

Features

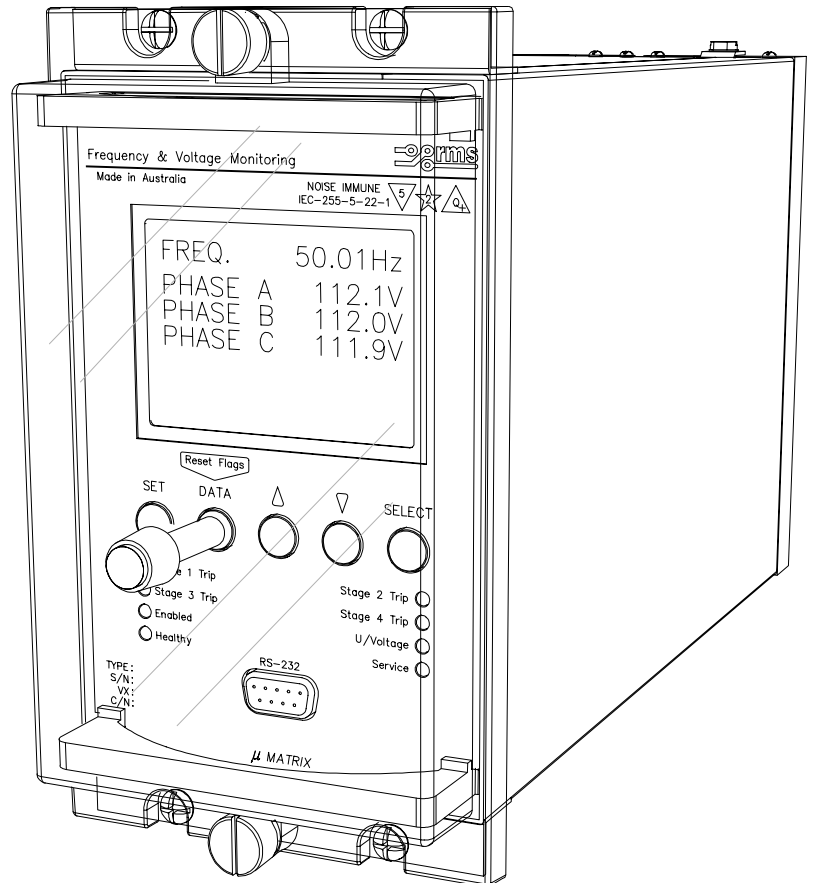
- Large graphics display panel
- Instantaneous frequency display
- Instantaneous three phase voltage
- 80 to 130V PU setting range
- 0.1V setting resolution
- 40 to 60Hz PU setting range
- Adjustable pick up & drop out
- Adjustable reset time delay
- 110V AC nominal VT inputs
- Six independent frequency or voltage stages & output trip contacts
- Independent definite time delay per setting stage
- Timing & trip indication LED's
- Relay enable input
- CPU watchdog
- Undervoltage blocking function
- Wide auxiliary supply range with fail alarm contact

COMMUNICATION

- Non platform specific PC programming software: μ MATRIXwin
- Optically isolated communication ports
- MODBUS RTU compatible network protocol
- Size 4 draw out case
- Made in Australia

Applications

Under frequency load shedding
Cogeneration schemes
Automatic transfer
Transformer protection



2H35 in size 4 rack mount case

Operation

Made in Australia

The 2H35 Series relay is a combined voltage & frequency monitoring relay with six stages of adjustable pick up & drop out points. Each stage can be set for under or over voltage or frequency operation & has an independent time delay driving an output relay. An undervoltage lockout is provided to disable the six frequency outputs when the voltage falls below a preset level. A single status input is used to enable the six sensing stages.

The 2H35 relay is built on the Micro MATRIX digital platform. The standard Micro MATRIX human machine interface (HMI) is combined with fully solid state voltage sensing & measuring circuitry to provide high accuracy, simple set up & flexible operation. Self-monitoring is carried out by hardware & software watchdogs. A CPU software watchdog records abnormal events & performs automatic periodic checks. High speed, high contact rating output relays are used.

The input transformer, output relays & opto isolated status input form the essential barriers against high voltage line transients while a switchmode auxiliary supply provides a wide operating range.

An RS232 programming port is provided for ease of establishing relay settings using a PC & μ MATRIXwin.

BURDENS

Auxiliary supply: (at 110V DC nominal supply)
Less than 7 watts during timing.
Less than 10 watts whilst output relay is energised.
Sensing circuits: Less than 1VA per phase all settings.

