



M12 X-coded 10Gb/s







iS Rayfast

EVERY CONNECTION COUNTS



M12 X-Coded Field installable for Rail

D4	Industrial Ethernet, Ethernet/IP for Railway Applications	
A5	Actuator-sensor plug connections for Devicenet, IO link and Profibus	
A8		
X –Code	Cat6A, high speed 10Gb rugged industrial ethernet applications	



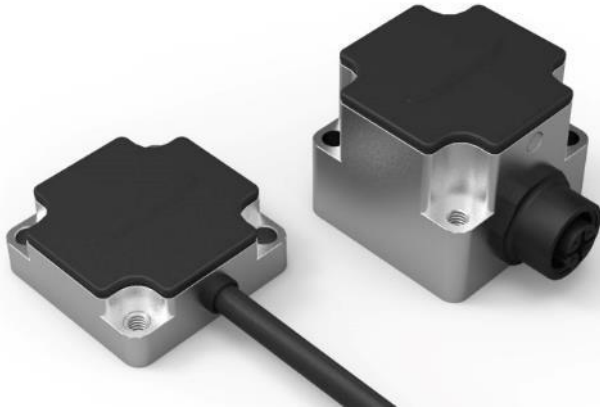
M12 X-coded series acc IEC 61076-2-109

- Cat 6a 10G/s data speed
- Torsion and Vibration proof strain relief
- IP 67 sealed
- Very compact dimensions
- Railway approved

