



# XL7 OCS DATASHEET

## MODEL 0 No Built-In I/O

### 1 TECHNICAL SPECIFICATIONS

#### 1.1 General Specifications

|                               |                                                                            |
|-------------------------------|----------------------------------------------------------------------------|
| Required Power (Steady State) | 170mA @ 24VDC                                                              |
| Heater Option                 | 250mA @ 24VDC with heater operation<br>*Heater Option (Model # plus "-22") |
| Required Power (Inrush)       | 7A for < 1ms @ 24VDC, DC switched                                          |
| Primary Power Range           | 10 - 30VDC                                                                 |
| Typical Power Backlight 100%  | 4.848W @ 24VDC                                                             |
| Power Backlight @ 50%         | 3.792W @ 24VDC                                                             |
| Power Backlight OFF           | 3.408W @ 24VDC                                                             |
| Relative Humidity             | 5 to 95% non-condensing                                                    |
| Clock Accuracy                | + / - 20 ppm maximum at 25°C<br>(+/- 1 min/month)                          |
| Surrounding Air Temp          | -10°C to +60°C (-22 Heater Option<br>Range is -40°C to +60°C)              |
| Storage Temp                  | -20°C to +60°C                                                             |
| Weight                        | 2 lbs (907g)                                                               |
| Altitude                      | Up to 2000m                                                                |
| Rated Pollution Degree        | Evaluated for Pollution Degree 2 Rating                                    |
| Certifications (UL/CE)        | <a href="#">North America</a><br><a href="#">Europe</a>                    |

#### 1.2 Control & Logic

|                          |                                                                                    |
|--------------------------|------------------------------------------------------------------------------------|
| Control Language Support | Advanced Ladder Logic Full IEC<br>61131-3 Languages Tag-Based Editor               |
| Logic Program Size       | 2 MB, 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 |

#### 1.3 Connectivity

|                        |                                                                                                       |
|------------------------|-------------------------------------------------------------------------------------------------------|
| Serial Ports           | 1 RS-232 and 1 RS-485 on first Modular Jack (MJ1/2)<br>1 RS-232 or 1 RS-485 on second Modular Jack    |
| USB mini-B             | USB 2.0 (480MHz) Programming & Data Access                                                            |
| USB A (500mA max)      | USB 2.0 (480MHz) for USB flash drives (2TB)                                                           |
| CAN Port Isolated 1 kV | 2 x Remote I/O, Peer-to-peer Comms, Cscape                                                            |
| CAN Protocols          | CsCAN, CANopen, DeviceNet, J1939                                                                      |
| Ethernet               | 2 x 10/100 Mb (Auto-MDX)                                                                              |
| Ethernet Protocols     | TCP/IP, Modbus TCP, FTP, SMTP, EGD, ICMP, ASCII, Cscape, Ethernet IP                                  |
| 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 User Interface

|                       |                                       |
|-----------------------|---------------------------------------|
| Display Type          | 7" TFT Color                          |
| Screen Brightness     | 800cd/m <sup>2</sup> (nits)           |
| Resolution            | QVGA (800 x 480)                      |
| Color                 | 16-bit (65,535)                       |
| Screen Memory         | 17MB                                  |
| 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        | 6                                     |

#### XL7 User Manual [MAN0974]

The User Manual includes extensive information on:

- Common %S & %SR Registers
- Resource Limits

## 2 CONTROLLER OVERVIEW

### 2.1 - Overview of XL7



1. Touchscreen
2. Function Keys
3. MJ1: RS232/ MJ2: 1/2 duplex RS485
4. Dip Switches
5. MJ3: RS-232/485 Serial Port
6. CAN1 Port
7. PWR: 10-30VDC In
8. Audio In & Out Ports
9. USB 2.0 "A": Flash Drive
10. LAN 1 & 2 Ports
11. CAN2 Port
12. USB mini "B": Programming
13. microSD: Data Storage

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



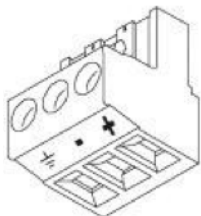
### 2.2 - Power Wiring

#### 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.

#### POWER UP

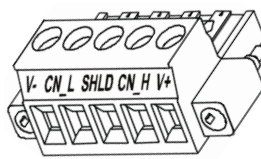
1. Attach included ferrite core with a minimum of two turns of the DC+ and DC- signals from the DC supply that is powering the controller.
2. Connect to Earth Ground
3. Apply recommended power.



