XLE MODEL

XLE & XLT OCS DATASHEET

MODEL 2

12 DC In, 6 Relay Out, 4 - 12-bit Analog In

XLT MODEL

1 TECHNICAL SPECIFICATIONS

1.1 General

Typical power-back-light 100%	267mA @ 10V (2.67W) 121mA @ 24V (2.90W)
Power Backlight Off	-15mA @ 24V (0.36W)
Power Ethernet Models	+35mA @ 10V (0.35W) +20mA @ 24V (0.48W)
Inrush Current	30A for < 1mS
Primary Pwr. Range	10-30VDC
Real Time Clock	Yes, battery backed; lithium coin cell CR2450
Clock Accuracy	+/- 90 Secs/Month
Relative Humidity	5 to 95% Non-condensing
Operating Temp.	-10°C to +60°C
Storage Temp.	-20°C to +70°C
Weight	0.75 lbs/340g (without I/O)
Certifications (UL/CE)	USA: https://hornerautomation.com/certifications/ Europe: http://www.horner-apg.com/en/support/certification.aspx

1.2 User Interface

Display Type	Transflective LCD (outdoor readable)
Resolution	128 x 64 pixels (XLe) 160 x 128 pixels (XLt)
Color	Monochrome
Built-In Storage	16MB
User-Program. Screens	1023 max 50 Objects per page
Backlight	LED
Backlight Lifetime	30,000+hrs
Brightness Control	0-100%(Xlt) On/Off(X-le) via system register
Screen Update Rate	Program dependant
Number of Keys	20 (XLe) 5 (XLt)
Touchscreen (XLt)	Resistive 1,000,000+ touch life

1.3 Connectivity

Serial Ports	RS-232 full handshaking or RS-485 half duplex on first Modular Jack (MJ1) RS-232 or RS-485 on second Modular Jack (MJ2)
USB mini-B	Programming only
CAN	1 x CAN Port, Isolated 1KV
CAN Protocols	CsCAN, CANopen, DeviceNet, J1939
Ethernet	Ethernet versions only
Ethernet Protocols	TCP/IP, Modbus TCP, FTP, SRTP, 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, more
Audio (XLt only)	Beeper, System or Software Controlled

1.4 Control & Logic

Control Lang. Support	Advanced Ladder Logic Full IEC 61131-3 Languages
Logic Program Size	256KB
Scan Rate	0.7 mS/K logic (XLe) 0.8 mS/K logic (XLt)
Digital Inputs	2048
Digital Outputs	2048
Analog Inputs	512
Analog Outputs	512
Gen. Purpose Registers	9,999 (words) Retentive 2,048 (bits) Retentive 2,048 (bits) Non-retentive

1.5 Inputs/Outputs

Model	DC In	DC Out	Relays	HS In	HS Out	mA/V In	mA/V RTD/T	mA/V Out
Model 0	-	-	-	-	-	-	-	-
Model 2	12	-	6	4	-	4	-	-
Model 3	12	12	-	4	2	2	-	-
Model 4	24	16	-	4	2	2	-	-
Model 5	12	12	-	4	2	-	2	2
Model 6	12	12	-	4	2	-	6	4

There are 4 high-speed inputs of the total DC Inputs. There are 2 high-speed outputs of the total DC outputs. Model 2, 3 & 4 feature 12-bit Analog Inputs. Model 5 features 14/16-bit Analog Inputs. High-speed Outputs can be used for PWM and Pulse Train Outputs, currently limited to <10kHz. (Model 6 limited to <65kHz). Model 6 features a 16 bit Analog Input.

High-Speed Inputs	
Number of Counters	4
Maximum Frequency	500 kHz each
Accumulator Size	32-bits each
Modes Supported	Totalizer, quadrature, pulse measurement, frequency measurement, set-point controllled outputs

technical specifications continued...

1.6 Digital DC Inputs

Inputs per Module	12 including 4 configurable HSC inputs
Commons per Module	1
Input Voltage Range	12 VDC / 24 VDC
Absolute Max. Voltage	35 VDC Max.
Input Impedance	10 kΩ
Input Current: Upper Threshold Lower Threshold	Positive Logic / Negative Logic: 0.8 mA / -1.6 mA 0.3 mA / -2.1 mA
Max. Upper Threshold	8 VDC
Min. Lower Threshold	3 VDC
OFF to ON Response	1 mS
ON to OFF Response	1 mS
High Speed Counter Max Freq*	500 kHz

