## TOS ON/OFF & PROPORTIONAL CONTROLLER

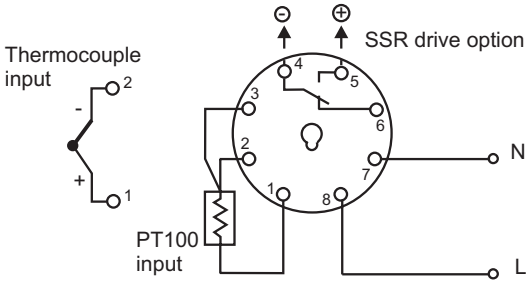
The TOS range of temperature controllers offer an extremely cost effective analogue solution for simple on/off or proportional control. Options for J/K thermocouples and PT100 RTDs are available with either relay or SSR drive outputs.

- Selectable on/off or proportional action
- Up to 1200°C scale ranges
- J, K T/couple or PT100 input options
- Relay or SSR drive output options

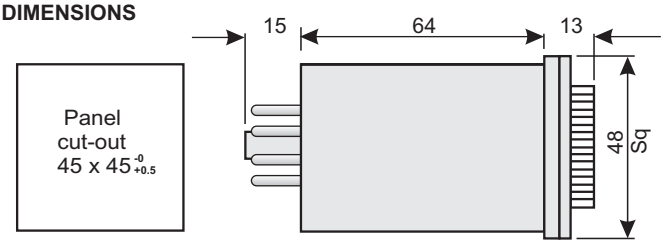
### SPECIFICATION

| | |
|---|---|
| Supply voltage: | 90 to 264Vac/dc @ 50/60 Hz |
| Power drain: | 3VA max. |
| Scale accuracy: | +/- 2% of FSD |
| Scale range: | See standard items below |
| Input sensor: | J or K thermocouple or PT100 - 3 wire |
| Max ext. resist: | T/couple: 100 , PT100: 5 per wire |
| Control band: | On/Off: Hysteresis = 0.5 +/- 0.2% of scale range |
| | Propl: Proportional band = 3% of scale range |
| Output rating: | Relay: 3A/240Vac resistive |
| | SSR: 20mA/12Vdc |
| Electrical life: | 100,000 ops at rated load |
| Ambient range: | -10 to 50°C non-condensing |
| Weight: | 180gms |

### CONNECTION DIAGRAM




### DIMENSIONS




### STANDARD ITEMS

| Input | Output | Range | Part Number |
|---|---|---|---|
| J T/c | Relay | 0 to 100°C | TOS-B4RJ1C |
| | | 0 to 200°C | TOS-B4RJ2C |
| K T/c | Relay | 0 to 200°C | TOS-B4RK2C |
| | | 0 to 400°C | TOS-B4RK4C |
| | | 0 to 800°C | TOS-B4RK8C |
| PT100 | Relay | 0 to 100°C | TOS-B4RP1C |

For suitable panel mounting or DIN-rail wiring sockets see page 33. For thermocouples and PT100 probes see page 26.

## TC4800 ON/OFF & PD TEMPERATURE CONTROLLER

The TC4800 range of temperature controllers is available in on/off or proportional + derivative (PD) control options, operating from a range of sensors. A 4 - 20mA input type also enables them to be used for the control of processes other than temperature. Of particular note is the dial lock which can be used to prevent tampering.

- Dial lock
- On/off or PD control action
- Dual 110/230Vac supply input
- J, K T/c, PT100 or 4 - 20mA inputs
- Deviation LEDs plus meter output
- Relay or SSR drive output options

### SPECIFICATION

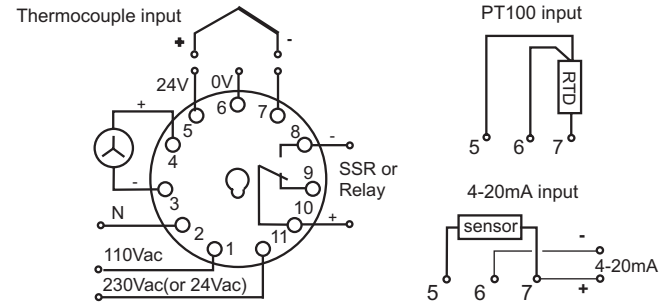
| | |
|---|---|
| Supply voltage: | 110/230(220-240)Vac @ 50/60 Hz or 24Vac/dc |
| Power drain: | 4VA max. |
| Scale accuracy: | +/- 2% of full scale |
| Scale range: | See part number below |
| Input sensor: | J, K, R or T thermocouple, 3-wire PT100 or 4-20mA |
| Max ext. resist: | T/couple: 100 , PT100: 5 per wire |
| Control band: | On/Off: Hyst. = 0.5% (1% TC486*) of full scale |
| | Propl: PB = 4% to 10% of full scale |
| Cycle time: | 20 secs (PD model only) |
| Output rating: | Relay: SPCO, 5A/240Vac resistive |
| | SSR: 30mA/24Vdc |
| Electrical life: | 100,000 ops at rated load |
| Deviation output: | +/- 50 Amps |
| Ambient range: | -10 to 50°C non-condensing |
| Approvals: | Conforms to CE emc EN50081-1 & EN50082-1 and low voltage EN61010-1 directives |
| Weight: | 200gms |

### Part Numbering Options : TC48 A B - C D -110/230VAC

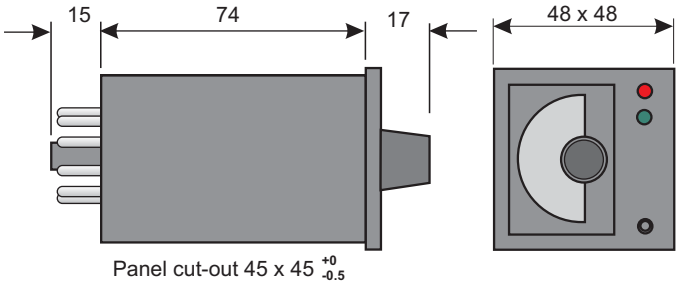
| | | | | | | | |
|---|---|---|---|---|---|---|---|
| A | Control | On/off | 1 | D | Scale | J, K 0 to 200ºC | 1 |
| | | PD | 3 | | | J, K 0 to 400ºC | 2 |
| | | Latch | 5 | | | K 0 to 600ºC | 3 |
| | | On/off 4-20mA | 6 | | | K 0 to 800ºC | 4 |
| B | Action/ Output | Rev/relay | 0 | | | K 0 to 1200º | 5 |
| | | Dir/relay | 1 | | | T -100 to 200ºC | 0 |
| | | Rev/SSR | 2 | | | T -170 to 30ºC | 6 |
| | | Dir/SSR | 3 | | | R 0 to 1600ºC | 0 |
| C | Sensor | K t/couple | 0 | | | PT100 -100 to 200ºC | 0 |
| | | J t/couple | 1 | | | PT100 -50 to 150ºC | 1 |
| | | T t/couple | 2 | | | PT100 0 to 100ºC | 2 |
| | | R t/couple | 3 | | | PT100 0 to 200ºC | 3 |
| | | PT100 3 wire | 5 | | | PT100 -50 to 100ºC | 4 |
| | | 4-20 mA | 6 | | | 4-20mA 0 to 100% | 6 |

For other temperature ranges, please contact our sales office.

### CONNECTION DIAGRAM




### DIMENSIONS




### STANDARD ITEMS

| Input | Mode | Output | Range | Part Number |
|---|---|---|---|---|
| K T/c | On/Off | Relay | 0 to 200°C | TC4810-01-110/230VAC |
| K T/c | On/Off | Relay | 0 to 400°C | TC4810-02-110/230VAC |
| K T/c | On/Off | Relay | 0 to 800°C | TC4810-04-110/230VAC |
| K T/c | On/Off | Relay | 0 to 1200°C | TC4810-05-110/230VAC |
| J T/c | On/Off | Relay | 0 to 200°C | TC4810-11-110/230VAC |
| PT100 | On/Off | Relay | -50 to 150°C | TC4810-51-110/230VAC |
| PT100 | On/Off | Relay | 0 to 100°C | TC4810-52-110/230VAC |
| PT100 | On/Off | Relay | 0 to 200°C | TC4810-53-110/230VAC |
| K T/c | PD | Relay | 0 to 200°C | TC4830-01-110/230VAC |
| K T/c | PD | Relay | 0 to 400°C | TC4830-02-110/230VAC |
| K T/c | PD | Relay | 0 to 600°C | TC4830-03-110/230VAC |

For suitable panel mounting or DIN-rail wiring sockets see page 33. For thermocouples and PT100 sensors see page 26.

## TR4800 TACHOMETER RELAY

The TR4800 series tachometer relay will switch it's output at the speed selected on the front dial. The units are designed to match the styling of the TC4800 temperature controllers and TT4800 Timers. They offer a fast reaction time of <0.4sec at 150rpm, have an internal supply to power active sensors and a meter output to display the measured speed. The range consists of three models covering speeds from 5 to 10,000 rpm.

- 3 models for 5 to 10,000 rpm
- 1mA meter output to display rpm
- High speed response to input
- Internal 15Vdc sensor supply

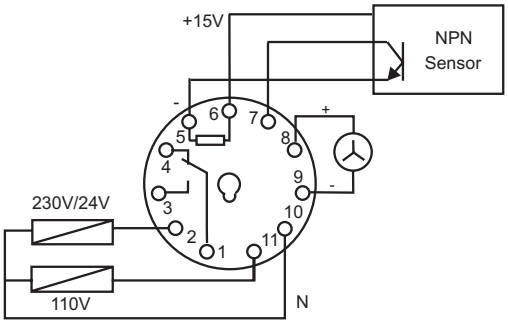
### SPECIFICATION

| | |
|---|---|
| Supply voltage: | 110/230(220-240)Vac @ 50/60 Hz or 24Vac/dc |
| Power drain: | 3VA or 2 Watts max. |
| Scale accuracy: | +/- 2% of full scale |
| Sensing ranges: | 01: 5 to 100 rpm<br>02: 50 to 1000 rpm<br>03: 500 to 10000 rpm |
| Input sensor: | Any volt-free contact or 3-wire active sensor with a power consumption of < 25mA at 15Vdc. See SI and SC range of sensors on pages 29 and 30. |
| Output rating: | SPCO relay rated at 5A/240Vac/30Vdc resistive |
| Electrical life: | 100,000 ops at rated load |
| Metering output: | 1 mAmp fsd at 75 |
| Ambient range: | -10 to 60°C non-condensing |
| Approvals: | Conforms to CE emc EN50081-1 & EN50082-1 and low voltage EN61010-1 directives |

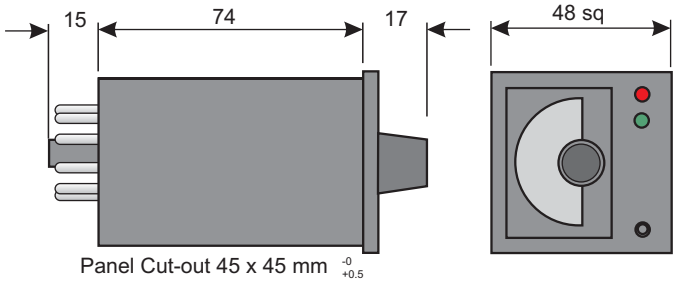
**Part Numbering Options : TR4801 - A - B**

| | | | |
|---|---|---|---|
| A | Range | 5 - 100 rpm<br>50 - 1000 rpm<br>500 - 10000 rpm | 01<br>02<br>03 |
| B | Power supply | 110/230Vac<br>24Vac/dc | 110/230VAC<br>24VAC/DC |

### CONNECTION DIAGRAM




### DIMENSIONS




### STANDARD ITEMS

| Type | Range | Part Number |
|---|---|---|
| Tachometer relay | 5 -100 rpm | TR4801-01-110/230VAC |
| Tachometer relay | 50 -1000 rpm | TR4801-02-110/230VAC |
| Tachometer relay | 500 -10000 rpm | TR4801-03-110/230VAC |

Note: For suitable panel mounting or DIN rail wiring sockets see page 33.

