



HOWARD BUTLER LTD

MONITORING RELAYS

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GENERAL SPECIFICATIONS

ENVIRONMENTAL

Working temperature	0 to +60 deg C
Functional temperature	-25 to + 70 deg C
Storage temperature	-40 to +85 deg C
Temperature Coefficient	0.03% per deg C (300ppm/°C)
Relative humidity	95% non condensing
Class of climate	HSE complying with DIN 40040 -3 complying with VDE/VDJ 3540

INSULATION

Test voltage	4kV RMS 50Hz 1min between Input / Case /Auxiliary
Impulse test	EMC 5kV transient complying with IEC 801 / EN55020
HF interference test	EHF 2.5kv 1MHz complying with IEC 255-4
Protection class	II complying with IEC 348

APPLIED STANDARDS

General	IEC 144/ BS 5420/ VDE/ VDI 0435/ IEC 947/ EN60947
Safety	EN61010-1 DIN 57411 / VDE 0411 ANSI C37
Surge withstand	IEC 801 / EN 55020 ANSI C37-90a
Radio screening	RFI degree N complies with VDE 0875
EMC	Emissions EN61326-1 Immunity EN61326-2

RELAY OUTPUT

Relay type	dual pole change over
Material	Silver / Cadmium
Contact resistance	200mOhm max Typically <50m Ohm
Rating AC	250V 5A non resistive 1200VA
Rating DC	125V 1A resistive 120 watts
Electrical life	1 x 10 ⁶ at above load
Mechanical life	5 x 10 ⁶
Operating time approx.	7ms (20ms max)
Dielectric strength	Between coil and contacts 5kV RMS 1min Between open contacts 1kV RMS 1min Between adjacent contacts 1kV RMS 1min
Insulation resistance	1000M Ohm at 500V DC
Operating temperature	-30 to + 75 deg C
Approval	UL and CSA recognised

ENCLOSURE

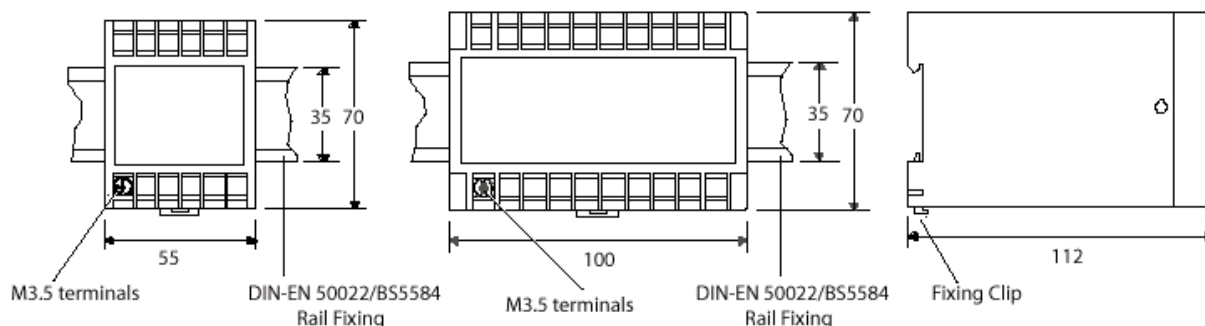
Fixing	Snap on to DIN rail 35 x7.5 mm complies with DIN-EN 50022 BS 5584
Mounting	Any position
Enclosure Code	Case IP 50/ terminals IP 30 Complies with IEC 529 BS 5490 DIN 40050
Material	Complying with UL 94 VO

APPROVALS

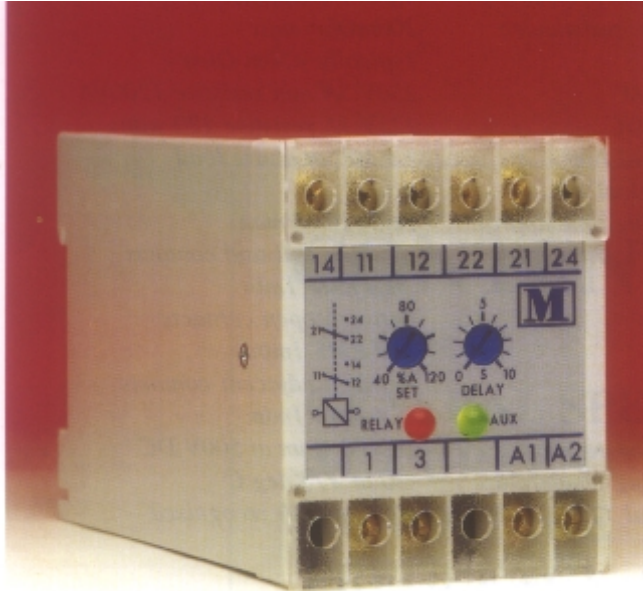
U.L. Approval File No E157034

CASE DIMENSIONS

All Dimensions in mm



AC CURRENT



TECHNICAL SPECIFICATION

INPUT

Rated value In	1A or 5A from CT 0.2 to 10 Amp direct connected
Frequency	50 /60 /400 Hz
Burden	<0.5 VA per phase
Overload	2 x In continuous 10 x In for 3 seconds

SETPOINT

Range Over	Adjustable 40% to 120% In
Range Under	Adjustable 0% to 80% In
Repeatability	Better than 0.5% of full span
Differential	Fixed 5%
Time Delay	Adjustable 200ms to 10 seconds

AUXILIARY

AC Voltage	115/230/400V (± 25% /45-65 Hz / <2 VA)
DC Voltage	24 volt (± 20% /galvanically isolated) <3 watt

SELECTION GUIDE

M200-A1U	Single phase under current
M200-A1O	Single phase over current
M200-A1C	Single Phase combined current
M200-A3U	3 Phase under current
M200-A3O	3 Phase over current

TYPICAL APPLICATIONS

The M200 AC current relays provide current monitoring and protection in both single and 3 phase systems. Used in applications such as motor protection, load detection and generator control.

Under over and combined under/over units are available.

The relay operates when the adjustable trip point is reached. An externally adjustable time delay is provided to prevent nuisance tripping.

As is common with all the M200 relays, on over units the relay energises when the input signal exceeds the trip point. On under units the relay de-energises when the input signal goes below the trip point.

A red LED indicates the state of the relay, whilst a green LED indicates the condition of the power supply.

WEIGHT & CASE SIZE

Single units	Approx. 0.4kg. 55mm case
Combined units	Approx. 0.6kg. 100mm case

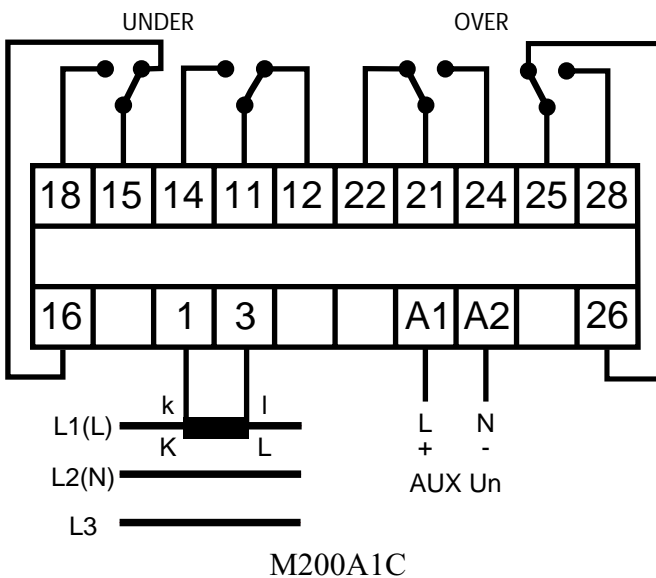
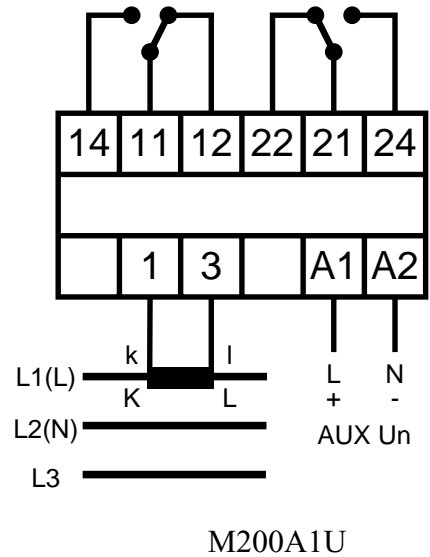
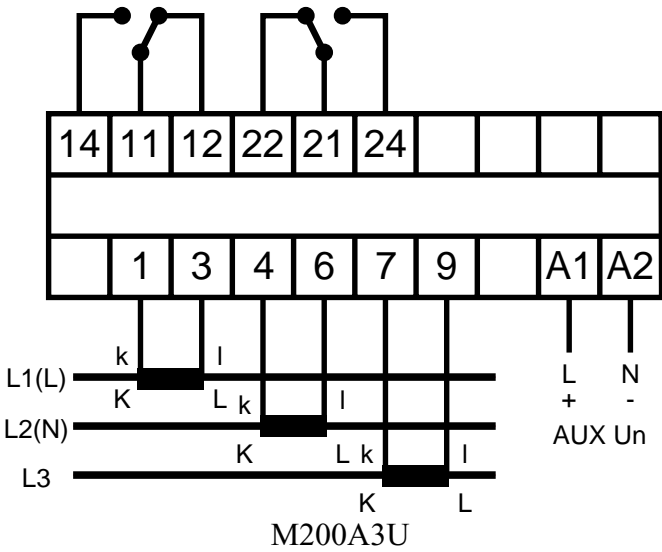
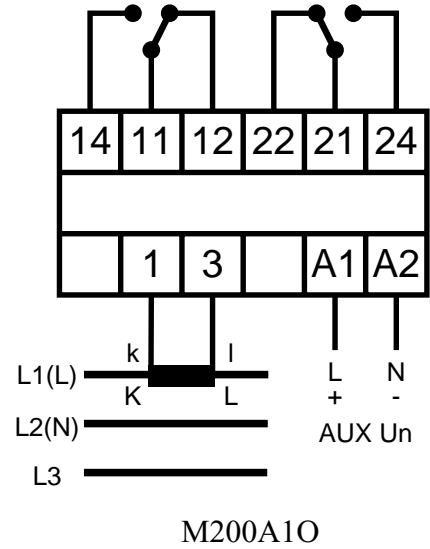
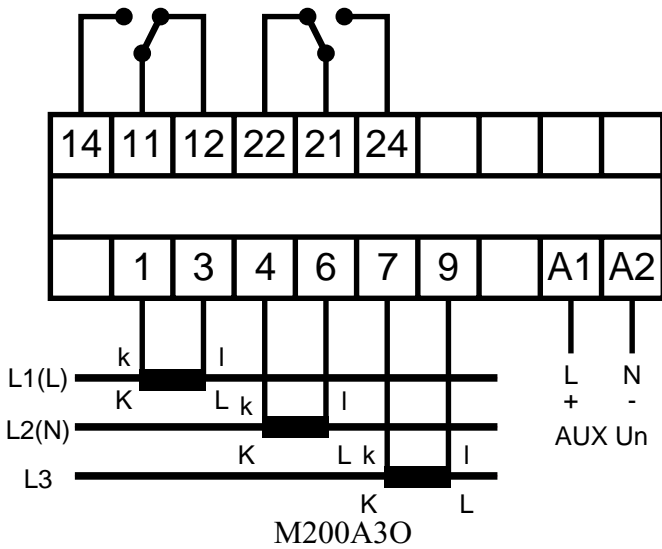
ORDERING INFORMATION

