



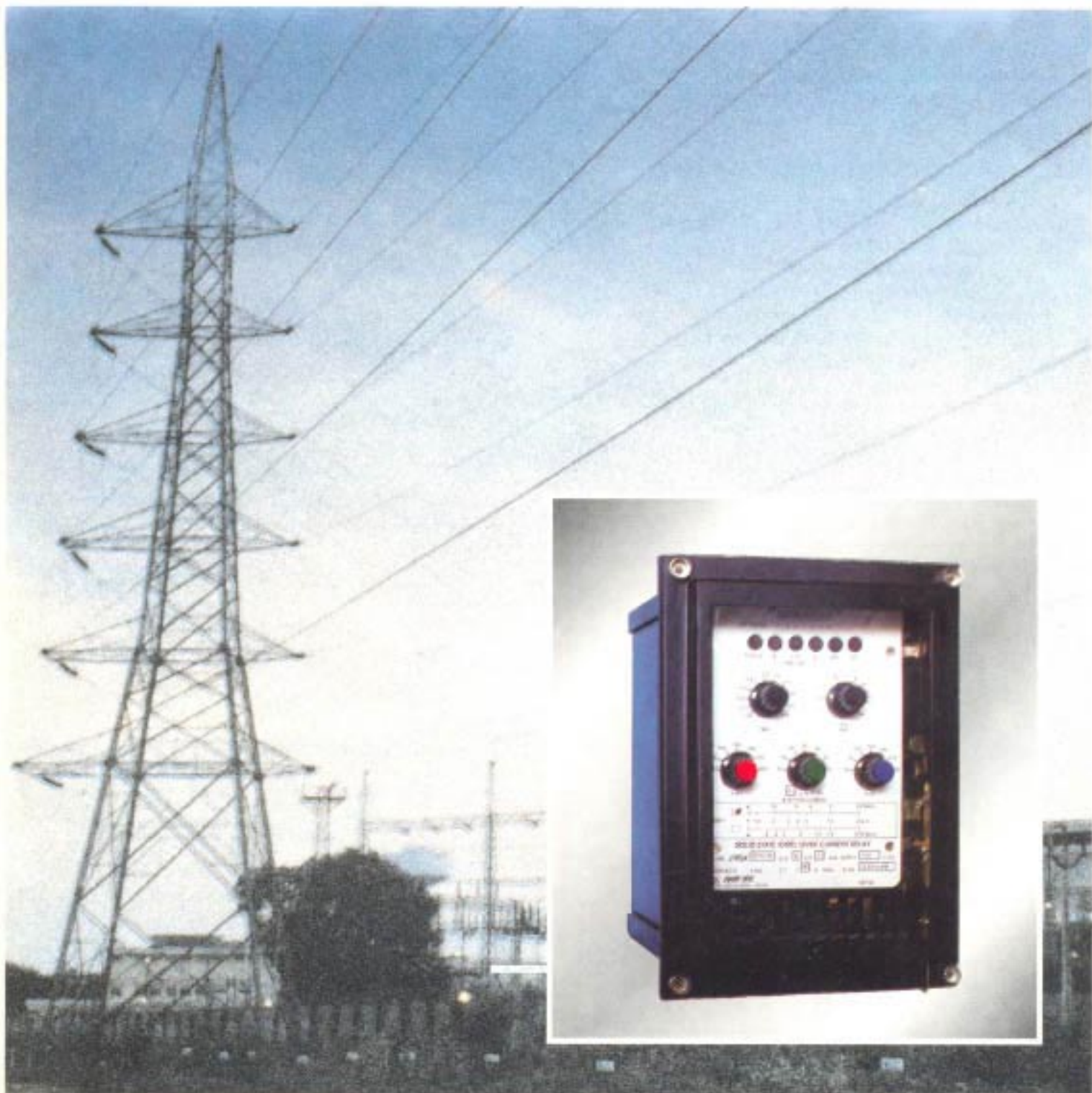
RWTUV

Jyoti Ltd.



