

Heavy-duty connectors  
for explosive  
environments

# ZGT / ZGH

models

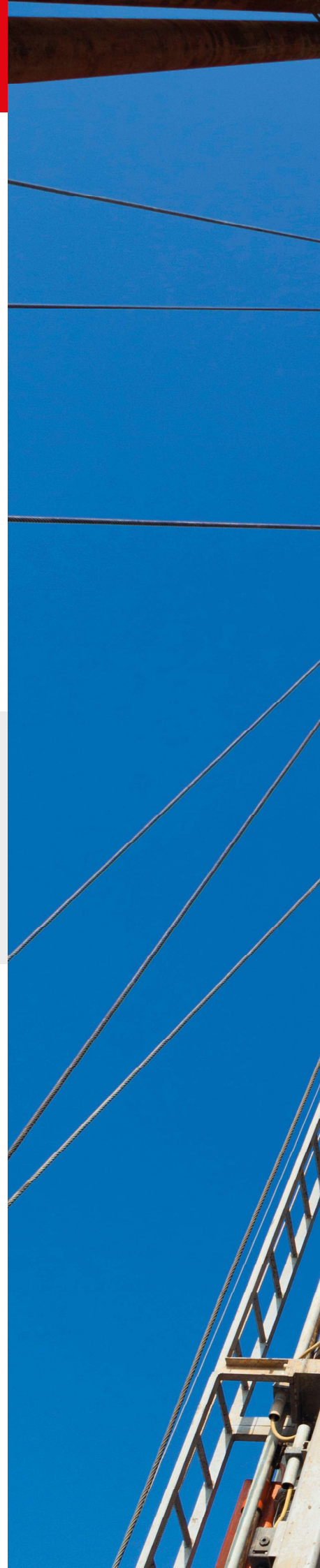
**ZGT / ZGH**

ZGT / ZGH connectors are designed for use in the mining industry and other applications, e.g. the chemical industry, with requirements for **product airtightness, intrinsically safe housing and good mechanical strength of the connector.**



*TENEO was invited by a foreign partner to collaborate on the development of highly specific connectors for special applications in **mining technology**, notably in subsea wells. The resulting jointly developed connector could establish highly dependable communication and power links not only on land, but also **underground and at sea.***

*TENEO connectors are used in subsurface drilling and mining equipment*





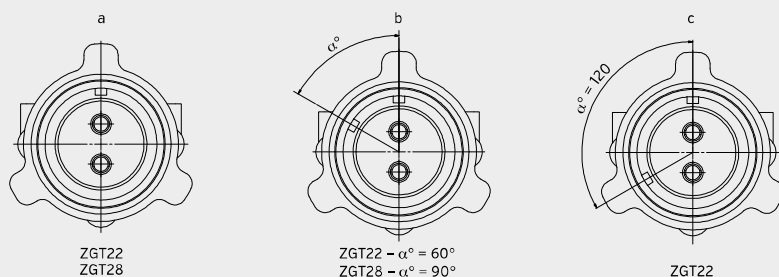
## ZGT TELECOMMUNICATION CONNECTORS FOR THE MINING INDUSTRY

The ZGT telecommunication connectors for the mining industry are designed for connecting and disconnecting electrical circuits, especially when surrounded by methane and when used in subsurface mining telecommunication facilities. These connectors are intrinsically safe, in compliance with the PN-84/E-08107 and PN-83/E-08110 standards and meet the technical requirements of the WT-89/MPM-13-35112 standard. They can also be used in environments with potentially explosive chemicals, in the chemical industry and in other similar environments. All ZGT series connectors are hermetic. Connector housings are made of brass (nickel plated) and provide protection from mechanical damage and over-voltage inside the connector.

### DESCRIPTION OF THE CONNECTOR DESIGN

A ZGT connector consists of a receptacle (panel mount or cable mount) and a plug (or a plug with a flange). Alphanumeric marking of receptacles and plugs defines their constructional properties. Panel mount receptacles consist of an airtight receptacle fitted with 2.5 mm diameter pins, and a ring with a nut, specially developed to enable repairs. Cable mount receptacles consist of a hermetic receptacle including an end-piece for sealing the attached cable. Plugs consist of an inner body fitted with 2.5 mm diameter sockets, cable termination sealing and a coupling nut allowing the plug to be secured to a cable mount or panel mount receptacle. Plugs with a flange (ZGT28 only) consist of panels (with "a" variant housing only), a coupling nut and a special flange that allows the plug to be secured to the device.

