



LOCATION



APPLICATIONS



FUNCTIONS



STANDARDS



PRODUCTS

RAIL ACADEMY POWER AND SIGNAL GUIDE

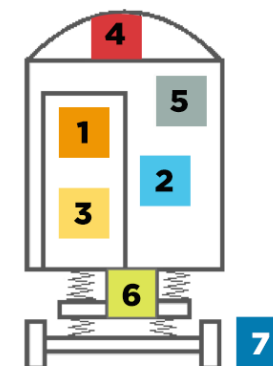
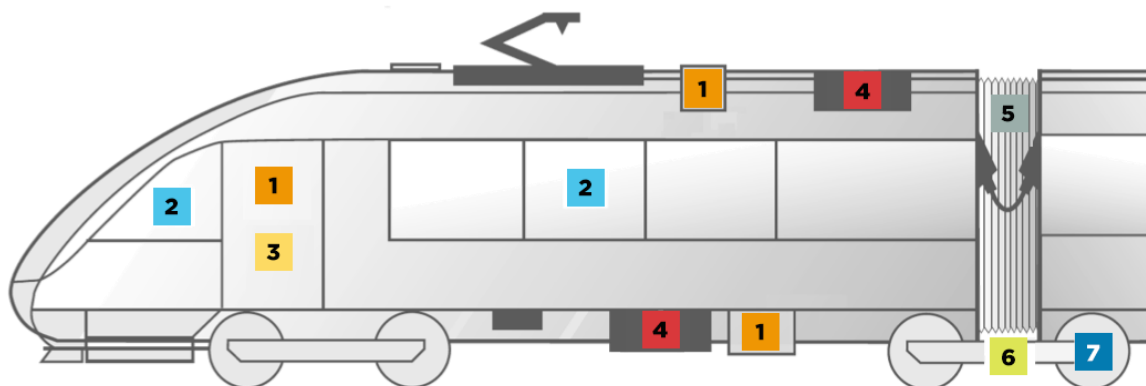




LOCATION

SERIES LOCATION ON BOARD ROLLING STOCK

APPLICATION TYPE	STATIC				DYNAMIC		
LOCATION	1	2	3	4	5	6	7
DEFINITION	Closed electrical operating area	Cabin and interiors	Closed electrical operating area; forced filtered ventilation with outside air	Outdoor static application	Outdoor dynamic application	Outdoor highly-dynamic application	Outdoor highly-dynamic application



[CONNECTOR TYPOLOGY FOR STATIC APPLICATIONS >](#)

[CONNECTOR TYPOLOGY FOR DYNAMIC APPLICATIONS >](#)

[REQUIREMENTS PER LOCATION >](#)





REQUIREMENTS

LOCATION OF CONNECTOR ON BOARD ROLLING STOCK

	APPLICATION TYPE	STATIC				DYNAMIC		
	LOCATION	1	2	3	4	5	6	7
DEFINITION	STANDARD	Closed electrical operating area	Cabin and interiors	Closed electrical operating area; forced filtered ventilation with outside air	Outdoor static application	Outdoor dynamic application	Outdoor highly-dynamic Application	Outdoor highly-dynamic Application
OverVoltage Category	EN 50124-1: 2001	OV2	OV2	OV2	OV2	OV2	OV2	OV2
Pollution Degree	EN 50124-1: 2001	PD2	PD2	PD3	PD3	PD3	PD3	PD3
IP Index	EN 60529: 1991	-	IP2X	IP65	IP65	1P66	1P66	1P66
Chocks & Vibrations	EN 61373: 1999	Cat. 1B	Cat. 1B	Cat. 1B	Cat. 1B	Cat. 1B	Cat. 2	Cat. 3
Salt Spray Resistance	EN 60512-11-6: 2002	96 h	96 h	96 h	240 h	240 h	240 h	240 h
Resistance to Ozone	ISO 1431-1: 2004	NO	NO	YES	YES	YES	YES	YES
Resistance to UV	EN ISO 4892-2: 2006	NO	NO	NO	YES	YES	YES	YES
Resistant to Fluids	EN60512-19-3: 1997	NO	NO	YES	YES	YES	YES	YES
Fire & Smoke		YES	YES	YES	YES	YES	YES	YES





STATIC APPLICATIONS

APPLICATION TYPE

LOCATION

CONNECTOR TYPOLOGY

STATIC APPLICATIONS

INDOOR

1

INDOOR CUBICLES

Plastic connector with fast and cheap locking system, no IP

1

OUTSIDE (WEATHER PROTECTED)

Plastic or metal connector locked by thread, bayonet, captive screws

2

CABIN AND INTERIORS

High density contact arrangement, free locking system Small IP

3

MACHINERY COMPART

Connector defined by specific requirements

OUTDOOR

4

ROOF

- Connector with metal frame, or plastic if protected

4

UNDER CAR

- Cable clamp behind the mobile plug

- Index protection IP66 mini

4

CAR SIDES

- Locking system : threaded, bayonet, captive screws, Automatic cover





OUTDOOR DYNAMIC APPLICATIONS

APPLICATION TYPE

LOCATION

CONNECTOR TYPOLOGY

OUTDOOR
DYNAMIC
APPLICATIONS

CAR TO
CAR

5

ROOF

5

CROSSING PANEL

5

PANEL

5

LOW PART

FRAME
TO
BOOGIE

5

FRAME

6

BOOGIE

AXLE

7

AXLE

- Connector with metal shell
- Angled connector or bracket to guide
- Adapted cable outlet (clamping, water tightness, cone exit, or boot)
- Index protection; IP66 mini
- Locking system to select:

<500 mating cycles; threaded, Captive screws
>500 mating cycles; CAM, Automatic cover

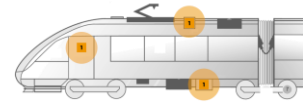
- Connector with metal shell
- Cable clamp behind the mobile plug
- Index protection; IP66 mini
- Locking system ; threaded, captive screws

- Connector defined by specific requirements





#1: CLOSED ELECTRICAL OPERATING AREA



POWER



CPP

Circular Power Connector
Dynamic, many arrangements



CSR

Rack Power Supply
Up to 700V

SIGNAL



SRC

Circular Static Connector
Derived from
MIL DTL 5015 & VG 95234



NGC

Rectangular Composite
Connector
Up to 20A
4, 6, 12 or 28 poles



CMC

Circular Dynamic Connector
Up to 500V – 250A
Many arrangements



HDC

Rectangular connector
EN 61 984



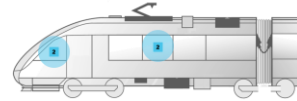
TECIRx

Circular Connector
Based on Mil-C-5015





#2: CABIN AND INTERIORS

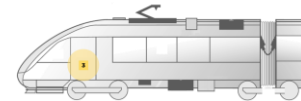


*This category is empty because IP 2X requested





#3: CLOSED ELECTRICAL OPERATING AREA (VENTILATED)



POWER



FXP

Power Shielded Connector
800A / 3000V
Up to 4 poles



EKO

Power Composite Connector
800A / 3000V
Up to 4 poles



CSR

Rack Power Supply
Up to 700V

SIGNAL



SRC

Circular Static Connector
Derived from
MIL DTL 5015 & VG 95234



NGC

Rectangular Composite connector
Up to 20A
4, 6, 12 or 28 poles



CMC

Circular Dynamic Connector
Up to 500V – 250A
Many arrangements



HDC

Rectangular connector
EN 61 984



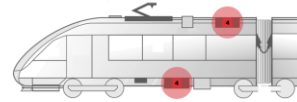
TECIRx

Circular Connector
Based on Mil-C-5015





#4: OUTDOOR STATIC APPLICATION



POWER



FXP

Power Shielded Connector
800A / 3000V
Up to 4 poles



EKO

Power Composite Connector
800A / 3000V
Up to 4 poles



EKO S

Power Shielded Connector
800A / 3000V
Up to 4 poles



EKO D

Power Derivation Connector
Shielded or composite
800A / 1500V - 3000V
3 inlets → 2x3 outlets



