Validation / Qualification
Test Report

Q17004

BULKHEAD RECEPTACLE + 90° PLUG VALIDATION PLAN ACCORDING TO EN50467

FXP size2 90°

PRJ-17-000901935

A	First Edition				2018/05/24	M BOIVIN
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1 INTRODUCTION

1.1 AIM OF THE TESTS

The aim of the type tests is to qualify the connector FXP2 – 90° according to the standard EN50467.
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.

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.

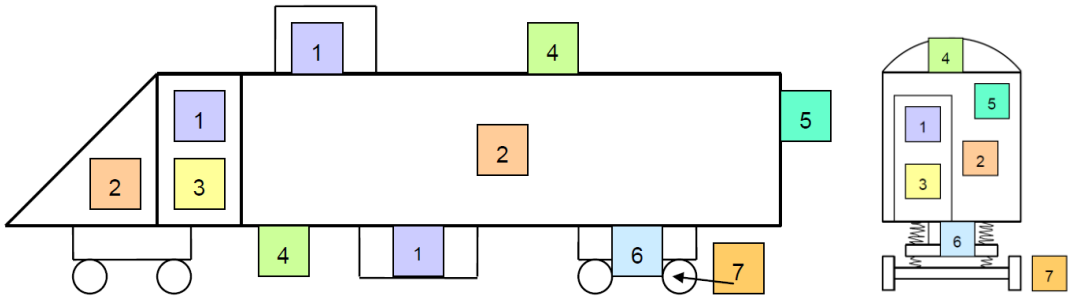

Figure 1 – Typical connector locations on board rolling stock (EN50467, fig. 3)

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1.2 APPLICABLE DOCUMENTS

1.2.1 TE Connectivity documents

Connectors:

- 212735_DEUTSCH - Female bulkhead receptacle for contacts to be screwed cal.20
- 212777_DEUTSCH - Male 90° plug for contacts to be crimped cal.20
- 114-157007 - Implementation and wiring procedure of FXP2 range
- 108-157008 - FXP size 2, 90° plug + bulkhead receptacle, Product Specification
- 502-157057 - FXP series EN45545-2 Compliance report
- 409-157000 - FXP series Maintenance Manual

Contacts:

- 212739_DEUTSCH - S/A female contact cal.20, connection for lug M10, M12 and M14
- 212836_DEUTSCH - S/A male 90° contact cal.20 to be crimped 50 to 240mm²

Other / Download documents:

- http://www.te.com/

1.2.2 Normative documents

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.

- EN 45545-2+A1:2016 – Railway applications – Fire protection on railway vehicles – Part 2: Requirements for fire behavior of materials and components
- EN 50467:2012 - Railway applications – Rolling stock – Electrical connectors, requirements and test methods
- EN 50124-1/A2:2005 - Railway applications – Insulation coordination – Part 1: Basic requirements – Clearances and creepage distances for all electrical and electronic equipment
- EN 60068-1:2014 - Environmental testing – part 1: general guidance
- EN 60068-2-1:2007 - Environmental testing – Part 2-1: Tests – Test A: Cold
- EN 60068-2-2:2007 - Environmental testing – Part 2-2: Tests – Test B: Dry heat
- EN 60068-2-11:1999 - Environmental testing – Part 2: Tests – Test Ka: Salt mist
- EN 60512-1:2001 - Connectors for electronic equipment – Tests and measurements – Part 1: General
- EN 60512-1-1:2002 - Connectors for electronic equipment – Tests and measurements – Part 1-1: General examination – Test 1a: Visual examination
- EN 60512-1-2:2002 - Connectors for electronic equipment – Tests and measurements – Part 1-2: General examination – Test 1b: Examination of dimension and mass
- EN 60512-2-1:2002 - Connectors for electronic equipment – Tests and measurements – Part 2-1: Electrical continuity and contact resistance tests – Test 2a: Contact resistance – Millivolt level method
- EN 60512-2-2:2003 - Connectors for electronic equipment – Tests and measurements – Part 2-1: Electrical continuity and contact resistance tests – Test 2b: Contact resistance – Specified test current method

- EN 60512-2-5:2003 - Connectors for electronic equipment – Tests and measurements – Part 2-5: Electrical continuity and contact resistance tests – Test 2e: Contact disturbance
- EN 60512-3-1:2002 – Connectors for electronic equipment – Tests and measurements – Part 3-1: Insulation tests – Test 3a: Insulation resistance
- EN 60512-4-1:2003 - Connectors for electronic equipment – Tests and measurements – Part 4-1: Voltage stress tests – Test 4a: Voltage proof
- EN 60512-5-1:2002 – Connectors for electronic equipment – Tests and measurements – Part 5-1: Current-carrying capacity tests – Test 5a: Temperature rise
- EN 60512-7-2:2012 - Connectors for electronic equipment – Tests and measurements – Part 7-2: Impact tests (free connectors) – Test 7b: Mechanical strength impact
- EN 60512-9-1:2010 - Connectors for electronic equipment – Tests and measurements – Part 9-1: Endurance tests – Test 9a: Mechanical operation
- EN 60512-11-6:2002 - Connectors for electronic equipment – Tests and measurements – Part 11-6: Climatic tests – Test 11f: Corrosion, salt mist
- EN 60512-11-9:2002 - Connectors for electronic equipment – Tests and measurements – Part 11-9: Climatic tests – Test 11i: Dry heat
- EN 60512-11-10:2002 - Connectors for electronic equipment – Tests and measurements – Part 11-10: Climatic tests – Test 11j: Cold
- EN 60512-13-1:2006 - Connectors for electronic equipment – Tests and measurements – Part 13-1: Mechanical operation tests – Test 13a: Engaging and separating force
- EN 60512-13-5:2006 - Connectors for electronic equipment – Tests and measurements – Part 13-5: Mechanical operation tests – Test 13e: Polarizing and keying method
- EN 60512-15-1:2008 - Connectors for electronic equipment – Tests and measurements – Part 15-1: Connector tests (mechanical) – Test 15a: Contact retention in insert
- EN 60512-15-2:2008 - Connectors for electronic equipment – Tests and measurements – Part 15-2: Connector tests (mechanical) – Test 15b: Insert retention in housing (axial)
- NFF 00-363:1995 – Rolling stock – Products to be crimped for electrical connections
- EN 60529:1991+A1:2000 – Degree of protection procured by enclosures (IP code)
- EN 61373:1999 – Railway applications – Rolling stock equipment – Shock and vibrations tests
- ISO 1431-1:2004 – Rubber, vulcanized or thermoplastic – Resistance to ozone cracking – Part 1: Static and dynamic strain testing

