

CNS 120-..., 180-..., 240-... Centrifugal Multistage Pumps are manufactured in two modifications:

- with removable rotor bearing assemblies for lubrication of which it is necessary to supply oil (pump version "2");
- with built-in hard-alloyed bearings operating on pumping medium (pump version "3").

Pumps conform to the requirements of standard API 610.

Inner flowing part of pumps is made of:

- steel 20X13;
- steel 12X18H12M3T (modification "M").

Centrifugal Multistage Pumps are completed with seals:

- mechanical ones - "T";
- gland ones - "S".

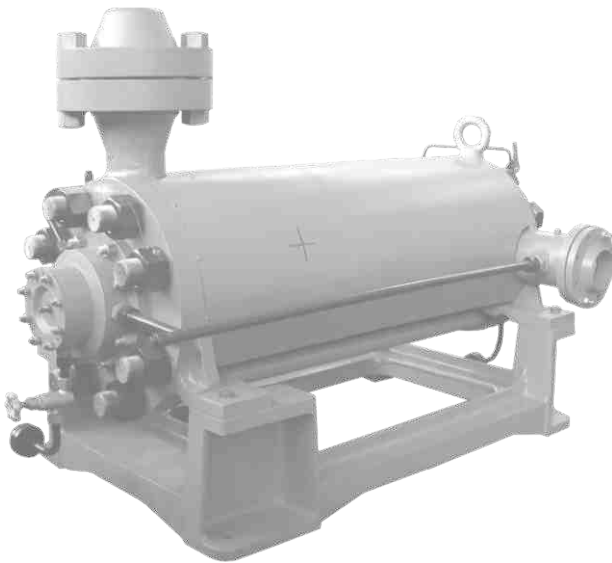


Centrifugal Multistage Pumps of CNS type pump version "2" are designed for pumping of pure water and oil field water without hydrogen sulfide into oil-bearing formations.

Pumps of version "2M" are designed for pumping of aggressive oil field water, including water containing hydrogen sulfide, into oil bearing formations.

Drive is performed by synchronous or asynchronous electric motors with power from 500 to 2000 kW.

Pumps are equipped with automatic system providing protection and alarm for critical parameters.



Pumps of CNS type pump version "3M" are designed for pumping of aggressive oil field water including water containing hydrogen sulfide into oil bearing formations.

Drive is performed by synchronous or asynchronous electric motors with power from 600 to 1600 kW.

Pumps are equipped with automatic system providing protection and alarm for critical parameters.

The example of designation for pump ordering

"Pump CNS 240-1900-2T TU U3Yu19-05747991-012-95",

where CNS - centrifugal multistage pump;
 240 - capacity, m³/hour;
 1900 - head, m;
 2 - serial number of modification;
 T - mechanical seal in pump design.

"Pump CNS 240-1900-2S-M TU 26-06-1438-85",

where CNS - centrifugal multistage pump (unit);
 240 - capacity, m³/hour;
 1900 - head, m;
 2 - serial number of modification;
 S - gland seal in pump design;
 M - pump for aggressive fluids.

