



FXP2 SERIES STRAIGHT VERSION VALIDATION PLAN ACCORDING TO EN50467

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1. SCOPE

1.1. Content

When tests are performed, the following specifications and standards listed in the document 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:

- Straight female receptacle with crimp contacts caliber 20
- Straight male plug with crimp contacts calibre 20

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 – Straight female receptacle:

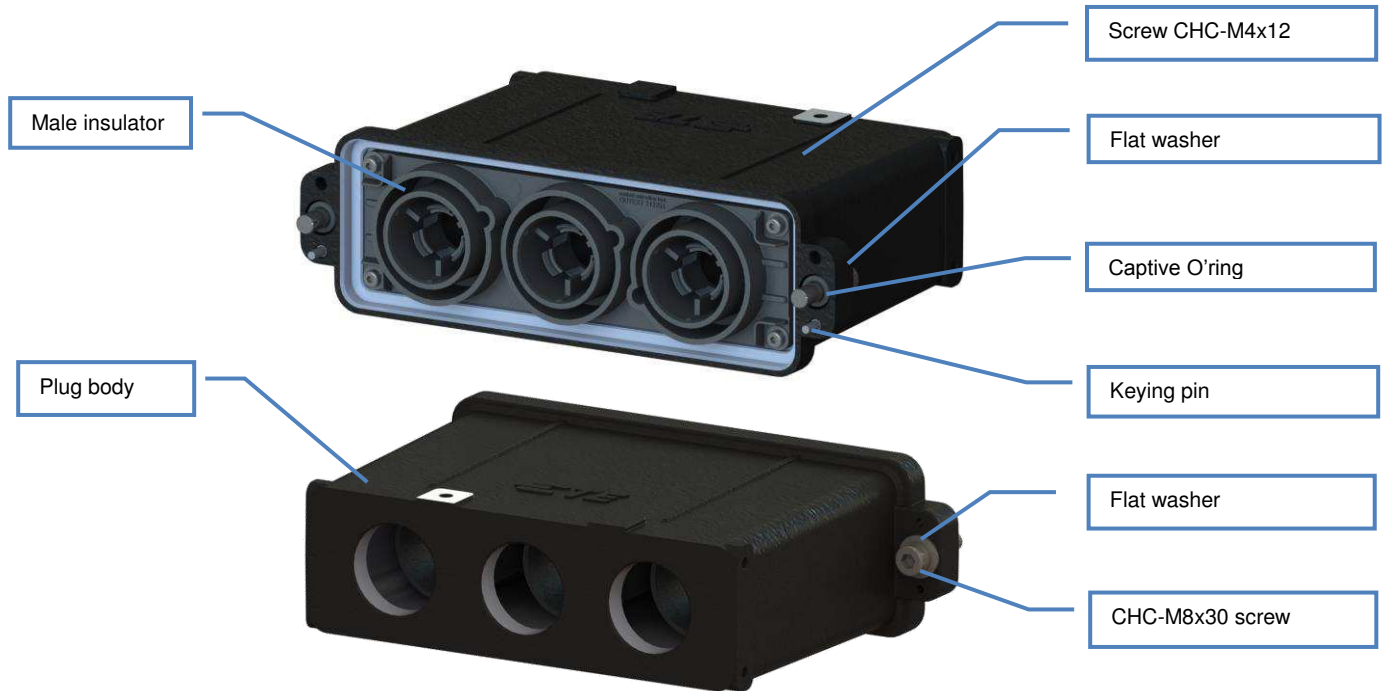


FXP size 2 – Female contact for receptacle:

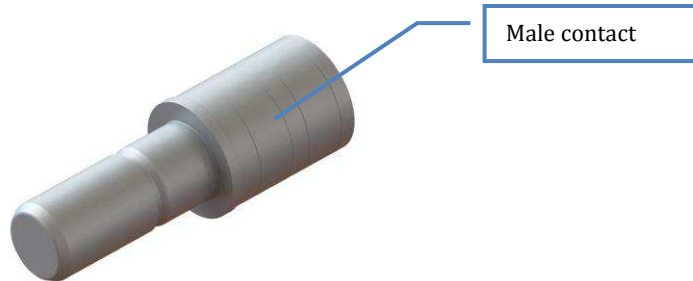




FXP size 2 – Straight male plug:



FXP size 2 – male contact for plug:



The contacts are assembled in the insulators by clips.
The link between the male and female contacts is done with a diablo (spring lamellas technology).
The cross section of termination allows for 50mm² / 70mm² / 95mm² / 120mm² / 150mm² / 185mm² and 240mm².

1.2. Qualification

When tests are performed, the following specifications and standards listed in the document 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:

- 212678_DEUTSCH : Straight female receptacle for contacts to be crimped cal.20
- 212679_DEUTSCH : Straight male plug for contacts to be crimped cal.20
- 114-157007 : Implementation and wiring procedure of FXP2 range
- 501-157008 : FXP size 2 straight version, qualification test report

Contacts:

- 212689_DEUTSCH : S/A female contact cal.20 to be crimped 50 to 240mm²
- 212919_DEUTSCH : S/A male contact cal.20 to be crimped 50 to 240mm²

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
- EN60068-1 – Environmental testing – Part 1 : General and guidance



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.

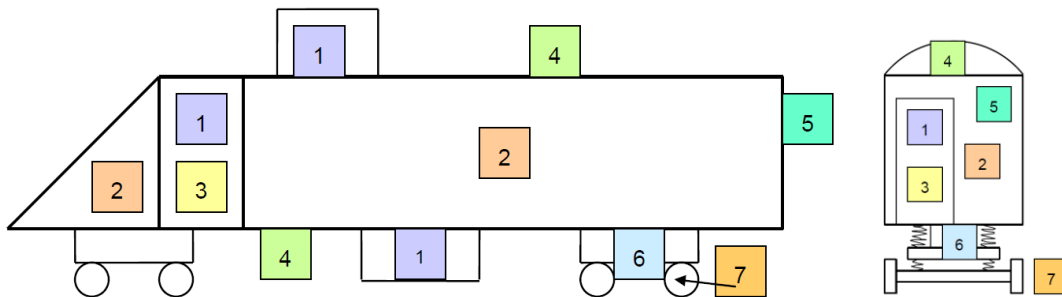


Figure 1 – Typical connector locations on board rolling stock (EN50467, fig. 3)

- 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	47.27 mm
Leakage Distance required	> 60 mm
Leakage Distance on product	65 mm

- RMS Withstand Voltage @ 50 Hz required:

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

Product Specification



- 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
Note: (a) test current: Maximum current admissible by the 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)				



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						

Product Specification



A8	Mechanical strength impact	7b	Only free connector (plug) Dropping height: 750mm for specimens of mass \leq 250g, otherwise 750mm 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 10mm², the herein products in tests allow contact terminations from 50 to 120mm². 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 & 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 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 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

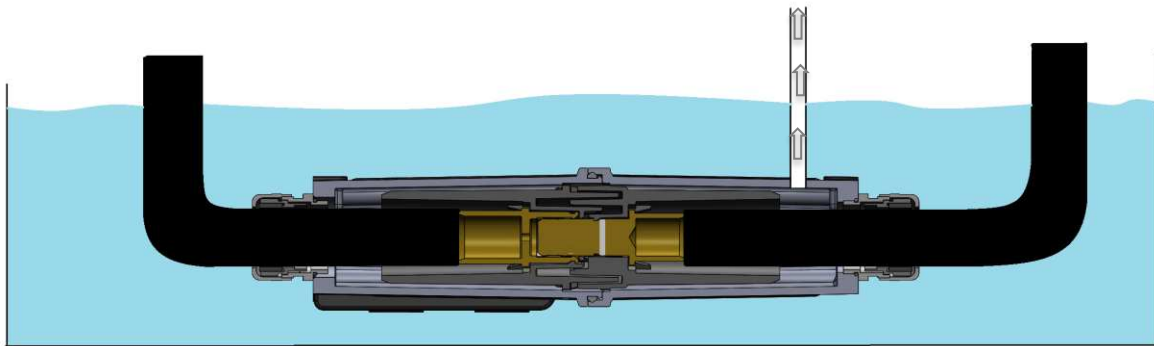


Figure 2 – IPx8 test schema

➔ 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)

