KWG-ISO5

Manual –English-

Version June 2018

Manufacturer's address

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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.

Changes made after printing will be disregarded. Technical modifications are reserved.
Version of manual: V10.

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

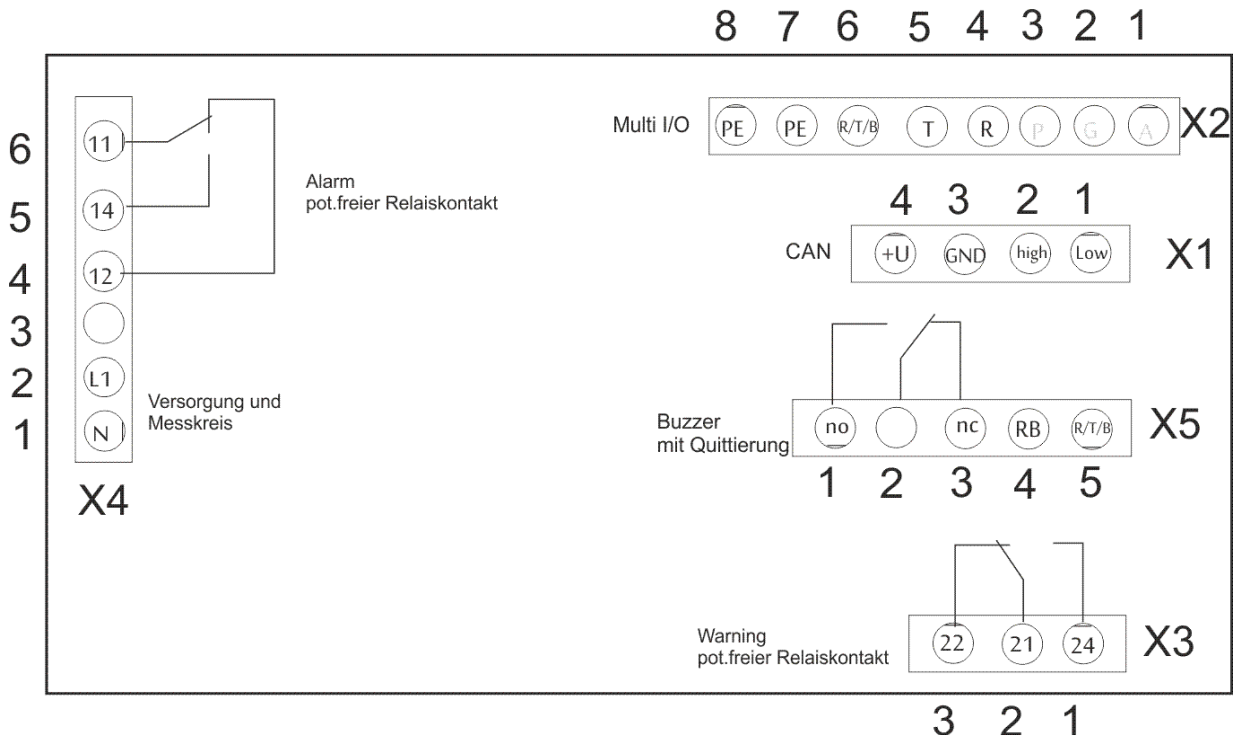
The KWG-ISO component generates a pulse-like measuring voltage. This is superimposed over the L1 and N terminals on the IT system to be monitored. Ohmic insulation fault between IT system and earth close the measuring circuit. When it falls short of the pre-warning level, the relay switches a “Warning”. 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.

