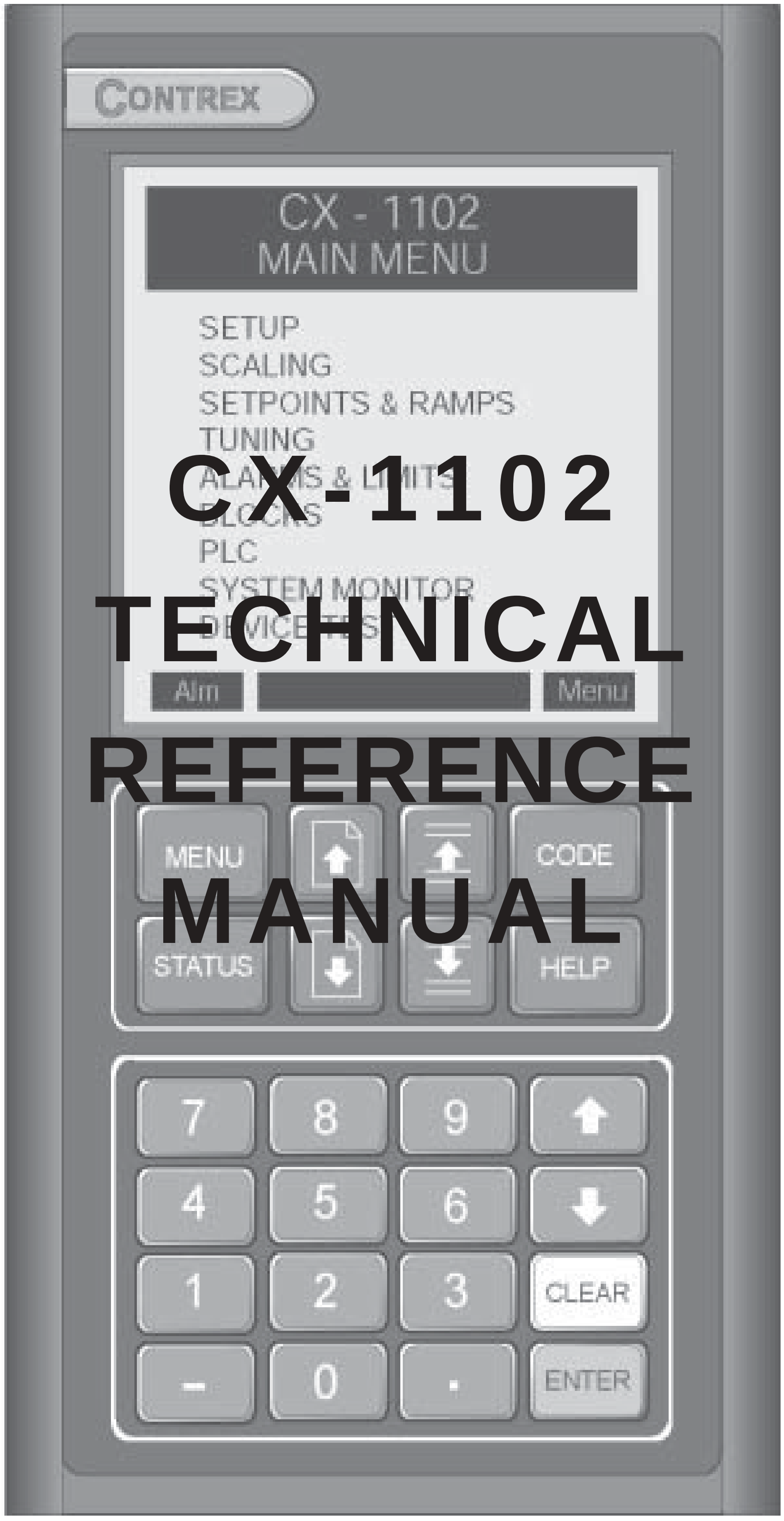


CX-1102 TECHNICAL REFERENCE MANUAL

CONTREX®

0001-0134 Rev A

Technical Assistance

If you have comments or questions concerning the operation of the CX–1102, a member of our Technical Support Staff will be happy to assist you. Ask for Technical Support:
763.424.7800 or 1.800.342.4411

Contrex®

8900 Zachary Lane North
Maple Grove, Minnesota 55369 USA
Phone:763.424.7800
Fax:763.424.8734
www.contrexinc.com
info@contrexinc.com

DANGER

Improper installation can cause severe injury, death or damage to your system.

Integrate this motion control unit into your system with caution.

Comply with the National Electrical Code and all applicable local and national codes.

Table of Contents

Introduction

INTRODUCING THE CX-1102

The CX-1102 is a Dual Axis Controller for Unwind/Dancer/Wind applications. It is specifically designed for the web handling industries. It has pre-engineered algorithms for most of the popular machine configurations.

Powered unwinds and powered rewinds are controlled from axle mounted motors, (center driven), and axle mounted encoders. The controller does NOT require surface sensing encoders, therefore simplifying machine design. It will calculate the diameters automatically, and then determine the proper RPM speed of the axles to achieve the desired constant surface speed.

Since both ends of the machine are controlled from a single CX-1102, the operation is smooth and coordinated. Automatic coordinated dancer load-up, run, stop, live zero state, and dancer unload sequences are all available. Line speed is automatically rolled back if a small diameter roll can not keep pace. Line Speed commands can be bipolar, or forward/reverse. Dual output, separately isolated drive command signals work with AC/DC/Regen/Vector/Servo motor and drive combinations (or brake controller).

More than just a speed controller, the CX-1102 has a built-in PLC to customize operations. Information about roll diameters, dancer position, totalized roll content, alarms, comparators, timers, and counters all add capability to get the best overall system performance for your machine. Use of a moving dancer, instead of load cells, improves stability. Automatic diameter calculations help keep the dancer at its desired mid-range position. Web tension must be controlled with external systems by adjusting the dancer force.

Pre-engineered application configurations allow for two variable diameters (re-spooling), or other machine combinations including fixed diameter nip rolls or process rolls. Unwinds could be motor powered, or brake controlled. Dancer signals can be full, or partial voltage range, including bipolar. Line speed command can be digital, or remote analog. It could also derive from an externally controlled master motor encoder if the CX-1102 is in a single axis configuration. The CX-1102 has easy selection for overwrap vs. underwrap web paths. Dancer can trim the speed of your choice, either the unwind or wind station.

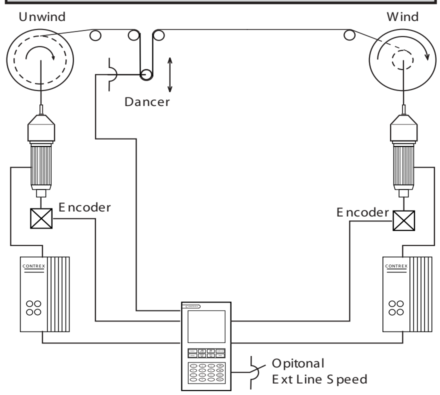
Easy setup uses a built-in polarity learning sequence, plus prompted data entry screens for operator input. Help screens, application specific parameter labels, and rear wiring terminal labels enhance the installation and operation procedures.

Industry sectors include paper, film, and foil conversion; wire and cable; extruded sheet, hose and tubing; fiberant textiles; non-wovens; slitters, die cutters, and embossers; re-spooling and inspection stations; printers and coaters.

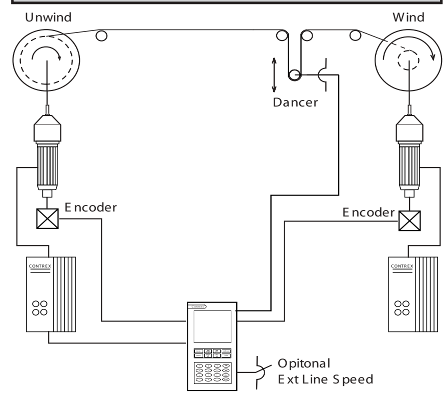
EXAMPLES OF CX-1102 APPLICATIONS

The CX-1102 accommodates a wide range of configurations. The universal motor speed control provides digital control to virtually any drive. It accepts quadrature encoders, plus dancer and line speed analog inputs.

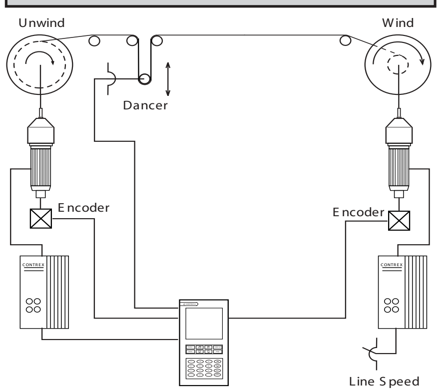
Control both axis, Dancer trims Unwind With Variable Diameters



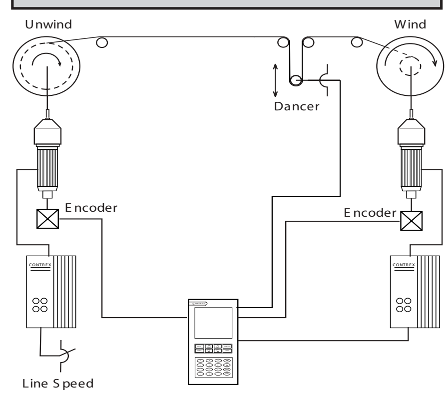
Control both axis, Dancer trims Wind With Variable Diameters



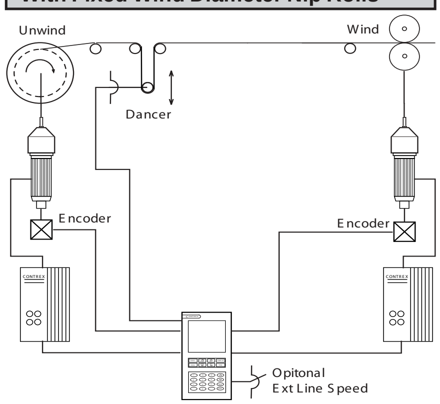
Control Dancer trimmed Unwind Only With Variable Diameters



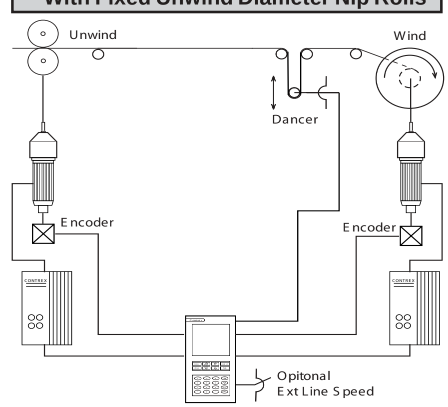
Control Dancer trimmed Wind Only With Variable Diameters



Control both axis, Dancer trims Unwind With Fixed Wind Diameter Nip Rolls



Control both axis, Dancer trims Wind With Fixed Unwind Diameter Nip Rolls



Installation/Setup

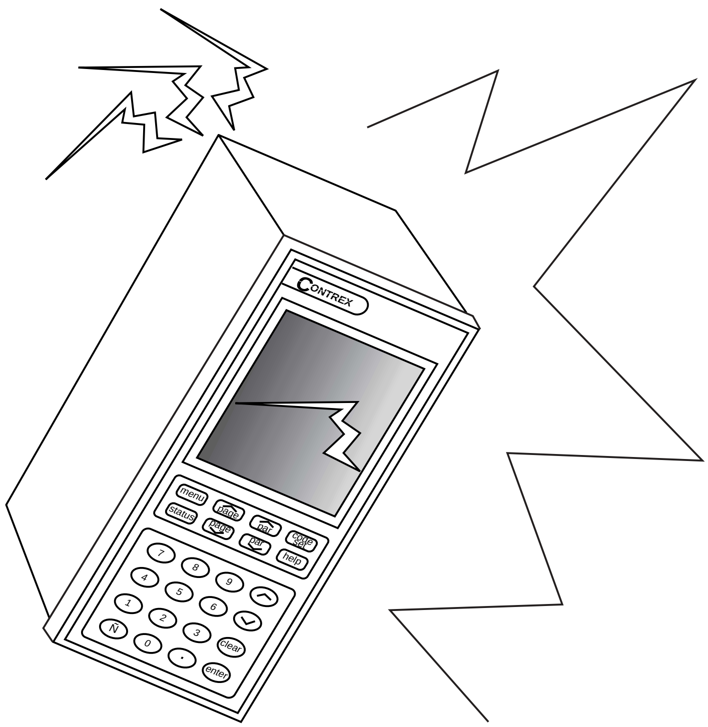
CONFIGURATION

This section will show you how to re-configure the CX-1102 for electrical compatibility. Complete this procedure prior to installation. This procedure does not require power to complete.

The area that is involved in re-configuring the CX-1102 is the AC Power Input Voltage switch. This switch is located in an external location on the CX-1102. You will not be required to access the interior of the CX-1102.

Figure 2-1 (page 2-5) illustrates the location of this switch.

WARNING



You will damage the CX-1102 if you apply 230 VAC to the AC Power input while the AC Power Input Voltage switch is in the 115 V position.

The AC Power Input Voltage switch is located on the rear of the CX-1102. The default configuration for the AC Power Input Voltage switch is 115 VAC.

To re-configure for 230 VAC Input, move the switch from the 115V position (up) to the 230V position (down).

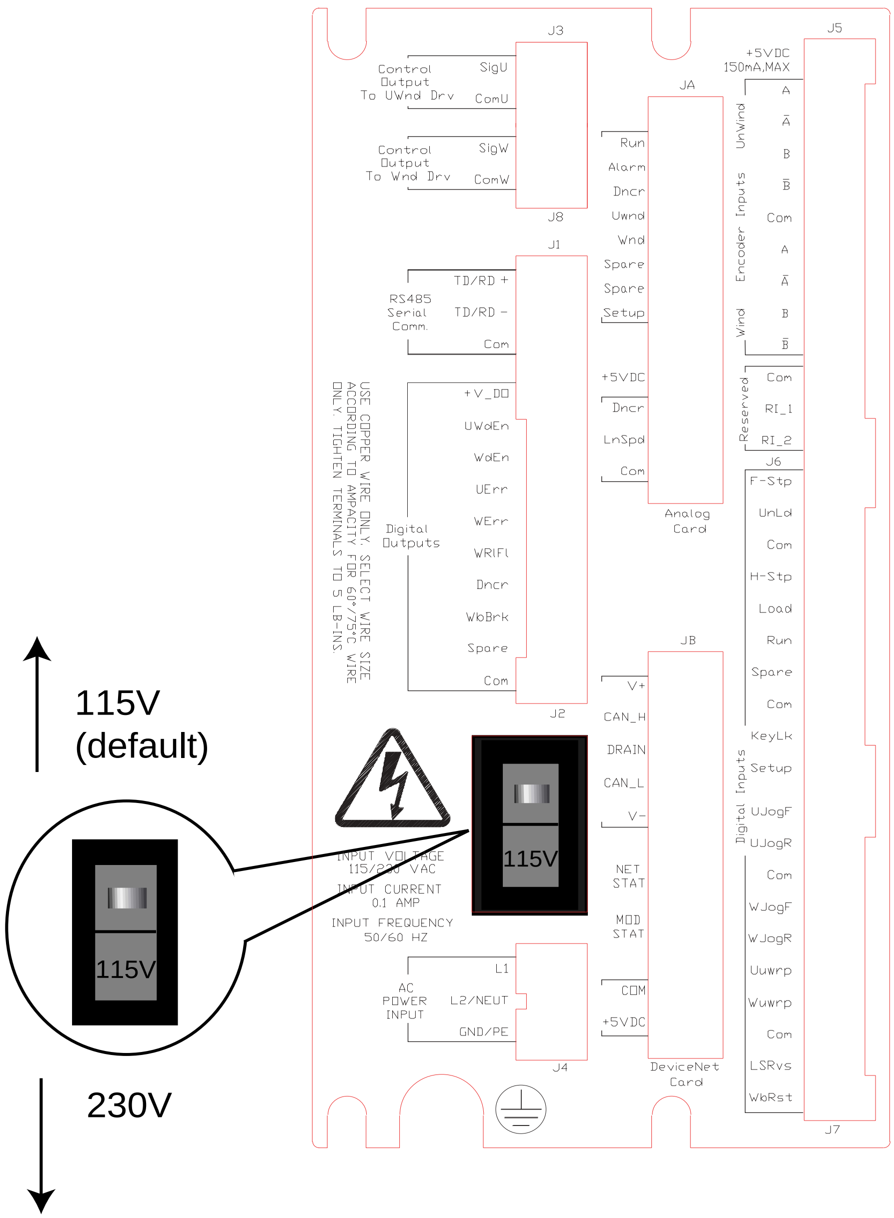
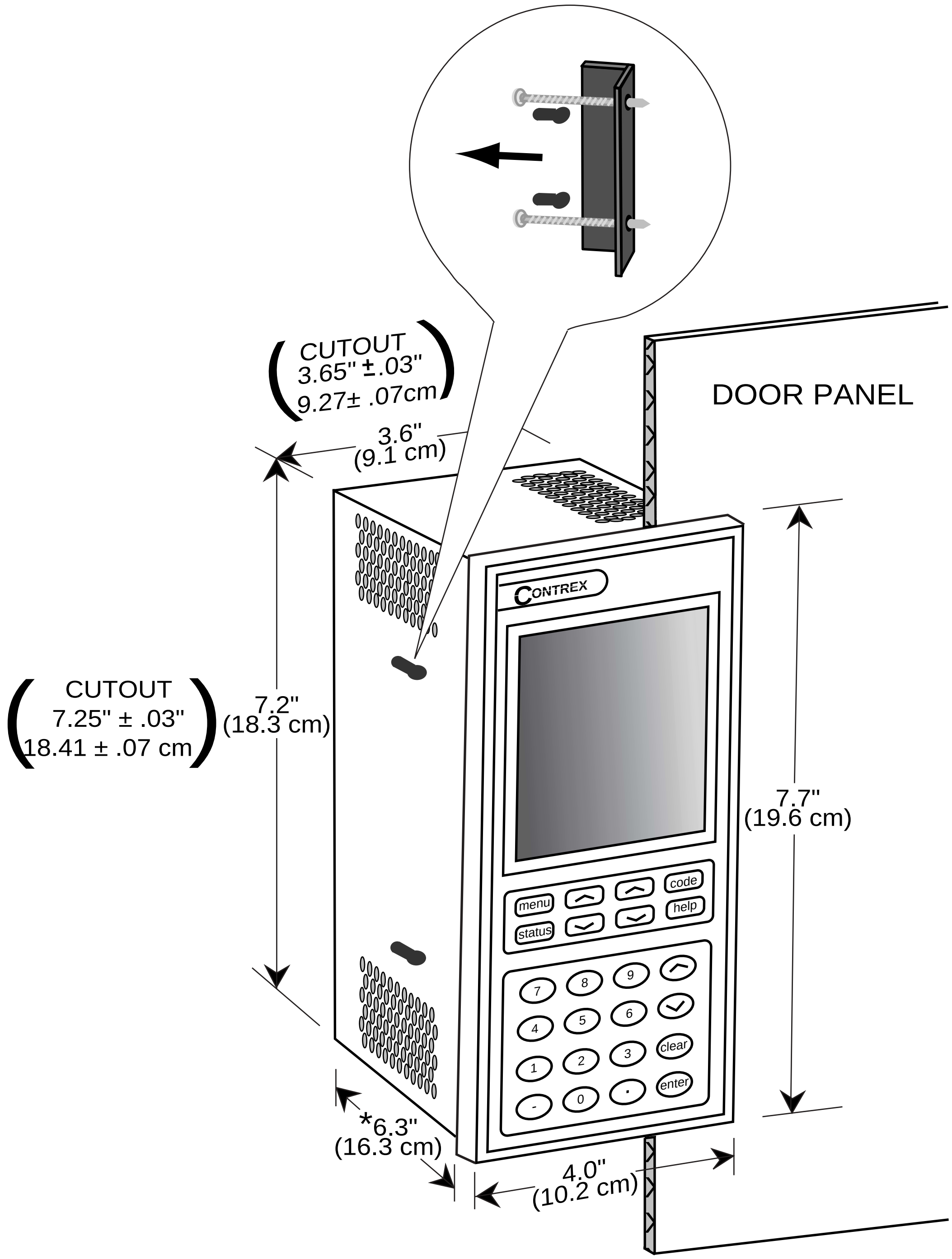


Figure 2-1 AC Power Input Voltage Switch



* From the rear of the door panel to the back of the connectors

Figure 2-2 CX–1102 Cutout Dimensions and Mounting Guide

MOUNTING

This section contains instructions for mounting the CX-1102 in the door panel of an industrial electrical enclosure. The CX-1102 is packaged in a compact 1/2 DIN vertical instrument enclosure that mounts easily in the door of your industrial electrical enclosure. The CX-1102 meets the NEMA 4 and the IP65 standards. To ensure compliance with these standards, enclose the CX-1102 in a Nema 4 or IP65 industrial electrical enclosure.

To mount the CX-1102:

1) The industrial electrical enclosure that will house the CX-1102 must conform to the following environmental conditions:

   Temperature: 0 - 55 degrees C
   (Internal enclosure temperature)

   Humidity: 0 - 95% RH non-condensing

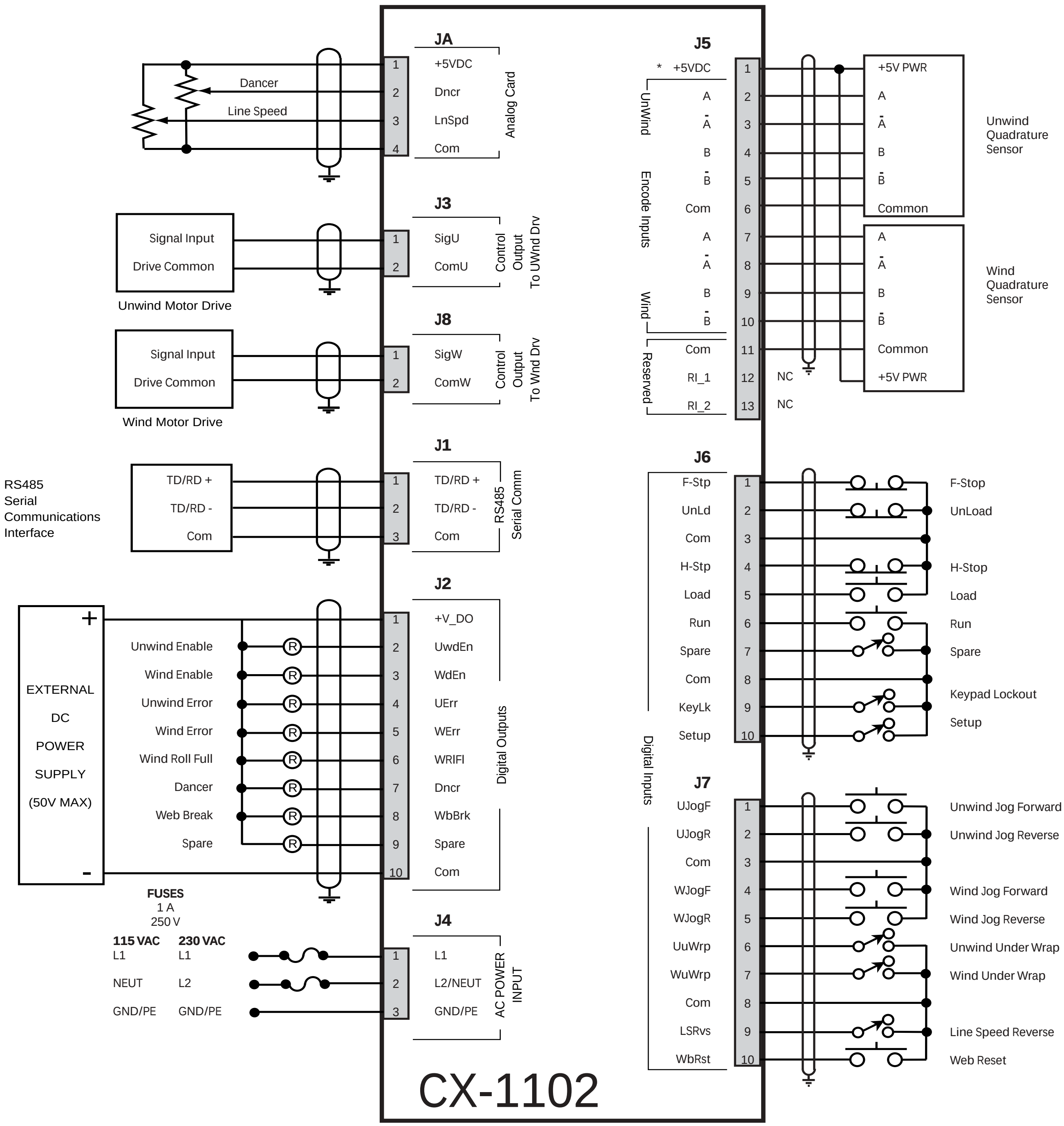
   Environment: Pollution degree 2 macro - environment

   Altitude: To 3300 feet (1000 meters)

2) The dimensions for the door panel cutout are 3.65"± .03" x 7.25 ±.03" (9.27 x 18.41cm). See figure 2-2. Allow two inches of clearance on both sides of the cutout and four inches of clearance on the top and bottom of the cutout for mounting clamp attachments, wire routing and heat convection.

3) Insert the CX-1102 through the door panel cutout until the gasket and bezel are flush with the door panel (see figure 2-2).

4) Slide the two mounting clamp bars into the slots that are located on either side of the CX-1102. See figure 2-2. Tighten the mounting screws until the CX-1102 is mounted securely in the electrical enclosure. Do not overtighten.



* Power for frequency input sensors may be supplied by J5, pin 1.
Total current should not exceed 150 mA .

Figure 2-3 CX–1102 General Wiring

WIRING

This section contains the input, output and serial communications wiring information for the CX-1102. Please read this section prior to wiring the CX-1102 to ensure that you make the appropriate wiring decisions.

NOTE: The installation of this motor control must conform to area and local electrical codes. See *The National Electrical Code* (NEC,) Article 430 published by the National Fire Protection Association, or *The Canadian Electrical Code* (CEC). Use local codes as applicable

Use a minimum wire gauge of 18 AWG.

Use shielded cable to minimize equipment malfunctions from electrical noise and terminate the shields at the receiving end only.

Keep the AC power wiring (J4) physically separated from all other wiring on the CX-1102. Failure to do so could result in additional electrical noise and cause the CX-1102 to malfunction.

Inductive coils on relay, contactors, solenoids that are on the same AC power line or housed in the same enclosure should be suppressed with an RC network across the coil.

A hand operated supply disconnect device must be installed in the final application. The primary disconnect device must meet EN requirements.

Install an AC line filter or isolation transformer to reduce excessive EMI noise, such as line notches or spikes, on the AC power line.

DANGER

Hazardous voltages.
Can cause severe injury, death
or damage the equipment.
The CX–1102 should only be installed by a
qualified electrician.

INPUTS

NOTE: The installation of this motor control must conform to area and local electrical codes. Refer to page 2-9 before you begin wiring.

AC Power Input

(J4 pins 1, 2,3)

The CX-1102 operates on either a 115 VAC - 10% + 15%, 0.250 Amp., 50/60 Hz or a 230 VAC -10% +15%, 0.125 Amp, 50/60 Hz. Use the separate 3 pin connector (J4) for the power connection.

* Fuse L1 for 115 VAC applications. Fuse L1 and L2 for 230 VAC applications. Use 1 Amp 250 normal blow fuses.

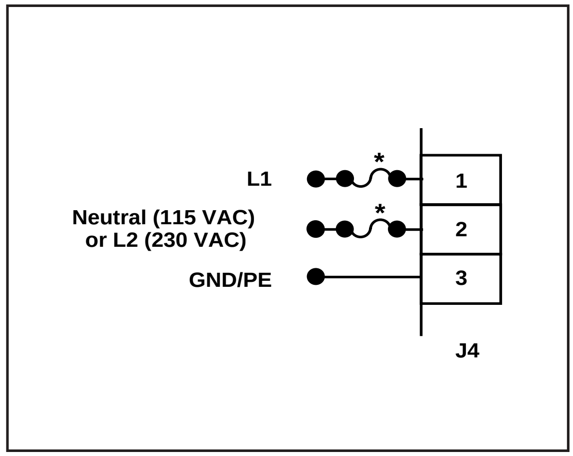


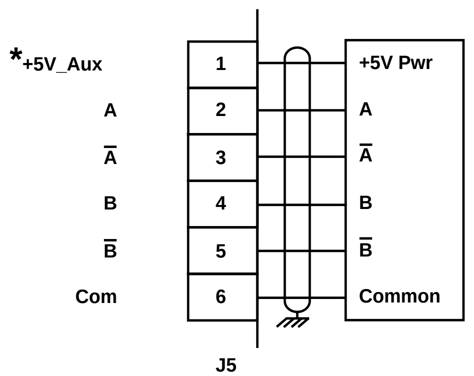
Figure 2-4 AC Power Input

WARNING

You will damage the CX-1102 if you apply 230 VAC to the AC Power input when the AC Power Input Voltage switch is in the 115 V position.

Unwind Frequency
(J5 pins 1, 2, 4, 5, 6)

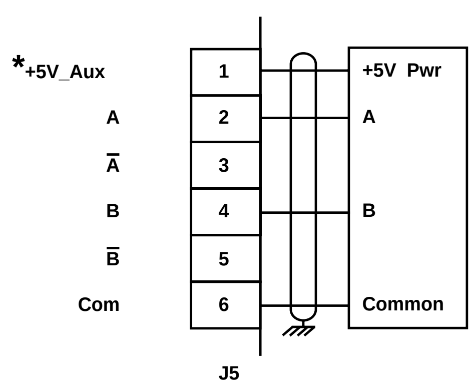
The wiring for the Unwind Frequency is determined by the sensor. Figures 2-5 and 2-6 illustrate the wiring for the various sensors. For signal level and performance specifications, refer to *Appendices: Appendix A* .



Total currant draw from the +5V_Aux (J5-Pin 1) should not exceed 150 Milliamps.

Figure 2-5 Unwind Frequency Quadrature Differential Sensor (Bidirectional)

Figure 2-6 Unwind Frequency Quadrature Single-Ended Sensor (Bidirectional)



* Total currant draw from the +5V_Aux (J5-Pin 1) should not exceed 150 Milliamps.

Wind Frequency
(J5 pins 1, 7, 8, 9, 10, 11)

The wiring for Wind Frequency is determined by the sensor. Figures 2-7 and 2-8 illustrate the wiring for the various sensors. For signal level and performance specifications refer to *Appendices: Appendix A*.

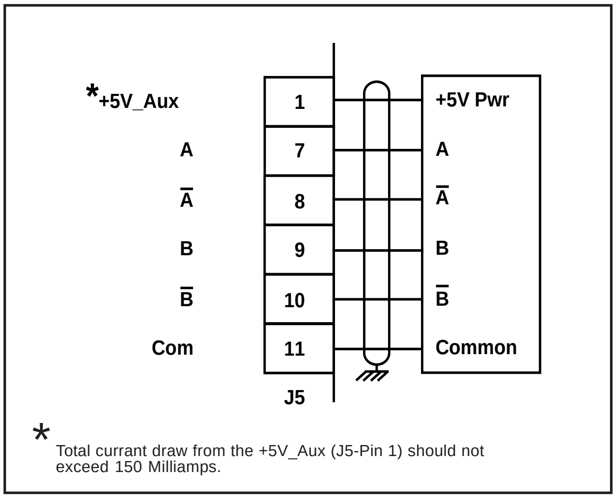
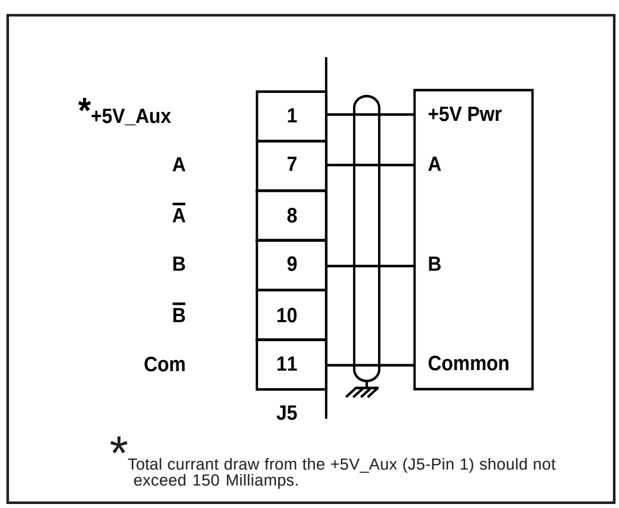


Figure 2-7 Wind Frequency
Quadrature Differential Sensor (Bidirectional)

Figure 2-8 Wind Frequency
Quadrature Single-Ended Sensor (Bidirectional)



F-Stop
(J6 pins 1,3)

F-Stop is a momentary input. When it is opened, the CX-1102 commands a zero speed immediately and ignores the specified deceleration rate. However, F-Stop does not hold zero speed or position (drive disabled). As a momentary input, F-Stop is internally latched and does not need to be maintained open by an operator device.

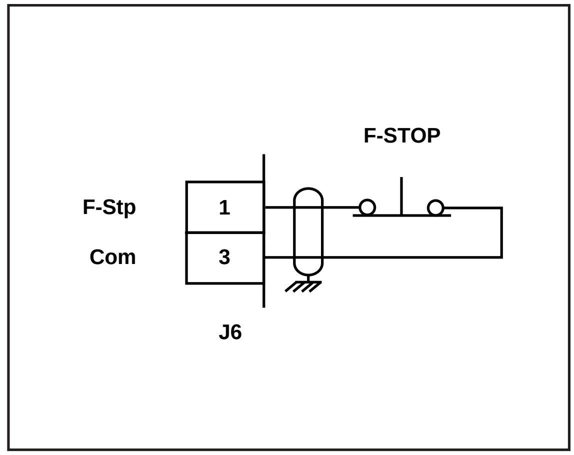


Figure 2-9   F-Stop

Unload
(J6 pins 2, 3)

When the Unload input (J6, pin 2) is momentarily opened, the CX-1102 enters the Unload state. As a momentary input, Unload is internally latched and does not need to be maintained open by an operator device.

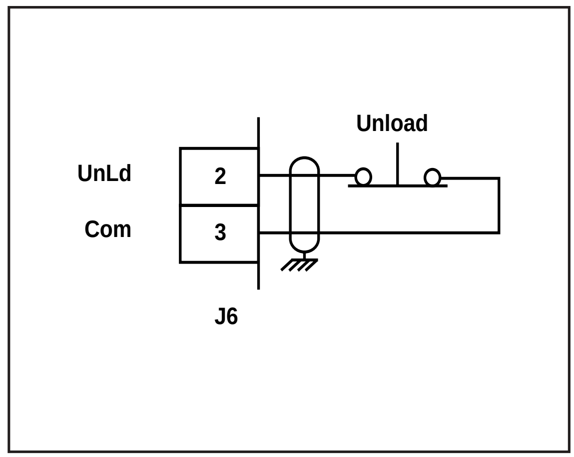


Figure 2-10 Unload

H-Stop
(J6 pins 4, 3)

H-Stop is a momentary input. When it is opened, the CX-1102 ramps to a zero speed command at the specified deceleration rate.   In addition, H-Stop holds zero speed after the deceleration ramp has been completed (drive enabled). As a momentary input, H-Stop is internally latched and does not need to be maintained open by an operator device.

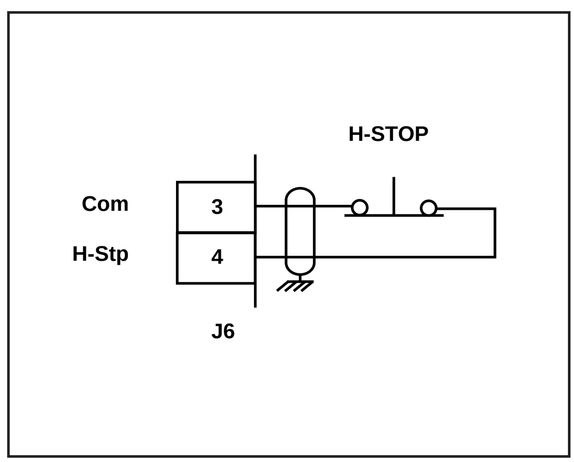


Figure 2-11   H-Stop

Load

(J6 pins 5, 3)

When the Load input (J6, pin 5) is momentarily shorted to common, the CX-1102 enters the Load state. As a momentary input, Load is internally latched and does not need to be maintained closed by an operator device.

NOTE: Close the H-Stop, Unload and F-Stop inputs prior to entering the Load state. If you are only using one of the Stop inputs, wire short the other Stop inputs to the common or the CX-1102 will not enter load.

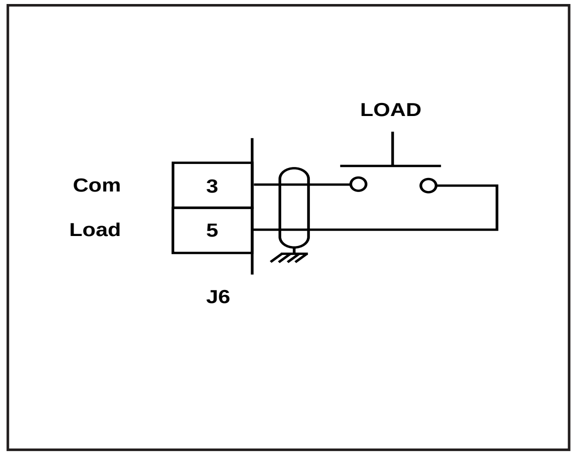


Figure 2-12 Load

Run

(J6 pins 6, 8)

When the Run input (J6, pin 6) is momentarily shorted to common, the CX-1102 enters the Run state. As a momentary input, Run is internally latched and does not need to be maintained closed by an operator device.

NOTE: Close the H-Stop, Unload and F-Stop inputs prior to entering the Run state. If you are only using one of the Stop inputs, wire short the other Stop inputs to the common or the CX-1102 will not enter run.

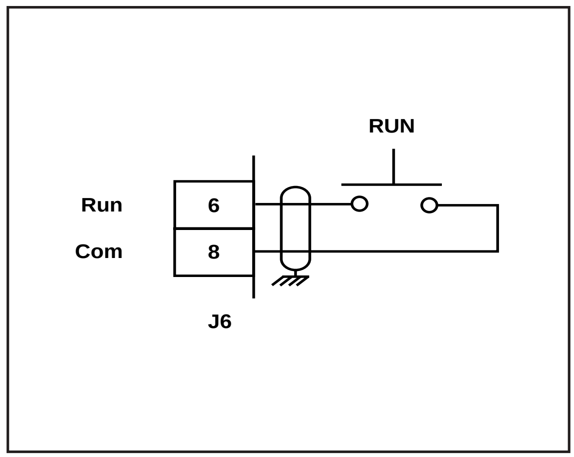


Figure 2-13 Run

Spare

(J6 pins 7, 8)

The Spare input is not defined at this time.

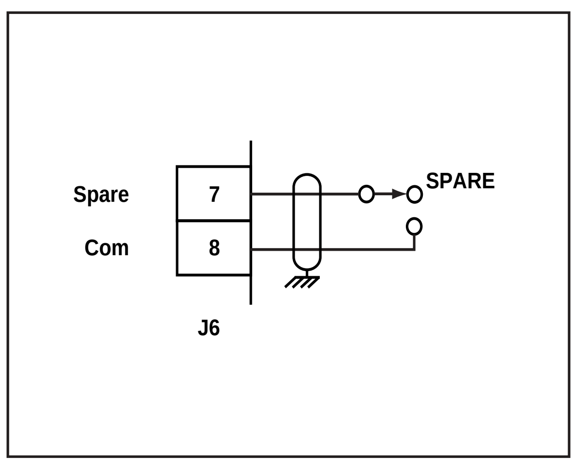


Figure 2-14 Spare

Keypad Lockout
(J6 pins 9, 8)

When the KEYPAD LOCKOUT input is closed, the Control Parameters that you have selected to "lockout" are inaccessible from the front keypad. All of the Monitor Parameters remain enabled.

The Keypad Lockout input is temporally used during the system setup procedure to initiate tests for the CX-1102 system setup procedure.

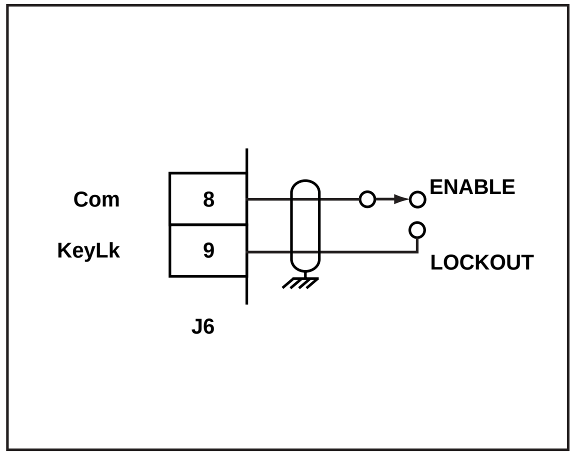


Figure 2-15 Keypad Lockout

Setup
(J6 pins 10, 8)

Setup is a maintained input. It is used only during the system setup procedure to put the CX-1102 into “Setup State”.

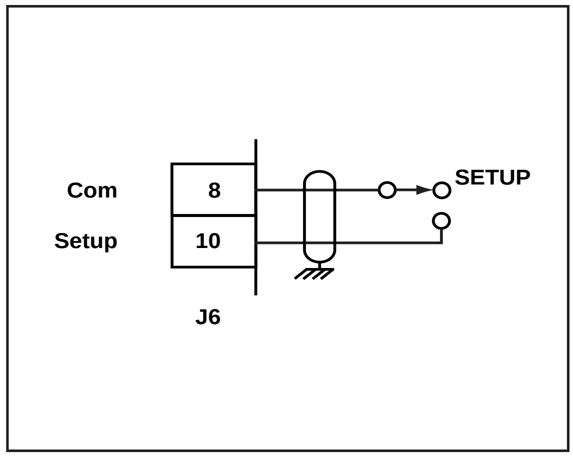


Figure 2-16 Setup

Unwind Jog Forward
(J7 pins 1, 3)

Unwind Jog Forward is a maintained input. When it is closed, it sends a forward unwind control output signal to the drive at the selected Jog Setpoint. As a maintained input, Unwind Jog Forward is only active when the operator device is closed.

NOTE: Close the H-Stop, Unload and F-Stop inputs prior to entering the Jog state. If you are only using one of the Stop inputs, wire short the other Stop inputs to the common or the CX-1102 will not enter Jog.

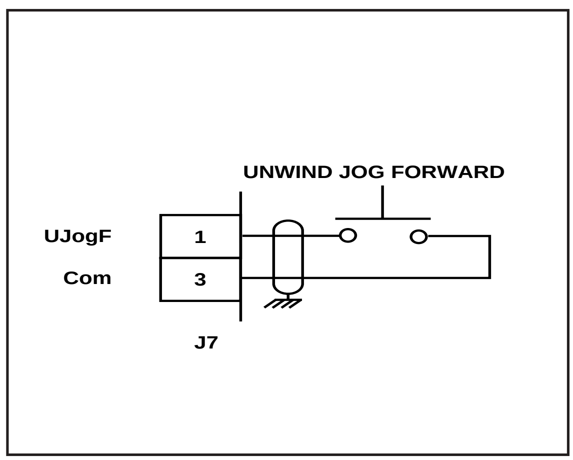


Figure 2-17 Unwind Jog Forward

Unwind Jog Reverse
(J7 pins 2, 3)

Unwind Jog Reverse is a maintained input. When it is closed, it sends a reverse unwind control output signal to the drive at the selected Jog Setpoint. As a maintained input, Unwind Jog Reverse is only active when the operator device is closed.

NOTE: Close the H-Stop, Unload and F-Stop inputs prior to entering the Jog state. If you are only using one of the Stop inputs, wire short the other Stop inputs to the common or the CX-1102 will not enter Jog.

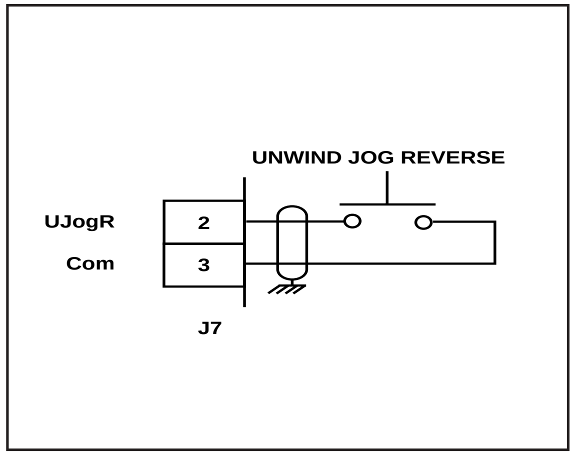


Figure 2-18 Unwind Jog Reverse

Wind Jog Forward
(J7 pins 4, 3)

Wind Jog Forward is a maintained input. When it is closed, it sends a forward wind control output signal to the drive at the selected Jog Setpoint. As a maintained input, Wind Jog Forward is only active when the operator device is closed.

NOTE: Close the H-Stop, Unload and F-Stop inputs prior to entering the Jog state. If you are only using one of the Stop inputs, wire short the other Stop inputs to the common or the CX-1102 will not enter Jog.

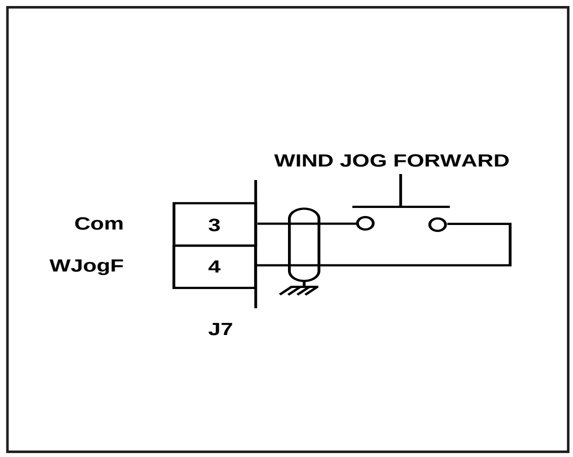


Figure 2-19 Wind Jog Forward

Wind Jog Reverse
(J7 pins 2, 3)

Wind Jog Reverse is a maintained input. When it is closed, it sends a reverse wind control output signal to the drive at the selected Jog Setpoint. As a maintained input, Wind Jog Reverse is only active when the operator device is closed.

NOTE: Close the H-Stop, Unload and F-Stop inputs prior to entering the Jog state. If you are only using one of the Stop inputs, wire short the other Stop inputs to the common or the CX-1102 will not enter Jog.

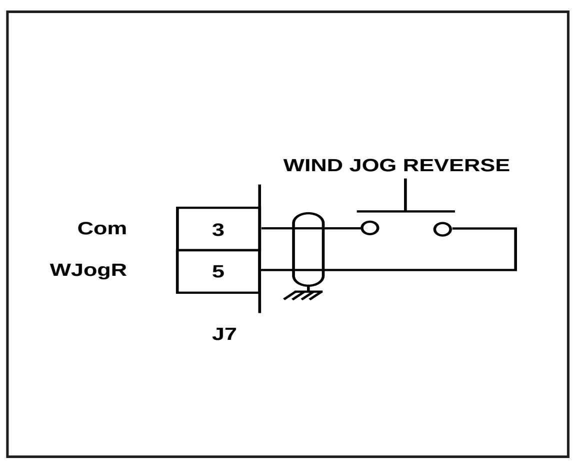


Figure 2-20 Wind Jog Reverse

Unwind Under Wrap
(J7 pins 6, 8)

When the Unwind Under Wrap input is closed, then the unwind axle has web material fed off the roll from the bottom rather than the top of the roll.

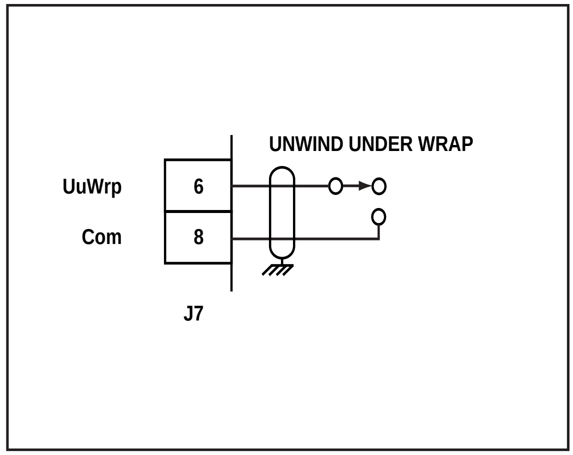


Figure 2-21 Unwind Under Wrap

Wind Under Wrap
(J7 pins 7, 8)

When the Wind Under Wrap input is closed, then the wind axle has web material fed off the roll from the bottom rather than the top of the roll.

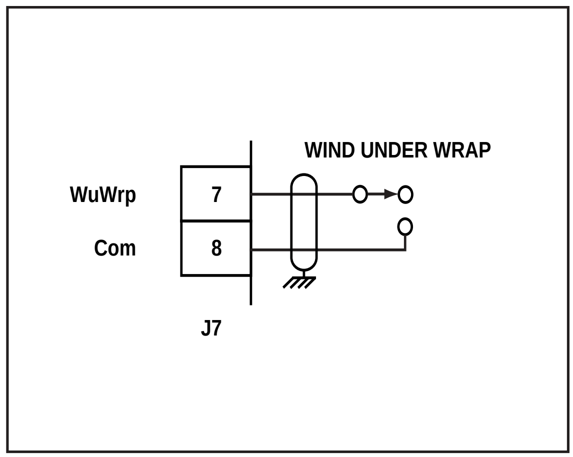


Figure 2-22 Wind Under Wrap

Line Speed Reverse
(J7 pins 9, 8)

When the Line Speed Reverse input is closed, the Line Speed command is negated to be oppsite the Line Speed Setpoint.

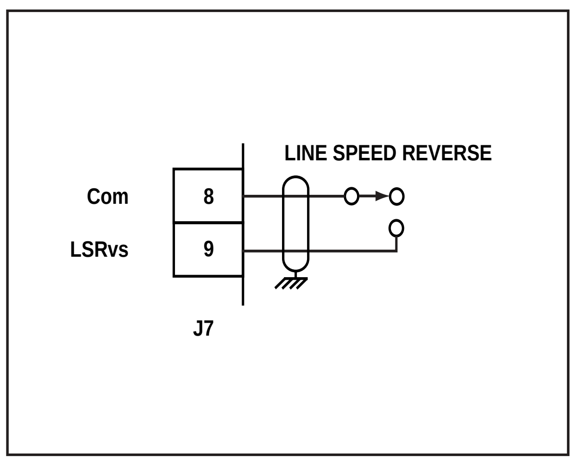


Figure 2-23 Line Speed Reverse

Web Reset
(J7 pins 10, 8)

Web Reset is a maintained input. When it is closed. As a maintained input, Web Reset is only active when the operator device is closed.

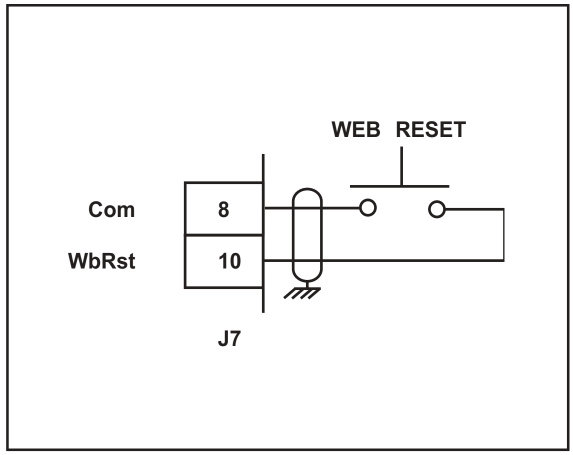


Figure 2-24 Web Reset

Dancer
(JA, Pins 1, 2, 4)

The Dancer Input can be used with a potentiometer (e.g., dancer pot).

* The total current from JA pin 1 and J5 pin 1 (+5V_Aux) must not exceed 150 mA.

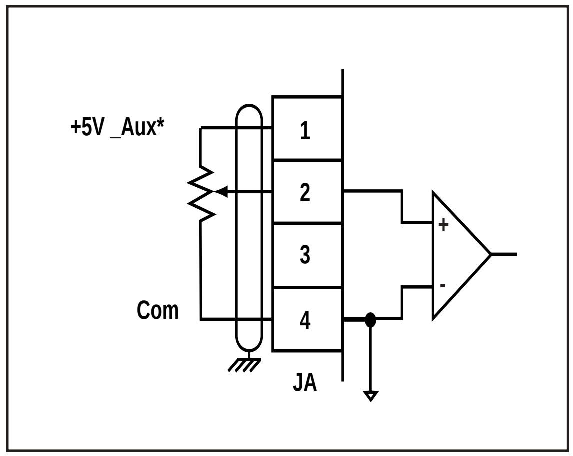


Figure 2-25 Dancer Input

Ext Line Speed Potentiometer
(JA, Pins 1, 3, 4)

The Ext Line Speed Input can be used with a potentiometer (e.g., line speed pot).

* The total current from JA pin 1 and J5 pin 1 (+5V_Aux) must not exceed 150 mA

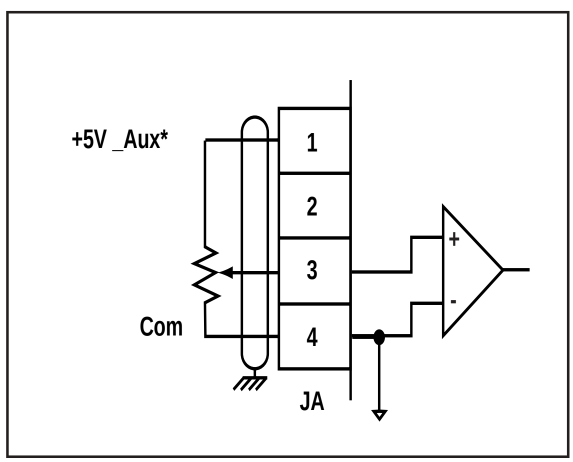


Figure 2-26 Line Speed Potentiometer

OUTPUTS

NOTE: The installation of this motor control must conform to area and local electrical codes. Refer to page 2-9 before you begin wiring.

Unwind Control Output
(J8 pins 1, 2)

Unwind Control Output is an isolated analog output signal that is sent to the motor drive to control the speed of the motor. Wire the Unwind Control Output into the speed signal input of the drive. If the motor drive has a potentiometer speed control, remove the potentiometer connections and wire the Unwind Control Output to the potentiometer wiper point. The CX-1102's Isolated Common should always be connected to the drive common.

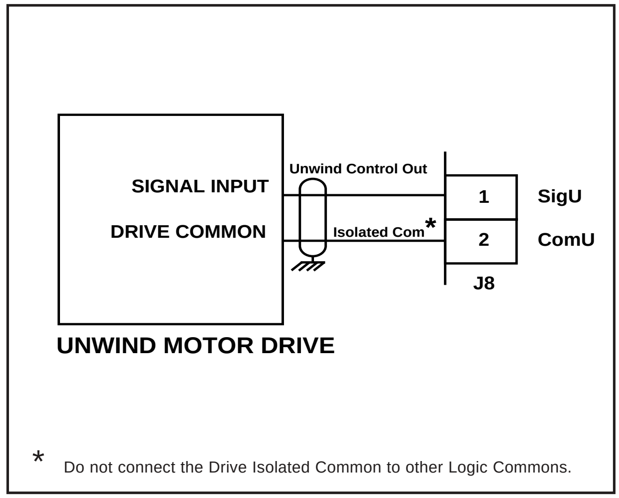


Figure 2-27 Unwind Control Output

Wind Control Output
(J3 pins 1, 2)

Wind Control Output is an isolated analog output signal that is sent to the motor drive to control the speed of the motor. Wire the Wind Control Output into the speed signal input of the drive. If the motor drive has a potentiometer speed control, remove the potentiometer connections and wire the Wind Control Output to the potentiometer wiper point. The CX-1102's Isolated Common should always be connected to the drive common.

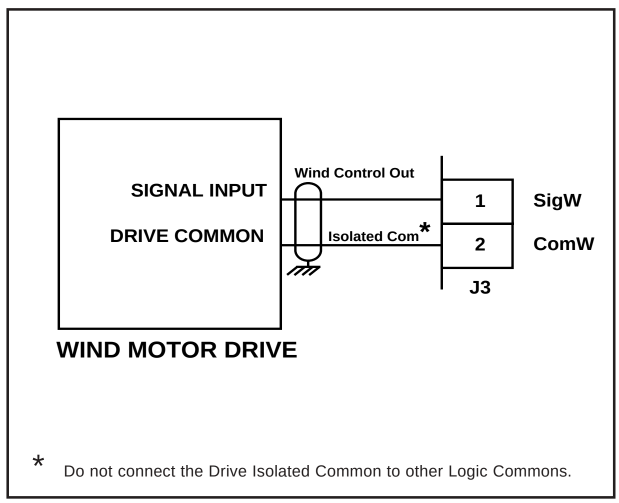


Figure 2-28 Wind Control Output

NOTE: All Digital Outputs are activated via the PLC and so are subject to the active PLC program.

Unwind Enable
(J2 pin 2)

The Unwind Enable output is activated (driven low) when the CX-1102 signals a run command to the motor drive. The Unwind Enable output is driven high (relay deactivated) after Power Up and at the completion of F-Stop. See Figure 2-29.

Wind Enable
(J2 pin 3)

The Wind Enable output is activated (driven low) when the CX-1102 signals a run command to the motor drive. The Wind Enable output is driven high (relay deactivated) after Power Up and at the completion of F-Stop. See Figure 2-29.

Unwind Error
(J2 pin 4)

The Unwind Error output is activated (driven low) when UwndRR Err (MP-22) is greater than E 200 RPM. See Figure 2-29.

Wind Error
(J2 pin 5)

The Wind Error output is activated (driven low) when WindRR Err (MP-32) is greater than E 200 RPM. See Figure 2-29.

Wind Roll Full
(J2 pin 6)

The Wind Roll Full output is activated (driven low) when WindEstDia (MP-17) is greater than or equal to 72 (Diameter EU). See Figure 2-29.

Dancer
(J2 pin 7)

The Dancer output is activated (driven low) when the dancer content is greater than or equal to 95% of DncrCtntFull (CP-272) or less than or equal to 5% of DncrCtntFull (CP-272). See Figure 2-29.

Web Break
(J2 pin 8)

The Web Break output is activated (driven low) when the dancer content is greater than or equal to 95% of DncrCtntFull (CP-272) and LineSpdRRef (MP-42) is greater than zero and the non-Dancer Trimmed Roll is rotaing at a speed greater than Zero Speed (CP-370). See Figure 2-29.

Spare
(J2 pin 9)

The Spare output is activated (driven low) when the dancer content is within a band that is E5% of DncrCtntFull (CP-272) above or below the Dancer SP (CP-250). See Figure 2-29.

NOTE: The Digital Outputs are open-collector relay drivers. For specification details, see *Appendices: Appendix A* . Use an external DC power supply to power the relays. Free-wheeling diodes are incorporated internally in the CX-1102 and do not need to be added externally.

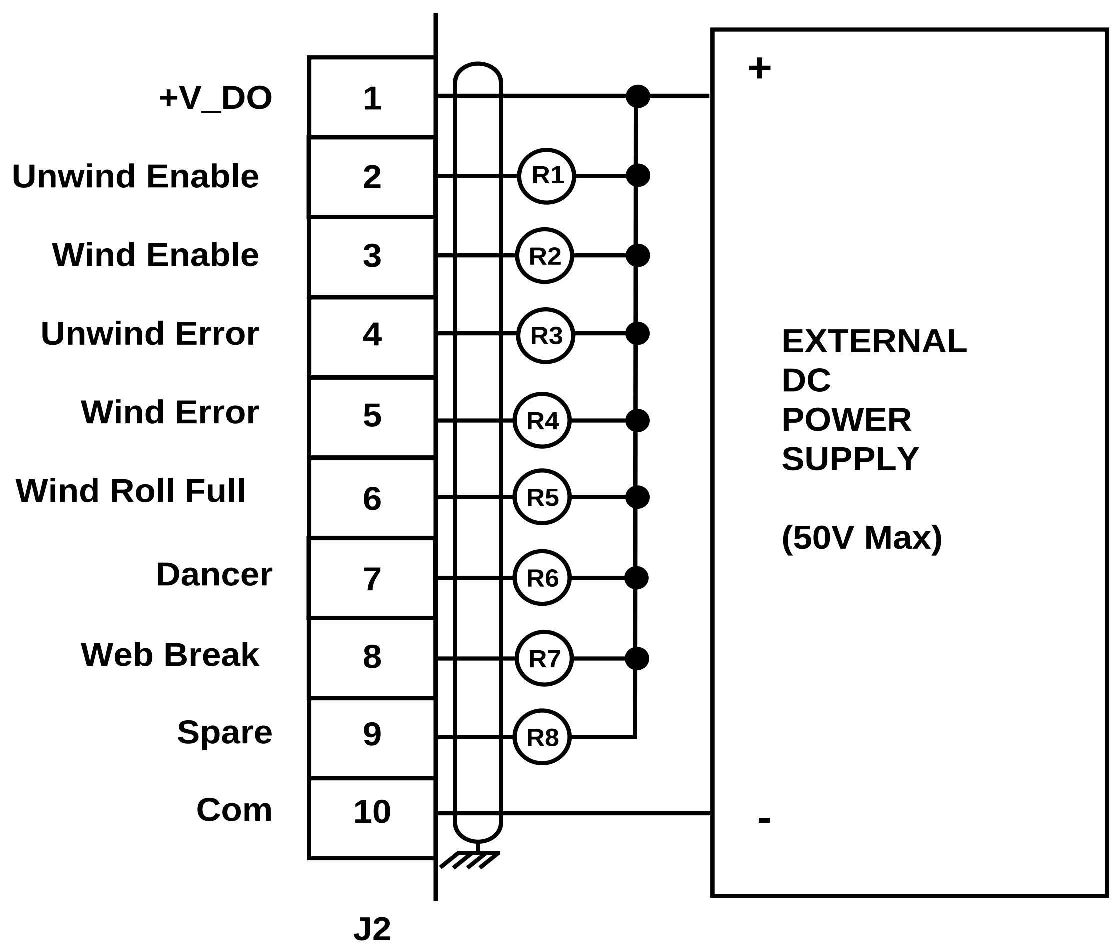


Figure 2-29 CX-1102 Digital Outputs

SERIAL COMMUNICATIONS

NOTE: The installation of this motor control must conform to area and local electrical codes. Refer to page 2-9 before you begin wiring.

The Serial Communications interface on the CX-1102 complies with EIA Standard RS-485-A for balanced line transmissions. This interface allows the host computer to perform remote computer parameter entry, status or performance monitoring, and remote control of the CX-1102. See *Serial Communications* for information on using Serial Communications.

Figures 2-30 and 2-31 illustrate a multidrop installation of the Serial Communications link and Serial Communications connections.

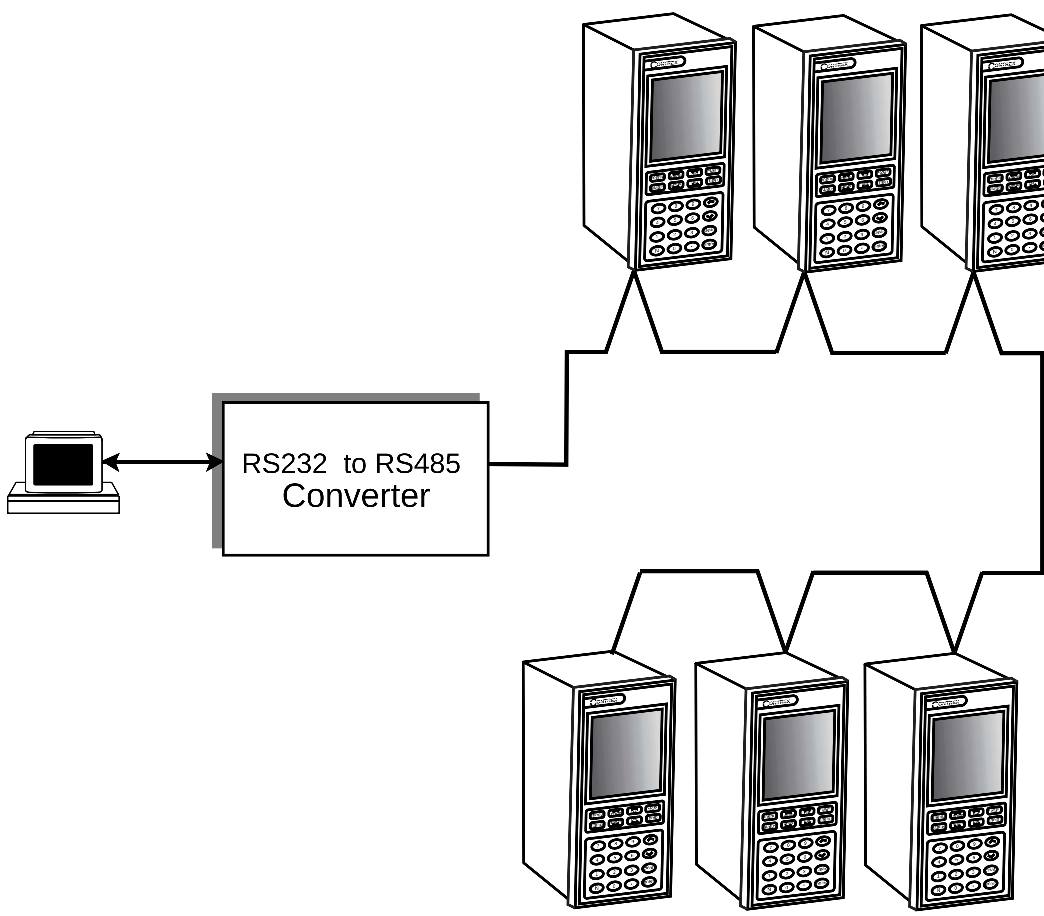
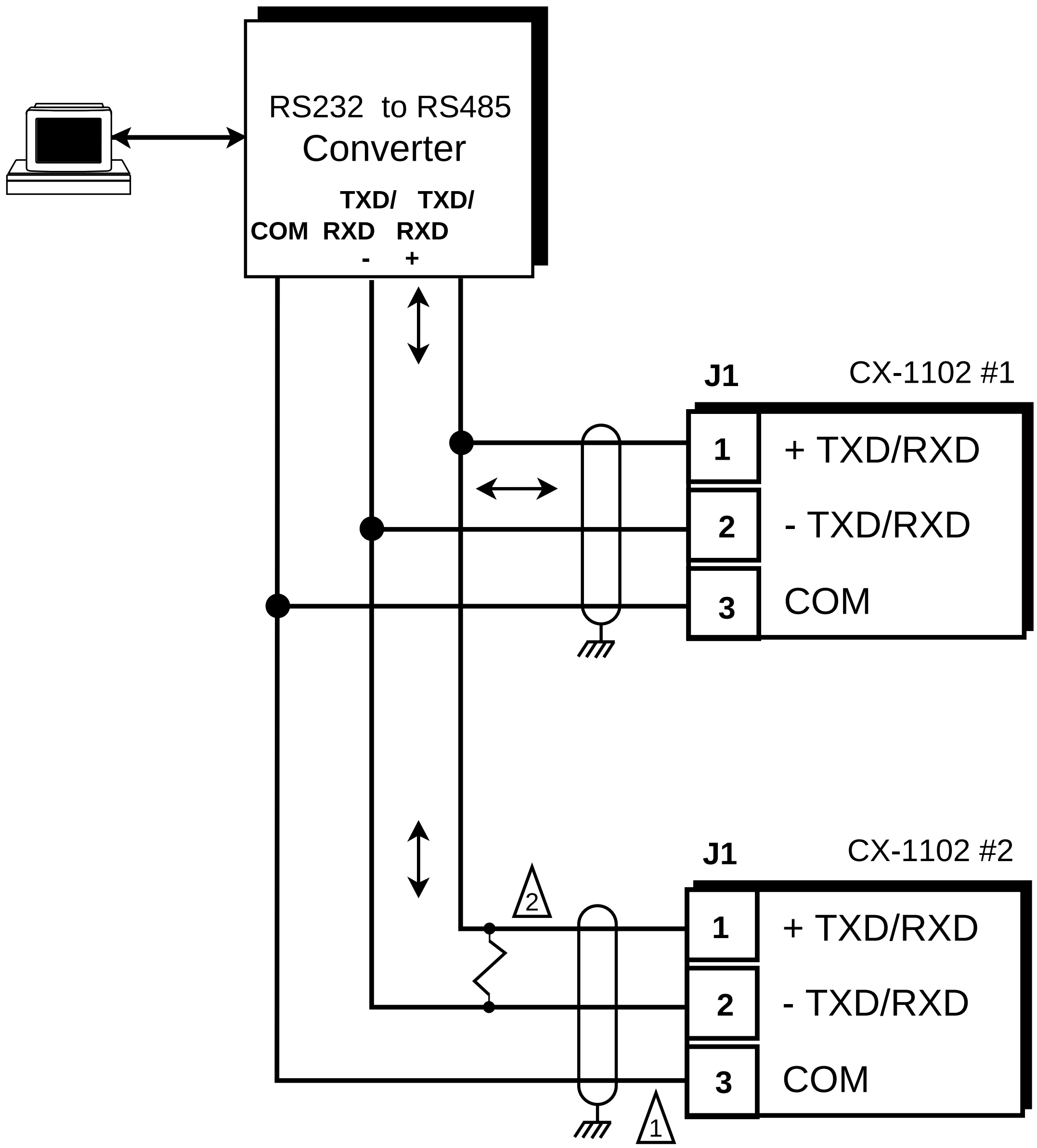


Figure 2-30 CX-1102 Multidrop Installation



1. Shield only at one end of the cable.

2. If you need to terminate the communication line, then terminate it at the unit which is the furthest away from the converter. A 100 ohm, 1/2 Watt resistor will usually terminate successfully. Refer to EIA Standard RS–485A, for more information.

Figure 2-31 CX-1102 Serial Communications Connections

—NOTES—

DEVICENET CARD (OPTIONAL)

For the installation, wiring and operation of the optional DeviceNet card, refer to the *CX-Series DeviceNet Card Technical Manual*, # 0001-0134.

—NOTES—

LOGIC CONTROL

This section addresses the seven digital inputs that control the CX-1102's operating state.
The seven digital inputs (listed by priority) are:

F-Stop
Unload
H-Stop
Run
Load
Jog Forward (Unwind and Wind)
Jog Reverse (Unwind and Wind)

When the CX-1102 is powered up, it defaults to F-Stop. Run is terminated by activating F-Stop, Unload or H-Stop. The operating state changes to the input that terminated Run, provided that another input is not subsequently activated. Jog Forward or Jog Reverse are terminated by deactivating the Jog Forward or Jog Reverse inputs. Jog Forward or Jog Reverse can also be terminated by activating F-Stop or H-Stop. The operating state automatically changes to F-Stop or H-Stop after the Jog deceleration ramp is completed. You can not enter Run from Jog with the Jog inputs active. However, you can enter Run during a deceleration from Jog after the Jog input is deactivated. You can not enter Jog Forward or Jog Reverse from Run. If two or more inputs become active at the same time, the input with the highest priority will dictate the operating state.

The sections that follow demonstrate how to use the digital inputs.

Caution

Do not use the AC line power to start or stop the system.

Use the Digital Inputs to start or stop the system.

Logic Inputs

F-Stop (Fast Stop) has priority over the other operating states. F-Stop forces the Control Output SigU and SigW signals to “0” volts and monitors the feedback. When the feedback is less than the Zero Speed (CP-370), the UwndDrvEn (PLC bit 41) and WindDrvEn (PLC bit 51) resets to “0”. This PLC bit is routed by the PLC program to an output that disables the drive. If the feedback does not reach Zero Speed within 1/2 second, the UwndDrvEn (PLC bit 41) and WindDrvEn (PLC bit 51)automatically resets to “0”. The integral, trim and feedforward are also set to “0”.

To activate F-Stop:

- Activate High (Open), Level Sensitive, Latched
- Wire to F-Stop interconnect
- Use momentary contact - does not need to be maintained to remain active

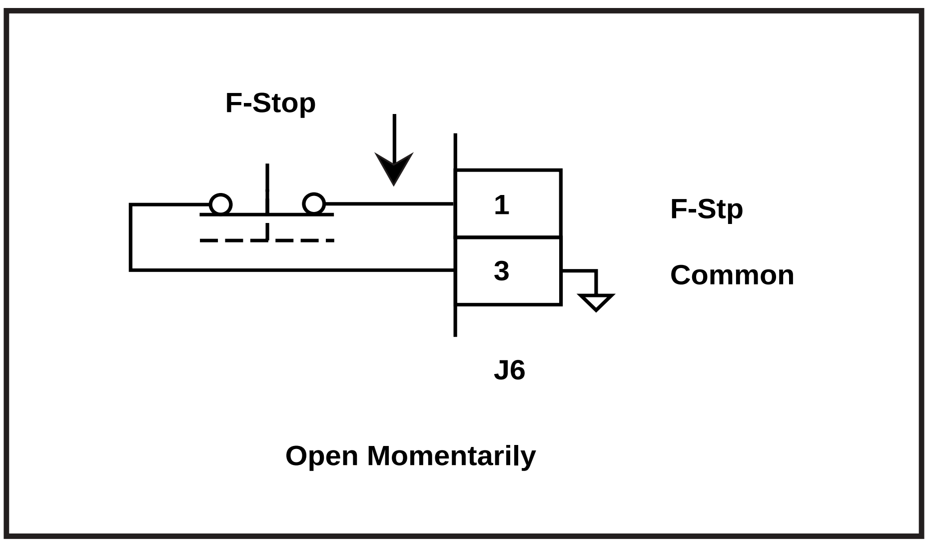


Figure 2-32 F-Stop Input

Unload has the fourth highest operating priority. Only from Run, H-Stop, Load, or F-Stop states, but not from Direct Setpoint Application. Normal operation is from H-Stop with the dancer loaded. If Unload is requested from Run, the roll(s) ramp to zero speed before starting the Unload sequence below. Unload has a ten second (10s) timer. If the Dancer is not unloaded within 10 seconds after the Unload input is latched, the CX-1102 automatically reverts to the F-Stop operating state. The Unload input may be held open to keep the CX-1102 from changing to F-Stop and therefore complete the Unload.

To activate Unload:

- Activate High (Open), Level Sensitive, Latched
- Use momentary contact - does not need to be maintained to remain active

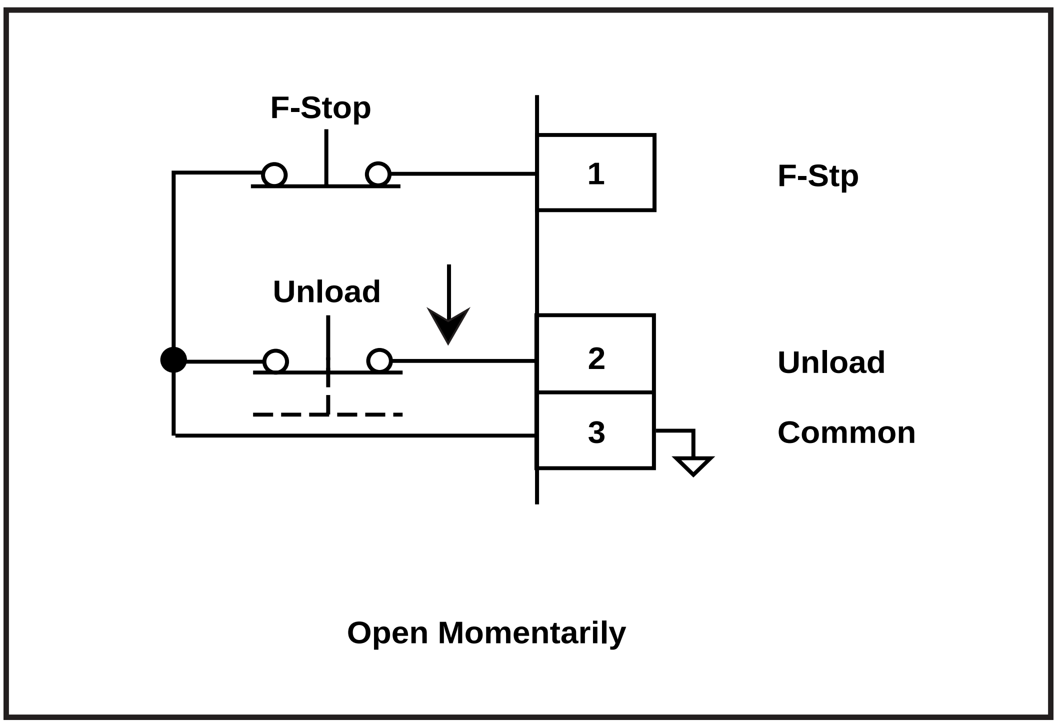


Figure 2-33 Unload Input

App Select (CP-202) = 1: The CX-1102 controls both rolls with Dancer Trimmed Unwind

1) The unwind is a bipolar or a unipolar reversible or a unipolar drive:
   - a) The wind roll is put into H-Stop.
   - b) The unwind roll jogs forward until the dancer is in the Full position.
   - c) The unwind roll goes into Jog Stop until the unwind roll stops.
   - d) Then the unwind roll transitions to F-Stop.
   - e) The wind roll transitions to F-Stop.
   - f) The system state transitions to F-Stop State.

2) The unwind is a unipolar brake and the wind is bipolar or unipolar reversible:
   - a) The unwind roll is put into H-Stop.
   - b) The wind roll jogs in reverse until the dancer is in the Full position.
   - c) The wind roll goes into Jog Stop until the wind roll stops.
   - d) Then the unwind roll transitions to F-stop.
   - e) The wind roll transitions to F-Stop.
   - f) The system state transitions to F-Stop State.

3) The unwind is a unipolar brake and the wind is unipolar:
   - a) The wind roll is put into F-Stop.
   - b) The unwind roll is put into F-Stop.
   - c) The system state transitions to F-Stop State.

App Select (CP-202) = 2: The CX-1102 controls both rolls with Dancer Trimmed Wind

1) The wind is a bipolar or a unipolar reversible drive:
   - a) The unwind roll is put into H-Stop.
   - b) The wind roll jogs in reverse until the dancer is in the Full position.
   - c) The wind roll goes into Jog Stop until the wind roll stops.
   - d) Then the wind roll transitions to F-Stop.
   - e) The unwind roll transitions to F-Stop.
   - f) The system state transitions to F-Stop State.

2) The wind is a unipolar drive:
   - a) The wind roll is put into H-Stop.
   - b) The unwind roll jogs forward until the dancer is in the Full position.
   - c) The unwind roll goes into Jog Stop until the unwind roll stops.
   - d) Then the unwind roll transitions to F-Stop.
   - e) The wind roll transitions to F-Stop.
   - f) The system state transitions to F-Stop State.

3) The wind is a unipolar drive and the unwind is a unipolar brake:
   - a) The wind roll is put into F-Stop.
   - b) The unwind roll is put into F-Stop.
   - c) The system state transitions to F-Stop State.

App Select (CP-202) = 3: The CX-1102 controls only the Dancer Trimmed Unwind roll

1) The unwind is a bipolar or a unipolar reversible or a unipolar drive:
    a) The unwind roll jogs forward until the dancer is in the Full position.
    b) The unwind roll goes into Jog Stop until the unwind roll stops.
    c) Then the unwind roll transitions to F-Stop.
    d) The system state transitions to F-Stop State.

2) The unwind is a unipolar brake and the wind is bipolar or unipolar reversible:
    a) The unwind roll is put into H-Stop.
    b) The unwind roll waits until the dancer is in the Full position.
    c) Then the unwind roll transitions to F-stop.
    d) The system state transitions to F-Stop State.

3) The unwind is a unipolar brake and the wind is unipolar:
    a) The unwind roll is put into F-Stop.
    b) The system state transitions to F-Stop State.

App Select (CP-202) = 4: The CX-1102 controls only the Dancer Trimmed Wind roll

1) The wind is a bipolar or a unipolar reversible drive:
    a) The wind roll jogs in reverse until the dancer is in the Full position.
    b) The wind roll goes into Jog Stop until the wind roll stops.
    c) Then the wind roll transitions to F-Stop.
    d) The system state transitions to F-Stop State.

2) The wind is a unipolar drive:
    a) The wind roll is put into H-Stop.
    b) The wind roll waits until the dancer is in the Full position.
    c) Then the wind roll transitions to F-Stop.
    d) The system state transitions to F-Stop State.

3) The wind is a unipolar drive and the unwind is a unipolar brake:
    a) The wind roll is put into F-Stop.
    b) The system state transitions to F-Stop State.

H-Stop (Stop and Hold) has the fifth highest operating priority. Use H-Stop to stop the drive with a deceleration ramp. The velocity command is ramped down to “0”. If the loop is “Closed”, the ramp is executed with velocity loop control (with feedforward, and Trim). If the loop is “Open”, the ramp will be executed with feedforward only. The deceleration rate for the ramp is determined by Dcl Tm HStp (CP-307) and Ref Ramps (CP-300) or by the Dcl Rt RStp (CP-308). When the velocity command reaches “0” and the feedback is less than the Zero Speed (CP-370), then H-Stop will; hold the Control Output (SigU/SigW) to “0” volts (Open Loop) or the dancer trimmed roll will hold the dancer in position near the Dancer SP (CP-250) (Closed Loop) and the non-dancer trimmed roll's position (Closed Loop position hold).

To activate H-Stop:

- Activate High (Open), Level Sensitive, Latched
- Use momentary contact - does not need to be maintained to remain active

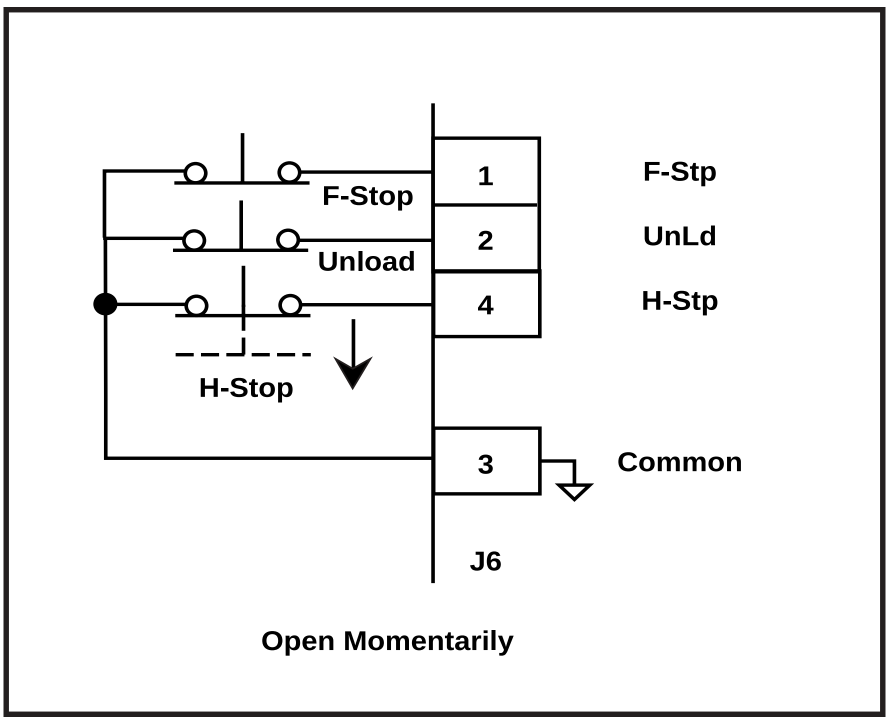


Figure 2-34 H-Stop Input

Run has the sixth highest operating priority. Run is the primary operating state. App Select (CP-202) determines the operation for Run, using either the applications 1 through 4 or the direct mode. The corresponding setpoint for the selected mode determines the operating speed. The direct mode will only operate as open loop. The applications 1 through 4 will "Run" in closed loop.

With the exception of the direct mode, the acceleration and deceleration ramps for the modes of operation are determined by Acl Tm RUN, (CP-301), Dcl Tm RUN (CP-303) and Ref Ramps (CP-300). The direct mode ramps are determined by Acl Tm Drct (CP-311), Dcl Tm Drct (CP-312) and UwndCOMaxVolts (CP-281) and WindCOMaxVolts (CP-286).

To activate Run:

- Activate Low (closed to common), Level Sensitive, Latched
- Use momentary contact - does not need to be maintained to remain active

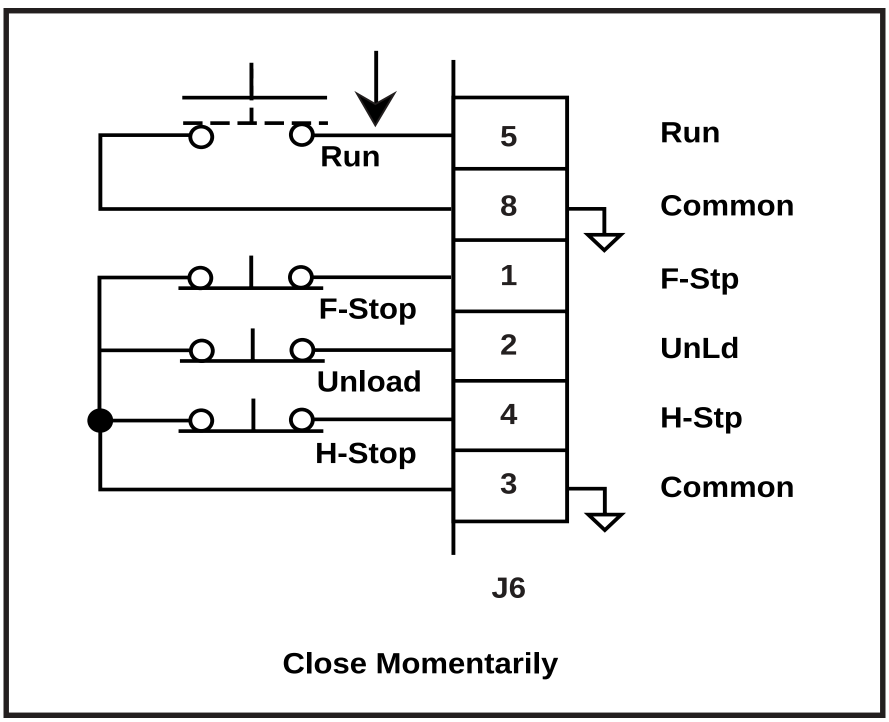


Figure 2-35 Run Input

Load has the seventh highest operating priority. Only from F-Stop or Unload states. Normal operation is from F-Stop with the dancer in the full position. Load can also be initiated from Unload state with positive Dancer Error. Load has a ten second (10s) timer. If the Dancer is not loaded within 10 seconds after the Load input is latched the CX-1102 automatically reverts to the F-Stop operating state. The Load input may be held closed to keep the CX-1102 from changing to F-Stop and therefore complete the Load.
To activate Load:

- Activate Low (closed to common), Level Sensitive, Latched
- Use momentary contact - does not need to be maintained to remain active

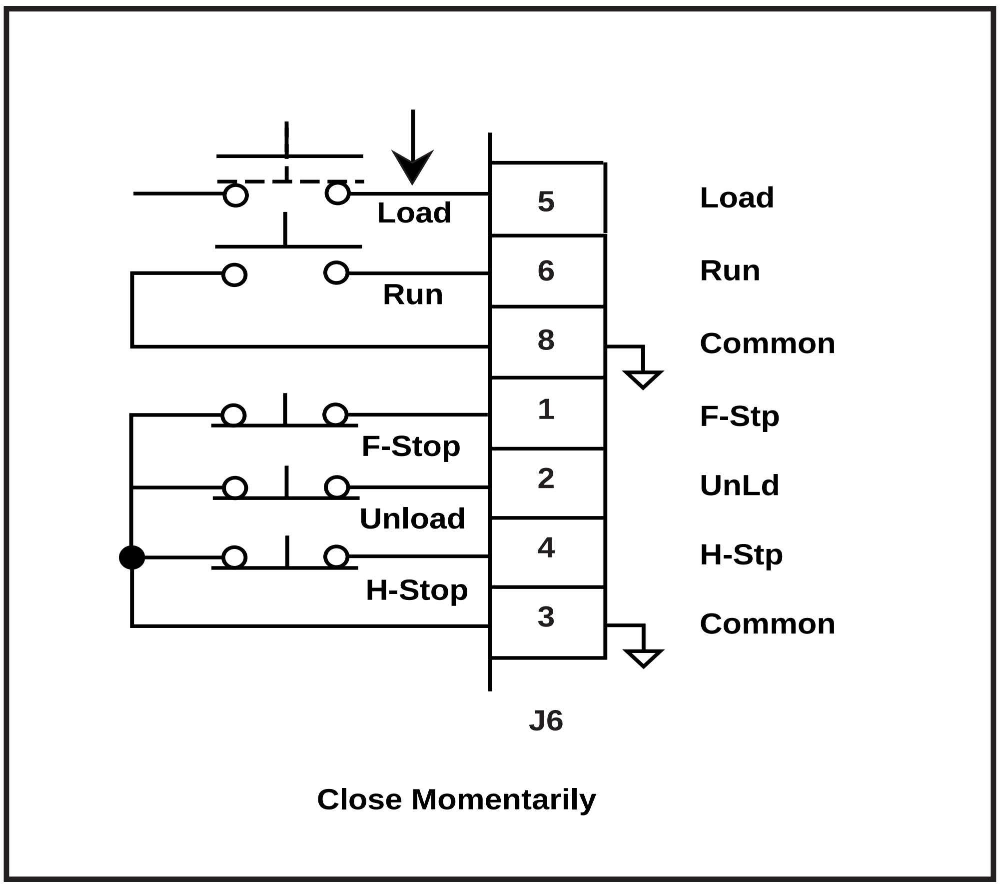


Figure 2-36 Load Input

App Select (CP-202) = 1: The CX-1102 controls both rolls with Dancer Trimmed Unwind

1) If the unwind is a bipolar or a unipolar reversible drive:
    a) The wind roll is put into H-Stop.
    b) The unwind roll Jogs in reverse to pull material out of the dancer until the dancer error changes from positive to negative.
    c) The unwind roll goes into Jog Stop until the unwind roll stops.
    d) Then the unwind roll transitions to Run with Dancer Trim.
    e) The wind roll remains in H-Stop.
    f) The system state transitions to H-Stop State.

2) If the unwind is a unipolar drive or a unipolar brake:
    a) The unwind roll is put into H-Stop.
    b) The wind roll jogs forward to pull material out of the dancer until the dancer error changes from positive to negative.
    c) The wind roll goes into Jog Stop until the wind roll stops.
    d) Then the unwind roll transitions to Run with Dancer Trim.
    e) The wind roll transitions to H-Stop.
    f) The system state transitions to H-Stop State.

App Select (CP-202) = 2: The CX-1102 controls both rolls with Dancer Trimmed Wind

1) If the wind is a bipolar or a unipolar reversible or a unipolar drive or a unipolar brake:
    a) The unwind roll is put into H-Stop.
    b) The wind roll jogs forward to pull material out of the dancer until the dancer error changes from positive to negative.
    c) The wind roll goes into Jog Stop until the wind roll stops.
    d) Then the wind roll transitions to Run with Dancer Trim.
    e) The unwind roll remains in H-Stop.
    f) The system state transitions to H-Stop State.

App Select (CP-202) = 3: The CX-1102 controls only the Dancer Trimmed Unwind roll

1) If the unwind is a bipolar or a unipolar reversible drive:
    a) The unwind roll jogs in reverse to pull material out of the dancer until the dancer error changes from positive to negative.
    b) The unwind roll goes into Jog Stop until the unwind roll stops.
    c) Then the unwind roll transitions to Run with Dancer Trim.
    d) The system state transitions to H-Stop State.

2) If the unwind is a unipolar drive or a unipolar brake:
    a) The unwind roll is put into H-Stop.
    b) The unwind roll waits until the dancer error changes from positive to negative.
    c) Then the unwind roll transitions to Run with Dancer Trim.
    d) The system state transitions to H-Stop State.

App Select (CP-202) = 4: The CX-1102 controls only the Dancer Trimmed Wind roll

1) If the wind is a bipolar or a unipolar reversible or a unipolar drive:
   a) The wind roll jogs forward to pull material out of the dancer until the dancer error changes from positive to negative.
   b) The wind roll goes into Jog Stop until the wind roll stops.
   c) Then the wind roll transitions to Run with Dancer Trim.
   d) The system state transitions to H-Stop State.

Jog Forward has the eighth highest operating priority. Use UJogF to “Jog” the unwind drive Forward or use WJogF to “Jog” the wind drive Forward at the rate indicated in Jog SP (CP-240). The acceleration and deceleration ramps are dictated by Acl Tm Jog (CP-241), Dcl Tm Jog (CP-243) and Jog SP (CP-240). After the UJogF or WJogF input is deactivated and the ramped reference has reached “0”, the CX-1102 automatically reverts to the F-Stop or H-Stop operating state.

To activate Jog Forward:

- Activate Low (closed to common), Level Sensitive, Not-Latched
- Use momentary contact - needs to be maintained to remain active

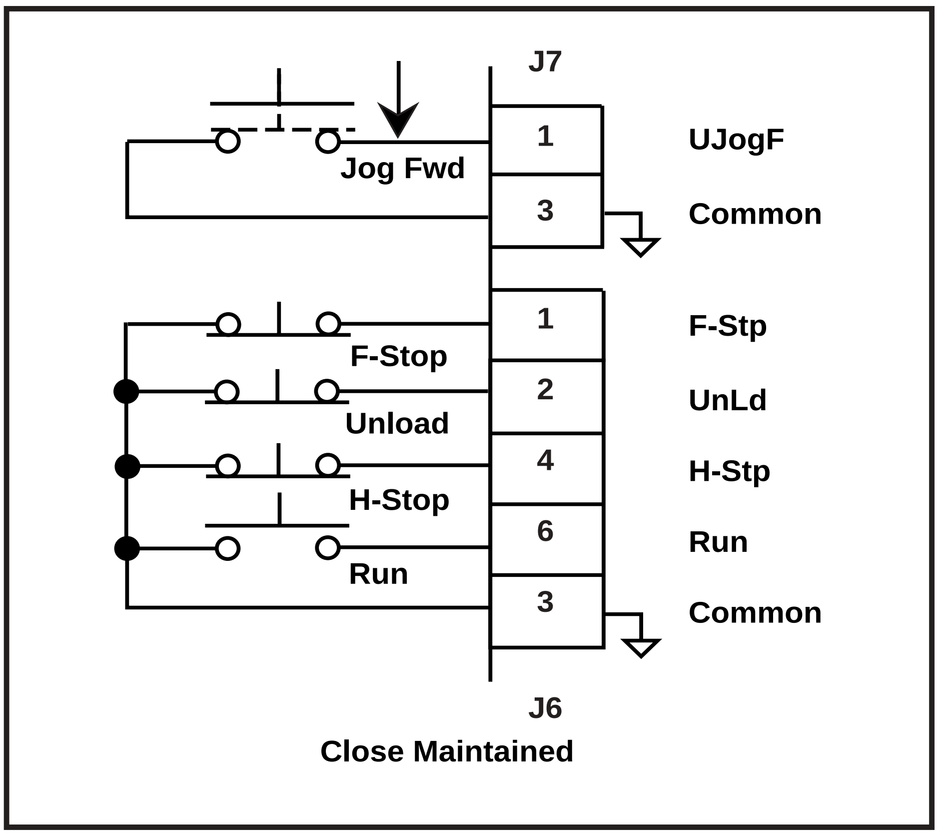


Figure 2-37   Jog Forward Input

Jog Reverse has nineth (the least) operating priority. Use UJogR to "Jog" the unwind drive Reverse or use WJogR to "Jog" the wind drive Reverse at the rate indicated in Jog SP (CP-240). The acceleration and deceleration ramps are dictated by Acl Tm Jog (CP-241), Dcl Tm Jog (CP-243) and Jog SP (CP-240). After the UJogR or WJogR input is deactivated and the ramped reference has reached "0", the CX-1102 automatically reverts to the F-Stop or H-Stop operating state.

To activate Jog Reverse:

- Activate Low (closed to common), Level Sensitive, Not-Latched
- Use momentary contact - needs to be maintained to remain active

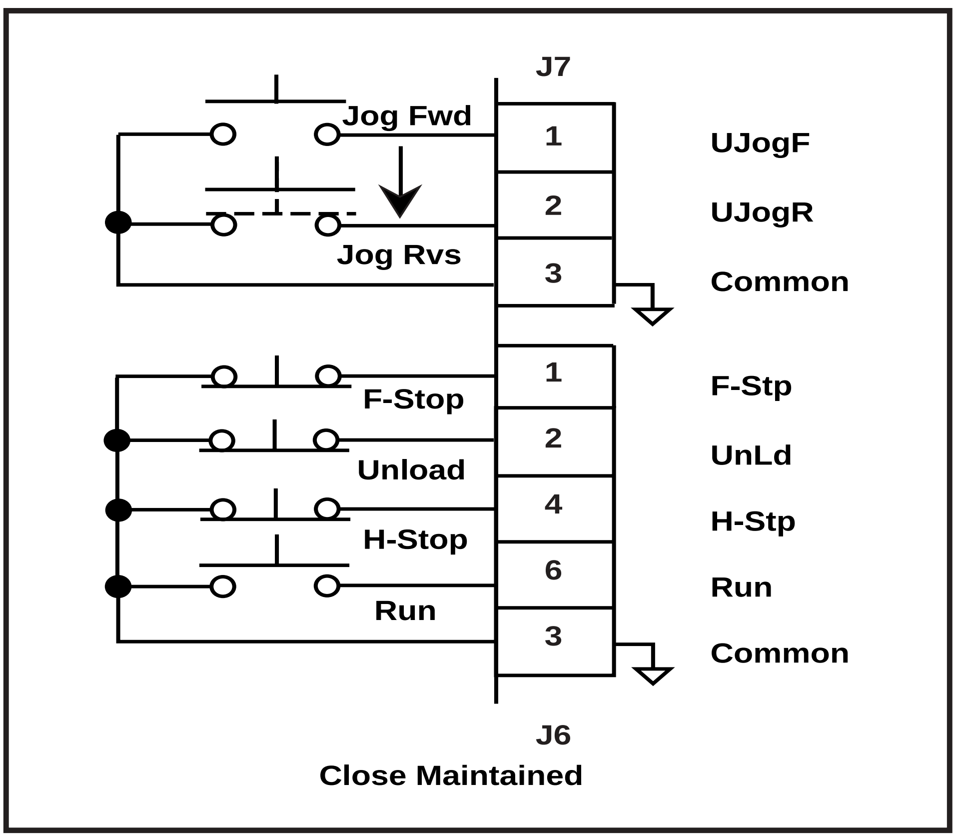


Figure 2-38 Jog Reverse Input

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Operator Interface

Keypad Operation
Screen Operation

Figure 3-1 The CX–1102 Front Panel

KEYPAD OPERATION

The CX–1102 operates on a system of screens that are controlled by the front keypad. Figure 3-1 shows the location of the keys and LCD screen display on the front panel. You will find detailed descriptions of the interactions of the keys and screens throughout the “Operations” section. The following is a brief summary of how the front panel functions.

LCD Screen Display	The screens are displayed on the LCD Display.
Menu Key	The Menu key accesses the main menu from a sub-menu or status screen, and a sub-menu from a parameter screen.
Status Screen Key	The Status key will immediately pop-up the status screen from any other screen. To return to the previous screen, press the Status key again.
Page Up/Down Keys	Some screens have multiple pages. The Page Up/Down keys allow you to scroll through, one page at a time.
Numeric Keys	Use the Numeric keys to enter the Parameter Code of either a Control Parameter (CP) or a Monitor Parameter (MP) or to enter a Parameter Value for a Control Parameter. Use the Enter key to activate the entry. Use the Clear key to delete the entry and clear the Parameter Value to zero.
Parameter Up/Down Keys	Each time you press the Parameter (Par) up key, the cursor and highlight bar will move up by one line. Each time you press the Parameter (Par) down key, the cursor will move down by one line. It will also automatically scroll through the lines if you hold the key down.
Code Select Key	Use the Code Select key in the Status screen and in the parameter screens to display a Parameter Code line. When the Parameter Code line appears, you can use it to access a parameter and its value. Enter a Parameter Code, then press the Enter key and the parameter and its value will be displayed. You can change a Control Parameter value by entering a new value or by scrolling with the Increment Up/Down keys. Use the Clear key to delete the entry and clear the parameter value to zero.
Help Screen Key	The Help key accesses the Help screen and gives you a brief description of the parameter or subject that is highlighted (active). The Help screen also functions as an options screen, where you can select Control Parameter data. You can access help from any screen. Press the Help key again to return to the previous screen.
Increment Scroll Up/Down	Use these keys in the parameter screens to change the active value. Each time you press the Increment Scroll Up key, the active value will increase by one increment. Each time you press the Increment Scroll Down key, the active value will decrease by one decrement. It will also automatically scroll through the increments or decrements if you hold the key down.
Clear Key	Use the Clear key to delete a value or change which you have entered. However, the Clear key will not delete the entry or change once the Enter key has been used.
Enter Key	Use the Enter key to accept a value or change which you have entered.

