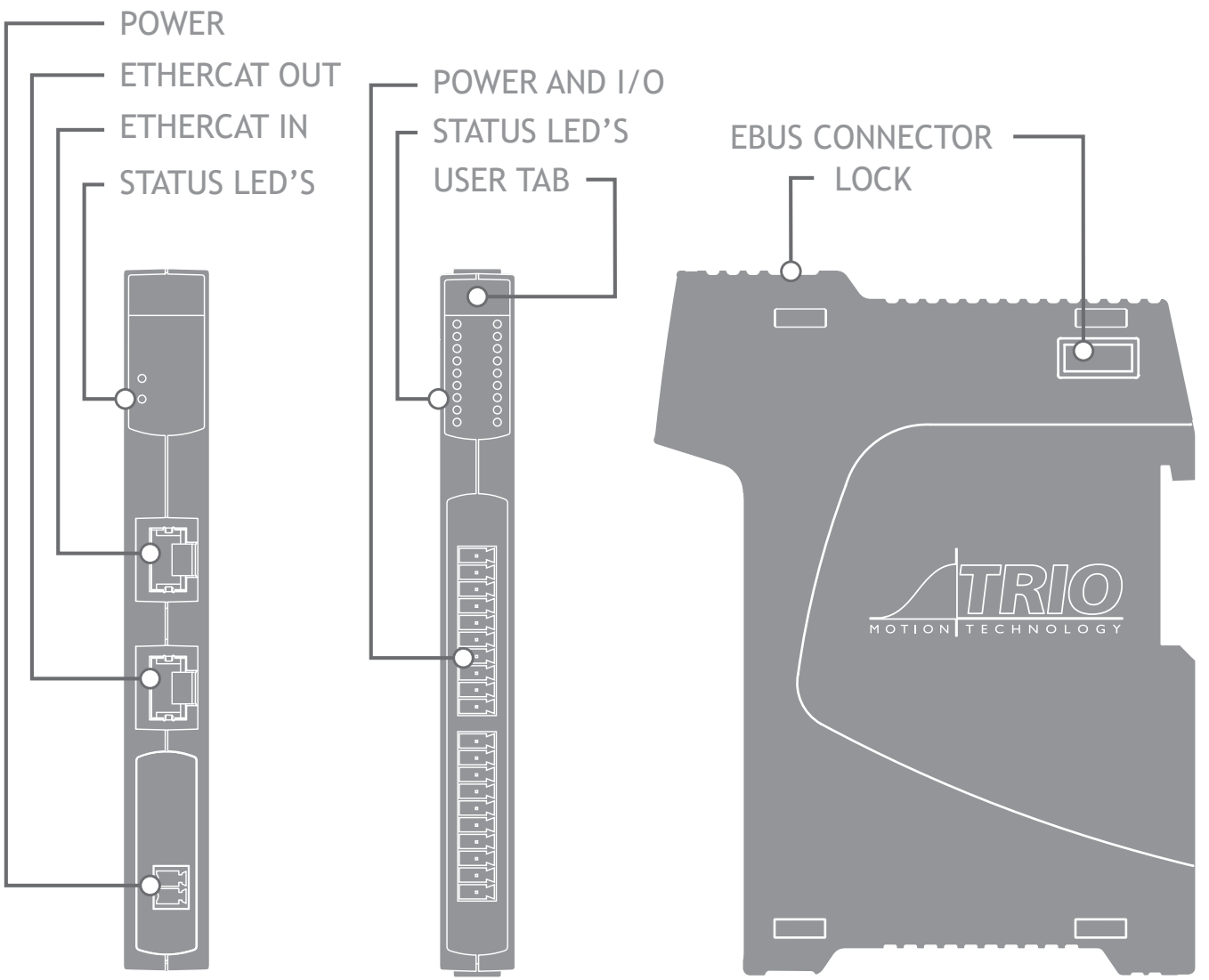
TRIO
MOTION TECHNOLOGY
A MEMBER OF THE ESTUN GROUP



QUICK START GUIDE
FLEXSLICE MODULES

P362 | P366 | P367 | P371 | P372 | P374 | P375 | P376 |P377 | P378 | P379

SAFETY WARNING

During the installation or use of control systems, users of Trio products must ensure that there is no possibility of injury to any person or damage to machinery.

Control systems, especially during installation, can malfunction or behave unexpectedly. Bearing this in mind, users must ensure that even in the event of a malfunction or unexpected behaviour, the safety of an operator or programmer is never compromised.

DESCRIPTION

The Flexslice system makes available a selection of digital and analogue I/O terminals as well as motion modules with pulse + direction outputs designed for precise positioning of stepper and servo motors via suitable drive technology. The digital I/O modules have high-speed functionality and can sample each EtherCAT cycle, or use distributed clocks for greater accuracy. In addition, analogue modules and axis modules may be fitted to make a superbly tailored system that can be placed remotely from the master if needed.

All Flexslice modules support automatic addressing with the master able to automatically detect and configure the modules on startup. The coupler supports up to 16 input/output modules which have a positive mechanical lock and bus connector, making a reliable “back-bone” style connection (EBUS). The complete assembly can be DIN rail mounted.

