Contents

This document is the original document.

Introduction

Validity of documentation

This documentation is valid for the product **SIL_QRBDUVOOM125** (AIDA pin assignment).

This operating manual explains the function and operation, describes the installation and provides guidelines on how to connect the product.

Using the documentation

This document is intended for instruction. Only install and commission the product if you have read and understood this document. The document should be retained for future reference.

Definition of symbols

Information that is particularly important is identified as follows:

DANGER!

This warning must be heeded! It warns of a hazardous situation that poses an immediate threat of serious injury and death and indicates preventive measures that can be taken.

WARNING!

This warning must be heeded! It warns of a hazardous situation that could lead to serious injury and death and indicates preventive measures that can be taken.

CAUTION!

This refers to a hazard that can lead to a less serious or minor injury plus material damage, and also provides on preventive measures that can be taken.

IMPORTANT

This describes a situation in which the product or devices could be damaged and also provides information on preventive measures that can be taken. It also highlights areas within the text that are of particular importance.

INFORMATION

This gives advice on applications and provides information on special features.

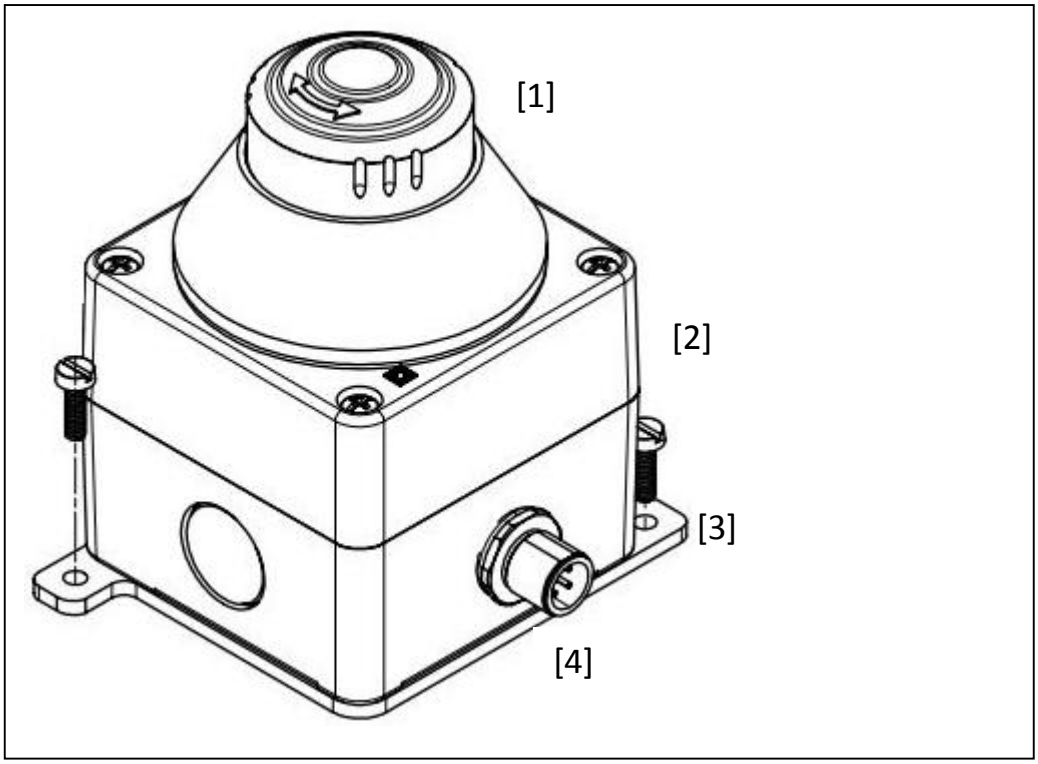
Overview

Unit features

- Consisting of the emergency-stop set "SET_QRBDUV_01", but mounted into the SIL plastic enclosure with M12 connector and mounting plate for an easy installation
- Emergency-stop device in accordance with EN 60204-1, EN ISO 13849-1, EN ISO 13850 and EN 60947-5-5, contacts in accordance with EN 60947-5-1
- Clear visual display in case the emergency-stop function is active
- In inactive state, the emergency-stop is not illuminated and it can no longer be identified as an emergency-stop
- turn in either direction to release
- Anti-lock collar

