



 **ELECTRONICS**

# D-Subminiatures Connectors and accessories

WEB Product Catalogue  
(2008 August revision)

## **FCI: SETTING THE STANDARD FOR CONNECTORS**

With operations in 30 countries and sales of 1.3 billion euros in 2007, FCI is a leading manufacturer of connectors.

Our 14,200 employees are committed to providing customers with high-quality, innovative products for a wide range of consumer and industrial applications.

## **INTRODUCTION**

The products are marketed through the international sales organisation of FCI.

FCI D-Sub product lines are present in high technology areas:

- communications,
- data,
- consumer,
- industrial,
- military.

Many styles of termination and performance levels are available and a large choice of accessories completes the range.

Our continuous improvement programme is focused on:

- Manufacturing process control,
- High quality level (ISO 9001 approved),
- Innovation

FCI is an excellent partner for your connection needs.

**For more information:**  
[www.fci.com](http://www.fci.com)

 **Check preferred and standard solutions !**

**PCB applications**      **Cable applications**

✓	
✓	
✓	
✓	
✓	
✓	
✓	
✓	
	✓
	✓
	✓
	✓
✓	
	✓
	✓
	✓
✓	
✓	
✓	
	✓
✓	
✓	
✓	

## INDEX

### D-Sub Overview

	page
■ Selector Guide	4-5
■ Technical characteristics	6-7

### Signal PCB Connectors DELTA D

■ Right angle solder to board	8-9
■ Right angle press-fit	10-11
■ Right angle Pin-in-Paste	12-13
■ Straight solder to board	14-15
■ Straight press-fit	16-17
■ Straight Pin-in-Paste	18-19

### Signal PCB connectors COMPACT D

■ High density solder to board	20-21
■ High density press-fit	22-23

### Mixed and full power DW series

■ General characteristics	24-27
■ DELTA D series - Full power right angle solder to board	28
■ DW series - Mixed and full power solder to board	29-30
■ DW series - Full power right angle and straight press-fit	31-32
■ DW series - Mixed and full power - Cable connectors	33-34
■ DW series - Power solder and crimp contacts	35
■ DW series - Power high voltage, coaxial contacts	36-37
■ μTCA™ - High power I/O PCB connectors	38-39
■ μTCA™ - High power I/O Cable connectors	40-41

### D / 8656 / 8657 / DP series

■ D series - Stamped and rolled contacts	42-43
■ 8656 series - Crimp contacts and cable connectors	44-45
■ 8657 series - IDC for flat cable	46-47
■ DP series - Machined contacts D-Sub	48-49

### Military products - DM series

■ DM series HE 501	50-51
■ DM series HE 508	52-53
■ DMW series HE 507 - Full and mixed power	54-55

### Accessories

■ D-Sub - Hoods	56-62
■ D-Sub - Locking devices	63-64
■ D-Sub - Caps	65
■ D-Sub - Brackets	66

<b>D-Sub Technical Characteristics and Dimensions</b>	<b>67-71</b>
---	--------------

**Nota:** All dimensions in mm

## PCB APPLICATIONS

### Standard applications

Pages

#### Signal standard density

Right angle	<ul style="list-style-type: none"> <li>• Solder to board:</li> <li>• Press-fit:</li> <li>• Pin-in-Paste:</li> </ul>	Delta D ..... 8
		Delta D ..... 10
		Delta D ..... 12
Straight	<ul style="list-style-type: none"> <li>• Solder to board:</li> <li>• Press-fit:</li> <li>• Pin-in-Paste:</li> </ul>	Delta D ..... 14
		Delta D ..... 16
		Delta D ..... 18
D series also available (Design with two shells) ...		42



#### Signal high density

<ul style="list-style-type: none"> <li>• Solder to board</li> <li>• Press-fit</li> </ul>	..... 20
	..... 22



#### Power

Right angle	<ul style="list-style-type: none"> <li>• Solder to board - Full &amp; mixed power:</li> </ul>	Delta D ..... 28
		DW series ..... 29
	<ul style="list-style-type: none"> <li>• Press-fit - Full power:</li> </ul>	DW series ..... 31
Straight	<ul style="list-style-type: none"> <li>• Solder to board - Full &amp; mixed power:</li> </ul>	DW series ..... 29
		<ul style="list-style-type: none"> <li>• Press-fit - Full power</li> </ul>



### Demanding applications : machined signal contacts

#### Signal

<ul style="list-style-type: none"> <li>• Right angle solder to board: DP series</li> <li>• Wire-wrap: DP series</li> <li>• Straight solder to board: DP series</li> </ul>	..... 48
---	----------



### Severe environment applications

#### Signal

HE 501 compliant standard	<ul style="list-style-type: none"> <li>• Right angle:</li> </ul>	DM series
	<ul style="list-style-type: none"> <li>• Straight:</li> </ul>	DM series ..... 50

#### Power

HE 508 compliant high temperature	<ul style="list-style-type: none"> <li>• Right angle:</li> </ul>	DM series
	<ul style="list-style-type: none"> <li>• Straight:</li> </ul>	DM series ..... 52



## CABLE APPLICATIONS

### Standard applications

Pages

Signal

- Solder bucket

D series ..... 42

- Crimp

8656 series ... 44

- IDC

8657 series ... 46

Power

- Solder bucket

DW series ..... 33

- Crimp

DW series ..... 33



### Demanding applications : machined signal contacts

Signal

- Solder bucket

DP series ..... 48



## ACCESSORIES

Hoods

- Plastic
- Metalised
- Metallic
- Others hoods

62

Locking devices

63

Caps

65

Brackets

66



# D-Sub - Technical Characteristics

Series	Delta D Solder to board	Delta D Press-fit	Delta D Pin-in-Paste	Mixed Power DW	D series	8656 series
<b>ENVIRONMENTAL CHARACTERISTICS</b>						
Operating temperature range	-55°C to 125°C	-55°C to 125°C	-55°C to 125°C	-55°C to 125°C	-55°C to 125°C	-55°C to 105°C
Salt spray	24 hours	24 hours	24 hours	24 hours	24 hours	24 hours
Damp heat	21 days	21 days	21 days	21 days	21 days	21 days
Proof version	no	no	no	no	no	no
UL 94 VO	E 118235 (R)	E 118235 (R)	E 118235 (R)	E 118235 (R)	E 118235 (R)	E 118235 (R)
<b>NORMES AND APPROVALS</b>						
NFC 93425				compliance with HE 507		in compliance with
DIN 41652	in compliance with	in compliance with	in compliance with		in compliance with	in compliance with
Others	LNZ 4404					
<b>MATERIAL</b>						
Shell	Steel	Steel	Ni	Steel	Steel	Steel
Insulator	Thermoplastic	Thermoplastic	Thermoplastic	Thermoplastic	Thermoplastic	Thermoplastic
Contacts	Copper alloy	Copper alloy	Copper alloy	Copper alloy	Copper alloy	Copper alloy
<b>STANDARD PLATING</b>						
Shell	Tin	Tin	Tin	Tin	Tin	Tin
Contact active area	Gold over Nickel	Gold over Nickel	Gold over Nickel	Gold over Nickel	Gold over Nickel	Gold over Nickel
termination area	Tin over Nickel	Tin over Nickel	Tin over Nickel	Tin over Nickel	Tin over Nickel	Tin over Nickel
<b>ELECTRICAL CHARACTERISTICS</b>						
Max current rating per contact	5 A	5 A	5 A	7.5 A (signal contact) 40 A (power contact)	5 A	5 A
Dielectric withstanding voltage (DWW)	1000 Vrms	1000 Vrms	1000 Vrms	1000 Vrms	1000 Vrms	1000 Vrms
Rated voltage	300 Vrms	300 Vrms	300 Vrms	300 Vrms	300 Vrms	300 Vrms
Insulation resistance	≥ 5000 MΩ	≥ 5000 MΩ	≥ 5000 MΩ	≥ 5000 MΩ	≥ 5000 MΩ	≥ 5000 MΩ
Contact resistance	≤ 10 mΩ *	≤ 10 mΩ *	≤ 10 mΩ *	≤ 7.3 mΩ	≤ 10 mΩ *	≤ 10 mΩ *
Insertion / Extraction force per contact (N)	5N Max. / 0.3N min.	5N Max. / 0.3N min.	5N Max. / 0.3N min.	5N Max. / 0.3N min.	5N Max. / 0.3N min.	5N Max. / 0.3N min.
<b>MECHANICAL AND DIMENSIONAL CHARACTERISTICS</b>						
Mating / Unmating cycles	200 min.	200 min.	500 min.	500 min.	200 min.	200 min.
Contact diameter on active area	1 mm	1 mm	1 mm	3.6 mm (power contact) 1 mm (signal contact)	1 mm	1 mm
Removable contacts	no	no	no	yes (cable)	no	yes
<b>WIRE</b>						
Size				AWG 20 Max. (signal contact) other see page 35	AWG 20 Max.	AWG 20 Max.
Max diameter on insulator				—	2.1 mm	1.52 mm
<b>LAYOUT</b>						
Number of contacts	9, 15, 25, 37, 50* Male and Female	9, 15, 25, 37, 50 Male and Female	9, 15, 25, 37*, 50* Male and Female	9, 15, 25, 37, 50* Male and Female	9, 15, 25, 37, 50 Male and Female	9, 15, 25, 37, 50 Male and Female

\* Straight version only

# D-Sub - Technical Characteristics

Series	8657 series	Compact D high density	DP series	DM HE 501 / HE 508	DMW HE 507
<b>ENVIRONMENTAL CHARACTERISTICS</b>					
Operating temperature range	-55°C to 125°C	-55°C to 125°C	-55°C to 125°C	-55°C to 125°C -55°C to 155°C	-55°C to 125°C
Salt spray	24 hours	24 hours	24 hours	48 hours	48 hours
Damp heat	21 days	21 days	21 days	56 days	56 days
Proof version	no	no	no	no	no
UL 94 VO	E 118235 (R)	E 118235 (R)	E 118235 (R)	E 118235 (R)	E 118235 (R)
<b>NORMES AND APPROVALS</b>					
NFC 93425	in compliance with		in compliance with		
DIN 41652	in compliance with		in compliance with		
Others				LNZ 4404	
Shell	Steel	Steel	Steel	Steel	Steel
<b>MATERIAL</b>					
Insulator	Thermoplastic	Thermoplastic	Thermoplastic	Thermoplastic/Thermoset	Thermoplastic/Thermoset
Contacts	Copper alloy	Copper alloy	Copper alloy	Copper alloy	Copper alloy
<b>STANDARD PLATING</b>					
Shell	Tin	Tin	Tin	Cadmium	Cadmium
Contact active area	Gold over Nickel	Gold over Nickel	Gold over Nickel	Gold over Nickel	Gold over Nickel
termination area	Tin over Nickel	Tin over Nickel	Tin over Nickel	Tin/Gold over Nickel	Tin/Gold over Nickel
<b>ELECTRICAL CHARACTERISTICS</b>					
Max current rating per contact	1.5 A	2.5 A	7.5 A	7.5 A	7.5 A (signal contact) 40 A (power contact)
Dielectric withstanding voltage (DWW)	1000 Vrms	1000 Vrms	1000 Vrms	1000 Vrms	1000 Vrms
Rated voltage	300 Vrms	300 Vrms	300 Vrms	300 Vrms	300 Vrms
Insulation resistance	≥ 5000 MΩ	≥ 5000 MΩ	≥ 5000 MΩ	≥ 5000 MΩ	≥ 5000 MΩ
Contact resistance	≤ 10 mΩ *	≤ 25 mΩ *	≤ 7.3 mΩ	≤ 7.3 mΩ	≤ 7.3 mΩ
Insertion / Extraction force per contact (N)	5N Max. / 0.3N min.	5N Max. / 0.3N min.	5N Max. / 0.3N min.	5N Max. / 0.3N min.	5N Max. / 0.3N min.
<b>MECHANICAL AND DIMENSIONAL CHARACTERISTICS</b>					
Mating / Unmating cycles	500 min.	200 min.	200 min.	500	500
Contact diameter on active area	1 mm	0.76 mm	1 mm	1 mm	1 mm (signal contact)
Removable contacts	no	no	no	no	yes (coax and power)
<b>WIRE</b>					
Size	AWG 26 to AWG 30		AWG 20 Max.	AWG 20	AWG 20 (signal contact) (other see page 36)
Max diameter on insulator	Flat cable		2.1 mm	2.1 mm	2.1 mm
<b>LAYOUT</b>					
Number of contacts	9, 15, 25, 37 Male and Female	Solder : 15, 26, 44, 62 Press-fit: 62, 78	9, 15, 25, 37, 50 Male and Female	9, 15, 25, 37, 50 Male and Female	9, 15, 25, 37, 50 Male and Female

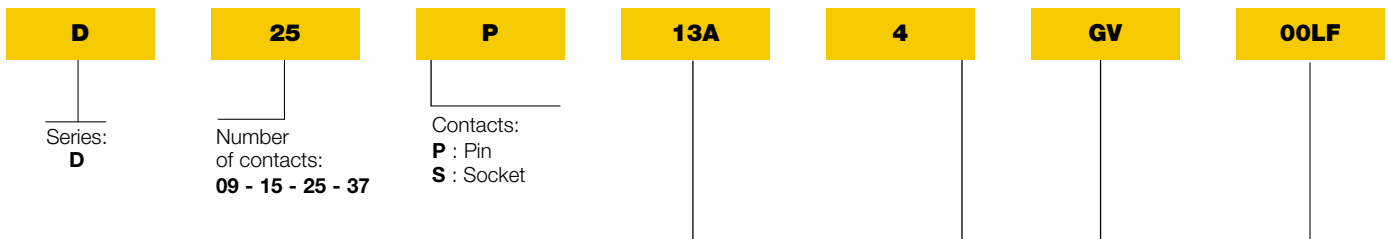
*PCB applications*

**UL** <sup>®</sup> **UL Recognized File E 118235 (R)**

■ In compliance with DIN 41652.



## ORDERING INFORMATION



**Termination:**

Code	Type	Foot print/Pitch	Length of termination	PCB thickness
😊 <b>13 A</b>	<b>Right angled – Europe standard</b>	<b>10.4 / 2.54 mm</b>	<b>2.90</b>	<b>1.6</b>
<b>13 B</b>	Right angled – Europe standard	10.4 / 2.54 mm	3.70	2.4 and 1.6
<b>23 A</b>	Right angled – Europe standard	10.4 / 2.84 mm	2.90	1.6
<b>23 B</b>	Right angled – Europe standard	10.4 / 2.84 mm	3.70	2.4 and 1.6
😊 <b>33 E</b>	<b>Right angled – US standard</b>	<b>8.08 / 2.84 mm</b>	<b>3.18</b>	<b>1.6</b>

**Durability:**

**4** : Standard class (≥ 200 mating / unmating)  
**6** : High performance class (≥ 500 mating / unmating) - LNZ 4404

**Mounting options** (see page 71)

**Options:**

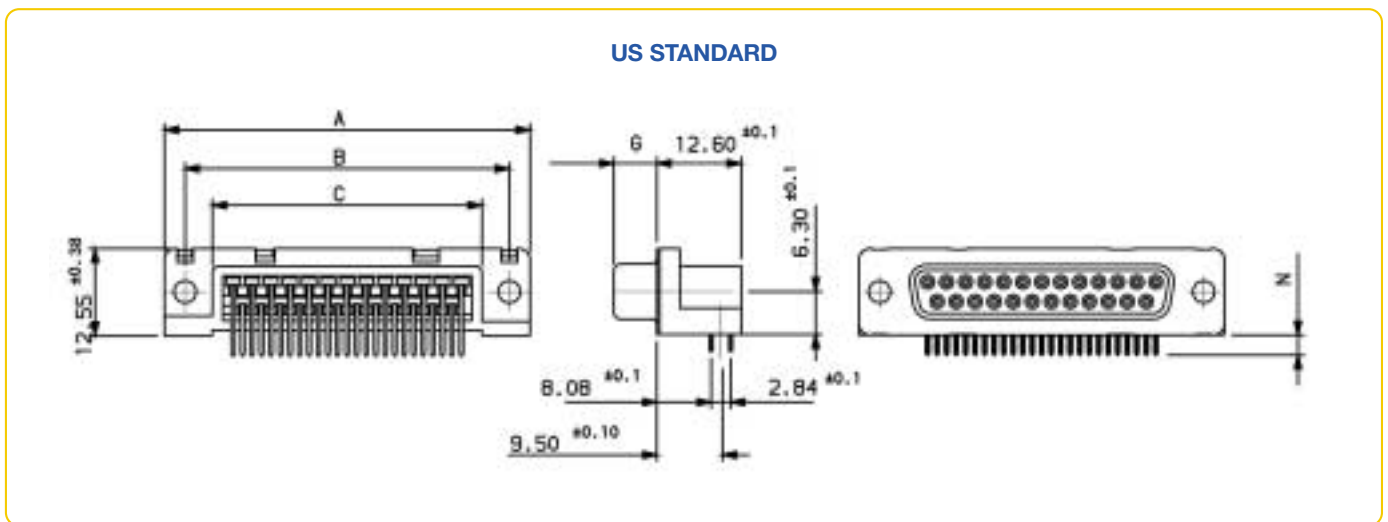
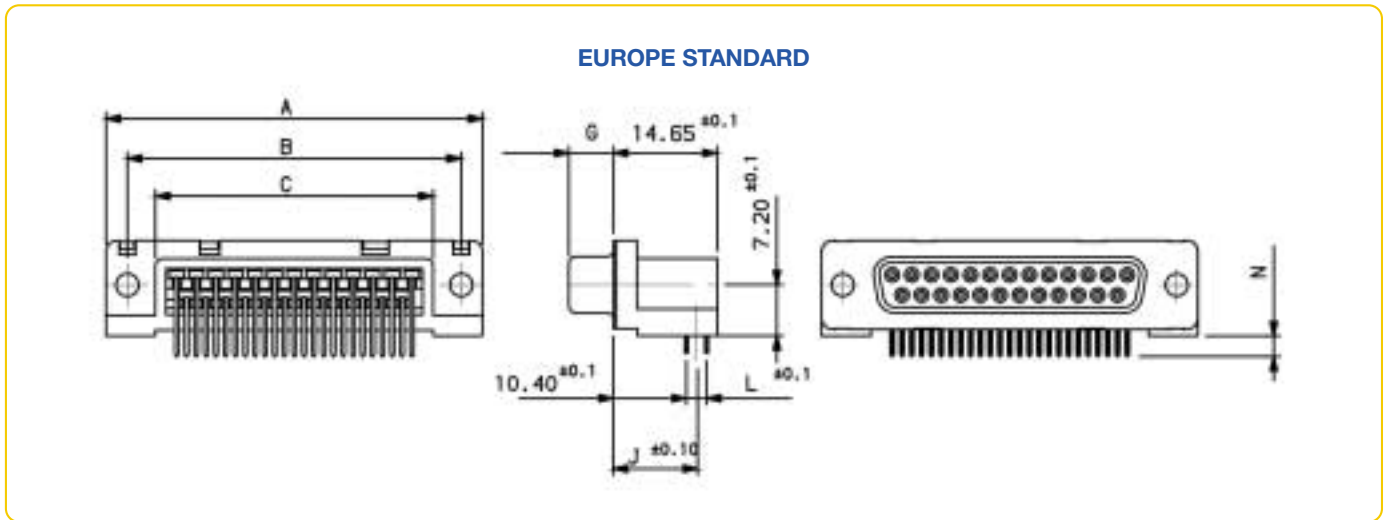
- PA** : Standard hole
- PL** : Threaded insert M3
- PX** : Threaded insert UNC 4-40
- PV** : Female screw UNC 4-40
- GI** : Harpoons + female screw M3 + elec. continuity
- GL** : Harpoons + insert M3 + elec. continuity
- 😊 **GX** : Harpoons + insert UNC 4-40 + elec. continuity
- 😊 **GV** : Harpoons + female screw UNC 4-40 + elec. continuity
- UA** : Elec. continuity
- UL** : Insert M3 + elec. continuity
- UX** : Insert UNC 4-40 + elec. continuity
- UV** : Female screw UNC 4-40 + elec. continuity

**Options**

**OOLF** : Standard series, RoHS compatible



SPECIFIC DIMENSIONS






		A±0.38	B±0.12	C±0.10	G <sup>+0.25</sup> <sub>-0</sub>	J±0.10		L±0.1		N±0.30		
						Termination		Termination		Terminal length		
						13.	23.	13.	23.	13 A 23 A	13 B 23 B	33 E
9	P	30.81	24.99	16.96	5.90 <sup>+0.15</sup> <sub>-0</sub>	11.67	11.82	2.54	2.84	2.90	3.70	3.18
	S	30.81	24.99	16.96	6.05	11.67	11.82	2.54	2.84	2.90	3.70	3.18
15	P	39.14	33.32	25.18	5.90 <sup>+0.15</sup> <sub>-0</sub>	11.67	11.82	2.54	2.84	2.90	3.70	3.18
	S	39.14	33.32	25.18	6.05	11.67	11.82	2.54	2.84	2.90	3.70	3.18
25	P	53.03	47.04	39.12	5.70	11.67	11.82	2.54	2.84	2.90	3.70	3.18
	S	53.03	47.04	39.12	6.05	11.67	11.82	2.54	2.84	2.90	3.70	3.18
37	P	69.32	63.50	55.68	5.70	11.67	11.82	2.54	2.84	2.90	3.70	3.18
	S	69.32	63.50	55.68	6.05	11.67	11.82	2.54	2.84	2.90	3.70	3.18

PCB applications

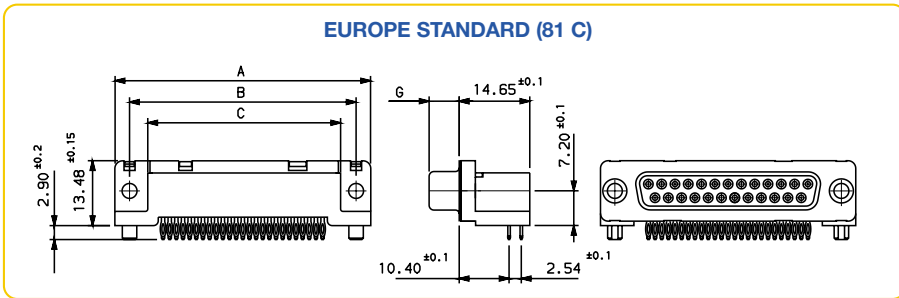
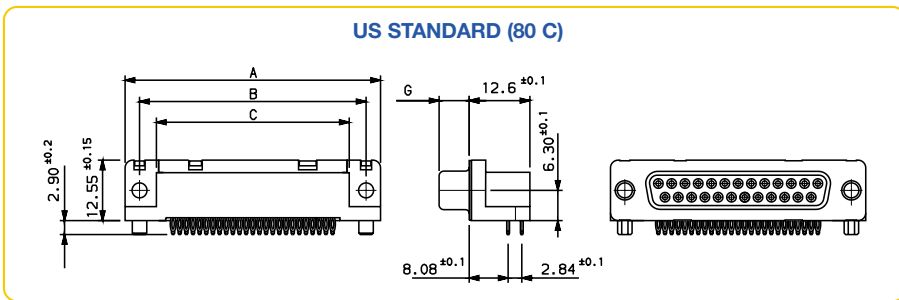
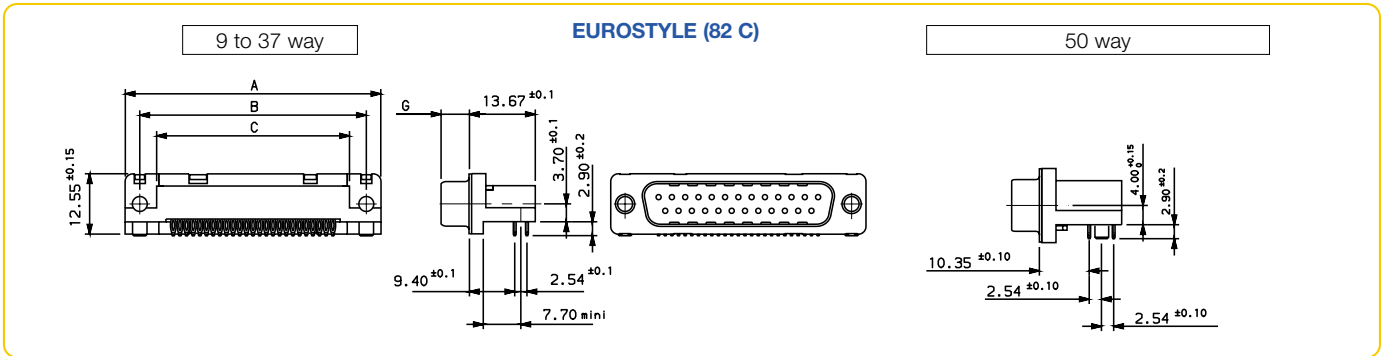
 UL Recognized File E 118235 (R)



## ORDERING INFORMATION

D	25	P	82C	4	PA	OOLF																
Series: D	Number of contacts: 09 - 15 - 25 - 37 - 50*  *only for Eurostyle version	Contacts: P : Pin S : Socket																				
Termination type:																						
<table border="1"> <thead> <tr> <th>Code</th> <th>Type</th> <th colspan="2">Foot print / Pitch</th> </tr> </thead> <tbody> <tr> <td> 82 C</td> <td>Eurostyle</td> <td>9.4 / 2.54 10.3 / 2.54</td> <td>9 to 37 way 50 way</td> </tr> <tr> <td>80 C</td> <td>US standard</td> <td>8.08 / 2.84</td> <td>9 to 37 way</td> </tr> <tr> <td>81 C</td> <td>Europe standard*</td> <td>10.4 / 2.54</td> <td>9 to 37 way</td> </tr> </tbody> </table>							Code	Type	Foot print / Pitch		 82 C	Eurostyle	9.4 / 2.54 10.3 / 2.54	9 to 37 way 50 way	80 C	US standard	8.08 / 2.84	9 to 37 way	81 C	Europe standard*	10.4 / 2.54	9 to 37 way
Code	Type	Foot print / Pitch																				
 82 C	Eurostyle	9.4 / 2.54 10.3 / 2.54	9 to 37 way 50 way																			
80 C	US standard	8.08 / 2.84	9 to 37 way																			
81 C	Europe standard*	10.4 / 2.54	9 to 37 way																			
Durability:																						
4 : Standard class (≥ 200 mating / unmating)																						
6 : High performance class (≥ 500 mating / unmating)																						
Mounting options (see page 71)																						
Options:																						
PA : Standard hole																						
PL : Threaded insert M3																						
 PX : Threaded insert UNC 4-40																						
 PV : Female screw UNC 4-40																						
GL : Harpoons + insert M3																						
GX : Harpoons + insert UNC 4-40																						
GV : Harpoons + Female screw UNC 4-40																						
Other options:																						
00 : Standard, non RoHS compatible																						
 OOLF : Standard, RoHS compatible																						

SPECIFIC DIMENSIONS



	A±0.38	B±0.12	C±0.10	G <sup>+0.25</sup> <sub>-0</sub>	
9	P	30.81	24.99	18.00	5.90 <sup>+0.15</sup>
	S	30.81	24.99	18.00	6.05
15	P	39.14	33.32	26.32	5.90 <sup>+0.15</sup>
	S	39.14	33.32	26.32	6.05
25	P	53.03	47.04	40.04	5.70
	S	53.03	47.04	40.04	6.05
37	P	69.32	63.50	55.50	5.70
	S	69.32	63.50	55.50	6.05
50*	P	67.10	61.11	54.10	5.70
	S	67.10	61.11	54.10	6.05

\* Only for Eurostyle version.

PRESS-FIT FEATURES

Application by pressure on insulator • D-Sub insertion kit : 8646 3064 01  
Eye of the needle design.

