PRODUCT SPECIFICATION

M12 CAT6A CORDSETS and RECEPTACLES

1.0 SCOPE

This Product Specification covers the M12 CAT6A series with cordsets and receptacles.

2.0 PRODUCT DESCRIPTION

The M12 CAT6A series receptacles and cordsets are for high speed data transmission suited to transmit up to 10GBit Ethernet Data.
The design covers the need for POE Transmission, and keeps the benefit of sealing and form Factor coming from the M12 standard.

2.1 PRODUCT NAME AND SERIES NUMBER(S)

CORDSETS:

1203410312	M12 CAT6A CORDSET STANDARD PUR AWG26	0.25M
1203410300	M12 CAT6A CORDSET STANDARD PUR AWG26	0.5M
1203410301	M12 CAT6A CORDSET STANDARD PUR AWG26	1M
1203410313	M12 CAT6A CORDSET STANDARD PUR AWG26	1.50M
1203410302	M12 CAT6A CORDSET STANDARD PUR AWG26	2M
1203410303	M12 CAT6A CORDSET STANDARD PUR AWG26	3M
1203410304	M12 CAT6A CORDSET STANDARD PUR AWG26	4M
1203410305	M12 CAT6A CORDSET STANDARD PUR AWG26	5M
1203410306	M12 CAT6A CORDSET STANDARD PUR AWG26	10M
1203410307	M12 CAT6A CORDSET STANDARD PUR AWG26	15M
1203410308	M12 CAT6A CORDSET STANDARD PUR AWG26	20M
1203410309	M12 CAT6A CORDSET STANDARD PUR AWG26	30M
1203410310	M12 CAT6A CORDSET STANDARD PUR AWG26	40M

RECEPTACLES:

1203410075 M12 CAT6A REC ASSY FRONT MOUNT

1203410150 M12 CAT6A REC ASSY BACK MOUNT

2.2 DIMENSIONS, MATERIALS, PLATINGS AND MARKINGS

See the appropriate sales drawings for information on dimensions, materials, platings and markings

2.3 SAFETY AGENCY APPROVALS

none

3.0 APPLICABLE DOCUMENTS AND SPECIFICATIONS

See the sales drawings and the other sections of this specification for the necessary referenced documents and specifications

IEC 61076-2-109 Ed 1.0
IEC 60512-29-100 Ed 1.0

4.0 RATINGS

4.1 VOLTAGE

48 Volts AC (RMS) PoE acc. IEEE 802.3a
57 Volts AC (RMS) PoE+ acc. IEEE 802.3a+

Test voltage 500 V RMS

4.2 CURRENT

0.5 Amps

4.3 TEMPERATURE

Operating: - 40°C to + 70°C (Cable limit this)

5.0 PERFORMANCE

5.1 ELECTRICAL REQUIREMENTS

ITEM	DESCRIPTION	TEST CONDITION	REQUIREMENT
1	Rated voltage – Rated impulse voltage – Pollution degree	Mated connectors IEC 60664-1	Rated voltage – 48V Rated impulse voltage – 1.5kV Pollution degree - 3
2	Voltage proof	Mated connectors IEC 60512-4-1, Test 4a Standard atmospheric conditions	0.5 kV
3	Current-carrying capacity	IEC 60512, Test 5a All contacts Values at 40 °C ambient temperature	0.5 A
4	Contact Resistance	IEC 60512, Test 2a Standard atmospheric conditions	5mΩ MAXIMUM
5	Insulation Resistance	Mated connectors IEC 60512, Test 3a, Method A Standard atmospheric conditions	100 MΩ MINIMUM

