



# FXP2 SERIES BULKHEAD RECEPTACLE + 90° PLUG VALIDATION PLAN ACCORDING TO EN50467

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## 1. SCOPE

### 1.1. Content

When tests are performed, the following specifications and standards shall be used. All inspections shall be performed using the applicable inspection plan and product drawing.

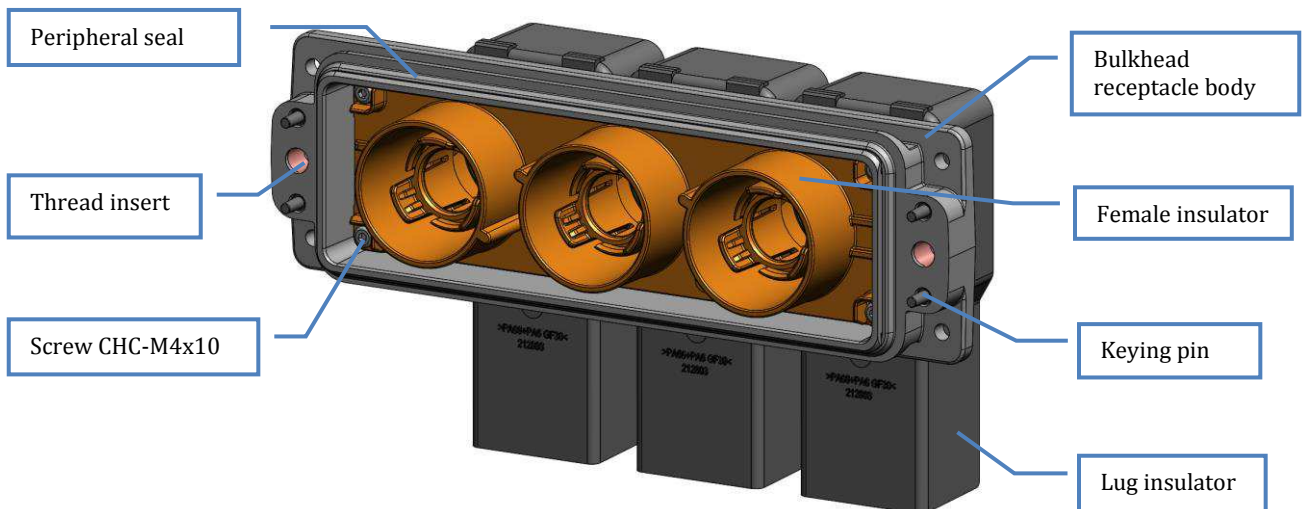
This specification defines the performance, tests and quality standards for FXP size 2 for electrical connection intended for use in railway rolling stock in version:

- Bulkhead receptacle with contacts caliber 20 for lug connection
- 90° plug with contact caliber 20 to be crimping

The FXP series is designed to fulfil the standard EN50467 and consequently section 7 of this standard which defined the type tests, specimens, sequence, ratings and measurements to be performed by the product in tests.

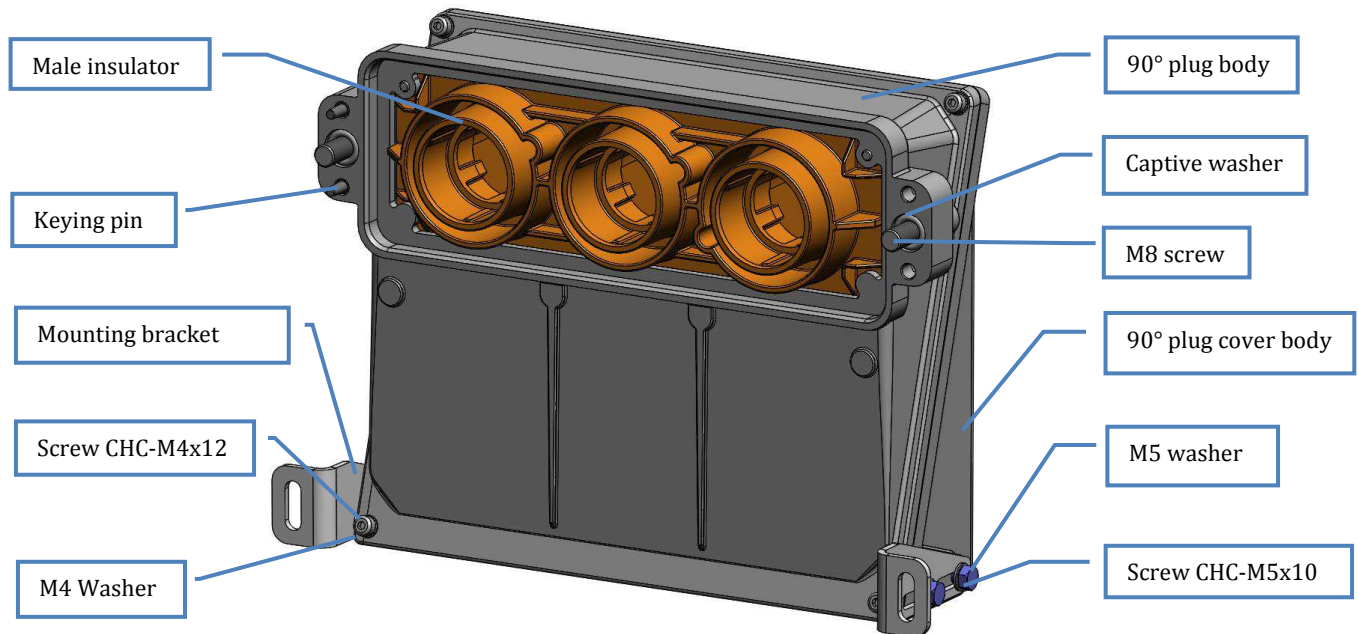
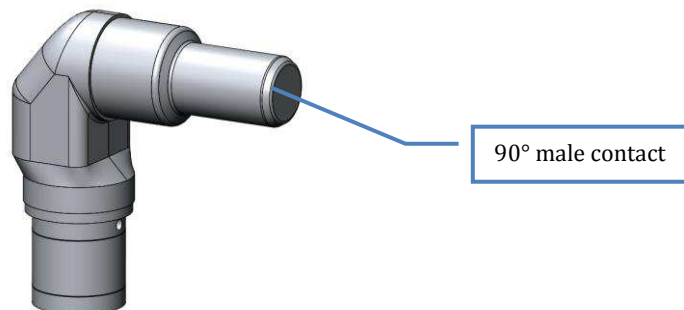
The connectors under test are shown below (more details are done in paragraph 3.5 sampling):

#### FXP size 2 - Bulkhead receptacle:



#### FXP size 2 – Female contact for receptacle:



FXP size 2 - 90° plug:FXP size 2 – 90° male contact for plug:

The straight contacts are assembled in the insulators, receptacle side, by clips and the 90° contact, 90° plug side, are enclosed inside the plug.

