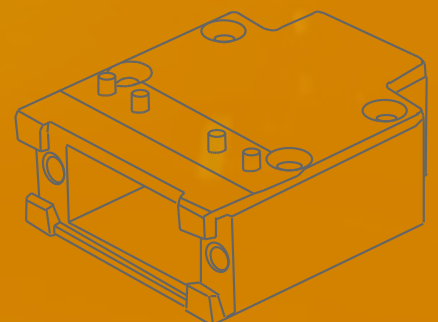


GIMOTA AG DATACONNECTOR CATALOGUE 2013



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GIMOTA DATA CONNECTOR CATALOGUE

2013



GIMOTA AG

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1	General Information	4
1.1	GIMOTA AG	4
2	Data Connectors General	4
2.1	Introduction	4
3	D-SUB Data signal connectors	5
3.1	Introduction	5
3.1.1	<i>General technical data</i>	5
3.2	Single parts and contacts for data signal connectors D-SUB	7
3.2.1	<i>Socket housings D-SUB TRAC</i>	7
3.2.2	<i>Pin housings D-SUB TRAC</i>	8
3.2.3	<i>Socket housings D-SUB TRAC H</i>	9
3.2.4	<i>Pin housing D-SUB TRAC H</i>	9
3.2.5	<i>Covers D-SUB</i>	10
3.2.6	<i>Cable clamps / shielding sleeves / wire hole plugs</i>	11
3.2.7	<i>Coding plates / coding slides / Fixing plates</i>	12
3.2.8	<i>Screws / spring washers</i>	13
3.2.9	<i>D-SUB Contacts</i>	15
3.3	D-SUB Connector sets, TRAC	16
3.3.1	<i>Plug set TRACST</i>	16
3.3.2	<i>Receptacle set TRACDO</i>	17
3.3.3	<i>Mounting strip TRACBE for direct fixation to casings/boards</i>	18
3.4	D-SUB Connector sets, TRAC H for increased voltage requirements	19
3.4.1	<i>Plug set TRACHST</i>	19
3.4.2	<i>Receptacle set TRACHDO</i>	20
3.4.3	<i>Mounting strip TRACHBE for direct fixation to casing/boards</i>	21
3.5	D-SUB Cover set	22
3.5.1	<i>Plug cover set TRACST</i>	22
3.5.2	<i>Receptacle cover set TRACDO</i>	22
3.6	Tools for D-SUB TRAC / TRAC H	23
3.6.1	<i>Compression tool for cable clamps and shielding sleeves</i>	23
3.6.2	<i>Crimping tool for contacts</i>	23
3.6.3	<i>Insertion and extraction tools</i>	24
3.6.4	<i>Supporting Tools</i>	25
3.7	Assembly instructions D-SUB TRAC / TRAC H	26
3.7.1	<i>Preparation</i>	26
3.7.2	<i>Cabel set</i>	27
3.7.3	<i>Assembling</i>	29

4	Data Connector TRAC F	30
4.1	Introduction	30
4.1.1	Technical Information	30
4.2	Single parts and contacts for data signal connectors TRAC-F	32
4.2.1	Contact Housings TRAC-F	32
4.2.2	Cover TRAC F	33
4.2.3	Cable clamp / Shielding sleeves / Wire hole plug	33
4.2.4	Code screw / Code pin	35
4.2.5	Screws / Washer	35
4.2.6	Contacts	36
4.3	Connector sets TRAC F	37
4.3.1	Connector parts set TRAC F	37
4.4	Tools for data connectors TRAC F	38
4.4.1	Compression tool for cable clamps and shielding sleeves	38
4.4.2	Crimping tool for contacts	38
4.4.3	Extraction tool for contacts	39
4.4.4	Accessories	39
4.5	Assembly Instructions TRAC F	40
4.5.1	Preparation	40
4.5.2	Cabel set	41
4.5.3	Assembling	43
5	Connector Kit F9/3BHC	44
5.1	Introduction	44
5.1.1	Technical Information	44
5.2	Connector set F9/3BHC	45
5.2.1	Connector parts set F9/3BHC 860 070 R100	45
5.2.2	Multipoint Connectors F9/3BHC	46
6.0	General Conditions	47
6.1	General Sales Conditions	47
6.2	Product Safety	48

1 General Information

1.1 GIMOTA AG

GIMOTA situated near Zurich Switzerland was founded in 1961 by Otto Schoch. The company has been amongst others specialized in supplying connectors for the use in railway applications. These are for example CIRCULAR CONNECTORS for power and data signal transmission or DATA CONNECTORS for signal transmission. Continuing in-house developments concentrated on the same field of activities, particularly with regard to connectors for high-current and data transmission circuits for example the GIMOTA TRAC-Series, and EMI shielded connectors.

GIMOTA connectors are used worldwide in various railway vehicles for lots of different applications. For example: high current feedings, conventional and electronic control systems, measuring probes of all kinds, analogue and digital data and signal transmission. All this is achieved at any installation conditions and in the most various subsystems on traction vehicles or in coaches. GIMOTA connectors are furthermore used in stationary systems for various applications.

GIMOTA supplies its products to most of the leading European railway manufacturers.

GIMOTA is known for its high flexibility. The company develops and manufactures connectors for specialized applications according to customer specifications. Even small batches are welcome to be realised.

GIMOTA takes all possible efforts to process any appropriate logistics solution, such as „just-in-time“ deliveries based on an order contract and forecasts, or maintaining minimum inventory levels specified with the customer.

GIMOTA is one of the leading providers of industrial traction connectors, and is continuously expanding its market share due to solutions always focused on customers demands. Top-quality products, and a consulting/marketing strategy takes full account of end users' needs.

2 Data Connectors General

2.1 Introduction

GIMOTA data connectors with the identification TRAC are characterized by a 360 ° EMC shielding system with integrated strainrelief. These connectors are available in the following versions:

- **D-SUB series TRAC:**
Standard version, socket / pin for housing, for example used in MITRAC vehicle control systems
- **D-SUB series TRAC H:**
Modified design for increased voltage requirements, socket / pin for housing, for example used in S2 MICAS vehicle control systems
- **TRAC series F:**
Housing for frame connectors type F, H, and DM according to EN IEC 60603-2 (DIN 41612)

The connectors comply with EN 60529 according to protection class IP44. Each cable can be applied with a 360 ° EMC shielding. All connectors are co-deable if required.

The essential characteristics of these railway specific connectors are:

- Solid zinc cast housing (self passivating)
- Strain relief on each cable
- Connection of cable screen to cable clamp
- Excellent contact between the housing and the cable clamp (also at higher currents)
- Easy codable (also after assembling)
- All accessories screws of stainless steel
- RoHS-Compliance

3 D-SUB Data signal connectors

3.1 Introduction

D-SUB connectors, designated **TRAC**, were specially developed for use in supervisory control systems. TRAC connectors are fitted with sturdy cast-zinc covers for 360° EMI screening and can be coded if required.

The connectors comply with protection class IP44 as per EN 60529, and are approved for indoor applications.

D-SUB connectors from the TRAC series can be ordered either as single parts or as sets.

When ordering connector sets, it is required to separately order the contacts (single or strip) and shielding sleeve (different sizes).

Basically, there are two types of contact housing:

TRAC socket/pin housing, the standard design (e.g. for MITRAC) up to 1 kV.

TRAC H socket/pin housing, designed for more demanding applications (e.g. for MICAS S2) up to 1.5 kV.

3.1.1 General technical data

Electrical properties

All electric data are valid on sea level with an environment temperature of 20 °C. Deviating environment conditions are to be taken into account with the plug interpretation.

		D-SUB TRAC	D-SUB TRAC H
Socket housing		Type SUH...S	Type SUHV...S
Pin housing		Type SUH...P	Type SUHV...P
Test voltage	[V] AC 1 Min	1000	1500
Service voltage	[V] AC/DC	125	125
Operation current at 20° C	[A]	max. 3	max. 3
Potential drop accross contacts	[mV]	max. 24	max. 24
Creepage distance in connecting zone	[mm]	min. 1.5	min. 3
Creep resistance acc. to IEC 60664	CTI-Wert	>300	>300
Insulation resistance	[MΩ]	>5000	>5000

Thermal properties / Fire characteristic

		D-SUB TRAC / TRAC H
Contact housing material		Thermoplastic, black
Service Temperature		-55° C to +105° C
Fire resistance class	UL 94	V-0

Mechanical properties contacts

		D-SUB TRAC / TRAC H acc. to DIN IEC 60512-5
Connecting life cycle of contacts	mating cycles	min. 500
Separating force of contact	[N]	> 0.2
Mating force of contact	[N]	< 3.4
Terminal cross-section: Data-Signal contacts		0.2 to 0.56mm ² AWG24-20
Terminal cross-section: Power contacts		0.8 to 8mm ² AWG18-8

Mechanical properties connectors

	D-SUB TRAC / TRAC H
Cover	3 sizes, screw-on cover
Cover material	zinc cast (self-passivating)
Contact housing material	thermoplastic, black
Screw material	stainless steel V2A
EMI shielding	with compressible shielding sleeve: 360°
Coding	at least 24 possibilities (mechanically)
Cable strain relief	crimpable or with cable tie up to 150 N

Strain relief

The cable clamp shall be tightly pressed into the guiding grooves of the connector cover



Elevated spikes at the corners ensure a proper contact with the connector cover



Strain relief compression



The cable is held in the cable clamp with strain relief compression onto the cable. The cable clamps have different diameters for use with various cables. Cable diameters can be adapted to the cable clamp size using heat-shrinkable tubes. In such cases and when cable types are used the first time, the strain relief crimp should be tested by means of a tensile test. During the test, the cable should resist a pull-out value of approximately 150 N for 1 minute. The appropriate compression tools guarantee a constant compression value by the two dies touching each other at the end of the compressing process.

EMI-Shielding

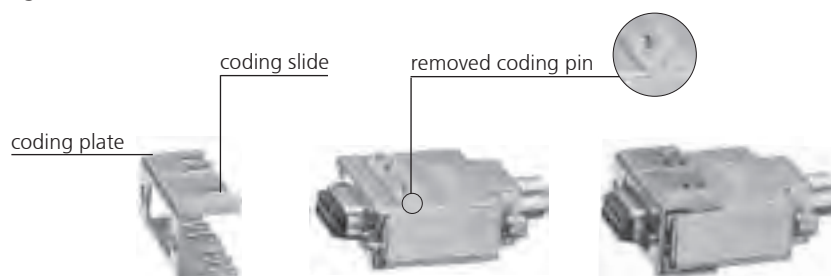


Compressible shielding sleeve



To provide 360° EMI connection, the TRAC connector has a separate crimp for proper contact of the cable shield to the cable clamp by using a shielding sleeve. The cable clamp features small side spikes which guarantee a conductive connection to the connector shell. The appropriate compression tools ensure easy positioning and compression of the shield bushing.

Coding



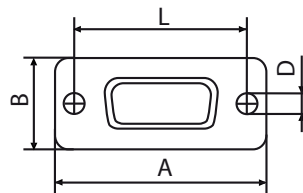
Coding a TRAC D-SUB connector:

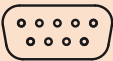


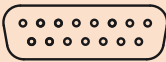

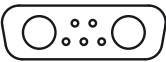
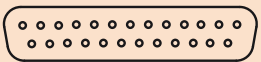



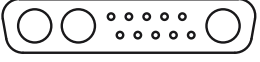
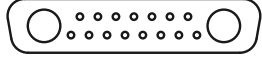
1. Remove coding pins on D-SUB cover using the coding pliers
2. Insert coding slide corresponding to this position in the coding plate using the coding tool

Coding of TRAC connectors can be carried out on site.

