

# K

CHAPTER



## FISCHER **FREEDOM™** SERIES

EASY MATING | EASY CLEANING | EASY INTEGRATION

### KEY FEATURES

- No key code: 360° mating freedom & optimized cable management
- Non-magnetic locking mechanism
- Membrane-sealed contacts (patent pending)
- Low profile
- IP68 sealed to 20 m/24 h



FREEDOM

K-2 / K-18

# FREEDOM



## PLUGS



### CABLE MOUNTED

- Body style (FLP01) ..... K-4
- Technical dimensions ..... K-5



### PANEL MOUNTED

- Body style (FLP03) ..... K-4
- Technical dimensions ..... K-6

## RECEPTACLES



### PANEL MOUNTED

- Body style (FLR01) ..... K-7
- Technical dimensions ..... K-8-9



### CABLE MOUNTED

- Body style (FLR50) ..... K-7
- Technical dimensions ..... K-10

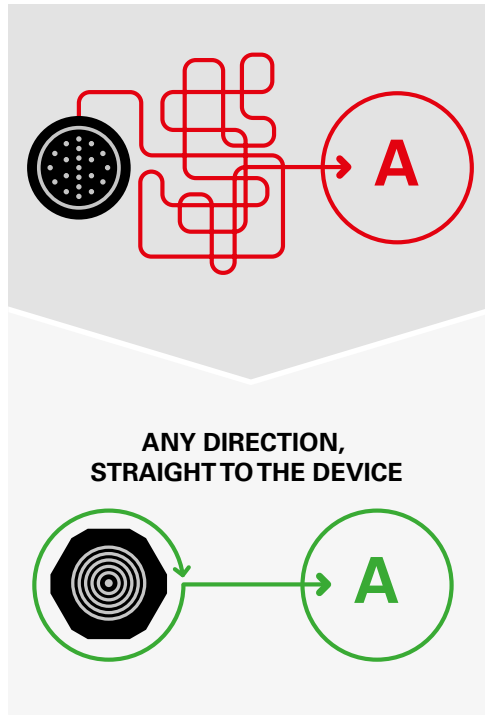
## FOR ALL FREEDOM

- Key features ..... K-3-10
- Electrical & contact configurations ..... K-11
- PCB hole layout ..... K-11
- Part numbering ..... K-12
- Pre-cabled plug / receptacle configurations ..... K-13-14
- Accessories ..... K-15-16
- Technical information ..... K-17-18

This catalog covers our standard connector solutions. For specific requests, including custom connectors, please contact your local sales representative.  
 Note: The images shown in this catalog are for illustrative purposes only.

### EASY MATING

- No key code = 360° mating freedom
- Optimized cable management – no more tangles and turns, cables always go in a straight line
- Non-magnetic quick-release locking mechanism



### EASY CLEANING

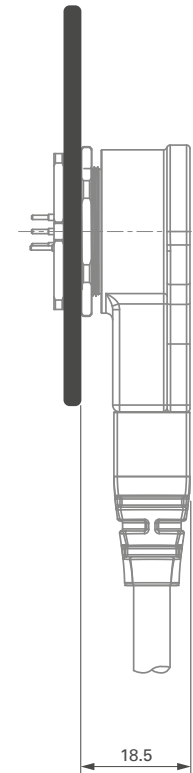
- Surface contacts = fixed tracks & membrane-sealed contacts
- No female contacts that can accumulate dirt, no long male contacts that can get broken
- A true cleanable solution on both receptacle and plug sides



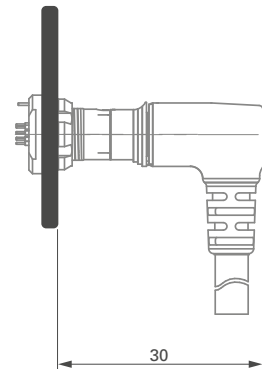
### EASY INTEGRATION

- 2x less protruding compared to a normal pin-socket type of connector
- A true low-profile solution
- Ideal for integration in wearable applications or on panels where space and access are limited

LP360™  
CONNECTOR



STANDARD PIN-SOCKET  
CONNECTOR



**PLUG**

CABLE MOUNTED

PANEL MOUNTED



Body style		FLP01	FLP01	FLP03	References to detailed information
Protection	Sealed to IP67		●		Sealing categories, pages K-17 & 18
	Sealed up to IP68	●		●	
Locking system	Friction				-
	Push-pull				
	Quick-release	●	●	●	
	Lanyard				
	Tamperproof				
Termination	Wires	●	●		Electrical & contacts configurations, page K-11
	Solder			●	
	ZIF			●	
Housing material	Brass	●		●	Page K-12
	Aluminum				
	Plastic		●		
Housing color	Anthracite	●		●	Page K-12
	Black		●		
Cabling	Cable clamp sets				-
	Overmoldable	●	●		
	Heat shrinkable	●	●		
Accessories	Cable bend reliefs	●	●		Page K-15
	Protective sleeves				
	Sealing caps	●	●	●	
Size	08		●	●	Technical dimensions, pages K-5 & 6
	14	●		●	

