

Features

- Three time ranges
0-0.99s, 0-9.9s, 0-99s
- High accuracy & repeatability –
timing compensated for output
relay delay
- Time settings easily selected
by digital thumb wheel switches
- Selectable delay operate or
delay release
- Optional reset functions
Instantaneous, definite time,
count down
- 2 N/O & 2 N/C output contacts
- Wide auxiliary supply range
with fail alarm contact
- Timing in progress LED
- Non-volatile trip indication
- Multi voltage timer initiate input
- Multi voltage flag reset input
- Size 2M draw out case

Application

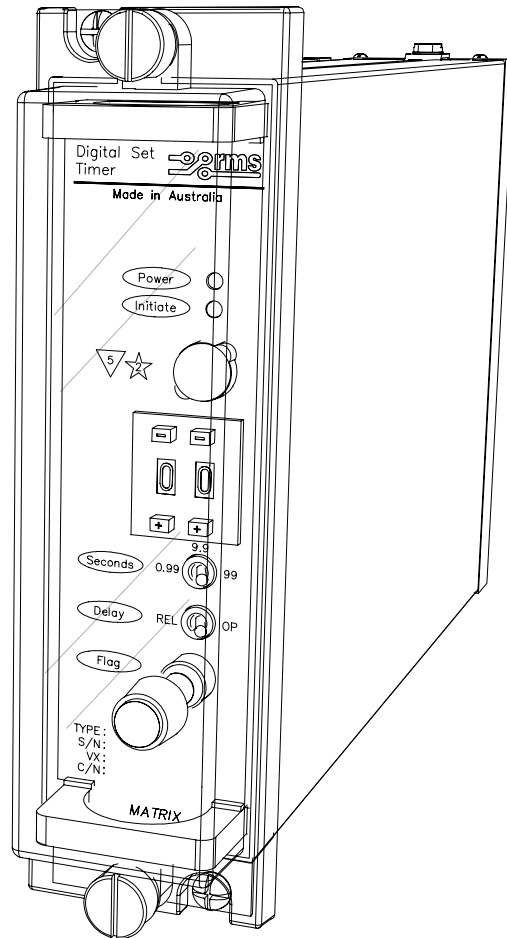
The 2T104 time delay relay is particularly suitable for use in protection & control schemes where precision time delays are required.

CB FAIL

A typical use is for providing a definite time delay in circuit breaker failure protection. For example: The transformer multi-trip relays energize the 2T104 timer & if the circuit breaker (CB) fails to clear the fault within the pre-set (0.6s) the timer times out & operates a multi-trip relay. This in turn trips all CB's on the section of the busbar connected to the CB, which has failed to trip.

INDUCTION DISC RESET EMULATION

Replacement of induction disc timing elements with solid-state relays can result in a loss of grading & reduced functionality due to the different reset characteristics. For example, the inherent slow reset time of induction disc relays provide an advantage in sensitive overcurrent schemes where pecking faults could go undetected due to the timer being instantaneously reset each time the current momentarily falls below the start setting. The 2T104 may be specified with a number of reset functions to avoid this problem & to suit specific protection applications.



2T104 depicted in a 2M28 case.

Operation

Made in Australia

A crystal oscillator & embedded micro controller based timing circuit are employed to provide accurate timing & flexible functionality. When a control signal is applied to the timer initiate input, the down counter begins counting down from the thumb wheel switch setting. When the zero is detected, the output relay & flag changes state & the down counter stops.

Three time ranges are selected via a front panel switch. A second function switch sets the timer to operate in time delay **ON** mode (Relay starts timing after the initiate control signal is applied & output contact picks up after the pre-set time delay has elapsed) or in time delay **OFF** mode (Relay output contact picks up instantaneously when the initiate control signal is applied, starts timing after the initiate control signal is removed & drops out after the pre-set time delay has elapsed). An LED on the front panel indicates when the relay has been initiated & flashes during timing.

The 2T104 timer may be specified with a number of different reset functions to provide instantaneous reset, definite time reset or induction disc reset emulation. These functions are specified at time of order & are factory programmed.

A switchmode power supply provides a very wide auxiliary operating range. A relay fail alarm is provided in the form of a C/O contact which is picked up when the auxiliary supply is healthy.

