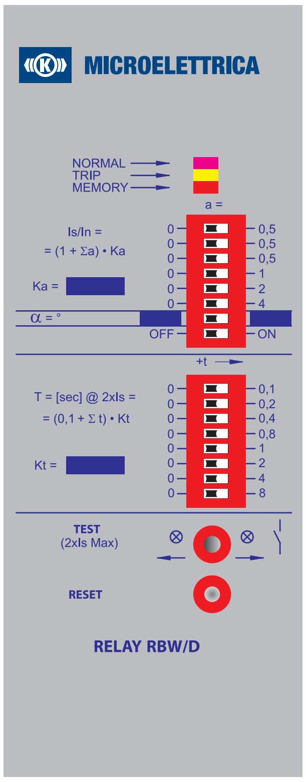
PROTECTION RELAYS

RBW

Directional overcurrent relay



General Characteristics

Two basic versions are available:

RBW/D	functions 32 - 67 - 67N definite time
RBW/I	functions 32 - 67 - 67N inverse time (see time/current curves).

The characteristic angle "α" of the measuring direction can be changed over to two different values.

Both versions are fitted, on request, with blocking input and output or with time start output.

Settings

Settings are made on relay's front face by means of 2 DIP-SWITCHES that allow to obtain a wide and accurate range for the trip level aswell as for the trip time delay.

Signalizations

1 Green led for signalization of power supply and relay's regular operation.
1 Red led for trip signalization.
1 Yellow led for trip memory.

Electrical Characteristics

Power supply :
Type 1 - 24 ÷ 110Vdc/ac ± 20% Permanent
Type 2 - 90 ÷ 220Vdc/ac ± 20% Permanent

Burden on power supply :	3W(cc); 6VA(ca).
Rated input voltage :	Vn=100 ÷ 380V, 50/60Hz
Burden on input voltage :	2VA a Vn
Rated input current :	1A o 5A
Burden on input current :	0.05VA@1A - 0.25VA@5A

MICROELETTRICA

Output Relays

- 1 trip relay with 2 Change-over contacts rating 5A
- 1 blocking output or time start relay with one Change-over contact rating 5A (optional).

The output relays are normally deenergized (energized on trip). On request they can be normally energized (deenergized on trip).

Commands

Test spring lever switch: when pressed it simulates a current flow of 2 times the rated input current and allows the complete functional check of the relay and of the trip time delay. In one position test function does not operate the output relays; in the other it also operates the output relays.

ON-OFF switch for blocking of the timed output contacts.

Output relays reset after trip can be:

- manual by reset push button on front face
- manual by remote push button connected to the relevant terminals provided on the relay
- automatic by connecting a bridge on remote reset terminals.

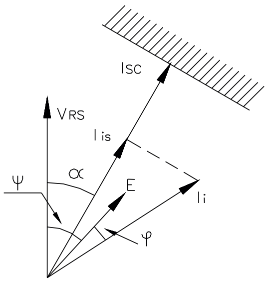
The trip memory led can be reset only by the front face push button.

Operation

Considering a three phase system, the phase displacement "Ψ" between the phase-to-neutral voltage "E" of the phase from which the input current "Ii" is supplied and the input voltage "Vi" to the relay, changes according to the type of connection.

With reference to the figure it is assumed:

Ψ = connection displacement
α = characteristic angle of the relay
φ = real phase displacement
φ_{MS} = α - Ψ = max sensitivity displacement (max torque angle)
counter clock wise angles positive



Inside the relay current and voltage are supplied by means of suitable transformers, displacing circuits and amplifiers to a static demodulator the output voltage of which is proportional to the product:

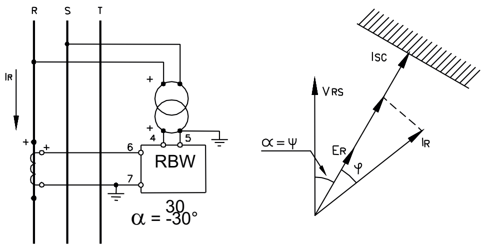
$I_i \cos(\varphi + \Psi - \alpha) = I_{is}$

The relay operates when $I_{is} > I_{sc}$ i.e. when the input current component in the measuring direction of the relay exceeds the set level.

