HORNER AUTOMATION GROUP

XL+ OCS DATASHEET

MODEL 4
24 DC In, 16 DC Out, 2 - 12-bit Analog In

1 TECHNICAL SPECIFICATIONS

1.1 General

Typical Power-Backlight 100%	800mA @ 24VDC
Power Backlight 50%	385mA (9.6W)
Power Backlight Off	290mA (7W)
Inrush Current	25 A for <1 ms @ 24 VDC DC
Primary Pwr. Range	18-30VDC
Clock Accuracy	+/- 20 ppm maximum at 25° C (+/- 1 Minutes per Month)
Real Time Clock	With Battery (5-10 Yrs life, Replaceable)
Relative Humidity	5 to 95% Non-condensing
Operating Temp.	-10°C to +60°C
Storage Temp.	-30°C to +70°C
Weight	7.63 lbs/3.46kg (without I/O)
Certifications (UL/CE)	USA: https://hornerautomation.com/certifications/ Europe: http://www.horner-apg.com/en/support/certification.aspx

1.2 Display

Display Type	15" XGA TFT (500 cd/m^2 typical)
Resolution	1024x768
Color	24-bit (16,777,216)
Built-In Storage	4 GB
User-Program. Screens	1023
Backlight	LED - 50,000 hour life
Screen Update Rate	User Configurable within the scan time. (perceived as instantaneous in many cases)
Brightness Control	0-100% via system register
Touchscreen	Resistive w/laminated cover, 1,000,000+ touch life

1.3 Connectivity

3x 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) RS-232 or RS-485 on third Modular Jack (MJ3) (Software Controlled RS-485 Termination/Biasing)
USB mini-B	USB 2.0 (480Mbps) Programming & Data Access
3x USB A	USB 2.0 (480Mbps) for USB FLASH Drives (2TB)
2x CAN	125kbps - 1Mbps, Remote I/O, Peer-to-Peer Comms, Cscape (Isolated Ports)
2 x Ethernet	1 Gigabit (Auto-MDX), Modbus TCP C/S, HTTP, FTP, SMTP, Cscape, Ethernet IP
Remote I/O	SmartRail, SmartStix, SmartBlock, SmartMod
Removable Memory	MicroSD (SDHC, SDXC IN FAT32 format, support for 128GB max. Application Updates, Datalogging, more
Audio	Beeper, Mic In, Line Out

1.4 Control & Logic

Control Lang. Support	Advanced Ladder Logic Full IEC 1131-3 Languages
Logic Program Size & Scan Rate	1MB
Online Programming Changes	Supported in Advanced Ladder
Digital Inputs	2048
Digital Outputs	2048
Analog Inputs	512
Analog Outputs	512
Gen. Purpose Registers	49,999 (words) Retentive 16,384 (bits) Retentive 16,384 (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 I/O. Model 5 features 14/16-bit Analog I/O. High-speed Outputs can be used for PWM and Pulse Train Outputs, currently limited to <65kHz.. Model 6 Features a 14/17 bit Analog I/O

High-Speed Counters	
Number of Counters	4
Maximum Frequency	500 kHz each
Accumulator Size	32-bits each

Modes Supported	
Totalizer	Quadrature
Pulse Measurement	Frequency Measurement
2 Position Controlled Outputs	1 ON/OFF Setpoint per Output

Horner Ireland Ltd., Unit 1 Centrepoint, Centre Park Road, Cork, Ireland T12 H24E | (p) +353 21 4321 266 (f) +353 21 4321 826 | www.horner-apg.com

CE

technical specifications continued...

1.6 Digital DC Inputs

Inputs per Module	24 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: 0.8 mA 0.3 mA / Negative Logic: -1.6 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*	10 kHz

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

1.7 Digital DC Outputs

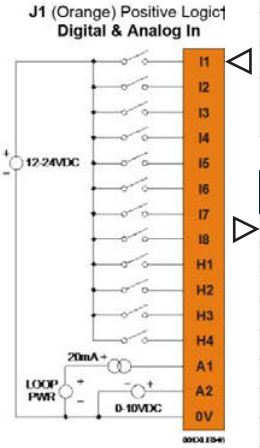
Outputs per Module	16 Including 2 Configurable PWM Outputs
Commons per Module	1
Output Type	Sourcing / 10 kΩ Pull-Down
Absolute Max. Voltage	28 VDC Max.
Output Protection	Short Circuit
Max. Output Current/Point	0.5 A
Max. Total Current	4 A Continuous
Max. Output Supply Voltage	30 VDC
Min. Output Supply Voltage	10 VDC
Max. Voltage Drop at Rated Current	0.25 VDC
Max. Inrush Current	650 mA per Channel
Min. Load	None
OFF to ON Response	1 mS
ON to OFF Response	1 mS
PWM Out	10 kHz
Output Characteristics	Current Sourcing (Pos. Logic)