The link between the male and female contacts is done with a diablo (spring lamellas technology). The cross section of termination allows for 50mm<sup>2</sup> / 70mm<sup>2</sup> / 95mm<sup>2</sup> / 120mm<sup>2</sup> / 150mm<sup>2</sup> / 185mm<sup>2</sup> and 240mm<sup>2</sup>.

## 1.2. Qualification

When tests are performed, the following specifications and standards shall be used. All inspections shall be performed using the applicable inspection plan and product drawing.



## 2. APPLICABLE DOCUMENTS

The following documents form part of this specification to the extent specified herein. In the case of a conflict between the requirements of this specification and the product drawing or of conflicts between the requirements of this specification and the referenced documents, this specification shall take precedence.

### 2.1. TE Connectivity documents

#### Connectors:

- 212735 - Female bulkhead receptacle for contacts to be screwed cal.20
- 212777 - Male 90° plug for contacts to be crimped cal.20
- 114-157007 – Implementation and wiring procedure of FXP2 range
- 501-157006 – FXP size 2, 90° plug + bulkhead receptacle, qualification test report
- 409-157000 – Maintenance manual

#### Contacts:

- 212739 - S/A female contact cal.20, connection for lug M10, M12 and M14
- 212836 – S/A male 90° contact cal.20 to be crimped 50 to 240mm<sup>2</sup>

#### Other / Download documents:

- <http://www.te.com/>

### 2.2. Normative references

The following referenced standards are applicable, as well as the standards listed therein as applicable standards. For undated references, the last standard version in effect at the test date has been used.

- EN50467:2012 – Railway Applications – Rolling Stock – Electrical connectors, requirements and test methods
- EN45545-2+A1:2016 – Railway Applications – Fire Protection on Railway Vehicles – Part 2: Requirements for fire behavior of materials and components
- EN50124-1+A2:2005 – Railway Applications – Insulation Coordination – Part 1: Basic Requirements – Clearances and creepage distances for all electrical and electronic equipment
- NFF00-363:1995 – Rolling stock – Products to be crimped for electrical connections
- EN60529:1991+A1:2000 – Degrees of Protection procured by enclosures (IP code)
- EN61373:1999 – Railway Applications – Rolling Stock Equipment – Shock & Vibrations tests



### 3. REQUIREMENTS

#### 3.1. Design and Construction

Product shall be of the design, construction and physical dimensions specified on the applicable product drawing.

#### 3.2. Ratings

Unless otherwise specified, severity of the service conditions shall be those per EN50467, table B.1, for on board rolling stock locations 4-5-6.

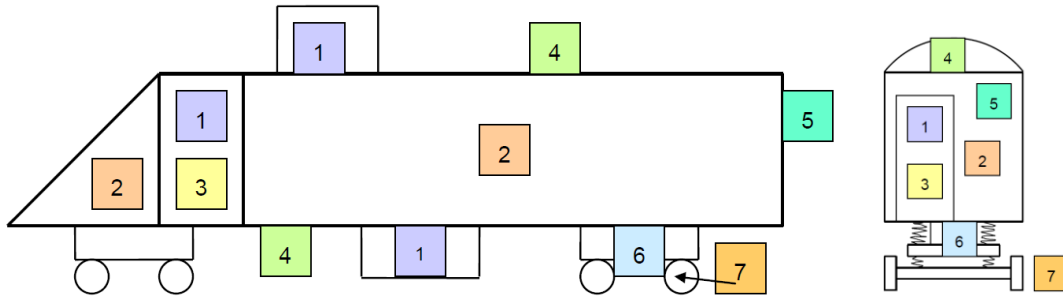


Figure 1 – Typical connector locations on board rolling stock (EN50467, fig. 3)

- Creepage and leakage distances per EN50124-1/A2

Table 1 – Creepage/Leakage distances	
Rated Voltage	4000V
Overtoltage Category	OV3
Pollution Degree	PD3
Creepage Distance required	> 32 mm
Creepage Distance on product	39.2 mm
Leakage Distance required	> 60 mm
Leakage Distance on product	62.3 mm

- RMS Withstand Voltage @ 50 Hz required:

Table 2 – Withstand Voltage	
Rated Voltage	4000V
Overtoltage Category	OV3
Pollution Degree	PD3
Rated Impulse Voltage (U <sub>Ni</sub> )	25kV
Withstand Voltage per EN50124-1/A2, tab. B1	11.6kV
Withstand Voltage per EN50467, tab. 14	12kV

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- RMS Withstand Voltage @ 50 Hz used for herein tests sequence: 12kV
- Insulation Resistance: > 5000MΩ
- Contact resistance: < 0.15mΩ
- Rated Current: to be determinate for a rising of 50K, 60K (for investigation current is also measured for a rising of Max operating temperature – ambient temperature)
- Operating Temperature range: -55 / +100°C
- Degree of Protection per EN60529-1/A1: IP66 / IP67 / IP68 5 meters
- Salt Mist resistance: 500h (240h required by EN50467)
- Mating Cycles: 500
- Insertion Force per contact: < 120N
- Vibration & Shocks per EN61373: category 2 (bogie)
- Fire & Smoke Classification per EN45545-2+A1: R22:HL3 / R23:HL3
- Fluids Resistance: Hydrochloric Acid, Sodium Hydroxide, IRM 902 Oil

### 3.3. Performance and tests description

Product shall be designed to meet the electrical, mechanical and environmental performance requirements specified in Paragraph 3.4. Unless otherwise specified, all tests shall be performed at ambient environmental conditions per EN50467 / EN60068-1.