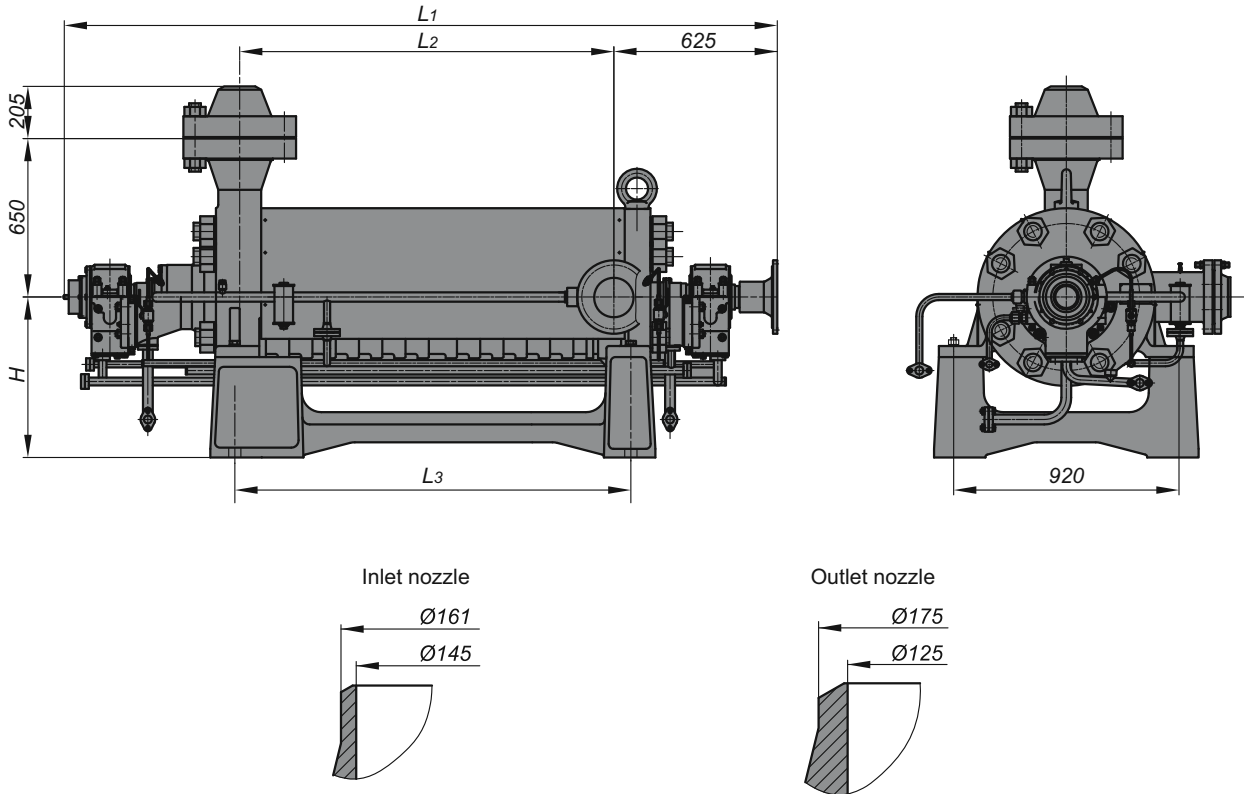
The Company improves the pumping equipment and equips pumping units with the motors of different manufactures. Thereby when ordering, please specify overall and mounting dimensions and required parameters according to the recommended form of Data Sheet.

