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12 sheets

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CONNECTORS
TYPES РСГАТВ, РСГБАТВ, РСГТВ, РСГБТВ, РСАТВ, РСБАТВ, РСТВ, РСБТВ

Specifications

АВ0.364.047 ТУ

CONTROLLERATE OF INSPECTION
(INFANTRY COMBAT VEHICLES)
SECUNDERABAD

These Specifications cover the audio-frequency low-voltage cylindrical subminiature sealed connectors of types РСГАТВ, РСГБАТВ with gilded pins and РСГТВ, РСГБТВ with silver pins, as well as the unsealed connectors of types РСАТВ, РСБАТВ with gilded pins and РСТВ, РСБТВ with silver pins, used for operation in the electric circuits of direct, alternating and pulse (pulse duration ranging from 1 s to 60 s) currents at a frequency of up to 3 MHz.

N o t e. Deleted from the Specifications are the connectors of types РС, РСГ, РСВ, РСГВ, РСА, РСГА, РСГБА which had been manufactured for operation under temperate and cold climatic conditions, since they are fully interchangeable with the all-weather version connectors of types РСТ, РСГТВ, РСБТВ, РСГБТВ, РСАТВ, РСГАТВ, РСБАТВ, РСГБАТВ, respectively.

Each connector consists of two parts: sealed, or unsealed plug and unsealed receptacle.

The sealed or unsealed type of the connector is determined by its plug.

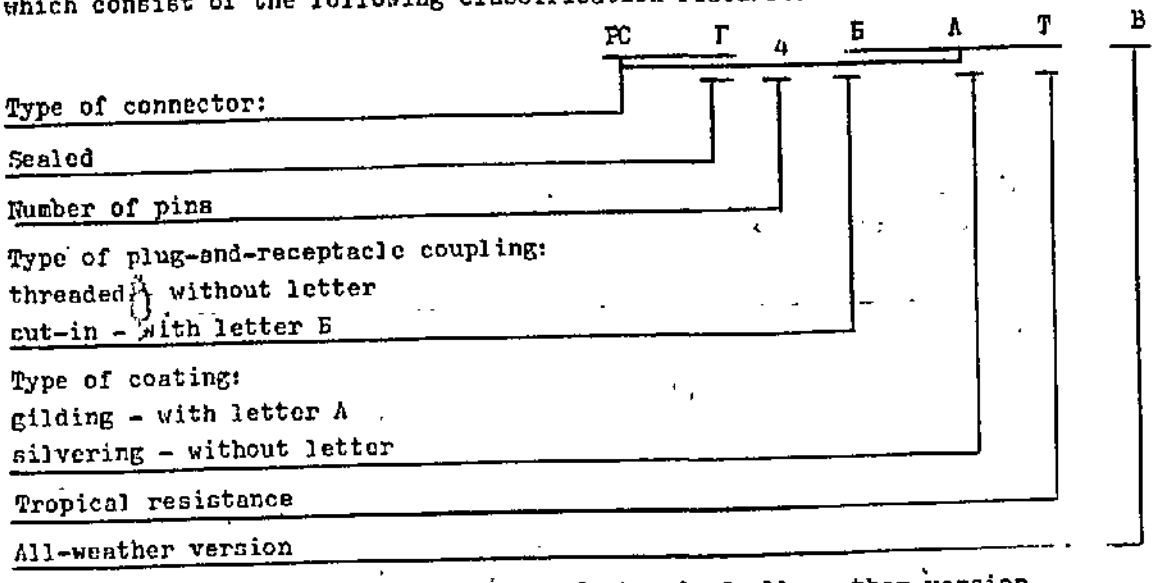
These Specifications are supplement to and amendment of publication ГОСТ В 21269-75 "Audio-Frequency Cylindrical Connectors Rated at Voltage up to 1500 V. General Specifications".

The numbering of sections and subsections in these Specifications is in compliance with that in the General Specifications.

