SHOVEL
EKG-20

Main dipper capacity - 16...24 m³
Dipper payload - 40 t
Working mass - 750 t
Main drive control system
- frequency converter and induction motor.
- TC2, working temperature: -40°C; +45°C.

Climatic version
- protection from internal and external short circuits and overloads;
- protection from overload (overheating) of IGBT transistors;
- protection from open-phase operation and wrong phase sequencing;
- protection from motor voltage overload;
- protection from power supply line voltage overload and voltage drops;
- protection from frequency converter cooling system ventilation failure;
- protection from insulation resistance drop;
- protection from drive self rotation.

Auxiliary drives
Aux. equipment power supply voltage:
- aux. drives – 380 V;
- lighting – 220 V;
- AC control circuits – 220 V;
- DC control circuits – 110 V;
- warning circuits – 24 V;
- clearance and emergency lighting – 12 V.

Protection:
- LED lights and floodlights.
- self-extinguishing cables.
- from electric shocks.
- from resistance level drop.

FRONTAL EQUIPMENT

Frontal equipment design – rigid rack-type crowd mechanism with double-beam stick and sheave-less dipper suspension.

Dipper
- Decast and welded.
- Cast front wall, door, yoke, teeth made of high-manganese steel.
- Rear wall is welded of rolled plates.
- 4-point hinged joints (with heavy-duty bushings, pins, and axles).
- Disc brakes mounted on the rear wall.

Design
- Cast front wall, door, yoke and teeth are made of high-manganese steel.
- Rear wall is welded of rolled plates.

Material
- Rear wall is welded of rolled plates.

Connection with the stick
- 4-point hinged joints (with heavy-duty bushings, pins, and axles).

Dipper door brakes
- Disc brakes mounted on the rear wall.

Coupling
- With flexible elements, coupling diameter 50 mm.
- Hinged joints in 2 points.

Boom
- All-welded box-section boom with heat-treated transverse and longitudinal diaphragm plates and forged parts. The frame of the boom is heat-treated. The boom has increased strength and torsion-proofness for digging rocky soil.
- Mounted in the middle of the boom.

Boom design
- All-welded box-section boom with heat-treated transverse and longitudinal diaphragm plates and forged parts. The frame of the boom is heat-treated. The boom has increased strength and torsion-proofness for digging rocky soil.
- Mounted in the middle of the boom.

Crowd mechanism
- Two-stage gearbox with external rack-and-pinion gear.

Gearbox
- With flexible elements, coupling diameter 50 mm.
- Hinged joints in 2 points.

Connection with the revolving frame
- Four guy ropes, rope diameter 70 mm.

Boom suspension
- Double-groove cast sheaves with heat-treated working surface.

Boom point sheave
- Pneumatic normally-closed shoe brake.
Stick
Design  – double spaced heat-treated box beams.
Gear rack  – forged rack with open gearing.

Dipper door winch
Construction  – gearless winch.
Motor power  – motor power.

Hoist winch
Drive  – two electric motors
Gearbox  – two-stage gearbox with spur gears.
Drums  – cantilever double-groove drums with heat-treated grooves spline-mounted on the shaft.
Couplings  – the couplings are combined with brake pulleys, couplings with flexible elements, coupling diameter 50mm.
Brakes  – pneumatic normally-closed shoe brakes.

Revolving frame
Design  – heavy-duty heat treated three-piece torsion-resistant box frame.
Boom support  – force transmission through parallel longitudinal beams.
Connection of frame parts  – heavy-duty fasteners M24.
Counterweight  – box-type housing filled with up to 85 t of 45-60 mm diameter balls.

