

Catalogue
2009-2010

Toughcon



Metal-Circular Connectors

Plastic-Circular Connectors

Accessories

Tools

Contacts

Toughcon

Product description



Toughcon circular connectors are used in many industrial applications as a flexible and favourably-priced solution for the electrical connection of several components. With a range of matching plugs, receptacles and accessories, the Toughcon system is suitable for flexible configuration and can be used for a wide range of requirements within an application.

The Toughcon TT series made of plastic is sturdy, light and favourable in price. The contact holder is the shell at the same time, and is made of resistant, glass-fibre reinforced, temperature-stable plastic. For tougher requirements, the Toughcon TM series is used. With this series, only the contact holder is made of glass-fibre reinforced plastic, the shell is made of sturdy zinc die-cast. The connector can also be keyed by turning the contact holder in the shell. This allows several Toughcon circular connectors to be used in one application without cables being inserted into the wrong receptacles.



A trapezoidal thread with end catch makes the connection vibration-proof and allows it to be opened and closed easily. Plugs and receptacles can be equipped with pins, sockets and early make contacts. The contact has been designed for a wide range of cable and insulation diameters and is available with gold or tin plating. There are a wide range of accessories available for both TT and TM series. The accessories available range from numerous different housing types (with strain relief, with shrink hose, with PG and M thread), through angled adapters to special connections to the Shureseal system.

Abilities

General					
Shell sizes	11	17		23	
Number of contacts	4	9	14	24	37
Keying possibilities (TM only)	2	3	2	5	5
Material metal shell TM	Zinc die-cast				
Material contact holder TM	Glass-fibre reinforced PPO				
Material TT series	Glass-fibre reinforced PPO				

Contacts					
Material	Brass/stainless steel				
Connection cross-sections	0,05mm to 4mm		0.000079 inch ² to 0.006 inch ²		
	AWG 30 to 12				
Max. insulation diameter [inch]	3,2/0.126	4/0.157	3,2/0.126	4/0.157	3,2/0.126
Surface and insertion cycles	Tin-plated 100/ Gold-plated 500				
Contact resistance	≤5mΩ				
Extraction force	>4.5N (min. 6.6N on average over all contacts)				

Properties	
Insertion ability	Only insertable without current
Rated current individual contact at +20°C in free air	13A
Rated voltage	250V
Testing voltage	1500V~
Insulation resistance	≥5000MΩ
Temperature range	-55°C to +105°C
Protective rating	IP 65
Combustibility	Self-extinguishing UL 94V-1



METAL



Metal circular connectors - Plugs and sockets

The connector comprises a die-cast zinc shell with union nut and a plastic contact holder. Depending on the shell size, up to two different set-ups are possible, which differ in the number of poles and assignment of contacts. The contact support can be keyed by turning.

Material Nickel-plated zinc die-cast, PPO with GF

Temperature range -55°C to +105°C

Scope of supply Connector, contact support

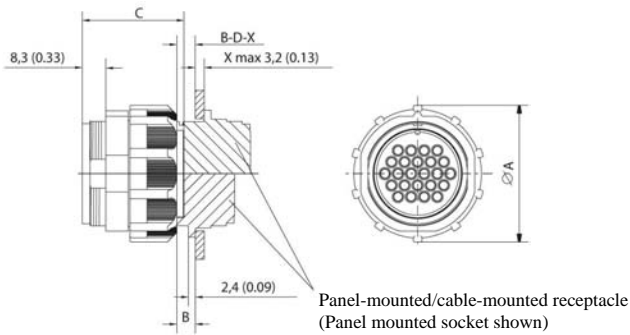


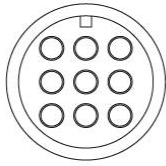
Figure A
Shown TM1710-P14



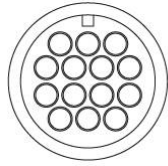
Figure B
Shown TM1710-S14



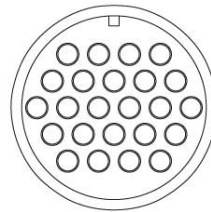
Structure 4



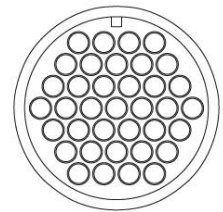
Structure 9



Structure 14



Structure 24



Structure 37

Manufacturer Product Code	Type	Figure	Size	Structure	Coding	Dimensions (mm/Inch)		
						A	B	C
TM1110-P04	Pin	A	11	4	2	28,7 1.13	6,4 0.25	35,8 1.41
TM1110-S04	Socket	B					6,4 0.25	29,5 1.16
TM1710-P09	Pin	A	17	9	3	38,1 1.50	6,4 0.25	35,8 1.41
TM1710-S09	Socket	B					6,4 0.25	29,5 1.16
TM1710-P14	Pin	A	17	14	2	38,1 1.50	6,4 0.25	35,8 1.41
TM1710-S14	Socket	B					6,4 0.25	29,5 1.16
TM2310-P24	Pin	A	23	24	5	48,0 1.89	8,1 0.32	35,8 1.41
TM2310-S24	Socket	B					8,1 0.32	29,5 1.16
TM2310-P37	Pin	A	23	37	5	48,0 1.89	8,1 0.32	35,8 1.41
TM2310-S37	Socket	B					8,1 0.32	29,5 1.16

Metal circular connectors - Panel-mounted receptacles

The panel-mounted receptacle is made up of a zinc die-cast shell with vibration protection and a plastic contact support, and can be attached to the device panel (max. 0.126") from the inside or the outside. The plastic contact holder can be keyed by turning.

Material Nickel-plated zinc die-cast, PPO with GF

Temperature range -55°C to +105°C

Scope of supply Panel-mounted socket, contact support and -holder, insertion area seal

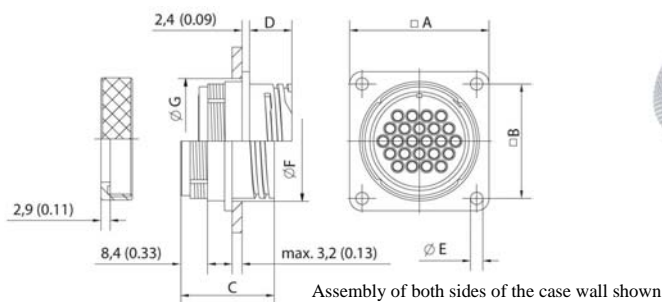


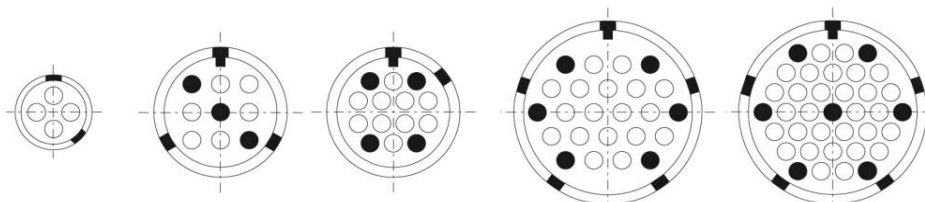
Figure A
Shown TM1131-P04



Figure B
Shown TM1131-S04

Keying

The TM series allows the contact holder to be turned in the shell. Only plugs and receptacles with the same keying can be connected and locked. This makes it possible to use the same Toughcon connections more than once in the same application without cables being able to be inserted in the wrong receptacles. The basic position is marked on the shell and the contact holder. The plastic series TT corresponds to the basic position.



Min. contacts
Keying

Any two
2

3

2

5

5

Manufacturer Product Code	Type	Figure	Size	Structure	Coding	Dimensions (mm/Inch)						
						A	B	C	D	E	F	G
TM1131-P04	Pin	A	11	4	2	28,7 1.13	21,6 0.85	35,8 1.41	11,3 0.45	3,3 0.13	18,3 0.72	20,7 0.82
TM1131-S04	Socket	B						29,5 1.16				
TM1731-P09	Pin	A	17	9	3	36,6 1.44	28,7 1.13	35,8 1.41	11,3 0.45	3,8 0.15	27,4 1.08	32,3 1.27
TM1731-S09	Socket	B						29,5 1.16				
TM1731-P14	Pin	A	17	14	2	36,6 1.44	28,7 1.13	35,8 1.41	11,3 0.45	3,8 0.15	27,4 1.08	32,3 1.27
TM1731-S14	Socket	B						29,5 1.16				
TM2331-P24	Pin	A	23	24	5	44,5 1.75	36,6 1.44	35,8 1.41	13,5 0.53	3,8 0.15	37,1 1.46	38,6 1.52
TM2331-S24	Socket	B						29,5 1.16				
TM2331-P37	Pin	A	23	37	5	44,5 1.75	36,6 1.44	35,8 1.41	13,5 0.53	3,8 0.15	37,1 1.46	38,6 1.52
TM2331-S37	Socket	B						29,5 1.16				

Metal circular connectors - Cable-mounted receptacles

The cable-mounted receptacle comprises a die-cast zinc shell with vibration protection and a plastic contact holder. Depending on the shell size, up to two different set-ups are possible, which differ in the number of poles and assignment of contacts. The contact holder can be keyed by turning.

