Rosenberger
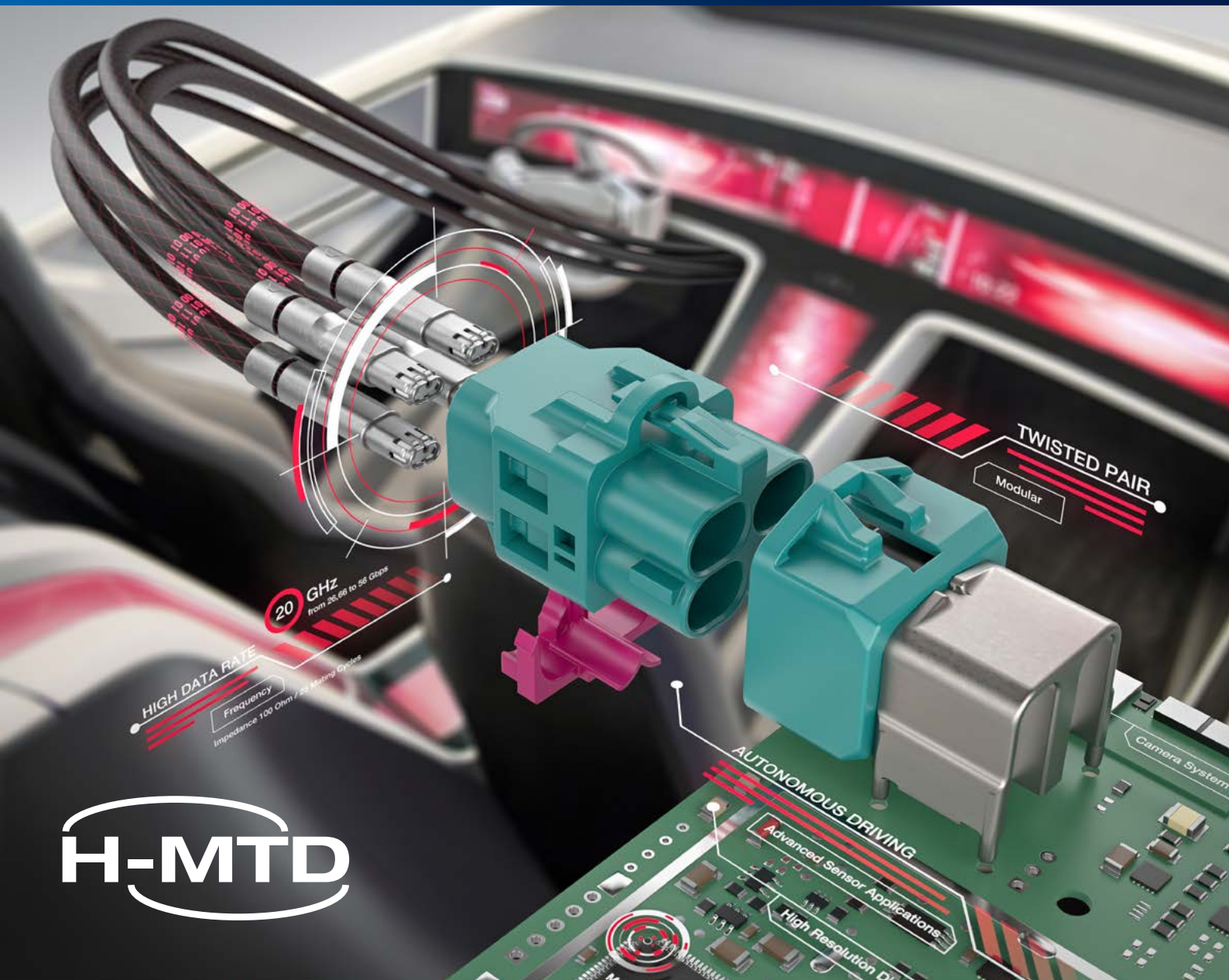
System for Frequencies up to 20 GHz and Data Transmission up to 56 Gbps

H-MTD® Connector Systems
High-Speed Modular Twisted-Pair Data

Rosenberger Automotive –
A Synonym for Quality and Innovation

On the following pages we present the high-quality Rosenberger H-MTD® connectors developed in our Automotive Business Area to fulfill the tough requirements of the automotive industry.

Contents

The Rosenberger online catalog contains the current Rosenberger H-MTD® product range with specific details, including data sheets, assembly instructions, and panel piercings.

www.rosenberger.com/ok/h-mtd

Rosenberger Automotive

At Rosenberger, we firmly believe in developing technology for the future. We are currently working on products and solutions that will shape our lives in the future.

We want to get faster and smarter in what we do and how we do it. Advanced driver assistance systems, connected car technology, electric mobility, infotainment systems – Rosenberger is extremely committed to designing innovative connector systems for future automotive electronics.
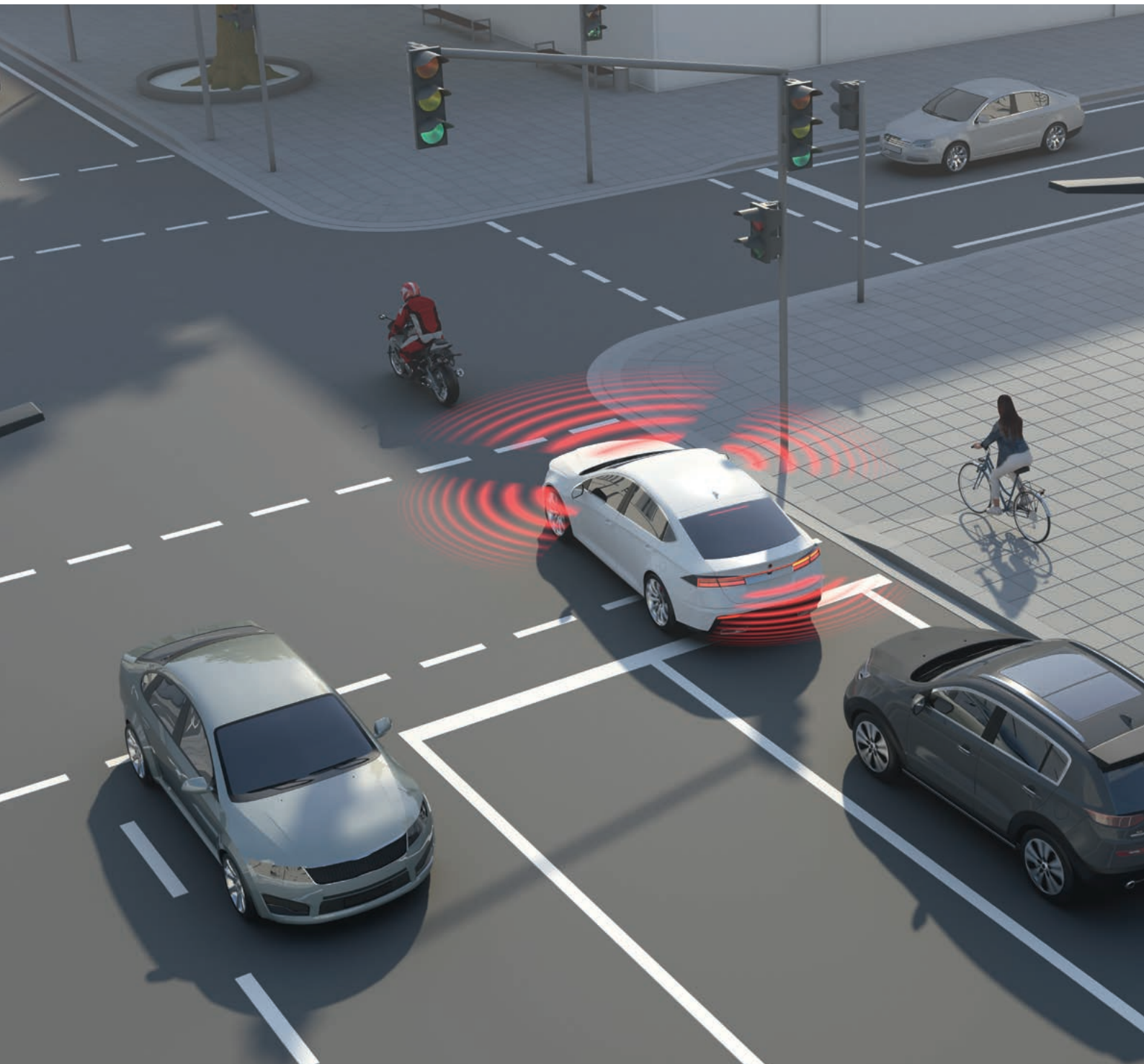
In 2000, Rosenberger started working in the automotive sector, designing and producing customized and standard products for these specific markets.

Rosenberger Automotive is a specialist development partner when it comes to integrating connector designs and customer-specific solutions with the highest quality and best performance – while continuing to meet customer price targets.

The contact systems have been specially designed to fulfill the tough requirements of the automotive industry. From the beginning, Rosenberger has developed a close and open relationship with its customers.

The priority in the most automotive applications, such as autonomous driving and driver assistance systems, is to ensure safety. It is necessary to determine exact positions, continuously calculate routes, and detect and classify objects. High data volumes from several cameras, various sensors, and navigation sources must be combined and transported for this purpose – in real time.

Application Areas

- Autonomous driving
- Driver assistance systems
- Navigation
- Infotainment
- Rear-entertainment
- Internet & mobile communication
- "WiGig" (Wireless Gigabit)

H-MTD® Product Overview

Rosenberger H-MTD® is a differential connector system for high-speed data transmission of up to 20 GHz or 56 Gbps, contained in a compact yet robust automotive grade housing.

Apart from ensuring high-bitrate data transmission and savings on installation space and weight, a further major advantage of this connector system is its modularity, providing the flexibility to support a wide range of Ethernet applications and industry protocols.

The application fields of the Rosenberger H-MTD® are countless as it can be used with a variety of different cables including Shielded Twisted Pair, Unshielded Twisted Pair and new High-Performance cables. With H-MTD® the customer can count on an interface that accommodates future vehicle networks, applications and protocols.

Rosenberger H-MTD® is compliant to all common automotive standards.

