**ANALOGUE TEMPERATURE CONTROLLERS**

**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
Max ext. resist: T/couple: 100 , PT100: 5 per wire
Control band: On/Off: Hyst. = 0.5% (1% TC486*) of full scale
Prop.: 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

**STANDARD ITEMS**

- J T/c Relay: 0 to 100°C - TOS-B4RJ1C
- K T/c Relay: 0 to 200°C - TOS-B4RK2C
- PT100 Relay: 0 to 800°C - TOS-B4R8C

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

**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
Prop.: 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

**STANDARD ITEMS**

- Input Mode Output Range Part Number
  - J T/c On/Off Relay 0 to 200°C TC4810-01-110/230VAC
  - K T/c On/Off Relay 0 to 800°C TC4810-02-110/230VAC
  - K T/c On/Off Relay 0 to 1000°C TC4810-03-110/230VAC
  - J T/c On/Off Relay 0 to 200°C TC4810-01-110/230VAC
  - PT100 On/Off Relay -50 to 150°C TC4810-01-110/230VAC
  - PT100 On/Off Relay 0 to 200°C TC4810-02-110/230VAC
  - K T/c PD Relay 0 to 800°C TC4830-01-110/230VAC
  - K T/c PD Relay 0 to 600°C TC4830-02-110/230VAC

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

TR4800 TACHOMETER RELAY

The TR4800 series tachometer relay will switch its 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
  02: 50 to 1000 rpm
  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 full scale 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

<table>
<thead>
<tr>
<th>A</th>
<th>Range</th>
<th>Part Number</th>
</tr>
</thead>
<tbody>
<tr>
<td>01</td>
<td>5 - 100 rpm</td>
<td>TR4801-01-110/230Vac</td>
</tr>
<tr>
<td>02</td>
<td>50 - 1000 rpm</td>
<td>TR4801-02-110/230Vac</td>
</tr>
<tr>
<td>03</td>
<td>500 - 10000 rpm</td>
<td>TR4801-03-110/230Vac</td>
</tr>
</tbody>
</table>

B  Power supply

<table>
<thead>
<tr>
<th>Power supply</th>
<th>Part Number</th>
</tr>
</thead>
<tbody>
<tr>
<td>110/230Vac</td>
<td>TR4801-01-110/230Vac</td>
</tr>
<tr>
<td>24Vac/dc</td>
<td>TR4801-02-110/230Vac</td>
</tr>
<tr>
<td>24VAC/DC</td>
<td>TR4801-03-110/230Vac</td>
</tr>
</tbody>
</table>

CONNECTION DIAGRAM

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 fascia 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, its 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 \( S = \frac{60}{nT} \) rpm
  where \( n \) = No. of pulses per revolution
  \( T \) = time set on potentiometer
Min. Pulse width: 3 msecs (for 50% duty cycle). To calculate the minimum ‘flag’ width \( W \), use the formula \( W = \frac{r}{10} \) 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

Part Numbering Options: FSRSST30SLP-110/230VAC

<table>
<thead>
<tr>
<th>Type Delay Part Number</th>
</tr>
</thead>
<tbody>
<tr>
<td>Shaft Rotation Sensor 30 sec FSRSST30SLP-110/230VAC</td>
</tr>
</tbody>
</table>

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.

SPECIFICATION

Dual supply voltage

Type Standard Item

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

DIFFERENTIAL OR SINGLE POINT DETECTION

LEVEL INDICATING LEDS

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

Type Range Part Number

- Tachometer relay
  - 5 - 100 rpm TR4801-01-110/230Vac
  - 50 - 1000 rpm TR4801-02-110/230Vac
  - 500 - 10000 rpm TR4801-03-110/230Vac

Note: For suitable panel mounting or DIN rail wiring sockets see page 33.
**DIFFERENTIAL LEVEL SENSOR**

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: 180gms

**CONNECTION DIAGRAM**

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

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**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
  - J T/c: 199, 399°C
  - 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
  - Propl: Propl. band = up to 3% of scale range
- Reset adjust: +/-3% of scale range
- Output rating: Relay: 2A/240Vac resistive
  - SSR: 20mA/12Vdc
- Electrical life: 100,000 ops at rated load
- Ambient range: -10 to 50°C non condensing