Material Nickel-plated zinc die-cast, PPO with GF

Temperature range -55°C to +105°C

Scope of supply Cable-mounted socket, contact support and holder, as well as insertion area seal

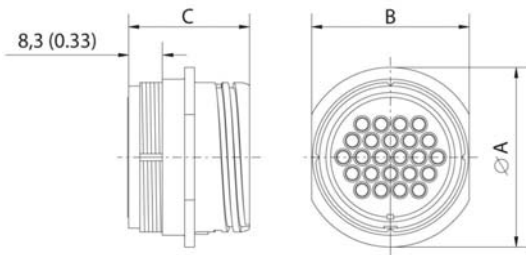


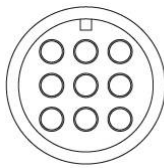
Figure A
Shown TM1721-P09



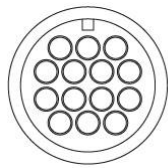
Figure B
Shown TM1721-S09



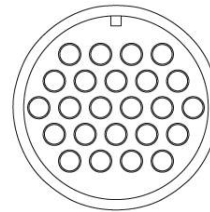
Structure 4



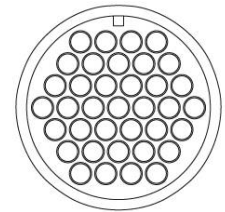
Structure 9



Structure 14



Structure 24



Structure 37

Manufacturer Product Code	Type	Figure	Size	Structure	Coding	Dimensions (mm/Inch)		
						A	B	C
TM1121-P04	Pin	A	11	4	2	23,6 0.93	20,8 0.82	35,8 1.41
TM1121-S04	Socket	B						29,5 1.16
TM1721-P09	Pin	A	17	9	3	34,0 1.34	30,5 1.20	35,8 1.41
TM1721-S09	Socket	B						29,5 1.16
TM1721-P14	Pin	A	17	14	2	34,0 1.34	30,5 1.20	35,8 1.41
TM1721-S14	Socket	B						29,5 1.16
TM2321-P24	Pin	A	23	24	5	43,9 1.73	38,6 1.52	35,8 1.41
TM2321-S24	Socket	B						29,5 1.16
TM2321-P37	Pin	A	23	37	5	43,9 1.73	38,6 1.52	35,8 1.41
TM2321-S37	Socket	B						29,5 1.16

Metal circular connectors - Back shell with strain relief

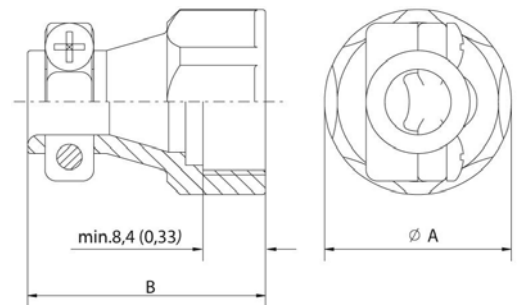
Thanks to the tension relief, both individual wire bundles and cables of different diameters can be fastened safely. The strain relief can be screwed quickly and easily onto the respective Toughcon connector or receptacle.

Material Nickel-plated zinc die-cast

Temperature range -55°C to +105°C

Scope of supply Strain relief with up to 2 rotating clamping fittings (depending on size), screws and back shell seal (no sealing function)

Manufacturer Product Code	Size	Dimensions (mm/Inch)			Ø Cable
		A	B		
TM118SR-33	11	25,9 1.02	32,8 1.29		2,8-8,4 0.11-0.33
TM118SR-45	11	25,9 1.02	36,6 1.44		2,8-11,4 0.11-0.45
TM178SR-45	17	36,8 1.45	36,6 1.44		2,8-11,4 0.11-0.45
TM178SR-70	17	36,8 1.45	42,2 1.66		8,6-17,8 0.34-0.70
TM238SR-70	23	43,2 1.70	39,6 1.56		8,6-17,8 0.34-0.70
TM238SR-112	23	43,2 1.70	42,2 1.66		14,5-28,4 0.57-1.12



Metal circular connectors - Back shell with shrink hose

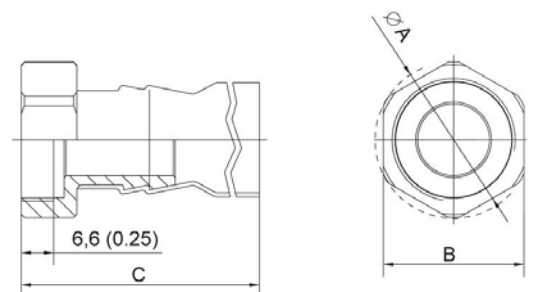
The back shell can easily be screwed onto the respective connector or receptacle. The inside of the shrink hose is coated with a special adhesive that forms a positive material bond with the cable. A secure seal is produced, especially when sheathed cables are used.

Material Anodised aluminium, polyolefin

Temperature range -55°C to +90°C

Scope of supply Back shell with shrink hose and back shell seal

Manufacturer Product Code	Size	Dimensions (mm/Inch)			Ø Cable
		A	B	C	
TM118ES-26	11	26 1.02	24 0.94	72,9 2.87	6,6-15,2 0.26-0.6
TM178ES-40	17	40 1.57	36 1.42	80,9 3.18	10,2-22,4 0.40-0.88
TM238ES-55	23	44 1.73	41 1.61	90,9 3.56	14,0-27,9 0.55-1.10



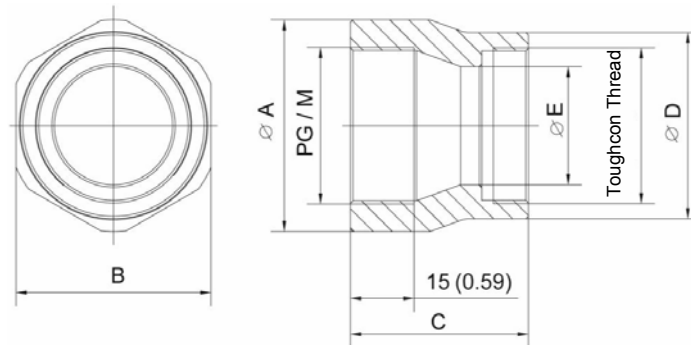
Metal circular connectors - Back shell with PG-/M-thread

The back shell with PG or metric thread allows further components to be screwed onto the Toughcon connectors or receptacles, such as cable screw attachments.

Material Anodised aluminium

Temperature range -55°C to +105°C

Scope of supply Back shell with PG or metric thread and back shell seal

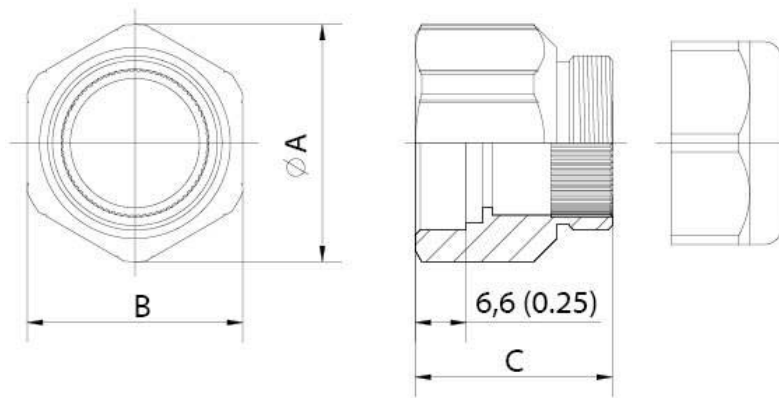
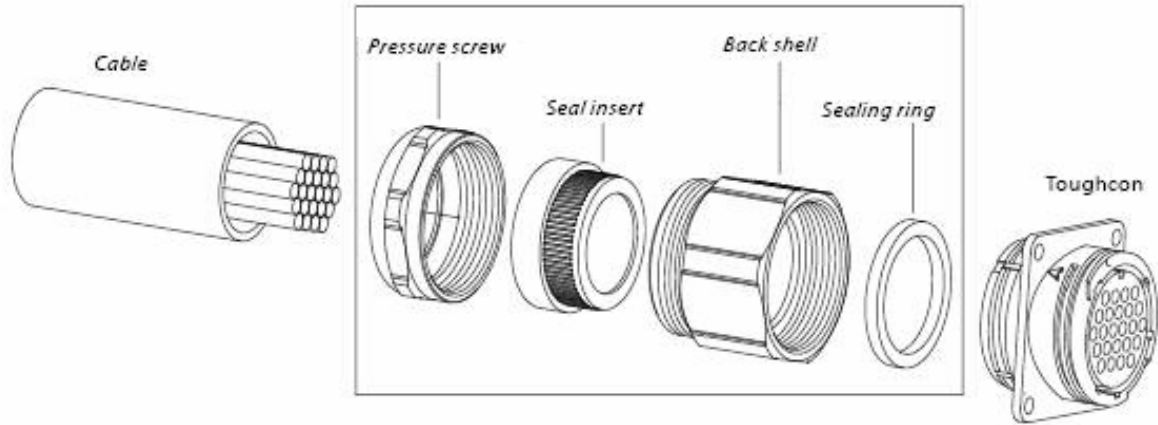