Technical data

Designation	Specification	Temperature of pumped medium, °C	Rotational speed, s ⁻¹ (rpm)	Capacity, m ³ /hour	Head, m	Power, kW, not more	Inlet pressure, MPa(kg/cm ²)		Efficiency, %	NPSH, m, not more	External leakage through the seal, m ³ /hour, not more		Mechanical impurities content		Motor power, kW
							min	max			gland	end	per weight, %	per solid particles size, mm	
CNS 120-...-2...															
CNS 120-1900-2...	TU U3.19-	0 ... 45	50	120	1900	913	0.1	3.1	68	7	5·10 ⁻³	5·10 ⁻⁴	0.1	0.1 (0.2)*	500 ... 1250
CNS 120-1775-2...	05747991	(0 ... 80)*	(3000)		1775	853	(1.0)	(31.0)							
CNS 120-1650-2...	-012-95				1650	793									
CNS 120-1525-2...	(TU 26-06-				1525	733									
CNS 120-1422-2...	1438-85)*				1422	684									
CNS 120-1275-2...					1275	613									
CNS 120-1150-2...					1150	553									
CNS 120-1050-2...					1050	505									
CNS 180-...-2...															
CNS 180-1900-2...	TU U3.19-	0 ... 45	50	180	1900	1226	0.1	3.1	76	7	5·10 ⁻³	5·10 ⁻⁴	0.1	0.1 (0.2)*	800 ... 1600
CNS 180-1775-2...	05747991	(0 ... 80)*	(3000)		1775	1145	(1.0)	(31.0)							
CNS 180-1650-2...	-012-95				1650	1064									
CNS 180-1525-2...	(TU 26-06-				1525	984									
CNS 180-1422-2...	1438-85)*				1422	917									
CNS 180-1275-2...					1275	822									
CNS 180-1150-2...					1150	842									
CNS 180-1050-2...					1050	677									
CNS 240-...-2...															
CNS 240-1900-2...	TU U3.19-	0 ... 45	50	240	1900	1592	0.1	3.1	78	7	5·10 ⁻³	5·10 ⁻⁴	0.1	0.1 (0.2)*	1000 ... 2000
CNS 240-1775-2...	05747991	(0 ... 80)*	(3000)		1775	1487	(1.0)	(31.0)							
CNS 240-1650-2...	-012-95				1650	1383									
CNS 240-1525-2...	(TU 26-06-				1525	1278									
CNS 240-1422-2...	1438-85)*				1422	1192									
CNS 240-1275-2...					1275	1068									
CNS 240-1150-2...					1150	964									
CNS 240-1050-2...					1050	880									
CNS 120-...-3T-M															
CNS 120-1900-3T-M	TU 26-06-	0 ... 80	50	120	1900	913	0.1	3.1	68	7	-	5·10 ⁻⁴	0.1	0.2	600 ... 1250
CNS 120-1775-3T-M	1438-85		(3000)		1775	853	(1.0)	(31.0)							
CNS 120-1650-3T-M					1650	793									
CNS 120-1525-3T-M					1525	733									
CNS 120-1422-3T-M					1422	684									
CNS 120-1275-3T-M					1275	613									
CNS 120-1150-3T-M					1150	553									
CNS 120-1050-3T-M					1050	505									
CNS 180-...-3T-M															
CNS 180-1900-3T-M	TU 26-06-	0 ... 80	50	180	1900	1249	0.1	3.1	76	7	-	5·10 ⁻⁴	0.1	0.2	800 ... 1600
CNS 180-1422-3T-M	1438-85		(3000)		1422	929	(1.0)	(31.0)							
CNS 180-1050-3T-M					1050	686									
CNS 240-...-3T-M															
CNS 240-1900-3T-M	TU 26-06-	0 ... 80	50	240	1900	1552	0.1	3.1	78	7	-	5·10 ⁻⁴	0.1	0.2	1000 ... 2000
CNS 240-1750-3T-M	1438-85		(3000)		1750	1475	(1.0)	(31.0)							
CNS 240-1422-3T-M					1422	1192									
CNS 240-1050-3T-M					1050	880									

* values in brackets are shown for corrosion resistant version of pump ("M")