Product Code	Input	Freq.	Aux.	Options
M200-A30	5A	50Hz	230V	

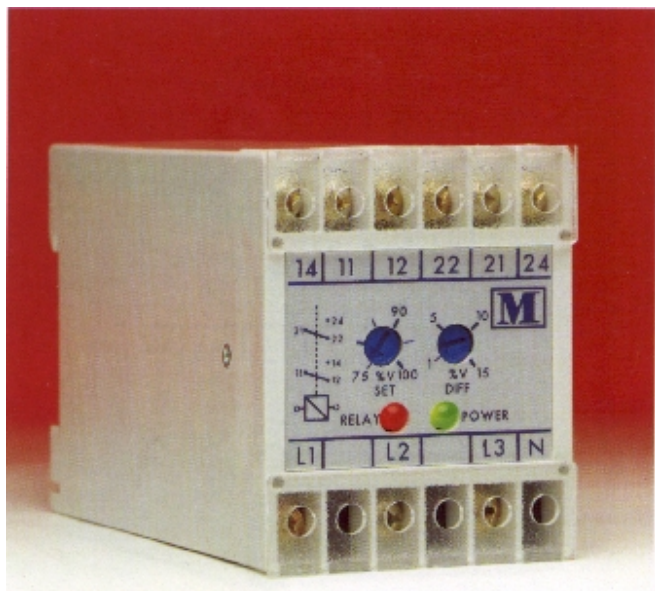
OPTIONS

1. Adjustable time delay max 30 seconds
2. AC Auxiliary in the range 57.7 to 480 volts
3. Calibration at nominal Hz 35 450Hz
4. Calibration at temperature other than 23° C

AC CURRENT CONNECTION DIAGRAMS



AC VOLTAGE



TECHNICAL SPECIFICATION

INPUT

Rated value U_n	Single phase 57.8 <500 V Three phase 100 <500 V
Frequency	50/60/400 Hz
Burden	<2.5 VA per phase single units <3 VA per phase combined units
Overload	1.5x U_n continuous 2 x U_n for 3 seconds

SETPOINT

Range under	Adjustable 75% to 100% U_n
Range over	Adjustable 100% to 125% U_n
Repeatability	Better than 0.5% of full span
Differential	Adjustable 1 to 15%
Operating time	Typically 200ms

AUXILIARY

All units self powered.

WEIGHT & CASE SIZE

Single units	Approx. 0.4kg. 55mm case
Combined units	Approx. 0.6kg. 100 mm case

SELECTION GUIDE

M200-V1U	Single phase under voltage
M200-V1O	Single phase over voltage
M200-V1C	Single phase combined voltage
M200-V33U	3 phase 3 wire under voltage
M200-V33O	3 phase 3 wire over voltage
M200-V33C	3 phase 3 wire combined
M200-V34U	3 phase 4 wire under voltage
M200-V34O	3 phase 4 wire over voltage
M200-V34C	3 phase 4 wire combined voltage

ORDERING INFORMATION

Product Code	Input	Freq	Options
M200-V34U/D	230V	50Hz	5 sec t/d

OPTIONS

1. On all of the above units, except the combined, an internally set time delay is available for any value between 1 & 10 seconds. To order use the above codes adding a D at the end of the code, e.g. M200-V34U/D 5 seconds (state the fixed delay period).

2. To prevent nuisance tripping when there is a slight variation in the voltage supply the following option is available. The external differential is replaced on the following products with an externally adjustable time delay. On these units the time delay is adjustable from 200ms to 10 seconds, and the differential is fixed at 1%.

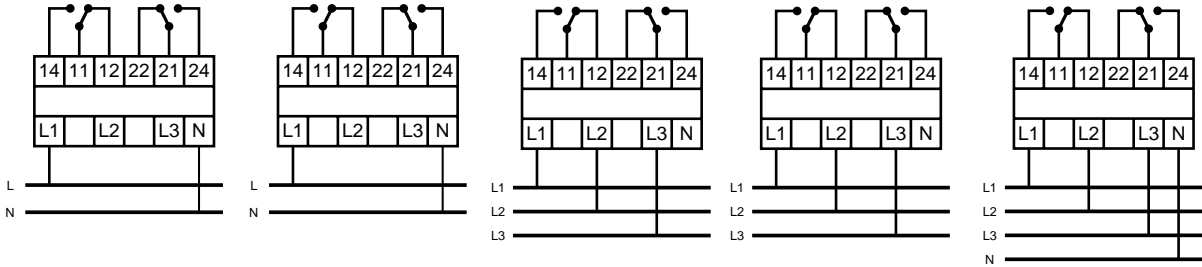
M200-V1X	Single phase under voltage
M200-V1Y	Single phase over voltage
M200-V1W	Single phase combined voltage
M200-V33X	3 phase 3 wire under voltage
M200-V33Y	3 phase 3 wire over voltage
M200-V33W	3 phase 3 wire combined voltage
M200-V34X	3 phase 4 wire under voltage
M200-V34Y	3 phase 4 wire over voltage
M200-V34W	3 phase 4 wire combined voltage

3. Calibration at temperatures other than 23° C

TYPICAL APPLICATIONS

The M200 AC voltage relay provides voltage monitoring and protection in both single and 3 phase systems. Used in applications such as mains failure, regulation of power supplies and to protect voltage sensitive equipment. Under, over and combined under/over units are available. The relay operates when the externally adjustable trip point is reached. An external differential control is provided with adjustment 1-15%. The differential ensures that the parameter being measured returns to % set above or below (depending on whether it is under or over unit) the trip point before the relay returns to its original state. As is common with all the M200 relays; on over units the relay energises when the input signal exceeds the trip point. On under units the relay de-energises when the input signal goes below the trip point. A red LED indicates the state of the relay, whilst a green LED indicates the condition of the power supply.