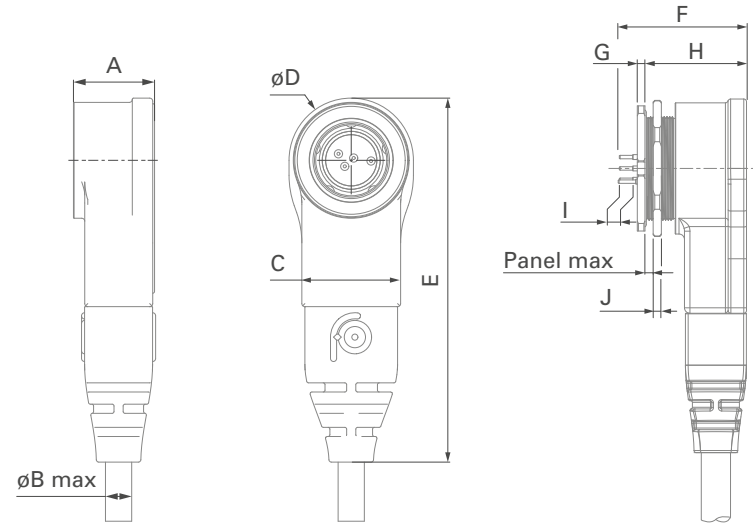
**PLUG FLP01**

**CABLE MOUNTED**

**METAL SIZE 14**



**PLASTIC SIZE 08**



Note: Plug is only available pre-cabled with a standard length (1 m). For customized solutions, please contact sales.

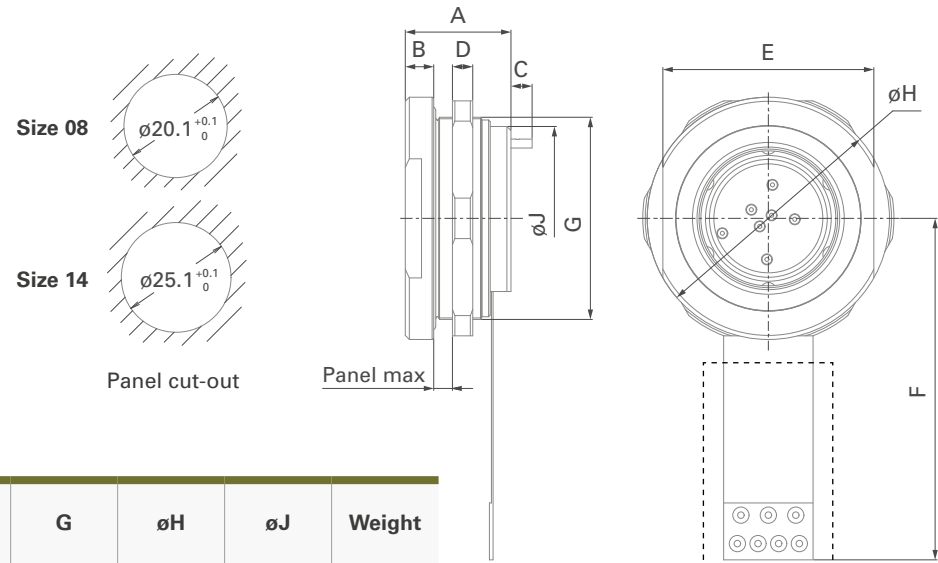
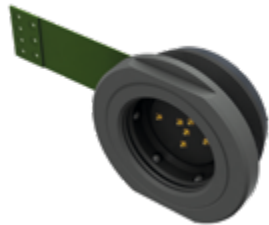
Size	A	$\phi B \text{ max}$	C	$\phi D$	E	Panel max	F	G	H	I	J	Weight (without cable)
<b>08 Plastic</b>	13.3	4.8	16.0	21.5	59.3	3	23.8	2.2	18.9	2.5	2	15.8 g
<b>14 Metal</b>	13	5.5	15.6	25.4	67.4	3	23.4	1.4	18.5	2.5	1.5	44.5 g

All dimensions are in millimeters and images are for reference only.

# PLUG FLP03

**PANEL MOUNTED**

**METAL**



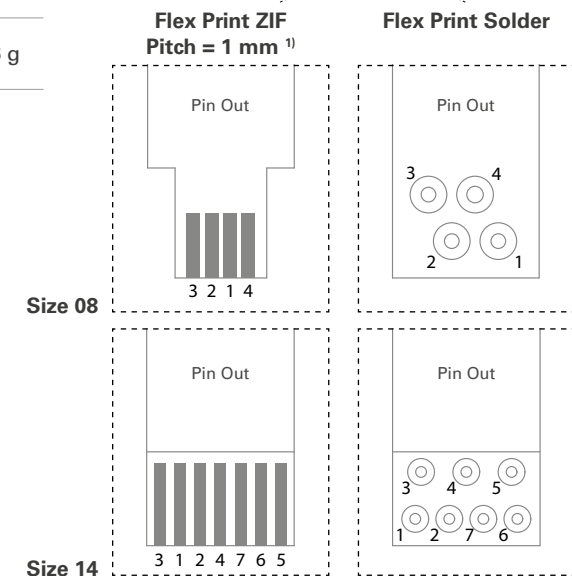
Size	A	B	C	D	E	Panel max	F	G	øH	øJ	Weight
<b>08 Metal</b>	13	3.5	2.7	2.5	21	3.7	42	M20x0.5	25	17.6	20.5 g
<b>14 Metal</b>	13	3.5	2.7	2.5	26	3.7	42	M25x0.5	30	22.6	32.6 g

## NUT ACCESSORY

Nut to be ordered separately. Available in different sizes.



