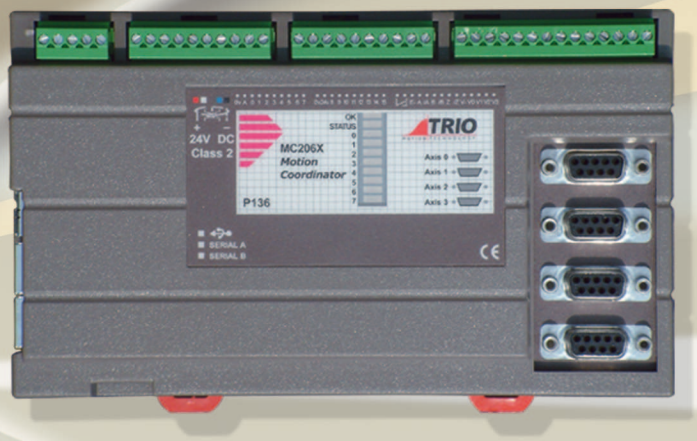
intelligence

COMMANDES NUMERIQUES



motion

la force de la gamme !

transtechnik

servomécanismes

Accessories
P350 RS232 Serial Cable
P315 CAN 16-I/O
P325 CAN 8 Analogue Inputs

MOTION COORDINATOR

DIN RAIL MOUNT

PRODUCT CODE: P192

MC302X

The Trio MC302X is a compact DIN rail mounted motion controller based on Trio's latest ARM processor technology.

The MC302X has been designed to provide a compact, cost effective solution for OEM applications. The unit features two axes, the first of which can be configured in software for either servo (with encoder feedback) or stepper control. The second axis may be either a reference encoder or a stepper axis. The differential line driver stepper outputs can be configured for simulated quadrature encoder outputs to synchronise multiple units. The built-in registration facilities make the MC302X ideal for Flying Shears, Winders, and high-speed Labellers.

The MC302X is programmed using Trio BASIC which features true pre-emptive multi-tasking of up to 3 simultaneous processes. Parts of a complex application can therefore be developed, tested and run independently, although the tasks can share data and motion control hardware.

Available Axis Configuration

Axis 0	stepper / servo / encoder
Axis 1	stepper / encoder
Axis 2	virtual

Each axis may run moves using linear or circular interpolation, electronic cams and gearboxes. Support is provided for continuously rotating machinery and two of the inputs may be configured for accurate hardware registration.

The MC302X has 8 opto-isolated 24V digital I/O (4 in, 4 bi-directional) built-in. These may be used as general purpose I/O or may be defined to be used by the controller for high speed registration, end of travel limits, datuming and feedhold functions as required.

The I/O count can be expanded using Trio's remote I/O system via the on board CAN channel up to a maximum of 256 digital and 32 analogue input channels.

The MC302X has an RS232 programming port, and a user selectable RS232/485 port for peripherals such as an HMI.

Built-in Communication Options

CAN	Trio remote I/O, DeviceNet slave, user programmable or CANopen
RS232 / 485	Modbus RTU slave, or user programmable

I/O Capability

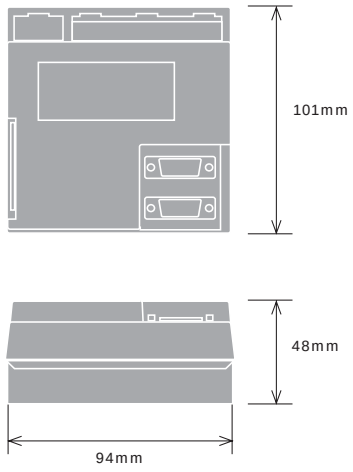
- 4 inputs and 4 bi-directional channels
- Remote I/O expandable to 256 bi-directional channels and 32 analogue inputs.

Multi-tasking

- 3 simultaneous BASIC tasks

Part Number	P192
Size	101mm x 94mm x 48mm
Weight	200g
Temperature Range	0-45 degrees Celsius
Power Consumption	24V @ 150mA
Maximum Number Of Axes	2 + 1 Virtual
Built In Encoder / Stepper (Line Driver) RS422 Bi-directional Port	2 @ 6Mhz (Encoder) or 2MHz (Stepper)
Built in Analogue Outputs	1 @ +/-10V 16 Bit Resolution
Servo Cycle Time	1000us, 500us, or 250us
Built In Inputs	4 x 24V Opto-Isolated
Built In Outputs	None
Built In Bi-directional I/O	4 x 24V Opto-Isolated
Built in Analogue Inputs	None
Inputs Functions	Forward Limit / Reverse Limit / Datum / F Hold
Watchdog Relay	1 Solid State - 24V @ 100mA Max Current
Serial Ports	1 RS232 (Programming) + 1 RS232 / RS485
CAN Ports	1 @ 1MBAUD max
Daughter board Slots	None
User Memory	512kbytes
Table Memory	16000 values
Multi-tasking	2 Fast Tasks + 1 Normal Task
EMC Compliance	BS EN61000-6-2 : 2001 generic noise immunity standard for industrial environment BS EN61000-6-4 : 2001 generic emission standard for light industrial environment

Overall Dimensions



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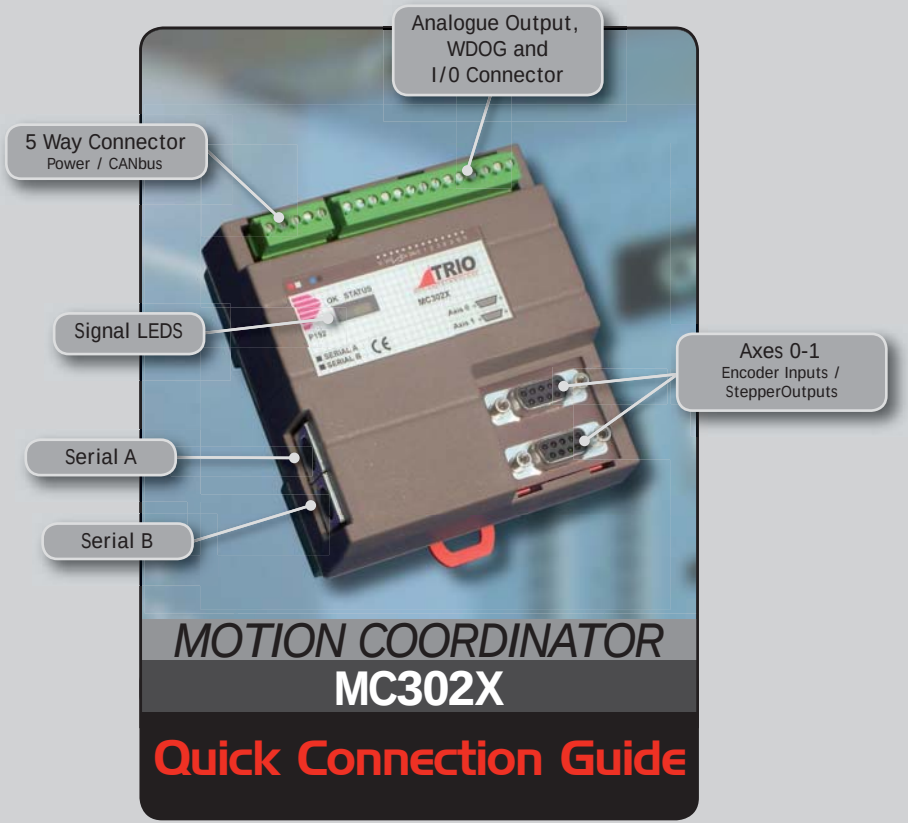
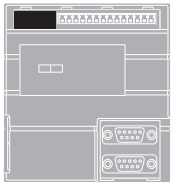
TRIO
MOTION TECHNOLOGY