TIMING FUNCTION / INITIATE SIGNAL INPUT (Status input)
 For accurate timing functions the 2T104 detects application or removal of a DC control signal. Two modes of operation are possible:

Delay operate mode

The relay is permanently connected to the auxiliary supply and is initiated by the application of a control signal. Application of the initiate signal (10ms minimum pulse length), starts the pre set timing cycle. During timing the front panel initiate LED will flash & then go on solid once the thumbwheel time setting has elapsed, this sets the output relay and visual indicator. The initiate LED is extinguished & the output contacts reset when the initiate signal is removed. After system reset the visual indicator may be reset locally by the front panel push button or remotely via the flag reset input.

To achieve a simple but less accurate delay **ON** function, the initiate signal may be connected directly to the auxiliary supply. Timing will then commence when power is applied to the relay while removal of power will reset the time delay & output relay. This mode is only suitable for longer time delay settings as the switch mode power supply takes 100 – 500ms (Depending on Vx), to start which adds to the inherent time delay.

Delay release mode

The relay is permanently connected to the auxiliary supply. Application of the initiate control signal (10ms minimum pulse length), causes the output relay to set instantaneously (Rset). It will remain in this state until the control signal is removed, this starts the timing cycle & resets the output relay when the preset time delay is reached. After system reset the visual indicator may be reset locally by the front panel push button or remotely via the flag reset input.

TIMING RESET OPTIONS

Instantaneous

If the initiate signal drops out before the preset time delay is reached the timing element will reset in less than 20ms for relay type status inputs & in less than 5ms for opto type status inputs.

Definite Time Reset (Treset)

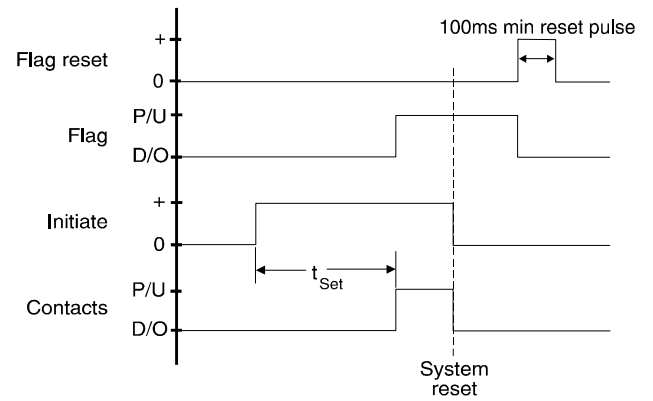
With this reset option a definite reset time must be specified. If the initiate signal drops out before the preset time delay is reached the delay timer will pause until the reset time has elapsed before resetting. If the initiate signal picks up again before the reset time has elapsed, the delay timer will restart the timing sequence from the paused timing point.

Count Down Reset

If the initiate signal drops out before the preset time delay is reached, the timer will count down toward reset. If initiate signal picks up again before reset is reached the timer will start counting back up towards the time delay pre set.

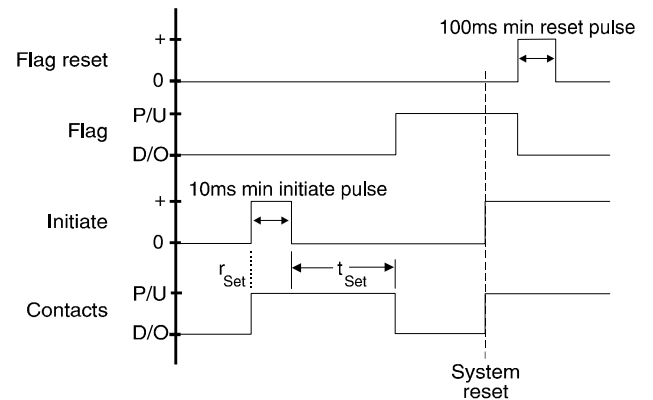
TIMING FUNCTIONS

Delay Operate (ON)



