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ГЕО 364.108 Ту
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(17) Sheets

CONNECTORS
TYPES Cω PГ , ω PГ , ωГГ-П
TECHNICAL SPECIFICATIONS
ГЕО 364.108. Ту
(Supersedo ГЕО 364.108 Ту
EDITION 1-67)

Verified by
23.2.95

I 2759 ГЕО.364.107ТУ

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These technical specifications (ТУ) deal with instrument parts of connectors and adopters, low frequency, low volt, cylindrical, threaded connections, of standard overall dimensions, sealed, types СШРГ, ШРГ ШРГ-П having silver plated contacts designed for use in DC and AC electric circuits with frequency upto 3 mH2 at voltage upto 850 V (amplitude value) current strength upto 200A together with corresponding cable parts of connectors type СШР and ШР, which are manufactured as per ГЕО.364-107ТУ.

Numbers of sections and sub-sections, accepted in these technical specifications, conform to numbers of similar sections and subsections of ОТУ (general technical specifications)

1. CLASSIFICATIONS CONVENTIONAL DESIGNATION.

1.1. Connectors are supplied in three types, 57 standard ratings, 150 standard designs.

1.2. Connectors are supplied in modifications suitable for operation only in regions with cold temperate climate.

1.3. Designation of connectors in orders and in design technical papers should consist of coords „plug", „socket" or „adopter", conventional designation of connector and designation of these technical specifications.

Conventional designation consist of classification signs of connector.

The following elements refer to the classfication signs:

a) Type of connector (СШРГ, ШРГ, ШРГ-П);

b) Conventional dimension of body;

- СШРГ 20, 28, 32, 36, 48, 55, 60
- ШРГ 16, 20, 28, 32, 36, 40, 48, 55, 60.
- ШРГ-П 20, 32, 40, 48, 55.

c) Design modification of connectors;

- Instrument part of connector without sleeve (ПГ)
- Instrument part of connector with straight sleeve (ПГК);
- Adapter (ПГКПГ)

d) Number of contacts of connector;

- СШРГ 2-3.4.7.10.15.20.26.30.45.~~48~~ 50
- ШРГ 1.2.3.4.5.6.7.8.9.10.12.14. 15.16.20.23.26.30.31.35.45.47;
- ШРГ-П.4.10.16.26.31;

e) Type of cable connection;
- Shielded (Э)
- Unshieled (H)

f) Type of contacts (socket - Г, pin - Ш);

g) Number of combination of contacts.
- СШРГ 1.2.3.4.5.6.7.8.9
  ШРГ 1.2.3.4.5.6.7.8.9.11.13.14;
- ШГГ-ПГ-1,2,3,8.

Example of designation
plug ШРГ-20-ПКЧ ЭШ8 ГЕО.364.108Ту
socket СШРГ 20П 2ЭГ6 ГЕО 364.108 Ту
Adapter ШРГ 20 ПКП 4 ЭШ8, ГЕ О 364.108 Ту

NOTE: Instrument part of connector without sleeve and two-sided adapter plug (adapter) are conventionally designated as those designed for connecting shielded cable (classification element "Э")

2. TECHNICAL REQUIREMENTS.

Technical Requirements are as per OTY with additional and detailed information, presented in this section.

Provisions given in Items 243 to 2.4.9 OTY do not refer to connectors manufactures as per these Ty, and Items 2.1.1, 2.1.2, 243. 2-1-4. 21.5. 2, 1.6 2.17. 211.02.1.11, 2-1-1-12, 2.1.16 2.1.17; 2.2.11; 2.21.4; 2.2.15; 2.21.6; 2.2.17; 2.2.2; 2.2.3; 2.2.4.2; 2.2.4.3; 2.2.4.4; 2.2.4.5; 2.3.1; 2.41; 2.5.1; 2.6.1; 2.6.2; 2.7.1; 2.8.2; 2.8.5; 2.8.9 OTY are updated by these technical specifications.

