

January 1998	Arc detecting relay system	CAMTO
Revised August 2002		601D0100 - 601D1200

NEW ARC DETECTING SYSTEM FROM CAMTO

Based on our experience with arc protection since 1962, CAMTO has developed a new system. The system units are built into boxes that all fit on a 35 mm DIN-rail. All front plates are dimensioned to fit into the 45 mm slot in the cover plates of a DIN-system.

The system consists of several different units so that the function of the arc detecting relay can be made dependent of simultaneous overcurrent. It is also possible to trip a back-up breaker further back in the supply. This happens with a time delay of 50-150 mSec., if there is remaining arc and overcurrent after the installation's supply breaker is supposed to have cleared the fault.

This provides an extra security in the case of malfunction of the supply breaker or if the arc has spread to the supply side of the breaker.

The arc detectors consist of two silicon solar cells encapsulated in transparent polyester. The detectors are supplied in two types with different directional sensitivity to light. Both types are delivered with 5 metres of screened cable and a mounting bracket as well. The arc detectors - 601A0200-01 and 601A0300-01 - are identical to those formerly used in connection with our earlier arc detecting relays.

The system is designed for DC-supply from a station battery. The battery voltage can be from 48Vdc to 220Vdc. For usage in installations with AC-supply an AC/DC power supply with NiCd back-up battery is available. For simple installations - without current dependency etc., - an Arc D-tect relay for 220-250Vac only - 601D0900 - is available.

The system consists of the following units:

601D0100	Arc detecting relay 48-220Vdc. 24Vdc optional.
601D0400	Junction box for parallel connection of up to 8 detectors.
601D0500	As 601D0400, with indication for each detector.
601D0600	Power supply 220-250Vac/16Vdc with 12V NiCd back-up battery.
601D0700	3-phase overcurrent relay, 1.5-3.0 x 5A, 48-220Vdc supply.
601D0800	Time relay 50-150 mSec. for trip of back-up breaker.
601D0900	Arc detecting relay 220-250Vac, 66 µF capacitor trip.
601D1100	Diode logic for max. 3 relays and max. 3 circuit breakers.
601D1200	Capacitor trip unit, 220-250Vac/300Vdc, 66 µF.

All units conform to: EN50081-1/2 and EN50082-1/2 (EMC-directive) and are CE-labelled.

ARC DETECTING RELAY 601D0100

The relay is designed to monitor up to 16 arc detectors in parallel. In case of an arcing fault at one or more detectors, the relay almost instantaneously generates a tripping pulse to the circuit breaker(s) supplying the installation. The delay is less than 1 mSec.

The arcing time is thus reduced to the mechanical opening time of the circuit breaker, reducing personal injury as well as damage to the installation.

The relay is completely solid state with complete isolation between input and output. Thus the relay can operate on one pilot voltage and the circuit breaker can have another pilot voltage. It is of course

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possible to use the same voltage for both purposes, but in that case input and output are connected via the power supply.

The factory setting of sensitivity is 6 mA of detector output current to cause trip. This is equivalent to a light intensity of 12,000 lux on a single detector, 6,000 lux on each of two detectors, 4,000 lux on each of three detectors etc. Another way to put it is that the total light intensity on all detectors installed has to exceed 12,000 lux to cause a trip. With 16 detectors equally lighted the breaker will trip at 750 lux. This is close to normal room lighting, and this is the reason why it is not recommended to use more than 16 detectors per relay.

The sensitivity is adjustable within 1-12 mA or 2,000 – 24,000 lux by means of a “SENS.ADJ.” button on the front plate. As mentioned the factory setting is 6 mA/12,000 lux.

The relay has a green LED “POWER” indicating that supply voltage is on and a red LED “TRIP” indicating that the relay has tripped on an arcing fault. The red LED remains turned on until a “RESET” button is pushed. The reset button does **NOT** reset relays and lamps - if any - connected to the output of the relay. (Please see later.)

The relay has a key switch with two positions. “ACTIVE” is used for normal duty and in this position the key can be removed. In “TEST” position the relay can be tested without tripping the circuit breaker as the output signal is turned off. In this position the key cannot be removed.

Relays and lamps on the output of the relay can be reset by temporarily turning the key to “TEST” and back to “ACTIVE”, or it can be done by interrupting the DC-supply by means of an external push-button switch.

