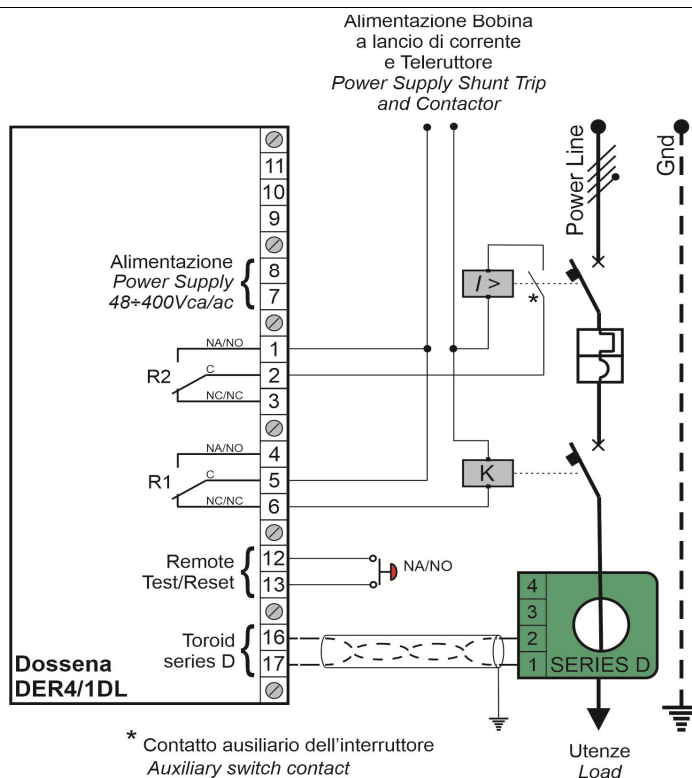
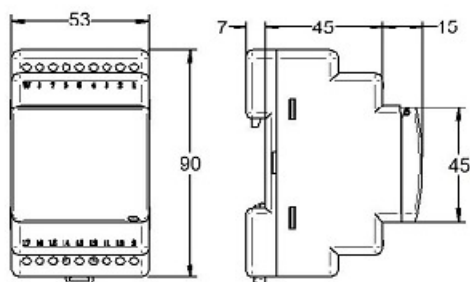


DER4 MU 1290 REV 1

Codice Ordinazione/ Order Code: 9DER4/1DL

CARATTERISTICHE TECNICHE / TECHNICAL CHARACTERISTICS

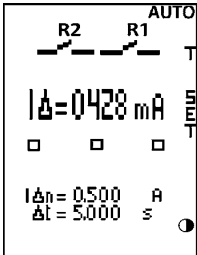
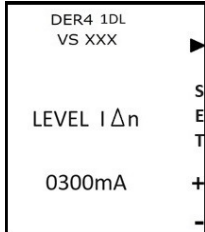
Introduction: The residual current devices, type A/AC Dossena DER4 series, fully compliant with IEC 60947-2: 2019, can be used in LV network in AC, TT and TN type. The series offers a wide range of adjustment of the $I_{\Delta n}$ threshold (up to 30 A) and of the delay time (up to 30s).