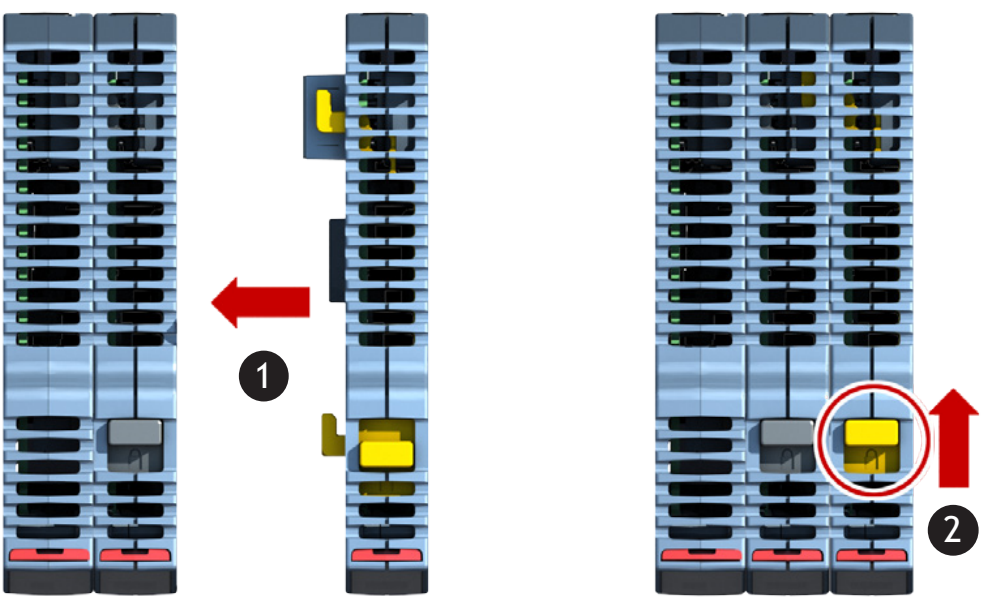
ASSEMBLING THE SYSTEM

One station consists of a P366 coupler and up to 16 Flexslice EtherCAT modules.

1. Align a Flexslice Module against the right hand side of the P366 Coupler Module.

2. Slide back the “click-to-lock” mechanism into position.

Removal of Flexslices is the opposite of this procedure.

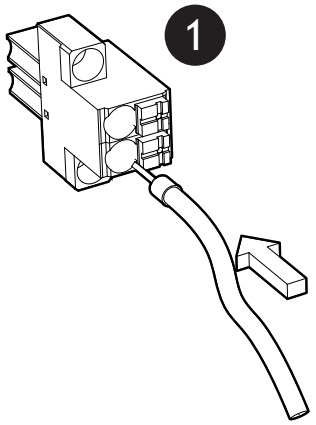


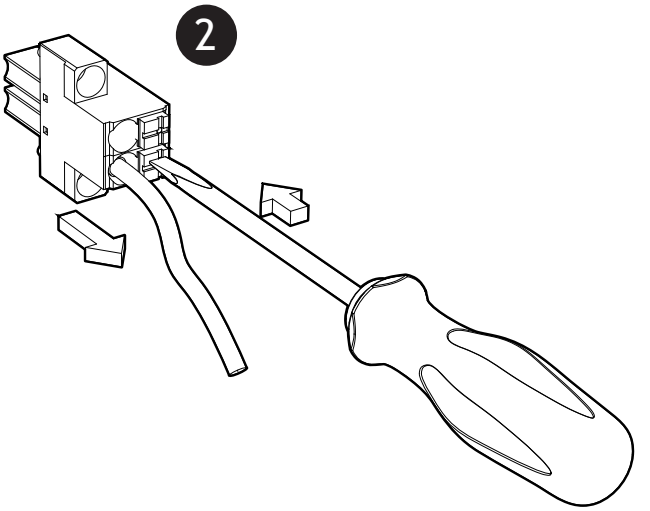
CONNECTORS

Power (24V) connector:

Note: Use ferrules on all wires for best connection.

1. Connection: Push wire into hole of connector. No tools are necessary.
2. Removal: Push screwdriver against coloured button to release wire and pull wire out.

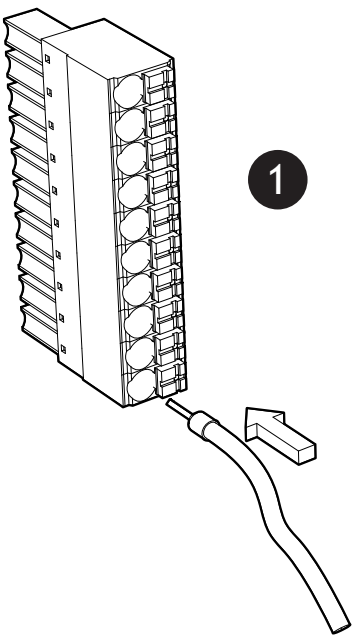


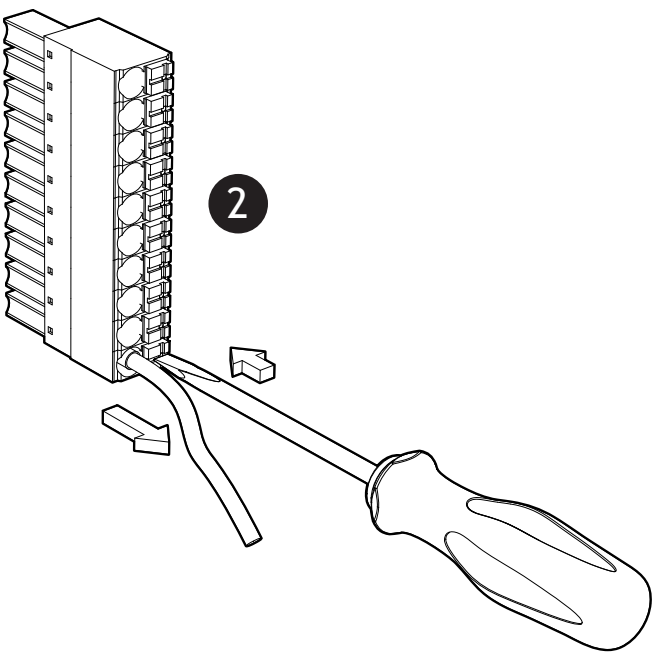


Data Connection (all modules):

Note: Use ferrules on all wires for best connection.