## 3.4. Tests Requirements and Procedures summary

Table 3 – General, Group 0 (non normative)

No.	Measurements to be performed		Condition	Requirements
	Test Items	EN60512		
01	Visual & dimensional examination	1a, 1b	Any existing cover shall be removed, if required	EN50467, 6.8, 6.9, 6.15 Dimensions shall comply with the drawings
02	Conformity of marking	1a	Any existing cover shall be removed, if required	EN50467, 6.2
03	Contact resistance	2b	Mated sample Test current: 600A (a) Measuring points: at the end of the termination. (b) All 3 contacts. Test Voltage DC: $1 < U (V) < 60$	Contact resistance shall be 0.15mΩ max
04	Insulation resistance	3a	Unmated sample Test voltage: 1000V DC $\pm 50V$ Measurement points (b): Contact/contact Contact/earth (c) Measurement after 60s $\pm 5s$	Insulation resistance shall be $> 5000M\Omega$
05	Dielectric Strength	4a	Mated sample Measurement points (b): Contact/contact Contact/earth (c) Test voltage: RMS withstand voltage 12kV, AC 50Hz	EN50467, 6.12 There shall be no breakdown or flashover
<p>Note: (a) test current: Maximum current admissible by the testing device is 600A            (b) measuring points: at the conductors as close as possible to the termination. If not possible, the conductor resistance shall be recalculated            (c) earth in the sense of non-live metal parts (e.g plug or receptacle housings here)</p>				





Table 4 – Mechanical Tests, Group A (per EN50467, tab. 5)

Test phase (a)	Test Designation	Test according to		Severity or conditions	Measurements to be performed		Requirements
		EN60512	EN50467		Designation	EN60512	
A1	Visual and dimensional examination			Any existing cover shall be removed, if required	Visual and dimensional examination	1a, 1b	EN50467, 6.2, 6.8, 6.9, 6.15 Dimensions shall comply with the drawings
A2 (b)	Durability of marking						
A3	Polarisation	13e		Tests force: 540N			EN50467, 6.3, 6.8
					Visual examination	1a	No damage likely to impair function
A4 (c)	Interlock						
A5 (d)	Terminations						
A6	Contact retention in insert	15a		Test load shall be 3 times the specified insertion force (mating) of 1 contact or the specified insertion force of 1 contact + 50N, whichever is less. The minimum test load shall not be less than 20N.			EN50467, 6.15
					Visual examination	1a	No axial displacement likely to impair normal operation
A7.1 (e)	Cable strain relief resistance to cable pull						
A7.2 (e)	Cable strain relief resistance to cable torsion						

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A8	Mechanical strength impact	7b	Only free connector (plug) Dropping height: 750mm for specimens of mass ≤ 250g, otherwise 500mm Dropping cycles: 8 Position in 45° steps, 1 cycle per position			EN50467, 6.15
				Visual examination	1a	Parts used for protection against electric shock shall not be damaged. Reduction of clearance and creepage distances is not allowed
<p>Note: (a) test phase numbers are those per EN50467                  (b) product in test is laser marked, so not removable. Consequently test A2 is not applicable.                  (c) no interlock system, consequently test A3 is not applicable.                  (d) tests required per EN50467 refer to the EN60352-2 which is applicable for crimped connections up to 10mm<sup>2</sup>, the herein products in tests allow contact terminations from 50 to 120mm<sup>2</sup>. Consequently, the tests to qualified the terminations has been done acc. to NFF00-363 (see test report 501-157003)                  (e) product in test is not equipped of strain relief, consequently tests A7.1 &amp; A7.2 are not applicable</p>						



Table 5 – Service Life Tests, Group B (per EN50467, tab. 6)

Test phase (a)	Test Designation	Test according to		Severity or conditions	Measurements to be performed		Requirements
		EN60512	EN50467		Designation	EN60512	
B1	Initial measurement			Mated sample Test current: 600A (b) Measuring points: at the end of the termination. (c) All 3 contacts. Test Voltage DC: $1 < U (V) < 60$	Contact resistance	2b	Reference value for subsequent measurement
B2	Mechanical operation	9a	7.9	Operating cycles: 500 Rest period in the unmated position of approximately 30s Periodic lubrication of mating screws each 20 cycles			EN50467, 6.13
					Visual examination	1a	No damage shall occur which could impair normal use
B3	Final measurement			Same conditions as for test phase B1.	Contact resistance	2b	For initial contact resistance up to 10mΩ the maximum rise permitted shall be 50%. For initial contact resistance above 10mΩ the maximum rise permitted is 5mΩ. The higher value is permissible.
							7.12

Note: (a) test phase numbers are those per EN50467

(b) test current: maximum current admissible by the testing device is 600A

(c) Measuring points: at the conductors as close as possible to the termination. If not possible, the conductor resistance shall be recalculated



**Table 6 – Thermal Tests, Group C (per EN50467, tab. 7)**

Test phase (a)	Test Designation	Test according to		Severity or conditions	Measurements to be performed		Requirements
		EN60512	EN50467		Designation	EN60512	
C1	Temperature rise	5a	7.8	Mated specimen, wired to cables of 500±50mm length (and so 1000±100mm between 2 contacts) All contacts connected together 1.Search current @ 50K 2.Search current @ 60K 3.Search current to reach the upper limiting temperature, +100°C (include ambient temperature) AC frequency: 50Hz			EN50467, 6.18; 6.19 The upper limiting temperature specified shall not be exceeded

Note: (a) test phase numbers are those per EN50467



Table 7 – Climatic test, Group D (per EN50467, tab. 8)

