

ELECTRICAL CONNECTORS FOR ROLLING STOCK APPLICATION



“Make In India”



PPS International

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GENERAL

PPS International is manufacturing wide range of Circular Connectors for Rolling stock applications which are widely used in 3 Phase Locomotives produced by CLW, DLW & DMW.

These connectors are mainly:

- ◆ Power Connectors, Control Connectors, Data Connectors etc.
 - ◆ Battery Connectors
 - ◆ Sensor Connectors
- & various other types of connectors and their accessories.





Introduction

PPS International in technical collaboration with GIMOTA AG Switzerland, has produced wide variety of Circular Connectors for Railway vehicles, which are being used in 3 Phase Locomotives.

These connectors correspond to the standards MIL-DTL-5015 and VG95234 and they are available in different series:

- Series GB:

Standard design with bayonet coupling single guiding key, with elastic insert for pressed in crimp-contacts.

- Series GV:

Like GB Series, but five guiding keys, with an extended Insert for better insulation at increased voltage.

- Series GU:

Special design with five guiding keys and available in size 48 only.

- Series GM:

Like GU Series, but modular construction.

The connectors series GB can be equipped for indoor as well as for outdoor applications.

Depending upon back shell, the connection can be sealed up to IP69K.

The connectors suitable for outdoor applications have been tested according IEC EN 60529 and achieved IP65 / IP67 / IP68 (5bar) and IP69K according to DIN 40050.

For outdoor applications rubber coated bayonet rings with dust protection lips are recommended. In addition a back shell with sealed cable clamp or with an adapter for heat shrinkable shapes are required.

The main properties of these connectors are, in brief:

- Bayonet-coupling
- Contact layouts up to 85 contacts
- Contacts for cross-sections available from 0.5 mm² up to 120 mm² wire
- High mechanical loading capacity
- Cases of (standard) Aluminium Alloy with surface treatments
- Durable elastic Inserts made of:
 - ETHYLEN ACRILATE for high fire protection requirements (GIMOTA standard)
 - SILICONE for high temperatures
 - VITTON for special requests
 - Thermoplast for special contacts
- Resistant against fuels, grease- and insulating oils
- Lifespan of 500 mating cycles at least.
- If not otherwise indicated all dimensions are in mm
- Conductor cross-sections in mm² and AWG: Indicated size are nominal values and need to be verified case by case as they are dependant on wire construction. The suitability has to be checked by the user/applicant.



TECHNICAL SPECIFICATIONS

Electrical characteristics

All electric data are valid on sea level with an environment temperature of 20 °C. Deviating environment conditions have to be considered for connector evaluation.

Connectors

Voltages						Insulation		
						Creepage Distance	CTI-Value	Insulating Resistance
Voltage-Index		Operating Voltage DC	Operating Voltage AC	Test Voltage	Flash-over	≥[mm]	IEC60664	[M]
[-]		[V]	[V]	[VAC]	[VAC]			
INST	MIL	250	200	1000	1400	1.6	≥300	≥5000
A	MIL	700	500	2000	2800	3.2	≥300	≥5000
B	MIL	2450	1750	4500	5700	7.9	≥300	≥5000
C	MIL	4200	3000	7000	8500	25.4	≥300	≥5000
D	MIL	1250	900	2800	3600	4.8	≥300	≥5000
E	MIL	1750	1250	3500	4500	6.3	≥300	≥5000
130V	SEV		130/250*				≥300	≥5000
250V	SEV		250/450*				≥300	≥5000
750V	ABB		750				≥300	≥5000
1000V	ABB		1000				≥300	≥5000

MIL: Requirements acc. to MIL-DTL-5015:

Values indicated on table above are applicable only if adequate safety measures are taken. That means the connection area of plug / Receptacle must be protected completely against pollution and humidity by an adequate cable clamp. Without safety precautions the operating voltage to grounding must not exceed 50 V.

SEV: Verifications SEV acc. to EN60998-1 (1993).

* The higher operation voltage can be applied:

- if plug and Receptacle at the connection side completely are encapsulated of casting resin,
- or by means of heat shrinking shape, which are long enough from the cable insulation over the crimping area into the insert.

