LLC TRADING HOUSE «ELECTROMASH»

Catalogue



SPECIAL TECHNOLOGICAL EQUIPMENT TO MECHANIZE THE PROCESSES OF ELECTRICAL EQUIPMENT REPAIR AND TESTING

P: (8635) 22-15-21; 22-15-23
WWW.TDELECTROMASH.COM
CITY NOVOCHERKASSK, ROSTOV REGION, RUSSIA

Introduction

This catalogue is a manual oriented to the personnel of electric repair enterprises and design offices.
The catalogue consists of 8 parts:

1. Equipment to repair conventional and special electrical motors with the capacity of up to 100 KW;
2. Equipment to repair armature and phase rotors;
3. Equipment to repair electrical machines with the capacity of more than 100 KW;
4. Equipment to produce electrical machine windings made of rectangular wire;
5. Equipment to repair transformers;
6. Equipment to restore winding wire;
7. Testing equipment;
8. Versatile equipment, technological facilities, units and assemblies of the lathes, transport, warehouse and other equipment (furnished upon request).

The catalogue provides brief explanation of the purpose (designation) and technical parameters of the special technological equipment intended for mechanization of the electrical equipment repair.
The catalogue includes the equipment most frequently ordered and demanded.
The complete list of the equipment and technological facilities used in the production process can be posted to the customer in reply to an additionally written request.
LLC TRADE HOUSE «ELECTROMASH» located in the city Novocherkassk produces the complete list of the equipment stated in the catalogue.
LLC TRADING HOUSE «ELECTROMASH» may provide additional services according to the customer's will, including:

1. Design and production of the similar equipment but with different parameters;
2. Design and production of the other equipment by setting a task or providing technical documentation by the customer;
3. Working out technological planning for electrical repair;
4. Giving technical task to develop construction part of the project and others;
5. Assembly and installation works (turn key variant);
6. Training maintenance personnel using company's equipment;
7. Providing technological processes of electrical equipment repair for the production process;
8. Performing complex repair of power transformers and electrical motors.

All equipment included in the catalogue is produced according to customer's individual.
For delivery conditions and order procedure you should apply to the following address:

Russia, 346428, Rostov region, Novocherkassk, ul. Prosveshcheniya, 106 b
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Part I

Equipment to repair electrical motors with the capacity up to 100 KW

1.1. Device to take rotor out 03.02.04
1.2. Cutting machine 04.02.06/04.02.06MO1
1.3. Dismantling test bench 04.02.34
1.4. Annealing installation 04.02.23
1.5. Multipurpose furnace 04.02.26
1.6. Machine to remove windings 04.02.28/MO3
1.7. Multipurpose machine tool 04.02.29
1.8. Blowing chamber 04.02.30
1.9. Machine to remove bearings 04.02.05; 04.02.05/MO1
1.10. Briquetting press 04.02.04
1.11. Washing machine 04.02.22
1.12. Manual level scissors 04.03.34
1.13. Relevelling machine 04.02.16
1.14. Machine to produce notch (slot) wedges 04.02.17; 04.02.17/MO1
1.15. Winding machine 04.02.15
1.16. Suspended device for stator mounting 03.02.03
1.17. Stator mounting device 04.03.15
1.18. Saturation (impregnation) tank 04.03.26
1.19. Saturation (impregnation) plant 04.02.19; 04.02.19/MO1
1.20. Induction heater 04.02.31
1.21. Drying furnace 04.01.04; 04.02.09
1.22. Drying installation 04.02.07; 04.02.08
1.23. Drying installation 04.02.07/MO1
1.24. Assembly test bench 04.03.36
1.25. Test bench for unimpregnated stators 02.01.05
1.26. Test bench for asynchronous electric motors with the capacity up to 100 KW. 02.01.07
1.27. Test bench for stator active steel 02.01.04
1.28. Dyeing chamber 09.01.03
1.29. Test bench for synchronous generators and DC machines with the capacity up to 100 KW. 02.01.06
1.30. Vacuum impregnation installation 04.02.39/MO1

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1.1. Device to take rotor out. 03.02.04

It is used to take rotor in and out of stator with the help of a hoisting mechanism.

Technical Description

1. Hoisting capacity, kg force	500
2. Overall dimensions, mm	860x105x560

1.2 Cutting machine 04.02.06; 04.02.06/MO1

It is intended to cut the frontal parts of the stator winding in electrical motors.

Technical Description
04.02.06; 04.02.06/MO1

1. Height of stator centers in mm 90…280 / 90…315
2. Drive of the units – electromechanical / hydrolic
3. Operating power in KW 11 / 7
4. Overall dimensions in mm
   Electromechanical 3100x600x1630
   hydrolic 2280x700x1820

1.3 Dismantling test bench 04.02.34

It is intended for removing bearing shields, bearings and pressing bearings on.

Technical Description

1. Drive –hydrolic
2. Hydrocylinder effort for bearing removal and pressing it on, H
   - piston cavity – 79500
   - rod cavity – 64000
3. Height of the repaired motor centers in mm
   max – 280
   min – 112
4. Shaft length for the repaired motors in mm

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max – 11390
min – 374

5. Rod stroke for hydrocylinders in mm
   - bearing removal – 160
   - mandrel travel – 900
   - pressing bearings on – 80
   - bench travel – 160
   - mandrel clutch – 63
6. Rated capacity of hydrolic tank in dm^3 – 20
7. Pump, type НШ 10х2
8. Pump drive
   - electric motor, type AIR 13236
   - power, KW – 5,5
   - rotation frequency in revolutions per minute – 1000
9. Maximum operating pressure in the hydrolic system in kg/sm^3 – 125
10. Brand of oil used in the system
    - Motor oil МГ 10-Г2, М-10 В2, М8-Г2, М8 В2 ГОСТ (standard) 8581-78, М8А, ГОСТ (standard) 10541-78.
11. Overall Dimensions in mm
    - length – 3200
    - width – 1290
    - height – 800
12. Mass, in kg

Delivery Set

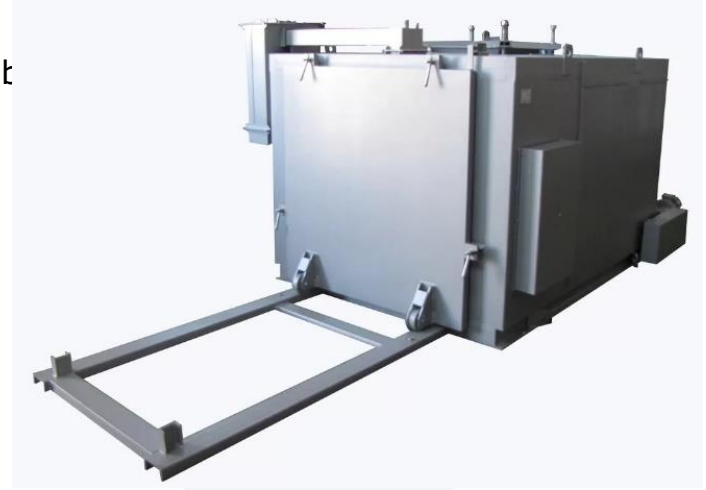
1. Test Bench to dismantle and assemble electric motors 04.02.34, units – 1
2. Pumping station in units – 1

1.4 Annealing installation 04.02.23

It is intended to anneal winding isolation while repairing electric motor stator. Chamber lining with heatresistant bricks and installation of the heaters is performed by the customer at the installation site. Max. temperature and duration of annealing are set by remote control and maintained automatically.

Technical Description

1. Max. temperature in C°
2. Inner dimensions of the chamb
3. Max. loading mass in kg –
4. Truck dimensions in mm
5. Heaters capacity in KW



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1.5. Multipurpose furnace 04.02.26

1.	Max. temperature in C°	450
2.	Inner dimensions of the container in mm	1340x920x680
3.	Heaters capacity in KW	19,2
4.	Overall dimensions in mm	1720x1260x1400

1.6. Machine to remove windings 04.02.28/MO3

It is intended for removing annular windings from electric motor stator after annealing.

Technical Description

1.	Height of stator centers in mm	90…280
2.	Pulling effort in kg force max	1000
3.	Operating power in KW	1,5
4.	Overall dimensions in mm	2320x670x1100

1.7. Multipurpose machine tool 04.02.29

It is intended for removing bearings and a set of contact rings from electric motor rotors and pulling annular windings out of electric motor stators with the height of the centers up to 315 mm.

Technical Description

1.	Pressing effort in kg force	12500
2.	Rod stroke in mm	320
3.	Drive	hydrolic
4.	Operating power in KW	3
5.	Overall dimensions in mm	3250x650x1200

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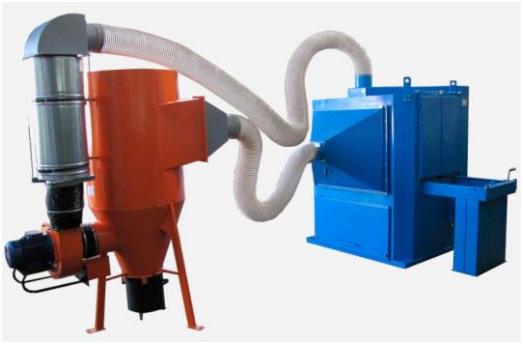
1.8. Blowing chamber 04.02.30

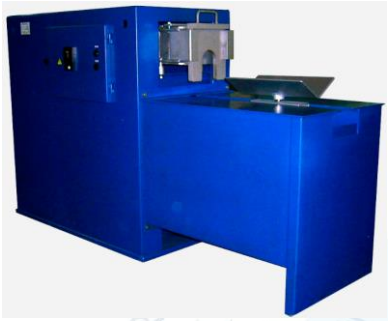


It is intended for blowing with pressed air around stator removing isolation remains after pulling the windings out.

Technical Description

1. Pressure in pneumatic network in atmospheres 5…6
2. The drive of the lifting device for stator and damper opening – pneumatic.
3. Hoisting capacity in kg force – 200
4. Overall dimensions in mm 1600x1400x2600

1.9. Machine to remove bearings 04.02.05; 04.02.05/MO1



It is intended for removing bearings from electric motor rotors of 3…9 overall dimensions.

Technical Description
04.02.05; 04.02.05/MO1

1. Press stroke in mm 250
2. Press maximum effort in kg force 6250
3. Operating power in KW 4 / 3
4. Drive electromechanical / hydrolic
5. Electromechanical / hydrolic overall dimensions – 1800x650x1200 2000x650x1160

1.10. Briquetting press 04.02.04

It is intended for briquetting the remains of the winding wire.

Technical Description

1. Pressing effort in kg sec 16000
2. Briquet size 300x300x150
3. Overall dimensions in mm 2140x850x1210

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1.11. Washing machine 04.02.22

It is intended to wash bearings and small parts in the heated washing solution.