Size	Part number	Inner thread size	Outer diameter	Flat open spanner	Material
<b>08 Metal</b>	223881	M20x0.5	ø26	24	Metal
<b>14 Metal</b>	224113	M25x0.5	ø31	29	Metal



<sup>1)</sup> ZIF connectors have a current limitation of 1 A.

**RECEPTACLE**

PANEL MOUNTED

CABLE MOUNTED



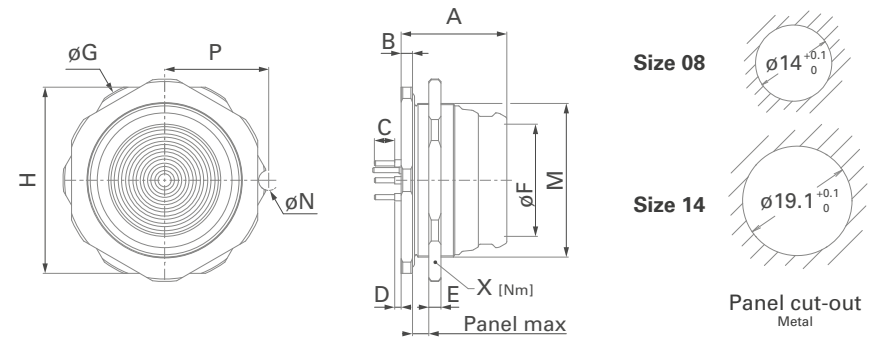
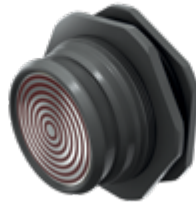
Body style		FLR01	FLR01	FLR50	References to detailed information
Protection	Sealed to IP67		●		Sealing categories, pages K-17 & 18
	Sealed up to IP68	●		●	
	Hermetic				
Termination	Wires			●	Electrical & contact configurations, page K-11
	PCB contacts	●	●		
Housing material	Stainless steel	●			Page K-12
	Aluminum			●	
	Plastic		●		
Housing color	Anthracite	●		●	Page K-12
	Black		●		
Design	Front projecting	●	●	●	Body styles, pages K-8 to 10
Assembly	Front mounting				
	Rear mounting	●	●	●	
Accessories	Cable bend relief			●	
	Protective sleeves				
	Sealing caps	●	●		
	Garment fixation	●	●	●	
Size	08	●	●	●	Technical dimensions, pages K-8 to 10
	14	●		●	

All dimensions are in millimeters and images are for reference only.

## RECEPTACLE FLR01

**PANEL**  
REAR MOUNTED

**METAL**



Size	A	B	C	D	Panel max	øF	øG	H	M	øN	P	X	Weight
<b>08</b> Metal	13	1.4	2.5	1	3	8	19.9	17.9	M14x0.5	2.0	10.3	2-4 Nm	7.5 g
<b>14</b> Metal	13	1.4	2.5	1	3	14	24.9	22.9	M19x0.5	2.5	12.8	2-4 Nm	15.2 g

## NUT ACCESSORY

Nut to be ordered separately. Metal nut available in different sizes. Refer to Accessories section for garment fixation.



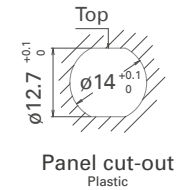
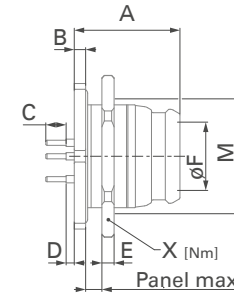
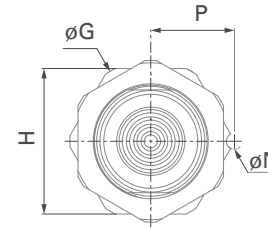
Size	Part number	Inner thread size	Outer diameter	E	Flat open spanner	Material
<b>08</b> Metal	224101	M14x0.5	ø20	2.0	18	Plastic
	223787	M14x0.5	ø20	1.5	18	Metal
<b>14</b> Metal	222825	M19x0.5	ø25	1.5	23	Metal
	222826	M19x0.5	ø30	1.5	28	Metal



**RECEPTACLE FLR01**

**PANEL**  
REAR MOUNTED

PLASTIC



Size	A	B	C	D	Panel max	øF	øG	H	M	øN	P	X	Weight
<b>08</b> Plastic	13.8	2.2	2.5	0.2	3	8	19.9	17.9	M14x0.5	2.0	10.3	1.0-1.5 Nm	3.3 g

**NUT ACCESSORY**

Nut to be ordered separately.  
Refer to Accessories section for garment fixation.



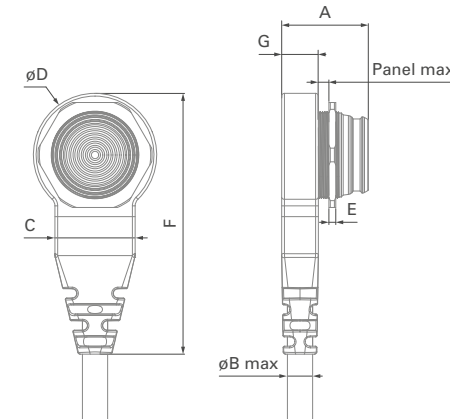
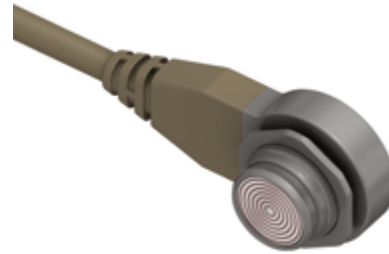
Size	Part number	Inner thread size	Outer diameter	E	Flat open spanner	Material
<b>08</b> Plastic	<b>224101</b>	M14x0.5	ø20	2.0	18	Plastic
	<b>223787</b>	M14x0.5	ø20	1.5	18	Metal

All dimensions are in millimeters and images are for reference only.

