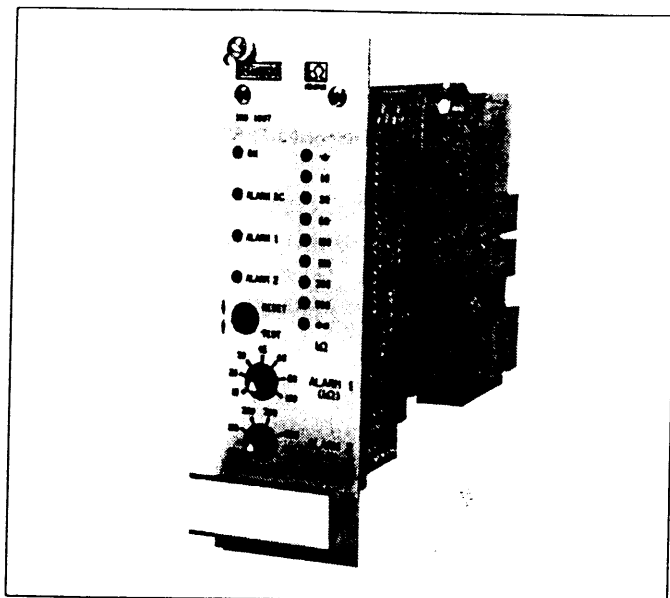




for unearthed single and three phase networks without
directly connected DC-loads



Product description

The A-ISOMETER IRD1007 (L)(M) monitor the insulation resistance of unearthed single and three phase AC networks (IT networks) up to 50 ... 400 Hz 500 V. For systems with higher nominal voltages, a coupling device can be connected to the terminal a2.

The device is supplied by the network to be monitored or any other independent power supply.

For the application in earth fault detection systems, the device is equipped with a measurement suppression as well as an optocoupler output. The response values are independently adjustable. If the insulation falls below the set response value, the fault will be indicated by LEDs and separate output relays.

In order to avoid complex network conditions, DC supplied components should be separated galvanically from the network to be monitored. Note that DC faults are indicated with an increased response sensitivity. The preset response values apply to the pure AC system only.

For systems with high leakage capacitances, the devices are equipped with an adjustable power-on delay. The output relays are also activated with a response delay and the faults can be indicated by flashing.

The devices are designed as a plug-in Euro card module. IRD1007L is equipped with a k Ω -LED bar graph indicator, type IRD1007M is equipped with a k Ω analog ohmmeter.

Function

A DC measuring voltage is superimposed on the network by the device. One pole is connected to the network via the contacts e2, e6, e10 while the other pole is connected to earth by means of an electronic measuring circuit and the terminals a16 and a32. The measuring circuit is closed via ohmic insulation faults.

If the insulation falls below the set response value, either the alarm LED <ALARM 1> or the LEDs <ALARM 2> and <ALARM 2> will illuminate and the output relays K1 or K1 and K2 are activated. If the switches S5, S6 are open, the faults will be indicated by flashing LEDs and relays.

The internal ohmmeter will indicate the system insulation level to earth in k Ω . The response to DC faults depends on the system voltage being monitored. The faults are signalled by the LEDs <ALARM DC> and simultaneously the output relays are energized.