Cameras

ADAS Head Unit

Product Portfolio

Cable and PCB connectors, modular housings, cable assemblies, waterproof types:

- Rosenberger H-MTD® single
- Rosenberger H-MTD® double
- Rosenberger H-MTD® quad
- Rosenberger H-MTD® six
- Rosenberger H-MTD®+6 Power pins
- Rosenberger H-MTD®e

Mechanical Properties

- Primary and secondary lock
- Crimp connection
- High cable retention force
- High coding efficiency (different codings on plastic housings to avoid misconnections)
- No contact pin damage possible
- Scoop proof
- Optional Connector Position Assurance (CPA)

Sensors   Displays
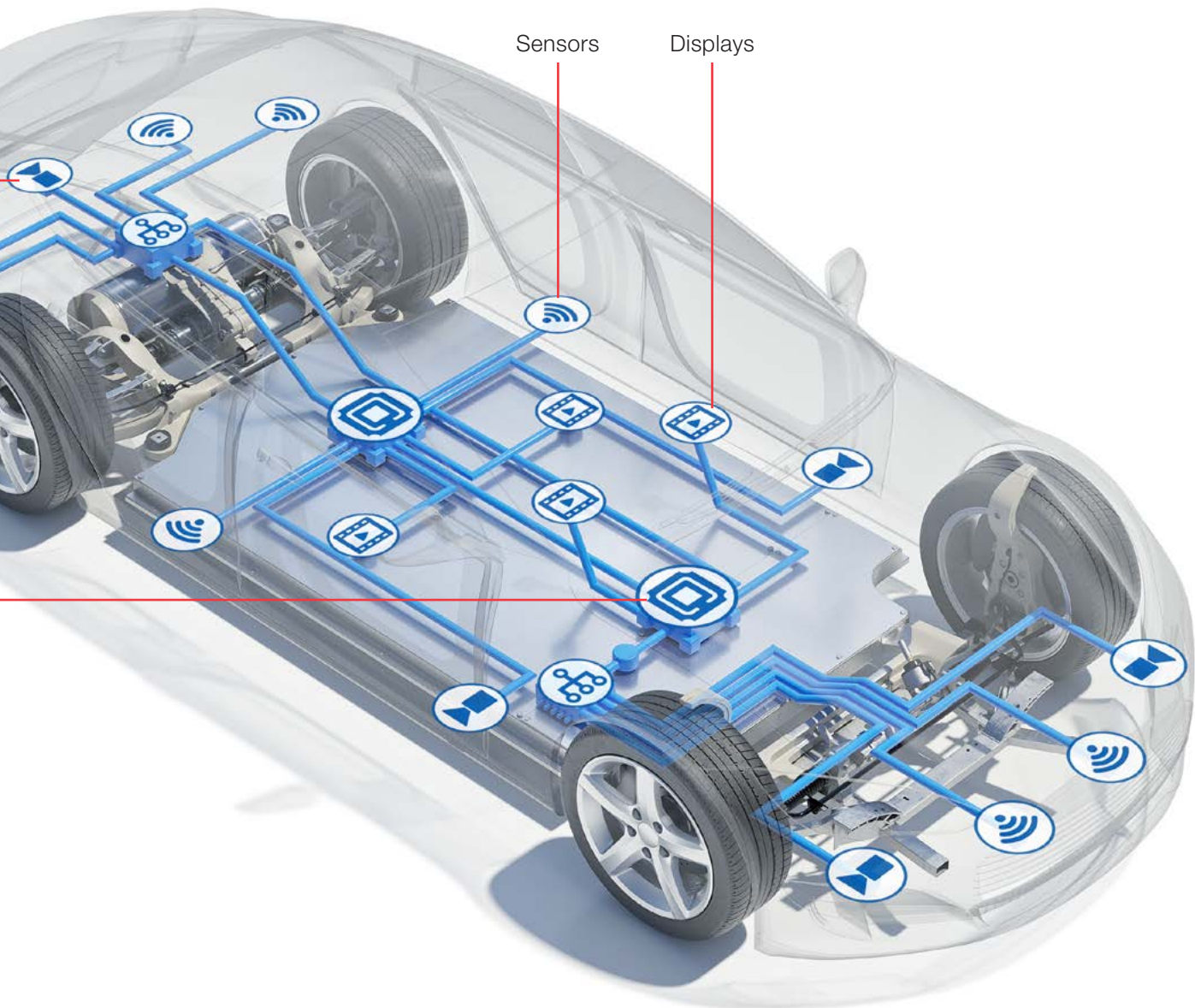
Applications

- Camera systems 4k and higher
- Driver assistance systems
- Autonomous driving
- High resolution displays
- Rear seat entertainment

Protocols

Automotive Ethernet

- 100BASE-T1
- 1000BASE-T1
- 2.5/5/10GBASE-T1

Further protocols
on request

SERDES

- APIX®
- FPD-Link
- GMSL™
- MIPI® A-PHYSM
- PCIe®
- USB
- GVIF
- HDBase-T™
- ASA Motion Link

H-MTD® Connectors

The Rosenberger H-MTD® connection system meets all electrical and mechanical automotive requirements. It features mechanical keying, latching, color code options, further locking features and a minimum size combined with pleasing ergonomics.

H-MTD®+6 Connectors

Rosenberger H-MTD®+6 power pin connectors – further variants with additional pins (MQS contacts) for power supply purposes.

H-MTD®e Unshielded Connectors

Rosenberger H-MTD®e connectors can be used in a variety of high-speed data connection applications, including unshielded Automotive Ethernet TC2. Highly cost-effective, they fulfill the exacting requirements of the automotive industry.
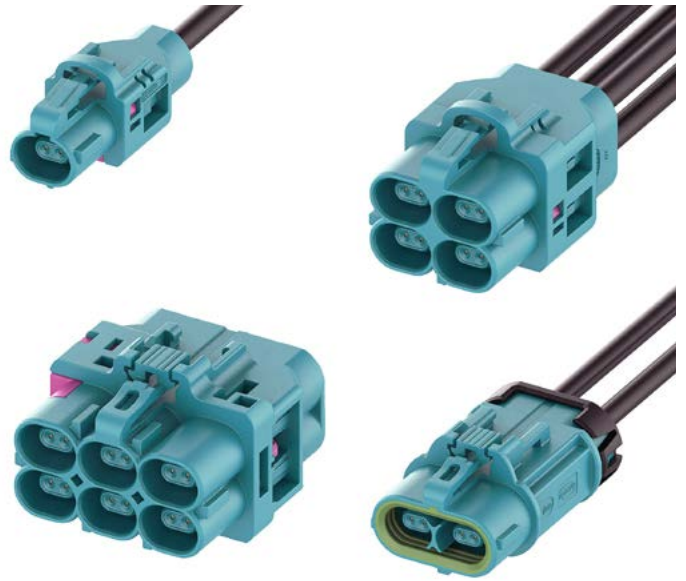
Connector Position Assurance (CPA)

High-speed data connectors are increasingly required in safety applications such as autonomous driving and driver assistance systems. In response, Rosenberger has developed an optional CPA solution which prevents unintentional disengagement and therefore improves connection reliability.

The CPA cannot be activated if the connector has not been completely mated. When aligned correctly the CPA can be closed. Additional products are available on request.
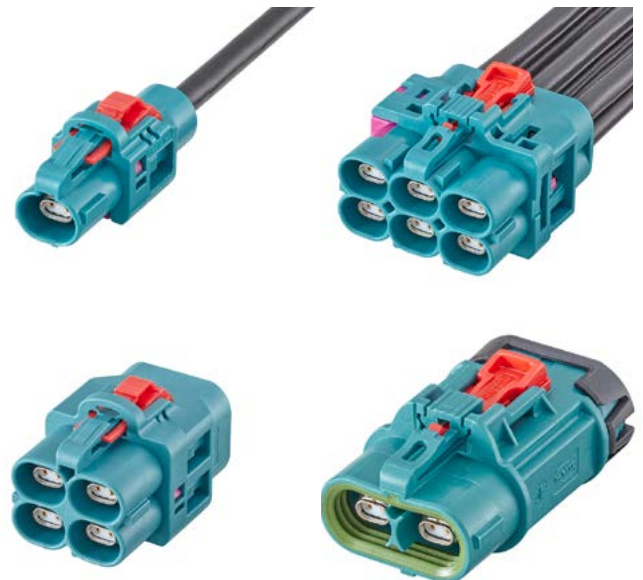
H-MTD® Number Codes

E6	K	1	0A –	1	xx	Z5 –	y
							Coding
							A Jet black
							B Pure white
							C Light blue
							D Claret violet
							E May green
							F Nut brown
							Z Water blue (neutral coding for coding A – F)
							G Platinum grey
							H Light pink
							J Beige
							K Curry
							L Yellow green
							M Pastel orange
							N Pastel green
							O Light green (neutral coding for coding G – R)
							P Carmine red
							R Signal blue
							y Placeholder for required coding
						Plating	
					01-Z9 Cable group		
					00 Blank		
					0M Surface mount device		
					xx Blank cable group		
				1 Crimp			
				4 PCB mounting			
			Successive number				
		1 Straight connector					
		2 Right angle connector					
	K Female jack						
	S Male plug						
	W Tools						
	Z Plastic housings and accessories						
Connector series							
E6 Rosenberger H-MTD®							
E9 Rosenberger H-MTD®e							
99 Special products power pin (Rosenberger H-MTD®+6)							

H-MTD® Shielded Cable Groups

Cable Group	Impedance	Cable Type
CA	100 Ω	e.g. GG 2Speed® 251, LEONI Dacar® 686-3
BZ	100 Ω	e.g. LEONI Dacar® 647-4

H-MTD®e Unshielded Cable Groups

Cable Group	Impedance	Cable Type
AQ	100 Ω	e.g. GG 2Speed® 132, LEONI Dacar® 676

H-MTD® Plating Code

Outer Contact

Code	Plating	Symbol	Layer thickness	Magnetic properties
S	Stainless steel			
T	Tin/lead-free	Sn	Min. 1.50 μm	Non magnetic
X	Placeholder, no outer contact			
Z	Special plating			

Center Contact

Code	Plating	Symbol	Layer thickness	Magnetic properties
5	Gold	Au	Min. 0.12 μm	Non magnetic

The used platings of outer and center contacts as well as the cable group of Rosenberger connectors can be identified by each part number.

H-MTD® Technical Data

Technical Data Rosenberger H-MTD® (Code E6)

Applicable Standards

Interface according to	Rosenberger H-MTD® RN_121-00
	Rosenberger H-MTD® RN_121-01
	Rosenberger H-MTD® RN_121-02
	Rosenberger H-MTD® RN_121-04
	Rosenberger H-MTD® RN_121-06
	Rosenberger H-MTD® RN_121-16
	Rosenberger H-MTD® RN_121-26
	Rosenberger H-MTD® RN_128-01
	Rosenberger H-MTD® RN_128-02
	Rosenberger H-MTD® RN_128-04
	Rosenberger H-MTD® RN_128-16

Electrical Data

Impedance	100 Ω
Frequency range depending on cable type	0.01 GHz to 20 GHz
Return loss	≥ 30 dB, 0.01 GHz to 3 GHz
	≥ 25 dB, 3 GHz to 6 GHz
	≥ 20 dB, 6 GHz to 10 GHz
	≥ 15 dB, 10 GHz to 15 GHz
	≥ 12 dB, 15 GHz to 20 GHz
Near end crosstalk	≥ 60 dB, 0.01 GHz to 7.5 GHz
	≥ 45 dB, 7.5 GHz to 20 GHz
Far end crosstalk	≥ 60 dB, 0.01 GHz to 7.5 GHz
	≥ 45 dB, 7.5 GHz to 20 GHz
Insulation resistance	≥ 1 x 10^2 MΩ
Signal contact resistance	≤ 10 mΩ
Outer contact resistance	≤ 7.5 mΩ
Test voltage (depends on connector)	> 250 V DC
Working voltage	< 60 V DC
Contact current depending on cable type	≤ 1.5 A DC at 85 °C ambient temperature

Electrical requirements are mandatory up to the maximum frequency specified by cable testing (according to data sheet). Data is for informational purposes only when the maximum frequency is surpassed.

