

zontal or vertical vibration successively & in three mutually perpendicular positions specified in cl.3.9 and tested in each position by fixed frequency method as per the norms given in table 5.

- Table 5 - See page No 38

Vibration-strength test is conducted simultaneously with guaranteed operating time tests as per the following regimes: 1/3 of total vibration time in first position of sensor before guaranteed operating time test, 1/3 of total vibration time in second position of sensor in the middle of guaranteed operating time tests and 1/3 of total vibration time in third position of sensor after guaranteed operating time test.

After ever, 1/3 part of total vibration time visual inspection is conducted, sensor fitness for work is checked by triple ~~switching~~ <sup>switching</sup> at 22 V as per the procedure of guaranteed operating time test and also <sup>forces,</sup> working and full travels ~~forces~~ are checked as per the procedure in <sup>at</sup> cl.3.4C of these specifications.

Sensor is considered as withstood the test, if no mechanical damages, loosening of fixtures and separation of coatings are observed during visual inspection and if <sup>forces</sup> working and full travels ~~forces~~ conform to the requirements <sup>of</sup> in cl.1.2.3 of these specifications and sensor remains fit for work.

3.19

Impact-strength test is conducted & in disconnected state of sensor in the middle, of guaranteed operating time test.

It is visually inspected before the test.

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Sensor is rigidly fixed on shock machine successively in three mutually-perpendicular positions, specified in cl.3.9 and subjected to the action of impacts in each position as per the norms given in table 6.

- Table 6 - See page no. 39

Total number of impacts is equally divided for different positions of sensor.

After test, sensor is visually inspected, <sup>forces</sup> working and full travels ~~forces~~ are checked as per the procedure <sup>at</sup> in cl.3.4C of these specifications and sensor fitness for work is checked by triple <sup>switching</sup> ~~attraction~~ at 22 V as per the procedure of guaranteed operating time test.

Sensor is considered as withstood the test, if no mechanical damages, loosening of fixtures and separation of coatings are observed during visual inspection, if <sup>forces</sup> working and full travels ~~forces~~ conform to the requirements <sup>at</sup> in cl. 1.2.3 of these specifications and sensor remains fit for work.

3.20 Test under reduced ambient air pressure conditions is conducted in a pressure chamber at  $+25 \pm 10^{\circ} \text{C}$ .

Sensor is visually inspected before the test and its fitness for work is checked by triple <sup>switching</sup> ~~attraction~~ at 22 V as per the procedure of guaranteed operating time test.

a) sensor, connected in bench circuit A20-000 IM is put into pressure chamber and pressure in it is reduced to 460 mm Hg. a col. After that, 29 V power supply is fed to the bench and sensor connected in bench circuit, is kept in

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stop) must be 2-3s, in this case velocity of sensor stem movement must lie in the range of 0.02-0.12 m/s.

After feeding power supply to bench, lamp  $\Pi_1$  must glow, in case of pressing stem till stop, lamp  $\Pi_1$  must extinguish and  $\Pi_2$  glow. After each cycle of ~~actuations~~ <sup>switchings</sup> ~~forces~~ <sup>forces</sup>, working and full travels ~~forces~~ <sup>to be</sup> are checked as per the procedure ~~in~~ <sup>at</sup> cl.3.4C of these specifications.

At the end of the guarantee tests additional tests amounting to 200 ~~actuations~~ <sup>switchings</sup> of sensor are conducted at 22 V as per the condition of this clause, and also visual inspection is conducted and ~~working~~ <sup>forces,</sup> and full strokes ~~forces~~ are checked as per the procedure ~~in~~ <sup>of</sup> cl.3.4C of these specifications.

Sensor is considered as withstood the test, if it remains fit for work and ~~if it remains fit~~ <sup>forces,</sup> if working and full travels ~~forces~~ conform to the requirements in cl.1.2.3 of these specifications.

Note: Guaranteed operating time tests to be conducted with full stem <sup>travel</sup> (not less than 6 mm).

3.22

Dust-tightness test is conducted using 4 Kg fine cement powder, put into a chamber of 1x1x1 M size. Sensor is ~~located~~ <sup>placed</sup> in the chamber and tested for 5 hours during which cement powder is disturbed after every 15 minutes by air jet velocity of 10-15 m/s.

Sensor is considered as passed the test, if dust quantity noticeable by eyes ~~does not penetrate into sensor and separation of coatings is not observed.~~

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3.23 Sensor service life tests is conducted as per the procedure <sup>of</sup> in <sup>cl.</sup> 3.21 of these specifications.

Sensor is considered as passed the service life test if it remains fit for work during additional tests amounting to 100 <sup>switchings</sup> ~~switchings~~ at 22 V as per the condition <sup>at</sup> in cl. 3.21 of these specifications.

Note: Number of <sup>switchings</sup> ~~switchings~~ made during guaranteed operating time are <sup>included</sup> ~~considered~~ in service life test.

3.24 Conformance of sensor and its installation to the requirements of <sup>resistance</sup> ~~resistance~~ to destructive action of single shocks with large accelerations is confirmed by full scale tests on the <sup>article</sup> ~~machine~~ with <sup>registering</sup> ~~registration~~ in combined tests report.

3.25 Before developing the procedure of bench tests on <sup>resistance</sup> ~~stability~~ to the action of antifreeze and <sup>(POL)</sup> CH<sub>4</sub> vapours, conformance of sensor to this requirement is confirmed during full-scale tests and its operation <sup>on article</sup> ~~in the machine~~ with <sup>registering</sup> ~~registration~~ in combined tests report.

3.26 Test on the action of  $\gamma$  and  $n$  background is conducted according to a special programme and procedure agreed with the customer's representative and the enterprise conducting these tests.

3.27 Test on determination of the level of interferences to <sup>Interphone System (IS)</sup> radio-reception and <sup>TM</sup> operation is conducted as per the

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procedure and in amount agreed with customer's representative.

4. TRANSPORTATION AND STORAGE

4.1 Packed sensors may may be transported by any means of transport which ensures protection against the action of precipitations and mechanical damages.

4.2 Sensor must be stored according to the requirements of OCT B3-1164 -72 and OCT B3-2381-74.

5. INSTRUCTIONS ON OPERATION ( APPLICATION )

5.1 Sensor must be used under conditions, conforming to the requirements of these specifications.

5.2 Application of sensor must be according to GOST 2.117-71 and ~~OCT 3-10-71~~. (2)

5.3 Maintenance during operation must be conducted according to the instructions on operation of the <sup>article</sup> machine.

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6.  
6.1

SUPPLIER GUARANTEES  
Sensor must be accepted by quality <sup>inspection</sup> ~~control~~ department of  
~~supplier-organization, plant.~~

Supplier guarantees conformance of sensor to the requirements of these specifications and no-failure operation with the observance of operating, transportation and storage conditions as stipulated in specifications by the user.

Guarantee period is stipulated as 500 motor hours of operation of main engine (6000 Km of <sup>tank</sup> ~~engine~~ run).

Guaranteed storage period of sensors, preserved taking into account OCT 83-2381-74, in user stores must not exceed 5 years or in case of packing in sealed covers according to OCT-83-2331-74 not more than 8 years.

LIST OF APPENDICES

*For appendices see pages 40 to 47.*

1. List of documents referred in these specifications.
2. A 20.000 33. Sensor A 20 Schematic circuit diagram.
3. A 20.000 14-1. Sensor A 20.
4. Dimensional drawing
4. A 20.000 C 5. sensor A 20 Assembly drawing;
5. A 20.000 PM Bench-simulator. Schematic circuit diagram.

Key to the tables

Table 1

1. a-Types of tests and checks; b- Numbers of the clauses, b- Test category; d- requirements; e- procedures; f- Acceptance; g- Periodic; h- Type; i-Checking of completeness and conformance to drawings;
- 2- Vibration-strength test at fixed frequency; 3- checking

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*wiring*

correctness of ~~electrical~~ <sup>wiring</sup> ~~connection~~, assembly and functional parameters; 1-

4-Insulation resistance test; a) under normal climatic conditions; b) under high temperature conditions; c) under high humidity conditions;

5- Insulation electrical strength test, 6- Spray-proofability test; 7- Interchangeability check; 8- Test on the absence of structural parts and assembly units with resonance frequencies in sensor; 9- ~~moisture-~~ resistance test; 10- Cold-resistance test, 11- Heat resistance test; 12- Test on the action of frost and dew, 13- Test on the action of sea (salt) fog;

14- Test on the action of cyclic changes in ambient temperature; 15- Vibration-resistance test, 16- Impact-resistance test; 17- Vibration-strength test; 18- Impact-strength test;

19- Test on the action of reduced ambient air pressure: a) upto 460 mm Hg. col; b- upto 170 mm Hg col.

20- Guaranteed operating time test; 21- Dust-tightness test;

22- Service life test; 23- Test on the action of single shocks with large accelerations; 24- Test on the action of antifreeze and PCM<sup>(POL)</sup> 25- Test

on the action of  $\gamma$  and  $\beta$  background; 26- Test on the level of radio - interferences;

27 & 30- 1.2.4b; 28- 1.2.4C; 29- 1.2.4C; 31- Notations; "+" tests are conducted;

"-" tests are not conducted;

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32- Notes; 1- Sequence of conducting tests may be changed in agreement with customer's representative.

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2- Sequence of conducting vibration strength and impact strength tests is determined by the procedure of tests.

3- During periodic tests, check on the action of water is made after test on the action of dust.

Table 2 1- Sub-ranges of frequencies, Hz; 2- Amplitude; 3- Acceleration; 4- Displacement mm, 5- from 5 to 10; 6- above 10 upto 20; 7- above 20 upto 25; 8- above 25 upto 40; 9- Note: <sup>Checking</sup> ~~Monitoring~~ is done by one of the methods by acceleration or displacement.

Table 3 1- Sub-ranges of frequencies, Hz; 2- Amplitude; 3- Acceleration; 4- Displacement, mm; 5- from 10 to 20; 6- above 20 to upto 30; 7- Above 30 upto 40; 8- Above 40 upto 50; 9- Above 50 upto 60; 10- Above 60 upto 80; 11- Above 80 upto 100; 12- Above 10 upto 120; 13- corresponds to acceleration; 14- Note: <sup>Checking</sup> ~~Monitoring~~ is done by one of the methods; by acceleration or displacement.