Metallized hole dimensions

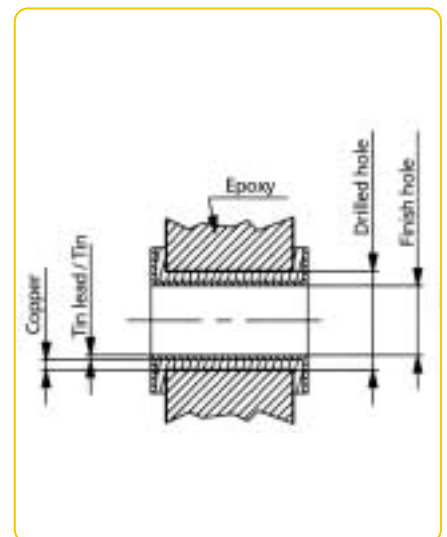
		Press-fit contacts	Press-fit harpoons
P.C.B. hole definition (note 1 and 2)	non RoHS	Drill diameter	Ø 1.15 ref (note 3)
		Drilled hole	Ø 1.18 - 1.2
		Copper plating	25 µm min (recommended 50 µ max)
	RoHS	Tin-lead plating	15 µm max (recommended 5 µ min)
		Finish hole (after reflow)	Ø 0.94 - 1.09
		Tin plating	0.8 to 1.2 µm
	Finish hole (after reflow)	Ø 1.00 - 1.09	

Note 1 : These dimensions must be respected to ensure press-fit pin performance  
Note 2 : According to IEC-352-S specification

Note 3 : Vital requirement for press-fit pin performance

Press-fit performance

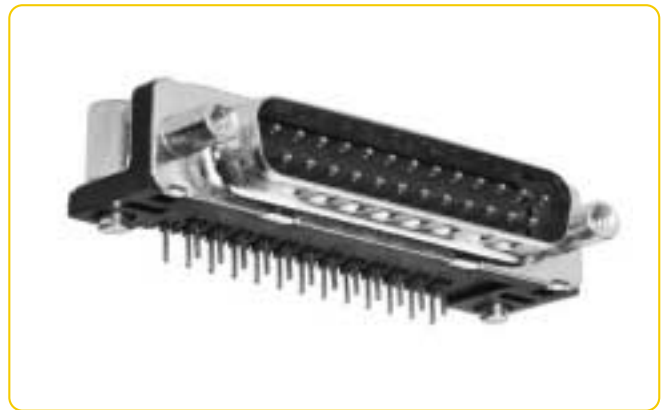
	Press-fit contacts	Press-fit harpoons
Insertion force	≤ 100 N	≤ 120 N
Extraction force	≥ 30 N	≥ 30 N





PCB applications

In compliance with DIN 41652:

- Reflow type: JSTD-020C
- Packaging: IEA-481-B
- Plating: BELLCORE CO GR-1217

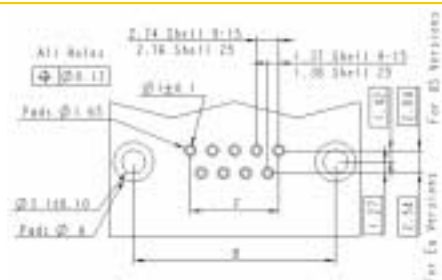


## PART NUMBER

<b>D</b>	<b>09</b>	<b>P</b>	<b>13A</b>	<b>6</b>	<b>RV</b>	<b>12</b>	<b>LF</b>
<b>Series:</b> D	<b>Number of contacts:</b> 09 - 15 - 25	<b>Contacts:</b> P : Pin S : Socket		<b>Durability:</b> 6 : High performance class (> 500 mating/unmating)			
<b>Termination:</b>							
<b>Code</b>	<b>Type</b>	<b>Footprint/Pitch</b>	<b>Termination length</b>	<b>PCB thickness</b>			
13A	Right angle - Europe standard	10.4 / 2.54 mm	2.0 mm	1.6 mm			
33E	Right angle - US standard	8.08 / 2.84 mm	2.0 mm	1.6 mm			
<b>Mounting options:</b>							
RL : Insert M3 + metal peg + electrical continuity							
RX : Insert UNC 4-40 + metal peg + electrical continuity							
RV : Female screw UNC 4-40 + metal peg + electrical continuity							
						<b>Packaging:</b> 09 : Tray for manual positioning 12 : Tape and Reel for automatic pick and place	
						<b>RoHS status:</b> LF : RoHS compatible EU directive 2002/95/EC	

## RECOMMENDED LAYOUTS AND PAD DIMENSIONS

Contacts	B <sup>+0.10</sup>	F	G
09	24.99	10.96	8.22
15	33.32	19.18	16.44
25	47.04	33.12	30.36

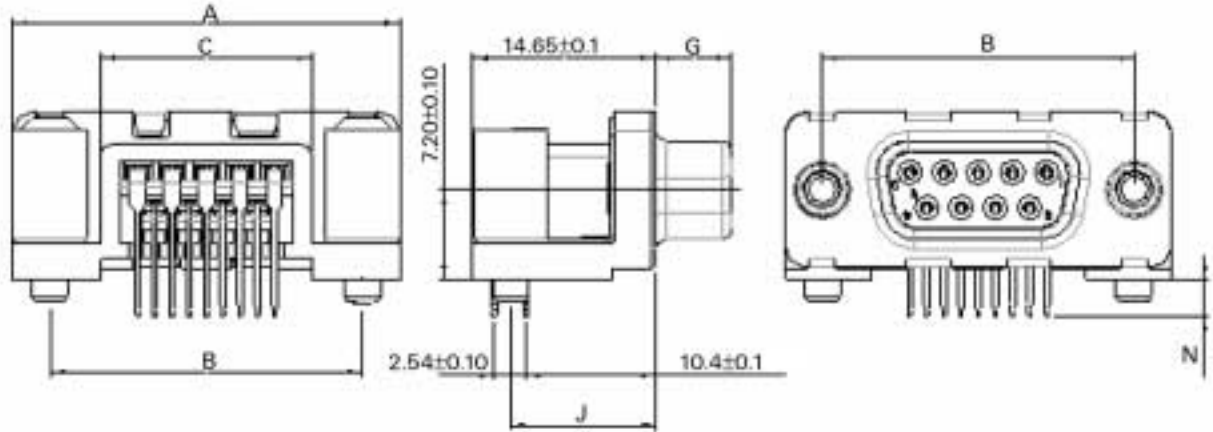


## TECHNICAL FEATURES

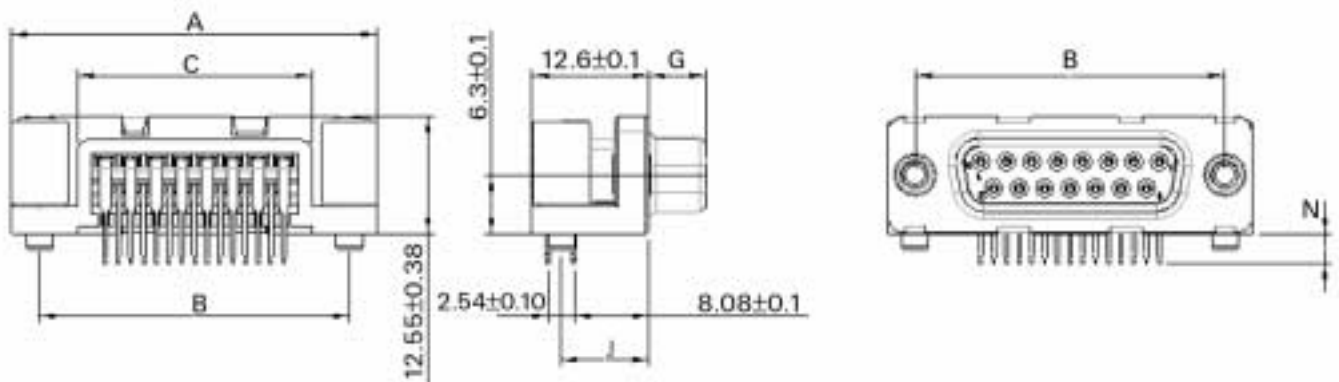
<b>MATERIALS</b>	Shell: Steel, nickel plated Housing: Thermoplastic HT UL94VO Contacts: Copper Alloy - Active part: Gold over nickel - Termination: Matt Tin over nickel Accessories: Brass - Front accessories: Nickel - Metal pegs: Tin over nickel
<b>OPERATING TEMPERATURE RANGE</b>	-55° to 125°C
<b>REFERENCE INFORMATION</b>	Product lead free in accordance to RoHS 2002/EC/95
<b>MECHANICAL PERFORMANCES</b>	Mating/unmating cycles: 500 min
<b>ELECTRICAL PERFORMANCES</b>	Current rating: 5 A Insulation resistance: ≥ 5000 MΩ Contact resistance: <10 mΩ Dielectric withstanding voltage: 1000 Vrms

PCB applications

EUROPE standard



US standard



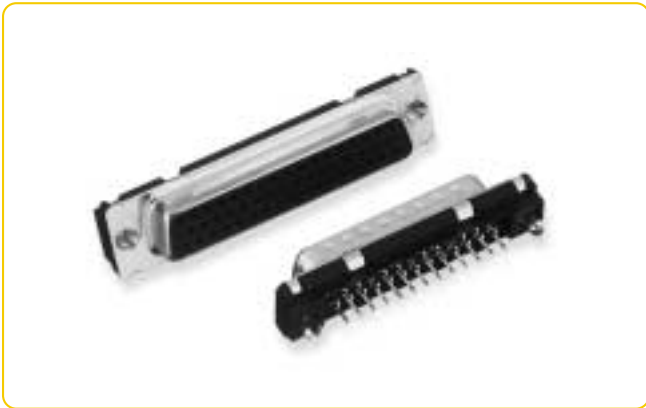
Dimensions

		A <sub>±0,38</sub>	B <sub>±0,12</sub>	C <sub>±0,10</sub>	G <sub>0/+0,25</sub>	J <sub>±0,10</sub>		N <sub>±0,30</sub>	
						Termination 13	Termination 33	Termination length	
								I3A 33E	I3B
9	P	30.81	24.99	16.96	5.90 <sup>-0/+0.15</sup>	11.67	9.50	2.00	2.90
	S	30.81	24.99	16.96	6.05	11.67	9.50	2.00	2.90
15	P	39.14	33.32	25.18	5.90 <sup>-0/+0.15</sup>	11.67	9.50	2.00	2.90
	S	39.14	33.32	25.18	6.05	11.67	9.50	2.00	2.90
25	P	53.03	47.04	39.12	5.70	11.67	9.50	2.00	2.90
	S	53.03	47.04	39.12	6.05	11.67	9.50	2.00	2.90

Dimensions in mm

PCB applications

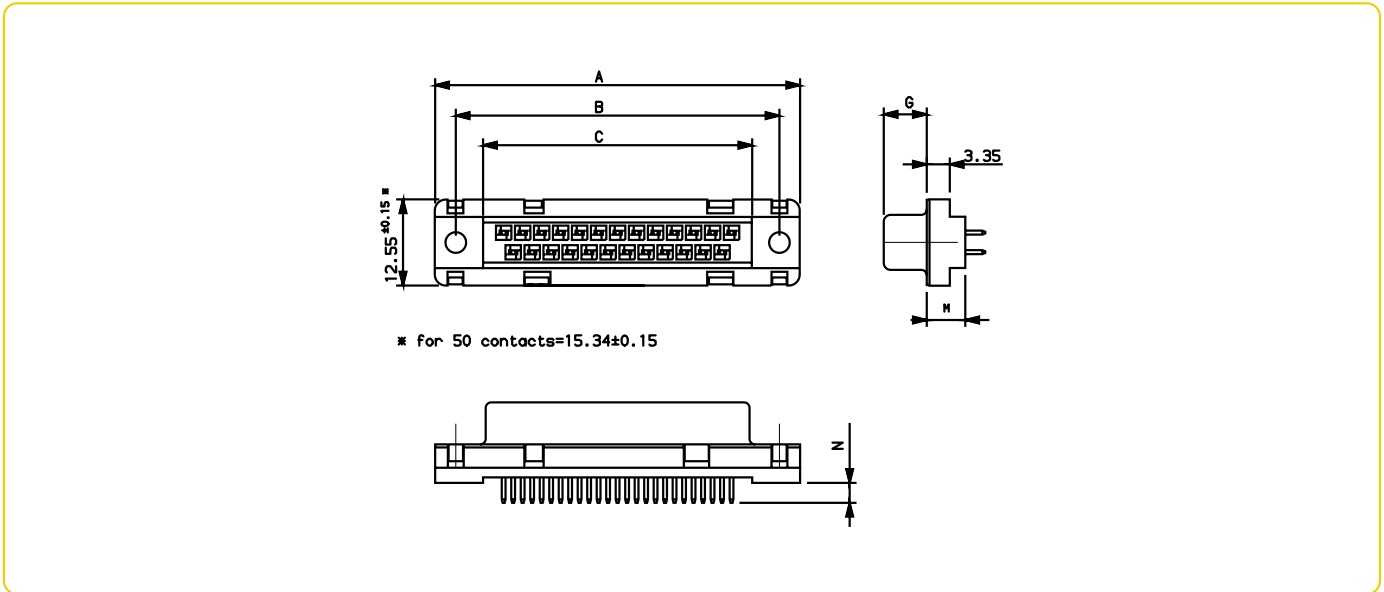
 UL Recognized File E 118235 (R)



## ORDERING INFORMATION

<b>D</b>	<b>25</b>	<b>P</b>	<b>24A</b>	<b>4</b>	<b>GV</b>	<b>00LF</b>
Series: <b>D</b>	Number of contacts: 09 - 15 - 25 - 37 - 50	Contacts: <b>P</b> : Pin <b>S</b> : Socket				
<b>Termination:</b>						
<b>Code</b>	<b>Type</b>	<b>Foot print/Pitch</b>	<b>Length of termination</b>	<b>PCB thickness</b>		
14 A	Straight version (low profile)	5.6 / 2.84 mm	2.90	1.6		
 24 A	<b>Straight version</b>	<b>6 / 2.84 mm</b>	<b>2.90</b>	<b>1.6</b>		
24 B	Straight version	6 / 2.84 mm	3.70	2.4		
34 A	Straight version	6.9 / 2.84 mm	2.90	1.6		
<b>Durability:</b>						
4 : Standard class (≥ 200 mating / unmating)						
6 : High performance class (≥ 500 mating / unmating) - LNZ 4404						
<b>Mounting options</b> (see page 71)						
<b>Options:</b>						
<b>PA</b> Standard hole						
<b>PL</b> Threaded insert M3						
<b>PX</b> Threaded insert UNC 4-40						
<b>PV</b> Female screw UNC 4-40						
<b>GL</b> Harpoons + insert M3 + elec. continuity						
<b>GX</b> Harpoons + insert UNC 4-40 + elec. continuity						
	<b>GV</b> Harpoons + Female screw UNC 4-40 + elec. continuity					
<b>Other options:</b>						
<b>00LF</b> : Standard series, RoHS compatible						

SPECIFIC DIMENSIONS



		A±0.38	B±0.12	C±0.10	G±0.25 -0	M±0.10			N±0.30	
						Terminal			Terminal length	
						14	24	34	14 A 24 A 34 A	24 B
9	P	30.81	24.99	16.96	5.90 <sup>+0.15</sup> <sub>-0</sub>	5.60	6.00	6.90	2.90	3.70
	S	30.81	24.99	16.96	6.05	5.60	6.00	6.90	2.90	3.70
15	P	39.14	33.32	25.18	5.90 <sup>+0.15</sup> <sub>-0</sub>	5.60	6.00	6.90	2.90	3.70
	S	39.14	33.32	25.18	6.05	5.60	6.00	6.90	2.90	3.70
25	P	53.03	47.04	39.12	5.70	5.60	6.00	6.90	2.90	3.70
	S	53.03	47.04	39.12	6.05	5.60	6.00	6.90	2.90	3.70
37	P	69.32	63.50	55.68	5.70	5.60	6.00	6.90	2.90	3.70
	S	69.32	63.50	55.68	6.05	5.60	6.00	6.90	2.90	3.70
50	P	67.10	61.11	54.11	5.70	5.60	6.00	6.90	2.90	3.70
	S	67.10	61.11	54.11	6.05	5.60	6.00	6.90	2.90	3.70

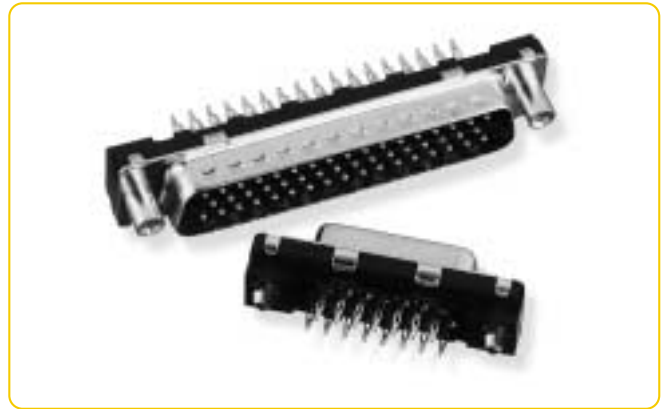
*PCB applications*

## PRESS-FIT TERMINATION

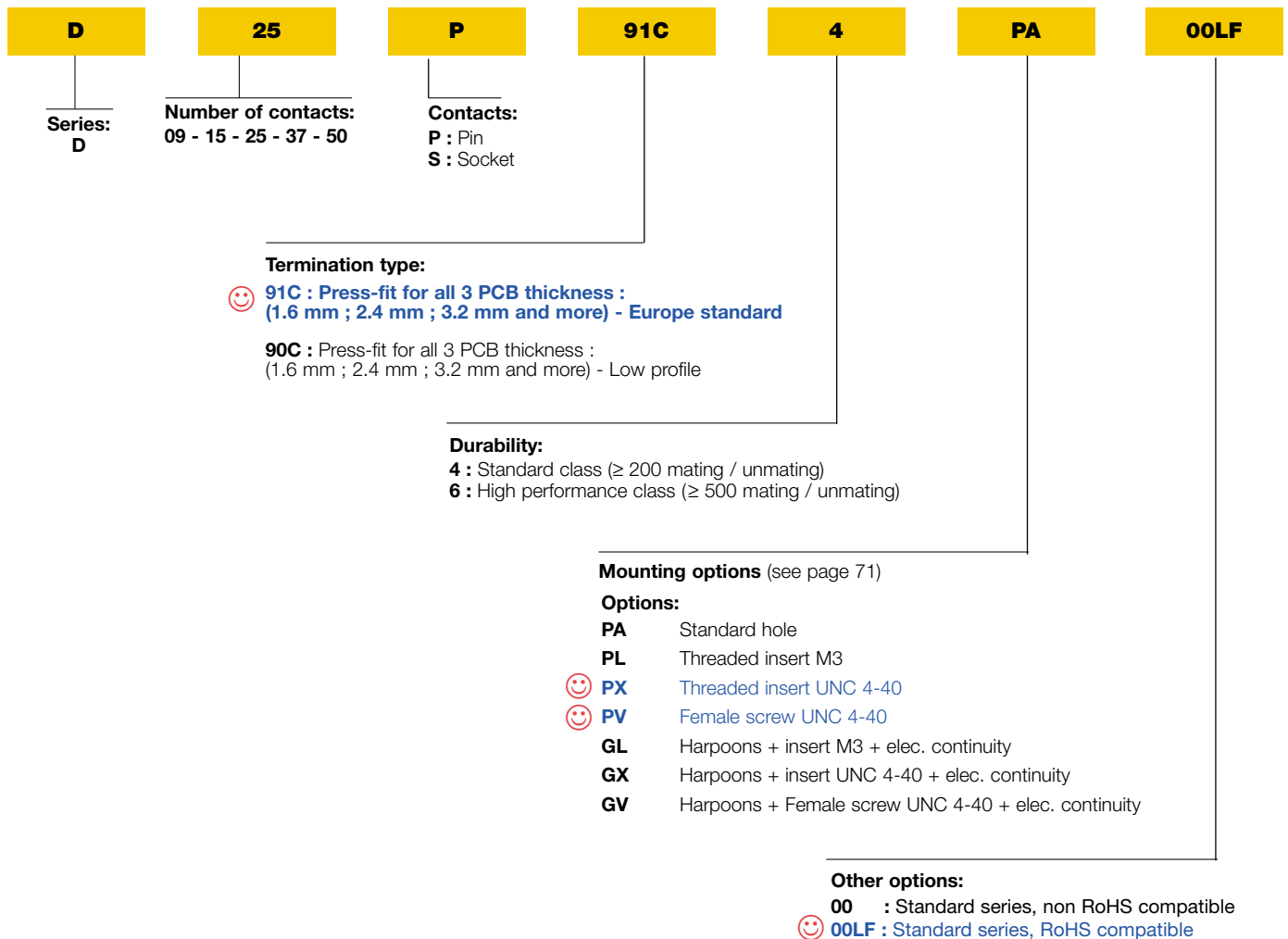


UL Recognized File E 118235 (R)

- In case of SMT (Surface Mount Technology) manufacturing process this new press-fit Delta D allows to save cost of an additional wave soldering.
- The "eye of the needle" termination combined with a special flat rock design (easy application by pressure on insulator) make this product line very attractive.

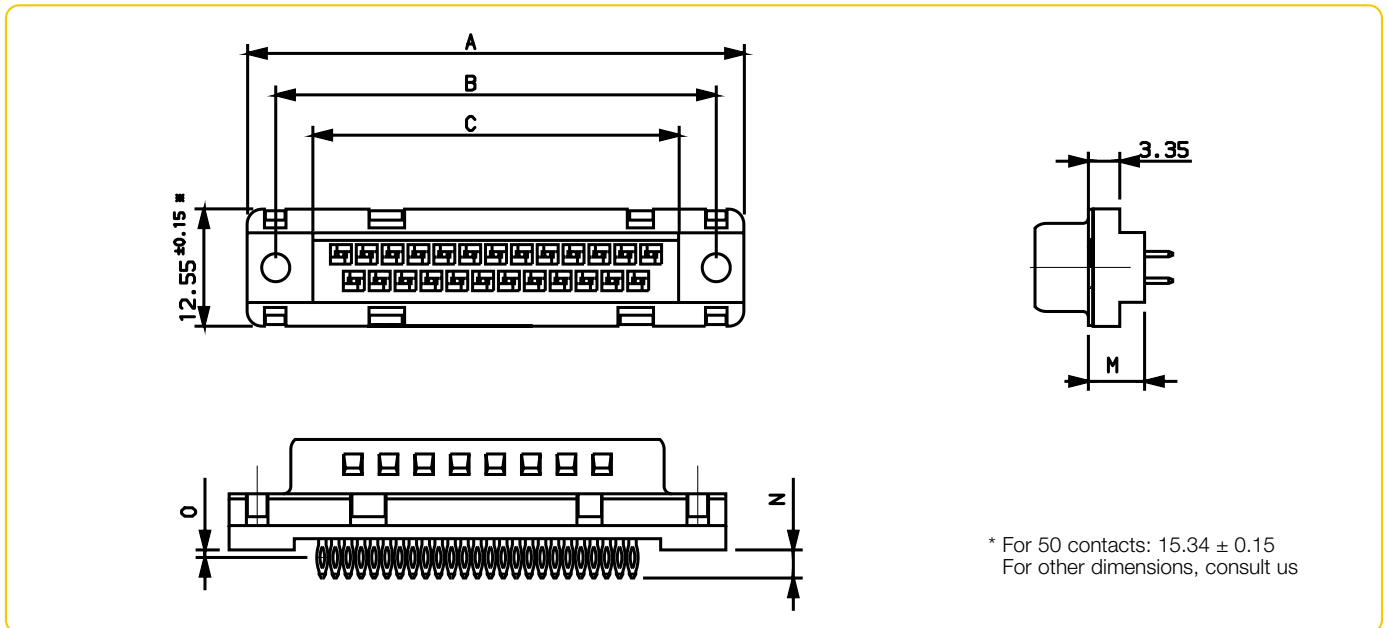


## ORDERING INFORMATION





SPECIFIC DIMENSIONS



\* For 50 contacts: 15.34 ± 0.15  
For other dimensions, consult us

Size	A±0.38	B± 0.12	C± 0.10
09	30.81	24.99	16.96
15	39.14	33.32	25.18
25	53.03	47.04	39.12
37	69.32	63.50	55.68
50	66.93	61.11	53.11

Termination type	M±0.1	N±0.3	O±0.2
90 C	5.60	3.40	1.20
91 C	6.00	3.00	0.80

PRESS-FIT FEATURES

Application by pressure on insulator  
D-Sub insertion kit : 8646 3064 01  
Eye of the needle design.

Metallized hole dimensions

P.C.B. hole definition (note 1 and 2)		Press-fit contacts	Press-fit harpoons
		Drill diameter	Ø 1.15 ref (note 3)
non RoHS	Drilled hole	Ø 1.18 - 1.2	Ø 3.19 - 3.25
	Copper plating	25 µm min (recommended 50 µ max)	25 µm min (recommended 50 µ max)
	Tin-lead plating	15 µm max (recommended 5 µ min)	15 µm max (recommended 5 µ min)
	Finish hole (after reflow)	Ø 0.94 - 1.09	Ø 3.02 - 3.20
RoHS	Tin plating	0.8 to 1.2 µm	0.8 to 1.2 µm
	Finish hole (after reflow)	Ø 1.00 - 1.09	Ø 3.08 - 3.20

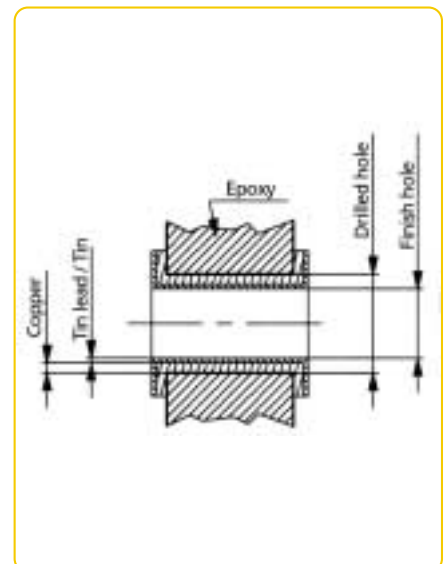
Note 1 : These dimensions must be respected to ensure press-fit pin performance

Note 2 : According to IEC-352-S specification

Note 3 : Vital requirement for press-fit pin performance

Press-fit performance

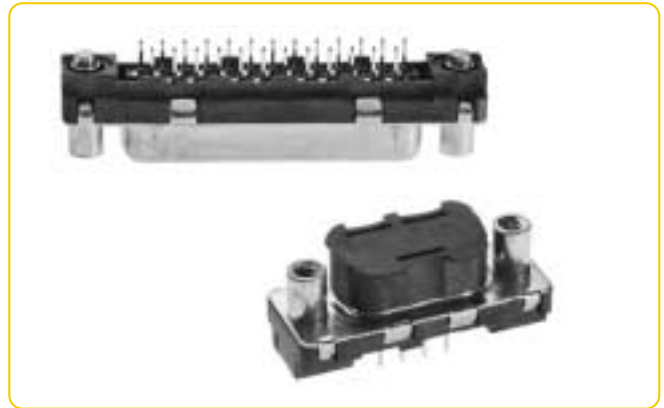
	Press-fit contacts	Press-fit harpoons
Insertion force	≤ 100 N	≤ 120 N
Extraction force	≥ 30 N	≥ 30 N



PCB applications

## In compliance with DIN 41652:

- Reflow type: JSTD-020C
- Packaging: IEA-481-B
- Plating: BELLCORE CO GR-1217

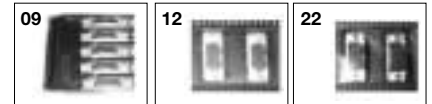


## ORDERING INFORMATION

D	09	P	24A	6	RV	12	LF
<b>Series:</b> D	<b>Number of contacts:</b> 09 - 15 - 25 - 37 - 50	<b>Contacts:</b> P : Pin S : Socket		<b>Durability:</b> 6 : High performance class (> 500 mating/unmating)			
	<b>Termination:</b>						
	<b>Code</b>	<b>Type</b>	<b>Footprint/Pitch</b>	<b>Termination length</b>	<b>PCB thickness</b>		
	24A	Straight version	6.0 / 2.84 mm	2.0 mm	1.6 mm		
	24B	Straight version	6.0 / 2.84 mm	2.9 mm	2.4 mm		
	<b>Mounting options:</b>						
	RL : Insert M3 + metal peg + electrical continuity						
	RX : Insert UNC 4-40 + metal peg + electrical continuity						
	RV : Female screw UNC 4-40 + metal peg + electrical continuity						
							<b>RoHS status:</b> LF : RoHS compatible EU directive 2002/95/EC

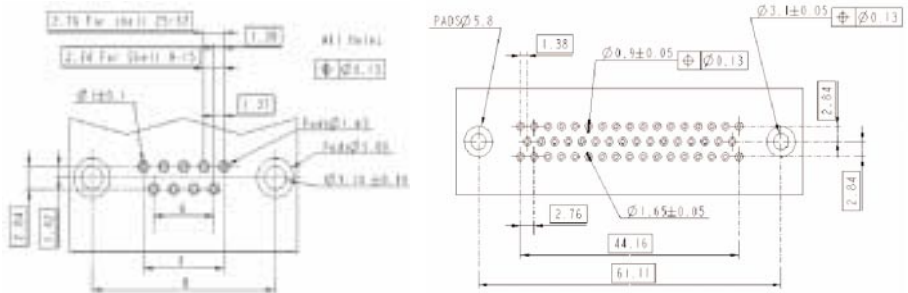
### Packaging:

- 09 : Tray for manual positioning
- 12 : Tape and Reel for automatic pick and place and gripper device (not available in 37 and 50 ways)
- 22 : Tape and Reel and pick-up cap for vacuum nozzle device (not available in 37 and 50 ways)



## RECOMMENDED LAYOUTS AND PAD DIMENSIONS

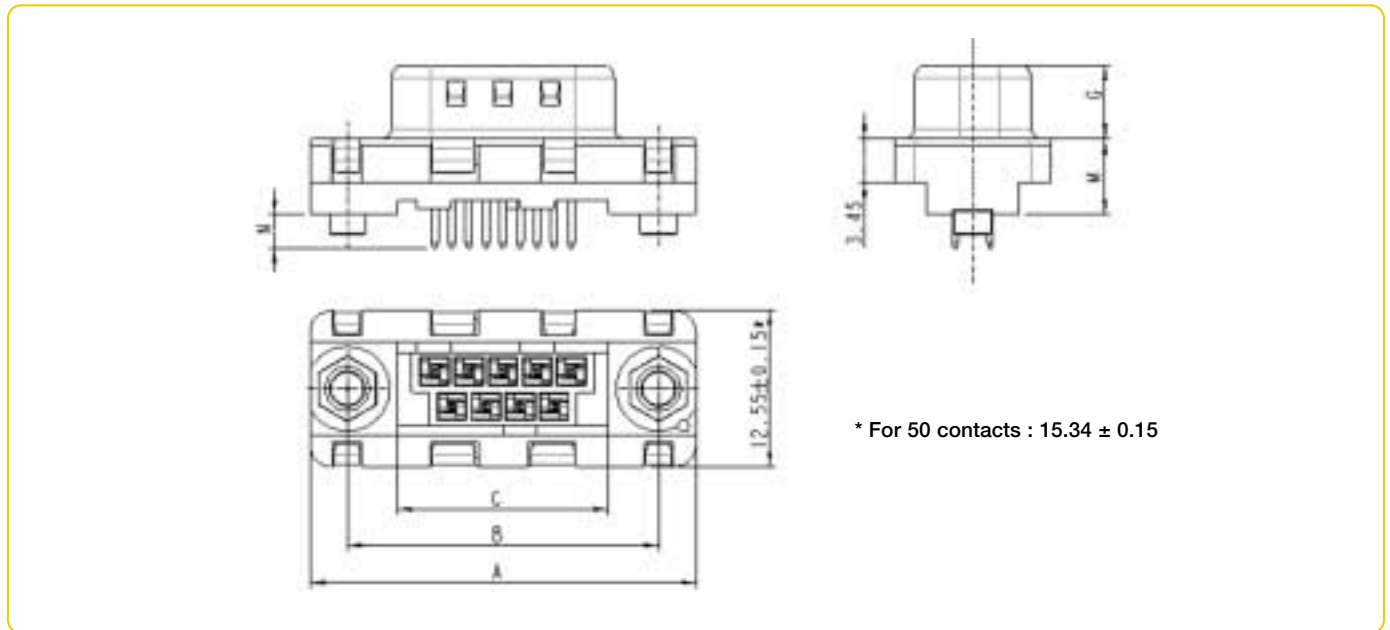
Contacts	B <sup>±0.10</sup>	F	G
09	24.99	10.96	8.22
15	33.32	19.18	16.44
25	47.04	33.12	30.36
37	63.50	49.68	46.92



## TECHNICAL FEATURES

<b>MATERIALS</b>	Shell: Steel, nickel plated Housing: Thermoplastic HT UL94VO Contacts: Copper Alloy - Active part: Gold over nickel - Termination: Matt Tin over nickel Accessories: Brass, bright tin over nickel
<b>OPERATING TEMPERATURE RANGE</b>	-55° to 125°C
<b>REFERENCE INFORMATION</b>	Product lead free in accordance to RoHS 2002/EC/95
<b>MECHANICAL PERFORMANCES</b>	Mating/unmating cycles: 500 min
<b>ELECTRICAL PERFORMANCES</b>	Current rating: 5 A Insulation resistance: ≥ 5000 MΩ Contact resistance: <10 mΩ Dielectric withstanding voltage: 1000 Vrms

SPECIFIC DIMENSIONS



\* For 50 contacts : 15.34 ± 0.15

Dimensions

		A <sup>+0,38</sup>	B <sup>+0,12</sup>	C <sup>+0,10</sup>	G <sup>+0/+0,25</sup>	M <sup>+0,10</sup>	N <sup>+0,30</sup>	
							Termination length	
							24A	24B
9	P	30.81	24.99	16.96	5.90 <sup>-0/+0,15</sup>	6.00	2.00	2.90
	S	30.81	24.99	16.96	6.05	6.00	2.00	2.90
15	P	39.14	33.32	25.18	5.90 <sup>-0/+0,15</sup>	6.00	2.00	2.90
	S	39.14	33.32	25.18	6.05	6.00	2.00	2.90
25	P	53.03	47.04	39.12	5.70	6.00	2.00	2.90
	S	53.03	47.04	39.12	6.05	6.00	2.00	2.90
37	P	69.32	63.50	55.68	5.70	6.00	2.00	2.90
	S	69.32	63.50	55.68	6.05	6.00	2.00	2.90
50	P	67.10	61.11	54.11	5.70	6.00	2.00	2.90
	S	67.10	61.11	54.11	6.05	6.00	2.00	2.90

Dimensions in mm

*PCB applications*

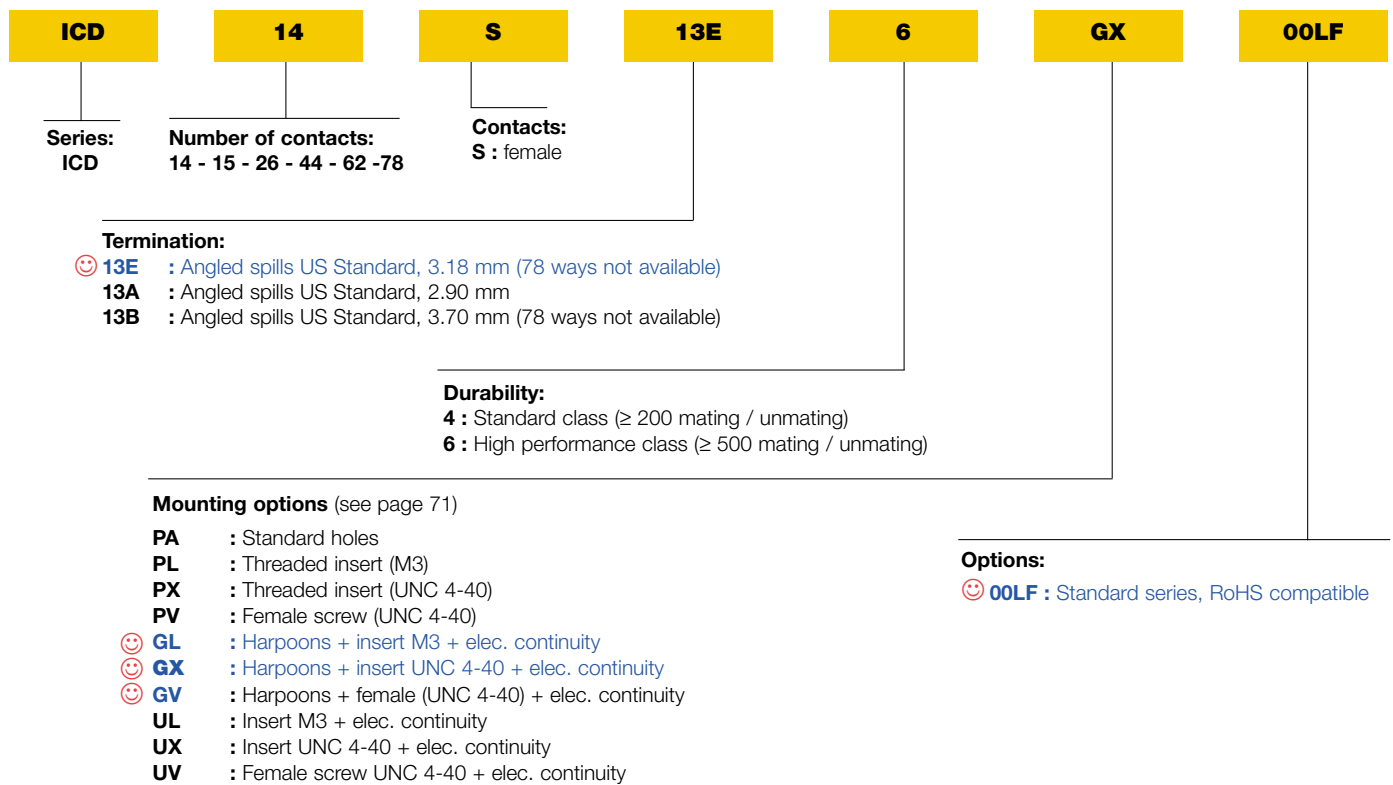


## UL Recognized File E 118235 (R)

COMPACT D series has been developed to answer the increasing need for higher density packaging.

