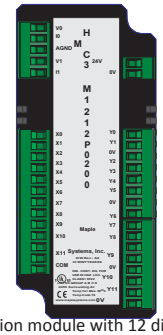
Quick Start Guide
HMC3-M1212P0200



Description:
HMC3-M1212P0200 I/O expansion module with 12 digital bidirectional inputs, 12 PNP-type sourcing digital outputs, and 2 analog inputs.

Contents:
- 1 HMC3-1212P0200 (in plastic bag)
- Removable screw type terminal blocks*
- Removable power supply connector*
- Quick Start Guide

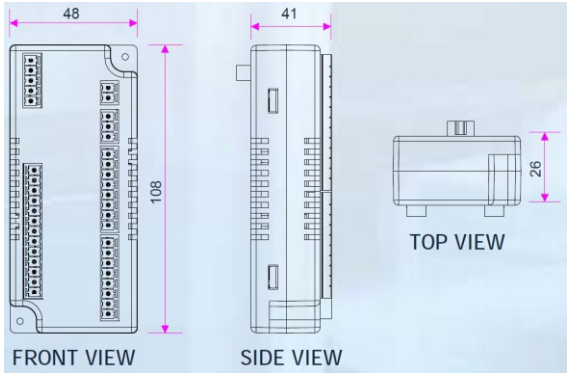
*Note: Connector manufacturer may vary.

Programming software (MAPware-7000), cables, and power supply purchased separately.

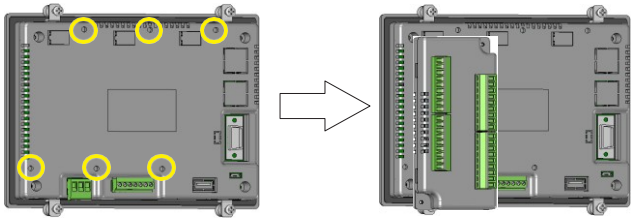
Specifications:

Power:	12VDC from HMC3000 base
Isolation:	I/O optically isolated from internal circuit
Digital Inputs:	12 bidirectional inputs
Rated Input Voltage:	24VDC
Rated Input Current:	up to 5mA (per contact)
Input Impedance:	3KΩ
Minimum ON voltage:	15 VDC
Maximum OFF voltage:	5 VDC
Turn ON/OFF time:	10 msec
Special Input Functions:	
High Speed Channels:	2 inputs, X0 and X2
Maximum Input Freq:	200KHz
Maximum Input Count:	4,294,967,295 (32-bit)
Digital Outputs:	12 sourcing outputs (PNP-type)
Output Current:	300mA maximum (per contact)
Rated Load:	300mA@24VDC
Nominal Load:	96Ω / 6W (Resistive) @ 24VDC
	6VA (Inductive, Unity Power Factor)
Special Output Functions:	
High Speed Channels:	2 outputs, Y0 and Y1
Maximum Output Freq:	1KHz
PWM duty cycle:	0 to 100%
Analog Inputs:	2 input channels
Voltage Input:	0 - 10V, 0 - 5V
Current Input:	0 - 20mA, 4 - 20mA
Resolution:	16-bit
Accuracy:	0.2% of full scale @ 25° C
Input Power Supply:	
Input Voltage:	24VDC +/- 15%
Connection Method:	Removable terminals (3.81 mm pitch)
Operating Temp:	0 to 55°C
Humidity:	10% to 90% (non-condensing)
Dimensions (WxHxD):	1.89 x 4.25 x 1.61 inches [48x108x41mm]

Dimensional Details:



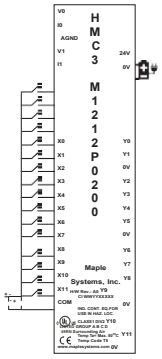
Mounting Module to HMC3000:
The HMC3 I/O module must be mounted onto the back of a HMC3000 Series unit using one of the HMC expansion ports.
When locating equipment behind the HMC3000 ensure that AC power wiring, PLC output modules, contactors, starters, relay and any other source of electrical interference are located away from the HMC3000. Make sure that variable speed drives and switching power supplies are located away from the unit.



