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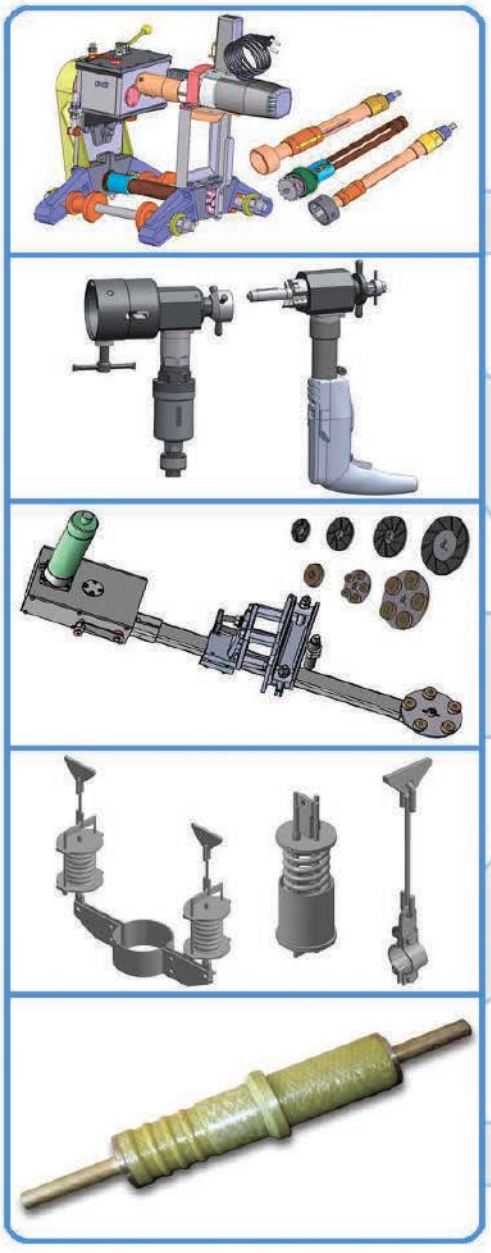
Certification



DEVICES AND TOOLS

FOR OVERHAULING:

- TURBINE EQUIPMENT
- BOILER EQUIPMENT
- ELECTRICAL EQUIPMENT

ELEMENTS OF HANGER-SUPPORT SYSTEMS

TURBINE GENERATORS TERMINAL LEADOUTS

2018

Ukraine 61017 Kharkov, Str. Serikovskaya, 1
Tel: +38 (057) 728-41-56; 728-54-73 Tel / fax: +38 (057) 728-41-57
E-mail: kf@khaer.com.ua, specteh-khaer@ukr.net
URL: www.khaer.com.ua

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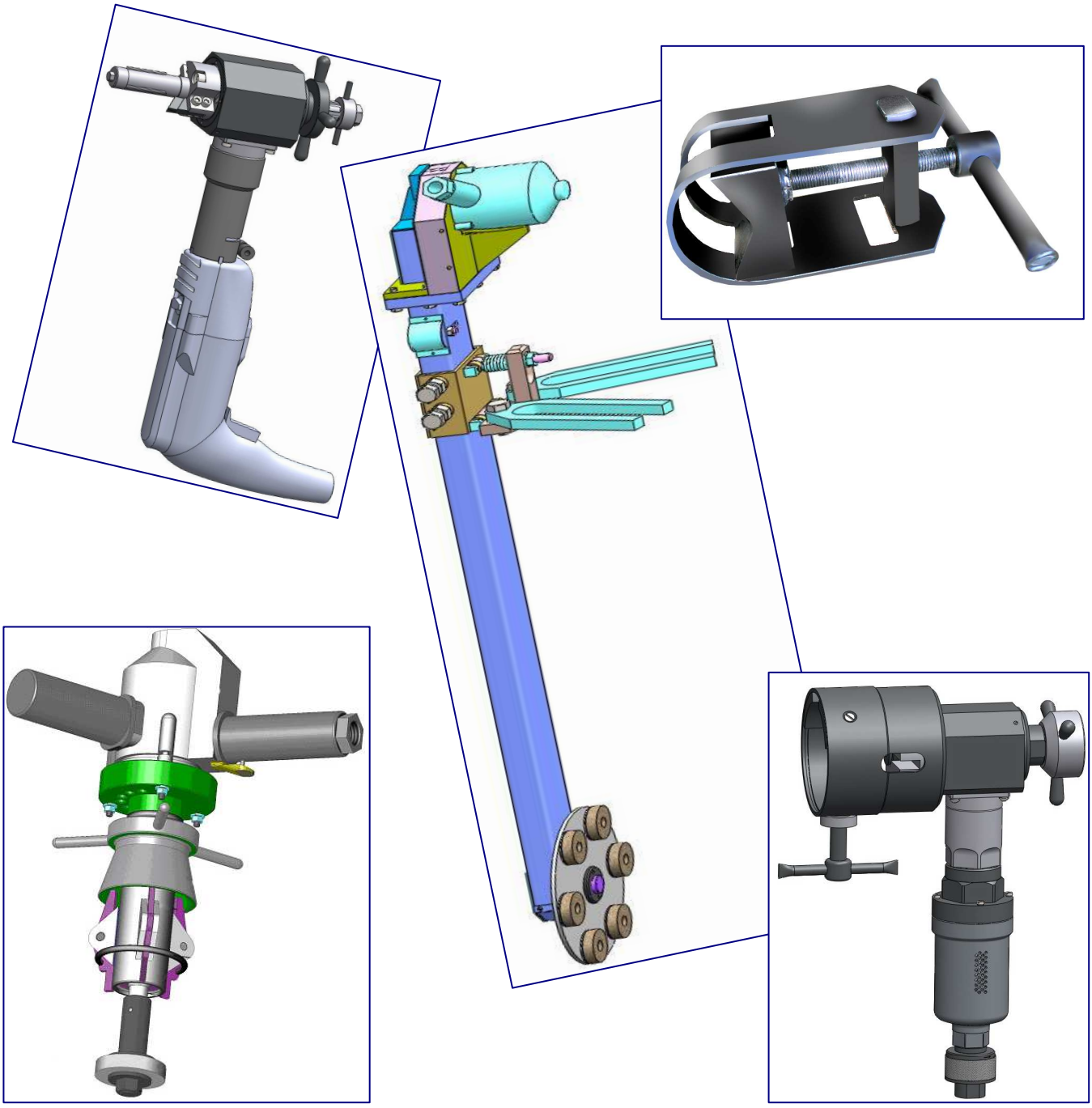
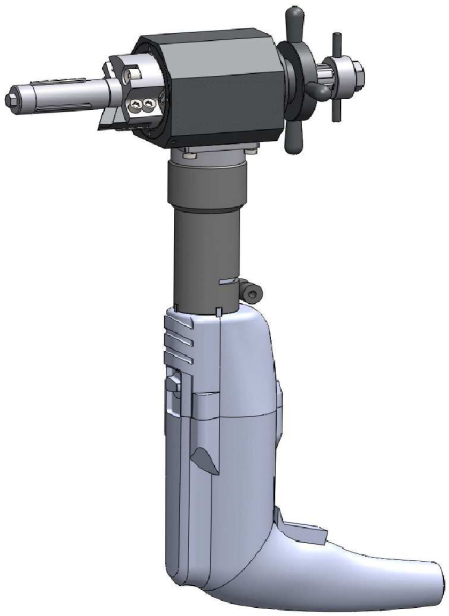
I. DEVICES AND TOOLS FOR BOILER EQUIPMENT OVERHAULING

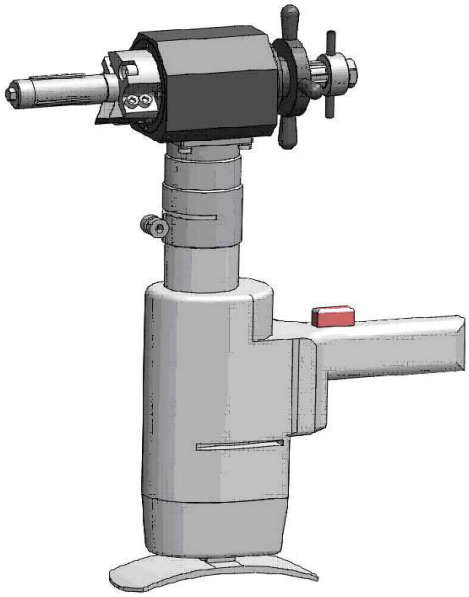


CHAMFERING MACHINES WITH INSIDE BRACING

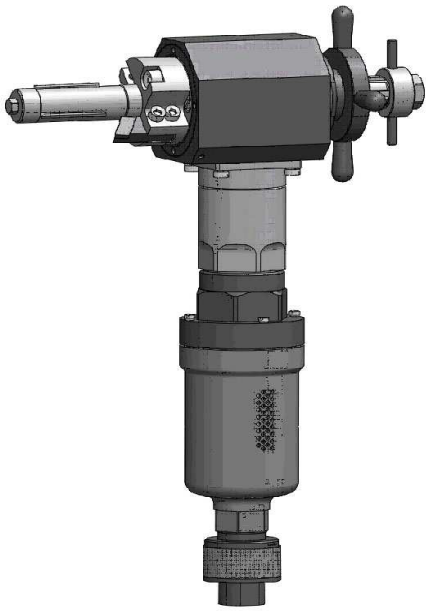
Intended for facing pipes for welding at the place of their installation during repair and erection works.



220 V



36 V



pneumatic

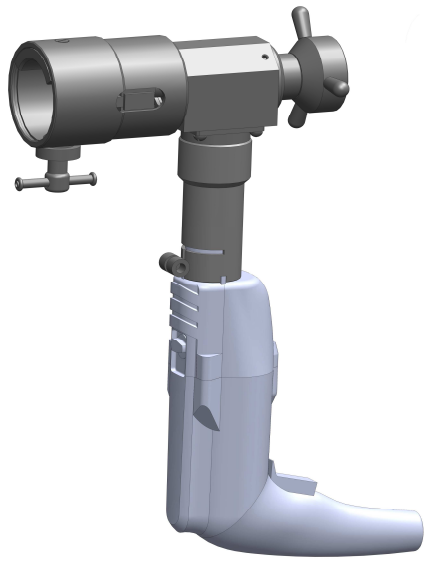
S/No.	The inner diameter of the pipe, mm	Type of drive	Designation	Mass in running order , kg
1	26 - 63	220 V	К1738 - 1Э220	9,4
2		36 V	К1738 - 1Э36	10,7
3		pneumatic	К1738 - 1П	9,5
4	45-102	pneumatic	К1738 - 2П	12,5

Specification

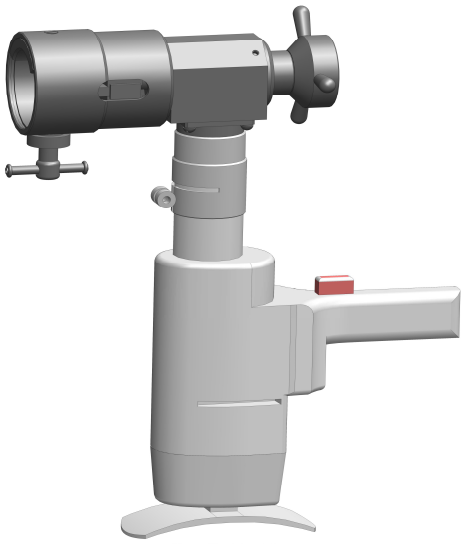
Type of drive	220V	36V	pneumatic
Power, kW	1,1	0,86	1,2
Rated voltage, V	220	36	-
Current frequency, Hz	50	200	-
Running speed of the toolholder , r.p.m.	100 - 200	200	max 145
Axial movement of the cutting tool, mm	20	20	20
Network air-pressure, atm	-	-	6,3
Length, mm	400	460	290
Width, mm	100	100	100
Height, mm	490	510	520

CHAMFERING MACHINES WITH OUTSIDE BRACING

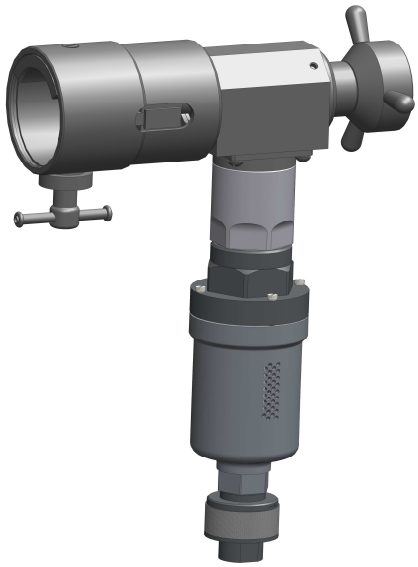
Intended for facing pipes for welding at the place of their installation during repair and erection works.



220 V



36 V



pneumatic

S/No.	The outer diameter of the pipe, mm	Type of drive	Designation	Mass in running order , kg
1	28 - 42	220 V	К1755 - 1Э220	8,5
2		36 V	К1755 - 1Э36	10
3		pneumatic	К1755 - 1П	8,8
4	28 - 60	220 V	К1755 - 2Э220	9,2
5		36 V	К1755 - 2Э36	10,7
6		pneumatic	К1755 - 2П	9,4

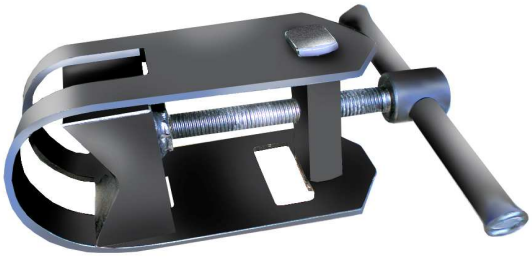
Specification

Type of drive	220V	36V	pneumatic
Power, kW	1,1	0,86	1,2
Rated voltage, V	220	36	-
Current frequency, Hz	50	200	-
Running speed of the toolholder , r.p.m.	100 - 200	200	max 145
Axial movement of the cutting tool, mm	20	20	20
Network air-pressure, atm	-	-	6,3
Length, mm	470	490	440
Width, mm	100	100	100
Height, mm	410	410	260

DEVICE FOR LINING OF PIPES К1201

Intended for lining of pipes in the course of butt welding.

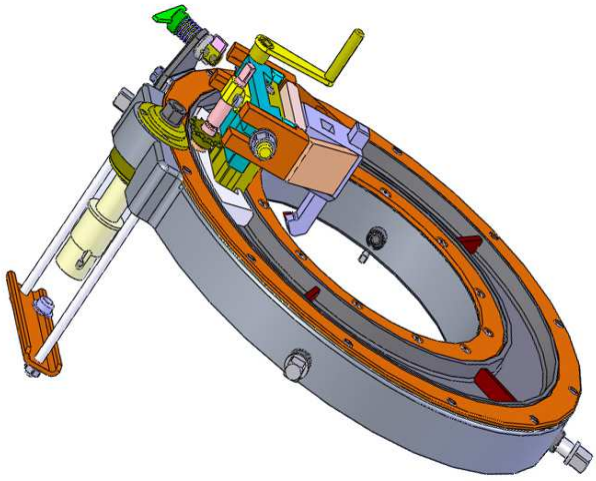
The outer diameter of the pipe, mm	Overall dimensions, mm	Weight, kg
28 - 32	50 x 211	2,27
32 - 38	56 x 216	2,36
38 - 45	63 x 221	2,44
45 - 48	66 x 224	2,47
48 - 51	69 x 227	2,47
48 - 56	74 x 235	2,77
56 - 60	78 x 238	2,81
60 - 65	83 x 242	2,87
65 - 75	93 x 250	3,26
76 - 83	101 x 256	3,37
98 - 102	122 x 290	5,9



DEVICES FOR PREPARING THE ENDS OF STEAM PIPELINES FOR WELDING

Intended for boring the tube inner surface, chamfering, facing the pipes and manifolds for welding.