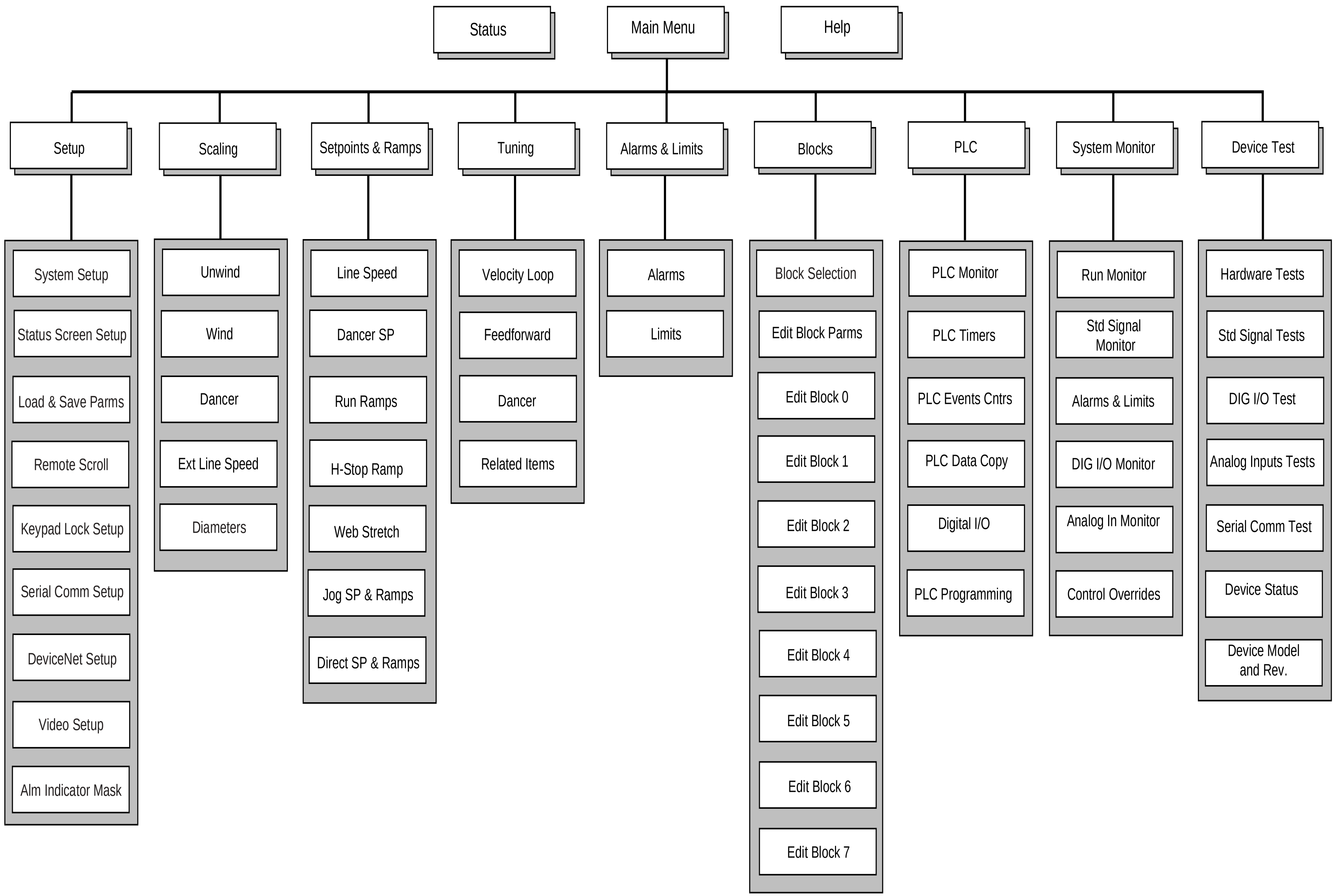


Fig 3-2 Overview of the CX–1102 Screen Matrix

SCREEN OPERATION

The CX–1102 screen matrix has three main screens. These screens are:

Status Screen
Main Menu
Help Screen

There are nine sub-menus that are accessed through the Main Menu screen. These sub-menus are:

Setup
Scaling
Setpoints and Ramps
Tuning
Alarms and Limits
Blocks
PLC
System Monitor
Device Test

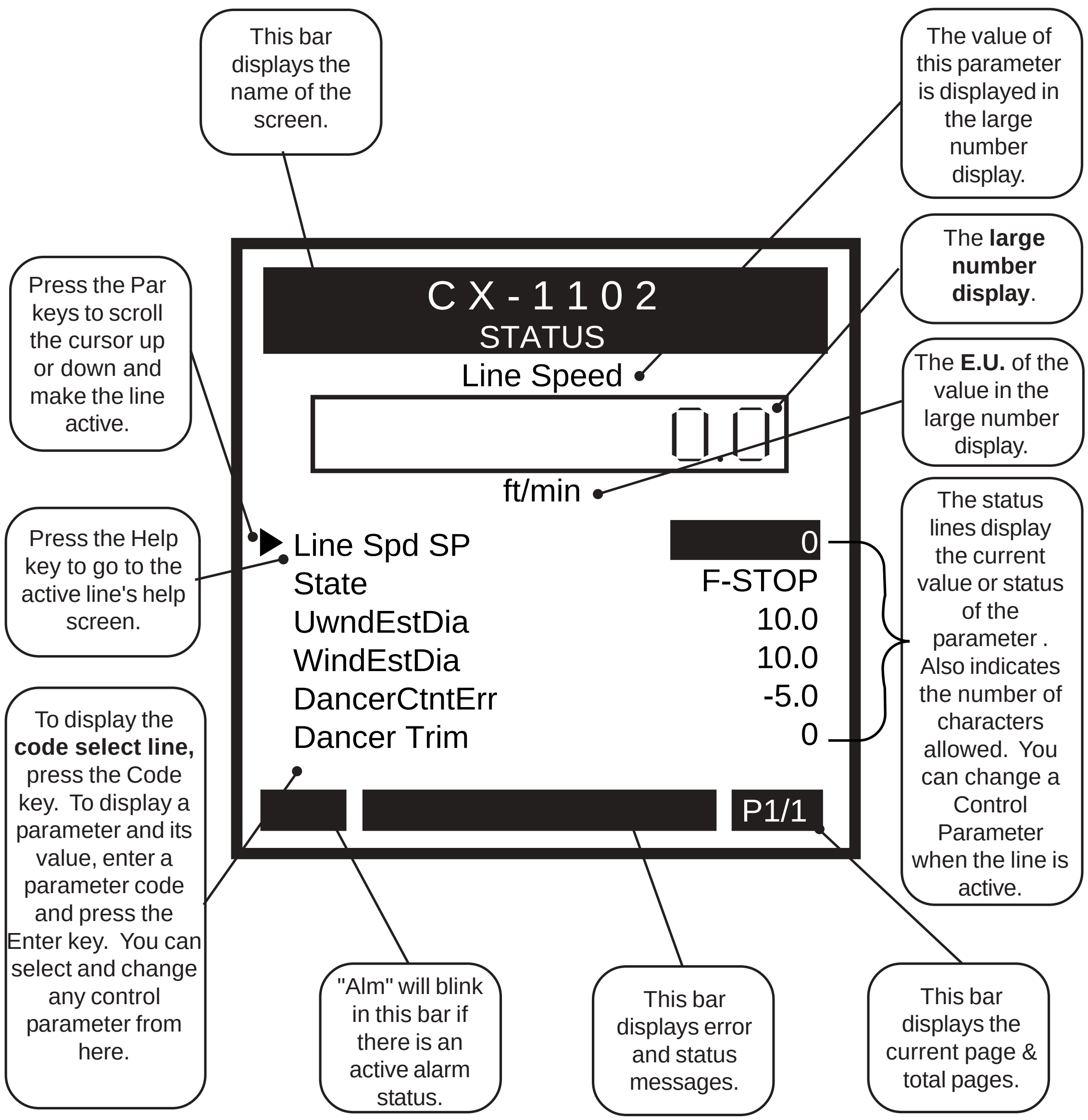
All of the parameter screens are accessed through these nine sub-menu screens. You can use the parameter screens to access the parameters. Parameters fall into two classifications; Control Parameters and Monitor Parameters. The Control Parameters allow you to enter data that is unique to you system. The Monitor Parameters allow you to monitor your system and diagnose problems.

This Screen Operation section is a basic overview of the three main screens; the Status screen, the Help screen and Main Menu screen. There is also a sample of a sub menu screen. For specific details on the parameter screens, refer to *System Setup-Control Parameters* and *System Monitoring-Monitor Parameters*. For the instructions to customize the Status screen, refer to *System Setup-Control Parameters :Setup/Status Screen Setup.*

Refer to Figure 3-2 for an overview of the CX–1102 screen matrix.

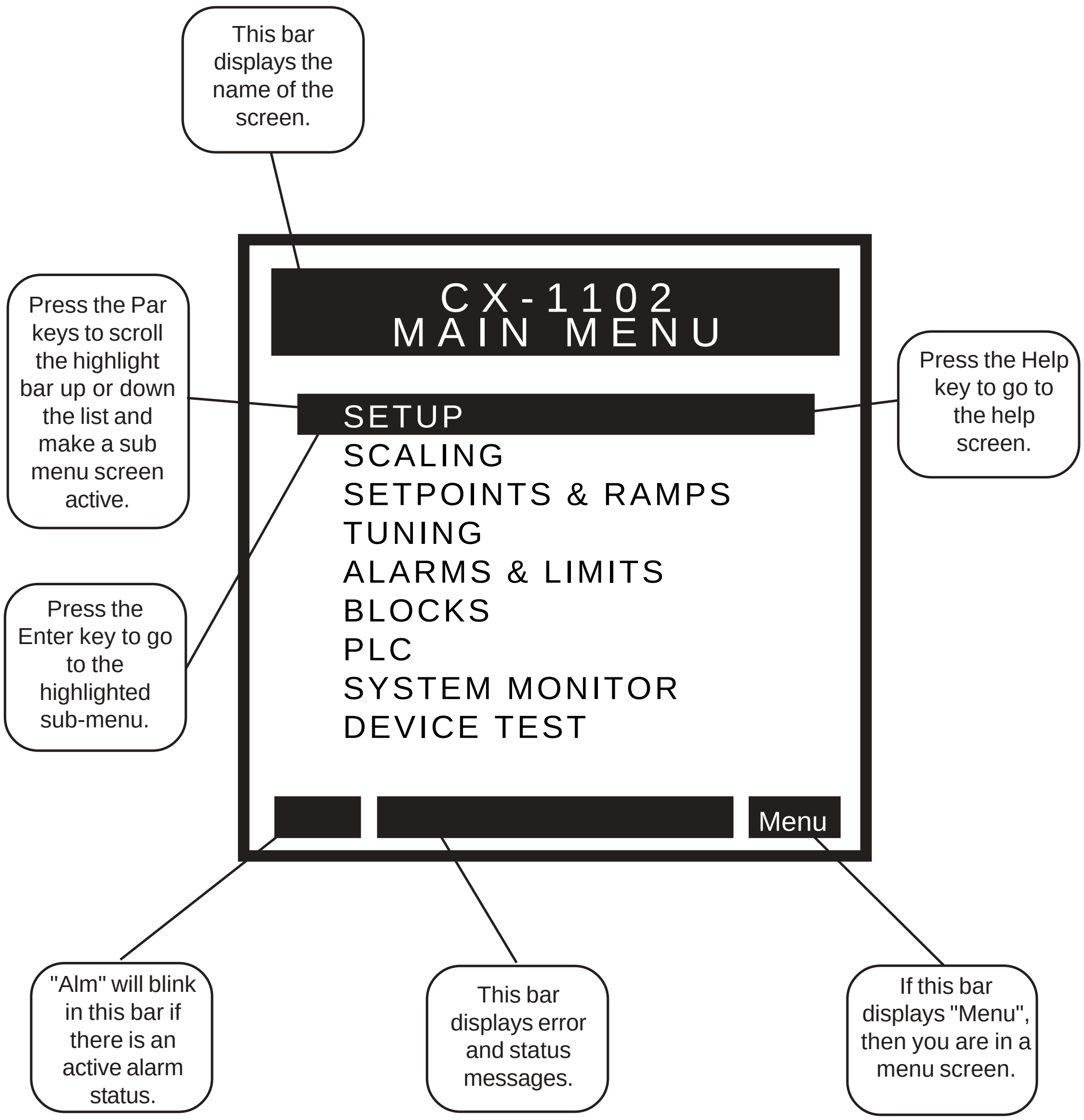
Status Screen

Press the Status key to access the Status screen. The Status screen has a **large number display** for a quick, visual reference to a frequently used parameter, as well as its value and E.U. (Scaled Feedback is the default parameter). Below the large number display, the Status screen lists six frequently used parameters. In addition to the frequently used parameters, the line at the bottom of the display, called the **code select line**, allows you to access and display any parameter and change any Control Parameter's value. The Status screen can be customized to reflect the parameters that you access most frequently. To customize the Status screen refer to *System Setup- Control Parameters: Device Configure/Status Screen Setup.*



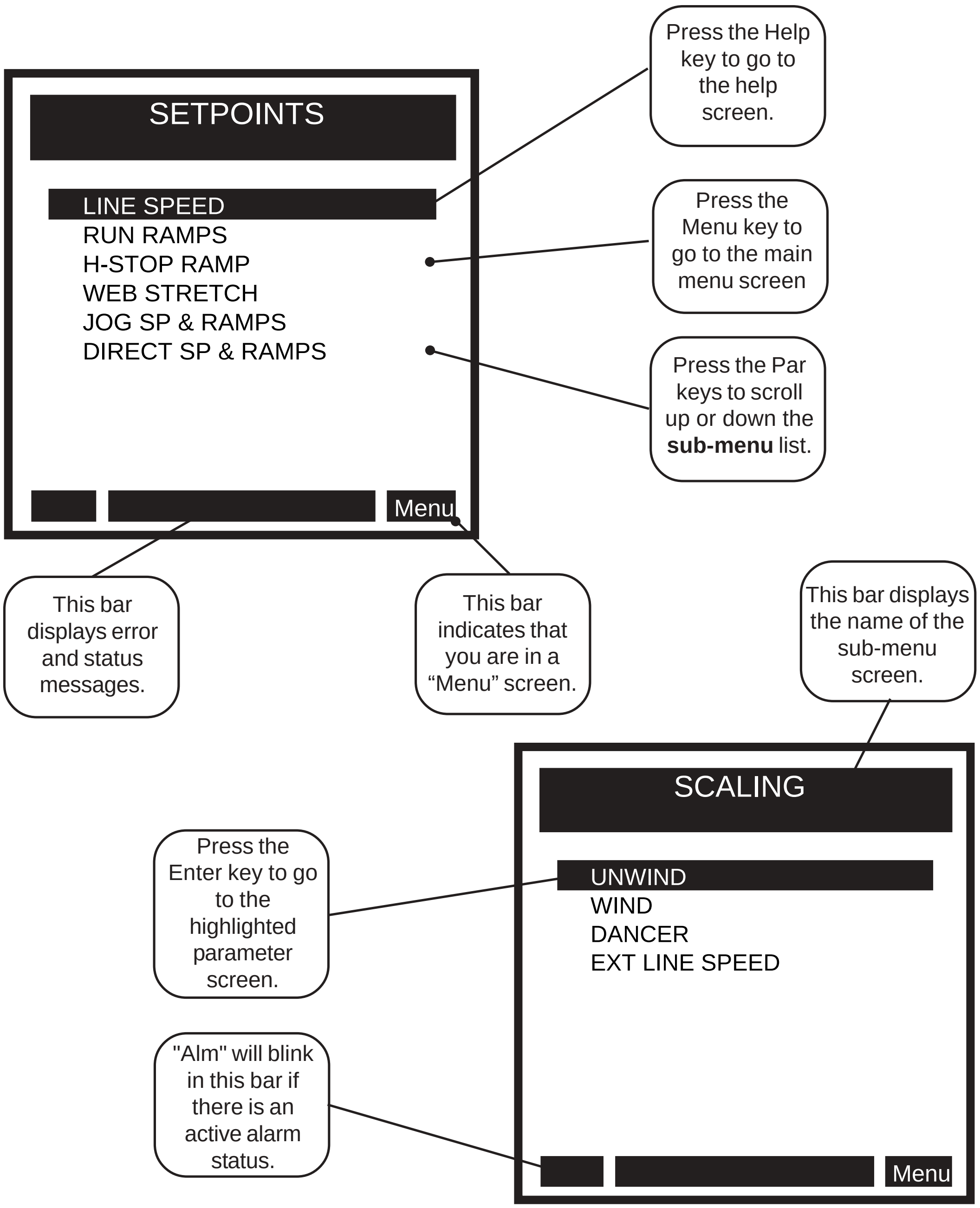
Main Menu Screen

Press the Menu key to access the Main Menu screen. The Main Menu screen displays the nine sub-menus that access all of the parameter screens.



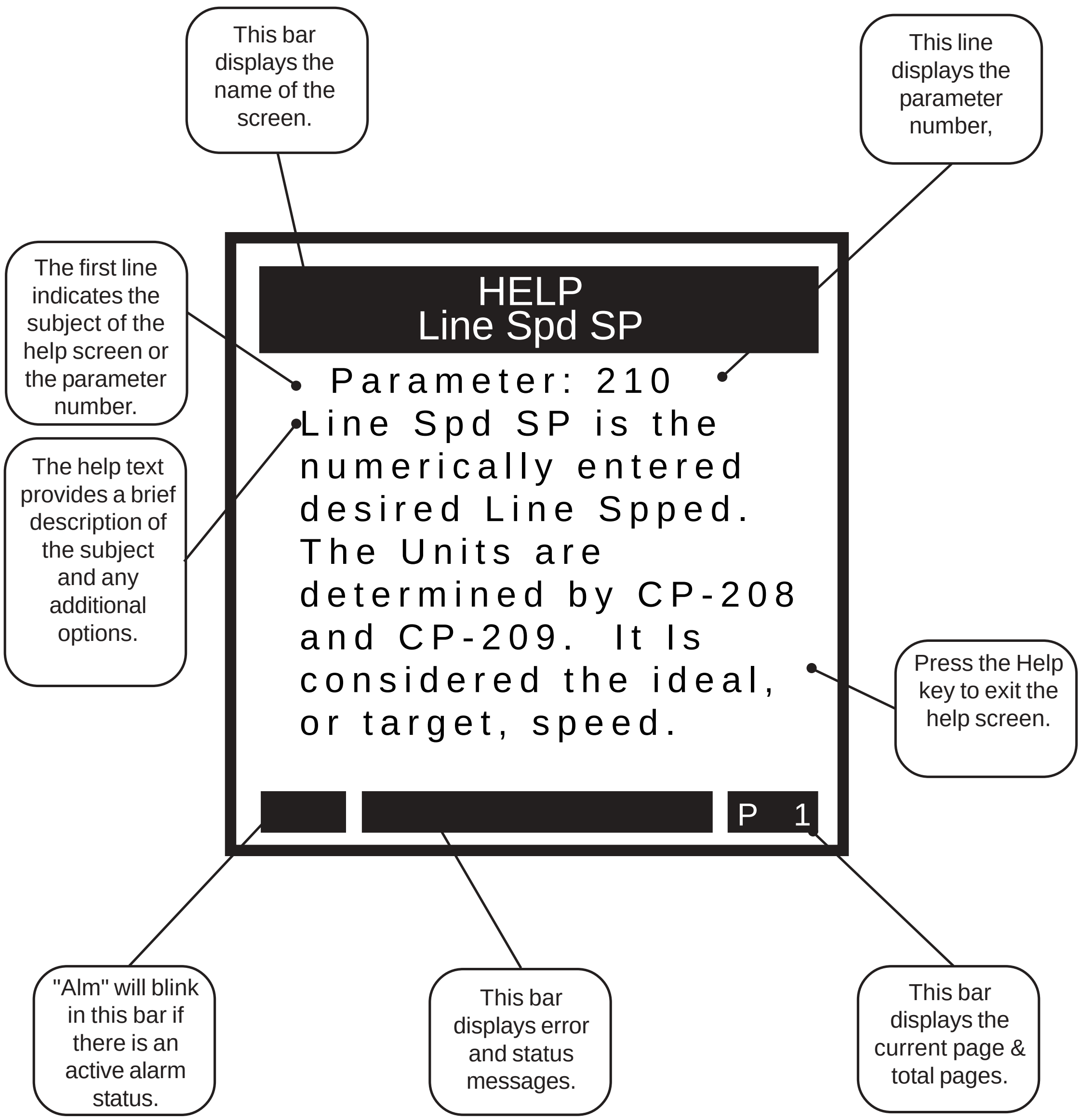
Sub-Menu Screen / Samples

Parameter screens are accessed through the sub-menu screens.



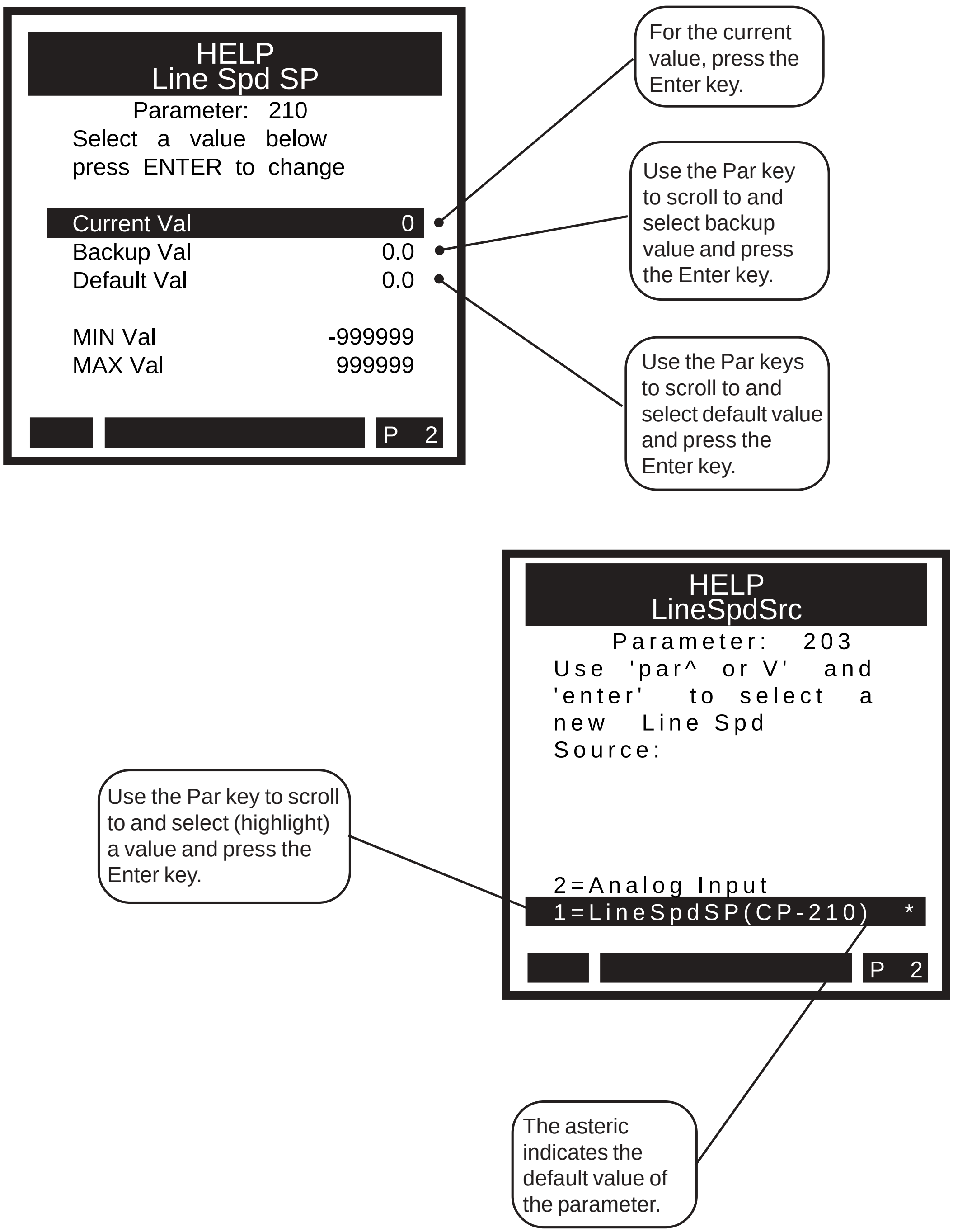
Help Screens

Press the Help key, to access the Help screens for an active (highlighted) Control Parameter line, an active Monitor Parameter line or an active menu line. You can access "Help" from any screen. To exit the Help screen and return to the previous screen, press the Help key again. In addition to the help information, the Help screens also function as an options screen. For more information on the help options, refer to "Help Screen / Sample Options" on the next page.



Help Screens / Sample Options

The Help screens also function as "options" screens where you can select a Control Parameter value. The last page of many Help screens (usually page 2) have parameter options that have three value lines; current value, backup value and default value. There are also Help screens that contain a list of options that you can scroll through and select. An asterisk next to an option indicates that it is the default value. See the samples below. To exit the Help screen and return to the previous screen, press the Help key again.



Drive Setup/Calibration

Calibration

CALIBRATION

This procedure is a series of steps designed to verify the motor/drive/encoder wiring and polarity, calibrate the dancer and setup some of the basic parameters necessary for proper operation of the CX-1102.

Before you begin this procedure, the motor and drive must be wired and configured in accordance with the manufacturer's instructions. Refer to your drive manual to assist you in making the following drive adjustments:

- Set the acceleration and deceleration times to their fastest settings.
- Set the IR compensation to its minimum setting.
- Set the Integral compensation to its minimum setting.
- Set the zero speed (balance) drive adjustment for zero creep. If there is still creep, then use the **UwndCO Offset {CP-283}** and/or **WindCO Offset {CP-288}** parameters to "offset" the creep. The CX-1102 needs to be in Direct Mode (**App Select {CP-202}** set to zero), with the **UwndDirect SP {CP-230}** and **WindDirect SP {CP-230}** set to zero and in **"RUN"** state.

The CX-1102 must be configured and installed in accordance with the installation procedures indicated in the *Installation* section of the *CX-1102 Technical Reference Manual* and the CX-1102, including its PLC, will be programmed as factory default.

NOTE: *The Wind Under Wrap input MUST be shorted to common if the wind axle will have web material fed onto the roll from the bottom rather than the top of the roll. The Unwind Under Wrap input MUST be shorted to common if the unwind axle will have web material fed off of the roll from the bottom rather than the top of the roll.*

NOTE: *The Menu and Status keys will be disabled during the setup procedure. This is done in order to simplify the automatically displayed screen sequence used while performing the setup procedure.*

NOTE: *Unipolar drives should not be used unless there is a large gear reduction between the motor and the roll, because the unipolar drive can not provide reverse torque to hold the roll in position.*

NOTE: *The F-stop, Unload and H-Stop inputs are monitored during "Setup State". If any of these inputs are opened during a test the CX-1102 will immediately zero the Control Outputs and display "Failure" for the test in progress.*

Setup consists of the following:

- Application Configuration
- Axis Configuration
- Wind Roll Setup
- Unwind Roll Setup
- Signal Polarity Test
- Dancer Calibration
- Wind Direction Test
- Unwind Direction Test

DANGER

Motion will occur in the calibration procedure. It is possible that sudden/violent motion could result and cause damage or personal injury. Make sure that the motor is secured in place. Take all possible precautions to ensure your safety.

DANGER

Hazardous voltages.

Can cause severe injury, death or damage the equipment.

Make adjustments with caution.

Step 1 - Application Configuration - Parameter Entry

Close the "Setup" input. The CX-1102 will change to "Setup State" and will automatically display **System Setup Application\Page 1**. **Setup State {MP-59**} will equal 0.

Configure the CP’s on this screen as required.

System State {MP-50}
Setup State {MP-59}
App Select {CP-202}
UnitPrs Sel {CP-208}
Time Base {CP-209}
FixedDiaSel {CP-207}
UwndDiaPrst {CP-364}
WindDiaPrst {CP-365}

NOTE: *The Help key accesses the Help screen and gives you a brief description of the parameter or subject that is highlighted (active) on the screen. Press the Help key again to return to the previous screen.*

Press the "Page Down" key to proceed to the next step.

Step 2 - Axis Configuration - Parameter Entry

The CX-1102 will display **System Setup Axis Configuration\Page 2**.
Setup State {MP-59} will equal 1 (not displayed on this screen).

Configure the CP’s on this screen as required.

WindCO Mode {CP-285}
WindCO MaxVolts {CP-286}
Wind PPR {CP-266}
WindGearRdcn {CP-265}
Wind MaxRPM {CP-329}
UwndCO Mode {CP-280}
UwndCO MaxVolts {CP-281}
Unwind PPR {CP-261}
UwndGearRdcn {CP-260}
Uwnd MaxRPM {CP-329}

NOTE: *The Help key accesses the Help screen and gives you a brief description of the parameter or subject that is highlighted (active) on the screen. Press the Help key again to return to the previous screen.*

Press the "Page Down" key to proceed to the next step.

Step 3 - Wind Roll Setup - Parameter Entry

The CX-1102 will display **System Setup Wind Roll\Page 3**.
Setup State {MP-59} will equal 2.

Configure the CP's on this screen as required.

Setup State {MP-59}
FixedDiaSel {CP-207}
LoadDiaCalEn {CP-361}
WindMinDia {CP-352}
WindMaxDia {CP-353}
WindDiaPrst {CP-365}
WindCtntPrst {CP-367}
WindCtntRO {CP-369}
WindEstDia {MP-17}
WindEstCtnt {MP-16}

NOTE: *The Help key accesses the Help screen and gives you a brief description of the parameter or subject that is highlighted (active) on the screen. Press the Help key again to return to the previous screen.*

Press the "Page Down" key to proceed to the next step.

Step 4 - Unwind Roll Setup - Parameter Entry

The CX-1102 will display **System Setup Unwind Roll\Page 4**.
Setup State {MP-59} will equal 3.

Configure the CP's on this screen as required.

Setup State {MP-59}
FixedDiaSel {CP-207}
LoadDiaCalEn {CP-361}
UwndMinDia {CP-350}
UwndMaxDia {CP-351}
UwndDiaPrst {CP-364}
UwndCtntPrst {CP-366}
UwndCtntRO {CP-368}
UwndEstDia {MP-07}
UwndEstCtnt {MP-06}

NOTE: *The Help key accesses the Help screen and gives you a brief description of the parameter or subject that is highlighted (active) on the screen. Press the Help key again to return to the previous screen.*

Press the "Page Down" key to proceed to the next step.

Step 5 - Signal Polarity Test

The CX-1102 will display **System Setup Signal Polarity\Page 5**. **Setup State {MP-59}** will equal 4.

Setup State {MP-59}
WindCO Volts {MP-37}
WindCOPolarity {CP-287}
WindEncRPM {MP-12}
WindEncPty {CP-269}
UwndCO Volts {MP-27}
UwndCOPolarity {CP-282}
UwndEncRPM {MP-02}
UwndEncPty {CP-264}
SigPolarity {MP-71}

NOTE: *The Help key accesses the Help screen and gives you a brief description of the parameter or subject that is highlighted (active) on the screen. Press the Help key again to return to the previous screen.*

This test aligns the Control Output polarity and the Encoder polarity, so a positive Control Output command causes positive Encoder feedback.

If the wind and/or unwind axis is under CX-1102 control:

NOTE: *This step will make use of "Direct" mode and ramps.*

NOTE: *The Keypad will be disabled while this test is moving the wind/unwind axis.*

WARNING
Prepare the machine for motion.
Alert everyone present.

The CX-1102 will *flash* "KeyLk" in the bottom center of the display.

Wind Polarity Test:
1) Momentarily close the KeyLk input to initiate the test.
2) The CX-1102 will test the wind axis.

For Bipolar and Unipolar Reversing Drives: The CX-1102 will ramp the Control Output command positive, and back to zero, then negative, and back to zero.

For Unipolar Drives: The CX-1102 will ramp the Control Output command positive, and back to zero. If no feedback occurs, it will negate **WindCOPolarity {CP-287}**, then ramp the Control Output command positive, and back to zero.

Fail test:

The CX-1102 will *flash* "Wind Failure" then "Pg Up" in the bottom center of the display.

Check the following:

a. Control Output Unwind/Wind wiring to the drive
b. encoder input wiring
c. drive armature and power wiring
d. is the drive enabled
e. is this a Unipolar Reverse setup - check the PLC program and verify the correct connection to the drives reversing input.

Press the "Page Up" key to restart this step (Wind Polarity Test).

Pass test:

The CX-1102 will *flash* "Wind PASS" then "KeyLk" in the bottom center of the display.
Setup State {MP-59} will equal 5.

The CX-1102 will change the **WindEncPty {CP-269}** to match the control output signal based on the recorded information. For unipolar drives, **WindCOPolarity {CP-287}** may also have been changed based on the recorded information.

<u>If the wind axis is NOT under CX-1102 control:</u>

1) Rotate the wind roll in the forward direction, then in the reverse direction.
2) Observe the value in **WindEncRPM {MP-12}** for a sign change. If the sign does not change then check the encoder input wiring.

Pass test:

The CX-1102 will *flash* "Wind PASS" then "KeyLk" in the bottom center of the display.
Setup State {MP-59} will equal 5.

<u>Unwind Polarity Test:</u>

1) Momentarily close the KeyLk input to initiate the test.
2) The CX-1102 will test the unwind axis.

For Bipolar and Unipolar Reversing Drives: The CX-1102 will ramp the Control Output command positive, and back to zero, then negative, and back to zero.

For Unipolar Drives: The CX-1102 will ramp the Control Output command positive, and back to zero. If no feedback occurs, it will negate **UwndCOPolarity {CP-282}**, then ramp the Control Output command positive, and back to zero.

Fail test:

The CX-1102 will *flash* "Uwnd Failure" then "Pg Up" in the bottom center of the display.

Check the following:

a. Control Output Unwind wiring to the drive
b. encoder input wiring
c. drive armature and power wiring
d. is the drive enabled
e. is this a Unipolar Reverse setup - check the PLC program and verify the correct connection to the drives reversing input.

Press the "Page Up" key to restart this step (Wind Polarity Test).

Pass test:

The CX-1102 will *flash* "Uwnd PASS" then "Pg Down" in the bottom center of the display.
Setup State {MP-59} will equal 6.

The CX-1102 will change the **UwndEncPty {CP-264}** to match the control output signal based on the recorded information. For unipolar drives, **UwndCOPolarity {CP-282}** may also have been changed based on the recorded information.

<u>If the unwind axis is NOT under CX-1102 control or is Unipolar Brake:</u>

1) Rotate the unwind roll in the forward direction, then in the reverse direction.
2) Observe the value in **UwndEncRPM {MP-02}** for a sign change. If the sign does not change then check the encoder input wiring.

Pass test:

The CX-1102 will *flash* "Uwnd PASS" then "Pg Down" in the bottom center of the display.
Setup State {MP-59} will equal 6.

Press the “Page Down” key to proceed to the next step.

Step 6 - Dancer Calibration

The CX-1102 will display automatically **System Setup Dancer\Page 6**. **Setup State {MP-59}** will equal 6.

Setup State {MP-59}
DncrFullVolts {CP-271}
DncrEmptyVlts {CP-273}
DncrCtntFull {CP-272}
Dancer SP {CP-250}
DancerCtnt {MP-82}
Dancer State {MP-58}
Dancer Volts {MP-81}

NOTE: *The Help key accesses the Help screen and gives you a brief description of the parameter or subject that is highlighted (active) on the screen. Press the Help key again to return to the previous screen.*

WARNING
For safety, place the CX-1102 into F-Stop during the dancer calibration.

The CX-1102 will *flash* "Dncr to Full" then "KeyLk" in the bottom center of the display.

Move the dancer to the "FULL" position, hold it there. Momentarily close the KeyLk input, the CX-1102 will store the value from **Dancer Volts {MP-81}** into **DncrFullVlts {CP-271}. Setup State {MP-59}** will incre ment to 7.

The CX-1102 will *flash* "Dncr toEmpty" then "KeyLk" in the bottom center of the display.

Move the dancer to the "EMPTY" position, hold it there. Momentarily close the KeyLk input, the CX-1102 will store the value from **Dancer Volts {MP-81}** into **DncrEmptyVolts {CP-273}**.

Fail test:
If the voltage-swing **DOES NOT** exceed the required 1 volt difference, the CX-1102 will *flash* **"Error <1v".** The CX-1102 will **NOT** proceed to the next step until this has been corrected. Press the "Page Up" key to restart this step (Dancer Calibration).

Pass test:
If the test passed, the CX-1102 will *flash* "Dancer PASS" then "Pg Down" in the bottom center of the display. **Setup State {MP-59}** will increment to 8.

NOTE: *At this time thread up the machine, measure the web material that is stored in the dancer between its full and empty positions and enter it into* ***DncrCtntFull {CP-272}****. Also enter your* ***Dancer SP {CP-250}****.* The Jog inputs (jog is open loop at this time) are available to assist in threading the machine prior to running the Direction tests. Since the direction tests have not been performed yet, the Jog movment may not match the Jog input labels.

Press the "Page Down" key to proceed to the next step.

Step 7 - Wind Direction Test

The CX-1102 will display automatically **System Setup Wind Direction\Page 7**.
Setup State {MP-59} will equal 8.

Setup State {MP-59}
Wind State {MP-48}
WindCO Volts {MP-37}
WindRollRPM {MP-13}
DancerCtnt {MP-82}
WindCOPolarity {CP-282}
WindEncPlrty {CP-264}
Wrap Polarity {MP-70}
Sig Polarity {MP-71}
Wind Dirn {MP-61}

NOTE: *The Help key accesses the Help screen and gives you a brief description of the parameter or subject that is highlighted (active) on the screen. Press the Help key again to return to the previous screen.*

REMINDER: *The Wind Under Wrap input MUST be shorted to common if the wind axle will have web material fed onto the roll from the bottom rather than the top of the roll. This needs to be done so the proper polarity can be determined in the following step.*

If the wind axis is under CX-1102 control:

This test sets the Control Output and Encoder polarities so a positive command equals forward direction.

NOTE: *The Keypad will be disabled while this test is moving the wind axis.*

The CX-1102 will now display “KeyLk” (flashing) in the lower center of the display.

NOTE: *The web must be threaded into the machine (and dancer), and the dancer in the (relaxed) full position with the web material tight against the dancer.*

WARNING
Prepare the machine for motion.
Alert everyone present.

1) Momentarily close the KeyLk input. The CX-1102 will send a positive command to the Wind axis, for forward direction. The CX-1102 will montior the Dancer content for movement away from the *Full* position.

If the Dancer does not move after X number of rotations of the Wind roll, the Wind axis is stopped.

If **WindCO Mode {CP-285}** is set to Unipolar, this test **Fails**.

If **WindCO Mode {CP-285}** is set to Bipolar or Unipolar Reversing, **WindCOPolarity {CP-287}** and **WindEncPlrty {CP-269}** are changed, and a positive command is issued to the Wind axis again for forward rotation (maximum of 2X number of rotations). The CX-1102 will montior the Dancer content for movement away from the *Full* position.

If the dancer moves from *Full* to approximately 3/4 of *Full*, the Wind roll is stopped, the Dancer will be held in position, and the test **Passes**.

Fail test:

Check the following:

a. is web threaded into machine
b. drive armature and power wiring
c. is the drive enabled
d. gear reduction is correct

Press the "Page Up" key to restart this step (Wind Direction Test).

Pass test:

The CX-1102 will *flash* "Wind PASS" then "Pg Down" in the bottom center of the display.
Setup State {MP-59} will equal 9.

Proceed to End of Wind Direction Test.

If the wind axis is NOT under CX-1102 control, if App Select {CP-202} is a 3 (DT Unwind only):

1) Momentarily close the KeyLk input. The CX-1102 will montior the Wind feedback and the Dancer content for movement away from the *Full* position to approximately 3/4 of *Full*.
2) Rotate the Wind roll in the forward direction.
3) When the dancer moves, the CX-1102 will change the **WindEncPlrty {CP-269}** value so **WindRollRPM {MP-13}** is a positive (no '-' sign) signal for forward rotation of the Wind roll, the dancer should be held in position, and the test **Passes**.

Fail test:

Check the following:

a. is web threaded into machine
b. drive armature and power wiring
c. is the drive enabled

Press the "Page Up" key to restart this step (Wind Direction Test).

Pass test:

The CX-1102 will *flash* "Wind PASS" then "Pg Down" in the bottom center of the display.
Setup State {MP-59} will equal 9.

End of Wind Direction Test

Press the "Page Down" key to proceed to the next step.

Step 8 - Unwind Direction Test

The CX-1102 will display automatically **System Setup Unwind Direction\Page 8**.
Setup State {MP-59} will equal 9.

Setup State {MP-59}
Uwnd State {MP-48}
UwndCO Volts {MP-27}
UwndRollRPM {MP-03}
DancerCtnt {MP-82}
UwndCOPolarity {CP-282}
UwndEncPlrty {CP-264}
Wrap Polarity {MP-70}
Sig Polarity {MP-71}
Uwnd Dirn {MP-60}

NOTE: *The Help key accesses the Help screen and gives you a brief description of the parameter or subject that is highlighted (active) on the screen. Press the Help key again to return to the previous screen.*

REMINDER: *The Unwind Under Wrap input MUST be shorted to common if the unwind axle will have web material fed off of the roll from the bottom rather than the top of the roll. This needs to be done so the proper polarity can be determined in the following step.*

<u>If the unwind axis is under CX-1102 control:</u>

This test sets the Control Output and Encoder polarities so a positive command equals forward direction.

NOTE: *The Keypad will be disabled while this test is moving the unwind axis.*

The CX-1102 will now display "KeyLk" (flashing) in the lower center of the display.

WARNING
Prepare the machine for motion.
Alert everyone present.

1) Momentarily close the KeyLk input.

If **UwndCO Mode {CP-280}** is set to Unipolar Brake, the Unwind roll will be put into F-Stop with a zero volts command. The CX-1102 will wait for the Dancer content to reach the Full position while monitoring the Unwind feedback signal.

If **UwndCO Mode {CP-280}** is set to Unipolar, Bipolar or Unipolar Reversing, the CX-1102 will send a positive command to the Unwind axis, for forward direction. The CX-1102 will montior the Dancer content for movement toward the *Full* position.

If the Dancer moves the wrong direction or does not move after X number of rotations of the Unwind roll, the Unwind axis is stopped.

If **UwndCO Mode {CP-280}** is set to Unipolar, this test **Fails**.

If **UwndCO Mode {CP-280}** is set to Bipolar or Unipolar Reversing, **UwndCOPolarity {CP-282}** and **UwndEncPlrty {CP-264}** are changed, and a positive command is issued to the Unwind axis again for forward rotation (maximum of 2X number of rotations). The CX-1102 will montior the Dancer content for movement toward the *Full* position.

If the Dancer moves to its *Full* position, both rolls are stopped, and the test **Passes**.

Fail test:

Check the following:

a. is web threaded into machine
b. drive armature and power wiring
c. is the drive enabled
d. gear reduction is correct

Press the "Page Up" key to restart this step (Unwind Direction Test).

Pass test:

The CX-1102 will *flash* "Uwnd PASS" then "Setup Done" in the bottom center of the display.
Setup State {MP-59} will equal 10.

Proceed to End of Unwind Direction Test.

If the unwind axis is NOT under CX-1102 control, ***if App Select {CP-202} is a 4 (DT Wind only)*****:**

1) Momentarily close the KeyLk input. The CX-1102 will montior the Unwind feedback and the Dancer content for movement from approximately 3/4 of *Full* to *Full*.
2) Rotate the Unwind roll in the forward direction.
3) When the dancer moves, the CX-1102 will change the **UwndEncPlrty {CP-264}** value so **UwndRollRPM {MP-03}** is a positive (no ‘-‘ sign) signal for forward rotation of the Unwind roll and the test **Passes**.

Fail test:

Check the following:

a. is web threaded into machine
b. drive armature and power wiring
c. is the drive enabled

Press the "Page Up" key to restart this step (Unwind Direction Test).

Pass test:

The CX-1102 will *flash* "Uwnd PASS" then "Setup Done" in the bottom center of the display.
Setup State {MP-59} will equal 10.

End of Unwind Direction Test

Open the "Setup" input, the CX-1102 control is in F-Stop and will automatically display the "Main Menu" screen. Remove any temporary terminal wiring.

After completing Setup proceed to the *CX-1102 Technical Reference Manual: System Setup/Control Parameters, Scaling*.

CREEP CALIBRATION

The Creep Calibration allows you to eliminate motion that may occur with an open loop stop (zero volt) Control Output. Make sure the unit is in F-Stop to start out.

1. Go to the **Setpoints & Ramps/Direct SP & Ramps/P1/1** screen and select Direct Mode by entering a 0 into the **App Select (CP-202)** parameter. You can use the Help screen for CP-202 to select Direct Mode.

2. Make sure the **UwndDirect SP (CP-203)** = 0.0 and **WindDirect SP (CP-235)** = 0.0 (include the decimal point).

3. Put the unit into RUN by activating the RUN input. The F-Stop, Unload, and H-Stop inputs must be closed in order to enter the RUN State. You should have the Drive Enable output connected to the drive enable input of your drive (or to a control relay that is connected to the Drive Enable input). If not, enable the drive by some external means.

4. If motion occurs, attempt to eliminate it (stop the motion) with the balance pot (also called zero-speed pot) or digital adjustment in your drive. If there is no pot (or digital adjustment) in the drive, or if the motion can not be stopped, attempt to use the **UwndCO Offset (CP-283)** parameter to "offset" the creep for the unwind and the **WindCO Offset (CP-288)** parameter to "offset" the creep for the wind. Be sure to record this parameter and/or make sure it gets into the backup parameter list at some point.

ANALOG CALIBRATION

The Analog Calibration allows you to calibrate the Dancer and Ext Line Speed Input. The board is calibrated at the factory and the accuracy should be adequate for most applications. However, you may need to re-calibrate if your application demands more accuracy in a specific range. The Analog Calibration screen is accessed through Main Menu/Device Tests/Analog Input Tests/pg 2.

Before recalibrating the analog board, consult technical support **first**:

Contrex Technical Support (763) 424-8700 or (800) 342-4411

Dancer Input:

1. Connect the Analog voltage to the Dancer Input (JA pins 2,4). Connect a voltmeter between pins 2 and 4.
2. Set Analog Cal Sel (CP-461) to “AI1” (1) to Select AI1 for calibration.
3. Set Analog Cal Ref (CP-462) to “A” (1) to select point A.

NOTE: The old calibration data will be overwritten.

4. Set Analog Cal EN (CP-460) to “On” (1) to start calibration.
5. Adjust the analog voltage until the meter reads the voltage that you want set for point A. This is generally your smallest (or negative) voltage point.
6. Enter the exact voltage measured by the meter into AnalogRef Val (CP-463).
7. Set Analog Cal Ref (CP-462) to “B” (2) to select point B.
8. Adjust the analog voltage until the meter reads the voltage that you want use for point B. This is generally your largest (or positive) voltage point.
9. Enter the exact voltage measured by the meter into AnalogRef Val (CP-463).
10. Set Analog Cal EN (CP-460) to “Off” (0) to disable further calibration.

Ext Line Speed Input:

1. Connect the Analog voltage to the Ext Line Speed Input (JA pins 3,4). Connect a voltmeter between pins 3 and 4.

2. Set Analog Cal Sel (CP-461) to “AI2” (2) to Select AI2 for calibration.

3. Set Analog Cal Ref (CP-462) to “A” (1) to select point A.

NOTE: The old calibration data will be overwritten.

4. Set Analog Cal EN (CP-460) to “On” (1) to start calibration.

5. Adjust the analog voltage until the meter reads the voltage that you want set for point A. This is generally your smallest (or negative) voltage point.

6. Enter the exact voltage measured by the meter into AnalogRef Val (CP-463).

7. Set Analog Cal Ref (CP-462) to “B” (2) to select point B.

8. Adjust the analog voltage until the meter reads the voltage that you want use for point B. This is generally your largest (or positive) voltage point.

9. Enter the exact voltage measured by the meter into AnalogRef Val (CP-463).

12. Set Analog Cal EN (CP-460) to “Off” (0) to disable further calibration.

—NOTES—

System Setup/Control Parameters

INTRODUCTION TO CONTROL PARAMETERS

Parameters are divided into two classifications; Control Parameters (CP) and Monitor Parameters (MP). This section is about Control Parameters. Monitor Parameters are explained in *System Monitoring: Monitor Parameters.*

The parameters appear on the screens by a Parameter Name. The Help screens list the parameters by both their Parameter Name and by a numbered code, which is called the Parameter Code. The operational data is the Parameter Value.

		Parameter Name	Parameter Code	Parameter Value
Parameters =	Monitor Parameter	Line Speed	MP-40	0.000 (default)
	Control Parameter	Line Spd SP	CP-210	0.000 (default)

Note: All Control Parameters are designated by a small indicator "dot" to the left of the Parameter Name, as it appears on a screen (unlike Monitor Parameters, which do not have a small indicator "dot" to the left of the Parameter Name).

The CX-1102 is pre-loaded at the factory with a complete set of default Control Parameter values. The majority of these default settings are suitable for most applications and do not require modification.

Control Parameters allow you to enter data that is unique to your system (e.g., encoder resolution, Lead to Follower ratios, maximum RPM, setpoints, acceleration/deceleration ramp rates) by accessing a parameter screen and entering a parameter value. Once the Control Parameters are entered and the setup for the CX-1102 is complete, the Control Parameters can be "locked out" so that they become inaccessible from the Keypad. This feature prevents an inadvertent accidental entry. For details, refer to the Keypad Lockout screen in *System Setup/Control Parameters: Setup/Keypad Lockout Setup*. A synopsis of the information is also available by referencing Keypad Lockout (MP-103) in *Appendices: Appendix C.*

The following sections demonstrate how to use the Control Parameter screens. These sections include:

Setup	Alarms and Limits
Scaling	Blocks
Setpoints and Ramps	PLC
Tuning	

—NOTES—

SETUP

The Setup screens allow you to perform a varitey of load, save and setup functions, The “Load” parameters allow you to load Control Parameter values and the PLC program from either the backup or from the factory default. The “Save” parameters allow you to save the Control Parameter values and the PLC program to a backup copy. You can customize the Status screen for your specific requirements. The Serial Communications Setup screen includes parameters that configure the serial communications port.   When Keypad Lock Input is active, Control Parameter values can not be changed. The Keypad Lockout Setup screens allow you to specify which Control Parameters will be exempt from the lockout when the Keypad Lockout Input is active.The Video Setup screen includes the parameters that control the screen operation. Display Setup contrast and adjust the pixel intensity of the screen display. The Alarm Indicator Mask screen includes the parameters that determine which alarms and which numerical comparator outcomes will cause the ‘alm’ to flash in the lower-left corner of the screen. The DeviceNet setup includes Control Parameters for DeviceNet network communications.

Caution: To avoid damage to your system, the CX-1102 must be calibrated and the motor drive set up before you operate your system. Refer to *Drive Setup / Calibration: Calibration*.

The Setup screens are:

- Status Screen Setup
- Load and Save Parms
- Remote Scroll Setup
- Keypad Lock Setup
- Serial Comm Setup
- DeviceNet Setup
- Video Setup
- Alm Indicator Mask

STATUS SCREEN SETUP   P1/1

You can customize the six status lines, as well as the large number display and the E.U. line on the Status screen.   To customize the large number display, enter this code of the parameter that you want displayed in Lg Number Parm (CP-440). Use Large Number Units (CP-449) to select and customize the E.U. line that appears immediately below the large number display.   For each of the status lines (CP-441 through CP-446), enter the code of the parameter that you want to appear on the corresponding line. You can enter a "0" in status lines 2 - 6 if you want them to remain blank. You can also access and change Control Parameters 441 through 446 while you are in the Status screen by using the Code key. For details on the Code key, refer to the Status screen in *Operator Interface: Screen Operation.*

Lg Number Parm (CP-440)

Use Large Number Parameter (CP-440) to select the parameter that displays in the Large Number Display in the Status screen (refer to the status screen in *Operator Interface: Screen Operation*. You can also use the Code key to access and change CP-440 in the Status Screen.

Lg Number Units (CP-449)

Use Large Number Units (CP-449) to select the E.U. text that displays immediately below the Large Number Display in the Status screen (refer to the status screen in *Operator Interface: Screen Operation*). Enter the numeric code that identifies the E.U. for the Control Parameter displayed in the Large Number Parameter (CP-440). Refer to CP-449 in *Appendices: Appendix C* for the numeric code list. The Help screen for CP-449 also contains a partial list of numeric code options. In addition, you can also scroll through the numeric code options by accessing CP-449 with the Code key while you are in the in the Status screen.

Status Line 1 (CP-441)

Use Status Line 1 (CP-441) to select the parameter that displays on the first line, under the Large Number Display, of the Status screen (refer to the status screen in *Operator Interface: Screen Operation)*. You can also use the Code key to access and change CP-441 in the Status screen.

Status Line 2 (CP-442)

Use Status Line 2 (CP-442) to select the parameter that displays on the second line (under the Large Number Display) of the Status screen (refer to the status screen in *Operator Interface: Screen Operation)*. If you want this line to remain blank, enter a "0" in CP-442. You can also use the Code key to access and change CP-442 in the Status screen.

Status Line 3 (CP-443)

Use Status Line 3 (CP-443) to select the parameter that displays on the third line (under the Large Number Display) of the Status screen (refer to the status screen in *Operator Interface: Screen Operation)*. If you want this line to remain blank, enter a "0" in CP-443. You can also use the Code key to access and change CP-443 in the Status screen.

Status Line 4 (CP-444)

Use Status Line 4 (CP-444) to select the parameter that displays on the fourth line (under the Large Number Display) of the Status screen (refer to the status screen in *Operator Interface: Screen Operation)*. If you want this line to remain blank, enter a "0" in CP-444. You can also use the "Code key to access and change CP-444 in the Status screen.

Status Line 5 (CP-445)

Use Status Line 5 (CP-445) to select the parameter that displays on the fifth line (under the Large Number Display) of the Status screen (refer to the status screen in *Operator Interface: Screen Operation)*. If you want this line to remain blank, enter a "0" in CP-445. You can also use the "Code key to access and change CP-445 in the Status screen.

Status Line 6 (CP-446)

Use Status Line 6 (CP-446) to select the parameter that displays sixth line (under the Large Number Display) of the Status screen (refer to the status screen in *Operator Interface: Screen Operation)*. If you want this line to remain blank, enter a "0" in CP-446. You can also use the "Code key to access and change CP-446 in the Status screen.

LOAD & SAVE PARMS   P1/1

The Load and Store Parameters screen includes four parameters. The "Load" parameters allow you to load Control Parameter values and the PLC program from either the backup or from the factory default. The "Save" parameters allow you to save the Control Parameter values and the PLC program to a backup copy. The Control Parameters are located in two sections: the Main List CPs and the Block CPs. The Main List CPs are (CP-201 through CP-494). The Block CP's are (CP-500 through CP-667). You can load and save each section separately, or you can load and save both sections together .

Load Parms (CP-496)

Use Load Parameters (CP-496) to retrieve (load) parameter values from either the factory or the default backup list. You can specify which parameter values to load form the back up, per the list below. It is easier to select the Load Parameters values through the Help screen, however, you can enter the corresponding number directly into the Load Parameters (CP-496). A message will flash in the error and message status bar at the bottom of the screen to indicate the completion of the operation . The Load Parameters operation will not function while the CX-1102 is in "RUN".

6 = Load Dflts BlockCP	Load Factory Defaults into CP-500 through CP-667
5 = Load Dflts Main CP	Load Factory Defaults into CP-201 through CP-494
4 = Load Dflts All Cp	Load Factory Defaults into CP-201 through CP-667
3 = Load Backup BlockCP	Load Backup into CP-500 through CP-667
2 = Load Backup Main CP	Load Backup into CP-201 through CP-494
1 = Load Backup All Cps	Load Backup into CP-201 through CP-667
0 = No Change	

Load PLC Prgm (CP-497)

Use Load PLC Program (CP-497) to retrieve (load) either the backup for the PLC program which you have saved or the factory default PLC program. Enter "1" to load the backup PLC program or enter "2 " to load the factory default PLC program. You can also select the one of the two values through the "Help" screen. The loaded program is compiled and a message will flash in the error and message status bar at the bottom of the screen to indicate the completion of the operation. The Load PLC Program operation will not function while the CX-1102 is in "RUN".

2 = Load Dflt PLC Prg	Load Factory Default PLC program
1 = Load Backup PLC Prg	Load Backup PLC program
0 = No Change	

Save Parms (CP-498)

Use Save Parameters (CP-498) to save the current parameter values to the backup. You can specify which parameter values to save as backup, per the list below Either enter the corresponding number directly into the Save Parameters (see list below) or select the Save Parameters values through the "Help" screen. A message (Saved2 BkUp) will flash in the error and message status bar at the bottom of the screen to indicate the completion of the operation.

3 = Save Block CP's	Save CP-500 through CP-667 to Backup
2 = Save Main CP's	Save CP-201 through CP-494 to Backup
1 = Save All CP's	Save CP-201 through CP-667 to Backup
0 = No Change	

Save PLC Prgm (CP-499)

Enter a "1" in Save PLC Program (CP-499) to save the current PLC program to the backup. A message (Saved2 BkUp) will flash in the error and message status bar at the bottom of the screen to indicate the completion of the operation.

1 = Save PLC Program to Backup
0 = No Change

REMOTE SCROLL SETUP   P1/1

Rmt Scroll (CP-400)

In Remote Scroll (CP-400), enter the number of the Control Parameter that you want the Remote Scroll Up PLC bit (168) or the Remote Scroll Dn PLC bit (169) to increment or decrement by 1 least significant digit, at the Rmt Scroll Rate (CP-401).   To disable the function, set Rmt Scroll (CP-400) to “0” .

Rmt Scroll Rate (CP-401)

Remote Scroll Rate (CP-401) is the number of times per second, that the Control Parameter that you entered in Rmt Scroll (CP-400) is either incremented or decremented by 1 least significant digit , when the Remote Scroll Up PLC bit (168) or the Remote Scroll Dn PLC bit (169) is active.

KEYPAD LOCKOUT SETUP P1/2

When Keypad Lock Input is active, Control Parameter values can not be changed. The Keypad Lockout Setup screens allow you to specify which Control Parameters, or blocks of Control Parameters, will be exempt from the lockout when the Keypad Lockout Input is active. Use KyPdLk Mask (CP-480) in conjunction with the Unlock Control Parameters 481 - 488 to specify which Control Parameters are exempt from the lockout.

KyPdLk Mask (CP-480)

When the keypad lockout input is active (low), and Key Pad Lock Mask (CP-480) is set to either "0",“1”, “2”, “3”, or “4”, then certain groupings (see list below) of Control Parameters can be exempted (masked out) from the lockout. In addition, the individual Control Parameters that are specified in CPs 481 through 488 are also exempt. When Key Pad Lock Mask (CP-480) is set to “4”, then entire blocks of Control Parameters can be exempted in Unlock Block (CP-489). If Key Pad Lock Mask (CP-480) is set to “0”, then all of the Control Parameters are locked out and non are exempt, including CPs 418-489.

4 = UnLckBlk = Block Values of the Block Selected by Unlock Block (CP-489) and the Unlocked CP’s.
3 = Blk Vals = All BlockValues (CP-540-667) and the Unlocked CP’s are allowed to change.
2 = Setpnts = Setpoints (CP-210, 220, 230, 235, 240) and the Unlocked CP’s are allowed to change.
1 = UnlckCP = CP’s selected by the Unlock CP A - F are allowed to changed.
0 = Total Lockout (default).

Unlock CP A (CP-481)

Unlock Control Parameter A (CP-481) determines which Control Parameter can change, even when the keypad-lockout is active. For the Unlock Control Parameter A (CP-481) to function, KyPdLk Mask (CP-480) must be set to a value other than “0” (All Lock). Enter “0” in Unlock Control Parameter A (CP-481) to disable it from selecting any Control Parameter.

Unlock CP B (CP-482)
Unlock CP C (CP-483)
Unlock CP D (CP-484)
Unlock CP E (CP-485)
Unlock CP F (CP-486)
Unlock CP G (CP-487)
Unlock CP H (CP-488)

Control Parameters 481 - 488 are identical to each other. Refer to the description for Unlock CP A (CP-481).

KeyPad Lockout (MP-103)

Keypad Lockout (MP-103) displays the Keypad Lockout status. “On” indicates that the Keypad Lockout is active. When Keypad Lockout is active, Control Parameter values can not be changed. With the exception of the Control Parameters that are exempted by CP’s 480-489, the “OFF” indicates that the Keypad Lockout is not active. When the Keypad Lockout is not active, any Control Parameter can be changed.

KEYPAD LOCKOUT SETUP   P2/2

KyPdLk Mask (CP-480)

When the keypad Lockout input is active (low), and Key Pad Lock Mask (CP-480) is set to either "0", “1”, “2”, “3”, or “4”, then certain groupings (see list below) of Control Parameters can be exempted (masked out) from the lockout. In addition, the individual Control Parameters that are specified in CPs 481 through 488 are also exempt. When Key Pad Lock Mask (CP-480) is set to “4”, then entire blocks of Control Parameters can be exempted in Unlock Block (CP-489). If Key Pad Lock Mask (CP-380) is set to “0”, then all of the Control Parameters are locked out and non are exempt, including CPs 381-389.

4 = UnLckBlk = Block Values of the Block Selected by Unlock Block (CP-489) and the Unlocked CP’s.
3 = Blk Vals = All BlockValues (CP-540-667) and the Unlocked CP’s are allowed to change.
2 = Setpnts = Setpoints (CP-210, 220, 230, 235, 240) and the Unlocked CP’s are allowed to change.
1 = UnlckCP = CP’s selected by the Unlock CP A - F are allowed to changed.
0 = Total Lockout.

UnlockBlock (CP-489)

Use Unlock Block (CP-489) to choose which block of Control Parameters are exempt from the lockout, even when Keypad-lockout is active. Unlock Block (CP-489) is used in conjunction with KyPdLk Mask (CP-480), which must be set to “4”.   Control Parameters 481 - 488 are also exempt when KyPdLk Mask (CP-480) is set to “4” .   If Key Pad Lock Mask (CP-480) is set to “0”, all of the Control Parameters are locked out and none are exempt, including CPs 481-489.

KeyPad Lockout (MP-103)

Keypad Lockout (MP-103) displays the Keypad Lockout status. The Keypad Lockout is active when “On” is displayed. When Keypad Lockout is active, Control Parameter values can not be changed. With the exception of the Control Parameters that are exempted by CP’s 480-489. The Keypad Lockout is not active when “OFF” is displayed. When the Keypad Lockout is not active, any Control Parameter can be changed.

SERIAL COM SETUP P1/1

The Serial Communications Setup screen includes parameters that configure the serial communications port. Each CX-1102 that is connected on the same communications link, must have a unique Device Address (CP-470). The baud rate, frame format and record format must be consistent with other devices are communicating with the CX-1102.

Device Address (CP-470)

Device Address (CP-470) assigns the serial communications address for the CX-1102. This number should be different from any other units that are on the serial link.

Baud Rate (CP-471)

The Baud Rate (CP-471) determines the serial communications data transfer rate (see list below) in Bits/Sec. With a 10 bit frame length, the number of Frame/Sec would be 1/10 the Baud Rate.

1 = 300 bps = 300 Baud
2 = 600 bps = 600 Baud
3 = 1200 bps = 1200 Baud
4 = 2400 bps = 2400 Baud
5 = 4800 bps = 4800 Baud
6 = 9600 bps = 9600 Baud (default)
7 = 19200 bps = 19.2k baud

Frame Format (CP-472)

Frame Format (CP-472) determines the parity, the number of data bits and the number of stop bits for the serial communications.

1 = N,8,1 = No Parity, 8 data bits, 1 stop bit (10 bit frame - ASCII or Binary)
2 = E,7,1 = Even Parity, 7 data bits, 1 stop bit (10 bit frame-ASCII only)

Record Format (CP-469)

Record Format (CP-469) determines which type of data format (see list below) will be used for the serial communication.

3 = ASCII2 2 = ASCII 1 = BINARY

CRC Enable (CP-468)

If CRC Enable (CP-468) is set to “ON” (1), you must append a CRC value to all serial communications messages that are received by the CX-1102 (See *Serial Communications: Using Serial Communications*). The CX-1102 checks the CRC value against the the message contents (excluding the “STX”), then calculates a CRC value and appends it to all serial communications responses. If CRC Enable (CP-468) is set to “OFF” (0), the CX-1102 will ignore any CRC value that is appended to a message and will not append a CRC value to any serial communications responses.

1 = On (Enabled) 0 = Off (Disabled)

DEVICENET SETUP   P1/2

The DeviceNet Setup screens include parameters to configure the DeviceNet option card for network communications. Page 1 of the DeviceNet Setup screens includes the Serial Number attribute of the Identity Object and the MAC ID and Baud Rate attributes from the DeviceNet Object. Page 2 is used to enter the eight Parameter Codes for the Assembly Queue. Refer to "CX-1102 DeviceNet Card Technical Manual" for more detailed information on CX-1102 DeviceNet operations.

DN MAC ID (CP-438)

DN MAC ID is the DeviceNet Media Access Control Identifier. The MAC ID is used to assign a unique identifier or address to each node on the network. Assign a different MAC ID to each CX-1102 device on the network from 0 to 63.

DN Baud Rate (CP-439)

The DN Baud Rate is the network data or transfer rate. Enter the number from the listing below that corresponds to the desired baud rate:

1 = 125k bps
2 = 250k bps
3 = 500k bps

Serial Number (CP-495)

Serial Number is the serial number from the DeviceNet card in this CX-1102 controller. If the card was factory installed, the Serial Number should already be entered. If the card is being field installed, enter the Serial Number from the label on the card or recorded in the DeviceNet Card Technical Manual.

DEVICENET SETUP   P2/2

The following parameters are used to identify the eight parameters for the I/O Assembly Queue.

DN Write Parm 1 (CP-430)

Enter the number of a Control Parameter to be written to with the DeviceNet poll command in the I/O Assembly Queue.

DN Write Parm 2 (CP-431)

Enter the number of a Control Parameter to be written to with the DeviceNet poll command in the I/O Assembly Queue.

DN Write Parm 3 (CP-432)

Enter the number of a Control Parameter to be written to with the DeviceNet poll command in the I/O Assembly Queue.

DN Write Parm 4 (CP-433)

Enter the number of a Control Parameter to be written to with the DeviceNet poll command in the I/O Assembly Queue.

DN Read Parm 1 (CP-434)

Enter the number of a Control Parameter or Monitor Parameter to be read with the DeviceNet poll command in the I/O Assembly Queue.

DN Read Parm 2 (CP-435)

Enter the number of a Control Parameter or Monitor Parameter to be read with the DeviceNet poll command in the I/O Assembly Queue.

DN Read Parm 3 (CP-436)

Enter the number of a Control Parameter or Monitor Parameter to be read with the DeviceNet poll command in the I/O Assembly Queue.

DN Read Parm 4 (CP-437)

Enter the number of a Control Parameter or Monitor Parameter to be read with the DeviceNet poll Command in the I/O Assembly Queue.

VIDEO SETUP   P1/1

The Video Setup screen includes the parameters that control the screen operation. Video Mode (CP-474) allows you to change the format. Contrast Value (CP-475) allows you to adjust the intensity of the pixels. If the screen appears too light, increase the value in Contrast Value. If the screen appears too dark, decrease the value. This may vary from screen to screen.

Video Mode (CP-474)

Video Mode (CP-474) determines how the LCD Screen Display will be displayed, per the list below:

3 = Standard w/Border
2 = Reverse Video
1 = Standard Video (default)

Contrast Value (CP-475)

Contrast Value (CP-475) determines the contrast for the LCD Screen Display. The higher values darken the pixels and lower values lighten the pixels.

ALARM INDICATOR MASK   P1/1

The Alarm Indicator Mask screen includes the parameters that determine which alarms and which numerical comparator outcomes will cause the ‘alm’ to flash in the lower-left corner of the screen. The two parameters are bit mapped for each condition. Place a ‘1’ in the bit position corresponding to the alarms or compares that you want to activate the ‘alm’ indicator. In this case, a ‘0’ in the bit masks (or disables) the condition from activating the ‘alm’ indicator. Refer to *Appendices: Appendix C* for the Std Alm Msk (CP-378) and CustAlm Msk (CP-379) bit map list.

Std Alm Msk (CP-378)

The Standard Alarm Mask (CP-378) allows you to mask out specific alarms so that they will not cause the ‘alm’ indicator to flash (in the lower left-hand corner of the CX-1102 screen) by entering a “0” in the corresponding bit position (see figure below). You can also activate any of these alarm conditions by entering a “1” in the corresponding bit position. Refer to *Appendices: Appendix C* for the Alarm Mask (CP-378) bit map list.

CustAlm Msk (CP-379)

Custom Alarm Mask (CP-379) allows you to mask out the compare results so that they will not cause the ‘alm’ indicator to flash (in the lower left-hand corner of the CX-1102 screen) by entering a “0” in the corresponding bit position (see figure below). You can also activate any of these compare conditions by entering a “1” in the corresponding bit position. Refer to *Appendices: Appendix C* for the Compare Mask (CP-379) bit map list.

—NOTES—

SCALING

This section discusses the setup procedures for scaling. The CX-1102 allows you to use Engineering Units (e.g., feet, inches, revolutions) relative to a specific time (e.g., seconds, minutes) to control and monitor your system. The scaling screens will walk you through the scaling of:

- the frequency inputs from the Unwind and Wind sensors
- the control output signal to the drive
- the Analog inputs (2) signals
- the Line Speed (MP-40); which is the default parameter that appears in the large number display on the status screen

Caution: To avoid damage to your system, the CX-1102 must be calibrated and the motor drive set up before you operate your system. Refer to *Drive Setup / Calibration: Calibration*.

The CX-1102 scaling screens are:

- Unwind
- Wind
- Dancer
- Ext Line Speed

—NOTES—

STANDARD SIGNALS

The Standard Signals screens consist of the Unwind Feedback Input screen (page 1), the Unwind Control Output screen (page 2), the Wind Feedback Input screen (page 1), and the Wind Control Output screen (page 2).

Unwind Feedback Input

The Unwind Feedback Input signal is a frequency from the quadrature sensor for the unwind motor/roll. UwndGearRdcn (CP-260) and Uwnd PPR (CP-261) scale the Unwind Feedback signal from frequency (pulses per second, Hz) to UwndRoll RPM (MP-03).

Unwind Control Output

The Control Output Signal (SigU) is the low voltage output signal that is the control (or command) signal input to your drive. SigU typically represents a speed command since the majority of drives operate in the velocity mode.

The UwndCO Offset (CP-283) is calibrated at the factory and generally will not need to be re-calibrated in most applications. The UwndCO Offset is added to the control output signal in order to zero (or balance) any offset voltage that may be present in the output circuitry. It can be used to counteract a creep problem with the drive, if a drive balance pot (or digital adjustment) is not available. When operating the SigU in bipolar, unipolar or bipolar absolute mode, the UwndCO Offset should be set to zero the SigU output voltage. Refer to *Drive Setup/Calibration: Creep Calibration* for more details.

Wind Feedback Input

The Wiind Feedback Input signal is a frequency from the quadrature sensor for the wind motor/roll. WindGearRdcn (CP-265) and Wind PPR (CP-266) scale the Wind Feedback signal from frequency (pulses per second, Hz) to WindRoll RPM (MP-13).

Wind Control Output

The Control Output Signal (SigW) is the low voltage output signal that is the control (or command) signal input to your drive. SigW typically represents a speed command since the majority of drives operate in the velocity mode.

The WindCO Offset (CP-288) is calibrated at the factory and generally will not need to be re-calibrated in most applications. The WindCO Offset is added to the control output signal in order to zero (or balance) any offset voltage that may be present in the output circuitry. It can be used to counteract a creep problem with the drive, if a drive balance pot (or digital adjustment) is not available. When operating the SigW in bipolar, unipolar or bipolar absolute mode, the WindCO Offset should be set to zero the SigW output voltage. Refer to *Drive Setup/Calibration: Creep Calibration* for more details.

UNWIND / UNWIND FEEDBACK P1/2

UwndGearRdcn (CP-260)

Unwind Gear Reduction (CP-260) is the mechanical ratio between the encoder device and the Unwind roll axle. Determine the number of encoder rotations for one axle rotation.

PPR Uwnd (CP-261)

Pulses Per Revolution Unwind (CP-261) is the number of electrical pulses in one revolution of the encoder device mounted on the Unwind axis. The value may be called Counts, Lines, or Pulses by various encoder manufacturers. Do NOT multiply by four for quadrature encoders.

UwndEncPty (CP-264)

Unwind Encoder Polarity (CP-264) is a selection that determines whether the direction indicated by the Unwind encoder can be accepted as-wired, or whether its indicated polarity must be negated (change sign). Due to encoder and installation variations, there is no way to predict whether encoder signal A will lead, or lag, signal B during forward machine motion. This controller can electronically negate the raw encoder signal if needed.

2 = Negated (neg = fwd)
1 = Normal (pos = fwd) (default)

Uwnd Hz (MP-01)

Unwind Hertz (MP-01) displays the current frequency of the Unwind Encoder Input, in Hertz.

UwndEncRPM (MP-02)

Unwind Encoder RPM (MP-02) displays the current speed of the Unwind encoder in RPM, based on PPR Uwnd (CP-261).

UwndRollRPM (MP-03)

Unwind Roll RPM (MP-03) displays the rotational speed of the Unwind station axle. It may be different than the encoder speed, or the motor speed, due to gear ratios.

Uwnd Rot (MP-09)

Unwind Rotations (MP-09) displays a totalized rotational count of the Unwind Roll.

UNWIND / UNWIND CONTROL OUTPUT   P2/2

UwndCO Mode (CP-280)

Unwind Control Output Mode (CP-280) affects the range of Control Output (SigU) analog signal sent out to the Unwind axis. Unipolar mode issues only one polarity output, and assumes the axis drive is either not capable of reverse direction, or the user has chosen to never command it in a reverse direction. The sign (+/-) of this signal typically is "+" = fwd, and "-" = reverse, but the controller may be configured (UwndCO Plrty CP-282), or may have learned during setup, that the inverse polarity may be needed, as machines may vary in regard to which rotation direction is called forward. Bipolar mode allows both "+" and "-" signal polarities as needed for both forward and reverse operation. Bipolar allows reversal by discrete input LineSpeedReverse (LSRvs), or by accepting negative Line Speed Setpoints. Unipolar Reversible is similar to Unipolar, but will allow a reverse direction operation via the discrete input LineSpeedReverse (LSRvs), triggered by a relay that is wired to simultaneously give a reverse direction input command directly to the axis drive device itself (typically an AC Inverter). The controller will issue its normal output signal, but will expect the axis to actually rotate the other way, and will expect the quadrature encoder to confirm that reversed direction. Unipolar Brake is similar to Unipolar operation, but assumes the device physically operating the axis is a brake, rather than a motor or clutch. The command output signal is reverse sloped since brakes are assummed to apply more brake action, causing slower speed, as the signal increases in magnitude. Further a brake will apply least brake action, causing the web to be pulled off at a faster speed, when zero volts is seen. Thus brake mode is limited to the unwind axis.

4 = Unipolar Brake
3 = Bipolar Absolute
2 = Bipolar (default)
1 = Unipolar

UwndCOMaxVolts (CP-281)

Unwind Control Output Maximum Volts (CP-281) sets the upper limit on the voltage directed out to the unwind axis drive. Bipolar operation assumes plus or minus this value. It should be set equal, or lower, than the input specifications of the unwind axis drive. This value, in conjunction with Uwnd MaxRPM (CP-329), affects the feedforward term Uwnd Kff (CP-324).

UwndCO Plrty (CP-282)

Unwind Control Output Polarity (CP-282) determines whether a positive, or negative, signal voltage will operate the Unwind Axis in the forward direction, under the most basic normal operation. Actual direction may be temporarily different due to Overwrap/Underwrap selections.

2 = Negated (neg = fwd)
1 = Normal (pos = fwd) (default)

UwndCO Offset (CP-283)

Unwind Command Out Offset (CP-283) adjusts for small variations in the specifications of certain IC devices on this particular contrControl Outputoller board. Usually a very small number, it serves to true up the 0 volts end point of the output voltage scale. It is preset at the factory, and should not need field adjustments.

UwndCO Volts (MP-27)

Unwind Control Output Volts (MP-27) displays the present value, in volts, of the Control Output (SigU) signal to the unwind drive. It is a combination of Uwnd FFwd (MP-24) plus Uwnd Trim (MP-26).

UwndCO Bits (MP-28)

Unwind Control Output Bits (MP-28) displays the present value, in DAC bits, of the Control Output (SigU) signal to the unwind drive. UwndCO Bits is the UwndCO Volts (MP-27) expressed in DAC bits.

UwndCOMaxBits (MP-29)

Unwind Control Output Maximum Bits (MP-29) reflects the maximum allowed output in units of DAC bits. The value of UwndCOMaxVolts (CP-281) determines this parameter, based on the conversion of 32767 bits = 15 VDC.

WIND / WIND FEEDBACK   P1/2

WindGearRdcn (CP-265)

Wind Gear Reduction (CP-265) is the mechanical ratio between the encoder device and the Wind roll axle. Determine the number of encoder rotations for one axle rotation.

PPR Wind (CP-266)

Pulses Per Revolution Wind (CP-266) is the number of electrical pulses in one revolution of the encoder device mounted on the Wind axis. The value may be called Counts, Lines, or Pulses by various encoder manufacturers. Do NOT multiply by four for quadrature encoders.

WindEncPty (CP-269)

Wind Encoder Polarity (CP-269) is a selection that determines whether the direction indicated by the Wind encoder can be accepted as-wired, or whether its indicated polarity must be negated (change sign). Due to encoder and installation variations, there is no way to predict whether encoder signal A will lead, or lag, signal B during forward machine motion. This controller can electronically negate the raw encoder signal if needed.

2 = Negated (neg = fwd)
1 = Normal (pos = fwd) (default)

Wind Hz (MP-11)

Wind Hertz (MP-11) displays the current frequency of the Wind Encoder Input, in Hertz.

WindEncRPM (MP-12)

Wind Encoder RPM (MP-12) displays the current speed of the Wind encoder in RPM, based on PPR Wind (CP-266).

WindRollRPM (MP-13)

Wind Roll RPM (MP-13) displays the rotational speed of the Wind station axle. It may be different than the encoder speed, or the motor speed, due to gear ratios.

Wind Rot (MP-19)

Wind Rotations (MP-09) displays a totalized rotational count of the Wind Roll.

WIND / WIND CONTROL OUTPUT   P2/2

WndCO Mode (CP-285)

Wind Control Output Mode (CP-285) affects the range of Control Output (SigW) analog signal sent out to the wind axis. Unipolar mode issues only one polarity output, and assumes the axis drive is either not capable of reverse direction, or the user has chosen to never command it in a reverse direction. The sign (+/-) of this signal typically is "+"=fwd, and "-"=reverse, but the controller may be configured (WindCO Plrty CP-287), or may have learned during setup, that the inverse polarity may be needed, as machines may vary in regard to which rotation direction is called forward. Bipolar mode allows both "+" and "-" signal polarities as needed for both forward and reverse operation. Bipolar allows reversal by discrete input LineSpeedReverse (LSRvs), or by accepting negative Line Speed Setpoints. Unipolar Reversible is similar to Unipolar, but will allow a reverse direction operation via the discrete input LineSpeedReverse (LSRvs), triggered by a relay that is wired to simultaneously give a reverse direction input command directly to the axis drive device itself (typically an AC Inverter). The controller will issue its normal output signal, but will expect the axis to actually rotate the other way, and will expect the quadrature encoder to confirm that reversed direction. Unipolar Clutch is similar to Unipolar operation, but assumes the device physically operating the axis is a torque-mode clutch, rather than a motor. Clutch mode is limited to the wind axis.

4 = Unipolar Brake
3 = Bipolar Absolute
2 = Bipolar (default)
1 = Unipolar

WindCOMax Volts (CP-286)

Wind Control Output Maximum Volts (CP-286) sets the upper limit on the voltage directed out to the wind axis drive. Bipolar operation assumes plus or minus this value. It should be set equal, or lower, than the input specifications of the wind axis drive. This value, in conjunction with Wind MaxRPM (CP-329), affects the feedforward term Wind Kff (CP-339).

WindCO Plrty (CP-287)

Wind Control Output Polarity (CP-287) determines whether a positive, or negative, signal voltage will operate the wind axis in the forward direction, under the most basic normal operation. Actual direction may be temporarily different due to Overwrap/Underwrap selections.

2 = Negated (neg = fwd)
1 = Normal (pos = fwd) (default)

WindCO Offset (CP-288)

Wind Control Output Offset (CP-288) adjusts for small variations in the specifications of certain IC devices on this particular controller board. Usually a very small number, it serves to true up the 0 volts endpoint of the output voltage scale. It is preset at the factory, and should not need field adjustments.

WindCO Volts (MP-37)

Wind Control Output Volts (MP-37) displays the present value, in volts, of the Control Output (SigW) signal to the wind drive. It is a combination of WindFFwd (MP-34) plus Wind Trim (MP-36).

WindCO Bits (MP-38)

Wind Control Output Bits (MP-28) displays the present value, in DAC bits, of the Control Output (SigW) signal to the wind drive. WindCO Bits is the WindCO Volts (MP-37) expressed in DAC bits.

WindCO MaxBits (MP-39)

Wind Control Output Maximum Bits (MP-39) reflects the maximum allowed output in units of DAC bits. The value of WindCO Max Volts (CP-286) determines this parameter, based on the conversion of 32767 bits = 15 VDC.

—NOTES—

ANALOG SIGNALS

The Analog Signals screens consist of the Dancer Input screen (page 1) and the Ext Line Speed Input screen (page 1).

Dancer

The Dancer Input signal is used to determine Dancer Ctnt (MP-82).

Refer *Drive Setup/Calibration: Calibration* for additional details.

Ext Line Speed Input

The Ext Line Speed Input signal may be used to control the Line Speed only when App Select (CP-202) is set to "1" (Dancer Trimmed Unwind, both axis) or "2" (Dancer Trimmed Wind, both axis) and LineSpdSrc (CP-203) is set for External Line Speed.

Refer *Drive Setup/Calibration: Calibration* for additional details.

DANCER / DANCER INPUT   P1/1

DncrFullVolts (CP-271)

Dancer Full Volts (CP-271) is part of the Dancer scale factor setup, with CP-272 and CP-273. The value is the actual voltage expected from the Dancer position sensor (Pot, Sonar, Optical sensor, etc.) when the Dancer arm is at the full end of its travel, with maximum web content.

DncrEmptyVlts (CP-273)

Dancer Empty Volts (CP-273) is part of the Dancer scale factor setup, with CP-271 and CP-272. The value is the actual voltage expected from the Dancer position sensor (Pot, Sonar, Optical sensor, etc.) when the Dancer arm is at the empty end of its travel, with minimum web content.

DncrCntFull (CP-272)

Dancer Content at Full Volts (CP-272) is part of the Dancer scale factor setup, with CP-271 and CP-273. The value is the Web Content, or the amount of web material (in Web EU's CP-208), stored in the dancer station when the dancer is in its full travel position.

Dancer SP (CP-250)

Dancer Setpoint (CP-250) is the desired nominal dancer operating content (position). Any deviation of actual dancer position will result in a speed adjustment at the dancer trimmed axis, in the correct direction to return the dancer toward this setpoint position. Units are Web EU. The amount of web material in the dancer station is the content. The angular dancer arm position, or the height of the dancer bar must be translated by the user into terms of web material content. One half of the value in DncrCntFull (CP-272) would be typical.

Dancer State (MP-58)

Dancer State (MP-58) displays the present condition of the Dancer LED mounted on the Analog board. The LED conditions indicate various specific Dancer arm states.

3 = Between limits - OK	= LED Green
2 = Full limit	= LED Orange
1 = Empty limit	= LED Red
0 = Not calibrated	= LED Off

Dancer Bits (MP-80)

Dancer Bits (MP-80) displays the ADC receiving the analog Dancer signal.

Dancer Volts (MP-81)

Dancer Volts (MP-81) displays the analog Dancer signal. Note that the dancer may not generate the full range of voltage. Configurations that generate larger voltage swings may attain higher accuracy in diameter and line speed calculations.

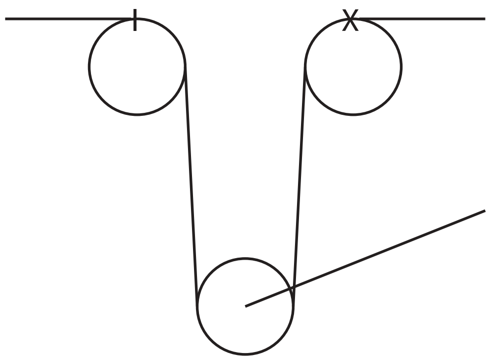
Dancer Ctnt (MP-82)

Dancer Content (MP-82) displays the estimation of the amount of web material presently stored within the dancer assembly. It assumes that there is a linear relationship between dancer volts and dancer content.

DANCER CONTENT MEASUREMENT

Dancer content is the amount of material contained in the dancer. The Dancer content should be measured as the amount of material that is dispensed out of the dancer when the dancer is moved from full to empty.

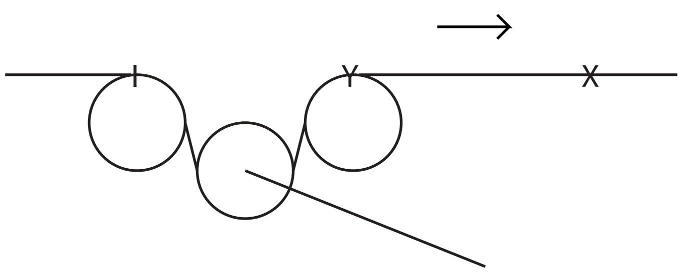
Dancer content measurement Example:



Move Dancer to the Dancer Full position.

Read value in Dancer Volts (MP-81) and enter this value into DncrFullVolts (CP-271).

Pull the material out of the dancer from the full position to the empty position.



Read value in Dancer Volts (MP-81) and enter this value into DncrEmptyVolts (CP-273).

Measure the distance from **X** to **Y** to determine the Dancer content.
Enter this value into DncrCtntFull (CP-272).
Units are in "Web EU"

Example: Line Speed EU's are ft/min then the Dancer EU's are feet.

$$\text{Dancer SP (CP-250)} = \frac{\text{Dancer Content}}{2} \quad \text{for mid-position Dancer operation}$$

EXT LINE SPEED / EXT LINE SPEED INPUT P1/1

ExtLSMax Volts (CP-276)

External Line Speed Maximum Volts (CP-276) is part of the scale factor setup for an external Line Speed analog signal source. This maximum volts, together with Ext LS Max (CP-277), determines the upper point of the calibration. See also CP-278 and CP-279 which determine the lower calibration point.

Ext LS Max (CP-277)

External Line Speed at Maximum Volts (CP-277) is part of the scale factor setup for an external Line Speed analog signal source. This speed, in Web EU/Tm units selected by UnitPrs Sel (CP-208), together with ExtLSMaxVolts (CP-276), determines the upper point of the calibration. See also CP-278 and CP-279 which determine the lower calibration point.

ExtLSMinVolts (CP-278)

External Line Speed Minimum Volts (CP-278) is part of the scale factor setup for an external Line Speed analog signal source. This minimum volts, together with Ext LS Min (CP-279), determines the lower point of the calibration. See also CP-276 and CP-277 which determine the upper calibration point.

Ext LS Min (CP-279)

External Line Speed at Minimum Volts (CP-279) is part of the scale factor setup for an external Line Speed analog signal source. This speed, in Web EU/Tm (CP-208), together with ExtLSMinVolts (CP-278), determines the lower point of the calibration. See also CP-276 and CP-277 which determine the upper calibration point.

Ext LS Bits (MP-86)

External Line Speed Bits (MP-86) displays the ADC receiving the analog Line Speed signal.

Ext LS Volts (MP-87)

External Line Speed Volts (MP-87) displays the analog Line Speed signal. It operates over the range of +/- 5 VDC. Reverse direction can be achieved via negative signal in some configurations, or via a positive signal plus a wire terminal reversing input switch.

Ext LineSpd (MP-88)

External Line Speed (MP-88) displays the Ext LS Volts (MP-87) signal converted into web line speed units. This display actively monitors the input signal even if the system is presently using another source for the Line Speed, or even if the value is later limited for various reasons.

DIAMETERS P1/1

UwndMinDia (CP-350)

Unwind Minimum Diameter (CP-350) sets a boundary for calculated diameters. It aids in the rejection of false diameter calculations caused by erratic machine conditions such as slack web or out-of-round rolls.

UwndMaxDia (CP-351)

Unwind Maximum Diameter (CP-351) sets a boundary for calculated diameters. It aids in the rejection of false diameter calculations caused by erratic machine conditions such a slack web or out-of-round rolls.

WindMinDia (CP-352)

Wind Minimum Diameter (CP-352) sets a boundary for calculated diameters. It aids in the rejection of false diameter calculations caused by erratic machine conditions such a slack web or out-of-round rolls.

WindMaxDia (CP-353)

Wind Maximum Diameter (CP-353) sets a boundary for calculated diameters. It aids in the rejection of false diameter calculations caused by erratic machine conditions such a slack web or out-of-round rolls.

UwndEstDia (MP-07)

Unwind Estimated Diameter (MP-07) is calculated from roll rotation and dancer movement. It can also be forced to the value in UwndDiaPrst (CP-364) via PLC action. It is used to translate web speed commands into roll RPM.

WindEstDia (MP-17)

Wind Estimated Diameter (MP-17) is calculated from roll rotation and dancer movement. It can also be forced to the value in WindDiaPrst (CP-365) via PLC action. It is used to translate web speed commands into roll RPM.

—NOTES—

SETPOINTS AND RAMPS

This section discusses the setup procedures for setpoints and ramps. The setpoint determines the speed at which you want your system to operate when the CX-1102 is in the “Run” mode. The setpoint is Line Speed in EU/Tm as determined from UnitPrs Sel CP-208) and Time Base (CP-209).

Caution: To avoid damage to your system, the CX-1102 must be calibrated and the motor drive set up before you operate your system. Refer to *Drive Setup / Calibration: Calibration*.

The CX-1102 setpoint and ramps setup screens are:

- Line Speed
- Run Ramps
- H-Stop Ramp
- Web Stretch
- Jog SP & Ramps
- Direct SP & Ramps

RUN APPLICATIONS

There are four applications of operation; the Lead Mode, the Follower Mode and the Direct Mode. Use App Select (CP-202) to enter the application of operation that you want to use when your system is in "Run". The setpoints that correspond to these four applications of operation are; the Line Spd SP (CP-210), the Web Stretch % (CP-220), the UwndDirect SP (CP-230), the WindDirect SP (CP-235) and the Jog SP (CP-240). Only one of these setpoints is active at any one time. The active setpoint is determined by the application of operation that you select in App Select (CP-202). The active Setpoint will also appear as the Setpoint X (CP-201).

The Lead Mode is generally used to control the *speed* of a single drive, but it can also be used to control the Lead speed of an entire process line.

The Follower Mode is generally used to control the *ratio* of one drive to another.

The Unwind Direct Mode is used for *direct* control of the value of UwndCO Volts (MP-27) and consequently the voltage at Control Output (SigU) (J3, pin 1). The Unwind Direct Mode is generally used as a diagnostic tool. However, the Unwind Direct Mode can also be used to set the drive's operating speed directly by simulating a pot.

The result of either the Lead Mode, the Follower Mode or the Jog Setpoint Mode calculation is displayed in LineSpd SRef (MP-41). The LineSpdSRef (MP-41) is the reference speed in feedback Engineering Units per time (Fb EU/Tm). The Direct Mode caluclation is not displayed in LineSpdSRef (MP-41) because the Direct Mode forces the Control Output (SigU) to match the Direct SP (CP-130).

App Select (CP-202)

Application Select (CP-202) determines which internal control algorithm will be active. The selection is based upon which axis are controlled by a speed command output from this device. And which axis should respond to correct a displacement of the dancer arm. This selection is made during initial setup. It can not be changed during RUN.

4 = Dancer trims Wind.
3 = Dancer trims Unwind.
2 = Operate both axis. Dancer trims Wind.
1 = Operate both axis. Dancer trims Unwind.
0 = Direct Mode both axis.

LINE SPEED

The Line Spd SP (CP-210) is the desired line speed (e.g., feet/minute) at which you want you system to operate.

The equation that governs this is:

LineSpdSRef (MP-41) = Line Spd SP (CP-210)

The Line Spd SP (CP-210) is only used for App Sel (CP-202) is set to "1" Dancer Trimmed Unwind, both axis or set to "2" Dancer Trimmed Wind, both axis and when the LineSpdSrc (CP-203) is set to "1" (CP-210).

LINE SPEED P1/1

Setpoint X (CP-201)

Setpoint X (CP-201) displays the active commanded Line Speed Setpoint. Setpoint X is a quick access, dynamically assigned parameter that is a mirror of the currently commanded Line Speed regardless of the source. It may display Line Spd SP (CP-210), or Pot LineSpd (MP-88) depending upon application choices. The label will change dynamically to indicate which parameter is being mirrored. If Line Spd SP (CP-210) is active, then any change to Setpoint X, (temporarily labeled LineSpeed X) will also change CP-210.

App Select (CP-202)

Application Select (CP-202) determines which internal control algorithm will be active. The selection is based upon which axis are controlled by a speed command output from this device. And which axis should respond to correct a displacement of the dancer arm. This selection is made during initial setup. It can not be changed during RUN.

4 = Dancer trims Wind.
3 = Dancer trims Unwind.
2 = Operate both axis. Dancer trims Wind.
1 = Operate both axis. Dancer trims Unwind.
0 = Direct Mode both axis.

LineSpdSrc (CP-203)

Line Speed Source (CP-203) selects the method of determining the desired line speed of the controlled axis. It can be a numerical entry via Line Speed SP (CP-210), an external Potentiometer or remote analog signal, or derived from the encoder mounted on an external lead axis which is controlled by another user-supplied system.

2 = Analog Input
1 = Line Speed (CP-210) (default)

Line Spd SP (CP-210)

Line Speed Setpoint (CP-210) is the numerically entered desired Line Speed. The units were determined by CP-208 and CP-209. It can be entered from the keypad, via serial link, or optionally via DeviceNet. It is considered the ideal, or target, speed. It may be internally reduced automatically if an axis diameter becomes too small to achieve the desired speed. Such automatic reductions would be revealed in LineSpdSRef (MP-41). Note that there are other alternatives for the source of the Line Speed command. See LineSpdSrc (CP-203).

Ext LineSpd (MP-88)

External Line Speed (MP-88) displays the Ext LS Volts (MP-87) signal converted into web line speed units. This display actively monitors the input signal even if the system is presently using another source for the Line Speed, or even if the value is later limited for various reasons.

Min LineSpd (CP-212)

Minimum Line Speed (CP-212) is a lower limit to the commanded line speed. It will prevent lower entries in Line Speed (CP-203). It also limits the acceptable line speed value from the alternative external line speed potentiometer. Caution: It can not limit an external master axis that is not under its control.

Max LineSpd (CP-211)

Maximum Line Speed (CP-211) is an upper limit to the commanded line speed. It will prevent higher entries in Line Speed (CP-203). It also limits the acceptable line speed value from the alternative external line speed potentiometer. Caution: It can not limit an external master axis that is not under its control.

DANCER SETUP   P1/1

Dancer SP (CP-250)

Dancer Setpoint (CP-250) is the desired nominal dancer operating content (position). Any deviation of actual dancer position will result in a speed adjustment at the dancer trimmed axis, in the correct direction to return the dancer toward this setpoint position. Units are Web EU. The amount of web material in the dancer station is the content. The angular dancer arm position, or the height of the dancer bar must be translated by the user into terms of web material content. One half of the value in DncrCntFull (CP-272) would be typical.

Dancer Auth (CP-331)

Dancer Authority (CP-331) sets a maximum, or upper limit, on the correction applied to the dancer trimmed axis by reason of displacement of the dancer from its target position. The dancer correction delta, a product of DncrCtnt Err (MP-83) and Dancer Gain (CP-332), is checked against this limit before it is used to adjust the dancer trimmed axis.

Dancer Gain (CP-332)

Dancer Gain (CP-332) adjusts the response to dancer content error. High gain can cause instability. Low gain can cause sluggish correction action.

Dancer Volts (MP-81)

Dancer Volts (MP-81) displays the analog Dancer Signal. Note that the dancer may not generate the full range of voltage. Configurations that generate larger voltage swings may attain higher accuracy in diameter and line speed calculations.

Dancer Ctnt (MP-82)

Dancer Content (MP-82) displays the estimation of the amount of web material presently stored within the dancer assembly. It assumes that there is a linear relationship between dancer volts and dancer content.

DncrCtnt Err (MP-83)

Dancer Content Error (MP-83) displays the difference between requested Dancer SP (CP-250) and actual Dancer Ctnt (MP-82). This error will be used to trim the speed of the dancer trimmed axis and attempt to restore the dancer content (position) toward the Dancer SP (CP-250).

Dancer Trim (MP-84)

Dancer Trim (MP-84) displays the amount of corrective line speed adjustment applied to the "dancer trimmed" roll. Proportional to the dancer error.

Dancer State (MP-58)

Dancer State (MP-58) displays the present condition of the Dancer LED mounted on the Analog board. The LED conditions indicate various specific Dancer arm states.

3 = Between limits - OK	= LED Green
2 = Full limit	= LED Orange
1 = Empty limit	= LED Red
0 = Not calibrated	= LED Off

RUN RAMPS

Since the ramp generator controls the rate of change of the velocity command, the velocity command is referred to as the ramped reference speed. The ramped reference speed is displayed in LineSpdRRef (MP-42). When the LineSpdSRef (MP-41) speed changes, the rate of change in the LineSpdRRef (MP-42) speed is limited by the acceleration and deceleration rates that you specify. You can specify the rates for “Run”, “H-Stop”, "Direct" and “Jog” independently.

Ramps may be used in each of the following situations:

1. The application requires slow starting and stopping to prevent product damage.
2. Minimize stress on your system during starting and stopping.
3. Minimize the overshoot of the response to step changes in the LineSpdSRef (MP-41).
4. Filter out high frequency components of the LineSpdSRef (MP-41) signal.
5. Keep the drive out of current limit (saturation) and thus maintain the linear properties of the drive. The control loop will perform better and operate more predictably.

Your drive's capacity should not be exceeded under normal operating loads. If you use acceleration rates in excess of your drive’s potential, then overshoot can occur. However, if the Lead in follower applications provides adequate ramps, you can set the Acl Tm RUN (CP-301) or Dcl Tm RUN (CP-303) to “0.5”or use Ramp Thd (CP-355). The Ramp Thd (CP-355) allows the ramp for large changes in the LineSpd SRef (MP-41) and bypasses the ramp for small or gradual changes. The ramp generator can be stopped in progress or bypassed through the PLC or by Cntrl Latch (CP-340).

Set the acceleration rate for the ramps by defining a reference speed for the ramps in Ref Ramps (CP-300). The acceleration rate can also be entered directly in Acl Rate RUN (CP-302), although you must also enter a valid reference speed in Ref Ramps (CP-300). This reference speed is generally the operating line speed. When you enter an acceleration time in Acl Tm RUN (CP-301), the CX-1102 automatically calculates the acceleration rate. Inversely, if you enter the acceleration rate in Acl Rt RUN (CP-302), the CX-1102 automatically calculates the acceleration time. The deceleration time and deceleration rate operate in the same way. When you enter a new reference speed, the CX-1102 automatically calculates the acceleration and deceleration times and preserves the given rates. The acceleration rate is defined by:

$$\text{acceleration rate} = \frac{\text{reference speed (EU/Tm)}}{\text{acceleration time (Seconds)}}$$

Likewise, the deceleration rate is defined by:

$$\text{deceleration rate} = \frac{\text{reference speed (EU/Tm)}}{\text{deceleration time (Seconds)}}$$

RUN RAMPS P 1/1

The Run Ramps parameters determine the acceleration and deceleration rates that are used during RUN. The Ref Ramps (CP-300) is the reference speed in EU/Tm used to define the RUN ramps. Acl Tm RUN (CP-301) is the time it would take to accelerate from “0” to the Ref Ramps (CP-300) speed. The Acl Rt RUN (CP-302) is the acceleration rate in EU/Tm/Sec. Dcl Tm RUN (CP-303) is the time it would take to decelerate from the reference speed to “0” speed. The Dcl Rt RUN (CP-304) is the deceleration rate in EU/Tm/Sec. Note that there are separate parameters that define the deceleration rates that are used for “H-Stop”.

Ref Ramps (CP-300)

The acceleration rate for the Lead Mode and the Follower Mode are determined by the Acl Tm RUN (CP-301) and the Referance Ramps (CP-300) The deceleration rate (from a faster speed to a slower speed) for the Lead Mode and the Follower Mode, are determined by the Dcl Tm RUN (CP-303) and the Ref Ramps (CP-300).

Acl Tm RUN (CP-301)

Acceleration Time RUN (CP-301) is the time, in seconds, that it takes to accelerate from 0 to the Ref Ramps (CP-300), while operating in the Lead or Follower Setpoint modes.

Acl Rt RUN (CP-302)

Acceleration Rate RUN (CP-302) is the acceleration rate that is used (while in Run) for the Lead and Follower Setpoints when the magnitude of the Scaled Reference increases.

Dcl Tm RUN (CP-303)

Deceleration Time RUN (CP-303) is the time in seconds, that it takes to decelerate from Ref Ramps (CP-300) speed to 0, while operating in the Lead or Follower Setpoint modes.

Dcl Rt RUN (CP-304)

Deceleration Rate RUN (CP-304) is the deceleration rate that is used (while in Run) for the Lead and Follower Setpoints when the magnitude of the Scaled Reference decreases.

Ramp Thd (CP-355)

When the diference between the LineSpdSRef (MP-41) and the LineSpdRRef (MP-42) is greater than Ramp Thd (CP-355), the ramp will work normally. When the difference between the LineSpdSRef (MP-41) and the LineSpdRRef (MP-42) is less than or equal to Ramp Thd (CP-355), the ramp will be bypassed. This avoids ramp delays for small lead changes but still allows a ramp for large lead or for large Lead Setpoint changes.

H-STOP RAMP   P1/1

There are separate parameters that define the deceleration rate that is used for "H-Stop". However, Ref Ramps (CP-300) functions as the reference speed. Dcl Tm HStp (CP-307) is the time it would take to decelerate from the Reference Ramps speed to 0 for an "H-Stop". Dcl Rt HStp (CP-308) is the deceleration rate for "H-Stop".

Ref Ramps (CP-300)

The acceleration rate for the Lead Mode and the Follower Mode are determined by the Acl Tm RUN (CP-301) and the Ref Ramps (CP-300). The deceleration rate (from a faster speed to a slower speed) for the Lead Mode and the Follower Mode, are determined by the Dcl Tm RUN (CP-303) and the Ref Ramps (CP-300).

Dcl Tm HStp (CP-307)

Deceleration Time H-Stop (CP-307) is the time, in seconds, that it takes to decelerate from the Ref Ramps (CP-300) speed to 0, during H-Stop, while operating in Jog, or the Lead Mode or the Follower Mode.

Dcl Rt HStp (CP-308)

Deceleration Rate H-Stop (CP-308) is the deceleration rate that is used for H-Stop, while operating in Jog, or the Lead Mode or the Follower Mode.

STRETCH   P1/1

App Select (CP-202)

Application Select (CP-202) determines which internal control algorithm will be active. The selection is based upon which axis are controlled by a speed command output from this device. And which axis should respond to correct a displacement of the dancer arm. This selection is made during initial setup. It can not be changed during RUN.

4 = Dancer trims Wind.
3 = Dancer trims Unwind.
2 = Operate both axis. Dancer trims Wind.
1 = Operate both axis. Dancer trims Unwind.
0 = Direct Mode both axis.