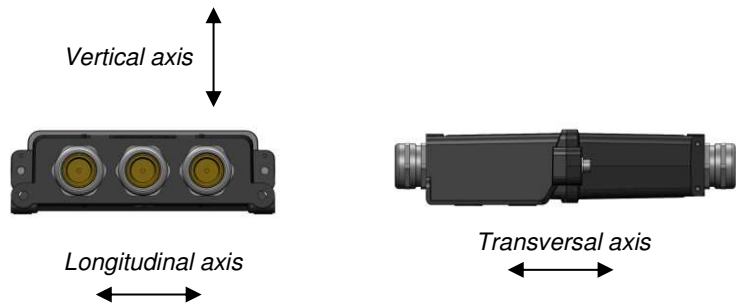


Figure 3 – Vibrations and shocks axis



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

Product Specification



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 set connectors
Group B	Service Life	3 sets connectors
Group C	Thermal	1 set connectors
Group D	Climatic	1 set connectors
Group E	Degree of Protection	2 sets connectors
Group F	Vibration and Shock	1 set connectors
Group G	Resistance to Fluids	3 sets 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
Straight female receptacle	FXP2RS-3M40-S
Straight male plug	FXP2PS-3M40-P
Female contact to be crimped 240mm ²	FXP-CS20-M240S-CU 3 per receptacle
Male contact to be crimped 240mm ²	FXP-CS20-M240P-CU 3 per plug
Cable gland	0401-0391AS 3 per plug + 3 per receptacle

Cables used for the herein tests sequence is:

- SILICABLE RW EN 50382-2 3600V F 120C 240mm²



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 ²)	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 the released tool in a production environment.

4.1.2. Test Sequence

The samples shall be prepared in accordance with product drawings. They shall be selected at random from the released tool in a production environment.

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-212678 : Straight female receptacle

COUPE A-A

Dimensions: (3x) M40x1.5-6H, 60, 60, 0.97, #5.007

Dimensions: 226±0.70, (4x) 8.65±0.15, 11.50 (Ø3), 65.50, 144±0.90, 11.50, 60.50, 60.50, 08.50, 08.50

Project No		REV.0200	
PRJ-16-00000102	Y	REV.0200	REV.0200
A Diffusion 332491		REV.0200	REV.0200

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

2 (C) Instructions de mise en œuvre à appliquer par le client
Customer instructions to be applied by the customer

3 Spécification de packaging = 107-157006
Packaging spec = 107-157006

⚠ Marquage laser :
TE + FXPR2-3M40-S + Année-Semaine
Laser marking :
TE + FXPR2-3M40-S + Year-Week

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

⚠ Isolant compatible avec les contacts :
Contact femelle calibre 20 mm à sertir de 120 à 240mm2 (plan 2126899)
Insulator compatible for contacts
Female contacts caliber 20mm to be crimped from 120 up to 240mm2 (drawing 2126899)

⚠ Lignes de conducteur repérées de noulage (III, II, I)
Conductor lines marking noted on insulator (III, II, I)

⚠ Pion détronpage (rep.5) à monter par le client
Keying pin (item 5) to be mounted by the customer

⚠ Logements pour pion de détronpage (rep.5)
Slots for keying pin (item.5)

⚠ Borne de masse Ø6.5 pour reprise de masse par cosse.
Ground terminal Ø6.5. For earthing terminal lug.