2.1. Design.

2.1.1. To Item 2.1.1. OTY. Complete set of designing technical papers for connectors СШРГ ; ВЛ 3645 014-00Л ; ВЛ3 647.016-00П ; connectors ШРГ ; ВЛ3.645.008-00П ; ВЛ3.645.007-00П , ВЛ3.645.008-00П, ВЛ3.645-018-60П. External view, overal dimensions, mounting dimensions and compling dimensions of connectors should conform to drawings.

2.12. To Item 2.1.2. OTY. External view of connector and their parts should correspond to the samples of external view in this case;

There should be no corrosion, burrs, bulges, dents, cracks on the surface of metallic parts manufactured by machining.

Threads of parts should be even without dents and thread breaks. Threads friction surfaces of connector should be lubricated with lubricant ЦИА ТИМ-201 GOST 6267-74.

2.1.4. To Item 2.1.4. OTY force of separating socket from the test pin-gauge should be within the limits of 0.25 to 1.5 kgf.

2.1.7. To Item 2.1.7 OTY. In connectors permissible air leakage should not exceed 2 liters/hour at differential pressure upto 1kgf/cm^2.

2.1.8. To item 2,1,10 OTY It is allowed to connect wire with cross section not exceeding values given in table 1 to the wiring tail.

Table 1/--

Contact diameter mm	Internal diameter of wiring tail, MM.	Wire cross section mm^2
1.5	2.0	1.93
2.5	2.7	3.00
3.5	5.2	13.00
5.5	9.0	35.00
9.0	12.0	50.00

2.19. To Item 2-111 OTY. Connection of wires to the contact end pieces is made by soldering.

2.1.10. To item 2.1.12. OTY. Connectors have one guide key.

2.1.11. To item 2.1.16 OTY parameters of connectors should conform to the following norms;

- Force of separating socket from the test pin -gauge should not be less than 0.2 kgf.

2.1.12. To item 2.1.17 OTY parameters of connectors should conform to following norm;

- force of separating socket from test pin-gauge should not be less than 0.2 kgf

2.2. Electrical parameters.

2.2.1. To item 2.2.11 OTY Resistance of contacts of connectors should not exceed the values indicated in table 2.

2.2.2. To item 2.2.14. OTY static instability of contact resistance of terminals should not exceed the values indicated in table 2.

2.2.3. To item 2.2.15 OTY Capacitance between any adjacent contacts should not exceed 20 pF

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2.2.5. To item 2.2.17. OTY Insulation Resistance between any contact pairs and also between metallic body of coupled connector and any contact pair in normal climatic conditions should not be less than 5000 meg -ohms.

Table 2/-

Connector	Contact diameter, in mm	Resistance of contacts megohms	Static instability, meg ohms.
СШРГ	2.5	1.00	0.20
	1.5	2.50	0.20
	2.5	1.00	0.20
ШРГ	3.5	0.75	0.15
	5.5	0.30	0.06
	9.0	0.15	0.04
	1.5	3.30	0.25
ШРГ-П	2.5	1.80	0.20
	3.5	1.00	0.20

2.2.6. To item 2.2.2. OTY Electric parameters of connectors should conform to the following norms:

- Resistance of contacts not exceed the value indicted in table 2 by more than 10%.
- Insulation resistance in normal conditions is at least 1000 meg-homs .
- Contact resistance of joints should conform to norms, indicated in the technical specifications during acceptance and delivery.

2.2.7. To item 2.2.3. OTY Electric parameters of connectors should conform to the following norms:

- Resistance of contacts should not exceed the value indicated in table 2 by more that 10%.
- Insulation resistance is at least 2500 meg ohms.
- Contact resistance of joints should conform to norm, set in these technical specifications dent acceptance and delivery.

In this case temperature of heating of contacts should not exceed 50°C.

2.3. STABILITY DURING MECHANICLA EFFECTS.

2.3.1. To item 2.3.1. OTY operating condition are as per group 3 of table 2 OTY in this case:

- Vibrator loads in the frequency range from 1 to 5000 H, with acceleration not exceeding 294 m/s^2 (30g)
- impact loads:

a) Multiple impacts with acceleration not exceeding 34.3 m/S^2 (35g);

b) Single impacts with acceleration not exceeding 4905 m/S^2 (500g).