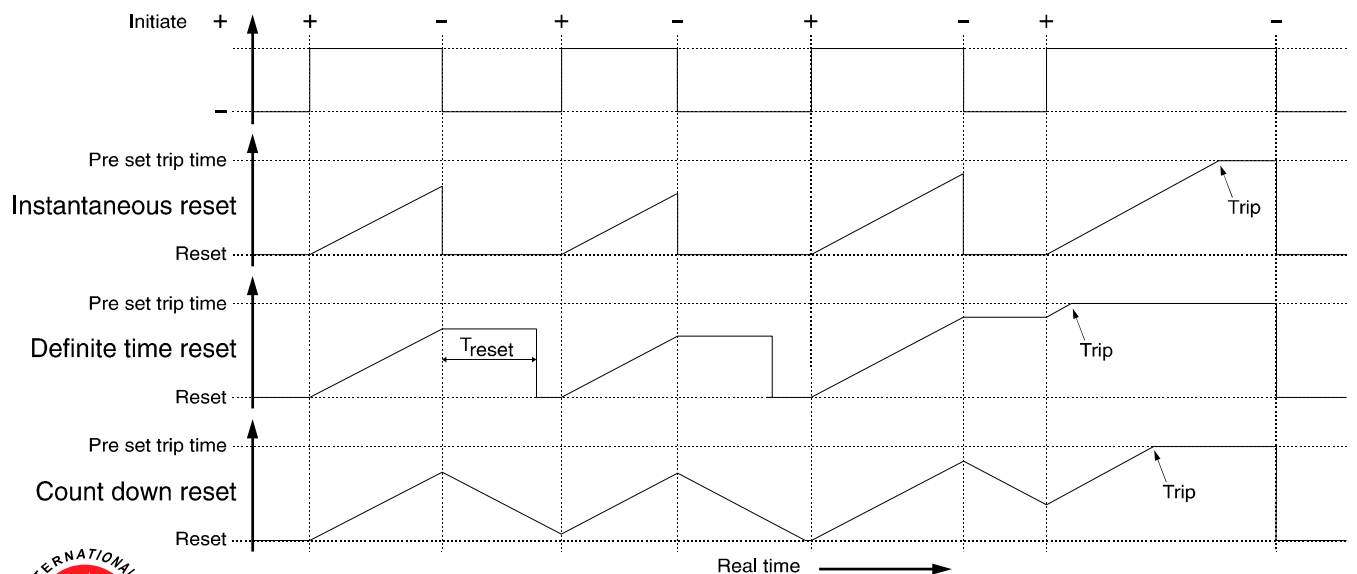
After time out contacts are reset to D/O condition upon removal of the initiate signal. The flag can only be reset once returned to this condition.

Delay Release (OFF)



After time out contacts are reset to P/U condition upon re-application of the initiate signal. The flag can only be reset once returned to this condition or after re-application of the auxiliary supply.

RESET FUNCTION DIAGRAM





AUXILIARY SUPPLY

40-300V DC / 40-275V AC or 20 - 70V DC switchmode supply.

BURDEN (110V DC nominal supply)

Less than 2 watts during idle & timing.
Less than 4 watts when output relays are energized.

FAIL ALARM CONTACT

1 C/O contact (Picked up when auxiliary supply is healthy)

OPERATION INDICATOR

The standard relay has a hand & remote reset magnetic disc flag (permanent memory) indicator fitted to give visual indication that the output relay element has operated. Note that an auxiliary supply is required to reset the flag circuitry.

TIME SETTING RANGES

The 2T104 relays allow for precision time settings of between zero (Minimum operate time) & 99 seconds. This is achieved by the use of 2 decimal thumb wheel switches & a range multiplication switch on the front panel.

| Range Selector Setting | Achievable Time Setting Range | Resolution of Time Setting |
|------------------------|-------------------------------|----------------------------|
| Range 1 | Zero to 0.99 Sec | 0.01 Sec |
| Range 2 | Zero to 9.9 Sec | 0.1 Sec |
| Range 3 | Zero to 99 Sec | 1 Sec |

WHEN SHOULD THE DELAY SET POINTS BE CHANGED?

The time delay & function settings should only be changed when the timing initiate LED is extinguished. Changes made when the initiate signal is applied will only become effective once the initiate signal is removed.

MINIMUM OPERATE TIME

Minimum guaranteed output contact operate time:

Opto Type Status Inputs: 25ms for delay settings <25ms
Relay Type Status Inputs: 50ms for delay settings <50ms

TIMING ACCURACY (Setting & repeat accuracy)

The timing accuracy is a combination of four factors:

1. Initiate time delay
Opto type status inputs: ±1ms
Relay type status input: ±5ms
2. Relay timing error: ±1.25ms
3. Output relay delay: ±5ms
4. Crystal oscillator error: ±0.2% of setting

The Idec relay type status input and relay outputs add electro mechanical delays of 20ms ±5ms. The pre set time delay is compensated by the nominal 20ms delays introduced by these relays to improve accuracy.

