



# XL4 OCS DATASHEET

## MODEL 0 No Built-In I/O

### 1 TECHNICAL SPECIFICATIONS

#### 1.1 General

|                               |   |
|-------------------------------|---|
| Typical Power Backlight 100%  | 239mA @ 10V (2.39W)<br>103mA @ 24V (2.47W)  |
| Power Backlight Off           | -24mA @ 24VDC (0.58W)   |
| Power Backlight @ 50%         | -18mA @ 24VDC (0.42W)   |
| Required Power (Steady State) | 103mA @ 24VDC (1.03W)<br>239mA @ 10VDC (2.39W)  |
| Heater Option                 | 250mA with heater operating (24VDC)<br>*Heater Option (Model# plus "-22")   |
| Required Power (Inrush)       | 2A for < 1ms @ 24VDC, DC switched   |
| Primary Power Range           | 10 - 30VDC<br>10 - 24VDC (with heater option)   |
| Relative Humidity             | 5 to 95%, Non-Condensing  |
| Clock Accuracy                | + / - 20 ppm maximum at 25°C<br>(+/- 1 min/month)   |
| Real Time Clock               | Battery Backed, Rechargeable Lithium  |
| Operating Temperature         | -10°C to +60°C<br>(-22 Heater Option range is -40°C to +60°C)   |
| Storage Temperature           | -20°C to +60°C  |
| Weight                        | 12 oz / 340g (without I/O)  |
| Altitude                      | Up to 2000m   |
| Rated Pollution Degree        | Evaluated for Pollution Degree 2 Rating   |
| Certifications (UL/CE)        | North America: <a href="https://hornerautomation.com/certifications/">https://hornerautomation.com/certifications/</a><br>Europe: <a href="http://www.horner-apg.com/en/support/certification.aspx">http://www.horner-apg.com/en/support/certification.aspx</a> |

#### 1.3 User Interface

|                       |                                       |
|-----------------------|---------------------------------------|
| Display Type          | 3.5" TFT Color                        |
| Screen Brightness     | 640cd/m <sup>2</sup> (nits)           |
| Resolution            | QVGA (320 x 240)                      |
| Color                 | 16-bit (65,535)                       |
| User-Program. Screens | 1023 max pages; 1023 objects per page |
| Backlight             | LED - 50,000 hour life                |
| Brightness Control    | 0-100% via System Register %SR57      |
| Number of Keys        | 5                                     |

#### 1.2 Connectivity

|                        |   |
|------------------------|---|
| Serial Ports           | 1 RS-232 and 1 RS-485 on singular Modular Jack  |
| USB mini-B             | USB 2.0 (480MHz) Programming & Data Access  |
| USB A                  | USB 2.0 (480MHz) for USB flash drives (2TB)   |
| CAN Port Isolated 1 kV | Remote I/O, Peer-to-peer Comms, Cscape  |
| CAN Protocols          | CsCAN, CANopen, DeviceNet, J1939  |
| Ethernet               | 10/100 Mb (Auto-MDX)  |
| Ethernet Protocols     | TCP/IP, Modbus TCP, FTP, SMTP, EGD, ICMP, ASCII   |
| Remote I/O             | SmartRail, SmartStix, SmartBlock, SmartMod  |
| Removable Memory       | microSD, SDHC, SDXC IN FAT32 format, support for 32GB max. Application Updates, Datalogging, and more |

#### 1.4 Control & Logic

|                          |  |
|--------------------------|--|
| Control Language Support | Advanced Ladder Logic Full IEC 61131-3 Languages                                   |
| Logic Program Size       | 1MB, maximum   |
| Logic Scan Rate          | 0.013ms/kB   |
| Digital Inputs           | 2048   |
| Digital Outputs          | 2048   |
| Analog Inputs            | 512  |
| Analog Outputs           | 512  |
| Gen. Purpose Registers   | 50,000 (words) Retentive<br>16,384 (bits) Retentive<br>16,384 (bits) Non-retentive |

### XL4 User Manual [MAN0964]

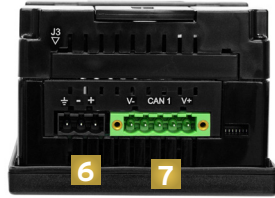
The User Manual includes extensive information on:

- Common %S & %SR Registers
- Resource Limits

## 2 CONTROLLER OVERVIEW

## 3 COMMUNICATIONS

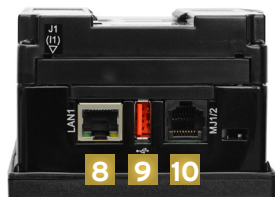
### 2.1 - Overview of XL4



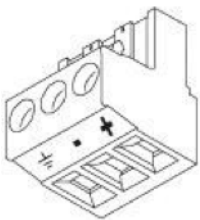
1. Touchscreen
2. Function Keys
3. High Capacity microSD Slot
4. Configuration Switches
5. USB Mini-B Port
6. Wide-Range DC Power
7. CAN Port
8. Ethernet LAN Port
9. USB A Port
10. RS232/RS485 Serial Port



NOTE: See Precaution #12 on page 4 about USB and grounding.