(Please refer to the *Motion Coordinator* Technical Reference Manual for Full Details)

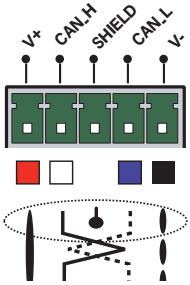
5-WAY CONNECTOR



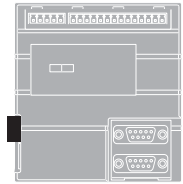
This is a 5 way 3.81mm pitch connector. The connector is used both to provide the 24 Volt power to the MC302X and provide connections for I/O expansion via Trio's P316 and P325 CAN I/O expanders. A 24V dc, Class 2 transformer or power source must be provided as this powers the unit.

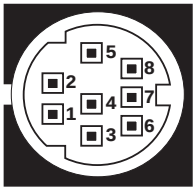
This 24 Volt input is internally isolated from the I/O 24 Volts and the +/-10V voltage outputs.

The 24V (V+) and 0V (V-) MUST be connected as they power the MC302X. The Shield MUST also be connected to ground as it provides the EMC screen for the Motion Coordinator. The CAN connections are optional.



SERIAL CONNECTIONS



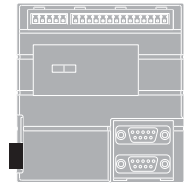


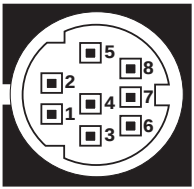
Serial Connector A

Pin	Function	Note
1	No Connection	
2	No Connection	Serial Port #0
3	RS232 Transmit	
4	RS232 0V	
5	RS232 Receive	
6	No Connection	
7	No Connection	
8	No Connection	

Note: Port 0 is the default programming port for connection to the PC running *Motion Perfect*.

SERIAL CONNECTIONS

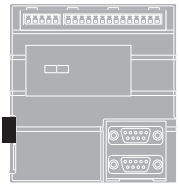


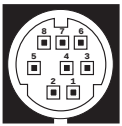


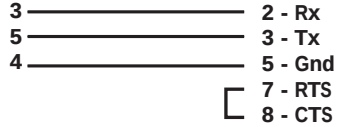
Serial Connector B

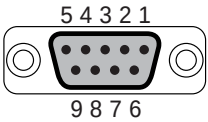
Pin	Function	Note
1	RS485 Data In A Rx+	Serial Port #1
2	RS485 Data In B Rx-	
3	RS232 Transmit	Serial Port #1
4	RS232 0V	
5	RS232 Receive	
6	No Connection	Serial Port #1
7	RS485 Data Out Z Tx-	
8	RS485 Data Out Y Tx+	
Note: Option for port #1 to be either RS232 or RS485		

SERIAL CABLE



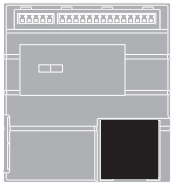


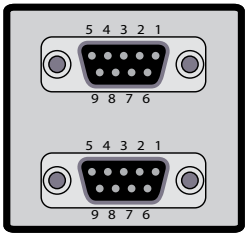


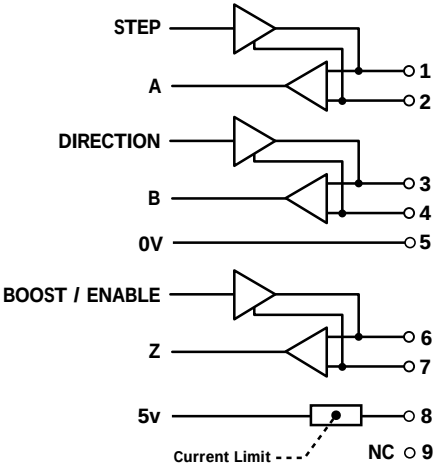


Motion Coordinator to “AT” style PC with 9 pin serial connector

STEPPER OUTPUTS / ENCODER INPUTS



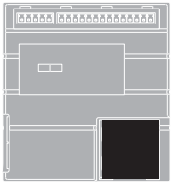




Pin	Servo Axis	Stepper Axis
1	Enc. A	Step +
2	Enc. /A	Step -
3	Enc. B	Direction +
4	Enc. /B	Direction -
5	0V	0V
6	Enc. Z	Boost +
7	Enc. /Z	Boost -
8	5V	5V
9	Not Connected	Not Connected

Current limit is 150mA total, shared between all outputs.

STEPPER OUTPUTS / ENCODER INPUTS *(CONTINUED)*



Default ATYPE Configuration:

Axis 0:	Voltage output servo axis with encoder feedback	ATYPE AXIS(0)=2
Axis 1:	Encoder feedback axis for synchronisation	ATYPE AXIS(1)=3

Stepper Configuration:

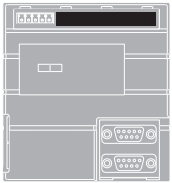
Axis 0:	Step and direction differential outputs	ATYPE AXIS(0)=1
Axis 1:	Step and direction differential outputs	ATYPE AXIS(1)=1

Stepper/Encoder Configuration:

Axis 0:	Encoder feedback axis for synchronisation	ATYPE AXIS(0)=3
Axis 1:	Step and direction differential outputs	ATYPE AXIS(1)=1

Changes to ATYPE should be set prior to enabling the axes with WDOG=ON. This statement should ideally placed in the STARTUP program. See user manual for other ATYPE combinations.