The housings of plugs and inner bodies are available in various variants (a, b, c) with different positions of keys and keyways, securing appropriate connection (e.g. "a" variant receptacle and "a" variant plug). Plug housing variants (a, b, c) are shown in the following figures:



[key at the angle alpha and analogically on the other side]

### BASIC TECHNICAL DATA OF ZGT CONNECTORS

Rated voltage:

- 60 V DC or AC with frequencies of up to 400 Hz, for intrinsically safe circuits in the mining industry (or similar conditions)
- 400 V DC AC with frequencies of up to 400 Hz in a normal environment

Current load:

- 25 A – under normal conditions (20°C)
- 10 A – at +55°C

Short-period overload: 20 A – at +55°C for 5 min.

Contact diameter 2,5 mm, contact system – see table above

Dimensions of cable attached to connector:

- Outside diameter of attached cable: max. 10 mm for ZGT22 / max. 15 mm for ZGT28
- Soldered wire diameter max. 2 mm
- Maximum static axial load of cable 500 N for 1 min.

Insulation resistance:

- Min. 1 000 MΩ under normal conditions
- Min. 50 MΩ in dry heat with slow temperature changes
- Min. 10 MΩ in high relative humidity of 95% at +40°C

Dielectric strength:

a) intrinsically safe connections in the mining industry:

- 750 V / 50 Hz for 1 min. under normal climatic conditions
- 500 V / 50 Hz for 1 min. in high relative humidity [+40°C, 93%]

b) other applications:

- 1 800 V / 50 Hz under normal climatic conditions
- 1 200 V / 50 Hz in relative humidity of 93% and at +40°C

Ingress protection rating IP67

Climatic category 40/055/10

Intrinsic safety category Exi I/II

Contact resistance of a contact pair  $\leq 1 \text{ m}\Omega$

Total contact resistance of all parts of the assembled connector  $\leq 2 \text{ m}\Omega$

## OPERATING CONDITIONS

ZGT connectors can be used in environments meeting the following conditions:

- temperatures ranging from -40°C to +55°C
- max. humidity 95% at +40°C
- max. pressure of 0,15 MPa for 1 hour under normal climatic conditions or for 2 minutes at -40°C and +55°C
- impact strength during individual impacts – 18 impacts with an acceleration of 500 g with 1 ms duration
- impact strength during multiple impacts – 600 impacts with an acceleration of 25 g with 2 ms duration
- stability during sinusoidal vibrations – frequency of 10–55 Hz and amplitude of 0,75 mm, for 3 hours
- permanent centrifugal acceleration 10 g +30%, in any position, for 10 seconds

Connectors meet the requirements of the WT-89/MPM-13-35112 standard

The warranty period is 8,5 years for the permitted number of connections – no more than 500 disconnections of plug and receptacle without electrical load

## EXAMPLE OF ORDERING A CONNECTOR

[receptacles and plugs must be ordered separately]

Example 1:

**Receptacle ZGT22B2Sa + Plug ZGT22KP2a**

Example 2:

**Cable Mount Receptacle ZGT28BP7b + Plug ZGT28KP7b**

SR

2RM

PK

VS

BS

ZGT / ZGH

RWN

SWITCHES

## MULTIPOLE HERMETIC CONNECTORS

The ZGH 27/10 multipole hermetic connectors are designed for use in the mining industry and other industrial applications (e.g. chemical industry) requiring airtightness of components in intrinsically safe circuits and high mechanical strength of connectors.

### DESCRIPTION OF THE CONNECTOR DESIGN

Connectors consist of a straight plug and a hermetic receptacle. The receptacle is the part of the connector designed to be mounted on the wall of the device. Contact pins are fitted in receptacles. The receptacle is hermetically sealed, protecting its internal parts; a protective rubber ring further seals space between the receptacle and the device or machine case.