**RECEPTACLE FLR50**

**CABLE MOUNTED**

**METAL**



Size	A	$\phi B$ max	C	$\phi D$	F	G	Panel max	Weight (without cable)
<b>08 Metal</b>	18.9	4.8	17.5	26.9	56.9	8.1	2.3	18 g
<b>14 Metal</b>	18.9	5.5	17.5	26.9	56.9	8.1	2.3	25 g

Note: Receptacle is only available pre-cabled with a standard length (1.0 m). For customized solutions please contact sales.

**NUT ACCESSORY**

Nut to be ordered separately. Available in different sizes. Refer to Accessories section for garment fixation.



Size	Part number	Inner thread size	Outer diameter	E	Flat open spanner	Material
<b>08 Metal</b>	224101	M14x0.5	$\phi 20$	2.0	18	Plastic
	223787	M14x0.5	$\phi 20$	1.5	18	Metal
<b>14 Metal</b>	222825	M19x0.5	$\phi 25$	1.5	23	Metal
	222826	M19x0.5	$\phi 30$	1.5	28	Metal

Size	Pin layout	Number of contacts		Receptacle	Pin number	Current [A]	Rated voltage r.m.s [V] <sup>3)</sup>	Test voltage [kV] in mated position			
				PCB contacts				IEC 60512-4-1 test 4a			
				Pin diameter [mm]				AC r.m.s.		DC	
								Contact to body	Contact to contact	Contact to body	Contact to contact
<b>08</b>		4	2	0.63	1, 2	1	≤ 160	0.7 <sup>4)</sup>	0.7	1.2 <sup>4)</sup>	1.2
			2	0.63	3, 4						
<b>14</b>		7	4	0.63	1, 2, 6, 7	1	≤ 160	0.7	0.7	1.2	1.2
			3	0.63	3, 4, 5						

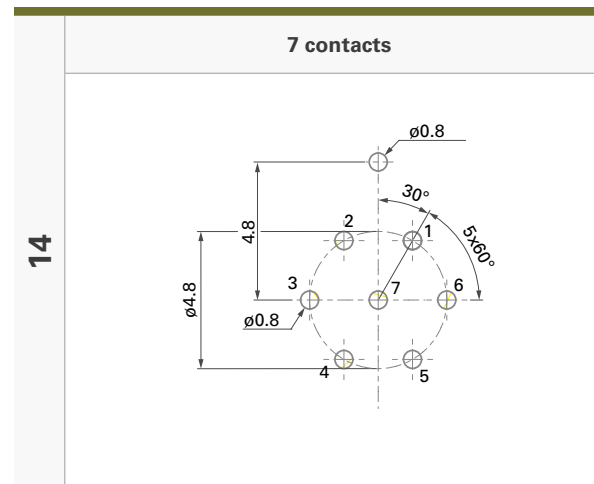
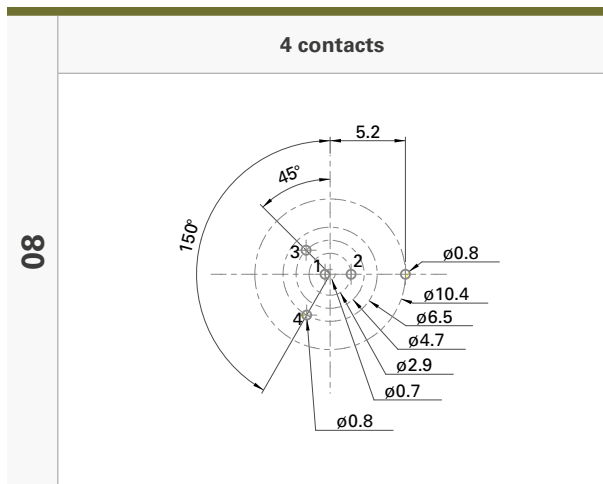
<sup>1)</sup> Current per contact at 40 °C temperature rise measured on the basic curve according to IEC 60512-5-2-5b. For the max. operating current, a reduction factor must be used and limitations due to the size of the wires and the permissible upper temperature limit of the materials employed must be taken into account.

<sup>2)</sup> Recommended operating voltage at sea level. This rated voltage is a general-purpose guideline where no other electrical safety standard applies. In case where other standards rule a specific use of the connector, then the application-specific safety criteria shall be considered first. This must be evaluated in the frame of equipment engineering.

<sup>3)</sup> Based on IEC 61984 safety requirements, Fischer Connectors recommends that, for operating voltage >50 V, power should not be used without integration of an active security system. Please contact us for further information.

<sup>4)</sup> N/A for plastic version.

### View from the front of the receptacle (grounding pin at 12 o'clock)



All dimensions are in millimeters and images are for reference only.

