High-Tech Range

MRA1- Trip Circuit Supervision

CSPC

C&S Controls & Switchgear Group

C&S Protection & Control Ltd.

Contents

1. Introduction and application

The *MRA1* - relay of the **HIGH TECH RANGE** is used to supervise the tripping circuit of protective devices taking into consideration the following protective criteria:

- supervision of the auxiliary voltage for the tripping circuit and for the supply of protective devices
- supervision of the tripping circuit with regard to cable break
- supervision of the mechanical functions of the circuit breaker

2. Features and characteristics

- high breaking capacity of the relay contacts
- in compliance with the requirements as per BS 142 and IEC 255
- manual reset for the indicator
- supervision independent of the circuit breaker position

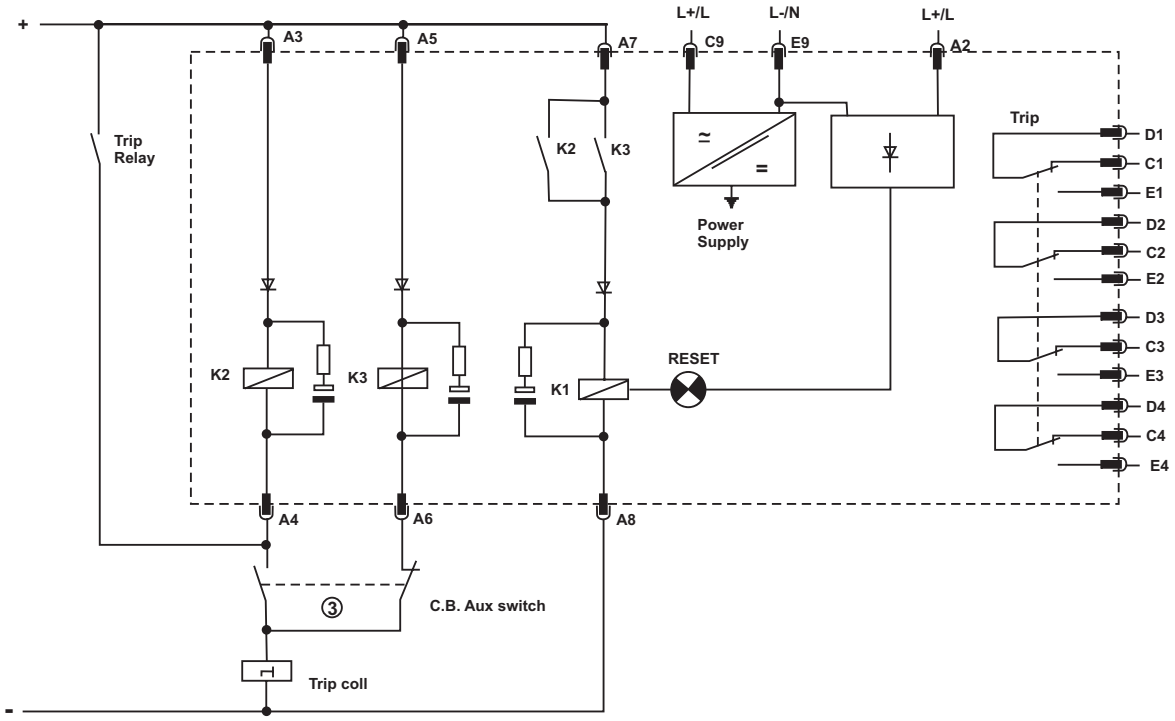

Fig. 1.1: Connection diagram MRA1

3. Functions

3.1 Supervision of the protective devices' voltage supply

The relay K1 releases when the voltage drops below 40% Un and it picks up at a voltage of approximately 80% Un. In order to avoid tripping when short voltage dips occur (of up to 400 ms), a RC element is connected in parallel. The faultless operation of the tripping circuit is indicated by the green LED „OK". The relay K1 operates when the entire trip circuit is in order.

3.2 Cable break supervision

Depending upon the position of the circuit breaker, relay K2 or K3 respond thereby switching on relay K1. Both, LED „OK" and LED „CB ON"/LED ,,CB OFF" will light up green. In the event of a line interruption, the appropriate relay (K2 or K3) releases.

3.3 Circuit breakers

C.B. „OFF":

The auxiliary contact of C.B. ③ is closed and K3 is activated.

When the supply voltage fails, K1 releases and the relay trips.

When the circuit breaker's tripping coil is interrupted, K3 and consequently K1 releases and the relay trips.

C.B. „ON":

Delayed release of K3.

Via the auxiliary contact of circuit breaker, K2 operates without delay and K1 remains activated.

Trip of protection:

K2 releases with a delay of 400 ms thus bridging the protection relay contact. If - in spite of a given switch off command - the circuit breaker does not switch off, the contact of the protection relay remains closed. On expiry of approx. 400 ms, K2 and K1 will release. The output relay K1 is then in tripping position.