Stretch % (CP-220)

Stretch % (CP-220) determines the ratio of dancer trimmed axis line speed to non-dancer trimmed axis line speed. A value of 0.0 % means equal line speeds, and would be appropriate for a non-extensible (no stretch) web material. If a material is expected to stretch, use a positive %, and if expected to shrink, use a negative %. The dancer control action will attempt to automatically compensate for an incorrect stretch %. However, the dancer will remain closer to the desired position, and dynamic response will be enhanced if this Stretch % properly reflects the expected stretch/ shrink %.

Min Stretch % (CP-222)

Min Stretch % (CP-222) is a lower limit to the Stretch % (CP-220). It will prevent lower entries in Stretch % (CP-220).

Max Stretch % (CP-221)

Max Stretch % (CP-221) is an upper limit to the Stretch % (CP-220). It will prevent higher entries in Stretch % (CP-220).

—NOTES—

JOG SP & RAMPS   P1/1

The Jog screen includes the parameters that are related to “Jog” operation. The Jog Setpoint as well as the accel and decel rates can be set in this screen. The loop type selection for the “Jog” mode of operation is also available on this screen. You can “Jog” in open loop mode, which uses Kff to generate the Control Output (SigU/SigW) based on the desired Jog Setpoint. You can also “Jog” in closed velocity loop which uses Kff and the PID loop to generate the Control Output (SigU/SigW) based on the desired Jog Setpoint. The closed loop operation requires Feedback, but should result in more accurate operating speed and better speed regulation.

There are also parameters to define the ramps used for “Jog”. The Jog SP (CP-240) in RPM functions as the reference speed. The Acl Tm Jog (CP-241) is the that time it will take to accelerate from “0” speed to the Jog SP. The Acl Rt Jog (CP-242) is the acceleration rate for “Jog”. Dcl Tm Jog (CP-243) is the time it should take to decelerate from the Jog SP to “0” speed. The Dcl Rt Jog (CP-244) is the deceleration rate used when the Jog SP is changed to a lower value as well as when both the Jog Forward and the Jog Reverse Inputs are deactivated and the axis is in Jog-Stop State until it reaches "0" speed.

Jog SP (CP-240)

The Jog Setpoint (CP-240) is the speed, in RPM, at which Jog ramps when it is activated. The Jog ramp rates are referenced to this speed.

Acl Tm Jog (CP-241)

Acceleration Time Jog (CP-241) is the time, in seconds, that it takes to accelerate from “0” to the Jog SP (CP-240).

Acl Rt Jog (CP-242)

Acceleration Rate Jog (CP-242) is the rate, in RPM per second, that it takes to accelerate when Jog is activated.

Dcl Tm Jog (CP-243)

Deceleration Time Jog (CP-243) is the time, in seconds, that it takes to decelerate from Jog SP (CP-240) to “0”, when the Jog Input is deactivated or when switching between “Jog Fwd” and “Jog Rvs”.

Dcl Rt Jog (CP-244)

Deceleration Rate Jog (CP-244) is the rate, in RPM per second, that is used when the Jog Input is deactivated or when switching between “Jog Fwd” and “Jog Rvs”.

Jog Loop Mode (CP-321)

Jog Loop Mode (CP-321) identifies the type of control loop (see list below) that is used during Jog.

1 = Velocity Loop (default)
0 = Open Loop

DIRECT SP & RAMPS

Direct Setpoint Mode puts a voltage on the Control Output (SigU/SigW). The UwndDirect SP (CP-230)/ WindDirect SP (CP-235) sets this voltage directly. The CX-1102 must be in “Run”.

Restrictions to the polarity of the output signal can be done with the UwndCO Mode (CP-280)/WindCO Mode (CP-285) on page 2 of the Scaling / Unwind / Unwind Control Out and/or page 2 of the Scaling / Wind / Wind Control Out screen.

Direct Setpoint Mode is used to directly control the voltage on the Control Output (SigU/SigW), which connects to the drive. It is typically used as a diagnostic tool, but could be as a pot replacement for indirectly setting the operating speed of the drive. When using Direct Setpoint Mode, the Control Output (SigU/SigW) voltage will be fixed at the value you enter into the UwndDirect SP (CP-230)/WindDirect SP (CP-235). It is an open loop operation and there is no attempt at controlling the Feedback speed. There is only one format available to Direct mode operation. There are separate ramp parameters associated with Direct Mode.

The defining equation for Direct Setpoint Mode:

UwndCO Volts (MP-27) volts = UwndDirect SP (CP-230) volts or
WindCO Volts (MP-37) volts = WindDirect SP (CP-235) volts

Since the Direct Setpoint Mode is used to directly output a given voltage rather than command a speed, it must have separate parameters to define the ‘voltage’ ramp. The UwndCOMaxVolts (CP-281) and WindCOMaxVolts (CP-286) are the reference voltages used to define the Direct ramps. The Acl Tm Drct (CP-311) is the time it would take to increase the Control Output (SigU/SigW) voltage from “0” volts to the reference voltage. The Dcl Tm Drct (CP-312) is the time it would take to decrease the Control Output (SigU/SigW) Volts from reference voltage to “0” volts.

The following pages display a synopsis of the Direct mode parameters.

DIRECT SP & RAMPS   P1/1

App Select (CP-202)

Application Select (CP-202) determines which internal control algorithm will be active. The selection is based upon which axis are controlled by a speed command output from this device. And which axis should respond to correct a displacement of the dancer arm. This selection is made during initial setup. It can not be changed during RUN.

4 = Dancer trims Wind.
3 = Dancer trims Unwind.
2 = Operate both axis. Dancer trims Wind.
1 = Operate both axis. Dancer trims Unwind.
0 = Direct Mode both axis.

Uwnd Direct SP (CP-230)

Unwind Direct Setpoint (CP-203) is active only in Direct Mode (CP202=0). It sends a voltage value directly to the Control Output (SigU) terminal. Run/Stop commands are recognized, but no other control function is active. All encoder and dancer signals are ignored.

Wind Direct SP (CP-235)

Wind Direct Setpoint (CP-235) is active only in Direct Mode (CP202=0). It sends a voltage value directly to the Control Output (SigW) terminal. Run/Stop commands are recognized, but no other control function is active. All encoder and dancer signals are ignored.

Acl Tm Drct (CP-311)

Acceleration Time Direct (CP-311) is the time, in seconds, that it takes to accelerate from 0 to the UwndCOMaxVolts (CP-281) and/or WindCOMaxVolts (CP-286) voltage, while operating in the Direct Mode.

Dcl Tm Drct (CP-312)

Deceleration Time Direct (CP-312) is the time, in seconds, that it takes to decelerate from the UwndCOMaxVolts (CP-281) and/or WindCOMaxVolts (CP-286) voltage to 0 volts, while operating in the Direct Mode.

UwndCO Volts (MP-27)

Unwind Control Output Volts (MP-27) displays the present value, in volts, of the Control Output (SigU) signal to the unwind drive. It is a combination of Uwnd FFwd (MP-24) plus Uwnd Trim (MP-26).

WindCO Volts (MP-37)

Wind Control Output Volts (MP-37) displays the present value, in volts, of the Control Output (SigW) signal to the wind drive. It is a combination of WindFFwd (MP-34) plus Wind Trim (MP-36).

UwndRollRPM (MP-03)

Unwind Roll RPM (MP-03) displays the rotational speed of the Unwind station axle. It may be different than the encoder speed, or the motor speed, due to gear ratios.

WindRollRPM (MP-13)

Wind Roll RPM (MP-13) displays the rotational speed of the wind station axle. It may be different than the encoder speed, or the motor speed, due to gear ratios.

—NOTES—

TUNING

Tuning includes setting the PID and Feedforward tuning parameters.

Caution: To avoid damage to your system, the CX-1102 must be calibrated and the motor drive set up before you operate your system. Refer to *Drive Setup / Calibration: Calibration*.

The CX-1102 Tuning parameters are found in the following screens:

- Velocity Loop
- Feedforward
- Dancer
- Related Items

—NOTES—

Tuning

Tuning should only be performed after successful completion of “Setup”

Tuning without Web

Tuning the system without web allows you to isolate each axis from system interaction, doesn’t waste material, and there is no threat of web breakage. This method does require the dancer to be in its “loaded” position with Dancer Content Error (MP-83) negative to enable the system to be put into “RUN” while tuning without web. Also since system dynamics may change after web is threaded into the machinery, some fine tuning may be required.

<u>Initialization</u>

1. Enter “Both” (4) in FixedDiaSel (CP-207).
2. If possible, set UwndDiaPrst (CP-364) and WindDiaPrst (CP-365) so Line Speed = RPM.
   Example: CP-208 UnitPrs Sel = ft/in and CP-209 Time Base = minute
   CP-364 & CP-365 = 3.82 inches (approx. 1 ft circumference)
   1 ft/min = 1 RPM
3. Enter "0" into Dancer Gain (CP-332). ***Screen - Setpoints & Ramps/Dancer***
4. Enter into Ref Ramps the expected running line speed (units equivalent to CP-208 & CP-209).
   Screen - Setpoints & Ramps/Run Ramps
5. Enter into RUN Ramp times the minimum ½ second. ***Screen - Setpoints & Ramps/Run Ramps***
6. Enter into H-Stop Decel Ramp time the minimum ½ second.
   Screen - Setpoints & Ramps/H-Stop Ramp
7. Enter into LineSpd SP (CP-201 or CP-210) a slow speed (approximately 1/5 normal running speed).
   Screen - Setpoints & Ramps/Line Speed

   NOTE: When tuning you will be testing the response of each axis while changing setpoints.

<u>Feedforward</u>

1. Enter KffAdjUpdt (CP-342) for 1 Sec (3). ***Screen - Tuning/Feedforward pages 1 and 2***
2. Enter KffAutoSel (CP-343) for “Both” (if controlling both axis or set to the axis under control if only controlling one axis).
3. Enter “ON” (1) into Kff Auto En (CP-344).
4. “Run” the system for a few seconds and let the CX-1102 set the values for Uwnd MaxRPM (CP-329) and/or Wind MaxRPM (CP-339).
5. Enter “OFF” (0) into Kff Auto En (CP-344).

<u>Tuning</u>

Tune each axis with empty rolls if possible.

DANGER

When you send the drive into oscillations, the system may react with abrupt or violent operation.

1. Enter "0" into <u>all</u> PID “K” values. ***Screen - Tuning/Feedforward pages 1 and 2***
2. Put the system into RUN state. This may require supporting the dancer in the “Loaded” position so the CX-1102 goes into H-Stop state when the Load terminals are closed.

   NOTE: While adjusting the Kp, Ki, and Kd values, periodically change the LineSpd SP (CP-201) from a low line speed (RPM) to a higher line speed (RPM).

   NOTE: Tune one axis then the other using the same procedure.

3. Increase the “Kp” value by 100 until the motor becomes unstable (you observe slight vibration), then decrease the “Kp” value by 100 until the vibrations disappear.
4. Increase the “Ki” value by 10 until you see overshoot or the motor becomes unstable when changing Line Speed (sustained oscillations), then decrease the “Ki” value by 10 until the motor becomes stable again and there is acceptable overshoot when changing speeds.
5. Enter "1" (RPM) into UwndDerivThd (CP-328) and WindDerivThd (CP-338).
6. Increase the “Kd” value by 100’s while running steady at a low line speed until the motor/feedback begins to jitter, then decrease the value for “Kd” by 100 and increase the value for UwndDerivThd (CP-328) or WindDerivThd (CP-338) of the axis you are tuning by 1’s until the jittering (at low line speed) ceases. If the jittering does not quit, try decreasing the value of “Kd” also. After achieving smooth steady state running line speed operation, try changing between low and higher line speeds.

Observe the response of the axis.

Too much overshoot: Decrease “Ki” and/or increase “Kd”.
Jerky transitions between speeds: Decrease “Kp” and/or “Kd”.
Jittery at steady line speeds: Decrease “Kd” and/or increase Derivative Threshold.

Repeat the above steps (3 thru 6) for the other axis.

After successfully achieving smooth operation, H-Stop the CX-1102/System, and put the CX-1102 into F-Stop state.

<u>Re-configure the CX-1102 back to normal setup values</u>

1. Enter into the Set FixedDiaSel (CP-207) to correctly represent your system. If necessary change either UnitPrs Sel (CP-208) and/or Time Base (CP-209) to correctly define the units for your system.
2. Enter into the RUN Ramp acceleration and deceleration times/rates and the H-Stop deceleration time/rate to your desired times/rates.
3. Enter into LineSpd SP (CP-201) the value for normal running line speed.

<u>Dancer Tuning</u>

After successfully achieving smooth/acceptable operation for each axis under control it is now time to thread the machine and tune the Dancer operation.

1. Enter the value for Dancer Auth (CP-331) to be the same as the normal running line speed value in LineSpd SP (CP-201). ***Screen - Tuning/Dancer***
2. Enter "10" into Dancer Gain (CP-332).
3. Enter into the LineSpd SP (CP-201) a value to run at a low line speed.
4. Momentarily close the “Load” input to load the dancer.

NOTE: The dancer may travel past its setpoint position and converge back to the setpoint position very slowly. This response will get better after you have finished this procedure.

5. Put the system into "RUN" and observe the Dancer.
6. While running, increase the Dancer Gain (CP-332) by 10's until you observe the dancer oscillating around its setpoint position, then reduce the Dancer Gain until it stabilizes.
7. Try several sequences of H-Stop, Unload, Load, and Run while observing the Dancer.

NOTE: Too much Dancer Gain will cause the dancer to oscillate or become unstable, too little Dancer Gain will make the dancer "sluggish" and unresponsive. Adjust the Dancer Gain value to obtain acceptable smooth responsive operation (very little dancer movement).

8. If the Dancer appears to be "jerky" while running at steady line speeds try increasing the value(s) for UwndMinDelta (CP-346) and/or WindMinDelta (CP-347). If your system has one fixed diameter, try also adjusting the value for DncrMinDelta (CP-345). These are thresholds that are used to trigger new diameter calculations.
9. If the dancer exhibits occasional oscillations or appears to be too responsive after a "Load" operation, decrease the value for Dancer Auth (CP-331). This limits the amount of Dancer Trim (MP-84) applied to the "dancer-trimmed" axis. Too little Dancer Auth will cause the dancer to be "sluggish" in converging to its setpoint position or appear non-responsive. However limiting the Dancer Trim by lowering the Dancer Auth value may "dampen" any occasional oscillations observed while running at normal line speeds. After decreasing the Dancer Auth, if the dancer does not recover back to its setpoint position after a disturbance, increase the Dancer Auth value so the dancer converges back to its setpoint.

NOTE: Since coarse adjustments were made (by 10's and 100's) during this tuning process, fine tuning may now be done in smaller increments if necessary.

Tuning with Web

Tuning with web allows you to accurately and completely tune the system as a whole. However, tuning with web threaded into the system may make it slightly more difficult to achieve optimum performance due to system interaction.

> NOTE: Feedforward should be set prior to performing this tuning procedure. When using the "Automatic Feedforward Adjust" feature of the CX-1102, it is best to do so before the machine is threaded with web, unless the system will only be operated in one direction or you intend to leave the "Automatic Feedforward Adjust" feature enabled continuously. However, it is recommended that the "Automatic Feedforward Adjust" (CP-344) be set to "OFF" while tuning the system.

<u>Initialization</u>

1. Enter into the LineSpd SP (CP-201) approximately 1/10th the normal operating line speed for the system. ***Screen - Setpoints & Ramps/Line Speed***
2. Enter into the Ref Ramps (CP-300) a value for normal operating line speed. ***Screen - Setpoints & Ramps/Run Ramps***
3. Enter into the RUN Ramp acceleration time/rate and deceleration time/rate, and also the H-Stop deceleration time/rate to desired values. ***Screen - Setpoints & Ramps/Run Ramps***
4. Enter into the Dancer Auth (CP-331) a value for normal operating line speed. ***Screen - Tuning/Dancer***
5. Enter "10" into Dancer Gain (CP-332). ***Screen - Tuning/Dancer***
6. Enter "100" into Uwnd Kp (CP-325) and Wind Kp (CP-335). ***Screen - Tuning/Velocity Loop***
7. Enter "20" into Uwnd Ki (CP-326) and Wind Ki (CP-336). ***Screen - Tuning/Velocity Loop***
8. Enter "0" into Uwnd Kd (CP-327) and Wind Kd (CP-337). ***Screen - Tuning/Velocity Loop***

<u>Tuning</u>

DANGER

When you send the drive into oscillations, the system may react with abrupt or violent operation.

1. Momentarily close the "Load" input to load the dancer. Observe operation of the axis while it loads the dancer. Operation should be smooth. If not, reduce "Kp" and/or "Ki" values for the *Loading* axis until it loads the dancer smoothly. ***Screen - Tuning/Feedforward pages 1 and 2***

> NOTE: If the axis does not successfully load the dancer, check Jog Loop Mode (CP-321), make sure it is set to "Vel" (1) closed loop, if it is you may have to increase the values for "Kp" and "Ki" to allow the dancer to be loaded, or you may have to increase the Jog SP (CP-240), or decrease the "Jog" ramp times.

> NOTE: While tuning you will be observing the system stability while running at a steady line speed and while changing between a low and a higher line speed.

2. After successfully loading the dancer, momentarily close the "RUN" input to put the system into "RUN" state at a low line speed.
3. Observe the response of the non-dancer trimmed axis.

4. Increase the value of “Kp” for the non-dancer trimmed axis by 100 until you observe instability or vibration of the motor, roll, or dancer, then reduce the “Kp” value until the vibration disappears and the system runs smoothly.
5. Try changing from the 1/10th line speed setpoint to a line speed of approximately 1/4th of normal operating speed and back. Observe the system stability. Adjust “Kp” accordingly as discussed above.
6. Next increase the value of “Ki” for the non-dancer trimmed axis by 10 until you observe unacceptable overshoot or oscillatory instability during line speed setpoint changes, then reduce the value for “Ki” of the non-dancer trimmed axis until the axis operates smoothly while changing the line speed setpoint between the 1/10th and 1/4th of normal operating line speed setpoint values. Set for smooth stable operation with acceptable overshoot. Monitor the Line Speed (MP-40) for overshoot while changing line speeds.
7. Enter "1" (RPM) into UwndDerivThd (CP-328) and/or WindDerivThd (CP-338).

NOTE: The effect of the derivative term set by “Kd” is to decrease overshoot and damp out load disturbances while the system is running. The derivative term can help stabilize control if the system has rolls with large diameters and large inertias.

8. Enter a value of “Kd” for the non-dancer trimmed axis to approximately ½ the value set for “Kp” of the same axis. Observe the system operation at steady line speed. If it runs smoothly, try increasing the value of “Kd” by 100 until the system exhibits *jitter*, then reduce “Kd” until the *jitter* disappears.

NOTE: If the axis continually causes *jitter*, increase the value for its Derivative Threshold by 1’s until the *jitter* disappears. If this does not successfully remove the *jitter*, reduce the value for “Kd” until the axis and the system runs stable, then reduce the Derivative Threshold by 1’s until the *jitter* occurs, then increase it by 1’s until it disappears again.

9. Try changing the Line Speed Setpoint (CP-201) values again between the low setting and the higher setting. Observe the axis stability. If it is “jerky” while changing speeds, reduce the value for “Kd” by 100 until smooth transitions are observed during line speed changes.
10. Repeat Steps 4 thru 9 for the dancer trimmed axis.
11. Increase the value of “Kp-p” (CP-323 for Unwind or CP-333 for the Wind) for the non-dancer trimmed axis to achieve acceptable position hold during “Load”, “H-Stop”, and “Unload” states. Too much “Kp-p” may cause the motor and roll to oscillate when transitioning to H-Stop or Unload states from RUN or Jog, especially if the deceleration rates are fast. Increase this value enough to provide a steady roll during “Load”, “H-Stop”, and “Unload” states.

NOTE: Depending on system configuration and operation during “Load” and “Unload” states the value of “Kp-p” for the dancer trimmed axis may also have to be set per instructions in Step 11 above.

<u>Dancer Tuning</u>

After successfully achieving smooth/acceptable operation for each axis under control it is now time to tune the Dancer operation.

1. Enter into a value for Dancer Auth (CP-331) to be the same as the normal running line speed value in LineSpd SP (CP-201). ***Screen - Tuning/Dancer***
2. Enter "10" into Dancer Gain (CP-332).
3. Enter into LineSpd SP (CP-201) a value to run at a low line speed.
4. Momentarily close the “Load” input to load the dancer.

NOTE: The dancer may travel past its setpoint position and converge back to the setpoint position very slowly. This response will get better after you are finished with this procedure.

5. Put the system into “RUN” and observe the Dancer.
6. While running, increase the Dancer Gain (CP-332) by 10’s until you observe the dancer oscillating around its setpoint position, then reduce the Dancer Gain until it stabilizes.
7). Try several sequences of H-Stop, Unload, Load, and Run while observing the Dancer.

NOTE: Too much Dancer Gain will cause the dancer to oscillate or become unstable, too little Dancer Gain will make the dancer “sluggish” and unresponsive. Adjust the Dancer Gain value to obtain acceptable smooth responsive operation.

8. If the Dancer appears to be “jerky” while running at steady line speeds try increasing the value(s) for UwndMinDelta (CP-346) and/or WindMinDelta (CP-347). If your system has one fixed diameter, try also adjusting the value for DncrMinDelta (CP-345). These are thresholds that are used to trigger new diameter calculations.
9. If the dancer exhibits occasional oscillations or appears to be too responsive after a “Load” operation, decrease the value for Dancer Auth (CP-331). This limits the amount of Dancer Trim (MP-84) applied to the “dancer-trimmed” axis. Too little Dancer Auth will cause the dancer to be “sluggish” in converging to its setpoint position or appear non-responsive. However limiting the Dancer Trim by lowering the Dancer Auth value may “dampen” any occasional oscillations observed while running at normal line speeds. After decreasing the Dancer Auth, if the dancer does not recover back to its setpoint position after a disturbance, increase the Dancer Auth value so the dancer converges back to its setpoint.

NOTE: Since coarse adjustments were made (by 10’s and 100’s) during this tuning process, fine tuning may now be done in smaller increments if necessary.

VELOCITY LOOP UNWIND   P1/3

The Velocity Loop screen includes parameters for the loop-type selection, the PID parameters for the Velocity Loop (Kp, Ki, Kd), and four tuning monitor parameters

UwndCntrlLp (MP-72)

Unwind Control Loop (MP-72) displays the present operating mode of the unwind axis. These modes are automatically selected depending on the present system State (MP-50).

2 = PsnHld (Position Hold)
1 = Vel (Velocity Loop)
0 = OL (Open Loop)

Uwnd Kp (CP-325)

Unwind Kp (CP-325) is the proportional gain constant for the PID loop. An increase in Unwind Kp (CP-325) creates a quicker response and a smaller error. However, a value that is too large will cause instability. If the integral term is used, (i.e., Unwind Ki not equal to zero) then a nonzero Unwind Kp can actually improve the loop response and decrease the overshoot to some extent.

Uwnd Ki (CP-326)

Unwind Ki (CP-326) is the integral constant for the PID loop. Integral action provides for zero steady state error. Increase Unwind Ki (CP-326) for a faster convergence to zero error.   However, a value that is too large will cause instability.

Uwnd Kd (CP-327)

Unwind Kd (CP-327) is the derivative constant for the PID loop. Derivative action attempts to damp out overshoot. Its effect is highly dependent on Unwind Kp and Unwind Ki, but, generally, too large a value causes instability.

Uwnd Kp-p (CP-323)

Unwind Kp-p (CP-323) is the proportional gain constant applied to the position error when the unwind axle is in position hold. The position hold gain may need to be different than the Uwnd Kp (CP-325) under run conditions.

Uwnd Intgrl (MP-25)

Unwind Integral (MP-25) displays the value of the integral term (i.e., integrated error times the Ki constant) of the PID compensator. Uwnd Intgrl is displayed in Volts. Uwnd Intgrl (MP-25) is a conditioned error signal that serves to adjust the UwndCO Volts (MP-27) to help achieve the desired speed. It is part of the PID error correction algorithm.

Uwnd Trim (MP-26)

Unwind Trim (MP-26) displays the value of the output of the PID compensator. Uwnd Trim is displayed in Volts. Uwnd Trim is the combined conditioned error signals that, combined with the Uwnd FFwd (MP-24), will become the UwndCO Volts (MP-27). It is the combination of all three parts of the PID error correction algorithm.

UwndCO Volts (MP-27)

Unwind Control Output Volts (MP-27) displays the present value, in volts, of the Control Output (SigU) signal to the unwind drive. It is a combination of Uwnd FFwd (MP-24) plus Uwnd Trim (MP-26).

UwndRR Err (MP-22)

Unwind Ramped Reference Error (MP-22) displays the instantaneous difference between the commanded UwndRRef (MP-21) and the actual UwndRollRPM (MP-03).

VELOCITY LOOP WIND   P2/3

The Velocity Loop screen includes parameters for the loop-type selection, the PID parameters for the Velocity Loop (Kp, Ki, Kd), and four tuning monitor parameters

WindCntrlLp (MP-73)

Wind Control Loop (MP-73) displays the present operating mode of the wind axis. These modes are automatically selected depending on the present system State (MP-50).

2 = PsnHld (Position Hold)
1 = Vel (Velocity Loop)
0 = OL (Open Loop)

Wind Kp (CP-335)

Wind Kp (CP-335) is the proportional gain constant for the PID loop. An increase in Wind Kp (CP-335) creates a quicker response and a smaller error.   However, a value that is too large will cause instability.   If the integral term is used, (i.e., Wind Ki (CP-336) not equal to zero) then a nonzero Wind Kp (CP-335) can actually improve the loop response and decrease the overshoot to some extent.

Wind Ki (CP-336)

Wind Ki (CP-336) is the Integral constant for the PID loop. Integral action provides for zero steady state error. Increase Wind Ki (CP-336) for a faster convergence to zero error.   However, a value that is too large will cause instability.

Wind Kd (CP-337)

Wind Kd (CP-337) is the derivative constant for the PID loop. Derivative action attempts to damp out overshoot. Its effect is highly dependent on Wind Kp and Wind Ki, but, generally, too large a value causes instability.

Wind Kp-p (CP-333)

Wind Kp-p (CP-333) is the proportional gain constant applied to the position error when the wind axle is in position hold. The position hold gain may need to be different than the Wind Kp (CP-335) under run conditions.

Wind Intgrl (MP-35)

Wind Integral (MP-35) displays the value of the integral term (i.e., integrated error times the Ki constant) of the PID compensator. Integral is displayed in Volts. Wind Intgrl (MP-35) is a conditioned error signal that serves to adjust the WindCO Volts (MP-37) to help achieve the desired speed. It is part of the PID error correction algorithm.

Wind Trim (MP-36)

Wind Trim (MP-36) displays the value of the output of the PID compensator. Wind Trim is displayed in Volts. Wind Trim is the combined conditioned error signals that, combined with the WindFFwd (MP-34), will become the WindCO Volts (MP-37). It is the combination of all three parts of the PID error correction algorithm.

WindCO Volts (MP-37)

Wind Control Output Volts (MP-37) displays the present value, in volts, of the Control Output (SigW) signal to the wind drive. It is a combination of WindFFwd (MP-34) plus Wind Trim (MP-36).

WindRR Err (MP-32)

Wind Ramped Reference Error (MP-32) displays the instantaneous difference between the commanded WindRRef (MP-31) and the actual WindRollRPM (MP-13).

VELOCITY LOOP   P3/3

UwndTrim Auth (CP-356)

The trim contribution to the DAC output is limited to positive and negative Unwind Trim Authority (CP-356).

WindTrim Auth (CP-358)

The trim contribution to the DAC output is limited to positive and negative Wind Trim Authority (CP-358).

UwndIntgrl Lmt (CP-357)

The integral contribution to the trim term is limited to the positive and negative Unwind Integral Limit (CP-357). UwndIntgrl Lmt (CP-357) can decrease the effects of integral windup or it can limit the maximum effect of the integral term.

WindIntgrl Lmt (CP-359)

The integral contribution to the trim term is limited to the positive and negative Wind Integral Limit (CP-359). WindIntgrl Lmt (CP-359) can decrease the effects of integral windup or it can limit the maximum effect of the integral term.

Uwnd DerivThd (CP-328)

Unwind Derivative Threshold (CP-328) is the minimum speed error that is required before the derivative term in the PID algorithm gains influence. Increase the Unwind Derivative Threshold to prevent the derivative term from acting on signal noise.

Wind DerivThd (CP-338)

Wind Derivative Threshold (CP-338) is the minimum speed error that is required before the derivative term in the PID algorithm gains influence. Increase the Wind DerivThd (CP-338) to prevent the derivative term from acting on signal noise.

FEEDFORWARD UNWIND   P1/2

Kff Auto En (CP-344)

Kff Automatic Enable (CP-344) enables the CX-1102 automatic adjustment of Kff (CP-324) at the specified KffAdjUpt (CP-342) interval in RUN or JOG with the loop closed.

1 = ON = Enabled
0 = OFF = Disabled (default)

KffAutoSel (CP-343)

Kff Automatic Select (CP-343) selects the axis which will have its Kff value automatically adjusted during RUN at the KffAdjUpdt (CP-342) interval when enabled via KffAuto En (CP-344).

3 = Unwind & Wind (default)
2 = Wind
1 = Unwind

KffAdjUpdt (CP-342)

Kf Adjus Update (CP-342) sets the sampling period for the Kff calculation when it is enabled. KffAdjUpdt (CP-342) is the time interval between each new Kff calculation and the automatic store to the Kff parameters depending on whether Kff Auto En (CP-344) is enabled.

6 = 10 Min Update
5 = 1 Min Update
4 = 10 Sec Update
3 = 1 Sec Update (default)
2 = 500 mSec Update
1 = 250 mSec Update

Uwnd MaxRPM (CP-329)

Unwind Maximum Roll RPM (CP-329) describes the estimated maximum Unwind roll RPM, after consideration of max motor RPM, and motor-to-roll gear ratios. This value, in conjunction with UwndCOMaxVolts (CP-281), affects the feedforward term, Uwnd Kff (CP-324). It may be manually entered, or may be adjusted automatically during feedforward Kff Auto En (CP-344) mode.

Uwnd Kff (MP-23)

Unwind Kff (MP-23) is the feedforward gain for the unwind axis. It translates a target roll RPM into an approximate voltage output, which is then error-trimmed +/- to effect the desired speed. A reasonable accurate feedforward can minimize the need for error trim action, thus improving the response of the control loop. It is automatically adjusted for any change entered into UwndCOMax Volts (CP-281), or UwndMaxRPM (CP-329). It is also adjusted automatically during feedforward Kff Auto En (CP-344) mode.

Uwnd FFwd (MP-24)

Unwind Feedforward (MP-24) displays the estimated voltage command to the drive that will achieve the commanded UwndRRef (MP-21). It is the major portion of the UwndCO Volts (MP-27) signal.

Uwnd Intgrl (MP-25)

Unwind Integral (MP-25) displays the value of the integral term (i.e., integrated error times the Ki constant) of the PID compensator. Uwnd Intgrl is displayed in Volts. Uwnd Intgrl (MP-25) is a conditioned error signal that serves to adjust the UwndCO Volts (MP-27) to help achieve the desired speed. It is part of the PID error correction algorithm.

Uwnd Trim (MP-26)

Unwind Trim (MP-26) displays the value of the output of the PID compensator. Uwnd Trim is displayed in Volts. Uwnd Trim is the combined conditioned error signals that, combined with the Uwnd FFwd (MP-24), will become the UwndCO Volts (MP-27). It is the combination of all three parts of the PID error correction algorithm.

UwndCO Volts (MP-27)

Unwind Control Output Volts (MP-27) displays the present value, in volts, of the Control Output (SigU) signal to the unwind drive. It is the combination of Uwnd FFwd (MP-24) plus Uwnd Trim (MP-26).

FEEDFORWARD WIND   P2/2

Kff Auto En (CP-344)

Kff Automatic Enable (CP-344) enables the CX-1102 automatic adjustment of Kff (CP-324) at the specified KffAdjUpt (CP-342) interval in RUN or JOG with the loop closed.

1 = ON = Enabled
0 = OFF = Disabled (default)

KffAutoSel (CP-343)

Kff Automatic Select (CP-343) selects the axis which will have its Kff value automatically adjusted during RUN at the KffAdjUpdt (CP-342) interval when enabled via KffAuto En (CP-344).

3 = Unwind & Wind (default)
2 = Wind
1 = Unwind

KffAdjUpdt (CP-342)

Kf Adjus Update (CP-342) sets the sampling period for the Kff calculation when it is enabled. KffAdjUpdt (CP-342) is the time interval between each new Kff calculation and the automatic store to the Kff parameters depending on whether Kff Auto En (CP-344) is enabled.

6 = 10 Min Update
5 = 1 Min Update
4 = 10 Sec Update
3 = 1 Sec Update (default)
2 = 500 mSec Update
1 = 250 mSec Update

CP-339 WindMaxRPM

Wind Maximum RPM (CP-339) describes the estimated maximum Wind Roll RPM, after consideration of max motor RPM, and motor-to-roll gear ratios. This value, in conjunction with WindCOMax Volts (CP-286), affects the feedforward term, Wind Kff (MP-33). It may be adjusted automatically during feedforward Kff Auto En (CP-344) mode.

Wind Kff (MP-33)

Wind Kff (MP-33) is the feedforward gain for the wind axis. It translates a target roll RPM into an approximate voltage output, which is then error-trimmed +/- to effect the desired speed. A reasonable accurate feedforward can minimize the need for error trim action, thus improving the response of the control loop. It is automatically adjusted for any change entered into WindCOMax Volts (CP-286), or WindMaxRPM (CP-339). It is also adjusted automatically during feedforward Kff Auto En (CP-344) mode.

Wind FFwd (MP-34)

Wind Feedforward (MP-34) displays the estimated voltage command to the drive that will achieve the commanded WindRRef (MP-31). It is the major portion of the WindCO Volts (MP-37).

Wind Intgrl (MP-35)

Wind Integral (MP-35) displays the value of the integral term (i.e., integrated error times the Ki constant) of the PID compensator. Integral is displayed in Volts. Wind Intgrl (MP-35) is a conditioned error signal that serves to adjust the WindCO Volts (MP-37) to help achieve the desired speed. It is part of the PID error correction algorithm.

Wind Trim (MP-36)

Wind Trim (MP-36) displays the value of the output of the PID compensator. Wind Trim is displayed in Volts. Wind Trim is the combined conditioned error signals that, combined with the WindFFwd (MP-34), will become the WindCO Volts (MP-37). It is the combination of all three parts of the PID error correction algorithm.

WindCO Volts (MP-37)

Wind Control Output Volts (MP-37) displays the present value, in volts, of the Control Output (SigW) signal to the wind drive. It is the combination of WindFFwd (MP-34) plus Wind Trim (MP-36).

DANCER SETUP P1/1

Dancer Sp (CP-250)

Dancer Setpoint (CP-250) is the desired nominal dancer operating content (position). Any deviation of actual dancer position will result in a speed adjustment at the follower axis, in the correct direction to return the dancer toward this setpoint position. Units are Web EU. The amount of web material in the dancer station is the content. The angular dancer arm position, or the height of the dancer bar must be translated by the user into terms of web material content.

Dancer Auth (CP-331)

Dancer Authority (CP-331) sets a maximum, or upper limit, on the correction applied to the dancer trimmed axis by reason of displacement of the dancer from its target position. The dancer correction delta, a product of DncrCtnt Err (MP-83) and Dancer Gain (CP-332), is checked against this limit before it is used to adjust the dancer trimmed axis.

Dancer Gain (CP-332)

Dancer Gain (CP-332) adjusts the response to dancer content error. High gain can cause instability. Low gain can cause sluggish correction action.

Dancer Volts (MP-81)

Dancer Volts (MP-81) displays the analog Dancer Signal. Note that the dancer may not generate the full range of voltage. Configurations that generate larger voltage swings may attain higher accuracy in diameter and line speed calculations.

Dancer Ctnt (MP-82)

Dancer Content (MP-82) displays the estimation of the amount of web material presently stored within the dancer assembly. It assumes that there is a linear relationship between dancer volts and dancer content.

DncrCtnt Err (MP-83)

Dancer Content Error (MP-83) displays the difference between requested Dancer SP (CP-250) and actual Dancer Ctnt (MP-82). This error will be used to trim the speed of the dancer trimmed axis and attempt to restore the dancer content (position) toward the Dancer SP (CP-250).

Dancer Trim (MP-84)

Dancer Trim (MP-84) displays the amount of corrective line speed adjustment applied to the "dancer trimmed" roll. Proportional to the dancer error.

Dancer State (MP-58)

Dancer State (MP-58) displays the present condition of the Dancer LED mounted on the Analog board. The LED conditions indicate various specific Dancer arm states.

3 = Between limits - OK	= LED Green
2 = Full limit	= LED Orange
1 = Empty limit	= LED Red
0 = Not calibrated	= LED Off

RELATED ITEMS   P1/1

Loop Update (CP-341)

Loop Update (CP-341) is the time interval between the Control Output (SigU/SigW) calculations. This interval sets the sampling rate of the PID control loop.

3 = 100 mSec Update
2 = 10 mSec Update
1 = 1 mSec Update (default)

DncrMinDelta (CP-345)

Dancer Minimum Delta (CP-345) sets the smallest dancer movement that will be accepted for diameter calculations. Calculating diameter from extremely small movement can introduce diameter error, resulting in incorrect line speeds. However, waiting for a large movement, while improving diameter calulation accuracy, can cause a cyclic action in the dancer position as it drifts off, and is then quickly corrected.

UwndMinDelta (CP-346)

Unwind Minimum Delta (CP-346) sets the smallest amount of unwind roll rotation that will be accepted for diameter calculations. Calculating diameter from extremely small rotations can introduce diameter error, resulting in incorrect line speeds. However, waiting for a large rotation, while improving diameter calulation accuracy, can cause a cyclic action in the dancer position as it drifts off, and is then quickly corrected.

WindMinDelta (CP-347)

Wind Minimum Delta (CP-347) sets the smallest amount of Wind roll rotation that will be accepted for diameter calculations. Calculating diameter from extremely small rotations can introduce diameter error, resulting in incorrect line speeds. However, waiting for a large rotation, while improving diameter calulation accuracy, can cause a cyclic action in the dancer position as it drifts off, and is then quickly corrected.

Sig Fltr Sel (CP-348)

Signa Filter Select (CP-348) selects the signal to route through a low pass filter. The effect is visible on the speed value. Only one filter routine is available, and should be used on the most erratic input signal. While the damped signal will permit smoother control action, note that it will introduce a small delay in response to the original signal variations.

4 = Analog In 2
3 = Frequency In 2
2 = Analog In 1
1 = Frequency In 1
0 = Not Used (default)

SigFltrTmConst (CP-349)

Signal Filter Time Constant (CP-349) sets the time constant in milliseconds for the signal filter.

—NOTES—

ALARMS AND LIMITS

Alarms and Limits includes setting alarms and various operating limits.

Caution: To avoid damage to your system, the CX-1102 must be calibrated and the motor drive set up before you operate your system. Refer to *Setup / Calibration: Calibration*.

The CX-1102 Alarms and Limits parameters are found in the following screens:

- Alarms
- Limits

ALARMS

There are several monitored alarms built-in to the CX-1102. These alarms are included in the PLC Bit-Map and can be used together or separately to activate an output or any other function that is available to the PLC. To customize the alarms for your system, modify the PLC program to include the alarm bit. In the PLC, Web Broken (Bit 93) is defaulted to DO-6, which functions as a indicator for a "Web Broken" condition. The remaining alarms are not included in the default PLC program.

The PLC Bits that are influenced by the alarm Control Parameters are:

PLC Bit Name	Description
43 UwRR@0Spd	Unwind Ramped Reference < Zero Speed (CP-370) RPM
44 UwFb@0Spd	Unwind Fb RPM <= Zero Speed (CP-370) RPM
46 UwMaxAcDcl	Unwind FB Accel/Decel > Max Acl/Dcl (CP-372) (EU/Tm)/Sec
47 UwMtrNRsp	Unwind Motor Drive NOT responding for NO Resp Time (CP-372)
48 UwndMaxHz	Unwind Feedback >= Max LS Alm (CP-371) Web EU/Tm

PLC Bit Name	Description
53 WdRR@0Spd	Wind Ramped Reference < Zero Speed (CP-370) RPM
54 WdFb@0Spd	Wiind Fb RPM <= Zero Speed (CP-370) RPM
56 WdMaxAcDcl	Wind FB Accel/Decel > Max Acl/Dcl (CP-372) (EU/Tm)/Sec
57 WdMtrNRsp	Wind Motor Drive NOT responding for NO Resp Time (CP-372)
58 WindMaxHz	Wind Feedback >= Max LS Alm (CP-371) Web EU/Tm

Since the CX-1102 uses the UwFb@0Spd (PLC Bit 44) for internal control, it is critical that you enter a valid value for Zero Speed (CP-370). "F-Stop" and "H-Stop" use the UwFb@0Spd (PLC Bit 44) to determine when to force the UwdDrvEn (PLC Bit 41) to "0" (Off). If the feedback does not reach zero speed as indicated by UwFb@0Spd (PLC Bit 44) within 1/2 second, then the UwdDrvEn (PLC Bit 41) is reset to "0" (Off).

The CX-1102 has an internal 1/2 second timer that functions with "H-Stop" and "F-Stop". During "H-Stop" the timer engages only when the "H-Stop" ramp is completed. However, during "F-Stop" the timer engages immediately. If the feedback slows to zero speed before 1/2 second expires, the UwdDrvEn (PLC Bit 41) will immediately reset to "0" for "F-Stop".

Use Max LS Alm (CP-371) to determine the state of the UwndMaxHz (PLC Bit 48). The CX-1102 sets UwndMaxHz (PLC Bit 48) to "1" when UwndRollRPM (MP-03) is greater than Max LS Alm (CP-371). Otherwise the CX-1102 resets UwndMaxHz (PLC Bit 48) to "0".

The change in the feedback speed is constantly being compared to MaxAcl/Dcl (CP-272). If the magnitude of the change in Feedback speed is greater than Max Acl/Dcl, then the UwMaxAcDcl (PLC Bit 46) is set to "1". Otherwise the CX-1102 resets the bit to "0".

If the CX-1102 is in "Run" and the UwndCO Volts (MP-27) is greater than 1/8 the UwndCOMax Volts (CP-281), the LineSpd RRef (MP-42) is greater than the Zero Speed (CP-370) and the feedback speed is less than Zero Speed (CP-370) in excess of the time specified in NO Resp Time (CP-372), then the CX-

1102 sets UwMtrNRsp (bit 47) to “1”. Otherwise, the CX-1102 resets UwMtrNRsp (bit 47) to “0”.

Any number of problems can be indicated when the CX-1102 sets UwMtrNRsp (bit 47) to “1”. For example, it can indicate that neither the drive nor the motor is responding to a nonzero voltage input when the CX-1102 has a nonzero speed reference while in “Run”. If this occurs when the motor is turning, it may indicate a loss of feedback. The encoder or encoder wiring could be at fault. If this occurs and UwndRollRPM (MP-03) displays a nonzero value, then check the feedback scaling and the value for Zero Speed (CP-370). If the motor is not moving, the drive may not be enabled. Check the enable logic and wiring. If the motor is not moving, it could also indicate that the SigU/SigW Control Output signal is not getting to the drive. Check the SigU/SigW Control Output wiring. In addition, there could be physical restrictions to motion or there could be a malfunction in the motor or the drive.

To further customize the alarms there are Control Parameters that you can use to make comparisons, which are reflected in the PLC. The four Control Parameters that compare the value of a user-selected Monitor Parameter to a user-entered Control Parameter value are:

Cmpr1 Val (CP-392)
Cmpr2 Val (CP-393)
Cmpr3 Val (CP-394)
Cmpr4 Val (CP-395)

There are also four Control Parameters that establish the type of comparison between the Monitor Parameter and corresponding Control Parameter. These four Control Parameters are:

Cmpr1 Parm (CP-380)
Cmpr2 Parm (CP-381)
Cmpr3 Parm (CP-382)
Cmpr4 Parm (CP-383)

In addition, there are four Control Parameters that establish the constant value (or threshold) that acts as the trigger point of comparison between the Monitor Parameter and corresponding comparison type. These four Control Parameters are:

Cmpr1 Type (CP-386)
Cmpr2 Type (CP-387)
Cmpr3 Type (CP-388)
Cmpr4 Type (CP-389)

Enter the parameter number of the Monitor Parameter that you need for comparison, into one of the four “Cmprl Parm” Control Parameters listed above. Enter the comparison type into the corresponding “Cmpr1 Type ” parameter.

For a “less than” comparison, use the ‘>=’ compare type and use the compliment of the Cmpr Out PLC Bit in your PLC program.
For a “less than” or “equal to” comparison, use the ‘>’ compare type with the NOT of the Cmpr PLC Bit in your PLC program.

NOTE: The compare type also determines if the comparison is performed with the signed value or with the magnitudes of the values (absolute values).

Enter the constant value (or threshold) that you want as the trigger point of the comparison into the corresponding “Cmpr1 Val” parameter.

There are four PLC bits that establish the "truth" of the comparison between the three corresponding parameters: Cmpr Parm, Cmpr1 Type and Cmpr Val. These four Control Parameters are:

Cmpr1 Out (Bit 60)
Cmpr2 Out (Bit 61)
Cmpr3 Out (Bit 62)
Cmpr4 Out (Bit 63)

The result of each comparison is reflected in the corresponding PLC Bit; "1" displayed in the corresponding bit indicates that the result of the corresponding comparison is "true". Otherwise, the bit is cleared ("0").

STANDARD P1/3

Zero Speed (CP-370)

When the magnitude of the UwndRollRPM (MP-03) is less than or equal to Zero Speed (CP-370), the UwFb@0Spd bit (44) in the PLC is set to "1". This value, as well as the PLC UwFb@0Spd bit condition, is used in other transparent internal calculations that are based on feedback information.

Max LS Alm (CP-371)

Maximum Line Speed Alarm (CP-371) signals an over-speed condition. When the magnitude of the UwndRollRPM (MP-03) is greater than or equal to Max LS Alm (CP-371), then the UwndMaxHz bit (48) in the PLC is set to "1". You can output this alarm for indication or action, or you can use the alarm logically in the PLC.

UwndMaxRmp (CP-373)

When either the feedback acceleration or the deceleration is greater than or equal to Unwind Maximum Ramp (CP-373), then the UwMaxAcDcl bit (46) in the PLC is set to "1". You can output this alarm for indication or action, or you can use the alarm logically in the PLC.

WindMaxRmp (CP-374)

When either the feedback acceleration or the deceleration is greater than or equal to Wind Maximum Ramp (CP-374), then the WdMaxAcDcl bit (56) in the PLC is set to "1". You can output this alarm for indication or action, or you can use the alarm logically in the PLC.

NO Resp Time (CP-372)

When the Control Output (SigU) signal is greater than 1/16 UwndCOMax Volts (CP-281) and the UwndRollRPM (MP-03) is less than Zero Speed (CP-370) for longer than the No Resp Time (CP-372), then the UwMtrNRsp bit (47) is set to "1". If this scenario occurs, it is generally an indication that the feedback has been lost. It can also indicate that the drive is not enabled (or faulted out), that theControl Output (SigU) signal is not getting to the drive or that there may be a physical obstruction preventing motion.

CUSTOM P2/3

Cmpr1 Parm (CP-380)

Enter a Monitor Parameter code in Compare 1 Parameter (CP-380) that will act on the value in Cmpr1 Val (CP-392), by using the comparison type that you entered in Cmp1 Type (CP-386). If the comparison that is established by these three parameters is "true", then the PLC sets the Cmpr1 Out bit (60) in the PLC to "1", which can be used to trigger a user defined indicator.

> NOTE: See *Appendices: Appendix C* for the Monitor Parameters that are not available for the Compare 1 Parameter (CP-380).

Cmpr1 Type (CP-386)

Use Cmpr1 Type (CP-386) to establish the type of comparison (see list below) that will compare the Monitor Parameter that you entered in Cmpr1 Parm (CP-380) to the value that you entered in Cmpr1 Val (CP-392). If you require a comparison that is not listed, then set the Cmpr1 Out bit in the PLC to "Ld Not". This programs the comparison type to become a "Not" statement For example, to program "Magnitude Less Than" (<) use "NOT" Magnitude greater than or equal to (>=).

6 = 'mag =' if Magnitude of parm selected by Cmpr1 Parm = Cmpr1 Val, Cmpr1 Out = 1
5 = 'mag >=' if Magnitude of parm selected by Cmpr1 Parm >= Cmpr1 Val, Cmpr1 Out = 1
4 = 'mag >' if Magnitude of parm selected by Cmpr1 Parm > Cmpr1 Val, Cmpr1 Out = 1
3 = '=' if value of parm selected by Cmpr1 Parm = Cmpr1 Val, Cmpr1 Out = 1
2 = '>=' if value of parm selected by Cmpr1 Parm >= Cmpr1 Val, Cmpr1 Out = 1
1 = '>' if value of parm selected by Cmpr1 Parm > Cmpr1 Val, Cmpr1 Out = 1

Cmpr1 Val (CP-392)

Enter a value in Cmpr1 Val (CP-392) that will be compared to the Monitor Parameter in Cmpr1 Parm (CP-380), using the comparison type that you entered in Cmpr1 Type (CP-386). If the comparison that is established by these three parameters is "true", then the PLC sets the Cmpr1 Out bit (60) in the PLC to "1" .

Cmpr2 Parm (CP-381)

Enter a Monitor Parameter code in Compare 2 Parameter (CP-381) that will act on the value in Cmpr2 Val (CP-393), by using the comparison type that you entered in Cmp2 Type (CP-387). If the comparison that is established by these three parameters is "true", then the PLC sets the Cmpr2 Out bit (61) in the PLC to "1", which can be used to trigger a user defined indicator.

> NOTE: See *Appendices: Appendix C* for the Monitor Parameters that are not available for the Compare 2 Parameter (CP-381).

Cmpr2 Type (CP-387)

Use Cmpr2 Type (CP-387) to establish the type of comparison (see list below) that will compare the Monitor Parameter that you entered in Cmpr2 Parm, (CP-381) to the value that you entered in Cmpr2 Val (CP-393). If you require a comparison that is not listed, then set the Cmpr2 Out bit in the PLC to "Ld Not". This programs the comparison type to become a "Not" statement For example, to program "Magnitude Less Than " (<) use "NOT " Magnitude greater than or equal to (>=).

6 = 'mag =' if Magnitude of parm selected by Cmpr2 Parm) = Cmpr2 Val, Cmpr2 Out = 1
5 = 'mag >=' if Magnitude of parm selected by Cmpr2 Parm) >= Cmpr2 Val, Cmpr2 Out = 1
4 = 'mag >' if Magnitude of parm selected by Cmpr2 Parm) > Cmpr2 Val, Cmpr2 Out = 1
3 = '=' if value of parm selected by Cmpr2 Parm) = Cmpr2 Val, Cmpr2 Out = 1
2 = '>=' if value of parm selected by Cmpr2 Parm) >= Cmpr2 Val, Cmpr2 Out = 1
1 = '>' if value of parm selected by Cmpr2 Parm) > Cmpr2 Val, Cmpr2 Out = 1

Cmpr2 Val (CP-393)

Enter a value in Cmpr2 Val (CP-393) that will compared to the Monitor Parameter in Cmpr2 Parm (CP-381), using the comparison type that you entered in Cmpr2 Type (CP-387). If the comparison that is established by these three parameters is "true", then the PLC sets the Cmpr2 Out bit (62) in the PLC screen to "1".

CUSTOM   P3/3

Cmpr3 Parm (CP-382)

Enter a Monitor Parameter in Compare 3 Parameter (CP-382) that will act on the value in Cmpr3 Val (CP-394), by using the comparison type that you entered in Cmp3 Type (CP-388). If the comparison that is established by these three parameters is “true”, then the PLC sets the Cmpr3 Out bit (62) in the PLC to “1” , which can be used to trigger a user defined indicator.

NOTE: See *Appendices: Appendix C* for the Monitor Parameters that are not available for the Compare 3 Parameter (CP-382).

Cmpr3 Type (CP-388)

Use Cmpr3 Type (CP-388) to establish the type of comparison (see list below) that will compare the Monitor Parameter that you entered in Cmpr3 Parm (CP-382) to the value that you entered in Cmpr3 Val (CP-394). If you require a comparison that is not listed, then set the Cmpr3 Out bit in the PLC to “Ld Not”. This programs the comparison type to become a “Not” statement   For example, to program “Magnitude Less Than” (<) use “NOT” Magnitude greater than or equal to(>=).

6 = ‘mag =’	if Magnitude of parm selected by Cmpr3 Parm) = Cmpr3 Val, Cmpr3 Out = 1
5 = ‘mag >=’	if Magnitude of parm selected by Cmpr3 Parm) >= Cmpr3 Val, Cmpr3 Out = 1
4 = ‘mag >’	if Magnitude of parm selected by Cmpr3 Parm) > Cmpr3 Val, Cmpr3 Out = 1
3 = ‘=’	if value of parm selected by Cmpr3 Parm) = Cmpr3 Val, Cmpr3 Out = 1
2 = ‘>=’	if value of parm selected by Cmpr3 Parm) >= Cmpr3 Val, Cmpr3 Out = 1
1 = ‘>’	if value of parm selected by Cmpr3 Parm) > Cmpr3 Val, Cmpr3 Out = 1

Cmpr3 Val (CP-394)

Enter a value in Cmpr3 Val (CP-394) that will be compared to the Monitor Parameter in Cmpr3 Parm (CP-382), using the comparison type that you entered in Cmpr3 Type (CP-388).   If the comparison that is established by these three parameters is “true”, then the PLC sets the Cmpr3 Out bit (62) in the PLC to “1”.

Cmpr4 Parm (CP-383)

Enter a Monitor Parameter in Compare 4 Parameter (CP-383) that will act on the value in Cmpr4 Val (CP-395), by using the comparison type that you entered in Cmpr4 Type (CP-389).   If the comparison that is established by these three parameters is “true”, then the PLC sets the Cmpr4 Out bit (63) in the PLC Programming screen to “1”, which can be used to trigger a user defined indicator.

NOTE: See *Appendices: Appendix C* for the Monitor Parameters that are not available for the Compare 4 Parameter (CP-383).

Cmpr4 Type (CP-389)

Use Cmpr4 Type (CP-389) to establish the type of comparison (see list below) that will compare the Monitor Parameter that you entered in Cmpr4 Parm (CP-383) to the value that you entered in Cmpr4 Val (CP-395). If you require a comparison that is not listed, then set the Cmpr4 Out bit in the PLC to “Ld Not”. This programs the comparison type to become a “Not” statement   For example, to program “Magnitude Less Then ” (<) use “NOT ” Magnitude greater than or equal to (>=).

6 = ‘mag =’	if Magnitude of parm selected by Cmpr4 Parm) = Cmpr4 Val, Cmpr4 Out = 1
5 = ‘mag >=’	if Magnitude of parm selected by Cmpr4 Parm) >= Cmpr4 Val, Cmpr4 Out = 1
4 = ‘mag >’	if Magnitude of parm selected by Cmpr4 Parm) > Cmpr4 Val, Cmpr4 Out = 1
3 = ‘=’	if value of parm selected by Cmpr4 Parm) = Cmpr4 Val, Cmpr4 Out = 1
2 = ‘>=’	if value of parm selected by Cmpr4 Parm) >= Cmpr4 Val, Cmpr4 Out = 1
1 = ‘>’	if value of parm selected by Cmpr4 Parm) > Cmpr4 Val, Cmpr4 Out = 1

Cmpr4 Val (CP-395)

Enter a value in Cmpr4 Val (CP-395) that will be compared to the Monitor Parameter in Cmpr4 Parm (CP-383), using the boundary type that you entered in Cmpr4 Type (CP-389).   If the comparison that is established by these three parameters is “true”, then the PLC sets the Cmpr4 Out bit (63) in the PLC to “1” .

—NOTES—

LIMITS   P1/2

The Limits screen includes the parameters that limit certain operating conditions. Some appear on other screens that are more relevant to their function.

UwndTrim Auth (CP-356)

The trim contribution to the DAC output is limited to positive and negative Unwind Trim Authority (CP-356).

WindTrim Auth (CP-358)

The trim contribution to the DAC output is limited to positive and negative Wind Trim Authority (CP-358).

UwndIntgrl Lmt (CP-357)

The integral contribution to the trim term is limited to the positive and negative Unwind Integral Limit (CP-357). UwndIntgrl Lmt (CP-357) can decrease the effects of integral windup or it can limit the maximum effect of the integral term.

WindIntgrl Lmt (CP-359)

The integral contribution to the trim term is limited to the positive and negative Wind Integral Limit (CP-359). WindIntgrl Lmt (CP-359) can decrease the effects of integral windup or it can limit the maximum effect of the integral term.

Zero Speed (CP-370)

When the magnitude of the UwndRollRPM (MP-03) is less than or equal to Zero Speed (CP-370), the UwFb@0Spd bit (44) in the PLC is set to “1”. This value, as well as the PLC UwFb@0Spd bit condition, is used in other transparent internal calculations that are based on feedback information.

LIMITS P2/2

The Limits screen includes the parameters that limit certain operating conditions. Some appear on other screens that are more relevant to their function.

UwndMinDia (CP-350)

Unwind Minimum Diameter (CP-350) sets a boundary for calculated diameters. It aids in the rejection of false diameter calculations caused by erratic machine conditions such as slack web or out-of-round rolls.

UwndMaxDia (CP-351)

Unwind Maximum Diameter (CP-351) sets a boundary for calculated diameters. It aids in the rejection of false diameter calculations caused by erratic machine conditions such a slack web or out-of-round rolls.

WindMinDia (CP-352)

Wind Minimum Diameter (CP-352) sets a boundary for calculated diameters. It aids in the rejection of false diameter calculations caused by erratic machine conditions such a slack web or out-of-round rolls.

WindMaxDia (CP-353)

Wind Maximum Diameter (CP-353) sets a boundary for calculated diameters. It aids in the rejection of false diameter calculations caused by erratic machine conditions such a slack web or out-of-round rolls.

—NOTES—

BLOCK SETUP

The blocks are used as a quick access to a group of Control Parameters whose values will need to be changed over the course of your system's operation. For example, the Blocks could be used to switch between speed setpoints and ratio setpoints. You can assign up to sixteen Control Parameters to the blocks. There are eight blocks that allow you to assign eight values to each of the sixteen Control Parameters. The blocks can be set up so that the active block (the block currently in use) can be selected through a switch.

Caution: To avoid damage to your system, the CX-1102 must be calibrated and the motor drive set up before you operate your system. Refer to *Drive Setup / Calibration: Calibration*.

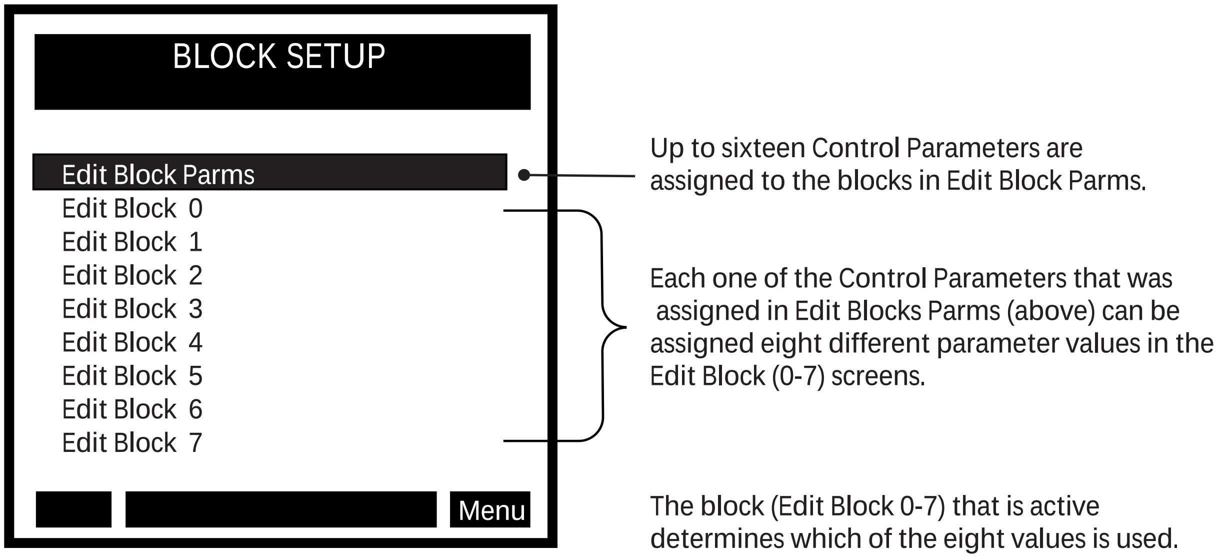
The Block Setup screens are:

- Edit Block Parms
- Edit Blk 0
- Edit Blk 1
- Edit Blk 2
- Edit Blk 3
- Edit Blk 4
- Edit Blk 5
- Edit Blk 6
- Edit Blk 7

—NOTES—

Block Setup

Use the blocks to assign eight different values to a single Control Parameter. Up to sixteen Control Parameters can each be assigned to each of the eight different blocks.



You can use either the PLC or the Keypad to change the active block.

To use the PLC to change the active block:
There are 3 PLC bits that are associated with the block selection: Block Select A, Block Select B and Block Select C. Make bits active by setting the bit equal to “1”. Select the active block in a binary (octal). The following table represents the PLC Bit logic:

BlkSel C	BlkSel B	BlkSel A	Active Block
0	0	0	0
0	0	1	1
0	1	0	2
0	1	1	3
1	0	0	4
1	0	1	5
1	1	0	6
1	1	1	7

To use the Keypad to change the active block:
Transfer control to the keypad by entering “2” (kypd) in Blk Sel Source (CP-478). To make a block active, enter the block's number in Keypad Blk Sel (CP-479). The active block is displayed in Active Block (MP-51).

DANGER
When you change the active block, the new values are loaded and can operate the system immediately. This can cause abrupt operation.

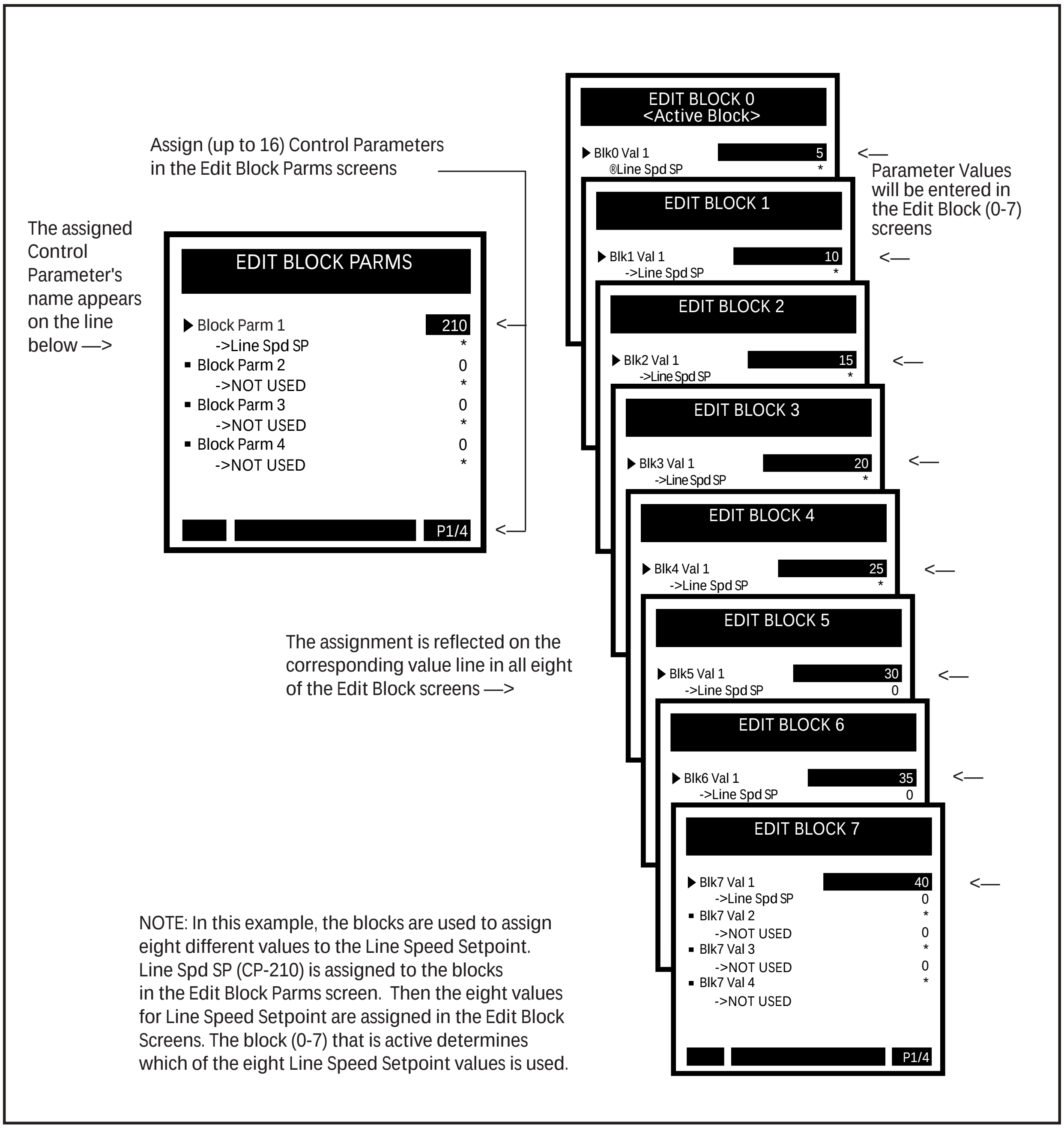
For more information on selecting and monitoring the active block, refer to *System Monitoring (MP) / System Monitor / Control Overrides*.

EDIT BLOCK PARMS

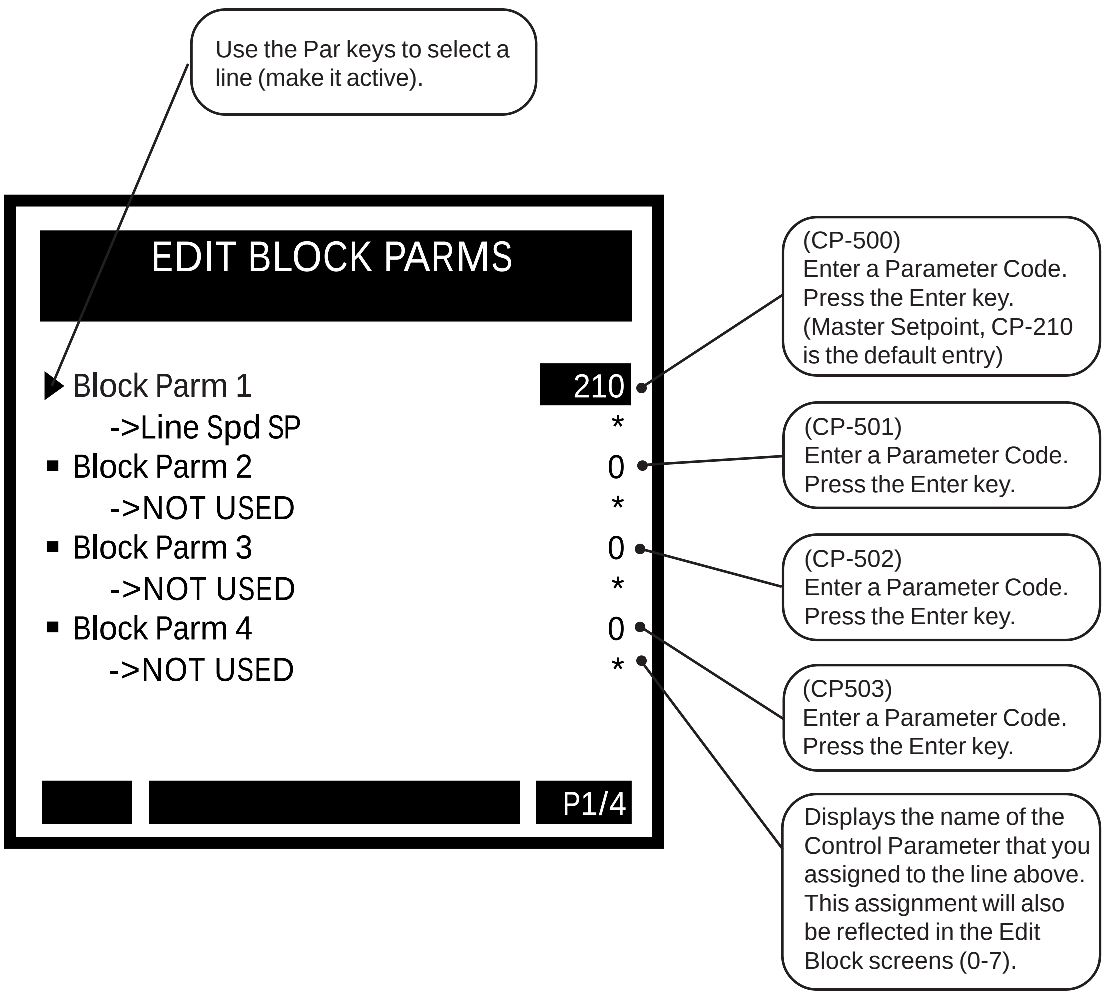
Block Parm 1 - Block Parm 16 (CP-500 to CP-515)

The Edit Block Parms screens (pages 1-4) contain sixteen lines (Block Parm 1- 16) that allow you to assign sixteen Control Parameters to Block Parms 1 through Block Parms 16 (CP-500 to CP-515). In turn, these Control Parameter assignments are reflected in corresponding lines in the Edit Blocks (0-7) screens (where the Control Parameter values are selected). When you enter a Parameter Code for a specific Control Parameter in a Block Parameter line (Block Parm 1-16) , the parameter's name will appear immediately below that Block Parameter line. Enter a "0" in the Block Parameter line(s) that you do not want to assigned Control Parameter. The line immediately below will display "Not Used". Line Spd SP (CP-210) is the default Control Parameter that is assigned to Block Parm 1. You can not assign Monitor Parameters to Edit Block Params.

The graphic matrix below displays the interaction between the Edit Block Parms screens and the Edit Block 0-7 screens:



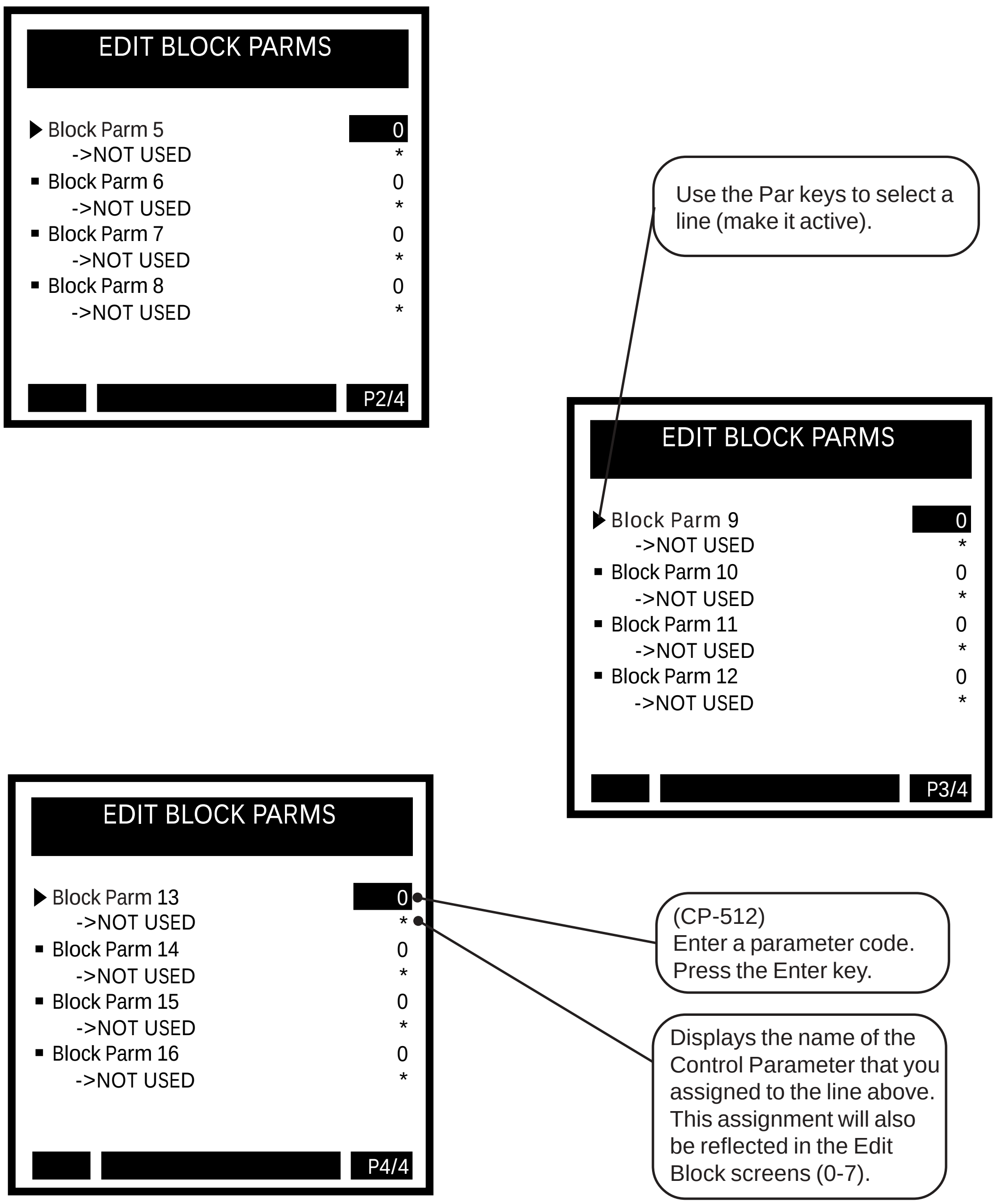
The Edit Block Parms screens are accessed through
—> Main Menu / Block Setup <—



Use the Page keys to scroll through pages 2 through 4 of the Edit Block Parms screens. These screens are similar to each other and to the page one screen that is displayed on the previous page. Enter Control Parameter codes in these screens, as noted below.

If you enter a Control Parameter code that is already in use, then the “Not Allowed“ messages will flash briefly in the error message bar. If you enter a code that does not exist, the “Not Used” designation (or Parameter Name if the line is in use) beneath the Block Parm line will change to “Not Defined”. However, if you enter a code that does not exist and the code number is higher than “350“, then the error message “Max Error” will flash briefly in the error message bar.

If you accidently enter too many digits for a code (e.g., 1022), the error message “Field Full” will flash briefly.

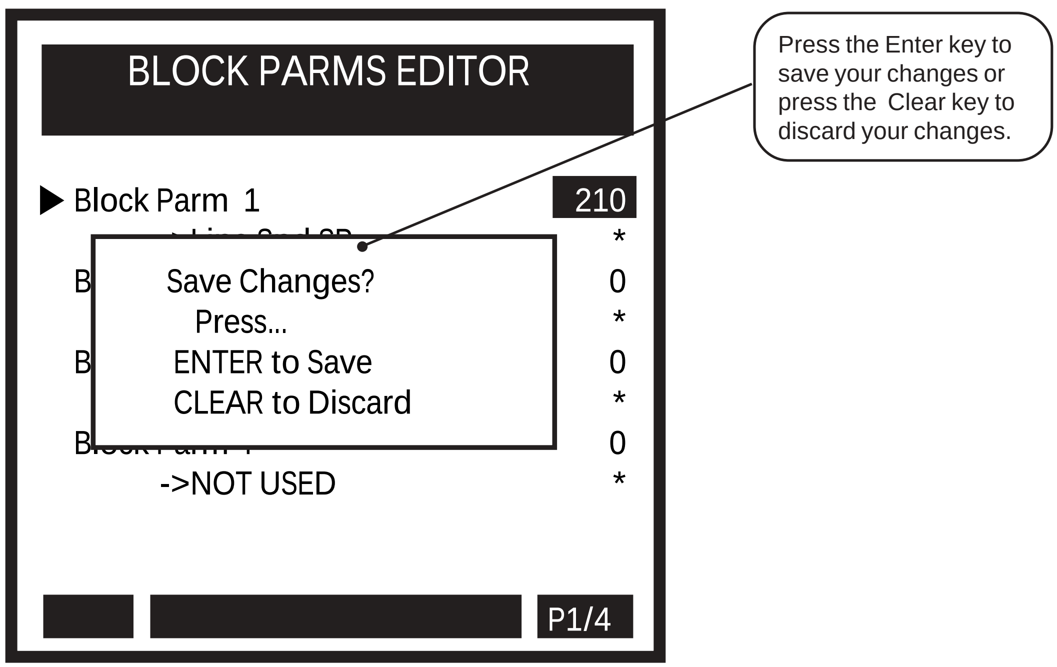


Edit Block Parms / Save

Press the Menu key from any of the Edit Block Parms screens to exit. If you have made changes in any of the screens, a dialog box will pop up and give you the opportunity to either save or to discard your changes.

If you have entered Control Parameters that can not be used in the blocks, then the code for each Control Parameter that can not be used are highlighted, one by one, and the error message “Invalid Parm” will flash five times in the error bar. Change all Control Parameter codes that are highlighted and exit Edit Block Parms again. You can not save changes unless all fo the“Invalid Parm” codes have been changed. Control Parameters that can be used are in the range of CP-202 through CP-206 and CP-209 through CP-249.

If you have entered a combination of 16 Control Parameters that create more internal variables than the CX-1102 can execute, then the error message“Parm Mem Lmt” will flash twice in the error bar. Any new Control Parameter codes that you entered will default back to “zero”.   Although this scenario is rare, it can occur. Either use different Control Parameters or use fewer Control Parameters.



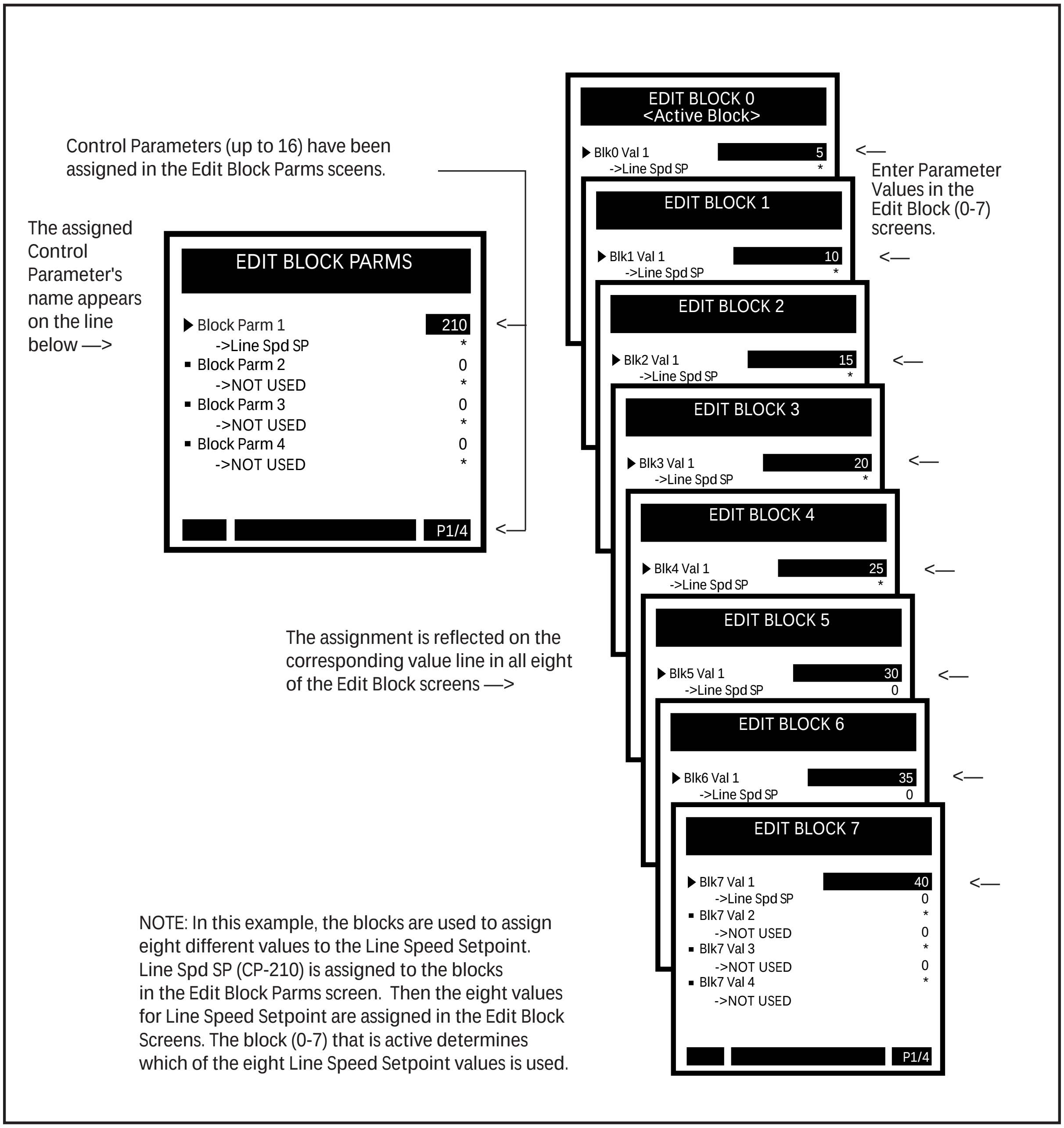
EDIT BLOCK 0 THROUGH 7

Blk0 Val 1 - Blk7 Val 16   (CP-540 to CP-667)

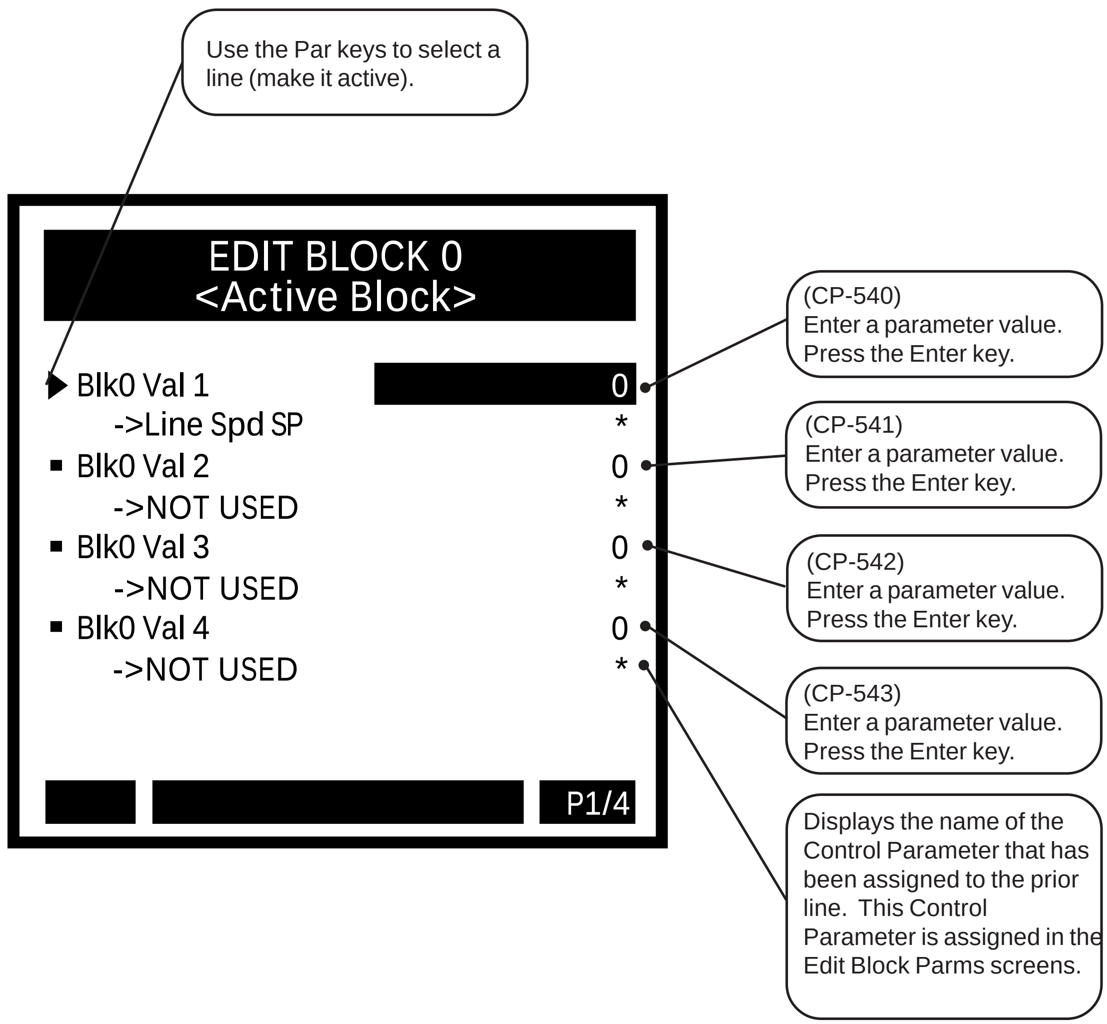
Use the Block Values (CP-540 to CP-667) to assign Parameter Values to the Control Parameters that were designated by name in the Edit Block Parms screens (CP-500 to CP-515). Edit Blocks 0-7 allow you to assign up to eight different values to a single Control Parameter by entering a different Parameter Value in each of the Edit Block screens (0-7). The graphic matrix below displays the interaction between the Edit Block Parms screens and the Edit Block 0-7 screens.

The block of Control Parameters and corresponding values that is in current use, is called the “active” block. The active block is selected in either the Keypad Block Select (CP-479) or in the PLC (in combination with the Digital inputs). The active block is monitored by Active Block (MP-51). For more information on selecting and monitoring the active block, refer to *System Monitoring (MP) / System Monitor / Control Overrides*.

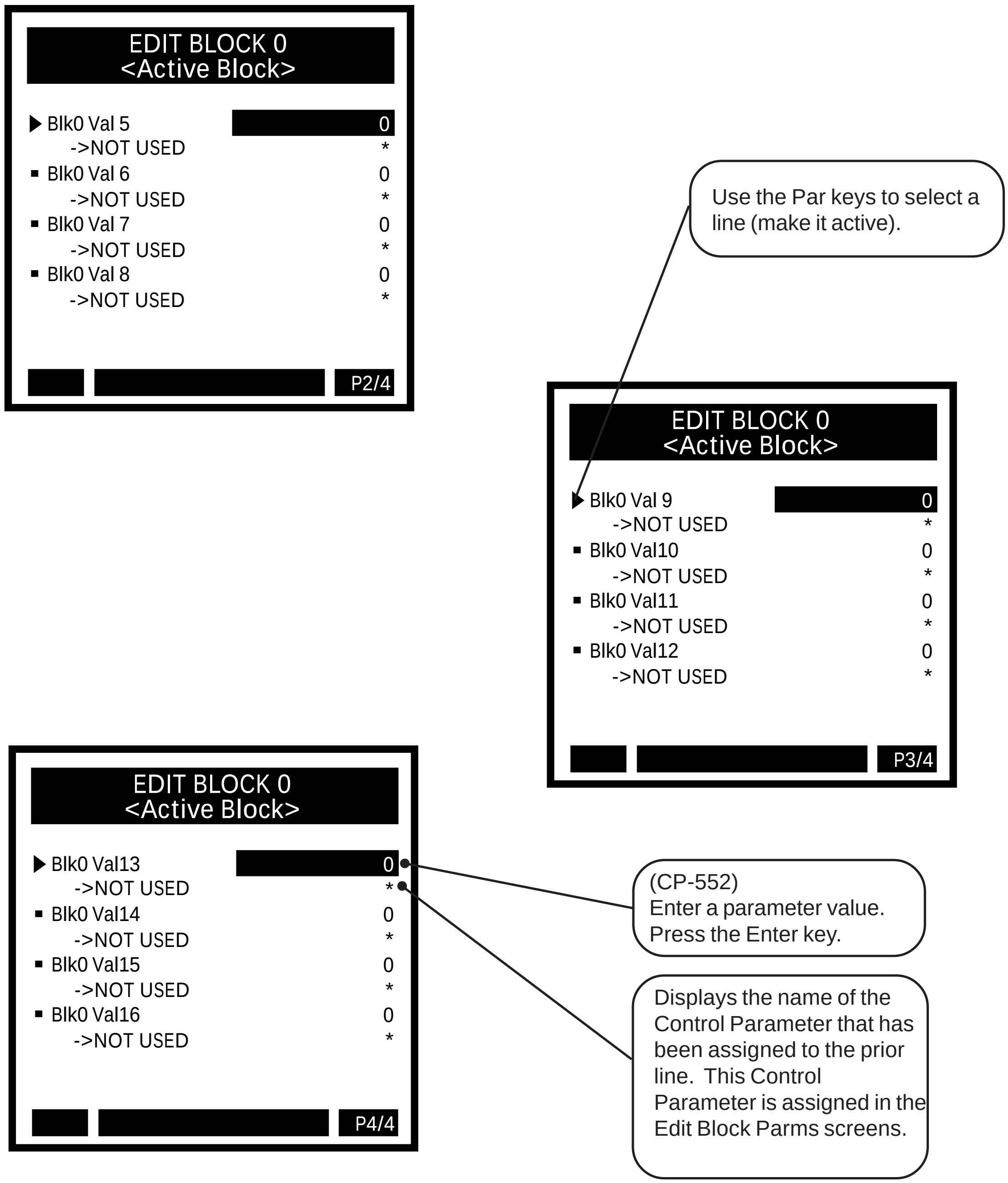
The default setting in the Val 1 line for Blocks 0-7 (Page 1), is Master Setpoint. This line can be reassigned in the Edit Block Parms screens.



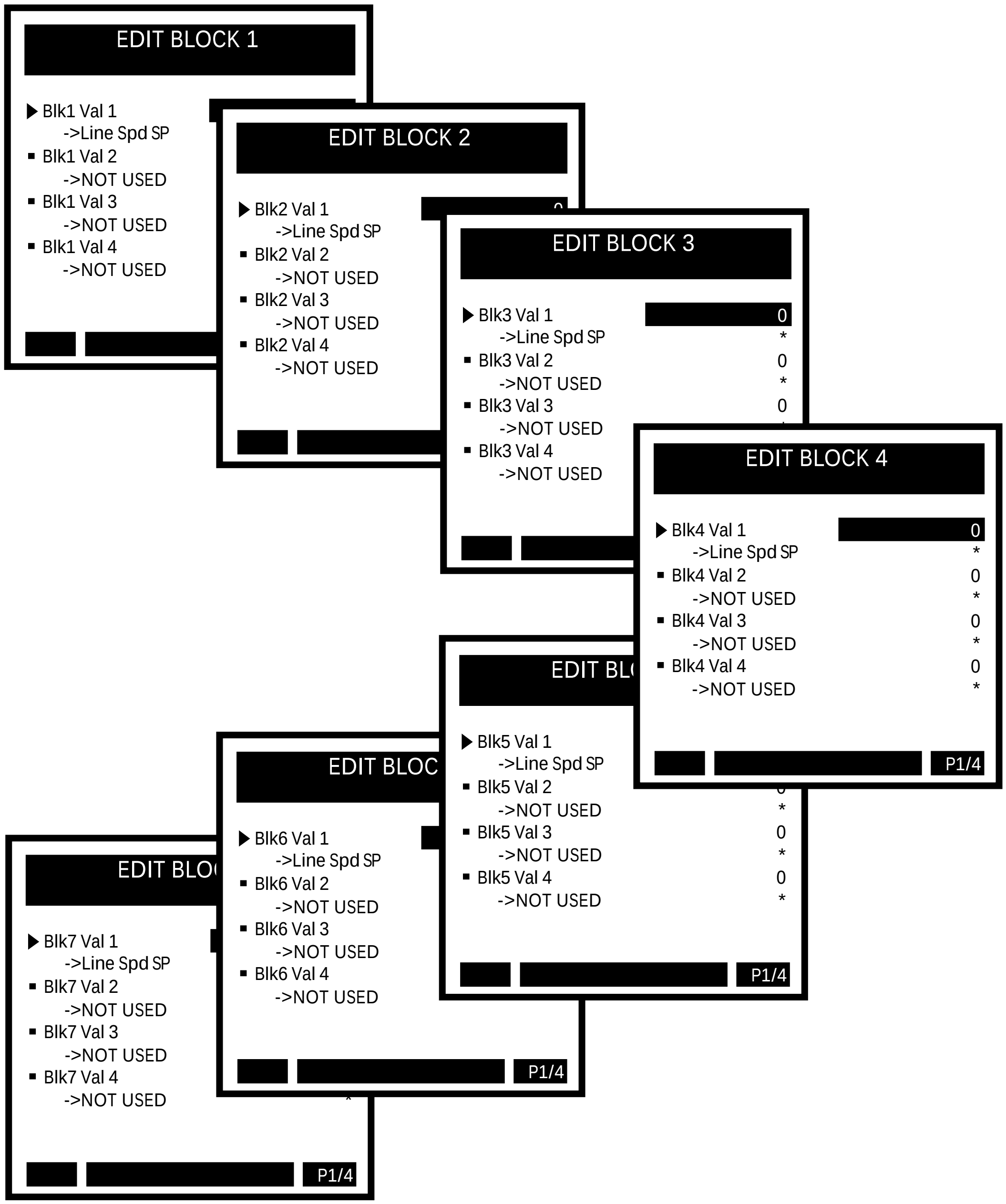
The Edit Block 0-7 screens are accessed through
—> Main Menu / Block Setup <—



Use the Page keys to go scroll through pages 2 through 4 of the Block 0 Data Edit screens. The setup for these screens is identical to the page one screen that is displayed on the previous page. Enter the relevant information in these screens.



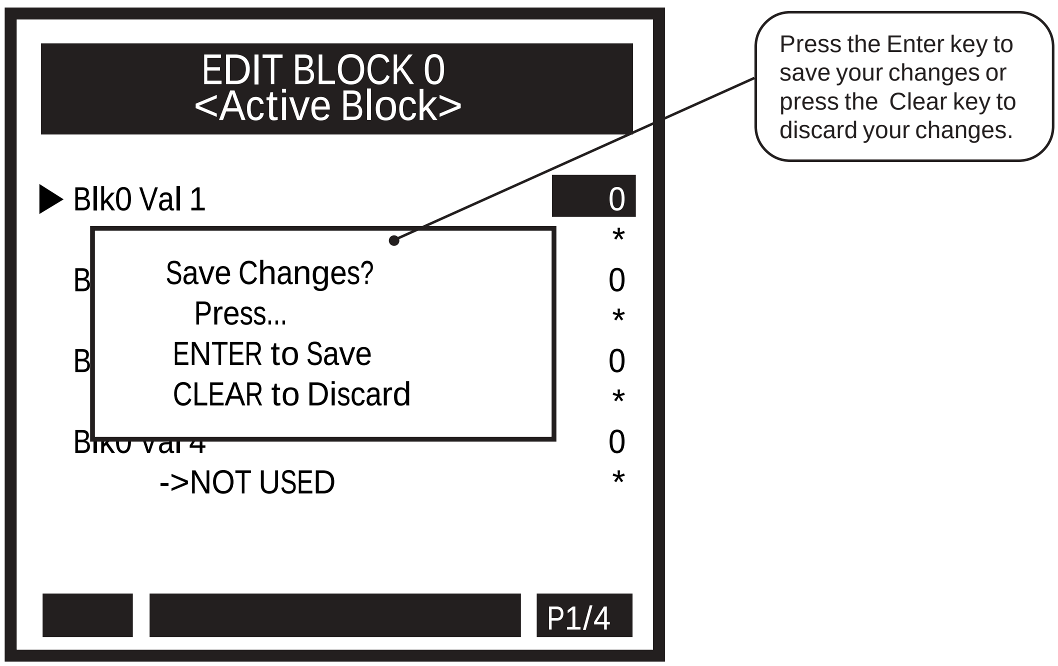
Use the Par keys to go scroll through the Block Setup menu and access the additional Edit Block screens (1-7). The set up for these screens is identical to the Block 0 Edit Block screens that are displayed on the previous pages. Enter the relevant Control Parameter values in these screens.



Edit Block / Save

Press the Menu key from any of the Edit Block screens to exit. If you have made changes in any of the screens (pages 1-4), a dialog box will popup and give you the opportunity to either save or to discard your changes.

NOTE: Once you have exited the Edit Block screen, if you change the value of a Control Parameter in any other screen (that is not a block screen) and that change can create problems with that Control Parameter when the block is put into use, then the error message “Invalid Blk” will flash briefly in the error message bar. Generally this scenario would only happen if a math error or an undefined operation were created in the block which houses the Control Parameter that changed. For example, If you change the value of a scaling parameter which is also used in a block and the affect that the change has on the block would create an overflow (e.g., a setpoint is too large in relationship to CP-208) then the block would become unusable or an “invalid block.”



PROGRAMMABLE LOGIC CONTROLLER (PLC)

This section discusses the setup procedures for the PLC (Programmable Logic Controller)**.** The CX-1102 provides a basic PLC to compliment the motion control operation with I/O flexibility. The PLC allows you to redirect or redefine the eight digital outputs and eight (of the 16) digital inputs. You can also use the PLC to initiate a number of internal functions, or to test the state of status indicators. The PLC includes four timers, four event counters, four latches, and four numerical comparators. The alarms are generated by the PLC. The CX-1102 provides an editor for changing the PLC program without the need of a portable computer or proprietary pendant. The program is presented as a text-based list of commands (instructions) and operands (I/O, contacts, coils).

Caution: To avoid damage to your system, the CX-1102 must be calibrated and the motor drive set up before you operate your system. Refer to *Drive Setup / Calibration: Calibration*.

The PLC screens are:

- PLC Monitor
- PLC Timers
- PLC Event Counters
- PLC Position Counters
- PLC Data Copy
- PLC Digital I/O
- PLC Programming

—NOTES—

PLC

The PLC adds functionality to the CX-1102. There are default settings for the PLC, which are generally sufficient for most applications, and whose operations are transparent to the user. There are also PLC screens which allow the user additional access to the PLC in order to expand on the CX-1102's functionality. The PLC has a "scan time" of 2 milliseconds. The scan is divided into two parts:

- The state of the status indicators is determined (this includes the alarms and the results of the Custom alarms) and the PLC-dedicated digital inputs are captured.
- The PLC program is executed and the digital outputs are updated with the results.

Since there is only one copy of the PLC bit map in memory when the PLC program executes, it uses the most current state of the PLC bits. Therefore, if a rung changes the state of a PLC bit value, the new value is then used in subsequent rungs. Though this rule is not violated in the case of the latches, the state of the latches is not determined until after the PLC program has completed. This means that the set and reset PLC bits can change, but only their state at the end of the PLC program will determine the state of the Latch throughout the entire next scan. Likewise, the event counters are not incremented/decremented until after the PLC porgram is completed, and their associated outputs will not change state during the execution of the program.

The PLC program performs the logic on the PLC bits as dictated by the user-entered program. The state of these PLC bits is determined before hand via internal calculations. These bits are PLC bit 2 through PLC bit 99. These bits are consider status information that are set or reset based on their function, current data and the state (or change thereof) of other PLC bits. These bits should never be operands of an OUT command, and therefore the state of these 'status' bits should remain constant throughout the execution of the PLC program.

The scan is summarized as follows:

1. The digital output (from last scan) are output to the actual outputs, the digital inputs are captured as a group and saved for later use.

2. Status bits are setup - state, block select, RUN mode, loop type, event counter maintenance, alarms, compares, set/reset latches.

   The Timers are maintained (status bits set/reset if necessary). This ends the first 1 millisecond part of the scan.

3. The digital inputs (stamped at top of 2 millisecond boundary) are copied to PLC bits (while OR'ing in the DI Set (CP-403), and performing One-shot operation on the DI 1 Shot bits, (CP-402), set PLC Bit Set (CP-407) bit, reset PLC Bit Clear (CP-408) bit.

4. Execute the PLC program. This performs only the logic as given by the program. No functions called out by setting a bit to "1" in the execution of the program will get executed at this time. Counters are not incremented at this time, and therefore, the counter outputs remain unchanged during the execution. The state of the latches are not determined at this time.

5. The digital out PLC bits are saved, but not sent to the actual outputs at this time. The saved digital output data is output at the top of the next 2 millisecond boundary. This maintains a fixed time interval between the reading of the digital inputs and the writing of the digital outputs.

6. Misc. functions: Block Select A,B,C decoded to select current block, PLC bits UwFrzIngl,

UwndOpnLp, WdFrzIngl, WindOpnLp, LSFrz Ramp, Negate LS are OR'ed in with the Cntrl Latch (CP-340). The result will be used in the next Scaled and Ramped Reference determination, or Control Loop calculation.

The Data Trace enable is maintained.

The Timers are maintained (status bits set/reset if necessary). This ends the 2^{nd} 1 millisecond part of the scan.

The PLC mimics the operation of Relay Logic. In this context, the relay "Coils" can be either energized (ON) or inactive (OFF). Likewise, the relay contacts, whether "open" or "closed", assume only one of the two states at any given time. Therefore, relays are binary devices. The state of a coil or contact can be represented as a "1" (ON") or a "0" (OFF). This is the basis for the PLC; it treats everything as binary entities with each assigned a particular function and it realizes only one state at any given time. The virtual "contacts" and "coils" that are available to the PLC program are defined in the PLC bit map. The PLC bit map assigns the function of the contacts and coils to a bit (single binary digit) memory location. The PLC program has access to the PLC bit map to logically combine the "contacts" (status) bits to activate (or deactivate), a "coil" bit. For example; the Block Selection default program routes the Digital Inputs DI_8, DI_9 and DI_10 to the Blk Sel A, B, C PLC Bits (coils) respectively. Note that the Digital Inputs are active low - so a closed contact to common (which would be "0" voltage on the input) would produce a "1 " (true = active) in the corresponding Bit in the PLC bit map. Refer to the PLC Program Operands in *Appendices: Appendix L.*

The status bits can be based on a binary condition (e.g., the UwndDrvEn /PLC bit 41) or they can be based on the result of a comparison between two nonbinary numbers (e.g., the UwndMaxHz /PLC Bit 48). The UwndMaxHz bit (48) is set (active = normally-open contact closed) when the value of the Feedback signal is greater than the value that you entered into Max LS Alm (CP-371). Most of the numerical comparisons that are associated with the PLC status bits involve one (or more) Control Parameters. Some of the Control Parameters are used to setup the PLC operation. In addition, there are Monitor Parameters to monitor the state of the PLC bits.