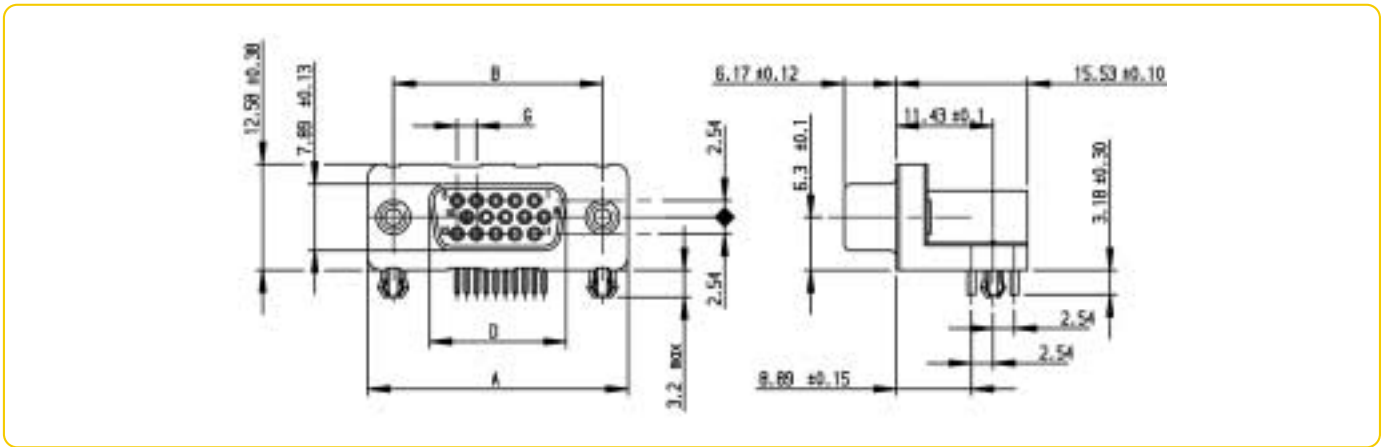


## ORDERING INFORMATION



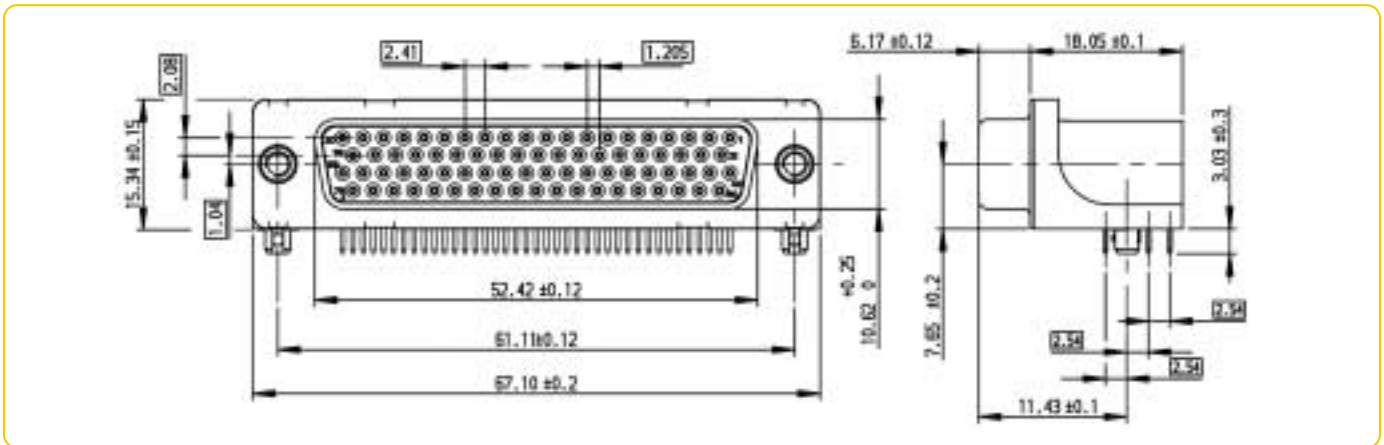
PCB applications

COMPACT D 3 ROWS (14-15/26/44/62 POS)

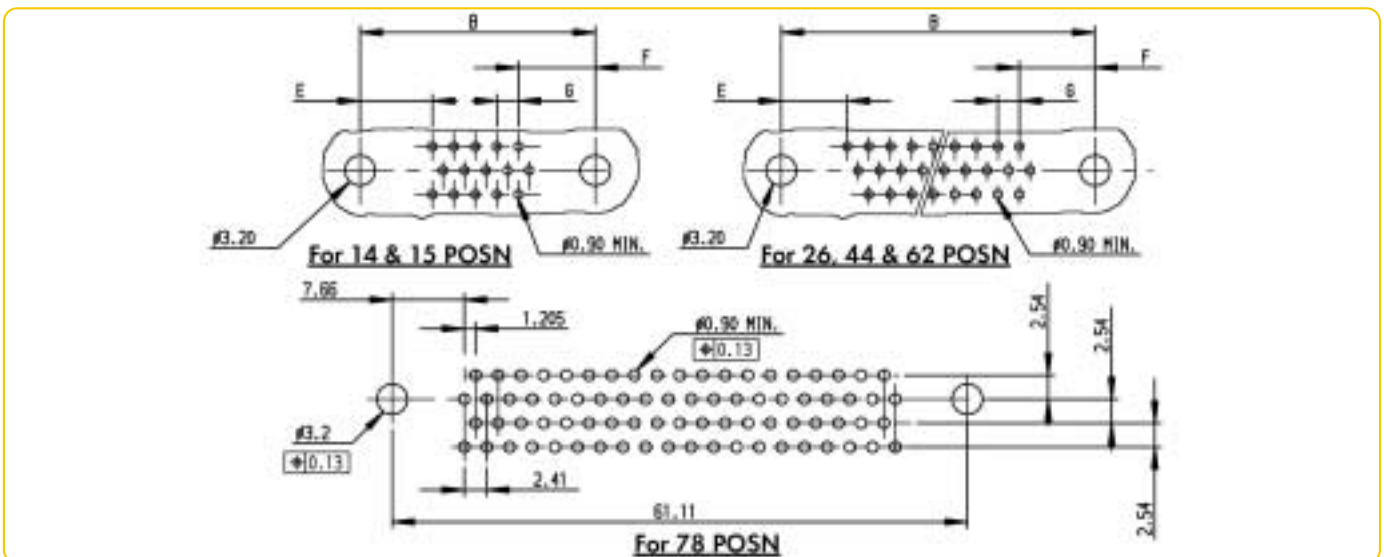


Size	Dimensions						
	A + 0.38	B + 0.12	C + 0.10	D + 0.25	E	F	G
14 / 15	30,81	24,99	16,96	16,21	7,68	8,19	2,285
26	39,14	33,32	25,18	24,54	7,02	8,01	2,285
44	53,03	47,04	39,12	38,25	7,01	8,02	2,285
62	69,32	63,50	55,68	54,71	7,03	8,21	2,41

COMPACT D 4 ROWS (78 POS)



PCB DRILLING DIMENSIONS

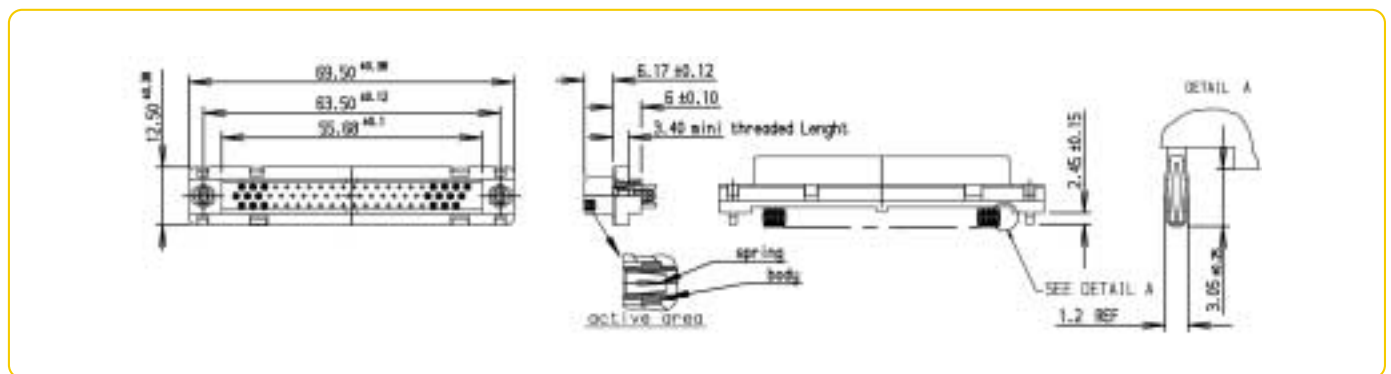




PCB applications

## ORDERING INFORMATION

<b>CD62S91C</b>	<b>6</b>	<b>GL</b>	<b>00LF</b>
<p><b>Series :</b> 62 way straight female press-fit</p>	<p><b>Durability:</b> 4 : Standard class (&gt; 200 mating/unmating) 6 : High performance class (&gt; 500 mating/unmating)</p>	<p><b>Mounting options:</b> GL : Harpoons + insert M3 + elec. continuity GX : Harpoons + insert UNC 4-40 + elec. continuity GV : Harpoons + female screw UNC 4-40 + elec. continuity</p>	<p><b>Options</b> 00LF : RoHS compatible EU directive 2002/95/EC</p>



## PRESS-FIT FEATURES

Application by pressure on insulator  
Eye of the needle design.

### Metallized hole dimensions

Metallized hole dimension		Hole press-fit contact SnPb	Hole press-fit contact Sn	Hole press-fit harpoon SnPb	Hole press-fit harpoon Sn	Hole press-fit contact Copper OSP	Hole press-fit harpoon Copper OSP
P.C.B. hole definition (note 1 and 2)	Drill diameter	Ø 1,15 ref (note 3)	Ø 1,15 ref (note 3)	Ø 3,22 ref (note 3)	Ø 3,22 ref (note 3)	Ø1,15 ref (note 3)	Ø 3,22 ref (note 3)
	Drilled hole	Ø 1,12 - Ø 1,18	Ø 1,12 - Ø 1,18	Ø 3,19 - Ø 3,25	Ø 3,19 - Ø 3,25	Ø1,12 - Ø1,18	Ø 3,19 - Ø 3,25
	Copper plating	25µm mini - 50µm maxi	25µm mini - 50µm maxi	25µm mini - 50µm maxi	25µm mini - 50µm maxi	25µm mini - 50µm maxi	25µm mini - 50µm maxi
	Tin lead plating	5µm mini - 15µm maxi		5µm mini - 15µm maxi			
	Pur lead plating		0,8 mini to 1,2µm maxi		0,8 mini to 1,2µm maxi		
	OSP plating (copper)					0,20µm mini - 0,5µm maxi	0,20µm mini - 0,5µm maxi
	Finish hole	Ø 0,94-1,09	Ø 1,00-1,09	Ø 3,00-3,20	Ø 3,08-3,20	Ø 1,01-1,09	Ø3,09-3,20

Note 1 : These dimensions must be respected to ensure press-fit pin performance

Note 2 : According to IEC-352-S specification


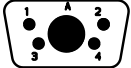
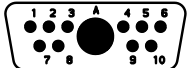
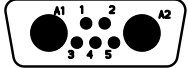
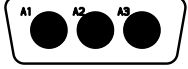

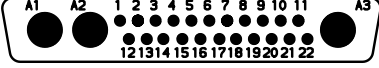
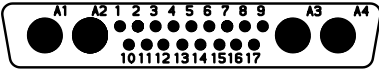
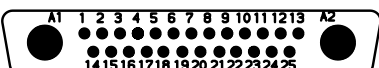

**Note 3 : Vital requirement for press-fit pin performance**

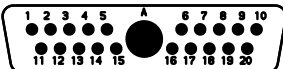
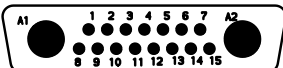
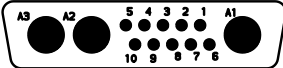
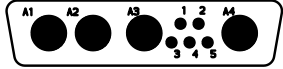

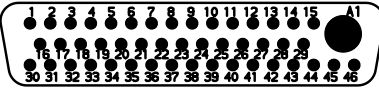
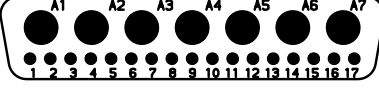

### Press-fit performance

	Press-fit contacts	Press-fit harpoons
Insertion force	< 100N	< 120N
SnPb / Extraction force	> 30N	> 30N
Copper Extraction force	> 20N	> 20N

### LAYOUTS

#### Male insulator front view

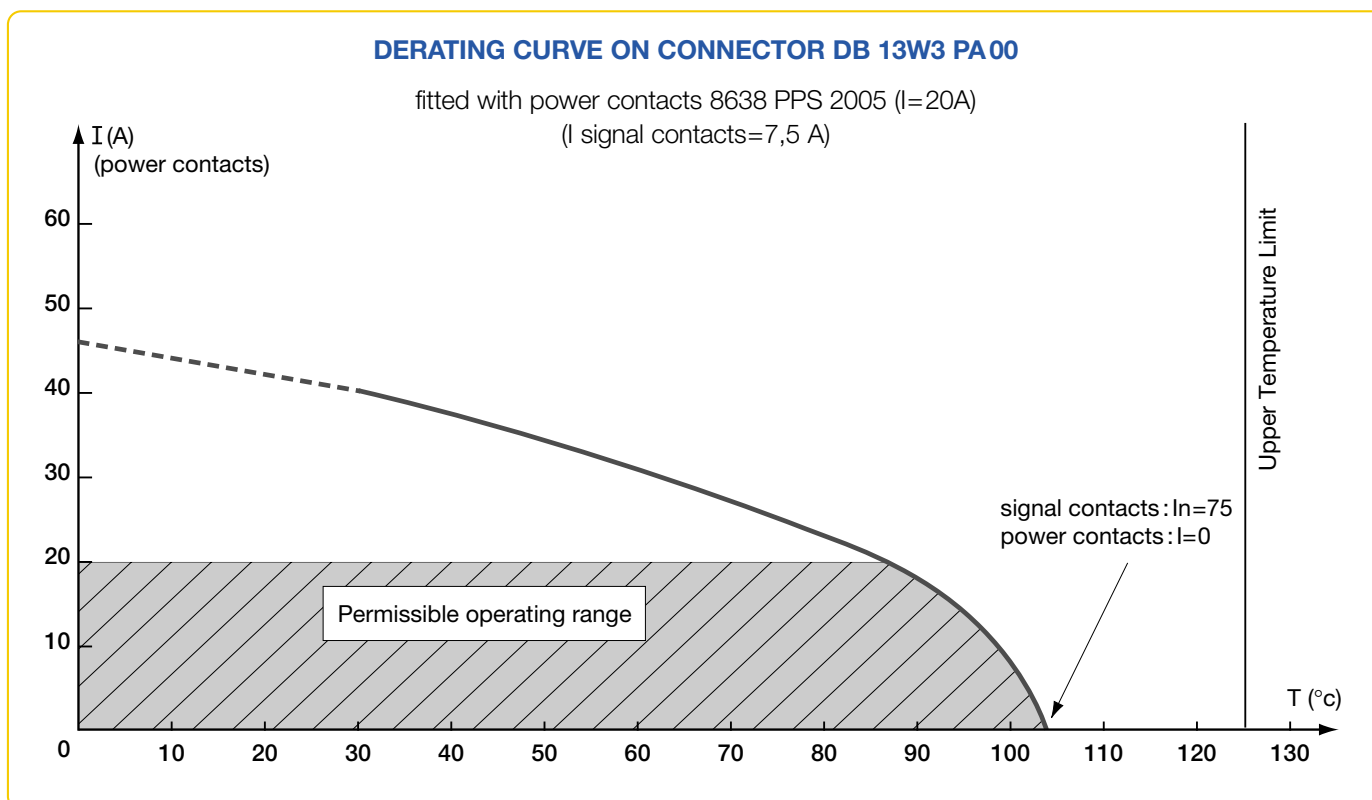
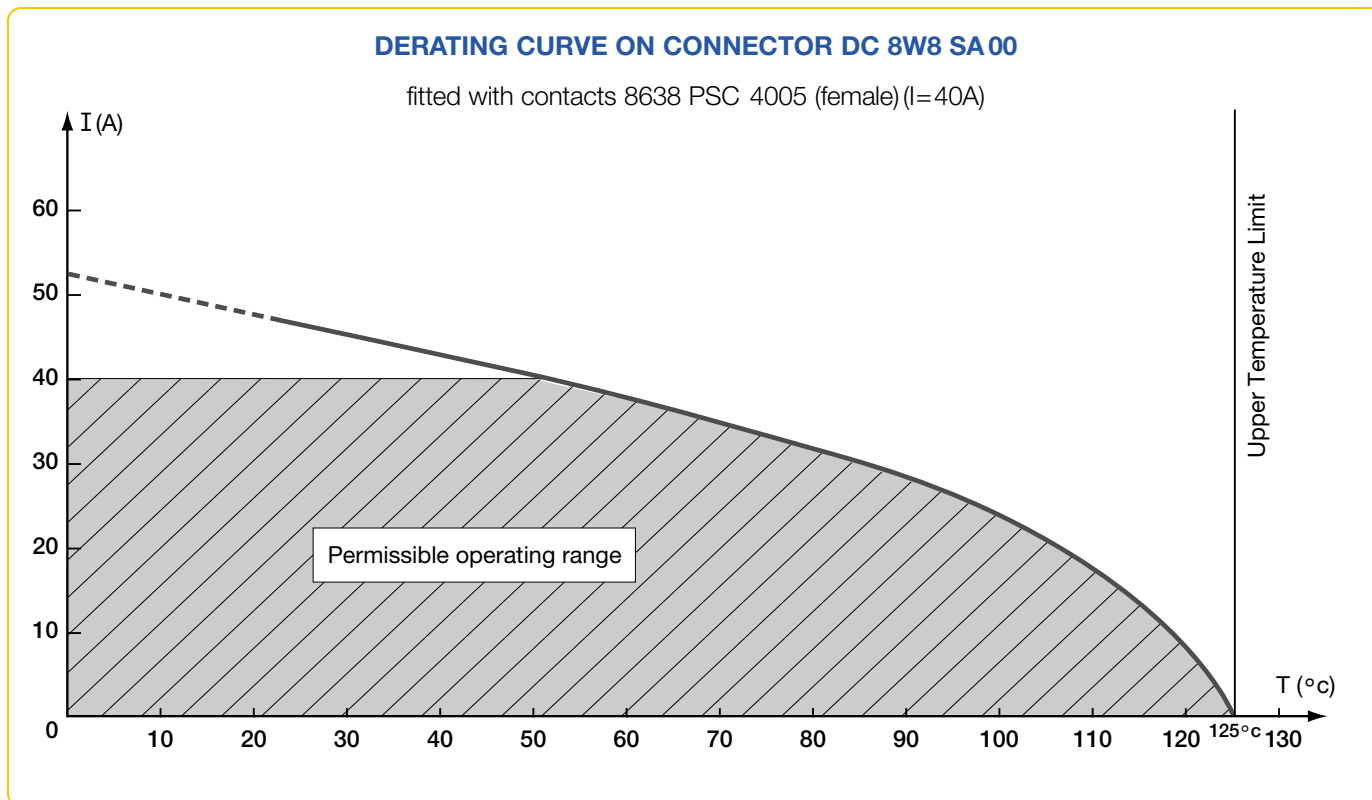
Shell size	Layout
E	2V2 coded 
	5W1 
A	11W1 
	7W2 
	3W3 
	3V3 coded 
	25W3 
C	21WA4 
	27W2 
	8W8 

Shell size	Layout
B	21W1 
	17W2 
	13W3 
	9W4 
	5W5 
D	47W1 
	24W7 
	36W4 

Example of layout codification 7W2 = 7 contacts of which 2 power contacts



## DERATING CURVES



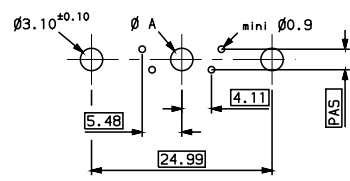
DIMENSIONS

PC board drilling

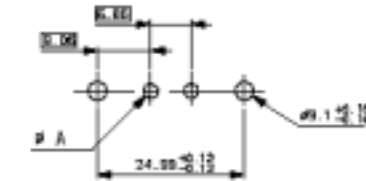
Solder termination

Version	Step	30 A	40 A
		Ø A	
3	2.84	Ø 2.40±0.10	Ø 3.10±0.10
7	2.84	Ø 2.40±0.10	Ø 3.10±0.10
5	2.54	Ø 2.40±0.10	

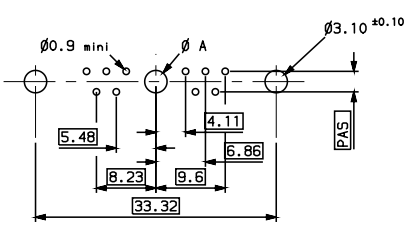
5W1  
(09)



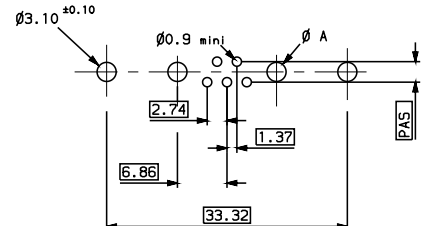
2V2  
(09)



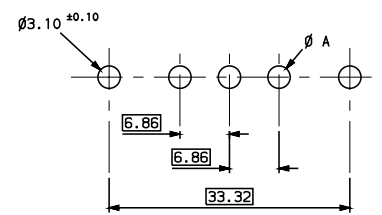
11W1  
(15)



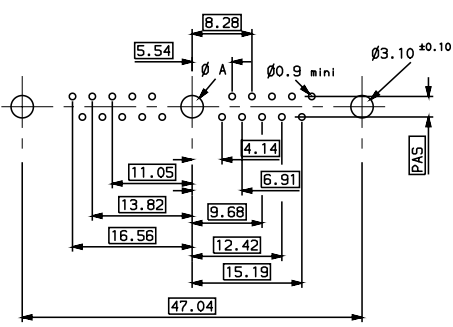
7W2  
(15)



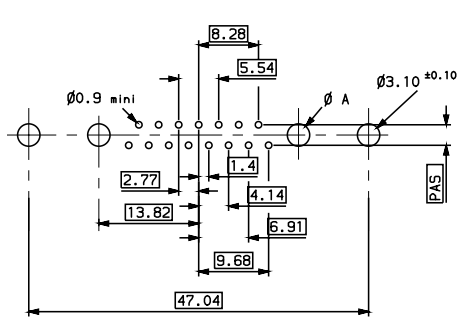
3V3  
3W3  
(15)



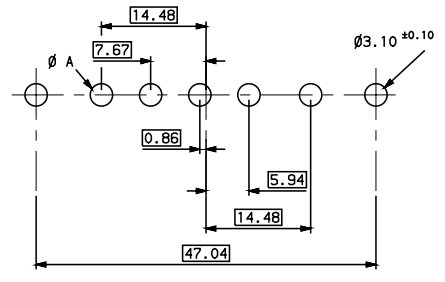
21W1  
(25)



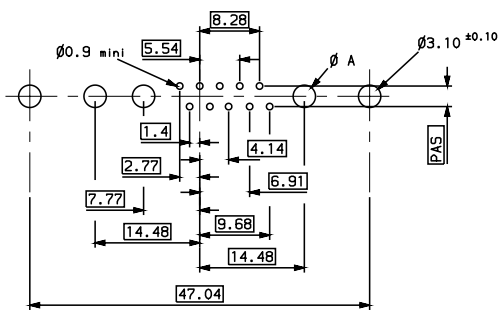
17W2  
(25)



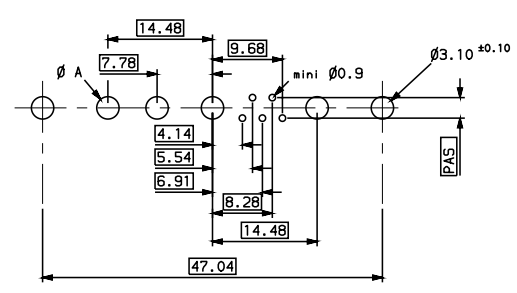
5W5  
(25)



13W3  
(25)

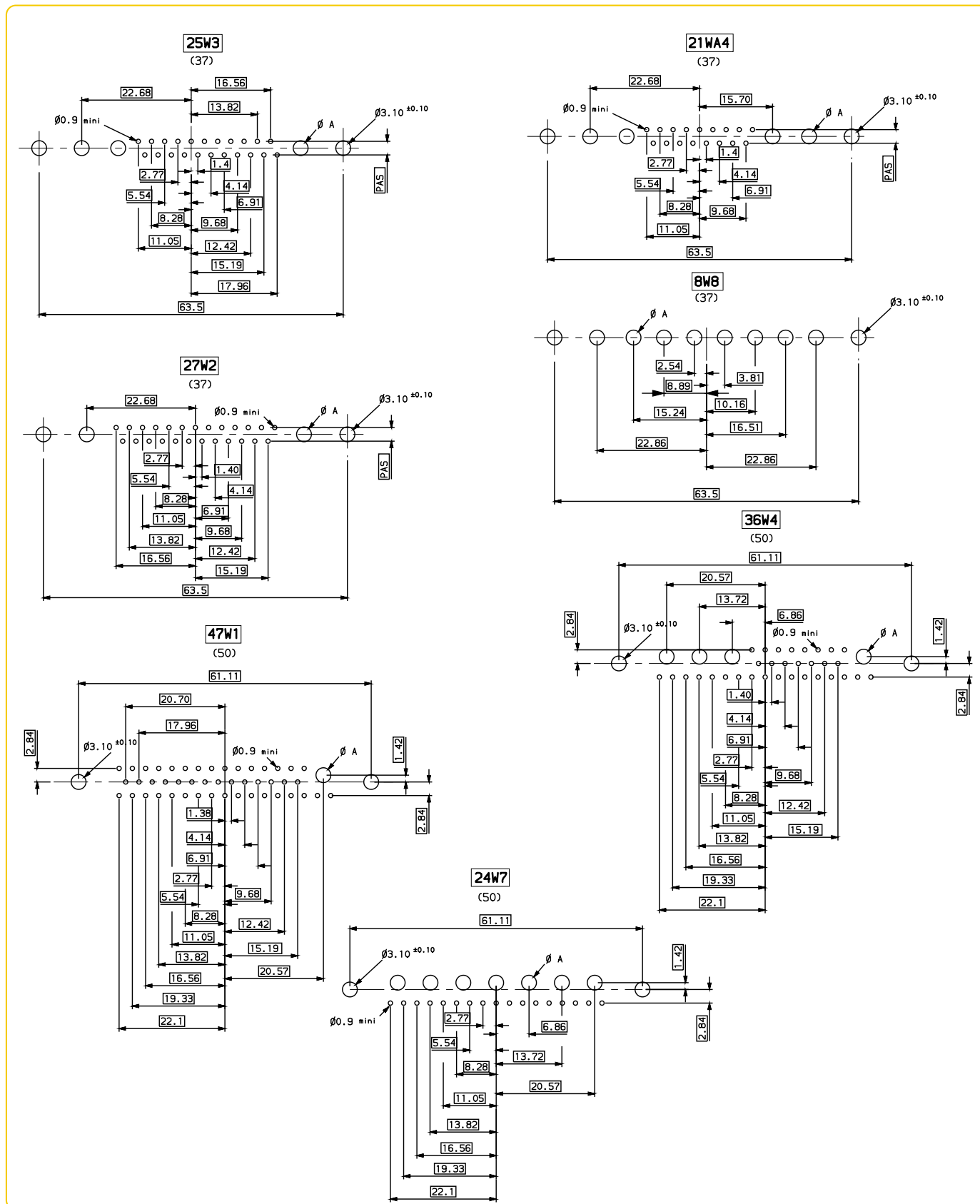


9W4  
(25)



DIMENSIONS

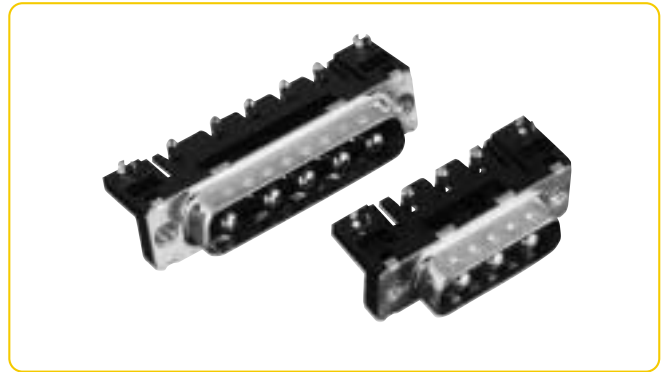
PC board drilling



PCB applications

 UL Recognized File E 118235 (R)

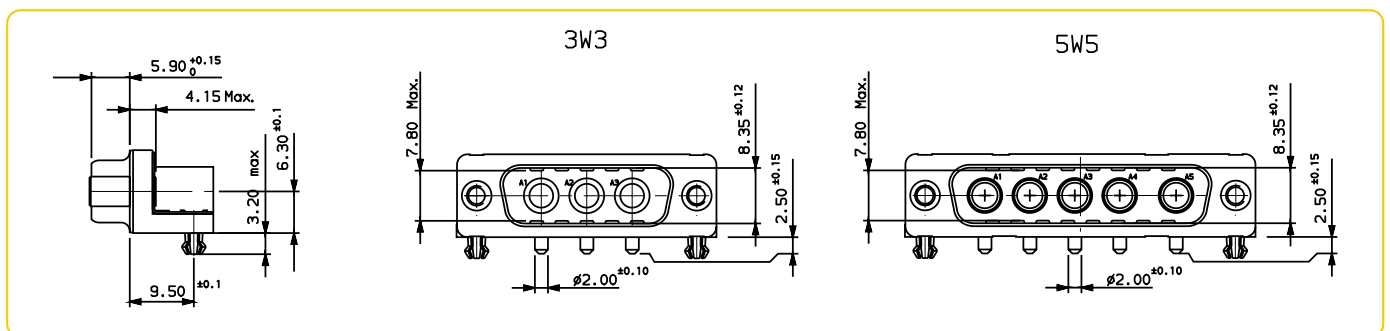
■ This monobloc insulator design with stamped and formed signal contacts combines performance and cost effectiveness.