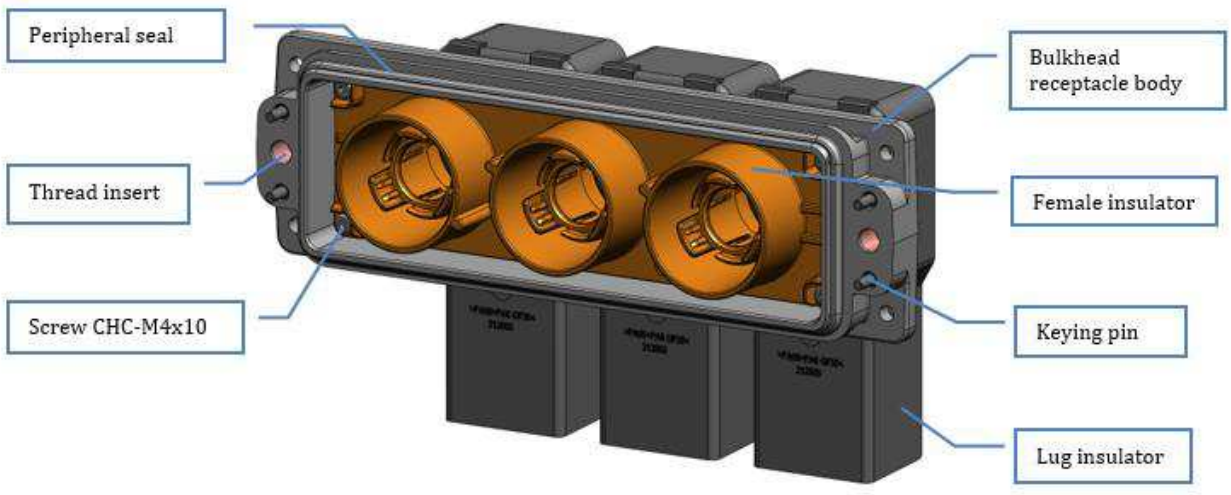
- Assembly drawings (see appendix 1):
  - 212735_DEUTSCH: Female bulkhead receptacle for contacts to be screwed cal. 20
  - 212777_DEUTSCH: Male 90° plug cal. 20
  - 212739_DEUTSCH: S/A female contact cal. 20, connection for lug M12 and M14
  - 212836_DEUTSCH: S/A male contacts cal. 20 90° to be crimped 50 to 240 mm^2

1.3 SAMPLING

Sample No.	Reference	Quantity per sample	Description	Drawing
1 to 12	FXP2WS-3XXX-S	1	FEMALE BULKHEAD RECEPTACLE	212735_DEUTSCH
	FXP2PA-3M40-P	1	MALE 90° PLUG	212777_DEUTSCH
	FXP-CS20-LM14S-CU	3	FEMALE CONTACT	212739_DEUTSCH
	FXP-CA20-M240P-CU	3	MALE CONTACT 90°	212836_DEUTSCH
	0401-0391AS	3	CABLE GLAND	/
	0151-0252AS	3	LUGS 240 MM^2	/
	HM14x40-I	3	H HEAD SCREW M14X40	/
	MU-14-I	3	FLAT WASHER M14	/
	3L14-I	3	TREP WASHER M14	/

The connectors under test are shown below:

FXP size 2 - Bulkhead receptacle:



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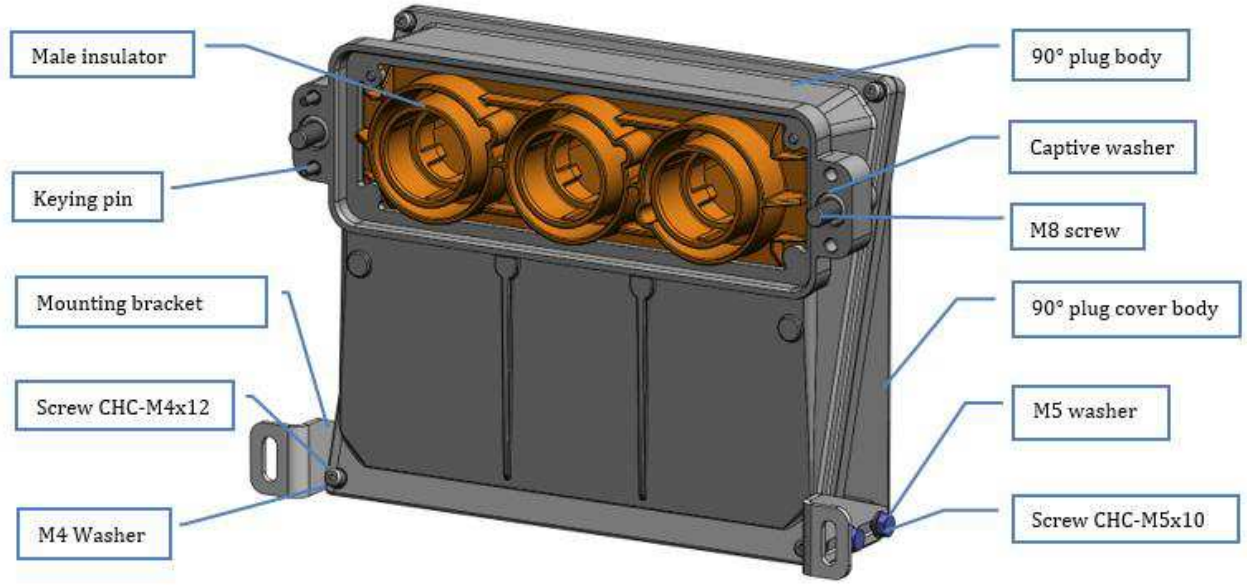
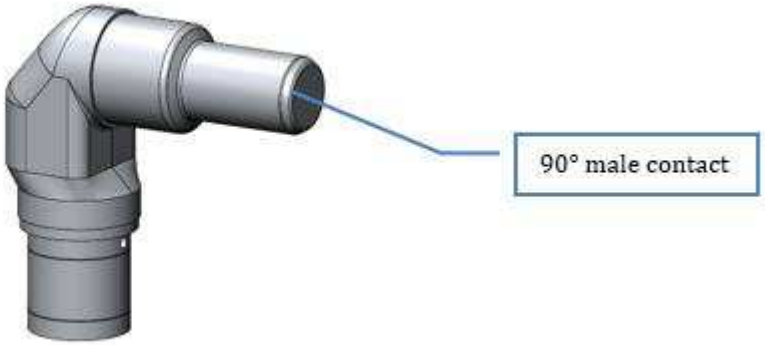
FXP size 2 – Female contact for receptacle:

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 diabolo (spring lamellas technology).
The cross section of termination chooses for the qualification is the big size (240 mm²).

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1.4 TESTS SEQUENCE

The samples are submitted to the tests in the table here-after:

Group		Test description	EN 60512	EN 50467	Sample number
0	01	Visual & dimensional examination	1a,1b		2 to 12
	02	Conformity of marking	1a		Each sample
	03	Contact resistance	2b		1, 5 and 7 to12
	04	Insulation resistance	3a		Each sample
	05	Dielectric strength	4a		Each sample
A	A1	Visual & dimensional examination	1a, 1b		1
	A3	Polarization	13e, 1a		
	A6	Contact retention in insert	15a, 1a		
	A8	Mechanical strength impact	7b, 1a		
B	B1	Initial measurement	2b		2 to 4
	B2	Mechanical operation	9a, 1a	7.9	
	B3	Final measurement	2b, 4a	7.12	
C	C1	Temperature rise	5a	7.8	5
D	D1	Initial measurement	2b		6
	D2	Cold	11j, 1a	6.18	
	D3	Dry heat	11i, 1a	6.18	
	D4	Salt mist test	11f, 1a	7.14	
	D5	Final measurement	2b		
	D6	Dielectric strength	4a	7.12	
E	E3	Degree of protection IP code		7.7	7 to 8
	E4	Dielectric strength	4a	7.12	
F	F1	Simulated long life random vibration at increased levels	2e, 1a	EN61373	9
	F2	Shock	1a	EN61373	
	F3	Random vibration test	2e, 1a	EN61373	
	F4	Dielectric strength	4a	7.12	
G	G1	Fluid resistance	19c		10 to 12
	G2	Engaging and separating force	13a		
	G3	Contact resistance	2b		
	G4	Insulation resistance	3a		
	G5	Dielectric strength	4a	7.12	
	G6	Contact retention in insert	15a		
	G7	Insert retention in housing (axial)	15b		
	G8	Visual examination	1a		
		Fire behavior of materials and components		6.22	
		Resistance to ozone		6.24	

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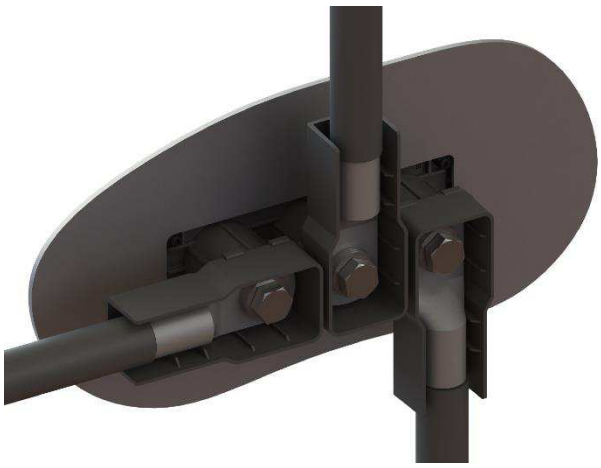
1.5 SAMPLES IMPLEMENTATION

For each test, except particular conditions:

- Preconditioning of the samples at least 24 hours, at (23 ± 5) °C and at 45% to 75% of HR
- Samples are completely assembled according to manufacturer's specifications

Each sample for testing is composed of a pair of connectors: a plug and a receptacle, equipped of contacts and cable glands.



Products are prepared and wired according to the application specifications below:

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

The cable and crimping tools used are:

Cable section	Cable designation	CRIMPING TOOL			
		Pump	Cylinders	Flexible	Dies
240 mm²	OMERIN 369 EN50382-2 3600V 1X240 F 120°C – 1701748 – 15/2017	PA133K	SU210K	F4622K	TN 240V20

1.6 SAMPLES WORKING ORDERS

WO No.	DESCRIPTION	CATALOGUE No.
200216600932	PRESSE ETOUPE M40 – 22 A 32MM NICKELE	STD0401-0391AS
200216847099	CONTACT FEMALE CAL.20, M14 - FXP	FXP-CS20-LM14S-CU
200216926335	PLUG MALE ANG.90 CAL.20 - FXP	FXP2PA-3M40-P
200216927408	RECEPTACLE FEMALE BULKHEAD - FXP	FXP2WS-3XXX-S
200216957548	CONTACT FEMALE CAL.20, M14 - FXP	FXP-CS20-LM14S-CU
200216973710	CONTACT MALE ANG.90, CAL.20, 240MM2 - FXP	FXP-CA20-M240P-CU