Manufacturer Product Code	Size	Thread	Dimensions (mm/Inch)				
			A	B	C	D	E
TM118GA-PG9	11	PG9	26 1.02	24 0.94	34 1.34	26 1.02	12,3 0.48
TM118GA-PG11	11	PG11	26 1.02	24 0.94	38 1.50	26 1.02	12,3 0.48
TM178GA-PG11	17	PG11	40 1.57	36 1.42	34 1.34	40 1.57	17,3 0.68
TM178GA-PG13	17	PG13	40 1.57	36 1.42	34 1.34	40 1.57	18,5 0.73
TM238GA-PG16	23	PG16	44 1.73	41 1.61	42 1.65	44 1.73	21,1 0.83
TM238GA-PG21	23	PG21	44 1.73	41 1.61	34 1.34	44 1.73	26,8 1.06
TM238GA-PG29	23	PG29	50 1.97	46 1.81	42 1.65	44 1.73	27,9 1.10
TM118GA-M16	11	M16	26 1.02	24 0.94	34 1.34	26 1.02	12,3 0.48
TM118GA-M20	11	M20	26 1.02	24 0.94	42 1.65	26 1.02	12,3 0.48
TM178GA-M20	17	M20	40 1.57	36 1.42	34 1.34	40 1.57	18,5 0.73
TM238GA-M20	23	M20	44 1.73	41 1.61	48 1.89	44 1.73	18,5 0.73
TM238GA-M25	23	M25	44 1.73	41 1.61	38 1.50	44 1.73	23,5 0.93
TM238GA-M32	23	M32	44 1.73	41 1.61	38 1.50	44 1.73	27,9 1.10
TM238GA-M40	23	M40	50 1.97	46 1.81	48 1.89	44 1.73	27,9 1.10

Metal circular connectors - *Back shell with cable gland*

Back shell with fitted cable screw attachment for a wide range of cable requirements.

Material Nickel-plated brass. Contact holder insert depends on the version.



Manufacturer Product Code	Size	Dimensions (mm/Inch)			
		A	B	C	Ø Cable
TM118UD-152	11	24,4 0.96	22 0.87	34 1.34	4,0-13,0 0.157-0.512
TM178UD-152	17	38,5 1.52	35 1.38	34 1.34	4,0-13,0 0.157-0.512
TM178UD-154	17	38,5 1.52	35 1.38	34 1.34	7,0-20,5 0.276-0.807
TM238UD-153	23	43,5 1.71	40 1.57	34 1.34	4,0-15,5 0.157-0.61
TM238UD-155	23	43,5 1.71	40 1.57	42 1.57	11,5-28,0 0.453-1.102

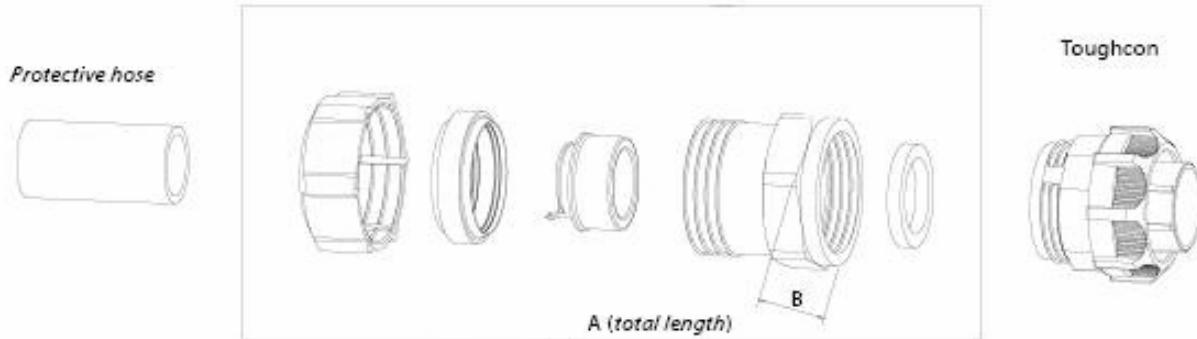
Metal circular connectors - *Back shell with Shureseal¹ adapter*

This adapter provides a connection from protective hoses with metal core e.g. Shureseal¹ to the Toughcon series. This results in a flexible, safe and hard-wearing connection, and a homogenous, self-contained unit.

Material Aluminium anodised, galvanised steel, nylon

Temperature range -55°C to +90°C

Scope of supply Back shell with metal-core protective hose, adapter and back shell seal



Manufacturer Product Code	For Rated Hose Width	For Size	Dimensions (mm/Inch)	
			A	B
TM118F-0375	3/8"	11	38 1.50	24 0.94
TM118F-0500	1/2"	11	40 1.57	24 0.94
TM178F-0375	3/8"	17	38 1.50	36 1.42
TM178F-0500	1/2"	17	40 1.57	36 1.42
TM178F-0750	3/4"	17	45 1.77	36 1.42
TM238F-0500	1/2"	23	40 1.57	41 1.61
TM238F-0750	3/4"	23	45 1.77	41 1.61
TM238F-1000	1"	23	49 1.93	41 1.61

¹ Shureseal is a registered trademark of the Thomas & Betts Corporation

Metal circular connectors - 90° angled adapters

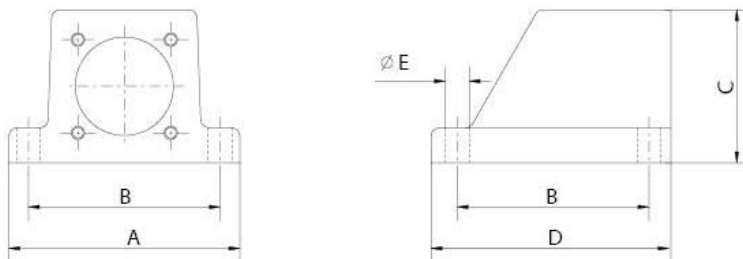
The angled adapter makes it possible to align the Toughcon panel-mounted receptacles at 90° to the attachment surface. The Toughcon is attached to the angled adapter by means of four M3 screws (not included in the scope of supply)

Material Zinc die-cast

Temperature range -55°C to +90°C

Scope of supply Flange bracket with o-ring-seal to attachment surface

Accessories Seals TM118GSK, TM178GSK, TM238GSK



Manufacturer Product Code	Size	Dimensions (mm/Inch)				
		A	B	C	D	E
TM118-90	11	53 2.09	44 1.73	35 1.38	55 2.15	5,5 0.22
TM178-90	17	63 2.48	54 2.13	42 1.65	64 2.52	5,5 0.22
TM238-90	23	71 2.80	60 2.36	52 2.05	74 2.91	5,5 0.22

Metal circular connectors - Contact support holders

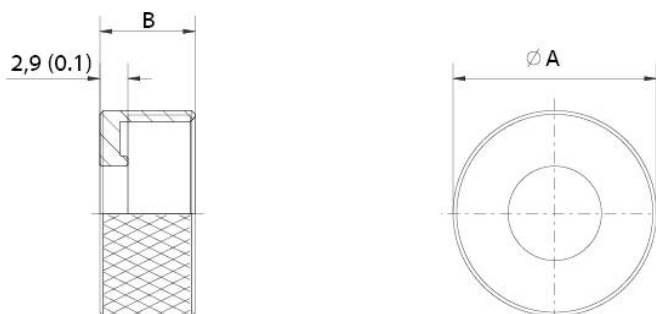
The contact support holder is used for holding the contact support in the shell with plugs and receptacles of the Toughcon TM series. The contact support holder is part of the scope of supply for panel-mounted receptacles and cable-mounted receptacles.