3.2 Single parts and contacts for data signal connectors D-SUB

3.2.1 Socket housings D-SUB TRAC

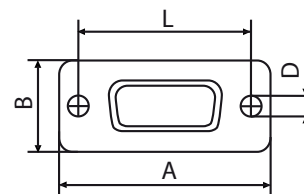


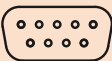


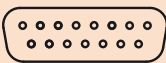

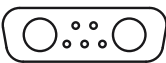

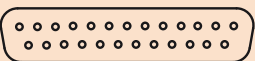


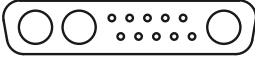
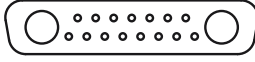
Standard layouts	Special layouts	
		
S09	S02W2	S05W1
		
S15	S03W3	S07W2
		
S25	S11W1	
		
	S05W5	S09W4
		
	S13W3	S17W2

Material: Thermoplastic / steel tin plated

Item number	Cover Size	Poles	L mm	D mm	A mm	B mm	Layout Code
SUH02W2S	1	2-poles	25.8	3	30.8	12.5	S02W2
SUH05W1S	1	5-poles	25.8	3	30.8	12.5	S05W1
SUH09S	1	9-poles	25.8	3	30.8	12.5	S09
SUH03W3S	2	3-poles	33.3	3	39.1	12.5	S03W3
SUH07W2S	2	7-poles	33.3	3	39.1	12.5	S07W2
SUH11W1S	2	11-poles	33.3	3	39.1	12.5	S11W1
SUH15S	2	15-poles	33.3	3	39.1	12.5	S15
SUH05W5S	3	5-poles	47.0	3	53.0	12.5	S05W5
SUH09W4S	3	9-poles	47.0	3	53.0	12.5	S09W4
SUH13W3S	3	13-poles	47.0	3	53.0	12.5	S13W3
SUH17W2S	3	17-poles	47.0	3	53.0	12.5	S17W2
SUH25S	3	25-poles	47.0	3	53.0	12.5	S25

3.2.2 Pin housings D-SUB TRAC



Standard layouts	Special layouts		
 P09	 P02W2	 P05W1	
 P15	 P03W3	 P07W2	 P11W1
 P25	 P05W5	 P09W4	
	 P13W3	 P17W2	

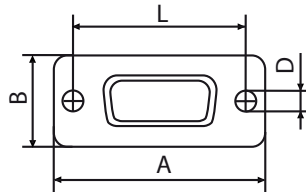
Material: Thermoplastic / steel tin plated

Item number	Cover Size	Poles	L mm	D mm	A mm	B mm	Layout Code
SUH02W2P	1	2-poles	25.8	3	30.8	12.5	P02W2
SUH05W1P	1	5-poles	25.8	3	30.8	12.5	P05W1
SUH09P	1	9-poles	25.8	3	30.8	12.5	P09
SUH03W3P	2	3-poles	33.3	3	39.1	12.5	P03W3
SUH07W2P	2	7-poles	33.3	3	39.1	12.5	P07W2
SUH11W1P	2	11-poles	33.3	3	39.1	12.5	P11W1
SUH15P	2	15-poles	33.3	3	39.1	12.5	P15
SUH05W5P	3	5-poles	47.0	3	53.0	12.5	P05W5
SUH09W4P	3	9-poles	47.0	3	53.0	12.5	P09W4
SUH13W3P	3	13-poles	47.0	3	53.0	12.5	P13W3
SUH17W2P	3	17-poles	47.0	3	53.0	12.5	P17W2
SUH25P	3	25-poles	47.0	3	53.0	12.5	P25


Electrical, thermal ,mechanical properties:


chapter: 3.1.1


3.2.3 *Socket housings D-SUB TRAC H*



Layouts


S09


S15

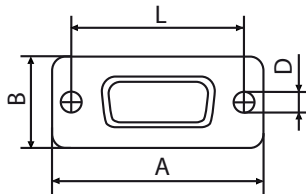

S25

Material: Thermoplastic / steel tin plated


Item number	Cover Size	Poles	L mm	D mm	A mm	B mm	Layout Code
SUHV09S	1	9-poles	25.8	3	30.8	12.5	S09
SUHV15S	2	15-poles	33.3	3	39.1	12.5	S15
SUHV25S	3	25-poles	47.0	3	53.0	12.5	S25


Electrical, thermal ,mechanical properties: chapter: 3.1.1


3.2.4 *Pin housing D-SUB TRAC H*



Layouts


P09


P15

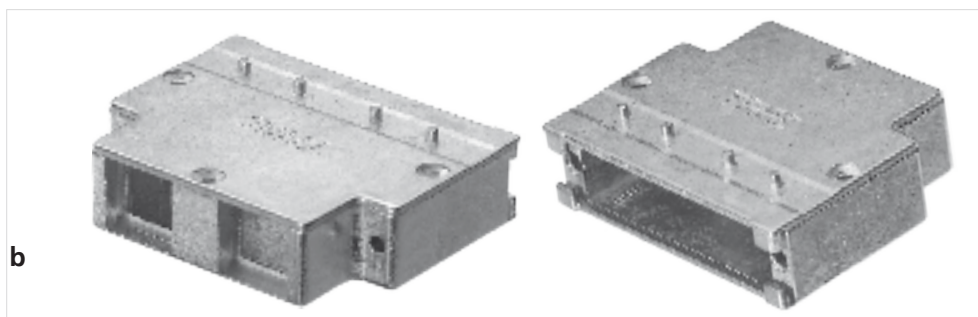
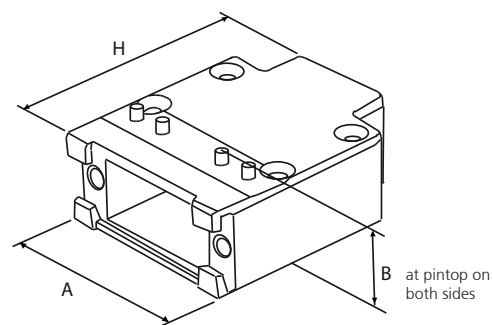

P25

Material: Thermoplastic / steel tin plated

Item number	Cover Size	Poles	L mm	D mm	A mm	B mm	Layout Code
SUHV09P	1	9-poles	25.8	3	30.8	12.5	P09
SUHV15P	2	15-poles	33.3	3	39.1	12.5	P15
SUHV25P	3	25-poles	47.0	3	53.0	12.5	P25

Electrical, thermal ,mechanical properties: chapter: 3.1.1

3.2.5 Covers D-SUB

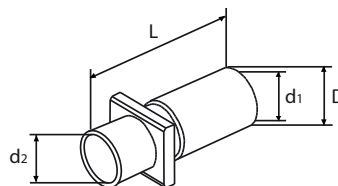


Material: Zinc cast (self passivating)

Item number	Cover	A mm	B mm	H mm	Cable entrances	Illustration
TRAC1	size 1	31.0	17.9	37.6	1	a
TRAC2	size 2	39.3	17.9	37.6	1	a
TRAC3	size 3	53.3	17.9	37.6	2	b

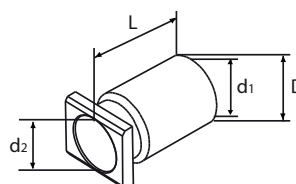
3.2.6 Cable clamps / shielding sleeves / wire hole plugs

Cable clamps



Material: Brass tin-plated

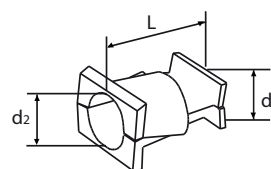
Item number	D mm	d1 mm	d2 mm	L mm	External diameter of cable (mm)	Strain relief compression	Shield compression
SUKABC06S	7.4	6.0	6.0	20.5	5.8 $+0/-0.8$	yes	yes
SUKABC067S	7.4	6.7	6.0	20.5	6.5 $+0/-0.8$	yes	yes
SUKABC09S	10..0	9.0	9.0	20.4	8.8 $+0/-0.8$	yes	yes
SUKABC10S	11.0	10.0	9.0	30.4	9.8 $+0/-0.8$	yes	yes



Material: Brass tin-plated

Item number	D mm	d1 mm	d2 mm	L mm	External diameter of cable (mm)	Strain relief compression	Shield compression
SUKABC12	13.0	12.0	10.0	22.4	11.8 $+0/-0.8$	yes	no
SUKABC12X	13.5/14.0	12.0	10.0	29.4	11.8 $+0/-0.8$	yes	yes*

* With internal shieldbushing. Item no. SUGSC375

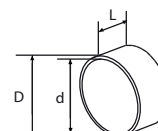


Material: zinc cast (self passivating)

Item number	d1 mm	d2 mm	L mm	External diameter of cable (mm)	Strain relief compression	Shield compression
SUKABV69	6-9	6-9	18.0	9 $+0/-3.0$	yes*	no

* with cable tie SUKABV69K

Shielding sleeves / supporting sleeves



Material: Bronze tin-plated

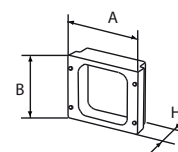
Item number	For cable clamp	d mm	D mm	L mm	colour
SUGSC297	SUKABC06S SUKABC067S	7.5	8.5	6.4	green
SUGSC460	SUKABC09S SUKABC10S	11.7	13.0	6.4	silver
SUGSC375*	SUKABC12X	9.5	10.3	6.4	yellow

* Supporting sleeve for internal shielding at SUKABC12X

Wire hole plugs



Material: Zinc cast (self passivating)



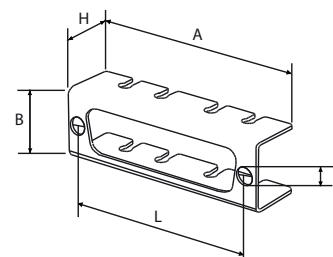
Item number	Description	A mm	B mm	H mm
SUBL	Wire hole plug to close the non used cable entrances	14	12	5

3.2.7 Coding plates / coding slides / Fixing plates

Coding plates



Material: Stainless steel

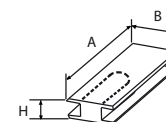


Item number	size	A mm	B mm	H mm	L mm	D mm
SUCB1	1	31.0	17.0	14.8	25.0	4.1
SUCB2	2	39.5	17.0	14.8	33.3	4.1
SUCB3	3	53.0	17.0	14.8	47.0	4.1

Coding slides



Material: Polyamide

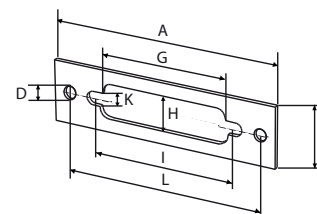


Item number	A mm	B mm	H mm
SUCR	12.0	4.0	1.6

Fixing plates



Material: Stainless steel
Material thickness: 1.5mm



Item number	Reducing plate	A mm	B mm	L mm	D mm	G mm	H mm	I mm	K mm
SUBB1		51.0	20.0	41.0	4.0	20.0	11.0	25.0	4.1
SUBB2		60.0	20.0	50.0	4.0	28.0	11.0	33.3	4.1
SUBB3		73.0	20.0	63.0	4.0	42.0	11.0	47.0	4.1
SUBB21	2 to 1*	60.0	20.0	50.0	4.0	20.0	11.0	25.0	4.1
SUBB31	3 to 1*	73.0	20.0	63.0	4.0	20.0	11.0	25.0	4.1
SUBB32	3 to 2*	73.0	20.0	63.0	4.0	28.0	11.0	33.3	4.1

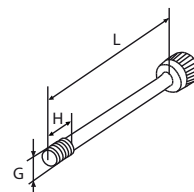
* Reducing fixing plates for smaller D-SUB housing application

3.2.8 Screws / spring washers

Plug screws (hex, socket screws)



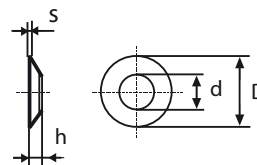
Material: Stainless steel



Item number	G thread	L mm	H mm	surface treatment
SUI6KT M3x34	M3	34.0	6.0	Molykott coated
SUI6KT M3x32.4	M3	32.4	6.0	Molykott coated
SUI6KT 4-40UNCx34	4-40UNC	34.0	6.0	browned
SUI6KT 4-40UNCx32.4	4-40UNC	32.4	6.0	browned

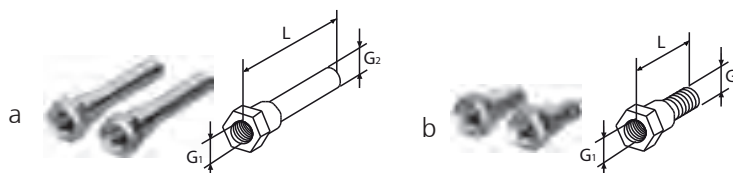
Spring washer for plug screws:

Material: Stainless steel



Item number	D mm	d mm	h mm	s mm
SUSN212748 M3	5.7	3.2	0.45	0.3

Receptacle fixing screws, strain washer, nuts



Material: Stainless steel

Item number	L mm	G1 thread	G2 thread	image
SUB21	21.3	M3 inside	M2.5 inside	a
SUB11	11.0	M3 inside	M3 outside	b

Screw and springwasher for SUB21:

Hex. Socket screw:

Item number: SUBN610 M2.5x20
Material: Stainless steel

Spring washer

Item number: SUSN212748 M2.5
Dimensions: Internal Diameter: 2.7
External Diameter: 5.1
Material: Stainless steel

Nut and springwasher for SUB11:

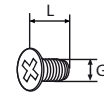
Hex. nut:

Item number: SUBN628 M3
Material: Stainless steel

Spring washer:

Item number: SUSN212748 M3
Dimensions: Internal Diameter: 3.2
External Diameter: 5.7
Material: Stainless steel

