

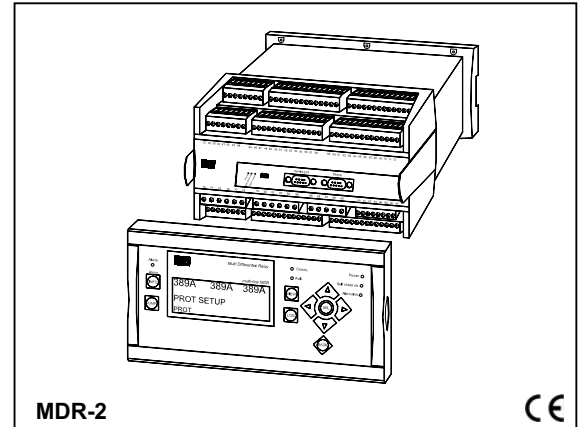
Type MDR-2

Multi differential protection relay

multi-line 2

4921240275C

- Relay for generators/electric motors
- 3-phase AC measurements
- Dynamic compensation for ext. failures
- Short response time (30 ms)
- Display indicating all measurements



Application

The MDR-2 differential protection relay is a micro-processor-based control unit containing all necessary functions for monitoring of the differential currents for a synchronous/asynchronous generator or motor (the object).

Via current transformers the MDR-2 measures each phase current on both sides of the object. The current transformers determine the limits of the protection area. Any failure within these limits (2- or 3-phase short circuits or earth leaks) will be detected as an error I_d : Differential currents, the currents flowing through the two current transformers of the phase in question differ, and, if a preset limit value is exceeded, a warning will be given or a tripping signal transmitted.

The MDR-2 dynamic compensation curves for warning and tripping are defined by the user.

Should an error occur outside the limits of the protection area, the MDR-2 will not transmit a tripping signal, as the above-mentioned phase currents are equal. In that way a selective protection is achieved.

Except for external measuring transformers the MDR-2 contains all necessary measuring circuits and presents all values on an LC display. Values and messages are presented in clear text (measuring values in engineering units).

The MDR-2 is a flexible and menu/PC programmed unit, enabling the user to easily adapt the unit to the object in question. The programming procedures are password protected.

Standard functions

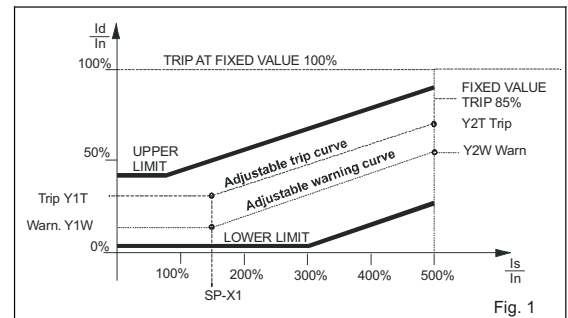
The unit is designed for differential current protection of a 3-phase generator/motor.

Inputs and outputs:

- Inputs: - 6 currents via current transformers
- 2 binary control inputs
- Outputs: - 6 relay outputs
("SYSTEM OK", 5 configurable relays)

Generator protective functions:

- Differential current (3-phase) protection, with programmable dynamic compensation (pick-up curves)
- Warning: Programmable value and delay
- Trip: Programmable value and delay



A pick-up curve is shown in Fig. 1. The curves represent the warning and tripping values ($I_d/I_n=Y$), defined as the differential current (I_d) divided by the nominal generator/motor current (I_n) referring to the stabilization current (I_s) divided by I_n ($I_s/I_n=X$).

The starting horizontal limit lines are placed according to the keyed in values of the points $P(X1, Y1T)$ and $P(X1, Y2T)$. These can be positioned anywhere within the marked area and must be decided according to the specifications of the plant in question.

For warning and tripping pick-up curves the following ranges are available:

- | | |
|-------------------|--|
| $I_d/I_n > 100\%$ | Fixed tripping point
Independent of the stabilization current |
| $I_s/I_n > 500\%$ | Fixed tripping ($I_d/I_n > 85\%$) |
| $I_d/I_n > Y2W$ | Fixed warning
Independent of the stabilization current |
| $I_s/I_n < 500\%$ | Trip and warning programmable within
"UPPER LIMIT" and "LOWER LIMIT"
values and dependent on the I_s/I_n value |

Type MDR-2

Display of values and texts:

- LEDs: Supervision, alarm
- Alarm and condition indication in clear text on LC display
- AC values (differential and actual currents for all 3 phases) on LC display

Acknowledgement of alarms:

- Automatic acknowledgement YES/NO (programmable)
- Remote acknowledgement via push button input
- Local acknowledgement via display front push button

Options

Overcurrent/short circuit protection (option C3):

- 2 x definite time or inverse time (curve with 6 programmable points) overcurrent protection (400% overcurrent max.)
- 1 x definite time short circuit protection (500% short circuit current max.)