ABB: User-Tests by ABB / Bombardier INC Zurich, Switzerland

* The data is as per GIMOTA Catalogue being our TOT Partner

Contacts

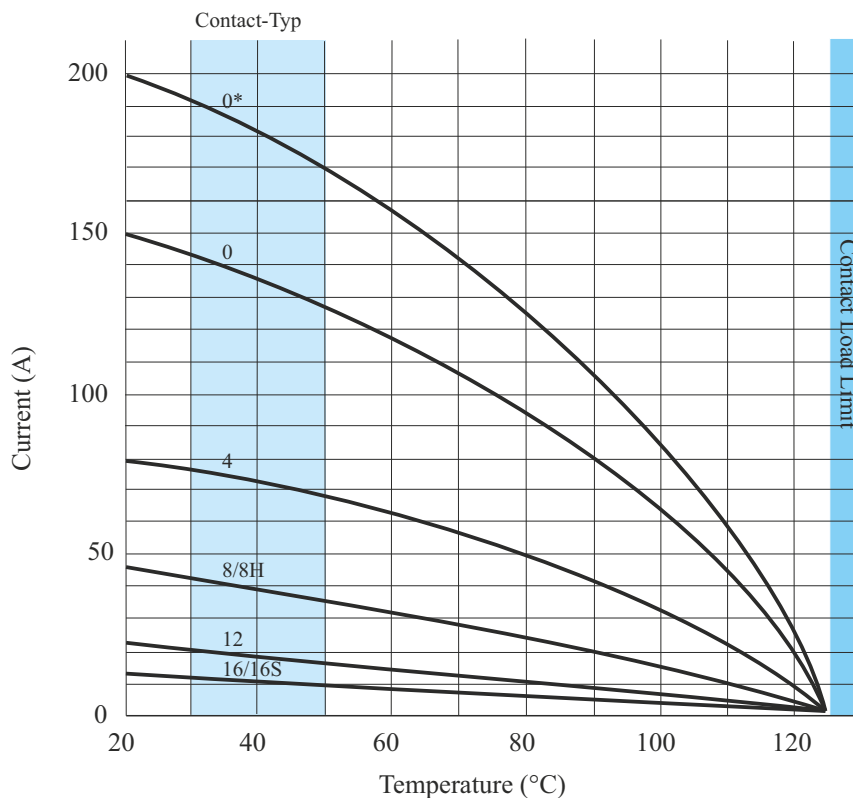
Size of Contacts			0*	0	4	8H	12	16/16S	20
Nominal current	continuous	[A]	200	150	80	56	23	13	7.5
Maximal current	short- term	[A]	300	245	135	90	41	22	7.5
Test current		[A]	240	200	110	72	35	20	9.0
contacts resistance ₁₎		[mΩ]		≥ 0.2	≥ 0.5	≥ 1.0	≥ 3.0	≥ 6.0	≥ 10

₁₎Verification acc. to VG95234 / 2 / Test 5.10.1 and VG95210 / 37

0* Lamella contact for increased current transfer

Rating Diagram for Contacts

Admissible nominal current



The “Contact Load Limit” corresponds to the permissible maximum temperature of the contacts. The maximum application temperature of the plug / receptacle has to be considered.



MECHANICAL PROPERTIES

Connectors

Bayonet cupling-torque¹⁾

			Connector sizes											
			10S	14S	16S	18	20	22	24	28	32	36	40	48
to lock	max.	[Nm]	1.7	1.8	2.0	4.0	5.0	6.0	6.5	7.0	8.0	9.0	10.0	10.0
to open	min.	[Nm]	0.45	0.55	0.63	1.00	1.50	1.50	2.00	2.70	3.60	4.50	5.90	5.90
	max.	[Nm]	1.7	1.8	2.0	4.0	5.0	6.5	6.5	7.0	8.0	9.0	10.0	10.0

¹⁾Verification acc. to VG95319/2/ Test 5.8.2

Contacts

Size of contacts

Size of contacts	0, 0*	4	8	8H	12	16/16S	20		
Contact material	copper alloy								
Gold plated 0.3 µm Au over 2.5 µm Ni	---	---	x	0	x	x	x		
Silver plated 3.5 µm Ag	x	x	0	x	x	0	0		
Contact mating force ¹⁾	nom.	[N]	42.5	20	15	15	7.5	5	1.8
Contact separating force	nom.	[N]	8.5	4	3	3	1.5	1	0.3

Plating on contact area: x = standard, o = on demand

¹⁾Verification acc. to VG95319 / 2 / Test 5.4 and 5.7

0* with Lamella for increased current transfer.

