

smiths connectors

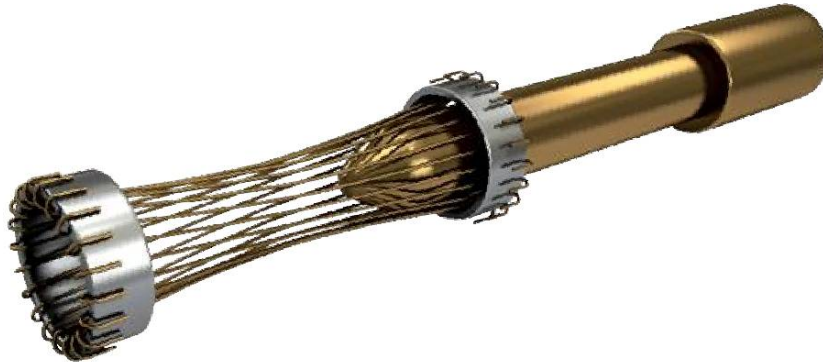
# M23 INDUSTRIAL Connector Series L & S

*Robust Circular Power & Signal Connectors*



# HYPERBOLOID TECHNOLOGY

Smiths Connectors offers an extensive range of superior contact technologies suitable for standard and custom solutions. Hypertac® (HYPERboloid conTACT) is the original superior performing hyperboloid contact technology designed for use in all applications and in harsh and demanding environments where high reliability and safety are critical. The inherent electrical and mechanical characteristics of the Hypertac hyperboloid contact ensures unrivalled performance in terms of reliability, number of mating cycles, low contact force and minimal contact resistance. The shape of the contact sleeve is formed by hyperbolically arranged contact wires, which align themselves elastically as contact lines around the pin, providing a number of linear contact paths.



## FEATURES

### LOW INSERTION/EXTRACTION FORCES

The angle of the socket wires allows tight control of the pin insertion and extraction forces. The spring wires are smoothly deflected to make line contact with the pin.

### LONG CONTACT LIFE

The smooth and light wiping action minimizes wear on the contact surfaces. Contacts perform up to 100,000 insertion/extraction cycles with minimal degradation in performance.

### LOWER CONTACT RESISTANCE

The design provides a far greater contact area and the wiping action of the wires insures a clean and polished contact surface. Our contact technology has half the resistance of conventional contact designs.

### HIGHER CURRENT RATINGS

The design parameters of the contact (e.g., the number, diameter and angle of the wires) may be modified for any requirement. The number of wires can be increased so the contact area is distributed over a larger surface. Thus, the high current carried by each wire because of its intimate line contact, can be multiplied many times.

### IMMUNITY TO SHOCK & VIBRATION

The low mass and resultant low inertia of the wires enable them to follow the most abrupt or extreme excursions of the pin without loss of contact. The contact area extends 360 degrees around the pin and is uniform over its entire length. The 3 dimensional symmetry of the Hypertac contact design guarantees electrical continuity in all circumstances.

## BENEFITS

### HIGH DENSITY INTERCONNECT SYSTEMS

Significant reductions in size and weight of sub-system designs. No additional hardware is required to overcome mating and un-mating forces.

### LOW COST OF OWNERSHIP

The Hypertac contact technology will surpass most product requirements, thus eliminating the burden and cost of having to replace the connector or the entire subsystem.

### LOW POWER CONSUMPTION

The lower contact resistance of our technology results in a lower voltage drop across the connector reducing the power consumption and heat generation within the system.

### MAXIMUM CONTACT PERFORMANCE

The lower contact resistance of the Hypertac contact reduces heat build-up; therefore Hypertac contacts are able to handle far greater current in smaller contact assemblies without the detrimental effects of high temperature.

### RELIABILITY UNDER HARSH ENVIRONMENTS

Harsh environmental conditions require connectors that will sustain their electrical integrity even under the most demanding conditions such as shock and vibration. The Hypertac contact provides unmatched stability in demanding environments when failure is not an option.

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## FEATURES

- ▶ **360° EMC shielding connection**
  - ▶ Outstanding electromagnetic compatibility
- ▶ **High performance in harsh environment**
  - ▶ O-rings for protection against vibration available
- ▶ **Various types of cable clamps**
  - ▶ For cable diameter Ø 5 - 18.5 mm
- ▶ **Variety of contacts**
  - ▶ Crimp contacts for all current cable cross sections available
  - ▶ Signal connectors with crimp and solder contacts
- ▶ **ROHS compliant**

## BENEFITS

- ▶ **Superior performance**
  - ▶ Hypertac® contact technology ensures immunity to shock and vibration, and minimal contact resistance
- ▶ **Stamped hyperboloid contacts on reels HCS™**
  - ▶ Favourable price and reduced processing costs
  - ▶ Fully automatic workable and reduced assembly time
  - ▶ High reliability wire B-crimp and additional insulation O-crimp
- ▶ **UL certified**
  - ▶ UL/CSA approval file No. 178462
- ▶ **Compatible with conventional M23 connectors**
- ▶ **Earth connection for power connectors**
  - ▶ For our connectors not for the application

# M23 INDUSTRIAL

M23 Circular Signal and Power Connectors in favour for of motor drive applications.

For the installation, crimp contacts are used which guarantee the highest possible quality of the connection, reducing the installation costs at the same time. In addition our circular connectors offer outstanding electromagnetic compatibility protection through a 360° screen connection.

### CRIMP TERMINATION

Hand-operated and fully automatic crimping tools can be used to assembly the crimp contacts. There are two different hyperboloid contact types available: Machined and stamped. These two types of contacts have different characteristics in terms of how the termination is made.

### MACHINED CONTACTS

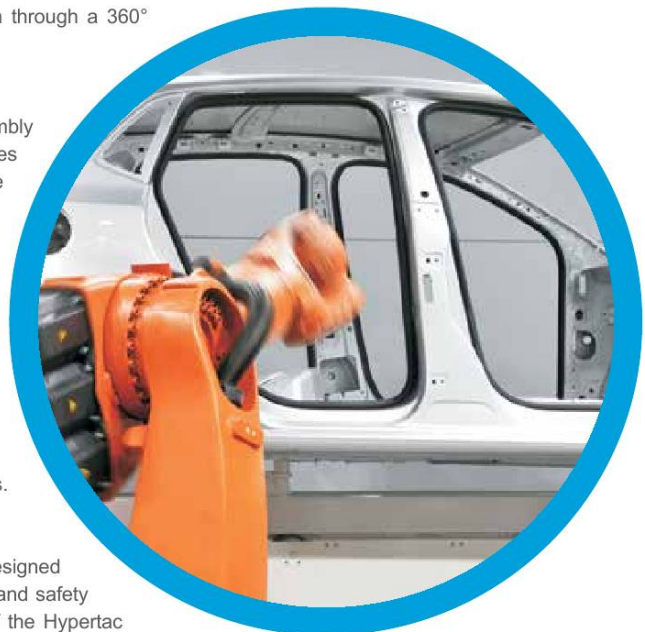
With this popular type of contact, the suitable contact size is matched to the wire gauge of the cable.

### STAMPED CONTACTS

The crimping sleeve allows a wider range of wire gauges to be crimped. Furthermore, the insertion and extraction force is usually lower by using stamped round pins and **HCS™** sockets. Stamped contacts are supplied on reels for use with automatic feed crimping tools.

### HYPERTAC HYPERBOLOID CONTACT

Hypertac is a superior performing hyperboloid contact technology designed for use in harsh and demanding environments where high reliability and safety are critical. The inherent electrical and mechanical characteristics of the Hypertac Hyperboloid contact ensures unrivalled performance in terms of reliability, number of mating cycles, low contact force and minimal contact resistance. These performance characteristics provide a real commercial benefit in terms of the total installed cost of ownership.





# TYPE OVERVIEW

## M23 POWER CONNECTORS SERIES L/A



CABLE PLUG WITH COUPLING RING



CABLE PLUG WITH COUPLING RING



CABLE PLUG WITH COUPLING RING



CABLE PLUG WITH COUPLING RING



CABLE PLUG WITH COUPLING RING



CABLE EXTENSION WITH EXTERNAL THREAD



CABLE EXTENSION WITH EXTERNAL THREAD



CABLE EXTENSION WITH EXTERNAL THREAD



CABLE EXTENSION WITH EXTERNAL THREAD



STRAIGHT RECEPTACLE WITH EXTERNAL THREAD



STRAIGHT RECEPTACLE WITH EXTERNAL THREAD



STRAIGHT RECEPTACLE WITH EXTERNAL THREAD



FIXED ANGLED STRAIGHT RECEPTACLE WITH EXTERNAL THREAD



ROTATABLE ANGLED STRAIGHT RECEPTACLE WITH EXTERNAL THREAD



ROTATABLE / FIXED ANGLED RECEPTACLE WITH EXTERNAL THREAD



PANEL FEED THROUGH WITH COUPLING RING

# TECHNICAL CHARACTERISTICS





## M23 POWER CONNECTORS SERIES L/A

		STANDARDS
Contact diameter 6poles	6 x Ø 2mm	–
Contact diameter 8poles	4 x Ø 2mm + 4 x Ø 1mm	–
Contact diameter 9poles	4 x Ø 2mm + 5 x Ø 1mm	–
<b>MATERIAL</b>		
Shell	CuZn alloy, zinc die-cast	–
Machined contacts	CuZn alloy	–
Stamped contacts	Tin bronze, stainless steel	–
Inserts	PA	–
Sealing	FKM	–
<b>FINISHES</b>		
Shell plating	Nickel-plated, chromium plated	–
Machined contacts plating	Gold plated	–
Stamped contacts plating	Partly gold plated	–
<b>PHYSICAL AND ENVIRONMENTAL</b>		
Operating temperature range	-40°C... +125°C	EN 61984
Storage conditions	-40°C... +70°C / min. humidity 40%	–
Environmental level	IP67 (mated)	DIN EN 60529
Contamination level	2	DIN 60664-1
Installation altitude	Up to 2000 m	EN 61984
Fire & Smoke	Recognition file No E 178462	UL 1977



# TECHNICAL CHARACTERISTICS

## M23 POWER CONNECTORS SERIES L/A

					STANDARDS	
Contact diameter						
	6 x 2	4 x 2	4 x 1	4 x 2 5 x 1		
<b>ELECTRICAL</b>						
Contact resistance (machined contacts)	$\leq 5.0 \text{ m}\Omega$ ( $\varnothing 1\text{mm}$ ) $\leq 3.0 \text{ m}\Omega$ ( $\varnothing 2\text{mm}$ )				–	
Contact resistance (stamped contacts)	$\leq 5.0 \text{ m}\Omega$ ( $\varnothing 1\text{mm}$ ) $\leq 5.0 \text{ m}\Omega$ ( $\varnothing 2\text{mm}$ )				–	
Overvoltage category	III				EN 61984	
<b>INNOVATION SERIES L (UL Version Series A)</b>						
Nominal voltage [Vrms]	630	630	250	–	DIN EN 60512	
	600	600	250	–	USR	
	600	600	250	–	CNR	
<b>SYSTEM 2000 SERIES L (UL Version Series A)</b>						
Nominal voltage [Vrms]	630	630	125	600	63	DIN EN 60512
	600	600	63	600	63	USR
	600	600	63	600	63	CNR
<b>VERSION 1i SERIES L</b>						
Nominal voltage [Vrms]	630	630	125	–	DIN EN 60512	
	600	600	125	–	USR	



Note:  
All dimensions are in mm.





# HOW TO ORDER

## M23 POWER CONNECTORS SERIES L/A



### 1 CONNECTOR FAMILY

<b>L</b>	M23 CIRCULAR POWER CONNECTORS, SIZE 1 SERIES L	<b>A</b>	M23 CIRCULAR POWER CONNECTORS, SIZE 1, SERIES A, UL/CSA RECOGNITION FILE E 178462
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### 2 CONNECTOR LAYOUT

INNOVATION			
<b>E E A</b>	STRAIGHT RECEPTACLE, NICKEL-PLATED LONG VERSION	<b>R F A</b>	EXTENSION, NICKEL-PLATED, THREADED CONNECTION M25x1.5, CABLE CLAMP Ø 7.7-14.5 mm
<b>E B A</b>	STRAIGHT RECEPTACLE, NICKEL-PLATED THREADED CONNECTION PG13.5	<b>D A A</b>	PANEL FEED THROUGH, NICKEL-PLATED, SQUARE FLANGE
<b>E D A</b>	STRAIGHT RECEPTACLE, NICKEL-PLATED THREADED CONNECTION M20x1.5	<b>P N A</b>	PLUG, NICKEL-PLATED, CABLE CLAMP Ø 7.7-14.5 mm
<b>E A B</b>	FIXED ANGLED RECEPTACLE, CHROMIUM-PLATED	<b>P R A</b>	PLUG, NICKEL-PLATED, SHORT VERSION, CABLE CLAMP Ø 7.7-14.5 mm
<b>R N A</b>	EXTENSION, NICKEL-PLATED, CABLE CLAMP Ø 7.7-14.5 mm	<b>P P A</b>	PLUG, NICKEL-PLATED, THREADED CONNECTION PG16, CABLE CLAMP Ø 7.7-14.5 mm
<b>R P A</b>	EXTENSION, NICKEL-PLATED, THREADED CONNECTION PG16, CABLE CLAMP Ø 7.7-14.5 mm	<b>P F A</b>	PLUG, NICKEL-PLATED, THREADED CONNECTION M25x1.5, CABLE CLAMP Ø 7.7-14.5 mm
SYSTEM 2000			
<b>E O B</b>	ROTATABLE ANGLED RECEPTACLE, CHROMIUM-PLATED	<b>R L A</b>	EXTENSION, NICKEL-PLATED, CABLE CLAMP Ø 7.7-18.5 mm
<b>F E A</b>	STRAIGHT RECEPTACLE, NICKEL-PLATED SHORT VERSION	<b>P L A</b>	PLUG, NICKEL-PLATED, CABLE CLAMP Ø 7.7-18.5 mm
VERSION 1i			
<b>G D G</b>	ROTATABLE ANGLED RECEPTACLE, CHROMIUM-PLATED	<b>V L A</b>	PLUG, NICKEL-PLATED, MACHINED SOCKETS, CABLE CLAMP Ø 5-16 mm
<b>G F G</b>	FIXED ANGLED RECEPTACLE, CHROMIUM-PLATED	<b>V M A</b>	PLUG, NICKEL-PLATED, STAMPED <b>HCS™</b> SOCKETS, CABLE CLAMP Ø 5-16 mm
<b>Y M A</b>	EXTENSION, NICKEL-PLATED, CABLE CLAMP Ø 5-16 mm		

### 3 INSERTS

INNOVATION			
<b>0 6 A</b>	6WAY, PINS 6 x Ø 2 mm, MACHINED CONTACTS	<b>0 8 A</b>	8WAY, PINS 4 x Ø 1 mm, 4 x Ø 2 mm, MACHINED CONTACTS
<b>0 6 B</b>	6WAY, SOCKETS 6 x Ø 2 mm; MACHINED CONTACTS	<b>0 8 B</b>	8WAY, SOCKETS 4 x Ø 1 mm, 4 x Ø 2 mm, MACHINED CONTACTS
SYSTEM 2000			
<b>0 6 C</b>	6WAY, PINS 6 x Ø 2 mm, MACHINED CONTACTS	<b>0 8 L</b>	8WAY, SOCKETS 4 x Ø 1 mm, 4 x Ø 2 mm, MACHINED CONTACTS
<b>0 6 D</b>	6WAY, SOCKETS 6 x Ø 2 mm, MACHINED CONTACTS	<b>0 9 A</b>	9WAY, PINS 5 x Ø 1 mm, 4 x Ø 2 mm, MACHINED CONTACTS
<b>0 8 K</b>	8WAY, PINS 4 x Ø 1 mm, 4 x Ø 2 mm, MACHINED CONTACTS	<b>0 9 B</b>	9WAY, SOCKETS 5 x Ø 1 mm, 4 x Ø 2 mm, MACHINED CONTACTS
VERSION 1i			
<b>0 6 E</b>	6WAY, PINS 6 x Ø 2 mm, MACHINED CONTACTS	<b>0 8 T</b>	8WAY, PINS 4 x Ø 1 mm, 4 x Ø 2 mm, MACHINED CONTACTS
<b>0 6 J</b>	6WAY, PINS 6 x Ø 2 mm, MACHINED CONTACTS	<b>0 8 X</b>	8WAY, PINS 4 x Ø 1 mm, 4 x Ø 2 mm, MACHINED CONTACTS
<b>0 6 M</b>	6WAY, SOCKETS 6 x Ø 2 mm, MACHINED CONTACTS	<b>0 8 Z</b>	8WAY, SOCKETS 4 x Ø 1 mm, 4 x Ø 2 mm, MACHINED CONTACTS
<b>0 6 F</b>	6WAY, SOCKETS 6 x Ø 2 mm, STAMPED <b>HCS™</b> CONTACTS	<b>0 8 U</b>	8WAY, SOCKETS 4 x Ø 1 mm, 4 x Ø 2 mm, STAMPED <b>HCS™</b> CONTACTS