***See I/O info below for detail regarding HSC and PWM**

1.7 Digital Relay Outputs

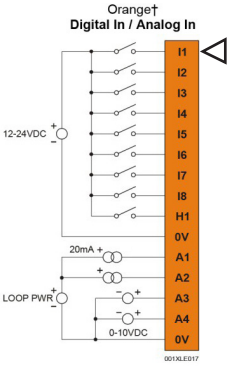
Outputs per Module	6 Relay
Commons per Module	6
Max. Output Current per Relay	3A @ 250 VAC, resistive
Max. Total Output Current	5A continuous
Max. Output Voltage	275 VAC, 30 VDC
Max. Switched Power	1000 VAC, 150 W
Contact Isolation to Ground	1000 VAC
Max. Voltage Drop at Related Current	0.5 V
Expected Life (see below derating chart for detail)	No Load: 5,000,000 Rated Load: 100,000
Max. Switching Rate	300 CPM at no load 20 CPM at rated load
Type	Mechanical Contact
Response Time	One update per ladder scan plus 10 mS

1.8 Analog Inputs, Medium Resolution

Number of Channels	4
Input Ranges	0-10 VDC, 0-20 mA, 4-20 mA
Safe Input Voltage Range	-0.5 V to 12 V
Input Impedance (clamped @ -0.5 VDC to 12 VDC)	Current Mode: 100 Ω Voltage Mode: 500 kΩ
Nominal Resolution	12 Bits
%AI Full Scale	32,000
Max. Over Current	35 mA
Conversion Speed	Once per Ladder Scan
Max Error at 25˚C (excluding Zero) Adjusting Filtering may Tighten	4-20 mA 1.00% 0-20 mA 1.00% 0-10 VDC 1.50%
Filtering	160 Hz Hash (noise) Filter, 1-128 Scan Digital Running Average Filter

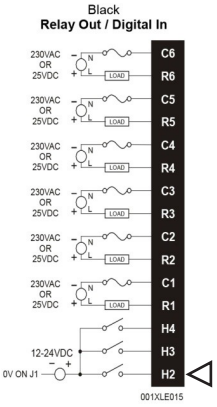
1.9 J1 (Orange) Name

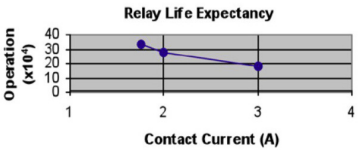
I2	IN1
I2	IN2
I3	IN3
I4	IN4
I5	IN5
I6	IN6
I7	IN7
I8	IN8
H1	HSC1 / IN9
0V	Common
A1	Analog IN1
A2	Analog IN2
A3	Analog IN3
A4	Analog IN4
0V	Common



1.10 J2 (Black) Name

C6	Relay 6 COM
R6	Relay 6 NO
C5	Relay 5 COM
R5	Relay 5 NO
C4	Relay 4 COM
R4	Relay 4 NO
C3	Relay 3 COM
R3	Relay 3 NO
C2	Relay 2 COM
R2	Relay 2 NO
C1	Relay 1 COM
R1	Relay 1 NO
H4	HSC4 / IN12
H3	HSC3 / IN11
H2	HSC2 / IN10





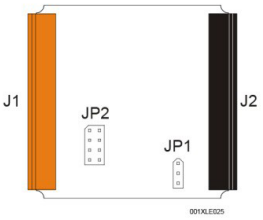
"**WARNING**: EXPOSURE TO SOME CHEMICALS MAY DEGRADE THE SEALING PROPERTIES OF MATERIALS USED IN THE Tyco relay PCJ

Cover / case & base: Mitsubishi engineering Plastics Corp.
5010GN6-30 or 5010GN6-30 M8 (PBT)
Sealing Material: Kishimoto 4616-50K (I part epoxy resin)

It is recommended to periodically inspect the relay for any degradation of properties and replace if degradation is found

Wiring Details:
Solid/Stranded wire - 12-24 awg (2.5-0.2mm^2).
Strip length - 0.28" (7mm).
Torque rating: 4.5 - 7 lb-in (0.50 - 0.78 N-m).

Model 2 Jumper Setting Details



Location of I/O jumpers (**JP1 & JP2**) and wiring connectors **(J1 and J2)** with back cover removed.

JP1 Digital DC In / HSC

Positive Logic	Negative Logic
Default	001XLE026

JP2 Analog In (A1 – A4)

Current (20 mA)	Voltage (10 V)
Default	001XLE027

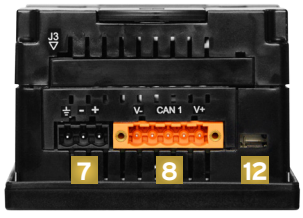
Note: The Cscape Module Setup configuration must match the selected I/O (JP) jumper settings.

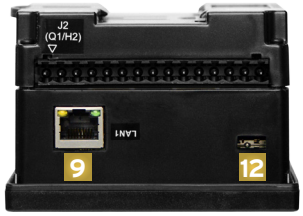
Note: When using JP2 (A1-A4), each channel can be independently configured.