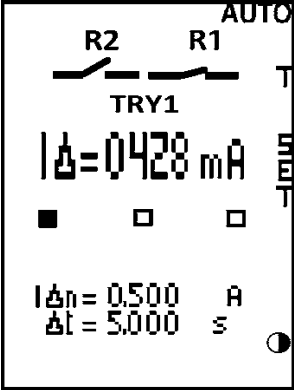
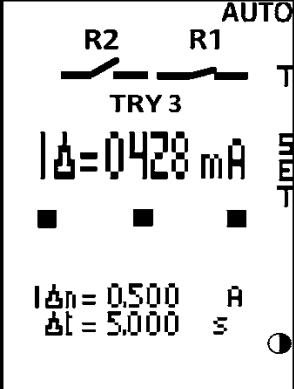
The residual current device DER4/1DL is designed to be used in environments where isn't necessary, or missing, of human presence (board for radio, pumping stations, cold storage, lighting installation, etc). With "operation state of RESET" settled in SETUP on "AUTO" mode, in case of intervention, when current leakage over set threshold, the device is operating and change the state of "Relay 1" in consequence the line is power off. Despite of the intervention of "Relay 1", the intervention condition persists, it means that the current leakage is present upstream of coil and consequently, after 400ms, change the state also "Relay 2", otherwise the rearmament of the "Relay 1" is in automatic mode. In order to verify the integrity of system, DER4/1DL executes different attempts at regular intervals of 60s to restore the "Relay 1", up to a maximum of three (the number of attempts has always visualized and identified on the display of DER4/1DL). If the fault persists beyond attempts to restore the system is put permanently out of service and "Relay 2" change the state. After 30sec of normal working DER4/1DL, forgets the attempts , but to facilitate the maintenance of system continues to display the number (maximum three) of consecutive historically attempts (it's possible to reset this indicator thanks to Reset button). With the " operation state of RESET", setting the SETUP in "Man", in case of failure, the relay DER4/1DL doesn't do the cycles described above, it operates like a normal earth differential relay (note: change of state both relays R2 and R1).

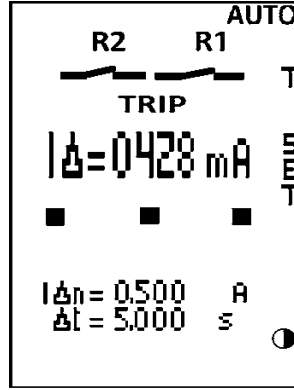
INSTALLATION SUGGESTIONS AND SAFETY PRECAUTION:

All installation and maintenance operations must be carried out by qualified personnel in the absence of voltage and in a total electrical safety regime, in compliance with the safety regulations.

- 1) Before powering the DER4, check that all connections have been executed properly.
- 2) ALWAYS install DER4 by using Dossena toroid D series.
- 3) The cross-section of the conductors must be such that the total resistance of each DER4 ↔toroid connections does not exceed 0.5Ω.
- 4) Minimize the distance connections between DER4 and toroid and keep them away from power cables; use twisted shielded cables, with the shield connected to ground at one point only (cable section ≥0,5mm2)
- 5) **At the first commissioning perform the calibration of toroid, please view section SETUP item CAL.**