Shell parts

Surface treatment code

Surface treatment code	A	B
Shell-material		
Surface treatment	epoxy- polyurethan	electroless nickel
Surface colour	black	black
Thickness of surface treatment	13- 16 µm	12- 15 µm
Conformity of RoHS	yes	yes
Corrosion resistance ¹⁾	500 h	48 h
Operating temperature	-55 to + 125°C	-55 to + 125°C
Temperature shock ²⁾	-55 to + 125°C	-55 to + 125°C
Electical conductivity ³⁾	non conductive	≤ 0.5 mΩ

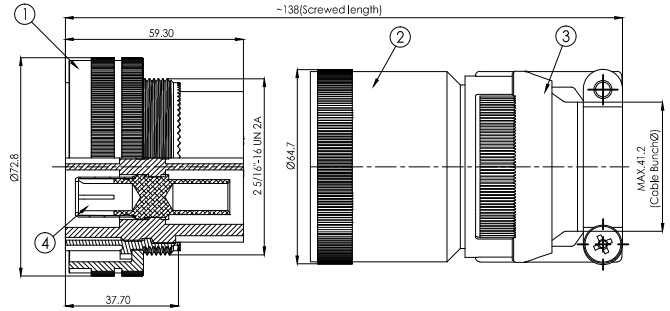
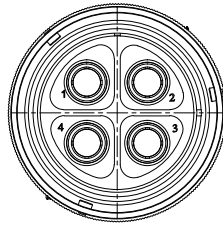
¹⁾Verification acc. to MIL 1344A Test 1001.1

²⁾Verification acc. to MIL 202F Method 107G

³⁾Verification acc. to MIL 1344A Test 3007

* According to GIMOTA preferences for outdoor use

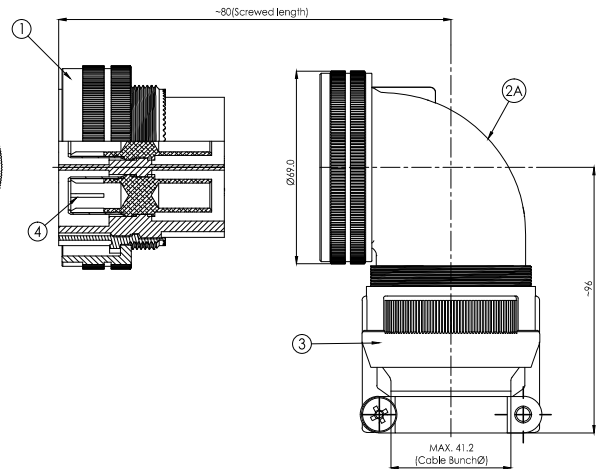
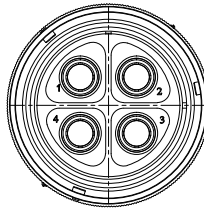
POWER CIRCULAR CONNECTORS



Standard case material: Aluminium alloy
 Standard case surface: Epoxy-polyurethane, black
 Standard contact mounting material: Silicone

Other Combinations also available

ABB Identification No.	Pos.	PPS Ident. No.	Description
HBTB315176R0113		HBTB315176R0113 consisting of:	Complete plug assy. straight size 40, 4 poles
	1	GB60-40-A4SN-SAC	Plug size 40, 4-poles for socket contacts
	2	BSL40-AC	Aluminum back shell long
	3	CC40-AC	Aluminium cable clamp
	4	10-903-0-352G10	Socket contacts size 0, 35mm ²



