

KW generators.  
Powerful.  
Innovative.

**KWG-DVR**  
**Generator regulator**



## Imprint

Document type:	Operating instructions		
Document name:	KWG_DVR_Operating_Manual_V2-0_EN		
Version:	V2.0		
Language:	EN		
Number of pages:	46 Pages		
Created by:	Tim Kurz	Created on:	20.06.2024
Modified by:	Tim Kurz	Modified on:	28.06.2024

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## List of changes

Index	Modified by	Stand	Amendment
V2.0	Tim Kurz	07/2024	New layout; adaptation of texts

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## 2 FOREWORD AND GENERAL INFORMATION

### 2.1 About these operating instructions

These operating instructions refer to the KWG-DVR series regulators and are intended to familiarize you with these KWG-DVR generator regulators and their intended use and to install and operate them safely, properly and efficiently.

Following the instructions in this operating manual helps to avoid hazards, unnecessary repair costs and downtime that could result from incorrect installation or operation. This also ensures a high level of reliability and a long service life for the controller.

Keep the instructions for the controller accessible to personnel at all times at the place of use until the product is disposed of.

The persons responsible for the installation, maintenance and servicing of the KWG-DVR generator controller must have read and understood this manual before installing and commissioning the system and must follow the instructions given in it. Follow the  chapter "3 Safety instructions".

The operators of the KWG-DVR generator controller must read and understand the following parts of the operating instructions and follow the instructions given therein before operating the system for the first time:

 Chapter 2 "Foreword and general information" on page 8

 Chapter 3 "Safety instructions" on page 13

 Chapter 4 "Description" on page 18

 Chapter 6 "Functional description of the generator regulator" on page 27

 Chapter 7 "Installation and commissioning" on page 28

 Chapter 8 "Maintenance" on page 40

The KWG-DVR generator governor may only be installed and used in compliance with all applicable national safety regulations and regulations on accident prevention and environmental protection.

We reserve the right to change the content of this documentation without prior notice. The illustrations do not necessarily correspond to the actual product.

The document is double-sided. The document must therefore be printed double-sided / duplex.

## 2.2 Display of warnings

For better differentiation, hazardous risks are identified in the instructions by the following warning signs and signal words.



### **DANGER**

Disregarding such warnings can lead to serious injury or even death.



### **WARNING**

Disregarding such warnings can lead to serious injury or even death.



### **CAUTION**

Disregarding such warnings can lead to minor to moderate injuries.

### **ATTENTION**

Indicates a potentially harmful situation that can lead to damage to the device or the surrounding area.

### **NOTE**

This information provides you with additional advice and tips to make your work easier.

## 2.3 Presentation conventions

The following presentation conventions are used:

Name	Representation	Function
Instruction for action 1st level	1), 2) etc.	Prompts an action.
Instruction for action 2nd level	a), b) etc.	Designates a section in a sequence of actions.
Enumeration in safety instructions	➤	Indicates individual elements of the enumeration in safety instructions.
Enumeration	•	Indicates individual elements of the enumeration.
Emphasis	▪	Indicates important remarks.
Cross reference		Reference within this document to another chapter or to a more detailed document.
Figure reference/table		Reference to a figure or table.

### 2.3.1 Extended symbolism

#### **1** Definition of components

defines components or parts.

## 2.4 Intended use of the KWG-DVR generator regulator

The controllers are components of machines and systems that are intended for industrial and professional use and therefore cannot be treated as retail goods. The controllers have primarily been developed and designed for KWG generator systems.

The controllers may only be used in accordance with the information on the rating plate, the type-specific data sheet or in accordance with a special release. This primarily relates to the most important data, such as the supply voltage and nominal excitation current.

### ATTENTION

The regulator does not provide adequate short-circuit protection for the downstream mains system. The generator outputs on the regulator must be protected against overcurrent and short circuits by suitable fuse devices and must not be connected to other power distribution or power generation systems without express written permission.

The controller is cast in an aluminum heat sink and is vibration-resistant. Thanks to the full encapsulation, the regulator is extremely robust and vibration-resistant. To achieve the full service life of the system, the controller should not be exposed to unnecessary vibrations. Precautionary measures for this can be a soft, vibration-resistant mounting.

### ATTENTION

Moisture and wetness on the regulator circuit board or on the regulator potting can destroy the regulator and as a result the connected generator can be damaged.

The installation space of the regulator must guarantee protection class IP54. To achieve protection class IP54, the regulator must either be screwed into the generator terminal box with the seal provided or installed in the external switch box provided for this purpose.

If the controller is properly installed on the generator, where the installation area fulfills at least IP54, operation and storage outdoors is permitted.

For a definition of the IP protection class, see  chapter 4.4 "Overview of protection classes (IP code)" on page 24.

The installation and operating location must be selected in such a way that a sufficient supply of fresh air is always guaranteed.

The rated output data of the controllers is valid for ambient temperatures < 60 °C and installation altitudes up to 1000 m above sea level. Operation at temperatures > 60 °C and > 1000 m installation altitude is only permitted after special acceptance and approval.

For cleaning and maintenance, see  chapter 8 "Maintenance" on page 40

### 2.4.1 Standards and regulations

The KWG controller systems comply with DIN EN 60034 / VDE0530 and are RoHS compliant.

## 2.5 Warranty

The controllers may only be used for the applications specified here and only in accordance with the information in these operating instructions. KW-Generator GmbH accepts no liability for improper use or misuse of the controllers.

No modifications may be made to the controllers. Any modification, improper repair or use of unsuitable third-party parts will invalidate any warranty claims. KW-Generator GmbH accepts no liability in this case.

## 2.6 Guarantee

If no special guarantee arrangements have been concluded in writing for type-related applications and customers, we shall grant a guarantee in accordance with the general European provisions.

## 3 SAFETY INSTRUCTIONS

Always observe the safety instructions listed in this chapter when working with the controllers. These are supplemented by additional specific warnings that only apply to certain actions and activities. These specific warnings are indicated at the relevant points in the manual and highlighted accordingly.

### 3.1 Qualification of staff

Installation, commissioning, operation, inspection, maintenance and repair work as well as the transport of the machine, controller or system may only be carried out by authorized and qualified specialist personnel.

Qualified personnel are persons who, on the basis of their training, experience and instruction, as well as their knowledge of relevant standards, regulations, accident prevention regulations and operating conditions, have been authorized by the person responsible for the safety of the component/system to carry out the required activities and are able to recognize and avoid possible hazards.

### 3.2 Safe operation - safety instructions

The following safety instructions must be observed when operating the controller.