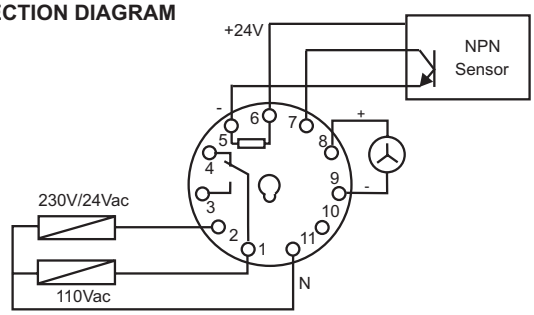
## FSRS SHAFT ROTATION SENSOR

The FSRS shaft rotation sensor is specifically designed to prevent access to a normally rotating machine until it has slowed to a safe speed. An adjustable potentiometer on the facia enables the sensor to be set for an appropriate minimum speed which may be considered as safe for the operator to gain access. If the sensor does not receive a pulse within the time set by the potentiometer, it's output will energise and this signal can be used to disable a guard. By using the normally closed contacts the sensor becomes fail-safe in the event of loss of power

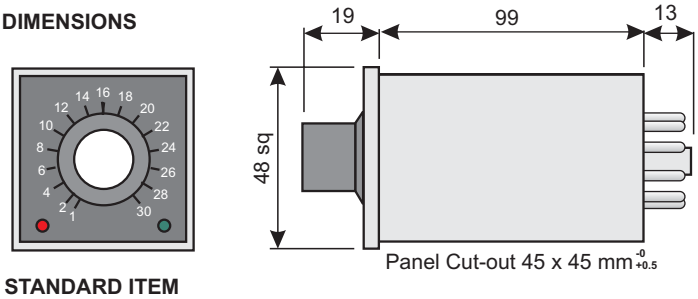
### SPECIFICATION

| | |
|---|---|
| Supply voltage : | 110/230(220-240)Vac @ 50/60 Hz |
| Power drain : | 4VA |
| Time delay : | 1 to 30 seconds |
| Sensing speed : | Calculated by $S_{min}$ = 60/nT rpm<br>where n = No. of pulses per revolution<br>T = time set on potentiometer |
| Min. Pulse width: | 3 msecs (for 50% duty cycle). To calculate the minimum 'flag' width ($W_f$) use the formula $W_f$ = r/10 mm (50% duty) where r = radius of shaft |
| Input sensor: | Any volt-free contact (no bounce) or 3-wire active Sensor with a power consumption of < 25mA at 24Vdc. See SI or SC series sensors on pages 29 - 30. |
| Output rating: | SPCO relay rated at 5A/240Vac/30Vdc resistive |
| Electrical life: | 100,000 ops at rated load |
| Ambient range: | 10 to 50°C non-condensing |
| Approvals: | Conform to CE emc EN50081-1 & EN50082-1 and low voltage EN61010-1 directives |

### CONNECTION DIAGRAM




### DIMENSIONS




### STANDARD ITEM

| Type | Delay | Part Number |
|---|---|---|
| Shaft Rotation Sensor | 30 sec | FSRST30SLP-110/230VAC |

Note: For suitable panel mounting or DIN rail wiring sockets see page 33.

## FLST LIQUID LEVEL DETECTOR

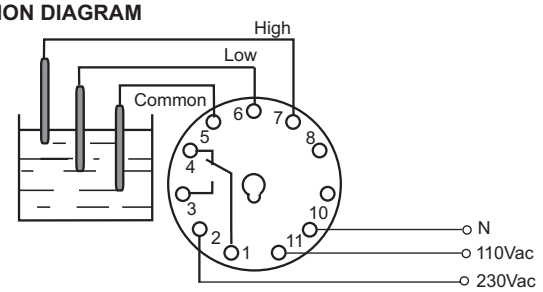
The FLST liquid level detector has a fixed sensitivity, designed primarily to sense water using a conductive differential sensing device. By shorting the high and low probes, however, it can also be used for single point detection. Under differential operation, the output relay will energise when the liquid falls below the 'Low' level and de-energise when it rises above the 'High' level.

- Differential or single point sensing
- Dual supply voltage
- Level indicating LEDs

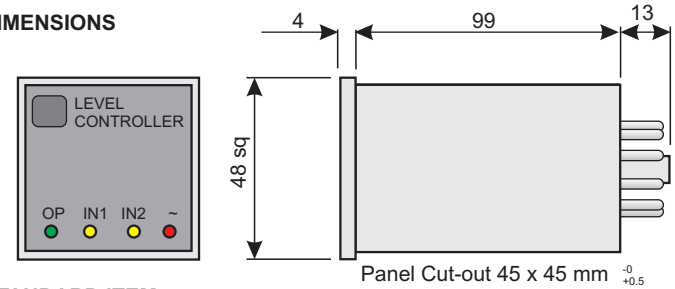
## SPECIFICATION

| | |
|---|---|
| Supply voltage: | 110/230(220-240)Vac @ 50/60 Hz |
| Power drain: | 4VA |
| Operating res: | 950K on, 220K ff |
| Sensing delay: | 500 msec typical |
| Output rating: | SPCO relay rated at 5A/240Vac/30Vdc resistive |
| Electrical life: | 100,000 ops at rated load |
| Ambient range: | -10 to 60°C non-condensing |
| Approvals: | Conforms to CE emc EN50081-1 & EN50082-1 and low voltage EN61010-1 directives |
| Weight: | 180gms |

## CONNECTION DIAGRAM




## DIMENSIONS




## STANDARD ITEM

| Type | Part Number |
|---|---|
| Differential Level sensor | FLST-110/230VAC |

Note: For suitable panel mounting or DIN rail sockets see page 33.

## FLDT LIQUID LEVEL DETECTOR

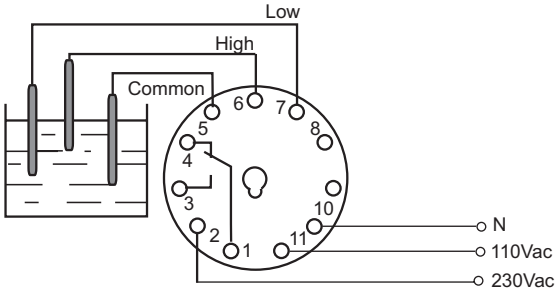
The FLDT liquid level detector is designed to operate with a differential sensing device but by shorting the high and low probes it can also be used for single point detection. A sensitivity control on the front of the unit enables it to be used for a wide range of conductive liquids. Under differential operation, the output relay will energise when the liquid falls below the 'Low' level and de-energise when it rises above the 'High' level.

- Differential or single point sensing
- Adjustable sensitivity control
- Dual supply voltage

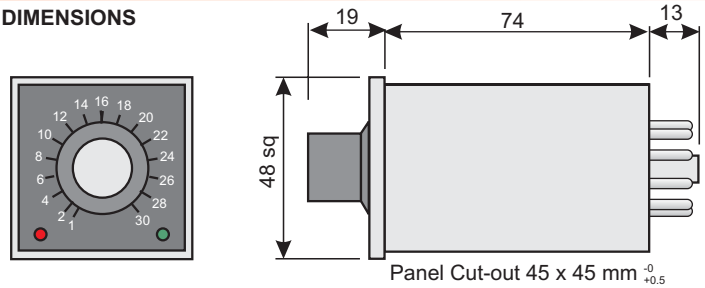
## SPECIFICATION

| | |
|---|---|
| Supply voltage: | 110/230(220-240)Vac @ 50/60 Hz |
| Power drain: | 4VA |
| Operating resistance range: | 2K ON, 5K OFF to 20K ON, 59K OFF |
| Sensing delay: | 500 msec typical |
| Output rating: | SPCO relay rated at 5A/240Vac/30Vdc resistive |
| Electrical life: | 100,000 ops at rated load |
| Ambient range: | -10 to 60°C non-condensing |
| Approvals: | Conforms to CE emc EN50081-1 & EN50082-1 and low voltage EN61010-1 directives |
| Weight: | 200gms |

## CONNECTION DIAGRAM




## DIMENSIONS




## STANDARD ITEM

| Type | Part Number |
|---|---|
| Differential Level sensor | FLDT-110/230VAC |

Note: For suitable panel mounting or DIN rail sockets see page 33.

## T3S ON/OFF & PROPORTIONAL TEMPERATURE CONTROLLER

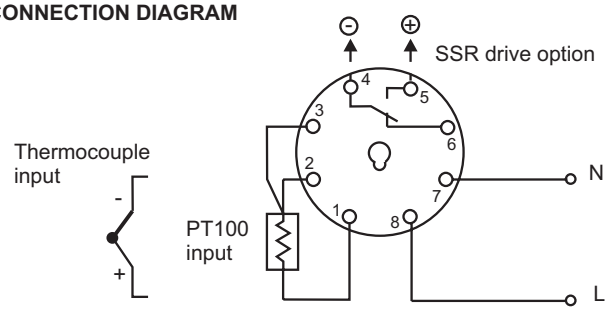
The T3S range of temperature controllers offer easy to set, non programmable digital on/off or proportional control. Options are available for J/K thermocouples and PT100 RTDs inputs with either relay or SSR drive outputs.

- Selectable on/off or proportional action
- Upto 800°C scale ranges
- J, K T/couple or PT100 input options
- Relay or SSR drive output options

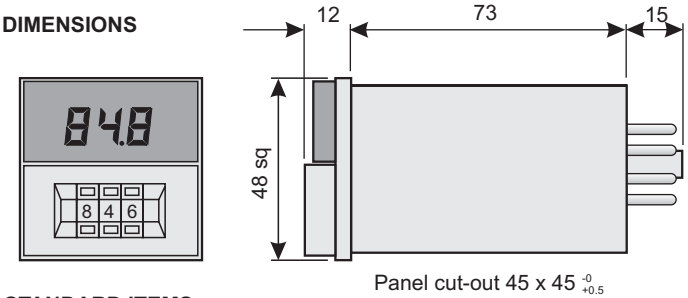
## SPECIFICATION

| | |
|---|---|
| Supply voltage: | 90 to 264Vac/dc @ 50/60 Hz |
| Power drain: | 5VA max. |
| Scale accuracy: | +/- 1% of FSD |
| Scale ranges: | PT100: 99.9, 199, 399°C<br>J T/c: 199, 399°C<br>K T/c: 399, 799°C |
| Max ext. resist: | T/couple: 100 , PT100: 5 per wire |
| Control band: | On/Off: Hysteresis = 0.2 to 0.5% of scale range<br>Propl: Propl. band = up to 3% of scale range |
| Reset adjust: | +/-3% of scale range |
| Output rating: | Relay: 2A/240Vac resistive<br>SSR: 20mA/12Vdc |
| Electrical life: | 100,000 ops at rated load |
| Ambient range: | -10 to 50°C non condensing |

## CONNECTION DIAGRAM




## DIMENSIONS




## STANDARD ITEMS

| Input | Output | Range | Part Number |
|---|---|---|---|
| J T/c | Relay | 0 to 199°C | T3S-B4RJ2C |
| J T/c | Relay | 0 to 399°C | T3S-B4RJ4C |
| K T/c | Relay | 0 to 399°C | T3S-B4RK4C |
| K T/c | Relay | 0 to 799°C | T3S-B4RK8C |

For suitable panel mounting or DIN rail wiring sockets see page 33.

## DTC410 ON/OFF TEMPERATURE CONTROLLER

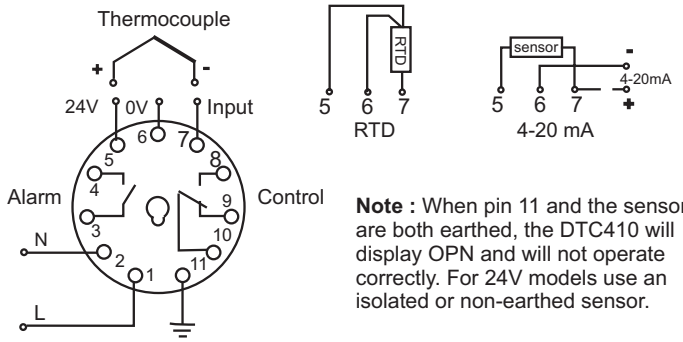
The DTC410 range of on/off temperature controllers are designed to offer the programmable functionality of modern PID controllers but at a price suited to on/off applications. The clear LCD display and 2-button programming gives an easy to use set-up procedure. Message displays also provide a clear indication of alarms or error status. For the matching UDT timer see page 8.

- 4 programmable thermocouple inputs
- 10 programmable alarm options
- Programmable set-point limits
- PT100 & 4-20mA inputs
- Direct or reverse action

### SPECIFICATION

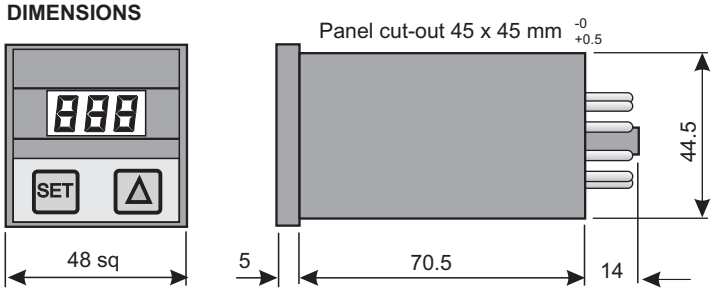
| | |
|---|---|
| Supply voltage: | 24Vac/dc @ 60mA max.<br>110Vac, 50/60 Hz @ 1.5VA max.<br>220-240Vac, 50/60 Hz @ 1.5VA max. |
| Sensor options: | J, K, T, N T/couples, PT100 and 4-20mA |
| Scale ranges: | J T/c = -99 to 700°C (999°F)<br>T T/c = -99 to 300°C (570°F)<br>K/N T/c = -99 to 999°C or F<br>PT100 = -99 to 400°C (700°F)<br>4-20mA = scalable -99 to 999 units |
| Gain accuracy: | T/c = +/- 0.25% of scale range<br>Others = +/- 0.6% of scale range |
| Offset accuracy: | T/c = +/- 5°C, PT100 = +/- 2°C |
| Outputs: | Control: 3A @ 240Vac, SPCO relay<br>Alarm: 0.5A @ 120Vac, SPNO relay |
| Approvals: | Conforms to CE generic standards EN50081-1 and EN50082-1 for emc and EN61010-1 for low voltage |
| Ambient range: | -10 to 50°C non-condensing |
| Memory back-up: | Lithium battery with 10 years operating life |
| Weight: | 205gms |

### CONNECTION DIAGRAM




**Note :** When pin 11 and the sensor are both earthed, the DTC410 will display OPN and will not operate correctly. For 24V models use an isolated or non-earthed sensor.

