KWG-ISO5

Manual –English-
Version June 2018
About this manual

This manual applies to the isolation monitors of the KWG-ISO5 series.
The safety and hazard information, as well as the general information, apply to all
KWG-ISO components and should be observed at all times for liability reasons.
No part of this manual may be reproduced, published or transferred in any form or by
any means whatsoever without the express written consent of KW-Generator GmbH &
Co.KG.
Changes made after printing will be disregarded. Technical modifications are reserved.

Standards and regulations

The KWG-ISO components are RoHS-compliant and comply with the regulations
according to
DIN EN 61010-1:2011,
DIN EN 61557-8:2016,
DIN EN 61326-1:2013-07,
DIN EN 61326-2-4:2013-07,
DIN EN ISO 13766-1
and are intended for networks in accordance with DIN VDE0100-551.

Use and application of the KWG-ISO components

The KWG-ISO components are parts of machines and systems which are intended for
industrial and professional use, and, therefore, cannot be handled as retail goods.
The ISO monitors may be used only in accordance with the technical specifications on
the type plate or data sheet or a special release.
They are protected against vibrations and moisture by means of a special grouting, but
they should be operated only in waterproof (IP54) switch boxes and cabinets. Do not
operate them outdoors and do not clean the switch box or cabinet using high-pressure
cleaners.

Use the KWG-ISO components only for the applications specified here and only in
accordance with the specifications in this manual. Any other use is improper use and is
not permitted. Misuse or improper use is prohibited. KW-Generator GmbH and Co.KG
accepts no liability in this case.

The KWG-ISO component monitors the isolation value of an unearthed AC system
with DC parts in the wide voltage range of 85V to 300V against earth, which is fed by a
KWG generator.
In any conductively connected system, only one isolation component may be connected.

**Warranty**

If no special provisions for warranty are concluded in writing for type-related applications and customers, then we shall provide a warranty in accordance with the general European regulations.

**General safety notes**

**HAZARD**

Electrical machines and equipment contain hazardous parts which are either live or revolving during machine operation. The KWG-ISO component, except the switching relay, is designed to be wear-proof and maintenance-free. Full grouting excludes repair works.

Therefore:

- improper use
- removing the protective coating, disconnecting the safety devices,
- insufficient maintenance and inspection,

could cause serious damage to life or property.

The safety officer must, therefore, affirm and ensure that transport, installation, commissioning, operation, inspection, as well as maintenance and repairs to the machine are carried out exclusively by qualified personnel, who must possess the following qualifications:

- specific technical training and experience
- knowledge of the technical standards and applicable laws
- knowledge of the general, national and local, system-specific safety regulations
- ability to identify and avoid hazardous situations.

Work on electric machines and equipment may be carried out only with the consent of the safety officer, and that with the machine at standstill, with all its poles disconnected from the mains and secured from accidental restart (including auxiliary circuits).

The generator and the KWG-ISO component may not be operated in explosive surroundings. Observe the extensive regulations in this regard!

Earthing the neutral conductor for operating with the KWG-ISO component is prohibited.
General design
The KWG-ISO component is designed as a single board and therefore to be suitable for grouting.

The control and evaluation is taken over by a uController.

All connections are pluggable. Subsequent possibility of the DIN (top-)hat rail mounting or chassis mounting through 2 or 4 pluggable mounting flanges is provided.

Mounting is possible with screw mounting using M3 or M4 screws. The casing is made of impact-resistant plastic in black colour.

Functional description
The KWG-ISO component generates a pulse-like measuring voltage. This is superimposed over the L1 and N terminals on the IT system to be monitored. Ohmic insulation fault between IT system and earth close the measuring circuit. When it falls short of the pre-warning level, the relay switches a “Warning”. When it falls short of the cut-off value, the relay switches “ALARM”. The self-test can be manually initiated by bridging the “T” input (test) for at least 1.5 seconds to “R/T/B centre” input. The internal fault memory can be deactivated or deleted by bridging the “R” input to “R/T/B centre” input. An additional relay “Buzzer” is activated, as soon as the status “Warning” is reached. The relay can be acknowledged by bridging the “R-B” (Reset Buzzer) input with the “R/T/B centre” input. The CAN interface makes it possible to read out other data and statuses of the component. The connections PE1 and PE2 must be connected.