Technical Description

1. Max loading in kg

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50

bars

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1.14. Machine to produce notch (slot) wedges 04.02.17 04.02.17/MO1

It performs milling and cutting operations with the wooden wedges intended to fix coil windings in stator notches (slots) in the automatic mode until the bar is completely processed

Technical Description
04.02.17 04.02.17/MO1

1.	Max. size of the bar in mm	800x320x(40…100)
2.	Operating power in KW	16,7 / 12
3.	Drive of supports	electromechanical Hydrolic
4.	Overall dimensions in mm	2550x1250x 910

1.15. Winding Machine 04.02.15

It is intended for winding annular windings of electric motors with the capacity of 0,12…100 KW.

Technical Description

1.	Average length of the coil loop in mm	220…1400
2.	Speed of spindle rotation in revolutions per min	130…570
3.	Operating power in KW	1,1
4.	Overall dimensions in mm	1020x730x1070

1.16. Suspended device for stator mounting 03.02.03

It is used for turning stator up to the 7th overall dimension by means of hoisting device used for packing windings.

Technical Description

1.	Hoisting capacity in kg sec	500
2.	Drive of the spindle –	(manual) hand operated
3.	Overall dimensions in mm	600x300x600

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1.17. Stator mounting device 04.03.15

It is intended for mechanical turning of stators of the 7^{th}...9^{th} overall dimensions while packing windings during electric motor repair.

Technical Description

1.	Operating power in KW	1,1
2.	Overall dimensions in mm	1200x600x1750

1.18. Saturation (impregnation) tank 04.03.26

It is intended for impregnation of electrical equipment in the solution of electroisolating varnishes.

Technical Description

1.	Size of capacity in mm	1700x1200x100
2.	Overall dimensions in mm	2100x1700x1200

1.19. Saturation plant 04.02.19; 04.02.19/MO1

It is intended for impregnating electric motor stators by means of electroisolating varnishes in two alternately filled compartments.

Technical Description
04.02.19; 04.02.19/MO1

1.	Size of impregnating compartment in mm	1900x1300x800
2.	Rated power in KW	4,5 / 3
3.	Device to open lids –	mech. / hydrolic.
4.	Overall dimensions in mm	5300x2600x1600

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1.20. Induction heater 04.02.31.01; 04.02.31.02

It is intended for heating bearings before fixing them to rotor shafts and electric motor armatures.

04.02.31.01 04.02.31.02

Technical Description
04.02.31.01; 04.02.31.02

1.	Power in KW	2,0
2.	Max. temperature of heating in C° -	120
3.	Heating time in min.	1,5
4.	Overall dimensions in mm	480 x 520 x 870 / 540x240x340
5.	Weight in kg.	70 / 40

1.21. Drying furnace 04.01.04; 04.02.09

It is intended for convection drying of the parts in automatic drying mode.

Technical Description

1. Max. temperature in C°
   - 04.01.04 – 160
   - 04.02.09 – 200
2. Power of electrical heaters in KW
   - 04.01.04 – 84
   - 04.02.09 – 84
3. Internal dimensions of the drying chamber
   - 04.01.04 – 260x1800x1930
   - 04.02.09 – 2500x1740x2920

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1.22. Drying installation 04.02.07; 04.02.08

It is intended for convection drying of the parts by means of mechanized loading into the chamber and using automatic drying mode.

Technical Description

1. Hoisting capacity of the truck in kg force	04.02.07 –	5000
	04.02.08 –	5000
2. Max. temperature in C° -	04.02.07 –	160
	04.02.08 –	160
3. Capacity of electric heaters in KW	04.02.07 –	84
	04.02.08 –	84
4. Size of the drying chamber in mm	04.02.07 –	2600x1800x1930
	04.02.08 –	2600x1800x2930
5. Overall dimensions (without railway) in mm	04.02.07 –	2700x2100x4200
	04.02.08 –	2700x2100x4950

1.23 Drying plant 04.02.07/MO1

It is intended for convection drying of large dimension parts with mechanized loading and in automatic drying mode. It is provided with 100% readiness for operating (additional assembly operations, construction and heat isolation operations are not necessary).

Technical Description

1. Load carrying capacity of the truck in kg	5000
2. Max. temperature in C°	160
3. Capacity of the heaters in KW	84
4. Drive for truck moving and door opening –	hydrolic
5. Overall dimensions of the drying chamber in mm	2550x1700x1500
6. Overall dimensions of the installation in mm	6000x2100x1950

1.24 Assembly test 04.03.36

It is intended for electric motors assembly of 7…13 dimensions by assembling stator on cantilever fixed rotor.

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1.25 Test Bench for unimpregnated stators 02.01.05

It is intended for testing electric motor stators having capacity up to 100 KW before winding impregnation.

Types of trials:

- measuring winding isolation resistance in relation to the body and between the phases;
- control of current equality in phases;
- control of the proper winding connection;
- detection of loop short circuits;
- testing winding isolation in relation to the body and between the phases by means of high voltage;
- measuring winding resistance offered direct current in practically cold condition.

Technical Description

1. Supply voltage, V –	380
2. Frequency in Hz –	50
3. Max. Load current, A –	30
4. Number of testing positions –	3
5. Occupied area in m^2 –	12

1.26 Testing bench for asynchronous electric motors with the capacity up to 100 KW. 02.01.07

It is intended for testing asynchronous electrical motors of the alternating current with the frequency of 50 Hz with short circuited and phase rotors of the capacity up to 100KW.

Types of trials:

- measuring winding isolation resistance in relation to machine body and between the windings;
- measuring winding resistance under direct current in practically cold condition;
- determining transformation ratio of phase rotor motors;
- electrical strength trails of the winding isolation in relation to the body of the motor and between the windings;
- electrical strength trails of the winding isolation between the loops;
- determination of idle current;
- determination of short circuit current and losses;
- idle running.

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Technical Description

1. Supply voltage, V –	380
2. Operating current, A -	500
4. Number of testing positions on the test bench with	
5. the power up to 20 KW, unit – up to 100 KW, unit -	1
6. Occupied area in m^2 –	25

1.27 Test Bench for stator active steel 02.01.04

It is intended to determine the condition of active steel in stator cores of asynchronous and synchronous electric motors with the capacity up to 100 KW.

Technical Description

1. Capacity of the tested stator in KW	0,5…100
2. Capacity of the determined losses W/kg	up to 5
3. Supply voltage, V –	220
4. Frequency in Hz –	50
5. Operating current, A –	8

1.28 Dyeing chamber 09.01.03

It is intended for dyeing parts having mass up to 500 kg by means of spraying.

Technical Description

1. Dimensions of the inner space mm	1300x1320
2. Operating power in KW –	8
3. Overall dimensions in mm	1500x2300x2200

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1.29. Test bench for synchronous generators and DC machines with the capacity up to 100 KW. 02.01.06

1. DC drive motor
2. Testing field
3. Power cabinet
4. Remote control
5. Open knife switch

This test bench is intended for acceptance trials of the repaired synchronous generators and DC electric machines with the capacity up to 100 KW.
Test bench is mean for trials in the following scope:

- measuring isolation resistance in relation to the body and between the windings;
- measuring winding resistance under direct current in practically cold condition;
- testing at increased frequency of rotation (using DC drive motor);
- testing winding isolation for electrical stability in relation to the machine body and between the windings;
- testing winding inter loop isolation for electrical stability;
- determination of the idling feature (for synchronous generators);
- determination of three phase short circuit characteristic (for synchronous generators);
- determination of the generator excitation current or frequency of motor rotation in idling (for DC machines) mode;
- testing commutation under rated load and short time current overloading (for DC machines).

Technical Description

1. Supply voltage, V –	380
2. Frequency in Hz –	50
3. Operating current, A –	250
4. Number of testing –	1
5. Occupied area in m –	25

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1.30 Vacuum Impregnation Installation 04.02.39/MO1

04.02.39.400

04.02.39.650

04.02.39.840

04.02.39.840.01

04.02.39.1600

It is intended for impregnation electric motor stators and rotors with preliminary discharging in the impregnation tank.

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Part II

Equipment to repair armatures and phase rotors.

2.1 Machine to remove a set of contact rings 04.01.09
2.2 Multipurpose machine 04.02.29
2.3 Machine to repair phase rotors 04.01.07
2.4 Hand operated level scissors 04.03.34
2.5 Rack for rotors 04.01.10
2.6 Drawing device 04.01.05; Drawing device. 04.01.06
2.7 Saturation tank 04.03.26
2.8 Drying plant 04.02.07

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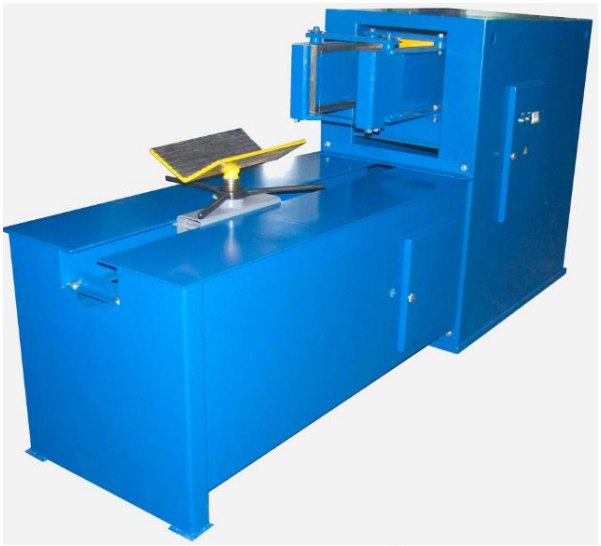
2.1 Machine to remove a set of contact rings 04.01.09

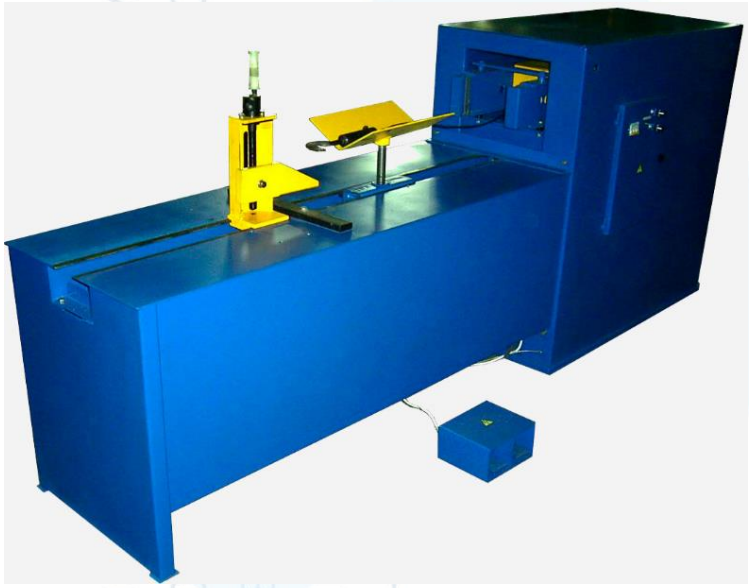
It is intended to remove a set of contact rings from electric motor rotors having height of the centers up to 315 mm (power up to 100 kW).



