

## **MOTOR PROTECTION RELAY**

### **MPR3S MOD(N)**

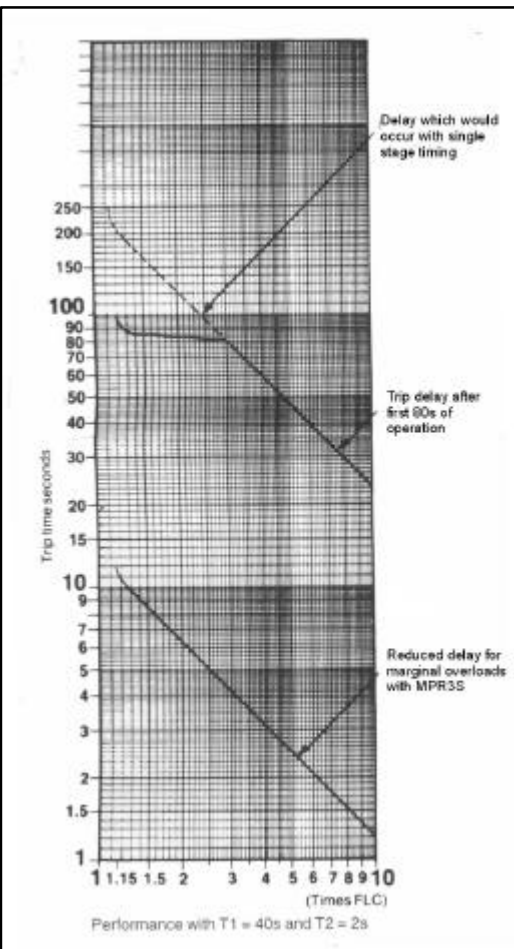


# MOTOR PROTECTION RELAY MPR3S MOD(N)

The MPR3S, together with suitable current transformers, monitors motor supply current. Three-phase motors generally require two CTs. An overload condition causes the unit to trip after a time delay inversely proportional to the overcurrent. The MPR3S uniquely provides independently adjustable time delays for starting and normal running. This allows an extended response time during starting, minimising nuisance trips, while maintaining a fast response during normal running. By setting the run delay at minimum (0.2s), shearpin type protection is achieved. Automatic transfer from the start delay to run delay occurs after a period of approximately twice the selected start delay. If necessary the start delay can be disabled to give conventional single delay operation.

Auto/manual reset facilities, with an adjustable reset delay, are provided. A pushbutton is fitted for local reset, with terminals for a remote reset contact.

Other MPR3S features include phase loss detection, motor temperature monitoring and a test button to confirm unit operation.



## Technical Specification

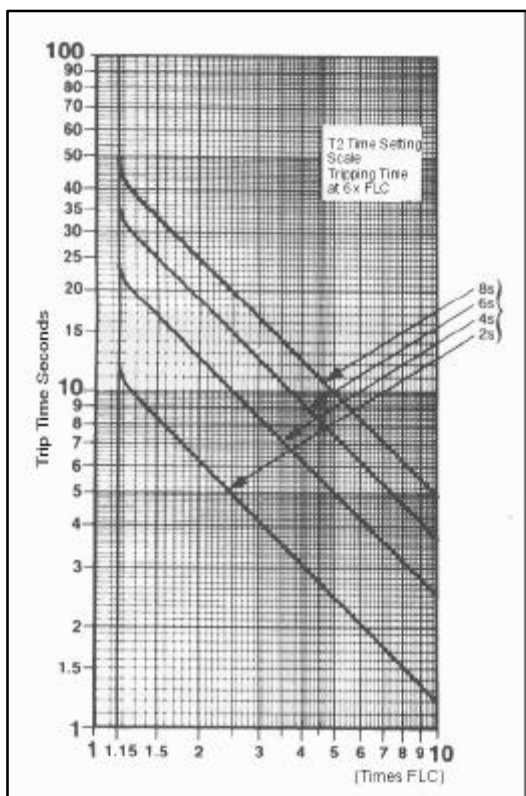
Supply voltage:	115/240V or 440V, 50/60Hz
Load current range:	Up to 400A using a single CT in each of two phases. See CT selection charts. The current range at the MPR3S input is 17.5 - 50mA.
Output relay:	Ratings (N/C and N/O contacts) Resistive load: 5A 115V
A.C. inductive load switching : $I_e = 5A$ max.	115V 50/60Hz Make:3600VA Break:360VA
D.C. inductive load switching : $I_e = 2.5mA$	125V & 250V Make: 69W Break: 69W
Ambient temperature range :	- 10°C to + 80°C
Operations/hour :	60 max.
Indicators:	Green- Power On. Amber- Trip level exceeded/timing in progress Amber- Output relay de-energised
Phase imbalance:	Normal time-delayed tripping if any line current exceeds set trip level
Phase loss:	Trip within 2s provided load current exceeds 50% of set trip level. Disabled by linking terminals S1 + S2 when used with soft starters or single-phase motors.
Start Delay T1:	4-40s at 600% FLC Enabled by linking terminals S2 + S3
Run Delay T2:	0.2 - 8s at 600% FLC (See time/current graph)
Motor Temperature	Trip when sensing element exceeds 2-4KΩ, reset when resistance falls to 750Ω. Suitable for motor thermistors to BS4999 Part 111. Disabled by linking terminals P1 and P2.
Reset:	Hand/Auto selection by terminal link. Button for local reset, terminals for remote reset, contact loading 2mA at 20V DC. Reset delay (hand or auto) 1-20ms
<b>Caution:</b>	If supply is removed for a period greater than 200ms the reset delay is terminated, and the MPR3S resets automatically when supply is restored.
Test:	Test button simulates 600% FLC overload to check operation.
Terminal cable capacity:	1 x 2.5mm <sup>2</sup>