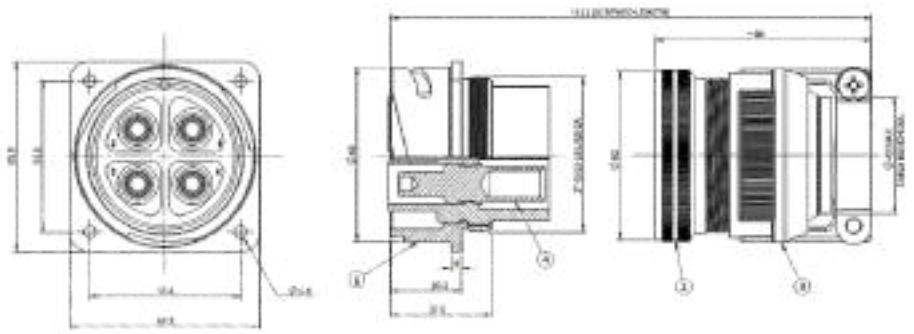
Standard case material: Aluminium alloy
 Standard case surface: Epoxy-polyurethane, black
 Standard contact mounting material: Silicone

Other Combinations also available

ABB Identification No.	Pos.	PPS Ident. No.	Description
HBTB315176R0213		HBTB315176R0213 consisting of:	Complete plug assy. with 90° bend size 40, 4 poles
	1	GB60-40-A4SN-SAC	Plug size 40, 4-poles, for socket contacts
	2A	BEN40-AC	Aluminium back shell 90 degree
	3	CC40-AC	Aluminium cable clamp
	4	10-903-0-352G10	Socket contacts size 0, 35mm ²



POWER CIRCULAR CONNECTORS



Standard case material: Aluminium alloy
 Standard case surface: Epoxy-polyurethane, black
 Standard contact mounting material: Silicone

Other Combinations also available

ABB Identification No.	Pos.	PPS Ident. No.	Description
HBTB315177R0113		HBTB315177R0113 consisting of:	Complete receptacle assy. straight size 40, 4 poles
	1	GB210-40-A4PN-SAC	Receptacle size 40, 4-poles for pin contacts
	2	BSN40-AC	Aluminum back shell straight
	3	CC40-AC	Aluminium cable clamp
	4	10-660-0-352G10	Pin contacts size 0, 35mm ²

Plug 40, 4-poles for socket contact	PPS Ident No.
	GB60-40-A4SN-SAC



Receptacle 40, 4-poles for pin contact	PPS Ident No.
	GB210-40-A4PN-SAC



Aluminium Back Shell 90 Degree for size 40	PPS Ident No.	
	BEN40-AC	



Aluminium Back Shell straight for size 40	PPS Ident No.	
	BSL40-AC	Long
	BSN40-AC	Short



Aluminium Cable Clamp for size 40	PPS Ident No.	
	CC40-AC	

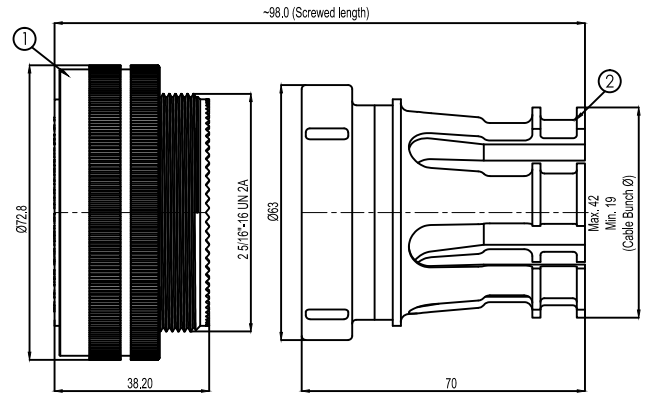
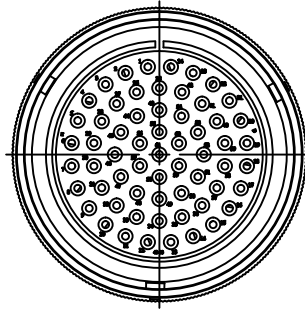


Socket Contact Size-0	Conductor size	PPS Ident No. (For Deep Indenting Dies)	PPS Ident No. (For Hexagonal Crimp Dies)
	16mm ²	10-903-0-162G10	10-903-0-162G62
	25mm ²	10-903-0-252G10	10-903-0-252G76
	35mm ²	10-903-0-352G10	10-903-0-352G89
	50mm ²	10-903-0-502G10	10-903-0-502G10