2.4. STABILITY TO CLIMATIC EFFECT:

2.4.1. To item 2.4.1. OTY operating condition are as per group 1 of table 3 OTY, in this case;

- Ambient temperature from minus 60° to +60°C.
- Atmospheric pressure from 800 to 1.10^{-6} mm mercury column.
- Increased pressure of air or other gas (except corrosive) upto 3 kgf/cm^2;
- Temperature change from minus 60° to 110°C (Considering the temperature of heating of contacts).

2.5. STABILITY TO SPECIAL EFFECTS:

- Insulation resistance in the process and after the effects of special factors should not be less than 5 meg ohms.
- Other electric parameters should conform to norms, established OTY and these technical specifications.

2.6. RELIABILITY.

2.6.1. To item 2.6.1. OTY Minimum working hours of connectors in conditions, permissibie by OTY and the technical specifications, should not be less than 700 hours. In this period connector should withstand 500 couplings and uncouplings.

2.6.2. To item 2.6.2. OTY storage period of connectors is 12 years.

2.7. Marking.

2.7.1. To item 2.7.1. of OTY (general technical specifications) It is allowed to mark technological no. of batch in addition.

2.8. Packing.

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2.8.1. To Item 2.8.1. of OTY (General technical specification). Delivery of plugs and sockets should be carried out separately paraffined paper of other equivalent material should be used for individual packing in wh ch the plugs (sockets) arewrapped.on agreement with factory -consumer it is allowed to supply plugs (sockets) without assembling the body with sleeve,and nuts, which is mentioned in supply agreement. In this case, body with complete set of parts delivered in bulk should be packed in a plyethylene packet. In this case, their proper assembly should be guaranteed by manufacturer. The weight of shipment container (box) should not exceed 40 kg.

Designing paper for packing should be prepared by manufacturer.

2.8.3. To Item 2.8.5. of OTY (General technical specification) where the pluga (sockets)are delivered without assembly of body with sleeve and nuts delivery list should be placed in individual packing (polyethylene packet)

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2.8.4. To Item 2.8.9. of OTY (General technical specification) warning marks; ~~1.6.~~ "CAUTION,FRAGILE" "TOP, DO NOT TILT", " KEEP AT DRY PLACE".

3. QUALITY CONTROL.

3.1. Quality control should be as per OTY (General technical specification) with supplements and amendments, specified in this section.

Provisions specified in Items 3.3.4.8 to 3.3.4.14 of OTY (General technical specification) donot refer to connectors manufactured according to technical specifications.
Items. 3.2.2.1; 3.2.2.2.; 3.2.2.3; 3.2.3.2; 3.2.3.7; 3.2.4.1; 3.2.4.2; 3.2.5.2; 3.2.5.3; 3.2.6; 3.3.1.1; 3.3.1.2; 3.3.1.3; 3.3.1.4; 3.3.1.7; 3.3.1.8; 3.3.1.9; 3.3.2.1.1; 3.3.2.1.3; 3.3.2.1.6; 3.3.2.5.2; 3.3.2.5.4; 3.3.3.1; 3.3.3.2; 3.3.3.3; 3.3.3.4; 3.3.3.5; 3.3.3.6; 3.3.3.7; 3.3.4.2; 3.3.4.4; 3.3.4.5; 3.3.4.6; 3.3.6.1; 3.3.7.1.1; 3.3.7.1.2; 3.3.7.1.3 OTY(General Technical specification) are updated by these Technical specifications.

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3.2. ACCEPTANCE RULES

3.2.2. qualifying test. 17

3.2.2.1. To Item 3.2.2.1 of OTY (General Technical specification) During the test as per group K-4 before testing the connectors for stability to effect of linear acceleration, perform the test for impact strength and impact stability, and after all the tests carry out the test for stability to the effect of single impacts.