## Terminal Functions

A1	Supply	R1	} Remote Reset. Volt Free N/O contact (Link for auto reset)
A2	115/240V or 440V	R2	
A3	50/60Hz	P1	} Thermistor Trip Link to disable
95	} Trip Contact (Closed when relay energised)	P2	
96		C	CT Common
05	} Common	C1,C2	CT1, CT2
06		S1	} Phase loss – disable by link to S2
08		S2	
	} Alarm Contacts	S3	} Function Common Start Delay T1 - enabled by link to S2

# MOTOR PROTECTION RELAY MPR3S MOD(N)

## Time / Current Graph



Typical operating time characteristics during running

## Operation

When power is applied to the MPR3S, the output relay energises, closing contacts 95 - 96 and 05 - 06. If the motor current exceeds the set level and the associated delay time the relay de-energises, disabling the starter circuit.

## Installation

Terminals R1 to S3 inclusive (i.e all lower terminals) are internally connected to a common circuit. Terminal P1 or C (one only) may be earthed. Wiring to all other terminals must be isolated and adequately insulated.

To avoid inductive pickup, thermistor wiring should be twisted pair and/or screened cable. This cable should not be run parallel to other cabling for long distances as a protection against capacitive pickup. 4A HBC fuses are recommended for control circuit protection.

**Note :** The MPR3S is only shockproof when fitted with the cladding jacket supplied.

## Set Up Procedure

### Method 1:

Set FLC and time delay potentiometers to required values. The trip current will be in the range 105-120% of set FLC.

**Method 2:** For precise setting with close protection.

1. With the current and both trip delays set to maximum, start the motor.
2. Reduce current setting until amber SET LED is illuminated, then increase setting until LED is just extinguished. The unit is then correctly set.
3. When the current increases by 10-15% the amber SET LED will illuminate and the unit will go into overload mode.

4. Trip delay settings and Reset time should be set to suitable values. A suitable value for T1 delay should be sufficient to allow motor to run up to speed on maximum load. The higher the load inertia the longer the trip delay required.
5. For motors with short acceleration times, T1 may not be required, in which case the T1 link should be omitted.
6. T2 setting can be adjusted to give a faster trip response during running whilst allowing for normal fluctuations in current which might cause nuisance tripping.

### Method 3 :

Inject test current corresponding to load current directly into MPR3S (allowing for CT turns ratio) and follow method 2.

The current range at the input terminals of the MPR3S is 17.5 - 50mA. Single-phase injection (using one CT or directly into terminals C + C1) requires a current 40% higher than corresponding 3-phase.

## Ordering Information

Complete MPR3S MOD(N) units :

Volts	Test Socket	Order Ref.	NSN
440	Yes	Y620029/A	5945-99-663-8776
440	No	Y620029/B	5945-99-126-6094
115/240	Yes	Y620029/C	5945-99-702-5236
115/240	No	Y620029/D	5945-99-321-5831

## Current Transformers

FLC (A)	Ordering Ref.	Primary Turns	CT Primary / Secondary
0.35 - 1	Z274003/AG	*	1A/25mA
0.7 - 2	Z274003/AG	*	1A/25mA
1.4 - 4	Z274003/AC	10	20A/25mA
1.75 - 5	Z274003/AC	8	20A/25mA
3.5 - 10	Z274003/AC	4	20A/25mA
7 - 20	Z274003/AC	2	20A/25mA
14 - 40	Z274003/AC	1	20A/25mA
17.5 - 50	Z274003/AD	2	50A/25mA
35 - 100	Z274003/AD	1	50A/25mA
70 - 200	Z274003/AE	1	100A/25mA
140 - 400	Z274003/AF	1	200A/25mA

\* Tapped Primary 0.5/1A, Secondary 25mA

## Spares

- Basic MPR3S MOD(N), no shock jacket, all volts.

Order Ref. V440008      NSN : 1365-99-126-6187

- Voltage Dropper Assembly for 440V Units

Order Ref. V440009      NSN : 1365-99-322-3433

Whippendell Marine