Technical Description

1. Pressing effort in kg force - 12000
2. Rod stroke in mm – 360
3. Operating power in KW
4. Overall dimensions in mm 2900x800x1200

2.2 Multipurpose machine 04.02.29



It is intended to remove bearings and a set of contact rings from electric motor rotor and pulling annular windings out of electric motor stator with the height of the centers up to 315 mm.

Technical Description

1. Pressing effort in kg force - 12500
2. Rod stroke in mm – 320
3. Drive - hydrolic
4. Operating power in KW - 3
5. Overall dimensions in mm 3250x650x1200

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2.3. Machine to repair phase rotors 04.01.07

It is intended to repair collectors by bandaging them with wire or glass tape or to pull the roads out of rotor slots.

Technical Description

1. Size of the machined rotors in mm	
Diameter	200…600
Length	550…1400
2. Diameter of bandaged wire in mm	1…2
3. The width of glass wire in mm	15; 20; 30
4. Collector size in mm	
Diameter	80…400
Length	40…200
5. Effort of pulling road in kg force –	1000
6. Operating power in KW –	0,25+0,75+4
7. Overall dimensions in mm	4200x1200x1400

2.4 Hand operated level scissors 04.03.34

They are intended for cutting isolation materials, used while repairing electric motors.

Technical Description

1. Max. thickness of material in mm – 2
2. Max. width of the material in mm – 1000
3. Dimensions in mm 1380x1450x1160

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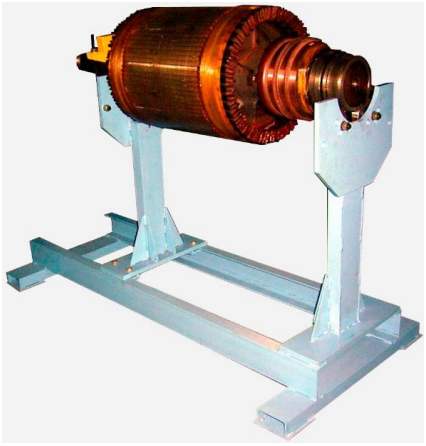
2.5 Rack for rotors 04.01.10



It is intended to install and rotate armatures and rotors of electric machines.

Technical Description

1. Distance between the rack axis in mm 500 – 1200
2. Diameters of the rotor shafts in mm 40 – 120
3. Overall dimensions in mm 1600x500x900

2.6 Tension device 04.01.05; 04.01.06

04.01.05

It is intended to draw the wire while fixing bandage or a glass tape to the armature or phase rotor.

Technical Description

1. Drawing effort in kg force 100…300
2. Wire diameter in mm 0,8…2,0
3. Tape width in mm 15; 20;30
4. Overall dimensions in mm / kg 1210x700x1170/175

04.01.06

Technical Description

1. Max. tension force of glass tape, kgf 99
2. Max. the width of the glass tape, mm 20
3. Power supply Voltage, V 220(50 Hz)
4. Power consumption 4.5 - 40
5. Overall dimensions in mm / kg 1300x700x1180 / 180

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2.7 Saturation tank 04.03.26

It is intended for impregnation of electrical equipment in the solution of electroisolating varnishes.

Technical Description

1. The inner size of container, mm 1050x710x 550
2. Internal tank size, mm 1150x890x1000
3. The level of varnish in the tank, mm 600
4. Exhaust ventilation air consumption, m3 / h 700
5. Overall dimensions of the tank, mm / kg 1300x1290x1280/330

2.8 Drying installation 04.02.07; 04.02.08

It is intended for convection drying of the parts by means of mechanized loading into the chamber and using automatic drying mode.

Technical Description

1. Hoisting capacity of the truck in kg force	04.02.07 –	5000
	04.02.08 –	5000
2. Max. temperature in C° -	04.02.07 –	160
	04.02.08 –	160
3. Capacity of electric heaters in KW	04.02.07 –	84
	04.02.08 –	84
4. Size of the drying chamber in mm	04.02.07 –	2600x1800x1930
	04.02.08 –	2600x1800x2930
5. Overall dimensions (without railway) in mm	04.02.07 –	2700x2100x4200
	04.02.08 –	2700x2100x4950

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Part III

Equipment to repair electrical machines
with the capacity more than 100 KW

3.1 Traverse to take rotor out. 04.03.47
3.2 Hand operated lever scissors. 04.03.34
3.3 Machine to produce notch wedges made of getinax and glasstextolit materials. 04.03.41
3.4 Stator mounting device. 04.03.35; Stator mounting device. 04.03.18
3.5 Drying installation. 04.02.07; 04.02.08
3.6 Drying installation. 04.02.07/MO1
3.7 Deadend dyeing chamber. 09.01.01
3.8 Test bench for stator active steel. 02.01.08
3.9 Test station for alternating current electrical machines. 02.01.09
3.10 Test station for alternating current electrical machines and power transformers. 02.01.10

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3.1 Traverse to take rotor out. 04.03.47

It is intended to take rotors in and out of stators having 9…13 dimensions.

Technical Description

1. Max. shaft diameter in mm – 140
2. Hoisting capacity in kg force – 1500
3. Overall dimensions in mm 2000x240x1000

3.2 Hand operated level scissors 04.03.34

Technical Description

4. Max. thickness of material in mm – 2
5. Max. width of the material in mm – 1000
6. Dimensions in mm 1380x1450x1160

3.3 Machine to produce notch wedges made of getinax and glasstextolit materials 04.03.41

It is intended for cutting wedges by means of twoside milling prefabricated parts.

Technical Description

1. Max. size of the wedge in mm
   Length – 200
   Thickness – 2…8
2. Operating power in KW 1,1+1,1
3. Overall dimensions in mm 1460x550x1100

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3.4. Stator mounting device 04.03.35; 04.03.18

It is intended for mechanized rotation of the stator while packing sections of the winding into the notches (slots).

Technical Description

Article	04.03.35	04.03.18
1. The frequency of rotation of the rotary ring, rpm	1,3	1,73
2. Diameter of fixed stators in the equipment, mm	-	995-1050
3. Height of fixed stators in the equipment, mm	-	230-530
4. Drive		
4.1. Gear motor, type	XC 75/65	XC 110/100
4.2. The motor		
4.2.1. Type	AT80V14	AD (AIRM)90V3
4.2.2. Power, kW	0,75	1,1
4.2.3. Rotation frequency, Rev/min	1400	1362
5. Overall dimensions (LxWxH) / weight, mm / kg	1500x1880x2135 / 850	1700x2250x2410/1050

3.5 Drying installation 04.02.07; 04.02.08

It is intended for convection drying of the parts by means of mechanized loading into the chamber and using automatic drying mode.

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Technical Description

1. Hoisting capacity of the truck in kg force	04.02.07 –	5000
	04.02.08 –	5000
2. Max. temperature in C° -	04.02.07 –	160
	04.02.08 –	160
3. Capacity of electric heaters in KW	04.02.07 –	84
	04.02.08 –	84
4. Size of the drying chamber in mm	04.02.07 –	2600x1800x1930
	04.02.08 –	2600x1800x2930
5. Overall dimensions (without railway) in mm	04.02.07 –	2700x2100x4200
	04.02.08 –	2700x2100x4950

3.6 Drying installation 04.02.07/MO1

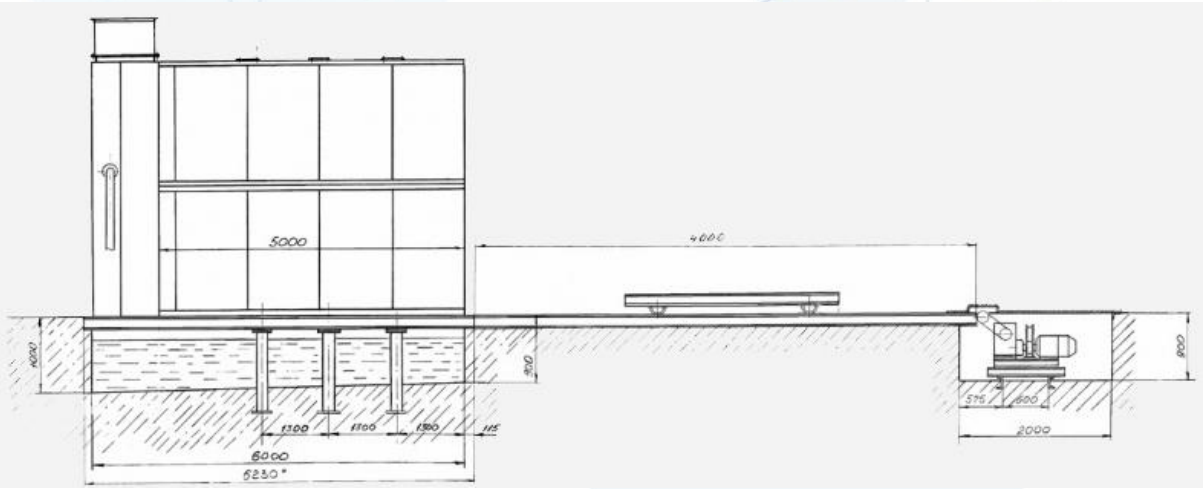
It is intended for convection drying of large size part with mechanized loading and automatic drying mode.
It is provided with 100% readiness for operation (additional assembly, construction and heat isolating operations are not necessary).

Technical Description

1. Hoisting capacity of the truck in kg force –	5000
2. Max. temperature in C°	160
3. Capacity of heaters in KW	84
4. Drive of the device moving the truck and opening the door –	hydrolic
5. Overall dimensions of the chamber in mm	2550x1700x1500
6. Overall dimensions of the installation in mm	6000x2100x1950

3.7 Deadend dyeing chamber 09.01.01

It is intended for dyeing large size parts by means of spraying.



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Technical Description

1. Internal dimensions of the camera (LxWxH), mm	4900 x 3900 x 3400
2. Dimensions of the opening for the passage of the cart with product (WxH), mm	2000 x 2100
3. The means of transporting goods	truck
4. Truck Dimensions, mm / kg	2800 x 1700 x 190 x 1260 / 6000
5. Trolley drive, type	of the Electromechanical
5.1. Engine type	AIM-M80V6-1M1281
5.1.1. Power,	kW 1,1
5.1.2. Speed, rpm	930
5.2. Gearbox, type	CH100-50-52
5.3. Trolley travel Speed, m/min	10.5
6. Electric Pump unit, type	K45/30
6.1. Volume flow, m3 / h	45
7. Overall dimensions (LxWxH) / weight, mm / kg	13315x4400x4000/3100

3.8 Test bench for stator active steel 02.01.08

It is intended for determining the condition of active steel in stator cores of asynchronous and synchronous electrical motors with capacity from 100 to 1000 KW.

Technical Description

1. Capacity of the tested stator in KW	100…1000
2. Capacity of the defined losses, V/kg	up to 5
3. Supply voltage in V –	380
4. Operating current in A –	40
5. Current frequency in Hz –	50

3.9 Test station for alternating current electrical machines with the capacity from 100 to 1000 KW. 02.01.09

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This station is intended for testing asynchronous and synchronous electrical motors. For machines with voltage up to 6 kV the range of power is from 250 up to 1000 KW. For machines with voltage up to 0,66 KV the range of power is from 100 to 400 KW.