1. CLASSIFICATION AND DESIGNATION

1.1. The connectors of 8 types, 48 standard ratings and 192 standard designs are delivered.

The plugs and receptacles of the connectors are assigned the designations (codes) which consist of the following classification features:



1.2. The connectors shall be manufactured of all-weather version.

1.3. In the delivery orders and design papers, the designation of plugs and receptacles of connectors shall consist of word "Plug" (or "Receptacle") and designation of standard design determined by standard rating, e.g.: Plug РСГ4АТВ АВО.364.047 ТУ.

If an encased plug or receptacle is required, word "encased" is added.

2. TECHNICAL REQUIREMENTS

The technical requirements are in accordance with ГОСТ В 21269-75 with the supplements and amendments set forth in this Section.

The provisions stipulated in Items and Subitems 2.1.6, 2.2.1.2, 2.4.8, 2.4.9 of the General Specifications do not cover the connectors to be manufactured according to these Specifications. Items 2.4.6 and 2.4.7 of the General Specifications do not apply to the connectors of types РСГБАТВ, РСГБТВ, РСБАТВ, РСБТВ. Items and Subitems 2.1.1 through 2.1.5, 2.1.7, 2.1.10, 2.1.11, 2.1.12, 2.1.16, 2.1.17, 2.2.1.1, 2.2.1.5, 2.2.2, 2.2.3, 2.2.4.2 through 2.2.4.5, 2.3.1, 2.4.1, 2.5.1, 2.6.1, 2.6.2, 2.7.1, and 2.8.11 of the General Specifications are supplemented by these Specifications.

2.1. Construction

2.1.1. Supplement to Item 2.1.1 of the General Specifications. The set of design papers should consist of the following documents:

ВЛ3.645.048 Сп thru ВЛ3.645.052 Сп
ВЛ3.647.044 Сп thru ВЛ3.647.047 Сп.

2.1.2. Supplement to Item 2.1.2 of the General Specifications. The appearance of the connectors (plugs and receptacles) and their parts should be in compliance with the appearance models and (or) the appropriate technical descriptions.

2.1.3. Supplement to Item 2.1.3 of the General Specifications. The mass of the connectors (plugs and receptacles) should not exceed the established values.

2.1.4. Supplement to Item 2.1.4 of the General Specifications. The connector unmating force should be within the range from 0.3 N to 0.8 N (from 0.03 kgf to 0.08 kgf).

Note. Some jacks are allowed to have the unmating force up to 0.98 N (0.1 kgf): one jack in 4- and 7-jack receptacles, two jacks in 10- and 19-jack receptacles, 3 jacks in 32-jack receptacles, 5 jacks in 50-jack receptacles, provided the connector unmating force is kept within the standards of these Specifications.

2.1.5. Supplement to Item 2.1.5 of the General Specifications. The connector unmating forces should not exceed the established values.

The thread and the friction parts of the connector coupling nut should be lubricated with grease ЦИАТИМ-221 ГОСТ 9433-60.

2.1.6. Supplement to Item 2.1.7 of the General Specifications. For the plugs of types РСГАТВ, РСГБАТВ, РСГТВ, РСГБТВ, the air leakage should not exceed 0.01 ℓ/h at a differential pressure up to 99066 Pa (1 kgf/cm^2).

2.1.7. Supplement to Item 2.1.10 of the General Specifications. The end pieces of the pins should permit the connection of wires with cross-section not exceeding 0.5 mm^2.

2.1.8. Supplement to Item 2.1.11 of the General Specifications. The wires should be connected to the end pieces of the pins by the soldering method.

2.1.9. Supplement to Item 2.1.12 of the General Specifications. The construction of the connectors should be provided with one sliding key.

2.1.10. Supplement to Item 2.1.16 of the General Specifications. The parameters of the connectors should be in compliance with the following standards:

- the jack unmating force should be at least 0.2 N (0.02 kgf);
- the connector unmating force should not exceed 110 per cent of the standard;
- for the plugs of types РСГАТВ, РСГБАТВ, РСГТВ, РСГБТВ the air leakage through the plug should not exceed 0.3 ℓ/h at a differential pressure up to 99066 Pa (1 kgf/cm^2).