### DIMENSIONS




### STANDARD ITEMS

| Input | Voltage | Part Number |
|---|---|---|
| Thermocouple | 24Vac/dc | DTC410-01-24 |
| | 110Vac | DTC410-01-110 |
| | 230Vac | DTC410-01-230 |
| PT100 | 24Vac/dc | DTC410-02-24 |
| | 110Vac | DTC410-02-110 |
| | 230Vac | DTC410-02-230 |
| 4-20 mA | 24Vac/dc | DTC410-03-24 |
| | 110Vac | DTC410-03-110 |
| | 230Vac | DTC410-03-230 |

For suitable panel mounting or DIN rail wiring sockets see page 33. For thermocouples, PT100 and other applicable types of sensor see page 26.

## PJ32 ON/OFF REFRIGERATION CONTROLLER

These controllers are designed specifically for normal and low temperature refrigeration units with static or ventilated evaporators. The front panel comes in a range of colours or can be custom designed. Versions are available with 1, 2 and 3 relay outputs, 1 and 2 NTC, 1 PTC and an optional digital input. The PJ32 can be powered from either 12Vac/dc or 230Vac supplies.

- NTC or PTC input options
- 12Vac/dc or 230Vac power supply
- Front panel mounting system
- Fast set up using programme key
- Custom front panels available
- Up to 3 relay outputs
- Serial connection/HACCP option

### SPECIFICATION

| | |
|---|---|
| Supply voltage : | 12Vac/dc or 230Vac |
| Power drain : | 3VA |
| Sensor options : | NTC or PTC |
| Scale range : | -50 to 90ºC |
| Accuracy : | NTC +/-1ºC<br>PTC +/-3ºC |
| Outputs : | S0E : 8A SPST relay<br>S0P/S1P : 16A SPST relay<br>S2,X,Y : 1 SPCO and 1SPST 8A relays<br>C : 2 SPST 5A and 1 SPST 8A relays |
| Approvals: | Conforms to CE generic standards EN50081-1 and EN50082-1 for emc and EN61010-1 for low voltage |
| Ambient range: | -10 to 50°C <80% rH non-condensing |
| Weight: | 150gms |

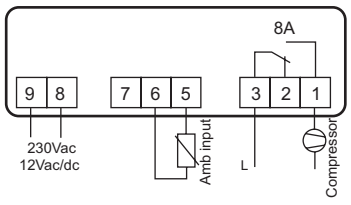
### Part Numbering Options : PJ32 A B C D

| | | | |
|---|---|---|---|
| A | Refrigeration unit type | S<br>Y<br>X<br>C | Static units above 0ºC<br>Static units below 0ºC<br>Static units below 0ºC<br>ventilated units below 0ºC |
| B | Digital input | 0<br>1<br>2 | No digital input<br>Digital input<br>Digital input + alarm output |
| C | Controller type | E<br>0<br>P | Economic<br>Top version<br>Top version 16A relays & buzzer |
| D | Power supply | L<br>0 | 12Vac/dc<br>230Vac |

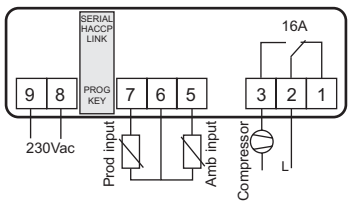
Note : All top versions include serial and HACCP link, quick mounting system, back-lit key pad and removable terminals.

### CONNECTION DIAGRAMS

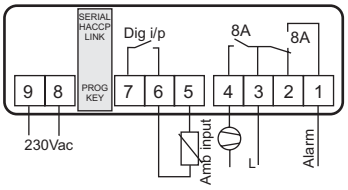
PJ32 S0E



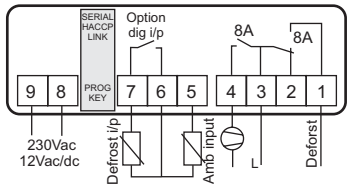

PJ32 S0 & S1



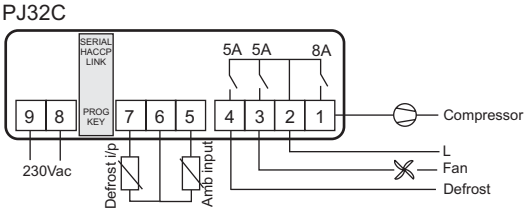

PJ32 S2



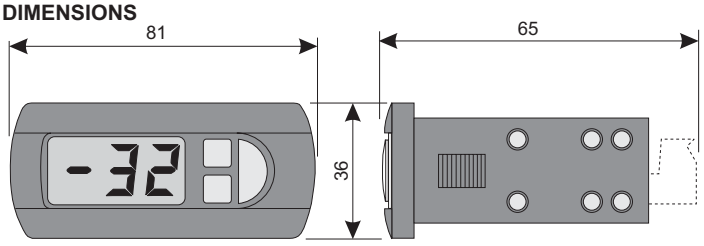

PJ32 X & Y




PJ32C



**DIMENSIONS**




PANEL CUT OUT : 71 x 29mm

**STANDARD ITEMS**

| Version | Voltage | Unit type | Inputs | Part Number |
|---|---|---|---|---|
| Basic | 12Vac/dc | Static>0ºC | 1 NTC | PJ32S0EL |
| Basic | 230Vac | Static>0ºC | 1 NTC | PJ32S0E0 |
| Top | 230Vac | Static>0ºC | 1 NTC | PJ32S000 |
| Top | 230Vac | Static>0ºC | 2 NTC | PJ32S0P0 |
| Top | 230Vac | Static>0ºC | 1 NTC,1 dig | PJ32S200 |
| Basic | 12Vac/dc | Static<0ºC | 2 NTC | PJ32Y0EL |
| Top | 230Vac | Static<0ºC | 2 NTC | PJ32Y000 |
| Top | 230Vac | Static<0ºC | 1 NTC, 1 dig | PJ32X100 |
| Top | 230Vac | Ventilated<0ºC | 2 NTC | PJ32C000 |
| Programming key | | | | PJOPZKEY00 |
| RS485 serial module | | | | PJOPZ48500 |
| HACCP module | | | | PJOPZHACP0 |

For models with PTC probe inputs, digital input options, alternative or customised front panels, please contact our sales office. For suitable NTC and PTC probes see page 26.

## IR32 ON/OFF REFRIGERATION CONTROLLER

The IR32 series temperature controllers were designed specifically for refrigeration and food processing applications and therefore use the NTC sensor, ideal for operation over the temperature range -50 to +90ºC. Three models provide the flexibility of controlling either 'static' refrigeration units with defrost by timed compressor-off state or by a separate defrost sensor or for ventilated units where an additional output drives an evaporator fan. Remote control via a PC or the hand held infra-red remote programmer provides added ease of setting.

- Simple programming of regulator, compressor, defrost & alarm settings
- 1, 2 or 4 output options
- Single or dual NTC probe input
- 8 Amp @ 250Vac relay outputs
- Infra-red, hand-held remote control programming option - see page 39
- RS232/485 programming and data analysis via serial link
- IP65 water and dust protection
- CE approval for emc and low voltage directives

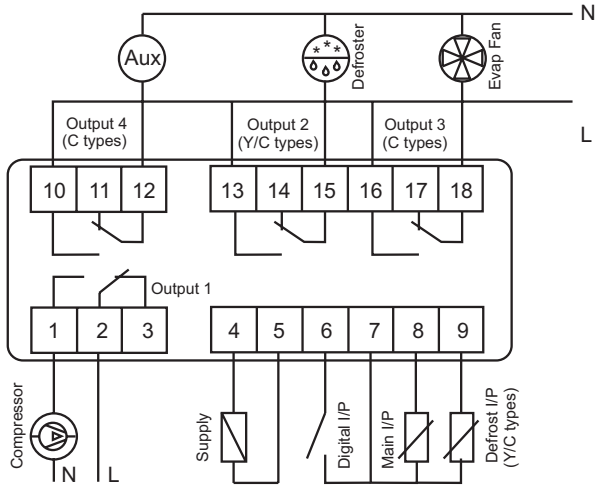
**Model Descriptions**

| Model No | Description |
|---|---|
| IR32S0LBR0 | Single relay compressor output and control set-point suitable for 'static' refrigeration systems where the defrost cycle can be timed during the compressor 'off' state. |
| IR32Y0LBR0 | Dual relay output, one to drive a compressor and the other an electrical heater or hot gas defrost system. Each is controlled from separate NTC sensors with independent set-points. |
| IR32C0LBR0 | 4 relay outputs to drive a compressor, defrost heater and ventilation fan. The fourth output may be used to drive an indicator lamp or as an alarm. Two NTC sensors and independent set-points provide flexible and accurate control. |

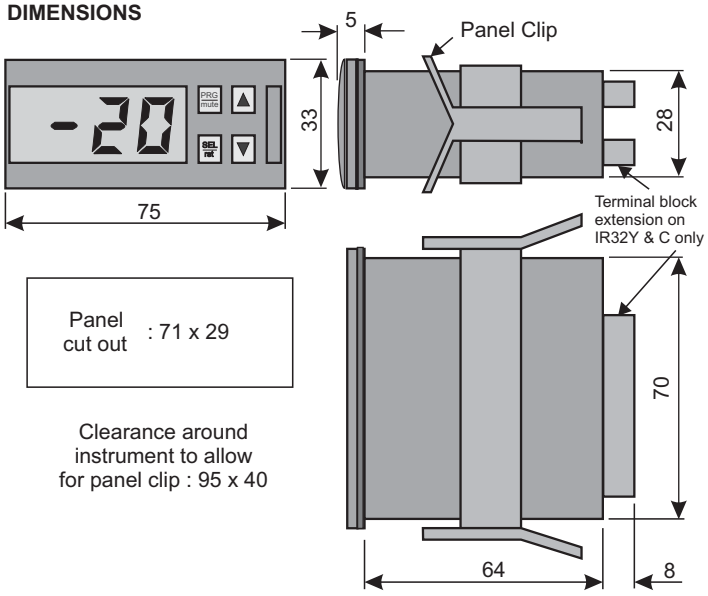
**SPECIFICATION**

| | |
|---|---|
| Inputs: | 1 or 2 NTC sensor (PTC available on request) |
| Scale range: | NTC = - 40 to 90˚C<br>PTC = - 40 to 120˚C |
| Accuracy: | +/- 1% of scale range |
| Outputs: | IR32S: SPCO relay<br>IR32Y: 2 x SPCO relay<br>IR32C: 4 x SPCO relay |
| Output ratings: | 8A @ 250Vac (10 A inrush) |
| Supply: | 12-24Vac/dc (110Vac & 240Vac via transformers TRA11 and TRA12 - see page 33) |
| Supply drain: | 3VA max. |
| Protection: | IP65 |
| Approval: | Conform to CE emc EN50081-1 & EN50082-1 and low voltage EN61010-1 directives. |
| Ambient range: | 0 to 50˚C |
| Weight: | IR32S: 160 gms<br>IR32Y: 180 gms<br>IR32C: 220 gms |

**CONNECTION DIAGRAM**




**DIMENSIONS**




Panel cut out : 71 x 29

Clearance around instrument to allow for panel clip : 95 x 40

**STANDARD ITEMS**

| Control Type | Part Number |
|---|---|
| 1 Relay, timed defrost | IR32S0LBR0 |
| 2 Relays, temperature defrost | IR32Y0LBR0 |
| 4 Relays, ventilated temperature defrost | IR32C0LBR0 |

For power supply transformers and IR remote controls see page 33. For NTC and PTC sensors see page 26. For matching timers see page 8.

## MICRO-CHILLER AIR-CONDITIONING CONTROLLERS

The µchiller compact has been specifically designed to control chillers and single compressor heat pumps. It will control air to air, air to water and water to water units with gas or water reversibility. The µchiller expansion boards allow full control of chillers with 1 or 2 hermetic compressors working also as heat pumps. A remote wall mounted terminal unit and fan speed control modules are also available as part of the µchiller range.

