XL Series Built-in I/O – Model 2 I/O
12 DC Inputs, 6 Relay Outputs, 4 Analog Inputs
for XLe, XLt, XL6 (all models) and XL10e

1 Specifications

Specifications				
Digital DC Inputs			**Digital Relay Outputs**	
Inputs per Module	12 including 4 configurable HSC inputs		Outputs per Module	6 relay
Commons per Module	1		Commons per Module	6
Input Voltage Range	12 VDC / 24 VDC		Max. Output Current per Relay	3 A at 250 VAC, resistive
Absolute Max. Voltage	35 VDC Max.		Max. Total Output Current	5 A continuous
Input Impedance	10 kΩ		Max. Output Voltage	275 VAC , 30 VDC
Input Current	Positive Logic	Negative Logic	Max. Switched Power	1250 VA, 150 W
Upper Threshold	0.8 mA	-1.6mA	Contact Isolation to XLe ground	1000 VAC
Lower Threshold	0.3 mA	-2.1mA	Max. Voltage Drop at Rated Current	0.5 V
Max Upper Threshold	8 VDC		Expected Life (See Derating section for chart.)	No load: 5,000,000 Rated load: 100,000
Min Lower Threshold	3 VDC		Max. Switching Rate	300 CPM at no load 20 CPM at rated load
OFF to ON Response	1 ms		Type	Mechanical Contact
ON to OFF Response	1 ms		Response Time	One update per ladder scan plus 10 ms
HSC Max. Switching Rate	10 kHz Totalizer/Pulse, Edges 5 kHz Frequency/Pulse, Width 2.5 kHz Quadrature			
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 +12V			
Input Impedance (Clamped @ -0.5 VDC to 12 VDC)	Current Mode: 100 Ω	Voltage Mode: 500 k Ω		
Nominal Resolution	10 Bits			
%AI full scale	32,000 counts			
Max. Over-Current	35 mA			
Conversion Speed	All channels converted once per ladder scan			
Max. Error at 25°C (excluding zero) *can be made tighter (~0.25%) by adjusting the digital filter setting to 3.	4-20 mA 1.00% 0-20 mA 1.00% 0-10 VDC 1.50%*			
Additional error for temperatures other than 25°C	TBD			
Filtering	160 Hz hash (noise) filter 1-128 scan digital running average filter			

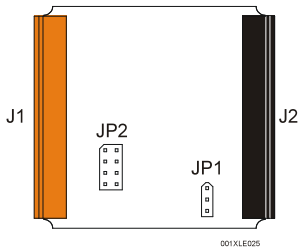
2 Wiring and Jumpers

Wiring Specifications

- For I/O wiring (discrete), use the following wire type or equivalent: Belden 9918, 18 AWG (0.8 mm^2) or larger.
- For shielded Analog I/O wiring, use the following wire type or equivalent: Belden 8441, 18 AWG (0.8 mm^2) or larger.
- For CAN wiring, use the following wire type or equivalent: Belden 3084, 24 AWG (0.2 mm^2) or larger.

Use copper conductors in field wiring only, 60/75° C

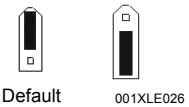
Jumper Setting Details



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

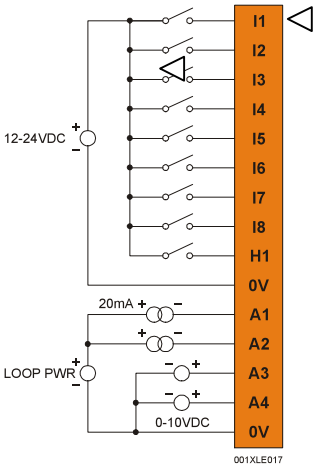
Note: The Cscape Module Setup configuration must match the selected I/O (JP) jumper settings.

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

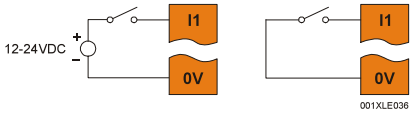
3 Input Wiring Details

J1 Orange Terminal Connector	Name
I1	IN1
I2	IN2
I3	IN3
I4	IN4
I5	IN5
I6	IN6
I7	IN7
I8	IN8
H1	HSC1 /IN9
0V	Ground
A1	Analog IN1
A2	Analog IN2
A3	Analog IN3
A4	Analog IN4
0V	Ground

Orange
Digital In / Analog In



Positive Logic vs. Negative Logic Wiring
The XLe can be wired for Positive Logic inputs or Negative Logic inputs.