The PLC uses a stack-based environment for moving bit data and computing boolean expressions. Your PLC program must conform to this format. Each rung of your ladder-logic program would be programmed as a group of commands (along with their operands) starting with a "LOAD" (or "LD NOT") command and ending with an "OUT" command. The stack allows you to enter a complicated logical combination (rung) without having to separate it into smaller groups (rungs) with temporary coils.

These are the commands:

LOAD
LD NOT (Load Not)
AND
AND NOT
OR
OR NOT
XOR (Exclusive OR)
XOR NOT
NOT
OUT
<END>

There are three parts to the stack: the Result Register (R); a bit mapped location named “S0” (bit location “0”); and a bit mapped location named “S1” (bit location “1”). When the stack is lifted with the “LOAD” and “LOAD NOT” commands, the contents of “S0” is copied to “S1” (the contents of “S1” is overwritten) and the contents of the Result Register (R), is copied to “S0” and the contents of the operand (or the complement of) is copied to the Result Register, “R”. When the Stack is dropped as in the “AND 0”, the “OR 0”, the “AND NOT 0” and the “OR NOT 0” commands, then the contents of “S0” (or its complement) is “AND’ed” or “OR’ed” with the Result Register (R) and the result is left in (R). The contents of “S1” is copied to “S0” (the contents of “S0” is overwritten), and the contents of “S1” remains the same. The following example shows the stack before and after the “LOAD” and “AND 0” commands.

Location 08 (DI_8): 1

Before “LOAD 8 DI_8”:	After “LOAD 8 DI_8”:
S1: 0	S1: 1
S0: 1	S0: 0
R: 0	R: 1

Before “AND 0 S0”:	After “AND 0 S0”:
S1: 1	S1: 1
S0: 0	S0: 1
R: 1	R: 0

For commands other than “LOAD” and “LD NOT” with an operand other than “0” (S0), there is no stack movement. For example; the “AND 9 DI_9” results in an “AND”s of the contents of Bit Location 09 (DI_9) with the Result Register (R) and the result of the operation stays in the Result Register (R). There is no stack movement and “S0” and “S1” remain the same. The “LOAD” and “LD NOT ”commands always lift the stack. The stack drops only when the operand is “0” (S0) for the “AND”, “OR”, “XOR”, “AND NOT”, “OR NOT ” and “XOR NOT ” commands.

THE COMMANDS

1. LOAD
This starts a new Rung (group of commands). The stack is lifted and the contents of the operand bit is loaded into the Result Register (R).

2. LD NOT
Same as “LOAD” but the Result Register is complemented after the load. This is used for starting the rung with a normally-closed contact.

3. AND
The contents (the bit value) of the operand bit is AND’ed with the Result Register (R). The operand is unaffected. The result is retained in the Result Register. If the operand is “0” (i.e., the “S0” register), then the stack is dropped.

4. AND NOT
The complement of the operand bit is AND’ed with the Result Register (R). The operand is unaffected. The result is retained in the Result Register. If the operand is “0” (i.e., the "S0" register), then the stack is dropped. This is typically used to “AND” in a normally-closed contact.

5. OR
The contents (the bit value) of the operand bit is OR'ed with the Result Register (R). The operand is unaffected. The result is retained in the Result Register. If the operand is "0" (i.e., the "S0" register), then the stack is dropped.

6. OR NOT
The complement of the operand bit is OR'ed with the Result Register. The operand is unaffected. The result is retained in the Result Register. If the operand is "0" (i.e., the "S0" register), then the stack is dropped. This is typically used to "OR" in a normally-closed contact.

7. XOR
The contents (the bit value) of the operand bit is Exclusively OR'ed with the Result Register. The operand is unaffected. The result is retained in the Result Register. If the operand is "0" (i.e., the "S0" register), then the stack is dropped.

8. XOR NOT
The complement of the operand bit is Exclusively OR'ed with the Result Register. The operand is unaffected. The result is retained in the Result Register. If the operand is "0" (i.e., the "S0" register), then the stack is dropped. This is typically used to XOR in a normally-closed contact.

9. NOT
The contents of the Result Register is complemented. The operand is ignored but must be included in the program - use one of the temporary coil locations or the NOP Opnd (171). This is typically used to complement the result before an "OUT" command. This could be the case if the rung is controlling an active-high output.

10. NOP
This is a No Operation Command. The command is ignored by the compiler. This can be used to temporarily remove a command.

11. OUT
This copies the contents of the Result Register (R), into the operand location. This terminates the rung.

12. <End>
This ends the PLC program. It signals the compiler that there are no more valid commands to follow. Every program must be terminated with an "<END>". The operand is ignored but it must be included in the program. Use the NOP Opnd (171).

The OPERANDS

The operands are divided into two main areas: the status bits (contacts); and the function bits (coils). The status bits range from bit 2 through bit 95. Do not use these bits as operands for the "OUT" command, as the results could be unpredictable. The function bits range from bit 100 to bit 219. These are used in conjunction with the "OUT" command to activate the indicated function. Activation of the indicated function occurs when the "OUT" command moves a "1" into the bit location (the Result Register contains a "1" just prior the "OUT" command). All of the bits that are not defined, are "Reserved" for future expansion. Refer to *Appendices: Appendix L* for a complete list of the PLC Program Operands.

Descriptions of the groups of operands and discussion of the associated Control Parameters follow:

Bit 0 is the top of the stack, S0 (first entry point).
Bit 1 is the bottom of the stack, S1, (lowest level).
Bit 2 is fixed at the value of 0.
Bit 3 is fixed at the value of 1.
Bit 4 is set to a 1 for the first PLC scan after power-up.

Bits 8 through 15 reflect the values captured on the Digital Inputs 8 through 15, respectively. DI Set (CP-403) can be used to set one or all of these bits even when the corresponding input is not active. This is typically used to test your program without having to actuate the input. DI 1 shot (CP-402) can be used to set one or more of the Inputs (DI_8 through DI_15) to automatically generate a one shot in the PLC bit location (bit 8-15) from an open to closed transition on the input.

Bits 16 through 19 are the output of the latches. This would be the equivalent of the normally-open contact of a latching relay.

Bits 20 through 23 indicate whether the diameter value calculated for either the unwind or wind roll is equal to or greater than the value set in UwndMaxDia (CP-351) or WindMaxDia (CP-353), or that the calculated diameter is equal to or less than the value set in UwndMinDia (CP-350) or WindMinDia (CP-352). If any of these conditions are true, the corresponding PLC bit will be set to one (1).

Bits 24 through 27 are the outputs of the timers. The running time for each timer is compared against the Timer Delay and Timer On-time CP’s (CP-410, CP-417) to determine if these output bits should be active (1).

Bit 30 indicates that the Line Speed (MP-40) is greater than or equal to the value set in Max LS Alm (CP-371)

Bit 31 is an indication that the commanded line speed in LineSpd SR (MP-41) is greater than the value for EstMaxLnSp (MP-43).

Bits 32 through 36 are the outputs of the event counters. When the count for each counter reaches the Trigger Count (CP-420, CP-422, CP-424, CP-426, CP-428), the corresponding counter output will be active (1).

Bit 37 indicates that the AC voltage for the control is below specification.

Bits 38 and 39 are set for one scan time when the corresponding position counter reaches or exceeds the Rollover value (CP-368, CP-369). The bit is set for one scan when the rollover occurs and the counter is reset to the “0” plus the amount the count is over the rollover value.

Bits 40 through 47 are basic status indicator bits. Bit 40 (UwCOSign) indicates the sign of the Control Output SigU. If CO Polarity is set to NEG (2), Bit 40 operates opposite of the actual voltage convention - if the voltage is negative, this is consider normal for CO Polarity set to NEG and the Bit 40 will be “0”.

Bits 48 through 59 are alarm conditions.

Bits 60 through 63 indicate if the corresponding compare result is true (1) or not (“0”).

Bits 64 through 67 reflect the value of App Select (CP-202).

Bit 70 has the value of one (1) for ½ second and zero (0) for ½ second continuously. This represents a one second square wave (1 Hz).

Bits 71 through 76, 78 and 79 indicate the system operating state of the controller. Only one of these bits can be active at a time. These bits are monitor (status) bits only. Do Not use these bits as operands for the “OUT” command. You can not request a state change with these bits.

Bits 80 through 87 indicate the active block. Only one of these bits can be active at a time. These bits are for monitoring status only. Do not use these bits as operands for the “OUT” command. You can not request a new block with these bits. You can do this only through the Blk Sel A,B,C bits.

Bits 88 and 89 indicate a reverse roll direction command to the corresponding drive from the control. These bits may be used to assist in direction changes when using unipolar reversible drives.

Bits 90 and 91 are indicators of the dancers content. Bit 90 indicates when the dancer content is greater than 95% full, the value in Dancer Ctnt (MP-82) > 95% of DncrCtntFull (CP-272). Bit 91 indicates when the dancer content is less than 5% full, the value in Dancer Ctnt (MP-82) < 5% of DncrCtntFull (CP-272).

Bit 92 indicates when the value for DncrCtntErr (MP-83) is positive.

Bit 93 is an indication of a broken web. If the control is in run state and the non-dancer trimmed roll is rotating (> zero speed) and the dancer is full, this bit is set to one (1).

PLC Bit 94 indicates when the dancer is at its commanded position (CP-250 Dancer SP ±5%).

PLC Bit 95 indicates when dancer trim (MP-84 DancerTrim) is not being applied.

Bits 100 through 107 are used to activate the Digital Outputs 0-7 respectively. The outputs are active low. Therefore, when the “OUT” command moves a 1 into one of these bits, the corresponding output will become active and pull the connected device to common, sinking current as dictated.

Bits 108 through 115 are used for temporary storage. They can be used to store the intermediate results of relatively complicated rungs. They could be referred to as virtual “Control Relays” and they can be used in the logic of several rungs

Bits 116 through 123 are used to set and reset the latches.

BIts 124 through 127 are used to enable the timers.

Bit 128 is used to reset Timer 4 since it retains its state when the Tmr4 En bit (PLC bit 127) is “0”.

Bits 130 through 133 are used to increment the corresponding counters. Bit 134 is used to decrement the Counter 4 count. The count is incremented on the transition from a “0” to a 1 in the increment or decrement bit.

Bits 135 through 137 are used to reset the corresponding counters. These are level activated; as long as the reset bit remains active (1), the count will remain at “0”

Bit 138 is used to preset the Counter 4 count to the Cntr4 Preset value (CP-429). This is also a level activated function - as long as the reset bit is active, the count will remain at the preset value for Counter 4 even if transitions occur on the increment (or decrement) bits.

Bits 140 through 142 are used to select the active block. This is accomplished in a binary (octal) fashion.

The following table represents the logic:

PLC Bit 142 BlkSel C	PLC Bit 141 BlkSel B	PLC Bit 140 BlkSel A	Active Block
0	0	0	0
0	0	1	1
0	1	0	2
0	1	1	3
1	0	0	4
1	0	1	5
1	1	0	6
1	1	1	7

Bits 144 through 152 is used to reset the integral term of the PID.

Bits 153 and 154 determine if the material is being transferred onto the bottom of the wind roll or off of the bottom of the unwind roll.

Bit 155 UwRot Rst may be used to reset the Unwind Rotations (MP-09) to zero. When bit 155 is "1" the UwndCnts (MP-05) and UwndRot (MP-09) will both be reset to zero.

Bit 156 WdRot Rst may be used to reset the Wind Rotations (MP-19) to zero. When bit 156 is "1" the WdndCnts (MP-15) and UwndRot (MP-19) will both be reset to zero.

Bit 157 may be used to disable Dancer Trim. While this bit is set to one (1) Dancer Trim will not be applied to the dancer trimmed roll.

Bits 158 and 159 are used to negate the CO SIG signal and the Scaled Reference signal, respectively. The Negate CO bit is ignored when operating in Unipolar mode. You can not reverse the polarity of the output in this case. The Negate SR bit is used to reverse the direction of the commanded speed, the Scaled Reference.

Bits 160 and 161 may be used to initiate a “Data Copy” operation where a value is transferred from one parameter to another. See the definitions of CP’s 396 thru 399.

Bit 167 may be used to start the “Data Trace” data collection. Refer to the section in Serial Communications Binary protocol for further information regarding the “Data Trace.”

Bits 168 and 169 are used as the “Remote” scroll up and scroll down controls. The parameter that will be incremented or decremented is selected by Remote Scroll (CP-400). The Rmt Scroll Rate (CP-401) determines the rate at which the select parameter is incremented or decremented when the corresponding bit is active.

Bits 176 and 177 may be used to illuminate the upper spare LED on the Analog Card. When bit 176 is one (1) the LED will be green. When bit 177 is one (1) the LED will be red. If both are set to one (1) the LED will be orange. If both are zero (0) the LED will be OFF.

Bits 178 and 179 may be used to illuminate the lower spare LED on the Analog Card. When bit 178 is one (1) the LED will be green. When bit 179 is one (1) the LED will be red. If both are set to one (1) the LED will be orange. If both are zero (0) the LED will be OFF.

Bit 180 may be used to request a change in system state (MP-50 System State) to F-Stop state. This is separate from but may be used in addition to the dedicated F-Stop input.

Bits 182 through 185 may be used for axis Jog requests. Bits 182 and 183 can be used to Jog the unwind roll in the forward or reverse direction. Bits 184 and 185 can be used to Jog the wind roll in the forward or reverse direction. Refer to the section about Jog Control for more information about Jog operation.

Bits 186 and 187 may be used to put the unwind or wind control loop into open loop.

Bits 200 and 201 are used to indicate when the unwind and wind are in “open loop” control. When the corresponding axis is in “open loop” the bit will be set to one (1).

Bits 204 through 211 indicate the operating state of the Unwind Axis. Only one of these bits can be active at a time. These bits are monitor (status) bits only. Do Not use these bits as operands for the “OUT” command. You can not request a state change with these bits.

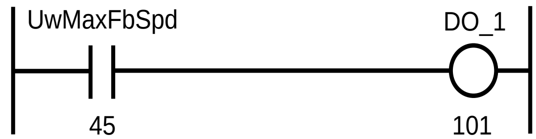
Bits 212 through 219 indicate the operating state of the Wind Axis. Only one of these bits can be active at a time. These bits are monitor (status) bits only. Do Not use these bits as operands for the “OUT” command. You can not request a state change with these bits.

PROGRAMMING EXAMPLES

The Basic Rung - Moving Bit Data

Since the PLC is based on bit data, a bit value is moved from one location to another. The most basic rung (a normally open contact energizing a coil) is implemented in the PLC program by moving bit data.

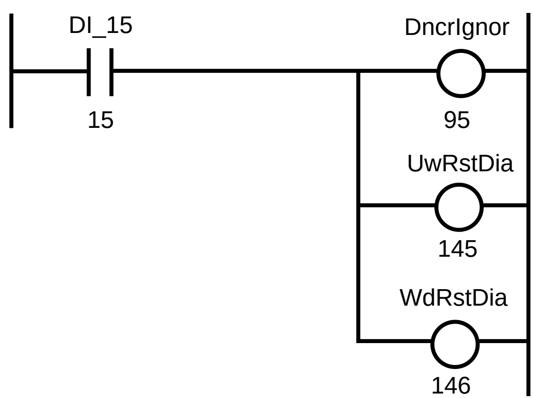
```
LOAD    45    UwMaxFbSpd
OUT    101    DO_1
```



The value of UwMaxFbSpd bit (contact) is loaded into the Result Register (R) with the “LOAD 45 UwMaxFbSpd” command and copied to the Digital Output DO_1 bit location (coil) with the “OUT” command. When the UwMaxFbSpd bit is set (1), the DO_1 bit will get set also. As a result, the actual DO_1 pin will be active - pulled low to sink current and possibly energize an external-relay coil. All rungs (groups of commands) must start with a “LOAD” or “LD NOT” command and end with an “OUT” command. “LD NOT” starts the rung with a normally-closed contact.

Since the “OUT” command does not change the value of the Result Register (R), you can move the result of a rung to more than one Bit location without starting a new rung.

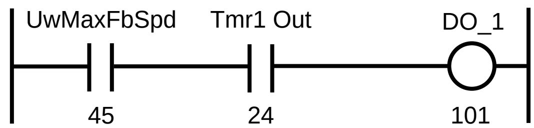
```
LOAD    15    DI_15
OUT     95    DncrIgnor
OUT    145    UwRstDia
OUT    146    WdRstDia
```



Series and Parallel Contacts - Operating on Bit Data

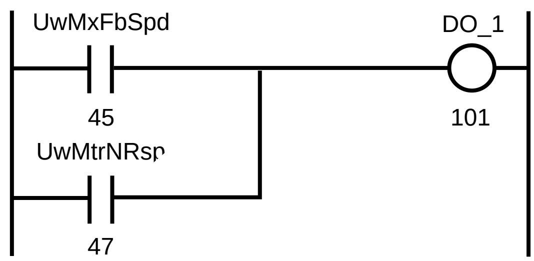
Often it is necessary to combine the state of more than one PLC bit (contact) to determine if another bit (coil) should be energized. The series connection of two contacts represents the "ANDing" of the states; both contacts need to be closed in order for energy to flow. The "AND" command is used to "AND" two PLC bits (contacts) together. The following example shows how to program a simple series connected rung.

```
LOAD     45     UwMaxFbSpd
AND      24     Tmr1 Out
OUT     101     DO_1
```



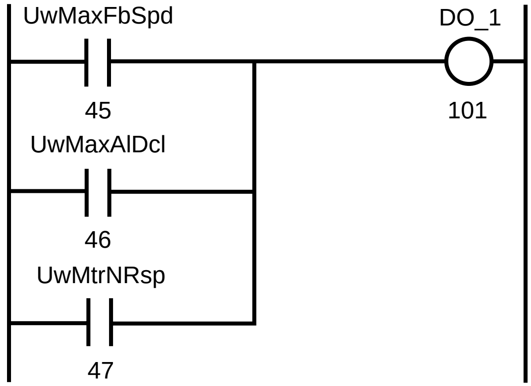
Similarly, the "OR" command is used to "OR" two PLC bits (contacts) together. This implements the ladder logic of parallel connected contacts as the following example illustrates.

```
LOAD     45     UwMxFbSpd
OR       47     UwMtrNRsp
OUT     101     DO_1
```



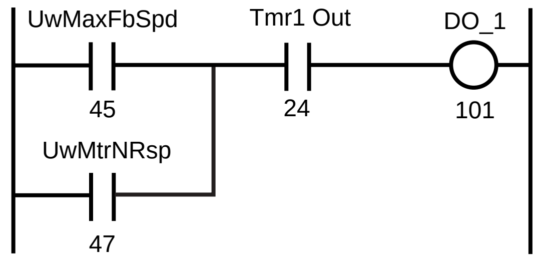
This can be expanded to include more bits.

LOAD	45	UwMaxFbSpd
OR	46	UwMaxAlDcl
OR	47	UwMtrNRsp
OUT	101	DO_1

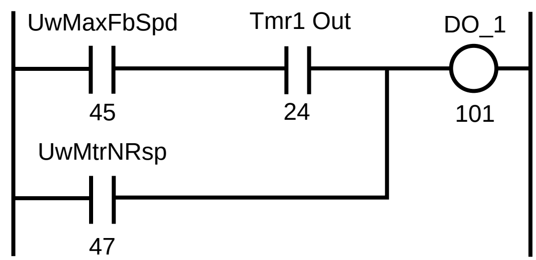


You can combine “AND’s” and “OR’s” to implement both the series and parallel connections.

LOAD	45	UwMaxFbSpd
OR	47	UwMtrNRsp
AND	24	Tmr1 Out
OUT	101	DO_1



LOAD	45	UwMaxFbSpd
AND	24	Tmr1 Out
OR	47	UwMtrNRsp
OUT	101	DO_1



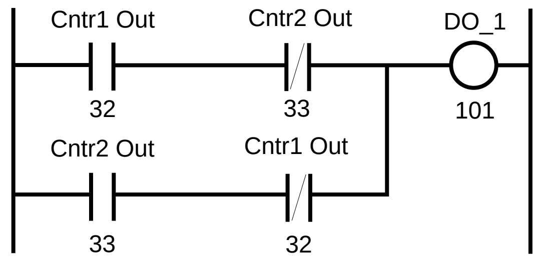
The order of the program commands effect the outcome. The result of each command is placed in the Result Register (R), which is then used in the next operation.

The exclusive “OR” command (“XOR”, “XOR NOT”) can be used to act on one of two true conditions, but not if both are true at the same time. The truth table for the “XOR” and “XOR NOT” is given by (1 = true):

R	Operand	XOR	XOR NOT
0	0	0	1
0	1	1	0
1	0	1	0
1	1	0	1

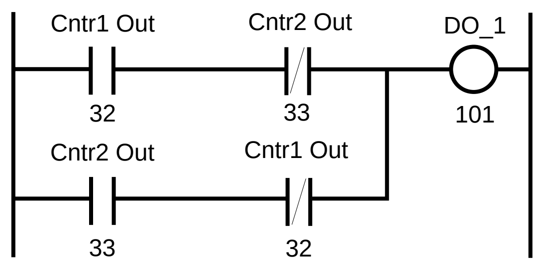
The following example implements an exclusive “OR” between Cntr1 Out and Cntr2 Out using ladder logic. The program commands use standard “AND” and “OR” logic.

LOAD	32	Cntr1 Out
AND NOT	33	Cntr2 Out
LOAD	33	Cntr2 Out
AND NOT	32	Cntr1 Out
OR	0	S0
OUT	101	DO_1



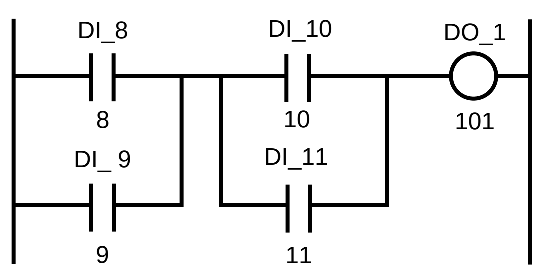
This programming can be greatly simplified with the “XOR” command as follows.

LOAD	32	Cntr1 Out
XOR	33	Cntr2 Out
OUT	101	DO_1



The “AND/OR” programming of the exclusive “OR” function above illustrates more complicated logic than we have seen thus far. It involves not only the use of normally-closed contacts, but the use of a second “LOAD” command to start the second branch, or sub-rung. If you understand the stack movement, the programming should seem quite obvious. Consider the following example:

LOAD	8	DI_8
OR	9	DI_9
LOAD	10	DI_10
OR	11	DI_11
AND	0	S0
OUT	101	DO_1



Assume the values of the Digital Input Bits DI_8, 9, 10, 11 are 1,0,0,0 respectively. The “S1” and “S0” Bits are “0” to start. The Result Register is also “0” to start.
The stack movement proceeds as follows:

Before “LOAD 8 DI_8”:

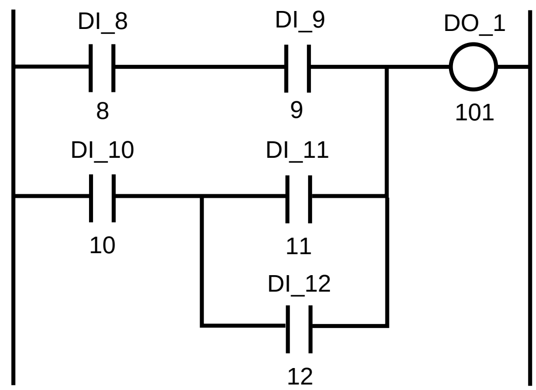
S1: 0
S0: 0
R: 0

After “LOAD 8 DI_8” (stack is lifted)

S1: 0
S0: 0
R: 0

Another example:

LOAD	8	DI_8
AND	9	DI_9
LOAD	10	DI_10
LOAD	11	DI_11
OR	12	DI_12
AND	0	S0
OR	0	S0
OUT	101	DO_1



Assume DI_8,9,10,11,12 have values of 1,1,0,1,1

Before "LOAD 8 DI_8":
S1: 0
S0: 0
R: 0

After "LOAD 8 DI_8" (stack is lifted)
S1: 0
S0: 0
R: 1

After "AND 9 DI_9":
S1: 0
S0: 0
R: 1

After "LOAD 10 DI_10" (stack is lifted):
S1: 0
S0: 1
R: 0

After "LOAD 11 DI_11" (stack is lifted):
S1: 1
S0: 0
R: 1

After "OR 12 DI_12":
S1: 1
S0: 0
R: 1

After “AND 0 S0” (stack falls):

S1: 1 (S1 remains the same after the shift down)
S0: 1
R: 0

After “OR 0 S0” (stack falls):

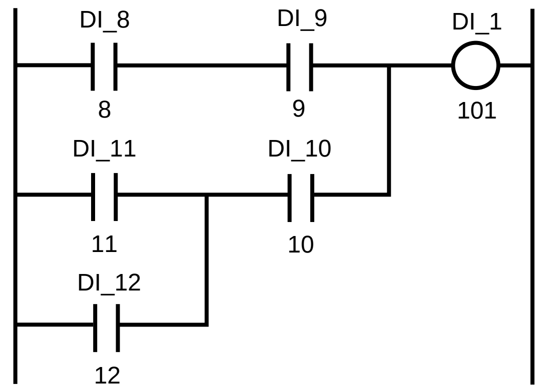
S1: 1
S0: 1
R: 1

After “OUT 101 D0_1”:

S1: 1
S0: 1
R: 1

The ladder diagram can be constructed differently to simplify the programming.

```
LOAD     8    DI_8
AND      9    DI_9
LOAD    11    DI_11
OR      12    DI_12
AND     10    DI_10
OR       0    S0
OUT    101    DO_1
```



In fact, most rungs can be simplified to require only one additional “LOAD” (other than the opening “LOAD”) and one operation with the “S0” register (i.e., the “S1” register would not be needed).

<u>The Latches</u>

There are four latches that are available with the PLC. Each has two inputs and one output. The output reflects the state of the latch, either “1” (ON) or “0” (Off). When the set input is “1” (true), the state of the latch (the output) will be “1” (On). When the reset input is “1” (true), then the state of the Latch will be “O” (Off). The set and reset inputs need only be true for one scan. The latch will retain its state (while the power is “On”) until the opposite input becomes true.   If both inputs are “1” (true) at the same time, the state of the latch will be “0” (Off).

The set inputs (act as coils) are labelled:

Lch1 Set (PLC Bit 116)
Lch2 Set (PLC Bit 117)
Lch3 Set (PLC Bit 118)
Lch4 Set (PLC Bit 119)

The reset inputs (act as coils) are labelled:

Lch1 Rst (PLC Bit 120)
Lch2 Rst (PLC Bit 121)
Lch3 Rst (PLC Bit 122)
Lch4 Rst (PLC Bit 123)

The outputs (used as contacts or status) are labelled:

Lch1 Out (PLC Bit 16)
Lch2 Out (PLC Bit 17)
Lch3 Out (PLC Bit 18)
Lch4 Out (PLC Bit 19)

A latch can be used to reverse the direction of motion with two sensors, one for forward, one for reverse. The sensors will only be active temporarily, so the latch retains the state until the opposite sensor is reached. The forward sensor is connected to DI_10, the reverse input to DI_11.

—NOTES—

PLC MONITOR

Use the PLC Monitor screens to monitor the state of all the PLC operands. Pages 2, 3 and 4 of the screens display the PLC bits in sequential order. Press the "help" key on each line to view the names for each bit. The Help screen will highlight the bits that are active.

Page 1 of the PLC Monitor screens displays the parameters that select the PLC bits and monitor the PLC. Use the Control Parameters Bit ; PLC Monitor 1 (CP-405) and PLC Monitor 2 (CP-406) to select a bit. The name and value of the bit that you choose is displayed in the corresponding Monitor Parameters ; PLC Mon 1 Val (MP-108) and PLC Mon 2 Val (MP-109). The default names for these Monitor Parameters (PLC Mon 1 Val and PLC Mon 2 Val) are replaced by the name and value of the PLC Bits selected in PLC Monitor 1 (CP-405) and PLC Monitor 2 (CP-406). You can also use the Code key when you are in any parameter screen to display the PLC Bit names and values of PLC Mon 1 Val (MP-108) or PLC Mon 2 Val (MP-109). You can also customize the Status screen to display them.

DI Set (CP-403) simulates an active low condition on one of the digital inputs, DI_8 through DI_15, without having to physically short the input connector to common. Enter a number with a "1" in the bit location corresponding to the digital input you want to force active. The action will be reflected in PLC 15-8 (MP-110), which displays the bit values for the digital inputs DI_8 through DI_15.

PLC Bit Set (CP-407) and PLC Bit Clear (CP-408) allow you to force a PLC Bit "On" (1) or "Off" (0). You can set (or clear) one of the status bits (contacts), PLC Bits 8-95, but you can not control a PLC Bit (coil) that is controlled by the PLC program (with the "OUT" command). Enter the number of the PLC Bit that you want to set (1) into PLC Bit Set (CP-407) and the number that you want to clear (0) into PLC Bit Clear (CP-408). When you are done testing, enter a "0" into PLC Bit Set (CP-407) and PLC Bit Clear (CP-408) . They will automatically default back to PLC Bits 3 (One) and 2 (Zero), respectively.

PLC MONITOR   P1/4

PLC Monitor 1 (CP-405)

PLC Monitor 1 (CP-405) determines which PLC bit will be monitored in PLC Mon 1 Val (MP-108). The PLC Mon 1 Val (MP-108) displays the name of the bit rather than "PLC Mon 1 Val". To select a PLC bit to monitor, enter the number of the bit or by use the 'Scroll' keys (^ or v) to scroll through the list. This bit can be monitored in any screen when the code select line set to PLC Mon 1 Val (MP-108). For the bit list, refer to *Appendices: Appendix L.*

PLC Mon 1 Val (MP-108)

PLC Monitor 1 Value (MP-108) displays both the description and the value of the PLC bit that was selected in PLC Monitor 1 (CP-405). Please note that a description of the PLC bit appears on the display line instead of the parameter name (PLC Mon 1 Val).

PLC Monitor 2 (CP-406)

PLC Monitor 2 (CP-406) functions identically to PLC Monitor 1 (CP-405). See above.

PLC Mon 2 Val (MP-109)

PLC Monitor 2 Value (MP-109) functions identically to PLC Monitor 1 Value (MP-108). See above.

DI Set (CP-403)

Digital Input Set (CP-403) simulates an "ACTIVE" condition on any or all of the PLC dedicated Digital Inputs (DI 15..8). Digital Input Set (CP-403) is logically OR'ed with the actual DI 15..8 (MP-101) bits to form the PLC 15-8 (MP-110) bits. The PLC 15-8 (MP-110) bits are used by the PLC logic. The value of DI Set (CP-403) will not effect the actual DI 15..8 (MP-101) value, rather, DI 15..8 (MP-101) reflects the present status of the actual inputs. Enter a "1" in a bit location to simulate an active condition on the corresponding input. DI 15 to DI 8 get mapped into Bit 7 to Bit 0. Page two of the "Help" screen displays inputs 15..8. Refer to *Appendices: Appendic C*.

PLC 15-8 (MP-110)

PLC 15-8 (MP-110) displays the status of PLC bits 15-8. A "1" in any bit indicates that the input is "active". The digital inputs are active low. Page one of the "Help" screen displays the bit map for PLC 15-8. Also refer to *Appendices: Appendic C*.

PLC Bit Set (CP-407)

PLC Bit Set (CP-407) forces a PLC bit to be set at "1". Enter the number of the bit that you want to set at "1". PLC Bit Set (CP-407) tests your PLC program rather than commanding a direct operation. The bit is set prior to the PLC program execution but after all the inputs, comparisons, timers and counters have had their status bits set up. However, the PLC could clear this bit and unpredictable results can occur. Do not attempt to set a PLC bit that is controlled by an OUT instruction in the PLC program. If you need to force an output, use DIG I/O TEST in the diagnostics screen. For the bit list, refer to *Appendices: Appendix L.*

PLC Bit Clear (CP-408)

PLC Bit Clear (CP-408) forces a PLC bit to be reset to "0". Enter the number of the bit that you want to clear. PLC Bit Clear (CP-408) tests your PLC rather than to commanding a direct operation. The bit is cleared prior to the PLC program execution but after all the inputs, comparisons, timers and counters have set up their status bits. However, the PLC could set this bit and unpredictable results can occur. Do not attempt to clear set a PLC bit that is controlled by an OUT instruction in the PLC program. If you need to force an output, use DIG I/O TEST in the diagnostics screen. For the bit list, refer to *Appendices: Appendix L.*

PLC MONITOR P2/4

PLC 15-8 (MP-110)

PLC 15-8 (MP-110) displays the status of PLC bits 15-8 . A "1" in any bit indicates that the input is "active". The digital inputs are active low. Page one of the "Help" screen displays the bit map for PLC 15-8. Also refer to *Appendices: Appendic C.*

PLC 23-16 (MP-111)

PLC 23-16 (MP-111) displays the status of the internal PLC status bits 23-16. A "1" in any bit indicates that the bit is "active". Page one of the "Help" screen displays the bit map for PLC 23-16. Also refer to *Appendices: Appendic C.*

PLC 31-24 (MP-112)

PLC 31-24 (MP-112) displays the status of the internal PLC status bits 31-24. A "1" in any bit indicates that the bit is "active". Page one of the "Help" screen displays the bit map for PLC 31-24. Also refer to *Appendices: Appendic C.*

PLC 39-32 (MP-611)

PLC 39-32 (MP-113) displays the status of the internal PLC status bits 39-32. A "1" in any bit indicates that the bit is "active". Page one of the "Help" screen displays the bit map for PLC 39-32. Also refer to *Appendices: Appendic C.*

PLC 47-40 (MP-114)

PLC 47-40 (MP-114) displays the status of the internal PLC status bits 47-40. A "1" in any bit indicates that the bit is "active". Page one of the "Help" screen displays the bit map for PLC 47-40. Also refer to *Appendices: Appendic C.*

PLC 55-48 (MP-115)

PLC 55-48 (MP-115) displays the status of the internal PLC status bits 55-48. A "1" in any bit indicates that the bit is "active". Page one of the "Help" screen displays the bit map for PLC 55-48. Also refer to *Appendices: Appendic C.*

PLC 63-56 (MP-116)

PLC 63-56 (MP-116) displays the status of the internal PLC status bits 63-56. A "1" in any bit indicates that the bit is "active". Page one of the "Help" screen displays the bit map for PLC 63-56. Also refer to *Appendices: Appendic C.*

PLC 71-64 (MP-117)

PLC 71-64 (MP-117) displays the status of the internal PLC status bits 71-64. A "1" in any bit indicates that the bit is "active". Page one of the "Help" screen displays the bit map for PLC 71-64. Also refer to *Appendices: Appendic C.*

PLC 79-72 (MP-118)

PLC 79-72 (MP-118) displays the status of the internal PLC status bits 79-72. A "1" in any bit indicates that the bit is "active". These bits are only used to monitor the operating state of the CX-1102. Page one of the "Help" screen displays the bit map for PLC 79-72. Also refer to *Appendices: Appendic C*

PLC 87-80 (MP-119)

PLC 87-80 (MP-119) displays the status of the internal PLC status bits 87-80. A "1" in any bit indicates that the bit is "active". These bits are only used to monitor the parameter block that is active. Page one of the "Help" screen displays the bit map for PLC 87-80. Also refer to *Appendices: Appendic C.*

PLC 95-88 (MP-120)

PLC 95-88 (MP-120) displays the status of the internal PLC status bits 95-88. A "1" in any bit indicates that the bit is "active". Page one of the "Help" screen displays the bit map for PLC 95-88. Also refer to *Appendices: Appendic C.*

PLC MONITOR P3/4

PLC 107-100 (MP-121)

PLC 107-100 (MP-71) displays the status of PLC bits 107-100. A "1" in any bit indicates that the output is "active". The digital outputs are active low (current sinking). Page one of the "Help" screen displays the bit map for PLC 107-100. Also refer to *Appendices: Appendic C*.

PLC 115-108 (MP-122)

PLC 115-108 (MP-122) displays the status of the internal PLC control bits 115-108. A "1" in any bit indicates that the bit is "active". These internal bits (control relays) can be used as global "control relays". For example, they can be used to create one-shots or latches. They can also be used to simplify programming. Page one of the "Help" screen displays the bit map for PLC 115-108. Also refer to *Appendices: Appendic C*.

PLC 123-116 (MP-123)

PLC 123-116 (MP-123) displays the status of the internal PLC control bits 123-116. A "1" in any bit indicates that the bit is "active". Page one of the "Help" screen displays the bit map for PLC 123-116. Also refer to *Appendices: Appendic C*.

PLC 131-124 (MP-124)

PLC 131-124 (MP-124) displays the status of the internal PLC control bits 131-124. A "1" in any bit indicates that the bit is "active". Page one of the "Help" screen displays the bit map for PLC 131-124. Also refer to *Appendices: Appendic C*.

PLC 139-132 (MP-125)

PLC 139-132 (MP-125) displays the status of the internal PLC control bits 139-132. A "1" in any bit indicates that the bit is "active". Page one of the "Help" screen displays the bit map for PLC 139-132. Also refer to *Appendices: Appendic C*.

PLC 147-140 (MP-126)

PLC 147-140 (MP-126) displays the status of the internal PLC control bits 147-140. A "1" in any bit indicates that the bit is "active". Blk Sel A, B, C select the block that is active, if Blk Sel Source (CP-478) has been set to "1" (DgIn). Page one of the "Help" screen displays the bit map for PLC 147-140. Also refer to *Appendices: Appendic C*.

PLC 155-148 (MP-127)

PLC 155-148 (MP-127) displays the status of the internal PLC control bits 155-148. A "1" in any bit indicates that the bit is "active". Page one of the "Help" screen displays the bit map for PLC 155-148. Also refer to *Appendices: Appendic C*.

PLC 163-156 (MP-128)

PLC 163-156 (MP-128) displays the status of the internal PLC control bits 163-156. A "1" in any bit indicates that the bit is "active". Page one of the "Help" screen displays the bit map for PLC 163-156. Also refer to *Appendices: Appendic C*.

PLC 171-164 (MP-129)

PLC 171-164 (MP-129) displays the status of the internal PLC control bits 171-164. A "1" in any bit indicates that the bit is "active". Page one of the "Help" screen displays the bit map for PLC 171-164. Also refer to *Appendices: Appendic C*.

PLC 179-172 (MP-130)

PLC 179-172 (MP-130) displays the status of the internal PLC status bits 179-172. None of these bits are presently active. They are reserved for future use. Page one of the "Help" screen displays the bit map for PLC 179-172. Also refer to *Appendices: Appendic C*.

PLC MONITOR   P4/4

PLC 187-180 (MP-131)

PLC 187-180 (MP-131) displays the status of the internal PLC control bits 187-180. A "1" in any bit indicates that the output is "active". Page one of the "Help" screen displays the bit map for PLC 187-180. Also refer to *Appendices: Appendic C*.

PLC 195-188 (MP-132)

PLC 195-188 (MP-132) displays the status of the internal PLC control bits 195-188. A "1" in any bit indicates that the bit is "active". Page one of the "Help" screen displays the bit map for PLC 195-188. Also refer to *Appendices: Appendic C*.

PLC 203-196 (MP-133)

PLC 203-196 (MP-133) displays the status of the internal PLC control bits 203-196. A "1" in any bit indicates that the bit is "active". Page one of the "Help" screen displays the bit map for PLC 203-196. Also refer to *Appendices: Appendic C*.

PLC 211-204 (MP-134)

PLC 211-204 (MP-134) displays the status of the internal PLC control bits 211-204. A "1" in any bit indicates that the bit is "active". Page one of the "Help" screen displays the bit map for PLC 211-204. Also refer to *Appendices: Appendic C*.

PLC 219-212 (MP-135)

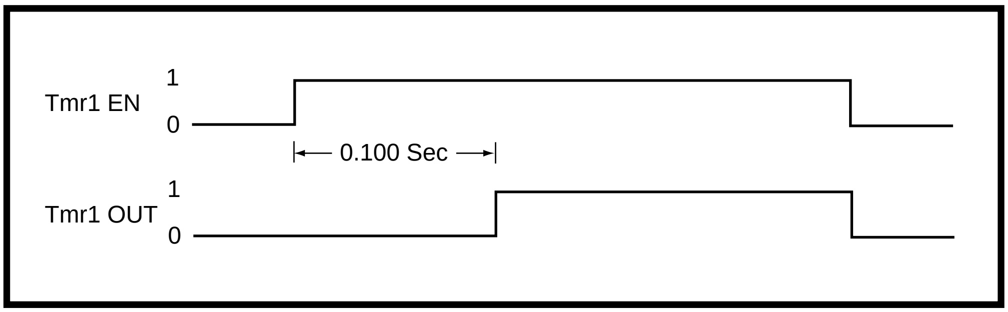
PLC 219-212 (MP-135) displays the status of the internal PLC control bits 219-212. A "1" in any bit indicates that the bit is "active". Page one of the "Help" screen displays the bit map for PLC 219-212. Also refer to *Appendices: Appendic C*.

—NOTES—

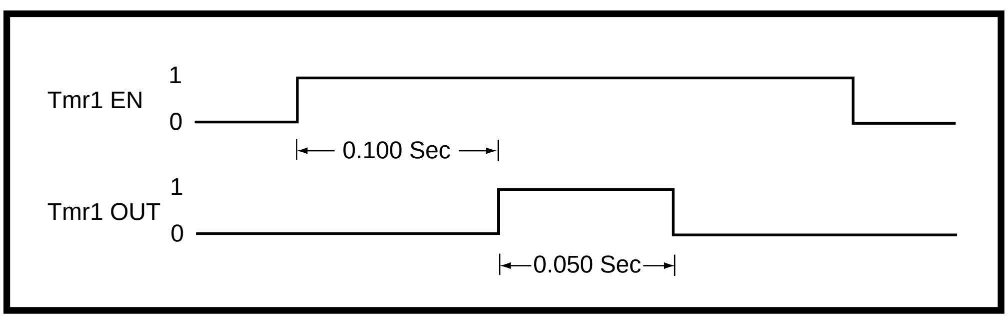
PLC TIMERS

The are four timers that work in conjunction with the PLC. Each timer can be set up to generate a pulse. The timers operate with 1 millisecond resolution. However, when the timer times out and the timer output becomes active, the PLC program may not react for another millisecond because of the two millisecond scan time. Therefore, enter the time values at “1” or “2” milliseconds shorter than you actually need to compensate. The timer outputs reflect the operation of an On-delay timer. If you need an Off-delay operation, use the “NOT” (complement) of the output. Timer 4, retains the accumulated time even when the Enable is deactivated.

The operation of each timer is dictated by their respective delay and on-time parameters. The following shows a typical time-trace of the Tmr1 Out when Tmr1 En changes from “0 ”to “1”. Tmr1 Delay (CP-410) equals “0.100” Seconds and Tmr1 on Tm (CP-411) equals “-1”.



The following shows a time-trace of the Tmr1 Out when Tmr1 En changes from “0” to “1”. Tmr1 Delay (CP-410) equals “0.100” Seconds and Tmr1 on Tm (CP-411) equals “0.050” Seconds.



PLC TIMERS   P1/1

Tmr1 Delay (CP-410)

Timer 1 Delay (CP-410) is the time, in seconds, from which Timer 1 becomes enabled (Tmr1 En bit going from “0” to “1”) until Tmr1 Out bit (24) in the PLC is going active (1). When the Tmr1 En bit (124) returns to “0”, the Tmr1 Out bit (24) is reset to “0” and the delay-time is reset to “0”.

Tmr1 on Tm (CP-411)

Timer 1 on Time (CP-411) is the time, in seconds, from which Timer 1 is going active (= 1) until Tmr1 Out is going inactive (back to “0”). When the Tmr1 En bit (124) returns to “0”, the Tmr1 Out bit (24) is reset = “0” and the on-time is reset to “0”. If you want Timer 1on-time to be infinite (“On” until Tmr1 is disabled with Tmr1 En = “0”), then enter a value of "-1" into Tmr1 on Tm (CP-411).

Tmr2 Delay (CP-412)

Timer 2 Delay (CP-412) is the time in seconds from which Timer 2 becoming enabled (Tmr2 En bit going from “0” to “1”) until Tmr2 Out bit (25) in the PLC going active (1). When the Tmr2 En bit (125) returns to “0”, the Tmr2 Out bit (25) is reset to “0” and the delay-time is reset to “0”.

Tmr2 on Tm (CP-413)

Timer 2 on Time (CP-413) is the time, in seconds, from which Timer 2 is going active (= 1) until Tmr2 Out is going inactive (back to “0”). When the Tmr2 En bit (125) returns to “0”, the Tmr2 Out bit (25) is reset = “0” and the on-time is reset to “0”. If you want Tmr2 on-time to be infinite (“On” until Tmr2 is disabled with Tmr2 En = “0”), then enter a value of "-1" into Tmr2 on Tm (CP-413).

Tmr3 Delay (CP-414)

Timer 3 Delay (CP-414) is the time, in seconds, from which Timer 3 becomes enabled (Tmr3 En bit going from “0” to “1”) until Tmr3 Out bit (26) in the PLC is going active (1). When the Tmr3 En bit (126) returns to “0”, the Tmr3 Out bit (26) is reset to “0” and the delay-time is reset to “0”.

Tmr3 on Tm (CP-415)

Timer 3 on Time (CP-415) is the time, in seconds, from which Timer 3 is going active (= 1) until Tmr3 Out is going inactive (back to “0”). When the Tmr3 En bit (126) returns to “0”, the Tmr3 Out bit (26) is reset = “0” and the on-time is reset to “0”. If you want Timer 3 on-time to be infinite (“On” until Tmr3 is disabled with Tmr3 En = “0”), then enter a value of "-1" into Timer 3 on Time (CP-415).

Tmr4 Delay (CP-416)

Timer 4 Delay (CP-416) is the time, in seconds, from Timer 4 becoming enabled (Tmr4 En bit going from “0” to “1”) toTmr4 Out bit (27) in the PLC going active (1). If Tmr4 becomes disabled, the delay-time is retained so the timing can continue when Tmr4 is re-enabled. The Tmr4Rst bit (128) in the PLC must be used to reset the delay time to “0”.

Tmr4 on Tm (CP-417)

Timer 4 on Tm (CP-417) is the time, in seconds, from Tmr4 Out going active (= 1) until Tmr4 Out going inactive (back to “0”). When Tmr4 becomes disabled, the on-time is retained so the timing can continue when Tmr4 is re-enabled. The Tmr4 Rst bit (128) in the PLC must be used to reset the on-time to “0”. If you want Tmr4 on-time to be infinite (“On” until Tmr4 is reset with Tmr4 Rst = 1) then enter a value of “-1” in Tmr4 on Tm (CP-417).

Tmr4 Time (MP-107)

Timer 4 Time (MP-107) displays the elapsed time, in seconds, for Timer 4 during the delay part of it's operation.

—NOTES—

PLC COUNTERS

There are four event counters that are associated with the PLC. One of these counters functions as an up/down counter. The other three counters operate as up-counters. The maximum count rate is approximately 100 counts per second (100 Hz). The up-counters all have upper trigger values associated with them. When the count reaches this trigger value, the counter output will be set automatically to "1". The count will continue past the trigger level when more transitions occur on the Increment PLC Bit. However, as long as the count is equal to or greater than the (up-counter) trigger level, the counter output PLC Bit will be "1". Each up-counter has a reset PLC bit associated with it to reset the count to "0". The up/down counter has a preset value that is loaded into the counter when the counter reset PLC Bit is set to a "1". Special Control Parameters hold the current count of the counters. As a result, the values are retained during a power-down. In addition, you can enter a new value into the count or increment/decrement the value with the scroll keys. The up/down counter has a down count trigger value and an associated output to indicate when the count is less than or equal to this trigger level.

The position counters that are associated with Unwind Encoder and Wind Encoder inputs are available for monitoring as well as for use in the numerical comparators. These counters are also used to determine the position error, which in turn drives the zero-error and position loops. These counters count pulses for non-quadrature (x1) encoders or count edges for quadrature (x4) encoders. You can set the count at which the counters rollover (to "0") with UwndCtntRO (CP-368) and WindCtntRO (CP-369). When the position-counter count reaches (or exceeds) the rollover value, the counter is reset to "0" (plus any count over the rollover value) and the rollover bit in the PLC is set (1) for one scan (one-shot). The rollover bits for Unwind Encoder and Wind Encoder inputs are UwndCtntRO (PLC Bit 38) and WindCtntRO (PLC Bit 39) respectively. The counters can be preset with the corresponding preset values.

PLC EVENT CNTRS   P1/1

Cntr1 Cnt (CP-421)

Counter 1 Count (CP-421) is the current count for “Counter 1”. The CX-1102 automatically increments it one count for every “0” to “1” transition of the Cntr1 Inc bit (130). Counter 1 Count is the default batch counter. Either use the “Scroll” keys or enter a new number to change this value. When the PLC program sets Cntr1 Rst bit (135) to “1”, then the Counter 1 Count (CP-421) resets to “0” .

Cntr1 Trig (CP-420)

When Counter 1 Count (CP-421) is greater than or equal to Counter 1 Trigger (CP-420), then the Cntr1 Out bit (32) in the PLC is set to “1”. If the count is less than, Cntr1 Out bit (32) will equal “0”.

Cntr2 Cnt (CP-423)

Counter 2 Count (CP-423) is the current count for “Counter 2”. The CX-1102 automatically increments it one count for every “0” to “1” transition of the Cntr1 Inc bit (131). Counter 2 Count is the default batch counter. Either use the “Scroll” keys or enter a new number to change this value. When the PLC program sets Cntr1 Rst bit (136) to “1”, then the Counter 2 Count (CP-423) resets to “0” .

Cntr2 Trig (CP-422)

When Counter 2 Count (CP-423) is greater than or equal to Counter 2 Trigger (CP-422), then the Cntr2 Out bit (33) in the PLC is set to “1”. If the count is less than, Cntr2 Out bit (33) will equal “0”.

Cntr3 Cnt (CP-425)

Counter 3 Count (CP-425) is the current count for “Counter 3”. The CX-1102 automatically increments it one count for every “0” to “1” transition of the Cntr3 Inc bit (132). Counter 3 Count is the default batch counter. Either use the “Scroll” keys or enter a new number to change this value. When the PLC program sets Cntr3 Rst bit (137) to “1”, then the Counter 3 Count (CP-425) resets to “0” .

Cntr3 Trig (CP-424)

When Counter 3 Count (CP-425) is greater than or equal to Counter 3 Trigger (CP-424), then the Cntr3 Out bit (34) in the PLC is set to “1”. If the count is less than, Cntr3Out bit (34) will equal “0”.

Cntr4 Cnt (CP-427)

Counter 4 Count (CP-427) is the current count for “Counter 4”. The CX-1102 automatically increments it one count for every “0” to “1” transition of the Cntr4 Inc bit (133). Counter 4 Count is the default batch counter. Either use the “Scroll” keys or enter a new number to change this value. When the PLC program sets Cntr4 Rst bit (138) to “1”, then the Counter 4 Count (CP-427) resets to “0” .

Cntr4 Preset (CP-429)

When the Counter 4 Rst bit in the PLC Programming screen is set to “ 1”, then Counter 4 Cnt (CP-427) is set to and held at the Counter 4 Preset (CP-429) value. If you need a transition preset, then create a one-shot or, when possible, use the DI 1 Shot (CP-402) mask.

Cntr4 TrigUp (CP-426)

When Counter 4 Count (CP-427) is greater than or equal to Counter 4 Trigger Up (CP-426), then the Cntr4 UpOut bit (35) in the PLC is set to “1”. If the count is less than, Cntr4UpO bit (35) will equal “0”.

Cntr4 TrigDn (CP-428)

When Counter 4 Count (CP-427) is less than or equal to Counter 4 Trigger Down (CP-428), then the Cntr4DnO bit (36) in the PLC is set to “1”. If the count is greater than, Cntr4DnO bit (36) will equal “0”.

PLC DATA COPY   P1/1

The PLC Data Copy function is used to copy CP or MP data (values) to a different CP (copy from source to destination). When a 0 to 1 transition occurs in the DataCopy 1 PLC bit (160), the value of the CP or MP selected by Copy Source 1 (CP-396) is copied to the CP selected by Copy Dest 1 (CP-397). When a 0 to 1 transition occurs in the DataCopy 2 PLC bit (161), the value of the CP or MP selected by Copy Source 2 (CP-398) is copied to the CP selected by Copy Dest 2 (CP-399). The values of the Copy Source CP or MP is unaffected by the data copy function.

Copy Source 1 (CP-396)

Copy Source 1 (CP-396) identifies the CP or MP whose value is copied to Copy Dest 1 when a 0 to 1 transition occurs in the DataCopy 1 PLC bit.

Copy Dest 1 (CP-397)

Copy Dest 1 (CP-397) identifies the CP that takes on the value of the CP or MP identified by Copy Source 1 when a 0 to 1 transition occurs in the DataCopy 1 PLC bit.

Copy Source 2 (CP-398)

Copy Source 2 (CP-398) identifies the CP or MP whose value is copied to Copy Dest 2 when a 0 to 1 transition occurs in the DataCopy 2 PLC bit.

Copy Dest 2 (CP-399)

Copy Dest 2 (CP-399) identifies the CP that takes on the value of the CP or MP identified by Copy Source 2 when a 0 to 1 transition occurs in the DataCopy 2 PLC bit.

—NOTES—

DIGITAL I/O

The PLC / Digital I/O, (page 1) screen displays parameters that are associated with the digital inputs for the PLC (DI-8 through DI-15). The DI-14 and DI-15 are routed to the Scroll Up bit (168) and Scroll Dn bit (169) respectively by the default PLC program. This allows these digital inputs to control the remote scroll-up and remote scroll-down function. The remote-scroll function can be assigned to almost any of the Control Parameters. Use Remote Scroll (CP-400) to select the Control Parameter that you want to assign to the remote scroll function. The rate of change when the PLC Bit is “1” (On or Digital Input active with default PLC program) is determined by Rmt Scroll Rate (CP-401). This is the number of increments/decrements to the least significant digit every second that the PLC bit (input) is active. Use Table 5-1 for the time-between increments or decrements of the various remote scroll rates.

DI 1 Shot (CP-402) determines which digital inputs will cause the corresponding PLC bit (8-15) to be “1” (On) for one PLC scan (one-shot) when an open-to-closed (active) transition occurs on the input. This is the default one-shot for the PLC.

Remote Scroll Rate	Increment Interval (Time)	Number of 10 - mSec Samples per Interval
1	1000 mSec = 1 Sec	100
2	500 mSec	50
3	333 mSec --> 330 mSec	33
4	250 mSec	25
5	200 mSec	20
10	100 mSec	10
11	91 mSec --> 90 mSec	9
12	83 mSec --> 80 mSec	8
14	71 mSec --> 70 mSec	7
15	67 mSec --> 60 mSec	6
20	50 mSec	5
25	40 mSec	4
30	33 mSec --> 30 mSec	3
50	20 mSec	2
100	10 mSec	**1**

Table 5-1 Remote Scroll Rates

DIGITAL I/O   P1/1

DI 1 Shot (CP-402)

Use the Digital Input 1 Shot (CP-402) to create a one scan pulse (one-shot) as the result of a high-to-low (open-to-closed) transition on any or all of the PLC dedicated inputs. To generate a 1-scan pulse for an inactive high to an active low transition, enter a “1” in the bit location of corresponding digital input. In the example below, the “1” has been entered in digital input 14.

DI 7..0 (MP-100)

Digital Input 7..0 (MP-100) displays the value of the “J6” digital inputs. A ‘1’ in the bit location indicates a “low voltage” condition on the corresponding input (which is consistent with a contact closure to common). Refer to Appendices: Appendix C for the DI 7..0 (MP-100) bit map list.

DI 15..8 (MP-101)

Digital Input 15..8 (MP-101) displays the value of the “J7” digital inputs. A ‘1’ in the bit location indicates a “low voltage” condition on the corresponding input (which is consistent with a contact closure to common). These eight inputs can be set up in the PLC Programming screen to generate a One-Shot Pulse on a high-to-low transition. Refer to Appendices: Appendix C for the DI 15..8 (MP-101) bit map list.

DO 7..0 (MP-102)

Digital Output 7..0 (MP-102) displays the value of the “J2” digital outputs. A ‘1’ in the bit location indicates an active “low voltage” condition on the corresponding open collector output (which would sink DC current). Refer to Appendices: Appendix C for the DO 7..0 (MP-102) bit map list.

PLC PROGRAMMING

Editor and the Compiler:
The PLC program consists of a text-based list of commands (instructions) and operands that work on bit data to produce the same result as a ladder-logic language. Each rung of a ladder logic program is implemented as a group of commands/operands starting with the “LOAD” (or LD NOT) command and ending with the “OUT ”command. A special series of screens that function as an editor allow you to change the PLC program. You can add commands, delete commands or change a command or operand. This is done with the keypad and screens; programming computer is not required.

Go to PLC / PLC Programming. This will bring up the current PLC program. There are five pages with a total of 64 lines. Each line consists of one command and one operand. The simplest rung would require two lines: one for the opening “LOAD” and one for the closing “OUT”. Scroll through the lines with the Par Up or Par Down keys. The second line of the PLC Programming title block will display what line is active (highlight) and if the command or operand on that line is active. Use the Page Up and Page Down keys scroll quickly through the entire program. Any changes made to the PLC program will be compiled immediately. The changes go into effect as soon as the PLC Program has been exited and saved.

Changing Commands:
Scroll the Par Up or Par Down keys to the command that you want to change (highlight). Use the Page Up and Page Down keys scroll quickly through the entire program. The second line of the PLC Programming title block will display what line is active (highlight) and the command on the line that is active. When an command is active (highlight), it can be changed by using the “increment scroll up/down” keys to scroll through the list of available commands. Stop scrolling when the correct command appears. Use the Clear key to delete a the active line. The operand may need to be changed to be consistent with the new command. Use the Par Down key to scroll to the operand (highlight).

Changing Operands:
Scroll the Par Up or Par Down keys to the to the operand that you want to change. Use the Page Up and Page Down keys scroll quickly through the entire program. The second line of the PLC Programming title block will display what line is active (highlight) and the operand on the line that is active. When a operands is active, it can be changed either by entering the PLC Bit number or by scrolling through the list of operands with the “increment scroll ▲ or ▼” keys. The name of the operand appears on the line to the right of the PLC Bit number. Stop scrolling when the correct operand appears. Press the Enter key to enter operand. Use the Clear key to delete a the active line.

Inserting a New Line:
To insert a new line at the active line (highlight), scroll to the command and press the Enter key. The new line is now active and the prior active line, as well as the rest of the lines, move down one line. The new line appears as a “NOP” (no operation) command and a “No Opnd” (No operand).

To Insert a new line below the active line (highlight), scroll to the operand and press the Enter key. A new line is inserted on the next line and becomes the active line. The entire program, moves down one line. The new line appears as a “NOP” (no operation) command and a “No Opnd” (No operand).

Delete a Line:
To delete a line, scroll to either the command or operand of the line and press the Clear key. A dialog box appears and asks if you want to delete the line. Press the Enter key to delete the line or the Clear key to cancel the request to delete.

Status and Help screens:
Press the Help key to go to the help screen for a description of the PLC Programming. Press the Status key to access the status screen. Press the Status key again to return to the PLC Programming screen. The Code is still functional in the status screen. However, if you access the status screen from the PLC programming screen, then you can not access the menu screens from the status screen. You must exit the PLC Programming screen in order to access the menu screens.

Closing and Saving the PLC Programming screen:
To return to the menu screen, press the Menu key. If you made any changes, a dialog box will appear to confirm the changes. To keep the changes, press the Enter key. Pressing the Enter key to accept the changes does not alter the PLC backup or the PLC default program. To discard the current changes, press the Clear key.

DANGER

When you exit the PLC Programming screen and press the Enter key, the changes will take effect immediately.

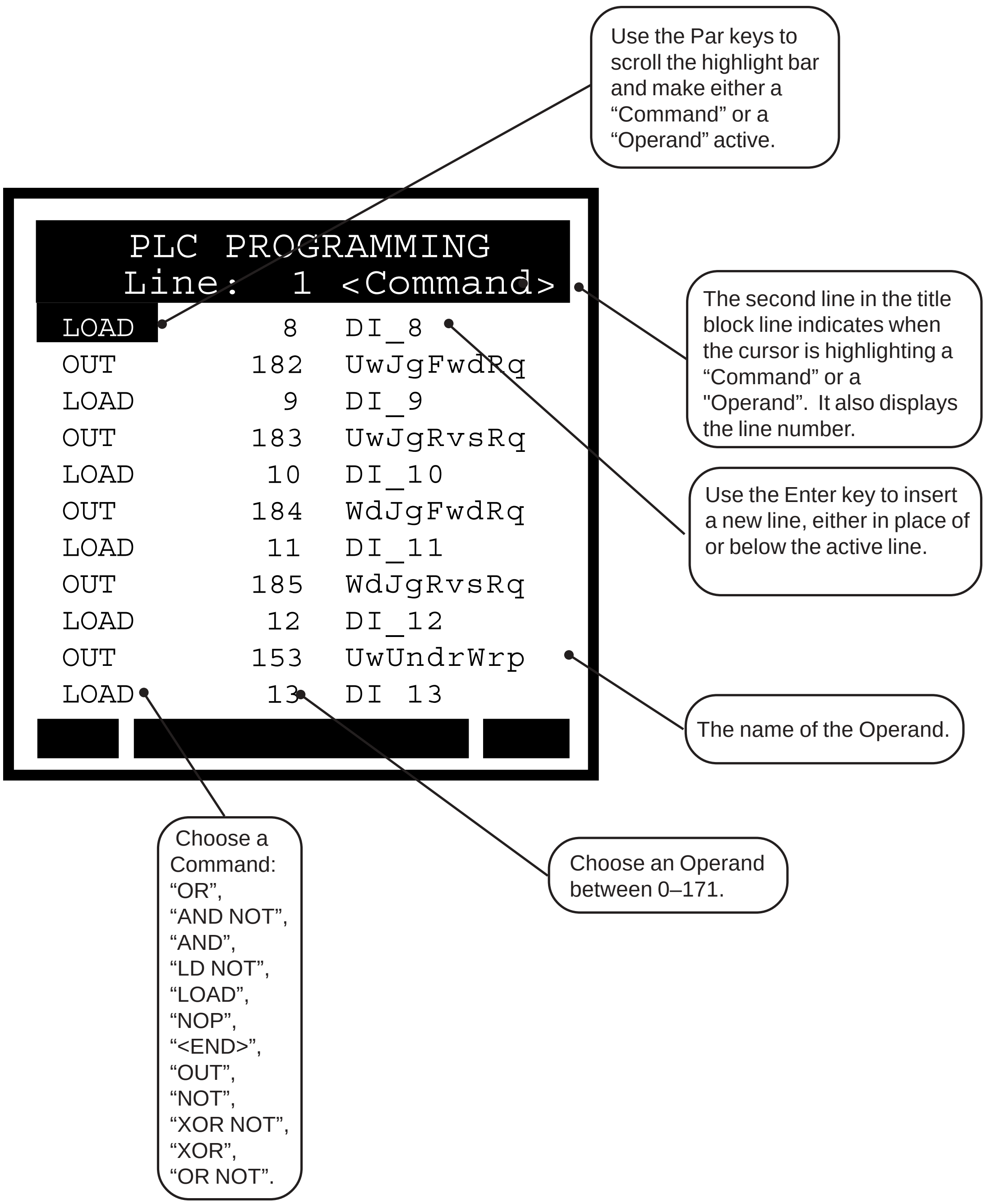
The new program could cause a digital output to change state, and cause an actuator to engage or disengage.

Creating a Customized Backup Program:
To save the changes that you have made to the PLC Program as a customized backup PLC program, go to the Setup/Load & Save Parms screen (page 1) and enter “1” in Save PLC Prgm (CP-499).

Loading the Backup Program or the Default Program:
The last page (page 5) of the PLC programming help screens (accessed from any line) allows you to choose between loading the backup PLC program (that you have customized) or loading the default PLC program that was shipped from the factory. “Load Default Program” is the default. You can also access the PLC backup or the PLC default programs from the Setup/Load & Save Parms screen (page 1). For the list of the factory default PLC Program Logic, see *Appendices: Appendix J*.

NOTE: The backup PLC Program is identical to the default PLC Program until you customize the PLC and then save the backup in the Setup/Load & Save Parms screen. In addition, if you perform a “Clear 9” power-up, your customized backup PLC Program will revert back to the default PLC Program.

The PLC Programing screens are accessed through
—> Main Menu / PLC <—



Use the Page keys to go scroll through the 64 command lines, a page at a time. The screens below display the default sttings for lines 12 through 64.

PLC PROGRAMMING
Line: 12 <Command>

OUT	154	WdUndrWrp
LOAD	14	DI_14
OUT	159	Negate LS
LOAD	15	DI_15
OUT	71	F-STOP
LOAD	145	UwRSTDia
OR	146	WdRSTDia
OR	41	UwndDrvEn
OUT	100	DO_0
LD NOT	51	WindDrvEn
OUT	101	DO_1

PLC PROGRAMMING
Line: 23 <Command>

LOAD	61	Cmpr2 Out
OUT	102	DO_2
LOAD	62	Cmpr3 Out
OUT	103	DO_3
LOAD	63	Cmpr4 Out
OUT	104	DO_4
LOAD	90	DncrFull
OR	91	DncrEmpty
OUT	105	DO_5
LOAD	93	WebBroken
OUT	106	DO_6

PLC PROGRAMMING
Line: 34 <Command>

LOAD	94	DncrLded
OUT	107	DO_7
<END>	171	No Opnd
NOP	171	No Opnd
NOP	171	No Opnd
NOP	171	No Opnd
NOP	171	No Opnd
NOP	171	No Opnd
NOP	171	No Opnd
NOP	171	No Opnd
NOP	171	No Opnd

PLC PROGRAMMING
Line: 45 <Command>

NOP	171	No Opnd
NOP	171	No Opnd
NOP	171	No Opnd
NOP	171	No Opnd
NOP	171	No Opnd
NOP	171	No Opnd
NOP	171	No Opnd
NOP	171	No Opnd
NOP	171	No Opnd
NOP	171	No Opnd
NOP	171	No Opnd

PLC PROGRAMMING
Line: 56 <Command>

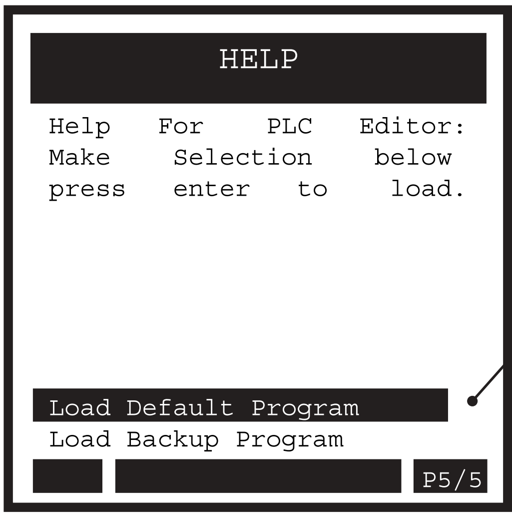
NOP	171	No Opnd
NOP	171	No Opnd
NOP	171	No Opnd
NOP	171	No Opnd
NOP	171	No Opnd
NOP	171	No Opnd
NOP	171	No Opnd
NOP	171	No Opnd
NOP	171	No Opnd

PLC PROGRAMMING
Line: 64 <Command>

NOP	171	No Opnd
NOP	171	No Opnd
NOP	171	No Opnd
NOP	171	No Opnd
NOP	171	No Opnd
NOP	171	No Opnd
NOP	171	No Opnd
NOP	171	No Opnd
NOP	171	No Opnd

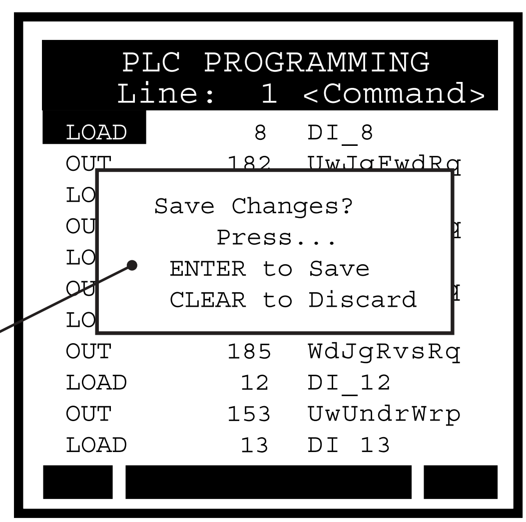
PLC Programming / Help Screen Option and Save Screen

The last page of the Help screens (page 5) allows you to choose between creating a backup of the changes that you have entered or loading the default bit program that was shipped from the factory. “Load Default Program” is the default choice.



To change to “Load Backup Program”, use the “par” key to scroll the highlight bar.

Press the Menu key from any of the PLC Proramming screens to exit. If you have made changes in any of the screens, a dialog box will popup and give you the opportunity to save or to discard your changes.



Press the Enter key to save your changes or press the Clear key to discard your changes.

—NOTES—

System Monitoring/Monitor Parameters

INTRODUCTION TO MONITOR PARAMETERS

Parameters are divided into two classifications; Control Parameters (CP) and Monitor Parameters (MP). This section is about Monitor Parameters. Control Parameters are explained in *System Setup/Control Parameters.*

The parameters appear on the screens by a Parameter Name. The Help screens list the parameters by both their name and by a numbered code, which is called the Parameter Code. The operational data is the Parameter Value.

		Parameter Name	Parameter Code	Parameter Value
Parameters =	Monitor Parameter	Line Speed	MP-40	0.0 (default)
	Control Parameter	Line Spd SP	CP-210	0.0 (default)

Note: Monitor Parameters are status indicators only - you can not directly affect or change a Monitor Parameter. When Monitor Parameters are displayed on the screens, they do not have a small indicator “dot” to the left of the Parameter Name (unlike Control Parameters, which do have a small indicator “dot” to the left of the Parameter Name).

Monitor Parameter (MP) screens allow you to monitor the performance of the CX-1102 and your system. These screens also help you troubleshoot for problems as well as confirm the wiring and tuning. Monitor Parameter screens can be accessed at any time during the CX-1102's operation, including during Run, Jog and F-Stop. The Monitor Parameter screens are accessed through the System Monitor screen.

—NOTES—

SYSTEM MONITOR

Use the system monitor screens to access the Monitor Parameter screens that monitor the operation of the CX-1102. In addition to their monitoring capability, the Control Override screens provide limited control of the Run/Stop/Jog logic and the block selection.

The CX-1102 system monitor screens are:

- Run Monitor
- STD Signals Monitor
- Limits and Alarms Monitor
- DIG I/O Monitor
- Analog In Monitor
- Control Overrides

RUN MONITOR / SYSTEM P1/3

The Run Monitor screen (page 1) contains monitor system data parameters. Setpoint X (CP-201) is also included on this screen to allow convenient assess to your active setpoint.

System State (MP-50)

System State (MP-50) displays the present operating state of the CX-1102 (see list below). Only one operating state may be active at a time. To access either the “Run” or the “Jog” operating state, the F-Stop, Unload and H-Stop inputs must be closed.

8 = Diagnostics	7 = Setup	6 = Not Defined
5 = Jog	4 = RUN	3 = Load
2 = H-Stop	1 = Unload	0 = F-Stop

Setpoint X (CP-201)

Setpoint X (CP-201) displays the active commanded Line Speed Setpoint. Setpoint X is a quick access, dynamically assigned parameter that is a mirror of the currently commanded Line Speed regardless of the source. It may display Line Speed SP (CP-210), or Ext LineSpd (MP-88) depending upon application choices. The label will change dynamically to indicate which parameter is being mirrored. If Line Speed SP (CP-210) is active, then any change to Setpoint X, (temporarily labeled LineSpeed X) will also change CP-210.

LineSpdSRef (MP-41)

Line Speed Scaled Reference (MP-41) displays the currently commanded target web speed. It may come from several possible sources, via LineSpdSrc (CP-203). If the non-dancer-trimmed axis is under control of this device, and a high Line Speed is commanded, this value will be automatically reduced to the limit calculated by EstMaxLineSpd (MP-43), due to speed limitations arising from a small diameter on one axis.

LineSpdRRef (MP-42)

Line Speed Ramped Reference (MP-42) displays the web speed command, in feedback Engineering Units. This is the output of the ramp calculations. When the ramp has been completed, the LineSpdRRef (MP-42) should equal the LineSpdSRef (MP-41).

Line Speed (MP-40)

Line Speed (MP-40) is an actual measured speed. It is derived from the roll RPM of the non-dancer-trimmed axis, and converted into web speed via the currently calculated diameter estimate. When the system is operating under good control, it should agree with the commanded LineSpdSRef (MP-41).

EstMaxLineSpd (MP-43)

Estimated Maximum Line Speed (MP-43) is calculated from an analysis of the potential maximum speeds achievable from each axis. Typically the axis with the smallest diameter will limit the maximum Line Speed possible. If the non-dancer-trimmed axis is under control of this device, and a high Line Speed is commanded, the LineSpdSRef (MP-41) will be automatically adjusted (limited), as new values of EstMaxLnSpd (MP-43) are calculated.

DncrCtnt Err (MP-83)

Dancer Content Error (MP-83) displays the difference between requested Dancer SP (CP-250) and actual Dancer Ctnt (MP-82). This error will be used to trim the speed of the dancer trimmed axis and attempt to restore the dancer content (position) toward the Dancer SP (CP-250).

Dancer Trim (MP-84)

Dancer Trim (MP-84) displays the amount of corrective line speed adjustment applied to the "dancer trimmed" roll. Proportional to the dancer error.

Wrap Pty (MP-70)

Wrap Polarity (MP-70) displays the present system configuration in regard to various combinations of overwrap/underwrap.

11 = Wind underwrap, Unwind underwrap
10 = Wind underwrap, Unwind overwrap
01 = Wind overwrap, Unwind underwrap
00 = Wind overwrap, Unwind overwrap

RUN MONITOR / UNWIND   P2/3

The Run Monitor / Unwind screen (page 2) monitor the parameters that are related to the Unwind control loop.

Uwnd State (MP-48)

Unwind State (MP-48) displays the present operating state of the Unwind control loop (see list below).

7 = Diagnostics	6 = Jog Stop	5 = Jog Reverse
4 = Jog Forward	3 = Not Defined	2 = RUN
1 = H-Stop	0 = F-Stop	

UwndCntrlLp (MP-72)

Unwind Control Loop (MP-72) displays the present operating mode of the unwind axis. These modes are automatically selected depending on the present system State (MP-50).

2 = PsnHld (Position Hold)
1 = Vel (Velocity Loop)
0 = OL (Open Loop)

Uwnd Dirn (MP-60)

Unwind Direction (MP-60) displays the present condition of the Uwnd LED mounted on the Analog board. The LED conditions indicate unwind roll motion, forward or reverse.

2 = Unwind forward motion	= LED Green
1 = Unwind reverse motion	= LED Red
0 = Unwind no motion, < 1Hz	= LED Off

UwndRollRPM (MP-03)

Unwind Roll RPM (MP-03) displays the rotational speed of the unwind station axle. It may be different than the encoder speed, or the motor speed, due to gear ratios.

UwndRRef (MP-21)

Unwind Ramped Reference (MP-21) displays the speed command, in Roll RPM. This is the output of the ramp calculations. When the ramp has been completed, the UwndRRef (MP-21) should equal the LineSpdSRef (MP-41). UwndRRef (MP-21) is the instantaneous commanded speed, in roll RPM, for the unwind axis. It is derived from Line Speed (after accel/decel ramps), Diameter, and possibly Dancer movement.

UwndRR Err (MP-22)

Unwind Ramped Reference Error (MP-22) displays the instantaneous difference between the commanded UwndRRef (MP-21) and the actual UwndRollRPM (MP-03).

Uwnd Trim (MP-26)

Unwind Trim (MP-26) displays the value of the output of the PID compensator. Uwnd Trim is displayed in Volts. Uwnd Trim is the combined conditioned error signals that, combined with the Uwnd FFwd (MP-24), will become the UwndCO Volts (MP-27). It is the combination of all three parts of the PID error correction algorithm.

UwndCO Volts (MP-27)

Unwind Control Output Volts (MP-27) displays the present value, in volts, of the Control Output (SigU) signal to the unwind drive. It is a combination of Uwnd FFwd (MP-24) plus Uwnd Trim (MP-26).

UwndEstDia (MP-07)

Unwind Estimated Diameter (MP-07) is calculated from roll rotation and dancer movement. It can also be forced to the value in UwndDiaPrst (CP-364) via PLC action. It is used to translate web speed commands into roll RPM.

UwndEstCtnt (MP-06)

Unwind Estimated Content (MP-06) is calculated from approximate web travel, and decrements during forward motion. It can be forced to the UwndCtntPrst (CP-366) by PLC action. While decrementing, it will ultimately rollover over at zero. At rollover, it sets a PLC bit, and resets itself to the value in UwndCtntRO (CP-368). If the web reverses direction, with the Unwind axis taking up web material, then the value will increment, and ultimately rollover upon reaching the UwndCtntRO (CP-368) limit. It is often used , via a comparator in the PLC, to declare a near-empty roll.

RUN MONITOR / WIND P3/3

The Run Monitor / Wind screen (page 3) monitor that are related to the Wind control loop.

Wind State (MP-49)

Wind State (MP-49) displays the present operating state of the wind control loop (see list below).

7 = Diagnostics	6 = Jog Stop	5 = Jog Reverse
4 = Jog Forward	3 = Not Defined	2 = RUN
1 = H-Stop	0 = F-Stop	

WindCntrlLp (MP-73)

Wind Control Loop (MP-73) displays the present operating mode of the wind axis. These modes are automatically selected depending on the present system State (MP-50).

2 = PsnHld (Position Hold)
1 = Vel (Velocity Loop)
0 = OL (Open Loop)

Wind Dirn (MP-61)

Wind Direction (MP-61) displays the present condition of the Wind LED mounted on the Analog board. The LED conditions indicate wind roll motion, forward or reverse.

2 = Wind forward motion	= LED Green
1 = Wind reverse motion	= LED Red
0 = Wind no motion, < 1Hz	= LED Off

WindRollRPM (MP-13)

Wind Roll RPM (MP-13) displays the rotational speed of the wind station axle. It may be different than the encoder speed, or the motor speed, due to gear ratios.

WindRRef (MP-31)

Wind Ramped Reference (MP-31) displays the speed command, in feedback Roll RPM. This is the output of the ramp calculations. When the ramp has been completed, the WindRRef (MP-31) should equal the LineSpdSRef (MP-41). WindRRef (MP-31) is the instantaneous commanded speed, in roll RPM, for the wind axis. It is derived from Line Speed (after accel/decel ramps), Diameter, and possibly Dancer movement.

WindRR Err (MP-32)

Wind Ramped Reference Error (MP-32) displays the instantaneous difference between the commanded WindRRef (MP-31) and the actual WindRollRPM (MP-13).

Wind Trim (MP-36)

Wind Trim (MP-36) displays the value of the output of the PID compensator. Wind Trim is displayed in Volts. Wind Trim is the combined conditioned error signals that, combined with the WindFFwd (MP-34), will become the WindCO Volts (MP-37). It is the combination of all three parts of the PID error correction algorithm.

WindCO Volts (MP-37)

Wind Control Output Volts (MP-37) displays the present value, in volts, of the Control Output (SigW) signal to the wind drive. It is a combination of WindFFwd (MP-34) plus Wind Trim (MP-36).

WindEstDia (MP-17)

Wind Estimated Diameter (MP-17) is calculated from roll rotation and dancer movement. It can also be forced to the value in WindDiaPrst (CP-365) via PLC action. It is used to translate web speed commands into roll RPM.

WindEstCtnt (MP-16)

Wind Estimated Content (MP-16) is calculated from approximate web travel, and increments during forward motion. It can be forced to the WindCtntPrst (CP-367) by PLC action. While incrementing, it will ultimately rollover over at the WindCtntRO (CP-369) limit. At rollover, it sets a PLC bit, and resets itself to the value in WindCtntRO (CP-369). If the web reverses direction, with the Wind axis taking up web material, then the value will decrement, and ultimately rollover upon reaching zero. It is often used , via a comparator in the PLC, to declare a near-empty roll.

STD SIGNAL MONITOR / UNWIND   P1/3

The STD Signal Monitor / Unwind screen (page 1) displays parameters that are related to the Unwind Frequency Input signal.

Uwnd State (MP-48)

Unwind State (MP-48) displays the present operating state of the Unwind control loop (see list below).

7 = Diagnostics	6 = Jog Stop	5 = Jog Reverse
4 = Jog Forward	3 = Not Defined	2 = RUN
1 = H-Stop	0 = F-Stop	

Uwnd Hz (MP-01)

Unwind Hertz (MP-01) displays the current frequency of the Unwind Encoder Input, in Hertz.

UwndEncRPM (MP-02)

Unwind Encoder RPM (MP-02) displays the current speed of the Unwind encoder in RPM relative to PPR Uwnd (CP-261).

UwndRollRPM (MP-03)

Unwind Roll RPM (MP-03) displays the rotational speed of the Unwind station axle. It may be different than the encoder speed, or the motor speed, due to gear ratios.

UwndCnts (MP-05)

Unwind Counts (MP-05) displays the encoder pulses from the Unwind station. They are converted to engineering units and displayed in UwndEstCtnt (MP-06). They will rollover, and begin again, as determined by UwndCtntRO (CP-368).

Uwnd Rot (MP-09)

Unwind Rotations (MP-09) displays a totalized rotational count of the Unwind Roll.

STD SIGNAL MONITOR / WIND P2/3

The STD Signal Monitor / Wind screen (page 2) displays the parameters that are related to the Wind Frequency Input signal.

Wind State (MP-49)

Wind State (MP-49) displays the present operating state of the wind control loop (see list below).

7 = Diagnostics	6 = Jog Stop	5 = Jog Reverse
4 = Jog Forward	3 = Not Defined	2 = RUN
1 = H-Stop	0 = F-Stop	

Wind Hz (MP-11)

Wind Hz (MP-11) displays the present frequency of the Wind Encoder Input, in Hertz.

WindEncRPM (MP-12)

Wind Encoder RPM (MP-12) displays the current speed of the Wind encoder in RPM relative to PPR Wind (CP-266).

WindRollRPM (MP-13)

Wind Roll RPM (MP-13) displays the rotational speed of the Wind station axle. It may be different than the encoder speed, or the motor speed, due to gear ratios.

WindCnts (MP-15)

Wind Counts (MP-15) displays the encoder pulses from the Unwind station. They are converted to engineering units and displayed in WindEstCtnt (MP-16). They will rollover, and begin again, as determined by WindCtntRO (CP-369).

Wind Rot (MP-19)

Wind Rotations (MP-09) displays a totalized rotational count of the Wind Roll.

STD SIGNAL MONITOR / CONTROL OUTPUTS   P3/3

The STD Signal Monitor / Control Outputs screen (page 3) displays SigU and SigW signal data. The SigU and SigW is the CX-1102 output signal that is the input to the drive as a velocity (or torque) command.

UwndCO Volts (MP-27)

Unwind Control Output Volts (MP-27) displays the present value, in volts, of the Control Output (SigU) signal to the unwind drive. It is a combination of Uwnd FFwd (MP-24) plus Uwnd Trim (MP-26).

UwndCO Bits (MP-28)

Unwind Control Output Bits (MP-28) displays the present value, in DAC bits, of the Control Output (SigU) signal to the unwind drive. UwndCO Bits is the UwndCO Volts (MP-27) expressed in DAC bits.

UwndCOMaxBits (MP-29)

Unwind Control Output Maximum Bits (MP-29) reflects the maximum allowed output in units of DAC bits. The value of UwndCOMaxVolts (CP-281) determines this parameter, based on the conversion of 32767 bits = 15 VDC.

WindCO Volts (MP-37)

Wind Control Output Volts (MP-37) displays the present value, in volts, of the Control Output (SigW) signal to the wind drive. It is a combination of WindFFwd (MP-34) plus Wind Trim (MP-36).

WindCO Bits (MP-38)

Wind Control Output Bits (MP-28) displays the present value, in DAC bits, of the Control Output (SigW) signal to the wind drive. WindCO Bits is the WindCO Volts (MP-37) expressed in DAC bits.

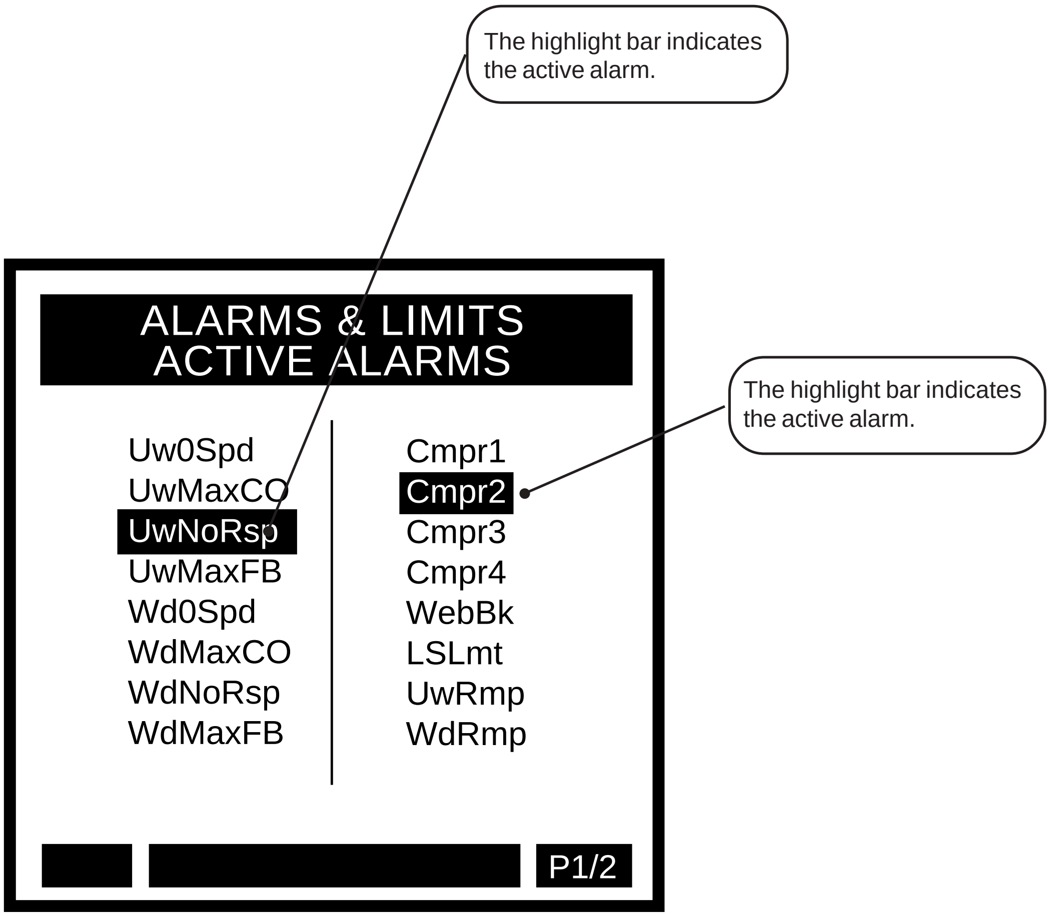
WindCOMaxBits (MP-39)

Wind Control Output Maximum Bits (MP-39) reflects the maximum allowed output in units of DAC bits. The value of WindCOMaxVolts (CP-286) determines this parameter, based on the conversion of 32767 bits = 15 VDC.

ALARMS & LIMITS / ACTIVE ALARMS   P1/2

The Alarms & Limits / Active Alarms screen (page 1) displays the status of the alarms and limits. This screen displays a list of the Limits, General Alarms and Custom Alms. The active Limits, Alarms and Custom Alms are highlighted *(See next page)*.

The Alarms & Limits screen is accessed through
—> Main Menu / System Monitor



ALARMS AND LIMITS P2/2

The Alarms & Limitsscreen (page 2) displays the bit-mapped Monitor Parameters that monitor the status of the Limits, Alarms and Custom Alms. Use either the *Appendices: Appendix C* or the “Help” screen to preview the bit map lists.

Active Block (MP-51)

Active Block (MP-51) displays the active block (0-7). The block can be selected and made active by the Block select bits (Blk Sel A,B,C), in the PLC Programming screen if Block Select Source (CP-478) is set to “1” (DigIn & PLC). Or the block can be selected and made active by the keypad if Block Select Source (CP-478) is set to “2” (Keypad Blk Sel).

InvalidBlks (MP-52)

Invalid Blocks (MP-52) displays the status of the blocks in the Block Setup screens. A “1” indicates that there is an error with the corresponding block. Generally, this indicates that an overflow condition can occur if the corresponding block is activated. In addition, since other parameters are used in conjunction with the Block Parameters that you selected, an error can result from a parameter that is not selected in Block Parameters. If a bad block is activated, the CX-1102 will execute an F-Stop until either the block error is corrected or a another block is activated. Refer to *Appendices: Appendix C* for the Invalid Blocks (MP-52) bit map list.

Misc Status (MP-53)

Miscellaneous Status (MP-53) displays various status conditions . A “1” in the CO Sign bit indicates a negative command output. A “1” in any other bit location indicates an active condition. Refer to *Appendices: Appendix C* for the Miscellaneous Status (MP-53) bit map list.

Std Alarms (MP-54)

Std Alarms (MP-54) displays various alarm conditions . A “1” in any bit location indicates an active condition. Refer to *Appendices: Appendix C* for the Std Alarms (MP-54) bit map list.

Custom Alms (MP-55)

Custom Alarms (MP-55) displays the outputs of the PLC numerical comparators. A “1” in bit locations 0-3 indicates that the result of the compare (Cmprx Parm value vs. Cmprx Val) is true for the given Cmprx Type. A “1” in bit locations 4-7 indicates that the result of the compare (Cmprx Parm value vs. Cmprx Val) is false for the given Cmprx Type (the NOT is true). Refer to CP-380 through CP-395. Refer to *Appendices: Appendix C* for the Custom Alarms (MP-55) bit map list.

Misc Alarms (MP-56)

Misc Alarms (MP-56) displays various alarm conditions . A “1” in any bit location indicates an active condition. Refer to *Appendices: Appendix C* for the Misc Alarms (MP-56) bit map list.

DIG I/O MONITOR   P1/1

The DIG I/O Monitor screen displays the status (state) of all the digital inputs and outputs.

DI 7..0 (MP-100)

Digital Input 7..0 (MP-100) displays the value of the “J6” digital inputs. A ‘1’ in the bit location indicates a “low voltage” condition on the corresponding input (which is consistent with a contact closure to common). Refer to *Appendices: Appendix C* for the DI 7..0 (MP-100) bit map list. The Help screen for DI 7..0 (MP-100) also contains a bit map list.

DI 15..8 (MP-101)

Digital Input 15..8 (MP-101) displays the value of the “J7” digital inputs. A ‘1’ in the bit location indicates a “low voltage” condition on the corresponding input (which is consistent with a contact closure to common). These eight inputs can be set up in the PLC Programming screen to generate a One-Shot -Pulse on a high-to-low transition. Refer to *Appendices: Appendix C* for the DI 15..8 (MP-101) bit map list. The Help screen for DI 15..8 (MP-101) also contains a bit map list.

DO 7..0 (MP-102)

Digital Output 7..0 (MP-102) displays the value of the “J2” digital outputs. A ‘1’ in the bit location indicates an active “low voltage” condition on the corresponding open collector output (which would sink DC current). Refer to *Appendices: Appendix C* for the DO 7..0 (MP-102) bit map list. The Help screen for DO 7..0 (MP-102) also contains a bit map list.

ANALOG IN MONITOR P1/1

The Analog In Monitor screen (page 1) monitors the input signals and displays the parameters for the analog inputs (Dancer and Ext Line Speed).

Dancer State (MP-58)

Dancer State (MP-58) displays the present condition of the Dancer LED mounted on the Analog board. The LED conditions indicate various specific Dancer arm states.

3 = Between limits - OK	= LED Green
2 = Full limit	= LED Orange
1 = Empty limit	= LED Red
0 = Not calibrated	= LED Off

Dancer Bits (MP-80)

Dancer Bits (MP-80) displays the ADC receiving the analog Dancer signal.

Dancer Volts (MP-81)

Dancer Volts (MP-81) displays the analog Dancer Signal. Note that the dancer may not generate the full range of voltage. Configurations that generate larger voltage swings may attain higher accuracy in diameter and line speed calculations.

Dancer Ctnt (MP-82)

Dancer Content (MP-82) displays the estimation of the amount of web material presently stored within the dancer assembly. It assumes that there is a linear relationship between dancer volts and dancer content.

DncrCtnt Err (MP-83)

Dancer Content Error (MP-83) displays the difference between requested Dancer SP (CP-250) and actual Dancer Ctnt (MP-82). This error will be used to trim the speed of the dancer trimmed axis and attempt to restore the dancer content (position) toward the Dancer SP (CP-250).

Ext LS Bits (MP-86)

External Line Speed Bits (MP-86) displays the ADC receiving the analog Line Speed signal.

Ext LS Volts (MP-87)

External Line Speed Volts (MP-87) displays the analog Line Speed signal. It operates over the range of 0 to +/-10vdc. Reverse direction can be achieved via negative signal in some configurations, or via a positive signal plus a wire terminal reversing input switch.

Ext LineSpd (MP-88)

External Line Speed (MP-88) displays the Ext LS Volts (MP-87) signal converted into web line speed units. This display actively monitors the input signal even if the system is presently using another source for the Line Speed, or even if the value is later limited for various reasons.

CONTROL OVERRIDES / STATE   P1/4

The Control Overrides / States screen (page 1) allows you to select and monitor the operating state for the CX-1102. The first line on the screen displays the current operating state.

System State (MP-50)

System State (MP-50) displays the present operating state of the CX-1102 (see list below). Only one operating state may be active at a time. To access either the “Run” or the “Jog” operating state, the F-Stop, Unload and H-Stop inputs must be closed.

8 = Diagnostics	7 = Setup	6 = Not Defined
5 = Jog	4 = RUN	3 = Load
2 = H-Stop	1 = Unload	0 = F-Stop

Scroll to either F-Stop, Load or Run and then press the Enter key and make that line active. The corresponding inputs must be wired properly for the CX-1102 to function in the operating state that you activate. To change to a different operating state, scroll to that state, press Enter and the CX-1102 will change to the new state. The F-Stop and H-Stop inputs should be closed (shorted to common) for the CX-1102 to enter “Run”. If the “Run” digital input is active, then a request for “F-Stop” will be ignored.

F-STOP
LOAD
RUN

Uwnd State (MP-48)

Unwind State (MP-48) displays the present operating state of the Unwind control loop (see list below).

7 = Diagnostics	6 = Jog Stop	5 = Jog Reverse
4 = Jog Forward	3 = Not Defined	2 = RUN
1 = H-Stop	0 = F-Stop	

UwndCntrlLp (MP-72)

Unwind Control Loop (MP-72) displays the present operating mode of the Unwind axis. These modes are automatically selected depending on the present system State (MP-50).

2 = PsnHld (Position Hold)
1 = Vel (Velocity Loop)
0 = OL (Open Loop)

Wind State (MP-49)

Wind State (MP-49) displays the present operating state of the wind control loop (see list below).

7 = Diagnostics	6 = Jog Stop	5 = Jog Reverse
4 = Jog Forward	3 = Not Defined	2 = RUN
1 = H-Stop	0 = F-Stop	

WindCntrlLp (MP-73)

Wind Control Loop (MP-73) displays the present operating mode of the Wind axis. These modes are automatically selected depending on the present system State (MP-50).

2 = PsnHld (Position Hold)
1 = Vel (Velocity Loop)
0 = OL (Open Loop)

CONTROL OVERRIDES P2/4

Use the Control Overrides / Diameter & Content screen (page 2) to set the diameter or the content. Scroll to the item that you want to set and press the Enter key to activate that item.

Set Unwind Diameter
Set Wind Diameter

Set Unwind Content
Set Wind Content

Set Unwind Dia Ctnt
Set Wind Dia Ctnt
Set Both Dia Ctnt

CONTROL OVERRIDES P3/4

Use the Control Overrides screen (page 3) to effect the following control functions:

Negate Line Speed (change direction),
Stop Ramp

Open Loop Wind
Stop Integral Wind

Open Loop Unwind
Stop Integral Unwind

Scroll the cursor to the item that you want to activate and press Enter. The highlighter will appear and will remain on the function(s) that are active. If you want to deactivate a function, scroll the cursor to the function that you want to deactivate and press Enter. The highlighter will disappear and that function is no longer active.

The Cntrl Latch bits are OR'ed with the corresponding PLC Bits. Use either the PLC or the keypad to activate these functions.

CONTROL OVERRIDES P4/4

You can also use this screen to select the source from which active block will be selected, as well as to monitor the active block. Use Blk Sel Source (CP-478) to determine the source (Digital Inputs & PLC, Keypad Blk Sel, or Cntr 4 Cnt) from which the active block is will be selected. Enter "Keypad Blk Sel" (2) in Blk Sel Source (CP-478) to control the selection of the blocks from Keypad Blk Sel (CP-479), using the keyboard. Enter "DI & PLC" (1) in Blk Sel Source (CP-478) to control the selection of the blocks from the inputs.

System State (MP-50)

System State (MP-50) displays the present operating state of the CX-1102 (see list below). Only one operating state may be active at a time. To access either the "Run" or the "Jog" operating state, the F-Stop, Unload and H-Stop inputs must be closed.

8 = Diagnostics	7 = Setup	6 = Not Defined
5 = Jog	4 = RUN	3 = Load
2 = H-Stop	1 = Unload	0 = F-Stop

Blk Sel Source (CP-478)

Block Select Source (CP-478) determines whether the active block will be selected by the Digital Inputs & PLC, Keypad Blk Sel (CP-479) or Counter 4.

3 = Cntr 4 Cnt
2 = KyPd = Keypad Blk Sel
1 = DgIn = Digital Inputs & PLC (default)

Keypad Blk Sel (CP-479)

The Keypad Block Select (CP-479) determines which block will be active when Blk Sel Source (CP-478) is set to "2" (KyPd).

Active Block (MP-51)

Active Block (MP-51) displays the active block. The block can be selected and made active by the Block Select bits (Blk Sel A,B.C), in the PLC Programming screen if Block Select Source (CP-478) is set to "1" (DigIn & PLC). Or the block can be selected and made active by the keypad if Block Select Source (CP-478) is set to "2" (Keypad Blk Sel).

Setpoint X (CP-201)

Setpoint X (CP-201) displays the active commanded Line Speed Setpoint. Setpoint X is a quick access, dynamically assigned parameter that is a mirror of the currently commanded Line Speed regardless of the source. It may display Line Speed SP (CP-210), or Ext LineSpd (MP-88) depending upon application choices. The label will change dynamically to indicate which parameter is being mirrored. If Line Speed SP (CP-210) is active, then any change to Setpoint X, (temporarily labeled LineSpeed X) will also change CP-210.

Uwnd State (MP-48)

Unwind State (MP-48) displays the present operating state of the Unwind control loop (see list below).

7 = Diagnostics	6 = Jog Stop	5 = Jog Reverse
4 = Jog Forward	3 = Not Defined	2 = RUN
1 = H-Stop	0 = F-Stop	

UwndCntrlLp (MP-72)

Unwind Control Loop (MP-72) displays the present operating mode of the Unwind axis. These modes are automatically selected depending on the present system State (MP-50).

2 = PsnHld (Position Hold)
1 = Vel (Velocity Loop)
0 = OL (Open Loop)

Wind State (MP-49)

Wind State (MP-49) displays the present operating state of the wind control loop (see list below).

7 = Diagnostics	6 = Jog Stop	5 = Jog Reverse
4 = Jog Forward	3 = Not Defined	2 = RUN
1 = H-Stop	0 = F-Stop	

WindCntrlLp (MP-73)

Wind Control Loop (MP-73) displays the present operating mode of the Wind axis. These modes are automatically selected depending on the present system State (MP-50).

2 = PsnHld (Position Hold)
1 = Vel (Velocity Loop)
0 = OL (Open Loop)

—NOTES—

Serial Communications

INTRODUCTION TO SERIAL COMMUNICATIONS

The CX-1102 can interface with a host computer through a RS-485 Serial Communications Interface (refer to Figure 2-30, *CX-1102 Multidrop Installation*, page 2-24). This interface allows the host computer to perform remote control of the CX-1102, Control Parameter entry, and status or performance monitoring.

This following sections describe the three available interfaces for Serial Communications:

CX-1102 Serial Communications ASCII Data-Link Protocol
(Message Transmission / Response Structures)

CX-1102 Serial Communications ASCII2 Data-Link Protocol
(Message Transmission / Response Structures)

CX-1102 Serial Communications Binary Data-Link Protocol
(Message Transmission / Response Structures)

NOTE: Before you can apply Serial Communications, the CX-1102 must be interfaced with a host computer through a RS-485 Serial Communications Interface.

The CX-1102 comes factory pre-loaded with default Control Parameters for Serial Communications. These Control Parameters set up the CX-1102 to accommodate the RS-485 Serial Communications Interface. Generally, the default settings are suitable for most applications and do not require modification, however, these default parameters can be modified for your specific application.

All of the other Control Parameters can be modified as well, when communications have been established through the host computer using the Serial Communications Interface. To configure for Serial Communications, refer to *System Setup - Control Parameters: Device Configure, Serial Communications* section.

CX-1102 Serial Communications ASCII Data-Link Protocol

(Message Transmission / Response Structures)

STX	1 Byte ^B Char(2)
Address	2 ASCII Chars
Function	2 ASCII Chars
Message Error	2 ASCII Chars
Data Field	Number of characters defined by Function
ETX	1 Byte ^C Char(3)
CRC	4 ASCII HEX Chars (0000 - FFFF)

Number of constant characters per Transmission = 10 characters (Minimum # of characters)
CX-1102 Serial Communications Buffer Size = 255 characters (Maximum # of characters)
(leaves a maximum of 245 characters for the data field)

Note: In this document pertaining to ASCII protocols, any reference to ASCII HEX or “0-F” refers to ASCII representation of a HEX number using ASCII characters “0-9” & “A-F”.