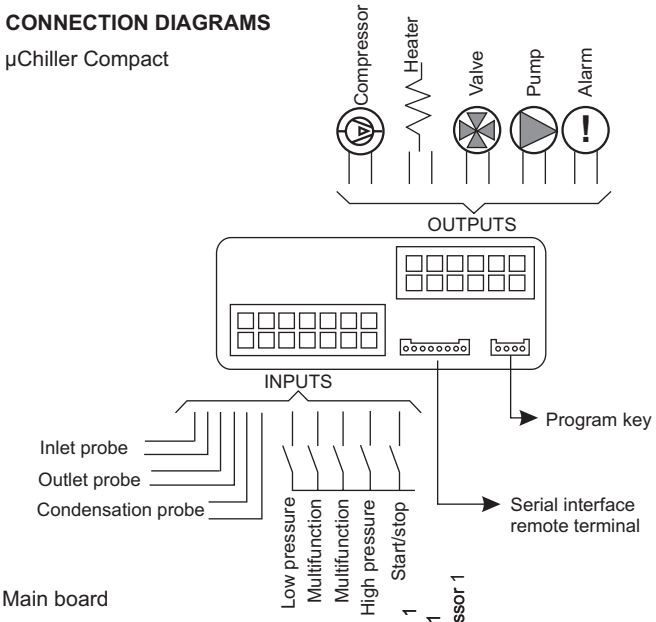
- Controls AHUs, chillers and single compressor heat pumps
- Expansion board for 1 and 2 hermetic compressor control
- Wall mounted remote terminal unit

## SPECIFICATION

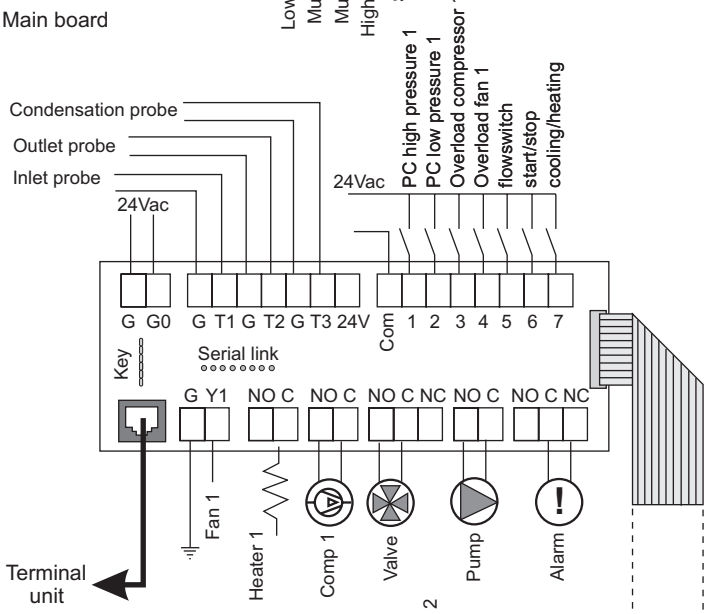
| | |
|---|---|
| Supply : | 24Vac+/-10%, 50/60Hz |
| Power drain : | 3W |
| Inputs : | 3 x NTC probe (3/5 x NTC on expansion cards)<br>5 x volt free contacts (7/11 on expansion cards) |
| Outputs : | 5 NO relays 2A res @ 250Vac (5/8 on exp cards)<br>1 Pulse modulation (1/2 on expansion cards) |
| Protection : | µchiller compact : IP55<br>Wall mounted terminal : IP30 |
| Ambient range : | µchiller compact : -10 to 60ºC < 90%rH<br>Expansion boards : -10 to 60ºC < 90%rH<br>Wall mounted terminal : 0 to 50ºC < 90% rH |
| Weight : | µchiller compact : 250gms<br>Main board : 150gms<br>Expansion board : 120gms<br>Wall mounted terminal : 270gms |

## CONNECTION DIAGRAMS

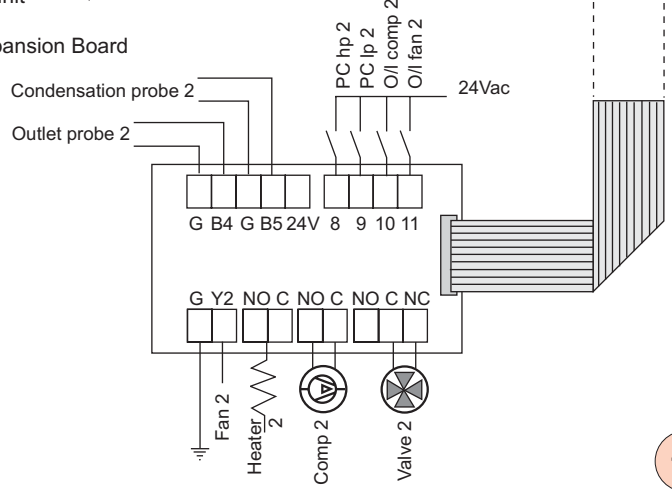
µChiller Compact




Main board

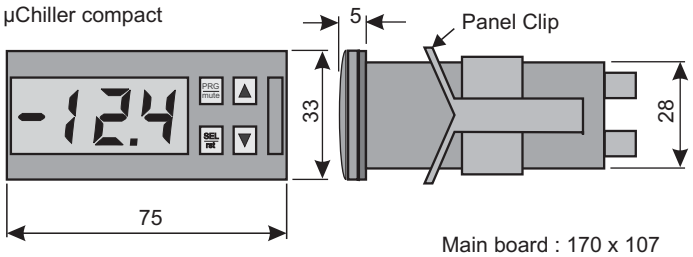



Expansion Board




## DIMENSIONS

µChiller compact




Main board : 170 x 107
Expansion board : 82 x 107
Wall mounted remote terminal : 115 x 76 x 31

## STANDARD ITEMS

| Item | Options | Part Number |
|---|---|---|
| µChiller compact | - | MCHSML000M |
| µChiller compact | Buzzer, IR control | MCHSML0010 |
| µChiller main board | Screw terms | MCHCOMP1B0 |
| µChiller expansion board | Screw terms | MCHCOMP2B0 |
| Panel mounted remote terminal | - | MCHTER00L0 |
| Wall mounted remote terminal | - | MCHTER00C0 |
| Serial Interface | - | MCHSMLSER0 |
| Remote module | - | MCHREB000 |
| Pressure module | - | MCHSML4200 |
| Program hardware key | - | MCHSMLKEY0 |

To connect a wall mounted remote terminal a serial interface is required for the µchiller compact whereas a remote module is needed for the main board. The pressure module will allow connection of a suitable pressure transducer to the µchiller compact (SPK - see page 26) for condenser pressure control.

## IR32 ON/OFF & PI TEMPERATURE & PROCESS CONTROLLER

The IR32 series temperature controllers, with their analogue, thermocouple and RTD inputs and relay or SSR drive output options, combine simple control and programmability with flexibility of use for a wide range of applications. They are available with 1, 2 or 4 outputs /set-points,can be configured for 9 different control modes including on/off, P or PI action and can be used to control temperature, humidity, air pressure or other media using suitable sensors - see pages 26-27 for details.

- 9 pre-set control modes
- Temperature, humidity or air-pressure input sensor options
- 1, 2 or 4 output/set-point options
- Relay or SSR drive output options
- Infra-red, hand-held remote control programming option - see page 33
- RS232/485 programming and data analysis via serial link
- IP65 water and dust protection
- CE approval for emc and low voltage directives
- Programmable advanced control options

## SPECIFICATION

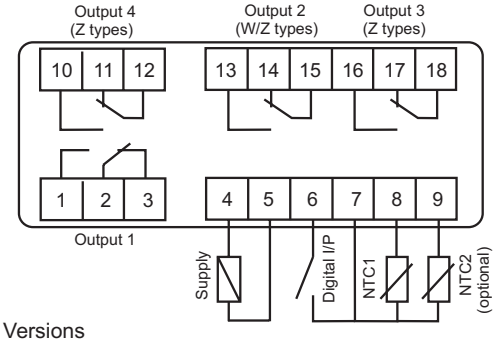
| | | |
|---|---|---|
| Supply: | 12-24Vac/dc +/- 10% - for transformers see page 33 | |
| Supply drain: | 3VA max. | |
| Probe supply: | 10Vdc @ 30mA internal | |
| Inputs: | Sensor: 1 or 2 NTC, PT100, J, K T/c, 4-20mA, -0.5 to 1V | |
| Digital input: | Programmable function to switch between set-points or to act as an alarm condition. | |
| Scale range: | NTC : | -40 to 90°C |
| | Pt100 : | -99 to 600°C |
| | J T/c : | -99 to 800°C |
| | K T/c: | -99 to 999°C |
| | mA/V : | -99 to 999 units |
| Accuracy: | +/- 0.5% of scale range | |
| Output types: | See connection diagrams | |
| Output ratings: | Relay: | 8A @ 250Vac (10 A inrush) |
| | SSR: | 10V/25mA |
| Protection: | IP65 | |
| Approval: | Conform to CE emc EN50081-1 & EN50082-1 and low voltage EN61010-1 directives. | |
| Ambient range: | 0 to 50°C @ 90% rH (non-condensing) | |
| Weight: | IR32A: | 240 gms |
| | IR32D: | 200 gms |
| | IR32V: | 200 gms |
| | IR32W: | 220 gms |
| | IR32Z: | 240 gms |

**Part Numbering Options : IR32 A B C 000**

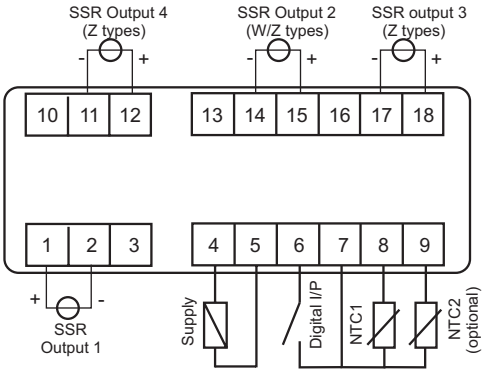
| | | | | |
|---|---|---|---|---|
| A | Outputs | 1 Relay<br>2 Relays<br>4 Relays<br>1 SSR<br>4 SSRs | 8A/250Vac<br>"<br>"<br>10V/25mA<br>" | V<br>W<br>Z<br>D<br>A |
| B | Input | NTC probe<br>PT100 probe<br>J/K Thermocouple<br>Current<br>Voltage | -50 to 90ºC<br>-99 to 600ºC<br>0 to 999ºC<br>4 to 20mA<br>-0.5 to +1V | 0<br>1<br>2<br>3<br>4 |
| C | Options | Economic (V0 only)<br>Standard<br>" | No IR sensor or buzzer<br>IR sensor & buzzer<br>IR sensor & buzzer | E<br>L<br>0 |