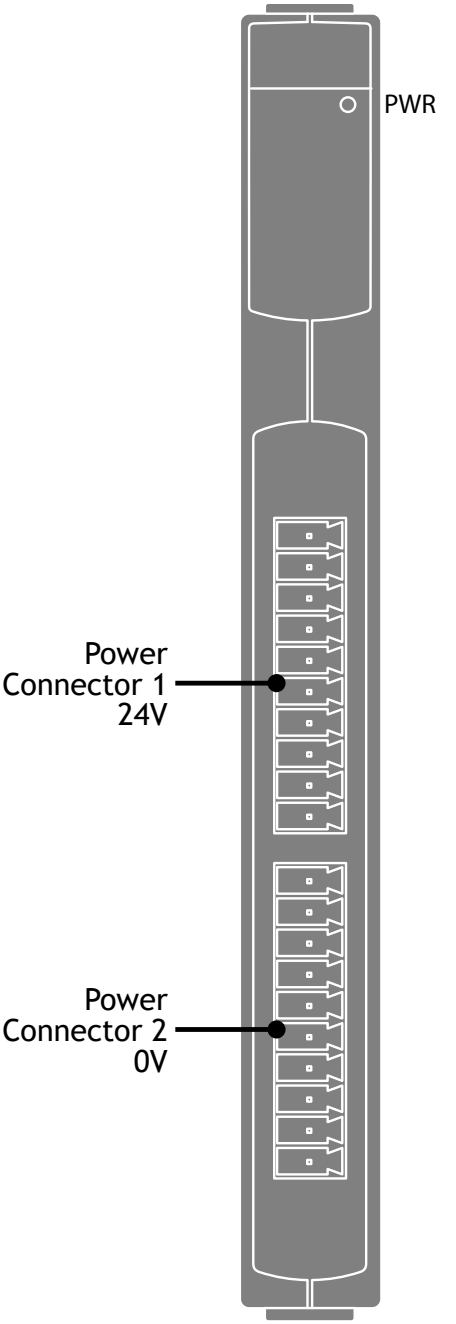
1. Connection: Push wire into hole of connector. No tools are necessary.
2. Removal: Push screwdriver against coloured button to release wire and pull wire out.





POWER CONNECT MODULE (P362)

The P362 Flexslice Power Connect provides a solution for simple and convenient wiring of 3 wire sensor power and return wires. The pins of the 2 x single-row push-in connectors (Power Connector 1 and Power Connector 2) are joined together to form 2 isolated banks of commoned connections. With 0V connected to the lower connector and 24V to the upper connector, the LED gives an indication that power is on.



CONNECTIONS

Module current consumption (EBUS 5V)	0mA
Power supply requirement	24V (+/-20%) dc
Max connector current	4A

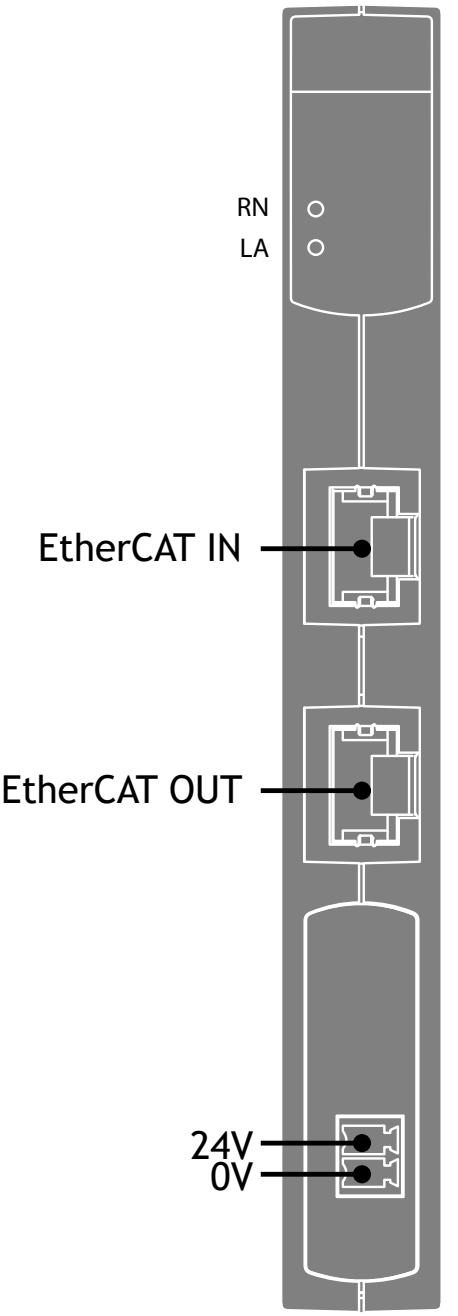
LED'S

PWR Green "Power" LED

COUPLER MODULE (P366)

The P366 Flexslice EtherCAT Coupler connects EtherCAT with the EtherCAT I/O slices. The coupler converts the passing telegrams from Ethernet 100BASE-T to EBUS signal format, and provides power to attached modules.

The coupler is connected to the network via the upper Ethernet interface. The lower RJ45 socket may be used to connect further EtherCAT devices in the same strand. The P366 coupler and system can be installed at any position in the EtherCAT network, making it suitable for operation close to the master or at a remote position.



CONNECTIONS

Power Supply	24V dc (±20%) Class 2 transformer or power supply, 0.8A min
EtherCAT In	RJ45
EtherCAT Out	RJ45
Recommended screened cable for EtherCAT; Cat5 SF/UTP	

