

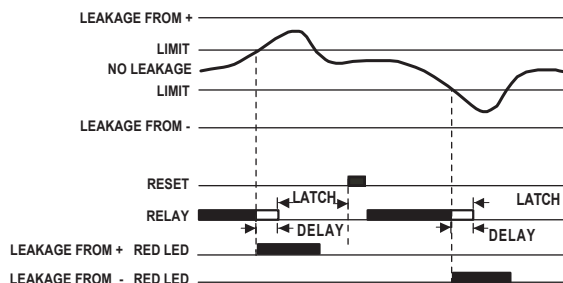
EARTH LEAKAGE MONITOR ASYM & SYM LEAKAGE FOR DC UNEARTHED IT SYSTEMS

Type: DDEB

FEATURES

- **Monitors Insulation deterioration and faults and gives an early warning if a leak current exceeds a preset level**
- **Reacts on both symmetric and asymmetric leakages**
- **Programmable leak current limit from 0.2 to 30 mA**
- **Universal unit for a wide range of distribution system voltages U_n from 20 to 500 V.**
- **Self-supplied from the distribution system**
- **Time delay - on and off - individually adjustable**
- **Relay function 2x1C/O (leak from + or -) or 1x2C/O**
- **The relays work in Fail Safe mode**
- **Latch function can be selected**
- **3-digit display shows actual current leak**
- **LEDs indicate the status of the relay, latch and timing function**

FUNCTION DIAGRAM



Description:

The DC earth leakage relay is designed to monitor unearthed DC IT systems for insulation deterioration or faults. The DDEB, that is power supplied from the system to be monitored, is connected to earth through an active current limited circuitry, trying to keep the earth voltage at half the system voltage. If there is a leak to ground from one or both of the supply lines the DDEB will compensate in order to keep the earth voltage at half the supply voltage. When the compensation current rises to a higher level than the set point the relay will switch, and the DDEB will let the earth float with the limited compensation current still running. This ensures that the special features of an unearthed system are still available while the fault can be found and repaired. The internal relays can be set to work in parallel for a fault or individually for faults in the positive or the negative line.

Operation:

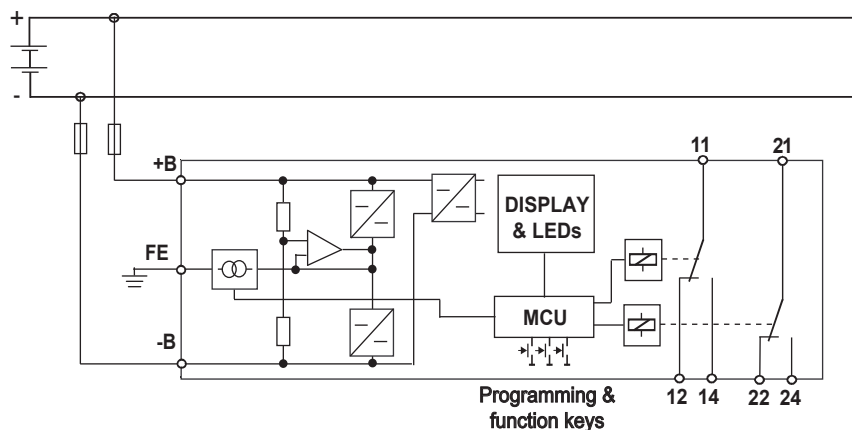
In order to minimize the size of the DDEB the unit is powered by 3 independent switch mode supplies. Two supplies are used to either source or drain current from the earth terminal and a third supply powers the electronics. The DDEB is with leak currents below 10mA either sourcing or draining with a DC current. At higher leak current, high supply voltage and high ambient temperature the DDEB automatically changes mode to a safe pulse pause mode where the pulses (leak and measuring current) are 600 msec and the pause up to 20 sec. or long enough to keep the temperature in the box below 65 °C.

If LATCH is selected the relays can be reengaged - if the leak current is under the set point - by pressing the S/R button on the front.