CPP

Circular Power Connector
Dynamic, many arrangements



WYE

Derivation Composite Power
Dynamic, many arrangement

SIGNAL



SRC

Circular Static Connector
Derived from
MIL DTL 5015 & VG 95234



NGC

Rectangular Composite Connector
Up to 20A
4, 6, 12 or 28 poles



CMC

Circular Dynamic Connector
Up to 500V – 250A
Many arrangements



HDC

Rectangular connector
EN 61 984



TECIRx

Circular Connector
Based on Mil-C-5015





#5: OUTDOOR DYNAMIC APPLICATION



POWER



FXP

Power Shielded Connector
800A / 3000V
Up to 4 poles



EKO S

Power Shielded Connector
800A / 3000V
Up to 4 poles



EKO D

Power Derivation Connector
Shielded or composite
800A / 1500V - 3000V
3 inlets → 2x3 outlets



CPP

Circular Power Connector
Dynamic, many arrangements



EKO A

Power Intercar Connector
800A / 3000V
Modular connector



CAM

Assisted Locking Connector
Many arrangements

SIGNAL



CMC

Circular Dynamic Connector
Up to 500V – 250A
Many arrangements



MU 27P

Circular Dynamic Connector
Up to 600V – 30A
27 poles

UIC



UIC552

Heating
Coupler



UIC541

Electro – Pneumatic
Brake coupler



UIC558

Audio
Coupler

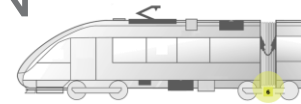


EVERY CONNECTION COUNTS





#6: OUTDOOR HIGHLY-DYNAMIC APPLICATION



POWER



FXP

Power Shielded Connector
800A / 3000V
Up to 4 poles



EKO

Power Composite Connector
800A / 3000V
Up to 4 poles



EKO S

Power Shielded Connector
800A / 3000V
Up to 4 poles



EKO D

Power Derivation Connector
Shielded or composite
800A / 1500V - 3000V
3 inlets → 2x3 outlets



CPP

Circular Power Connector
Dynamic, many arrangements



WYE

Derivation Composite Power
Dynamic, many arrangement

SIGNAL



CMC

Circular Dynamic Connector
Up to 500V – 250A
Many arrangements



#7 : OUTDOOR HIGHLY DYNAMIC APPLICATION



POWER



CPP

Circular Power Connector
Dynamic, many arrangements

SIGNAL



CMC

Circular Dynamic Connector
Up to 500V – 250A
Many arrangements





APPLICATIONS



INTER-VEHICLE >

TRACTION POWER >

TRAIN CONTROL >

SUB SYSTEMS >

PIS & SAFETY >





INTER-VEHICLE

POWER



FXP

Power Shielded Connector
800A / 3000V
Up to 4 poles



EKO S

Power Shielded Connector
800A / 3000V
Up to 4 poles



EKO A

Power Intercar connector
800A / 3000V
Modular connector



CPP

Circular Power Connector
Dynamic, many arrangements

SPECIFIC



CAM

Assisted Locking Connector
Many arrangements

SIGNAL



CMC

Circular Dynamic Connector
Up to 500V – 250A
Many arrangements



MU 27P

Circular Dynamic Connector
Up to 600V – 30A
27 poles

UIC



UIC552

Heating
Coupler



UIC541

Electro – Pneumatic
Brake coupler



UIC558

Audio
Coupler



EVERY CONNECTION COUNTS





TRACTION POWER



FXP

Power Shielded Connector
800A / 3000V
Up to 4 poles



EKO

Power Composite Connector
800A / 3000V
Up to 4 poles



EKO S

Power Shielded Connector
800A / 3000V
Up to 4 poles



EKO D

Power Derivation Connector
Shielded or composite
800A / 1500V - 3000V
3 inlets → 2x3 outlets