**CONNECTION DIAGRAM**

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

---

**STANDARD ITEMS**

<table>
<thead>
<tr>
<th>Input</th>
<th>Output</th>
<th>Range</th>
<th>Part Number</th>
</tr>
</thead>
<tbody>
<tr>
<td>J T/c</td>
<td>Relay</td>
<td>0 to 199°C</td>
<td>T3S-B4RJ2C</td>
</tr>
<tr>
<td>J T/c</td>
<td>Relay</td>
<td>0 to 399°C</td>
<td>T3S-B4RJ4C</td>
</tr>
<tr>
<td>K T/c</td>
<td>Relay</td>
<td>0 to 399°C</td>
<td>T3S-B4RK4C</td>
</tr>
<tr>
<td>K T/c</td>
<td>Relay</td>
<td>0 to 799°C</td>
<td>T3S-B4RK8C</td>
</tr>
</tbody>
</table>

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

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

**SPECIFICATION**

- Supply voltage: 24Vac/dc @ 60mA max. 110Vac, 50/60 Hz @ 1.5VA max. 220-240Vac, 50/60 Hz @ 1.5VA max.
- Sensor options: J, K, T, N thermocouples, PT100 and 4-20mA
- Gain accuracy: T/c = +/- 0.25% of scale range
- Scale ranges: J T/c = -99 to 700°C (999°F) K/N T/c = -99 to 999°C or 700°C 4-20mA = scalable -99 to 999 units
- Other = +/- 0.6% of scale range
- Offset accuracy: T/c = +/- 5°C, PT100 = +/- 2°C

**CONNECT DIAGRAM**

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

**DIMENSIONS**

- Panel cut-out 45 x 45 mm
- Standard Items
- Thermocouple 24Vac/dc 110Vac 230Vac
- PT100 24Vac/dc 110Vac 230Vac
- 4-20 mA 24Vac/dc 110Vac 230Vac

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 and 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

**SPECIFICATION**

- Supply voltage : 12Vac/dc or 230Vac
- Power drain : 3VA
- Sensor options : NTC or PTC
- Scale range : -50 to 99°C
- Accuracy : NTC +/-1°C
- PTC +/-3°C
- Outputs : 50E : 8A SPST relay
- S0P/S1P : 1A SPST relay
- S2,X,Y : 1 SPCO and 1SPST 8A relays
- C : 2 SPST 5A and 1 SPST 8A relays

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

<table>
<thead>
<tr>
<th>A</th>
<th>B</th>
<th>C</th>
<th>D</th>
</tr>
</thead>
<tbody>
<tr>
<td>Refrigeration unit type</td>
<td>Digital input</td>
<td>Controller type</td>
<td>Power supply</td>
</tr>
<tr>
<td>S</td>
<td>0</td>
<td>E</td>
<td>L</td>
</tr>
<tr>
<td>Y</td>
<td>1</td>
<td>P</td>
<td>12Vac/dc</td>
</tr>
<tr>
<td>X</td>
<td>2</td>
<td>Economic Top version 16A relays &amp; buzzer</td>
<td></td>
</tr>
<tr>
<td>C</td>
<td>3</td>
<td>ventilated units below 0°C</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>230Vac</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>100VA</td>
</tr>
</tbody>
</table>

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

For suitable panel mounting or DIN rail wiring sockets see page 33. For thermocouples, PT100 and other applicable types of sensor 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 +90°C. 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
- RS485 programming and data analysis via serial link
- IP65 water and dust protection
- CE approval for emc and low voltage directives

**Model Descriptions**

<table>
<thead>
<tr>
<th>Model No</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>IR32S0LBR0</td>
<td>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.</td>
</tr>
<tr>
<td>IR32Y0LBR0</td>
<td>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.</td>
</tr>
<tr>
<td>IR32C0LBR0</td>
<td>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.</td>
</tr>
</tbody>
</table>

**SPECIFICATION**

<table>
<thead>
<tr>
<th>Inputs:</th>
<th>1 or 2 NTC sensor (PTC available on request)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Scale range:</td>
<td>NTC = - 40 to 90°C</td>
</tr>
<tr>
<td></td>
<td>PTC = - 40 to 120°C</td>
</tr>
<tr>
<td>Accuracy:</td>
<td>+/- 1% of scale range</td>
</tr>
<tr>
<td>Outputs:</td>
<td>IR32S: 1 x SPCO relay</td>
</tr>
<tr>
<td></td>
<td>IR32Y: 2 x SPCO relay</td>
</tr>
<tr>
<td></td>
<td>IR32C: 4 x SPCO relay</td>
</tr>
<tr>
<td>Output ratings:</td>
<td>8A @ 250Vac (10 A inrush)</td>
</tr>
</tbody>
</table>

**CONNECTION DIAGRAM**

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.
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: -90ºC to 90ºC, Pt100: -99 to 600ºC, J: -99 to 800ºC, K: -99 to 999ºC, 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 50ºC @ 90% rH (non-condensing)
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.