1.8 Analog Inputs

Number of Channels	2
Input Ranges Safe Input Range Input Impedance (Clamped @ -0.5 VDC to 12 VDC)	0 - 10 VDC 0 - 20 mA 4 - 20 mA -0.5 V to +12V Current Mode: 100Ω Voltage Mode: 500Ω
Nominal Resolution %AI full scale Max. Over-Current	10 Bits 32,000 counts 35 mA
Conversion Speed	All channels converted once per ladder scan
Max. Error @25° C (excluding zero)	4-20 mA 1.00% 0-20 mA 1.00% 0-10 VDC 0.50%
Filtering	160 Hz hash (noise) filter 1-128 scan digital running average filter

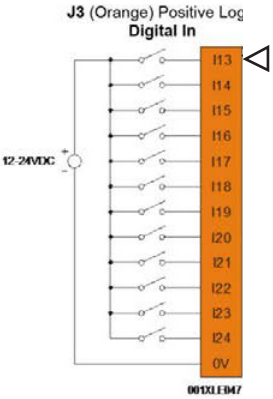
1.9 J1 (Orange) Name

I2	IN1
I2	IN2
I3	IN3
I4	IN4
I5	IN5
I6	IN6
I7	IN7
I8	IN8
H1	HSC1 / IN9
H2	HSC2 / IN10
H3	HSC3 / IN11
H4	HSC4 / IN12
A1	Analog IN1
A2	Analog IN2
0V	Common



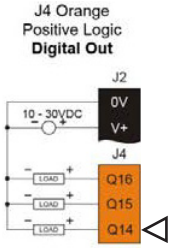
1.10 J3 (Orange) Name

I13	IN13
I14	IN14
I15	IN15
I16	IN16
I17	IN17
I18	IN18
I19	IN19
I20	IN20
I21	IN21
I22	IN22
I23	IN23
I24	IN24
0V	Common



1.11 J4 (Orange) Name

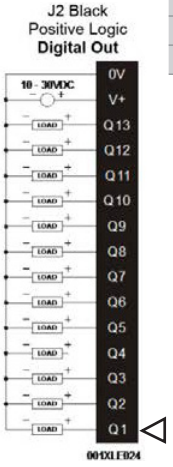
Q16	OUT16
Q15	OUT15
Q14	OUT14

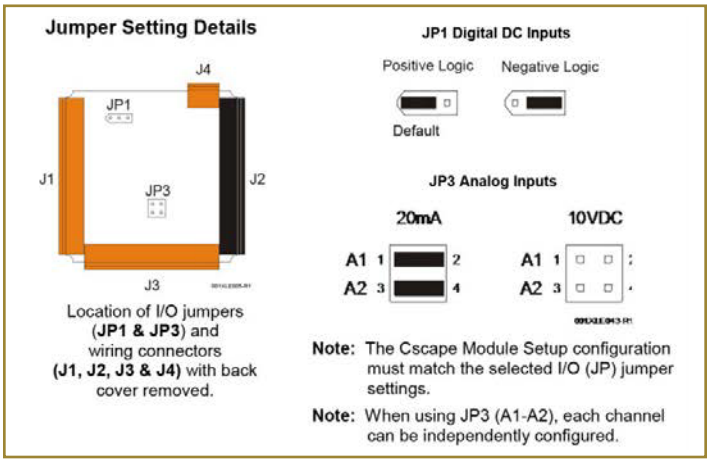


Wiring Details:
Solid/Stranded wire - 12-24 awg (2.5-0.2mm^2).
Strip length - 0.28" (7mm).
Torque rating: 4.5 - 7 lb-in (0.50 - 0.78 N-m).