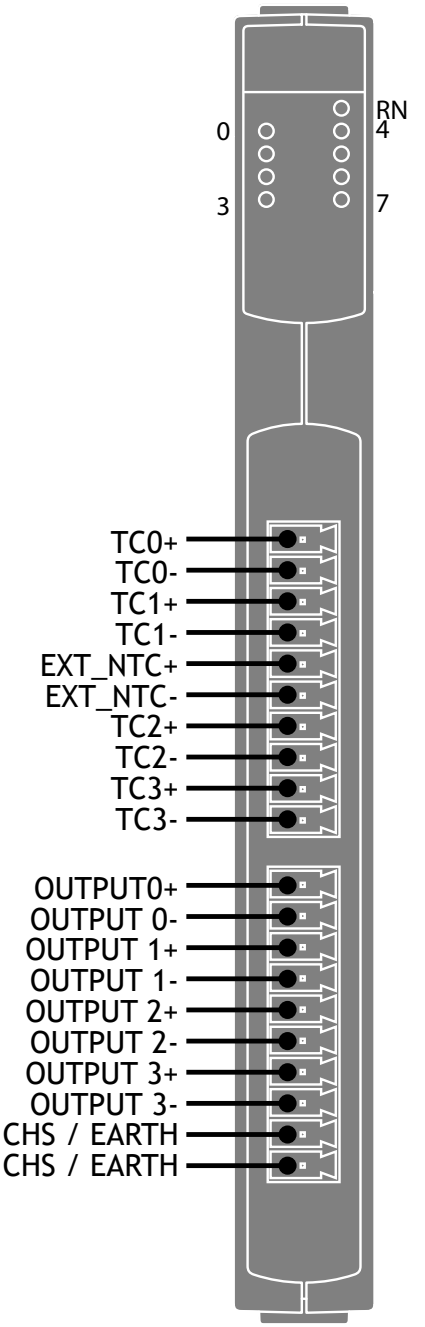
LED'S

RN Green "RUN" LED

LA Green EBUS Link/Act LED

THERMOCOUPLE (P367)

The P367 Flexslice Thermocouple module has 4 thermocouple inputs, each digitised to a resolution of 16 bit. The 4 thermocouple inputs are brought out to a single row push-in connector. A second single row push-in connector has 4 relay outputs for control of a heater or other switched load.



CONNECTIONS

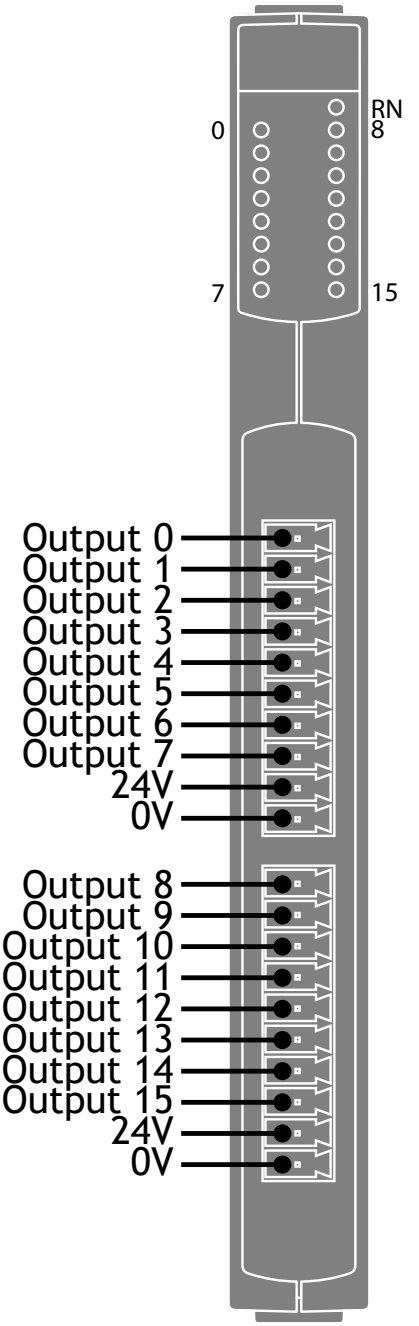
Power Supply	via the EBUS
Module current consumption (EBUS 5V)	160mA max
Number of Inputs	4
Thermocouple types	J, K, T, E
Resolution	16 bit
Number of Outputs	4
Output type	Normally open (NO) solid state relay
Load type	Resistive, inductive and capacitive
Max. Output Voltage	24V
Max Output Current	100mA

LED'S

RN	Green "RUN" LED
0 - 3	Yellow LEDs status
4 - 7	Yellow LEDs warning

16-OUT PNP MODULE (P371)

The P371 digital output slice connects the binary control signals from the *Motion Coordinator* to the machine's input devices at 24V dc. All 16 outputs are current sourcing (PNP) type and have electrical isolation. Outputs and power connection are via 2 x single-row push-in connectors. The Flexslice module indicates the output signal states via LEDs.



CONNECTIONS

Power Supply	24V dc (±20%) Class 2 transformer or power supply
Output bank 1	8 x 24V dc Outputs, 0.5A max per channel
Output bank 2	8 x 24V dc Outputs, 0.5A max per channel
Max current	4 Amps per bank
Isolation Outputs to EBUS	1,000V dc
Isolation between banks	1,000V dc

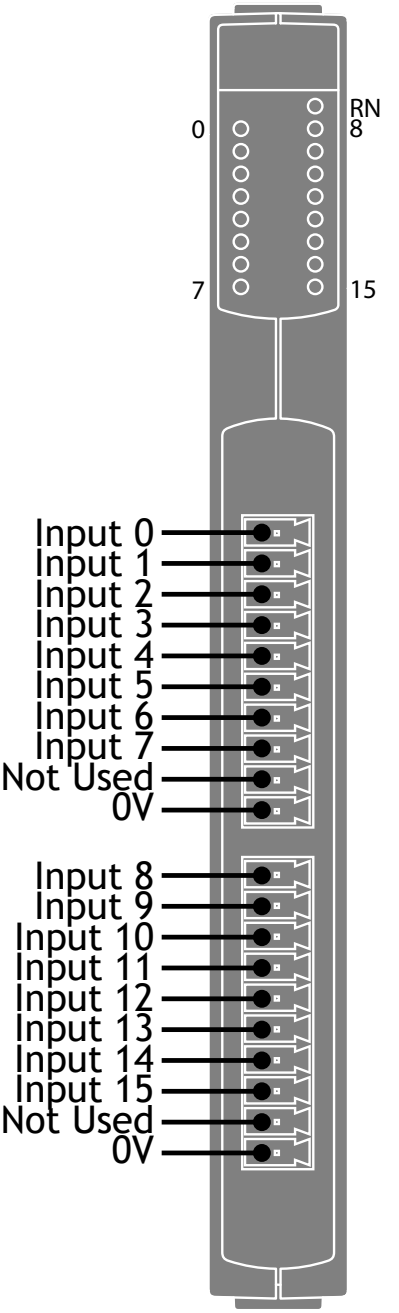
LED'S

RN	Green "RUN" LED
0 - 15	Yellow LEDs Output status

IF BOTH BANKS ARE USED, EACH ISOLATED 24V AND 0V MUST BE WIRED.