The plug is attached to a cable using a part that hermetically seals the attachment using two triangular countersunk screws. A seal ring between the receptacle and plug ensures airtightness.

Excellent mechanical strength and internal safety is ensured by the use of proper materials – brass and Tarnamid (receptacle coupling and nut thread).

Protective caps can be used to seal the receptacle and plug after their disconnection. The protective caps are usually made of rubber. Tarnamid caps can also be specially ordered (B39.001-04 and K39.002-11).

### BASIC TECHNICAL DATA OF ZGH CONNECTORS

Rated voltage;

- For intrinsically safe circuits in the mining industry: 30 V ≈
- Other applications: 400 V ≈

Number of contacts: 10

Contact pin diameter: 2,5 mm

Contact rated current: 25 A

Diameter of the required hole on a device for installation of connector: diameter 16,5 mm

Ingress protection rating: IP68

Connector operating temperature range: -10°C to +50°C

Product weight: 0.8 kg

Connectors meet the WT-82/MPM-13-35111 standard

The warranty period is 8.5 years for the permitted number of connections – no more than 500 disconnections of plug and receptacle without electrical load

EXAMPLE OF A CONNECTOR ORDER

(receptacles and plugs must be ordered separately)

**Hermetic Receptacle ZGH27B10**

**+**

**Straight Plug ZGH27K10**

SR

2RM

PK

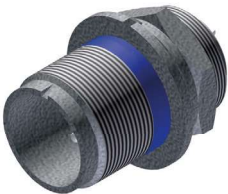
VS

BS

ZGT / ZGH

RWN

SWITCHES



ZGT Panel Mount Receptacle



ZGT Straight Cable Mount Receptacle



ZGT Straight Cable Mount Plug



ZGH Connector

BASIC DATA

Connector diameter

ZGT	22 / 28 mm
ZGH	27 mm

Number of contacts

ZGT	2 / 4 / 7
ZGH	10

CONFIGURATION

Material (housing)	Brass (nickel plated)
Configuration	Panel Mount Receptacle Straight Cable Mount Receptacle Straight Cable Mount Plug
Mating	Screw joint
Connection to wire	Soldering

ELECTRICAL PROPERTIES

Operating voltage U<sub>n</sub>

In normal environments	400 V =~
For intrinsically safe environments ZGT	60 V =~
For intrinsically safe environments ZGH	30 V =~

Contact diameter	Contact rated current I <sub>n</sub>	Contact marking	Diameter of connectable wire
Ø 2.5 mm at 20°C	25 A		4.15 mm²
Ø 2.5 mm at 55°C	10 A		4.15 mm²

Contact resistance of a contact pair	
Ø 2.5 mm	≤ 1 mΩ
Housing contact resistance	≤ 2 mΩ
Insulation resistance under normal climatic conditions	≥ 1 GΩ
Insulation resistance [40°C, 93%]	≥ 10 MΩ
Insulation resistance [55°C]	≥ 50 MΩ

MECHANICAL PROPERTIES	
Number of connections / disconnections	500
Impact strength	
Individual impacts [18 impacts]	max. 500 g
Repeated impacts [600 impacts] ZGT	max. 25 g
Repeated impacts [600 impacts] ZGH	max. 35 g
Stability during sinusoidal vibrations / at frequency	3 g / 10–55 Hz
Continuous centrifugal acceleration	max. 10 g

OPERATING ENVIRONMENT	
Temperature	
ZGT	–40°C to +55°C
ZGH	–10°C to +50°C
Relative humidity [40°C]	max. 95%
Airtightness	
Overpressure for 1 hour under normal climatic conditions	150 kPa
Overpressure for 2 minutes at –40°C to +55°C	150 kPa
Ingress protection	
ZGT	IP 67
ZGH	IP 68

Technical drawings (3D models) are available upon request

[info@teneo.cz](mailto:info@teneo.cz)

