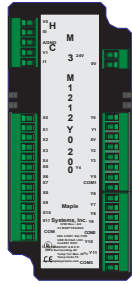


Quick Start Guide HMC3-M1212Y0200



Description:

HMC3-M1212Y0200 I/O expansion module with 12 digital bidirectional inputs, 10 relay outputs, 2 PNP-type sourcing outputs, and 2 analog inputs.

Contents:

- 1 HMC3-M1212Y0200 (in plastic bag)
- Removable screw type terminal blocks*
- Removable power supply connector*
- Quick Start Guide

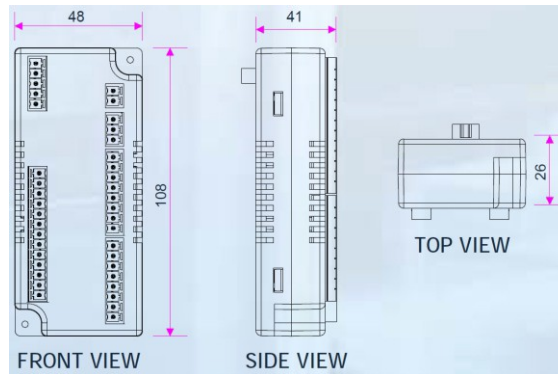
*Note: Connector manufacturer may vary.

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

Specifications:

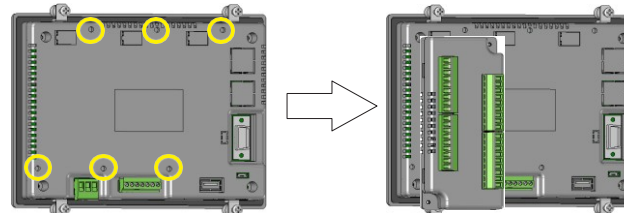
- Power:** 12VDC from HMC3000 base
Isolation: I/O optically isolated from internal circuit
- Digital Inputs:** 12 bidirectional inputs
Rated Input Voltage: 24VDC
Rated Input Current: up to 5mA (per contact)
Input Impedance: 3KΩ
Minimum ON voltage: 15 VDC
Maximum OFF voltage: 5 VDC
Turn ON/OFF time: 10 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:** 10 relays, 2 sourcing outputs (PNP-type)
Output Current: 300mA maximum (per contact)
Rated Load: 300mA@24VDC (PNP)
230VAC/2A, 30VDC/2A (relay)
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.



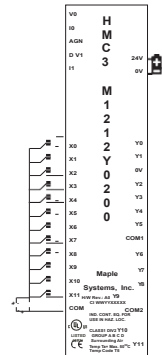
- Step 1: Remove protective tab on HMC3000 expansion port to expose socket.
- Step 2: Align I/O module screws with screw holes, then carefully press down to establish contact between I/O interconnect plug on I/O module and the socket.
- Step 3: Tighten the two screws of the I/O module to the base (approx.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

Wiring I/O Expansion Modules:

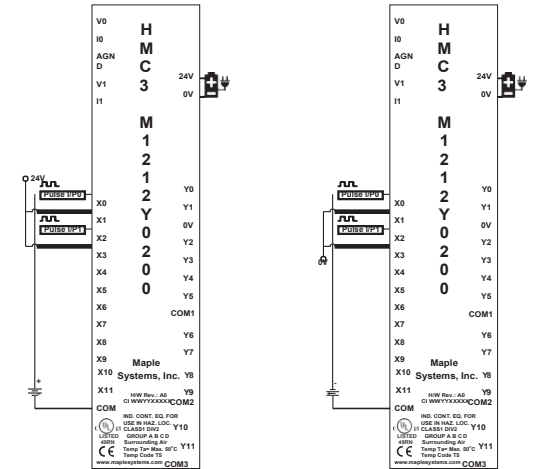
The HMC3 I/O module has green block terminals that are used to wire the module to the digital input devices (i.e. switches, contacts, etc.). The block terminals can be physically removed from the module to facilitate connection (18-gauge wire recommended) Note: A 3/32" flat blade screwdriver should be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

Connecting to bidirectional inputs:

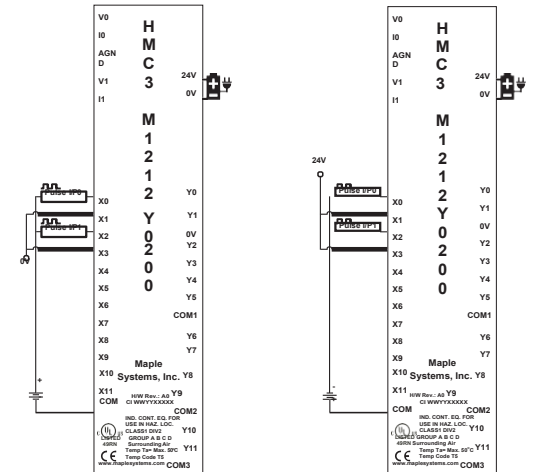
1. Normal



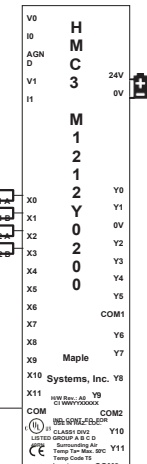
2. HSC - Single Phase Up Counter



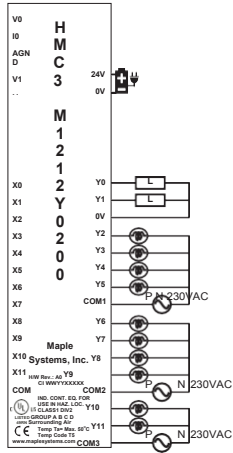
3. HSC - Single Phase Down Counter



4. HSC - Quadrature 4X Mode



5. PNP-type sourcing outputs:



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:

| 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).

5. HSC 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).
6. Enable the HSC Reset Bit by setting Mnn081 (Channel 1) ...
7. To start the process again, simply reset (clear) the HSC Reset Bit and set the HSC Enable Bit. Note: if the HSC Enable Bit is still ON, you must reset (clear) this bit, and then set it again.

Additional Resources:

Detailed instructions on the operation and installation of the HMC3000 Series are available in the HMC3000 Programming Manual that is included with the MAPware-7000 configuration software. MAPware-7000 also includes help files that provide detailed information on using the configuration software.

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

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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