3.2.2.2. To Item 3.2.2.2. of OTY (General Technical specification) For test as per groups K-1; K-2; K-11 connectors with minimum, medium and maximum number of contacts are selected. The tests are performed on equal number of connectors of each type.

3.2.2.3. To Item 3.2.2.3. of OTY (General Technical specification) tests as per group K-3 should be carried out on 50 samples, but tests a as per group K-5 are performed on samples.

3.2.3. Acceptance tests.

3.2.3.1 To Item 3.2.3.2. of OTY (General Technical Specification). Tests of connectors as per Item 2.1.5 (group C-2) should not be carried out, if the test as per Item 2.2.1.6 (group C-2) has been carried out with the use of auxiliary plugs (sockets).
Do not check connectors as per Item 2.1.8(group C-2). Conformity of the connectors to these requirements are ensured by the design and is guaranteed by manufacturer.

3.2.3.2. To Item 3.2.3.7 of OTY (General Technical Specification). Date of rechecking should be indicated additionally on label and should be marked on plug (socket).

3.2.4. Periodical tests.

3.2.4.1. To Item 3.2.4.1. of OTY (General Technical Specification). Check the connector uncoupling force as per Item 5 group П-2.

3.2.4.2. To Item 3.2.4.2. of OTY (General Technical Specification). Samples for testing the connectors as per П-1 and П-2 should be selected as per each from following design and technological group:

group I connectors, type СШРГ;
group II connector, type Ш Р Г;
group III connectors, type ШРГ-П

Every sample in the group should include:

Connectors with maximum and median number of contacts from those in production for test as per group П-1 connectors with minimum median and maximum number of contacts from those in production for test as per group П-2.

For tests as per group П-3 samples should include connectors of each type, of any standard rating.

3.2.4.3. To Item 3.2.4.3. of OTY (General Technical Specification). Tests as per group -1 should be carried out on 50 samples.

3.2.5. Tests for durability.

3.5.1. To Item 3.2.5.2. of OTY (General Technical Specification). Rules for selecting samples should correspond to the rules specified in these technical specifications for group П-1.

3.2.5.2. To Item 3.2.5.3. of OTY (General Technical Specification) Durability tests should be carried out on 20 samples.

3.2.6. Preservation tests.

3.2.6.1. To Item 3.2.6 of OTY (General Technial Specification). Rules for selection of samples should correspond to rules, specified in these technical specifications for group П-2.

3.3. Procedure.

3.3.1. Design check.

3.3.1.1. To Item 3.3.1.1.; 3.3.1.2; 3.3.1.3.; 3.3.1.4; 3.3.1.8; 3.3.1.9 of OTY (General Technical Specification). check as per Item 2.1.1. to 2.1.4; 2.1.8; 2.1.9 of OTY (General Technical Specification) should be carried out on connectors which are not coupled.

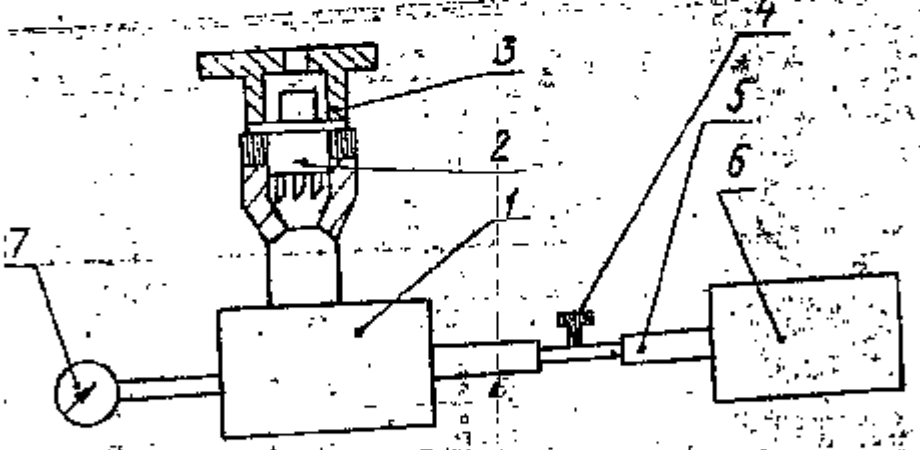
3.3.1.3. To Item 3.3.1.7 of OTY (General Technical Specification). Connectors air-tightness should be checked as per diagram, specified in drawing 4, OTY (General Technical Specification), under pressure of 1.5 atmospheres. Keep the connectors under pressure for 1 minute, after which carry out air-tightness test for 1minute. The connector is considered to pass the test if air leakage through it does not exceed 2 litres/hour.