  Integrated flashing function of the yellow anti-lock collar after operating the emergency-stop
- Connection to an evaluation unit via a 5 pole M12 connector

Scope of supply



Legend

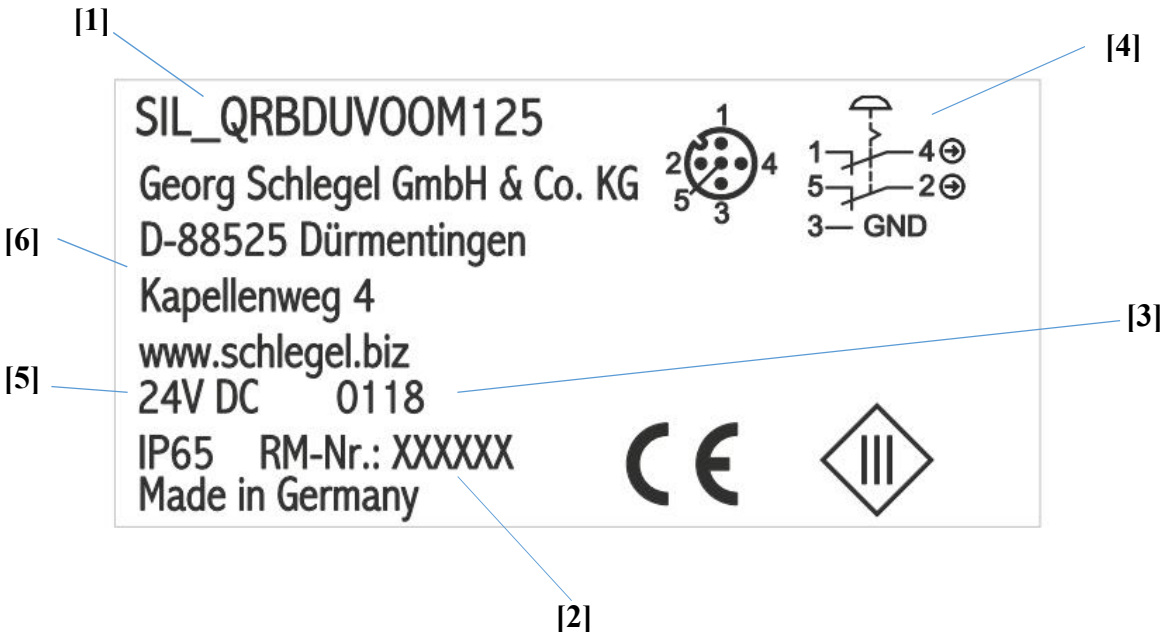
[1] Emergency-stop button QRBDUV (SET_QRBDUV_01, internally wired)

[2] Plastic enclosure SIL22/1

[3] Mounting plate (M4 screws not included in the scope of delivery)

[4] 5 pole M12 connector, A coded

Printing on the enclosure



Legend

[1] Type reference
[2] Production lot number
[3] Production date (mmyy)
[4] Pin assignment
[5] Electrical data
[6] Manufacturer's address

Safety

Intended use

By operating the active emergency-stop the emergency-stop function is triggered and the voltage to the evaluation device is interrupted (two-channel, fully operated).

In active state the emergency-stop device SIL_QRBDUVOOM125 is illuminated (the actuator lights up red) and fulfils the requirements in accordance with EN ISO 13850.

In inactive state the emergency-stop device SIL_QRBDUVOOM125 is not illuminated and it cannot be identified as emergency-stop device. The emergency-stop function is deactivated.

The safety function of the emergency-stop device is:

- Ensuring that the red lighting can be detected under defined environmental conditions.
  In case of lighting failure of the red illumination of the active emergency-stop device the emergency-stop function is triggered and the voltage to the evaluation device is interrupted (one-channel, partially operated).

CAUTION!

It must not be possible to bypass the emergency-stop. Otherwise, depending on the application, material damage and severe injuries may result.

The emergency-stop must **not** be used as substitute for other safety measures.

WARNING!

Loss of the safety function by deactivating the emergency-stop device.

Deactivating the emergency-stop device may result in serious injury and death.
The emergency-stop function must only be deactivated when the machine/plant is in an operating mode that does not become dangerous to the operator, or when the safety function is implemented by other measures.