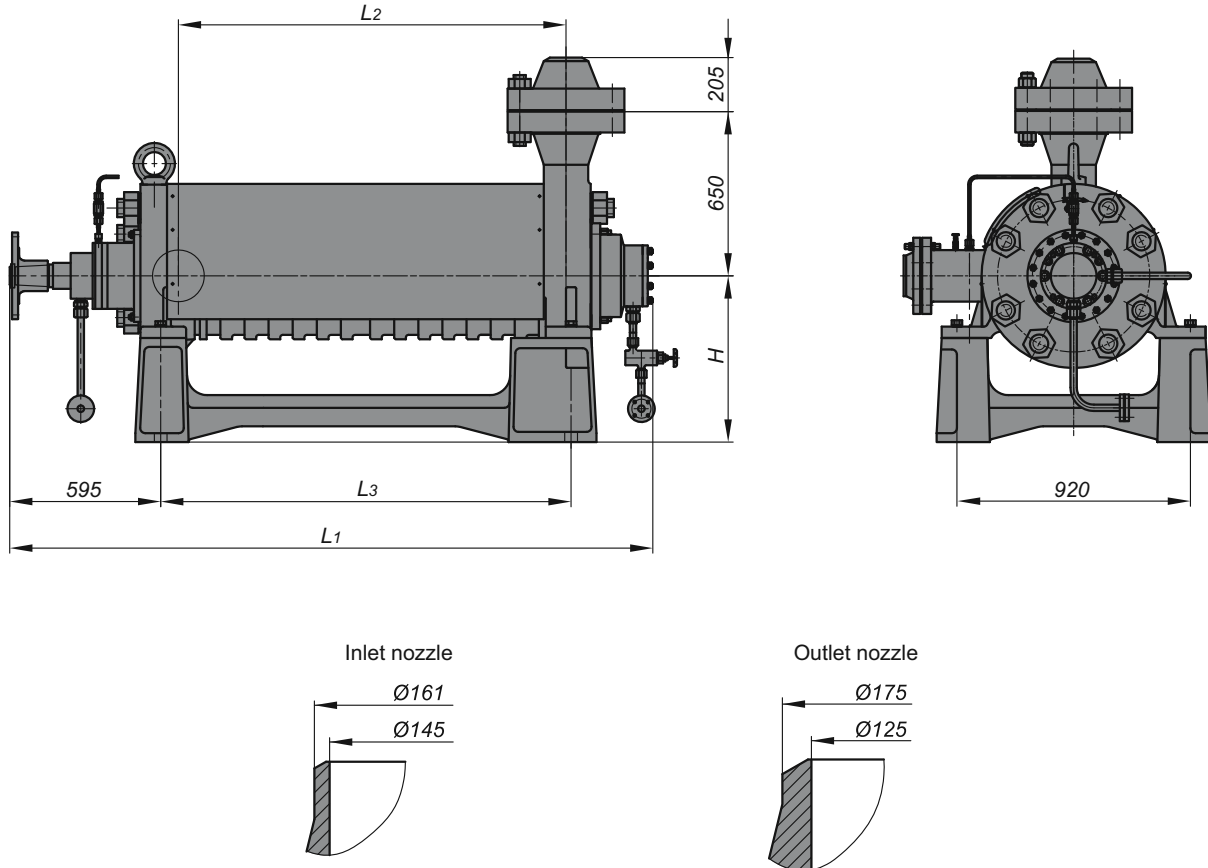
Dimensional drawing
of CNS 120-...-2-..., CNS 180-...-2-..., CNS 240-...-2-... pumps



Main dimensions (mm) and weight of pumps version "2"

Pump designation	Number of stages	L1	L2	L3	H	Pump weight, kg
CNS 120-...-2...						
CNS 120-1900-2...	15	2910	1567	1617	655	3800
CNS 120-1775-2...	14	2815	1472	1617	655	3630
CNS 120-1650-2...	13	2720	1377	1617	655	3450
CNS 120-1525-2...	12	2625	1282	1237	655	3280
CNS 120-1422-2...	11	2530	1187	1237	655	3100
CNS 120-1275-2...	10	2435	1092	1237	655	2900
CNS 120-1150-2...	9	2340	997	952	565	2700
CNS 120-1050-2...	8	2245	902	952	565	2500
CNS 180-...-2...						
CNS 180-1900-2...	15	2910	1567	1617	655	3790
CNS 180-1775-2...	14	2815	1472	1617	655	3680
CNS 180-1650-2...	13	2720	1377	1617	655	3550
CNS 180-1525-2...	12	2625	1282	1237	655	3410
CNS 180-1422-2...	11	2530	1187	1237	655	3150
CNS 180-1275-2...	10	2435	1092	1237	655	3030
CNS 180-1150-2...	9	2340	997	952	565	2900
CNS 180-1050-2...	8	2245	902	952	565	2690
CNS 240-...-2...						
CNS 240-1900-2...	15	2910	1567	1617	655	3810
CNS 240-1775-2...	14	2815	1472	1617	655	3690
CNS 240-1650-2...	13	2720	1377	1617	655	3570
CNS 240-1525-2...	12	2625	1282	1237	655	3420
CNS 240-1422-2...	11	2530	1187	1237	655	3170
CNS 240-1275-2...	10	2435	1092	1237	655	3050
CNS 240-1150-2...	9	2340	997	952	565	2910
CNS 240-1050-2...	8	2245	902	952	565	2700