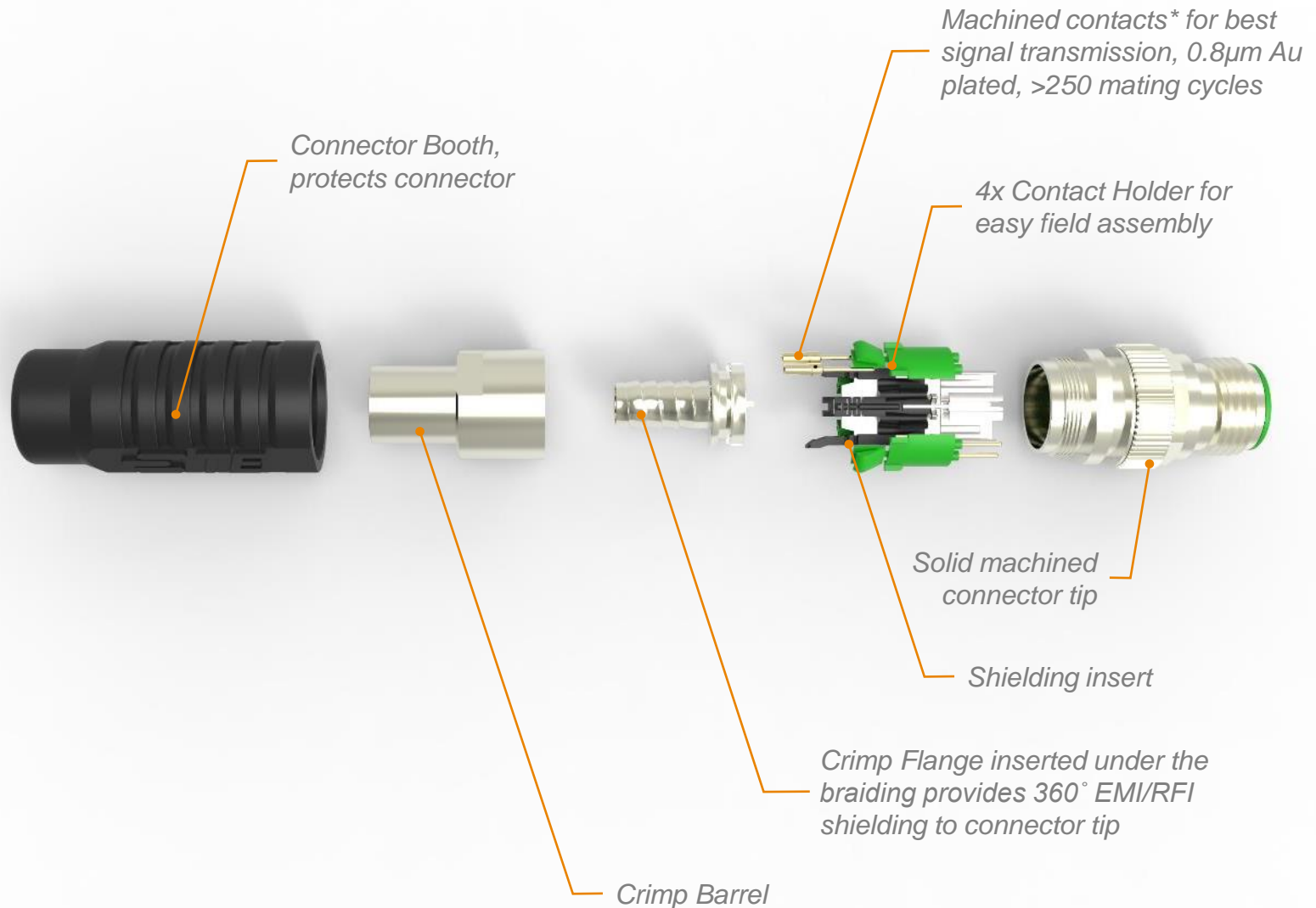
Applications

Ruggedized data communications

- Sensors
- Surveillance camera's
- IP-Networks
- Routers and switches

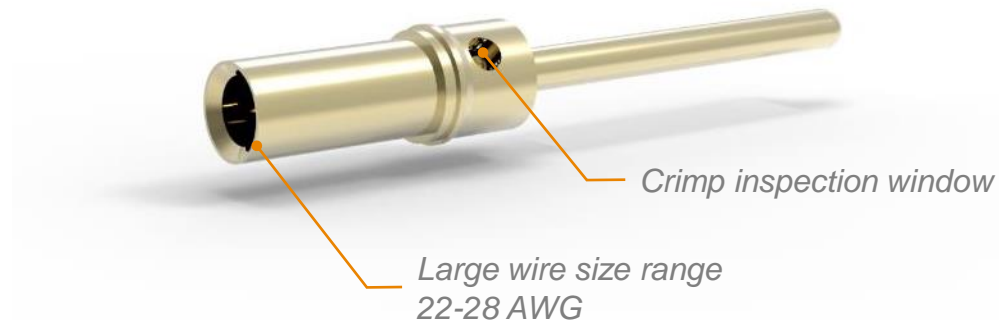


Features and Benefits



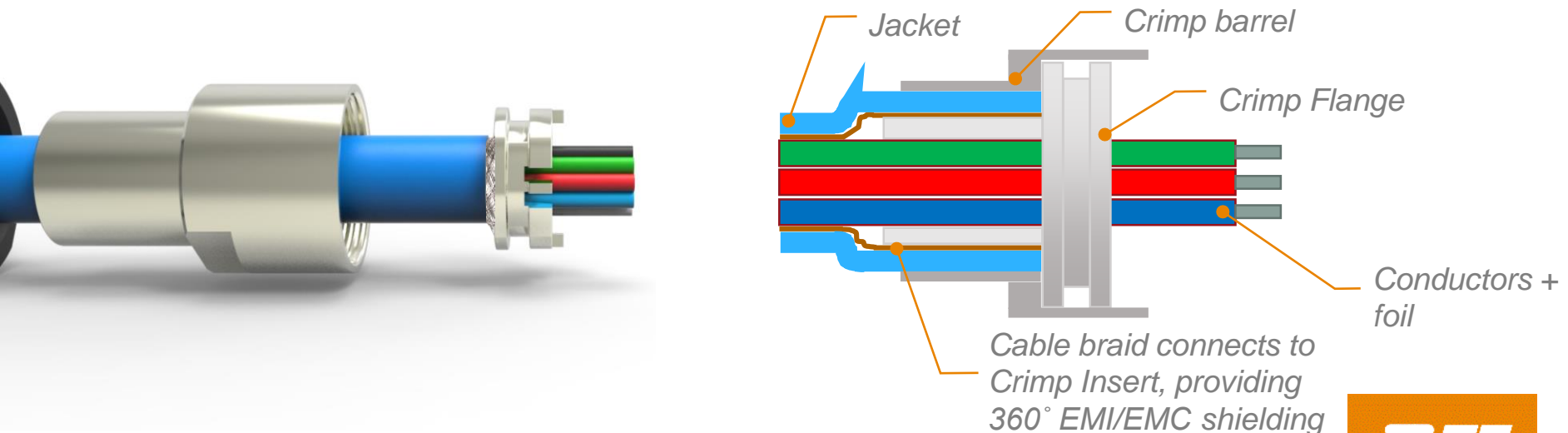
Secure data transmission: Contact

- Crimp contacts provides best possible resistance against vibration
- Machined snap in contacts enable rugged contact design, while keeping field installation easy to manage
- 0.8 μ m Au plating enables more than 250 mating cycles
- Max current 0.5A, Max Voltage 48V