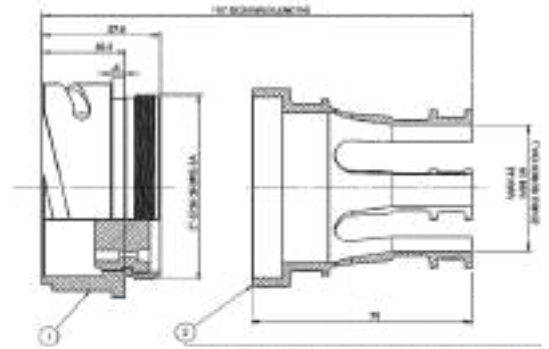
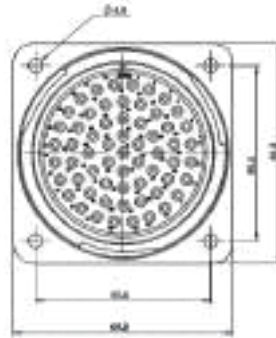


Pin Contact Size-0	Conductor size	PPS Ident No. (For Deep Indenting Dies)	PPS Ident No. (For Hexagonal Crimp Dies)
	16mm ²	10-660-0-162G10	10-660-0-162G62
	25mm ²	10-660-0-252G10	10-660-0-252G76
	35mm ²	10-660-0-352G10	10-660-0-352G89
	50mm ²	10-660-0-502G10	10-660-0-502G10





Plugs	PPS Identification No.	Illustrations
Plug size 40, 61-poles for socket contacts	GB60-40-63SN-EAC	  <p style="text-align: center;">PLUG</p>
Plug size 40, 35-poles for socket contacts	GB60-40-35SN-EAC	
Plug size 36, 22-poles for socket contacts	GB60-36-A22SN-EAC	
Plug size 32, 31-poles for socket contacts	GB60-32-31SN-EAC	
Plug size 32, 13-poles for socket contacts	GB60-32-013SN-EAC	
Plug size 28, 37-pole for socket contacts	GB60-28-21SN-EAC	
Plug size 24, 7-poles for socket contacts	GB60-24-07SN-EAC	
Plug size 24, 4-poles for socket contacts	GV60-24-A4SN-EAC	
Plug size 22, 19-pole for socket contacts	GB60-22-14SN-EAC	
Plug size 18, 5-poles for socket contacts	GB60-18-11SN-EAC	



Receptacles	PPS Identification No.	Illustrations
Receptacle size 40, 61-poles for pin contacts	GB210-40-63PN-EAC	  RECEPTACLE
Receptacle size 40, 35-poles for pin contacts	GB210-40-35PN-EAC	
Receptacle size 36, 22-poles for pin contacts	GB210-36-A22PN-EAC	
Receptacle size 32, 31-poles for pin contacts	GB210-32-31PN-EAC	
Receptacle size 32, 13-poles for pin contacts	GB210-32-013PN-EAC	
Receptacle size 24, 07-poles for pin contacts	GB210-24-07PN-EAC	
Receptacle size 24, 04-poles for pin contacts	GV210-24-A4PN-EAC	
Receptacle size 22, 14-poles for pin contacts	GB210-22-14PN-EAC	
Receptacle size 18, 05-poles for pin contacts	GB210-18-11PN-EAC	

Synthetic Cable Clamp	Size	PPS Ident No.
	32	10-350349K-323
	40	10-350349K-403



Aluminium/ Synthetic Cable Clamp	Size	PPS Ident No.
	18	CC18-AC
	32	CC32-AC
	40	CC40-AC



Aluminium Back Shell 90 Degree	Size	PPS Ident No.
	32	BEN32-AC
	40	BEN40-AC



Aluminium/ Synthetic Back Shell	Size	PPS Ident No.	Type
	18	BSN18-AC	Normal
	32	BSH32-AC	Short
	40	BSL40-AC	Long
		BSN-40-AC	Normal



Synthetic Reduction Ring	Size	PPS Ident. No.
	22-32	10-350349RR-2232
	24-32	10-350349RR-2432
	28-32	10-35049RR-2832
	36-40	10-35049RR-3640



