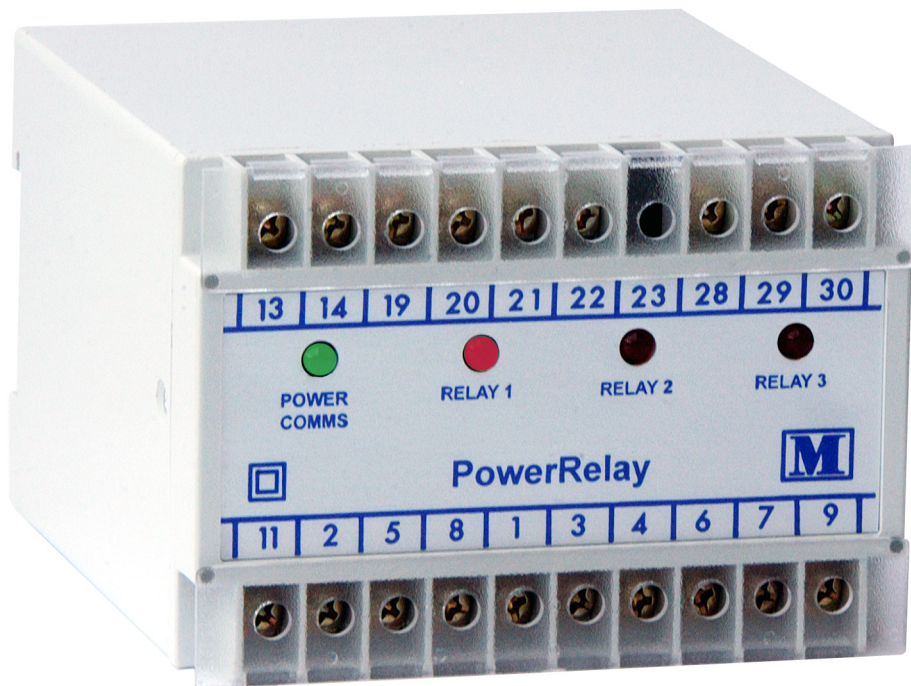


multitek



PowerRelay

The combination transducer relay

POWER RELAY

The M570-PR* PowerRelay is a combination of multifunctional relay and AC power transducer. The RS485 communication port provides Modbus output of all parameters measured and allows programming of the 4 relays as well as programming of CT and VT ratios, demand times etc.

RELAY SETUP

The M570-PR* PowerRelay Setup allows programming of the 4 independent relays and any 8 parameters out of 18 assignable can be assigned to 3 of these relays. Each relay has adjustable parameters, such as set point, time delay etc. The 4th relay is an option and can be used for pulsed output for W.h VAr.h VA.h A.h

Parameters

20 different parameters can be assigned to the relays.

Relay Mode

The relay can be assigned so that it operates as an over, under or window type.

Trip (% Range)

The trip-point (setpoint) can be adjusted between 10 and 120% of nominal input.

Reset (% Range)

The reset (differential) can be adjusted between 1 and 120% of nominal input.

The screenshot shows the 'Relay Setup' window with 8 columns for Parameter 1 through Parameter 8. Each column contains a dropdown for 'Assignment', a dropdown for 'Relay Mode', a text input for 'Setpnt (% Range)', a text input for 'Diff (% Range)', a dropdown for 'Group Logic', a text input for 'Time Delay' with a unit selector (s), a dropdown for 'Attach To Relay', and a checkbox for 'Disabled'. Below the columns, there is a 'Relay #' dropdown set to 1 and a 'Type' dropdown set to 'Operate'. At the bottom right are 'Help', 'OK', and 'Cancel' buttons.

