TIMER AND THERMISTOR UNIT MANUAL

Health and Safety at Work Act 1974

It is most important that equipment is used in it's correct application according to the purpose for which it was designed and that the relevant instructions, regulations, procedures and codes of practice are strictly complied with.

Installation, operation and maintenance of the equipment should be carried out by appropriately qualified personnel and customers and users are referred to the information contained in this leaflet and to the specific technical literature. Additional information on individual products and a free technical advisory service can be provided on request.

Particular attention should be made to the Electricity at Work Regulations 1989.

The information provided should be carefully read before installing units. Their observance will ensure reliable and satisfactory service.

SPECIFICATION

Supply Voltage

Types TM, YD	110 - 440v A.C. only
Type TH24	24 - 60v A.C.D.C.
Type TH110	110 - 240v A.C. only
Type TH415	220 - 440v A.C. only

For connection details check the rating label and refer to the appropriate section below.

As switchgear applications will impose the most severe voltage requirements the units have been designed to accommodate the British Standard Switchgear voltage tolerances. Namely, satisfactory operation at 15% below the minimum voltage and 10% above the maximum voltage, of the stated range.

Frequency

48.75-63Hz.

Ambient Temperature

Full stabilisation over the range -20°C to +50°C, at standard altitudes and humidity conditions.
Extreme Conditions: When used at altitudes above 2,000 metres (6,600 ft.) consult Crompton Controls regarding derating of the unit.

Relay Contact Rating

The relay switch rating requirements as listed below.

TEST DUTY	CARRY AND BREAK	MAKE
1	0.6A. 110V. 0.4 p.f.±.05	6A. 110V. 0.7 p.f.±.05
2	0.14A. 485V. 0.4 p.f.±.05	1.4A. 485V. 0.7 p.f.±.05
3	6A. 110V. 0.7 p.f.±.05	6A. 485V. 0.7 p.f.±.05
4	1.4A. 485V. 0.7 p.f.±.05	1.4A. 485V. 0.7 p.f.±.05

The test voltages of 110v and 485v represent an over voltage of 10% on the switching rated voltages of 100v and 440v. Care should be taken in low voltage control circuits to ensure that the continuous current through the contacts does not exceed 2 amps. Where the above limits would be exceeded a buffer relay of sufficient capacity to handle the load is required.
Electrical life of relay: 10^5 operations at rated load.
Mechanical life of relay: $30x10^6$ operations.

Flash Testing

The timer unit may have the usual high-voltage insulation test (up to 2,200 volts~) applied between any of the connection terminals and earth. However, the normal practice should be followed of taking care not to apply high test voltages between the terminals themselves.

Input-Output Interaction

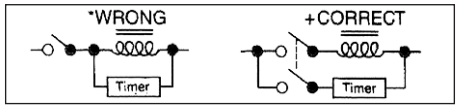
NIL on normal circuits. There is complete electrical isolation of the input driving circuit and the relay output contacts. The input-output capacity is less than 100pF.

Current Consumption

Up to 20mA approx. dependant on supply voltage.

Reset Time

The relay contacts normally change state within 0.18 secs. maximum of removing the input signal. However, it should be noted that the low holding consumption of the timer may result in the above reset time being significantly increased should the unit be directly connected in parallel with apparatus storing electrical energy, i.e. solenoids, capacitors etc. If the reset time is important the control switch for the input signal should only feed the timer unit:-



*Only 'wrong' in relatively few applications: i.e. where the reset time is important and the energy store of significant magnitude.

Fusing

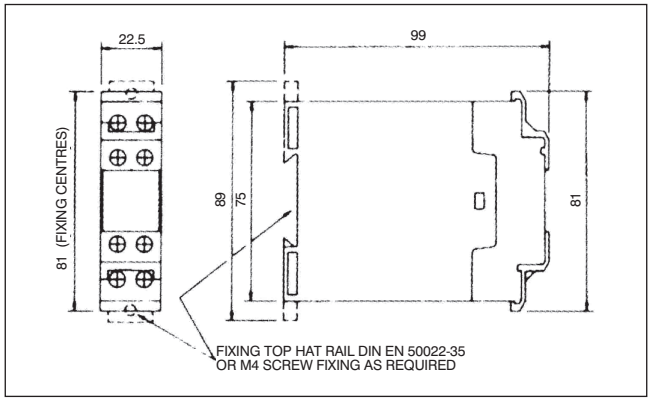
Where fusing of the circuit being controlled is considered necessary, the fuse should be inserted in the feed wire to terminal A2, A3 or A4 as appropriate.
In order to adequately protect the printed circuit connections it is advisable to restrict the fuse to a maximum of 4 amps.

HRC fuses are preferred.

Enclosure

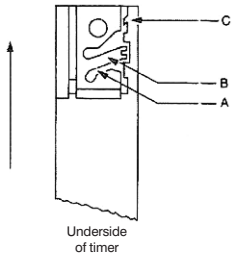
Terminal Housing:	Polycarbonate/GVIV-O Grey
Case:	ABS/V-O Grey
Finger Protection:	Transparent Polycarbonate

Please Note:- All dimensions in millimetres.



