

M12 CONNECTOR SERIES FOR RAILWAY APPLICATIONS

Suitable for a wide range of cable diameters up to 10mm, the new Hypertac M12 connectors allow for a complete 360° of cable screen termination minimising the possibility of electrical interference in sensitive applications such as GPS and video signal transmission. Furthermore, a unique backshell design allows installers complete flexibility to change from a straight cable exit to right angled after cable termination and installation. This patented feature allows customers to optimise the cable routing within an application at the time of installation, to only procure a single connector for all requirements and thus also benefit from economies of volume and simpler inventory management.

Both A and D-coded, free assembled and overmoulded versions are IP67 sealed when mated and are available with operating voltage of up to 90V, in accordance with the French Rail Traction specification NF F 61-030, according to DIN EN 61076-2-101 operating voltage up to 250V AC/DC is possible. The socket contacts utilise the high reliability Hyperboloid socket technology featuring superior electrical characteristics. Able to be crimped to cables with cross sections from 0.03 to 1.0mm² (AWG32 to AWG18) the mechanical construction of the Hypertac socket comprises a number of wires arranged in a hyperboloid fashion that expand, wrap around and grip along the length of a pin contact inserted inside its bore. This design offers substantial improvements over alternative technology capabilities in terms of insertion force, mating cycles and fretting corrosion resistance in addition to the key requirements of high current capability and low contact resistance.

The main features of these railways compatible M12 connectors are:

- Overmoulded and free assembled versions
- Fire and smoke compliance
- Robust housings
- Environmental level IP67
- For cable diameters up to Ø 10mm
- 360° electromagnetic shielding
- Crimp contacts
- Very compact design Ø 15mm
- RoHS conformity



Technical Characteristics

Electrical		Mechanical	
Contacts	Ø 1mm	Contact retention force	>20N [EN 61984]
Withstanding voltage	2500V [EN 50124-1]	Mating cycles	>500
Insulation resistance	≤9x10 ³ MΩ	Coding	A-code, D-code
Contact resistance	<5 mΩ	Insulator	PA
Voltage rating	90V acc. NF F 61-030 250V acc. DIN 61076-2-101 (4 contacts) 60V acc. DIN 61076-2-101 (5 contacts)	Sealing	FPM
Current rating	4A		
Contact plating	gold plated		

Environmental			
Temperature range	-40°C ... +125°C	Salt spray	90h
Vibration resistance	DIN EN 60068-2-64	Environmental level	IP67
Fire & Smoke	UL94: V0	Fluid resistance	oil hydrolysis microbes

M12 Railway Applications



Audiovisual Communication Systems



Passenger Information



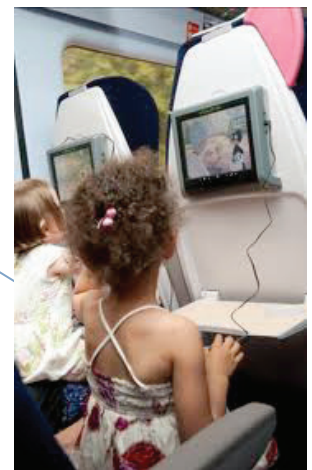
Video Surveillance



Ticket Machines



Electronic Displays



Passenger Entertainment

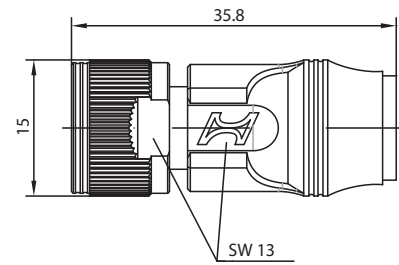
Cable Plugs

Straight female cable plug (overmoulded) – Type PB

To define your individual cable quality and cable length please contact factory

Including Ø 1mm machined hyperboloid sockets

4way D-coded	Part number
	W PB M 04A FRAN 284 (NEXANS 2PK 211)
	W PB M 04A FRAN 285 (NEXANS 2PC 912 / NEXANS 2PH 190)
4way A-coded	Part number
	W PB M 05A FRAN 284 04 (NEXANS 2PK 211)
	W PB M 05A FRAN 285 04 (NEXANS 2PC 912 / NEXANS 2PH 190)
5way A-coded	Part number
	W PB M 05A FRAN 284 (NEXANS 2PK 211)
	W PB M 05A FRAN 285 (NEXANS 2PC 912 / NEXANS 2PH 190)