⚠ Couple de verrouillage 10 ±1 Nm
Locking torque 10±1 Nm

12 Référence de l'outil de de démontage des contacts :
DUTEX1212751
Contact extraction tool reference: DUTEX1212751

13 Service voltage according to EN50124-1/A2:2005

Service voltage (V)	1500V	3000V	4000V
Over-voltage category	OV3	OV3	OV2
Pollution degree	PD3	PD3	PD3

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

Tableau des caractéristiques / Characteristics table	
REFFÉRENCES	REFFÉRENCES
N° de références	N° de références
Matériau boîtier	Matériau boîtier
Matériau isolant	Matériau isolant
Caractéristiques générales	Caractéristiques générales
Service voltage	Service voltage
Over-voltage category	Over-voltage category
Pollution degree	Pollution degree
Caractéristiques environnementales	Caractéristiques environnementales
Classement feu-fumée	Classement feu-fumée
Caractéristiques mécaniques	Caractéristiques mécaniques
Précontrainte	Précontrainte
Force de traction	Force de traction
Force de torsion	Force de torsion
Force de flexion	Force de flexion
Force de compression	Force de compression
Force de traction du câble sur la borne	Force de traction du câble sur la borne
Précontrainte des contacts de ligne	Précontrainte des contacts de ligne

-	-	-	-	Carton	9	1	Y00000-0206-0346AS	Boîte	10
-	-	-	-	Carton	-	-	-	Sachet déshydratant	9
-	-	-	-	-	3.5	1	0206-0329AS	Deshydrating bag	-
-	-	-	-	Plastique	0.8	1	Y00000000-EMB030	Sachet ZIP	8
-	-	-	-	Inox	0.38	4	MU-04-1	Rondelle plate Ø4	7
-	-	-	-	Stainless steel	2.26	4	CHC04x12-1	Vis CHC M4x12	6
-	-	-	-	Stainless steel	0.15	2	0222-0401AS	Scres CHC M4x12	3
-	-	-	-	Polycarbonate	0.21	4	YB-KA-210840A-QM00	Pion	5
-	-	-	-	Elastomere	6.33	1	YB-KC-212688A-RE00	Joint périphérique taille 2	4
-	-	-	-	Stainless steel	0.15	2	0222-0401AS	Peripherals seal size 2	4
-	-	-	-	Inox	0.15	2	0222-0401AS	Helicot M8x125 (13 g)	3
-	-	-	-	Polyamide	328.52	1	YK-KC-212683A-PH00	Isolant femelle taille 2 pour 3x cal. 20	2
-	-	-	-	Polyamide	328.52	1	YK-KC-212683A-PH00	Socket body FXP T02	2
-	-	-	-	Vernis PU noir RoHS	3361.24	1	YK-KC-212683A-JD7A	Corps d'embase FXP T02	1
-	-	-	-	Black PU varnish RoHS	3361.24	1	YK-KC-212683A-JD7A	Socket body FXP T02	1
Observations	Protection	Fiche matière	Matériau	Masse (g)	Nbr	Coefficient	Désignation	Désignation	REP
Remarks	Painting	Bois sheet	Material	Weight (g)	Qty	Part number	Designation	Designation	Item

Reference commerciale / Commercial reference : FXPR2-3M40-S

TE-NC-028478A-0000

Part No

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TE Connectivity

108-157009

114-157007

17196 g

CUSTOMER DRAWING



Drawing C-212689 : Female contact

COUPE A-A
ECHELLE 1 : 1

Ø D1 ±0.05

Ø D2 ±0.1

L2 ±0.1

L3

Project NR		REVISIONS			
LTN	DESCRIPTION	DATE	SVN	AP/VS	
A	Suppression des ref. titon, création des ref. cuivre Diffusion 332491	26JUL2017	JFG	MV	