Application:

Unearthed systems can function even with a direct short from any point in the wiring to ground, but another short or leak from another point in the system can be fatal. Either direct with heavy currents, overheating or indirect through component malfunction. The DDEB solves the problem by monitoring the circuit and giving an early warning as soon as it senses a leak current greater than the set value. Securing the ground level at half system voltage reduces at the same time personal risks for electric shock.

CONNECTION DIAGRAM



Please note

If the two relay contacts are in "Fault" position and all LED's are red and the display shows "FFF", then the DDEB is defect and must be replaced.

SPECIFICATIONS

INPUT

To Earth connector DC Current up to set point then a floating DC Voltage
 Programmable from 0,2 to 30 mA
 Set points Programmable from 0,1 to set point -0,1 mA
 Differential Programmable from 0,1 to set point -0,1 mA
 Voltage limit Voltage on Earth connector FE must be limited to be within system voltage

PERFORMANCE PARAMETERS

TIMING
 Response time Typical <200 msec. Below 10 mA and not pulsed earth leakage current. At higher current, voltage and ambient temperatures dependent on pause time . Max. 20 sec.
 Time range during run Programmable separate On and Off delay 0 - 99,9 sec. MCU controlled.

ELECTRICAL
 Accuracy Set point ± 2 % within system voltage
 Temp. dependence Typ. ± 0.02 % / °C

OUTPUT

RELAY 2 relays x 1C/O, AgNi/Au
 Contact rating 6 A, 250 VAC, 1500 W
 See figure for DC rating
 Mechanical life 20 million operations

ANALOG INDICATION
 Display 3 digit LED
 Current resolution 0,1 mA
 Time resolution 0,1 sec.

SUPPLY

DC voltage 20 - 500 V ±10%
 Supply range 20 - 500 V ±10%
 Power consumption Max 3.5 W

GENERAL

Temperature range - 25 °C to + 55 °C ambient
 Humidity Up to 90 % RH non-condensing
 Dielectric test voltage DC circuit to contact 4000 Vrms
 Contact to contact 2500 Vrms
 Open contact circuit 1000 Vrms
 Weight 0.17 kg.



International Standards
 Product safety EN 60255-27: 2006
 EMC EN 50263: 2000
 EN 60255-22 Immunity
 EN 61000-25 Emission

ORDERING INFORMATION

EXAMPLE:

TYPE
 Differential DC current control relay

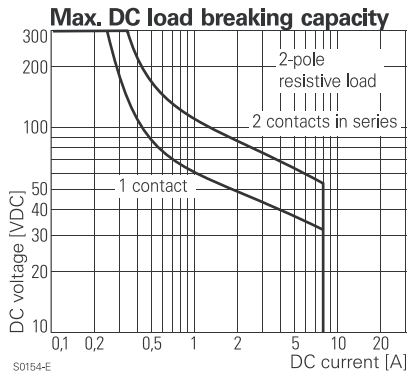
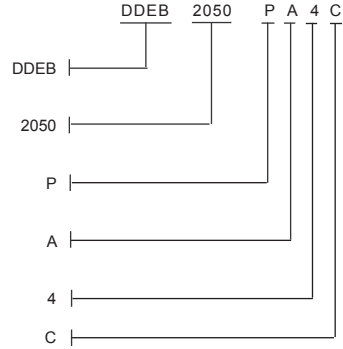
SUPPLY VOLTAGE
 20 - 500 Vdc

ADJUSTMENT
 Programmed

HOUSING
 Rail mounting

SIZE
 45 mm.

CODE END



Setup procedure for the DDEB

To enter Setup Menu pres S/R button for app. 5sec.