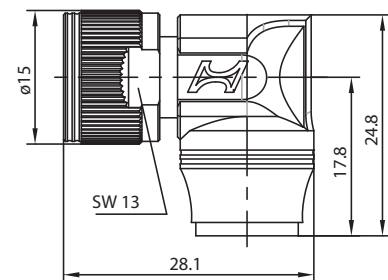
Stamped hyperboloid sockets also can be used, please contact factory

90° angled female cable plug (overmoulded) – Type PD

To define your individual cable quality and cable length please contact factory

Including Ø 1mm machined hyperboloid sockets

4way D-coded	Part number
	W PD M 04C FRAN 286 (NEXANS 2PK 211)
	W PD M 04C FRAN 287 (NEXANS 2PC 912 / NEXANS 2PH 190)
4way A-coded	Part number
	W PD M 05C FRAN 286 04 (NEXANS 2PK 211)
	W PD M 05C FRAN 287 04 (NEXANS 2PC 912 / NEXANS 2PH 190)
5way A-coded	Part number
	W PD M 05C FRAN 286 (NEXANS 2PK 211)
	W PD M 05C FRAN 287 (NEXANS 2PC 912 / NEXANS 2PH 190)



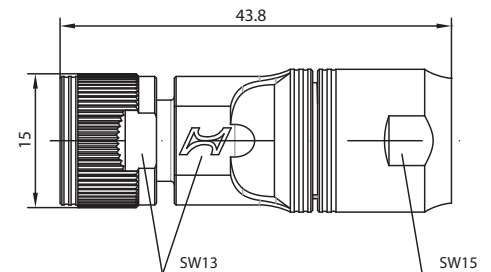
Stamped hyperboloid sockets also can be used, please contact factory

Straight female cable plug (free assembled) – Type PC

Cable diameters up to Ø 10 mm can be used

Including Ø 1mm machined hyperboloid sockets

4way D-coded	Part number
	W PC A 04A FRAN 283
4way A-coded	Part number
	W PC A 05A FRAN 283 04
5way A-coded	Part number
	W PC A 05A FRAN 283



Without contacts for ordering machined or stamped hyperboloid sockets separately

4way D-coded	Part number
	W PC A 04A NNNN 283
4way/5way A-coded	Part number
	W PC A 05A NNNN 283

90° angled female cable plug (free assembled) – Type PE

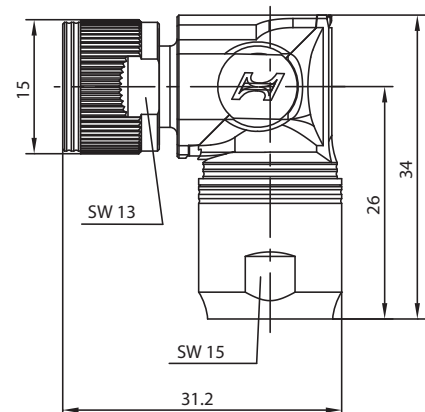
Cable diameters up to Ø 10 mm can be used

Including Ø 1mm machined hyperboloid sockets

4way D-coded	Part number
	W PE A 04C FRAN 283
4way A-coded	Part number
	W PE A 05C FRAN 283 04
5way A-coded	Part number
	W PE A 05C FRAN 283

Without contacts for ordering machined or stamped hyperboloid sockets separately

4way D-coded	Part number
	W PE A 04C NNNN 283
4way/5way A-coded	Part number
	W PE A 05C NNNN 283