NORMAL WORKING STATE (green display)														
		The instrument is in the normal state of measurement and supervision. The following parameters are displayed and continuously updated: IΔ: Visualization in TRMS of the residual current in A. IΔn= Threshold of the set residual current. Δt= Limiting non-actuating time. Reset= automatic (AUTO) or manual (MAN) State of the relays and their meaning (R2, R1). If the measured leakage current exceeds the threshold of 25% of the IΔn, the percentage of the detected current in relation to the set nominal leakage current threshold IΔn will appear flashing on the display. The flashing speed will increase as the set threshold value IΔn approaches. In the event of a trip, the estimate of the maximum measurable tripping current is displayed.												
Keys function:  : Press this button to adjust the contrast (once you have changed the contrast, enter and exit setup to save the settings) SET: press for at least 3 seconds to enter in SET UP.  : pressing the T (Test) button checks the operation of the protection system (DER4 + circuit-breaker opening) - see page 5														
SETUP (blue display)														
		SET = press SET button for at least 3 seconds to enter the SET UP (display becomes blue).  = press to switch from one parameter to another in a cyclical way. +/- = press to modify the selected parameter. On the toroid type selection page it is possible to start toroid calibration by holding down the CAL key for 2s, in order to eliminate possible offsets. <u>This operation is absolutely necessary for the instrument commissioning and must be carried out in the total absence of residual current (all loads must be switched off).</u> The display will turn green and the message “CALIBRA” will appear. If the calibration is successful the display will return to blue and the message “CAL OK” will appear, otherwise the display will turn red and the message “FAIL” will appear. press SET button for at least 3 seconds to exit from SETUP and save the parameters. DER4 automatically exits from SETUP without saving modifications, after 3 minutes of inactivity.												
Note: In the SETUP phase the residual current protection is suspended.														
PARAMETERS				RANGE [DEFAULT]										
LEVEL IΔn (A)= Threshold of the nominal residual current. The intervention of the TRIP relay will occur when 85% of the set IΔn value is exceeded. <table><tr><td>T35/T60/T80</td><td>T110</td><td>T160/T210/T80S/T60A/T110A/T160A</td><td>T80SX/T300M</td><td>T210A/TDRT</td></tr><tr><td>0,03 ÷ 30A</td><td>0,1 ÷ 30A</td><td>0,3 ÷ 30A</td><td>0,3 ÷ 300A</td><td>1 ÷ 30A</td></tr></table>				T35/T60/T80	T110	T160/T210/T80S/T60A/T110A/T160A	T80SX/T300M	T210A/TDRT	0,03 ÷ 30A	0,1 ÷ 30A	0,3 ÷ 30A	0,3 ÷ 300A	1 ÷ 30A	0,03 ÷ 30A [12A]
T35/T60/T80	T110	T160/T210/T80S/T60A/T110A/T160A	T80SX/T300M	T210A/TDRT										
0,03 ÷ 30A	0,1 ÷ 30A	0,3 ÷ 30A	0,3 ÷ 300A	1 ÷ 30A										
TOROID TYPE= Toroid choice (T35 - T60 - T80 - T110 - T160 - T210 – T80S (adder toroid transformation ratio CTs ≤ 500/5) – T80SX (adder toroid transformation ratio CTs ≥ 600/5) - T300M (multiplier toroid) – T60A – T110A – T160A - T210A - TDRT). WARNING: In case of variation of this parameter it is necessary to carry out the calibration procedure.				T35 ÷ TDRT [T35]										
DELAY ΔT= Limiting non-actuating time (s): delay within which a residual current higher than the set IΔn can flow in the DER4 without causing it to trip (if = “INST” the residual current device will operate without delay, with instantaneous tripping).				INST/ 0,06 ÷ 30s [5s]										
RLY2 MODE= It represents the rest state of the relay 2. It is normally open (NDE) and closes when the IΔ exceeds the IΔn. In case of NE the written R2 will become reversed.				NDE/NE [NDE]										
RLY1 MODE= It represents the rest state of the relay 1. It is normally open (NDE) and closes in the presence of alarms. In case of NE the written R1 will become reversed.				NDE/NE [NDE]										
RST MODE= manual or automatic. After a trip for IΔ> IΔn, the message "SET" becomes "RST" and will therefore allow the RESET of the TRIP condition (only if IΔ <IΔn).				MAN/AUTO [MAN]										
BA ALARM= If set to ON, the continuity of the tripping coil and its power supply are constantly monitored, generating an alarm in the event of an anomaly. If the undervoltage release is used set BA ALARM = OFF.				ON/OFF [ON]										
CONTRAST= Instrument contrast setting.				0000 ÷ 0020 [0001]										
DC ALERT= If set to ON, the instrument monitors the possible presence of high and anomalous DC components by generating the relevant flashing “DC” signal.				ON/OFF [OFF]										
PASSWORD= To set the password, enter the chosen number in the relevant field. If a password has already been entered, the display will appear green, the message SET will become black and it will not be possible to navigate in the setup until the correct password is entered. Once the correct password has been entered, pressing the SET button for 3 seconds will unlock the setup. Only at this point the display will turn blue and it will be possible to set the parameters and saving them.				OFF÷ 9999 [OFF]										

