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«Uralmash Oil and Gas Equipment Holding» LLC

117036, 60-letiya Ocyabrya, pr., 21, bld. 4, Moscow, Russia

tel.: +7 (495) 783-05-69, fax: +7(495) 783-05-68

e-mail: info@uralmash-ngo.com

www.uralmash-ngo.com

Branch of «Uralmash Oil and Gas Equipment Holding» LLC in Ekaterinburg

620012, Pervoy Pyatiletki square, Ekaterinburg, Russia

tel.: +7 (343) 270-12-00, fax: +7 (343) 270-12-01

e-mail: ngo@urbo.su

2020

KEEPING UP THE TRADITIONS – WE CREATE THE FUTURE

Drilling rigs

Drilling rigs



- Drilling rigs are block-modular designed, transported as small blocks by trailers or as assembly units by general purpose transport.
- Drilling rigs are equipped with a fully variable speed AC drive with frequency regulation.
- The AC drive motors are powered by diesel-electric stations or by power transmission lines through a container-type thyristor assembly.
- Drilling rigs are completed with a Driller's cabin, equipped with ventilation and air-conditioning system.
- Drilling rigs are completed with a single- or two-speed drawworks, triplex mud pumps.
- Drilling rigs design allows to minimize negative environmental effect.
- Drilling derricks are adapted for installation of a top drive system of any manufacturer.
- Service upon delivery:
 - check assembly;
 - erection supervision and precommissioning;
 - technical diagnostics of machines and mechanisms;
 - warranty and out-of-warranty repair;
 - spare parts supply.



Mobile drilling rigs



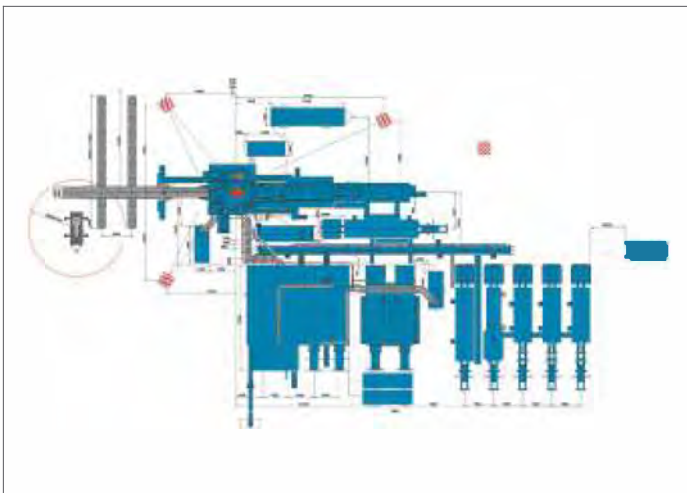
Mobile drilling rigs of 800 to 900 HP power range, of 8200 to 10500 ft drilling depth.

Mobile drilling rigs can have a self-propelled or semitrailer version of the derrick and draw-works unit. The main modules of the drilling rigs include in-built transportation means. All the equipment of the drilling rigs is built in certified semi-trailers and transported by a truck tractor. The drilling rigs are equipped with a two-section open-face mast with guylines without anchors.

Drilling rigs have a diesel, diesel-electric or electric drive of the main mechanisms with a system of control from the Driller's console. Depending on Customer requirements the mobile drilling rigs are equipped with a mud system of 750 to 1500 bbl capacity and different sets of auxiliary and cleaning equipment.

Main parameters and characteristics

Parameters / Model	MBU 2500/160 D	MBU 3200/200 D	MBU 3200/200 DER
Maximum static hook load (API), t (lbs.)	200 (440925)	225 (496040)	240 (529109)
Rated drilling depth, ft	8202	10499	10499
Drill string length, ft	59.05	59.05	59.05
Drive type	diesel	diesel	diesel-electric
Derrick type	open-face mast	open-face mast	open-face mast
Derrick height, ft	108.27	108.27	108.27
Substructure type	foldable	foldable	foldable
Substructure height, ft	19.5	19.5	23.6
Wireline diameter, in.	1-1/8	1-1/8	1-1/8
Wireline string-up	8(4x5)	10(5x6)	10(5x6)
Drawworks	LBU-600 D	LBU-600 D	LBU-670 ET
Drawworks input shaft rated power, HP	815	815	911
Rotary drive rated power, HP	503	503	503
Rotary table opening, in.	27 ½	27 ½	27 ½
Mud pump	UNBT-600 L	UNBT-600 L	UNBT-1180 L
Mud pump power, HP	816	816	1600
Full pump flow, gpm	806.7	806.7	814.7
Maximum pressure (output), bar (PSI)	350 (5076)	350 (5076)	350 (5076)
Number of pumps	2	2	2
Mud system total net volume, bbl	754	754-1572	943-1572
Possibility of cluster drilling	yes	yes	yes



Land drilling rigs



Land drilling rigs of 1500 – 2000 HP power range, of rated drilling depth from 16400 to 26200 ft.