The relay has two free contacts for remote signalling. One - terminals 9/10 - closes on trip from an arcing fault. The contact latches and it can be reset by pushing the “RESET” button. The other contact - terminals 11/12 - closes when the key is turned to “TEST”. It also closes if the supply voltage is missing - regardless of the position of the key

The relay has two terminals - 15/16 - for blocking from the overcurrent unit. The relay is blocked unless the overcurrent unit is signalling an overcurrent. If the connection to the overcurrent unit is cut off, e.g. by cable breakage, the blocking is cancelled and the relay will function regardless of the current. Furthermore the relay has two terminals - 13/14 - for controlling the time unit for back-up breaker trip. The use of these terminals is shown on drawing 601D1210.

DATA

Supply voltage	48-220Vdc or 16Vdc from AC/DC power supply. Special version 601D0100-01 is for 24Vdc only.
Sensitivity	Factory setting: 6 mA of input current causes trip. This is equivalent to 12,000 lux in total on all detectors connected to the relay.
No. of detectors per relay	Max. 16 pcs. is recommended. The number depends on ambient light intensity - open or enclosed installation - and sensitivity setting.
Time delay	Max. 1 mSec. after start of arcing.
Dimensions	Width: 106 mm. Height incl. terminals: 90 mm. Depth to base plate incl. DIN-rail: 62 mm without key, 77 mm with key in place. Depth from cover plate to base plate incl. DIN-rail: 50 mm.

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“POWER” on the front plate indicates that 220Vac is present and that the built-in 12V NiCd back-up battery is kept charged.

If 220Vac is disconnected the green light turns off and a red LED “ACTIVE” is turned on, indicating that the back-up battery is now supplying 12Vdc to the connected units. The 12Vdc can be turned off.

This is **NOT** enough to ensure functionality of the units, but it is sufficient to maintain turned on LED indications from Arc D-tect relay, junction boxes and time unit for back-up breaker for some time. A typical installation using this unit is shown on drawing 601D0614.

DATA

Supply voltage	220-250Vac 50-60Hz to terminals 9-11 or 10-12.
Output voltage	16Vdc terminals 1/3 and 2/4. Terminals 3 & 4 are positive.
Indications maintained	1-2 hours, depending on the number of LED’s turned on.
Dimensions	As for 601D0100 except that this unit has no key.

OVERCURRENT RELAY 601D0700

This unit is a 3-phase overcurrent relay. It operates if the set current is exceeded and activates a start contact. The current setting range is 1.5-3.0 x 5A. Setting is done by means of a front plate button “CURRENT ADJ”. The factory setting is 2.0 (=10A) The unit is power supplied from 48-220Vdc on the terminals 7 & 8 plus on 7. A green led “POWER” indicates that the supply voltage is present. The unit supplies the time unit for back-up breaker 601D0800 as well.

Each time the set current is exceeded a red LED “TRIP” turns on and an output relay activates. The relay contact - closed during normal function - cancels the blocking of the Arc D-tect relay each time the output relay activates. As the relay contact is a normally closed contact, a disconnection to the Arc D-tect relay (cable breakage) automatically cancels the blocking of the Arc D-tect relay. When the output relay is activated a signal is sent to the time unit for the back-up breaker, but this unit remains inactive unless a simultaneous signal from the Arc D-tect relay indicates a remaining arc.

Thus both overcurrent and remaining arc must be present to trip the back-up circuit breaker.

Neither the relay nor the LED latch but “follow” the current above and beneath the current set. The unit is connected as illustrated in drawing no. 601D0714. Please refer to drawing no. 601D1210 as well.

It should be noted that the use of the overcurrent relay increases the total arcing time with the reaction time of the overcurrent relay which is 20-30 mSec.

DATA

Supply voltage	48-220Vdc on terminals 7-8, positive on 7, or 16Vdc from AC/DC supply 601D0600 on terminal 15 & 8, positive on terminal 15.
Current level	Setable 1.5-3.0 x 5A. Factory setting is 2.0 x.5A (10A).
Reaction time	20 - 30 mSec.
Dimensions	As for 601D0100 except that this unit has no key.

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TIME UNIT FOR BACK-UP BREAKER 601D0800

The unit is designed to trip a back-up breaker further back in the supply if the tripping of the installation's supply breaker for some reason should fail on an arcing fault. In order to trip the back-up breaker two criteria must be fulfilled simultaneously: The overcurrent relay must send a signal to terminal 9 and an output from the Arc D-tect relay must be received on terminals 1 & 2, both at a time where the arc should be turned off and the overcurrent should have stopped since the Arc D-tect relay is supposed to have has tripped the supply circuit breaker.

