

QUICK START GUIDE

FLEXSLICE MODULES

P359 | P362 | P366 | P367 | P368 | P371 | P372 | P374 | P375
P376 | P377 | P378 | P379 | P386 | P387





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 or analogue voltage 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.

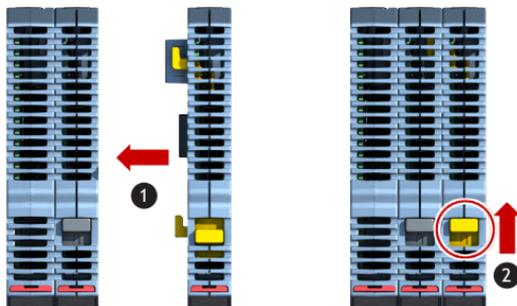


ASSEMBLING THE SYSTEM

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.



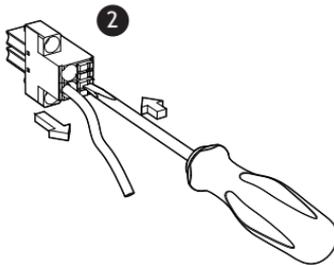
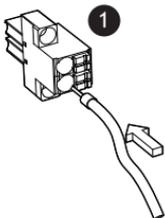
2

CONNECTORS

Power (24V) connector:

Note: Use ferrules on all wires for best connection.

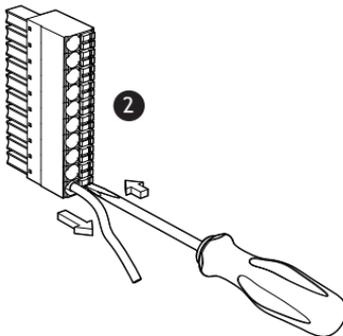
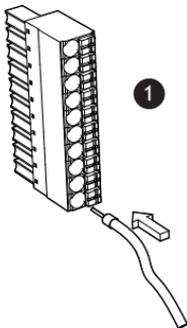
1. Connection: Push wire into hole of connector. No tools are necessary.
2. Removal: Push screwdriver against coloured button to release wire and pull wire out.



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.



3



POWER CONNECT MODULE (P362)

(Sold as Pack of 10 - P462)

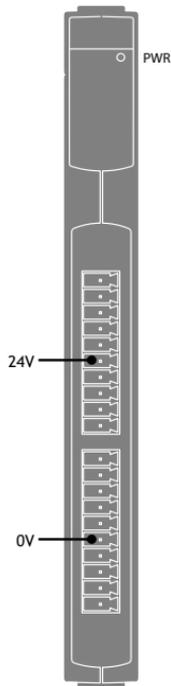
The P362 Flexslice Power Connect provides a solution for simple and convenient wiring of 3 wire sensor power and return wires. The pins of the 2 x single-row push-in connectors are joined together to form 2 isolated banks of commoned connections. With 0V connected to the lower connector and 24V to the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

CONNECTIONS

| | |
|--------------------------------------|---|
| Module current consumption (EBUS 5V) | 0mA |
| Power supply requirement | 24V dc ($\pm 20\%$) Class 2 transformer or power supply |
| Max connector current | 4A |

LED'S

PWR Red "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.

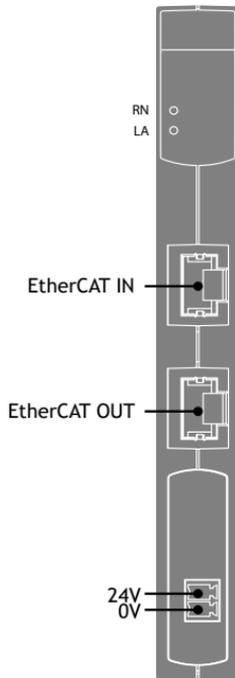
CONNECTIONS

| | |
|--|---|
| Power Supply | 24V dc ($\pm 20\%$) 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)

(Sold as Pack of 10 - P467)

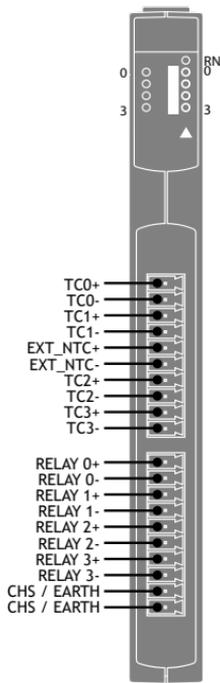
The P367 Flexslice Thermocouple module has 4 thermocouple inputs, each digitised to a resolution of 16 bit. The 4 thermocouple inputs are brought out to a single row push-in connector. A second single row push-in connector has 4 relay outputs for control of a heater or other switched load.