## ORDERING INFORMATION

<b>D</b>	<b>3 5</b>	<b>W W</b>	<b>3 5</b>	<b>P</b>	<b>36A</b>	<b>6</b>	<b>GX</b>	<b>08LF</b>
Series: D	Layouts			Contacts: P : male				
<b>Code</b> 36 A <b>Type</b> Right angle, US standard, solder <b>Foot print</b> 8.08 mm <b>Length of termination</b> 2.50 <b>PCB thickness</b> 1.6					<b>Durability:</b> <b>6</b> : High performances class (500 ≤ mating / unmating)			
<b>Mounting options</b> (see page 70) <b>Options</b> <b>Description</b> ☺ <b>GL</b> Harpoon + insert M3 + elec. continuity ☺ <b>GX</b> Harpoon + insert UNC 4-40 + elec. continuity ☺ <b>GV</b> Harpoon + Female screw UNC 4-40 + elec. continuity								
<b>Power contacts:</b> <b>08LF</b> : Fitted with power contacts 30 A, RoHS compatible								

## SPECIFIC DIMENSIONS



☺ Preferred option

PCB applications



UL Recognized File E 118235 (R)

STRAIGHT AND RIGHT ANGLE PC BOARD VERSIONS



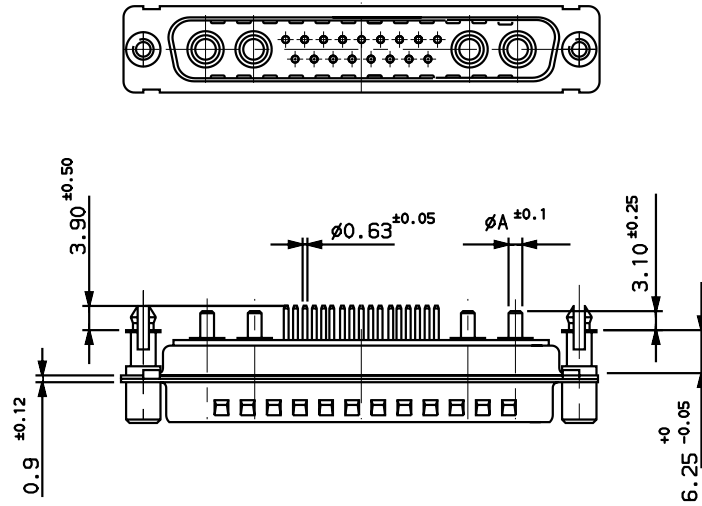
ORDERING INFORMATION

D	B	L	13 W 3	P	3	00	G	30LF																	
<p><b>Series:</b> D</p>	<p><b>Shell size (tin plated):</b> E, A, B, C, D (only straight version)</p>		<p><b>Layout of contacts:</b> (see page 24) (for right angled versions, 47W1, 24W7, 36W4 non available)</p>	<p><b>Contacts:</b> P : Pin S : Socket</p>		<p><b>Durability:</b> 00 : 200 mating / unmating 43 : 500 mating / unmating</p>																			
	<p><b>Options 1</b> (see page 70)</p> <table border="1"> <thead> <tr> <th></th> <th>Blank</th> <th>L</th> <th>O</th> <th>I</th> <th>V</th> </tr> </thead> <tbody> <tr> <td>Straight version</td> <td></td> <td>X</td> <td>X</td> <td>X</td> <td>X</td> </tr> <tr> <td>Right angled</td> <td>X</td> <td>X</td> <td>X</td> <td>X</td> <td>X</td> </tr> </tbody> </table> <p>X : Available</p> <p><b>Blank</b> : without accessory  <b>L</b> : Threaded insert M3  <b>O</b> : Threaded insert UNC 4-40  <b>I</b> : Female screw M3  <b>V</b> : Female screw UNC 4-40</p>		Blank	L	O	I	V	Straight version		X	X	X	X	Right angled	X	X	X	X	X			<p><b>Termination type:</b>  <b>3</b> : Straight version  <b>5</b> : Right angled / Europe standard  <b>7</b> : Right angled / US standard (5W1, 9W4 non available)</p>			
	Blank	L	O	I	V																				
Straight version		X	X	X	X																				
Right angled	X	X	X	X	X																				
				<p><b>Options 2</b> (see page 70) PCB accessories</p> <table border="1"> <thead> <tr> <th></th> <th>A</th> <th>H</th> <th>G</th> <th>M</th> </tr> </thead> <tbody> <tr> <td>Straight version</td> <td>X</td> <td>X</td> <td>X</td> <td></td> </tr> <tr> <td>Right angled</td> <td>X</td> <td>X</td> <td>X</td> <td>X</td> </tr> </tbody> </table> <p>X : Available</p> <p><b>A</b> : without accessory on PCB  <b>H</b> : Locking device used for PCB thickness 2.4 mm  <b>G</b> : Locking device used for PCB thickness 1.6 mm  <b>M</b> : Metal brackets</p>		A	H	G	M	Straight version	X	X	X		Right angled	X	X	X	X						
	A	H	G	M																					
Straight version	X	X	X																						
Right angled	X	X	X	X																					
								<p><b>Power contacts:</b>  <b>30LF</b> : Fitted with power contacts 30 A, RoHS compatible  <b>40LF</b> : Fitted with power contacts 40 A, RoHS compatible  <b>00LF</b> : Without power contacts, RoHS compatible</p>																	

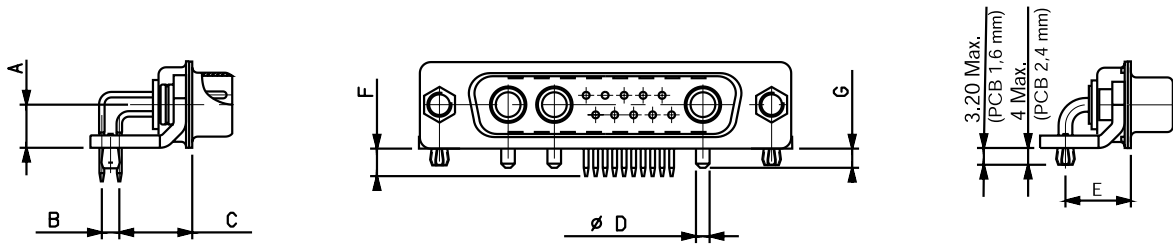
## SPECIFIC DIMENSIONS

### ▀ Straight version

I	30 A	40 A
Ø A	2	2.8



### ▀ Right angle version



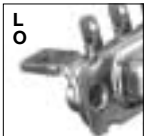
	Termination type	Amp.	A±0.10	B±0.20	C±0.20	D±0.10	E±0.20	F±0.50	G±0.30
Europe	5...	30 A	7.20	2.54	10.30	2.00	11.65	4.00	3.60
		40 A	7.20	2.54	10.30	2.80	11.65	4.00	3.60
U.S	7...	30 A	6.30	2.84	8.08	2.00	9.50	3.90	3.60

PCB applications

 UL Recognized File E 118235 (R)






PART NUMBER


<b>D</b>	<b>E</b>	<b>L</b>	<b>2</b> <b>3</b> <b>3</b> <b>5</b> <b>8</b>	<b>V</b> <b>V</b> <b>W</b> <b>W</b> <b>W</b>	<b>2</b> <b>3</b> <b>3</b> <b>5</b> <b>8</b>	<b>P</b>	<b>93C</b>	<b>5</b>	<b>G</b>	<b>40LF</b>
Series D	Shell size (tin plated) E, A, B, C		Layouts							
<b>Front accessory</b>										
	Blank	L	O	V	<b>Blank</b> : Without accessory <b>L</b> : Threaded insert M3 <b>O</b> : Threaded insert UNC 4-40 <b>V</b> : Female screw UNC 4-40					
Straight version		X	X	X						
Right angled	X	X	X	X						
X : available										
										
						<b>Contacts:</b> <b>P</b> : Pin <b>S</b> : Socket				
						<b>Termination type:</b> <b>93C</b> : Straight version <b>81C</b> : Right angle / European standard <b>80C</b> : Right angle / US standard				
						<b>Durability:</b> <b>5</b> : 200 mating / unmating <b>6</b> : 500 mating / unmating				

PCB accessory

	M	G	A	<b>A</b> : without accessory <b>G</b> : Harpoon used for PCB thickness from 1.6 mm <b>M</b> : Metal brackets without harpoon		
Straight version		X				
Right angled	X		X			

Power contacts

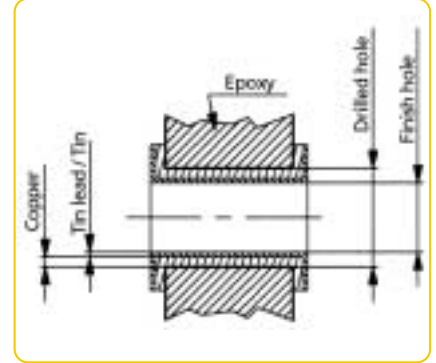
- 40** : Fitted with power contacts 40 A, non RoHS compatible
-  **40LF**: Fitted with power contacts 40 A, RoHS compatible

PCB applications

## SPECIFIC DIMENSIONS

### Metallized hole dimensions

			Press-fit contacts	Press-fit harpoons	
P.C.B. hole definition (note 1 and 2)		Drill diameter	$\text{Ø } 3.22 \pm 0.03$	$\text{Ø } 3.22 \pm 0.03$	$\text{Ø } 3.22 \pm 0.03$
		Drilled hole	$\text{Ø } 3.19 - 3.25$	$\text{Ø } 3.19 - 3.25$	
		Copper plating	25 $\mu\text{m}$ min (recommended 50 $\mu\text{m}$ max)	25 $\mu\text{m}$ min (recommended 50 $\mu\text{m}$ min)	
	non RoHS	Tin lead plating	15 $\mu\text{m}$ max (recommended 5 $\mu\text{m}$ min)	15 $\mu\text{m}$ max (recommended 5 $\mu\text{m}$ min)	
		Finish hole (after reflow)	$\text{Ø } 3.02 - 3.20$	$\text{Ø } 3.02 - 3.20$	
	RoHS	Tin plating	0.8 to 1.2 $\mu\text{m}$	0.8 to 1.2 $\mu\text{m}$	
		Finish hole (after reflow)	$\text{Ø } 3.08 - 3.20$	$\text{Ø } 3.08 - 3.20$	



Note 1 : These dimensions must be respected to ensure press-fit pin performance

Note 2 : According to IEC-352-S specification

**Note 3 : Vital requirement for press-fit pin performance**

### Press-fit performance

	Press-fit contacts	Press-fit harpoons
Insertion force	$\leq 200 \text{ N}$ (average insertion 160N)	$\leq 200 \text{ N}$ (average insertion 160N)
Extraction force	$\geq 30 \text{ N}$	$\geq 30 \text{ N}$



*Cable applications*



UL Recognized File E 118235 (R)

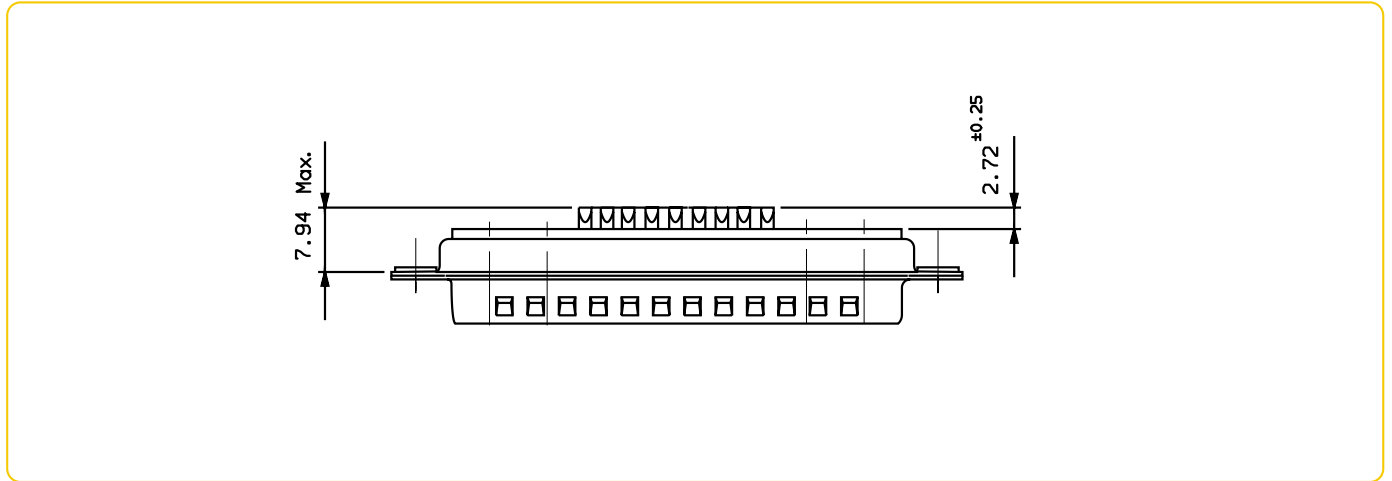


**ORDERING INFORMATION** (power contacts have to be ordered separately — see next page)

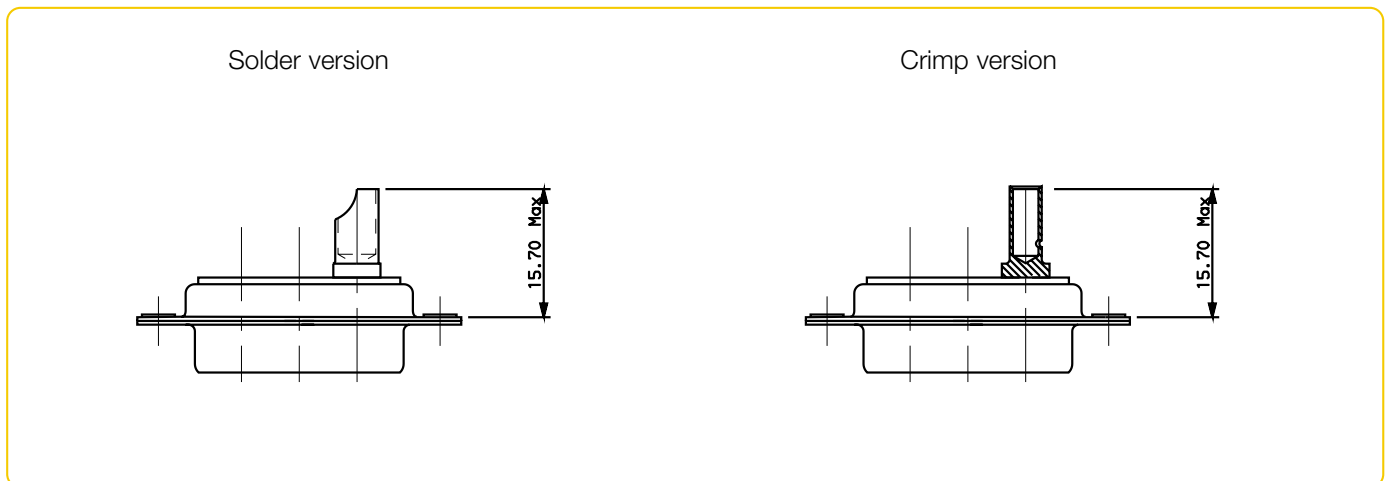
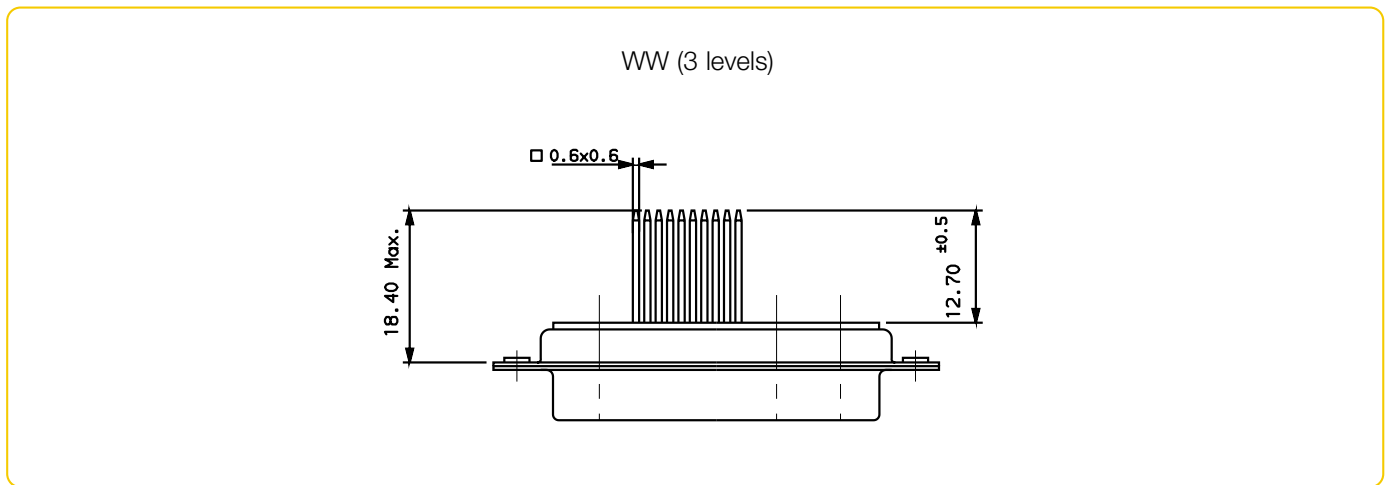
<b>D</b>	<b>B</b>	<b>L</b>	<b>13 W 3</b>	<b>P</b>	<b>4</b>	<b>00</b>	<b>A</b>	<b>00LF</b>																					
Series: <b>D</b>	Shell size (tin plated): <b>E, A, B, C, D</b>		Contacts: <b>P</b> : Pin <b>S</b> : Socket		Durability: <b>00</b> : 200 mating / unmating <b>43</b> : 500 mating / unmating (blank for solder bucket termination)		Termination type: <b>0</b> : Solder bucket (blank for plating 00) <b>4</b> : Wire wrap (3 levels)																						
Mounting Options 1 (see page 70)			Layout of contacts (see page 24)		Options: <b>A</b> : without accessory on PCB		Power contacts: <b>00LF</b> : RoHS compatible																						
<table border="1"> <thead> <tr> <th></th> <th>Blank</th> <th>L</th> <th>O</th> <th>I</th> <th>V</th> <th>F</th> </tr> </thead> <tbody> <tr> <td>Solder buckets</td> <td>X</td> <td>X</td> <td>X</td> <td>X</td> <td>X</td> <td>X</td> </tr> <tr> <td>Wire wrap</td> <td>X</td> <td>X</td> <td>X</td> <td>X</td> <td>X</td> <td>X</td> </tr> </tbody> </table>				Blank	L	O	I	V	F	Solder buckets	X	X	X	X	X	X	Wire wrap	X	X	X	X	X	X						
	Blank	L	O	I	V	F																							
Solder buckets	X	X	X	X	X	X																							
Wire wrap	X	X	X	X	X	X																							
<p>X : Available</p> <p>☺ <b>Blank</b> : without accessory</p> <p>☺ <b>L</b> : Threaded insert M3</p> <p>☺ <b>O</b> : Threaded insert UNC 4-40</p> <p><b>I</b> : Female screw M3</p> <p><b>V</b> : Female screw UNC 4-40</p> <p><b>F</b> : Float mounting</p>																													

### SPECIFIC DIMENSIONS

#### ■ Solder bucket



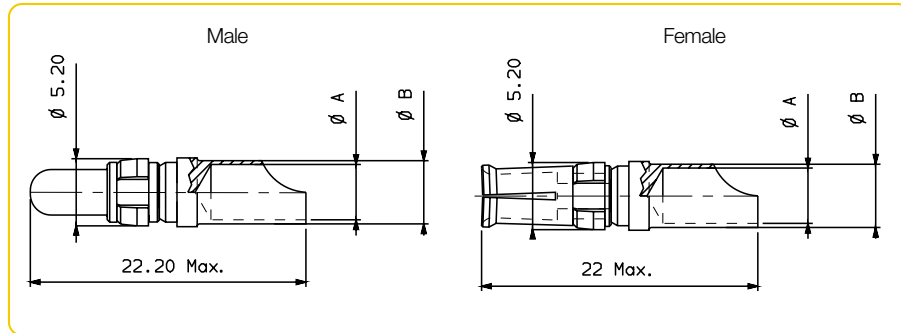
#### ■ Wire wrap



*Cable applications*

## POWER CONTACTS

### Solder contacts

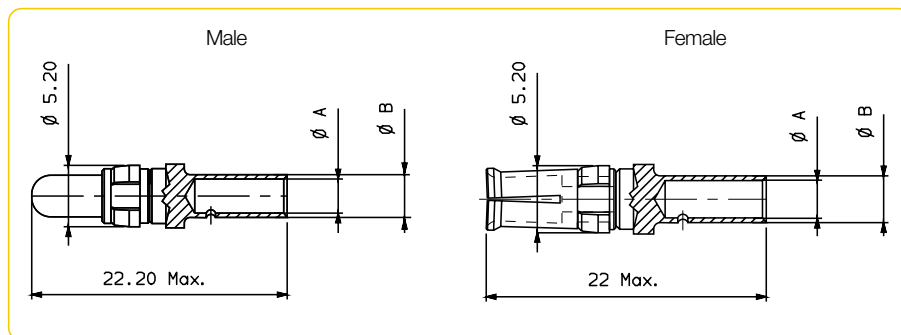


Type	Max. current rating	Clip colour	RoHS* Part number ≥ 200 mating/unmating	RoHS* Part number ≥ 500 mating/unmating	Wire		Strip length mm <sup>+0.5</sup> <sub>-0</sub>	Ø A <sub>0</sub> <sup>+0.1</sup>	Ø B <sup>+0.05</sup>
					Size	section mm <sup>2</sup>			
Male	10A	Black	8638PPS1005LF	8638PPS1006LF	16	1.3	7	1.7	2.6
Male	15A	White	8638PPS1505LF	8638PPS1506LF	14	1.9	7	2.1	3
Male	20A	Red	8638PPS2005LF	8638PPS2006LF	12	3.2	7	2.8	3.65
Male	40A	Blue	8638PPS4005LF	8638PPS4006LF	8	9	7	4.4	5
Female	10A	Black	8638PSS1005LF	8638PSS1006LF	16	1.3	7	1.7	2.6
Female	15A	White	8638PSS1505LF	8638PSS1506LF	14	1.9	7	2.1	3
Female	20A	Red	8638PSS2005LF	8638PSS2006LF	12	3.2	7	2.8	3.65
Female	40A	Blue	8638PSS4005LF	8638PSS4006LF	8	9	7	4.4	5

- Clip material: plastic withstanding 125°C  
- Termination plating: matt tin

\* RoHS compatible EU directive 2002/95/EC

### Crimp contacts



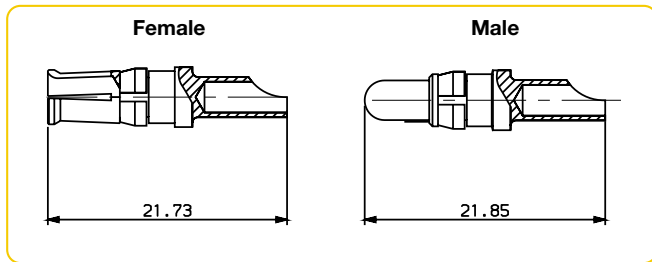
Type	Max. current rating	Clip colour	RoHS* Part number ≥ 200 mating/unmating	RoHS* Part number ≥ 500 mating/unmating	Wire		Strip length mm <sup>+0.5</sup> <sub>-0</sub>	Ø A <sub>0</sub> <sup>+0.1</sup>	Ø B <sup>+0.05</sup>
					Size	section mm <sup>2</sup>			
Male	10A	Black	8638PPC1005LF	8638PPC1006LF	16 to 18	0.9 to 1.3	7	1.8	2.55
Male	20A	Red	8638PPC2005LF	8638PPC2006LF	12 to 14	2 to 3	7	2.8	3.7
Male	30A	White	8638PPC3005LF	8638PPC3006LF	9	6	7	3.75	4.65
Male	40A	Blue	8638PPC4005LF	8638PPC4006LF	8 to 10	5 to 8	7	4.8	5.5
Female	10A	Black	8638PSC1005LF	8638PSC1006LF	16 to 18	0.9 to 1.3	7	1.8	2.55
Female	20A	Red	8638PSC2005LF	8638PSC2006LF	12 to 14	2 to 3	7	2.8	3.7
Female	30A	White	8638PSC3005LF	8638PSC3006LF	9	6	7	3.75	4.65
Female	40A	Blue	8638PSC4005LF	8638PSC4006LF	8 to 10	5 to 8	7	4.8	5.4

- Clip material: plastic withstanding 125°C  
- Termination plating: matt tin

\* RoHS compatible EU directive 2002/95/EC

*Cable applications*

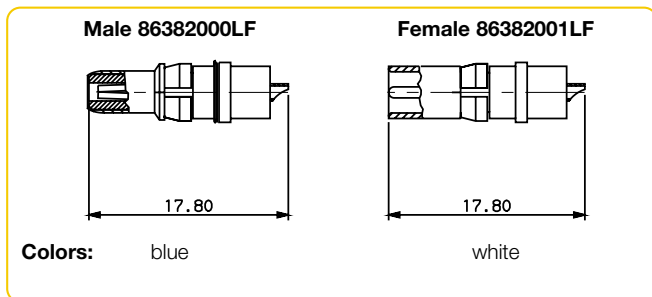
## POWER CONTACTS - METAL CLIP



Wire Size	Max. current	Part numbers	
		Male	Female
AWG8	40A	86303098NLF	86303099NLF
AWG12	20A	86303056NLF	86303057NLF
AWG14	15A	86303060NLF	86303061NLF
AWG16	10A	86303064NLF	86303065NLF

Durability : 500 mating/unmating

## HIGH VOLTAGE CONTACTS



These removable contacts are suitable for the contact cavities of the DMW series and DW series.

The coaxial contacts are in compliance with:

- NFC 93569
- KMX4 specification

### ELECTRICAL CHARACTERISTICS

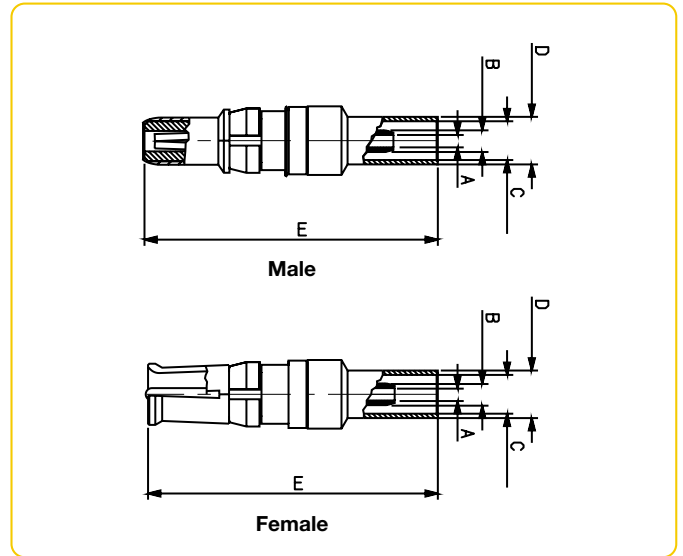
Dielectric with standing voltage	: 2800 V.r.m.s
Break down voltage	: 3200 V.r.m.s
Insulation resistance	: $10^6$ M $\Omega$
Contact resistance	: $\leq 5$ m $\Omega$
Max current rating	: 5A
Material	: TEFLON

### MECHANICAL CHARACTERISTICS

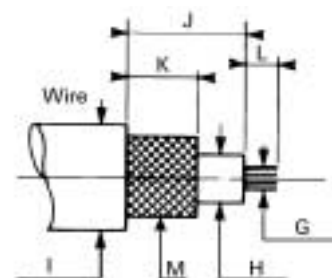
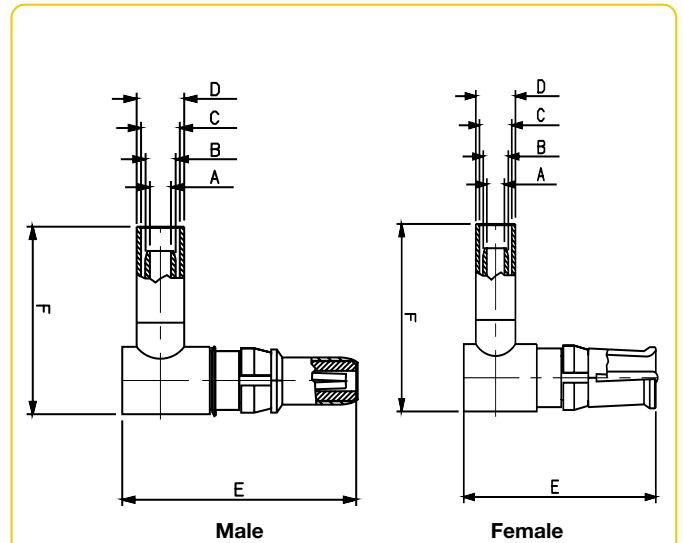
Mating force per set of contact	: 3N
Mating endurance	: 200
Temperature	: -55° C to +125° C

## COAXIAL CONTACTS

### ■ Straight



### ■ Angled



*Cable applications*

## STANDARD COAXIAL CONTACTS

Contact type	Part numbers				Contacts dimension						Cable			Wire							
	Soldered screen	NFC 93569 KMX4	Crimped screen	NFC 93569 KMX4	A <sup>+0.10</sup>	B <sup>+0.15</sup>	C <sup>+0.02</sup>	D <sup>+0.15</sup>	E <sup>+0.04</sup>	F <sup>+0.4</sup>	MILC 17E	NFC 93550	Impe- dance	G	H	I	J	K	L	M (max.)	
Straight	male	DM537405000NCLF	KMX4M11D02	KMX4M12D02					23.60								7.90	6.35	2		
	male	DM537405008NCLF	-	-					21.80												1.40
Right angle	female	DM537425000NCLF	KMX4F11D02	KMX4F12D02	1	1.75	2.32	3.20	23.60		RG 178BU	KX21A	500±2	0.30	0.90	1.80					
	female	DM537425008NCLF	-	-					21.80								9.50	5.95	1.60		
Straight	male	DM537415000NCLF	KMX4M11C02	KMX4M12C02					18.64	15.30							7.90	6.35	2.00		
	female	DM537435000NCLF	KMX4F11C02	KMX4F12C02					18.64	15.30											2.05
Right angle	male	DM537405001NCLF	KMX4M11D01	KMX4M12D01	1.70	2.46	3	3.84	23.60		RG 316U	KX22A	50Ω <sup>±2</sup>	0.50	1.50	2.50					
	female	DM537425001NCLF	KMX4F11D01	KMX4F12D01					23.60								9.50	5.95	1.60		
Right angle	male	DM537415001NCLF	KMX4M11C01	KMX4M12C01					18.64	15.30											
	female	DM537435001NCLF	KMX4F11C01	KMX4F12C01					18.64	12.50											

## SPECIFIC COAXIAL CONTACTS

Contact type	Part numbers				Contacts dimension						Cable			Wire						
	Soldered screen	NFC 93569 KMX4	Crimped screen	NFC 93569 KMX4	A <sup>+0.10</sup>	B <sup>+0.15</sup>	C <sup>+0.02</sup>	D <sup>+0.15</sup>	E <sup>+0.04</sup>	F <sup>+0.4</sup>	MILC 17E	NFC 93550	Impe- dance	G	H	I	J	K	L	M (Max.)
Straight	male	DM537405002NCLF	-	DM537403NCLF	2.75	4.40	5.45	5.95	26.30		RG 180BU		95Ω <sup>±2</sup>	0.30	2.60	3.58	9.70	7.90	2	3.14
	female	DM537425002NCLF	-	DM537423NCLF					26.30											
Straight	male	DM537405005NCLF	-	DM537405NCLF					23.60								9.50		2	
	female	DM537425004NCLF	-	DM537425NCLF	3.15	4.40	5.45	5.95	23.60		RG 58CU	KX15	500Ω <sup>±2</sup>	0.90	2.95	4.95		7.9		3.81
Right angle	female	DM537435004NCLF	-	DM537436NCLF					18.64	17.50							10.70		2.40	

*PCB applications*

## I/O, POWER CONNECTOR

This power module I/O connectors for 48 volts applications are designed in accordance with μTCA specifications. The robust D-Sub concept based on simplified and cost effective Delta D design combines power contacts able to handle up to 24 A with signal contacts. PCB connectors are proposed in traditional solder-to-board and Pin-in-Paste versions for optimized applied cost. Specific to the design of FCI is the fact that the connector's compact footprint allows for more space on the PCB for other components.