'Jyoti'
**Inverse Definite
Minimum Time Lag
Over Current &
Earth Fault Relay
(Type JTRSA, JSRSA)**

Made compact in size
to save space and cost
with inbuilt superior
performance
characteristics



APPLICATIONS

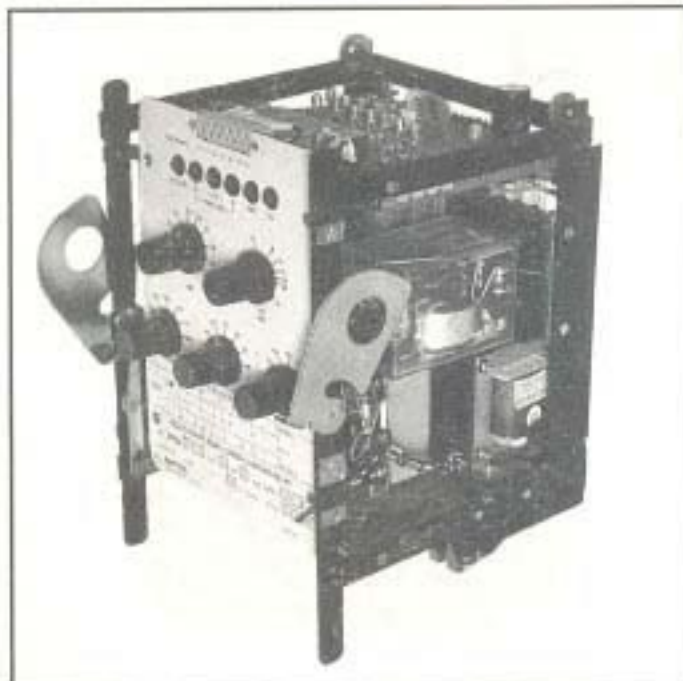
'JYOTI' Inverse Definite Minimum Time Lag (IDMTL) overcurrent and earth fault relays type JTRSA (Triple Pole) or JSRSA (Single Pole) are used for protection of motors, generators, transformers, distribution lines and are also suitable as back-up protective relays on extra high voltage transmission lines.

POSITIVE FEATURES

- Identical time/current characteristics on all current settings.
- Low burden.
- Separate indication for relay pick-up and operations.
- Low over-shoot.
- Operating time easily adjustable with 3 points adjustment.
- High drop-out to pick-up ratio.
- Compact design for 3 phase version.
- Completely static using 'HIREL' Components.
- Test points to monitor relay healthiness during service
- Draw-out metallic case (1D size) for 3 pole / 1 pole relays.

CONSTRUCTION & OPERATION

The relay is housed in a draw-out metallic case. Fig.1 shows block schematic of a triple pole static IDMTL combined over current (O/C) and earth fault (E/F) relay type JTRSA (common TMS control). (Relays with two separate TMS controls, one for two O/C elements and second for E/F element are also available). The main CT Secondary current is reduced to smaller proportionate value using intermediate current transformer mounted inside the relay. This current is converted into voltage signal by resistive burden. The voltage signal after rectification and filtering (V1) is fed to a shaping circuit. This circuit generates inverse type of characteristics. The output voltage V2 from the shaping circuit is fed to an integrator block. The integrated voltage V3 operates the output relay as soon as it crosses the set level detector. The relay current controls the function of the



integrator block. The relay operating time depends on integrator time constant. This is adjusted by a time multiplier setting. The relay setting current is selected by a make before break type of a band switch.

Relay are also available with a High-set unit common to all 3-poles to provides fastest protection under short circuit conditions exceeding a given setting. The maximum value among all the voltage proportional to phase currents is selected and is fed to the instantaneous unit level detector, which will trip the output relay, the moment relay current exceeds the set level of the high set unit.

Built-in-High-set unit is not included in the relays where two separate TMS controls are provided.

The power supply block gives appropriate stabilized DC bias voltage to the relay circuitry. The relay is protected from the high voltage spikes and accidental reverse polarity connection of DC auxiliary supply.

The test points are provided on the relay, which will help in checking the healthiness of relay circuitry. Fig.2 shows CT connections for three phase over current and earth fault protection of a feeder.

The diagram in Fig.5 shows the type designations for commonly used IDMTL relays.

TECHNICAL DATA

CURRENT SETTING RANGES (PLUG-SETTINGS)

50% - 200%	adjustable in seven equal steps of 25%
20% - 80%	adjustable in seven equal steps of 10%
10% - 40%	adjustable in seven equal steps of 5%

CT secondary 1 amp. or 5 amp.