AC VOLTAGE CONNECTION DIAGRAMS



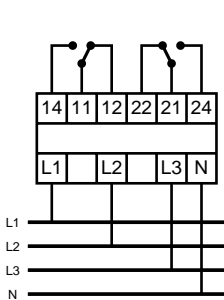
M200V10

M200V1U

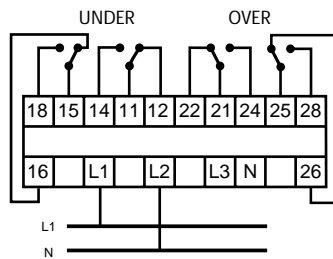
M200V33O

M200V33U

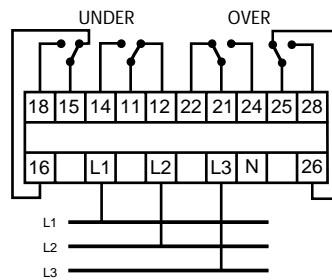
M200V34O



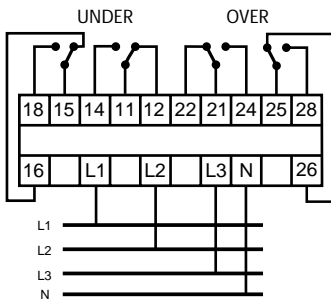
M200V34U



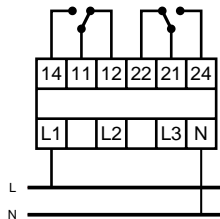
M200V1C



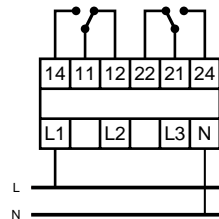
M200V33C



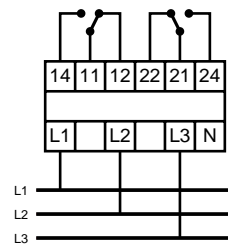
M200V34C



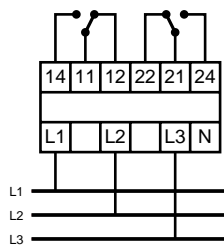
M200V1X



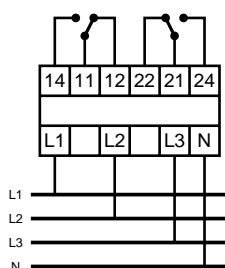
M200V1Y



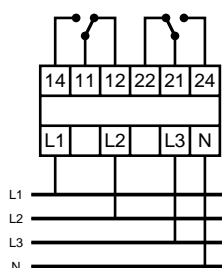
M200V33X



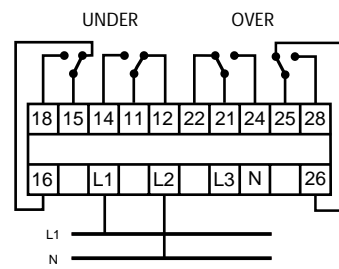
M200V33Y



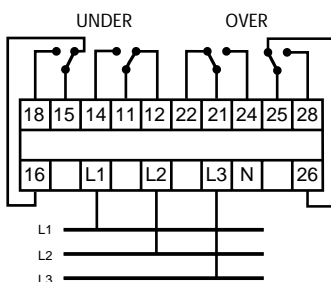
M200V34X



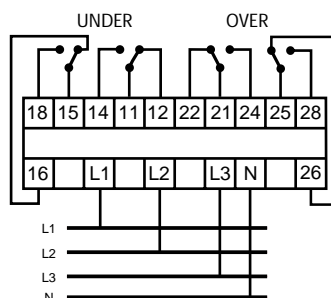
M200V34Y



M200V1W

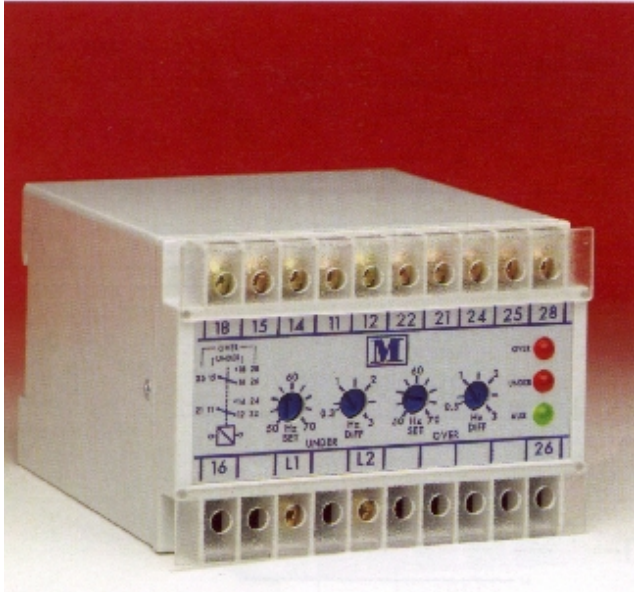


M200V33W



M200V34W

FREQUENCY



SELECTION GUIDE

M200-F1U	Single or 3 phase under frequency
M200-F1O	Single or 3 phase over frequency
M200-F1C	Single or 3 phase combined frequency

TYPICAL APPLICATIONS

The M200 series frequency relays are designed to monitor the frequency of a system and if the frequency deviates outside the adjustable pre-set limits, the relay will operate.

Typically used in protecting generators against over or under speed, this is achieved as speed is proportional to frequency. Other uses such as monitoring mains power supplies, computer supplies etc.

The user is provided with adjustment of both the trip point of frequency being monitored and the differential. As is common with all the M200 relays; on over units the relay energises when the input signal exceeds the trip point. On under units the relay de-energises when the input signal goes below the trip point.

A red LED indicates the state of the relay, whilst a green LED indicates the condition of the power supply. The frequency relays monitor their own power supply so no auxiliary power is necessary.

TECHNICAL SPECIFICATION

INPUT

Rated value U_n	57.8 < 500V + 25%
Rated Frequency	50/60/400 Hz
Burden	< 25 VA
Overload	1.5 x U_n continuous 2 x U_n for 3 seconds

SETPOINT

Range 50Hz nominal	Adjustable 40 to 60Hz
Range 60Hz nominal	Adjustable 50 to 70Hz
Range 400Hz nominal	Adjustable 360 to 440Hz
Differential 50 & 60Hz	Adjustable 0.3 to 3Hz
Differential 400Hz	Adjustable 3 to 30Hz
Repeatability	Better than 0.5% of full span
Operating time	Typically 200 ms

AUXILIARY

All units self powered

WEIGHT & CASE SIZE

Single units	Approx. 0.4kg, 55mm case
Combined units	Approx. 0.6kg, 100mm case

ORDERING INFORMATION

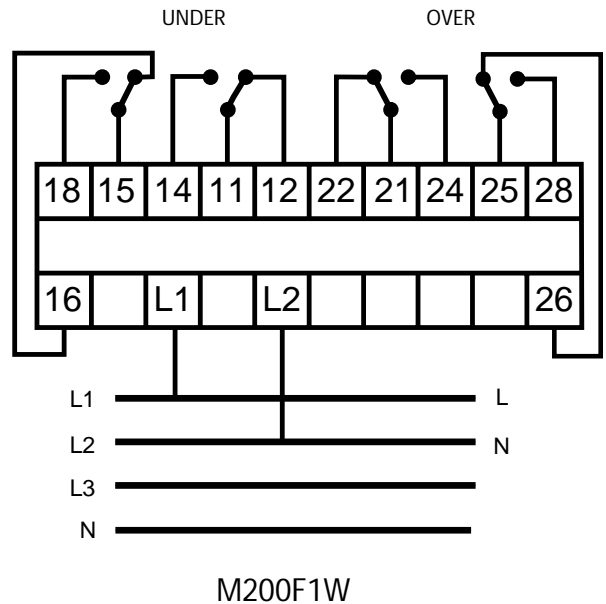
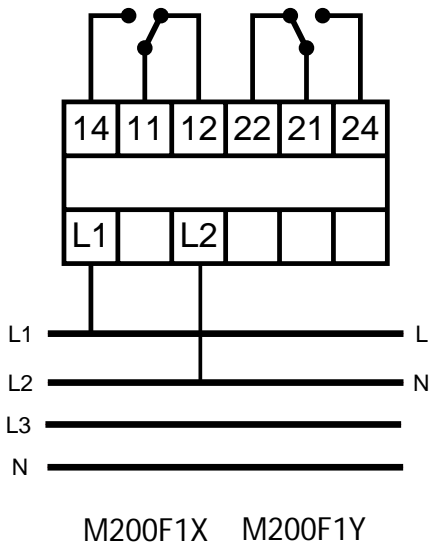
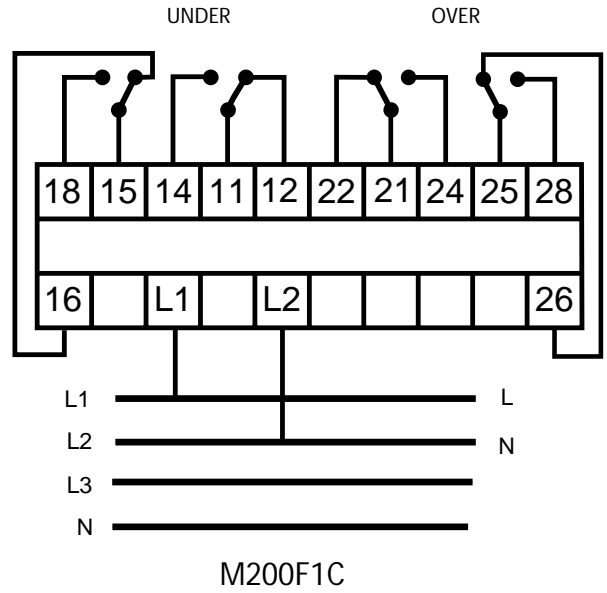
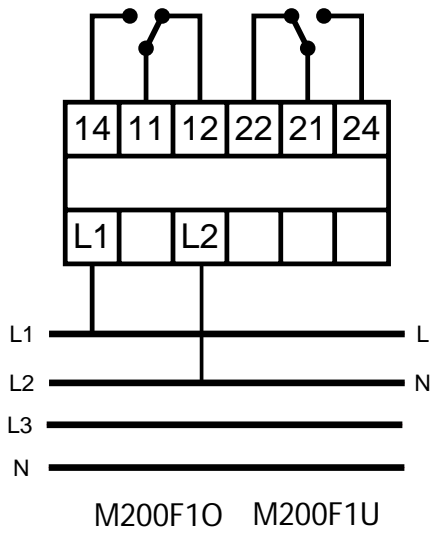
Product Code	Input V	Nominal Freq.	Options
M200-F1C	230v	50Hz	