Table 4 1- Acceleration, g; 2- Pulse duration, ms; 3- Number of impacts in each plane, not less than; 4- Rate of impacts per minute, not more than; 5- From 10 to 15.

Table 5 1- Fixed frequency Hz; 2- Amplitude; 3- Acceleration, g; 4- Displacement, mm; 5- Total test duration, hours; 6- corresponds to acceleration;

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7- Note: Monitoring is done by one of the methods; by acceleration or displacement.

Table 6 1- Acceleration, g; 2- Pulse duration, ms; 3- Total number of impacts; 4- Number of impacts per minute; 5- from 10 to 15; 6- upto 100.

Key to the appendices

Reference documents

Appendix 1. ~~List of documents referred in these specifications~~

- 1- Electrical equipment of special transport ~~machines~~ <sup>vehicles</sup>. General specifications. 2- Matching the use of ~~used~~ <sup>bought-out</sup> items; 3- Order of matching the use of ~~used~~ <sup>bought-out</sup> items;
- 4- Sodium chloride; 5- Master technical document; 6- Assembly units and parts of tracked vehicles. Methods and means of preservation.

Appendix 2. Sensor A20. Schematic circuit diagram.

- 1- ~~Symbol~~ <sup>Ref. No</sup>; 2- ~~Label~~ <sup>nomenclature</sup>; 3- Quantity; 4- Remark; 5- Micro-switch A301 HO.360.011; 6- Plug W PF20 П5Э W7 ГЕО.364.108 ТУ.

Appendix 3: Sensor A20. Dimensional drawing.

- A1- For direct actuation of micro-switch contacts, required sensor stem working stroke 1-2 mm. Force on stem in this case must be 3 kgf max.
- A2- Force, required to achieve 6 mm sensor stem ~~stroke~~ <sup>travel</sup> must be 4 kgf max.
- A3 - Transportation cap, screwed on black is not shown in the drawing
- B- Procedure of sensor adjustment and ~~control~~ <sup>check</sup> during

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its mounting on ~~object~~ *article*

B1- Before mounting sensor on object, check upper position *stroke length* and ~~movement~~ of pusher, which forms part of the ~~object~~ *article* drive ~~and~~ *pression* on sensor stem.

a) In extreme projecting(upper) position, pusher may protrude over ~~resting~~ *joint* surface for fixing of sensor by max. 3 mm or sink by max. 1 mm(see drawing).

*1mm maximum protruding is recommended*  
b) Pusher full travel from extreme projecting(upper) position to extreme removed(lower) position must be min. 2.5 mm. ;

B2- Set pusher at extreme projecting (Upper) position. Fix sensor on ~~resting~~ *joint* surface, unscrew ~~protective cap~~ *plug*, loosen screw B. Turn in screw Γ till direct actuation of micro-switch contacts(~~stop based~~ *register* on glowing of lamp or hearing of bang), then turn screw Γ further by 0.5-3 revolutions. Tighten screw B fully.

B3- Checking correctness of sensor setting;

a) in extreme projecting(upper) position of pusher, press screw B(soldered) by screw-driver, rigid support must be felt in this case.

b) in the same position, press screw Γ by screw-driver, rigid support must not be in this case (due to compression of buffer spring).

c) in extreme removed (lower) position of pusher, press screw Γ by screw-driver, rigid support must be felt in this case.

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B4- After adjustment and checking of sensor, mark screw [ (by accepted method on the ~~object~~ <sup>article</sup>), ~~put protective cap~~ <sup>screw in protective plug</sup> and ~~connect~~ <sup>tie it</sup> by wire to block screw;

- 1- Stamp; 2- Protective <sup>plug</sup> cap; 3- Block; 4- Instead of cancelled;
- 5- View A; 6- 0.35kg; 7- Serial number location; 8- Schematic circuit diagram; 9- Micro-switch A301; 10- 3 holes  $\Phi 5.3$ ;
- 11- Pusher upper position; 12- Object ~~resting~~ <sup>joint</sup> surface; 13- ~~Object~~ <sup>article</sup> pusher.

Appendix 3- Sensor A20. Assembly drawing.

1- Carry out ~~installation~~ <sup>wiring</sup> with wire of ( item 34) according to schematic circuit diagram.

2- Fix wires (item 34) by solder ПОССГ -61-0.5

GOST 1499-70 with fusing agent  $\Phi K C_n$  OCT 4. ГО. 0.33.000;

3- At the soldering places, slip ~~on~~ <sup>-over sleeves</sup> tubes of (item 35) which are marked according to the marking of block pins.

Mark ~~tubes~~ <sup>sleeves</sup> with ribbon for type writers GOST 6048-67 or ink as per the specification БКО.029.000.

4- Technical requirements on ~~electrical installation~~ <sup>wiring</sup> as per 10.010.001; 5- ~~Put~~ <sup>should be secured with</sup> screws 21, 26, 27 ~~on~~ <sup>with</sup> enamel ГФ - 92 X C series GOST 9151-75, heads of screws to be coated with same enamel.

6. Free space over screws (item 23) and stud (item 13) to be poured with compound.

7- Fix ~~plate~~ <sup>name</sup> (item 9) to casing (item 7) by compound 36-1 according to И - 212-72, ~~and stamping~~ <sup>with</sup> serial number ~~on~~ <sup>having been punched</sup> it by type П0 - 3 GOST 2930-62 and pouring it with black enamel MC -17 ТУ 6-10-1012-78. Plate surface to be coated

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with varnish AK-113 GOST 23832-79. Mark grid on the back surface of the plate; 8. Lubricate surface of stem, (item 1) by lubricant QUATHM-221 GOST 9433-60 lightly.

9- Device to be adjusted in the following manner. turn lever (~~item~~ 2) till <sup>stop</sup> support A, by turning <sup>in</sup> screw (~~item~~ 17), till direct actuation of microswitch (~~item~~ 30) contacts (actuation is <sup>registered</sup> determined on glowing of lamp, connected to terminals of block/~~item~~ 28) <sup>then further</sup> turn screw (~~item~~ 17) ~~further~~ by 1/4 revolution and solder.

Soldering of screw (~~item~~ 17) to lever (~~item~~ 2) is conducted by solder ПССУ-61-0.5 GOST 1499-70 with fusing agent ФКСН OCT 4. TO. 033.000.

Working stroke of stem (~~item~~ 1) till direct actuation of microswitch contacts must be 1 - - 2 mm.

Full travel of stem (~~item~~ 1) - 6 mm.

Force on sensor <sup>stem</sup> for direct actuation of microswitch contacts must be max. 3 kgf.

Force required for achieving 6 mm stem travel must be max. 4 kgf.

10- Article must conform to specifications A 20.000 TY.

11- ~~Specify~~ <sup>Mark after</sup> quality of soldering ~~after~~ <sup>ed</sup> checked.

12- Instead of cancelled; 13- View B; 14- 0.35 kg; 15- point g; 16- p.17; 17- p. 11.

Appendix 4: Bench-simulator schematic circuit, diagram.

1- ~~Ref. No~~ <sup>Ref. No</sup> 2- ~~Name~~ <sup>nomenclature</sup>; 3- Quantity, 4- Remarks; 5- Lamp MH26-0.1

- B - 1 TY 16-535.174- 68;

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*Fuse*

6- ~~Супер-автомат~~ ПУ-30-2 ГОСТ 3010-52;

7- Relay ТКЕ 56 ПА1 ТУ No.872-66; 8- Socket

WP20 П5 НШ7 ГЕО.364.107 ТУ

9- Sensor А 20, А 20.000 ТУ

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эффективности проведенных мероприятий или ресурса, по согласованной программе испытаний, руководствуясь видами испытаний

табл. I.

Таблица 1  
Table 1

a) Виды испытаний и проверок <i>Types of tests and checks</i>	b) Номера пунктов <i>NUMBER OF THE CLAUSES</i>	c) Категория испытаний <i>TEST CATEGORY</i>	d) Требования <i>REQUIREMENTS</i>	e) Методы <i>METHODS</i>	f) Приемочные стандарты <i>ACCEPTANCE STANDARDS</i>	g) Периодичность <i>PERIODICITY</i>	h) Типовые <i>TYPE</i>
1. Проверка комплектности и соответствия чертежам <i>CHECKING OF COMPLETENESS AND CONFORMANCE TO DRAWINGS.</i>	I.2.1, I.3.1	3.2	+	+	+		
2. Испытание на вибропрочность на фиксированной частоте <i>VIBRATION-STRENGTH TEST AT FIXED FREQUENCY</i>	I.2.2.	3.3.	+	+	+		
3. Проверка правильности электромонтажа, сборки и функциональных параметров <i>CHECKING CORRECTNESS OF WIRING, ASSEMBLY AND FUNCTIONAL PARAMETERS</i>	I.2.3.	3.4	+	+	+		
4. Испытание сопротивления изоляции: <i>INSULATION RESISTANCE TEST</i>							
a) в нормальных климатических условиях; <i>UNDER NORMAL CLIMATIC CONDITIONS</i>	I.2.4a.	3.5.	+	+	+		
б) в условиях повышенной температуры; <i>UNDER HIGH TEMPERATURE CONDITIONS</i>	1.2.4b I.2.4б.	3.5.	-	+	+		
в) в условиях повышенной влажности; <i>UNDER HIGH HUMIDITY CONDITIONS</i>	1.2.4c I.2.4в.	3.5.	-	+	+		

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Продолжение табл. I  
Continuation of Table I.