The outer diameter of the pipe, mm	Designation	Weight, kg
133 - 159	К182Г	40
219 - 273	К113Г	44
325 - 377	К208Г	54,2



Specification

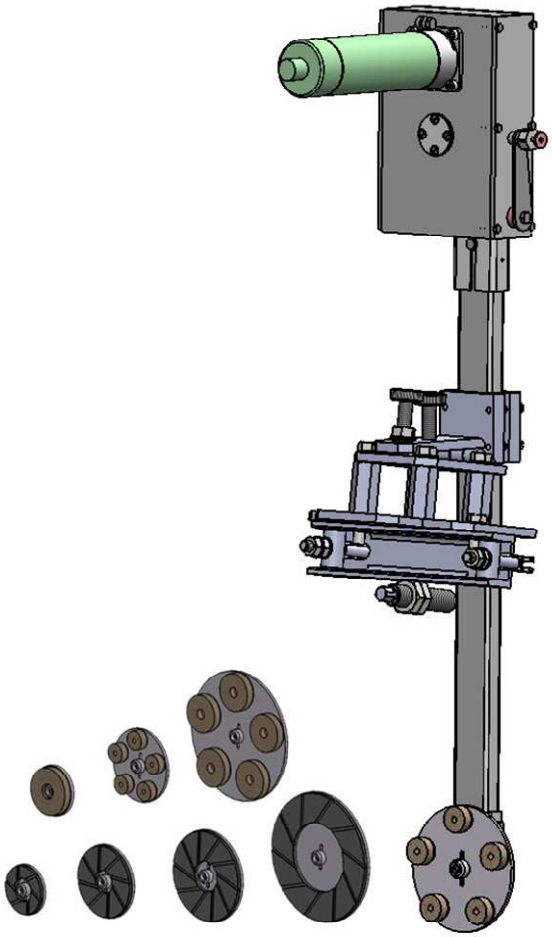
Type of drive	pneumatic
Slide stroke, mm	no less than 35
Possible length of boring when working with one reset of the cutting tool, mm	no less than 70
Rotation frequency of gear wheel with slider at maximum load, r.p.m.	no more than 25
Feed	automatic
Feed rate, mm/rev	0,167

UNIVERSAL DEVICE FOR GRINDING AND RESEATING THE GATE VALVE SEATS К - 8085/2М

Intended for performing the works on grinding and reseating the gate valve seats with the internal diameter DN 50, 80, 100, 150 mm for work surfaces with the diameters of 66, 96, 120, 170 mm without cutting them out of the pipeline.

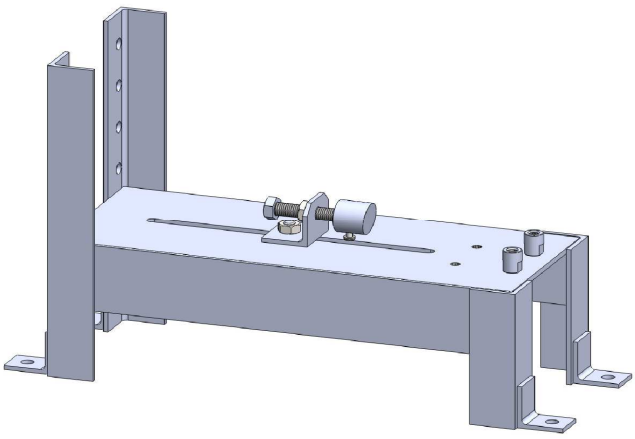
Specification

Type of drive	pneumatic
Power, kW	0,82
Rated pressure of compressed air in the network, atm	6
Rotation frequency of the drive, r.p.m.	2550
No-load speed grinding set, m/sec	6,6 - 17,8
No-load speed reseating set, m/sec	1,7 - 4,5
Reduction ratio:	
- for grinding	1 : 1,25
- for reseating	1 : 1,5
Overall dimensions, mm	910 x 190 x 280
Weight, kg	9,8



Completeness

Designation	Number, pcs.
Universal mount	1
The frame processing wedge	1
Grinding blocks:	1
Ду 150 Ø170	1
Ду 100 Ø120	1
Ду 80 Ø96	1
Ду 50 Ø66	1
Lapping blocks:	1
Ду 150 Ø170	1
Ду 100 Ø120	1
Ду 80 Ø96	1
Ду 50 Ø66	1

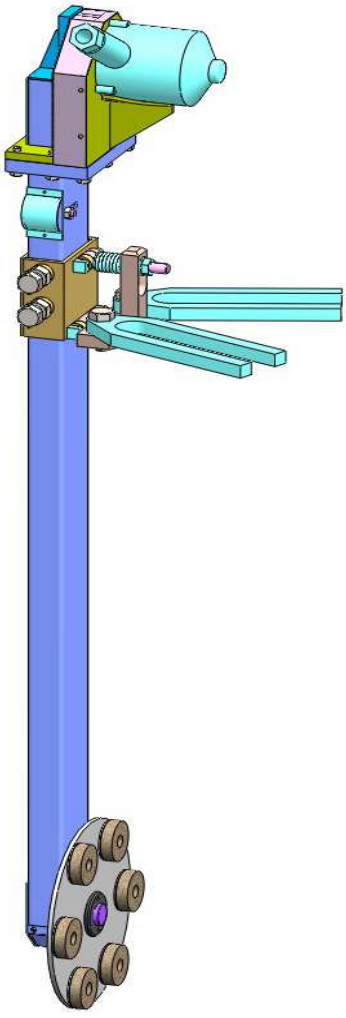


Bed for wedge machining

DEVICES FOR GATE VALVE REPAIRING К - 8085М, К - 8085/1М

Intended for grinding the gate valve seats with the inner diameter DN 100 - 200 mm, DN 200 - 300 mm without cutting them out of the pipeline.

Designation	Orifice valves, mm	The diameter of the treated surface, mm	Overall dimensions, mm	Weight, kg
К - 8085М	100 - 200	115 - 235	1260 x 315 x 310	26
К - 8085/1М	200 - 300	235 - 360	1320 x 440 x 315	37

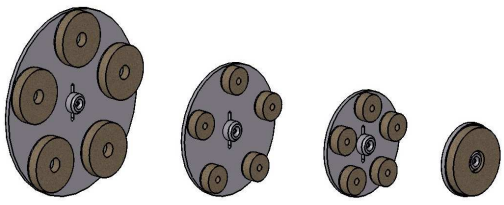


Specification

Type of drive	pneumatic
Power, kW	1,3
Rated pressure of compressed air in the network, atm	6
Rotation frequency of the drive, r.p.m.	4580
Rotation frequency of abrasive wheel, r.p.m.	1520
Reduction ratio	1 : 3

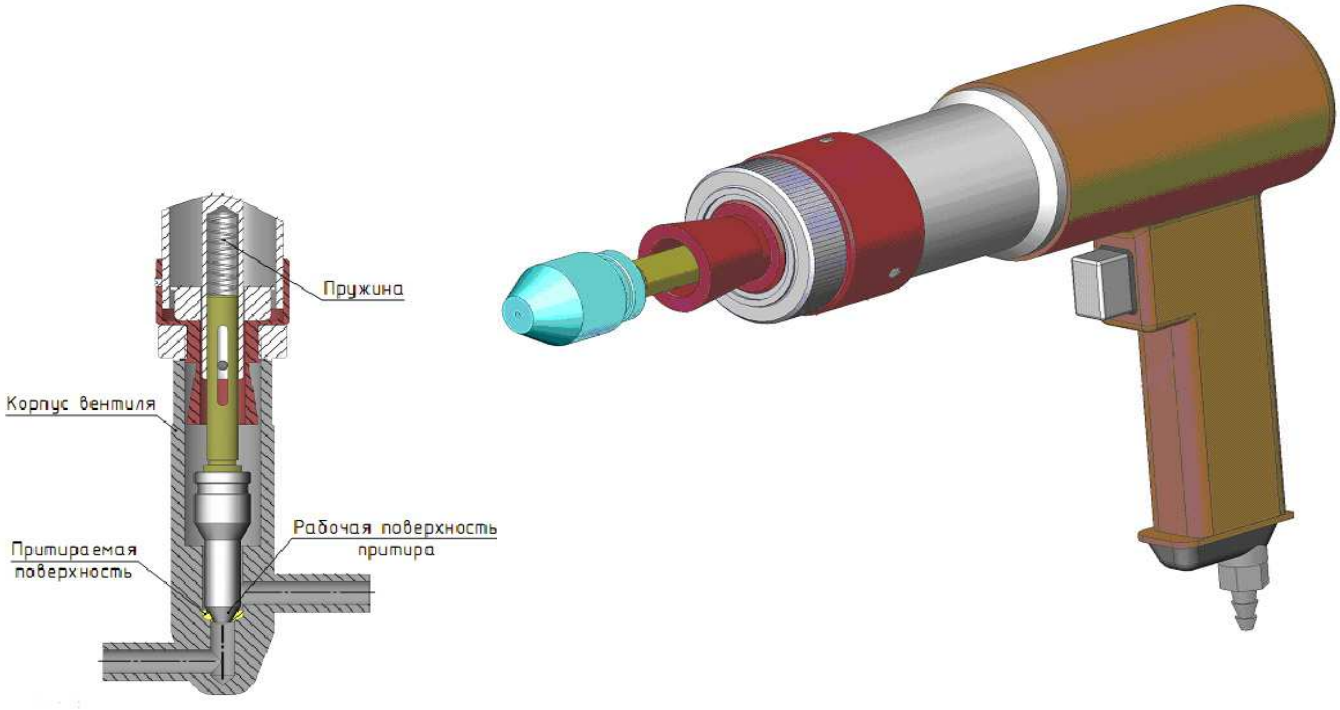
Completeness

Designation	Grinding blocks	Number, pcs.
К - 8085М	Ду 100 Ø 115	1
	Ду 150 Ø 180	1
	Ду 200 Ø 235	1
К - 8085/1М	Ду 200 Ø 235	1
	Ду 250 Ø 280	1
	Ду 300 Ø 360	1



DEVICES FOR RESEATING AND GRINDING THE VALVE SEAT GUIDES ГМ - 068А, ГМ - 068

Intended for repairing high pressure conical valve seat guides DN10 and DN20 at the place of their installation without cutting them out of the pipeline.



Scheme of installation tools

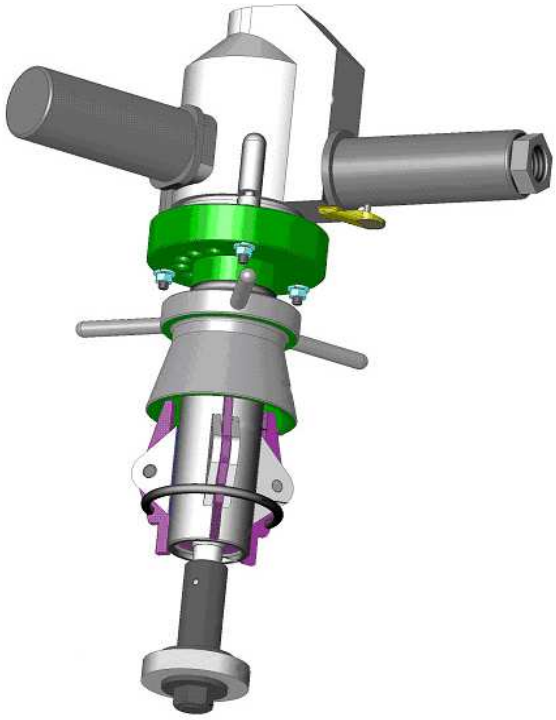
Specification

Parameters	ГМ - 068А	ГМ - 068
Type of drive	pneumatic	pneumatic
Power, kW	0,5	0,5
Rated pressure of compressed air in the network, atm	5	5
Rotation frequency of the spindle, r.p.m.	2000	2000
Internal diameter of the valves in process, mm	10 x 60°	20 x 60°
		20 x 21°
Overall dimensions, mm	390 x 60 x 180	390 x 60 x 180
Weight, kg	2,3	2,3
Lapping, supplied	10 x 60° - 1pcs.	20 x 60° - 1pcs.
		20 x 21° - 1pcs.

By agreement with the Customer, reseating tools of various configurations can be manufactured.

DEVICE FOR GRINDING THE VALVE SEAT GUIDES ГМ - 046А

Intended for grinding the valve seat guides DN50 mm for work surfaces with the diameter of 42 - 62 mm without cutting them out of the pipelines.



Specification

Type of drive	pneumatic
Power, kW	1,3
Rated pressure of compressed air in the network, atm	6
Rotation frequency of the spindle, r.p.m.	4580
No-load speed of abrasive wheel, m/sec	12,5 - 13,7
Overall dimensions, mm	470 x 220 x 280
Weight, kg	8,4

UNIVERSAL DRILLING-AND-MILLING HEAD УСФГ Т814 FOR MILLING

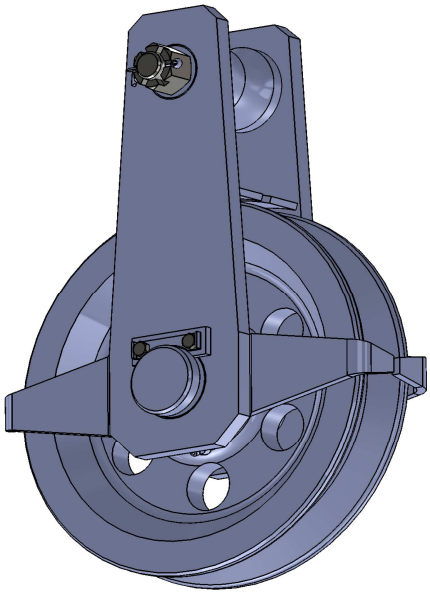
Intended for mechanical processing of parts during the repair and rehabilitation of power equipment.

Specification

Type of drive	pneumatic
Rotation frequency of the spindle, r.p.m.	80 - 100
	8 - 12
Torque, N•m	120
	1200
Rated pressure of compressed air in the network, atm	5
Morse taper in the spindle	5
Drilling depth, mm	135
Head rotation	360°
Weight, kg	84,5

ANGLE BLOCKS

Intended for changing the direction of steel wire rope when handling various materials during the repair of power equipment. Rotating shells allow reeving the wire rope without drawing it over the roller.



Specification

Parameters	К1289	К1288	К1285А
Lifting capacity, t	1	3	5
The diameter of the block, mm	140	225	275
The diameter of the trough, mm	110	180	215
Overall dimensions, mm	207 x 151 x 63	336 x 246 x 91	418 x 295 x 127
Weight, kg	2,6	9	21

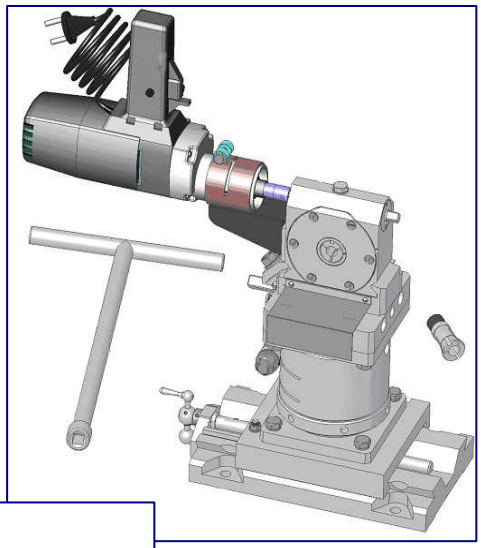
HOLE CUTTERS FROM 5 TO 20 mm

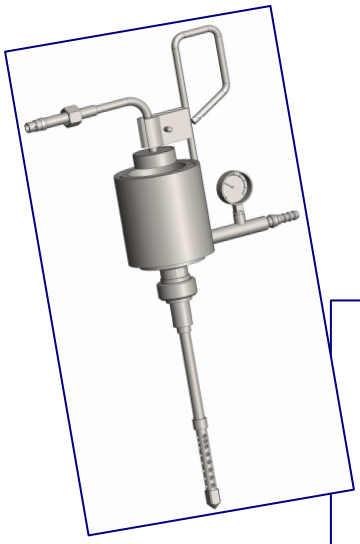
Intended for cutting holes in the following materials: cardboard, leather, aluminum, brass, copper, steel with the hardness of HB ≤ 150 and the thickness of up to 1,5 mm.

