

Brief Instructions

Terminal Boxes GR.T* Glass Fiber Reinforced Polyester

Pepperl-Fuchs GmbH
Lilienthalstrasse 200
69307 Mannheim, Germany
Tel. +49 621 776-0
Fax +49 621 776-1000

Document No.: DOCT-6113a

Edition: 09/2018

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Validity

Specific processes and instructions in this instruction manual require special provisions to guarantee the safety of the operating personnel.

Target Group, Personnel

Responsibility for planning, assembly, commissioning, operation, maintenance, and dismantling lies with the plant operator.

The personnel must be appropriately trained and qualified in order to carry out mounting, installation, commissioning, operation, maintenance, and dismantling of the device. The trained and qualified personnel must have read and understood the instruction manual.

Reference to Further Documentation

Observe laws, standards, and directives applicable to the intended use and the operating location. Observe Directive 1999/92/EC in relation to hazardous areas.

The corresponding datasheets, manuals, declarations of conformity, EC-type-examination certificates, certificates, and control drawings if applicable (see datasheet) are an integral part of this document. You can find this information under www.pepperl-fuchs.com.

Intended Use

The terminal boxes are used to distribute electrical energy and electrical signals in hazardous areas. They must be installed in fixed installations. Intended use includes observing these operating instructions and the other applicable documents, e.g. the data sheet. Any other use of the terminal boxes is not allowed.

Mounting and Installation

Observe the installation instructions according to IEC/EN 60079-14.

If you intend to install the device or enclosure in areas that may be exposed to aggressive substances, ensure that the stated surface materials are compatible with these substances. If required, contact Pepperl+Fuchs for further information.

The requirements of the IEC/EN 60079-31 regarding excessive dust deposits must be considered by the user.

Safety-relevant markings are found on the nameplate supplied. Ensure that the nameplate is present and legible. Take the ambient conditions into account.

The permitted ambient temperatures of the built-in components must not be exceeded.

Ensure that the enclosure is not damaged, distorted, or corroded.

Ensure that all seals are clean, undamaged, and correctly fitted.

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Tighten all screws of the enclosure/enclosure cover with the appropriate torque.

Cover screws are designed to be self-captive and they should remain in the cover at all times. If they ever need to be replaced, they have to be screwed (not pushed) through the captive section of the cover, otherwise the captive function would be damaged or destroyed.

For cable glands only use incoming cable diameters of the appropriate size.

Tighten all cable glands with the appropriate torque.

Close all unused cable glands with the appropriate sealing plugs.

Close all unused enclosure holes with the appropriate stopping plugs.

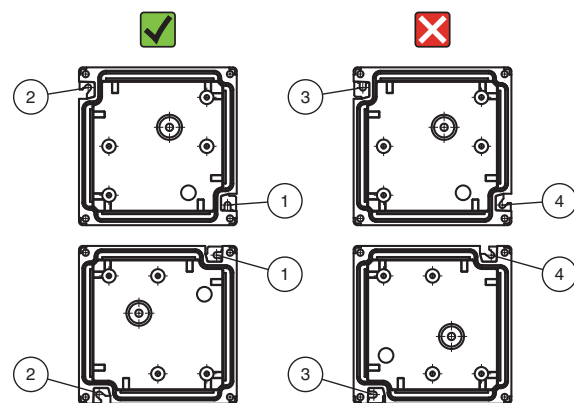
Only use stopping plugs that are suitably certified for the application.

Only use sealing plugs that are suitably certified for the application.

Use the thru-holes for the enclosure mounting. These thru-holes must be accessible when the cover is removed.

All available mounting holes must be used for mounting the enclosure.

Take note of the various designs of the mounting holes.



Mount the enclosure with the appropriate mounting holes in position (1) and (2).

Do not mount the enclosure with shown mounting holes in position (3) and (4).

It is recommended to use screws according to ISO 4762 or equivalent.

For easier installation, screws (1) and (2) can be drilled into the wall and the enclosure attached loosely to them prior to fixing all other screws. Screw numbers are shown beside the mounting holes.

Note: GR.13.18.* , GR.18.18.* and GR.18.24.* show hole (2) being circular instead of a slot. In this case, fix the enclosure with one hand and screw (1) before marking the other hole positions.

If mounting the enclosure on concrete use expansion anchors. When mounting the enclosure to a steel framework use vibration resistant mounting material.

Make sure that the enclosure is mounted on a flat surface to avoid distortion of the enclosure and ensure proper sealing function of the cover gasket.

Torque moments depend on the used screws and the material where they are screwed into.