1.12 J2 (Black) Name

0V	Common
V+	V+
NC	OUT 13
Q12	OUT 12
Q11	OUT 11
Q10	OUT 10
Q9	OUT 9
Q8	OUT 8
Q7	OUT 7
Q6	OUT 6
Q5	OUT 5
Q4	OUT 4
Q3	OUT 3
Q2	OUT 2 / PWM 2
Q1	OUT 1 / PWM 1



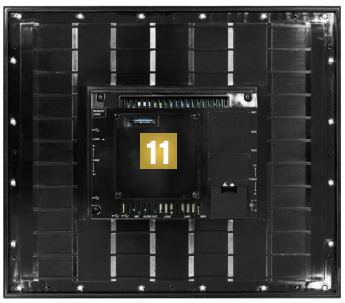


Horner Ireland Ltd., Unit 1 Centrepoint, Centre Park Road, Cork, Ireland T12 H24E | (p) +353 21 4321 266 (f) +353 21 4321 826 | www.horner-apg.com

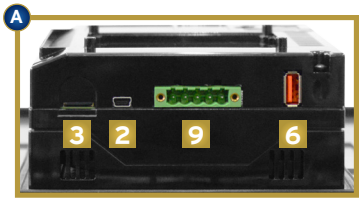
2 WIRING & JUMPERS

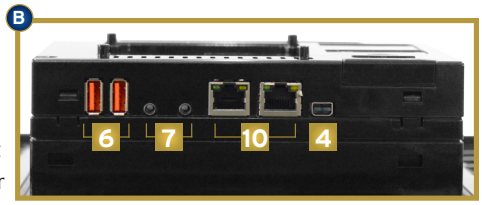
wiring & jumpers continued...

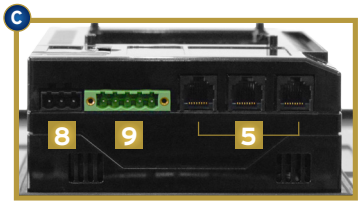
2.1 - Port Connectors



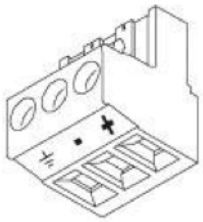
1. Virtual Function Keys Slide in from the Right Upon Touching Top Right Corner of Screen
2. USB Mini-B Port
3. High Capacity microSD Slot
4. Mini DisplayPort Video Output (Future)
5. RS232/RS485 Serial Ports (3)
6. USB A Ports (3)
7. Mic Input / Audio Output
8. Wide-Range DC Power
9. Dual CAN Port
10. Dual Ethernet LAN Port
11. Optional Built-In I/O







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 COMMUNICATIONS

3.1 - CAN Communications

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	-

CAN

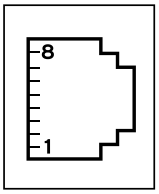
Solid/Stranded wire; 12-24 awg (2.5-0.2mm). Strip length - 0.28" (7mm).

Locking spring-clamp, two-terminators per conductor.

Torque Rating: 4.5-7in-lbs (0.50 - 0.78N-m).

SHLD and V+ pins are not internally connected to XL+

3.2 - Serial Communications



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

RS-485 termination and biasing via software

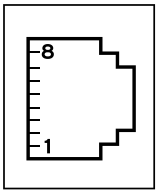
MJ1 PINS		
PIN	SIGNAL	DIRECTION
8	TXD	OUT
7	RXD	IN
6	0V	GROUND
5	+5V at 60mA	OUT
4	RTS	OUT
3	CTS	IN
2	RX-/TX-	IN/OUT
1	RX+/TX+	IN/OUT

communications continued on next page...

Horner Ireland Ltd., Unit 1 Centrepoint, Centre Park Road, Cork, Ireland T12 H24E | (p) +353 21 4321 266 (f) +353 21 4321 826 | www.horner-apg.com

CE

3.3 - Serial Communications Continued...



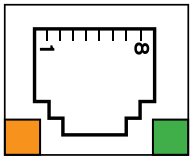
MJ2/3 SERIAL PORTS

MJ2/3: RS-232 or RS-485 half or full-duplex, software selectable

RS-485 termination and biasing, software selectable

MJ2/3 PINS		
PIN	SIGNAL	DIRECTION
8	TXD RS232	OUT
7	RXD RS232	IN
6	0 V	Ground
5	+5V@60mA	OUT
4	TS- RS485	OUT
3	TS+ RS485	OUT
2	RX- RS485	IN
1	RX+ RS485	IN