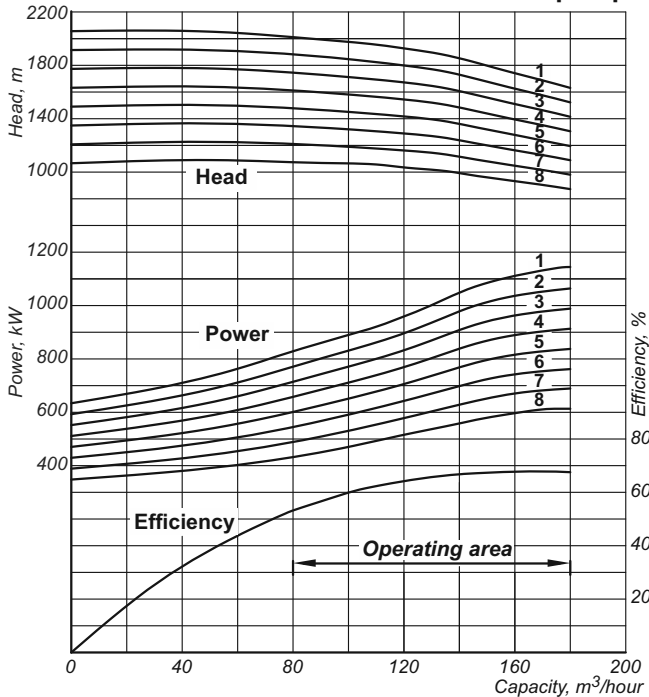
Dimensional drawing
of CNS 120-...-3M, CNS 180-...-3T, CNS 240-...-3T-M pumps



Main dimensions (mm) and weight of pumps version "3M"

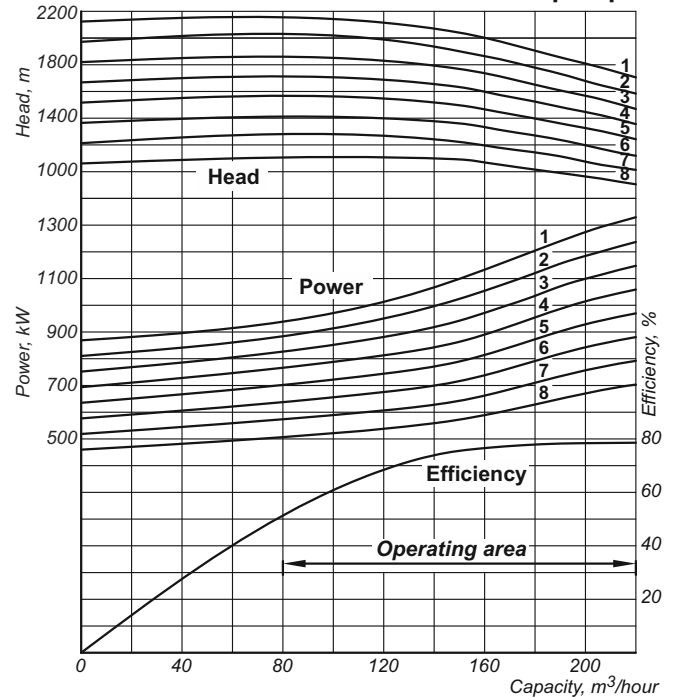
Pump designation	Number of stages	L1	L2	L3	H	Pump weight, kg
CNS 120-...-3T-M						
CNS 120-1900-3T-M	15	2530	1567	1617	655	3690
CNS 120-1775-3T-M	14	2435	1472	1617	655	3580
CNS 120-1650-3T-M	13	2340	1377	1617	655	3460
CNS 120-1525-3T-M	12	2245	1282	1237	655	3310
CNS 120-1422-3T-M	11	2150	1187	1237	655	3050
CNS 120-1275-3T-M	10	2055	1092	1237	655	2925
CNS 120-1150-3T-M	9	1960	997	952	565	2790
CNS 120-1050-3T-M	8	1865	902	952	565	2580
CNS 180-...-3T-M						
CNS 180-1900-3T-M	15	2530	1567	1617	655	3700
CNS 180-1422-3T-M	11	2150	1187	1237	655	2840
CNS 180-1050-3T-M	8	1865	902	952	565	2200
CNS 240-...-3T-M						
CNS 240-1900-3T-M	15	2530	1567	1617	655	3700
CNS 240-1750-3T-M	15	2530	1567	1617	655	3700
CNS 240-1650-3T-M	13	2340	1377	1617	655	3460
CNS 240-1050-31-M	8	1865	902	952	565	2200