If the back-up breaker has been tripped a red LED "TRIP" is turned on. It latches and remain on until a "RESET" button is activated. Like the Arc D-tect relay this unit has a key-switch allowing the system to be tested without tripping of the back-up breaker. And as on the Arc D-tect relay the key cannot be removed when it is in "TEST" position.

WARNING: When a test has been made with the key in "TEST" , the **"RESET" button must be activated before** the key is turned back to "ACTIVE". Otherwise the back-up breaker will be tripped when the key is turned back.

The unit is connected to the rest of the system as illustrated in drawing no. 601D0814. Please refer to drawing no. 601D1210 as well.

To secure that the back-up circuit breaker is tripped if the arc has spread to the supply side of the incoming circuit breaker, the current transformers for the overcurrent relay must be placed on the supply side of the incoming circuit breaker.

DATA

Voltage supply	Supplied from terminals 15-16 of the overcurrent relay, to terminals 5-6. Terminal 15 to 5 and terminal16 to 6.
Time delay	Factory setting is 100 mSec, but the unit can be ordered with another setting in the range 50 - 150 mSec. The setting should be at least 20 mSec. above the circuit breakers opening time.
Dimensions	As for 601D0400. This unit has a key and the total height over base plate incl. DIN-rail is 77 mm.

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ARC DETECTING RELAY 601D0900 FOR AC

This relay is designed for use in installations without a DC-supply (station battery) and it is supplied from the mains 220 - 250Vac.

Since the AC voltage is likely to disappear when an arcing fault develops, the relay has energy stored in a storage capacitor charged with a dc-voltage to trip the circuit breaker. The trip energy stored is sufficient for all known circuit breakers with a 220/250Vac shunt trip coil.

The storage capacitor is an extremely long-life electrolytic capacitor. In the mode of operation used - charged with dc and no ripple - it has a specified life time of more than 30 years at an ambient temperature of max. 50°C . (121°F.)

An electromagnetic indicator for relay operation is installed on the front of the relay together with a green LED indicating that power is on.

During normal operation the red push-button of the indicator is nearly flush with the front plate surface, but on trip the button jumps out 5-6 mm. This disconnects the AC-voltage to the relay and the green LED turns off. Reset is done by pushing the button down until it latches magnetically.

The indicator has a free contact that closes on trip. It is connected to terminals 9-10 and it may be used for remote indication of relay trip.

With the normal version which disconnects the AC voltage on trip, there is no arc protection until the relay has been reset by pressing down the red button. A special version which **does not** disconnect the AC voltage on trip is available on order. When using this version the arc protection is restored when the AC voltage comes back even if the relay has not been reset. The special version has the number 601D0900S.

The relay has a key switch with two positions. "ACTIVE" is for normal operation and in this position the key can be removed. In "TEST" position the relay can be tested without tripping the circuit breaker as the output signal is turned off. In this position the key cannot be removed.

A free contact connected to terminals 11-12 closes when the key switch is in "TEST". It also closes if the AC voltage to the relay is missing, regardless of the position of the key.

The relay can be used in the same manner as the DC-relay 601D0100, but it **cannot** be used together with the indicating junction box 601D0500 since no power for the indicating LED's is available after a trip.

Drawing 601D0914 is illustrating the use of the relay together with junction box 601D0400.

CAUTION: Dangerous voltage is present at the storage capacitor even after the relay has been disconnected from the mains. The capacitor has a self-discharge circuit which will discharge it to a safe voltage level within 2 minutes after disconnection from the mains.

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DATA

Supply voltage	220-250Vac, 50-60Hz.
Sensitivity	Factory setting: 6 mA of input current causes trip. This is equivalent to 12,000 lux in total on all detectors connected to the relay.
No. of detectors per relay	Up to 16, depending on sensitivity setting of the relay and ambient light conditions.
Tripping energy	66 μ F capacitor charged to 300Vdc. Energy: 2.97Ws (Joule)
Free signal contacts	1: Terminals 9-10: Closes on trip. 2: Terminals 11-12: Closes on key switch in "TEST" or if AC voltage is missing, regardless of the key position. Max. rating: 250V/1A ac/dc 50W.
Dimensions	As for 601D0100.

DIODE LOGIC 601D1100

For installations with more than one Arc D-TECT relay and/or more than one circuit breaker a diode logic unit is available.

The unit has three input diodes to handle the outputs of three Arc D-TECT relays and three output diodes to handle the trip coils of three circuit breakers. If more than three relays/circuit breakers are needed, more units can be added by connecting terminal 8 of one box to terminal 4 of the next one, thus increasing the number of inputs and outputs with multiples of three. The unit is shown on drawing 601D1114.