2 WIRING & CONNECTORS

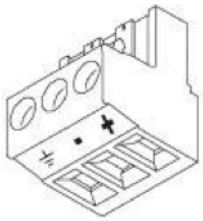
2.1 - Port Connectors

1. Function Keys
2. Touchscreen
3. Navigation Keys
4. USB Mini-B Port
5. High Capacity microSD Slot
6. RS232/RS485 Serial Ports (2)
7. Wide-Range DC Power
8. CAN Port
9. Ethernet LAN Port (optional)
10. Optional Built-In I/O
11. Configuration Switches
12. Mounting Clip Locations
13. DIN Rail Clip
14. Softkeys





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).

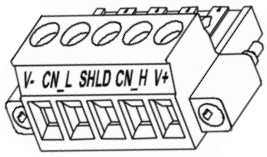
Torque rating: 4.5 - 7 lb-in (0.50 - 0.78 N-m).

DC- is internally connected to I/O V-, but is isolated from CAN V-.

A Class 2 power supply must be used.

3 COMMUNICATIONS

3.1 - CAN Communications

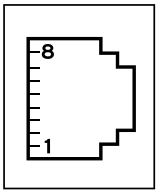


CAN

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 lb-in (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.

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

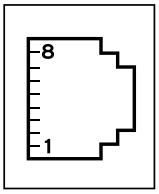
3.2 - Serial Communications



MJ1: RS-232 w/full handshaking or RS-485 half-duplex

RS-485 termination via switches; biasing via software

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



MJ2 SERIAL PORT

MJ2: RS-232 or RS-485 half or full-duplex, software selectable

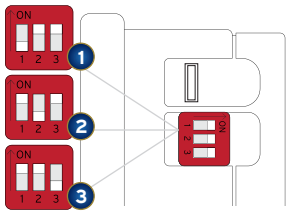
RS-485 termination via switches; biasing via software

MJ2 PINS		
PIN	SIGNAL	DIRECTION
8	232 TXD	OUT
7	232 RXD	IN
6	0 V	Ground
5	+5V@60mA	OUT
4	485 TX-	OUT
3	485 TX+	OUT
2	485 RX- or RX/TX-	IN or IN/OUT
1	485 RX+ or RX/TX+	IN or IN/OUT

communications continued on next page...

communications continued...

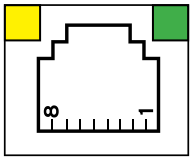
3.4 - Dip Switches



1.9 DIP SWITCHES			
PIN	NAME	FUNCTION	DEFAULT
1	MJ1 RS-485 Termination	ON = Terminated	OFF
2	MJ2 RS-485 Termination	ON = Terminated	OFF
3	Bootload	Always Off	OFF

The DIP switches are used to provide a built-in termination to both the MJ1 port and 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.

3.5 - Ethernet Communications



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

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

4 BUILT-IN I/O

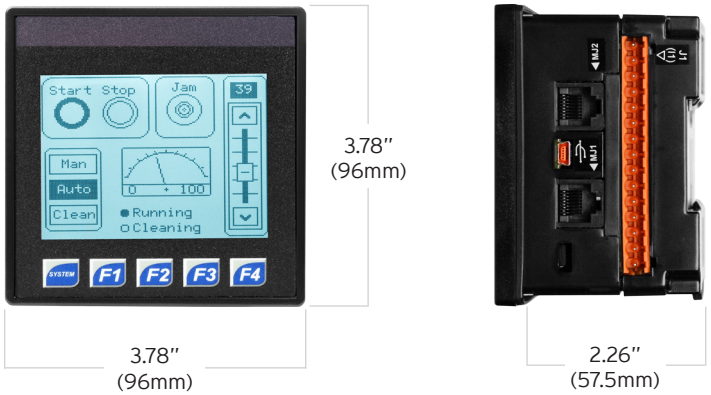
4.1 - 5. Built-in I/O (Model 2, 3, 4, 5 & 6)

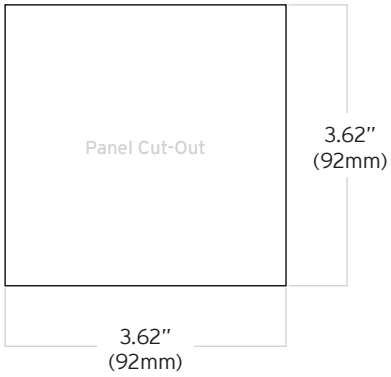
All XLe and XLt models (except model 0) feature built-in I/O. The I/O is mapped into OCS Register space, in three separate areas – Digital/Analog I/O, High-Speed Counter I/O, and High-speed Output I/O. Digital/Analog I/O location is fixed starting at 1, but the High- speed Counter and High-speed Output references may be mapped to any open register location. For more details on using the High-Speed Counter and High-Speed Outputs, see the XLe/XLt OCS User's Manual (MAN0878).