If external ground connections exist, ensure they are in good condition, and are not damaged or corroded.

In order to prevent condensation in the enclosure, use suitably certified breather drains.

Requirements for Cable Glands:

Only use cable glands that are suitably certified for the application.

Only use cable glands with a temperature range appropriate to the application.

Ensure that the degree of protection is not violated by the cable glands.

Ground metal cable glands.

In order to guarantee the temperature classes, ensure that power dissipation is lower than the figure stated in the certificate. Most of the power dissipation arises from current flowing in the cables.

For terminal boxes installed in ambient temperatures above +40 °C, the cable entry point temperature may rise 40K above the ambient temperature when the maximum allowed power is dissipated. Cable with a suitable temperature rating must be selected.

In case of mixed Ex e / Ex i arrangements, ensure the required minimum distances according to IEC/EN 60079-11.

Ensure that the terminals are in good condition and are not damaged or corroded.

Use only one conductor per terminal.

Observe the tightening torque of the terminal screws.

Use the shortest possible cable lengths and avoid small core cross sections.

Observe the minimum bending radius of the conductors.

When installing the conductors the insulation must reach up to the terminal.

When using stranded conductors, crimp wire end ferrules on the conductor ends.

Unused cables and connection lines must be either connected to terminals or securely tied down and isolated.

Insulation by tape alone is not permitted.

The use of jumpers may reduce the maximum allowed voltage of the terminal box. Only suitably ,Ex e' certified jumpers which are listed in the certificate of the respective terminal manufacturer are allowed to be fitted.

Observe the special conditions for safe use listed in the manufacturer's documentation.

Do not bunch more than 6 conductors in order to avoid hot spots.

Arrange ground connections for incoming and outgoing cables so that the earth fault current is not carried between separate grounding plates.

When installing additional components, make sure that these components are listed in the relevant certificates.

Only use suitably certified terminals.

Do not install fuse terminals, relays, miniature circuit breakers, contactors etc. in the enclosure.

Rules for installing additional terminals:

It is allowed to add terminals in accordance with the maximum permitted power dissipation. For calculation and terminal capacity tables please refer to below section ,Maximum Terminal Capacity'.

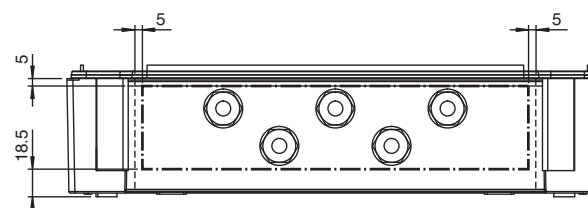
Rules for bringing in additional thru-holes for glands:

Determine if the space needed for the additional holes does not affect the stability of the enclosure wall and therefore the effectiveness of the gasket system.

In case of doubts consult Pepperl+Fuchs.

Maintain a minimum distance to the enclosure rims of 5 mm.

Maintain a minimum distance to the enclosure bottom of 18.5 mm.



Calculate the minimum distance from the center of the additional thru-hole to the center of an already existing adjacent thru-hole by means of one of the following formulas:

1. Calculation via diameters

HSN = diameter of adjacent thru-hole

HSA = diameter of additional thru-hole

Minimum distance between centers = $1.5 \times (HSN+HSA)/2$

2. Calculation via widths across corners

WCN = width across corners of adjacent cable gland

WCA = width across corners of additional cable gland

Minimum distance between centers = $1.2 \times (WCN+WCA)/2$

Fabricate the additional thru-holes with an appropriate tooling method.

Ensure the thru-hole diameters are fitting to the gaskets and cable glands to be installed.

Ensure the enclosure surfaces around the thru-holes are undamaged in order to maintain the IP-protection.

Operation, Maintenance, Repair

Observe IEC/EN 60079-14 during operation.

Observe IEC/EN 60079-17 for maintenance and inspection.

Observe IEC/EN 60079-19 for repair and overhaul.

Before opening the enclosure make sure that the built-in components are de-energized.

When energized, the enclosure may only be opened for maintenance, if only intrinsically safe circuits are used inside the enclosure.

The required maintenance intervals depend on the respective application, ambient conditions and national regulations and therefore have to be determined by the user.

Labels, windows and other surfaces which are not protected against electrostatic discharge may be a potential electrostatic charge hazard and shall therefore be cleaned only with a damp cloth.

Before reassembly, make sure both gasket and sealing upstand are in good and clean condition to assure the degree of protection.

If there is a defect, the device must be repaired by Pepperl+Fuchs.