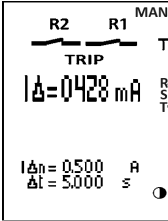
TENTATIVO 1 / ATTEMPT 1	EVENTI / EVENTS
	Display giallo fisso / <i>Yellow display</i> Relè R2 non cambia stato, relè R1 cambia stato / <i>Relay R2 doesn't change state, relay R1 changes state</i> Lampeggia la scritta TRY 1 / <i>Flashing written TRY 1</i> Si annerisce il quadrato relativo al primo tentativo TRY 1 / <i>Blackens the square relative to the first attempt TRY 1</i> Appare la scritta RST per resettare i ripristini consecutivi storicamente avvenuti / <i>Appears the written RST to reset the consecutive historically attempts</i>
TENTATIVO 2 / ATTEMPT 2	EVENTI / EVENTS
	Display giallo fisso / <i>Yellow display</i> Relè R2 non cambia stato, relè R1 cambia stato / <i>Relay R2 doesn't change state, relè R1 changes state</i> Lampeggia la scritta TRY 2 / <i>flashing the written TRY 2</i> Si annerisce il quadrato relativo al primo tentativo TRY 2 / <i>Blackens the square relative to the first attempt TRY 2</i> Appare la scritta RST per resettare i ripristini consecutivi storicamente avvenuti / <i>Appears the written RST to reset the consecutive historically attempts</i>
TENTATIVO 3 / ATTEMPT 3	EVENTI / EVENTS
	Display giallo fisso / <i>Yellow display</i> Relè R2 non cambia stato, relè R1 cambia stato / <i>Relay R2 doesn't change state, relè R1 changes state</i> Lampeggia la scritta TRY 3 / <i>flashing the written TRY 3</i> Si annerisce il quadrato relativo al primo tentativo TRY 3 / <i>Blackens the square relative to the first attempt TRY 3</i> Appare la scritta RST per resettare i ripristini consecutivi storicamente avvenuti / <i>Appears the written RST to reset the consecutive historically attempts</i>

TRIP (R2)	EVENTI / EVENTS
	Display rosso fisso / <i>Red display</i> Relè R2 cambia stato, relè R1 cambia stato / <i>Relay R2 changes state, relay R1 changes state</i> Lampeggia la scritta "TRIP" / <i>Flashing the written TRIP</i> Appare la scritta RST per resettare la condizione di TRIP / <i>Appears the written RST to reset the TRIP condition</i>

Note: Dopo 30s di buon funzionamento il DER4/1DL dimentica i tentativi fatti ma al fine di agevolare la manutenzione dell'impianto continua a visualizzare il numero (massimo tre) di ripristini consecutivi storicamente avvenuti (è possibile azzerare questo indicatore mediante il pulsante RESET). Il display è di colore verde.
 After 30s of normal working DER4/1DL forgets the attempts performed but to facilitate the maintenance of system continues to display the number (maximum three) of consecutive historically attempts (it's possible to reset this indicator pressing RESET button). The display is green.

TEST

Premendo il tasto di **T** (test) si verifica il sistema di protezione differenziale (DER4 + sgancio/apertura interruttore) / Pressing the T (test) button checks the complete residual current protection system (DER4 + circuit breaker tripping/opening)

	Modalità RST / <i>RST Mode</i>	Eventi / <i>Events</i>	Funzione dei pulsanti / <i>Keys function</i>
	Modalità “MAN” <i>“MAN” mode</i>	display rosso fisso / <i>red display</i> relè R2 e relè R1 cambiano stato / <i>R2 and R1 relays change state</i> lampeggia il segnale di pericolo / <i>flashing danger signal</i> lampeggia la scritta “TRIP” / <i>flashing written TRIP</i>	T = premere per eseguire il test / <i>push test button to perform the test</i> RST = premere per riarmare il relè differenziale e riportarlo in condizione di normale vigilanza / <i>push to perform the riarmament and return in normal vigilance</i>
	Modalità “AUTO” <i>“AUTO” mode</i>	Premendo una volta il tasto T= test (si simula una dispersione di corrente differenziale in impianto), si verifica la condizione “tentativo 1” con un quadrato ■ annerito, dopo 60” il display si riporta in modalità vigilanza (verde). Se si preme nuovamente il test, si verifica la condizione “tentativo 2” con due quadrati ■■ anneriti, dopo 60” il display si riporta in modalità vigilanza (verde). Se si preme nuovamente il test, si verifica la condizione “tentativo 3” con tre quadrati ■■■ anneriti, dopo 60” il display si riporta in modalità vigilanza (verde). Se si preme per la quarta volta il pulsante di test, si verifica la condizione di TRIP che tramite la B.A. provoca l'apertura definitiva dei circuiti di potenza. <i>Pushing once, the test button T (it simulates the the presence of residual current in the system), it verifies the condition “attemp 1” with square ■ (blakened), after 60” the display backs in surveillance mode (green).</i> <i>If you push again the test button it's possible to verify the condition “attemp 2” with two squares ■■ (blakened), after 60” the display backs to normal surveillance (green).</i> <i>If you push again the test button it's possible to verify the condition “attemp 3” with three squares ■■■ (blakened), after 60” the display backs in normal surveillance (green).</i> <i>If you press the test button for the fourth time, it's possible to verify trip condition by opening coil that causes the opening of power circuit.</i>	