Mechanical Data

Mating cycles (standard, non waterproof)	≥ 25
Mating cycles (waterproof)	≥ 5
Engagement force	≤ 45 N*
Engagement force waterproof	≤ 45 N*
Retention force latch	≥ 110 N
Retention force primary lock	≥ 80 N
Retention force secondary lock	≥ 120 N*
Polarization feature effectiveness	≥ 150 N*

* Depends on connector

Environmental Data

Temperature range	-40 °C to +105 °C
Thermal shock	DIN EN 60068-2-14
Humidity	DIN EN 60068-2-30 at +40 °C
Dry heat	DIN EN 60068-2-2 at +105 °C
Vibration	DIN EN 60068-2-64
Mechanical shock	DIN EN 60068-2-27
RoHS	Compliant

Materials

Outer contact	CuZn (brass), CuSn (bronze), Zinc Alloy, or equivalent Test adaptors stainless steel
Signal contacts	CuZn, CuSn (brass, bronze), or equivalent
Dielectric	PA, PBT, LCP, or equivalent
Gasket	Silicone, rubber, or equivalent
Crimping ferrule	CrNi (steel), or equivalent
Plastic housings and secondary lock	PA, PBT, or equivalent

Platings

Outer contact	Tin, special plating
Signal contact	Gold

Rosenberger connectors fulfill in principle the indicated data of the Technical Data. Individual values of connectors may deviate depending upon application, design, type of cable, assembly method and execution. Specific data sheets for particular products can be provided on request by your Rosenberger sales partner.

Interface Dimensions

MALE

FEMALE
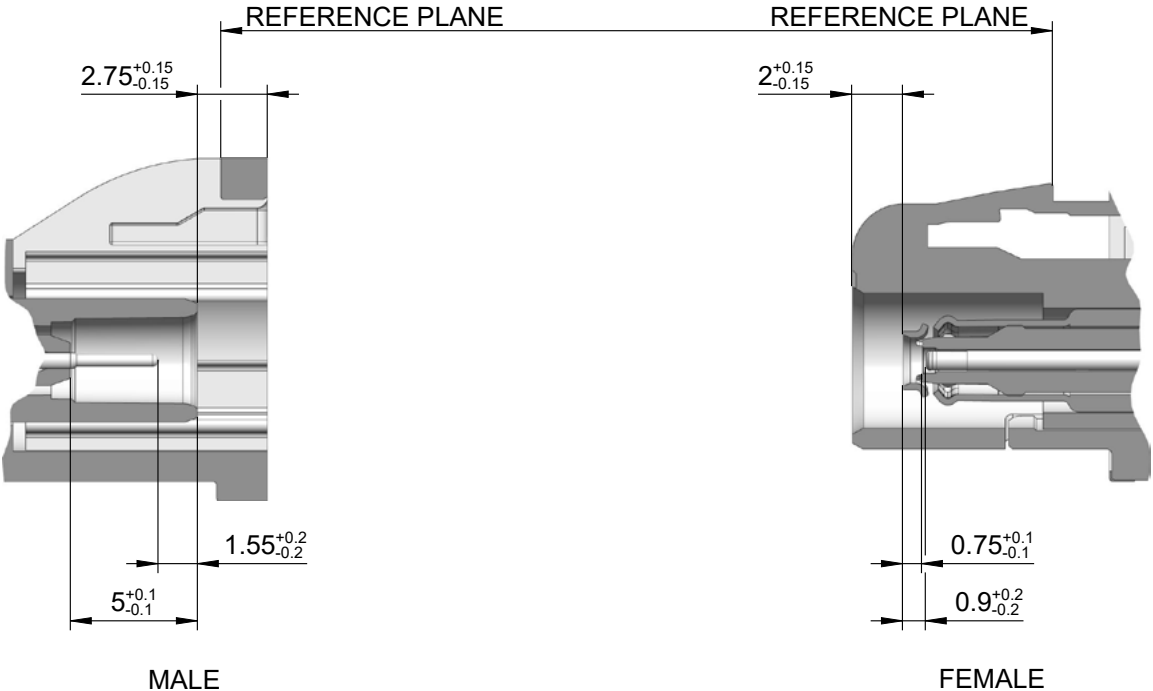
H-MTD® Connectors

PCB Connectors – Pin-in-Paste

Straight Plug, Single

Rosenberger No.	Description	Panel Piercing / PCB Layout	Coding H-MTD®	Product
E6S10A-40MT5-y	Pin-in-paste 2 signal pins	MB 821	See coding table	

Straight Plug, Double

Rosenberger No.	Description	Panel Piercing / PCB Layout	Coding H-MTD®	Product
E6S10B-40MT5-y	Pin-in-paste 2×2 signal pins	MB 671	See coding table	
E6S13B-40MT5-y	Pin-in-paste 2×2 signal pins Vertical	MB 1035	See coding table	

Straight Plug, Quad

Rosenberger No.	Description	Panel Piercing / PCB Layout	Coding H-MTD®	Product
E6S10D-40MT5-y	Pin-in-paste 4×2 signal pins	MB 865	See coding table	

Straight Plug, Six

Rosenberger No.	Description	Panel Piercing / PCB Layout	Coding H-MTD®	Product
E6S10F-40MT5-y	Pin-in-paste 6×2 signal pins	MB 689 / MB 715	See coding table	

y: Please fill-in required coding, availability of the specific coding on request

Right Angle Plug, Single

Rosenberger No.	Description	Panel Piercing / PCB Layout	Coding H-MTD®	Product
E6S20A-40MT5-y	Pin-in-paste 2 signal pins	MB 633	See coding table	
E6S22A-40MT5-y	Cable up Pin-in-paste 2 signal pins	MB 816	See coding table	
E6S218-40MT5-y	Cable up Edge mount Pin-in-paste 2 signal pins	MB 693	See coding table	

Right Angle Plug, Double

Rosenberger No.	Description	Panel Piercing / PCB Layout	Coding H-MTD®	Product
E6S20B-40MT5-y	Pin-in-paste 2×2 signal pins	MB 666	See coding table	

Right Angle Plug, Quad

Rosenberger No.	Description	Panel Piercing / PCB Layout	Coding H-MTD®	Product
E6S20D-40MT5-y	Pin-in-paste 4×2 signal pins	MB 869	See coding table	

Right Angle Plug, Six

Rosenberger No.	Description	Panel Piercing / PCB Layout	Coding H-MTD®	Product
E6S20F-40MT5-y	Pin-in-paste 6×2 signal pins	MB 940	See coding table	

y: Please fill-in required coding, availability of the specific coding on request

Cable Connectors

Straight Plug, Single

Rosenberger No.	Description	Cable Group	Assembly Instruction	Coding H-MTD®	Product
E6S10A-1BZZ5-y	2 signal pins	BZ	MA E6V008 MA E6V004	See coding table	
E6S10A-1CAZ5-y		CA			
E6S10C-1BZZ5-y	2 signal pins With slot for positioning clip	BZ	MA E6V008 MA E6V004	See coding table	
E6S10C-1CAZ5-y		CA			

Straight Plug, Double

Rosenberger No.	Description	Cable Group	Assembly Instruction	Coding H-MTD®	Product
E6S10B-1BZZ5-y	2×2 signal pins	BZ	MA E6V008 MA E6V004	See coding table	
E6S10B-1CAZ5-y		CA			
E6S10V-1BZZ5-y	2×2 signal pins With slot for positioning clip	BZ	MA E6V008 MA E6V004	See coding table	
E6S10V-1CAZ5-y		CA			

Straight Jack, Single

Rosenberger No.	Description	Cable Group	Assembly Instruction	Coding H-MTD®	Product
E6K10A-1BZZ5-y	2 signal pins	BZ	MA E6V007 MA E6V003	See coding table	
E6K10A-1CAZ5-y		CA			
E6K11A-1BZZ5-y	2 signal pins With CPA	BZ	MA E6V007 MA E6V003	See coding table	
E6K11A-1CAZ5-y		CA			

y: Please fill-in required coding, availability of the specific coding on request

Straight Jack, Double

Rosenberger No.	Description	Cable Group	Assembly Instruction	Coding H-MTD®	Product
E6K10B-1BZZ5-y	2×2 signal pins	BZ	MA E6V007 MA E6V003	See coding table	
E6K10B-1CAZ5-y		CA			
E6K11B-1BZZ5-y	2×2 signal pins With CPA	BZ	MA E6V007 MA E6V003	See coding table	
E6K11B-1CAZ5-y		CA			

Straight Jack, Quad

Rosenberger No.	Description	Cable Group	Assembly Instruction	Coding H-MTD®	Product
E6K10D-1BZZ5-y	4×2 signal pins	BZ	MA E6V007 MA E6V003	See coding table	
E6K10D-1CAZ5-y		CA			
E6K11D-1BZZ5-y	4×2 signal pins With CPA	BZ	MA E6V007 MA E6V003	See coding table	
E6K11D-1CAZ5-y		CA			

Straight Jack, Six

Rosenberger No.	Description	Cable Group	Assembly Instruction	Coding H-MTD®	Product
E6K10F-1BZZ5-y	6×2 signal pins	BZ	MA E6V007 MA E6V003	See coding table	
E6K10F-1CAZ5-y		CA			
E6K11F-1BZZ5-y	6×2 signal pins With CPA	BZ	MA E6V007 MA E6V003	See coding table	
E6K11F-1CAZ5-y		CA			

y: Please fill-in required coding, availability of the specific coding on request

H-MTD® Connectors – Waterproof

PCB Connectors – Pin-in-Paste

Straight Plug, Single, Waterproof

Rosenberger No.	Description	Panel Piercing / PCB Layout	Coding H-MTD®	Product
E6S14A-40MT5-y	Waterproof Pin-in-paste 2 signal pins	MB 821	See coding table	

Straight Plug, Double, Waterproof

Rosenberger No.	Description	Panel Piercing / PCB Layout	Coding H-MTD®	Product
E6S14B-40MT5-y	Waterproof Pin-in-paste 2×2 signal pins	MB 797	See coding table	

Right Angle Plug, Single, Waterproof

Rosenberger No.	Description	Panel Piercing / PCB Layout	Coding H-MTD®	Product
E6S24A-40MT5-y	Waterproof Pin-in-paste 2 signal pins	MB 780	See coding table	
E6S24J-40MT5-y	Waterproof Pin-in-paste 2 signal pins	MB 1027	See coding table	

Right Angle Plug, Double, Waterproof

Rosenberger No.	Description	Panel Piercing / PCB Layout	Coding H-MTD®	Product
E6S24B-40MT5-y	Waterproof Pin-in-paste 2×2 signal pins	MB 1026	See coding table	

Right Angle Plug, Quad, Waterproof

Rosenberger No.	Description	Panel Piercing / PCB Layout	Coding H-MTD®	Product
E6S24D-40MT5-y	Waterproof Pin-in-paste 4×2 signal pins	MB 869	See coding table	

y: Please fill-in required coding, availability of the specific coding on request

Cable Connectors

Straight Plug, Single, Waterproof

Rosenberger No.	Description	Cable Group	Assembly Instruction	Coding H-MTD®	Product
E6S14E-1BZZ5-y	Waterproof 2 signal pins With slot for positioning clip	BZ	On request	See coding table	
E6S14E-1CAZ5-y		CA	MA E6V006		

Straight Jack, Single, Waterproof

Rosenberger No.	Description	Cable Group	Assembly Instruction	Coding H-MTD®	Product
E6K14A-1BZZ5-y	Waterproof 2 signal pins	BZ	On request	See coding table	
E6K14A-1CAZ5-y		CA	MA E6V005		
E6K14J-1BZZ5-y	Waterproof 2 signal pins With CPA	BZ	On request	See coding table	
E6K14J-1CAZ5-y		CA	MA E6V005		

Straight Jack, Double, Waterproof

Rosenberger No.	Description	Cable Group	Assembly Instruction	Coding H-MTD®	Product
E6K14B-1BZZ5-y	Waterproof 2×2 signal pins	BZ	On request	See coding table	
E6K14B-1CAZ5-y		CA	MA E6V005		
E6K14K-1BZZ5-y	Waterproof 2×2 signal pins With CPA	BZ	On request	See coding table	
E6K14K-1CAZ5-y		CA	MA E6V005		