COMMISSIONING.

After the installation of the system, (also see “Manual KWG Generators”) the functioning of the KWG-ISO component must be tested. Depending on the application, the trigger unit or the main contactor must respond to a manual self-test. After resetting, the main contactor or the trigger unit can be brought back to the “ON” position. If not, check the installation. Contact KWG, if required.

If an insulation fault occurs during commissioning or later, the following procedure is advisable for identifying the source of the fault.

1. Remove the complete load from the distribution box, switch box or the generator and disconnect the external devices.
2. Commission the system. If no fault occurs, reconnect the load on the distribution box, switch box or generator.
3. If an insulation fault occurs, then the supply line or the extension of the devices is faulty. If no insulation fault occurs, then switch on the different devices step by step. Immediately mark the device which causes an insulation fault on switching on and have it examined in a specialist workshop.
4. If an insulation fault occurs after step 1), without any connected load, then the generator system is faulty. -> Contact KWG.
## Pin assignment

<table>
<thead>
<tr>
<th>Connection</th>
<th>Manufacturers</th>
<th>Type</th>
<th>Spec.</th>
<th>Function</th>
</tr>
</thead>
<tbody>
<tr>
<td>X4.1</td>
<td>Tyco</td>
<td>AMP Mate-N-LOK 641831-1</td>
<td>6-pole</td>
<td>Supply L1</td>
</tr>
<tr>
<td>X4.2</td>
<td>Tyco</td>
<td>AMP Mate-N-LOK 641828-1</td>
<td>8-pole</td>
<td>Alarm OUT / Optocoupler</td>
</tr>
<tr>
<td>X4.3</td>
<td>Tyco</td>
<td>AMP Mate-N-LOK 641828-1</td>
<td>8-pole</td>
<td>Supply L2</td>
</tr>
<tr>
<td>X4.4</td>
<td>Tyco</td>
<td>AMP Mate-N-LOK 641828-1</td>
<td>8-pole</td>
<td>Not used</td>
</tr>
<tr>
<td>X4.5</td>
<td>Tyco</td>
<td>AMP Mate-N-LOK 641828-1</td>
<td>8-pole</td>
<td>Relay alarm / NC</td>
</tr>
<tr>
<td>X4.6</td>
<td>Tyco</td>
<td>AMP Mate-N-LOK 641828-1</td>
<td>8-pole</td>
<td>Relay alarm / NO</td>
</tr>
<tr>
<td>X4.7</td>
<td>Tyco</td>
<td>AMP Mate-N-LOK 641828-1</td>
<td>8-pole</td>
<td>Relay alarm / armature</td>
</tr>
<tr>
<td>X2.1</td>
<td>Tyco</td>
<td>AMP Mate-N-LOK 350789-1</td>
<td>4-pole</td>
<td>Alarm OUT / Optocoupler</td>
</tr>
<tr>
<td>X2.2</td>
<td>Tyco</td>
<td>AMP Mate-N-LOK 350792-1</td>
<td>4-pole</td>
<td>Alarm OUT / GND</td>
</tr>
<tr>
<td>X2.3</td>
<td>Tyco</td>
<td>AMP Mate-N-LOK 350792-1</td>
<td>4-pole</td>
<td>PWM OUT / Optocoupler</td>
</tr>
<tr>
<td>X2.4</td>
<td>Tyco</td>
<td>AMP Mate-N-LOK 350792-1</td>
<td>4-pole</td>
<td>Reset button</td>
</tr>
<tr>
<td>X2.5</td>
<td>Tyco</td>
<td>AMP Mate-N-LOK 350792-1</td>
<td>4-pole</td>
<td>Test button</td>
</tr>
<tr>
<td>X2.6</td>
<td>Tyco</td>