# HOW TO ORDER

## M23 POWER CONNECTORS SERIES L/A

### 4 TERMINATION STYLE - CRIMP CONTACTS

<b>N</b>	<b>N</b>	<b>N</b>	<b>N</b>	WITHOUT CONTACTS, CONTACTS TO BE ORDERED SEPARATELY, ALL CONNECTOR DESIGNS
<b>INNOVATION</b>				
<b>M</b>	<b>R</b>	<b>C</b>	<b>N</b>	PINS - Ø 2 mm AWG 20-16, RECEPTACLE
<b>M</b>	<b>R</b>	<b>K</b>	<b>N</b>	PINS - Ø 2 mm AWG 18-14, RECEPTACLE
<b>M</b>	<b>R</b>	<b>E</b>	<b>C</b>	PINS - Ø 1 mm, AWG 24-18, Ø 2 mm AWG 20-16, RECEPTACLE
<b>M</b>	<b>R</b>	<b>E</b>	<b>K</b>	PINS - Ø 1 mm, AWG 24-18, Ø 2 mm AWG 18-14, RECEPTACLE
<b>M</b>	<b>R</b>	<b>P</b>	<b>N</b>	PINS - Ø 2 mm AWG 16-14, EXTENSION
<b>M</b>	<b>R</b>	<b>E</b>	<b>P</b>	PINS - Ø 1 mm, AWG 24-18, Ø 2 mm AWG 16-14, EXTENSION
<b>SYSTEM 2000</b>				
<b>M</b>	<b>R</b>	<b>S</b>	<b>N</b>	PINS - Ø 2 mm AWG 18-14, RECEPTACLE
<b>M</b>	<b>R</b>	<b>W</b>	<b>N</b>	PINS - Ø 2 mm AWG 12, RECEPTACLE
<b>M</b>	<b>R</b>	<b>R</b>	<b>S</b>	PINS - Ø 1 mm, AWG 24-18, Ø 2 mm AWG 18-14, RECEPTACLE
<b>M</b>	<b>R</b>	<b>R</b>	<b>W</b>	PINS - Ø 1 mm, AWG 24-18, Ø 2 mm AWG 12, RECEPTACLE
<b>M</b>	<b>R</b>	<b>T</b>	<b>U</b>	PINS - Ø 1 mm, AWG 22-18/16, Ø 2 mm AWG 18-14/12, EXTENSION
<b>VERSION 1i</b>				
<b>M</b>	<b>R</b>	<b>L</b>	<b>N</b>	PINS - Ø 2 mm AWG 24-16, RECEPTACLE
<b>M</b>	<b>R</b>	<b>Z</b>	<b>N</b>	PINS - Ø 2 mm AWG 16-14, RECEPTACLE
<b>M</b>	<b>R</b>	<b>W</b>	<b>N</b>	PINS - Ø 2 mm AWG 12, RECEPTACLE
<b>M</b>	<b>R</b>	<b>R</b>	<b>L</b>	PINS - Ø 1 mm, AWG 24-18, Ø 2 mm AWG 24-16, RECEPTACLE
<b>M</b>	<b>R</b>	<b>R</b>	<b>Z</b>	PINS - Ø 1 mm, AWG 24-18, Ø 2 mm AWG 16-14, RECEPTACLE
<b>M</b>	<b>R</b>	<b>R</b>	<b>W</b>	PINS - Ø 1 mm, AWG 24-18, Ø 2 mm AWG 12, RECEPTACLE
<b>M</b>	<b>R</b>	<b>J</b>	<b>N</b>	PINS - Ø 2 mm AWG 22-16, EXTENSION
<b>F</b>	<b>R</b>	<b>B</b>	<b>N</b>	HYPERTAC SOCKETS - Ø 2 mm AWG 20-16, PLUG
<b>F</b>	<b>R</b>	<b>D</b>	<b>N</b>	HYPERTAC SOCKETS - Ø 2 mm AWG 18-14, PLUG
<b>F</b>	<b>R</b>	<b>H</b>	<b>N</b>	HYPERTAC SOCKETS - Ø 2 mm AWG 18-14, PLUG (terminals with insulation sleeves)
<b>F</b>	<b>R</b>	<b>K</b>	<b>B</b>	HYPERTAC SOCKETS - Ø 1 mm, AWG 24-18, Ø 2 mm AWG 20-16, PLUG
<b>F</b>	<b>R</b>	<b>K</b>	<b>D</b>	HYPERTAC SOCKETS - Ø 1 mm, AWG 24-18, Ø 2 mm AWG 18-14, PLUG
<b>F</b>	<b>R</b>	<b>O</b>	<b>N</b>	HYPERTAC SOCKETS - Ø 2 mm AWG 18-14, PLUG
<b>F</b>	<b>R</b>	<b>R</b>	<b>N</b>	HYPERTAC SOCKETS - Ø 2 mm AWG 18-12, PLUG
<b>F</b>	<b>R</b>	<b>F</b>	<b>O</b>	HYPERTAC SOCKETS - Ø 1 mm, AWG 24-18, Ø 2 mm AWG 18-14, PLUG
<b>F</b>	<b>R</b>	<b>F</b>	<b>R</b>	HYPERTAC SOCKETS - Ø 1 mm, AWG 24-18, Ø 2 mm AWG 18-12, PLUG
<b>F</b>	<b>R</b>	<b>P</b>	<b>O</b>	HYPERTAC SOCKETS - Ø 1 mm, AWG 26-16, Ø 2 mm AWG 18-14, PLUG
<b>F</b>	<b>R</b>	<b>P</b>	<b>R</b>	HYPERTAC SOCKETS - Ø 1 mm, AWG 26-16, Ø 2 mm AWG 18-12, PLUG
<b>M</b>	<b>R</b>	<b>I</b>	<b>N</b>	PINS - Ø 2 mm AWG 16-12, EXTENSION
<b>M</b>	<b>R</b>	<b>Y</b>	<b>J</b>	PINS - Ø 1 mm, AWG 24-16, Ø 2 mm AWG 22-16, EXTENSION
<b>M</b>	<b>R</b>	<b>Y</b>	<b>I</b>	PINS - Ø 1 mm, AWG 24-16, Ø 2 mm AWG 16-12, EXTENSION
<b>F</b>	<b>R</b>	<b>H</b>	<b>N</b>	HYPERTAC SOCKETS - Ø 2 mm AWG 18-14, PLUG
<b>F</b>	<b>R</b>	<b>U</b>	<b>N</b>	HYPERTAC SOCKETS - Ø 2 mm AWG 14-12, HYPERTAC PLUG
<b>F</b>	<b>R</b>	<b>F</b>	<b>H</b>	HYPERTAC SOCKETS - Ø 1 mm, AWG 24-18, Ø 2 mm AWG 18-14, PLUG
<b>F</b>	<b>R</b>	<b>F</b>	<b>U</b>	HYPERTAC SOCKETS - Ø 1 mm, AWG 24-18, Ø 2 mm AWG 14-12, PLUG

### 5 CABLE CLAMPING

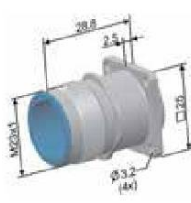
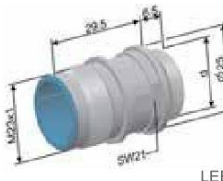

<b>0</b>	<b>0</b>	<b>0</b>	WITHOUT CABLE CLAMP, ALL RECEPTACLES & PANEL FEED THROUGH	<b>2</b>	<b>6</b>	<b>0</b>	VARIABLE CABLE CLAMP, EXTENSION & PLUG VERSION 1i, CLAMP RANGE 5 – 9 mm
<b>1</b>	<b>7</b>	<b>0</b>	VARIABLE CABLE CLAMP, EXTENSION & PLUG INNOVATION, CLAMP RANGE 7.7 – 14.5 mm	<b>2</b>	<b>6</b>	<b>1</b>	VARIABLE CABLE CLAMP, EXTENSION & PLUG VERSION 1i, CLAMP RANGE 9 – 15 mm
<b>2</b>	<b>1</b>	<b>3</b>	VARIABLE CABLE CLAMP, EXTENSION & PLUG SYSTEM 2000, CLAMP RANGE 7.7 – 18.5 mm	<b>2</b>	<b>6</b>	<b>2</b>	CABLE CLAMP, EXTENSION & PLUG VERSION 1i, CABLE DIAMETER 16 mm

### 6 VERSION NUMBER

<b>0</b>	<b>1</b>	DEPENDENT ON TYPE AND SPECIAL DESIGN, SEE DETAILED DESCRIPTION OF THE CONNECTOR DESIGN
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# AVAILABLE CONNECTORS

## ► POWER RECEPTACLES - INNOVATION



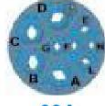
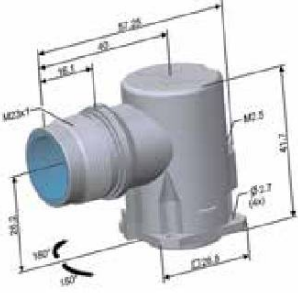

CONTACT ARRANGEMENTS VIEW MATING FACE				TERMINATION CROSS SECTION					CABLE CLAMP
		06A	08A	AWG 20-16	AWG 18-14	AWG 24-18 AWG 20-16	AWG 24-18 AWG 18-14	without contacts	
LAYOUT DESCRIPTION	PART NUMBER CODE	SHELL	INSERT						
Straight receptacle, long version 	LEEA AEEA*	06A	MRCN					NNNN	00002
			MRKN						
		08A		MREC					
				MREK				NNNN	
Straight receptacle, threaded connection  <p>d = LEBA/AEBA PG13.5 LEDA M20x1.5</p>	LEBA AEBA*	06A	MRCN					NNNN	000
			MRKN						
	LEDA	08A		MREC					
				MREK			NNNN		
Fixed angled receptacle 	LEAB AEAB*	06A	MRCN					NNNN	00002
			MRKN						
	08A		MREC						
			MREK				NNNN		

Dimensions are in mm

\* UL Version





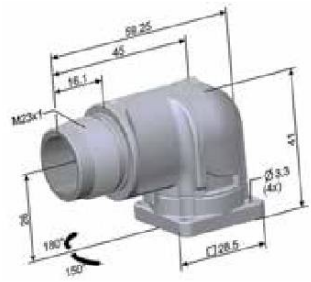
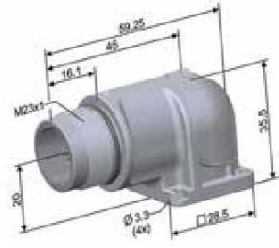
► POWER RECEPTACLES - SYSTEM 2000

CONTACT ARRANGEMENTS VIEW MATING FACE		  							CABLE CLAMP		
LAYOUT DESCRIPTION PART NUMBER CODE	SHELL	INSERT	TERMINATION CROSS SECTION								
			AWG 18-14	AWG 12	AEG 24-18 AWG 18-14	AWG 24-18 AWG 12	AWG 24-18 AWG 18-14	AWG 24-18 AWG 12	without contacts		
Rotatable angled receptacle 	LEOB AEOB*	06C	MRSN							000	
				MRWN							NNNN
		08K			MRRS						
						MRRW					NNNN
		09A					MRRS				
								MRRW			NNNN
											NNNN
Straight receptacle, short version 	LFEA AFEA*	06C	MRSN							000	
				MRWN							NNNN
		08K			MRRS						
						MRRW					NNNN
		09A					MRRS				
								MRRW			NNNN
											NNNN

Dimensions are in mm

\* UL Version




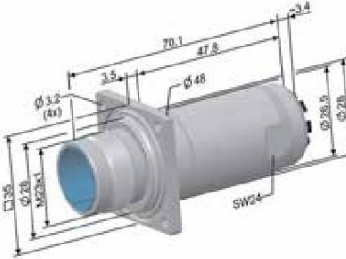
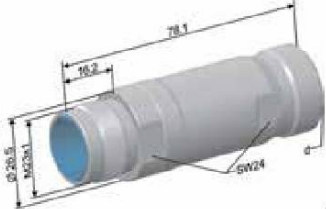
▶ POWER RECEPTACLES - VERSION 1i

CONTACT ARRANGEMENTS VIEW MATING FACE		 								
LAYOUT DESCRIPTION PART NUMBER CODE	SHELL	INSERT	TERMINATION CROSS SECTION						CABLE CLAMP	
			AWG 24-16	AWG 16-14	AWG 12	AWG 24-18 AWG 24-16	AWG 24-18 AWG 16-14	AG 24-18 AWG 12		without contacts
Rotatable angled receptacle 	LGDG*	06E	MRLN						000	
				MRZN						
					MRWN					NNNN
		08T				MRRL				
							MRRZ			
								MRRW		NNNN
Fixed angled receptacle 	LGFG*	06E	MRLN						000	
				MRZN						NNNN
					MRWN					
		08T				MRRL				
							MRRZ			
								MRRW		NNNN

Dimensions are in mm

\* UL Version

► POWER EXTENSIONS - INNOVATION

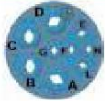
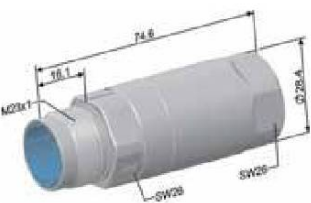
CONTACT ARRANGEMENTS VIEW MATING FACE			  <b>06A</b> <b>08A</b>		
LAYOUT DESCRIPTION PART NUMBER CODE	SHELL	INSERT	TERMINATION CROSS SECTION		CABLE CLAMP
			AWG 16-14	AWG 24-18 AWG 16-14	
Extension with cable clamp Ø 7.7-14.5 mm 	LRNA ARNA*	06A	MRPN		170
Extension with cable clamp Ø 7.7-14.5 mm, square flange 		LRNA ARNA*	06A	MRPN	
Extension with cable clamp Ø 7.7-14.5 mm, threaded connection  d = LRPA/ARPA PG16 LRFA/ARFA M25x1.5	LRPA ARPA*  LRFA ARFA*		06A	MRPN	NNNN
			08A	MREP	NNNN

Dimensions are in mm

\* UL Version



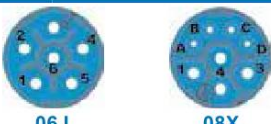
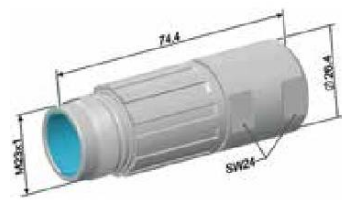
▶ **POWER EXTENSION - SYSTEM 2000**

CONTACT ARRANGEMENTS VIEW MATING FACE	 <p><b>09A</b></p>				
LAYOUT DESCRIPTION PART NUMBER CODE	SHELL	INSERT	TERMINATION CROSS SECTION		CABLE CLAMP
			AWG 22-18/16 AWG 18-14/12	without contacts	
Extension with cable clamp Ø 7.7-18.5 mm 	LRLA ARLA*	09A	MRTU		213
				NNNN	

Dimensions are in mm

\* UL Version

▶ **POWER EXTENSION - VERSION 1i**




CONTACT ARRANGEMENTS VIEW MATING FACE	 <p><b>06J</b>      <b>08X</b></p>							
LAYOUT DESCRIPTION PART NUMBER CODE	SHELL	INSERT	TERMINATION CROSS SECTION				CABLE CLAMP	
			AWG 22-16	AWG 16-12	AWG 24-16 AWG 22-16	AWG 24-16 AWG 16-12		without contacts
Extension with cable clamp Ø 5-16 mm 	LYMA*	06J	MRJN				260 261 262	
				MRIN				NNNN
						MRYJ		
		08X				MRYI		
								NNNN

Flange can be ordered separately <sup>1)</sup>

Dimensions are in mm

\* UL Version







► POWER PANEL FEED THROUGH - INNOVATION

CONTACT ARRANGEMENTS VIEW MATING FACE		 								
LAYOUT DESCRIPTION PART NUMBER CODE	SHELL	INSERT	TERMINATION CROSS SECTION					CABLE CLAMP		
			AWG 20-16	AWG 18-14	AWG 24-18 AWG20-16	AWG 24-18 AWG 18-14	without contacts			
Panel feed through, square flange 	LDAA ADAA*	06B	FRBN					000		
				FRDN					NNNN	
		08B				FRKB				
							FRKD			
									NNNN	
									NNNN	