Cable Extensions

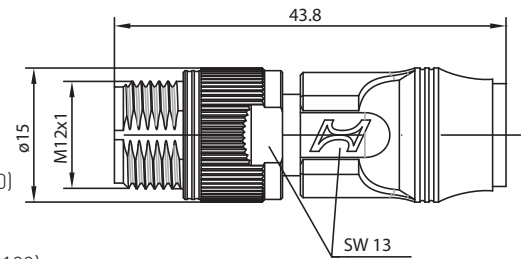
Straight male cable extension (overmoulded) – Type RB

To define your individual cable quality and cable length please contact factory

Including Ø 1mm machined pins

4way D-coded	Part number
	W RB M 04B MRAN 284 (NEXANS 2PK 211)
	W RB M 04B MRAN 285 (NEXANS 2PC 912 / NEXANS 2PH 190)
4way A-coded	Part number
	W RB M 05B MRAN 284 04 (NEXANS 2PK 211)
	W RB M 05B MRAN 285 04 (NEXANS 2PC 912 / NEXANS 2PH 190)
5way A-coded	Part number
	W RB M 05B MRAN 284 (NEXANS 2PK 211)
	W RB M 05B MRAN 285 (NEXANS 2PC 912 / NEXANS 2PH 190)

Stamped round pins also can be used, please contact factory



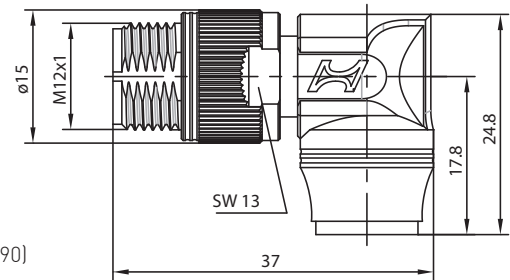
90° angled male cable extension (overmoulded) – Type RD

To define your individual cable quality and cable length please contact factory

Including Ø 1mm machined pins

4way D-coded	Part number
	W RD M 04D MRAN 286 (NEXANS 2PK 211)
	W RD M 04D MRAN 287 (NEXANS 2PC 912 / NEXANS 2PH 190)
4way A-coded	Part number
	W RD M 05D MRAN 286 04 (NEXANS 2PK 211)
	W RD M 05D MRAN 287 04 (NEXANS 2PC 912 / NEXANS 2PH 190)
5way A-coded	Part number
	W RD M 05D MRAN 286 (NEXANS 2PK 211)
	W RD M 05D MRAN 287 (NEXANS 2PC 912 / NEXANS 2PH 190)

Stamped round pins also can be used, please contact factory



Straight male cable extension (free assembled) – Type RC

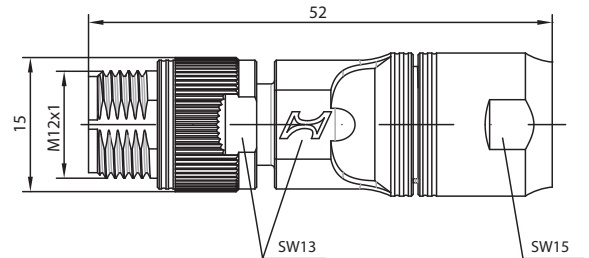
Cable diameters up to Ø 10 mm can be used

Including Ø 1mm machined pins

4way D-coded	Part number
	W RC A 04B MRAN 283
4way A-coded	Part number
	W RC A 05B MRAN 283 04
5way A-coded	Part number
	W RC A 05B MRAN 283

Without contacts for ordering machined or stamped pins separately

4way D-coded	Part number
	W RC A 04B NNNN 283
4way/5way A-coded	Part number
	W RC A 05B NNNN 283



90° angled male cable extension (free assembled) – Type RE

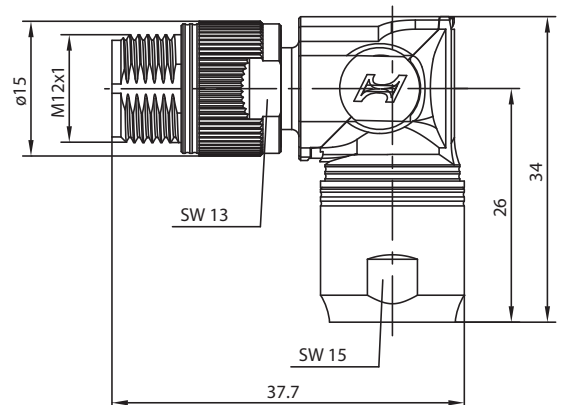
Cable diameters up to Ø 10 mm can be used