Test phase (a)	Test Designation	Test according to		Severity or conditions	Measurements to be performed		Requirements
		EN60512	EN50467		Designation	EN60512	
D1	Initial measurement			Mated sample Test current: 600A (b) Measuring points: at the end of the termination. (c) All 3 contacts.	Contact resistance	2b	Reference value for subsequent measurement.
D2	Cold	11j	6.18	Mated sample Test temperature: -55°C Test duration: 2hours			EN50467, 6.7
					Visual examination	1a	No damage shall occur which could impair normal use.
D3	Dry heat	11i	6.18	Mated sample Test temperature: +100°C Test duration: 7days			EN50467, 6.7
					Visual examination	1a	No damage shall occur which could impair normal use.
D4	Salt mist test	11f	7.14	Mated sample Test duration: 500hours (d) Checking stages: 120-240-360hours	Visual examination	1a	No damage shall occur which could impair normal use.
D5	Final measurement			The same conditions as for test phase D1.	Contact resistance	2b	For initial contact resistance up to 10 mΩ the max rise permitted shall be 50 %. For initial contact resistance above 10 mΩ the max rise permitted is 5 mΩ. The higher value is permissible.
D6	Dielectric strength		7.12	Mated sample Measurement points (c): Contact/contact Contact/earth (e) Test voltage: RMS withstand voltage 12kV, AC 50Hz	Voltage proof	4a	EN50467, 6.12 There shall be no breakdown or flashover

Note: (a) test phase numbers are those per EN50467

(b) test current: maximum current admissible by the testing device is 600A

(c) measuring points: at the conductors as close as possible to the termination. If not possible, the conductor resistance shall be recalculated

(d) 240h required by EN50467

(e) earth in the sense of non-live metal parts (e.g plug or receptacle housings here)

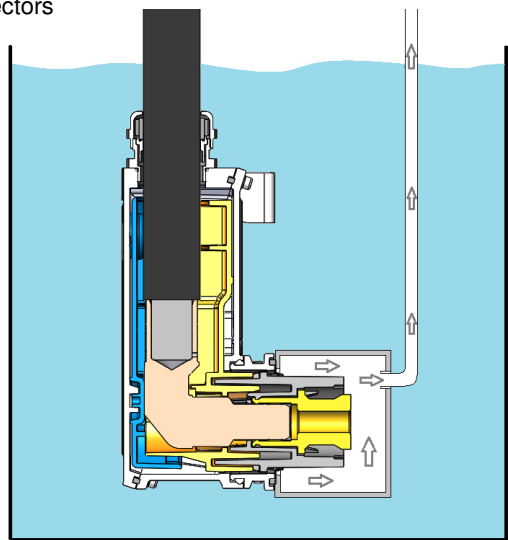


Table 8 – Degree of Protection Tests, Group E (per EN50467, tab. 9)							
Test phase (a)	Test Designation	Test according to		Severity or conditions	Measurements to be performed		Requirements
		EN60512	EN50467		Designation	EN60512	
E1 (b)	Protection against electric shock						
E2 (c)	Provision for earthing						
E3 (d)	Degree of protection IP code		7.7	IP6x IPx6 IPx7 IPx8 (e)			EN50467, 6.11
E4 (f)	Dielectric strength		7.12	Test voltage: RMS withstand voltage 12kV, 50Hz Test voltage applied between all contacts connected together and the accessible surface	Voltage proof	4a	EN50467, 6.12 There shall be no breakdown or flashover

Note: (a) test phase numbers are those per EN50467  
 (b) connectors non IP2X, specified as not to be used under load when disconnected, consequently test E1 is not applicable  
 (c) connectors without earthing contact, consequently test E2 is not applicable  
 (d) the cables of receptacle are removed for IPxx test because the receptacle is open on the panel or the box.  
 (e) with depression inside the connector of -0.5 bar (equivalent to IPx8 5 meters).  
 (f) after each IPxx, the voltage proof test is done before unmate connectors

Figure 2 – IPx8 test schema

➡ Arrow represent air pressure of -0.5 bar





**Table 9 – Vibrations and Shock Tests, Group F (per EN50467, tab. 10)**

Test phase (a)	Test Designation	Test according to		Severity or conditions	Measurements to be performed		Requirements
		EN60512	EN50467		Designation	EN60512	
F1	Simulated long life random vibration at increased levels		EN 61373: 1999, Clause 9	Connectors mated, all contacts wired in series and monitored for micro interruption. According to classification of intended mounting location (see Annex B): category 2			6.16
					Contact disturbance	2e	Micro interruption $\leq 1 \mu s$
					Visual examination	1a	No damage likely to impair function.
F2	Shock		EN 61373: 1999, Clause 10	Connectors mated. According to classification of intended mounting location (see Annex B): category 2			6.16
					Visual examination	1a	No damage likely to impair function.
F3	Random vibration test		EN 61373: 1999, Clause 8	Connectors mated, all contacts wired in series and monitored for micro interruption. According to classification of intended mounting location: category 2			6.16
					Contact disturbance	2e	Micro interruption $\leq 1 \mu s$
					Visual examination	1a	No damage likely to impair function.
F4	Dielectric strength		7.12	Mated sample Measurement points (b): Contact/contact Contact/earth (c) Test voltage: RMS withstand voltage 12kV, AC 50Hz	Voltage proof	4a	EN50467, 6.12 There shall be no breakdown or flashover

Note: (a) test phase numbers are those per EN50467

(b) measuring points: at the conductors as close as possible to the termination. If not possible, the conductor resistance shall be recalculated

(c) earth in the sense of non-live metal parts (e.g plug or receptacle housings here)