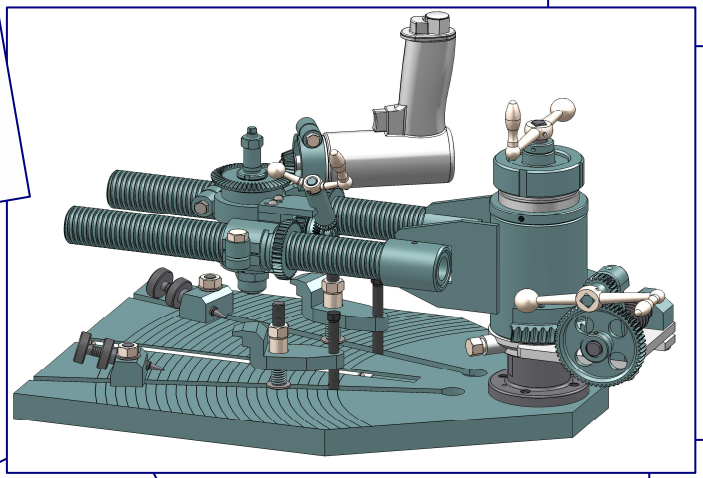
Specification

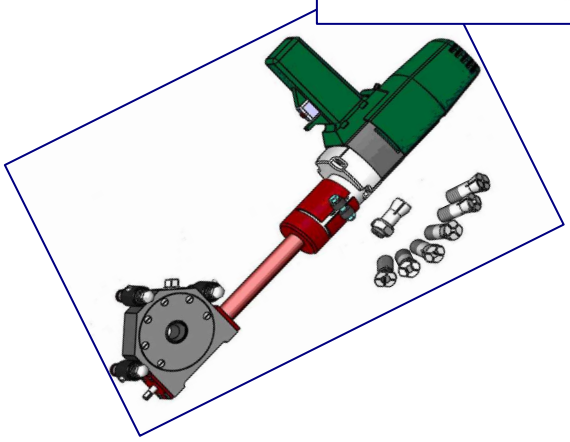
Punching diameter, mm	5 - 20
Weight, kg	0,1 - 1
Set, pcs.	12 (5,6,7,8,9,10,11,12,14,16,18,20)

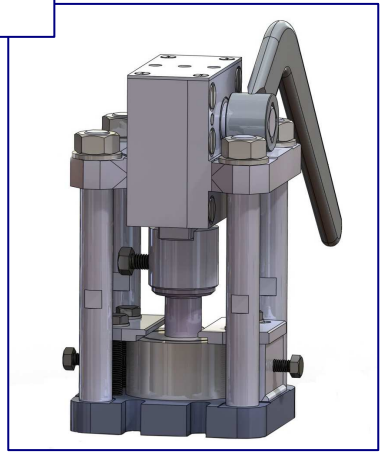
II. DEVICES FOR TURBINE EQUIPMENT OVERHAULING











SCREW HYDRAULIC JACK FOR PRESSING OUT THE RIVETS P= 10 TON-FORCE T21.18

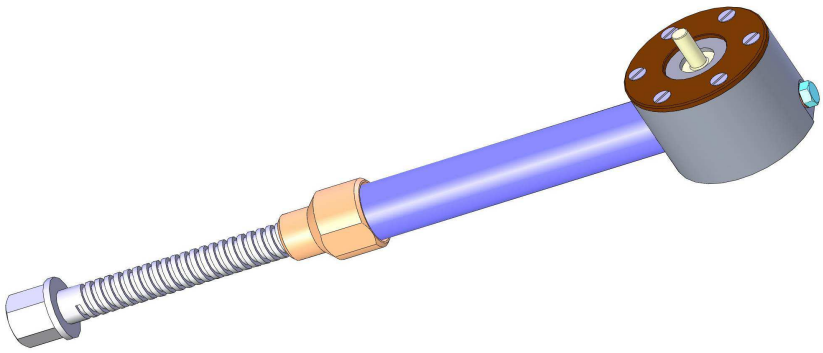
Screw hydraulic jack is intended for pressing out the rivets using the force of up to 10 tons.

Specification

Rod output force, kg(ton-force)	10 000
Piston stroke, mm	17
Overall dimensions, mm	383 × 152 × 72
Weight, kg	3,7

SCREW HYDRAULIC JACK FOR PRESSING OUT THE RIVETS P= 15 TON-FORCE T01.80

Screw hydraulic jack is intended for pressing out the rivets fixing the blades on the turbine disk when opening the set of blades with prong or T-shaped tails, as well as for other types of works, using the force of up to 15 tons.



Specification

Rod output force, kg(ton-force)	15 000
Piston stroke, mm	20
Maximum diameter of the pressed out rivet, mm	16
Overall dimensions, mm	500 × 90 × 64
Weight, kg	4,65

SCREW HYDRAULIC JACK FOR PRESSING OUT THE RIVETS P= 32 TON-FORCE T01.53

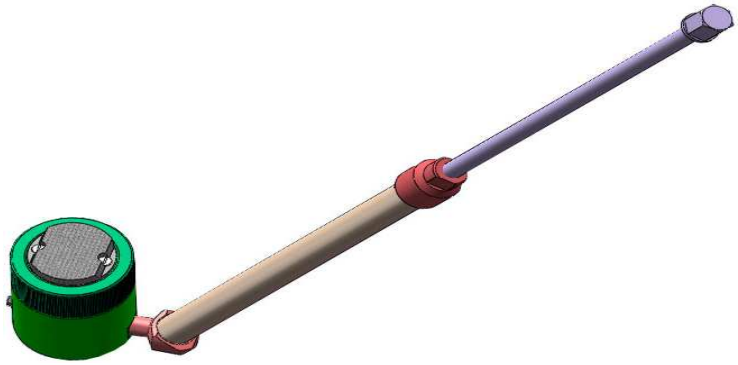
Screw hydraulic jack is intended for pressing out the rivets from the turbine disks when opening the set of blades of steam turbines with prong or T-shaped tails, as well as for other types of works, using the force of up to 32 tons.

Specification

Rod output force, kg(ton-force)	32 000
Piston stroke, mm	20
Maximum diameter of the pressed out rivet, mm	16
Overall dimensions, mm	1070 × 115 × 120
Weight, kg	12,6

DEVICE FOR ROTOR REVIVING T01.159

The device is intended for reviving and lifting the turbine generator rotors when carrying out the assembling, repair and control-and-measuring works, as well as for other types of works related to the application of force up to 30 tones.

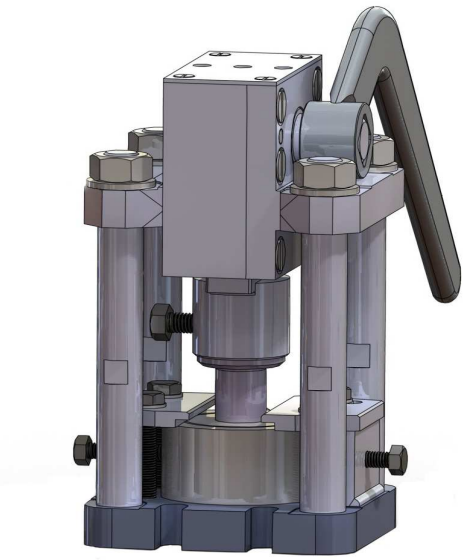


Specification

Maximum weight of the load lifted, kg	30 000
Piston stroke, mm	20
Maximum pressure in the hydraulic system, kg/cm2	260
Volume of oil in the hydraulic system, l	0,35
Maximum overall dimensions, mm	930 x 700 x 178
Weight, kg	15

HAND-OPERATED ECCENTRIC PRESST01.81

The device is intended for punching the metal binding band having the thickness of S = 1 - 3 mm in the course of re-blading the turbine rotor disks.



Specification

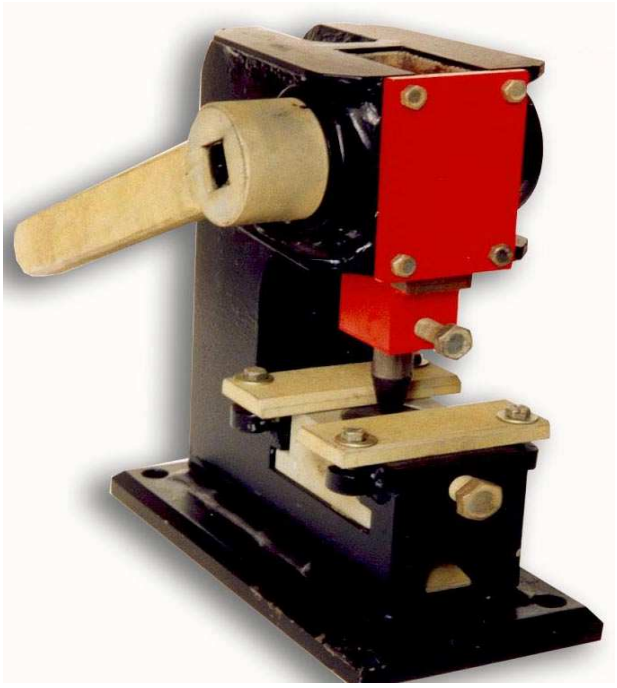
Force, kg	3 000
Punch stroke, mm	5,2
Overall dimensions, mm	110 × 237 × 120
Weight, kg	10,9

PRESS FOR PUNCHING HOLES IN THE BINDING BAND T01.52

The device is intended for punching the binding band having the thickness of S = 1 - 4 mm in the course of re-blading the turbine rotor disks.

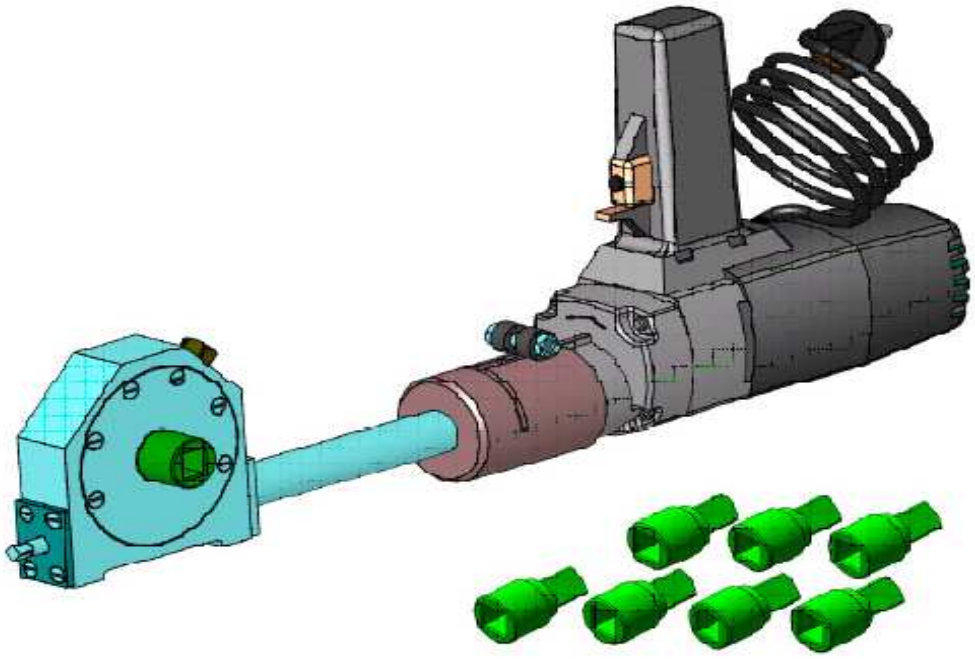
Specification

Force, kg	6 200
Punch stroke, mm	6
Overall dimensions, mm	310×330×190
Weight, kg	39,4



DEVICE FOR REAMER ROTATION T01.54

The device is intended for reaming the rivet holes when re-blading the stages with a small distance between their disks.

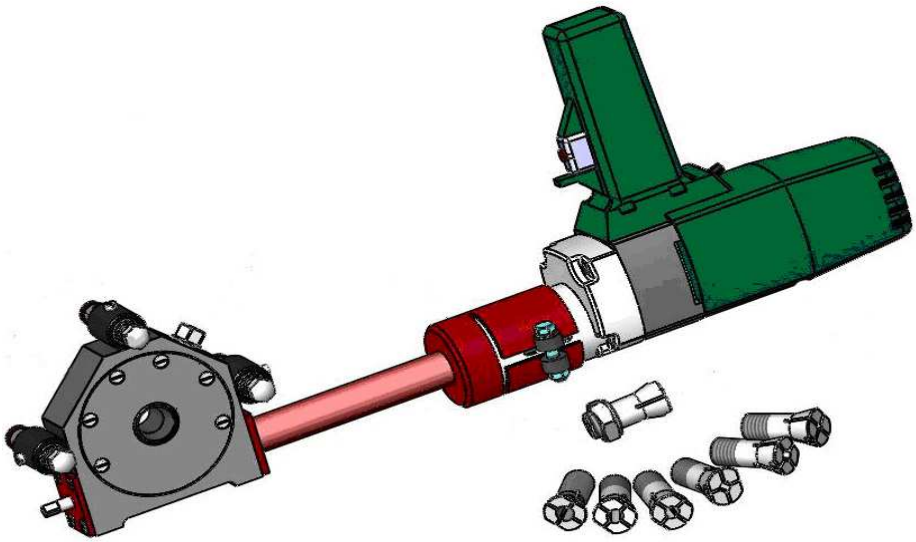


Specification

Type of drive	electric	
Power, kW	1,2	
Rated voltage, V	~220	
Current frequency, Hz	50	
Rotation frequency of the drive, r.p.m.	0 - 650	
Rotation frequency of the tool, r.p.m.	no more than 76	
Type of tool fastening in the hub	adaptor	
Diameter of the reamer bit, mm	11 - 18	
Overall dimensions, mm	780 x 100 x 300	
Weight, kg	9,6	
Set of adaptors, pcs.	6	□, mm
		9
		10
		11
		12
		13
		15

ANGLE DRILLING HEAD B-35

The device is intended for drilling out rivets when re-blading the stages of turbine-generator rotors with a small distance between their discs.

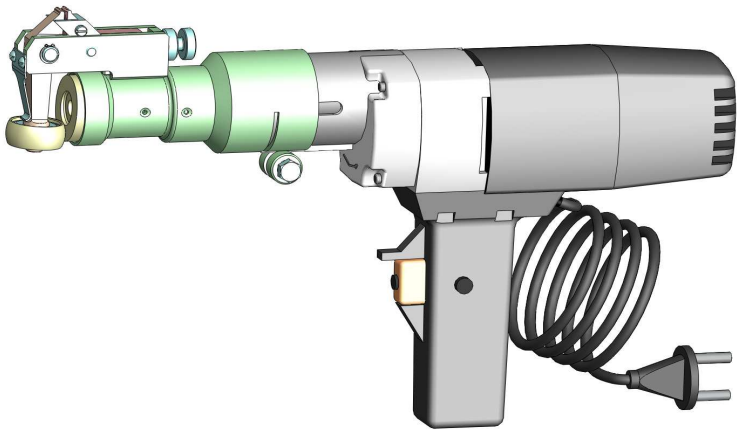


Specification

Type of drive	electric	
Power, kW	1,2	
Rated voltage, V	220	
Current frequency, Hz	50	
Rotation frequency of the drive, r.p.m.	0 - 650	
Rotation frequency of the tool, r.p.m.	no more than 76	
Type of tool fastening in the hub	collet	
Drilled diameter, mm	5 - 12	
Head travel towards the spacers, mm	30	
Overall dimensions, mm	550 x 85 x 260	
Weight, kg	9,6	
Pliers, pcs.	7	Ø, mm
		5
		6
		8
		9
		10
		11
		12

DEVICE FOR SEAL STRIPS PULL-OFF T01.114

The device is intended for restoring the shape of seal strips (whiskers) of turbine oil protective rings.



Specification

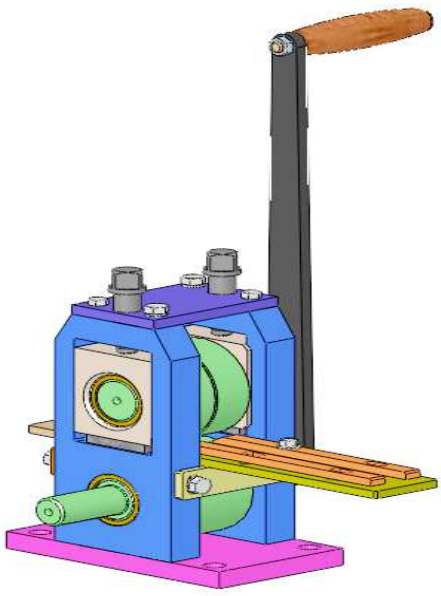
Type of drive	electric
Power, kW	1,2
Rated voltage, V	220
Current frequency, Hz	50
Rotation frequency, r.p.m.	0 - 650
Blows per minute	460 - 660
Overall dimensions, mm	480 x 90 x 260
Weight, kg	5,6

GROOVE MAKING DEVICE AC2.08

Intended for making grooves in the oil thrower nibs and shroud seals.

Specification

Type of drive	manual
Overall dimensions, mm	360×315×260
Weight, kg	30



RESTS FOR ROTORS PLACEMENT Г10.02

Intended for placing power equipment rotors when carrying out repair works.

Specification

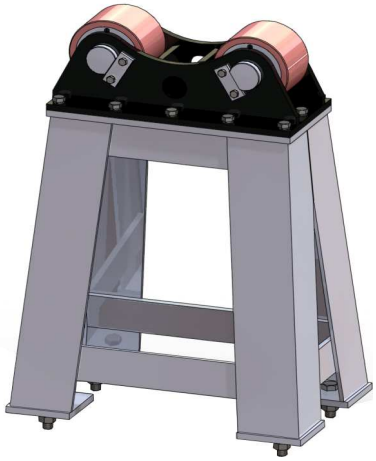
Maximum load, kg	30 000
Overall dimensions, mm	970 × 1113 × 620
Weight, kg	no more than 340
Set	2 pcs.

ROLLER SUPPORTS FOR ROTORS PLACEMENT T21.16

Intended for placing and rotating the turbine and generator rotors when carrying out repair works.

Specification

Maximum load, kg	30 000
Overall dimensions, mm	970 × 1438 × 620
Weight, kg	no more than 610
Set	2 pcs.



By agreement with the Customer, universal rollers and roller supports with any load-lifting capacity and for various journal diameters can be manufactured for rotating the rotors.