Dimensions are in mm

\* UL Version





► POWER PLUGS - INNOVATION

CONTACT ARRANGEMENTS VIEW MATING FACE				 06B		 08B			
LAYOUT DESCRIPTION PART NUMBER CODE	SHELL	INSERT	TERMINATION CROSS SECTION						CABLE CLAMP
			AWG 20-16	AWG 18-14	AWG 18-14 <sup>1)</sup>	AWG 24-18 AWG 20-16	AWG 24-18 AWG 18-14	without contacts	
Plug with cable clamp Ø 7.7-14.5 mm 	LPNA APNA*	06B	FRBN						170
		08B		FRDN	FRHN			NNNN	
Plug with cable clamp Ø 7.7-14.5 mm, square flange 	LPNA APNA*	06B	FRBN					NNNN	17003
		08B		FRDN	FRHN			NNNN	
Plug with cable clamp Ø 7.7-14.5mm, short version 	LPRA APRA*	06B	FRBN					NNNN	170
		08B		FRDN		FRKB		NNNN	
Plug with cable clamp Ø 7.7-14.5 mm and threaded connection  d = LPPA/APPA PG16 LPFA/APFA M25x1.5	LPPA APPA* LPFA APFA*	06B	FRBN					NNNN	000
		08B		FRDN	FRHN			NNNN	

Dimensions are in mm

\* UL Version

▶ POWER PLUGS - SYSTEM 2000


CONTACT ARRANGEMENTS VIEW MATING FACE		  																						
LAYOUT DESCRIPTION PART NUMBER CODE	SHELL	INSERT	TERMINATION CROSS SECTION								CABLE CLAMP													
			AWG 18-14	AWG 18-12	AWG 24-18	AWG 18-14	AWG 24-18	AWG 18-12	AWG 26-16	AWG 18-14		AWG 26-16	AWG 18-12	without contacts										
Plug with cable clamp Ø 7.7-18.5 mm  	LPLA APLA*	06D	FRON																					
				FRRN																				
																							NNNN	
		08L					FRFO																	
								FRFR																
									FRPO															
											FRPR													
																							NNNN	
																								NNNN
		09B																						
																								FRFO
																								FRPR
																						NNNN		

Dimensions are in mm

\* UL Version




► POWER PLUGS - VERSION 1i

CONTACT ARRANGEMENTS VIEW MATING FACE				06M		08Z				
LAYOUT DESCRIPTION PART NUMBER CODE	SHELL	INSERT	TERMINATION CROSS SECTION					CABLE CLAMP		
			AWG 18-14	AWG 14-12	AWG 24-18 AWG 18-14	AWG 24-18 AWG 14-12	without contacts			
Plug with cable clamp Ø 5-16 mm, machined sockets   Flange can be ordered separately <sup>1)</sup>	LVLA*	06M	FRHN					260 261 262		
				FRUN					NNNN	
		08Z				FRFH				
							FRFU			NNNN

Dimensions are in mm








\* UL Version

CONTACT ARRANGEMENTS VIEW MATING FACE				06F		08U			
LAYOUT DESCRIPTION PART NUMBER CODE	SHELL	INSERT	CONTACTS TO BE ORDERED SEPARATELY STAMPED HCS™ CONTACTS ON REELS <sup>2)</sup>					CABLE CLAMP	
			without contacts						
Plug with cable clamp Ø 5-16 mm, stamped HCS™ sockets   Flange can be ordered separately <sup>1)</sup>	LVMA*	06F				NNNN	260 261 262		
		08U				NNNN			

Dimensions are in mm





\* UL Version

# CABLE CLAMPS & ACCESSORIES





<p>CABLE CLAMP NO. 170 FOR LPNA/LRNA</p>	<p>CLAMP RANGE</p>	
	<p>With reducing sleeve from Ø 7.7–12 mm Without reducing sleeve from Ø 11–14.5 mm Can be used for shielded and non-shielded cables</p>	
<p>CABLE CLAMP NO. 213 FOR LPLA/LRLA</p>	<p>CLAMP RANGE</p>	
	<p>Onion ring seal for different cable diameters from Ø 7.5–18.5 mm Thickness of shielding up to Ø 1 mm Can be used for shielded and non-shielded cables</p>	
<p>CABLE CLAMP NO. 260/261/262 FOR LVMA/LYMA</p>	<p>CLAMP RANGE</p>	
	<p>.260 cable diameter Ø 5–9 mm .261 cable diameter Ø 9–15 mm .262 cable diameter Ø 16mm Can be used for shielded and non-shielded cables</p>	
<p>THREAD PROTECTION CAP</p>	<p>PART NUMBER</p>	
	<p>031.001053.1000</p>	
<p>DUST SHIELD CAPS</p>	<p>PART NUMBER</p>	<p>DESCRIPTION</p>
	<p>C/BEL/1</p>	<p>Dust shield cap for extension and receptacle</p>
	<p>C/BEL/7</p>	<p>Dust shield cap for extension and receptacle with chain 125 mm</p>
	<p>C/BEL/5</p>	<p>Dust shield cap for plug with chain 125 mm</p>

# CONTACTS

## ▶ MACHINED PINS INNOVATION

TYPE		E	C	K	P
Contact diameter [mm]		1	2	2	2
PART NUMBER AND LAYOUT		021.129.1020 	021.101.2000 	021.147.2000 	021.279.1020 
Termination cross section <sup>1)</sup>	[AWG] [mm <sup>2</sup> ]	24 – 18 0.24 – 1	20 – 16 0.5 – 1.5	18 – 14 0.75 – 2.5	16 – 14 1.5 – 2.5
Nominal current @ 20°C [A] <sup>2)</sup>	VDE USR CNR	9 8 7	20 20 14	20 20 14	20 20 14
Crimping tool		B150	B151	B151	B151
Positioner		B055/A	B157	B157	B165

## ▶ HYPERTAC SOCKETS INNOVATION






TYPE		K	B	D	H
Contact diameter [mm]		1	2	2	2
PART NUMBER AND LAYOUT		020.232.2000 	020.090.1020 	020.105.1020 	020.123.1020 
Termination cross section <sup>1)</sup>	[AWG] [mm <sup>2</sup> ]	24 – 18 0.24 – 1	20 – 16 0.5 – 1.5	18 – 14 0.75 – 2.5	18 – 14 0.75 – 2.5
Nominal current @ 20°C [A]	VDE USR CNR	9 8 7	20 20 14	22 20 14	22 20 12
Crimping tool		B150	B151	B151	B151
Positioner		B055/A	B157	B157	B154

Note:





<sup>1)</sup> Mentioned crimp ranges are recommendations and only valid with flexible wires H05(07)V-K [mm<sup>2</sup>] acc. to DIN VDE 0281/0282 pp and with non compressed standard cables and wires acc. to DIN VDE 0295. It is possible that due to another structure of wired further cross sections and currents can be processed.

<sup>2)</sup> data only valid when plugged with Hypertac sockets.

► MACHINED PINS SYSTEM 2000

TYPE		R	T	S	W	U
Contact diameter [mm]		1	1	2	2	2
PART NUMBER AND LAYOUT		021.382.1020 	021.385.1020 	021.380.1020 	021.415.1020 	021.384.1020 
Termination cross section <sup>1)</sup>	[AWG] [mm <sup>2</sup> ]	24 – 18 0.24 – 1	22 – 18/16 0.34 – 1/1.5	18 – 14 0.75 – 2.5	12 4	18 – 14/12 0.75 – 2.5/4
Nominal current @ 20°C [A] <sup>2)</sup>	VDE USR CNR	9 9 7.5	9 9 7.5	30 30 18	30 30 18	30 30 18
Crimping tool		B151	B151	B179	B179	B179
Positioner		B245	B252	B245	B245	B252

► HYPERTAC SOCKETS SYSTEM 2000

TYPE		F	P	O	R
Contact diameter [mm]		1	1	2	2
PART NUMBER AND LAYOUT		020.256.1020 	020.332.1020 	020.331.1020 	020.281.1020 
Termination cross section <sup>1)</sup>	[AWG] [mm <sup>2</sup> ]	24 – 18 0.24 – 1	26 - 16 0.14 – 1.5	18 – 14 0.75 – 2.5	18 – 12 1 – 4
Nominal current @ 20°C [A]	VDE USR CNR	9 9 7.5	9 9 7.5	30 30 18	30 30 18
Crimping tool		B150	B151	B151	B179
Positioner		B055/A	B252	B252	B252

Note:

<sup>1)</sup> Mentioned crimp ranges are recommendations and only valid with flexible wires H05(07)V-K [mm<sup>2</sup>] acc. to DIN VDE 0281/0282 pp and with non compressed standard cables and wires acc. to DIN VDE 0295.





It is possible that due to another structure of wired further cross sections and currents can be processed.

<sup>2)</sup> data only valid when plugged with Hypertac sockets.





► MACHINED PINS VERSION 1i

TYPE		R	W	L	Z
Contact diameter [mm]		1	2	2	2
PART NUMBER AND LAYOUT		021.382.1020 	021415.1020 	021.001009.1020 	021.001004.1020 
Termination cross section <sup>1)</sup>	[AWG]	24 – 18	12	24 – 16	16 – 14
	[mm <sup>2</sup> ]	0.24 – 1.0	4	0.24 – 1.5	1.5 – 2.5
Nominal current @ 20°C [A] <sup>2)</sup>	VDE	9	30	30	30
	USR	9	30	30	30
	CNR	7.5	18	-	-
Crimping tool		B151	B179	B151	B179
Positioner		B245	B245	B297	B297

► MACHINED PINS VERSION 1i




TYPE		Y	J	I
Contact diameter [mm]		1	2	2
PART NUMBER AND LAYOUT		021.001017.1020 	021.001025.1020 	021.001018.1020 
Termination cross section <sup>1)</sup>	[AWG]	24 - 16	22 - 16	16 - 12
	[mm <sup>2</sup> ]	0.24 - 1.5	0.34 - 1.5	1.5 - 4
Nominal current @ 20°C [A] <sup>2)</sup>	VDE	9	30	30
	USR	8	30	30
	CNR	-	-	-
Crimping tool		B151	B151	B179
Positioner		B306	B305	B305

Note:

<sup>1)</sup> Mentioned crimp ranges are recommendations and only valid with flexible wires H05(07)V-K [mm<sup>2</sup>] acc. to DIN VDE 0281/0282 pp and with non compressed standard cables and wires acc. to DIN VDE 0295. It is possible that due to another structure of wired further cross sections and currents can be processed.

<sup>2)</sup> data only valid when plugged with Hypertac sockets.

► **HYPERTAC SOCKETS VERSION 1i**





TYPE		F	H	U
Contact diameter [mm]		1	2	2
PART NUMBER AND LAYOUT		020.256.1020 	020.123.1020 	020.001011.1020 
Termination cross section <sup>1)</sup>	[AWG] [mm <sup>2</sup> ]	24 – 18 0.24 – 1	18 – 14 0.75 – 2.5	14 – 12 2.5 – 4.0
Nominal current @ 20°C [A]	VDE	9	20	30
	USR	9	12	-
	CNR	7.5	-	-
Crimping tool		B150	B151	B151
Positioner		B055/A	B154	B341

**Note:**




<sup>1)</sup> Mentioned crimp ranges are recommendations and only valid with flexible wires H05(07)V-K [mm<sup>2</sup>] acc. to DIN VDE 0281/0282 pp and with non compressed standard cables and wires acc. to DIN VDE 0295. It is possible that due to another structure of wired further cross sections and currents can be processed.



► **HCS™ STAMPED SOCKETS Ø 1 mm VERSION 1i**

TYPE		A	B	C	D
Contact diameter [mm]		1	1	1	1
PART NUMBER AND LAYOUT		020.000376.2000 	020.000377.2000 	020.000378.2000 	020.000379.2000 
Termination cross section <sup>1)</sup>	[AWG] [mm <sup>2</sup> ]	32 – 28 0.03 – 0.08	28 – 24 0.08 – 0.2	24 – 20 0.2 – 0.5	- 0.75 - 1.0
Nominal current @ 20°C [A]	VDE	4	6	8	8
	USR	9	9	9	9
	CNR	-	-	-	-
Hand crimping tool with feeder line for small reels		B287/32-28	B287/28-24	B287/24-20	B287/0.75-1
Applicator for Schäfer/AMP crimping machines		B288/32-28	B288/28-24	B288/24-20	B288/0.75-1
Applicator for Kirsten PP3 crimping machine		B286/32-28	B286/28-24	B286/24-20	B286/0.75-1
Number of contacts on reel	[Pieces]	9000	9000	9000	9000
Number of contacts on small reel	[Pieces]	300	300	300	300

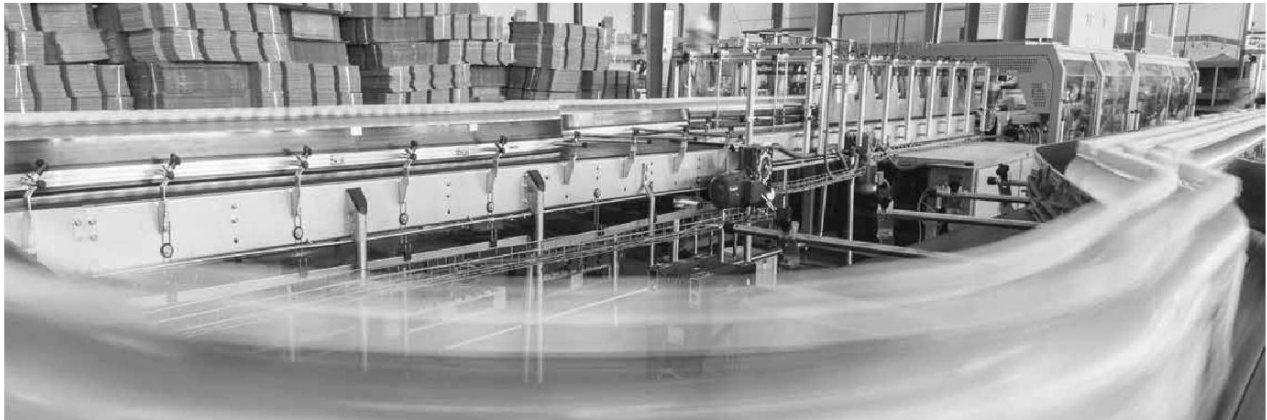
► **HCS™ STAMPED SOCKETS Ø 2 mm VERSION 1i**

TYPE		E	F	G
Contact diameter [mm]		2	2	2
PART NUMBER AND LAYOUT		020.001001.2000 	020.001002.2000 	020.001003.2000 
Termination cross section <sup>1)</sup>	[AWG] [mm <sup>2</sup> ]	20 - 18 0.5 - 1.0	18 - 14 1.0 - 2.0	- 2.5 - 4.0
Nominal current @ 20°C [A]	VDE	12	18	30
	USR	12	18	30
	CNR	-	-	-
Hand crimping tool with feeder line for small reels		B295/0.5-1	B295/1.0-2.0	B295/2.5-4.0
Applicator for Schäfer/AMP crimping machines		on demand	on demand	on demand
Applicator for Kirsten PP3 crimping machine		on demand	on demand	on demand
Number of contacts on reel	[Pieces]	4000	3500	2500
Number of contacts on small reel	[Pieces]	150	150	150

Note:

<sup>1)</sup> Mentioned crimp ranges are recommendations and only valid with flexible wires H05(07)V-K [mm<sup>2</sup>] acc. to DIN VDE 0281/0282 pp and with non compressed standard cables and wires acc. to DIN VDE 0295. It is possible that due to another structure of wired further cross sections and currents can be processed.