The darkening of the pins in the shape of some points and spots, as well as the change in colour of coats and paints of connector parts, which does not cause the worsening of the connector operation, are allowed.

2.1.11. Supplement to Item 2.1.17 of the General Specifications. The parameters of the connectors should be in compliance with the following standards:

- the jack unmating force should be at least 0.2 N (0.02 kgf);
- the connector unmating forces should not exceed 105 per cent of the standards specified in Appendix 1;
- for the plugs of types РСГАТВ, РСГБАТВ, РСГТВ, РСГБТВ, the air leakage through the plug should not exceed 0.2 ℓ/h at a differential pressure up to 99066 Pa (1 kgf/cm^2).

The darkening of pins in the shape of some points and spots, as well as the change in colour of coats and paints of connector parts, which does not cause the worsening of the connector operation, are allowed.

2.2. Electrical Parameters

2.2.1. Supplement to Subitem 2.2.1.1 of the General Specifications. The resistance of connector pins should not exceed 5 megohms.

2.2.2. Supplement to Subitem 2.2.1.5 of the General Specifications. The capacitance should not exceed 6 pF.

2.2.3. Supplement to Item 2.2.2 of the General Specifications. The electrical parameters of the connectors should be in compliance with the following standards:

- the insulation resistance should be at least 1000 megohms under normal climatic conditions, 50 megohms at a maximum positive temperature, 5 megohms in long moisture and 20 megohms in short moisture conditions.

2.2.4. Supplement to Item 2.2.3 of the General Specifications. The electrical parameters of the connectors should be in compliance with the following standards:

- the insulation resistance should be at least 1000 megohms.

2.2.5. Supplement to Subitem 2.2.4.1 of the General Specifications. The minimum electromotive force in the circuit is 1 mV, the minimum current applied to one pin is 1 μA.

2.2.6. Supplement to Subitem 2.2.4.2 of the General Specifications. The maximum total current load applied to the connector should not exceed the established values. In this case, the temperature of the overheated pins should not exceed 20 °C.

2.2.7. Supplement to Subitem 2.2.4.3 of the General Specifications. The maximum working current applied to a single pin should not exceed 4 A. The temperature of overheated pins should not exceed 20 °C.

2.2.8. Supplement to Subitem 2.2.4.4 of the General Specifications. The maximum admissible short-term currents applied to a pin and connector should not exceed the double amount of the current. The time of the current application should not be longer than 5 min.

2.2.9. Supplement to Subitem 2.2.4.5 of the General Specifications. The maximum operating DC voltage or AC voltage amplitude should not exceed the established values, under normal climatic conditions.

2.3. Resistance to Mechanical Effects

2.3.1. Supplement to Item 2.3.1 of the General Specifications. The values of the mechanical loads applied should be as follows:

- vibration within the frequency range from 1 Hz to 2500 Hz with an acceleration not greater than 147 m/s^2 (15g);
- numerous impacts with an acceleration not greater than 490 m/s^2 (50g);
- single impacts with an acceleration not greater than 4905 m/s^2 (500g);
- linear (centrifugal) loads with an acceleration not greater than 1471 m/s^2 (150g);
- acoustic noises with a level not greater than 170 dB.

2.4. Resistance to Climatic Effects

2.4.1. Supplement to Item 2.4.1 of the General Specifications. The operating conditions of the connectors should be in accordance with group 2 of Table 3 of the General Specifications. Particularly:

- the ambient air temperature is within the range from -60 °C to +85 °C and up to +200 °C for a short period of 6 min when the current loads are applied;
- the atmospheric pressure is from 107200 Pa (from 800 mm Hg to 10^{-6} mm Hg) with the dependence taken into account;
- the relative air humidity is up to 98 per cent at a temperature of +35 °C (without condensed moisture);
- the increased pressure is up to 297198 Pa (3 kgf/cm^2);
- the temperature change is from -60 °C to +105 °C (the temperature of overheated pins is taken into account).

