164-740-800

2P740 Phase Fail Relay

Product Test Procedure

Version Control

Issue	Date	Summary of Changes	Author
A	10/07/2007	Initial Release	ERL
B	30/06/2008	Update test description	MVL
C	11/07/2008	Update for surface mount design	MVL

Author	Checked and Registered	.pdf file created	Released
MVL	DG	DG	David Greenwood Digitally signed by David Greenwood DN: CN = David Greenwood, C = AU, O = RMS Reason: Document is released Date: 2008.08.13 14:00:28 +10'00'

1. DESCRIPTION OF OPERATION

The 2P740 is designed to provide an alarm if any of the incoming voltage supplies are lost or an under voltage condition exists. The relay will remain in the dropped out condition until the faulted phase returns to normal or the under voltage condition is removed. **Note that the revision C test procedure was developed for new 660-377 surface mount PCB design. For earlier 2P740 version using through-hole parts (690-207 PCB) refer to revision B.**

2. SPECIFICATIONS

660-377-401 ..... 415V AC 50 Hz
660-377-402 ..... 110V AC 50Hz
660-377-403..... 440V AC 50 Hz
660-377-404 ..... 240V AC 50Hz

Undervoltage	70-80% of nominal (factory set during calibration)
Normal Pick Up	All phase-phase voltages rise above 87.5% ±2.5%
Pick Up after drop out	Reduced phase-phase voltage pick up again at 90% ±2%
Phase Imbalance	5 to 15% ±2% of nominal voltage expressed as a phase to phase voltage difference as a percentage of nominal voltage when two phase to phase voltages are reduced equally with the third at nominal voltage.
Time Delay (if fitted)	2 seconds

3. TEST EQUIPMENT REQUIRED

Three Phase adjustable supply
Digital Multimeter

4. ASSOCIATED DRAWINGS

660-377-20x	Circuit Diagram
660-377-30x	Loading Diagram

5. HIGH VOLTAGE TESTING

a) Apply 2kV 50Hz test for 1 minute between terminal Groups A and B.

b) Apply three 5kV 1/50 impulses of each polarity between terminal Groups A and B.

Group A	**Group B**
Inputs	Outputs

6. CALIBRATION & TEST PROCUDURE

a) Connect the DVM between TP101-3 and TP101-1 with range set to 100V.

b) Adjust R103, R108, R114 & R123 fully clockwise and R121 fully anti-clockwise. Install J112 in “INST” position.

c) Apply nominal 3 Phase volts to the 2P740 as per the connection label. The output relay should be picked up.

d) Check for ~30VDC at TP102-2.

e) Check that the 'Supply Normal' LED is also enabled. Press each phase drop out button on the three- phase control equipment (BLUE, YELLOW, and RED) and confirm that the LED is disabled.

f) Adjust Balance trimpot (R103) anti-clockwise for a minimum reading between TP101-3 and TP101-1.

g) Connect the DVM between TP102-5 and TP102-1 with range set to 20V. Decrease Red phase so that the RED-YELLOW line voltage is 85% of the normal line voltage. Adjust trimpot R108 anti-clockwise so that TP102-5 gives a maximum reading.

h) Set front panel potentiometer to 15% (fully anti-clockwise). Relay should be picked up. Adjust R121 clockwise until the relay drops out. Increase red phase and check that the relay picks up at between 88 and 92% of normal line voltage.

	110V AC	240V AC	415V AC	440V AC
Drop-out	93.5	204	353	374
Pick-up	96.8 – 101.2	211.2 – 220.8	365.2 – 381.8	387.2 – 404.8

i) Increase Red phase so that the RED-YELLOW line voltage is 95% of the normal line voltage. Set front potentiometer to 5% (fully clockwise). Relay should be picked up. Adjust R123 anti-clockwise until the relay drops out. Increase red phase and check that the relay picks up at between 95.75 and 97.5% of nominal line voltage.

	110V AC	240V AC	415V AC	440V AC
Drop-out	104.5	228	394.5	418
Pick-up	105.4 – 107.3	229.8 - 234	397.4 – 404.6	421.3 - 429

j) Set the three phase supply to the nominal line voltage. For 80% under-voltage dropout, decrease all three phases slowly to 80% of nominal voltage (relay should be picked up). Adjust trimpot R114 anti-clockwise until the relay drops out. Slowly increase all voltages until the relay picks up. Check that the relay picks up at between 84 and 92% of nominal line voltage. Return all phases to normal line voltage.

	110V AC	240V AC	415V AC	440V AC
Drop-out	88	192	332	352
Pick-up	92.4 – 101.2	201.6 – 220.8	348.6 – 381.8	369.6 – 404.8

k) For 70% under-voltage dropout, decrease all three phases slowly to 70% of nominal voltage (relay should be picked up). Adjust trimpot R114 anti-clockwise until the relay drops out. Slowly increase all voltages until the relay picks up. Check that the relay picks up at between 73 and 81% of nominal line voltage. Return all phases to normal line voltage.

	110V AC	240V AC	415V AC	440V AC
Drop-out	77	168	290.5	308
Pick-up	80.3 – 89.1	175.2 – 194.4	302.9 – 336.2	321.2 – 356.4

l) Place link on J112 position 1-2 for time delay (relay should be picked up).

m) Slowly decrease red phase until LED just extinguishes. Relay should drop out 2.2 – 2.8 seconds later. Remove link on J112.

7. GENERAL & FUNCTIONAL

Check that the relay is electrically sound and mechanically robust as per Standard Inspection & Test Schedule 903-000-026.