#### **DANGER**

Non-compliance with warnings and safety instructions

#### **Death or serious injury**

- All safety and warning instructions must be followed!
- Before carrying out any work on the appliance, switch it off completely and secure it against unintentional restarting.
- The regulators may only be operated with the protective covers correctly fitted.
- Do not operate the controllers in potentially explosive atmospheres.
- Never carry out visual inspections for maintenance purposes and cleaning work on the controllers during operation.



### CAUTION



Hot surfaces

#### Risk of burns

- The generators and regulators can be very hot during and after operation. Do not touch the generator during operation and allow the generator and controller to cool down completely after use.

### ATTENTION

Never expose the generator and the regulator to jets from high-pressure cleaners. This could damage the appliance.

## 3.3 Safe operation - safety rules

The following safety instructions must be observed when installing and working on the controllers.

### 3.3.1 Safety rules for working on electrical systems

Always follow the five safety rules for working on electrical systems when working on the generators/regulators:

- Unlock.
- Secure against restarting.
- Check that there is no voltage.
- Earthing and short-circuiting.
- Cover or block off neighboring live parts.

### 3.3.2 Safety instructions for installation, maintenance and repair



#### **DANGER**

Non-compliance with warnings and safety instructions

##### **Death or serious injury**

- All safety and warning instructions must be followed!
- Before carrying out any work on the appliance, switch it off completely and secure it against unintentional restarting.
- Work on electrical systems and on the generators and/or controllers may only be carried out by trained specialist personnel and in accordance with the applicable national regulations.
- Do not operate the controller in potentially explosive atmospheres.
- Never carry out visual inspections for maintenance purposes and cleaning work on the generators during operation.



#### **DANGER**



Dangerous electrical voltage

##### **Death or serious injury due to electric shock**

- Before working on the appliance, it must be disconnected from the power supply!
- Work on electrical systems and controllers may only be carried out when they are switched off and de-energized. Drive units that have been switched off must be secured against unintentional restarting (including existing auxiliary circuits).
- Unauthorized persons, children and animals must not have access to the generator/regulator during and after operation.



## WARNING



Rotating machine parts

### Death or serious injury from being pulled in

- Before working on the appliance, it must be disconnected from the power supply!
- Work on electrical systems and generators/controllers may only be carried out when they are switched off and de-energized. Switched-off drive units must be secured against unintentional restarting (e.g. by removing and keeping the ignition key).
- Have the generators turned off.
- Use personal protective equipment for long hair [see  chapter 3.4 "Personal protective equipment" on page 16 or a hair tie.
- Unauthorized persons, children and animals must not have access to the generator/regulator during and after operation.

## 3.4 Personal protective equipment

Personal protective equipment is required and must be used for various activities on the device/system.

The specialist companies must provide sufficient protective equipment for their personnel and supervisors must check that it is worn.

Commandment sign	Meaning	Explanation
	Use eye protection M004	Eye protection must be used wherever biological, chemical, thermal, mechanical, optical or electrical hazards occur that can enter the eyes and damage them in a fraction of a second.
	Use foot protection M008	Safety shoes must be used wherever slippery floor coverings, falling or protruding sharp objects, obstacles of any kind, cold, wet, heat, aggressive liquids, dust and much more must be expected. Safety shoes in different categories offer acid-resistant, waterproof, nail penetration-resistant, slip-resistant or heat-resistant soles. Steel toecaps protect the toe area from broken bones, bruises and contusions.

Commandment sign	Meaning	Explanation
	Use hand protection M009	<p>Safety gloves must be used wherever injuries caused by stabs, cuts, burns or hypothermia as well as other harmful effects such as substances that can permanently damage the skin and, above all, severely damage the hands.</p> <p>Under no circumstances should safety gloves be used when working on rotating parts such as drills etc.</p>
	Use protective clothing M010	<p>Protective clothing must be used wherever special work tasks have to be carried out in extreme working conditions and the body may be damaged.</p> <p>Depending on the design, they can protect the wearer from heat, cold, moisture, vapors, radiation, electrical energy, flames, sparks, flammable liquids and chemical substances.</p> <p>High visibility vests, on the other hand, help to ensure that you are not overlooked.</p>
	Use head protection M014	<p>A safety helmet must be worn wherever falling, swinging, toppling or flying objects are likely to hit your head and cause injury.</p> <p>Long hair can cause serious accidents if it is caught by machines or machine parts. Hoods, scarves, caps or close-meshed hairnets are therefore required in appropriate work areas.</p>

## 4 DESCRIPTION

### 4.1 General structure

The regulators consist of a circuit board (basic version), which is fully encapsulated. The aluminum cover serves as a potting shell and seals the generator. At the same time, the aluminum cover serves as a heat sink for the power components of the regulator. The regulator cover is usually designed with through-holes  $\varnothing$  6 mm and fastened with M5 screws.

As the controller has a digital design, the control behavior and all I/O ports can only be set as parameters via software.

The trimmer (potentiometer) on the controller can also be parameterized. It is usually used for voltage correction  $\pm 5\%$  (or  $\pm 10\%$ ). The different colored LEDs are used for diagnostics and as a status display.

Communication can be established either via the J1939-CAN bus or via the analog input, the digital output, the digital input, the relay, the 1-phase or 3-phase current transformer, or via other additional modules.

An analogue input is also provided for a temperature sensor (KWG-NTC), which can be used to parameterize additional protective functions.

The controller supply must be a 3-phase voltage. For generators with 3-phase output windings (three-phase voltage system), the 3-phase regulator supply is also used for actual value measurement.

In single-phase systems, the sense input is controlled. In this case, the generator must be supplied via an electrically isolated 3-phase excitation winding.