It is allowed to fill the tray also with pertraleum jelly in addition to water and alcohol. In doing so, see that the liquid is not cooled during air-tightness test in cold condition.

It is allowed to carry out test as per diagram, given Fig.1. In this case, tests should be carried out as follows: open valve (fig 1) and feed pressure of 1.5 atmospheres from the source of

FIG. I

Air tightness test diagram



1. Tank capacity 2·5 litres
2. Connector under test
3. clamp
4. valve
5. Connecting hose
6. Source of compressed air
7. Pressure gauge.

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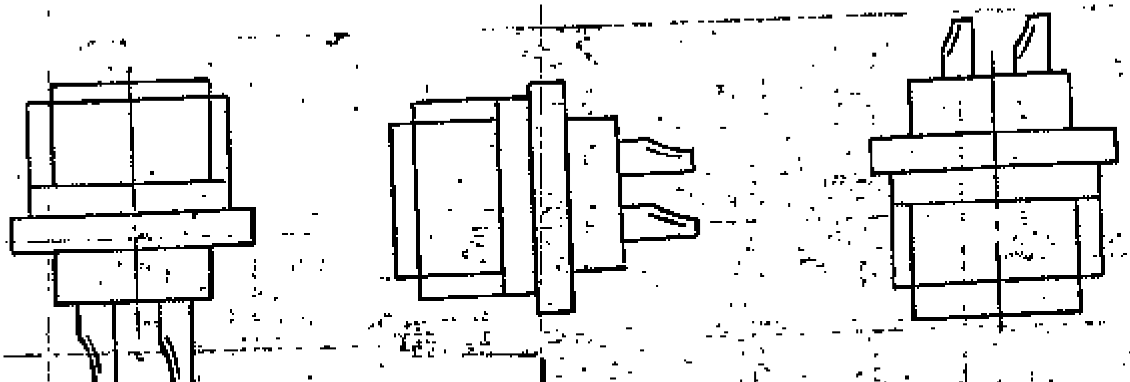

compressed air 6 to the connector. After setting up pressure, valve 4 should be closed. Leakage value is determined by variation of pressure in tank 1.

Test should be carried out for the period of 5 minutes. Connector is considered to pass the test, if pressure drop does not exceedn 10mm. Mercury coloum per minute.

Air-tightness test diagram.

1. Tank, capacity 2.5 letre.
2. Connector under test.
3. Clamp
4. Valve.
5. Connecting hose
6. Source of compressed air.
7. Pressure gauge.

3.3.2. Checking of electrical parameter.

3.3.2.1. To Item 3.3.2.1. of OTY (General Technical Specification). Potential wires are connected to hole bottoms for wire soldering. When connector with connected wires is under test, potential wires should be connected to external diameter of wiring tail at a distance of 1 to 2 MM. from insulator surface.

3.3.2.2. To Item 3.3.2.1.3 of OTY (General Technical Specifications) Use of amplifier is not compulsary, if signal amplitude value on screen of oscillograph is not less than 15 MM.

3.3.2.3. To Item 3.3.2.1.6 of OTY (General Technical Specification). It is allowed to fit isolating (PVC) tubes onto the wiring tails.

3.3.3. Stability to mechanical effects.

3.3.3.1. To Item 3.3.3.1. of OTY (General Technical Specification). To perform the test connectors are fastened at three positions specified in Fig. 2.

Positions of connectors during tests (cable part of connector is not shown)

After fastening, the connector are locked in accordance with operating instruction.