IMPORTANT

The emergency-stop device must only be used indoor and must be protected from direct sunlight. Its brightness covers the scope of the workplace regulation ASR A3.4 for common industrial environment.

IMPORTANT

The emergency-stop device must not be used in an atmosphere with a high degree of hydrogen sulphide (H_2S), e.g. in sewage plants and farms.

IMPORTANT

The emergency-stop enclosure must not be opened.

IMPORTANT

Only one active/inactive emergency-stop (e.g. SET_QRBDUV_01) per circuit may be used (no cascading).

The following is deemed as improper use in particular

- Any component, technical or electrical modification of the product
- Use of the product in areas not described in this operating manual
- Use of the product differing from the technical details (see "Technical Data")

IMPORTANT

EMC-compliant electrical installation

The product is defined for use in an industrial environment. The product may cause interference if installed in other environments. If installed in other environments, measures should be taken to comply with the applicable standards and directives for the respective installation site with regard to interference.

Safety regulations

Safety assessment

Before using a device it is necessary to perform a safety assessment in accordance with the Machinery Directive.

Functional safety is guaranteed for the product as a single component. However, this does not guarantee the functional safety of the overall machine/plant. In order to achieve the required safety level for the overall machine/plant, define the safety requirements for the machine/plant and how those must be implemented from the technical and organisational view.

Qualification of the personnel

The products may only be assembled, installed, programmed, commissioned, operated, decommissioned and maintained by competent persons.

A competent person is a qualified and skilled person who, based on their training, experience and current professional activity, has the specialist knowledge required. In order to be able to inspect, assess and operate devices, systems, machines and installations, the person has to have knowledge on the state of the art and the applicable national, European and international laws, directives and standards.

It is the company's responsibility only to employ personnel who

- is familiar with the basic regulations concerning work safety and accident prevention,
- has read and understood the information provided in the section entitled Safety in this manual and
- has a good knowledge of the basic and technical standards applicable to the specific application.

Warranty and liability

All claims to warranty and liability will be rendered invalid if

- the product was used contrary to the purposes for which it is intended,
- damage results from having not followed the guidelines in the manual,
- the operating personnel is not suitably qualified,
- or if any type of modification has been made (e.g. exchanging of components on the PCB, soldering work etc.).

Disposal

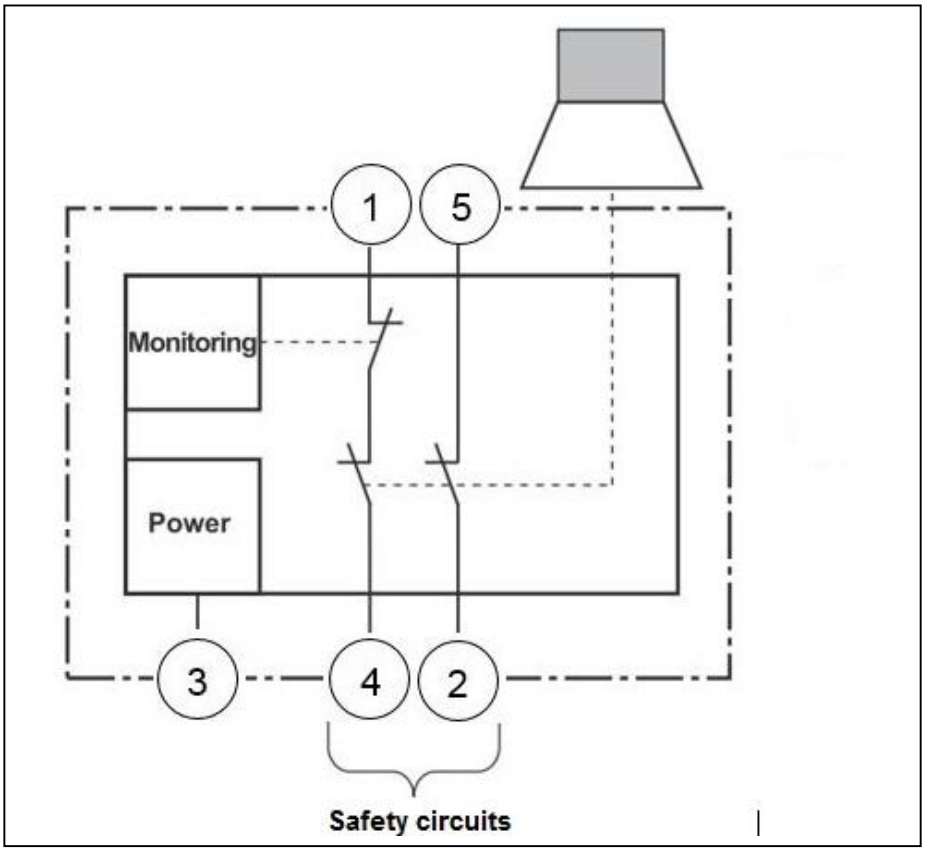
- In safety-related applications, please comply with the mission time T_M in the safety-related characteristic values.
- When decommissioning, please comply with the local regulations regarding the disposal of electronic devices (e.g. Electrical and Electronic Equipment Act).