OPTIONS

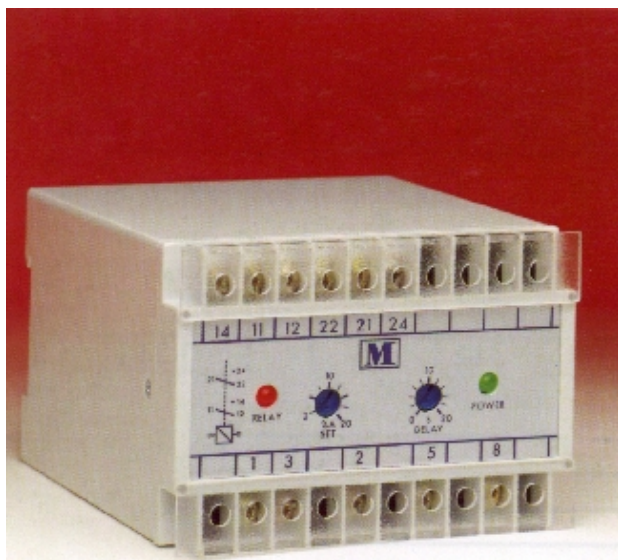
1. On all of the above units an internally set time delay is available for any value between 1 & 10 seconds. To order use the above code, adding a D at the end of the code, e.g. M200-F1U/D 7 seconds (state the fixed delay period)
2. AC auxiliary in range 57.7 to 480 volts
3. Calibration at temperature other than 23° C
4. To prevent nuisance tripping when there is a slight variation in the frequency, the following option is available. The external differential is replaced with an external time delay. On these units the time delay is adjustable from 200ms to 10 seconds, and the differential is fixed at 1%.

M200-F1X	Single or 3 phase under frequency
M200-F1Y	Single or 3 phase over frequency
M200-F1W	Single or 3 phase combined frequency

FREQUENCY CONNECTION DIAGRAMS



REVERSE POWER



TECHNICAL SPECIFICATION

INPUT

Rated value U_n	57.8 < 500V \pm 25%
Rated value I_n	C. T operated 1 or 5A amp direct connection 0.2 to 10A
Frequency	50 / 60 / 400Hz
Burden	< 3VA voltage < 0.5 VA current
Overload	1.5 x U_n 2 x I_n continuous 2x U_n 10 x I_n for 3 seconds

SETPOINT

Range	2% to 20% reverse current
Repeatability	Better than 0.5% of full span
Time delay	Adjustable 200ms to 20 sec
Hysteresis	1%

AUXILIARY

All units self powered

WEIGHT & CASE SIZE Approx. 0.6kg. 100mm case

SELECTION GUIDE

M200-RP1	Single phase or 3 phase 4 wire
M200-RP3	3 phase 3 wire

TYPICAL APPLICATIONS

The M200 reverse power relay is used to monitor the direction of power from AC generators. If the current in the system being monitored is reversed, to a value greater than the customer adjustable pre-set limit, the relay will energise.

The adjustable trip point is 2 to 20% of input current. An adjustable time delay of 0 to 20 seconds is provided. Correct setting of the trip point and time delay will ensure protection against motoring in the event of a generator failure and prevent tripping due to transients encountered during synchronising.

A red LED indicates the state of the relay and a green LED indicates the condition of the power supply

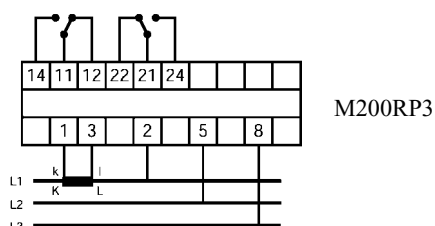
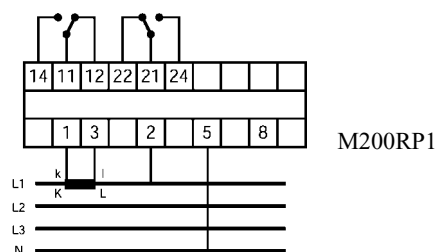
ORDERING INFORMATION

Product Code	I_n	Input U_n	Input Freq.
M200-RP3	1 Amp	400V	50Hz

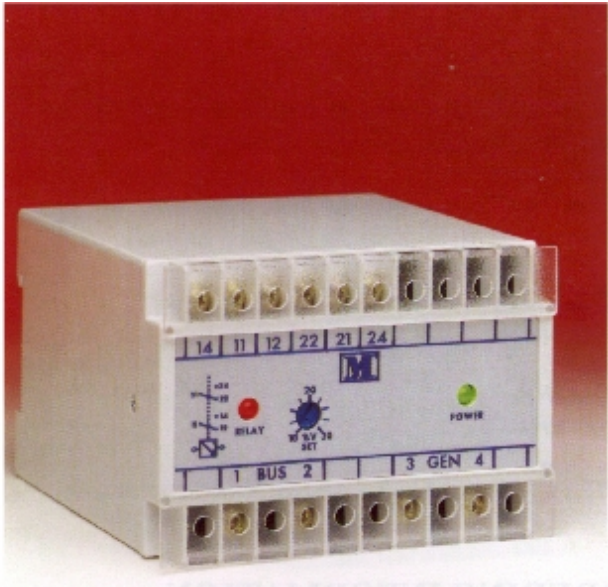
OPTIONS

- Adjustable time delay max 30 seconds
- AC auxiliary in range 57.7 to 480 volts
- Calibration at nominal Hz 35 450Hz
- Calibration at temperature other than 23 C

CONNECTION DIAGRAMS



SYNCHRONISING CHECK



TECHNICAL SPECIFICATION

INPUT

Rated value U_n	57.8 < 500V \pm 25%
Frequency	50 / 60 / 400 Hz
Burden	< 4VA terminals marked GEN < 2VA terminals marked BUS
Overload	1.5x U_n continuous 10x U_n for 3 seconds

SETPOINT

Range	Adjustable 10% to 30% of nominal system voltage (6-20 electrical degrees)
Repeatability	Better than 0.5% of full span
Differential	Fixed at 5%
Operating time	Typically 500ms

AUXILIARY

Both units self powered.

WEIGHT & CASE SIZE Approx. 0.6kg, 100mm case

SELECTION GUIDE

M200-PLL 1 generator 1 bus or 2 generators

M200-PLD 1 generator 1 bus with dead bus facility

Both units can be used on Single or 3 phase systems.

ORDERING INFORMATION

Product Code	System Voltage	Freq.	Options
M200-PLD	400V	50Hz	Cal at 35° C

TYPICAL APPLICATIONS

The M200-PLL & PLD are synchronising check relays, also known as paralleling relays. They are used to ensure at two AC supplies are synchronised. For a system to be synchronised, frequency, phase angle and voltage have to within pre-set limits.

The M200-PLL can monitor either mains bus bar and incoming generator or two generators.

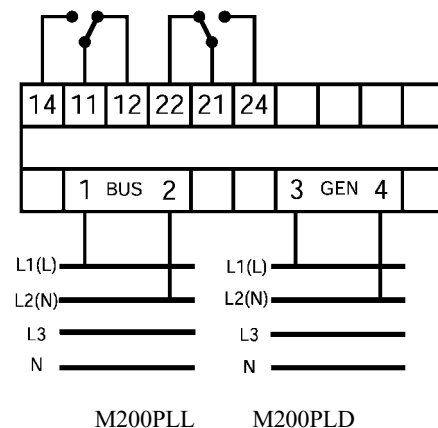
The PLL has customer adjustment of the differential voltage between 10 to 30%. This voltage corresponds to 6 to 20 electrical degrees. The unit compares the input voltage and phase relationship of the bus bar to that of the generator when the signal is within the pre-set limits, the relay energises.

The M200-PLD operates as the M200-PLL but has the additional feature of the dead bus facility. This enables the relay to energise with a generator supply only, which is a common requirement when mains failure occurs.