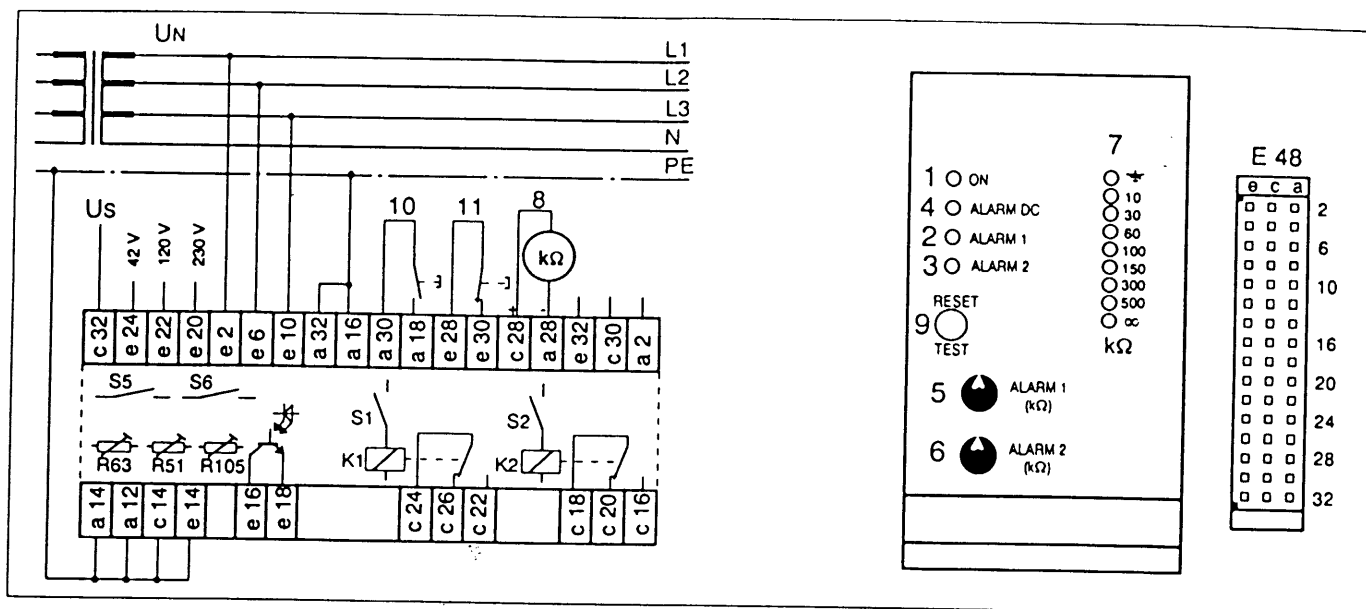
The fault indication can be stored by connecting a bridge between the contacts e28 and e30. If a button (n.c. contact) is connected between the contacts e28 and e30, the memory can be reset by pushing the reset button provided that the insulation resistance exceeds the selected response value by 25%. The memory can also be reset by pushing the <test/reset> button on the front of the device.

When the contacts c30/e32 are bridged, the measuring value remains stored. If the measurement suppression is activated, it will be indicated by the flashing operation LED.

When pushing the test button, the function of the measuring circuit, the alarm LEDs and the output relay can be tested.

- ⇒ insulation monitor for unearthed single and three phase networks (IT networks) up to 50 ... 400 Hz 500 V
- ⇒ operation and alarm LEDs
- ⇒ alarm LED for DC faults
- ⇒ two steplessly adjustable response values
- ⇒ steplessly adjustable response delay
- ⇒ steplessly adjustable power-on delay
- ⇒ two separate output relays with each one change-over contact
- ⇒ principle of measurement: superimposed measuring DC voltage

Wiring diagram



Legend to wiring diagram

- | | | | |
|----|--|----------|---|
| 1 | operation-LED, green, flashing if c30, e32 is closed | e16, e18 | optocoupler output, not floating, switches together with K1, flashing if S5 is off. |
| 2 | alarm LED, red, indicating earth fault >ALARM 1< | a2 | connection for coupling device |
| 3 | alarm LED, red, indicating earth fault >ALARM 2< | c30, c32 | measurement suppression |
| 4 | alarm LED, red, indicating DC earth faults | | |
| 5 | adjustment potentiometer >ALARM 1< | | |
| 6 | adjustment potentiometer >ALARM 2< | | |
| 7 | built-in kΩ indication | | |
| 8 | external kΩ meter | | |
| 9 | test and reset button | | |
| 10 | external test button, as required | | |
| 11 | external rest button, as required | | |
| K1 | output relay K1 >ALARM 1< | | |
| K2 | output relay K2 >ALARM 2< | | |

Adjustments on the printed circuit board

- R63 response delay K1 <ALARM1>
R51 response delay K2 <ALARM 1>
R105 power-on delay
S1, S2 selector switch N/O / N/C operation
S1 "1" = N/O operation K1 (relay energizes)
S1 "2" = N/C operation K1 (relay deenergizes)
S2 "1" = N/O operation K2
S2 "2" = N/C operation K2
S5, S6 switch for flashing indications
S5 off = K1 flashing
S6 off = K2 flashing

Key to the different types of device

Type	Rated mains voltage U_N	Supply voltage U_S	Internal DC resistance R_i acc. to VDE 0413	Response value R_{AN1}	Response value R_{AN2}	Max. stray voltage
IRD1007-2	0 ... 400 V	230/120/42 V	10.5 kΩ	1 ... 10 kΩ	10 ... 100 kΩ	230 V
IRD1007-3	0 ... 500 V		25 kΩ	2 ... 20 kΩ	20 ... 200 kΩ	
IRD1007-4		500 V	100 kΩ	10 ... 100 kΩ	100 kΩ ... 1 MΩ	500 V
IRD1007-5			200 kΩ	20 ... 200 kΩ	200 kΩ ... 2 MΩ	
IRD1007-6			1 MΩ	100 kΩ ... 1 MΩ	1 ... 10 MΩ	