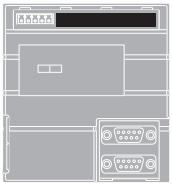
AMPLIFIER ENABLE (WATCHDOG) RELAY OUTPUT

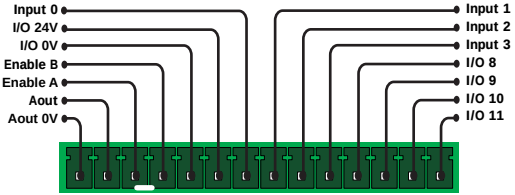


An internal relay (Enable A and Enable B) is used to enable external amplifiers when the controller has powered up correctly and the system and application software are ready. The amplifier enable is a single pole solid state relay with a set of normally open volt free “contacts”.

ALL STEPPER AND SERVO AMPLIFIERS MUST BE INHIBITED WHEN THE AMPLIFIER ENABLE OUTPUT IS OPEN CIRCUIT

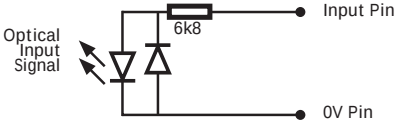
I/O CONNECTOR 1

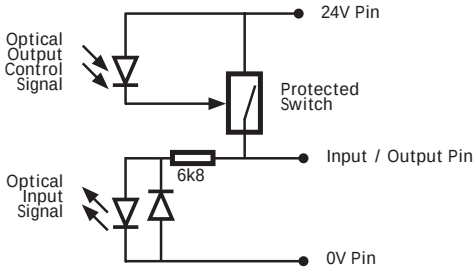




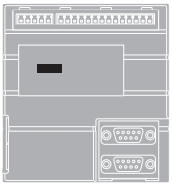
I/O Connector

Analogue Output / WDOG / Inputs 0-3 / I/O 8-11





LED ERROR CODES



OK	STATUS	
		No power or critical fault
		Normal operation
		Enable relay open
		Enable relay energised
		Error in motion system (flashing)

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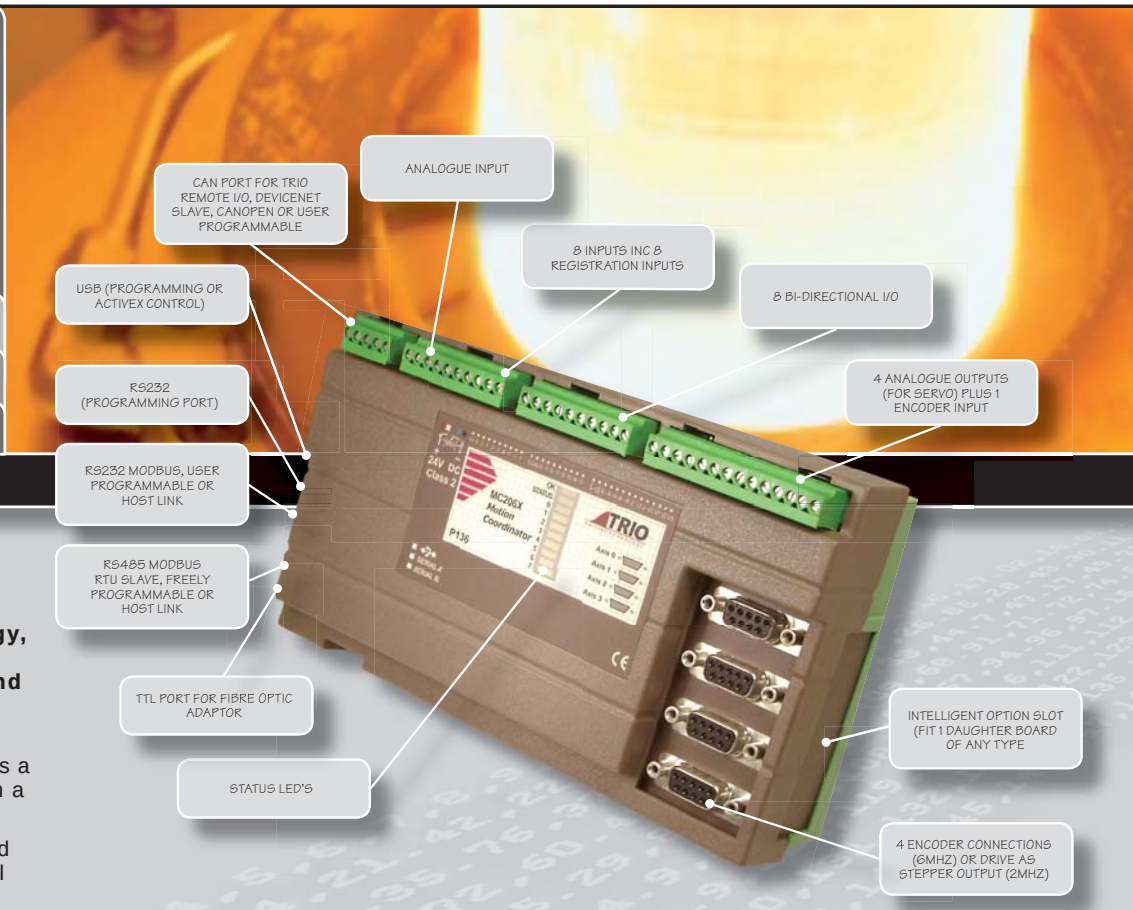
Accessories
P390 Additional Servo Axis
P393 Additional Reference Encoder Input
P395 Additional Differential Stepper Axis
P399 MC206X Daughter Board Adapter
P350 RS232 Serial Cable
P435 Serial to Fibre Optic Adapter
P315 CAN 16-I/O
P325 CAN 8 Analogue Inputs
Pxxx All Daughter Boards

MOTION COORDINATOR

DIN RAIL MOUNT

PRODUCT CODE: P136

MC206X



The MC206X *Motion Coordinator* is based on Trio's high-performance 32-bit floating point DSP technology, providing exceptionally fast computational speed, flexibility, and connectivity.

Advanced FPGA techniques enable 4 axes of stepper and servo circuitry plus a master encoder input to be enclosed in a compact DIN-rail mounted package.

An expansion connector is incorporated to add a fifth axis or any other optional Daughter Boards. Up to 8 axes may be provided using a SERCOS Daughter Board.