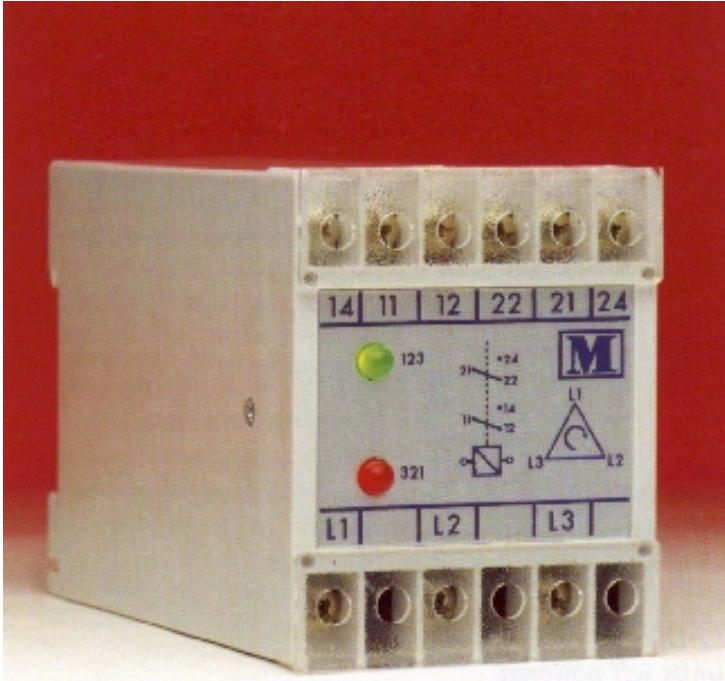
OPTION

1. Calibration at temperature other than 23° C

CONNECTION DIAGRAM



PHASE SEQUENCE



TECHNICAL SPECIFICATION

INPUT

Rated value U_n	$57.8 < 500V \pm 25\%$
Frequency	50/60/400 Hz
Burden	$< 3VA$
Overload	$1.5x U_n$ continuous $2x U_n$ for 3 seconds

SETPOINT

Not adjustable

AUXILIARY

Self powered.

WEIGHT & CASE SIZE Approx. 0.4kg, 55mm case

ORDERING INFORMATION

Product Code Input U_n Freq. Options
M200-PS1 415v 50Hz Cal 35° C

OPTIONS

1. Calibration at nominal Hz 35...450Hz
2. Calibration at temperature other than 23° C

SELECTION GUIDE

M200-PS1 3 phase 3 or 4 wire

TYPICAL APPLICATIONS

The M200-PS1 provides phase and sequence phase failure protection. Used to ensure the sequence is correct when connecting 3 phase loads.

With an incorrect phase sequence the relay will de-energise preventing the starting of incorrectly connected machinery.

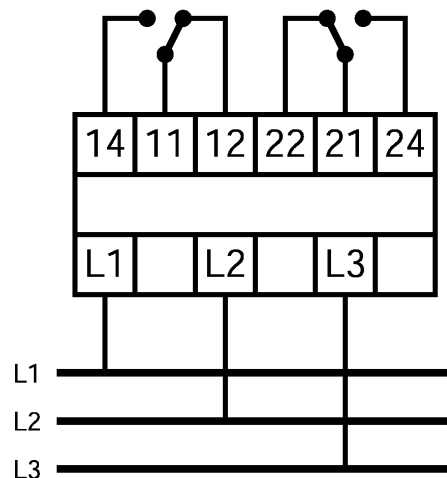
The relay will also trip if there is a phase loss and can therefore be used as a phase failure relay.

Note if regenerated voltage is present in the open phase the M200-PB1 or M200-PB2 should be used.

The red LED "ON" indicates phase sequence incorrect and relay is de-energised.

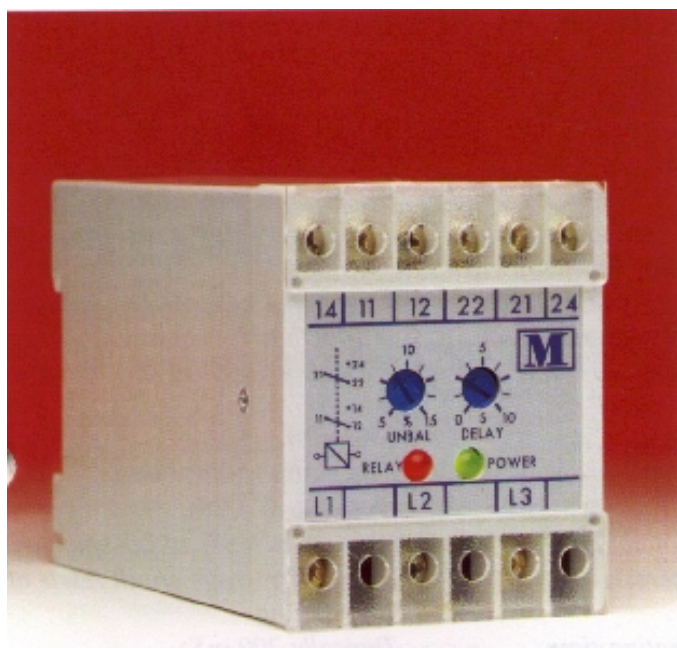
The green LED "ON" indicates phase sequence correct and relay is energised.

CONNECTION DIAGRAM



M200PSI

PHASE BALANCE



SELECTION GUIDE

- M200-PB1** Detects phase loss & phase unbalance
M200-PB2 Detects phase loss, phase unbalance & symmetrical under-voltage

TYPICAL APPLICATIONS

The M200-PB1 can detect the following conditions in phase 3 or 4 wire systems. Phase Unbalance, Phase Loss, Phase Reversal and Phase Sequence.

The phase balance relays are used to detect phase loss and unbalance in systems using motors, generators, heater elements, transformers etc. A Phase unbalance as small as 10% in a 3 phase motor can cause the temperature in the motor winding to increase by more than 120%, correct setting of the PB1/PB2 will ensure this does not occur. Protection against open phase regenerated voltage, created if a single phase should fail is also provided.

Customer adjustment of unbalanced voltage between 5 to 15% is provided along with time delay adjustment of 200ms to 10 seconds.

If the system being monitored is healthy, the relay is energised, and the red LED will be illuminated. If a phase unbalance greater than the pre-set level or phase loss / reversal occurs, the relay de-energises after the time delay period. The M200-PB2 provides all the protection features of the PB1 with the additional benefit of having symmetrical under voltage protection. This means that if all the phase voltages remain balanced but drop below a pre-set value, the relay will de-energise. The under voltage is internally set. For standard units it is set at 85% below the nominal voltage, but this value can optionally be between 70% and 90%

TECHNICAL SPECIFICATION

INPUT

Rated value U_n	57.8<500V± 25%
Frequency	50/60/400 Hz
Burden	<2VA
Overload	1.5x U_n 2x U_n

SETPOINT

Range	Adjustment 5 to 15% unbalanced voltage
Repeatability	Better than 0.5% of full span
Under-voltage	PB2 only, pre-set 85% of nominal voltage (optional 90% to 70%)

Time delay Adjustable 200 ms to 10 sec

AUXILIARY

Self powered

WEIGHT & CASE SIZE Approx. 0.4kg, 55mm case

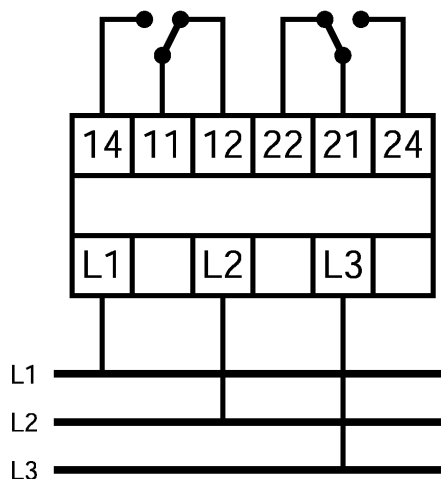
ORDERING INFORMATION

Product Code	U_n Input Freq. Option
M200-PB2	415 v 50Hz Under Volts at 70%

OPTIONS

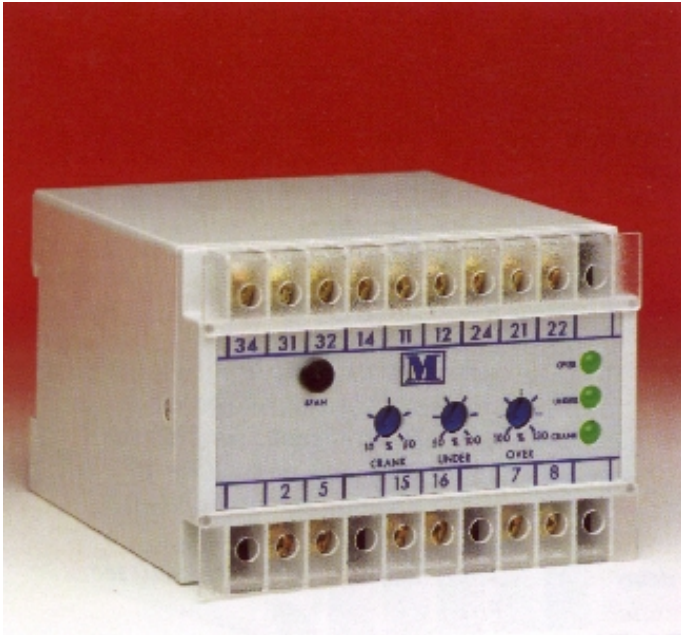
- Adjustable time delay max 30 seconds
- Internal under voltage set between 90% to 70%
- Calibration at nominal Hz 35...450Hz
- Calibration at temperature other than 23° C

CONNECTION DIAGRAM



M200PB1 M200PB2

SPEED SENSING



TYPICAL APPLICATIONS

The M200-ST3 is most commonly used to detect the speed of engines used in generating sets. The pick-up, situated close to the flywheel, produces a high frequency pulse train directly proportional to the number of teeth passing it. The frequency is converted by the ST3 into a mA signal directly proportional to the rotational speed of the flywheel.

The relay provides the user with the following adjustments, which allows the control of start up and normal running and protects against over and under speeds of the generator.