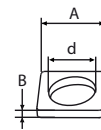
Screws for covers



Material: Stainless steel

Item number	Description	G thread	L mm
SUBN4919 M2.5x5	Thread-cutting countersunk cross-head screw	M2.5	5.0

Square washers



Item number	A mm	d mm	B mm	Material
SUUQ1.0	6.0	4.1	1.0	Stainless steel
SUUQ1.5	6.0	4.1	1.5	Stainless steel p-galvanised, yellow

3.2.9 D-SUB Contacts

Data-Signal-Socket contacts HD20



Material: Cu Sn (tin bronze)

Item number	Description	Section (mm)	Contact surface / surface of contact zone
SUPCS20-24AU2	Single contact	0.2 - 0.56 (AWG24-20)	gold-plated / $\geq 0.8 \mu\text{m}$ Au auf 1.3 μm Ni
SUPCS20-24AU2-5	Contact strip, reel with 500 pcs	0.2 - 0.56 (AWG24-20)	gold-plated / $\geq 0.8 \mu\text{m}$ Au auf 1.3 μm Ni
SUPCS20-24AU2-125	Contact strip, reel with 12500 pcs	0.2 - 0.56 (AWG24-20)	gold-plated / $\geq 0.8 \mu\text{m}$ Au auf 1.3 μm Ni

Power-Socket contacts size 8



Material: Cu alloy

Item number	Description	Section (mm)	Contact surface / surface of contact zone
SUMCS8-18AU1	Single contact	0.8 - 1.4 (AWG18-16)	gold-plated / $\geq 1.3 \mu\text{m}$ Au auf 1.3 μm Ni
SUMCS8-14AU1	Single contact	2.0 - 3.0 (AWG14-13)	gold-plated / $\geq 1.3 \mu\text{m}$ Au auf 1.3 μm Ni
SUMCS8-11AU1	Single contact	5.0 (AWG11)	gold-plated / $\geq 1.3 \mu\text{m}$ Au auf 1.3 μm Ni
SUMCS8-8AU1	Single contact	8.0 (AWG8)	gold-plated / $\geq 1.3 \mu\text{m}$ Au auf 1.3 μm Ni

Data-Signal-Pin contacts HD20



Material: Cu Sn (tin bronze)

Item number	Description	Section (mm)	Contact surface / surface of contact zone
SUPCP20-24AU2	Single contact	0.2 - 0.56 (AWG24-20)	gold-plated / $\geq 0.8 \mu\text{m}$ Au on 1.3 μm Ni
SUPCP20-24AU2-5	Contact strip, reel with 500 pcs	0.2 - 0.56 (AWG24-20)	gold-plated / $\geq 0.8 \mu\text{m}$ Au on 1.3 μm Ni
SUPCP20-24AU2-125	Contact strip, reel with 12500 pcs	0.2 - 0.56 (AWG24-20)	gold-plated / $\geq 0.8 \mu\text{m}$ Au on 1.3 μm Ni

Power-Pin contacts size 8

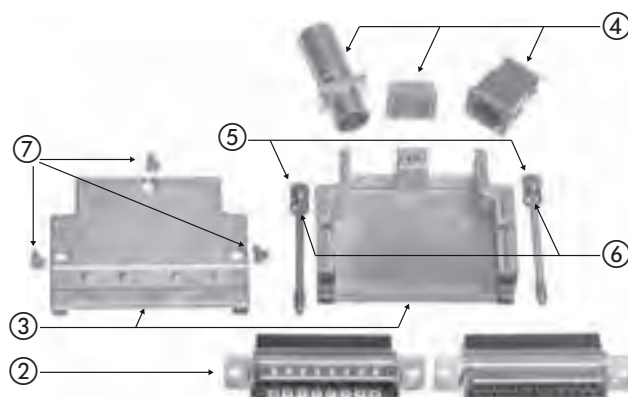


Material: Cu alloy

Item number	Description	Section (mm)	Contact surface / surface of contact zone
SUMCP8-18AU1	Single contact	0.8 - 1.4 (AWG18-16)	gold-plated / $\geq 1.3 \mu\text{m}$ Au on 1.3 μm Ni
SUMCP8-14AU1	Single contact	2.0 - 3.0 (AWG14-13)	gold-plated / $\geq 1.3 \mu\text{m}$ Au on 1.3 μm Ni
SUMCP8-11AU1	Single contact	5.0 (AWG11)	gold-plated / $\geq 1.3 \mu\text{m}$ Au on 1.3 μm Ni
SUMCP8-8AU1	Single contact	8.0 (AWG8)	gold-plated / $\geq 1.3 \mu\text{m}$ Au on 1.3 μm Ni

3.3 D-SUB Connector sets, TRAC

3.3.1 Plug set TRACST



Pos.	Description	Item number	Qty.	Set code configuration		
				Size 1	Size 2	Size 3
1	D-SUB plug set	TRACST		TRACST	TRACST	TRACST
2 *	Socket housing 9-poles	SUH09S	1	P09	S15	S25
	Socket housing 15-poles	SUH15S	1			
	Socket housing 25-poles	SUH25S	1			
	Pin housing 9-poles	SUH09P	1		P15	P25
	Pin housing 15-poles	SUH15P	1			
	Pin housing 25-poles	SUH25P	1			
3	Cover	HBTB 316238	1	P0091/92	P0151/152	P0251/252
4	No. of cable entrances per cover			1	1	2
	Cable clamp Di = 6mm	SUKABC06S			C06S	
	Cable clamp Di = 6.7mm	SUKABC067S			C067S	
	Cable clamp Di = 9mm	SUKABC09S			C09S	
	Cable clamp Di = 10mm	SUKABC10S			C10S	
	Cable clamp Di = 12mm	SUKABC12			C12	
	Cable clamp Di = 12mm	SUKABC12X			C12X	
	Cable clamp Di = 6-9mm	SUKABV69			V69	
	Wire hole plugs	SUBL			BL	
5	Screw M3x34mm	SUI6KT M3x34	2		1	
	Screw M3x32.4mm	SUI6KT M3x32.4	2		2	
	Screw 40UNC-2Ax34	SUI6KT 4-40UNCx34	2		3	
	Screw 4-40UNC-2Ax32.4	SUI6KT 4-40UNCx32.4	2		4	
6	Spring washer M3	SUSN212748 M3	2		-	
7	Screw M2.5x5mm	SUBN4919 M2.5x5	3 / 4		-	

* Layoutcode for special layouts: socket housing chapter 3.2.1 / pin housing chapter 3.2.2

Ordering example

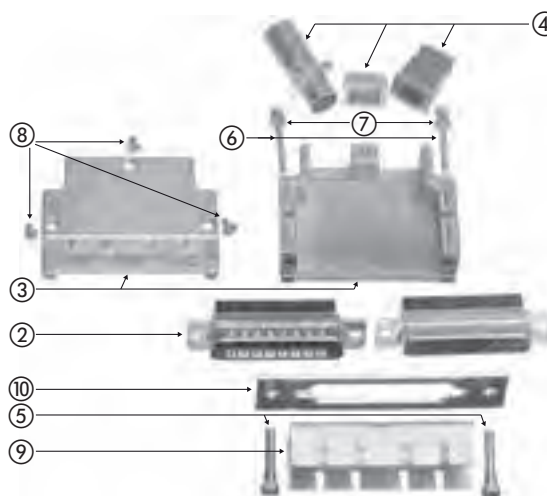
D-SUB plug (**TRACST**), 25-pole/socket housing (**S25**), cable clamp SUKABC12 (**C12**), wire hole plug (**BL**), screw M3 x 34mm (**1**) = Item number.: **TRACSTS25C12BL1**

Contacts and Shielding sleeves for crimping EMC braids to cable clamp have to be ordered separately according to individual requirements.

Shielding sleeves: chapter 3.2.6

Contacts: chapter 3.2.9

3.3.2 Receptacle set TRACDO



Pos.	Description	Item number	Qty.	Set code configuration		
				Size 1	Size 2	Size 3
1	D-SUB receptacle set	TRACDO		TRACDO	TRACDO	TRACDO
2 *	Socket housing 9-poles	SUH09S	1	S09	S15	S25
	Socket housing 15-poles	SUH15S	1			
	Socket housing 25-poles	SUH25S	1			
	Pin housing 9-poles	SUH09P	1			
	Pin housing 15-poles	SUH15P	1			
	Pin housing 25-poles	SUH25P	1			
3	Cover	HBTB 316238	1	P0091/92	P0151/152	P0251/252
4	No. of cable entrances			1	1	2
	Cable clamp Di = 6mm	SUKABC06S			C06S	
	Cable clamp Di = 6.7mm	SUKABC067S			C067S	
	Cable clamp Di = 9mm	SUKABC09S			C09S	
	Cable clamp Di = 10mm	SUKABC10S			C10S	
	Cable clamp Di = 12mm	SUKABC12			C12	
	Cable clamp Di = 12mm	SUKABC12X			C12X	
	Cable clamp Di = 6 -9mm	SUKABV69			V69	
	Wire hole plug	SUBL			BL	
5	Bolt large	SUB21	2		-	
6	Screw M2.5x20mm	SUBN610 M2.5x20mm	2		-	
7	Strain washer M3	SUSN212748 M3	2		-	
8	Screw M2.5x5mm	SUBN4919 M2.5x5	4 / 3		-	
9	Coding plate	SUCB1 / SUCB2 / SUCB3	1		-	
10	Fixing plate	SUBB1 / SUBB2 / SUBB3	1		-	

* Layoutcode for special layouts: socket housing chapter 3.2.1 / pin housing chapter 3.2.2

Ordering example:

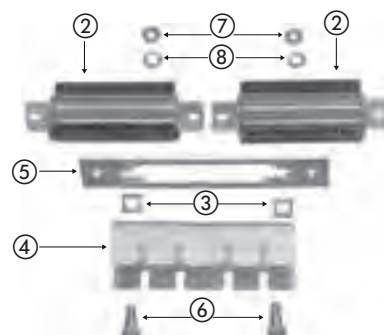
D-SUB receptacle (**TRACDO**), 25-pole/pin housing (**P25**), cable clamp SUKABC10S (**C10S**), cable clamp SUKABC12 (**C12**) = Item number.: **TRACDOP25C10SC12**

Contacts and Shielding sleeves for crimping EMC braids to cable clamp have to be ordered separately according individual requirements.

Shielding sleeves: chapter 3.2.6

Contacts: chapter 3.2.9

3.3.3 Mounting strip TRACBE for direct fixation to casings/boards



Pos.	Description	Item number	Qty.	Set code configuration		
				Size 1	Size 2	Size 3
1	D-SUB mounting strip	TRACBE		TRACBE	TRACBE	TRACBE
2 *	Socket housing 9-poles	SUH09S	1	S09		
	Socket housing 15-poles	SUH15S	1		S15	
	Socket housing 25-poles	SUH25S	1			S25
	Pin housing 9-poles	SUH09P	1	P09		
	Pin housing 15-poles	SUH15P	1		P15	
	Pin housing 25-poles	SUH25P	1			P25
3	Square washer 6x6x1.0mm	SUUQ1.0	2	U1.0	U1.0	U1.0
	Square washer 6x6x1.5mm	SUUQ1.5	2	U1.5	U1.5	U1.5
4	Coding plate	SUCB1 / SUCB2 / SUCB3	1		-	
5	Fixing plate	SUBB1 / SUBB2 / SUBB3	1		-	
6	Bolt, small	SUB11	2		-	
7	Hexagonal nut	SUBN628 M3	2		-	
8	Spring washer	SUSN212748 M3	2		-	

* Layoutcode for special layouts: socket housing chapter 3.2.1 / pin housing chapter 3.2.2

Ordering example:

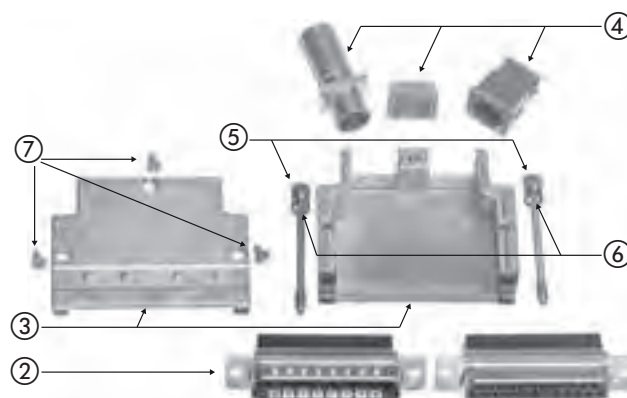
D-SUB mounting strip (**TRACBE**), 25-pole/pin housing (**P25**), Unterlagscheibe 1.5 mm (**U1.5**)
= Item number: **TRACBEP15U1.5**

Contacts have to be ordered separately according individual requirements.