16-IN PNP MODULE (P372)

The P372 digital input slice connects 24V dc signals from devices on the machine to the binary control registers in the *Motion Coordinator*. All 16 inputs are current sinking (PNP) type and have electrical isolation. Inputs and power connection are via 2 x single-row push-in connectors. The Flexslice module indicates the input signal states via LEDs.



CONNECTIONS

Power Supply	None
Input bank 1	8 x 24V dc Inputs, 3.5mA typ, 0V common
Input bank 2	8 x 24V dc Inputs, 3.5mA typ, 0V common
Isolation Outputs to EBUS	1,000V dc
Isolation between banks	1,000V dc

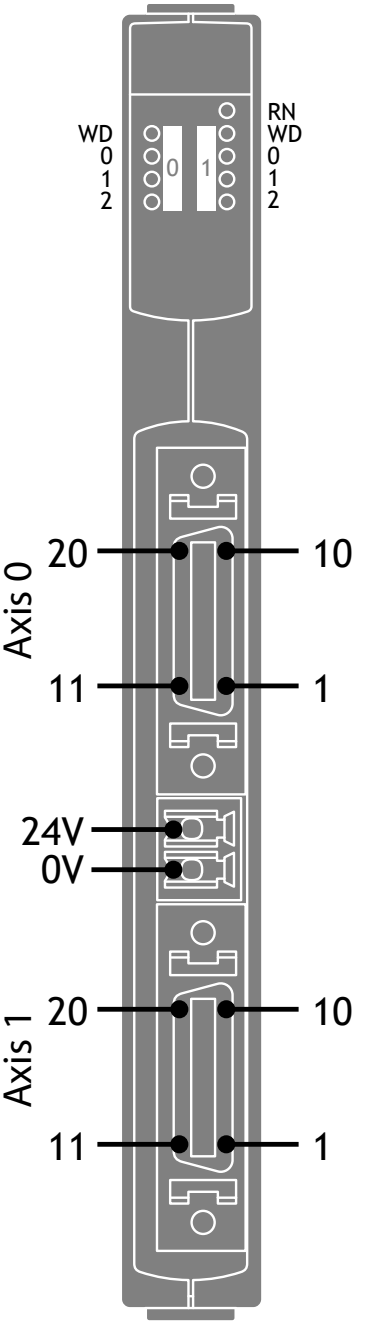
LED'S

RN	Green "RUN" LED
0 - 15	Yellow LEDs Input status

IF BOTH BANKS ARE USED, EACH ISOLATED 0V MUST BE WIRED.

ANALOGUE 2 SERVO AXES (P374)

The P374 Flexslice Analogue 2 Servo Axis Module allows up to 2 servo motors, stepper motors or encoders to be connected to a control system. It supports incremental encoder inputs. If configured for stepper / pulse output an axis can be pulse+direction or quadrature simulated encoder output. Two 20 way MDR connectors (Axis 0 and 1) provide a reliable shielded connection for high speed signals. Each MDR connector supports all the signals for full closed loop control of a servo axis.



CONNECTIONS

Module current consumption (EBUS 5V)	180mA max
Max Axes	2 (software configurable)
Max Enc Rate	8M Edges/s encoder count
Max Step Rate	8MHz pulse count
Step / Pulse Width	Pulse Control or Square Wave
Enc / Step Input / Output	RS422
DAC Voltage Output	2 x 12bit +/-10V @ 5mA
Registration Inputs	4 x 24V Isolated PNP inputs
WDOG Output	2 x Normally open (NO) solid state relay
WDOG Max. Output Voltage	24V
WDOG Max Output Current	100mA
Field Programmable	Yes
Power Supply	24V (+/-20%) dc Class 2 transformer or power supply @ 100mA

LED'S

RN Green "RUN" LED

WD Red "WDOG LED (Axis 0 & 1)

0 - 2 Yellow Status LEDs (Axis 0 & 1)

(See next page for pin out details)

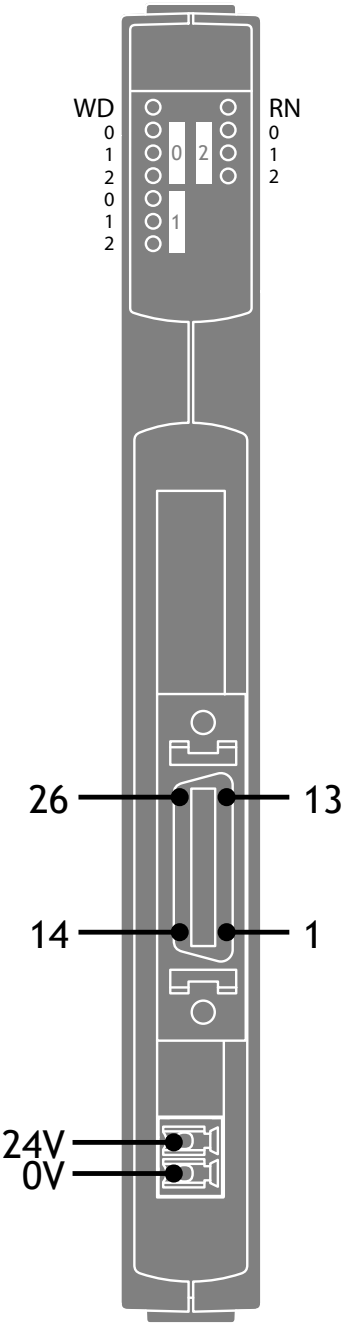
(P374) PIN OUTS FLEXIBLE AXIS CONNECTORS (AXIS 0 AND 1)

