1. MANUFACTURER

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2. PURPOSE

GGCD 01 device (Grounding and grounding control device) along with the grounding clamps makes the active system for static grounding and grounding control and it is used in areas that may be endangered by explosive mixtures of gas and vapours of flammable liquid with air, in danger zones 1 and 2 according to the HRN EN 60079-10-1:2009 (EN 60079-10-1:2009).

Device ensures that objects like tanks are electrostatic grounded correctly during the loading and unloading of flammable liquids. The device provides a conductive connection to the ground and monitors in parallel the quality of the connection. The electrostatic level of the tank is kept on a safe level. An occasional discharge in conjunction with sparks is prevented and therefore the explosion protection ensured.

3. DEGREE OF PROTECTION


Apparatus category: II 2G

Explosion protection marking: Ex de [ib] mb IIC T5 Gb
Ambient temperature: \(-20^\circ\text{C} > T_{\text{amb}} > +50^\circ\text{C}\)

Mechanical protection: IP 66 category 1, according to the EN 60529:1991/A1:2000

Degree of protection: I (protective grounding), according to the EN 61140:2002/A1:2006

Certificate: Ex-Agency [E-1/08] - HREx T 10.024

The device complies with standards:
- CENELEC CLC/TR 50404 (Electrostatics-Code of practice for the avoidance of hazards due to static electricity),
- CEN 1755 +A1 (Safety of industrial trucks-Operation in potentially explosive atmospheres-Use in flammable gas, vapour, mist and dust),
- BGR 132 – BG Rules for avoiding ignition hazards as a result of electromagnetic charges

4. MODEL CODE

GGCD 01 / .

- basic device marking
- K1 - type with one clamp K1, with 10m cable,
- K2 - type with two clamps K1, with 2 x 10m cable.

Each version of GGCD device has two operating modes (which can be selected with control switch):
MODE 1 – Device doesn't recognize if object is grounded in any other way in the moment of connecting
grounding clamps. It is used when the object because of itself construction can't be isolated from ground (rail
 cars, tank containers). Pushbutton START has no function in this mode.
MODE 2 – Device inside control time (cca 10s) recognize if object is already grounded in some other way with
R_Z UK < 7 kΩ, and if clamps are connected correctly to grounded object. Mode is started pushing to START
pushbutton. It can be used when grounded object is isolated from ground (tank trucks, etc...).
Control switch can be locked with padlock in any of operating modes.

5. OPERATING PRINCIPLE

<table>
<thead>
<tr>
<th>State of grounding process</th>
<th>Reaction of the ground monitoring device</th>
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</table>
| Clamp is not connected, grounding equipment not in use | Grounding incorrect
  • Red indicating lamp ON
  • Green indicating lamp OFF
  • Contact OPEN |
| Clamp is directly grounded, e.g. via the loading platform | Grounding incorrect (only MOD 2)
  • Red indicating lamp ON
  • Green indicating lamp OFF
  • Contacts OPEN |
| Clamp connected to tank vehicle. | Grounding OK
  • Red indicating lamp OFF
  • Green indicating lamp ON
  • Contacts CLOSED |
| Clamp connected to tank vehicle, but cable to the grounding is disconnected. | Grounding incorrect
  • Red indicating lamp ON
  • Green indicating lamp OFF
  • Contacts OPEN |
| Clamp connected to tank vehicle. Tank vehicle is grounded subsequently (e.g. via the loading arm). | Grounding OK
  • Red indicating lamp OFF
  • Green indicating lamp ON
  • Contacts CLOSED |
6. BLOCK DIAGRAM

7. TECHNICAL DATA

Nominal voltage $U_{n}$: 230 V ± 10 10%, 50 Hz
Nominal current $I_{n}$: 50 mA
Nominal power $P_{0}$: 10 W
Output circuit: 2 switch over contacts $U_{n}=250$ V AC, $I_{n}=8$ A / 230 V, 4 A at $\cos \phi = 0.4$