ALLARMI/ALARMS

MSG	COLORE DISPLAY/ DISPLAY COLOUR	EVENTI/ EVENTS	CAUSA/ CAUSE
TC – BA	giallo fisso yellow		ALLARME B.A.: Possibile problema della bobina di apertura (disconnessa o assenza tensione) o interruttore non armato. ATTENZIONE: Se l’impianto non fa uso della bobina di apertura occorre disabilitare tale controllo (BA ALARM=OFF). T.C. ALARM: Possible shunt trip problem (disconnection, no voltage) or no armed circuit breaker. WARNING: Disable the shunt trip check, if no shunt trip is used in the system (BA ALARM=OFF).
TRIP	rosso fisso red	R1 e R2 cambiano di stato. Sul display rimane visualizzato il valore della corrente differenziale che ha provocato l'intervento. R1 and R2 switch. The value of the residual current that caused the trip remains shown on the display.	ALLARME DI TRIP In modalità RST=“MAN”: La corrente di dispersione IΔ ha superato l'85% della soglia IΔn. In modalità RST=“AUTO”: Dopo aver raggiunto lo stato “TRY3” si verifica, entro 30s, un nuovo superamento della soglia IΔn. Oppure il superamento della soglia IΔn persiste per almeno 400ms dopo l'intervento del relè R1 (possibile teleruttore guasto). TRIP ALARM In RST mode=“MAN”: The residual current IΔ has exceeded 85% of threshold IΔn. In RST mode=“AUTO”: After reaching the “TRY3” state, the IΔn threshold is exceeded again within 30s. Or the exceeding of the IΔn threshold persists for at least 400ms after the intervention of relay R1 (possible contactor failure).
TORO	rosso fisso red	R1 e R2 cambiano di stato. R1 and R2 switch.	ALLARME TOROIDE Problema toroide: o manca il collegamento o possibile presenza di cortocircuiti sugli avvolgimenti. TOROID ALARM Toroid problem. There is a disconnection or a short in the windings.
TEMP	giallo fisso yellow		ALLARME TEMPERATURA Eccessiva temperatura interna. TEMPERATURE ALARM Excessive internal temperature.
FAILED	giallo fisso yellow		ALLARME ALIMENTAZIONE Rilevata alimentazione interna non stabile. POWER SUPPLY ALARM Unstable internal power supply detected.
RST	giallo fisso yellow	R1 cambia stato. R1 switches.	ALLARME RESET IMPREVISTO Lo strumento in seguito ad un disturbo o ad un’anomalia ha eseguito un reset interno e lo segnala. Per resettare questa condizione premere il tasto SET velocemente e se si ripete contattare il centro assistenza riferendo il codice di errore che appare in alto a sinistra. UNEXPECTED RESET ALARM Following a disturbance or anomaly, the instrument has performed an internal reset and reports it. To reset this condition, press the SET button quickly and if it happens again, contact the support reporting the error code that appears at the top left.
SET	rosso fisso red	R2 cambia di stato. R2 switches.	GRAVE ANOMALIA INTERNA Il prodotto è guasto e si porta in una condizione di sicurezza: contattare l'assistenza. SERIOUS INTERNAL ANOMALY The product is faulty and in a safe condition: contact support.