Parameter 1	Parameter 2	Parameter 3	Parameter 4	Parameter 5	Parameter 6	Parameter 7	Parameter 8
Assignment: V (Volts)	Assignment: A (Amps)	Assignment: Hz (Frequency)	Assignment: W (Power)	Assignment: VAr (Reactive)	Assignment: -W (Reverse)	Assignment: -VAr (Rev.VAr)	Assignment: Vbal (V Balan)
Relay Mode: Over	Relay Mode: Under	Relay Mode: Window	Relay Mode: Over	Relay Mode: Under	Relay Mode: Over	Relay Mode: Under	Relay Mode: Window
Setpnt (% Range): 110	Setpnt (% Range): 85	Centre (% Range): 100	Setpnt (% Range): 105	Setpnt (% Range): 95	Setpnt (% Range): 110	Setpnt (% Range): 80	Centre (% Range): 100
Diff (% Range): 2	Diff (% Range): 2	+/- (% Range): 5	Diff (% Range): 1	Diff (% Range): 1	Diff (% Range): 2	Diff (% Range): 2	+/- (% Range): 10
Group Logic: Average	Group Logic: Any 1	Group Logic: Any 1	Group Logic: Sum	Group Logic: Sum	Group Logic: Any 3	Group Logic: Sum	Group Logic: Any 1
Time Delay: 5.0 s	Time Delay: 10.0 s	Time Delay: 2.0 s	Time Delay: 10.0 s	Time Delay: 10.0 s	Time Delay: 5.0 s	Time Delay: 15.0 s	Time Delay: 5.0 s
Attach To Relay: 1	Attach To Relay: 2	Attach To Relay: 3	Attach To Relay: 1	Attach To Relay: 1	Attach To Relay: 2	Attach To Relay: 3	Attach To Relay: 2
<input type="checkbox"/> Disabled	<input type="checkbox"/> Disabled	<input type="checkbox"/> Disabled	<input type="checkbox"/> Disabled	<input type="checkbox"/> Disabled	<input type="checkbox"/> Disabled	<input type="checkbox"/> Disabled	<input type="checkbox"/> Disabled
Range 0-230.00V (0-100%). 5% = 11.50V Setpoint = 253.00V Differential = -4.60V	Range 0-400.00A (0-100%). 5% = 20.00A Setpoint = 340.00A Differential = 8.00A	Range 40-60Hz (0-100%). Mid range 50Hz (50%) 5% = 1Hz Centre Point = 60.00Hz Window (+/-) = 1.00Hz	Range 0-276.00kW (0-100%). 5% = 13.80kW Setpoint = 289.80kW Differential = -2.76kW	Range 0-276.00kVAr (0-100%). 5% = 13.80kVAr Setpoint = 262.20kVAr Differential = 2.76kVAr	Range 0 to -92.00kW (0-100%). 5% = 4.60kW Setpoint = -101.20kW Differential = 1.84kW	Range 0 to -276.00kVAr (0-100%). 5% = 13.80kVAr Setpoint = -220.80kVAr Differential = -5.52kVAr	Range 0-230.00V (0-100%). 5% = 11.50V Centre Point = 230.00V Window (+/-) = 23.00V

Group Logic

Allows the relay to trip on 1, 2, 3 phases, the sum or the average of the systems assigned parameter when limits are reached.

Time Delay

The time delay can be set between 40msec to 2 minutes in 1 second steps.

Attach to Relay

The parameter can be attached to relay 1, relay 2 or relay 3.

Relay Action

The relay can be programmed to energise on trip or de-energise on trip.

PULSED OUTPUT RELAY

The fourth relay is an option and is used as an energy relay providing a pulse output corresponding to either Watt hour Import or Export, VAr hour Import or Export, VA hour or Ampere hour. Pulse width can be selected as well as the relay divisor which allows relay to pulse every 1, 10 or 100 counts.

RELAYS STATE

The free set up and monitor software allows monitoring of the state of each relay as well as indicating the parameters assigned. See below the exceptions screen.