If no activity on the buttons for 50sec., then the setup will end without saving data. To return to factory default see below

Choose function first :

Function 1.: Asym & Sym LEDs: "Leakage to +" and "Leakage to -" are blinking Red & Green In phase

Function 2.: Asym + Sym LEDs: "Leakage to +" and "Leakage to -" are blinking Red & Green out of phase

Function 1.: Different values for Asym and Sym

Step 1: Set Trip to Asym over current. Relay A ON to OFF

LEDs: "Asym +" and "Relay A" are blinking Red

Set trip value from 0,1 to 30,0 mA

Press Up or Down keys to change trip value and press S/R for next Setup menu

Step 2: Set Return to acceptable Asym current. A Relay Off to ON

LEDs: "Asym +" and "Relay A" are blinking Green

Set return value 0,1 to "trip value" x,x mA

Press Up or Down keys to change trip value and press S/R for next Setup menu

Step 3: Set Delay time from ON to OFF Relay A

LEDs: "Relay A" are blinking Red

Set OFF time delay from 0,0 to 99,9 sec.

Press Up or Down keys to change trip value and press S/R for next Setup menu

Step 4: Set Delay time from OFF to ON Relay A

LEDs: "Relay A" are blinking Green

Set ON delay time from 0,0 to 99,9 sec.

Press Up or Down keys to change trip value and press S/R for next Setup menu

Step 5: Set Latch OFF (0) or ON (1) Relay A

If latch OFF all 4 LEDs are Green

If latch ON all 4 LEDs are Red

Press Up or Down keys to change latch setting and press S/R for next Setup menu

Step 6: Set Trip to Sym over current. Relay B ON to OFF

LEDs: "Asym +" and "Asym -" and "Relay B" are blinking Red

Set trip value from 0,1 to 30,0 mA

Press Up or Down keys to change trip value and press S/R for next Setup menu

Step 7: Set Return to acceptable Sym current. Relay B Off to ON

LEDs: "Asym +" and "Asym -" and "Relay B" are blinking Green

Set return value 0,1 to "trip value" x,x mA

Press Up or Down keys to change trip value and press S/R for next Setup menu

Step 8: Set Delay time from ON to OFF Relay B

LEDs: "Relay B" are blinking Red

Set OFF time delay from 0,0 to 99,9 sec.

Press Up or Down keys to change trip value and press S/R for next Setup menu

Step 9: Set Delay time from OFF to ON Relay B

LEDs: "Relay B" are blinking Green

Set ON delay time from 0,0 to 99,9 sec.

Press Up or Down keys to change trip value and press S/R for next Setup menu

Step 10: Set Latch OFF (0) or ON (1) Relay B

If latch OFF all 4 LEDs are Green

If latch ON all 4 LEDs are Red

Press Up or Down keys to change latch setting and press S/R for next Setup menu

Function 2.: Same value for Asym + Sym

Step 1: Set Trip to over current. Relay A&B ON to OFF

LEDs: "Asym +" and "Asym -" are blinking Red out of phase

Set trip value from 0,1 to 30,0 mA

Press Up or Down keys to change trip value and press S/R for next Setup menu

Step 2: Set Return to acceptable current. Relay A&B Off to ON

LEDs: "Asym +" and "Asym -" are blinking Green out of phase

Set return value 0,1 to "trip value" x,x mA

Press Up or Down keys to change trip value and press S/R for next Setup menu

Step 3: Set Delay time from ON to OFF Relay A&B

LEDs: "Relay A" and "Relay B" are blinking Red

Set OFF time delay from 0,0 to 99,9 sec.

Press Up or Down keys to change trip value and press S/R for next Setup menu

Step 4: Set Delay time from OFF to ON Relay A&B

LEDs: "Relay A" and "Relay B" are blinking Green

Set ON delay time from 0,0 to 99,9 sec.

Press Up or Down keys to change trip value and press S/R for next Setup menu

Step 5: Set Latch OFF (0) or ON (1) Relay A&B

If latch OFF all 4 LEDs are Green

If latch ON all 4 LEDs are Red

Press Up or Down keys to change latch setting and press S/R for next Setup menu

To return to factory default setup values press

"S/R" and "UP" buttons simultaneously for app. 5 sec.

Function 1:	Sym & Asym
Asym Over current trip:	10,0 mA
Asym Return trip:	9,8 mA
Relay A Delay time ON to OFF:	2,0 sec.
Relay A Delay time OFF to ON:	2,0 sec.
Relay A Latch:	...OFF (0)