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1.7 TESTS DEVICES

Description	TE No.	Calibration dates	
		Current	Next
Caliper MITUTOYO	6131	*2017/10*	*2018/10*
Caliper MAHR	5143	*2017/10*	*2018/10*
Comparator MAHR	5483	*2017/06*	*2018/06*
3D OGP	6616	*2017/11*	*2018/11*
Buffer P M14x2.0 5H	0443	*2017/09*	*2019/09*
Buffer P/NP M40x1.5 – 6H	5504	*2016/06*	*2018/06*
Scale PCM BE6001	6689	*2018/01*	*2019/01*
Traction / compression machine ADAMEL LHOMARGY DY36	1118	*2017/04*	*2019/04*
Ohmmeter MEGGER DLRO600	6701	*2018/03*	*2019/03*
Insulation tester MEGGER BM25	2231	*2017/11*	*2018/11*
Dielectric strength tester SEFELEC PR 12 PF	1589	*2017/03*	*2018/03*
Comparator Mitutoyo	6626	*2017/06*	*2018/06*
Dynamometric key FACOM	7604	*2017/11*	*2019/11*
Datalogger AGILENT 34970A	1868	*2017/03*	*2018/03*
Current generator ZENONE model GI2000GL	7054	*2017/06*	*2018/06*
AC current probe *CHAUVIN ARNOUX MA100*	7570	*2017/03*	*2018/03*
Climatic chamber CLIMATS 320H60-1-5	1574	*2017/06*	*2018/06*
Salt spray chamber DYCOMETAL type SSC-400	7574	*2017/05*	*2018/05*
Shower + Flowmeter PIUISI instrument (indicator)	/	/	/
Micro-cuts detection device	7344-0001-03-002	*2017/10*	*2018/10*
Driver station	7161-0001-05-002	*2017/11*	*2018/11*
Sensor signal conditioner model 488C series	7161-0001-26-001	*2016/12*	*2018/12*
Accelerometer	7161-0001-28-001	*2017/10*	*2018/10*
Climatic chamber FRANCE ETUVES D069	6019	*2017/06*	*2018/06*
Climatic chamber FRANCE ETUVES	6225	*2017/06*	*2018/06*
Climatic chamber BINDER	6659	*2015/05*	*2020/05*

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2 CONCLUSION

General, Group 0 (non-normative)					Sample No.												
Test	Test description	Standard	Test ratings	Requirements	1	2	3	4	5	6	7	8	9	10	11	12	Compliancy
01	Visual and dimensional examination	EN60512-1-1 EN60512-1-2	Customer drawing	Dimension shall comply with the drawings		✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
02	Conformity of marking	EN50467-6.2	Customer drawing	Supplier's name, manufacture date, sample reference and contact locating numbers		✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
03	Contact resistance	EN60512-2-2	600 A	CR ≤ 0.15 mΩ	✓				✓		✓	✓	✓	✓	✓	✓	✓
04	Insulation resistance	EN60512-3-1	1000 V DC 60s	IR ≥ 5 000 MΩ	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
05	Dielectric strength	EN60512-4-1	12 kV / AC 50Hz	No breakdown nor flashover	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓

Mechanical tests, Group A (per EN 50467, tab. 5)					Sample No.												
Test	Test description	Standard	Test ratings	Requirements	1	2	3	4	5	6	7	8	9	10	11	12	Compliancy
A1	Visual and dimensional examination	EN60512-1-1 EN60512-1-2	Customer drawing	Dimension shall comply with the drawings	✓												✓
A3	Polarization	EN60512-13-5	540 N	No damage likely to impair function	✓												✓
A6	Contact retention in insert	EN60512-15-1	200 N / 10 s	No axial displacement likely to impair normal operation	✓												✓
A8	Mechanical strength impact	EN 60512-7-2	Dropping Height: 500 mm	Parts used for protection against electric shock shall not be damaged. Reduction of clearance and creepage distances is not allowed	✓												✓

Service Life Tests, Group B (per EN 50467, tab. 6)					Sample No.												
Test	Test description	Standard	Test ratings	Requirements	1	2	3	4	5	6	7	8	9	10	11	12	Compliancy
B1	Initial measurement	EN60512-2-2	600 A	CR initial, reference value		✓	✓	✓									✓
B2	Mechanical operation	EN60512-9-1	500 cycles	No damage shall occur which could impair normal use		✓	✓	✓									✓
B3	Final measurement	EN60512-2-2 EN60512-4-1	600 A 12 kV / AC 50 Hz	≤ CR initial + 50% No breakdown nor flashover		✓	✓	✓									✓

Thermal Tests, Group C (per EN 50467, tab. 7)					Sample No.												
Test	Test description	Standard	Test ratings	Requirements	1	2	3	4	5	6	7	8	9	10	11	12	Compliancy
C1	Temperature rise	EN60512-5-1 EN50467-7.8	50K 60K	The upper limiting temperature specified shall not be exceeded					✓								✓

Climatic Tests, Group D (per EN 50467, tab. 8)					Sample No.												
Test	Test description	Standard	Test ratings	Requirements	1	2	3	4	5	6	7	8	9	10	11	12	Compliancy
D1	Initial measurement	EN60512-2-2	600 A	CR initial, reference value						✓							✓
D2	Cold	EN60512-11-10 EN50467-6.18	-55°C / 2 h	No damage shall occur which could impair normal use						✓							✓
D3	Dry heat	EN60512-11-9 EN50467-6.18	+100°C / 168 h	No damage shall occur which could impair normal use						✓							✓
D4	Salt mist test	EN60512-11-6 EN50467-7.14	500 h	No damage shall occur which could impair normal use						✓							✓
D5	Final measurement	EN60512-2-2	600 A	≤ CR initial + 50%						✓							✓
D6	Dielectric strength	EN50467-7.12 EN60512-4-1	12 kV / AC 50 Hz	No breakdown nor flashover						✓							✓

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Degree of Protection Tests, Group E (per EN 50467, tab. 9)					Sample No.												
Test	**Test description**	**Standard**	**Test ratings**	**Requirements**	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**	**12**	**Compliancy**
E3	Degree of protection IP code	EN50467-7.7	Dust test	IP6X							✓	✓					✓
			Water jet test	IPX6							✓	✓					
			Immersion 1m / 30min	IPX7							✓	✓					
			-0.5 bar / 30min	IPX8							✓	✓					
E4	Dielectric strength	EN50467-7.12 EN60512-4-1	12 kV / AC 50 Hz	No breakdown nor flashover							✓	✓					✓