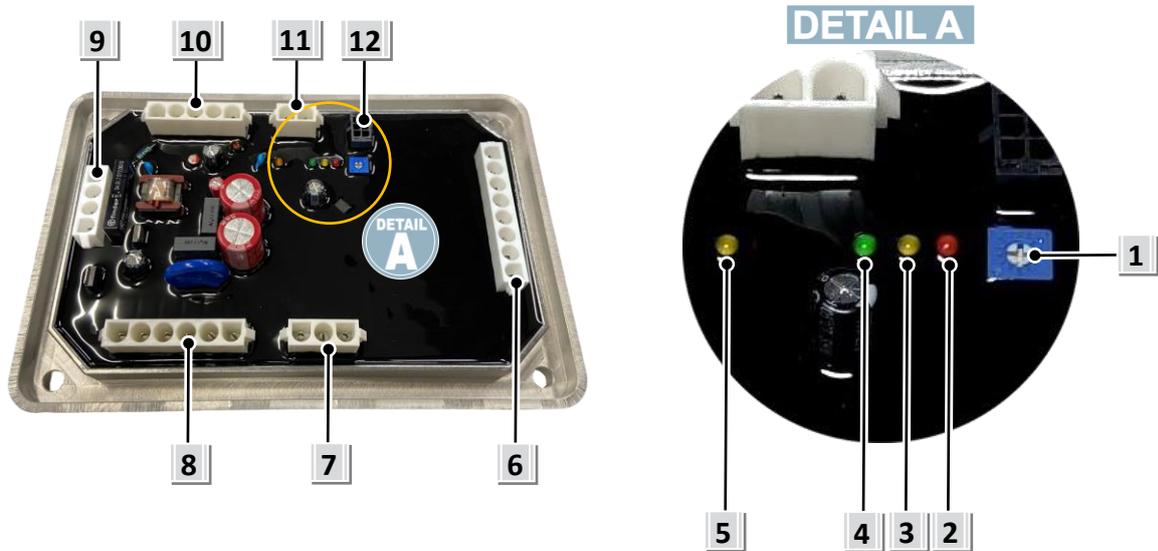


Illustration 1: Controller structure overview (fully equipped)

No.	Designation	Function
1	Potentiometer (trimmer)	Parameterizable; for adjusting parameters (e.g. for voltage correction)
2	LED red	Status of temperature limits <sup>1)</sup>
3	Yellow LED	Status f/U characteristic curve <sup>1)</sup>
4	Green LED	Status of excitation current, power and torque limiters <sup>1)</sup>
5	LED orange (from DVR5)	Phase error status, interruption <sup>1)</sup>
6	(optional)	Connection for digital I/Os
7	Sensor connection	Connection for sensor cables
8	Generator connection	Connection of the generator (supply)
9	(optional)	Relay output
10	CAN connection	Connection for the CAN connection
11	NTC connection	Connection of the KWG-NTC temperature sensor
12	Programming plug	Connection for programming the controller

Table 1: Controller structure overview

<sup>1)</sup> For a detailed description see [Table 4](#)

### 4.2 Type designations and serial numbers

Each KWG controller has an individual serial number, a software version and a parameter set. These can be found on the type plate.

#### NOTE

Please have the serial number, software version and parameter set ready in case of queries, repeat orders or spare parts orders.

#### 4.2.1 Type plate on the controller

DVR-5 Par210	←	Parameter set
V2048	←	Software version
Sn.: 94661	←	Serial number

Illustration 2Parameter set, software version, serial number of a controller (example)

Example for: Parameter set, software version, serial number:

Parameter set:	Par210
Software version:	V2048
Serial number:	94661

Table 2Parameter set, software version, serial number (example)

### 4.3 Technical data

The following table provides an overview of the general data of KWG controllers.

If no other data is listed in the type-specific data sheet, the data of the

☰ Table 3, Table 4 and Table 5 Validity.

<b>Functional features:</b>	
Maximum temperature range:	-40°C - +95°C
Temperature range nominal operation:	-35°C - +75°C
Service life at rated operation:	20.000h
Voltage range at ZU-ZV-ZW:	50 - 350 V AC (optional 50 - 560 V)
max. output current F1-F2:	5 A
min. Output current F1-F2:	0,002 A
permissible resistance at F1-F2:	10 - 50 Ohm
internal power loss at rated operation:	6 - 8 W
Pulse frequency of the output stage:	1 kHz
Current consumption without $I_{err}$ in rated operation:	approx. 40 - 60 mA (phase CLOSE/ZV/ZW)

Table 3 Technical data - Functional features

<b>Operating features:</b>	
Measurement of the voltage:	RMS pointer calculation
Protection of individual phases:	Phase-weighted voltage regulation
Excitation current accuracy at rated operation:	± 1 %
Excitation current accuracy max:	± 10 %
Static output voltage accuracy at nominal speed and at a speed range of ± 5 % of $n_N$ :	± 1 % (depending on the CREST factor)
Static output voltage accuracy max. at nominal speed and at speed range of ± 5 % of $n_N$ :	± 7 % (depending on CREST factor)
Dynamic voltage change:	< 25 % with nominal load switch-on and switch-off; (depending on parameter set)
Controller speed:	1 ms; Includes actual value acquisition, PID calculation and output of the manipulated variable
Settling time in practice:	0.05 to 0.5 s depending on application, generator type and parameter setting
Quasi-CREST factor:	2
Permissible distortion factor of the generator:	< 20 %
Auxiliary voltage for external:	10 V ± 5 %, max. 20 mA

Operating features:		
Optocoupler output:	Type: SFH6168-2 or similar.	
Optocoupler input:	Switching threshold:	5 V
	Nominal voltage:	12 - 24 V DC
	Voltage max:	Voltage max: $\pm 35$ V DC
	Input current at 12V:	approx. 5 mA
Analog input:	Impedance:	33 kOhm
	Nominal voltage:	0 - 10 V DC
	Voltage max:	$\pm 35$ V DC
Relay (optionally equipped)	1x NO contact - Ag-Ni, 6 A	
	250 V, AC1, 1500 VA	
	230 V, AC15, 300 VA	
	Minimum current:	10mA
	mech. service life:	10 x 10 <sup>6</sup> Switching cycles
	electrical service life AC1:	60 x 10 <sup>3</sup> Switching cycles
permissible temperature sensor:	KWG-NTC	
CAN:	SAE J1939	
	Broadcast J1939-75	
	Peer-to-peer KWG additional data	
	Baud rate: 250 kbps	
LED's status display:	Red	flashes slowly at controller temperature limit
		lights up when the generator temperature is limited
	Yellow	Lights up when f/U characteristic active
	Green	Lights up when I <sub>err</sub> limitation active
		flashes with power/torque limitation
	Orange (from DVR5)	lights up in the event of a phase error
flashes during run-on time (10s after the phase error has been rectified)		

Table 4 Technical data - Operating characteristics

<b>Mechanical features:</b>		
Controller weight (basic equipment):	550 - 600 g	
Dimensions (mm):	172 x 116 x 33	
Fastening:	4x M5	
	Hole spacing:	152 x 96 mm
	Screw tightening torque:	5 Nm
Heat sink (also potting cover):	Chill casting AL239	
	KWG drawing:	KZ002-001-001
Suitable seal:	KWG no:	PTZ-348
Potting material:	2-component PU casting compound	
Vibration resistant:	5g	

Table 5 Technical data - Mechanical features

### 4.4 Overview of protection classes (IP code)

#### NOTE

Here is an excerpt from the EN 60529 standard (degrees of protection provided by enclosures (IP code)).