CPP

Circular Power Connector
Dynamic, many arrangements



WYE

Derivation Composite Power
Dynamic, many arrangement





TRAIN CONTROL



SRC

Circular Static Connector
Derived from
MIL DTL 5015 & VG 95234



NGC

Rectangular Composite Connector
Up to 20A
4, 6, 12 or 28 poles



HDC

Rectangular Connector
EN 61 984



TECIRx

Circular Connector
Based on Mil-C-5015





SUB SYSTEMS

POWER



CPP

Circular Power Connector
Dynamic, many arrangements

SIGNAL



SRC

Circular Static Connector
Derived from
MIL DTL 5015 & VG 95234



NGC

Rectangular Composite connector
Up to 20A
4, 6, 12 or 28 poles



CMC

Circular Dynamic Connector
Up to 500V – 250A
Many arrangements



HDC

Rectangular connector
EN 61 984



TECIRx

Circular Connector
Based on Mil-C-5015



EVERY CONNECTION COUNTS





PIS AND SAFETY



SRC

Circular Static Connector
Derivated from
MIL DTL 5015 & VG 95234



NGC

Rectangular Composite connector
Up to 20A
4, 6, 12 or 28 poles



CMC

Circular Dynamic Connector
Up to 500V – 250A
Many arrangements



HDC

Rectangular connector
EN 61 984



TECIRx

Circular Connector
Based on Mil-C-5015





FUNCTIONS



CAB CONTROL >

**PROPULSION &
BREAKING >**

**AUXILIARY
POWER SUPPLY >**

LIGHTING >

DOORS >

AIR CONDITIONING >

INTER-VEHICLE >

BATTERY >

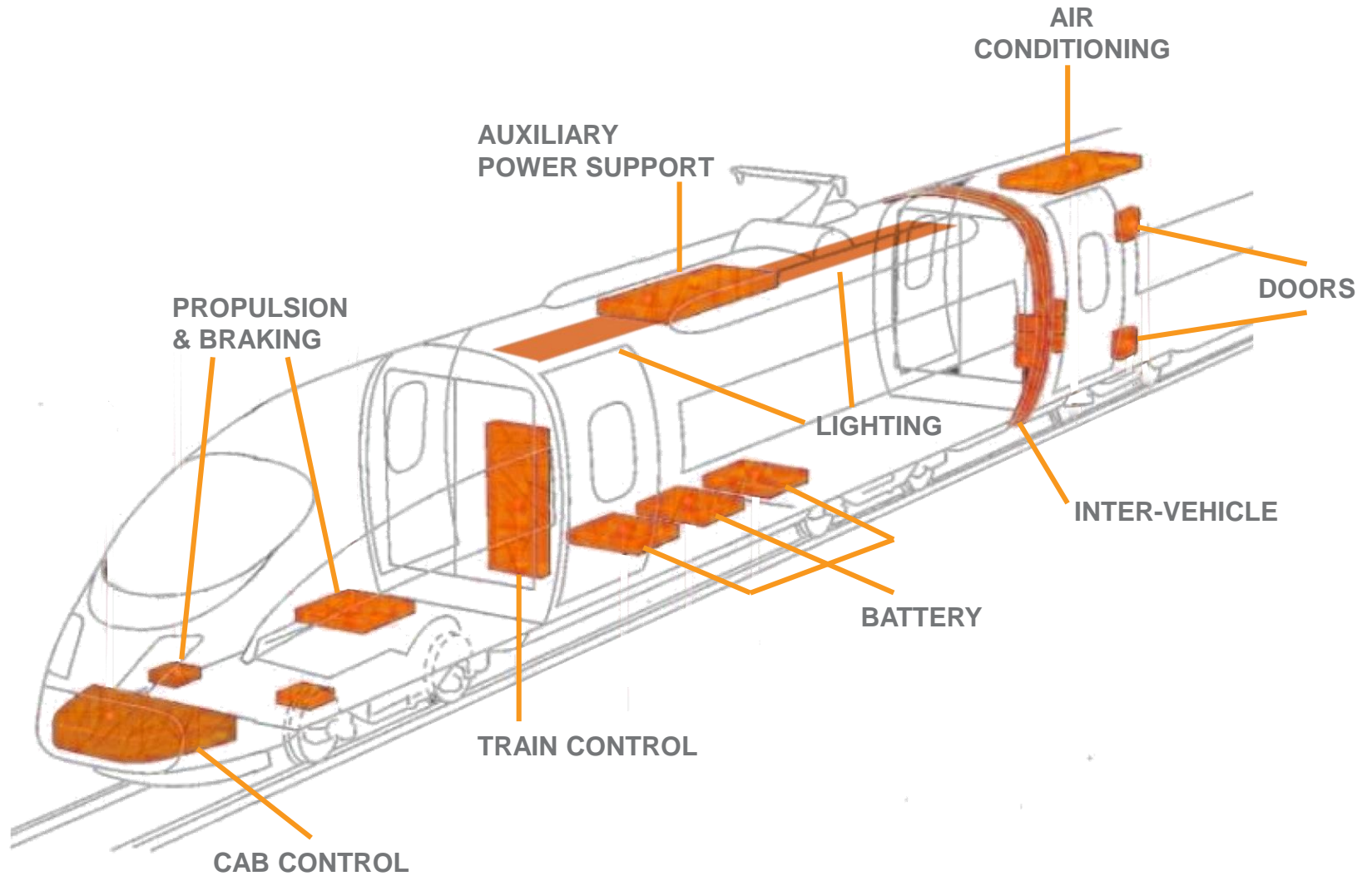
TRAIN CONTROL >

ILLUSTRATION >



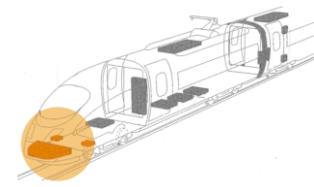


FUNCTIONS





CAB CONTROL



SRC

Circular Static Connector
Derivated from
MIL DTL 5015 & VG 95234



NGC

Rectangular Composite connector
Up to 20A
4, 6, 12 or 28 poles



HDC

Rectangular connector
EN 61 984



TECIRx

Circular Connector
Based on Mil-C-5015



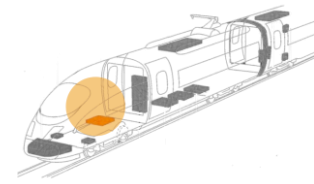
Functions Illustration >

EVERY CONNECTION COUNTS





PROPULSION & BRAKING



POWER



FXP

Power Shielded Connector
800A / 3000V
Up to 4 poles



EKO

Power Composite Connector
800A / 3000V
Up to 4 poles



EKO S

Power Shielded Connector
800A / 3000V
Up to 4 poles



EKO D

Power Derivation Connector
Shielded or composite
800A / 1500V - 3000V
3 inlets → 2x3 outlets