Mounting

Either A: Snap mounting on top hat rail, DIN EN 50 022 3S
or B: Screw mounting by slide out lugs.



Conversion from DIN Rail Mounting To Foot Mounting

Insert a 6mm wide screwdriver blade into slot 'A'. Turn lug 'B' anti-clockwise until end of lug is clear of the main moulding. Slide the moulding outwards until the slot in the end of lug 'B' is aligned with the location lug 'C' on the main moulding.

Repeat the above on other end of timer case.

TIMERS

This unit is part of a range of fully stabilised precision electronic timers. Suitable for nearly all industrial and other sequence timing applications where small size, high reliability and long life is required. It is designed to ensure extremely stable timing under all general conditions including fluctuations in supply voltage and ambient temperature.

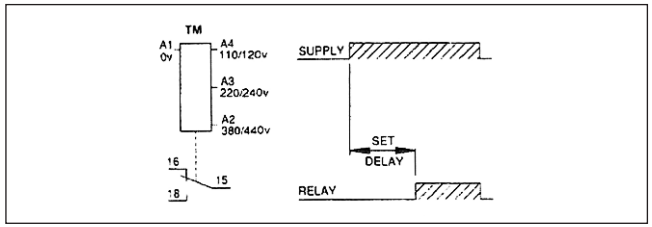
STANDARD TIMER TYPE TM

Function

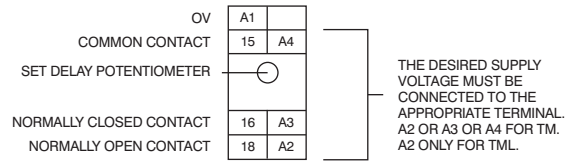
Delay on energisation.

Operation

Timing commences from the moment the desired suppiy voltage is applied. At the end of the set delay period the changeover output contacts operate. The timer is reset by removing the supply, which can be removed at any time without affecting the subsequent delay period. Indefinite application of the supply voltage is not detrimental to the unit.



External Connections and Controls



Time Delay Setting

The delay period is set by rotating the potentiometer to the desired time setting indicated on the scale. The effective potentiometer rotation is 270°C from the minimum to the maximum time setting. The maximum delay period is as given by the unit reference for example:-
Ref. TM305.
allows a delay period of up to 30 seconds.

STAR DELTA TIMER TYPE YD

Function

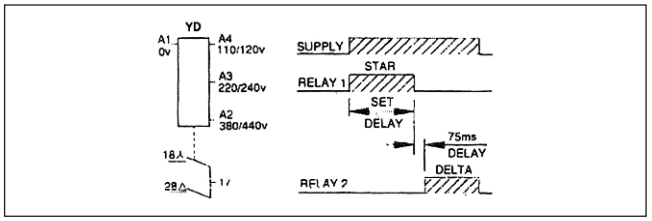
Dual relay timer for star delta starting.

Operation

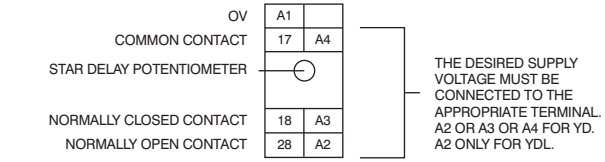
The star output contact closes and timing of the star delay commences from the moment the desired supply voltage is applied. At the end of the set star delay period the star output contact opens. After an additional fixed delay period of 75mS the delta output contact closes and remains closed until the timer is reset by removing the supply.

The fixed delay ensures short circuit protection allowing for the inertia of the contactors with the briefest possible current-free dwell during star to delta change-over.

Indefinite application of the supply voltage is not detrimental to the unit.



External Connections and Controls



Time Delay Setting

The star delay period is set by rotating the potentiometer.

The maximum delay period is as given by the unit reference, for example:

Ref. YD30S

allows a delay period of up to 30 seconds. The effective potentiometer rotation is 270° from the minimum to the maximum time setting.

THERMISTOR PROTECTION UNITS

For use in conjunction with PTC Thermistors as specified in the same British Standard

Thermistor units provide inherent positive protection against conditions which can cause over-temperature damage to the motor windings of electric motors by:-

1. Locked Rotor.
2. Under or over-voltage.
3. Too frequent starting.
4. Excessive run up times.
5. Impaired Ventilation.
6. High ambient temperature
7. Single-phasing.
8. Sustained overload.
9. Unsuitable duty-cycles.
10. Unbalanced voltages.

Thermistors are inserted deep into the motor windings where subsequent varnish impregnation ensures that they come into good thermal contact with the actual insulated wire they are designed to protect. If the motor winding temperature rises above it's safe point the resulting vast change of resistance of the thermistors is utilized to activate an external control unit which initiates the stopping of the motor.

These thermistors have the advantage of very small size and mass and medium impedance, hence the connecting wire between the motor and device can be of inexpensive light gauge.

It should be noted, however, that certain special types of motors prove difficult protect because of more rapid rates of temperature rise In other parts of the motor, particularly the rotor.