# APPLICATIONS



## Servos & Drives



- ▶ High current and voltage ratings
- ▶ Shock and vibration proof
- ▶ Low contact resistance
- ▶ Minimal insertion/extraction forces
- ▶ Earth connection for power connectors

## Controls



- ▶ Hyperboloid contacts
- ▶ IP67 sealing
- ▶ Low electrical resistance
- ▶ Long life
- ▶ Low rate of wear

## Encoders



- ▶ High signal integrity ensuring failure free performance
- ▶ 360° EMC shielding connection
- ▶ Stamped hyperboloid contacts on reels
- ▶ High performance in harsh environment

## Machinery



- ▶ Minimum service requirements
- ▶ Low wear of plating surfaces for long life
- ▶ High current rating
- ▶ Uniform electrical and mechanical characteristics over a high number of operations

## Conveyance



- ▶ Resistance against oxidation and corrosion
- ▶ Superior reliability for critical applications
- ▶ Protection against humidity and pollution
- ▶ Customized keying options to prevent mismatching

## Robotics

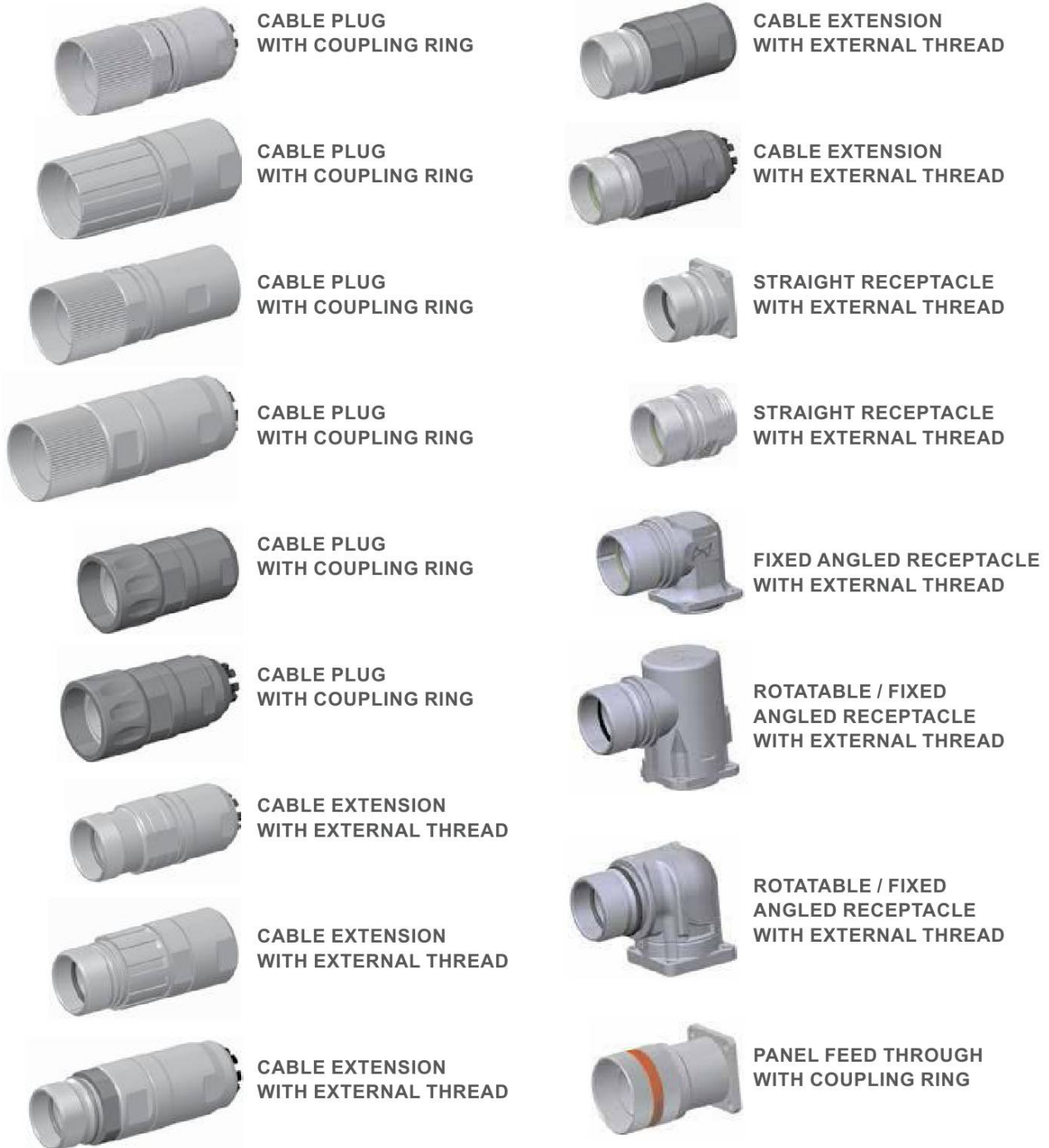


- ▶ Various types of cable clamps
- ▶ Broad variety of contacts
- ▶ Quick and easy exchange of the connector system
- ▶ ROHS compliant
- ▶ UL certified



# TYPE OVERVIEW

## M23 SIGNAL CONNECTORS SERIES S



# TECHNICAL CHARACTERISTICS











## M23 SIGNAL CONNECTORS SERIES S








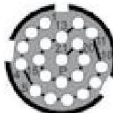







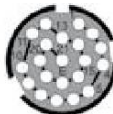









		STANDARDS
Contact diameter 6/7poles	6/7 x Ø 2mm	–
Contact diameter 9poles	8 x Ø 1mm + 1 x Ø 2mm 6 x Ø 1mm + 3 x Ø 2mm 9 x Ø 1mm	– – –
Contact diameter 12/16/17poles	12/16/17 x Ø 1mm	–
Contact diameter 21poles	21 x Ø 0.6mm	–
<b>MATERIAL</b>		
Shell	CuZn alloy, zinc die-cast, plastic	–
Machined contacts	CuZn alloy	–
Stamped contacts	Tin bronze, stainless steel	–
Inserts	PA, PPS, PBT	–
Sealing	FKM, NBR	–
<b>FINISHES</b>		
Shell plating	Nickel-plated, chromium plated	–
Machined contacts plating	Gold plated	–
Stamped contacts plating	partly gold plated	–
<b>ELECTRICAL</b>		
Contact resistance	<5 mΩ	
Overvoltage categorie	III	EN 61984
<b>PHYSICAL AND ENVIRONMENTAL</b>		
Operating temperature range	-40°C ... 125°C	EN 61984
Storage conditions	-40°C ... 70°C / min. humidity 40%	-
Environmental level	IP67 (mated)	DIN EN 60529
Contamination level	3	DIN 60664-1
Installation altitude	up to 2000 m	EN 61984
Fire & Smoke	Recognition file No E 178462	UL 1977



# CONTACT ARRANGEMENTS VIEW MATING FACE

## M23 SIGNAL CONNECTORS SERIES S

CONTACT ARRANGEMENTS		6 x 2	6 x 2	7 x 2	
INSERTS FOR PLUGS AND PANEL FEED THROUGH CRIMP CONTACTS			 <b>06H</b>	 <b>07D</b>	
Part number			030.704.2000	030.637.2000	
INSERTS FOR RECEPTACLES AND EXTENSIONS CRIMP CONTACTS			 <b>06G</b>	 <b>07C</b>	
Part number			030.697.2000	030.635.2000	
Operating Voltage [V]	VDE (DC)		120	120	
	IEC 60449 VDE (AC)		50	50	
	UL 1977 USR (AC)		125	125	
INSERTS FOR RECEPTACLES IP67 UNMATED CRIMP PINS					
Part number		SEAB/UEAB SFOA/SFRA			
Operating Voltage [V]	VDE (DC)				
	IEC 60449 VDE (AC)				
	UL 1977 USR (AC)				
INSERTS FOR RECEPTACLES AND EXTENSIONS SOLDER CONTACTS		 <b>06C</b>	 <b>06E</b>	 <b>07A</b>	
Part number		with pins	060.031.2000	1.164	1.085
		with Hypertac sockets	060.032.2000	1.139	1.086
INSERTS FOR PLUGS SOLDER CONTACTS		 <b>06D</b>	 <b>06F</b>	 <b>07B</b>	
Part number		with pins	060.029.2000	1.141	1.083
		with Hypertac sockets	060.030.2000	1.142	1.084
Operating Voltage [V]	VDE (DC)		120	63	120
	IEC 60449 VDE (AC)		50	50	50

8 x 1 1 x 2	6 x 1 3 x 2	9 x 1	12 x 1	12 x 1 code 20°	16 x 1	17 x 1	21 x 0.6
							
<b>09F</b>	<b>09H</b>	<b>09K</b>	<b>12S</b>	<b>12U</b>	<b>16B</b>	<b>17H</b>	<b>21B</b>
030.627.2000	030.629.2000	030.677.2000	030.619.2000	030.623.2000	030.691.2000	030.679.2000	030.226.1000
							
<b>09E</b>	<b>09G</b>	<b>09J</b>	<b>12T</b>	<b>12V</b>	<b>16A</b>	<b>17G</b>	<b>21A</b>
030.625.2000	030.631.2000	030.676.2000	030.617.2000	030.621.2000	030.701.2000	030.678.2000	030.225.1000
120	120	120	120	120	120	120	32
50	50	50	50	50	50	50	32
125	125	125	125	125	125	125	-
							
			<b>12A</b>	<b>12C</b>		<b>17A</b>	
			030.400.2000 030.505.2000	030.387.2000 030.506.2000		030.479.2000 030.504.2000	
			120	120		120	
			50	50		50	
			125	125		125	
							
<b>09C</b>		<b>09A</b>	<b>12E</b>				
1.053		1.129	1.023				
1.056		1.130	1.050				
							
<b>09D</b>		<b>09B</b>	<b>12F</b>				
1.055		1.132	1.049				
1.054		1.120	1.024				
16		120	120				
16		50	50				



# HOW TO ORDER

## M23 SIGNAL CONNECTORS SERIES S



### 1 CONNECTOR FAMILY

**S** M23 CIRCULAR SIGNAL CONNECTORS, SERIES S

### 2 CONNECTOR LAYOUT

#### RECEPTACLES IP67 UNMATED

F	O	A	STRAIGHT RECEPTACLE, NICKEL-PLATED
F	R	A	STRAIGHT RECEPTACLE, NICKEL-PLATED, THREADED CONNECTION PG13.5
E	A	B	FIXED ANGLED RECEPTACLE, CHROMIUM-PLATED

#### RECEPTACLES CRIMP

F	F	A	STRAIGHT RECEPTACLE, NICKEL-PLATED
F	Q	A	STRAIGHT RECEPTACLE, NICKEL-PLATED, THREADED CONNECTION M20x1.5
F	L	A	STRAIGHT RECEPTACLE, NICKEL-PLATED, THREADED CONNECTION PG13.5
F	T	A	STRAIGHT RECEPTACLE, NICKEL-PLATED, 21WAY ONLY

#### EXTENSIONS SOLDER & CRIMP

R	N	A	EXTENSION, NICKEL-PLATED, CABLE CLAMP Ø 5.5-12 mm
R	R	A	EXTENSION, NICKEL-PLATED, CABLE CLAMP Ø 5.5-12 mm, THREADED CONNECTION M20x1.5
R	G	A	EXTENSION, NICKEL-PLATED, CABLE CLAMP Ø 5.5-12 mm, THREADED CONNECTION PG13.5

#### EXTENSIONS CRIMP

R	F	A	EXTENSION, NICKEL-PLATED, CABLE CLAMP Ø 7.7-14.5 mm
V	R	A	EXTENSION, NICKEL-PLATED, CABLE CLAMP Ø 5-16 mm

#### PLUGS SOLDER & CRIMP

P	N	A	PLUG, NICKEL-PLATED, CABLE CLAMP Ø 5.5-12 mm
P	R	A	PLUG, NICKEL-PLATED, CABLE CLAMP Ø 5.5-12 mm, THREADED CONNECTION M20x1.5
P	G	A	PLUG, NICKEL-PLATED, CABLE CLAMP Ø 5.5-12 mm, THREADED CONNECTION PG13.5
P	H	A	ANGLED PLUG, NICKEL-PLATED, CABLE CLAMP Ø 7.7-14.5 mm

#### PLUGS CRIMP

P	F	A	PLUG, NICKEL-PLATED, CABLE CLAMP Ø 7.7-14.5 mm
V	P	A	PLUG, NICKEL-PLATED, CABLE CLAMP Ø 5-16 mm

#### RECEPTACLES SOLDER

F	N	A	STRAIGHT RECEPTACLE, NICKEL-PLATED
F	P	A	STRAIGHT RECEPTACLE, NICKEL-PLATED, THREADED CONNECTION PG13.5

#### RECEPTACLES CRIMP

F	M	B	ROTATABLE ANGLED RECEPTACLE, CHROMIUM-PLATED
F	Y	B	FIXED ANGLED RECEPTACLE, CHROMIUM-PLATED
G	D	G	ROTATABLE ANGLED RECEPTACLE, CHROMIUM-PLATED
G	F	G	FIXED ANGLED RECEPTACLE, CHROMIUM-PLATED

#### EXTENSIONS SOLDER & CRIMP

R	O	C	EXTENSION, PLASTIC SHELL CABLE CLAMP Ø 5.5-12 mm
R	U	C	EXTENSION, PLASTIC SHELL, CABLE SPECIFIC CABLE CLAMPS
R	W	C	EXTENSION, PLASTIC SHELL, CABLE SPECIFIC CABLE CLAMPS, SQUARE FLANGE

#### PLUGS SOLDER & CRIMP

P	O	C	PLUG, PLASTIC SHELL CABLE CLAMP Ø 5.5-12 mm
P	U	C	PLUG, PLASTIC SHELL, CABLE SPECIFIC CABLE CLAMPS
P	Y	C	PLUG, PLASTIC SHELL, CABLE SPECIFIC CABLE CLAMPS, SQUARE FLANGE

#### PANEL FEED THROUGH CRIMP

D	B	A	PANEL FEED THROUGH, NICKEL-PLATED SQUARE FLANGE
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# HOW TO ORDER

## M23 SIGNAL CONNECTORS SERIES S

### 3

#### INSERTS

##### FOR CRIMP PINS (RECEPTACLES IP67 UNMATED)

0	0	0	WITHOUT INSERT, INSERTS TO BE ORDERD SEPARATELY	1	2	C	12WAY, CODE 20°, FOR PINS Ø 12 x 1 mm
1	2	A	12WAY, FOR PINS 12 x Ø 1 mm	1	7	A	17WAY, FOR PINS 17 x Ø 1 mm

##### FOR SOLDER CONTACTS

0	0	0	WITHOUT INSERT, INSERTS TO BE ORDERD SEPARATELY
0	6	C	6WAY, FOR CONTACTS 6 x Ø 2 mm E-PART
0	6	D	6WAY, FOR CONTACTS 6 x Ø 2 mm P-PART
0	6	E	6WAY, FOR CONTACTS 6 x Ø 2 mm E-PART
0	6	F	6WAY, FOR CONTACTS 6 x Ø 2 mm P-PART
0	7	A	7WAY, FOR CONTACTS 7 x Ø 2 mm E-PART
0	7	B	7WAY, FOR CONTACTS 7 x Ø 2 mm P-PART

##### FOR SOLDER CONTACTS

0	9	C	9WAY, FOR CONTACTS 8 x Ø 1 + 1 x Ø 2 mm E-PART
0	9	D	9WAY, FOR CONTACTS 8 x Ø 1 + 1 x Ø 2 mm P-PART
0	9	A	9WAY, FOR CONTACTS 9 x Ø 1 mm P-PART
0	9	B	9WAY, FOR CONTACTS 9 x Ø 1 mm E-PART
1	2	E	12WAY, FOR CONTACTS 12 x Ø 1 mm P-PART
1	2	F	12WAY, FOR CONTACTS 12 x Ø 1 mm E-PART

##### FOR CRIMP CONTACTS

0	0	0	WITHOUT INSERT, INSERTS TO BE ORDERD SEPARATELY
0	6	G	6WAY, FOR CONTACTS 6 x Ø 2 mm E-PART
0	6	H	6WAY, FOR CONTACTS 6 x Ø 2 mm P-PART
0	7	C	7WAY, FOR CONTACTS 7 x Ø 2 mm E-PART
0	7	D	7WAY, FOR CONTACTS 7 x Ø 2 mm P-PART
0	9	E	9WAY, FOR CONTACTS 8 x Ø 1 + 1 x Ø 2 mm E-PART
0	9	F	9WAY, FOR CONTACTS 8 x Ø 1 + 1 x Ø 2 mm P-PART
0	9	G	9WAY, FOR CONTACTS 6 x Ø 1 + 3 x Ø 2 mm E-PART
0	9	H	9WAY, FOR CONTACTS 6 x Ø 1 + 3 x Ø 2 mm P-PART
0	9	J	9WAY, FOR CONTACTS 9 x Ø 1 mm E-PART
0	9	K	9WAY, FOR CONTACTS 9 x Ø 1 mm P-PART

##### FOR CRIMP CONTACTS

1	2	S	12WAY, FOR CONTACTS 12 x Ø 1 mm E-PART
1	2	T	12WAY, FOR CONTACTS 12 x Ø 1 mm P-PART
1	2	U	12WAY, CODE 20°, FOR CONTACTS 12 x Ø 1 mm E-PART
1	2	V	12WAY, CODE 20°, FOR CONTACTS 12 x Ø 1 mm P-PART
1	6	A	16WAY, FOR CONTACTS 16 x Ø 1 mm E-PART
1	6	B	16WAY, FOR CONTACTS 16 x Ø 1 mm P-PART
1	7	G	17WAY, FOR CONTACTS 17 x Ø 1 mm E-PART
1	7	H	17WAY, FOR CONTACTS 17 x Ø 1 mm P-PART
2	1	A	21WAY, FOR CONTACTS 21 x Ø 0.6 mm E-PART
2	1	B	21WAY, FOR CONTACTS 21 x Ø 0.6 mm P-PART