FIXED ADDRESS	DIGITAL/ ANALOG I/O FUNCTION	MODEL 2	MODEL 3	MODEL 4	MODEL 5	MODEL 6
%I	Digital Inputs	1-12	1-12	1-24	1-12	1-12
	Reserved	13-32	13-31	25-31	13-31	13-31
	ESCP Alarm	n/a	32	32	32	32
%Q	Digital Outputs	1-6	1-12	1-16	1-12	1-12
	Reserved	7-24	13-24	17-24	13-24	13-24
%AI	Analog Inputs	1-4	1-2	1-2	1-2	1-4; 33-38
	Reserved	5-12	3-12	3-12	3-12	n/a1-12
%AQ	Analog Outputs	n/a	n/a	n/a	9-12	9-12
	Reserved	n/a	1-8	1-8	1-8	

Reserved areas maintain backward compatibility with other XL Series OCS models

5 INSTALLATION DIMENSIONS





5.1. - Installation Procedure

The XLe/t 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 XLe/t. 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 on Page 1, creating a 92mm x 92mm +/-0.1mm opening into which the XLe/t 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 XLe/t. Insert the XLe/t through the panel cutout (from the front). The gasket must be between the host panel and the XLe/t.
5. Install and tighten the four mounting clips (provided in the box) until the gasket forms a tight seal (max torque 0.8 to 1.13Nm, 7-10 lb-in).
6. Reinstall the XLe/t I/O Removable Terminal Blocks. Connect communications cables to the serial port, USB ports, Ethernet port, and CAN port as required.

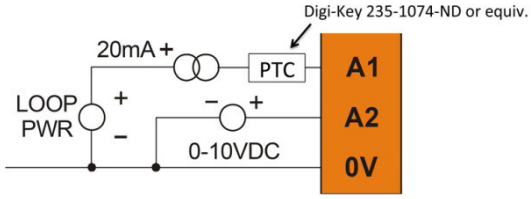
battery and safety warnings on next page...

6 BATTERY

The XLe/t uses a replaceable non-rechargeable 3V Lithium coin-cell battery (CR2450) to run the Real-Time Clock and to keep the retained register values. This battery is designed to maintain the clock and memory for 7-10 years. Please reference MAN0878 providing instructions on how to replace the battery.

7 ANALOG INPUT TRANZORB FAILURE

A common cause of Analog Input Tranzorb Failure on Analog Inputs Model 2, 3, 4, 5 & 6: If a 4- 20mA circuit is initially wired with loop power, but without a load, the Analog inputcould see 24Vdc. This is higher than the rating of the tranzorb. This can be solvedby NOT connecting loop power prior to load connection, or by installing a low-cost PTC in series between the load and Analog input.



NOTE†: Refers to Model 2 – orange (pg. 1,) Models 3 & 4 – J1 (pg. 2) and Model 5 – 20mA Analog In (pg. 3.)

8 SAFETY

8.1 - 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.

8.2 - 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

8.3 - 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 save manner in accordance with good practice and local codes.
6. Wear proper personal protective equipment including safety glasses and insulted 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.

9 TECHNICAL SUPPORT

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

North America
(317) 916-4274
www.hornerautomation.com
techsppt@heapg.com

Europe
(+) 353-21-4321-266
www.horner-apg.com
techsppt@horner-apg.com

10 PART NUMBER BUILDER

EXAMPLE PART NUMBERS

GLOBAL MODEL NUMBERS

HE-X [screen] 1 [ethernet] [I/O]

screen	ethernet	I/O
E (no touchscreen) **T** (touchscreen)	**0** (no ethernet) **E** (ethernet)	**0** (model 0) **2** (model 2) **3** (model 3) **4** (model 4) **5** (model 5) **6** (model 6)

EUROPEAN MODEL NUMBERS

HEX [screen] [ethernet] C [CAN option] [I/O] - [overlay type]

screen	ethernet	CAN option	I/O	overlay type
E22 (no touchscreen) **T24** (touchscreen)	**0** (no ethernet) **1** (ethernet)	**0** (no CAN*) **1** (CsCAN) **2** (CANopen) **4** (DeviceNet) **5** (J1939)	**00** (model 0) **12** (model 2) **13** (model 3) **14** (model 4) **15** (model 5) **16** (model 6)	**00** (dark colour) **01** (llight colour) **02** (blank) **03-99** (custom)

*No CAN is only available on XLe