3.4 Mechanical functions of the circuit breaker

If - in spite of a trip command from the protection relay - the circuit breaker does not switch off, the contact of the protection relay remains closed; K2 and K1 con- sequently release.

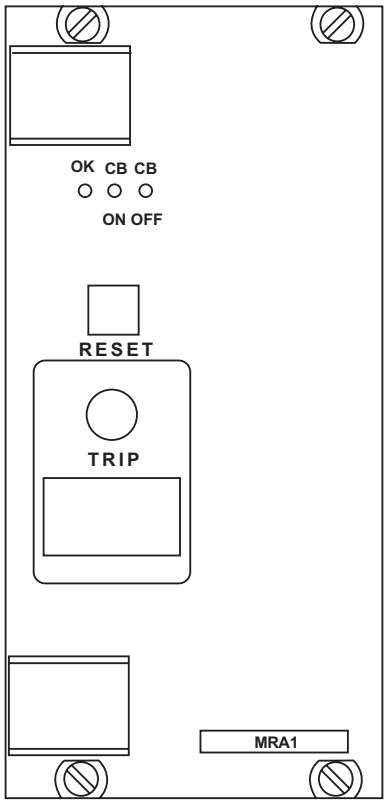

Fig. 3.1: Front plate MRA1

3.5 LEDs

The front plate of the **MRA1** is equipped with three LEDs. LED „OK" serves to indicate the readiness for operation. The LEDs „C.B. ON" and „C.B. OFF" signalize that the circuit breaker is switched on or switched off.

3.6 Reset

Following on each tripping (also after the first start-up of the protection system), the flag indicator has to be reset either manually or electrically.

3.7 Terminal Block

The plug-in module **MRA1** has a very compact base with plug connectors and screw-type connectors:

- 8 screw-type terminals (connection plug row A) for voltage inputs
- 27 poles tab terminals for relay outputs, supply voltage (terminal connectors series C, D and E, max. 6A current carrying capacity).

  Connection with tabs 6.3 mm x 0.8 mm for cable up to max. 1.5 mm^2 or with tabs 2.8 mm x 0.8 mm for cable up to max. 1 mm^2.

By using 2.8 x 0.8 mm tabs a bridge connection between different poles is possible.

