



ENGINEERING SPECIFICATION

SYMCOM MODEL CIO-EN MODBUS/TCP, MODBUS/RTU I/O MODULE FOR SYMCOM 777-P/P1/P2 PRODUCTS

PART 1 GENERAL

1.1 REFERENCES

- A. UL 508 Industrial Control Equipment – Underwriters Laboratories
- B. IEC 60947 Low Voltage Switchgear and Controlgear – International Electrotechnical Commission
- C. CSA C22.2 No. 14 Industrial Control Equipment – Canadian Standards Association
- D. ANSI/IEEE C62.41 – American National Standards Institute/Institute of Electrical & Electronics Engineers

1.1 WARRANTY

- A. Manufacturer Warranty: The manufacturer shall guarantee the product to be free from defects in material and workmanship for a period of five years from the date of manufacture when installed and operated according to the manufacturer's requirements.

PART 2 PRODUCTS

2.1 MANUFACTURERS

The equipment specified shall be the CIO-EN, manufactured by SymCom, Inc.

2.2 DESCRIPTION

- A. Regulatory Requirements:
 1. The equipment shall be UL Listed as type NKCR—Industrial Control Equipment-Motor Controllers-Auxiliary Devices.
 2. The equipment shall be ULC Listed as type NKCR7—Industrial Control Equipment-Motor Controllers-Auxiliary Devices Certified for Canada.
 3. The equipment shall be CE marked for use in the European Union and evaluated against IEC 60947 Low Voltage Switchgear and Controlgear.
 4. The equipment shall be CSA certified as class 3211-03—Industrial Control Equipment-Motor Controllers-Auxiliary Devices.

2.3 PERFORMANCE/DESIGN CRITERIA: CIO-EN I/O MODULE FOR SYMCOM 777-P/P1/P2 PRODUCTS

- A. Specific Functional Requirements
 1. The product shall require 24VDC input power.
 2. The product shall consume no more than 2.5 Watts.
 3. The product shall provide a diagnostic indicator light to indicate whether or not it has error-free Modbus/RTU communications with an attached SymCom 777-P/P1/P2.
 4. The product shall provide a diagnostic indicator light to indicate whether or not it has error-free Modbus/RTU communications with an upstream Master device.
 5. The product shall provide a diagnostic indicator light to indicate whether or not it is connected to an Ethernet network.
 6. The product shall provide a diagnostic indicator light to indicate whether or not it is communicating in an Ethernet network.
 7. The product shall provide an indication when an unrecoverable error in nonvolatile memory occurs.
- B. Input/Output Requirements
 1. The product shall provide 4 digital inputs rated at 24VDC.
 2. The product shall provide 1 SPDT normally open output relay with a pilot duty rating of 480VA @ 240VAC.
 3. The product shall provide 1 SPST normally open output relay with a pilot duty rating of 480VA @ 240VAC.
 4. The product shall provide a remote reset input rated at 24VDC that provides the ability to reset an attached 777-P/P1/P2.
- C. Modbus/RTU Requirements
 1. The product shall be able to connect to and communicate with a SymCom 777-P/P1/P2 via Modbus/RTU.
 2. The product shall be able to read and assume a SymCom 777-P/P1/P2's Modbus address.
 3. The product must implement Modbus/RTU communications that adhere to the Modbus/RTU standard.
 4. The product shall pass all supported Modbus/RTU requests not specifically handled in the CIO-EN to the attached 777-P/P1/P2.
 5. The product shall provide support for 0x03 and 0x06 Modbus commands.
- D. Modbus/TCP Requirements
 1. The product shall be able to read and assume a SymCom 777-P/P1/P2's Modbus address as the last octet in its IP address.
 2. The product must implement Modbus/TCP communications that adhere to the Modbus/TCP standard.
 3. The product shall pass all supported Modbus/TCP requests not specifically handled in the CIO-EN to the attached 777-P/P1/P2.



P/P1/P2.

4. The product shall provide support for 0x03 and 0x06 Modbus commands.

E. Network Requirements

1. The product shall provide the ability to read the status of each of its inputs via Modbus/RTU and Modbus/TCP.
2. The product shall provide the ability to read/modify the status of each of its outputs via Modbus/RTU and Modbus/TCP.
3. The product shall provide the ability to enable/disable a communications watchdog timer, which is defined as a timer that counts down while there are no communications between the CIO-EN and a Modbus (RTU and TCP) master or attached overload.
4. The product shall provide the ability to change the state of the output relays when a Modbus network watchdog timeout occurs.
5. The product shall provide the ability to link each output's state to each input's state.
6. The product shall provide the ability to link each output's state to the warning status register read from an attached 777-P/P1/P2.
7. The product shall provide the ability to link each output's state to the fault status register read from an attached 777-P/P1/P2.
8. The product shall provide the ability to configure each input to be capable of resetting an attached 777-P/P1/P2.
9. The product shall provide the ability to configure each input to be capable of tripping an attached 777-P/P1/P2.
10. The product shall provide the ability to configure an input to be capable of inhibiting faults in an attached 777-P/P1/P2.
11. The product shall provide the ability to modify and read an assembly built with Modbus registers from an attached 777-P/P1/P2 at Modbus assembly 502. This assembly shall be capable of storing up to 40 words.

F. Ethernet Requirements

1. The product shall be able to support 10Base-T Ethernet connectivity.
2. The product shall include an embedded webpage that may be used to configure its Ethernet settings, including the IP address, subnet mask, gateway, and DHCP status.
3. The product shall support ICMP.

G. Logging Requirements

1. The product shall be able to log parameters specified by the user. These parameters shall be represented by their respective Modbus addresses.
2. The product shall provide the ability to log power on and power off events.
3. The product shall provide the ability to log overload fault events.
4. The product shall provide the ability to log overload pending fault events.
5. The product shall provide the ability to log overload warning events.
6. The product shall provide the ability to retrieve log files via FTP.

H. Electromagnetic Compatibility

1. The equipment shall be immune to electrostatic discharge per IEC 61000-4-2, Level 3, 6kV contact discharge and 8kV air discharge.
2. The equipment shall be immune to electrical fast transient bursts exceeding IEC 61000-4-4, Level 4, 4kV power supply port and 2 kV inputs/output ports.
3. The equipment's 24V supply shall be immune to electrical surges per IEC 61000-4-5, Level 1. Specified limits shall be 500V line-to-line and line-to-ground.
4. The equipment's RS-485 and input lines shall be immune to electrical surges per IEC 61000-4-5, Level 2. Specified limits shall be 1kV line-to-line and line-to-ground.
5. The equipment shall be immune to radiated radio frequency emissions per IEC 61000-4-6, Level 3. Specified limits shall be 10V/m at 150 MHz.

- I. Enclosure Class of Protection: The equipment shall provide IP20 (Finger Safe) protection.

J. Environmental Requirements

1. The equipment shall operate continuously without de-rating in ambient temperatures of -20° to 70°C (-4° to 158°F).
2. The equipment shall operate continuously without de-rating in relative humidity of up to 95% non-condensing.
3. The equipment shall operate properly after storage in ambient temperatures of -40° to 80°C (-40° to 176°F).

K. Dimensions:

1. The equipment dimensions shall not exceed 3.500" high X 1.000" wide X 5.500" deep.

L. Mounting:

1. The equipment shall be mountable on the side of a 777-P/P1/P2, snapped onto a DIN rail or surface mounted.

End of Section

CIO-EN Rev. 2.0 01/20/2009