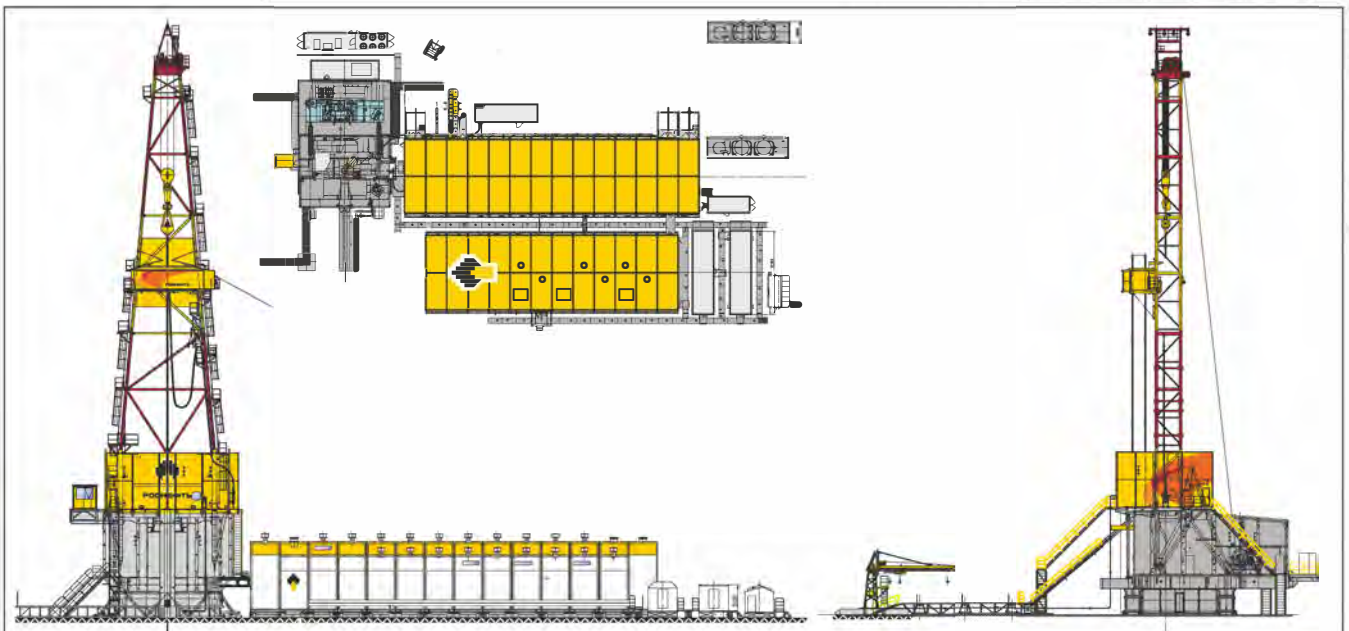
Land drilling rigs are made in any climatic version, drilling rigs are equipped with an open-face mast, and also with different types of shelters – sandwich panels or tent on metal structures.

Drilling rigs can be used to drill different types of wells of any complexity.

Depending on Customer requirements, cluster drilling rigs are equipped with a mud system of 1700 to 3100 bbl capacity and different types of auxiliary and cleaning equipment sets.

Main parameters and characteristics

Parameters / Model	5000/320 BMCh	6500/450 BMCh	6500/450 DER	600 DER
Max. static hook load, mt (lbs.)	385 (848780)	540 (1190496)	540 (1190496)	600 (1322774)
Rated drilling depth, ft.	16404	21325	21325	26247
Drill-pipe stand length, ft.	82.02...88.58	88.58	82.02...88.58	88.58
Drive type	electric, AC		diesel-electric	
Derrick	open-face mast			
Derrick height, ft.	150.92	150.92	150.92	150.92
Substructure type	self-elevating	Box on box	self-elevating	self-elevating
Substructure elevation, ft.	29.5	32.8	30.2	30.2
Drill line diameter, in.	1-1/2	1-1/2	1-1/2	1-1/2
No. of lines of traveling system (string up)	10 (5x6)	12 (6x7)	12 (6x7)	12 (6x7)
Drawworks	LBU-1100 ET	LBU-1500 AC-2	LBU-1500 AC-2	LBU-1500 ET-3
Input shaft rated power, HP	1496	2039	2039	2039
Swivel	UV-320 MA	UV-450 MA	UV-450 MA	UV-500 MA
Rotary table	R-700	R-700	R-950	R-950
Rotary table drive rated power, HP	1088	1088	1631	1088
Mud pump	UNBT-1180 L	UNBT-1180 L	UNBT-1180 L	UNBT-1600 L
Mud pump power, HP	1600	1600	1600	2200
Discharge flow max, gpm	814.7	814.7	814.7	1146
Operating pressure max, bar (PSI)	350 (5076)	350 (5076)	350 (5076)	520 (7542)
Number of pumps	2	2	3	2
Mud system total net volume, bbl	1698	2642	3145	2516
Number of steps of cleaning	4	4	4	4



Cluster drilling rigs



Cluster drilling rigs of 800 to 2000 HP power range, 8200 to 26200 ft drilling depth.

Depending on Customer requirements, cluster drilling rigs are equipped with an open-face mast derrick or a tower derrick of high assembly ability, and also with different types of shelters – sandwich panels or tent on metal structures.

Depending on Customer requirements, cluster drilling rigs are equipped with a mud system of 1700 to 3100 bbl capacity and different types of auxiliary and cleaning equipment sets.

Main parameters and characteristics

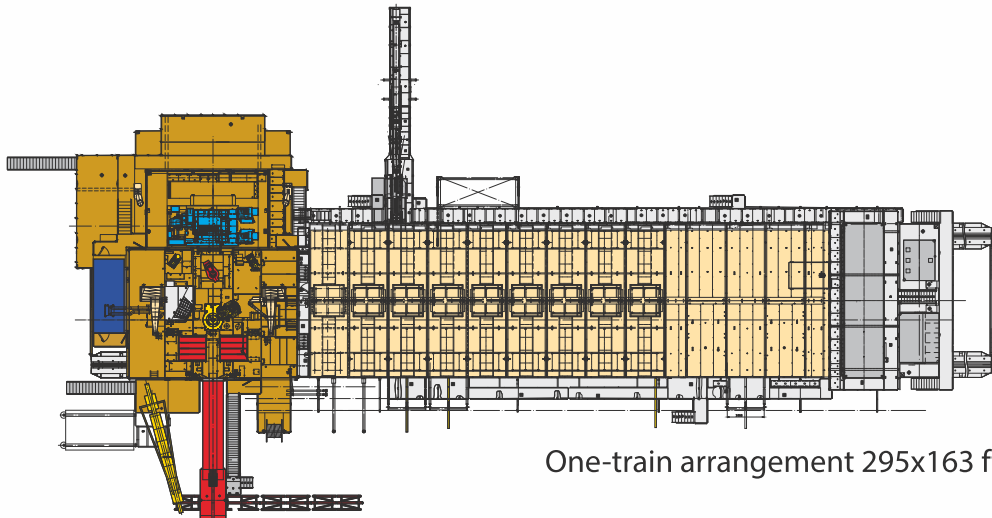
Parameters/ Model	2500/160 ESK-BMCh	4200/250 EK-BMCh	4500/270 EK-BMCh	5000/320 EK-BMCh 5000/320 ESK-BMCh	6000/400 EK-BMCh		6000/450 EK-BMCh
Max. static hook load, mt (lbs.)	160 (440925)	250 (661386)	270 (716502)	320 (848779)	400 (1058218)		450 (1190496)
Nominal drilling depth, ft	8202	13779	14764	16404	19685		21325
Drill-pipe stand length, ft	82.02	82.02	82.02	82.02...88.58	82.02...88.58		82.02...88.58
Drive type	electric, AC	electric, AC	electric, AC	electric, AC	electric, AC		electric, AC
Derrick (mast-type)	double-pole	open-face	open-face	open-face	open-face, full height sheltered	tower, full height sheltered without guylines	open-face
Derrick height, ft	149.6	149.6	148.6	150.9	150,9	147,6	150,9
Substructure type	modular	modular	modular	modular	modular		modular
Substructure elevation, ft	26.9	27.88	32.4	32.4	32.4	35.43	40.02
Drill line diameter, in	1-1/8	1-1/8	1-1/4	1-3/8	1-3/8		1-1/2
No. of lines of traveling system (string-up)	8(4x5)	10(5x6)	10(5x6)	10(5x6)	12(6x7)		12(6x7)
Drawworks	LBU-600 AC-1	LBU-900 AC-1	LBU-900 AC-2	LBU-1500 AC-1	LBU-1500 AC-1		LBU-1500 AC-2
Power rating, HP	815.76	1223.64	1223.64	2039.4	2039.4		2039.4
Swivel	UV-175 MA	UV-250 MA	UV-270 MA	UV-320 MA	UV-450 MA		UV-500 MA
Rotary table type	R-700	R-700	R-700	R-700	R-700		R-700
Rotary table drive rated power, HP	856.55	856.55	856.55	856.55	856.55		856.55
Mud pump	UNBT-600 L	UNBT-1180 L	UNBT-1180 L	UNBT-1180 L	UNBT-1180 L		UNBT-1180 L
Mud pump power, HP	816	1600	1600	1600	1600		1600
Discharge flow, gpm	806.7	814.7	814.7	814.7	814.7		814.7
Operating pressure max, bar (PSI)	350 (5076)	320 (4541)	320 (4641)	350 (5076)	350 (5076)		350 (5076)
Number of pumps	2	2	2	2	3	2	3
Mud system total net volume, bbl	943	1018	1132-2138		1132-2138	3100	3145
Number of steps of cleaning	4	4	4	4	4		4

