



Carouse!USA

Commercial and Residential Turntables

Motion Control User Manual

Model MC-2

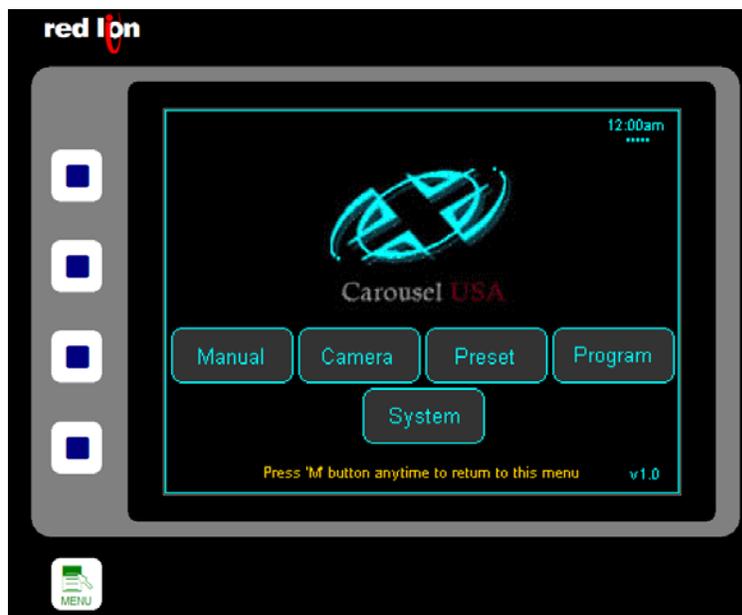
Introduction

The control system for the Carousel Turntables offers four modes of operation:

1. Manual
2. Camera
3. Preset
4. Program
5. Remote Motion Controller

These functions can be accessed via a built-in HTML (web) server using a standard web browser such as Internet Explorer or Netscape Navigator, from user-supplied buttons and switches via an accessory port, or using an optional built-in touchscreen terminal. Remote Motion Controller Mode is selected when the loop-back connector is removed from the user interface connector on the bottom of the control enclosure.

The main menu of the system is shown below:



In addition to selecting one of the four available operation modes, the main menu also offers the Setup menu, where system parameters such as the current date and time, and the network address of the system can be monitored and adjusted.

Buttons are displayed along the left side of the HTML and touch screen versions allowing quick jumps to each mode (top-to-bottom: Manual, Camera, Preset, Program) or back to this main screen via the lower "Menu" or "M" button.

Manual Mode

Manual mode offers the user the ability to simply rotate the table at a speed of their choosing.

The system will begin to rotate the table when the right or left arrow is pressed on the screen below. This screen is available via HTML, or will be shown on the touchscreen if that option was chosen. The "X" button appears as soon as a move is started, and will cause the table to stop rotating when it is pressed.



The speed graph in the lower right-hand corner of the screen adjusts the rotational speed during manual mode.

If a digital input has been assigned to the jog left or jog right function, those inputs will take priority over any other action and will cause this page to be displayed and the table to rotate until the inputs switch off.

The "Mark" button will teach the system that the current position of the table is zero, which is used as a reference for preset and programmed moves.

NOTE: Changing the zero position of the table will change all preset and programmed positions.

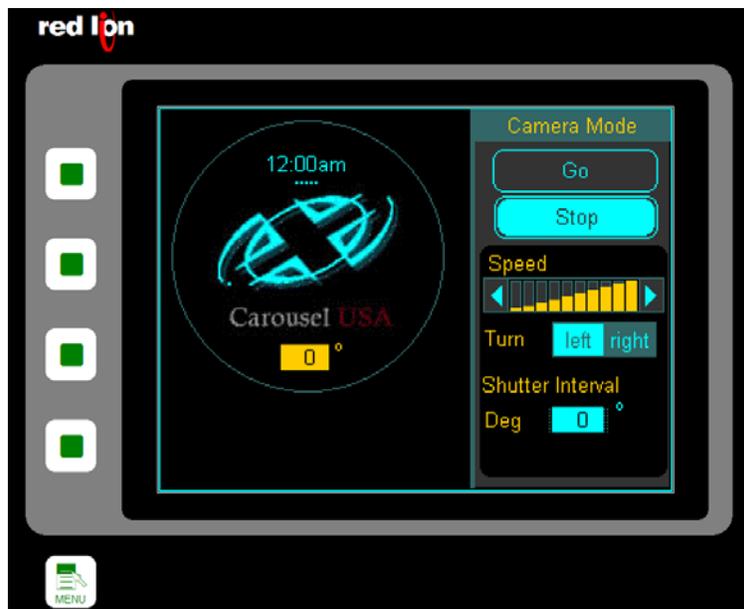
Camera Mode

Camera Mode operates much like Jog Mode except that the user may specify how often to provide a signal to an external camera or other device.

