





**1.0 SCOPE**

This specification defines the performance for all DIN valve connector series.

**2.0 PRODUCT DESCRIPTION**

**Field Attachable Without Circuit**

Series; C28, C22, C92 C25, C29, CSP,C01, C04, C05, C08, C12, C14, C17, C18, C19, C20, C32, C40, C41, C43, C44, C47, C50, C51, C52, C59, C62, C70, C71, C81 & C82

**Field Attachable With Circuit**

Series; S28, S22, S92 S25, S29, S02, S04, S05, S11, S14, S18, S19, S20, S40, S41, S43, S44, S53, S54, S55, S56 & S62

**Bases**

Series; B04, B14, B15, B20, B21, B22, B23, B24, B26, B27, B28, B29, B30, B31, B39, B40, B41, B42, B46, B47 & B48.

**Adaptors**

A06, A07, A02, A03, A04, A05, A08, A09, A10, A11 & A01

For materials, plating & markings, see sections 11, 12 and sales drawings SD-121\*\*\*.\*\*\* related to each series.

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### 3.0 APPLICABLE DOCUMENTS AND SPECIFICATIONS

See sales drawings SD-121\*\*\*.\*\*\* and other sections of this specification for the relevant reference documents and specifications. In cases where the specification differs from the product drawings, the product drawings take precedence.

Testing and testing sequences are according to EN 175301-803:2006,

### 4.0 RATINGS

4.1	Current	Type A & B: Nominal 10 Amps / Max 16 Amps
		Type C & Micro: Nominal 6 Amps / Max 10 Amps
4.2	Voltage	Max 250 V AC / Max 300 V DC
4.3	Operating Temperature Range	-40°C to +90°C
4.4	Storage Temperature Range	-40°C to +125°C
4.5	Storage Humidity Range	+15% to +70% RH
4.6	Operating Temperature Range at mated interface	Typical, NBR -40°C to +90°C, Silicone -40°C to +125°C
4.7	Derating Curves	See Appendix 1
4.8	Cable Range	Minimum 0.75mm <sup>2</sup> - Maximum 1.5mm <sup>2</sup>
4.9	Over voltage category	3
4.10	Pollution Degree	3

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5.0 TEST GROUP INFORMATION

Test Group	Number of Specimen
P	6
AP	2
BP	2
CP	2
1.1	4

Table 1, Test Group Size

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6.0 GROUP P (PRELIMINARY)

Test Ref.	Item	Test Condition	Requirements
P1	General Examination IEC-60512 Test 1A	Visual examination of unmated connectors	There shall be no defects that would impair normal operation
P2	Polarization Method IEC-60512 Test 13E	Force to be applied for 60 seconds at a rate of 25mm Min 2 + PE = 60N 3 + PE = 100N	It shall be possible to correctly align and mate the appropriate mating connectors It shall not be possible to mate the connectors in any way other than the correct manner #
P3	Contact Resistance IEC-60512 Test 2B	Measure contact resistance across the interface of male and female, Test current 1A	= 15mΩ Max * See note below
P4	Insulation Resistance IEC-60512 Test 3, Method A	Mated & Unmated connector with 100±15V DC between adjacent contacts. Reading measurement when stable condition is reached or within 60s±5s of application of voltage.	100mΩ Min. * See note below
P5	Voltage Proof IEC-60512 Test 4A	Mated connectors, Standard atmospheric conditions, Contact/contact: measuring points as P4, 2kV +/- 50V for 60s +/- 5s @45-60Hz, test voltage not to exceed 500V/s, test method A	No breakdown or flashover * See note below

