

Test Bench for Power board

Overview:

The new high end IRS systems available since January 2010 are equipped with a Datalog module that can be used to record all the events occurring in the IRS and power supply.
This function allows for much better maintenance of IRS systems.
This document describes the testing procedure to detect damages of Power board.

Attention:



When connecting the computer to the IRS module through the serial link, you have to pay attention to have both devices wired to the same ground to avoid any electrical discharge that can damage both devices.

Safety :



The installation, configuration, commissioning and maintenance of the IRS products must only be carried out by personnel qualified and trained to work with low voltage electrical equipment in an industrial environment.



The front door should not be opened except by competent technicians when connecting or disconnecting the device. Electrical isolation must be ensured between the equipment and the power supply.



In both off and on modes, the IRS regulator doesn't ensure isolation from the power supply. One should pay attention to the fact that electrical shock may occur when touching the lamps or the cables coming from the IRS. It is thus recommended to turn off the power supply (400 V) within 2 sec following the end of regulation.

1. Testing the Power board without power supply

1.1 Testing the insulation between the earth and contacts of connector P14, P19, P25, TR1,TR2,TR3

1.1.1 Technical requirements

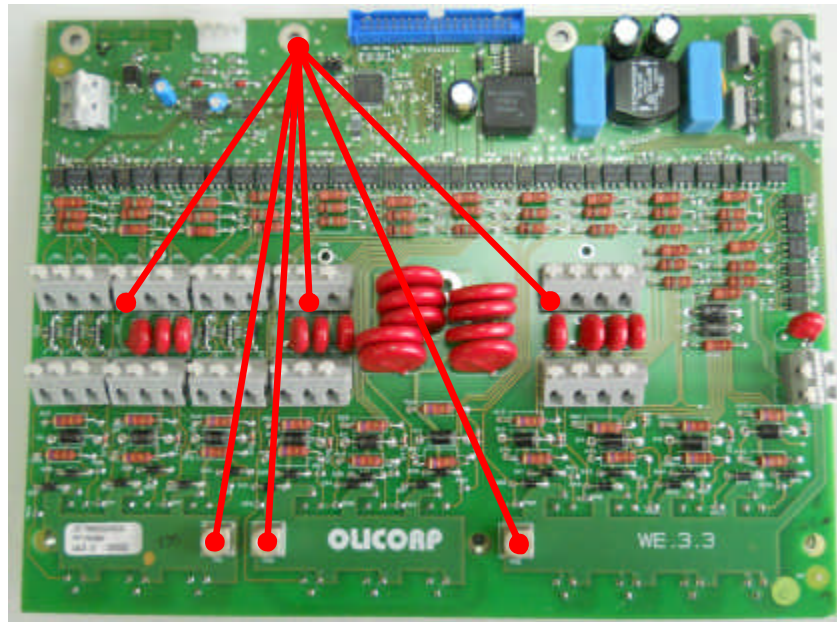
To measure the resistance between the earth and contacts of connector P14, P19, P25, TR1,TR2,TR3. The measured value must be more than 10 MOhms.

1.1.2 Instruments and tools

Multimeter.

1.1.3 Procedure

Set your Multimeter to resistance measuring mode. Select the measuring limit - MOhms. Measure the resistance between the points shown in **Fig.**



1.1.4 Test report

If the measured resistance value meets the requirements of clause 1.1.1, then the test - **Passed (P)**, if not - **Not Passed (N)**.