As shown below, the Camera Mode screen has “Go”, “Stop” and speed controls as well as a field for the Shutter Interval. Use this field to enter the number of degrees desired between shutter triggers. For instance, if the value of 3 was entered here, the system will send a shutter signal to the camera every three degrees.

There is no built-in stop for this function—it will continue to run and issue shutter commands until stopped.

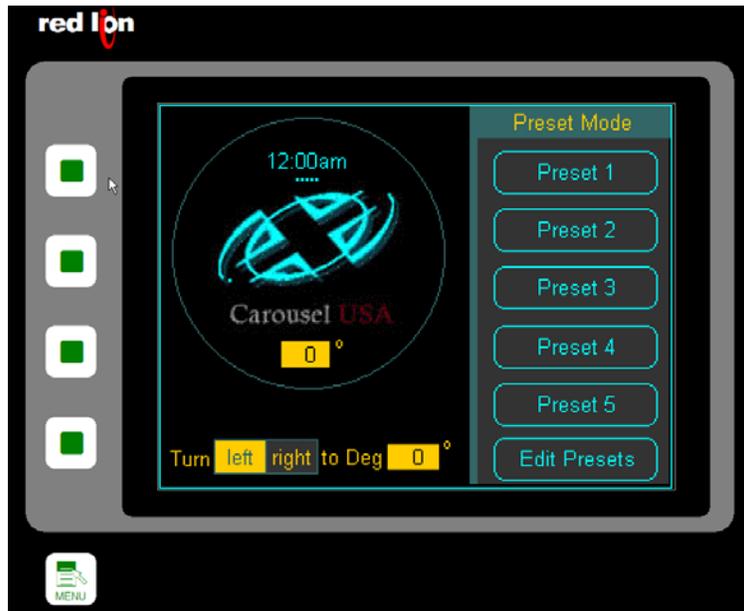
Digital inputs may be assigned to start and stop camera mode, in which case these inputs will take precedence over any screen-selected function.



The shutter command signal is given on between pins 27 (+24VDC) and 21 (switched ground path). This is a transistor capable of switching up to 12W.

Preset Mode

Preset Mode is used to position the turntable in one of five preset positions. These positions may be chosen or edited via HTML or the touchscreen. The user may also assign digital inputs to any or all of these preset positions. A signal on an assigned digital input will supersede any choices made over HTML or on the touchscreen.

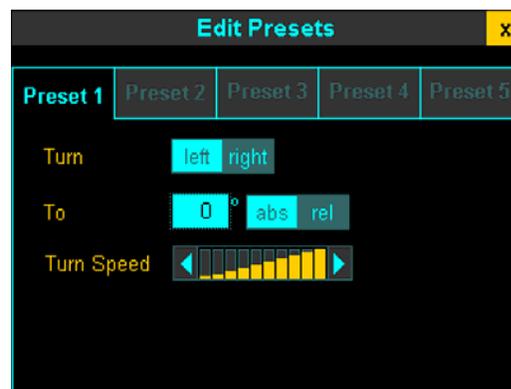


Pressing the Edit Preset button opens a screen that allows each of these five presets to be defined.

On the Edit Presets screen, five tabs are presented, each representing one of the five presets. For each, the user may specify whether the turn is to the right or to the left, the size and speed of the move and whether the measurement of the turn is relative to the starting position or in absolute terms.