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 Relays | 4 |
| Relay 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 LH Bank Yellow LEDs relay outputs
- 0 - 3 RH Bank Red LEDs relay input status / warning



RTD MODULE (P368)

(Sold as Pack of 10 - P468)

The P368 Flexslice RTD module has 4 resistance temperature detector (RTD) inputs, each digitised to a resolution of 16 bit. The 4 RTD inputs are brought out to single row push-in connectors. 4 relay outputs are provided 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 |
| RTD types | PT100, PT1000 2 or 3 wire |
| 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 |



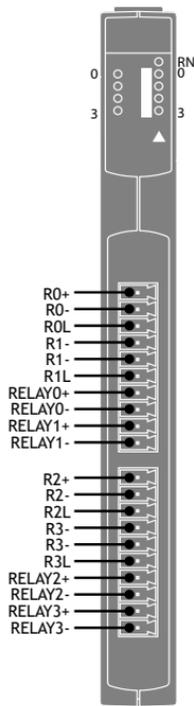
Rx- and RxL must be connected together with a short wire link if a 2 wire RTD is used

LED'S

RN Green "RUN" LED

0 - 3 LH Bank Yellow LEDs relay outputs

0 - 3 RH Bank Red LEDs relay input status / warning





16-OUT PNP MODULE (P371)

(Sold as Pack of 10 - P471)

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

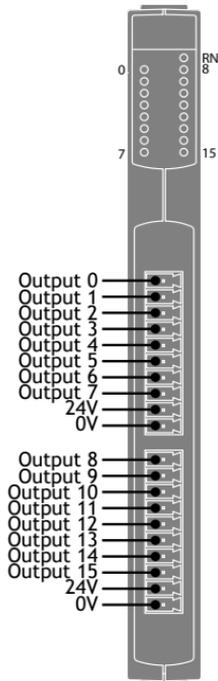
| | |
|---------------------------|---|
| Power Supply | 24V dc ($\pm 20\%$) Class 2 transformer or power supply |
| Output bank 1 | 8 x 24V dc Outputs, 0.5A max per channel |
| Output bank 2 | 8 x 24V dc Outputs, 0.5A max per channel |
| Max current | 4 Amps per bank |
| Isolation Outputs to EBUS | 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)

(Sold as Pack of 10 - P472)

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

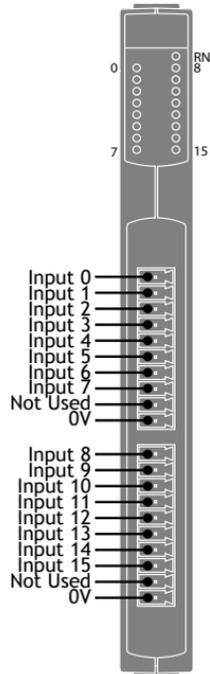
| | |
|---------------------------|---|
| Power Supply | None |
| Input bank 1 | 8 x 24V dc Inputs, 3.5mA typ, 0V common |
| Input bank 2 | 8 x 24V dc Inputs, 3.5mA typ, 0V common |
| Isolation Outputs to EBUS | 1,000V dc |
| Isolation between banks | 1,000V dc |

LED'S

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



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



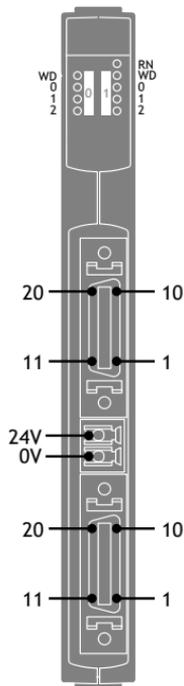
ANALOGUE 2 SERVO AXES (P374)