MULTIPURPOSE ROLLERS FOR ROTATING THE ROTORS T21.16.01

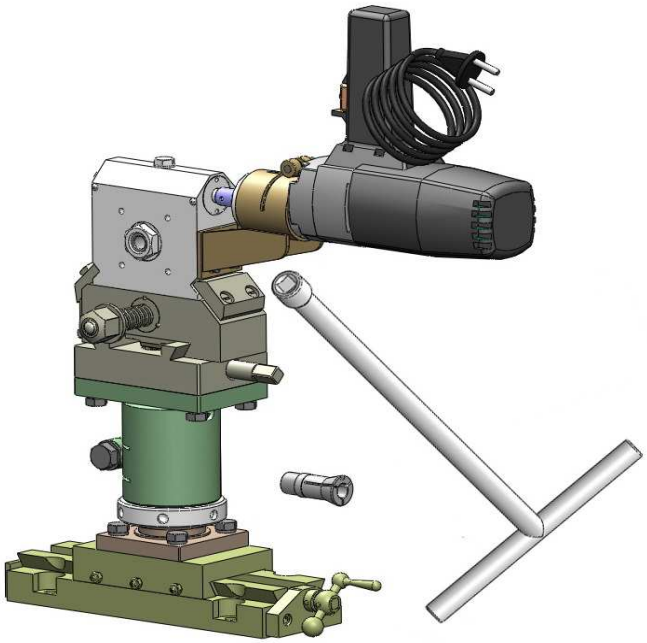
Intended for placing and rotating the turbine and generator rotors when carrying out repair works.

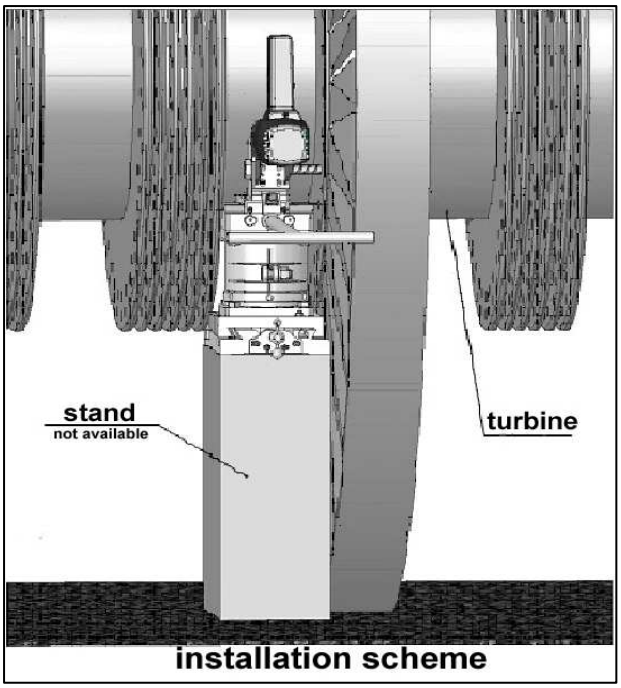
Specification

Maximum load, kg	30 000
Overall dimensions, mm	800 × 310 × 360
Weight, kg	no more than 260
Set	2 pcs.

ANGLE DRILLING DEVICE УСП-3М

Intended for drilling out rivets from the middle stages of turbine rotor discs with a small distance between their discs.





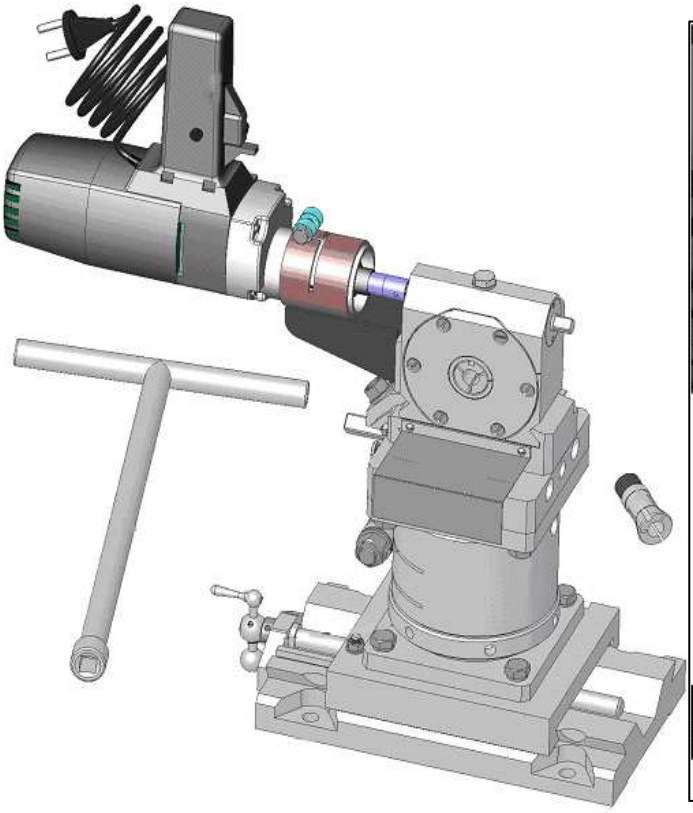
installation scheme

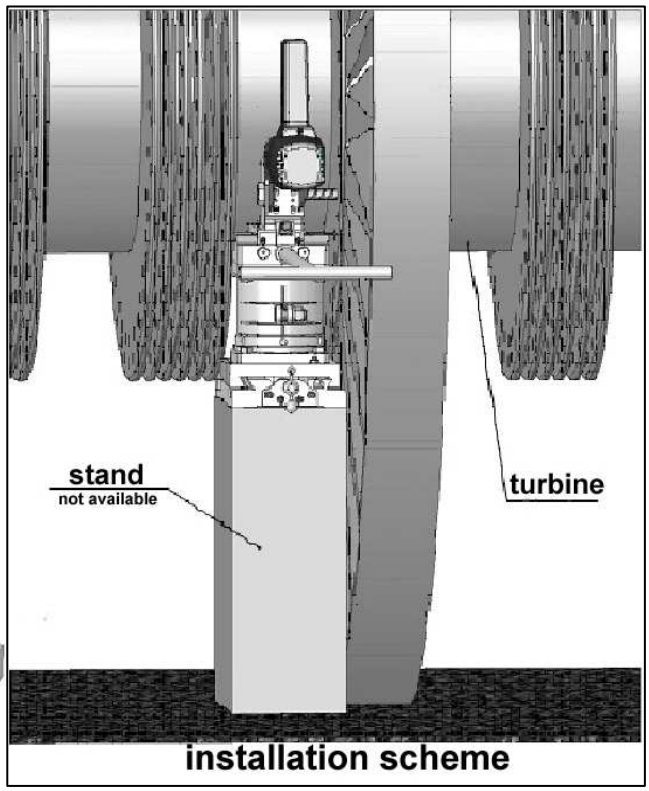
Specification

Type of drive	electric	
Power, kW	1,2	
Rated voltage, V	~220	
Current frequency, Hz	50	
Rotation frequency of the drive, r.p.m.	0 - 650	
Rotation frequency of the drill bit, r.p.m.	0 - 70	
Drilled diameter, mm	8 - 15	
Vertical head travel, mm	55	
Horizontal head travel, mm	150	
Drilling depth, mm	60	
Type of drill bit fastening	collet	
Overall dimensions, mm	577 x 200 x 650	
Weight, kg	40,2	
Pliers, pcs.	3	Ø, mm
		8
		13
		15

ANGLE DRILLING DEVICE УСП-3Б

Intended for drilling out rivets from the middle stages discs of turbine rotors.





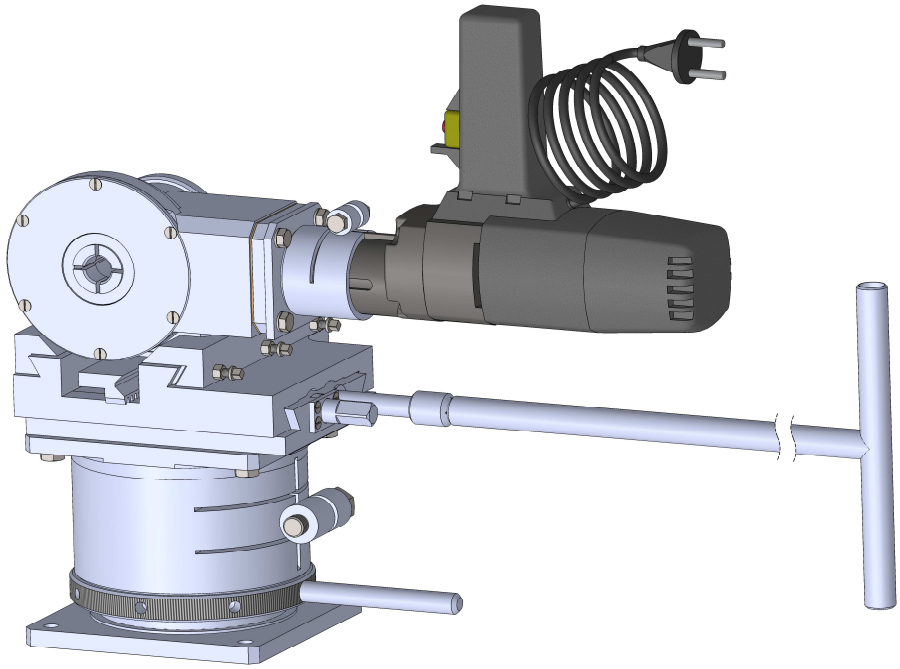
installation scheme

Specification

Type of drive	electric	
Power, kW	1,2	
Rated voltage, V	~220	
Current frequency, Hz	50	
Rotation frequency of the drive, r.p.m.	0 - 650	
Rotation frequency of the drill bit, r.p.m.	0 - 70	
Drilled diameter, mm	8 - 15	
Vertical head travel, mm	55	
Horizontal head travel, mm	150	
Drilling depth, mm	75	
Type of drill bit fastening	collet	
Overall dimensions, mm	610 x 200 x 690	
Weight, kg	53,5	
Pliers, pcs.	3	Ø, mm
		8
		13
		15

ANGLE DRILLING-AND-MILLING DEVICE УСФП-2А

Intended for drilling out rivets and preparing holes for rivets after installing blades on the turbine rotor disc.

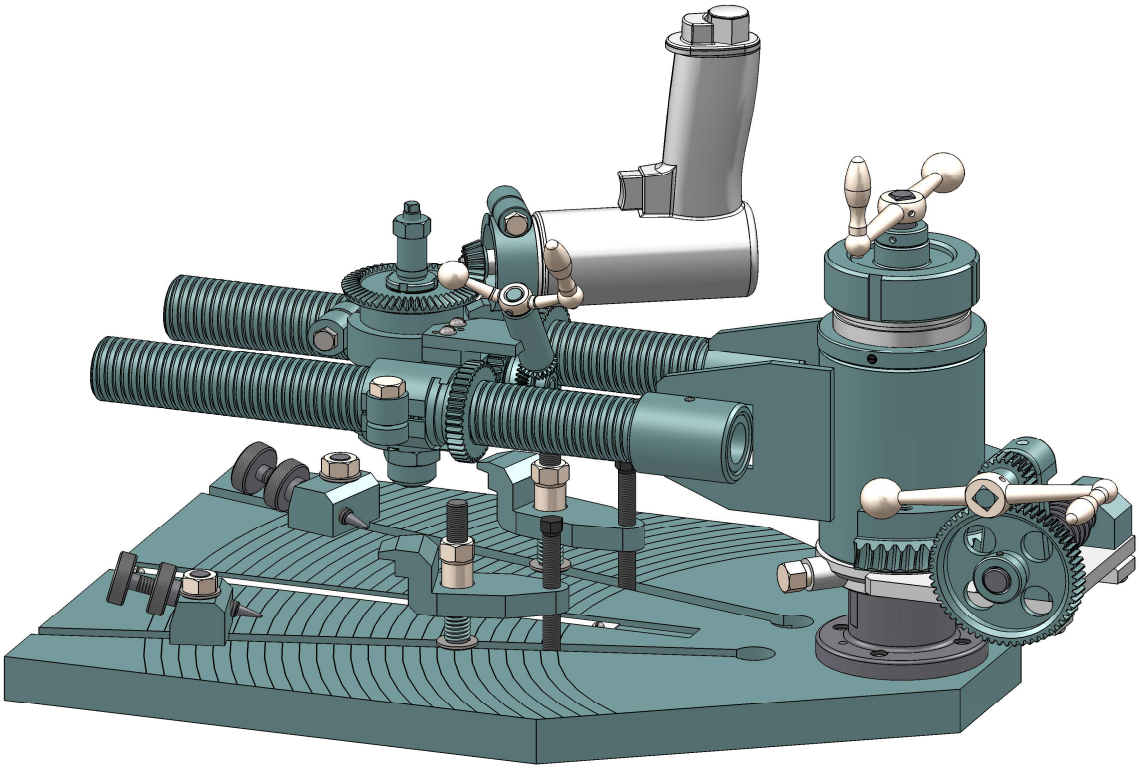


Specification

Type of drive	electric
Power, kW	1,2
Rated voltage, V	220
Current frequency, Hz	50
Rotation frequency of the drive, r.p.m.	0 - 650
Rotation frequency of the drill bit, r.p.m.	0 - 390
Maximum drilled diameter, mm	23
Drilling depth, mm	200
Longitudinal travel, mm	100
Vertical travel, mm	60
Feed	manual
Type of tool fastening	Morse taper 2
Overall dimensions, mm	540 x 230 x 510
Weight, kg	44,2
Reduction sleeves Morse taper 2→1, pcs.	1

DEVICE FOR MILLING THE SHOULDERS T01.32

Intended for milling the shoulders of steam turbine seals segments .

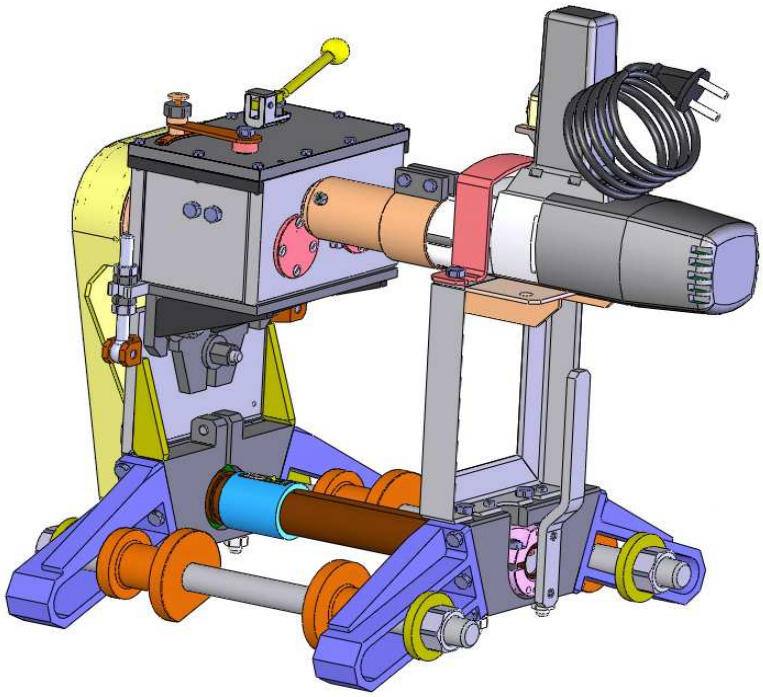


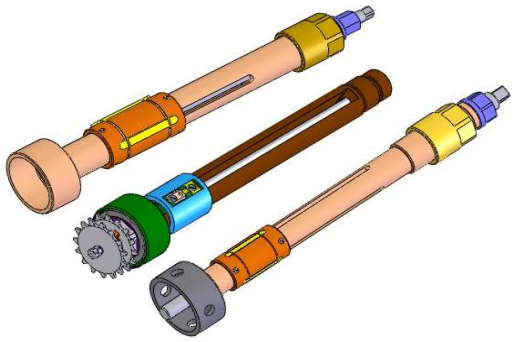
Specification

Type of drive	pneumatic	
Rated pressure of compressed air, atm	5	
Rotation frequency of the spindle, r.p.m.	450	
Type of tool fastening	collet	
Maximum diameter of the milling cutter, mm	8	
Maximum radius of processing, mm	440	
Feed	manual	
Vertical travel, mm	80	
Maximum angle of traverse rotation	140°	
Overall dimensions, mm	630 x 380 x 390	
Weight, kg	68,2	
Pliers, pcs.	4	Ø, mm
		4
		5
		6
		8

DEVICES ГМ.431 and ГМ.436 FOR REAMING THE HOLES OF TURBINE COUPLINGS

The devices are intended for reaming the holes in the turbine rotor half-couplings before installing the fit bolts and pairing the half-couplings.