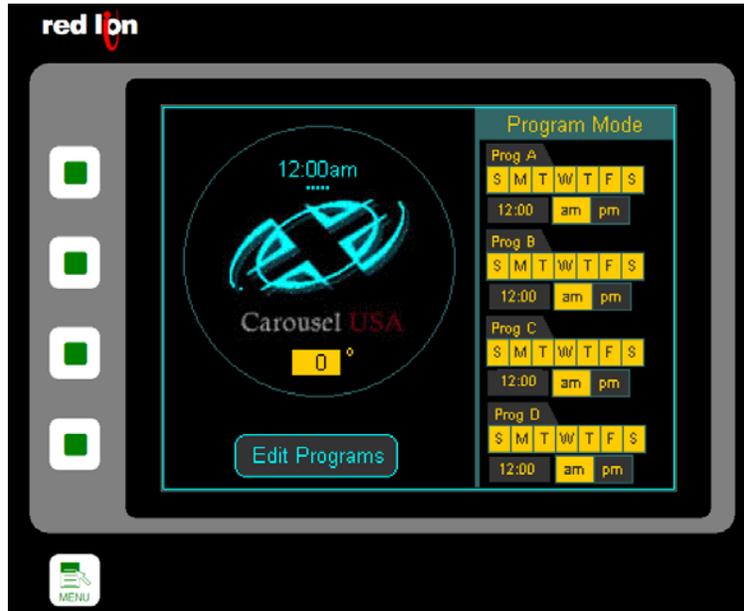
A relative move of 30° will increment the turntable that amount every time the command is issued.

An absolute move of 30° will move the table 30° from the zero position. If multiple commands of this type are issued, no further action after the first will be seen as the turntable will already be at 30°.

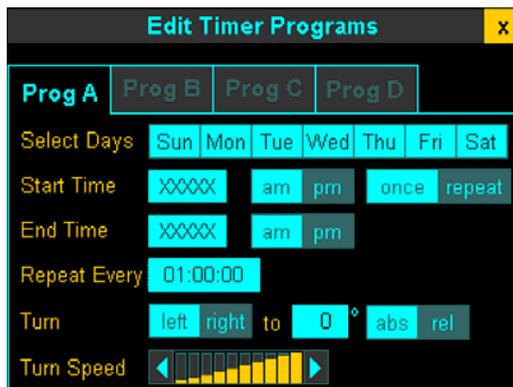


Program Mode

Program Mode provides a way for the user to have up to five moves start automatically based on the day of the week and the time of the day. These moves could be as simple as rotating 90° every half hour, or turning 180 degrees every day at midnight. Multiple programs can be set to overlap to create a wide variety of move profiles.



The Program Mode Screen shows the settings for all the programs at a glance. Pressing the Edit Program button opens a screen that allows each of the five programs to be edited.



On the Edit Timer Programs screen, four tabs are presented each representing one of the four programs. For each, the user may specify the days of the week and the times that the program should run, the repeat interval during that time, and the move profile.

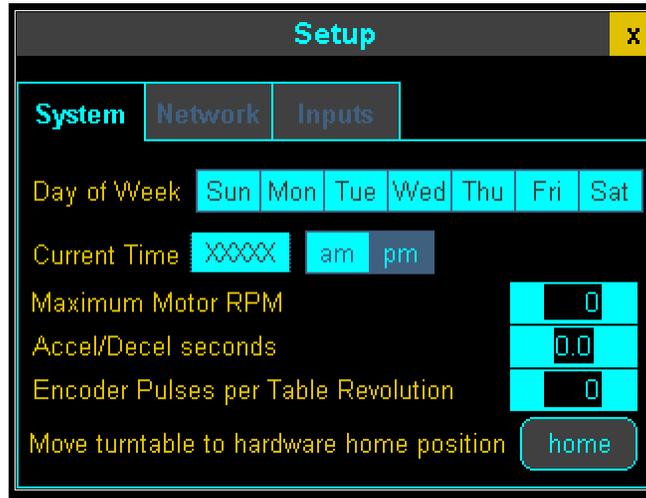
Selecting "Once" will cause the program to run only once... it will not be repeated.

Selecting "Repeat" will cause the program to run any time the current system time is between the Start and Stop times.

The "Repeat Every" field specifies how often during the interval defined by the Start Time and Stop Time the program should run. For example, a car showroom might program a move to occur every 15 minutes between 11 AM and 9 PM. Eleven AM would be the start time, nine PM the stop time, and the "Repeat Every" field would be set to 15 minutes. If the user wanted the turntable to run continuously, program 360° move repeating every 00:00:00 seconds.