Product Code

ZGT22BSa

Model

Rated housing size

Connector housing type

Housing variant

Contractual marking of method of mounting to device

Total number of contacts in the connector

B = panel mount receptacle

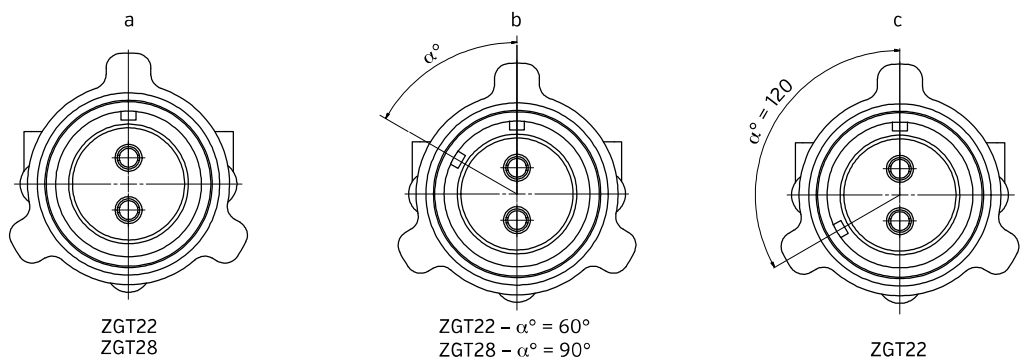
BP = straight cable mount receptacle

KP = straight cable mount plug

KK = plug with a flange

S = nut

Receptacle and plug housings are available in three variants (a, b, c), each with a different key and keyway orientation based on the angle alpha, ensuring safe connection of matching housings (e.g. receptacle "a" with plug "a"). See the figures below for the different variants ["a", "b", "c"] (plug housings have the angle alpha on the other side).



Product Code

ZGH27B10

Connector model

Rated housing size

Connector housing type

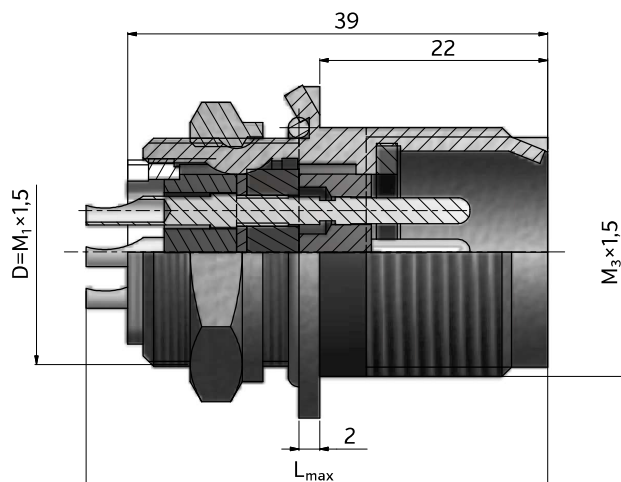
Total number of contacts in the connector

B = panel mount receptacle

KP = straight cable mount plug

# PANEL MOUNT RECEPTACLE

## ZGT\_B\_S\_



Size	Code	Diagram	Contact					Connector		Dimensions [mm]		
			id.	type	n	∅ [mm]	I <sub>n</sub> [A]	I <sub>n</sub> [A]	U <sub>n</sub> [V]	M <sub>1</sub>	M <sub>3</sub>	L <sub>max</sub>
<b>22</b>	ZGT22B2Sa			pin	2	2.5	25	50	60 400 *)	M22	M24	44
	ZGT22B2Sb											
	ZGT22B2Sc											
	ZGT22B4Sa			pin	4	2.5	25	100	60 400 *)	M22	M24	44
	ZGT22B4Sb											
	ZGT22B4Sc											
<b>28</b>	ZGT28B7Sa			pin	7	2.5	25	175	60 400 *)	M28	M33	44
	ZGT28B7Sb											

\*) 60 V for mining circuits (intrinsically safe) etc., 400 V for other applications