Select Parameter

Select either
W.h import or export
VAr import or export
VA.h or A.h

Units

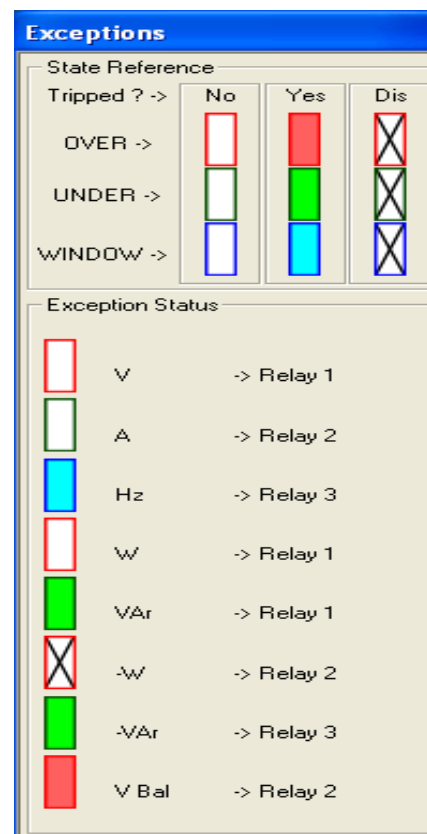
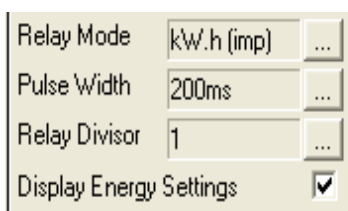
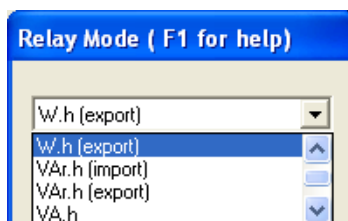
The pulsed output will either
be h or k.h or M.h this is
automatically set by C.T. and
V.T. ratios of the system.

State Reference

Key to relay conditions

Under/Over/Window

Over condition red band.
Under condition green band.
Window condition blue band.



Relay Mode

Assigns the relay to Watt
hour import Ampere hour
etc. Pulse width sets the
width of relay pulse.

Display Energy Settings

Tick this box and the
monitor displays the energy
relay settings.

Dis

If a parameter is not
assigned.
The box contains a cross
(disconnected).

Exception status

This shows the parameter,
the relay that it is assigned to
and the state that relay is in.
Colour band indicates over,
under or window.

SYSTEM MONITOR

The System Monitor program displays all 42 parameters being measured. CT and VT ratios demand times, etc. all can be set via this program. The System Monitor enables programming of the 4 relays as well as data logging. System Monitor is free and contains help files and operating instructions. It can be downloaded from Multitek website: www.multitek-ltd.com

COMMUNICATION

PowerRelay uses RS485 Modbus protocol. This enables remote reading and programming of the PowerRelay via a host computer. The RS485 allows up to 32 PowerRelays to be connected in parallel, allowing them to be used with PC, PLC, RTU, Data loggers and Scada programs. RS485 to USB converters now available.

Type

Displays system type
i.e. 3 phase 4 wire,
3 phase 3 wire
etc.

Voltage Current

Voltage and Current ratios
can be programmed and the
values are displayed.

Monitor / Log

Display 6 parameters at a
time, showing the
instantaneous value.

The screenshot shows the Monitor95 software interface. It has a blue title bar and a standard Windows-style window with minimize, maximize, and close buttons. The interface is divided into several sections:

- Left Panel:** Contains fields for Model (570), Version (0.3.01.00), Date (16-02-04), Type (3ph4W), Voltage (V) (230.000), Current (A) (400.000), Power (kW) (276.000), Monitor relay (Change ->), Status (Show/Hide->), Demand Time (8), Demand Status (8), Stack Free (2 (min 2)), Parity Errors (0), CRC Errors (0), and EEPROM (OK).
- Top Right Panel:** Labeled 'Monitor / Log', it displays I 2 (400.1), I 3 (400.3), W Sum (276309), VA Sum (276306), VAR Sum (0.000), and PF Avg (-1.000). It also has a 'Factory Version' button with a red 'M' logo.
- Bottom Right Panel:** Contains buttons for 'Pass Codes', 'Resets', 'General', 'Energy', 'Registers', 'Cal Enable', 'Demand', 'Calibrate', 'Reset', 'EEProm', and 'Node #'. It also has a 'Timer' section showing '00:00:00' and buttons for 'Start', 'Pause', 'Stop', and 'Master Code'.
- Bottom Section:** Labeled 'Map 3<', it shows Modbus TX and RX data streams. It also has an 'Errors (0)' section with a 'Clear' button. At the bottom, there are fields for 'Lock', 'Port' (COM1: baud=9600 parity=N data=8 stop=2), 'Response (ms)' (500), 'Node #' (1), and buttons for 'Start', 'Log', and 'Updated'.