DATA

Diodes	1000V reverse voltage, 3A continuous, 25A for 1 Sec.
Dimensions	As for the rest of the units except that width is only 17 mm.

CAPACITOR TRIP UNIT 601D1200

This unit has been designed to provide energy for tripping of the circuit breaker in installations where DC-units like the 601D0100 and the 601D0700 are supplied from the AC mains by means of a 601D0600 power supply. Please refer to drawing 601D0614.

The unit has a 66 μ F capacitor which is kept charged to 300Vdc by the AC supply voltage. In the case of an arcing fault the AC voltage will disappear and the energy stored in the capacitor can be used for tripping of the circuit breaker.

The unit has 2 green indicating LED's, one is for indicating that AC voltage is present, the other indicates that the capacitor is charged with DC voltage

The unit can also be used to increase the stored energy of an AC Arc D-TECT relay 601D0900 if several or extremely large circuit breakers are to be tripped. Please refer to application drawing 601D1216.

The unit is available with 132 μ F storage capacitor as well. The number is then 601D1200-01.

CAUTION: Dangerous voltage is present at the storage capacitor even after the unit has been disconnected from the mains. The unit has a self-discharge circuit which will reduce the voltage to a safe level within 2 minutes after disconnection from the mains.

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DATA

Supply voltage	220-250Vac, 50-60Hz.
Storage capacitor	66 μ F for 601D1200, 132 μ F for 601D1200-01.
Stored energy	2.97Ws (Joule) for 601D1200. 5.94Ws (Joule) for 601D1200-01.
Dimensions	As for 601D0100 except that this unit has no key.

FIELD TEST OF ARC D-TECT SYSTEMS.

Testing of a completed installation can be done with a 75W or 100W light bulb or a photoflash. The light bulb used should be a normal tungsten incandescent lamp. This one has a light- and heat radiation (infrared) that closely matches the sensitivity characteristic of the Arc Detector. The Arc Detector has its maximum sensitivity at a wavelength of 850 nanometers (10^{-9} m) which is in the infrared (invisible) range. In the middle of the visible region - at 550 nm - the sensitivity is down to approx. 50%. This means that both light and heat radiation from an arc contribute to the detector current that triggers the Arc D-TECT relay.

Halogen lamps should not be used because the light contains much more blue light and almost no infrared radiation. The maximum emission from a halogen lamp is in a region - 400 nm - where the sensitivity of the arc detector is down to 10-20% of its maximum.

If a photoflash unit is used it is essential that it is set to the "MANUAL" mode. If it is used in the "AUTO" mode, the light emission will be dependent of random reflections and it will change with the position from which it is fired. This is bad from a test point of view. In the "MANUAL" mode the light emission will be the same for each firing independent of firing position.

TEST A: ARC D-TECT RELAY 601D0100 - JUNCTION BOX 601D0400 - DETECTORS 601A0200 / 0300.

1. Switch on the supply voltage. The green LED marked "POWER" on the relay lights up.
2. Turn the keyswitch of the relay to position "TEST" in order to do tests without tripping the circuit breaker. The signal contact of terminals 11 - 12 on the relay closes. In this position the key cannot be removed.
3. Expose a detector to light by closing the light bulb to the detector until the red LED of the relay "TRIP" lights up. The signal contact of terminals 9 - 10 on the relay closes.
With the factory setting of sensitivity - 6 mA of detector current to trip the relay - a 75W bulb should be closed in to a distance of 5-10 cm from the detector in order to trigger the relay. A 100W bulb can be a little longer away from the detector.
A photoflash - in "MANUAL" mode - may be used for testing, but it is able to trigger the relay from a distance of at least 2 - 3 m, so it might be doubtful which detector is being tested.
4. Press the button "RESET" on the relay to extinguish the red trip LED. Contact 9 - 10 opens.
5. Repeat procedures 3 and 4 for all detectors installed.
6. Turn the keyswitch to position "ACTIVE". Contact 11 - 12 opens. The key may now be removed.
7. Close the circuit breaker. Repeat procedure 3 above. The circuit breaker will be tripped and the red trip LED will turn on. Repeat procedure 4 above. **The test is now finished.**

If AC voltage is used for tripping, the breaker may not trip using a photoflash. The light burst is too short, giving only a half cycle or less tripping voltage to the trip coil. Use the light bulb instead. This is a testing problem only. An actual arc will - of course - give a continuous light and heat emission.