Setup

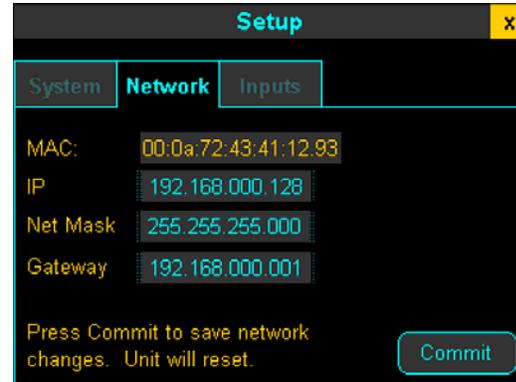
The Setup Area is divided into three tabs: System, Network and Inputs.



The System Tab allows you to set the day of the week and the time of day. For your convenience, you can use the home button to rotate of the table to the zero position. Also on this tab are settings that will allow you to change the maximum motor speed, the acceleration and deceleration characteristics of the table, and configure the system for the specific gearbox installed for your table.

The Network Tab shows the MAC ID of your unique controller. Your systems administrator can use this MAC ID to help determine the IP address of a HTML-only controller if the default address is changed and then lost.

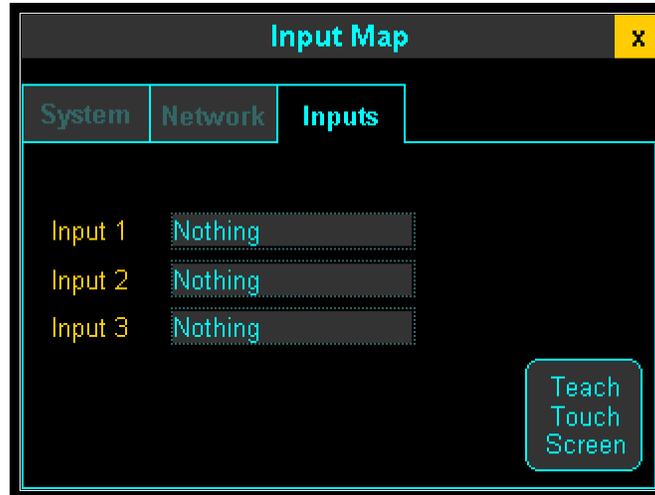
The IP, Netmask, and Gateway fields can all be adjusted to suit the requirements of any network. No changes are accepted here until the Commit button is pressed. Keep in mind that if you are accessing the unit over the network, you will have to enter the new address into your browser after you make this change!



The factory default network settings are shown above.

Setup- Cont.

The final tab of the Setup Area allows you to define the functions you wish associated with the available digital inputs. There is also a button there that allows you to calibrate the touchscreen to the image on the screen.



The Carousel controller provides up to three inputs that can be defined as shown. Once an input is defined, when it is “true” that function will be performed regardless of any other activity being commanded from the screen.

The inputs for Cam On and Cam Off will cause camera mode to start and stop, respectively.

Turn Left and Turn Right initiate jog mode at the speed commanded on the Jog Screen.

Presets 1 – 5 will cause the turntable to move to that specific preset position.

An input on the Mark 0 command will reset the current position indicator to zero.

Physical Interface

There are six connections to the Carousel Turntable Controls: Power, Ethernet, Servo Power Out, Servo Encoder Out, Proximity Switch, and User Interface.

The incoming power is factory configured for 230VAC, three phase which should be installed by a licensed electrician to the top of the disconnect switch located in the panel.

The Ethernet connection is provided via sealed RJ45 connector. This is a standard 10 Base T/100 BASE-TX Ethernet connection where the RJ45 is wired as a NIC (network interface card). A crossover cable will be required to connect this directly to a personal computer, or it may be connected to a router via a straight cable. If the controls will be placed in a damp location, purchase the sealed mating connector from Bulgin (PN: PX0837).

The Encoder cable connects to the supplied sensor. This sensor reports the current table position back to the control system.

The User Interface provides auxiliary power, digital inputs, digital outputs and connections for an external step-and-direction type motion controller. The connector for this interface is an AMP-brand, Part Number 206126-1. In order to use any of these external interface functions, an additional harness will have to be purchased from Carousel USA or fabricated by an experienced electrical engineer. Since all motion control commands are routed through this connector to facilitate the use of an external motion controller, harnesses made for even simple camera interface or external preset selection will have to include the proper loop-back connections.