**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

**CONNECTION DIAGRAMS**

NTC/Relay Versions

<table>
<thead>
<tr>
<th>Output 4 (Z types)</th>
<th>Output 2 (W/Z types)</th>
<th>Output 3 (Z types)</th>
</tr>
</thead>
<tbody>
<tr>
<td>10 11 12</td>
<td>13 14 15 16 17 18</td>
<td></td>
</tr>
<tr>
<td>1 2 3</td>
<td>4 5 6 7 8 9</td>
<td></td>
</tr>
</tbody>
</table>

NTC/SSR Versions

<table>
<thead>
<tr>
<th>SSR Output 4 (Z types)</th>
<th>SSR Output 2 (W/Z types)</th>
<th>SSR output 3 (Z types)</th>
</tr>
</thead>
<tbody>
<tr>
<td>10 11 12</td>
<td>13 14 15 16 17 18</td>
<td></td>
</tr>
<tr>
<td>1 2 3</td>
<td>4 5 6 7 8 9</td>
<td></td>
</tr>
</tbody>
</table>

T/C, Voltage & Current Input/Relay Versions

<table>
<thead>
<tr>
<th>Output 4 (Z types)</th>
<th>Output 2 (W/Z types)</th>
<th>Output 3 (Z types)</th>
</tr>
</thead>
<tbody>
<tr>
<td>10 11 12</td>
<td>13 14 15 16 17 18</td>
<td></td>
</tr>
<tr>
<td>1 2 3</td>
<td>4 5 6 7 8 9</td>
<td></td>
</tr>
</tbody>
</table>

T/C, Voltage and Current Input/SSR Versions

<table>
<thead>
<tr>
<th>SSR Output 4 (Z types)</th>
<th>SSR Output 2 (W/Z types)</th>
<th>SSR output 3 (Z types)</th>
</tr>
</thead>
<tbody>
<tr>
<td>10 11 12</td>
<td>13 14 15 16 17 18</td>
<td></td>
</tr>
<tr>
<td>1 2 3</td>
<td>4 5 6 7 8 9</td>
<td></td>
</tr>
</tbody>
</table>

**DIMENSIONS**

- **Panel cut out:** 71 x 29
- **Clearance around instrument to allow for panel clip:** 95 x 40

**STANDARD ITEMS**

<table>
<thead>
<tr>
<th>Output Type</th>
<th>Input Type</th>
<th>Part Number</th>
</tr>
</thead>
<tbody>
<tr>
<td>1 Relay</td>
<td>NTC</td>
<td>IR32V0E000</td>
</tr>
<tr>
<td></td>
<td>PT100</td>
<td>IR32V1L000</td>
</tr>
<tr>
<td></td>
<td>J/K thermocouple</td>
<td>IR32V2L000</td>
</tr>
<tr>
<td></td>
<td>4-20mA</td>
<td>IR32V3L000</td>
</tr>
<tr>
<td></td>
<td>-0.5 to 1V</td>
<td>IR32V4L000</td>
</tr>
<tr>
<td>2 Relays</td>
<td>NTC</td>
<td>IR32W00000</td>
</tr>
<tr>
<td></td>
<td>PT100</td>
<td>IR32W10000</td>
</tr>
<tr>
<td></td>
<td>J/K thermocouple</td>
<td>IR32W20000</td>
</tr>
<tr>
<td></td>
<td>4-20mA</td>
<td>IR32W30000</td>
</tr>
<tr>
<td></td>
<td>-0.5 to 1V</td>
<td>IR32W40000</td>
</tr>
<tr>
<td>4 Relays</td>
<td>PT100</td>
<td>IR32Z10000</td>
</tr>
<tr>
<td></td>
<td>J/K thermocouple</td>
<td>IR32Z20000</td>
</tr>
<tr>
<td>1 SSR</td>
<td>PT100</td>
<td>IR32D1L000</td>
</tr>
<tr>
<td></td>
<td>J/K thermocouple</td>
<td>IR32D2L000</td>
</tr>
<tr>
<td>4 SSRs</td>
<td>PT100</td>
<td>IR32A10000</td>
</tr>
<tr>
<td></td>
<td>J/K thermocouple</td>
<td>IR32A20000</td>
</tr>
</tbody>
</table>

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.
DIGITAL TEMPERATURE & PROCESS CONTROLLERS

C1 1/32 DIN PID TEMPERATURE & PROCESS CONTROLLER

- Fuzzy autotune and adaptive algorithms
- Programmable alarms
- Clear 4 digit LED display
- Transmitter power supply

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.