Ordering details

	Type -2	Type -3	Type -4	Type -5	Type -6
IRD1007L-	913 559	913 571	913 543	913 574	913 587
IRD1007M-	913 558	913 564	913 542	913 573	913 586

Right to modifications reserved

IRD1007MY - INSTALLATION & SERVICE INSTRUCTIONS

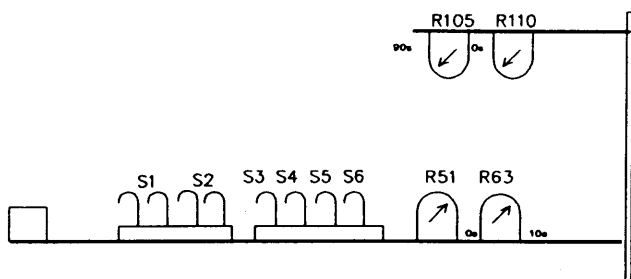
The **A-Isometer IRD1007** is used for insulation monitoring in floating (IT) single, or three phase circuits, including long cables with high leakage capacitance values. This unit operates by placing a DC signal onto the cable, to provide fast, safe and precise insulation measurements to be obtained in AC networks, faults on directly connected DC circuits are also detected.

The IRD1007MY-4 (6) insulation monitors are designed for operation in AC networks of 0 - 500Volts 50-400Hz, higher voltage operation is possible by the addition of high voltage coupling units. A Bender AGH204S high voltage coupling allows operation to AC 1.5KV 50-400Hz and a AGH520S coupling to 6KV 50-400hz. These high voltage coupling units are high impedance devices, designed to block the network high voltage from the monitoring unit whilst allowing the safe connection of the monitoring signal onto the network.

The IRD1007 Units are of a Eurocard PCB construction 160mm X 100mm size with a 3U X 8 te (hp) front plate and a DIN 41612 E48 edge connector.

PCB LAYOUT

SWITCH AND POTENTIOMETER LOCATIONS



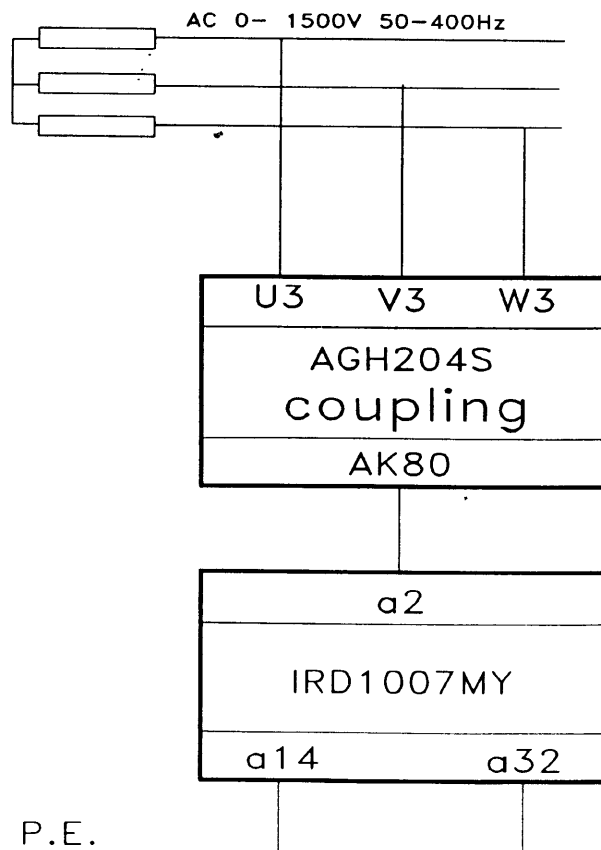
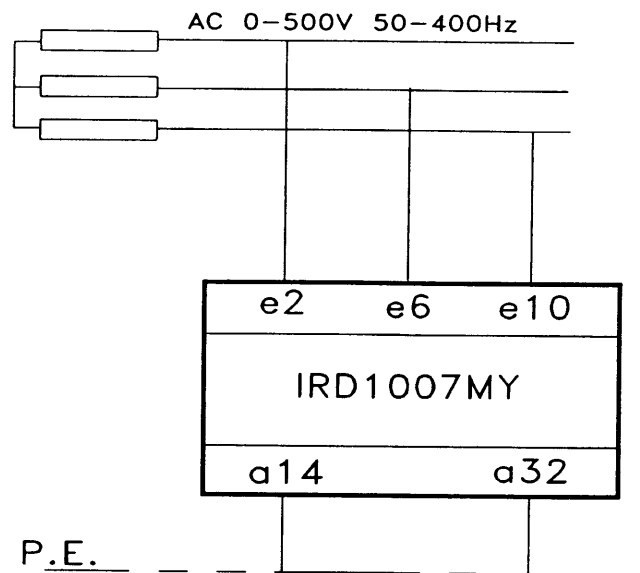
Full connection details are provided on the Bender data sheet 1.4/7.1 and also **BENDER UK LTD.** Drawings SL00121 - SL00124 . For connection information for systems supplied in front panel enclosures or 19" racks please contact **BENDER UK LTD.**