Material Anodised aluminium

Temperature range -55°C to +90°C

Scope of supply Contact support holder

Manufacturer Product Code	Size	Dimensions (mm/Inch)	
		A	B
TM118RET	11	21,4 0.84	10 0.39
TM178RET	17	32,5 1.28	10 0.39
TM238RET	23	39 1.54	10 0.39

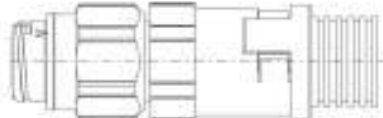


Metal circular connectors – Examples

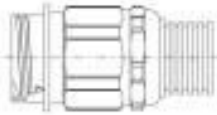
Pressure screws ¹



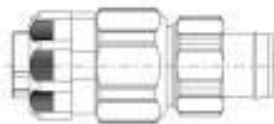
Standard



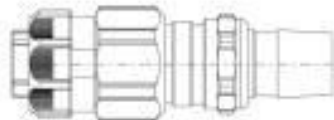
Corrugated tube



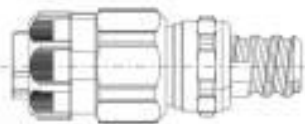
UNI corrugated tube



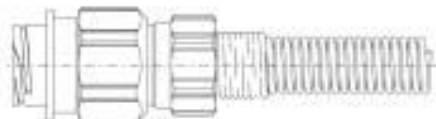
Smooth hoses



Smooth hoses thin-walled



UL hose

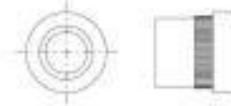


UNI Flex



Clamp

Seal inserts



Standard ²



Extended short



Increased strain relief



EMC Iris



EMC Cone



Multiple form N



Multiple form E



Multiple divided



Closed



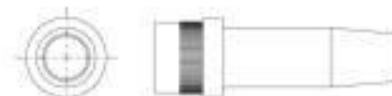
Closed divided



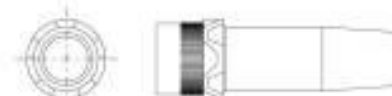
Flat cable



Bus cable ASi



Bend protection



Bend protection with increased strain relief

¹ Shown with screwed up Toughcon

² Refers to usage

Plastic circular connectors - Plugs and sockets

The connector is made of glass-fibre reinforced plastic and has a coupling. Depending on the shell size, up to two different set-ups are possible, which differ in the number of poles and assignment of contacts.

Material PPO with GF

Temperature range -55°C to +105°C

Scope of supply Connector

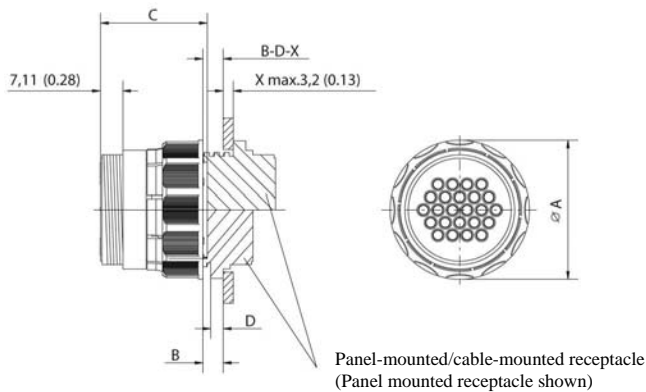


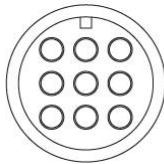
Figure A
Shown TT1110-P04



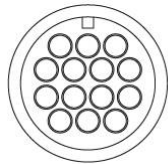
Figure B
Shown TM1110-S04



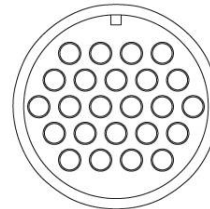
Structure 4



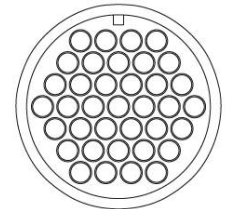
Structure 9



Structure 14



Structure 24



Structure 37

Manufacturer Product Code	Type	Figure	Size	Structure	Dimensions (mm/Inch)			
					A	B	C	D
TT1110-P04	Pin	A	11	4	25,4 1.00	6,4 0.25	34,0 1.34	2,3 0.09
TT1110-S04	Socket	B				6,4 0.25	29,0 1.14	
TT1710-P09	Pin	A	17	9	34,5 1.36	6,4 0.25	34,0 1.34	2,3 0.09
TT1710-S09	Socket	B				6,4 0.25	29,0 1.14	
TT1710-P14	Pin	A	17	14	34,5 1.36	6,4 0.25	34,0 1.34	2,3 0.09
TT1710-S14	Socket	B				6,4 0.25	29,0 1.14	
TT2310-P24	Pin	A	23	24	44,5 1.75	8,1 0.32	34,0 1.34	4,1 0.16
TT2310-S24	Socket	B				8,1 0.32	29,0 1.14	
TT2310-P37	Pin	A	23	37	44,5 1.75	8,1 0.32	34,0 1.34	4,1 0.16
TT2310-S37	Socket	B				8,1 0.32	29,0 1.14	

Plastic circular connectors - Panel-mounted receptacles

The panel-mounted receptacle is made of glass-fibre reinforced plastic with vibration protection. Depending on the shell size, up to two different set-ups are possible, which differ in the number of poles and assignment of contacts. The panel-mounted receptacle can be fixed in place from the inside (up to max. panel thickness 0.126") or the outside of the device panel.

Material PPO with GF

Temperature range -55°C to +105°C

Scope of supply Panel-mounted socket

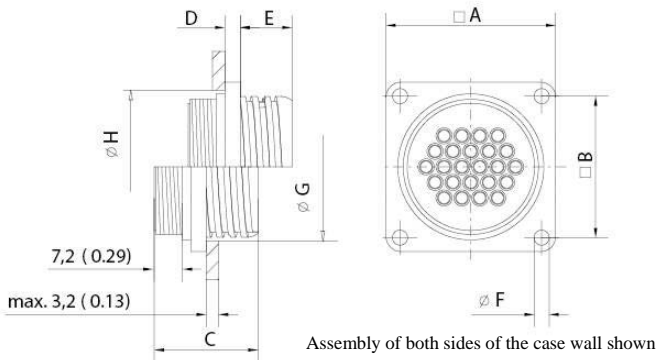


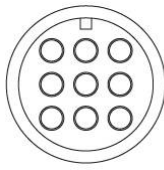
Figure A
Shown TT2330-P37



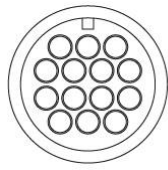
Figure B
Shown TT2330-S37



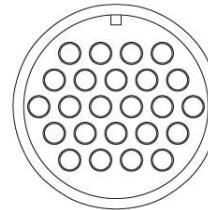
Structure 4



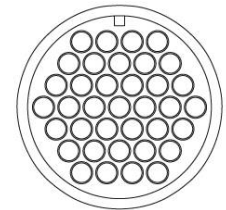
Structure 9



Structure 14



Structure 24



Structure 37

Manufacturer Product Code	Type	Figure	Size	Structure	Dimensions (mm/Inch)							
					A	B	C	D	E	F	G	H
TT1130-P04	Pin	A	11	4	28,7 1.13	21,6 0.85	33,8 1.33	2,3 0.09	10,7 0.42	3,3 0.13	18,3 0.72	20,7 0.82
TT1130-S04	Socket	B					26,9 1.06					
TT1730-P09	Pin	A	17	9	36,6 1.44	28,7 1.13	33,8 1.33	2,3 0.09	10,7 0.42	3,8 0.15	27,4 1.08	28,4 1.12
TT1730-S09	Socket	B					26,9 1.06					
TT1730-P14	Pin	A	17	14	36,6 1.44	28,7 1.13	33,8 1.33	2,3 0.09	10,7 0.42	3,8 0.15	27,4 1.08	28,4 1.12
TT1730-S14	Socket	B					26,9 1.06					
TT2330-P24	Pin	A	23	24	44,5 1.75	36,6 1.44	33,8 1.33	4,1 0.16	13,5 0.53	3,8 0.15	37,1 1.46	38,6 1.52
TT2330-S24	Socket	B					26,9 1.06					
TT2330-P37	Pin	A	23	37	44,5 1.75	36,6 1.44	33,8 1.33	4,1 0.16	13,5 0.53	3,8 0.15	37,1 1.46	38,6 1.52
TT2330-S37	Socket	B					26,9 1.06					

Plastic circular connectors - Cable-mounted receptacles

The cable-mounted receptacle is made of glass-fibre reinforced plastic and has an end catch as vibration protection. Depending on the shell size, up to two different set-ups are possible, which differ in the number of poles and assignment of contacts.