1.2 Testing the resistance between contacts TR1 and P14, TR2 and P19, TR3 and P25.

1.2.1 Technical requirements

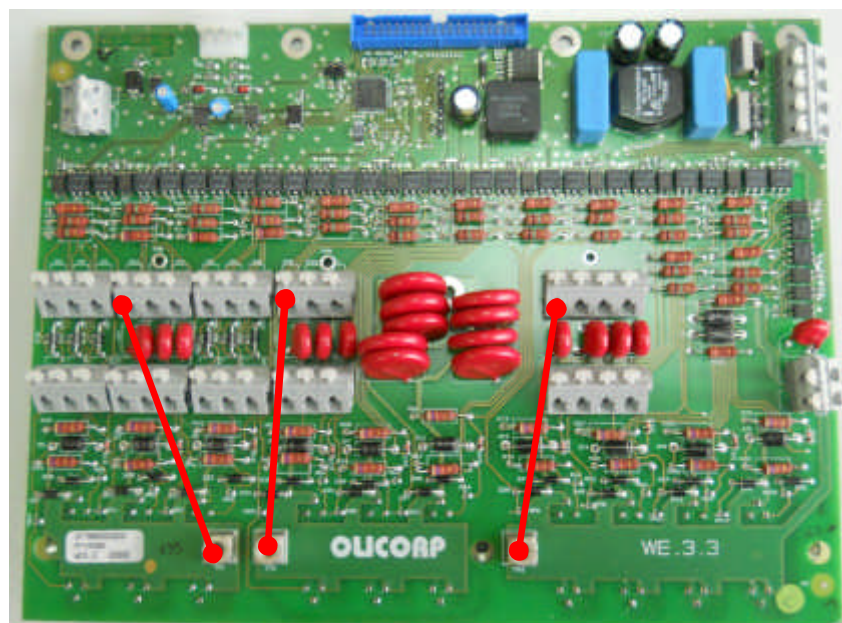
To measure the resistance between contacts TR1 and P14, TR2 and P19, TR3 and P25. The measured value must be not less than 470 KOhms.

1.2.2 Instruments and tools

Multimeter.

1.2.3 Procedure

Set your Multimeter to resistance measuring mode and select the measuring limit - MOhms. Place one multimeter probe at TR1, place the other probe at P14. Measure the resistance. Repeat the procedure for the other contactors.



1.2.4 Test report

If the measured resistance value meets the requirements of clause 1.2.1, then the test **Passed (P)**, if not – **Not Passed (N)**.

1.3 Testing 5V presence and consumption in 24V circuit

1.3.1 Technical requirements

To measure resistance between Profibus connector and IRS box The measured value must be tenths of Ohms.

1.3.2 Instruments and tools

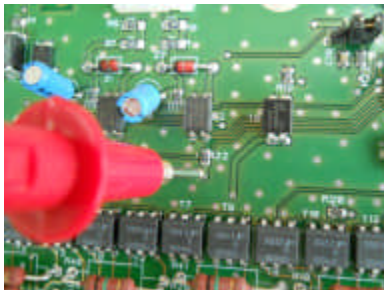
Multimeter. 24V power supply unit, Tool **T5**.

1.3.3 Procedure

Connect 24V power supply to IRS with the cable Tool **T5** (as shown in Fig).

Attention! When 24V power supply unit is switched on for the first time, watch the absorbed current! It must not exceed 50mA.

Set your Multimeter to permanent resistance measuring mode. Place one multimeter probe to the connector (as shown in Fig), the other probe to the point (as shown in Fig). Measure the resistance. It must be within 5V +/- 5%.



1.3.4 Test report

If the measured resistance value meets the requirements of clause 1.3.1, then the test **Passed (P)**, if not – the test **Not Passed (N)**.

2. Testing the Power board with the power supply inside the IRS box.

Following tests of the Power board require the power supply ON. Thus, further measurements must be done inside IRS box. For this, install the Power board into the IRS box and connect all connectors. IRS box must be grounded properly. We strictly recommend to disconnect the IRS from the mains when making any connection or changes in the circuit. If the mains is required to be ON for the job, keep the door always closed.

2.1.1 Technical requirements

To measure the resistance between the earth of the Power board and IRS box. The measured value must be in tenths of Ohms.

2.1.2 Instruments and tools

Multimeter.

2.1.3 Procedure

The IRS under examination must be disconnected from the power supply! Turn the 24V supply unit OFF.

Set your Multimeter to resistance measuring mode and select the measuring limit - Ohms. Open the IRS box door and disconnect CN6 from MCU board. Place one multimeter probe at pin2 of CN6 connector (as shown in Fig), place the other probe on IRS box. Measure the resistance. Then connect CN6 back to MCU board.



2.1.4 Test report

If the measured resistance value meets the requirements of clause **2.1.1**, then the test **Passed (P)**, if not - **Not Passed (N)**.

3. Testing the channels operation

3.1 Lamp ON in the selected channel at 100% power

3.1.1 Technical requirements

To test operation of the 1st to the 10th channel or the 1st to the 12th channel – depending on the IRS modification.