1. Mains Connections -

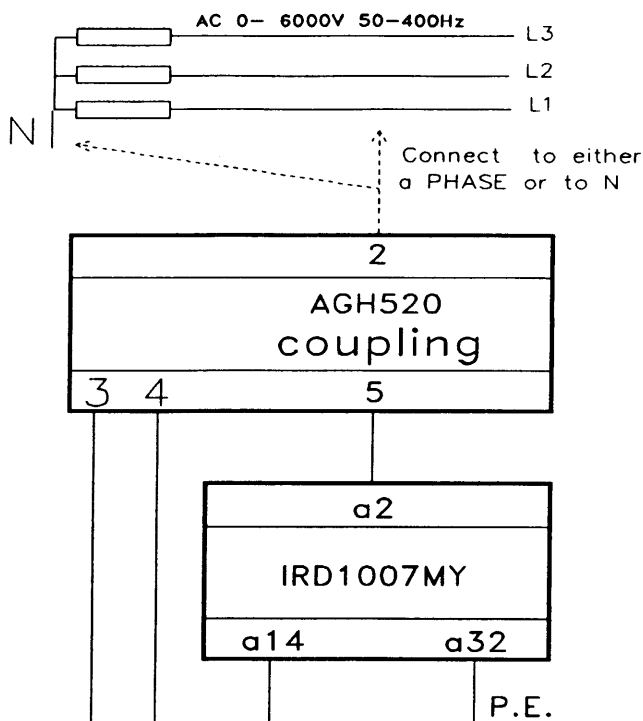
The IRD1007MY monitors require direct connection to networks of 0-500V, from terminals e2, e6 and e10. When the monitor is used with a high voltage coupling, monitor connection a2 (AK) is to be connected to the high voltage coupling (AGH204S connection AK80 or AGH520S terminal 5), the coupling is then in turn connected to the high voltage network (AGH204S terminals u3,v3 and w3 or for the AGH520S terminal 2). The AGH204 coupling is a Din Rail mounting case 110mm W x 10mm D x 72mm H and the AGH520S is a cast resin unit 220mm W x 170mm H x 81 Deep.

Note :The terminal shrouds provided with the high voltage couplings must always be fitted.

Insulation Monitor Network Sensing Connections



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2. Auxiliary Excitation

The IRD1007 is designed for universal excitation and can accept 42Volts terminals: c32-e24, 120 Volts terminals: c32-e22 and 230 Volts terminals: c32-e20. The IRD1007 will operate accurately on 50Hz or 60Hz auxiliary supply with a Voltage range of 80% - 115%V.

3. Earth Connections

The IRD1007 has earth connections on a32, a16, a14, c14, e14 and a12, these terminals may be linked together and wired back to the main earth bar. Two earth connections are also provided on the AGH520S coupling, terminals 3 and 4 both of these are to be separately connected to earth, for safety.

4. Test and Reset Functions

An integral insulation monitor TEST switch is fitted to the front cover plate, in addition a Remote Test Switch may also be installed. A remote test switch must be a spring return N/O switch, this operates in parallel with the built-in test button and is to be connected between terminals a30- a18.

The IRD1007 alarm relays K1 and K2 may be set for auto or hand-reset following fault repairs. To set for auto-reset, adjust the PCB switches S3 and S4 to open and for hand

reset to closed. For hand-reset it is also necessary to either link terminals e28 - e30 or to install a remote reset switch, in series with e28-e30. The Remote Reset switch must have a spring return N/C contact.