Functions that are included in the ASCII Protocol:

01) Data Read Single Parameter
02) Data Write Single Parameter
03) Data Read Parm Block (14 parameter limit)
04) Data Write Parm Block (14 parameter limit)
05) Control Command Send
08) Data Read Custom Engineering Units
09) Data Write Custom Engineering Units
10) Data Read Constant Table (4 parameter limit)

Example:
Request Value for CP-210

Table 7-1 Data Read Single Parameter, Host Transmission

STX	ADDR		FUNC		DATA			EXT	CRC			
^B	0	1	0	1	2	1	0	^C	F	4	4	6

Definition of Message Elements

“STX”	Signals the start of transmission. (Host/CX-1102) A single byte ASCII Char (02) “^B”.
”Address”	Address of the CX-1102 that will recognize and interpret the message. A two character ASCII number in the range of “01” - “99”. (“@0” = Global Transmission)
“Function”	The CX-1102 function requested which defines the data structure to follow. It is a two character ASCII number in the range of “01”-”10" (accepted functions are defined above).
“Message Error” (Msg Error)	General transmission response from the CX-1102. This is a two character ASCII HEX number, in the range of “00” - “FF”, which may indicate a serial communications error has occurred upon receipt of a message transmission.
“Data Field”	A field of variable length which contains the data for the function requested. The Data Field is defined for individual functions through out the following section.
“ETX”	Signals the end of the message. (Host/CX-1102) A single byte ASCII Char (03) “^C”.
“CRC”	(Cyclic Redundancy Check) If CRC Enable is “ON”, a CRC value is calculated and sent with each transmission. The CRC includes all message data except the STX byte. The data stream is checked against the CRC at the receiving end. The CRC is a four character ASCII HEX number in the range of “0000” - “FFFF”.
“Format Character” (Fmt)	An ASCII character, in the range of “0-2”; where “0” indicates the value is “OK” as is, “1” indicates the value is negative and “2” indicates the value is in binary format.
“Resolution Character” (Res)	An ASCII character, in the range of “0-9”, that indicates the number of digits to the right of the decimal point for the value.

FUNCTION (01) DATA READ SINGLE PARAMETER

Table 7-2 Host Transmission

Character #	1	2	3	4	5	6	7	8	9	10	11	12	13
DESC	STX	Address		Function		Parameter Number			ETX	CRC (0000 - FFFF)			
ASCII	^B	0-9	1-9	0	1	0-9	0-9	0-9	^C	0-F	0-F	0-F	0-F

Data Field - Parameter Number - 3 characters.

Message Length = 13 characters.

Table 7-3 CX-1102 Response

Character #	1	2	3	4	5	6-19	20	21	22	23	24
DESC	STX	Address		Msg Error		Data Field	ETX	CRC (0000 - FFFF)			
ASCII	^B	0-9	1-9	0-F	0-F	<below>	^C	0-F	0-F	0-F	0-F

Data Field per Table 7-3 (14 characters)

Character #	6	7	8	9	10	11	12	13	14	15	16	17	18	19
DESC	Error Code		Res	Fmt	Parameter Value (0000000000-9999999999)									
ASCII	0-3	0-9	0-9	0-2	0-9	0-9	0-9	0-9	0-9	0-9	0-9	0-9	0-9	0-9

Parameter Error Code - 2 characters.
Resolution - 1 character (Number of digits to the right of the decimal point).
Format - 1 character (0 = OK as is, 1 = Negative value, 2 = Binary value).
Parameter Value - 10 character (Positive numeric value of the parameter).

Message Length = 24 characters.

FUNCTION (02) DATA WRITE SINGLE PARAMETER

Table 7-4 Host Transmission

Character #	1	2	3	4	5	6-20	21	22	23	24	25
DESC	STX	Address		Function		Data Field	ETX	CRC (0000 - FFFF)			
ASCII	^B	0-9	0-9	0	2	<below>	^C	0-F	0-F	0-F	0-F

Data Field per Table 7-4 (15 characters)

Character #	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20
DESC	Parm Number			Res	Fmt	Parameter Value (0000000000-9999999999)									
ASCII	0-9	0-9	0-9	0-9	0-9	0-9	0-9	0-9	0-9	0-9	0-9	0-9	0-9	0-9	0-9

Parameter Number - 3 characters.
Resolution - 1 character.
Format - 1 character.
Parameter Value - 10 characters.

Message Length = 25 characters.

Table 7-5 CX-1102 Response

Character #	1	2	3	4	5	6	7	8	9	10	11	12
DESC	STX	Address		Msg Error		Error Code		ETX	CRC (0000 - FFFF)			
ASCII	^B	0-9	1-9	0-F	0-F	0-3	0-9	^C	0-F	0-F	0-F	0-F

Data Field - Parameter Error Code - 2 characters.

Message Length = 12 characters

FUNCTION (03) DATA READ PARAMETER BLOCK

Table 7-6 Host Transmission

Character #	1	2	3	4	5	6-8	9	10	11	12	13
DESC	STX	Address		Function		Data Field	ETX	CRC (0000 - FFFF)			
ASCII	^B	0-9	1-9	0	3	<below>	^C	0-F	0-F	0-F	0-F

Data Field per Table 7-6
Number of Parameters x 3 characters/parameter (14 parameters max. = 42 characters)

Character #	6	7	8
DESC	Parameter Number 100's	Parameter Number 10's	Parameter Number 1's
ASCII	0-9	0-9	0-9

Parameter Number - 3 characters.

Message Length = 13 to 52 characters.

Data Field Example:
Data Read Block of 3 Parameters (MP-40, CP-201, CP-440)

Character #	6	7	8	9	10	11	12	13	14
DESC	Parameter 40			Parameter 101			Parameter 440		
ASCII	0	4	0	2	0	1	4	4	0

Table 7-7 CX-1102 Response

Character #	1	2	3	4	5	6-22	23	24	25	26	27
DESC	STX	Address		Msg Error		Data Field	ETX	CRC (0000 - FFFF)			
ASCII	^B	0-9	1-9	0-F	0-F	<below>	^C	0-F	0-F	0-F	0-F

Data Field per Table 7-7
Number of Parameters x 17 characters/parameter (14 parameters max. = 238 characters)

Character #	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22
DESC	Parm Number			Error Code		Res	Fmt	Parameter Value (0000000000-9999999999									
ASCII	0-9	0-9	0-9	0-3	0-9	0-9	0-2	0-9	0-9	0-9	0-9	0-9	0-9	0-9	0-9	0-9	0-9

Parameter Number - 3 characters.
Parameter Error Code - 2 characters.
Resolution - 1 character.
Format - 1 character.
Parameter Value - 10 characters.

Message Length = 27 to 248 characters.

FUNCTION (04) DATA WRITE PARAMETER BLOCK

Table 7-8 Host Transmission

Character #	1	2	3	4	5	6-20	21	22	23	24	25
DESC	STX	Address		Function		Data Field	ETX	CRC (0000 - FFFF)			
ASCII	^B	0-9	0-9	0	4	<below>	^C	0-F	0-F	0-F	0-F

Data Field per Table 7-8
Number of Parameters x 15 characters/parameter (14 parameters max. = 210 characters)

Character #	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20
DESC	Parm Number			Res	Fmt	Parameter Value (0000000000-9999999999)									
ASCII	0-9	0-9	0-9	0-9	0-2	0-9	0-9	0-9	0-9	0-9	0-9	0-9	0-9	0-9	0-9

Parameter Number - 3 characters.
Resolution - 1 characters.
Format - 1 characters.
Parameter Value - 10 characters.

Message Length = 25 to 220 characters.

Table 7-9 CX-1102 Response

Character #	1	2	3	4	5	6-10	11	12	13	14	15
DESC	STX	Address		Msg Error		Data Field	ETX	CRC (0000 - FFFF)			
ASCII	^B	0-9	1-9	0-F	0-F	<below>	^C	0-F	0-F	0-F	0-F

Data Field per Table 7-9
Number of Parameters x 5 characters/parameter (14 parameters max. = 70 characters)

Character #	6	7	8	9	10
DESC	Parameter Number			Parameter Error Code	
ASCII	0-9	0-9	0-9	0-3	0-9

Parameter Number - 3 characters.
Parameter Error Code - 2 characters.

Message Length = 15 to 80 characters.

FUNCTION (05) CONTROL COMMAND SEND

Table 7-10 Host Transmission

Character #	1	2	3	4	5	6	7	8	9	10	11	12
DESC	STX	Address		Function		Command		ETX	CRC (0000 - FFFF)			
ASCII	^B	0-9	0-9	0	5	0-2	0-9	^C	0-F	0-F	0-F	0-F

Data Field - Control Command - 2 characters
Valid Control Commands:

01 = F-Stop.
02 = R-Stop.
03 = H-Stop.
04 = Run.
05 = Jog Forward.
06 = Jog Reverse.
07 = Jog Stop.
09 = Reset Integral.
10 = Preset FB Position.
11 = Preset LD Position.
12 = Reset Position Error.
13 = Preset FB & LD Position.
14 = Preset FB, LD, & Reset Position Error.
17 = Negate Scaled Reference.
21 = Bypass Ramp.
22 = Stop Ramp.
23 = Open Loop.
24 = Stop Integral.

Message Length = 12 characters.

Table 7-11 CX-1102 Response

Character #	1	2	3	4	5	6	7	8	9	10	11	12
DESC	STX	Address		Msg Error		Cmd Error		ETX	CRC (0000 - FFFF)			
ASCII	^B	0-9	1-9	0-F	0-F	0-3	0-9	^C	0-F	0-F	0-F	0-F

Data Field - Command Error Code - 2 characters.

Message Length = 12 characters.

FUNCTION (08) DATA READ CUSTOM ENGINEERING UNITS

Table 7-12 Host Transmission

Character #	1	2	3	4	5	6	7	8	9	10
DESC	STX	Address		Function		ETX	CRC (0000-FFFF)			
ASCII	^B	0-9	1-9	0	8	^C	0-F	0-F	0-F	0-F

Data Field - 0 characters.

Message Length = 10 characters.

Table 7-13 CX-1102 Response

Character #	1	2	3	4	5	6-20	21	22	23	24	25
DESC	STX	Address		Msg Error		Data Field	ETX	CRC (0000 - FFFF)			
ASCII	^B	0-9	1-9	0-F	0-F	<below>	^C	0-F	0-F	0-F	0-F

Data Field per Table 7-13
Engineering Units Text - (1 to 15 characters)

Character #	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20
DESC	Engineering Units Text														
ASCII	!- ~	!- ~	!- ~	!- ~	!- ~	!- ~	!- ~	!- ~	!- ~	!- ~	!- ~	!- ~	!- ~	!- ~	!- ~

Message Length = 11 to 25 characters.

Note: The Engineering Units Text string may be any string of printable ASCII characters of up to 15 characters long.

FUNCTION (09) DATA WRITE CUSTOM ENGINEERING UNITS

Table 7-14 Host Transmission

Character #	1	2	3	4	5	6-20	21	22	23	24	25
DESC	STX	Address		Function		Data Field	ETX	CRC (0000 - FFFF)			
ASCII	^B	0-9	0-9	0	9	<below>	^C	0-F	0-F	0-F	0-F

Data Field per Table 7-14
Engineering Units Text - (1 to 15 characters)

Character #	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20
DESC	Engineering Units Text														
ASCII	!- ~	!- ~	!- ~	!- ~	!- ~	!- ~	!- ~	!- ~	!- ~	!- ~	!- ~	!- ~	!- ~	!- ~	!- ~

Message Length = 11 to 25 characters.

Note: The Engineering Units Text String may be any string of printable ASCII characters of up to 15 characters long.

Table 7-15 CX-1102 Response

Character #	1	2	3	4	5	6	7	8	9	10	11	12
DESC	STX	Address		Msg Error		Error Code		ETX	CRC (0000 - FFFF)			
ASCII	^B	0-9	1-9	0-F	0-F	0-3	0-9	^C	0-F	0-F	0-F	0-F

Data Field - EU Text Error Code - 2 characters.

Message Length = 12 characters.

FUNCTION (10) DATA READ PARAMETER CONSTANT TABLE

Table 7-16 Host Transmission

Character #	1	2	3	4	5	6-8	9	10	11	12	13
DESC	STX	Address		Function		Data Field	ETX	CRC (0000 - FFFF)			
ASCII	^B	0-9	1-9	1	0	<below>	^C	0-F	0-F	0-F	0-F

Data Field per Table 7-16
Number of Parameters x 3 characters/parameter (4 parameters max. = 12 characters)

Character #	6	7	8
DESC	Parameter Number 100's	Parameter Number 10's	Parameter Number 1's
ASCII	0-9	0-9	0-9

Parameter Number - 3 characters.

Message Length = 13 to 22 characters.

Table 7-17 CX-1102 Response

Character #	1	2	3	4	5	6-241	242	243	244	245	246
DESC	STX	Address		Msg Error		Data Field	ETX	CRC (0000 - FFFF)			
ASCII	^B	0-9	1-9	0-F	0-F	<below>	^C	0-F	0-F	0-F	0-F

Data Field - Number of Parameters x 59 characters/parameter (4 parameters max. = 236 characters).

Parameter Number	- 3 characters	(000 - 999).
Parameter Error Code	- 2 characters	(00 - 32).
Title Text String	- 15 characters	(String of 15 printable ASCII characters).
Minimum Value Format*	- 1 character	(0 - 2).
Minimum Value*	- 10 characters	(0000000000 - 9999999999).
Maximum Value Format*	- 1 character	(0 - 2).
Maximum Value*	- 10 characters	(0000000000 - 9999999999).
Default Value Format*	- 1 character	(0 - 2).
Default Value*	- 10 characters	(0000000000 - 9999999999).
Minimum Resolution*	- 1 character	(0 - 9) Resolution for Minimum Value.
Maximum Resolution*	- 1 character	(0 - 9) Maximum Resolution for any value.
Default Resolution*	- 1 character	(0 - 9) Resolution for Default Value.
Parameter Control byte	- 2 characters	(ASCII HEX Number, 00 - FF).
Field Length	- 1 character	(0 - 9) Length of parameter field.

* These fields will be filled with zeros for all Monitor Parameter requests.

Message Length = 69 to 246 characters

Message Error Bits Definitions:

Bit 7	=	(1) CRC Failure
Bit 6	=	(1) Buffer Overflow
Bit 5	=	(1) ETX Not Received/Data Field Error
Bit 4	=	(1) Invalid Function/Data Error
Bit 3	=	(1) Over-Run Error
Bit 2	=	(1) Noise Error
Bit 1	=	(1) Framing Error
Bit 0	=	(1) Parity Error

Example:

"86" = the number 10000110 (binary) would indicate a CRC failure with Noise errors and Framing errors occurred when the transmission message was received.

Other Errors Returned From The Control Through Serial Communications:

00	=	OK
01	=	General Data Error
02	=	Res Byte Error
03	=	Invalid Parameter
04	=	String too Long
05	=	Out of Range
06	=	Not Allowed
07	=	Lockout During Run
08	=	Not Ready
09	=	Block Parameter Error
10	=	Block Value Error
11	=	Block Parameter Memory Limit
12	=	MIN Error
13	=	MAX Error
14	=	Invalid Command (PLC/Control Command Send)
15	=	Invalid Operand (PLC)
16	=	<END> Statement Missing (PLC)
17	=	PLC Program Memory Limit
18	=	Defaults Loaded
19	=	Backup Loaded
20	=	Backup Saved
21	=	Checksum Error
22	=	Faults Cleared
23	=	Test Passed
24	=	Test Failed
25	=	No Compare Parameter
26	=	Divide by Zero
27	=	Long Word Overflow
28	=	Parameter Transfer Limit Overflow
29	=	Memory Read request too long
30	=	Data Field Length Error
31	=	Message Function Request/Parameter NOT Processed
32	=	Invalid Function Request

Parameter Control Byte Definitions:

Bit 7	=	(1) Negative Numbers are Possible (0) Positive Numbers Only
Bit 6	=	(1) Leading Zero's OK (0) No Leading Zero's
Bit 5	=	(1) Restricted (0) Not Restricted
Bit 4	=	(1) Parameter Defined (0) Parameter is NOT Defined
Bit 3	=	Not Used (Reserved) always 0
Bit 2	=	(1) Floating Point Number (0) Fixed Decimal Point Number
Bit 1	=	(1) Binary Number (0) Decimal Number
Bit 0	=	(1) Integer (0) Non-Integer

Example of CRC-16 Calculation (in C):

```
#define CRC16  0x8005                       /* CRC-16 Generating Poly */

/* function returns the accumulated CRC value calculated for the Buffer */
/* this value can be transmitted or compared to a CRC value received */
/* "*data" is a pointer to the Buffer of data bytes to calculate the CRC for */
/* "len" is the number of data bytes to use for the calculation */

unsigned int do_crc(unsigned char *data, int len)
{
  int i, j;                                 /* byte & bit counters */
  unsigned int accum = 0xFFFF;              /* CRC value accumulator */
  unsigned int dat;                         /* holds data byte */

  for(i = 0; i < len; ++i){                 /* for each byte of data */
       dat = *data++;                       /* get data byte & goto next */
       accum ^= (dat << 8);                 /* put data into high byte */
       j = 0;                               /* clear bit counter */
       while(j++ < 8){                      /* for each bit */
            if(accum & 0x8000)              /* if MSB set */
                 accum ^= CRC16;            /* Modulus-2 math w/CRC 16 */
            accum <<= 1;                    /* shift left 1 bit */
       }                                    /* end for each bit */
  }                                         /* end for each byte */

return(accum);                              /* return the CRC value */
}                                           /* End do_crc function */
```

Note: This "CRC" must be converted to 4 ASCII characters before transmission. (Chars 0 to 9 and A to F should be used). For all "ASCII HEX" values the A through F characters must be in Upper Case when Transmitted in order to keep the conversions consistent.

CX-1102 Serial Communications ASCII2 Data-Link Protocol

(Message Transmission / Response Structures)

STX	1 Byte ^B Char(2)
Address	1 or 2 ASCII characters, normally followed by a comma
Data Field	Flexible field of ASCII characters defined later in this document
ETX	1 Byte ^C Char(3)

Note: The "ETX" character may be followed by "CRC" characters if "CRC Enable" is "ON". Any reference to ASCII HEX or "0-F" refers to ASCII representation of a HEX number using ASCII characters "0-9" & "A-F".

Functions that are included in the ASCII2 Protocol:

1) Control Acknowledgment
2) Data Read Single Parameter
3) Data Write Single Parameter
4) Control Command Send
5) Data Read Custom Engineering Units
6) Data Write Custom Engineering units
7) Data Read Parameter Title
8) Data Read Maximum Parameter Value
9) Data Read Minimum Parameter Value
10) Data Read Default Parameter Value
11) Data Read Backup Parameter Value
12) Data Read Value of the Maximum Parameter Field length
13) Data Read Parameter Control Byte

Definition of Message Elements

"STX"	Signals the start of a transmission. (Host/CX-1102) A single byte ASCII Char (02) "^B".
"Address"	Address of the CX-1102 to recognize and interpret the message. One or two ASCII characters, followed by a comma, in the range of "0-99". ("0" indicates a Global Transmission to be received by all controls on the serial link).
"Message Error" (Msg Error)	General transmission response from the CX-1102. This is a two character ASCII HEX number, in the range of "00" - "FF", which may indicate a serial communications error has occurred upon receipt of a message transmission.
"Data Field"	A field of variable length which contains the data for the function requested. The Data Field is defined for individual functions through out the following section.
"?"	Field terminator requesting response from the CX-1102.
"**,**"	Address and Data Field separator.
"="	Assignment operator indicating assignment of data to follow, or indicator of a parameter value to follow.
"**.**"	Indicates a Constant Table Read of type to follow.
"!"	Indicates a Control Command Send.
"ETX"	Signals the end of the message. (Host/CX-1102) A single byte ASCII Char (03) "^C".
"CRC"	(Cyclic Redundancy Check) If CRC Enable is "ON", a CRC value is calculated and sent with each transmission. The CRC includes all message data except the STX byte. The data stream is checked against the CRC at the receiving end. The CRC is a four character ASCII HEX number in the range of "0000" - "FFFF".

Note: To conserve space, the CRC field has been omitted on all of the following message definition tables. If the CRC Enable is "ON", then a CRC value must be appended to each message transmission immediately following the ETX character.

FUNCTION (01) CONTROL ACKNOWLEDGMENT

Table 7-18 Host Transmission

Character #	1	2	3	4
DESC	STX	Address	Inquiry	ETX
ASCII	^B	1-99	?	^C

Address Field

This field may consist of one or two ASCII characters, depending on the address of the control. For example, if the address is less than 10, then only one ASCII character is required in this field. If the address is greater than 9, then two ASCII characters are required in this field to represent the address. Leading spaces in this field will be ignored.

Table 7-19 CX-1102 Response

Character #	1	2	3	4	5
DESC	STX	Msg Error	Separator	ACK	ETX
ASCII	^B	0-FF	,	^F	^C

Msg Error Field

This field may consist of one or two ASCII HEX characters that indicate any serial communications errors that may have occurred when the message transmission was received.

ACK

This field acknowledges that the control exists (represented by ASCII character #6). If there is not a control at the address indicated, there will not be a response.

FUNCTION (02) DATA READ SINGLE PARAMETER

Table 20 Host Transmission

Character #	1	2	3	4	5	6
DESC	STX	Address	Separator	Parm #	Inquiry	ETX
ASCII	^B	1-99	,	0-999	?	^C

Parm # Field

This field may consist of one or more ASCII characters representing the parameter number requested. If the parameter number is less than 10, then a single ASCII character may be used to represent the parameter number. If the parameter number is in the range of 10 to 99, then two characters are required to represent the parameter number. If the parameter number is 100 or greater, then three characters are required to represent the parameter number. Any leading spaces will be ignored.

Table 21 CX-1102 Response

Character #	1	2	3	4	5	6	7
DESC	STX	Msg Error	Separator	Parm #	Equals	Value	ETX
ASCII	^B	0-FF	,	0-999	=	<below>	^C

Value Field

This field will consist of an ASCII string representing the value for the parameter requested. If there is an error retrieving the parameter value, this field will contain the error code number preceded by an "E" (e.g., "E3").

Examples with No Error:

decimal integer value of 1	"1"
decimal integer value of 1000	"1000"
decimal integer value of -20	"-20"
decimal value of 1234.56	"1234.56"
decimal value of -15.00	"-15.00"
Binary value of 89_D	"01011001"

FUNCTION (03) DATA WRITE SINGLE PARAMETER

Table 22 Host Transmission

Character #	1	2	3	4	5	6	7	8
DESC	STX	Address	Separator	Parm #	Assign	Value	Inquiry	ETX
ASCII	^B	0-99	,	0-999	=	<below>	?	^C

Value Field

This field will consist of an ASCII string representing the value to be assigned to the parameter. Leading spaces in this field will be ignored.

Examples:

decimal integer value of 1	"1"
decimal integer value of 1	" 1"
decimal integer value of 1000	"1000"
decimal integer value of -20	"-20"
decimal value of 1234.56	"1234.56"
decimal value of -15.00	"-15.00"
Binary value of 89_D	"01011001"

Inquiry Field (Inq)

The inclusion of the inquiry designator is optional. If no response is required this character may be omitted from the message. If this character field is not included in the message, the operation will be performed, however the control will not respond.

Table 23 CX-1102 Response

Character #	1	2	3	4	5	6	7
DESC	STX	Msg Error	Separator	Parm #	Equals	Value	ETX
ASCII	^B	0-FF	,	0-999	=	<below	^C

Value Field

This field will consist of an ASCII string representing the value assigned to the parameter. If an error occurred in the assignment operation, this field will contain the error code number preceded by an "E" (e.g., "E3").

Value Field Examples with No Error:

decimal integer value of 1	"1"
decimal integer value of 1000	"1000"
decimal integer value of -20	"-20"
decimal value of 1234.56	"1234.56"
decimal value of -15.00	"-15.00"
Binary value of 89_D	"01011001"

FUNCTION (04) CONTROL COMMAND SEND

Table 24 Host Transmission

Character #	1	2	3	4	5	6
DESC	STX	Address	Separator	Command	Inquiry	ETX
ASCII	^B	0-99	,	ASCII2 Command String	?	^C

List of Valid ASCII2 Command Strings:

FST! = F-Stop
ULD! = Unload
HST! = H-Stop
RUN! = Run
LDD! = Load
PUD! = Set Unwind Diameter to Preset value
PWD! = Set Wind Diameter to Preset value
PUC! = Set Unwind Roll Content to Preset value
PWC! = Set Wind Roll Content to Preset value
PAU! = Set Unwind Diameter and Roll Content to Preset values
PAW! = Set Wind Diameter and Roll Content to Preset values
RAP! = Set Both Wind and Unwind Diameter and Roll Content to Preset values
NSR! = Negate the Line Speed Scaled Reference
OLW! = Open Loop Wind
FWI! = Freeze the Wind Integral
STR! = Stop the Line Speed Ramp
OLU! = Open Loop Unwind
FUI! = Freeze the Unwind Integral

Command Field

Insert any of the valid ASCII2 command strings defined above.

Inquiry Field (Inquiry)

The inclusion of the inquiry designator is optional. If no response is required this character may be omitted from the message. If this character field is not included in the message, the commanded operation will be performed, however the control will not respond.

Table 25 CX-1102 Response

Character #	1	2	3	4	5
DESC	STX	Msg Error	Separator	Command	ETX
ASCII	^B	0-FF	,	<below>	^C

Command Field

If the requested command is acted upon, this field will contain the command string that was sent. If an error occurred, this field will contain an "E" followed immediately by an ASCII representation of the error code number which occurred. (e.g., "E31")

FUNCTION (05) DATA READ CUSTOM ENGINEERING UNITS

Table 26 Host Transmission

Character #	1	2	3	4	5	6	7
DESC	STX	Msg Error	Separator	EU Request		Inquiry	ETX
ASCII	^B	1-99	,	E	U	?	^C

Table 27 CX-1102 Response

Character #	1	2	3	4	5	6	7	8
DESC	STX	Msg Error	Separator	EU Indicator		Equals	EU Text	ETX
ASCII	^B	0-FF	,	E	U	=	<below>	^C

Engineering Unit Text Field

This field will contain the custom engineering units text string from the control's memory. (Up to 15 printable ASCII characters long)

FUNCTION (06) DATA WRITE CUSTOM ENGINEERING UNITS

Table 28 Host Transmission

Character #	1	2	3	4	5	6	7	8	9
DESC	STX	Address	Separator	EU Indicator		Assign	EU Text	Inquiry	ETX
ASCII	^B	0-99	,	E	U	=	<below>	?	^C

EU Text Field

This field should contain a string of up to 15 printable ASCII characters that are to be assigned to the custom engineering units text for the control at the indicated address.

Inquiry Field (Inquiry)

The inclusion of the inquiry designator is optional. If no response is required this character may be omitted from the message. If this character field is not included in the message, the commanded operation will be performed, however the control will not respond.

Table 29 CX-1102 Response

Character #	1	2	3	4	5	6	7	8
DESC	STX	Msg Error	Separator	EU Indicator		Equals	EU Text	ETX
ASCII	^B	0-FF	,	E	U	=	<below>	^C

Engineering Unit Text Field

If the assignment is successful, this field will contain the custom engineering units text string assigned. (Up to 15 printable ASCII characters long) If an error occurred in the assignment operation, this field will contain the error code number preceded by an “E” (e.g., “E4”).

Data Read Constant Table

7) Data Read Parameter Title
8) Data Read Maximum Parameter Value
9) Data Read Minimum Parameter Value
10) Data Read Default Parameter Value
11) Data Read Backup Parameter Value
12) Data Read Value of the Maximum Parameter Field length
13) Data Read Parameter Control Byte

Note: For all constant table reads, the host transmission message structure is the same differing only by the read command following the period.

Table 30 Host Transmission

Character #	1	2	3	4	5	6	7	8	9	10
DESC	STX	Address	Separator	Parm Number			CTR	Type	Inquiry	ETX
ASCII	^B	1-99	,	0-9	0-9	0-9	.	<below>	?	^C

Constant Table Read Type Strings:

TTL	=	Parameter Title Text
MAX	=	Maximum Parameter Value
MIN	=	Minimum Parameter Value
DEF	=	Default Parameter Value
BKU	=	Backup Parameter Value
FLD	=	Parameter Field length
CTB	=	Parameter Control Byte

CTR Field

This field should always be a period designating a Constant Table Read of type to follow for the indicated parameter.

Type Field

Insert the desired constant table read type string into this field. The control will respond with the appropriate data for the type of read requested. This is a three character field.

FUNCTION (07) DATA READ PARAMETER TITLE

Table 31 CX-1102 Response

Character #	1	2	3	4	5	6	7
DESC	STX	Msg Error	Separator	Parm #	Equals	Parm Title Text	ETX
ASCII	^B	0-FF	,	1-999	=	<below>	^C

Parm Title Text Field

This field will contain an ASCII string of 15 characters for the title of the parameter requested. If there is an error in the request, this field will contain the error code number preceded by an “E” (e.g., “E3”).

FUNCTION (08) DATA READ MAXIMUM PARAMETER VALUE

Table 32 CX-1102 Response

Character #	1	2	3	4	5	6	7
DESC	STX	Msg Error	Separator	Parm #	Equals	Max Parm Value	ETX
ASCII	^B	0-FF	,	1-999	=	<below>	^C

Max Parm Value Field

This field will contain an ASCII string Representation of the numeric maximum value for the parameter requested. If there is an error in the request, this field will contain the error code number preceded by an "E" (e.g., "E3").

FUNCTION (09) DATA READ MINIMUM PARAMETER VALUE

Table 33 CX-1102 Response

Character #	1	2	3	4	5	6	7
DESC	STX	Msg Error	Separator	Parm #	Equals	Min Parm Value	ETX
ASCII	^B	0-FF	,	1-999	=	<below>	^C

Min Parm Value Field

This field will contain an ASCII string Representation of the numeric minimum value for the parameter requested. If there is an error in the request, this field will contain the error code number preceded by an "E" (e.g., "E3").

FUNCTION (10) DATA READ DEFAULT PARAMETER VALUE

Table 34 CX-1102 Response

Character #	1	2	3	4	5	6	7
DESC	STX	Msg Error	Separator	Parm #	Equals	Default Parm Value	ETX
ASCII	^B	0-FF	,	1-999	=	<below>	^C

Default Parm Value Field

This field will contain an ASCII string Representation of the numeric default value for the parameter requested. If there is an error in the request, this field will contain the error code number preceded by an “E” (e.g., “E3”).

FUNCTION (11) DATA READ BACKUP PARAMETER VALUE

Table 35 CX-1102 Response

Character #	1	2	3	4	5	6	7
DESC	STX	Msg Error	Separator	Parm #	Equals	Backup Parm Value	ETX
ASCII	^B	0-FF	,	1-999	=	<below>	^C

Backup Parm Value Field

This field will contain an ASCII string Representation of the numeric backup value for the parameter requested. If there is an error in the request, this field will contain the error code number preceded by an “E” (e.g., “E3”).

FUNCTION (12) DATA READ VALUE OF THE MAXIMUM PARAMETER FIELD LENGTH

Table 36   CX-1102 Response

Character #	1	2	3	4	5	6	7
DESC	STX	Msg Error	Separator	Parm #	Equals	Parm Field Length	ETX
ASCII	^B	0-FF	,	1-999	=	0-9	^C

Parm Field Length Field

This field will contain an ASCII character, of the range 0 to 9, for the field length of the parameter requested. If there is an error in the request, this field will contain the error code number preceded by an “E” (e.g., “E3”).

FUNCTION (13) DATA READ PARAMETER CONTROL BYTE

Table 37 CX-1102 Response

Character #	1	2	3	4	5	6-13	14
DESC	STX	Msg Error	Separator	Parm #	Equals	Parm Control Byte	ETX
ASCII	^B	0-FF	,	1-999	=	0-1	^C

Parameter Control Byte Field

This field will contain an ASCII string of 8 characters, of the range 0 to 1, representing, in binary format, the parameter control byte for the parameter requested. If there is an error in the request, this field will contain the error code number preceded by an "E" (e.g., "E3").

Parameter Control Byte field per Table 37

Character #	6	7	8	9	10	11	12	13
DESC	Bit 7	Bit 6	Bit 5	Bit 4	Bit 3	Bit 2	Bit 1	Bit 0
ASCII	0-1	0-1	0-1	0-1	0-1	0-1	0-1	0-1

Parameter Control Byte Definitions:

Bit 7 = (1) Negative Numbers are Possible (0) Positive Numbers Only
Bit 6 = (1) Leading Zero's OK (0) No Leading Zero's
Bit 5 = (1) Restricted (0) Not Restricted
Bit 4 = (1) Parameter Define (0) Parameter is NOT Defined
Bit 3 = Not Used (Reserved) always 0
Bit 2 = (1) Floating Decimal Point Number (0) Fixed Decimal Point Number
Bit 1 = (1) Binary Number (0) Decimal Number
Bit 0 = (1) Integer (0) Non-Integer

Message Error Response Field
Consists of 2 Bytes (ASCII "HEX")
"ASCII HEX" means the numeric value in the field is NOT represented as a decimal (Base 10) Number. The Number is represented by the characters: 0 through 9 and A through F for the HEX equivalent of the binary number.

Message Error Bit Definitions:

Bit 7 = (1) CRC Failure
Bit 6 = (1) Buffer Overflow
Bit 5 = (1) ETX Not Received/Data Field Error
Bit 4 = (1) Invalid Function/Data Error
Bit 3 = (1) Over-Run Error
Bit 2 = (1) Noise Error
Bit 1 = (1) Framing Error
Bit 0 = (1) Parity Error

Example:

"86" = the number 10000110 (binary) would indicate a CRC failure with Noise errors and Framing errors occurred when the transmission message was received.

Other Errors Returned From The Control Through Serial Communications:

00	=	OK
01	=	General Data Error
02	=	Res Byte Error
03	=	Invalid Parameter
04	=	String too Long
05	=	Out of Range
06	=	Not Allowed
07	=	Lockout During Run
08	=	Not Ready
09	=	Block Parameter Error
10	=	Block Value Error
11	=	Block Parameter Memory Limit
12	=	MIN Error
13	=	MAX Error
14	=	Invalid Command (PLC/Control Command Send)
15	=	Invalid Operand (PLC)
16	=	<END> Statement Missing (PLC)
17	=	PLC Program Memory Limit
18	=	Defaults Loaded
19	=	Backup Loaded
20	=	Backup Saved
21	=	Checksum Error
22	=	Faults Cleared
23	=	Test Passed
24	=	Test Failed
25	=	No Compare Parameter
26	=	Divide by Zero
27	=	Long Word Overflow
28	=	Parameter Transfer Limit Overflow
29	=	Memory Read request too long
30	=	Data Field Length Error
31	=	Message Function Request/Parameter NOT Processed
32	=	Invalid Function Request

Note: In the ASCII2 protocol the error codes listed above are preceded by an “E” (e.g., “E32” indicates an Invalid Function Request)

Example of CRC-16 Calculation (in C):

```
#define CRC16  0x8005                          /* CRC-16 Generating Poly */

/* function returns the accumulated CRC value calculated for the Buffer */
/* this value can be transmitted or compared to a CRC value received */
/* "*data" is a pointer to the Buffer of data bytes to calculate the CRC for */
/* "len" is the number of data bytes to use for the calculation */

unsigned int do_crc(unsigned char *data, int len)
{
   int i, j;                                   /* byte & bit counters */
   unsigned int accum = 0xFFFF;                /* CRC value accumulator */
   unsigned int dat;                           /* holds data byte */

   for(i = 0; i < len; ++i){                   /* for each byte of data */
        dat = *data++;                         /* get data byte & goto next */
        accum ^= (dat << 8);                   /* put data into high byte */
        j = 0;                                 /* clear bit counter */
        while(j++ < 8){                        /* for each bit */
             if(accum & 0x8000)                /* if MSB set */
                  accum ^= CRC16;              /* Modulus-2 math w/CRC 16 */
             accum <<= 1;                      /* shift left 1 bit */
        }                                      /* end for each bit */
   }                                           /* end for each byte */

return(accum);                                 /* return the CRC value */
}                                              /* End do_crc function */
```

Note: This "CRC" must be converted to 4 ASCII characters before transmission. (Chars 0 to 9 and A to F should be used). For all "ASCII HEX" values the A through F characters must be in Upper Case when Transmitted in order to keep the conversions consistent.

CX-1102 Serial Communications Binary Data-Link Protocol

(Message Transmission / Response Structures)

STX	BYTE
Length	BYTE
Address	BYTE
Function	BYTE
Message Error	BYTE
Data Field	Defined later for each function type
ETX	BYTE
CRC	WORD (2 BYTES)

Valid Binary Protocol Functions:

1) Data Read Single Parameter
2) Data Write Single Parameter
3) Data Read Parameter Block (Limit 16)
4) Data Write Parameter Block (Limit 16)
5) Control Commands
6) PLC Program Download from Control
7) PLC Program Upload to Control
8) Custom Engineering Units Download
9) Custom Engineering Units Upload
10) Data Read Constant Table (Limit 6)
11) Parameter Data Trace Enable/Disable (enables/disables the CX-1102's ability to collect data traces)
12) Data Read Parameter Trace (read consecutive trace data from the CX-1102)
13) Data Read Trace Status Byte

Example:
Request for CP-210

Table 38 Data Read Single Parameter, Host Transmission

STX	LEN	ADDR	FUNC	DATA	ETX	CRC
02	09	01	01	00D2	03	0C56

Definition of Message Elements

"STX"	Signals the start of a transmission (Host/CX-1102)
"Length"	Length of complete message in bytes including STX, ETX, & CRC
"Address"	Address of the CX-1102
"Function"	Defines the data structure that is expected to follow and what action the CX-1102 will take.
"Message Error"	This is a general transmission error response from the CX-1102.
"Data Field"	A field of variable length which contains the data for the function requested. The Data Field is defined for individual functions through out the following section.
"ETX"	Signals the end of a data transmission (Host/CX-1102)
"CRC"	(Cyclic Redundancy Check) The CRC is calculated and sent with each transmission. It includes all message data except the STX byte. The data stream is checked against the CRC at the receiving end.
"Resolution Character" (Res)	An ASCII character, in the range of "0-9", that indicates the number of digits to the right of the decimal point for the value.

FUNCTION (01) DATA READ SINGLE PARAMETER

Table 39 Host Transmission

Byte #	1	2	3	4	5	6	7	8	9
DESC	STX	Length	Address	Function	Parm Number		ETX	CRC	
Decimal	2	9	1-99	1	1-999		3	0-65535	
Hex	02	09	01-63	01	0001-03E7		03	0000-FFFF	

Message Length = 9 bytes

Table 40 CX-1102 Response

Byte #	1	2	3	4	5	6	7	8	9	10	11	12	13	14
DESC	STX	Length	Address	Msg Error	Error Code	Control Byte	Res	Parameter Value				ETX	CRC	
Decimal	2	14	1-99	0-255	0-32	0-244	0-9	-2147483648 2147483647				3	0-65535	
Hex	02	0E	01-63	00-FF	00-20	00-F4	00-09	80000000-7FFFFFFF				03	0000-FFFF	

Data Field -(7 Bytes)

Parameter Error Code - 1 byte
Parameter Control byte - 1 byte
Resolution - 1 byte
Parameter Value - LONG (4 bytes)

Message Length = 14 bytes

FUNCTION (02) DATA WRITE SINGLE PARAMETER

Table 41 Host Transmission

Byte #	1	2	3	4	5	6	7	8	9	10	11	12	13	14
DESC	STX	Length	Address	Func	Parm Number		Res	Parameter Value				ETX	CRC	
Decimal	2	14	0-99	2	101-999		0-9	-2147483648 2147483647				3	0-65535	
Hex	02	0E	00-63	02	0065-03E7		00-09	80000000-7FFFFFFF				03	0000-FFFF	

Data Field -(7 Bytes)

Parameter Number - WORD (2 bytes)
Resolution - 1 byte
Parameter Value - LONG (4 bytes)

Message Length = 14 bytes

Table 42 CX-1102 Response

Byte #	1	2	3	4	5	6	7	8
DESC	STX	Length	Address	Msg Error	Error Code	ETX	CRC	
Decimal	2	8	1-99	0-255	0-32	3	0-65535	
Hex	02	08	01-63	00-FF	00-20	03	0000-FFFF	

Message Length = 8 bytes

FUNCTION (03) DATA READ PARAMETER BLOCK

Table 43 Host Transmission

Byte #	1	2	3	4	5	6	7	8	9
DESC	STX	Length	Address	Function	Parm Number		ETX	CRC	
Decimal	2	9-39	1-99	3	1-999		3	0-65535	
Hex	02	09-27	01-63	03	0001-03E7		03	0000-FFFF	

Data Field per Table 43
Number of parameters x 2 bytes/parameter (16 parameters max. = 32 bytes)

Parameter Number - WORD (2 bytes) for each parameter request

Message Length = 9 to 39 bytes

Table 44 CX-1102 Response

Byte #	1	2	3	4	5-13	14	15	16
DESC	STX	Length	Address	Msg Error	Data Field	ETX	CRC	
Decimal	2	16-151	1-99	0-255	<below>	3	0-65535	
Hex	02	10-97	01-63	00-FF	<below>	03	0000-FFFF	

Data Field per Table 44
Number of parameters x 9 bytes/parameter (16 parameters max. = 144 bytes)

Byte #	5	6	7	8	9	10	11	12	13
DESC	Error Code	Parmameter Number		Control Byte	Res	Parameter Value			
Decimal	0-32	1-999		0-244	0-9	-2147483648-2147483647			
Hex	00-20	0000-03E7		00-F4	00-09	80000000-7FFFFFFF			

Parameter Error Code - 1 byte
Parameter Number - WORD (2 bytes)
Parameter Control byte - 1 byte
Resolution - 1 byte
Parameter Value - LONG (4 bytes)

Message Length = 16 to 151 bytes

FUNCTION (04) DATA WRITE PARAMETER BLOCK

Table 45 Host Transmission

Byte #	1	2	3	4	5-11	12	13	14
DESC	STX	Length	Address	Function	Data Field	ETX	CRC	
Decimal	2	14-199	0-99	4	<below>	3	0-65535	
Hex	02	0E-77	00-63	04	<below>	03	0000-FFFF	

Data Field per Table 45
Number of parameters x 7 bytes/parameter (16 parameters max. = 112 bytes)

Byte #	5	6	7	8	9	10	11
DESC	Parameter Number		Resolution	Parameter Value			
Decimal	101-999		0-9	-2147483648 to 2147483647			
Hex	0065-03E7		00-09	80000000-7FFFFFFF			

Parameter Number - WORD (2 bytes)
Resolution - 1 byte
Parameter Value - LONG (4 bytes)

Message Length = 14 to 119 bytes

Table 46 CX-1102 Response

Byte #	1	2	3	4	5-7	8	9	10
DESC	STX	Length	Address	Msg Error	Data Field	ETX	CRC	
Decimal	2	10-55	1-99	0-255	<below>	3	0-65535	
Hex	02	0A-37	01-63	00-FF	<below>	03	0000-FFFF	

Data Field per Table 46
Number of Parameters x 3 bytes/parameter (16 parameters max. = 48 bytes)

Byte #	5	6	7
DESC	Error Code	Parameter Number	
Decimal	0-32	1-999	
Hex	00-20	001-03E7	

Parameter Error Code - BYTE
Parameter Number - WORD (2 Bytes)

Message Length = 10 to 55 bytes

FUNCTION (05) DATA WRITE CONTROL COMMAND

Table 47 Host Transmission

Byte #	1	2	3	4	5	6	7	8
DESC	STX	Length	Address	Function	Command	ETX	CRC	
Decimal	2	8	0-99	5	1-24	3	0-65535	
Hex	02	08	00-63	05	01-18	03	0000-FFFF	

Valid Control Commands:

01 (01) = F-Stop
02 (02) = R-Stop
03 (03) = H-Stop
04 (04) = Run
05 (05) = Jog Forward
06 (06) = Jog Reverse
07 (07) = Jog Stop
09 (09) = Reset Integral
10 (0A) = Preset Feedback Position
11 (0B) = Preset Lead Position
12 (0C) = Reset Position Error
13 (0D) = Preset Feedback & Lead Position
14 (0E) = Preset Feedback & Lead Position and Reset Position Error
17 (11) = Negate Scaled Reference
21 (15) = Bypass Ramp
22 (16) = Stop Ramp
23 (17) = Open Loop
24 (18) = Stop Integral

Message Length = 8 bytes

Table 48 CX-1102 Response

Byte #	1	2	3	4	5	6	7	8
DESC	STX	Length	Address	Msg Error	Error Code	ETX	CRC	
Decimal	2	8	1-99	0-255	0-32	3	0-65535	
Hex	02	08	01-63	00-FF	00-20	03	0000-FFFF	

Message Length = 8 bytes

FUNCTION (06) DATA READ PLC PROGRAM

Table 49 Host Transmission

Byte #	1	2	3	4	5	6	7	8
DESC	STX	Length	Address	Function	PLC Type	ETX	CRC	
Decimal	2	8	1-99	6	0-1	3	0-65535	
Hex	02	08	01-63	06	00-01	03	0000-FFFF	

PLC Program Type:
- 00 = Default Program
- 01 = Current User Program

Message Length = 8 bytes

Table 50 CX-1102 Response

Byte #	1	2	3	4	5-132	133	134	135
DESC	STX	Length	Address	Msg Error	PLC Program	ETX	CRC	
Decimal	2	9-135	1-99	0-255	0-255	3	0-65535	
Hex	02	09-87	01-63	00-FF	00-FF	03	0000-FFFF	

PLC Program Field - (2 to 128 Bytes)
This field will contain the PLC Program Requested, which may be any where from 2 to 128 bytes of data. The format for this data will be in pairs of Commands & Operands:

PLC Command - 1 byte
PLC Operand - 1 byte

Refer to *Appendices: Appendix K* for the PLC Program Commands and *Appendices: Appendix L* for the PLC Program Operands.

Message Length = 9 to 135 bytes

FUNCTION (07) DATA WRITE PLC PROGRAM

Table 51 Host Transmission

Byte #	1	2	3	4	5-132	133	134	135
DESC	STX	Length	Address	Function	PLC Program	ETX	CRC	
Decimal	2	9-135	0-99	7	0-255	3	0-65535	
Hex	02	09-87	00-63	07	00-FF	03	0000-FFFF	

PLC Program Field - (2 to 128 Bytes)
This field should contain a PLC Program, which may be any where from 2 to 128 bytes of data. The format for this data should be in pairs of Commands & Operands:

PLC Command - 1 byte
PLC Operand - 1 byte

Refer to *Appendices: Appendix K* for the PLC Program Commands and *Appendices: Appendix L* for the PLC Program Operands.

Message Length = 9 to 135 bytes

Table 52 CX-1102 Response

Byte #	1	2	3	4	5	6	7	8
DESC	STX	Length	Address	Msg Error	Error Code	ETX	CRC	
Decimal	2	8	1-99	0-255	0-32	3	0-65535	
Hex	02	08	01-63	00-FF	00-20	03	0000-FFFF	

Message Length = 8 bytes

FUNCTION (08) DATA READ CUSTOM ENGINEERING UNITS

Table 53 Host Transmission

Byte #	1	2	3	4	5	6	7
DESC	STX	Length	Address	Function	ETX	CRC	
Decimal	2	7	1-99	8	3	0-65535	
Hex	02	07	01-63	08	03	0000-FFFF	

Message Length = 7 bytes

Table 54 CX-1102 Response

Byte #	1	2	3	4	5-19	20	21	22
DESC	STX	Length	Address	Msg Error	EU Text	ETX	CRC	
Decimal	2	8-22	1-99	0-255	<below>	3	0-65535	
Hex	02	08-16	01-63	00-FF	<below>	03	0000-FFFF	

EU Text Field - Engineering Units Text String (0 to 15 Printable ASCII characters)

Message Length = 7 to 22 bytes

FUNCTION (09) DATA WRITE CUSTOM ENGINEERING UNITS

Table 55 Host Transmission

Byte #	1	2	3	4	5-19	20	21	22
DESC	STX	Length	Address	Function	EU Text	ETX	CRC	
Decimal	2	8-22	0-99	9	<below>	3	0-65535	
Hex	02	08-16	00-63	09	<below>	03	0000-FFFF	

EU Text Field - Engineering Units Text String (1 to 15 Printable ASCII characters)

Message Length = 8 to 22 bytes

Table 56 CX-1102 Response

Byte #	1	2	3	4	5	6	7	8
DESC	STX	Length	Address	Msg Error	Error Code	ETX	CRC	
Decimal	2	8	1-99	0-255	0-32	3	0-65535	
Hex	02	08	01-63	00-FF	00-20	03	0000-FFFF	

Message Length = 8 bytes

FUNCTION (10) DATA READ CONSTANT TABLE

Table 57 Host Transmission

Byte #	1	2	3	4	5-6	7	8	9
DESC	STX	Length	Address	Function	Parameter #	ETX	CRC	
Decimal	2	9-19	1-99	10	1-999	3	0-65535	
Hex	02	09-13	01-63	0A	0001-03E7	03	0000-FFFF	

Parameter Number Field - Number of parameters x 2 bytes/parameter (6 parameters max. = 12 bytes)

Message Length = 9 to 19 bytes

Table 58 CX-1102 Response

Byte #	1	2	3	4	5-220	221	222	223
DESC	STX	Length	Address	Msg Error	Data Field	ETX	CRC	
Decimal	2	43-223	1-99	0-255	<below>	3	0-65535	
Hex	02	2B-DF	01-63	00-FF	<below>	03	0000-FFFF	

Data Field - Number of parameters x 36 bytes/parameter (6 parameters max. = 216 bytes)

Parameter Number	-WORD (2 bytes) (0000 - 03E7)
Parameter Error Code	-1 byte (00 - 20)
Parameter Title	-16 bytes (String of 16 Printable ASCII characters)
Minimum Value*	-LONG (4 bytes) (80000000 - 7FFFFFFF)
Maximum Value*	-LONG (4 bytes) (80000000 - 7FFFFFFF)
Default Value*	-LONG (4 bytes) (80000000 - 7FFFFFFF)
Resolution for Minimum*	-1 byte (00 - 09)
Maximum Resolution*	-1 byte (00 - 09)
Resolution for Default*	-1 byte (00 - 09)
Parameter Control byte	-1 byte (00 - F4)
Field Length	-1 byte (00 - 09)

* These fields will be filled with zeros for all Monitor Parameter requests.

Message Length = 43 to 223 bytes

FUNCTION (11) PARAMETER TRACE ENABLE/DISABLE

This function is used to setup and control the CX-1102 internal data collection feature: "Data Trace".

CX-1102 internal data collection feature
The CX-1102 control has the capability to record 1 millisecond samples of up to 4 monitor parameters. The total size is 8192 samples (data points). The number of "Traces" (monitor parameters sampled) may be 1 (single trace), 2 (dual trace), or 4 (quad trace). The number of samples collected per trace are listed below:

Number of Samples per Trace

# of Trace Parameters	Description	Samples per Trace Parameter	Total Sample Time
1	Single Trace	8192	8.192 Sec
2	Dual Trace	4096	4.096 Sec
4	Quad Trace	2048	2.048 Sec

Configuration:

For a single trace, set the value for Trace Parameter 1 to the desired monitor parameter number, and set the rest of the Trace Parameters to zero (0).

For a dual trace, set the values for Trace Parameter 1 and 2 to the desired monitor parameter numbers, and set the rest of the Trace Parameters to zero (0).

For a quad trace, set all of the values for Trace Parameters 1 thru 4 to the desired monitor parameter numbers.

Trigger:

The trace sampling begins when a "trigger" is encountered, after the "data trace" has been enabled. The trigger is signaled through the PLC program by the "start trace" bit (167) transition from 0 to 1.

The CX-1102 control has the capability to collect "pre-trigger" data samples. These are samples collected prior to a "trigger". The "pre-trigger time" is variable from 0 seconds to 2.000 seconds, and is setup by the pre-trigger time (Pre-Trig) value and resolution in a "Set Trace Configuration" message (defined later in this section).

Actions taken by the CX-1102 control in response to this function (11) are controlled by a "message control byte" defined below.

Control Byte Definitions:

Bit 7 = Not Used (always 0)
Bit 6 = Not Used (always 0)
Bit 5 = Not Used (always 0)
Bit 4 = Not Used (always 0)
Bit 3 = Not Used (always 0)
Bit 2 = (1) Set Trace configuration (Pre-Trigger setting, and all Trace Parameter numbers)
Bit 1 = (1) Read Data Trace configuration (Pre-Trigger setting, and all Trace Parameter numbers)
Bit 0 = (1) Enable the Data Trace collection and wait for a trigger point (0) Disable the Trace collection "stop"

Message Control byte definition description:

Value	CX-1102 Control actions	CX-1102 Response
00	Disable Trace, stop collecting data	Error code
01	Enable Trace, wait for trigger	Error code
02	Read Trace Configuration, ignore bit 0	Status Byte, Trace Configuration
03	Read Trace Configuration, ignore bit 0	Status Byte, Trace Configuration
04	Set Trace Config, Disable Trace, stop	Configuration Error Codes
05	Set Trace Config, Reset Trace, wait for trigger	Configuration Error Codes
06	Set & Read Trace Config & Disable Trace, stop	Error Codes & Trace Configuration
07	Set & Read Trace Config & Reset, wait for trigger	Error Codes & Trace Configuration

Trace Status Byte Definitions:

Bit 7 = Not Used (always 0)
Bit 6 = Not Used (always 0)
Bit 5 = Not Used (always 0)
Bit 4 = Not Used (always 0)
Bit 3 = (1) Trace complete (0) Trace not complete
Bit 2 = (1) Trace active, trigger encountered, collecting data (0) No Trigger encountered
Bit 1 = (1) Trigger enabled, collecting data, waiting for trigger (0) Trigger disabled
Bit 0 = (1) Trace enabled (0) Trace disabled

Trace Status Byte values:

00 = Trace disabled
01 = Trace enabled
03 = Trace enabled, collecting pre-trigger data, waiting for trigger
05 = Trace enabled, trigger encountered, collecting data
08 = Trace complete, data collected

Set Trace Configuration, Read Trace Configuration, and enable or disable the internal trace data capture
Message Control byte value: 6 or 7

Table 59 Host Transmission

Byte #	1	2	3	4	5	6 - 16	17	18	19
DESC	STX	Length	Address	Function	Control	Data Field	EXT	CRC	
Decimal	2	19	1-99	11	6 or 7	<below>	3	0 - 65535	
Hex	02	13	01 - 63	0B	06 or 07	<below>	03	0000 - FFFF	

Data Field per Table 59

Byte #	6	7	8	9	10	11	12	13	14	15	16
DESC	Trace Parm 1		Trace Parm 2		Trace Parm 3		Trace Parm 4		Pre-Trigger		Resolution
Decimal	0 - 90		0 - 90		0 - 90		0 - 90		0.000 - 2.000		0 - 3
Hex	0000 - 005A		0000 - 005A		0000 - 005A		0000 - 005A		0000 - 07D0		00 - 03

Message length = 19 bytes
Result: Trace parameters 1 to 4 and the pre-trigger time value are all set, and the Trace Data collection is enabled or disabled. The values for the Trace Parameters are returned along with the Pre-Trigger setting.

Table 60 CX-1102 Response

Byte #	1	2	3	4	5 - 20	21	22	23
DESC	STX	Length	Address	Msg Error	Data Field	ETX	CRC	
Decimal	2	23	1 - 99	0 - 255	<below>	3	0 - 65535	
Hex	02	17	01-63	00 - FF	<below>	03	0000 - FFFF	

Data Field per Table 60

Byte #	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20
DESC	Error	Trace Parm 1		Error	Trace Parm 2		Error	Trace Parm 3		Error	Trace Parm 4		Error	Pre-Trigger		Res
Decimal	0-32	0-90		0-32	0-90		0-32	0-90		0-32	0-90		0-32	0.000-2.000		0-3
Hex	00-20	0000-005A		00-20	0000-005A		00-20	0000-005A		00-20	0000-005A		00-20	0000-07D0		00-03

Message length = 23 bytes

Response Data Field Definitions:

Byte #	Type	Description
5	byte	Error code result from Setting Trace Parameter 1
6-7	UINT	Trace Parameter 1 value
8	byte	Error code result from Setting Trace Parameter 2
9-10	UINT	Trace Parameter 2 value
11	byte	Error code result from Setting Trace Parameter 3
12-13	UINT	Trace Parameter 3 value
14	byte	Error code result from Setting Trace Parameter 4
15-16	UINT	Trace Parameter 4 value
17	byte	Error code result from Setting Pre-Trigger Time
18-19	UINT	Pre-Trigger Time value setting (seconds)
20	byte	Pre-Trigger Time value resolution byte

Set Trace Configuration and enable or disable the internal trace data capture.
Message Control byte value: 4 or 5

Table 61 Host Transmission

Byte #	1	2	3	4	5	6 - 16	17	18	19
DESC	STX	Length	Address	Function	Control	Data Field	EXT	CRC	
Decimal	2	19	1 - 99	11	4 or 5	<below>	3	0 - 65535	
Hex	02	13	01 - 63	0B	04 or 05	<below>	03	0000 - FFFF	

Data Field per Table 61

Byte #	6	7	8	9	10	11	12	13	14	15	16
DESC	Trace Parm 1		Trace Parm 2		Trace Parm 3		Trace Parm 4		Pre-Trigger		Resolution
Decimal	0 - 90		0 - 90		0 - 90		0 - 90		0.000 - 2.000		0 - 3
Hex	0000 - 005A		0000 - 005A		0000 - 005A		0000 - 005A		0000 - 07D0		00 - 03

Message length = 19

Result: Trace parameters 1 to 4 and the pre-trigger time value are all set, and the Trace Data collection is enabled or disabled.

Table 62 CX-1102 Response

Byte #	1	2	3	4	5 - 9	10	11	12
DESC	STX	Length	Address	Msg Error	Data Field	ETX	CRC	
Decimal	2	12	1 - 99	0 - 255	<below>	3	0 - 65535	
Hex	02	0C	01-63	00 - FF	<below>	03	0000 - FFFF	

Data Field per Table 62

Byte #	5	6	7	8	9
DESC	TrcParm 1 Error	TrcParm 2 Error	TrcParm 3 Error	TrcParm 4 Error	Pre-Trigger Error
Decimal	0 - 32	0 - 32	0 - 32	0 - 32	0 - 32
Hex	00 - 20	00 - 20	00 - 20	00 - 20	00 - 20

Message length = 12 bytes

Read Trace Configuration
Message Control byte value: 2 or 3

Table 63 Host Transmission

Byte #	1	2	3	4	5	6	7	8
DESC	STX	Length	Address	Function	Control	EXT	CRC	
Decimal	2	8	1 - 99	11	2 or 3	3	0 - 65535	
Hex	02	08	01 - 63	0B	02 or 03	03	0000 - FFFF	

Message length = 8 bytes

Result: The Data Trace is neither enabled nor disabled. The Trace configuration is simply returned in the response along with the Trace Status byte.

Table 64 CX-1102 Response

Byte #	1	2	3	4	5 - 16	17	18	19
DESC	STX	Length	Address	Msg Error	Data Field	ETX	CRC	
Decimal	2	19	1 - 99	0 - 255	<below>	3	0 - 65535	
Hex	02	13	01-63	00 - FF	<below>	03	0000 - FFFF	

Data Field per Table 64

Byte #		6	7	8	9	10	11	12	13	14	15	16
DESC	Status	Trace Parm 1		Trace Parm 2		Trace Parm 3		Trace Parm 4		Pre-Trigger		Res
Decimal	0-8	0 - 90		0 - 90		0 - 90		0 - 90		0 - 2.000		0 - 3
Hex	00-08	0000 - 005A		0000 - 005A		0000 - 005A		0000 - 005A		0000 - 07D0		00 - 03

Message length = 19 bytes

Table 65 Host Transmission

Byte #	1	2	3	4	5	6	7	8
DESC	STX	Length	Address	Function	Data	ETX	CRC	
Decimal	2	8	1-99	11	0-1	3	0-65535	
Hex	02	08	01-63	0B	00-01	03	0000-FFFF	

Data Field:

00 = Disable Data Trace Collection

01 = Enable Data Trace Collection and reset data pointers to the beginning, start collecting new data and wait for a trigger point.

Message Length = 8 bytes

Table 66 CX-1102 Response

Byte #	1	2	3	4	5	6	7	8
DESC	STX	Length	Address	Msg Error	Error Code	ETX	CRC	
Decimal	2	8	1-99	0-255	0-32	3	0-65535	
Hex	02	08	01-63	00-FF	00-20	03	0000-FFFF	

An Error Code of “00” indicates that the action was taken and was completed. Refer to page 7-53 for other error code responses.

Message Length = 8 bytes

FUNCTION (12) DATA READ PARAMETER TRACE

Use this function to read consecutive trace data from the control, re-read the last data set, or reset and re-read the trace data from the beginning again.

Table 67 Host Transmission

Byte #	1	2	3	4	5	6	7	8
DESC	STX	Length	Address	Function	Control	ETX	CRC	
Decimal	2	8	1-99	12	0-2	3	0-65535	
Hex	02	08	01-63	0C	00-02	03	0000-FFFF	

Control Byte (5) definition:

- 00 = Reset and re-read from beginning
- 01 = Continue reading from end of the last data point that was read
- 02 = Re-read the prior data segment

Message Length = 8 bytes

Table 68 CX-1102 Response

Byte #	1	2	3	4	5-245	246	247	248
DESC	STX	Length	Address	Msg Error	Data Field	ETX	CRC	
Decimal	2	12-248	1-99	0-255	<below>	3	0-65535	
Hex	02	0C	01-63	00-FF	<below>	03	0000-FFFF	

Data Field per Table 68
Length = 1 + [4 x Number of data points]

Byte #	5	6	7	8	9
DESC	Status/Error Code	Trace Data			
Decimal	0-32	-2147483648-2147483647			
Hex	00-20	80000000-7FFFFFFF			

Trace Read Status/Error Code - 1 byte/response
Trace Data - LONG (4 bytes/data point*)

*Maximum of 60 Data Points/Transmission (1 + [4 x 60] = 241 bytes)

Message Length = 12 to 248 bytes

FUNCTION (13) READ PARAMETER TRACE DATA/RE-READ PREVIOUS

Use this function to read the trace status byte.
Status Byte Definitions:

Bit 7	=	Not Defined (always 0)
Bit 6	=	Not Defined (always 0)
Bit 5	=	Not Defined (always 0)
Bit 4	=	Not Defined (always 0)
Bit 3	=	(1) Trace Complete (0) Not Complete
Bit 2	=	(1) Trace Active (trigger encountered, collecting data) (0) Not Active
Bit 1	=	(1) Trace Enabled (waiting for trigger to occur) (0) Disabled
Bit 0	=	(1) Trace Enabled (0) Disabled

Table 69 Host Transmission

Byte #	1	2	3	4	5	6	7
DESC	STX	Length	Address	Function	ETX	CRC	
Decimal	2	8	1-99	13	3	0-65535	
Hex	02	08	01-63	0D	03	0000-FFFF	

Message Length = 7 bytes

Table 70 CX-1102 Response

Byte #	1	2	3	4	5	6	7	8
DESC	STX	Length	Address	Msg Error	Status	ETX	CRC	
Decimal	2	8	1-99	0-255	0-8	3	0-65535	
Hex	02	08	01-63	00-FF	00-08	03	0000-FFFF	

Status Bytes values:

Bits:	76543210	Decimal:	Description
	00000000	= 0	Trace Disabled, no data collected.
	00000001	= 1	Trace Enabled.
	00000011	= 3	Trace Enabled, waiting for trigger.
	00000101	= 5	Trigger Encountered, collecting data.
	00001000	= 8	Trigger Complete, collecting data.

Message Length = 8 bytes

Message Error Response Field

This field consists of one byte. Each bit in the byte may be set to 1 indicating a specific error has occurred.

Message Error Bits Definitions:

Bit 7	=	(1) CRC Failure
Bit 6	=	(1) Buffer Overflow
Bit 5	=	(1) ETX Not Received/Data Field Error
Bit 4	=	(1) Invalid Function/Data Error
Bit 3	=	(1) Over-Run Error
Bit 2	=	(1) Noise Error
Bit 1	=	(1) Framing Error
Bit 0	=	(1) Parity Error

Example:

"86" = the number 10000110 (binary) would indicate a CRC failure with Noise errors and Framing errors occurred when the transmission message was received.

Other Errors Returned From Control Through The Serial Communications

0 (00)	=	OK
1 (01)	=	General Data Error
2 (02)	=	Res Byte Error
3 (03)	=	Invalid Parameter
4 (04)	=	String too Long
5 (05)	=	Out of Range
6 (06)	=	Not Allowed
7 (07)	=	Lockout During Run
8 (08)	=	Not Ready
9 (09)	=	Block Parameter Error
10 (0A)	=	Block Value Error
11 (0B)	=	Block Parameter Memory Limit
12 (0C)	=	MIN Error
13 (0D)	=	MAX Error
14 (0E)	=	Invalid Command (PLC/Control Command Send)
15 (0F)	=	Invalid Operand (PLC)
16 (10)	=	<END> Statement Missing (PLC)
17 (11)	=	PLC Program Memory Limit
18 (12)	=	Defaults Loaded
19 (13)	=	Backup Loaded
20 (14)	=	Backup Saved
21 (15)	=	Checksum Error
22 (16)	=	Faults Cleared
23 (17)	=	Test Passed
24 (18)	=	Test Failed
25 (19)	=	No Compare Parameter
26 (1A)	=	Divide by Zero
27 (1B)	=	Long Word Overflow
28 (1C)	=	Parameter Transfer Limit Overflow
29 (1D)	=	Memory Read request too long
30 (1E)	=	Data Field Length Error
31 (1F)	=	Message Function Request/Parameter NOT Processed
32 (20)	=	Invalid Function Request

Control Byte Definitions:

Bit 7	=	(1) Negative Numbers Allowed (0) Positive Numbers only
Bit 6	=	(1) Leading Zero's (0) No Leading Zero's
Bit 5	=	(1) Restricted Parameter (0) Unrestricted Parameter
Bit 4	=	(1) Parameter Defined (0) Undefined Parameter
Bit 3	=	Not Used (always 0)
Bit 2	=	(1) Floating Decimal Point (0) Fixed Decimal Point
Bit 1	=	(1) Binary Number (0) Decimal Number
Bit 0	=	(1) Integer (0) Non-Integer

Note: Applies to Parameters & Parameter Values

Example of CRC-16 Calculation (in C):

```
#define CRC16  0x8005                          /* CRC-16 Generating Poly */

/* function returns the accumulated CRC value calculated for the Buffer */
/* this value can be transmitted or compared to a CRC value received */
/* “*data” is a pointer to the Buffer of data bytes to calculate the CRC for */
/* “len” is the number of data bytes to use for the calculation */

unsigned int do_crc(unsigned char *data, int len)
{
   int i, j;                                   /* byte & bit counters */
   unsigned int accum = 0xFFFF;                /* CRC value accumulator */
   unsigned int dat;                           /* holds data byte */

   for(i = 0; i < len; ++i){                   /* for each byte of data */
         dat = *data++;                        /* get data byte & goto next */
         accum ^= (dat << 8);                  /* put data into high byte */
         j = 0;                                /* clear bit counter */
         while(j++ < 8){                       /* for each bit */
              if(accum & 0x8000)               /* if MSB set */
                   accum ^= CRC16;             /* Modulus-2 math w/CRC 16 */
              accum <<= 1;                     /* shift left 1 bit */
         }                                     /* end for each bit */
   }                                           /* end for each byte */

return(accum);                                 /* return the CRC value */
}                                              /* End do_crc function */
```

Troubleshooting/Diagnostics

DEVICE TESTS

The Device Tests screens allow you to test the memory, keypad and display of the CX-1102. You can also test the analog and digital I/O as well as the serial communications and calibrate the Analog Inputs. Processor fault conditions and counters can be monitored. The software revision level, the model and the release date is also available. If any test fails, contact Contrex Technical Support at (763) 424-7800 or (800) 342-4411.

The CX-1102 Device Tests screens are:

- Hardware Tests
- STD Signal Tests
- DIG I/O Tests
- Analog Input Tests
- Serial Comm Test
- Device Status
- Device Model & Rev

HARDWARE TESTS / MEMORY   P1/3

Use the Hardware Tests / Memory (page 1) to test the CX-1102's memory. Enter the number in Memory Test (CP-490) that corresponds to the section of memory that you want to test (see list below), then press the Enter key. To test all three sections, enter a “4”, then press the Enter key.

4 = Test ALL MEMORY
3 = Test NVRAM
2 = Test SRAM
1 = Test ROM
0 = Test Done

You can also refer to page 1 of the Memory Test's (CP-490) Help screen for the test list and the corresponding numeric codes. You can enter a test from the Help screen by scrolling the highlight bar to the test and pressing the Enter key.

When the test(s) are complete, the ROM Test (MP-94), SRAM Test (MP-95) and NVRAM Test (MP-96) will update and indicate whether the test passed or failed. A message will flash in the message bar, as well. At the completion of the test, the value of Memory Test (CP-490) will automatically return to “0” (test done).

If any test fails, contact Contrex Technical Support at (763) 424-7800 or (800) 342-4411.

Memory Test (CP-490)

To test the physical memory, either enter the number associated with the test (see list below) in Memory Test (CP-490) or go to the Help screen for Memory Test (CP-490) and choose the test. The test result will flash in the error and message status bar at the bottom of the screen and is also summarized in the Diagnostics/Device Tests Memory screen. The test results are also available through Monitor Parameters MP-94, MP-95, MP-96.

4 = Test ALL MEMORY
3 = Test NVRAM
2 = Test SRAM
1 = Test ROM
0 = Test Done

ROM Test (MP-94)

ROM Test (MP-94) displays the result of the most recent ROM Test. ROM Test runs a checksum test on the CX-1102 program memory.

1 = Memory Test Fail
0 = Memory Test Pass

SRAM Test (MP-95)

SRAM Test (MP-95) displays the result of the most recent SRAM Test. SRAM Test runs a read/write test on the scratch-pad memory.

1 = Memory Test Fail
0 = Memory Test Pass

NVRAM Test (MP-96)

Non Volatile RAM Test (MP-96) displays the result of the most recent Non Volatile RAM Test. The test runs both a read/write and a checksum test on the nonvolatile memory. The parameter values, the PLC program and the backups are all stored in this memory.

1 = Memory Test Fail
0 = Memory Test Pass

HARDWARE TESTS / KEYPAD   P2/3

Use the Hardware Tests / Keypad (page 2) to test the keypad. Press the Enter key to start the test. The "START" text on the first line of screen will change to "EXIT" and you can begin testing the keys (with the exception of the Enter key). Press each key individually. Each of the keys should register a number in the Keypad Buffer line that corresponds with the numbers listed in Figure 8-1. A key has failed the test if its number does not correspond with the numbers that are listed in Figure 8-1. Press the Enter key to exit the test.

KeyPad Lockout (MP-103)

Keypad Lockout (MP-103) displays the Keypad Lockout status. The Keypad Lockout is active when "On" is displayed. When Keypad Lockout is active, Control Parameter values can not be changed, with the exception of the Control Parameters that are exempted by CP's 480-489. The Keypad Lockout is not active when "OFF" is displayed. When the Keypad Lockout is not active, any Control Parameter can be changed.

Figure 8-1 The Hardware Tests Corresponding Keypad Numbers

HARDWARE TESTS / VIDEO   P3/3

Use the Hardware Tests / Video (page 3) to test the screen display. Either enter a “1 ”in Video Test (CP-492) and press the Enter key to start the test. You can also use the increment scroll-up key, to start the test. The Display Diagnostic instructional screen will appear. Use the Page Up or Page Down keys to step through each test.

Each screen uses a different display combination to test the display hardware. The Contrast Test will automatically scroll through a range of contrast. Refrain from pressing a key during this test and allow the Contrast Test to complete its cycle. To exit the tests, and return to the Hardware Tests Display screen (page 3), press the Menu key.

Video Test (CP-492)

To start the Video Test, enter “1” in Video Test (CP-492). Then use the Page Up/Down keys to page through tests. Press the Menu key to exit the tests and return to the previous screen.

Video Mode (CP-474)

Video Mode (CP-474) determines how the LCD Screen Display will be displayed, per the list below:

3 = Standard Video w/Border
2 = Reverse Video
1 = Standard Video (default)

Contrast Value (CP-475)

Contrast Value (CP-475) determines the contrast for the LCD Screen Display. The higher values darken the pixels and lower values lighten the pixels.

—NOTES—

STD SIGNAL TESTS

The STD Signal Tests screens allow you to test the control output and the frequency inputs. The STD Signals Tests / Frequency Inputs screen (page 1) displays the Monitor Parameters that are associated with Unwind Frequency Input and the Wind Frequency Input. Input a known frequency and monitor the results here.

Use the STD Signals Tests / Control Output screen (page 2) to test the Control Output (SigU/SigW). The Control Output (SigU/SigW) is the CX-1102 output signal that is input to the drive. Temporarily disconnect the signal from the drive and use a scope or voltmeter to verify the Control Output (SigU/SigW) operation.

NOTE: The CX-1102 must be in “F-Stop" when you begin the diagnostics. To start the diagnostics, enter a “1” for Unwind, "2" for Wind or "3" for Both into Diagnostics En (CP-450) and press the Enter key.

Select the type of output test in Diag DAC Test (CP-453). The output test types are:

2 = Immediate Output (an immediate step to a constant voltage)
1 = Continuous Ramp (a continuous ramp to plus and minus voltage - if bipolar mode)
0 = Disabled (default)

In continuous ramp (1), you can set the ramp time.

Diag DAC Volts (CP-454) determines the voltage that is output for the “Immediate Output” test (2). This is also the peak voltage that the “Continuous Ramp” test (1) will reach. Diag DAC Bits (CP-455) also determines the voltage, but in terms of the DAC bit value. Diag DAC Test (CP-453) is limited to ± UwndCOMax Volts and ± WindCOMax Volts.

Diag Rmp Tm (CP-456) determines the slope of the ramp for the continuous ramp. This is the time in seconds that it takes to increase the voltage from 0 volts to the Diag DAC Volts (CP-454). In order to get every possible bit combination, the continuous ramp must ramp at a time of 32.767 seconds or more and the Diag DAC Volts (CP-454) must be equal to the UwndCOMax Volts (CP-281). In this scenario, UwndCOMax Volts (CP-281) must be 15 volts. The ramp should appear without discontinuity, even at low voltage.

The purpose of the UwndCO Offset/WindCO Offset is to cancel any electrical offsets that may be present on the Control Output (SigU/SigW) when the CX-1102 is calling for “0” volts on the output. Set Diagnostics En (CP-450) to “1” for Unwind, "2" for Wind or "3" for Both and Diag DAC Test (CP-453) to “2” (Immediate Output), then set the Diag DAC Volts (CP-454) to “0” and measure the voltage on pin J3-1 relative to J3-2 and pin J8-1 relative to J8-2. Enter the negative of the voltage reading in UwndCO Offset (CP-283) / WindCO Offset (CP-288) and then verify that the voltage on the Control Output (SigU/SigW) reads at or close to “0” volts.

STD SIGNAL TESTS / FREQUENCY INPUTS   P1/2

The STD Signals Tests / Frequency Inputs screen (page 1) displays the Monitor Parameters that are associated with Unwind Frequency Input and the Wind Frequency Input. Input a known frequency and monitor the results here.

Uwnd Hz (MP-01)

Unwind Hertz (MP-01) displays the current frequency of the Unwind Encoder Input, in Hertz.

UwndEncRPM (MP-02)

Unwind Encoder RPM (MP-02) displays the current speed of the Unwind encoder in RPM relative to PPR Uwnd (CP-261).

UwndRollRPM (MP-03)

Unwind Roll RPM (MP-03) displays the rotational speed of the Unwind station axle. It may be different than the encoder speed, or the motor speed, due to gear ratios.

UwndCnts (MP-05)

Unwind Counts (MP-05) displays the encoder pulses from the Unwind station. They are converted to engineering units and displayed in UwndEstCtnt (MP-06). They will rollover, and begin again, as determined by UwndCtntRO (CP-368).

Uwnd Rot (MP-09)

Unwind Rotations (MP-09) displays a totalized rotational count of the Unwind Roll.

Wind Hz (MP-11)

Wind Hz (MP-11) displays the present frequency of the Wind Encoder Input, in Hertz.

WindEncRPM (MP-12)

Wind Encoder RPM (MP-12) displays the current speed of the Wind encoder in RPM relative to PPR Wind (CP-266).

WindRollRPM (MP-13)

Wind Roll RPM (MP-13) displays the rotational speed of the Wind station axle. It may be different than the encoder speed, or the motor speed, due to gear ratios.

WindCnts (MP-15)

Wind Counts (MP-15) displays the encoder pulses from the Unwind station. They are converted to engineering units and displayed in WindEstCtnt (MP-16). They will rollover, and begin again, as determined by WindCtntRO (CP-369).

Wind Rot (MP-19)

Wind Rotations (MP-09) displays a totalized rotational count of the Wind Roll.

STD SIGNAL TESTS / CONTROL OUTPUT   P2/2

The STD Signals Tests / Control Output screen (page 2) displays the Control and Monitor Parameters that are associated with the SigU and SigW. Use this screen to perform a variety of tests that verify the operation of the SigU and SigW.

Diagnostics En (CP-450)

When Diagnostics Enable (CP-450) is set to “1, 2 or 3” (On or enabled), the digital inputs will not recognize their normal function and the digital outputs can be controlled by Diag DO (CP-452). In addition, the SigU/SigW Control Output can be tested.   When you enter diagnostics, Diag DO (CP-452) is forced equal to the current DO 7..0 (MP-102) so that there is no unexpected change in the outputs. Change the outputs through Diag DO (CP-452) while performing the diagnostics.

3 = Both
2 = Wind Axis
1 = Unwind Axis
0 = Disabled (default)

Warning: The actuator may energize if you change Diag DO (CP-452). Stand clear of the system.

Diag DAC Test (CP-453)

Diagnostic DAC Test (CP-453) selects and enables the type of output control that is used for the diagnostic Control Output DAC test.

2 = Immediate Output
1 = Continuous Ramp
0 = Disabled (default)

Diag DAC Volts (CP-454)

Diagnostic DAC Volts (CP-454) is the maximum voltage output (either positive or negative) at the Control Output DAC during a non zero diagnostic DAC test . The voltage corresponds to Diag DAC Bits (CP-455).

Diag DAC Bits (CP-455)

Diagnostic DAC Bits (CP-455) is the maximum value in bits written (either positive or negative) to the Control Output DAC during a non zero diagnostic DAC test (CP-453) and when Diag En (CP-450) is set to “1” (On or enabled). The value corresponds to Diag DAC Volts (CP-454).

Diag Rmp Tm (CP-456)

Diagnostic Ramp Time (CP-456) is the time, in seconds, from 0 volts to either positive or negative Diag DAC Volts (CP-454) during a Diagnostic DAC Test with a Ramp.

UwndCO Offset (CP-283)

Unwind Control Output Offset (CP-283) adjusts for small variations in the specifications of certain IC devices on this particular controller board. Usually a very small number, it serves to true up the 0 volts end point of the output voltage scale. It is preset at the factory, and should not need field adjustments.

WindCO Offset (CP-288)

Wind Control Output Offset (CP-288) adjusts for small variations in the specifications of certain IC devices on this particular controller board. Usually a very small number, it serves to true up the 0 volts endpoint of the output voltage scale. It is preset at the factory, and should not need field adjustments.

UwndCO Volts (MP-27)

Unwind Control Output Volts (MP-27) displays the present value, in volts, of the Control Output (SigU) signal to the unwind drive. It is a combination of Uwnd FFwd (MP-24) plus Uwnd Trim (MP-26).

WindCO Volts (MP-37)

Wind Control Output Volts (MP-37) displays the present value, in volts, of the Control Output (SigW) signal to the wind drive. It is a combination of WindFFwd (MP-34) plus Wind Trim (MP-36).

System State (MP-50)

System State (MP-50) displays the present operating state of the CX-1102 (see list below).   Only one operating state may be active at a time. To access either the “Run” or the “Jog” operating state, the F-Stop, Unload and H-Stop inputs must be closed.

8 = Diagnostics	7 = Setup	6 = JOG
5 = Unload	4 = Load	3 = Run
2 = H-Stop	1 = F-Stop	

DIGITAL I/O TEST P1/1

Use the Digital I/O Test to activate the digital outputs and monitor the digital inputs without the inputs being in actual operation. To enter the diagnostics state, enter a “1” in Diagnostics En (CP-450) or use the increment scroll-up key. ***Danger: The CX-1102 must be in “F-Stop" when you begin the diagnostics.*** The Diag DO (CP-452) will automatically set to the current state of the Digital Outputs. This will prevent any unexpected change on the outputs. Determine the binary value for Diag DO (CP-452) that places a “1” in the bits corresponding to the digital outputs that you want active and a “0” in the bits corresponding to the outputs that you want inactive. ***Danger: Changing the digital outputs may cause movement in your system.*** Enter this value into Diag DO (CP-452). Verify that the outputs are active (low). The Digital Inputs can be monitored in DI 7..0 (MP-102) and DI 15..8 (MP-101). Short the corresponding pin common of the inputs to make the output active. Monitor these MP’s to verify that the active pins are recognized (a “1” appears in the corresponding bit).

Diagnostics En (CP-450)

When Diagnostics Enable (CP-450) is set to “1, 2 or 3” (On or enabled), the digital inputs will not recognize their normal function and the digital outputs can be controlled by Diag DO (CP-452). In addition, the SigU/SigW Control Output can be tested. When you enter diagnostics, Diag DO (CP-452) is forced equal to the current DO 7..0 (MP-102) so that there is no unexpected change in the outputs. Change the outputs through Diag DO (CP-452) while performing the diagnostics.

Warning: The actuator may energize if you change Diag DO (CP-452). Stand clear of the system.

3 = Both
2 = Wind Axis
1 = Unwind Axis
0 = Disabled (default)

Diag DO Shift (CP-451)

When in Diagnostics State, Diagnostics Digital Out Shift (CP-451) may be used to activate the digital outputs one at a time.

Warning: The actuator may energize if you change Diag DO (CP-452). Stand clear of the system.

8 = Spare	Activated
7 = WbBrk	Activated
6 = Dncr	Activated
5 = WRlFl	Activated
4 = WErr	Activated
3 = UErr	Activated
2 = WdEn	Activated
1 = UwdEn	Activated
0 = Off (default)	

Diag DO (CP-452)

Diagnostic Digital Out (CP-452) controls the digital outputs when Diagnostics En (CP-450) is set to “1” (On or enabled) during diagnostics. It is an 8 Bit Binary number with 1 bit per output. If the bit is a “1”, then the corresponding output is pulled “low”. When you enter diagnostics, Diag DO (CP-452) is forced equal to the current DO 7..0 (MP-102) so that there is no unexpected change in the outputs. Change the outputs through Diag DO (CP-452) while performing the diagnostics.

Warning: The actuator may energize if you change Diag DO (CP-452). Stand clear of the system.

DI 7..0 (MP-100)

Digital Input 7..0 (MP-100) displays the value of the “J6” digital inputs. A ‘1’ in the bit location indicates a “low voltage” condition on the corresponding input (which is consistent with a contact closure to common). Refer to *Appendices: Appendix C* for the DI 7..0 (MP-100) bit map list.

DI 15..8 (MP-101)

Digital Input 15..8 (MP-101) displays the value of the “J7” digital inputs. A ‘1’ in the bit location indicates a “low voltage” condition on the corresponding input (which is consistent with a contact closure to common). These eight inputs can be set up in the PLC Programming screen to generate a One-Shot -Pulse on a high-to-low transition. Refer to *Appendices: Appendix C* for the DI 15..8 (MP-101) bit map list.

DIGITAL I/O TEST   P1/1 continued

DO 7..0 (MP-102)

Digital Output 7..0 (MP-102) displays the value of the “J2” digital outputs. A ‘1’ in the bit location indicates an active “low voltage” condition on the corresponding open collector output (which would sink DC current). Refer to *Appendices: Appendix C* for the DO 7..0 (MP-102) bit map list.

System State (MP-50)

System State (MP-50) displays the present operating state of the CX-1102 (see list below). Only one operating state may be active at a time. To access either the “Run” or the “Jog” operating state, the F-Stop, Unload and H-Stop inputs must be closed.

8 = Diagnostics	7 = Setup	6 = JOG
5 = Unload	4 = Load	3 = Run
2 = H-Stop	1 = F-Stop	

DANGER

The CX-1102 should not be in “Run” or “Jog” when you begin the diagnostics.

Changing the digital outputs may cause movement in your system.

—NOTES—

ANALOG INPUT TESTS

The Auxiliary Analog tests screens display the input screen (page 1) and the calibration screen (page 2). The Auxiliary Analog Input screen displays the Monitor Parameters that monitor the results of inputing a voltage. Use the Aux Analog Calibration screen (page 2) to calibrate the Auxiliary Analog In; AI1 and AI2. These boards are calibrated at the factory and are adequate for most applications. However, you may need to re-calibrate if your application demands more accuracy in a specific range or if you need to calibrate directly to EU/Tm with a known signal level on the inputs. The following sections will explain the calibration for Analog Input 1, Analog Input 2.

Dancer Input:

1. Connect the Analog voltage to the Dancer Input (JA pins 2,4). Connect a voltmeter between pins 2 and 4.

2. Set Analog Cal Sel (CP-461) to “AI1” (1) to Select AI1 for calibration.

3. Set Analog Cal Ref (CP-462) to “A” (1) to select point A.

NOTE: The old calibration data will be overwritten.

4. Set Analog Cal EN (CP-460) to “On” (1) to start calibration.

5. Adjust the analog voltage until the meter reads the voltage that you want set for point A. This is generally your smallest (or negative) voltage point.

6. Enter the exact voltage measured by the meter into AnalogRef Val (CP-463).

7. Set Analog Cal Ref (CP-462) to “B” (2) to select point B.

8. Adjust the analog voltage until the meter reads the voltage that you want use for point B. This is generally your largest (or positive) voltage point.

9. Enter the exact voltage measured by the meter into AnalogRef Val (CP-463).

10. Set Analog Cal EN (CP-460) to “Off” (0) to disable further calibration.

Ext Line Speed:

1. Connect the Analog voltage to the External Line Speed Input (JA pins 3,4). Connect a voltmeter between pins 3 and 4.

2. Set Analog Cal Sel (CP-461) to “AI2” (2) to Select AI2 for calibration.

3. Set Analog Cal Ref (CP-462) to “A” (1) to select point A.

NOTE: The old calibration data will be overwritten.

4. Set Analog Cal EN (CP-460) to “On” (1) to start calibration.

5. Adjust the analog voltage until the meter reads the voltage that you want set for point A. This is generally your smallest (or negative) voltage point.

6. Enter the exact voltage measured by the meter into AnalogRef Val (CP-463).

7. Set Analog Cal Ref (CP-462) to “B” (2) to select point B.

8. Adjust the analog voltage until the meter reads the voltage that you want use for point B. This is generally your largest (or positive) voltage point.

9. Enter the exact voltage measured by the meter into AnalogRef Val (CP-463).

12. Set Analog Cal EN (CP-460) to “Off” (0) to disable further calibration.

ANALOG INPUT TESTS   P1/2

The Auxiliary Analog Input screens display the Monitor Parameters that monitor the results of inputting a voltage.

Dancer Bits (MP-80)

Dancer Bits (MP-80) displays the ADC receiving the analog Dancer signal.

Dancer Volts (MP-81)

Dancer Volts (MP-81) displays the analog Dancer Signal. Note that the dancer may not generate the full range of voltage. Configurations that generate larger voltage swings may attain higher accuracy in diameter and line speed calculations.

Dancer Ctnt (MP-82)

Dancer Content (MP-82) displays the estimation of the amount of web material presently stored within the dancer assembly. It assumes that there is a linear relationship between dancer volts and dancer content.

Ext LS Bits (MP-86)

External Line Speed Bits (MP-86) displays the ADC receiving the analog Line Speed signal.

Ext LS Volts (MP-87)

External Line Speed Volts (MP-87) displays the analog Line Speed signal. It operates over the range of 0 to +/- 5VDC. Reverse direction can be achieved via negative signal in some configurations, or via a positive signal plus a wire terminal reversing input switch.

Ext Line Spd (MP-88)

External Line Speed (MP-88) displays the Ext LS Volts (MP-87) signal converted into web line speed units. This display actively monitors the input signal even if the system is presently using another source for the Line Speed, or even if the value is later limited for various reasons.

ANALOG INPUT TESTS / CALIBRATION   P2/2

Analog Cal En (CP-460)

Analog Calibration Enable (CP-456) enables the calibration process for the auxiliary analog board. When Analog Cal En (CP-460) is set to “1” (On), the signal that is selected in Analog Cal Sel (CP-461) will be calibrated.

1 = Enabled
0 = Disabled (default)

Analog Cal Sel (CP-461)

Analog Calibration Select (CP-461) selects the signal (AI1, AI2) on the auxiliary analog board for calibration.

2 = Analog In 2
1 = Analog In 1 (default)

Analog Cal Ref (CP-462)

Analog Calibration Reference (CP-462) determines which of the two calibration reference points (see list below) are to be calibrated.

2 = point B
1 = point A (default)

Analog Ref Val (CP-463)

Analog Reference Value (CP-463) is the value of measured data for the signal at the specified reference point (Analog Cal Ref, CP-462). Use a voltmeter for voltage mode operation to measure the voltage on the analog signal selected for calibration at the specified reference point. Enter the measured value in the Analog Ref Val (CP-463).

Dancer Bits (MP-80)

Dancer Bits (MP-80) displays the ADC receiving the analog Dancer signal.

Dancer Volts (MP-81)

Dancer Volts (MP-81) displays the analog Dancer Signal. Note that the dancer may not generate the full range of voltage. Configurations that generate larger voltage swings may attain higher accuracy in diameter and line speed calculations.

Ext LS Bits (MP-86)

External Line Speed Bits (MP-86) displays the ADC receiving the analog Line Speed signal.

Ext LS Volts (MP-87)

External Line Speed Volts (MP-87) displays the analog Line Speed signal. It operates over the range of 0 to +/-5VDC. Reverse direction can be achieved via negative signal in some configurations, or via a positive signal plus a wire terminal reversing input switch.

AnlgCal Ref A (MP-168)

Analog Calibration Reference A (MP-168) displays the Analog Ref Val (CP-463) for the signal (AI1, AI2), which was selected in Analog Cal Sel (CP-461) and which was stored during the calibration of point A.

AnlgCal Ref B (MP-169)

Analog Calibration Reference B (MP-169) displays the AnalogRef Val (CP-463) for the signal (AI1, AI2), which was selected in Analog Cal Sel (CP-461) and which was stored during the calibration of point B.

SERIAL COMMUNICATIONS TEST   P1/2

Use the Serial Communications Test screen to set up the Baud Rate, Frame Format and Record Format that will be used by the host computer. You can send a byte out and receive a byte on the RS-485 port. These are decimal numbers. If you want to send ASCII, you must use the decimal equivalent. Likewise, if an ASCII character is received, it will be displayed as the decimal equivalent (e.g., ‘A’ = 65). Use the SerCom Errs (MP-91) “help” screen to decipher any errors.

Device Address (CP-470)

Device Address (CP-470) assigns a serial communications address to the CX-1102. This number should be different from any other units that are on the serial link.

Baud Rate (CP-471)

The Baud Rate (CP-471) determines the serial communications data transfer rate (see list below) in bits/sec. With a 10 bit frame length, the number of frame/sec would be 1/10 the Baud Rate.

1 = 300 bps = 300 Baud	2 = 600 bps = 600 Baud	3 = 1200 bps = 1200 Baud
4 = 2400 bps = 2400 Baud	5 = 4800 bps = 4800 Baud	6 = 9600 bps = 9600 Baud (default)
7 = 19200 bps = 19.2 Kbaud		

Frame Format (CP-472)

Frame Format (CP-472) determines the parity, the number of data bits, and the number of stop bits for the serial communications.

1 = N,8,1 = No Parity, 8 data bits, 1 stop bit (10 bit frame-ASCII or Binary)
2 = E,7,1 = Even Parity, 7 data bits, 1 stop bit (10 bit frame-ASCII only)

Record Format   (CP-469)

Record Format (CP-469) determines which type of data format (see list below) will be used for the serial communication.

3 = ASCII2	2 = ASCII	1 = BINARY

CRC Enable (CP-468)

If CRC Enable (CP-468) is set to “ON” (1), you must append a CRC value to all serial communications messages that are received by the CX-1102 (See *Serial Communications: Using Serial Communications*). The CX-1102 checks the CRC value against the the message contents (excluding the “STX”), then calculates a CRC value and appends it to all serial communications responses.   If CRC Enable (CP-468) is set to “OFF” (0), the CX-1102 will ignore any CRC value that is appended to a message and will not append a CRC value to any serial communications responses.

1 = On (Enabled)   0 = Off (Disabled)

SerCom Char Out (CP-473)

When a new value is entered in SerCom Char Out (CP-473), it is transmitted out the RS-485 serial port at the Baud Rate (CP-471) and the Frame Format (CP-472). SerCom Char Out (CP-473) is a decimal number.

SerCom Char In (MP-90)

Serial Communications Character In (MP-90) displays the value of the last byte that was received by the Serial Communications port. SerCom Char In (MP-90) is displayed in a decimal format. SerCom Char In (MP-90) is used primarily for troubleshooting.

SerCom Errs (MP-91)

Serial Communications Errors (MP-91) displays all serial communications errors that occurred during the most recent transmission.

SERIAL COMM TEST / MESSAGE DISPLAY P2/2

Receive Buffer:

00 00 00 00 00 00
00 00 00 00 00 00
00 00 00 00 00 00

Transmit Buffer:

00 00 00 00 00 00
00 00 00 00 00 00
00 00 00 00 00 00

SerCom Errs (MP-91)

Serial Communications Errors (MP-91) displays all serial communications errors that occurred during the most recent transmission.

DEVICE STATUS   P1/2

The Device Status screen displays the microprocessor related faults. Norm Pwr Ups (MP-154) indicates how many times power has been applied to the CX-1102 since the last "Clear-7" power-up. The Low Pwr Cntr (MP-155) shows the number of times the CX-1102 experienced low power before shutting down. If this number is greater than Norm Pwr Ups (MP-154), it can indicate that the line-power input has dipped below about 100 volts AC. However, this could also indicate that a "Clear-7" power-up was executed and the Low Pwr had not been reset. Therefore, it is important to reset the Low Pwr Cntr (MP-155) after a "Clear-7" power-up, to keep the numbers accurate. Use Clr Fault Cntrs (CP-491) to reset the Low Pwr Cntr (MP-155).

Last Reset (MP-150)

Last Reset (MP-150) displays a "1" in a bit to indicate the reason for the last reset. Refer to *Appendices: Appendix C* for the Last Reset (MP-150) bit map list. The Help screen for Last Reset (MP-150) also contains a bit map list.

Misc Intrpt (MP-151)

Miscellaneous Interrupts (MP-151) displays a "1" in a bit to indicate which of the various system interrupts may have caused the last reset. Refer to *Appendices: Appendix C* for the Misc Intrpt (MP-151) bit map list. The Help screen for Misc Intrpt (MP-151) also contains a bit map list.

Device Alms (MP-152)

Device Alarms (MP-152) displays the status of microprocessor or other hardware related alarms. Notification of a bad block selection is also included. Refer to *Appendices: Appendix C* for the Device Alarms (MP-152) bit map list. The Help screen for Device Alarms (MP-152) also contains a bit map list.

Norm Pwr Ups (MP-154)

Normal Power Ups (MP-154) displays the number of normal power-ups since the most recent "Clear-7" power-up . This value is reset only by a "Clear-7" power-up. Norm Pwr Ups (MP-154) is used primarily for troubleshooting.

Low Pwr Cntr (MP-155)

Low Power Counter (MP-155) displays the number of low power detections, including normal "Power Downs". You can reset this numeric value, but only in Clr Fault Cntrs (CP-491). Low Pwr Cntr (MP-155) is used primarily for troubleshooting.

Mem Err Cntr (MP-156)

Memory Error Counter (MP-156) displays the number of memory test failures that occurred during "Power Up". You can reset this numeric value, but only in Clr Fault Cntrs (CP-491). Mem Err Cntr (MP-156) is used primarily for troubleshooting.

WatchDogCntr (MP-157)

Watch Dog Counter (MP-157) displays the number of watch dog resets that were caused by Watchdog time-out. WatchDogCntr (MP-157) is used primarily for in troubleshooting. You can reset this numeric value, but only in 'Clr Fault Cntrs' (CP-491).

Clr Fault Cntrs (CP-491)

To reset all the system-fault counters except Norm Pwr Ups (MP-154), enter a "1" in Clear Fault Counters (CP-491). The error and message status bar at the bottom of the screen will flash "Flts Cleared" and the value will return to "0".

DEVICE STATUS   P2/2

Last Reset (MP-150)

Last Reset (MP-150) displays a “1” in a bit to indicate the reason for the last reset. Refer to *Appendices: Appendix C* for the Last Reset (MP-150) bit map list. The Help screen for Last Reset (MP-150) also contains a bit map list.

Misc Intrpt (MP-151)

Miscellaneous Interrupts (MP-151) displays a “1” in a bit to indicate which of the various system interrupts may have caused the last reset. Refer to *Appendices: Appendix C* for the Misc Intrpt (MP-151) bit map list. The Help screen for Misc Intrpt (MP-151) also contains a bit map list.

MiscIntrptCntr (MP-158)

Miscellaneous Interrupt Counter (MP-158) displays the number of miscellaneous interrupts that occurred as the result of bus errors, address errors, divide-by-0 errors, unexecuted instruction errors, general exceptions, and unexecuted and spurious interrupts. You can reset this numeric value, but only in Clr Fault Cntrs (CP-491). MiscIntrptCntr (MP-158) is used primarily for troubleshooting.

PC at Intrpt (MP-153)

Program Counter at Interrupt (MP-153) shows were the last interrupt of the microprocessor program counter occurred . If the CX-1102 repeatedly displays the “REST FAULT” error box, then record the “PC @Intrpt” value as well as the line just above it (which indicates the cause of the reset), before you press the clear key to continue. The program counter at interrupt is stored in the PC at Intrpt (MP-153) Monitor Parameter for review. A value of “2560” is normal.

Clr Fault Cntrs (CP-491)

To reset all the system-fault counters except Norm Pwr Ups (MP-154), enter a “1” in Clear Fault Counters (CP-491). The error and message status bar at the bottom of the screen will flash “Flts Cleared” and the value will return to “0”.

DEVICE MODEL & REVISION   P1/1

The Device Model and Revision screen displays the model of the CX-1102, the software number, the revision level of the software and the date that this software was released. The Contrex copyright is also displayed on this screen. If you call technical support for assistance, you may be asked for this information.

Model # (MP-97)

Model # (MP-97) displays the model number for this CX-1102. This model number is unique to the CX-1102 series of controllers.

REVISION (MP-99)

REVISION (MP-99) is the revision level of the software for this individual CX-1102.

RELEASE (MP-98)

RELEASE (MP-98) is the date that the software for this individual CX-1102 was released. The numeric, six digit format is: year, month, day.

—NOTES—

TROUBLESHOOTING

If you need to verify the integrity of the CX-1102 independently, refer to the *Troubleshooting/Diagnostics: Device Tests* section. If the information in this section does not solve your problem, consult technical support:

Contrex Technical Support (763) 424-8700 or (800) 342-4411

PARAMETER LOAD AT POWER-UP

This section contains instructions to restore either the default Control Parameter values or the back-up Control Parameter values. The procedures are:

Clear-7
Clear-8
Clear-9

CLEAR-7

Use the Clear-7 procedure to restore the Control Parameter's factory default settings, with the exception of these three Control Parameters: Contrast Value (CP-475), UwndCO Offset (CP-283), WindCO Offset (CP-288) and Serial Number (CP-495). The back-up settings for the Control Parameters are not altered.

NOTE: Clear-7 also restores the PLC to the factory default. The back-up for the PLC is not altered. The fault counters are not reset.

Norm Pwr Ups (MP-154) is reset to “1” (normal power-up) or “0” (if CPU reset occurs during power-up).

EstMaxLnSpd (MP-43) is reset to “0”.

The Code Select line and the Large Number units in the “Status” screen are cleared.

To do the Clear-7 Procedure:

Press the Clear key and the “7” key, then continue to press the keys while you apply power to the CX-1102.

CLEAR-8

Use the Clear-8 procedure to restore the Control Parameters to the back-up settings, with the exception of these two Control Parameters: UwndCO Offset (CP-283), WindCO Offset (CP-288) and Serial Number (CP-495). This procedure uses the back-up settings which you have entered; the back-up settings are not reset to the factory default.

NOTE: Clear-8 also restores the PLC to the back-up settings which you have entered; the PLC back-up settings are not reset to the factory default.

The fault counters are not reset.

To do the Clear-8 Procedure:

Press the Clear key and the “8” key, then continue to press the keys while you apply power to the CX-1102.

CLEAR-9

Use the Clear-9 procedure to restore the Control Parameter's factory default settings. The back-up settings for the Control Parameters are also restored to the factory default.

NOTE: Clear-9 restores the PLC to the factory default. The back-up for the PLC is also restored to the factory default.

The fault counters are reset to “0”.

Norm Pwr Ups (MP-154) is reset to “1” (normal power-up) or “0” (if CPU reset occurs during power-up).

EstMaxLnSpd (MP-43) is reset to “0”.

The Code Select line and the Large Number units in the “Status” screen are cleared.

To do the Clear-9 Procedure:

Press the Clear key and the “9” key, then continue to press the keys while you apply power to the CX-1102.