CPP

Circular Power Connector
Dynamic, many arrangements



WYE

Derivation Composite Power
Dynamic, many arrangement

SIGNAL



CMC

Circular Dynamic Connector
Up to 500V – 250A
Many arrangements



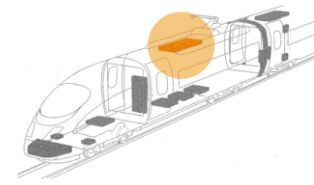
Functions Illustration >

EVERY CONNECTION COUNTS





AUXILIARY POWER SUPPLY



POWER



FXP

Power Shielded Connector
800A / 3000V
Up to 4 poles



EKO

Power Composite Connector
800A / 3000V
Up to 4 poles



EKO S

Power Shielded Connector
800A / 3000V
Up to 4 poles



CPP

Circular Power Connector
Dynamic, many arrangements



WYE

Derivation Composite Power
Dynamic, many arrangement

SIGNAL



CMC

Circular Dynamic Connector
Up to 500V – 250A
Many arrangements



HDC

Rectangular connector
EN 61 984

SPECIFIC



CAM

Assisted Locking Connector
Many arrangements



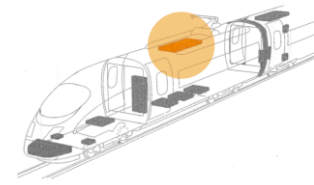
Functions Illustration >

EVERY CONNECTION COUNTS





LIGHTING



SRC

Circular Static Connector
Derived from
MIL DTL 5015 & VG 95234



NGC

Rectangular Composite connector
Up to 20A
4, 6, 12 or 28 poles



HDC

Rectangular connector
EN 61 984



TECIRx

Circular Connector
Based on Mil-C-5015



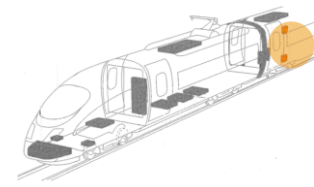
Functions Illustration >

EVERY CONNECTION COUNTS





DOORS



SRC

Circular Static Connector
Derivated from
MIL DTL 5015 & VG 95234



NGC

Rectangular Composite connector
Up to 20A
4, 6, 12 or 28 poles



HDC

Rectangular connector
EN 61 984



TECIRx

Circular Connector
Based on Mil-C-5015



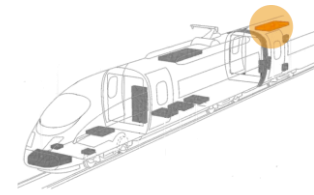
Functions Illustration >

EVERY CONNECTION COUNTS





AIR CONDITIONING



POWER



CPP

Circular Power Connector
Dynamic, many arrangements

SIGNAL



SRC

Circular Static Connector
Derived from
MIL DTL 5015 & VG 95234



NGC

Rectangular Composite Connector
Up to 20A
4, 6, 12 or 28 poles



CMC

Circular Dynamic Connector
Up to 500V – 250A
Many arrangements



HDC

Rectangular connector
EN 61 984



TECIRx

Circular Connector
Based on Mil-C-5015



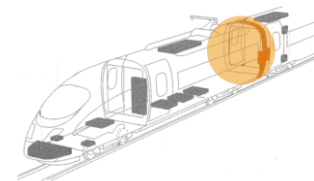
Functions Illustration >

EVERY CONNECTION COUNTS





INTER-VEHICLE



POWER



FXP

Power Shielded Connector
800A / 3000V
Up to 4 poles



EKO S

Power Shielded Connector
800A / 3000V
Up to 4 poles



EKO A

Power Intercar connector
800A / 3000V
Modular connector



CPP

Circular Power Connector
Dynamic, many arrangements

SPECIFIC



CAM

Assisted Locking Connector
Many arrangements

SIGNAL



CMC

Circular Dynamic Connector
Up to 500V – 250A
Many arrangements



MU 27P

Circular Dynamic Connector
Up to 600V – 30A
27 poles



HDC

Rectangular connector
EN 61 984

UIC



UIC552

Heating
Coupler



UIC541

Electro – Pneumatic
Brake coupler



UIC558

Audio
Coupler



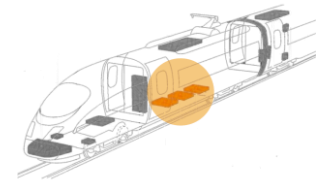
Functions Illustration >

EVERY CONNECTION COUNTS





BATTERY



CSR

Rack Power Supply
Up to 700V



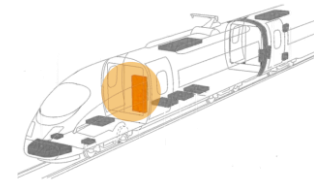
Functions Illustration >

EVERY CONNECTION COUNTS





TRAIN CONTROL



SRC

Circular Static Connector
Derived from
MIL DTL 5015 & VG 95234



NGC

Rectangular Composite Connector
Up to 20A
4, 6, 12 or 28 poles



HDC

Rectangular connector
EN 61 984



TECIRx

Circular Connector
Based on Mil-C-5015



Functions Illustration >

EVERY CONNECTION COUNTS





RAIL APPLICABLE STANDARDS

PRODUCT		STANDARDS			FIRE & SMOKE			METHOD PERFORMANCE TEST			
		APTA AAR S512	UIC	Based on « 5015 »	EN 45545 (HL3 / R22- R23)	NFF 16 101 NFF 16 102 Exigency 2	DIN 5510	UNI CEI 11170	EN 61984	NFF 61 030	EN 50 467
POWER	FXP >				✓	✓	✓	✓	✓	IN PROGRESS	
	EKO >				✓	✓	✓	✓	✓	✓ Analogy Vs 61030	
	EKO S >				✓	✓	✓	✓	✓	✓ Analogy Vs 61030	
	EKO D >				✓	✓	✓	✓	✓	✓ Analogy Vs 61030	
	EKO A >				✓	✓	✓	✓	✓	N/A	
	CPP >				✓	✓	✓	✓	✓	N/A	
	WYE >				✓	✓	✓	✓	✓	N/A	
SIGNAL	SRC >				HL2	✓			✓	✓ Analogy Vs 61030	
	NGC >				✓	✓	✓	✓	✓	✓ Analogy Vs 61030	
	CMC >				✓	✓			✓	N/A	
	MU 27P >	✓				✓			N/A	N/A	
	HDC >				In progress				✓	✓	IN PROGRESS
	TECIRx >			✓	X, LUL	✓				✓	N/A
SPECIFIC	CSR >				✓	✓			✓	N/A	
	CAM >				✓	✓			✓	N/A	
UIC	UIC552 >		✓		✓	✓			✓	N/A	
	UIC541 >		✓		✓	✓			✓	N/A	
	UIC558 >		✓		✓	✓			✓	N/A	
TRACKSIDE	SIG >					✓				N/A	





POWER AND SIGNAL PRODUCTS

CONNECTORS >

WIRE & CABLE >

TERMINALS >

**CABLE
ASSEMBLIES** >



EVERY CONNECTION COUNTS





CONNECTORS

POWER SIGNAL

FXP	SRC
EKO	HDC
EKO S	NGC
EKO D	CMC
CPP	MU 27P
EKO A	TECIRx
WYE	

UIC SPECIFIC

UIC552	CSR
UIC541	CAM
UIC558	

TRACKSIDE

SIG



EVERY CONNECTION COUNTS





BENEFITS

- Designed according to EN50467
- Unshielded and shielded cables
- Static and dynamic applications
- Over voltage safety features (i.e Permanent Magnet Motor)
- Light, compact and high electrical performances
- Halogen-free

DESCRIPTION

- Locking system with captive screws
- Crimp contacts: cable cross-section from 10 to 120 mm²
- Copper and aluminum cables

MAIN CHARACTERISTICS

- Rated current: up to 400A
- Service voltage :
 - Up 3000V (OV2PD3 & OV3PD2 according to EN50467)
 - Up 4000V (OV2PD2 according to EN50467)
- Protection index: IP68
- Service temperature: -40°C / +100°C
- Salt spray resistance: 500 hours



INTER-VEHICLE >

TRACTION POWER >



PROPULSION &
BRAKING >

AUXILIARY POWER
SUPPLY >

INTER-VEHICLE >



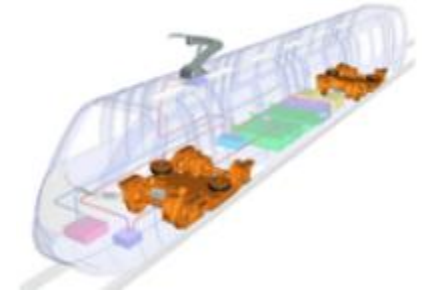
EN 50467
NFF 61030
EN 45545
DIN 5510
UNICEI 11170
UL94

MORE >



EVERY CONNECTION COUNTS





NEW MOTOR GENERATION: New Connector Generation

The next evolution in electric motor use is the **Permanent Magnet (PM) Motor**

- Uses less energy
- Facilitates motor cooling
- Improves motor performance
- Reduces vehicle life-cycle costs
- Shifts braking power from the mechanical to the electrical system

BENEFITS

- Standard platform
- Modularity
- EN & WW F&S compliant resin
- Compact: space saving
- Field proven
- Few components (50)
- Flexible installation
- Easy maintenance
- Protective against return currents

MODULARITY MADE EASY



Standard



Individual Handling



Modular



Easy Handling

BENEFITS

- High level of performance
- Straight and 90° connection
- Compact and weight-saving
- Halogen free
- Field-proven

DESCRIPTION

- Connection suitable for unshielded cables
- Locking system with captive screws
- Configurations: 1, 3 or 4 poles
- Crimp contacts: cable cross-section from 10 to 240 mm²
- Copper and aluminum cables

MAIN CHARACTERISTICS

- Rated current: up to 800 A
- Service voltage: up to 3000 V DC/AC
- Withstand voltage: 9500 V
- Protection index: IP 67
- Salt spray: 500 hours
- Temperature range: -40°C +100°C
- Vibrations and shocks: EN 61373 category 1B



LOCATION



APPLICATIONS

TRACTION POWER >

FUNCTIONS

PROPULSION & BRAKING >

AUXILIARY POWER SUPPLY >

STANDARDS

EN 50467
 NFF 61030
 EN 45545
 DIN 5510
 UNICEI 11170
 UL94



EKO S

BENEFITS

- Unshielded and shielded cables
- Static and dynamic applications
- High mechanical resistance
- Compact and weight-saving
- Halogen free
- Field-proven

DESCRIPTION

- Straight and 90° connection
- Locking system with captive screws
- Configurations: 3 or 4 poles
- Crimp contacts: cable cross-section from 10 to 240 mm²
- Copper and aluminum cables

MAIN CHARACTERISTICS

- Rated current: up to 800 A
- Service voltage: up to 3000 V DC/AC
- Withstand voltage: 9500 V
- Protection index: IP 67
- Salt spray: 96 hours or 500 hours
- Temperature range: -40°C +100°C
- Vibrations and shocks: EN 61373 category 1B



LOCATION

3 4 5 6

APPLICATIONS

INTER-VEHICLE >

TRACTION POWER >

FUNCTIONS

PROPULSION &
BRAKING >

AUXILIARY POWER
SUPPLY >

INTER-VEHICLE >

STANDARDS

EN 50467
NFF 61030
EN 45545
DIN 5510
UNICEI 11170
UL94



EVERY CONNECTION COUNTS



EKO D

BENEFITS

- Unshielded and shielded cables
- Static and dynamic applications
- High mechanical resistance
- Compact and weight-saving
- Halogen free
- Field-proven

DESCRIPTION

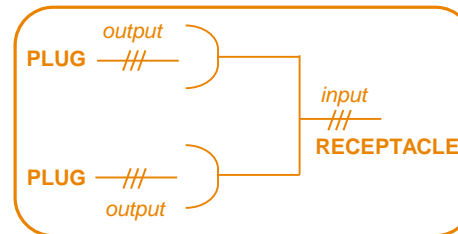
- Straight, 90° or «T» multi-pole derivation, shielded or not
- Locking system by 2 captive screws
- 3 inputs / 2x3 outputs
- Crimp contacts: cable-cross section from 25 to 240 mm²

MAIN CHARACTERISTICS

- Rated current: up to 800 A
- Service voltage: 1500 V or 3000 V DC/AC
- Withstand voltage: 9500 V
- Protection index: IP 67
- Salt spray: 96 hours or 500 hours
- Temperature range: -40°C +100°C
- Vibrations and shocks: EN 61373 category 1B