PICK UP CURRENT

More than 100% of current setting and less than or equal to 130% of current setting

RESETTING CURRENT

More than 90% of the pick-up value.

TYPE OF CHARACTERISTICS

3.0 secs. at 10 times setting current at Time multiplier setting (TMS) = 1 as per IS 3231-1987, BS 142-1966 and IEC 255-4-1976.

Time/current characteristics are given in Fig.3

OR

1.3 secs. at 10 times setting current at TMS = 1.

Time/current characteristics are given in Fig.4.

TIME MULTIPLIER SETTING

Continuously adjustable from 0.05 to 1.0 (common for all three poles)

In case of JTRSA relays with two TMS controls, the second TMS control is for E/F element, adjustable from 0.05 to 1.0

RESETTING TIME

Maximum time of 450 msec on removal of 20 times the setting current at TMS = 1.

OVER SHOOT

Within 100 m.secs. on removal of 20 times the setting current at TMS = 1.

BURDEN ON MAIN CT

Less than 1 VA on nominal setting with a maximum of 1.6 VA at maximum setting (200%)

BURDEN ON DC AUXILIARY SUPPLY

D.C. AUXILIARY SUPPLY VOLTAGE	TYPE B OF RELAY	BURDEN IN WATTS		
		CONTINUOUS	HOLD ON	TRANSIENT
24 VDC	JTRSA	0.75	1.75	6
30 VDC	JTRSA	1	2	6.5
50 VDC	JTRSA	1.5	3.5	8
110 VDC	JTRSA	3	7	13
220 VDC	JTRSA	7	15	24
24 VDC	JSRSA	0.75	1	5.5
30 VDC	JSRSA	1	1.5	6
50 VDC	JSRSA	1.5	2.5	7
110 VDC	JSRSA	3	6	12
220 VDC	JSRSA	6.5	10	20

AUXILIARY SUPPLY

Standard Voltage : 24V, 30V, 50V, 110V & 220 VDC

Relays suitable for other DC Voltages may be supplied on request.

The relay works satisfactory for a variation of auxiliary supply from 80% to 110% of the rated DC auxiliary voltage.

THERMAL RATING

The relay will with-stand two times the setting current continuously and 20 times the setting current for three seconds.

ACCURACY

The relay is calibrated at 27° C and falls into error class of 7.5 as per IS 3231- 1987, E - 7.5 as per BS 142-1966 & IEC 255-4-1976 for IDMTL unit.

INSTANTANEOUS UNIT SETTING (HIGHSET UNIT)

Continuously adjustable with a setting range of 400% to 2000% of setting current. It is common to all the three poles in case of triple pole relays. The operating value of the instantaneous unit conforms to error class 10 as per IS 3231-1987. Operating time of highset unit conforms to Class T 60.

Highset unit is not provided in relays with two TMS controls.

PICK-UP INDICATOR

Light emitting diode (LED) gives visual indication when the relay picks up. This is self - reset type.

OPERATION INDICATORS

Three nos. LED indicators for faulty phase indication and one LED indicator for relay operation due to instantaneous unit are provided. These indicators flags are Hand Reset (H/R). LED indication is also provided for 'DC' healthy condition.

OUTPUT CONTACTS

Two nos. self reset type of contacts are provided in any combination of make or break, for ALARM & TRIP.

CONTACT RATING

MAKE CAPACITY

Continuous : 1250 VA/1250 W with maximum of 660 V and 5 Amps AC & DC.

For 3 seconds : 7500 VA/7500 W with maximum of 660 Volts and 30 Amps AC & DC.

BREAK CAPACITY

1250 VA with a maximum of 660 V and 5 amps AC with minimum P.F. of 0.4; 100 W resistive with maximum of 220 V and 6 Amp DC; 50 W Inductive (L/R = 40 ± 5 msec.) with maximum of 250 V and 5 Amps.

INSULATION

The relay will withstand 2KV AC RMA, 50 Hz. for one minute between all terminals connected together and all metallic parts intended to be earthed. The relay will withstand 1KV AC RMS, 50 Hz. for one minute across the output contacts in open position.

The relay will withstand impulse of 5 KV peak 1.2/50 µs as per IS 8686-1977 and IEC-255-4 (Type test only)

CASE

The single pole & triple pole relays are supplied in the same metallic draw-out casing type 1D.