Виды испытаний и проверок	Номера пунктов		Категории испытаний		
	Требования	Методики	Приемочные	Периодические	Типовые
5. Испытание электрической прочности изоляции <i>Insulation electrical strength test.</i>	1.2.5	3.6	+	+	+
6. Испытание на брызгозащитность <i>Spray-proofability test</i>	1.2.8	3.7	-	+	+
7. Проверка взаимозаменяемости <i>Check</i>	1.2.6	3.8	+	+	+
8. Испытание на отсутствие в датчике конструктивных элементов и сборочных единиц с резонансными частотами <i>Test on the absence of structural parts and assembly units with resonance frequencies in sensor</i>	1.2.7	3.9	-	-	+
9. Испытание на влагостойчивость <i>Moisture resistance test</i>	1.2.4в	3.10	-	+	+
10. Испытание на холодоустойчивость <i>Cold resistance test</i>	1.2.8	3.11	-	+	+
11. Испытание на теплоустойчивость <i>Heat resistance test</i>	1.2.4б	3.12	-	+	+
12. Испытание на устойчивость к воздействию инея и росы <i>Test on the action of frost and dew</i>	1.2.8	3.13	-	+	+

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Продолжение табл. I  
Continuation of table I

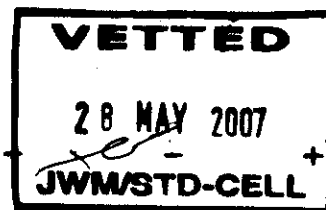
a) Вид испытаний и проверок	b) Номера пунктов	c) Категории испытаний
	d) Требу- ваний	e) Мето- дики f) Прием- сдаточн: g) перио- дическ. h) Типовне
13. <i>Test on the action of sea (salt) fog</i> Испытание на воз- действие морского (соляного) тумана	I.2.8ж.	3.14. - - +
14. <i>Test on the action of cyclic changes in ambient temperature</i> Испытание на воз- действие цикличе- ского изменения температур окру- жающей среды	I.2.8з.	3.15 - + +
15. <i>Vibration resistance test</i> Испытание на воз- мустойчивость	I.2.8к.	3.16 - + +
16. <i>Impact resistance test</i> Испытание на удар- ную устойчивость	I.2.8л.	3.17 - + +
17. <i>Vibration strength test</i> Испытание на вибро- прочность	I.2.8м.	3.18 - + +
18. <i>Impact strength test</i> Испытание на удар- ную прочность	I.2.8н.	3.19 - + +
19. <i>Test on the action of reduced ambient air pressure</i> Испытание на воз- действие понижен- ного давления ок- ружающего воздуха:		
a) <i>up to 460 mm Hg. col.</i> до 460 мм рт.ст.;	I.2.8к.	3.20а. - - +
b) <i>up to 170 mm Hg. col.</i> до 170 мм рт.ст.;	I.2.8к.	3.20б. - - +

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Продолжение табл. I  
Continuation of table I

Виды испытаний и проверок	Номера пунктов	Категории испытаний			
		Требования	Методики	Приемочные	Периодические
20. Испытание на гарантию наработку <i>Guaranteed operating time test</i>	I.2.8x				
21. Испытание на пыленепроницаемость <i>Dust-tightness test</i>	I.2.9	3.21	-	+	+
22. Испытание на ресурс <i>Service life test</i>	I.2.10	3.22	-	+	+
23. Испытание на воздействие одиночных ударов с большими ускорениями <i>Test on the action of single shocks with large accelerations</i>	I.2.8x	3.24	-	-	+
24. Испытание на воздействие антифриза и ГСМ <i>Test on the action of antifreeze and GCM</i>	I.2.8x	3.25	-	-	+
25. Испытание на воздействие и фона <i>Test on action of and background</i>	I.2.8x	3.26	-	-	+
26. Испытание на уровень радиопомех <i>Test on the level of radio-interferences</i>	I.2.11	3.27	-	-	+



11- Notations; "+" tests are conducted;

"-" tests are not conducted.

1- Sequence of conducting tests may be changed in agreement with customer's representative.

2- Sequence of conducting vibration strength and impact strength tests is determined by the procedure of tests.

3- During periodic tests, check on the action of water is made after test on the action of dust.

Таблица 2

Table 2

Поддиапазоны частот, Гц <i>Sub-ranges of frequencies, Hz.</i>	Значение амплитуды <i>AMPLITUDE</i>	
	Ускорение, <i>ACCELERATION</i>	Смещение, мм <i>DISPLACEMENT, mm</i>
От 5 до 10 <i>FROM 5 TO 10</i>	0,05 - 0,30	0,5 - 0,8
Св. 10 до 20 <i>ABOVE 10 UP TO 20</i>	0,30 - 1,00	
Св. 20 до 25 <i>ABOVE 20 UP TO 25</i>	1,00 - 2,00	
Св. 25 до 40 <i>ABOVE 25 UP TO 40</i>	2,00	0,3

Примечание. Контроль осуществляется одним из способов  
*acceleration or displacement.*

Таблица 3

Table 3

Поддиапазоны частот, Гц <i>Sub-ranges of frequencies, Hz.</i>	Значение амплитуды <i>AMPLITUDE</i>	
	Ускорение, g <i>ACCELERATION</i>	Смещение, мм <i>DISPLACEMENT, mm</i>
От 10 до 20 <i>FROM 10 TO 20</i>	1,0 - 2,0	2,0
Св. 20 до 30 <i>ABOVE 20 UP TO 30</i>	2,0 - 4,0	1,2
Св. 30 до 40 <i>ABOVE 30 UP TO 40</i>	4,0	0,6
Св. 40 до 50 <i>ABOVE 40 UP TO 50</i>	4,0 - 6,0	
Св. 50 до 60 <i>ABOVE 50 UP TO 60</i>	6,0	соответствует ускорению <i>CORRESPONDS TO ACCELERATION</i>
Св. 60 до 80 <i>ABOVE 60 UP TO 80</i>		
Св. 80 до 100 <i>ABOVE 80 UP TO 100</i>		
Св. 100 до 120 <i>ABOVE 100 UP TO 120</i>		

Примечание. Контроль осуществляется одним из способов:  
по ускорению или смещению.

NOTE: Monitoring is done by one of the methods,  
by acceleration or displacement.

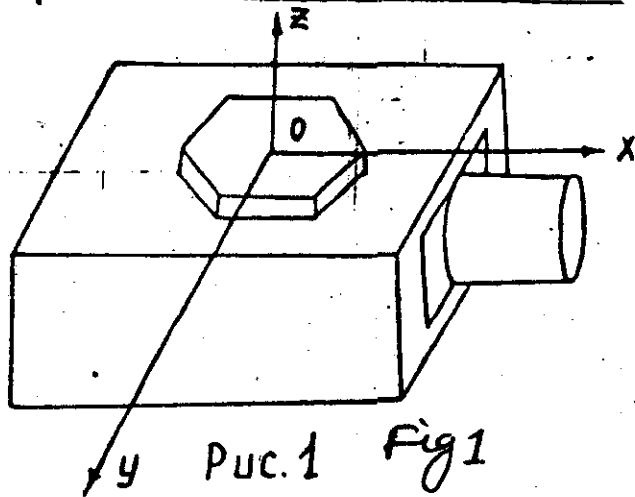
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A-20-000TY

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у Рuc.1 Fig1

Таблица 4

Table 4

1 Ускорение, $g$ ACCELERATION	2 Длительность импульса, мс PULSE DURATION, ms	3 Количество ударов в каждой плоскости, не менее number of impacts in each plane, not less than	4 Частота ударов в минуту, не более rate of impacts per minute, not more than
15	От 10 до 15 From 10 to 15	20	80

Таблица 5

Table 5

1 Фиксированная частота, Гц FIXED FREQUENCY, Hz	2 Амплитуда значения амплитуды AMPLITUDE	3 Ускорение, $g$ ACCELERATION	4 Смещение, мм DISPLACEMENT, mm	5 Общая продолжительность испытаний, час TOTAL TEST DURATION, HOURS
10	1,0	2,0		3,0
20	2,0	1,0		9,0
30	3,0	0,8		6,0
40	4,0	0,6		4,5
50		0,4		
60		0,3		
80		Соответствует ускорению CORRESPONDS TO ACCELERATION		
100				1,5
120				

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Таблица 6  
Table 6

Ускорение, g ACCELERATION, g	Длительность импульса, мс PULSE DURATION, MS	Общее количество ударов TOTAL NUMBER OF IMPACTS	Количество ударов в минуту NUMBER OF IMPACTS PER MINUTE
15	От 10 до 15 FROM 10 TO 15	2000	до 100 UP TO 100

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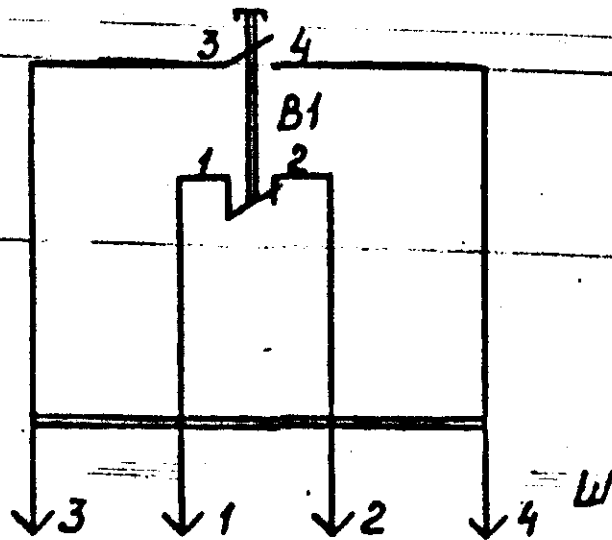
П Е Р Е Ч Е Н Ъ  
REFERENCE DOCUMENTS  
документов, на которые даны ссылки  
в настоящих технических условиях

Specs. Page No  
where related to  
documents.

Наименование документов	Обозначение документов	Номера страниц ТУ, на которых даны ссылки на документы
<i>Electrical equipment</i>		
1. Электрооборудование специальных транспортных машин. Общие технические условия	ОСТ ВЗ-1164-72	2,5,31,6
2. <i>Matching the use of bought out items.</i> Согласование применения покупных изделий	ГОСТ 2.117-71	31
3. <del>Порядок согласования применения покупных изделий</del>	<del>ГОСТ 2.10-71</del>	<del>31</del>
4. Натрий хлористый	ГОСТ 4233-66	20
5. <del>Руководящий технический документ</del>	<del>РТУЗ 160-71</del>	<del>4, 30</del>
6. Сборочные единицы и детали гусеничных машин. Методы и средства консервации	ОСТ ВЗ-2381-74	5,31

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Д20.000 33



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Ref. no.