For your safety

The unit meets all necessary conditions for a safe operation. However, please note the following:

- Check the function of the actuator prior to the first commissioning and then at regular intervals (at least annualy).

Block diagram/terminal configuration (pin assignment AIDA)



Description of function

The emergency-stop is active when actuator and anti-lock collar are being illuminated. If the emergency-stop is activated, the two safety circuits pin 1-4 and pin 5-2. The emergency-stop is locked. The yellow LEDs are flashing.

The emergency-stop function must be reset deliberately by unlocking the emergency-stop (turn to the left or right).

The emergency-stop function is inactive if the connections pin 1 and pin 5 are disconnected from the supply. The illumination turns off, the emergency-stop is without function.

The emergency-stop device detects whether the red illumination is defective and it opens the safety circuit pin 1-4.

Operating states

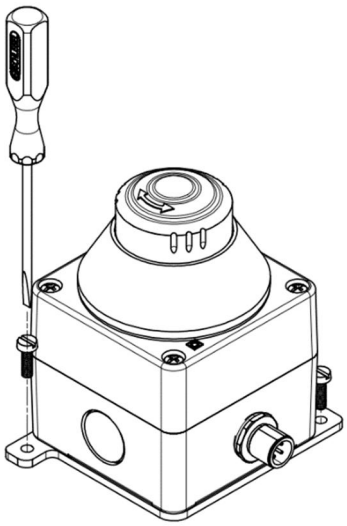
- **Active:** The emergency-stop is electrically supplied and it is not operated. The emergency-stop is illuminated red, the anti-lock collar is illuminated yellow.
- **Inactive:** The emergency-stop is not electrically supplied and thus not illuminated.
- **Triggered:** The emergency-stop is in active state, the actuator has been pushed and thus is locked. The two safety circuits are opened (fully operated). The emergency-stop is illuminated red, the anti-lock collar is flashing yellow.

Installation

CAUTION!

Always install the device with the supply voltage switched off.

- Fix the mounting plate with M4 screws (not included in the scope of delivery
- Secure the screws against loosening with a screw adhesive (e.g. locking varnish)



Wiring

Please note:

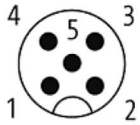
- Information given in section "Technical Data" must be followed.
- The power supply must meet the regulations for PELV in accordance with EN 60204-1.
- The maximum cable length depends on the conductor section used and the current requirement of the input circuits of the connected evaluation device. In case of a maximum current consumption of 100 mA, plus the current of the input circuits of the evaluation device, a rated operating voltage of 24 V (tolerance: -20 %/+15 %), that is at least 19.2 V, must be available for the emergency-stop.

Preparing for operation

IMPORTANT

Check the function of the emergency-stop device before commissioning for the first time and then at regular intervals (at least annually).

Assignment of the 5 pole M12 male connector



PIN	Function (pin assignment: AIDA)
1	Safety contact/test clock channel 1
2	Safety contact channel 2
3	0V U_B
4	Safety contact channel 1
5	Safety contact/test clock channel 2

Requirements and connection to evaluation devices

For the use of SIL_QRBDUVOOM125 an evaluation device must be connected.