Alternatively the device can be repaired by a qualified electrician in compliance with IEC/EN 60079-19.

Delivery, Transport, Disposal

Disposing of device and packaging must be in compliance with the applicable laws and guidelines of the respective country.

Maximum Terminal Capacity

Maximum number of terminals in relation to the cross-section and the permissible continuous current, based on terminal type WDU. GR.T*.10.10.07 and GR.T*.13.13.09 based on terminal type AKZ.

Calculation of terminals quantities:

$$\sum_{k=0}^n \frac{\text{installed terminals quantity}}{\text{permitted terminals quantity}} < 1$$

Example:

- enclosure type GR.T*.36.36.10
- 10 x 6 mm² terminals with an application current of 24 A consume 45% of the rated power dissipation [10 (installed terminal quantity) / 22 (permitted terminal quantity)]
- 20 x 2.5 mm² terminals with an application current of 10 A consume 25% of the rated power dissipation [20 (installed terminal quantity) / 79 (permitted terminal quantity)]
- installation of additional 5 terminals with 2.5 mm² and an application current of 10 A will consume 6% of the rated power dissipation
- 45% + 25% + 6% = 76% < 1
- result: installation of the additional terminals is permissible

Enclosure type:		GR.T*. 13.18.09					
Maximum permitted power dissipation [W]:		11					
Permitted number of terminals based on terminal capacity and application current:							
Current [A]	Terminal capacity [mm ²]						
	1.5	2.5	4	6	10	16	
3	19	19	16	12	10	8	
5	19	19	16	12	10	8	
10	19	19	16	12	10	8	
16	2	7	16	12	10	8	
20	0	1	8	12	10	8	
24	0	0	3	8	10	8	
35	0	0	0	1	5	8	
50	0	0	0	0	0	3	
63	0	0	0	0	0	1	

Enclosure type:		GR.T*. 18.36.17					
Maximum permitted power dissipation [W]:		27					
Permitted number of terminals based on terminal capacity and application current:							
Current [A]	Terminal capacity [mm ²]						
	1.5	2.5	4	6	10	16	
3	55	55	46	35	28	23	
5	55	55	46	35	28	23	
10	35	55	46	35	28	23	
16	4	13	31	35	28	23	
20	0	2	15	29	28	23	
24	0	0	6	16	28	23	
35	0	0	0	1	11	23	
50	0	0	0	0	0	7	
63	0	0	0	0	0	1	

Enclosure type:		GR.T*. 36.72.17					
Maximum permitted power dissipation [W]:		104					
Permitted number of terminals based on terminal capacity and application current:							
Current [A]	Terminal capacity [mm ²]						
	1.5	2.5	4	6	10	16	
3	377	377	320	240	192	160	
5	341	377	320	240	192	160	
10	63	113	197	240	192	160	
16	6	24	60	102	181	160	
20	0	4	28	57	109	160	
24	0	0	11	32	69	118	
35	0	0	0	2	22	46	
50	0	0	0	0	0	14	
63	0	0	0	0	0	2	

Enclosure type:		GR.T*. 18.18.10					
Maximum permitted power dissipation [W]:		14					
Permitted number of terminals based on terminal capacity and application current:							
Current [A]	Terminal capacity [mm ²]						
	1.5	2.5	4	6	10	16	
3	19	19	16	12	10	8	
5	19	19	16	12	10	8	
10	19	19	16	12	10	8	
16	3	9	16	12	10	8	
20	0	2	10	12	10	8	
24	0	0	4	10	10	8	
35	0	0	0	1	7	8	
50	0	0	0	0	0	4	
63	0	0	0	0	0	1	

Enclosure type:		GR.T*. 36.36.10					
Maximum permitted power dissipation [W]:		33					
Permitted number of terminals based on terminal capacity and application current:							
Current [A]	Terminal capacity [mm ²]						
	1.5	2.5	4	6	10	16	
3	165	165	140	105	84	70	
5	165	165	140	105	84	70	
10	45	79	135	105	84	70	
16	5	17	41	69	84	70	
20	0	3	19	38	72	70	
24	0	0	8	22	46	70	
35	0	0	0	1	15	30	
50	0	0	0	0	0	9	
63	0	0	0	0	0	2	