Equipment installed at the station allows to perform the following types of tests:

- measuring resistance of winding isolation in relation to machine body and between windings (performed by megaommeter ф4102/1);
- measuring resistance of the windings under direct current in practically cold condition (performed by means of a bridge P.333);
- testing under increased frequency of rotation (if rotating windings or bandages were under repair). These tests are carried out in motor mode by 20% increasing frequency of supply voltage (electric machine transformer with 100 KW capacity and 0.4 kV of voltage is used).
- testing of winding isolation in relation to machine body and between the windings to measure electrical strength by alternating voltage with 50 Hz frequency. Testing voltage is formed by one phase oil transformer having capacity of 25 kVA and is regulated by electrostatic kilovoltmeter C196 (voltage regulation limits are 0÷27 kV);
- electric stability testing of winding interloop isolation. It is carried out in machine idling by applying voltage of the value more than 30% from the rated one. (Increased voltage is formed by induction regulator). Test bench allow to perform this type of testing for machines where idle operating power at the voltage more than 30% from the rated one constitutes not more than 500 KW.
- determination of the idle current and losses while performing this test they measure linear voltage, linear current of the stator in every phase and operating power at the rated voltage.
- determination of the short circuit current and losses. In the condition of short circuit, voltage is supplied to stator, rotor is retarded and if it is a phase rotor then windings are short circuited. During this process they measure input voltage, stator current (linear short circuit current) and consumed power. Short circuit current and losses are measured at the same meaning of short circuit voltage.

$$U_{short.c} \approx U_{r/3,8}$$

- determination of transformation ratio. Transformation ratio is found by using measurements of linear voltages at the clamps of stator windings and at the rings of static rotor having disconnected winding.

Technical Description

1. Power supply is obtained from shop substation with capacity not less than (KW) – 630
2. Supply voltage in V – 380
3. Regulated voltage in V
   - Three phase 0-9000
   - 0-650
   - one phase 0-27000
4. Range of current measurements in A
   - With 10 kV voltage 50
   - 0,4 kV voltage 50, 200, 600
5. Number of simultaneously tested motors in units – 1
6. Occupied area in m^2 – 75

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3.10 Test station for alternating current electrical machines and power transformers 02.01.10

It is intended for testing asynchronous and synchronous machines of the capacity from 100 to 1000 KW and voltage up to 6 KV, and from 100 to 400 KW with voltage up to 0,66 KV, transformers with power up to 5000 kVA and voltage up to 10 KV.
This station allows to carry out tests on electrical machines according to the demands of СТОЭС 1.1-95 standard "Electrical machines rotating above 45th dimension asynchronous and synchronous" and standard ГОСТ 183-73. For transformers – the standards are the following ГОСТ 11677-85, ГОСТ 3484-88. Test methods correspond to the following standards: ГОСТ 11828-86, ГОСТ 7217-87, ГОСТ 10169-77. The equipment installed at the station allows to perform the following types of the tests:
For electric motors.

- measuring winding isolation resistance in relation to the body and between the phases;
- measuring winding resistance offered direct current in practically cold state;
- testing winding isolation in relation to the body and between the windings;
- idle running of electrical machine;
- determination of idle current and losses;
- determination of short circuit voltage and losses;
- determination of transformation ratio (for electrical motors with phase rotor);
- testing under increased frequency of rotation (for asynchronous machines with phase rotor and synchronous machines if rotating windings or bandages were under repair);
- testing of interloop isolation of the windings to prove electrical strength.

For transformers:

- measuring winding isolation resistance and absorption ratio;
- determination of transformation ratio;
- testing a set of winding connections;
- testing electrical strength of winding isolation by applying increased voltage of industrial frequency;
- determination of idle current and losses;
- determination of short circuit voltage and losses;
- measuring winding resistance to direct current in practically cold condition.

Technical Description

1. Power supply from shop substation with the power not less than (KW) – 630
1. Supply voltage in V – 380
2. Output regulated 3 phase station voltage (V) 0-650
0-10000
1-phase 0-27000

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Part IV

Equipment to produce electrical machine windings made of rectangular wire

4.1 Winding machine. 04.03.03
4.2 Drawing machine. 04.03.19
4.3 Winding machine. 04.03.30
4.4 Rack with brakes to install drums and to draw wire. 04.03.40
4.5 Readjustable winding pattern (gauge). 04.03.14
4.6 Winding pattern (gauge). 04.03.27
4.7 Transformer to solder wires. 03.04.08
4.8 Drawing machine. 04.03.29
4.9 Drawing machine. 04.03.28
4.10 Planishing press. 04.03.49
4.11 Hand operated lever scissors. 04.03.34
4.12 Saturation tank. 04.03.26
4.13 Hydrolic press for pressing the coils of КЭМ type. 04.03.13/MO1
4.14 Rolling machine. 04.03.17
4.15 Drying installation. 04.02.07/MO1
4.16 Drying installation. 04.02.07
4.17 Test bench to test sections of electrical machine windings. 02.01.11
4.18 Device for heating press slats. 04.03.35

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4.1 Winding machine 04.03.03

It is intended for winding annular parts of high voltage coils for electrical machines with simultaneous isolation of the coils by means of micatape.

Technical Description

1. Cross section of the flat wire in mm — 1x6,9…3,5x7,4
2. Inner diameter of the part in mm — 316…720
3. Operating power in KW — 3
4. Overall dimensions — 2200x800x1500

4.2 Drawing machine 04.03.19

It is intended for drawing annular parts of high voltage electrical machines.

Technical Description

1. Max. length of the machine in mm — 1800
2. Drive — pneumatic
3. Overall dimensions in mm — 2060x500x1080

4.3 Winding machine 04.03.30

It is intended for winding electrical motor and transformer coils made of wire with circular or rectangular cross sections.

Technical Description

1. Speed of spindle rotation in rev/min
   I stage — 15…63
   II stage — 30…126
2. Regulation of spindle speed in the range — stepless.
3. Diameter of planwasher in mm — 620
4. Cross section of the wound wires round wire, diameter in mm — 1,0…5,2
   rectangular wire, in mm — 3,0…48

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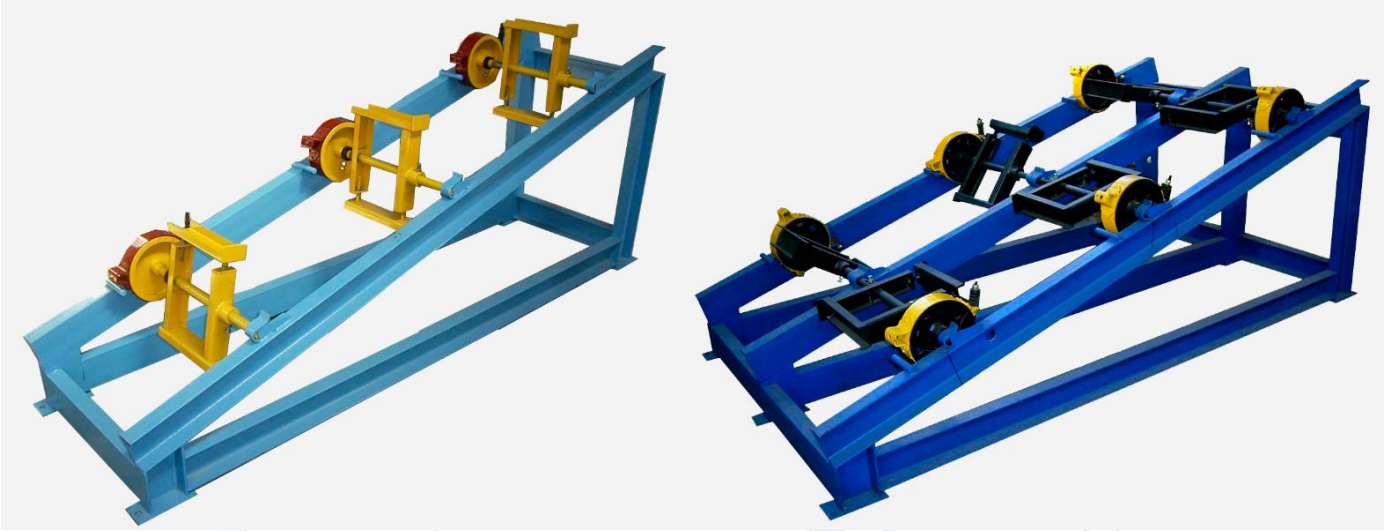
5.	Operating power in KW –	3
6.	Overall dimensions in mm	1050x850x1200

4.4 Rack with brakes to install drums and to draw wire 04.03.40



04.03.40 04.03.40.01

It is intended to install drums and wire into the winding equipment and to draw wires by means of braking the drum.

Technical Description

Actical	04.03.40	04.03.40.01
1. Number of installed drums, PCs	3	6
2. Dimensions of the installed drum, mm		
2.1. Diameter	700...800	250...800
2.2. Width	350	200...350
3. Overall dimensions, mm		
3.1. Length	2450	2700
3.2. Width 680 1300		
3.3. Height	1050	1050
4. Weight, kg	180	350

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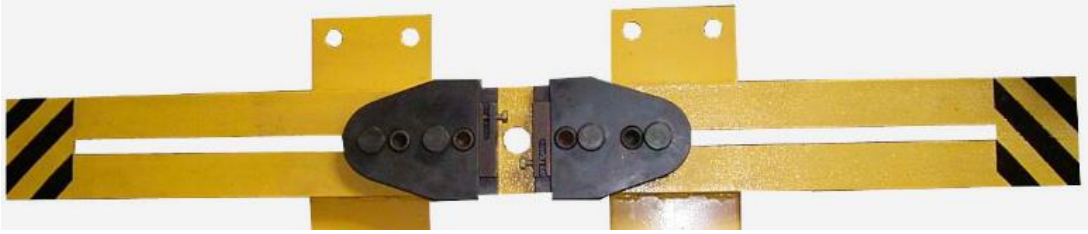
4.5 Readjustable winding pattern (gauge) 04.03.14

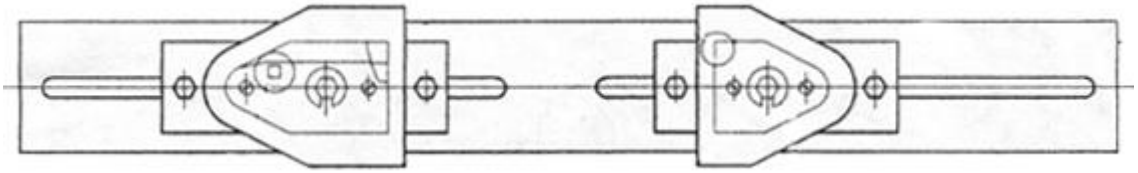


It is intended for winding prefabricated parts of high voltage coils for electric machine stators.