Example:	Connector design				Contact block			Housing		Standard options			
	FLP01	Z	QM	14	P	007	S	AN	360	V	2	Z	B
FLR01	W	ZZ	14	T	007	P	AN	360	V	3	A	C	

**Body style**

- **F** = Freedom
  - **L** = Low profile
    - **P01** = Cable plug right angle
    - **P03** = Panel plug
    - **R01** = Rear mounted receptacle
    - **R50** = Cable mounted receptacle

**Sealing level**

- Plug**
- **Z** = Not applicable
- Receptacle**
- **W** = Water sealing

**Locking system**

- Plug**
- **QM** = Quick-release medium force
- Receptacle**
- **ZZ** = No locking

**Connector size**

- **08** = Size 08 (interface diameter)
- **14** = Size 14 (interface diameter)

**Polarity of contacts**

- **P** = Piston
- **T** = Track

**Number of contacts**

- **Size 08** = 004
- **Size 14** = 007

**Contact type**

- **A** = Flex print Solder
- **B** = Flex print ZIF <sup>1)</sup>
- **S** = Solder
- **P** = PCB

**Housing material**

- **B** = Brass (plug)
- **C** = Stainless steel (receptacle)
- **D** = Plastic

**Grounding**

- **A** = Grounding pin (receptacle)
- **Z** = Not applicable (plug)

**Insulating material**

- **2** = Plastic (plug)
- **3** = Epoxy (receptacle)

**O-ring material**

- Plug** = Interface O-ring  
**Receptacle** = Panel O-ring
- **V** = Viton®
  - **Z** = Not applicable

**Keying code**

- **360** = No code

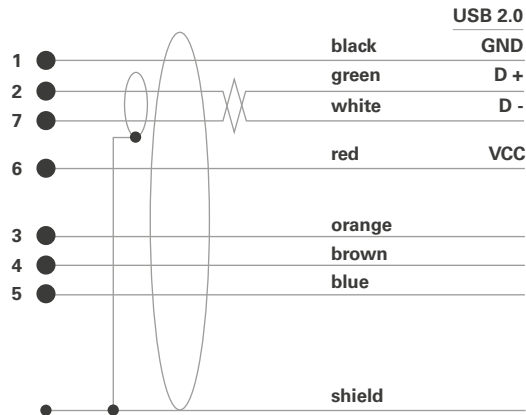
**Housing color**

- **AN** = Anthracite
- **BK** = Black

<sup>1)</sup> ZIF connectors have a current limitation of 1 A.

### CABLE SPECIFICATION 7 PINS SIZE 14

- PUR halogen free, flame retardant outer sheath, nominal thickness 0.55 mm, black (RAL9005 matt / TAN (RAL 7002 matt)
- Working voltage: 100 V
- Weight: 45 kg/km
- Breaking strength: 400 N (Vectran central strength member)
- Recommended bending radius: 40 mm static / 60 mm dynamic
- Working temperature: -40 °C to +90 °C
- Overall diameter: nominal 5.35 mm / maximal 5.50 mm



**AWG28 (white/green twisted)**

Tinned copper conductor 7x0.13 mm / polypropylene insulation / nominal thickness 0.28 mm / nominal diameter 0.95 mm / characteristic impedance 90 ±10 Ω Tinned copper drain wire 7x0.13 mm, aluminum / polyester tape

**AWG26 (black/red)**

Tinned copper conductor 7x0.16 mm / polypropylene insulation / nominal thickness 0.21 mm / nominal diameter 0.90 mm

**AWG24 (blue/brown/orange)**

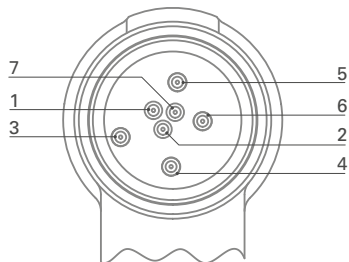
Bare copper conductor 7x0.20 mm / polypropylene insulation / nominal thickness 0.20 mm / nominal diameter 1.0 mm

**Shield**

Tinned copper braid / coverage 95% / wire diameter 0.13 mm

### WIRING DIAGRAM FOR STANDARD PRE-CABLED PLUG / RECEPTACLE

View from front of plug



WIRE	PRECABLED SOLUTION 1 m, open end	
	Pin number	
AWG26 black	1	
AWG28 green	2	
AWG26 orange	3	
AWG24 brown	4	
AWG24 blue	5	
AWG26 red	6	
AWG28 white	7	

<b>Part number</b>	<b>133714</b> Plug assembly 1 m black cable & boot
	<b>133736</b> Plug assembly 1 m black cable overmold

WIRE	PRECABLED SOLUTION 1 m, open end	
	Pin number	
AWG26 black	1	
AWG28 green	2	
AWG24 orange	3	
AWG24 brown	4	
AWG24 blue	5	
AWG26 red	6	
AWG28 white	7	

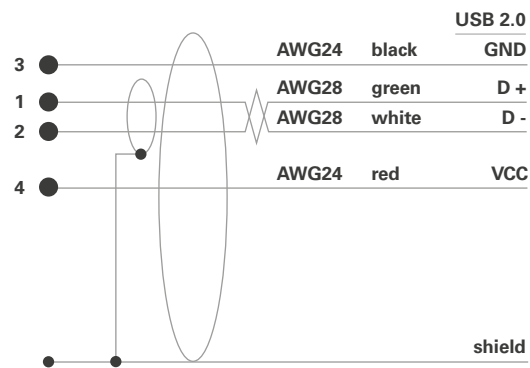
<b>Part number</b>	<b>134563</b> Plug assembly 1 m black cable & boot
	<b>134564</b> Plug assembly 1 m TAN cable & boot
	<b>134999</b> Receptacle assembly 0.5 m TAN cable & boot

All dimensions are in millimeters and images are for reference only.