Pin	Incremental Encoder Function	Pulse & Direction Function
1	Enc A(n)	Pulse(n)
2	Enc /A(n)	/Pulse(n)
3	Enc B(n)	Dir(n)
4	Enc /B(n)	/Dir(n)
5	+5V Enc (100mA max.)	
6	Do not connect	
7	WDOG(n)+	
8	WDOG(n)-	
9	Input A+ (n)	
10	Input A/B Common	
11	Enc Z(n)	Enable(n)
12	Enc /Z(n)	/Enable(n)
13	NC	NC
14	NC	NC
15	0V Enc	
16	Do not connect	
17	VOUT + (n)	
18	VOUT - (n)	
19	Do not connect	
20	Input B+ (n)	
Shell	Screen	

1. n=axis number
2. WDOG(n)+/- = normally open solid state relay, rated 24V@100mA (one per axis)
3. Input A/B Common, 0V_Enc & VOUT- are all isolated so must be connected with the correct signals.
4. +5V Output. 100mA maximum per axis connector.

3 AXIS STEP / ENCODER (P375)

The P375 Flexslice 3 Axis Step /Encoder Module controls up to 3 Stepper motors with Pulse/ Direction/Enable or 3 encoders with A, B and Z inputs for each axis. There is also one global watchdog output independent from the axis configuration.



CONNECTIONS

Power Supply	24V dc (±20%) Class 2 transformer or power supply
Axis connector	26 way MDR with latch

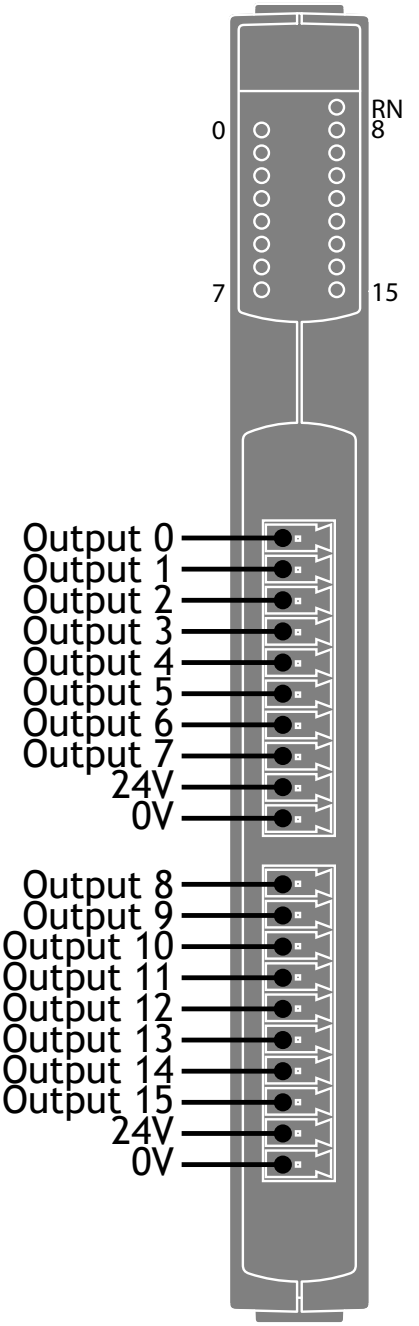
Pin	Function	Pin	Function
26	WDOG+	13	WDOG-
25	0V EXT	12	B/DIR2-
24	5V EXT	11	B/DIR2+
23	Z/ENB2-	10	A/STP2-
22	Z/ENB2+	9	A/STP2+
21	0V EXT	8	B/DIR1-
20	5V EXT	7	B/DIR1+
19	Z/ENB1-	6	A/STP1-
18	Z/ENB1+	5	A/STP1+
17	0V EXT	4	B/DIR0-
16	5V EXT	3	B/DIR0+
15	Z/ENB0-	2	A/STP0-
14	Z/ENB0+	1	A/STP0+

LED'S

RN	Green "RUN" LED
WD	Red "WDOG" LED
9x	Yellow LEDs status

16-OUT NPN (P376)

The P376 digital output slice connects the binary control signals from the *Motion Coordinator* to the machine's input devices, such as relays, contactors, valves, lamps etc. at 24V dc. All 16 outputs are current sinking (NPN) type and have electrical isolation. Outputs and power connection are via 2 x single-row push-in connectors. The Flexslice module indicates the output signal states via LEDs.



CONNECTIONS

Power Supply	24V dc (±20%) Class 2 transformer or power supply
Output bank 1	8 x Outputs, 24V dc 1.0A max per channel
Output bank 2	8 x Outputs, 24V dc 1.0A max per channel
Max current	4 Amps per bank
Isolation Outputs to EBUS	1,000V dc
Isolation between banks	1,000V dc