# HOW TO ORDER

## M23 SIGNAL CONNECTORS SERIES S



### 4

#### TERMINATION STYLE

WITH CRIMP PINS (RECEPTACLES IP67 UNMATED)

N	N	N	N	WITHOUT PINS, PINS TO BE ORDERED SEPARATELY	M	R	E	N	PINS, Ø 1 mm, AWG 24 - 18
M	R	A	N	PINS, Ø 1 mm, AWG 26 - 22	M	R	M	N	PINS, Ø 1 mm, AWG 24 - 18 (terminals with insulation sleeves)

WITH CRIMP CONTACTS

N	N	N	N	WITHOUT CONTACTS, MACHINED OR STAMPED CONTACTS TO BE ORDERED SEPARATELY	F	R	R	N	HYPERTAC SOCKETS - Ø 2 mm, AWG 20 - 16
M	R	R	N	PINS - Ø 2 mm, AWG 18 - 14	F	R	M	N	HYPERTAC SOCKETS - Ø 2 mm, AWG 18 - 14
M	R	V	N	PINS - Ø 2 mm, AWG 22 - 16	F	R	O	R	HYPERTAC SOCKETS - Ø 1 mm + Ø 2 mm, AWG 24 - 18, AWG 20 - 16
M	R	S	R	PINS - Ø 1 mm + Ø 2 mm, AWG 24 - 18, AWG 18 - 14	F	R	O	M	HYPERTAC SOCKETS - Ø 1 mm + Ø 2 mm, AWG 24 - 18, AWG 18 - 14
M	R	S	V	PINS - Ø 1 mm + Ø 2 mm, AWG 24 - 18, AWG 22 - 16	F	R	B	R	HYPERTAC SOCKETS - Ø 1 mm + Ø 2 mm, AWG 30 - 22, AWG 20 - 16
M	R	W	R	PINS - Ø 1 mm + Ø 2 mm, AWG 30 - 22, AWG 18 - 14	F	R	B	M	HYPERTAC SOCKETS - Ø 1 mm + Ø 2 mm, AWG 30 - 22, AWG 18 - 14
M	R	W	V	PINS - Ø 1 mm + Ø 2 mm, AWG 30 - 22, AWG 22 - 16	F	R	O	N	HYPERTAC SOCKETS - Ø 1 mm, AWG 24 - 18
M	R	S	N	PINS - Ø 1 mm, AWG 24 - 18	F	R	B	N	HYPERTAC SOCKETS - Ø 1 mm, AWG 30 - 22
M	R	W	N	PINS - Ø 1 mm, AWG 30 - 22	F	R	F	N	HYPERTAC SOCKETS - Ø 0.6 mm, AWG 26 - 22
M	R	G	N	PINS - Ø 0.6 mm, AWG 26 - 22					

WITH SOLDER CONTACTS (built-in)

M	S	B	N	PINS - Ø 2 mm	F	S	B	N	HYPERTAC SOCKETS - Ø 2 mm
M	S	A	B	PINS - Ø 1 mm + Ø 2 mm	F	S	A	B	HYPERTAC SOCKETS - Ø 1 mm + Ø 2 mm
M	S	A	N	PINS - Ø 2 mm	F	S	A	N	HYPERTAC SOCKETS - Ø 2 mm

### 5

#### CABLE CLAMPING

0	0	0	WITHOUT CABLE CLAMP, ALL RECEPTACLES & PANEL FEED THROUGH	2	6	0	VARIABLE CABLE CLAMP, EXTENSION & PLUG CLAMP RANGE 5-9 mm
1	6	9	VARIABLE CABLE CLAMP, EXTENSION & PLUG CLAMP RANGE 5.5 - 12 mm	2	6	1	VARIABLE CABLE CLAMP, EXTENSION & PLUG CLAMP RANGE 9-15 mm
1	7	0	VARIABLE CABLE CLAMP, EXTENSION & PLUG CLAMP RANGE 7.7 - 14.5 mm	2	6	2	CABLE CLAMP, EXTENSION & PLUG CABLE DIAMETER 16 mm
-	-	-	SPECIFIC CABLE CLAMP, CONNECTORS WITH PLASTIC SHELL, PLEASE CONTACT FACTORY				



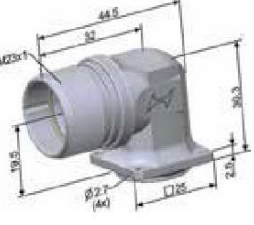
### 6

#### VERSION NUMBER

0	1	DEPENDENT ON TYPE AND SPECIAL DESIGN, SEE DETAILED DESCRIPTION OF THE CONNECTOR DESIGN
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# AVAILABLE CONNECTORS

## ► SIGNAL RECEPTACLES - IP67 UNMATED

LAYOUT DESCRIPTION PART NUMBER CODE	SHELL	CONTACT STYLE	TERMINATION CROSS SECTION	CONTACT ARRANGEMENTS VIEW MATING FACE			CABLE CLAMP		
				12A 12 x 1	12C 12 x 1 (code 20*)	17A 17 x 1			
Straight receptacle 	SFOA	MACHINED CRIMP PINS	AWG 26-22	12A	12C	17A	000		
MRAN			MRAN					MRAN	
AWG 24-18			MREN					MREN	MREN
AWG 24-18 <sup>1)</sup>			MRMN					MRMN	MRMN
without contacts <sup>2)</sup>	NNNN	NNNN	NNNN						
Straight receptacle, threaded connection PG13.5 	SFRA	MACHINED CRIMP PINS	AWG 26-22	12A	12C	17A	000		
MRAN			MRAN					MRAN	
AWG 24-18			MREN					MREN	MREN
AWG 24-18 <sup>1)</sup>			MRMN					MRMN	MRMN
without contacts <sup>2)</sup>	NNNN	NNNN	NNNN						
Fixed angled receptacle 	SEAB UEAB*	MACHINED CRIMP PINS	AWG 26-22	12A	12C	17A	000		
MRAN			MRAN					MRAN	
AWG 24-18			MREN					MREN	MREN
AWG 24-18 <sup>1)</sup>			MRMN					MRMN	MRMN
without contacts <sup>2)</sup>	NNNN	NNNN	NNNN						

Dimensions are in mm



\* UL Version

**Note:**

<sup>1)</sup> Terminals with insulation sleeves, <sup>2)</sup> Machined contacts are shown on page 60-61







► SIGNAL RECEPTACLES WITH SOLDER CONTACTS 6 - 12WAY



LAYOUT DESCRIPTION PART NUMBER CODE	SHELL	NUMBER OF CONTACTS	CONTACT ARRANGEMENTS VIEW MATING FACE		
			06C 6 x 2	06E 6 x 2	
		CONTACT STYLE			
Straight receptacle 	SFNA	PINS WITH SOLDER CUP	06C	MSBN	MSBN
		SOCKETS WITH SOLDER CUP		FSBN	FSBN
Straight receptacle with threaded connection PG 13.5 	SFPA	PINS WITH SOLDER CUP	06C	MSBN	MSBN
		SOCKETS WITH SOLDER CUP		FSBN	FSBN

Dimensions are in mm





 <p><b>07A</b> 7 x 2</p>		 <p><b>09C</b> 8 x 1 / 1 x 2</p>		 <p><b>09A</b> 9 x 1</p>		 <p><b>12E</b> 12 x 1</p>		CABLE CLAMP
CONTACT ARRANGEMENTS VIEW MATING FACE								
07A	MSBN	09C	MSAB	09A	MSAN	12E	MSAN	000
	FSBN		FSAB		FSAN		FSAN	
07A	MSBN	09C	MSAB	09A	MSAN	12E	MSAN	000
	FSBN		FSAB		FSAN		FSAN	








► SIGNAL RECEPTACLES FOR CRIMP CONTACTS 6 - 17WAY

LAYOUT DESCRIPTION PART NUMBER CODE	SHELL
Straight receptacle 	SFFA*
Straight receptacle with threaded connection 	SFQA* SFLA*

Dimensions are in mm \* UL Version

d =  
SFQA = M20x1.5  
SFLA = PG 13.5

CONTACT STYLE GENDER REVERSIBLE	TERMINATION CROSS SECTION	CONTACT ARRANGEMENTS VIEW MATING FACE			
		06G 6 x 2		07C 7 x 2	
MACHINED CRIMP PINS	AWG 18-14	06G	07C	MRRN	MRRN
	AWG 22-16			MRVN	MRVN
	AWG 24-18, 18-14			-	-
	AWG 24-18, 22-16			-	-
	AWG 30-22, 18-14			-	-
	AWG 30-22, 22-16			-	-
	AWG 24-18			-	-
	AWG 30-22			-	-
MACHINED CRIMP SOCKETS	AWG 20-16	06G	07C	FRRN	FRRN
	AWG 18-14			FRMN	FRMN
	AWG 24-18, 20-16			-	-
	AWG 24-18, 18-14			-	-
	AWG 30-22, 20-16			-	-
	AWG 30-22, 18-14			-	-
	AWG 24-18			-	-
	AWG 30-22			-	-
MACHINED CONTACTS	CONTACTS TO BE ORDERED SEPARATELY <sup>1)</sup> 	06G	07C	NNNN	NNNN
STAMPED HCS™ CONTACTS	CONTACTS ON REELS TO BE ORDERED SEPARATELY <sup>2)</sup> 			-	-

							CABLE CLAMP					
<b>09E</b> 8 x 1 / 1 x 2	<b>09G</b> 6 x 1 / 3 x 2	<b>09J</b> 9 x 1	<b>12T</b> 12 x 1	<b>12V</b> 12 x 1 (code 20*)	<b>16A</b> 16 x 1	<b>17G</b> 17 x 1						
CONTACT ARRANGEMENTS VIEW MATING FACE												
09E	-	09G	-	09J	12T	12V	16A	17G	-			
	-		-						-	-	-	-
	MRSR		MRSR						-	-	-	-
	MRSV		MRSV						-	-	-	-
	MRWR		MRWR						-	-	-	-
	MRWV		MRWV						-	-	-	-
	-		-						MRSN	MRSN	MRSN	MRSN
	-		-						MRWN	MRWN	MRWN	MRWN
09E	-	09G	-	09J	12T	12V	16A	17G	-			
	-		-						-	-	-	-
	FROR		FROR						-	-	-	-
	FROM		FROM						-	-	-	-
	FRBR		FRBR						-	-	-	-
	FRBM		FRBM						-	-	-	-
	-		-						FRON	FRON	FRON	FRON
	-		-						FRBN	FRBN	FRBN	FRBN
09E	NNNN	09G	NNNN	09J	12T	12V	16A	17G	NNNN			
	-		-						NNNN	NNNN	NNNN	NNNN

► SIGNAL RECEPTACLES FOR CRIMP CONTACTS 6 - 17WAY

LAYOUT DESCRIPTION PART NUMBER CODE	SHELL
Rotatable angled receptacle 	SFMB*
Fixed angled receptacle 	SFYB*
Rotatable angled receptacle 	SGDG*
Fixed angled receptacle 	SGFG*








Dimensions are in mm

\* UL Version

CONTACT STYLE GENDER REVERSIBLE	TERMINATION CROSS SECTION	CONTACT ARRANGEMENTS VIEW MATING FACE			
		06G 6 x 2		07C 7 x 2	
MACHINED CRIMP PINS	AWG 18-14	06G	07C	MRRN	MRRN
	AWG 22-16			MRVN	MRVN
	AWG 24-18, 18-14			-	-
	AWG 24-18, 22-16			-	-
	AWG 30-22, 18-14			-	-
	AWG 30-22, 22-16			-	-
	AWG 24-18			-	-
	AWG 30-22			-	-
MACHINED CRIMP SOCKETS	AWG 20-16	06G	07C	FRRN	FRRN
	AWG 18-14			FRMN	FRMN
	AWG 24-18, 20-16			-	-
	AWG 24-18, 18-14			-	-
	AWG 30-22, 20-16			-	-
	AWG 30-22, 18-14			-	-
	AWG 24-18			-	-
	AWG 30-22			-	-
MACHINED CONTACTS	CONTACTS TO BE ORDERED SEPARATELY <sup>1)</sup>	06G	07C	NNNN	NNNN
STAMPED HCST <sup>TM</sup> CONTACTS	CONTACTS ON REELS TO BE ORDERED SEPARATELY <sup>2)</sup>			-	-

<sup>1)</sup> Machined contacts are shown on page 60-61, <sup>2)</sup> Stamped contacts are shown on page 62-63

Note:





							CABLE CLAMP
<b>09E</b> 8 x 1 / 1 x 2	<b>09G</b> 6 x 1 / 3 x 2	<b>09J</b> 9 x 1	<b>12T</b> 12 x 1	<b>12V</b> 12 x 1 (code 20°)	<b>16A</b> 16 x 1	<b>17G</b> 17 x 1	
CONTACT ARRANGEMENTS VIEW MATING FACE							
09E	09G	09J	12T	12V	16A	17G	000
							000
							000
							000
							000
							000
							000
							000
09E	09G	09J	12T	12V	16A	17G	000
							000
							000
							000
							000
							000
							000
							000
09E	09G	09J	12T	12V	16A	17G	000
							000



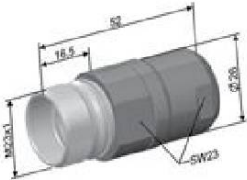

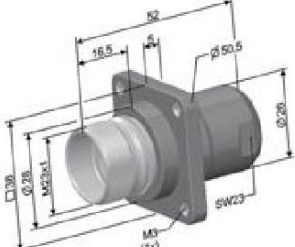
► SIGNAL EXTENSIONS WITH SOLDER CONTACTS 6 - 12WAY

LAYOUT DESCRIPTION PART NUMBER CODE	SHELL	NUMBER OF CONTACTS	CONTACT ARRANGEMENTS VIEW MATING FACE		
			06C 6 x 2	06E 6 x 2	
		CONTACT STYLE			
Extension with cable clamp Ø 5.5-12 mm 	SRNA	PINS WITH SOLDER CUP	06C	MSBN	MSBN
SOCKETS WITH SOLDER CUP		06E		FSBN	FSBN
Extension with cable clamp Ø 5.5-12 mm, threaded connection 	SRRA SRGA	PINS WITH SOLDER CUP	06C	MSBN	MSBN
SOCKETS WITH SOLDER CUP		06E		FSBN	FSBN
Extension, plastic shell, with cable clamp Ø 5.5-12 mm 	SROC	PINS WITH SOLDER CUP	06C	MSBN	MSBN
SOCKETS WITH SOLDER CUP		06E		FSBN	FSBN

Dimensions are in mm





 <p><b>07A</b> 7 x 2</p>		 <p><b>09C</b> 8 x 1 / 1 x 2</p>		 <p><b>09A</b> 9 x 1</p>		 <p><b>12E</b> 12 x 1</p>		CABLE CLAMP
CONTACT ARRANGEMENTS VIEW MATING FACE								
07A	MSBN	09C	MSAB	09A	MSAN	12E	MSAN	169
	FSBN		FSAB		FSAN		FSAN	
07A	MSBN	09C	MSAB	09A	MSAN	12E	MSAN	000
	FSBN		FSAB		FSAN		FSAN	
07A	MSBN	09C	MSAB	09A	MSAN	12E	MSAN	169
	FSBN		FSAB		FSAN		FSAN	

► SIGNAL EXTENSIONS WITH SOLDER CONTACTS 6 - 12WAY



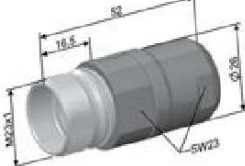
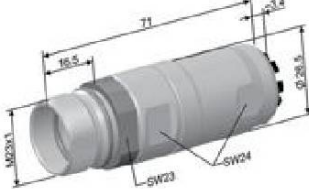
LAYOUT DESCRIPTION PART NUMBER CODE	SHELL	NUMBER OF CONTACTS	CONTACT ARRANGEMENTS VIEW MATING FACE		
			06C 6 x 2	06E 6 x 2	
		CONTACT STYLE			
Extension, plastic shell, with cable specific cable clamps <sup>1)</sup> 	SRUC	PINS WITH SOLDER CUP	06C	MSBN	MSBN
		SOCKETS WITH SOLDER CUP		FSBN	FSBN
Extension with cable clamp Ø 5.5-12 mm, square flange 	SRNA	PINS WITH SOLDER CUP	06C	MSBN	MSBN
		SOCKETS WITH SOLDER CUP		FSBN	FSBN
Extension, plastic shell, with cable specific cable clamps <sup>1)</sup> , square flange 	SRWC	PINS WITH SOLDER CUP	06C	MSBN	MSBN
		SOCKETS WITH SOLDER CUP		FSBN	FSBN