Material PPO with GF

Temperature range -55°C to +105°C

Scope of supply Cable-mounted socket

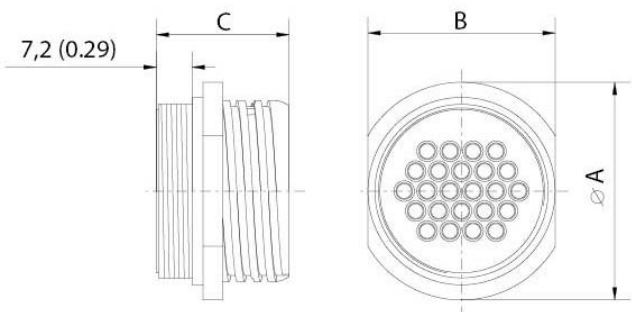
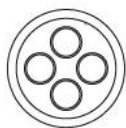


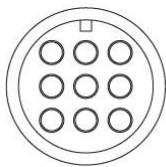
Figure A
Shown TT1720-P09



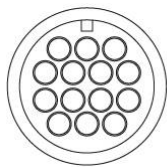
Figure B
Shown TT1720-S09



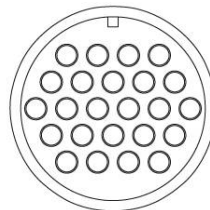
Structure 4



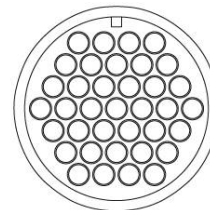
Structure 9



Structure 14



Structure 24



Structure 37

Manufacturer Product Code	Type	Figure	Size	Structure	Dimensions (mm/Inch)		
					A	B	C
TT1120-P04	Pin	A	11	4	23,6 0.93	20,6 0.81	33,8 1.33
TT1120-S04	Socket	B					26,9 1.06
TT1720-P09	Pin	A	17	9	33,3 1.31	29,5 1.16	33,8 1.33
TT1720-S09	Socket	B					26,9 1.06
TT1720-P14	Pin	A	17	14	33,3 1.31	29,5 1.16	33,8 1.33
TT1720-S14	Socket	B					26,9 1.06
TT2320-P24	Pin	A	23	24	43,9 1.73	37,8 1.49	33,8 1.33
TT2320-S24	Socket	B					26,9 1.06
TT2320-P37	Pin	A	23	37	43,9 1.73	37,8 1.49	33,8 1.33
TT2320-S37	Socket	B					26,9 1.06

Plastic circular connectors - Back shell with strain relief

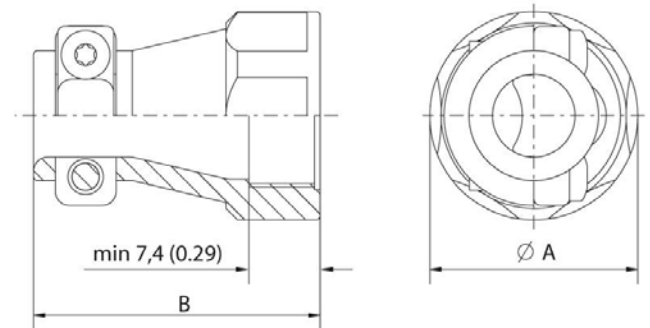
Thanks to the strain relief, both individual wire bundles and cables of different diameters can be fastened safely. It can be screwed quickly and easily onto the respective Toughcon connector or receptacle.

Material PPO with GF

Temperature range -55°C to +105°C

Scope of supply Strain relief with up to two rotating clamping fittings (depending on size) and

Manufacturer Product Code	Size	Dimensions (mm/Inch)			Ø Cable
		A	B		
TT118SR-33	11	23,1 0.91	31,8 1.25		2,8-8,4 0.11-0.33
TT118SR-45	11	23,1 0.91	35,6 1.40		2,8-11,4 0.11-0.45
TT178SR-45	17	29,5 1.16	35,6 1.40		2,8-11,4 0.11-0.45
TT178SR-70	17	29,5 1.16	41,9 1.65		8,6-17,8 0.34-0.70
TT238SR-70	23	40,6 1.60	39,4 1.55		8,6-17,8 0.34-0.70
TT238SR-112	23	40,6 1.60	41,9 1.65		14,5-28,4 0.57-1.12



Plastic circular connectors - Back shell with shrink hose

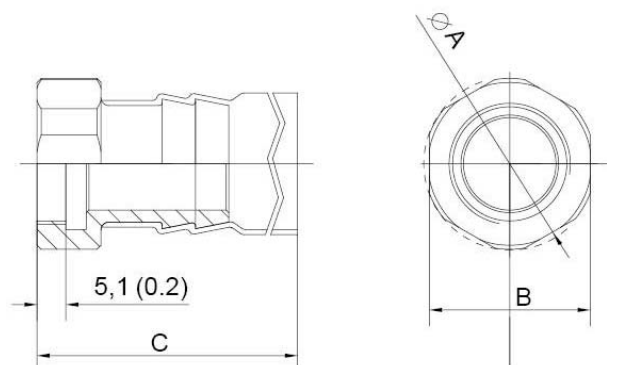
The back shell can easily be screwed onto the respective connector or receptacle and makes it possible to feed cables sealed. The inside of the shrink hose is coated with a special adhesive that forms a positive material bond with the cable. A secure seal is produced, especially when sheathed cables are used.

Material Anodised aluminium, polyolefin

Temperature range -55°C to +90°C

Scope of supply Back shell with shrink hose and back shell seal

Manufacturer Product Code	Size	Dimensions (mm/Inch)			Ø Cable
		A	B	C	
TT118ES-26	11	26 1.02	24 0.94	71,4 2.81	6,6-15,2 0.26-0.6
TT178ES-40	17	34 1.34	32 1.26	79,2 3.12	10,2-22,4 0.40-0.88
TT238ES-55	23	44 1.73	41 1.61	88,9 3.50	14,0-27,9 0.55-1.10



Plastic circular connectors - Back shell with PG-/M-thread

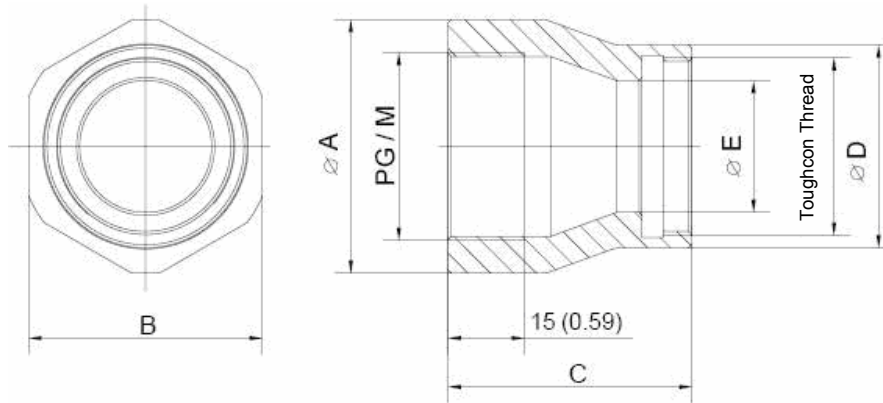
The back shell with PG or metric thread allows further components to be screwed onto the Toughcon plugs or receptacles, such as cable screw attachments.