5. Remote K-Ohm Meter

This should be connected between terminals c28-a28 with correct polarity. The type reference of the standard 72mm square instrument for the IRD1007MY-4 is MET/72/120K and the IRD1007MY-6 is a MET/72/1.2M

Potentiometer R110 is provided on the IRD1007 PCB to allow adjustment of the analogue output FSD, to set this up the IRD1007 must be installed on a PCB extender card and a zero ohm test fault must be placed across the insulation monitor (see procedure in section 12 - Bench Testing) , R110 is then adjusted to give 400uA output from c28-a28 into a uA meter .

6. Trip Contacts

The alarm relays K1 and K2 each have SPCO trip contacts, rated at 230 Volts, 440VA, 2A continuous rating. Always keep the load to a minimum to obtain optimum reliability and life.

7. Active / Fail Safe Operation

The IRD1007 monitor alarms may each be individually set for active or fail-safe operation via the S1 and S2 selector switches which are located on the PCB.

Selector switches S1 and S2 :

Position 1 - K1 & K2 Relays Normally open, close on fault - ACTIVE SETTING

To position 2 - K1 & K2 relays Normally closed, open on fault / excitation failure
- FAIL-SAFE SETTING

8. Monitoring Principles

The IRD1007MY insulation monitor uses a 15 Volt DC monitoring voltage superimposed between the system and earth. The maximum monitoring current is 125 uA (MY-4 model) or 63uA (MY-6 model) on a Zero Ohm fault.

The operation of this system is extremely rapid taking less than one second to respond to low capacitance network faults, however for higher capacitance systems time adjustment facilities are provided.

There are three time adjustments on the IRD1007 monitors :

IRD1007MY - INSTALLATION & SERVICE INSTRUCTIONS

R105 - 0-90 Sec's this is provided, to allow for the initial network capacitance charging period required by the insulation monitor measuring signal.

R51 - Alarm 1, 0-10 Sec's Main Alarm delay setting

R63 - Alarm 2, 0-10 Sec's Pre-Alarm delay

Both R51 and R63 are provided for large distribution system installations, where significant sections may be switched in normal operations causing charge -discharge of capacitance, which may give rise to nuisance alarms, in offshore umbilical applications these time delays are set to zero.

9. Megger Tests

The insulation monitor forms the first fault on the system. The insulation monitor could be damaged by a megger or DC pressure test (see data sheet for maximum DC stray voltage level) and must always be disconnected before this is carried out.

10. Adjustment Range

The Main Alarm/Trip setting is steplessly adjustable from 10 - 100 K, 100 to 1000 Kohms for the MY-4 and 100 - 1000K, 1000K -10 Megohms for the MY-6 model. Insulation resistance is measured in Megohms but earth faults are invariably in Kilohms.

11. Unit Testing

We recommend that each Insulation Monitoring System is tested with a genuine resistor connected between the system and earth during commissioning. This must be carried out in a safe manner with the high voltage supply safely isolated and all local safety precautions must be observed.

12. Bench Testing

If an insulation monitor is suspected of being faulty, the unit and couplings may be simply bench tested (away from the network).