Enclosure type:		GR.T*. 36.72.24					
Maximum permitted power dissipation [W]:		104					
Permitted number of terminals based on terminal capacity and application current:							
Current [A]	Terminal capacity [mm ²]						
	1.5	2.5	4	6	10	16	
3	377	377	320	240	192	160	
5	377	377	320	240	192	160	
10	70	127	221	240	192	160	
16	7	27	67	115	192	160	
20	0	4	31	64	122	160	
24	0	0	12	36	78	133	
35	0	0	0	2	25	52	
50	0	0	0	0	0	15	
63	0	0	0	0	0	2	

Enclosure type:		GR.T*. 10.10.07					
Maximum permitted power dissipation [W]:		3.2					
Permitted number of terminals based on terminal capacity and application current:							
Current [A]	Terminal capacity [mm ²]						
	1.5	2.5	4	6	10	16	
3	9	9	7	-	-	-	
5	9	9	7	-	-	-	
10	9	9	7	-	-	-	
16	1	4	7	-	-	-	
20	0	1	4	-	-	-	
24	0	0	2	-	-	-	
35	0	0	0	-	-	-	
50	0	0	0	-	-	-	
63	0	0	0	-	-	-	

Enclosure type:		GR.T*. 18.24.10					
Maximum permitted power dissipation [W]:		17					
Permitted number of terminals based on terminal capacity and application current:							
Current [A]	Terminal capacity [mm ²]						
	1.5	2.5	4	6	10	16	
3	31	31	26	20	16	13	
5	31	31	26	20	16	13	
10	26	31	26	20	16	13	
16	3	10	23	20	16	13	
20	0	2	11	20	16	13	
24	0	0	4	12	16	13	
35	0	0	0	1	8	13	
50	0	0	0	0	0	5	
63	0	0	0	0	0	1	

Enclosure type:		GR.T*. 36.36.17					
Maximum permitted power dissipation [W]:		39					
Permitted number of terminals based on terminal capacity and application current:							
Current [A]	Terminal capacity [mm ²]						
	1.5	2.5	4	6	10	16	
3	165	165	140	105	84	70	
5	165	165	140	105	84	70	
10	52	91	140	105	84	70	
16	5	20	47	80	84	70	
20	0	3	22	44	84	70	
24	0	0	9	25	54	70	
35	0	0	0	2	17	35	
50	0	0	0	0	0	11	
63	0	0	0	0	0	2	

Enclosure type:		GR.T*. 48.60.24					
Maximum permitted power dissipation [W]:		72					
Permitted number of terminals based on terminal capacity and application current:							
Current [A]	Terminal capacity [mm ²]						
	1.5	2.5	4	6	10	16	
3	393	393	334	250	200	167	
5	393	393	334	250	200	167	
10	80	145	251	250	200	167	
16	8	31	76	130	200	167	
20	0	5	36	72	139	167	
24	0	0	14	40	88	150	
35	0	0	0	2	28	59	
50	0	0	0	0	0	17	
63	0	0	0	0	0	3	

Enclosure type:		GR.T*. 13.13.09					
Maximum permitted power dissipation [W]:		6.7					
Permitted number of terminals based on terminal capacity and application current:							
Current [A]	Terminal capacity [mm ²]						
	1.5	2.5	4	6	10	16	
3	13	13	11	-	-	-	
5	13	13	11	-	-	-	
10	13	13	11	-	-	-	
16	2	6	11	-	-	-	
20	0	1	6	-	-	-	
24	0	0	3	-	-	-	
35	0	0	0	-	-	-	
50	0	0	0	-	-	-	
63	0	0	0	-	-	-	

Enclosure type:		GR.T*. 18.36.10					
Maximum permitted power dissipation [W]:		22					
Permitted number of terminals based on terminal capacity and application current:							
Current [A]	Terminal capacity [mm ²]						
	1.5	2.5	4	6	10	16	
3	55	55	46	35	28	23	
5	55	55	46	35	28	23	
10	30	51	46	35	28	23	
16	3	11	26	35	28	23	
20	0	2	13	24	28	23	
24	0	0	5	14	28	23	
35	0	0	0	1	9	19	
50	0	0	0	0	0	6	
63	0	0	0	0	0	1	

Enclosure type:		GR.T*. 36.36.24					
Maximum permitted power dissipation [W]:		44					
Permitted number of terminals based on terminal capacity and application current:							
Current [A]	Terminal capacity [mm ²]						
	1.5	2.5	4	6	10	16	
3	165	165	140	105	84	70	
5	165	165	140	105	84	70	
10	59	104	140	105	84	70	
16	6	22	54	92	84	70	
20	0	4	25	51	84	70	
24	0	0	10	29	61	70	
35	0	0	0	2	19	40	
50	0	0	0	0	0	12	
63	0	0	0	0	0	2	