The contact block on relay case has spring loaded links which automatically short circuit the CT secondaries & short output NC contacts, if any when the relay is withdrawn from the case. This facilitates removal of relay cradle for testing, inspection, etc. without disturbing the external connections. The trip circuit is isolated before the relay is withdrawn from the cradle.

For Panel Cutout drawing refer fig.6. Cutout Dimensions are identical for JTRSA and JSRSA.

WEIGHT

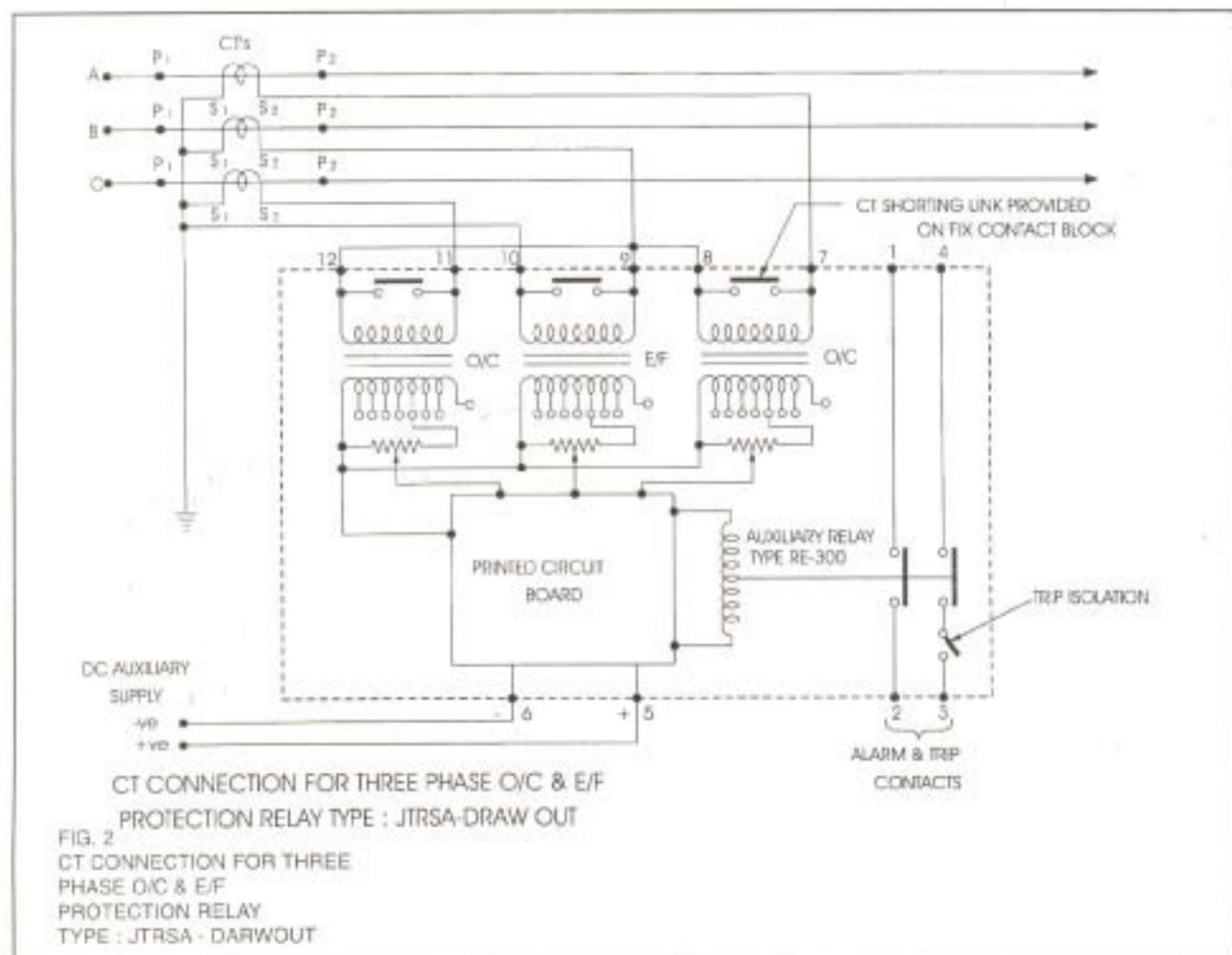
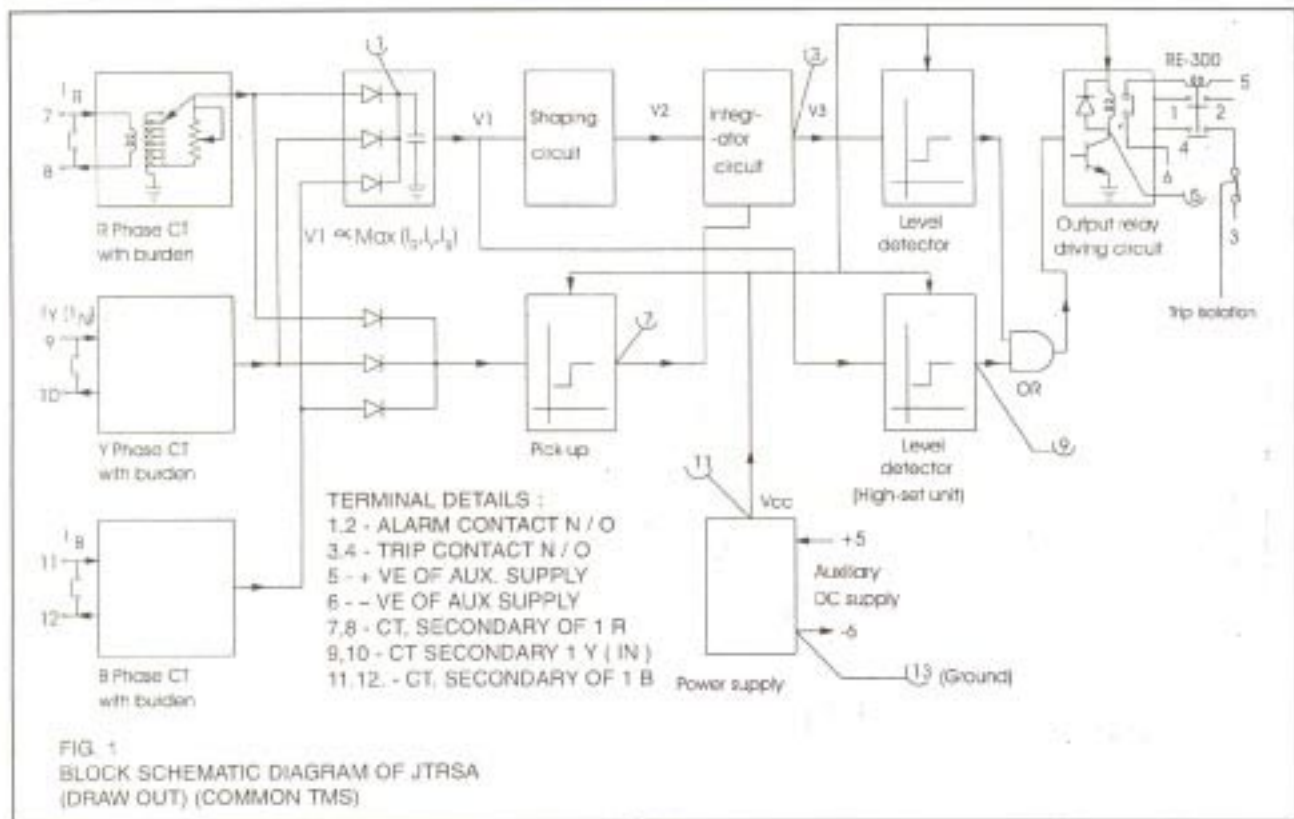
Triple pole (JTRSA) : 6.8.Kg. (approx.)
Single pole (JSRSA) : 5.6 Kg. (approx.)