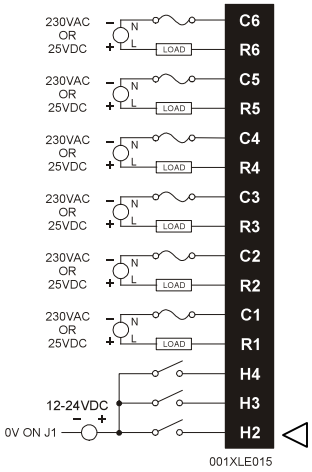


Positive Logic In Negative Logic In

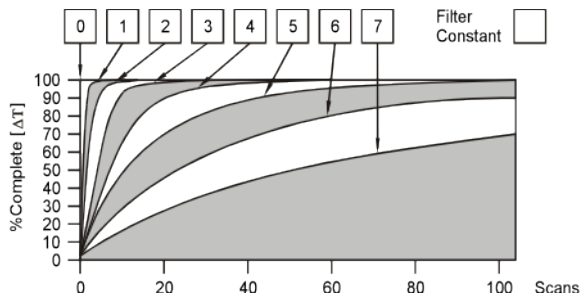
4 Output Wiring Details

J2 Black Terminal Connector	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

J2 Black
Digital In / Relay Out



Analog Input Digital Filtering

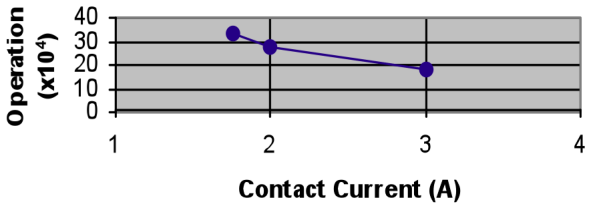


Digital Filtering
The chart above demonstrates the effect of digital filtering on an analog input value. The Digital Filtering level is set in Cscape as part of the I/O Configuration.

5 I/O Register Map

Registers	Description	
%I1 to %I24	Digital Inputs	
%I32	Output Fault	
%I25 to %I31	Reserved	
%Q1 to %Q16	Digital outputs	
%Q17	Clear HSC1 accumulator to 0	
%Q18	Totalizer: Clear HSC2 Quadrature 1-2: Accumulator 1 Reset to max – 1	
%Q19	Clear HSC3 Accumulator to 0	
%Q20	Totalizer: Clear HSC4 Quadrature 3-4: Accumulator 3 Reset to max – 1	
%Q21 to %Q32	Reserved	
%AI1 to %AI4	Analog inputs	
%AI5, %AI6	HSC1 Accumulator	
%AI7, %AI8	HSC2 Accumulator	
%AI9, %AI10	HSC3 Accumulator	
%AI11, %AI12	HSC4 Accumulator	
%AQ1, %AQ2	PWM1 Duty Cycle	Registers are allocated for these I/O points even though the I/O is not present for this model.
%AQ3, %AQ4	PWM2 Duty Cycle	
%AQ5, %AQ6	PWM Prescale	
%AQ7, %AQ8	PWM Period	
%AQ9 to %AQ14	Analog outputs	

Relay Life Expectancy



"**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

6 Safety

When found on the product, the following symbols specify:


Warning: Electrical Shock Hazard.


Warning: Consult user documentation.

This equipment is suitable for use in Class I, Division 2, Groups A, B, C and D or Non-hazardous locations only

WARNING – EXPLOSION HAZARD – Substitution of components may impair suitability for Class I, Division 2
AVERTISSEMENT - RISQUE D'EXPLOSION - LA SUBSTITUTION DE COMPOSANTS PEUT RENDRE CE MATERIAL INACCEPTABLE POUR LES EMPLACEMENTS DE CLASSE 1, DIVISION 2

WARNING – EXPLOSION HAZARD – Do not disconnect equipment unless power has been switched off or the area is known to be non-hazardous.
AVERTISSEMENT - RISQUE D'EXPLOSION - AVANT DE DECONNECTOR L'EQUIPMENT, COUPER LE COURANT OU S'ASSURER QUE L'EMPLACEMENT EST DESIGNE NON DANGEREUX.

WARNING: To avoid the risk of electric shock or burns, always connect the safety (or earth) ground before making any other connections.

WARNING: 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.

WARNING: Replace fuse with the same type and rating to provide protection against risk of fire and shock hazards.

WARNING: In the event of repeated failure, do not replace the fuse again as a repeated failure indicates a defective condition that will not clear by replacing the fuse.

WARNING: 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.

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.

- 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 electric circuits or pulse-initiating equipment, open their related breakers.
- Do not make connections 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 floors 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

7 Technical Support

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

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

Europe:
(+) 353-21-4321-266
www.horner-apg.com
email: techsupport@hornerirl.ie