**CONNECTION DIAGRAMS**

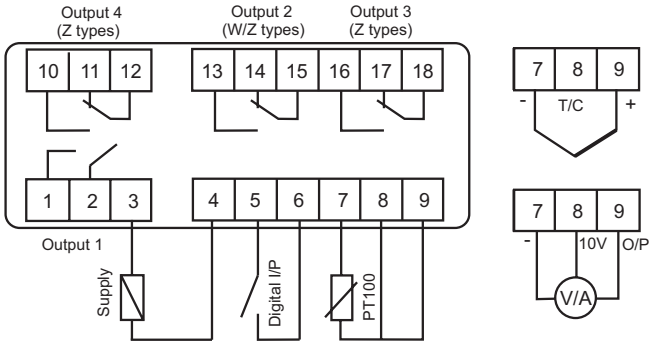
NTC/Relay Versions



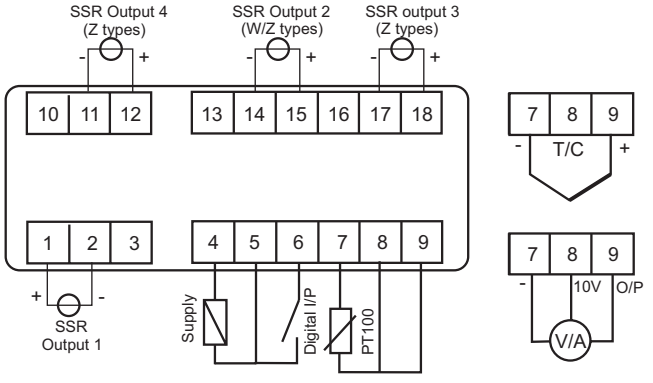

NTC/SSR Versions



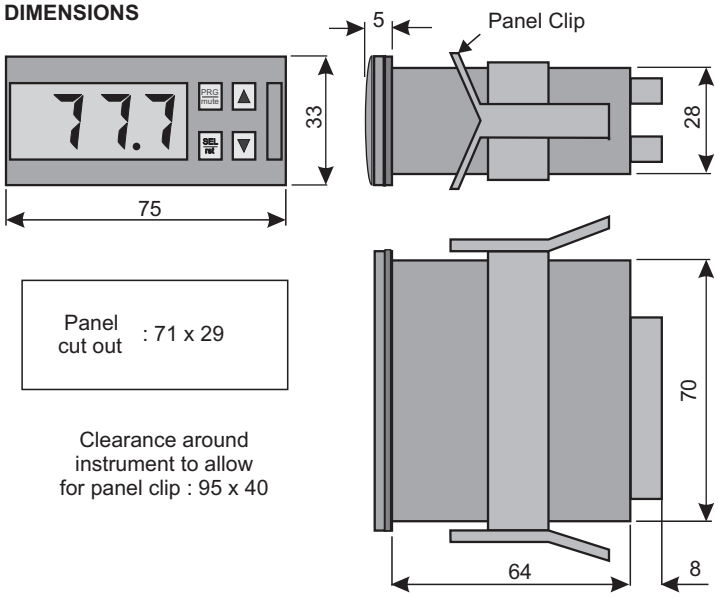

T/C, Voltage & Current Input/Relay Versions




T/C, Voltage and Current Input/SSR Versions




**DIMENSIONS**




Panel cut out : 71 x 29

Clearance around instrument to allow for panel clip : 95 x 40

**STANDARD ITEMS**

| OutputType | Input Type | Part Number |
|---|---|---|
| 1 Relay | NTC, economic | IR32V0E000 |
| | NTC | IR32V0L000 |
| | PT100 | IR32V1L000 |
| | J/K thermocouple | IR32V2L000 |
| | 4-20mA | IR32V3L000 |
| | -0.5 to 1V | IR32V4L000 |
| 2 Relays | NTC | IR32W00000 |
| | PT100 | IR32W10000 |
| | J/K thermocouple | IR32W20000 |
| | 4-20mA | IR32W30000 |
| 4 Relays | PT100 | IR32Z10000 |
| | J/K thermocouple | IR32Z20000 |
| 1 SSR | PT100 | IR32D1L000 |
| | J/K thermocouple | IR32D2L000 |
| 4 SSRs | PT100 | IR32A10000 |
| | J/K thermocouple | IR32A20000 |

For power supply transformers and IR remote controls see page 33. For NTC and PT100 sensors and suitable thermocouples see page 26. For matching timers see page 8.

## IRDR ON/OFF & PI TEMPERATURE & PROCESS CONTROLLER

The IRDR series of temperature controllers are designed specifically for in-panel, DIN-rail mounting. With their analogue, thermocouple and RTD inputs and 1, 2 & 4 output options, they combine simple control and programmability with flexibility of use for a wide range of applications. They can be configured for 9 different control modes for on/off, P or PI action and used to control temperature, humidity, air-pressure or other media with suitable transducers - see page 26-27 for details.

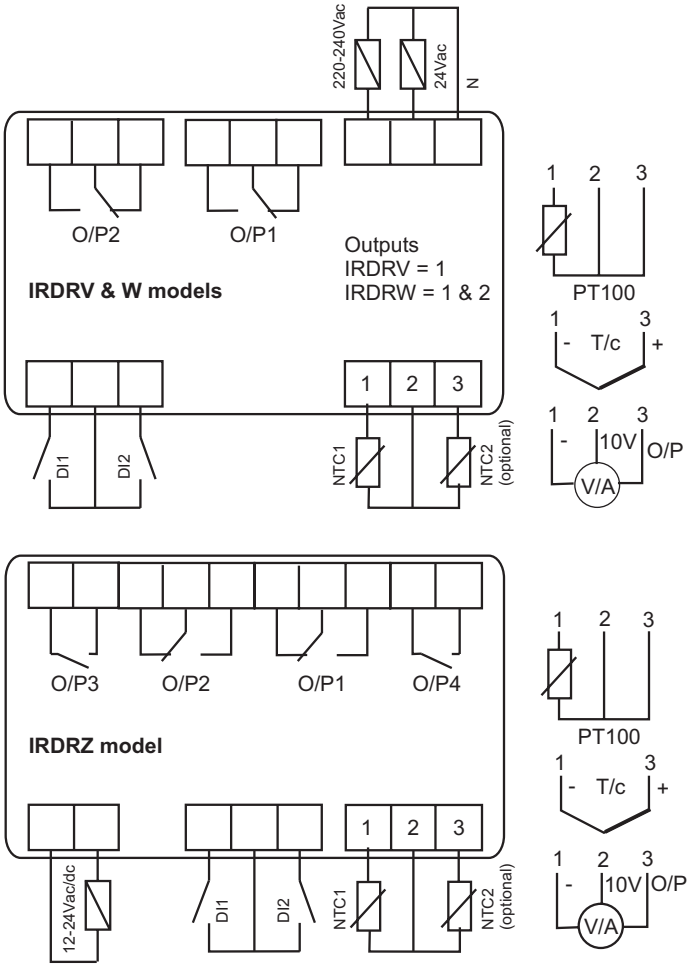
- DIN-rail mounting
- 9 programmable control modes
- Temperature, humidity or air-pressure input sensor options
- 1, 2 or 4 output/set-point options
- 2 Digital inputs to select temperatures or activate alarms.
- Infra-red, hand-held remote control programming option
- RS232/485 programming and data analysis via serial link
- CE approval for emc and low voltage directives
- Dual 12-24Vac/dc and 240Vac supply inputs (not all models)

**SPECIFICATION**

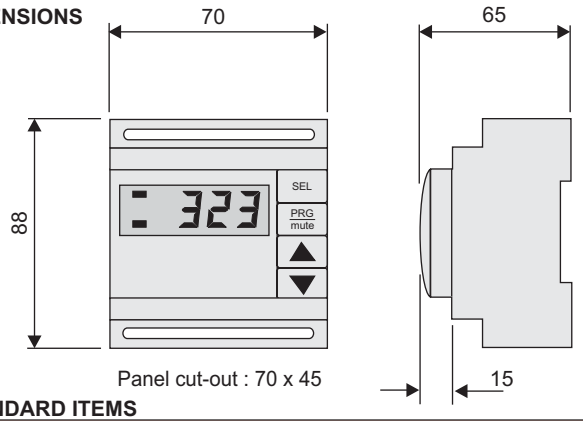
| | | |
|---|---|---|
| Supply voltage: | 12-24Vac/dc +/- 10% - for transformers see page 33 | |
| Supply drain: | 3VA max. | |
| Inputs: | Sensor: 1 or 2 NTC, PT100, J, K t/c, 4-20mA, -0.5 to 1V | |
| Digital inputs: | 2 - programmable function to switch between set-points or to act as an alarm. | |
| Scale range: | NTC : | -40 to 90°C |
| | Pt100 : | -99 to 600°C |
| | J T/c : | -99 to 800°C |
| | K T/c: | -99 to 999°C |
| | mA/V : | -99 to 999 units |

| | |
|---|---|
| Accuracy: | +/- 0.5% of scale range |
| Output types: | See connection diagrams |
| Output ratings: | Relay: 8A @ 250Vac (10 A inrush)<br>SSR: 10V/25mA |
| Probe supply: | 10Vdc @ 30mA internal |
| Protection: | IP40 |
| Approval: | Conforms to CE emc EN50081-1 & EN50082-1 and low voltage EN61010-1 directives. |
| Ambient range: | 0 to 50°C @ 90% rH (non-condensing) |
| Weight: | IRDRV : 220 gms IRDRW : 240 gms |

### CONNECTION DIAGRAM




### DIMENSIONS




### STANDARD ITEMS

| Output Type | Input Type | Part Number |
|---|---|---|
| 1 relay | NTC | IRDRV00000 |
| | PT100 | IRDRV10000 |
| | J/K thermocouple | IRDRV20000 |
| 2 relays | NTC | IRDRW00000 |
| | PT100 | IRDRW10000 |
| | J/K thermocouple | IRDRW20000 |
| 4 relays | PT100 | IRDRZ10000 |
| | J/K thermocouple | IRDRZ20000 |
| Wall mounting enclosure | | GR15070P |

For IR remote controls see page 33. For suitable NTC and PT100 sensors and thermocouples see page 26.

## OUTPUT CONVERSION MODULES

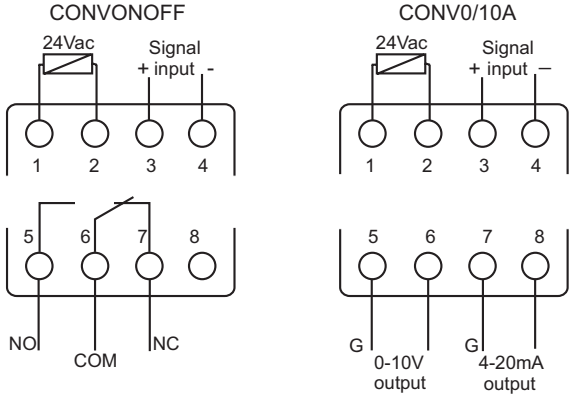
These modules can be connected to the SSR output of an IR32 or IRDR controller and will convert the 10V PWM output into a 0-10V, 4-20mA or on/off relay output. All models operate from a 24Vac supply voltage. Whilst they were designed specifically for use with the IR range of temperature controllers, they can be used in conjunction with any controller that has a 10Vdc PWM or 10Vdc on/off output.

- Converts SSR control output to 0-10V, 4-20mA or on/off relay output
- DIN rail mounting

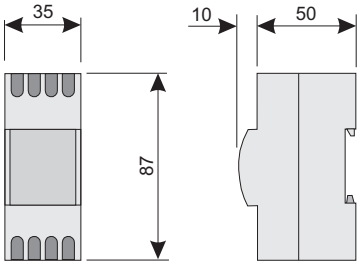
### SPECIFICATION

| | |
|---|---|
| Supply voltage : | 24Vac +/- 10% 50/60Hz |
| Power drain : | 50mA max (30mA On/Off version) |
| Input : | CONV0/10A : 10VdcPWM,10/20mA, impedance 200<br>min time 8ms, max time 0.2s<br>CONVONOFF : 10Vdc on/off 10/20mA imp 200 |
| Output : | CONV0/10A : voltage : 0-10V, 5mA max<br>current : 4-20mA 7Vdc max<br>response time 1.2 secs<br>CONVONOFF : SPCO relay 10A @ 250Vac resistive |
| Ambient range : | 0 to 50ºC 90%rH (non condensing) operating<br>-10 to 70ºC 90%rH storage |
| Protection level : | IP20 |
| Weight : | 80gms |

### CONNECTION DIAGRAMS




### DIMENSIONS




### STANDARD ITEMS

| Input | Output | Part Number |
|---|---|---|
| 10VdcPWM | 0-10V/4-20mA | CONV0/10A |
| 10Vdc on/off | SPCO relay | CONVONOFF |

## C1 1/32 DIN PID TEMPERATURE & PROCESS CONTROLLER

These microprocessor based PID auto-tune controllers are simple to configure and operate. Covering the standard range of input sensors with control and alarm outputs, continuous retransmission, custom linearisation and optional serial communications, the C1 series controller combines flexibility with an extremely compact 1/32 DIN 48 x 24mm package.