Replacement spindle

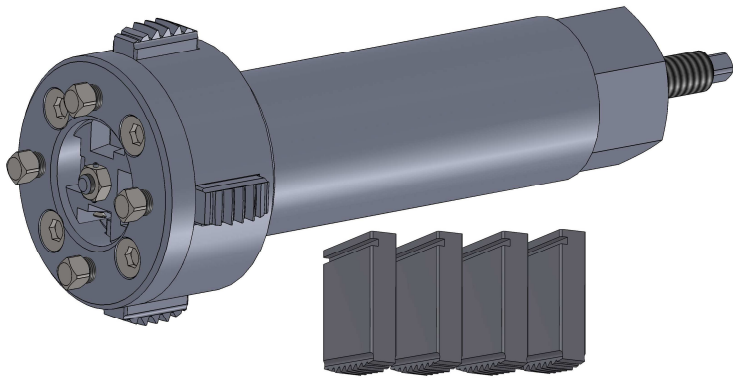
Designation	Type of turbine
ГМ431	К - 300, К - 160
ГМ436	ПТ - 60, ПТ - 80, ВК - 100, Т - 100, К - 210

Specification

Parameters	ГМ.431	ГМ.436
Type of drive	electric	electric
Power, kW	1,2	1,2
Voltage, V	220	220
Current frequency, Hz	50	50
Diameter of reamed holes, mm	38 - 60	38 - 53
Rotation frequency of the input shaft, r.p.m.	0 - 650	0 - 650
Rotation frequency of the spindle, r.p.m.	0 - 240	0 - 240
Overall dimensions, mm	680 × 470 × 565	680 × 553 x 603
Weight, kg	77	77,5
Scope of delivery		
Set of working spindles (5 pcs.), set	1	1
Set of centering spindles (5 pcs.), set	1	1
Cutter with a carbide blade (T5K10), pcs.	50	50
Special keys, ps	2	2
Drift-holder for sharpening blades, pcs.	1	1

ADJUSTABLE TAPS T24.10

Intended for correcting and calibrating threads in the basic parts during the repair of turbine generators at the electric power plant.



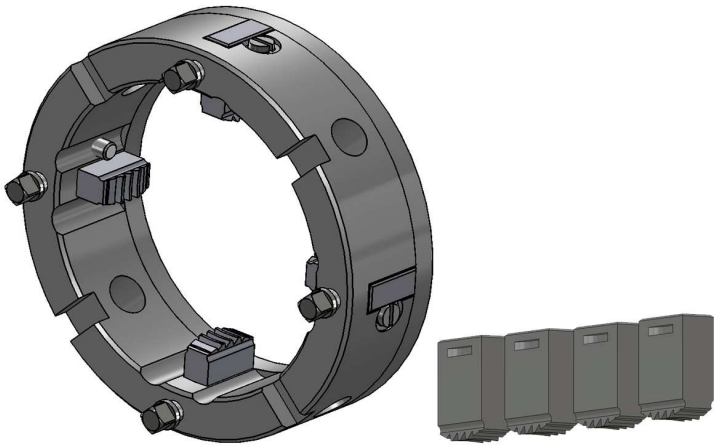
Specification

S/No.	Range Thread	Thread Pitch	Weight, kg
1	M 56 - 64	3*; **4**; 6*	2,8
2	M 72 - 85		5,3
3	M 90 - 100		6,1
4	M 115 - 120		8
5	M 140 - 165		12,8

* - comb with a pitch completed separately

ADJUSTABLE DIES T24.09

Intended for correcting and calibrating threads on the fasteners and other parts during the repair of turbine generators at the electric power plant.



Specification

S/No.	Range Thread	Thread Pitch	Weight, kg
1	M 56 - 64	3*; **4**; 6*	3,8
2	M 64 - 76		4,3
3	M 76 - 90		4,7
4	M 90 - 100		5,05
5	M 100 - 120		6
6	M 120 - 140		6,8
7	M 140 - 165		7,8

* - comb with a pitch completed separately

SPECIAL WRENCHES FOR THE ADJUSTABLE DIES T25.20

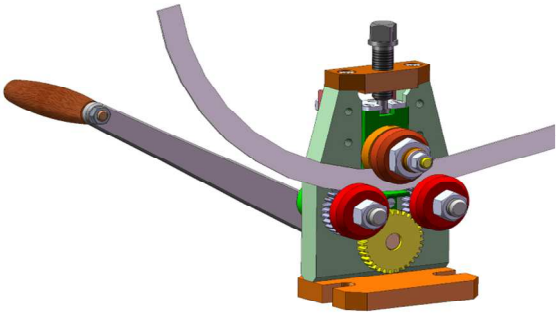
Intended for fixing the adjustable dies and ensuring the required effort for threads correcting and calibrating.

Specification

S/No.	Key size	Weight, kg
1	120 x 120 x 205	2
2	130 x 130 x 215	2,5
3	150 x 150 x 235	3
4	160 x 160 x 235	3,6
5	185 x 185 x 295	5,4
6	205 x 205 x 295	7
7	230 x 230 x 325	9,3

DEVICE FOR FLAT BAR BENDING AC2.09

Intended for bending oil protective whiskers or flat bars of metal on the edge.



Specification

Type of drive	manual
Flat bar width, mm	10 - 40
Flat bar thickness, mm	1 - 3
Radius of bend, mm	175 - 6000
Overall dimensions, mm	286 × 150 × 300
Weight, kg	12,4

DEVICE FOR MILLING THE SEAL GROOVE ON THE TURBINE CYLINDER SPLITS T01.62

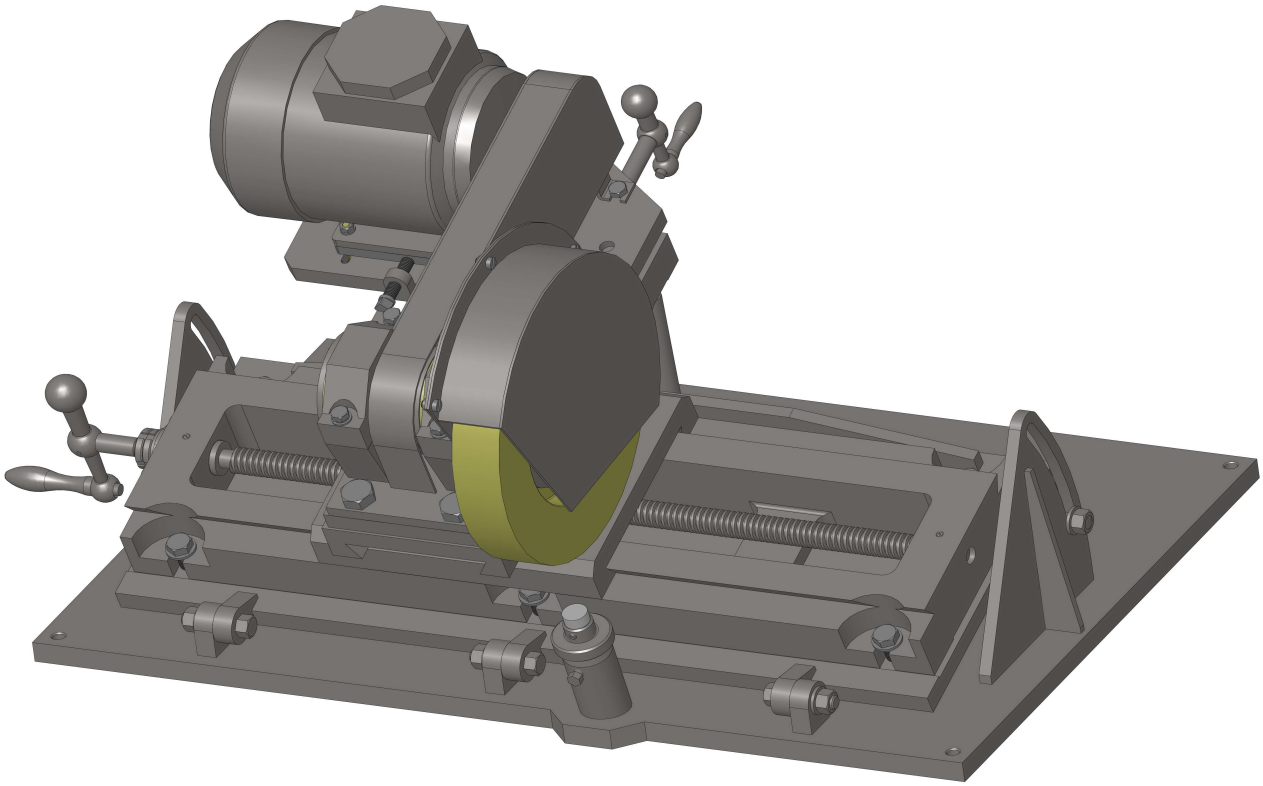
Intended for milling the seal groove on the cylinder splits.

Specification

Type of drive	pneumatic
Power, kW	1,5
Feed	5
Rotation frequency of the drive, r.p.m.	4 500
Rotation frequency of the spindle, r.p.m.	1500
Type of tool fastening	collet
Longitudinal travel, mm	1000
Crosscut travel, mm	200
Vertical travel of the spindle, mm	90
Drilling depth, mm	60
Overall dimensions, mm	1680 x 690 x 835
Weight, kg	115

DEVICE FOR GRINDING THE ROTOR JOURNALS T01.86

Intended for grinding the rotor journals and thrust collars of steam turbines and turbo-generators in the course their repair.

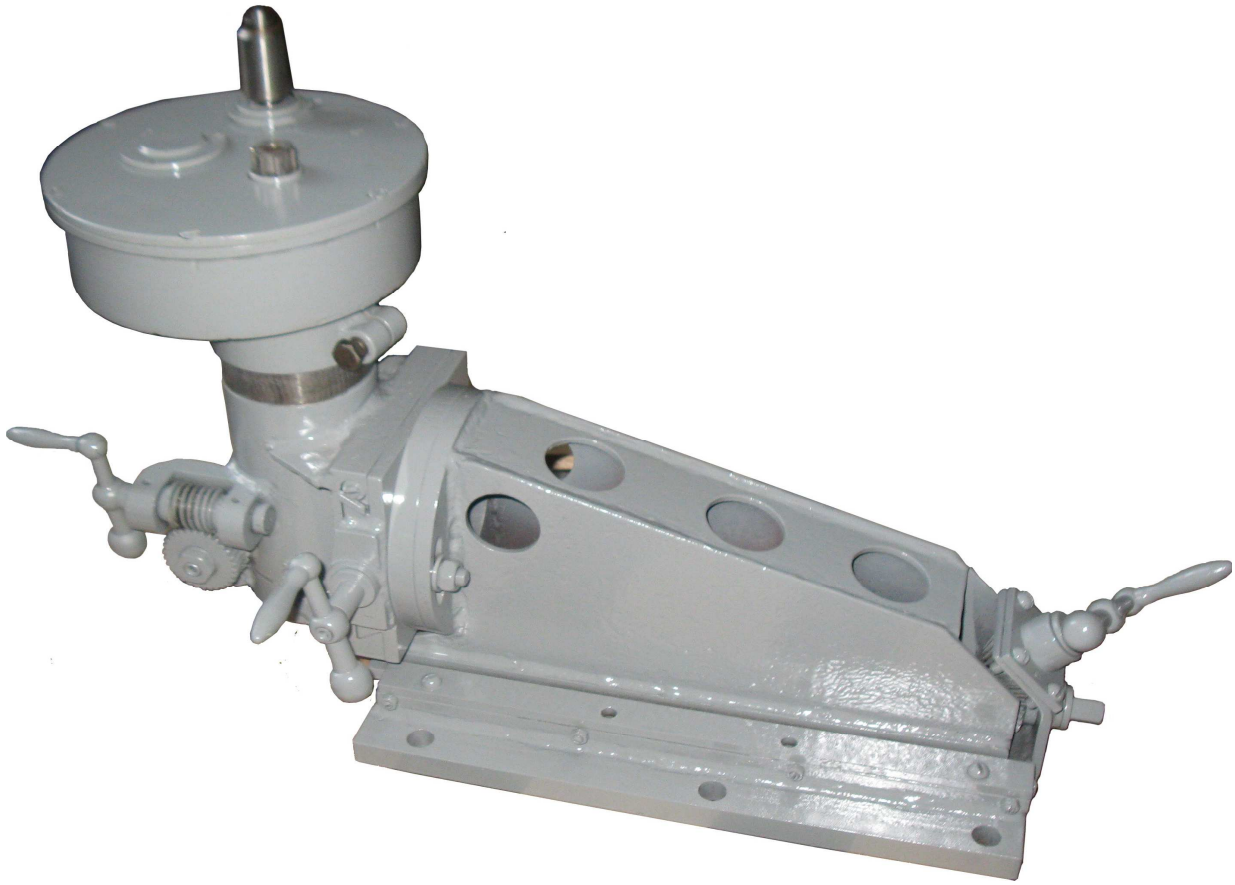


Specification

Type of drive	electric motor
Power, kW	1,1
Voltage, V	380
Current frequency, Hz	50
Rotation frequency of the drive, r.p.m.	2800
Rotation frequency of the abrasive disk, m/sec.	25
Main slide travel, mm	500
Cross slide travel, mm	150
Overall dimensions, mm	790 x 550 x 480
Weight, kg	210
Scope of delivery	
Grinding ПВ 250 x 40 x 76, pcs	1
Diamond pencil, pcs	1

SPECIAL-PURPOSE MACHINE (MILLING ATTACHMENT)

Intended for machining the parts in the course of repair and reconstruction of power equipment.

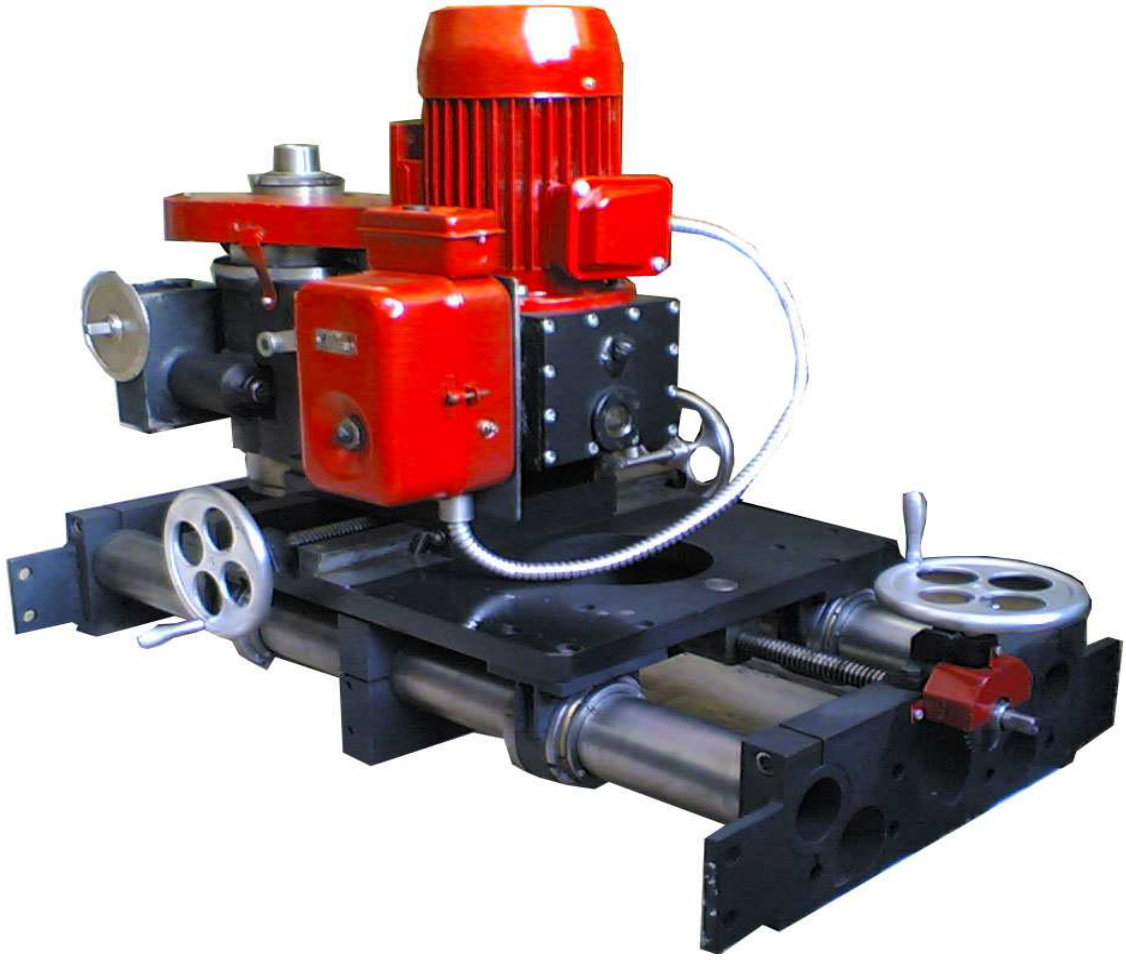


Specification

Type of drive	pneumatic
Drive power at 6 atm, kW	1,5
Rotation frequency of the spindle, r.p.m.	500 - 1500
Maximum movement of the spindle, mm	
longitudinal	200
cross	80
vertical	90
Turn angle of the milling head	± 16º
Morse taper of the spindle	2
Overall dimensions, mm	690 x 300 x 385
Weight, kg	63

MACHINE FOR MILLING THE WINDING ON THE TURBINE CYLINDER SPLITS T01.138

The machine is intended for milling operations.