5.2 MECHANICAL REQUIREMENTS

ITEM	DESCRIPTION	TEST CONDITION	REQUIREMENT
7	IP degree of protection	According to IEC 60529 connectors in mated and locked position	IP65 and IP67
8	Mechanical operation	IEC 60512, Test 9a Standard atmospheric conditions Max. speed of operations = 10 mm/s Rest: 30 s, unmated.	100 (gold)
9	Insertion and withdrawal forces	IEC 60512, Test 13b Standard atmospheric conditions Max. speed = 10 mm/s	30 N MAXIMUM
10	Contact retention in insert	Not applicable	Not applicable
11	Polarizing method	IEC 60512, Test 13e	Engaging force: 1,5 x total insertion force but 35 N min.
12	Vibration (sinusoidal)	IEC 60512, Test 6d Standard atmospheric conditions Connectors in mated and locked position The fixed and free connector shall be rigidly installed in a suitable fixture as specified in dynamic stress tests. F = 10 Hz to 500 Hz Ampl. = 0.35 mm	Contact disturbance: Discontinuity 10 µs. maximum No damage Dielectric withstanding voltage: No breakdown Contact Resistance: Max. change from initial 5 mΩ (shield. 100 MΩ)
13	Shock	IEC 60512 Test 6c Connectors in mated and locked position The fixed and free connector shall be rigidly installed in a suitable fixture as specified in dynamik stress tests. Half sine shock acceleration 490m/s² Duration of impact: 11ms	Visual: No Damage Contact Resistance: Max. change from initial 4.5MΩ (SHIELD. 100 MΩ)

5.3 TEST SCHEDULE

According to: IEC 61076-2-109 Ed 1.0 and IEC 60512-29-100 Ed 1.0

5.3.1 TEST GROUP P-PRELIMINARY

Test phase	Test			Measurement to be performed		Requirements
	Title	IEC 60512 Test No.	Severity or condition of test	Title	IEC 60512 Test No.	All connector styles
P1	General examination	1	Unmated connectors	Visual examination	1a	There shall be no defect that would impair normal operation
				Dimensional examination	1b	The dimensions specified in IEC 61076-2-109 Ed1
P2			Connection points according to dwg all contacts per specimens	Contact resistance – Millivolt level method	2a	Initial value according to 5.1.4
P3			Test voltage 500 V ± 15 V d.c. Method A	Insulation resistance	3a	Initial value according to 5.1.5
P4			Contact/ contact same measuring points as for P3	Voltage proof	4a	According to 5.1.2

5.3.2 TEST GROUP AP – DYNAMIC/ CLIMAT

Test phase	Test			Measurement to be performed		Requirements
	Title	IEC 60512 Test No.	Severity or condition of test	Title	IEC 60512 Test No.	All connector styles
AP1			See 5.2.9	Insertion and withdrawal forces	13b	Requirements see 5.2.9
AP2	Gauge retention force		Female contacts only 3 contacts/ specimen sizing and retention force gauge	Engaging and separating forces	16e	
AP3	Vibration	6d	Sweep cycles: 10 Full duration: 6 h See 5.2.12	Contact disturbance	2e	Duration of disturbance 1 µs max.
				Contact resistance – Millivolt level method	2a	Rise in relation to initial values ≤10 mΩ
				Visual examination	1a	There shall be no defect that would impair normal operation
AP4	Shock	6c	See 5.2.13	Contact disturbance	2e	Duration of disturbance 1 µs max.
				Contact resistance – Millivolt level method	2a	Rise in relation to initial values ≤10 mΩ
				Visual examination	1a	There shall be no defect that would impair normal operation
AP5	Rapid change of temperature	11d	–25 °C to 85 °C *t* = 30 min. 5 cycles	Contact resistance – Millivolt level method	2a	Rise in relation to initial values ≤10 mΩ
				Insulation resistance	3a	Initial value according to 5.1.5
				Voltage proof	4a	According to 5.1.2
				Visual examination	1a	There shall be no defect that would impair normal operation