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TEST B: ARC D-TECT RELAY 601D0100 - JUNCTION BOX 601D0500 - DETECTORS 601A0200 / 0300.

1. Switch on the supply voltage. The green LED's marked "POWER" on the relay and the junction box light up.
 2. Turn the keyswitch on the relay to position "TEST" in order to do tests without tripping the circuit breaker. The signal contact of terminals 11 - 12 on the relay closes. In this position the key cannot be removed.
 3. Expose a detector to light by closing the light bulb to the detector until the corresponding red LED on the indicator junction box just lights up. In this position, the red LED will extinguish if the bulb is moved away from the detector. If the bulb is moved closer to the detector, the relay triggers, the detector red LED latches, the yellow LED marked "TRIP" on the junction box and the red LED marked "TRIP" on the relay both light up. Contact 9 - 10 on the relay closes.
 4. Press the "RESET" buttons on the junction box and the relay to extinguish all LED's. Contact 9 - 10 on the relay opens. If two junction boxes are installed, both reset buttons must be pressed, even if no LED is lit on one of them.
 5. Repeat procedures 3 and 4 for all detectors installed.
 6. Turn the keyswitch to position "ACTIVE". Contact 11 - 12 opens. The key may now be removed.
 7. Close the circuit breaker. Repeat procedure 3 above. The circuit breaker will be tripped and the LED's mentioned under procedure 3 above will turn on. Contact 9 - 10 on the relay closes.
Repeat procedure 4 above. **The test is now finished.**
- Again a photoflash in "MANUAL" mode may be used for the tests, but the previous remarks still apply.

TEST C: OVERCURRENT RELAY 601D0700 AND ARC D-TECT RELAY 601D0100.

The 601D0700 is a 3-phase current relay with a setting range of $1.5 - 3.0 \times I_N$ (5A). The factory setting is $2.0 = 10A$.

1. Switch on the supply voltage. The green LED marked "POWER" lights up.
2. Connect a current source capable of delivering 0 - 15A ac-current to the current inputs. Input 1: Terminals 1 - 2, input 2: Terminals 3 - 4 and input 3: Terminals 5 - 6. Although the relay is a 3-phase relay, it can be tested single phase, so that a single phase current source connected to one ...of the current inputs is adequate. **Overcurrent can be simulated** by lifting the wire to terminal 13.
3. Increase the input current until the red LED marked "TRIP" lights up which means that the current setting has been exceeded. This happens when $I = 10A$ at the factory setting. It can be changed by means of the "CURRENT ADJ." on the front plate.
Decrease the current until the "TRIP" LED turns off.
4. Check that the contact at terminals 13 - 14 opens when the red LED lights up and that it closes again when the LED turns off.
This normally closed contact is used to inhibit the Arc D-TECT relay so that it cannot trip the circuit breaker unless the contact is open, i.e. the current setting is exceeded.
Being a normally closed contact, the inhibit of the Arc D-TECT relay will automatically be lifted if the cable between the units is disconnected or broken.
5. Increase the current until the red "TRIP" LED is turned on.
6. Perform TEST A or TEST B above. TEST A if a simple junction box 601D0400 is used, or TEST B if an indicator junction box 601D0500 is used.
7. Remove the input current and switch off the supply voltage. **The test is now finished.**

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TEST D: 601D0800 BACK-UP BREAKER TIME RELAY

This unit can only be tested in conjunction with 601D0100 Arc D-TECT relay and 601D0700 Overcurrent relay because it needs signals from both units to be able to operate.

1. Turn keyswitches on the 601D0100 and on the 601D0800 to position "TEST"
2. Switch on the supply voltage. Connect test current to the 601D0700 and exceed the set current level. Red "TRIP" LED on the 601D0700 turns on. **Overcurrent can be simulated** - see TEST C.
3. Expose a detector to light to trigger the 601D0100 Arc D-TECT relay. Red "TRIP" LED on the relay turns on. After a short delay the red "TRIP" LED on the 601D0800 time relay turns on and latches. The delay is factory set at 100 milliseconds. It can be changed by means of the "TIME ADJ." on the front plate. The range is 50 - 150 mS.
4. Press the reset buttons on both the 601D0100 Arc D-TECT relay and the 601D0800 Time relay to turn off both "TRIP" LED's.

It is essential to do this before next step. Otherwise the back-up breaker will be tripped when the keyswitches are turned to "ACTIVE"!!