Concept



LOCATION



APPLICATIONS

TRACTION POWER >

FUNCTIONS

PROPULSION & BRAKING >

AUXILIARY POWER SUPPLY >

STANDARDS

EN 50467
NFF 61030
EN 45545
DIN 5510
UNICEI 11170
UL94



EVERY CONNECTION COUNTS



EKO A

BENEFITS

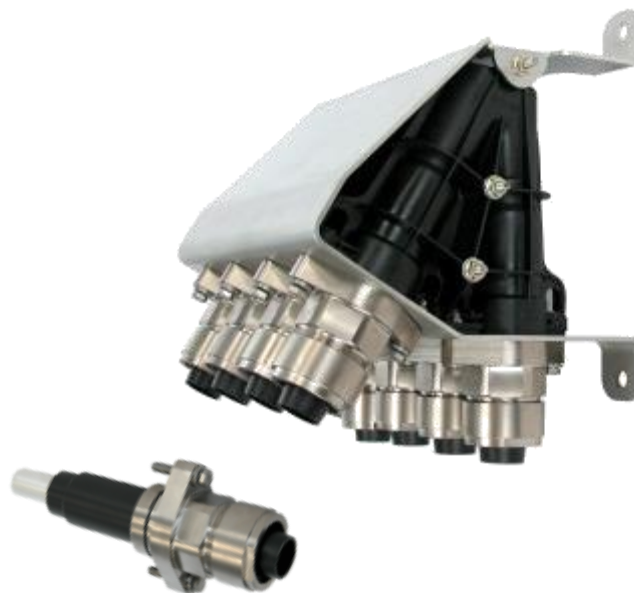
- Modular and dynamic applications
- Flexible assembling process
- High level of performance
- Compact and weight-saving
- Halogen free
- Field-proven

DESCRIPTION

- Modular connector from 2 to 8 angled modules into metal frame
- Locking system by 2 captive screws
- Crimp contacts caliber 12 and 20 in silver plated brass
- Cable cross-section from 50 to 240 mm²

MAIN CHARACTERISTICS

- Rated current: up to 700 A
- Service voltage: up to 3000V DC/AC
- Withstand voltage > 9,5 kV
- Protection index: IP 66
- Salt spray: 96 hours or 500 hours
- Temperature range: -40°C, +100°C
- Vibrations and shocks: EN 61373 category 1 class A



 LOCATION

5

 APPLICATIONS

INTER-VEHICLE >

 FUNCTIONS

INTER-VEHICLE >

 STANDARDS

NFF 61030
EN 45545
DIN 5510
UNICEI 11170
UL94



EVERY CONNECTION COUNTS





BENEFITS

- High dynamic applications
- High vibrations resistance
- Ruggedized power connector
- Field-proven solution from metro to high speed train

DESCRIPTION

- Aluminium or bronze connector with screw locking system
- Single or multi-poles over 4 shells and 8 configurations
- Crimp contacts: cable cross-section up to 185 mm²
- EMI/RFI shielding protection

MAIN CHARACTERISTICS

- Rated current: from 15 to 500 A
- Service voltage: up to 2000 V
- Withstand voltage: up to 7500 V
- Protection index: IP66
- Salt spray: 96 hours or 500 hours
- Temperature range: -40°C +100°C
- Vibrations and shocks: EN61373 category 1B



INTER-VEHICLE >

TRACTION POWER >



PROPULSION &
BRAKING >

AUXILIARY POWER
SUPPLY >

INTER-VEHICLE >

AIR CONDITIONING >

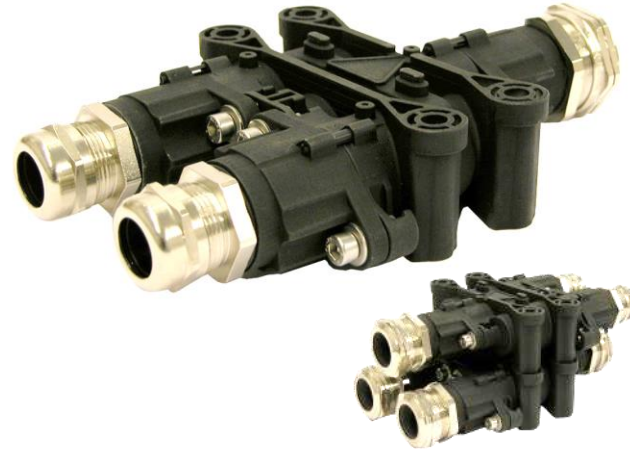


NFF 61030
DIN 5510
UNICEI 11170
UL94



EVERY CONNECTION COUNTS





BENEFITS

- Modular and stackable
- Compact and weight-saving
- Halogen free

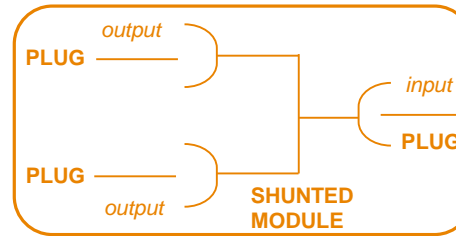
DESCRIPTION

- Single pole power derivation in composite, locking system by captive screws
- 1 input / 2 outputs
- Cable cross-section: from 35 to 120 mm²
- 6 keying positions

MAIN CHARACTERISTICS

- Rated current: 400 A max. (with cable 120 mm²)
- Service voltage: 3000 V
- Withstand voltage: 9500 V
- Protection index: IP66
- Salt spray: 500 hours
- Temperature range: -40°C, +100°C
- Vibrations and shocks: EN 61-373 category 2

Concept



LOCATION

4 6

APPLICATIONS

TRACTION POWER >

FUNCTIONS

PROPULSION & BRAKING >

AUXILIARY POWER SUPPLY >

STANDARDS

EN 50467
 NFF 61030
 EN 45545
 DIN 5510
 UNICEI 11170
 UL94

BENEFITS

- Quick positive locking system
- NF F 61030 standard compliant
- Broad range of accessories
- Field-proven

DESCRIPTION

- Aluminum connector with bayonet locking system
- From 6 to 60 crimp contacts over 9 shells and 11 configurations
- Crimp solid contacts AWG16, 12 and 8
- Connector design based on the MIL DTL 5015 & VG95234 specifications

MAIN CHARACTERISTICS

- Rated current: from 17 to 45 A
- Service voltage: up to 500 V
- Withstand voltage: up to 3250 V
- Protection index: IP66
- Salt spray: 250 or 500 hours
- Temperature range: -40°C +100°C



LOCATION



APPLICATIONS

- TRAIN CONTROL >
- PIS & SAFETY >
- SUB SYSTEMS >

FUNCTIONS

- CAB CONTROL >
- TRAIN CONTROL >
- AIR CONDITIONING >
- DOORS >

STANDARDS

NFF 61030
UL94



BENEFITS

- Quick positive locking system
- NF F 61030 / EN 61984 compliant
- Field-proven

DESCRIPTION

- Aluminum connector
- Crimp solid contacts AWG16, 12 and 8
- Modular Systems enable customized Interfaces
- A choice among 4 500 PN
- 2600 enclosures (metal) // 500 inserts (10A to 420A; 3000V)
- IP44 & IP68

MAIN CHARACTERISTICS

- Inserts for up to 3000V; 420A; 216 contacts or up to 150mm² wire cross section
- Extremely impact-resistant due to powder coating
- Excellent corrosion protection due to hard coating
- Locking systems for highest vibration and shock protection
- Temperature range: -40°C +100°C



LOCATION

1 3 4

APPLICATIONS

TRAIN CONTROL >

PIS & SAFETY >

SUB SYSTEMS >

FUNCTIONS

CAB CONTROL >

TRAIN CONTROL >

AIR CONDITIONING >

DOORS >

LIGHTING >

STANDARDS

NFF 61030
EN 61 984



EVERY CONNECTION COUNTS



BENEFITS

- According to NFF 61030 standard
- High dynamic applications
- Ruggedized hybrid: signal/optic/data connector
- Field-proven solution from metro to high speed train



DESCRIPTION

- Aluminum or bronze connector with screw locking
- From 4 to 61 crimp contacts over 6 shells and 22 configurations
- Crimp solid contacts, coax twinax, quadrax cell or optical
- EMI/RFI shielding protection