### 2.2 - Power Wiring

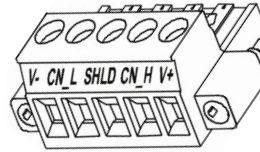


| Primary Power Port Pins |        |                            |
|-------------------------|--------|----------------------------|
| PIN                     | SIGNAL | DESCRIPTION                |
| 1                       | Ground | Frame Ground               |
| 2                       | DC-    | Input Power Supply Ground  |
| 3                       | DC+    | Input Power Supply Voltage |

DC Input / Frame

Solid/Stranded Wire: 12-24 awg (2.5-0.2mm).  
 Strip Length: 0.28" (7mm).  
 Torque Rating: 4.5 - 7 in-lbs (0.50 - 0.78 N-m).  
 DC- is internally connected to I/O V-, but is isolated from CAN V-.  
 A Class 2 power supply must be used.

### 3.1 - CAN Communications



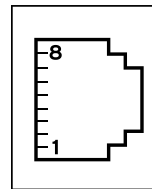
| CAN Pin Assignments |         |                       |
|---------------------|---------|-----------------------|
| PIN                 | SIGNAL  | DESCRIPTION           |
| 1                   | V-      | CAN Ground - Black    |
| 2                   | CN L    | CAN Data Low - Blue   |
| 3                   | SHLD    | Shield Ground - None  |
| 4                   | CN H    | CAN Data High - White |
| 5                   | V+ (NC) | No Connect - Red      |

CAN

Solid/Stranded Wire: 12-24 awg (2.5-0.2mm).  
 Strip Length: 0.28" (7mm).  
 Locking spring-clamp, two-terminators per conductor.  
 Torque Rating: 4.5 in-lbs (0.50 N-m).

V+ pin is not internally connected, the SHLD pin is connected to Earth ground via a 1 MΩ resistor and 10 nF capacitor.

### 3.2 - Serial Communications



**MJ1/2 SERIAL PORTS**  
 Two Serial Ports on One Module Jack (8posn)  
**MJ1:** RS-232 w/Full Handshaking  
**MJ2:** RS-485 Half-Duplex

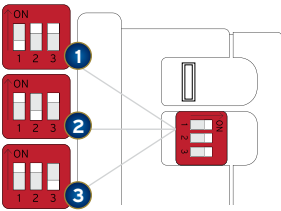
| MJ1 PINS |            |           | MJ2 PINS   |           |
|----------|------------|-----------|------------|-----------|
| PIN      | SIGNAL     | DIRECTION | SIGNAL     | DIRECTION |
| 8        | TXD        | OUT       | --         | --        |
| 7        | RXD        | IN        | --         | --        |
| 6        | 0V         | GROUND    | 0V         | GROUND    |
| 5        | +5V @ 60mA | OUT       | +5V @ 60mA | OUT       |
| 4        | RTS        | OUT       | --         | --        |
| 3        | CTS        | IN        | --         | --        |
| 2        | --         | --        | RX- / TX-  | IN / OUT  |
| 1        | --         | --        | RX+ / TX+  | IN / OUT  |

communications continued on next page...

## communications continued...

## 5 DIMENSIONS & INSTALLATION

### 3.3 - Dip Switches

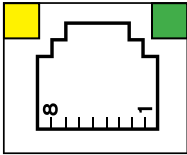


The DIP switches are used to provide a built-in termination to the MJ2 port if needed. The termination for these ports should only be used if this device is located at either end of the multidrop/ daisy-chained RS-485 network.

#### DIP SWITCHES

| PIN | NAME               | FUNCTION        | DEFAULT |
|-----|--------------------|-----------------|---------|
| 1   | RS-485 Termination | ON = Terminated | OFF     |
| 2   | Spare              | Always OFF      | OFF     |
| 3   | Factory Use        | Always OFF      | OFF     |

### 3.4 - Ethernet Communications



Green LED indicates link - when illuminated, data communication is available.

Yellow LED indicates activity - when flashing, data is in transmission.

## 4 BATTERY MAINTENANCE

The XL4 has an advanced battery system that uses a rechargeable lithium battery. The battery powers the real time clock when power is removed, and it is needed for register data retention. Please reference the XL4 User Manual [MAN0964] which provides instructions on how to replace the battery.

**NOTE:** For detailed rechargeable battery information, refer to the Battery Manual [MAN1142].

**Wiring Details:**

**Solid/Stranded Wire:** 12-24 awg (2.5-0.2mm<sup>2</sup>).  
**Strip Length:** 0.28" (7mm).  
**Torque Rating:** 4.5 - 7 in-lbs (0.50 - 0.78 N-m).