## CABLE SPECIFICATION 4 PINS SIZE 08

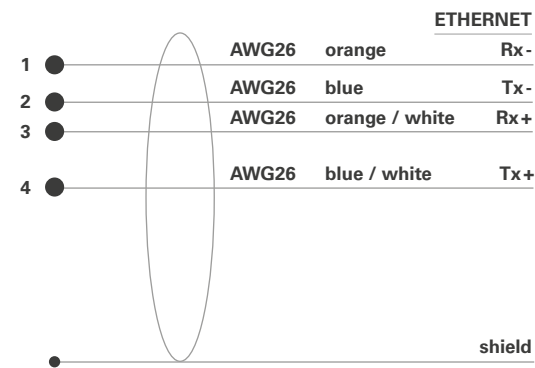
### USB **CABLE**

- PUR halogen free, flame retardant outer sheath, black (RAL9005 matt) / Tan (RAL 7002 matt)
- Working voltage: ≤ 100 V
- Weight: 34 kg/km
- Overall diameter: nominal 4.8 mm / minimum 4.6 mm



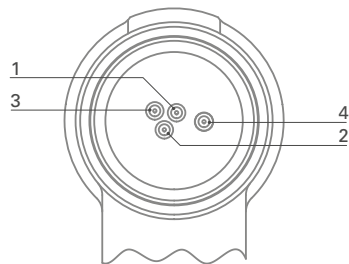
### ETHERNET **CABLE**

- Breaking strength: ≤ 100 N
- Recommended bending radius: 20 mm static / 40 mm dynamic
- Working temperature: -30 °C to +80 °C
- Weight: 29 kg/km
- Overall diameter: nominal 4.7 mm / minimum 4.4 mm / maximum 5.0 mm



## WIRING DIAGRAM FOR STANDARD PRE-CABLED PLUG

View from front of plug



WIRE	PRECABLED SOLUTION USB 2.0 1 m, open end
	Pin number
AWG24 black	3
AWG28 green	1
AWG28 white	2
AWG24 red	4
<b>Part number</b>	<b>135121</b> Plug assembly 1 m black cable & boot

WIRE	PRECABLED SOLUTION Ethernet 100 Mbit/s 1 m, open end
	Pin number
AWG26 orange	1
AWG26 blue	2
AWG26 orange / white	3
AWG26 blue / white	4
<b>Part number</b>	<b>135528</b> Plug assembly 1 m black cable & boot