Dimensions are in mm

Note:  
<sup>1)</sup> Cable specific cable clamp please contact factory



 <p><b>07A</b> 7 x 2</p>		 <p><b>09C</b> 8 x 1 / 1 x 2</p>		 <p><b>09A</b> 9 x 1</p>		 <p><b>12E</b> 12 x 1</p>		CABLE CLAMP
CONTACT ARRANGEMENTS VIEW MATING FACE								
07A	MSBN	09C	MSAB	09A	MSAN	12E	MSAN	...
	FSBN		FSAB		FSAN		FSAN	
07A	MSBN	09C	MSAB	09A	MSAN	12E	MSAN	16901
	FSBN		FSAB		FSAN		FSAN	
07A	MSBN	09C	MSAB	09A	MSAN	12E	MSAN	...
	FSBN		FSAB		FSAN		FSAN	

► SIGNAL EXTENSIONS FOR CRIMP CONTACTS 6 - 17WAY

LAYOUT DESCRIPTION PART NUMBER CODE	SHELL
Extension with cable clamp Ø 5.5-12 mm 	SRNA*
Extension with cable clamp Ø 5.5-12 mm, threaded connection  <p>d = SRRA = M20x1.5 SRGA = PG13.5</p>	SRRA* SRGA*
Extension, plastic shell, with cable specific cable clamps <sup>3)</sup> 	SRUC*
Extension with cable clamp Ø 7.7-14.5 mm 	SRFA*

Dimensions are in mm

\* UL Version

CONTACT STYLE GENDER REVERSIBLE	TERMINATION CROSS SECTION	CONTACT ARRANGEMENTS VIEW MATING FACE			
		06G 6 x 2		07C 7 x 2	
MACHINED CRIMP PINS	AWG 18-14	06G	07C	MRRN	MRRN
	AWG 22-16			MRVN	MRVN
	AWG 24-18, 18-14			-	-
	AWG 24-18, 22-16			-	-
	AWG 30-22, 18-14			-	-
	AWG 30-22, 22-16			-	-
	AWG 24-18			-	-
	AWG 30-22			-	-
MACHINED CRIMP SOCKETS	AWG 20-16	06G	07C	FRRN	FRRN
	AWG 18-14			FRMN	FRMN
	AWG 24-18, 20-16			-	-
	AWG 24-18, 18-14			-	-
	AWG 30-22, 20-16			-	-
	AWG 30-22, 18-14			-	-
	AWG 24-18			-	-
	AWG 30-22			-	-
MACHINED CONTACTS	CONTACTS TO BE ORDERED SEPARATELY <sup>1)</sup> 	06G	07C	NNNN	NNNN
STAMPED HCS™ CONTACTS	CONTACTS ON REELS TO BE ORDERED SEPARATELY <sup>2)</sup> 			-	-

Note:


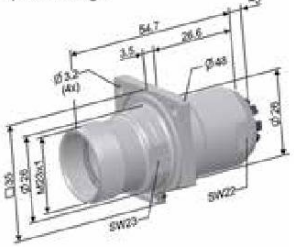
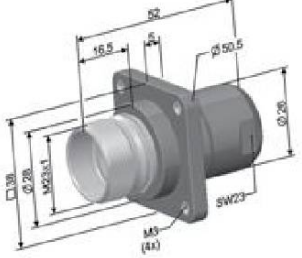

<sup>1)</sup> Machined contacts are shown on page 60-61, <sup>2)</sup> Stamped contacts are shown on page 62-63

<sup>3)</sup> Cable specific cable clamp please contact factory



CONTACT ARRANGEMENTS VIEW MATING FACE													CABLE CLAMP	
09E 8 x 1 / 1 x 2	09G 6 x 1 / 3 x 2	09J 9 x 1	12T 12 x 1	12V 12 x 1 (code 20°)	16A 16 x 1	17G 17 x 1								
09E	09G	09J	12T	12V	16A	17G	-	-	-	-	-	-	169	
							MRSR	MRSR	-	-	-	-		-
							MRSV	MRSV	-	-	-	-		-
							MRWR	MRWR	-	-	-	-		-
							MRWV	MRWV	-	-	-	-		-
							-	-	MRSN	MRSN	MRSN	MRSN		MRSN
							-	-	MRWN	MRWN	MRWN	MRWN		MRWN
							-	-	-	-	-	-		-
09E	09G	09J	12T	12V	16A	17G	-	-	-	-	-	-	000	
							FROR	FROR	-	-	-	-		-
							FROM	FROM	-	-	-	-		-
							FRBR	FRBR	-	-	-	-		-
							FRBM	FRBM	-	-	-	-		-
							-	-	FRON	FRON	FRON	FRON		FRON
							-	-	FRBN	FRBN	FRBN	FRBN		FRBN
							-	-	-	-	-	-		-
09E	09G	09J	12T	12V	16A	17G	NNNN	NNNN	NNNN	NNNN	NNNN	NNNN	170	
							-	-	NNNN	NNNN	NNNN	NNNN		NNNN

► SIGNAL EXTENSIONS FOR CRIMP CONTACTS 6 - 17WAY

LAYOUT DESCRIPTION PART NUMBER CODE	SHELL
Extension with cable clamp Ø 5.5-12 mm 	SROC*
Extension with cable clamp Ø 5.5-12 mm, square flange 	SRNA*
Extension, plastic shell, with cable specific cable clamps <sup>3)</sup> , square flange 	SRWC*
Extension with cable clamp Ø 5-16 mm 	SVRA*

Flange can be ordered separately<sup>4)</sup>

Dimensions are in mm

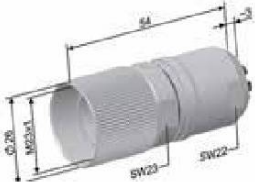
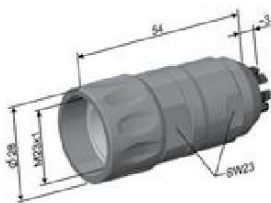

\* UL Version

CONTACT STYLE GENDER REVERSIBLE	TERMINATION CROSS SECTION	CONTACT ARRANGEMENTS VIEW MATING FACE			
		06G 6 x 2		07C 7 x 2	
MACHINED CRIMP PINS	AWG 18-14	06G	07C	MRRN	MRRN
	AWG 22-16			MRVN	MRVN
	AWG 24-18, 18-14			-	-
	AWG 24-18, 22-16			-	-
	AWG 30-22, 18-14			-	-
	AWG 30-22, 22-16			-	-
	AWG 24-18			-	-
	AWG 30-22			-	-
MACHINED CRIMP SOCKETS	AWG 20-16	06G	07C	FRRN	FRRN
	AWG 18-14			FRMN	FRMN
	AWG 24-18, 20-16			-	-
	AWG 24-18, 18-14			-	-
	AWG 30-22, 20-16			-	-
	AWG 30-22, 18-14			-	-
	AWG 24-18			-	-
	AWG 30-22			-	-
MACHINED CONTACTS	CONTACTS TO BE ORDERED SEPARATELY <sup>1)</sup>	06G	07C	NNNN	NNNN
STAMPED HCS™ CONTACTS	CONTACTS ON REELS TO BE ORDERED SEPARATELY <sup>2)</sup>			-	-

Note:  
<sup>1)</sup> Machined contacts are shown on page 60-61, <sup>2)</sup> Stamped contacts are shown on page 62-63  
<sup>3)</sup> Cable specific cable clamp please contact factory. <sup>4)</sup> More information please contact factory.





CONTACT ARRANGEMENTS VIEW MATING FACE													CABLE CLAMP	
09E 8 x 1 / 1 x 2	09G 6 x 1 / 3 x 2	09J 9 x 1	12T 12 x 1	12V 12 x 1 (code 20°)	16A 16 x 1	17G 17 x 1								
09E	09G	09J	12T	12V	16A	17G	-	-	-	-	-	-	169	
							-	-	-	-	-	-		-
							MRSR	MRSR	-	-	-	-		-
							MRSV	MRSV	-	-	-	-		-
							MRWR	MRWR	-	-	-	-		-
							MRWV	MRWV	-	-	-	-		-
							-	-	MRSN	MRSN	MRSN	MRSN		MRSN
							-	-	MRWN	MRWN	MRWN	MRWN		MRWN
09E	09G	09J	12T	12V	16A	17G	-	-	-	-	-	-	16901	
							-	-	-	-	-	-		-
							FROR	FROR	-	-	-	-		-
							FROM	FROM	-	-	-	-		-
							FRBR	FRBR	-	-	-	-		-
							FRBM	FRBM	-	-	-	-		-
							-	-	FRON	FRON	FRON	FRON		FRON
							-	-	FRBN	FRBN	FRBN	FRBN		FRBN
09E	09G	09J	12T	12V	16A	17G	NNNN	NNNN	NNNN	NNNN	NNNN	NNNN	260 261 262	
							-	-	NNNN	NNNN	NNNN	NNNN		NNNN

► SIGNAL PLUGS WITH SOLDER CONTACTS 6 - 12WAY

LAYOUT DESCRIPTION PART NUMBER CODE	SHELL	NUMBER OF CONTACTS	CONTACT ARRANGEMENTS VIEW MATING FACE		
			06D 6 x 2	06F 6 x 2	
		CONTACT STYLE			
Plug with cable clamp Ø 5.5–12 mm 	SPNA	PINS WITH SOLDER CUP	06D	MSBN	MSBN
		SOCKETS WITH SOLDER CUP		06F	FSBN
Plug with cable clamp Ø 5.5–12 mm, threaded connection  d = SPRA = M20x1.5 SPGA = PG13.5	SPRA SPGA	PINS WITH SOLDER CUP	06D	MSBN	MSBN
		SOCKETS WITH SOLDER CUP		06F	FSBN
Plug, plastic shell, with cable clamp Ø 5.5–12 mm 	SPOC	PINS WITH SOLDER CUP	06D	MSBN	MSBN
		SOCKETS WITH SOLDER CUP		06F	FSBN
Plug, plastic shell, with cable specific cable clamps <sup>1)</sup> 	SPUC	PINS WITH SOLDER CUP	06D	MSBN	MSBN
		SOCKETS WITH SOLDER CUP		06F	FSBN

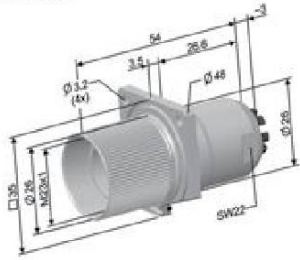
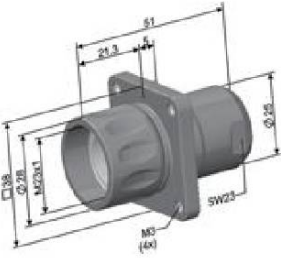
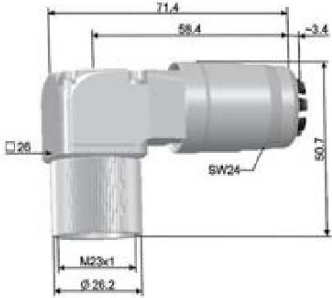
Dimensions are in mm

**Note:**  
<sup>1)</sup> Cable specific cable clamp please contact factory

 <p><b>07B</b> 7 x 2</p>		 <p><b>09D</b> 8 x 1 / 1 x 2</p>		 <p><b>09B</b> 9 x 1</p>		 <p><b>12F</b> 12 x 1</p>		CABLE CLAMP
CONTACT ARRANGEMENTS VIEW MATING FACE								
07B	MSBN	09D	MSAB	09B	MSAN	12F	MSAN	169
	FSBN		FSAB		FSAN		FSAN	
07B	MSBN	09D	MSAB	09B	MSAN	12F	MSAN	000
	FSBN		FSAB		FSAN		FSAN	
07B	MSBN	09D	MSAB	09B	MSAN	12F	MSAN	169
	FSBN		FSAB		FSAN		FSAN	
07B	MSBN	09D	MSAB	09B	MSAN	12F	MSAN	...
	FSBN		FSAB		FSAN		FSAN	







► SIGNAL PLUGS WITH SOLDER CONTACTS 6 - 12WAY

LAYOUT DESCRIPTION PART NUMBER CODE	SHELL	NUMBER OF CONTACTS	CONTACT ARRANGEMENTS VIEW MATING FACE			
			06D 6 x 2	06F 6 x 2		
Plug with with cable clamp Ø 5.5–12 mm, square flange 	SPNA	PINS WITH SOLDER CUP	06D	MSBN	MSBN	
		SOCKETS WITH SOLDER CUP		06F	FSBN	FSBN
Plug, plastic shell, with cable specific cable clamps <sup>1)</sup> , square flange 	SPYC	PINS WITH SOLDER CUP	06D	MSBN	MSBN	
		SOCKETS WITH SOLDER CUP		06F	FSBN	FSBN
Angled plug with cable clamp Ø 7.7-14.5 mm 	SPHA	PINS WITH SOLDER CUP	06D	MSBN	MSBN	
		SOCKETS WITH SOLDER CUP		06F	FSBN	FSBN

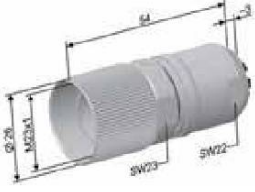

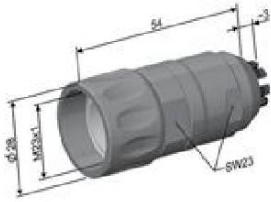
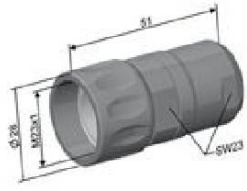
Dimensions are in mm

<sup>1)</sup> Cable specific cable clamp please contact factory

Note:



 <p><b>07B</b> 7 x 2</p>		 <p><b>09D</b> 8 x 1 / 1 x 2</p>		 <p><b>09B</b> 9 x 1</p>		 <p><b>12F</b> 12 x 1</p>		CABLE CLAMP
CONTACT ARRANGEMENTS VIEW MATING FACE								
07B	MSBN	09D	MSAB	09B	MSAN	12F	MSAN	16914
	FSBN		FSAB		FSAN		FSAN	
07B	MSBN	09D	MSAB	09B	MSAN	12F	MSAN	...
	FSBN		FSAB		FSAN		FSAN	
07B	MSBN	09D	MSAB	09B	MSAN	12F	MSAN	17003
	FSBN		FSAB		FSAN		FSAN	

► SIGNAL PLUGS FOR CRIMP CONTACTS 6 - 17WAY

LAYOUT DESCRIPTION PART NUMBER CODE	SHELL
Plug with cable clamp Ø 5.5-12 mm 	SPNA*
Plug with cable clamp Ø 5.5-12 mm, threaded connection 	SPRA* SPGA*
Plug, plastic shell, with cable clamp Ø 5.5-12 mm 	SPOC*
Plug, plastic shell, with cable specific cable clamps <sup>3)</sup> 	SPUC*

Dimensions are in mm

\* UL Version

CONTACT STYLE GENDER REVERSIBLE	TERMINATION CROSS SECTION	CONTACT ARRANGEMENTS VIEW MATING FACE			
		06H 6 x 2		07D 7 x 2	
MACHINED CRIMP PINS	AWG 18-14	06H	07D	MRRN	MRRN
	AWG 22-16			MRVN	MRVN
	AWG 24-18, 18-14			-	-
	AWG 24-18, 22-16			-	-
	AWG 30-22, 18-14			-	-
	AWG 30-22, 22-16			-	-
	AWG 24-18			-	-
	AWG 30-22			-	-
MACHINED CRIMP SOCKETS	AWG 20-16	06H	07D	FRRN	FRRN
	AWG 18-14			FRMN	FRMN
	AWG 24-18, 20-16			-	-
	AWG 24-18, 18-14			-	-
	AWG 30-22, 20-16			-	-
	AWG 30-22, 18-14			-	-
	AWG 24-18			-	-
	AWG 30-22			-	-
MACHINED CONTACTS	CONTACTS TO BE ORDERED SEPARATELY <sup>1)</sup> 	06H	07D	NNNN	NNNN
STAMPED HCS™ CONTACTS	CONTACTS ON REELS TO BE ORDERED SEPARATELY <sup>2)</sup> 			-	-

Note:

<sup>1)</sup> Machined contacts are shown on page 60-61, <sup>2)</sup> Stamped contacts are shown on page 62-63