Contacts: chapter 3.2.9

3.4 D-SUB Connector sets, TRAC H for increased voltage requirements

3.4.1 Plug set TRACHST



Pos.	Description	Item number	Qty.	Set code configuration		
				Size 1	Size 2	Size 3
1	D-SUB plug set	TRACHST		TRACHST	TRACHST	TRACHST
2	Socket housing 9-poles	SUHV09S	1	S09 P09	S15 P15	S25 P25
	Socket housing 15-poles	SUHV15S	1			
	Socket housing 25-poles	SUHV25S	1			
	Pin housing 9-poles	SUHV09P	1			
	Pin housing 15-poles	SUHV15P	1			
	Pin housing 25-poles	SUHV25P	1			
3	Cover	HBTB 316238	1	P0091/92	P0151/152	P0251/252
4	No. of cable entrances per cover			1	1	2
	Cable clamp Di = 6mm	SUKABC06S			C06S	
	Cable clamp Di = 6.7mm	SUKABC067S			C067S	
	Cable clamp Di = 9mm	SUKABC09S			C09S	
	Cable clamp Di = 10mm	SUKABC10S			C10S	
	Cable clamp Di = 12mm	SUKABC12			C12	
	Cable clamp Di = 12mm	SUKABC12X			C12X	
	Cable clamp Di = 6 -9mm	SUKABV69			V69	
	Wire hole plugs	SUBL			BL	
5	Screw M3x34mm	SUI6KT M3x34	2		1	
	Screw M3x32.4mm	SUI6KT M3x32.4	2		2	
	Screw 40UNC-2Ax34	SUI6KT 4-40UNCx34	2		3	
	Screw 4-40UNC-2Ax32.4	SUI6KT 4-40UNCx32.4	2		4	
6	Spring washer M3	SUSN212748 M3	2		-	
7	Screw M2.5x5mm	SUBN4919 M2.5x5	3 / 4		-	

Ordering example

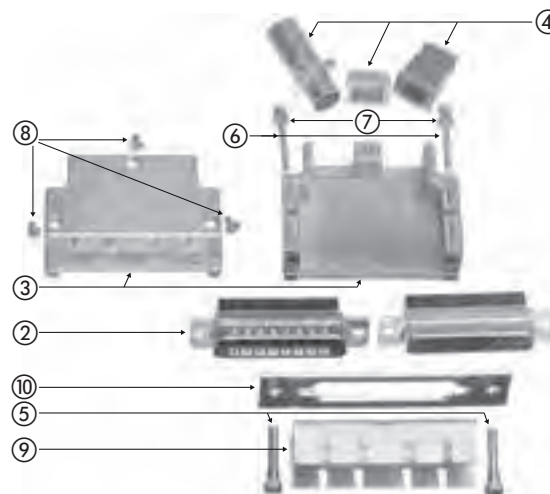
D-SUB plug (**TRACHST**), 25-pole/socket housing (**S25**), cable clamp SUKABC12 (**C12**), wire hole plug (**BL**), screw M3 x 34mm (**1**) = Item number.: **TRACHSTS25C12BL1**

Contacts and Shielding sleeves for crimping EMC braids to cable clamp have to be ordered separately according individual requirements.

Shielding sleeves: chapter 3.2.6

Contacts: chapter 3.2.9

3.4.2 Receptacle set TRACHDO



Pos.	Description	Item number	Qty.	Set code configuration		
				Size 1	Size 2	Size 3
1	D-SUB receptacle set	TRACHDO		TRACHDO	TRACHDO	TRACHDO
2	Socket housing 9-poles	SUHV09S	1	P09	S15	S25
	Socket housing 15-poles	SUHV15S	1			
	Socket housing 25-poles	SUHV25S	1			
	Pin housing 9-poles	SUHV09P	1		P15	P25
	Pin housing 15-poles	SUHV15P	1			
	Pin housing 25-poles	SUHV25P	1			
3	Cover	HBTB 316238	1	P0091/92	P0151/152	P0251/252
4	No. of cable entrances			1	1	2
	Cable clamp Di = 6mm	SUKABC06S			C06S	
	Cable clamp Di = 6.7mm	SUKABC067S			C067S	
	Cable clamp Di = 9mm	SUKABC09S			C09S	
	Cable clamp Di = 10mm	SUKABC10S			C10S	
	Cable clamp Di = 12mm	SUKABC12			C12	
	Cable clamp Di = 12mm	SUKABC12X			C12X	
	Cable clamp Di = 6 -9mm	SUKABV69			V69	
	Wire hole plug	SUBL			BL	
5	Bolt large	SUB21	2		-	
6	Screw M2.5x20mm	SUBN610 M2.5x20mm	2		-	
7	Strain washer M3	SUSN212748 M3	2		-	
8	Screw M2.5x5mm	SUBN4919 M2.5x5	4 / 3		-	
9	Coding plate	SUCB1 / SUCB2 / SUCB3	1		-	
10	Fixing plate	SUBB1 / SUBB2 / SUBB3	1		-	

Ordering example:

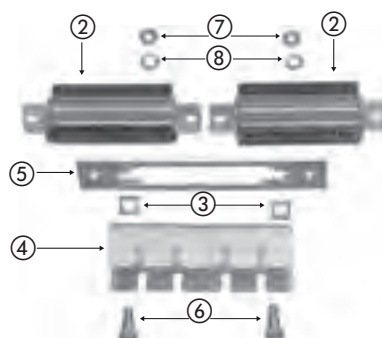
D-SUB receptacle (**TRACHDO**), 25-pole/pin housing (**P25**), cable clamp SUKABC10S (**C10S**), cable clamp SUKABC12 (**C12**) = Item number.: **TRACHDOP25C10SC12**

Contacts and Shielding sleeves for crimping EMC braids to cable clamp have to be ordered separately according individual requirements.

Shielding sleeves: chapter 3.2.6

Contacts: chapter 3.2.9

3.4.3 Mounting strip TRACHBE for direct fixation to casing/boards



Pos.	Description	Item number	Qty.	Set code configuration		
				Size 1	Size 2	Size 3
1	D-SUB mounting strip	TRACHBE		TRACHBE	TRACHBE	TRACHBE
2 *	Socket housing 9-poles	SUHV09S	1	S09	S15	S25
	Socket housing 15-poles	SUHV15S	1			
	Socket housing 25-poles	SUHV25S	1			
	Pin housing 9-poles	SUHV09P	1	P09	P15	P25
	Pin housing 15-poles	SUHV15P	1			
	Pin housing 25-poles	SUHV25P	1			
3	Square washer 6x6x1.0mm	SUUQ1.0	2	U1.0	U1.0	U1.0
	Square washer 6x6x1.5mm	SUUQ1.5	2	U1.5	U1.5	U1.5
4	Coding plate	SUCB1 / SUCB2 / SUCB3	1	-		
5	Fixing plate	SUBB1 / SUBB2 / SUBB3	1	-		
6	Bolt, small	SUB11	2	-		
7	Hexagonal nut	SUBN628 M3	2	-		
8	Spring washer	SUSN212748 M3	2	-		

Ordering example:

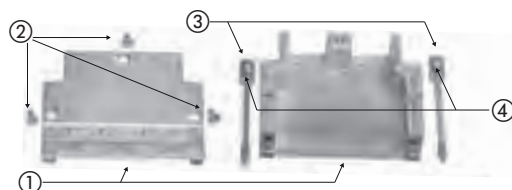
D-SUB mounting strip (**TRACHBE**), 25-pole/pin housing (**P25**), Unterlagscheibe 1.5 mm (**U1.5**)
 = Item number: **TRACHBEP15U1.5**

Contacts have to be ordered separately according individual requirements.

Contacts: chapter 3.2.9

3.5 D-SUB Cover set

3.5.1 Plug cover set TRACST



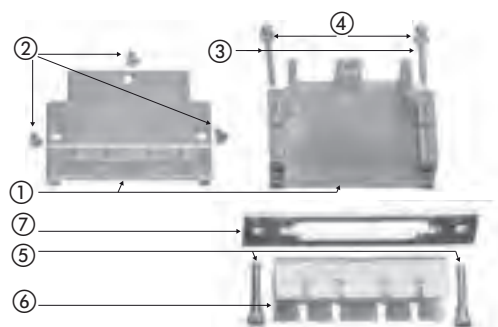
Pos.	Description	Item number	Qty.	Set code configuration		
				Size 1	Size 2	Size 3
	D-SUB plug cover set	TRACST		TRACST	TRACST	TRACST
1	Cover size 1	HBTB 316238 P0091/92	1	1		
	Cover size 2	HBTB 316238 P0151/152	1		2	
	Cover size 3	HBTB 316238 P0251/252	1			3
2	Screw M2.5x5mm	SUBN4919 M2.5x5	4 / 3	-		
3	Screw M3x34mm	SUI6KT M3x34	2		1	
	Screw M3x32.4mm	SUI6KT M3x32.4	2		2	
	Screw 4-40UNC-2Ax34mm	SUI6KT 4-40UNCx34	2		3	
	Screw 4-40UNC-2Ax32.4mm	SUI6KT 4-40UNCx32.4	2		4	
4	Spring washer M3	SUSN212748 M3	2	-		

Ordering example:

D-SUB plug (**TRACST**), size 1 (**1**), screw M3 x 34mm (**1**) = Item number: **TRACST1-1**

Other components have to be ordered separately according individual requirements

3.5.2 Receptacle cover set TRACDO



Pos.	Item number	Art. No.	Qty.	Set code configuration		
				Size 1	Size 2	Size 3
	D-SUB socket cover set	TRACDO		TRACDO	TRACDO	TRACDO
1	Cover size 1	HBTB 316238 P0091/92	1	1		
	Cover size 2	HBTB 316238 P0151/152	1		2	
	Cover size 3	HBTB 316238 P0251/252	1			3
2	Screw M2.5x5mm	SUBN4919 M2.5 x 5	4 / 3	-		
3	Screw M2.5x34mm	SUBN610 M2.5 x 20	2		-	
4	Strain washer M3	SUSN212748 M3	2		-	
5	Bolt, large	SUB21	2		-	
6	Coding plate size 1 - 3	SUCB1 / SUCB2 / SUCB3	1		-	
7	Fixing plate size 1 -3	SUBB1 / SUBB2 / SUBB3	1		-	

Ordering example:

D-SUB plug (**TRACDO**), size 1 (**1**), = Item number: **TRACDO1**

Other components have to be ordered separately according individual requirements

3.6 Tools for D-SUB TRAC / TRAC H

3.6.1 Compression tool for cable clamps and shielding sleeves

Mechanical hand compression tool



Item number	Twin-Die for strain relief and shield compression	for cable clamp	for shielding sleeve
GIW30L	GIM30K06	SUKABC06S	SUGSC297
GIW30L	GIM30K06	SUKABC067S	SUGSC297
GIW30L	GIM30K09	SUKABC09S	-
GIW30L	GIM30K10	SUKABC10S	-
GIW30L	GIM30K12	SUKABC12	SUGSC460
on request	on request	SUKABC12X	-

3.6.2 Crimping tool for contacts

Crimping tool for datasignal contacts (HD20)



Item number crimping tool	Item number presshead	Mechanical crimping tool for	Item number contacts	image
GIW10V	GIM10VHD20	Single socket contact	SUPCS20-24AU2	b
169424-1		Socket contact strip, reel with 500 pcs	SUPCS20-24AU2-5	a
on request		Socket contact strip, reel with 12500 pcs	SUPCS20-24AU2-125	-
GIW10V	GIM10VHD20	Single pin contact	SUPCP20-24AU2	b
169424-1		Pin contact strip, reel with 500 pcs	SUPCP20-24AU2-5	a
on request		Pin contact strip, reel with 12500 pcs	SUPCP20-24AU2-125	-

Crimpingtool for power contacts size 8



Item number Crimpingtool	Item number Locator	Item number contacts	Contact type	Section (mm)	Illustration
M300BT	SP689	SUMCS8-8AU1	Socket contact	8.0	a
M300BT	SP689	SUMCS8-11AU1	Socket contact	5.0	a
M300BT	SP689	SUMCS8-14AU1	Socket contact	2.0 - 3.0	a
FT8	TP731	SUMCS8-18AU1	Socket contact	0.8 - 1.4	b
M300BT	SP689	SUMCP8-8AU1	Pin contact	8.0	a
M300BT	SP689	SUMCP8-11AU1	Pin contact	5.0	a
M300BT	SP689	SUMCP8-14AU1	Pin contact	2.0 - 3.0	a
FT8	TP731	SUMCP8-18AU1	Pin contact	0.8 - 1.4	b

3.6.3 Insertion and extraction tools

Extraction-/insertion tool for contacts (HD20)



Item number	Description	Contact type
WMLEI GR20	Insertion- /extraction tool for contacts size 20	SUPCS20 / SUPCP20

Extraction-tool for contacts (size 8)



Item number	Description	Contact type
WMLE GR8	Extraction-tool for contacts size 8	SUMCS8 / SUMCP8

3.6.4 Supporting Tools

Cutting pliers for removing coding pins



Item number	Description
GIW901	Tool for cutting of the coding pins on the cover (special shape of cutting head)

Coding tool



Item number	Description
GIW902	Tool for inserting coding slides into coding plate

Hex.socket screw driver for fixing screws



Item number	Description
GIW903	Tool for tightening the hex. socket screws M3

3.7 Assembly instructions D-SUB TRAC / TRAC H

3.7.1 Preparation

Standard Part sets

Standard part sets conclude all single parts except shielding sleeves, contacts, shrinkable tubes cable ties.