CONTACT PINS/ CONTACT SOCKETS



	Size	PPS Ident No.
Contact Socket 16 (Gold Plated)	16/0.5mm2	10-40556-05AU
	16/1.0mm2	10-40556AU
	16/1.5mm2	10-40556-20-1AU
	16/2.0mm2	10-40556-20AU



	Size	PPS Ident No.
Contact Pin 16 (Gold Plated)	16/0.5mm2	10-40557-05AU
	16/1.0mm2	10-40557AU
	16/1.5mm2	10-40557-20-1AU
	16/2.0mm2	10-40557-20AU



	Size	PPS Ident No.
Contact Socket 12 (Gold Plated)	12/0.5mm2	10-40560-11AU
	12/1.0mm2	10-40560-15AU
	12/1.5mm2	10-40560-18AU
	12/2.5mm2	10-40560-22AU
	12/4.0mm2	10-40560-30AU
	12/6.0mm2	10-40560-38AU



	Size	PPS Ident No.
Contact Pin 12 (Gold Plated)	12/0.5mm2	10-40561-11AU
	12/1.0mm2	10-40561-15AU
	12/1.5mm2	10-40561-18AU
	12/2.5mm2	10-40561-22AU
	12/4.0mm2	10-40561-30AU
	12/6.0mm2	10-40561-38AU





CONTACT PINS/ CONTACT SOCKETS

	Size	PPS Ident No.
Contact Socket 8 (Silver Plated)	8H/2.5mm2	10-40796-22AG
	8H/6.0mm2	10-40796-38AG
	8H/10mm2	10-40796-50AG



	Size	PPS Ident No.
Contact Pin 8 (Silver Plated)	8H/2.5mm2	10-40794-22AG
	8H/6.0mm2	10-40794-38AG
	8H/10mm2	10-40794-50AG

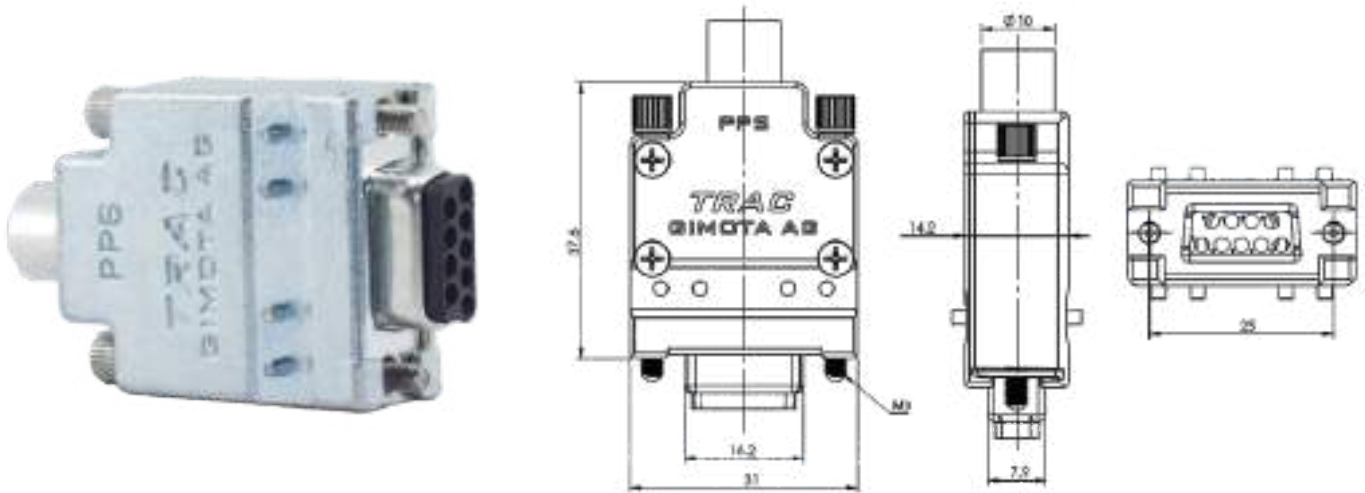


	Size	PPS Ident No.
Contact Socket 0 (Silver Plated)	0/16mm2	10-903-0-162G10
	0/25mm2	10-903-0-252G10
	0/35mm2	10-903-0-352G10
	0/50mm2	10-903-0-502G10