2.5. Resistance to Special Effects

2.5.1. Supplement to Item 2.5.1 of the General Specifications. The special effects should be in accordance with application group V specified in Table 1 of Standard HO.005.058.

The insulation resistance of the connectors during and after the effects of special factors should be at least 3 megohms.

The rest of the electrical parameters should be in compliance with the delivery and acceptance standards established by the General and present Specifications.

2.6. Reliability

2.6.1. Supplement to Item 2.6.1 of the general Specifications. The minimum service life of the connectors should be 1000 h.

During the aforesaid time the connectors should withstand 250 mating/unmating operations.

2.6.2. Supplement to Item 2.6.2 of the General Specifications. The storage term of the connectors should be 12 years.

2.7. Marking

2.7.1. Supplement to Item 2.7.1 of the General Specifications. The Manufacturer's trademark should not be marked on the connectors. The letter "B" denoting the all-weather version should be marked after the designation of the connector.

2.8. Packing

2.8.1. Supplement to Subitem 2.8.1.1 of the General Specifications. The mass of the box containing the packed connectors should not exceed 50 kg.

3. QUALITY INSPECTION

The quality inspection should be performed in compliance with ГОСТ В 21269-75, with the supplements and amendments set forth by these Specifications.

The provisions stipulated in Subitems 3.3.1.6, 3.3.2.12, 3.3.4.13, 3.3.4.14 of the General Specifications do not cover the connectors to be manufactured according to the present Specifications. Subitems 3.3.4.11 and 3.3.4.12 of the General Specifications do not apply to the connectors of types РСГБАТВ, РСГБТВ, РСБАТВ, РСБТВ. Items and Subitems 3.1.1, 3.2.2.1, 3.2.2.2, 3.2.2.3, 3.2.3.2, 3.2.4.1, 3.3.4.2, 3.2.4.3, 3.2.5.2, 3.2.5.3, 3.3.1.4, 3.3.2.5.2, 3.3.2.5.4, 3.3.3.1 through 3.3.3.4, 3.3.4.2, 3.3.4.5, 3.3.4.8, 3.3.4.10, 3.3.6.1, 3.3.7.11, 3.3.7.12, 3.3.7.13 of the General Specifications are supplemented by the present Specifications, and Subitem 3.3.1.7 thereof is supplemented for the connectors of types РСГАТВ, РСГБАТВ, РСГТВ, РСГБТВ.

3.1.1. Supplement to Item 3.1.1 of the General Specifications. The plugs of types РСГАТВ, РСГБАТВ, РСГТВ, РСГБТВ should be airtight under normal climatic conditions when the excessive air pressure of 99066 Pa (1 kgf/cm^2) is applied, i.e. the air leakage is impermissible.

3.2. Acceptance Rules

3.2.2. Qualification Tests

3.2.2.1. Supplement to Subitem 3.2.2.1 of the General Specifications. The check for strength of the nonremovable pins of the plug insulator is not performed according to Item 6 of group К-6. The conformity to this requirement is ensured by the construction and guaranteed by the Manufacturer.

The tightness check of the connectors of types РСГАТВ, РСГБАТВ, РСГТВ, РСГБТВ according to Item 5 of group К-2 should be performed under normal climatic conditions.

The check of the unmating force of the connectors of types РСТВ, РСАТВ, РСГТВ, РСГАТВ according to Item 5 of group К-4 should be performed upon completing the tests according to this group.

3.2.2.2. Supplement to Subitem 3.2.2.2 of the General Specifications. To perform the tests according to groups K-9, K-10 and K-11, the connectors of any standard construction may be selected.

3.2.2.3. Supplement to Subitem 3.2.2.3 of the General Specifications. To perform the tests according to groups K-3 and K-9, 50 and 20 connectors should be selected, respectively.