# Not applicable to form B Industrial, C12, S12, C22 & S22

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7.0 GROUP AP TEST SEQUENCE

Test Ref.	Item	Test Condition	Requirements
AP1	Mechanical Operation IEC-60512 Test 9A	Max. speed: 10 mm/s Rest 30's (unmated)	50 operation cycles Contact Resistance 15 mΩ max.
AP2.1	Solderability (when applicable) IEC-60512 Test 12B	Wetting iron method, Ageing method 3, Soldering iron size B, only for solder buckets	NA
AP2.2	Screw Terminal (when applicable) EN 60999-1	See EN 60999-1 Sections 9.1, 9.2, 9.4, 9.5 & 9.6, see Appendix 6	See Appendix 6
AP3	Voltage Proof IEC-60512 Test 4A	Mated connectors, Standard atmospheric conditions, Contact/contact: measuring points as P4, 2kV +/- 50V for 60s +/- 5s @45-60Hz, test voltage not to exceed 500V/s	No breakdown or flashover * See note below
AP4	Damp Heat Steady State IEC-60512 Test 11C	Electrode Voltage: 60 VDC Recovery time 1-2 hours 40°C - 95% Relative Humidity	10 day # See note below
AP5	Contact Resistance IEC-60512 Test 2B	Measure contact resistance across the interface of male and female, test current 1A, Test Method A	15mΩ Max * See note below
AP6	Insulation Resistance IEC-60512 Test 3, Method A	Mated & Unmated connector with 100±15V DC between adjacent contacts. Reading measurement when stable condition is reached or within 60s±5s of application of voltage.	100mΩ Min. *See note below
AP7	Voltage Proof IEC-60512 Test 4A	Mated connectors, Standard atmospheric conditions, Contact/contact: measuring points as P4, 2kV +/- 50V for 60s +/- 5s @45-60Hz, test voltage not to exceed 500V/s, Test Method A	No breakdown or flashover * See note below
AP8	Insertion and Withdrawal Forces IEC-60512 Test 13B	Cross head speed: 25mm/min, Cycles: 1	2 + PE ≤ 60N 3 + PE ≤ 80N
AP9	Unmated Connectors IEC-60512 Test 1A	Visual examination	No damage due to conditioning

#Functional test to be performed before and after test to with-circuit & adaptor part numbers, See Appendix 6

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8.0 GROUP BP TEST SEQUENCE

Test Ref.	Item	Test Condition	Requirements
BP1	Dry Heat IEC-60512 Test 11J	Temperature 125°C	96 Hr Contact Resistance 15 mΩ max. #See note below
BP2	Cold IEC-60512 Test 11J	Temperature -40°C	2 hr Contact Resistance 15 mΩ max. #See note below
BP3	Degree of Protection EN 60529	Contre Screw Tightening Torque 0.4Nm, Internal thread Main Nut tightening torque 1Nm, External thread main nut tightening torque See Appendix 2	Degree of protection : IP65 acc. to EN 60529 or IPX7 acc. to EN 60529 for connectors that include fixing screw with rubber washer (gasket)
BP4	Mechanical Strength Impact IEC-60512 Test 7B	Only for free connectors Drop height: (1000 ± 10) mm Test cable: un-shielded PVC-pilot cable Drop Cycles: 8	No Damage #See note below
BP5	Protection against hazardous parts IEC-60512 Test 1A	IPxxB, Unmounted Connector, Protect against access with a test finger according to EN 60529 15.2, 10 N Max, See Appendix 7	Test probe shall not make contact with a live terminal
BP6	Unmated Connectors IEC-60512 Test 1A	Visual examination	No damage due to conditioning

#Functional test to be performed before and after test to with-circuit & adaptor part numbers, See Appendix 5

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9.0 GROUP CP TEST SEQUENCE

Test Ref.	Item	Test Condition	Requirements
CP1	Resistance to Fluids IEC-60512	Test acc. to EN 2591 Test C 15, T2 = 80°C Hydraulic oil HM 22 acc. to EN ISO 6743-4	No Damage
CP2	Retreatment	Cleaning of specimen by washing in light petrol	No Damage
CP3	Voltage Proof IEC-60512 Test 4A	Mated connectors, Standard atmospheric conditions, Contact/contact: measuring points as P4, 2kV +/- 50V for 60s +/- 5s @45-60Hz, test voltage not to exceed 500V/s Test Method A	No breakdown or flashover * See note below
CP4	General Examination IEC-60512 Test 1A	Visual examination of unmated connectors	No damage due to conditioning

\*Not applicable to with-circuit part numbers

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10.0 ADDITIONAL TEST SEQUENCES

Test Ref.	Item	Test Condition	Requirements
1.1	Glow Wire IEC 60695-2-11	Parts shall be tested at 850°C, See Test Standard and Appendix 4 for details of the test setup Only V0 part numbers to be tested please see Sales drawings for details	Parts shall extinguish within 30 seconds of tip removal & any drops shall not ignite the paper below

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**11.0 CRITICAL PARAMETERS**

Critical features are detailed on drawings SD-121\*\*\*.\*\*\*, please see individual part numbers for specific sales drawings, where specific sales drawings are not available please see the generic sales drawing for the specific series number for details of the intelligent part number.