Connect the SIL_QRBDUVOOM125 with an evaluation device having the defined characteristics (see section "Defined characteristics of evaluation devices")

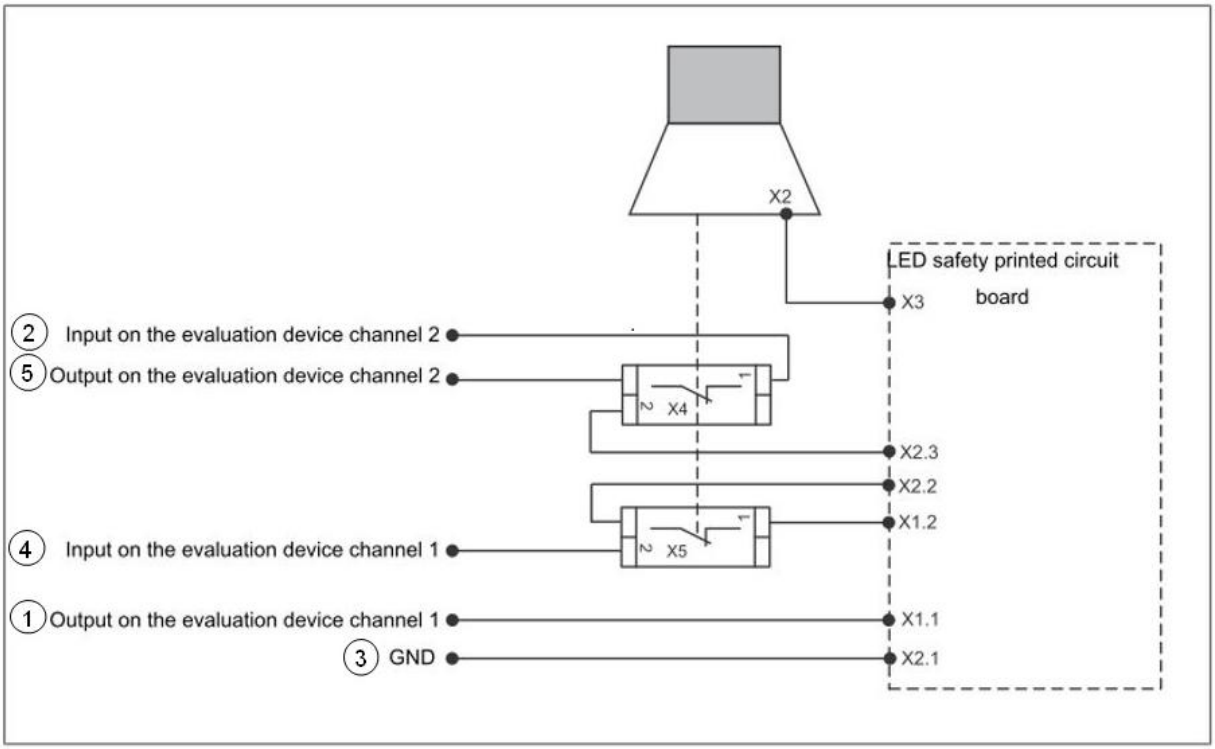


Fig.: AIDA pin assignment, flashing function is active

Defined characteristics of evaluation devices:

- Dual-channel with identification of partial operation (only one channel of the input circuit is open)
- Cross-wire monitoring and earth fault detection: Cross-wire monitoring is also possible via a positive or negative input circuit
- Digital inputs type 2 in accordance with EN 61131-2
- Time-shifted test cycles (not overlapping) with a maximum on/off test pulse duration of 7.5 ms

Connect the evaluation device as described in the operation manual of the evaluation device.
Please note:

- Safe disconnection of the outputs to voltages of more than 60 V
- The power supply that feeds the evaluation device must meet the regulations for PELV in accordance with EN 60204-1.
- The evaluation device must meet the requirements in the "Technical data". The specified values must not be exceeded.
- On the LED safety printed circuit board there are two permanently installed safety fuses. If the fuses are tripped by overcurrent or overvoltage, the LED safety printed circuit board must be exchanged.

Ensure that the wiring and EMC requirements of IEC 60204-1 are met.

- Use a customary 5 pole unshielded cable with a A coded M12 socket plug to connect the evaluation device to the emergency-stop.

IMPORTANT

Check external connection wiring!

Check the function of the emergency-stop before commissioning the machine/plant. The evaluation device must switch off when operating the emergency-stop button.
If the evaluation device does not switch off, there may be a wrong wiring.