User programs are written in Trio's established multi-tasking BASIC language using the powerful *Motion* Perfect application development software.

Complex motion such as cams, gears, linked axes, and interpolation is made easy with Trio's comprehensive BASIC command set.

The MC206X has 16 opto-isolated 24V digital I/O (8 in, 8 bi-directional) built-in. Fast high speed hardware registration inputs are available for each axis where highly accurate control is required for applications such as print and packaging lines.

The I/O count can be expanded using Trio's remote I/O system with both digital and analogue modules.

Trio's MC206X offers wide communications capability with 2 RS-232 serial ports, 1 RS-485 port, 1 TTL serial port, 1 USB port and 1 CAN channel as standard.

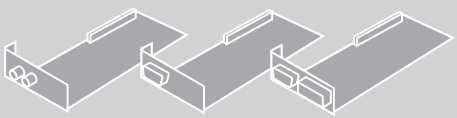
Axis Configuration *(without SERCOS / CAN or SLM)*

Axis 0	stepper / servo / encoder
Axis 1	stepper / servo / encoder
Axis 2	stepper / servo / encoder
Axis 3	stepper / servo / encoder
Axis 4	encoder only
Axis 5	Added by use of an axis option board fitted to intelligent option slot
Axis 6/7	virtual

An adaptor is available to convert the TTL port to Trio's fibre-optic network for adding Trio HMIs.
The MC206X has 8 available axes which can be assigned to the built in hardware or one of the 3 available digital drive networks by means of the appropriate daughter board option. Each board is capable of driving different numbers of axes. Any un-allocated axes can be assigned to the built in hardware or used as virtual axes.

When used with the MC206X, the different digital drive network daughter boards can have the following number of axes:

Sercos	CAN	SLM
Up to 8 axes* (2 Standard)	Up to 4 axes* (2 Standard)	Up to 3 axes (3 Standard)



**Extra axes added by P701, P702 and P704*

Multi-tasking

- 7 simultaneous BASIC tasks

Feature Enable Codes

The MC206X is supplied as standard with axis 0 (servo or stepper) and axis 4 (encoder input) enabled. Software "Feature Enable Codes" can be purchased and then entered using *Motion* Perfect to enable axis 1, 2 and 3 for either servo or stepper operation. No extra hardware is required to update these additional axes.

I/O Capability

- 8 inputs and 8 bi-directional channels
- 1 x 10 bit 0-10V analogue input
- Expandable to 256 bi-directional channels and 32 analogue inputs.

Fieldbus Communication Options

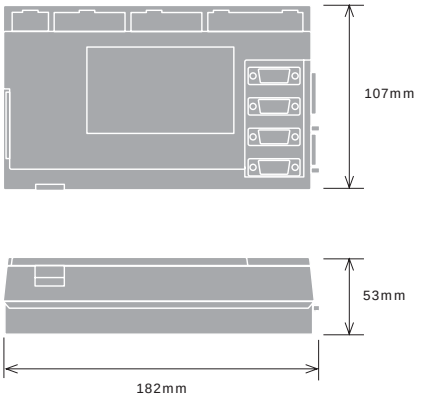
CAN	Trio remote I/O, CANopen I/O, DeviceNet slave or user programmable
RS232	Modbus RTU slave, Hostlink or user programmable†
RS485	Modbus RTU slave, Hostlink or user programmable†
Option Slot	Profibus, CANbus, Ethernet or Ethernet IP

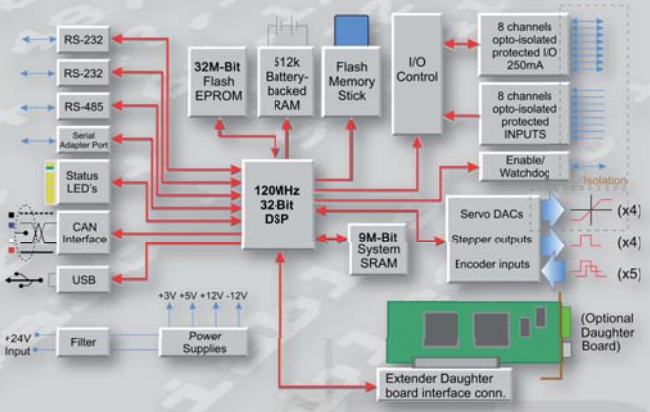
†Only 1 instance of a protocol can be used at a time. Option slot is limited to one daughter board.

Part Number	P136
Size	107mm x 182mm x 53mm
Weight	325g
Temperature Range	0-45 degrees Celsius
Power Consumption	24Volts @ 300mA
Maximum Number Of Axes	8
Built In Encoder Inputs	1 @ 6MHz
(Line Driver) RS422 Bi-directional Port	4 @ 6MHz (Encoder) or 2 MHz (Stepper)
Built in Analogue Outputs	4 @ +/-10V 16 Bit Resolution
Servo Cycle Time	1000us, 500us, or 250us
Built In Inputs	8 x 24V Opto-Isolated
Built In Outputs	None
Built In Bi-directional I/O	8 x 24V Opto-Isolated
Built in Analogue Inputs	1 @ 0-10V 10 Bit Resolution
Inputs Functions	Forward Limit/ Reverse Limit / Datum / F Hold
Watchdog Relay	1 Solid State - 24V @ 100mA Max Current
Serial Ports	RS232 (Programming) / RS232 / RS485 / TTL / USB
CAN Ports	1 @ 1MBAUD max
Daughter board Slots	1 Slot
User Memory	512kbytes
Table Memory	32000 values
Multi-tasking	2 Fast Tasks + 5 Normal Tasks
EMC Compliance	BS EN61000-6-2 : 2001 generic noise immunity standard for industrial environment
	BS EN61000-6-4 : 2001 generic emission standard for light industrial environment

Required to fit any daughter board to MC206X.