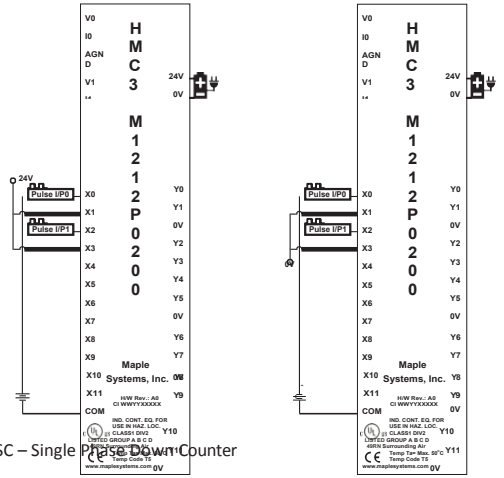
Step 1: Remove protective tab on HMC3000 expansion port to expose socket.
Step 2: Align I/O module screws with screw holes, then carefully press down to establish contact between I/O interconnect plug on I/O module and the socket.
Step 3: Tighten the two screws of the I/O module to the base (approx. 0.1Nm torque).

Wiring I/O Expansion Modules:
The HMC3 I/O module has green block terminals that are used to wire the module to the digital input devices (i.e. switches, contacts, etc.). The block terminals can be physically removed from the module to facilitate connection (18-gauge wire recommended) Note: A 3/32" flat blade screwdriver should be used to tighten the screws of the terminal block.
Connecting to bidirectional inputs:

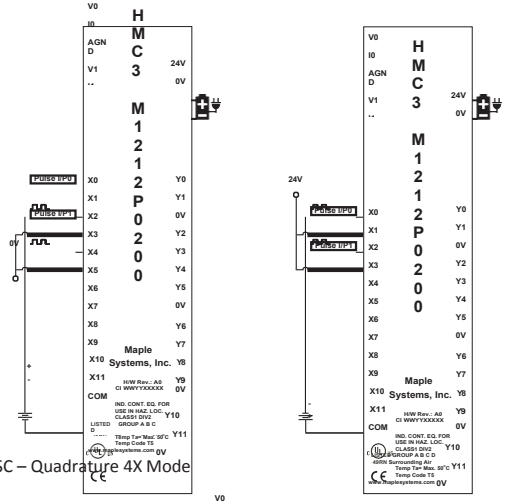
1. Normal



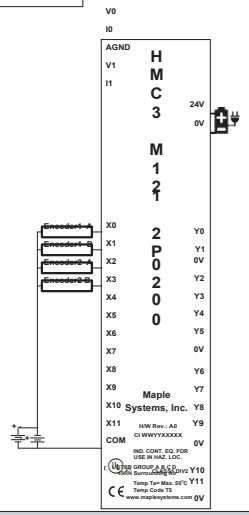
2. HSC- Single Phase Up Counter



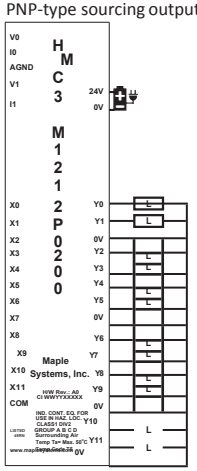
3. HSC – Single Phase Down Counter



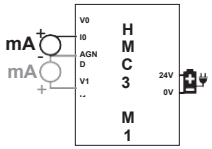
4. HSC – Quadrature 4X Mode



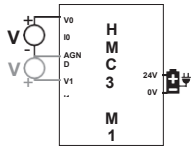
5. PNP-type sourcing outputs:



6. Analog Input- Current:



7. Analog Input- Voltage:



Configuration:
Use MAPware-7000 to configure the expansion port, in which the module is installed, using the module's model number.