Following parts sets are available in 3 sizes:

Connectors	TRACST	and	TRACHST
Receptacles	TRACDO	and	TRACHDO
Mounting strips	TRACBE	and	TRACHBE

Appart from standard TRAC/TRACH contact housings for 9-, 15-, and 25-pole size HD20 contacts (pins/sockets) other arrangements and combinations with size 8 power contacts are available on request. (see 3.2)

Contacts

Contacts are to be selected according to the relevant informations in this catalogue:

- Contact insert (Contact arrangement/Contact number) (acc. 3.2.1 - 3.2.4)
- Contact type **Pin** (P) or **Socket** (S) (acc. 3.2.9)
- Conductor cross section (acc. 3.2.9)
- Manufacturing mode (single contacts - on reels)
- Electrical properties (acc. 3.1.1)

Shielding sleeves

Shielding sleeves are to be selected depending on the cable clamps. (acc. 3.2.6)

Item number Cable clamp	requires shielding sleeve	Colour
SUKABC06S	SUGSC297	green
SUKABC067S	SUGSC297	green
SUKABC09S	SUGSC460	silver
SUKABC10S	SUGSC460	silver
SUKABC12X	SUGSC375	yellow
SUKABC12S	SUGSC500	turquoise

Tools

Compression Tools for cable clamps (see 3.6.1)
 Compression Tools for shielding sleeves (see 3.6.1)
 Crimping Tools for contacts (see 3.6.2)
 Supporting Tools (see 3.6.3 - 3.6.4)

Moreover the following standard tools are recommended:

- Crosshead-screwdriver
- Cable stripper
- Knife
- Plastic hammer

Accomplishing Material (optional)

- Cable tie SUKBV69K to cable clamp SUKABV69 (see 3.7.2)
- Heat shrinkable tubes to single conductor bundles (see 3.7.2)
- Heat shrinkable tubes for diameter adaption (see 3.7.2)
- Heat shrinkable tubes for conductor identification
- Label for connector identification

3.7.2 Cabel set

Conductor dismanteling

Conductor area	A	mm ²	0.2 - 0.56	0.8 - 1.4	2.0 - 8.0
Disinsulation length	x	mm	2.5	9.5	9.5
For contact type			HD20	size 8	size 8

Single Conductors, non shielded:

Single conductor bundles may be fixed with the divisible cable clamp SUKABV69 for various diameters from 6 up to 9 mm.

- Dismantle Conductors by (x)mm acc. conductor dismanteling table
- A heat shrinkable tube can be applied at the clamping area (optinal)
- Firmly tight the cable clamp with the cable tie SUKBV69K

		Cover size 1	Cover size 2	Cover size 3
Approximate distance from cable clamp to end of conductors	a	34 mm	37 mm	40 - 55 mm*

* depending on contact position and used cable entrance of the cover



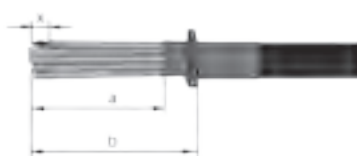
Multiple Conductor Cable, non shielded:

For adequate strain relieve of non shielded cables the cable clamps SUKABC can be used for 6mm to 12mm cable diameters.

- Dismantle Conductors by (x)mm acc. conductor dismanteling table
- A heat shrinkable tube can be applied at the clamping area to enlarge cable diameters (optinal)

		Cover size 1	Cover size 2	Cover size 3
Approximate distance from cable clamp shoulder to end of conductors.	a	34 mm	37 mm	40 - 55 mm*
Approximate distance from cable insulation to contacts.	b	40 mm	43 mm	46 - 61 mm*

* depending on contact position and used cable entrance of the cover



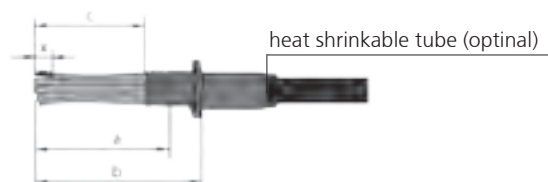
Multiple Conductors, shielded:

For adequate strain relieve and excellent shielding performance the cable clamps SUKABC can be used for 6mm to 12mm cable diameters.

- Dismantle Conductors by (x)mm acc. conductor dismanteling table
- A heat shrinkable tube can be applied at the clamping area to enlarge cable diameters (optional)

		Cover size 1	Cover size 2	Cover size 3
Approximate distance from cable clamp end of conductors	a	34 mm	37 mm	40 - 55 mm*
Approximate distance from cable insulation to contacts	b	40 mm	43 mm	46 - 61 mm*
Approximate distance from shield to contacts	c	24 mm	27 mm	30 - 45 mm*

* depending on contact position and used cable entrance of the cover



Application of Cable Clamp SUKABCxxS for cable retention

If the overall diameter of the cable is more than 1 mm smaller than the cable clamp inside diameter, the application of a heatshrinkable or filler tube with a length of approx. 25 mm is required. (Img. 1)



Compress the retention reach at the cable clamp with the specified tool (acc. to 3.6.1). (Img. 2)



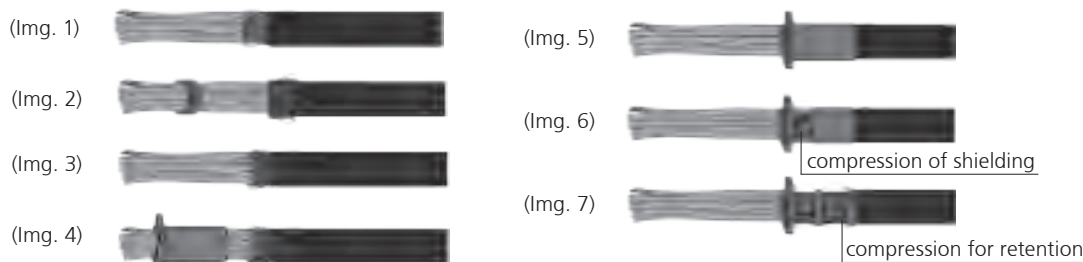
Application of shielding sleeve to Crimping Cable Clamp SUKABCxxS

- After compression of the cable clamp for cable retention, the shield has to overlap not more than 8 mm from the shield contactation reach
- Fold back the shield over the shield contactation reach (Img.1)
- Set up the shielding sleeve in flush with the end of the cable clamp (Img. 2/3)
- Compress the shielding sleeve with the specified tool (acc. to 3.6.1.) (Img. 4)



Application of shielding sleeve to Cable Clamp SUKABC12X

- Fold back the shield over the cable insulation (Img. 1/2)
- Set up the supporting sleeve on the cable and fold the shield back over the supporting sleeve (Img. 2/3)
- Set cable clamp fully over the supporting sleeve (Img. 4/5)
- Compress the cable clamp on the supporting sleeve with the specified tool (acc. to 3.6.1). (Img. 6)
- Compress the strain relieve with the specified tool (acc. to 3.6.1) (Img. 7)



Contact crimping

Contact: To be crimped with the specified tool. (acc. to 3.6.2)

IMPORTANT: The crimping tool has to be closed completely, that means until the automatic release by the tool.



Check

Crimping: Examine the position and the shape of the crimping

Single wires: No wires must be beyond the crimping slot

Contact shape: Contacts must not be deformed or damaged beyond the crimping reach

Heat Shrinkable Tubes, fixing

Optional: At the connection area of each conductor heat shrinkable tubes for identification and/or for support or additional insulation of conductors may be applied.

3.7.3 Assembling

Contacts application

Apply the contacts, corresponding to the contact layout requirement, into the contact housing until they properly click in. Examine the correct contact fixing by slightly pulling each conductor.

Connector Assembling

Case: examine regarding residues (eg. wire rests), clean it accordingly

Contact housing: apply to the correct position

Cable clamp: push up against the case (if required use plastic hammer)

Wire hole plug: push up against the case (if required use plastic hammer)

Conductors: check arrangement, put it in adequate order if necessary

Cover: place the cover, it shall suit without special effort

apply self-cutting cover screws and tighten them

apply fixing screws including the spring washers

Optional: Apply selfadhesive label for connector identification

Optional: Nipp away polarisation pins from the case acc. to the polarisation plan, place coding slides acc. to the coding plan at the coding plate (use tools acc. 3.6.4)

4 Data Connector TRAC F

4.1 Introduction

GIMOTA AG developed the plug-case TRAC F, to carry standard contact-inserts of the types F, DM and H according to EN IEC 60603-2 (DIN 41612). Particularly the assembled plug is conceived for connecting electronic control devices. Each cable-admittance can be equipped with an EMI-shielding of 360°.

The two-piece TRAC F case in zinc-cast allows to connect up to six cables, with an outer diameters of up to 14mm. In addition the case can be coded if necessary, to avoid connecting failures.

For cable diameters up to 12 mm the same cable-clamps are used as with the data plugs D-SUB TRAC. The same compression tools are therefore applicable.

Ensure a correct mounting of the TRAC F plug: suitable fixation-points and coding-points are to be placed correctly at the front-side of the electronic devices. For flat front-panels, a particular TRAC F fixation frame is available on request.

Assembled connectors correspond to the following requirements:

- EN 60529 Protection class IP44/ for indoor application only
- IEC 61373, VDE 0115-106 shock and vibrationtest

TRAC F plugs may be supplied as single components or connectors sets.

To order connector-sets, the following information is necessary:

- number of required cable admittances
- outer diameters of cables and type of cable with/without EMC-shielding for each admittance
- number of contacts (48/31/15)

and, if required:

- type and number of contacts (single contacts or strip-contacts)
- supply of coding parts
- supply of fixation frames

4.1.1 Technical Information

Electrical Properties

All electric data are valid on sea level with an environment temperature of 20 °C. Deviating environment conditions are to be taken into account with the plug interpretation.

		TRAC F-48	TRAC F-31		TRAC F-15
Contact insert		FKE F48	FKE F31		FKE H15
Type of contacts		Signal	Signal	Power	Power
Test voltage	[V] AC 1 Min	1500	1500	1500	1500
Service voltage	[V] AC/DC	125	125	125	125
Operating current at 20° C *	[A]	5.5	5.5	12	12
Contact resistance	[mΩ]	≤ 8	≤ 8		≤ 8
Creepage distances in contacting zone	[mm]	≥ 3	≥ 3		≥ 3
Creep resistance acc. to IEC60664	CTI-value	> 300	> 300		> 300
Insulation resistance	[MΩ]	> 5000	> 5000		> 5000

*) Valid for single contact, consider the rating curves according to EN IEC 60603-2 for connectors

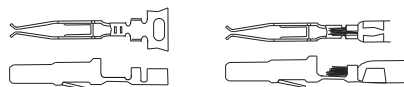
Thermal properties / Fire characteristic

		TRAC F
Insert Material		reinforced Polyester
Operating temperature	[°C]	-55 to + 125
Fire Resistance Class	acc. UL 94 acc. NF F 16-101/102	V-0 F2/I3

Mechanical Properties - Connector

		TRAC F
Case		2-piece, screwed together
Case material		zinc cast (self passivating)
Screws		stainless steel V2A
EMC Shielding		with shielding sleeves: 360° for each cable
Coding		7 possibilities
Pressed cable clamp		Strain relief up to 150 N
Cable clamps with cable tie		specially suitable for Single wire Bundles

Mechanical Properties - Contacts



		TRAC F
Number of contacts		48 (Signal contacts) 31 (7 Power + 24 Signal contacts) 15 (15 Power contacts)
Mechanical contact-lifespan	Mating Cycles	min. 500 (specification class 1)
Separation Force per contact	[N]	~ 15
Conductor cross-sections signal contacts		0.14 up to 1.50 mm ²
Conductor-cross-sections power contacts		0.8 up to 6mm ² using FASTON-sleeves of size 6.3 x 0.8mm

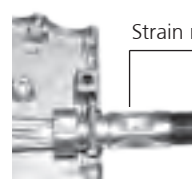
Signal contacts are available as single contacts or for automated processings, as contact-strips.