For IR remote controls see page 33. For suitable NTC and PT100 sensors and thermocouples see page 26.
DIGITAL TEMPERATURE & PROCESS CONTROLLERS

**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
- Programmable alarms
- Relay or triac + SSR output options
- Simple 4 digit LED display
- IP65 front panel protection
- 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
- Accuracy : +/- 0.25% of scale range +/- 1 digit (RTD & t/c)
- Operating modes : Indicator with 2 alarms
  1 PID or on/off loop with 1 alarm
- Output 1 : SPST N.O. relay 2A/250Vac resistive or 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
- Auxiliary 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 : C1- A B C D -0000**

- A Power supply
  - 100 - 240Vac
  - 24Vac/dc
- B Output 1 Relay
  - Triac
- CD Options
  - None
  - Auxiliary transmitter power supply
  - Aux power supply + PV retransmission
  - RS485
  - RS485 + aux power supply

**CONNECTION DIAGRAM**

- Thermocouple
- Voltage
- Current
- External shunt
- 2.5ohm

**DIMENSIONS**

- Panel cut-out : 45 x 22.5

**STANDARD ITEMS**

<table>
<thead>
<tr>
<th>Voltage</th>
<th>Output 1</th>
<th>Comms</th>
<th>Part Number</th>
</tr>
</thead>
<tbody>
<tr>
<td>100-240Vac</td>
<td>Relay</td>
<td>None</td>
<td>C1-3000-0000</td>
</tr>
<tr>
<td>100-240Vac</td>
<td>Relay</td>
<td>RS485</td>
<td>C1-3050-0000</td>
</tr>
<tr>
<td>100-240Vac</td>
<td>Triac</td>
<td>None</td>
<td>C1-3300-0000</td>
</tr>
<tr>
<td>24Vac/dc</td>
<td>Relay</td>
<td>None</td>
<td>C1-5000-0000</td>
</tr>
<tr>
<td>24Vac/dc</td>
<td>Relay</td>
<td>RS485</td>
<td>C1-5050-0000</td>
</tr>
</tbody>
</table>

For suitable input sensors see page 26.
**DIGITAL TEMPERATURE & PROCESS CONTROLLERS**

**STANDARD ITEMS**

<table>
<thead>
<tr>
<th>Voltage</th>
<th>Output 1</th>
<th>Comms</th>
<th>Part Number</th>
</tr>
</thead>
<tbody>
<tr>
<td>100-240Vac</td>
<td>Relay</td>
<td>None</td>
<td>M1-3000-0000</td>
</tr>
<tr>
<td>100-240Vac</td>
<td>Triac</td>
<td>None</td>
<td>M1-3300-0000</td>
</tr>
<tr>
<td>24Vac/dc</td>
<td>Relay</td>
<td>None</td>
<td>M1-5000-0000</td>
</tr>
</tbody>
</table>

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

**SPECIFICATION**

- Power supply : 100 - 240Vac @ 50/60Hz, 24Vac @50/60Hz, 24Vdc
- Input sensors : J, K, L, T, S Thermocouples, PT100, 0/4 to 20mA, 0/10 to 50mV
- Scale ranges : PT100 -99.9 to 300ºC
- T t/c -200 to 0ºC
- K t/c 0 to 600ºC
- L & J t/c 0 to 600ºC
- 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 0-5Vac +/-10%, 30mA max, not isolated & Not isolated and
- Serial interface : RS485 isolated for Modbus/Jbus protocols
- Auxiliary supply : 18Vac +/-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**

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

**SPECIFICATION**

- Power supply : 100 - 240Vac @ 50/60Hz, 24Vac @50/60Hz, 24Vdc
- Input sensors : J, K, L, T, S Thermocouples, PT100, 0/4 to 20mA, 0/10 to 50mV
- Scale ranges : PT100 -99.9 to 300ºC
- T t/c -200 to 0ºC
- K t/c 0 to 600ºC
- L & J t/c 0 to 600ºC
- PT100 0/10 to 50mV
- 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
- Output 2 : SSR drive 0-5Vac +/-10%, 30mA max, not isolated & Not isolated and
- Serial interface : RS485 isolated for Modbus/Jbus protocols
- Auxiliary supply : 18Vac +/-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 : M4- A B C D -0000**
**DIGITAL TEMPERATURE & PROCESS CONTROLLERS**

**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 customizable procedures. With a sampling time of 0.1sec, up to 16 program segments, configurable outputs, programmable alarm functions and serial communications facilities, the M5 is a powerful process controller/programmer in a compact 1/16 DIN 48 X 48mm package.