Adjustment of crank speed 10 to 50%

Adjustment of under speed 50 to 100%

Adjustment of over speed 100 to 133 %

A mA output signal proportional to input frequency.

Typical start-up as follows -

When the speed of the motor reaches the crank's set-point, the crank relay energises, disengaging the crank starter. When the under speed set-point is reached, the under speed relay is energised and the motor is now in the normal running condition with all relays energised. Should an under or over speed condition occur the appropriate relay is de-energised. Two other safety features are incorporated; if the pick-up sensor input lead breaks the over speed relay will de-energise also the crank relay will only de-energise when the input frequency goes below 20% of the set-point. The mA output signal can be fed to digital or analogue meters scaled in speed, or to provide a control signal to a PLC etc.

TECHNICAL SPECIFICATION

INPUT

Pulses 5V-75V peak to peak
Frequency 1000-10000 Hz (speed of rotation RPM x number of teeth / 60)

Open circuit protection Over-speed relay de-energised

OUTPUT

Rated value 0-1mA = 133% of nominal speed
Load resistance < 10k Ohm
Calibration Value 0.75mA = 100% of nominal speed
SETPOINT
Range

Crank 10 to 50%
Under 50 to 100%
Over 100 to 130%

Repeatability Better than 0.5% of full span

Hysteresis 2% (under, over) crank resets at 20% setting

Operating time Typically 200 ms

AUXILIARY

DC Voltage 24 VDC \pm 20%

WEIGHT & CASE SIZE Approx. 0.5kg. 100mm case

NOTE: The 3 relays in this product are single pole changeover. The remainder of this specification is as per general specification on page 3.

SELECTION GUIDE

M200-ST3 Speed sensing relay

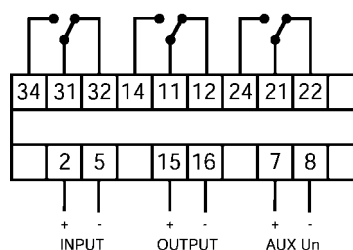
ORDERING INFORMATION

Product Code M200-ST3
Normal running speed 1800 rpm
Number of teeth on flywheel 50
Magnetic pick up output voltage 10 volt pk-pk

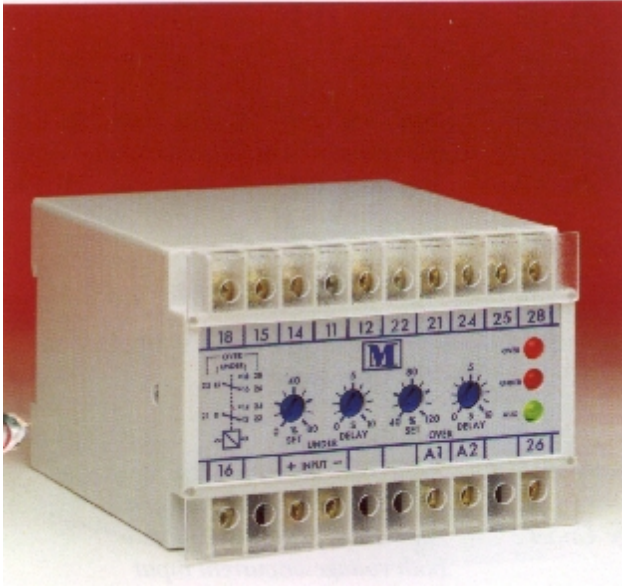
OPTIONS

1. Calibration at temperature other than 23° C
2. Set-points are factory set. Specify frequency of crank; under speed and over speed settings required.

CONNECTION DIAGRAM



DC TRANSDUCER TRIP



SELECTION GUIDE

M200-TAU	DC volts or mA under trip
M200-TAO	DC volts or mA over trip
M200-TAC	DC volts or mA combined trip

TYPICAL APPLICATIONS

The M200 DC transducer trips have endless applications. As the name implies they are designed to accept inputs from transducers and transmitters, and provide a relay operation when the transducer signal deviates outside a pre-set limit.

Any of the M100 series transducers can be used with the transducer trip. A typical application is to control power using a M100-WA5 with a 4-20mA signal fed to a M200-TAO. For example the output goes above a pre-set limit of 80%, the TAO relay will close, setting off an alarm or shutting down a process.

Either DC voltage or DC current inputs can be used. As is common with all the M200 relays, on over units the relay energises when the input signal exceeds the trip point and on under units the relay de-energises when the input signal goes below the trip point.

A red LED indicates the state of the relay, whilst a green LED indicates the condition of the power supply.

TECHNICAL SPECIFICATION

INPUT

Rated value In	0<20mA or 4- 20mA
Voltage drop	1 volt
Rated value Un	1<50 volt or 1-5 volt
Impedance	10k Ohm / Volt
Overload	2xIn 1.5x Un continuous 10x In 2x Un for 3 seconds

SETPOINT

Range Over	Adjustable 40% to 120% for both voltage and current input.
Range Under	Adjustable 0% to 80% for both voltage and current input.
Repeatability	Better than 0.5% of full span
Time delay	Adjustable 200 ms to 10 seconds
Differential	Fixed 5%

AUXILIARY

AC Voltage	115/230/400 V ± 25% / 45-65Hz / 2VA
DC voltage	24 volt (± 20% / galvanically isolated) <3 watt

WEIGHT & CASE SIZE

Single units	Approx. 0.4kg. 55mm case
Combined unit	Approx. 0.6 kg. 100mm case

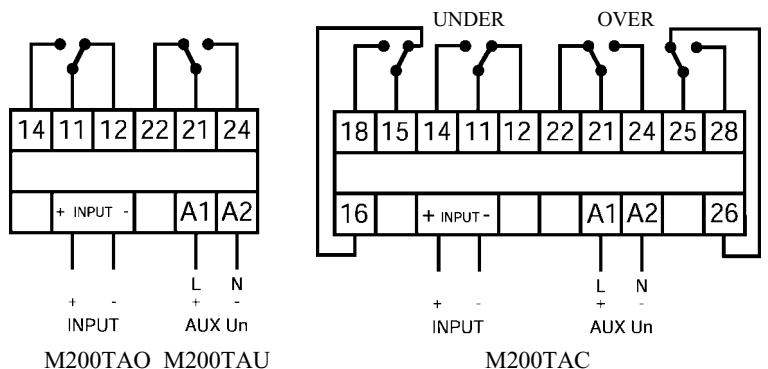
ORDERING INFORMATION

Product Code	Input	Vn or In	Aux	Freq
M200-TAC	1mA	110v	50Hz	

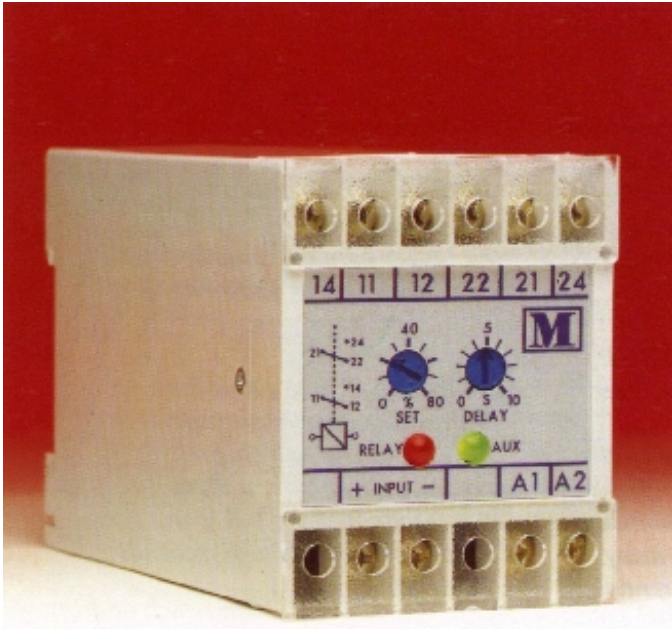
OPTIONS

1. Adjustable time delay max 30 seconds
2. AC auxiliary in the range 57.7 to 480 volts
3. Calibration at nominal Hz 35.....450Hz
4. Calibration at temperature other than 23° C

CONNECTION DIAGRAMS



THERMOCOUPLE



SELECTION GUIDE

M200-TJU	J type thermocouple under trip
M200-TJO	J type thermocouple over trip
M200-TKU	K type thermocouple under trip
M200-TKO	K type thermocouple over trip

TYPICAL APPLICATIONS

Designed to monitor thermocouples and provide a relay signal if the temperature being monitored exceeds the pre-set limit. J and K type thermocouples inputs are available covering a wide range of temperatures. As is common with all the M200 relays, on over units the relay energises when the input signal exceeds the trip point and on under units the relay de-energises when the input signal goes below the trip point. A red LED indicates the state of the relay, whilst a green LED indicates the condition of the power supply.