Cable strain relief

The cable clamp shall be tightly pressed into the guiding grooves of the connector cover



Elevated spikes at the corners ensure a proper contact with the connector cover

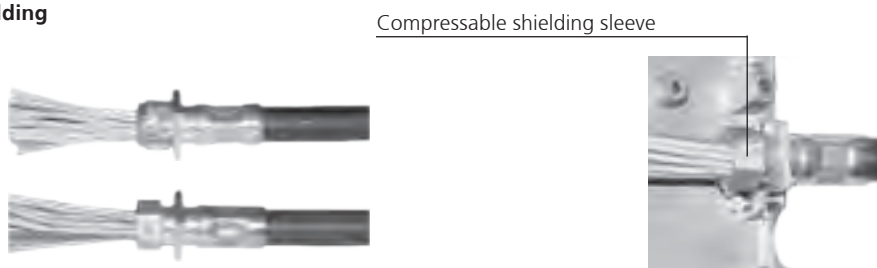


Strain relief compression

The cable is fixed to the cable clamp by a strain relief compression. Cable clamps are available in diameter from 6 up to 14mm. This allows to connect cables of any diameters, 4 up to 14mm. If necessary, we recommend the use of heat shrinking tube to adjust the cable diameter to the cable clamp. In this case a verification of the strain relief with a test force of at least 150 N during 1 Minute shall be considered.

Our pressing tools ensure an invariant pressing process result if properly operated to achieve clear surface contact of the two die shells.

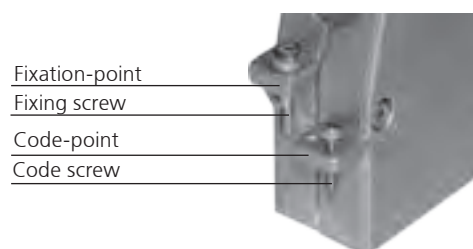
EMI-Shielding



To guarantee a 360° EMC protection, the TRAC F connector conclude a separate compressable shielding-sleeve that tightly connects the cable shield to the cable clamp. The cable clamp shoulder is additionally equipped with small spikes to provide an adequate and secure contact between case and cable clamp.

The shielding sleeves is easily positioned and pressed with the appropriate GIMOTA compression tool.

Coding



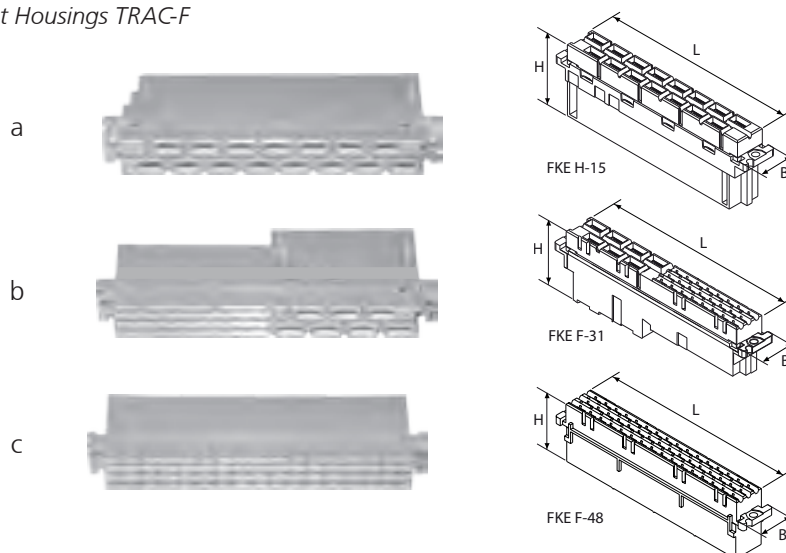
To code the TRAC F-connector code screws at the connector and code pins at the fixation frame are required. The coding of TRAC F connectors is preferably to be set during the final assembling, to avoid false coding set-up's.

Coding is very simple:

1. Screw the code-screws in the code-point at the plug
2. Fill the unused code-holes at the fixation-frame with the corresponding code-pins

4.2 Single parts and contacts for data signal connectors TRAC-F

4.2.1 Contact Housings TRAC-F

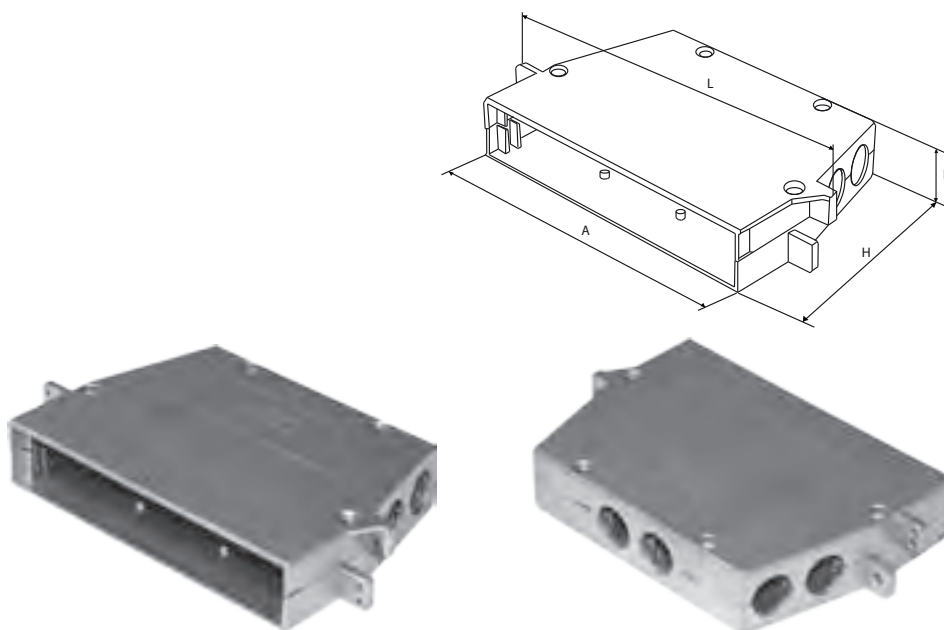


Material: Reinforced polyester

Item number	Number of Poles	Contacts		L mm	B mm	H mm	Illustration
		Signal	Power				
FKE H-15	15-poles		15	84.7	14.8	31.0	a
FKE F-31	31-poles	24	7	84.9	14.7	31.0	b
FKE F-48	48-poles	48		85.1	14.6	25.0	c

Electrical, Thermal, Mechanical properties: (see 4.1.1)

4.2.2 Cover TRAC F



Material: Zinc-cast (self passivating)

Item number	A mm	B mm	H mm	L mm	Cable admitances
TRACF 00	98.55	20.0	69.4	113.5	6

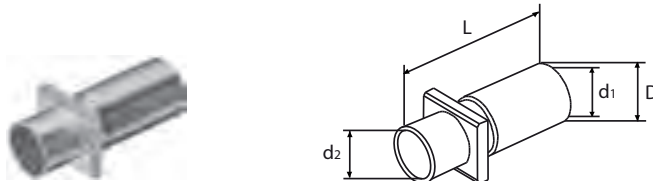
Consisting of:

2 half shells *TRAC F*, 4 case screws *FI6KTBN610 M2.5x16*, 4 hex. screw nuts *FMU M2.5*,
2 fixing screws *FI6KT M3x12*, 2 washers *SUBN3212*

Mechanical properties: (see 4.1.1)

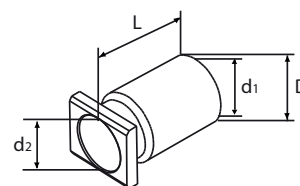
4.2.3 Cable clamp / Shielding sleeves / Wire hole plug

Cable clamps



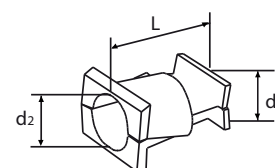
Material: Brass, tin-plated

Item number	D mm	d1 mm	d2 mm	L mm	External diameter of cable (mm)	Strain relief compression	Shield compression
SUKABC06S	7.4	6.0	6.0	20.5	5.8 $+0/-0.8$	yes	yes
SUKABC067S	7.4	6.7	6.0	20.5	6.5 $+0/-0.8$	yes	yes
SUKABC09S	10..0	9.0	9.0	20.4	8.8 $+0/-0.8$	yes	yes
SUKABC10S	11.0	10.0	9.0	30.4	9.8 $+0/-0.8$	yes	yes
SUKABC12S	13.0	12.0	10.8	30.4	11.8 $+0/-0.8$	yes	yes



Material: Brass tin-plated

Item number	D mm	d1 mm	d2 mm	L mm	External diameter of cable (mm)	Strain relief compression	Shield compression
SUKABC12	13.0	12.0	10.0	22.4	11.8 $+0/-0.8$	yes	no

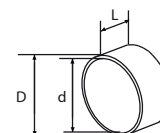


Material: zinc cast

Item number	d1 mm	d2 mm	L mm	External diameter of cable (mm)	Strain relief	Shield compression
SUKABV69	6-9	6-9	18.0	9 $+0/-3.0$	yes*	no

* with cable tie SUKABV69K

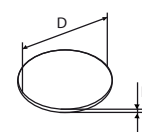
Shielding sleeves / supporting sleeves



Material: Bronze tin-plated

Item number	For cable clamp	d mm	D mm	L mm	colour
SUGSC297	SUKABC06S SUKABC067S	7.5	8.5	6.4	green
SUGSC460	SUKABC09S SUKABC10S	11.7	13.0	6.4	silver
SUGSC500	SUKABC12S	12.7	14.0	6.4	green

Wire hole plugs

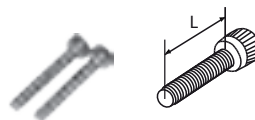


Material: Stainless steel

Item number.	Description	D mm	H mm
FBL12.8x0.4	Wire hole plug to close the non used cable admittances	12.80	0.40

4.2.4 Code screw / Code pin

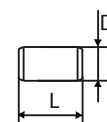
Code screw



Material: Stainless steel

Item number	Thread	L mm
FSCI6KTBN610	M2	10.0

Code pin

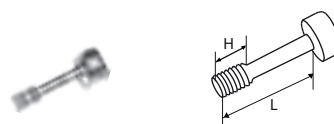


Material: stainless steel

Item number	D	L
FSTDDBN1208	3.0	6.0 $+1/-1$

4.2.5 Screws / Washer

Plug fixing screws (hexagonal socket screws)



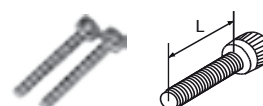
Material: Stainless steel

Item number	Thread	L mm	H mm
SUI6KT M3 x 18	M3	18.0 $+1/-1$	5

Spring washer to plug fixing screws:

Item Number:	SUSN212748	M3
Dimensions:	inner diameter:	3.2
	outer diameter:	5.7
Material:	stainless steel	

Case screws



Material: Stainless steel

Item number	Thread	H mm
FSCI6KTBN991110	M2.5	16.0

4.2.6 Contacts

Snap-In Contacts (Signal) Type F



Material: Phosphorus bronze, nickle-plated

Item number	Description	Cross-Section (mm ²)	AWG	Contact surface / surface of contact zone
FSCS-26AU1	Single contact	0.12 - 0.50	26-20	gold-flashed / ≥ 1.25 µm Au on 1.25 µm Ni
FSCS-26AU1-25	Contact strip, roll 2500 pcs	0.12 - 0.50	26-20	gold-flashed / ≥ 1.25 µm Au on 1.25 µm Ni
FSCS-20AU1	Single contact	0.50 - 1.50	20-15	gold-flashed / ≥ 1.25 µm Au on 1.25 µm Ni
FSCS-20AU1-25	Contact strip, roll 2500 pcs	0.50 - 1.50	20-15	gold-flashed / ≥ 1.25 µm Au on 1.25 µm Ni

FASTON Contacts (Power)