## FEATURES

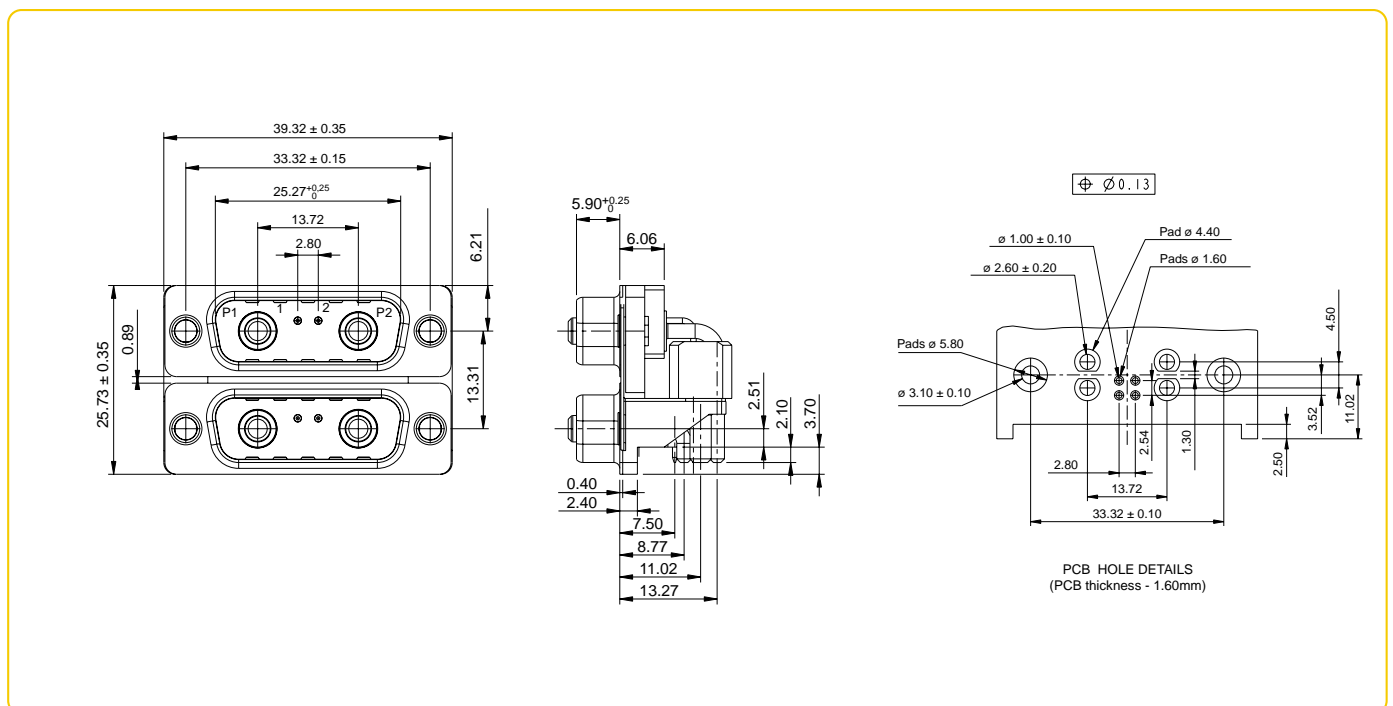
- 48 V / 24 A (shell size A)
- FMLB (First Mate Last Brake) functionality for hot plugging
- Field repairable



## ORDERING INFORMATION

<b>10070158</b>	<b>002</b>	<b>12</b>	<b>X</b>	<b>LF</b>
<p><b>μTCA</b> 48 V / 24 A power board connector</p>	<p><b>001</b> : Dual solder-to-board <b>002</b> : Dual Pin-in-Paste <b>003</b> : Single solder-to-board <b>004</b> : Single Pin-in-Paste</p>	<p><b>12</b> : Tape and reel packing <b>19</b> : Card box packing</p>	<p><b>L</b> : M3 threaded insert <b>X</b> : UNC 4-40 threaded insert</p>	<p><b>LF</b> : RoHS compatible EU directive 2002/95/EC</p>

## PRODUCT DRAWING





*Cable applications*

## FEATURES

- Field repairable
- Touch proof
- Stackable hoods with high retention devices
- Cost saving jumper option for signal contacts



## ORDERING INFORMATION

### CABLE CONNECTOR

**10070165**

**μTCA**  
48 V / 24 A power cable connector

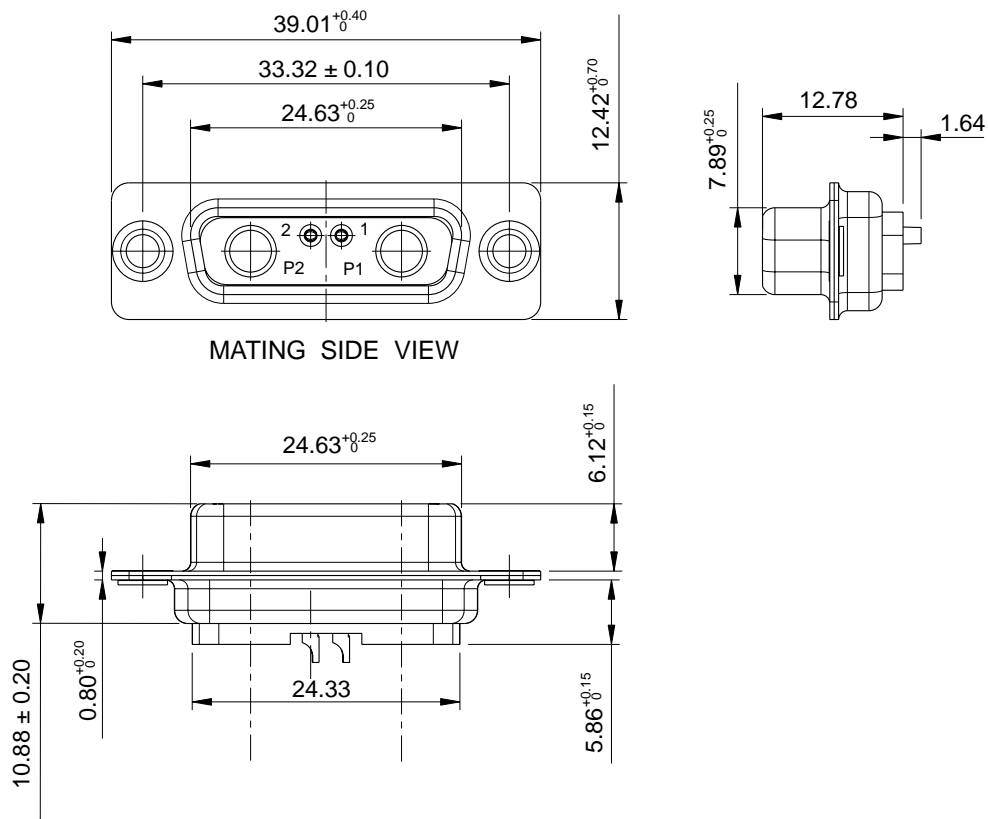
**001**

**001** : without jumper  
**002** : with jumper option

**19ALF**

Card box packing

## PRODUCT DRAWING



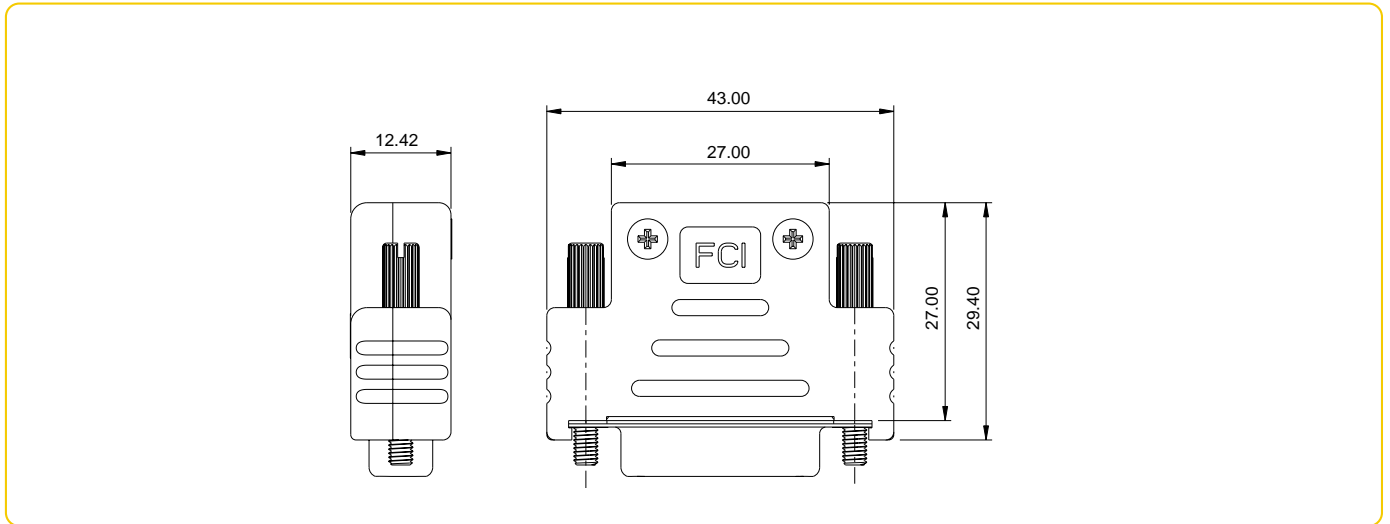
### POWER CONTACTS

- 8638PSC3005LF** 30 A crimp contacts
- 8638PSS4005LF** 40 A solder buckets contacts



■ HOOD (stackable hood and slim design)

10070163 - 001LF



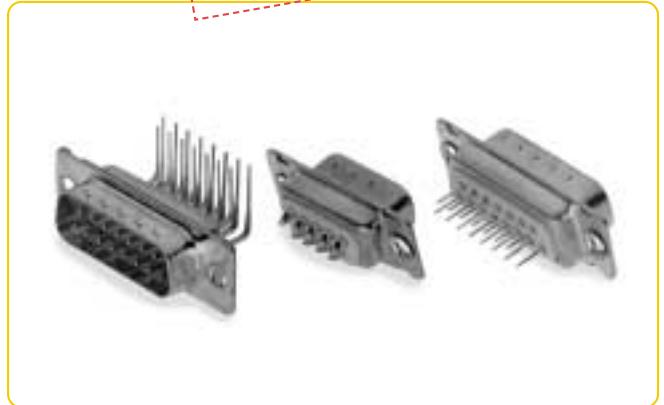
# D series - Stamped and rolled contacts

*PCB and Cable applications*

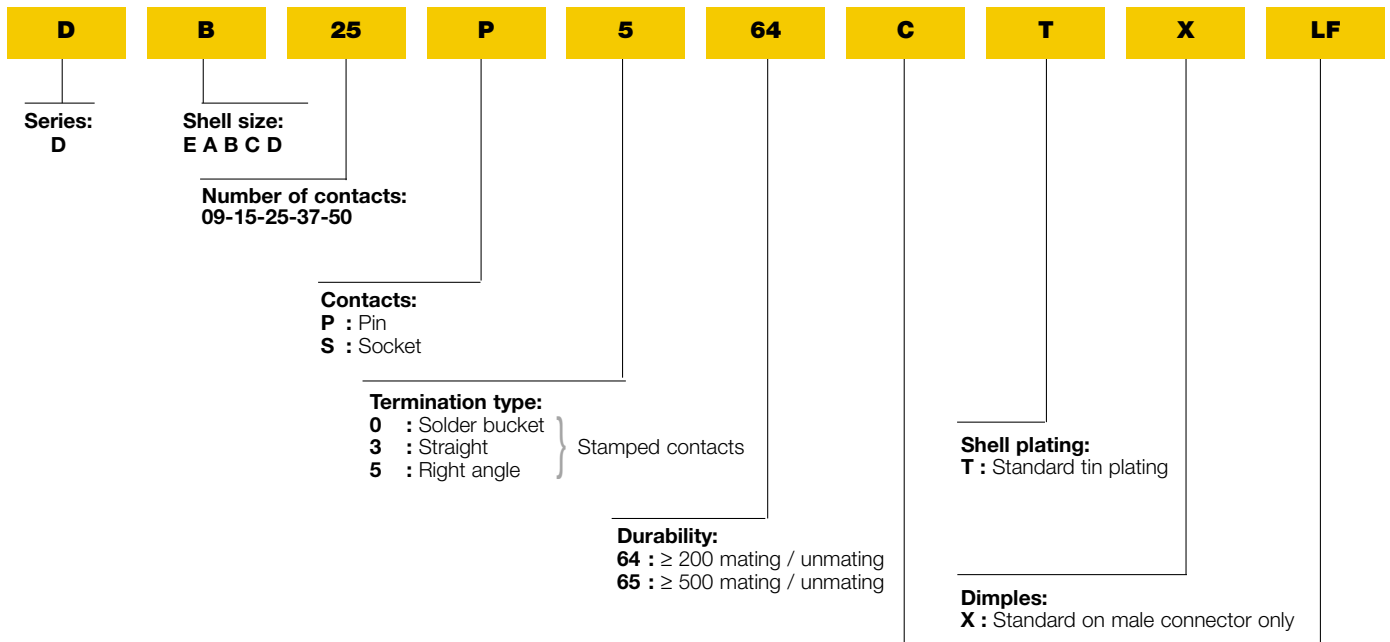


**UL Recognized File E 118235**

■ D series is the standard D-Sub full metal shell version with stamped contacts. This design is basically proposed in solder bucket, straight and angled version without accessories.



## ORDERING INFORMATION



**Options 2** (see page 70)

Termination type Index	Straight version	Angled version	Solder buckets
<b>Blank</b>	Without accessory	Not possible	Without accessory
<b>C</b>	Not possible	Without bracket	Not possible
<b>H*</b>	Not possible	Not possible	Shielding termination fingers*

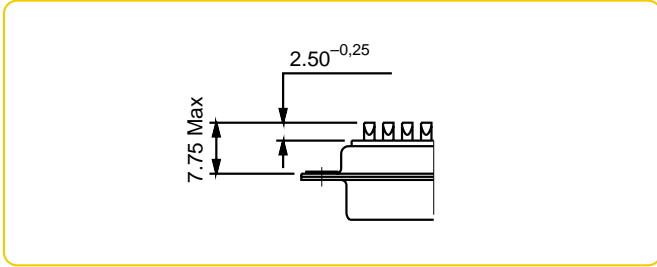
\* not available on 50 way

**Blank** : non RoHS compatible  
**LF** : RoHS compatible

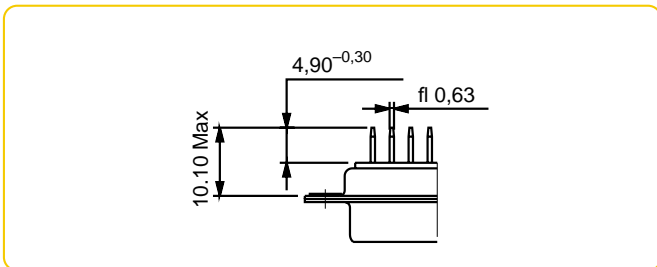
*PCB and  
Cable applications*

## SPECIFIC DIMENSIONS

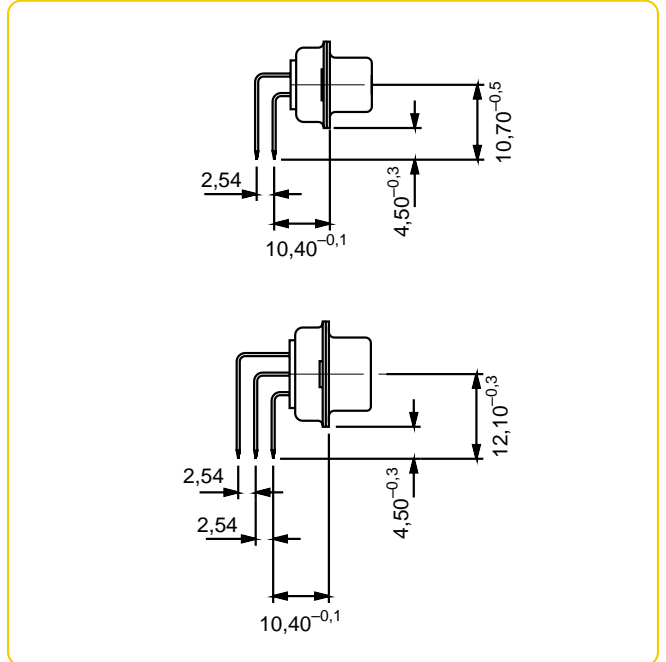
### Solder buckets



### Straight spills



### Right angle spills



*Cable applications*



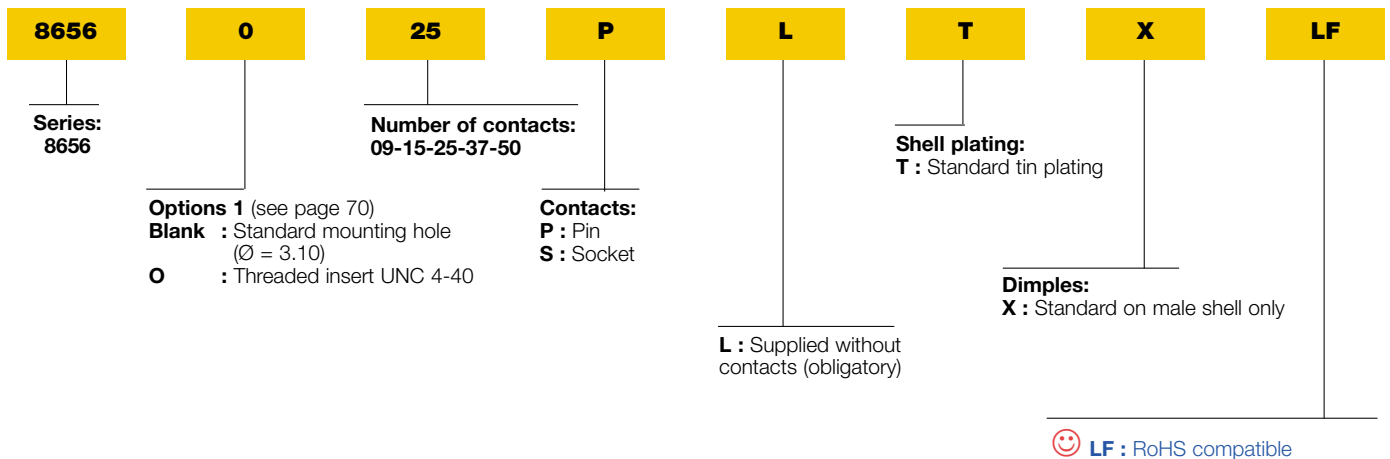
UL Recognized File E 118235

- 8656 series is a D connector with removable crimp contacts for AWG 20/24 or 24/28 wires.
- It is used for commercial cabling like computer equipment, cash registers...
- It accepts our standard accessories (hoods, locking devices) and is available with a complete range of crimping tools from hand tools to high volume production equipment.



## ORDERING INFORMATION

### Connector part numbers



### Contact part numbers

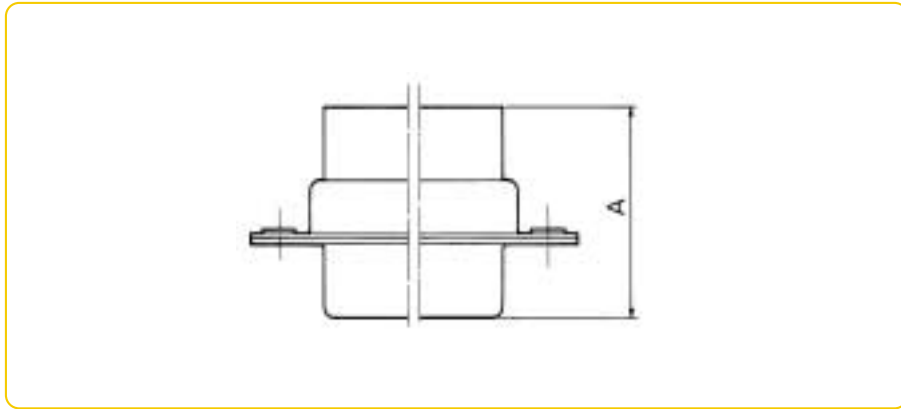
Contact type \ Packaging type	Box of 500 contacts	Reel of 400 contacts	Reel of 5000 contacts	Reel of 10 000 contacts
AWG 24/28 male	865635006 ▲	8656300306 ▲	8656451006 ▲	8656454006 ▲
AWG 24/28 female	865635106 ▲	8656300406 ▲	8656651006 ▲	8656654006 ▲
AWG 20/24 male	865635206 ▲	8656300506 ▲	8656452006 ▲	8656453006 ▲
AWG 20/24 female	865635306 ▲	8656300606 ▲	8656652006 ▲	8656653006 ▲

#### ▲ Contact performance code

- 4LF: ≥ 200 mating / unmating, RoHS compatible
- 5LF: ≥ 500 mating / unmating, RoHS compatible

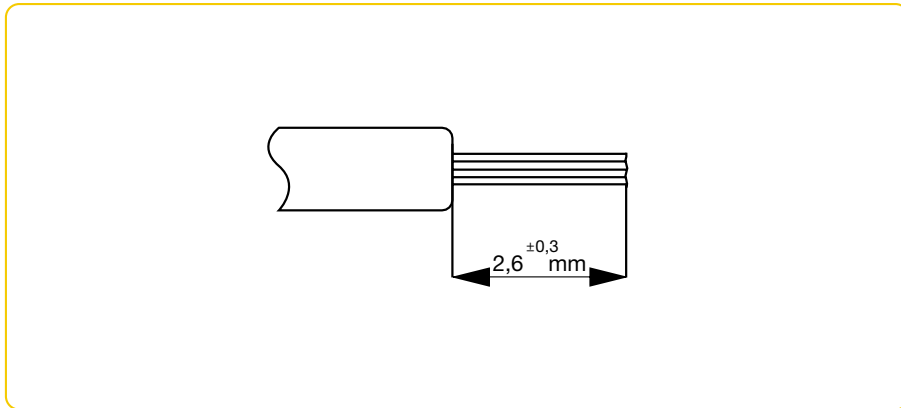
*Cable applications*

### SPECIFIC DIMENSIONS



	09	15	25	37	50
<b>Pin</b>	17.19	17.19	17.35	17.35	17.35
<b>A<sub>Max.</sub></b>					
<b>Socket</b>	17.44	17.44	17.44	17.44	17.44

### CABLE PREPARATION



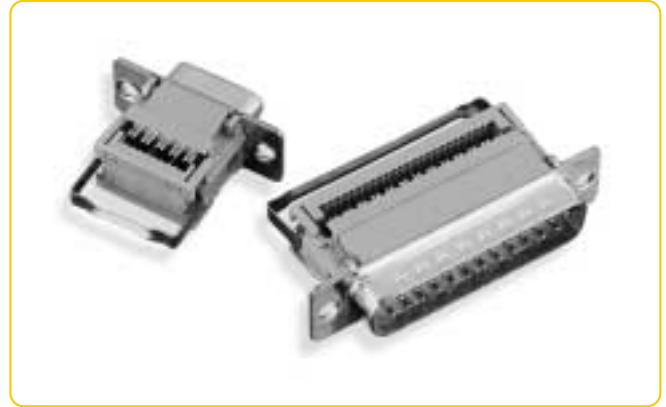
*Cable applications*

## INSULATION DISPLACEMENT CONNECTION FOR FLAT CABLE, MULTI STRAND (AWG 26/28) OR SINGLE STRAND (AWG 28/30)

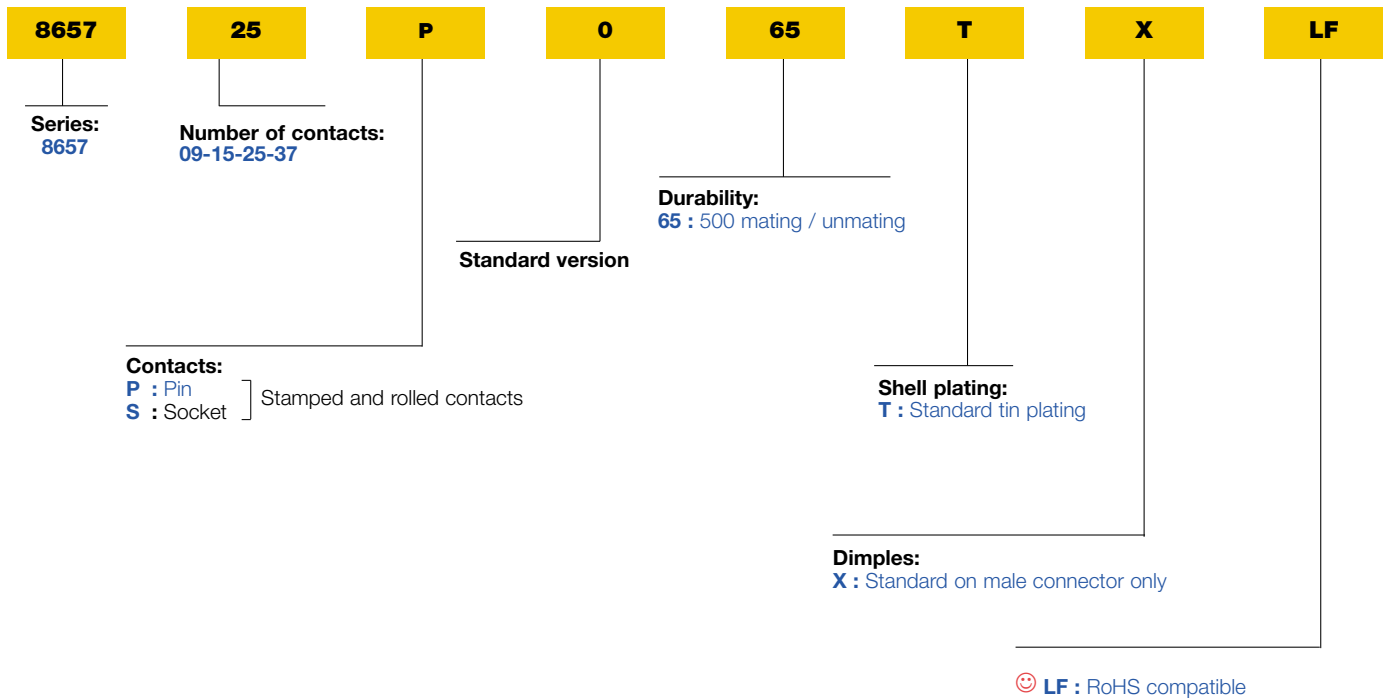


UL Recognized File E 118235

These connectors are suitable for input/output applications and interconnecting electronic equipment.



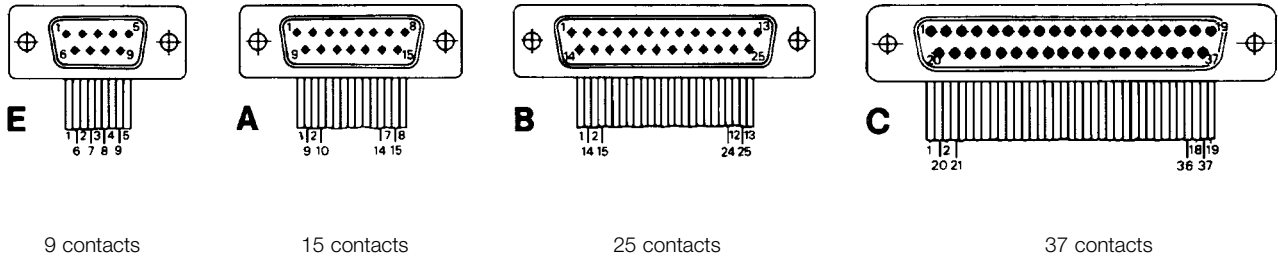
## ORDERING INFORMATION



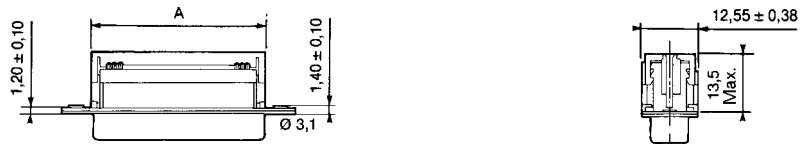
## LAYOUTS

### Male insulator front view

Contacts are individually numbered on the front side of the insulator



## SPECIFIC DIMENSIONS



**HIGH PROFILE**  
supplied with  
metallic strain relief clamp

	09	15	25	37
<b>A</b> ± 0.25	19.27	27.50	41.27	57.70

PCB and  
Cable applications



UL Recognized File E 118235

- DP series is designed for high performance applications, particularly in the field of telecommunications: data transmission, private automatic branch switching, telecom (LNZ listed).
- It features machined contacts and is available with solder bucket, straight spills, angled spills, and wire wrap terminations.