Operator’s cabin
Design  – two level bracket-mounted cabin.
Top cabin  – with resilient suspension, working and rest areas, and panoramic windshield.
Operator’s seat  – anatomical weight-adjustable seat with vibration-isolating mount.
Control joysticks  – installed in operator’s seat consoles.
Windows  – shatterproof glass, windsreen wiper, and a sunscreen.
Ventilation  – superpressure system.
Climate control  – automatic
Audio communication  – built-in.
Information system  – excavator units monitoring system that can store/display warning messages and excavator performance data on a screen.
Video monitoring system  – five cameras provide the operator with a view on: dipper working area, entry ladder, inside the housing, cable drum, left side of the excavator.

Swing gear
Drive  – vertical flanged electric motors.
Drive gearbox  – 4 two-stage planetary gearboxes.
Brakes  – pneumatic normally-closed shoe brakes.
Swing circle  – with external gear ring and roller circle with 40 taper rollers.
Swing speed  – 0 – 3 rpm.

Rest area  – table, documentation racks, microwave oven, and refrigerator.
Bottom cabin  – cabinet with operating documentation, work bench and racks for small tools and spare parts.
CARRIAGE

Carriage
Design – three-modular carriage with heat-treated central part and side box frames.
Propel drive – one electric motor for each track.
Gearboxes – two-stage onboard gearbox and two-stage attached gearbox with spur gearing.
Brake – pneumatic normally-closed shoe brake.
Track – maintenance-free design, 48 1800mm-wide links.
Support rollers – 6 on each frame.
Idlers – 1 on each frame
Carrier rollers – 4 on each frame
Drive rollers – elevated roller with replaceable cams
Takeup devices – built-in hydraulic cylinders
Movement speed – 0-1,1 km/h.

Cable drum
Design – attached with automatic reeving.
Capacity – min. 350 m of cable
Quantity of layers – 2
Cable diameter – 54-59 mm

Auxiliary equipment
Hoist – lifting capacity 500 kg.
Auxiliary winch – lifting capacity 2500 kg.

LUBRICATION SYSTEM

Centralized lubrication system of EKG-20
Type – Automatic centralized lubrication system for bearings of the revolving frame units, frontal equipment, and carriage, and for open gearings and rolling surfaces of the frontal equipment and slewing mechanisms.

Lubrication pumps
– Barrel pump for lubricating rolling bearings
– Barrel pump for lubricating open gearings
– Pump for lubricating the carriage

Lubricant containers
– Standard 200l barrels with lubricant for rolling bearings and open gearings. Empty barrels shall be replaced with full ones.

Tank of the carriage – 5 l tank of the carriage lubrication pump shall be filled with a lubricant gun through a filling nipple.

Pneumatic system
Configuration – screw compressor unit in noise-abating enclosure.
Air receiver capacity – 1,08 m³
Drier – diaphragm type.
Capacity – 1,15 m³/min
Pressure – 0,92 MPa
Control – electropneumatic valves.

Mechanical equipment protection system.
Main drive control algorithms include the set of interlocks, providing:
– dipper lift limitation
– stick movement limitation
– bucket protection from dipper throw
– boom protection from impacts
– boom overhoist protection
– limitation of side loads when digging and handling oversized materials
– excavator tilt angle limitation
– hoist rope unwinding length limitation
**OPERATING PARAMETERS**

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Main dipper capacity, m³</td>
<td>20</td>
</tr>
<tr>
<td>Dipper capacity range, m³</td>
<td>16-24</td>
</tr>
<tr>
<td>Dipper payload, t</td>
<td>40</td>
</tr>
<tr>
<td>Dipper sheave force, t</td>
<td>170</td>
</tr>
<tr>
<td>Crowd force, max, t</td>
<td>75</td>
</tr>
<tr>
<td>Time of working cycle, s</td>
<td>27</td>
</tr>
<tr>
<td>Digging height, max, m [C]</td>
<td>16,4</td>
</tr>
<tr>
<td>Digging radius, max, m [D]</td>
<td>22,2</td>
</tr>
<tr>
<td>Clean-up radius, m [E]</td>
<td>14,9</td>
</tr>
<tr>
<td>Dumping radius, max, m [B]</td>
<td>19,6</td>
</tr>
<tr>
<td>Dumping height, max, m [A]</td>
<td>10,7</td>
</tr>
<tr>
<td>Working tilt angle, degrees</td>
<td>5</td>
</tr>
<tr>
<td>Gradeability, degrees</td>
<td>12</td>
</tr>
</tbody>
</table>