Material PA

Temperature range -20°C to +100°C

Scope of supply Back shell with PG or metric thread

Accessories Back shell seal

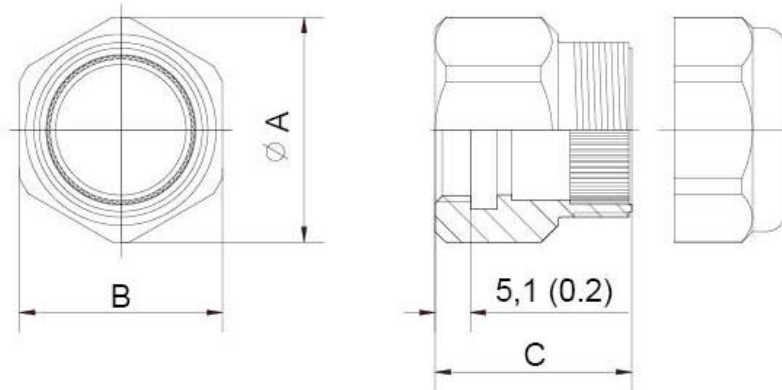
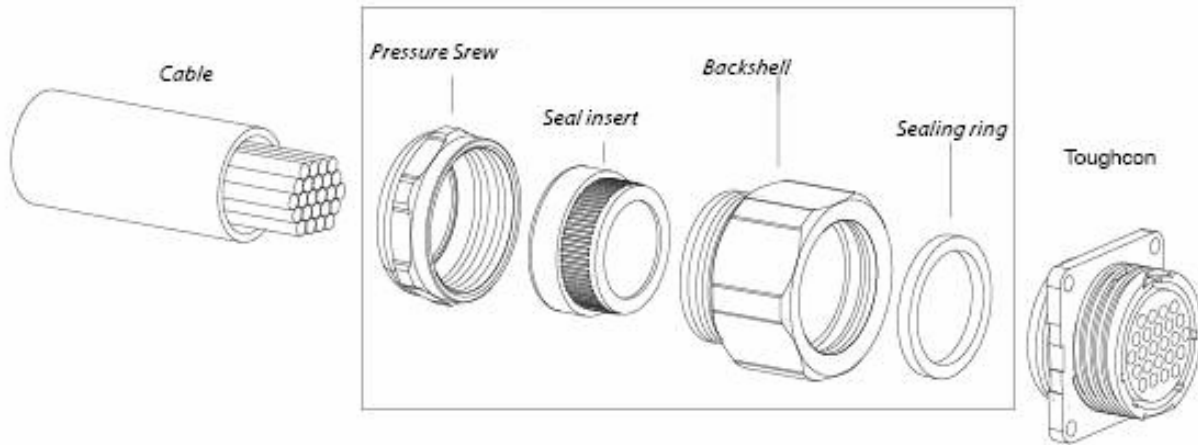


Manufacturer Product Code	Size	Thread	Dimensions (mm/Inch)				
			A	B	C	D	E
TT118GA-PG9	11	PG9	26 1.02	24 0.94	34 1.34	22,2 0.87	12,3 0.48
TT118GA-PG11	11	PG11	26 1.02	24 0.94	38 1.50	22,2 0.87	12,3 0.48
TT178GA-PG11	17	PG11	34 1.34	32 1.26	34 1.34	34 1.34	17,3 0.68
TT178GA-PG13	17	PG13	34 1.34	32 1.26	34 1.34	34 1.34	18,5 0.73
TT238GA-PG16	23	PG16	44 1.73	41 1.61	38 1.50	40 1.57	21,1 0.83
TT238GA-PG21	23	PG21	44 1.73	41 1.61	34 1.34	40 1.57	26 1.02
TT238GA-PG29	23	PG29	50 1.97	46 1.81	48 1.89	40 1.57	26 1.02
TT118GA-M16	11	M16	26 1.02	24 0.94	34 1.34	22,2 0.87	12,3 0.48
TT118GA-M20	11	M20	26 1.02	24 0.94	42 1.65	22,2 0.87	12,3 0.48
TT178GA-M20	17	M20	34 1.34	32 1.26	34 1.34	34 1.34	18,5 0.73
TT238GA-M20	23	M20	44 1.73	41 1.61	42 1.62	40 1.57	18,5 0.73
TT238GA-M25	23	M25	44 1.73	41 1.61	34 1.34	40 1.57	23,5 0.93
TT238GA-M32	23	M32	44 1.73	41 1.61	38 1.50	40 1.57	26 1.02
TT238GA-M40	23	M40	50 1.97	46 1.81	48 1.89	40 1.57	26 1.02

Plastic circular connectors - Back shell with cable gland

Back shell with fitted cable screw attachment for a wide range of cable requirements.

Material Nickel-plated brass. Contact holder insert depends on the version



Manufacturer Product Code	Size	Dimensions (mm/Inch)			
		A	B	C	Ø Cable
TT118UD-152	11	26,5 1.04	24 0.95	30 1.18	4,0-13,0 0.157-0.512
TT178UD-152	17	36,5 1.43	33 1.30	32 1.25	4,0-13,0 0.157-0.512
TT178UD-154	17	36,5 1.43	33 1.30	32 1.22	7,0-20,5 0.276-0.807
TT238UD-153	23	46,5 1.83	43 1.69	35 1.38	4,0-15,5 0.157-0.61
TT238UD-155	23	46,5 1.83	43 1.69	35 1.38	11,5-28,0 0.453-1.102

Plastic circular connectors - 90° angled adapters

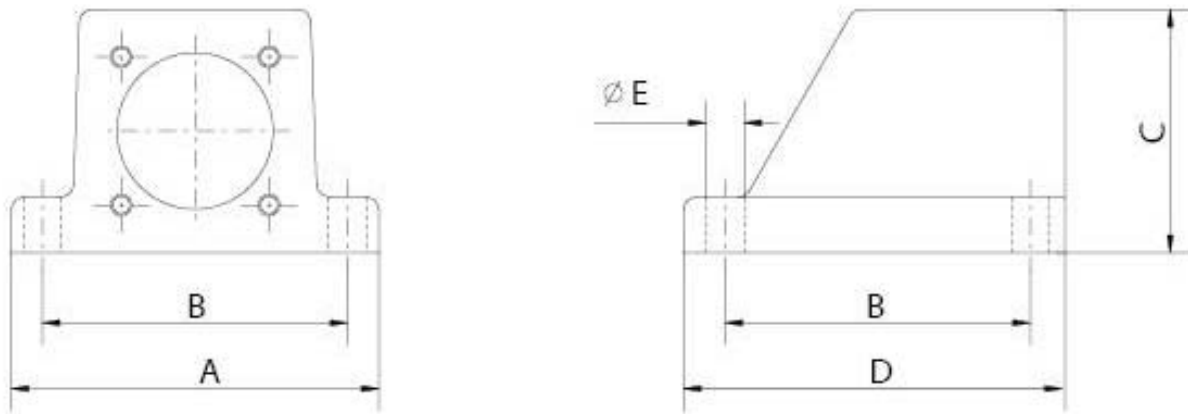
The angled adapter makes it possible to align the Toughcon panel-mounted receptacles at 90° to the attachment surface. The Toughcon is attached to the angled adapter by means of four self-tapping screws (not included in the scope of supply)

Material Zinc die-cast

Temperature range -55°C to +90°C

Scope of supply Flange bracket with o-ring-seal to attachment surface

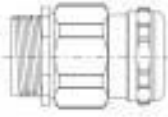
Accessories Seals TM118GSK, TM178GSK, TM238GSK, screws



Manufacturer Product Code	Size	Dimensions (mm/Inch)				
		A	B	C	D	E
TT118-90	11	53 2.09	44 1.73	35 1.38	56 2.20	5,5 0.22
TT178-90	17	68 2.68	55 2.17	43 1.69	68 2.68	5,5 0.22
TT238-90	23	70 2.76	60 2.36	52 2.05	74 2.91	5,5 0.22