3.1.2 Instruments and tools

24V power supply unit. Personal computer (PC) or NoteBook with installed **SuperVisor** software. Tool **T5**. Tool **T3**. USB cable. Cable to connect the IRS to the mains. Auto transformer. Multimeter.

3.1.3 Procedure

Switch PC or NoteBook ON. Start up **SuperVisor**. Select the COM port corresponding to the virtual USB COM port. Turn the 24V power supply ON. If the USB connection is kept OK, the green LED near the USB connector on the MCU board must be glowing permanently. Switch the load Tool **T3** to the 1st channel output under the general testing scheme clause 10.2 (see the table in the diagram).

We strictly recommend to disconnect the IRS from the mains when making any connection or changes in the circuit. If the mains is required to be ON for the job, keep the door always closed.



Then switch the IRS to the mains.

Use SuperVisor to set the nominal voltage or nominal power (depending on the IRS version) in the 1st channel and switch the Oven ON. The load lamps must be glowing permanently. Then sequentially set the nominal voltage or nominal power for all the rest channels. There, the load lamps must not glow. Switch the Oven OFF. Disconnect the IRS from the mains and switch load Tool **T3** to the next channel 2. Repeat the procedure for the 2nd channel. Continue for all the rest channels.

3.1.4 Test report

If in each channel, for which the nominal voltage or nominal power is set, the load lamps are permanently ON, and for the channel, which is not selected, the lamps are OFF, then for each channel the test **Passed (P)**, otherwise - **Not Passed (N)**.

Power regulation in the selected channel and stabilization at changing the input (power) voltage

3.1.5 Technical requirements

To check the power regulation and stabilization at changing the input voltage in the 1st to the 10th channel or in the 1st to the 12th channel depending on the IRS modification.

3.1.6 Instruments and tools

24V power supply unit. Personal computer (PC) or NoteBook with installed **SuperVisor** software. Tool **T5**. Tool **T3**. USB cable. Cable to switch the IRS to the mains. Auto transformer. Multimeter.

3.1.7 Procedure

Switch PC or NoteBook ON. Start up **SuperVisor**. Select the COM port corresponding to the virtual USB COM port. Turn the 24V power supply ON. If the USB connection is kept OK, the green LED near the USB connector on the MCU board must be glowing permanently. Switch the load Tool **T3** to the 1st channel output under the general testing scheme clause 10.2 (see the table in the diagram).

We strictly recommend to disconnect the IRS from the mains when making any connection or changes in the circuit. If the mains is required to be ON for the job, keep the door always closed.

Then switch the IRS to the mains.

Use SuperVisor and set the half value of the nominal voltage or the half value of the nominal power (depending on the IRS version) in the 1st channel and switch the Oven ON. The load lamps must glow half heat. At the auto transformer output, using the Multimeter to control the voltage, set the voltage +10% of the nominal. The load lamps must glow with the same brightness. At the auto transformer output, using the Multimeter to control the voltage, set the voltage -10% of the nominal. The load lamps must glow with the

same brightness. Switch the Oven OFF. Turn the IRS off the mains and switch the load Tool **T3** to the next channel 2. Repeat the procedure for the 2nd channel. Repeat for all other channels.

3.1.8 Test report

If in each channel, for which half nominal voltage or half nominal power is set, the load lamps glow half heat and their brightness does not change at changing the input supply voltage, then for each channel the test **Passed (P)**, otherwise - **Not Passed (N)**.

3.2 DeadLamps identification

3.2.1 Technical requirements

To test the mode of the DeadLamps identification from the 1st to the 10th channel or from the 1st to the 12th channel depending on the IRS modification.

3.2.2 Instruments and tools

24V power supply unit. Personal computer (PC) or NoteBook with installed **SuperVisor** software. Tool **T5**. USB cable. Cable to switch the IRS to the mains. Auto transformer.

3.2.3 Procedure

Switch PC or NoteBook ON. Start up **SuperVisor**. Select the COM port corresponding to the virtual USB COM port. Turn the 24V power supply ON. If the USB connection is kept OK, the green LED near the USB connector on the MCU board must be glowing permanently. Switch the load Tool **T3** to the 1st channel output under the general testing scheme clause 10.2 (see the table in the diagram).