<sup>3)</sup> Cable specific cable clamp please contact factory

CONTACT ARRANGEMENTS VIEW MATING FACE													CABLE CLAMP	
09F 8 x 1 / 1 x 2	09H 6 x 1 / 3 x 2	09K 9 x 1	12S 12 x 1	12U 12 x 1 (code 20°)	16B 16 x 1	17H 17 x 1								
09F	09H	09K	12S	12U	16B	17H	-	-	-	-	-	-	169	
							-	-	-	-	-	-		-
							MRSR	MRSR	-	-	-	-		-
							MRSV	MRSV	-	-	-	-		-
							MRWR	MRWR	-	-	-	-		-
							MRWV	MRWV	-	-	-	-		-
							-	-	MRSN	MRSN	MRSN	MRSN		MRSN
							-	-	MRWN	MRWN	MRWN	MRWN		MRWN
09F	09H	09K	12S	12U	16B	17H	-	-	-	-	-	-	000	
							-	-	-	-	-	-		-
							FROR	FROR	-	-	-	-		-
							FROM	FROM	-	-	-	-		-
							FRBR	FRBR	-	-	-	-		-
							FRBM	FRBM	-	-	-	-		-
							-	-	FRON	FRON	FRON	FRON		FRON
							-	-	FRBN	FRBN	FRBN	FRBN		FRBN
09F	09H	09K	12S	12U	16B	17H	NNNN	NNNN	NNNN	NNNN	NNNN	NNNN	169	
							-	-	NNNN	NNNN	NNNN	NNNN		NNNN

► SIGNAL PLUGS FOR CRIMP CONTACTS 6 - 17WAY

LAYOUT DESCRIPTION PART NUMBER CODE	SHELL
Plug with cable clamp Ø 5.5-12 mm, square flange 	SPNA*
Plug, plastic shell, with cable specific cable clamps <sup>1)</sup> , square flange 	SPYC*
Angled plug with cable clamp Ø 7.7-14.5 mm 	SPHA*

Dimensions are in mm

\* UL Version

CONTACT STYLE GENDER REVERSIBLE	TERMINATION CROSS SECTION	CONTACT ARRANGEMENTS VIEW MATING FACE			
		06H 6 x 2		07D 7 x 2	
MACHINED CRIMP PINS	AWG 18-14	06H	07D	MRRN	MRRN
	AWG 22-16			MRVN	MRVN
	AWG 24-18, 18-14			-	-
	AWG 24-18, 22-16			-	-
	AWG 30-22, 18-14			-	-
	AWG 30-22, 22-16			-	-
	AWG 24-18			-	-
AWG 30-22	-	-	-		
MACHINED CRIMP SOCKETS	AWG 20-16	06H	07D	FRRN	FRRN
	AWG 18-14			FRMN	FRMN
	AWG 24-18, 20-16			-	-
	AWG 24-18, 18-14			-	-
	AWG 30-22, 20-16			-	-
	AWG 30-22, 18-14			-	-
	AWG 24-18			-	-
AWG 30-22	-	-	-		
MACHINED CONTACTS	CONTACTS TO BE ORDERED SEPARATELY <sup>1)</sup> 	06H	07D	NNNN	NNNN
STAMPED HCS™ CONTACTS	CONTACTS ON REELS TO BE ORDERED SEPARATELY <sup>2)</sup> 			-	-

Note:

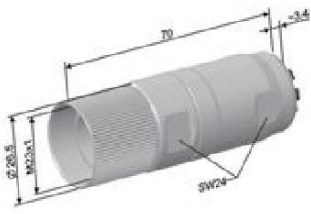
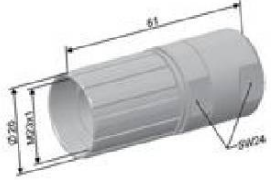
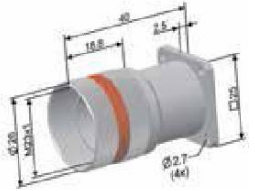
<sup>1)</sup> Machined contacts are shown on page 60-61, <sup>2)</sup> Stamped contacts are shown on page 62-63

<sup>3)</sup> Cable specific cable clamp please contact factory



CONTACT ARRANGEMENTS VIEW MATING FACE													CABLE CLAMP	
09F 8 x 1 / 1 x 2	09H 6 x 1 / 3 x 2	09K 9 x 1	12S 12 x 1	12U 12 x 1 (code 20°)	16B 16 x 1	17H 17 x 1								
09F	09H	09K	12S	12U	16B	17H	-	-	-	-	-	-	16914	
							-	-	-	-	-	-		-
							MRSR	MRSR	-	-	-	-		-
							MRSV	MRSV	-	-	-	-		-
							MRWR	MRWR	-	-	-	-		-
							MRWV	MRWV	-	-	-	-		-
							-	-	MRSN	MRSN	MRSN	MRSN		MRSN
							-	-	MRWN	MRWN	MRWN	MRWN		MRWN
09F	09H	09K	12S	12U	16B	17H	-	-	-	-	-	-	...	
							-	-	-	-	-	-		-
							FROR	FROR	-	-	-	-		-
							FROM	FROM	-	-	-	-		-
							FRBR	FRBR	-	-	-	-		-
							FRBM	FRBM	-	-	-	-		-
							-	-	FRON	FRON	FRON	FRON		FRON
							-	-	FRBN	FRBN	FRBN	FRBN		FRBN
09F	09H	09K	12S	12U	16B	17H	NNNN	NNNN	NNNN	NNNN	NNNN	NNNN	17003	
							-	-	NNNN	NNNN	NNNN	NNNN		NNNN

► SIGNAL PLUGS FOR CRIMP CONTACTS 6 - 17WAY








LAYOUT DESCRIPTION PART NUMBER CODE	SHELL
Plug with cable clamp Ø 7.7-14.5 mm 	SPFA*
Plug with cable clamp Ø 5-16 mm 	SVPA*
Flange can be ordered separately <sup>3)</sup> Panel feed through, square flange 	SDBA*

Dimensions are in mm

\* UL Version


CONTACT STYLE GENDER REVERSIBLE	TERMINATION CROSS SECTION	CONTACT ARRANGEMENTS VIEW MATING FACE			
		06H 6 x 2		07D 7 x 2	
MACHINED CRIMP PINS	AWG 18-14	06H	07D	MRRN	MRRN
	AWG 22-16			MRVN	MRVN
	AWG 24-18, 18-14			-	-
	AWG 24-18, 22-16			-	-
	AWG 30-22, 18-14			-	-
	AWG 30-22, 22-16			-	-
	AWG 24-18			-	-
AWG 30-22	-	-			
MACHINED CRIMP SOCKETS	AWG 20-16	06H	07D	FRRN	FRRN
	AWG 18-14			FRMN	FRMN
	AWG 24-18, 20-16			-	-
	AWG 24-18, 18-14			-	-
	AWG 30-22, 20-16			-	-
	AWG 30-22, 18-14			-	-
	AWG 24-18			-	-
AWG 30-22	-	-			
MACHINED CONTACTS	CONTACTS TO BE ORDERED SEPARATELY <sup>1)</sup>	06H	07D	NNNN	NNNN
STAMPED HCS™ CONTACTS	CONTACTS ON REELS TO BE ORDERED SEPARATELY <sup>2)</sup>			-	-

Note:  
<sup>1)</sup> Machined contacts are shown on page 60-61, <sup>2)</sup> Stamped contacts are shown on page 62-63  
<sup>3)</sup> More information please contact factory.

														CABLE CLAMP		
09F 8 x 1 / 1 x 2		09H 6 x 1 / 3 x 2		09K 9 x 1		12S 12 x 1		12U 12 x 1 (code 20°)		16B 16 x 1		17H 17 x 1				
CONTACT ARRANGEMENTS VIEW MATING FACE																
09F	-	09H	-	09K	-	12S	-	12U	-	16B	-	17H	-	170		
	-		-		-		-		-		-		-		-	
	MRSR		MRSR		-		-		-		-		-		-	
	MRSV		MRSV		-		-		-		-		-		-	
	MRWR		MRWR		-		-		-		-		-		-	
	MRWV		MRWV		-		-		-		-		-		-	
	-		-		MRSN		MRSN		MRSN		MRSN		MRSN		MRSN	
	-		-		MRWN		MRWN		MRWN		MRWN		MRWN		MRWN	
09F	-	09H	-	09K	-	12S	-	12U	-	16B	-	17H	-		260 261 262	
	-		-		-		-		-		-		-			-
	FROR		FROR		-		-		-		-		-			-
	FROM		FROM		-		-		-		-		-			-
	FRBR		FRBR		-		-		-		-		-			-
	FRBM		FRBM		-		-		-		-		-			-
	-		-		FRON		FRON		FRON		FRON		FRON			FRON
	-		-		FRBN		FRBN		FRBN		FRBN		FRBN			FRBN
09F	NNNN	09H	NNNN	09K	NNNN	12S	NNNN	12U	NNNN	16B	NNNN	17H	NNNN			000
	-		-		NNNN		NNNN		NNNN		NNNN		NNNN			

# 21 PIN CONNECTORS

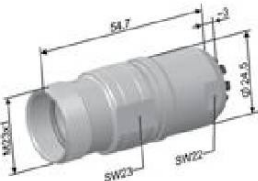

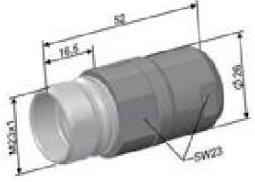
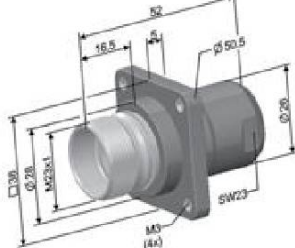
## ► RECEPTACLE FOR 21 PIN INSERTS

LAYOUT DESCRIPTION PART NUMBER CODE	SHELL	CONTACT STYLE	TERMINATION CROSS SECTION	21A 21 x 0.6		CABLE CLAMP
				VIEW MATING FACE		
Straight receptacle 	SFOA	MACHINED CRIMP PINS	AWG 26-22	21A	MRGN	000
		MACHINED CRIMP SOCKETS	AWG 26-22		FRFN	
		CONTACTS TO BE ORDERED SEPARATELY <sup>1)</sup>	without contacts		NNNN	

Dimensions are in mm

Note:  
<sup>1)</sup> Machined contacts are shown on page 60-61

► EXTENSIONS FOR 21 PIN INSERTS

LAYOUT DESCRIPTION PART NUMBER CODE	SHELL	CONTACT STYLE	TERMINATION CROSS SECTION	21A 21 x 0.6 VIEW MATING FACE		CABLE CLAMP
Extension with cable clamp Ø 5.5-12 mm, 	SRNA	MACHINED CRIMP PINS	AWG 26-22	21A	MRGN	16913
MACHINED CRIMP SOCKETS		AWG 26-22	FRFN			
CONTACTS TO BE ORDERED SEPARATELY <sup>1)</sup>		without contacts	NNNN			
Extension with cable clamp Ø 5.5-12 mm, square flange 	SRNA	MACHINED CRIMP PINS	AWG 26-22	21A	MRGN	16912
MACHINED CRIMP SOCKETS		AWG 26-22	FRFN			
CONTACTS TO BE ORDERED SEPARATELY <sup>1)</sup>		without contacts	NNNN			
Extension plastic shell, with cable specific cable clamps <sup>2)</sup> 	SRUC	MACHINED CRIMP PINS	AWG 26-22	21A	MRGN	... 09
MACHINED CRIMP SOCKETS		AWG 26-22	FRFN			
CONTACTS TO BE ORDERED SEPARATELY <sup>1)</sup>		without contacts	NNNN			
Plug, plastic shell, with cable specific cable clamps <sup>2)</sup> , square flange 	SRWC	MACHINED CRIMP PINS	AWG 26-22	21A	MRGN	... 04
MACHINED CRIMP SOCKETS		AWG 26-22	FRFN			
CONTACTS TO BE ORDERED SEPARATELY <sup>1)</sup>		without contacts	NNNN			

Dimensions are in mm

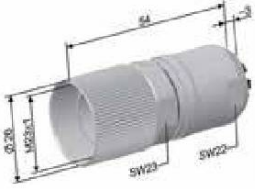
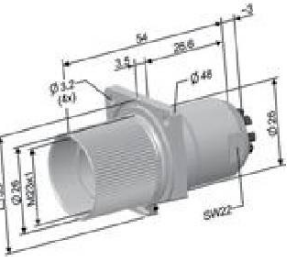

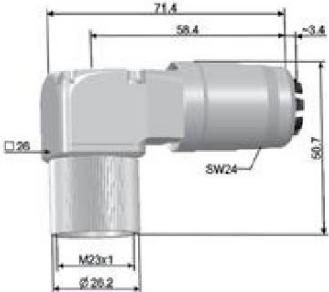
Note:

<sup>1)</sup> Machined contacts are shown on page 60-61, <sup>2)</sup> Cable specific cable clamp please contact factory











► PLUGS FOR 21 PIN INSERTS

LAYOUT DESCRIPTION PART NUMBER CODE	SHELL	CONTACT STYLE	TERMINATION CROSS SECTION	21B 21 x 0.6		CABLE CLAMP
				VIEW MATING FACE		
Plug with cable clamp Ø 5.5-12 mm 	SPNA	MACHINED CRIMP PINS	AWG 26-22	21B	MRGN	16928
		MACHINED CRIMP SOCKETS	AWG 26-22		FRFN	
		CONTACTS TO BE ORDERED SEPARATELY <sup>1)</sup>	without contacts		NNNN	
Plug with cable clamp Ø 5.5-12 mm, square flange 	SPNA	MACHINED CRIMP PINS	AWG 26-22	21B	MRGN	16946
		MACHINED CRIMP SOCKETS	AWG 26-22		FRFN	
		CONTACTS TO BE ORDERED SEPARATELY <sup>1)</sup>	without contacts		NNNN	
Plug, plastic shell, with cable specific cable clamps <sup>2)</sup> 	SPUC	MACHINED CRIMP PINS	AWG 26-22	21B	MRGN	... 12
		MACHINED CRIMP SOCKETS	AWG 26-22		FRFN	
		CONTACTS TO BE ORDERED SEPARATELY <sup>1)</sup>	without contacts		NNNN	
Angled plug with cable clamp Ø 7.7-14.5 mm 	SPHA	MACHINED CRIMP PINS	AWG 26-22	21B	MRGN	17008
		MACHINED CRIMP SOCKETS	AWG 26-22		FRFN	
		CONTACTS TO BE ORDERED SEPARATELY <sup>1)</sup>	without contacts		NNNN	

Dimensions are in mm






Note:  
<sup>1)</sup> Machined contacts are shown on page 60-61  
<sup>2)</sup> Customized cable clamp please contact factory

# CABLE CLAMPS & ACCESSORIES






<p>CABLE CLAMP NO. 169</p>	<p>CLAMP RANGE</p>	
	<p>With reducing sleeve from 5.5 – 8.5 mm                  Without reducing sleeve from 8 – 12 mm                  Can be used for shielded and non-shielded cables</p>	
<p>CABLE CLAMP NO. 170</p>	<p>CLAMP RANGE</p>	
	<p>With reducing sleeve from 7.7 – 12 mm                  Without reducing sleeve from 11 – 14.5 mm                  Can be used for shielded and non-shielded cables</p>	
<p>CABLE CLAMP NO. 260/261/262 FOR SVPA/SVRA</p>	<p>CLAMP RANGE</p>	
	<p>.260 cable diameter 5 – 9 mm                  .261 cable diameter 9 – 15 mm                  .262 cable diameter 16mm                  Can be used for shielded and non-shielded cables</p>	
<p>THREAD PROTECTION CAP</p>	<p>PART NUMBER</p>	
	<p>031.001053.1000</p>	
<p>DUST SHIELD CAPS</p>	<p>PART NUMBER</p>	<p>DESCRIPTION</p>
	<p>C/BEL/1</p>	<p>Dust shield cap for extension and receptacle</p>
	<p>C/BEL/7</p>	<p>Dust shield cap for extension and receptacle with chain 125 mm</p>
	<p>C/BEL/5</p>	<p>Dust shield cap for plug with chain 125 mm</p>

# CONTACTS

## ► MACHINED PINS SERIES S

TYPE		R	V	S	W	G
Contact diameter [mm]		2	2	1	1	0.6
PART NUMBER AND LAYOUT		021.310.1020 	021.356.1020 	021.311.1020 	021.402.1020 	021.072.1020 
Termination cross section <sup>1)</sup>	[AWG] [mm <sup>2</sup> ]	18 – 14 0.75 – 2.5	22 – 16 0.34 – 1.5	24 – 18 0.24 – 1.0	30 – 22 0.05 – 0.34	26 – 22 0.14 – 0.34
Nominal current @ 20°C [A] <sup>2)</sup>	VDE USR CNR	20 20 -	20 20 -	9 9 -	9 - -	3 - -
Crimping tool		B179	B151	B150	B150	B150
Positioner		B201	B201	B055/A	B055/A	B378

## ► HYPERTAC SOCKETS SERIES S




TYPE		R	M	O	B	F
Contact diameter [mm]		2	2	1	1	0.6
PART NUMBER AND LAYOUT		020.315.1020 	020.263.1020 	020.256.1020 	020.353.1020 	020.060.1020 
Termination cross section <sup>1)</sup>	[AWG] [mm <sup>2</sup> ]	20 - 16 0.5 - 1.5	18 - 14 0.75 - 2.5	24 - 18 0.24 - 1.0	30 - 22 0.05 - 0.34	26 - 22 0.14 - 0.34
Nominal current @ 20°C [A]	VDE USR CNR	20 20 -	20 20 -	9 9 -	9 9 -	3 - -
Crimping tool		B151	B151	B150	B150	B151
Positioner		B201	B201	B055/A	B055/A	B378

Note:

<sup>1)</sup> Mentioned crimp ranges are recommendations and only valid with flexible wires H05(07)V-K [mm<sup>2</sup>] acc. to DIN VDE 0281/0282 pp and with non compressed standard cables and wires acc. to DIN VDE 0295. It is possible that due to another structure of wired further cross sections and currents can be processed.