Further information on the protection classes can be found in the current version of the EN 60529 standard.

#### Protection against contact and foreign bodies:

1. code number	Designation - Explanation
0	Not protected.
1	Protected against solid foreign objects 50 mm in diameter and larger: The object probe (50 mm sphere) must not penetrate fully.
2	Protected against solid foreign bodies 12.5 mm in diameter and larger: The object probe (12.5 mm sphere) must not penetrate fully. <u>Note:</u> Typically the ventilation slots in a PC power supply housing,...
3	Protected against solid foreign bodies 2.5 mm in diameter: The object probe (2.5 mm sphere) must not penetrate at all.
4	Protected against solid foreign bodies 1 mm and larger: The object probe (1 mm sphere) must not penetrate at all.
5	Dust-protected: Ingress of dust is not completely prevented, but dust must not penetrate in such quantities that the operation of the appliance or safety is impaired.
6	Dustproof: No ingress of dust at a negative pressure of 20 mbar in the housing.

Table 6 Protection classes - 1st digit: Protection against contact and foreign bodies

**Protection from water:**

2. code number	Designation - Explanation
0	No protection.
1	Protected against dripping water: Vertically falling drops must not have any harmful effects.
2	Protected against dripping water when the housing is tilted up to 15°: Vertically falling drops must not have any harmful effects if the housing is inclined by an angle of up to 15° on either side of the vertical.
3	Protected against water spray: Water sprayed at an angle of up to 60° on either side of the vertical must not have any harmful effects.
4	Protected against splash water: Water splashing against the housing from any direction must not have any harmful effects.
5	Protected against water jets: Water directed as a jet against the housing from any direction must not have any harmful effects. <u>Note:</u> Corresponds to approx. 12.5 liters/minute (garden hose). Test period approx. 5 minutes. (Data without guarantee.).
6	Protected against strong water jets: Water directed as a strong jet against the housing from any direction must not have any harmful effects.
7	Protected against the effects of temporary immersion in water: Water must not enter in a quantity that causes harmful effects when the enclosure is temporarily submerged in water under standardized pressure and time conditions.
8	Protected against the effects of permanent immersion in water: Water shall not enter in such quantity as to cause harmful effects when the enclosure is continuously immersed in water under conditions agreed between the manufacturer and the user. However, the conditions must be more severe than for code number 7.

Table 7: Protection classes - 2nd digit: Protection against water

## 5 TRANSPORTATION AND STORAGE

The regulator is supplied with the generator ready for installation. If the regulator is supplied already attached to the generator, the components are sealed with a protective film to protect them from water and dirt.

It is recommended that all components are carefully checked for transportation damage on arrival at their destination. Any visible damage must be reported immediately to the transport company involved and to KW-Generator GmbH.

The controller does not require maintenance during the storage period.

### ATTENTION

**Components may be damaged by moisture.**

- During transportation and storage, ensure that all covers and/or packaging are properly closed.
- If the controller is not put into operation immediately, it must be stored in a protected, clean, dry and vibration-free location.

Permissible temperatures:	
Transportation	-40 °C to +75 °C
Storage	-40 °C to +75 °C
Permissible relative humidity:	
Transportation	95 %, non-condensing
Storage	95 %, non-condensing

Table 8 Storage and transportation conditions

## 6 FUNCTIONAL DESCRIPTION OF THE GENERATOR REGULATOR

A KWG generator regulator must be used for safe operation of the KWG generator. The voltage regulator is matched to the respective generator type for safe and stable operation. The system is stable in all operating positions and ensures compliance with the guidelines and the requirements of the application. Adjustments can only be made at KWG, as all parameters are stored digitally in the controller software.

The generator regulator is connected to the generator via plug connections.

### NOTE

The technical enhancements of the DVR controller are fully hardware-compatible with the previous versions.

Additional modules such as current measurements remain identical.

The internal parameter structure can vary; all previous parameters remain unchanged.

### 6.1 General functions

- Excitation current controller: frequency-controlled PI
- Output voltage regulator: PID frequency-dependent
- Temperature limitation generator with NTC sensor: Setpoint specifications Table
- Generator temperature limitation with resistance measurement of the exciter stator winding: Setpoint specifications Table
- Temperature limitation of the controller temperature: Setpoint specifications Table
- Torque controller: PID
- Power controller: PID (requires current transformer module)
- Boost (short-term increase in the excitation current): Adjustable current value, duration and blocking time.
- Analog voltage specification: 0 - 10 V
- Voltage preset to set value via digital input
- Diverse assignment of the relay and optocoupler output
- CAN bus J1939
- Operating hours counter, history data for excitation current, frequency, temperature and max. values can be read out via CAN
- Auxiliary voltage for free external use (approx. 10 V)
- No external voltage required to operate the controller/generator
- Protection of the generator:
  - Excitation current limitation
  - Regulated output voltage over speed range
  - Temperature limitation
  - f/U characteristic (voltage over frequency)
  - f/I characteristic (excitation current over frequency)
  - Power/torque limitation
  - Missing sensor voltage (with sensor operation for 1-phase generators)

## 7 INSTALLATION AND COMMISSIONING

This chapter describes the installation and initial commissioning of the generator/controller.

Before installing and commissioning the controller, carefully read the  chapter 3 "Safety instructions".



### DANGER

Non-compliance with warnings and safety instructions

#### Death or serious injury

- All safety and warning instructions must be followed!
- Before carrying out any work on the appliance, switch it off completely and secure it against unintentional restarting.
- The regulators may only be operated with the protective covers correctly fitted.
- Do not operate the controllers in potentially explosive atmospheres.
- Unauthorized persons, children and animals must not have access to the generator/regulator during and after operation.
- The system must be equipped with the necessary protective devices in accordance with the statutory regulations.
- The generator/regulator may only be installed by authorized and qualified specialist personnel.



### WARNING

Danger from self-starting machines

#### Death or serious injury

- Do not start the generator until you have ensured that all the points listed in this chapter have been met.

## 7.1 Before installation

Before installation, check that:

- the controller is suitable for the generator type.
- the plug connections on the controller are correctly plugged in and firmly engaged.
- the mechanical assembly is correct.
- sufficient cooling air is available, no hot air is blowing on the regulator and that the regulator is not exposed to radiant heat (e.g. exhaust pipe).
- the connections on the terminal board are made correctly.
- the connections have been assigned correctly and there are no short circuits.
- the system is disconnected by the main switch or other disconnecting devices.

## 7.2 After installation

- Wait until the genset has reached its rated speed before switching on the system.
- Check the output voltage of the generator. If the deviations from the nominal voltage are too great, stop the generator immediately.
- If vibration tendencies are audible or measurable, stop the generator immediately and check whether the regulator is designed for the generator type.