Therefore the relay has its maximum sensitivity when $\cos(\varphi + \Psi - \alpha) = 1$, i.e. when $\varphi = \varphi_{MS} = \alpha - \Psi$.
Of course the relay does not trip if the input current has a direction opposite to the measuring one.
Tripping is not affected by input voltage variations within large limits (0,03 : 1,5) Vn.

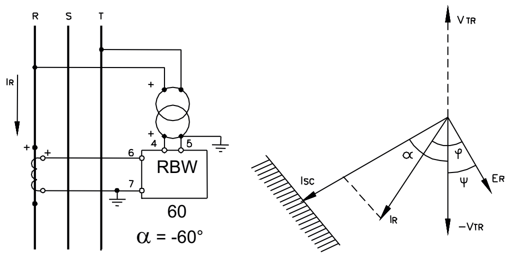
Connection Diagrams

MEASUREMANT OF THE ACTIVE COMPONENT OF CURRENT; REVERSE POWER DETECTION



$V_i = V_{RS} \rightarrow \varphi_{MS} = 180°$; $V_i = V_{RS} \rightarrow \varphi_{MS} = 0°$

MEASUREMANT OF THE INDUCTIVE COMPONENT OF CURRENT; SYNCHRONOUS MOTOR OUT-OF-STEP

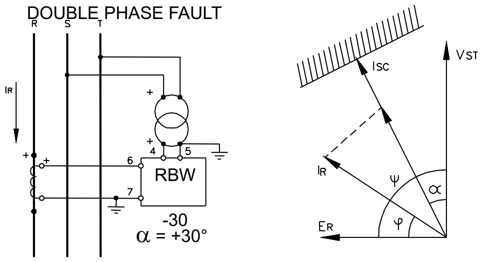


$\varphi_{MS} = -90°$

E01-ING-Rev.2

DIRECTIONAL OVERCURRENT

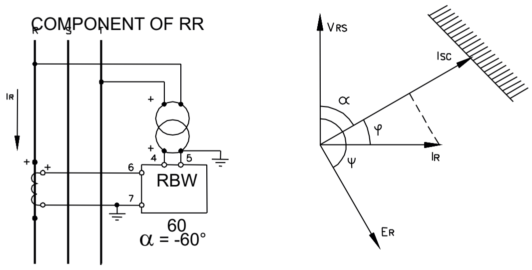
DOUBLE PHASE FAULT



$\varphi_{MS} = -60°$

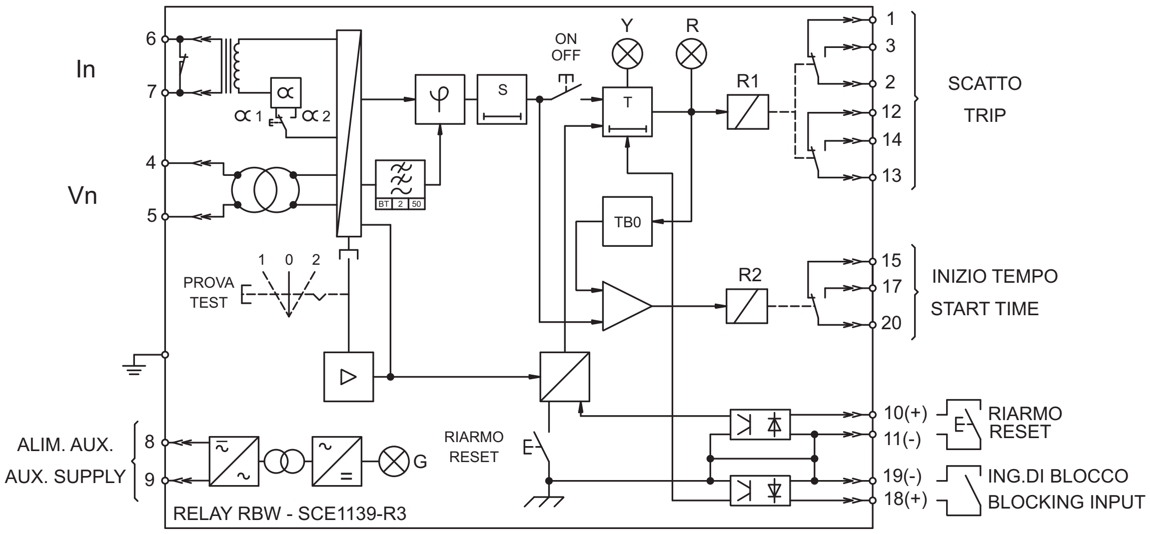
MEASUREMANT OF THE CAPACITIVE

COMPONENT OF RR

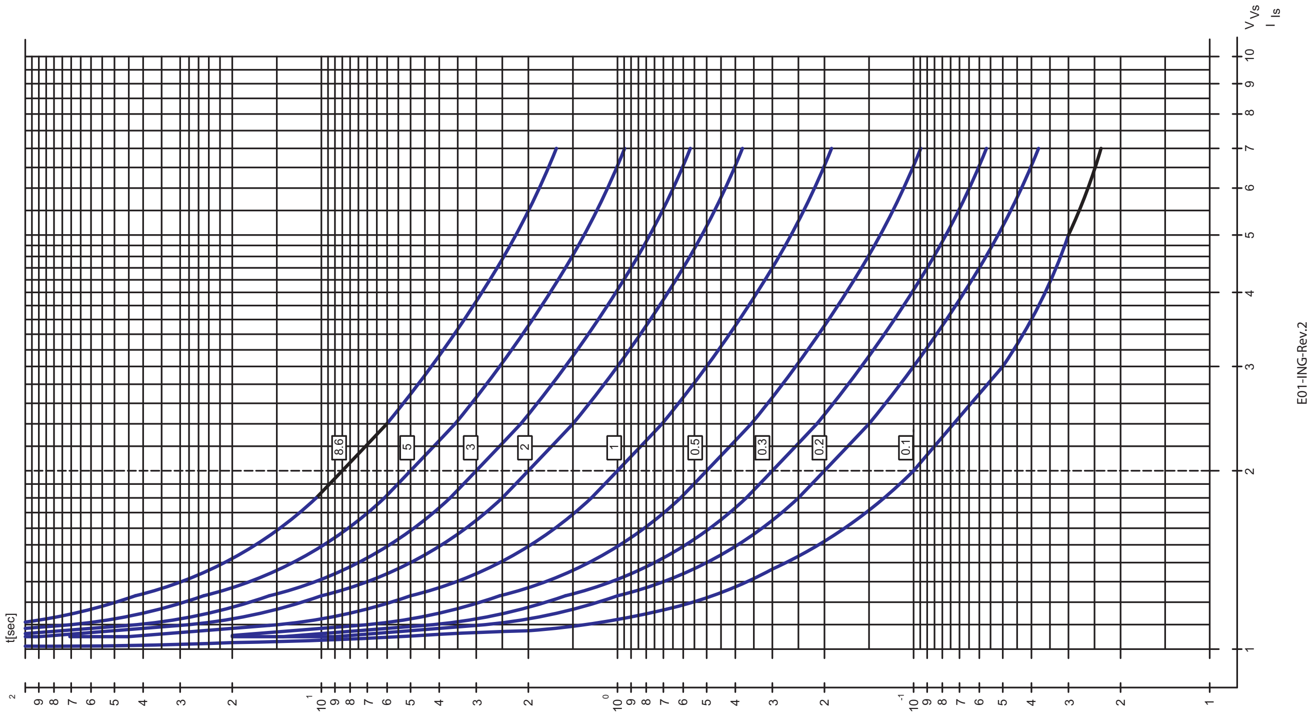


$\varphi_{MS} = +90°$

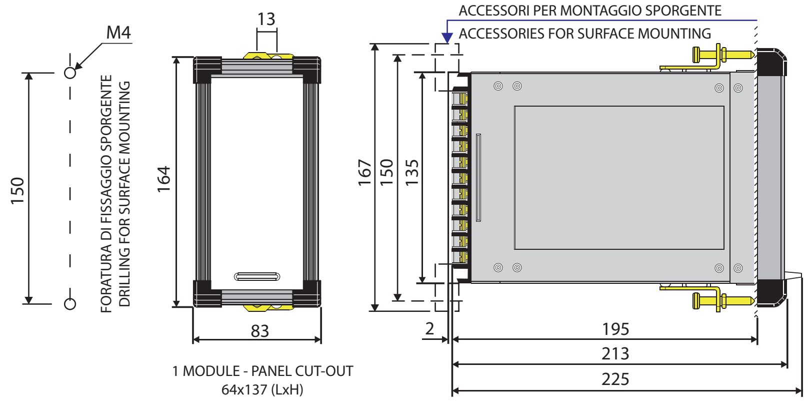