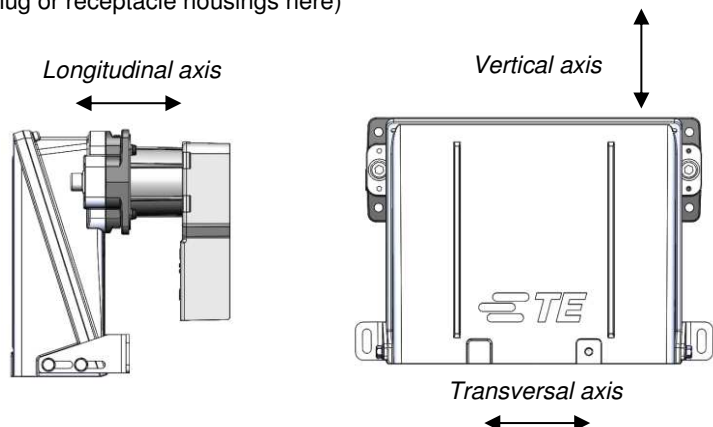


Figure 3 – Vibrations and shocks axis



**Table 10 – Resistance of Fluids, Group G (per EN50467, tab. 11)**

Test phase (a)	Test Designation	Test according to		Severity or conditions	Measurements to be performed		Requirements
		EN60512	EN50467		Designation	EN60512	
G1	Fluid resistance	19c		Connectors unmated  Fluids temperature (step1): Hydrochloric Acid (b) and Sodium Hydroxide (b): 23±2°C IRM 902 Oil: 50±2°C  Ageing cycle temperature (step3): +65°C			EN50467, 6.23
G2					Engaging and separating forces	13a	No damage likely to impair function.
G3					Contact resistance	2a or 2b	For initial contact resistance up to 10 mΩ the maximum rise permitted shall be 50 %. For initial contact resistance above 10 mΩ the maximum rise permitted is 5 mΩ. The higher value is permissible.
G4				Test voltage: 1000V DC ±50V Measurement points (b): Contact/contact Contact/earth (c)	Insulation resistance	3a	Insulation resistance shall be >500MΩ
G5	Dielectric strength		7.12	Mated sample Measurement points (c): Contact/contact Contact/earth (d) Test voltage: RMS withstand voltage 12kV, AC 50Hz	Voltage proof	4a	EN50467, 6.12 There shall be no breakdown or flashover
G6				Unmated sample Testing force: 200N Increase of force: ≤10N/s Test done successively on both side of the contacts	Contact retention in insert	15a	Axial displacement after the test ≤0.5mm



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G7				Unmated sample Testing force: 360N (sum of all the contacts insertion force) Increase of force: ≤50N/s Test done successively on both side of the inserts	Insert retention in housing (axial)	15b	No displacement or damage likely to impair function
G8				Mated and unmated sample	Visual examination	1a	No damage likely to impair function
<p>Note: (a) test phase numbers are those per EN50467          (b) normal solution of hydrochloric acid or sodium hydroxide          (c) measuring points: at the conductors as close as possible to the termination. If not possible, the conductor resistance shall be recalculated          (d) earth in the sense of non-live metal parts (e.g plug or receptacle housings here)</p>							


**Table 11 – Shielding Effectiveness, Group H (per EN50467, tab. 12)**

Test phase (a)	Test Designation	Test according to		Severity or conditions	Measurements to be performed		Requirements
		EN60512	EN50467		Designation	EN60512	
H1 (b)	Shielding Effectiveness or						
	Effective transfer of impedance						

Note: (a) test phase numbers are those per EN50467

(b) connectors are passive components that are themselves intrinsically immune from EMC disturbances (...) Connectors are part of system or sub-system. EMC requirements for railway rolling stock described in EN 50121 series can be verified only for complete systems. Under several circumstances the most concerning issue in a wiring installation is the cable shielding characteristic, not the connector shielding characteristic. (EN50467, section 6.21) Consequently tests HI is not applicable



**Table 12 – Tests on raw materials (per EN50467, tab. 13)**

Test Designation (a)	EN50467 Article	Applicable standard	Severity or conditions	Requirements
Fire behavior of materials and components (b)	6.22	EN45545-2+A1:2016	Classification HL2 minimum	R22 & R23
Resistance to ozone. (c)	6.24	ISO1431-1:2004	Method B Test duration: 24h, 500ppb Temperature: 40°C Elongation: 20%	Visual examination No cracks shall appear
Resistance to UV (d)				
<p>Note: (a) These tests are done on standardized tests samples. Quantity and dimensions of samples are determinate in the applicable standard. Each of these is realized in an external laboratory approved ISO17025 and sanctioned by a certification report.</p> <p>(b) for non-metallic materials which have a weight above 10g</p> <p>(c) for exposed rubber and plastic parts</p> <p>(d) no none metallic part exposed to sunlight, consequently UV test is not applicable</p>				



### 3.5. Sampling

Number of Specimen as below table:

Table 12a - Number of Specimen (per EN50467, tab. 4)		
Test	Description	Numbers & consist of
Group 0	General	All specimens
Group A	Mechanical	1 pair connectors
Group B	Service Life	3 pairs connectors
Group C	Thermal	1 pair connectors
Group D	Climatic	1 pair connectors
Group E	Degree of Protection	2 pairs connectors
Group F	Vibration and Shock	1 pair connectors
Group G	Resistance to Fluids	4 pairs connectors (a)
Group H	Shielding Effectiveness	Not applicable
-	Tests on raw materials	According to applicable standards

Note: (a) 1 specimen per fluid

#### 3.5.1. Samples BOM

A pair of connectors is composed of a plug and a receptacle, equipped of contacts and cable glands per hereafter table:

Table 13 – Samples BOM	
Sub-assembly or components	Part number
Bulkhead receptacle	FXP2WS-3XXX-S
90° Plug	FXP2PA-3M40-P
Female contact to be screwed	FXP-CS20-LM14S-CU 3 per bulkhead receptacle
90° male contact to be crimped 240mm <sup>2</sup>	FXP-CA20-M240P-CU 3 per 90° plug
Cable gland	0401-0391AS 3 per 90° plug
Lugs 240mm <sup>2</sup>	0151-0252AS 3 per bulkhead receptacle
H head screw M14x40	HM14x40-I 3 per bulkhead receptacle
Flat washer M14	MU-14-I 3 per bulkhead receptacle
TREP washer M14	3L14-I 3 per bulkhead receptacle

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Cables used for the herein tests sequence is:

- SILICABLE RW EN 50382-2 3600V F 120C 240mm<sup>2</sup>

### 3.5.2. Samples setting-up

Product shall be prepared and wired according to the application specifications below:

- 114-157007: Implementation and wiring procedure of FXP2 range

Crimping tools to be used:

Table 14 – Crimping Tools					
Cable section (mm <sup>2</sup> )	Hydraulic crimping tools				TE lab ref
	Pump	Cylinders	Flexible	Dies	
240	PA133K	SU210K	F4622K	TN 240V20	