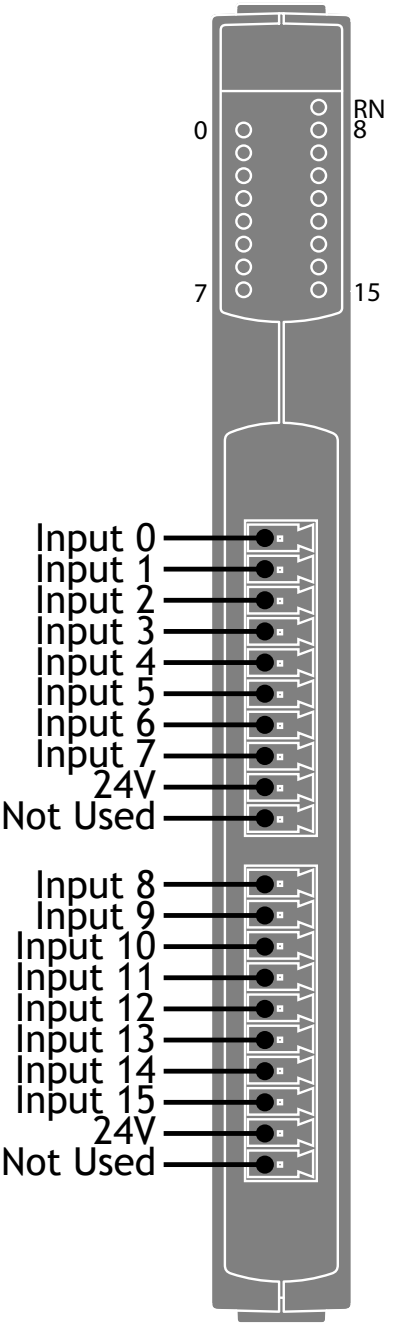
LED'S

RN	Green "RUN" LED
0 - 15	Yellow LEDs Output status

IF BOTH BANKS ARE USED, EACH ISOLATED 24V AND 0V MUST BE WIRED.

16-IN NPN (P377)

The P377 digital input slice connects 24V dc signals from devices on the machine to the binary control registers in the *Motion Coordinator*. All 16 inputs are current sourcing (NPN) type and have electrical isolation. Inputs and power connection are via 2 x single-row push-in connectors. The Flexslice module indicates the input signal states via LEDs.



CONNECTIONS

Power Supply	24V dc (±20%) Class 2 transformer or power supply
Input bank 1	8 x NPN Inputs, 3.5mA typ, 24V dc common
Input bank 2	8 x NPN Inputs, 3.5mA typ, 24V dc common
Isolation Outputs to EBUS	1,000V dc
Isolation between banks	1,000V dc

LED'S

RN	Green "RUN" LED
0 - 15	Yellow LEDs Intput status

IF BOTH BANKS ARE USED, EACH ISOLATED 24V MUST BE WIRED.

8 ANALOGUE OUTPUTS (P378)

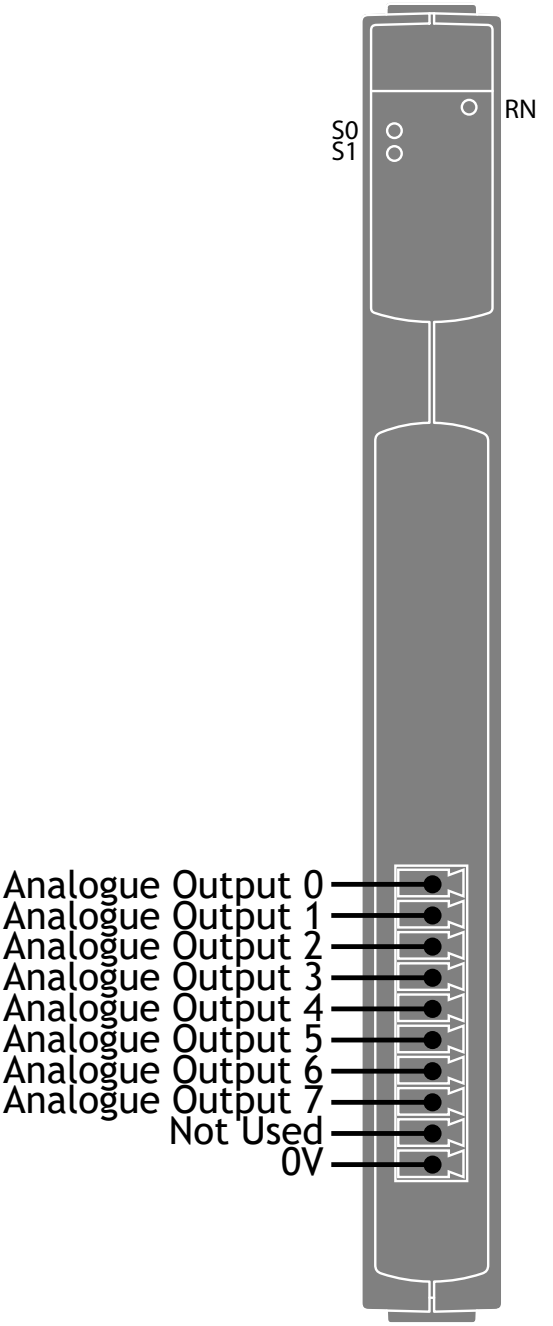
The P378 Flexslice 8 Analogue Output module has eight programmable voltage range output terminals, each output has a resolution of 12 bit. The 8 single ended outputs have a common 0V potential and are brought out to a single row push-in connector.

CONNECTIONS

Power Supply	None
Analogue Outputs	8 x +/-10V, 0 … +10V
Output current	5mA (max)
Output Resistance	16Ω internal
Isolation Outputs to EBUS	1,000V dc