We strictly recommend to disconnect the IRS from the mains when making any connection or changes in the circuit. If the mains is required to be ON for the job, keep the door always closed.

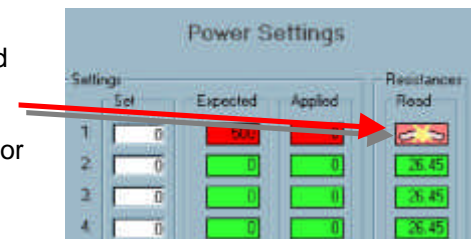
Then switch the IRS to the mains.


Use SuperVisor to set the nominal voltage or nominal power (depending on the IRS version) in the 1st channel and switch the Oven ON. Then press the button on Tool **T3**, thus imitating a dead lamp. DeadLamp icon must appear in SuperVisor window.

Switch the Oven OFF. Disconnect the IRS from the mains and switch load Tool **T3** to the next channel 2. Repeat the procedure for the 2nd channel. Continue for all the rest channel.

3.2.4 Test report

If the DeadLamp is detected for each channel, then for each channel the test **Passed (P)**, otherwise – **Not Passed (N)**.



| Settings: | Set | Expected | Applied | Resistances |
|-----------|-----|----------|---------|---|
| 1 | 0 | 000 | 0 |  |
| 2 | 0 | 0 | 0 | 26.45 |
| 3 | 0 | 0 | 0 | 26.45 |
| 4 | 0 | 0 | 0 | 26.45 |

4. Testing Overload and Cutout modes

4.1 Testing Overload mode

4.1.1 Technical requirements

To test Overload mode.

4.1.2 Instruments and tools

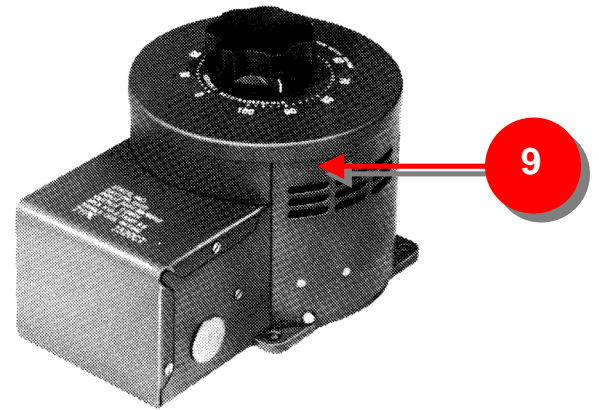
24V power supply unit. Personal computer (PC) or NoteBook with installed **SuperVisor** software. Tool **T5**. Tool **T3**. Tool **T6**. USB cable. Cable to connect the IRS to the mains. Auto transformer. Multimeter.

4.1.3 Procedure

Switch PC or NoteBook ON. Start up **SuperVisor**. Select the COM port corresponding to the virtual USB COM port. Open the IRS box door. Connect Tool **T6** and **USB cable** through the servicing hole. Turn the 24V power supply ON. If the USB connection is kept OK, the green LED near the USB connector on the MCU board must be glowing permanently.