**MASSES AND OVERALL DIMENSIONS**

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Working mass, t</td>
<td>750</td>
</tr>
<tr>
<td>Mass of ballast, t</td>
<td>85</td>
</tr>
<tr>
<td>Ground bearing pressure, MPa (kg/cm²)</td>
<td>0,245 (2,5)</td>
</tr>
<tr>
<td>Height of boom point sheaves, m [G]</td>
<td>17,67</td>
</tr>
<tr>
<td>Height of A-frame, m [K]</td>
<td>12,74</td>
</tr>
<tr>
<td>Max. clearance radius over boom point sheaves, m [H]</td>
<td>16</td>
</tr>
<tr>
<td>Max. clearance radius over revolving frame, m [I]</td>
<td>10</td>
</tr>
<tr>
<td>Clearance under frame, m [J]</td>
<td>3,36</td>
</tr>
<tr>
<td>Ground clearance, m [M]</td>
<td>0,85</td>
</tr>
<tr>
<td>Operator’s eye level, m [N]</td>
<td>8,32</td>
</tr>
<tr>
<td>Overall width, m [L]</td>
<td>12,3</td>
</tr>
</tbody>
</table>
## FRONT-END EQUIPMENT

<p>| | | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Crowd mechanism type</td>
<td>rack</td>
<td></td>
</tr>
<tr>
<td>Stick make</td>
<td>double beam</td>
<td></td>
</tr>
<tr>
<td>Boom make</td>
<td>single beam</td>
<td></td>
</tr>
<tr>
<td>Boom sheave diameter, mm</td>
<td>2280</td>
<td></td>
</tr>
</tbody>
</table>

## ELECTRIC EQUIPMENT

<p>| | | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Electric drive type</td>
<td>frequency converter and induction motor</td>
<td></td>
</tr>
<tr>
<td>Voltage, kV</td>
<td>6</td>
<td></td>
</tr>
<tr>
<td>Frequency, Hz</td>
<td>50</td>
<td></td>
</tr>
<tr>
<td>Main transformer power, kVA</td>
<td>1600</td>
<td></td>
</tr>
</tbody>
</table>

## GEARBOXES

<table>
<thead>
<tr>
<th>Gearbox</th>
<th>Design</th>
<th>Qty, pc</th>
</tr>
</thead>
<tbody>
<tr>
<td>Propel</td>
<td>Two-stage in-line</td>
<td>2</td>
</tr>
<tr>
<td>Hoist</td>
<td>Two-stage in-line</td>
<td>1</td>
</tr>
<tr>
<td>Crowd</td>
<td>Two-stage in-line</td>
<td>1</td>
</tr>
<tr>
<td>Swing</td>
<td>Two-stage planetary</td>
<td>4</td>
</tr>
</tbody>
</table>

## REVOlVING FRAME

<p>| | | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Length, m</td>
<td>13,4</td>
<td></td>
</tr>
<tr>
<td>Width, m</td>
<td>9,2</td>
<td></td>
</tr>
</tbody>
</table>

## SWING GEAR & BEARING ASSEMBLY

<p>| | | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Design</td>
<td>with conical rollers</td>
<td></td>
</tr>
<tr>
<td>Swing gear diameter, mm</td>
<td>5171</td>
<td></td>
</tr>
<tr>
<td>number of teeth / module</td>
<td>160/32</td>
<td></td>
</tr>
</tbody>
</table>