## 3.6. Tests Sequence

Table 15 - Tests Sequence								
Test or Examination	Test Group							
	0	A	B	C	D	E	F	G
	Test Sequences							
Visual and dimensional examination	1	1						
Conformity of marking	2							
Visual examination		2	3		3,5,7		2,4,6	8
Polarisation		3						
Contact retention in insert		4						6
Mechanical strength impact		5						
Contact resistance	3		1,4		1,8			3
Mechanical operation			2					
Dielectric strength - Voltage withstanding			5		9	2	7	5
Temperature rise				1				
Cold					2			
Dry heat					4			
Salt mist test					6			
Degree of protection – IP code						1		
Simulated long life random vibration at increased levels							1	
Shock							3	
Random vibration test							5	
Fluid resistance								1
Engaging & separating forces								2
Insulation resistance	4							4
Insert retention in housing (axial)								7

**Notes:**

- Numbers indicate the sequence in which the tests are performed.



## 4. QUALITY ASSURANCE PROVISIONS

### 4.1. Qualification Testing

#### 4.1.1. Specimens Selection

Specimens shall be prepared in accordance with applicable Instruction Sheets and shall be selected at random from current production.

#### 4.1.2. Test Sequence

The samples shall be prepared in accordance with product drawings. They shall be selected at random from current production.

#### 4.1.3. Test Report

A test report shall be released based on herein test specification added to below information:

- Samples working order
- Tests devices list + calibration dates
- General conclusion
- For each test:
  - Sampling number
  - Samples setting-up
  - Test devices
  - Methodology description
  - Test date(s)
  - Results summary
  - Test conclusion
- Appendix: Customer Drawings, Insulation coordination drawing
- Appendix: Customer Drawings, Insulation coordination drawing, Tests results detailed

### 4.2. Requalification Testing

If changes significantly affecting form, fit or functions are made to the product or manufacturing process, product assurance shall coordinate requalification testing, consisting of all or part of the original testing sequence as determined by development/product, quality and reliability engineering.

### 4.3. Acceptance

Acceptance is based on verification that the product meets the requirements of paragraph 3.4. Failures attributed to equipment, test setup or operator deficiencies shall not disqualify the product. If product failure occurs, corrective action shall be taken and specimens resubmitted for qualification. Testing to confirm corrective action is required before re-submittal.

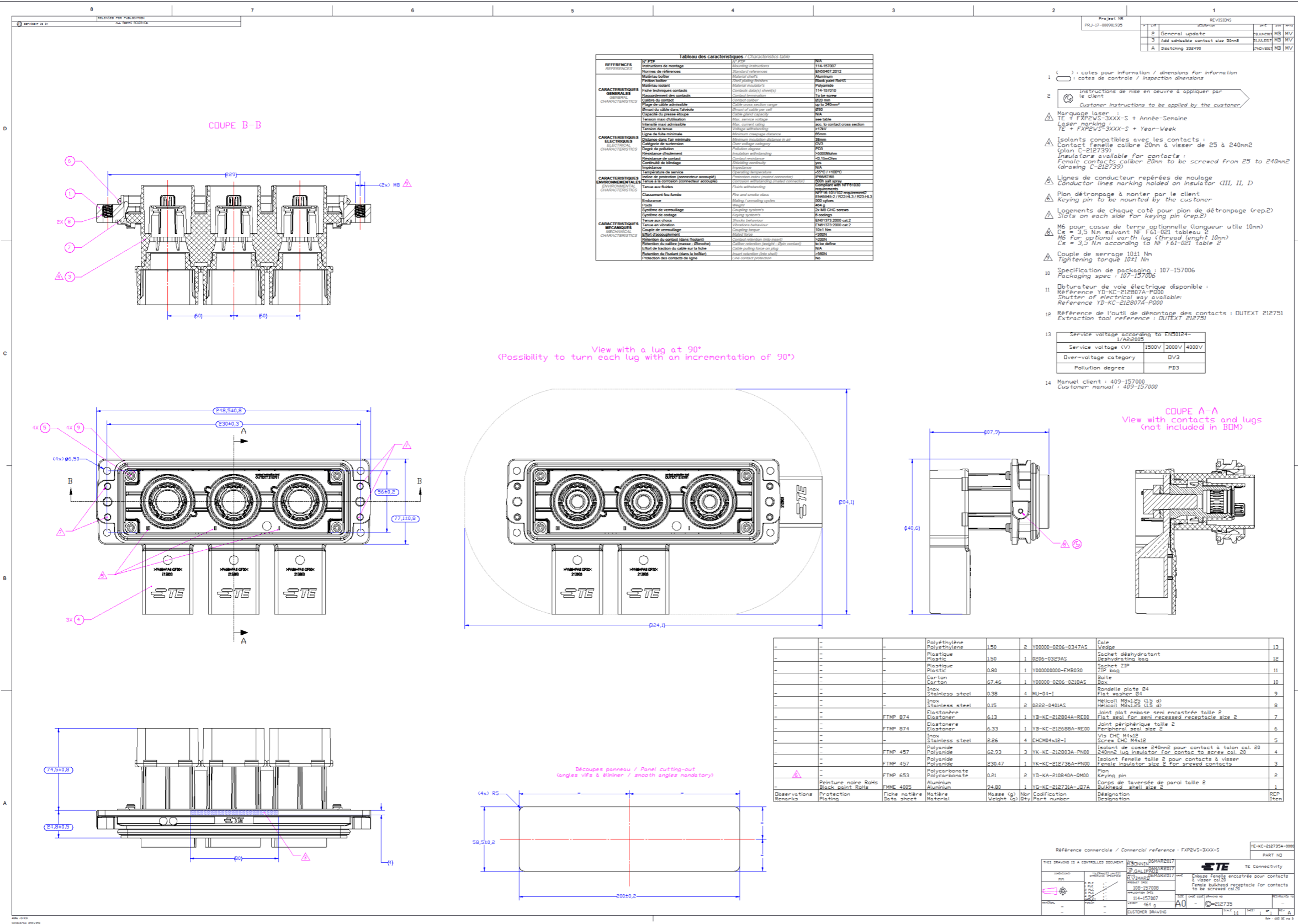
### 4.4. Quality Conformance Inspection

The applicable quality inspection plan shall specify the sampling acceptable quality level to be used. Dimensional and functional requirements shall be in accordance with the applicable product drawing and this specification. Bulk wire resistance shall be subtracted from resistance readings.