Start Log

User goes into the log screen
and logging of up to 6
parameters can be
performed.

Response Time

User can set response time.

Node

Node (address) can be set
between 1 and 247.

- * Phase Voltage (V)***
- * Phase Current (I)***
- * Phase Balance (V)***
- * Frequency (Hz)***
- * Reverse Power. (-W)***
- * Reverse VAr (-VAr)***
- * System Active Power (W)***
- * System Reactive Power (VAr)***
- * Apparent Power per phase (VA)***
- * System Apparent Power (VA)***
- * Import Active Energy (W.h)***
- * Export Active Energy (W.h)***
- * Import Reactive Energy (VAr.h)***
- * Export Reactive Energy (VAr.h)***
- * Apparent Energy (VA.h)***
- * Ampere Energy (A.h)***
- * Amp Demand (Ad)***
- * Import Watt Demand (Wd)***
- * Export Watt Demand (Wd)***
- * VA Demand (VAd)***

Single Phase
Single Phase 3 wire
3 phase 3 wire unbalanced load
3 phase 4 wire unbalanced load

M570-PR1
M570-PR1-3
M570-PR4
M570-PR9

All data including, energy registers, current and voltage ratios relay trip points and calibration data is stored in a non volatile eeprom. Under power down (power loss) conditions this data is retained.

Applications include generating sets, switchgear, management systems, distribution feeders, control panels, UPS systems, process control, generating systems, power management and control.

The PowerRelay communication port is auto-configurable meaning that when connected to an existing Modbus network it will automatically set Baud rate, Parity and Stop bits.

A green LED is provided to indicate power is present, and the unit is communicating correctly.

- * **Phase Voltage (V)**
- * **Line Voltage (V)**
- * **Phase Current (I)**
- * **Frequency (Hz)**
- * **Active Power per phase (W)**
- * **System Active Power (W)**
- * **Reactive Power per phase (VAr)**
- * **System Reactive Power (VAr)**
- * **Apparent Power per phase (VA)**
- * **System Apparent Power (VA)**
- * **Import Active Energy (W.h)**
- * **Export Active Energy (W.h)**
- * **Import Reactive Energy (VAr.h)**
- * **Export Reactive Energy (VAr.h)**
- * **Apparent Energy (VA.h)**
- * **Ampere Energy (A.h)**
- * **Power Factor per phase (P.F.)**
- * **System Power Factor (P.F.)**
- * **Amp Demand (Ad)**
- * **Watt Demand (Wd)**
- * **VA Demand (VAd)**
- * **Maximum Amp Demand (Max Ad)**
- * **Maximum Watt Demand Import (Max Wd)**
- * **Maximum Watt Demand Export (Max Wd)**
- * **Maximum VA Demand (Max VAd)**
- * **Neutral Current**

Relay type: Single Pole A or B contact.
Material: AgSnInO
AC Rating: 250V 5A DC Rating: 30V 1A
Relay's R1 and R2 are normally open
Relay R3 is normally closed.
Note contact operation of R1, R2 and R3 can
be changed on request when ordering.
Relay R4 is normally open and closes when
unit counts energy etc.
Terminal 19 is common to all 4 relays

Specified @ 23°C 10%-Un 10%-In
Voltage & Current:-
Accuracy $\pm 1\%$ of range
Resolution $\pm 1\%$
Frequency:-
Accuracy $\pm 0.02\text{Hz}$
Repeatability $\pm 0.02\text{Hz}$
All other Parameters:-
Accuracy $\pm 2\%$
Repeatability $\pm 1\%$

GENERAL SPECIFICATION

INPUT

Rated Un	Direct connected voltages between 57.8 and 600 V. Specify nominal.
Range	10-120% Un
Overload	1.5 x Un cont. 4 x Un for 1 sec
Rated In	1 or 5 amp
Range	10-120% In
Burden	0.5VA per phase Volts & Amps
Overload	4 x In continuous. 50 x In for 1sec
Frequency	50 / 60 Hz nominal range 45/65Hz