Wiring Diagram



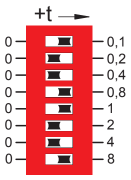
Inverse Time (Curves for Ralays UB0 - UB0/A - RBW)

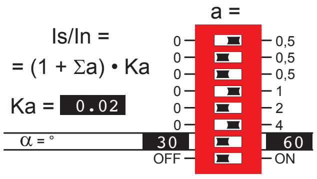


Overall Dimensions (mm)



Example setting trip time delay T = 10s	Example setting level Is = 0.13
T= [sec] @ 2xIs = (0.1 + Σt) •K t; Kt = 1; T = [0.1+(9.9)]•1 = 10s	Is/In = (1 + Σa) • Ka; Ka = 0.02; Is = [1+(5.5)]•0.02 = 0.13





Order Code

Relay Type	☐ **RBW/D**	☐ **RBW/I**
Auxiliary Power Supply	☐ Type 1 (24 ÷ 110Vdc/ac ±20% Permanent) ☐ Type 2 (90 ÷ 220Vdc/ac ±20% Permanent)	
Rated Input Current (In)	☐ 1A	☐ 5A
Rated input Voltage (Vn)	Specify range (100 ÷ 380)V	...
Output Relays Configuration	☐ Deenergized (energized on trip)	☐ Energized (deenergized on trip) (Standard)
Blocking Input (BI)	☐ Request	☐ Not Request
Blocking Output (BO)	☐ Request (relay R2)	☐ Not Request
Start time Output (TO)	☐ Request (relay R2)	☐ Not Request
Execution	☐ Front Panel (Standard)	☐ Surface Mounting (on Request)