APPENDIX

Drawing C-212735 : Bulkhead receptacle







Drawing C-212777 : 90° plug

Tableau des caractéristiques / Characteristics table			
REFERENCES	Normes de références	Normes de références	Normes de références
CHARACTERISTIQUES GENERALES	Fiche techniques contacts	Normes de références	Normes de références
CHARACTERISTIQUES ELECTRIQUES	Distance dans l'air maximale	Minimum insulation distance in air	See table
CHARACTERISTIQUES ENVIRONNEMENTALES	Température de service	Operating temperature	See table
CHARACTERISTIQUES MECANIKES	Effort de traction du câble sur la fiche	Cable pulling force on the socket	See table

Project No: PRJ-17-0050935

REVISIONS			
1	General Update	MB	MV
2	Additional brackets modified	MB	MV
3	Additional brackets modified	MB	MV
4	Additional brackets modified	MB	MV

1 ( ) : cotes pour information / dimensions for information  
 1 ( ) : cotes de contrôle / inspection dimensions

2 Instructions de mise en oeuvre à appliquer par le client  
 Customer instructions to be applied by the customer

Marquage laser : TE + FXP2PA-3M40-P + Année-Senaire  
 Laser marking : TE + FXP2PA-3M40-P + Year-Week

Marquage laser : Lignes de conducteurs (III, II, I)  
 Laser marking : Conductor lines (III, II, I)

Isolants compatibles avec les contacts : Contact mâle calibre 20mm à sertir de 70 à 240nm  
 Insulators compatible for contacts : Male contacts caliber 20mm to be crimped from 70 to 240nm (drawing C-212772)

Lignes de conducteur repérées de moulage  
 Conductor lines marking molded on insulator (III, II, I)

Pion démontage à monter par le client  
 Keying pin to be mounted by the customer

Peinture PU noire RoHS  
 Black PU paint RoHS

Logements de chaque côté pour pion de démontage (rep.2)  
 Slots on each side for keying pin (rep.2)

M6 pour casse de terre optionnelle (longueur utile 10mm)  
 M6 for optional earth lug (thread length 10mm)  
 Ce = 3,5 Nm according to NF F61-021 Table 2

Couple de serrage 1021 Nm  
 Tightening torque 1021 Nm

Couple de serrage 321 Nm  
 Tightening torque 321 Nm

Couple de serrage 321 Nm  
 Tightening torque 321 Nm

Coller les vis au frein filet fort  
 Stick the screws with a strong thread lock

15 Specification of packaging : 107-157006  
 Packaging spec : 107-157006

16 Obturateur de voie électrique disponible : Référence YD-KC-212810A-P000  
 Switcher of electrical way available: Reference YD-KC-212810A-P000

Service voltage according to EN50124-1/A2:2005	
Service voltage (V)	1500V 3000V 4000V
Diver-voltage category	DV3
Pollution degree	PD3

18 Manuel client : 409-157000  
 Customer manual : 409-157000

View with brackets advanced at maximum

View with brackets retracted at maximum

COUPE A-A  
View with contacts (not included in BOM)

COUPE D-D

COUPE B-B

QTY	REF	DESIGNATION	UNIT	QTY	REF	DESIGNATION	UNIT
1.50	Y00000-0206-0347A5	Cole		20			
1.50	0206-0322A5	Sacnet déshydratant		19			
0.80	Y00000000-EMB030	Zippe + ZIP		18			
104.04	Y00000-0206-0219A5	Boîte		17			
32.16	Y1-KG-212812A-DY9C	Tôle de bridage		16			
304.81	YF-KG-212764A-JD7A	Couvercle de corps de Fiche 90°		15			
0.16	0301-0111A5	Joint torique		14			
7.68	YB-KG-212768A-RE00	Joint de forme		13			
0.46	0436-0005-M-1	Rondelle contact étroite		12			
3.06	HMDX10-1	Vis H MD10		11			
0.03	0301-0122A5	Joint torique 21.5 x 3.3		10			
2.26	CHCM0412-1	Vis CHC M4x12		9			
164.58	YK-KG-212767A-PN00	Couvercle isolant		8			
0.15	0436-0004-E-1	Rondelle contact		7			
1.86	CHCM04-08-1	Vis CHC		6			
349.30	YK-KG-212766A-PN00	Isolant 90° mâle		5			
0.56	MU-08-1	Rondelle plate		4			
19.23	CHCM08-30-1	Vis CHC		3			
0.21	YD-KA-210840A-DM00	Pion		2			
213.44	YF-KG-212764A-JD7A	Corps de fiche à 90°		1			



Drawing C-212739 : Female contact

4	3	2			1																																																															
<p>View A-A for commercial references FXP-CS20-LM14S-CU</p>			<p>View A-A for commercial references FXP-CS20-LM12S-CU</p>			<p>View A-A for commercial references FXP-CS20-LM10S-CU</p>																																																														
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<p>1 ( ) : cotes pour information / dimensions for information          ( ) : cotes de controle / inspection dimensions</p> <p>▲ Couple de serrage sur vis cosse avec 3 rondelles coniques = 20Nm          Lug screw tightening torque with 3 elements conical washer = 20Nm</p> <p>▲ Couple de serrage de la cosse avec 3 rondelles coniques = 35Nm          Lug screw tightening torque with 3 elements conical washer = 35Nm</p> <p>▲ Couple de serrage de la cosse avec 3 rondelles coniques = 55Nm          Lug screw tightening torque with 3 elements conical washer = 55Nm</p> <p>5 Contact avec filetage M10 à utiliser pour les cosses de 25mm<sup>2</sup> à 150mm<sup>2</sup>          Contact avec filetage M12 à utiliser pour les cosses de 50mm<sup>2</sup> à 185mm<sup>2</sup>          Contact avec filetage M14 à utiliser pour les cosses de 95mm<sup>2</sup> à 240mm<sup>2</sup>          Contact with M10 thread to use for lug of 50mm<sup>2</sup> to 185mm<sup>2</sup>          Contact with M12 thread to use for lug of 50mm<sup>2</sup> to 185mm<sup>2</sup>          Contact with M14 thread to use for lug of 95mm<sup>2</sup> to 240mm<sup>2</sup></p> <p>6 Connexions à réaliser par le client          Connexion constituées des éléments de fixation suivants:          -Vis H.M classe A2-70, lg filetée en prise recommandée: 2x Ø vis          -Rondelle élastique conique 3 éléments inox A2          -Rondelle M ou L inox A2.</p> <p>Implementation of the connection provided by the customer          Connection consisting of the following fasteners:          -Screw H.M class A2-70, threaded lenght recommended: 2x Ø vis          -Conical elastic washer 3 elements A2 stainless steel          -Washer M or L stainless steel A2</p> <p>7 Specification d'emballage = 107-157006          Packaging spec = 107-157006</p> <p>8 Manuel client = 409-157000          Customer manual = 409-157000</p>																																																																				
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Drawing C-212836 : 90° male contact