### ATTENTION

#### **Damage due to oscillation tendency in the control circuit.**

- Check whether the controller is designed for the generator type in order to prevent damage to the controller, the generator, the drive unit, the drive train or the connected electrical equipment.

### 7.3 Avoiding damage during the insulation test

During an insulation test, the generator system is subjected to a withstand voltage (HV) or a surge test.

#### ATTENTION

**Damage due to insulation test.**

- Before carrying out an insulation test, the controller must be completely disconnected from all connections to prevent damage to the controller.
- Insulation tests may only be carried out by authorized electricians.

When testing the system with high voltage, the controller must always be disconnected before the test must be completely unplugged from the test specimen.

If a filter (xy) is installed in the system, it must be completely disconnected from the test specimen before the test.

## 7.4 Controller circuit diagrams

### 7.4.1 Controller assignment diagram

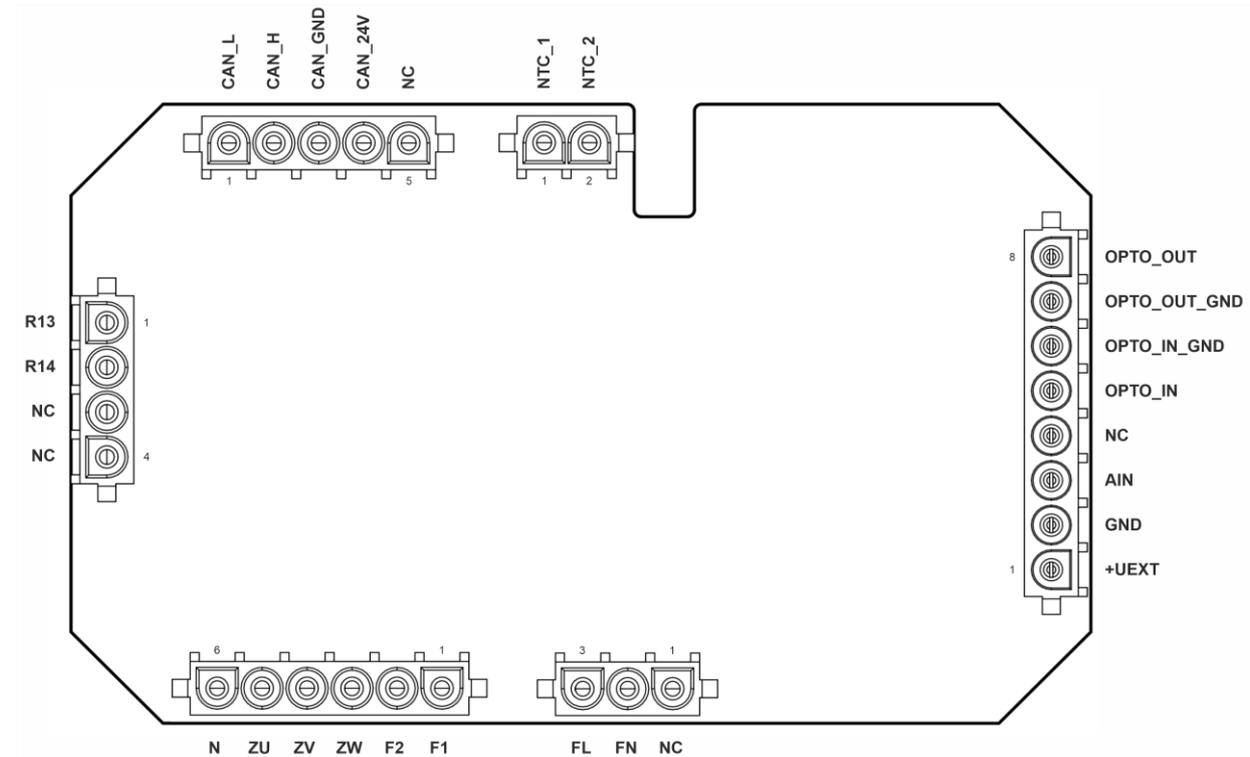


Illustration 3 Controller assignment diagram

### 7.4.2 Controller I/O ports block diagram

Circuit of the optocoupler I/O ports:

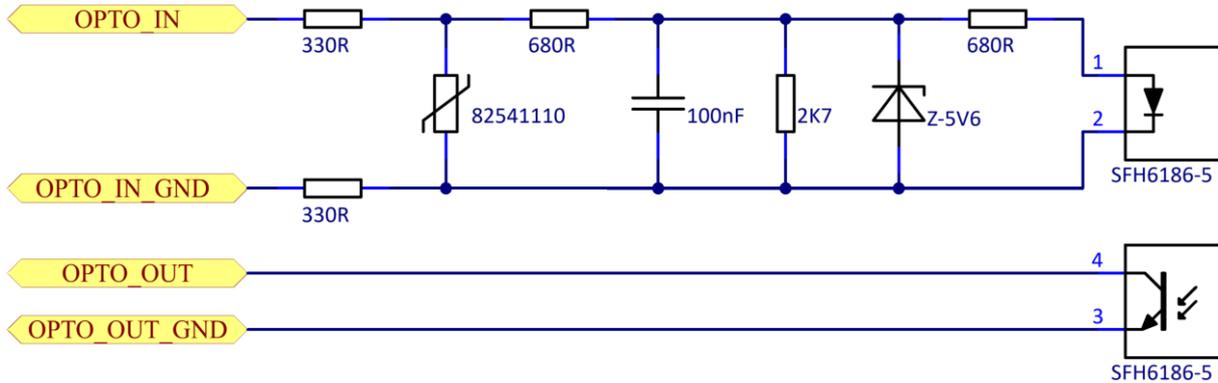


Illustration 4 Controller I/O ports block diagram

### 7.4.3 Block diagram of external 10 V circuit

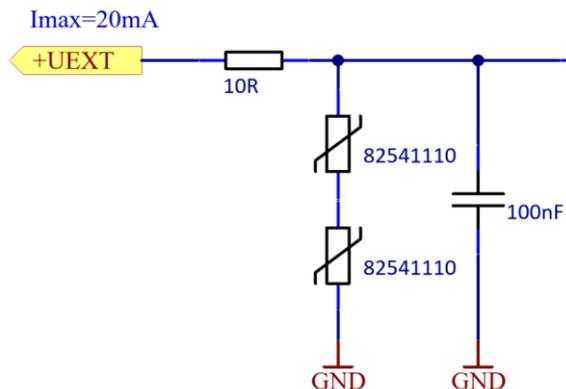


Illustration 5 Block diagram of external 10 V circuit

### 7.4.4 Block diagram Analog IN circuit

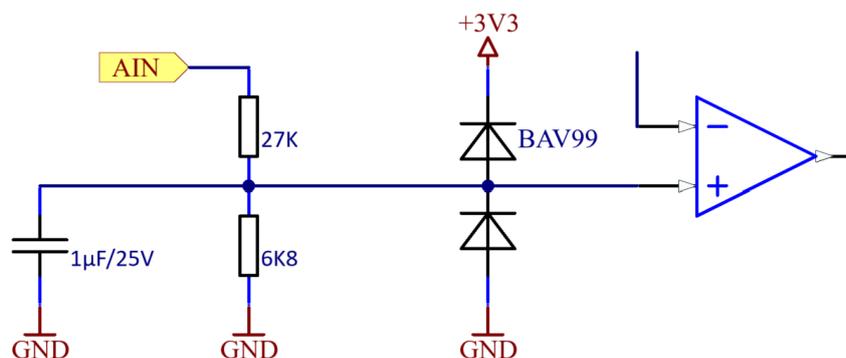


Illustration 6 Block diagram Analog IN circuit

### 7.4.5 Block diagram of relay circuit

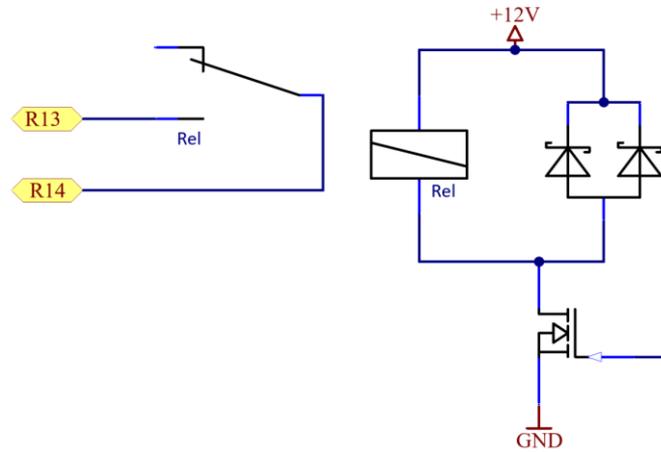


Illustration 7 Block diagram of relay circuit

## 7.5 Connection of the generator controller

### NOTE

The illustrations shown in the current chapter are symbolic images.

### 7.5.1 Generator with three-phase winding and DVR regulator

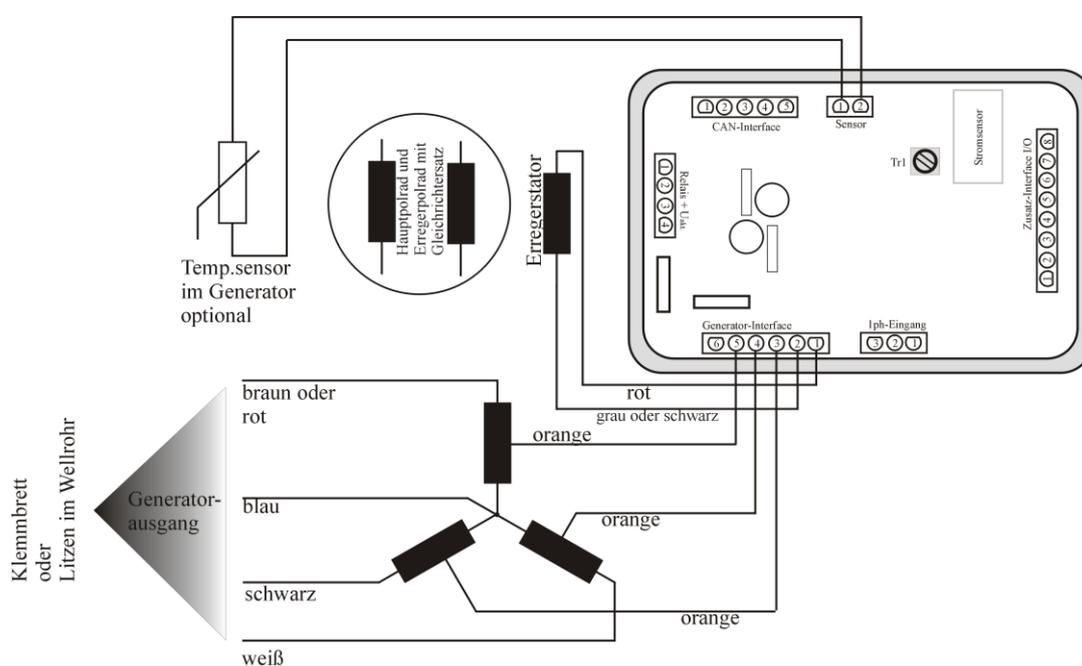


Illustration 8 Connection: Generator with three-phase winding and DVR regulator



### 7.5.3 Generator regulator pin assignment

DVR controller	
Generator interface	1 = F1 2 = F2 3 = ZW 4 = ZV 5 = CLOSED 6 = N (optional when using the current measurement module and CAN J1939 broadcast data)
CAN interface	1 = CAN_LOW 2 = CAN_HIGH 3 = CAN_GND 4 = CAN_24 V (+9 V to +30 V) 5 = nc
Sense input	1 = nc 2 = Sensor FN 3 = Sensor FL
Relay interface	1 = R13 (NO relay) 2 = R14 (COM relay) 3 = nc 4 = nc
Sensor	1 = NTC_1 2 = NTC_2
Additional I/O interface	1 = +UEXT (+10 V Ref-Out, 20 mA max.) 2 = GND 3 = AIN (Analog Input) 4 = nc 5 = OPTO_IN 6 = OPTO_IN_GND 7 = OPTO_OUT_GND 8 = OPTO_OUT

Table 9: Pin assignment: DVR controller

### 7.5.4 Interface to the KWG iso-monitor / optional current transformer equipment

In addition to the stand-alone operating mode, the KWG insulation monitor offers the option of communicating with the KWG generator controller. The insulation value is output via the CAN BUS. At the same time, the insulation value can be further processed in the KWG generator controller and used to control relays, for example. When the 3-phase current transformer is fitted, the current is measured and data is output via the CAN bus. At the same time, the power, cos PHI, torque, etc. can be calculated from the current value. Optionally, power or torque can be limited in the KWG generator controller.

