



IC1 – EARTH CONTINUITY RELAY
Manual Version 1.1

Operation Manual

Earth Continuity Relay Manual
Part number: A01047

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Overview

The IC1 has been designed to provide Earth Continuity monitoring of a supply cable by grounding the load end of the pilot core via a diode to earth.

The IC1 has a high tolerance to cable capacitance, allowing long cable runs.

Pilot Termination using 1A diode and/or operates transparently with Bramco Smart Pilot Node.

- Local/Remote mode of pilot operation.
- Failsafe operation.

Two sets of IC1 relay contacts are provided.

Status Leds for –

- Power
- Closed
- Ready
- Pilot Open
- Pilot Short
- RY On

1. Physical Layout

The IC1 relay enclosure provides facilities for both, DIN rail mounting, or screw mounting.

See Section 3 for Installation Recommendations.

See Section 4 for Specifications.

See Section 5 for Fault Diagnosis.

See Section 6 for the Typical Connection Diagram.



IC1 Enclosure

1.1. Terminal Connections

Terminal Number	Description
1	AC power /DC POS
2	AC power/DC NEG
3	COM1
4	N/C1
5	N/O1
6	COM2
7	N/C2
8	N/O2
9	NO CONNECTION
10	NO CONNECTION
11	NO CONNECTION
	NO CONNECTION
13	NO CONNECTION
14	NO CONNECTION
15	PILOT
16	EARTH

2. IC1 Operation

2.1. Local/Remote Mode

This is selected via the LOC/REM slide switch on the front facia of the unit.

LOCAL CONTROL MODE -

Pilot termination uses a 1A diode at the external machine with the cathode end (Bar end) connected to Earth.

When the Pilot resistance is less than 45 ohms, no pilot short, and the pilot diode termination is healthy, then the EC relay is closed, i.e. healthy failsafe condition.

REMOTE START MODE -

Remote Start Mode enables the IC1 relay to Start and Stop a load circuit.

The Remote Start pilot circuit has a N/C stop button, in series with a 100R Start resistor, with a N/O Start button across it, in series with a pilot termination diode with the cathode connected to earth.

When the pilot loop resistance is less than 145R and the Start button is pressed, shorting the 100R resistor, then the IC1 relay should close.

When the pilot loop resistance becomes larger than 145 ohms, the IC1 relay will open.

3. Installation

3.1. General Recommendations

Following are some key recommendations for installation and wiring to help achieve successful operation.

A typical connection diagram is included in Section 6.

3.2. Pilot and Earth

Wire from Pilot Terminal 15 direct to the pilot pin on the restrained receptacle.

Wire from Earth Terminal 16 direct to the physical Earth.

3.3. Pilot Termination

Use a 1A 1000V diode 1N4007 for pilot to earth termination in the remote machine.

The IC1 relay will operate correctly with a Bramco Smart Pilot Node installed on the Pilot circuit, in addition to the Pilot termination diode.

4. Specifications

Supply Voltage	A00765 110V AC 50/60Hz 2VA A00972 24 – 48VAC/DC 2VA OPTIONAL A01001 240V AC 50/60Hz 2VA
Local Mode (FS Mode) Pilot/Earth Resistance	Relay is closed if pilot resistance with termination diode is less than 45 ohms. Relay opens at more than 45 ohms.
Remote Mode (NFS Mode) Pilot Control	Relay is open initially, and if Ready led is On (i.e. pilot resistance is less than 145R), closes if pilot resistance drops by 100R, (remote momentary start initiate – not sustained). Relay opens when pilot resistance becomes greater than 145R.
Pilot Termination	1A 1000V diode and/or Smart Pilot Node.
Pilot/Earth Shunt leakage tolerance	Greater than 500 ohms. Greater than 1000 ohms when Smart Pilot Node installed.
Pilot/Earth capacitance tolerance	2 uF maximum (lumped)
Drop out delay	500mS typical
Relay Function	Failsafe
Temperature Range	0 – 60 Deg C
Contact ratings	2 sets 5A 240VAC, 100VA max

5. Fault Diagnosis

INDICATION	POSSIBLE CONDITION/SUGGESTION
<i>Power</i> Led is Off	- Check power supply
Pilot <i>Closed</i> Led is On	- The pilot circuit is diode terminated and less than 45 ohms.
Pilot <i>Open</i> Led is On	- Measurable resistance in the pilot is above the 45 Ohms. - Ensure that there are no "stop" or safety circuits in operation that may be holding the pilot circuit open. - Perform a complete continuity and resistance test on the pilot circuit. - The Diode termination may be faulty. If a new machine, ensure that the termination diode is wired with the correct polarity.
Remote <i>Ready</i> Led is On	- Indicating that Remote mode is selected, and the pilot resistance is less than 145 ohms. i.e. Ready to start. - Momentary operating the Start contact will short the 100 ohm resistor and the IC1 Relay will close. The Ready Led will remain On if the pilot resistance is below 145 ohms.
Pilot <i>Short</i> Led is On	- A pilot leakage resistance below 500 ohms has been detected. - Perform a complete short circuit test on the pilot circuit. - If a new machine, ensure that the termination diode is wired with the correct polarity. - Inspect panel wiring and termination wiring for obvious shorts due to poor connections etc. - Inspect the trailing cable for damage. Replace cable if necessary. - The Diode termination may be faulty.
Both Pilot <i>Closed</i> and Pilot <i>Short</i> Leds are On	- The pilot circuit is less than 45 ohms. - The pilot circuit has leakage of less than 500 ohms.
Both Pilot <i>Open</i> and Pilot <i>Short</i> Leds are On	- The pilot circuit is above 45 ohms. - The pilot circuit has a leakage of less than 500 ohms.

6. IC1 Typical Connections