Maximum timing error is therefore:

Opto type status inputs: 7.25ms +0.2% of setting
Relay type status input: 11.25ms +0.2% of setting

Technical Data

TIME DELAYED OUTPUT CONTACTS (2 x Idec RH type)

Maximum Contact Capacity (Amps)

| Voltage | DC | | | AC | | |
|-------------------|-----|-----|-----|-----|-----|-----|
| | 30 | 125 | 250 | 110 | 220 | 250 |
| Resistive | 10 | 2.4 | 1.2 | 10 | 7 | 6.6 |
| Inductive L/R 7ms | 7.5 | 1.8 | 0.9 | 7.5 | 5 | 4.4 |

Make & Carry for 200ms

30A at 250V DC resistive

Maximum Break Capacity

0.34A at 250V DC inductive (40ms)

OUTPUT RELAY CONTACT CONFIGURATION

2 N/O & 2 N/C contacts
(Other configurations are available upon request)

AMBIENT OPERATING TEMPERATURE RANGE

-5 to 55 degrees C.

HUMIDITY

40 degrees C & 95% RH non condensing

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

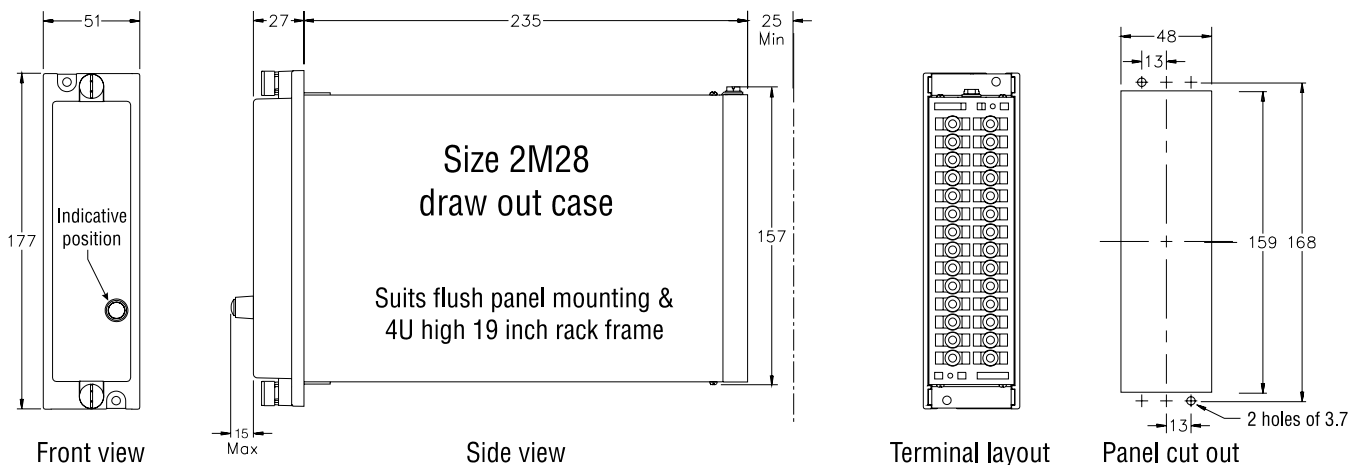
EN61000-4-4:1995 4KV Level 4

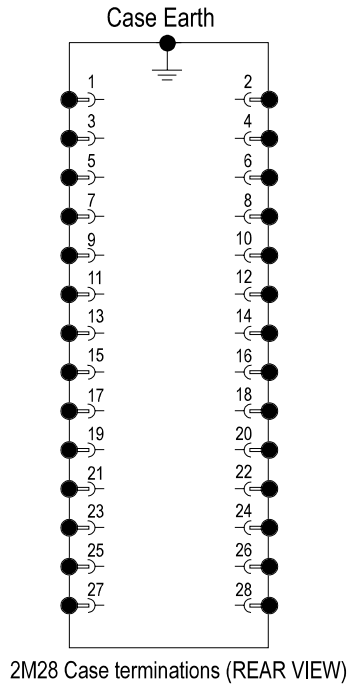
CASE

Size 2 draw out
28 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
1 x M4 terminal screw kit (28 per kit) P/N 290-407-153
1 x Product Test Manual