Secure data transmission: EMI/RFI

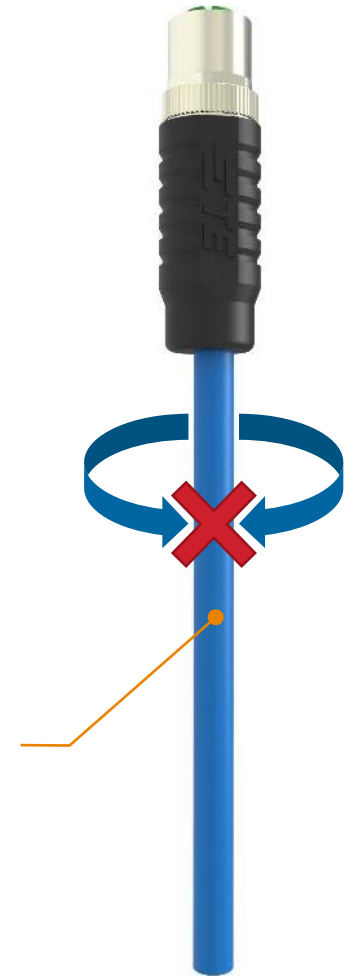
- Best EMI/EMC/RFI performance due to 360° crimped cable braid
- Stable electrical connection between cable braid and crimp flange keeps 360° cable intact throughout the tip of the connector
- Crimp Flange protects the conductors: No risk of breakage



Secure data transmission: Rugged design

- Crimping eliminates cable rotation, which potentially leads to breakage of conductors
- Vibration proof screw locking due to integral latching
- M12 Hexagon Locking nut
- Defined recommended Torque (1.5Nm) to guarantee optimal locking
- Silicon O-Ring to achieve IP67

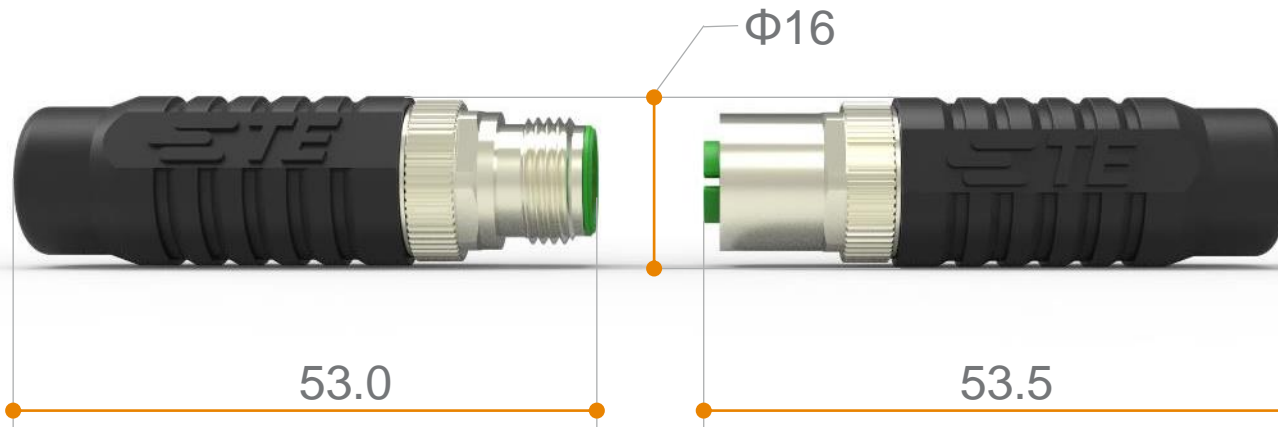
Crimping the cable jacket prevents cable rotation which is likely to occur in a PG clamp. This can potentially lead to breakage of the conductors in the cable. Which are very difficult to find.