Overall Dimensions





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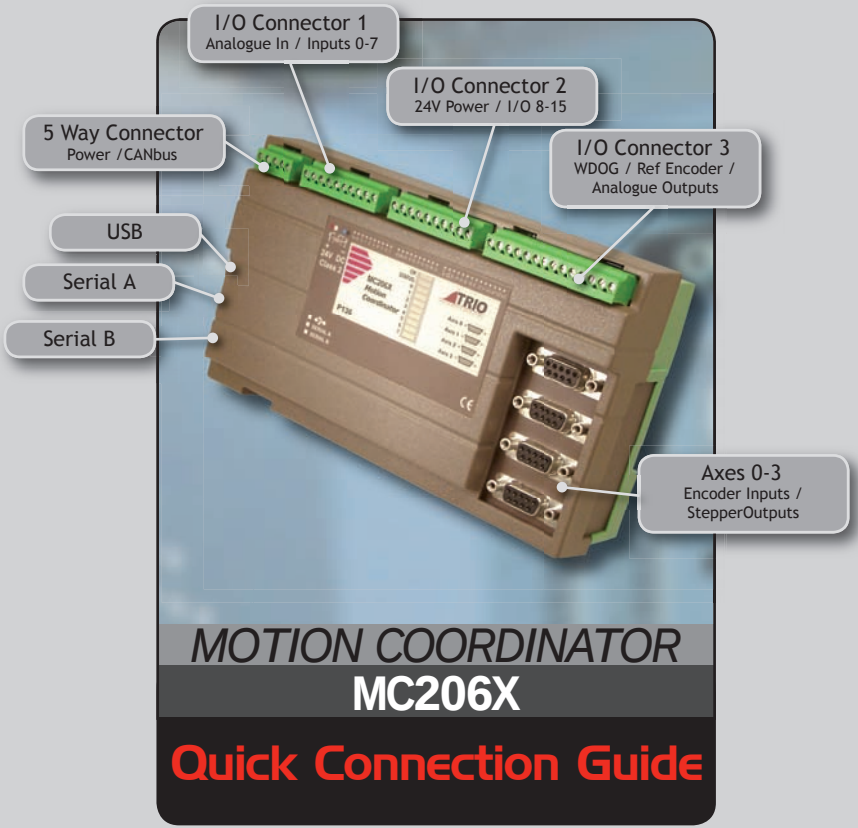
Website: www.triomotion.com

TRIO
MOTION TECHNOLOGY



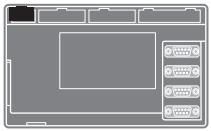
MOTION COORDINATOR

MC206X

Quick Connection Guide

(Please refer to the *Motion Coordinator* Technical Reference Manual for Full Details)

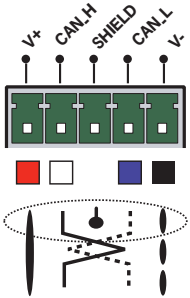
5-WAY CONNECTOR



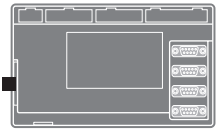
This is a 5 way 3.81mm pitch connector. The connector is used both to provide the 24 Volt power to the MC206X and provide connections for I/O expansion via Trio's P316 and P325 CAN I/O expanders. A 24V dc, Class 2 transformer or power source must be provided as this powers the unit.

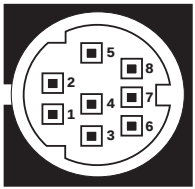
This 24 Volt input is internally isolated from the I/O 24 Volts and the +/-10V voltage outputs.

The 24V (V+) and 0V (V-) MUST be connected as they power the MC206X. The Shield MUST also be connected to ground as it provides the EMC screen for the Motion Coordinator. The CAN connections are optional.



SERIAL CONNECTIONS



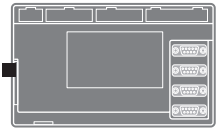


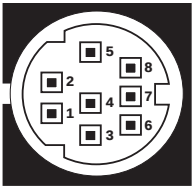
Serial Connector A

Pin	Function	Note
1	Internal V 5	
2	Internal V 0	Serial ort P 0 #
3	RS232 ran Tmit	
4	RS232 V 0	
5	RS232 ece Rve	
6	+5V utpat	
7	Externally buffered output (TTL)	For f bre-optic adaptor.
8	Externally buffered input (TTL)	

Note: Port 0 is the default programming port for connection to the PC running Motion Perfect.

SERIAL CONNECTIONS

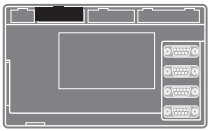


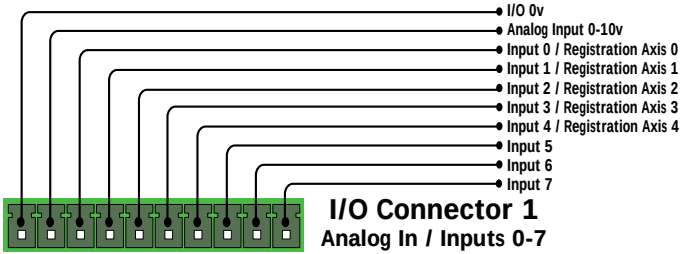


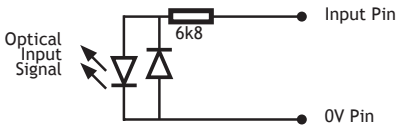
Serial Connector B

Pin	Function	Note
1	RS485 Data In A Rx+	Serial Port #2
2	RS485 Data In B Rx-	
3	RS232 ransmit T	Serial Port #1
4	RS232 0V / RS485 0V	
5	RS232 eceive R	
6	Internal v 5	Serial Port #2
7	RS485 Data Out Z Tx-	
8	RS485 Data Out Y Tx+	