MAIN CHARACTERISTICS

- Rated current: from 15 to 250 A
- Service voltage: up to 500 V
- Withstand voltage: 2550 V or 3250 V
- Protection index: IP66
- Salt spray: 96 hours or 500 hours
- Temperature range: -50°C +100°C
- Vibrations and shocks: EN61373 category 1B



LOCATION

3 4 5 6

APPLICATIONS

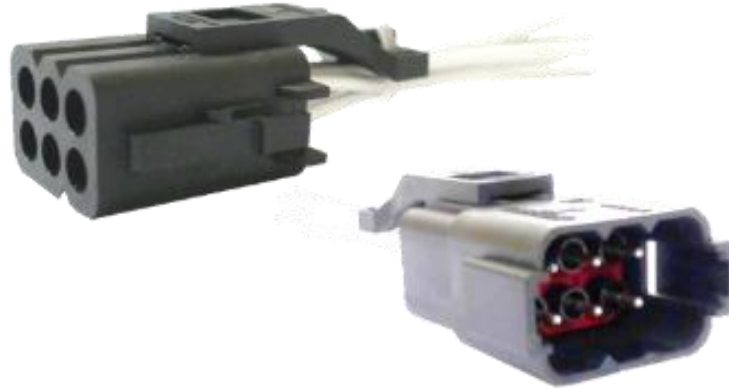
INTER-VEHICLE >
 TRACTION POWER >
 TRAIN CONTROL >
 SUB SYSTEMS >

FUNCTIONS

PROPULSION &
 BRAKING >
 AUXILIARY POWER
 SUPPLY >
 INTER-VEHICLE >

STANDARDS

NFF 61030
 DIN 5510
 UNICEI 11170
 UL94



BENEFITS

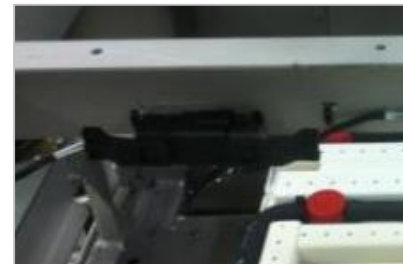
- Compact and cost-effective solution
- High level of performance
- Halogen free
- Field-proven

DESCRIPTION

- Monobloc signal connector in 100% composite, Clip Locking System
- 4 arrangements 4, 6, 12 & 28 contacts
- Contacts: caliber 1,6 mm - Silver or gold plated
- Cable cross-sections: 0,5 to 2,5 mm²

MAIN CHARACTERISTICS

- Rated current: up to 20A
- Service voltage: 500 V AC/DC according to EN 50124-1/A2 (OV3-PD2)
- Protection index: IP 66 mated
- Temperature range: -40°C, +100°C
- Vibrations and shocks: category 1 class B according to EN 61373



LOCATION

1 3 4

APPLICATIONS

TRAIN CONTROL >
 PIS & SAFETY >
 SUB SYSTEMS >

FUNCTIONS

CAB CONTROL >
 TRAIN CONTROL >
 AIR CONDITIONING >
 DOORS >
 LIGHTING >

STANDARDS

NFF 61030
 EN 45545
 DIN 5510
 UNICEI 11170
 UL94





MU27P

BENEFITS

- Compliant to AAR-S-512 and APTA RP-E-019 99 standard

DESCRIPTION

- Aluminum shell with automatic push pull coupling system
- Arrangement: 27 poles
- 10, 12 or 14 AWG wire
- Mechanical coding
- 5 color codes to prevent intermating of any other 27 pole jumpers

MAIN CHARACTERISTICS

- Rated current: 30 A
- Service voltage: 600 V DC
- Salt spray: 250 hours
- Temperature range: -40°C, +110°C



LOCATION

5



APPLICATIONS

INTER-VEHICLE >



FUNCTIONS

INTER-VEHICLE >



STANDARDS

AAR-S-512
APTA RP-E-019 99
UL94



EVERY CONNECTION COUNTS



UIC552

BENEFITS

- Compliant to UIC552 standard
- Rail networks approved
- Full UIC package available
- Low maintenance cost
- Field-proven

DESCRIPTION

- Aluminum connector with automatic cover locking system
- Single pole caliber 25
- Cable cross-section: 185mm²
- Options: safety lock, self-disconnect pigtail

MAIN CHARACTERISTICS

- Rated current: 800 A
- Service voltage: 3000 V DC
- Protection index: IP 56
- Salt spray: 500 hours
- Temperature range: -50°C, +120°C



LOCATION

5

APPLICATIONS

INTER-VEHICLE >

FUNCTIONS

INTER-VEHICLE >

STANDARDS

UIC552
NFF 61030
DIN 5510
UNICEI 11170
UL94



EVERY CONNECTION COUNTS



UIC 541-5

BENEFITS

- Compliant to UIC541.5 standard
- Rail Networks approved
- Full UIC package available
- Low maintenance cost
- Field-proven

DESCRIPTION

- Aluminum alloy connector with assisted self locking system
- Configuration: 9 crimp contacts
- Option: version with switch

MAIN CHARACTERISTICS

- Service voltage: 400 V
- Withstand voltage: 1500V
- Protection index : IP66
- Salt Spray: 500 hours
- Temperature range: -40°C,+100°C



LOCATION

5

APPLICATIONS

INTER-VEHICLE >

FUNCTIONS

INTER-VEHICLE >

STANDARDS

UIC 541-5
NFF 61030
DIN 5510
UNICEI 11170
UL94



EVERY CONNECTION COUNTS

STE
connectivity

UIC558

BENEFITS

- Compliant to UIC558 standard
- Rail Networks approved
- Full UIC package available
- Low maintenance cost
- Field-proven

DESCRIPTION

- Aluminum shell with automatic cover locking system
- Arrangement: 13 and 18 poles
- Silver or gold plated contacts

MAIN CHARACTERISTICS

- Service voltage: 110 V DC
- Test voltage: 2000 V
- Protection index: IP 67
- Salt spray: 500 hours
- Temperature range: -50°C, +120°C



LOCATION

5

APPLICATIONS

INTER-VEHICLE >

PIS & SAFETY >

TRAIN CONTROL >

FUNCTIONS

INTER-VEHICLE >

STANDARDS

UIC558
NFF 61030
DIN 5510
UNICEI 11170
UL94



EVERY CONNECTION COUNTS

STE
connectivity

BENEFITS

- Rackable and panel system
- Increased safety during operation
- According to railway standard
- Misalignment tolerance $\pm 2\text{mm}$

DESCRIPTION

- Rackable power connector
- Fixed socket and floating plug
- 2 power contacts for terminal lugs
 - Caliber 14 / M10 threaded or Caliber 18 / M12 threaded
- 7 auxiliary crimp contacts $\text{Ø}4$

MAIN CHARACTERISTICS

- Rated current: - 350 A ($\text{Ø}14$) - 500 A ($\text{Ø}18$) and pilots 30 A ($\text{Ø}4$)
- Service voltage: 700 V DC
- Withstand voltage: 3500 V
- Temperature range: -40°C , $+100^{\circ}\text{C}$



 LOCATION

4

 APPLICATIONS

SUB SYSTEMS >

 FUNCTIONS

BATTERY >

 STANDARDS

NFF 61030
EN 45545
UL94

CAM

BENEFITS

- Harsh environment
- High mechanical resistance
- Easy and fast connect
- Halogen Free
- Field-proven



DESCRIPTION

- Aluminum connector with safe cam locking system for harsh environment
- 6 shells and 21 configurations from 4 to 61 contacts + earth
- Crimp connections: cable cross-section up to 185 mm²
- Configuration: power or signal or hybrid
- Option: version with switch

MAIN CHARACTERISTICS

- Rated current: from 15 A up to 500 A
- Service voltage: up to 500 V
- Withstand voltage: up to 3250 V
- Protection index: IP54 (above in option)
- Salt spray: 96 hours or 500 hours
- Temperature Range: -40°C, +100°C