INFORMATION REQUIRED WITH ORDER/ENQUIRY

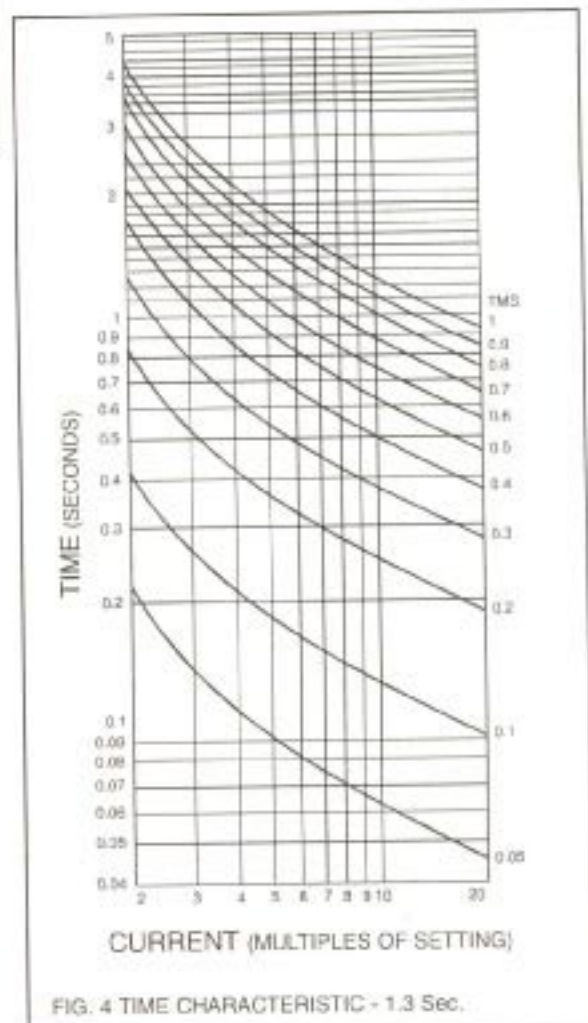
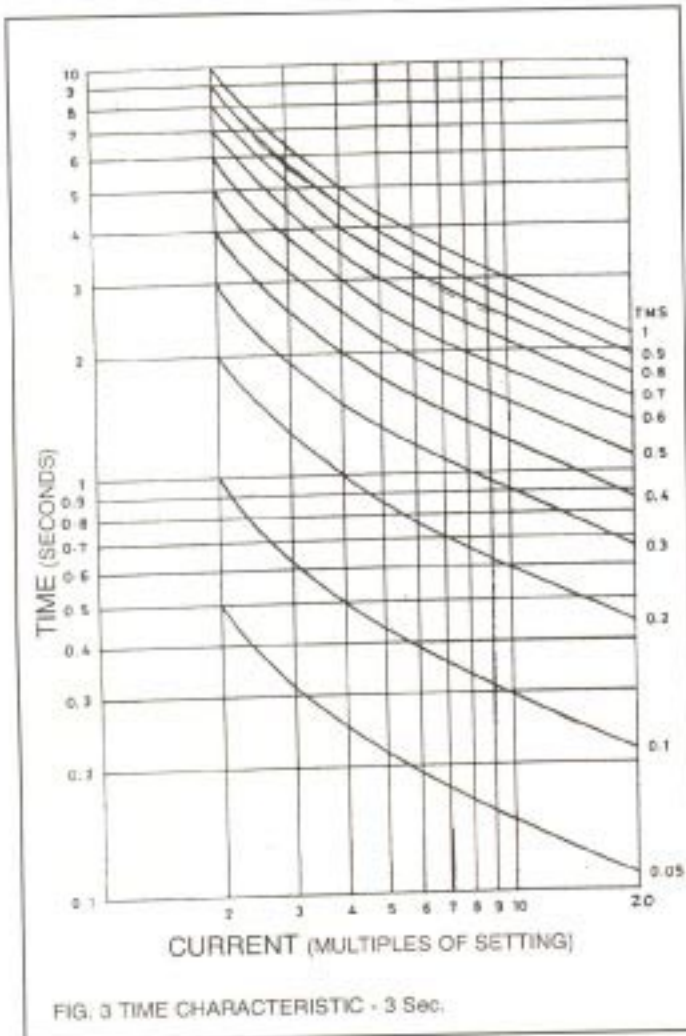
- 1) Single pole or triple pole relay
- 2) 3 Over current elements or 2 Over current and 1 Earth fault element.
- 3) CT Secondary rating (1A / 5A)
- 4) Current setting range for E/F element 10% TO 40% OR 20% TO 80%.
- 5) Characteristic (3.0 secs or 1.3 secs at 10 times setting current & TMS = 1).
- 6) DC Auxiliary supply voltage
- 7) Output contact combination 2 N/O or 1 N/O + 1 N/C
- 8) Whether Highset unit required
- 9) Whether separate TMS control for E/F unit required. (Highest unit cannot be provided with relays having separate TMS control for E/F Unit)

CARE TO BE TAKEN DURING USAGE

- 1) Ripple content in Aux. DC supply should not exceed 3%
- 2) Do not extend the Auxiliary DC supply by connecting series resistance.
- 3) Do not reverse DC supply polarity
- 4) Do not short circuit any test point terminals.