3.2.3. Acceptance Tests

3.2.3.1. Supplement to Subitem 3.2.3.2 of the General Specifications. The tightness check of the connectors of types РСГАТВ, РСГБАТВ, РСГТВ, РСГБТВ according to Item 2 of group С-3 should be performed under normal climatic conditions.

3.2.4. Periodical Tests

3.2.4.1. Supplement to Subitem 3.2.4.1 of the General Specifications. The check of the unmating force of the connectors of types РСТВ, РСАТВ, РСГТВ, РСГАТВ according to Item 5 of group П-2 should be performed upon completing the tests according to this group.

3.2.4.2. Supplement to Subitem 3.2.4.2 of the General Specifications. To perform the tests according to groups П-1 and П-2, the connectors are subdivided into four constructive and manufacturing groups:

group 1 - types РСГАТВ, РСГТВ;

group 2 - types РСАТВ, РСТВ;

group 3 - types РСГБАТВ, РСГБТВ;

group 4 - types РСБАТВ, РСБТВ.

Each group should include all the standard ratings of the connectors being manufactured and all the types of the connectors in approximately equal quantity.

N o t e. It is allowed to perform the tests of only groups 1 and 3 with their results applicable to groups 2 and 4, respectively, without regard for the failures due to poor tightness.

To perform the tests according to group П-3, the connectors of any standard constructions may be selected.

3.2.4.3. Supplement to Subitem 3.2.4.3 of the General Specifications. To perform the tests according to group П-1, 50 connectors should be selected.

3.2.5. Durability Tests

3.2.5.1. Supplement to Subitem 3.2.5.2 of the General Specifications. To perform the durability tests, the connectors should be subdivided into the following four constructive and manufacturing groups:

group 1 - types РСГАТВ, РСГТВ;

group 2 - types РСАТВ, РСТВ;

group 3 - types РСГБАТВ, РСГБТВ;

group 4 - types РСБАТВ, РСБТВ.

Each group should include all the standard ratings of the connectors being manufactured and all the types of the connectors in approximately equal quantity.

N o t e. It is allowed to perform the tests of only groups 1 and 3 with their results applicable to groups 2 and 4, respectively, without regard for the failures due to poor tightness.

3.2.5.2. Supplement to Subitem 3.2.5.3 of the General Specifications. To perform the tests, 20 connectors should be selected.

3.3. Testing Methods

In performing the tests, be guided by Technical Description and Operating Instructions ABO.364.010 TO.

3.3.1. Construction Check

3.3.1.1. Supplement to Subitem 3.3.1.4 of the General Specifications. The drawing of the check pin gauge is illustrated in Appendix 5.

3.3.1.2. Supplement to Subitem 3.3.1.7 of the General Specifications. It is allowed to neglect the check of the body flange for tightness.

It is allowed to check the connectors for tightness a minute after the air has been supplied for a minute.

3.3.2. Checking of Electrical Parameters

3.3.2.1. Supplement to Subitem 3.3.2.5.2 of the General Specifications. The temperature of overheated pins should be measured on the pins proper. The circuits should be fed with current in this case.

3.3.2.2. Supplement to Subitem 3.3.2.5.4 of the General Specifications. The current in each circuit should be increased double, and the connectors should be kept under such a load for 5 min.

3.3.3. Resistance to Mechanical Effects

3.3.3.1. Supplement to Subitem 3.3.3.1 of the General Specifications. The waterproofness check is not required.

The tightness check of the connectors of types РСАТВ, РСБАТВ, РСТВ, РСБТВ is not required.

3.3.3.2. Supplement to Subitem 3.3.3.2 of the General Specifications. The vibration tests should be performed at an amplitude of A = 1.5 mm and transition frequency of 50 Hz.

The tests by the swinging frequency method should be performed in accordance with the Plot attached (see the figure).

To perform the tests by the fixed frequency method, the frequency bands, amplitude and acceleration are shown in Table 1.

