

Isolated Power System Monitor (IPM400)

The Isolated Power System Monitor (IPM400) permanently monitors the insulation resistance between line 1/line 2 and earth in isolated power systems, which are mainly found in Group 2 Medical Locations.

The Isolated Power System Monitor is set to give an alarm when the insulation of the complete network drops below the set value; this is typically 250k Ohms. The minimum setting recommended by the standard is 50k Ohms. This feature also ensures that any Patient Monitoring Equipment below 250k Ohms will give an alarm.



The current and temperature of the Isolation Transformer are also permanently monitored. If the windings become too hot or overloaded the alarm is triggered but again the system will continue to operate as normal, giving time for the completion of the operation or the removal of the faulty equipment. The IPM400 system has an integrated insulation monitor and webserver.

It can monitor up to 8 external alarms (typically UPS) and display these on the LCD screen and via the selected remote alarm.

Communication to peripheral units is provided by web-server and email functionality. The IPM400 includes an internal 10W power supply.

Features

- Insulation monitor for detecting earth faults on an IT network
- Temperature & Transformer-Load Current Monitor
- Configurable Transformer load trip point
- Configurable Transformer over temperature protection
- 8 channels for monitoring digital signals via relay or electronic contacts
- Communication interface with ModBus RTU Protocol for transmitting measured values and network status.
- Webserver with TCP/IP functionality, connected via standard network plugs
- Programmable volt free changeover contact for RA006 clinical alarm and BMS
- Driver function to display isolation and transformer status on remote alarm units with the optional capability of a remote test function for special markets
- Remote alarm compatibility with RA006, RA004 and RA003 (future: RA008)
- Compliant to HD60364-7-710.



Product Specification

| | |
|---|---------------------------|
| Nominal ac isolation voltage..... | AC300V |
| Contact circuits | AC250V |
| Insulation group to DIN VDE 0110 (01.89)dirty group 3 | |
| AC Test Voltage | |
| Electronic - relay contacts | AC2000V |
| Electronic - Modbus interface | AC2000V |
| Relay contacts - Modbus interface | AC2000V |
| Relay contacts - RJ45 Jack..... | AC2000V |
| RJ45 Jack - Modbus interface | AC2000V |
| Electronic - RJ45 Jack..... | AC1500V |
| Operation class | continuous |
| Supply voltage UsAC 100-230V -10%/+15%, 50/60Hz | |
| Power consumption | |
| With peripheral units and alarm state+230mA/-200mA | |
| Relay contacts | |
| K1 (Main/Common Alarm)..... | normal open contact |
| Function | active / failsafe |
| K2 (Insulation Alarm) | normal open contact |
| Function | active / failsafe |
| K3 (Optional Alarm) | normal open contact |
| Function | active / failsafe |
| Switching capacity | 1100VA |
| Nominal contact voltage..... | 250V |
| Continuous current..... | 5A |
| Breaking capacity | |
| At AC230V, cos.phi=0,4..... | 3A |
| At DC110V, L/R=0 | 0,3A |
| Mechanical | |
| Operational temperature | -10°C .. +50°C |
| Storage temperature | -40°C .. +80°C |
| Humidity classification to DIN 40 040..... | F |
| Ingress protection to DIN 40 050 | IP30 |
| Terminals to VBG4 | IP20 |
| Mounting | |
| Direction | equal |
| Rail Mounting..... | DIN EN 60 715 |
| Terminals | |
| Type | plug-able screw terminals |
| Wire capacity | 0.5to 2,5mm ² |
| Weight..... | ~500g |
| Dimensions | 105mm x 95mm x 75mm |
| Requirements on IT-Network | |
| Nominal voltage..... | AC 230V, 50Hz |
| Max line capacitance to earth | 0,5µF/Phase |