① ПОС-ОВО-ЗНАЧЕНИЕ	② NOMENCLATURE Наименование	③ Кол. шт.	④ Примечание REMARKS
B1	⑤ MICROSWITCH Микровыключатель Д301 NO.360.011	1	
Ш	⑥ ШУЛКА ПЕЛО Колодка ШРГ20П53Ш7 ГЕО.364.108ТУ	1	

**ЕСКД**

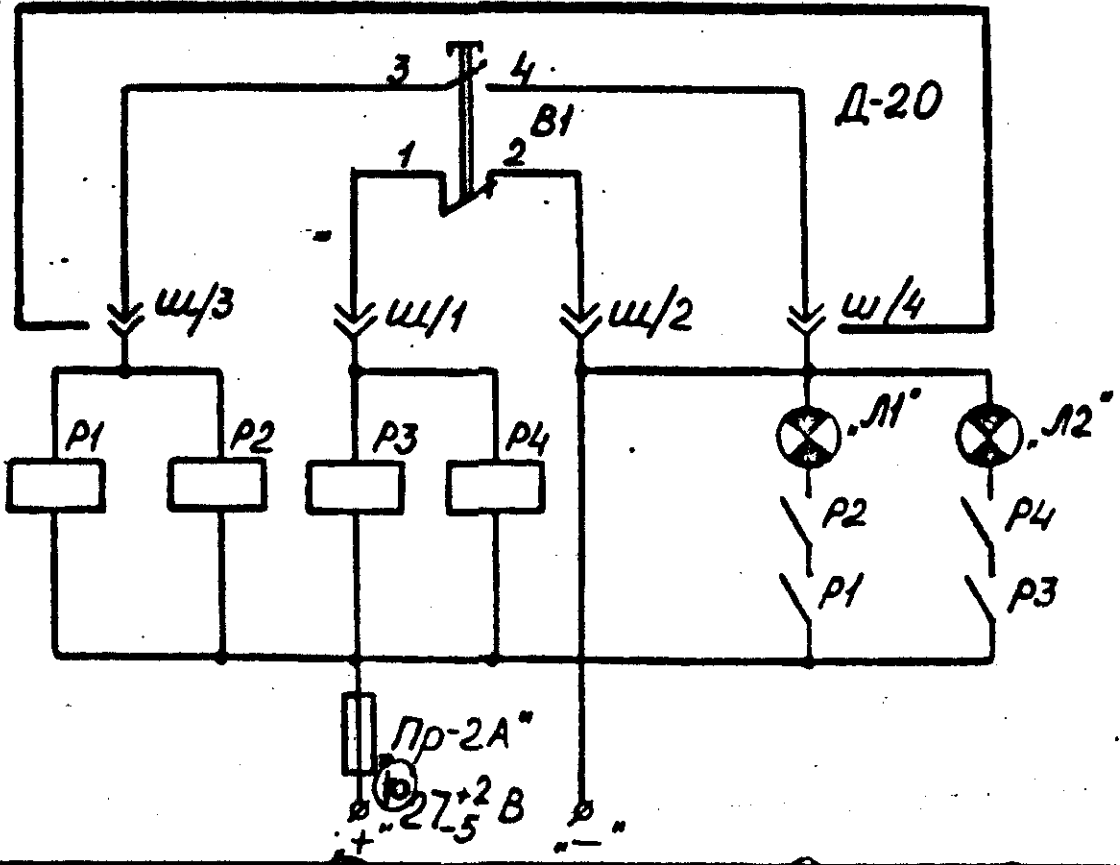
Д20.000 33		41	
3	1	НЦЛ12397-86	74.81
2	3 шт.	БД 1212-77	11.811
43	Лист	№ докум.	Год
SENSOR B-20 Датчик Д-20 SCHEMATIC CIRCUIT Схема электрическая ПЛАН принципиальная		Лист	Листов 1

23332

40

Д20.000 ПМ

28 MAY 1967  
JWMS:TD-CE  
VETTED



7 Ry. no.

703 (F) 7503 HQ символ	2 NOMENCLATURE Наименование	3 Кол. шт	4 ПРИМЕЧАНИЕ REMARKS
Л1, Л2	5 ЛАМПА МН26-0,12-В-1 ТУ16-535174-68	2	
Пр	6 Предохранитель ПЦ-30-2 ГОСТ5010-53	1	
Р1...Р4	7 РЕЛЕ ТКЕ56ПД1 ТУН°872-66	4	
Ш	8 СОКЕТ розетка ШР20П5МШ7 ГЕО.364.107 ТУ	1	
120	9 ДАТЧИК Д20 Д20.000 ТУ	1	

ЕСКД

1. АИ/12391-80	7481
НОВ 53392-78	2737
ТУСН°80СУМ	ПОТО

Д20.000 ПМ		42.	
BENCH Simulator Стенд-имитатор		Лист	Масса
Схема электрическая SCHEMATIC CIRCUIT ПРИНЦИПИАЛЬНАЯ DIAGRAM		5	(22)
		Лист	Листов

CONNECTORS OF TYPE WPF

SPECIFICATIONS

Γ EO. 364.108 TY

**VETTED**  
2<sup>o</sup> MAY 2007  
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JWM/STD-CELL

Translated by	Authenticated by	ARMoured VEHICLE PROJECT AVADI
IN/SDGC	BYKOVA	
Date	Checked by	SPECIFICATION NO: Γ EO. 364.108 TY
	<i>[Signature]</i>	
		Page No: 1 of 10
		Approved: <i>[Signature]</i>



These specifications are applicable to the <sup>device-</sup>~~instrumental~~  
<sup>mounted</sup> part of connectors of low-frequency and low-  
voltage cylindrical <sup>with</sup> threaded <sup>connection</sup> ~~parts~~ of standard sizes,  
hermetic type  $\text{UPT}$  with silver coating of contacts meant  
for working in DC or AC electrical circuits with frequencies  
up to 3 MHz at voltages up to 850 V (<sup>peak</sup> amplitude value) and  
current strength up to 200A together with the respective  
cable parts of connectors type  $\text{UP}$  to be supplied according  
to ГЭО.364.108.Т.

## 1. CLASSIFICATION, CONVENTIONAL NOTATION <sup>designation</sup>

1.1. Connectors ~~in suitable condition~~ are supplied  
for use in regions with cold and moderate climate only.

1.2. The <sup>designation</sup> ~~nomenclature~~ of connectors mentioned in the  
order and design documents should consist of word "plug" or  
"socket", ~~then the~~ <sup>designation</sup> conventional nomenclature of connector  
and the present specifications.

The conventional designation consists of classification  
<sup>features</sup> ~~indices~~ of the connector.

<sup>if</sup> The classification <sup>features</sup> ~~indices~~ include the following: ~~elements~~  
~~particulars~~:

- a) type of connector ( $\text{UPT}$ ),
- b) conventional dimension of body: -  $\text{UPT}$ : 16, 20,  
28, 32, 36, 40, 48, 55, 60;
- c) design <sup>variants</sup> ~~variations~~ of connector: - <sup>device-mounted</sup> ~~instrumental~~  
part of connector without sleeve (П),

ГЭО.364.108.Т.

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*device-mounted*  
- ~~instrumental~~ part of connector with straight sleeve (T/K);

d) number of contacts in the connector: WPF: 1, 2, 3, 4, 5, 6, 7, 9, 10

e) type of connected cable:

- shielded (>),

- unshielded (H);

f) type of contacts (plug-in socket-<sup>pin</sup>┐, plug-W);

g) combination number of contacts: - WPF: 1, 2, 3, 4, 5, 6, 7, 8, 9, 11, 13, 14;

Example of designation:

Plug WPF 20 T K 5 3 10 7 100.364.108.TY

1.3. The ~~instrumental~~ *device-mounted* part of the connector without sleeve should be conventionally designated as intended for the connection of shielded cables (classification item "A").

## 2. Basic Technical *Requirements* Specifications and Characteristics

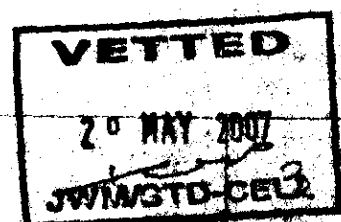
2.1. Overall, installation and assembly dimensions as well as the general view of connectors should be in conformity with drawings (see appendix I, Fig. 2.1).

2.2. The diagrams showing the arrangement of contacts in insulators, the number of contacts and their diameters should conform to appendix 2.

2.3. The ~~disjoining~~ *disconnection* forces of connectors and the torque of coupling nut in the cable portion of connector are given in appendix 2.

2.4. When the pressure drop is up to 1 kgf/cm<sup>2</sup> for connectors, the allowable leakage of air should not exceed 2 litres/hour.

TEO. 364.108.TY



2.5. To the tail ends of contacts; it is allowed to connect wires of cross-sections which should not exceed the values given in the table:

Diameter of contact, mm	Internal diameter of contact, mm	Cross-section of wire, mm <sup>2</sup>
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

2.6. The <sup>connection</sup> joining of wire to the tail ends of contacts should be done by the method of soldering.

2.7. Connectors have one <sup>to line</sup> directional key.

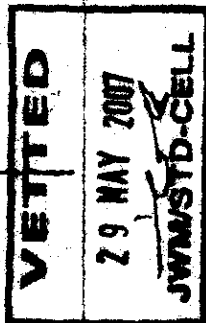
2.8. Electrical parameters.

2.8.1. Resistance of contacts, static instability of transitional resistance of contacts should not exceed in the values given in the table:

Connector	Diameter of contacts, mm	Resistance of contacts, $\frac{m\Omega}{Mohm}$	Static instability, $\frac{m\Omega}{\Omega}$
UPT	1.5	2.50	0.20
	2.5	1.00	0.20
	3.5	0.75	0.15
	5.5.	0.30	0.06
	9.0	0.15	0.04

2.8.2. The capacitance between any neighbouring contacts should not exceed 20 PF.

ГЕО 364 108 ТУ



2.8.3. The insulation resistance between any pairs of contacts and also between any pair of contacts and metallic body of jointed connector under standard climatic conditions should not be less than 5000 M.ohm.

2.8.4. The working current at the contact and maximum total current load on the connector should not exceed the values mentioned in appendix 2.

In this case, the overheating temperature of contacts should not exceed  $50^{\circ}$  C.

2.8.5. Maximum DC operational ~~voltage~~ <sup>peak</sup> voltage or the ~~applied~~ <sup>peak</sup> value of AC voltage for normal atmospheric pressure should not exceed the values mentioned in appendix 3.

