PCA/2 Pilot Control Relay

1. Description

The PCA Pilot Control relay is designed to provide on/off control of equipment from a remote location. This is achieved with the use of the pilot and earth in a cable **where earth continuity is not a requirement**.

The relay is housed in a Sprecher & Schuh enclosure with LED indication.

Power is supplied from a separate transformer or a floating 36-46 Volts DC supply.

2. Features

- Electronic design
- Plug in enclosure for quick change out
- LED indication to aid fault finding
- High immunity to transients in the pilot circuit
- AC or DC operation
- Selectable operation - Pick up if loop resistance is less than 200 ohms or less than 400 ohms.

3. Application

The PCA Pilot Control Relay is mainly used in surface mining applications. The relay is normally installed in the substation to remotely remove power from machines working in an open cut situation. In this application trailing cables are usually quite long and produce large transients in the pilot circuit. Inductive and capacitive coupling as well as the use of non-symmetrical cables are the cause of these transients. The PCA Relay has high immunity to these transients and therefore provides reliable operation.

3.1 On/Off Control

The pilot of the cable is terminated in the machine with a diode connected to earth. This ensures detection of a pilot to earth fault. The cathode of the diode must be connected to earth (see typical circuit). The operating range of the relay is selectable by the alteration of an internal shunt. 200 ohm and 400 ohm settings are available. The factory setting is for 200 ohm operation.

200 Ohm Operation

Provided the loop resistance is less than 200 ohms and the resistance between pilot and earth is greater than 200 ohms the relay will energise. When this occurs the normally open and normally closed contacts change state.

The relay de-energises when the loop resistance of the pilot and earth exceeds 220 ohms or the resistance between the conductors is less than 200 ohms.

400 Ohm Operation

Provided the loop resistance is less than 400 ohms and the resistance between pilot and earth is greater than 500 ohms the relay will energise. When this occurs the normally open and normally closed contacts change state.

The relay de-energises when the loop resistance of the pilot and earth exceeds 440 ohms or the resistance between the conductors is less than 500 ohms.

A time delay on pick up and drop out prevents nuisance tripping due to electrical noise or dirty slip rings, used on cable reeling applications.

3.2 LED Indication

OC (Open Circuit) - The LED is illuminated to indicate a trip condition due to the pilot/earth loop resistance exceeding the drop out resistance.

SC (Short Circuit) - The LED is illuminated to indicate a trip condition due to leakage of less than the minimum allowable resistance between pilot and earth.

A faulty terminating diode could also cause the above conditions. The installation of a Gas Discharge Device connected across the diode and between pilot and earth (at the relay base) can prevent damage to the diode due to switching spikes.

4. Specifications

Supply Volts:

AC 16 - 0 - 16 Volts ± 20%, 3 VA
DC 36 - 46 Volts **(Floating Supply)**

Loop Resistance:

200 Ohm Setting
Pick up if resistance is < 200 ohms
Trip if resistance is > 220 ohms
Shunt Leakage Trip if < 250 ohms

400 Ohm Setting
Pick up if resistance is < 400 ohms
Trip if resistance is > 440 ohms
Shunt Leakage Trip if < 500 ohms

Time Delay:

On detection of a healthy circuit:	1 Second
Drop out due to an open circuit:	500 mS
Drop out due to a short circuit:	500 mS

Relay Contacts:

1 N/O and 1 N/C contact. Rated at 6A 240 VAC, 4A 30 VDC (resistive)

Dimensions:

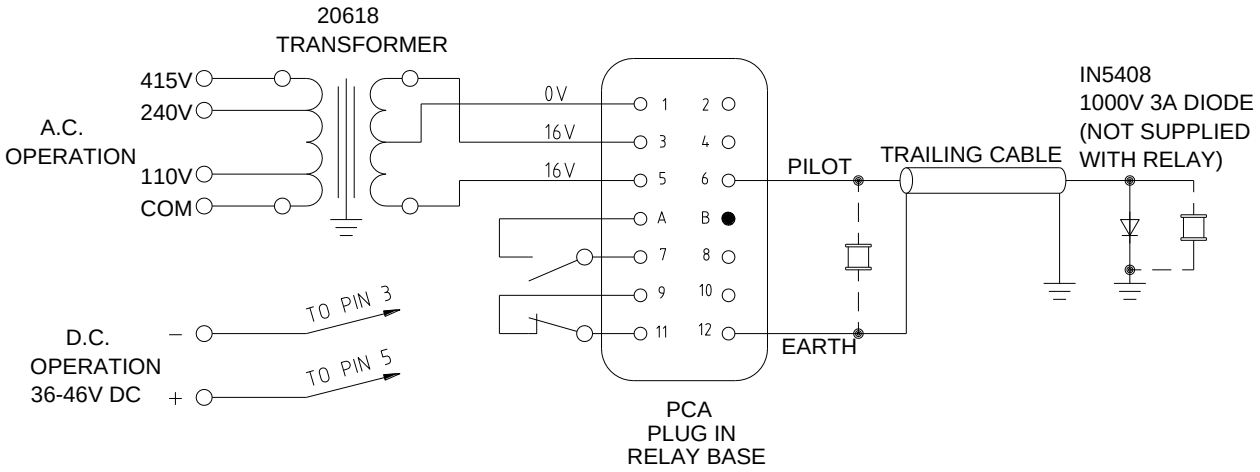
Enclosure with front connected base:
107 H x 52 W x 134 D mm

20618 Transformer
75 H x 75 W x 65 D mm

5. Equipment List

E07114	PCA Pilot Control Relay
E01960E	PCA Relay Base
E00876	Type 20618 Transformer. Primary 415,240,110 volts. Secondary 16-0-16 volts, 30VA
E04357	90V/20kA Gas Discharge Tube

TYPICAL CIRCUIT



NOTES

1. THE END OF LINE DIODE MUST BE CONNECTED IN THE DIRECTION SHOWN.
2. FOR DC OPERATION CONNECT +ve PIN 5,-ve TO PIN 3.
3. INSTALLATION OF A GAS DISCHARGE DEVICE ACROSS THE DIODE AND RELAY IS RECOMMENDED IF LONG CABLES ARE INSTALLED.