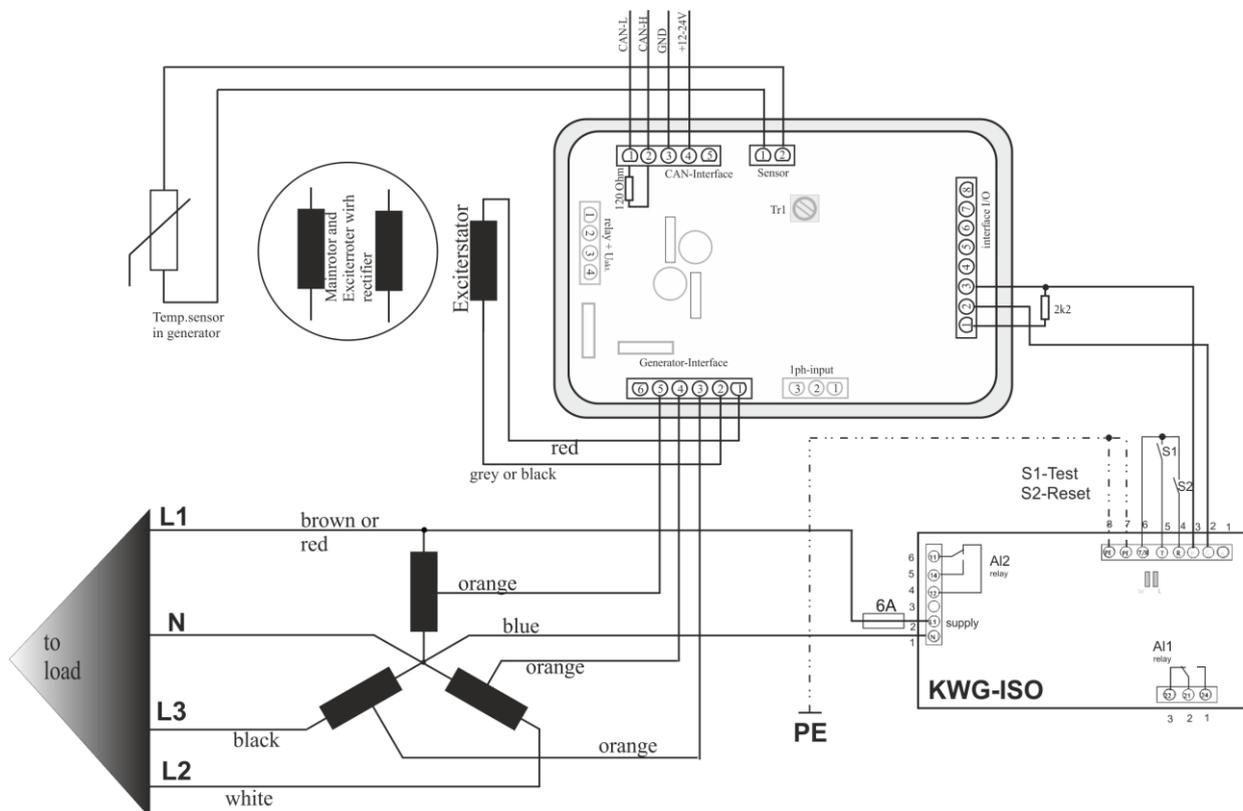


Illustration 10 Interface to the KWG iso-monitor / optional current transformer equipment