The input (X and XW), outputs (Y and YW), and configuration (M and MW) memory addresses are used to interact with the module. These addresses are created according to the slot location of the module, where nn refers to the slot number (ex. 01...05):

Function	Register	Access
X0-X15 Inputs	Xnn000-015 (XWnn00)	Rd Only
Slot nn- CH1 Rate Register	XWnn01	Rd Only
Slot nn- CH2 Rate Register	XWnn03	Rd Only
Slot nn- CH1 Pulses Per Scan Register	XWnn05	Rd Only
Slot nn- CH2 Pulses Per Scan Register	XWnn07	Rd Only
Y0-Y15 Outputs	Ynn000-015 (YWnn00)	Rd/Write

High Speed Counter Configuration:

Function	HSC Channel 1	HSC Channel 2	Access
Pulse Input Pin	X0	X2	Rd Only
Direction Pin*	X1	X3	Rd Only
Reset HW Pin	X4	X5	Rd Only
Preset Reached Pin	Y2	Y3	Rd Only
Enable Counting	Mnn080	Mnn176	Rd/Write
Reset SW Bit	Mnn081	Mnn177	Rd/Write
Preset Reached	Mnn083	Mnn179	Rd Only
Configuration Register	MWnn00	MWnn06	Rd/Write
Current Value	MWnn01	MWnn07	Rd Only
Preset Value	MWnn03	MWnn09	Rd/Write

*- X1 and X3 are used as Encoder pins 1B and 2B respectively when using Quadrature 4X mode.

Pulse Width Modulation (PWM) Configuration:

5. increments (starting from 0) the current value register in MWnn01 (Channel 1) or MWnn07 (Channel 2) until the preset value is reached. Then HSC sets Y1 (Channel 1) or Y6 (Channel 2).

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Pulse Width Modulation Option	PWM Channel 1	PWM Channel 2	
PWM Output	Y0 (terminal)	Y1 (terminal)	Rd/Write
PWM Configuration Register	MWnn24	MWnn30	Rd/Write
PWM Frequency or Minimum Freq. Setting Register	MWnn25 MWnn26	MWnn31 MWnn32	Rd/Write
PWM ON Duty or Maximum Freq. Setting Register	MWnn27 MWnn28	MWnn33 MWnn34	Rd/Write
PWM Acceleration Time	MWnn37	MWnn38	Rd/Write
PWM Deceleration Time	MWnn39	MWnn40	Rd/Write
PWM Total Pulse	MWnn41 MWnn42	MWnn43 MWnn44	Rd/Write
PWM Elapsed Pulse	MWnn45 MWnn46	MWnn47 MWnn48	Rd/Write
PWM Trapezoidal Minimum Pulse Count	MWnn50 MWnn51	MWnn52 MWnn53	Rd/Write
PWM ON Duty Setting Error Flag	Mnn466	Mnn471	Rd/Write
PWM Frequency Setting Error Flag	Mnn467	Mnn472	Rd/Write
PWM Acceleration Time Setting Error Flag	Mnn468	Mnn473	Rd/Write
PWM Deceleration Time Setting Error Flag	Mnn469	Mnn474	Rd/Write
PWM No of Total Pulses Setting Error Flag	Mnn470	Mnn475	Rd/Write
PWM Pulse Enable Flag	Mnn576	Mnn577	Rd/Write
PWM End of Total Pulses	Mnn784	Mnn785	Rd/Write

To implement High Speed Counter Operation:

1. Connect a device to X0 (Channel 1) or X5 (Channel 2) that will provide the high speed pulses to the expansion module.
2. Configure for HSC mode using the configuration register MWnn00 (Channel 1) or MWnn06 (Channel 2).
3. Write the HSC preset count value in MWnn03 (Channel 1) or MWnn09 (Channel 2).
4. Enable the HSC by setting the HSC Enable bit Mnn080 (Channel 1) or MWnn09 (Channel 2).

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 – Do not disconnect equipment unless power has been removed or the area is known to be non-hazardous.

⚠ WARNING – EXPLOSION HAZARD - Substitution of components may impair suitability for Class I, Division 2.

⚠ WARNING - CAUTION, battery may explode if mistreated. Do not recharge, disassemble or dispose of in fire.

It is recommended that the user periodically inspect the sealed devices used, check for any degradation of properties, and replace as necessary.

For Technical Support:

Please contact Maple Systems if you have any questions regarding this product. We ask that you provide us with the unit serial number and firmware revision number written on the product label of the unit.

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