MODBUS ACCURACY

Specified @ 23°C	10%-Un 10%-In
Parameters unless stated	Class 0.3% to IEC 688
Volts and Amps	Class 0.25% to IEC 688
Frequency	Class 0.1Hz to IEC 688
Power Factor	Class 1.0% to IEC 688
Active & Reactive Energy	1% of reading IEC1036

INSULATION

Test Voltage	4 kV RMS 50 Hz for 1 min Inputs/Case/Auxiliary/Output 3kV RS485 / Outputs 1.5kV Relay
Impulse Test	EMC 5kV transient complying with IEC 801 / EN 55020 HF
Surge withstand	IEC 801 / EN55020 ANSI C37.90A
Interference	EHF 2.5 kV 1Mhz complying with IEC 255-4
Protection Class	II complying with IEC348

APPLIED STANDARDS

General	IEC 688 BSEN60688, BS4889, IEC 359
EMC	Emissions BSEN50081/1 Immunity BSEN50082/2
Safety	IEC 1010, BSEN601010

AUXILIARY

AC voltage	115, 230, 277, 400 volts (±15%)
DC voltage	12, 24, 48, 110, 125, volts (±15%) Specify nominal voltage.

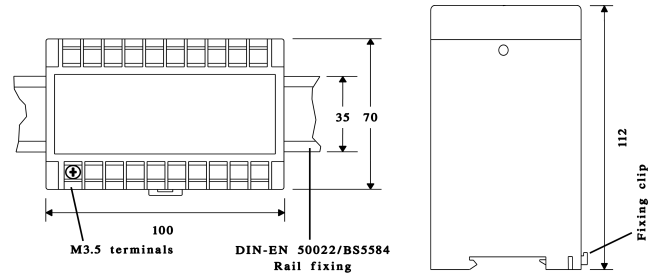
ENVIRONMENTAL

Working Temperature	-25 to +70 deg C
Storage Temperature	-40 to +85 deg C
Temperature Coefficient	0.01% per deg C

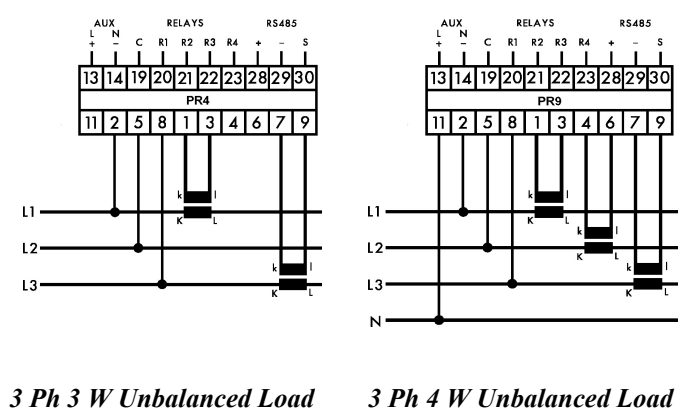
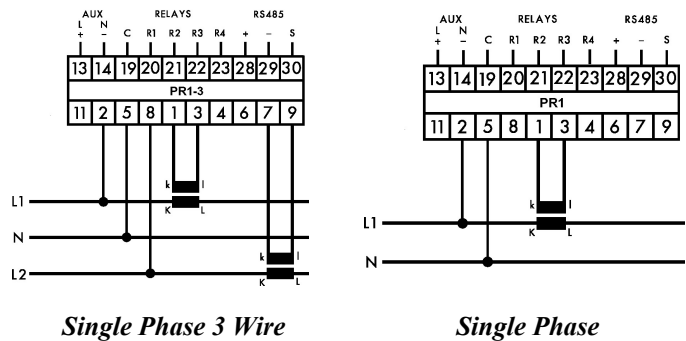
APPROVALS

UL, C-UL, CSA

CASE DIMENSIONS



CONNECTION DIAGRAMS



multitek®

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