SETTING STAGES

A total of six (6) setting stages are provided. Each stage may be selected as either an under/over frequency stage or as an under/over voltage stage.

Stage 1 to 6 when configured for frequency detection monitor the phase A input only.

Stage 1 to 3 when configured for voltage detection monitor on all three phases using or gate logic.

Stage 4 to 6 when configured for voltage detection monitor the phase A input only.

FREQUENCY STAGE SET POINTS

Stage 1 to 6 inputs: 1 phase 63.5 or 110V AC
Setting stages: Up to 6 independent stages
Setting stages: 4 independent stages
Setting range: 40 to 60Hz
Setting resolution: 0.05Hz (0.01Hz in μ MATRIXwin)
Accuracy: +/-0.03Hz (70 to 121V)
+/-0.10Hz (30 to 69V)
+/-0.50Hz (14 to 29V)
Hysteresis: 0.05 to 0.5Hz
Frequency measuring time: 60ms (3 cycles)
Error in response time: <5ms
Minimum operate time: 70ms (Including output relay delay)
Overfrequency function: PU at set point
DO at set point – hysteresis
Underfrequency function: PU at set point
DO at set point + hysteresis
Undervoltage lockout: 20 to 90V
Setting resolution: 0.1V steps

VOLTAGE STAGE SET POINTS

Stage 1 to 3 Inputs: 3 phase 110V AC
Setting stages: Up to 3 independent stages
Stage 4 to 6 Inputs: 1 phase 110V AC
Setting stages: Up to 3 independent stages
Setting range: 80 to 130V
Hysteresis: 0.2 to 5V
Overvoltage function: PU at set point
DO at set point – hysteresis
Undervoltage function: PU at set point
DO at set point + hysteresis
Undervoltage lockout: 20 to 90V

VOLTAGE MEASUREMENT ACCURACY

Precision of voltage setting: 0.1V steps
Voltage pick up repeatability: +/-0.1V from 90 to 120V
Voltage display: 4 digits
Resolution of voltage display: 0.1V
Accuracy of displayed voltage: +/-0.25V

VOLTAGE DISPLAY

(Data Page)
Display range: 10-145V
Display format: 4 digits

TIME SETTING RANGE

The 2H35 allows for a separate time range for each of the six setting stage set points. Time delays between 100ms & 320 seconds may be set in steps of 0.05 seconds.

TIMING ACCURACY 50us/s

An inherent uncertainty in the definite time delay function is introduced by a number of factors:

1. The 40ms cycle time of the software control loop
2. The 10ms delay between each zero crossing (at 50Hz)
3. The varied switching speed of the output relay (~2ms)

RESET TIME DELAY

Electronic reset time is adjustable between zero & 5 seconds. When the frequency pick up & drop out points are set very close together it is advisable to set a longer reset delay to avoid timer resetting due to transient frequency fluctuations.

RELAY FAIL ALARM

A C/O alarm contact is maintained in the energised state when all of the following conditions are met:

- The auxiliary supply is applied
- The internal 24V DC rail is within acceptable limits
- The CPU hardware watchdog maintains a pulsing output

A CPU software watchdog records “suspect” events to an assert register and if necessary performs a soft restart.

RELAY ENABLE STATUS INPUT

The status input on the 2H35 is used to enable the four frequency monitoring stages of the relay. The relay must be “enabled” in order for the time delay stages to operate.

STATUS INPUT FUNCTION

The status input function is factory set to enable on the application of a control voltage. It is also possible for the status input to operate on the removal of a control voltage by simply changing a software flag in the PC setup program.

OUTPUT CONTACTS

Stages 1 to 4: 1 C/O contact per stage
Stages 4 to 6: 1 N/O contact per stage

OUTPUT CONTACT RATINGS

Make & carry

30A AC or DC (Limits L/R=40ms & 300V max.) for 0.2s
20A AC or DC (Limits L/R=40ms & 300V max.) for 0.5s
5A AC or DC continuously

Break (Limits 5A & 300V max.)

1,250VA AC resistive
250VA at 0.4PF AC inductive
75W DC resistive
30W DC inductive L/R = 40ms
50W DC inductive L/R = 10ms

Minimum recommended load

0.5W, 10mA or 5V minimum.

AMBIENT OPERATING TEMPERATURE RANGE

-5 to 55 degrees C.