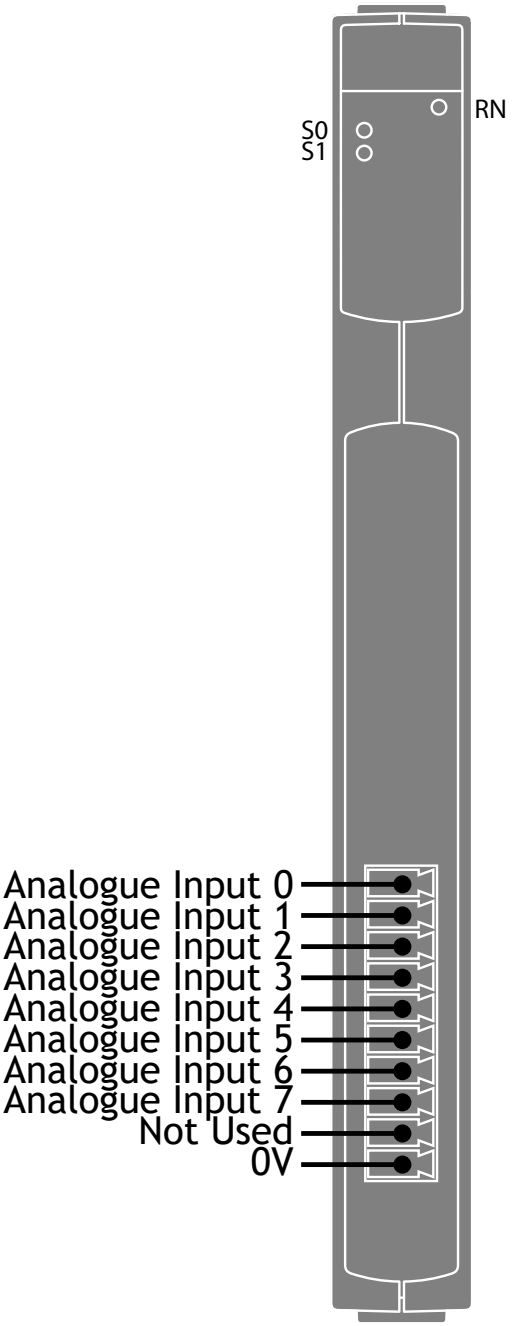
LED'S

RN	Green "RUN" LED
S0 - S1	Yellow LEDs Output status



8 ANALOGUE INPUTS (P379)

The P379 Flexslice 8 Analogue Input module has eight programmable voltage range input terminals, each digitised to a resolution of 12 bit. The 8 single ended inputs have a common 0V potential and are brought out to a single row push-in connector.



CONNECTIONS

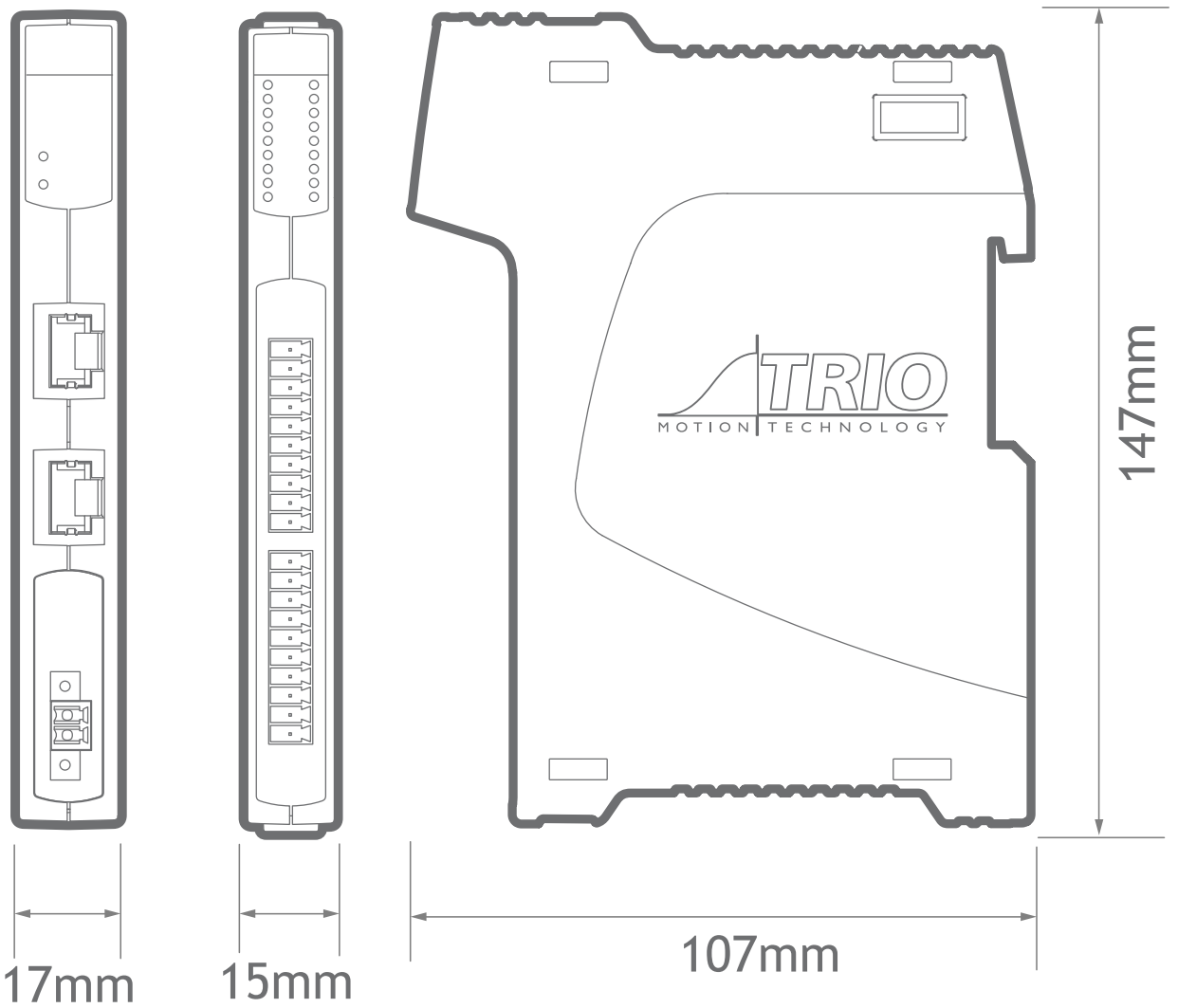
Power Supply	None
Analogue Inputs	8 x +/-10V, 0 … +10V
Overvoltage protection	+/- 25V
Input resistance	>31kΩ internal
Isolation Outputs to EBUS	1,000V dc

LED'S

RN	Green "RUN" LED
S0 - S1	Yellow LEDs Output status

DIMENSIONS

P366 Coupler P362, P367 - P379



CAD data Drawings to aid packaging and mounting are available in various formats from the Trio web site. Products should be wired by qualified persons. Specifications may change without notice. E & OE