Vibrations and Shock Tests, Group F (per EN 50467, tab. 10)					Sample No.												
Test	**Test description**	**Standard**	**Test ratings**	**Requirements**	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**	**12**	**Compliancy**
F1	Simulated long life random vibration at increased levels	EN61373: 1999, clause 9	Cat.2 ≤ 0.1 µs	Micro interruption ≤ 1 µs No damage likely to impair function									✓				✓
F2	Shock	EN61373: 1999, clause 10	Cat.2	No damage likely to impair function									✓				✓
F3	Random vibration test	EN61373: 1999, clause 8	Cat.2 ≤ 0.1 µs	Micro interruption ≤ 1 µs No damage likely to impair function									✓				✓
F4	Dielectric strength	EN50467-7.12 EN60512-4-1	12 kV / AC 50 Hz	No breakdown nor flashover									✓				✓

Resistance of Fluids, Group G (per EN 50467, tab. 11)					Sample No.												
Test	**Test description**	**Standard**	**Test ratings**	**Requirements**	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**	**12**	**Compliancy**
G1	Fluid resistance	EN60512-19-3	HCl: 23°C NaOH: 23°C IRM902 oil: 50°C Ageing: 70°C	No damage likely to impair function and maintain legible marking										✓	✓	✓	✓
G2	Engaging and separating force	EN60512-13-1	Insertion/extraction forces	No damage likely to impair function										✓	✓	✓	✓
G3	Contact resistance	EN60512-2-2	600 A	≤ CR initial + 50%										✓	✓	✓	✓
G4	Insulation resistance	EN60512-3-1	1000 V DC / 60 s	IR ≥ 500 MΩ										✓	✓	✓	✓
G5	Dielectric strength	EN50467-7.12 EN60512-4-1	12 kV / AC 50 Hz	No breakdown nor flashover										✓	✓	✓	✓
G6	Contact retention in insert	EN60512-15-1	200 N / 10 s	Axial displacement after the test ≤ 0.5 mm										✓	✓	✓	✓
G7	Insert retention in housing	EN60512-15-2	360 N / 1 min	No displacement or damage likely to impair function										✓	✓	✓	✓
G8	Mated and unmated sample	EN60512-1-1	visual	No damage likely to impair function										✓	✓	✓	✓

Tests on raw materials (per EN 50467, tab. 13)				Sample No.	
Test description	**Standard**	**Test ratings**	**Requirements**		**Compliancy**
Fire behaviour of materials and components	EN 45545-2	R22 / R23	HL2 mini	✓	✓
Resistance to ozone	ISO 1431-1	Method B: 24h / 500 ppb / 40°C / elongation 20%	No cracks shall appear	✓	✓

✓	Test realized and compliant result
✘	Test realized and no compliant result

The FXP size 2 connector's, bulkhead receptacle and 90° plug versions, comply with the EN50467 requirements.

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3 APPENDICES

APPENDIX 1: Drawings 14

212735_DEUTSCH: Female bulkhead receptacle for contacts to be screwed cal.20 14

212777_DEUTSCH: Male 90° plug cal. 20 15

212739_DEUTSCH: S/A female contact cal. 20, connection for lug M12 and M14 16

212836_DEUTSCH: S/A male contacts cal. 20 90° to be crimped 50 to 240 mm^2 17

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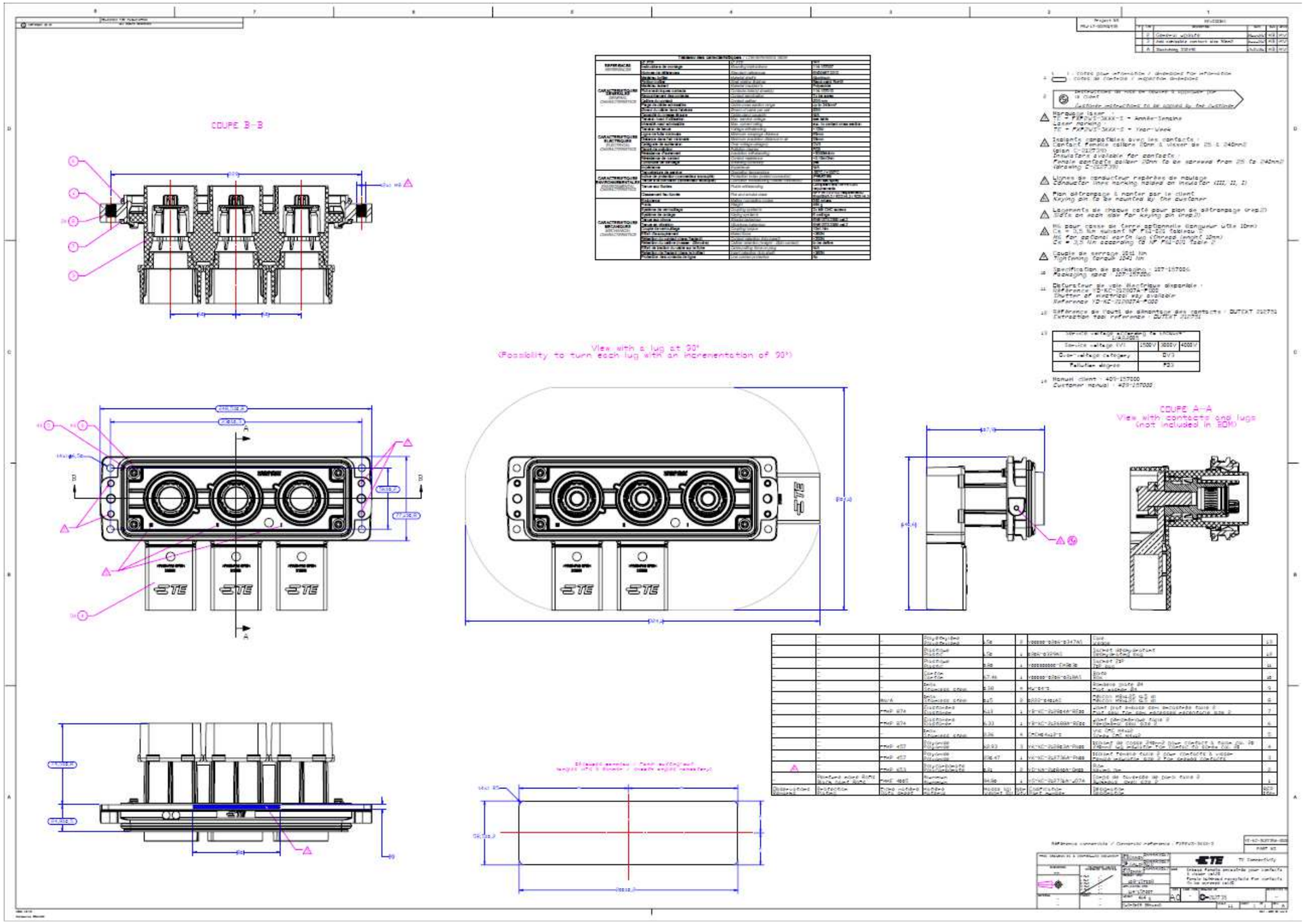
APPENDIX 1: Drawings