INSULATION WITHSTAND

IEC60255-5 2KV RMS & 1.2/50 5KV impulse between:

- ♦ all input terminals & frame
- ♦ all output terminals & frame
- ♦ all input & output terminals
- ♦ each input group
- ♦ each output group

HIGH FREQUENCY DISTURBANCE

IEC60255-22-1 2.5KV 1MHz common mode
1.0KV 1MHz differential mode

ELECTROSTATIC DISCHARGE

EN61000-4-2:1995 8KV Level 3

RADIO FREQUENCY INTERFERENCE

EN61000-4-3:1995 10V/m Level 3

FAST TRANSIENT DISTURBANCE

EN61000-4-4:1995 4KV Level 4

CASE

Size 4 draw out
56 M4 screw terminals
Flush panel mount or 4U high 1/4 width 19 inch rack mount
IP51 rating

ACCESSORIES SUPPLIED WITH EACH RELAY

1 x M4 self threading mounting screw kit P/N 290-406-151
2 x M4 terminal screw kit (28 per kit) P/N 290-407-153
1 x Product Test Manual



AUXILIARY SUPPLY

20-70V DC switchmode supply or
40-275V AC / 40-300V DC switchmode supply
Burden: Less than 7 watts during timing

Inputs:

A high efficiency switchmode power supply is incorporated which provides a low burden to the auxiliary supply.

Input Transients:

Withstands multiple high-energy transients & ring waves in accordance with IEEE28 - ANSI C26.1 Cat. II, accordingly:

- 0.5uS 100KHz 6KV O/C, 500A S/C, 4J
- 1.2/50uS 6Kv O/C
- 8/20uS 3KA S/C, 80J clamped at 1,000V

Mains conducted EMI within limits specified by AS 3548 Class B.

Isolation:

The inputs are isolated from the outputs in accordance with AS3260 Class II Limited Current Circuitry, accordingly:

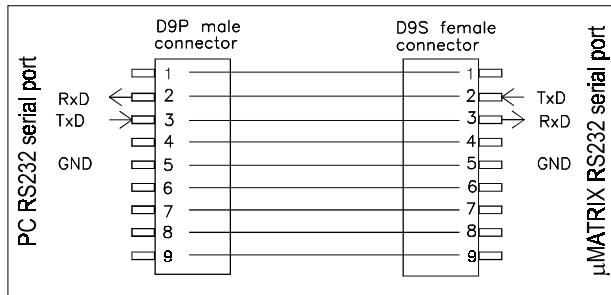
- Withstand voltage of 2.5Kv RMS 50Hz for one minute
- Creepage & clearance distance greater than 4mm
- Output leakage current less than 0.25A to earth

Output Protection:

Outputs will withstand continuous short circuit. Output regulators & switching control regulator are thermally protected.

PC TO μMATRIX SERIAL CABLE

One cable supplied with each order.
P/N 997-000-042



Communications

COMMUNICATION PORTS

Two (2) communications ports are available.

Programming port

The programming port is accessible from the front panel of the relay via an RS232 physical link & PC configuration program supplied with the relay. The μMATRIXwin configuration program is designed to operate with all relays from the Micro MATRIX range & with all installed firmware version.

Network port

The network port is intended for applications where permanent connection to a master control system is required. An optically isolated RS232 or RS485 physical layer is provided for this function.

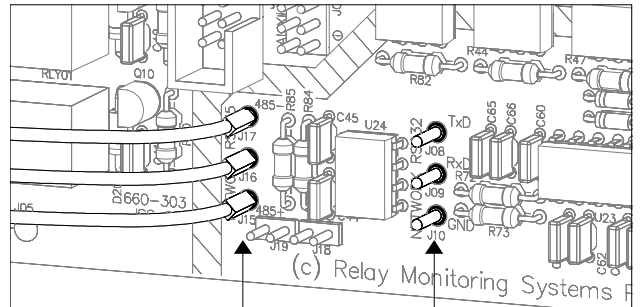
The RS485 connection is intended for applications where multiple μMATRIX relays are to be connected on a common communications bus.

The RS232 connection is intended for interface to an RS232 to optic fiber converter in environments subject to extreme electrical interference.

The network port may be used for a permanent link to a modem, remote PC, data concentrator or SCADA system. The standard communications protocol is MODBUS RTU.