Straight Jack, Quad, Waterproof

Rosenberger No.	Description	Cable Group	Assembly Instruction	Coding H-MTD®	Product
E6K14D-1BZZ5-y	Waterproof 4×2 signal pins	BZ	On request	See coding table	
E6K14D-1CAZ5-y		CA	MA E6V009		
E6K14L-1BZZ5-y	Waterproof 4×2 signal pins With CPA	BZ	On request	See coding table	
E6K14L-1CAZ5-y		CA	MA E6V009		

y: Please fill-in required coding, availability of the specific coding on request

H-MTD®+6 Power Pin Connectors

PCB Connectors – Pin-in-Paste

Straight Plug, Single +6

Rosenberger No.	Description	Panel Piercing / PCB Layout	Coding H-MTD®	Product
99S1HC-40MT5-y	Pin-in-paste 2 signal pins 6 power pins	MB 815	See coding table	

Straight Plug, Single +6, Waterproof

Rosenberger No.	Description	Panel Piercing / PCB Layout	Coding H-MTD®	Product
E6S14M-40MT5-Y	Waterproof Pin-in-paste 2 signal pins 6 power pins	MB 923	See coding table	

Straight Plug, Double +6

Rosenberger No.	Description	Panel Piercing / PCB Layout	Coding H-MTD®	Product
99S1HG-40MT5-y	Pin-in-paste 2×2 signal pins 6 power pins	MB 798	See coding table	

Right Angle Plug, Single +6

Rosenberger No.	Description	Panel Piercing / PCB Layout	Coding H-MTD®	Product
99S2HC-40MT5-y	Pin-in-paste 2 signal pins 6 power pins	MB 756	See coding table	

Right Angle Plug, Double +6

Rosenberger No.	Description	Panel Piercing / PCB Layout	Coding H-MTD®	Product
99S2HG-40MT5-y	Pin-in-paste 2×2 signal pins 6 power pins	MB 757	See coding table	

y: Please fill-in required coding, availability of the specific coding on request

Cable Connectors

Straight Jack, Single +6

Rosenberger No.	Description	Cable Group	Assembly Instruction	Coding H-MTD®	Product
99K1HC-1BZZ5-y	2 signal pins 6 power pins	BZ	On request	See coding table	
99K1HC-1CAZ5-y		CA	MA 99V062		

Straight Jack, Single +6, Waterproof

Rosenberger No.	Description	Cable Group	Assembly Instruction	Coding H-MTD®	Product
E6K14M-1BZZ5-y	Waterproof 2 signal pins	BZ	On request	See coding table	
E6K14M-1CAZ5-y	6 power pins With CPA	CA	MA E6V014		

Straight Jack, Double +6

Rosenberger No.	Description	Cable Group	Assembly Instruction	Coding H-MTD®	Product
99K1HG-1BZZ5-y	2×2 signal pins 6 power pins	BZ	On request	See coding table	
99K1HG-1CAZ5-y		CA	MA 99V062		

y: Please fill-in required coding, availability of the specific coding on request

H-MTD®e Technical Data

Technical Data H-MTD®e (Code E9)

Applicable Standards

Interface according to	Rosenberger H-MTD®e RN_240-00 Rosenberger H-MTD®e RN_240-01 Rosenberger H-MTD®e RN_240-02 Rosenberger H-MTD®e RN_240-04 Rosenberger H-MTD®e RN_240-06 Rosenberger H-MTD®e RN_244-01 Rosenberger H-MTD®e RN_244-02 Rosenberger H-MTD®e RN_244-04

Electrical Data

Impedance	100 Ω
Frequency range depending on cable type	DC to 1 GHz
Return loss	$\geq \left(\begin{matrix} 38 & 1 \leq f < 75 \\ 20 - 20\log\left(f/600 \right) & 75 \leq f \leq 600 \end{matrix} \right) dB \ ^*$
Insertion loss	$\leq \left(0.01\sqrt{f} \right) dB \ ^*$
Mode conversion loss	$\geq \left(\begin{matrix} 55 & 10 \leq f \leq 80 \\ 77 - 11.51\log(f) & 80 < f \leq 600 \end{matrix} \right) dB \ ^*$
Skew (between signal contacts) straight connectors Skew (between signal contacts) right angle connectors	$\leq$ 5 ps $\leq$ 25 ps
Near end crosstalk	$\leq$ -30 dB, DC to 100 MHz
Far end crosstalk	$\leq$ -35 dB, DC to 100 MHz
Insulation resistance	$\geq 1 \times 10^2$ MΩ
Signal contact resistance	$\leq$ 10 mΩ
Test voltage (depends on connector)	> 250 V DC
Working voltage	< 60 V DC
Contact current depending on cable type	$\leq$ 1.5 A DC at 85 °C ambient temperature

* f in MHz

Mechanical Data

Mating cycles (standard, non waterproof)	$\geq$ 25
Mating cycles (waterproof)	$\geq$ 5
Engagement force	$\leq$ 45 N*
Engagement force waterproof	$\leq$ 45 N*
Retention force latch	$\geq$ 110 N
Retention force primary lock	$\geq$ 80 N
Retention force secondary lock	$\geq$ 120 N*
Polarization feature effectiveness	$\geq$ 150 N*

* Depends on connector

Compatibility

	H-MTD®e jack	H-MTD®e plug	H-MTD® jack	H-MTD® plug
H-MTD®e jack	–	×	–	o
H-MTD®e plug	×	–	×	–

×: compatible, o: not compatible

Environmental Data

Temperature range	-40 °C to +105 °C
Thermal shock	DIN EN 60068-2-14
Humidity	DIN EN 60068-2-30 at +40 °C
Dry heat	DIN EN 60068-2-2 at +105 °C
Vibration	DIN EN 60068-2-64
Mechanical shock	DIN EN 60068-2-27
RoHS	Compliant

Materials

Signal contacts	CuZn (brass), CuSn (bronze), or equivalent
Dielectric	PA, PBT, LCP, or equivalent
Gasket	Silicone, rubber, or equivalent
Plastic housings and secondary lock	PA, PBT, or equivalent

Platings

Signal contacts	Gold

Rosenberger connectors fulfill in principle the indicated data of the Technical Data. Individual values of connectors may deviate depending upon application, design, type of cable, assembly method and execution. Specific data sheets for particular products can be provided on request by your Rosenberger sales partner.
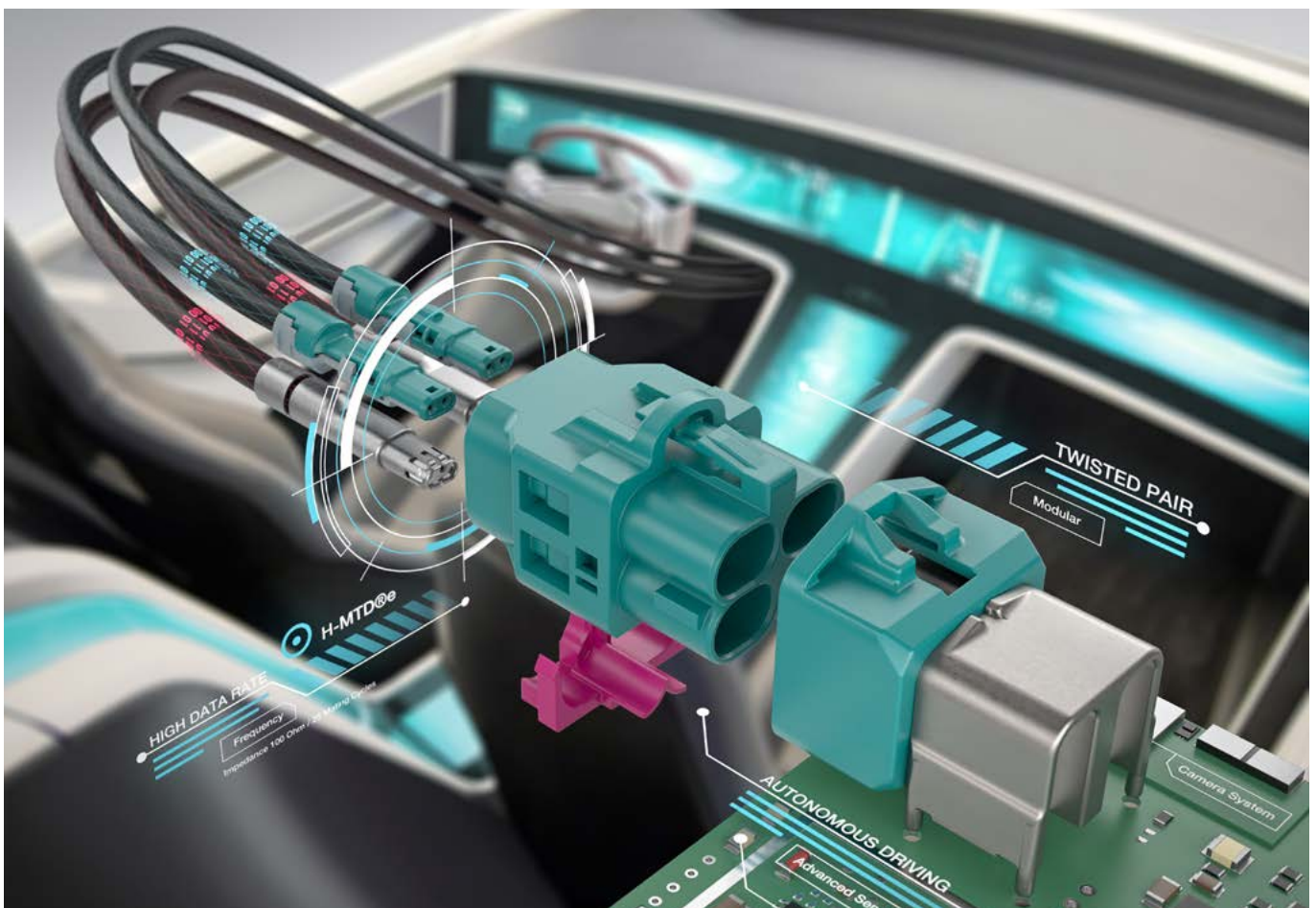
H-MTD®e Connectors

H-MTD®e Unshielded Connectors

Rosenberger H-MTD®e connectors can be used in a variety of high-speed data connection applications, including unshielded Automotive Ethernet TC2 and TC9. Highly cost-effective, they fulfill the exacting requirements of the automotive industry and are fully compatible with standard Rosenberger H-MTD® connectors.