| | |
|--|--|
| Max load current through CT..... | 100A |
| Temperature-Monitor | |
| Trip resistance R _δ (Terminals Z1/Z2) | >3,5kΩ |
| Response delay (self-time) | ~ 1,5s |
| Wiring | |
| Type of cable..... | screened, twisted pair |
| Max length | 3m |
| Transformer Load-Monitor | |
| Current Transformer | |
| Ratio @ AC230V | 1:1000 |
| Ratio @ AC110V | 1:2000 |
| Load..... | ~16Ω |
| Trip point | |
| Adjustable | 100 to 15,000VA, Δ1VA |
| Hysteresis..... | ca.20% |
| Response delay (self-time)..... | ~ 1,5s |
| Wiring | |
| Type of cable..... | screened, twisted pair |
| Max length | 3m |
| Insulation Monitor | |
| Rated voltage for measuring circuit . AC 265V, 50-60Hz | |
| Measuring voltage..... | DC14V |
| Measuring current..... | max.58µA |
| DC internal resistance (Terminal L1, L2 to PE) ... | 240kΩ |
| Measuring circuit impedance (Terminal L1, L2 to PE) | |
| Line-voltage ≤AC300V | 220kΩ |
| Response value | |
| Adjustable | 50kΩ ... 500kΩ, Δ1kΩ |
| Factory Setting | 250kΩ |
| Hysteresis..... | ca.20% |
| Response delay (self-time) | ~ 1,5s |
| Digital Inputs | |
| Digital Inputs | DI1, DI2, DI3, DI4, DI5, DI6, DI7, DI8 |
| Actuating Voltage | DC 20V |
| Alarm OFF..... | off(0) |
| Alarm on K1..... | on(1) |
| Alarm on K2..... | on(2) |
| Alarm on K3..... | on(3) |
| Used Contact..... | normal open (1), normal closed (0) |
| Wiring | |
| Type of cable..... | screened, twisted pair |
| Max length | 3m |
| Capacity | 0,5 .. 2,5mm ² |

Remote Alarm Communication

| | |
|---------------------|-----------------------------|
| Interface | RS485, non-isolated |
| Communication | specific broadcast protocol |
| Wiring | |

| | |
|---------------------|---------------------------|
| Type of cable | screened, twisted pair |
| Max length | 1000m |
| Capacity..... | 0,5 .. 2,5mm ² |

Modbus Communication

| | |
|-------------------------|-------------------------|
| Interface | RS485, isolated |
| Communication | Modbus RTU Slave |
| Baud Rate | 2400, 9600 or 19200Baud |
| Address Range | 1..255 |
| Parity | Even/Odd |
| Supported Command | Read Multiple Register |
| Command Code..... | 0x03 |
| Starting Address | 0x00 |
| Register Count..... | 1, 2 or 4 |

Wiring

| | |
|---------------------|---------------------------|
| Type of cable | screened, twisted pair |
| Max length | 1000m |
| Capacity..... | 0,5 .. 2,5mm ² |

TCP/IP Communication

| | |
|---|-------------------|
| Interface | 10Base T |
| Connection | RJ45, CAT5 |
| EMC requirementuse a ferrite over the network cable | |
| Würth, type 742 712 22 | 2 loops |
| MAC Address | 00:50:C2:9E:Fx:xx |
| Factory Settings | |
| Hostname | IPM400 |
| DHCP | disabled |
| IP-Address | 192.168.77.42 |
| Gateway | 192.168.77.51 |
| Subnet Mask | 255.255.255.0 |
| Primary DNS | 192.168.77.250 |
| Secondary DNS..... | 213.237.150.188 |

Auxiliary Equipment

| | |
|----------------------------------|-------|
| Max Output at U1-U2 | 240mA |
| Auxiliary Loads at 24Vdc: | |
| RA003 | 70mA |
| RA004 | 120mA |
| RA005 / RA006 (THD) | 40mA |
| RA005/ RA006 / RA007 (SMD) | 24mA |
| 24V-Relay | 40mA |