## PROPEL MECHANISM

<p>| | | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Design</td>
<td>two-crawler mounting with large diameter rollers</td>
<td></td>
</tr>
<tr>
<td>Overall length, m</td>
<td>11,2</td>
<td></td>
</tr>
<tr>
<td>Overall width, m</td>
<td>9,31</td>
<td></td>
</tr>
<tr>
<td>Track gauge, m</td>
<td>7,29</td>
<td></td>
</tr>
<tr>
<td>Track width, m</td>
<td>1,8</td>
<td></td>
</tr>
<tr>
<td>number of links</td>
<td>48</td>
<td></td>
</tr>
<tr>
<td>pitch of links, mm</td>
<td>500</td>
<td></td>
</tr>
<tr>
<td>Speed, km/h</td>
<td>1,1</td>
<td></td>
</tr>
</tbody>
</table>
### ROPES AND GUY STRANDS

<table>
<thead>
<tr>
<th>Structure</th>
<th>Type</th>
<th>Qty, pc</th>
<th>Diameter, mm</th>
<th>Length, m</th>
</tr>
</thead>
<tbody>
<tr>
<td>Hoist</td>
<td>GOST</td>
<td>2</td>
<td>57</td>
<td>91</td>
</tr>
<tr>
<td>Boom suspension</td>
<td>Guy strand</td>
<td>4</td>
<td>70</td>
<td>15</td>
</tr>
<tr>
<td>Dipper door opening</td>
<td>GOST</td>
<td>1</td>
<td>15,5</td>
<td>22</td>
</tr>
<tr>
<td>Auxiliary winch</td>
<td>GOST</td>
<td>1</td>
<td>13,5</td>
<td>250</td>
</tr>
</tbody>
</table>

### Parameters of motors in main drives of EKG-20

<table>
<thead>
<tr>
<th>Description</th>
<th>Motor type</th>
<th>Power, kW</th>
<th>Rotational speed, rpm</th>
<th>Qty, pcs</th>
</tr>
</thead>
<tbody>
<tr>
<td>Hoist motor</td>
<td>АДРЭ-С 600-8 УХЛ2</td>
<td>600</td>
<td>560/840</td>
<td>2</td>
</tr>
<tr>
<td>Crowd motor</td>
<td>АДРЭ-С 325-8 УХЛ1</td>
<td>325</td>
<td>500</td>
<td>1</td>
</tr>
<tr>
<td>Swing motor</td>
<td>АДРВЭ-С 150-8 УХЛ2</td>
<td>150</td>
<td>750</td>
<td>4</td>
</tr>
<tr>
<td>Propel motor</td>
<td>АДРЭ 200-8 УХЛ1</td>
<td>200</td>
<td>500/1000</td>
<td>2</td>
</tr>
<tr>
<td>Dipper door opening motor</td>
<td>Д 32 УХЛ1</td>
<td>12</td>
<td>780</td>
<td>1</td>
</tr>
<tr>
<td>Cable reel motor</td>
<td>Д 12 УХЛ2</td>
<td>2,5</td>
<td>1180</td>
<td>1</td>
</tr>
</tbody>
</table>
## WEIGHT AND DIMENSIONS OF MAIN ASSEMBLY UNITS

### DIPPER 20 m³
- Height, mm – 5780
- Width, mm – 4325
- Length, mm – 3390
- Weight, t – 35

### STICK
- Height, mm – 1460
- Width, mm – 3485
- Length, mm – 11710
- Weight, t – 24.7

### BOOM
- Width, mm – 1370
- Width with attachments, mm – 5680
- Length, mm – 17000
- Weight, t – 65

### RACK
- Height, mm – 8600
- Width, mm – 3900
- Length, mm – 6500
- Weight, t – 14.6

### TRACK MOVE
- Height, mm – 2300
- Width, mm – 7510
- Length, mm – 10920
- Weight (assembled track frame), t – 72

### TRACK
- Track Height, mm – 407
- Track Width, mm – 710
- Track Length, mm – 1800
- Track weight, t – 0.78
- Track chain weight, t – 40.34
LOWER FRAME
Height, mm – 2054
Width, mm – 4576
Length, mm – 4380
Weight, t – 28.6