### 5.1 - Dimensions



### 5.2 - Installation Procedure

- The XL4 utilizes a clip installation method to ensure a robust and watertight seal to the enclosure. Please follow the steps below for the proper installation and operation of the unit.
  - This equipment is suitable for Class I, Division 2, Groups A, B, C and D or non-hazardous locations only.
  - Digital outputs shall be supplied from the same source as the operator control station.
  - Jumpers on connector JP1 shall not be removed or replaced while the circuit is live unless the area is known to be free of ignitable concentrations of flammable gases or vapors.
1. Carefully locate an appropriate place to mount the XL4. Be sure to leave enough room at the top of the unit for insertion and removal of the microSD™ card.
  2. Carefully cut the host panel per the diagram, creating a 92mm x 92mm +/-0.1mm opening into which the XL4 may be installed. If the opening is too large, water may leak into the enclosure, potentially damaging the unit. If the opening is too small, the OCS may not fit through the hole without damage.
  3. Remove any burrs and or sharp edges and ensure the panel is not warped in the cutting process.
  4. Remove all Removable Terminals from the XL4. Insert the XL4 through the panel cutout (from the front). The gasket must be between the host panel and the XL4.
  5. Install and tighten the four mounting clips (provided in the box) until the gasket forms a tight seal  
**NOTE: Max torque is 0.8 to 1.13Nm, 7 to 10 in-lbs.**
  6. Reinstall the XL4 I/O Removable Terminal Blocks. Connect communications cables to the serial port, USB ports, Ethernet port, and CAN port as required.

## 6 SAFETY

### 6.1 - WARNINGS

1. To avoid the risk of electric shock or burns, always connect the safety (or earth) ground before making any other connections.
2. To reduce the risk of fire, electrical shock, or physical injury, it is strongly recommended to fuse the voltage measurement inputs. Be sure to locate fuses as close to the source as possible.
3. Replace fuse with the same type and rating to provide protection against risk of fire and shock hazards.
4. In the event of repeated failure, do NOT replace the fuse again as repeated failure indicates a defective condition that will NOT clear by replacing the fuse.
5. Only qualified electrical personnel familiar with the construction and operation of this equipment and the hazards involved should install, adjust, operate, or service this equipment. Read and understand this manual and other applicable manuals in their entirety before proceeding. Failure to observe this precaution could result in severe bodily injury or loss of life.
6. **WARNING** - Battery may explode if mistreated. Do not recharge, disassemble, or dispose of in fire.
7. **WARNING - EXPLOSION HAZARD** - Batteries must only be changed in an area known to be non-hazardous.

### 6.2 - FCC COMPLIANCE

This device complies with Part 15 of the FCC Rules. Operation is subject to the following two conditions:

1. This device may not cause harmful interference
2. This device must accept any interference received, including interference that may cause undesired operation

### 6.3 - PRECAUTIONS

All applicable codes and standards need to be followed in the installation of this product. Adhere to the following safety precautions whenever any type of connection is made to the module:

1. Connect the safety (earth) ground on the power connector first before making any other connections.
2. When connecting to the electric circuits or pulse-initiating equipment, open their related breakers.
3. Do NOT make connection to live power lines.
4. Make connections to the module first; then connect to the circuit to be monitored.
5. Route power wires in a safe manner in accordance with good practice and local codes.
6. Wear proper personal protective equipment including safety glasses and insulated gloves when making connections to power circuits.
7. Ensure hands, shoes, and floor are dry before making any connection to a power line.
8. Make sure the unit is turned OFF before making connection to terminals.
9. Make sure all circuits are de-energized before making connections.
10. Before each use, inspect all cables for breaks or cracks in the insulation. Replace immediately if defective.
11. Use copper conductors in Field Wiring only, 60/75°C.
12. Use caution when connecting controllers to PCs via serial or USB. PCs, especially laptops may use "floating power supplies" that are ungrounded. This could cause a damaging voltage potential between the laptop and controller. Ensure the controller and laptop are grounded for maximum protection. Consider using a USB isolator due to voltage potential differences as a preventative measure.

## 7 PART NUMBER BUILDER

|         | Global   | European    |
|---------|----------|-------------|
| Model O | HE-XC1E0 | HEXT251C100 |

## 8 TECHNICAL SUPPORT

For assistance and manual updates, contact Technical Support at the following locations:

**North America**  
 (317) 916-4274  
[www.hornerautomation.com](http://www.hornerautomation.com)  
[techspt@heapg.com](mailto:techspt@heapg.com)

**Europe**  
 (+) 353-21-4321-266  
[www.hornerautomation.eu](http://www.hornerautomation.eu)  
[technical.support@horner-apg.com](mailto:technical.support@horner-apg.com)