Technical Description

1. Thickness of the wound wire in mm	1…4
2. Average length of the coil loop in mm	500-2000
3. Overall dimensions in mm	1200x300x110

4.6 Winding pattern (gauge) 04.03.27



It is intended for winding two loop coils of the armature. It is proposed as an analogue. Parameters of the pattern depend on particular coil dimensions.

4.7 Transformer to solder wires 03.04.08

It is intended for by means of soldering soft and hard solder of wound wires with circular or rectangular cross section or while producing electric machine and transformer windings.

Technical Description

1. Max. diameter, thickness of the wires in mm	10
2. Max. width of the wires in mm	20
3. Consumed power in KW	10
4. Overall dimensions in mm	515x500x1100

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4.8 Drawing machine 04.03.29

It is intended for drawing hard coils of electric machine stator windings made out of prefabricaed parts of the «boat» type.

Technical Description

1. Coil size: length in mm	350…900
Width in mm	60…400
Cross-section of the slot part	
height in mm	8… 30
thickness in mm	4… 16
break up angle in degrees	0… 140
2. Diameter of stator boring in mm	240…840
3. Drive	hydrolic
4. Overall dimensions in mm	1900x650-2100

4.9 Drawing machine 04.03.28

It is intended for drawing out hard coils of electric machine stator windings made out of prefabricated parts of the «boat» type.

Technical Description.

1. Coil size: length in mm	450…2000
Width in mm	100… 700
Cross section of the slot part:	
height in mm	10…60
Width in mm	5… 20
Max. Chord a in mm	690
2. Diameter of stator boring in mm	840…2000
3. Drive	hydrolic
4. Overall dimensions in mm	3800 x 720 x 1600

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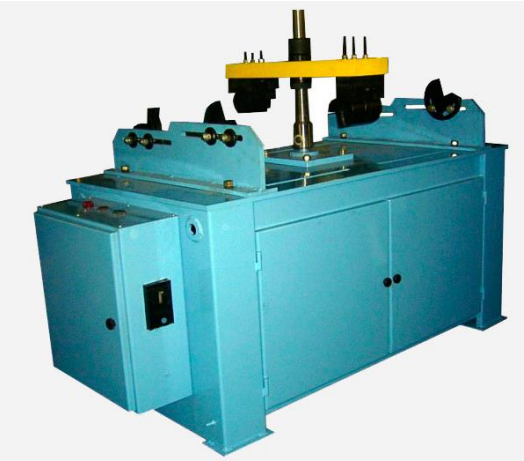
4.10 Planishing press 04.03.49



It is intended for planishing coil patterns of electric machine windings after their drawing.

Technical Description

1. Pressing force, kgf		6300
2. Central angle of the coil, deg.		90...1400
3. length of the grooved part of the coil, mm		200...1200
4. Drive clips passplanet		hydraulic
5. Maximum pressure in the hydraulic system,	kg / cm2	125
6. Pumping station		
6.1. Drive		
6.1.1. electric Motor, type		4A100L6.
6.1.2. Power, kW		2.2
6.1.3. speed, rpm		950
6.2. Pump, type		NSH 10 G3
6.3. Pressure valve, type		108.00.000 V (KN 50.6.3.00)
6.4. The valve		
6.4.1. Single section withelectric control, type		73.00.00.000 In (PE-50-00)
6.5. Hydraulic cylinder clip passplanet HZ		90
7. overall dimensions (LxWxH) / weight, mm / kg		1600x800x1200/500

4.11 Hand operated lever scissors 04.03.34

They are intended for cutting isolation materials, used while repairing electric motors.

Technical Description

1. Max. thickness of material in mm – 2
2. Max. width of the material in mm – 1000
3. Dimensions in mm - 1380x1450x1160

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4.12 Saturation tank 04.03.26

It is intended for impregnation of electrical equipment in the solution of electroisolating varnishes.

Technical Description

1. The inner size of container, mm	1050x710x 550
2. Internal tank size, mm	1150x890x1000
3. The level of varnish in the tank, mm	600
4. Exhaust ventilation air consumption, m3 / h	700
5. Overall dimensions of the tank, mm / kg	1300x1290x1280/330

4.13 Hydrolic press for pressing the coils of KEM type. 04.03.13/MO1

The press is designed for crimping the grooved parts of coils (rigid sections) of large electric machines.

Technical Description

Parameter name	04.03.13/M01	04.03.13/M02
1. Supply Voltage (50 Hz), V	380	380
2. Nominal power consumption, kW	2,2	2,2
3. Pressing force, kgf		
3.1. In the horizontal plane	2900	2900
3.2. In the vertical plane	1500	1500
4. The Central angle of the coil, grad.	10 ° ...140 °	10 ° ...140 °
5. Length of the grooved part of the coil, mm	200 ... 1200	200...1500

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6. Number of clamps, fixing pressplank, PCs	3	4
7. The number of installed passplanet, PCs	2	2
8. Drive clips passplanet	hydraulic	hydraulic
9. Maximum pressure in the hydraulic system, kg / cm2	150	150
10. Pumping station		
10.1. Drive		
10.1.1. Electric Motor, type	asynchronous	asynchronous
10.1.2. Power, kW	2,2	2,2
10.1.3. speed, rpm	950	950
10.2. gear Pump, type	GP2-0113R97F/20N	GP2-0113R97F/20N
10.3. Safety valve type	CR5/22N	CR5/22N
10.4. hydraulic Distributor:, type	DS3-S1/11N-D00	DS3-S1/11N-D00
10.5. hydraulic Cylinder for clamping pressplanes	GA 93.000-06	GA 93.000-06
10.5.1. Quantity, PCs	6	8
11. Overall dimensions (LxWxH) / weight, mm / kg	1100x1370x1380/550	1800x1370x1380/650

4.14 Rolling machine. 04.03.17

It is intended for tightening bushing isolation of the slot section in electric machine winding by the means of rolling.

Technical Description

1. Length of slot section in the coil in mm	250…1200
2. Section of the slot part in mm	8x12…20x40
3. Min. distance between slot parts in the coil in mm.	150
4. Operating power in KW	1,1+0,25
5. Overall dimensions in mm	1800x550x1200

4.15 Drying Installation. 04.02.07/MO1

It is intended for convection drying of large size parts with mechanized loading in automatic drying mode. It is provided with 100% readiness for operation (additional assembly, construction and heat isolation operations are not necessary).

Technical Description

1. Hoisting capacity of the truck in kg. force	5000
2. Max. temperature in C^0	160
3. Power of the heaters in KW	84

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4. Drive of mechanisms for truck motion and door opening- hydrolic
5. Drying chamber size in mm 2550x1700x1500
6. Overall dimensions of the installation in mm 6000x2100x1950

4.16 Drying Installation. 04.02.07

It is intended for convection drying of the parts by means of mechanized loading into the chamber and using automatic drying mode.

Technical Description

1. Hoisting capacity of the truck in kg force	04.02.07 –	5000
	04.02.08 –	5000
2. Max. temperature in C° -	04.02.07 –	160
	04.02.08 –	160
3. Capacity of electric heaters in KW	04.02.07 –	84
	04.02.08 –	84
4. Size of the drying chamber in mm	04.02.07 –	2600x1800x1930
	04.02.08 –	2600x1800x2930
5. Overall dimensions (without railway) in mm	04.02.07 –	2700x2100x4200
	04.02.08 –	2700x2100x4950

4.17. Test bench to test sections of electrical machine windings. 02.01.11

It is intended for testing inter loop and body isolation of the windings for low voltage and high voltage electrical machines of alternating and direct current having 10 kv voltage.

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Technical Description

1. rated power supply voltage (50 Hz),	220 V
2. Load current, A to	100
3. Current value of the test value main insulation voltage, kV from 1 to	50
4. Maximum test value coil insulation voltages, kV/Vit	1-4
5. The pulse repetition frequency, Hz 1 to	5
6. The area occupied by the stand, m2	11
7. overall dimensions of the control Cabinet (LxWxH) / weight, mm/kg	650 x 840 x 1500 / 170
8. overall dimensions of the test table (LxWxH) / weight, mm / kg	1360 x 790 x 1000 / 310
9. overall dimensions of the transformer test IOM-50/20 (LxWxH) / weight, mm / kg	750x750x860/197
10. Digital oscilloscope	GDS-2062
10.1. Margin of error, %	3
10.2. vertical deviation Coefficient, mV / del	2-5x103
10.3. scan Factor, MKS / division	0.001-107
11. MT4Y Digital meter	
11.1. Accuracy class of	0.15
11.2. Measurement speed, Rev./sec	3
11.3. The time, MS less than	300

4.18 Device for heating press slats. 04.03.35

It is intended for heating press slats, used while pressing and baking slot isolation of the sections and electric motor rods.

Technical Description

1. Supply voltage V	380, 50 Hz
2.Operating current in A	up to 30.
3. Number of racks in units	2
4. Capacity of one rack in KW	5
5. Output voltage in V	from 10 to 32
6. Output current in A	up to 160
7. Max. temperature of heating press slats in C^0	200

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Part V.

Equipment to repair transformers.

5.1 Traverse to lift transformer windings 03.05.04
5.2 Manual lever scissors 04.03.34
5.3 Machine for electro cardboard corrugation 03.05.09; Machine for electro cardboard corrugation 03.05.03
5.4 Readjust able machine for electro cardboard corrugation 03.05.06
5.5 Machine for milling rings out of electro cardboard 03.05.10
5.6 Machine for cutting isolation 03.05.11
5.7 Winding machine 04.03.30
5.8 Winding machine 04.03.32
5.9 Extensible winding pattern 03.05.05
5.10 Pulling device 03.05.07
5.11 Transformer to solder wires 03.04.08
5.12 Test bench for welding transformers 02.01.14
5.13 Dead end dyeing chamber 09.01.01

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5.1 Traverse to lift transformer windings 03.05.04

The traverse is designed for recess-mounting of the windings of transformers during the repair.

Technical Description

1. Carrying capacity, kg 1500
2. Outer diameter of the windings, mm
2.1. Minimum 300 2.2. Maximum 800
3. The maximum winding height, mm 1750
4. Overall dimensions, mm
4.1. Length 850
4.2. Width 1000 4.3. Height 2290
5. Weight 120

5.2 Hand operated lever scissors 04.03.34

They are intended for cutting isolation materials, used while repairing electric motors.

Technical Description

1. Max. thickness of material in mm – 2
2. Max. width of the material in mm – 1000
3. Dimensions in mm - 1380x1450x1160

5.3 Machine for electro cardboard corrugation 03.05.09; 03.05.03

It is intended for corrugation of electro cardboard used to make cooling canals.
03.05.09 inside HV windings in the transformers of I-II dimension.
03.05.03 – between LV and HV windings in the transformers of I-II dimensions.

Technical Description

	03.05.09	03.05.03
1. Max. thickness of the cardboard in mm	0,5…1,5	2
2. Max. width of the cardboard in mm	690	690
3. Height of the corrugator in mm	5,0+0,5	12 +2,5
4. Operating power in KW	4,0	
5. Dimensions in mm	1350x1020x1150	

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5.4 Readjustable machine for electro cardboard corrugation 03.05.06

It is intended for corrugation of electro cardboard used for isolation of power transformer windings.