### Available mating combinations

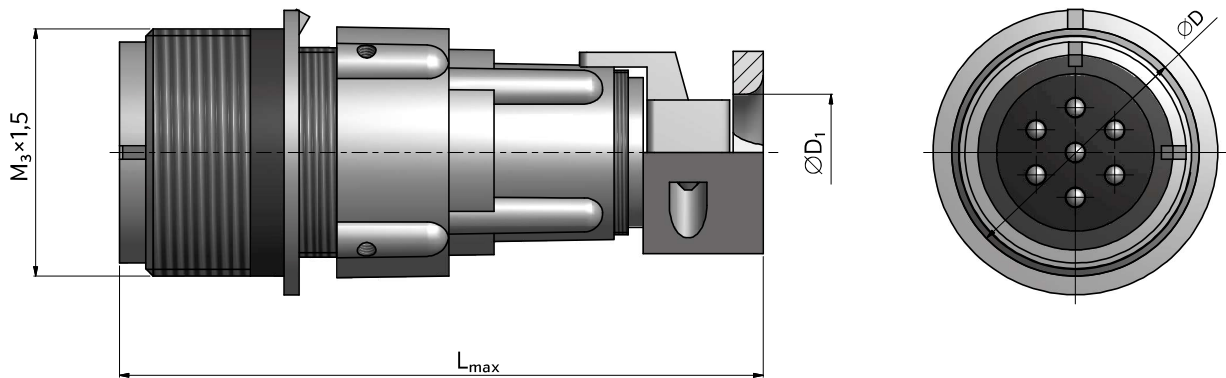
Code	Counterpart
ZGT XX B YY Sa	ZGT XX KP YY a
ZGT XX B YY Sb	ZGT XX KP YY b
ZGT XX B YY Sc	ZGT XX KP YY c

XX - housing size • YY - number of contacts

### Order example

Receptacle		ZGT	22	B	2	Sa
Plug		ZGT	22	KP	2	a

STRAIGHT CABLE MOUNT RECEPTACLE  
ZGT\_BP\_



Size	Code	Diagram	Contact					Connector			Dimensions [mm]			
			id.	type	n	∅ [mm]	I <sub>n</sub> [A]	I <sub>n</sub> [A]	U <sub>n</sub> [V]	D <sub>1</sub>	M <sub>1</sub>	M <sub>3</sub>	L <sub>max</sub>	
22	ZGT22BP2a			pin	2	2.5	25	50	60 400 *)	10.5	{M22}	M24	83	
	ZGT22BP2b													
	ZGT22BP2c													
	ZGT22BP4a			pin	4	2.5	25	100	60 400 *)	10.5	{M22}	M24	85	
	ZGT22BP4b													
	ZGT22BP4c													
28	ZGT28BP7a			pin	7	2.5	25	175	60 400 *)	15.5	{M28}	M33	85	
	ZGT28BP7b													

\*) 60 V for mining circuits (intrinsically safe) etc., 400 V for other applications

Available mating combinations

Code	Counterpart
ZGT XX BP YY Sa	ZGT XX KP YY a
ZGT XX BP YY Sb	ZGT XX KP YY b
ZGT XX BP YY Sc	ZGT XX KP YY c

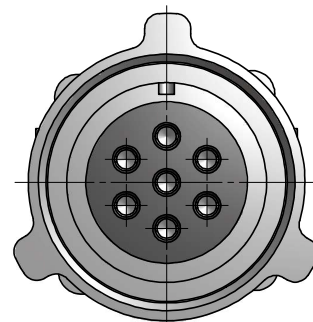
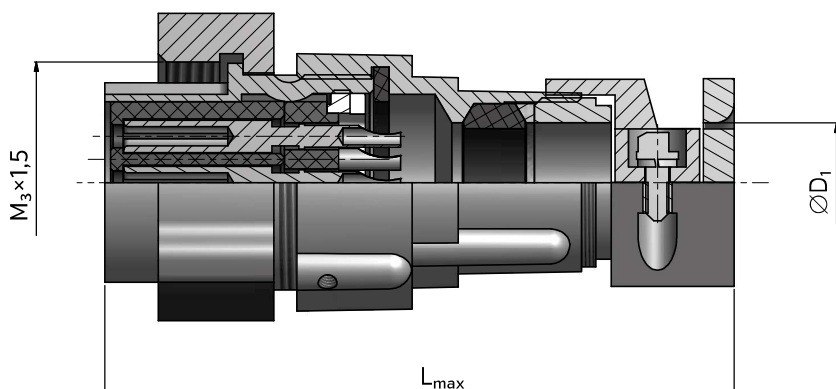
XX – housing size • YY – number of contacts