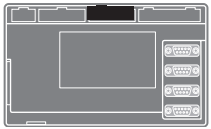
I/O CONNECTOR 1

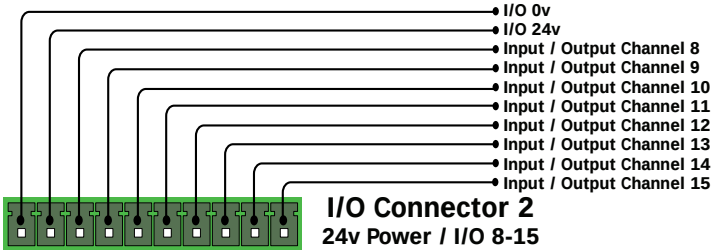


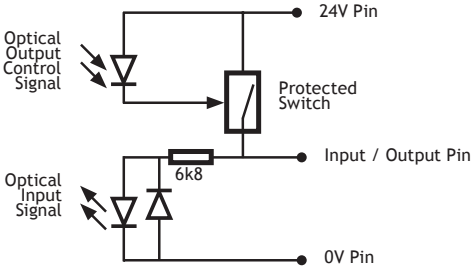




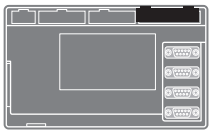
I/O CONNECTOR 2

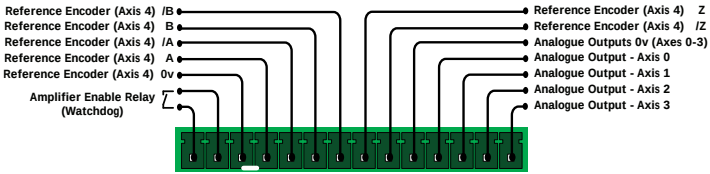




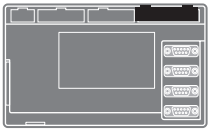


I/O CONNECTOR 3



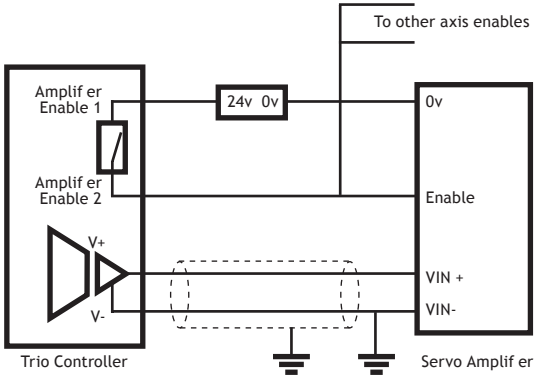


AMPLIFIER ENABLE (WATCHDOG) RELAY OUTPUT



An internal relay is used to enable external amplif ers when the controller has powered up correctly and the system and application software are ready. The amplif er enable is a single pole solid state relay with a normally open “contact”. The enable relay contact will be open circuit if there is no power on the controller OR a following error exists on a servo axis OR the user program sets it open with the WDOG=OFF command.

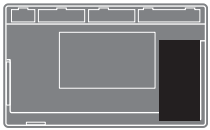
ALL STEPPER AND SERVO AMPLIFIERS MUST BE INHIBITED WHEN THE AMPLIFIER ENABLE OUTPUT IS OPEN CIRCUIT

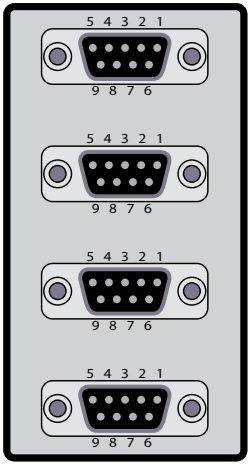


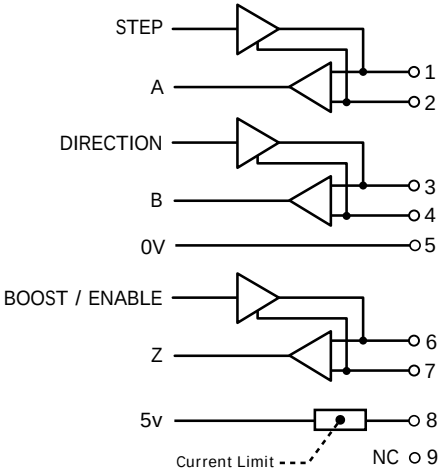
ANALOGUE INPUT AIN0: 0 TO 10V

ANALOGUE OUTPUTS AOUT 0 TO AOUT 4
Output: +/-10V at 5mA
Output impedance: 100 Ohms.
Common 0V return. Isolated from I/O & Encoders.

STEPPER OUTPUTS / ENCODER INPUTS







Pin	Servo Axis	Stepper Axis
1	Enc. A	Step +
2	Enc. /A	Step -
3	Enc. B	Direction +
4	Enc. /B	Direction -
5	0V	0V
6	Enc. Z	Boost +
7	Enc. /Z	Boost -
8	5V*	5V*
9	Not Connected	Not Connected

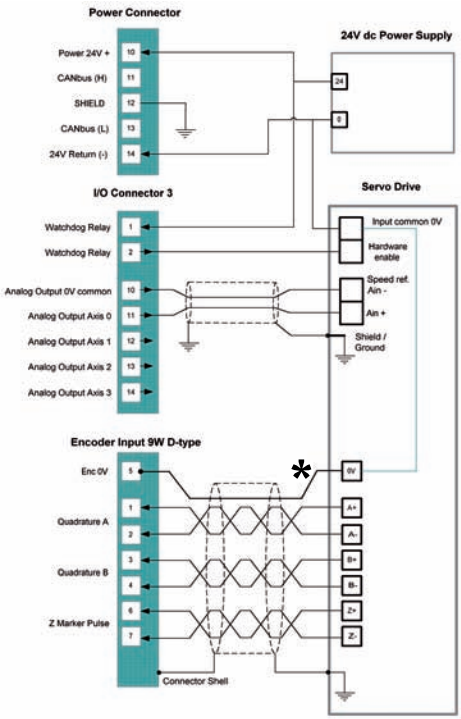
* Current limit is 150mA total, shared between all outputs (including daughter board if f tted).

GROUNDING AND SHIELDING

Ensure that:

1. The shield pin is grounded as close to the MC206X as possible.
2. 0V, V- and E- connections are NOT used for terminating screens.
3. Pin 5 of Encoder/Stepper plug is connected to 0V on drive.
4. Encoder cable screen is clamped to 9 way D shell.
5. MC206X 24V supply has common 0V with the drive(s)

When wiring MC206X Stepper outputs to a differential input stepper drive, use the 0V and shield connections shown for the encoder. The stepper drive must have its common 0V connected to the MC206X 24V return. (24V -)

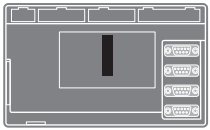


* Encoder input 0V MUST be connected to pin 5

USE OF DAUGHTER BOARD

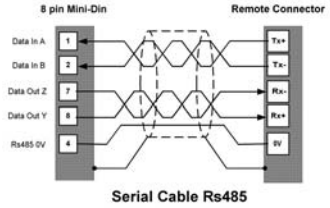
Follow the wiring instructions for the daughter board that is installed. In addition, because the daughter board front panel is f tted within the MC206X plastic case, a separate shield ground wire should be connected to all screened cables. This includes all cables terminated with a D-type multi-pin connector.