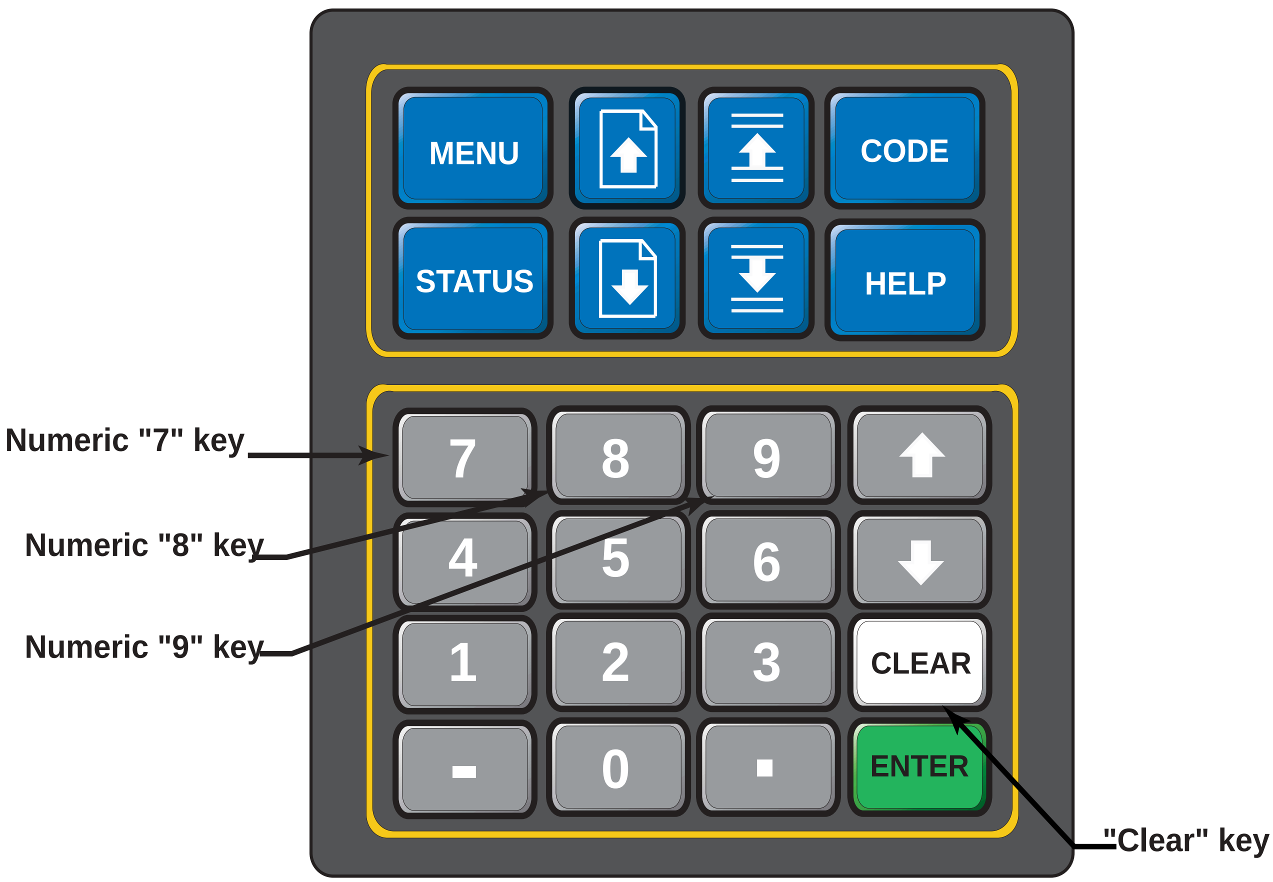


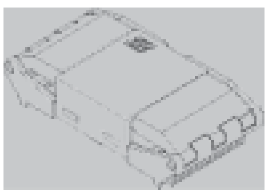
Figure 8-6 Parameter Load at Power-up Corresponding Keypad Numbers

EEPROM CHIP REPLACEMENT

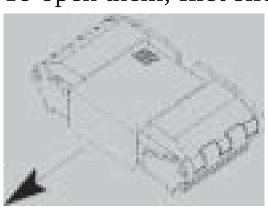
The EEPROM (Electrical Erasable Programmable Read Only Memory) chip, which is also referred to as the "Flash Memory", is the software for the CX-1102.

To replace the EEPROM chip:

- Make a record of your current Control Parameter values; the replacement chip contains default values that will replace your current values when you perform the "Clear 9" step.
- Turn off the power to the CX-1102 and remove the back panel.
- Pull out the CPU board and locate the 44 pin PSOP Surface Mount Socket that houses the EEPROM chip.
- **Ground yourself - Static electricity can damage the EEPROM chip.**
- The PSOP Socket has a positive locking lid design. The lock is attached to the left lid and slides back and forth in a direction parallel to the hinge pins.

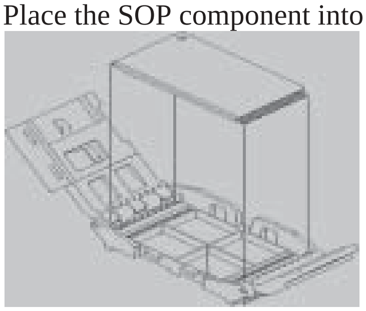


- To open them, first slide the lock sideways (approximately 1mm) to the unlocked position.



- Both lids are now free to be opened by rotating them on their respective hinges.

- Place the SOP component into the socket.



- The lids must be closed simultaneously to assure proper seating of the SOP component. If this is not observed, the component will shift off center in the socket resulting in an unsatisfatory electrical connection. Now, while maintaining a downward pressure on the lock, slide it sideways to its locked position.

- Replace the CPU board and the back panel.

- Press the “Clear” key and the “9” key, then continue to press the keys while you apply power to the CX-1102.

- The “Clear 9” procedure restores the factory default settings and automatically performs the Power Up diagnostic routines.

- Reenter the values for your Control Parameters.

—NOTES—

Appendices

APPENDIX A: CX-1102 SPECIFICATIONS

Electrical

AC Power Input:	115 VAC +15% -10% 48 to 62 Hertz 0.250 Amps Maximum 30 Watts Maximum or (switch selectable) 230 VAC +15% -10% 48 to 62 Hertz 0.125 Amps Maximum 30 Watts Maximum
Frequency Inputs(2):	Differential Mode (26LS32): 5 to 15 VDC Operating Voltage 200 mV Differential Input Voltage 100 mV Hysteresis Typical 2.0 kOhm, 1/8 W to 5 V Internal Pullup 0 to 180 kHertz Operating Frequency Quadrature Optically Isolated (Dig_Com) Single-Ended Mode: Current Sinking 5 to 15 VDC Operating Voltage 2.5 V Switching Threshold 100 mV Hysteresis Typical 2.0 kOhm, 1/8 W to 5 V Internal Pullup 0 to 180 kHertz Operating Frequency Quadrature Optically Isolated (Dig_Com)
Digital Inputs(16):	Single-Ended (74HC14) Current Sinking 5 to 24 VDC Operating Voltage 3.15 V Rising Edge Threshold Maximum 0.90 V Falling Edge Threshold Minimum 1.0 V Hysteresis Typical 10.0 kOhm, 1/8 W to 5 V Internal Pullup 1 mSec Response Time (DI0 - DI7) 2 mSec Response Time (DI8 - DI15) Optically Isolated (Dig_Com)
Digital Outputs(8):	NPN Darlington (ULN2003) Current Sinking 50 VDC Maximum Operating Voltage 1.0 V Saturation at 200 mA Typical 0.6 V Saturation at 1 mA Typical 200 mA Continuous/Channel 500 mA Peak/Channel (50% Duty Cycle) 750 mA Continuous Total All Channels Internal Freewheeling Diodes 2 mSec Update Rate Optically Isolated (Dig_Com)

(Continued)

Appendix A: CX-1102 Specifications (continued)

Control Output to Drive (2):	±5 V to ±15 V Bipolar Analog Zero/Span Software Calibration 16 Bits Bipolar Resolution (15+Sign) 18 mA Maximum Drive Current Optically Isolated (ComU / ComW)
Aux. Power Output:	+5 VDC ±5% 150 mA Maximum Optically Isolated (Dig_Com)
Serial Communications:	RS485 Compatible 5 VDC Differential Operation 300 to 19200 Baud Rate Selectable Character Format Half Duplex Optically Isolated (Dig_Com)
Analog In (2):	2 Input Channels ±5 VDC 80 kOhm Input Resistance 14 Bits Resolution ±0.1% Drift Error Typical (50° C Range) Zero Monotonic Error Software Calibration NOVRAM Calibration Storage Optically Isolated (Dig_Com)

Physical

Construction:	NEMA4, 4X, 12, 13 IP65 Compatible Frontpanel 14 Line by 21 Character LCD Display Sealed Membrane Keypad Polycarbonate ABS Front Bezel Paint over Zync Plate CRS Enclosure
Overall Dimensions:	19.6 cm (7.7 in) Bezel Height 10.2 cm (4.0 in) Bezel Width 17.8 cm (7.0 in) Total Depth
Panel Dimensions:	18.41 cm (7.25 in) Panel Height Cutout 9.27 cm (3.65 in) Panel Width Cutout 16.30 cm (6.30 in) Panel Inside Depth
Weight:	2.3 kilograms (5.1 Pounds)

Environmental

(Continued)

Appendix A: CX-1102 Specifications (continued)

Operating Temperature:	0° to 55° C (32° to 131° F) Int. Enclosure 0° to 40° C (32° to 104° F) Ext. Enclosure
Storage Temperature:	-25° to 70° C (-13° to 158° F)
Environment:	The CX-1102 shall be installed in a pollution degree 2 macro-environment.
Relative Humidity:	0 to 95% Non-condensing
Altitude:	To 3,300 Feet (1000 Meters)

Performance

Setpoint Resolution:	6 Digits in Engineering Units
Speed Regulation:	0.01% Error in Lead Modes (>10Hz) 0.00% Error in Follower Modes (>10Hz)
Accel/Decel Ramps:	Settable in Time or Rate 0.1 to 3600.0 Seconds 0.001 to 999,999 EUs/T/Second Separate for Run, Direct, Jog, H-Stop
Limits:	Maximum Speed Minimum Speed Trim Authority Integral Limit
Alarms:	Zero Speed Maximum Feedback Maximum Accel/Decel No Response Programmable Custom Alms (6)
PLC:	64 Program Instructions Total

(Continued)

	9 Instruction Types 8 Digital Inputs (DI8-DI15) 8 Digital Outputs (DO0-DO7) 4 Timers 4 Counters 4 Latches
Setpoint Scaling Modes:	Direct Line Speed Follower
Digital Inputs:	F-Stop Unload H-Stop Load Run Spare Keypad Lockout Setup Unwind Jog Forward Unwind Jog Reverse Wind Jog Forward Wind Jog Reverse Unwind Under Wrap Wind Under Wrap Line Speed Reverse Web Reset
Digital Outputs:	Unwind Enable Wind Enable Unwind Error Wind Error Wind Roll Full Dancer Web Break Spare
Control Loop Formats:	Velocity Open Loop
Closed Loop Algorithm:	PID + FF Adaptive or Self-Adjust Feedforward
Control Loop Response:	2mSec Speed Loop and PLC Functions
Block Parameters:	8 Switch Selectable Parameter Blocks

(Continued)

Appendix A: CX-1102 Specifications (continued)

	Permissible Setpoint Mode Switching 16 Parameters per Block Full Control Parameter Selection
Device Configuration:	Parameter Load and Store PLC Program Load and Store Status Screen Configuration Serial Communications Format Selectable Keypad Lockout Normal/Reverse Video Video Contrast Adjust Annunciator Enable Standard Alarm Mask
Diagnostics:	Memory Test Keypad Test Video Test I/O Signal Tests Serial Communications Test Annunciator Test
Help Screens:	Help Screen for all Parameters Displays Minimum, Maximum and Default Summary of Parameter Operation Retrieve Default or Backup Values Decode/Select of Bit Mapped Parameters

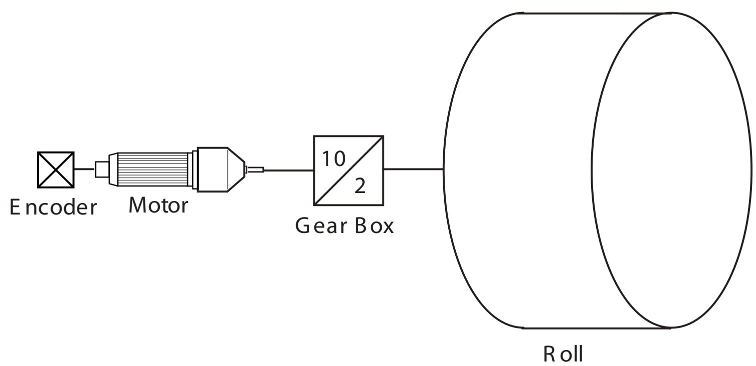
—NOTES—

APPENDIX B: FORMULAS

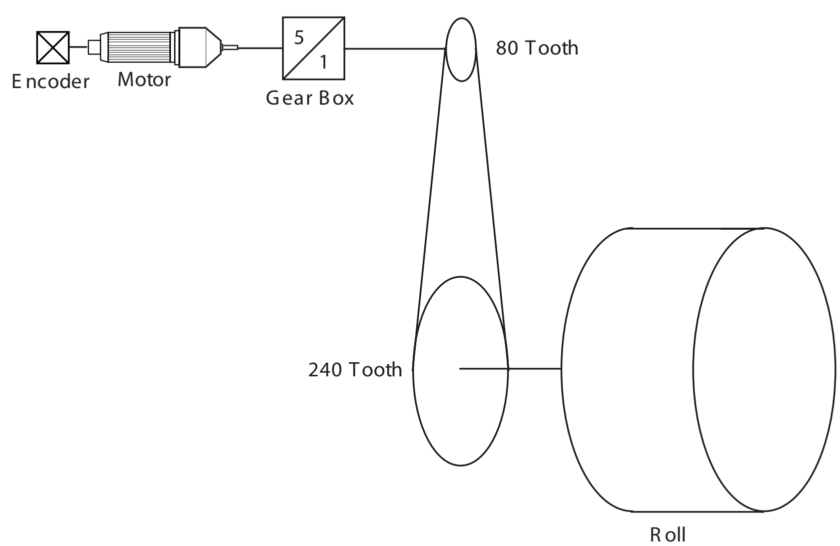
The equations used to scale the Gear Reduction are given by:

This assumes the encoder is mounted on the motor shaft (prefered).

$$\text{Gear Reduction (CP-260 or CP-265)} = \frac{\text{Encoder rotations}}{\text{Roll rotations}}$$



$$\text{Gear Reduction} = \frac{10}{2} = 5 \qquad \text{(CP-260 or CP-265)}$$



$$\text{Gear Reduction} = \frac{5}{1} \times \frac{240}{80} = 15 \qquad \text{(CP-260 or CP-265)}$$

(Continued)

Appendix B: Formulas (continued)

The equations used for Dancer Storage/Content Minimum are given by:

Dancer Storage should be greater than or equal to 1/2 second at the desired maximum line speed.

Dancer Storage Check Example:

Maximum Line Speed = 300 ft/min

Dancer Content >= 300 ft/min x 1 min/60 sec x 0.5 sec = 2.5 ft

If the value for DncrCtntFull (CP-272) is greater than or equal to 2.5 feet then the dancer has the recommended storage content to allow a Maximum Line Speed of 300 ft/min.

The equations used for Maximum Roll RPM are given by:

This assumes the encoder is mounted on the motor shaft (prefered).

written with parameter text:

$$\text{Maximum Roll RPM} = \frac{\text{Maximum Motor RPM}^{1}}{\text{Gear Reduction}^{2}} = \text{(CP-329 or CP-339)}$$

[1] Maximum Motor RPM is the RPM of the motor shaft (encoder) when the motor drive command voltage is at the value that was entered for the UwndCOMaxVolts (CP-281) or WindCOMaxVolts (CP-286).

2 Gear Reduction is the value entered into either UwndGearRdcn (CP-260) or WindGearRdcn (CP-265).

Example:

Max Motor RPM = 1750 RPM Gear Reduction = 15

$$\text{Maximum Roll RPM} = \frac{1750}{15} = 116.67 \text{ (CP-329 or CP-339)}$$

(Continued)

—NOTES—

APPENDIX C: PARAMETER SUMMARY NUMERIC QUICK REFERENCE

MP-01 Uwnd Hz

Unwind Hertz (MP-01) displays the current frequency of the Unwind Encoder Input, in Hertz.

Minimum Value: -180000 Maximum Value: 180000
Units: Hertz

MP-02 UwndEncRPM

Unwind Encoder RPM (MP-02) displays the current speed of the Unwind encoder in RPM, based on PPR Uwnd (CP-261).

Minimum Value: -99999.9 Maximum Value: 99999.9
Units: RPM

MP-03 UwndRollRPM

Unwind Roll RPM (MP-03) displays the UwndGearRdcn (CP-260) applied to UwndEncRPM (MP-02) to determine the Unwind Roll RPM value.

Minimum Value: -99999.9 Maximum Value: 99999.9
Units: Roll RPM

MP-05 UwndCnts

Unwind Counts (MP-05) displays the totalized encoder pulses from the Unwind station. They are converted to engineering units and displayed in UwndEstCtnt (MP-06). They will rollover, and begin again, as determined by UwndCtntRO (CP-368).

Minimum Value: –2000000000 Maximum Value: 2000000000
Units: Counts

MP-06 UwndEstCtnt

Unwind Estimated Content (MP-06) is calculated from approximate web travel, and decrements during forward motion. It can be forced to the UwndCtntPrst (CP-366) by PLC action. While decrementing, it will ultimately rollover over at zero. At rollover, it sets a PLC bit, and resets itself to the value in UwndCtntRO (CP-368). If the web reverses direction, with the Unwind axis taking up web material, then the value will increment, and ultimately rollover upon reaching the UwndCtntRO (CP-368) limit. It is often used , via a comparator in the PLC, to declare a near-empty roll.

Minimum Value: 0.0 Maximum Value: 999999.9
Units: EU

(Continued)

MP-07 UwndEstDia

Unwind Estimated Diameter (MP-07) is calculated from roll rotation and dancer movement. It can also be forced to the value in UwndDiaPrst (CP-364) via PLC action. It is used to translate web speed commands into roll RPM.

Minimum Value: 0.00 Maximum Value: 9999.99
Units: EU

MP-09 Uwnd Rot

Unwind Rotations (MP-09) displays a totalized rotational count of the Unwind Roll.

Minimum Value: -999999.9 Maximum Value: 999999.9
Units: Roll Rotations

MP-11 Wind Hz

Wind Hz (MP-11) displays the current frequency of the Wind Encoder Input, in Hertz.

Minimum Value: -180000 Maximum Value: 180000
Units: Hertz

MP-12 WindEncRPM

Wind Encoder RPM (MP-12) displays the current speed of the Wind encoder in RPM, based on PPR Wind (CP-266).

Minimum Value: -99999.9 Maximum Value: 99999.9
Units: RPM

MP-13 WindRollRPM

Wind Roll RPM (MP-13) displays the WindGearRdcn (CP-265) applied to WindEncRPM (MP-12) to determine the WindRollRPM value.

Minimum Value: -99999.9 Maximum Value: 99999.9
Units: Roll RPM

MP-15 WindCnts

Wind Counts (MP-15) displays the totalized encoder pulses from the Wind station. They are converted to engineering units and displayed in WindEstCtnt (MP-16). They will rollover, and begin again, as determined by WindCtntRO (CP-369).

Minimum Value: –2000000000 Maximum Value: 2000000000
Units: Counts

(Continued)

MP-16 WindEstCtnt

Wind Estimated Content (MP-16) is calculated from approximate web travel, and increments during forward motion. It can be forced to the WindCtntPrst (CP-367) by PLC action. While incrementing, it will ultimately rollover over at the WindCtntRO (CP-369) limit. At rollover, it sets a PLC bit, and resets itself to the value in WindCtntRO (CP-369). If the web reverses direction, with the Wind axis taking up web material, then the value will decrement, and ultimately rollover upon reaching zero. It is often used , via a comparator in the PLC, to declare a near-empty roll.

Minimum Value: 0.0   Maximum Value: 9999999.9
Units: EU

MP-17 WindEstDia

Wind Estimated Diameter (MP-17) is calculated from roll rotation and dancer movement. It can also be forced to the value in WindDiaPrst (CP-365) via PLC action. It is used to translate web speed commands into roll RPM.

Minimum Value: 0.00   Maximum Value: 9999.99
Units: EU

MP-19 Wind Rot

Wind Rotations (MP-09) displays a totalized rotational count of the Wind Roll.

Minimum Value: -999999.9   Maximum Value: 999999.9
Units: Roll Rotations

MP-21 UwndRRef

Unwind Ramped Reference (MP-21) is the instantaneous commanded speed, in roll RPM, for the unwind axis. It is derived from the LineSpdRRef (MP-42), diameter, and possibly dancer movement.

Minimum Value: -99999.9   Maximum Value: 99999.9
Units: Roll RPM

MP-22 UwndRR Err

Unwind Ramped Reference Error (MP-22) displays the instantaneous difference between the commanded UwndRRef (MP-21) and the actual UwndRollRPM (MP-03).

Minimum Value: -99999.9   Maximum Value: 99999.9
Units: Roll RPM

MP-23 Uwnd Kff

Unwind Kff (MP-23) is the feedforward gain for the unwind axis. It translates a target roll RPM into an approximate voltage output, which is then error-trimmed +/- to effect the desired speed. A reasonable accurate feedforward can minimize the need for error trim action, thus improving the response of the control loop. It is automatically adjusted for any change entered into UwndCOMax Volts (CP-281), or UwndMaxRPM (CP-329). It is also adjusted automatically during feedforward Kff Auto En (CP-344) mode.

Minimum Value: 00.00   Maximum Value: 99999.99
Units: Volts/k Roll RPM

(Continued)

MP-24 Uwnd FFwd

Unwind Feedforward (MP-24) displays the estimated voltage command to the drive required achieve the commanded UwndRRef (MP-21). It is usually the major portion of the UwndCO Volts (MP-27) signal.

Minimum Value: -15.00 Maximum Value: 15.00
Units: Volts

MP-25 Uwnd Intgrl

Unwind Integral (MP-25) displays the value of the integral term (i.e., integrated error times the Ki constant) of the PID compensator. Uwnd Intgrl is displayed in Volts. Uwnd Intgrl (MP-25) is a conditioned error signal that serves to adjust the UwndCO Volts (MP-27) to help achieve the desired speed. It is part of the PID error correction algorithm.

Minimum Value: -15.00 Maximum Value: 15.00
Units: Volts

MP-26 Uwnd Trim

Unwind Trim (MP-26) displays the value of the output of the PID compensator. Uwnd Trim is displayed in Volts. Uwnd Trim is the sum of the conditioned error signals that, combined with the Uwnd FFwd (MP-24), become the UwndCO Volts (MP-27). Uwnd Trim is the combination of all three terms of the PID error correction algorithm.

Minimum Value: -15.00 Maximum Value: 15.00
Units: Volts

MP-27 UwndCO Volts

Unwind Control Output Volts (MP-27) displays the present value, in volts, of the Control Output (SigU) signal to the unwind drive. It is the combination of Uwnd FFwd (MP-24) plus Uwnd Trim (MP-26).

Minimum Value: -15.00 Maximum Value: 15
Units: Volts

MP-28 UwndCO Bits

Unwind Control Output Bits (MP-28) displays the present value, in DAC bits, of the Control Output (SigU) signal to the unwind drive. UwndCO Bits is the UwndCO Volts (MP-27) expressed in DAC bits.

Minimum Value: -32768 Maximum Value: 32767
Units: Bits

MP-29 UwndCOMaxBits

Unwind Control Output Maximum Bits (MP-29) reflects the maximum allowed output in units of DAC bits. The value of UwndCOMax Volts (CP-281) determines this parameter, based on the conversion of 32767 bits = 15 VDC.

Minimum Value: 0 Maximum Value: 32767
Units: Bits

(Continued)

MP-31 WindRRef

Wind Ramped Reference (MP-31) is the instantaneous commanded speed, in roll RPM, for the wind axis. It is derived from the LineSpdRRef (MP-42), diameter, and possibly dancer movement.

Minimum Value: -99999 Maximum Value: 99999
Units: Roll RPM

MP-32 WindRR Err

Wind Ramped Reference Error (MP-32) displays the instantaneous difference between the commanded WindRRef (MP-31) and the actual WindRollRPM (MP-13).

Minimum Value: -99999 Maximum Value: 99999
Units: Roll RPM

MP-33 Wind Kff

Wind Kff (MP-33) is the feedforward gain for the wind axis. It translates a target roll RPM into an approximate voltage output, which is then error-trimmed +/- to effect the desired speed. A reasonable accurate feedforward can minimize the need for error trim action, thus improving the response of the control loop. It is automatically adjusted for any change entered into WindCOMax Volts (CP-286), or WindMaxRPM (CP-339). It is also adjusted automatically during feedforward Kff Auto En (CP-344) mode.

Minimum Value: 0.000 Maximum Value: 9999.999
Units: Volts/k Roll RPM

MP-34 Wind FFwd

Wind Feedforward (MP-34) displays the estimated voltage command to the drive required to achieve the commanded WindRRef (MP-31). It is usually major portion of the WindCO Volts (MP-37) signal.

Minimum Value: -15.0 Maximum Value: 15
Units: Volts

MP-35 Wind Intgrl

Wind Integral (MP-35) displays the value of the integral term (i.e., integrated error times the Ki constant) of the PID compensator. Integral is displayed in Volts. Wind Intgrl (MP-35) is a conditioned error signal that serves to adjust the WindCO Volts (MP-37) to help achieve the desired speed. It is part of the PID error correction algorithm.

Minimum Value: -15.0 Maximum Value: 15
Units: Volts

MP-36 Wind Trim

Wind Trim (MP-36) displays the value of the output of the PID compensator. Wind Trim is displayed in Volts. Wind Trim is the sum of the conditioned error signals that, combined with the WindFFwd (MP-34), become the WindCO Volts (MP-37). Wind Trim is the combination of all three terms of the PID error correction algorithm.

Minimum Value: -15.0 Maximum Value: 15
Units: Volts

(Continued)

MP-37 WindCO Volts

Wind Control Output Volts (MP-37) displays the present value, in volts, of the Control Output (SigW) signal to the wind drive. It is the combination of WindFFwd (MP-34) plus Wind Trim (MP-36).

Minimum Value: -15.0 Maximum Value: 15
Units: Volts

MP-38 WindCO Bits

Wind Control Output Bits (MP-28) displays the present value, in DAC bits, of the Control Output (SigW) signal to the wind drive. WindCO Bits is the WindCO Volts (MP-37) expressed in DAC bits.

Minimum Value: -32768 Maximum Value: 32767
Units: Bits

MP-39 WindCOMaxBits

Wind Control Output Maximum Bits (MP-39) reflects the maximum allowed output in units of DAC bits. The value of WindCOMaxVolts (CP-286) determines this parameter, based on the conversion of 32767 bits = 15 VDC.

Minimum Value: 0 Maximum Value: 32767
Units: Bits

MP-40 Line Speed

Line Speed (MP-40) is an actual measured speed. It is derived from the roll RPM of the non-dancer-trimmed axis, and converted into web speed via the currently calculated diameter estimate. When the system is operating under good control, it should agree with the commanded LineSpdSRef (MP-41).

Minimum Value: -99999999 Maximum Value: 99999999
Units: EU/Tm

MP-41 LineSpdSRef

Line Speed Scaled Reference (MP-41) displays the currently commanded target web speed. It may come from several possible sources, via LineSpdSrc (CP-203). If the non-dancer-trimmed axis is under control of this device, and a high Line Speed is commanded, this value will be automatically reduced to the limit calculated by EstMaxLnSpd (MP-43), due to speed limitations arising from a small diameter on one axis.

Minimum Value: -99999999 Maximum Value: 99999999
Units: EU/Tm

MP-42 LineSpdRRef

Line Speed Ramped Reference (MP-42) displays the web speed command. This is the output of the ramp calculations. When the ramp has been completed, the LineSpdRRef (MP-42) should equal the LineSpdSRef (MP-41).

Minimum Value: -99999999 Maximum Value: 99999999
Units: EU/Tm

(Continued)

MP-43 EstMaxLineSpd

Estimated Maximum Line Speed (MP-43) is calculated from an analysis of the potential maximum speeds achievable from each axis. Typically the axis with the smallest diameter will limit the maximum Line Speed possible. If the non-dancer-trimmed axis is under control of this device, and a high Line Speed is commanded, the LineSpdSRef (MP-41) will be automatically adjusted (limited), as new values of EstMaxLnSpd (MP-43) are calculated.

Minimum Value: 0 Maximum Value: 99999999
Units: EU/Tm

MP-48 Uwnd State

Unwind State (MP-48) displays the present operating state of the Unwind control loop (see list below).

7 = Diagnostics
6 = Jog Stop
5 = Jog Reverse
4 = Jog Forward
3 = Not Defined
2 = RUN
1 = H-Stop
0 = F-Stop

Minimum Value: 0 Maximum Value: 7
Units: Coded

MP-49 Wind State

Wind State (MP-49) displays the present operating state of the wind control loop (see list below).

7 = Diagnostics
6 = Jog Stop
5 = Jog Reverse
4 = Jog Forward
3 = Not Defined
2 = RUN
1 = H-Stop
0 = F-Stop

Minimum Value: 0 Maximum Value: 7
Units: Coded

(Continued)

MP-50 System State

System State (MP-50) displays the present system operating state of the CX-1102 (see list below). Only one operating state may be active at a time. To access either the “Run”, "Load" or the “Jog” operating state, the F-Stop, Unload and H-Stop inputs must be closed.

8 = Diagnostics
7 = Setup
6 = Not Defined
5 = Jog
4 = RUN
3 = Load
2 = H-Stop
1 = Unload
0 = F-Stop

Minimum Value: 0 Maximum Value: 8
Units: Coded

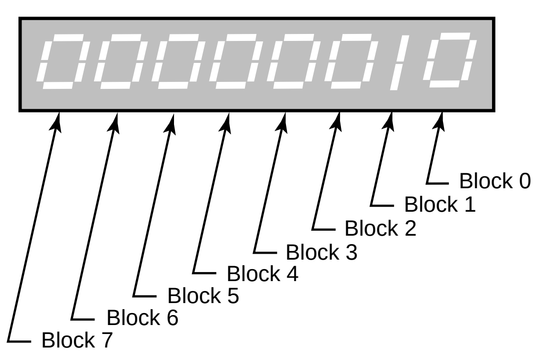
MP-51 Active Blk

Active Block (MP-51) displays the active block (0-7). The block can be selected and made active by the Block select bits (Blk Sel A,B.C), in the PLC Programming screen if Blk Sel Source (CP-478) is set to “1” (DigIn & PLC). Or the block can be selected and made active by the keypad if Blk Sel Source (CP-478) is set to “2” (Keypad Blk Sel).

Minimum Value: 0 Maximum Value: 7
Units: Coded

MP-52 InvalidBlks

Invalid Blocks (MP-52) displays the status of the blocks in the Block Setup screens. A “1” indicates that there is an error with the corresponding block (see graphic below). Generally, this indicates that an overflow condition can occur if the corresponding block is activated. In addition, since other parameters are used in conjunction with the Block Parameters that you selected, an error can result from a parameter that is not selected in Block Parameters. If a bad block is activated, the CX-1102 will execute an F-Stop until either the block error is corrected or a another block is activated.



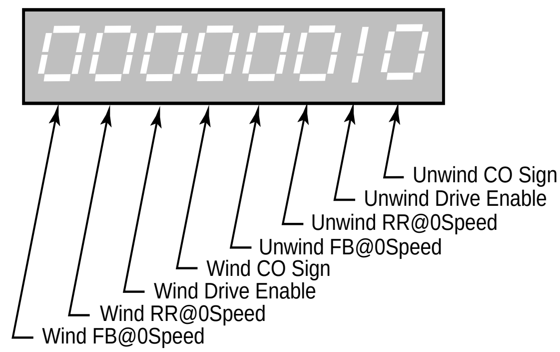
Minimum Value: 00000000 Maximum Value: 11111111
Units: Coded

(Continued)

Appendix C: Parameter Summary Numeric Quick Reference (continued)

MP-53 Misc Status

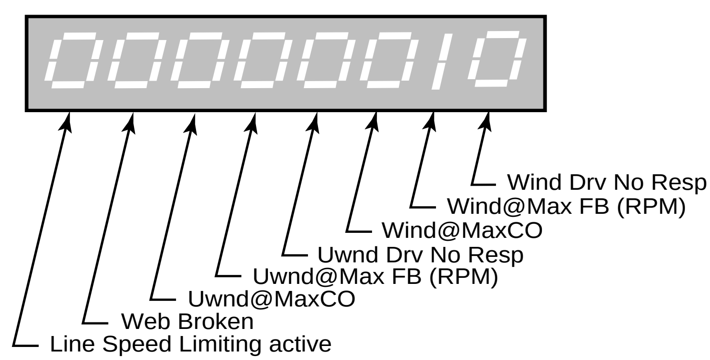
Miscellaneous Status (MP-53) displays various status conditions (see graphic below). A “1” in the Unwind Drive Enable bit indicates a drive enabled output. A “1” in any other bit location indicates an active condition.



Minimum Value: 00000000 Maximum Value: 11111111
Units: Coded

MP-54 Std Alms

Std Alarms (MP-54) displays various alarm conditions (see graphic below). A “1” in any bit location indicates an active condition.

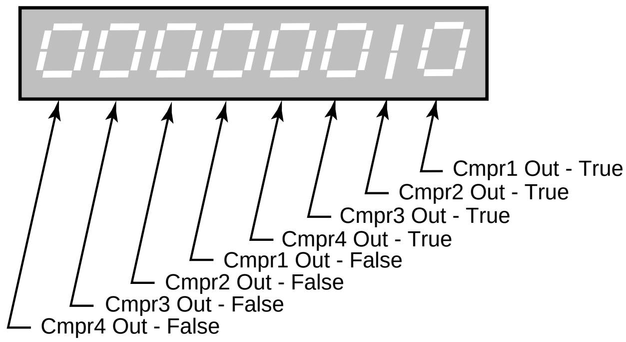


Minimum Value: 00000000 Maximum Value: 11111111
Units: Coded

(Continued)

MP-55 Custom Alms

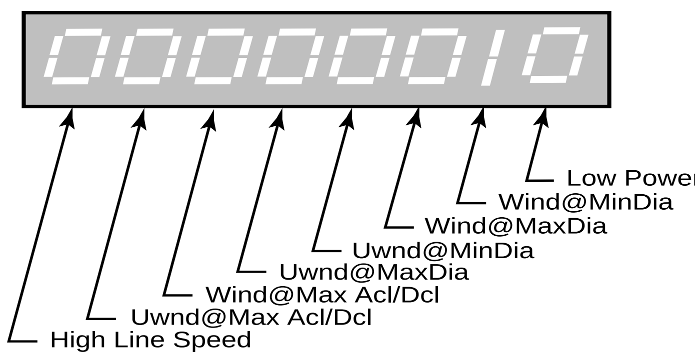
Custom Alarms (MP-55) displays the outputs of the PLC numerical comparators. A "1" in bit locations 0-3 indicates that the result of the compare (Cmprx Parm value vs. Cmprx Val) is true for the given Cmprx Type. A "1" in bit locations 4-7 indicates that the result of the compare (Cmprx Parm value vs. Cmprx Val) is false for the given Cmprx Type (the NOT is true). Refer to CP-380 through CP-395.



Minimum Value: 00000000   Maximum Value: 11111111
Units: Coded

MP-56 Misc Alarms

Misc Alarms (MP-56) displays various alarm conditions (see graphic below). A "1" in any bit location indicates an active condition.



Minimum Value: 00000000   Maximum Value: 11111111
Units: Coded

(Continued)

MP-58 Dancer State

Dancer State (MP-58) displays the present condition of the Dancer LED mounted on the Analog board. The LED conditions indicate various specific Dancer arm states.

3 = Between limits - OK	= LED Green
2 = Full limit	= LED Orange
1 = Empty limit	= LED Red
0 = Not calibrated	= LED Off

Minimum Value: 0   Maximum Value: 3
Units: Coded

MP-59 Setup State

Setup State (MP-59) displays the present condition of the Setup LED mounted on the Analog board. The LED conditions indicate the progression of specific steps as the controller attempts to complete the Setup sequence. If the sequence cannot be completed, this indication is helpful to determine specifically which operation was unsuccessful.

Test Failure	= LED Flashing Red
10 = Setup complete	= LED Green
9 = Unwind Direction	= LED Flashing Green
8 = Wind Direction	= LED Alternating Orange and Green
7 = Dancer Empty Calibration	= LED Flashing Orange
6 = Dancer Full Calibration	= LED Orange
5 = Unwind Polarity	= LED Alternating Red and Orange
4 = Wind Polarity	= LED Alternating Red and Green
3 = Unwind Roll Configuration	= LED Red
2 = Wind Roll Configuration	= LED Red
1 = Axis Configuration	= LED Red
0 = Application Configuration	= LED Off (Setup has never been done)

Minimum Value: 0   Maximum Value: 10
Units: Coded

MP-60 Uwnd Dirn

Unwind Direction (MP-60) displays the present condition of the Uwnd LED mounted on the Analog board. The LED conditions indicate unwind roll motion, forward or reverse.

2 = Unwind forward motion	= LED Green
1 = Unwind reverse motion	= LED Red
0 = Unwind no motion, < 1Hz	= LED Off

Minimum Value: 0   Maximum Value: 2
Units: Coded

MP-61 Wind Dirn

Wind Direction (MP-61) displays the present condition of the Wind LED mounted on the Analog board. The LED conditions indicate wind roll motion, forward or reverse.

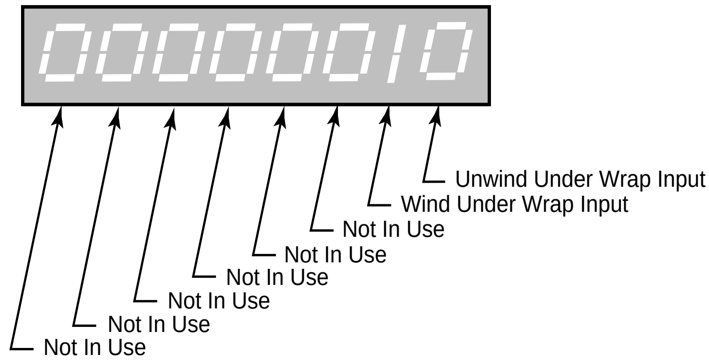
2 = Wind forward motion	= LED Green
1 = Wind reverse motion	= LED Red
0 = Wind no motion, < 1Hz	= LED Off

Minimum Value: 0   Maximum Value: 2
Units: Coded

(Continued)

MP-70 Wrap Pty

Wrap Polarity (MP-70) displays the present system configuration in regard to various combinations of overwrap/underwrap.

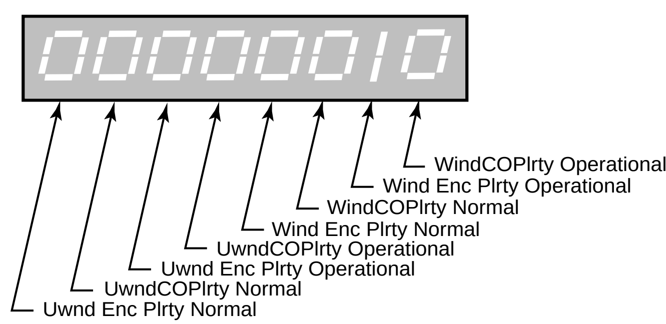


11 = Wind underwrap, Unwind underwrap
10 = Wind underwrap, Unwind overwrap
01 = Wind overwrap, Unwind underwrap
00 = Wind overwrap, Unwind overwrap

Minimum Value: 00000000 Maximum Value: 00000011
Units: Coded

MP-71 SigPolarity

Signal Polarities (MP-71) displays the present system configuration in regard to encoder polarity, and drive output polarity for both axis. For encoder polarity digits, a "0" in the designated location means the encoder signal wiring (quadrature signal A and B) will be accepted "as wired", with positive values meaning forward web motion. A "1" in that location means the perceived raw signal will be multiplied by "-1" before interpreting direction. This is the electronic or mathematical equivalent to reversing the A and B wires. For drive command output digits, a "0" means a positive signal will drive the axis in the forward direction, and a "1" means that a negative signal is needed to drive the axis in the forward direction. The polarities are shown for two conditions. The normalized condition is for a basic arrangement with both rolls in an Overwrap mode. The normalized polarities can be preset manually, or set automatically during the learn setup mode. See UwndEncPty (CP-264), and WindEncPty (CP-269). The operational condition reflects the present mode, after acknowledging that one or both axis may be set for Underwrap.



Minimum Value: 00000000 Maximum Value: 11111111
Units: Coded

(Continued)

MP-72 UwndCntrlLp

Unwind Control Loop (MP-72) displays the present operating mode of the unwind axis. These modes are automatically selected depending on the present system State (MP-50).

2 = PsnHld (Position Hold)
1 = Vel (Velocity Loop)
0 = OL (Open Loop)

Minimum Value: 0   Maximum Value: 2
Units: Coded

MP-73 WindCntrlLp

Wind Control Loop (MP-73) displays the present operating mode of the wind axis. These modes are automatically selected depending on the present system State (MP-50).

2 = PsnHld (Position Hold)
1 = Vel (Velocity Loop)
0 = OL (Open Loop)

Minimum Value: 0   Maximum Value: 2
Units: Coded

MP-80 Dancer Bits

Dancer Bits (MP-80) displays the present value of the analog Dancer input signal, in bits from the ADC.

Minimum Value: -8192   Maximum Value: 8191
Units: Bits

MP-81 Dancer Volts

Dancer Volts (MP-81) displays the analog Dancer signal. Note that the dancer may not generate the full range of voltage. Configurations that generate larger voltage swings may attain higher accuracy in diameter and line speed calculations.

Minimum Value: -5.0   Maximum Value: 5.0
Units: Volts

MP-82 Dancer Ctnt

Dancer Content (MP-82) displays an estimation of the amount of web material presently stored within the dancer assembly. It assumes that there is a linear relationship between dancer volts and dancer content.

Minimum Value: 0   Maximum Value: 9999999
Units: Web EU

(Continued)

MP-83 DncrCtnt Err

Dancer Content Error (MP-83) displays the difference between requested Dancer SP (CP-250) and actual Dancer Ctnt (MP-82). This error will be used to trim the speed of the dancer trimmed axis and attempt to restore the dancer content (position) toward the Dancer SP (CP-250).

Minimum Value: -9999999   Maximum Value: 9999999
Units: Web EU

MP-84 Dancer Trim

Dancer Trim (MP-84) displays the amount of corrective line speed adjustment applied to the "dancer trimmed" roll. Proportional to the dancer error.

Minimum Value: -99999999   Maximum Value: 99999999
Units: EU/Tm

MP-86 Ext LS Bits

External Line Speed Bits (MP-86) displays the present value of the analog Line Speed input signal, in bits from the ADC.

Minimum Value: -8192   Maximum Value: 8191
Units: Bits

MP-87 Ext LS Volts

External Line Speed Volts (MP-87) displays the analog Line Speed signal. It operates over the range of +/- 5 VDC. Reverse direction can be achieved via negative signal in some configurations, or via a positive signal plus a wire terminal reversing input switch.

Minimum Value: -5.0   Maximum Value: 5
Units: Volts

MP-88 Ext LineSpd

External Line Speed (MP-88) displays the Ext LS Volts (MP-87) signal converted into web line speed units. This display actively monitors the input signal even if the system is presently using another source for the Line Speed, or even if the value is later limited for various reasons.

Minimum Value: -99999999   Maximum Value: 99999999
Units: EU/Tm

MP-90 SerCom Char In

Serial Communications Character In (MP-90) displays the value of the last byte that was received by the Serial Communications port. SerCom Char In (MP-90) is displayed in a decimal format. SerCom Char In (MP-90) is used primarily for troubleshooting.

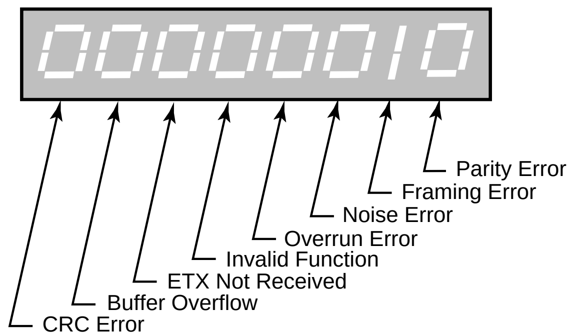
Minimum Value: 0   Maximum Value: 255
Units: Binary Character

(Continued)

Appendix C: Parameter Summary Numeric Quick Reference (continued)

MP-91 SerCom Errs

Serial Communications Errors (MP-91) displays all serial communications errors that occurred during the most recent transmission.



Minimum Value: 00000000   Maximum Value: 11111111
Units: Coded

MP-94 ROM Test

ROM Test (MP-94) displays the result of the most recent ROM Test. ROM Test runs a checksum test on the CX-1102 program memory.

1 = Memory Test Fail
0 = Memory Test Pass

Minimum Value: 0   Maximum Value: 1
Units: Coded

MP-95 SRAM Test

SRAM Test (MP-95) displays the result of the most recent SRAM Test. SRAM Test runs a read/write test on the scratch-pad memory.

1 = Memory Test Fail
0 = Memory Test Pass

Minimum Value: 0   Maximum Value: 1
Units: Coded

MP-96 NVRAM Test

Non Volatile RAM Test (MP-96) displays the result of the most recent Non Volatile RAM Test. The test runs both a read/write and a checksum test on the nonvolatile memory. The parameter values, the PLC program and the backups are all stored in this memory.

1 = Memory Test Fail
0 = Memory Test Pass

Minimum Value: 0   Maximum Value: 1
Units: Coded

(Continued)

MP-97 Model

Model # (MP-97) displays the model number for this CX-1102. This model number is unique to the CX-1102 series of controllers.

Minimum Value: 1000 Maximum Value: 60000
Units: Model Number

MP-98 RELEASE

RELEASE (MP-98) is the date that the software for this individual CX-1102 was released. The numeric, six digit format is: year, month, day.

Minimum Value: 090102 Maximum Value: 123105
Units: Date

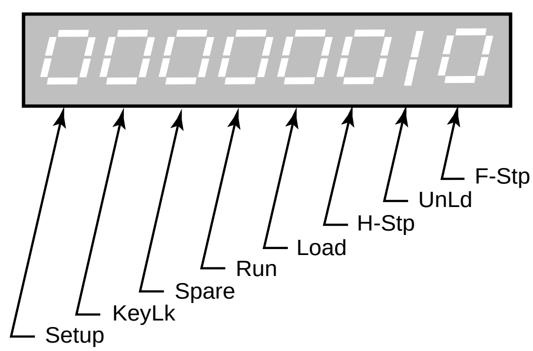
MP-99 REVISION

REVISION (MP-99) is the revision level of the software for this individual CX-1102.

Minimum Value: 0.50 Maximum Value: 99.99
Units: Rev Level

MP-100 DI 7..0

Digital Input 7..0 (MP-100) displays the value of the "J6" digital inputs. A '1' in the bit location (see graphic below) indicates a "low voltage" condition on the corresponding input (which is consistent with a contact closure to common).

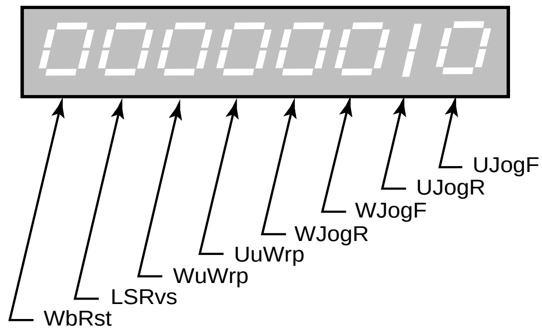


Minimum Value: 00000000 Maximum Value: 01111111
Units: Coded

(Continued)

MP-101 DI 15..8

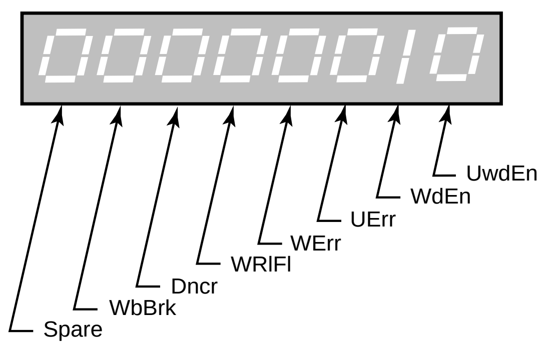
Digital Input 15..8 (MP-101) displays the value of the “J7” digital inputs. A ‘1’ in the bit location (see graphic below) indicates a “low voltage” condition on the corresponding input (which is consistent with a contact closure to common). These eight Inputs can be set up in the PLC Programming screen to generate a One-Shot-Pulse on a high-to-low transition.



Minimum Value: 00000000 Maximum Value: 11111111
Units: Coded

MP-102 DO 7..0

Digital Output 7..0 (MP-102) displays the value of the “J2” digital outputs. A ‘1’ in the bit location (see graphic below) indicates an active “low voltage” condition on the corresponding open collector output (which would sink DC current).



Minimum Value: 00000000 Maximum Value: 11111111
Units: Coded

(Continued)

MP-103 KeyPad Lockout

Keypad Lockout (MP-103) displays the Keypad Lockout status. The Keypad Lockout is active when “On” is displayed. When Keypad Lockout is active, Control Parameter values can not be changed, with the exception of the Control Parameters that are exempted by CP’s 480-489. The Keypad Lockout is not active when “OFF” is displayed. When the Keypad Lockout is not active, any Control Parameter can be changed.

Minimum Value: 0 Maximum Value: 1
Units: Coded

MP-107 TMR4 TIME

Timer 4 Time (MP-107) displays the elapsed time, in seconds, for Timer 4 during the delay part of its operation.

Minimum Value: 0 Maximum Value: 86400
Units: Seconds

MP-108 PLC Mon 1 Val

PLC Monitor 1 Value (MP-108) displays both the description and the value of the PLC bit that was selected in PLC Monitor 1 (CP-305). Please note that a description of the PLC bit appears on the display line instead of the parameter name (PLC Mon 1 Val).

Minimum Value: 0 Maximum Value: 1
Units: Coded

MP-109 PLC Mon 2 Val

PLC Monitor 2 Value (MP-109) displays both the description and the value of the PLC bit that was selected in PLC Monitor 2 (CP-306). Please note that a description of the PLC bit appears on the display line instead of the parameter name (PLC Mon 2 Val).

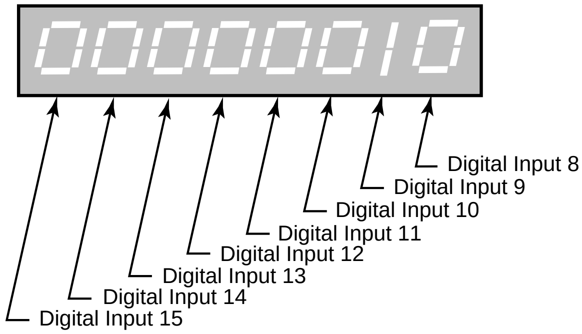
Minimum Value: 0 Maximum Value: 1
Units: Coded

(Continued)

Appendix C: Parameter Summary Numeric Quick Reference (continued)

MP-110 PLC 15-8

PLC 15-8 (MP-110) displays the status of PLC bits 15-8 (See graphic and list below). A "1" in any bit indicates that the input is "active". The digital inputs are active low.

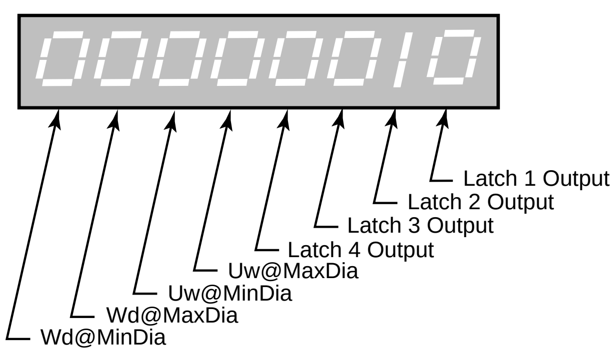


Description	Default Function
Digital Input 8	Unwind Jog Forward
Digital Input 9	Unwind Jog Reverse
Digital Input 10	Wind Jog Forward
Digital Input 11	Wind Jog Reverse
Digital Input 12	Unwind Under Wrap
Digital Input 13	Wind Under Wrap
Digital Input 14	Line Speed Reverse
Digital Input 15	Web Reset

Minimum Value: 00000000 Maximum Value: 11111111
Units: Coded

MP-111 PLC 23-16

PLC 23-16 (MP-111) displays the status of the internal PLC status bits 23-16 (See graphic below). A "1" in any bit indicates that the bit is "active".



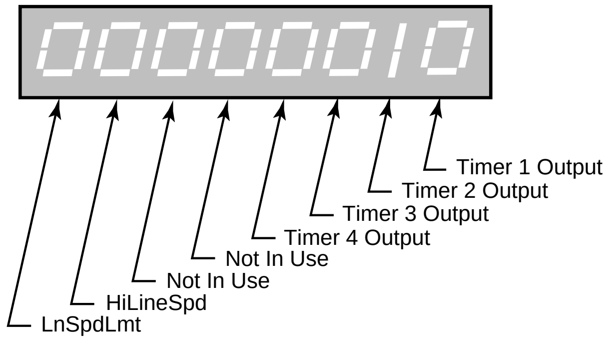
Minimum Value: 00000000 Maximum Value: 11111111
Units: Coded

(Continued)

Appendix C: Parameter Summary Numeric Quick Reference (continued)

MP-112 PLC 31-24

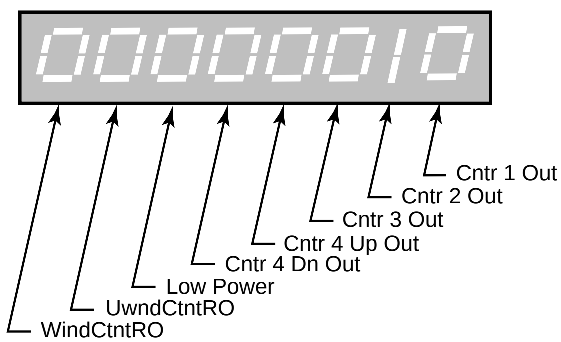
PLC 31-24 (MP-112) displays the status of the internal PLC status bits 31-24 (See graphic below). A “1” in any bit indicates that the bit is “active”



Minimum Value: 00000000   Maximum Value: 11111111
Units: Coded

MP-113 PLC 39-32

PLC 39-32 (MP-113) displays the status of the internal PLC status bits 39-32 (See graphic below). A “1” in any bit indicates that the bit is “active”



Bit Name	Description
Cntr1 Out	Counter 1 Output
Cntr2 Out	Counter 2 Output
Cntr3 Out	Counter 3 Output
Cntr4UpO	Counter 4 Up counter Output
Cntr4DnO	Counter 4 Down counter Output
Low Power	Low Power Indication
UwndCtntRO	UwndEstCtnt reached UwndCtntRO (CP-368) = UwndEstCtnt Rollover (one-shot)
WindCtntRO	WindEstCtnt reached WindCtntRO (CP-369) = WindEstCtnt Rollover (one-shot)

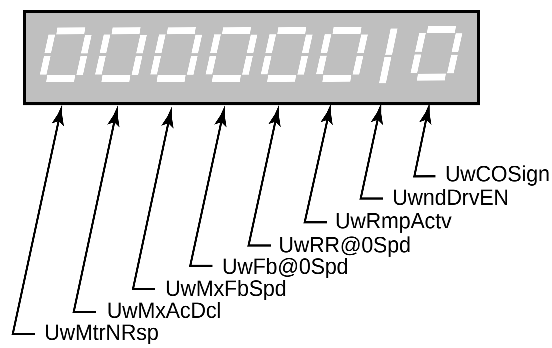
Minimum Value: 00000000   Maximum Value: 11111111
Units: Coded

(Continued)

Appendix C: Parameter Summary Numeric Quick Reference (continued)

MP-114 PLC 47-40

PLC 47-40 (MP-114) displays the status of the internal PLC status bits 47-40 (See graphic below). A “1” in any bit indicates that the bit is “active”



Bit Name	Description
UwCOSign	Unwind Command Output sign is negative (-)
UwndDrvEn	Unwind Drive Enable
UwRmpActv	Unwind Ramp Active
UwRR@0Spd	Unwind Ramp Reference (MP-21) less than Zero Speed (CP-370)
UwFb@0Spd	UnwindRollRPM (MP-03) less than Zero Speed (CP-370)
UwMxFbSpd	Unwind at Maximum Feedback Speed (CP-339)
UwMxAcDcl	Unwind at Maximum Accel/Decel (CP-373)
UwMtrNRsp	Unwind Motor/Drive NOT Responding (CP-372)

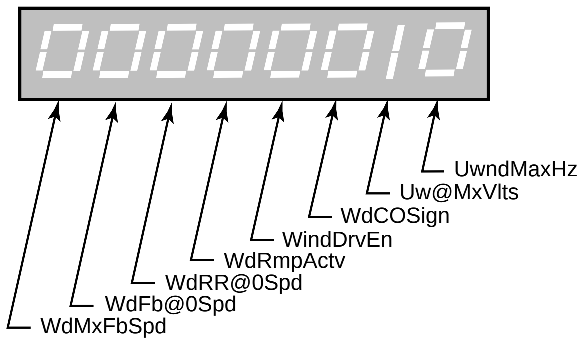
Minimum Value: 00000000   Maximum Value: 11111111
Units: Coded

(Continued)

Appendix C: Parameter Summary Numeric Quick Reference (continued)

MP-115 PLC 55-48

PLC 55-48 (MP-115) displays the status of the internal PLC status bits 55-48 (See graphic below). A "1" in any bit indicates that the bit is "active".



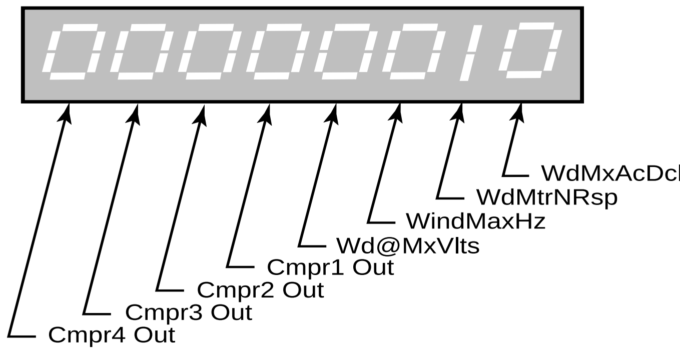
Bit Name	Description
UwndMaxHz	Uwnd Hz (MP-01) > Max allowed Frequency = 180 KHz
Uw@MaxVlts	UwndCO Volts (MP-27) at UwndCOMaxVolts (CP-281)
WdCOSign	Wind Command Output sign is negative (-)
WindDrvEn	Wind Drive Enable
WdRmpActv	Wind Ramp Active
WdRR@0Spd	WindRRef (MP-31) less than Zero Speed (CP-370)
WdFb@0Spd	WindRollRPM (MP-13) less than Zero Speed (CP-370)
WdMxFbSpd	Wind at Maximum Feedback Speed (CP-329)

Minimum Value: 00000000 Maximum Value: 11111111
Units: Coded

(Continued)

MP-116 PLC 63-56

PLC 63-56 (MP-116) displays the status of the internal PLC status bits 63-56 (See graphic below). A "1" in any bit indicates that the bit is "active".



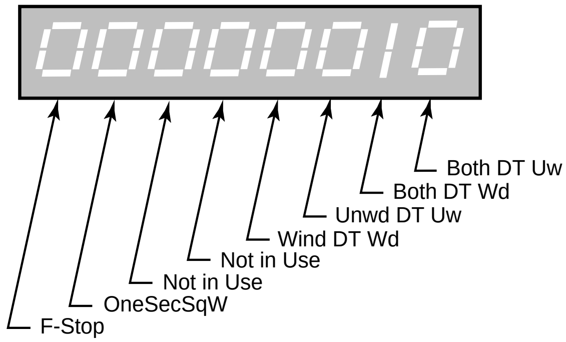
Bit Name	Description
WdMxAcDcl	Wind at Maximum Accel/Decel
WdMtrNRsp	Wind Motor/Drive NOT Responding (CP-372)
WindMaxHz	Wind Hz (MP-11) > Max allowed Frequency = 180 KHz
Wd@MaxVlts	WindCO Volts (MP-37) at WindCOMaxVolts (CP-286)
Cmpr1 Out	Comparator 1 Output
Cmpr2 Out	Comparator 2 Output
Cmpr3 Out	Comparator 3 Output
Cmpr4 Out	Comparator 4 Output

Minimum Value: 00000000 Maximum Value: 11111111
Units: Coded

(Continued)

MP-117 PLC 71-64

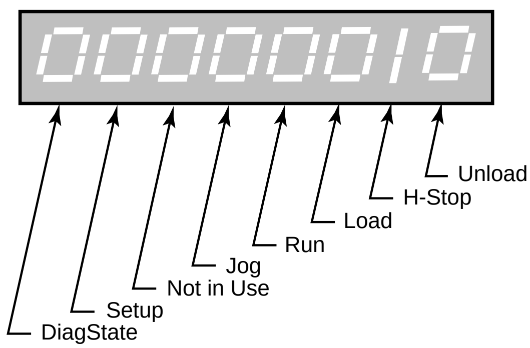
PLC 71-64 (MP-117) displays the status of the internal PLC status bits 71-64.



Minimum Value: 00000000 Maximum Value: 11111111
Units: Coded

MP-118 PLC 79-72

PLC 79-72 (MP-118) displays the status of the internal PLC status bits 79-72 (See graphic below). A “1” in any bit indicates that the bit is “active”. These bits are only used to monitor the operating state of the CX-1102.

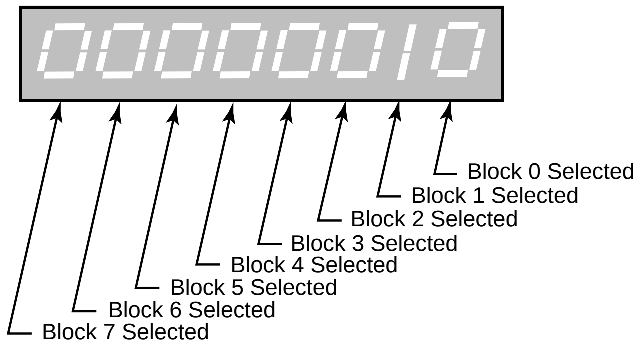


Minimum Value: 00000000 Maximum Value: 11111111
Units: Coded

(Continued)

MP-119 PLC 87-80

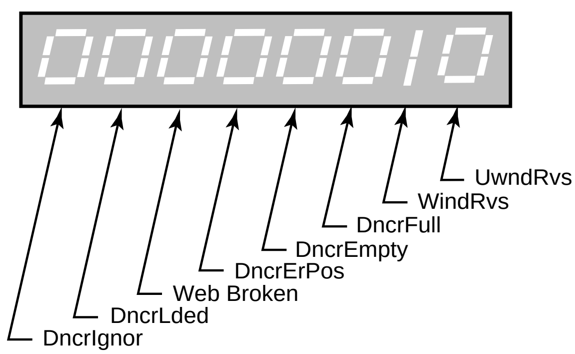
PLC 87-80 (MP-119) displays the status of the internal PLC status bits 87-80 (See graphic below). A “1” in any bit indicates that the bit is “active”. These bits are only used to monitor the parameter block that is active.



Minimum Value: 00000000 Maximum Value: 11111111
Units: Coded

MP-120 PLC 95-88

PLC 95-88 (MP-120) displays the status of the internal PLC status bits 95-88. None of these bits are presently active. They are reserved for future use.



Bit Name	Description
UwndRvs	Unwind Roll Reverse command indicated
WindRvs	Wind Roll Reverse command indicated
DncrFull	Dancer Full > 95% Full
DncrEmpty	Dancer Empty < 5% Full
DncrErPos	Dancer Error Positive - Dancer Ctnt (MP-82) > Dancer SP (CP-250)
Web Broken	Web Broken State
DncrLded	Dancer Loaded - dancer @ position ±5%
DncrIgnor	Dancer Ignored

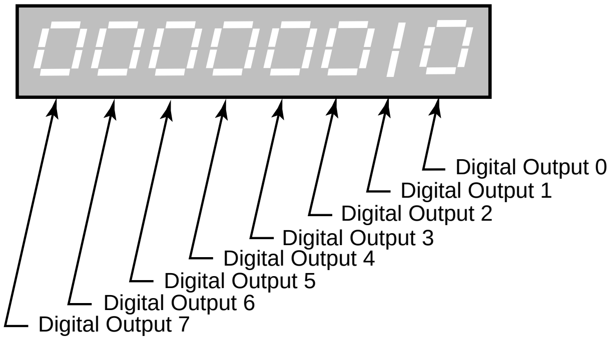
Minimum Value: 00000000 Maximum Value: 11111111
Units: Coded

(Continued)

Appendix C: Parameter Summary Numeric Quick Reference (continued)

MP-121 PLC 107-100

PLC 107-100 (MP-121) displays the status of PLC bits 107-100 (See graphic and list below). A “1” in any bit indicates that the output is “active”. The digital outputs are active low (current sinking).

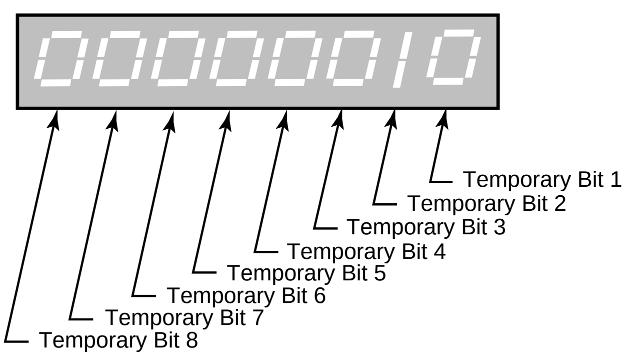


Bit Name	Description
Digital Output 0	Unwind Enable
Digital Output 1	Wind Enable
Digital Output 2	Unwind Error
Digital Output 3	Wind Error
Digital Output 4	Wind Roll Full
Digital Output 5	Dancer
Digital Output 6	Web Break
Digital Output 7	Spare

Minimum Value: 00000000 Maximum Value: 11111111
Units: Coded

MP-122 PLC 115-108

PLC 115-108 (MP-122) displays the status of the internal PLC control bits 115-108 (See graphic below). A “1” in any bit indicates that the bit is “active”. These internal bits (control relays) can be used as global “control relays”. For example, they can be used to create one-shots or latches. They can also be used to simplify programming.

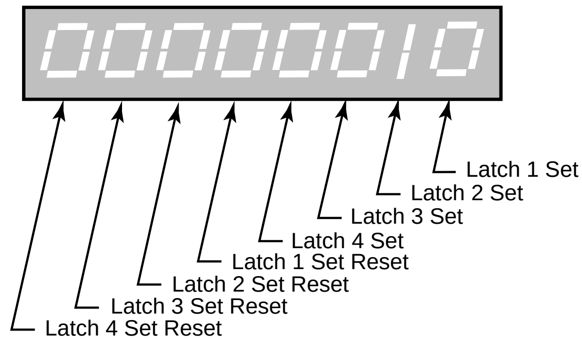


Minimum Value: 00000000 Maximum Value: 11111111
Units: Coded

(Continued)

MP-123 PLC 123-116

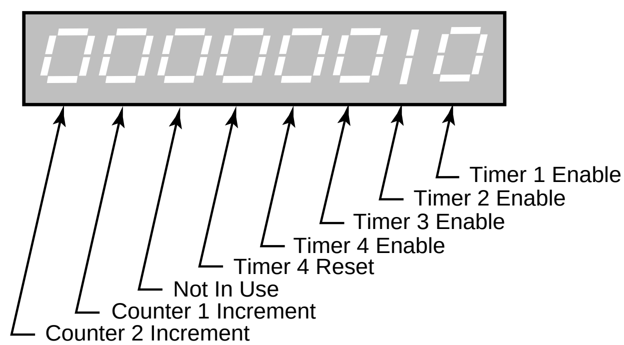
PLC 123-116 (MP-123) displays the status of the internal PLC control bits 123-116 (See graphic below). A “1” in any bit indicates that the bit is “active”.



Minimum Value: 00000000 Maximum Value: 11111111
Units: Coded

MP-124 PLC 131-124

PLC 131-124 (MP-124) displays the status of the internal PLC control bits 131-124 (See graphic below). A “1” in any bit indicates that the bit is “active”.



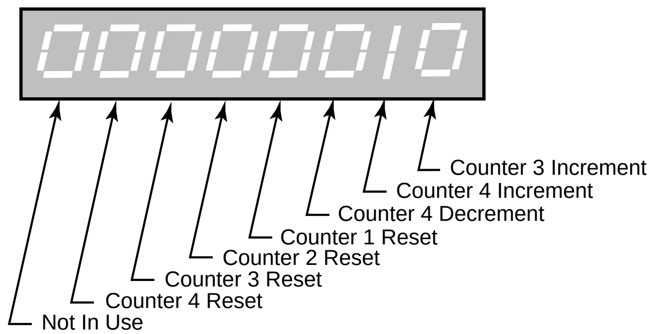
Minimum Value: 00000000 Maximum Value: 11111111
Units: Coded

(Continued)

Appendix C: Parameter Summary Numeric Quick Reference (continued)

MP-125 PLC 139-132

PLC 139-132 (MP-125) displays the status of the internal PLC control bits 139-132 (See graphic below). A “1” in any bit indicates that the bit is “active”.



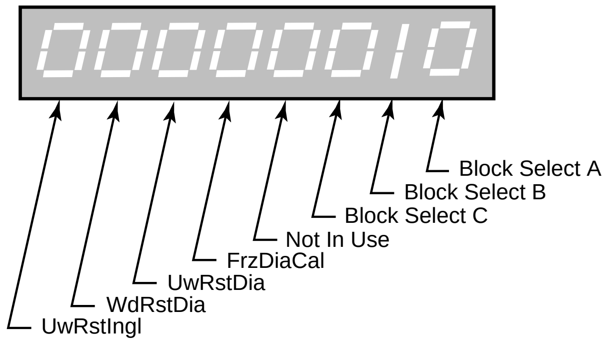
Minimum Value: 00000000 Maximum Value: 11111111
Units: Coded

(Continued)

Appendix C: Parameter Summary Numeric Quick Reference (continued)

MP-126 PLC 147-140

PLC 147-140 (MP-126) displays the status of the internal PLC control bits 147-140 (See graphic below). A "1" in any bit indicates that the bit is "active". Blk Sel A, B, C select the block that is active, if Blk Sel Source (CP-378) has been set to "1" (DgIn). The chart below indicates which block has been selected, based on the Block Select A, B or C inputs.



Blk Sel C	B	A	Block Selected
0	0	0	0
0	0	1	1
0	1	0	2
0	1	1	3
1	0	0	4
1	0	1	5
1	1	0	6
1	1	1	7

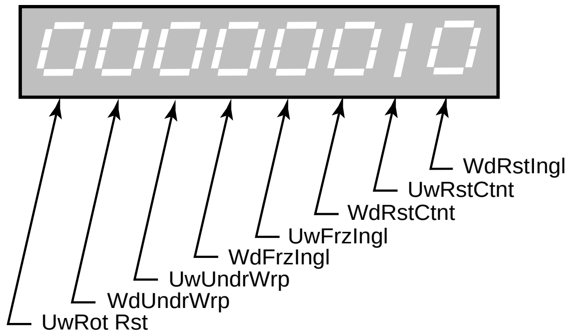
Bit Name	Description
Blk Sel A	Block Select A
Blk Sel B	Block Select B
Blk Sel C	Block Select C
Not In Use	
FrzDiaCal	Freeze Diameter Calculations
UwRstDia	Unwind Reset Diameter to Preset value
WdRstDia	Wind Reset Diameter to Preset value
UwRstIngl	Unwind Reset Integral to zero

Minimum Value: 00000000 Maximum Value: 11111111
Units: Coded

(Continued)

MP-127 PLC 155-148

PLC 155-148 (MP-127) displays the status of the internal PLC control bits 155-148 (See graphic below).   A “1” in any bit indicates that the bit is “active”.



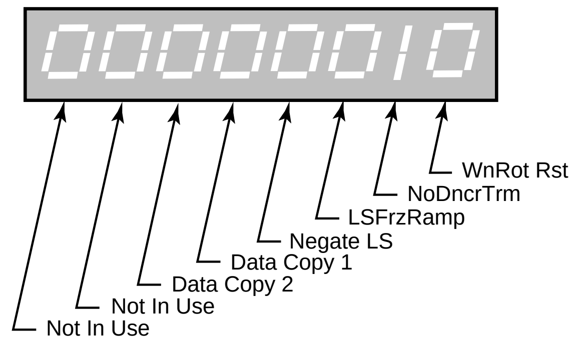
Bit Name	Description
WdRstIngl	Wind Reset Integral to zero
UwRstCtnt	Unwind Reset Content to Preset value
WdRstCtnt	Wind Reset Content to Preset value
UwFrzIntgrl	Unwind Freeze Integral (Freeze at current value)
WdFrzIntgrl	Wind Freeze Integral (Freeze at current value)
UwUndrWrp	Unwind Underwrap configuration
WdUndrWrp	Wind Underwrap configuration
UwRot Rst	Unwind Rotation Reset

Minimum Value: 00000000   Maximum Value: 11111111
Units: Coded

(Continued)

MP-128 PLC 163-156

PLC 163-156 (MP-128) displays the status of the internal PLC control bits 163-156 (See graphic below).   A “1” in any bit indicates that the bit is “active”.



Bit Name	Description
WdRot Rst	Wind Rotation Reset
NoDncrTrm	No Dancer Trim
LSFrzRamp	Line Speed Freeze Ramp
Negate LS	Negate Line Speed Scaled Reference, change sign of LineSpdSRef (MP-41)
Data Copy 1	
Data Copy 2	
Not In Use	
Not In Use	

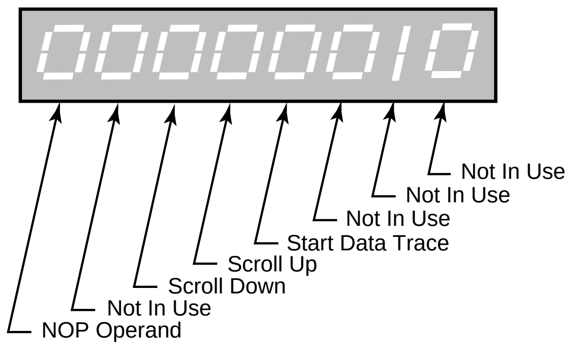
Minimum Value: 00000000   Maximum Value: 11111111
Units: Coded

(Continued)

Appendix C: Parameter Summary Numeric Quick Reference (continued)

MP-129 PLC 171-164

PLC 171-164 (MP-129) displays the status of the internal PLC control bits 171-164. (See graphic below). A “1” in any bit indicates that the bit is “active”.

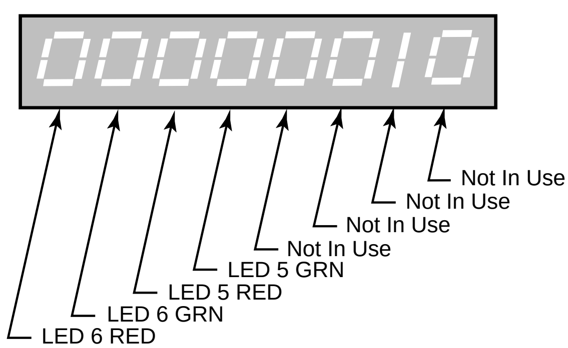


Bit Name	Description
Not In Use	
Not In Use	
Not In Use	
StrtTrace	Start Data Trace
Scroll Up	Remote Scroll Up (CP-400, 401)
Scroll Down	Remote Scroll Down (CP-400, 401)
Not In Use	
NOP Opnd	No Operation Operand

Minimum Value: 00000000 Maximum Value: 11111111
Units: Coded

MP-130 PLC 179-172

PLC 179-172 (MP-130) displays the status of the internal PLC control bits 179-172. (See graphic below). A “1” in any bit indicates that the bit is “active”.

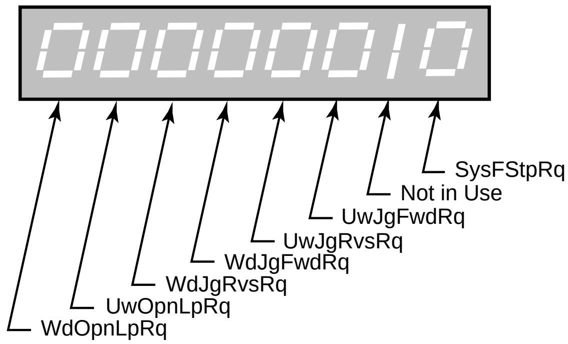


Minimum Value: 00000000 Maximum Value: 11111111
Units: Coded

(Continued)

MP-131 PLC 187-180

PLC 187-180 (MP-131) displays the status of the internal PLC control bits 187-180. (See graphic below).   A “1” in any bit indicates that the bit is “active”.



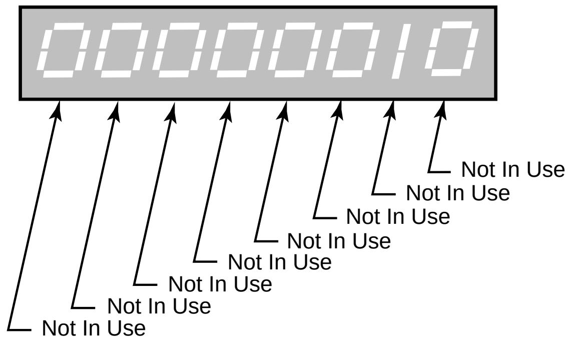
Bit Name	Description
SysFStpRq	Request System State change to F-Stop State
Not in Use	
UwJgFwdRq	Request Unwind Axis Jog Forward State
UwJgRvsRq	Request Unwind Axis Jog Reverse State
WdJgFwdRq	Request Wind Axis Jog Forward State
WdJgRvsRq	Request Wind Axis Jog Reverse State
UwOpnLpRq	Request Unwind Axis Open Loop control
WdOpnLpRq	Request Wind Axis Open Loop control

Minimum Value: 00000000   Maximum Value: 11111111
Units: Coded

(Continued)

MP-132 PLC 195-188

PLC 195-188 (MP-132) displays the status of the internal PLC control bits 195-188. (See graphic below). A “1” in any bit indicates that the bit is “active”.

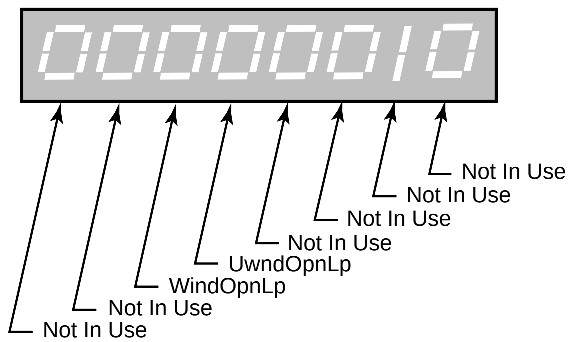


Minimum Value: 00000000 Maximum Value: 11111111
Units: Coded

(Continued)

MP-133 PLC 203-196

PLC 203-196 (MP-133) displays the status of the internal PLC control bits 203-196 (See graphic below).   A “1” in any bit indicates that the bit is “active”.



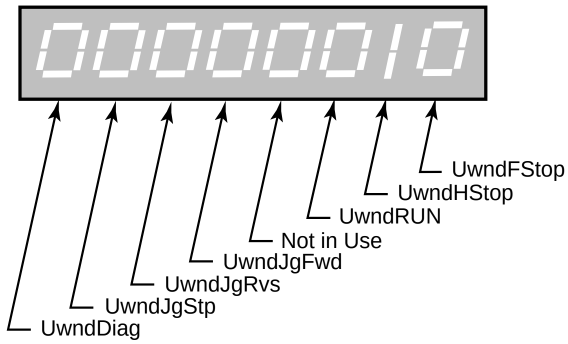
Bit Name	Description
Not In Use	
Not In Use	
Not In Use	
Not In Use	
UwndOpnLp	Unwind in Open Loop Mode
WindOpnLp	Wind in Open Loop Mode
Not In Use	
Not In Use	

Minimum Value: 00000000   Maximum Value: 11111111
Units: Coded

(Continued)

MP-134 PLC 211-204

PLC 211-204 (MP-134) displays the status of the internal PLC control bits 211-204. (See graphic below).   A “1” in any bit indicates that the bit is “active”.



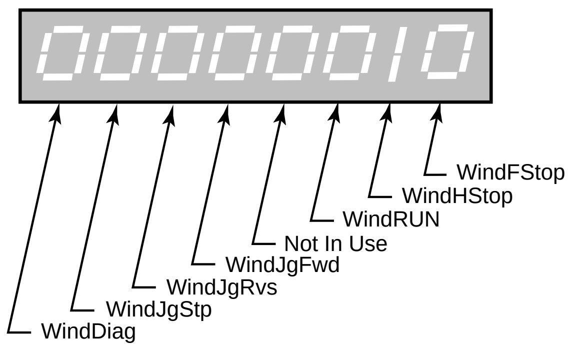
Bit Name	Description
UwndFStop	Unwind in F-Stop State
UwndHStop	Unwind in H-Stop State
UwndRUN	Unwind in Run State
Not in Use	
UwndJgFwd	Unwind in Jog Forward State
UwndJgRvs	Unwind in Jog Reverse State
UwndJgStp	Unwind in Jog Stop State
UwndDiag	Unwind in Diagnostics State

Minimum Value: 00000000   Maximum Value: 11111111
Units: Coded

(Continued)

MP-135 PLC 219-212

PLC 219-212 (MP-135) displays the status of the internal PLC control bits 219-212. (See graphic below). A “1” in any bit indicates that the bit is “active”.



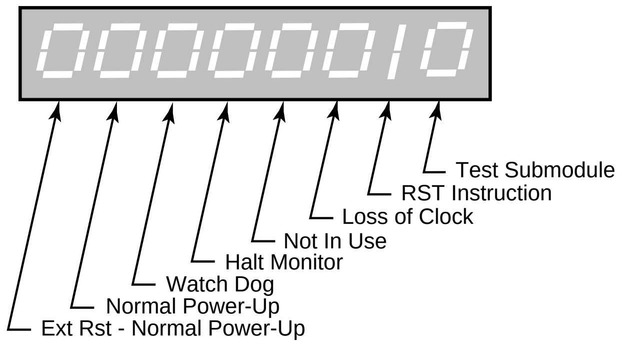
Bit Name	Description
WindFStop	Wind in F-Stop State
WindHStop	Wind in H-Stop State
WindRUN	Wind in Run State
Not in Use	
WindJgFwd	Wind in Jog Forward State
WindJgRvs	Wind in Jog Reverse State
WindJgStp	Wind in Jog Stop State
WindDiag	Wind in Diagnostics State

Minimum Value: 00000000 Maximum Value: 11111111
Units: Coded

(Continued)

MP-150Last Reset

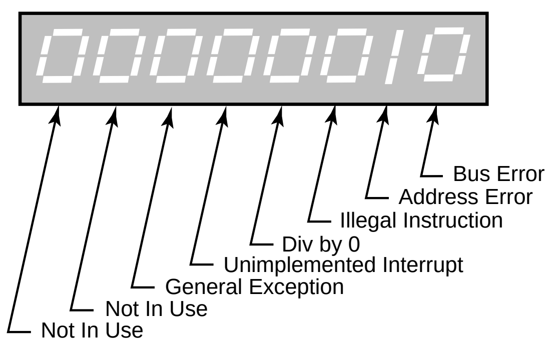
Last Reset (MP-150) displays a “1” in a bit to indicate the reason for the last reset.



Minimum Value: 00000000   Maximum Value: 11110111
Units: Coded

MP-151Misc Intrpt

Miscellaneous Interrupts (MP-151) displays a “1” in a bit to indicate which of the various system interrupts may have caused the last reset.

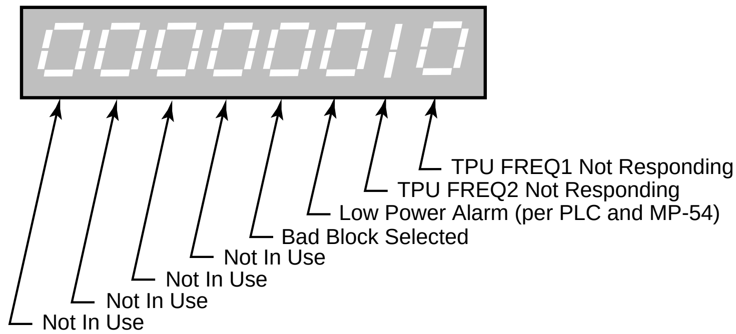


Minimum Value: 00000000   Maximum Value: 00111111
Units: Coded

(Continued)

MP-152 Device Alms

Device Alarms (MP-152) displays the status of microprocessor or other hardware related alarms. Notification of a bad block selection is also included .



Minimum Value: 00000000 Maximum Value: 00001111
Units: Coded

MP-153 PC at Intrpt

Program Counter at Interrupt (MP-153) shows where the last interrupt of the microprocessor occurred . If the CX-1102 repeatedly displays the "RESET FAULT" error box, then record the "PC @Intrpt" value as well as the line just above it (which indicates the cause of the reset), before you press the clear key to continue. The program counter at interupt is stored in the Program Counter at Interrupt (MP-153) Monitor Parameter for review. A value of "2560" is normal.

Minimum Value: 2560 Maximum Value: 524288
Units: Address

MP-154 Norm Pwr Ups

Normal Power Ups (MP-154) displays the number of normal power-ups since the most recent "Clear-7" power-up . This value is reset only by a "Clear-7" power-up. Norm Pwr Ups (MP-154) is used primarily for troubleshooting.

Minimum Value: 1 Maximum Value: 65535
Units: Counts

MP-155 Low Pwr Cntr

Low Power Counter (MP-155) displays the number of low power detections, including normal "Power Downs". You can reset this numeric value, but only in Clr Fault Cntrs (CP-491). Low Pwr Cntr (MP-155) is used primarily for troubleshooting.

Minimum Value: 0 Maximum Value: 65535
Units: Counts

(Continued)

MP-156 Mem Err Cntr

Memory Error Counter (MP-156) displays the number of memory test failures that occurred during “Power Up”. You can reset this numeric value, but only in Clr Fault Cntrs (CP-491). Mem Err Cntr (MP-156) is used primarily for troubleshooting.

Minimum Value: 0   Maximum Value: 65535
Units: Counts

MP-157 WatchDogCntr

Watch Dog Counter (MP-157) displays the number of watch dog resets that were caused by watchdog time-out. WatchDogCntr (MP-157) is used primarily for troubleshooting. You can reset this numeric value, but only in Clr Fault Cntrs (CP-491).

Minimum Value: 0   Maximum Value: 65535
Units: Counts

MP-158 MiscIntrptCntr

Miscellaneous Interrupt Counter (MP-158) displays the number of miscellaneous interrupts that occurred as the result of bus errors, address errors, divide-by-0 errors, unexecuted instruction errors, general exceptions, and unexecuted and spurious interrupts. You can reset this numeric value, but only in Clr Fault Cntrs (CP-491). MiscIntrptCntr (MP-158) is used primarily for troubleshooting.

Minimum Value: 0   Maximum Value: 65535
Units: Counts

MP-168 AnlgCal Ref A

Analog Calibration Reference A (MP-168) displays the Analog Ref Val (CP-463) for the signal (AI1, AI2), which was selected in Analog Cal Sel (CP-461) and which was stored during the calibration of point A.

Minimum Value: -6.0   Maximum Value: 6
Units: Volts

MP-169AnlgCal Ref B

Analog Calibration Reference B (MP-169) displays the AnalogRef Val (CP-463) for the signal (AI1, AI2), which was selected in Analog Cal Sel (CP-461) and which was stored during the calibration of point B.

Minimum Value: -6.0   Maximum Value: 6
Units: Volts

(Continued)

CP-201 Setpoint X

Setpoint X (CP-201) displays the active commanded Line Speed Setpoint. Setpoint X is a quick access, dynamically assigned parameter that is a mirror of the currently commanded Line Speed regardless of the source. It may display Line Spd SP (CP-210), or ExtLineSpd (MP-88) depending upon application choices. The label will change dynamically to indicate which parameter is being mirrored. If Line Spd SP (CP-210) is active, then any change to Setpoint X, (temporarily labeled LineSpeed X) will also change CP-210.

Minimum Value: -9999999	Maximum Value: 9999999
Default Value: 0.0	Units: Web EU/Tm

CP-202 App Select

Application Select (CP-202) determines which internal control algorithm will be active. The selection is based upon which axis are controlled by a speed command output from this device. And which axis should respond to correct a displacement of the dancer arm. This selection is made during initial setup. It can not be changed during RUN.

4 = Dancer trims Wind.
3 = Dancer trims Unwind.
2 = Operate both axis. Dancer trims Wind.
1 = Operate both axis. Dancer trims Unwind.
0 = Direct Mode both axis.

Minimum Value: 0	Maximum Value: 4
Default Value: 1	Units: Coded

CP-203 LineSpdSrc

Line Speed Source (CP-203) selects the method of determining the desired line speed of the controlled axis. It can be a numerical entry via Line Spd SP (CP-210), an external Potentiometer or remote analog signal, or derived from the encoder mounted on an external lead axis which is controlled by another user-supplied system.

2 = Analog Input
1 = Line Speed SP (CP-210) (default)

Minimum Value: 1	Maximum Value: 2
Default Value: 1	Units: Coded

CP-207 FixedDiaSel

Fixed Diameter Select (CP-207) determines which rolls need automatic diameter calculations. If some of the rolls are fixed diameter nip rolls, their diameter will be numerically entered at setup via UwndDiaPrst (CP-364), or WindDiaPrst (CP-365).

3 = Unwind and Wind are fixed
2 = Wind is fixed
1 = Unwind is fixed
0 = Neither are fixed (default)

Minimum Value: 0	Maximum Value: 3
Default Value: 0	Units: Coded

(Continued)

CP-208 UnitPrs Sel

Unit Pairs Select (CP-208) determines the engineering units that will be associated with numerical entries or monitored data displays. In each pair selection the first Engineering Unit will apply to Web EU (Line) distance or speed, Roll Content. The second Engineering Unit will apply to Roll Diameter, Dancer Content and Dancer Position.

6 = Meters/Millimeters
5 = Centimeters/Millimeters
4 = Millimeters/Millimeters
3 = Yards/Inches
2 = Feet/Inches (default)
1 = Inches/Inches

Minimum Value: 1	Maximum Value: 6
Default Value: 2	Units: Coded

CP-209 Time Base

Time Base (CP-209) selection determines the time units for Web EU/Tm (Line Speed). The lineal units were determined by UnitPrs Sel (CP-208). For example, CP-208 = 3 and CP-209 = 2 will result in Web EU/Tm (Line Speed) defined as Yards/Minute.

3 = per Hour
2 = per Minute (default)
1 = per Second

Minimum Value: 1	Maximum Value: 3
Default Value: 2	Units: Coded

CP-210 Line Spd SP

Line Speed Setpoint (CP-210) is the numerically entered desired Line Speed. The units were determined by CP-208 and CP-209. It can be entered from the keypad, via serial link, or optionally via DeviceNet. It is considered the ideal, or target, speed. It may be internally reduced automatically if an axis diameter becomes too small to achieve the desired speed. Such automatic reductions would be revealed in LineSpdSRef (MP-41). Note that there are other alternatives for the source of the Line Speed command. See LineSpdSrc (CP-203).

Minimum Value: -9999999	Maximum Value: 9999999
Default Value: 0.0	Units: Web EU/Tm

CP-211 Max LineSpd

Maximum Line Speed (CP-211) is an upper limit to the Line Spd SP (CP-210). It will prevent higher entries in Line Spd SP (CP-210). It also limits the acceptable line speed value from the alternative external line speed potentiometer. Caution: It can not limit an external lead axis that is not under its control.

Minimum Value: 0	Maximum Value: 9999999
Default Value: 9999999	Units: Web EU/Tm

(Continued)

CP-212 Min LineSpd

Minimum Line Speed (CP-212) is a lower limit to the Line Spd SP (CP-210). It will prevent lower entries in Line Spd SP (CP-210). It also limits the acceptable line speed value from the alternative external line speed potentiometer. Caution: It can not limit an external lead axis that is not under its control.

Minimum Value: 0	Maximum Value: 9999999
Default Value: 0	Units: Web EU/Tm

CP-220 Stretch %

Stretch % (CP-220) determines the ratio of dancer trimmed axis line speed to non-dancer trimmed axis line speed. A value of 0.0 % means equal line speeds, and would be appropriate for a non-extensible (no stretch) web material. If a material is expected to stretch, use a positive %, and if expected to shrink, use a negative %. The dancer control action will attempt to automatically compensate for an incorrect stretch %. However, the dancer will remain closer to the desired position, and dynamic response will be enhanced if this Stretch % properly reflects the expected stretch/ shrink %.

Minimum Value: -10.0	Maximum Value: 10
Default Value: 0.0	Units: %

CP-221 Max Stretch %

Max Stretch % (CP-221) is an upper limit to the Stretch % (CP-220). It will prevent higher entries in Stretch % (CP-220).

Minimum Value: 0.0	Maximum Value: 10
Default Value: 10.0	Units: %

CP-222 Min Stretch %

Min Stretch % (CP-222) is a lower limit to the Stretch % (CP-220). It will prevent lower entries in Stretch % (CP-220).

Minimum Value: -10.0	Maximum Value: 0.0
Default Value: -10.0	Units: %

CP-230 Uwnd Direct SP

Unwind Direct Setpoint (CP-203) is active only in Direct Mode (CP202=0). It sends a voltage value directly to the Control Output (SigU) terminal. Run/Stop commands are recognized, but no other control function is active. All encoder and dancer signals are ignored.

Minimum Value: -15.0	Maximum Value: 15
Default Value: 0.0	Units: Volts

CP-235 Wind Direct SP

Wind Direct Setpoint (CP-235) is active only in Direct Mode (CP202=0). It sends a voltage value directly to the Control Output (SigW) terminal. Run/Stop commands are recognized, but no other control function is active. All encoder and dancer signals are ignored.

Minimum Value: -15.0	Maximum Value: 15

(Continued)

Default Value: 0.0 Units: Volts

CP-240 Jog SP

Jog Setpoint (CP-240) determines an axle rotaional speed in RPM of the Roll. It will be applied to the selected axis, in the selected direction, according to the state of the four Jog input terminals in Jog Mode. It is also used in some automatic Load/Unload sequences.

Minimum Value: 0	Maximum Value: 999999
Default Value: 50	Units: Roll RPM

CP-241 Acl Tm Jog

Acceleration Time Jog (CP-241) is the time, in seconds, to accelerate from 0 RPM to the Jog SP (CP-240).

Minimum Value: 0.1	Maximum Value: 3600
Default Value: 2.000	Units: Seconds

CP-242 Acl Rt Jog

Acceleration Rate Jog (CP-242) is the rate in RPM/Sec. It is a different representation of the same rate as defined in Acl Tm Jog (CP-241).

Minimum Value: 0	Maximum Value: 9999999
Default Value: 25.00	Units: RPM/Sec

CP-243 Dcl Tm Jog

Deceleration Time Jog (CP-243) is the time, in seconds, to decelerate from the Jog SP (CP-240) to 0 RPM.

Minimum Value: 0.1	Maximum Value: 3600
Default Value: 2.000	Units: Seconds

CP-244 Dcl Rt Jog

Deceleration Rate Jog (CP-244) is the rate in RPM/Sec. It is a different representation of the same rate as defined in Dcl Tm Jog (CP-243).

Minimum Value: 0	Maximum Value: 9999999
Default Value: 100.0	Units: RPM/Sec

CP-250 Dancer SP

Dancer Setpoint (CP-250) is the desired nominal dancer operating content (position). Any deviation of actual dancer position will result in a speed adjustment at the dancer trimmed axis, in the correct direction to return the dancer toward this setpoint position. Units are Web EU. The amount of web material in the dancer station is the content. The angular dancer arm position, or the height of the dancer bar must be translated by the user into terms of web material content. One half of the value in DncrCntFull (CP-272) would be typical.

Minimum Value: 0	Maximum Value: 99999
Default Value: 20.00	Units: Web EU

(Continued)

CP-260 UwndGearRdcn

Unwind Gear Reduction (CP-260) is the mechanical ratio between the encoder device and the Unwind roll. It is used to determine the number of encoder rotations for one roll rotation.

Minimum Value: 0.100	Maximum Value: 20000
Default Value: 1.000	Units: Ratio

CP-261 Uwnd PPR

Unwind Pulses Per Revolution (CP-261) is the number of pulses in one revolution of the encoder device mounted on the Unwind axis. The value may be called Counts, Lines, or Pulses by various encoder manufacturers. Do NOT multiply by four for quadrature encoders.

Minimum Value: 1	Maximum Value: 60000
Default Value: 60	Units: Pulses/Rev

CP-264 UwndEncPty

Unwind Encoder Polarity (CP-264) is a selection that determines whether the direction indicated by the Unwind encoder can be accepted as-wired, or whether its indicated polarity must be negated (change sign). Due to encoder and installation variations, there is no way to predict whether encoder signal A will lead, or lag, signal B during forward machine motion. This controller can electronically negate the raw encoder signal if needed.

2 = Negated (neg=fwd)
1 = Normal (pos=fwd) (default)

Minimum Value: 1	Maximum Value: 2
Default Value: 1	Units: Coded

CP-265 WindGearRdcn

Wind Gear Reduction (CP-265) is the mechanical ratio between the encoder device and the Wind roll axle. It is used to determine the number of encoder rotations for one axle rotation.

Minimum Value: 0.100	Maximum Value: 20000
Default Value: 1.000	Units: Ratio

CP-266 Wind PPR

Wind Pulses Per Revolution (CP-266) is the number of pulses in one revolution of the encoder device mounted on the Wind axis. The value may be called Counts, Lines, or Pulses by various encoder manufacturers. Do NOT multiply by four for quadrature encoders.

Minimum Value: 1	Maximum Value: 60000
Default Value: 60	Units: Pulses/Rev

(Continued)

CP-269 WindEncPty

Wind Encoder Polarity (CP-269) is a selection that determines whether the direction indicated by the Wind encoder can be accepted as-wired, or whether its indicated polarity must be negated (change sign). Due to encoder and installation variations, there is no way to predict whether encoder signal A will lead, or lag, signal B during forward machine motion. This controller can electronically negate the raw encoder signal if needed.

2 = Negated (neg=fwd)
1 = Normal (pos=fwd) (default)

Minimum Value: 1	Maximum Value: 2
Default Value: 1	Units: Coded

CP-271 DncrFullVolts

Dancer Full Volts (CP-271) is part of the dancer scale factor setup, with CP-272 and CP-273. The value is the actual voltage expected from the dancer position sensor (Pot, Sonar, Optical sensor, etc.) when the dancer arm is at the full end of its travel, with maximum web content.

Minimum Value: -5.00	Maximum Value: 5
Default Value: 5.00	Units: Volts

CP-272 DncrCtntFull

Dancer Content at Full Volts (CP-272) is part of the dancer scale factor setup, with CP-271 and CP-273. The value is the web content, or the amount of web material (in Web EU's CP-208), stored in the dancer station when the dancer is in its full travel position.

Minimum Value: 0	Maximum Value: 999999
Default Value: 40.00	Units: Web EU

CP-273 DncrEmptyVlts

Dancer Empty Volts (CP-273) is part of the dancer scale factor setup, with CP-271 and CP-272. The value is the actual voltage expected from the dancer position sensor (Pot, Sonar, Optical sensor, etc.) when the dancer arm is at the empty end of its travel, with minimum web content.

Minimum Value: -5.00	Maximum Value: 5
Default Value: 0.00	Units: Volts

CP-276 ExtLSMaxVolts

External Line Speed Maximum Volts (CP-276) is part of the scale factor setup for an external Line Speed analog signal source. This maximum volts, together with Ext LS Max (CP-277), determines the upper point of the calibration. See also CP-278 and CP-279 which determine the lower calibration point.

Minimum Value: -5.0	Maximum Value: 5
Default Value: 5.0	Units: Volts

(Continued)

CP-277 Ext LS Max

External Line Speed at Maximum Volts (CP-277) is part of the scale factor setup for an external Line Speed analog signal source. This speed, in Web EU/Tm units selected by UnitPrs Sel (CP-208), together with ExtLSMaxVolts (CP-276), determines the upper point of the calibration. See also CP-278 and CP-279 which determine the lower calibration point.

Minimum Value: -9999999	Maximum Value: 9999999
Default Value: 100.0	Units: EU/Tm

CP-278 ExtLSMinVolts

External Line Speed Minimum Volts (CP-278) is part of the scale factor setup for an external Line Speed analog signal source. This minimum volts, together with LineSpdMin (CP-279), determines the lower point of the calibration. See also CP-276 and CP-277 which determine the upper calibration point.

Minimum Value: -5.0	Maximum Value: 5.0
Default Value: 0.0	Units: Volts

CP-279 Ext LS Min

External Line Speed at Minimum Volts (CP-279) is part of the scale factor setup for an external Line Speed analog signal source. This speed, in Web EU/Tm units selected by UnitPrs Sel (CP-208), together with ExtLSMinVolts (CP-278), determines the lower point of the calibration. See also CP-276 and CP-277 which determine the upper calibration point.

Minimum Value: -9999999	Maximum Value: 9999999
Default Value: 0.0	Units: EU/Tm

CP-280 UwndCO Mode

Unwind Control Output Mode (CP-280) affects the range of Control Output (SigU) analog signal sent out to the Unwind axis. Unipolar mode issues only one polarity output, and assumes the axis drive is either not capable of reverse direction, or the user has chosen to never command it in a reverse direction. The sign (+/-) of this signal typically is "+"=fwd, and "-"=reverse, but the controller may be configured (UwndCO Plrty CP-282), or may have learned during setup, that the inverse polarity may be needed, as machines may vary in regard to which rotation direction is called forward. Bipolar mode allows both "+" and "-" signal polarities as needed for both forward and reverse operation. Bipolar allows reversal by discrete input LineSpeedReverse (LSRvs), or by accepting negative Line Speed Setpoints. Unipolar Reversible is similar to Unipolar, but will allow a reverse direction operation via the discrete input LineSpeedReverse (LSRvs), triggered by a relay that is wired to simultaneously give a reverse direction input command directly to the axis drive device itself (typically an AC Inverter). The controller will issue its normal output signal, but will expect the axis to actually rotate the other way, and will expect the quadrature encoder to confirm that reversed direction. Unipolar Brake is similar to Unipolar operation, but assumes the device physically operating the axis is a brake, rather than a motor or clutch. The control output signal is reverse sloped since brakes are assummed to apply more brake action, causing slower speed, as the signal increases in magnitude. Further a brake will apply least brake action, causing the web to be pulled off at a faster speed, when zero volts is applied. Thus brake mode is limited to the Unwind axis.

4 = Unipolar Brake
3 = Unipolar Reversible
2 = Bipolar (default)
1 = Unipolar

Minimum Value: 1	Maximum Value: 4
Default Value: 2	Units: Coded

(Continued)

CP-281 UwndCOMax Volts

Unwind Control Output Maximum Volts (CP-281) sets the upper limit on the voltage sent to the Unwind axis drive. Bipolar operation assumes plus or minus this value. It should be set equal, or lower, than the input specifications of the Unwind axis drive. This value, in conjunction with Uwnd MaxRPM (CP-329), affects the feedforward term Uwnd Kff (CP-324).

Minimum Value: 0.1	Maximum Value: 15
Default Value: 10.0	Units: Volts

CP-282 UwndCO Plrty

Unwind Control Output Polarity (CP-282) determines whether a positive, or negative, signal voltage will operate the Unwind Axis in the forward direction, under the most basic normal operation. Actual direction may be temporarily different due to Overwrap/Underwrap selections.