Order example

Receptacle		ZGT	22	BP	2	a
Plug		ZGT	22	KP	2	a

# STRAIGHT CABLE MOUNT PLUG

## ZGT\_KP\_



Size	Code	Diagram	Contact					Connector		Dimensions [mm]			
			id.	type	n	∅ [mm]	I <sub>n</sub> [A]	I <sub>n</sub> [A]	U <sub>n</sub> [V]	D <sub>1</sub>	M <sub>1</sub>	M <sub>3</sub>	L <sub>max</sub>
22	ZGT22KP2a			socket	2	2.5	25	50	60 400 *)	10.5	[M22]	M24	80
	ZGT22KP2b												
	ZGT22KP2c												
	ZGT22KP4a			socket	4	2.5	25	100	60 400 *)	10.5	[M22]	M24	80
	ZGT22KP4b												
	ZGT22KP4c												
28	ZGT28KP7a			socket	7	2.5	25	175	60 400 *)	15.5	[M28]	M33	82
	ZGT28KP7b												

\*) 60 V for mining circuits (intrinsically safe) etc., 400 V for other applications

## Available mating combinations

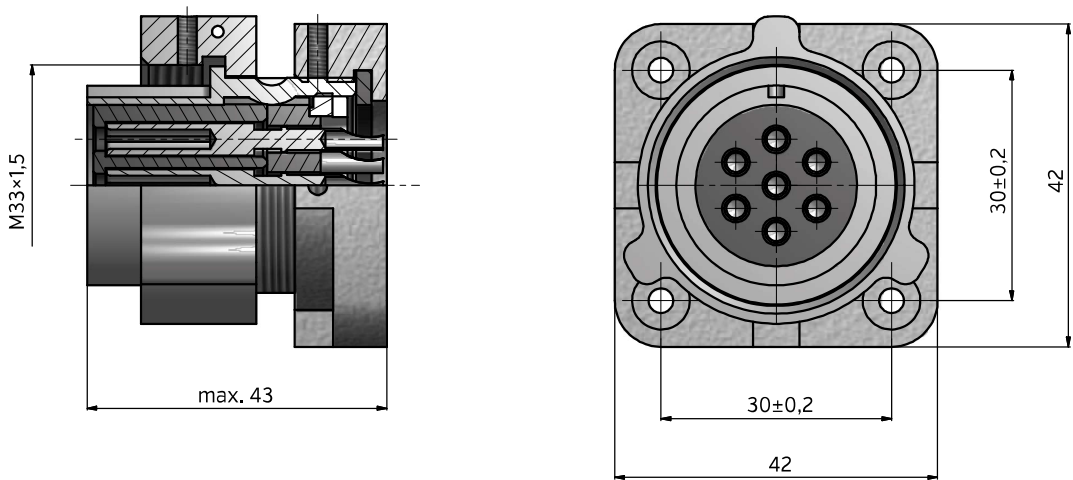
Code	Counterpart – alternative 1	Counterpart – alternative 2
ZGT XX KP YY a	ZGT XX BP YY a	ZGT XX B YY Sa
ZGT XX KP YY b	ZGT XX BP YY b	ZGT XX B YY Sb
ZGT XX KP YY b	ZGT XX BP YY c	ZGT XX B YY Sb
ZGT XX KK YY c	ZGT XX BP YY a	ZGT XX B YY Sa

XX – housing size • YY – number of contacts

## Order example

Receptacle		ZGT	22	KP	2	a
Plug		ZGT	22	BP	2	a

PLUG WITH SPECIAL FLANGE  
ZGT\_KK\_



Size	Code	Diagram	Contact					Connector	
			id.	type	n	∅ [mm]	I <sub>n</sub> [A]	I <sub>n</sub> [A]	U <sub>n</sub> [V]
28	ZGT28KK7a			socket	7	2.5	25	175	60 400 *)

\*) 60 V for mining circuits [intrinsically safe] etc., 400 V for other applications