Failures/Malfunctions

- Failure of the LED of the emergency-stop button
  If more than 1 red LED is defective, one of the two safety contacts of the emergency-stop will open.
  Remedy: Replace the device.
- Input voltage at channel 1 and channel 2 too low
  If the input voltage is to low, on the the two safety channels of the emergency-stop will open.
  Remedy: Check details acc. to section "Wiring"
- Interruption GND
  If the connection to GND is interrupted, one of the two safety contacts of the emergency-stop will open.
  Remedy: Check details acc. to section "Wiring"

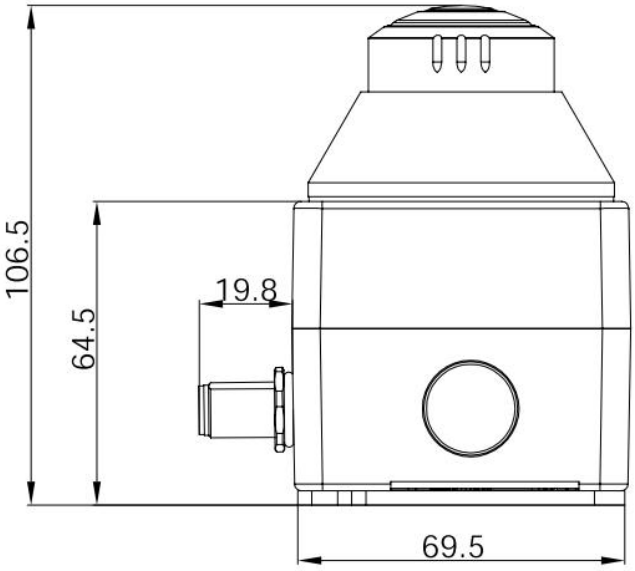
The operating conditions of the illumination are:

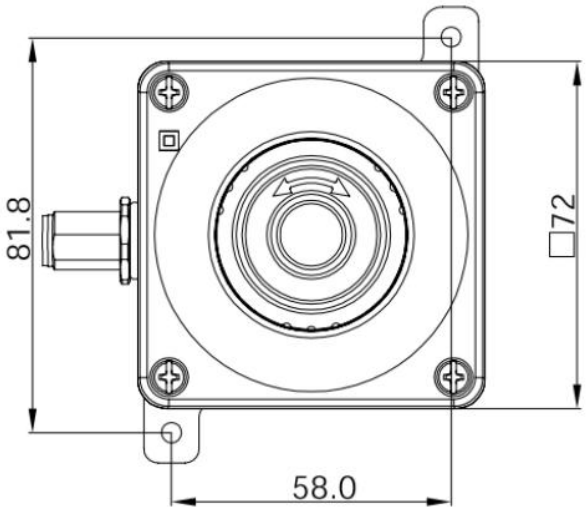
- Permanent red illumination of the actuator
- Permanent yellow illumination of the anti-lock collar
- Flashing yellow illumination of the anti-lock collar after operating the emergency-stop device
- For all other conditions the wiring must be checked and the emergency-stop must be exchanged, if necessary.

Service and maintenance

During operation, the light sources lose brightness. The device is designed for sufficient brightness for an operating time of 20 years. Check in regular intervals, at least once per year as part of the function test, whether the illumination of the emergency-stop is still clearly visible. Dust, soot and other deposits have an influence on the brightness. If necessary, the emergency-stop button must be cleaned or the device must be exchanged.

Dimensions in mm





Technical data

General	
Illuminant	
Kind	**LED**
Colour	**yellow, red**
Electrical Data	
Rated operating voltage	**24 V**
Voltage tolereance	**-20% / +15%**
Power consumption	**2.1 W**
Conditional short circuit current	**100 A**
Protection class	**III**
Power loss	**0.7 W**
Emergency-stop	
Release type emergency-stop	**turn to release**
Minimum operating current (I_m)	**5 mA**
Voltage drop (U_d)	**0.5 V**
Residual current (I_r)	**3 µA**
Utilisation category	
in accordance with the standard	**EN 60947-5-1**
DC13 at	**24 V**
current	**0.3 A**
Conventional thermal current (I_{the})	**0.3 A**
Contact fuse protection, fuse quick-acting	**≤ 1 A**
Contact material	**AgNi**
Mechanical life	**6.050 cycles**
Bouncing time	**10 ms**
Environmental data	
Ambient temperature	
Temperature range	**-25 - 55 °C**
Storage temperature	
Temperature range	**-25 - 75 °C**
Vibrations	
Frequency	**10 - 55 Hz**
Amplitude	**0.35 mm**
Creapage and clearance distances	
in accordance with the standard	**EN 60947-5-1**
Overvoltage category	**II**
Pollution degree	**2**
Rated insulation voltage (U_i)	**50 V**
Rated impulse withstand voltage (U_{imp})	**0.5 kV**
Degree of protection	**IP65**