5. Turn both keyswitches to position "ACTIVE". Close the main circuit breaker and the back-up circuit breaker.
6. Repeat test no. 3 above. The main circuit breaker will be tripped and the back-up circuit breaker will be tripped after the set delay.

Tests no. 3 and no. 6 cannot be made using a photoflash. The light burst is too short. The time relay needs a constant signal from the Arc D-TECT relay during the entire delay time, simulating that an arc is remaining after the main circuit breaker has been tripped. Use the light bulb.

7. Repeat step no. 4 above (reset). Remove the test current source, switch off the supply voltage and remove the keys. **The test is now finished.**

TEST E: ARC D-TECT RELAY 601D0900 - JUNCTION BOX 601D0400 - DETECTORS 601A0200 / 0300.

1. Switch on the supply voltage. Press down the red "TRIP" button until it latches. The green LED marked "POWER" on the relay lights up.
2. Turn the keyswitch of the relay to position "TEST" in order to do tests without tripping the circuit breaker. The signal contact of terminals 11 - 12 on the relay closes. In this position the key cannot be removed.
3. Expose a detector to light by closing the 75W/100W light bulb to the detector until the red "TRIP" button jumps out. Contact of terminals 9 - 10 on the relay closes and the green "POWER" LED is turned off because the indicator device turns off the supply voltage.

NB! On the 601D0900S version of the relay, the indicator device does not turn off the supply voltage and the "POWER" LED remains on.

A photoflash may also be used for the test, but earlier remarks about this will still apply.

4. Press down the "RESET" button. The green "POWER" LED turns on and contact 9 - 10 opens. The 601D900S version will work even if the "RESET" button is not pressed.
5. Repeat procedures 3 and 4 for all detectors installed.
6. Turn the keyswitch to "ACTIVE" and close the circuit breaker.
7. Repeat test no. 3 above. The circuit breaker will be tripped. Contact 9 - 10 closes.
8. Repeat step no. 4 above and remove the key. **The test is now finished.**

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TEST F: DIODE LOGIC UNIT 601D1100

This unit is tested by means of a continuity tester. Please refer to drawing 601D1114.

1. Check that there is a direct connection between terminals 4 and 8.
2. Check that there is a diode in the forward direction from terminals 1, 2 and 3 to terminals 4/8.
3. Check that there is a diode in the forward direction from terminals 4/8 to terminals 5, 6 and 7.

TEST G: CAPACITOR TRIP UNIT 601D1200

1. Connect mains voltage - 220-250Vac - between one of the terminals 1, 3, 9 or 11 and one of the terminals 2, 4, 10 or 12. Green LED's marked "AC" and "DC" light up.
2. Measure the DC voltage between one of the terminals 5, 7, 13 or 15 and one of the terminals 6, 8, 14 or 16. The DC voltage is dependent of the AC input voltage. With 220Vac input the DC voltage is approx. 300Vdc. Terminals 5, 7, 13 and 15 are positive.
3. Disconnect the mains voltage. The "AC" LED turns off. The "DC" LED remains on, but brightness reduces while the self-discharge circuit is working.
4. Check that the DC voltage is down to a safe level within 2 minutes after disconnecting the mains.

TROUBLE SHOOTING

Apart from checking that the correct supply voltage is present, the following might be considered:

1. A particular detector does not trip the relay/indicating junction box:

Insufficient light level - photoflash in "Auto" mode.

Cable connection not properly made, cable breakage etc.

Check if other detectors will trip. If so replace the detector.

The detector current may be measured by placing an amp-meter between the red and green wires of the cable and then illuminating the detector by means of a light bulb. The current increases with the

light and the detector should be able to generate at least 6mAdc. The red wire is positive.

2. The relay does not trip the circuit breaker:

The circuit breaker is not closed or the key is in position "TEST"

The load current is too small. The output thyristor of the relay needs at least 50mA of load current to fire and stay on (latching/holding current).

Wiring not properly made, cable breakage etc.

3. The relay trips erroneously:

Ambient light level too high. Factory setting of sensitivity must be changed.

Measure the total detector current by connecting an amp-meter between the red wire of the cable and terminal 1 of the relay. Note the current value.

Disconnect the cable completely and place the amp-meter between terminals 1 and 2 of the relay.

If the factory setting has not been changed the reading should be 6mA. Adjust the current to 3mA higher than the measured value above by means of the "SENS ADJ." Connect the cable again.

EMC influence exceeds the limits in EN50081-1/2 and EN50082-1/2. (EU EMC directive)