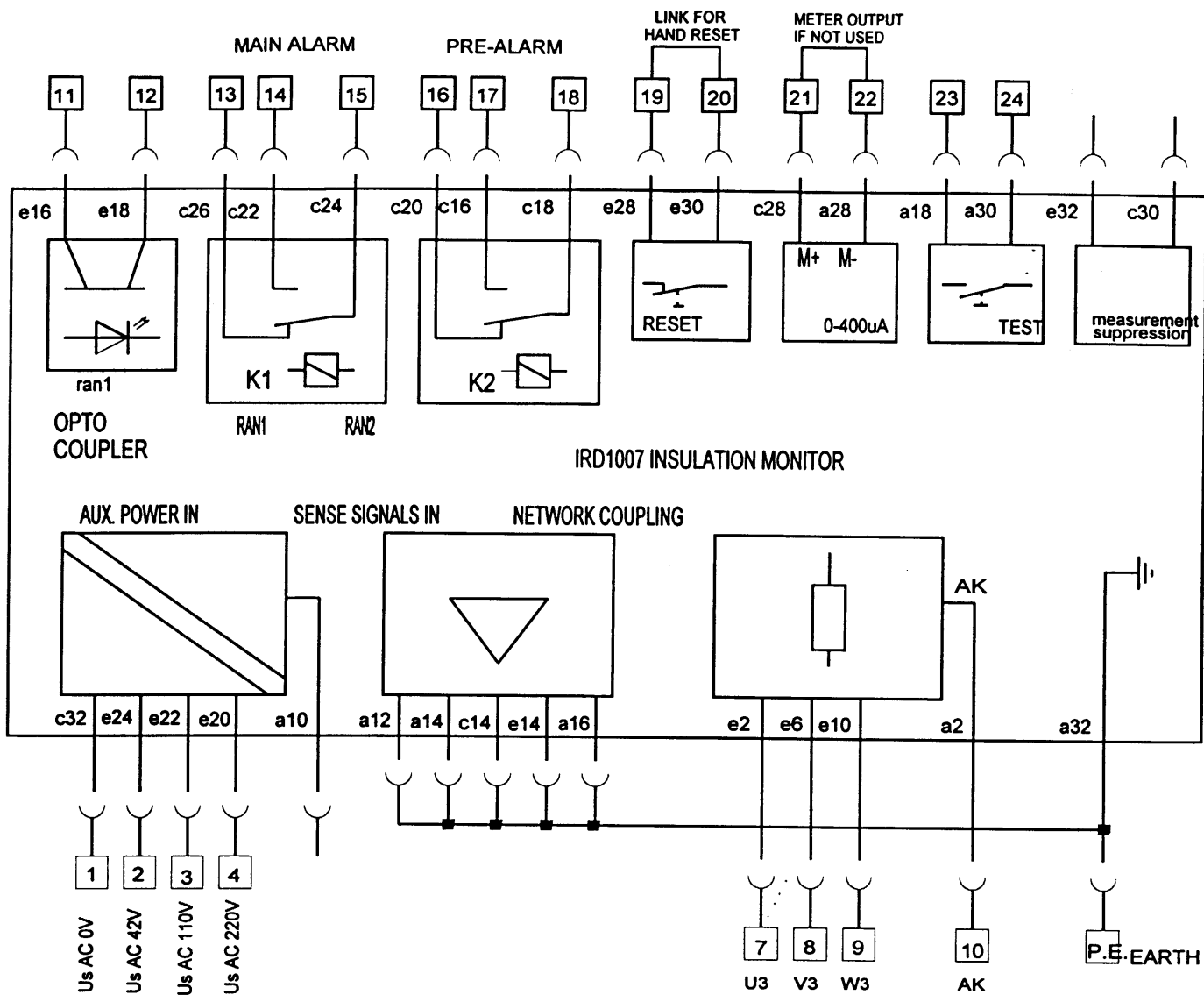
Care should be taken when bench testing to ensure that all the necessary safety precautions are observed.

To test a monitor alone link e2-e6-e10 together and connect a test resistor (see below) between this link and earth. If an IRD1007 is used together with a AGH204S

coupling connect the IRD1007 and coupling together and link u3-u3-v3-w3 on the coupling, then connect a test resistor between this and earth and for an IRD1007 with AGH520S, link the units together and then connect a test resistor between AGH520S terminal 2 and earth.

When the test resistor is connected adjust the response adjusters R1 and R2 to minimum, energise the IRD1007, allow a 3-5 seconds and read the Kohm meter, this should indicate the test resistor value. Slowly adjust the trip settings upto the resistor value, an alarm should be raised when the resistor value is reached. If this does not occur, return the unit to the manufacturer.

Please note that this unit will also read earth faults on the external test / reset and remote meter circuits if connected, therefore if there is any doubts about the integrity of these sections of circuit, please disconnect when testing the unit.



NOTES:

TERMINAL NUMBERS 4 ARE FROM BUK 1 ENCLOSURE TERMINAL IDENTs

Refer to the Bender Data sheet - 1.4/7.1
IRD1007 for external wiring connections

1	03/06/97
Issue	Date

SPECIFICATIONS	CONTRACT NO.	DATE	Bender UK Ltd	Unit 43 Trinity Enterprise Centre, Furness Business Park Barrow-in-Furness, Cumbria, LA14 2PN Tel 44 (0) 1229 821713, Fax 44 (0)1229 871788
	DESIGNED BY J Murray	03/06/97		
	CHECKED BY 7			Bender BUK1 (ex- AG1/RG300) Insulation Monitoring System Front Panel Mounting Case
	INSTALLED BY		SD7	BD00023