	Size	PPS Ident No.
Contact Pin 0 (Silver Plated)	0/16mm2	10-660-0-162G10
	0/25mm2	10-660-0-252G10
	0/35mm2	10-660-0-352G10
	0/50mm2	10-660-0-502G10





SUB-D Plug	PPS Identification No.	Illustrations
SUB-D plug, 9-poles for socket contacts	TRACHSTS09C09S1	
SUB-D receptacle, 9-poles for pin contacts	TRACHDOP09C09S	
SUB-D plug, 9-poles for pin contacts	TRACHSTP09C09S1	
SUB-D plug, 25-poles for socket contacts	TRACHSTS25C12BL1	
SUB-D plug, 15-poles for socket contacts	TRACHSTS15C10S1	
SUB-D plug, 17-poles for socket contacts	TRACHSTS17C10SV691	

Others Combinations also available

Cable Clamps	Size	PPS Ident No.
	SUB-D6	SUKABC06S
	SUB-D9	SUKABC09S
	SUB-D10	SUKABC10S
	SUB-D12	SUKABC12



Cable Clamps	Size	PPS Ident No.
	SUB-D 6-9	SUKABV6911404



Housing Socket	Size	PPS Ident No.	
	9P	SUHV09S	1.5 Kv
	9P	SUH09S	1.0 Kv
	15P	SUHV15S	1.5 Kv
	17P	SUH17W2S	1.0 Kv
25P	SUHV25S	1.5 Kv	



Housing Pin	Size	PPS Ident No.	
	9P	SUHV09P	1.5 Kv
	9P	SUH09P	1.0 Kv
	15P	SUHV15P	1.5 Kv
	17P	SUHV17P	1.0 Kv
25P	SUHV25P	1.5 Kv	



Fixing Plate	Size	PPS Ident No.
	SUB-D Size-1	SUBB1
	SUB-D Size-2	SUBB2
SUB-D Size-3	SUBB3	



Coding plate	Size	PPS Ident No.
	SUB-D Size-1	SUCB1
	SUB-D Size-2	SUCB2
	SUB-D Size-3	SUCB3



Receptacle Fixing Screw	Size	PPS Ident No.
	M2.5x20	SUB21
	M2.5x20	SUI6KT
	M3.0x10	SUB11



Coding Slide	Size	PPS Ident No.
	12x4x1.6 mm	SUCR



Sub-D Pin Contact	Size	PPS Ident No.
	HD20-24	SUPCP20-24AU2
In Reel	HD20-24	AU2-5



(Single)



(Reel of 500 Pcs)

Sub-D Socket Contact	Size	PPS Ident No.
	HD20-24	SUPCS20-24AU2
In Reel	HD20-24	AU2-5



(Single)





(Reel of 500 Pcs)



Contact Socket 8 (Silver Plated)	Size	PPS Ident No.
	8H/2-3mm2	SUMCS8-14AU1





Contact Pin 8 (Silver Plated)	Size	PPS Ident No.
	8H/2-3mm2	SUMCS8-14AU1




Description	Size	PPS Ident No.	Illustration
Plug	Size 48, 04-poles	GU602-48-4SN-TAC	
Receptacle	Size 48, 04-poles	GU310-48-4PN-TAC	

Plug	Size 14, 5-poles	KPSE120061-47	
	Size 13, 9-poles	182645-1	




Receptacle size 14, 5-poles	Size 14, 5-poles	KPSE7E14-5P-DZ-BM221FO-A223	
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C.P.C cable clamp kit	Size 13	182663-1	
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Cable admittance		BVIVG-U437	
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OTHER CONNECTORS



Description	PPS Ident No.	Illustration
Anderson Connector PP 120A	*1321BLAU	
Anderson Connector PP 120A	*1321G3ROT	
Anderson Contacts 120A	*1319	

Description	Size	PPS Ident. No	Illustrations
Contact Pin 16	16/0.5-1.0mm ²	430-8560-004	
Contact Socket 16	16/0.5-1.0mm ²	031-8704-000	
Socket type III contact 16	-	1-163088-0	

Shrinkable Boot		FTH-3S-16	
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PPS International

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