Cluster drilling rigs are also made in different arrangement versions:

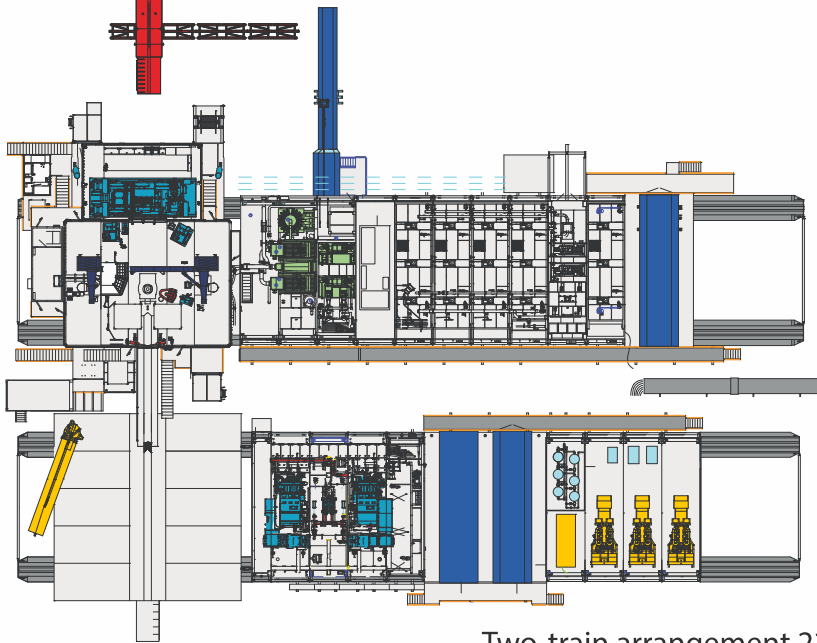
- land-cluster drilling rig;
- one-«train» drilling rig;
- two-«train» drilling rig;
- two-«train» multi-floor drilling rig.

Cluster drilling rigs

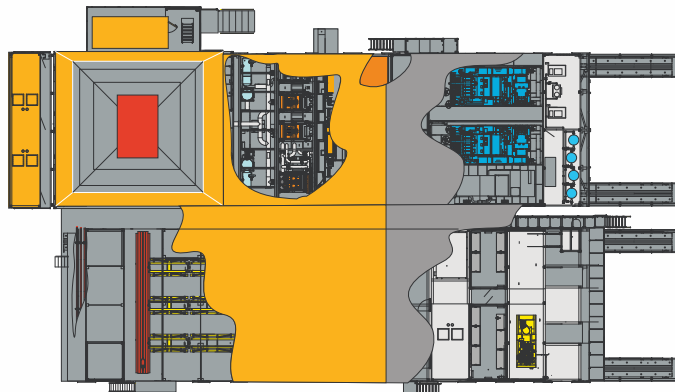




One-train arrangement 295x163 ft



Two-train arrangement 223x166 ft



Two-train multi-floor arrangement 150x98 ft

Mud pumps



Modern triplex mud pumps of 800 to 2200 HP power range and spare parts to previous duplex and triplex pumps modifications.

Design features:

- pump power and pressure on each piston diameter allow forced drilling practices;
- forged fluid ends made of high-strength alloyed steel;
- ion nitriding of the gear transmission;
- hydraulic seal of the cylinder and piston assembly;
- double-chamber seal of the slide block rod for excluding oil leakage from the case, its contamination with drilling mud;
- lubrication of the reduction gear from two systems:
 - pressure lubrication with automated maintaining of constant pressure in oil line;
 - gravity oil system lubrication from storage trays;
- safety valve of the locking device;
- drive transmission at any side of the pump or at the both sides;
- suction and discharge headers for pipes connection from both sides;
- the shaft of the crank-slide mechanism is made whole-welded instead of the welded-cast structure to increase reliability;
- the design of the hydraulic unit of the pump UNBT-1180L-52 (7500 PSI) allows its installation in the «standard» pump UNBT-1180L (5000 PSI) without modifications to the housing.