Mechanical Data	
Mounting position	**any**
Connection type	**5 pole M12, A coded**
Dimensions	
Height	**106.5 mm**
Width	**72 mm**
Depth	**89.3 mm** (incl. M12)

Where standards are undated, the 2017-08 latest editions shall apply.

Safety characteristic values

IMPORTANT

You must comply with the safety-related characteristic values in order to achieve the required safety level for your machine/plant.

Those figures are based on data of the installed type: SET_QRBDUV_01

Operating mode	EN ISO 13849-1: 2015	EN ISO 13849-1: 2015	EN ISO 13849-1: 2015 PFH_D [1/h]	EN ISO 13849-1: 2015 T_M [year]
Perceptibility of the red illumination in defined ambient conditions	**PL d**	**Cat. 2**	**3,00E-07**	**20**

Operating mode	EN ISO 13849-1: 2015 B10d
NC contacts	**100,000**

All units used within a safety function must be considered when calculating the safety characteristic values.

Please note that the Performance Level in accordance with EN 13849-1 can be reduced due to reduced fault detection if several emergency-stop devices are switched in series.

INFORMATION

The SIL-/PL values of a safety function are **not** identical to the SIL-/PL values of the units that are used and may be different. We recommend that you use customary software tools like e.g. SISTEMA or PAScal to calculate the SIL/PL values of the safety function.

Supplementary data

Permitted operating height

The values stated in the technical data apply to the use of the devices in operating heights up to max. 2000 m above sea level. When used in higher altitudes limitations have to be taken into account:

- Permitted maximum operating height 5000 m
- From an operating height of 2000 m the maximum permitted ambient temperature is reduced by 0.5 °C/100 m

Operating height	Permitted ambient temperature
3000 m	50 °C
4000 m	45 °C
5000 m	40 °C

Ordering information

Product

Features	Order code
Complete device consisting of emergency-stop to be activated / deactivated, LED monitoring, contact block with 2 NC (SET_QRBDUV_01) in a black/grey plastic enclosure with 5 pole M12 connector, with integrated flashing function, pin assignment acc. to AIDA	SIL_QRBDUVOOM125

EC Declaration of Conformity

EC Declaration of Conformity

Issuer name and address:	Georg Schlegel GmbH & Co. KG Kapellenweg 4 88525 Dürmentingen
Authorized person for documentation:	Georg Schlegel GmbH & Co. KG Kapellenweg 4 88525 Dürmentingen
Product:	emergency stop device
Product /Type designation	SIL_QRBDUVOOM125

The designated product is in conformity with the European Directives:

2006/42/EC Machinery directive
2014/30/EU EMC directive published in Official Journal of the EU p.79-106
2011/65/EU ROHS directive published in OJ L174, p. 88-110

Standards or technical rules applied for conformity assessment::
EN 60947-5-5:1997/A2:2017, EN ISO 13849-1: 12.2015, EN ISO 13850: 06.2015

This declaration of conformity is based on the conformity test of the basic type used:
SET_QRBDUV_01.Consistency of a type sample SET_QRBDUV_01 with the Directive No:
2006/42/EC Machinery directive

has been certified by::

Notified body/ Address:	Institut für Arbeitsschutz der Deutschen Gesetzlichen Unfallversicherung (IFA) Alte Heerstr. 111 D-53757 Sankt Augustin Identification No.: 0121 Type-Examination Certificate No.: IFA 1701200 (SET_QRBDUV_01)

Dürmentingen, 2018-02-01
(Place, date)

(Christoph Schlegel, Managing Director)