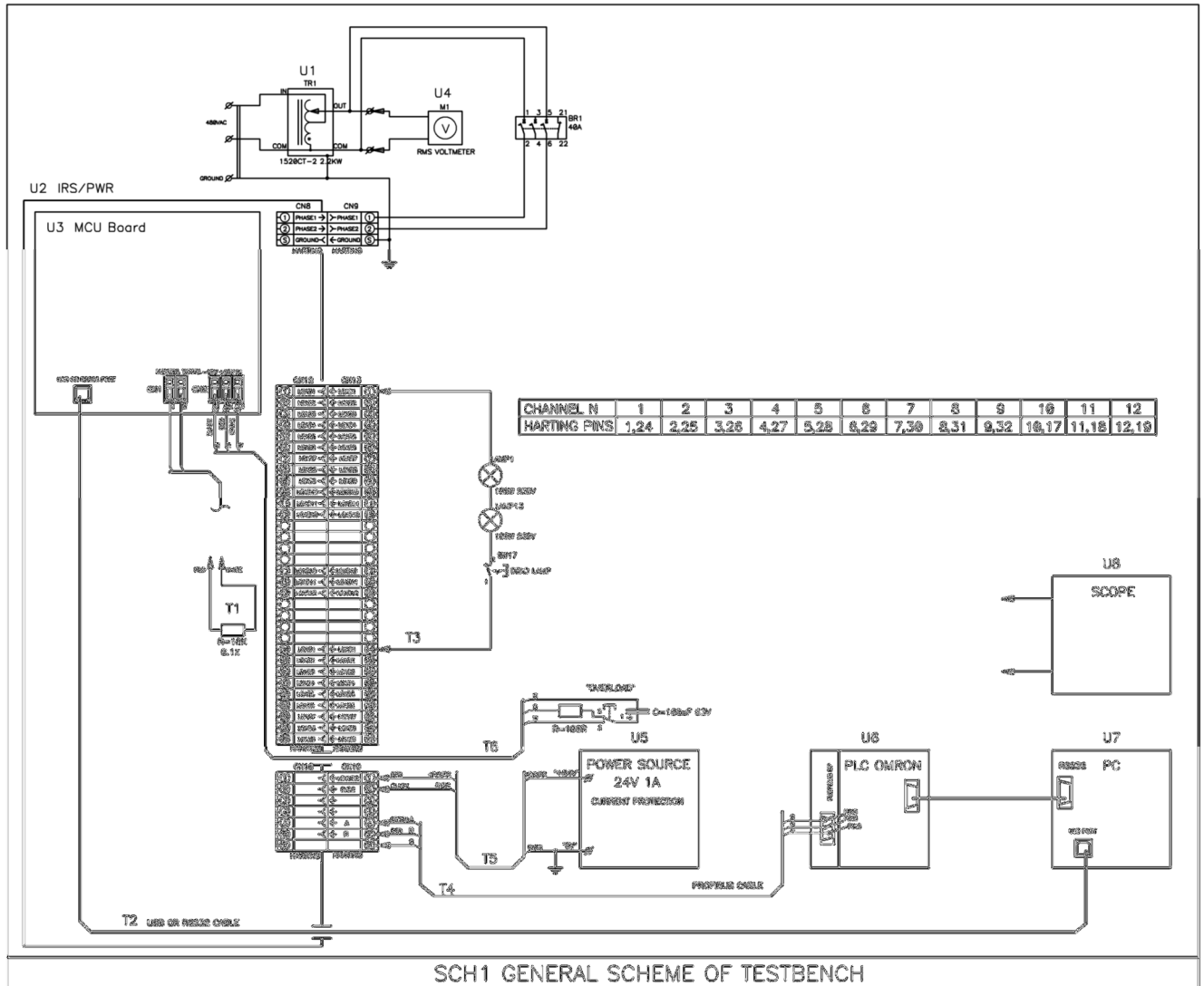
Standard tools and devices:



| Tool ? | Name of the tool or device |
|--------|---|
| 1 | Screwdrivers |
| 2 | Measuring probes for Multimeter |
| 3 | T3 Test load 460V 100W |
| 4 | T6 OverLoad regime testing tool |
| 5 | T5 IRS power feeding cable |
| 6 | U5 Power supply unit 24V >3A |
| 7 | U4 Multimeter with the possibility of measuring the rms ac voltage |
| 8 | T2 USB cable |
| 9 | U1 Autotransformer |
| 10 | U8 FLUKE 196 ScopMeter, optional |
| 11 | Cable to connect IRS to power supply (16A) |

5.2 General testing scheme

General testing scheme:



BOM for general testing scheme:

| Pos. | Description | No. in Farnell catalog |
|----------------|--|-------------------------------|
| U1 | Autotransformer STACO ENERGY PRODUCTS - 2520-2 - Variable Transformer | 1381710 |
| CN9 | Power Connector: HARTING - 0914 002 2751 - INSERT, FEMALE, AXIAL, SCREW, 100A, HARTING - 0930 006 1750 - COUPLER, HAN6B HARTING - 0914 024 0313 - FRAME HINGED HOUSING, 6 MODULE | 3453881 3454460 3329835 |
| R | Resistor 10K +/-0.1% 0.25W | |
| R | Resistor 100 Ohm +/-5% 0.25W | |
| ? | Capacitor 100uF 63V | |
| BR1 | Breaker 40A | |
| LAMP1,2 | LAMP 230V 100W | |