Technical Description

1. Max. width of the cardboard in mm	700
2. Height of the corrugator in mm	
I roller	5+0,5
II roller	12,5+2,5
3. Cardboard thickness in mm	0,5…2,0
4. Installed power in KW	4,0
5. Dimensison in mm	1400x930x1260

5.5 Machine for milling rings out of electro cardboard 03.05.10

It is intended for milling radial surfaces of the rings in III-IV dimension transformer isolation.

Technical Description.

1.Min. internal diameter in mm	230
2.Max. external diameter in mm	1500
3.Operating power in KW	2,2
4.Owerall dimensions in mm	1115x830x1925

5.6 Machine for cutting isolation 03.05.11

It is intended for fabricating electro cardboard parts of rectangular isolation for III-IV dimension transformers.

Technical Description.

1.Max. dimensions of the parts in mm		
	thickness	60
	width	200
2.Operating power in KW		2,2
3.Overall dimensions in mm		850x800x150

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5.7 Winding machine 04.03.30

It is intended for winding electrical motor and transformer coils made of wire with circular or rectangular cross sections.

Technical Description

7. Speed of spindle rotation in rev/min
   I stage 15…63
   II stage 30…126
8. Regulation of spindle speed in the range – stepless.
9. Diameter of planwasher in mm – 620
10. Cross section of the wound wires round wire, diameter in mm 1,0…5,2
    rectangular wire, in mm 3,0…48

5.8 Winding machine. 04.03.32

It is intended to wind transformer coils.

Technical Description

1. Rate spindle rotation in revolutions per minute
   I stage 15…63
   II stage 30…126
2. Control of spindle rate in ranges - stepless
3. Size of wound conductors
   annular (diameter) mm 1,0…5,2
   rectangular (section) mm^2 3,0…48
4. Operating power in KW 3
5. Overall dimensions in mm 2530x700x1340

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5.9 Extensible winding pattern. 03.05.05

It is intended to wind windings of the transformers with I-II dimensions on isolation cylinders.

Technical Description

	Performance I	II
1. Min. diameter in mm	200	240
2. Max. diameter in mm	350	450
3. Length in mm	360	800

5.10 Pulling device 03.05.07

It is intended for pulling wires while winding transformer windings and clamping them in the period of winding machine stoppage (halt).

Technical Description

	Performance I	II
1. Max. width of the wire in mm	17	
2. Max. thickness of the wire in mm	3,5	
3. Number of streams	8	16
4. Drive	pneumatic	
5. Dimensions in mm	330x245x345	565x245x345

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5.11 Transformer to solder wires 03.04.08

It is intended for by means of soldering soft and hard solder of wound wires with circular or rectangular cross section or while producing electric machine and transformer windings.

Technical Description

5. Max. diameter, thickness of the wires in mm	10
6. Max. width of the wires in mm	20
7. Consumed power in KW	10
8. Overall dimensions in mm	515x500x1100

5.12 Test bench for welding transformers 02.01.14

It is intended for testing welding transformers used in manual are welding at 220V voltage and 380 V with capacity up to 20KVA.

Types of performed trials:

- Measuring resistance of winding isolation in relation to body and between the windings;
- Idle running test;
- Testing electrical stability of interloop winding isolation;
- Testing mechanical strength of transformers (short circuit test)
- Testing limits of welding current regulation;
- Testing electrical stability of isolation by applying high voltage.

Technical Description.

1. Supply voltage in V	380
2. Operating power in KVA	50
3. Limits (margins) of welding current regulation in A	100…650
4. Number of testing position	1
5. Occupied area in m^2	16

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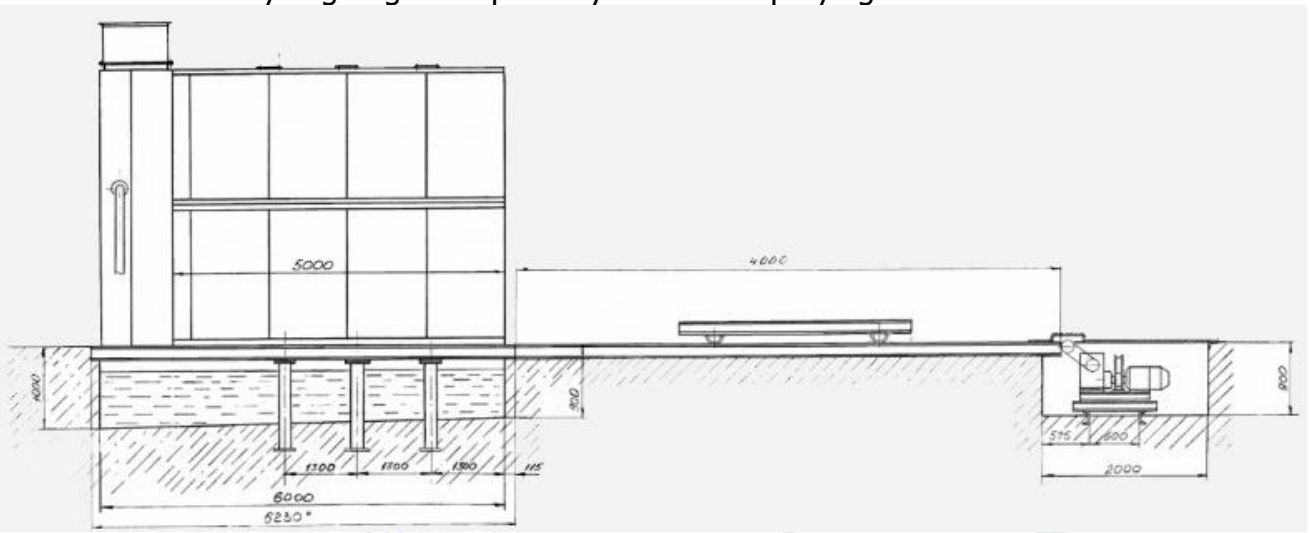
5.13 Deadend dyeing chamber 09.01.01

It is intended for dyeing large size parts by means of spraying.



Technical Description

1. Internal dimensions of the camera (LxWxH), mm 4900 x 3900 x 3400
2. Dimensions of the opening for the passage of the cart with product (WxH), mm 2000 x 2100

3. The means of transporting goods	truck
4. Truck Dimensions, mm / kg	2800 x 1700 x 190 x 1260 / 6000
5. Trolley drive, type	of the Electromechanical
5.1. Engine type	AIM-M80V6-1M1281
5.1.1. Power,	kW 1,1
5.1.2. Speed, rpm	930
5.2. Gearbox, type	CH100-50-52
5.3. Trolley travel Speed, m/min	10.5
6. Electric Pump unit, type	K45/30
6.1. Volume flow, m3 / h	45
7. Overall dimensions (LxWxH) / weight, mm / kg	13315x4400x4000/3100

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Part VI

Equipment to restore winding wire.

6.1 Annealing furnace 03.04.07
6.2 Installation to clean and restore the wire 03.04.05
6.3 Installation to isolate wires 04.03.12
6.4 Installation to isolate wires 03.04.06
6.5 Machine for cutting isolation paper 03.04.09

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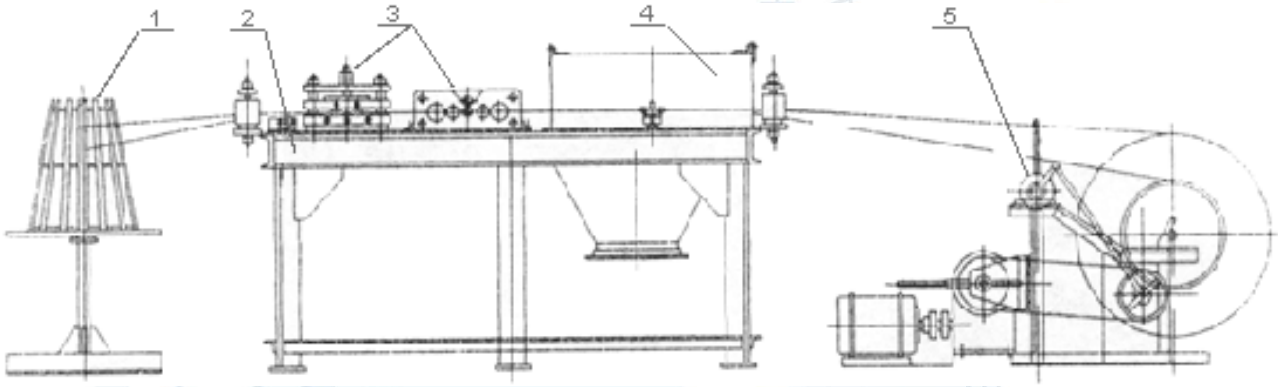
6.1 Wire annealing furnace 03.04.07

It is intended for annealing isolation and wires for recurring application. Annealing is performed without oxygen access. Annealing chamber is isolated from environment by water gate.

Technical Description.

1. Mass of the melt in kg.	500
2. Volume of water tub in m	3
3. Annealing temperature in C^0	400
4. Operating power in KW	40
5. Overall dimensions in mm	3550x2000x3450

6.2 Installation to clean and restore the wire. 03.04.05



1.Rack for wire coil.
2.Machine body
3.Planishing device
4.Cleaning device
5.Winding unit with wire doling device

This installation is intended for restoration and cleaning of winding wires from old isolation left after annealing.

Technical Description.

1. Number of streams	1
2. Rotation frequency of input drum in rev/min	5,4
3. Rate of wire pulling m/min	6,2…6,8
4. Power of electric motors, KW	0,55; 4,0; 3,0
5. Dimensions of the machine in mm	
Length	6300
Width	1250
6. Mass in kg.	1600

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6.3 Installation to isolate wires. 04.03.12

1.Drum with wires
2.Unit to clean and restore the wire
3.Winding heads
4.Drawing unit
5.Winding unit with wire doling device
6.Input drum

It is intended to isolate winding wires by means of tape isolating materials.