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

### 3 COMMUNICATIONS

#### 3.1 - CAN Communications

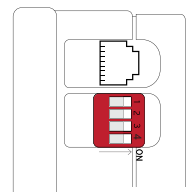


| CAN Pin Assignments |         |                       |
|---------------------|---------|-----------------------|
| PIN                 | SIGNAL  | DESCRIPTION           |
| 1                   | V-      | CAN Ground - Black    |
| 2                   | CN L    | CAN Data Low - Blue   |
| 3       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

Solid/Stranded wire: 12-24 awg (2.5-0.2mm).  
 Strip Length: 0.28" (7mm).  
 Locking spring-clamp, two-terminators per conductor.  
 Torque, Terminal Hold-Down Screws: 4.5 - 7 in-lbs (0.50 - 0.78 N-m)

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

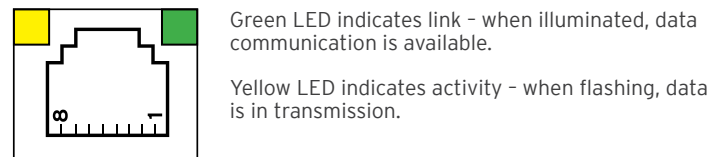
#### 3.2 - Dip Switches



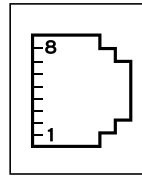
| DIP SWITCHES |                       |                 |         |
|--------------|-----------------------|-----------------|---------|
| PIN          | NAME                  | FUNCTION        | DEFAULT |
| 1            | MJ3 RS485 Termination | ON = Terminated | OFF     |
| 2            | MJ3 Duplex            | ON = Half       | OFF     |
| 3            |                       | OFF = Full      | OFF     |
| 4            | MJ2 RS485 Termination | ON = Terminated | OFF     |

The DIP switches are used to provide a built-in termination to both the MJ1, MJ2 & MJ3 ports 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.

#### 3.4 - Ethernet Communications

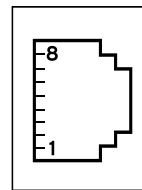


#### 3.3 - Serial Communications



MJ1/2 Independent Serial Ports  
 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        | OV         | GROUND    | OV         | GROUND    |
| 5        | +5V @ 60mA | OUT       | +5V @ 60mA | OUT       |
| 4        | RTS        | OUT       | --         | --        |
| 3        | CTS        | IN        | --         | --        |
| 2        | --         | --        | RX- / TX-  | IN / OUT  |
| 1        | -          | --        | RX+ / TX+  | IN / OUT  |



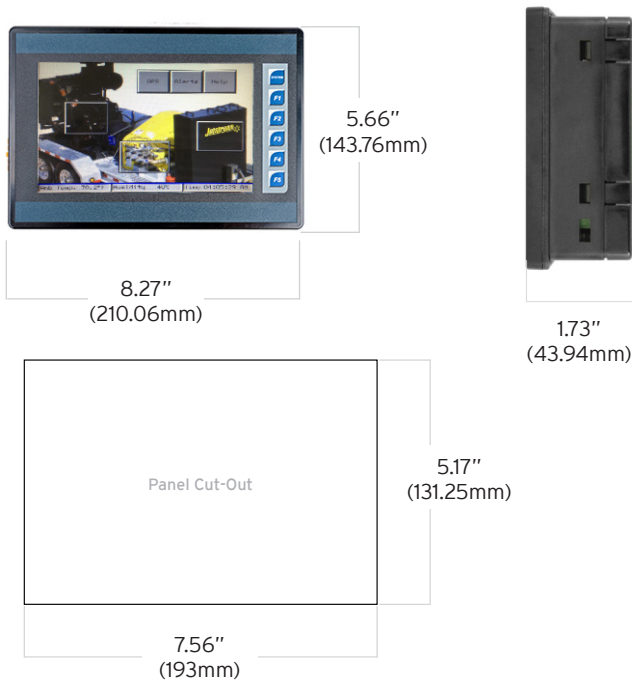
MJ3 SERIAL PORT  
 2 Multiplexed Serial Ports on One Modular Jack (8posn)

