

XL10 Prime Datasheet - Model 6

12 DC In, 12 DC Out, 17-bit Analog In (mA/V/TC/mV/RTD), 4 – 12-bit Analog Out

MAN1317-21-EN_XL10P_Mod6



Part Numbers

Global Part Number	HE-XPV1E6
European Part Number	HEXP505C116

User Manual and Add-Ons

Find the documents via the [Documentation Search](#).

Part #	Description
MAN1029	EXL10 & XL10 Prime User Manual
MAN1142	Rechargeable Battery Manual
HE-BAT019	Rechargeable 3.6V Lithium Battery
HE-XCK	Programming Cables
HE-XDAC	2 channel Analog Output I/O option kit, selectable 0-10V, +/-10V, 4-20mA.
HE-XDAC107	4 channel Analog Output I/O option kit, selectable 0-10V, +/-10V, 4-20mA.
HE-XKIT	Blank I/O Board
HE200MJ2TRM	Adapter, RJ45 (8P8C) male to 8-position terminal strip.
HE-FBD001	Ferrite core for filtering out electrical noise.

Battery Maintenance

The XL10 Prime uses a Renata CR2032 lithium battery to run the Real Time Clock. The battery life is 7-10 years.

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TECHNICAL SPECIFICATIONS

General Specifications

Typical Power Backlight 100%	1017mA @ 10VDC (10.17W) 440mA @ 24VDC (10.56W)
Power Backlight @ 50%	242mA @ 24VDC (2.66W)
Power Backlight OFF	223mA @ 24VDC (2.52W)
Required Power (Inrush)	25A for < 1ms @ 24VDC, DC switched
Primary Power Range	10 - 30VDC
Max. Current	1100mA, Class 2
Relative Humidity	5 to 95%, Non-Condensing
Clock Accuracy	+ / - 20 ppm maximum at 25°C (+/- 1 min/month)
Real Time Clock	Battery Backed, Lithium Coin
Operating Temperature	-10°C to +60°C
Storage Temperature	-20°C to +60°C
Weight	3.9375 lbs (1786g)
Altitude	Up to 2000m
Rated Pollution Degree	Degree 2 Rating
Certifications (UL/CE)	North America or Europe
Enclosure Type	1, 3R, 4, 4X, 12, 12K & 13

Control and Logic

Control Lang. Support	Register-Based Advanced Ladder Logic; Variable-Based Advanced Ladder; IEC 61131-3 Languages
Logic Program Size	2MB, maximum
Scan Rate	.02ms/kB
Digital Inputs	2048
Digital Outputs	2048
Analog Inputs	512
Analog Outputs	512
Gen. Purpose Registers	50,000 (words) Retentive 16,384 (bits) Retentive 16,384 (bits) Non-retentive

User Interface

Display Type	10.4" VGA TFT (550 nit typical)
Resolution	640 X 480
Color	16-bit (65,536)
Screen Memory	27MB
User-Program. Screens	1023 max pages; 1023 objects per page
Backlight	LED - 50,000 hour life

Connectivity

Serial Ports	1 RS-232 & 1 RS-485 on first Modular Jack (MJ1/2) 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 1kV	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

USB Webcams

USB Webcams supported should support the UVC (USB Video class) protocol for the OCS to be able to display video. Most USB based video devices support this today. Special feature such as zoom and high definition are not supported by the OCS

CONTROLLER OVERVIEW

Overview of OCS



- | | |
|--|---------------------------|
| 1. Touchscreen | 9. Dip Switches |
| 2. Function Keys | 10. MJ3: RS-232/485 |
| 3. Audio Out/In | 11. CAN1: CAN I/O Port |
| 4. USB 2.0 'A' Port | 12. Power: 10-30VDC In |
| 5. LAN1 Port | 13. microSD: Data Storage |
| 6. LAN2 Port | 14. USB mini 'B' Port |
| 7. Built-In I/O | 15. CAN 2: CAN I/O |
| 8. MJ1/MJ2: RS-232 & 1/2 Duplex RS-485 | |

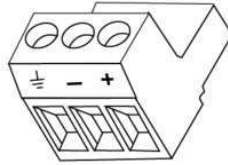
NOTE: Use caution when connecting controllers to PCs via serial or USB. PCs, especially laptops may use “floating power supplies” that are ungrounded. This could cause a damaging voltage potential between the laptop and controller. Ensure the controller and laptop are grounded for maximum protection. Consider using a USB isolator due to voltage potential differences as a preventative measure.

LAN2 Ethernet Port



HE-ETX2 is used in place of LAN2 in order to utilize 2nd ethernet port functionality at this time due to components shortage issues. If multi-USB device functionality is needed, such as for USB flash drive or webcam utilization, a power USB hub may be used. The RTS5411 chipset was found to be functional in our testing.

Power Wiring



NOTE: The Primary Power Range is 10VDC to 30VDC.

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, Terminal Hold-Down Screws: 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. **OPTION:** Attach ferrite core with a minimum of two turns of the DC+ and DC- signals from the DC supply that is powering the controllers.