Advantages of UNBT series pumps:

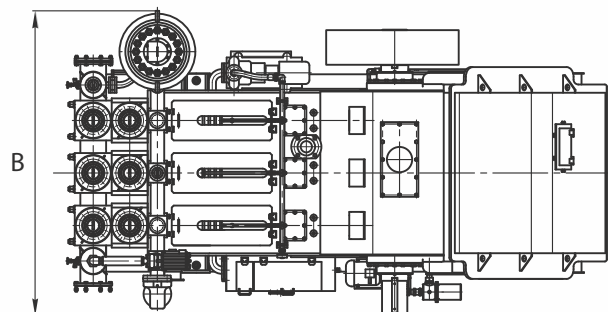
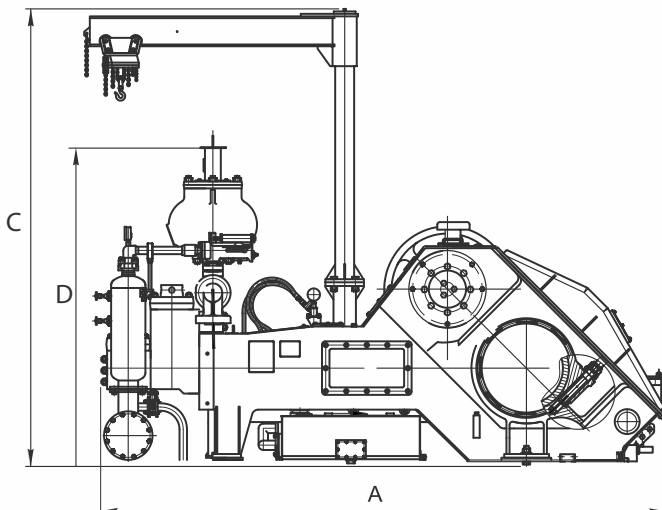
- possibility of forced drilling practices;
- full accordance to drilling practices requirements;
- minimum degree of irregularity of discharge pressure;
- less consumption of valves and piston rods in comparison with double-acting duplex pumps;
- less wear of valves and piston rods in comparison with duplex pumps;
- guarantee of pumps specified life;
- mud pumps drive switching-off when pressure in the delivery pipe is exceeded, with simultaneous release of the excess pressure;
- pump stroke-independent lubrication.

Mud pumps

Parameters / Model	UNBT-600L	UNBT-1180L	UNBT-1180M	UNBT-1180L-52	UNBT-1600L
Pump power, HP	815	1600	1600	1600	2200
Number of cylinders, pcs.	3	3	3	3	3
The lowest pressure at the pump inlet, psi	29	29	29	29	29
Maximum piston stroke rate per minute	160	125	125	125	110
Piston stroke, in	8,858	11,42	12,99	11,42	14,96
Discharge flow (max), gpm	806,7	814,7	924,1	814,7	1146
Operating pressure (max), PSI	5076	5076	5076	7542	7542
The degree of unevenness of the pressure at the pump outlet, not more than, %	5	5	5	5	5
Conditional pass inlet manifold, in	7,874	9,843	9,843	9,843	9,843
Conditional pass output header, in	3,937	3,543	3,937	3,937	3,543
Weight, lb	33008	49218	43171	52250	71525

Dimensions, in

A	157,3	191,1	199,5	191,2	218,4
B	92,5	113,4	93,2	114,1	123,7
C	135,4	147,6	142,7	147,6	146,3
D	80,7	107,6	108	106,9	109,1



Drawworks



Drawworks with chain transmission of ET and AC series are an original design of drawworks of 800 to 2000 HP power range. Drawworks with chain transmission ensure an effective operation during round-trip and drilling.

Design features:

- drawworks lifting shaft is the gear transmission output shaft;
- drawworks braking – with the main drive motor;
- two- and one-speed transmission;
- disc brake for fixing the drum immobile;
- two brake control systems – operation and emergency;
- drum with grooves cut for «Lebus»-type rope (protective flanges with ring plates made of wear-resistant steel);
- simple arrangement;
- compactness;
- exclusion of conventional structural components (chain transmission, air clutches, electromagnetic or hydromatic brake, band brake and brake control lever);
- remote control.

Advantages:

- weight is much less in comparison with traditional drawworks with chain transmission;
- «low» and «high» lifting shaft speed due to gear transmission:
 - «high» speed is for pulling out and running of the drill-string and the empty elevator,
 - «low» speed is for operations with the casing string and breakdown elimination;
- multifunction drive:
 - pulling out and variable running of drilling and casing pipes, raising and lowering of the empty elevator up to the full stop and holding it immobile;
 - variable drilling bit feeding at the bit feed controller mode;
- leakproof transmission body due to special-design seals (without seal cups).

Drawworks

Main parameters and characteristics of the drawworks with electric drives and one-speed chain transmission

Drawworks designation	LBU 600 AC1	LBU 670 ET 1-M	LBU 670 ET-1	LBU 670 AC1-M	LBU 1500 AC1	LBU 1500 AC1-5
Load capacity, mt/lbs	175/385809	200/440924	200/440924	200/440924	320/705479	400/881849
Hook lifting speed, maximum, ft/s	4.59	4.59	4.59	4.59	4.59	4.1
Drill line diameter, in.	1-1/8	1-1/8	1-1/8	1-1/8	1-3/8	1-3/8
Rated input power, HP	816	911	911	911	2039	2039
Electric drive type	AC	DC	DC	AC	AC	AC
No. of electric motors	1	1	1	1	2	2
Drum size						
diameter, in.	22.04	22.04	22.04	22.04	29.92	29.92
length, in.	48.07	41.22	48.07	41.22	57.16	70.03
Mechanical brake type	Disc	Disc	Disc	Disc	Disc	Spot-type disk brake
Brake mechanism place of installation	Hoisting shaft	Hoisting shaft	Hoisting shaft	Hoisting shaft	Hoisting shaft	Hoisting shaft
No. of brake mechanisms	1	1	1	1	1	1
Drawworks dimensions, in. length width height	138.8 118.7 87.7	121.85 124.09 79.13	138.77 119.01 79.13	119.48 125.07 81.25	228.62 129.21 914.37	– – –
Drawworks weight, lbs.	37037.7	40344.58	39242.27	37919.5	53285.72	–
Drawworks module dimensions, in. length width height	– – –	736.22* 131.49* 202.75*	239.37 146.25 101.49	736.22* 131.49* 202.75*	304.13 131.88 113.77	353.38 123.38 112.87
Drawworks module weight, lbs.	–	122026*	57100	119050*	72532	78440

Main parameters and characteristics of the drawworks with electric drive and two-speed chain transmission