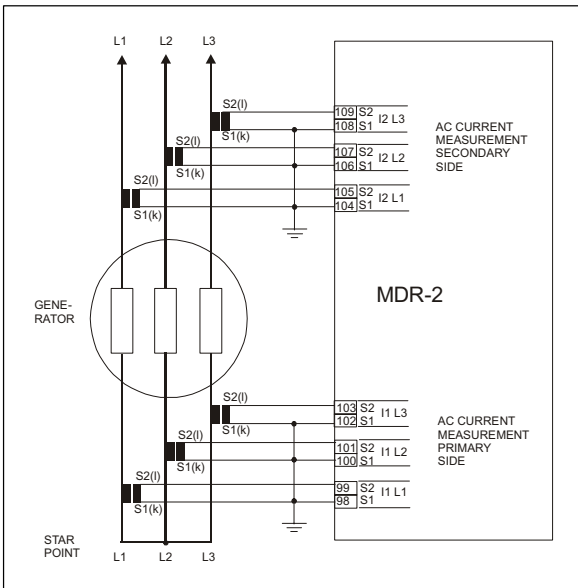
Cables (option J):

- J1: Display cable, 3m
- J2: Display cable, 6m
- J3: Serial interface cable for PC utility software
- J6: Display cable, 1m

Display gasket (option L):

Rubber gasket makes display protection IP54 (standard IP52)

Principle diagram



Technical specifications

Accuracy: $0.1 \times I_N < I < I_N$: 1% of I_N
 $I_N < I$: 1% of I
($I_N = 1A$ or $5A$, I = measured value)

Operating temp.: -25...70°C

Climate: Class HSE, to DIN 40040

Meas. frequency: 30...70Hz (nominal 50Hz or 60Hz)

Aux. supply: 12/24V DC -25/+30%, max. 8W

Binary inputs: Input voltage: 6...32V DC (bi-directional)
Input impedance: Max. 2.4 kΩ

Meas. current: -1A or -5A, consumption:
Max. 0.3VA per phase

Overcurrent: $4 \times I_N$, continuously
 $20 \times I_N$, 10 sec. (max. 75A)
 $80 \times I_N$, 1 sec. (max. 300A)

Response times: Differential current: 30 ms
Overcurrent (option): 50 ms
Short circuit (option): 30 ms

Fuse: All voltage inputs should be protected by a 2A fuse

Relay outputs: Contact rating: 8A/250V AC. ("Status": 1A)

Safety: To EN 61010-1. Installation cat. III, 600V.
Pollution degree 2

Galv. separation: Between AC inputs and others:
3250V AC – 50Hz – 1 min.

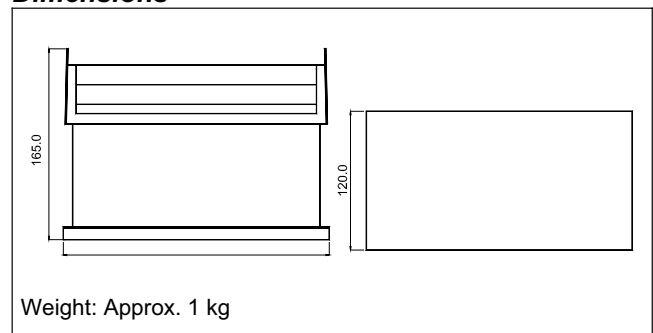
EMC/CE: To EN 61000-1/2/3/4 and IEC 255-3

Connections: Current: Max. 4 mm² (multi-stranded)
6 mm² (single-stranded)
Others: Max. 2.5 mm² (multi-stranded)
Display: 9-pin SUB-D (female)
Service port: 9-pin SUB-D (male)

Protection: Terminals: IP20
Display front: IP52 (IP54 with gasket)
According to IEC 529 and EN 60529

Material: All plastic parts are self-extinguishing to UL 94 (V1)

Dimensions



Order specifications

Type – Option – Option

Example: MDR-2 – J1

Due to our continuous development we reserve the right to supply equipment which may vary from the described.



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