Compact & Light weight design envelope

Plug

Receptacle



Assembly time saving

One of the fastest and easiest field assembly times

Cable preparation, termination and assembly of the TE M12 is typically 4 minutes. This can save up to 50% of labor costs

Benchmark labor cost calculation comparison;

1 hour (60mins) / 8 mins = 7.5 connector terminations per hour

Hourly labor rate €10 = Labor cost per termination €1.33

1 hour (60mins) / 4 mins = 15 connector terminations per hour

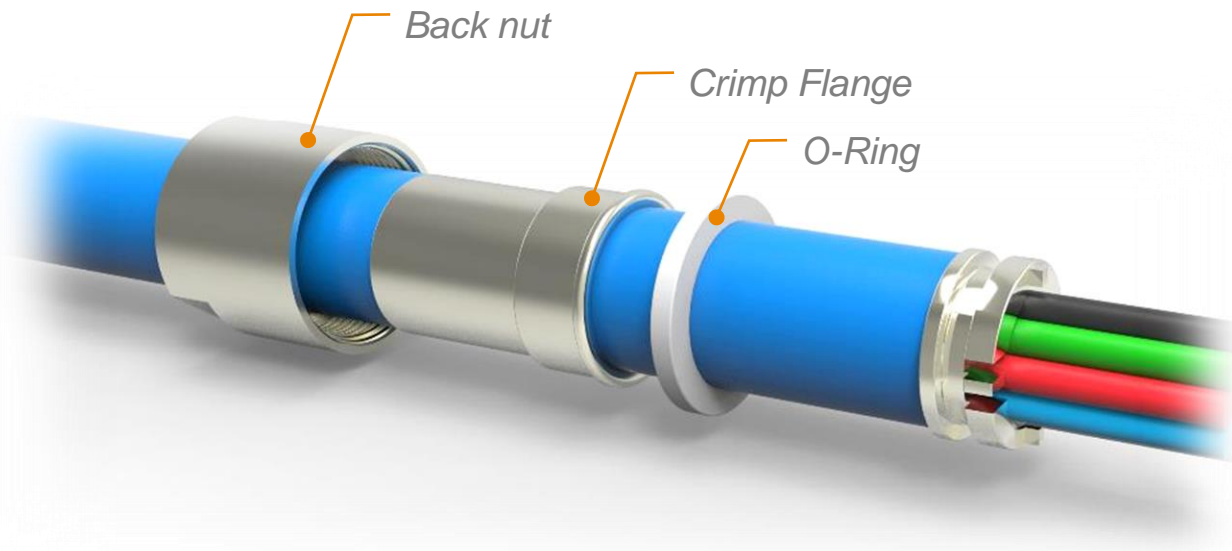
Hourly labor rate €10 = Labor cost per termination €0.67

Potential saving = €1.33 - €0.67 = €0.66 per connector



IP 67 sealed (when mated)

Once the “back nut” is tightened according to the specified torque & the “crimp flange” is crimped, the O-ring retained within the “back nut” creates an IP67 seal between the crimp flange, cable and “back nut”. This process also creates a secure **tamper proof*** attachment to the cable.



* Connector cannot be opened anymore after crimping

Product Performance Data

Temperature Range

-40°C to 85°C (without cable boot)

-40°C to 70°C (with cable boot)

Current Rating:

0.5 Amp

Operational Voltage:

48V

Contact Resistance:

≤ 5 MΩ

Insulation Resistance:

≥ 100 MΩ

Data Transmission Characteristics:

IEC 802.3an Cat 6a

Data Transmission Rate:

Up to 10Gbit/s

IP Rating:

IP67

Mating Cycles:

≥ 250 mating cycles

Standards:

Shock and Vibe EN 61373 Cat1 Class B

Fire Performance NFF-16-101 I2/F2, EN

45545-2 HL3 R22/R23

Materials

Housing	Cu alloy Ni plated
Insulator + Contact holder	Thermoplastic
Contact Material	Cu alloy
Contact Plating	Au
Sealing	Elastomer
Cable Boot	TPE



Connector / Tool Partnumbers

Cable	Gender	PN	Contact Crimp Tool	Positioner	Setting	Crimp Tool Cable Jacket	Crimp insert Cable jacket Tool	Insertion tool Crimp insert (Handle)	Insert for Handle
H&S Radox Cat 7 #84124806 24 AWG	Male	1-2315714-1	601966-1 (Compact)	2-2823582-0		1-2823557-1	1-2823558-6	1-2823560-1	1-2823561-1
	Female	1-2315715-1	601966-1 (Compact)	2-2823582-1		1-2823557-1	1-2823558-6	1-2823560-1	1-2823561-1
TE Cat 7	Male	1-2315714-2	601966-1 (Compact)	2-2823582-0		1-2823557-1	1-2823558-6	1-2823560-1	1-2823561-1
	Female	1-2315715-2	601966-1 (Compact)	2-2823582-1		1-2823557-1	1-2823558-6	1-2823560-1	1-2823561-1



