NEUTRAL EARTHING PROTECTION

NLM5

NEUTRAL LINK MONITOR RELAY

NEXT-GENERATION NEUTRAL-TO-EARTH PROTECTION FOR MINING AND INDUSTRIAL SUPPLY TRANSFORMERS

The NLM5 Neutral Link Monitor provides next-generation neutral-to-earth protection for mining and industrial applications, continuously monitoring Neutral Earthing Resistor (NER) integrity, phase-voltage rise and neutral earth-leakage current.

The NLM5 monitors the current-limitation system on the secondary star-point-to-earth connection of a supply transformer, and can also monitor a direct star-point-to-earth connection.

Designed and engineered in Australia, the NLM5 is compliant with AS2081:2011 and adds protection-coordination trip timing, a time-stamped event log and a password-protected touchscreen interface.

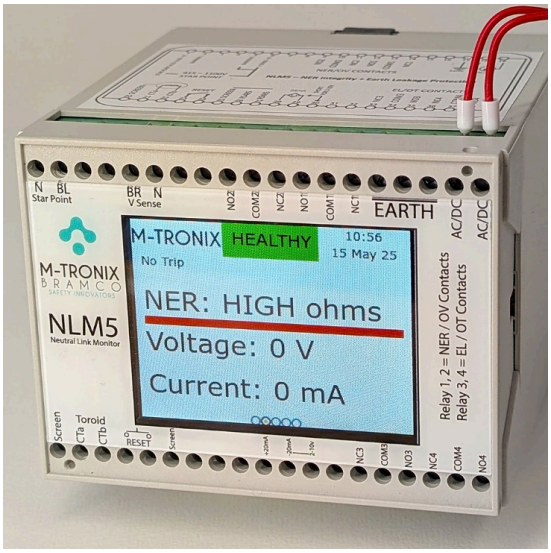

FIG. 1 — NLM5 NEUTRAL LINK MONITOR, FRONT VIEW

NER RANGE **10 – 650 Ω**	EARTH LEAKAGE **30 – 500 mA**
OUTPUT CONTACTS **4 × C/O, 5 A**	DIRECT CONNECTION **Up to 1100 V**

AS2081:2011 COMPLIANT

TOUCHSCREEN CONFIGURED

AUSTRALIAN DESIGNED & SUPPORTED

KEY FEATURES

01 Direct connection to AC supply systems up to 1100 V — no barrier required

02 Operation up to 4160 V with barrier assembly

03 Neutral earth-leakage current measured via an external EL toroid (not supplied)

04 Backup protection by detecting voltage rise across the NER

05 Configured as failsafe and latch-on-fault

06 Adjustable trip levels for earth leakage, excess voltage and NER resistance limits

07 Adjustable trip delays for earth leakage, over-voltage and NER integrity

08 Open-circuit toroid protection, reset input, time-stamped event log and password-protected settings

KEY BENEFITS

COMPLETE NER SUPERVISION

Resistance integrity, phase-voltage rise and neutral leakage current in one relay.

COORDINATED PROTECTION

Independent trip delays allow the NLM5 to coordinate with upstream and downstream protection.

TOUCHSCREEN COMMISSIONING

All parameters set on the 2.8-inch colour touchscreen and protected by password.

AUDITABLE

Time-stamped event and trip log for post-incident investigation.

APPLICATIONS

TX	NER	SUB	MCC	S/P	U/G
Transformer star points	NER installations	Substations & switchrooms	MCCs & fixed plant	Surface & process equipment	Underground distribution