If very long runs are required, or if runs are close to heavy conductors it may be necessary to take precautions against Induced voltage pick-up. In such cases lightly twisting the two conductors together before drawing in the conduit will usually be sufficient. For extreme cases see effect of capacitance.

The following thermistors are available:-

Type Ref.	Colour Code of Leads	Type Ref.	Colour Code of Leads
PTCR100	Red	PTCR140	Blue & White
PTCR110	Brown	PTCR160	Blue & Red
PTCR120	Grey	PTCR190	Grey & Brown
PTCR130	Blue		

Note: The same Thermistor Protection Unit can be used with all PTCR's.

Operation

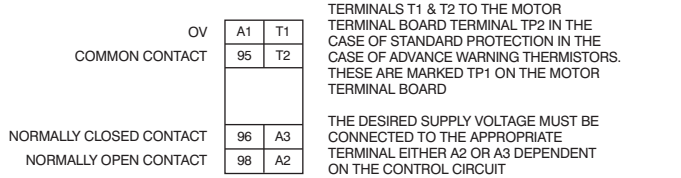
The change-over output contacts operate immediately on application of the desired supply voltage. If an over temperature condition occurs, when the motor winding temperature rises above it's safe working threshold, it is detected by the termistors resulting in a vast change of resistance. This initiates the unit, de-energises the relay and breaks the control circuit, therefore switching off the supply to the motor.

Important

The Thermistor unit is inherently a self-resetting device, Therefore, if used with 'Auto-start' circuits where unexpected re-starting could cause danger a manual reset circuit should be employed.

Indefinite application of the supply voltage is not detrimental to the unit.

External Connections



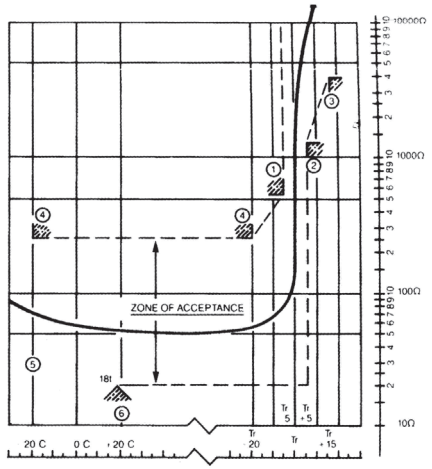
Supply Voltage Connections – (–15% +10%)

	A2	A3
TH24	24/60v	
TH110	220/240v	110/125v
TH415	380/440v	220/240v

Temperature/Resistance Characteristics

Note:-

As a ready rule, but not as a specification point, the thermistors can be regarded as having a resistance of approximately 1,000 ohms at the reference temperature Tr.

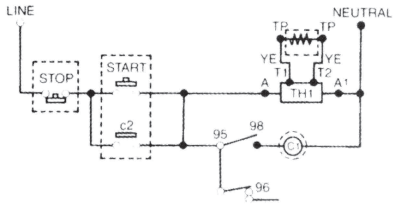


Effect of Capacitance

Long runs of certain types of cable in the thermistor circuit may affect the operation of the Thermistor unit, causing the relay to remain energised even when the thermistor(s) reach the tripping value. If It is suspected that trouble of this nature is being experienced, the thermistor circuit should be disconnected at the motor terminals when the contactor should drop out. If this does not happen, then an isolation transformer should be fitted.

Should, however, an earthed Neutral (ie. earthed at the supply distribution transformer) be available when the Neutral of the control circuit should always be connected directly (without interceding auxiliary switches, etc.) to terminal A1 of the Thermistor unit (see typical key diagram below).

When the above is carried out, the cable length may be increased by about ten times without an isolation transformer being necessary.



*A=A2 or A3 dependant on unit reference.

Final Check of Installation

AFTER taking due precautions against receiving an electric shock, or causing a short circuit, test each installation by breaking the thermistor circuit AT THE MOTOR END whilst the motor is running. The motor should stop.

The above test, whilst desirable on average installations, becomes essential where there are unusual lengths of cable runs as, by so doing, any possible inductive or capacitive effect on the cables will be checked.

Combined Remote Stop and Test Circuit

At little extra cost, as the same Thermistor circuit cabling will be utilised, a permanent combined remote stop/overload test facility can be provided near the motor drive. Connect a standard type stop push button, with a 5,000 ohm resistor across the terminals, in series with thermistor circuit operation of the push button will insert the resistor into the thermistor circuit and so stop/test the installation.

Important - Testing Thermistor Circuits

On no account should a 500 volt insulation tester or other high voltage test equipment be connected ACROSS the thermistor terminals as this will damage the thermistors. High test voltages (up to 2,200v) can, however, be applied from the thermistor to the motor winding to check the thermistor insulation.

Guarantee

All goods are guaranteed for one year from date of purchase. This does not effect the statutory rights of the user.

All information contained in this publication is, as far as possible, correct at the time of going to print. However, due to our policy of continued improvement, we reserve the right to alter specifications without prior notice.

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