**12.0 GENERAL REQUIREMENTS**

- All materials and platings are RoHS compliant.
- IP-classification: This component will be used in a product that fulfils IP65 or IP67 classification according to IEC 60529 for non-active category products.
- Test Sample Size: See table 1 page 4 for test sample size in each test group.
- Product shall undergo UL certification where applicable.

**13.0 MATERIALS**

All materials are specified in sales drawings SD-121\*\*\*.\*\*\*, please see individual part numbers for specific sales drawings, where specific sales drawings are not available please see the generic sales drawing for the specific series number for details of the intelligent part number.

**14.0 MARKING**

Cavity number to be moulded on housings

**15.0 PACKAGING & LABELLING**

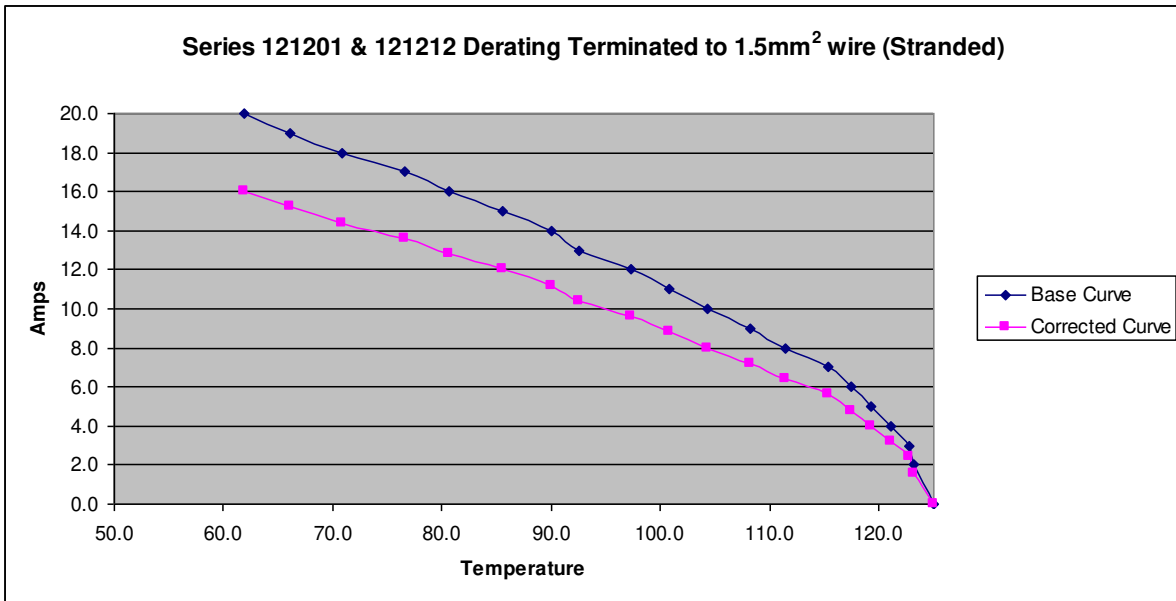
See packaging specification PK-121\*\*\*.\*\*\* for packaging of assembly options and labeling requirements for cartons. Please see individual part numbers for specific packaging specifications.

Parts shall be packaged to protect against damage during handling, transit and storage. No Styrofoam shall be used in any packing that comes in direct contact with the connectors.