### 7.5.5 Connection with current transformer equipment

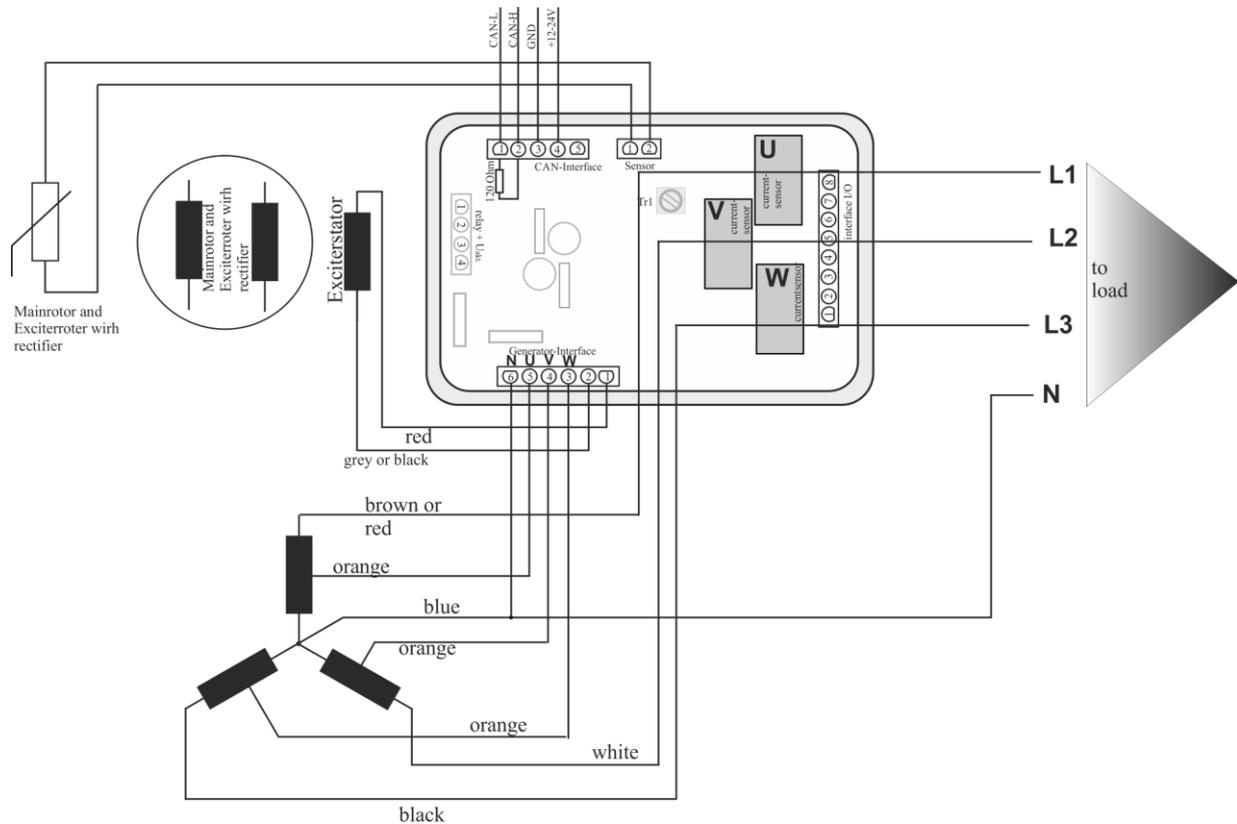


Illustration 11 Connection with current transformer equipment

### 7.5.6 Connection with current transformer equipment and insulation monitoring

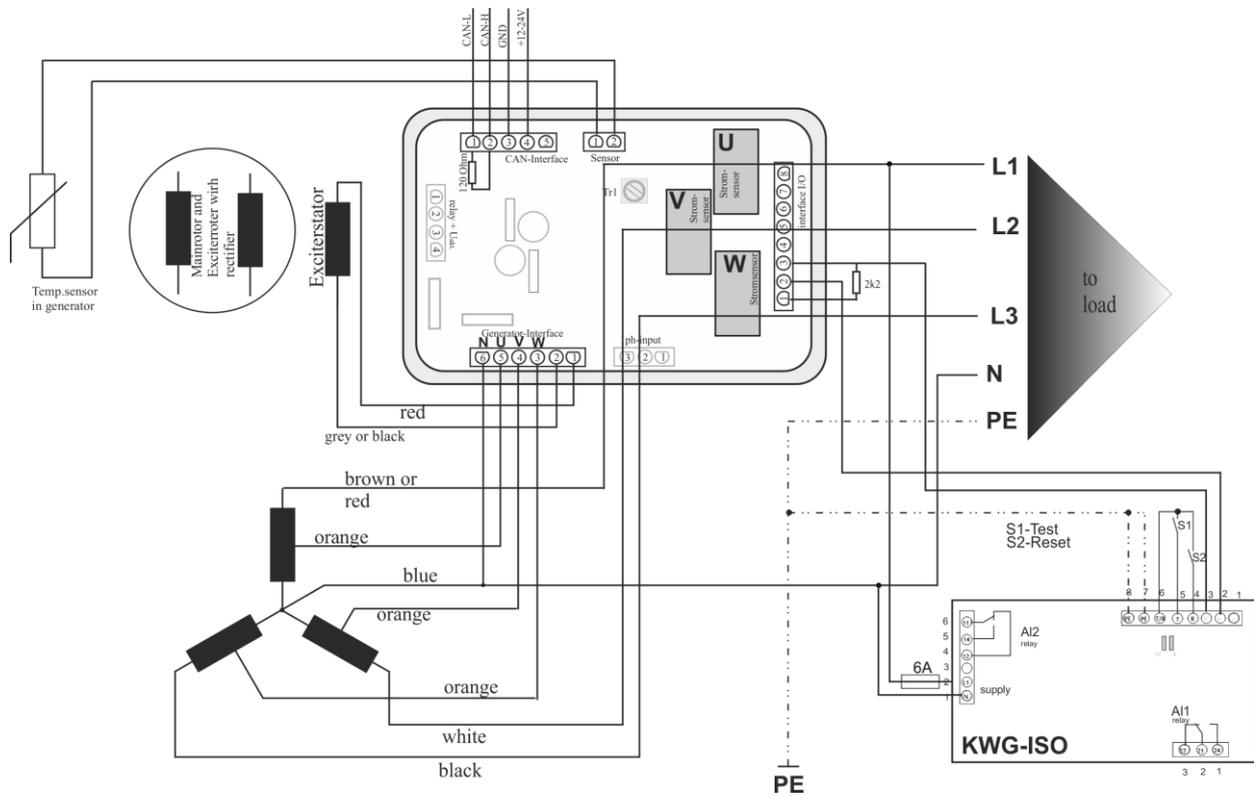


Illustration 12 Connection with current transformer equipment and insulation monitoring

### 8 MAINTENANCE



#### DANGER



Dangerous electrical voltage

#### Death or serious injury due to electric shock

- Visual inspections and cleaning work on the generator/regulator for maintenance purposes must never be carried out during operation.



#### CAUTION



Hot surfaces

#### Risk of burns

- Parts of the generator/controller can be very hot during and after operation. Do not touch the generator/controller during operation and allow it to cool down completely after use.
- Wear safety gloves.

#### ATTENTION

#### Damage to components due to water ingress possible.

- Never expose the generator to jets from high-pressure cleaners.

Maintenance work must be carried out regularly and on time to ensure reliable operation of the system.

All components of the controller are maintenance-free. Damage and defects to the regulator must be rectified immediately by authorized and qualified specialist personnel, regardless of the maintenance intervals. The generator must not be put into operation until defects have been rectified. Repair work may only be carried out by trained specialist personnel. The regulator must be checked regularly for excessive soiling of the cooling surface and cleaned if necessary.

It may be necessary to carry out checks on the drive system in accordance with the specifications and regulations of the respective drive/system manufacturer. This also includes fitted protective covers.

Observe the maintenance instructions of the drive or system manufacturer. The generator may only be opened by KW-Generator GmbH or an authorized service centre. It does not contain any parts that can be replaced or repaired by the user.

Before installing and commissioning the generator, carefully read the  chapter "3 Safety instructions".

## 9 TROUBLESHOOTING



### DANGER



Dangerous electrical voltage

**Death or serious injury due to electric shock**

- All troubleshooting/repair work on the generator system may only be carried out by a qualified electrician.

### 9.1 Troubleshooting

Detailed information on troubleshooting can be found in the operating instructions  "KWG\_Generator\_Operating-Manual" in the chapter "Troubleshooting".

## **10 REPAIR**

No repair or maintenance work can be carried out on the components of the controller by the user. We strongly recommend that you remove the controller for this work and send it to KW-Generator GmbH.

## 11 DECOMMISSIONING, UNINSTALLATION



### DANGER



Dangerous electrical voltage

#### Death or serious injury due to electric shock

- Before working on the appliance, it must be disconnected from the power supply and de-energized!
- Work on electrical systems and generators may only be carried out when they are switched off and de-energized. Switched-off drive units must be secured against unintentional restarting (including existing auxiliary circuits).



### WARNING

Danger from self-starting machines

#### Death or serious injury

- Before removing the regulator, make sure that the unit cannot be started automatically or manually.

### ATTENTION

#### Damage due to improper plug removal.

- When disconnecting the plug, do not pull on the cable strands, as these could come loose from the plug contact and this could lead to an electrical interruption.

## 12 WASTE DISPOSAL

Observe the applicable legal regulations when disposing of or recycling generator systems that are no longer functional. If necessary, commission a disposal company. Further information can be obtained from the responsible environmental authorities or from KW-Generator GmbH as well as from the type-specific data sheet.

Designation	Material
Controller	Disposal as industrial electronics scrap.  The regulator is lead-free, contains a hardened PU potting compound and the heat sink is cast in AL239.

Table 10 Disposal

### **13 SPARE PARTS**

Please contact KW-Generator GmbH directly for spare parts due to the wide range of possible variants.