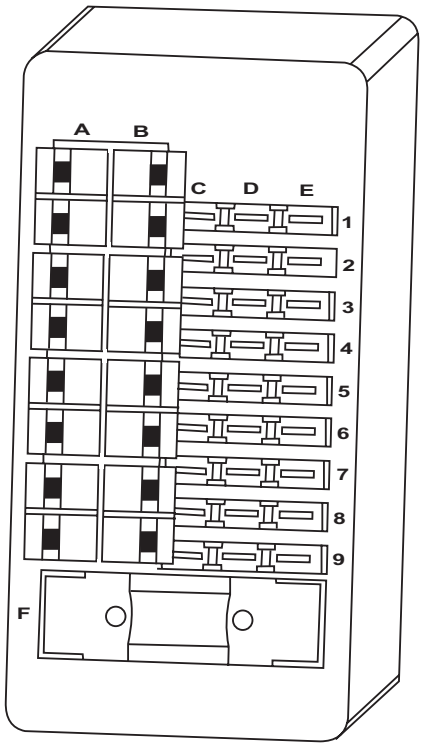

Fig. 3.1: Terminal block

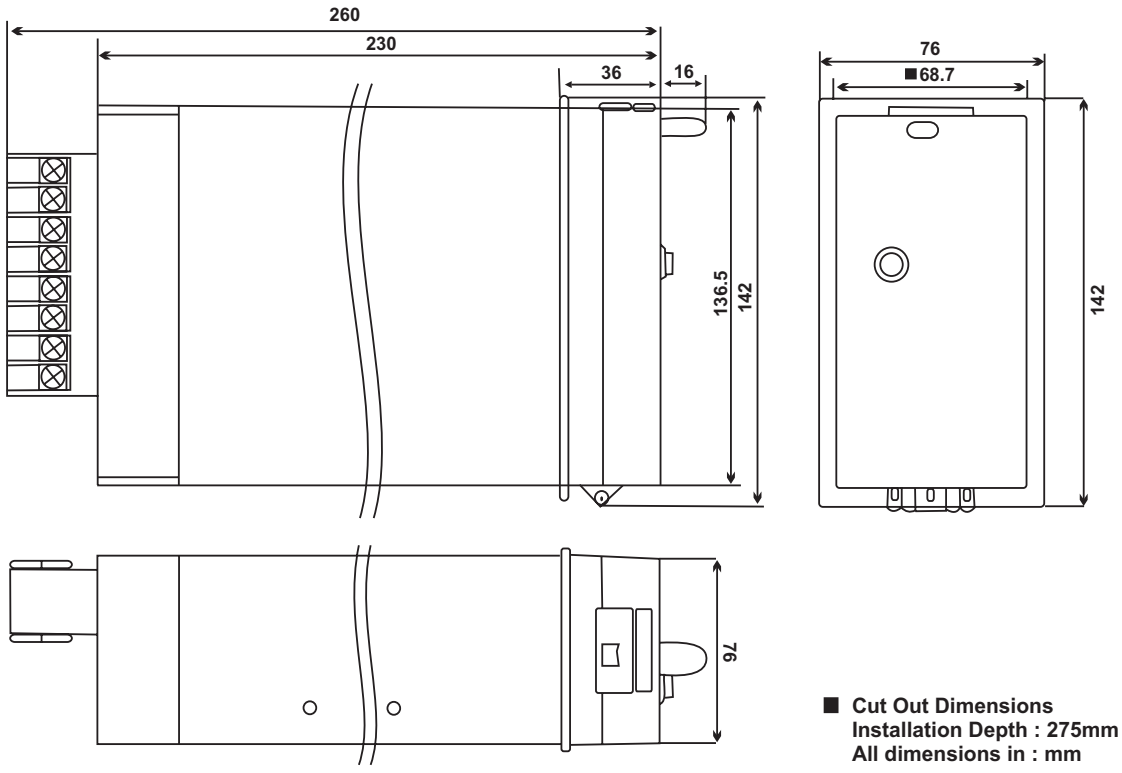

Fig. 3.2: Dimensional drawing

Please observe!

A distance of 50 mm is necessary when the units are mounted one below the other for the front cover to be easily opened. The front cover can be opened downwards.

4. Technical Data

Output relay

Output contacts	:	4 change-over contacts
Making capacity for 3 s	:	7500 VA / 30 A AC and DC
Breaking capacity AC	:	2200 VA / max. 250 V
Breaking capacity DC	:	
ohmic	:	24 V / 5A
		110 V / 0.35 A
		230 V / 0.25 A
inductive (L/R < 40 ms)	:	24 V / 1 A
		110 V / 0.2 A
		230 / 0.15 A

Measuring inputs

Operating time	:	
Reset	:	<100 ms
Tripping	:	>400 ms
Minimum operating current	:	>20 mA

System data

Design standard	:	VDE 0435, part 303; IEC 255-4; BS 142
Specified ambient service temperature range		
for storage	:	- 25°C to + 70°C
for operating	:	-25°C to + 55°C
Moisture-carrying capacity class F as per DIN 40040 and per DIN IEC 68, part 2-3	:	rel. humidity <95 % at 40°C for 56 days
High voltage tests as per VDE 0435, part 303	:	
Insulation test as per IEC 255-5	:	2.5 kV (eff) / 50 Hz; 1 min.
Impulse voltage test as per IEC 255.5	:	5 kV; 1.2 / 50 μs, 0.5 J
High frequency test IEC 255-6-4	:	2.5 kV / 1 MHz 4 kV / 2.5 kHz, 15 ms
Radio interference suppression test as per EN 55011	:	limit value class B
Mechanical tests	:	
Shcok	:	class 1 as per DIN IEC 25-21-2
Vibration	:	class 1 as DIN IEC 25-21-1
Degree of protection (front of the device)	:	IP 54 at closed front cover (only D-version)
Vibration test	:	0.5 g, 10 - 300 Hz

Technical data subject to change without notice !

5. Order form

Trip Circuit Supervision	***MRA1***		
Rated voltage (DC)	24 V operating range 18 - 32 V	**24**	
	110 V operating range 80 - 150 V	**110**	
Housing (12TE):	19"- equipment frame		**A**
	flush mounting		**D**

Other Product Ranges from CSPC

BASIC RANGE

- Micro-controller based compact economical design
- DIN rail mounted
- Status indication via LED
- Step-less settings through front potentiometer

FUNCTIONAL RANGE

- Genset Supervision & Control
- Auto Synchroniser
- Load Balancing & Control
- Related Protection

INTEGERATED RANGE

- Complete numeric protection, solution for sub-station in association with TEAM-ARTECHE, Spain
- Distance protection
- Comprehensive transformer protection –
  a. Three winding transformer
  b. Two winding transformer
- Multi-functional relay: variety of protection combination

For further information, please contact :

CSPC

C&S Protection & Control Ltd.

44, Okhla Indl. Estate, New Delhi-110020, Ph.: 011-55602414, 26319465-66 Fax: 011-55602413 email: cspc@controlsindia.com

Marketing Office : **DELHI :** Ph.: 55602414, 26319465-66 Fax : 55602413 **CHANDIGARH :** Ph. 2776154, 2776151, 2726153 Fax: 2726154 **KOLKATA :** Ph. 24549607-08 Fax: 24549371 **MUMBAI :** Ph.: 24114727-28 Fax : 24126631 **PUNE :** Ph.: 5444822-824, Fax: 5410820, **AHMEDABAD :** Ph.: 65841425, 6589132 Fax : 6589132 **BANGALORE :** Ph.: 5586147, 5323582, 5594939 Fax: 5582796, ***CHENNAI :*** Ph.: 26426475, 26426572 Fax: 26411972 ***HYDERABAD :*** Ph.: 27813003, 55332304 Fax: 27812987

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