3.4 - Ethernet Communications



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

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

4 BUILT-IN I/O

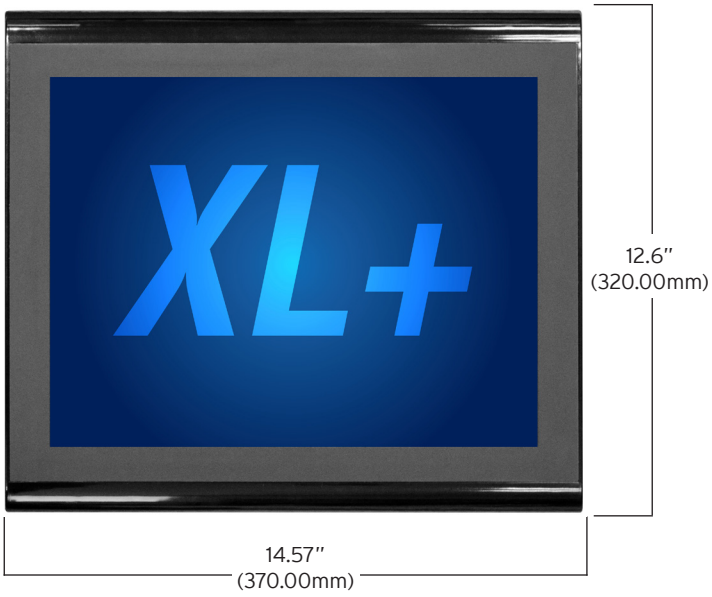
4.1 - Built-in I/O (Model 2, 3, 4, 5 & 6)

All XL-Plus models (except the HE-XP7E0) 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 XL-Plus OCS User's Manual (MAN1106).

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	33-38 (1-4 reserved)
	Reserved	5-12	3-12	3-12	3-12	n/a1-12
%AQ	Analog Outputs	n/a	n/a	n/a	9-10	9-12
	Reserved	n/a	1-8	1-8	1-8	1-12

Reserved areas maintain backward compatibility with other XL Series OCS models

5 INSTALLATION DIMENSIONS



For detailed product and panel cutout dimensions, please refer to MAN1108

Torque Rating: 4.5-7in-lbs (0.50 - 0.78N-m).
SHLD and V+ pins are not internally connected to XL+

installation dimensions continued on next page...

Horner Ireland Ltd., Unit 1 Centrepoint, Centre Park Road, Cork, Ireland T12 H24E | (p) +353 21 4321 266 (f) +353 21 4321 826 | www.horner-apg.com

installation dimensions continued...

5.1. - Installation Procedure

The XL Plus allows unique installation options that simplify installation for systems that may not need robust vibration or water resistance.

If the system does not experience shock or vibration and will not be exposed to weather or wash down conditions the unit can be installed by cutting the rectangular opening and installing the 4 supplied clips.

For system that may experience shock or vibration or are installed outdoors or in wash down environments, the rectangular cut and clips are used and perimeter holes must be drilled in the panel. The supplied studs are then inserted into the perimeter of the controller and supplied nuts will secure the perimeter of the unit to the panel.

Please reference the XL Plus installation cutout drawing document (MAN1108) for further details.

1. Carefully locate an appropriate place to mount the XL-Plus. Be sure to leave enough room at the top of the unit for insertion and removal of the microSD card. Also leave enough room at the bottom for the insertion and removal of USB FLASH drives and wiring

2. Carefully cut the host panel per the diagram above, creating a 288.5mm x 216 +/- 0.1mm opening into which the XL-Plus may be installed. If the opening is too large, water may leak into the enclosure, potentially damaging the OCS. If the opening is too small, the OCS may not fit through the hole without damage.

3. Remove all Removable Terminals from the OCS. Insert the OCS through the panel cutout (from the front). The gasket needs to be between the host panel and the OCS.

4. Install and tighten the screws on the clips such that the gasket is compressed against the panel. Recommended torque is 7-10 in-lbs (0.79-1.13 Nm). If the perimeter studs are needed, it is recommended to use a thread locker (similar to 242 Blue Loctite). Use supplied lock washers and nut. Recommended torque is 3-4 in-lbs (0.34-0.45 Nm).

5. Reinstall the I/O Removable Terminal Blocks. Connect communications cables to the serial port, USB ports, Ethernet port, and CAN port as required.

6 BATTERY

The XL+ uses a replaceable non-rechargeable 3V Lithium coin-cell battery 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 MAN1106 providing instructions on how to replace the battery.

7 SAFETY

7.1 - 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.

7.2 - 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

7.3 - 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.

8 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
technical.support@horner-apg.com

9 PART NUMBER BUILDER

EXAMPLE PART NUMBERS

I/O

HEXT751C [ ]

100 (model 0)
112 (model 2)
113 (model 3)
114 (model 4)
115 (model 5)
116 (model 6)

Horner Ireland Ltd., Unit 1 Centrepoint, Centre Park Road, Cork, Ireland T12 H24E | (p) +353 21 4321 266 (f) +353 21 4321 826 | www.horner-apg.com