Including Ø 1mm machined hyperboloid pins

4way D-coded	Part number
	W RE A 04D MRAN 283
4way A-coded	Part number
	W RE A 05D MRAN 283 04
5way A-coded	Part number
	W RE A 05D MRAN 283

Without contacts for ordering machined or stamped pins separately

4way D-coded	Part number
	W PE A 04D NNNN 283
4way/5way A-coded	Part number
	W RE A 05D NNNN 283



Receptacles and Panel Feed Through

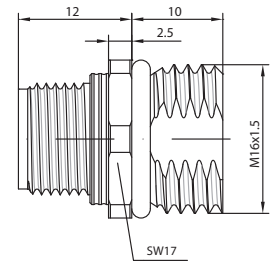
Straight male receptacle – Type EA

Including Ø 1mm machined pins

4way D-coded	Part number
	W EA A 04D MRAN 000
4way A-coded	Part number
	W EA A 05D MRAN 000 04
5way A-coded	Part number
	W EA A 05D MRAN 000

Without contacts for ordering machined or stamped pins separately

4way D-coded	Part number
	W EA A 04D NNNN 000
4way/5way A-coded	Part number
	W EA A 05D NNNN 000



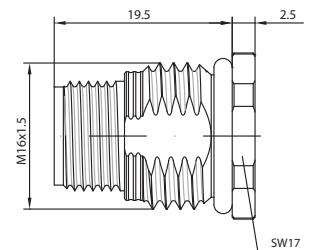
Straight male receptacle– Type EB

Including Ø 1mm machined pins

4way D-coded	Part number
	W EB A 04D MRAN 000
4way A-coded	Part number
	W EB A 05D MRAN 000 04
5way A-coded	Part number
	W EB A 05D MRAN 000

Without contacts for ordering machined or stamped pins separately

4way D-coded	Part number
	W EB A 04D NNNN 000
4way/5way A-coded	Part number
	W EB A 05D NNNN 000



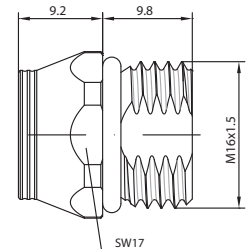
Straight female panel feed through – Type DA

Including Ø 1mm machined hyperboloid sockets

4way D-coded	Part number
	W DA A 04C FRAN 000
4way A-coded	Part number
	W DA A 05C FRAN 000 04
5way A-coded	Part number
	W DA A 05C FRAN 000

Without contacts for ordering machined or stamped hyperboloid sockets separately

4way D-coded	Part number
	W DA A 04C NNNN 000
4way/5way A-coded	Part number
	W DA A 05C NNNN 000



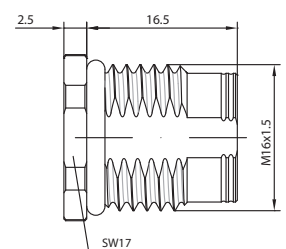
Straight female panel feed through – Type DB

Including Ø 1mm machined hyperboloid sockets

4way D-coded	Part number
	W DB A 04C FRAN 000
4way A-coded	Part number
	W DB A 05C FRAN 000 04
5way A-coded	Part number
	W DB A 05C FRAN 000

Without contacts for ordering machined or stamped hyperboloid sockets separately

4way D-coded	Part number
	W DB A 04C NNNN 000
4way/5way A-coded	Part number
	W DB A 05C NNNN 000