Technical Description

1. The maximum size of wire, mm	
1.1. Width	16
1.2. Thickness	5
2. Width of the insulation tape, mm	15 ... 20
3. Number of winding heads, PCs	2
4. The Number of bobbins of insulating material, Installed on one winding head, PCs	2
5. The frequency of rotation of the winding head, Rev/min	430 150...
6. Linear wire speed, m / min	2.1...6.0
7. Winding head Drive	
7.1. Electric Motor, type	AIR 80 A8U2
7.1.1. Power, kW	0,37
7.1.2. Speed, rpm	690
7.2. Frequency Converter, type	V1000 VZAB0P4BAA

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7.2.1. Power, kW	0,4
7.2.2. output frequency, Hz	0-90
7.2.3. Output voltage, V	220
8. traction drum Drive (gear motor CMU50-U90-750-1.8 0.37-570-380-50(4p))	
8.1. electric Motor, type	MOTIVE 71 B4
8.1.1. Power, kW	0,37
8.1.2. Rotation frequency, Rev/min	1366
8.2. Reducers	
8.2.1. Type/gear ratio	MU50/25
8.2.2. Type/gear ratio	MU90/30
8.3. The frequency Converter type	V1000 VZAB0P4BAA
8.3.1. Power, kW	0,4
8.3.2. Output frequency, Hz	0-90
8.3.3. Output voltage, V	220
9. The drive of the receiving drum	
9.1. Motor type AIR63V4У3	
9.1.1. Power, kW	0,37
9.1.2. Cstate of rotation, Rev/min	1320
9.2. Gearbox	
9.2.1. Type/gear ratio	NMRV-050/100
9.3. Frequency Converter, type	CIMR-F7Z40P71B
9.3.1. Power, kW	0,75
9.3.2. Output frequency, Hz	0-90
9.3.3. Output voltage, V	380
10. Clamshell lead screw drive	
10.1. Electric Motor, type	MOTIVE 71B6
10.1.1. Power, kW	0,25
10.1.2. Speed, rpm	933
10.2. Gearbox	
10.2.1. Type/gear ratio	NMRV-050/100
10.3. Frequency Converter, type	V1000 VZAB0P4BAA
10.3.1. Power, kW	0,4
10.3.2. Output frequency, Hz	0-90
10.3.3. Output voltage, V	220
11. Installed capacity, kW	1,73
12. Overall dimensions, mm	
12.1. Length without extension	3950
12.2. Length with extension	4500
12.3. Width	1160
12.4. Height	1050
13. Weight, kg	1050

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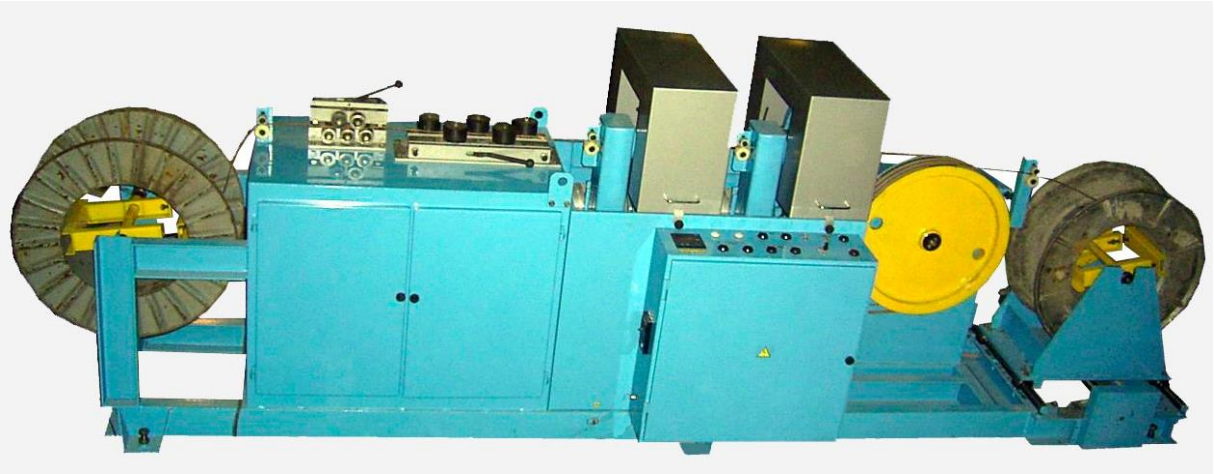
6.4 Installation to polish wires. 03.04.06



1. Drum with wire
2. Winding head
3. Saturation tub
4. Dryig furnace
5. Drum with wire

It is intended for putting glasstape isolation on copper wires of annular section with diameter from 1,68 to 4,1 mm and rectangular section with diameter on smaller side from 1,08 to 3,5 mm, on the bigger side from 3,05 to 9,3 mm with simultaneous laying, impregnation and drying.

Technical Description

1. The maximum size of wire, mm	
1.1. Width	16
1.2. Thickness	5
2. Power dryer kW	50
3. Number of winding heads, PCs	2
4. The Number of bobbins of insulating material, installed on one winding head, PCs	2
5. The stroke of the layout for one turn of the receiving drum, mm	300-1000
6. The frequency of rotation of the winding head, Rev/min	225
7. Linear wire speed, m / min	4...11
8. The drive winding head	
8.1. Motor type	AIR 80 A8У2
8.1.1. Power, kW	0,37
8.1.2. Rotation frequency, Rev/min	690
9. Drive traction drum	
9.1. Motor type	AIR 63 B4У3
9.1.1. Power, kW	0,37
9.1.2. Rotation frequency, Rev/min	1320
9.2. Reducers	
9.2.1. Type/gear ratio	NMRV-040/20

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9.2.2. Type/gear ratio	NMRV-090/20
3. frequency Converter, type	9FR-S520S-0.4 K-EC
9.3.1. Power, kW	0,4
9.3.2. output frequency, Hz	0.5-120
9.3.3. Output voltage, V	220
10. The drive of the receiving drum	
10.1. electric Motor, type	AIR56V4UZ
10.1.1. Power, kW 0,18	
10.1.2. speed of rotation, rpm	1350
10.2. Gearbox	
10.2.1. Type/gear ratio	NMRV-040/100
10.3. frequency Converter, type	FR-S520S-0,4 K-EC
10.3.1. Power, kW	0,4
10.3.2. output frequency, Hz	0.5-120
10.3.3. Output voltage, V	220
11. Clamshell lead screw drive	
11.1. electric Motor, type	AIR63V4U3
11.1.1. Power, kW	0,37
11.1.2. speed, rpm	1320
11.2. Gearbox	
11.2.1. Type/gear ratio	NMRV-050/30
12. Installed capacity, kW	1.66
13. Overall dimensions (LxWxH) / weight, mm / kg	4950x1160x1310/1200

6.5. Machine to cut isolation paper 03.04.09

It is intended for cutting coils made of electrotechnical paper of 500…750 mm width into rolls of 130 mm width and cutting these into bobbins with 4…14 mm width.

Technical Description

1. Dimensions of the Bay with paper	
1.1. Width, mm	500...1000
1.2. Diameter, mm	1000 max
1.3. Weight, kg	600 max
2. Roll Sizes	
2.1. Outer Diameter, mm	260 max
2.2. Internal Diameter, mm	42
2.3. Width, mm	10 min
3. Cutting Speed, m / min	
3.1. Minimum	0
3.2. Maximum (Ø 260mm)	80
4. Number of winding shafts, PCs	2
5. Number of shafts of the recoil device, PCs	2
6. The drive shafts of the winding	Electromechanical
6.1. Electric Motor, type	AIR 80 A8U2

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6.1.1. Power, kW	0,37
6.2. Gearbox, type / gear ratio	RS50 / 30
6.3. Frequency Converter	
6.3.1. Type	MX2 AB007-E
6.3.2. Power, kW	0,75
6.3.3. Output frequency, Hz	0-90
6.3.4. Output voltage, V	220
7. Installed capacity, kW	0,75
8. Power supply Voltage (50 Hz), V	220
9. Overall dimensions / weight, mm / kg	1950x1500x1520/400

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Part VII

Testing equipment.

7.1 Test bench for stator active steel. 02.01.04
7.2 Test Bench for unsaturated stators 02.01.05
7.3 Test bench for synchronous generators and DC machines with up to 100 KW capacity 02.01.06 02.01.06/M1
7.4 Test bench for asynchronous electric motors with capacity up to 100 KW. 02.01.07 02.01.07/M1
7.5 Test bench of stator active steel 02.01.08
7.6 Test station for AC electric machines with capacity from 100 up to 1000 KW. 02.01.09 02.01.09/M1
7.7. Test station for AC electromachines and power transformers 02.01.10 02.01.10/M1
7.8 Test bench for testing winding sections of electrical machines 02.01.11
7.9 Test station of power transformers of I-IV dimensions 02.01.13 02.01.13/M1
7.10 Test bench to test welding transformers 02.01.14
7.11 Test bench of power, measuring and welding transformers 02.01.19

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7.1. Test bench for stator active steel 02.01.04

It is intended to determine the condition of active steel in stator cores of asynchronous and synchronous electric motors with the capacity up to 100 KW.

Technical Description

6. Capacity of the tested stator in KW	0,5…100
7. Capacity of the determined losses W/kg	up to 5
8. Supply voltage, V –	220
9. Frequency in Hz –	50
10. Operating current, A –	8

7.2. Test Bench for unsaturated stators 02.01.05

It is intended for testing electric motor stators of the capacity up to 100 KW before winding impregnation.

Types of performed trials:

- Measuring resistance of winding isolation in relation to the body and between the phases;
- Control of current equality in phases;
- Checking winding connection;
- Detection of coil short circuits;
- Testing winding isolation in relation to body and between the phases by using higher voltage.
- Measuring winding resistance offered to direct current in practically cold condition.

Technical Description

1. Power consumption, kVA	3
2. Rated power supply voltage 50 Hz, V	220
3. Current load And 30	
4. Output regulated voltage 50 Hz, V	0 ÷ 45 (40A) 100 ÷ 5000 (50mA)
5. DC Output voltage, V	500, 1000 (50mA)
6. Number of test places	3
7. Overall dimensions of the stand / weight, mm / kg	910x 610x1880 / 250
8. Milliommeter	GOM-802
8.1. The value of the allowed error value, %	1,2
8.2. Limit of resistance measurement, mOm	30 ÷ 3x109

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8.3. Test current, A	1x10-6 ÷ 1
9. Installation for checking electrical safety	GPT-79612
9.1. Test alternating voltage,	kV 0.100-5
9.2. Maximum current, mA	20
9.3. Test constant voltage, V	500, 1000
9.4. Measurement of insulation resistance, IOM	1÷1999
9.5. Accuracy Class	3
10. MT4W Digital meters	
10.1. Accuracy class	0.5
10.2. Measurement speed, Rev./sec	5
10.3. Time to set the reading, msec	less than 20

7.3 Test bench for synchronous generators and DC machines with up to 100 KW capacity 02.01.06 ; 02.01.06/M1

Test bench is intended for carrying out acceptance trials of the repaired synchronous generators and electric machines of direct current with the capacity up to 100 KW.

Test bench provides trials in the following scope:

- Measuring isolation resistance in relation to the body and between the windings;
- Measuring winding resistance under direct current conditions in practically cold state;
- Testing with increased rotation frequency (by means of DC drive motor);
- Electric stability test in relation to machine body and between the windings;
- Electric stability test of winding interloop isolation;
- Determination of idle characteristic (for synchronous generators);
- Determination of 3 phase short circuit feature (for synchronous generators);
- Determinations of generator excitation current or frequency of motor rotation at idle running (for DC machines);

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- Commutation check up in the conditions of rated load and short time current overload (for DC machines).

Test bench **02.01.06/M1** also includes testing DC machines under load. Load is represented by synchronous generator with power return supply into the net. Test bench provides automatic process of measurements and output of all protocols into the computer.