TECHNICAL SPECIFICATION

INPUT

Type J Fe/const	Min range 0-185°C (min span 10mV) Max range 0-870°C (max span 50mV)
Type K NiCr/NiAl	Min range 0-245°C (min span 10mV) Max range 0-1230°C (max span 50mV)

Thermocouple
break protection
Cold junction
Compensation
Overload

Upscale energise

Automatic over range 0-50 C
10 x Input continuous

SETPOINT

Range Over	Adjustable 40% to 120% for both voltage and current input
Range Under	Adjustable 0% to 80% for both voltage and current input

Repeatability
Time delay
Differential

Better than 0.5% of full span
Adjustable 200ms to 10 seconds
Fixed 2%

AUXILIARY

AC Voltage	115/230/400V ± 25% / 45-65Hz / 2VA
DC Voltage	24 volt (± 20% / galvanically isolated) <3 Watt

WEIGHT &

CASE SIZE
Approx. 0.4kg 55mm case

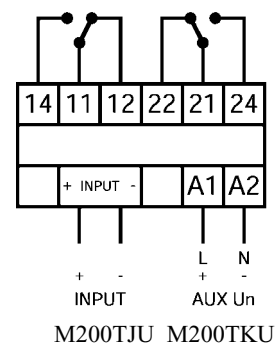
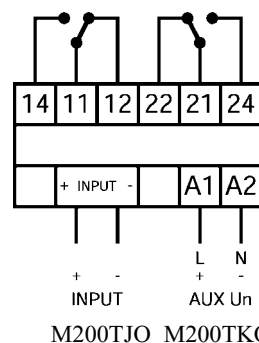
ORDERING INFORMATION

Product Code Temp range Aux Freq Options
M200-TJO 0-300°C 120V 60Hz 0-30 sec T/D

OPTIONS

1. Adjustable time delay max 30 seconds
2. AC auxiliary in the range 57.7 to 480 volts
3. Calibration at temperature other than 23° C

CONNECTION DIAGRAMS



THERMISTOR TRIP



TECHNICAL SPECIFICATION

INPUT

Positive temperature coefficient thermistors < 1500 Ohms max at nominal temperature. Sensors can be connected in series but 1500 ohm must not be exceeded.

Trip point 2500-3500 Ohms
Reset point 1500-2300 Ohms

Total resistance of sensor loop 1500 Ohms max at nominal temperature

Differential Fixed 5%
Repeatability Better than 5% of range

RESET

M200-TTA Automatic
M200-TTM Manual via push switch on front of product

AUXILIARY

AC Voltage 115/230/400V
 $\pm 25\%$ / 45-65Hz / 2VA
DC Voltage 24 volt ($\pm 20\%$ / non isolated)
< 3 watt

WEIGHT & CASE SIZE Approx. 0.3kg 55mm case

SELECTION GUIDE

M200- TTA Automatic reset
M200-TTM Manual reset

TYPICAL APPLICATIONS

The M200 thermistor trip accepts positive temperature coefficient thermistor inputs. Typically used to monitor temperature in motor windings.

When the thermistor is below its predetermined temperature the resistance is low and the M200-TTA / TTM relay is energised. A green LED indicates the safe condition. When the temperature exceeds the predetermined temperature, the resistance of the thermistor rapidly increases, this increase in temperature is detected by M200-TTA/TTM and the relay is de-energised.

The M200-TTM is manually reset. Once the relay has de-energised it will stay de-energised regardless of the temperature being monitored. The relay can only be reset via the reset push button on the front of the unit. The M200-TTA automatically resets once the temperature has dropped below the trip point

A yellow LED is provided to indicate the condition of the power supply.

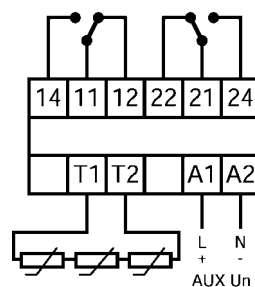
ORDERING INFORMATION

Product Code Aux Freq Options
M200-TTA 230V 50Hz

OPTIONS

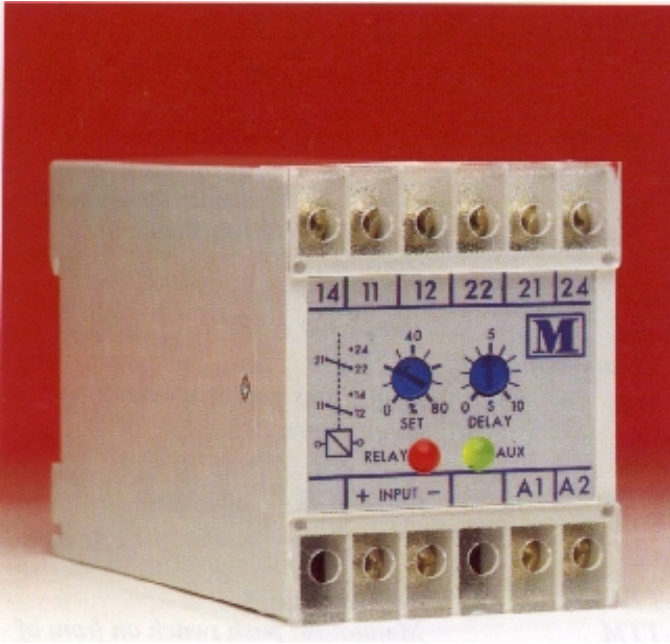
1. AC auxiliary in the range 57.7 to 480 volts
2. Calibration at temperature other than 23 C

CONNECTION DIAGRAMS



M200TTA M200TTM

MILLIVOLT TRIP



TECHNICAL SPECIFICATION

INPUT

Rated value mV dc	10-999.9mV dc
Input Impedance	50k Ohm
Source impedance	100 ohms max
Overload	10 x Input continuous

SETPOINT

Range Over	Adjustable 40% to 120%
Range Under	Adjustable 0% to 80%
Repeatability	Better than 0.5% of full span
Time delay	Adjustable 200 ms to 10 seconds
Differential	Fixed 5%

AUXILIARY

AC Voltage	115/230/400V ± 25% / 45-65 Hz / <2VA
DC Voltage	24V (± 20% galvanically isolated) < 3 W

WEIGHT & CASE SIZE

Single units	Approx. 0.4kg 55mm case
Combined units	Approx. 0.6kg 100mm case

SELECTION GUIDE

M200-MVU	mV under trip
M200-MVO	mV over trip
M200-MVC	mV combined trip

TYPICAL APPLICATIONS

The mV trip relays will accept DC millivolt signals from shunts, sensors and transducers.

A common application is to protect equipment from over current in a DC charging system. For example using a 400A to 75mV shunt. The 75mV signal is fed to the M200-MVO if the customer wishes to ensure the current does not exceed 300 amps then the MVO trip would be set at 75 % (56.25mv). If the current goes above 300 Amps the relay would energise. As is common with all the M200 relays, on over units the relay energises when the input signal exceeds the trip point and on under units the relay de-energises when the input signal goes below the trip point.

A red LED indicates the state of the relay, whilst a green LED indicates the condition of the power supply.

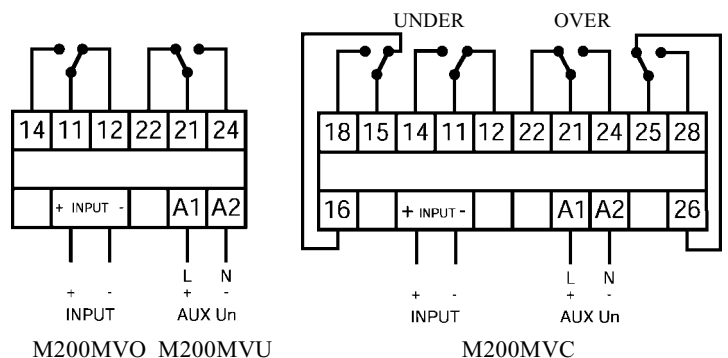
ORDERING INFORMATION

Product Code	Input	Aux	Freq	Options
M200-MVU	75mV	230V	50Hz	Cal 40°C

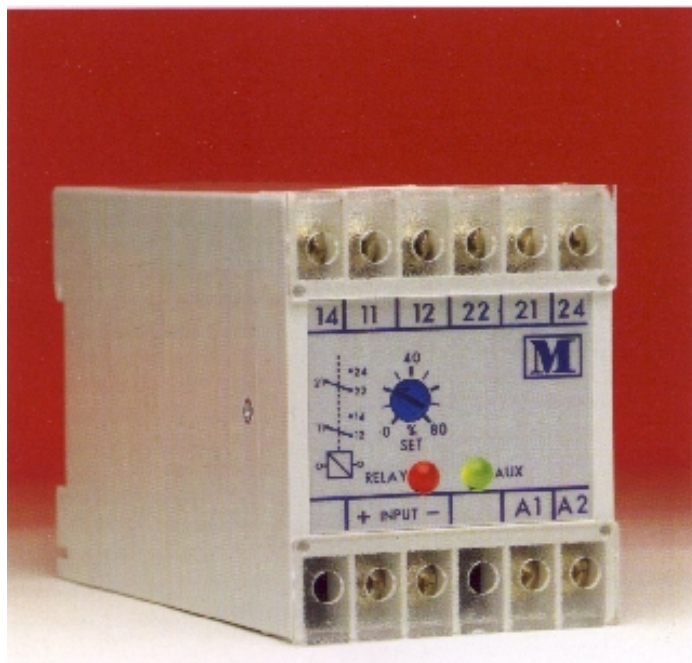
OPTIONS

- Adjustable time delay max 30 seconds
- AC auxiliary in the range 577 to 480 volt
- Calibration at temperature other than 23° C