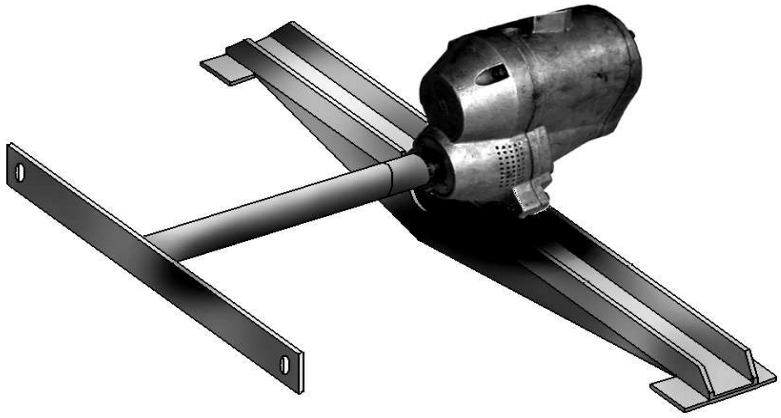


Specification

Type of drive	electric motor
Power, kW	2
Voltage, V	380
Current frequency, Hz	50
Feed	manual
Motor speed, r.p.m.	3000
Rotation frequency of the spindle, r.p.m.	250 - 500
Longitudinal travel, mm	285
Crosscut travel, mm	190
Vertical travel, mm	70
Weight, kg	300

DEVICE FOR ROTORS AND BORING BARS ROTATION T - 783

Intended for ensuring the rotation of rotor and boring bars in the course of carrying out the works on repairing the power equipment.



Specification

Rotation frequency, r.p.m.	8 - 12
Torque, N•m	1120
Overall dimensions, mm	1475 x 960 x 470
Weight, kg	91

CLAMPS FOR CENTERING ROTORS ON THE HALF-COUPLINGS T29.40

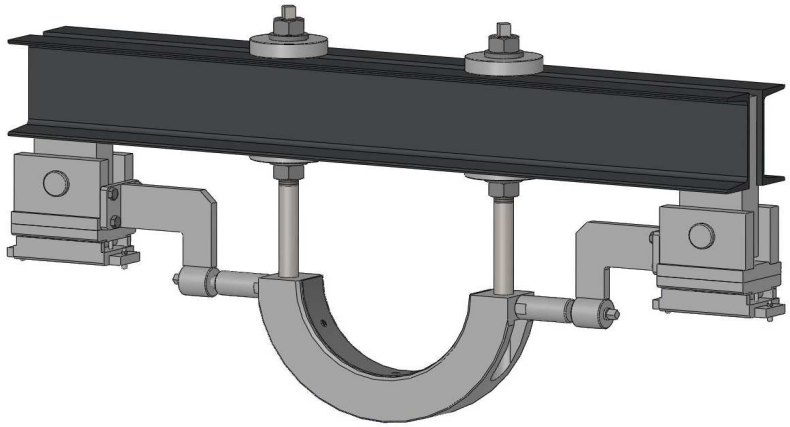
Intended for centering turbine rotors during the repair and erection works.

Specification

Maximum generated force, kg	500
Kit, pcs	3
Weight, kg	6,9

DEVICE FOR ROTOR PENDULUM CHECKING T22.17

Intended for checking the outrun of the rotor shaft front end in order to eliminate uneven tightening of the coupling between the rotors and the alignment error of the half-couplings ends.



Specification

Диаметр шейки ротора турбины первого опорного подшипника, мм	300
Distance between the roller supports centers, mm	1140
The diameter of the bed of the first reference thickness, mm	830
Device permissible loads, no more than, kg	6000
Overall dimensions, mm	1340 x 677 x 176
Weight, kg	135

Devices for pendulum checking of rotors for turbines of various types and modifications can be developed and manufactured.

MOMENT WEIGHING SCALES T935

Intended for determining the moments of mass of the turbine blades when carrying out repair and renewal works on re-blading the turbine rotor with its subsequent balancing. Use of the moment weighing scales allows optimum positioning of blades on the turbine disk.

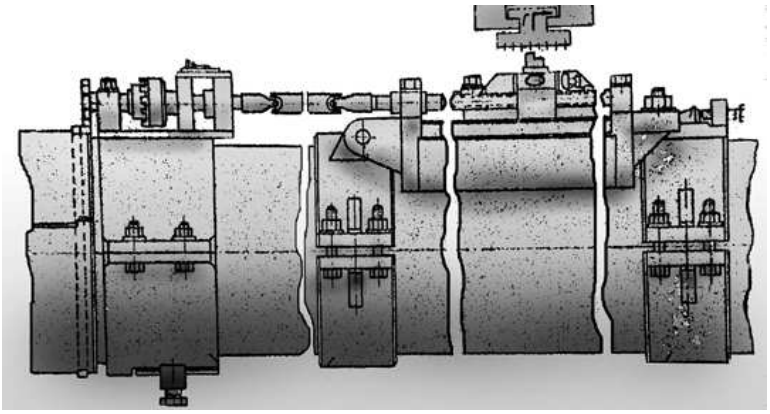
Specification

Overall dimensions, mm	Ø 500 x 2000 x 1300
Weight blades, kg ,	no more than12
Weight, kg	64,5
Loads P=2 kg (included)	6 pcs

DEVICE FOR TURNING THE PACKING RING COMBS (WITHOUT REDUCING GEAR) T21.05

Intended for machining seal strips of high and medium pressure cylinders of turbines K300 - 240.

Can be used for the similar turbines of other types

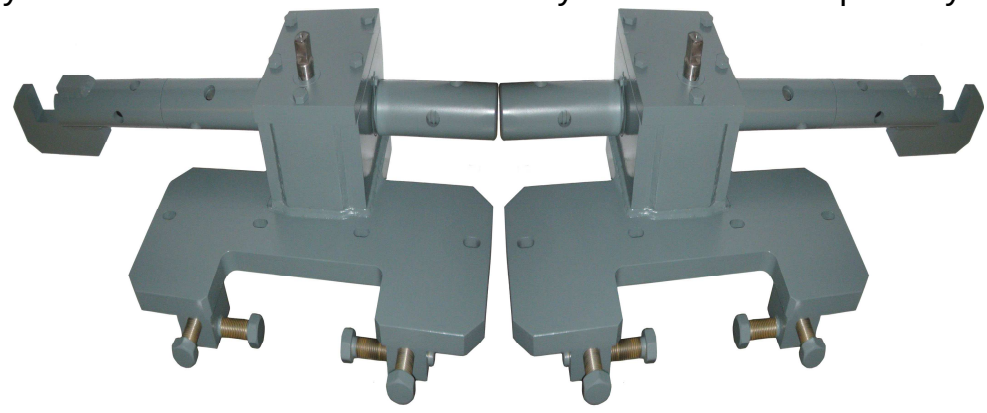


Specification

Type of drive	pneumatic
Air pressure in the manifold, MPa	5
Line feed, mm/rev.	0,1
Radial infeed, mm/rev.	0,098
Longitudinal travel, mm	630
Radial traverse, mm	15
Overall dimensions, mm	1200 x 400 x 400
Weight, kg	65

DEVICE FOR ROTORS AXIAL MOVEMENT TP82.388

The device (2pcs.) is intended for axial movement of rotors of low and medium pressure cylinders of turbines K300 – 240 ready-assembled or separately.

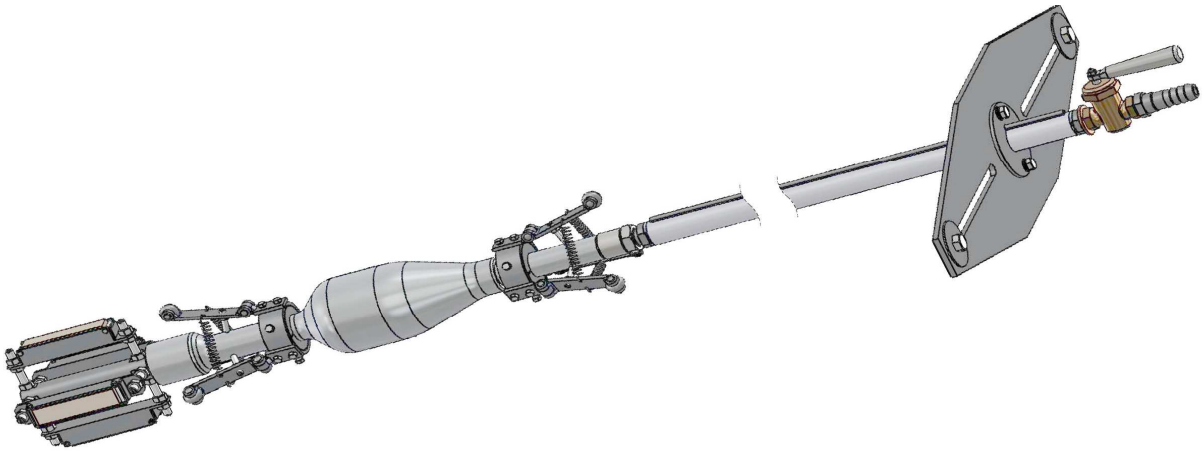


Specification

Type of drive	manual
Reduction ratio	1:30
The thread pitch of the lead screw, mm	8
Move the screw, mm	100
Overall dimensions, mm	670 x 435 x 380
Weight (2pcs), kg	300

DEVICE FOR PROCESSING AXIAL PASSAGES OF TURBINE ROTORS ЧКР3

Intended for processing axial channels of rotors with the diameter of processed holes from 95 to 150mm .

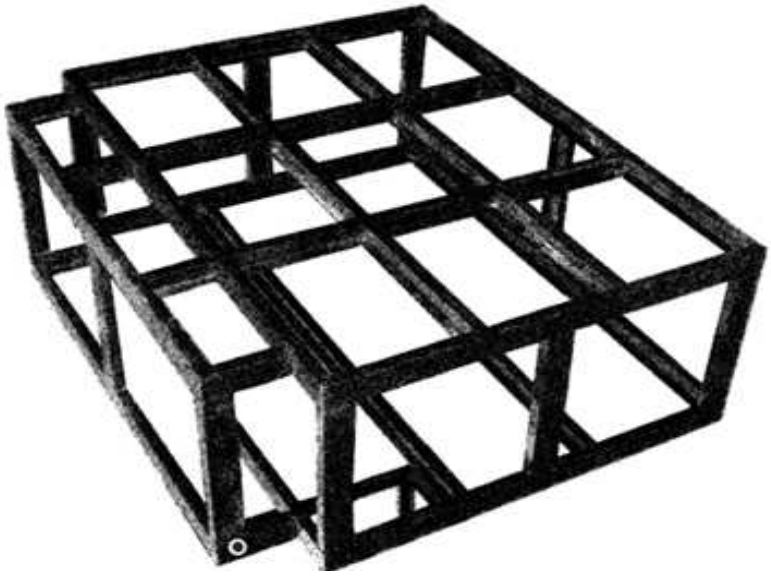


Specification

Type of drive	pneumatic
Power, kW	1,4
Rotation frequency of the spindle, r.p.m.	6600
Rated pressure of compressed air, atm	0,630
Specific air flow m^3/min	1,4
Diameter of the reamed holes, mm	95 - 150
Feed	manual
Bar grinding БКв 20 x 100 64С - 16П, pcs	4
Bar grinding БКв 20 x 100 64С - 14М, pcs	4
Overall dimensions, mm	3650 x 1800 x 100
Weight, kg	18,6

RACK STACK FOR PLACING DIAPHRAGMS PT00.10.15

Intended for storing and transportation of diaphragms.



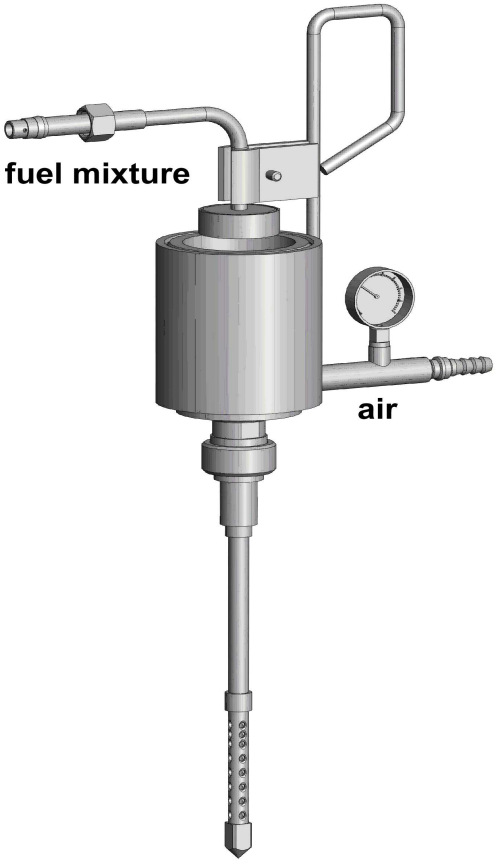
Overall dimensions, mm
2554 x 2180 x 1000
Can be manufactured for the diaphragms of any types and dimensions

Weight, kg
450

EJECTION HEATER 149.251

Intended for heating turbine studs having central holes with the diameters of 20 mm and 35 mm in the course of repair works.

When ordering, please specify the diameter of studs central holes, depth and length of the stud heated part.



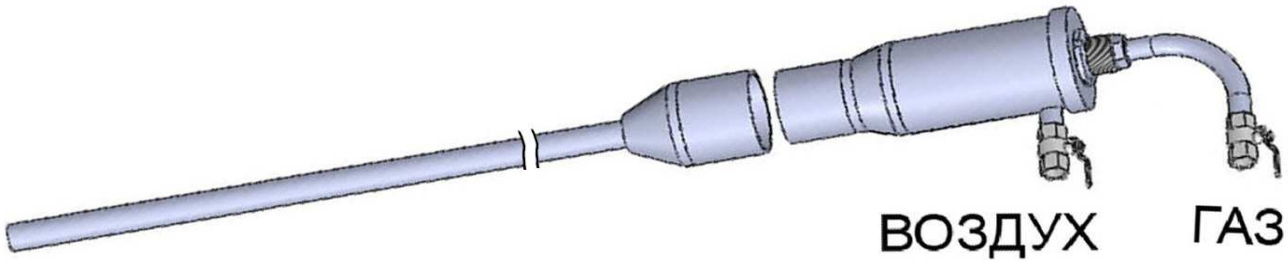
Specification

Maximum coolant temperature, °C	800 - 850
Working pressure of compressed air before the heater, kg/cm 2	3 - 6
Oxygen consumption, kg/h	2,5
Fuel mixture	Industrial acetylene gas GOST 5457-75
	Industrial oxygen gas GOST 5583-78
Fuel components pressure, kg/cm^2: acetylene oxygen	 0,5 - 0,7 5
Fuel components consumption, kg/h: acetylene oxygen	 1,3 2
Overall dimensions, mm	150 x 380
Weight, kg	9,0 - 10,0

GAS HEATER FOR TURBINE STUDS M352

Intended for heating turbine studs having central holes with the diameters of 20 mm and 35 mm in the course of repair works.

When ordering, please specify the diameter and length of the stud heated.



Specification

Working pressure of compressed air before the heater, kg/cm^2	3 - 6
Liquefied gas	Industrial propane butane mixture СПБТ GOST 20448-90
Compressed air consumption with the pressure of 6 kg/cm^2, m^3/min	2,5
Propane - butane consumption, kg/h	2 - 4
Overall dimensions, mm	875 - 1220 x 150 x 180
Weight, kg	6 - 6,5

WEDGE GAUGE

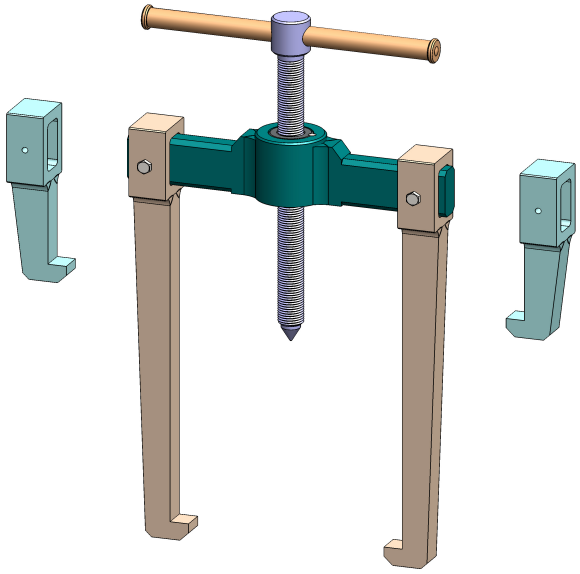
Intended for determining the air clearance of turbines steam path during the repair of power equipment.

Specification

Parameters	T01.06	T23.02
Clearance measurement range, mm	0,2 - 9	8 - 20
Division value, mm	0,1	0,1
The slope of the wedge	1:10	1:15
Overall dimensions, mm	195/500x10x20	320/500x15x30
Weight, kg	0,17	0,45

REMOVER TOOL

Intended for removing bearings and couplings from the shafts.