LOCATION

5

APPLICATIONS

INTER-VEHICLE >

FUNCTIONS

INTER-VEHICLE >

STANDARDS

NFF 16101
NFF 16102
UL94



EVERY CONNECTION COUNTS



BENEFITS

- Rugged and anti-vandalism design
- Secured by padlocking
- Rail networks approved
- Fully weather proof

DESCRIPTION

- Nickel plated brass shell with push pull coupling system
- Arrangements: 8 and 14 poles
- Crimp contacts suitable for 10, 12 or 14 AWG wire

MAIN CHARACTERISTICS

- Rated current: 10 A
- Service voltage: 400 V
- Withstand voltage: 3000 V
- Protection index: IP2X and scoop proof
- Salt spray: 500 hours
- Temperature range: -40°C, +110°C
- Vibrations: 15g (V.axis) - 6g (T.axis) – 4g (L.axis)
- Impact: 40g – 3 ms per axis



 LOCATION

TRACK SIDE

 APPLICATIONS

RAILWAY SIGNALING

 FUNCTIONS

WAYSIDE
EQUIPMENT

TRACKSIDE
EQUIPMENTS

 STANDARDS

Network Rail Acceptance
RT/E/PS/00005 cable
UL94

TECIRP

“hard” insert

BENEFITS

- Mates with existing MIL-C-5015
- More efficient use of space
- Rapid wire assembly through pin clip design
- No filler plugs required
- Retained nut for ease of use

DESCRIPTION

- Free and fixed circular connector series
- 3 Pin Bayonet Coupling with steel wear pins for 2000+ cycles
- 7 to 60 contact arrangements
- Crimp contacts: cable cross-section from 0.25 to 10 mm²
- Rear of connector takes accessories, enabling cable, conduit, gland and heatshrink termination

MAIN CHARACTERISTICS

- Rated Current : up to 46 A
- Service Voltage : up to 1250 V DC/AC Peak
- Withstand Voltage : 2800 V
- Protection Index : IP 67 Mated
- Temperature Range : -55 °C - 125 °C



LOCATION

1 3 4

APPLICATIONS

TRAIN CONTROL >
PIS & SAFETY >
SUB SYSTEMS >

FUNCTIONS

CAB CONTROL >
TRAIN CONTROL >
AIR CONDITIONING >
DOORS >

STANDARDS

MIL-C-5015
NFF 61-030
BS6853
VG95234

TECIRH

“soft” insert

BENEFITS

- Mates with other MIL-C-5015
- Rapid connection and disconnection
- More efficient use of space
- Simple cable termination
- Halogen free insulator

DESCRIPTION

- Free and fixed circular connector series
- 3 Pin Bayonet Coupling with steel wear pins for 2000+ cycles
- 1 to 86 contact arrangements
- Crimp contacts: cable cross-section from 0.22 to 50 mm²
- Rear of connector takes accessories, enabling cable, conduit, gland and heatshrink termination

MAIN CHARACTERISTICS

- Rated Current : up to 135 A
- Service Voltage : up to 1750 V DC/AC Peak
- Withstand Voltage : 3500 V
- Protection Index : IP 67 Mated
- Temperature Range : -55 °C - 200 °C
- NFF 16-101 Classification I2 F1 and BS6853



LOCATION

1 3 4

APPLICATIONS

TRAIN CONTROL >
PIS & SAFETY >
SUB SYSTEMS >

FUNCTIONS

CAB CONTROL >
TRAIN CONTROL >
AIR CONDITIONING >
DOORS >

STANDARDS

MIL-C-5015
BS6853
VG95234
LUL Standard



HIGH PERFORMANCE RAIL WIRE AND CABLE

POWER >

LOW VOLTAGE
& CONTROL >

HIGH-SPEED
DATA >

FIRE
RESISTANT >



EVERY CONNECTION COUNTS



POWER

ZHPCG Power Cables

- Dual wall Zero Halogen power cables
- Meets key rail specifications, EN45545-2, DIN 5510-2
- New launch summer 2015, ZHPCG-EN (meets EN50264-2)



400R Primary wire & multi core cable

- New launch summer 2015
- Dual wall low fire hazard for USA applications
- Meets key rail specifications, NFPA 130 2010





ZHPCG POWER CABLE

DESCRIPTION

- Dual wall Zero Halogen power cable, supplied as a single core cable
- ZHPCG-15 (600/1,300V)
- ZHPCG-35 (1,800/3,300V)
- ZHPCG-36 (1,800/3,300V) very flexible

MAIN CHARACTERISTICS

- Zero Halogen
- Outstanding resistance to oils
- Excellent scrape abrasion & cut through
- Voltage rating: 600V & 1800V
- Conductor cores 1.0mm² to 400.0mm²
- Temperature rating: -30°C up to +115°C
- Flexible (does not wrinkle on bending)
- Dual wall
- Compliant with:
 - EN45545-2
 - DIN 5510-2





400R POWER CABLE

DESCRIPTION

- Dual wall high flame resistance power cable
- 400R02 (1,000V)
- 400R03 (2,500V)

MAIN CHARACTERISTICS

- Excellent handling and flexibility
- Outstanding resistance to oils
- Voltage rating: 1000V & 2500V
- Conductor cores 26AWG to 00AWG
- Temperature rating: -65°C up to +125°C (wire)
- Dual wall construction (notch and abrasion resistant)
- Compliant with:
 - NFPA 130 Flammability
 - NFPA 130 Total Smoke Release
 - NFPA 130 Peak Smoke Release
 - BSS 7238 Ds Smoke 4 Minutes
 - BSS 7238 Dm Smoke 4 Minutes
 - BSS 7239 Toxicity



POWER >

EVERY CONNECTION COUNTS





LOW VOLTAGE & CONTROL

100G & 100E Primary Wire & Multi Core Cable

- Dual wall Zero Halogen primary wire
 - Thin wall light weight cross linked jacket
 - Meets key rail Spec EN50306-2,3,4 EN45545-2, DIN 5510-2
-



400R Primary Wire & Multi Core Cable

- Dual wall Low fire hazard for USA applications
 - Meets key rail specifications, NFPA 130 2010
-



EPD Specialty/Bespoke Cables

- Custom designed Multi Core Cables
- Meeting the customers exact cabling requirements
- Rail Zero Halogen outer jacket, can be braided or screened
- Rail specifications EN50306-4, EN45545-2, DIN 5510-2



EVERY CONNECTION COUNTS





100G & 100E LOW POWER/SENSOR CABLE

DESCRIPTION

- Dual wall Zero Halogen primary wire, supplied as both single core signal wire, and Multi core cable, can be braided or screened

MAIN CHARACTERISTICS

- Small size, lightweight
- Excellent handling and flexibility
- Outstanding resistance to oils
- Excellent scrape abrasion & cut through
- Voltage rating: 750 V 100G
- Voltage rating: 300 V 100E
- Conductor cores 0.5mm² to 4.0mm² 100G
- Conductor cores 0.5mm² to 2.5mm² 100E
- Temperature rating: -40°C up to +125°C (wire)
- Flexible (does not wrinkle on bending)
- Dual wall construction (notch and abrasion resistant)
- Compliant with:
 - EN50306-(2,-3,-4)
 - EN45545-2
 - DIN 5510-2



LOW VOLTAGE & CONTROL >

EVERY CONNECTION COUNTS





400R LOW POWER/SENSOR CABLE

DESCRIPTION

- Dual wall High flame resistance primary wire, supplied as both single core signal wire, and Multi core cable, for the USA rail market

MAIN CHARACTERISTICS

- Small size, lightweight
- Excellent handling and flexibility
- Outstanding resistance to oils
- Voltage rating: 600 V
- Conductor cores 26AWG to 10AWG
- Temperature rating: -65°C up to +125°C (wire)
- Flexible (does not wrinkle on bending)
- Dual wall construction (notch and abrasion resistant)
- Compliant with
 - NFPA 130 Flammability
 - NFPA 130 Total Smoke Release
 - NFPA 130 Peak Smoke Release
 - BSS 7238 Ds Smoke 4 Minutes
 - BSS 7238 Dm Smoke 4 Minutes
 - BSS 7239 Toxicity