Indicating lamps:
- Red:
  - blinking inside control time (10 sec - MOD2), contacts NO are open, contacts NC are closed,
  - continuous operation (MOD1 and MOD 2), contacts NO are open, contacts NC are closed
- Green:
  - continuous operation (MOD1 and MOD 2), contacts NO are closed, contacts NC are open

Max. r.m.s. voltage $U_{m}$: 253 V
Max. open circuit voltage $U_{0}$: 15 V
Max. current $I_{0}$: 1.60 mA
Max. power $P_{0}$: 6.0 mW - linear characteristics
Max. external inductance $L_{0}$: 50 mH
Max. external capacity $C_{0}$: 45 nF
Maximum length of the clamp cable: 100 m

Connecting terminals:
- network supelay terminal, output contacts: 1,5-4 mm² stranded, flexible
- Cable to the grounding point or busbar for equipotential bonding: 25 mm² max. stranded, flexible

Stripping length: 4 mm² - 10 mm, 25 mm² - 14 mm

Tightening torque of terminal screws:
terminal 4 mm² - 0,6 Nm, terminal 25 mm² - 3,0 Nm

Cable ferrules:
Stranded and flexible cables are installed with cable ferrules according to DIN 46228 T1

Cover screws:
M6x30 (Z4) - 4,8 A2

Tightening torque for cover screw: 1,5 Nm

Cable glands and plugs:
- GGCD 01/K1: 3xM25 Exi cable glands and 2xM25 Exe cable glands for cable Øv= 9-15 mm, 1 x M25 Exi plug, 1 x M25 Exe plug
- GGCD 01/K2 - 4xM25 Exi cable glands, 2xM25 Exe cable glands for cable 15 > Ø, > 9 mm, 1 x M25 Exe plug

Tightening torque for cable glands:
- cable gland body 3,5 Nm,
- cable gland nut 2,5 Nm

Tightening torque for plugs: 3,5 Nm

Clamp cable:
3 or 2x1,5 mm²
- cable capacity (wire-wire) 135 nF/km
- wire inductance 0,65 mH/km
- wire resistance 12,0 Ω/km

Dimension (LxWxH):
255 x 250 x 160 mm without clamps

Dimension of clamps holder(L x W x H):
300 x 300 x 195 mm without clamps

Mounting enclosure onto surface:
With screw kit M6 through the holes in the enclosure Ø7/Ø12 mm at the top of the rectangle 235 x 200 mm

Mounting clamps holder onto surface:
With screw kit M8 at the top of the rectangle 225 x 260 mm

Weight (without clamps):
ca. 6,0 kg

Weight of clamps with 10 m cable:
ca. 2,5 kg

8. BLOCK DIAGRAM OF DEVICE AND OPERATING INSTRUCTIONS

It is generally considered that object is satisfactorily electrostatic grounded if resistance to earth is not higher than 10⁶ Ω.
Open – closed threshold of output relay depends of clamps resistance $R_C=R_{C1}+R_{C2}$, loop resistance PAL of conduit $R_{PAL}$ and possible resistance object of grounding of outside grounding $R_Z$ (just in MOD 2 operation inside control time). That given substitute resistance from Z1 to equipotential bonding determines open – closed threshold $R_{UK\ ON}$.

In ideal case when $R_Z=\infty$ and $R_{PAL}=0$ in MOD 2 outside control time and in MOD 1 operation:
- $R_{C1} + R_{C2} < 1.7 \, k\Omega$ object is electrostatic grounded, green signal light is on, output NO contact is closed, and NC is open,
- increasing $R_{C1} + R_{C2} > 2.3 \, k\Omega$ is considering that object is not satisfactorily electrostatic grounded, red signal light is turning on, output NO contact is opening and NC is closing.

In second case when $R_Z=0$ and $R_{PAL}=0$ in MOD 2 outside control time and in MOD 1 operation:
- $R_{C1} < 5.0 \, k\Omega$ object is electrostatic grounded, green signal light is on, output NO contact is closed and NC is open,
- increasing $R_{C1} > 5.6 \, k\Omega$ s considering that object is not satisfactorily electrostatic grounded, red signal light is turning on, output NO contact is opening and NC is closing.