2.9. Stability during mechanical effects:

- vibration loads within the frequency range 1-5000 Hz with acceleration not exceeding  $294 \text{ m/sec}^2$  (30 g);

- impact loads;

a) ~~repeated~~ <sup>multiple</sup> impacts with acceleration not exceeding  $343 \text{ m/sec}^2$  (35 g);

b) single impacts with acceleration not exceeding  $4905 \text{ m/sec}^2$  (500 g).

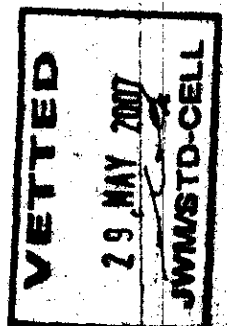
2.10. Resistance under climatic effects:

- ambient temperature from  $-60^{\circ}$  to  $+60^{\circ}$  C;

- atmospheric pressure from 800 to  $1 \times 10^6 \text{ mm}$  mercury column;

- ~~excess~~ <sup>increased</sup> pressure of air or other gas (excluding aggressive gases) up to  $3 \text{ kgf/cm}^2$ ;

- temperature changes from  $-60^{\circ}$  to  $+110^{\circ}$  C (taking account of overheating <sup>temperature</sup> of the contacts).



ГЕО 364 108 ТУ

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2.11. The minimum operating time of connectors under the working conditions and specifications allowed by these specifications should not be less than 700 hours. During the specified period, the connectors should withstand 500 connections-disconnections.

2.12. The <sup>storage</sup> preservation period of connectors is 12 years.

### 3. Storage

3.1. The <sup>storage</sup> preservation periods of connectors in manufacturer's package is 3 years when it is stored in unheated store; under a shed-3 years.

Do not store <sup>in out of doors</sup> ~~on open platform.~~

### 4. Guarantee

Suppliers ~~should~~ guarantee the conformity of each connector with the requirements <sup>of</sup> in specifications during the <sup>storage</sup> preservation period (p.2.12) or minimum operating <sup>time</sup> period (p.2.11) within the <sup>storage</sup> preservation period <sup>provided</sup> while the operating <sup>conditions</sup> least parameters are followed by the customer.

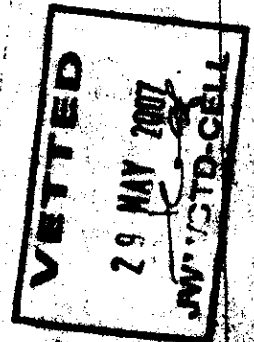
### Appendix 1

### Plug WPE

See Page - 8

<sup>Device-mounted</sup>  
Instrumental part without sleeve

- Key: 1. 4 holes  $\phi$  4, 2. Conventional designation,  
3. Dimensions in mm, 4. Massing, not more than,  
5. Fig.1



GEO 364 10879

6

Flux MET

See page - 9

*Device-mounted*

Instrumental part with straight shielding sleeve, *shielded*

Key: 1, Fig 2, 2. Massing, not exceeding

Appendix 2

See page - 10

*Conventional*

Key: 1. Tentative size of body, 2. Diagram showing the arrangement of contacts in insulator. Numbering of contacts, given: for plugs-on the side of tail end, for sockets-on the side of contacting part; 3. Conventional designation of contacts, 4. Diameter of contacts in mm, 5. Number of contacts, in pieces, 6. Combination number of contacts, 7. Nos of contacts for measurement of overheating temperatures, 8. Current load in Amp., not more than; 9. operating current on each contact, 10. Maximum load on <sup>single</sup> singular contact, 11. Total load on connector, 12. DC voltage, <sup>peak</sup> amplitude value of AC voltage in Volts, 13. <sup>operating</sup> voltage, 14. Test voltage, 15. under <sup>normal</sup> climatic conditions, 16. at 0.5 mm mercury column, 17. <sup>Disconnection</sup> forces of connectors in kgf, not more than, 18. Torque of coupling nut in kgf.cm, not more than; 19. Remarks, 20. Any

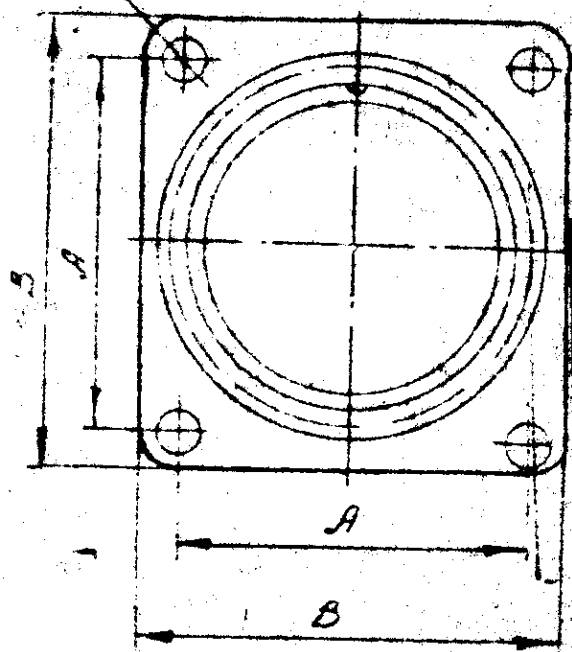
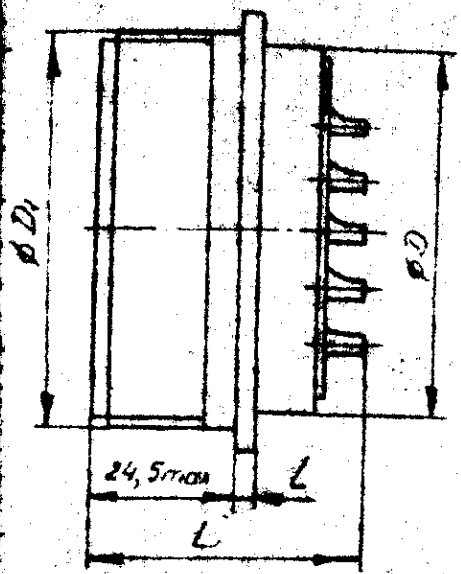
FEO 364 108 TY

7



Вилка ШРГ - PLUG UNIT  
 приборная без патрубка - DEVICE MOUNTED  
 PART WITHOUT SLEEVE

① 4 отв.  $\phi d$  - 4 HOLES  $\phi d$



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Условное обозначение CONVENTIONAL DESIGNATION	③ Размеры, мм DIMENSIONS IN MM							Масса NET WEIGHT
	D	D <sub>1</sub>	$\phi$	A	B	L	L	
ШРГ 32 П 8 Э Ш 12	32	Сп М 38 × 1,5	4,5	32	44	42		73
ШРГ 32 П 10 Э Ш 11							3,2	70
ШРГ 36 П 4 Э Ш 13	36	Сп М 39 × 1,5		34	46	66		126

⑤ Рисунок 1 FIG. 1

Продолжение приложения I  
CONT. APPENDIX I.

Вылко ЩРГ - ПЛУБ ЩРГ  
приборная с прямым патрубком экранированная

ЩРГ 20ПК53ЦЦ7

DEVICE-MOUNTED PART WITH  
STRAIGHT SLEEVE, SHIELDED.

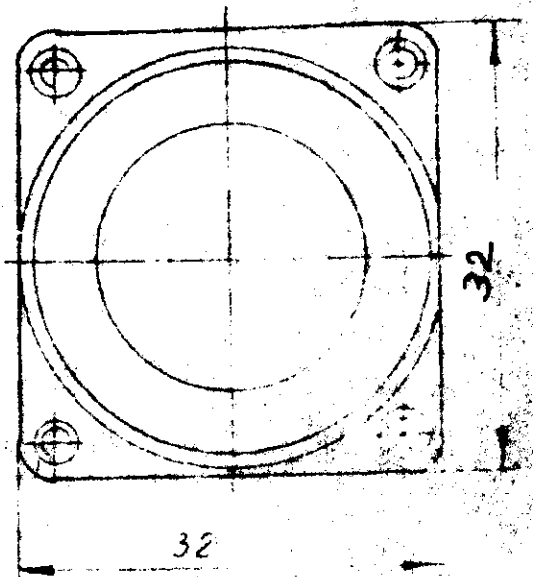
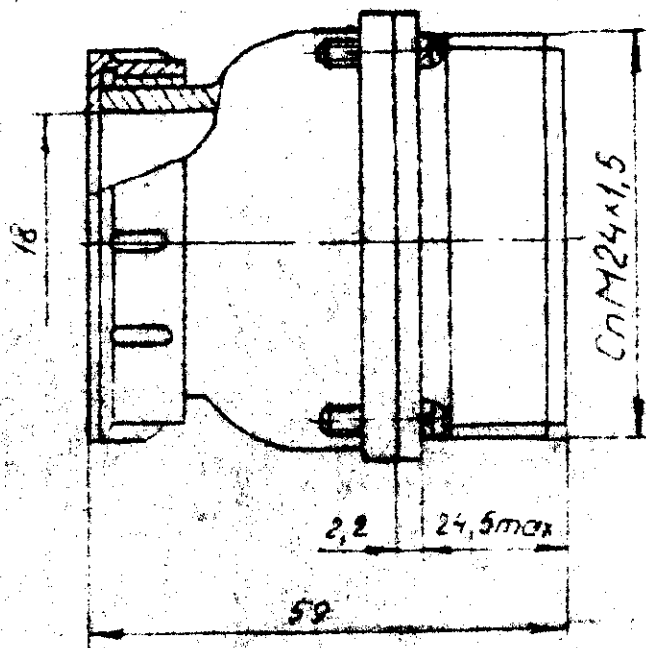


Рис. 2  
FIG. 2

Масса, не более 55  
MASS IN GRAMS NOT  
EXCEEDING - 55

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23	15	15	15	25	25	160	850	2850	350	13
6	8	5	3	10	10	10	10	2850	350	9
1	2	7	15	10	20	50	850	2550	350	4
1	3	Any	4	200	200	225	850	2650	350	11
1	1	5	1	25	35	850	850	2850	350	11

V-77-376  
 28 MAY 1967  
 UNDER-DEPT

Diagram showing the Arrangement of Contacts in inter-later. Number of Contacts is given: for Plugs - on the side of face end; for Sockets - on the side of contacting parts.