- Fuzzy autotune and adaptive algorithms
- Relay or triac + SSR output
- IP65 front panel protection
- Programmable alarms
- Clear 4 digit LED display
- Transmitter power supply

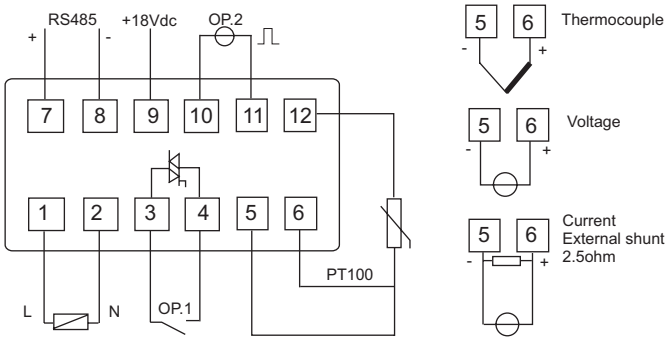
## SPECIFICATION

| | |
|---|---|
| Power supply : | 100 - 240Vac @ 50/60Hz, 24Vac @50/60Hz, 24Vdc |
| Supply variation : | -15% +10% of supply voltage |
| Input sensors : | J, K, L, T, S thermocouples, PT100, 0/4 to 20mA, 0/10 to 50mV |
| Scale ranges : | PT100 -99.9 to 300ºC<br>PT100 -200 to 600ºC<br>L & J t/c 0 to 600ºC<br>T t/c -200 to 400 ºC<br>K t/c 0 to 1200ºC<br>S t/c 0 to 1600ºC |
| Operating modes : | Indicator with 2 alarms<br>1 PID or on/off loop with 1 alarm |
| Accuracy : | +/- 0.25% of scale range +/- 1 digit (RTD & t/c)<br>+/- 0.1% of scale range (mA & mV) |
| Output 1 : | SPST N.O. relay 2A/250Vac resistive or<br>Triac 2A/250Vac for contactor coil |
| Output 2 : | SSR drive 0-5Vdc +/-10%, 30mA max, not isolated |
| Serial interface : | RS485 isolated for Modbus/Jbus protocols |
| Auxilliary supply : | 18Vdc +/-20%, 30mA max for transmitter supply |
| Approvals : | Conforms to CE standards EN50081-1 and EN50082-1 for emc and EN61010-1 for low voltage. |
| Protection : | IP65 |
| Ambient temp : | 0 to 50ºC non condensing |
| Weight : | 100gms |

**Part Numbering Options : C1- A B C D -0000**

| | | | |
|---|---|---|---|
| A | Power supply | 100 - 240Vac<br>24Vac/dc | 3<br>5 |
| B | Output 1 | Relay<br>Triac | 0<br>3 |
| CD | Options | None<br>Auxilliary transmitter power supply<br>Aux power supply+ PV retransmission<br>RS485<br>RS485 + aux power supply | 00<br>06<br>07<br>50<br>56 |

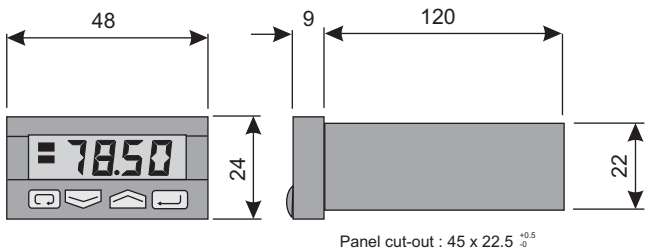
## CONNECTION DIAGRAM







## DIMENSIONS




## STANDARD ITEMS

| Voltage | Output 1 | Comms | Part Number |
|---|---|---|---|
| 100-240Vac | Relay | None | C1-3000-0000 |
| 100-240Vac | Relay | RS485 | C1-3050-0000 |
| 100-240Vac | Triac | None | C1-3300-0000 |
| 24Vac/dc | Relay | None | C1-5000-0000 |
| 24Vac/dc | Relay | RS485 | C1-5050-0000 |

For suitable input sensors see page 26.

## M1 1/16 DIN PID TEMPERATURE & PROCESS CONTROLLER

These microprocessor based PID autotune controllers are simple to configure and operate. With a single clear 4 digit LED display, 1 control and 1 alarm output, the M1 series is an economical solution to PID control problems in a standard 1/16 DIN 48 x 48mm package. Suitable for use with the standard range of input sensors, the M1 has optional PV re-transmission and serial communications.

- Fuzzy autotune and adaptive algorithms
- Relay or triac + SSR output options
- IP65 front panel protection
- Programmable alarms
- Single 4 digit LED display
- Transmitter power supply

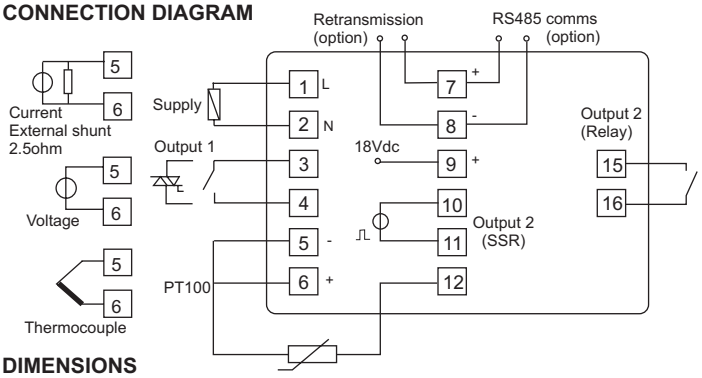
## SPECIFICATION

| | |
|---|---|
| Power supply : | 100 - 240Vac @ 50/60Hz, 24Vac @50/60Hz, 24Vdc |
| Supply variation : | -15% +10% of supply voltage |
| Input sensors : | J, K, L, T, S Thermocouples, PT100, 0/4 to 20mA, 0/10 to 50mV |
| Scale ranges : | PT100 -99.9 to 300ºC<br>PT100 -200 to 600ºC<br>L & J t/c 0 to 600ºC<br>T t/c -200 to 400 ºC<br>K t/c 0 to 1200ºC<br>S t/c 0 to 1600ºC |
| Accuracy : | +/- 0.25% of scale range +/- 1 digit (RTD & t/c)<br>+/- 0.1% of scale range (mA & mV) |
| Operating modes : | Indicator with 2 alarms<br>1 PID or on/off loop with 1 alarm |
| Output 1 : | SPST N.O. relay 2A/250Vac resistive or<br>Triac 1A/250Vac for contactor coil |
| Output 2 : | SSR drive 0-5Vdc +/-10%, 30mA max, not isolated and SPST N.O. relay 2A/250Vac resistive |
| Serial interface : | RS485 isolated for Modbus/Jbus protocols |
| Auxilliary supply : | 18Vdc +/-20%, 30mA max for transmitter supply |
| Approvals : | Conforms to CE standards EN50081-1 and EN50082-1 for emc and EN61010-1 for low voltage. |
| Ambient temp : | 0 to 50ºC non condensing |
| Weight : | 130gms |

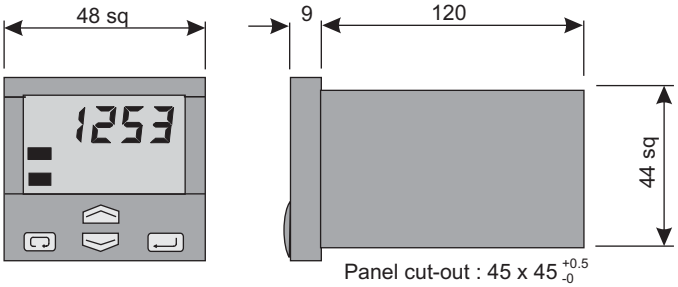
**Part Numbering Options : M1- A B C D -0000**

| | | | |
|---|---|---|---|
| A | Power supply | 100 - 240Vac<br>24Vac/dc | 3<br>5 |
| B | Output 1 | Relay<br>Triac | 0<br>3 |
| CD | Serial comms | None<br>Aux transmitter power supply<br>Aux power supply + PV retransmission<br>RS485<br>RS485 + aux power supply | 00<br>06<br>07<br>50<br>56 |

## CONNECTION DIAGRAM




## DIMENSIONS



### STANDARD ITEMS

| Voltage | Output 1 | Comms | Part Number |
|---|---|---|---|
| 100-240Vac | Relay | None | M1-3000-0000 |
| 100-240Vac | Relay | RS485 | M1-3050-0000 |
| 100-240Vac | Triac | None | M1-3300-0000 |
| 24Vac/dc | Relay | None | M1-5000-0000 |
| 24Vac/dc | Relay | RS485 | M1-5050-0000 |

For suitable input sensors see page 26

## M3 1/16 DIN PID TEMPERATURE & PROCESS CONTROLLER

These microprocessor based PID autotune controllers are simple to configure and operate. With a dual 4 digit LED display, showing set point and process value, up to 2 PID control outputs and 1 alarm output, the M3 series is a sophisticated PID controller. Housed in a standard 1/16 DIN 48 x 48mm package and suitable for use with the standard range of input sensors, the M3 has optional PV re-transmission and serial communications.

- Fuzzy autotune and adaptive algorithms
- Programmable alarm functions
- Dual 4 digit LED display
- Transmitter power supply
- Up to 2 PID control outputs
- Relay or triac + SSR outputs
- IP65 front panel protection
- Serial communications

### SPECIFICATION

Power supply : 100 - 240Vac @ 50/60Hz, 24Vac @50/60Hz, 24Vdc
Supply variation : -15% +10% of supply voltage
Input sensors : J, K, L, T, S Thermocouples, PT100, 0/4 to 20mA, 0/10 to 50mV
Scale ranges :

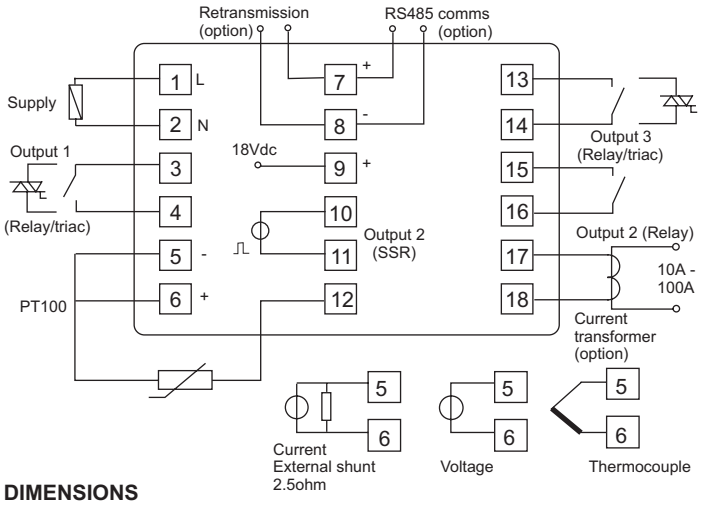
| | |
|---|---|
| PT100 | -99.9 to 300ºC |
| PT100 | -200 to 600ºC |
| L & J t/c | 0 to 600ºC |
| T t/c | -200 to 400 ºC |
| K t/c | 0 to 1200ºC |
| S t/c | 0 to 1600ºC |

Accuracy : +/- 0.25% of scale range +/- 1 digit (RTD & t/c)
+/- 0.1% of scale range (mA & mV)
Operating modes : 1 PID or on/off loop with 2 alarms
2 PID or on/off heat-cool loops with 1 alarm
Output 1/3 : SPST N.O. relay 2A/250Vac resistive or Triac 1A/250Vac for contactor coil
Output 2 : SSR drive 0-5Vdc +/-10%, 30mA max, not isolated and SPST N.O. relay 2A/250Vac resistive
Serial interface : RS485 isolated for Modbus/Jbus protocols
Auxilliary supply : 18Vdc +/-20%, 30mA max for transmitter supply
Approvals : Conforms to CE standards EN50081-1 and EN50082-1 for emc and EN61010-1 for low voltage.
Protection : IP65
Ambient temp : 0 to 50ºC non condensing
Weight : 130gms

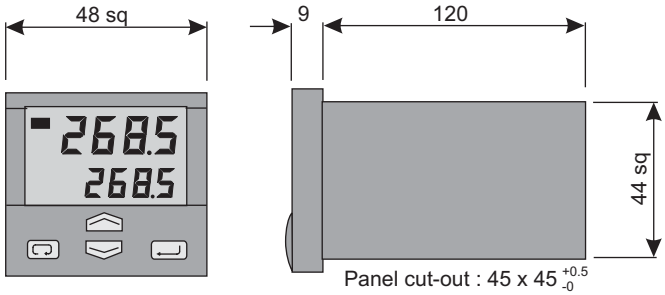
**Part Numbering Options : M3- A B C D -0000**

| | | | |
|---|---|---|---|
| A | Power supply | 100 - 240Vac<br>24Vac/dc | 3<br>5 |
| B | Output 1/ 3 | Relay/Relay<br>Relay/Triac<br>Triac/Relay<br>Triac/Triac | 1<br>2<br>4<br>5 |
| CD | Options | None<br>Current transformer input<br>Aux transmitter power supply<br>Aux power supply + PV retransmission<br>Aux supply + current transformer<br>RS485<br>RS485 + aux power supply<br>RS485 + current transformer | 00<br>03<br>06<br>07<br>08<br>50<br>56<br>58 |

### CONNECTION DIAGRAM




### DIMENSIONS




### STANDARD ITEMS

| Voltage | Output 1/3 | Comms | Part Number |
|---|---|---|---|
| 100-240Vac | Relay/relay | None | M3-3100-0000 |
| 100-240Vac | Relay/relay | RS485 | M3-3150-0000 |
| 100-240Vac | Relay/triac | None | M3-3200-0000 |
| 24Vac/dc | Relay/relay | None | M3-5100-0000 |
| 24Vac/dc | Relay/relay | Rs485 | M3-5150-0000 |

For suitable input sensors see page 26.

## M4 1/16 DIN PID TEMPERATURE & PROCESS CONTROLLER

These microprocessor based PID autotune controllers are simple to configure and operate. With a dual 4 digit LED display, showing set point and process value, up to 2 PID control outputs, 1 alarm output and ramp/dwell functions the M4 series is a sophisticated PID controller. Housed in a standard 1/16 DIN 48x48 package and suitable for use with the standard range of input sensors, the M4 has an optional 4-20mA analogue output and serial communications.