Trip Level (Different on Request - See time current curves)	☐ Ka (0.02) Is = (0.02 ÷ 0.19) x In ☐ Ka (0.1) Is = (0.1 ÷ 0.95) x In ☐ Ka (1) Is = (1 ÷ 9.5) x In	step 0. 01 x In (Standard) step 0. 05 x In step 0. 5 x In
Trip time delay (definite time) RBW/D (Different on Request - See time current curves)	☐ Kt (0.5) Ts = (0.05 ÷ 8.3) s ☐ Kt (1) Ts = (0.1 ÷ 16.6) s	step 0. 05s step 0. 1s (Standard)
Trip time delay (Inverse time) RBW/I (Different on Request - See time current curves)	☐ Kt (0.5) Ts = (0.05 ÷ 8.3) s @2xIs ☐ Kt (1) Ts = (0.1 ÷ 16.6) s @2xIs	step 0. 05s step 0. 1s
Characteristic Angle (Different on Request)	☐ α (30°), (60°) (Standard) ☐ α (-30°), (60°)	

The technical specifications reported are not binding and they should be agreed in the contract.

For further technical information on our products visit www.microelettrica.com

Microelettrica Scientifica S.p.A.

20090 Buccinasco (MI) , Via Lucania 2, Italy
Tel.: +39 02 575731
E-mail: info@microelettrica.com
www.microelettrica.com

KNORR-BREMSE
SELECTRON
NEW YORK AIR BRAKE
KIEPE ELECTRIC
IFE
EVAC
MERAK
ZELISKO
MICROELETTRICA
RAILSERVICES

E01-ING-R2-RBW