CONNECTION DIAGRAMS



DC VOLTAGE TRIP



TECHNICAL SPECIFICATION

INPUT

Rated value U_n	$1 < 150$ volt
Impedance	10k Ohm / Volt
Overload	1.5 x U_n continuous 2 x U_n for 3 seconds

SETPOINT

Range Over	Adjustable 40% to 120%
Range Under	Adjustable 0% to 80%
Repeatability	Better than 0.5% of full span
Differential	Fixed 5%

AUXILIARY

AC Voltage	115/230/400V $\pm 25\%$ / 45-65Hz / 2VA
DC Voltage	24 volt ($\pm 20\%$ / galvanically isolated) <3 watt

WEIGHT & CASE SIZE

Single units	Approx. 0.4kg, 55mm case size
Combined unit	Approx. 0.6kg, 100mm case size

ORDERING INFORMATION

Product Code	Input V_n	Aux	Freq Options
M200-TVU	24V	110V	50Hz

OPTIONS

1. AC auxiliary in the range 57.7 to 480 volts
2. Calibration at nominal Hz 35...450Hz
3. Calibration at temperature other than 23° C

SELECTION GUIDE

M200-TVU	DC volts under trip
M200-TVO	DC volts over trip
M200-TVC	DC volts combined trip

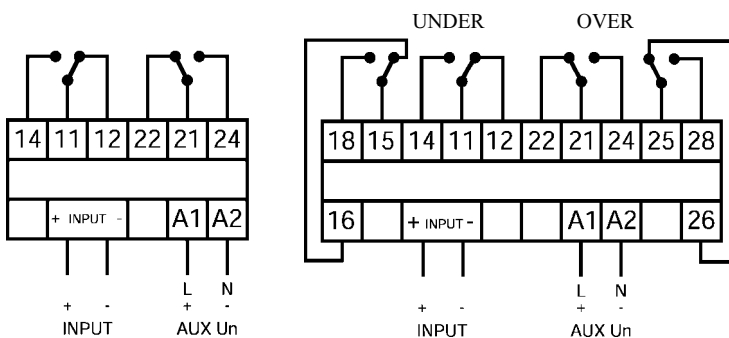
TYPICAL APPLICATIONS

The M200 DC voltage trips are commonly used for monitoring battery voltage conditions but can be used in any application where the dc voltage level is critical. The user is provided with an adjustable set-point of 0-80% on under units and 40-120% on over units. The differential is internally set at 5%; no time delay is provided.

As is common with all M200 relays, on over units the relay energises when the input signal exceeds the trip point and on under units the relay de-energises when the input signal goes below the trip point.

A red LED indicates the state of the relay whilst a green LED indicates the state of the power supply.

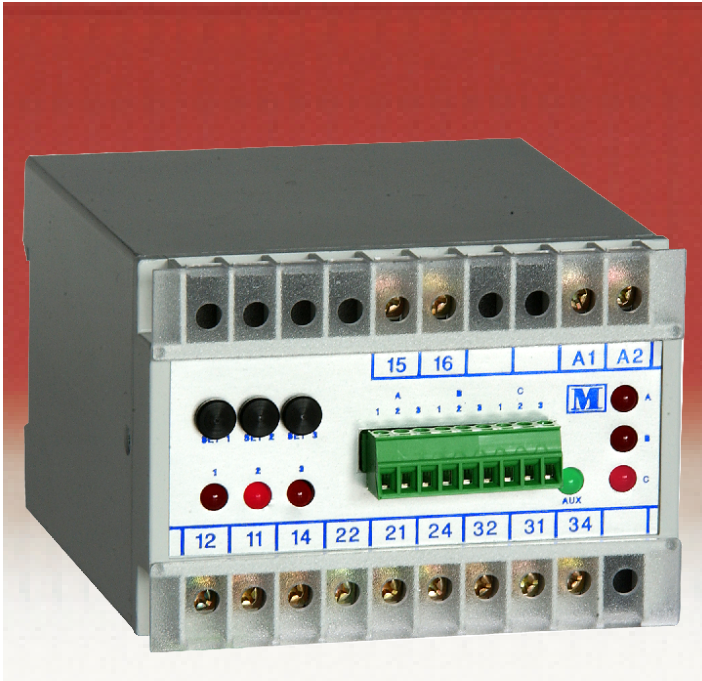
CONNECTION DIAGRAMS



M200TVO M200TVU

M200TVC

TEMPERATURE RELAY (THREE RTDS)



PRODUCTS COVERED

M200-RT3 3 Input RTD temperature trip

APPLICATION

The M200-RT3 monitors 3 individual RTDs (resistance temperature detectors) and provides LED indication as to which RTD is at the highest temperature, as well as a mA output signal that is proportional to the temperature of the highest RTD.

The mA output signal can be fed to an analogue or digital meter scaled in temperature or to a computer system.

The three relays are provided with customer adjustable set points, as the temperature rises each relay will energise when the set point is reached. Three LED's are provided to show the state of each relay, when the relay energises the red LED is illuminated. A green LED is provided to indicate the condition of the power supply.

Typical applications included monitoring of temperature in transformer windings and large 3 phase motor windings.

Typically a unit could be monitoring 3 inputs from a Pt 100 RTDs over the range of 0-200 °C, the first set point could be set at 80 °C and when this point is reached the relay could switch on a cooling fan. The second relay could be adjusted for 130 °C and when this temperature is reached the relay could set off an alarm. The third relay could be adjusted to 180 °C and when this temperature is reached the relay could shut down the complete system.

SPECIFICATION

INPUT

2 or 3 wire

Copper Cu 10 Ohm RTD Range 0-200 °C

Platinum Pt 100 Ohm RTD Range 0-200 °C

OUTPUT

Rated value

0-1mA input

Load resistance

Maximum 5k Ohms

RELAY SETPOINTS

Adjustment range

50% to 100% of input temperature range for all 3 set points.

Repeatability

Better than 0.5% of full span

Differential

Fixed 2% of range

RELAYS

Relay type

Single pole change over

Rating AC

250V 5A non resistive 1200VA

Rating DC

125V 1A resistive load 120 watts

Mechanical life

5 x 10⁶

AUXILIARY

AC Voltage

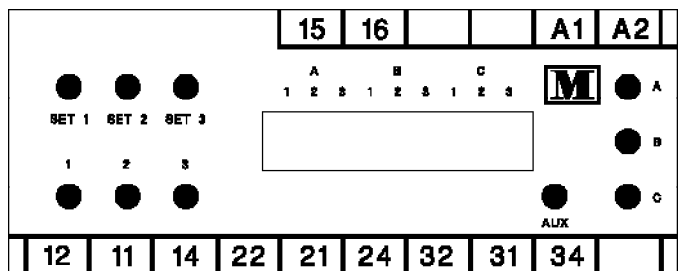
120V, 240V

± 25% / 45-65Hz / 2VA

WEIGHT & CASE SIZE

Approx. 0.6kg. 100mm case

CONNECTION DIAGRAM



TEMPERATURE RELAY (SIX RTDS)



SPECIFICATION

INPUT

2 or 3 wire

Copper Cu 10 Ohm RTD Range 0-200 °C

Platinum Pt 100 Ohm RTD Range 0-200 °C

RELAY SETPOINTS

Adjustment range

50% to 100% of input temperature range.

Repeatability

Better than 0.5% of full span

Differential

Fixed 2% of range

RELAYS

Relay type

Single pole change over

Rating AC

250V 5A non resistive 1200VA

Rating DC

125V 1A resistive load 120 watts

Mechanical life

5 x 10⁶

AUXILIARY

AC Voltage

120V, 240V

± 25% / 45-65Hz / 2VA

WEIGHT & CASE SIZE

Approx. 0.6kg. 100mm case

PRODUCTS COVERED

M200-RT6

6 Input RTD temperature trip

APPLICATION

The M200-RT6 monitors 6 individual RTDs (resistance temperature detectors) and provides LED indication as to which RTD is at the highest temperature.

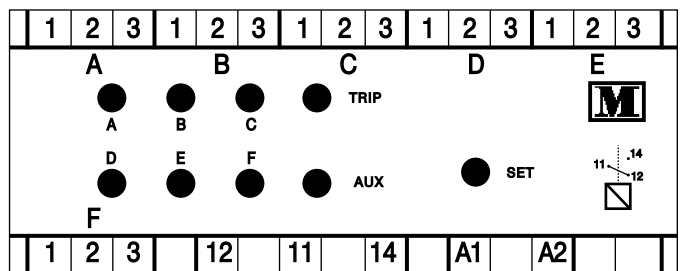
Each RTD has an associated LED which illuminates when the temperature exceeds the trip point.

A green LED is provided to indicate the condition of the power supply.

Typical applications included monitoring of temperature in transformer windings and large 3 phase motor windings.

Typically, a unit could be monitoring 6 inputs from a Pt 100 RTDs over the range of 0-200 °C, the set point could be set at 110 °C and when this point is reached the relay could switch on an alarm.

CONNECTION DIAGRAM



***UK MANUFACTURERS OF ANALOGUE METERS, CURRENT
TRANSFORMERS, TRANSDUCERS, MONITORING RELAYS, DIGITAL PANEL
METERS, PANEL MOUNT EARTH LEAKAGE RELAYS, PANEL MOUNT 3
PHASE CURRENT RELAYS***