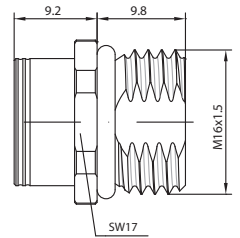




Straight female panel feed through – Type DC

Including Ø 1mm machined hyperboloid sockets

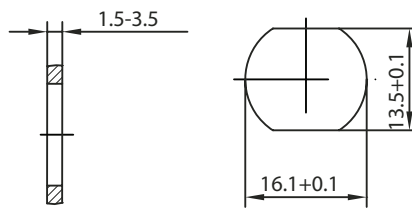
4way D-coded	Part number
	W DC A 04C FRAN 000
4way A-coded	Part number
	W DC A 05C FRAN 000 04
5way A-coded	Part number
	W DC A 05C FRAN 000



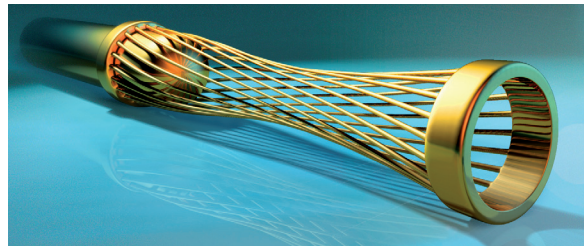
Without contacts for ordering machined or stamped hyperboloid sockets separately

4way D-coded	Part number
	W DC A 04C NNNN 000
4way/5way A-coded	Part number
	W DC A 05C NNNN 000

Mounting arrangement for all receptacles and panel feed through:



For all free assembled versions contacts to be ordered separately:



Ø 1mm machined contacts (crimp)

Machined hyperboloid socket 0.24–1.0 mm² (AWG 24–18)
 Machined round pin 0.24–1.0 mm² (AWG 24-18)

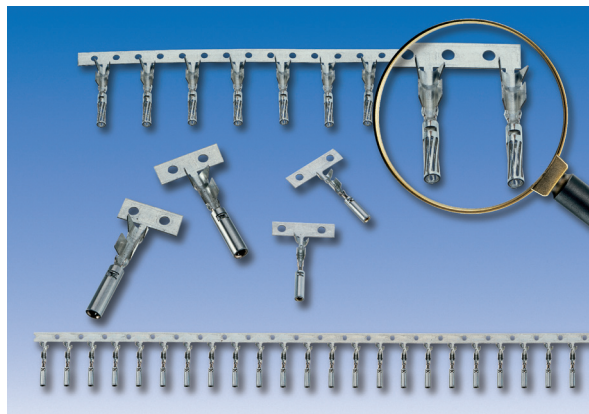
Part number
 020.001022.1020
 021.001039.1020

Crimping tool
 B151 + B200 or B150 + B055A
 B151 + B200 or B150 + B055A

Ø 1mm machined contacts (solder)

Machined hyperboloid socket
 Machined round pin

Part number
 090.000029.2000
 070.000011.2000



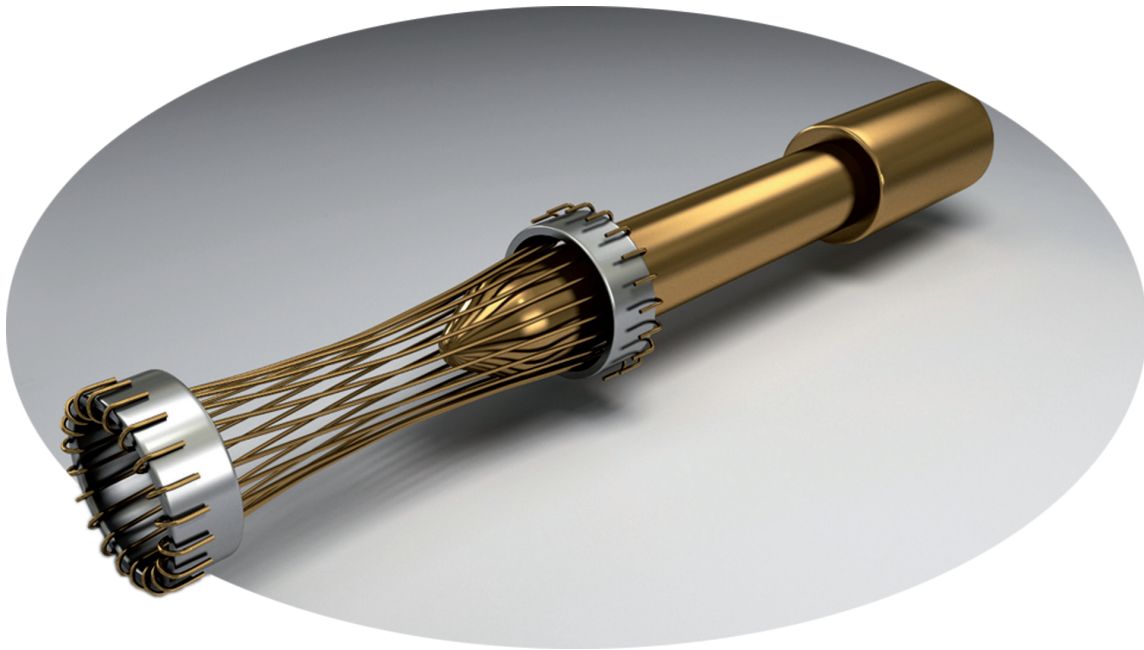
Ø 1mm stamped contacts HCSTTM (reel 300pcs)