3.3.3.2. To Item 3.3.3.2 of OTY (General Technical Specification). Connectors resistance to vibration should be checked as per GOST 16962-71, procedure 102-1, index of rigidity XVIII.

- Connectors positions during tests should be as per Item 3.3.3.1 of these technical specifications.

3.3.33.To Item 3.3.3.3. Of OTY (General Technical Specification). Connectors resistance to vibration should be checked as per GOST 16962-71, procedure 103-1.1, index of regidity XVIII.

Connectors positions during tests should be as per Item 3.3.3.1 of these technical specifications.

3.3.3$. To Items 3.3.3.4. and 3.3.3.5 of OTY (General Technical Specification). Impact strength and impact stability of connectors should be checked as per GOST 16962-71, procedures 104-1, 105-1, index of rigidity II.

Test parameters:

- acceleration 35 g;
- Connectors positions during tests should be as per Item 3.3.3.1 of these technical specifications.

3.3.3.5. To Item 3.3.3.6 of OTY (General Technical Specification). Connectors stability for effect of single impacts should be checked as per GOST 16962-71, procedure 106-1, index of regidity V.

Connectors positions during tests should be as per Item 3.3.3.1 of these technical specification.

3.3.3.6. To Item 3.3.3.7. of OTY (General Technical Specifications) Connectors stability for the effect of linear acceleration should be checked as per GOST 16962-71, procedure 107-1, acceleration value 200g. Connectors positions during tests should be as per Item 3.3.3.1 of these technical specifications.

3.3.4. Test for compliance with requirements for stability to climatic effects.

3.3.4.1. To Item 3.3.4.2 of OTY (General Technical Specification). Temperature of +110°C should be set in heat chamber.

3.3.4.2. To Item 3.3.4.4. of OTY (General Technical Specification). Hygro-stability of connectors should be checked as per GOST 16962-71, procedures 207-2, 208-2. Duration of treatment in chamber of humidity during prolonged effect is 10 days.

-temperature in chamber of humidity should be + 25 ± 2°C;

-Connectors, used for checking as per Items 3.3.2.3.1 of OTY, should not be subjected for checking as per Items 3.3.2.1.6, 3.3.2.1.7 of OTY (General Technical Specifications).

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3.3.4.3. To Item 3.3.4.3. of General Technical Specifications. Connectors stability to effect of temperature change should be checked as per GOST 16962-71, procedure 205-1.
temperature of -60°C should be set in the cooling chamber.
Temparature of + 110°C should be set in the heating chamber.

3.3.4.4. To Item 3.3.4.6. of General Technical Specifications. Connectors stability to decreased atmospheric pressure should be checked as per GOST 16962-71, procedure 209-1.

3.3.6. Wear-resistance test.

3.3.6.1. To Item 3.3.6.1 of General Technical Specifications. After every 30 couplings of connectors it is necessary to keep them for 10 minutes. Torque of union nut should be checked only during qualifying test.

Values of parameters which determine serviceability should meet Items 2.1.11,

2.2.6. of these technical specifications.

3.3.7. Reliability Test.

3.3.7.1. To Item 3.3.7.1.1. of General Technical Specifications. During the test for reliability conditions, scope, test sequence and time intervals for checking parameters should be as per table 16 of General Technical Specifications.

before test, in the process of and after the test only parameters specified in table 16.

General Technical Specifications in column parameters to be checked and checking procedure" Torque of union nut should be checked only during qualifying tests.

3.3.7.2. To Item 3.3.7.2.1 of General Technical Specifications. During the test for durability, conditions, scope test sequence and periodicity of measurement should be as per table 16 of General Technical Specifications.

before the test, in process and after test only parameters, specified in table 16 of General Technical Specifications, in column "parameters to be checked and checking procedure should be checked.

Test for determining 95% of the service life should be carried out on connectors, which have passed the test for durability with cyclic repetition of the effective factors, specified in table 16 of General Technical Specifications, without repeating 10% of coupling-uncoupling at the begining of each cycle and by carrying out 5% of coupling-uncoupling in stead of 90% at the end of each cycle, 95% of the sevice life is determined as the testing period equal to the mean time interval between the first and second failures.