Technical Description

1. Power consumption, kva	130
2. Supply voltage, V	380 (50 Hz)
3. Output adjustable Voltage (constant), V	
3.1. Post1	0 ÷ 400
3.2. Post2	30 ÷ 600
3.3. Post3	0 ÷ 260
4. Load current, A	
4.1. Post1	20
4.2. Post2	250
4.3. Post3	50
5. High-voltage test voltage, V	0 ÷ 3000 (50 Hz)
6. Rated speed Tested electric machines, rpm up to	1500
7. A synchronous generator driven by toothed belt	
7.1. Electric Motor, type	AIR 315 A4 UZ
7.1.1. Power, kw	100
7.1.2. Speed, rpm	1500
7.2. Gear Belt, type	MEGADYNE ISORAN2400RPP8 (636)
7.3. Frequency Converter, type	CIMR-F7Z41100B
7.3.1. Power, kw	110
7.3.2. Output frequency, Hz	0 ÷ 60
7.3.3. Output voltage, V	380
8. Digital megohmmeter	E6-22
8.1. Accuracy Class	1.5
8.2. The range of measured resistances, kom	1 ÷ 107
8.3. Rated test voltage, V	100, 500, 1000
8.4. Maximum current, ma no more than	5
9. The milliohmmeter	GOM-802
9.1. The Value of the allowed error value, %	0,1
9.2. Limit of resistance measurement, mom	30 ÷ 3x109
9.3. Test current, A	1x10-6 ÷ 1
10. Pfp-1 Digital meter	
10.1. Accuracy Class	0,15
10.2. Measurement Speed, m / s	3
10.3. Time to establish the readings, msec less than	300

11. Overall dimensions of the control and power Cabinet (lxwxh) / weight, mm / kg 820 x 1225 x 2160 / 720

12. Overall dimensions of the drive control Cabinet / weight, mm / kg 600 x 900 x 1680 / 280

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13. The dimensions of the test field (lxwxh) / weight, mm / kg 2600 x 2100 x 1000 / 2300
15. Overall dimensions load resistance (lxwxh) / weight, mm / kg 1400 x 600 x 2200 / 600
16. Overall dimensions load resistance (lxwxh) / weight, mm / kg 1300 x 1400 x 1100 / 1100

7.4 Test bench for asynchronous electric motors with capacity up to 100 KW. 02.01.07; 02.01.07/M1

It is intended for testing asynchronous electrical motors of the alternating current with the frequency of 50 Hz with short circuited and phase rotors of the capacity up to 100KW.

Types of trials:

- measuring winding isolation resistance in relation to machine body and between the windings;
- measuring winding resistance under direct current in practically cold condition;
- determining transformation ratio of phase rotor motors;
- electrical strength trails of the winding isolation in relation to the body of the motor and between the windings;
- electrical strength trails of the winding isolation between the loops;
    - determination of idle current;
    - determination of short circuit current and losses;
    - idle running.

Technical Description

1. Supply voltage, V –	380
2. Operating current, A -	500
3. Number of testing positions on the test bench with	
4. The power up to 20 KW, unit – up to 100 KW, unit -	1
5. Occupied area in m^2 –	25

Test bench **02.01.07/M1** guarantees automatic process of measuring and testing with computer output of all protocols.

Technical Description

1. Supply voltage, V –	380
2. Operating current, A -	500
3. Number of testing positions on the test bench with	
4. The power up to 20 KW, unit – up to 100 KW, unit -	1
5. Occupied area in m^2 –	25

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7.5 Test bench for stator active steel 02.01.08

It is intended for determining the condition of active steel in stator cores of asynchronous and synchronous electrical motors with capacity from 100 to 1000 KW.

Technical Description

1. Capacity of the tested stator in KW	100…1000
2. Capacity of the defined losses, V/kg	up to 5
3. Supply voltage in V –	380
4. Operating current in A –	40
5. Current frequency in Hz –	50

7.6 Test station for AC electric machines with capacity from 100 up to 1000 KW. 02.01.09; 02.01.09/M1

This station is intended for testing asynchronous and synchronous electrical motors. For machines with voltage up to 6 kV the range of power is from 250 up to 1000 KW. For machines with voltage up to 0,66 KV the range of power is from 100 to 400 KW. Equipment installed at the station allows to perform the following types of tests:

- measuring resistance of winding isolation in relation to machine body and between windings (performed by megaommeter ф4102/1);
- measuring resistance of the windings under direct current in practically cold condition (performed by means of a bridge P.333);
- testing under increased frequency of rotation (if rotating windings or bandages were under repair). These tests are carried out in motor mode by 20% increasing frequency of supply voltage (electric machine transformer with 100 KW capacity and 0.4 kV of voltage is used).
- testing of winding isolation in relation to machine body and between the windings to measure electrical strength by alternating voltage with 50 Hz frequency. Testing voltage is formed by one phase oil transformer having capacity of 25 kVA and is regulated by electrostatic kilovoltmeter C196 (voltage regulation limits are 0÷27 kV);

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- electric stability testing of winding interloop isolation. It is carried out in machine idling by applying voltage of the value more than 30% from the rated one. (Increased voltage is formed by induction regulator). Test bench allow to perform this type of testing for machines where idle operating power at the voltage more than 30% from the rated one constitutes not more than 500 KW.
- determination of the idle current and losses while performing this test they measure linear voltage, linear current of the stator in every phase and operating power at the rated voltage.
- determination of the short circuit current and losses. In the condition of short circuit, voltage is supplied to stator, rotor is retarded and if it is a phase rotor then windings are short circuited. During this process they measure input voltage, stator current (linear short circuit current) and consumed power. Short circuit current and losses are measured at the same meaning of short circuit voltage.

$$U_{short.c} \approx U_{r/3,8}$$

- determination of transformation ratio. Transformation ratio is found by using measurements of linear voltages at the clamps of stator windings and at the rings of static rotor having disconnected winding.

Technical Description

7. Power supply is obtained from shop substation with capacity not less than (KW) – 630
8. Supply voltage in V – 380
9. Regulated voltage in V
   Three phase 0-9000
   0-650
   one phase 0-27000
10. Range of current measurements in A
    With 10 kV voltage 50
    0,4 kV voltage 50, 200, 600
11. Number of simultaneously tested motors in units – 1
12. Occupied area in m^2 – 75

Test bench **02.01.09/M1** provides automatic process of measurements and trials with computer output of protocols.

7.7 Test station for AC electromachines and power transformers. 02.01.10; 02.01.10/M1

This station is provided for testing asynchronous and synchronous machines with the capacity of 100-1000 KW and voltage up to 6 KW, and capacity of 100-400 KW, voltage up to 0,66 KV, also transformers with capacity up to 5000 KVA, voltage up to 10 KV.
This station allows to carry out electric machine tests according to standard STOES 1.1-95 «Synchronous and asynchronous electrical machines rotating more than 45 th dimension» and corresponding to standard GOST 183-74. Standards for transformers are the following: GOST 11677-85, GOST 3484-88

Testing methods correspond to standards GOST 11828-86, GOST 7217-87, GOST 10169-77.
Station equipment allows to perform the following trials:
For electric motors:

- Measuring resistance of winding isolation in relation to body and between the phases;
- Measuring winding resistance offered to direct current in practically cold state;
- Testing winding isolation in relation to body and between the windings;
- Idle running of electrical machine;
- Determination of idle current and losses;
- Determination of short circuit voltage and losses;
- Determination of transformation ratio (for electrical motors with phase rotor);
- Testing under increased frequency of rotation (for asynchronous machines with phase rotor and synchronous machines if rotation windings or bandages were under repair).
- Electrical stability testing winding intersloop isolation;

For transformers:

- Measuring resistance of winding isolation and absorption ratio;
- Determining transformation ratio;
- Check up asset of winding connections;
- Testing electric stability of winding isolation by applying increased voltage of industrial frequency;
- Determination of idle current and losses;
- Determination of short circuit voltage and losses;
- Measuring winding resistance offered to direct current in practically cold state;

Test bench **02.01.10/M1** automatically controls all measurements and trials with computer output of all protocols.

Technical Description.

1.Power supply from shop substation with capacity not less than (KVA)	630
2.Supply voltage in V	380
3.Output regulated 3 phase voltage of the station in V	0-650
	0-10000
1 phase	0-27000

7.8. Test bench for testing winding sections of electrical machines. 02.01.11

It is intended for testing interloop and body isolation for windings of lowvoltage and highvoltage electrical machines of alternating and direct current having voltage of 10 KV.

Technical Description.

1. Sopply voltage in V	380
2. General operating power in KVA	50
3. Secondary voltage while testing coil isolation KV/coil, max.	1,5
4. Secondary voltage while testing body isolation, KV, max.	35
5. Occipeid area in m^2	16

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7.9. Test station of power transformers of I-IV dimensions. 02.01.13 ; 02.01.13/M1

It is intended to test transformers with the capacity up to 200000 KVA and voltage of up to 10 KV.

Types of carried out trials:

- Measuring resistance of winding isolation and absorption ratio;
- Determination of transformation ratio;
- Check out a set of winding connections;
- Testing electric stability of winding isolation by applying high voltage of industrial frequency;
- Determination of short circuit current and losses;
- Measuring winding resistance offered to direct current in practically cold condition;

Test bench **02.01.13/M1** automatically controls measurements and testing phenomena outputting all protocols into the computer.

Technical Description.

1.Consumed power in KVA	400
2.Supply voltage in V	380
3.Output regulated 3 phase voltage of the station in V	0-650 0-10000
4.Occupied area in m^2	100

7.10. Test bench to test welding transformers. 02.01.14

It is intended for testing welding transformers for manual are welding with 220V and 380 V of voltage and power up to 20 kVA.

Types of carried out trials:

1.Supply voltage in V	380
2.Operating power in KVA	50
3.Welding current regulation limits in A	100…650
4.Number of tested sites	1
5.Occupied area in m^2	16

7.11. Test bench of power, measuring and welding transformers. 02.01.19

Technical Description.

Installation for high voltage testing of isolation, including transformer oil;
0-75 KV alternating current of 50 Hz
0-50 KV direct current

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- Measuring isolation resistance by means of 2500 V megaommeter
- Regulated 3 phase output with measuring system
- 0-6300 V current measurement up to 50 A
- 0-650 V current measurement up to 600 A allows to carry out
- determination of idle current and losses;
- determination of short circuit current and losses;
- device to determine transformation ratio (ratio of coil numbers is up to 1:350);
- device to determine a set of connections (by means of two voltmeters)
- measuring winding resistance offered to direct current by means of a measuring digital bridge.

The following features are provided:

- control of welding current regulation limits;
- control of transformer mechanical strength (multiple short circurs)
- control of electrical strength of winding interloop isolation (2Un at 100 Hz frequency).

For products contact the LLC Trading House «ELECTROMASH»:
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info@tdelectromash.com
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CONTACTS FOR THE PURCHASE OF EQUIPMENT:

Russia, 346428, Rostov region, Novocherkassk,
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mobile phone: + 7 (928)909-22-92
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info@tdelectromash.com
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