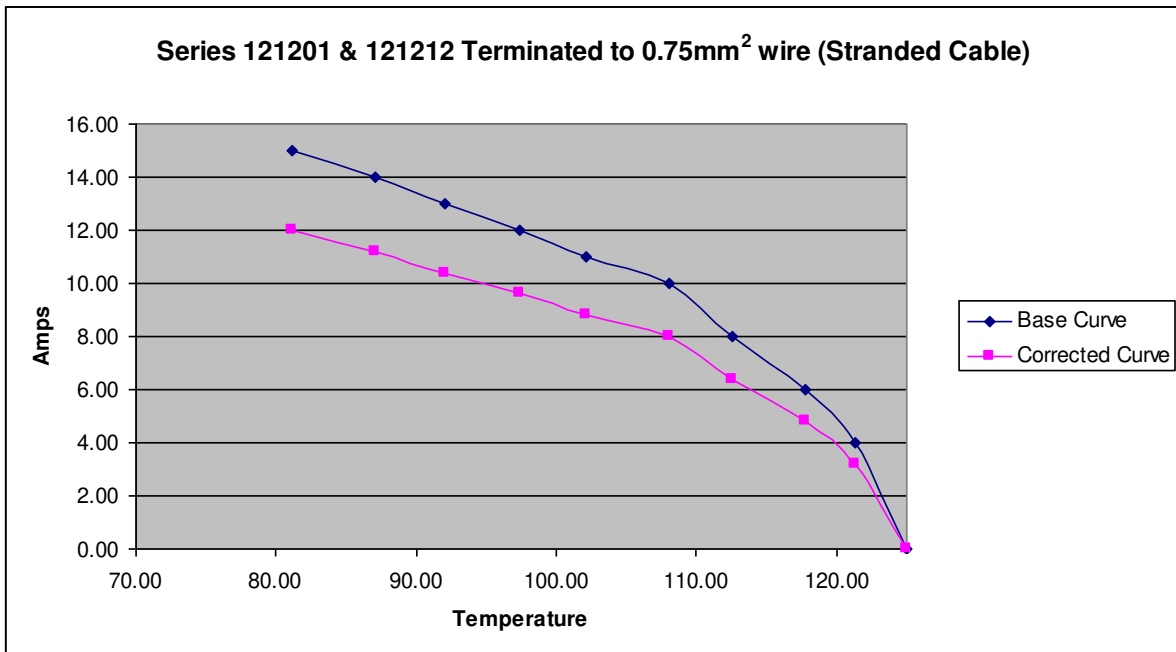
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Appendix 1