Stamped hyperboloid socket 0.03–0.08 mm² (AWG 32-28)
 Stamped hyperboloid socket 0.08–0.2 mm² (AWG 28-24)
 Stamped hyperboloid socket 0.2–0.5 mm² (AWG 24-20)
 Stamped round pin 0.03–0.08 mm² (AWG 32-28)
 Stamped round pin 0.08–0.2 mm² (AWG 28-24)
 Stamped round pin 0.2–0.5 mm² (AWG 24-20)

Part number
 020.000376.2000A2
 020.000377.2000A2
 020.000378.2000A2
 021.001005.1025A2
 021.001006.1025A2
 021.001007.1025A2

Crimping tool
 B287/32-28
 B287/28-24
 B287/24-20
 B287/32-28
 B287/28-24
 B287/24-20

Superior Contact Technology, Unrivalled System Performance



Hypertac interconnect solutions for railways are built upon the unique Hypertac Hyperboloid Contact Technology.

The Hypertac Hyperboloid contact

The Hyperboloid socket has a number of spring wires, the position of which is defined by a wire carrier. This is fitted to an outer sleeve or shank that carries the termination of the socket.

The spring wires within the socket are set a small angle to the centre line and are deflected when the mating pin contact enters. Each spring wire is deflected within its elastic limit and makes a line contact with the pin. A smooth wiping action reduces wear of the plating surfaces of the pin and socket wires. This construction allows a very tight control of the spring forces and hence the insertion and withdrawal forces.

The Hypertac Hyperboloid contact design ensures unrivalled performance in terms of:

- Multiple line contacts of low resistance maintained under high levels of shock and vibration
- Low insertion forces
- Low wear of plating surfaces for long life
- Uniform electrical and mechanical characteristics over a high number of mating operations
- High current rating

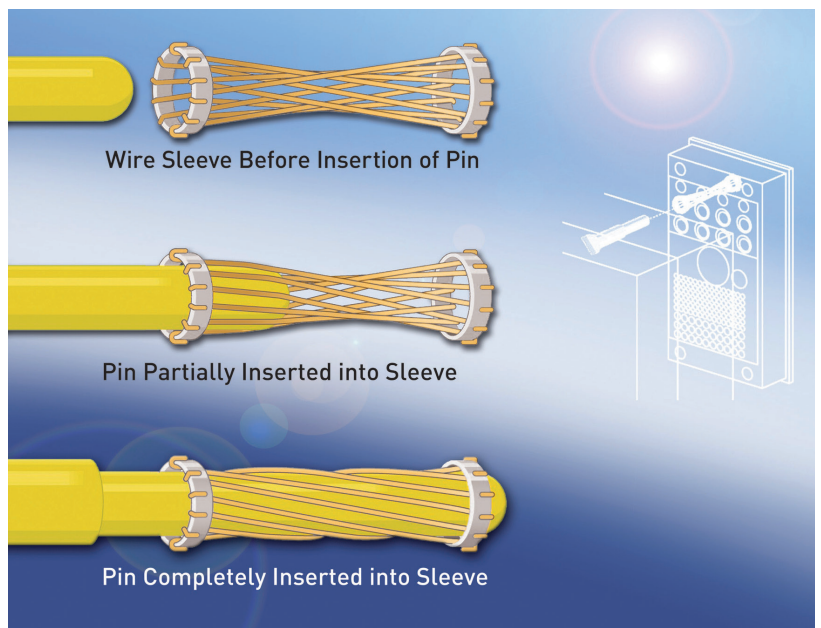
Hypertac contacts and connectors have been tested to:

- Sine vibrations (according to CEI 68-2-6) 20 g from 10 to 2,000 Hz
- Random vibrations (according to CEI 68-2-35) 0.5 g² / Hz from 10 to 2,000 Hz
- Shock (according to CEI 68-2-27) 250 g during 0.4 ms (1/2 sine-wave)

The results of the tests carried out on Hypertac contacts show no discontinuity when measured down to 2ns and a stable contact resistance.

The Hypertac Hyperboloid contact provides the following commercial benefits:

- Low cost of ownership – does not need replacement during equipment life
- Reduced system costs – equipment design is less critical
- Reduced qualification costs – no re-testing due to contact failures



Ordering Information

W
PC
M
05A
FRAN
283
04

Series Name **W**

Design

PB	Straight cable plug overmoulded
PD	90° cable plug overmoulded
PC	Straight cable plug free assembled
PE	90° cable plug free assembled
RB	Straight cable extension overmoulded
RD	90° cable plug overmoulded
RC	Straight cable extension free assembled
RE	90° cable extension free assembled
EA	Straight receptacle front panel mounting M16x1.5
EB	Straight receptacle rear panel mounting M16x1.5
DA	Straight panel feed through hexagon wrench size 17 front panel mounting M16x1.5
DB	Straight panel feed through rear panel mounting M16x1.5
DC	Straight panel feed through front panel mounting

Materials and Plating

A	nickel plated
M	mixed: metallic & plastics

Part Polarity

04A	4way D-coded for sockets clockwise polarized for straight cable plugs
04B	4way D-coded for pins counter clockwise polarized for straight cable extensions
04C	4way D-coded for sockets clockwise polarized for panel feed through and 90° cable plugs
04D	4way D-coded for pins counter clockwise polarized for receptacles and 90° cable extensions
05A	4, 5way A- coded for sockets clockwise polarized for straight cable plugs
05B	4, 5way A- coded for pins counter clockwise polarized for straight cable extensions
05C	4, 5way A- coded for sockets clockwise polarized for panel feed through and 90° cable plugs
05D	4, 5way A- coded for pins counter clockwise polarized for receptacles and 90° cable extensions

Version Number

04	5way insulator partially equipped for 4 pole versions
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Cable Clamping

000	without cable clamp for receptacles and panel feed through
294	Clamp for all free assembled cable plugs and cable extensions, clamping range Ø 6 ... 8 mm
293	Clamp for all free assembled cable plugs and cable extensions, clamping range Ø 4 ... 6 mm
283	Clamp for all free assembled cable plugs and cable extensions, clamping range Ø 8 ... 10 mm
284	Clamp for overmoulded straight cable plugs and straight cable extensions. Cable NEXANS 2PK 211
285	Clamp for overmoulded straight cable plugs and straight cable extensions. Cable NEXANS 2PC 912/ 2PH 190
286	Clamp for overmoulded 90° cable plugs and 90° cable extensions. Cable NEXANS 2PK 211
287	Clamp for overmoulded 90° cable plugs and 90° cable extensions. Cable NEXANS 2PC 912/ 2PH 190

Termination Style

NNNN	without contacts for all free assembled versions, hyperboloid machined or stamped contacts to be ordered separately
FRAN	including machined sockets Ø 1 mm mandrel crimp barrel
MRAN	including machined pins Ø 1 mm mandrel crimp barrel
FDAN	including machined sockets Ø 1 mm solder
MDAN	including machined pins Ø 1 mm solder

A-coded version
D-coded version