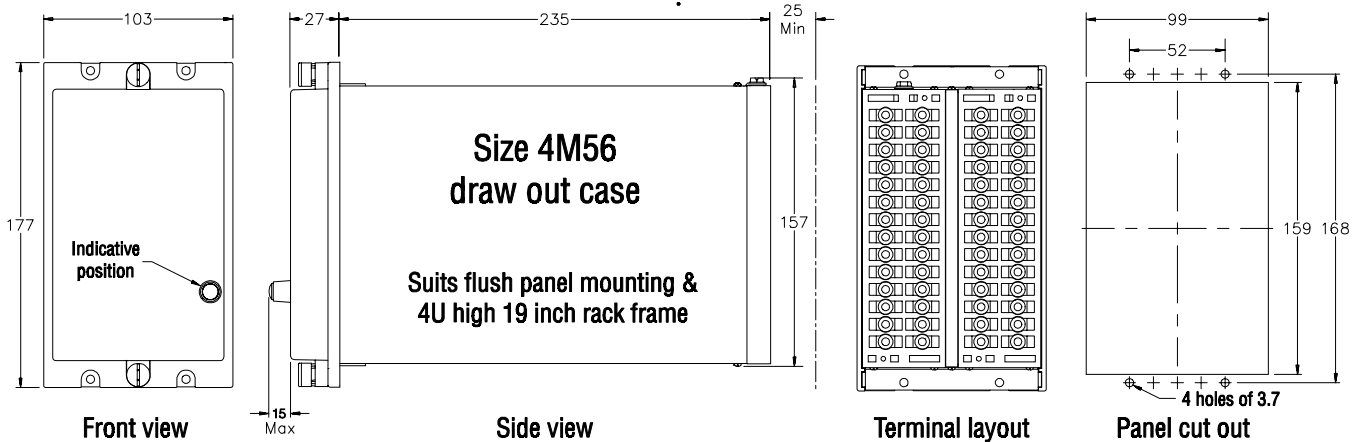
Changing the Network port from RS485 to RS232

μMATRIX relays are shipped with the rear network port terminals connected to the RS485 serial input. This configuration may be changed in the field to an RS232 connection if required by withdrawing the relay module from the case & changing the three plug in wires as depicted.



RS485 Port Connections

RS232 Port Connections

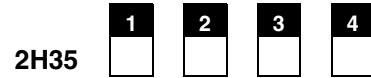


Visit www.rmspl.com.au for the latest product information.

Due to RMS continuous product improvement policy this information is subject to change without notice. 2H35/Issue A4/14/04/2003/3/4

