

ECM2 EARTH CONTINUITY RELAY

ELECTRICAL PROTECTION

Product Description

Earth Continuity protection is provided using pilot earth loop or earth continuity monitoring. An additional core (the pilot core) is included with the power and earth cores in the trailing or reeling cables to the machine. The ECM2 relay monitors a low voltage DC signal applied between the pilot and earth of the cable and by measuring this signal determines the resistance of the earth pilot loop.

The ECM2 relay is factory configured. No customer modifications are required. The loop resistance is set to 100Ω, in addition to a 235Ω termination resistor, giving a maximum of 335Ω.

The ECM2 relay performs the following functions:

1. Ensures an earth return path from the machine back to the substation and/or distribution box.
2. Provides an interlock circuit to ensure that if the pilot earth continuity circuit is broken or short-circuited then the machine is isolated or cannot be energised.
3. Provides one set of voltage free contacts to interface in the start sequence of the control circuit that controls the trailing cable output supply ensuring pilot circuit healthy prior to start.

The relay is housed in a DIN rail mount enclosure with three LEDs to provide indication.

The relay is supplied with a clamp-on inductive choke, to be fitted around the pilot lead just before its connection to the ECM2 relay. Connection details are provided in a separate Application Note.

The ECM2 relay can be supplied from 20-50VAC 50/60Hz, 19-70VDC. An external power supply is available that accommodates 85-264VAC and 120-370VDC inputs.

Features

- Electronic microprocessor design
- DIN rail or foot mount
- External Reset
- AC or DC supply operation
- LED indication to aid fault finding

Applications

The ECM2 Earth Continuity Relay has been designed to monitor the earth continuity of trailing and reeling cables supplying power to mobile machines where there is not a requirement to comply with AS/NZS 2081.

Earth Continuity Protection

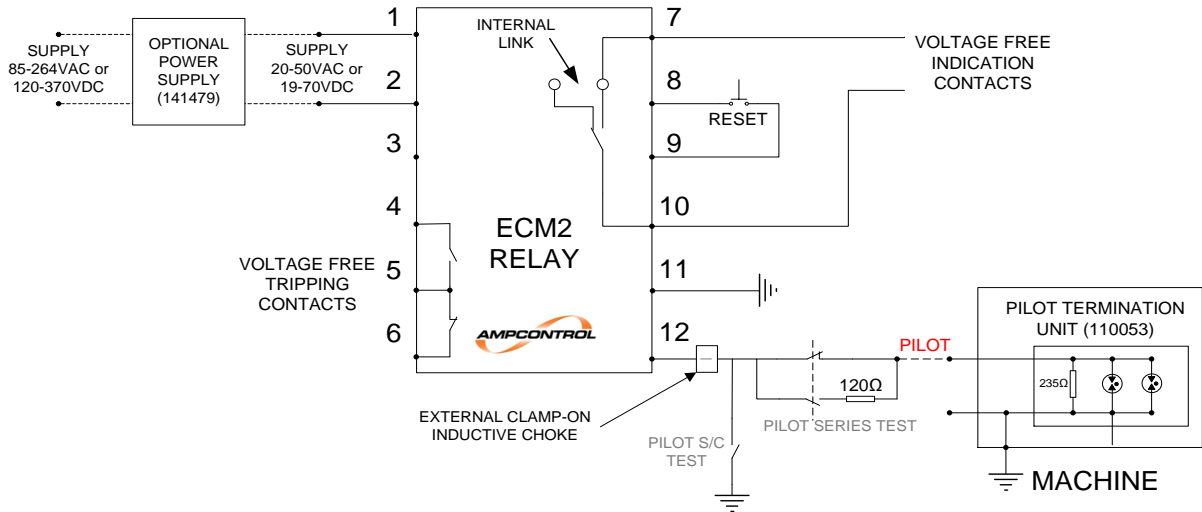
The ECM2 relay continually monitors the earth continuity of a mining trailing cable. To protect against a short circuit of the pilot conductor to Earth, a 235Ω resistor is connected in the machine at the furthest point (as per the connection diagram below). This ensures detection of a pilot to earth fault.

Provided the total loop resistance is less than 335Ω and the resistance between pilot and earth is greater than 190Ω (1000Ω in parallel with the termination resistor), the relay flashes it's OK light and is ready to be energised by pushing the reset button (note the reset can be linked for automatic resetting). When this occurs, the normally open and changeover contacts change state.

The relay de-energises when the loop resistance of the pilot and earth exceeds the preset loop resistance (335Ω) or the resistance between the conductors is less than 190Ω. Time delays (<300ms) on pick-up and drop-out prevents nuisance tripping due to electrical noise or dirty slip rings, on cable reeling applications.



Connection Diagram – Earth Fault Limited Systems with Trailing Cables



NOTE



The voltage free contacts (pins 7 & 10) can be configured N/O or N/C via a link inside the relay enclosure. Contact Ampcontrol for more information

SPECIFICATIONS

General				
Supply Voltage	20-50VAC 50/60Hz, 19-70VDC 110V and 240VAC require external supply			
Power Consumption	4VA approx.			
Tripping Relay Contacts (Terminals 4, 5, 6)	1x C/O 240VAC or 30VDC, 2A max, 100VA max.			
Indication Relay Contacts (Terminals 7, 10)	1x N/O (or 1x N/C) 120VAC or 30VDC, 1A max, 100VA max.			
Earth Continuity Protection				
Pilot (Series) Resistance	>100Ω, hysteresis >5Ω (excluding termination resistor)			
Shunt Leakage Trip Value	<1000Ω, hysteresis >20Ω (excluding termination resistor)			
Dimensions (HxWxD)				
Standard ECM2	75 x 22 x 110mm			
External Power Supply	90 x 22.5 x 100mm			
LED Indication				
LED	State	Indication	Lamp Relay	Output Relay
GREEN	Flashing	Initial state the relay enters when the ECM2 is powered up (other LEDs are OFF).	Normal	Normal
	Steady ON	With the external circuit showing the correct conditions and after a reset, the relay enters its normal operating mode with the green LED in a steady ON state.	Active	Active
YELLOW	Flashing	This is a fault condition where the ECM2 has detected a SC between the pilot and earth.	Normal	Normal
RED	Flashing	Fault condition where the ECM2 has detected an OC between the pilot and earth (series resistance >100Ω).	Normal	Normal

ORDERING INFORMATION

Part Number	Description
110051	ECM2 Earth Continuity Relay 20-50VAC 50/60Hz, 19-70VDC
141479	85-264VAC or 120-370VDC to 24VDC 1A External Power Supply
110053	ECM2 Termination Module with Suppression
165512	External Clamp-On Inductive Choke (supplied)

Find Out More

For more information on this product, contact Ampcontrol Customer Service on +61 1300 267 373 or customerservice@ampcontrolgroup.com or visit the Ampcontrol website: www.ampcontrolgroup.com

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