<sup>2)</sup> data only valid when plugged with Hypertac sockets.

► **MACHINED PINS SERIES S (FOR RECEPTACLES IP67 UNMATED)**

TYPE		A	E	M
Contact diameter [mm]		1	1	1
PART NUMBER AND LAYOUT		021.029.1020 	021.129.1020 	021.165.1020 
Termination cross section <sup>1)</sup>	[AWG] [mm <sup>2</sup> ]	26 - 22 0.14 - 0.34	24 - 18 0.24 - 1.0	24 - 18 0.24 - 1.0
Nominal current @ 20°C [A] <sup>2)</sup>	VDE	9	9	9
	USR	8	8	8
	CNR	7	7	7
Crimping tool		B150	B150	B150
Positioner		B055/A	B055/A	B055/A

**Note:**

<sup>1)</sup> Mentioned crimp ranges are recommendations and only valid with flexible wires H05(07)V-K [mm<sup>2</sup>] acc. to DIN VDE 0281/0282 pp and with non compressed standard cables and wires acc. to DIN VDE 0295.

It is possible that due to another structure of wired further cross sections and currents can be processed.

<sup>2)</sup> data only valid when plugged with Hypertac sockets.



# TECHNICAL CHARACTERISTICS

## SPECIFICATIONS

### MATERIALS

Body: Tin-bronze

Plating: partly gold plated

Sleeve: stainless steel (sockets)

### CRIMP GEOMETRY

Wire crimp: B-Crimp

Insulation crimp: O-Crimp

### MECHANICAL

Operating Temperature: -40°C to 125°C

Insertion/extraction force: <4 N

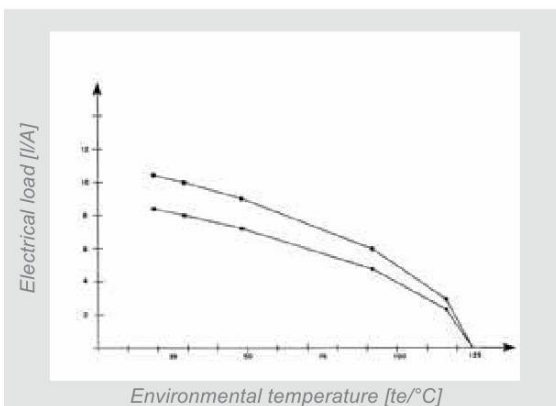
### ELECTRICAL

Contact resistance: <5 mΩ

## FEATURES

- ▶ Favourable price
- ▶ Fully automatic processable
- ▶ Reduced assembly time
- ▶ High reliability wire B-crimp
- ▶ Additional insulation crimp
- ▶ Intermateable with machined round contacts

# HCS™ CONTACT



Electrical load HCS™ Ø 1 mm

Derating curve acc. DIN IEC 512/item3 (in air)



Hyperboloid Contact Stamped

# PERFORMANCE

The HCS contact (**H**yperboloid **C**ontact **S**tamped) is the advanced evolution of the machined HYPERTAC® Hyperboloid Contact Technology that is ideal for higher volume applications requiring a fully automated process. The demand for lower cost hyperboloid contacts led Smiths Connectors to the development of the stamped/rolled HCS contact, that is supplied on a reel and features an open crimp barrel design.

For all variations, the wire cage has the same design characteristics. In the contact area all single contact flaps are made in a circle shape which guarantees "wire quality". The HCS contacts, on reels for crimping machines with automatic feeder lines are fully compatible with our machined HYPERTAC® hyperboloid contacts.





Vibration test acc. to DIN EN 60512/item4 35g X/Y/Z sinusoidal for 50h each without contact interrupts and without any change in contact resistance [<5mΩ].

Smiths Connectors offers a full service for crimping tools:





- ▶ Applicators for all typical crimp devices
- ▶ Hand crimping tools for field installation



► **HCS™ STAMPED SOCKETS SERIES S**

TYPE		A	B	C	D
Contact diameter [mm]		1	1	1	1
PART NUMBER AND LAYOUT		020.000376.2000 	020.000377.2000 	020.000378.2000 	020.000379.2000 
Termination cross section <sup>1)</sup>	AWG [mm <sup>2</sup> ]	32 – 28 0.03 – 0.08	28 – 24 0.08 – 0.2	24 – 20 0.2 – 0.5	0.75 – 1.0
Max. nominal current @ 20°C [A]	VDE	4	6	8	8
	USR	9	9	9	9
	CNR	-	-	-	-
Hand crimping tool with feeder line for small reels		B287/32-28	B287/28-24	B287/24-20	B287/0.75-1
Applicator for Schäfer/AMP crimping machine		B288/32-28	B288/28-24	B288/24-20	B288/0.75-1
Applicator for Kirsten PP3 crimping machine		B286/32-28	B286/28-24	B286/24-20	B286/0.75-1
Number of contacts on reel	[Pieces]	9000	9000	9000	9000
Number of contacts on small reel	[Pieces]	300	300	300	300

► **HCS™ STAMPED PINS SERIES S**

TYPE		A	B	C	D
Contact diameter [mm]		1	1	1	1
PART NUMBER AND LAYOUT		021.001005.1025 	021.001006.1025 	021.001007.1025 	021.001008.1025 
Termination cross section <sup>1)</sup>	AWG [mm <sup>2</sup> ]	32 – 28 0.03 – 0.08	28 – 24 0.08 – 0.2	24 – 20 0.2 – 0.5	0.75 – 1.0
Max. nominal current @ 20°C [A]	VDE	4	6	8	8
	USR	9	9	9	9
	CNR	-	-	-	-
Hand crimping tool with feeder line for small reels		B287/32-28	B287/28-24	B287/24-20	B287/0.75-1
Applicator for Schäfer/AMP crimping machine		B288/32-28	B288/28-24	B288/24-20	B288/0.75-1
Applicator for Kirsten PP3 crimping machine		B286/32-28	B286/28-24	B286/24-20	B286/0.75-1
Number of contacts on reel	[Pieces]	9000	9000	9000	9000
Number of contacts on small reel	[Pieces]	300	300	300	300

Note:




<sup>1)</sup> Mentioned crimp ranges are recommendations and only valid with flexible wires H05(07)V-K [mm<sup>2</sup>] acc. to DIN VDE 0281/0282 pp and with not compressed standard cables and wires acc. to DIN VDE 0295. It is possible that due to another structure of wired further cross sections and currents can be processed.



# TOOLS

## ▶ CRIMPING TOOLS FOR MACHINED CONTACTS



HAND CRIMPING TOOLS	PART NUMBER
 <p>A hand crimping tool with blue handles and a blue head. The head has a dial with 'SEL.' and 'NO.' markings and a 'RAISE TO ROTATE' label. Text on the head includes 'BMC-USA CASE 11951' and 'GAGE 11951'.</p>	B150
 <p>A hand crimping tool with blue handles and a blue head. The head has a dial with 'SEL.' and 'NO.' markings and a 'RAISE TO ROTATE' label. Text on the head includes 'BMC-USA CASE 11951'.</p>	B151
 <p>A hand crimping tool with black handles and a red head. The head has a dial with 'SEL.' and 'NO.' markings and a 'RAISE TO ROTATE' label. Text on the head includes 'BMC-USA CASE 11951'.</p>	B179

CRIMP ACCESSORIES	PART NUMBER
 <p>A master gauge with a green handle, a blue body with 'CM31111' printed on it, and a red handle.</p>	<b>MASTER GAUGE</b> B190 (for B150 and B151) B230 (for B179)
 <p>A cylindrical metal positioner with a red band.</p>	<b>POSITIONER</b> B154, B157, B165, B201, B245, B252, B297, B305, B306, B341, B378
 <p>A metal positioner with a spring mechanism.</p>	<b>POSITIONER</b> B055/A



► **CRIMPING TOOLS FOR STAMPED HCS™ CONTACTS**

HAND CRIMPING TOOL WITH FEEDER LINE FOR SMALL REELS	TERMINATION CROSS SECTION	PART NUMBER
	<b>Ø 1 mm CONTACTS</b> 0.032–0.08 mm², AWG 32-28 0.08-0.20 mm², AWG 28-24 0.20-052 mm², AWG 24-20 0.75-1.00 mm²	<b>Ø 1 mm CONTACTS</b> B287/32-28 B287/28-24 B287/24-20 B287/0.75-1
	<b>Ø 2 mm CONTACTS</b> 0.50-1.00 mm², AWG 20-18 1.00-2.00 mm², AWG 18-14	<b>Ø 2 mm CONTACTS</b> B295/0.5-1.0 B295/1.0-2.0




HAND CRIMPING TOOL FOR DISCRETE CONTACTS	TERMINATION CROSS SECTION	PART NUMBER
	<b>Ø 2 mm CONTACTS</b> 2.50–4.00 mm², AWG12	<b>Ø 2 mm CONTACTS</b> B295/2.5-4

APPLICATORS FOR CRIMPING MACHINES WITH FEEDER LINE	TERMINATION CROSS SECTION	PART NUMBER
Schäfer/AMP 	<b>Ø 1 mm CONTACTS</b> 0.032–0.08 mm², AWG 32-28 0.08-0.20 mm², AWG 28-24 0.20-052 mm², AWG 24-20 0.75-1.00 mm²  <b>Ø 2 mm CONTACTS</b> 0.50-1.00 mm², AWG 20-18 1.00-2.00 mm², AWG 18-14 2.50–4.00 mm², AWG12	<b>Ø 1 mm CONTACTS</b> B288/32-28 B288/28-24 B288/24-20 B288/0.75-1  <b>Ø 2 mm CONTACTS</b> on demand on demand on demand
Kirsten PP3 	<b>Ø 1 mm CONTACTS</b> 0.032–0.08 mm², AWG 32-28 0.08-0.20 mm², AWG 28-24 0.20-052 mm², AWG 24-20 0.75-1.00 mm²  <b>Ø 2 mm CONTACTS</b> 0.50-1.00 mm², AWG 20-18 1.00-2.00 mm², AWG 18-14 2.50–4.00 mm², AWG12	<b>Ø 1 mm CONTACTS</b> B286/32-28 B286/28-24 B286/24-20 B286/0.75-1  <b>Ø 2 mm CONTACTS</b> on demand on demand on demand

► INSERTION AND EXTRACTION TOOLS

INSERTION TOOLS FOR INSULATORS	PART NUMBER	CONNECTOR LAYOUT	CONTACT
	B091	<b>Power</b> LEAB	NA
	B116	<b>Signal</b> SDBA	NA

INSERTION TOOLS FOR CONTACTS	PART NUMBER	CONNECTOR LAYOUT	CONTACT
	B117	<b>Power Innovation:</b> Plugs, Extensions, Receptacles, Panel Feed Through <b>Power System 2000, Version 1i:</b> Receptacles	Ø 2 mm
	B118	<b>Power Innovation:</b> Plugs, Extensions, Receptacles, Panel Feed Through <b>Power System 2000, Version 1i:</b> Receptacles <b>Signal:</b> Receptacles IP67	Ø 1 mm
	S/MONT/1/0060	<b>Signal:</b> Plugs, Receptacles, Extensions 21way	Ø 0.6 mm

EXTRACTION TOOLS FOR INSULATORS	PART NUMBER	CONNECTOR LAYOUT	CONTACT
	B202	<b>Signal:</b> Receptacles with 2part insulators for crimp contacts	NA
	B116	<b>Signal:</b> Panel Feed Through with 2part insulator for crimp contacts, Receptacles with solder contacts	NA
	B186	<b>Signal:</b> Receptacles 21way	NA

EXTRACTION TOOLS FOR CONTACTS	PART NUMBER	CONNECTOR LAYOUT	CONTACT
	B132		
	B037A (B132 + B037/10)	<b>Power Innovation:</b> Receptacles, Extensions, <b>Power System 2000, Version 1i:</b> Receptacles	Ø 2 mm
	B038A (B132 + B038/10)	<b>Power Innovation:</b> Receptacles, Extensions, <b>Power System 2000, Version 1i:</b> Receptacles <b>Signal:</b> Receptacles IP67	Ø 1 mm
	B056A (B132 + B056/10)	<b>Power Innovation:</b> Plugs, Panel Feed Through	Ø 1 mm
	S/DEM/6/0060	<b>Signal:</b> Plugs, Receptacles, Extensions 21way	Ø 0.6 mm





**Disclaimer 2016**

All of the information included in this catalog is believed to be accurate at the time of printing. It is recommended, however, that users should independently evaluate the suitability of each product for their intended application and be sure that each product is properly installed, used and maintained to achieve desired results.

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# SMITHS CONNECTORS PRODUCT LINES

## Circular



- ▶ Metal and plastic
- ▶ Industrial M12, M23, M40, M58
- ▶ Crimp and solder terminations
- ▶ Push/pull latch mechanism
- ▶ Colour coding

## EMI / EMP Filter



- ▶ EMI/RFI filtering and transient protection
- ▶ RoHS compliant solderless filter connectors available
- ▶ Filtered adapter for "bolt on" EMI/EMP solutions
- ▶ Filter hybrid capability
- ▶ Circular, ARINC, D-Subminiature, Micro-D

## Heavy Duty



- ▶ Modular solution: signal, power, data contacts and fibre optics
- ▶ EMC shielding
- ▶ High pressure up to 35K PSI, 250°C
- ▶ High temperature up to 440°C

## High Power



- ▶ Single and multi-way
- ▶ Circular and configurable rectangular
- ▶ Power contact up to 1,200 Amps
- ▶ Excellent performance in harsh environments

## High Speed Copper / Fibre



- ▶ Quadrx and Twinax connectors
- ▶ Fibre Optic Butt Joint, Expanded Beam and Floating Fibre Termini available
- ▶ ARINC and MIL-STD contacts

## Mil / Aero Standards



- ▶ Standard military interface
- ▶ ARINC 801
- ▶ ARINC interface
- ▶ Custom inserts

## Modular / Rectangular



- ▶ Configurable modules for signal, power, coax, fibre optic and/or pneumatics
- ▶ Guided hardware for blind mating
- ▶ Easy configuration in a single frame
- ▶ For rack & panel and cable applications

## PCB



- ▶ Low, medium and high density board-to-board, cable to board and stacking
- ▶ Signal, power, coax and high speed configurations
- ▶ Numerous termination styles

## Spring Probe



- ▶ Z-axis compliant
- ▶ Blind mate engagement
- ▶ High density
- ▶ Extreme miniaturization
- ▶ High reliability, multi-cycle performance



# SMITHS CONNECTORS

## GLOBAL SUPPORT

### AMERICAS

[info.us@smithsconnectors.com](mailto:info.us@smithsconnectors.com)

**Costa Mesa, CA**  
1.714.371.1100

**Hudson, MA**  
1.978.568.0451

**Kansas City, KS**  
1.913.342.5544

### EUROPE

#### France

33.2.32969176  
[info.fr@smithsconnectors.com](mailto:info.fr@smithsconnectors.com)

#### Germany

49.991.250.120  
[info.de@smithsconnectors.com](mailto:info.de@smithsconnectors.com)

#### Italy

39.010.60361  
[info.it@smithsconnectors.com](mailto:info.it@smithsconnectors.com)

#### United Kingdom

44.208.236.2400  
[info.uk@smithsconnectors.com](mailto:info.uk@smithsconnectors.com)

### ASIA

[asiainfo@smithsconnectors.com](mailto:asiainfo@smithsconnectors.com)

**Shanghai, China**  
86.21.3318.4650

**Suzhou, China**  
86.512.6273.1188

**Singapore**  
65.6846.1655

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