Plastic circular connectors – Examples

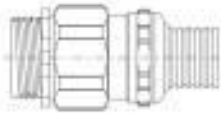
Pressure screws ¹



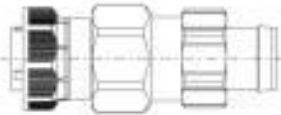
Standard



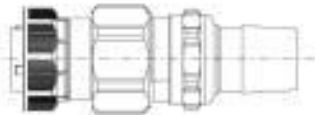
Corrugated tube



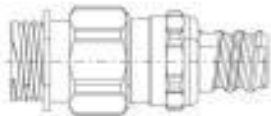
UNI corrugated tube



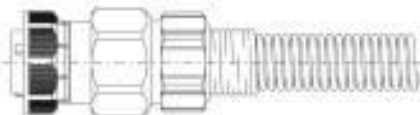
Smooth hoses



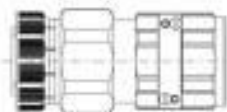
Smooth hoses thin-walled



UL hose

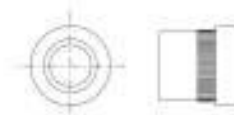


UNI Flex

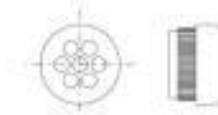


Clamp

Seal inserts



Standard ²



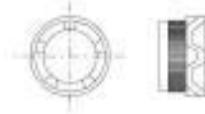
Multiple form N



Extended short



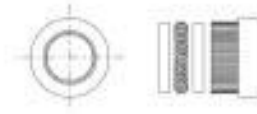
Multiple form E



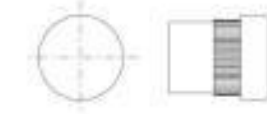
Increased strain relief



Multiple divided



EMC Iris



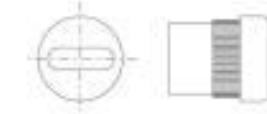
Closed



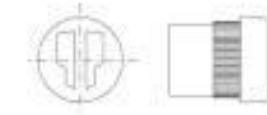
EMC Cone



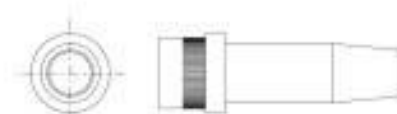
Closed divided



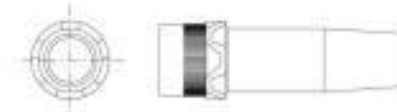
Flat cable



Bus cable ASI



Bend protection

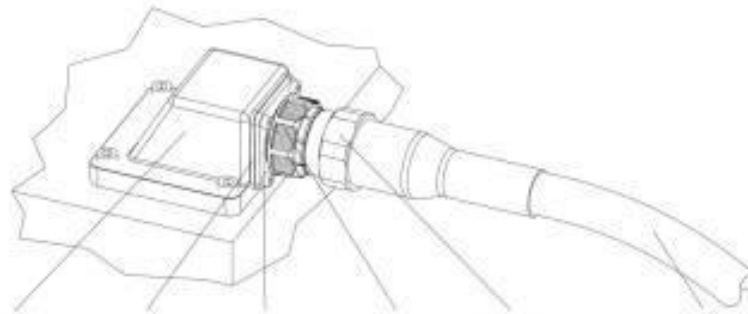
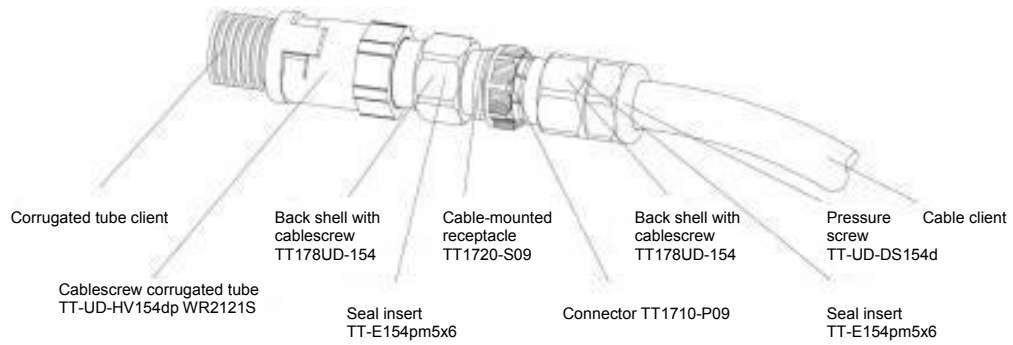


Bend protection with increased strain relief

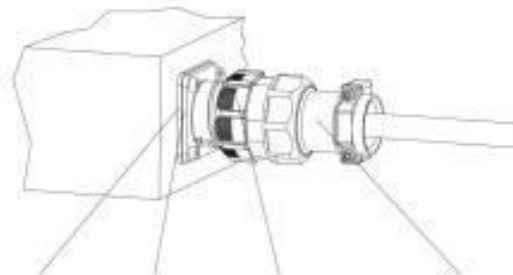
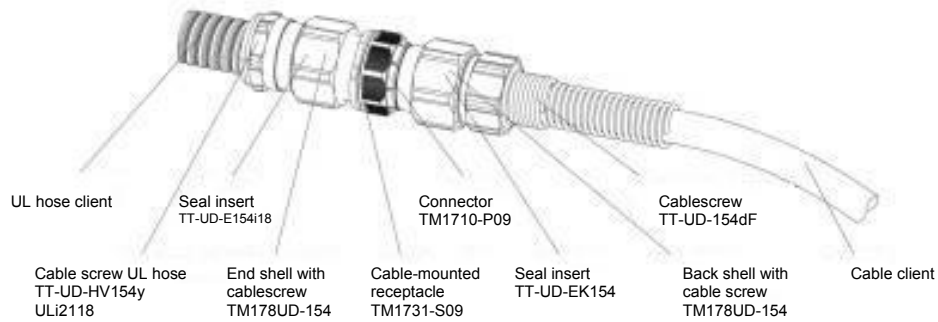
¹ Shown with screwed up Toughcon

² Refers to usage

Plastic



Metal



General accessories - Protective caps for plastic and metal circular connectors

The use of a protective cap is advisable particularly for applications where the disconnected Toughcon connector or receptacle could come into contact with humidity or dust. The protective cap can either be screwed into place on the receptacle or attached to the cable using a cable binder (not included in the scope of supply). This means the protective cap cannot be lost.

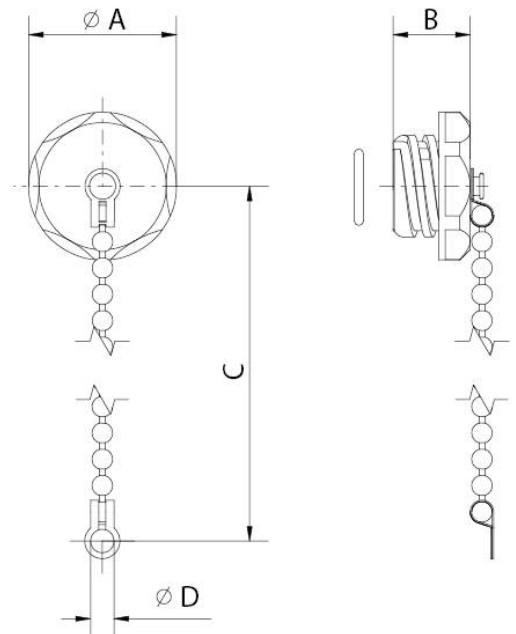
Material PPO

Temperature range -20°C to +105°C

Scope of supply Protective cap with ball chain and insertion area seal

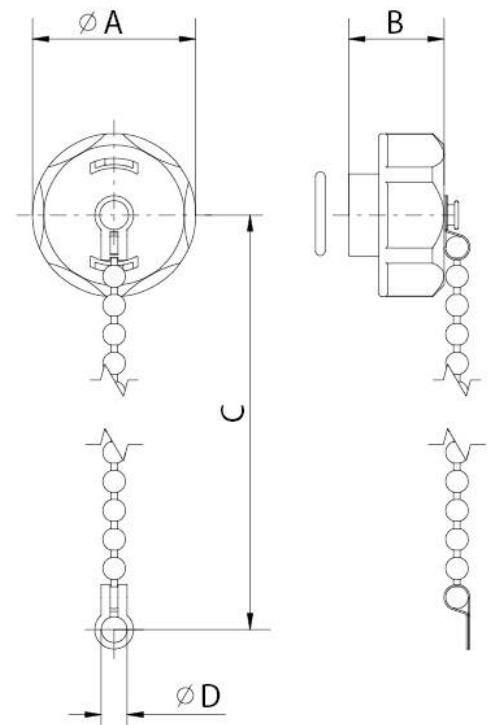
Connector:

Manufacturer Product Code	Size	Dimensions (mm/Inch)			
		A	B	C	D
TT118DCP	11	25,4 1.00	13,2 0.52	125 4.92	4 0.16
TT178DCP	17	36,4 1.43	13,8 0.55	125 4.92	4 0.16
TT238DCP	23	44,3 1.74	17,3 0.68	125 4.92	4 0.16



Receptacle:

Manufacturer Product Code	Size	Dimensions (mm/Inch)			
		A	B	C	D
TT118DCR	11	25,4 1.00	14,8 0.58	125 4.92	4 0.16
TT178DCR	17	34,5 1.36	15,5 0.61	125 4.92	4 0.16
TT238DCR	23	44,1 1.74	15,3 0.60	125 4.92	4 0.16



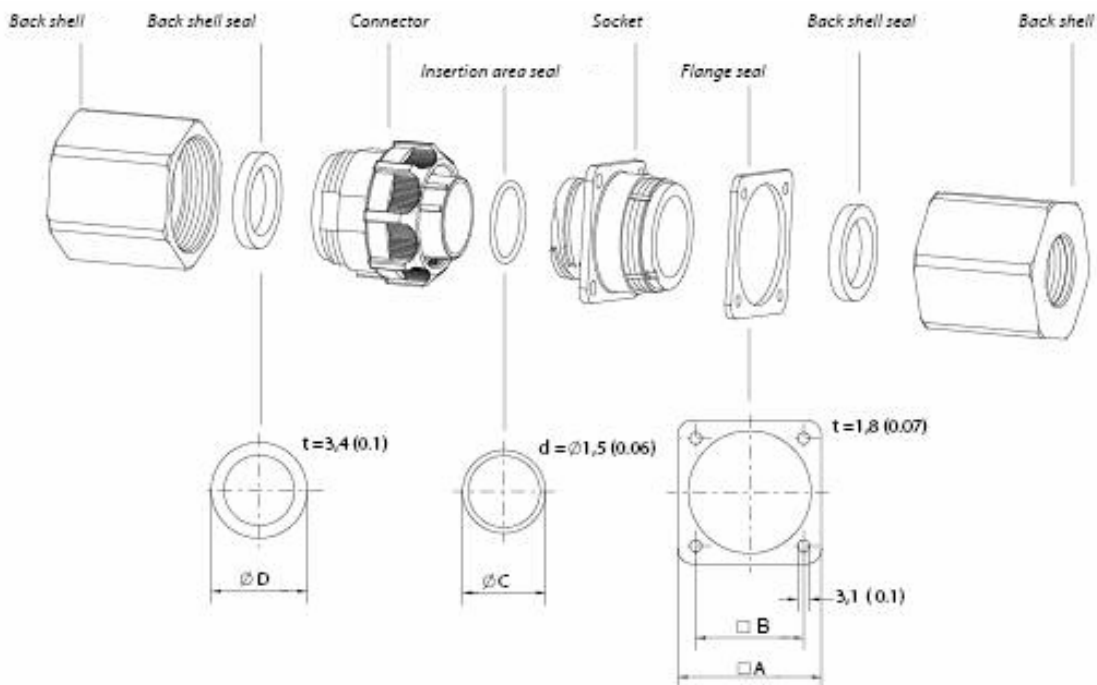
General accessories – Seals for plastic and metal circular connectors