Derating curve for 1.5 mm<sup>2</sup> cable

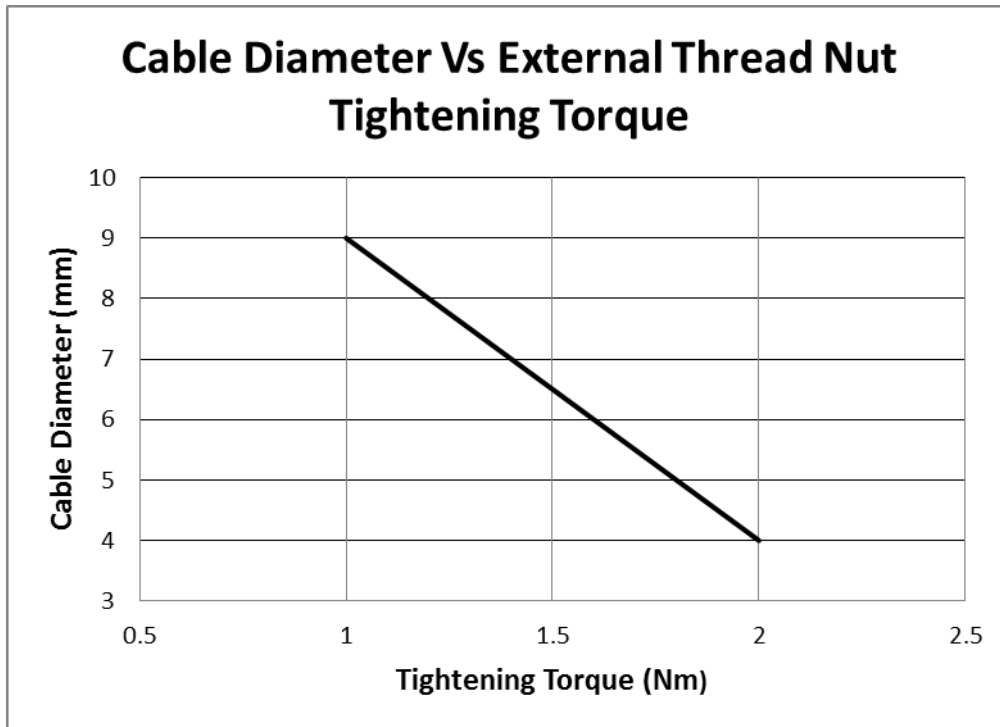


Derating curve for 0.75 mm<sup>2</sup> cable

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Appendix 2



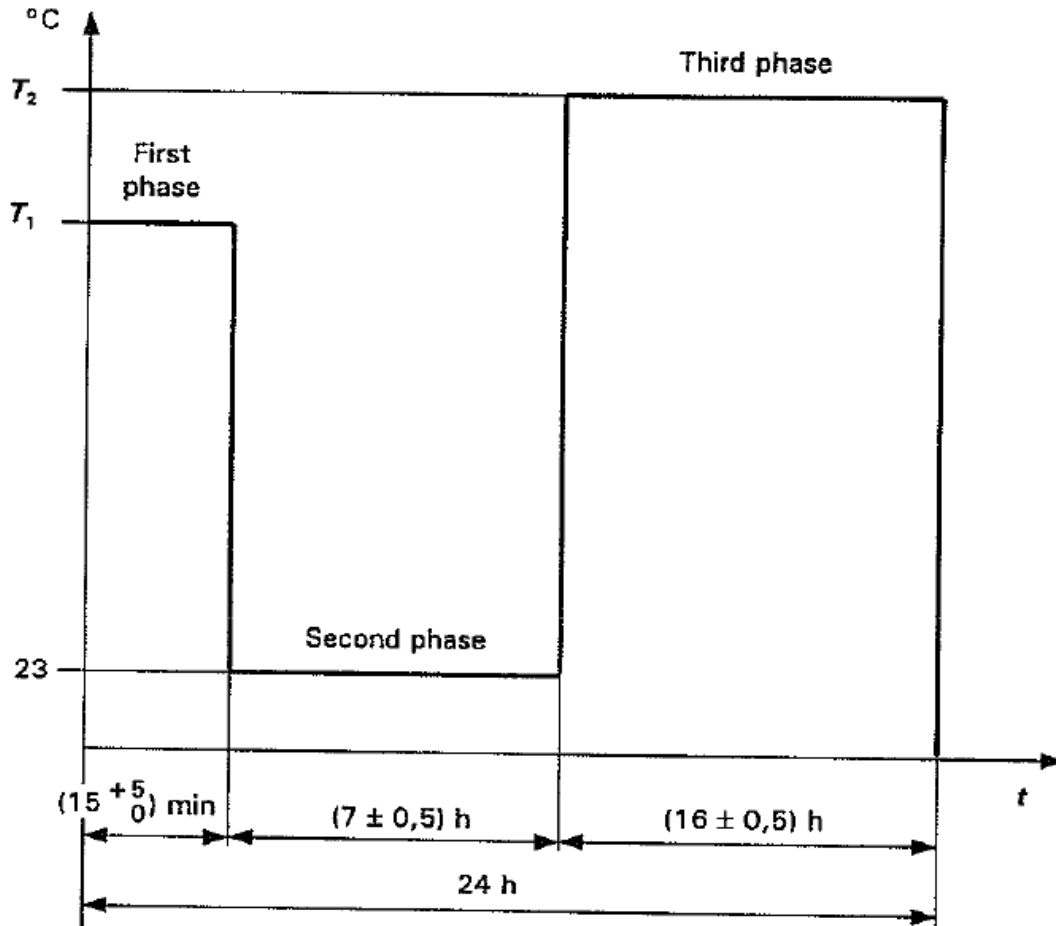
Graph showing external thread tightening torque for Form A & B.

\*Note; For form C and C Micro the tightening torque is 0.5Nm Minimum 0.6 Nm maximum.