Straight Jack, Single

Rosenberger No.	Description	Cable Group	Assembly Instruction	Coding H-MTD®	Product
E9K10A-1AQX5-y	2 signal pins	AQ	MA_E9V001	See coding table	

Straight Jack, Double

Rosenberger No.	Description	Cable Group	Assembly Instruction	Coding H-MTD®	Product
E9K10B-1AQX5-y	2×2 signal pins	AQ	MA_E9V001	See coding table	

Straight Jack, Quad

Rosenberger No.	Description	Cable Group	Assembly Instruction	Coding H-MTD®	Product
E9K10D-1AQX5-y	4×2 signal pins	AQ	MA_E9V001	See coding table	

Straight Jack, Six

Rosenberger No.	Description	Cable Group	Assembly Instruction	Coding H-MTD®	Product
E9K10F-1AQX5-y	6×2 signal pins	AQ	MA_E9V001	See coding table	

Straight Plug, Single

Rosenberger No.	Description	Cable Group	Assembly Instruction	Coding H-MTD®	Product
E9S10A-1AQX5-y	2 signal pins	AQ	MA_E9V002	See coding table	
E9S1CA-1AQX5-y	2 signal pins With slot for positioning clip	AQ	MA_E9V002	See coding table	

y: Please fill-in required coding, availability of the specific coding on request

Straight Plug, Double

Rosenberger No.	Description	Cable Group	Assembly Instruction	Coding H-MTD®	Product
E9S10B-1AQX5-y	2×2 signal pins	AQ	MA_E9V002	See coding table	
E9S1CB-1AQX5-y	2×2 signal pins With slot for positioning clip	AQ	MA_E9V002	See coding table	

y: Please fill-in requiredcoding, availability of the specific coding on request

H-MTD®e Unshielded Connectors – Waterproof

Straight Jack, Single, Waterproof

Rosenberger No.	Description	Cable Group	Assembly Instruction	Coding H-MTD®	Product
E9K14A-1AQX5-y	Waterproof 2 signal pins	AQ	MA_E9V003	See coding table	

Straight Jack, Double, Waterproof

Rosenberger No.	Description	Cable Group	Assembly Instruction	Coding H-MTD®	Product
E9K14B-1AQX5-y	Waterproof 2×2 signal pins	AQ	MA_E9V0003	See coding table	

Straight Plug, Single, Waterproof

Rosenberger No.	Description	Cable Group	Assembly Instruction	Coding H-MTD®	Product
E9S14A-1AQX5-y	Waterproof 2 signal pins	AQ	MA_E9V006	See coding table	
E9S14E-1AQX5-Y	Waterproof 2 signal pins With slot for positioning clip	AQ	MA_E9V006	See coding table	

y: Please fill-in required coding, availability of the specific coding on request

H-MTD® Test PC-Boards

Testboard H-MTD®

Rosenberger No.	Description	Connectors	Product
PCB-T2003-SB-01	Impedance 100 Ω Frequency range DC to 10 GHz	1 × H-MTD® male E6S10A-40MT5-Z 4 × RPC-2.92 female 02K721-40MS3	
PCB-T3503-SB-01	Impedance 100 Ω Frequency range DC to 10 GHz	1 × H-MTD® male E6S10F-40MT5-Z 4 × RPC-2.92 female 02K721-40MS3	
PCB-S3401-SB-01	Impedance 100 Ω Frequency range DC to 10 GHz	1 × H-MTD® male E6S20A-40MT5-Z 4 × RPC-2.92 female 02K721-40MS3	
PCB-T0601-SB-01	Impedance 100 Ω Frequency range DC to 10 GHz	1 × H-MTD® male E6S20B-40MT5-Z 6 × RPC-2.92 female 02K721-40MS3	
PCB-T0602-SB-01	Impedance 100 Ω Frequency range DC to 10 GHz	1 × H-MTD® male E6S20D-40MT5-Z 10 × RPC-2.92 female 02K721-40MS3	
PCB-T0704-SB-02	Impedance 100 Ω Frequency range DC to 10 GHz	1 × H-MTD® male E6S20F-40MT5-Z 12 × RPC-2.92 female 02K721-40MS3	

Testboard H-MTD®, Waterproof

Rosenberger No.	Description	Connectors	Product
PCB-T2003-SB-02	Impedance 100 Ω Frequency range DC to 10 GHz	1 × H-MTD® male E6S14A-40MT5-Z waterproof 4 × RPC-2.92 female 02K721-40MS3	
PCB-S3401-SB-02	Impedance 100 Ω Frequency range DC to 10 GHz	1 × H-MTD® male E6S24A-40MT5-Z waterproof 4 × RPC-2.92 female 02K721-40MS3	
PCB-T0601-SB-02	Impedance 100 Ω Frequency range DC to 10 GHz	1 × H-MTD® male E6S24B-40MT5-Z waterproof 6 × RPC-2.92 female 02K721-40MS3	
PCB-T0602-SB-02	Impedance 100 Ω Frequency range DC to 10 GHz	1 × H-MTD® male E6S24D-40MT5-Z waterproof 10 × RPC-2.92 female 02K721-40MS3	

Testboard H-MTD® +6 Power Pin

Rosenberger No.	Description	Connectors	Product
PCB-T2003-SB-03	Impedance 100 Ω Frequency range DC to 10 GHz	1 × H-MTD®+6 male 99S1HC-40MT5-Z 6 × SMA female 32K101-400L5 4 × RPC-2.92 female 02K721-40MS3	
PCB-T2003-SB-04	Impedance 100 Ω Frequency range DC to 10 GHz	1 × H-MTD®+6 male 99S1HG-40MT5-Z 6 × SMA female 32K101-400L5 6 × RPC-2.92 female 02K721-40MS3	
PCB-T1401-SB-01	Impedance 100 Ω Frequency range DC to 10 GHz	1 × H-MTD®+6 male 99S2HC-40MT5-Z 6 × SMA female 32K101-400L5 4 × RPC-2.92 female 02K721-40MS3	
PCB-T1401-SB-02	Impedance 100 Ω Frequency range DC to 10 GHz	1 × H-MTD®+6 male 99S2HG-40MT5-Z 6 × SMA female 32K101-400L5 6 × RPC-2.92 female 02K721-40MS3	

H-MTD® Test Adaptors

Precision Adaptors with H-MTD® Housing

Rosenberger No.	Description	Connector Interfaces	Product
02K3E6-K00S5	Y-Adaptor With H-MTD® housing single	RPC-2.92 female H-MTD® female	
02S3E6-K00S5	Y-Adaptor With H-MTD® housing single	RPC-2.92 male H-MTD® female	
02K3E6-S00S5	Y-Adaptor With H-MTD® housing single	RPC-2.92 female H-MTD® male	
02S3E6-S00S5	Y-Adaptor With H-MTD® housing single	RPC-2.92 male H-MTD® male	

Precision Adaptors without H-MTD® Housing for Universal Use

Rosenberger No.	Description	Connector Interfaces	Product
02K3E6-K01S5	Y-Adaptor Without H-MTD® housing	RPC-2.92 female H-MTD® female	
02S3E6-K01S5	Y-Adaptor Without H-MTD® housing	RPC-2.92 male H-MTD® female	
02K3E6-S01S5	Y-Adaptor Without H-MTD® housing	RPC-2.92 female H-MTD® male	
02S3E6-S01S5	Y-Adaptor Without H-MTD® housing	RPC-2.92 male H-MTD® male	

Directional Coupler

Rosenberger No.	Description	Coupler	Product
DCDP-H-MTD-1G	Coupler Kit including: 1 × coupler H-MTD® 2 × cable assemblies LCA-109-1000-Z 2 × cable assemblies LCA-101-1000-Z-Z	2 × H-MTD® male E6S215-40ML5-Z 4 × SMA female 32K264-40ML5	

Hand Crimping Tool Kit

Rosenberger No.	Description	Cable Group	Product
E6W003-SET	Complete tool kit in case Incl. 6 pliers for cutting, stripping, crimping For male and female connectors	CA	

Further tools and tool kits are availabe on request
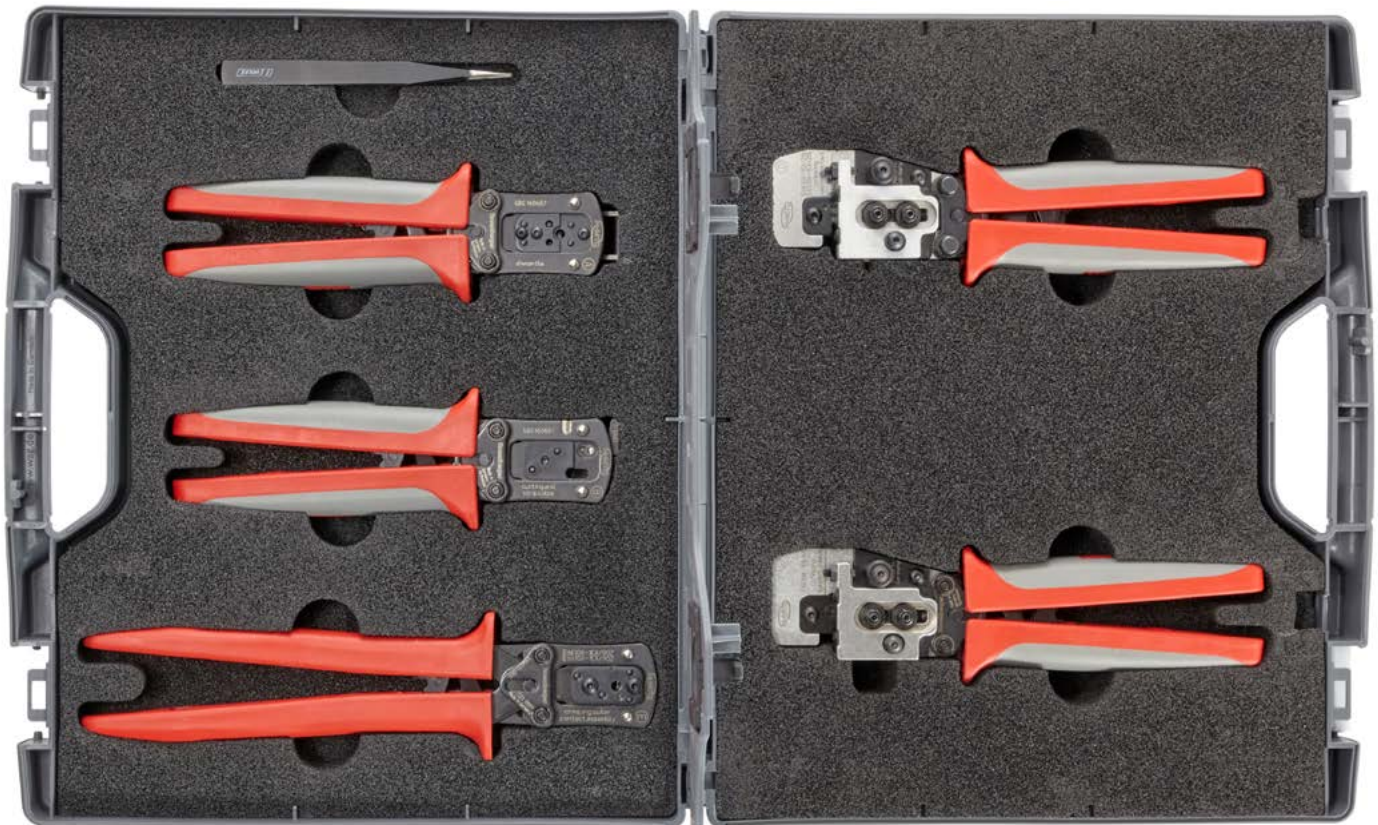
Learn more about the compact hand crimping tool kit from Rosenberger for the quick replacement of damaged Rosenberger H-MTD® connectors on the cable harness.

www.rosenberger.com/v/h-mtd-toolkit

H-MTD® Connectors for Multiheader

Rosenberger multiheaders combine multipin configurations with coaxial and differential high-speed connectors for future-proof automotive wiring systems. They enable all connector combinations for data transmission and power supply in the smallest space, with the lowest weight at the best price/performance ratio. Depending on the design, they combine a variety of electrical contacts, e. g. MQS with coaxial and differential data connectors such as FAKRA, HFM®, H-MTD® or RosenbergerHSD®.