<td>AMP Mate-N-LOK 350792-1</td>
<td>4-pole</td>
<td>R/T/B centre</td>
</tr>
<tr>
<td>X2.7</td>
<td>Tyco</td>
<td>AMP Mate-N-LOK 350792-1</td>
<td>4-pole</td>
<td>PE1</td>
</tr>
<tr>
<td>X2.8</td>
<td>Tyco</td>
<td>AMP Mate-N-LOK 350792-1</td>
<td>4-pole</td>
<td>PE2</td>
</tr>
<tr>
<td>X3.1</td>
<td>Tyco</td>
<td>AMP Mate-N-LOK 350792-1</td>
<td>4-pole</td>
<td>Relay warning / NO</td>
</tr>
<tr>
<td>X3.2</td>
<td>Tyco</td>
<td>AMP Mate-N-LOK 350792-1</td>
<td>4-pole</td>
<td>Relay warning / armature</td>
</tr>
<tr>
<td>X3.3</td>
<td>Tyco</td>
<td>AMP Mate-N-LOK 350792-1</td>
<td>4-pole</td>
<td>Relay warning / NC</td>
</tr>
<tr>
<td>X1.1</td>
<td>Tyco</td>
<td>AMP Mate-N-LOK 643406-1</td>
<td>5-pole</td>
<td>CAN_L</td>
</tr>
<tr>
<td>X1.2</td>
<td>Tyco</td>
<td>AMP Mate-N-LOK 643406-1</td>
<td>5-pole</td>
<td>CAN_H</td>
</tr>
<tr>
<td>X1.3</td>
<td>Tyco</td>
<td>AMP Mate-N-LOK 643406-1</td>
<td>5-pole</td>
<td>GND_CAN</td>
</tr>
<tr>
<td>X1.4</td>
<td>Tyco</td>
<td>AMP Mate-N-LOK 643406-1</td>
<td>5-pole</td>
<td>VDD_CAN (12 - 24V)</td>
</tr>
<tr>
<td>X5.1</td>
<td>Tyco</td>
<td>AMP Mate-N-LOK 643406-1</td>
<td>5-pole</td>
<td>Relay horn / NO</td>
</tr>
<tr>
<td>X5.2</td>
<td>Tyco</td>
<td>AMP Mate-N-LOK 643406-1</td>
<td>5-pole</td>
<td>Relay horn / armature</td>
</tr>
<tr>
<td>X5.3</td>
<td>Tyco</td>
<td>AMP Mate-N-LOK 643406-1</td>
<td>5-pole</td>
<td>Relay horn / NC</td>
</tr>
<tr>
<td>X5.4</td>
<td>Tyco</td>
<td>AMP Mate-N-LOK 643406-1</td>
<td>5-pole</td>
<td>Reset buzzer button</td>
</tr>
<tr>
<td>X5.5</td>
<td>Tyco</td>
<td>AMP Mate-N-LOK 643406-1</td>
<td>5-pole</td>
<td>R/T/B centre</td>
</tr>
</tbody>
</table>
## Technical data and special features

### Design data
- **Casing dimensions (l x b x h)**: 125 x 114 x 27 [mm]
- **Weight**: 200 g with casing and grouting
- **Mounting**: DIN rail or optionally flange mounting

### Electrical data of input
- **Power supply**: 85 .. 300 V~
- **Mains frequency**: 18 .. 150 Hz
- **Power consumption**: max. 2.2W
- **Device fuse**: integrated PTC
- **Protection class**: I (with double or reinforced insulation)
- **Isolation of electrical circuits**: Overvoltage category I (in accordance with EN 60 010-1)
- **Power input/output voltages**: 2.21 kV

### Electrical data of measuring circuit
- **Measuring voltage**: ±12 V
- **Measuring current**: ≤ 200 µA
- **Internal resistance DC**: ≥ 50 kΩ
- **Permissible external DC voltage**: ≤ 300 V
- **Permissible grid leakage capacity**: ≤ 5 µF

### Permissible climatic conditions
- **Temperature during operation**: -25°C to +60°C
- **Temperature during storage and transport**: -30°C to +85°C
- **Humidity**: 10% to 93% (condensation without grouting not permitted)
- **Operating height for given specifications**: 0 to 2000m above MSL.