Ordering Information

Generate the required ordering code as follows: e.g. 2T104 BGGC

2T104 1 2 3 4

1 AUXILIARY SUPPLY RANGE

- A 20-70V AC/DC
- B 40-275V AC & 40-300V DC

2 TIMING INITIATE INPUT

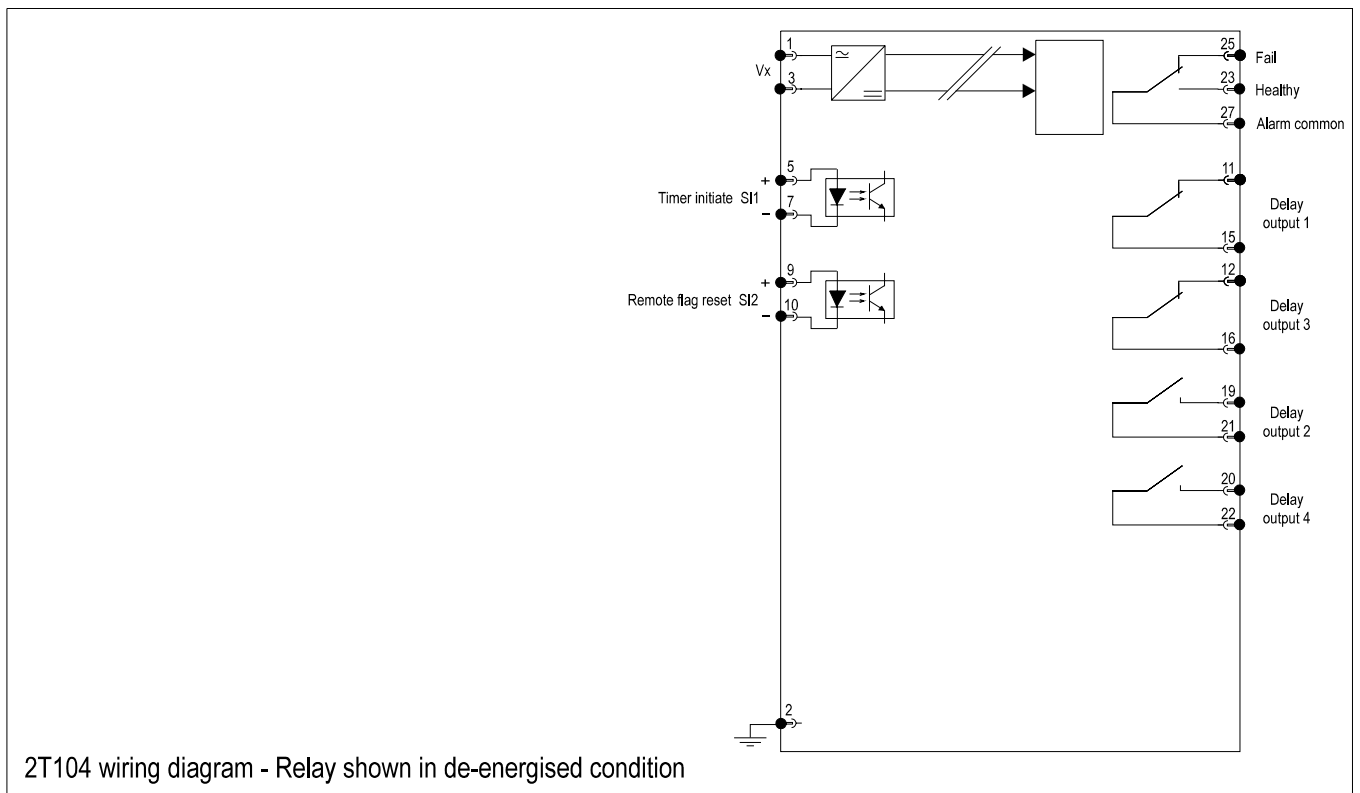
- | Opto-isolated input | Relay coil input |
|---------------------|------------------|
| A 24-80V DC | D 12V DC |
| B 75-150V DC | E 24V DC |
| C 150-300V DC | F 48V DC |
| | G 110V DC |

3 REMOTE FLAG RESET INPUT

- | Opto-isolated input | Relay coil input |
|---------------------|------------------|
| A 24-80V DC | D 12V DC |
| B 75-150V DC | E 24V DC |
| C 150-300V DC | F 48V DC |
| | G 110V DC |

4 TIMING RESET FUNCTION

- A Instantaneous reset
- B Definite time reset – Specify reset delay ____ s
- C Count down reset



Australian Content

Unless otherwise stated the product(s) quoted are manufactured by RMS at our production facility in Melbourne Australia. Approximately 60% 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 ISO9001-2000. 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 customer's 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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