All customized assembly combinations are explicitly designed for the respective application. Rosenberger develops the interfaces according to the requirements of automotive manufacturers and Tier 1 suppliers.

Product Portfolio

- Scalable multiheader
- Customized multiheader
- Modular housings, single, double, quad, six, right angle and straight
- Combinations of all common series
  e. g. HFM®, H-MTD®, RosenbergerHSD®, FAKRA

Features

- Design and process perfectly aligned for automotive market requirements and applications
- Wide operating temperature range
- Frequency range data connectors up to 20 GHz
- Reliable signal integrity
- Cost efficient
- Open to various protocols

Scalable multiheader

Customized multiheader
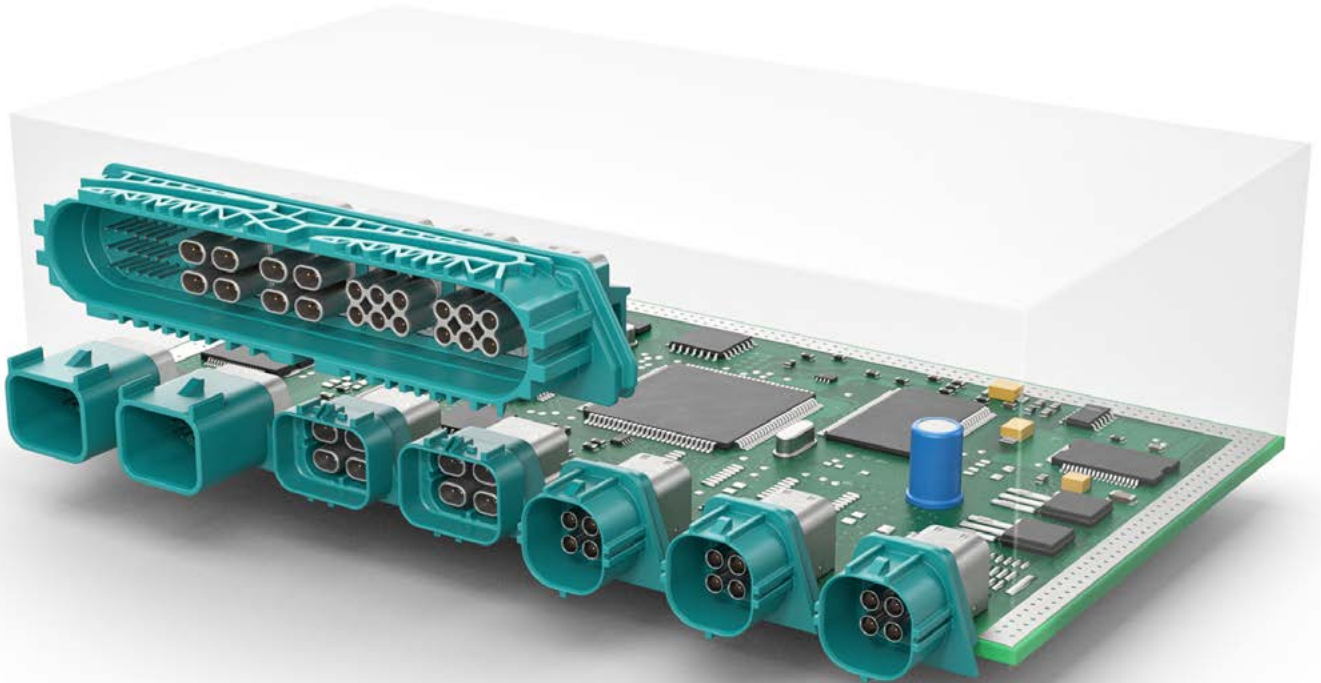
Benefits

- Scalable multiheaders reduce weight and size – space savings of up to 40 %
- Production according to customer specification
- Every conceivable modular design is possible
- Combination of data and power connectors as specified
- Simplified, fast connection and disconnection of complex signal lines
- The modular concept enables a fully automated assembly process
- Application-specific implementations due to modular and scalable design in the smallest installation space

Applications

- For all applications and complex controls in the automotive wiring system
- Video and audio technology
- Wiring harnesses
- Advanced Driver Assistance Systems (ADAS)
- 4K cameras and displays
- Infotainment

H-MTD® Cable Assemblies

Rosenberger offers a comprehensive range of standard cable assemblies as well as customized solutions for high speed data transmissions.

Cable variants with 0.14 mm² center contact sections are available. There are fully shielded cable variants for Rosenberger H-MTD®. Additional unshielded cables for the cost-optimized Rosenberger H-MTD®e are available.

Customized versions on request, please feel free to contact us.

Rosenberger Number Code – Cable Assemblies Rosenberger H-MTD®/H-MTD®e

L	xx-	101-	xxxx-	-y-y	(_flex)
					Add. if flexible cable
				Coding Side A and B	
				A Jet black	
				B Pure white	
				C Light blue	
				D Claret violet	
				E May green	
				F Nut brown	
				Z Water blue (neutral coding for coding A – F)	
				G Platinum grey	
				H Light pink	
				J Beige	
				K Curry	
				L Yellow green	
				M Pastel orange	
				N Pastel green	
				O Light green (neutral coding for coding G – R)	
				P Carmine red	
				R Signal blue	
				y Placeholder for required coding	
			Length in mm		
		Successive number			
		Include assembled connectors			
		For details please see data sheet			
	Cable group				
	AQ				
	BZ				
	CA				
Cable assembly					

Cable Assemblies H-MTD®

Rosenberger No.	Description	Cable Group	Side A	Side B	Product
LCA-101-xxxx-y-y	xxxx: length in mm y-y: coding side A/B (see table)	CA	E6K10A-1CA Jack, straight	E6K10A-1CA Jack, straight	
LCA-102-xxxx-y-y	xxxx: length in mm y-y: coding side A/B (see table)	CA	E6K10A-1CA Jack, straight	E6S10A-1CA Plug, straight	
LCA-103-xxxx-y-y	xxxx: length in mm y-y: coding side A/B (see table)	CA	E6S10A-1CA Plug, straight	E6K10A-1CA Jack, straight	
LCA-104-xxxx-y-y	xxxx: length in mm y-y: coding side A/B (see table)	CA	E6S10A-1CA Plug, straight	E6S10A-1CA Plug, straight	

Cable Assemblies H-MTD®e

Rosenberger No.	Description	Cable Group	Side A	Side B	Product
LAQ-344-xxxx-y-y	xxxx: length in mm y-y: coding side A/B (see table)	AQ	E9K10A-1AQ Jack, straight	E9K10A-1AQ Jack, straight	
LAQ-338-xxxx-y-y	xxxx: length in mm y-y: coding side A/B (see table)	AQ	E9S10A-1AQ Plug, straight	E9S10A-1AQ Plug, straight	
LAQ-339-xxxx-y-y	xxxx: length in mm y-y: coding side A/B (see table)	AQ	E9S10A-1AQ Plug, straight	E6K10A-1AQ Jack, straight	

xxxx: length in mm, -y: coding side A/B see table

H-MTD® Pinnings

The standard pinning of the Rosenberger H-MTD® is defined in the Rosenberger standards RN_143-XX (XX defining the port quantity).
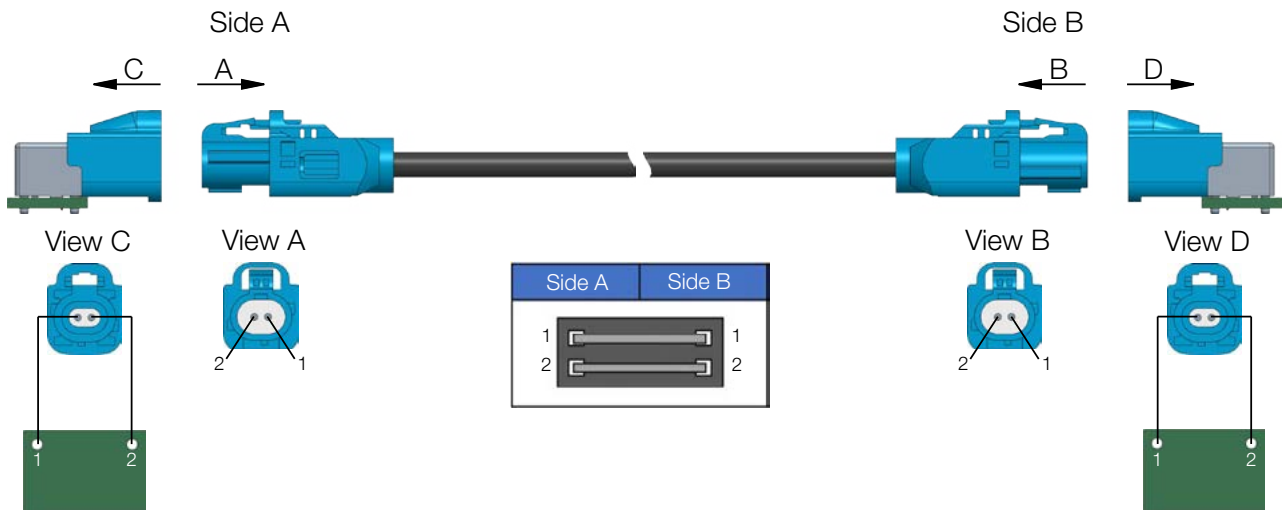
Pinning according Rosenberger norm RN_143-01
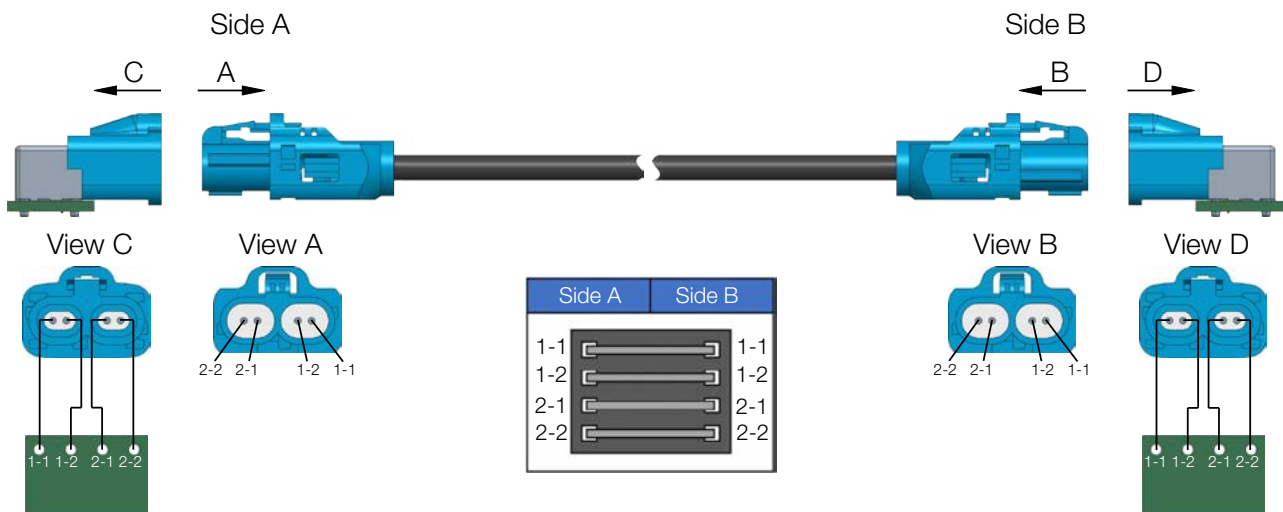
Pinning according Rosenberger norm RN_143-02