## ORDERING INFORMATION

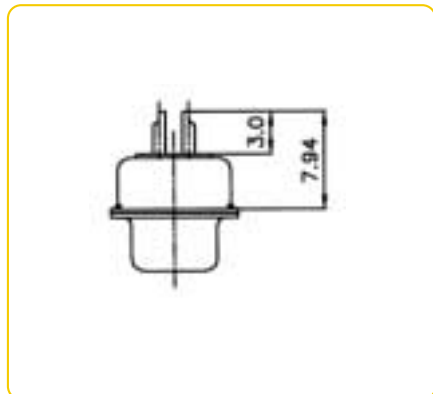
D	B	P	V	25	P	3	64	C	T	X	LF																																	
<p><b>Series:</b> D</p> <p><b>Shell size:</b> E, A, B, C, D</p> <p>P : Characterisation of DP series</p> <p><b>Front accessories</b> (see page 70)  <b>Blank</b> : Standard mounting holes (Ø = 3.10)  <b>L</b> : Threaded insert M3  <b>V</b> : Female screw locks UNC 4-40  <b>S</b> : Spacers (straight spills only)</p> <p><b>Number of contacts:</b> 09-15-25-37-50</p> <p><b>Contacts:</b> P : Pin S : Socket</p> <p><b>Termination:</b>  <b>0</b> : Solder buckets (blank for plating 00)  <b>3</b> : Straight spills  <b>5</b> : Angled spills- 2.54 mm between rows  <b>8</b> : Angled spills- 2.84 mm between rows  <b>4</b> : Wire wrap (3 levels)  <b>6</b> : Wire wrap (2 levels)</p> <p><b>Durability:</b>  <b>64</b> : ≥ 200 mating / unmating  <b>65</b> : ≥ 500 mating / unmating, blank for solder bucket termination</p> <p><b>PCB accessories</b> (see page 70)</p> <table border="1"> <thead> <tr> <th>Index</th> <th>Termination type</th> <th>Straight spills</th> <th>Angled spills</th> <th>Solder buckets</th> <th>Wire wrap</th> </tr> </thead> <tbody> <tr> <td>Blank</td> <td></td> <td>Without accessory</td> <td>Two plastic brackets* Without bracket</td> <td>Without accessory</td> <td>Without accessory</td> </tr> <tr> <td>C</td> <td></td> <td rowspan="2">Harpoons (Compulsary with option L or V)</td> <td>Two metal brackets</td> <td rowspan="2">Shielding termination fingers</td> <td rowspan="2"></td> </tr> <tr> <td>M</td> <td></td> <td>Harpoons (9 to 37 ways only)</td> </tr> <tr> <td>G</td> <td></td> <td></td> <td></td> <td></td> <td></td> </tr> <tr> <td>H</td> <td></td> <td></td> <td></td> <td></td> <td></td> </tr> </tbody> </table> <p>* Except 50 pos. with monobloc plastic brackets</p> <p><b>Shell plating:</b> T : Standard tin plated</p> <p><b>Dimples:</b> X : Standard on male connectors only</p> <p>LF : Standard series, RoHS compatible</p>												Index	Termination type	Straight spills	Angled spills	Solder buckets	Wire wrap	Blank		Without accessory	Two plastic brackets* Without bracket	Without accessory	Without accessory	C		Harpoons (Compulsary with option L or V)	Two metal brackets	Shielding termination fingers		M		Harpoons (9 to 37 ways only)	G						H					
Index	Termination type	Straight spills	Angled spills	Solder buckets	Wire wrap																																							
Blank		Without accessory	Two plastic brackets* Without bracket	Without accessory	Without accessory																																							
C		Harpoons (Compulsary with option L or V)	Two metal brackets	Shielding termination fingers																																								
M			Harpoons (9 to 37 ways only)																																									
G																																												
H																																												



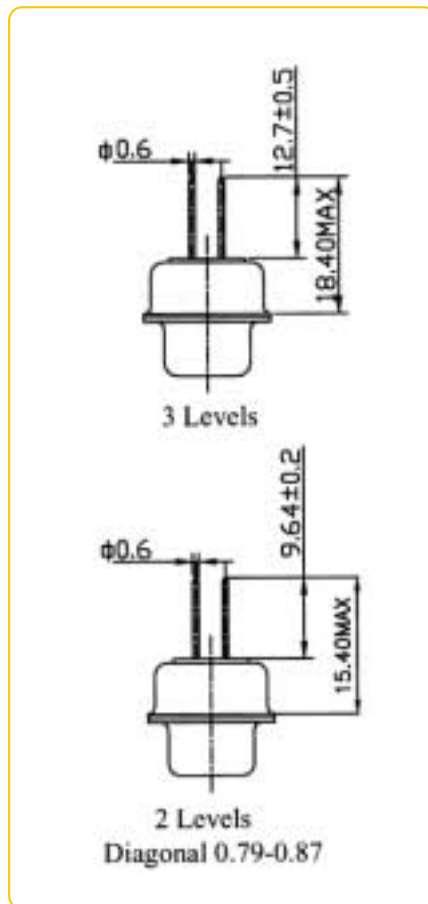
*PCB and  
Cable applications*

## SPECIFIC DIMENSIONS

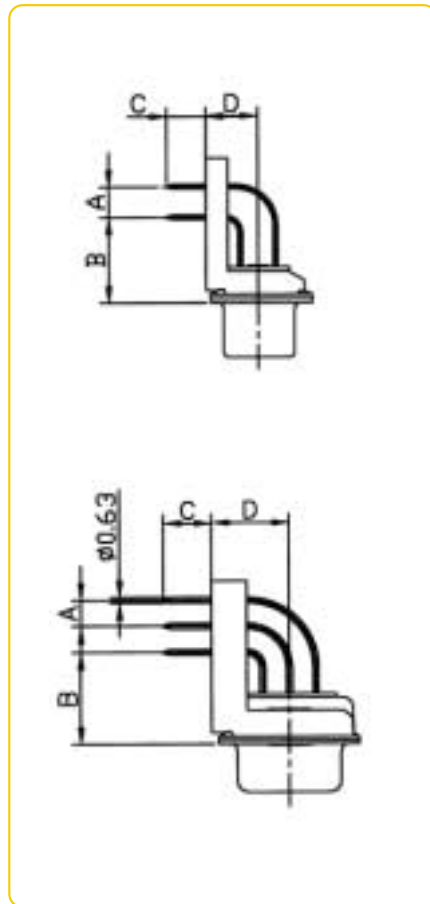
### Solder buckets



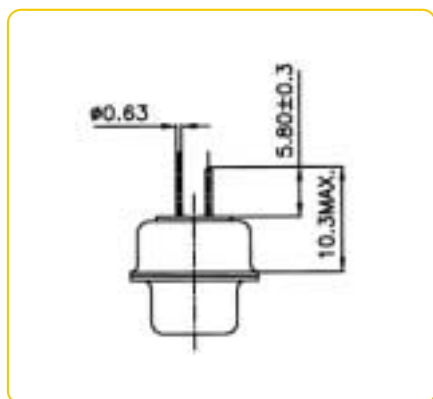
### Wire wrap



### Right angle spills



### Straight spills



Termination code		5	8
		Dimension	
A		2.54	2.84
B $\pm 0.1$		10.30	10.30
C $\pm 0.5$		4.00	4.00
D $\pm 0.1$	9 to 37 contacts	7.20	7.20
	50 contacts	8.60	8.60

*PCB and Cable applications*

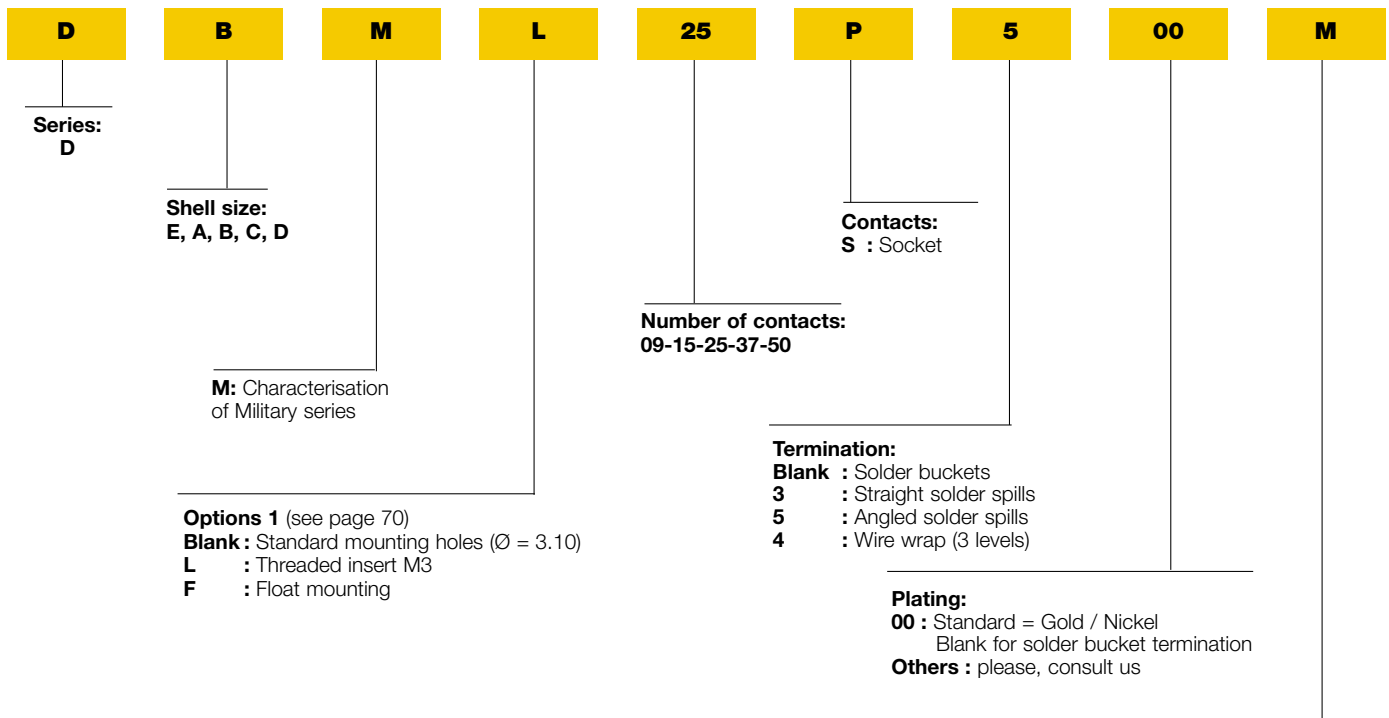


**UL Rating Product File E 118235 (R)**

- ▶ For aerospace, military 125° class-European standard in compliance with NFC 93425 / HE 501.
- ▶ **Shell plating:** Cadmium
- ▶ **Military and Aero applications**



**ORDERING INFORMATION**

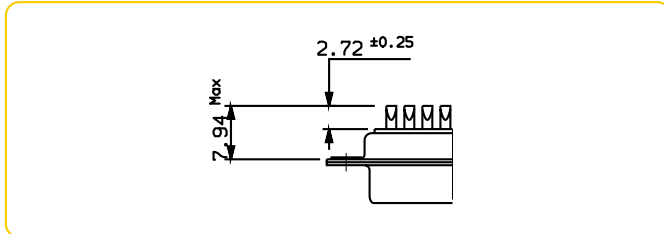


Options 2 (see page 70)

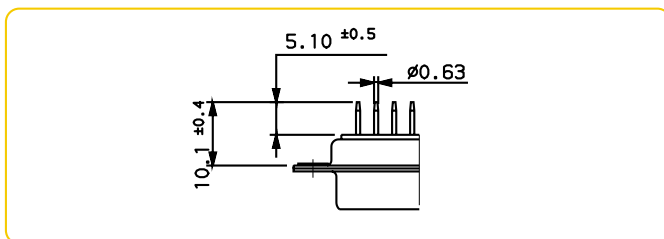
Option	Version	Angled spills	Other terminations
	<b>Blank</b>	Plastic brackets	Not applicable
	<b>C</b>	Without brackets	Not applicable
	<b>M</b>	Metal brackets	Not applicable

## SPECIFIC DIMENSIONS

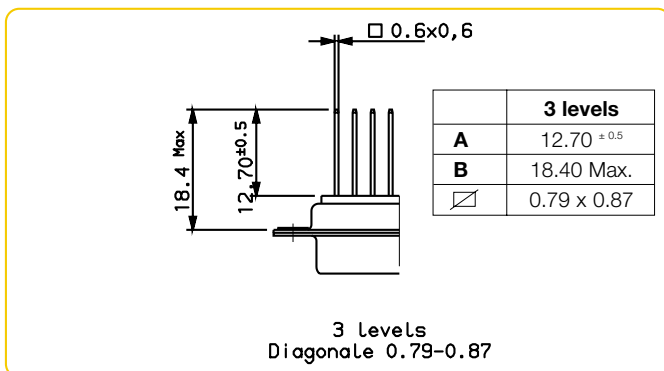
### Solder buckets



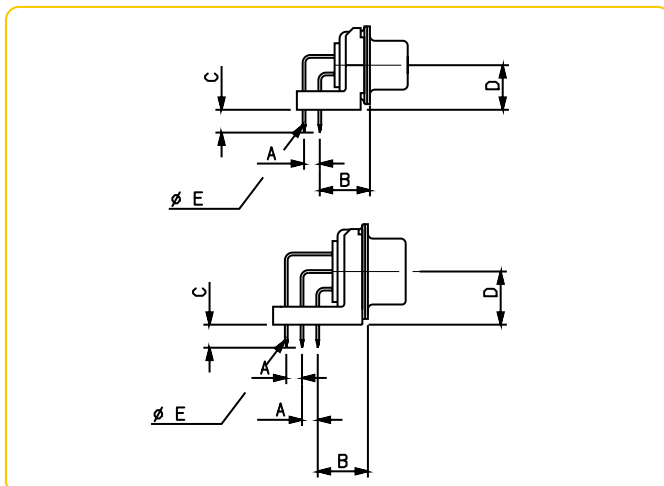
### Straight spills



### Wire wrap



### Right angle spills



## CROSS REFERENCE LIST FOR THE MAIN HE 501 AND FCI

Connector type		HE 501	FCI
Solder buckets	F	HE 501 N..AP3	D.M..PLF
		HE 501 N..AS3	D.M..SLF
	M	HE 501 F..AP3	D.MF..PLF
		HE 501 F..AS3	D.MF..SLF

Connector type		HE 501	FCI
Straight spills	Standard	M HE 501 N..YP4.3	D.M..P 300LF
		F HE 501 N..YS4.3	D.M..S 300LF
	Float mounting	M HE 501 F..YP4.3	D.MF..P 300LF
		F HE 501 F..YS4.3	D.MF..S 300LF

Connector type		HE 501	FCI
Wire wrap 3 levels	Standard	M HE 501 N..KP3.3	D.M..P 400LF
		F HE 501 N..KS3.3	D.M..S 400LF
	Float mounting	M HE 501 F..KP3.3	D.MF..P 400LF
		F HE 501 F..KS3.3	D.MF..S 400LF

Connector type		HE 501	FCI
Angled spills 500	Standard	M HE 501 P..VP6.3	D.M..P 500LF
		F HE 501 P..VS6.3	D.M..S 500LF
	Metal brackets	M HE 501 M..VP6.3	D.M..P 500MLF
		F HE 501 M..VS6.3	D.M..S 500MLF

Dimension	Termination	5
<b>A</b>		2.54
<b>B</b> $\pm 0.1$		10.30
<b>C</b> $\pm 0.5$		4.00
<b>D</b> $\pm 0.1$	9 to 37 contacts	7.20
	50 contacts	8.60
<b>Ø E</b>		0.63

PCB and Cable applications

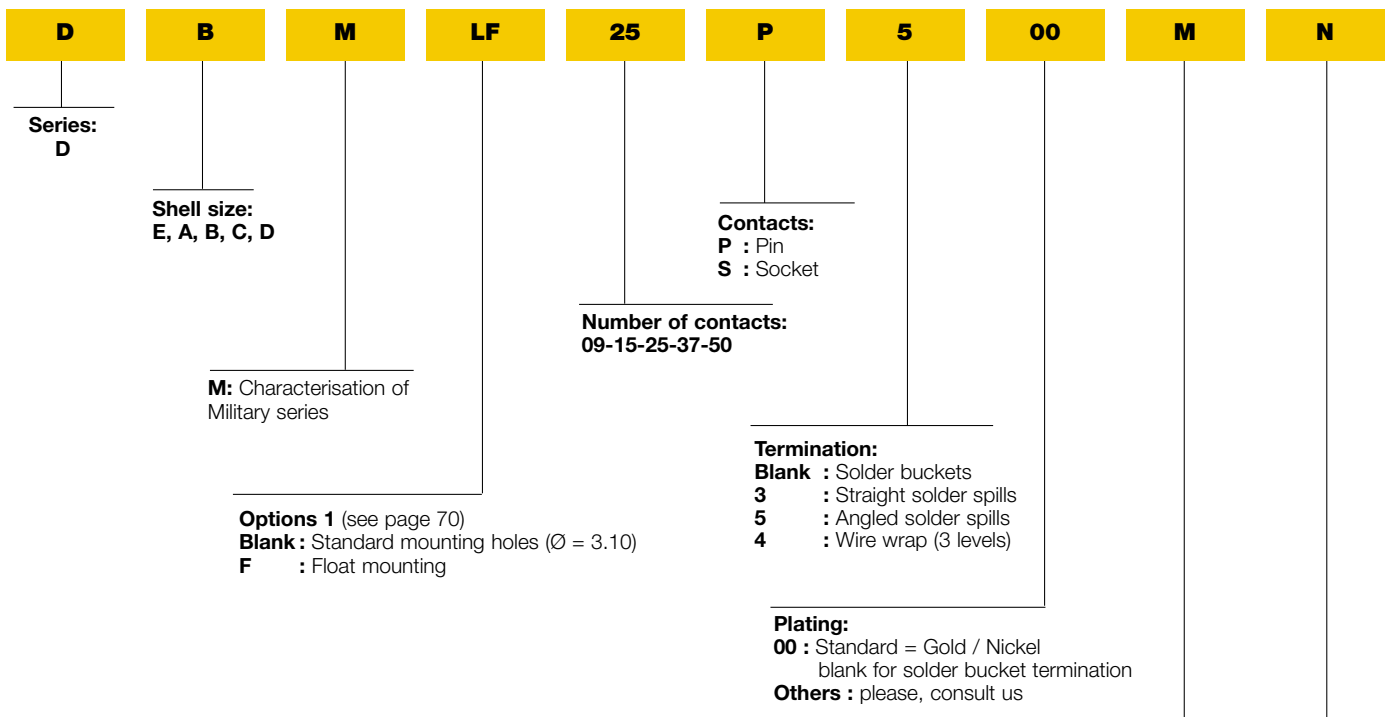


UL Rating Product File E 118235 (R)

- ▶ For particularly severe applications, especially high temperatures class + 155°C in compliance with NFC 93425 / HE 508.
- ▶ **Shell plating:** Cadmium
- ▶ **Military and Aero applications**



ORDERING INFORMATION



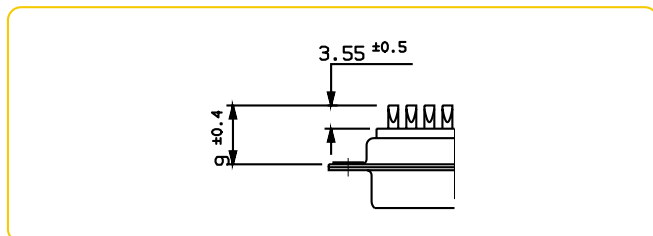
Options 2 (see page 70)

Option	Version	Angled spills	Other terminations
Blank		Plastic brackets	Not applicable
C		Without brackets	Not applicable
M		Metal brackets	Not applicable

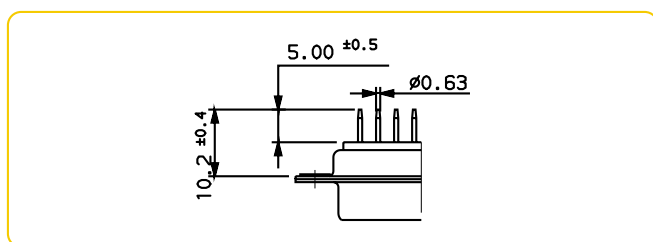
N : Obligatory for HE 508

## SPECIFIC DIMENSIONS

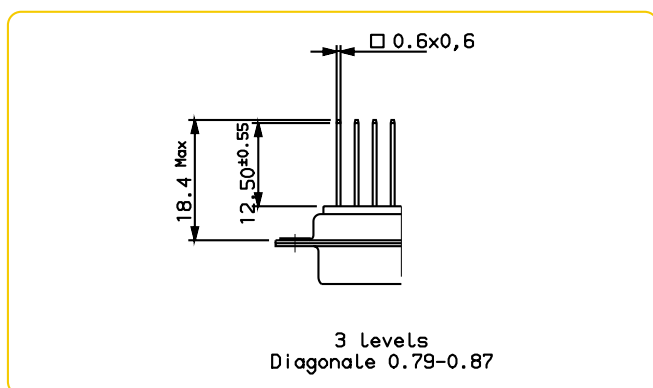
### Solder buckets



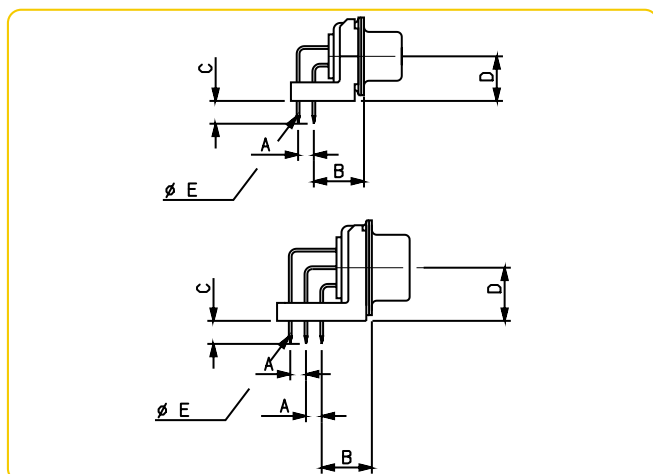
### Straight spills



### Wire wrap



### Right angle spills



## CROSS REFERENCE LIST FOR THE MAIN HE 508 AND FCI

Connector type		HE 508		FCI
Solder buckets	Standard	M	HE 508 N..AP	D.M..PNLF
		F	HE 508 N..AS	D.M..SNLF
	Float mounting	M	HE 508 F..AP	D.MF..PNLF
		F	HE 508 F..AS	D.MF..SNLF

Connector type		HE 508		FCI
Straight spills	Standard	M	HE 508 N..YP4	D.M..P 300NLF
		F	HE 508 N..YS4	D.M..S 300NLF
	Float mounting	M	HE 508 F..YP4	D.MF..P 300NLF
		F	HE 508 F..YS4	D.MF..S 300NLF

Connector type		HE 508		FCI
Wire wrap 3 levels	Standard	M	HE 508 N..KP3	D.M..P 400NLF
		F	HE 508 N..KS3	D.M..S 400NLF
	Float mounting	M	HE 508 F..KP3	D.MF..P 400NLF
		F	HE 508 F..KS3	D.MF..S 400NLF

Connector type		HE 508		FCI
Angled spills 500	Standard	M	HE 508 P..VP6	D.M..P 500NLF
		F	HE 508 P..VS6	D.M..S 500NLF
	Metal	M	HE 508 M..VP6	D.M..P 500MNLF
			HE 508 M..VS6	D.M..S 500MNLF

Dimension	Termination	5
A		2.54
B ±0.1		10.30
C ±0.5		4.00
D ±0.1	9 to 37 contacts	7.20
	50 contacts	8.60
Ø E		0.63

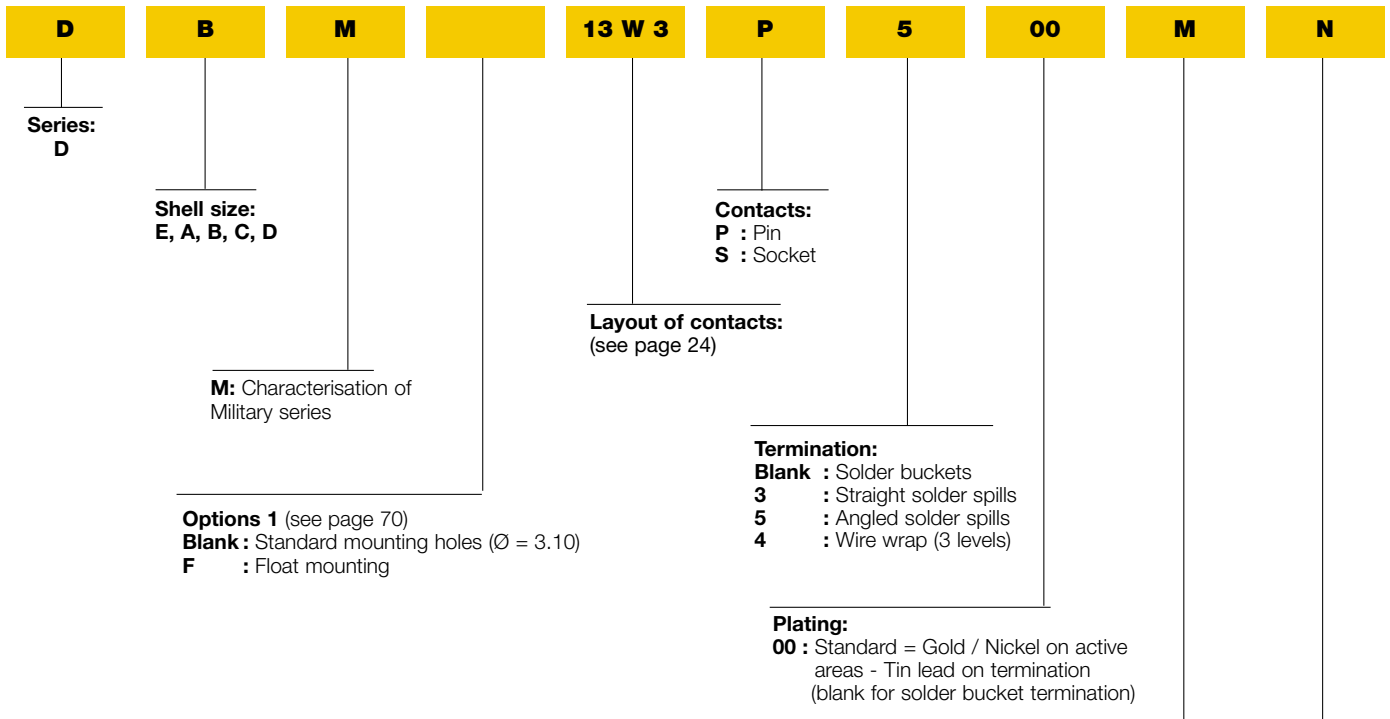
*PCB and  
Cable applications*

**UL Rating Product File E 118235**

- Connectors drawn from DM series. Composed of mixed arrangements of standard signal and size 8 cavities housing, coax, power, high voltage and optical removable contacts.
- Shell plating:** Cadmium
- Military and Aero applications**



**ORDERING INFORMATION**



Options 2 (see page 70)

Option	Version	Angled spills	Other terminations
Blank		Plastic brackets	Not applicable
C		Without brackets	Not applicable
M		Metal brackets	Not applicable

**N** : Compulsary in compliance with HE 507

PCB and  
Cable applications

## LAYOUTS

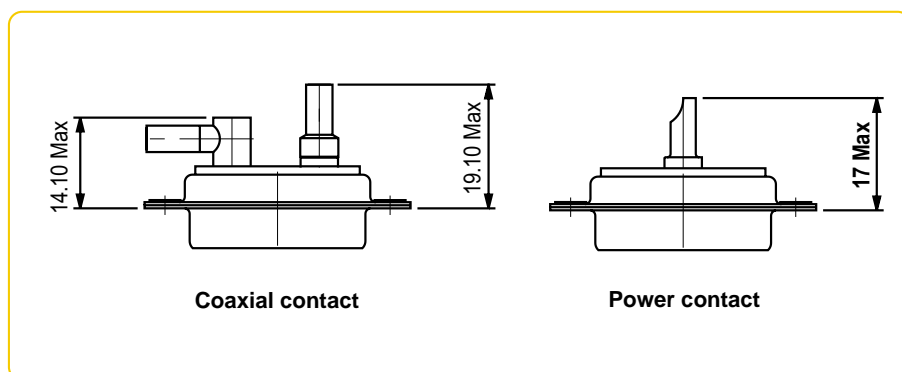
### Male insulator front view

Shell size		Layout
E	5W1	
A	11W1	
	7W2	
	3W3	
	3V3	
	B	21W1
17W2		
13W3		
9W4		
5W5		

Shell size		Layout
C	25W3	
	21WA4	
	27W2	
	8W8	
D	47W1	
	24W7	
	36W4	

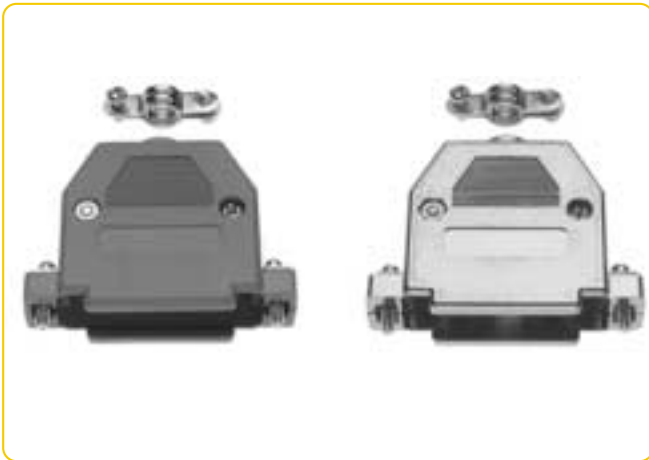
- Standard contacts
- Coaxial and power contacts

## SPECIFIC DIMENSION for standard terminations, see DM series, page 51



*Cable applications*

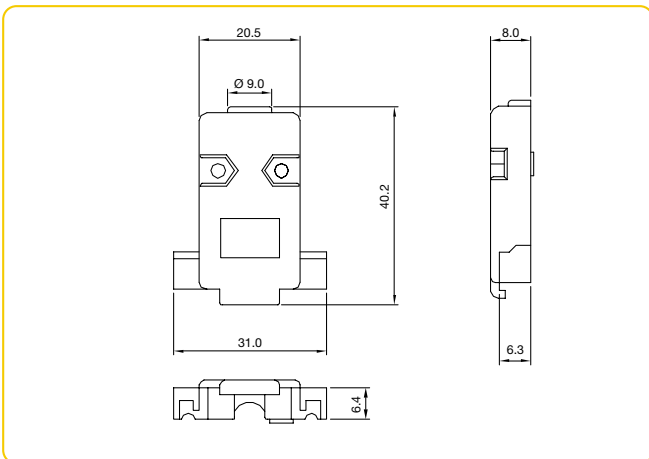
1 • Straight exit plastic and metalised hood with integrated locking - Economical series



Material : self extinguishing UL 94V0 thermoplastic  
 Colour : black / metalised  
 Temperature range : -55°C +105°C  
 Locking screws : UNC 4-40 thread

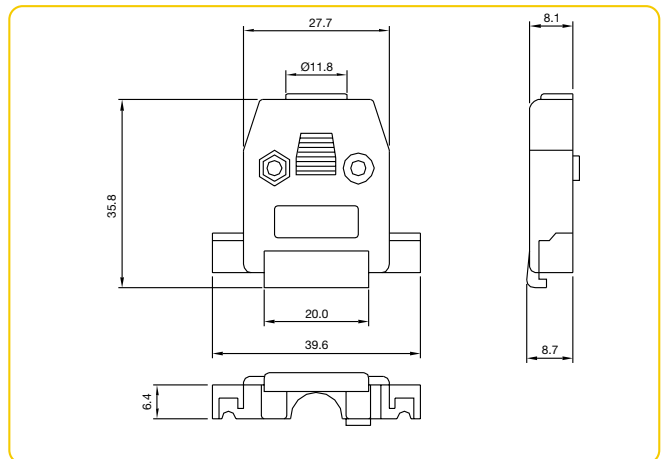
Shell size E (9 way)

- Plastic hood : part number : 10039449-00001LF
- Metalised hood : part number : 10039449-00002LF



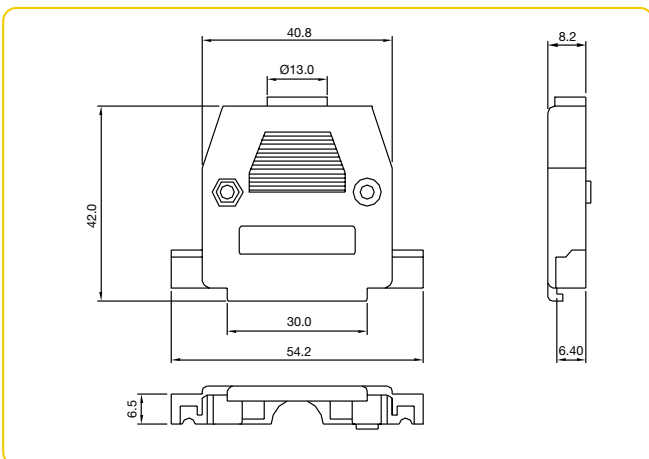
Shell size A (15 way)

- Plastic hood : part number : 10039450-00001LF
- Metalised hood : part number : 10039450-00002LF



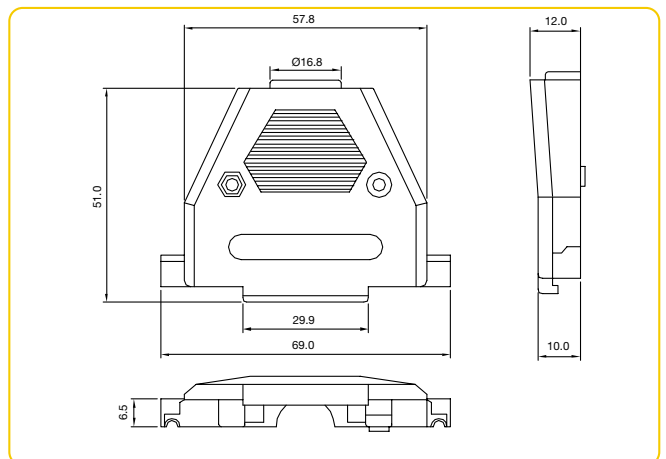
Shell size B (25 way)

- Plastic hood : part number : 10039451-00001LF
- Metalised hood : part number : 10039451-00002LF



Shell size C (37 way)

- Plastic hood : part number : 10039452-00001LF
- Metalised hood : part number : 10039452-00002LF