Conventional designation of Contacts.

Diameter of Contacts in mm

Number of Contacts in Pieces

Combination number of Contacts.

Nos of Contacts for measurement of over heating temperatures

Operational Current on each Contact

Maximum Load on Single Contact

TOTAL Load on Connector

Operational Voltage

Under normal Climate Condition at 0.5 mm mercury column

Disconnection for test of Connectors in kgf not more than

Torque of Coupling not kgf cm not more than

Remarks

(10)

SUPERVISOR

I - 769

ALBUM NO: 227  
 TECHNICAL PAPERS  
 FOR ARTICLE 84/0842711-03-Гб-40007  
 TECHNICAL SPECIFICATIONS  
 O NO. 360,011 TY  
 20 Sheets

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 28 MAY 2007  
*[Signature]*  
**JWM/STD-CELL**

TRANSLATED	Shivprakash		Ordnance Factory Project Hyderabad.
REVIEWED	Lebedev A		
CHECKED	L. Deva		
DATED	5 SEP 2007	APPROVED	

①

Project  
Hyderabad

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ISRO/DRDO SECURITY

SHEET 3 OF 4

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LIST  
OF CONTENTS OF ALBUM NO: 227  
INDEX 84/0848711-03-1b-40007

Serial No:	Drawing, Assembly articles No:	Description of technical paper	Drawing No (process sheet)	Number of sheets in On copy	Remarks
1.	Particular technical specifications	Miniature push button KM	0190.350 011 technical specification	18	
				1	
2.	Appendix-1			1	
3	Amendment sheets				
Total sheets				20	

Contd..3/-

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TY 11-76

MINIATURE PUSH BUTTONS  
OF KM TYPE  
PARTICULAR TECHNICAL  
SPECIFICATIONS

Ø 100.360.011TY

20 Sheets

(SUPERSEDED Ø 100.360.011TY  
EDITION 2-86)

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**JWM/STD-CELL**

Conte...4/-

present particular technical specifications, valves in miniature push buttons of type, intended for operation in DC and AC electric circuits.

Given particular technical specifications are supplementary and amendatory to GOST B 21349-75 "Push buttons and push button switches. General technical specifications; Numberation of items and subitems of these particular technical specifications corresponds to that of a valagous items and subitems of general Technical Specifications.

1. Classification, Conventional designation

- 1.1 Push buttons are manufactured in 3 designs / a unipolar locking button, a unipolar a /bipolar button of two types / standard, decorative/ in compliance with drawing 1.1.1 and table 1
- 1.2 Push buttons are supplied in two climatic designs: all climates design moderate and cold climates designs moderate and cold climates designs.
- 1.3 Conventional designations of push buttons when ordering as well as in design technical papers should consist of words "miniature push button", brief designation of push button, designation of a climatic design letter 'B' / for all climate design/ and designation of present particular technical specifications.

Example of conventional designations: miniature size push button KM A I -1Y B 0M 0.360.011 TY where KM-miniature push button:

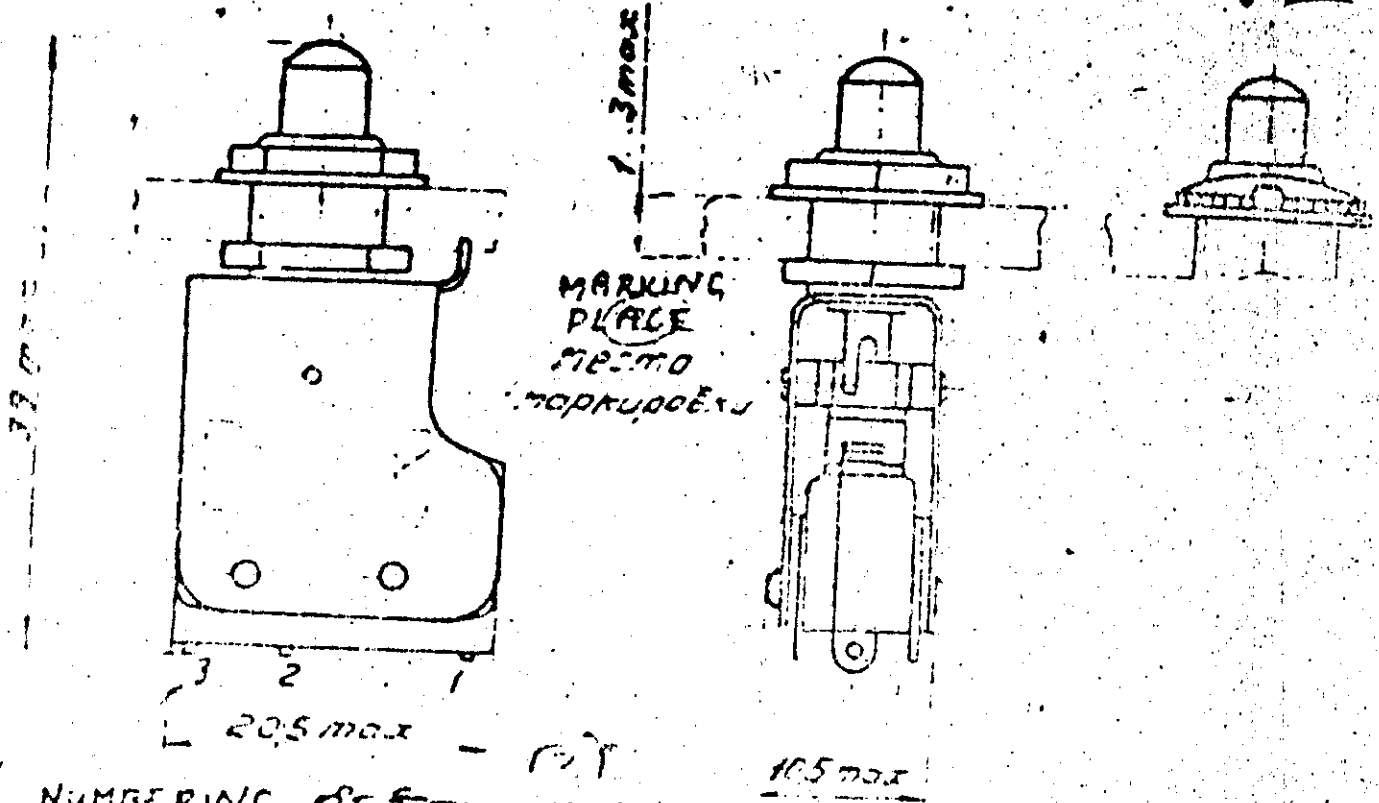
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24 MAY 2007  
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**JWM/STD-CELL**

Contd....5/-

2769 50521  
 MINIATURE PUSH BUTTONS KMA

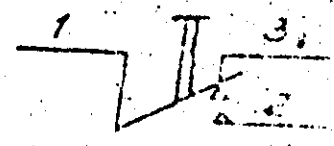
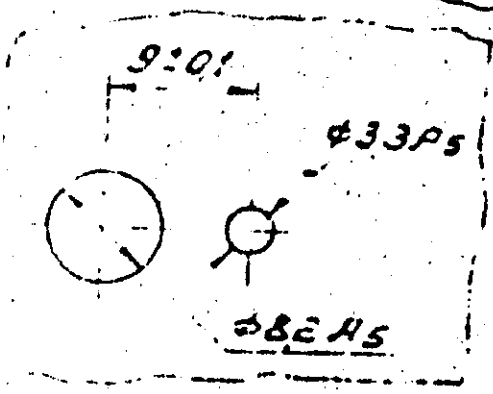
KMAI-IV

KMAII-IV



MARKING OUT FOR INSTALLATION

CIRCUIT DIAGRAM

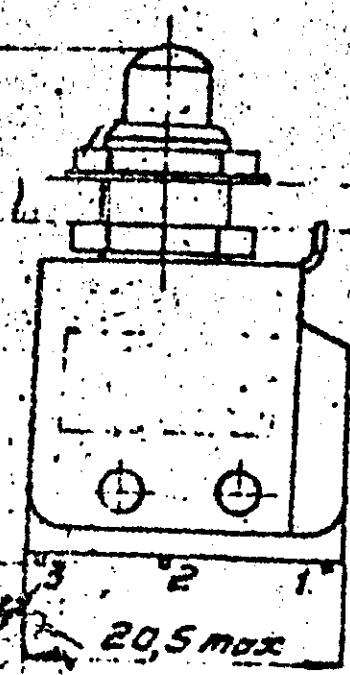


(6)  
 FIG. 1

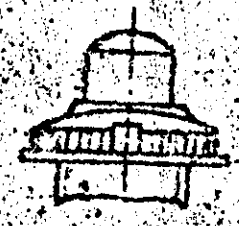
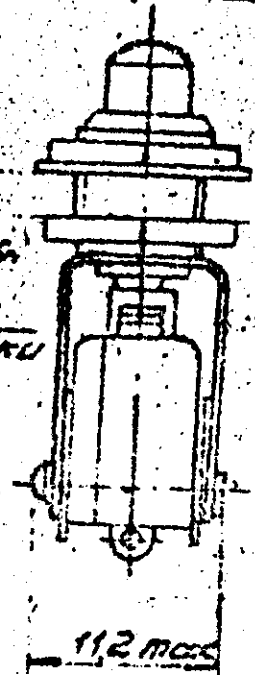
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6921 0.9 21 I  
 MINIATURE PUSH BUTTONS KMI

KMDY-T

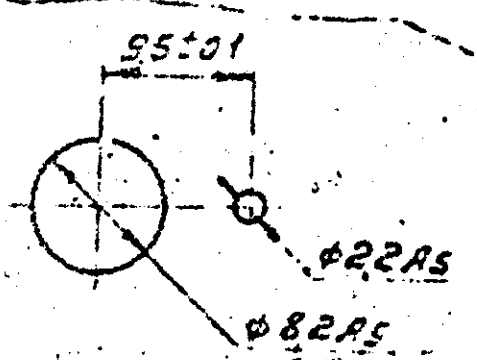


MARKING PLACE  
 ПЕЧМД  
 ПОДКЛЮЧЕНИЮ  
 (2)