3.3.7.3. To Item 3.3.7.1.3. of General Technical Specifications. Before and after the test for the torque of union nuts should not be checked.

4. TRANSPORTATION AND STORAGE.

4.1. Requirements for transportation and storage conditions should be as per General Technical Specifications with supplements and ammendments set out in this section

Provisions specified in Item .

4.2. of General Technical Specifications, are updated by this technical specifications.

4.2. To Item 4.2. of General Technical Specifications. When storing connectors in unheated ~~store~~ store hours and under sheds and also when they are mounted on equipment of unprotected objects, storage periods should comply with those given table 3 depending on the storage conditions.

Table 3

Place of storage	Connectors storage time, year		
	Manufacturing package	Mounted on equipment (in unprotected object)	As part of equipment and SPTA (in airtightned package)
Unheated storehouse.	3	3	6
Under the shed.	3	3	6
On open site	Storing is not allowed		6

5. INSTRUCTIONS FOR USE.

5.1. Instructions for use are given in General Technical Specifications.

5.2. While mounting it is not allowed to assemble sleeves of one technological batch with bodies of an other technological batch.

5.3. It is allowed to operate connectors in condition of air humidity of upto 98% at temperature + 40°C without moisture condensation for 10 days at minimum operating period with in the limits of storage term. In this case surface corrosion in the form of small white spots, easily removed with dry cloth fogging of anodized surfaces are possible on metal parts, and also reducing of insulation resistance to 2 megohms are allowed.

5.4. It is allowed to operate connectors at minimum current of $1 \cdot 10^{-7}$A and minimum e.m.f. of terminal circuit of $1 \cdot 10^{-3}$V.

REMARKS: The specified minimum current and e.m.f. values are given without consideration for the effect of possible leakage currents, induced currents, etc which should be taken into account by the consumer in each specific case.

6. REFERENCES.

6.2. To Item 6.2. of General Technical specifications 95% service life of connectors in conditions allowed by these technical specifications equal to 2000 hours and 500 coupling — uncoupling cycles.

6.3. Relation between overheating temperature of connector contacts and current load is given in table 4.

% of current load on contacts.	100	90	80	70	60	50
Overheating temperature of contacts, °C, not exceeding.	50	58	41	35	27	22

6.4. Relation between minimum operation time of connectors and ambient temperature and current load is given in table 5.

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Table 5

Connector temperature with account of over-heating (ambient temperature + overheating temperature), °C	96	87	82	77	65	55	47	42	37	30
Minimum operating time of connectors in hours.	1000	2000	3000	5000	10000	15000	20000	25000	50000	100000

7. GAURANTEE OF SUPPLIER.

7.1. Gaurantee of supplier are as per General Technical Specifications.

x.x.x.x.x.x

Typed by M.B.Jayanthi.

NO:86255/OFPM/PDO/87-88 NOTIFICATION NO.95

Date:09.11.87.

NOTIFICATION OF AMENDMENTS TO SPECIFICATIONS

The following cofrections/Amendments are now required to be carried out in the documents as below:

Documents details : EO.364.108TY

OFPM Regn.No. : I 2759

Details of amendments:-

Sl.No. Details

1. Ref : page No.2, first paragraph, second line

Delete: 'Adopter'

Add : 'Adapter'

2. Ref : page No.3, 2.1.1, Fifth line

Delete: 'Compling'

Add : 'Coupling'

3. Ref : page No.5, 2.2.5, 3rd line

Add : Letter 'i' after 'el' and before 'matic'

to read as 'elimatic'

4. Ref : page No.6, 2.7

Delete: 'Msrking'

Add : 'Marking'

5. Ref : page No.12, second line

Delete: 'bariation'

Add : 'Variation'

6. Ref : page No.12

Delete: 'Air tightness test diagram' and below given inscriptions from 1st to 7th, as that is given on page No.10 is repeated again on page 12.

CI/ICV.

AWM/PDO