LED ERROR CODES

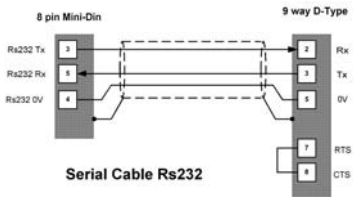


OK	STATUS	
		No power or critical fault
		Normal operation
		Enable relay open
		Enable relay energised
OK ST	ATUS	Error in motion system (f ashing)

Good quality screened cables should be used for the serial ports and for the USB link. The serial ports, USB port and CANbus port are not galvanically isolated, therefore the 0V return MUST be connected to all peripheral devices. In addition, bond together the 0V (24V return) terminals of all system components so as to minimise current f owing in the serial cables.



Serial Cable Rs485



Serial Cable Rs232

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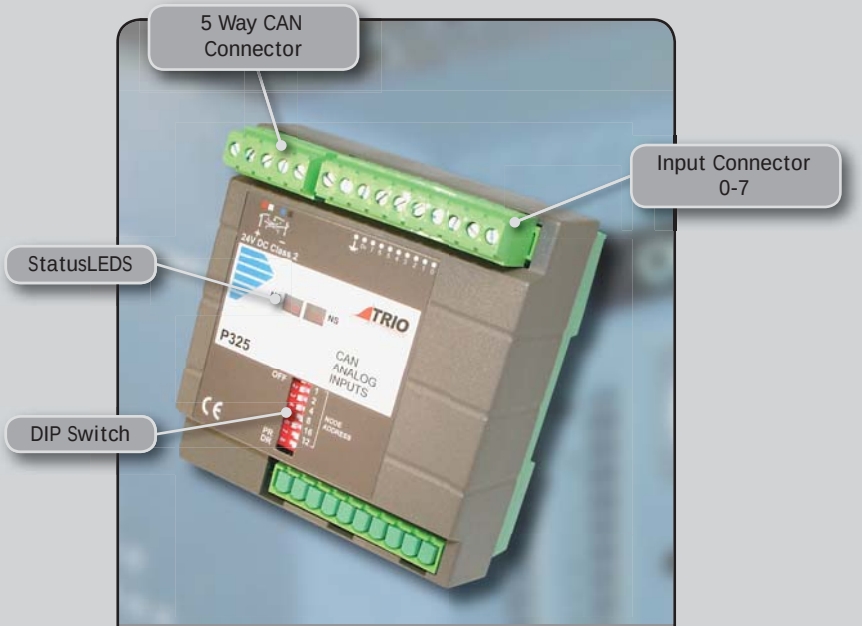
TRIO
MOTION TECHNOLOGY



I/O MODULE

CAN ANALOGUE INPUTS MODULE

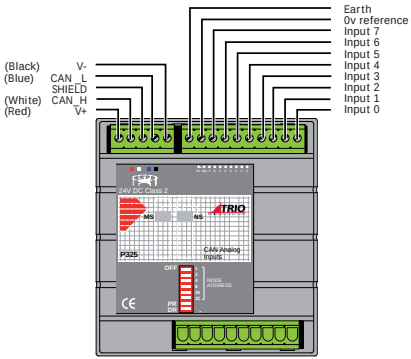
Quick Connection Guide

(Please refer to the *Motion Coordinator* Technical Reference Manual for Full Details)

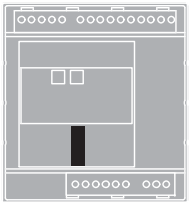
DESCRIPTION

The CAN Analogue Inputs Module allows the *Motion Coordinator* to be expanded with banks of 8 analogue input channels.

NOTE: Network cable must be screened twisted pair such as BELDEN 3084A



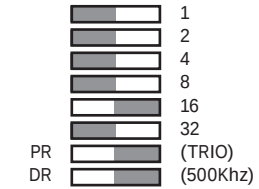
DIP SWITCH SETTINGS



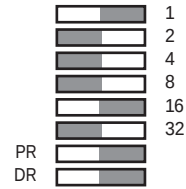
The switch marked DR sets 125kHz or 500kHz. Only 500Khz is valid with the TRIO protocol. The switch marked "PR" selects Analogue Feedback Mode (PR=off). Up to 4 P325 modules can be connected.

The addresses for P325 modules MUST be set 16,17,18... in sequence. Therefore the first P325 Module should have the switch setting:

ADDRESS = 16 Ain Channels 0...7

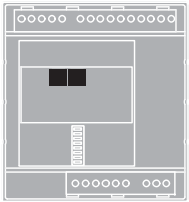


ADDRESS = 17 Ain Channels 8...15



Note: P325 modules and P316 (16-I/O) modules may be mixed on the network. The P316 addresses will be 0 to 15 in sequence and the P325 modules will be 16 to 19 in sequence.

LED INDICATORS



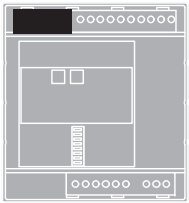
MS NS

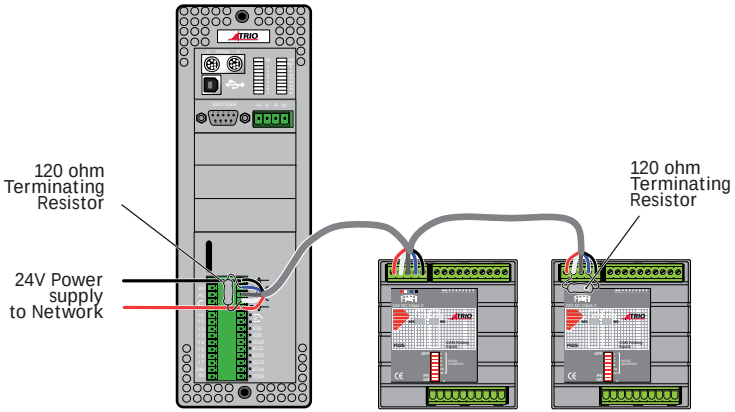
MS Represents “Module Status” - GREEN ON when module powered on OK
NS Represents “Network Status” - GREEN ON is initialised.

Analogue Input Channel Numbers:

Address:	Start:	End:
16	0	7
17	8	15
18	16	23
19	24	31

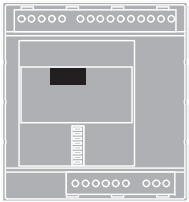
WIRING





The P325 can be connected to any *Motion Controller* with a built in CANbus port.