Project NR		REVISIONS				
PRJ-17-000901935		#	DESCRIPTION	DATE	BY	APPR
		3	Add cross section 30mm <sup>2</sup>	27JUL2017	MB	MV
		4	Add packaging spec number	27SEP2017	MB	MV
		A	Disatching 332490	27SEP2017	MB	MV

REF. Commerciale / Commercial ref.	REP. Item	Classification Part number	Qty	Description	Masse (g) / Weight	Matière / Material	Fiche matière / Data sheet	Protection / Plating	Observations / Remarks
EXP-CA20-50P-CU	X	YC-K3-212772A-0D1A	1	Contact mâle cal 20 à sertir 240mm <sup>2</sup> Male contact cal 20 to be crimped 240mm <sup>2</sup>	563,02	Cuivre / Copper	FMME 2005	Argenture / Silver plating	-
EXP-CA20-70P-CU	X	YC-K3-212772B-0D1A	1	Contact mâle cal 20 à sertir 105mm <sup>2</sup> Male contact cal 20 to be crimped 105mm <sup>2</sup>	566,86	Cuivre / Copper	FMME 2005	Argenture / Silver plating	-
EXP-CA20-95P-CU	X	YC-K3-212772C-0D1A	1	Contact mâle cal 20 à sertir 150mm <sup>2</sup> Male contact cal 20 to be crimped 150mm <sup>2</sup>	560,13	Cuivre / Copper	FMME 2005	Argenture / Silver plating	-
EXP-CA20-120P-CU	X	YC-K3-212772D-0D1A	1	Contact mâle cal 20 à sertir 120mm <sup>2</sup> Male contact cal 20 to be crimped 120mm <sup>2</sup>	560,01	Cuivre / Copper	FMME 2005	Argenture / Silver plating	-
EXP-CA20-140P-CU	X	YC-K3-212772E-0D1A	1	Contact mâle cal 20 à sertir 95mm <sup>2</sup> Male contact cal 20 to be crimped 95mm <sup>2</sup>	561,91	Cuivre / Copper	FMME 2005	Argenture / Silver plating	-
EXP-CA20-160P-CU	X	YC-K3-212772F-0D1A	1	Contact mâle cal 20 à sertir 70mm <sup>2</sup> Male contact cal 20 to be crimped 70mm <sup>2</sup>	561,40	Cuivre / Copper	FMME 2005	Argenture / Silver plating	-
EXP-CA20-180P-CU	X	YC-K3-212772G-0D1A	1	Contact mâle cal 20 à sertir 50mm <sup>2</sup> Male contact cal 20 to be crimped 50mm <sup>2</sup>	572,04	Cuivre / Copper	FMME 2005	Argenture / Silver plating	-
EXP-CA20-243P-CU	X	Y000000000 DMD041	1	Sachet de déshydratation / Drying bag	1,20	Plastique / Plastic			

COUPE A-A  
A-A CUT

3 Longueur de dénudage de la gaine du câble = L1+1mm  
Cable stripping length = L1+1mm

4 Repère de zone de sertissage  
Mandatory crimping area landmark

Commercial reference	Cross-section (mm <sup>2</sup> )	Dimensions (mm)			Weight (g)
		L1	D1	D2	
EXP-CA20-MP43P-CU	240mm <sup>2</sup>	33	23	20	563,02
EXP-CA20-M105P-CU	105mm <sup>2</sup>	26	20,5	24	566,86
EXP-CA20-M150P-CU	150mm <sup>2</sup>	26	18	23	560,13
EXP-CA20-M120P-CU	120mm <sup>2</sup>	25	15,5	21	560,01
EXP-CA20-M95P-CU	95mm <sup>2</sup>	23	14,5	18,5	561,91
EXP-CA20-M70P-CU	70mm <sup>2</sup>	22	12,5	16	561,40
EXP-CA20-M50P-CU	50mm <sup>2</sup>	22	10,9	14	572,04

6 Specification de packaging : 107-157006  
Packaging spec : 107-157006

7 Manuel client : 409-157000  
Customer manual : 409-157000

see table

PART NO

THIS DRAWING IS A CONTROLLED DOCUMENT.		DATE: 14MAR2017	TE Connectivity	
DIMENSIONS: 1/32" / 0.015"		BY: BONNIN		
TOLERANCES UNLESS OTHERWISE SPECIFIED:		DATE: 14MAR2017	TE Connectivity	
1/32" / 0.015"		BY: GALIPAUD		
MATERIAL: -		DATE: 14MAR2017	TE Connectivity	
FINISH: -		BY: VIMARD		
PRODUCT SPEC: 108-157010		NAME: S/E contacts mâles cal. 20 90° à sertir 50 à 240mm <sup>2</sup>	TE Connectivity	
APPLICATION SPEC: 114-157007		NAME: S/A male contacts cal. 20 90° to be crimped 50 to 240mm <sup>2</sup>		
WEIGHT: 563.02 g		SIZE: A2	TE Connectivity	
CUSTOMER DRAWING		SCALE: 1:1		