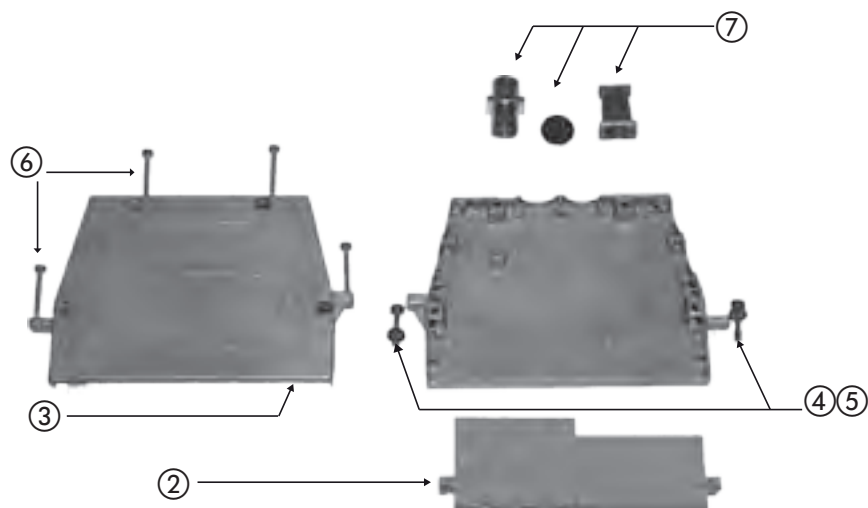


Material: Brass

Item number	Description	Cross-Section (mm ²)	AWG	Contact surface / surface of contact zone
FSCF-20	Single contact	0.5 - 1.0	20-17	brass
FSCF-17	Single contact	1.0 - 2.5	17-14	brass

4.3 Connector sets TRAC F

4.3.1 Connector parts set TRAC F



Pos.	Description	Item number	Quantity	Set code configuration		
				a	b	c
1	TRAC F Connector Set	TRAC F		TRACF	TRACF	TRACF
2	Housing H 15	FKE H15	1	15	31	48
	Housing F 31	FKE F31	1			
	Housing F 48	FKE F48	1			
3	Cover	TRAC F00	1	*	*	*
4	Screw M3 x 12	FI6KT M3 x 12	2	*	*	*
5	Washer M3	SUBN2312	2	*	*	*
6	Screw M2.5 x 16	FI6KTBN610	4	*	*	*
7	Cable clamps / Wire hole plugs		X	6 (individual)		
	Contact Snap-In		X	-	24	48
	Contact FASTON		X	15	7	-
	Shielding sleeves		X	up to 6		

Ordering example:

TRAC F connector (**TRACF**), 48-poles F-housing (**48**) = Part No.: **TRACF48**

* These parts are included in the set.

X These parts have to be ordered separately if required.

4.4 Tools for data connectors TRAC F

4.4.1 Compression tool for cable clamps and shielding sleeves

Mechanical hand compression tool



Item number	Twin-Die for strain relief and shield compression	for cable clamp	for shielding sleeve
GIW30L	GIM30K06	SUKABC06S	SUGSC297
GIW30L	GIM30K06	SUKABC067S	SUGSC297
GIW30L	GIM30K09	SUKABC09S	-
GIW30L	GIM30K10	SUKABC10S	-
GIW30L	GIM30K12	SUKABC12	SUGSC460
GIW30L	GIM30K12	-	SUGSC500
GIW30L	GIM30K12	SUKABC12S	-

4.4.2 Crimping tool for contacts

Crimping tool for snap-in / FASTON contacts



Item number Handle	Item number Presshead	Description	Item No. Contacts
GIW10V	GIM10VFSCS	Mechanical crimping tool for Snap-In contacts Type F	FSCS-26AU1 FSCS-20AU1
GIW10V	GIM10VFSCF	Mechanical crimping tool for FASTON contacts	FSCF-20 FSCF-17

4.4.3 *Extraction tool for contacts*

Extraction tool for Snap-In contacts type F



Item number	Text	Contact type
WMLE FS	Extraction-tool for Snap-In contacts	FSCS-26AU1 / FSCS-20AU1

4.4.4 *Accessories*

Hex. socket screw driver



Item number	Description	Application
GIW903	for hex. socket screws M3	plug fixing screws
GIW904	for hex. socket screws M2.5	case screws
GIW905	for hex. socket screws M2	code screws

4.5 Assembly Instructions TRAC F

4.5.1 Preparation

Standard part set

Parts sets are supplied corresponding to the order in set-packages. Note that contacts and shielding sleeves as well as optional filling tubes are not included in the parts sets. They are to be ordered separately for each case.

The following standard parts sets are available:

Case	TRAC F00
Case with contact insert 48p	TRAC F48
Case with contact insert 31p	TRAC F31
Case with contact insert 15p	TRAC F15

You will find the part set overview in chapter (4.3.1).

Individual part set according to customer specification

Individual part sets according to customers specification can be defined and supplied on request.

Contacts

Contacts are to be selected according to the relevant information in this catalogue:

- Contact layout (number of poles) (acc. chapter 4.2.1)
- Conductor cross-section (acc. chapter 4.2.6)
- Manufacturing mode (single contacts or contacts on reels)

Shielding sleeves

Shielding sleeves are to be selected depending on the cable clamps: (acc. 4.2.3)

Item number	required shielding sleeve	colour
SUKABC06S	SUGSC297	green
SUKABC067S	SUGSC297	green
SUKABC09S	SUGSC460	silver
SUKABC10S	SUGSC460	silver
SUKABC12S	SUGSC500	turquoise

Tools

Compression Tools for cable clamps (see 4.4.1)
 Compression Tools for shielding sleeves (see 4.4.1)
 Crimping Tools for contacts (see 4.4.2)
 Supporting Tools (see 4.2.3 - 4.4.4)

Moreover the following standard tools are recommended:

- Crosshead-screwdriver
- Cable stripper
- Knife
- Plastic hammer

Accomplishing Material (optinal)

- Cable tie SUKBV69K to cable clamp SUKABV69 (see 4.5.2)
- Heat shrinkable tubes to single conductor bundles (see 4.5.2)
- Heat shrinkable tubes for diameter adaption (see 4.5.2)
- Heat shrinkable tubes for conductor identification
- Label for connector identification

4.5.2 Cabel set

Conductor, dismanteling

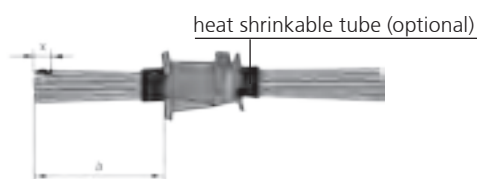
Disinsulation length	x	mm	2.5	2.5	2.5
Conductor area	A	mm ²	0.12 - 0.50	0.5 - 1.5	0.5 - 2.5
For contact type			Snap-In	Snap-In	FASTON

Single Conductors, non shielded:

Single conductor bundles may be fixed with the divisible cable clamp for various diameters from 6 up to 9 mm.

- Dismantle Conductors by (x)mm acc. conductor dismanteling table
- A heat shrinkable tube can be applied at the clamping area (optinal)
- Firmly tight the cable clamp with the cable tie SUKBV69K

		Cable entrances at side	Cable entrances at front
Approximate distance from cable clamp to end of conductors	a	93 mm	73 mm

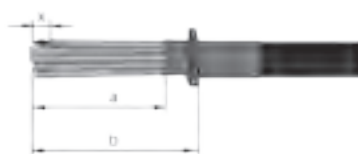


Multiple Conductor Cable, non shielded:

For adequate strain relieve of non shielded cables the cable clamps SUKABC can be used for 6mm to 12mm cable diameters.

- Dismantle Conductors by (x)mm acc. conductor dismanteling table
- A heat shrinkable tube can be applied at the clamping area to enlarge cable diameters (optinal)

		Cable entrances at side		Cable entrances at front	
Cable outer diameter		< = 9	> 9	< = 9	> 9
Approximate distance from cable clamp to end of conductors.	a	87 mm	97 mm	67 mm	77 mm
Approximate distance from cable insulation to contacts.	b	93 mm	103mm	73 mm	83 mm



Multiple Conductor cable, shielded:

For adequate strain relieve and excellent shielding performance the cable clamps SUKABC can be used for 6mm to 12mm cable diameters.

- Dismantle Conductors by (x)mm acc. conductor dismanteling table
- A heat shrinkable tube can be applied at the clamping area to enlarge cable diameters (optional)

		Cable Entrances at side		Cable Entrances frontside	
Cable outer diameter		≤ 9	> 9	≤ 9	> 9
Approximate distance from cable clamp to end of conductors.	a	87 mm	97 mm	67 mm	77 mm
Approximate distance from cable insulation to contacts.	b	93 mm	103mm	73 mm	83 mm
Approximate distance from shield to contacts	c	80 mm	90 mm	60 mm	70 mm



Application of Cable Clamp SUKABCxxS for cable retention

If the overall diameter of the cable is more than 1 mm smaller than the cable clamp inside diameter, the application of a heatshrinkable or filler tube with a length of approximately 25 mm is required. (Img. 1)



Crimp the retention reach at the cable clamp with the specified tool (acc. to 4.4.1). (Img. 2)



Application of shielding sleeve to Cable Clamp SUKABCxxS

- After compression of the cable clamp for cable retention, the shield has to overlap not more than 8 mm from the shield contactation reach
- Fold back the shield over the shield contactation reach (Img.1)
- Set up the shielding sleeve in flush with the end of the cable clamp (Img. 2/3)
- Compress the shielding sleeve with the specified tool (acc. to 4.4.1) (Img. 4)



Contact crimping

Contact: To be crimped with the specified tool acc. to 4.4.2
 IMPORTANT: The crimping tool has to be closed completely, that means until the automatic release of the tool.



Check

Crimping: Examine the position and the shape of the crimping
 Single wires: No wires must be beyond the crimping slot
 Contact shape: Contacts must not be deformed or damaged beyond the crimping reach

Heat Shrinkable Tubes fixing

Optional: At the connection area of each conductor heat shrinkable tubes for identification and/or for support or additional insulation of conductors may be applied.

4.5.3 Assembling

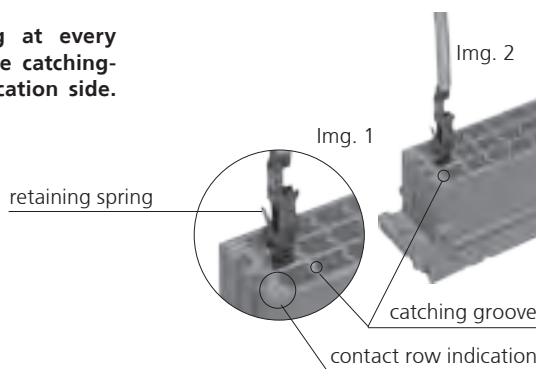
Contacts application

Apply the contacts, corresponding to the contact layout requirement, into the contact housing until they properly click in. Examine the correct contact fixing by slightly pulling each conductor.

IMPORTANT:

It is required that the retaining-spring at every Snap-In contact is positioned towards the catching-groove, or towards the contact row indication side.
 (refer to Img. 1 and Img. 2)

In case of wrong insertion, no fixation in the contact chamber can be achieved and the retaining-spring will be damaged. The contact finally **must** be replaced before re-insertion of the contact!



Connector Assembling

Case: examine regarding residues (eg wire rests), clean it accordingly
 Contact housing: apply to the correct position
 Cable clamp: push up against the case (if required use plastic hammer)
 Wire hole plug: push up against the case (if required use plastic hammer)
 Conductors: check arrangement, put it in adequate order if necessary
 Cover 2 shells: place the upper half at the lower half (Plastic hammer)
 apply cover screws and tighten them
 apply fixing screws including the spring washers

Optional: apply selfadhesive lable for connector identification
 Optional: apply the coding screws at the connector case

5 Connector Kit F9/3BHC

5.1 Introduction

The electronics connector with the designation **3BHC** are a complement to the broad range of type F products. The 9-pin male multipoint connector are available with angled dip soldering contacts, the female multipoint connector with crimp contacts. Therefor the appropriate crimp contacts Type FSCS can be used. The connectors comply with protection class IP44 acc. to IEC EN 60529, they are only qualified for indoor application.

- Elimination of an additional contact with the male multipoint connector compared to the FASTON connection
- Simple crimping of the female multipoint connector on manual or automated facilities
- Space saving compared to the standard type F connectors
- The male multipoint connectors are easy to engage with the female multipoint connectors

The application areas include:

- Industrial Electronics
- Power Electronics
- Railway Engineering

Advantages:

5.1.1 Technical Information

Electrical Properties

All electric data are valid on sea level with an environment temperature of 20 °C. Deviating environment conditions are to be taken into account with the connector interpretation.

		3BHC	3BHC
Contact insert		male multipoint connector	female multipoint connector
Type of Contacts		Signal	Signal
Number plug contacts		9	9
Test Voltage	[V] AC 1 Min	1500	1500
Operating Voltage	[V] AC/DC	125	125
Operating Current at 20° C *	[A]	5.5	5.5
Contact-Resistance	[mΩ]	≤ 8	≤ 8
Creeping Distances	[mm]	≥ 3	≥ 3
Creepage-Resistance acc. to IEC664	CTI-value	> 300	> 300
Insulation-Resistance	[MΩ]	> 5000	> 5000

*) Valid for single Contact, consider the Rating according to IEC 60603-2 (DIN 41612) for connectors.