Drawworks designation	LBU-750E-SNG	LBU-900 ET-3	LBU-900-AC-2	LBU-1200 ET-3	LBU-1500 ET-3	LBU-1500 AC-2
Load capacity, mt/lbs	225/496040	270/595248	270/595248	400/881849	320/705479	450/992080
Hook lifting speed, maximum, ft/s	5.57	5.25	5.25	5.12	4.92	4.92
Drill line diameter, in.	1-1/8	1-1/4	1-1/4	1-3/8	1-3/8	1-1/2
Rated input power, HP	1019	1224	1224	1631	2039	2039
Electric drive type	DC	DC	AC	DC	DC	AC
No. of electric motors	1	1	1	1	2	2
Drum size						
diameter, in.	22.04	25.19	25.19	26.96	29.92	29.92
length, in.	46.85	48.93	48.93	54.05	57.16	57.16
Mechanical brake type	Band	Spot-type disk brake	Spot-type disk brake	Spot-type disk brake	Spot-type disk brake	Spot-type disk brake
Mechanical brake place of installation	Hoisting shaft	Transmission countershaft	Transmission countershaft	Transmission countershaft	Transmission countershaft	Transmission countershaft
Drawworks dimensions, in. length width height	– – –	186.25 119.05 85.9	191.96 120.07 94.48	174.4 125.98 89.17	309.05 133.54 96.02	291.92 139.09 98.50
Drawworks weight, lbs.	–	50904	47311	58532	90257	82287
Drawworks module dimensions, in. length width height	324.8 136.8 98.7	332.95 126.18 134.56	332.95 128.89 134.56	261.81* 136.06* 94.09*	310.86 215.35* 105.9*	450.78 139.09 121.7
Drawworks module weight, lbs.	76897	68960	65168	66579*	99080*	98767 (106112)*

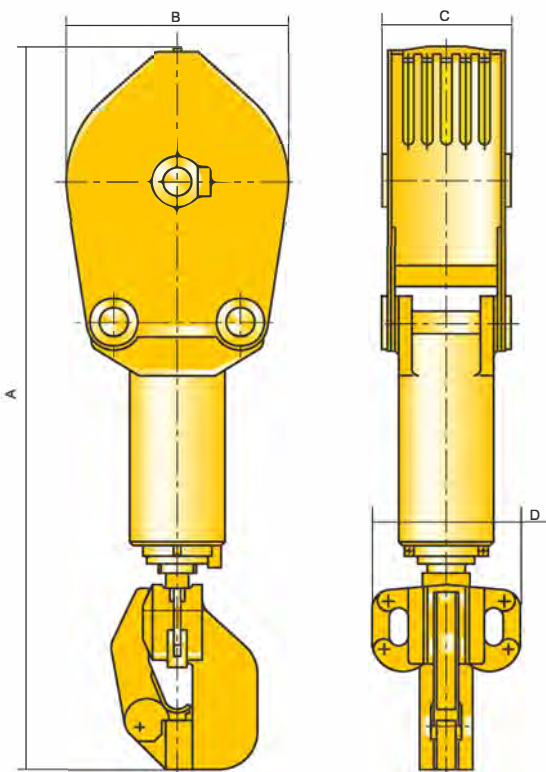
* on a semi-trailer

Hook blocks

Main design features:

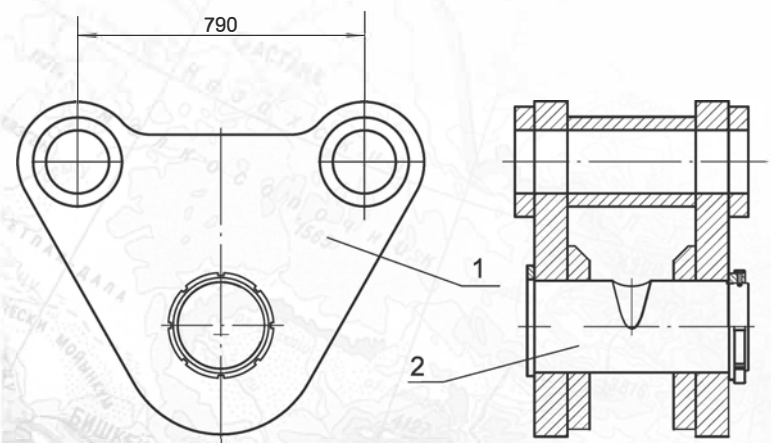
- small overall radius dimensions and the cast hook are handy for manual pipe racking;
- built-in elongated locking device provides automatic gripping of the swivel bails;
- a hydraulic shock absorber and an orientator ensure an easy rotation of the hook and the hook block; handling, which makes operation easy and safe during gripping and releasing of pipe stands.

Parameters / Model	UTBK 4-160	UTBK 5-225	UTBK 5-270	UTBK 5-320	UTBK 6-320	UTBK 6-400	UTBK 6-450	UTBK 6-500	
Load capacity, mt (lbs)	160 (352739)	225 (496040)	270 (595248)	320 (705479)	320 (705479)	400 (881849)	450 (992080)	500 (1102311)	
Sheaves number, pcs.	4	5	5	5	6	6	6	6	
Sheave external diameter, in.	29.9	44.09	44.09	55.11	55.11	55.11	55.11	55.11	
Cable diameter, in.	1-1/8	1-1/8	1-1/4	1-3/8	1-3/8	1-3/8	1-1/2	1-3/8	
Weight, lbs.	12536	12301	13988	23369	26113	22950	28175	28880	
Dimensions, in.	A	154.3	140.2	150.9	175.7	202.0	171.2	211.6	207.9
	B	46.1	41.5	46.1	57.1	57.1	57.1	57.1	57.1
	C	33.9	29.0	32.5	37.3	40.1	40.1	41.7	41.7
	D	630	32.1	32.1	31.8	37.8	37.8	37.8	37.4



Adapter of TDS

The adapter of TDS of 320 ton load capacity consists of a traverse 1, at the top of which there are two openings for connections with the travelling block, at the lower part, axis 2 is installed, on which the TDS bail is suspended.



Swivels

Swivel design meets high requirements to its reliability:

- the main support is a thrust bearing with taper rollers, which prolongs the swivel life up to the overhaul;
- the gooseneck made of high-alloy steel, is high-resistant to the attack of the flush fluid supplied under high pressures;
- design of the swivel body lower part ensures secure sealing of the oil bath;
- in the quick-release seal the pipe working surface is hardened with plasma coating in the cups contact area;
- cups lifetime is prolonged due to their alternate engagement into rotation, or their simultaneous engagement with rotation speed 2 times less than the swivel stem rotation speed.