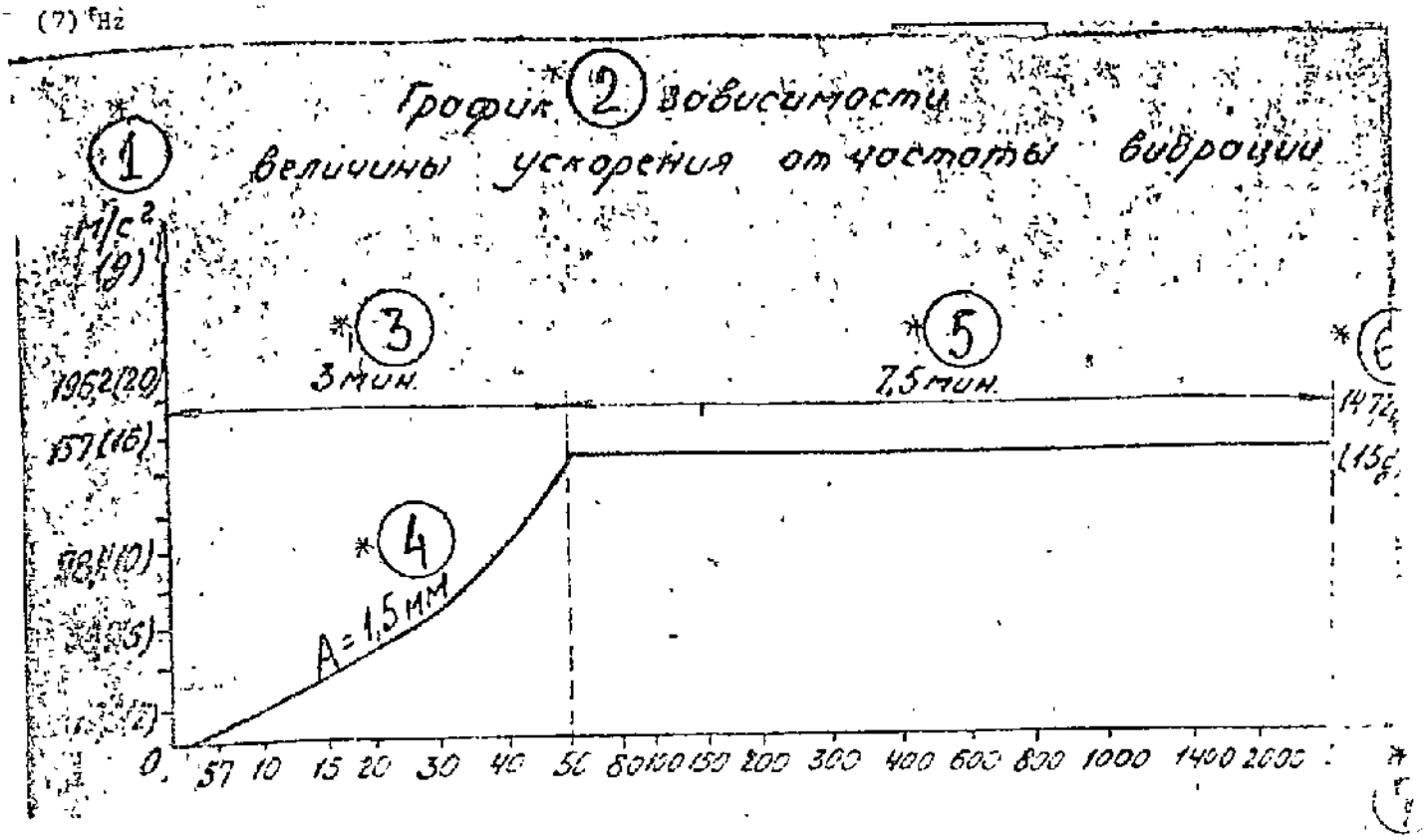
3.3.3.3. Supplement to Subitem 3.3.3.3 of the General Specifications. The vibration tests should be performed by the swinging frequency method in compliance with the Plot attached (see Fig. 1).