GEARBOX
Height, mm – 2190
Width, mm – 1750
Length, mm – 1255
Weight, t – 4.99

EXCAVATOR CABIN
Width, mm – 1900
Height, mm – 5005
Length, mm – 5300
Weight, t – 5.3

CABLE DRUM
Height, mm – 1920
Width, mm – 4540
Weight, t – 4.9

DRUM WINCH WITH ROPE
Diameter, mm – 1350
Width, mm – 770
Diameter of Rope, mm – 57
Weight (without rope), t – 2.38

CROWN GEAR
Outside diameter, mm – 5171,2
Height, mm – 360
Weight, t – 10.9
## Weight and Dimensions of Main Assembly Units

<table>
<thead>
<tr>
<th>Component</th>
<th>Height, mm</th>
<th>Weight, t</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>SUSPECTOR HOUSING</strong></td>
<td>3421</td>
<td>0.66</td>
</tr>
<tr>
<td><strong>CRANE BEAM</strong></td>
<td>6361</td>
<td>0.41</td>
</tr>
<tr>
<td><strong>CIRCLE ROLLER</strong></td>
<td>240</td>
<td>9.4</td>
</tr>
<tr>
<td><strong>SWINGING MECHANISM</strong></td>
<td>4210</td>
<td>22.125</td>
</tr>
<tr>
<td><strong>VENTILATION UNIT</strong></td>
<td>2372</td>
<td>3.023</td>
</tr>
<tr>
<td></td>
<td>7925</td>
<td></td>
</tr>
</tbody>
</table>
**THE FRONT SECTION OF THE TURNTABLE**
- Height, mm – 1980
- Width, mm – 4500
- Length, mm – 7200
- Weight, t – 39

**MIDDLE SECTION OF THE TURNTABLE**
- Width, mm – 4500
- Height, mm – 1270
- Length, mm – 4780
- Weight, t – 18.2

**COUNTERWEIGHT HOUSING**
- Height, mm – 4315
- Width, mm – 9200
- Weight, t – 17.7

**GEAR WINCH**
- Height, mm – 2740
- Width, mm – 2400
- Length, mm – 4249
- Weight, t – 37.7

**COMPRESSOR STATION**
- Height, mm – 1996
- Width, mm – 790
- Length, mm – 1700
- Weight, t – 1.076

**CENTRAL PIVOT**
- Diameter, mm – 580
- Height, mm – 2733
- Weight, t – 4.81
Uralmashplant is one of the leading Russian machine-building plants. For more than 80 years Uralmashplant has been a key provider of basic machinery for mining, chemical, metallurgical, construction, oil-and-gas, and power engineering industries, since fundamental national industries have originated here, at the Ural heavy machine-building plant.

The trademark “UZTM” is well-known all over the world. The plant supplies its products to CIS countries, Western and Eastern Europe, Middle East, South and Southeastern Asia, Africa, North and Latin America. Uralmashplant has its own highly efficient design center. The plant comprises welding, machining and assembly, heat-treatment, and toolmaking facilities.

Uralmashplant offers complex solutions from technology development and engineering to supply, installation, and maintenance services. Uralmashplant offers to its customers highly-effective, reliable, low maintenance, energy-saving, and highly automated equipment designed with a glance to actual ecological requirements.

### MAIN PRODUCTS

**Mining equipment:**
- crawler-type excavators,
- walking and crawler-mounted draglines,
- jaw and cone crushers for all reduction stages,
- ball and rod mills, autogenous and semi-autogenous mills,
- crushing and screening plants for producing cubiform particles.

**Metallurgical equipment:**
- sintering equipment,
- indurating equipment,
- rolling mill rolls

**Lifting and handling equipment:**
- heavy metallurgical cranes,
- lifting equipment for nuclear power plants,
- general-purpose special and EOT cranes.

### CONTACTS

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