Parameters / Model	UV160MA	UV175MA	UV250MA	UV270MA	UV320MA	UV450MA	UV500MA
Load capacity, mt (lbs.)	100 (220462)	66 (145505)	145 (319670)	145 (319670)	200 (440924)	260 (573201)	300 (661386)
Maximum working pressure, bar (PSI)	350 (5076.32)	350 (5076.32)	350 (5076.32)	350 (5076.32)	350 (5076.32)	350 (5076.32)	350 (5076.32)
Fluid passage bore, in.	3	3	3	3	3	3	3
Sub-to-kelly thread (left-hand)	3152L	3152L	3152L	3152L	3152L	3152L	3152L
Stem connecting thread (left-hand)	3152L	3152L	3152L	3152L	3177L	3177L	3177L
Height (without sub), in.	87.7	87.7	94.9	94.9	103.4	117.7	127.16
Width at bail pins, in.	37.4	37.4	42.9	42.9	47.7	54.1	54.3
Weight, lbs	3571	3505	4850	4850	6569	9039	12500

Drilling derricks



Designation/ Characteristics	M 34/160-OG-R	M 33/200-OG-R	M 45/225-R	M 45/320-R	M 46/320-OG-R	B 53/400-R	M 46/450-OG-R	M 46/500-OG-R
Max. static hook load, mt (lbs.)	200 (440924)	240 (529109)	270 (595248)	384 (846575)	384 (846575)	480 (105821)	540 (1190496)	600 (1322773)
Distance between rotary table and lower part of crown block frame, ft	111.5	108.2	149.6	147.0	150.9	147.6	150.9	150.9
Distance between pins of lower and upper hinges at the support, ft	–	113.7	156.0	156.0	161.1	–	171.2	171.2
Subbase (distance between pins of hinges at the support of derrick legs), ft								
transversely catwalk axis	–	4.9	–	–		32.8	–	–
along catwalk axis	8.8	10.5	33.8	33.8	32.8	32.8	32.8	32.8
Upper base (distance between crown block frame supports), ft								
along catwalk axis	2.9	3.0	7.5	7.5	8.5	9.2	8.5	8.5
transversely catwalk axis	3.9	5.6	8.5	9.6	8.5	9.2	8.5	8.5

Crown blocks

Crown blocks are combined with the crown and defined physically by the derrick type and the string-up diagram, specified depending on drilling equipment arrangement on the substructure and inside the derrick.



Parameters	Crown block type									
	UKB-5-160	UKB-5-200	UKB-6-250	UKB-6-270	UKB-6-300	UKB-6-325	UKB-6-400	UKB-7-400	UKB-7-500	UKB-7-540
Maximum hook load, kN	1600	2000	2500	2700	3000	3250	4000	4000	5000	5400
Grooves for line diameter, in.	1-1/8	1-1/8	1-1/8	1-1/4	1-1/4	1-1/4	1-3/8	1-3/8	1-3/8	1-1/2
Sheave outside diameter, in.	28.34	44.09	39.37	39.37	44.09	44.09	55.11	55.11	55.11	55.11
Sheave groove bottom diameter, in.	24.4	40.15	35.4	35.4	40.15	39.76	50.69	50.69	50.69	50.69
Pin diameter, in.	5.51	8.66	8.66	8.66	8.66	8.66	11.02	11.02	12.0	11.02
Sheave bearings	42228	42244	97744 LM	6-42244	97744 LM	97744 LM	709715 6M	709715 6M	F-576041 TR2FAG	709715 6M
Dimensions, in.										
length	88.58	91.33	114.96	52.0	173.03	125.59	170.66	169.88	165.94	170.47
width	70.27	56.69	94.68	91.33	118.11	121.25	118.11	125.59	125.98	151.18
height	71.65	52.04	96.85	56.69	214.56	87.79	228.58	187.08	285.15	218.70
Weight, lbs.	3924	7098	10295	22696	16358	13205	22046	21495	32738	25926

Top drive system



The top drive system (TDS) with an AC variable-frequency drive is intended for application as a part of drilling rigs of average and big depth of drilling. TDS is used for operation in macroclimatic regions with moderate climate, category 1 according to GOST 15150-69 (-45°C...+40°C).

The advantages of using TDS:

- time saving in the process of pipe extension during drilling;
- reduced probability of stuck pipe drilling equipment;
- expansion (development) of the wellbore during the descent and ascent of the tool;
- improved accuracy of drilling operations for directional drilling;
- increased safety of the drilling crew;
- reducing the probability of fluid release from the well through the drill string;
- relief of the descent of the casing in the zones of complications due to rotation and flushing;
- improving the quality of core.

Design Features:

- hydraulic caliper brakes on disk type in each electric motor;
- traverse beam with rotating of the pipe handler by 360°;
- automatic threading off-loading system;
- oil heating system in the reduction gear and the hydraulic tank;
- IBOP, working pressure 5000 PSI or 10000 PSI;
- built in unified hydraulic unit;
- unified circulating system of hydraulic fluid
- cooling and filtering;
- guide beam;
- control container – VFD-TDS.

The constructive design of the TDC allows it to be installed on drilling rigs of the corresponding load capacity of all domestic and foreign manufacturers.

	SVP 250 EChR	SVP 320 EChR	SVP 450 EChR	SVP 450 EChR-M	SVP 500 EChR
Maximum Load capacity as per API, short ton	275	353	496		500
Main drive type	Electric AC				
Drive electric motors power, HP	603	804 (2x402)		1072 (2x536)	1206 (2x603)
Maximum variable torque during drilling, lbf ft	33190	39681		47941	53104
Maximum breakout torque, lbf ft	47941	59005		73756	79756
Maximum rotation speed , rpm	200	211		220	250
Maximum rotation speed at max. variable torque, rpm	90	105		110	
Working pressure of mud pump, PSI	5000	5000		7500	
Pipe clump range, in	3'1/2 – 8'	5' – 7'3/4		3'1/2 – 8'5/8	
Weight, lb	25353	31967	32848	34171	38581



Drillers cabin



Purpose:

- driller's workstation;
- installation of control elements and instrumentation for operative remote control of the drilling rig mechanisms and units;
- operation in moderate climate areas (-45°C ... $+40^{\circ}\text{C}$) at the fields with hydrogen sulphide content less than 6%.