The tests should be performed by continuously varying the frequency from the minimum to maximum value and back, by the logarithmic law with base 10. The total time of the test is 96 h for long effect of vibration, and 12 hours for short effect of vibration.

When performing the tests by the fixed frequency method according to Item 3 of the testing record, the frequency bands, amplitude, acceleration, and the keeping time are shown in Table .

3.3.3.4. Supplement to Subitem 3.3.3.4 of the General Specifications. The impact duration should be 2 ms to 10 ms. The total number of impacts should be 10,000.

*(1) m/s^2 (g)
*(2) ACCELERATION VS VIBRATION FREQUENCY PLOT
*(3) 3 min
*(4) A = 1.5 mm
*(5) 7.5 min
*(6) 147.2 m/s^2 (15g)
(7) Hz



Frequency band, Hz ±2	Acceleration, m/s^2 (g) ±20 %	Amplitude, mm ±20 %	Time of keeping on given frequency band	
			short, min	long, h
10			50	10
10 - 20			50	10
20 - 30		1.5	50	10
30 - 40			50	10
40 - 50			40	10
50 - 80			40	8
80 - 100			40	6
100 - 150			40	6
150 - 200			40	6
200 - 300			40	6
300 - 400			40	4
400 - 600	147.2 (15)		40	3
600 - 800			30	3
800 - 1000			30	1
1000 - 1200			30	1

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Table 1, continued

Frequency band, Hz ±2	Acceleration, m/s^2 (g) ±20 %	Amplitude, mm ±20 %	Time of keeping on given frequency band	
			short, min	long, h
1200 - 1400	147.2 (15)		30	0.5
1400 - 1600			30	0.5
1600 - 2000			30	0.5
2000 - 2500			30	0.5

3.3.4. Check of Resistance to Climatic Effects

3.3.4.1. Supplement to Subitem 3.3.4.2 of the General Specifications. The check according to Item 3.3.4.1.3 should not be performed.

The check of the connectors of types РСАТВ, РСБАТВ, РСТВ, РСБТВ according to Subitem 3.3.1.7 should not be performed.

3.3.4.2. Supplement to Item 3.3.4.4 of the General Specifications. The humidity should be (95±3) per cent at a temperature of (+40±2) °C. The keeping time is 56 days during long effect and 10 days during short one.

After the long effect of the increased humidity, the spot corrosion on the metallic parts of the connectors is allowed.

3.3.4.3. Supplement to Subitem 3.3.4.5 of the General Specifications. The waterproofness check should not be performed.

The tightness check of the connectors of types РСАТВ, РСБАТВ, РСТВ, РСБТВ should not be performed.

3.3.4.4. Supplement to Subitem 3.3.4.8 of the General Specifications. The fungiproofness of the connectors should be checked in compliance with ГОСТ 16962-71 by method 214-1.

3.3.4.5. Supplement to Subitem 3.3.4.10 of the General Specifications. The time of keeping the connectors in the chamber is 2 days.

3.3.6. Check of Resistance to Wear

3.3.6.1. Supplement to Subitem 3.3.6.1 of the General Specifications. After every 25 connector matings, it is required to keep the connectors for cooling off, to clean the insulators and pins.

After every 50 connector matings, the grease should be renewed.

The water-proofness check should not be performed.

The tightness check of the connectors of types РСАТВ, РСБАТВ, РСТВ, РСБТВ should not be performed.

The permissible deviations from the parameters and serviceability criteria are as follows:

- the jack unmating force should be at least 0.2 N (0.02 kgf);
- the connector unmating force should not exceed 110 per cent of the standard.

The rest of the parameters and serviceability criteria should be in compliance with the standards established by the General Specifications and the present Specifications for the acceptance and delivery of the connectors.