**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 0 to 1200ºC
  - K t/c 0 to 1200 ºC
  - S t/c 0 to 1600 ºC
- **Accuracy:** +/- 0.25% of scale range +/- 1 digit (RTD & t/c)
  - +/- 0.1% of scale range (mA & mV)
- **Operating modes:** 1 P, PD, PID or on/off loop with 2 or 3 alarms
  - 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:** 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
  - 6
  - 7
  - 8
  - 9
  - 10
  - 11
  - 12
  - 13
  - 14
  - End

**STANDARD ITEMS**

<table>
<thead>
<tr>
<th>Voltage</th>
<th>Output 1/3</th>
<th>Options</th>
<th>Part Number</th>
</tr>
</thead>
<tbody>
<tr>
<td>100-240Vac</td>
<td>Relay/relay</td>
<td>4-20mA output</td>
<td>M4-3107-0000</td>
</tr>
<tr>
<td>100-240Vac</td>
<td>Relay/relay</td>
<td>RS485, DI, 4-20mA o/p</td>
<td>M4-3197-0000</td>
</tr>
<tr>
<td>100-240Vac</td>
<td>Relay/relay</td>
<td>RS485, DI, 4-20mA o/p, timer</td>
<td>M4-3197-2000</td>
</tr>
<tr>
<td>24Vac/dc</td>
<td>Relay/relay</td>
<td>4-20mA output</td>
<td>M4-5100-0000</td>
</tr>
</tbody>
</table>

For suitable input sensors see page 26.

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

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

For suitable input sensors see page 26.

**DIGITAL TEMPERATURE & PROCESS CONTROLLERS**

**Output 4 :** 4-20 mA analogue control output (optional)

**Serial interface :** RS485 isolated for Modbus/Jbus protocols

**Auxiliary 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
**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 communications. 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**

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

**DIMENSIONS**

- Panel cut-out : 45 x 45

---

**STANDARD ITEMS**

<table>
<thead>
<tr>
<th>Voltage</th>
<th>Output 1/2</th>
<th>Options</th>
<th>Part Number</th>
</tr>
</thead>
<tbody>
<tr>
<td>100-240Vac</td>
<td>Relay/relay</td>
<td>None</td>
<td>M5-3100-0000</td>
</tr>
<tr>
<td>100-240Vac</td>
<td>Relay/relay</td>
<td>Setpoint programmer</td>
<td>M5-3100-1000</td>
</tr>
<tr>
<td>100-240Vac</td>
<td>Relay/relay</td>
<td>RS485, programmer</td>
<td>M5-3150-1000</td>
</tr>
<tr>
<td>24Vac/dc</td>
<td>Relay/relay</td>
<td>None</td>
<td>M5-5100-0000</td>
</tr>
<tr>
<td>24Vac/dc</td>
<td>Relay/relay</td>
<td>RS485 comm</td>
<td>M5-5150-0000</td>
</tr>
</tbody>
</table>

For suitable input sensors see page 26.
**DIGITAL TEMPERATURE & PROCESS CONTROLLERS**

### 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

### 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**: PT100 -99.9 to 300°C, PT100 -200 to 600°C
- **Thermocouples**: B, J, K, L, N, R, T
- **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)
- **Ramp**: +/- 0.1% of scale range (mA & mV)
- **Operating modes**: 1 PID or on/off loop with 2 or 3 alarms
- **Current**: 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)
- **Part Numbering Options**: X3-ABCD-E0 0 0
- **STANDARD ITEMS**
  - **Voltage Output 1/2 Comms/options Part Number**: 100-240Vac Relay/relay None X3-3100-0000
  - **Output 1/2 Relay/relay Start-up/timer X3-3100-2000
  - **Output 1/2 Relay/relay RS485 comms X3-3150-0000
  - **24Vac/dc Relay/relay None X3-5100-0000
  - **24Vac/dc Relay/relay RS485 comms X3-5150-0000
- **Part Numbering Options**: X3-ABCD-E0 0 0
- **STANDARD ITEMS**
  - **Voltage Output 1/2 Comms/options Part Number**: 100-240Vac Relay/relay None X1-3100-0000
  - **Output 1/2 Relay/relay Start-up/timer X1-3100-2000
  - **Output 1/2 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.