LED ERROR CODES



MS — NO power or Address switches out of range

MS — Normal operation

MS — Recoverable fault (flashing)

MS — Unrecoverable fault

NS — Device not on-line

NS — On-line but not initalised (flashing)

NS — On-line and initalised by *Motion Coordinator*

NS — CANbus connection time-out (flashing)

NS — Critical link failure, cycle power to reset

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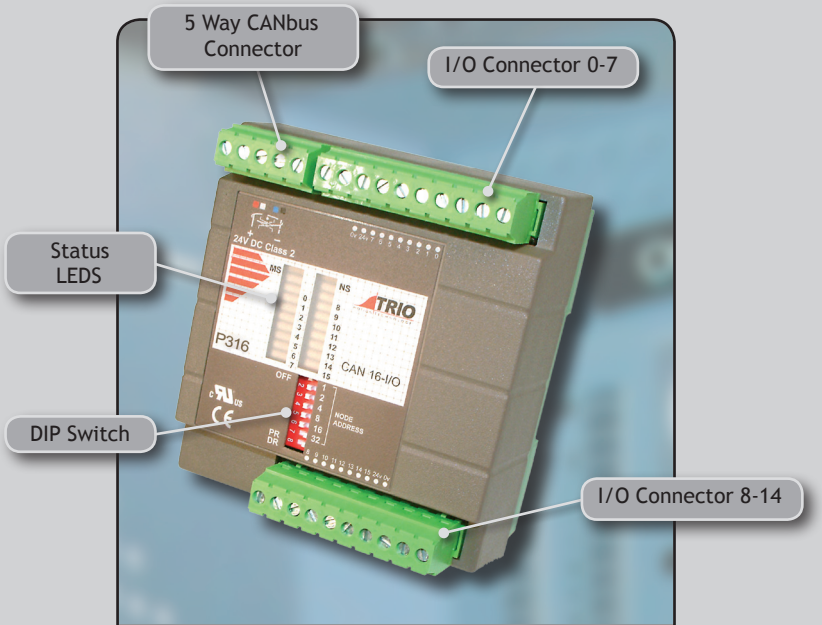
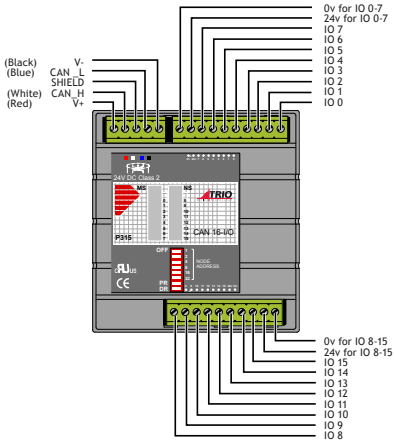


I/O MODULE
CAN 16 I/O
Quick Connection Guide

(Please refer to the ***Motion Coordinator*** Technical Reference Manual for Full Details)

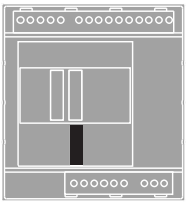
DESCRIPTION

The CAN 16-I/O Module allows the 24volt digital inputs and outputs of the Motion Coordinator to be extended in blocks of 16 bi-directional channels.



NOTE: Network cable must be screened twisted pair such as BELDEN 3084A

DIP SWITCH SETTINGS

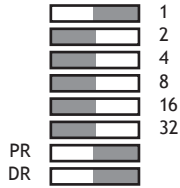


The top 6 DIP switches on the CAN 16-I/O set the module address. Only addresses 0..15 are valid CAN 16-I/O addresses. The switch marked PR is set ON to select TRIO protocol. The switch marked DR sets 125kHz or 500kHz. Only 500Khz is valid with the TRIO protocol.

The addresses for I/O modules MUST be set 0,1,2... in sequence. Therefore the first CAN 16-I/O Module should have the switch setting:

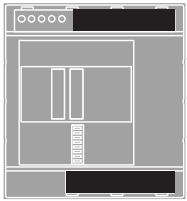
ADDRESS = 0 I/O Channels 16...31

ADDRESS = 1 I/O Channels 32...47

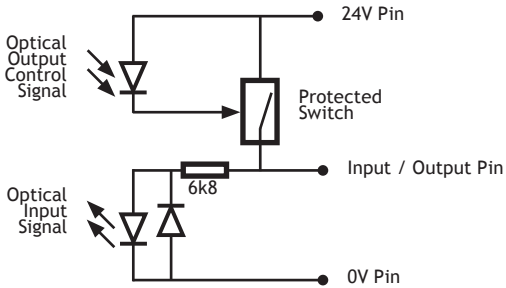


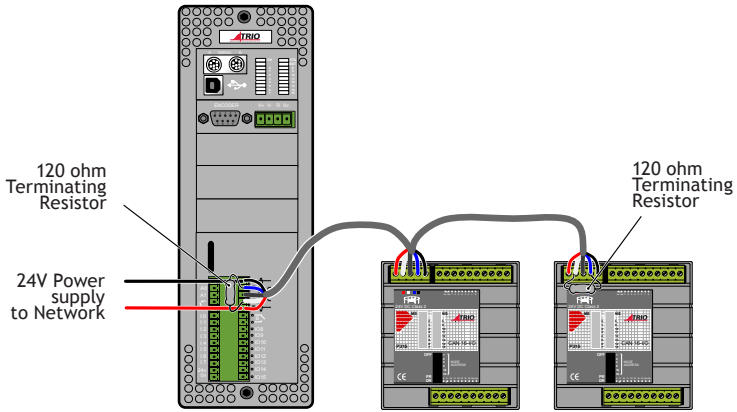
Note that the I/O Channels referred to above are the I/O channels including the 0..15 channels built in to the controller.

24V INPUT/ OUTPUT CHANNELS



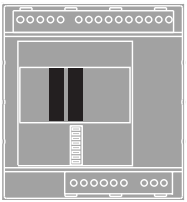
Input/output channels are all identical bi-directional channels. The inputs have a protected 24v sourcing output connected to the same pin. The maximum current capacity is 250mA/Channel (Maximum 1 Amp total/bank of 8)



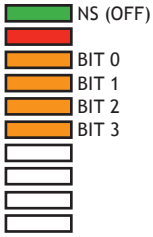


The P316 can be connected to any *Motion Coordinator* with a built-in CANbus port.

ERROR CODES



WHOLE BANK FLASHING



ERROR CODE DISPLAYED ON 8...11

Error Codes (Binary):

Invalid Protocol	1
Invalid Module Address	2
Invalid Data Rate	3
Uninitialised	4
Duplicate Address	5
Start Pending	6
System Shutdown	7
Unknown Poll	8
Poll Not Implemented	9
CAN Error	10
Receive Data Timeout	11

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