212735_DEUTSCH: Female bulkhead receptacle for contacts to be screwed cal.20



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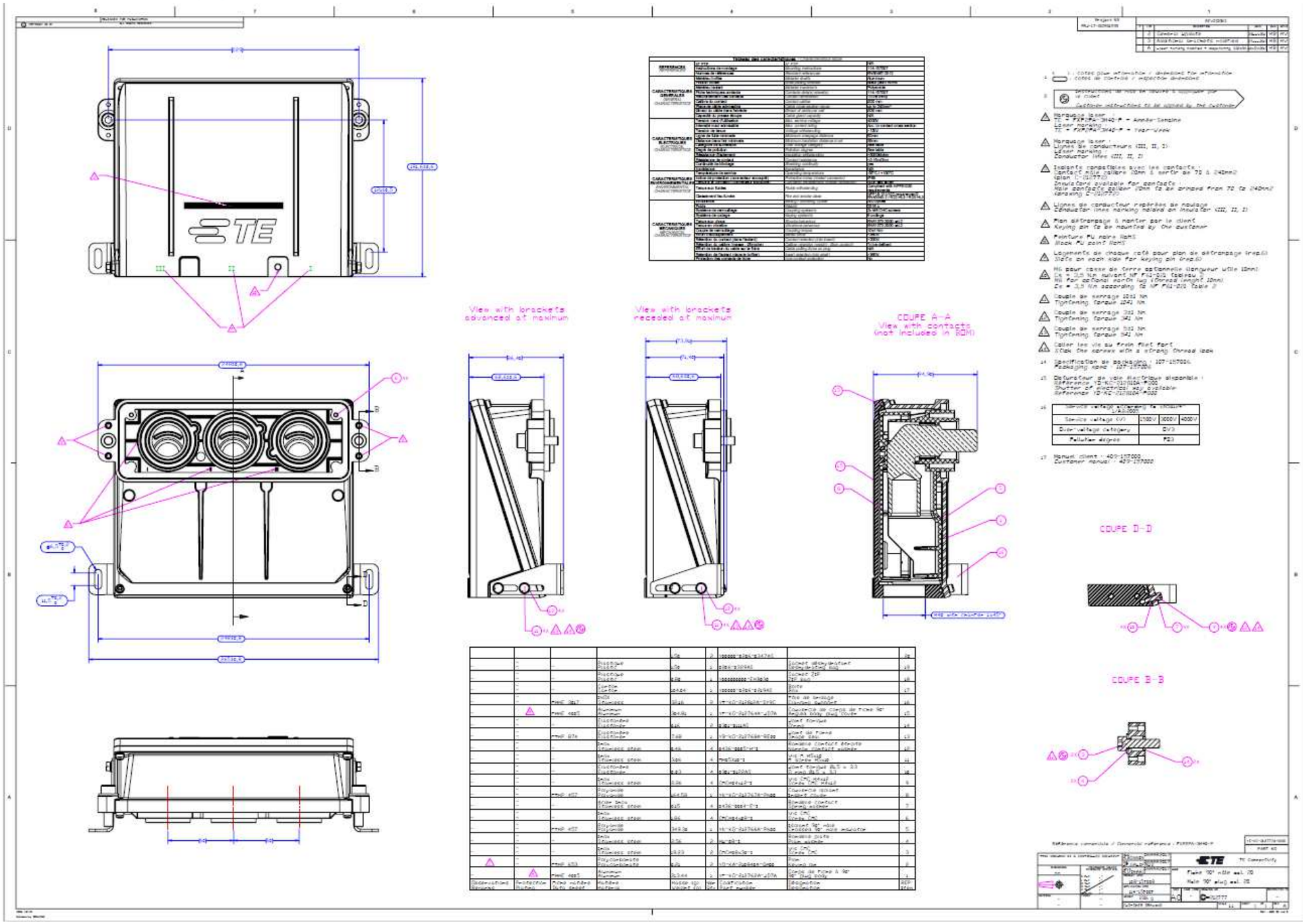
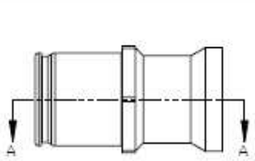
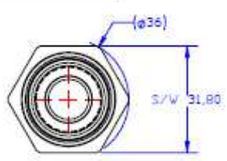
212777_DEUTSCH: Male 90° plug cal. 20



212739_DEUTSCH: S/A female contact cal. 20, connection for lug M12 and M14



View A-A
for commercial references
FXP-CS20-LM14S-CU



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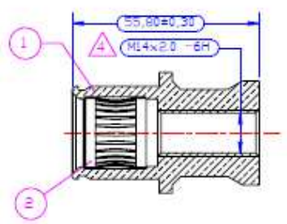
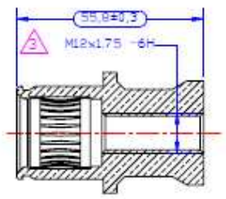
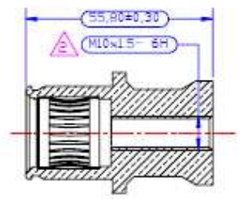
for commercial references
FXP-CS20-LM12S-CU