3.3.7. Reliability Check

3.3.7.1. Supplement to Subitem 3.3.7.1.1 of the General Specifications. After the tests according to Section 2 of Table 16 of the General Specifications have been completed, the connectors should be placed in the chamber and kept at a temperature of +200 °C for 6 min. After removed from the chamber, the connectors should be kept for an hour under normal climatic conditions and checked for appearance and insulation resistance.

The check according to Section 3 of the testing sequence given in Table 16 of the General Specifications should be performed at a humidity of 98 per cent and temperature of (+40±2) °C.

The water-proofness check should not be performed.

The tightness check of the connectors of types РСАТВ, РСБАТВ, РСТВ, РСБТВ should not be performed.

The unmating force of the connectors of types РСТВ, РСАТВ, РСГТВ, РСГАТВ should be checked upon the completion of the tests.

3.3.7.2. Supplement to Subitem 3.3.7.1.2 of the General Specifications. The check according to Section 3 of the testing sequence given in Table 16 of the General Specifications should be performed at a humidity of 98 per cent and temperature of (+40±2) °C.

The water-proofness check should not be performed.

The tightness check of the connectors of types РСАТВ, РСБАТВ, РСТВ, РСБТВ should not be performed.

The unmating force of the connectors of types РСТВ, РСАТВ, РСГТВ, РСГАТВ should be checked upon the completion of the tests.

3.3.7.3. Supplement to Item 3.3.7.1.3 of the General Specifications. The check according to Subitems 3.3.1.6 and 3.3.4.1.3 should not be performed.

The tightness check of the connectors of types РСАТВ, РСБАТВ, РСТВ, РСБТВ should not be perfomed.

The unmating force of the connectors of types РСТВ, РСАТВ, РСГТВ, РСГАТВ should be checked upon the completion of the tests.

4. SHIPMENT AND STORAGE

The shipment and storage requirements should be in compliance with ГОСТ В 21269-75, with supplements and amendments as specified in this Section.

4.1. Supplement to Subsection 4.2 of the General Specifications. When the connectors are stored in unheated storerooms, as well as when they are built in the equipment of the exposed using activity, their storageability, depending on the storage places, should be in compliance with the data specified in Table 2.

Table 2

Storage place	Connector storageability term, years	
	packed by Manufacturer	built in equipment (as part of exposed using activity)
Unheated storeroom	9	9
Under shed	3	3
On open site	Storage is not allowed	-

5. HANDLING AND OPERATING INSTRUCTIONS

The handling and operating instructions should be in compliance with ГОСТ В 21269-75 and Technical Description АВО.364.010 ТО, with supplements and amendments as specified by this Section.

5.1. Supplement to Subsection 5.2 of the General Specifications. The pins located over the periphery of the insulator should be loaded with a maximum current of 4 A through the pin as established.

5.2. The receptacles are allowed to be used at a temperature of +100 °C.

5.3. It is allowed to use the connectors at a relative air humidity of up to 98 per cent and temperature of +40 °C (without moisture condensation).

6. REFERENCES

6.2. The dependence of the minimum operating hours of the connectors on the ambient air temperature at the maximum 100-percent current load corresponding to the predetermined overheating temperature of $\Delta t' = 20$ °C is shown in Table 3.

Table 3

Ambient air temperature with regard to $\Delta t'$, °C	105	90	80	65	60	55	50
Minimum operating hours of connectors	1000	5000	10,000	25,000	40,000	60,000	100,000

6.3. The pins of the connectors may withstand the pulse current frequently applied within the established values and time at intervals of at least 10 min.

If a connector has not full 100-percent current load, one should use Table 4 to determine the actual temperature of overheated pins Δt_{act} and the difference $\Delta t' - \Delta t_{act} = \Delta t$, and use Table 3 to determine the minimum operating hours of the connector, with regard to obtained correction Δt.

Table 4

Connector current load, per cent of maximum allowance established by Specifications	80	70	50	40	30	20
Temperature of overheated pins (Δt_{act}), °C, max.	14	12	10	9	6	4