### Regulations

### Relay outputs data
- **Type**: PE014024
- **4000Vrms dielectric strength between contacts and coil**
- **VDE Cert. No**: 40011901, UL E2140251
- **Nominal voltage**: 250VAC (max. 400VAC)
- **Rated current**: 5A
- **Creepage distance between contacts and coil**: > 3.2mm

### Optocoupler outputs data
- **Type**: HCPL-181-06BE
- **3750Vrms dielectric strength**
- **DIN EN 60747-5-2, UL1577, CSA A 88324**
- **200% < CTR < 400%**
- **Iprimär**: 9.5mA,
- **Collector Current < 30mA**,  
- **VCEsat < 0.2V , tr = 4µs (type)**

### CAN connection
- **Speed**: 250 kBit/s
- **Communication**: J1939, electrically isolated
- **termination resistor**: not fitted as standard
- **CAN supply voltage**: 12/24V. Range: 9-36V.
CAN interface

Hardware
Termination resistor (120 Ohm) is not fitted as standard.
The CAN interface is electrically isolated. For the communication, an external supply voltage must be connected to X1 (U-GND).

J1939-messages
Source address: 132 (84h)
Destination address: 130 (82h)
PDU format: 40 (28h)
Number of data bytes: 8
Priority: 3

Data bytes:

0: STATUS byte
   Bit 0: ISOLATION_FAULT
   Bit 1: ISOLATION_WARNING
   Bit 2: BUZZER_ON

1-4: ISOLATION RESISTANCE
   Value in Ohms – LSB first

Flange mounting
Interface to the KWG generator governor

Besides the autarkic mode of operation, the KWG isolation monitor offers the possibility of communication with the KWG generator governor. The isolation value is given via the governor-CAN-bus. Simultaneously, the isolation value in the KWG generator governor can be further processed and can trigger, for example, the relay. The communication is compatible with the earlier designs of the ISO monitor. That notwithstanding, the isolation value can also be read out directly from the CAN bus of the isolation monitor.

Connection examples
Anschlussbeispiel Isowächter KWG-ISO5
Überwachung mit Vorwarnung und Alarm in Fahrzeugen

H1 = Leuchtmelder 12V Alarm
H2 = Leuchtmelder 12V Vorwarnung
S1 = Test-Taster
S2 = Reset-Taster
Fehler wird bis zum Betätigen gespeichert. Ist keine Speicherung erwünscht, kann S2 gebrückt werden.
Alarm = potentialfreier Relaiskontakt
Schaltet bei Riso < 23 kOhm
Warnung = potentialfreier Relaiskontakt
Schaltet bei Riso < 46 kOhm

Anschlussbeispiel Isowächter KWG-ISO5
Allpolige Abschaltung mit Hauptschütz und mit Vorwarnung

K1 = Hauptschütz
H1 = Leuchtmelder 230V
S1 = Test-Taster
S2 = Reset-Taster
Fehler wird bis zum Betätigen gespeichert. Ist keine Speicherung erwünscht, kann S2 gebrückt werden.
Alarm = potentialfreier Relaiskontakt
Schaltet bei Riso < 23 kOhm
Warnung = potentialfreier Relaiskontakt
Schaltet bei Riso < 46 kOhm
Disassembly

Before dismantling the KWG-ISO component, ensure that the unit cannot be started either automatically or even manually. Moreover, the system must be disconnected from the power supply. The KWG-ISO component can be disconnected electrically by simply pulling out the AMP plug.

Disposal instructions

For proper disposal, observe the local regulations pertaining to electronic scrap.