Cable Stripping
1-2823559-1 stripping tool



Contact crimp tool
601966-1 (Compact) 601967-1 (Standard)
Recommended setting see above
Positioner: See above



Handle
1-2823560-1 (Handle)
1-2823560-1 (Insert for handle)



Cable Jacket Crimping
Crimp tool 1-2823557-1
Crimp insert X-2823558-X (see above)

Summary: Connector advantages



- Quickest and easiest field assembly time
- Smallest field assembled M12 connector on the market
- Solid machined metal (brass) housing
- Machined 0.8 μ m Au plated crimp contacts (min. 250 Mating cycles)
- IP67 water proofing
- Rotation free cable strain relief
- Effective 360° EMI/RFI shielding achieved by full metal housing and crimp flange technology
- Very competitive pricing



Wire and cable solutions

High Speed data cable range

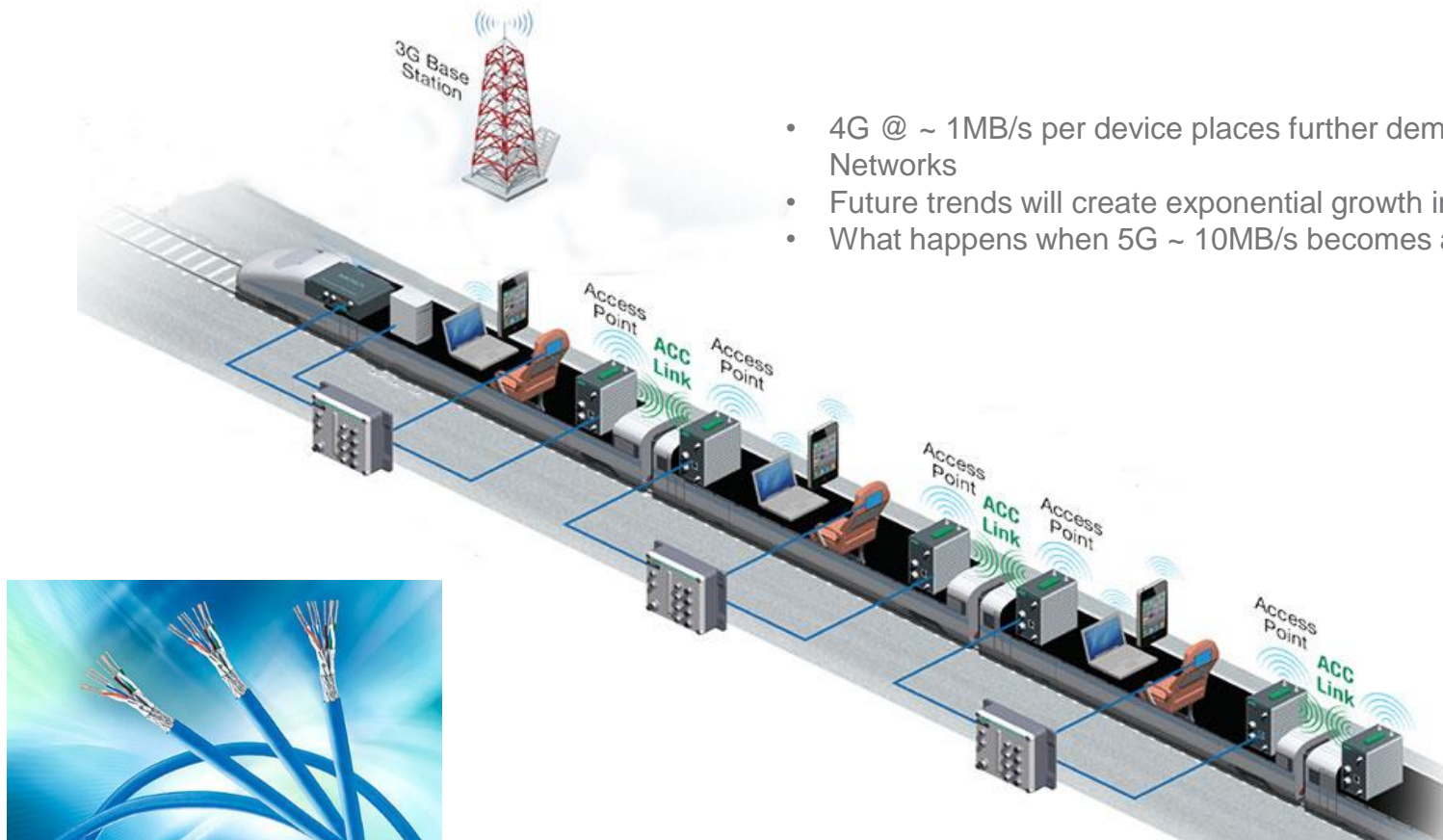


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DATA CABLE uses

Enhancing Passenger Comfort with Intelligent Technology

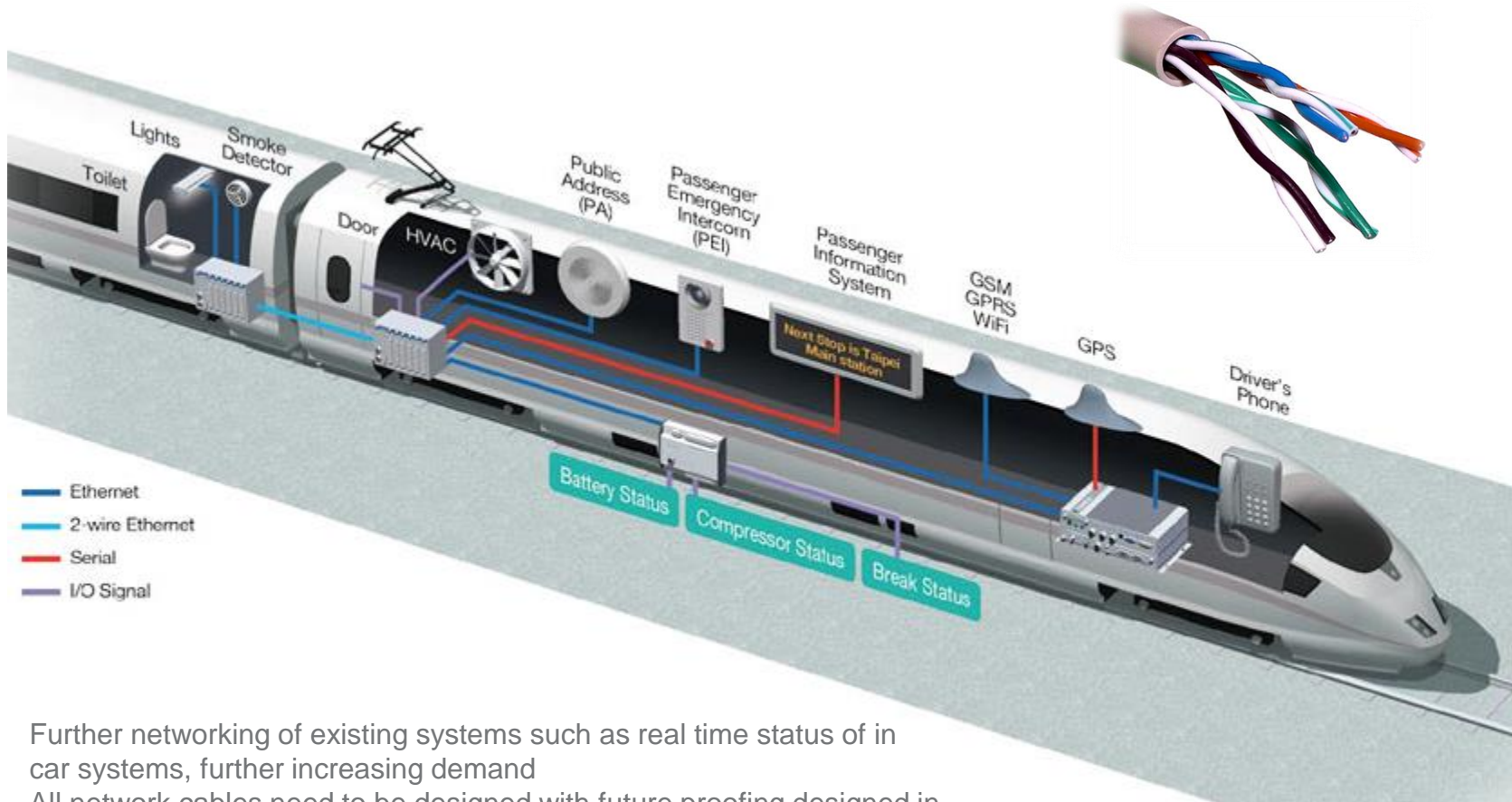