Connections



Pin assignment

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

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	*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*
Relay outputs data	4000Vrms dielectric strength between contacts and coil
Type: PE014024	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	3750Vrms dielectric strength
Type: HCPL-181-06BE	DIN EN 60747-5-2, UL1577, CSA A 88324
	200% < CTR < 400%
	I_primär: 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

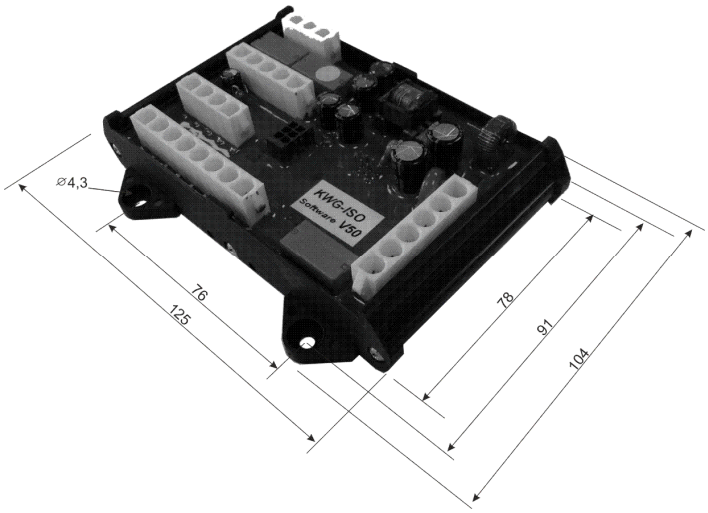
Source address: 132 (84h)
Destination address: 130 (82h)
PDU format: 40 (28h)
Number of data bytes: 8
Priority: 3

Data bytes:

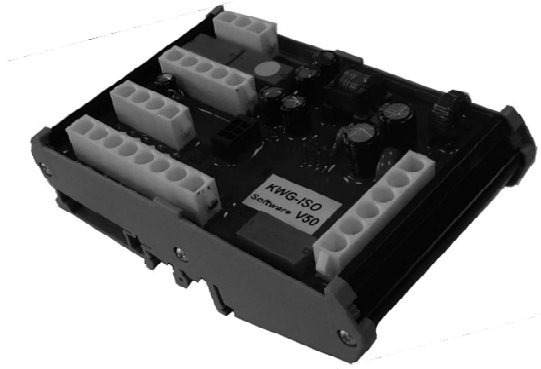
0: STATUS byte
- Bit 0: ISOLATION_FAULT
- Bit 1: ISOLATION_WARNING
- Bit 2: BUZZER_ON

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

Flange mounting



DIN rail mounting

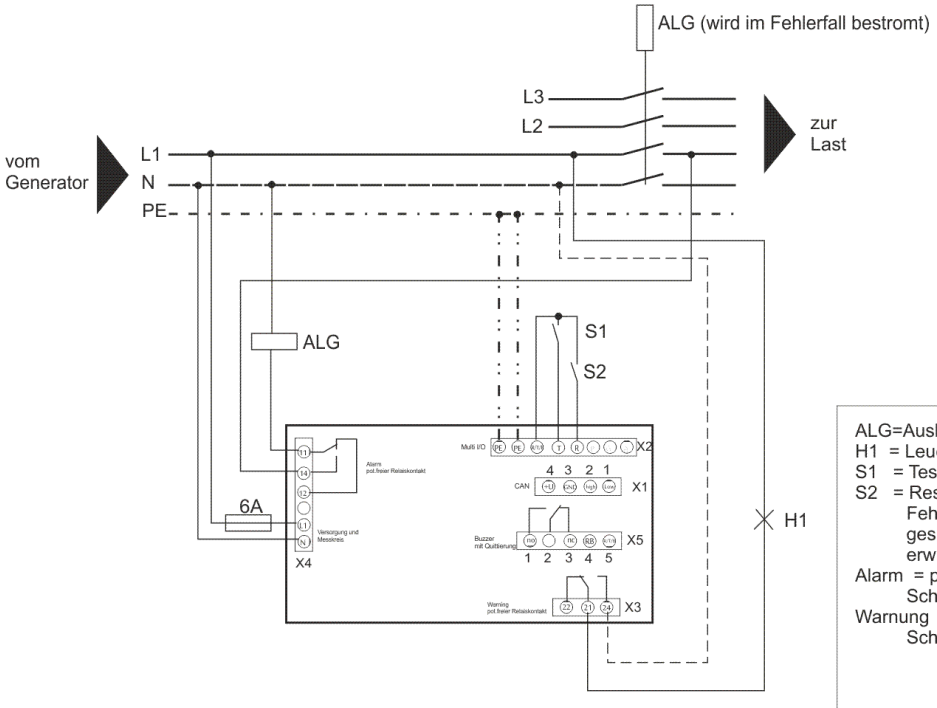


Interface to the KWG generator governor

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.