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Appendix 3

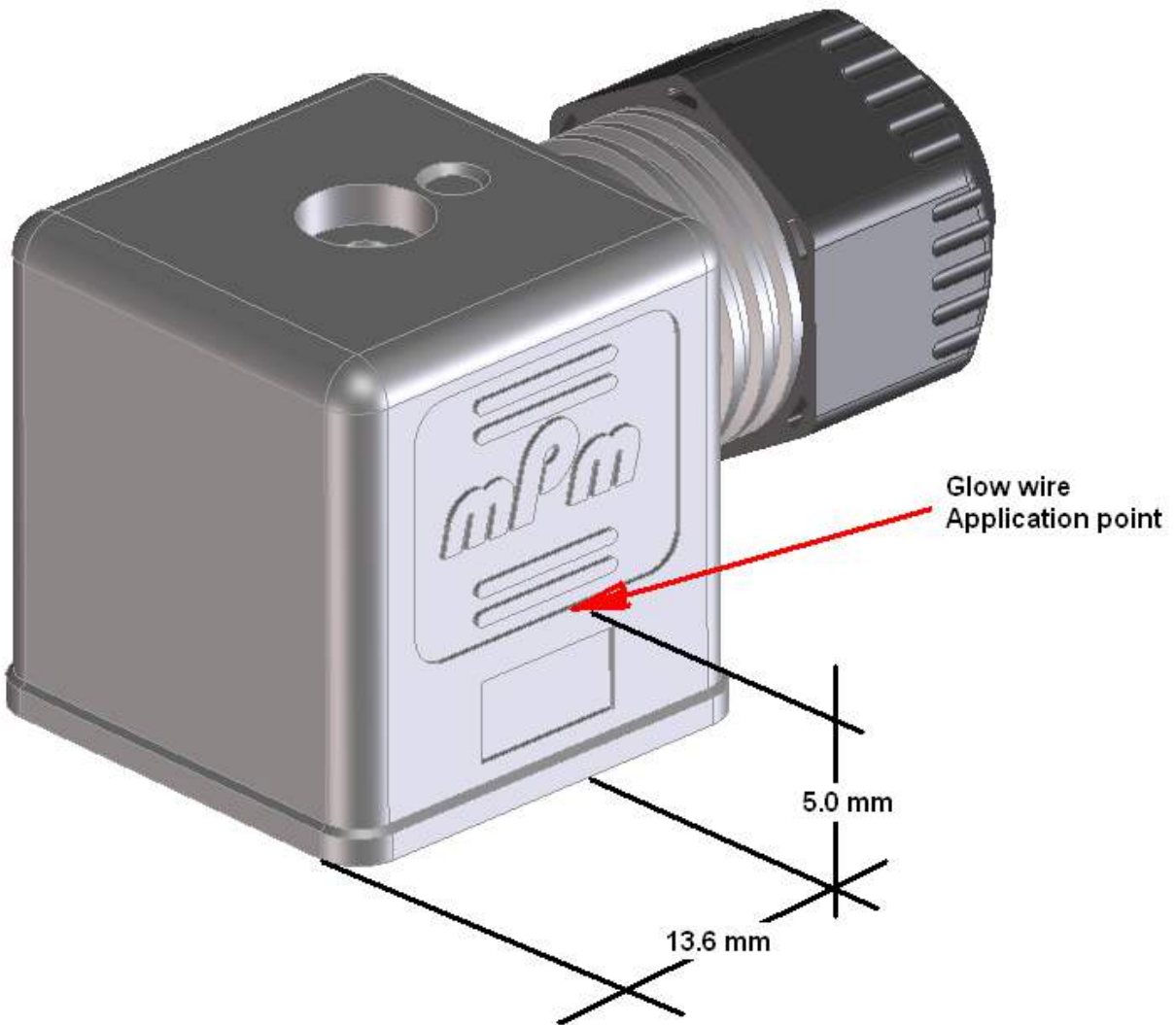


Example of test cycle

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Appendix 4



Glow wire test setup

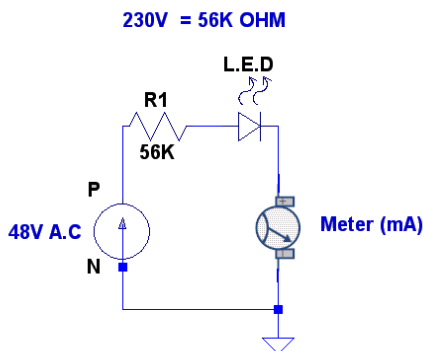
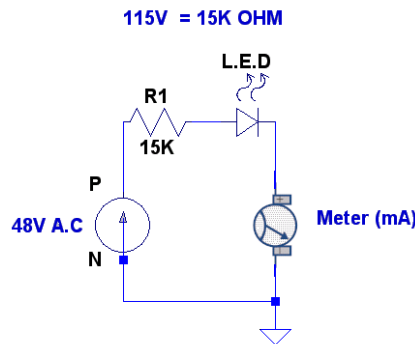
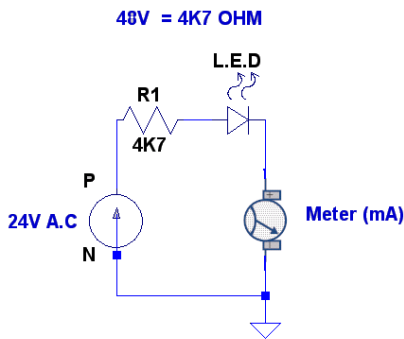
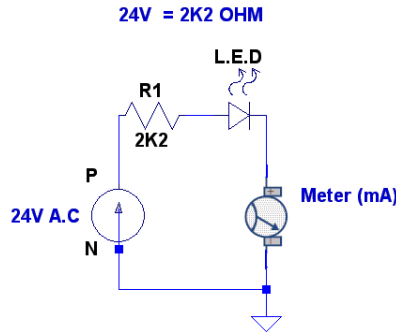
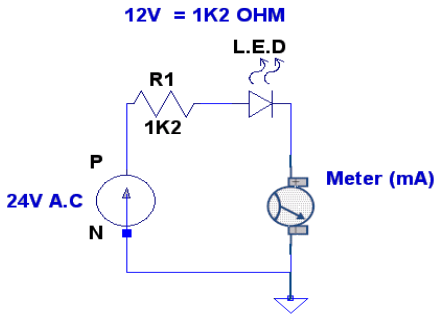
\*Note; height correct for form A, B and C.

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Appendix 5

Voltage (V)	Resistor	Test Voltage	Current Reading (mA)	Tolerance (mA)
12	1K2	24V AC	19.00	+/- 15%
24	2K2	24V AC	10.36	+/- 15%
48	4K7	48V AC	4.85	+/- 15%
115	15K	48V AC	7.58	+/- 15%
230	56K	48V AC	4.08	+/- 15%



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Appendix 6.0

Test Ref.	Item	Test Condition	Requirements
AP2.2	9.1	The largest conductor size see table 1, shall be stripped re-shaped and then inserted into the terminal block	The conductor shall enter the the clamping unit completely without undue force
AP2.2	9.2	Three terminal blocks shall have new conductors fitted as per table 1 until they just protrude through the terminal block. They shall be positioned in such a way as to most likely allow wires to escape and then tightened to the specified torque	No wire of the conductor shall have escaped outside the clamping unit in such a manner as to reduce the creepage and clearance distances
AP2.2	9.4	Three clamping units of both the smallest and largest conductor size shall be terminated with a conductor of length H, + 75mm. The terminated conductor shall be suspended a distance H +/- 15mm from a platen with a hole in the bushing with a centreline which describes a circle of 75mm in diameter. The platen is rotated a 10 +/- 2 rotations a minute for 15 minutes. The conductor will have a mass suspended from its end. See table 2 for weights and dimensions and figure 1 for test apparatus setup.	During the test the conductor shall not slip from the terminal block
AP2.2	9.5	After test 9.4 a steady pulling force shall be applied to each connection as outlined in table 3 below for 1 min	During the test the conductor shall not slip from the terminal block
AP2.2	9.6	The terminal block screw is tightened and loosened five times on any conductor on the max or min conductor size. A new conductor is used each time the screw is loosened.	During the test the terminal block and screw shall not be damaged