- 4G @ ~ 1MB/s per device places further demand on Rail Networks
- Future trends will create exponential growth in this area
- What happens when 5G ~ 10MB/s becomes a reality



DATA CABLE uses-

Integrated Solutions for Passenger & operator Information



- Further networking of existing systems such as real time status of in car systems, further increasing demand
- All network cables need to be designed with future proofing designed in

Ethernet LAN Network cables

What does CAT-5e, CAT-6, CAT-6_A, CAT-7 and CAT7_A... mean?

The Simple Answer: CAPACITY

Computer Networking Technology started in early 1980's over multi-pair cable networks and has been refined to support higher bit rates and longer distances over time.

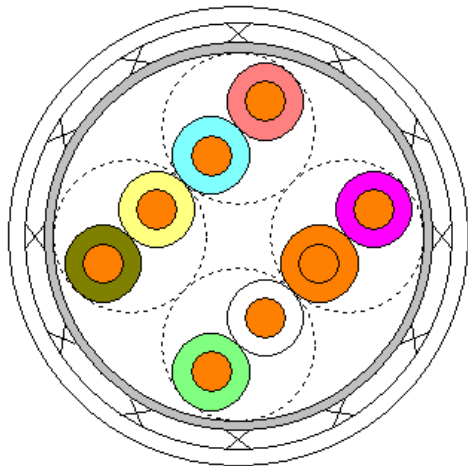
The enemy to Capacity or Data Rate is "Crosstalk" or data carried on one line appearing on another line causing disruption of the data and loss of Capacity the following cable standards have been developed over time:

Cable class	Band Width	Category	Level	Capacity
A	100 kHz	Cat 1	20	Public adress channels
B	1 MHz	Cat2	1	4G phone
C	16 MHz	Cat 3	1	CCTV camera + 6 4G phones
D	100 MHz	Cat 5e	10	CCTV cameras
E	250 MHz	Cat 6	25	CCTV cameras
E _A	500MHz	Cat 6 _A	50	CCTV cameras
F	600MHz	Cat 7	60	CCTV cameras
F _A	1 GHz	Cat 7 _A	100	CCTV cameras
I	2 GHz	Cat 8.1	200	CCTV cameras

Rail data cables 2 types

Data is carried on twisted pairs with two common configurations:

Four Pair cat 7

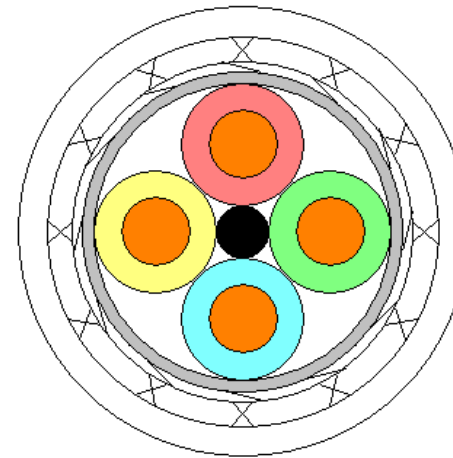


Four Pair

This configuration is four twisted pairs twisted together with data on all pairs

The Total Capacity of the cable is the summation of the Capacity of each pair

Quad cat 5e



Quads

This configuration is four wires twisted together. The Pink and Blue are one pair and the Green and Yellow are a second pair

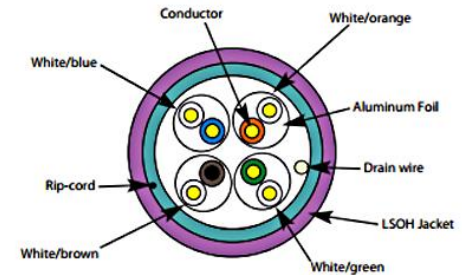
The Total Capacity of a Quad cable is normally half the Capacity of a Four pair