5.3.2 TEST GROUP AP – DYNAMIC/ CLIMAT *(continued)*

Test phase	Test			Measurement to be performed		Requirements
	Title	IEC 60512 Test No.	Severity or condition of test	Title	IEC 60512 Test No.	All connector styles
AP6	Climatic sequence	11a				
AP6.1	Dry heat	11i	Temperature: 85 °C Duration: 16 h	Insulation resistance at high temperature	3a	Initial value according to 5.1.5
AP6.2	Damp heat, cyclic, first cycle	11m	Method Db Temperature: 40 °C Recovery time: 2 h	Visual examination	1a	There shall be no defect that would impair normal operation
AP6.3	Cold	11j	Temperature: −25 °C Duration: 2 h Recovery time: 2 h	Visual examination	1a	There shall be no defect that would impair normal operation
AP6.4	Damp heat, cyclic, remaining cycles	11m	Conditions according to AP6.2 5 cycles Recovery time: 2 h	Contact resistance – Millivolt level method	2a	Rise in relation to initial values ≤15 mΩ
				Insulation resistance	3a	Initial value according to 5.1.5
				Voltage proof	4a	According to 5.1.2
				Insertion and withdrawal forces	13b	Requirements see 5.2.9
				Visual examination	1a	There shall be no defect that would impair normal operation
AP7	IP Protection degree	IEC 60529		Table 1 of IEC 60529		According to 5.2.7
AP8				Visual examination	1a	There shall be no defect that would impair normal operation
AP9	Polarizing method	13e	See 5.2.11			It shall be possible to correctly align and mate the appropriate mating connectors. It shall not be possible to mate the connectors in any other than the correct manner. The insertion and withdrawal forces acc.AP1

5.3.3 TEST GROUP BP – MECHANICAL ENDURANCE

Test phase	Test			Measurement to be performed		Requirements
	Title	IEC 60512 Test No.	Severity or condition of test	Title	IEC 60512 Test No.	All connector styles
BP1			Female contacts only 3 contacts/specimen sizing and retention force gauge	Gauge retention force	16e	
BP2	Mechanical operation (half of the specified number of operations)	9a	Speed 10 mm/s max. Rest 30 s (unmated) Operations see 5.2.8 Speed: 10 mm/s max. Rest time: 30 s (unmated)			
				Contact resistance-Millivolt level method	2a	Rise in relation to initial values ≤15 mΩ
				Visual examination	1a	There shall be no defect that would impair normal operation
BP3	Climatic test					
BP3.1	Corrosion industrial atmosphere	11g	Flowing mixed gas corrosion - 4 days, test method 4 according IEC 60068-2-60	Contact resistance-Millivolt level method	2a	Rise in relation to initial values ≤15 mΩ

5.3.3 TEST GROUP BP – MECHANICAL ENDURANCE *(continued)*

Test phase	Test			Measurement to be performed		Requirements
	Title	IEC 60512 Test No.	Severity or condition of test	Title	IEC 60512 Test No.	All connector styles
BP4	Mechanical operation (remaining half of specified number of operations)	9a	See BP2	Contact resistance – Millivolt level method	2a	Rise in relation to initial values ≤10 mΩ
				Insulation resistance	3a	Initial value according to 5.1.5
				Voltage proof	4a	According to 5.1.2
			Unmated connectors	Visual examination	1a	There shall be no defect that would impair normal operation
BP5				Insertion and withdrawal forces	13b	For requirements, see 5.2.9
BP6			Female contacts only 3 contacts/specimen sizing and retention force gauge	Gauge retention force	16e	

5.3.4 TEST GROUP CP – ELECTRICAL LOAD

Test phase	Test			Measurement to be performed		Requirements
	Title	IEC 60512 Test No.	Severity or condition of test	Title	IEC 60512 Test No.	All connector styles
CP1	Rapid change of temperature	11d	–25 °C to 85 °C *r* = 1 h 5 cycles	Contact resistance – Millivolt level method	2a	Rise in relation to initial values ≤15 mΩ
				Insulation resistance	3a	Initial value according to 5.1.5
				Voltage proof	4a	According to 5.1.2
CP2	Mechanical Operation	9a	See BP2			
CP3	Electrical load and temperature	9b	Duration: 1 000 h Amp.Temp.: 40 °C Current load according to 5.1.3 Recovery time: 2 h Temperature: sensor in center of specimen	Contact resistance – Millivolt level method	2a	Rise in relation to initial values ≤15 mΩ
				Insulation resistance	3a	Initial value according to 5.1.5
				Voltage proof	4a	According to 5.1.2
CP4			Unmated connectors	Visual examination	1a	There shall be no defect that would impair normal operation