View A-A
for commercial references
FXP-CS20-LM10S-CU







REVISIONS					
F	LTR	DESCRIPTION	DATE	DWN	APVD
	2	General update	03JUL2017	MB	MV
	3	Add contact with M10 threaded	13JUL2017	MB	MV
	A	Add contact with M10 threaded. Remove brass contacts - Diff 332490	09NOV2017	JFG	MV

Project NR
PRJ-17-000901935

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

⚠1 Couple de serrage sur vis cosse avec 3 rondelles coniques = 20Nm
Lug screw tightening torque with 3 elements conical washer = 20Nm

⚠2 Couple de serrage de la cosse avec 3 rondelles coniques = 35Nm
Lug screw tightening torque with 3 elements conical washer = 35Nm

⚠4 Couple de serrage de la cosse avec 3 rondelles coniques = 55Nm
Lug screw tightening torque with 3 elements conical washer = 55Nm

5 Contact avec filetage M10 à utiliser pour les cosses de 25mm2 à 150mm2
Contact avec filetage M12 à utiliser pour les cosses de 50mm2 à 185mm2
Contact avec filetage M14 à utiliser pour les cosses de 95mm2 à 240mm2
Contact with M10 thread to use for lug of 50mm2 to 185mm2
Contact with M12 thread to use for lug of 50mm2 to 185mm2
Contact with M14 thread to use for lug of 95mm2 to 240mm2

6 Connexions à réaliser par le client
Connexion constituées des éléments de fixation suivants:
-Vis H.M classe A2-70, lg filetée en price recommandée: 2x Ø vis
-Rondelle élastique conique 3 éléments inox A2
-Rondelle M ou L inox A2.

Implementation of the connection provided by the customer
Connection consisting of the following fasteners:
-Screw H.M class A2-70, threaded lenght recommanded 2x Ø vis
-Conical elastic washer 3 elements A2 stainless steel
-Washer M or L stainless steel A2

7 Specification d'emballage = 107-157006
Packaging spec = 107-157006

8 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	FXP-CS20-LM14S-CU	FXP-CS20-LM12S-CU	FXP-CS20-LM10S-CU
-	-	-	Plastique Plastic	1	1	0206-0329A5	Sachet déshydratant Deshydrating bag	4	X	X	X
-	-	-	Plastique Plastic	1	1	Y0000000000-EMB040	Sachet bulle 80 x 100 mm Bubble bag 80 x 100 mm	3	X	X	X
-	Argenture Silver plating	FMME 2001	Cuivre béryllium Beryllium copper	2,4	1	16866-000A4	Diabolo calibre 20 Diabolo caliber 20	2	X	X	X
-	Argenture Silver plating	FMME 2003	Cuivre Copper	210,98	1	YC-KC-212738C-CC1A	Contact femelle cal. 20 à visser M10 Female contact cal. 20 , to be screwed M10	1			X
-	Argenture Silver plating	FMME 2003	Cuivre Copper	204,04	1	YC-KC-212738B-CC1A	Contact femelle cal. 20 à visser M12 Female contact cal. 20 , to be screwed M12	1		X	
-	Argenture Silver plating	FMME 2003	Cuivre Copper	195,49	1	YC-KC-212738A-CC1A	Contact femelle cal. 20 à visser M14 Female contact cal. 20 , to be screwed M14	1	X		
									Commercial references		

Référence commerciale / *Commerciale reference* : see table

see table
PART NO

Commercial references	Filetage Thread	Weight (g)
FXP-CS20-LM14S-CU	14	199.89
FXP-CS20-LM12S-CU	12	208.44
FXP-CS20-LM10S-CU	10	215.38

THIS DRAWING IS A CONTROLLED DOCUMENT

DWN M.BONNIN 14MAR2017
CHK JF GALIPAUD 14MAR2017
APVD M.VIMARD 14MAR2017

TE Connectivity

TOLERANCES UNLESS OTHERWISE SPECIFIED
DIMENSIONS: (mm)
3 PLC ±1
4 PLC ±1
5 PLC ±1
6 PLC ±1
ANGLES ±1
MATERIAL -
FINISH -

TERMINATION SPEC 108-137010
APPLICATION SPEC 114-157007
WEIGHT 197.91 g

NAME
S/E contact femelle cal.20 à talon M12 et M14
S/A female contact cal.20 , connection for lug M12 and M14