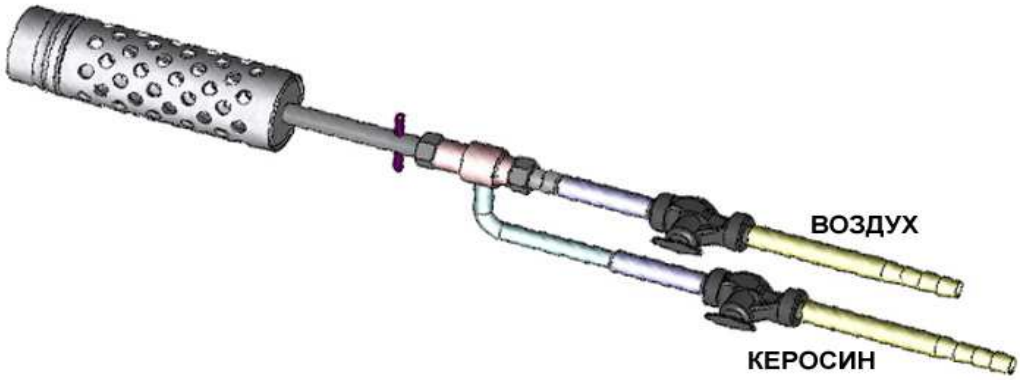


Specification

Parameters	AC604	AC604A
Type of drive	manual	manual
Шаг ходового винта, мм	2,5	2,5
Maximum removing effort, kgf	1500	1500
Diameters of removed couplings, mm	90 - 190	90 - 280
Standard sizes of removed bearings	№ 304 - № 314	№ 304 - № 326
Overall dimensions, mm	260 x 50 x 395	350 x 50 x 395
Weight, kg	6,3	9,1

KEROSENE BURNER T25.133

Intended for open flame heating of parts, units and single elements of power equipment, as well as for heating and annealing the welded joints.



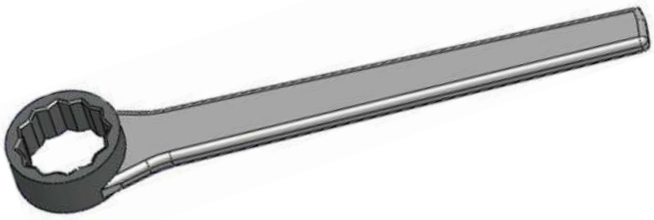
Specification

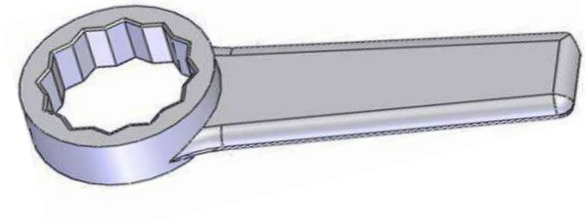
Primary fuel	kerosene
Overall dimensions, mm	1000 x 134 x 120
Weight, kg	5,2

BOX-END WRENCHES (RING SPANNERS)

BOX-END WRENCHES (RING SPANNERS)

Intended for assembling and disassembling the turbines and generators





Dimensions manufactured keys

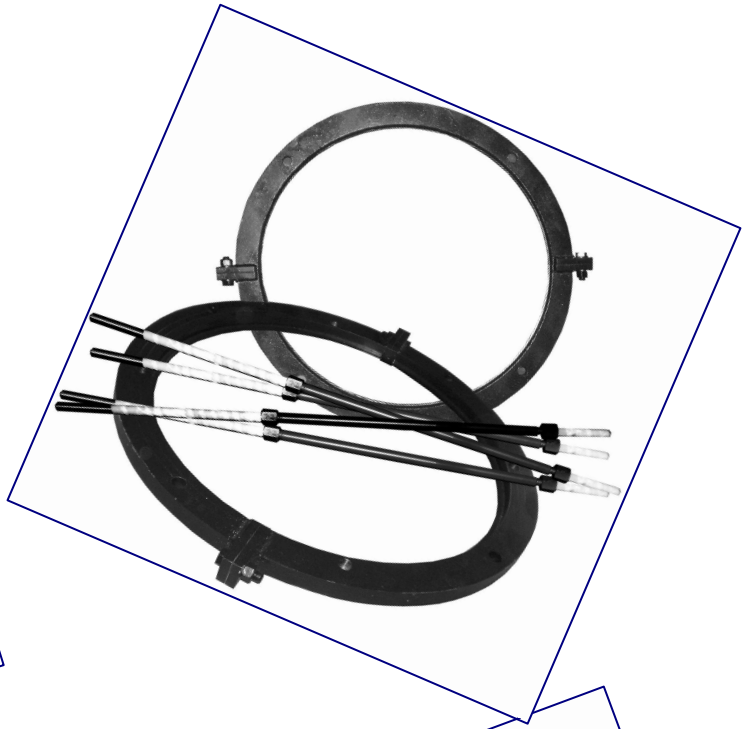
1	s = 27 L = 200
2	s = 30 L = 220
3	s = 32 L = 240
4	s = 36 L = 265
5	s = 41 L = 300
6	s = 46 L = 330
7	s = 50 L = 360
8	s = 55 L = 400
9	s = 60 L = 430
10	s = 65 L = 460
11	s = 70 L = 500
12	s = 75 L = 530
13	s = 80 L = 560

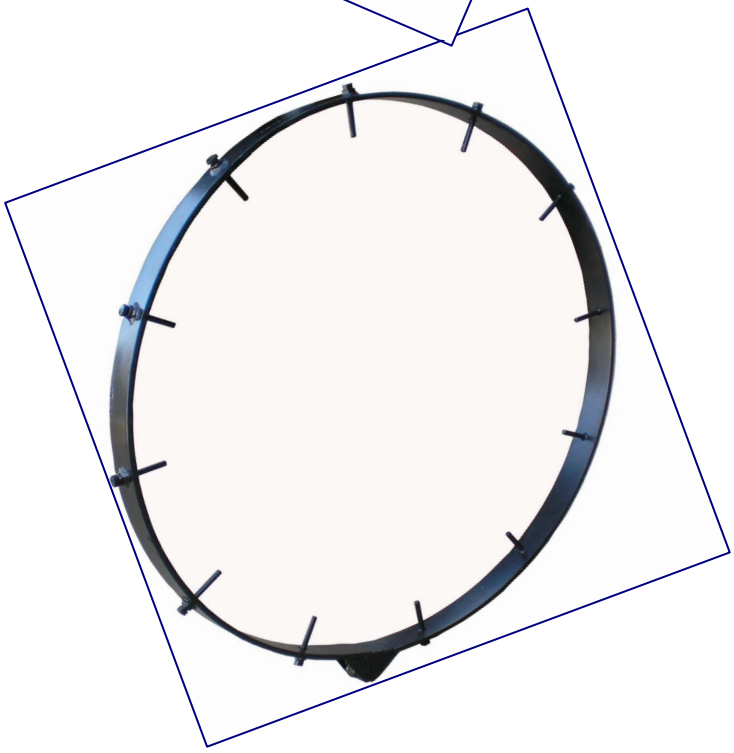
14	s = 85 L = 285 (shortened)
15	s = 90 L = 305 (shortened)
16	s = 95 L = 310 (shortened)
17	s = 100 L = 330 (shortened)
18	s = 105 L = 340 (shortened)
19	s = 110 L = 355 (shortened)
20	s = 115 L = 365 (shortened)
21	s = 120 L = 440 (shortened)
22	s = 130 L = 475 (shortened)
23	s = 145 L = 510 (shortened)
24	s = 155 L = 525 (shortened)
25	s = 160 L = 540 (shortened)

S , mm	27 - 160
Weight, kg	0,61 - 23,9

ISO 9001
BUREAU VERITAS
Certification

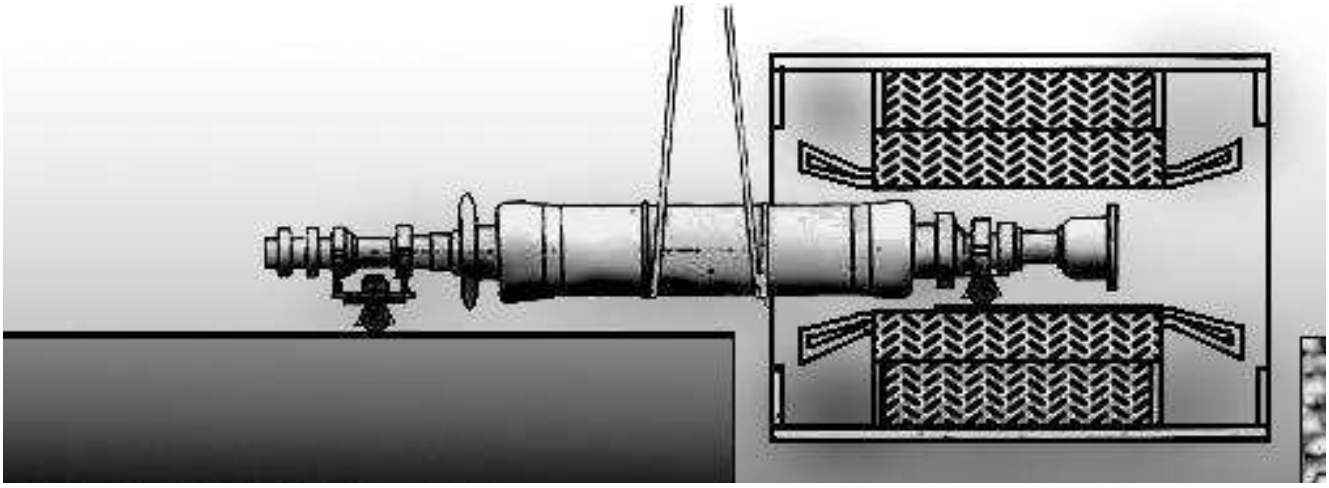
III. DEVICES FOR ELECTRICAL EQUIPMENT OVERHAULING





DEVICE FOR ROTOR REMOVAL ГР.18

Intended for ensuring the removal of rotor from the stator



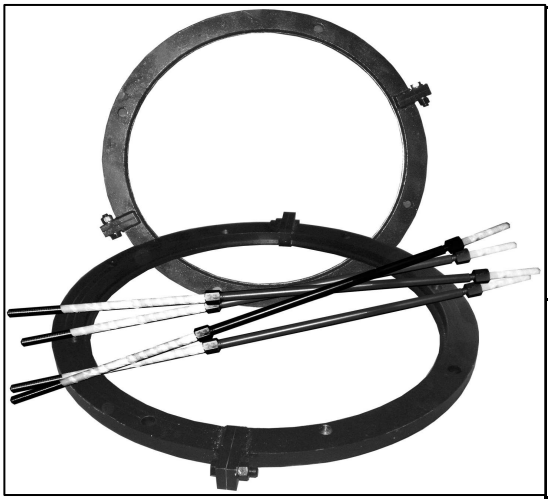
MANUFACTURED ON CUSTOMER'S REQUEST SPECIFYING THE GENERATOR TYPE

ROTOR SUSPENSION DEVICE ГР.21

Intended for carrying out assembling and repair-and-renewal works during the repair of turbogenerators

MANUFACTURED ON CUSTOMER'S REQUEST SPECIFYING THE GENERATOR TYPE

DEVICE FOR RETAINING RINGS FITTING AND REMOVAL ГР.19



Intended for ensuring convenience and reliability when carrying out technologically safe works on fitting and removing retaining rings from rotors

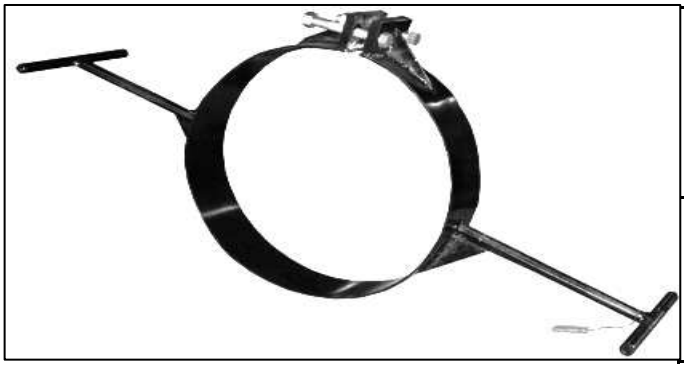
MANUFACTURED ON CUSTOMER'S REQUEST SPECIFYING THE GENERATOR TYPE

DEVICE FOR FAN HUBS REMOVAL AND INSTALLATION ГР.20

Intended for ensuring convenience, reliability and safety when carrying out the works on removing the hub from the rotor fan

MANUFACTURED ON CUSTOMER'S REQUEST SPECIFYING THE GENERATOR TYPE

SLIP RING CLAMP ГР.23

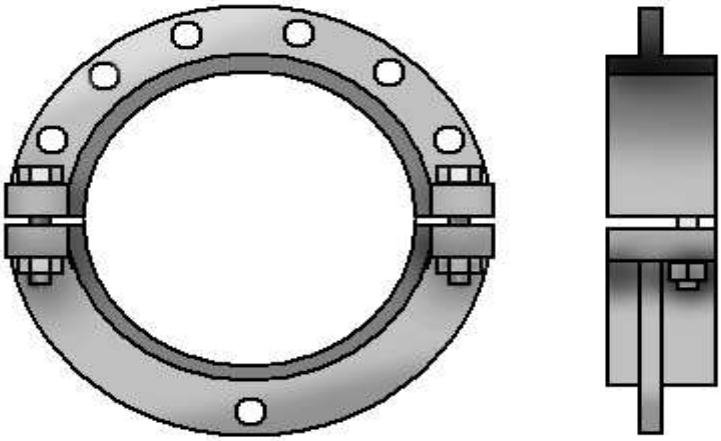


Intended for installing slip rings onto the turbine rotor in the course of repair and renewal works

MANUFACTURED ON CUSTOMER'S REQUEST SPECIFYING THE GENERATOR TYPE

DEVICE FOR OUTER SHIELDS REMOVAL AND INSTALLATION ГР.17

Intended for ensuring convenience, reliability and safety when carrying out the works on removing and installing the outer shields.



MANUFACTURED ON CUSTOMER'S REQUEST SPECIFYING THE GENERATOR TYPE

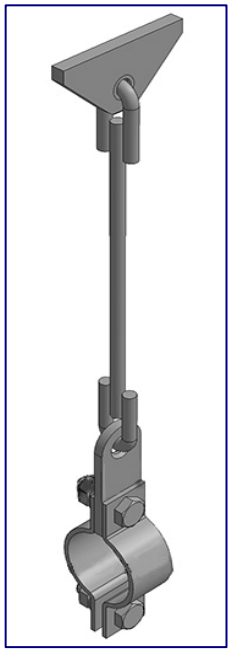
SHAFT CLAMP FOR INSULATION BAKING ГР.24

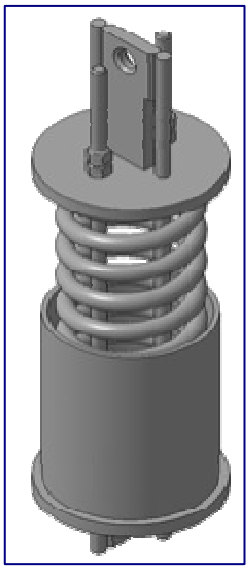
Intended for even clamping of baked insulation on the turbogenerator rotor bushing.