2. Connect to earth ground.
3. Apply recommended power.

MODEL 6 SPECIFICATIONS

Digital DC Input

Inputs per Module	12 Including 4 Configurable HSC Inputs	
Commons per Module	1	
Input Voltage Range	12VDC / 24VDC	
Absolute Max. Voltage	30VDC Max.	
Input Impedance	10k Ω	
Input Current	Positive Logic	Negative Logic
Upper Threshold	0.8mA	-1.6mA
Lower Threshold	0.3mA	-2.1mA
Max. Upper Threshold	8VDC	
Min. Lower Threshold	3VDC	
OFF to ON Response	1ms	
ON to OFF Response	1ms	
Galvanic Isolation	None	
Logic Polarity	Selectable in Cscope	
I/O Indication	9 (IN 9-12)	
Connector Type	3.5mm Pluggable Cage Clamp Connector	
High Speed Counter Max Freq	1MHz	

Digital DC Outputs

Outputs per Module	16 Including 2 Configurable PWM Outputs
Commons per Module	1
Output Type	Sourcing / 10k Ω Pull-Down
Output Frequency	500kHz
Absolute Max. Voltage	28VDC Max.
Output Protection	Short Circuit
Max. Output Current / Point	0.5A
Max. Total Current	4A Continuous
Max. Output Supply Voltage	30VDC
Min. Output Supply Voltage	10VDC
Max. Voltage Drop at Rated Current	0.25VDC
Max. Inrush Current	650mA per Channel
Min. Load	None
OFF to ON Response	1ms
ON to OFF Response	1ms
Output Characteristics	Current Sourcing (Pos. Logic)
PWM Out	\approx 5kHz
Rise Time	50 - 115 μ s
Fall Time	8-20 μ s

Analog Inputs

Number of Channels	6		
Input Ranges (Selectable)	0-20mA; 4-20mA DC; 0-60mV; 0-10VDC; T/C (Ungrounded): J, K, N, T, E, R, S, B RTD: PT100, PT1000		
%AI Full Scale	10V, 20mA, 100mV: 32,000 counts full scale RTD/ TC: 20 counts/ °C		
Nominal Resolution	17 Bits		
Absolute Max. Input Voltage	-0.5 to -12VDC (+/- 30VDC)		
Input Impedance (Clamped @ -0.5 to 10.23VDC)	T/C / RTD / mV > 2MΩ mA: 15Ω + 1.5V / V: 1.1MΩ		
Max Over Current	35mA		
Galvanic Isolation	None		
Conversion Speed	Min. All Channels Converted in app. < 250ms or 41ms per channel enable		
Sensor Range and Accuracy	Input Type:	Range:	Accuracy:
	TC J (Ungrounded)	-120 to 1000°C / -184 to 1832°F	+/- 0.2% of full scale +/- 1°C
	TC K (Ungrounded)	-130 to 1372°C / -202 to 2501.6°F	+/- 0.2% of full scale +/- 1°C
	TC T (Ungrounded)	-130 to 400°C / -202 to 752°F	+/- 0.2% of full scale +/- 1°C
	TC E (Ungrounded)	-130 to 780°C / -202 to 1436°F	+/- 0.2% of full scale +/- 1°C
	TC N (Ungrounded)	-130 to 1300°C / -202 to 2372°F	+/- 0.2% of full scale +/- 1°C
	TC R, S (Ungrounded)	20 to 1768°C / 68 to 3214.4°F	+/- 0.2% of full scale +/- 3°C
	TC B (Ungrounded)	500 to 1820°C / 212 to 3308°F Functions below 500°C with reduced accuracy.	+/- 0.2% of full scale +/- 3°C
	PT100/1000	-200 to 850°C / -328 to 1562°F	+/- 0.15% of full scale
	0-20mA	0-20mA	+/- 0.15% of full scale
	0-60mV	0-60mV	+/- 0.15% of full scale
	0-10V	0-10V	+/- 0.15% of full scale

Analog Outputs

Number of Channels	4
Output Ranges	0-10VDC, 0-20mA, 4-20mA
Nominal Resolution	12 Bits
Max. Error at 25°C (Excluding Zero)	0-20mA 0.1% of full scale 0-10V 0.1 % of full scale
Maximum Loop Voltage	27V
Response Time	One Update per program logic scan
Minimum Resistance Load	500Ω
Conversion Speed	Min. All Channels Once per Scan
Galvanic Isolation	None
Temperature Drift Error	20mA.....0.000143%/°C 0 - 10V.....0.000151%/°C

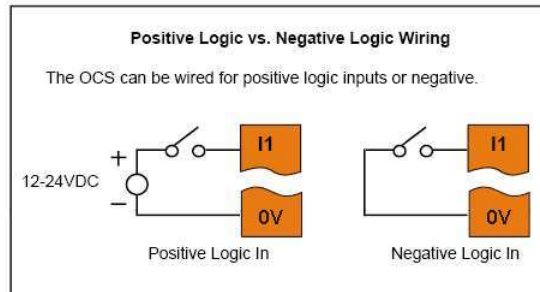
WIRING: INPUTS AND OUTPUTS

Analog Inputs Information

Raw input values for channels 1-4 are found in the registers as Integer- type data with a range from 0 – 32000. Analog inputs may be filtered digitally with the Filter Constant found in the Cscape Hardware Configuration for Analog Inputs. Valid filter values are 0-7 and act according to the following chart:

Data Values	
Input Mode:	Data Format, 12-bit INT:
0-20mA, 4-20mA	0-32000
0-41V	0-32000
T/C & RTD	°C or °F may be selected in the Hardware Configuration section in Cscape. The raw value is an integer, so the user should divide by 10.

Digital Inputs Information



Digital inputs may be wired in either a Positive Logic or Negative Logic fashion as shown. The setting in the Cscape Hardware Configuration for the Digital Inputs must match the wiring used in order for the correct input states to be registered. When used as a normal input and not for high speed functions, the state of the input is reflected in registers %I1 – %I12. Digital inputs may alternately be specified for use with High Speed Counter functions, also found in the Hardware Configuration for Digital Inputs. Refer to the User Manual via the [Documentation Search](#) for more details.