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\*Note: Terminal tightening torque for all tests is 0.4Nm

Table 1, Conductor cross section Vs conductor diameter

Conductor cross section	Theoretical diameter of the conductor	
	Solid	Stranded
mm <sup>2</sup>	mm	mm
0.75	1.0	1.2
1.50	1.5	1.7

Table 2 Mass Vs conductor cross sectional area

Conductor Cross Section	Diameter of bushing hole	Height H	Mass attached to conductor
mm <sup>2</sup>	mm	mm	kg
0.75	6.5	260	0.4
1.55	6.5	260	0.4

Table 3 Pull force Vs conductor cross sectional area.

Cross Sectional Area mm <sup>2</sup>	0.75	1.55
Pull Force N	30	40

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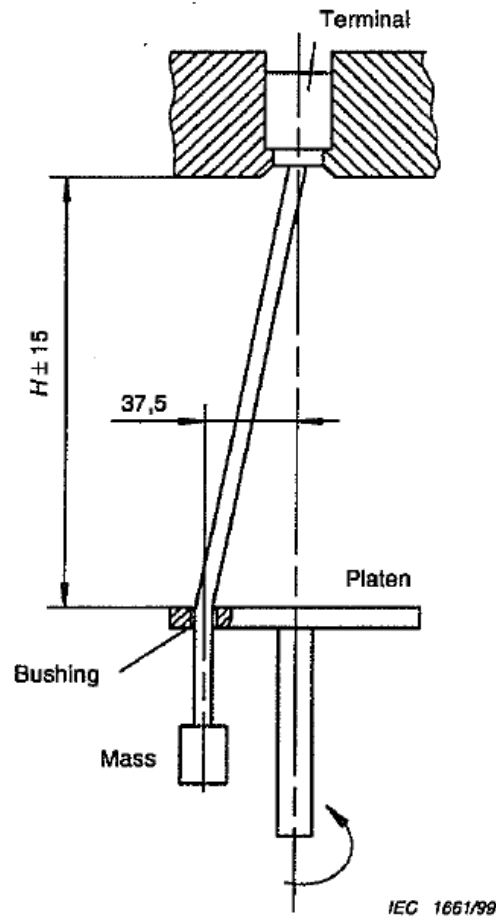


Figure 1 – Test apparatus according to 9.4

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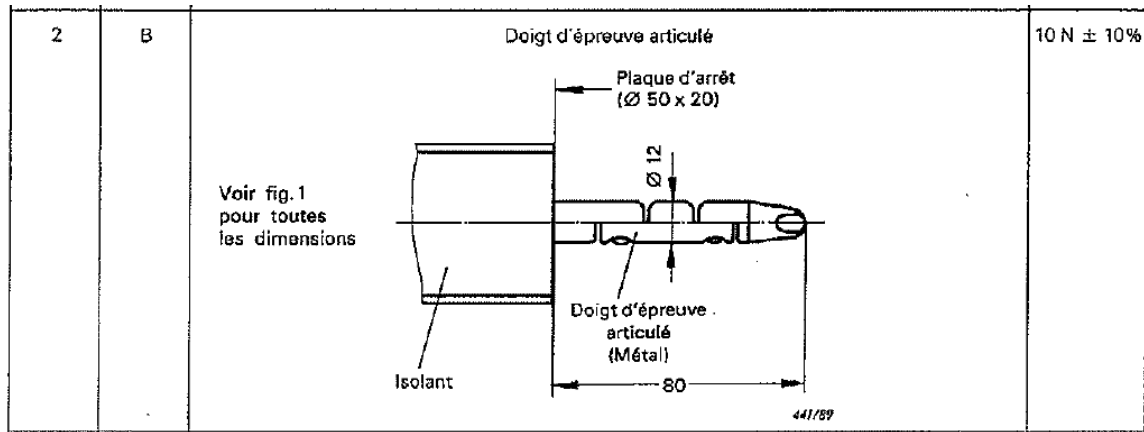


Figure 2, above shows the test probe to be used during test section BP5

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