Inside control time in MOD 2 operation in boundary case when are $R_{C1}=0$ and $R_{C2}=0$ in order to electrostatic grounding is satisfactorily, i.e. that output NO contact is closed, it must be $R_Z > 7.0 \, k\Omega$.

**9. INSTALLING, CONTROL, MAINTENANCE AND REPAIR**

It is necessary to read this manual before installing and usage and if it is needed to request extra informations from manufacturer. Installing and usage of device is allowed only to qualified and authorized persons. Installing of device have to be done in non-voltage state. PAL (equipotential bonding connection) terminals inside device are connected to PA (equipotential bonding connection) busbar or grounding point with two single wire cables. It that case control loop is achieved and permanent monitoring of galvanic continuity connection PAL (equipotential bonding connection) terminal with PA (equipotential bonding connection) busbar or grounding point. Connection is made with conductor with cross-section 6-25 mm$^2$.

Electric connection, and cables for output connections inside enclosure must be conducted separately from intrinsic safety conduits. It is not allowed to connect output connectors into other intrinsic safety circuits. Along whole area of grounding equipotential bonding (PA) must be done. At enclosure closing, cover screws, cable glands and plugs must be tightened with torque specified in this manual.

Every afterwards enclosure opening is allowed only when supply is switched off.

Before connecting clamps for grounding on the object of grounding, object itself must be electrostatically discharged which must be secured in appropriate way.
Electric connection scheme of cables and conductors:

TOP view without built-in components
10. SPARE PARTS AND ACCESSORIES

Spare parts
- Control module GGCD 01,
- Connecting cable 0.5 m with coupler GGCD 01/K1,
- Connecting cable 0.5 m with coupler GGCD 01/K2,
- Clamp K1 with 10 m cable with plug,
- Clamp K2 with 10 m cable with plug,
- Pushbutton PBT 02,
- Signal lamp SLP,
- Switch SMS 03/GGCD,
- Pushbutton actuator SPO 01/7,
- Front element of signal lamp SPO 02/1,
- Front element of signal lamp SPO 02/2,
- Switch actuator SMO 17/GGCD
- Terminal EURO 4/35
- Terminal EURO 4/35 BL
- Terminal EURO E4/35
- Terminal EURO E16-25/35
- Cable gland SPU 25 black,
- Cable gland SPU 25 blue,
- Plug SPC 25 black,
- Plug SPC 25 blue,
- Enclosure gasket SKX 16,
- Enclosure screws SKX 16, M6x30 (Z4) - 4,8 A2

Accessories
- Cable real with 20 m cable, with connector for control modul and clamps, type GGCD 01/KO 20,
- Cable gland for armoured cable type Ex e II, type SIB-DEF 4F, 9 < Ø, < 27,5 mm, 6 < Øu < 19,5 mm, f = 1,25 - 16 mm, LCIE 05 ATEX 6146 X
- Telemetry system for remote monitoring of up to 27 devices, type GGCD 01/PC CONTROL. The system consists of:
  - The auxiliary module GGCD 01/M1 located in the unit enclosure,
  - Peripheral central unit located outside of the hazardous area - the connection to devices and to PC computer with RS 232 interface
  - Software application compatible with Windows operating system

11. MARKING

Explosion protected grounding and grounding control device type GGCD 01/K1, K2 are labeled with internal and external labels:

![Label for GGCD 01/K1, K2](image)

Cable with connector for GGCD 01/K1, GGCD 01/K2 is labeled:

![Cable Label](image)
Clamps K1, K2 for GGCD 01/K1, GGCD 01/K2 are labeled:

Module GGCD 01 is labeled:

12. STORAGE AND TRANSPORT

Transport and storage is only allowed in the original packaging, on the way pointed out on the carton box.

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