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

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

Sections du câble Cable cross sections	Dutils de sertissage hydrauliques (M/crochets) hydraulic crimping tools			
	Pompe Pump	Vérins Jacks	Flexibles Flex hoses	Matrices Dies
120 mm ²	PA 133 K	SUI13K ou SUE10K Chape ouverte/ Opened shell ou / or VF13K ou VF210K Chape fermée/ Closed shell	F 4622K Longueur/Length 1,80 m ou / or F 4623K Longueur/Length 3,00 m	TN120V13 TN120V20 (1 crimping)
150 mm ²				TN150V13 TN150V20 (1 crimping)
185 mm ²				TN185V20 (1 crimping)
240 mm ²				TN240V20 (2 crimping)

4 Longueur de dénudage de la gaine du câble = L2+1mm
 Cable stripping length = L2+1mm

5 Zone de sertissage
Mandatory crimping area

6 Repérage de la position du sertissage sur la pièce référencée YC-KC-212689A-CD1A
 Marking position for crimping on the part referenced YC-KC-212689A-CD1A

7 Repérage pour la position du sertissage sur les pièces référencées YC-KC-212689B/C/D-CD1A
 Marking position for the crimping on the contacts referenced YC-KC-212689B/C/D-CD1A

8 Dutil de démontage des contacts : DUTEXT 212751A
 Contact disassembly tool reference: DUTEXT 212751A

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

Observations Remarks	Protection Plating	Fiche matière Data sheet	Matière Material	Masse (g) Weight (g)	Nbr Qty	Codification Part number	Désignation Designation	REP Item
-	-	-	-	1	1	0206-0329AS	Sachet déshydratant Deshydrating bag	4
-	-	-	Plastique Plastic	1	1	Y0000000000-EMB040	Sachet bulle 80 x 100 mm Bubble bag 80 x 100 mm	3
-	Argenture Silver plating	-	Cuivre béryllium Beryllium copper	2,4	1	16866-000A4	Diabolo calibre 20 Diabolo caliber 20	2
-	Argenture Silver plating	FMME2005	Cuivre Copper	105,03	1	YC-KC-212690D-CD1A	Contact femelle cal.20, section 120 mm ² Female contact cal.20, section 120mm ²	1
-	Argenture Silver plating	FMME2005	Cuivre Copper	112,13	1	YC-KC-212690C-CD1A	Contact femelle cal.20, section 150 mm ² Female contact cal.20, section 150 mm ²	1
-	Argenture Silver plating	FMME2005	Cuivre Copper	120,81	1	YC-KC-212690B-CD1A	Contact femelle cal.20, section 185 mm ² Female contact cal.20, section 185 mm ²	1
-	Argenture Silver plating	FMME2005	Cuivre Copper	151,75	1	YC-KC-212690A-CD1A	Contact femelle cal.20, section 240 mm ² Female contact cal.20, section 240 mm ²	1

Commercial references	Cross-section (mm ²)	Dimensions (mm)					Weight (g)
		L1	L2	L3	D1	D2	
FXP-CS20-M240S-CU	240	62.9	33	/	29	23	158.33
FXP-CS20-M185S-CU	185	55.9	26	16	26	20.5	133.06
FXP-CS20-M150S-CU	150	55.9	26	15	23	18	123.98
FXP-CS20-M120S-CU	120	54.9	25	15	21	16.5	116.55

Commercial references: FXP-CS20-M240S-CU, FXP-CS20-M185S-CU, FXP-CS20-M150S-CU, FXP-CS20-M120S-CU

Commercial references

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APPROVED	DATE	NAME
JF GALIPAUD	26JUL2017	JF GALIPAUD
CHR BONNIN	26JUL2017	CHR BONNIN
YVIMARD	26JUL2017	YVIMARD

PRODUCT SPEC: 108-157009
 APPLICATION SPEC: 114-157007
 WEIGHT: 149.58 g

Customer Drawing: S/E contact femelle cal.20 à sertir 120 à 240 mm²
 S/A Female contact cal.20 to be crimped, 120 up to 240 mm²

Scale: 2:1, Sheet: 1 of 1, Rev: A