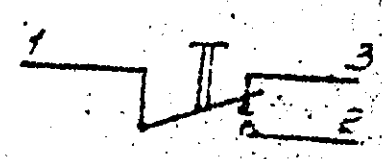


NUMBERING OF TERMINALS  
 ON BODY

MARKING-OUT FOR INSTALLATION



CIRCUIT DIAGRAM



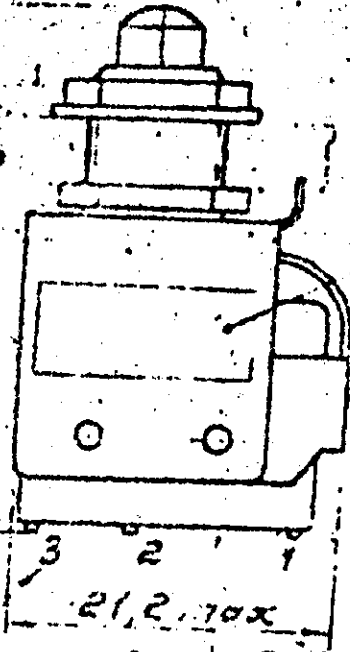
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FIG-2

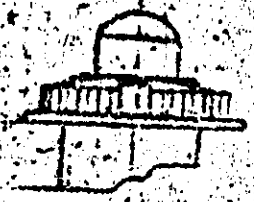
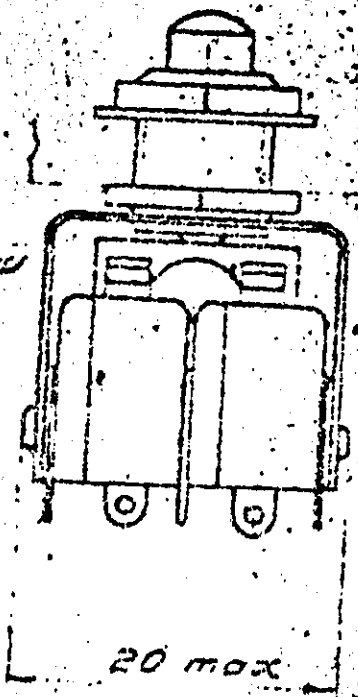
# MINIATURE PUSH BUTTONS - RM2

RM2-I

RM22-I



②  
PUSH  
BUTTON  
MARKING  
PLACE



NUMBERING OF TERMINALS  
ON BODY

MARKING FOR INSTALLATION

CIRCUIT DIAGRAM

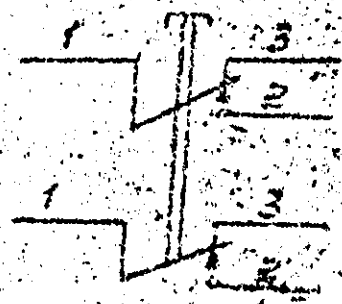
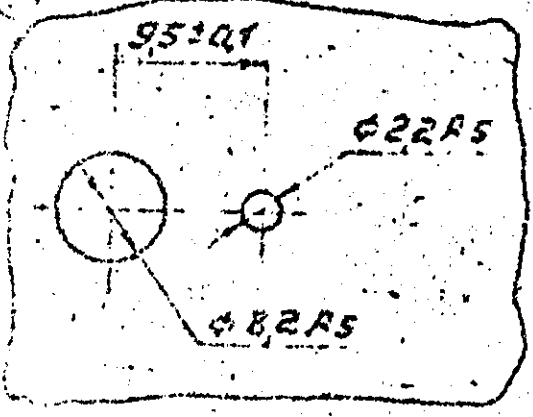
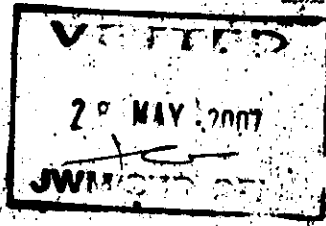


FIG-3

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- A - Locking push button
- A - Decorative type
- I - Decorative type
- I - Design type ( unipolar)



The figure after a hyphen designates a base microswitch (for KM -1, KM2-M/13-1).

Table 1

Designs	Type designation	Designation of main design document.	Switching force N(kgf)	Mass, g
Unipolar Locking push button.	KMAI-IY	0103.604.000	from 12,8/1,3/	15
KMA	KMAPI-IY	YC3.604.012	to 27,5/2,8/	14
Unipolar	KMI-I	0103,604.001	from 2,4/0,25/	11,5
KMI	KMAI-I	YC3.604.008	to 6,9/0,7/	12,5
Bipolar	KM2-1	0103.604.002	from 5,9/0,6/	16,5
KM2	KMA2-I	YB3.604.011	to 12,8/1,3/	17,5

2. TECHNICAL REQUIREMENTS

Technical requirements as per GOST B 21248-75/ General technical specifications/ with supplements and amendments given in present item.

Provisions, stated in sub items 2.1.8, 2.1.9, 2.1.10, 2.1.4/ b. of 2.1.11, 2.1.12, 2.4.6, 2.4.7, 2.4.9, of General technical specifications do not refer to push buttons manufactured as per present particular technical specifications and item 2.4.1/a/ of UTS is amended by present particular technical specifications.

2.1 DESIGN

- 2.1.1 To item 2.1.1 of general technical specifications, set of design technical papers are given in table 1.
- General view, overall, mounting and connecting diagrams are given in drawings 1,2,3.
- 2.1.2 To item 2,1,4 of general technical specifications, Mass should not exceed the values, specified in table 1.
- 2.1.3 To item 2.1.4 general technical specifications, force, directed along a terminal should be at least 19.6H/2.0 kgf/ tensile force directed perpendicular to axis of at least 4,9 H/0,5 kgf/.
- 2.1.4 To item 2.1.7 of general technical specifications, force should comply with the values, specified in table 1.
- 2.15 To item 2.1.13 of general technical specifications, Electric modes test conditions and number of cycles of switching are given in table 2 item 2,2,5.
- 2.1.6 To items 2.1.14 of general technical specifications, switching force should comply with the values, specified in table 1.
- 2.1.7 To item 2.1.15 of general technical specifications, switching force should comply with the values, specified in table 1

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2.2. ELECTRIC PARAMETERS AND MODES

- 2.2.1 To item 2.2.1 of general technical specifications.
- 2.2.1.1 To item 2.2.1.1 of general technical specifications.  
Electric contact resistance  $R_c$  not exceeding 0,05 ohm
- 2.2.1.2 To item 2.2.1.2 of general technical specifications. Test voltage  $U_{test}$  - ~~500 V~~, 1100 V.
- 2.2.2 To item 2.2.2. of general technical specifications.  
Electric contact resistance not exceeding 0,5 ohm  
Insulation resistance at least 50 M ohm  
Test voltage - 550 V.
- 2.2.3 To item 2.2.3 of general technical specifications. Electric contact resistance-not exceeding 0,2 ohm.  
Insulation resistance of at least 100 M ohm  
Testing voltage should comply with item 2,2,1,2.
- 2.2.5 To item 2.2.5 of general technical specifications electric modes Limiting values of permissible electric modes of operation are given in table 2.  
value of  $\cos \varphi$  - of at least 0,5 time constant  
values of  $|q|$  - not exceeding 0.015 sec

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NUMBER OF SHEETS 10

SHEET 11 OF 11

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Table - 2

Electric switching mode

Type of current	Type of load-ant	Voltage V.		Current, A.		Maximum switching power.	Number of cycles of switching	
		Mini- mum	Maxi- mum	Minimum	Maxi- mum		Normal climatic conditions	Upper value of temperature
DC	Active inductive	0.5	30	0.0005	4	70	10,000	5,000
AC	Active inductive		250		3	300	10,000	5,000

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- 2.2.6 To item 2.2.6 of general technical specifications, current 10A, flow time not exceeding 180 s.
- 2.3.4 Resistance to mechanical effects
- 2.3.1 To item 2.3.1 of general technical specifications. Operating conditions as per group 4 of general technical specifications.
- 2.4 Resistance to climatic effects.
  - 2.4.1 To item 2.4.1 of general technical specifications, operating conditions as per groups 2 of general technical specifications.
    - Upper value of ambient temperature - + 100°C / 373°K/
    - Atmospheric pressure - upto 666 Pa/5 mm Hg/
  - 2.4.2 To item 2.4.2 of general technical specifications.
    - Upper value of temperature + 100°C / 373°K/.
- 2.5 Resistance to special effects.
  - 2.5.1 To item 2.5.1 of general technical specifications. Special effects as per group 5 of application of standard NO.005.05 for factors, specified in item 1b of table 1- as per NO.005.05 in groups 2, 4 and 5.

2.6. Reliability

2.6.1 To item 2.6.1 of general technical specifications, Minimum operating time 5000 h. During this minimum operating time a push button should withstand the number of switching cycles, specified in table 2.

2.6.2 To 2.6.2 of general technical specifications storage life of push buttons is 10 years.

2.7 Marking.

2.7.1 To item 2.7.1 of general technical specifications Designation of all on climatic design (letter B<sup>u</sup>) 13 to be put on the same line along with the designation of a push button and after this designation.

Push buttons should have marking only as per subitem, a, b, e, f, of general technical specifications.

It is allowed to mark the date of manufacture by applying an article only two figures, marking the year of manufacture.

2.8 Packing

2.8.1 To item 2.8.5 of general technical specifications. It is allowed to specify contents of precious metals in one push button.

3. QUALITY INSPECTION

Quality inspection should be conducted as per COST B 21248-75/ General technical specifications/ with supplements and amendments, stated in this item. Provisions, stated in sub items 3.3.1.6, 3.3.1.9, 3.3.1.10, 3.3.1.11, 3.3.4.1.10, 3.3.4.1.11, 3.3.4.1.13 of General technical specifications do not refer to push buttons, manufactured as per particular technical specifications.

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3.2 ACCEPTANCE RULES

3.2.2 Qualifying tests

3.2.2.1 To item 3.2.2.1 of general technical specifications. Tests as per groups K-2 / item 4/ k-4/ item 2.15/ k-5/ item .1/k-12. k-13 are not to be conducted, since requirements as per these items do not refer to push buttons.

Tests as per groups k-7/ item 2/, k-11, k-16 are not to be conducted,

On the basis of data, obtained during development, stage a manufacturer guarantees the compliance of push buttons with the requirements for resistance to increased pressure of air, to mild to misty salty mist, to acoustic noises, to special effects, to effect of sun radiation.