(Sold as Pack of 10 - P474)

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 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 dc ($\pm 20\%$) Class 2 transformer or power supply @100mA |



LED'S

- RN Green "RUN" LED
- WD Red "WDOG" LED
- 0 - 2 Yellow LEDs Input status for each axis



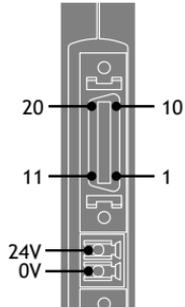
See next page for pin-outs.



PIN OUTS P374

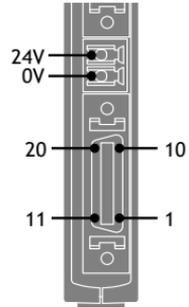
Top Connector- Axis 0

| Pin | Function |
|-----|----------------------------|
| 1 | A/STP0+ |
| 2 | A/STP0- |
| 3 | B/DIR0+ |
| 4 | B/DIR0- |
| 5 | +5V Enc (100mA max.) |
| 6 | Do not connect |
| 7 | WDOG A0 |
| 8 | WDOG B0 |
| 9 | Input A0+ |
| 10 | Input A0/ B0 0V |
| 11 | Z/ENB0+ |
| 12 | Z/ENB0- |
| 13 | Do not connect |
| 14 | Do not connect |
| 15 | 0V Enc |
| 16 | Do not connect |
| 17 | Vout0+ |
| 18 | Vout0- |
| 19 | Do not connect |
| 20 | Input B0+ |



Bottom Connector- Axis 1

| Pin | Function |
|-----|----------------------------|
| 1 | A/STP1+ |
| 2 | A/STP1- |
| 3 | B/DIR1+ |
| 4 | B/DIR1- |
| 5 | +5V Enc (100mA max.) |
| 6 | Do not connect |
| 7 | WDOG A1 |
| 8 | WDOG B1 |
| 9 | Input A1+ |
| 10 | Input A1/ B1 0V |
| 11 | Z/ENB1+ |
| 12 | Z/ENB1- |
| 13 | Do not connect |
| 14 | Do not connect |
| 15 | 0V Enc |
| 16 | Do not connect |
| 17 | Vout1+ |
| 18 | Vout1- |
| 19 | Do not connect |
| 20 | Input B1+ |





3 AXIS STEP / ENCODER (P375)

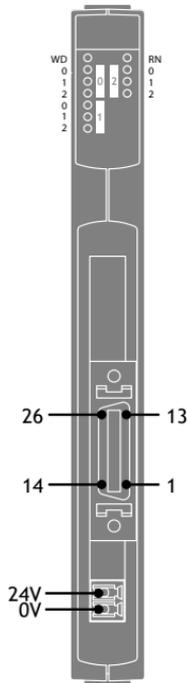
(Sold as Pack of 10 - P475)

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 ($\pm 20\%$) Class 2 transformer or power supply |
| Axis connector | 26 way MDR with latch |

| Pin | Function | Pin | Function |
|-----|----------|-----|----------|
| 26 | WDOG A | 13 | WDOG B |
| 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/DIRO- |
| 16 | 5V EXT | 3 | B/DIRO+ |
| 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)

(Sold as Pack of 10 - P476)

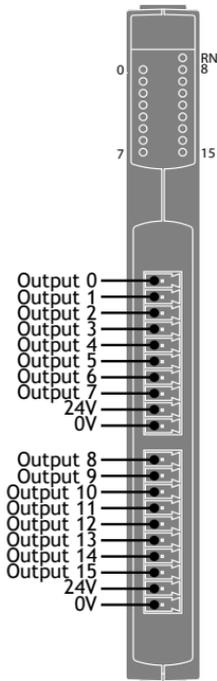
The P376 digital output slice connects the binary control signals from the *Motion Coordinator* to the machine's input devices, such as relays, contactors, valves, lamps etc. at 24V dc. All 16 outputs are current sinking (NPN) type and have electrical isolation. Outputs and power connection are via 2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

CONNECTIONS

| | |
|---------------------------|---|
| Power Supply | 24V dc ($\pm 20\%$) 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)

(Sold as Pack of 10 - P477)

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.