TERMINAL LAYOUT & FRONT PANEL

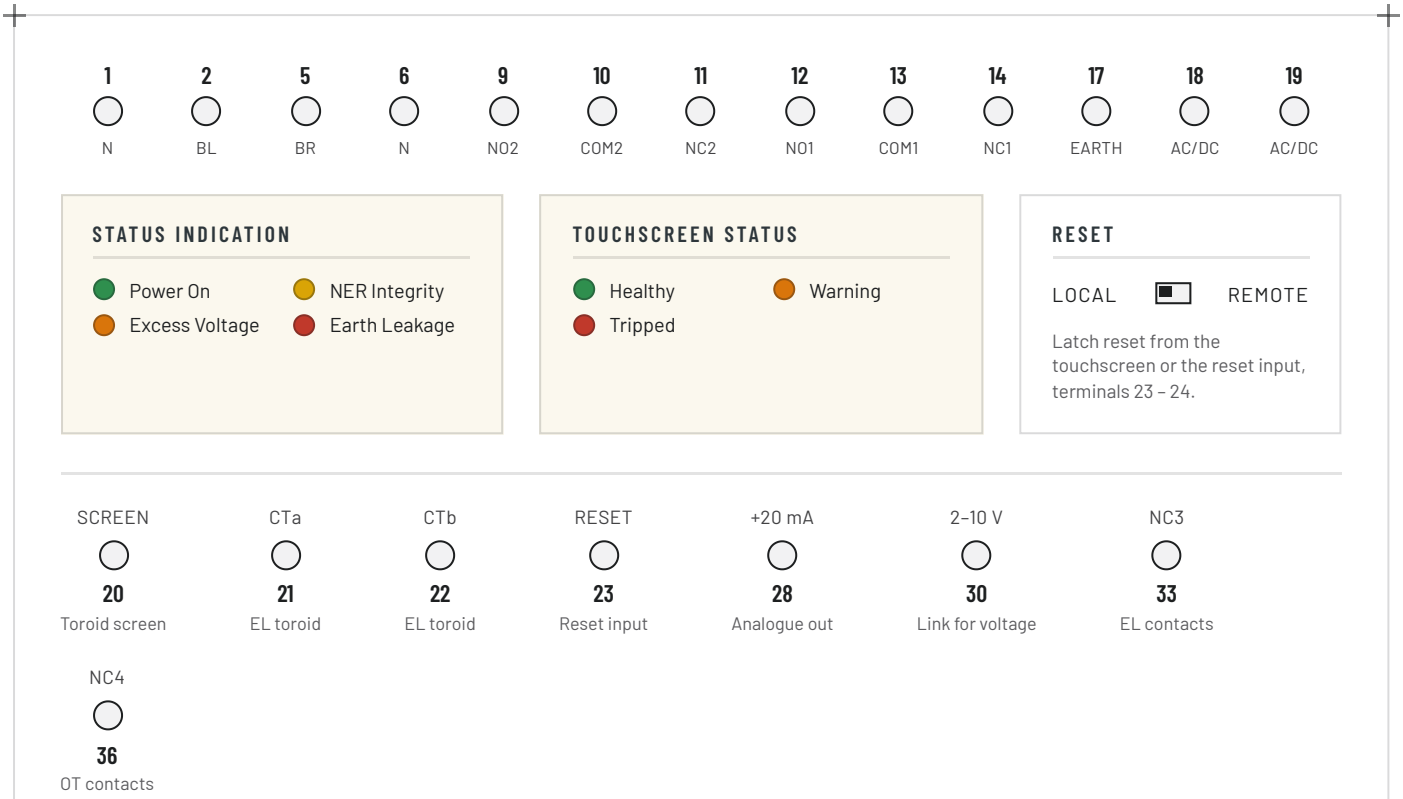

FIG. 2 — NLM5 TERMINAL DESIGNATIONS AND FRONT-PANEL INDICATION

INDICATION

Power On	Supply present
NER Integrity	NER resistance outside the set limits
Excess Voltage	Phase-voltage rise above the set trip level
Earth Leakage	Neutral earth-leakage current above the set trip level
Healthy	Touchscreen banner — all functions within limits
Tripped	Touchscreen banner with the latched fault description

CONTROL SETTINGS

NER limits	Trip value adjustable –50% to +100% of the set NER value (AS/NZS 2081:2011)
Excess voltage	5 – 50% of phase voltage, 50 – 500 ms delay
Earth leakage	30 – 500 mA, 50 – 500 ms delay; response 50 – 60 Hz or 5 – 100 Hz

INSTALLATION NOTES

01 Earth leakage sensing requires an external 1000:1 EL toroid (part A01334).

02 Toroid connections in screened cable, earthed at one end (terminal 20).

03 A barrier assembly is required above 1100 V, up to 4160 V.

04 All contacts are shown in the de-energised (relay healthy) condition.

05 RS-485 hardware is fitted but is not implemented in the current firmware.

TERMINAL FUNCTIONS

NO.	TERMINAL	FUNCTION
1	**N**	Star point, neutral
2	**BL**	Star point, barrier link
5	**BR**	V sense, barrier return
6	**N**	V sense, neutral
9 – 11	**Relay 2**	NO2 / COM2 / NC2 — NER & over-voltage
12 – 14	**Relay 1**	NO1 / COM1 / NC1 — NER & over-voltage
17	**Earth**	Earth connection
18 – 19	**AC/DC**	Supply, 24 – 48 V AC/DC
20	**Screen**	Toroid cable screen
21 – 22	**CTa / CTb**	EL toroid input
23 – 24	**Reset**	Reset pushbutton input
25	**Screen**	Serial cable screen
26 – 27	**RS485 a / b**	Serial port (hardware only)
28 – 29	**± 20 mA**	Instrumentation output
30	**2 – 10 V**	Link for voltage output
33 – 35	**Relay 3**	NC3 / COM3 / NO3 — earth leakage
36 – 38	**Relay 4**	NC4 / COM4 / NO4 — open toroid

DIMENSIONS & ENCLOSURE

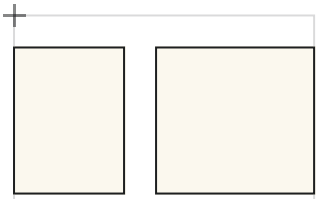

FIG. 3 — ENCLOSURE, FRONT & SIDE ELEVATION (100 MM HIGH)

Dimensions	75 mm (W) × 100 mm (H) × 109.5 mm (D)
Material	High-impact resistant polycarbonate
Protection	IP20
Mounting	DIN rail
Terminals	Cage screw terminals
Weight	333 g

SPECIFICATIONS

SUPPLY

MODEL	MIN	TYP	MAX	UNIT
A01605	20	24	50	V AC/DC

Power consumption	4 VA ± 20%
Operating temperature	0 – 60 °C
NER resistance	10 – 650 Ω, per system voltage
NER trip adjustment	–50% to +100% (+10% / –0%)
System voltages	415 / 1100 V (240 / 635 V phase)
Earth leakage current	30 – 500 mA
Excess voltage trip	5 – 50% of phase voltage
Trip delays	50 – 500 ms (OV, EL); 2 – 10 s (NER)
Outputs	4 – 20 mA or 2 – 10 V; RS-485 Modbus (hardware only)
Relay contacts	4 × changeover, 5 A at 250 V AC (100 VA)
Display	2.8 in touchscreen

ORDERING INFORMATION

PART NO.	DESCRIPTION
A01605	NLM5 — Neutral Link Monitor
A01334	Toroid (1000T) — 40 mm; consult factory for alternative sizes

Supplied with: Relay unit and instruction sheet; EL toroid ordered separately.

STANDARDS & COMPLIANCE

AS2081:2011 — Electrical equipment for mines

AS/NZS 2081:2011 — NER trip adjustment range

RoHS — Compliant

RCM E200379

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