If necessary tests for compliance with the specified above requirements should be included in new tests, carried out according to GOBT B 18347-73 item 2.

3.2.2.2. To item 3.2.2.3 of general technical specifications. Making up sampling is to be carried out as follows:  
- for group K-7 / item 1 / - as per each group of articles, consisting of push buttons of one design, / any type/ of one climatic design.  
- for groups- k-8. k-9 sampling is to be done from push buttons of any design/any type/ of all climatic design.

3.2.4 Periodical tests

3.2.4.1 To item 3.2.4.3 of general technical specifications, Making up sampling is to be carried out as follows:  
- for group II-1 as per each group of articles, consisting of push buttons of one design / any type/ of any climatic design according to table 1.

- for group II- 2 - as per each group of articles,

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of one climatic design,

-for groups -3 sampling is to be done from push button of any design, of any type and climatic design,

--for-g

3.2.4.2 To item 3.2.4.4. of general technical specifications. Volume of sampling  $n = 30$  pieces, acceptance number  $C = 0$ .

3.2.4.3 To item 3.2.4.5 of general technical specifications. Volume of sampling  $n_1 = 15$  pieces,  $n_2 = 15$  pieces. acceptance number  $C_1 = C_2 = 0$

3.2.5 Durability tests

3.2.5.1 To item 3.2.5.3 of general technical specifications, Volume of sampling  $n = 20$  pieces, acceptance number  $C = 0$

3.3 Inspection procedure

List of testing equipments and measuring devices are given in appendix.1

3.3.1 Design checking

3.3.1.1 To item 3.3.1.4 of general technical specifications. Method 109-1 as per GOST 18962-71.

3.3.1.2 To item 3.3.1.5 of General technical specifications Characteristics of a soldering iron should be as follows:

- power 30 to 40 W.
- temperature of a soldering iron tip 300 to 350°C ( 573 to 623 °K )

Solder of NOC-61 grades as per GOST 1499-70 and Flux KTC as per OST 11 029.001-74 and to be used for testing Distance between a push button body and solder should be of not less than 1 mm

3.3.1.3 To item 3.3.1.12 of general technical specifications. Electrical modes, number of switching cycles in normal climatic conditions are to be in compliance with table 2, item 2.2.5.

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*Frequency*  
 Frequency of switching -12 cycles per minute.  
 Parameters of push buttons after testing for wear resistance should be in compliance with table 3.

Parameters	Ratings
Electric contact resistance, ohm, maximum	0,1
Insulation resistance, Mohm, minimum	50
Testing voltage, V	550
Switching force, k(kgf)	as per table 1

- 3.3.2 Checking of electrical parameters.
- 3.3.2.1 To item 3.3.2.1.1 of general technical specifications  
 Mode of measuring:  
 current- 1A, e.m.f. -XI
- 3.3.3.2 To item 3.3.2.1.2 of general technical specifications.  
 Accelerated tests are to be conducted with voltages of 1250 V. Voltage is to be gradually increased from zero upto testing value for 0,2 to 0,5s.  
 Push buttons should be exposed to testing voltage for  $5 \pm 0,25$ , after this the voltage is to be gradually decreased to zero for 0,2 to 0,5s.
- 3.3.2.3 To item 3.3.2.1 of general technical specifications .  
 Mode of measuring: Voltage- 250 -500 V
- 3.3.2.4 To item 3.3.2.5 of general technical specifications,  
 current-10A, Voltage-40V, time of current flow-180S  
 After testing is over:  
 Resistance of an electric contact should not exceed 0.1 ohm.



Insulation resistance should be of atleast 100 megohms.  
Switching force should comply with table 1.

3.3.3 Checking of resistance to mechanical effects.

3.3.3.1 To 3.3.3.1 of general technical specifications. Push buttons are to be secured to a fixture with a supplier's certificate.

Resistance of an electric contact should not exceed 0.5 ohms.  
Switching force should comply with table 1.

3.3.3.2 To item 3.3.3.1.1 of general technical specifications. Rigidity - X as per GOST 16962-71.

3.3.3.3 To item 3.3.3.1.2 of general technical specifications. Method 103-1.1 rigidity degree - XY as per GOST 16962-71.

3.3.3.4 To item 3.3.3.1.3 of general technical specifications. Rigidity - IY, impact pulse duration - 1-3 MS as per GOST 16962-71.

3.3.3.5 To item 3.3.3.1.4 of G.T.S. Degree of rigidity - IY as per GOST 16962-71.

3.3.3.6 To item 3.3.3.1.5 of general technical specifications. Degree of rigidity - VI as per GOST 16962-71.

3.3.3.7 To 3.3.3.1.6 of general technical specifications. Degree of rigidity - VI as per GOST 16962-71.

3.3.3.8 To item 3.3.3.1.7 to general technical specifications. Method 106-2, degree of rigidity - III as per GOST 16962-71.

3.3.4 Checking of resistance to climatic effects.

3.3.4.1 To item 3.3.4.1.1 of general technical specifications. Upper value of temperature should be of  $+100 \pm 3^{\circ}\text{C}$  /  $373 \pm 3\text{K}$ .

Resistance of an electric contact should not exceed 0.07 ohms.  
test method - 201-1.

Resistance of an electric contact should not exceed 0.07 ohms.



Insulation resistance is to be of at least 100 M ohm.  
switching force is to be in compliance with table 1.

3.3.4.2 To item 3.3.4.1.2 of general technical specifications,  
Electric load; current- 0,2A, Voltage - 3,0 V.  
Measuring device - HC 274000  
Resistance of an electric contacts should not exceed 0,05 ohm.

Testing voltage 600V.  
Switching force- in compliance with table 1,

3.3.4.3 To item 3.3.4.1.3 of general technical specifications  
Temperature- min. 60 ± 3°C / 213 ± 3K / and + 120 ± 3°C / 373 ± 3K/.

Resistance of an electric contact should not exceed 0,05 ohm.

Insulation resistance - at least 100 ohm  
switching force-in compliance with table 1

3.3.4.4 To item 3.3.4.1.4 of general technical specifications.  
Voltage- 250 V.

3.3.4.5 To item 3.3.4.1.5 of general technical specifications.  
Resistance of an electric contact should not exceed 0,05 ohm, insulation resistance during short time test- at least 30 M ohm during long time test- at least 3,0 M ohm.

switching force- in compliance with item 3.3.4

3.3.4.6 To item 3.3.4.1.6 of general technical specifications.  
Air pressure in a pressure chamber 533 Pa / 4 mm Hg/-

Test voltage- 500 V.

3.3.4.7 To item 3.3.4.1.8 of general technical specifications.  
Duration of test-7 days.

Qualifications in the pressure chamber are to be as follows: 50% of push buttons - button upwards, 50% of push buttons - button downwards.

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3.3.4.8 To item 3.3.4.1.9 of general technical specifications  
Method 214-1 as per GOST 16962-71

3.3.4.9 To item 3.3.4.1.12 of general technical specification  
Outside appearance of push buttons after testing shall  
meet the following requirements:  
There should be no mechanical damages and corrosion of  
parts, buckling, cracks, bulging of plastic.

3.3.5 Checking of resistance to special effects.

3.3.5.1 To item 3.3.5.1 of general technical specifications.  
Resistance of an electric contact insulation  
resistance and testing voltage should be in compliance  
with item 2.1.4

3.3.6 Reliability checking.

3.3.6.1 To item 3.3.6.1.1 of general technical specifications  
Testing time for wear resistance in normal climatic  
conditions -  $t = 10$  h.

Upper value of temperature -  $+100 \pm 3^\circ\text{C} / 373 \pm 3\text{K}$ ,  
relative humidity -  $95 \pm 3\%$  at a temperature of  $+40 \pm 3^\circ\text{C}$   
 $313 \pm 2\text{K}$ , value of electrical loads and a number  
of switching cycles - according to table 2, item  
2.2.5.

Resistance of an electric contact insulation  
and testing voltage - in compliance with item 2.1.4  
Switching force - in compliance with item 2.1.4

To item 3.3.6.1.2 of general technical specifications  
Duration - 500 h. upper value of temperature -  
 $300 \pm 3^\circ\text{C} / 373 \pm 3\text{K}$ , relative humidity -  $95 \pm 3\%$  at a temperature  
of  $+40 \pm 3^\circ\text{C} / 313 \pm 2\text{K}$ , electrical loads, value of  
switching cycles - according to table 2.

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3.3.6.3 To item 3.3.6.1.3 of general technical specifications.  
Resistance of an electric contact, insulation  
resistance and testing voltage-in compliance with item  
2.2.3, switching force- in compliance with item 2.1.4

3.3.7. Checking of marking

3.3.7.1 To item 3.3.7.1 of general technical specifications.  
Methods a/b/ item 3.3.7.1 of general technical  
specifications.

3.3.8 Checking of packing.

3.3.8.1 To item 3.3.8.1 of general technical specifications.

4. TRANSPORTATION AND STORAGE.

Requirements for transportation and storage conditions-  
as per GOST B 21248-75/ General technical specification

5. APPLICATION AND OPERATION INSTRUCTIONS

Application and operation instructions-as per GOST B 2  
GOST B 21248-75 / general technical specifications with  
supplements and an amendment, stated in present item.

5.1 To item 5.2.2 of general technical specifications  
solder should be of grade ПГО-61 GOST 21931-76

Distance between push button body and soldered is to  
be at least 1.0 mm

5.2 To item 5.2.3 of general technical specifications.

Drawing for installation of push buttons on equipment  
in compliance with drawing 1.2.3.

5.3 It is allowed to operate push buttons in conditions of  
relative humidity of air of upto 98% and at a temperature  
of + 40°C/313K/ without moisture condensation.

6. REFERENCES

Contra. 21/-

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6. REFERENCE DATA

6.2

To item 6,2 of general technical specifications. 95 percent service life in modes and conditions, specified in general technical specifications and in particular technical specifications and in particular technical specifications should be at least 7500 h.

During this time push buttons should withstand 1,5 volt switching cycles, specified in table 2, item 2,2,5.

7. SUPPLIERS GUARANTEES

Suppliers guarantees - as per GOST B 21248-75 of general technical specifications

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