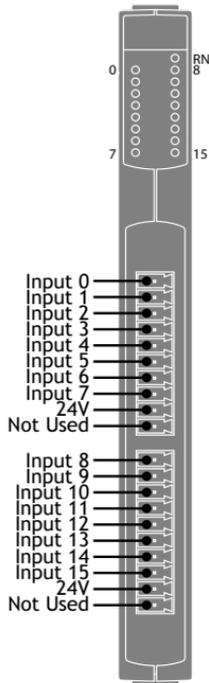
CONNECTIONS

| | |
|---------------------------|---|
| Power Supply | 24V dc ($\pm 20\%$) 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 Input status

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





8 ANALOGUE OUTPUTS (P378)

(Sold as Pack of 10 - P478)

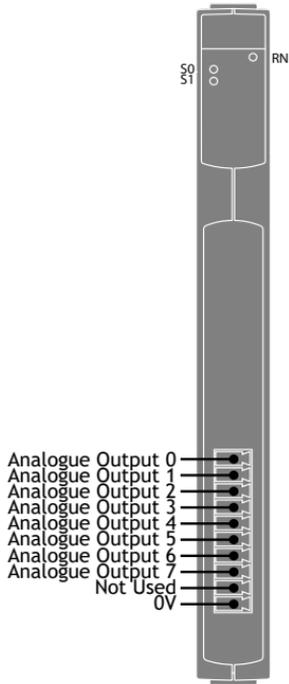
The P378 Flexslice 8 Analogue Output module has eight programmable voltage range output terminals, each output has a resolution of 12 bit. The 8 single ended outputs have a common 0V potential and are brought out to a single row push-in connector.

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)

(Sold as Pack of 10 - P479)

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.

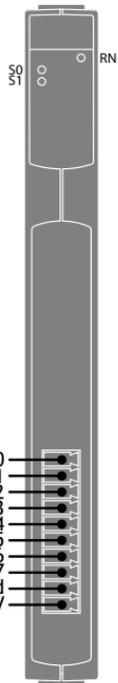
CONNECTIONS

| | |
|---------------------------|------------------------|
| Power Supply | None |
| Analogue Inputs | 8 x +/-10V, 0 ... +10V |
| Overtoltage protection | +/- 25V |
| Input resistance | >31k Ω internal |
| Isolation Outputs to EBUS | 1,000V dc |

LED'S

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

Analogue Input 0
Analogue Input 1
Analogue Input 2
Analogue Input 3
Analogue Input 4
Analogue Input 5
Analogue Input 6
Analogue Input 7
Not Used
0V





8 ANALOGUE INPUTS CURRENT (P359)

(Sold as Pack of 10 - P459)

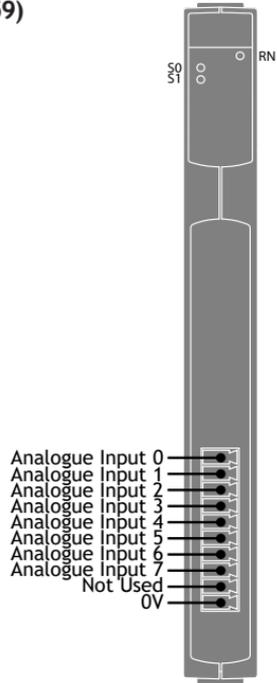
The P359 Flexslice 8 Analogue Current Input module has eight input terminals, each digitised to a resolution of 12 bits. The 8 single ended inputs have a common 0V potential and are brought out to a single row push-in connector

CONNECTIONS

| | |
|---------------------------|-----------|
| Power Supply | None |
| Analogue Inputs | 4-20mA |
| Overtoltage protection | +/- 25V |
| Internal resistance | 249Ω |
| Isolation Outputs to EBUS | 1,000V dc |

LED'S

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



32-OUT NPN (P386)

(Sold as Pack of 10 - P483)