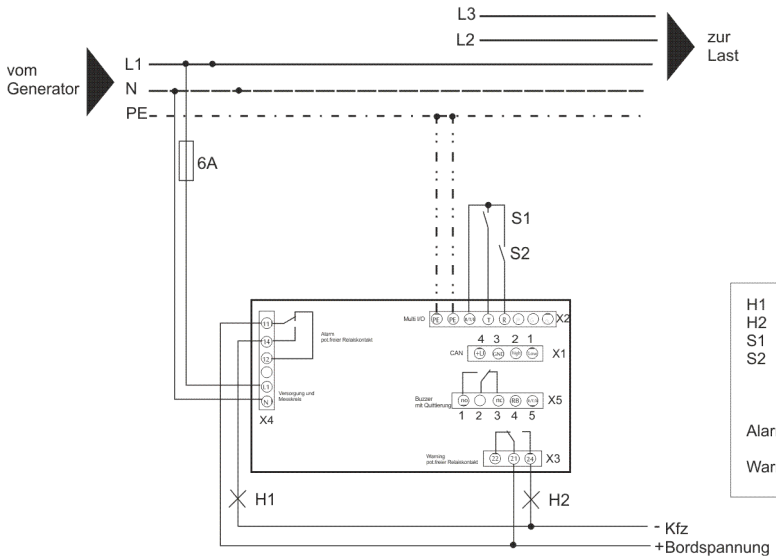
Connection examples

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



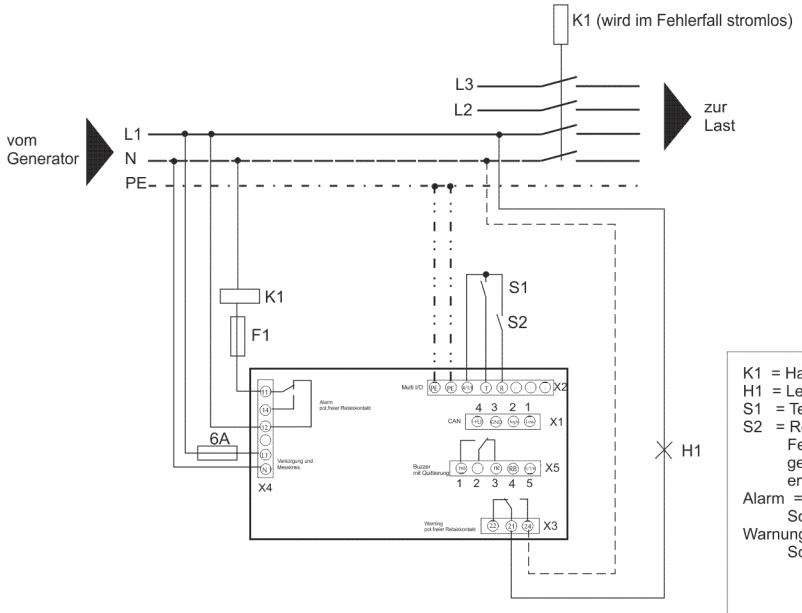
ALG=Auslösegerät z.B: ABB
H1 = Leuchtmelder 230V
S1 = Test-Taster
S2 = Reset-Taster
Fehler wird bis zum Betätigen gespeichert. Ist keine Speicherung erwünscht, kann S2 gebrückt werden.
Alarm = potentialfreier Relaiskontakt
Schaltet bei Riso < 23 kOhm
Warnung = potentialfreier Relaiskontakt
Schaltet bei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

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.