**CAPS**

CABLE MOUNTED

PANEL MOUNTED

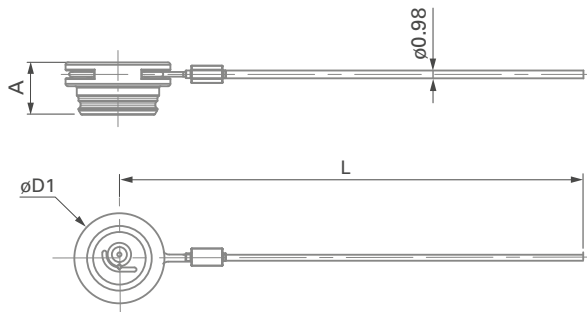


FIGURE 1

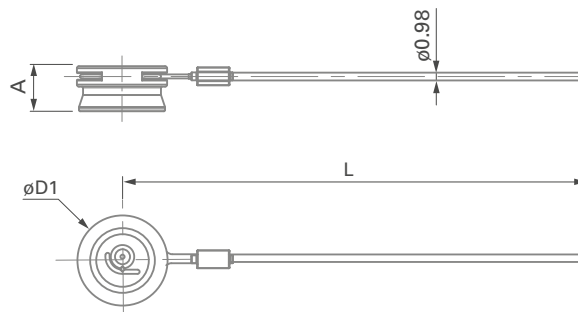


FIGURE 2

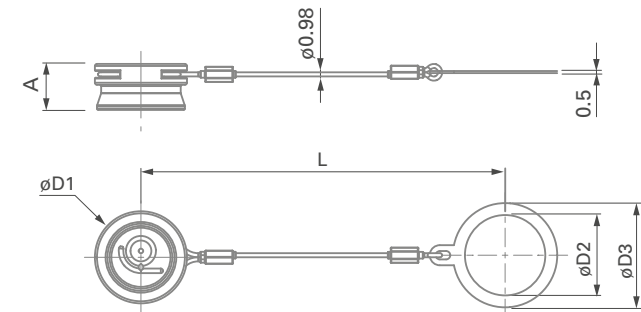
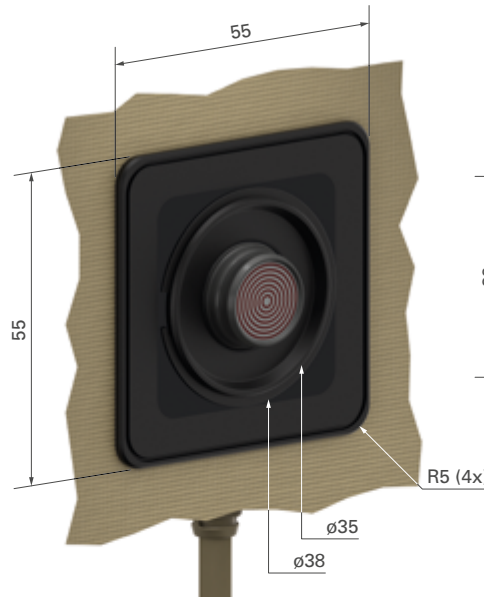
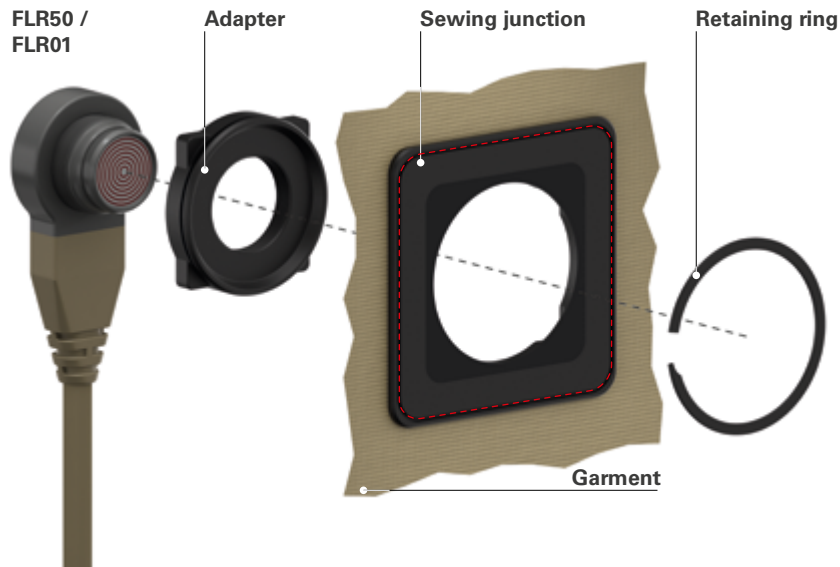


FIGURE 3

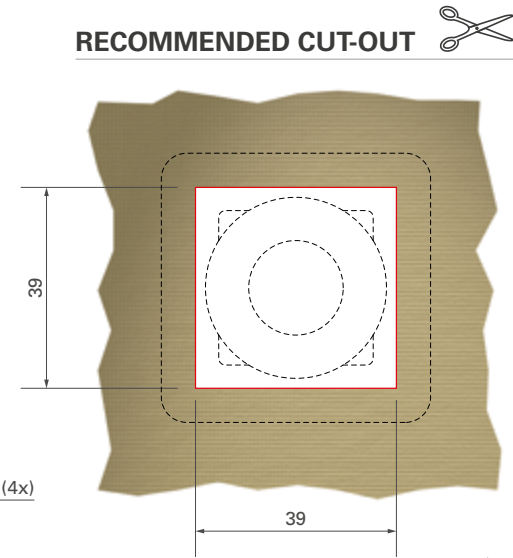
Size	Caps for		A	øD1	L	øD2	øD3	Part number	Fig.
	FLP01 FLP03	FLR01 FLR50							
08	●		11	23.0	200	-	-	FCP08C 1B2 A200	1
		●	11	20.4	200	-	-	FCR08C 1B2 A200	2
		●	11	20.4	95	14.0	18.0	FCR08P 1B2 A095	3
14	●		11	28.0	200	-	-	FCP14C 5B2 A200	1
		●	11	25.4	200	-	-	FCR14C 1B2 A200	2
		●	11	25.4	95	19.2	24.9	FCR14P 1B2 A095	3

All dimensions are in millimeters and images are for reference only.

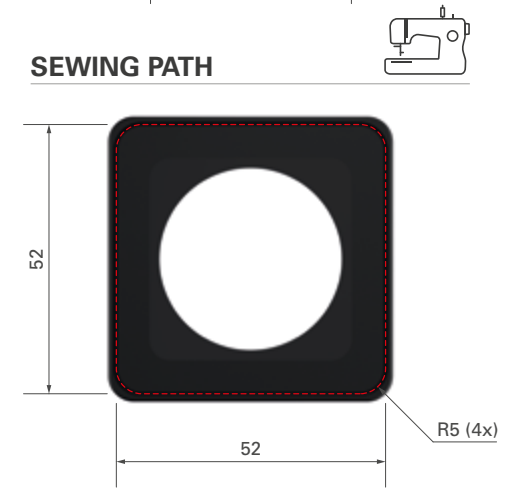
### QUICK DETACH SYSTEM



#### RECOMMENDED CUT-OUT

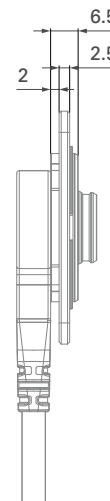


#### SEWING PATH



Material thickness on path: 1.6 mm

Part	Size	Part number	Material
	<b>08</b>	224464	PPA
	<b>14</b>	224452	
	<b>08/14</b>	224451	Central area: PPA Soft edge for sewing: TPE
		224518	Base material: stainless steel Surface finish: black zinc