LOW VOLTAGE & CONTROL >

EVERY CONNECTION COUNTS





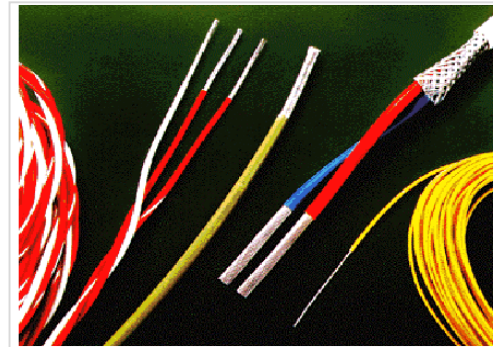
SPECIALTY/BESPOKE CABLE

DESCRIPTION

- Bespoke customer specific multi-core cables
- TE designs cable around customers needs
- For rail supply with ZH jacket

MAIN CHARACTERISTICS

- Zero Halogen Jackets and Components
- Compliant with:
 - EN 45545-2
 - EN 50306-4
 - DIN 5510-2



LOW VOLTAGE & CONTROL >

EVERY CONNECTION COUNTS





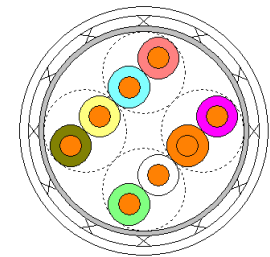
HIGH-SPEED DATA

- Zero Halogen Ethernet Local Area Network Cables
- CAT-5, CAT-6, CAT-7 and MiVB cable
- Cables compliant to EN45545-2

Data is carried on twisted pairs with two common configurations:

CAT 7 Four Pair

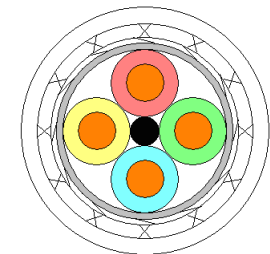
This configuration is four twisted pairs twisted together with data on all pairs. The total capacity of the cable is the summation of the capacity of each pair.



CAT 5 Quad

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.





HIGH-SPEED DATA

ETHERNET LOCAL AREA NETWORK CABLES

Standard Product Offering (bespoke designs available on request)

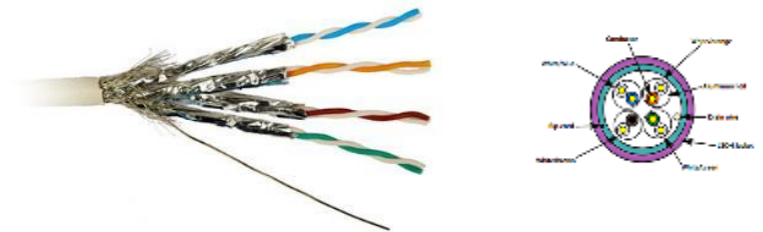
CAT 5 Quad 22AWG Braid Shielded



CAT 6 4 Pair 24AWG Braid Shielded



CAT 7 4 Pair 24AWG Braid Shielded



EVERY CONNECTION COUNTS

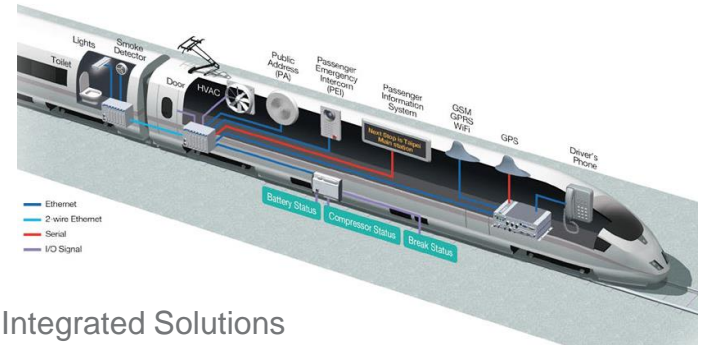




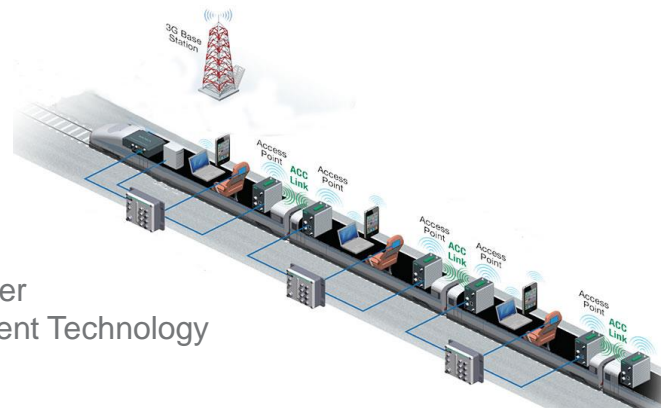
HIGH-SPEED DATA APPLICATIONS



High Quality Video and Dependable Data Archives on Ethernet Networks



Integrated Solutions for Passenger Information



Enhancing Passenger Comfort with Intelligent Technology



HIGH-SPEED DATA >

EVERY CONNECTION COUNTS





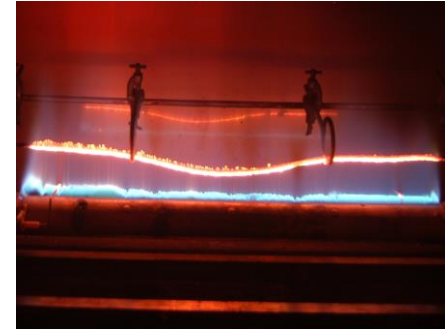
FIRE RESISTANT CABLE 100GFL

DESCRIPTION

- Cable will still keep its electrical integrity after being subjected to 2 hours

MAIN CHARACTERISTICS

- Dual wall Zero Halogen 100G cable, supplied with a mica wrap
- Compliant to:
 - EN50200 2 hours burning
 - EN45545



TERMINALS

LUGS

- Cable to device connections
- 6 AWG—1000 MCM
- Long & standard crimp barrels



COPPER TUBULAR LUGS

- CTN type and MJTN junction sleeves
- Specially designed for flexible wires



SPLICES

- Cable to cable connections
- 2 AWG—1500 MCM
- Parallel & positive stop butt connections



QUICK DISCONNECTS

- Fast and easy to disconnect cable to cable communications
- Common sizes available



DESCRIPTION

- High performance copper compression crimping terminals and splices
- Supplied in metric for FRANCE
- Designed for high current cables and leads
- Ideally suited for power generation and distribution
- Available in a number of terminal and splice styles
- Metric sizes ranging from 1.5 to 1000mm²
- Hex crimping tools and dies supplied by TE
- Each tool is calibrated and certified before being sold.
- NF F Compliant

KEY MARKETS

- RAIL – trackside, signaling, locomotives



DESCRIPTION

- Designed for high current applications
- Ideally suited for power generation and distribution
- Accepts a wide range of stranded copper wires
 - Terminals, 6 AWG to 1,000 MCM [13 to 507 mm²]
 - Spices, 6 AWG to 1,500 MCM [13 to 760 mm²]
- Available in a variety of terminal and splice styles
- Listed by UL, file no. E12388, Spec UL-486
- Certified by CSA, file no. LR7189

KEY MARKETS

- RAIL – trackside, signaling, locomotives
- INDUSTRIAL – machine builders, construction panel builders, automotive, defense, aerospace, marine, utilities, power generation and distribution





CABLE ASSEMBLIES

GLOBAL FOOTPRINT & COMPETENCY CENTERS



CAPABILITIES

- Make-to-Print
- Innovative solutions (new build)



EVERY CONNECTION COUNTS