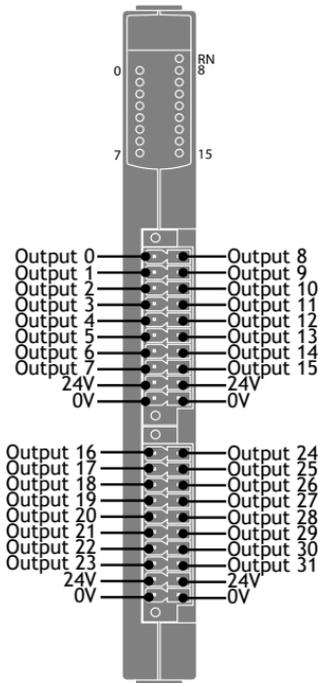
The P386 digital output slice connects the binary control signals from the *Motion Coordinator* to the machine's input devices, such as relays, contactors, valves, lamps etc. at 24V dc. All 32 outputs are current sinking (NPN) type and have electrical isolation. Outputs and power connection are via 2 x double-row push-in connectors. The Flexslice module indicates the output signal states via LEDs.

CONNECTIONS

| | |
|---------------------------|---|
| Power Supply | 24V dc ($\pm 20\%$) Class 2 transformer or power supply |
| Output bank 1 | 16 x Outputs, 24V dc 1.0A max per channel |
| Output bank 2 | 16 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.

32-IN NPN (P387)

(Sold as Pack of 10 - P484)

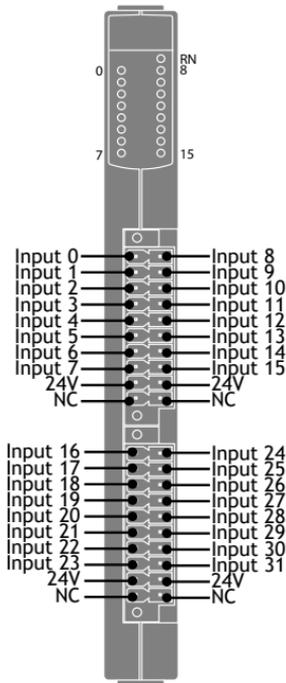
The P387 digital input slice connects 24V dc signals from devices on the machine to the binary control registers in the *Motion Coordinator*. All 32 inputs are current sourcing (NPN) type and have electrical isolation. Inputs and power connection are via 2 x double-row push-in connectors. The Flexslice module indicates the input signal states via LEDs.

CONNECTIONS

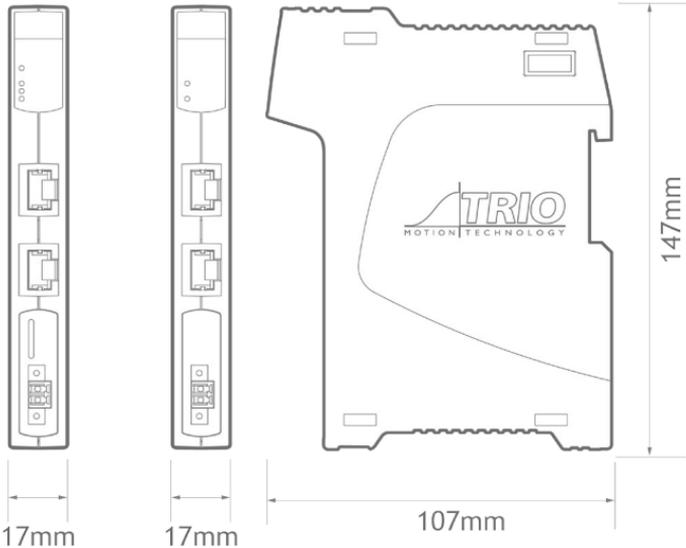
| | |
|---------------------------|---|
| Power Supply | 24V dc ($\pm 20\%$) Class 2 transformer or power supply |
| Input bank 1 | 16 x NPN Inputs, 3.5mA typ, 24V dc common |
| Input bank 2 | 16 x NPN Inputs, 3.5mA typ, 24V dc common |
| Isolation Outputs to EBUS | 1,000V dc |
| Isolation between banks | 1,000V dc |

LED'S

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



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



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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

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