5.3.5 TEST GROUP DP – CHEMICAL RESISTIVITY

Test phase	Test			Measurement to be performed		Requirement
	Title	IEC 60512 Test No.	Severity or condition of test	Title	IEC 60512 Test No.	All connector styles
DP1	Resistance to fluids	19c	Upon agreement between manufacturer and user			Upon agreement between manufacturer and user
DP2	Retreatment		Clearing of specimen by washing briefly in light petrol	Contact resistance – Millivolt level	2a	Rise in relation to initial values ≤15 mΩ
DP3				Voltage proof	4a	According to 5.1.2
DP4			Unmated connectors	Visual examination	1a	There shall be no defect that would impair normal operation
DP5	Solderability, wetting, iron method	12b	Iron size B			
DP6	Resistance to soldering heat, iron methode	12e	Iron size B			

5.3.6 TEST GROUP EP – CONNECTION METHOD TESTS

Test phase	Test			Measurement to be performed		Requirement
	Title	IEC 60512 Test No.	Severity or condition of test	Title	IEC 60512 Test No.	All connector styles
EP1	crimp terminations					
EP1.1	Tensile strength (crimped connection)	16d	According to IEC 60352-2			

5.3.7 TEST GROUP FP – ELECTRICAL TRANSMISSION REQUIREMENTS

Test phase	Test			Measurement to be performed		
	Title	IEC 60512 Test No.	Severity or condition of test	Title	IEC 60512 Test No.	Requirements
FP 1			All pairs	Insertion loss	60512-29-100 Test 29a	Mated connectors All pairs: ≤ 0,02 √*f* dB from 1 to 500 MHz Whenever the formula results in a value less than 0,1 dB, the requirement shall revert to 0,1 dB.
FP 2			All pairs, both directions, (pair to pair)	NEXT loss	60512-29-100 Test 29c	Mated connectors All pair combinations: ≥ 94-20log (*f*) dB from 1 to 250 MHz All pair combinations: ≥ 46,04 -30log (*f*/250) dB from 250 to 500 MHz Whenever the formula results in a value greater than 80 dB, the requirement shall revert to 80 dB.
FP 3			All pairs, both directions	Return loss	60512-29-100 Test 29b	Mated connectors All pairs: ≥ 68-20log (*f*) dB from 1 to 500 MHz Whenever the formula results in a value greater than 30 dB, the requirement shall revert to 30 dB.
FP 4			All pairs, both directions, (pair to pair)	FEXT loss	60512-29-100 Test 29d	Mated connectors All pair combinations: ≥ 83,1-20log (*f*) dB from 1 to 500 MHz Whenever the formula results in a value greater than 75 dB, the requirement shall revert to 75 dB.

5.3.7 TEST GROUP FP – ELECTRICAL TRANSMISSION REQUIREMENTS *(continued)*

Test phase	Test			Measurement to be performed		
	Title	IEC 60512 Test No.	Severity or condition of test	Title	IEC 60512 Test No.	Requirements
FP 5			All pairs, both directions	TCL	60512-29-100 Test 29f	Mated connectors All pairs: ≥ 68-20log (*f*) dB from 1 to 500 MHz Whenever the formula results in a value greater than 50 dB, the requirement shall revert to 50 dB.
FP 6			All pairs, both directions	TCTL	60512-29-100 Test 29g	Mated connectors All pairs: ≥ 68-20log (*f*) dB from 1 to 500 MHz Whenever the formula results in a value greater than 50 dB, the requirement shall revert to 50 dB.
FP 7	Input to Output resistance		Measurement points as defined in 6.4.5 All input/output connector paths	Millivolt level method	2a	Per 6.4.5
FP 8	Resistance unbalance		Measurement points as defined in 6.4.6 All input/output connector path combinations	Millivolt level method	2a	Per 6.4.6
FP 9			All pairs, both directions	PSANEXT	60512-25-9	Mated connectors All pairs: ≥ 110,5 – 20log(*f*) dB from 1 MHz to 500 MHz
FP 10			All pairs, both directions	PSAFEXT	60512-25-9	Mated connectors All pairs: ≥ 107 – 20log(*f*) dB from 1 MHz to 500 MHz Whenever the formula results in a value greater than 67 dB, the requirement shall revert to 67 dB

6.0 PACKAGING

Parts shall be packaged to protect against damage during handling, transit and storage. Please refer to packaging specification:

PK-120341-075 (Receptacles);

PK-120341-300 (Cordsets).