| MJ3 PINS |            |           |
|----------|------------|-----------|
| PIN      | SIGNAL     | DIRECTION |
| 8        | TXD RS232  | OUT       |
| 7        | RXD RS232  | IN        |
| 6        | OV         | GROUND    |
| 5        | +5V @ 60mA | OUT       |
| 4        | TX- RS485  | OUT       |
| 3        | TX+ RS485  | OUT       |
| 2        | RX- RS485  | IN        |
| 1        | RX+ RS485  | IN        |

Attach optional ferrite core with a minimum of two turns of serial cable. See website for more details. [Part #: HE-FBD001]

## 5 DIMENSIONS & INSTALLATION

### 5.1 - Dimensions



\* +1mm/ -0mm cutout tolerance

### 5.2 - Installation Procedure

- The XL7 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.

The XL7 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.

1. Carefully locate an appropriate place to mount the XL7. 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 131.25mm x 193mm with a +1mm /-0mm panel cutout tolerance, opening into which the XL7 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 XL7. Insert the XL7 through the panel cutout (from the front). The gasket must be between the host panel and the XL7.
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, or 7 to 10 in-lbs.**
6. Reinstall the XL7 I/O Removable Terminal Blocks. Connect communications cables to the serial port, USB ports, Ethernet port, and CAN port as required.

## 6 SAFETY & WARNINGS

### 6.1 - WARNINGS

- To avoid the risk of electric shock or burns, always connect the safety (or earth) ground before making any other connections.
- 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.
- Replace fuse with the same type and rating to provide protection against risk of fire and shock hazards.
- 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.
- 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.
- WARNING** - Battery may explode if mistreated. Do not recharge, disassemble, or dispose of in fire.
- 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:

- This device may not cause harmful interference
- 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:

- Connect the safety (earth) ground on the power connector first before making any other connections.
- When connecting to the electric circuits or pulse-initiating equipment, open their related breakers.
- Do NOT make connection to live power lines.
- Make connections to the module first; then connect to the circuit to be monitored.
- Route power wires in a safe manner in accordance with good practice and local codes.
- Wear proper personal protective equipment including safety glasses and insulated gloves when making connections to power circuits.
- Ensure hands, shoes, and floor are dry before making any connection to a power line.
- Make sure the unit is turned OFF before making connection to terminals.
- Make sure all circuits are de-energized before making connections.
- Before each use, inspect all cables for breaks or cracks in the insulation. Replace immediately if defective.
- Use copper conductors in Field Wiring only, 60/75°C.
- 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 BATTERY

The XL7 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 MAN0974 providing instructions on how to replace the battery.

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

## 8 ACCESSORIES

### 8.1 Backup Battery: HE-BAT019

The XL7 uses a 3.6V lithium-ion rechargeable battery to run the Real-Time Clock and to maintain the retained register values. This battery is designed to maintain the clock and memory for 7-10 years.

### 8.2 Programming Cables Kit: HE-XCK

This programming cable kit includes the following adapter cables:

- USB to MiniUSB
- USB to RS-232 Serial
- RS-232 Serial to RJ45 Ethernet

Visit the Horner Website to purchase accessories.

## 9 PART NUMBER

|         | Global   | European    |
|---------|----------|-------------|
| Model 0 | HE-XW1E0 | HEXT391C100 |

## 10 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)  
 techsppt@heapg.com

### Europe

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