2 = Negated (neg=fwd)
1 = Normal (pos=fwd) (default)

Minimum Value: 1	Maximum Value: 2
Default Value: 1	Units: Coded

CP-283 UwndCO Offset

Unwind Control Output Offset (CP-283) adjusts for small variations in the specifications of certain IC devices on this particular controller board. Usually a very small number, it serves to true up the 0 volts end point of the output voltage scale. It is preset at the factory, and should not need field adjustments.

Minimum Value: -1.00	Maximum Value: 1
Default Value: 0	Units: Volts

CP-285 WindCO Mode

Wind Control Output Mode (CP-285) affects the range of Control Output (SigW) analog signal sent out to the Wind axis. Unipolar mode issues only one polarity output, and assumes the axis drive is either not capable of reverse direction, or the user has chosen to never command it in a reverse direction. The sign (+/-) of this signal typically is "+"=fwd, and "-"=reverse, but the controller may be configured (WindCO Plrty CP-287), or may have learned during setup, that the inverse polarity may be needed, as machines may vary in regard to which rotation direction is called forward. Bipolar mode allows both "+" and "-" signal polarities as needed for both forward and reverse operation. Bipolar allows reversal by discrete input LineSpeedReverse (LSRvs), or by accepting negative Line Speed Setpoints. Unipolar Reversible is similar to Unipolar, but will allow a reverse direction operation via the discrete input LineSpeedReverse (LSRvs), triggered by a relay that is wired to simultaneously give a reverse direction input command directly to the axis drive device itself (typically an AC Inverter). The controller will issue its normal output signal, but will expect the axis to actually rotate the other way, and will expect the quadrature encoder to confirm that reversed direction.

3 = Unipolar Reversible
2 = Bipolar (default)
1 = Unipolar

Minimum Value: 1	Maximum Value: 3
Default Value: 2	Units: Coded

(Continued)

CP-286 WindCOMax Volts

Wind Control Output Maximum Volts (CP-286) sets the upper limit on the voltage sent to the Wind axis drive. Bipolar operation assumes plus or minus this value. It should be set equal to, or lower than, the input specifications of the Wind axis drive. This value, in conjunction with Wind MaxRPM (CP-329), affects the feedforward term Wind Kff (MP-33).

Minimum Value: 0.1	Maximum Value: 15
Default Value: 10.0	Units: Volts

CP-287 WindCO Plrty

Wind Control Output Polarity (CP-287) determines whether a positive, or negative, signal voltage will operate the Wind Axis in the forward direction, under the most basic normal operation. Actual direction may be temporarily different due to Overwrap/Underwrap selections.

2 = Negated (neg=fwd)
1 = Normal (pos=fwd) (default)

Minimum Value: 1	Maximum Value: 2
Default Value: 1	Units: Coded

CP-288 WindCO Offset

Wind Control Output Offset (CP-288) adjusts for small variations in the specifications of certain IC devices on this particular controller board. Usually a very small number, it serves to true up the 0 volts endpoint of the output voltage scale. It is preset at the factory, and should not need field adjustments.

Minimum Value: -1.00	Maximum Value: 1
Default Value: 0.00	Units: Volts

CP-300 Ref Ramps

The acceleration rate for the application selected are determined by the Acl Tm RUN (CP-301) and the Ref Ramps (CP-300). The deceleration rate (from a faster speed to a slower speed) for the application selected, are determined by the Dcl Tm RUN (CP-303) and the Ref Ramps (CP-300).

Minimum Value: 0.001	Maximum Value: 9999999
Default Value: 100	Units: EU/Tm

CP-301 Acl Tm RUN

Acceleration Time RUN (CP-301) is the time that it takes to accelerate from 0 to the Ref Ramps (CP-300). Time is consistant with Ref Ramps (CP-300) and Acl Rt RUN (CP-302).

Minimum Value: 0.5	Maximum Value: 3600
Default Value: 10.00	Units: Seconds

(Continued)

CP-302 Acl Rt RUN

Acceleration Rate RUN (CP-302) is the acceleration rate that the speed changes from 0 to the Ref Ramps (CP-300). Rate is consistant with Ref Ramps (CP-300) and Acl Tm RUN (CP-301).

Minimum Value: 0	Maximum Value: 9999999
Default Value: 10.00	Units: Web EU/Tm/Sec

CP-303 Dcl Tm RUN

Deceleration Time RUN (CP-303) is the time that it takes to decelerate from Ref Ramps (CP-300) speed to 0. Time is consistant with Ref Ramps (CP-300) and Dcl Rt RUN (CP-304).

Minimum Value: 0.5	Maximum Value: 3600
Default Value: 10.00	Units: Seconds

CP-304 Dcl Rt RUN

Deceleration Rate RUN (CP-304) is the deceleration rate that the speed changes from Ref Ramps (CP-300) speed to 0, while operating in App Select (CP-202) 1, 2, 4 or 5. Rate is consistant with Ref Ramps (CP-300) and Dcl Tm RUN (CP-303).

Minimum Value: 0	Maximum Value: 9999999
Default Value: 10.00	Units: Web EU/Tm/Sec

CP-307 Dcl Tm HStp

Deceleration Time H-Stop (CP-307) is the time, in seconds, that it takes to decelerate from the Ref Ramps (CP-300) speed to 0, during H-Stop.

Minimum Value: 0.5	Maximum Value: 3600
Default Value: 10.00	Units: Seconds

CP-308 Dcl Rt HStp

Deceleration Rate H-Stop (CP-308) is the deceleration rate that is used for H-Stop.

Minimum Value: 0	Maximum Value: 9999999
Default Value: 10.00	Units: Web EU/Tm/Sec

CP-311 Acl Tm Drct

Acceleration Time Direct (CP-311) is the time, in seconds, that it takes to accelerate from 0 to the UwndCOMaxVolts (CP-281) and/or WindCOMaxVolts (CP-286) voltage, while operating in the Direct Mode.

Minimum Value: 0	Maximum Value: 3600
Default Value: 3.000	Units: Seconds

(Continued)

CP-312 Dcl Tm Drct

Deceleration Time Direct (CP-312) is the time, in seconds, that it takes to decelerate from the UwndCOMaxVolts (CP-281) and/or WindCOMaxVolts (CP-286) voltage to 0 volts, while operating in the Direct Mode.

Minimum Value: 0	Maximum Value: 3600
Default Value: 3.000	Units: Seconds

CP-321 Jog Loop Mode

Jog Loop Mode (CP-321) identifies the type of control loop (see list below) that is used during Jog.

1 = Velocity Loop (default)
0 = Open Loop

Minimum Value: 0	Maximum Value: 1
Default Value: 1	Units: Coded

CP-323 Uwnd Kp-p

Unwind Kp-p (CP-323) is the proportional gain constant applied to the position error when the unwind axle is in position hold. The position hold gain may need to be different than the Uwnd Kp (CP-325) under run conditions.

Minimum Value: 0	Maximum Value: 32767
Default Value: 2	Units: Constant

CP-325 Uwnd Kp

Unwind Kp (CP-325) is the proportional gain constant for the PID loop. An increase in Unwind Kp (CP-325) creates a quicker response and a smaller error. However, a value that is too large will cause instability. If the integral term is used, (i.e., Unwind Ki not equal to zero) then a nonzero Unwind Kp can actually improve the loop response and decrease the overshoot to some extent.

Minimum Value: 0	Maximum Value: 30000
Default Value: 400	Units: Constant

CP-326 Uwnd Ki

Unwind Ki (CP-326) is the integral constant for the PID loop. Integral action provides for zero steady state error. Increase Unwind Ki (CP-326) for a faster convergence to zero error. However, a value that is too large will cause instability.

Minimum Value: 0	Maximum Value: 30000
Default Value: 40	Units: Constant

CP-327 Uwnd Kd

Unwind Kd (CP-327) is the derivative constant for the PID loop. Derivative action attempts to damp out overshoot. Its effect is highly dependent on Unwind Kp and Unwind Ki, but, generally, too large a value causes instability.

Minimum Value: 0	Maximum Value: 30000
Default Value: 200	Units: Constant

(Continued)

CP-328 Uwnd DerivThd

Unwind Derivative Threshold (CP-328) is the minimum speed error that is required before the derivative term in the PID algorithm gains influence. Increase the Unwind Derivative Threshold to prevent the derivative term from acting on signal noise.

Minimum Value: 0	Maximum Value: 99999
Default Value: 5	Units: Roll RPM

CP-329 Uwnd MaxRPM

Unwind Maximum Roll RPM (CP-329) describes the estimated maximum Unwind roll RPM, after consideration of max motor RPM, and motor-to-roll gear ratios. This value, in conjunction with UwndCOMax Volts (CP-281), affects the feedforward term, Uwnd Kff (MP-23). It may be adjusted automatically during feedforward Kff Auto En (CP-344) mode.

Minimum Value: 0.1	Maximum Value: 999999
Default Value: 2000	Units: Roll RPM

CP-331 Dancer Auth

Dancer Authority (CP-331) sets a maximum, or upper limit, on the correction applied to the dancer trimmed axis by reason of displacement of the dancer from its target position. The Dancer Trim (MP-84), a product of DncrCtnt Err (MP-83) and Dancer Gain (CP-332), is checked against this limit before it is used to adjust the dancer trimmed axis.

Minimum Value: 0	Maximum Value: 999999
Default Value: 100	Units: EU/Tm

CP-332 Dancer Gain

Dancer Gain (CP-332) adjusts the response to dancer content error. High gain can cause instability. Low gain can cause sluggish correction action.

Minimum Value: 0	Maximum Value: 99999
Default Value: 50	Units: (EU/Tm)/(Dancer Error EU)

CP-333 Wind Kp-p

Wind Kp-p (CP-333) is the proportional gain constant applied to the position error when the wind axle is in position hold. The position hold gain may need to be different than the Wind Kp (CP-335) under run conditions.

Minimum Value: 0	Maximum Value: 32767
Default Value: 2	Units: Constant

(Continued)

CP-335 Wind Kp

Wind Kp (CP-335) is the proportional gain constant for the PID loop. An increase in Wind Kp (CP-335) creates a quicker response and a smaller error. However, a value that is too large will cause instability. If the integral term is used, (i.e., Wind Ki (CP-336) not equal to zero) then a nonzero Wind Kp (CP-335) can actually improve the loop response and decrease the overshoot to some extent.

Minimum Value: 0	Maximum Value: 30000
Default Value: 400	Units: Constant

CP-336 Wind Ki

Wind Ki (CP-336) is the Integral constant for the PID loop. Integral action provides for zero steady state error. Increase Wind Ki (CP-336) for a faster convergence to zero error. However, a value that is too large will cause instability.

Minimum Value: 0	Maximum Value: 30000
Default Value: 40	Units: Constant

CP-337 Wind Kd

Wind Kd (CP-337) is the derivative constant for the PID loop. Derivative action attempts to damp out overshoot. Its effect is highly dependent on Wind Kp and Wind Ki, but, generally, too large a value causes instability.

Minimum Value: 0	Maximum Value: 30000
Default Value: 200	Units: Constant

CP-338 Wind DerivThd

Wind Derivative Threshold (CP-338) is the minimum speed error that is required before the derivative term in the PID algorithm gains influence. Increase the Wind DerivThd (CP-338) to prevent the derivative term from acting on signal noise.

Minimum Value: 0	Maximum Value: 99999
Default Value: 5	Units: Roll RPM

CP-339 WindMaxRPM

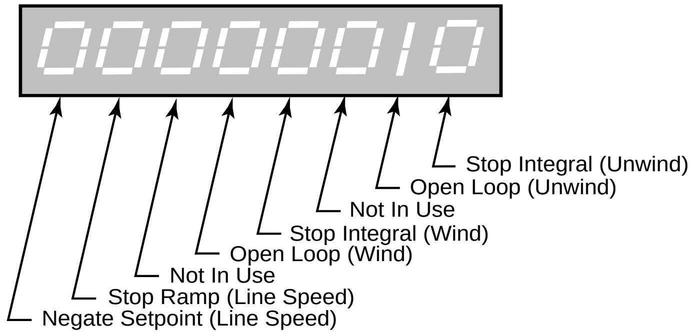
Wind Maximum RPM (CP-339) describes the estimated maximum Wind Roll RPM, after consideration of max motor RPM, and motor-to-roll gear ratios. This value, in conjunction with WindCOMax Volts (CP-286), affects the feedforward term, Wind Kff (MP-33). It may be adjusted automatically during feedforward Kff Auto En (CP-344) mode.

Minimum Value: 0.1	Maximum Value: 999999
Default Value: 2000	Units: Roll RPM

(Continued)

CP-340 Cntrl Latch

Control Latch (CP-340) allows you to set or "latch in" certain operating conditions that are specific to the CX-1102. Enter "1" in the bit that corresponds to the control condition(s) that you want active (see graphic below). The condition(s) will remain active till the bit is reset to 0. These requests are logically OR'd with the PLC bits that set the same condition. In the sample below, "Open Loop" is active:



Minimum Value: 0	Maximum Value: 255
Default Value: 0	Units: Coded

CP-341 Loop Update

Loop Update (CP-341) is the time interval between the Control Output (SigU/SigW) calculations. This interval sets the sampling rate of the PID control loop.

3 = 100 mSec Update
2 = 10 mSec Update
1 = 2 mSec Update (default)

Minimum Value: 1	Maximum Value: 3
Default Value: 1	Units: Coded

CP-342 KffAdjUpdt

Kff Adjust Update (CP-342) sets the sampling period for the Kff calculation when it is enabled. KffAdjUpdt (CP-342) is the time interval between each new Kff calculation and the automatic store to the Kff parameters depending on whether Kff Auto En (CP-344) is enabled.

6 = 10 Min Update
5 = 1 Min Update
4 = 10 Sec Update
3 = 1 Sec Update (default)
2 = 500 mSec Update
1 = 250 mSec Update

Minimum Value: 1	Maximum Value: 6
Default Value: 3	Units: Coded

(Continued)

CP-343 KffAutoSel

Kff Automatic Select (CP-343) selects the axis which will have its Kff value automatically adjusted during RUN at the KffAdjUpdt (CP-342) interval when enabled via KffAuto En (CP-344).

3 = Unwind & Wind (default)
2 = Wind
1 = Unwind

Minimum Value: 1	Maximum Value: 3
Default Value: 3	Units: Coded

CP-344 Kff Auto En

Kff Automatic Enable (CP-344) enables the CX-1102 automatic adjustment of Uwnd Kff (MP-23) and Wind Kff (MP-33) at the specified KffAdjUpdt (CP-342) interval in RUN with the loop closed.

1 = ON = Enabled
0 = OFF = Disabled (default)

Minimum Value: 0	Maximum Value: 1
Default Value: 0	Units: Coded

CP-345 DncrMinDelta

Dancer Minimum Delta (CP-345) sets the smallest dancer movement that will be accepted for diameter calculations. Calculating diameter from extremely small movement can introduce diameter error, resulting in incorrect line speeds. However, waiting for a large movement, while improving diameter calulation accuracy, can cause a cyclic action in the dancer position as it drifts off, and is then quickly corrected.

Minimum Value: 0.01	Maximum Value: 99999
Default Value: 0.05	Units: Inches

CP-346 UwndMinDelta

Unwind Minimum Delta (CP-346) sets the smallest amount of Unwind roll rotation that will be accepted for diameter calculations. Calculating diameter from extremely small rotations can introduce diameter error, resulting in incorrect line speeds. However, waiting for a large rotation, while improving diameter calulation accuracy, can cause a cyclic action in the dancer position as it drifts off, and is then quickly corrected.

Minimum Value: 0.001	Maximum Value: 99999
Default Value: 0.1	Units: Rotations

CP-347 WindMinDelta

Wind Minimum Delta (CP-347) sets the smallest amount of Wind roll rotation that will be accepted for diameter calculations. Calculating diameter from extremely small rotations can introduce diameter error, resulting in incorrect line speeds. However, waiting for a large rotation, while improving diameter calulation accuracy, can cause a cyclic action in the dancer position as it drifts off, and is then quickly corrected.

Minimum Value: 0.001	Maximum Value: 99999
Default Value: 0.1	Units: Rotations

(Continued)

CP-348 Sig Fltr Sel

Signal Filter Select (CP-348) selects the signal to route through a low pass filter. The effect is visible on the speed value. Only one filter routine is available, and should be used on the most erratic input signal. While the damped signal will permit smoother control action, note that it will introduce a small delay in response to the original signal variations.

4 = Analog In 2
3 = Frequency In 2
2 = Analog In 1
1 = Frequency In 1
0 = Not Used (default)

Minimum Value: 0	Maximum Value: 4
Default Value: 0	Units: Coded

CP-349 SigFltrTmConst

Signal Filter Time Constant (CP-349) sets the time constant in milliseconds for the signal filter.

Minimum Value: 2	Maximum Value: 500
Default Value: 10	Units: Milliseconds

CP-350 UwndMinDia

Unwind Minimum Diameter (CP-350) sets a boundary for calculated diameters. It aids in the rejection of false diameter calculations caused by erratic machine conditions such as slack web or out-of-round rolls.

Minimum Value: 0.001	Maximum Value: 99999
Default Value: 12.0	Units: Inches

CP-351 UwndMaxDia

Unwind Maximum Diameter (CP-351) sets a boundary for calculated diameters. It aids in the rejection of false diameter calculations caused by erratic machine conditions such a slack web or out-of-round rolls.

Minimum Value: 0.001	Maximum Value: 100000
Default Value: 72	Units: Inches

CP-352 WindMinDia

Wind Minimum Diameter (CP-352) sets a boundary for calculated diameters. It aids in the rejection of false diameter calculations caused by erratic machine conditions such a slack web or out-of-round rolls.

Minimum Value: 0.001	Maximum Value: 99999
Default Value: 12.0	Units: Inches

CP-353 WindMaxDia

Wind Maximum Diameter (CP-353) sets a boundary for calculated diameters. It aids in the rejection of false diameter calculations caused by erratic machine conditions such a slack web or out-of-round rolls.

Minimum Value: 0.001	Maximum Value: 100000
Default Value: 72	Units: Inches

(Continued)

CP-355 Ramp Thd

When the difference between the LineSpd SRef (MP-41) and the LineSpd RRef (MP-42) is greater than Ramp Thd (CP-355), the ramp will work normally. When the difference between the LineSpd SRef (MP-41) and the LineSpd RRef (MP-42) is less than or equal to Ramp Thd (CP-355), the ramp will be bypassed. This avoids ramp delays for small line speed changes but still allows a ramp for large line speed or for large Line Spd SP (CP-210) changes.

Minimum Value: 0	Maximum Value: 999999
Default Value: 1.0	Units: EU/Tm

CP-356 UwndTrim Auth

The trim contribution to the DAC output is limited to positive and negative Unwind Trim Authority (CP-356).

Minimum Value: 0	Maximum Value: 100
Default Value: 100.0	Units: % of CP-281

CP-357 UwndIntgrl Lmt

The integral contribution to the trim term is limited to the positive and negative Unwind Integral Limit (CP-357). UwndIntgrl Lmt (CP-357) can decrease the effects of integral windup or it can limit the maximum effect of the integral term.

Minimum Value: 0	Maximum Value: 100
Default Value: 100.0	Units: % of CP-281

CP-358 WindTrim Auth

The trim contribution to the DAC output is limited to positive and negative Wind Trim Authority (CP-358).

Minimum Value: 0	Maximum Value: 100
Default Value: 100.0	Units: % of CP-286

CP-359 WindIntgrl Lmt

The integral contribution to the trim term is limited to the positive and negative Wind Integral Limit (CP-359). WindIntgrl Lmt (CP-359) can decrease the effects of integral windup or it can limit the maximum effect of the integral term.

Minimum Value: 0	Maximum Value: 100
Default Value: 100.0	Units: % of CP-286

CP-361 LoadDiaCalcEn

When Load Diameter Calculation Enable (CP-361) is enabled, the CX-1102 will calculate the diameter of the dancer trimmed roll, and estimate the diameter of the other roll, during a Load sequence. If LoadDiaCalcEn (CP-361) is disabled, the initial dancer trimmed roll diameter must be preset prior to running. *See UnwinDiaPrst (CP-364) and WindDiaPrst (CP-365) for more information about presetting roll diameters.*

1 = ON = Enabled (default)
0 = OFF = Disabled

Minimum Value: 0	Maximum Value: 1
Default Value: 1	Units: Coded

(Continued)

CP-364 UwndDiaPrst

Unwind Diameter Preset (CP-364) defines a known diameter value that can be forced into UwndEstDia (MP-07) on demand. For example, it can be used to pre-set a full roll diameter when loading a new supply roll. The PLC code can control this action via wired input, or by monitoring for an internal operational condition. It also defines the nip roll diameter on machines with fixed nip rolls.

Minimum Value: 0	Maximum Value: 99999
Default Value: 48	Units: Diameter EU

CP-365 WindDiaPrst

Wind Diameter Preset (CP-365) defines a known diameter value that can be forced into WindEstDia (MP-17) on demand. For example, it can be used to pre-set an empty roll core diameter after off loading a full takeup roll. The PLC code can control this action via wired input, or by monitoring for an internal operational condition. It also defines the nip roll diameter on machines with fixed nip rolls.

Minimum Value: 0	Maximum Value: 99999
Default Value: 48	Units: Diameter EU

CP-366 UwndCtntPrst

Unwind Content Preset (CP-366) defines a known roll content (total length on the roll) value that can be forced into UwndEstCtnt (MP-06) on demand. For example, it can be used to pre-set a full roll content when loading a new supply roll. The PLC code can control this action via wired input, or by monitoring for an internal operational condition. If the Preset value is larger than the UwndCtntRO (CP-368), then UwndEstCtnt (MP-06) will display the Preset Value minus the Rollover value.

Minimum Value: 0	Maximum Value: 9999999
Default Value: 10000	Units: Web EU

CP-367 WindCtntPrst

Wind Content Preset (CP-367) defines a known roll content (total length on the roll) value that can be forced into WindEstCtnt (MP-16) on demand. For example, it can be used to pre-set content to zero content when loading a new empty core on the Wind axis. The PLC code can control this action via wired input, or by monitoring for an internal operational condition. If the Preset value is larger than the WindCtntRO (CP-369), then WindEstCtnt (MP-16) will display the Preset Value minus the Rollover value.

Minimum Value: 0	Maximum Value: 9996699
Default Value: 10000	Units: Web EU

(Continued)

CP-368 UwndCtntRO

Unwind Content Rollover (CP-368) defines an upper limit to the amount of Unwind roll content that will be accommodated in the totalizing content counter, UwndEstCtnt (MP-06). Note that the Unwind is presumed to be a pay-off roll, resulting in a roll content value that decrements downward during forward travel. When this content register, UwndEstCtnt (MP-06), decrements down to zero, it will rollover, restoring its value to the amount shown in UwndCtntRO (CP-368). It will again decrement downward upon further forward motion. If the web reverses motion, with the Unwind station taking up web material, then the content register, UwndEstCtnt (MP-06), will increment and ultimately rollover to zero upon reaching this upper rollover point. A PLC bit is set at each rollover action, for use in counting, alarms, or other action. In most applications, the UwndEstCtnt (MP-06) is used, in conjunction with UwndCtntPrst (CP-366) to predict an end-of-roll condition. However, the rollover point UwndCtntRO (CP-368), is set at more than a full roll's content, and is never reached. In these cases the rollover point acts as a backup protection to prevent content registers from incrementing indefinitely, causing register overflow.

Minimum Value: 0	Maximum Value: 9999999
Default Value: 10000	Units: Web EU

CP-369 WindCtntRO

Wind Content Rollover (CP-369) defines an upper limit to the amount of Wind roll content that will be accommodated in the totalizing content counter, WindEstCtnt (MP-16). Note that the Wind is presumed to be a take-up roll, resulting in a roll content value that increments upward during forward travel. When this content register, WindEstCtnt (MP-16), increments up to this limit (CP-369), it will rollover, restoring its value to zero. It will again increment upward upon further forward motion. If the web reverses motion, with the Wind station paying off web material, then the content register, WindEstCtnt (MP-16), will decrement and ultimately rollover to this upper limit upon reaching zero. A PLC bit is set at each rollover action, for use in counting, alarms, or other action. In most applications, the WindEstCtnt (MP-16) is used, in conjunction with WindCtntPrst (CP-367) to predict a near-full-roll condition. However, the rollover point (CP-369), is set at more than a full roll's content, and is never reached. In these cases the rollover point acts as a backup protection to prevent content registers from incrementing indefinitely, causing register overflow.

Minimum Value: 0	Maximum Value: 9999999
Default Value: 10000	Units: Web EU

CP-370 Zero Speed

When the magnitude of the UwndRollRPM (MP-03) or WindRollRPM (MP-13) is less than or equal to Zero Speed (CP-370), the UwFb@0Spd bit (44) or WdFb@0Spd bit (54) in the PLC is set to “1”. This value, as well as the PLC bit condition, is used in other transparent internal calculations that are based on feedback information, and to determine when each roll is stopped.

Minimum Value: 0	Maximum Value: 100000
Default Value: 5.0	Units: Roll RPM

CP-371 Max LS Alm

Maximum Line Speed Alarm (CP-371) signals an over-speed condition. When the magnitude of the Line Speed (MP-40) is greater than or equal to Max LS Alm (CP-371), then the HiLineSpd bit (30) in the PLC is set to “1”. You can output this alarm for indication or action, or you can use the alarm logically in the PLC.

Minimum Value: 0	Maximum Value: 9999999
Default Value: 2000	Units: EU/Tm

(Continued)

CP-372 NO Resp Time

When the Control Output (SigU) signal is greater than 1/16 UwndCOMax Volts (CP-281) and the UwndRollRPM (MP-03) is less than Zero Spd (CP-370) for longer than the No Response Time (CP-372), then the UwMtrNRsp bit (47) is set to “1”. When the Control Output (SigW) signal is greater than 1/16 WindCOMax Volts (CP-286) and the WindRollRPM (MP-13) is less than Zero Spd (CP-370) for longer than the No Response Time (CP-372), then the WdMtrNRsp bit (57) is set to “1”. If this scenario occurs, it is generally an indication that the feedback has been lost. It can also indicate that the drive is not enabled (or faulted out), that the Control Output (SigU) signal is not getting to the drive or that there may be a physical obstruction preventing motion.

Minimum Value: 0.010	Maximum Value: 600
Default Value: 1.000	Units: Seconds

CP-373 UwndMaxRmp

When either the feedback acceleration or the deceleration is greater than or equal to Unwind Maximum Ramp (CP-373), then the UwMxAcDcl bit (46) in the PLC is set to “1” . You can output this alarm for indication or action, or you can use the alarm logically in the PLC.

Minimum Value: 0	Maximum Value: 9999999
Default Value: 2000	Units: EU/Tm/Sec

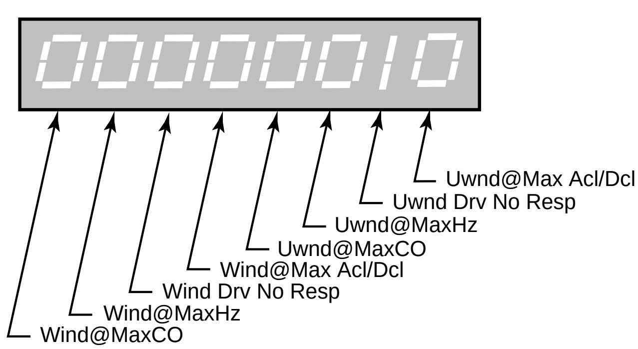
CP-374 WindMaxRmp

When either the feedback acceleration or the deceleration is greater than or equal to Wind Maximum Ramp (CP-374), then the WdMxAcDcl bit (56) in the PLC is set to “1”. You can output this alarm for indication or action, or you can use the alarm logically in the PLC.

Minimum Value: 0	Maximum Value: 9999999
Default Value: 2000	Units: EU/Tm/Sec

CP-378 Std Alm Msk

The Standard Alarm Mask (CP-378) allows you to mask out specific alarms so that they will not cause the ‘Alm’ indicator to flash (in the lower left-hand corner of the CX-1102 screen) by entering a “0” in the corresponding bit position (see figure below). You can also activate any of these alarm conditions by entering a “1” in the corresponding bit position.

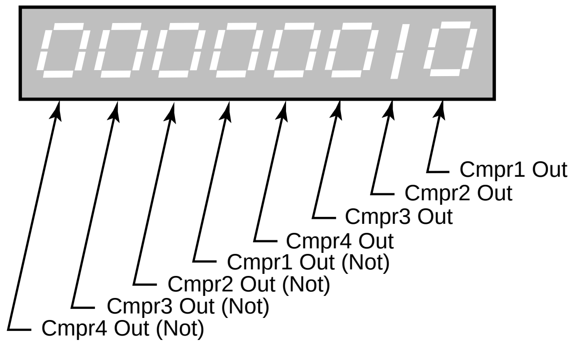


Minimum Value: 00000000	Maximum Value: 11111111
Default Value: 00000000	Units: Coded

(Continued)

CP-379 CustAlm Msk

Custom Alarm Mask (CP-379) allows you to mask out the compare results so that they will not cause the 'Alm' indicator to flash (in the lower left-hand corner of the CX-1102 screen) by entering a "0" in the corresponding bit position (see figure below). You can also activate any of these compare conditions by entering a "1" in the corresponding bit position.



Minimum Value: 00000000	Maximum Value: 11111111
Default Value: 00000000	Units: Coded

(Continued)

Appendix C: Parameter Summary Numeric Quick Reference (continued)

CP-380 Cmpr1 Parm

Enter a Monitor Parameter code in Compare 1 Parameter (CP-380) that will act on the value in Cmpr1 Val (CP-392), by using the comparison type that you entered in Cmp1 Type (CP-386). If the comparison that is established by these three parameters is “true”, then the PLC sets the Cmpr1 Out bit (60) in the PLC to “1”, which can be used to trigger a user defined indicator.

Minimum Value: 1	Maximum Value: 199
Default Value: 12 (WindEncRPM)	Units: Parameter Code

NOTE: The following Monitor Parameters are not available for the Cmpr1 Parm (CP-380), Cmpr2 Parm (CP-381), Cmpr3 Parm (CP-382) or Cmpr4 Parm (CP-383):

MP-52 .... InvalidBlks
MP-53 .... Misc Status
MP-54 .... Std Alarms
MP-55 .... Custom Alms
MP-56 .... Run LED
MP-57 .... Alarm LED
MP-58 .... Dancer State
MP-59 .... Setup State
MP-60 .... Uwnd Dirn
MP-61 .... Wind Dir
MP-70 .... Wrap Pty
MP-71 .... SigPolarity
MP-72 .... UwndCntrlLp
MP-73 .... WindCntlLp
MP-90 ... SerCom Char In
MP-91 .... SerCom Errs
MP-94 .... ROM Test
MP-95 .... SRAM Test
MP-96 ...... NV RAM Test
MP-97 .... MODEL #
MP-98 .... RELEASE
MP-99 .... REVISION
MP-100 .... DI 7..0
MP-101 .... DI 15..8
MP-102 .... DO 7..0
MP-103 KeyPad Lockout
MP-108 .. PLC Mon 1 Val
MP-109 .. PLC Mon 2 Val
MP-110 .... PLC 15-8
MP-111 .... PLC 23-16
MP-112 .... PLC 31-24
MP-113 .... PLC 39-32
MP-114 .... PLC 47-40
MP-115 .... PLC 55-48
MP-116 .... PLC 63-56
MP-117 .... PLC 71-64
MP-118 .... PLC 79-72
MP-119 .... PLC 87-80
MP-120 .... PLC 95-88
MP-121 ..... PLC 107-100
MP-122 ..... PLC 115-108
MP-123 ..... PLC 123-116
MP-124 ..... PLC 131-124
MP-125 ..... PLC 139-132
MP-126 ..... PLC 147-140
MP-127 ..... PLC 155-148
MP-128 ..... PLC 163-156
MP-129 ..... PLC 171-164
MP-130 ..... PLC 179-172
MP-131 ..... PLC 187-180
MP-132 ..... PLC 195-188
MP-133 ..... PLC 203-196
MP-134 ..... PLC 211-204
MP-135 ..... PLC 219-212
MP-150 .... Last Reset
MP-151 .... Misc Intrpt
MP-152 ...... Device Alms
MP-153 .... PC at Intrpt
MP-156 .... Mem Err Cntr
MP-157 ... WatchDogCntr
MP-158 ... MiscIntrptCntr
MP-168 ... AnlgCal Ref A
MP-169 ... AnlgCal Ref B

(Continued)

CP-381 Cmpr2 Parm

Enter a Monitor Parameter code in Compare 2 Parameter (CP-381) that will act on the value in Cmpr2 Val (CP-393), by using the comparison type that you entered in Cmp2 Type (CP-387). If the comparison that is established by these three parameters is “true”, then the PLC sets the Cmpr2 Out bit (61) in the PLC to “1”, which can be used to trigger a user defined indicator.

Minimum Value: 1	Maximum Value: 199
Default Value: 22 (UwndRR Err)	Units: Parameter Code

NOTE: Refer to the "NOTE" in CP-380.

CP-382 Cmpr3 Parm

Enter a Monitor Parameter in Compare 3 Parameter (CP-382) that will act on the value in Cmpr3 Val (CP-394), by using the comparison type that you entered in Cmp3 Type (CP-388). If the comparison that is established by these three parameters is “true”, then the PLC sets the Cmpr3 Out bit (62) in the PLC to “1” , which can be used to trigger a user defined indicator.

Minimum Value: 1	Maximum Value: 199
Default Value: 32 (WindRR Err)	Units: Parameter Code

NOTE: Refer to the "NOTE" in CP-380.

CP-383 Cmpr4 Parm

Enter a Monitor Parameter in Compare 4 Parameter (CP-382) that will act on the value in Cmpr4 Val (CP-395), by using the comparison type that you entered in Cmpr4 Type (CP-389). If the comparison that is established by these three parameters is “true”, then the PLC sets the Cmpr4 Out bit (63) in the PLC Programming screen to “1”, which can be used to trigger a user defined indicator.

Minimum Value: 1	Maximum Value: 199
Default Value: 17 (WindEstDia)	Units: Parameter Code

NOTE: Refer to the "NOTE" in CP-380.

CP-386 Cmpr1 Type

Use Cmpr1 Type (CP-386) to establish the type of comparison (see list below) that will compare the Monitor Parameter that you entered in Cmpr1 Parm (CP-380) to the value that you entered in Cmpr1 Val (CP-392). If you require a comparison that is not listed, then set the Cmpr1 Out bit in the PLC to “Ld Not”. This programs the comparison type to become a “Not” statement For example, to program “Magnitude Less Than” (<) use “NOT” Magnitude greater than or equal to (>=).

6 = ‘mag =’ if Magnitude of parm selected by Cmpr1 Parm = Cmpr1 Val, Cmpr1 Out = 1
5 = ‘mag >=’ if Magnitude of parm selected by Cmpr1 Parm >= Cmpr1 Val, Cmpr1 Out = 1
4 = ‘mag >’ if Magnitude of parm selected by Cmpr1 Parm > Cmpr1 Val, Cmpr1 Out = 1
3 = ‘=’ if value of parm selected by Cmpr1 Parm = Cmpr1 Val, Cmpr1 Out = 1
2 = ‘>=’ if value of parm selected by Cmpr1 Parm >= Cmpr1 Val, Cmpr1 Out = 1
1 = ‘>’ if value of parm selected by Cmpr1 Parm > Cmpr1 Val, Cmpr1 Out = 1

Minimum Value: 1	Maximum Value: 6
Default Value: 4	Units: Coded

(Continued)

CP-387 Cmpr2 Type

Use Cmpr2 Type (CP-387) to establish the type of comparison (see list below) that will compare the Monitor Parameter that you entered in Cmpr2 Parm, (CP-381) to the value that you entered in Cmpr2 Val (CP-393). If you require a comparison that is not listed, then set the Cmpr2 Out bit in the PLC to “Ld Not”. This programs the comparison type to become a “Not” statement For example, to program “Magnitude Less Than ” (<) use “NOT ” Magnitude greater than or equal to (>=).

6 = ‘mag =’ if Magnitude of parm selected by Cmpr2 Parm) = Cmpr2 Val, Cmpr2 Out = 1
5 = ‘mag >=’ if Magnitude of parm selected by Cmpr2 Parm) >= Cmpr2 Val, Cmpr2 Out = 1
4 = ‘mag >’ if Magnitude of parm selected by Cmpr2 Parm) > Cmpr2 Val, Cmpr2 Out = 1
3 = ‘=’ if value of parm selected by Cmpr2 Parm) = Cmpr2 Val, Cmpr2 Out = 1
2 = ‘>=’ if value of parm selected by Cmpr2 Parm) >= Cmpr2 Val, Cmpr2 Out = 1
1 = ‘>’ if value of parm selected by Cmpr2 Parm) > Cmpr2 Val, Cmpr2 Out = 1

Minimum Value: 1	Maximum Value: 6
Default Value: 4	Units: Coded

CP-388 Cmpr3 Type

Use Cmpr3 Type (CP-388) to establish the type of comparison (see list below) that will compare the Monitor Parameter that you entered in Cmpr3 Parm (CP-382) to the value that you entered in Cmpr3 Val (CP-394). If you require a comparison that is not listed, then set the Cmpr3 Out bit in the PLC to “Ld Not”. This programs the comparison type to become a “Not” statement For example, to program “Magnitude Less Than” (<) use “NOT” Magnitude greater than or equal to(>=).

6 = ‘mag =’ if Magnitude of parm selected by Cmpr3 Parm) = Cmpr3 Val, Cmpr3 Out = 1
5 = ‘mag >=’ if Magnitude of parm selected by Cmpr3 Parm) >= Cmpr3 Val, Cmpr3 Out = 1
4 = ‘mag >’ if Magnitude of parm selected by Cmpr3 Parm) > Cmpr3 Val, Cmpr3 Out = 1
3 = ‘=’ if value of parm selected by Cmpr3 Parm) = Cmpr3 Val, Cmpr3 Out = 1
2 = ‘>=’ if value of parm selected by Cmpr3 Parm) >= Cmpr3 Val, Cmpr3 Out = 1
1 = ‘>’ if value of parm selected by Cmpr3 Parm) > Cmpr3 Val, Cmpr3 Out = 1

Minimum Value: 1	Maximum Value: 6
Default Value: 4	Units: Coded

CP-389 Cmpr4 Type

Use Cmpr4 ype (CP-388) to establish the type of comparison (see list below) that will compare the Monitor Parameter that you entered in Cmpr4 Parm (CP-383) to the value that you entered in Cmpr4 Val (CP-395). If you require a comparison that is not listed, then set the Cmpr4 Out bit in the PLC to “Ld Not”. This programs the comparison type to become a “Not” statement For example, to program “Magnitude Less Then ” (<) use “NOT ” Magnitude greater than or equal to (>=).

6 = ‘mag =’ if Magnitude of parm selected by Cmpr4 Parm) = Cmpr4 Val, Cmpr4 Out = 1
5 = ‘mag >=’ if Magnitude of parm selected by Cmpr4 Parm) >= Cmpr4 Val, Cmpr4 Out = 1
4 = ‘mag >’ if Magnitude of parm selected by Cmpr4 Parm) > Cmpr4 Val, Cmpr4 Out = 1
3 = ‘=’ if value of parm selected by Cmpr4 Parm) = Cmpr4 Val, Cmpr4 Out = 1
2 = ‘>=’ if value of parm selected by Cmpr4 Parm) >= Cmpr4 Val, Cmpr4 Out = 1
1 = ‘>’ if value of parm selected by Cmpr4 Parm) > Cmpr4 Val, Cmpr4 Out = 1

Minimum Value: 1	Maximum Value: 6
Default Value: 5	Units: Coded

(Continued)

CP-392 Cmpr1 Val

Enter a value in Cmpr1 Val (CP-392) that will be compared to the Monitor Parameter in Cmpr1 Parm (CP-380), using the comparison type that you entered in Cmpr1 Type (CP-386). If the comparison that is established by these three parameters is “true”, then the PLC sets the Cmpr1 Out bit (60) in the PLC to “1” .

Minimum Value: -9999999	Maximum Value: 9999999
Default Value: 2000	Units: same as the selected MP

CP-393 Cmpr2 Val

Enter a value in Cmpr2 Val (CP-393) that will compared to the Monitor Parameter in Cmpr2 Parm (CP-381), using the comparison type that you entered in Cmpr2 Type (CP-387). If the comparison that is established by these three parameters is “true”, then the PLC sets the Cmpr2 Out bit (61) in the PLC screen to “1”.

Minimum Value: -9999999	Maximum Value: 9999999
Default Value: 200	Units: same as the selected MP

CP-394 Cmpr3 Val

Enter a value in Cmpr3 Val (CP-394) that will be compared to the Monitor Parameter in Cmpr3 Parm (CP-382), using the comparison type that you entered in Cmpr3 Type (CP-388). If the comparison that is established by these three parameters is “true”, then the PLC sets the Cmpr3 Out bit (62) in the PLC to “1”.

Minimum Value: -9999999	Maximum Value: 9999999
Default Value: 200	Units: same as the selected MP

CP-395 Cmpr4 Val

Enter a value in Cmpr4 Val (CP-395) that will be compared to the Monitor Parameter in Cmpr4 Parm (CP-383), using the boundary type that you entered in Cmpr4 Type (CP-389). If the comparison that is established by these three parameters is “true”, then the PLC sets the Cmpr4 Out bit (63) in the PLC to “1” .

Minimum Value: -9999999	Maximum Value: 9999999
Default Value: 72	Units: same as the selected Monitor Parameter

CP-396 Copy Source 1

Copy Source 1 (CP-396) identifies the CP or MP whose value is copied to Copy Dest 1 (CP-397) when a 0 to 1 transition occurs in the Data Copy 1 PLC bit (160).

Minimum Value: 1	Maximum Value: 667
Default Value: 230	Units: CP or MP

CP-397 Copy Dest 1

Copy Dest 1 (CP-397) identifies the CP that takes on the value of the CP or MP identified by Copy Source 1 (CP-396) when a 0 to 1 transition occurs in the Data Copy 1 PLC bit (160).

Minimum Value: 201	Maximum Value: 667
Default Value: 230	Units: CP or MP

(Continued)

CP-398 Copy Source 2

Copy Source 2 (CP-398) identifies the CP or MP whose value is copied to Copy Dest 2 (CP-399) when a 0 to 1 transition occurs in the Data Copy 2 PLC bit (161).

Minimum Value: 1	Maximum Value: 667
Default Value: 235	Units: CP or MP

CP-399 Copy Dest 2

Copy Dest 2 (CP-399) identifies the CP that takes on the value of the CP or MP identified by Copy Source 2 (CP- 398) when a 0 to 1 transition occurs in the Data Copy 2 PLC bit (161).

Minimum Value: 201	Maximum Value: 667
Default Value: 235	Units: CP or MP

CP-400 Rmt Scroll

In Remote Scroll (CP-400), enter the number of the Control Parameter that you want the Remote Scroll Up PLC bit (168) or the Remote Scroll Dn PLC bit (169) to increment or decrement by 1 least significant digit, at the Rmt Scroll Rate (CP-401). To disable the function, set Rmt Scroll (CP-400) to “0” .

Minimum Value: 0	Maximum Value: 449
Default Value: 201	Units: Parameter CP

CP-401 Rmt Scroll Rate

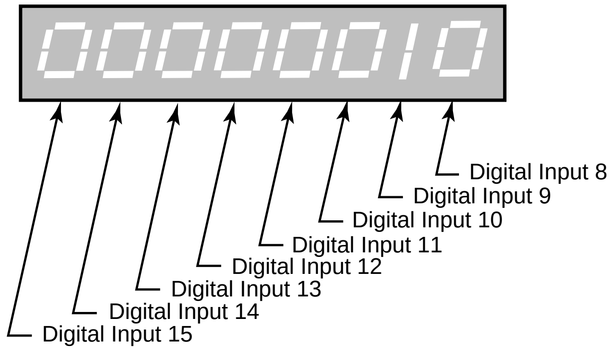
Remote Scroll Rate (CP-401) is the number of times per second, that the Control Parameter that you entered in Rmt Scroll (CP-400) is either incremented or decremented by 1 least significant digit , when the Remote Scroll Up PLC bit (168) or the Remote Scroll Dn PLC bit (169) is active.

Minimum Value: 1	Maximum Value: 100
Default Value: 10	Units: Increments/Decrements

(Continued)

CP-402 DI 1 Shot

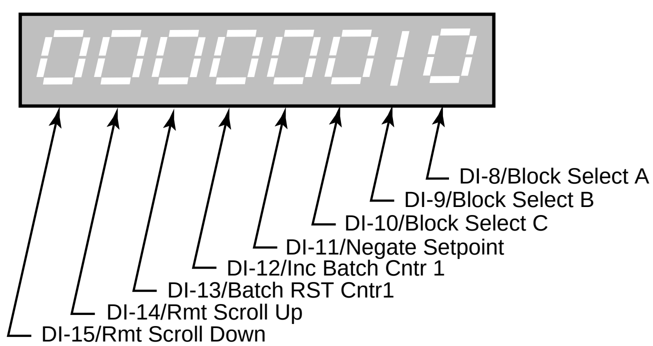
Use the Digital Input 1 Shot (CP-402) to create a one scan pulse (one-shot) as the result of a high-to-low (open-to-closed) transition on any or all of the PLC dedicated inputs. To generate a 1-scan pulse for an inactive high to an active low transition, enter a “1” in the bit location of corresponding digital input. In the example below, the “1” has been entered in Digital Input 9.



Minimum Value: 00000000 Maximum Value: 11111111
Default Value: 00000000 Units: Coded

CP-403 DI Set

Digital Input Set (CP-403) simulates an “ACTIVE” condition on any or all of the PLC dedicated Digital Inputs (DI 15-8). DI Set (CP-403) is logically OR’ed with the actual DI 15..8 (MP-101) bits to form the PLC 15-8 (MP-110) bits. The PLC 15-8 (MP-110) bits are used by the PLC logic. The value of DI Set (CP-403) will not effect the actual DI 15..8 (MP-101) value, rather, DI 15..8 (MP-101) reflects the present status of the actual inputs. Enter a “1” in a bit location to simulate an active condition on the corresponding input. DI 15 to DI 8 get mapped into Bit 7 to Bit 0. Refer to the graphic below.



Minimum Value: 00000000 Maximum Value: 11111111
Default Value: 00000000 Units: Coded

(Continued)

CP-405 PLC Monitor 1

PLC Monitor 1 (CP-405) determines which PLC bit will be monitored in PLC Mon 1 Val (MP-108). The PLC Mon 1 Val (MP-108) displays the name of the bit rather than "PLC Mon 1 Val". To select a PLC bit to monitor, enter the number of the bit or by use the Scroll keys (^ or v) to scroll through the list. This bit can be monitored in any screen when the code select line set to PLC Mon 1 Val (MP-108).

Minimum Value: 0	Maximum Value: 223
Default Value: 12	Units: PLC Bits

CP-406 PLC Monitor 2

PLC Monitor 2 (CP-406) determines which PLC bit will be monitored in PLC Mon 2 Val (MP-109). The PLC Mon 2 Val (MP-109) displays the name of the bit rather than "PLC Mon 2 Val". To select a PLC bit to monitor, enter the number of the bit or by use the Scroll keys (^ or v) to scroll through the list. This bit can be monitored in any screen when the code select line set to PLC Mon 2 Val (MP-109).

Minimum Value: 0	Maximum Value: 223
Default Value: 13	Units: PLC Bits

CP-407 PLC Bit Set

PLC Bit Set (CP-407) forces a PLC bit to be set to "1". Enter the number of the bit that you want to set to "1".   PLC Bit Set (CP-407) tests your PLC program rather than commanding a direct operation. The bit is set prior to the PLC program execution but after all the inputs, comparisons, timers and counters have had their status bits set up. However, the PLC could clear this bit and unpredictable results can occur. Do not attempt to set a PLC bit that is controlled by an OUT instruction in the PLC program. If you need to force an output, use Diag DO in the diagnostics screen.

Minimum Value: 0	Maximum Value: 223
Default Value: 3	Units: PLC Bits

CP-408 PLC Bit Clear

PLC Bit Clear (CP-408) forces a PLC bit to be reset to "0". Enter the number of the bit that you want to clear. PLC Bit Clear (CP-408) tests your PLC program rather than commanding a direct operation. The bit is cleared prior to the PLC program execution but after all the inputs, comparisons, timers and counters have set up their status bits.   However, the PLC could set this bit and unpredictable results can occur. Do not attempt to clear a PLC bit that is controlled by an OUT instruction in the PLC program. If you need to force an output, use Diag DO in the DIG I/O Test diagnostics screen.

Minimum Value: 0	Maximum Value: 223
Default Value: 2	Units: PLC Bits

CP-410 Tmr1 Delay

Timer 1 Delay (CP-410) is the time, in seconds, from which Timer 1 becomes enabled (Tmr1 En bit going from 0 to 1) until the Tmr1 Out bit (24) in the PLC is activated = 1. When the Tmr1 En bit (124) returns to "0", the Tmr1 Out bit (24) is reset to "0" and the delay-time is reset to "0".

Minimum Value: 0	Maximum Value: 86400
Default Value: 1.000	Units: Seconds

(Continued)

CP-411 Tmr1 on Tm

Timer 1 on Time (CP-411) is the time, in seconds, from which Tmr 1 Out is activated (= 1) until Tmr1 Out is deactivated (back to 0). When the Tmr1 En bit (124) returns to “0”, the Tmr1 Out bit (24) is reset = 0 and the on- time is reset to “0”. If you want Timer 1 on-time to be infinite (“On” until Tmr1 is disabled with Tmr1 En = 0), then enter a value of -1 into Tmr1 on Tm (CP-411).

Minimum Value: -1	Maximum Value: 86400
Default Value: -1	Units: Seconds

CP-412 Tmr2 Delay

Timer 2 Delay (CP-412) is the time in seconds from which Timer 2 becomes enabled (Tmr2 En bit going from 0 to 1) until the Tmr2 Out bit (25) in the PLC activated = 1. When the Tmr2 En bit (125) returns to “0”, the Tmr2 Out bit (25) is reset to “0” and the delay-time is reset to “0”.

Minimum Value: 0	Maximum Value: 86400
Default Value: 1.000	Units: Seconds

CP-413 Tmr2 on Tm

Timer 2 on Time (CP-413) is the time, in seconds, from which Tmr 2 Out is activated (= 1) until Tmr2 Out is de-activated (back to 0). When the Tmr2 En bit (125) returns to “0”, the Tmr2 Out bit (25) is reset = 0 and the on- time is reset to “0”. If you want Tmr2 on-time to be infinite (“On” until Tmr2 is disabled with Tmr2 En = 0), then enter a value of -1 into Tmr2 on Tm (CP-413).

Minimum Value: -1	Maximum Value: 86400
Default Value: -1	Units: Seconds

CP-414 Tmr3 Delay

Timer 3 Delay (CP-414) is the time, in seconds, from which Timer 3 becomes enabled (Tmr3 En bit going from 0 to 1) until the Tmr3 Out bit (26) in the PLC is activated = 1. When the Tmr3 En bit (126) returns to “0”, the Tmr3 Out bit (26) is reset to “0” and the delay-time is reset to “0”.

Minimum Value: 0	Maximum Value: 86400
Default Value: 1.000	Units: Seconds

CP-415 Tmr3 on Tm

Timer 3 on Time (CP-415) is the time, in seconds, from which Tmr3 Out is activated (= 1) until Tmr3 Out is deactivated (back to 0). When the Tmr3 En bit (126) returns to “0”, the Tmr3 Out bit (24) is reset = 0 and the on- time is reset to “0”. If you want Timer 3 on-time to be infinite (“On” until Tmr3 is disabled with Tmr3 En = 0), then enter a value of -1 into Tmr3 on Tm (CP-415).

Minimum Value: -1	Maximum Value: 86400
Default Value: -1	Units: Seconds

(Continued)

CP-416 Tmr4 Delay

Timer 4 Delay (CP-416) is the time, in seconds, from Timer 4 becoming enabled (Tmr4 En bit going from “0” to “1”) toTmr4 Out bit (27) in the PLC going active = 1. If Tmr4 becomes disabled, the delay-time is retained so the timing can continue when Tmr4 is re-enabled. The Tmr4Rst bit (128) in the PLC must be used to reset the delay time to “0”.

Minimum Value: 0	Maximum Value: 86400
Default Value: 1.000	Units: Seconds

CP-417 Tmr4 on Tm

Timer 4 on Tm (CP-417) is the time, in seconds, from Tmr4 Out going active (= 1) until Tmr4 Out going inactive (back to “0”). When Tmr4 becomes disabled, the on-time is retained so the timing can continue when Tmr4 is re-enabled. The Tmr4 Rst bit (128) in the PLC must be used to reset the on-time to “0”. If you want Tmr4 on-time to be infinite (“On” until Tmr4 is reset with Tmr4 Rst = 1), then enter a value of “-1” in Tmr4 on Tm (CP-417).

Minimum Value: -1	Maximum Value: 86400
Default Value: -1	Units: Seconds

CP-420 Cntr1 Trig

When the Cntr1 Cnt (CP-421) is greater than or equal to Counter 1 Trigger (CP-420), then the Cntr1 Out bit (32) in the PLC is set to “1”. If the count is less than Counter 1 Trigger, then Cntr1 Out bit (32) will be “0”.

Minimum Value: 0	Maximum Value: 10000000
Default Value: 10	Units: Counts

CP-421 Cntr1 Cnt

Counter 1 Count (CP-421) is the current count for “Counter 1”.   The CX-1102 automatically increments it one count for every “0” to “1” transition of the Cntr1 Inc bit (130). Counter 1 Count is the default batch counter. Either use the Scroll keys or enter a new number to change this value.   When the PLC program sets Cntr1 Rst bit (135) to “1”, then the Cntr1 Cnt (CP-421) resets to “0” .

Minimum Value: 0	Maximum Value: 10000000
Default Value: 0	Units: Counts

CP-422 Cntr2 Trig

When the Cntr2 Cnt (CP-423) is greater than or equal to Counter 2 Trigger (CP-422), then the Cntr2 Out bit (33) in the PLC is set to “1”. If the count is less than, the Counter 2 Trigger, the Cntr2 Out bit (33) will be “0”.

Minimum Value: 0	Maximum Value: 10000000
Default Value: 10	Units: Counts

CP-423 Cntr2 Cnt

Counter 2 Count (CP-423) is the current count for “Counter 2”. The CX-1102 automatically increments it one count for every “0” to “1” transition of the Cntr2 Inc bit (131). Either use the Scroll keys or enter a new number to change this value. When the PLC program sets Cntr2 Rst bit (136) to “1”, then the Cntr2 Cnt (CP-423) resets to “0” .

Minimum Value: 0	Maximum Value: 10000000
Default Value: 0	Units: Counts

(Continued)

CP-424 Cntr3 Trig

When the Cntr3 Cnt (CP-425) is greater than or equal to Counter 3 Trigger (CP-424), then the Cntr3 Out bit (34) in the PLC is set to “1”. If the count is less than, the Counter 3 Trigger, the Cntr3 Out bit (34) will be “0”.

Minimum Value: 0	Maximum Value: 10000000
Default Value: 10	Units: Counts

CP-425 Cntr3 Cnt

Counter 3 Count (CP-425) is the current count for “Counter 3”. The CX-1102 automatically increments it one count for every “0” to “1” transition of the Cntr3 Inc bit (132). Either use the Scroll keys or enter a new number to change this value. When the PLC program sets Cntr3 Rst bit (137) to “1”, then the Cntr3 Cnt (CP-425)   resets to “0” .

Minimum Value: 0	Maximum Value: 10000000
Default Value: 0	Units: Counts

CP-426 Cntr4TrigUp

When Cntr4 Cnt (CP-427) is greater than or equal to Counter 4 Trigger Up (CP-426), then the Cntr4 UpOut bit (35) in the PLC is set to “1”. If the count is less than, the Counter 4 Trigger Up, the Cntr4UpO bit (35) will be “0”.

Minimum Value: 0	Maximum Value: 10000000
Default Value: 10	Units: Counts

CP-427 Cntr4Cnt

Counter 4 Count (CP-427) is the current count for “Counter 4”. The CX-1102 automatically increments it one count for every “0” to “1” transition of the Cntr4 Inc bit (133). The CX-1102 automatically decrements it one count for every “0” to “1” transition of the Cntr Dec bit (134). Either use the Scroll keys or enter a new number to change this value. When the PLC program sets Cntr4 Rst bit (138) to “1”, then the Cntr4 Cnt (CP-427) resets to the value of Cntr4Preset (CP-429).

Minimum Value: 0	Maximum Value: 10000000
Default Value: 0	Units: Counts

CP-428 Cntr4TrigDn

When Cntr4 Cnt (CP-427) is less than or equal to Counter 4 Trigger Down (CP-428), then the Cntr4DnO bit (36) in the PLC is set to “1”. If the count is less than, the Counter 4 Trigger Down, the Cntr4 DnO bit (36) will be “0”.

Minimum Value: 0	Maximum Value: 10000000
Default Value: 0	Units: Counts

CP-429 Cntr4Preset

When the Cntr4 Rst bit in the PLC Programming screen is set to “ 1”, then Cntr4 Cnt (CP-327) is set to and held at the Counter 4 Preset (CP-429) value. If you need a transition preset , then create a one-shot or, when possible, use the DI 1 Shot (CP-402) mask.

Minimum Value: 0	Maximum Value: 10000000
Default Value: 0	Units: Counts

(Continued)

CP-430 DN Write Parm 1

Enter the number of a Control Parameter to be written to with the DeviceNet poll command in the I/O Assembly Queue.

Minimum Value: 0	Maximum Value: 667
Default Value: 0	Units: CP

CP-431 DN Write Parm 2

Enter the number of a Control Parameter to be written to with the DeviceNet poll command in the I/O Assembly Queue.

Minimum Value: 0	Maximum Value: 667
Default Value: 0	Units: CP

CP-432 DN Write Parm 3

Enter the number of a Control Parameter to be written to with the DeviceNet poll command in the I/O Assembly Queue.

Minimum Value: 0	Maximum Value: 667
Default Value: 0	Units: CP

CP-433 DN Write Parm 4

Enter the number of a Control Parameter to be written to with the DeviceNet poll command in the I/O Assembly Queue.

Minimum Value: 0	Maximum Value: 667
Default Value: 0	Units: CP

CP-434 DN Read Parm 1

Enter the number of a Control Parameter or Monitor Parameter to be read with the DeviceNet poll command in the I/O Assembly Queue.

Minimum Value: 0	Maximum Value: 667
Default Value: 0	Units: CP or MP

CP-435 DN Read Parm 2

Enter the number of a Control Parameter or Monitor Parameter to be read with the DeviceNet poll command in the I/O Assembly Queue.

Minimum Value: 0	Maximum Value: 667
Default Value: 0	Units: CP or MP

CP-436 DN Read Parm 3

Enter the number of a Control Parameter or Monitor Parameter to be read with the DeviceNet poll command in the I/O Assembly Queue.

Minimum Value: 0	Maximum Value: 667
Default Value: 0	Units: CP or MP

(Continued)

CP-437 DN Read Parm 4

Enter the number of a Control Parameter or Monitor Parameter to be read with the DeviceNet poll Command in the I/O Assembly Queue.

Minimum Value: 0	Maximum Value: 667
Default Value: 0	Units: CP or MP

CP-438 DN MAC ID

DN MAC ID is the DeviceNet Media Access Control Identifier. The MAC ID is used to assign a uniqe identifier or address to each node on the network. Assign a different MAC ID to each CX-1102 device on the network from 0 to 63.

Minimum Value: 0	Maximum Value: 63
Default Value: 63	Units: ID

CP-439 DN Baud Rate

The DN Baud Rate is the network data or transfer rate. Enter the number from the listing below that corresponds to the desired baud rate:

1 = 125k bps
2 = 250k bps
3 = 500k bps

Minimum Value: 1	Maximum Value: 3
Default Value: 1	Units: Coded

CP-440 Lg Number Parm

Use Large Number Parameter (CP-440) to select the parameter that displays in the large number display in the Status screen (refer to the status screen in *Operation: Screen Operation*). You can also use the Code key to access and change CP-440 in the Status screen.

Minimum Value: 1	Maximum Value: 667 (restricted)
Default Value: 40	Units: Parameter Code

CP-441 Status Line 1

Use Status Line 1 (CP-441) to select the parameter that displays on the first line (under the Large Number Display) of the Status screen (refer to the status screen in *Operation: Screen Operation*). You can also use the Code key to access and change CP-441 in the Status screen.

Minimum Value: 1	Maximum Value: 667
Default Value: 201	Units: Parameter Code

CP-442 Status Line 2

Use Status Line 2 (CP-442) to select the parameter that displays on the second line (under the Large Number Display) of the Status screen (refer to the status screen in *Operation: Screen Operation*). If you want this line to remain blank, enter a “0” in CP-442. You can also use the Code key to access and change CP-442 in the Status screen.

Minimum Value: 0	Maximum Value: 667
Default Value: 50	Units: Parameter Code

(Continued)

CP-443 Status Line 3

Use Status Line 3 (CP-443) to select the parameter that displays on the third line (under the Large Number Display) of the Status screen (refer to the status screen in *Operation: Screen Operation*). If you want this line to remain blank, enter a "0" in CP-443. You can also use the Code key to access and change CP-443 in the Status screen.

Minimum Value: 0	Maximum Value: 667
Default Value: 7	Units: Parameter Code

CP-444 Status Line 4

Use Status Line 4 (CP-444) to select the parameter that displays on the fourth line (under the Large Number Display) of the Status screen (refer to the status screen in *Operation: Screen Operation*). If you want this line to remain blank, enter a "0" in CP-444. You can also use the Code key to access and change CP-444 in the Status screen.

Minimum Value: 0	Maximum Value: 667
Default Value: 17	Units: Parameter Code

CP-445 Status Line 5

Use Status Line 5 (CP-445) to select the parameter that displays on the fifth line (under the Large Number Display) of the Status screen (refer to the status screen in *Operation: Screen Operation*). If you want this line to remain blank, enter a "0" in CP-445. You can also use the Code key to access and change CP-445 in the Status screen.

Minimum Value: 0	Maximum Value: 667
Default Value: 83	Units: Parameter Code

CP-446 Status Line 6

Use Status Line 6 (CP-446) to select the parameter that displays sixth line (under the Large Number Display) of the Status screen (refer to the status screen in *Operation: Screen Operation*). If you want this line to remain blank, enter a "0" in CP-446. You can also use the Code key to access and change CP-446 in the Status screen.

Minimum Value: 0	Maximum Value: 667
Default Value: 84	Units: Parameter Code

(Continued)

CP-449 Lg Number Units

Use Large Number Units (CP-449) to select the EU text that displays immediately below the Large Number Display on the Status screen (refer to the status screen in *Operation: Screen Operation*). Enter a numeric code that identifies the EU for the Control Parameter displayed in the Large Number Parameter (CP-440). Refer to the numeric code list below. The Help screen for CP-449 also contains a partial list of numeric code options. In addition, you can also scroll through the numeric code options by accessing CP-449 with the Code key while you are in the in the Status screen.

0 = <BLANK>
1 = Inches/min
2 = Feet/min (default)
3 = Yards/min
4 = mm/min
5 = cm/min
6 = Meters/min
7 = Inches/sec
8 = Feet/sec
9 = Yards/sec
10 = mm/sec
11 = cm/sec
12 = Meters/sec
13 = Inches/hr
14 = Feet/hr
15 = Yards/hr
16 = mm/hr
17 = cm/hr
18 = Meters/hr
19 = Inches
20 = Feet
21 = Yards
22 = Millimeters
23 = Centimeters
24 = Meters
25 = Hertz
26 = RPM
27 = Lines
28 = Counts
29 = Rotations
30 = RPM/sec
31 = Counts/sec
32 = Pulses/rev
33 = Volts
34 = Volts/kRPM
35 = Bits
36 = Percent (%)
37 = Seconds
38 = Minutes
39 = Hours
40 = Units/sec
41 = Units/min
42 = Units/hr
43 = Custom (user defined through the serial com)

Minimum Value: 0	Maximum Value: 43
Default Value: 2 Feet/min (default)	Units: Coded

CP-450 Diagnostics En

When Diagnostics Enable (CP-450) is set to “1, 2 or 3” (On or enabled), the digital inputs will not recognize their normal function and the digital outputs can be controlled by Diag DO (CP-452). In addition, the SigU/SigW Control Output can be tested. When you enter diagnostics, Diag DO (CP-452) is forced equal to the current DO 7..0 (MP-102) so that there is no unexpected change in the outputs. Change the outputs through Diag DO (CP-452) while performing the diagnostics.

Warning: The actuator may energize if you change Diag DO (CP-452). Stand clear of the system.

3 = Both
2 = Wind Axis
1 = Unwind Axis
0 = Disabled (default)

Minimum Value: 0	Maximum Value: 3
Default Value: 0	Units: Coded

(Continued)

CP-451 Diag DO Shift

When in Diagnostics State, Diagnostics Digital Out Shift (CP-451) may be used to activate the digital outputs one at a time.

Warning: The actuator may energize if you change Diag DO (CP-452). Stand clear of the system.

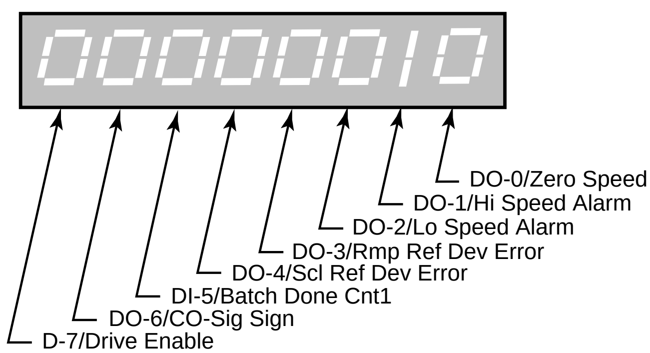
8 = Spare	Activated
7 = WbBrk	Activated
6 = Dncr	Activated
5 = WRlFl	Activated
4 = WErr	Activated
3 = UErr	Activated
2 = WdEn	Activated
1 = UwdEn	Activated
0 = Off (default)	

Minimum Value: 0	Maximum Value: 8
Default Value: 0	Units: Coded

CP-452 Diag DO

Diagnostic Digital Out (CP-452) controls the digital outputs when Diagnostics En (CP-450) is set to “1, 2 or 3” (On or enabled) during diagnostics. It is an 8 Bit Binary number with 1 bit per output. If the bit is a “1”, then the corresponding output is pulled “low”. When you enter diagnostics, Diag DO (CP-452) is forced equal to the current DO 7..0 (MP-102) so that there is no unexpected change in the outputs. Change the outputs through Diag DO (CP-452) while performing the diagnostics.

Warning: The actuator may energize if you change Diag DO (CP-452). Stand clear of the system.



Minimum Value: 00000000	Maximum Value: 11111111
Default Value: 00000000	Units: Coded

(Continued)

CP-453 Diag DAC Test

Diagnostic DAC Test (CP-453) selects and enables the type of output control that is used for the diagnostic Control Output DAC test.

2 = Immediate Output
1 = Continuous Ramp
0 = Disabled (default)

Minimum Value: 0	Maximum Value: 2
Default Value: 0	Units: Coded

CP-454 Diag DAC Volts

Diagnostic DAC Volts (CP-454) is the maximum voltage output (either positive or negative) at the Control Output DAC during a non zero diagnostic DAC test . The voltage corresponds to Diag DAC Bits (CP-455).

Minimum Value: -15	Maximum Value: 15
Default Value: 0	Units: Volts

CP-455 Diag DAC Bits

Diagnostic DAC Bits (CP-455) is the maximum value in bits written (either positive or negative) to the Control Output DAC during a non zero diagnostic DAC test (CP-453) and when Diag En (CP-450) is set to “1” (On or enabled). The value corresponds to Diag DAC Volts (CP-454).

Minimum Value: -32768	Maximum Value: 32767
Default Value: 0	Units: Bits

CP-456 Diag Rmp Tm

Diagnostic Ramp Time (CP-456) is the time, in seconds, from 0 volts to either positive or negative Diag DAC Volts (CP-454) during a diagnostic DAC test with a ramp.

Minimum Value: 0	Maximum Value: 600
Default Value: 10.000	Units: Seconds

CP-460 Analog Cal En

Analog Calibration Enable (CP-456) enables the calibration process for the auxiliary analog board. When Analog Cal En (CP-460) is set to “1” (On), the signal that is selected in Analog Cal Sel (CP-461) will be calibrated.

1 = Enabled
0 = Disabled (default)

Minimum Value: 0	Maximum Value: 1
Default Value: 0	Units: Coded

(Continued)

CP-461 Analog Cal Sel

Analog Calibration Select (CP-461) selects the signal (AI1, AI2) on the auxiliary analog board for calibration.

2 = Analog In 2 (Linespeed Pot)
1 = Analog In 1 (default) (Dancer)

Minimum Value: 1	Maximum Value: 2
Default Value: 1	Units: Coded

CP-462 Analog Cal Ref

Analog Calibration Reference (CP-462) determines which of the two calibration reference points (see list below) are to be calibrated.

2 = point B
1 = point A (default)

Minimum Value: 1	Maximum Value: 2
Default Value: 1	Units: Coded

CP-463 Analog Ref Val

Analog Reference Value (CP-463) is the value of measured data for the signal at the specified reference point (Analog Cal Ref, CP-462). Use a voltmeter for voltage mode operation to measure the voltage on the analog signal selected for calibration at the specified reference point. Enter the measured value in the Analog Ref Val (CP-463).

Minimum Value: -6.0	Maximum Value: 6
Default Value: 0	Units: Volts

CP-468 CRC Enable

If CRC Enable (CP-468) is set to “ON” (1), you must append a CRC value to all serial communications messages that are received by the CX-1102 (See *Serial Communications: Using Serial Communications*). The CX-1102 checks the CRC value against the the message contents (excluding the “STX”), then calculates a CRC value and appends it to all serial communications responses. If CRC Enable (CP-468) is set to “OFF” (0), the CX-1102 will ignore any CRC value that is appended to a message and will not append a CRC value to any serial communications responses.

1 = On (Enabled)
0 = Off (Disabled)

Minimum Value: 0	Maximum Value: 1
Default Value: 1	Units: None

CP-469 Record Format

Record Format (CP-469) determines which type of data format (see list below) will be used for the serial communication.

3 = ASCII2
2 = ASCII
1 = BINARY

Minimum Value: 1	Maximum Value: 3
Default Value: 1	Units: Coded

(Continued)

CP-470 Device Address

Device Address (CP-470) assigns a serial communications address to the CX-1102. This number should be different from any other units that are on the serial communications link.

Minimum Value: 1	Maximum Value: 99
Default Value: 1	Units: Address

CP-471 Baud Rate

The Baud Rate (CP-471) determines the serial communications data transfer rate (see list below) in Bits/sec. With a 10 bit frame length, the number of frame/sec would be 1/10 the Baud Rate.

1 = 300 bps = 300 Baud
2 = 600 bps = 600 Baud
3 = 1200 bps = 1200 Baud
4 = 2400 bps = 2400 Baud
5 = 4800 bps = 4800 Baud
6 = 9600 bps = 9600 Baud (default)
7 = 19200 bps = 19.2k Baud

Minimum Value: 1	Maximum Value: 7
Default Value: 6	Units: Coded

CP-472 Frame Format

Frame Format (CP-472) determines the parity, the number of data bits, and the number of stop bits for the serial communications.

1 = N,8,1 = No Parity, 8 data bits, 1 stop bit (10 bit frame - ASCII or Binary) (default)
2 = E,7,1 = Even Parity, 7 data bits, 1 stop bit (10 bit frame-ASCII only)

Minimum Value: 1	Maximum Value: 2
Default Value: 1	Units: Coded

CP-473 SerCom Char Out

When a new value is entered in SerCom Char Out (CP-473), it is transmitted out the RS-485 serial port at the Baud Rate (CP-471) and the Frame Format (CP-472). SerCom Char Out (CP-473) is a decimal number.

Minimum Value: 0	Maximum Value: 255
Default Value: 0	Units: Decimal Character

(Continued)

CP-474 Video Mode

Video Mode (CP-474) determines how the LCD Screen Display will be dispalyed, per the list below:

3 = Standard Video w/Border
2 = Reverse Video
1 = Standard Video(default)

Minimum Value: 1	Maximum Value: 3
Default Value: 1	Units: Coded

CP-475 Contrast Value

Contrast Value (CP-475) determines the contrast for the LCD Screen Display. The higher values darken the pixels and lower values lighten the pixels.

Minimum Value: 8	Maximum Value: 32
Default Value: 18	Units: Contrast Integer

CP-478 Blk Sel Source

Block Select Source (CP-478) determines whether the active block will be selected by the digital inputs and PLC, by Keypad Blk Sel (CP-479) or by Cntr4 Cnt.

3 = Cntr4 Cnt
2 = KyPd = Keypad Blk Sel
1 = DgIn = Digital Inputs/PLC (default)

Minimum Value: 1	Maximum Value: 2
Default Value: 1	Units: Coded

CP-479 Keypad Blk Sel

The Keypad Block Select (CP-479) determines which block will be active when Blk Sel Source (CP-478) is set to “2” (KyPd).

Minimum Value: 0	Maximum Value: 7
Default Value: 0	Units: Parameter Code

(Continued)

CP-480 KyPdLk Mask

Key Pad Lock Mask (CP-480) sets the level of keypad lockout when the Keypad Lockout input is active (low). Each level allows certain Control Parameters to be changed (or masked out from the lockout) even though keypad lockout is active. A value of “1” or higher allows the Control Parameters that are selected by Unlock CP A-H (CP-481 to CP-488) to be changed, with the keypad lockout active. When set to “3” (Blk Vals), the block values can be changed as well as the Main List Block Parameter Values and the unlocked Control Parameters. When set to “4” (UnLckBlk), the block values of the block selected by Unlock Block (CP-489) can be changed as well as the main list block parameter values and the unlocked Control Parameters, when the selected block is active.

4 = UnLckBlk = Block Values of the Block Selected by Unlock Block (CP-489) and the Unlocked CP’s.
3 = Blk Vals = All BlockValues (CP-540-567) and the Unlocked CP’s are allowed to change.
2 = Setpnts = Setpoints (CP-210, 220, 230, 235, 240) and the Unlocked CP’s are allowed to change.
1 = UnlckCP = CP’s selected by the Unlock CP A - F are allowed to changed.
0 = Total Lockout (default).

Minimum Value: 0	Maximum Value: 4
Default Value: 0	Units: Coded

CP-481 Unlock CP A

Unlock Control Parameter A (CP-481) determines which Control Parameter can change, even when the keypad lockout is active. For the Unlock CP A (CP-481) to function, KyPdLk Mask (CP-480) must be set to something other than “0” (All Lock). Enter “0” in Unlock CP A (CP-481) to disable it from selecting any Control Parameter.

Minimum Value: 0	Maximum Value: 667
Default Value: 0	Units: Parameter Code

CP-482 Unlock CP B

Unlock Control Parameter B (CP-482) determines which Control Parameter can change, even when the keypad lockout is active. For the Unlock CP B (CP-482) to function, KyPdLk Mask (CP-480) must be set to something other than “0” (All Lock). Enter “0” in Unlock CP B (CP-482) to disable it from selecting any Control Parameter.

Minimum Value: 0	Maximum Value: 667
Default Value: 0	Units: Parameter Code

CP-483 Unlock CP C

Unlock Control Parameter C (CP-483) determines which Control Parameter can change, even when the keypad lockout is active. For the Unlock CP C (CP-483) to function, KyPdLk Mask (CP-480) must be set to something other than “0” (All Lock). Enter “0” in Unlock CP C (CP-483) to disable it from selecting any Control Parameter.

Minimum Value: 0	Maximum Value: 667
Default Value: 0	Units: Parameter Code

CP-484 Unlock CP D

Unlock Control Parameter D (CP-484) determines which Control Parameter can change, even when the keypad lockout is active. For the Unlock CP D (CP-484) to function, KyPdLk Mask (CP-480) must be set to something other than “0” (All Lock). Enter “0” in Unlock CP D (CP-484) to disable it from selecting any Control Parameter.

Minimum Value: 0	Maximum Value: 667
Default Value: 0	Units: Parameter Code

(Continued)

CP-485 Unlock CP E

Unlock Control Parameter E (CP-485) determines which Control Parameter can change, even when the keypad lockout is active. For the Unlock CP E (CP-485) to function, KyPdLk Mask (CP-480) must be set to something other than “0” (All Lock). Enter “0” in Unlock CP E (CP-485) to disable it from selecting any Control Parameter.

Minimum Value: 0	Maximum Value: 667
Default Value: 0	Units: Parameter Code

CP-486 Unlock CP F

Unlock Control Parameter F (CP-486) determines which Control Parameter can change, even when the keypad lockout is active. For the Unlock CP F (CP-486) to function, KyPdLk Mask (CP-480) must be set to something other than “0” (All Lock). Enter “0” in Unlock CP F (CP-486) to disable it from selecting any Control Parameter.

Minimum Value: 0	Maximum Value: 667
Default Value: 0	Units: Parameter Code

CP-487 Unlock CP G

Unlock Control Parameter G (CP-487) determines which Control Parameter can change, even when the keypad lockout is active. For the Unlock CP G (CP-487) to function, KyPdLk Mask (CP-480) must be set to something other than “0” (All Lock). Enter “0” in Unlock CP G (CP-487) to disable it from selecting any Control Parameter.

Minimum Value: 0	Maximum Value: 667
Default Value: 0	Units: Parameter Code

CP-488 Unlock CP H

Unlock Control Parameter H (CP-488) determines which Control Parameter can change, even when the keypad lockout is active. For the Unlock CP H (CP-488) to function, KyPdLk Mask (CP-480) must be set to something other than “0” (All Lock). Enter “0” in Unlock CP H (CP-488) to disable it from selecting any Control Parameter.

Minimum Value: 0	Maximum Value: 667
Default Value: 0	Units: Parameter Code

CP-489 Unlock Block

Unlock Block (CP-489) determines which block of Control Parameters can change values, even though keypad lockout is active. The main list block parameter values are also allowed to be changed when the selected Unlock Block is active and KyPdLk Mask (CP-480) is set to ‘UnlckBlk’ (4). For the Unlock Block (CP-489) to function, KyPdLk Mask (CP-480) must be set to “4”

Minimum Value: 0	Maximum Value: 7
Default Value: 7	Units: Block Number

(Continued)

CP-490 Memory Test

To test the physical memory, either enter the number associated with the test (see list below) in Memory Test (CP-490) or go to the Help screen for Memory Test (CP-490) and choose the test. The test result will flash in the error and message status bar at the bottom of the screen and is also summarized in the Diagnostics/Device Tests Memory screen. The test results are also available through Monitor Parameters MP-94, MP-95, MP-96.

4 = Test ALL MEMORY
3 = Test NVRAM
2 = Test SRAM
1 = Test ROM
0 = Test Done *

Minimum Value: 0	Maximum Value: 4
Default Value: 0	Units: Coded

CP-491 Clr Fault Cntrs

To reset all the system-fault counters except Norm- Pwr-Ups (MP-84), enter a “1” in Clear Fault Counters (CP-491). The error and message status bar at the bottom of the screen will flash “Flts Cleared” and the value will return to “0”.

Minimum Value: 0	Maximum Value: 1
Default Value: 0	Units: Coded

CP-492 Video Test

To start the Video Test, enter “1” in Video Test (CP-492). Then use the page up/down keys to page through tests. Press the Menu key to exit the tests and return to the previous screen.

Minimum Value: 0	Maximum Value: 1
Default Value: 0	Units: Coded

CP-495 Serial Number

Serial Number (CP-495) is the serial number from the DeviceNet card in this CX-1102 controller. If the card was factory installed, the Serial Number should already be entered. If the card is being field installed, enter the Serial Number from the label on the card or recorded in the DeviceNet Card Technical Manual.

CP-496 Load Parms

Use Load Parameters (CP-496) to retrieve (load) parameter values from either the factory or the default backup list. You can specify which parameter values to load form the back up, per the list below. It is easier to select the Load Parameters values through the “Help” screen, however, you can enter the corresponding number directly into the Load Parm (CP-496). A message will flash in the error and message status bar at the bottom of the screen to indicate the completion of the operation . The Load Parameters operation will not function while the CX-1102 is in “RUN”.

6 = Load Dflts BlockCP	Load Factory Defaults into CP-400 through CP-667
5 = Load Dflts Main CP	Load Factory Defaults into CP-201 through CP-494
4 = Load Dflts All Cp	Load Factory Defaults into CP-201 through CP-667
3 = Load Backup BlockCP	Load Backup into CP-500 through CP-667
2 = Load Backup Main CP	Load Backup into CP-201 through CP-494
1 = Load Backup All Cps	Load Backup into CP-201 through CP-667
0 = No Change	

Minimum Value: 0	Maximum Value: 6
Default Value: 0	Units: Coded

(Continued)

CP-497 Load PLC Prgm

Use Load PLC Program (CP-497) to retrieve (load) either the backup for the PLC program which you have saved or the factory default PLC program. Enter “1” to load the backup PLC program or enter “2 ” to load the factory default PLC program. You can also select the one of the two values through the Help screen. The loaded program is compiled and a message will flash in the error and message status bar at the bottom of the screen to indicate the completion of the operation. The Load PLC Program operation will not function while the CX-1102 is in “RUN”.

2 = Load Dflt PLC Prg	Load Factory Default PLC program
1 = Load Backup PLC Prg	Load Backup PLC program
0 = No Change	

Minimum Value: 0	Maximum Value: 2
Default Value: 0	Units: Coded

CP-498 Save Parms

Use Save Parameters (CP-498) to save the current parameter values to the backup. You can specify which parameter values to save as back up, per the list below Either enter the corresponding number directly into the Save Parameters (see list below) or select the Save Parameters values through the Help screen. A message (Saved2 BkUp) will flash in the error and message status bar at the bottom of the screen to indicate the completion of the operation.

3 = Save Block CP’s	Save CP-500 through CP-667 to Backup
2 = Save Main CP’s	Save CP-201 through CP-494 to Backup
1 = Save All CP’s	Save CP-201 through CP-667 to Backup
0 = No Change	

Minimum Value: 0	Maximum Value: 3
Default Value: 0	Units: Coded

CP-499 Save PLC Prgm

Enter a “1” in Save PLC Program (CP-499) to save the current PLC program to the backup. A message (Saved2 BkUp) will flash in the error and message status bar at the bottom of the screen to indicate the completion of the operation.

1 = Save PLC Program to Backup
0 = No Change

Minimum Value: 0	Maximum Value: 1
Default Value: 0	Units: Coded

CP-500 to CP-515   Block Parm 1 - Block Parm 16

Use the Block Parameters 1-16 (CP-500 to CP-515) to select the Control Parameters that will be controlled by the BLK0 Val1 - BLK7 Val 16 values (CP-540 to CP-667). When you enter a new parameter number in a block parameter, the text that appears immediately below the block parameter will change accordingly. Enter a “0” to clear the block parameters that are not in use. There are eight blocks; each contains up to sixteen Control Parameters.

Minimum Value: 0	Maximum Value: 349
Default Value: 110	Units: Parameter Code

(Continued)

CP-540 to CP-667 Blk0 Val 1 - Blk7 Val 16

Use the Block Values (CP-540 to CP-667) to define or change the values of the Control Parameters that you assigned to the Block Parameters (CP-500 to CP-515). This allows you to assign up to eight different values to a single parameter, which you can select. The active Block Value is selected by the PLC and monitored by Active Block (CP-51).

Minimum Value: -99999999	Maximum Value: 99999999
Default Value: 0	Units: Parameter Value

(Continued)

APPENDIX D: CONTROL PARAMETER REFERENCE

CODE	DESCRIPTION	MIN	MAX	DEFAULT	USER RECORD	UNITS
CP-201	Setpoint X	-9999999	9999999	0.0		EU/Tm
CP-202	App Select	0	4	1		Coded
CP-203	LineSpdSrc	1	2	1		Coded
CP-207	FixedDiaSel	0	3	0		Coded
CP-208	UnitPrs Sel	1	6	2		Coded
CP-209	Time Base	1	3	2		Coded
CP-210	Line Spd SP	-9999999	9999999	0.0		EU/Tm
CP-211	Max LineSpd	0	9999999	9999999		EU/Tm
CP-212	Min LineSpd	0	9999999	0		EU/Tm
CP-220	Stretch %	-10.0	10	0.0		%
CP-221	Stretch % Max	0.0	10	10.0		%
CP-222	Stretch % Min	-10.0	0.0	-10.0		%
CP-230	UwndDirect SP	-15.0	15	0.0		Volts
CP-235	Wind Direct SP	-15.0	15	0.0		Volts
CP-240	Jog SP	0	999999	50		Roll RPM
CP-241	Acl Tm Jog	0.1	3600	2.000		Seconds
CP-242	Acl Rt Jog	0	9999999	25.00		RPM/Sec
CP-243	Dcl Tm Jog	0.1	3600	2.000		Seconds
CP-244	Dcl Rt Jog	0	9999999	100.0		RPM/Sec
CP-250	Dancer SP	0	99999	20.00		Web EU
CP-260	UwndGearRdcn	0.100	20000	1.000		Ratio
CP-261	Uwnd PPR	1	60000	60		Pls/Rev
CP-264	UwndEncPty	1	2	1		Coded
CP-265	WindGearRdcn	0.100	20000	1.000		Ratio
CP-266	Wind PPR	1	60000	60		Pls/Rev
CP-269	WindEncPty	1	2	1		Coded
CP-271	DncrFullVolts	-5.00	5	5.00		Volts
CP-272	DncrCtntFull	0	999999	40.00		Web EU
CP-273	DncrEmptyVlts	-5.00	5	0.00		Volts
CP-276	ExtLSMaxVolts	-5.0	5	5.0		Volts

(Continued)

CODE	DESCRIPTION	MIN	MAX	DEFAULT	USER RECORD	UNITS
CP-277	Ext LS Max	-9999999	9999999	100.0		EU/Tm
CP-278	ExtLSMinVolts	-5.0	5	0.0		Volts
CP-279	Ext LS Min	-9999999	9999999	0.0		EU/Tm
CP-280	UwndCO Mode	1	4	2		Coded
CP-281	UwndCOMaxVolts	0.1	15	10.0		Volts
CP-282	UwndCOPolarity	1	2	1		Coded
CP-283	UwndCO Offset	-1.00	1	0		Volts
CP-285	WindCO Mode	1	3	2		Coded
CP-286	WindCOMaxVolts	0.1	15	10.0		Volts
CP-287	WindCOPolarity	1	2	1		Coded
CP-288	WindCO Offset	-1.00	1	0.00		Volts
CP-300	Ref Ramps	0.001	9999999	100		EU/Tm
CP-301	Acl Tm RUN	0.5	3600	10.00		Seconds
CP-302	Acl Rt RUN	0	9999999	10.00		EU/Tm/S
CP-303	Dcl Tm RUN	0.5	3600	10.00		Seconds
CP-304	Dcl Rt RUN	0	9999999	10.00		EU/Tm/S
CP-307	Dcl Tm HStp	0.5	3600	10.00		Seconds
CP-308	Dcl Rt HStp	0	9999999	10.00		EU/Tm/S
CP-311	Acl Tm Drct	0	3600	3.000		Seconds
CP-312	Dcl Tm Drct	0	3600	3.000		Seconds
CP-321	Jog Loop Mode	0	1	1		Coded
CP-323	Uwnd Kp-p	0	32767	2		Constant
CP-325	Uwnd Kp	0	30000	400		Constant
CP-326	Uwnd Ki	0	30000	40		Constant
CP-327	Uwnd Kd	0	30000	200		Constant
CP-328	UwndDerivThd	0	99999	5		Roll RPM
CP-329	Uwnd MaxRPM	0.1	999999	2000		Roll RPM
CP-331	Dancer Auth	0	9999999	100		EU/Tm
CP-332	Dancer Gain	0	99999	50		EU/Tm/EU
CP-333	Wind Kp-p	0	32767	2		Constant

(Continued)

Appendix D: Control Parameter Reference (continued)

CODE	DESCRIPTION	MIN	MAX	DEFAULT	USER RECORD	UNITS
CP-335	Wind Kp	0	30000	400		Constant
CP-336	Wind Ki	0	30000	40		Constant
CP-337	Wind Kd	0	30000	200		Constant
CP-338	Wind DerivThd	0	99999	5		Roll RPM
CP-339	Wind MaxRPM	0.1	999999	2000		Roll RPM
CP-340	Cntrl Latch	0	255	0		Coded
CP-341	Loop Update	1	3	1		Coded
CP-342	KffAdjUpdt	1	6	3		Coded
CP-343	KffAutoSel	1	3	3		Coded
CP-344	Kff Auto En	0	1	0		Coded
CP-345	DncrMinDelta	0.01	99999	0.05		Web EU
CP-346	UwndMinDelta	0.001	99999	0.1		Rotations
CP-347	WindMinDelta	0.001	99999	0.1		Rotations
CP-348	Sig Fltr Sel	0	4	0		Coded
CP-349	SigFltrTmConst	2	500	10		mSec
CP-350	UwndMinDia	0.001	99999	12.0		Dia EU
CP-351	UwndMaxDia	0.001	100000	72		Dia EU
CP-352	WindMinDia	0.001	99999	12.0		Dia EU
CP-353	WindMaxDia	0.001	100000	72		Dia EU
CP-355	Ramp Thd	0	999999	1.0		EU/Tm
CP-356	UwndTrim Auth	0	100	100.0		%of CP281
CP-357	UwndIntgrl Lmt	0	100	100.0		%of CP281
CP-358	WindTrim Auth	0	100	100.0		%of CP286
CP-359	WindIntgrl Lmt	0	100	100.0		%of CP286
CP-361	LoadDiaCalcEn	0	1	1		Coded
CP-364	UwndDiaPrst	0	99999	48		Dia EU
CP-365	WindDiaPrst	0	99999	48		Dia EU
CP-366	UwndCtntPrst	0	9999999	10000		Web EU
CP-367	WindCtntPrst	0	9999999	10000		Web EU
CP-368	UwndCtntRO	0	9999999	10000		Web EU

(Continued)

CODE	DESCRIPTION	MIN	MAX	DEFAULT	USER RECORD	UNITS
CP-369	WindCtntRO	0	9999999	10000		Web EU
CP-370	Zero Speed	0	100000	5.0		Roll RPM
CP-371	Max LS Alm	0	9999999	2000		EU/Tm
CP-372	NO Resp Time	0.010	600	1.000		Seconds
CP-373	UwndMaxRmp	0	9999999	2000		RPM/Sec
CP-374	WindMaxRmp	0	9999999	2000		RPM/Sec
CP-378	Std Alm Msk	00000000	11111111	00000000		Coded
CP-379	CustAlm Msk	00000000	11111111	00000000		Coded
CP-380	Cmpr1 Parm	1	199	12		MP
CP-381	Cmpr2 Parm	1	199	22		MP
CP-382	Cmpr3 Parm	1	199	32		MP
CP-383	Cmpr4 Parm	1	199	17		MP
CP-386	Cmpr1 Type	1	6	4		Coded
CP-387	Cmpr2 Type	1	6	4		Coded
CP-388	Cmpr3 Type	1	6	4		Coded
CP-389	Cmpr4 Type	1	6	5		Coded
CP-392	Cmpr1 Val	-9999999	9999999	2000		Parm Val
CP-393	Cmpr2 Val	-9999999	9999999	200		Parm Val
CP-394	Cmpr3 Val	-9999999	9999999	200		Parm Val
CP-395	Cmpr4 Val	-9999999	9999999	72		Parm Val
CP-396	Copy Source 1	1	667	0		CP or MP
CP-397	Copy Dest 1	201	667	0		CP or MP
CP-398	Copy Source 2	1	667	35		CP or MP
CP-399	Copy Dest 2	201	667	35		CP or MP
CP-400	Rmt Scroll	0	449	201		CP
CP-401	Rmt Scroll Rate	1	100	10		Inc/Sec
CP-402	DI 1 Shot	00000000	11111111	00000000		Coded
CP-403	DI Set	00000000	11111111	00000000		Coded
CP-405	PLC Monitor 1	0	223	12		PLC Bits
CP-406	PLC Monitor 2	0	223	13		PLC Bits

(Continued)

CODE	DESCRIPTION	MIN	MAX	DEFAULT	USER RECORD	UNITS
CP-407	PLC Bit Set	0	223	3		PLC Bits
CP-408	PLC Bit Clear	0	223	2		PLC Bits
CP-410	Tmr1 Delay	0	86400	1.000		Seconds
CP-411	Tmr1 on Tm	-1	86400	-1		Seconds
CP-412	Tmr2 Delay	0	86400	1.000		Seconds
CP-413	Tmr2 on Tm	-1	86400	-1		Seconds
CP-414	Tmr3 Delay	0	86400	1.000		Seconds
CP-415	Tmr3 on Tm	-1	86400	-1		Seconds
CP-416	Tmr4 Delay	0	86400	1.000		Seconds
CP-417	Tmr4 on Tm	-1	86400	-1		Seconds
CP-420	Cntr1 Trig	0	10000000	10		Counts
CP-421	Cntr1 Cnt	0	10000000	0		Counts
CP-422	Cntr2 Trig	0	10000000	10		Counts
CP-423	Cntr2 Cnt	0	10000000	0		Counts
CP-424	Cntr3 Trig	0	10000000	10		Counts
CP-425	Cntr3 Cnt	0	10000000	0		Counts
CP-426	Cntr4TrigUp	0	10000000	10		Counts
CP-427	Cntr4 Cnt	0	10000000	0		Counts
CP-428	Cntr4TrigDn	0	10000000	0		Counts
CP-429	Cntr4Preset	0	10000000	0		Counts
CP-430	DN Write Parm 1	0	667	0		CP
CP-431	DN Write Parm 2	0	667	0		CP
CP-432	DN Write Parm 3	0	667	0		CP
CP-433	DN Write Parm 4	0	667	0		CP
CP-434	DN Read Parm 1	0	667	0		CP or MP
CP-435	DN Read Parm 2	0	667	0		CP or MP
CP-436	DN Read Parm 3	0	667	0		CP or MP
CP-437	DN Read Parm 4	0	667	0		CP or MP
CP-438	DN MAC ID	0	63	63		ID
CP-439	DN Baud Rate	1	3	1		Coded

(Continued)

CODE	DESCRIPTION	MIN	MAX	DEFAULT	USER RECORD	UNITS
CP-440	Lg Number Parm	1	667	40		CP or MP
CP-441	Status Line 1	1	667	201		CP or MP
CP-442	Status Line 2	0	667	50		CP or MP
CP-443	Status Line 3	0	667	7		CP or MP
CP-444	Status Line 4	0	667	17		CP or MP
CP-445	Status Line 5	0	667	83		CP or MP
CP-446	Status Line 6	0	667	84		CP or MP
CP-449	Lg Number Units	0	43	2		Coded
CP-450	Diagnostics En	0	3	0		Coded
CP-451	Diag DO Shift	0	8	0		Coded
CP-452	Diag DO	00000000	11111111	00000000		Coded
CP-453	Diag DAC Test	0	2	0		Coded
CP-454	Diag DAC Volts	-15.0	15.0	0.0		Volts
CP-455	Diag DAC Bits	-32768	32767	0		Bits
CP-456	Diag Rmp Tm	0	600	10.000		Seconds
CP-460	Analog Cal En	0	1	0		Coded
CP-461	Analog Cal Sel	1	2	1		Coded
CP-462	Analog Cal Ref	1	2	1		Coded
CP-463	AnalogRef Val	-6.0	6	0		Volts
CP-468	CRC Enable	0	1	1		Coded
CP-469	Record Format	1	3	1		Coded
CP-470	Device Address	1	99	1		Address
CP-471	Baud Rate	1	7	6		Coded
CP-472	Frame Format	1	2	1		Coded
CP-473	SerCom Char Out	0	255	0		Decimal
CP-474	Video Mode	1	3	1		Coded
CP-475	Contrast Value	8	32	18		Contrast
CP-478	Blk Sel Source	1	3	1		Coded
CP-479	Keypad Blk Sel	0	7	0		Coded
CP-480	KyPdLk Mask	0	4	0		Coded

(Continued)

CODE	DESCRIPTION	MIN	MAX	DEFAULT	USER RECORD	UNITS
CP-481	Unlock CP A	0	667	0		CP
CP-482	Unlock CP B	0	667	0		CP
CP-483	Unlock CP C	0	667	0		CP
CP-484	Unlock CP D	0	667	0		CP
CP-485	Unlock CP E	0	667	0		CP
CP-486	Unlock CP F	0	667	0		CP
CP-487	Unlock CP G	0	667	0		CP
CP-488	Unlock CP H	0	667	0		CP
CP-489	Unlock Block	0	7	7		Block #
CP-490	Memory Test	0	4	0		Coded
CP-491	Clr Fault Cntrs	0	1	0		Coded
CP-492	Video Test	0	1	0		Coded
CP-495	Serial Number	0	999999	0		Serial #
CP-496	Load Parms	0	6	0		Coded
CP-497	Load PLC Prgm	0	2	0		Coded
CP-498	Save Parms	0	3	0		Coded
CP-499	Save PLC Prgm	0	1	0		Coded
CP-500	Block Parm 1	0	349	210		CP
CP-501	Block Parm 2	0	349	0		CP
CP-502	Block Parm 3	0	349	0		CP
CP-503	Block Parm 4	0	349	0		CP
CP-504	Block Parm 5	0	349	0		CP
CP-505	Block Parm 6	0	349	0		CP
CP-506	Block Parm 7	0	349	0		CP
CP-507	Block Parm 8	0	349	0		CP
CP-508	Block Parm 9	0	349	0		CP
CP-509	Block Parm 10	0	349	0		CP
CP-510	Block Parm 11	0	349	0		CP
CP-511	Block Parm 12	0	349	0		CP
CP-512	Block Parm 13	0	349	0		CP

(Continued)

CODE	DESCRIPTION	MIN	MAX	DEFAULT	USER RECORD	UNITS
CP-513	Block Parm 14	0	349	0		CP
CP-514	Block Parm 15	0	349	0		CP
CP-515	Block Parm 16	0	349	0		CP
CP-540	Blk0 Val 1	-99999999	99999999	0		Parm Val
CP-541	Blk0 Val 2	-99999999	99999999	0		Parm Val
CP-542	Blk0 Val 3	-99999999	99999999	0		Parm Val
CP-543	Blk0 Val 4	-99999999	99999999	0		Parm Val
CP-544	Blk0 Val 5	-99999999	99999999	0		Parm Val
CP-545	Blk0 Val 6	-99999999	99999999	0		Parm Val
CP-546	Blk0 Val 7	-99999999	99999999	0		Parm Val
CP-547	Blk0 Val 8	-99999999	99999999	0		Parm Val
CP-548	Blk0 Val 9	-99999999	99999999	0		Parm Val
CP-549	Blk0 Val10	-99999999	99999999	0		Parm Val
CP-550	Blk0 Val11	-99999999	99999999	0		Parm Val
CP-551	Blk0 Val12	-99999999	99999999	0		Parm Val
CP-552	Blk0 Val13	-99999999	99999999	0		Parm Val
CP-553	Blk0 Val14	-99999999	99999999	0		Parm Val
CP-554	Blk0 Val15	-99999999	99999999	0		Parm Val
CP-555	Blk0 Val16	-99999999	99999999	0		Parm Val
CP-556	Blk1 Val 1	-99999999	99999999	0		Parm Val
CP-557	Blk1 Val 2	-99999999	99999999	0		Parm Val
CP-558	Blk1 Val 3	-99999999	99999999	0		Parm Val
CP-559	Blk1 Val 4	-99999999	99999999	0		Parm Val
CP-560	Blk1 Val 5	-99999999	99999999	0		Parm Val
CP-561	Blk1 Val 6	-99999999	99999999	0		Parm Val
CP-562	Blk1 Val 7	-99999999	99999999	0		Parm Val
CP-563	Blk1 Val 8	-99999999	99999999	0		Parm Val
CP-564	Blk1 Val 9	-99999999	99999999	0		Parm Val
CP-565	Blk1 Val10	-99999999	99999999	0		Parm Val
CP-566	Blk1 Val11	-99999999	99999999	0		Parm Val

(Continued)

CODE	DESCRIPTION	MIN	MAX	DEFAULT	USER RECORD	UNITS
CP-567	Blk1 Val12	-99999999	99999999	0		Parm Val
CP-568	Blk1 Val13	-99999999	99999999	0		Parm Val
CP-569	Blk1 Val14	-99999999	99999999	0		Parm Val
CP-570	Blk1 Val15	-99999999	99999999	0		Parm Val
CP-571	Blk1 Val16	-99999999	99999999	0		Parm Val
CP-572	Blk2 Val 1	-99999999	99999999	0		Parm Val
CP-573	Blk2 Val 2	-99999999	99999999	0		Parm Val
CP-574	Blk2 Val 3	-99999999	99999999	0		Parm Val
CP-575	Blk2 Val 4	-99999999	99999999	0		Parm Val
CP-576	Blk2 Val 5	-99999999	99999999	0		Parm Val
CP-577	Blk2 Val 6	-99999999	99999999	0		Parm Val
CP-578	Blk2 Val 7	-99999999	99999999	0		Parm Val
CP-579	Blk2 Val 8	-99999999	99999999	0		Parm Val
CP-580	Blk2 Val 9	-99999999	99999999	0		Parm Val
CP-581	Blk2 Val10	-99999999	99999999	0		Parm Val
CP-582	Blk2 Val11	-99999999	99999999	0		Parm Val
CP-583	Blk2 Val12	-99999999	99999999	0		Parm Val
CP-584	Blk2 Val13	-99999999	99999999	0		Parm Val
CP-585	Blk2 Val14	-99999999	99999999	0		Parm Val
CP-586	Blk2 Val15	-99999999	99999999	0		Parm Val
CP-587	Blk2 Val16	-99999999	99999999	0		Parm Val
CP-588	Blk3 Val 1	-99999999	99999999	0		Parm Val
CP-589	Blk3 Val 2	-99999999	99999999	0		Parm Val
CP-590	Blk3 Val 3	-99999999	99999999	0		Parm Val
CP-591	Blk3 Val 4	-99999999	99999999	0		Parm Val
CP-592	Blk3 Val 5	-99999999	99999999	0		Parm Val
CP-593	Blk3 Val 6	-99999999	99999999	0		Parm Val
CP-594	Blk3 Val 7	-99999999	99999999	0		Parm Val
CP-595	Blk3 Val 8	-99999999	99999999	0		Parm Val
CP-596	Blk3 Val 9	-99999999	99999999	0		Parm Val

(Continued)

Appendix D: Control Parameter Reference (continued)