- Fuzzy autotune and adaptive algorithms
- Ramp and dwell functions
- Relay or triac + SSR output
- Transmitter power supply
- Up to 2 PID control outputs
- Optional 4-20mA output
- IP65 front panel protection
- Serial communications

### SPECIFICATION

Power supply : 100 - 240Vac @ 50/60Hz, 24Vac @50/60Hz, 24Vdc
Supply variation : -15% +10% of supply voltage
Input sensors : J, K, L, T, S Thermocouples, PT100, 0/4 to 20mA, 0/10 to 50mV
Scale ranges :

| | |
|---|---|
| PT100 | -99.9 to 300ºC |
| PT100 | -200 to 600ºC |
| L & J t/c | 0 to 600ºC |
| T t/c | -200 to 400 ºC |
| K t/c | 0 to 1200ºC |
| S t/c | 0 to 1600ºC |

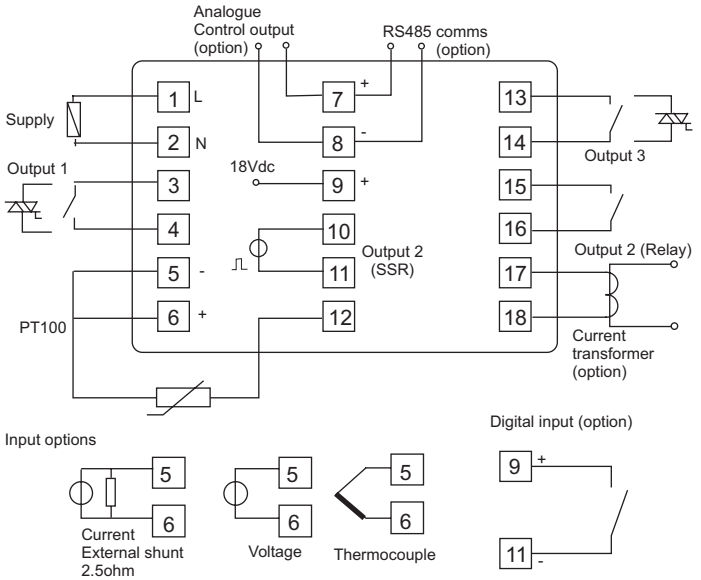
Accuracy : +/- 0.25% of scale range +/- 1 digit (RTD & t/c)
+/- 0.1% of scale range (mA & mV)
Operating modes : 1 PID or on/off loop with 2 alarms
2 PID or on/off heat-cool loops with 1 alarm
Output 1 : SPST N.O. relay 2A/250Vac resistive or Triac 1A/250Vac resistive
Output 2 : SSR drive 0-5Vdc +/-10%, 30mA max, not isolated & SPST N.O. relay 2A/250Vac resistive
Output 3 : SPST N.O. relay 2A/250Vac resistive or Triac 1A/250Vac resistive

| | |
|---|---|
| Output 4 : | 4-20 mA analogue control output (optional) |
| Serial interface : | RS485 isolated for Modbus/Jbus protocols |
| Auxilliary supply : | 18Vdc +/-20%, 30mA max for transmitter supply |
| Approvals : | Conforms to CE standards EN50081-1and EN50082-1 for emc and EN61010-1 for low voltage. |
| Ambient temp : | 0 to 50ºC non condensing |
| Weight : | 130gms |

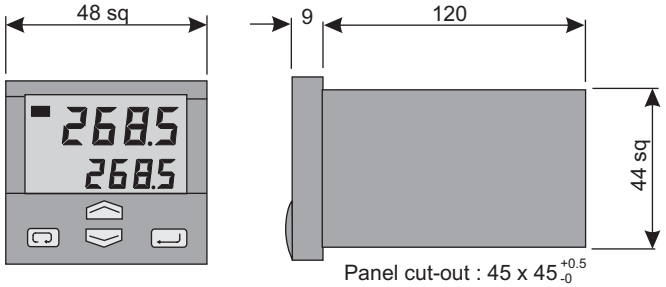
**Part Numbering Options : M4 - A B C D - E 000**

| | | | |
|---|---|---|---|
| A | Power supply | 100 - 240Vac<br>24Vac/dc | 3<br>5 |
| B | Output 1/ 3 | Relay/Relay<br>Relay/Triac<br>Triac/Relay<br>Triac/Triac | 1<br>2<br>4<br>5 |
| CD | Options | None<br>Current transformer input<br>Aux transmitter power supply<br>Aux power supply + control output<br>Aux power supply + current transformer<br>Aux supply + control o/p+ current tfmr<br>RS485<br>RS485 + aux power supply<br>RS485 + current transformer<br>Digital input<br>Digital input + current transformer<br>Digital input + control output<br>Digital i/p + control output + current tfmr | 00<br>03<br>06<br>07<br>08<br>09<br>50<br>56<br>58<br>90<br>93<br>97<br>99 |
| E | Special functions | None<br>Start-up + timer functions | 0<br>2 |

## CONNECTION DIAGRAM




## DIMENSIONS




## STANDARD ITEMS

| Voltage | Output 1/3 | Options | Part Number |
|---|---|---|---|
| 100-240Vac | Relay/relay | 4-20mA output | M4-3107-0000 |
| 100-240Vac | Relay/relay | RS485, DI, 4-20mA o/p | M4-3197-0000 |
| 100-240Vac | Relay/relay | RS485, DI, 4-20mA o/p, timer | M4-3197-2000 |
| 24Vac/dc | Relay/relay | 4-20mA output | M4-5100-0000 |

For suitable input sensors see page 26.

## M5 1/16 DIN PID PROCESS CONTROLLER/PROGRAMMER

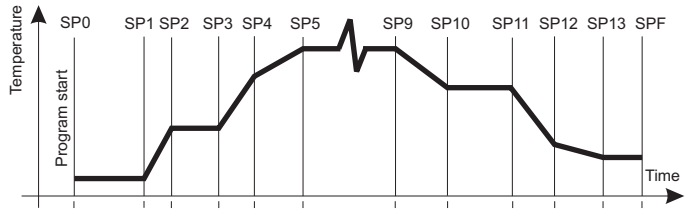
The M5 series is a PID autotune set point programmer. Despite its advanced features, the M5 remains user friendly due to its simple and customisable procedures. With a sampling time of 0.1secs, up to 16 program segments, configurable outputs, programmable alarm functions and serial communi-cations facilities, the M5 is a powerful process controller/programmer in a compact 1/16 DIN 48 X 48mm package.

- Fuzzy autotune and adaptive algorithms
- Multiple outputs modes
- Ramp and dwell functions
- Transmitter power supply
- 0.1 sec sampling time
- Up to 16 program segments
- Remote set point facility
- Serial communications

## SPECIFICATION

| | |
|---|---|
| Power supply : | 100 - 240Vac @ 50/60Hz, 24Vac @50/60Hz, 24Vdc |
| Supply variation : | -15% +10% of supply voltage |
| Input sensors : | J, K, L, T, S Thermocouples, PT100, 0/4 to 20mA, 0/10 to 50mV |
| Scale ranges : | PT100 -99.9 to 300ºC<br>PT100 -200 to 600ºC |
| Scale ranges : | L & J t/c 0 to 600ºC<br>T t/c -200 to 400 ºC<br>K t/c 0 to 1200ºC<br>S t/c 0 to 1600ºC |
| Accuracy : | +/- 0.25% of scale range +/- 1 digit (RTD & t/c)<br>+/- 0.1% of scale range (mA & mV) |
| Operating modes : | 1 P, PD, PID or on/off loop with 2 or 3 alarms<br>2 P, PD, PID or on/off heat-cool loops with 1 or 2 alarms |
| Output 1 : | SPST N.O. relay 2A/250Vac resistive or Triac 1A/250Vac resistive |
| Output 2 : | SPST N. O. relay 2A/250Vac resistive or Triac 1A/250Vac resistive |
| Output 3 : | SPST N.O. Relay 2A/250Vac resistive |
| Output 4 : | 4-20mA, 0-10V or potentiometer options |
| Serial interface : | RS485 isolated for Modbus/Jbus protocols |
| Auxilliary supply : | 18Vdc +/-20%, 30mA max for transmitter supply |
| Approvals : | Conforms to CE standards EN50081-1 and EN50082-1 for emc and EN61010-1 for low voltage. |
| Ambient temp : | 0 to 50ºC non condensing |
| Weight : | 230gms |

## TYPICAL PROGRAM



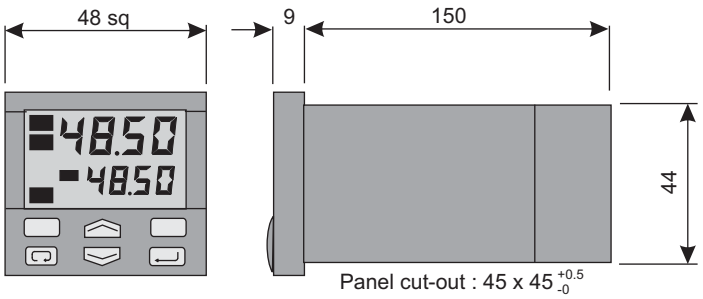

| Segment | Initial | 1 | 2 | 3 | 4 | 5 ..... 9 | 10 | 11 | 12 | 13 | 14 | End |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Time | t0 | t1 | t2 | t3 | t4 | t5 ..... t9 | t10 | t11 | t12 | t13 | t14 | |

**Part Numbering Options : M5 - A B C D - E 000**

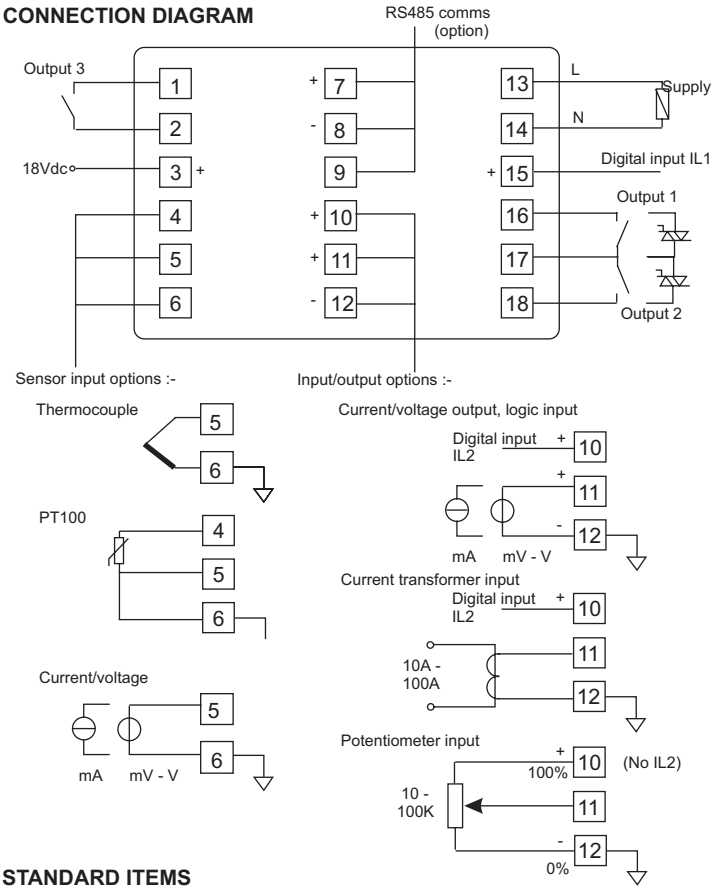
| | | | |
|---|---|---|---|
| A | Power supply | 100 - 240Vac<br>24Vac/dc | 3<br>5 |
| B | Output 1/ 2 | Relay/Relay<br>Relay/Triac<br>Triac/Relay<br>Triac/Triac | 1<br>2<br>4<br>5 |
| CD | Options | None<br>Feedback potentiometer input<br>Remote setpoint input<br>Current transformer input<br>Logic/continuous output<br>Logic/cont + remote setpoint output<br>RS485<br>RS485 + feedback potentiometer input<br>RS485 + remote setpoint input<br>RS485 + current transformer input<br>RS485 + Logic/continuous output | 00<br>01<br>02*<br>03<br>04<br>05*<br>50<br>51<br>52*<br>53<br>54 |
| E | Setpoint program | Not fitted<br>Fitted (adaptive tuning not active) | 0<br>1 |

* Not available with setpoint program installed (E=1)

## DIMENSIONS




## CONNECTION DIAGRAM




## STANDARD ITEMS

| Voltage | Output 1/2 | Options | Part Number |
|---|---|---|---|
| 100-240Vac | Relay/relay | None | M5-3100-0000 |
| 100-240Vac | Relay/relay | Setpoint programmer | M5-3100-1000 |
| 100-240Vac | Relay/relay | RS485, programmer | M5-3150-1000 |
| 24Vac/dc | Relay/relay | None | M5-5100-0000 |
| 24Vac/dc | Relay/relay | RS485 comms | M5-5150-0000 |

For suitable input sensors see page 26.