Design:

- module with quick release connections at the cables and pipelines input;
- framework made of steel pipes and sections;
- noise- and heat- insulated doors, glasses and walls;
- multiple glass units with an anti-mist system;
- brush window wipers with window washers on the front and upper windows;
- air condition system;
- driller's cabin can be made integrated with the block-box.

Equipment in the cabin:

- driller's pneumatic console;
- driller's electric console with an air preparation unit;
- drilling data control display console;
- top drive console;
- video viewing device;
- explosion-proof alarm station;
- small-sized pressure indicator (in the pneumatic console);
- explosion-proof light panel;
- heater;
- conditioner with a control unit;
- operator's armchair.

Operator's armchair equipment:

- left and right consoles near the armchair with the main control elements installed on them;
- command device of the drawworks - joy stick;
- control button;
- switch.

Drillers cabin



Mud systems



Mud systems for mobile, land and «train»-type drilling rigs different volume with different configuration of the cleaning equipment.

Design features of mud cleaning:

- specified quality of cleaning;
- environmental safety;
- reduction of slime harmful effect on the processing properties of the drilling mud;
- technical-economic indicators improvement during drilling;
- operating safety for the maintenance staff;
- operation in different climate conditions.

Design features:

- block-modular design;
- factory-assembled units and modules with internal piping interconnection, mechanisms and cables lines.

Set of equipment for drilling fluid cleaning includes:

- shaker screen;
- desander;
- desilter;
- centrifuge and degasser.

Dewatered slime of drilling mud is gathered onto a special screw conveyer, transported outside the mud system complex and can be loaded into a motor vehicle.

Mud systems are transported to a new drilling location:

- without dismantling of equipment, by transportation modules in standard trailers.

Composition and packaging of the mud system modules and the type of the cleaning equipment depend on the drilling rig design and are agreed with Customer in each case.

Mud systems



Main typical sizes of the mud systems

Parameters/ model	Mobile drilling rigs									Cluster drilling rigs				Land drilling rigs									
	1677	1006	1006	1006	712	1341	1341	838	712	1677	1341	2683	2264	1006	2264	3522	5031	335	335	1467	1006	603	1467
Net volume, bbl	1677	1006	1006	1006	712	1341	1341	838	712	1677	1341	2683	2264	1006	2264	3522	5031	335	335	1467	1006	603	1467
Water tank, bbl	419									419	419	335	754	-	-	452	452	-	-	125	-	-	125
Liquid chemicals tank, bbl	50	50	302	-	251	-	-	-	-	-	-	50	-	-	-	50	201	-	-	-	302	-	-
Jet mixer tank, bbl	84	84	-	84	-	84	84	-	-	84	84	-	125	-	-	-	-	-	-	84	-	-	84
Flush water tank, bbl										84	84												
Unit of chemical reinforcement of centrifuges		-	*	*	-	*	*	*	-	*	*	*								*	*	-	*
Sludge removal system (screw conveyor)	+	-	+	-	-	+	+	+	-	+	+	+	+	-	+	+	+	+	+	-	+	-	-
No. of cleaning stages	4	4		3	3	4	3		3	4	4	4	4	4	4	4	4	3	4	3	4	2	5

* upon Customer request

Final configuration of the mud system equipment is specified by Customer

Mud systems

Screw conveyor

KSh



Design features:

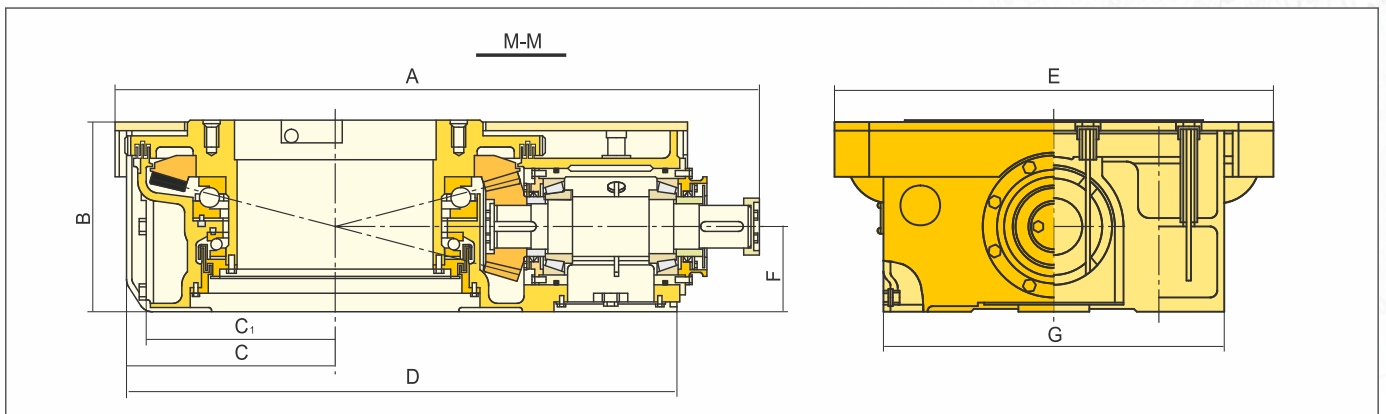
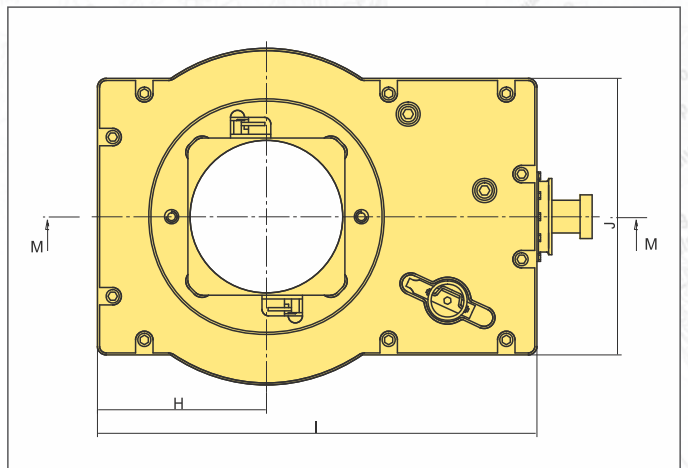
- versions of the conveyor with intermediate bearing supports of the screw and without intermediate supports;
- absence of special receiving boxes. Sludge from the shale shakers, hydrocyclones and centrifuges is removed through the sloping shoots of the cleaning equipment directly to the screw blades. Special receiving boxes can be installed on customer's request;
- to prevent freezing of conveyed materials the screw conveyor body is equipped with a steam jacket which enables to operate the conveyor under sub-zero temperatures;
- sliding supports are designed to compensate thermal expansion;
- simplified access to the bearing assemblies for repair and replacement of the bearings.