Side A

C | A →

Side B

B ← | D →

View C

View A

2-1 | 1-2
2-2 | 1-1
3-1 | 4-2
3-2 | 4-1

Side A	Side B
1-1	1-1
1-2	1-2
2-1	2-1
2-2	2-2
3-1	3-1
3-2	3-2
4-1	4-1
4-2	4-2

View B

2-1 | 1-2
2-2 | 1-1
3-1 | 4-2
3-2 | 4-1

View D

| 1-1 | 1-2 | 2-1 | 2-2 |
| 4-2 | 4-1 | 3-2 | 3-1 |

| 1-1 | 1-2 | 2-1 | 2-2 |
| 4-2 | 4-1 | 3-2 | 3-1 |

Pinning according Rosenberger norm RN_143-04

Side A

C | A →

Side B

B ← | D →

View C

View A

3-1 | 2-2 | 2-1 | 1-2
3-2 | | | 1-1
4-1 | | | 6-2
4-2 | 5-1 | 5-2 | 6-1

Side A	Side B
1-1	1-1
1-2	**1-2**
2-1	**2-1**
2-2	2-2
3-1	3-1
3-2	3-2
4-1	4-1
4-2	4-2
5-1	5-1
5-2	5-2
6-1	6-1
6-2	6-2

View B

3-1 | 2-2 | 2-1 | 1-2
3-2 | | | 1-1
4-1 | | | 6-2
4-2 | 5-1 | 5-2 | 6-1

View D

| 1-1 | 1-2 | 2-1 | 2-2 | 3-1 | 3-2 |
| 6-2 | 6-1 | 5-2 | 5-1 | 4-2 | 4-1 |

| 1-1 | 1-2 | 2-1 | 2-2 | 3-1 | 3-2 |
| 6-2 | 6-1 | 5-2 | 5-1 | 4-2 | 4-1 |
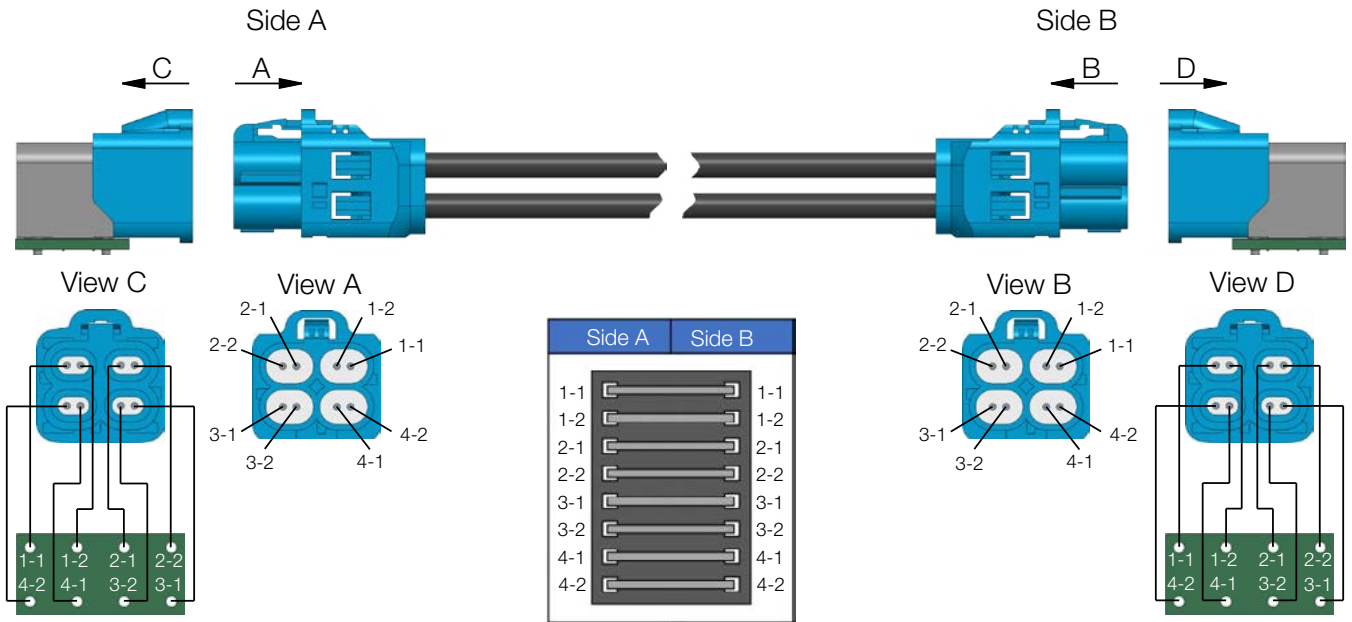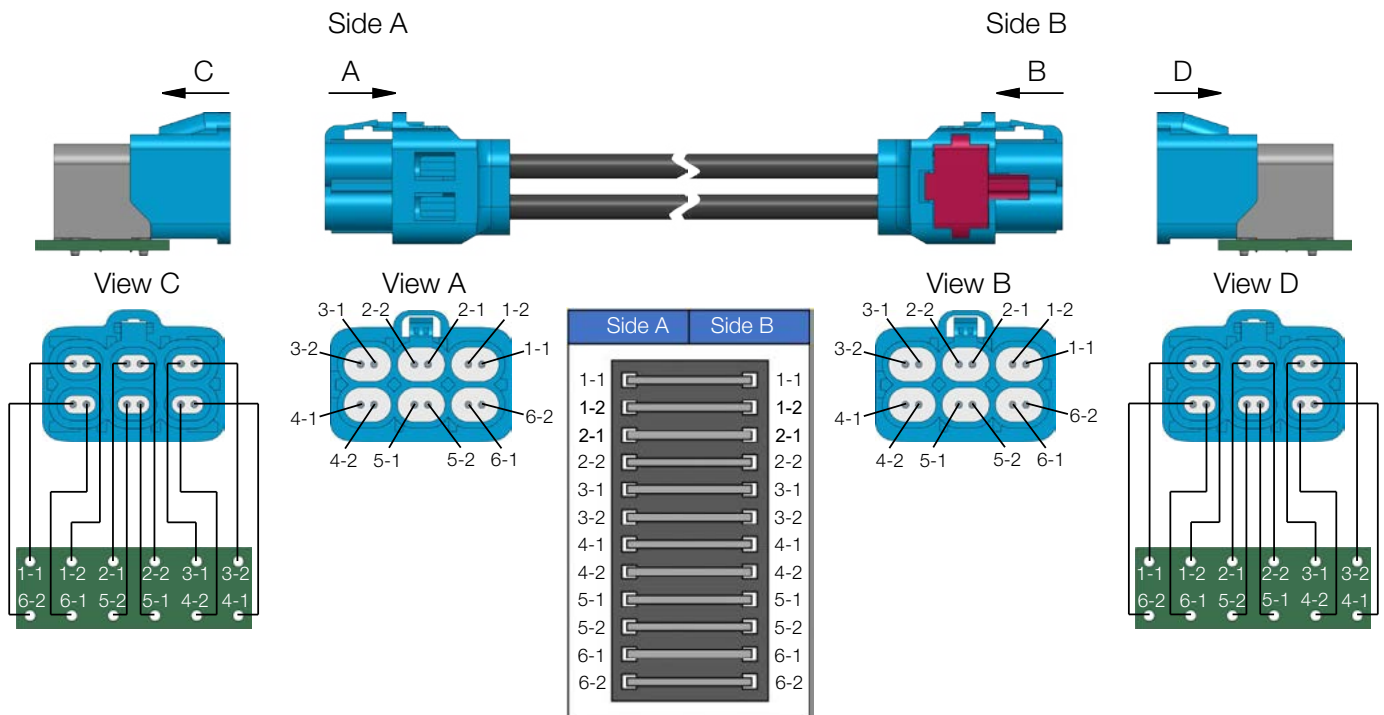
Pinning according Rosenberger norm RN_143-06

H-MTD® Codings

Coding H-MTD® Single, H-MTD®+6 Single

Coding	Jack	Plug	Color / RAL-No. (similar)	
A			Jet black / 9005	■
B			Pure white / 9010	□
C			Light blue / 5012	■
D			Claret violet / 4004	■
E			May green / 6017	■
F			Nut brown / 8011	■
G			Platinum grey / 7036	■
H			Light pink / 3015	■
J			Beige / 1001	■
K			Curry / 1027	■
L			Yellow green / 6018	■
M			Pastel orange / 2003	■
O (neutral coding for coding G – M)			Light green / 6027	■
Z (neutral coding for coding A – F)			Water blue / 5021	■

Availability of specific codings upon request. Color of the plastic housing defined in accordance to the listed RAL colors. Minor color differences due to manufacturing possible.

Coding H-MTD® Double, H-MTD®+6 Double

Coding	Jack	Plug	Color / RAL-No. (similar)	
A			Jet black / 9005	⬛
B			Pure white / 9010	⬜
C			Light blue / 5012	🟦
D			Claret violet / 4004	🟪
E			May green / 6017	🟩
F			Nut brown / 8011	🟫
G			Platinum grey / 7036	⬜
H			Light pink / 3015	🟥
J			Beige / 1001	🟧
K			Curry / 1027	🟨
L			Yellow green / 6018	🟩
M			Pastel orange / 2003	🟧
O (neutral coding for coding G – M)			Light green / 6027	🟦
Z (neutral coding for coding A – F)			Water blue / 5021	🟦
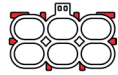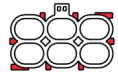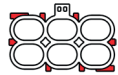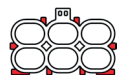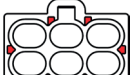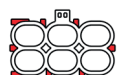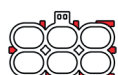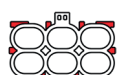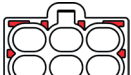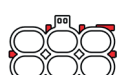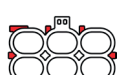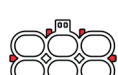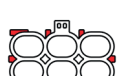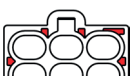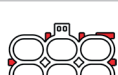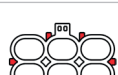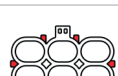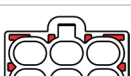
Availability of specific codings upon request. Color of the plastic housing defined in accordance to the listed RAL colors. Minor color differences due to manufacturing possible.

Coding H-MTD® Quad

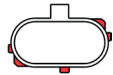| Coding	Jack	Plug	Color / RAL-No. (similar)	
A			Jet black / 9005	
B			Pure white / 9010	
C			Light blue / 5012	
D			Claret violet / 4004	
E			May green / 6017	
F			Nut brown / 8011	
G			Platinum grey / 7036	
H			Light pink / 3015	
J			Beige / 1001	
K			Curry / 1027	
L			Yellow green / 6018	
M			Pastel orange / 2003	
O (neutral coding for coding G – M)			Light green / 6027	
Z (neutral coding for coding A – F)			Water blue / 5021	

Availability of specific codings upon request. Color of the plastic housing defined in accordance to the listed RAL colors. Minor color differences due to manufacturing possible.