CODE	DESCRIPTION	MIN	MAX	DEFAULT	USER RECORD	UNITS
CP-597	Blk3 Val10	-99999999	99999999	0		Parm Val
CP-598	Blk3 Val11	-99999999	99999999	0		Parm Val
CP-599	Blk3 Val12	-99999999	99999999	0		Parm Val
CP-600	Blk3 Val13	-99999999	99999999	0		Parm Val
CP-601	Blk3 Val14	-99999999	99999999	0		Parm Val
CP-602	Blk3 Val15	-99999999	99999999	0		Parm Val
CP-603	Blk3 Val16	-99999999	99999999	0		Parm Val
CP-604	Blk4 Val 1	-99999999	99999999	0		Parm Val
CP-605	Blk4 Val 2	-99999999	99999999	0		Parm Val
CP-606	Blk4 Val 3	-99999999	99999999	0		Parm Val
CP-607	Blk4 Val 4	-99999999	99999999	0		Parm Val
CP-608	Blk4 Val 5	-99999999	99999999	0		Parm Val
CP-609	Blk4 Val 6	-99999999	99999999	0		Parm Val
CP-610	Blk4 Val 7	-99999999	99999999	0		Parm Val
CP-611	Blk4 Val 8	-99999999	99999999	0		Parm Val
CP-612	Blk4 Val 9	-99999999	99999999	0		Parm Val
CP-613	Blk4 Val10	-99999999	99999999	0		Parm Val
CP-614	Blk4 Val11	-99999999	99999999	0		Parm Vall
CP-615	Blk4 Val12	-99999999	99999999	0		Parm Val
CP-616	Blk4 Val13	-99999999	99999999	0		Parm Val
CP-617	Blk4 Val14	-99999999	99999999	0		Parm Val
CP-618	Blk4 Val15	-99999999	99999999	0		Parm Val
CP-619	Blk4 Val16	-99999999	99999999	0		Parm Val
CP-620	Blk5 Val 1	-99999999	99999999	0		Parm Val
CP-621	Blk5 Val 2	-99999999	99999999	0		Parm Val
CP-622	Blk5 Val 3	-99999999	99999999	0		Parm Val
CP-623	Blk5 Val 4	-99999999	99999999	0		Parm Val
CP-624	Blk5 Val 5	-99999999	99999999	0		Parm Val
CP-625	Blk5 Val 6	-99999999	99999999	0		Parm Val
CP-626	Blk5 Val 7	-99999999	99999999	0		Parm Val

(Continued)

CODE	DESCRIPTION	MIN	MAX	DEFAULT	USER RECORD	UNITS
CP-627	Blk5 Val 8	-99999999	99999999	0		Parm Val
CP-628	Blk5 Val 9	-99999999	99999999	0		Parm Val
CP-629	Blk5 Val10	-99999999	99999999	0		Parm Val
CP-630	Blk5 Val11	-99999999	99999999	0		Parm Val
CP-631	Blk5 Val12	-99999999	99999999	0		Parm Val
CP-632	Blk5 Val13	-99999999	99999999	0		Parm Val
CP-633	Blk5 Val14	-99999999	99999999	0		Parm Val
CP-634	Blk5 Val15	-99999999	99999999	0		Parm Val
CP-635	Blk5 Val16	-99999999	99999999	0		Parm Val
CP-636	Blk6 Val 1	-99999999	99999999	0		Parm Val
CP-637	Blk6 Val 2	-99999999	99999999	0		Parm Val
CP-638	Blk6 Val 3	-99999999	99999999	0		Parm Val
CP-639	Blk6 Val 4	-99999999	99999999	0		Parm Val
CP-640	Blk6 Val 5	-99999999	99999999	0		Parm Val
CP-641	Blk6 Val 6	-99999999	99999999	0		Parm Val
CP-642	Blk6 Val 7	-99999999	99999999	0		Parm Val
CP-643	Blk6 Val 8	-99999999	99999999	0		Parm Val
CP-644	Blk6 Val 9	-99999999	99999999	0		Parm Val
CP-645	Blk6 Val10	-99999999	99999999	0		Parm Val
CP-646	Blk6 Val11	-99999999	99999999	0		Parm Val
CP-647	Blk6 Val12	-99999999	99999999	0		Parm Val
CP-648	Blk6 Val13	-99999999	99999999	0		Parm Val
CP-649	Blk6 Val14	-99999999	99999999	0		Parm Val
CP-650	Blk6 Val15	-99999999	99999999	0		Parm Val
CP-651	Blk6 Val16	-99999999	99999999	0		Parm Val
CP-652	Blk7 Val 1	-99999999	99999999	0		Parm Val
CP-653	Blk7 Val 2	-99999999	99999999	0		Parm Val
CP-654	Blk7 Val 3	-99999999	99999999	0		Parm Val
CP-655	Blk7 Val 4	-99999999	99999999	0		Parm Val
CP-656	Blk7 Val 5	-99999999	99999999	0		Parm Val

(Continued)

CODE	DESCRIPTION	MIN	MAX	DEFAULT	USER RECORD	UNITS
CP-657	Blk7 Val 6	-99999999	99999999	0		Parm Val
CP-658	Blk7 Val 7	-99999999	99999999	0		Parm Val
CP-659	Blk7 Val 8	-99999999	99999999	0		Parm Val
CP-660	Blk7 Val 9	-99999999	99999999	0		Parm Val
CP-661	Blk7 Val10	-99999999	99999999	0		Parm Val
CP-662	Blk7 Val11	-99999999	99999999	0		Parm Val
CP-663	Blk7 Val12	-99999999	99999999	0		Parm Val
CP-664	Blk7 Val13	-99999999	99999999	0		Parm Val
CP-665	Blk7 Val14	-99999999	99999999	0		Parm Val
CP-666	Blk7 Val15	-99999999	99999999	0		Parm Val
CP-667	Blk7 Val16	-99999999	99999999	0		Parm Val

(Continued)

—NOTES—

APPENDIX E: MONITOR PARAMETER REFERENCE

CODE	DESCRIPTION	MIN	MAX	UNITS
MP-01	Uwnd Hz	–180000	180000	Hertz
MP-02	UwndEncRPM	–99999.9	99999.9	RPM
MP-03	UwndRollRPM	–99999.9	99999.9	Roll RPM
MP-05	UwndCnts	–2000000000	2000000000	Counts
MP-06	UwndEstCtnt	0.0	9999999.9	EU
MP-07	UwndEstDia	0.00	9999.99	EU
MP-09	Uwnd Rot	–999999.9	999999.9	Roll Rot
MP-11	Wind Hz	–180000	180000	Hertz
MP-12	WindEncRPM	–99999.9	99999.9	RPM
MP-13	WindRollRPM	–99999.9	99999.9	Roll RPM
MP-15	WindCnts	–2000000000	2000000000	Counts
MP-16	WindEstCtnt	0.0	9999999.9	EU
MP-17	WindEstDia	0.00	9999.99	EU
MP-19	Wind Rot	–999999.9	999999.9	Roll Rot
MP-21	UwndRRef	–99999.9	99999.9	Roll RPM
MP-22	UwndRR Err	–99999.9	99999.9	Roll RPM
MP-23	Uwnd Kff	00.00	99999.99	V/k RPM
MP-24	Uwnd FFwd	–15.00	15.00	Volts
MP-25	Uwnd Intgrl	–15.00	15.00	Volts
MP-26	Uwnd Trim	–15.00	15.00	Volts
MP-27	UwndCO Volts	–15.00	15	Volts
MP-28	UwndCO Bits	–32768	32767	Bits
MP-29	UwndCOMaxBits	0	32767	Bits
MP-31	WindRRef	–99999.9	99999.9	Roll RPM
MP-32	WindRR Err	–99999.9	99999.9	Roll RPM
MP-33	Wind Kff	00.00	99999.99	V/k RPM
MP-34	Wind FFwd	–15.00	15.00	Volts
MP-35	Wind Intgrl	–15.00	15.00	Volts
MP-36	Wind Trim	–15.00	15.00	Volts
MP-37	WindCO Volts	–15.00	15	Volts

(Continued)

CODE	DESCRIPTION	MIN	MAX	UNITS
MP-38	WindCO Bits	–32768	32767	Bits
MP-39	WindCOMaxBits	0	32767	Bits
MP-40	Line Speed	–99999999	99999999	EU/Tm
MP-41	LineSpdSRef	–99999999	99999999	EU/Tm
MP-42	LineSpdRRef	–99999999	99999999	EU/Tm
MP-43	EstMaxLnSpd	0	99999999	EU/Tm
MP-48	Uwnd State	0	7	Coded
MP-49	Wind State	0	7	Coded
MP-50	System State	0	8	Coded
MP-51	Active Blk	0	7	Coded
MP-52	InvalidBlks	00000000	11111111	Coded
MP-53	Misc Status	00000000	11111111	Coded
MP-54	Std Alms	00000000	11111111	Coded
MP-55	Custom Alms	00000000	11111111	Coded
MP-56	Misc Alarms	00000000	11111111	Coded
MP-58	Dancer State	0	3	Coded
MP-59	Setup State	0	10	Coded
MP-60	Uwnd Dirn	0	2	Coded
MP-61	Wind Dirn	0	2	Coded
MP-70	Wrap Pty	00000000	00000011	Coded
MP-71	SigPolarity	00000000	11111111	Coded
MP-72	UwndCntrlLp	0	2	Coded
MP-73	WindCntrlLp	0	2	Coded
MP-80	Dancer Bits	-8192	8191	Bits
MP-81	Dancer Volts	-5.0	5	Volts
MP-82	Dancer Ctnt	0	9999999	Web EU
MP-83	DncrCtntErr	–9999999	9999999	Web EU
MP-84	Dancer Trim	-99999999	99999999	EU/Tm
MP-86	Ext LS Bits	-8192	8191	Bits
MP-87	Ext LS Volts	-5.0	5	Volts

(Continued)

Appendix E: Monitor Parameter Reference (continued)

CODE	DESCRIPTION	MIN	MAX	UNITS
MP-88	Ext LineSpd	–999999	99999999	EU/Tm
MP-90	SerCom Char In	0	255	Binary
MP-91	SerCom Errs	00000000	11111111	Coded
MP-94	ROM Test	0	1	Coded
MP-95	SRAM Test	0	1	Coded
MP-96	NV RAM Test	0	1	Coded
MP-97	Model #	1000	60000	Model #
MP-98	RELEASE	090102	123105	Date
MP-99	REVISION	0.50	99.99	Rev Level
MP-100	DI 7..0	00000000	11111111	Coded
MP-101	DI 15..8	00000000	11111111	Coded
MP-102	DO 7..0	00000000	11111111	Coded
MP-103	KeyPad Lockout	0	1	Coded
MP-107	Tmr4 Time	0	86400	Seconds
MP-108	PLC Mon 1 Val	0	1	Coded
MP-109	PLC Mon 2 Val	0	1	Coded
MP-110	PLC 15-8	00000000	11111111	Coded
MP-111	PLC 23-16	00000000	11111111	Coded
MP-112	PLC 31-24	00000000	11111111	Coded
MP-113	PLC 39-32	00000000	11111111	Coded
MP-114	PLC 47-40	00000000	11111111	Coded
MP-115	PLC 55-48	00000000	11111111	Coded
MP-116	PLC 63-56	00000000	11111111	Coded
MP-117	PLC 71-64	00000000	11111111	Coded
MP-118	PLC 79-72	00000000	11111111	Coded
MP-119	PLC 87-80	00000000	11111111	Coded
MP-120	PLC 95-88	00000000	11111111	Coded
MP-121	PLC 107-100	00000000	11111111	Coded
MP-122	PLC 115-108	00000000	11111111	Coded
MP-123	PLC 123-116	00000000	11111111	Coded

CODE	DESCRIPTION	MIN	MAX	UNITS
MP-124	PLC 131-124	00000000	11111111	Coded
MP-125	PLC 139-132	00000000	11111111	Coded
MP-126	PLC 147-140	00000000	11111111	Coded
MP-127	PLC 155-148	00000000	11111111	Coded
MP-128	PLC 163-156	00000000	11111111	Coded
MP-129	PLC 171-164	00000000	11111111	Coded
MP-130	PLC 179-172	00000000	11111111	Coded
MP-131	PLC 187-180	00000000	11111111	Coded
MP-132	PLC 195-188	00000000	11111111	Coded
MP-133	PLC 203-196	00000000	11111111	Coded
MP-134	PLC 211-204	00000000	11111111	Coded
MP-135	PLC 219-212	00000000	00001111	Coded
MP-150	Last Reset	00000000	11110111	Coded
MP-151	Misc Intrpt	00000000	00111111	Coded
MP-152	Device Alms	00000000	00001111	Coded
MP-153	PC at Intrpt	2560	524288	Address
MP-154	Norm Pwr Ups	1	65535	Counts
MP-155	Low Pwr Cntr	0	65535	Counts
MP-156	Mem Err Cntr	0	65535	Counts
MP-157	WatchDogCntr	0	65535	Counts
MP-158	MiscIntrptCntr	0	65535	Counts
MP-168	AnlgCal Ref A	–6.0	6	Volts
MP-169	AnlgCal Ref B	–6.0	6	Volts

—NOTES—

APPENDIX F: CONTROL PARAMETER SCREEN LOCATOR

CP#	CP Name	Screen
CP-201	Setpoint X	Setpoints & Ramps\Line Speed\pg 1
	....	System Monitor\Run Monitor\pg 1
	....	System Monitor\Control Overrides\pg 4
CP-202	App Select	Setup\System Setup\pg 1
	....	Setpoints & Ramps\Line Speed\pg 1
	....	Setpoints & Ramps\Web Stretch\pg 1
	....	Setpoints & Ramps\Direct SP & Ramps\pg 1
CP-203	LineSpdSrc	Setpoints & Ramps\Line Speed\pg 1
CP-207	FixedDiaSel	Setup\System Setup\pg 1
	....	Setup\System Setup\pg 3
	....	Setup\System Setup\pg 4
CP-208	UnitPrs Sel	Setup\System Setup\pg 1
CP-209	Time Base	Setup\System Setup\pg 1
CP-210	Line Spd SP	Status\pg 1
	....	Setpoints & Ramps\Line Speed\pg 1
CP-211	Max LineSpd	Setpoints & Ramps\Line Speed\pg 1
CP-212	Min LineSpd	Setpoints & Ramps\Line Speed\pg 1
CP-220	Stretch %	Setpoints & Ramps\Web Stretch\pg 1
CP-221	Stretch % Max	Setpoints & Ramps\Web Stretch\pg 1
CP-222	Stretch % Min	Setpoints & Ramps\Web Stretch\pg 1
CP-230	UwndDirect SP	Setpoints & Ramps\Direct SP & Ramps\pg 1
CP-235	WindDirect SP	Setpoints & Ramps\Direct SP & Ramps\pg 1
CP-240	Jog SP	Setpoints & Ramps\Jog SP & Ramps\pg 1
CP-241	Acl Tm Jog	Setpoints & Ramps\Jog SP & Ramps\pg 1
CP-242	Acl Rt Jog	Setpoints & Ramps\Jog SP & Ramps\pg 1
CP-243	Dcl Tm Jog	Setpoints & Ramps\Jog SP & Ramps\pg 1
CP-244	Dcl Rt Jog	Setpoints & Ramps\Jog SP & Ramps\pg 1
CP-250	Dancer SP	Setup\System Setup\pg 6
	....	Scaling\Dancer\pg 1
	....	Setpoints & Ramps\Dancer\pg 1

(Continued)

Appendix F: Control Parameter Screen Locator (continued)

CP#	CP Name	Screen
	....	Tuning\Dancer\pg 1
CP-260	UwndGearRdcn	Setup\System Setup\pg 2
	....	Scaling\Unwind\pg 1
CP-261	Uwnd PPR...............	Setup\System Setup\pg 2
	....	Scaling\Unwind\pg 1
CP-264	UwndEncPty	Setup\System Setup\pg 5
	....	Setup\System Setup\pg 8
	....	Scaling\Unwind\pg 1
CP-265	WindGearRdcn	Setup\System Setup\pg 2
	....	Scaling\Wind\pg 1
CP-266	Wind PPR................	Setup\System Setup\pg 2
	....	Scaling\Wind\pg 1
CP-269	WindEncPty	Setup\System Setup\pg 5
	....	Setup\System Setup\pg 7
	....	Scaling\Wind\pg 1
CP-271	DncrFullVolts..........	Setup\System Setup\pg 6
	....	Scaling\Dancer\pg 1
CP-272	DncrCtntFull	Setup\System Setup\pg 6
	....	Scaling\Dancer\pg 1
CP-273	DncrEmptyVlts	Setup\System Setup\pg 6
	....	Scaling\Dancer\pg 1
CP-276	ExtLSMaxVolts.......	Scaling\Ext Line Speed\pg 1
CP-277	Ext LS Max	Scaling\Ext Line Speed\pg 1
CP-278	ExtLSMinVolts	Scaling\Ext Line Speed\pg 1
CP-279	Ext LS Min..............	Scaling\Ext Line Speed\pg 1
CP-280	UwndCO Mode	Setup\System Setup\pg 2
	....	Scaling\Unwind\pg 2
CP-281	UwndCOMaxVolts..	Setup\System Setup\pg 2
	....	Scaling\Unwind\pg 2
CP-282	UwndCO Plrty	Setup\System Setup\pg 5
	....	Setup\System Setup\pg 8
	....	Scaling\Unwind\pg 2

(Continued)

Appendix F: Control Parameter Screen Locator (continued)

CP#	CP Name	Screen
CP-283	UwndCO Offset	Scaling\Unwind\pg 2
	....	Device Tests\Standard Signal Tests\pg 2
CP-285	WindCO Mode	Setup\System Setup\pg 2
	....	Scaling\Wind\pg 2
CP-286	WindCOMaxVolts ...	Setup\System Setup\pg 2
	....	Scaling\Wind\pg 2
CP-287	WindCO Plrty	Setup\System Setup\pg 5
	....	Setup\System Setup\pg 7
	....	Scaling\Wind\pg 2
CP-288	WindCO Offset	Scaling\Wind\pg 2
	....	Device Tests\Standard Signal Tests\pg 2
CP-300	Ref Ramps	Setpoints & Ramps\Run Ramps\pg 1
	....	Setpoints & Ramps\H-Stop Ramp\pg 1
CP-301	Acl Tm RUN	Setpoints & Ramps\Run Ramps\pg 1
CP-302	Acl Rt RUN	Setpoints & Ramps\Run Ramps\pg 1
CP-303	Dcl Tm RUN	Setpoints & Ramps\Run Ramps\pg 1
CP-304	Dcl Rt RUN	Setpoints & Ramps\Run Ramps\pg 1
CP-307	Dcl Tm HStp	Setpoints & Ramps\H-Stop Ramp\pg 1
CP-308	Dcl Rt HStp	Setpoints & Ramps\H-Stop Ramp\pg 1
CP-311	Acl Tm Drct	Setpoints & Ramps\Direct SP & Ramps\pg 1
CP-312	Dcl Tm Drct	Setpoints & Ramps\Direct SP & Ramps\pg 1
CP-321	Jog Loop Mode	Setpoints & Ramps\Jog SP & Ramps\pg 1
CP-323	Uwnd Kp-p	Tuning\Velocity Loop\pg 1
CP-325	Uwnd Kp	Tuning\Velocity Loop\pg 1
CP-326	Uwnd Ki	Tuning\Velocity Loop\pg 1
CP-327	Uwnd Kd	Tuning\Velocity Loop\pg 1
CP-328	UwndDerivThd	Tuning\Velocity Loop\pg 3
CP-329	Uwnd MaxRPM	Setup\System Setup\pg 2
	....	Tuning\Feedforward\pg 1
CP-331	Dancer Auth	Setpoints & Ramps\Dancer\pg 1
	....	Tuning\Dancer\pg 1
CP-332	Dancer Gain	Setpoints & Ramps\Dancer\pg 1

(Continued)

CP#	CP Name	Screen
	....	Tuning\Dancer\pg 1
CP-333	Wind Kp-p..............	Tuning\Velocity Loop\pg 2
CP-335	Wind Kp	Tuning\Velocity Loop\pg 2
CP-336	Wind Ki	Tuning\Velocity Loop\pg 2
CP-337	Wind Kd	Tuning\Velocity Loop\pg 2
CP-338	WindDerivThd	Tuning\Velocity Loop\pg 3
CP-339	Wind MaxRPM	Setup\System Setup\pg 2
	....	Tuning\Feedforward\pg 2
CP-340	Cntrl Latch	Available through the "CODE" key
CP-341	Loop Update	Tuning\Related Items\pg 1
CP-342	KffAdjUpdt	Tuning\Feedforward\pg 1
	....	Tuning\Feedforward\pg 2
CP-343	KffAutoSel	Tuning\Feedforward\pg 1
	....	Tuning\Feedforward\pg 2
CP-344	Kff Auto En	Tuning\Feedforward\pg 1
	....	Tuning\Feedforward\pg 2
CP-345	DncrMinDelta	Tuning\Related Items\pg 1
CP-346	UwndMinDelta	Tuning\Related Items\pg 1
CP-347	WindMinDelta	Tuning\Related Items\pg 1
CP-348	Sig Fltr Sel	Tuning\Related Items\pg 1
CP-349	SigFltrTmConst	Tuning\Related Items\pg 1
CP-350	UwndMinDia	Setup\System Setup\pg 4
	....	Scaling\Diameters\pg 1
	....	Alarms & Limits\Limits\pg 2
CP-351	UwndMaxDia..........	Setup\System Setup\pg 4
	....	Scaling\Diameters\pg 1
	....	Alarms & Limits\Limits\pg 2
CP-352	WindMinDia	Setup\System Setup\pg 3
	....	Scaling\Diameters\pg 1
	....	Alarms & Limits\Limits\pg 2
CP-353	WindMaxDia...........	Setup\System Setup\pg 3
	....	Scaling\Diameters\pg 1

(Continued)

Appendix F: Control Parameter Screen Locator (continued)

CP#	CP Name	Screen
	....	Alarms & Limits\Limits\pg 2
CP-355	Ramp Thd	Setpoints & Ramps\Run Ramps\pg 1
CP-356	UwndTrim Auth	Tuning\Velocity Loop\pg 3
	....	Alarms & Limits\Limits\pg 1
CP-357	UwndIntgrl Lmt	Tuning\Velocity Loop\pg 3
	....	Alarms & Limits\Limits\pg 1
CP-358	WindTrim Auth	Tuning\Velocity Loop\pg 3
	....	Alarms & Limits\Limits\pg 1
CP-359	WindIntgrl Lmt	Tuning\Velocity Loop\pg 3
	....	Alarms & Limits\Limits\pg 1
CP-361	LoadDiaCalcEn	Setup\System Setup\pg 3
	....	Setup\System Setup\pg 4
CP-364	UwndDiaPrst	Setup\System Setup\pg 1
	....	Setup\System Setup\pg 4
CP-365	WindDiaPrst	Setup\System Setup\pg 1
	....	Setup\System Setup\pg 3
CP-366	UwndCtntPrst	Setup\System Setup\pg 4
CP-367	WindCtntPrst	Setup\System Setup\pg 3
CP-368	UwndCtntRO	Setup\System Setup\pg 4
CP-369	WindCtntRO	Setup\System Setup\pg 3
CP-370	Zero Speed	Alarms & Limits\Alarms\pg 1
	....	Alarms & Limits\Limits\pg 1
CP-371	Max LS Alm	Alarms & Limits\Alarms\pg 1
CP-372	NO Resp Time	Alarms & Limits\Alarms\pg 1
CP-373	UwndMax Rmp	Alarms & Limits\Alarms\pg 1
CP-374	WindMax Rmp	Alarms & Limits\Alarms\pg 1
CP-378	Std Alm Msk	Setup\Alm Indicator Mask\pg 1
CP-379	CustAlm Msk	Setup\Alm Indicator Mask\pg 1
CP-380	Cmpr1 Parm	Alarms & Limits\Alarms\pg 2
CP-381	Cmpr2 Parm	Alarms & Limits\Alarms\pg 2
CP-382	Cmpr3 Parm	Alarms & Limits\Alarms\pg 3
CP-383	Cmpr4 Parm	Alarms & Limits\Alarms\pg 3

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CP#	CP Name	Screen
CP-386	Cmpr1 Type	Alarms & Limits\Alarms\pg 2
CP-387	Cmpr2 Type	Alarms & Limits\Alarms\pg 2
CP-388	Cmpr3 Type	Alarms & Limits\Alarms\pg 3
CP-389	Cmpr4 Type	Alarms & Limits\Alarms\pg 3
CP-392	Cmpr1 Val	Alarms & Limits\Alarms\pg 2
CP-393	Cmpr2 Val	Alarms & Limits\Alarms\pg 2
CP-394	Cmpr3 Val	Alarms & Limits\Alarms\pg 3
CP-395	Cmpr4 Val	Alarms & Limits\Alarms\pg 3
CP-396	Copy Source 1	PLC\PLC Data Copy\pg 1
CP-397	Copy Dest 1	PLC\PLC Data Copy\pg 1
CP-398	Copy Source 2	PLC\PLC Data Copy\pg 1
CP-399	Copy Dest 2	PLC\PLC Data Copy\pg 1
CP-400	Rmt Scroll	Setup\Remote Scroll Setup\pg 1
CP-401	Rmt Scroll Rate	Setup\Remote Scroll Setup\pg 1
CP-402	DI 1 Shot	PLC\Digital I/O\pg 1
CP-403	DI Set	PLC\PLC Monitor\pg 1
CP-405	PLC Monitor 1	PLC\PLC Monitor\pg 1
CP-406	PLC Monitor 2	PLC\PLC Monitor\pg 1
CP-407	PLC Bit Set	PLC\PLC Monitor\pg 1
CP-408	PLC Bit Clear	PLC\PLC Monitor\pg 1
CP-410	Tmr1 Delay	PLC\PLC Timers\pg 1
CP-411	Tmr1 on Tm	PLC\PLC Timers\pg 1
CP-412	Tmr2 Delay	PLC\PLC Timers\pg 1
CP-413	Tmr2 on Tm	PLC\PLC Timers\pg 1
CP-414	Tmr3 Delay	PLC\PLC Timers\pg 1
CP-415	Tmr3 on Tm	PLC\PLC Timers\pg 1
CP-416	Tmr4 Delay	PLC\PLC Timers\pg 1
CP-417	Tmr4 on Tm	PLC\PLC Timers\pg 1
CP-420	Cntr1 Trig	PLC\PLC Event Cntrs\pg 1
CP-421	Cntr1 Cnt	PLC\PLC Event Cntrs\pg 1
CP-422	Cntr2 Trig	PLC\PLC Event Cntrs\pg 1
CP-423	Cntr2 Cnt	PLC\PLC Event Cntrs\pg 1

(Continued)

Appendix F: Control Parameter Screen Locator (continued)

CP#	CP Name	Screen
CP-424	Cntr3 Trig	PLC\PLC Event Cntrs\pg 1
CP-425	Cntr3 Cnt	PLC\PLC Event Cntrs\pg 1
CP-426	Cntr4TrigUp	PLC\PLC Event Cntrs\pg 1
CP-427	Cntr4 Cnt	PLC\PLC Event Cntrs\pg 1
CP-428	Cntr4TrigDn	PLC\PLC Event Cntrs\pg 1
CP-429	Cntr4Preset	PLC\PLC Event Cntrs\pg 1
CP-430	DN Write Parm 1	Setup\DeviceNet Setup\pg 2
CP-431	DN Write Parm 2	Setup\DeviceNet Setup\pg 2
CP-432	DN Write Parm 3	Setup\DeviceNet Setup\pg 2
CP-433	DN Write Parm 4	Setup\DeviceNet Setup\pg 2
CP-434	DN Read Parm 1	Setup\DeviceNet Setup\pg 2
CP-435	DN Read Parm 2	Setup\DeviceNet Setup\pg 2
CP-436	DN Read Parm 3	Setup\DeviceNet Setup\pg 2
CP-437	DN Read Parm 4	Setup\DeviceNet Setup\pg 2
CP-438	DN MAC ID	Setup\DeviceNet Setup\pg 1
CP-439	DN Baud Rate	Setup\DeviceNet Setup\pg 1
CP-440	Lg Number Parm	Setup\Status Screen Setup\pg 1
CP-441	Status Line 1	Setup\Status Screen Setup\pg 1
CP-442	Status Line 2	Setup\Status Screen Setup\pg 1
CP-443	Status Line 3	Setup\Status Screen Setup\pg 1
CP-444	Status Line 4	Setup\Status Screen Setup\pg 1
CP-445	Status Line 5	Setup\Status Screen Setup\pg 1
CP-446	Status Line 6	Setup\Status Screen Setup\pg 1
CP-449	Lg Number Units	Setup\Status Screen Setup\pg 1
CP-450	Diagnostics En	Device Tests\Std Signals Tests\pg 2
		Device Tests\Digital I/O Test\pg 1
CP-451	Diag DO Shift	Device Tests\Digital I/O Test\pg 1
CP-452	Diag DO	Device Tests\Digital I/O Test\pg 1
CP-453	Diag DAC Test	Device Tests\Std Signals Tests\pg 2
CP-454	Diag DAC Volts	Device Tests\Std Signals Tests\pg 2
CP-455	Diag DAC Bits	Device Tests\Std Signals Tests\pg 2
CP-456	Diag Rmp Tm	Device Tests\Std Signals Tests\pg 2

(Continued)

CP#	CP Name	Screen
CP-460	Analog Cal En	Device Tests\Analog Input Tests\pg 2
CP-461	Analog Cal Sel	Device Tests\Analog Input Tests\pg 2
CP-462	Analog Cal Ref	Device Tests\Analog Input Tests\pg 2
CP-463	AnalogRef Val	Device Tests\Analog Input Tests\pg 2
CP-468	CRC Enable	Setup\Serial Comm Setup\pg 1
	....	Device Tests\Serial Comm Test\pg 1
CP-469	Record Format	Setup\Serial Comm Setup\pg 1
	....	Device Tests\Serial Comm Test\pg 1
CP-470	Device Address	Setup\Serial Comm Setup\pg 1
	....	Device Tests\Serial Comm Test\pg 1
CP-471	Baud Rate	Setup\Serial Comm Setup\pg 1
	....	Device Tests\Serial Comm Test\pg 1
CP-472	Frame Format	Setup\Serial Comm Setup\pg 1
	....	Device Tests\Serial Comm Test\pg 1
CP-473	SerCom Char Out	Device Tests\Serial Comm Test\pg 1
CP-474	Video Mode	Setup\Video Setup\pg 1
	....	Device Tests\Hardware Tests\pg 3
CP-475	Contrast Value	Setup\Video Setup\pg 1
	....	Device Tests\Hardware Tests\pg 3
CP-478	Blk Sel Source	Blocks\Block Selection\pg 1
	....	System Monitor\Control Overrides\pg 4
CP-479	Keypad Blk Sel	Blocks\Block Selection\pg 1
	....	System Monitor\Control Overrides\pg 4
CP-480	KyPdLk Mask	Setup\Keypad Lock Setup\pg 1
	....	Setup\Keypad Lock Setup\pg 2
CP-481	Unlock CP A	Setup\Keypad Lock Setup\pg 1
CP-482	Unlock CP B	Setup\Keypad Lock Setup\pg 1
CP-483	Unlock CP C	Setup\Keypad Lock Setup\pg 1
CP-484	Unlock CP D	Setup\Keypad Lock Setup\pg 1
CP-485	Unlock CP E	Setup\Keypad Lock Setup\pg 1
CP-486	Unlock CP F	Setup\Keypad Lock Setup\pg 1
CP-487	Unlock CP G	Setup\Keypad Lock Setup\pg 1

(Continued)

Appendix F: Control Parameter Screen Locator (continued)

CP#	CP Name	Screen
CP-488	Unlock CP H	Setup\Keypad Lock Setup\pg 1
CP-489	Unlock Block	Setup\Keypad Lock Setup\pg 2
CP-490	Memory Test	Device Tests\Hardware Tests\pg 1
CP-491	Clr Fault Cntrs	Device Tests\Device Status\pg 1
		Device Tests\Device Status\pg 2
CP-492	Video Test	Device Tests\Hardware Tests\pg 3
CP-495	Serial Number	Setup\DeviceNet Setup\pg 1
CP-496	Load Parms	Setup\Load & Save Parms\pg 1
CP-497	Load PLC Prgm	Setup\Load & Save Parms\pg 1
CP-498	Save Parms	Setup\Load & Save Parms\pg 1
CP-499	Save PLC Prgm	Setup\Load & Save Parms\pg 1
CP-500	Block Parm 1	Block Setup\Edit Block Parms\pg 1
CP-501	Block Parm 2	Block Setup\Edit Block Parms\pg 1
CP-502	Block Parm 3	Block Setup\Edit Block Parms\pg 1
CP-503	Block Parm 4	Block Setup\Edit Block Parms\pg 1
CP-504	Block Parm 5	Block Setup\Edit Block Parms\pg 2
CP-505	Block Parm 6	Block Setup\Edit Block Parms\pg 2
CP-506	Block Parm 7	Block Setup\Edit Block Parms\pg 2
CP-507	Block Parm 8	Block Setup\Edit Block Parms\pg 2
CP-508	Block Parm 9	Block Setup\Edit Block Parms\pg 3
CP-509	Block Parm 10	Block Setup\Edit Block Parms\pg 3
CP-510	Block Parm 11	Block Setup\Edit Block Parms\pg 3
CP-511	Block Parm 12	Block Setup\Edit Block Parms\pg 3
CP-512	Block Parm 13	Block Setup\Edit Block Parms\pg 4
CP-513	Block Parm 14	Block Setup\Edit Block Parms\pg 4
CP-514	Block Parm 15	Block Setup\Edit Block Parms\pg 4
CP-515	Block Parm 16	Block Setup\Edit Block Parms\pg 4
CP-540	Blk0 Val 1	Block Setup\Edit Block 0\pg 1
CP-541	Blk0 Val 2	Block Setup\Edit Block 0\pg 1
CP-542	Blk0 Val 3	Block Setup\Edit Block 0\pg 1
CP-543	Blk0 Val 4	Block Setup\Edit Block 0\pg 1
CP-544	Blk0 Val 5	Block Setup\Edit Block 0\pg 2

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CP#	CP Name	Screen
CP-545	Blk0 Val 6	Block Setup\Edit Block 0\pg 2
CP-546	Blk0 Val 7	Block Setup\Edit Block 0\pg 2
CP-547	Blk0 Val 8	Block Setup\Edit Block 0\pg 2
CP-548	Blk0 Val 9	Block Setup\Edit Block 0\pg 3
CP-549	Blk0 Val10	Block Setup\Edit Block 0\pg 3
CP-550	Blk0 Val11...............	Block Setup\Edit Block 0\pg 3
CP-551	Blk0 Val12	Block Setup\Edit Block 0\pg 3
CP-552	Blk0 Val13	Block Setup\Edit Block 0\pg 4
CP-553	Blk0 Val14	Block Setup\Edit Block 0\pg 4
CP-554	Blk0 Val15	Block Setup\Edit Block 0\pg 4
CP-555	Blk0 Val16	Block Setup\Edit Block 0\pg 4
CP-556	Blk1 Val 1	Block Setup\Edit Block 1\pg 1
CP-557	Blk1 Val 2	Block Setup\Edit Block 1\pg 1
CP-558	Blk1 Val 3	Block Setup\Edit Block 1\pg 1
CP-559	Blk1 Val 4	Block Setup\Edit Block 1\pg 1
CP-560	Blk1 Val 5	Block Setup\Edit Block 1\pg 2
CP-561	Blk1 Val 6	Block Setup\Edit Block 1\pg 2
CP-562	Blk1 Val 7	Block Setup\Edit Block 1\pg 2
CP-563	Blk1 Val 8	Block Setup\Edit Block 1\pg 2
CP-564	Blk1 Val 9	Block Setup\Edit Block 1\pg 3
CP-565	Blk1 Val10	Block Setup\Edit Block 1\pg 3
CP-566	Blk1 Val11...............	Block Setup\Edit Block 1\pg 3
CP-567	Blk1 Val12	Block Setup\Edit Block 1\pg 3
CP-568	Blk1 Val13	Block Setup\Edit Block 1\pg 4
CP-569	Blk1 Val14	Block Setup\Edit Block 1\pg 4
CP-570	Blk1 Val15	Block Setup\Edit Block 1\pg 4
CP-571	Blk1 Val16	Block Setup\Edit Block 1\pg 4
CP-572	Blk2 Val 1	Block Setup\Edit Block 2\pg 1
CP-573	Blk2 Val 2	Block Setup\Edit Block 2\pg 1
CP-574	Blk2 Val 3	Block Setup\Edit Block 2\pg 1
CP-575	Blk2 Val 4	Block Setup\Edit Block 2\pg 1
CP-576	Blk2 Val 5	Block Setup\Edit Block 2\pg 2

(Continued)

CP#	CP Name	Screen
CP-577	Blk2 Val 6	Block Setup\Edit Block 2\pg 2
CP-578	Blk2 Val 7	Block Setup\Edit Block 2\pg 2
CP-579	Blk2 Val 8	Block Setup\Edit Block 2\pg 2
CP-580	Blk2 Val 9	Block Setup\Edit Block 2\pg 3
CP-581	Blk2 Val10	Block Setup\Edit Block 2\pg 3
CP-582	Blk2 Val11	Block Setup\Edit Block 2\pg 3
CP-583	Blk2 Val12	Block Setup\Edit Block 2\pg 3
CP-584	Blk2 Val13	Block Setup\Edit Block 2\pg 4
CP-585	Blk2 Val14	Block Setup\Edit Block 2\pg 4
CP-586	Blk2 Val15	Block Setup\Edit Block 2\pg 4
CP-587	Blk2 Val16	Block Setup\Edit Block 2\pg 4
CP-588	Blk3 Val 1	Block Setup\Edit Block 3\pg 1
CP-589	Blk3 Val 2	Block Setup\Edit Block 3\pg 1
CP-590	Blk3 Val 3	Block Setup\Edit Block 3\pg 1
CP-591	Blk3 Val 4	Block Setup\Edit Block 3\pg 1
CP-592	Blk3 Val 5	Block Setup\Edit Block 3\pg 2
CP-593	Blk3 Val 6	Block Setup\Edit Block 3\pg 2
CP-594	Blk3 Val 7	Block Setup\Edit Block 3\pg 2
CP-595	Blk3 Val 8	Block Setup\Edit Block 3\pg 2
CP-596	Blk3 Val 9	Block Setup\Edit Block 3\pg 3
CP-597	Blk3 Val10	Block Setup\Edit Block 3\pg 3
CP-598	Blk3 Val11	Block Setup\Edit Block 3\pg 3
CP-599	Blk3 Val12	Block Setup\Edit Block 3\pg 3
CP-600	Blk3 Val13	Block Setup\Edit Block 3\pg 4
CP-601	Blk3 Val14	Block Setup\Edit Block 3\pg 4
CP-602	Blk3 Val15	Block Setup\Edit Block 3\pg 4
CP-603	Blk3 Val16	Block Setup\Edit Block 3\pg 4
CP-604	Blk4 Val 1	Block Setup\Edit Block 4\pg 1
CP-605	Blk4 Val 2	Block Setup\Edit Block 4\pg 1
CP-606	Blk4 Val 3	Block Setup\Edit Block 4\pg 1
CP-607	Blk4 Val 4	Block Setup\Edit Block 4\pg 1
CP-608	Blk4 Val 5	Block Setup\Edit Block 4\pg 2

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Appendix F: Control Parameter Screen Locator (continued)

CP#	CP Name	Screen
CP-609	Blk4 Val 6	Block Setup\Edit Block 4\pg 2
CP-610	Blk4 Val 7	Block Setup\Edit Block 4\pg 2
CP-611	Blk4 Val 8	Block Setup\Edit Block 4\pg 2
CP-612	Blk4 Val 9	Block Setup\Edit Block 4\pg 3
CP-613	Blk4 Val10	Block Setup\Edit Block 4\pg 3
CP-614	Blk4 Val11...............	Block Setup\Edit Block 4\pg 3
CP-615	Blk4 Val12	Block Setup\Edit Block 4\pg 3
CP-616	Blk4 Val13	Block Setup\Edit Block 4\pg 4
CP-617	Blk4 Val14	Block Setup\Edit Block 4\pg 4
CP-618	Blk4 Val15	Block Setup\Edit Block 4\pg 4
CP-619	Blk4 Val16	Block Setup\Edit Block 4\pg 4
CP-620	Blk5 Val 1	Block Setup\Edit Block 5\pg 1
CP-621	Blk5 Val 2	Block Setup\Edit Block 5\pg 1
CP-622	Blk5 Val 3	Block Setup\Edit Block 5\pg 1
CP-623	Blk5 Val 4	Block Setup\Edit Block 5\pg 1
CP-624	Blk5 Val 5	Block Setup\Edit Block 5\pg 2
CP-625	Blk5 Val 6	Block Setup\Edit Block 5\pg 2
CP-626	Blk5 Val 7	Block Setup\Edit Block 5\pg 2
CP-627	Blk5 Val 8	Block Setup\Edit Block 5\pg 2
CP-628	Blk5 Val 9	Block Setup\Edit Block 5\pg 3
CP-629	Blk5 Val10	Block Setup\Edit Block 5\pg 3
CP-630	Blk5 Val11...............	Block Setup\Edit Block 5\pg 3
CP-631	Blk5 Val12	Block Setup\Edit Block 5\pg 3
CP-632	Blk5 Val13	Block Setup\Edit Block 5\pg 4
CP-633	Blk5 Val14	Block Setup\Edit Block 5\pg 4
CP-634	Blk5 Val15	Block Setup\Edit Block 5\pg 4
CP-635	Blk5 Val16	Block Setup\Edit Block 5\pg 4
CP-636	Blk6 Val 1	Block Setup\Edit Block 6\pg 1
CP-637	Blk6 Val 2	Block Setup\Edit Block 6\pg 1
CP-638	Blk6 Val 3	Block Setup\Edit Block 6\pg 1
CP-639	Blk6 Val 4	Block Setup\Edit Block 6\pg 1
CP-640	Blk6 Val 5	Block Setup\Edit Block 6\pg 2

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Appendix F: Control Parameter Screen Locator (continued)

CP#	CP Name	Screen
CP-641	Blk6 Val 6	Block Setup\Edit Block 6\pg 2
CP-642	Blk6 Val 7	Block Setup\Edit Block 6\pg 2
CP-643	Blk6 Val 8	Block Setup\Edit Block 6\pg 2
CP-644	Blk6 Val 9	Block Setup\Edit Block 6\pg 3
CP-645	Blk6 Val10	Block Setup\Edit Block 6\pg 3
CP-646	Blk6 Val11	Block Setup\Edit Block 6\pg 3
CP-647	Blk6 Val12	Block Setup\Edit Block 6\pg 3
CP-648	Blk6 Val13	Block Setup\Edit Block 6\pg 4
CP-649	Blk6 Val14	Block Setup\Edit Block 6\pg 4
CP-650	Blk6 Val15	Block Setup\Edit Block 6\pg 4
CP-651	Blk6 Val16	Block Setup\Edit Block 6\pg 4
CP-652	Blk7 Val 1	Block Setup\Edit Block 7\pg 1
CP-653	Blk7 Val 2	Block Setup\Edit Block 7\pg 1
CP-654	Blk7 Val 3	Block Setup\Edit Block 7\pg 1
CP-655	Blk7 Val 4	Block Setup\Edit Block 7\pg 1
CP-656	Blk7 Val 5	Block Setup\Edit Block 7\pg 2
CP-657	Blk7 Val 6	Block Setup\Edit Block 7\pg 2
CP-658	Blk7 Val 7	Block Setup\Edit Block 7\pg 2
CP-659	Blk7 Val 8	Block Setup\Edit Block 7\pg 2
CP-660	Blk7 Val 9	Block Setup\Edit Block 7\pg 3
CP-661	Blk7 Val10	Block Setup\Edit Block 7\pg 3
CP-662	Blk7 Val11	Block Setup\Edit Block 7\pg 3
CP-663	Blk7 Val12	Block Setup\Edit Block 7\pg 3
CP-664	Blk7 Val13	Block Setup\Edit Block 7\pg 4
CP-665	Blk7 Val14	Block Setup\Edit Block 7\pg 4
CP-666	Blk7 Val15	Block Setup\Edit Block 7\pg 4
CP-667	Blk7 Val16	Block Setup\Edit Block 7\pg 4

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APPENDIX G: MONITOR PARAMETER SCREEN LOCATOR

MP#	MP Name	Screen
MP-01	Uwnd Hz	Scaling\Unwind\pg 1
	....	System Monitor\Std Signals Monitor\pg 1
	....	Device Tests\Std Signals Tests\pg 1
MP-02	UwndEncRPM	Setup\System Setup\pg 5
	....	Scaling\Unwind\pg 1
	....	System Monitor\Std Signals Monitor\pg 1
	....	Device Tests\Std Signals Tests\pg 1
MP-03	UwndRollRPM	Setup\System Setup\pg 8
	....	Scaling\Unwind\pg 1
	....	Setpoints & Ramps\Direct SP & Ramps\pg 1
	....	System Monitor\Run Monitor\pg 2
	....	System Monitor\Std Signals Monitor\pg 1
	....	Device Tests\Std Signals Tests\pg 1
MP-05	UwndCnts	System Monitor\Std Signals Monitor\pg 1
	....	Device Tests\Std Signals Tests\pg 1
MP-06	UwndEstCtnt...........	Setup\System Setup\pg 4
	....	System Monitor\Run Monitor\pg 2
MP-07	UwndEstDia............	Status\pg 1
	....	Setup\System Setup\pg 4
	....	Scaling\Diameters\pg 1
	....	System Monitor\Run Monitor\pg 2
MP-09	Uwnd Rot	Scaling\Unwind\pg 1
	....	System Monitor\Std Signals Monitor\pg 1
	....	Device Tests\Std Signals Tests\pg 1
MP-11	Wind Hz	Scaling\Wind\pg 1
	....	System Monitor\Std Signals Monitor\pg 2
	....	Device Tests\Std Signals Tests\pg 1
MP-12	WindEncRPM	Setup\System Setup\pg 5
	....	Scaling\Wind\pg 1
	....	System Monitor\Std Signals Monitor\pg 2
	....	Device Tests\Std Signals Tests\pg 1
MP-13	WindRollRPM	Setup\System Setup\pg 7

(Continued)

MP#	MP Name	Screen
	....	Scaling\Wind\pg 1
	....	Setpoints & Ramps\Direct SP & Ramps\pg 1
	....	System Monitor\Run Monitor\pg 3
	....	System Monitor\Std Signals Monitor\pg 2
	....	Device Tests\Std Signals Tests\pg 1
MP-15	WindCnts	System Monitor\Std Signals Monitor\pg 2
	....	Device Tests\Std Signals Tests\pg 1
MP-16	WindEstCtnt	Setup\System Setup\pg 3
	....	System Monitor\Run Monitor\pg 3
MP-17	WindEstDia	Status\pg 1
	....	Setup\System Setup\pg 3
	....	Scaling\Diameters\pg 1
	....	System Monitor\Run Monitor\pg 3
MP-19	Wind Rot	Scaling\Wind\pg 1
	....	System Monitor\Std Signals Monitor\pg 2
	....	Device Tests\Std Signals Tests\pg 1
MP-21	UwndRRef	System Monitor\Run Monitor\pg 2
MP-22	UwndRR Err	Tuning\Velocity Loop\pg 1
	....	System Monitor\Run Monitor\pg 2
MP-23	Uwnd Kff	Tuning\Feedforward\pg 1
MP-24	Uwnd FFwd	Tuning\Feedforward\pg 1
MP-25	Uwnd Intgrl	Tuning\Velocity Loop\pg 1
	....	Tuning\Feedforward\pg 1
MP-26	Uwnd Trim	Tuning\Velocity Loop\pg 1
	....	Tuning\Feedforward\pg 1
	....	System Monitor\Run Monitor\pg 2
MP-27	UwndCO Volts	Setup\System Setup\pg 5
	....	Setup\System Setup\pg 8
	....	Scaling\Unwind\pg 2
	....	Setpoints & Ramps\Direct SP & Ramps\pg 1
	....	Tuning\Velocity Loop\pg 1
	....	Tuning\Feedforward\pg 1

(Continued)

Appendix G: Monitor Parameter Screen Locator (continued)

MP#	MP Name	Screen
	....	System Monitor\Run Monitor\pg 2
	....	System Monitor\Std Signals Monitor\pg 3
	....	Device Tests\Std Signals Tests\pg 2
MP-28	UwndCO Bits	Scaling\Unwind\pg 2
	....	System Monitor\Std Signals Monitor\pg 3
MP-29	UwndCO Max Bits .	Scaling\Unwind\pg 2
	....	System Monitor\Std Signals Monitor\pg 3
MP-31	WindRRef	System Monitor\Run Monitor\pg 3
MP-32	WindRR Err	Tuning\Velocity Loop\pg 2
	....	System Monitor\Run Monitor\pg 3
MP-33	Wind Kff	Tuning\Feedforward\pg 2
MP-34	Wind FFwd	Tuning\Feedforward\pg 2
MP-35	Wind Intgrl	Tuning\Velocity Loop\pg 2
	....	Tuning\Feedforward\pg 2
MP-36	Wind Trim	Tuning\Velocity Loop\pg 2
	....	Tuning\Feedforward\pg 2
	....	System Monitor\Run Monitor\pg 3
MP-37	WindCO Volts	Setup\System Setup\pg 5
	....	Setup\System Setup\pg 7
	....	Scaling\Wind\pg 2
	....	Setpoints & Ramps\Direct SP & Ramps\pg 1
	....	Tuning\Velocity Loop\pg 2
	....	Tuning\Feedforward\pg 2
	....	System Monitor\Run Monitor\pg 3
	....	System Monitor\Std Signals Monitor\pg 3
	....	Device Tests\Std Signals Tests\pg 2
MP-38	WindCO Bits	Scaling\Wind\pg 2
	....	System Monitor\Std Signals Monitor\pg 3
MP-39	WindCOMaxBits	Scaling\Wind\pg 2
	....	System Monitor\Std Signals Monitor\pg 3
MP-40	Line Speed	Status\pg 1
	....	System Monitor\Run Monitor\pg 1

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MP#	MP Name	Screen
MP-41	LineSpdSRef	System Monitor\Run Monitor\pg 1
MP-42	LineSpdRRef	System Monitor\Run Monitor\pg 1
MP-43	EstMaxLnSpd	System Monitor\Run Monitor\pg 1
MP-48	Uwnd State	Setup\System Setup\pg 8
		System Monitor\Run Monitor\pg 2
		System Monitor\Std Signals Monitor\pg 1
		System Monitor\Control Overrides\pg 1
		System Monitor\Control Overrides\pg 4
MP-49	Wind State	Setup\System Setup\pg 7
		System Monitor\Run Monitor\pg 3
		System Monitor\Std Signals Monitor\pg 2
		System Monitor\Control Overrides\pg 1
		System Monitor\Control Overrides\pg 4
MP-50	System State	Status\pg 1
		Setup\System Setup\pg 1
		System Monitor\Run Monitor\pg 1
		System Monitor\Control Overrides\pg 1
		System Monitor\Control Overrides\pg 4
		Device Tests\Std Signals Tests\pg 2
		Device Tests\Digital I/O Test\pg 1
MP-51	Active Blk	System Monitor\Limits & Alarms\pg 2
		System Monitor\Control Overrides\pg 4
MP-52	InvalidBlks	System Monitor\Limits & Alarms\pg 2
MP-53	Misc Status	System Monitor\Limits & Alarms\pg 2
MP-54	Std Alms	System Monitor\Limits & Alarms\pg 2
MP-55	Custom Alms	System Monitor\Limits & Alarms\pg 2
MP-56	Misc Alarms	System Monitor\Limits & Alarms\pg 2
MP-58	Dancer State	Setup\System Setup\pg 6
		Scaling\Dancer\pg 1
		Setpoints & Ramps\Dancer\pg 1
		Tuning\Dancer\pg 1
		System Monitor\Analog Monitor\pg 1

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MP#	MP Name	Screen
MP-59	Setup State	Setup\System Setup\pg 1
		Setup\System Setup\pg 3
		Setup\System Setup\pg 4
		Setup\System Setup\pg 5
		Setup\System Setup\pg 6
		Setup\System Setup\pg 7
		Setup\System Setup\pg 8
MP-60	Uwnd Dirn	Setup\System Setup\pg 8
		System Monitor\Run Monitor\pg 2
MP-61	Wind Dirn	Setup\System Setup\pg 7
		System Monitor\Run Monitor\pg 3
MP-70	Wrap Pty	Setup\System Setup\pg 7
		Setup\System Setup\pg 8
		System Monitor\Run Monitor\pg 1
MP-71	SigPolarity	Setup\System Setup\pg 5
		Setup\System Setup\pg 7
		Setup\System Setup\pg 8
		System Monitor\Run Monitor\pg 1
MP-72	UwndCntrlLp	Tuning\Velocity Loop\pg 1
		System Monitor\Run Monitor\pg 2
		System Monitor\Control Overrides\pg 1
		System Monitor\Control Overrides\pg 4
MP-73	WindCntrlLp	Tuning\Velocity Loop\pg 2
		System Monitor\Run Monitor\pg 3
		System Monitor\Control Overrides\pg 1
		System Monitor\Control Overrides\pg 4
MP-80	Dancer Bits	Scaling\Dancer\pg 1
		System Monitor\Analog Monitor\pg 1
		Device Tests\Analog Input Tests\pg 1
		Device Tests\Analog Input Tests\pg 2
MP-81	Dancer Volts	Setup\System Setup\pg 6
		Scaling\Dancer\pg 1

(Continued)

Appendix G: Monitor Parameter Screen Locator (continued)

MP#	MP Name	Screen
	....	Setpoints & Ramps\Dancer\pg 1
	....	Tuning\Dancer\pg 1
	....	System Monitor\Analog Monitor\pg 1
	....	Device Tests\Analog Input Tests\pg 1
	....	Device Tests\Analog Input Tests\pg 2
MP-82	Dancer Ctnt	Setup\System Setup\pg 6
	....	Setup\System Setup\pg 7
	....	Setup\System Setup\pg 8
	....	Scaling\Dancer\pg 1
	....	Setpoints & Ramps\Dancer\pg 1
	....	Tuning\Dancer\pg 1
	....	System Monitor\Analog Monitor\pg 1
	....	Device Tests\ Analog Input Tests\pg 1
MP-83	DncrCtnt Err	Status\pg 1
	....	Setpoints & Ramps\Dancer\pg 1
	....	Tuning\Dancer\pg 1
	....	System Monitor\Run Monitor\pg 1
	....	System Monitor\Analog Monitor\pg 1
MP-84	Dancer Trim	Status\pg 1
	....	Setpoints & Ramps\Dancer\pg 1
	....	Tuning\Dancer\pg 1
	....	System Monitor\Run Monitor\pg 1
MP-86	Ext LS Bits	Scaling\Ext Line Speed\pg 1
	....	System Monitor\Analog Monitor\pg 1
	....	Device Tests\Analog Input Tests\pg 1
	....	Device Tests\Analog Input Tests\pg 2
MP-87	Ext LS Volts	Scaling\Ext Line Speed\pg 1
	....	System Monitor\Analog Monitor\pg 1
	....	Device Tests\Analog Input Tests\pg 1
	....	Device Tests\Analog Input Tests\pg 2
MP-88	Ext LineSpd	Scaling\Ext Line Speed\pg 1
	....	Setpoints & Ramps\Line Speed\pg 1

MP#	MP Name	Screen
	....	System Monitor\Analog Monitor\pg 1
	....	Device Tests\Analog Input Tests\pg 1
MP-90	SerCom Char In	Device Tests\Serial Comm Test\pg 1
MP-91	SerCom Errs	Device Tests\Serial Comm Test\pg 1
	....	Device Tests\Serial Comm Test\pg 2
MP-94	ROM Test	Device Tests\Hardware Tests\pg 1
MP-95	SRAM Test	Device Tests\Hardware Tests\pg 1
MP-96	NV RAM Test	Device Tests\Hardware Tests\pg 1
MP-97	Model #	Device Tests\Device Model & Rev\pg 1
MP-98	RELEASE	Device Tests\Device Model & Rev\pg 1
MP-99	REVISION	Device Tests\Device Model & Rev\pg 1
MP-100	DI 7..0	PLC\Digital I/O\pg 1
	....	System Monitor\Dig I/O Monitor\pg 1
	....	Device Tests\Digital I/O Test\pg 1
MP-101	DI 15..8	PLC\Digital I/O\pg 1
	....	System Monitor\Dig I/O Monitor\pg 1
	....	Device Tests\Digital I/O Test\pg 1
MP-102	DO 7..0	PLC\Digital I/O\pg 1
	....	System Monitor\Dig I/O Monitor\pg 1
	....	Device Tests\Digital I/O Test\pg 1
MP-103	KeyPad Lockout	Setup\Keypad Lock Setup\pg 1
	....	Setup\Keypad Lock Setup\pg 2
	....	Device Tests\Hardware Tests\pg 2
MP-107	Tmr4 Time	PLC\PLC Timers\pg 1
MP-108	PLC Mon 1 Val	PLC\PLC Monitor\pg 1
MP-109	PLC Mon 2 Val	PLC\PLC Monitor\pg 1
MP-110	PLC 15-8	PLC\PLC Monitor\pg 1
MP-111	PLC 23-16	PLC\PLC Monitor\pg 2
MP-112	PLC 31-24	PLC\PLC Monitor\pg 2
MP-113	PLC 39-32	PLC\PLC Monitor\pg 2
MP-114	PLC 47-40	PLC\PLC Monitor\pg 2
MP-115	PLC 55-48	PLC\PLC Monitor\pg 2

APPENDIX H: ERROR CODE DEFINITIONS

Error	Definition
Acl Tm High	Acceleration time is too high.
Acl too Hi	Acceleration rate is too high.
Adrs Error	Address Error, there is an internal address conflict with the CPU.
Bad Blk Calc	During calculations for one of the parameter blocks, an error was encountered causing the block to be marked as bad. The block parameter value(s) in error should be corrected.
Bad Blk Sel	An attempt was made to switch to a bad parameter block.
Binary Only	The number is Binary, only "1's" and "0's" may be entered.
BkUp Loaded	Prompt which displays on completion of loading a code parameter backup into main CP list.
Blk Parm Err	An error was encountered in the block parameters.
Blk Val Err	An error was encountered in the block values of a block.
Buss Error	There is an internal buss conflict with the CPU.
ChkSm Error	Checksum Error, the checksum calculated for memory data is not correct.
Dcl Tm High	Deceleration time is too high.
Default Set	Prompt after resetting a parameter back to its default value.
Defaults Set	Prompt after resetting all parameters back to their default values.
Divide By 0	Math error has occurred internal resulting in divide by zero.
DP Present	Decimal point already present in the number you are entering.
Dspl Error	Display Error, an error has occurred when attempting to display a parameter (e.g., the parameter does not exist).
Field Full	The maximum number of characters (digits, decimal point, negative sign) allowed for parameter entry has been reached while entering a number via the keypad. You tried to enter more numbers/characters than will fit into the space allotted for the parameter value entry.
Flts Cleared	Prompt to indicate that the faults have been cleared, as a result of entering a 1 into Clr Fault Cntrs (CP-491)
Gen Intrpt	Some error occurred during the controls program execution to cause a General Interrupt.

(Continued)

Appendix H: Error Code Definitions (continued)

Error	Definition
Halt Monitor	Reset caused by microprocessor or double bus fault.
Illegal Inst	Illegal Instruction.
Invalid Cmd	An invalid command was encountered during compilation of the PLC program.
Invalid Opnd	An invalid operand was encountered during compilation of the PLC program.
Invalid Parm	The parameter requested is not defined and therefore is invalid.
KyPd Lockout	The keypad is locked out, disallowing entry for this parameter through the keypad.
LgWd Ovfl	There was a Long Word Overflow as a result of some internal calculation.
LossOf Clock	There is no clock signal. Last reset caused by the detection of no clock signal.
Low Power	The device's AC input voltage level is low (below the required specification).
Max Error	The parameter value just entered is above the maximum allowed for the parameter.
Max Res Met	The maximum number of digits to the right of the decimal point for the parameter being entered has already been met (an attempt was made to exceed this limit).
Max SP Error	The value just entered for the setpoint exceeds the value set in its corresponding Max SP (211,221).
Memory Fail	Indicates that a memory test has failed.
Memory Pass	Indicates that the memory test has passed.
Memory Error	An internal memory error was encountered.
Min Error	The parameter value last entered exceeded the minimum value allowed for the parameter.
Min SP Error	The value just entered for the setpoint exceeds the value set in its corresponding Min SP (212,222).

(Continued)

Error	Definition
Minus First	When entering the value for this parameter the minus sign (-) must be entered first.
No <END>	During compilation of the PLC program, no END command was found.
No Cmpr Parm	Invalid comparison parameter entered.
Not Allowed	The last action attempted is not allowed.
Not Processd	The request for a parameter value change was not processed due to a “combo” check error that occurred as a result of some calculation for a related parameter value or a parameter in a block of parameters. May be the result of a block parameter transfer to the control via serial communications.
Not Ready	The control was “not ready” to process the last request.
NVRAM Failed	The memory test for the nonvolatile RAM has failed.
NVRAM Passed	The memory test for the nonvolatile RAM has passed.
Only 1 Page	Occurs when the page up or page down key is pressed and there is only one page to display.
Parm Mem Lmt	Indicates that the internal memory limit for parameters in block parameters has been exceeded, and therefore the number of parameters defined in block parameters must be reduced.
PLC BkUp set	Prompt to indicate that the PLC program has been changed to be the same as the backup PLC program that was saved to backup.
PLC Dflt set	Prompt to indicate that the PLC program has been changed to be the same as the default PLC program.
PLC Mem Lmt	During compilation of the PLC program, the internal memory limit set for the PLC program has been exceeded. The PLC program should be reduced.
Power Loss	Indicates that a momentary loss of AC power was detected.
Ratio too Hi	The ratio is too high.

(Continued)

Appendix H: Error Code Definitions (continued)

Error	Definition
Res Error	The resolution for the last parameter value exceeded the limits for that parameter (result of a parameter value change using serial communications).
ROM Failed	Indicates that the memory test for the internal ROM part has failed.
ROM Passed	Indicates that the memory test for the internal ROM part has passed.
RUN Lockout	Indicates that the parameter entry is locked out during run. An attempt was made to enter a parameter value into a parameter that is locked out during run while the control is in run.
Saved 2 BkUp	Prompt to indicate that the data has been saved to backup storage for later use.
SP too High	The setpoint is too high.
SP too Low	The setpoint is too low.
Speed too Hi	The speed is too high.
SRAM Failed	Indicates that the memory test for the internal RAM part has failed.
SRAM Passed	Indicates that the memory test for the internal RAM part has passed.
Test Module	Reset caused by microprocessor's test sub-module.
UImpd Intrpt	An error has occurred while the CPU was processing to cause an unimplemented interrupt.
Watch Dog	The internal CPU watch dog timer has timed out. CPU is out of time and is not able to function correctly.

–NOTES—

APPENDIX I: SERIAL COMMUNICATIONS ERROR CODE DEFINITIONS

#	Name	Definition
0	OK	Request processed
1	General Data Error	A non-specified error occurred as a result of the last serial communications transmission. Check the contents of the last message transmission against the protocol definition.
2	Res Error	The resolution for the Control Parameter value exceeds the minimum or maximum that is allowed.
3	Invalid Parm	The requested parameter does not exist.
4	String too long	The custom engineering units string that was sent exceeds the 15 character limit and was truncated to 15 characters.
5	Out of Range	The parameter requested is above or below the available number of parameters, or the address requested for a memory read is not within the memory address range.
6	Not Allowed	The request is not allowed.
7	Lockout During RUN	An attempt was made to change a parameter value for a parameter that is locked out during run, while the control is in run (state).
8	Not Ready	The CX-1102 was “not ready” to receive the last request.
9	Block Parm Error	An error was encountered while processing a block parameter request.
10	Block Value Error	An error was encountered while processing a block value request.
11	Parm Memory Limit	The internal memory limit for block parameters was exceeded during processing of a block parameter change.
12	MIN Error	There was an attempt to exceed the minimum value allowed for a parameter value.

(Continued)

#	Name	Definition
13	Max Error	There was an attempt to exceed the maximum value allowed for a parameter value.
14	Invalid Command PLC	An invalid command was encountered during compilation of the PLC program.
15	Invalid Operand PLC	An invalid operand was encountered during compilation of the PLC program.
16	No <END> PLC	No END command was found during compilation of the PLC program.
17	PLC Memory Limit	The internal memory limit for the PLC program was reached while compiling the PLC program. The PLC program should be reduced in size.
18	Defaults Loaded	The default parameter values have been loaded into the Control Parameters.
19	Backup Loaded	The backup parameter values have been loaded into the Control Parameters.
20	Backup Saved	The Control Parameter values have been saved to backup storage.
21	Checksum Error	A checksum calculation error has occurred as a result of the last request.
22	Faults Cleared	The fault counters have been cleared.
23	Passed	The requested memory test passed.
24	Failed	The requested memory test failed.
25	No Compare Parm	No compare parameter.
26	Divide by Zero	The last request caused a “divide by zero” in an internal calculation.
27	Long Word Overflow	The last request caused a “long word overflow” in an internal calculation.
28	Parm Transfer Limit Error	An attempt was made to exceed the maximum number of parameters allowed for a request.

(Continued)

Appendix I: Serial Communications Error Code Definitions (continued)

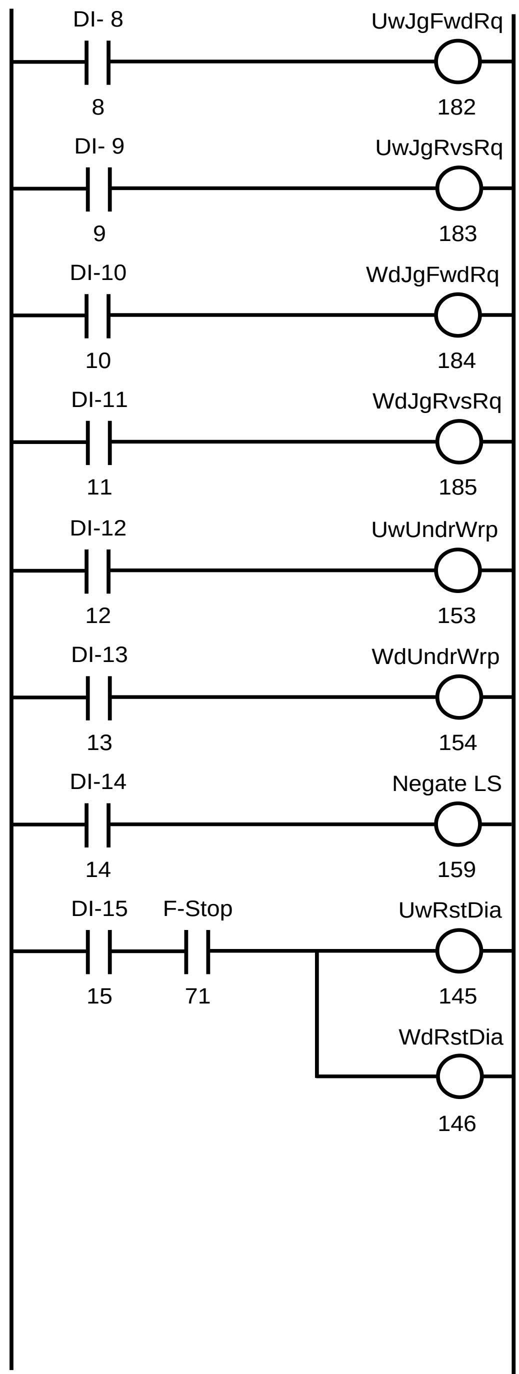
#	Name	Definition
29	Memory Read too Long	An attempt was made to read too many bytes of memory at one time.
30	Data Length Error	The “data field” length did not match the length expected for the specific serial communications function request.
31	Not Processed Msg	The last serial communications function request was not processed due to a combinational check error. One or more of the parameters in the block of parameters sent caused an error.
32	Invalid Serial Comm	The serial communications function that was requested, is not defined in the list of allowed functions. Check the protocol definition.

–NOTES—

APPENDIX J: PLC DEFAULT PROGRAM LOGIC

PLC Command **Equivalent Logic Ladder**

LOAD	8	DI_8
OUT	182	UwJgFwdRq
LOAD	9	DI_9
OUT	183	UwJgRvsRq
LOAD	10	DI_10
OUT	184	WdJgFwdRq
LOAD	11	DI_11
OUT	185	WdJgRvsRq
LOAD	12	DI_12
OUT	153	UwUndrWrp
LOAD	13	DI_13
OUT	154	WdUndrWrp
LOAD	14	DI_14
OUT	159	Negate LS
LOAD	15	DI_15
AND	71	F-Stop
OUT	145	UwRstDia
OUT	146	WdRstDia

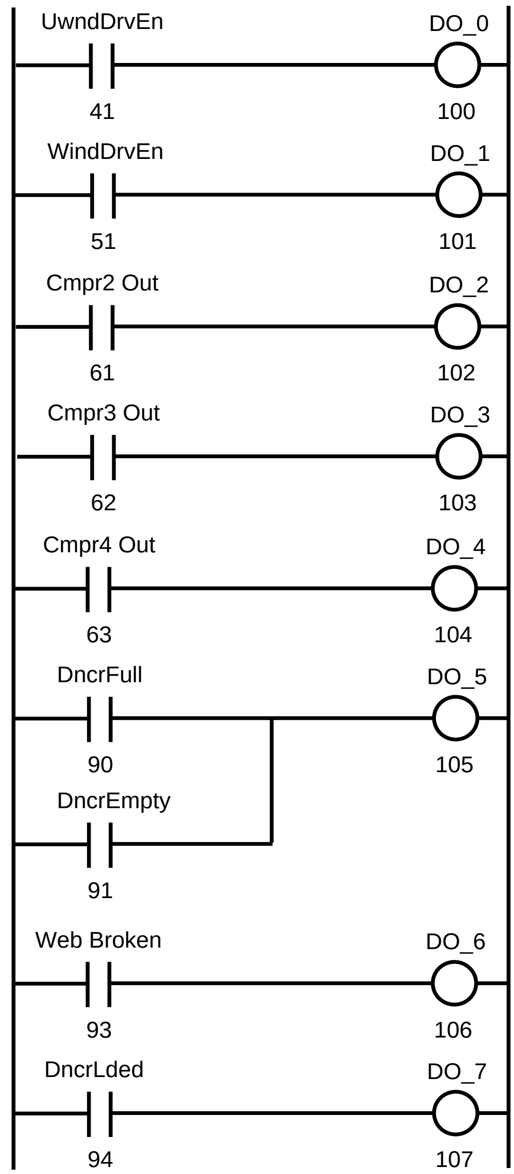


(Continued)

Appendix J: Default PLC Program Logic (continued)

PLC Command			
	LOAD	41	UwndDrvEn
	OUT	100	DO_0
	LOAD	51	WindDrvEn
	OUT	101	DO_1
*	LOAD	61	Cmpr2 Out
	OUT	102	DO_2
**	LOAD	62	Cmpr3 Out
	OUT	103	DO_3
***	LOAD	63	Cmpr4 Out
	OUT	104	DO_4
	LOAD	90	DncrFull
	OR	91	DncrEmpty
	OUT	105	DO_5
	LOAD	93	Web Broken
	OUT	106	DO_6
	LOAD	94	DncrLded
	OUT	107	DO_7

Equivalent Logic Ladder



* Cmpr2 is setup as Unwind Ramped Reference Error (RR - FB > Cmpr2 Val)
** Cmpr3 is setup as Wind Ramped Reference Error (RR - FB > Cmpr3 Val)
*** Cmpr4 is setup as Wind Roll Full Alarm (Wind Diameter $\geq$ Cmpr4 Val)

APPENDIX K: PLC PROGRAM COMMANDS

Command Description	Decimal:	Hexidecimal:
END Command	224	E0
LOAD Command	225	E1
AND Command	226	E2
OR Command	228	E4
Exclusive OR Command (XOR)	229	E5
NOT Command	232	E8
LOAD NOT Command	233	E9
AND NOT Command	234	EA
OR NOT Command	236	EC
Exclusive OR NOT Command	237	ED
OUT Command	240	F0
NOP Command	255	FF

—NOTES—

APPENDIX L: PLC PROGRAM OPERANDS

Op	Name	Related CP
0	S0	
1	S1	
2	ZERO = 0, off state	
3	ONE = 1, on state	
4	Pwr-Up 1 (on) for 1st PLC Scan	
5	Reserved	
6	Reserved	
7	Reserved	
8	DI_8, Default - UJogF, Unwind Jog Forward	
9	DI_9, Default - UJogR, Unwind Jog Reverse	
10	DI_10, Default - WJogF, Wind Jog Forward	
11	DI_11, Default - WJogR, Wind Jog Reverse	
12	DI_12, Default - UuWrp, Unwind Under Wrap	
13	DI_13, Default - WuWrp, Wind Under Wrap	
14	DI_14, Default - LSRvs, Line Speed Reverse	
15	DI_15, Default - WbRst, Web Reset	
16	Lch1 Out, Latch 1 Output	
17	Lch2 Out, Latch 2 Output	
18	Lch3 Out, Latch 3 Output	
19	Lch4 Out, Latch 4 Output	
20	Uw@MaxDia, Unwind at Maximum Diameter	CP-351
21	Uw@MinDia, Unwind at Minimum Diameter	CP-350
22	Wd@MaxDia, Wind at Maximum Diameter	CP-353
23	Wd@MinDia, Wind at Minimum Diameter	CP-352
24	Tmr1 Out, Timer 1 Output	CP-410,CP-411
25	Tmr2 Out, Timer 2 Output	CP-412,CP-413
26	Tmr3 Out, Timer 3 Output	CP-414,CP-415
27	Tmr4 Out, Timer 4 Output	CP-416,CP-417
28	Reserved	
29	Reserved	

(Continued)

Op	Name	Related CP
30	HiLineSpd, High Line Speed Alarm	CP-371
31	LnSpdLmt, LineSpdSRef > EstMaxLnSpd	
32	Cntr1 Out, Counter 1 Output	CP-420,CP-421
33	Cntr2 Out, Counter 2 Output	CP-422,CP-423
34	Cntr3 Out, Counter 3 Output	CP-424,CP-425
35	Cntr4UpO, Counter 4 Up Counter Output	CP-426,CP-427
36	Cntr4DnO, Counter 4 Down Counter Output	CP-428,CP-427
37	Low Power, Low Power Indication	
38	UwndCtntRO, UwndEstCtnt >= UwndCtntRO	
39	WindCtntRO, WindEstCtnt >= WindCtntRO	
40	UwCOSign, Unwind Control Output Sign (1 = Negative)	CP-282,MP-27
41	UwndDrvEn, Unwind Drive Enable	
42	UwRmpActv, Unwind Ramp Active	CP-355
43	UwRR@0Spd, Unwind Ramped Reference at ‘0’ Speed	CP-370
44	UwFb@0Spd, Unwind Feedback at ‘0’ Speed	CP-370
45	UwMxFbSpd, Unwind at Maximum Feedback Speed	CP-329
46	UwMxAcDcl, Unwind at Maximum Accel/Decel	CP-373
47	UwMtrNRsp, Unwind Motor/Drive NOT Responding	CP-372
48	UwndMaxHz, Unwind Feedback is >= Maximum Freq (Hz)	MP-01
49	Uw@MxVlts, Unwind Control Output at Maximum Volts	CP-281
50	WdCOSign, Wind Control Output Sign (1 = Negative)	CP-287,MP-37
51	WindDrvEn, Wind Drive Enable	
52	WdRmpActv, Wind Ramp Active	CP-355
53	WdRR@0Spd, Wind Ramped Reference at ‘0’ Speed	CP-370
54	WdFb@0Spd, Wind Feedback at ‘0’ Speed	CP-370
55	WdMxFbSpd, Wind at Maximum Feedback Speed	CP-339
56	WdMxAcDcl, Wind at Maximum Accel/Decel	CP-374
57	WdMtrNRsp, Wind Motor/Drive NOT Responding	CP-372
58	WindMaxHz, Wind Feedback is >= Maximum Freq (Hz)	MP-11
59	Wd@MxVlts, Wind Control Output at Maximum Volts	CP-286

(Continued)

Op	Name	Related CP
60	Cmpr1 Out, Numerical Comparator 1 result	CP-380,386,392
61	Cmpr2 Out, Numerical Comparator 2 result	CP-381,387,393
62	Cmpr3 Out, Numerical Comparator 3 result	CP-382,388,394
63	Cmpr4 Out, Numerical Comparator 4 result	CP-383,389,395
64	Both DT Uw, App1 - Both - Dancer Trimmed Unwind	CP-202
65	Both DT Wd, App2 - Both - Dancer Trimmed Wind	CP-202
66	Uwnd DT Uw, App3 - Unwind - Dancer Trimmed follower	CP-202
67	Wind DT Wd, App4 - Wind Dancer Trimmed follower	CP-202
68	Reserved	
69	Reserved	
70	OneSecSqW, One Second Square Wave Output	
71	F-Stop, F-Stop State (Monitor Only)	MP-50
72	Unload, Unload State (Monitor Only)	MP-50
73	H-Stop, H-Stop State (Monitor Only)	MP-50
74	Load, Load State (Monitor Only)	MP-50
75	Run, Run State (Monitor Only)	MP-50
76	Jog , Jog State (Monitor Only)	MP-50
77	Reserved	
78	Setup, Setup State (Monitor Only)	MP-50
79	DiagState, Diagnostics State (Monitor Only)	MP-50
80	Blk Sel 0, Block 0 Selected (Active) - (Monitor Only)	MP-51
81	Blk Sel 1, Block 1 Selected (Active)	MP-51
82	Blk Sel 2, Block 2 Selected (Active)	MP-51
83	Blk Sel 3, Block 3 Selected (Active)	MP-51
84	Blk Sel 4, Block 4 Selected (Active)	MP-51
85	Blk Sel 5, Block 5 Selected (Active)	MP-51
86	Blk Sel 6, Block 6 Selected (Active)	MP-51
87	Blk Sel 7, Block 7 Selected (Active)	MP-51
88	UwndRvs, Unwind Roll Reverse command indicated	
89	WindRvs, Wind Roll Reverse command indicated	

(Continued)

Appendix L: PLC Program Operands (continued)

Op	Name	Related CP
90	DncrFull, Dancer Full > 95%	CP-272,MP-82
91	DncrEmpty, Dancer Empty < 5%	CP-272,MP-82
92	DncrErPos, Dancer Error Positive = DncrCtnt > DncrSP	CP-272,MP-82
93	Web Broken, Web Broken State	
94	DncrLded, Dancer Loaded - dancer @ position ±5%	CP250,272,MP82
95	DncrIgnor, Dancer Ignored	
96	Reserved (Not accessible)	
97	Reserved (Not accessible)	
98	Reserved (Not accessible)	
99	Reserved (Not accessible)	
100	DO_0, Default - UwdEn, Unwind Enable	
101	DO_1, Default - WdEn, Wind Enable	
102	DO_2, Default - UErr, Unwind Error	
103	DO_3, Default - WErr, Wind Error	
104	DO_4, Default - WRlFl, Wind Roll Full	
105	DO_5, Default - Dncr, Dancer	
106	DO_6, Default - WbBrk, Web Break	
107	DO_7, Default - Spare, Spare	
108	Tmp1, Temporary Control Relay 1, CR1	
109	Tmp2, Temporary Control Relay 2, CR2	
110	Tmp3, Temporary Control Relay 3, CR3	
111	Tmp4, Temporary Control Relay 4, CR4	
112	Tmp5, Temporary Control Relay 5, CR5	
113	Tmp6, Temporary Control Relay 6, CR6	
114	Tmp7, Temporary Control Relay 7, CR7	
115	Tmp8, Temporary Control Relay 8, CR8	
116	Lch1 Set, Latch 1 Set	
117	Lch2 Set, Latch 2 Set	
118	Lch3 Set, Latch 3 Set	
119	Lch4 Set, Latch 4 Set	

(Continued)

Op	Name	Related CP
120	Lch1 Rst, Latch 1 Reset	
121	Lch2 Rst, Latch 2 Reset	
122	Lch3 Rst, Latch 3 Reset	
123	Lch4 Rst, Latch 4 Reset	
124	Tmr1 En, Timer 1 Enable	CP-410,CP-411
125	Tmr2 En, Timer 2 Enable	CP-412,CP-413
126	Tmr3 En, Timer 3 Enable	CP-414,CP-415
127	Tmr4 En, Timer 4 Enable	CP-416,CP-417
128	Tmr4 Rst, Timer 4 Reset	CP-416,CP-417
129	Reserved	
130	Cntr1 Inc, Counter 1 Increment	CP-420,CP-421
131	Cntr2 Inc, Counter 2 Increment	CP-422,CP-423
132	Cntr3 Inc, Counter 3 Increment	CP-424,CP-425
133	Cntr4 Inc, Counter 4 Increment	CP-426,CP-427
134	Cntr4 Dec, Counter 4 Decrement	CP-428,CP-427
135	Cntr1 Rst, Counter 1 Reset	CP-421
136	Cntr2 Rst, Counter 2 Reset	CP-423
137	Cntr3 Rst, Counter 3 Reset	CP-425
138	Cntr4 Rst, Counter 4 Reset	CP-429,CP-427
139	Reserved	
140	Blk Sel A, Block Select A	CP-478,MP-51
141	Blk Sel B, Block Select B	CP-478,MP-51
142	Blk Sel C, Block Select C	CP-478,MP-51
143	Reserved	
144	FrzDiaCal, Freeze Diameter Calculations	MP-07,MP-17
145	UwRstDia, Unwind Reset Diameter to Preset value	CP-364
146	WdRstDia, Wind Reset Diameter to Preset value	CP-365
147	UwRstIngl, Unwind Reset Integral to zero	MP-25
148	WdRstIngl, Wind Reset Integral to zero	MP-35
149	UwRstCtnt, Uwind Reset Content to Preset value	CP-366

(Continued)

Appendix L: PLC Program Operands (continued)

Op	Name	Related CP
150	WdRstCtnt, Wind Reset Content to Preset value	CP-367
151	UwFrzIngl, Unwind Freeze Integral (Freeze at current value) ..	MP-25
152	WdFrzIngl, Wind Freeze Integral (Freeze at Current Value)	MP-35
153	UwUndrWrp, Unwind Underwrap configuration	
154	WdUndrWrp, Wind Underwrap configuration	
155	UwRot Rst	
156	WdRot Rst	
157	NoDncrTrm, No Dancer Trim	
158	LSFrzRamp, Line Speed Freeze Ramp	
159	Negate LS, Negate Line Speed Scaled Reference	
160	Data Copy 1	
161	Data Copy 2	
162	Reserved	
163	Reserved	
164	Reserved	
165	Reserved	
166	Reserved	
167	StrtTrace, Start Data Trace	
168	Scroll Up, Remote Scroll Up	CP-400,CP-401
169	Scroll Dn, Remote Scroll Down	CP-400,CP-401
170	Reserved	
171	NOP Opnd, No Operation Operand	
172	Reserved	
173	Reserved	
174	Reserved	
175	Reserved	
176	LED 5 GRN, Illuminate LED 5 Green	
177	LED 5 RED, Illuminate LED 5 Red	
178	LED 6 GRN, Illuminate LED 6 Green	
179	LED 6 RED, Illuminate LED 6 Red	

Op	Name	Related CP
180	SysFStpRq, Request System State change to F-Stop State	
181	Reserved	
182	UwJgFwdRq, Request Unwind Axis Jog Forward State	
183	UwJgRvsRq, Request Unwind Axis Jog Reverse State	
184	WdJgFwdRq, Request Wind Axis Jog Forward State	
185	WdJgRvsRq, Request Wind Axis Jog Reverse State	
186	UwOpnLpRq, Request Unwind Axis Open Loop control	
187	WdOpnLpRq, Request Wind Axis Open Loop control	
188	Reserved	
189	Reserved	
190	Reserved	
191	Reserved	
192	Reserved	
193	Reserved	
194	Reserved	
195	Reserved	
196	Reserved	
197	Reserved	
198	Reserved	
199	Reserved	
200	UwndOpnLp, Unwind in Open Loop mode	
201	WindOpnLp, Wind in Open Loop mode	
202	Reserved	
203	Reserved	
204	UwndFStop, Unwind in F-Stop State	
205	UwndHStop, Unwind in H-Stop State	
206	UwndRUN, Unwind in Run State	
207	Reserved	
208	UwndJgFwd, Unwind in Jog Forward State	
209	UwndJgRvs, Unwind in Jog Reverse State	

Op	Name	Related CP
210	UwndJgStp, Unwind in Jog Stop State	
211	UwndDiag, Unwind in Diagnostics State	
212	WindFStop, Wind in F-Stop State	
213	WindHStop, Wind in H-Stop State	
214	WindRUN, Wind in Run State	
215	Reserved	
216	WindJgFwd, Wind in Jog Forward State	
217	WindJgRvs, Wind in Jog Reverse State	
218	WindJgStp, Wind in Jog Stop State	
219	WindDiag, Wind in Diagnostics State	

APPENDIX M: WIRING DIAGRAM EXAMPLES

DANGER

THIS DIAGRAM IS FOR CONCEPTUAL PURPOSES ONLY !
USE SAFETY EQUIPMENT.
MAKE WIRING CONNECTIONS CAREFULLY.
INCORRECT USE OF EQUIPMENT OR CONNECTIONS CAN CAUSE INJURY OR DEATH.

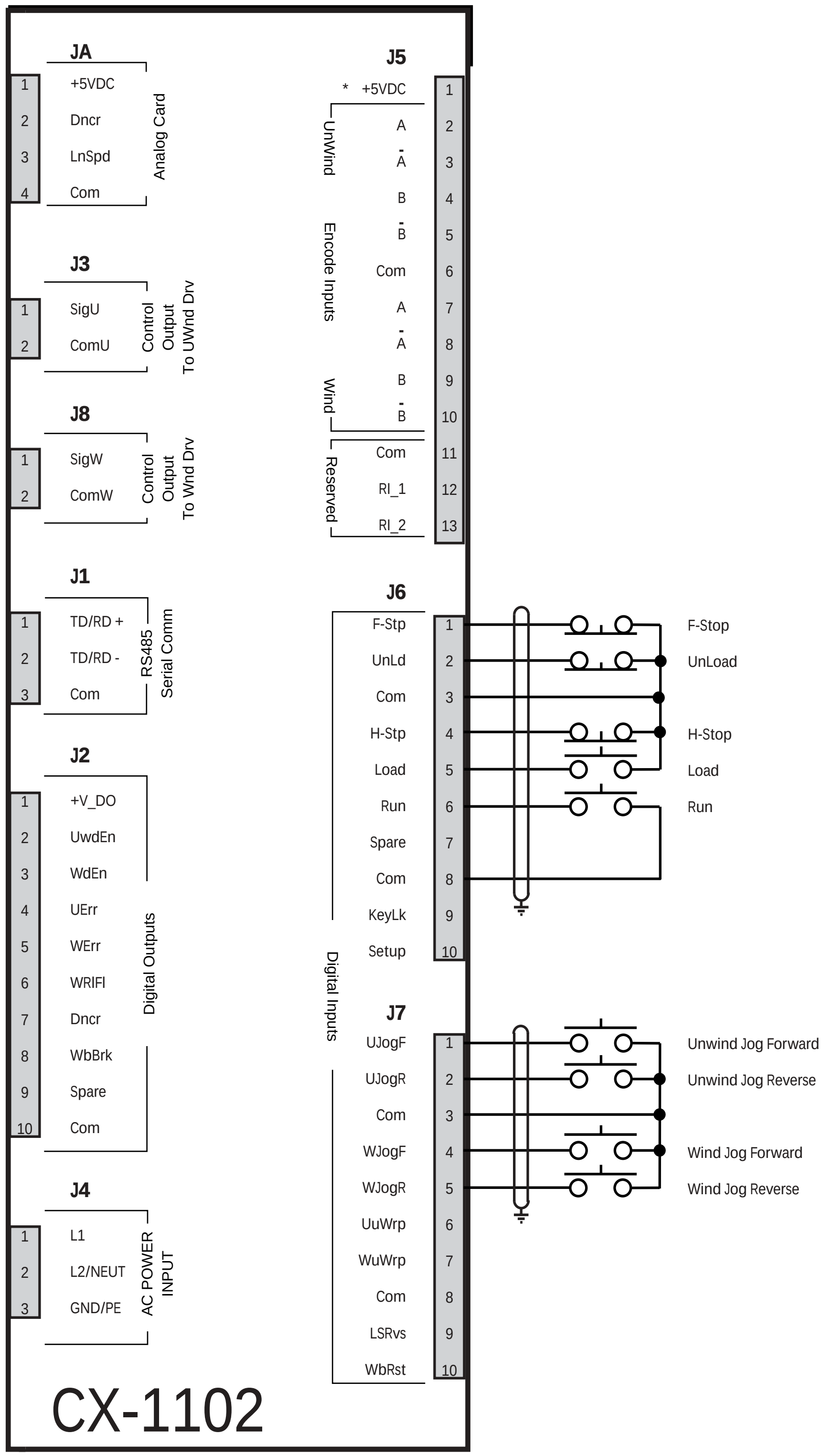


Figure M-1 Start/Stop Wiring Connections without Relays

DANGER

THIS DIAGRAM IS FOR CONCEPTUAL PURPOSES ONLY !
USE SAFETY EQUIPMENT.
MAKE WIRING CONNECTIONS CAREFULLY.
INCORRECT USE OF EQUIPMENT OR CONNECTIONS CAN CAUSE INJURY OR DEATH.

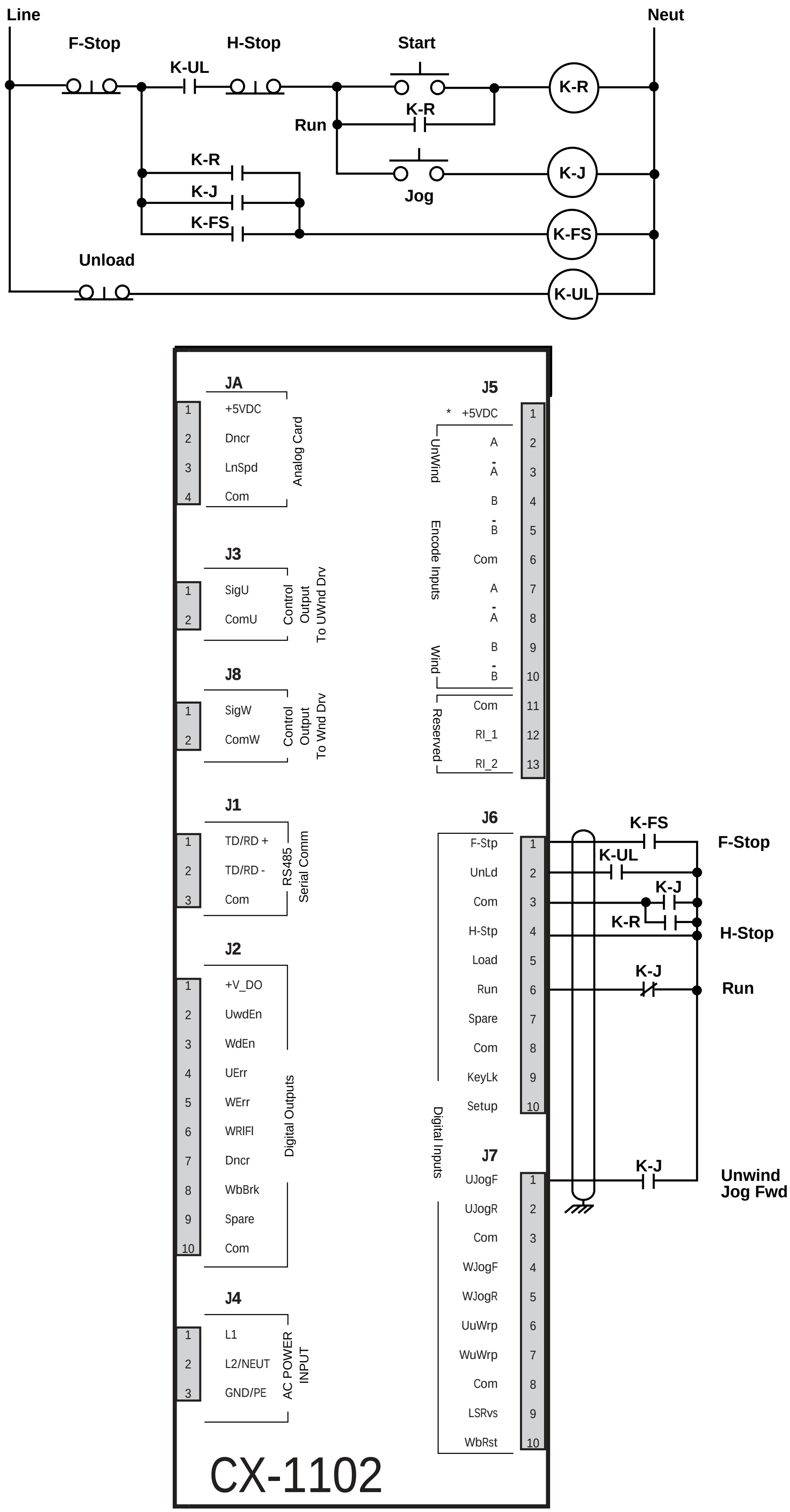
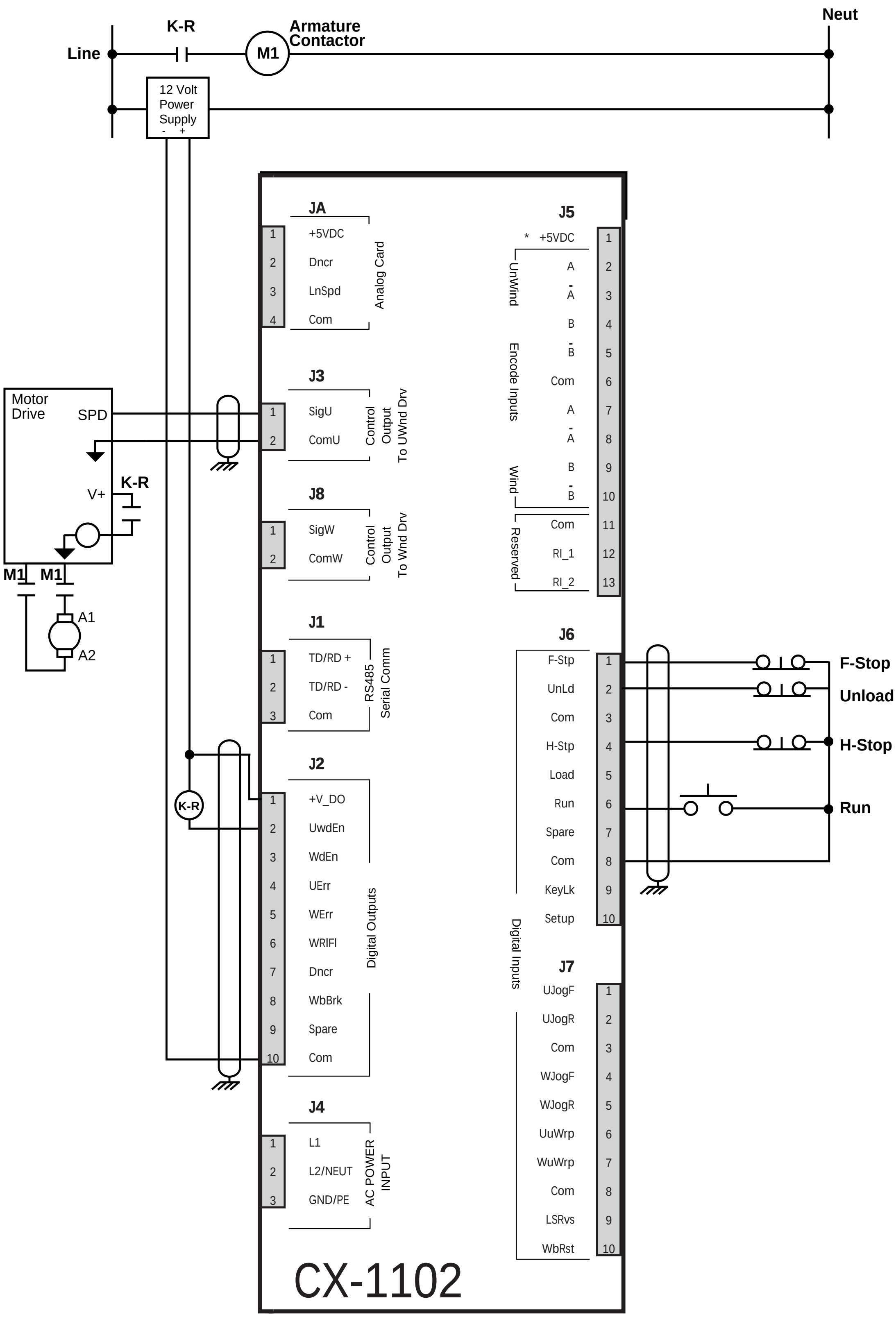


Figure M-2 Start/Stop Wiring Connections with Relays



DANGER

THIS DIAGRAM IS FOR CONCEPTUAL PURPOSES ONLY !
USE SAFETY EQUIPMENT.
MAKE WIRING CONNECTIONS CAREFULLY.
INCORRECT USE OF EQUIPMENT OR CONNECTIONS CAN CAUSE INJURY OR DEATH.

Figure M-3 Start/Stop Wiring Connections with Armature Contactor

—NOTES—

APPENDIX N: FAX COVER SHEET

Date: ______________________

Atten: **Contrex Technical Support**

From:
Name _____________________________ Company Name _____________________________________

Telephone # ________________________ Ext # _______________________ Fax # _________________

We have ______ CX-1102(s) that are used for: ____

____

____

____

____

____

Serial Communication Hookup: _____Yes _____No

Brief Description of the Problem: ____

____

____

____

____

____

____

Contrex Fax # = (763) 424-8734

We are transmitting _____ pages, including:
This Cover Sheet,
A copy of Appendix D w/ the User Record completed,

—NOTES—

APPENDIX O: REVISION LOG

Manual Revision	ECO Number	Revision Date	Corresponding * Software Rev.	Pages Changed
A	-	03/04	1000-8023 Rev. 1.0	New Manual Release

* Software revisions may not mandate manual changes. If your software revision is more recent than what is reflected here, use the the most current revision of the manual.

—NOTES—

Index

A

B

C

D

E

F

G

H

I

J

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Warranty/Service

SERVICE POLICY

Contrex, Inc., recognizes that with each sale of its product there are certain product obligations. This document defines the limits of such obligations and provides guidelines for the performance of related services.

Applicability

This Service Policy shall apply to all product sales of Contrex, Inc. However, it may be modified by mutual consent. Thus, whenever an accepted proposal contains wording inconsistent with this policy, the proposal will prevail with respect to specific sale or series of sales involved. Applicability of this policy is also somewhat limited in cases where products are sold to an OEM for resale to user. See paragraph below entitled *OEM Service.*

Service Personnel

Contrex, Inc., has a staff whose primary responsibility is service - both factory service and field (on-site) service. Personnel of this department are usually available for service on a 24 hour notice. To facilitate quicker handling of service requests, either written or by phone, such requests should be directed to the Contrex, Inc., Technical Services Department.

Service Charges

Contrex, Inc., reserves the right to charge for all services performed at the customers request with the exception of factory service performed under warranty. All on-site service is charged at flat-rate per diem rates plus expenses. Any Contrex, Inc., product developing defects as defined in the warranty during its effective period will be repaired or replaced without charge, providing it is shipped, prepaid, to Contrex, Inc., 8900 Zachary Lane North, Maple Grove, Minnesota 55369.

Spare Parts

Contrex, Inc., will usually have an adequate inventory of spare parts and circuit boards for all standard products. However, purchasers are encouraged to maintain a nominal supply of spare parts to insure immediate on-site accessibility.

Instruction Manuals

Instructions for installation, maintenance and troubleshooting are included in manuals that are provided with the equipment. Repairs may be performed in the field by competent customer personnel; but in order to not invalidate the warranty they must be made in strict accordance with published instructions, and ONLY AFTER obtaining approval of the Technical Service Department (such repairs are usually limited to the replacement of circuit boards and major subassemblies, not the repair of these items).

OEM Service

In many instances Contrex, Inc., products are sold to the original equipment manufactures or integrators for inclusion in larger systems. In such cases the obligations of Contrex, Inc., extend only to that original purchaser. It is the latter's responsibility to handle any service required by his customer, the end user. Such problems can usually be solved by field replacement of complete units. OEM's are encouraged to buy and maintain a supply of “loaners” for this purpose. Contrex, Inc., will provide factory overhaul service at nominal charges to support that OEM. Users of Contrex, Inc., products that were acquired as components of larger systems may buy service or spare parts directly from Contrex, Inc., at standard prices, but they must appeal through the OEM for warranty service.

If Contrex, Inc., encounters trouble in the field which appears to be the result of fault or inadequacy of the system, Contrex, Inc., reserves the right to recover service charges from the party that authorized the service activity.

WARRANTY

Contrex, Inc., guarantees this device against defects in workmanship and materials for a period of one (1) year from the date of purchase. Any parts or components that fail during the warranty period will be replaced or repaired without charge. This guarantee is void if the device has been damaged by improper installation or operation, tampering, careless handling or accident.

When a device fails to function in accordance with standards set forth in the instruction manual, the purchaser should contact an authorized representative of Contrex, Inc., 8900 Zachary Lane North, Maple Grove, Minnesota 55369. Whether repairs will take place in the field or at the factory will be solely the prerogative of Contrex, Inc.

If inspection reveals defects that are caused by faulty materials or workmanship, Contrex, Inc., reserves the right to either replace the device or rebuild the device using new or refurbished warranted parts and components. In either instance, the device that is returned to the purchaser meets full factory standards for new device performance. If there is less than 90 days remaining on the warranty period at the time of the repair, the warranty will extend to 90 days after the repair.

Parts and services outside the scope of this warranty will be available at Contrex, Inc., current market price.

Contrex's liability for a device or it's use, whether in warranty or not, shall not in any instance exceed the cost of correcting the defects of the device. Contrex, Inc., assumes no responsibility for damage to property or injuries to persons from improper use of this device.

No express warranties and no implied warranties whether of merchantability or otherwise (except as to title), other than those set forth above , which are expressly made in lieu of all other warranties, shall apply to any devise sold by Contrex, Inc.

Contrex, Inc., reserves the right to change or improve its devices without imposing any obligation upon Contrex, Inc., to make changes or improvements in previously manufactured devices.

This warranty statement is a summary of Contrex, Inc's policy. Further limits of liability are contained in the Contrex, Inc's purchase order acknowledgments and invoices.