Specifications

Parameters	KSh 16	KSh 20	KSh 25	KSh 32	KSh 40	Remarks
Flow rate, gallon/hour, not less than	4226	5283	6604	8453	10566	
Screw rotary speed, rpm.	40	40	40	40	40	
Screw diameter, in	11.8	13.7	15.7	17.7	19.6	
Screw thickness, in	0.23-0.39	0.23-0.39	0.23-0.39	0.23-0.39	0.23-0.39	as agreed upon with Customer
Installed electric motor power, HP	10.2	10.2	10.2	10.2	10.2	
Electric motor supply voltage, V	380	380	380	380	380	
Steam pressure in steam jacket, PSI (bar)	9.4 (0.65)-116 (8)	9.4 (0.65)-116 (8)	9.4 (0.65)-116 (8)	9.4 (0.65)-116 (8)	9.4 (0.65)-116 (8)	as agreed upon with Customer
Steam temperature, °C not more than	140	140	140	140	140	
One screw conveyor working part length, ft	11.15-53.8	11.15-53.8	11.15-53.8	11.15-53.8	11.15-53.8	
Armoring of screw surface edge with wear-resistant materials	as agreed upon with Customer					
Steam jacket body thermal insulation	as agreed upon with Customer					

Rotary tables

Parameters/model	R-700	R-950
Rotary table opening, in.	27,56	37,40
Rotary table safe static load, mt	500	630
Rotary table static torque, ft.-lb.	579	868
Rotary table speed, rpm (not more than)	350	350
Driving shaft to rotary table gear ratio	3.61	3.81
Weight (without bushing), lbs.	10560	15432
Dimensions, in.		
A	89,37	95,47
B	26,77	29,53
C	29,13	34,45
C1	26,18	30,12
D	76,57	81,30
E	60,83	72,83
F	12,01	12,99
G	47,24	61,02
H	30,51	36,42
I	79,13	85,24
J	50,00	-



Electric equipment of drilling rigs



Drilling rigs are powered from power lines of 6.3 kV, 50 Hz or from diesel electric stations complex.

Electric equipment includes:

- power supply system;
- variable electric drives of the main mechanisms;
- electric drives of the auxiliary mechanisms;
- drilling rigs automated control system;
- drilling rigs lighting system;
- drilling process variables control system;
- explosion-proof system of industry simplex-duplex loud-speaking communication;
- service systems;
- explosion-proof system of industry closed-circuit television;
- explosion-proof equipment of wireless communication (radio stations);
- meteorological equipment set.

Drilling rigs can be powered from power lines or from some independent supply sources (diesel or gas-turbine power stations).

Modern drilling rigs have a variable (AC or DC) drive of all the main mechanisms.

Holding's drilling rigs are equipped with digitally controlled DC or AC transducers.

High assembly ability of drilling rigs electrical equipment:

- factory-assembled electrical mounting of each module;
- large unit completed factory-assembled electrical devices of large-scale integration;
- microprocessor control system of the drilling rig electric drives;
- use of quick release plug connections.

Drilling rigs automated control system

All the drilling rigs are equipped with an automated control system.

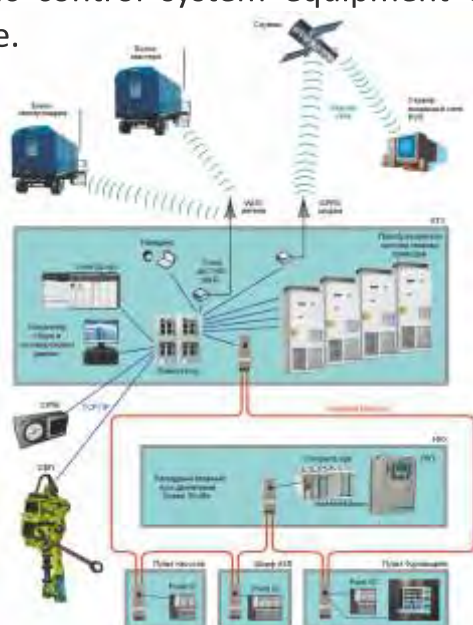
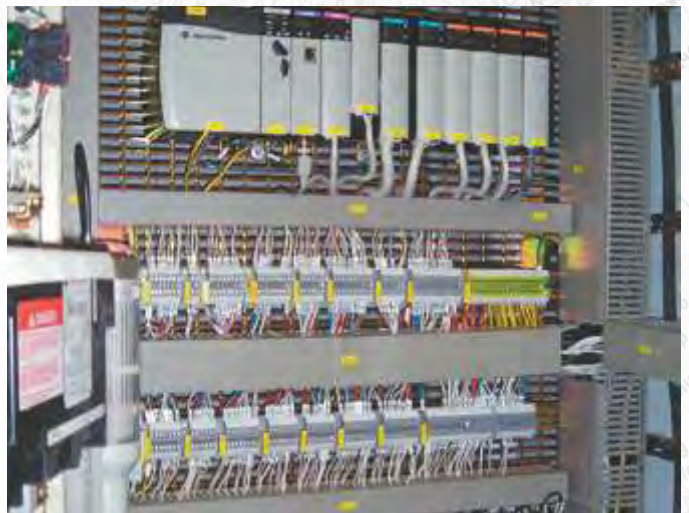
Main functions of automated control systems:

- drawworks, mud pumps and rotary tables main drives control;
- auxiliary mechanisms and mud system mechanisms control;
- main electric equipment monitoring with displaying on control panels;
- archiving of failures and drilling rig main parameters, with possibility of viewing them in the diaries;
- remote access of the supremal to the drilling rig parameters.

All the automatic control system equipment is interconnected by ring information network – Industrial Ethernet, ensuring trouble-free operation in the case of damage of one section of the network.

Automatic control system is powered by uninterruptible power supply, ensuring reliable operation in the case of power voltage reduction.

Main drives control bypass circuit keeps electric drives of the main mechanisms operable in the case of failure of the automatic control system equipment or software.



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