Available mating combinations

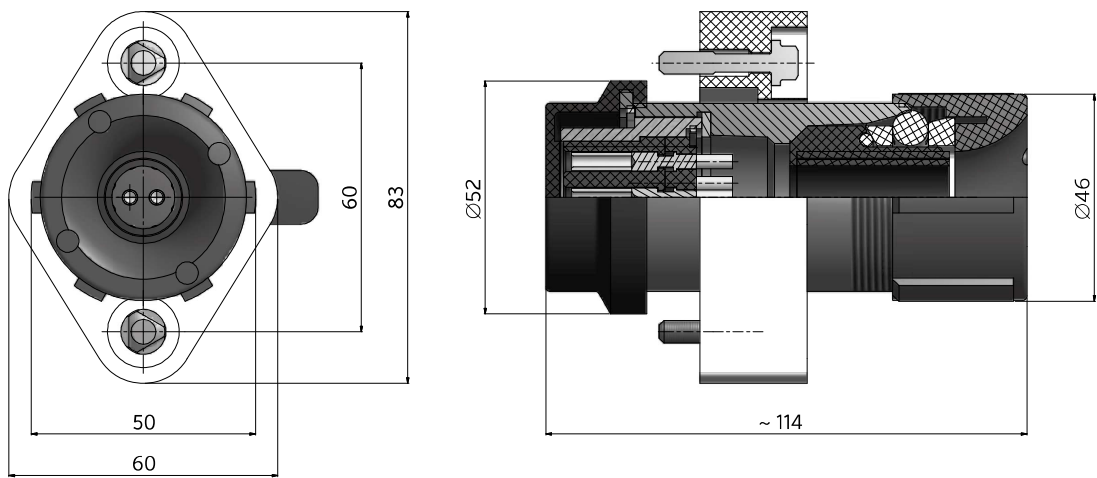
Code	Counterpart – alternative 1	Counterpart – alternative 2
ZGT28KK7a	ZGT28BP7a	ZGT28B7Sa

XX – housing size • YY – number of contacts

Order example

Receptacle		ZGT	28	KK	7	a
Plug		ZGT	28	BP	7	a

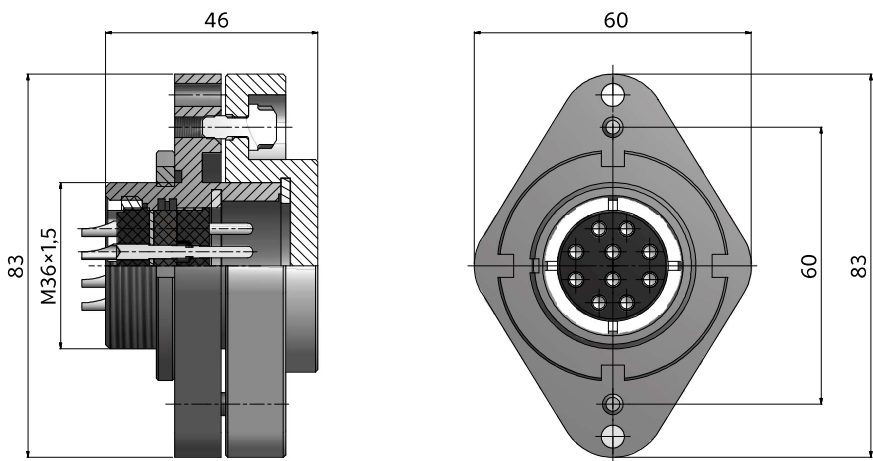
STRAIGHT RECEPTACLE  
ZGH\_K\_



Size	Code	Diagram	Contact				Connector		
			id.	type	n	Ø [mm]	I <sub>n</sub> [A]	I <sub>n</sub> [A]	U <sub>n</sub> [V]
27	ZGH27K10 Straight receptacle			socket	10	2.5	25	250	30 400 *)

\*) 30 V for mining circuits (intrinsically safe) etc., 400 V for other applications

HERMETIC PANEL MOUNT PLUG  
ZGH\_B\_



Size	Code	Diagram	Contact				Connector		
			id.	type	n	Ø [mm]	I <sub>n</sub> [A]	I <sub>n</sub> [A]	U <sub>n</sub> [V]
27	ZGH27B10 Hermetic panel mount plug			pin	10	2.5	25	250	30 400 *)

\*) 30 V for mining circuits (intrinsically safe) etc., 400 V for other applications