TE RAIL high speed Four Pair cat 7 cable

Ethernet LAN Cables – Product offering

CAT 7 4 Pair Braid Shielded 1000 MHz (10Gb/s) EN 45545-2 compliant

TE Part	TE PN	Description	Wire size	Spec	Colour	Reel length
TECC0018C7	2297800-1	FOUR PAIR 26AWG S/FTP CAT7 LSZH	AWG 26	EN45545-2	Blue	305 metres
TECC0011C7	2297799-1	FOUR PAIR 24AWG S/FTP CAT7 LSZH	AWG 24	EN45545-2	Blue	305 metres
TECC0019C7	2297801-1	FOUR PAIR 22AWG S/FTP CAT7 LSZH	AWG 22	EN45545-2	Blue	305 metres



M12 X-code cable Plug to Plug Straight

PartNr	Description	Cable Length [m]
1-2317142-1	M12 X-code Cable assy Plug-Plug 1m length	1.0
1-2317142-2	M12 X-code Cable assy Plug-Plug 1.5m length	1.5
1-2317142-3	M12 X-code Cable assy Plug-Plug 2m length	2.0
1-2317142-4	M12 X-code Cable assy Plug-Plug 2.5m length	2.5
1-2317142-5	M12 X-code Cable assy Plug-Plug 3m length	3.0
1-2317142-6	M12 X-code Cable assy Plug-Plug 3.5m length	3.5
1-2317142-7	M12 X-code Cable assy Plug-Plug 4m length	4.0
1-2317142-8	M12 X-code Cable assy Plug-Plug 4.5m length	4.5
1-2317142-9	M12 X-code Cable assy Plug-Plug 5m length	5.0
2-2317142-0	M12 X-code Cable assy Plug-Plug 5.5m length	5.5
2-2317142-1	M12 X-code Cable assy Plug-Plug 6m length	6.0
2-2317142-2	M12 X-code Cable assy Plug-Plug 6.5m length	6.5
2-2317142-3	M12 X-code Cable assy Plug-Plug 7m length	7.0
2-2317142-4	M12 X-code Cable assy Plug-Plug 7.5m length	7.5
2-2317142-5	M12 X-code Cable assy Plug-Plug 8m length	8.0
2-2317142-6	M12 X-code Cable assy Plug-Plug 8.5m length	8.5
2-2317142-7	M12 X-code Cable assy Plug-Plug 9m length	9.0
2-2317142-8	M12 X-code Cable assy Plug-Plug 9.5m length	9.5
2-2317142-9	M12 X-code Cable assy Plug-Plug 10m length	10.0
3-2317142-0	M12 X-code Cable assy Plug-Plug 10.5m length	10.5
3-2317142-1	M12 X-code Cable assy Plug-Plug 11m length	11.0
3-2317142-2	M12 X-code Cable assy Plug-Plug 11.5m length	11.5
3-2317142-3	M12 X-code Cable assy Plug-Plug 12m length	12.0
3-2317142-4	M12 X-code Cable assy Plug-Plug 12.5m length	12.5
3-2317142-5	M12 X-code Cable assy Plug-Plug 13m length	13.0
3-2317142-6	M12 X-code Cable assy Plug-Plug 13.5m length	13.5
3-2317142-7	M12 X-code Cable assy Plug-Plug 14m length	14.0
3-2317142-8	M12 X-code Cable assy Plug-Plug 14.5m length	14.5
3-2317142-9	M12 X-code Cable assy Plug-Plug 15m length	15.0
4-2317142-0	M12 X-code Cable assy Plug-Plug 15.5m length	15.5
4-2317142-1	M12 X-code Cable assy Plug-Plug 16m length	16.0
4-2317142-2	M12 X-code Cable assy Plug-Plug 16.5m length	16.5
4-2317142-3	M12 X-code Cable assy Plug-Plug 17m length	17.0
4-2317142-4	M12 X-code Cable assy Plug-Plug 17.5m length	17.5
4-2317142-5	M12 X-code Cable assy Plug-Plug 18m length	18.0
4-2317142-6	M12 X-code Cable assy Plug-Plug 18.5m length	18.5
4-2317142-7	M12 X-code Cable assy Plug-Plug 19m length	19.0
4-2317142-8	M12 X-code Cable assy Plug-Plug 19.5m length	19.5
4-2317142-9	M12 X-code Cable assy Plug-Plug 20m length	20.0