TIME CURRENT CHARACTERISTIC FOR
IDMTL O/C AND E/F RELAY TYPE JTRSA &
JSRSA



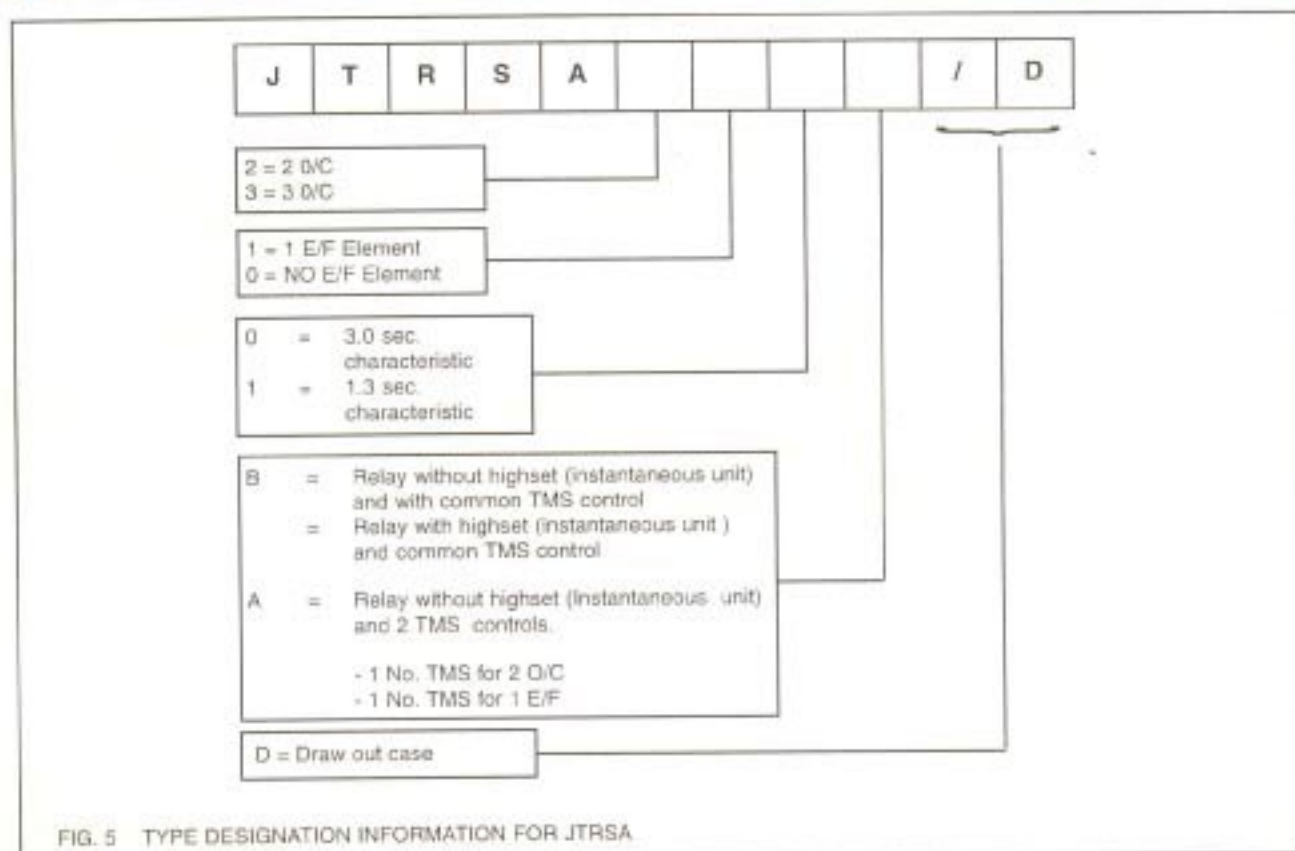


FIG. 5 TYPE DESIGNATION INFORMATION FOR JTRSA

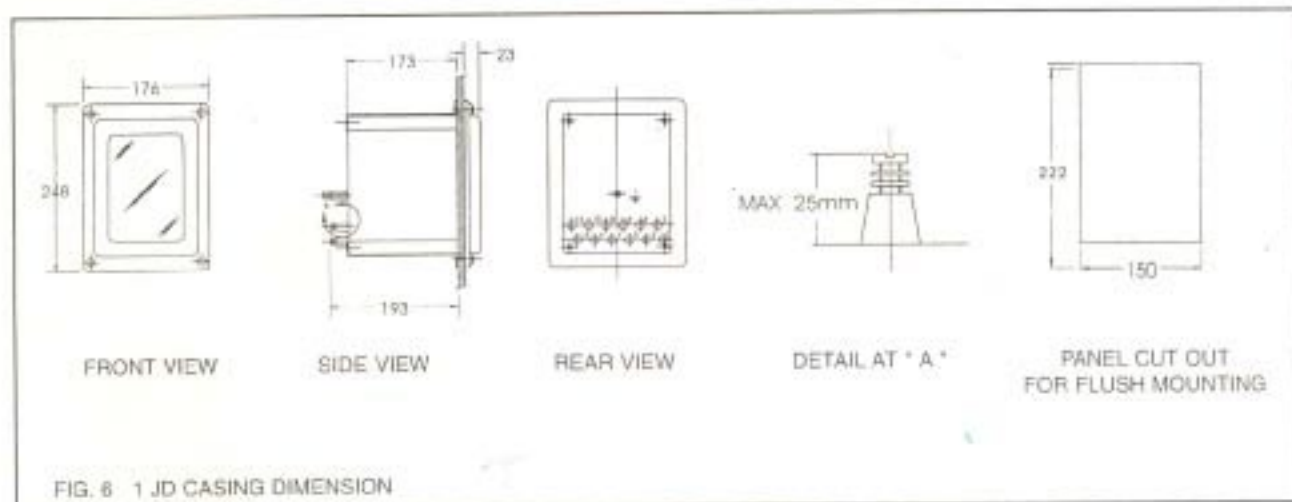


FIG. 6 1 JD CASING DIMENSION



Jyoti Ltd. VADODARA (INDIA)
50 Years of Engineering Excellence

FOR FURTHER ENQUIRIES
PLEASE CONTACT

**Electronics & Control Systems
Division**

3-15, B.L.D.C. Goreva,
Vadodara-390 016.

Telephones : (0265) 380561,
Tele Fax : +91-265-381214
E-Mail : cmd.jyoti@sm3
sprintpg.ems.vsnl.net.in
Gratis : PROJYOTI
Website : http://www.jyoti.com

ZONAL AND BRANCH
OFFICES

• **Bangalore** : 491, 1st Floor, 10th Cross, 6th Main Sadashivanagar, Bangalore-500 080. Fax : 080-3313375, E-Mail : kar.jyoti@sm3.sprintpg.ems.vsnl.net.in • **Calcutta** : 45, Jhowalla Road, Syed Amir Ali Avenue, Calcutta-700 019. Fax : 033-2475267, E-Mail : cal.jyoti@sm3.sprintpg.ems.vsnl.net.in • **Chennai** : VEE DEE YEM Complex, 270, Ground Floor, Lloyds Road (Arvai Shanmugham Salai) Royapettah, Chennai 600014. Fax : 040-8275140, E-Mail : mad.jyoti@sm3.sprintpg.ems.vsnl.net.in • **Mumbai** : 103, Kakad Chambers, 132, Dr. Annie Besant Road, Worli, Mumbai-400 018. Fax : 022-4964468, E-Mail : bby.jyoti@sm3.sprintpg.ems.vsnl.net.in • **New Delhi** : 405, Chiranjiv Towers, 43, Nehru Place, New Delhi-110 019. Fax : 011-6426225, E-Mail : del.jyoti@sm3.sprintpg.ems.vsnl.net.in • **Secunderabad** : 1st Floor, S-4-187/7, Karbala Maidan, M.G.Road, Secunderabad-500 003. Fax : 040-7833673, E-Mail : sec.jyoti@sm3.sprintpg.ems.vsnl.net.in

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