Ordering Information

Generate the required ordering code as follows: e.g. 2H35 BBBA



1 AUXILIARY SUPPLY RANGE

- A 20-70V DC
- B 40-300V DC

2 RELAY INITIATE INPUT

Opto-isolated input

- A 24-80V AC/DC
- B 75-150V AC/DC
- C 150-300V AC/DC

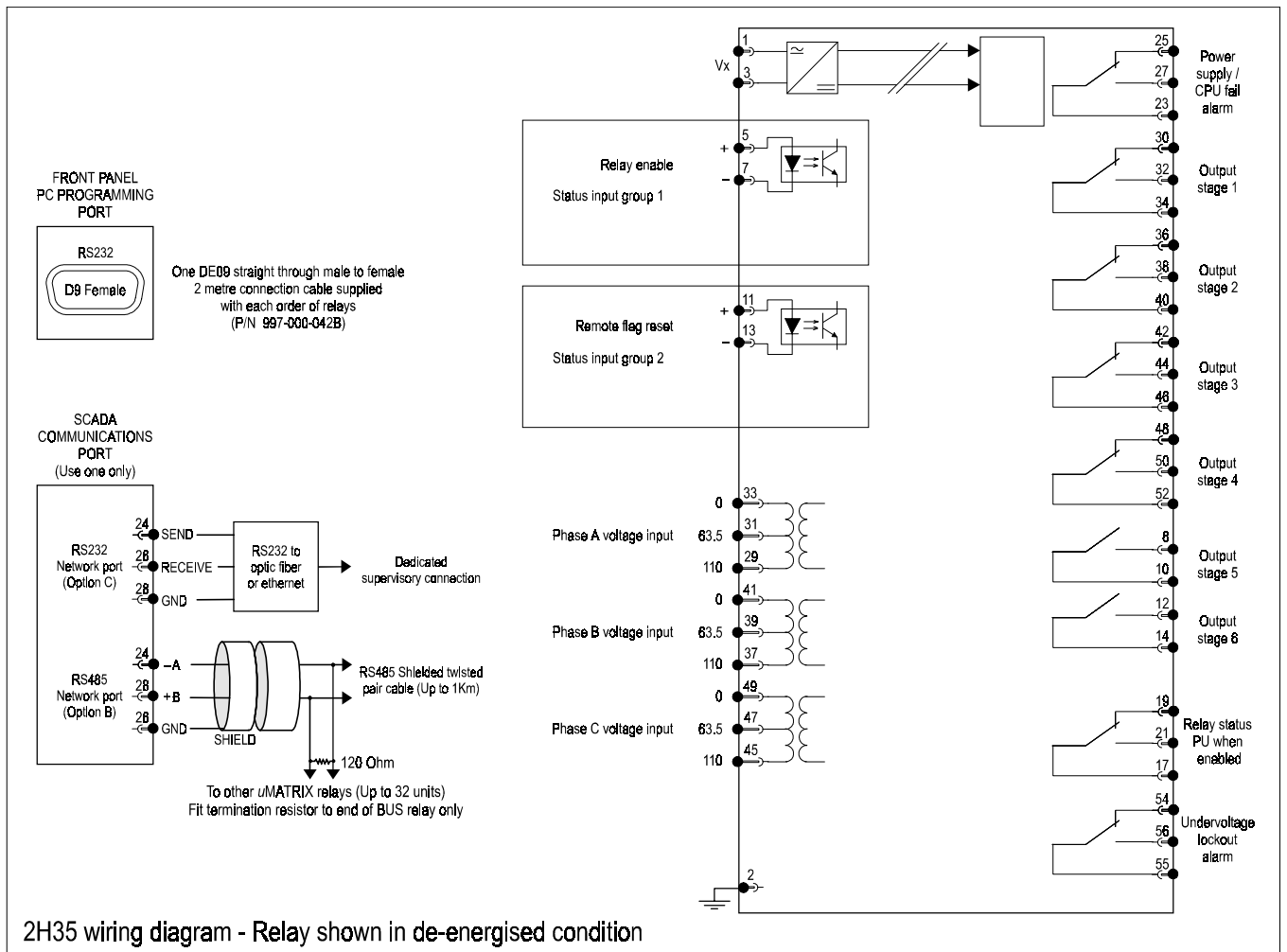
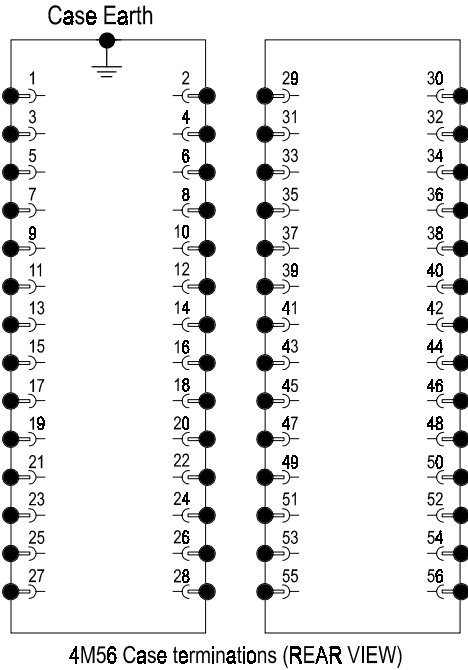
3 REMOTE FLAG RESET INPUT

Opto-isolated input

- A 24-80V AC/DC
- B 75-150V AC/DC
- C 150-300V AC/DC

4 SCADA COMMUNICATIONS PORT

- A Not required
- B RS 485
- C RS 232



Australian Content

Unless otherwise stated the product(s) quoted are manufactured by RMS at our production facility in Melbourne Australia. Approximately 90% of our sales volume is derived from equipment manufactured in house with a local content close to 90%. Imported components such as semi-conductors are sourced from local suppliers & preference is given for reasonable stock holding to support our build requirements.

Quality Assurance

RMS holds NCSI (NATA Certification Services International), registration number 6869 for the certification of a quality assurance system to AS/NZS ISO9001-1994. Quality plans for all products involve 100% inspection and testing carried out before despatch. Further details on specific test plans, quality policy & procedures may be found in section A4 of the RMS product catalogue.

Product Packaging

Protection relays are supplied in secure individual packing cardboard boxes with moulded styrene inserts suitable for recycling. Each product & packing box is labeled with the product part number, customer name & order details.

Design References

The products & components produced by RMS are based on many years of field experience since Relays Pty Ltd was formed in 1955. A large population of equipment is in service throughout Australia, New Zealand, South Africa & South East Asia attesting to this fact. Specific product & customer reference sites may be provided on application.

Product Warranty

All utility grade protection & auxiliary relay products, unless otherwise stated, are warranted for a period of 24 months from shipment for materials & labour on a return to factory basis. Repair of products damaged through poor application or circumstances outside the product ratings will be carried out at the customers expense.

Standard Conditions of Sale

Unless otherwise agreed RMS Standard Terms & Conditions (QF 907) shall apply to all sales. These are available on request or from our web site.



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