A 24VDC power source is provided on pin 27 (+24) and pin 1 (common). Up to ½ amp may be drawn from this connector for input switching, shutter control, and any other auxiliary functions that the user may desire. Digital inputs are made by routing the common signal from pin 1 back into pins 5, 6 and 7:

User Input 1	Pin 5
User Input 2	Pin 6
User Input 3	Pin 7

Take care not to short the positive dc supply on pin 27 to ground. If this occurs, the internal circuit breaker will have to be reset in the controller.

There are also digital outputs on this connector to serve as the camera trigger. Pin 21 provides a sinking output to trigger an external camera. Depending on the nature of your camera, an interposing relay may be required. When a shutter command is issued, Pin 21 will provide a ground path for the 24VDC supplied from Pin 27. Up to 12W may be switched in this manner. Pin 23 is also configured as shutter release as factory default, but this pin may be reprogrammed by the factory for specific applications.

Also routed through this connector are the servo motion commands. If you desire to interface to an external motion controller, the User Interface connector will allow you to do this. Pins 12 (PP), 13 (PG), 15 (NP) and 16 (NG) will accept a differential line driver motion controller input. Connecting Pin 17 to the +24VDC supply of the external motion controller will allow the system to accept open collector motion commands on Pin 12 (PP) and Pin 15 (NP). For more information about the servo amplifier, please download the manual for the Mitsubishi MR-J3 servo amplifier from this website: <http://www.meau.com/functions/dms/getfile.asp?ID=01000000000000001000001027000000>

Here are the pin descriptions for the User Interface connector:

- PIN 1. Common from internal DC Power Supply
- PIN 2. Connected to Common (Pin 1) to indicate local control of servo motor is connected.
- PIN 3. Routes "In Position" signal from Servo Amplifier to system controller
- PIN 4. Routes "Alarm" signal from Servo Amplifier to system controller. Provides path to Common (Pin 1) when Servo Amplifier is not faulted and ready for a command when using external motion controller.
- PIN 5. User Input 1, connect to common (Pin 1) for TRUE.
- PIN 6. User Input 2, connect to common (Pin 1) for TRUE.
- PIN 7. User Input 3, connect to common (Pin 1) for TRUE.
- PIN 8. Servo "In Position" signal for use with external motion controller. Provides path to Common (Pin 1) when servo has completed commanded move. Must be looped back to Pin 3 for local operation.
- PIN 9. Servo "Ready" signal for use with external motion controller. Provides path to Common (Pin 1) when servo has is ready for a command.
- PIN 10. Servo "Alarm" signal for use with external motion controller. Provides path to Common (Pin 1) when servo has no fault. Must be looped back to Pin 4 for local operation.
- PIN 11. Step Command Output from local controller. Must be looped back to Pin 12 for local operation.
- PIN 12. Servo "Forward Pulse" command. Must be looped back to Pin 11 for local operation.
- PIN 13. Servo inverted "Forward Pulse" command for external use of differential line driver motion controller.
- PIN 14. Direction Command Output from local controller. Must be looped back to Pin 15 for local operation
- PIN 15. Servo "Reverse Pulse" command. Must be looped back to Pin 14 for local operation
- PIN 16. Servo inverted "Reverse Pulse" command for external use of differential line driver motion controller.
- PIN 17. Servo "Open Collector Common". Must be looped back to Pin 27 for local operation or tied to external motion controller +24VDC signal for external open collector motion commands.
- PIN 18. Servo "Reset" command. Must be looped back to Pin 19 for local operation. May be tied to Pin 1 by external controls for fault reset.
- PIN 19. Reset Command from local controls. Must be looped back to pin 18 for local control.