SIZE A2 | CAGE CODE - | DRAWING NO C-212739 | REFERENCE TO -
CUSTOMER DRAWING | SCALE 1:1 | SHEET 1 OF 1 | REV A

Ref : 4AM 80 mm C

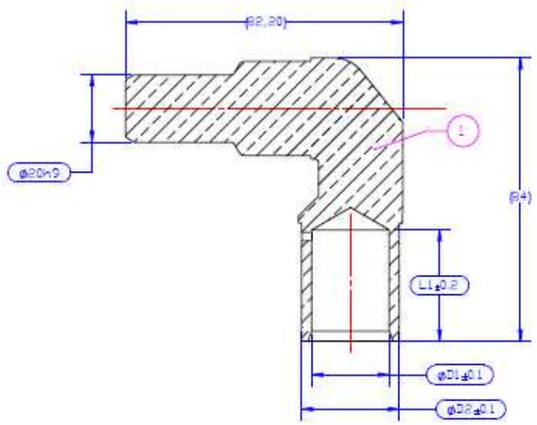
| Indicates Change

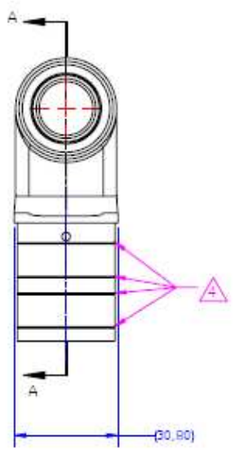
Validation / Qualification Test Report

212836_DEUTSCH: S/A male contacts cal. 20 90° to be crimped 50 to 240 mm²

Réf. Commerciale Commercial ref							REP Item	Codification Part number	Nbr Qty	Designation	Masse (g) Weight	Matière Material	Fiche matière Datasheet	Protection Plating	Observations Remarks
FXP-CA20-M50P-CU	FXP-CA20-M70P-CU	FXP-CA20-M95P-CU	FXP-CA20-M120P-CU	FXP-CA20-M150P-CU	FXP-CA20-M185P-CU	FXP-CA20-M240P-CU									
						x	1	YC-KG-212778A-CD1A	1	Contact mâle cal. 20 à sertir 240mm² *Male contact cal. 20 to be crimped 240mm²*	563,02	Cuivre *Copper*	FMME 2005	Argenture *Silver plating*	-
					x		1	YC-KG-212772B-CD1A	1	Contact mâle cal. 20 à sertir 185mm² *Male contact cal. 20 to be crimped 185mm²*	586,86	Cuivre *Copper*	FMME 2005	Argenture *Silver plating*	-
				x			1	YC-KG-212772C-CD1A	1	Contact mâle cal. 20 à sertir 150mm² *Male contact cal. 20 to be crimped 150mm²*	580,13	Cuivre *Copper*	FMME 2005	Argenture *Silver plating*	-
			x				1	YC-KG-212772D-CD1A	1	Contact mâle cal. 20 à sertir 120mm² *Male contact cal. 20 to be crimped 120mm²*	580,01	Cuivre *Copper*	FMME 2005	Argenture *Silver plating*	-
		x					1	YC-KG-212772E-CD1A	1	Contact mâle cal. 20 à sertir 95mm² *Male contact cal. 20 to be crimped 95mm²*	585,94	Cuivre *Copper*	FMME 2005	Argenture *Silver plating*	-
	x						1	YC-KG-212772F-CD1A	1	Contact mâle cal. 20 à sertir 70mm² *Male contact cal. 20 to be crimped 70mm²*	581,80	Cuivre *Copper*	FMME 2005	Argenture *Silver plating*	-
x							1	YC-KG-212772G-CD1A	1	Contact mâle cal. 20 à sertir 50mm² *Male contact cal. 20 to be crimped 50mm²*	572,94	Cuivre *Copper*	FMME 2005	Argenture *Silver plating*	-
x	x	x	x	x	x	x	2	0206-0329AS	1	Sachet désydratant *Deshydrating bag*	1,50	Plastique Plastic	-	-	-
x	x	x	x	x	x	x	3	Y0000000000-EM3041	1	Sachet ZIP *ZIP Bag*	1,20	Plastique *Plastic*	-	-	-

COUPE A-A
A-A CUT





Project NR
PRJ-17-000901935

REVISIONS					
F	LTR	DESCRIPTION	DATE	DWN	APVD
	3	Add cross section 50mm2	07JUL2017	MB	MV
	4	Add packaging spec number	07SEP2017	MB	MV
	A	Diskaking 332490	07SEP2017	MB	MV

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

2

Sections du câble *Cable cross sections*	Outils de sertissage hydrauliques (Mécatraction) *Hydraulic crimping tools (Mecatraction)*				Outils de sertissage manuel (Mécatraction) *Manual crimping tools (Mecatraction)*	
	Pompe *Pump*	Vérins *Jacks*	Flexible *Flexhoses*	Matrices *Dies*	Pinces *Clamps*	Matrices *Dies*
50mm2	DA 133 K	SU33K ou SU210K Chape ouverte/ *Opened shell* ou / or VF33K ou VF210K Chape fermée/ *Closed shell*	Ref 4602K Longueur/ *Length* 1,80 m ou / or Ref 4603K Longueur/ *Length* 3,80 m	TN50V13 TN50V20 (1 crimping)	PNMICF	HL 16-50 F (1 crimping)
70mm2				TN70V13 TN70V20 (1 crimping)	PNMICF	HL 25-70 F (1 crimping)
95mm2				TN95V13 TN95V20 (1 crimping)	Non disponible *Not available*	
120mm2				TN120V13 TN120V20 (1 crimping)		
150mm2		SU210K Chape ouverte/ *Opened shell* ou / or VF210K Chape fermée/ *Closed shell*		TN150V20 (1 crimping)		
185mm2				TN185V20 (1 crimping)		
240mm2				TN240V20 (2 crimping)		

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

5

Commercial reference	Cross-section (mm²)	Dimensions (mm) L1	D1	D2	Weights (g)
FXP-CA20-M240P-CU	240mm²	33	23	29	563,02
FXP-CA20-M185P-CU	185mm²	26	20,5	26	586,86
FXP-CA20-M150P-CU	150mm²	26	18	23	580,13
FXP-CA20-M120P-CU	120mm²	25	16,5	21	580,01
FXP-CA20-M95P-CU	95mm²	23	14,5	18,5	585,94
FXP-CA20-M70P-CU	70mm²	22	12,5	16	581,8
FXP-CA20-M50P-CU	50mm²	22	10,8	14	572,94

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

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

Référence commerciale / *Commerciale reference* : see table

see table
PART NO

THIS DRAWING IS A CONTROLLED DOCUMENT.

DWN	M.BONNIN	14MAR2017
APVD	JF.GALIPAUD	14MAR2017
MFG	M.VIMARD	14MAR2017

DIMENSIONS: mm
TOLERANCES UNLESS OTHERWISE SPECIFIED
2 PLC ±1
3 PLC ±0
ANGLES ±1
MATERIAL -
FINISH -

TE Connectivity

NAME: S/E contacts mâles cal. 20 90° à sertir 50 à 240mm2
S/A male contacts cal. 20 90° to be crimped 50 to 240mm2

PRODUCT SPEC: 108-157010
APPLICATION SPEC: 114-157007
WEIGHT: 56302 g

SIZE: A2 | CAGE CODE: - | DRAWING NO: C-212836 | REVISION: -

CUSTOMER DRAWING | SCALE: 1:1 | SHEET 1 OF 1 | REV: A