## X1 1/8 DIN PID TEMPERATURE & PROCESS CONTROLLER

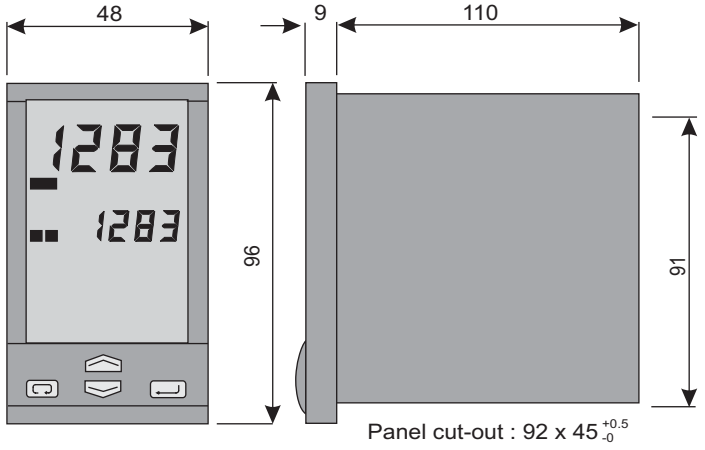
The X1 series microprocessor based PID controllers are a cost effective solution to heat-cool applications. The X1 has up to 2 PID control outputs, programmable alarm functions and optional serial communications, remote setpoint adjustment and ramp-dwell functions. The IP65 rated 1/8 DIN 96x48 case has a clear dual LED display showing the process value and setpoint as well as function indicators.

- Fuzzy autotune and adaptive algorithms
- Programmable alarm functions
- Wide range of thermocouple inputs
- IP65 front panel protection
- Analogue output
- Ramp and dwell functions
- Remote set point facility
- Dual 4 digit LED display
- Heater break detection
- Serial communications

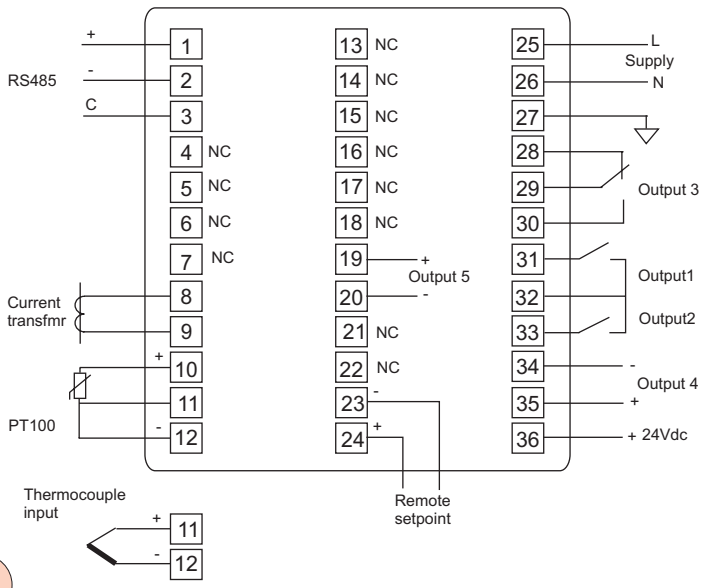
## SPECIFICATION

| | | |
|---|---|---|
| Power supply : | 100 - 240Vac @ 50/60Hz, 24Vac @50/60Hz, 24Vdc | |
| Supply variation : | -15% +10% of supply voltage | |
| Input sensors : | B, E, J, K, L, N, R, T, S thermocouples, PT100, 0/4 to 20mA, 0/10 to 50mV | |
| Scale ranges : | | |
| RTDs : | PT100 | -99.9 to 300ºC |
| | PT100 | -200 to 600ºC |
| Thermocouples : | B t/c | 0 to 1800ºC |
| | E-L-J t/c | 0 to 600ºC |
| | K t/c | 0 to 1200ºC |
| | N t/c | 0 to 1200ºC |
| | R t/c | 0 to 1600ºC |
| | S t/c | 0 to 1600ºC |
| | T t/c | -200 to 400 ºC |
| | T/c Ni-NiMo18% | 0 to 1100ºC |
| | T/c W3%Re-W25%Re | 0 to 2000ºC |
| | T/c W5%Re-W26%Re | 0 to 2000ºC |
| Current: | 0/4-20mA : | { Configurable in engineering units |
| Voltage : | 0/10 - 50mV : | { mA, mV, V, bar, psi, rH, ph |
| Accuracy : | +/- 0.25% of scale range +/- 1 digit (RTD & t/c) +/- 0.1% of scale range (mA & mV) | |
| Operating modes : | 1 PID or on/off loop with 2 or 3 alarms 2 PID or on/off heat-cool loops with 1or 2 alarms | |
| Output 1 : | SPST N.O. relay 2A/250Vac resistive or Triac 1A/250Vac resistive | |
| Output 2 : | SPST N.O. relay 2A/250Vac resistive or Triac 1A /250Vac resistive | |
| Output 3 : | SPDT N.O.Relay 2A/250Vac resistive | |
| Output 4 : | SSR drive 0-5Vdc +/-10%, 30mA max, non isolated | |
| Output 5 : | Analogue control output (optional) | |
| Serial interface : | RS485 isolated for Modbus/Jbus protocols | |
| Auxilliary supply : | 24Vdc +/-20%, 30mA max for transmitter supply | |
| Approvals : | Conforms to CE standards EN50081-1 and EN50082-1 for emc and EN61010-1 for low voltage. | |
| Ambient temp : | 0 to 50ºC non condensing | |
| Weight : | 250gms | |

## DIMENSIONS




## CONNECTION DIAGRAM



**Part Numbering Options : X1 - A B C D - E 000**

| | | | |
|---|---|---|---|
| A | Power supply | 100 - 240Vac<br>24Vac/dc | 3<br>5 |
| B | Output 1/ 2 | Relay/Relay<br>Triac/Triac | 1<br>5 |
| C | Serial comms | None<br>RS485 | 0<br>5 |
| D | Options | None<br>Analogue output + remote setpoint | 0<br>5 |
| E | Special functions | None<br>Start-up + timer functions | 0<br>2 |

**STANDARD ITEMS**

| Voltage | Output 1/2 | Options | Part Number |
|---|---|---|---|
| 100-240Vac | Relay/relay | None | X1-3100-0000 |
| 100-240Vac | Relay/relay | Start-up/timer | X1-3100-2000 |
| 100-240Vac | Relay/relay | RS485 comms | X1-3150-0000 |
| 24Vac/dc | Relay/relay | None | X1-5100-0000 |
| 24Vac/dc | Relay/relay | RS485 comms | X1-5150-0000 |

For suitable input sensors see page 26.

## X3 1/8 DIN PID TEMPERATURE & PROCESS CONTROLLER

The X3 series microprocessor based PID controllers are a cost effective solution to double action valve control applications. The X3 has up to 2 PID control outputs, programmable alarm functions and optional serial communications, remote setpoint adjustment and ramp - dwell functions. The IP65 rated 1/8 DIN 96x48 case has a clear dual LED display showing the process value and setpoint as well as function indicators.

- Fuzzy autotune and adaptive algorithms
- Programmable alarm functions
- Wide range of thermocouple inputs
- IP65 front panel protection
- Analogue output with pot feedback
- Ramp and dwell functions
- Remote set point facility
- 3 Digital inputs
- Heater break detection
- Serial communications

**SPECIFICATION**

Power supply : 100 - 240Vac @ 50/60Hz, 24Vac @50/60Hz, 24Vdc
Supply variation : -15% +10% of supply voltage
Input sensors : B, E, J, K, L, N, R, T, S thermocouples, PT100, 0/4 to 20mA, 0/10 to 50mV

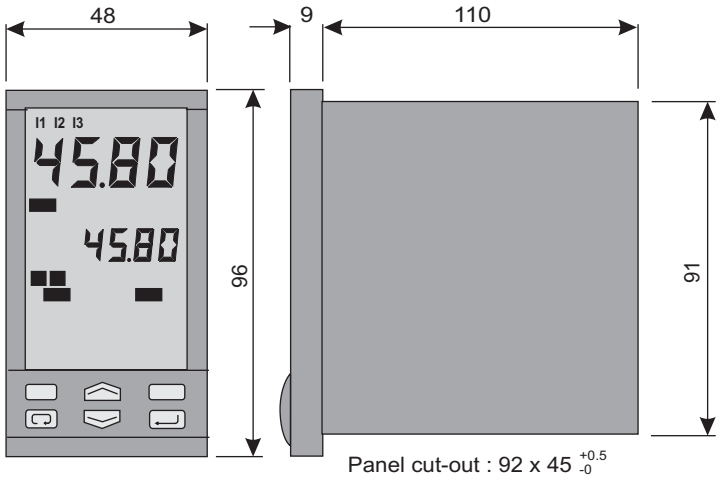
Scale ranges :

| | | |
|---|---|---|
| RTDs : | PT100 | -99.9 to 300ºC |
| | PT100 | -200 to 600ºC |
| Thermocouples : | B t/c | 0 to 1800ºC |
| | E-L-J t/c | 0 to 600ºC |
| | K t/c | 0 to 1200ºC |
| | N t/c | 0 to 1200ºC |
| | R t/c | 0 to 1600ºC |
| | S t/c | 0 to 1600ºC |
| | T t/c | -200 to 400 ºC |
| | T/c Ni-NiMo18% | 0 to 1100ºC |
| | T/c W3%Re-W25%Re | 0 to 2000ºC |
| | T/c W5%Re-W26%Re | 0 to 2000ºC |

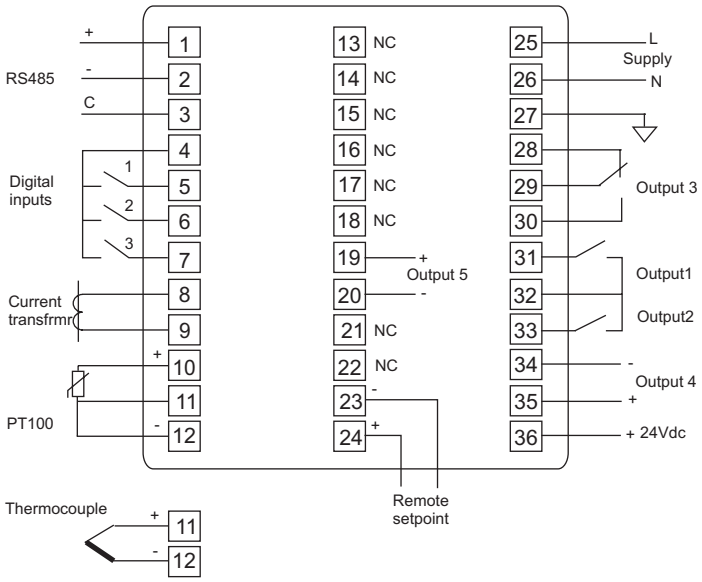
Current : 0/4-20mA { Configurable in engineering units
Voltage : 0/10 - 50mV { mA, mV, V, bar, psi, rH, ph
Accuracy : +/- 0.25% of scale range +/- 1 digit (RTD & t/c)
+/- 0.1% of scale range (mA & mV)
Operating modes : 1 PID or on/off loop with 2 or 3 alarms
2 PID or on/off double action loops with 1 or 2 alarms
Output 1 : SPST N.O. relay 2A/250Vac resistive or Triac 1A/250Vac resistive
Output 2 : SPST N.O. relay 2A/250Vac resistive or Triac 1A /250Vac resistive
Output 3 : SPDT N.O.Relay 2A/250Vac resistive
Output 4 : SSR drive 0-5Vdc +/-10%, 30mA max, non isolated
Output 5 : Analogue control output (optional)

Serial interface : RS485 isolated for Modbus/Jbus protocols
Auxilliary supply : 24Vdc +/-20%, 30mA max for transmitter supply
Approvals : Conforms to CE standards EN50081-1 and EN50082-1 for emc and EN61010-1 for low voltage.
Ambient temp : 0 to 50ºC non condensing
Weight : 250gms

**DIMENSIONS**




**CONNECTION DIAGRAM**




**Part Numbering Options : X3 - A B C D - E 000**

| | | | |
|---|---|---|---|
| A | Power supply | 100 - 240Vac<br>24Vac/dc | 3<br>5 |
| B | Output 1/ 2 | Relay/Relay<br>Triac/Triac | 1<br>5 |
| C | Serial comms | None<br>RS485 | 0<br>5 |
| D | Options | None<br>Valve drive output<br>Analogue output + remote setpoint | 0<br>2<br>5 |
| E | Special functions | None<br>Start-up + timer functions<br>8 segment programmer | 0<br>2<br>3 |

**STANDARD ITEMS**

| Voltage | Output 1/2 | Comms/options | Part Number |
|---|---|---|---|
| 100-240Vac | Relay/relay | None | X3-3100-0000 |
| 100-240Vac | Relay/relay | Start-up/timer | X3-3100-2000 |
| 100-240Vac | Relay/relay | RS485 comms | X3-3150-0000 |
| 24Vac/dc | Relay/relay | None | X3-5100-0000 |
| 24Vac/dc | Relay/relay | RS485 comms | X3-5150-0000 |

For suitable input sensors see page 26.