- PIN 20. Servo "Servo ON" command. Currently disabled in Servo Parameters but available if external motion controller requires it.
- PIN 21. Camera Shutter Output. Provides path to ground for 24VDC supplied at Pin 27 when shutter should be activated. May switch up to 12W.
- PIN 22. Servo "Torque Limit" command. Currently disabled in Servo Parameters but available if external motion controller requires it.
- PIN 23. Auxiliary output signal. Factory programmed to duplicate Pin 21.
- PIN 24. No Connection
- PIN 25. Output to local Estop Circuit. Loop back from Pin 27 for local control. Interrupt between Pin 27 and Pin 25 to incorporate an external estop circuit.
- PIN 26. Not used.
- PIN 27. Internal DC power supply, +24VDC.
- PIN 28. Frame Ground

Electrical Schematics

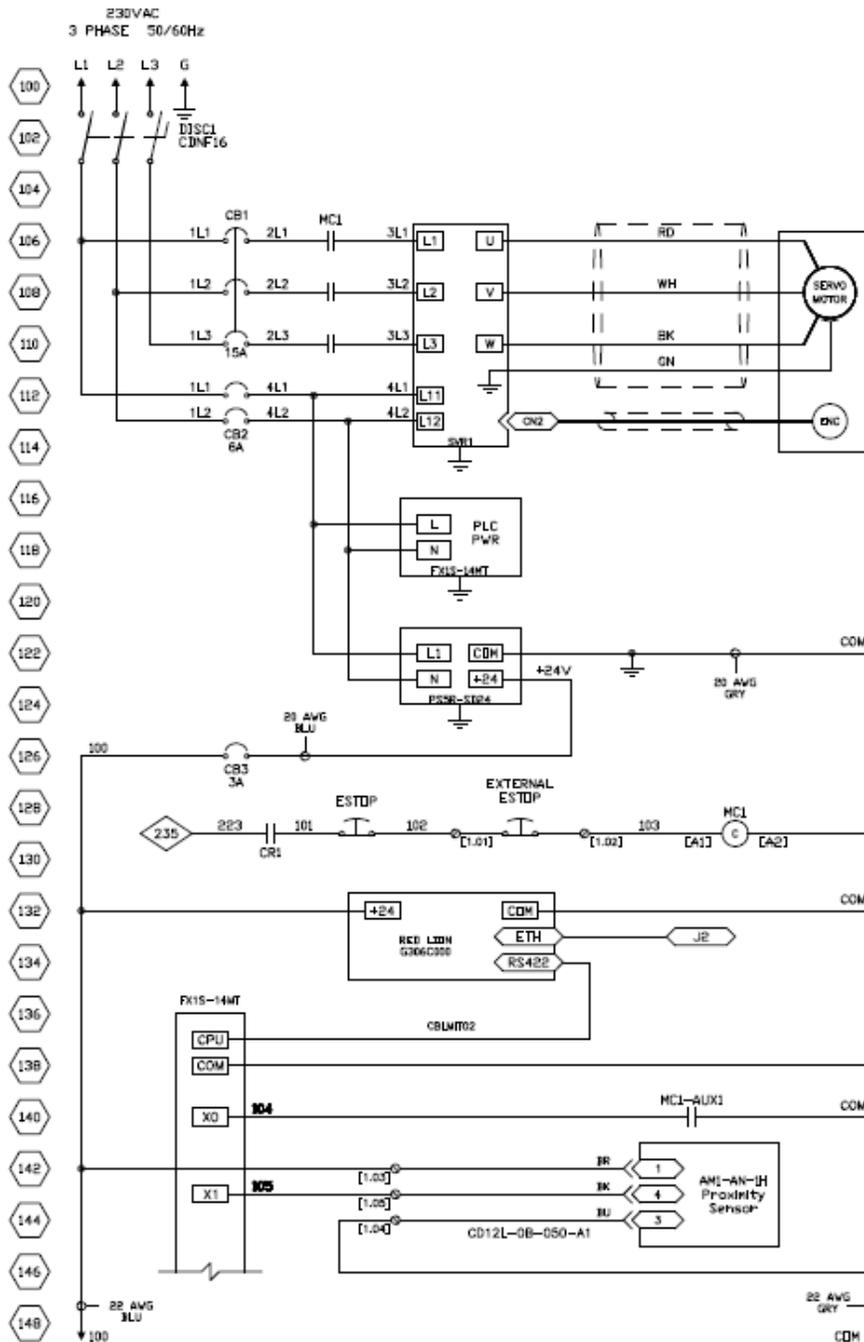


Table Servo System
 AMP MIT MR-J3-100A
 MOTOR MIT HF-SP10EK
 NOM 5.5A/ MAX15.5A

PLC Power Supply
 In: 100-240VAC/1ϕ/19V

Power Supply
 IDEC PS2B-S24
 In: 115-230VAC/1ϕ/60W
 OUT: 24VDC

Red LHM G306C000
 6" Color Touchscreen
 JR Ethernet Connector
 Enclosure Mounted

RS422 Cable

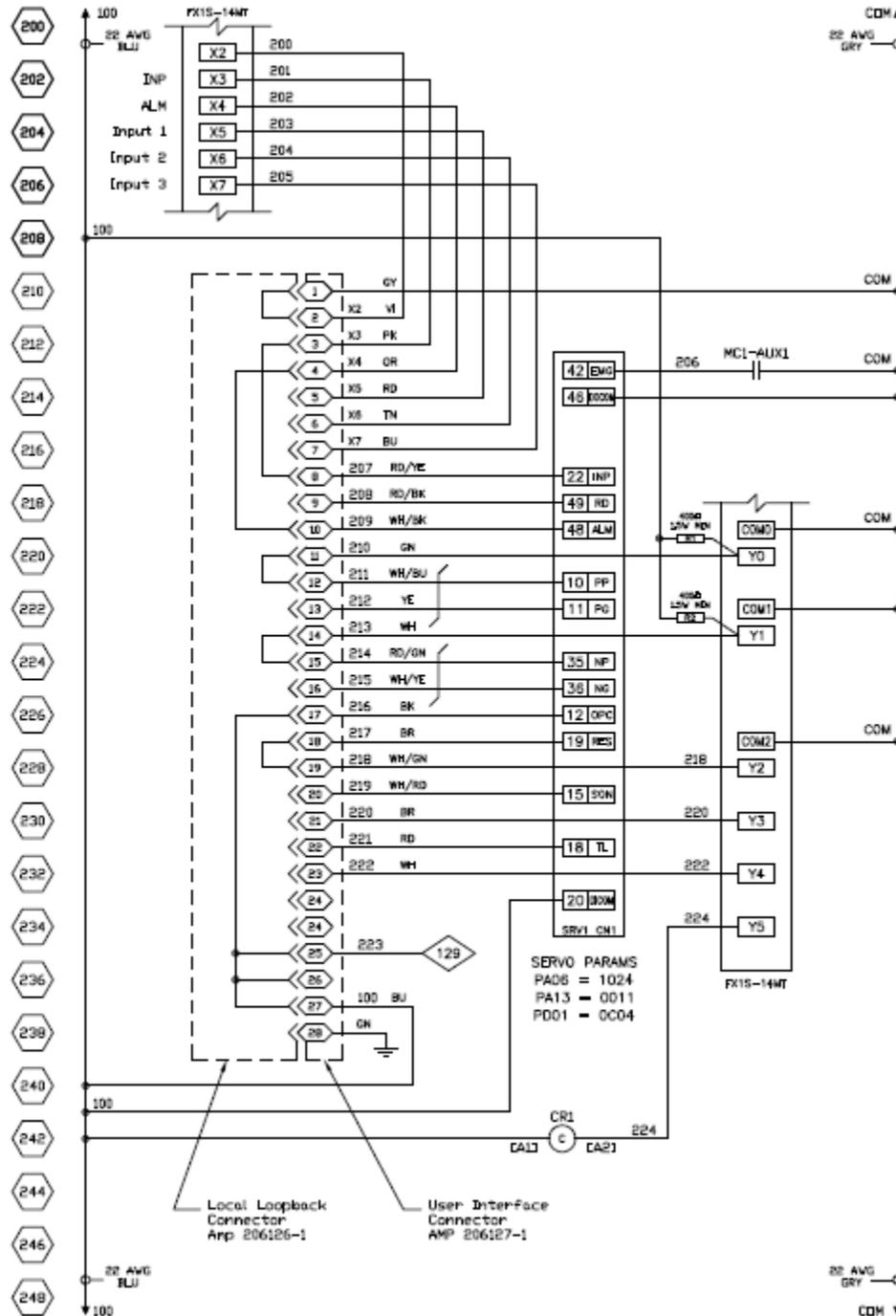
PLC
 MIT FX1S-14MT
 8 Inputs
 6 Outputs

STOP BK

Home Flag

Proximity Sensor
 Automation Direct
 AMI-AN-IH (SPND)
 CD12L-0B-050-A1 Cables

Electrical Schematics – Cont.





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