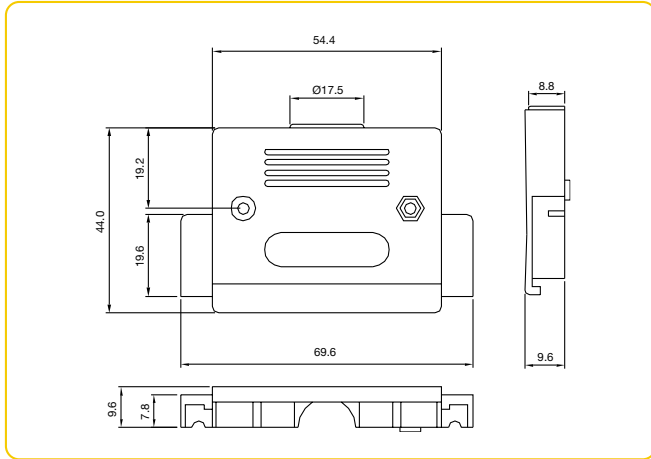




## Straight exit plastic and metalised hood with integrated locking

### Shell size D (50 way)

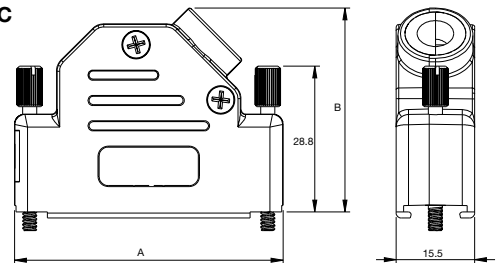
- Plastic hood : part number : **10039453-00001LF**
- Metalised hood : part number : **10039453-00002LF**



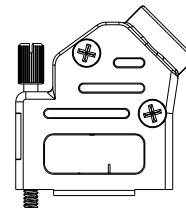
### 2 • Angle exit plastic hood for cable



Size A,B,C



Size E



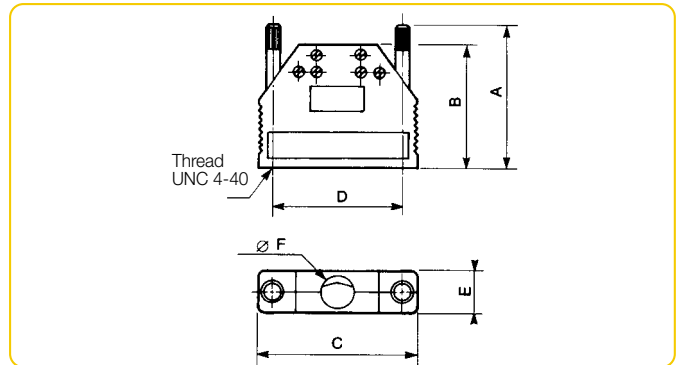
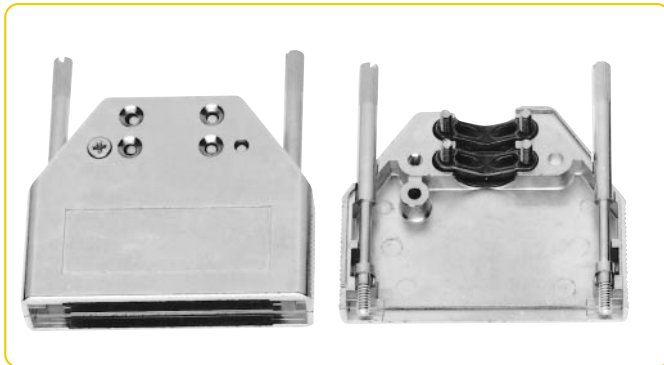
Shell size	Part number	A	B	Cable diameter
E (9)	8655PHRA0901LF	31.0	36.2	4 to 13 mm
A (15)	8655PHRA1501LF	39.5	40.2	
B (25)	8655PHRA2501LF	53.0	40.2	
C (37)	8655PHRA3701LF	69.5	40.2	

- Material** : polycarbonat UL 94V0
- Cable strain relief** : steel fibre reinforced polycarbonat UL 94V0
- Colour** : black
- Temperature range** : -40°C +120°C
- Packaging** : bulk, in box of 100 pieces
- Locking screws** : UNC 4-40 thread

All dimensions in mm

*Cable applications*

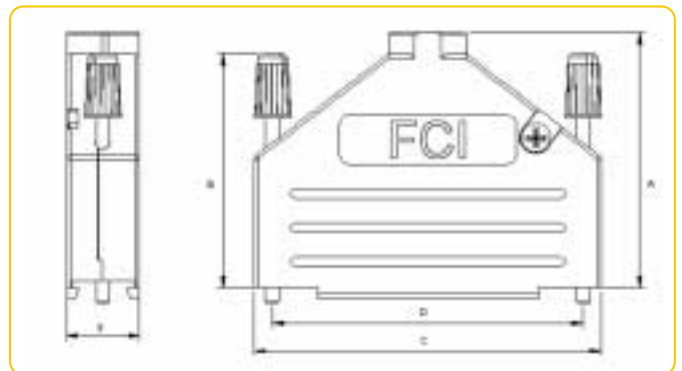
## 3 • Straight exit metal hood with two metal clamps for cable EMI / RFI



Shell size	Part numbers in bulk	Packaging	Part numbers (in individual set)	Packaging	A <sup>±0.1</sup>	B <sup>±0.3</sup>	C <sup>±0.1</sup>	D <sup>±0.1</sup>	E <sup>±0.2</sup>	F max.
E	8655MH0901LF	80	8655MH0911LF	50	55.00	45.00	34.40	24.99	14.70	7.85
A	8655MH1501LF	80	8655MH1511LF	50	55.00	45.00	42.70	33.32	14.70	11.80
B	8655MH2501LF	60	8655MH2511LF	50	55.00	45.00	56.70	47.04	14.70	11.80
C	8655MH3701LF	40	8655MH3711LF	50	55.00	45.00	72.95	63.50	14.70	11.80
D	8655MH5001LF	40	8655MH5011LF	50	55.00	45.00	70.60	61.11	17.30	14.10

- Material** : zamack
- Plating** : nickel
- Environment** : frequencies at 100 Mz > 40 dB
- Corrosion resistance** : 50 hours exposure to salt spray

## 4 • Straight exit metal hood for cable EMI / RFI - Economical series



Shell size	Part numbers	A	B	C	D	E
E	8655MH0901BLF	38.3	47.3	31	24.99	14.6
A	8655MH1501BLF	40.5	47.3	39.5	33.32	14.6
B	8655MH2501BLF	47.3	47.3	53.2	47.04	14.6
C	8655MH3701BLF	52.2	47.3	70.9	63.5	15

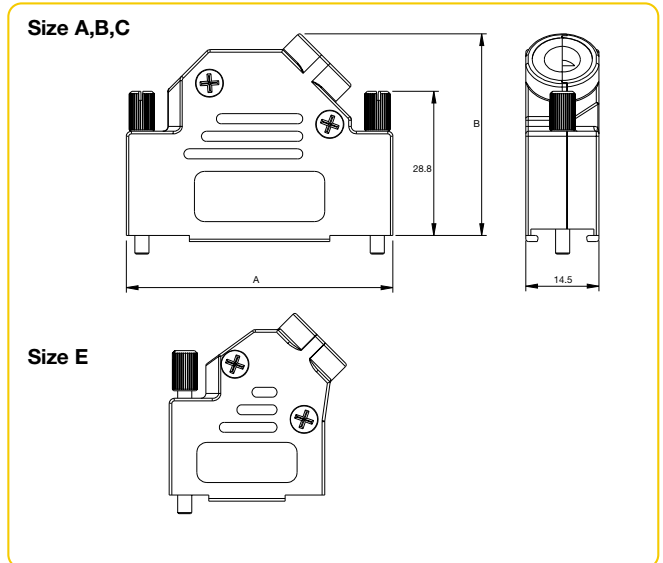
- Material** : zamack, nickel plated
- Cable strain relief** : steel fiber reinforced polycarbonat UL 94V0 for EMI/RFI screening
- Temperature range** : -40°C +120°C
- Environment** : >40 dB between 30 MHz and 1 GHz
- Packaging** : bulk, in box of 100 pieces
- Locking screws** : UNC 4-40 thread

*Cable applications*

## 5 • Angle exit metal hood for cable EMI / RFI - Economical series



Shell size	Part number	A	B	Cable diameter
E (9)	8655MHRA0901LF	31.0	36.2	4 to 13 mm
A (15)	8655MHRA1501LF	39.5	40.2	
B (25)	8655MHRA2501LF	53.2	40.2	
C (37)	8655MHRA3701LF	69.7	40.2	10 to 16 mm
D (50)	8655MHRA5001LF	67.2	43.7	

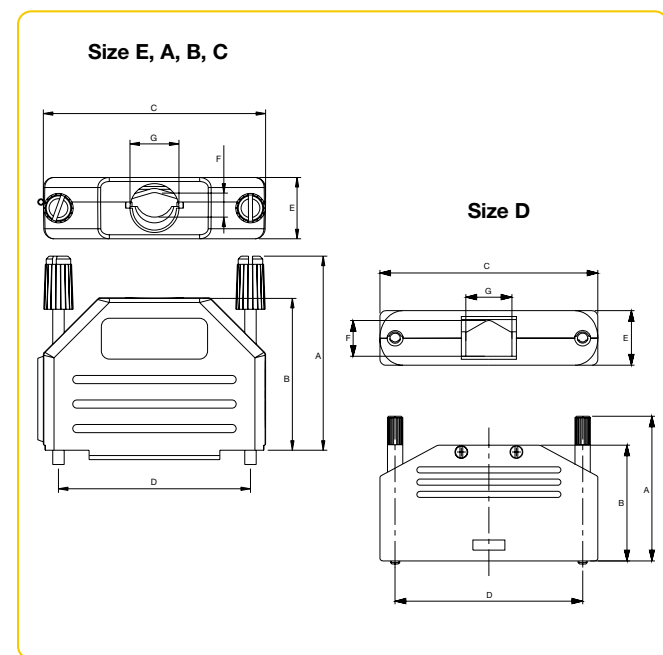


- Material** : zamack, nickel plated
- Cable strain relief** : steel fibre reinforced polycarbonat UL 94V0 for EMI/RFI screening
- Temperature range** : -40°C +120°C
- Environment** : >40 dB between 30 MHz and 1 GHz
- Packaging** : bulk, in box of 100 pieces
- Locking screws** : UNC 4-40 thread

## 6 • “Snap together” plastic hood



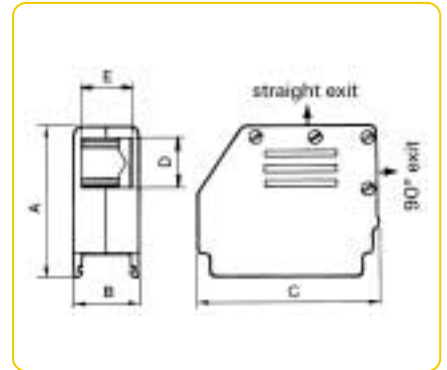
Shell size	Part number	A	B	C	D	E	with clamp		without clamp		
							F min	F max	G	F	G
E(9)	86303637BLF	47.3	31.3	32.4	24.99	15	1	5.5	8.5	7	8.5
A(15)	86303638BLF	47.3	30.8	40.7	33.32	15	4	7	12	11	12
B(25)	86303639BLF	47.3	37.3	54.4	47.04	15	4	7	12	11	12
C(37)	86303640BLF	47.3	36	70.9	63.5	15	4	7	12	11	12
D(50)	86303641BLF	47.3	37.8	71.2	61.11	15	4.4	11.5	15.5	14	18



- Material (size E,A,B,C)** : nylon (UL 94V2)
- Material (size D)** : thermoplastic (UL 94V2)
- Colour** : black
- Temperature range** : -40°C +95°C
- Packaging** : individual sets
- Locking screws** : UNC 4-40 thread

*Cable applications*

## 7 • Universal plastic hood with metal clamp for strain relief



Shell size	Part numbers black hood	Part numbers metalised hood	A	B	C	with clamp			without clamp	
						D	E		D	E
							min.	max.		
<b>E</b>	863093C09ALF	863093C09MLF	29.75	15.50	24.25	6	1.90	10.10	8	11.50
<b>A</b>	863093C15ALF	863093C15MLF	29.75	15.50	32.50	6	1.90	10.10	8	11.50
<b>B</b>	863093C25ALF	863093C25MLF	46.50	15.50	46.00	13.50	2.60	10.10	16	11.50
<b>C</b>	863093C37ALF	863093C37MLF	46.50	15.50	60.50	13.50	2.60	10.10	16	11.50
<b>D</b>	863093C50ALF	863093C50MLF	48.50	18.00	56.50	15.50	4.40	12.60	18	14.00

**Material (black hood):**  
self extinguishing UL 94V0 thermoplastic

**Material (metalised):**  
thermoplastic

**Temperature range:**  
-55°C +125°C

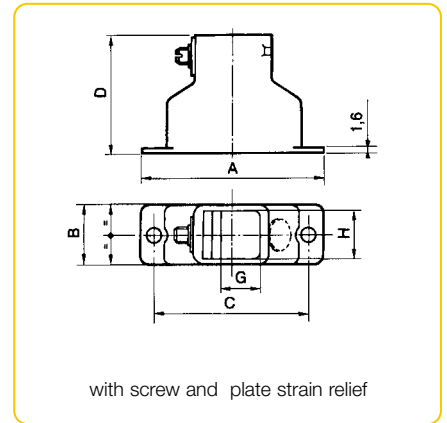
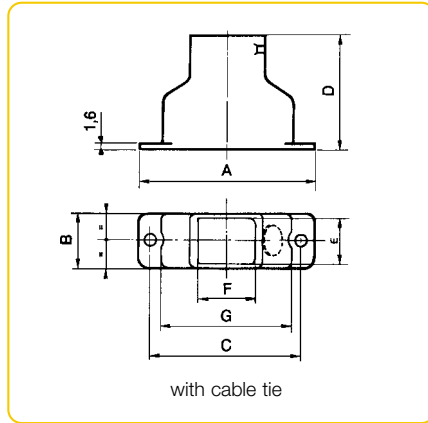
**Packaging:**  
individual sets

All dimensions in mm

*Cable applications*

## MONOBLOC PLASTIC HOODS FOR POTTING

### 8 • Straight exit



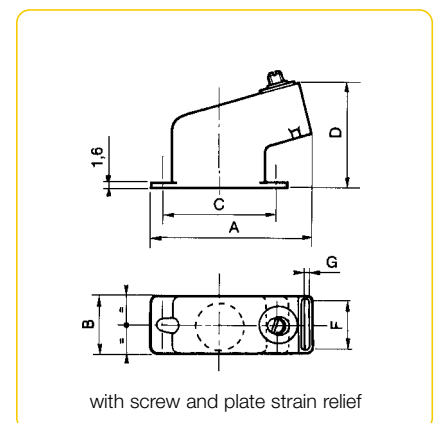
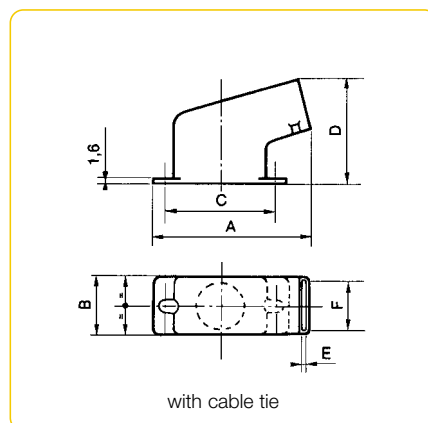
Shell size	Part numbers		A	B	C	D	E	F	G min.	G Max.	H
	Hood with cable tie	Hood with screw and plate									
E	863086BLF	86303920ALF	30.60	12.50	25.00	29.00	9.90	9.90	2.70	7.10	10.50
A	863021BLF	86303921ALF	38.90	12.50	33.32	29.00	9.90	11.90	4.50	9.10	10.50
B	863022BLF	86303922ALF	52.80	12.50	47.05	35.00	9.90	16.40	9.20	13.60	10.50
C	863023BLF	86303923ALF	69.10	12.50	63.50	41.00	9.90	23.40	9.20	20.60	10.50
D	863024BLF	86303924ALF	66.70	15.30	61.10	41.00	12.70	23.40	9.20	20.60	13.30

**Material:** self extinguishing UL rated 94 V0 thermoplastic

**Temperature range:** -55°C to +105°C

**Colour:** black

### 9 • Right angle exit



Shell size	Part numbers		A	B	C	D	E	F	G min.	G Max.
	Hood with cable tie	Hood with screw and plate								
E	86305002BLF	86303925ALF	30.60	12.50	25.00	26.20	10.50	10.50	2.70	7.10
A	863026BLF	86303926ALF	38.90	12.50	33.32	28.60	12.50	10.50	4.50	9.10
B	863027BLF	86303927ALF	52.80	12.50	47.05	36.40	17.00	10.50	9.20	13.60
C	863028BLF	86303928ALF	69.10	12.50	63.50	42.60	24.00	10.50	9.20	20.60
D	863029BLF	86303929ALF	66.70	15.30	61.10	41.60	24.00	13.30	9.20	20.60

**Material:** self extinguishing UL rated 94 V0 thermoplastic

**Temperature range:** -55°C to +105°C

**Colour:** black

*Cable applications*

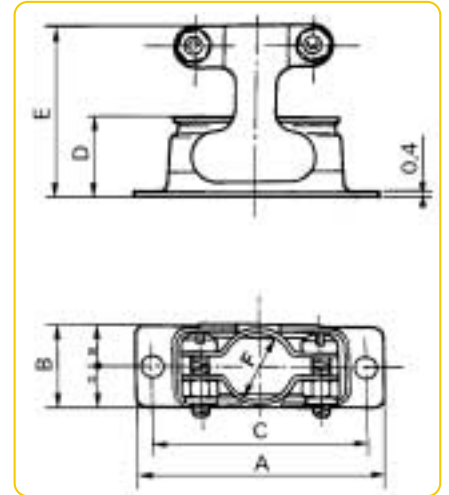
## HOOD WITH CABLE CLAMPS

### 10 • Metal hood with circular clamp and straight exit

**Material:** Steel

**Plating:** Yellow chromate cadmium

**Corrosion resistance:**  
50 hours exposure to salt spray



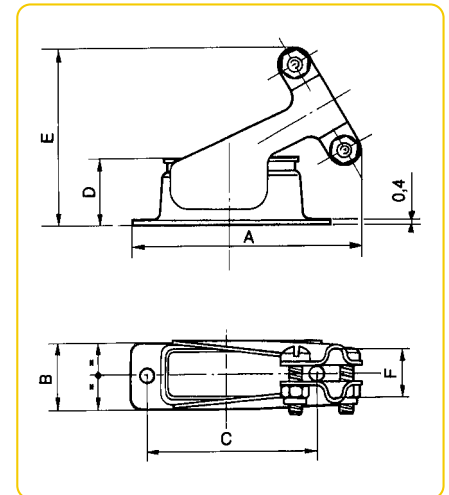
Shell size	Part numbers	A	B	C	D	E	F
E	863010	30.55	12.70	24.99	12.30	26.40	8.00
A	863011	38.89	12.70	33.32	12.30	26.40	10.00
B	863012	52.78	12.70	47.04	12.30	27.20	15.00
C	863013	69.06	12.70	63.50	12.30	27.20	18.00
D	863014	66.67	15.40	61.17	12.30	27.20	20.60

### 11 • Metal hood with circular clamp and 30° exit

**Material:** Steel

**Plating:** Yellow chromate cadmium

**Corrosion resistance:**  
50 hours exposure to salt spray



Shell size	Part numbers	A	B	C	D	E	F
E	863016	39.00	12.70	24.99	12.30	30.60	8.00
A	863017	43.10	12.70	32.32	12.30	32.50	10.00
B	863018	55.40	12.70	47.04	12.30	34.50	15.05
C	863019	75.30	12.70	63.50	12.30	37.50	18.00
D	863020	72.80	15.40	61.11	12.30	37.60	20.60

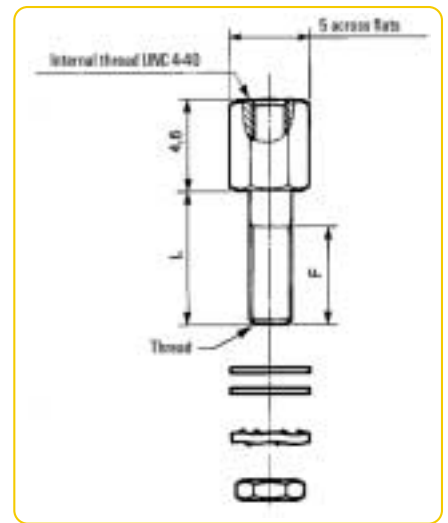
*PCB and Cable applications*

## 12 • Female screw locks

Part numbers	Thread	L Max.	F	Material
863001TLF	M3	8.30	6.90	Brass
86552153TLF	M3	8.30	6.90	Steel
863001017TLF	M3	6.30	5.00	Brass
863001061TLF	M3	13.00	12.00	Brass
863001060TLF	UNC 4-40	8.30	6.90	Brass

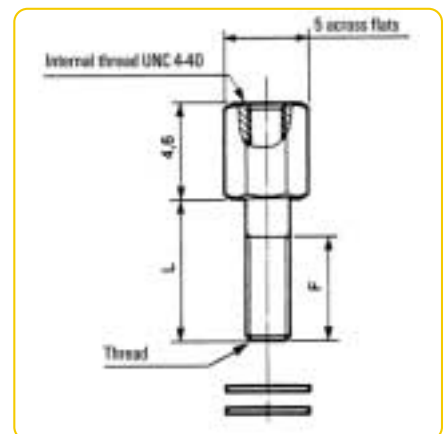
**Plating:** bright tin

**Corrosion resistance:** 50 hours exposure to salt spray



## 13 • Specific female screw locks for Delta D series

Part numbers	Thread	L Max.	F	Material
863001018TLF	M3	4.5	3.7	Steel
863001019TLF	UNC 4.40	4.5	3.7	Steel



## TORQUE FORCE

Material	Torque Max. (Nm)
Brass	0.5
Steel	0.7

## 14 • Male screw locks

Shell size	Connector type	Part numbers	
E	Male	863005ATLF	863009ATLF
	Female		
A	Male	863005ATLF	863004ATLF
	Female		
B	Male	863005ATLF	863009ATLF
	Female		
C	Male	863008ATLF	863002ATLF
	Female	863005ATLF	
D	Male	863015ATLF	863025ATLF
	Female	863003ATLF	

For use with connector without hood or with hood 7  
 For use with connector with hoods 10  
 For use with connector with hood 8

**Material:** steel

**Plating:** bright tin

**Corrosion resistance:** 50 hours exposure to salt spray

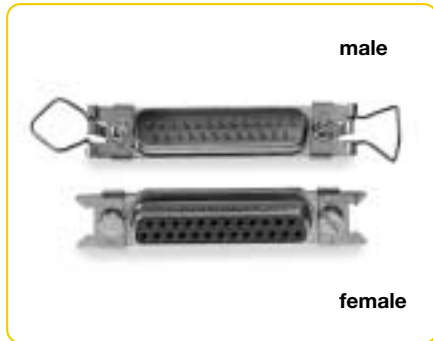
To obtain military plating (yellow chromate cadmium) exclude «TLF» in the part number (ex: 863005A)

**Thread:** UNC 4-40

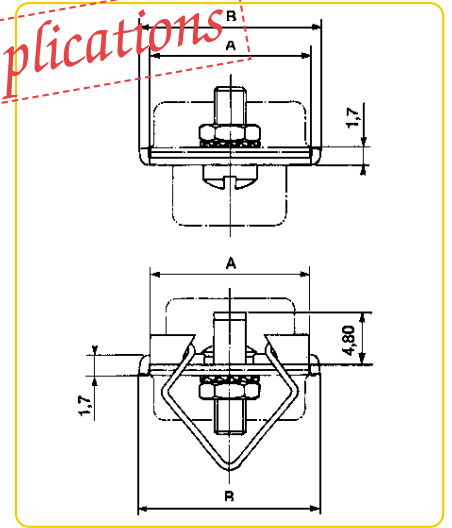


*PCB and Cable applications*

## 15 • Lever locks



*PCB applications*



**Material:** steel  
**Plating:** passivated

Shell size	A	B	M3 thread		UNC 4-40 thread	
			Female	Male	Female	Male
E, A, B, C	12.50	14.30	86303425LF	86552096LF	86303425060LF	86552098LF
D	15.30	17.10	86303426LF	86552097LF	86303426060LF	86552099LF

## 16 • Specific lever locks for straight Delta D series with harpoons

Shell size	M3 thread		UNC 4-40 thread	
	Female	Male	Female	Male
E, A, B, C	86303425LF	865520961ALF	86303425060LF	865520981ALF
D	86303426LF	865520971ALF	86303426060LF	865520991ALF



*PCB and Cable applications*

## 17 • Metal caps

Shell size	For use with connectors	Part numbers	Packaging
E	Male	86553148TLF	30
	Female	86553113TLF	30
		86553138TLF*	30
A	Male	86553149TLF	25
	Female	86553114TLF	25
		86553139TLF*	25
B	Male	86553150TLF	20
	Female	86553115TLF	20
		86553140TLF*	20
C	Male	86553151TLF	15
	Female	86553116TLF	15
		86553141TLF*	15
D	Male	86553152TLF	10
	Female	86553117TLF	10
		86553142TLF*	10



**Material:** steel

**Plating:** bright tin

To obtain military plating (yellow chromate cadmium) exclude "TLF" in part number (ex : 86553148A).

\* Sealed caps IP 65

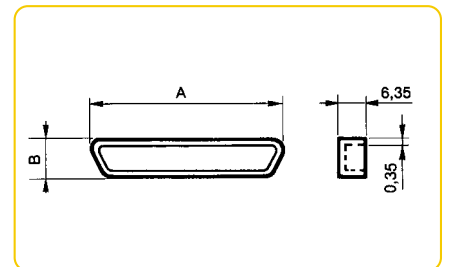
## 18 • Attaching cord for metal caps

86553156LF (length = 100 mm)

Packaging: individual



## 19 • Plastic dust cap



Shell size	For male connector	A	B	For female connector	A	B
E	70518CLF	19.17	10.30	70523CLF	17.77	9.00
A	70519CLF	27.50	10.30	70524CLF	26.10	9.00
B	70520CLF	41.67	10.70	70525CLF	39.82	9.00
C	70521CLF	58.13	10.70	70526CLF	56.28	9.00
D	70522CLF	55.49	13.40	70527CLF	53.89	11.85

**Material:** thermoplastic

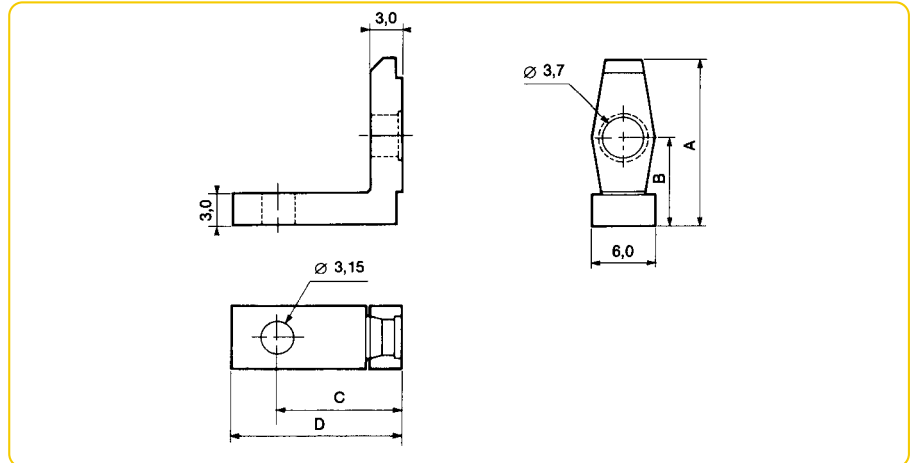
**Color:** red

Plastic mounting brackets are normally supplied with angled spill D-Sub connectors series D, DP, DM and DMW. However, both plastic and metal brackets can be ordered separately, using the part numbers listed below. These brackets are supplied with a screw and a nut. Order two assemblies for each connector.