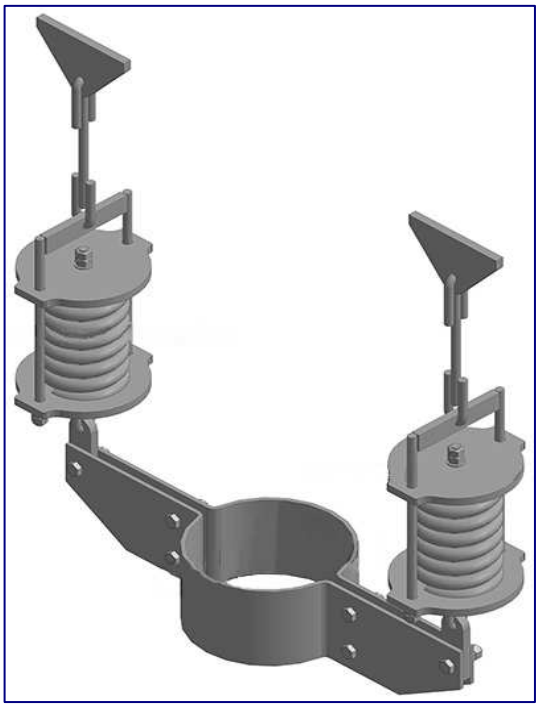
MANUFACTURED ON CUSTOMER'S REQUEST SPECIFYING THE GENERATOR TYPE

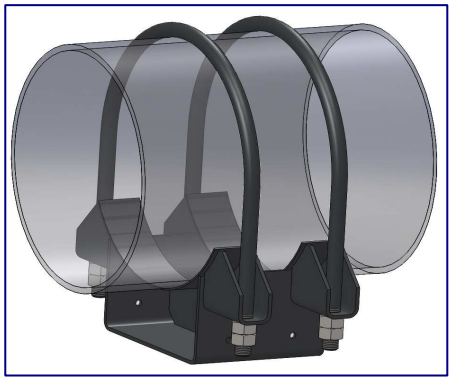
IV. ELEMENTS OF PIPELINE

HANGER-SUPPORT SYSTEMS



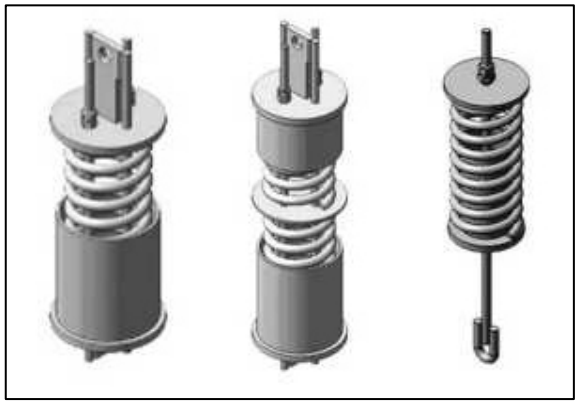






SPRING BLOCKS

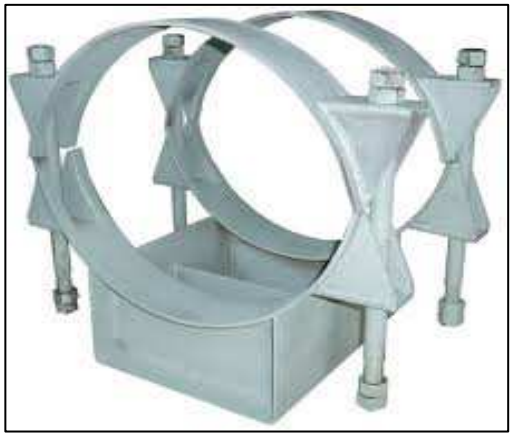
Standard establishes the construction and basic dimensions of spring blocks with the forces from 1.26 kN (128 kgf) to 58.45 kN (5960 kgf) and the working deformations of 70 and 140 mm, intended for the operation at the ambient temperatures from -40℃ to + 120℃.



МВН 045-63, МВН 049-63, ОСТ 108.275.58-80, ОСТ 108.275.59-80, ОСТ 108.275.60-80, ОСТ 108.275.69-80, ОСТ 108.764.01-80, ОСТ 34-42-743-85, ОСТ 34-42-744-85, ОСТ 34-42-745-85.

SLIDING SUPPORTS

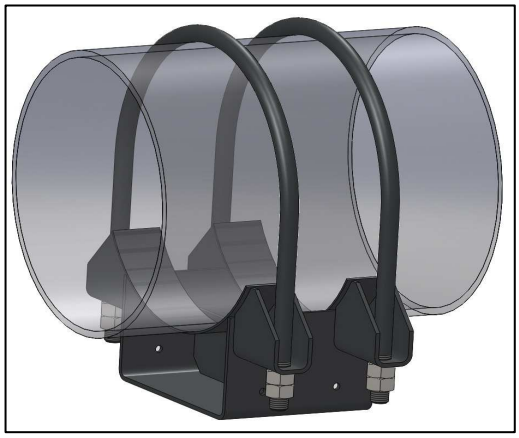
Sliding piping supports are movable piping supports intended for fastening various pipelines with the diameters from 50 mm to 1620 mm, and the accommodation of vertical loads: weight of the pipeline proper, weight of the medium carried, wind pressure and precipitation. In addition to supporting pipes, a sliding piping support allows horizontal displacement of the pipeline along its axis as a result of thermal expansions of metal.



МВН 136-63 в части Dн=57÷273 мм, МВН 136-63 в части Dн=325÷465 мм, ОСТ 108.275.29-80, ОСТ 108.275.30-80, ОСТ 108.275.31-80, ОСТ 108.275.32-80, ОСТ 108.275.33-80, ОСТ 108.275.34-80, ОСТ 108.275.35-80, ОСТ 108.275.36-80, ОСТ 108.275.48-80, ОСТ 108.275.49-80.

NON-STANDARD ELEMENTS OF HANGER-SUPPORT SYSTEMS CAN BE MANUFACTURED!

MOVABLE, FIXED SUPPORTS



MBH 2347-63, OCT 108.275.25-80, OCT 108.275.26-80, OCT 108.275.27-80, OCT 108.275.28-80, OCT 108.275.37-80, OCT 108.275.38-80, OCT 108.275.47-80. MBH 038-63, MBH 038-64, MBH 044-64, MBH 110-64, MBH 111-64, MBH 112-64, MBH 113-64, MBH 121-64, MBH 122-64, MBH 167-64, MBH 370-63, MBH 9136-64, MBH 9138-64, MBH 9169-64, MBH 9170-64, MBH 9171-64, MBH 9951-64, MBH 9952-64, MBH 1786-64, MBH 1787-64.

PIPE CLAMP ASSEMBLIES

OCT 108.275.52-80, OCT 108.275.53-80, OCT 108.275.54-80, OCT 108.275.55-80, OCT 108.275.56-80, OCT 108.275.57-80, OCT 108.275.63-80, OCT 108.275.66-80, OCT 108.275.65-80, OCT 108.275.66-80.MBH 033-64, MBH 034-64, MBH 042-63, MBH 046-63,

MBH 047-63, MBH 049-63, MBH 060-63, MBH 1775-64, MBH 1776-64, MBH 1777-64, MBH 1785-64, MBH 375-64, MBH 381-63, MBH 9034-64, MBH 9042-64, MBH 9043-64, MBH 9373-64, MBH 9374-64, MBH 9377-64, MBH 9378-64, MBH 9379-64, MBH 9380-64, MBH 9333-64, MBH 961-64, MBH 962-64, MBH 9778-64.

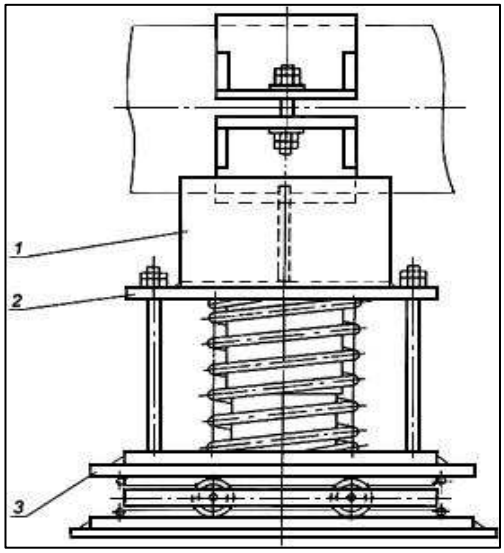
NON-STANDARD ELEMENTS OF HANGER-SUPPORT SYSTEMS CAN BE MANUFACTURED!

RODS, LUGS, LIFTING EYES

МВН 054-63, МВН 055-63 в части типа I, МВН 055-63 в части типа I I, МВН 363-63, МВН 365-63, МВН 9365-65, МВН 379-65, МВН 382-63, ОСТ 108.632.01-80, ОСТ 108.632.02-80, ОСТ 108.632.03-80, ОСТ 108.632.04-80, ОСТ 108.632.05-80, ОСТ 108.632.06-80, ОСТ 108.632.07-80, ОСТ 108.632.08-80, ОСТ 108.632.09-80, ОСТ 34-42-742-85, ОСТ 34-42-741-85. МВН 361-63, МВН 366-63, ОСТ 108.367.37-80, ОСТ 108.643.01-80.

МВН 2276-64, МВН 2278-64, МВН 2279-64, МВН 2283-64, МВН 2285-64, МВН 2287-64, МВН 2293-64, МВН 2332-64, МВН 2336-64, МВН 2346-64, МВН 2640-64, МВН 2641-64, МВН 2642-64, МВН 2643-64, МВН 2644-64, МВН 2645-64, МВН 2646-64, МВН 2647-64, МВН 2648-64, МВН 2649-64, МВН 594-64, МВН 603-64, МВН 824-64, МВН 825-64, МВН 827-64, МВН 828-64, МВН 829-64, МВН 831-64, МВН 834-64, МВН 836-64, МВН 837-64, МВН 840-64.

HOLDERS, HALFCLAMPS, PIPING SUPPORT FRAMES, ROLLER BLOCKS, BED PLATES, STOP BLOCKS, THREADED COUPLINGS, CLEVISES, FINS



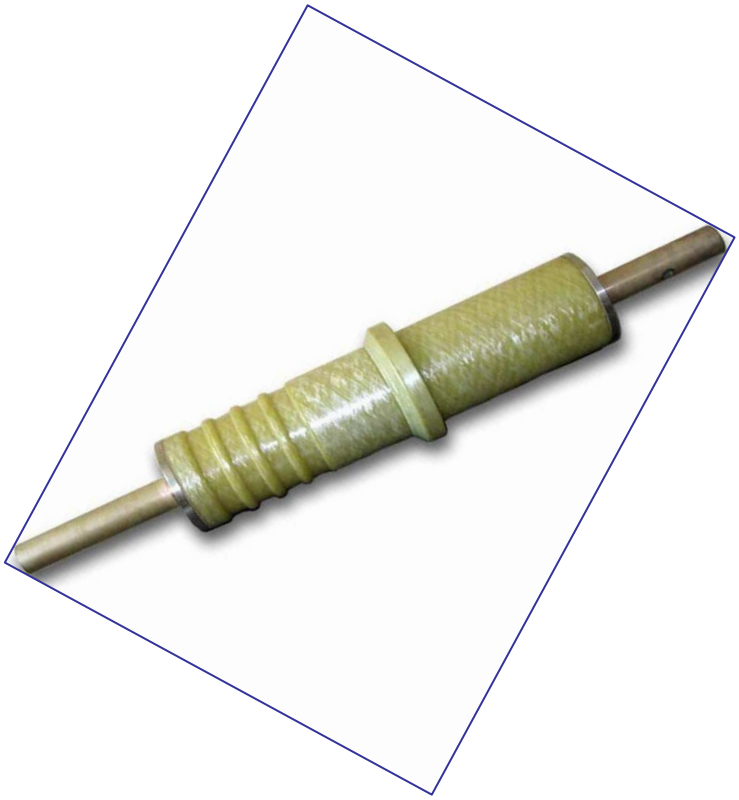
МВН 9953-64, ОСТ 108.275.39-8, ОСТ 108.275.40-8, ОСТ 108.275.41-8, ОСТ 108.275.42-8, ОСТ 108.275.43-8, ОСТ 108.275.44-8, ОСТ 108.275.45-8, ОСТ 108.275.46-8, ОСТ 108.275.50-80,

ОСТ 108.275.51-80, ОСТ 108.275.61-80, ОСТ 108.275.62-80, ОСТ 108.343.02-80, ОСТ 108.343.03-80, ОСТ 108.382.01-80, ОСТ 108.382.02-80, ОСТ 108.386.01-80, ОСТ 108.386.03-80, ОСТ 34-42-723...733-85.

NON-STANDARD ELEMENTS OF HANGER-SUPPORT SYSTEMS CAN BE MANUFACTURED!

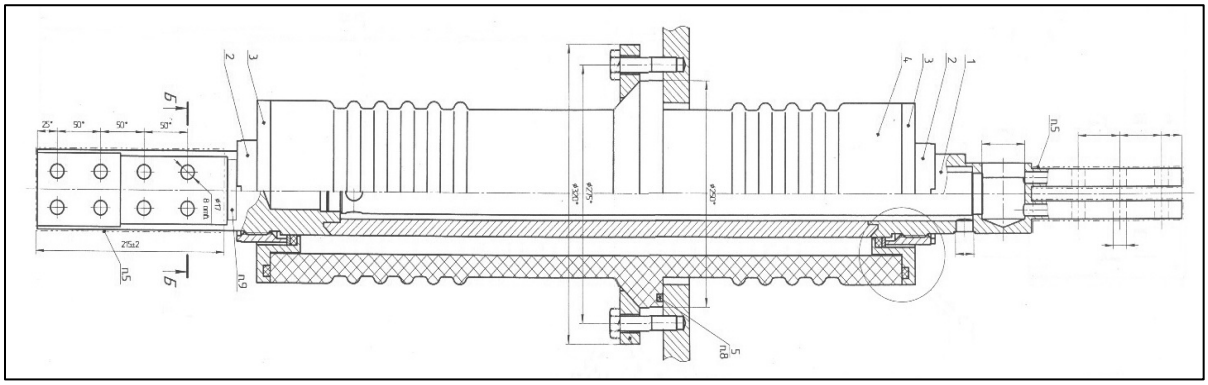
ISO 9001
BUREAU VERITAS
Certification

V. TERMINAL LEADOUTS OF TURBINE-GENERATOR SETS



TURBINE GENERATORS TERMINAL LEADOUTS

Used when manufacturing, repairing and modernizing the stators of turbine- and hydro-generators. Used when carrying out modernization with the replacement of porcelain insulators for FRP ones.



Specification

The company manufactures terminal leadouts using FGR insulators for turbine generators with air, hydrogen and water-cooled stator windings with the capacity of up to 500 MW and the voltage not exceeding 20 kV. The leadouts covers are made of stainless non-magnetic steel.

Seals are manufactured and installed individually for each piece, which gives a 100% guarantee on gas and hydraulic tightness, as well as excludes defects of the seals.

Leadout contact surfaces are silver plated.

The material used for manufacturing the cylinders corresponds to specifications ТУ У 26.1-22641550-001-2004.

	Leadout assembly	ТГВ-300	ТГВ-200	ТГВ-200М	ТВС-30	СГК-538/160-70М	ТГВ-500
1	Rated capacity, MW	300	200	200	30	19,5	500
2	Rated voltage, kV	20	15,75	15,75	10,5	6,3	20
	FRP insulator						
1	Density, g/cm^3	1,8-2,0	1,8-2,0	1,8-2,0	1,8-2,0	1,8-2,0	1,8-2,0
2	Breaking stress, MPa, not less than:						
	- at static bending	250	250	250	250	250	250
	- at axial compression	150	150	150	150	150	150
3	Voltage testing with the frequency of 50Hz over the surface, kV/mm	0,265					
4	Volume resistivity Ohm x m, not less than:						
	- in the initial condition	$5{\cdot}10^{11}$	$5{\cdot}10^{11}$	$5{\cdot}10^{11}$	$5{\cdot}10^{11}$	$5{\cdot}10^{11}$	$5{\cdot}10^{11}$
	- after staying for 24 hours in the humidity chamber	$1{\cdot}10^{9}$	$1{\cdot}10^{9}$	$1{\cdot}10^{9}$	$1{\cdot}10^{9}$	$1{\cdot}10^{9}$	$1{\cdot}10^{9}$
5	Surface electrical resistance, Ohm x m, not less than						
	- in the initial condition	$1{\cdot}10^{12}$	$1{\cdot}10^{12}$	$1{\cdot}10^{12}$	$1{\cdot}10^{12}$	$1{\cdot}10^{12}$	$1{\cdot}10^{12}$
	- after staying for 24 hours in the humidity chamber	$1{\cdot}10^{9}$	$1{\cdot}10^{9}$	$1{\cdot}10^{9}$	$1{\cdot}10^{9}$	$1{\cdot}10^{9}$	$1{\cdot}10^{9}$
6	Loss-angle tangent at 50 Hz, not more than 3%	1,5	1,5	1,5	1,5	1,5	1,5

Leadouts produced by **Kharkovenergoremont Ltd.** are tested and used in the system of Centrenergo PJSC (Uglegorskaya TPP), DTEK Vostokenergo (Luganskaya TPP and Zuyevskaya TPP), Donbassenergo JSC (Starobeshevskaya TPP), Ukrhydroenergo PJSC (Kyiv HPPs), Zagreb, Republic of Croatia (KONCAR-Generators & Motors Inc.), Turkmenistan (KomplektEnergo Company).

We carry out repairs and modernization of leadouts with the replacement of porcelain insulators for FRP ones for turbine generators of all types with the capacity of up to 500 MW and the voltage not exceeding 20 kV.

WE HAVE THE OPPORTUNITY TO DEVELOP THE DESIGN OF TERMINAL LEADOUTS FOR OTHER TYPES OF GENERATORS, AS PER THE CUSTOMER'S ORDER.

LEADOUTS ASSEMBLING SPANNER ГР.22

Intended for tightening the connections of turbogenerators electrical leadouts.

Overall dimensions, mm	645 x 88 x 40
Weight, kg	2,05

Ukraine 61017 Kharkov, Str. Serikovskaya, 1
Tel: +38 (057) 728-41-56; 728-54-73 Tel / fax: +38 (057) 728-41-57
E-mail: kf@khaer.com.ua, specteh-khaer@ukr.net
URL: www.khaer.com.ua