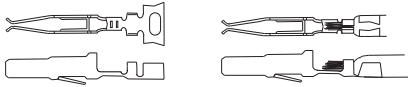
Thermal Properties

		3BHC
Contact housing Material		reinforced polyester
Fire Resistance Class	acc. UL 94 acc. NF F 16-101/102	V-0 F2/I3
Operating Temperature	[°C]	-55 bis +125

Mechanical Properties Connector

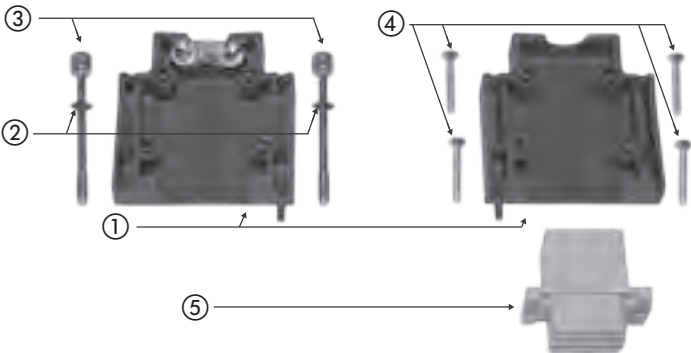
	3BHC
Cover	2-piece, screwed together
Cover material	polyamide 6/66
Screws	stainless steel V2A
EMC shielding	no
Coding	not applicable
Cable clamp screwed	Strain relief up to 50 N

Mechanical Properties Contacts



		3BHC
Mechanical Contact-lifespan	Mating Cycles	min. 500 (specification class 1)
Mating Force per contact	[N]	~ 1.5
Conductor Cross-sections		0.14 up to 1.50 mm ²

5.2 Connector set F9/3BHC
5.2.1 Connector parts set F9/3BHC 860 070 R100

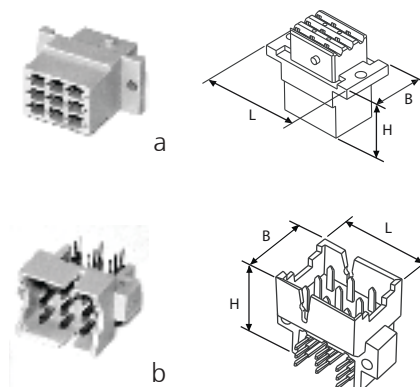


Pos.	Description	Item number	Qty.
1	Cover (bottom part)	3BHC 860 070 R0001	1
1	Cover (top part)	3BHC 860 070 R0002	1
2	Washer M3	SUSN212748 M3	2
3	Screw M3 x 34	SUI6KT M3x34	2
4	Cover screw	3BHC 860 070 R0006	4
5	Female multipoint connector F9	3BHC 860 070 R0003	1

Order Number: **3BHC 860 070 R100**

Contacts and male multipoint connectors have to be ordered separately if required.

5.2.2 Multipoint Connectors F9/3BHC



Item number	Pin	L mm	B mm	H mm	Pict
Female multipoint connector F9 / 3BHC 860 070 R0003	9-pin	28	14.8	24.8	a
90° Male multipoint connector F9 / 3BHC 860 049 R1303	9-pin	25.3	14.8	22.1	b

5.2.3 Contacts

Snap-In Contacts (Signal) Type F



Material: Phosphorus bronze, nickle-plated

Item number	Description	Cross-Section (mm ²)	AWG	Contact surface / surface of contact zone
FSCS-26AU1	Single contact	0.12 - 0.50	26-20	gold-flashed / ≥ 1.25 µm Au on 1.25 µm Ni
FSCS-26AU1-50	Contact strip, roll 5000 pcs	0.12 - 0.50	26-20	gold-flashed / ≥ 1.25 µm Au on 1.25 µm Ni
FSCS-20AU1	Single contact	0.50 - 1.50	20-15	gold-flashed / ≥ 1.25 µm Au on 1.25 µm Ni
FSCS-20AU1-50	Contact strip, roll 5000 pcs	0.50 - 1.50	20-15	gold-flashed / ≥ 1.25 µm Au on 1.25 µm Ni

6.0 General Conditions

6.1 General Sales Conditions

The present General Sales Conditions are binding and exclusively applicable, if no deviating or additional conditions have been mutually agreed between the buyer and Gimota Inc.. Any deviations need to be stipulated accordingly in writing. .

General

The published pictures, dimensions and weights within catalogues and drawings are for information only without obligation regarding the supplied goods. Literal errors excepted.

Offers

Our offers are valid for a period of 3 months unless other terms have been stipulated. Extraordinary price changes for raw materials are excepted.

Prices / Packaging / Conditions of Payment / Surcharges

If nothing else is stipulated our prices are quoted in Swiss francs CHF for delivery ex works (INCOTERMS 2010, EXW Geroldswil) exclusive packaging and value-added tax (VAT) .

Total order values below CHF 100 will incur an order processing charge of CHF 20.

Packing is charged according actual cost.

The general payment terms are 30 days net as of invoice date.

We reserve the right to charge interest of 5% on late payments.

Transfer of Gain and Risk, Shipment and Insurance

Gain and risk is transferred to the buyer with dispatch of the consignment ex works. Shipment is carried out with invoice and at the consignee's risk. Transport insurance is taken out by us only upon written request of the consignee. The cost of the insurance is borne by the consignee.

Delivery periods / Delivery date

Delivery periods given in our offers begin with the receipt of the order. The delivery time is deemed as achieved if on its expiry, the consignment is prepared and ready for dispatch from the factory. We make every effort to adhere to delivery dates given in our order confirmations. However, they are non-binding, and overruns cannot be taken as reason for damages claims or for cancellations of concerning orders.

Lack of raw materials, defects on tools, transport/logistic problems and comparable influences could decisively raise cost and reduce the feasibility of the products. If this makes it impossible for us to comply with our delivery commitment we are released from our delivery obligations without any compensation claims. Recognisable delays will be communicated immediately.

Documents / Samples

Our catalogues, drawings, sketches, etc. are our intellectual property, and shall not be modified or used for purposes other than intended without our written acceptance.

Samples are provided at a charge.

Testing and Acceptance of the Consignment

The buyer is requested to inspect/test the consignment on receipt and report any defects that are found in writing within 10 days to Gimota Inc. If no failures or irregularities are reported the consignment is deemed to be approved by the receiver.

If more extensive tests and reports (such as factory- or inspection certificates) are requested by the buyer, it must be agreed on in writing and mentioned within the concerning orders. The costs must be borne by the buyer.

Products assessed as defective are not supposed to be returned without our agreement. Otherwise developing delivery cost will be charged accordingly.

Parts which are found to be unusable due to material defects or production failures will be either replaced or repaired, as we consider appropriate.

Property Rights

The delivered goods remain our property until the full purchase price has been paid. The buyer assures participation for adequate arrangements in order to protect our property accordingly.

Cancellation / Returning goods

The cancellation of contracts requires our written agreement.

Cost for pre-processed or finished parts will be charged in any case.

Raw materials specially purchased for a customer will also be charged.

Complaints regarding a consignment do not entitle the purchaser to cancel the remainder of an order. Produced and delivered goods can not be returned to the supplier.

We are authorized to withdraw from delivery obligations if the financial situation of the buyer markedly deteriorate or appears different than originally presented to us.

Warranty

During the warranty period Gimota Inc. is obligated to replace or repair, all parts that are defective or unusable as a result of material defects or of design/production failures, as we consider necessary, as soon as possible. Warranty claims require a written request from the buyer. The warranty period is 12 months after receipt of the consignment as far as no other legal regulations are effective. Excluded from the warranty are damages due to incorrect storage, natural wear, faulty processing and disregard of regulations, etc.

Modifications or repair of products without our written acceptance as well as not following our operating instruction exculpate us from product warranty.

Our liability is limited on the replacement of defective goods or on reimbursement of the invoiced value.

Exclusion of other Liabilities

Possible claims by the purchaser are fully covered within these „General Sales Conditions“. All not expressly mentioned claims for damages, reduction, cancellation of or withdrawal from the contract are excluded.

Jurisdiction

The place of jurisdiction for any direct or indirect differences/ disputes is Zurich, Switzerland only. The legal relationship is subjected to substantive Swiss law.

The General Sales Conditions valid at the purchase date are mandatory and considerable.

The current and up-to date sales conditions are explicitly published on www.gimota.com

Final Provisions

The General Sales Conditions have been update as per **January 1st 2013**. They replace all previous versions and are integrated part of all our offers and order confirmations.

With this edition all previous versions are void. In case of discrepancies between the German text and any other-language version of these General Terms of Business, the German original text shall prevail.

6.2 Product Safety

Information and advice given in the following is applicable in connection with the use of our products and data contained in our data sheets and catalogue. Failure to comply with the advice can put people and equipment at severe risk.

1. Materials

Electrical plug-type connectors contain no substances that could be dangerous in normal operation. The connectors consist of conducting and non-conducting materials.

Data signal connectors:

The insulators are generally made of a fiber glass-reinforced plastic in a metal frame; covers can be made of die cast metal (zinc, aluminum) or of plastic.

2. Hazards

When plug-type connectors are correctly wired and are used and handled with due regard to the given parameters, there will be generally no risk.

Incorrect wiring or assembly of connectors can lead to electric shock, burns or fire. The same applies to careless handling of metal tools or conductive fluids, as well as to the use of defective parts, e.g. damaged during transport or storage.

Live circuits may not be made or broken by means of plug-in connectors. This can lead to ionization and arcing, causing electric shock, burns or fire. Such manipulations can also cause electronic circuits to be destroyed.

Only contacts in correctly assembled plug-in connectors may be energized. Abnormal rises in resistance in a plug-in connector can cause it to become overheated.

An increase in resistance can be caused by cracked, broken or deformed contacts or by broken wires in the conductor strand, as well as by badly made crimps due to the wrong or defective crimping tool being used, by poor solder joints or by screw connections not being properly tightened. Oxide films and the presence of contamination on the contacts or crimps can also lead to rises in resistance and therefore to local overheating. Overheating can further be caused by the formation of creepage paths or short circuits in the plug due to:

- water entering through badly sealed cable clamps or due to the capillary effect along the conductor wires;
- contamination of the insulator or residues left over from processing (e.g. bits of wire) in the connector.

We warn against exceeding the continuous currents given in our documentation, as this too can cause overheating of the connector.

Overheating of a plug-type connector causes the insulator to be destroyed. This can result in spurious signals; also, there is the danger of electric shock or of fire, with toxic gases formed in combination with other materials. Since overheating is not necessarily visually apparent, there is a risk of burns being caused if overheated parts are touched.

3. Handling

Components of electrical plug-type connectors must be carefully handled during transport, storage and use to avoid damage. Although these parts normally have no sharp edges or corners, care should be taken to ensure that no injury to fingers can occur.

Plug-type connectors can be damaged in transit to the customer. Such damage can be a source of danger. These products should therefore be checked before installation or use, and damaged ones removed.

4. Disposal and scrapping of waste

Dangerous or even toxic gases can be formed when certain materials are burned. Such materials must therefore be disposed of in the proper manner.

5. Application

Plug-type connectors with accessible contacts should not be used on the supply side of the electric circuit.

Touching the exposed contacts of an unconnected plug-type connector can result in an electric shock. Voltages above 30 V AC or 42.5 V DC are generally dangerous. It must be ensured that such voltages cannot under any circumstances reach the accessible metal parts of the connector housing. Before energizing with voltage, plug-type connectors and the wiring should be checked. It must be ensured that metal parts and insulators are not damaged, and that no soldering jumper, loose wire strands, conductive fluids or other conducting materials can form an electrical bond. The circuit should be checked for insulation resistance and electrical continuity. It is essential that the correct working tools are used, in accordance with our catalogues and data sheets.

Only qualified personnel should be allowed to wire, assemble or modify plug-type connectors.

The pertinent national regulations should be referred to in order to determine the permitted operating voltage.

6. Important general note

6.1 Product design

We are committed to a policy of continuous improvement and further development of our products. Because of this, our products may differ from the descriptions, technical data and figures in this catalogue and in the data sheets. Unless otherwise stated, all dimensions in this catalogue are approximate values in mm.

6.2 Insulation clearances, ambient conditions

The permitted operating voltages depend on the specific application and on the applicable national safety regulations. For this reason, the clearances and creepage distances are given as reference values. Attention should therefore be given to reductions in the clearances and creepage distances due to the circuit board and/or wiring.

All voltage data are valid at sea level and a temperature of 20°C. The given temperatures are temperature limits. The permitted operating temperature will depend on the actual application.

6.3 Fabrication instructions

Our detailed fabrication instructions should be referred to when processing work is carried out.



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