Every seal can be delivered either as a retrofit for the TT series or as a spare part for the TM series. These are insertion area seals that can easily be inserted into a cavity in the receptacle.

Material NBR, EPDM or CR/SBR

Temperature range -20°C to +105°C

Scope of supply The respective seal



Back shell seal:

Manufacturer Product Code	Size	Dimensions (mm/Inch)
		D
TT118ED	11	17,2 0.68
TT178ED	17	25,4 1.00
TT238ED	23	34,1 1.34
TM118ED	11	18,3 0.72
TM178ED	17	29,3 1.15
TM238ED	23	35,6 1.14

Flange seal:

Manufacturer Product Code	Size	Dimensions (mm/Inch)	
		A	B
TM118GSK	11	25,4 1.00	13,2 0.52
TM178GSK	17	36,4 1.43	13,8 0.55
TM238GSK	23	44,3 1.74	17,3 0.68

Insertion area seal:

Manufacturer Product Code	Size	Dimensions (mm/Inch)
		C
TT118SR	11	13,0 0.51
TT178SR	17	22,0 0.87
TT238SR	23	31 1.22

General accessories – Contacts for plastic and metal circular connectors

Series TT93 pins and sockets are precision-punched and correspond to industrial standard size 16. The standard version is made of a copper alloy and then either tin or gold-plated. A supporting spring made of stainless steel guarantees a tireless connection between pin and socket contact.

The contacts can easily be inserted into the plugs and receptacles of the TT and TM series and locked securely. They can be removed again easily and without damage with the aid of the removal tool (e.g. in the event of assembly faults or a conductor having to be replaced). The conductors are crimped to the contacts.

Available for many different conductors or insulation diameters. The grounding pin contacts also available allow certain contacts to be made first within the connection, e.g. ground wires.

Operating voltage 250V testing voltage: 1500V

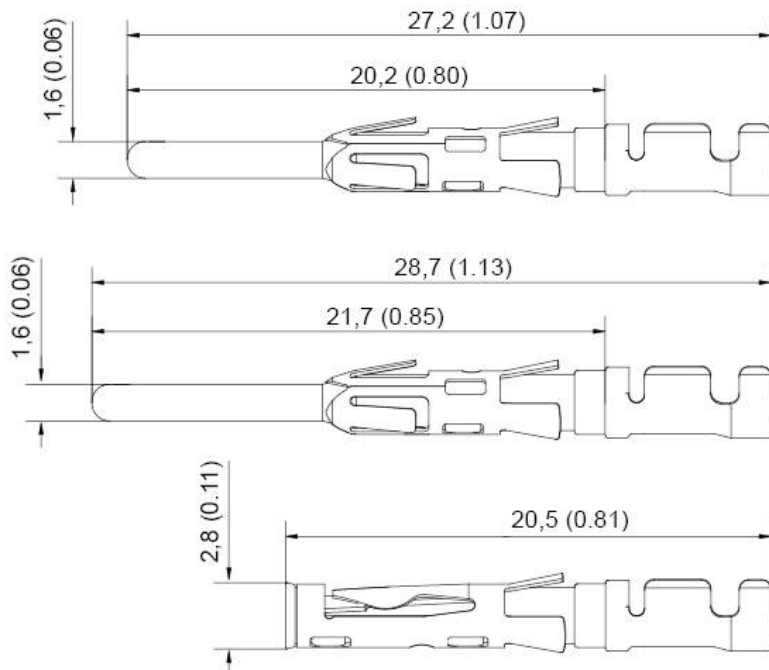
Current load capacity 13A at 20°C in free air

Contact resistance <5mΩ

Pull-out forces > 4.5N (> 6.6N on average over all contacts)

Insertion cycles 500 gold-plated, 100 tin-plated

Material Brass, stainless steel



General accessories – Contacts for plastic and metal circular connectors

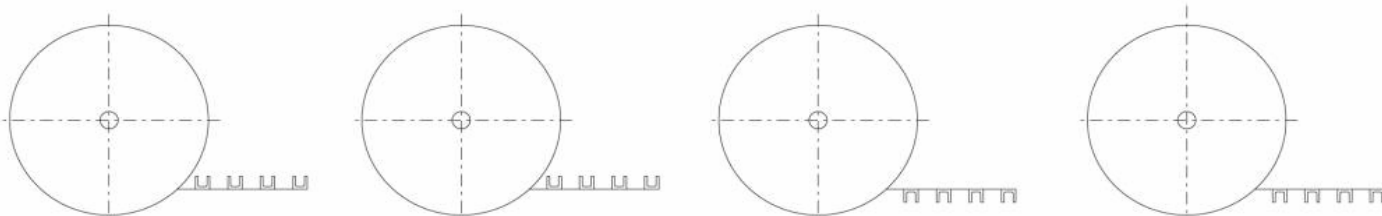
TT93

	Ø Wire (mm ² /inch ²)	AWG	Ø Isolator (mm/inch)	Shell Size					
				11	17	23	Contacts		
				4	9	14	24	37	
26	0,05-0,14 0.00008-0.00022	26-30	0,4-0,8 0.02-0.03	O	O	O	O	O	
24	0,14-0,25 0.00021-0.00039	24-26	0,8-1,4 0.03-0.06	O	O	O	O	O	
21	0,25-0,5 0.00039-0.00078	20-24	2,0-2,5 0.08-0.1	O	O	O	O	O	
20	0,25-0,5 0.00039-0.00078	20-24	1,1-1,8 0.04-0.07	O	O	O	O	O	
17	0,75-1,5 0.00116-0.00233	16-18	2,0-3,5 0.08-0.14	A	O	A	O	A	
16	0,75-1,5 0.00116-0.00233	16-18	2,0-2,5 0.08-0.1	O	O	O	O	O	
14	1,5-2,5 0.00233-0.00388	14-16	2,0-4,0 0.08-0.16	A	O	A	O	A	
13	2,5-4,0 0.00388-0.00620	12-14	2,8-4,2 0.11-0.17	A	B	A	B	A	
12	2,5-4,0 0.00388-0.00620	12-14	2,8-3,5 0.11-0.14	A	O	A	O	A	

Contact Type		Coating	
P	Pin	T	Tin Matt
S	Socket	G	Gold 0,38µm
G	Early Make Pin	U	Tin Bright
		H	Gold 0,75µm
		I	Gold Flash

	Packaging	Coil Direction
2	Loose piece contacts 500 pcs	-
3	Reeled 5000 pcs Pin AWG 12-14 – Socket AWG 14-16 & AWG 12-14 on coil 3000 pcs	A
4	See Section 3	B
5	See Section 3	C
6	See Section 3	D

A **B** **C** **D**



O Unrestricted use	A Ø Isolator max. 0,126 inch	B Ø Isolator max. 0,158 inch
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Tools - *Hand-held crimping tool*

This tool can be used to safely crimp the conductor with the respective pin or socket contacts of the series TT93. The tool has a protection feature against false operation and is easy to use. There are two crimping tools available:



WT10-01 Hand-held crimping tool for 0.00022 inch² to 0.0023 inch² (AWG 26-16)



WT10-02 Hand-held crimping tool for 0.000079 inch² to 0.00087 inch² (AWG 30-20)

Tools - *Removal tool*



The removal tool TR116 is used to remove pin or socket contacts of the series TT93 easily and without destruction. This means re-equipping or repairs are easy and safe to carry out.

Tools - *Insertion tool*



The insertion tool TR216 is used to push the contacts easily into the contact holes until they lock in place. This makes assembly easier, particularly where fine cables are involved.