Coding H-MTD® Six

Coding	Jack	Plug	Color / RAL-No. (similar)	
A			Jet black / 9005	■
B			Pure white / 9010	☐
C			Light blue / 5012	■
D			Claret violet / 4004	■
E			May green / 6017	■
F			Nut brown / 8011	■
G			Platinum grey / 7036	■
H			Light pink / 3015	■
J			Beige / 1001	■
K			Curry / 1027	■
L			Yellow green / 6018	■
M			Pastel orange / 2003	■
O (neutral coding for coding G – M)			Light green / 6027	■
Z (neutral coding for coding A – F)			Water blue / 5021	■
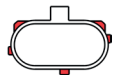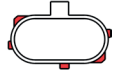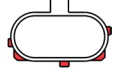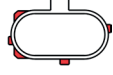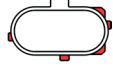
Availability of specific codings upon request. Color of the plastic housing defined in accordance to the listed RAL colors. Minor color differences due to manufacturing possible.

Coding H-MTD® Single Waterproof

Coding	Jack	Plug	Color / RAL-No. (similar)	
A			Jet black / 9005	
B			Pure white / 9010	
C			Light blue / 5012	
D			Claret violet / 4004	
E			May green / 6017	
F			Nut brown / 8011	
G			Platinum grey / 7036	
H			Light pink / 3015	
J			Beige / 1001	
K			Curry / 1027	
L			Yellow green / 6018	
M			Pastel orange / 2003	
O (neutral coding for coding G – M)			Light green / 6027	
Z (neutral coding for coding A – F)			Water blue / 5021	
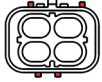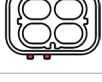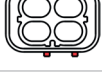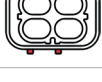
Availability of specific codings upon request. Color of the plastic housing defined in accordance to the listed RAL colors. Minor color differences due to manufacturing possible.

Coding H-MTD® Double Waterproof

Coding	Jack	Plug	Color / RAL-No. (similar)	
A			Jet black / 9005	
B			Pure white / 9010	
C			Light blue / 5012	
D			Claret violet / 4004	
E			May green / 6017	
F			Nut brown / 8011	
G			Platinum grey / 7036	
H			Light pink / 3015	
J			Beige / 1001	
K			Curry / 1027	
L			Yellow green / 6018	
M			Pastel orange / 2003	
O (neutral coding for coding G – M)			Light green / 6027	
Z (neutral coding for coding A – F)			Water blue / 5021	

Availability of specific codings upon request. Color of the plastic housing defined in accordance to the listed RAL colors. Minor color differences due to manufacturing possible.

Coding H-MTD® Quad Waterproof

Coding	Jack	Plug	Color / RAL-No. (similar)	
A			Jet black / 9005	
B			Pure white / 9010	
C			Light blue / 5012	
D			Claret violet / 4004	
E			May green / 6017	
F			Nut brown / 8011	
G			Platinum grey / 7036	
H			Light pink / 3015	
J			Beige / 1001	
K			Curry / 1027	
L			Yellow green / 6018	
M			Pastel orange / 2003	
N			Pastel green / 6019	
P			Carmine red / 3002	
R			Signal blue / 5005	
Z (neutral coding for coding A – R)			Water blue / 5021	

Availability of specific codings upon request. Color of the plastic housing defined in accordance to the listed RAL colors. Minor color differences due to manufacturing possible.

Competencies & Technologies

Rosenberger's mission is to be a leader when it comes to innovation and technology within its business segments.

An ongoing focus on cost management and process optimization complements our commitment to the increasingly stringent market requirements for delivering products of the highest quality. Effective research & development, the very latest manufacturing technologies, the highest possible levels of efficiency in production processes, and continuous improvement of process automation make up Rosenberger's core competencies.

Using state-of-the-art production, Rosenberger can continue to develop and optimize key manufacturing technologies – turned parts production, stamped & formed technology, injection molding technology.

Manufacturing everything in house ensures a high degree of flexibility which combined with continuous quality controls ensures newly designed products can be produced in the required quantities. With acceptable tolerances now in the range of one hundredth of a millimeter, the production of electronic connectors requires the highest precision.

Automated Connector Mounting and Cable Assembling

At Rosenberger various machine types are used for enabling precise and extreme deformation of raw materials and fast throughput of large quantities. In addition to extensive stamping, forming and embossing operations, Rosenberger machines are used to join, laser-weld and, if required, laser-mark large quantities of pieces. This takes place directly in the processing area with minimum set-up and assembly times.

The necessary tool construction for the specially equipped stamping and forming assembly machines are designed and produced as far as possible in the company's own tool shop.

With the help of its strip stamping technology Rosenberger produces high quantities with maximum repeatability and short reaction and running times. The implementation of the production process from strip material to high-quality end product is carried out with maximum production speed, cost-efficiency and precision.

Rosenberger uses various raw materials including pure and partially tinned copper, copper-tin and stainless steel strips.

Stamping Technologies

The Rosenberger Group meets the increasing requirements with its high-quality stamping technology. Competence and experience guarantees reliable pluggability as well as highly resilient, stamped and formed (SF) connectors; especially under demanding conditions such as those found in the automotive industry. Rosenberger quality is assured by the adoption of fully automated processes with 100 % repeatability. Maximum efficiency is achieved by the involvement of the potential harness makers as early as the design phase of the respective SF connectors.

Benefits of Stamping & Forming

- Cost optimization
- Reduced use of materials
- Fast production of large quantities
- Guaranteed plug compatibility
- Process-safe manufacturing
- Precision
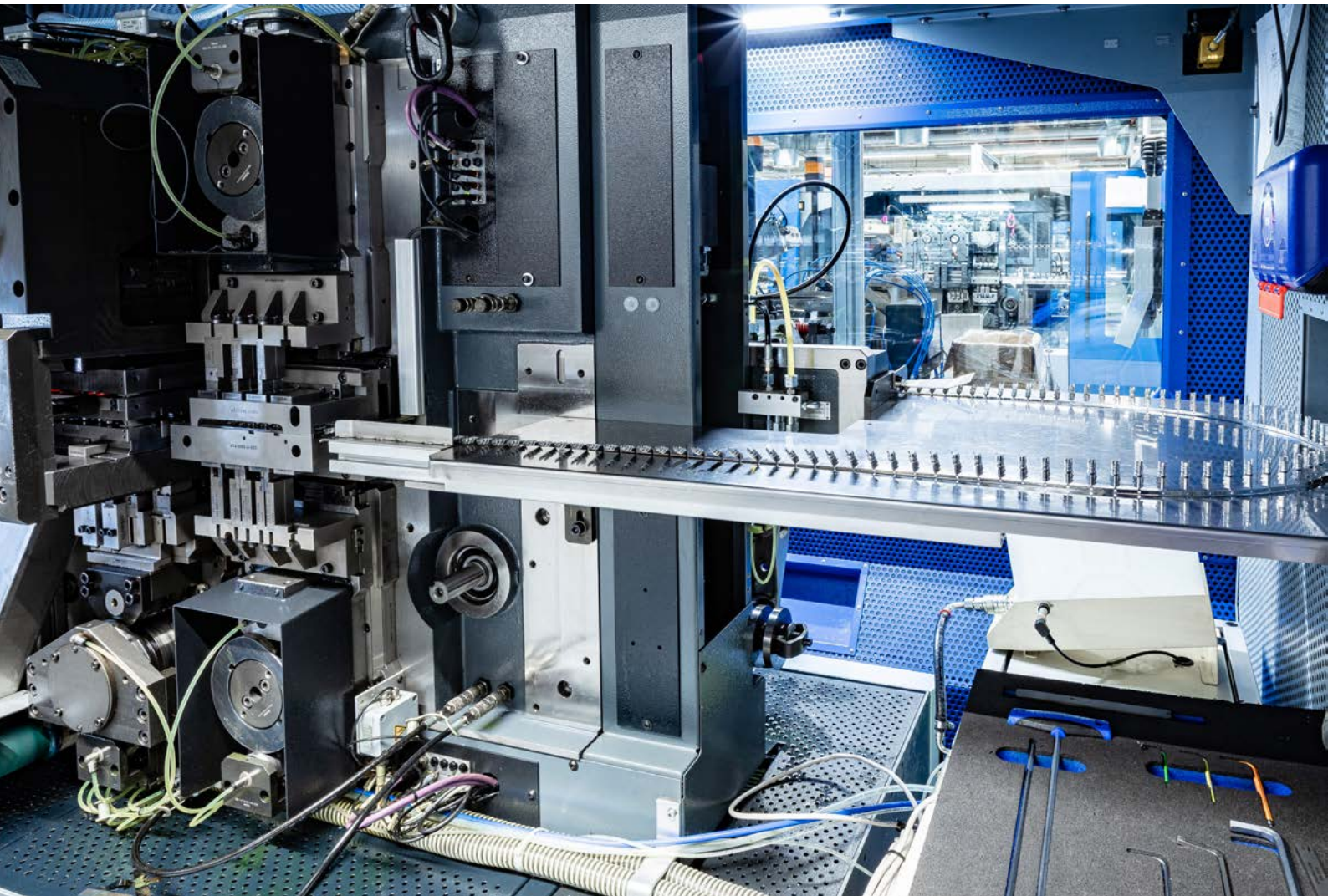
Belting & Packing – Tape & Reel

For high volume production, stamped and formed connector parts such as outer contacts/connector bodies, center/inner contacts or support sleeves can be delivered on reels only.

Information about high-volume production and assembly, special tools for cable assembly and ordering procedure of packing units is available on request: automotive@rosenberger.com

Learn more about the stamping technologies at Rosenberger.

www.rosenberger.com/ stamping-technologies

Quality & Environment

The quality of Rosenberger products, solutions and services is an essential part of our corporate strategy.

Ensuring the optimum quality of products and services and taking responsibility for our environment are fundamental elements of Rosenberger's corporate philosophy. Our quality philosophy does not only cover the optimization of parts and products, but also the continuous improvement of all company processes: from product development, planning, procurement, production, sales, logistics right through to environmental policy. To summarize, we want to offer maximum benefits for our customers all over the world.

We aim to act in an environmentally conscious manner, use materials economically, protect natural resources, recycle, and ensure energy efficiency.

In recognition of continuously improving processes and applying quality management systems, Rosenberger has won a number of prestigious quality and environmental excellence awards.

Complete Control with Innovative Technology

Industrial image processing guarantees fully automatic machine inspection. A combination of hardware and software ensures error-free execution of complex production. Digital sensors inside industrial cameras with special optics for image acquisition analyze and monitor all process steps. If products are in need of adjustment they are immediately scanned prior to checking for errors against the respective design data.

IMDS System

Rosenberger has been registered in the IMDS database (International Material Data System) since 2001.

IMDS reports for automotive customers are provided as a part of the PPAP documentation.

www.mdsystem.com

Certificates

- IATF 16949
- DIN EN 9100
- ISO 9001
- ISO 14001
- ISO 45001
- ISO 50001
- DaKKs accreditation according to DIN EN ISO 17025

Learn more about Rosenberger certifications:

www.rosenberger.com/certifications

Information Security – TISAX®

Information security is an integral part of our corporate culture. Rosenberger was audited at TISAX® (Trusted Information Security Assessment Exchange).

Learn more about Rosenberger information security:

www.rosenberger.com/company/ information-security

Rosenberger Global Network

Rosenberger is one of the world`s leading manufacturers of impedance controlled and optical connectivity solutions. It provides connectivity solutions in high-frequency, high-voltage, and fiber-optic technologies for mobile communication networks, data centers, test & measurement applications, automotive electronics, as well as high-voltage contact systems, medical electronics or aerospace applications.

A global network of R&D, manufacturing and assembly locations provides innovation, optimized cost structure and excellent customer services world-wide.

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Rosenberger No.

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Website

For more information refer to our website:
www.rosenberger.com/h-mtd