**METAL**

**ENVIRONMENTAL & MECHANICAL DATA**

Characteristic	Performance	Standard	
<b>Sealing</b>	Connectors in mated condition or with cap Plug without cap Receptacle without cap	IP68, 20 m / 24 h IP67, 0.2 m / 30 min IP68, 20 m / 24 h	IEC 60529, MIL-STD-810 Method 512.6
<b>Operating temperature range (connectors only)</b>	-55 °C to +135 °C	MIL-STD-810 Method 501.6 and 502.6	
<b>Corrosion resistance mated</b>	Salt mist 1,000 h <sup>1)</sup> Connectors in mated condition. Cosmetic changes may appear over time without impacting mechanical or electrical functions.	MIL-STD-810 Method 509.6	
<b>Mechanical endurance</b>	10,000 mating cycles / 5,000 full rotations <sup>2)</sup> Preserved mechanical and electrical functionality. Normal wear will appear.	IEC 60512-9-1	
<b>Random vibration</b>	9.26 G rms	MIL-STD-202 Method 214 Condition I	
<b>Unmating force</b>	Typical 40 N	IEC 60512-13-1	
<b>Shock</b>	30 G	MIL-STD-202 Method 213 Condition J	

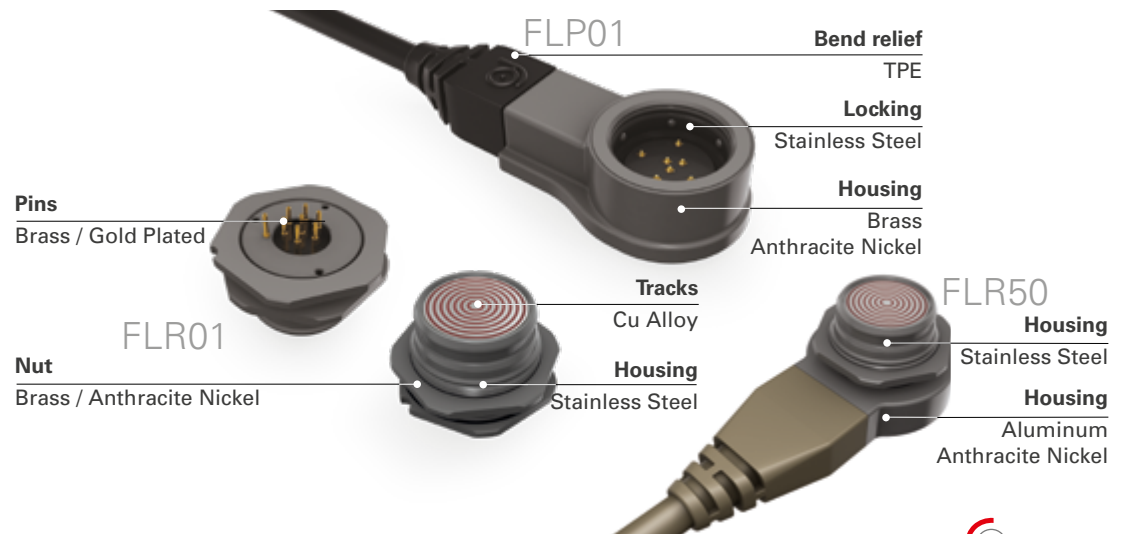
<sup>1)</sup> Exception for FLR50: 200 h mated and unmated.

<sup>2)</sup> 180° rotation considered per mating within the mating cycle test.

**ELECTRICAL DATA**

Characteristic	Performance	Standard
<b>Contact resistance</b>	<50 mOhm (typical value)	MIL-STD-202 Method 307
<b>Shell resistance</b>	<50 mOhm (cabled; new condition)	MIL-STD-202 Method 307
<b>Insulation resistance</b>	>10 <sup>10</sup> Ohm	MIL-STD-202 Method 302, IEC 60512-3-1
<b>Shielding effectiveness</b>	360° shielded	-
<b>Data protocols</b>	USB 2.0 and 100 Mbit/s Ethernet	

**MATERIAL & SURFACE FINISH**



All dimensions are in millimeters and images are for reference only.

**PLASTIC**

**ENVIRONMENTAL & MECHANICAL DATA**

Characteristic	Performance	Standard	
<b>Sealing</b>	Connectors in mated condition or with cap Plug without cap Receptacle without cap	IP67, 0.2 m / 30 min IP67, 0.2 m / 30 min IP67, 0.2 m / 30 min	IEC 60529, MIL-STD-810 Method 512.6
<b>Operating temperature range (connectors only)</b>	-40 °C to +85 °C	MIL-STD-810G Method 501.6 and 502.6	
<b>Corrosion resistance mated</b>	Salt mist 1,000 h Connectors in mated condition. Cosmetic changes may appear over time without impacting mechanical or electrical functions.	MIL-STD-810G Method 509.6	
<b>Mechanical endurance</b>	5,000 cycles / 2,500 full rotations	IEC 60512-9-1	
<b>Random vibration</b>	9.26 G rms	MIL-STD-202G Method 214A Condition I	
<b>Unmating force</b>	Typical 24 N	IEC-60512-13-1	
<b>Shock</b>	30 G	EIA-364-27B MIL-STD-202G Method 213B Condition J, K	

<sup>1)</sup> 180° rotation considered per mating within the mating cycle test.

**ELECTRICAL DATA**

Characteristic	Performance	Standard
<b>Contact resistance</b>	<50 mOhm (typical value)	MIL-STD-202 Method 307
<b>Insulation resistance</b>	>10 <sup>10</sup> Ohm	IEC 60512-3-1 MIL-STD-202 Method 302
<b>Shielding effectiveness</b>	N/A	N/A
<b>Data protocols</b>	USB 2.0 and 100 Mbit/s Ethernet	

**MATERIAL & SURFACE FINISH**