## 20 • Plastic brackets

Shell size	Part numbers	A	B	C	D
E, A, B, C	86303714LF	13.20	7.20	10.74	13.90
D	86303715LF	16.00	8.60	12.09	16.50

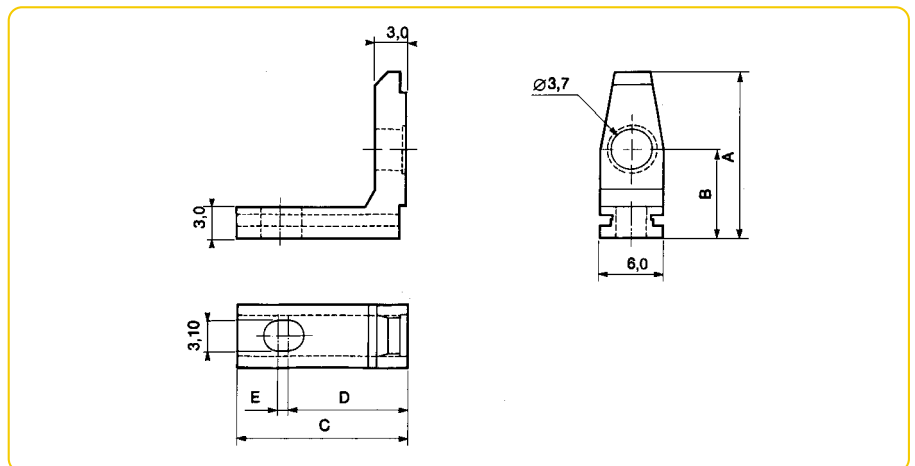
**Material:** UL rated 94V0 thermoplastic



## 21 • Plastic brackets with oblong mounting hole to PCB

Shell size	Part numbers	A	B	C	D	E
E, A, B, C	86303612LF	13.20	7.40	13.60	10.50	0.8
D	86303613LF	16.15	8.80	16.50	11.60	1.0

**Material:** UL 94V0 rated thermoplastic

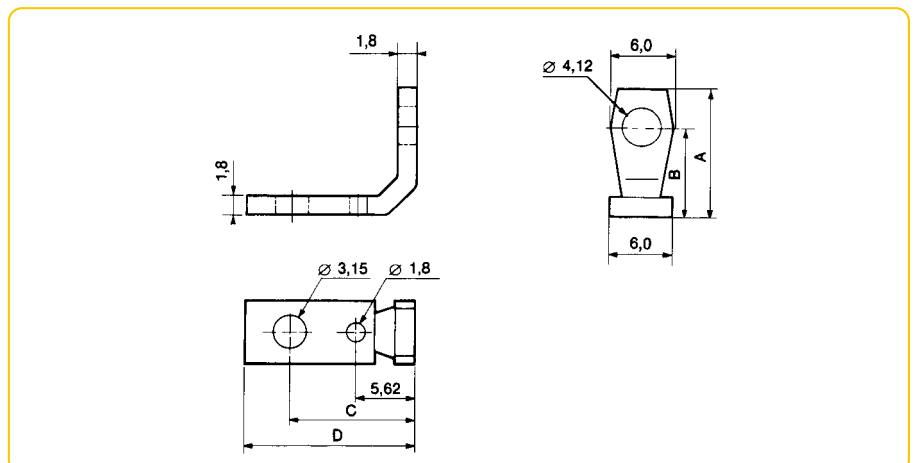


## 22 • Metal brackets

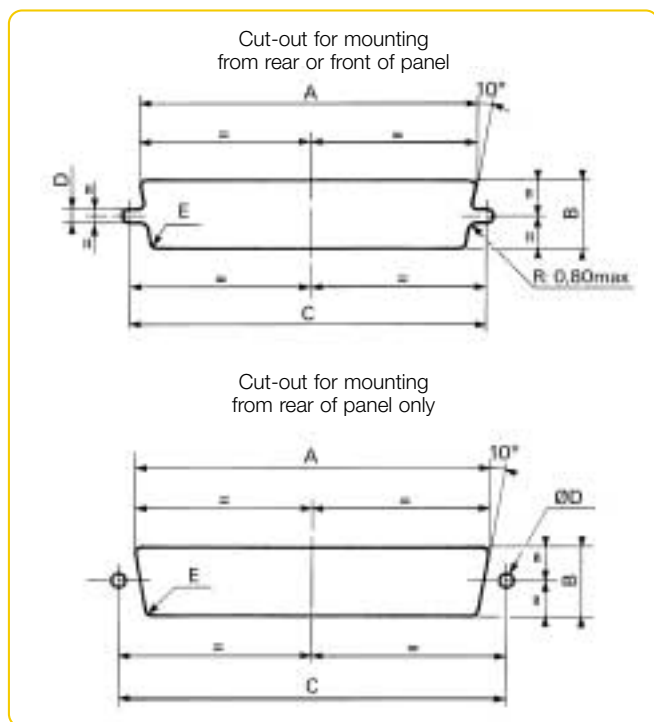
Shell size	Part numbers	A	B	C	D
E, A, B, C	86552008	10.55	7.20	10.74	13.90
D	86552009	12.55	8.60	12.09	16.50

**Material:** steel

**Platium:** yellow chromate cadmium



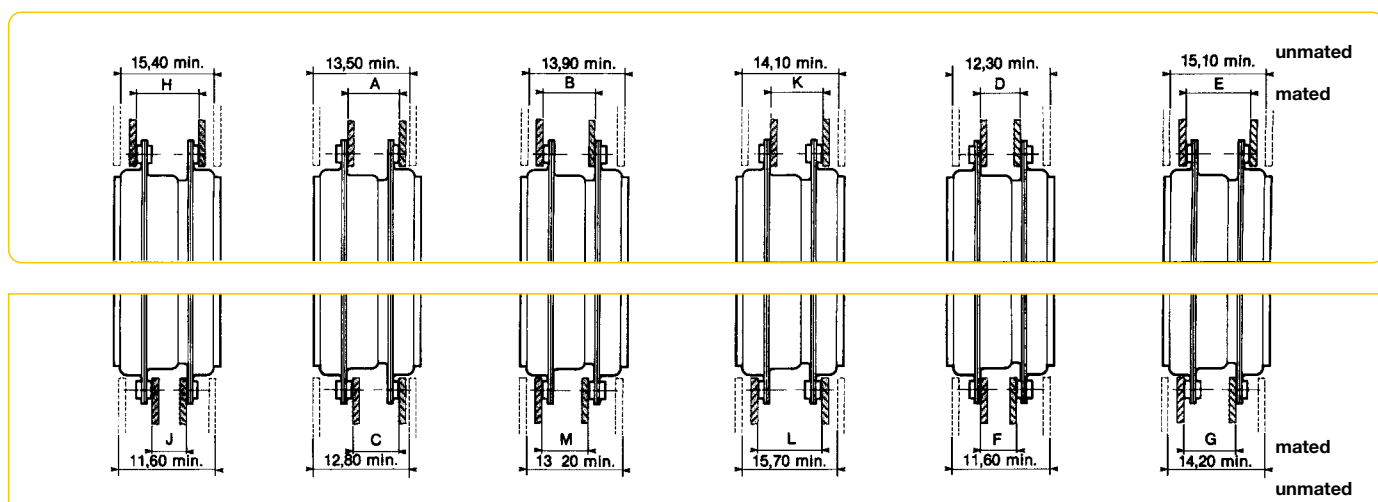
## PANEL CUT-OUT



Shell size	Type of mounting	Mounting position	A <sup>±0.2</sup>	B <sup>±0.2</sup>	C <sup>±0.2</sup>	D <sup>±0.01</sup>	E <sup>±0.1</sup>
E	rigid	front	22.20	13.00	25.00	3.00	2.10
		rear	20.50	11.40	25.00	3.00	3.30
	float	front	23.00	13.80	25.00	2.20	2.10
		rear	21.30	12.20	25.00	2.20	3.30
A	rigid	front	30.50	13.00	33.30	3.00	2.10
		rear	28.80	11.40	33.30	3.00	3.30
	float	front	31.30	13.80	33.30	2.20	2.10
		rear	29.60	12.20	33.30	2.20	3.30
B	rigid	front	44.30	13.00	47.00	3.00	2.10
		rear	42.50	11.40	47.00	3.00	3.30
	float	front	45.10	13.80	47.00	2.20	2.10
		rear	43.30	12.20	47.00	2.20	3.30
C	rigid	front	60.70	13.00	63.50	3.00	2.10
		rear	59.10	11.40	63.50	3.00	3.30
	float	front	61.50	13.80	63.50	2.20	2.10
		rear	59.80	12.20	63.50	2.20	3.30
D	rigid	front	58.30	15.80	61.50	3.00	2.10
		rear	56.30	14.10	61.50	3.00	3.30
	float	front	59.20	16.60	61.50	2.20	2.10
		rear	57.20	14.90	61.50	2.20	3.30

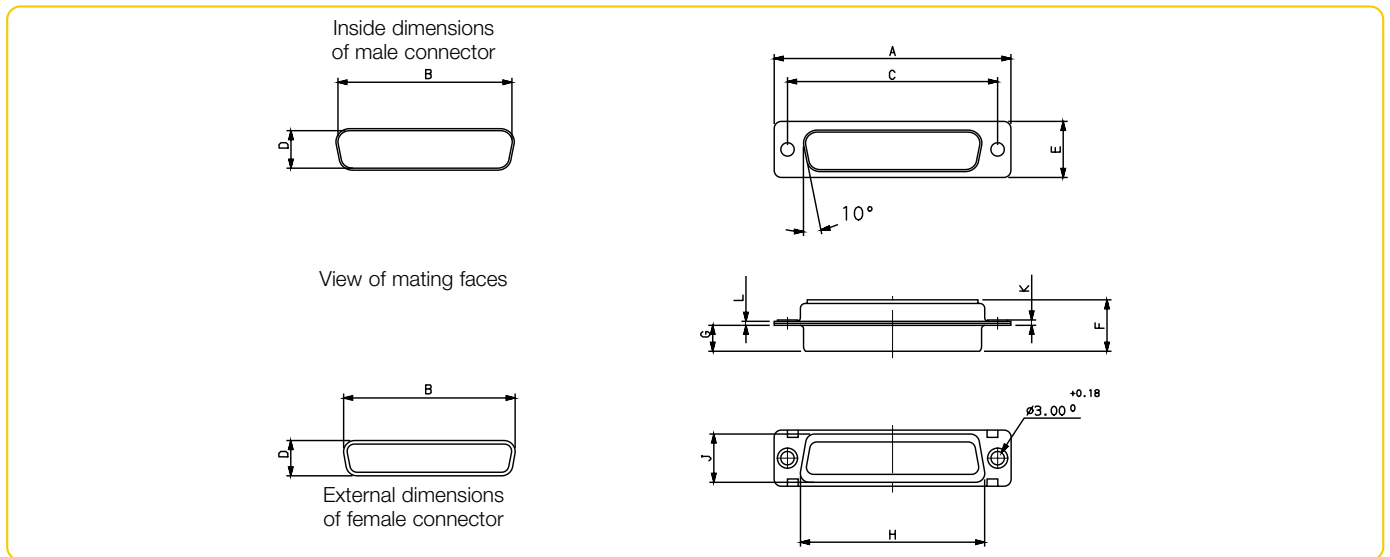
## PANEL MOUNTING

It is recommended that only **one of a pair** of connectors should be float mounted. Rigid mounted connectors require 2 screws Ø 3mm, float mounting connectors require 2 screws Ø 2 mm.



Shell size	A <sup>+0.6</sup> <sub>-0</sub>	B <sup>+0.6</sup> <sub>-0</sub>	C <sup>+0.6</sup> <sub>-0</sub>	D <sup>+0.6</sup> <sub>-0</sub>	E <sup>+0.6</sup> <sub>-0</sub>	F <sup>+0.6</sup> <sub>-0</sub>	G <sup>+0.6</sup> <sub>-0</sub>	H <sup>+0.6</sup> <sub>-0</sub>	J <sup>+0.6</sup> <sub>-0</sub>	K <sup>+0.6</sup> <sub>-0</sub>	L <sup>+0.6</sup> <sub>-0</sub>	M <sup>+0.6</sup> <sub>-0</sub>
E	7.65	7.65	6.85	6.45	8.85	5.65	8.25	9.45	5.65	8.25	9.45	6.85
A	7.65	7.65	6.85	6.45	8.85	5.65	8.25	9.45	5.65	8.25	9.45	6.85
B	7.55	7.55	6.75	6.35	8.85	5.55	8.15	9.35	5.55	8.15	9.35	6.75
C	7.55	7.95	6.75	6.35	9.15	5.55	8.35	9.55	5.55	8.15	9.75	7.15
D	7.55	7.95	6.75	6.35	9.15	5.55	8.35	9.55	5.55	8.15	9.75	7.15

## SHELL DIMENSIONS



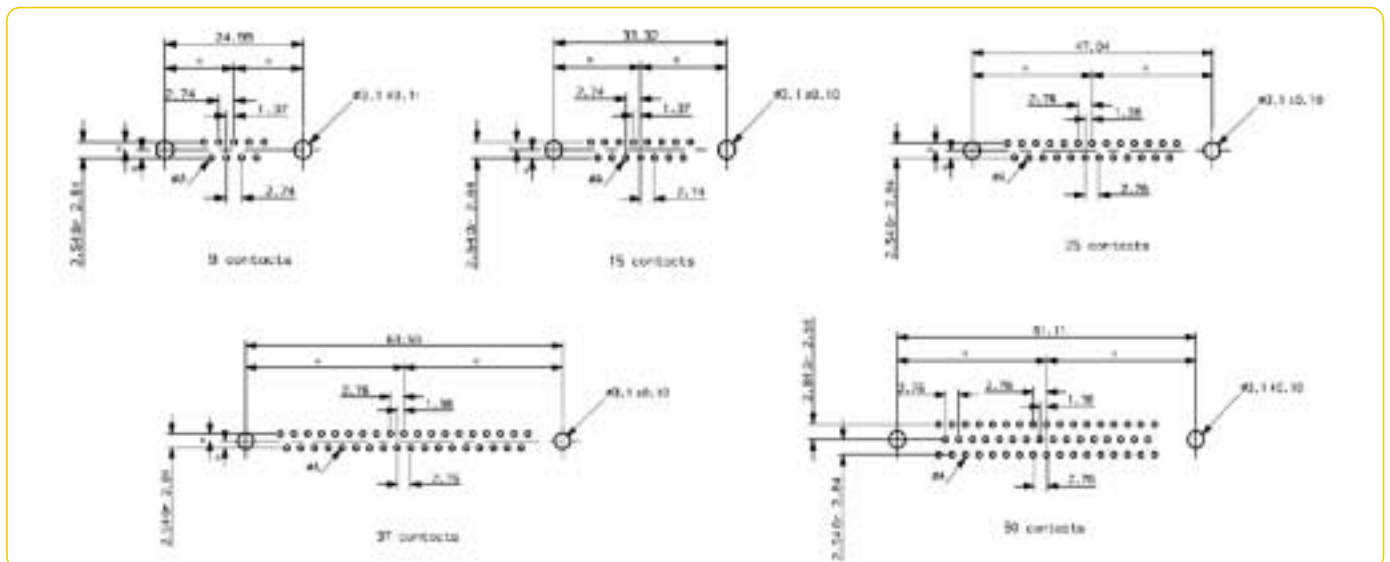
		A± 0.38	B± 0.13	C± 0.13	D± 0.13	E± 0.38	F Max.	G <sup>+0.25</sup> <sub>-0</sub>	H± 0.25	J± 0.25	K Max.	L± 0.12
E	P	30.81	16.91	24.99	8.35	12.55	10.99	5.85	19.27	10.71	1.50	0.90
	S	30.81	16.33	24.99	7.89	12.55	11.21	6.05	19.27	10.71	1.50	0.90
A	P	39.14	25.24	33.32	8.35	12.55	10.99	5.85	27.50	10.71	1.50	0.90
	S	39.14	24.66	33.32	7.89	12.55	11.21	6.05	27.50	10.71	1.50	0.90
B	P	53.03	38.96	47.04	8.35	12.55	11.07	5.75	41.27	10.71	1.50	0.90
	S	53.03	38.37	47.04	7.89	12.55	11.21	6.05	41.27	10.71	1.50	0.90
C	P	69.32	55.42	63.50	8.35	12.55	11.09	5.75	57.70	10.71	1.50	1.00
	S	69.32	54.83	63.50	7.89	12.55	11.21	6.05	57.70	10.71	1.50	0.90
D	P	66.93	52.80	61.11	11.20	15.37	11.09	5.75	55.32	13.56	1.70	1.00
	S	66.93	52.42	61.11	10.74	15.37	11.21	6.05	55.32	13.56	1.50	0.90

## PC CARD DRILLING DIMENSIONS (mm)

(for solder versions)

Note:  $\varnothing A = 0.8$  min. for D, DP

Note:  $\varnothing A = 0.9$  min. for Delta D, Compact D, HE501, HE507, HE508 and DP US footprint



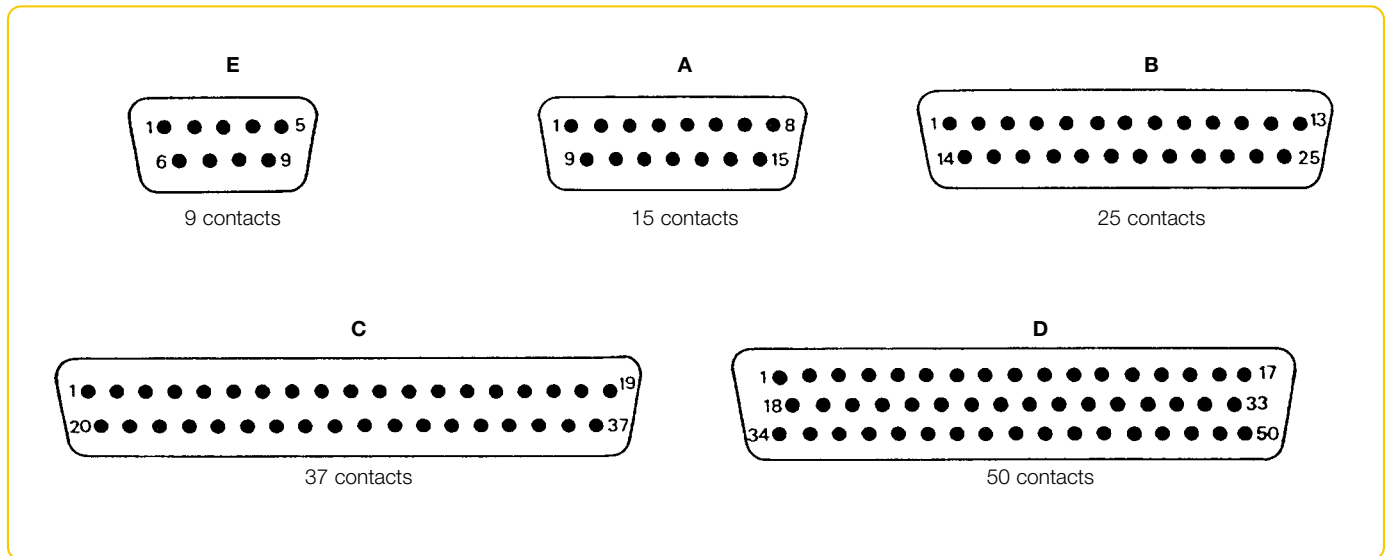
Note: pitch between row= 2.84 for straight spills

## LAYOUTS

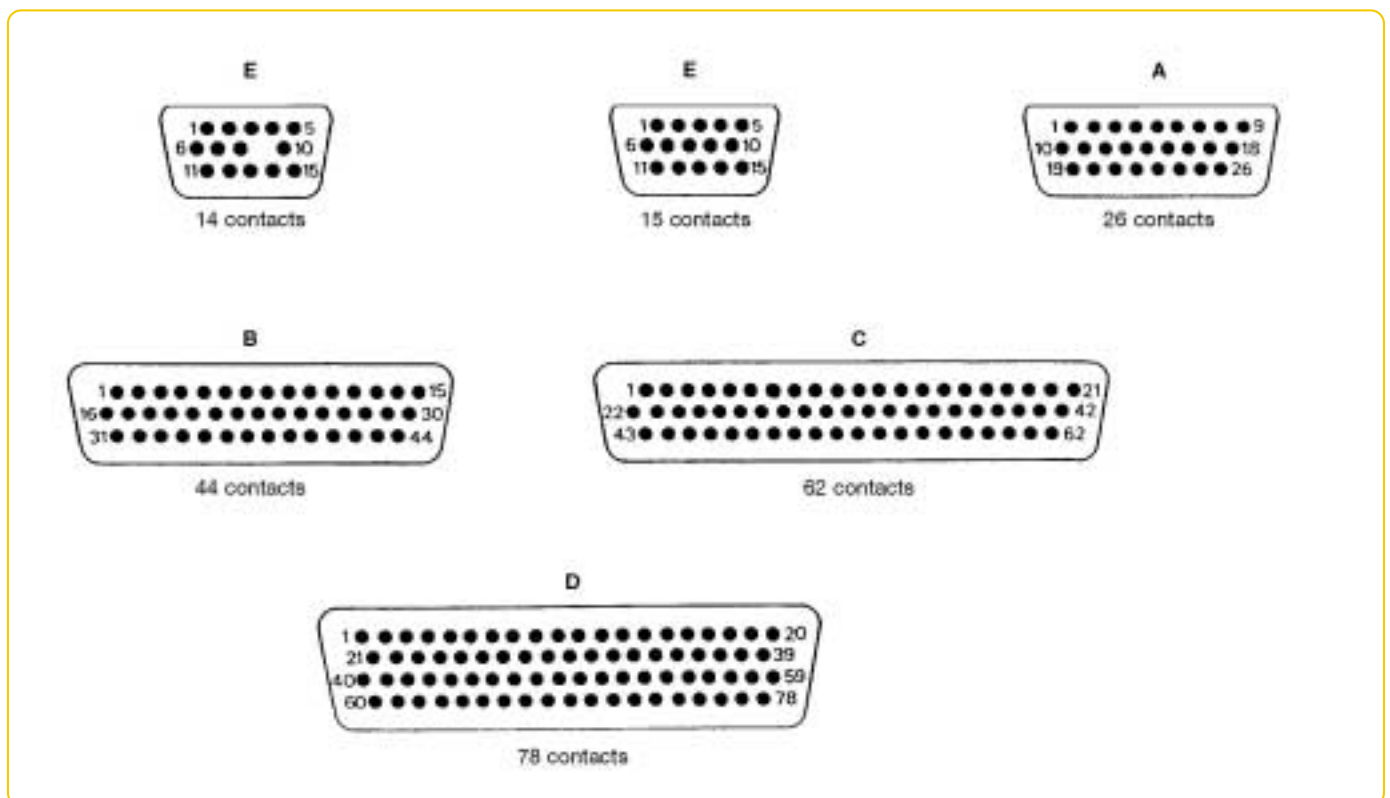
### Male insulator front view

Contacts are individually numbered on both sides of the insulator.

### Standard density connectors

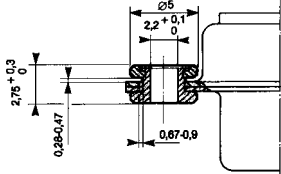

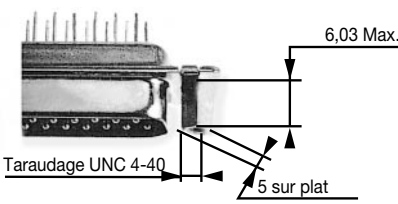
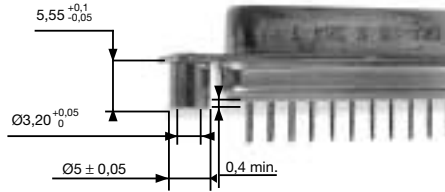


### High density connectors (Compact D)


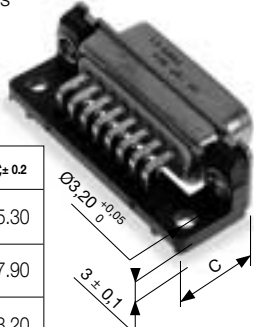
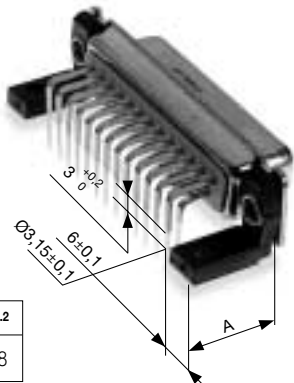
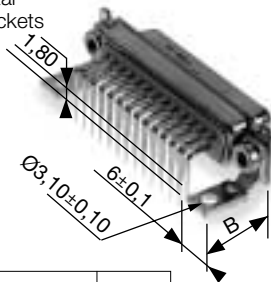

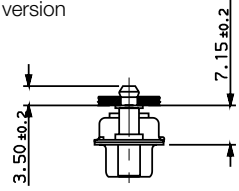
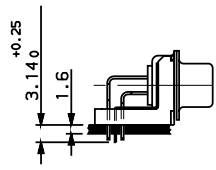

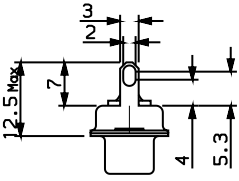


## MOUNTING OPTIONS for D, DP, DW, DM, DMW, 8656, 8657 series (dimensions in mm)

### Options 1

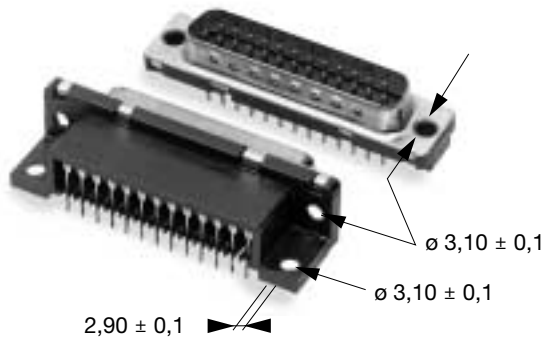
<p><b>F</b> Float mounting (only military series)</p> 	<p><b>L</b> Threaded insert M3 <b>O</b> Threaded insert UNC 4-40</p> 
<p><b>V</b> Female screw lock UNC 4-40</p> 	<p><b>S</b> Spacers riveted to shell</p> 

### Options 2

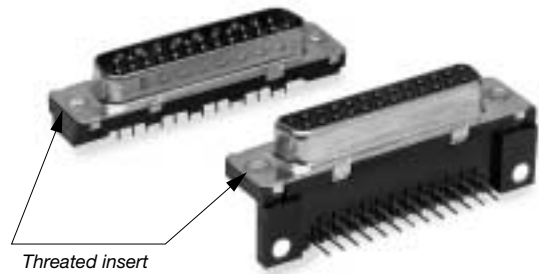
<p><b>C</b> Without bracket</p> 	<p><b>Blank</b> For <b>DM</b> and <b>DMW</b> series connectors are delivered with monobloc plastic bracket <b>P</b> For <b>DW</b> series</p>  <table border="1"> <thead> <tr> <th>Termination</th> <th>C ± 0.2</th> </tr> </thead> <tbody> <tr> <td rowspan="2">5</td> <td>9 to 37 contacts</td> <td>15.30</td> </tr> <tr> <td>50 contacts</td> <td>17.90</td> </tr> <tr> <td rowspan="2">9 (US standard)</td> <td>9 to 37 contacts</td> <td>13.20</td> </tr> <tr> <td>50 contacts</td> <td>15.70</td> </tr> </tbody> </table> <p>Bracket thickness = 3<sup>-0.1</sup></p>	Termination	C ± 0.2	5	9 to 37 contacts	15.30	50 contacts	17.90	9 (US standard)	9 to 37 contacts	13.20	50 contacts	15.70	<p><b>Blank</b> For <b>DP</b> series connectors are delivered with 2 separate plastic brackets (except for layout 50 with monobloc bracket)</p>  <table border="1"> <thead> <tr> <th>Layout</th> <th>A ± 0.2</th> </tr> </thead> <tbody> <tr> <td>9 to 37 contacts</td> <td>14.8</td> </tr> </tbody> </table>	Layout	A ± 0.2	9 to 37 contacts	14.8
Termination	C ± 0.2																	
5	9 to 37 contacts	15.30																
	50 contacts	17.90																
9 (US standard)	9 to 37 contacts	13.20																
	50 contacts	15.70																
Layout	A ± 0.2																	
9 to 37 contacts	14.8																	
<p><b>M</b> Metal brackets</p>  <table border="1"> <thead> <tr> <th>Termination</th> <th>B ± 0.2</th> </tr> </thead> <tbody> <tr> <td rowspan="2">5, 8, 14, 18</td> <td>9 to 37 contacts</td> <td>14.80</td> </tr> <tr> <td>50 contacts</td> <td>17.40</td> </tr> <tr> <td rowspan="2">9 (US standard)</td> <td>9 to 37 contacts</td> <td>13.19</td> </tr> <tr> <td>50 contacts</td> <td>15.99</td> </tr> </tbody> </table>	Termination	B ± 0.2	5, 8, 14, 18	9 to 37 contacts	14.80	50 contacts	17.40	9 (US standard)	9 to 37 contacts	13.19	50 contacts	15.99	<p><b>U</b> Monobloc plastic bracket with metal plate for electrical continuity (dim. same as above)</p> 	<p><b>G</b> Harpoon with electrical continuity For <b>DM</b> and <b>DP</b> series available in angled version only For <b>PCB</b> thickness of 1.6 Metallized hole ø 3.1<sup>+0.12</sup></p> <p>straight version</p>  <p>angled version</p>  <p>except 50 way</p>				
Termination	B ± 0.2																	
5, 8, 14, 18	9 to 37 contacts	14.80																
	50 contacts	17.40																
9 (US standard)	9 to 37 contacts	13.19																
	50 contacts	15.99																
<p><b>H</b> Shielding fingers for solder D series (not available on 50 way)</p> 																		

## MOUNTING OPTIONS for DELTA D and COMPACT D series

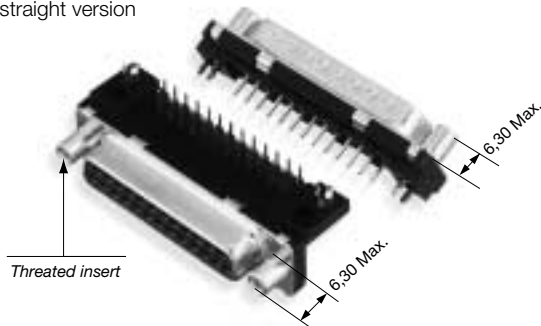
**PA** Standard hole without hardware



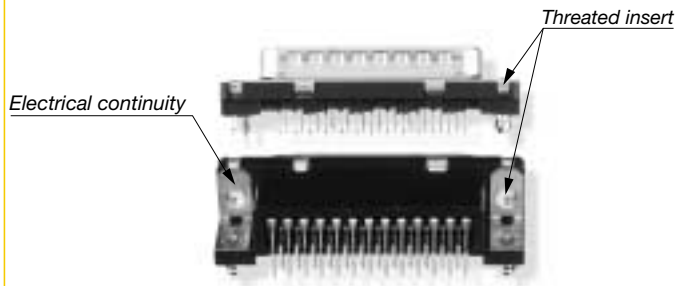
- PL** With threaded insert M3
- PX** With threaded insert UNC 4-40
- PV** With female screw UNC 4-40 (not represented)



- GV** Harpoons + Female screw UNC 4-40 + Electrical continuity through metal strip for angled version and monobloc hardware for straight version
- GI** Harpoons + Female screw M3 + Electrical continuity through metal strip for angled version and monobloc hardware for straight version



- GL** Thread M3
- GX** Thread UNC 4-40
- Harpoons + Insert + Electrical continuity through metal strip for angled version and monobloc hardware for straight version

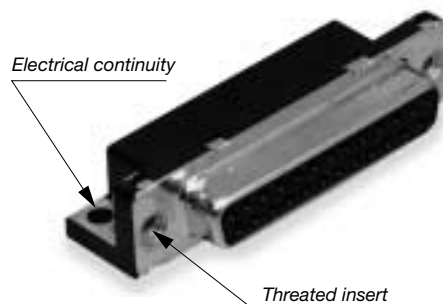


PCB thickness: 1,6 mm/Metallized toles  $\varnothing 3,1^{+0,1}$

**UV** Female screw UNC 4-40 + Electrical continuity through metal strip



- UL** Insert M3 + Electrical continuity through metal strip
- UX** Insert UNC 4-40 + Electrical continuity through metal strip
- UA** Electrical continuity through metal strip



**For more information on FCI sales offices,  
headquarters, agents and local distributors,  
visit [www.fci.com](http://www.fci.com)**



Americas - Tel.: 1 (800) 237 2374

Europe - Tel.: 33 1 39 49 21 83

Asia/Pacific - Tel.: 65 6549 6666



# Mouser Electronics

Authorized Distributor

Click to View Pricing, Inventory, Delivery & Lifecycle Information:

## FCI:

[D09P13A4PX00LF](#) [D09P13A6UV00LF](#) [D09P13A6UX00LF](#) [D09P13B4UV00LF](#) [D09P13B6UA00LF](#)  
[D09P13F6GL00LF](#) [D09P23B4GV00LF](#) [D09P23B6GV00LF](#) [D09P23B6PA00LF](#) [D09P90C6GX00LF](#)  
[D09P91C4GI00LF](#) [D09P91C4GL00LF](#) [D09P91C4GX00LF](#) [D09S13A4PV00LF](#) [D09S13A4UX00LF](#)  
[D09S13B6UA00LF](#) [D09S13B6UV00LF](#) [D09S13F6GL00LF](#) [D09S14A6GV00LF](#) [D09S23A4GV00LF](#)  
[D09S23A6GX00LF](#) [D09S23B6GV00LF](#) [D09S23B6PA00LF](#) [D09S24A6PX00LF](#) [D09S24B4PL00LF](#)  
[D09S24B4PV00LF](#) [D09S34A4GX00LF](#) [D09S34A6GV00LF](#) [D09S54A4GX00LF](#) [D09S90C4GL00LF](#)  
[D09S91C4GI00LF](#) [D09S91C4GL00LF](#) [D09S91C8PV00LF](#) [D15P13A6PV00LF](#) [D15P13B6UA00LF](#)  
[D15P13B6UX00LF](#) [D15P13F6GL00LF](#) [D15P24A4GI00LF](#) [D15P24B6PV00LF](#) [D15P34A4GX00LF](#) [D15S13B6UA00LF](#)  
[D15S13F6GL00LF](#) [D15S23A4GV00LF](#) [D15S23A4GX00LF](#) [D15S24A4PV00LF](#) [D15S24A4PX00LF](#)  
[D15S24B4PL00LF](#) [D15S33E6GL12LF](#) [D15S90C4GX00LF](#) [D15S90C6GL00LF](#) [D15S91C4GL00LF](#) [D15S91C6GI00LF](#)  
[D15S91C6GL00LF](#) [D15S91C6GX00LF](#) [D15S91C8PV00LF](#) [D25P13B6UA00LF](#) [D25P13F6GL00LF](#)  
[D25P23A4GV00LF](#) [D25P23A4GX00LF](#) [D25P23B4GV00LF](#) [D25P24A4PV00LF](#) [D25P24A6PV00LF](#)  
[D25P24B4PL00LF](#) [D25P82C6PL00LF](#) [D25P91C4GI00LF](#) [D25P91C4GL00LF](#) [D25P91C6GL00LF](#) [D25S13A4GI00LF](#)  
[D25S13A4PX00LF](#) [D25S13B6UA00LF](#) [D25S23A4GV00LF](#) [D25S23A4GX00LF](#) [D25S23A6GX00LF](#)  
[D25S23B6GL4ALF](#) [D25S24B4PV00LF](#) [D25S24B4PX00LF](#) [D25S24B6PL00LF](#) [D25S33E6GX09LF](#)  
[D25S90C6GL00LF](#) [D25S91C6GX00LF](#) [D37P13A4PV00LF](#) [D37P13A4UV00LF](#) [D37P23A4GX00LF](#)  
[D37P23A6GX00LF](#) [D37P24A6PV00LF](#) [D37P24A6PX00LF](#) [D37P24B6PV00LF](#) [D37P90C6GL00LF](#)  
[D37P91C6PI9CLF](#) [D37S13A4PL00LF](#) [D37S13A4PV00LF](#) [D37S13B4UV00LF](#) [D37S13F6GL00LF](#) [D37S23A4GX00LF](#)  
[D37S24B4PL00LF](#) [D37S24B4PX00LF](#) [D37S90C6GX00LF](#) [D37S91C4GL00LF](#) [D37S91C6GL00LF](#)  
[D37S91C6GX00LF](#)