Performances and curves of CNS 120-... pumps



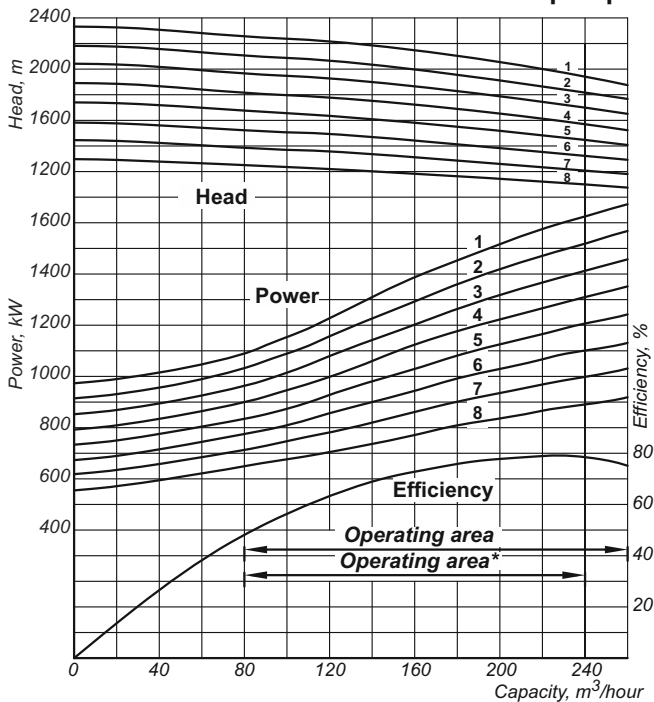
- | | |
|-----------------------------|-----------------------------|
| 1 - CNS 120-1900-... (i=15) | 5 - CNS 120-1422-... (i=11) |
| 2 - CNS 120-1775-... (i=14) | 6 - CNS 120-1275-... (i=10) |
| 3 - CNS 120-1650-... (i=13) | 7 - CNS 120-1150-... (i=9) |
| 4 - CNS 120-1525-... (i=12) | 8 - CNS 120-1050-... (i=8) |
- where *i* – number of pump stages

Performances and curves of CNS 180-... pumps



- | | |
|-----------------------------|-----------------------------|
| 1 - CNS 180-1900-... (i=15) | 5 - CNS 180-1422-... (i=11) |
| 2 - CNS 180-1775-... (i=14) | 6 - CNS 180-1275-... (i=10) |
| 3 - CNS 180-1650-... (i=13) | 7 - CNS 180-1150-... (i=9) |
| 4 - CNS 180-1525-... (i=12) | 8 - CNS 180-1050-... (i=8) |
- where *i* – number of pump stages

Performances and curves of CNS 240-... pumps



- * For pumps CNS 240-1900 with electric motor power N=1600kW
- | | |
|-----------------------------|-----------------------------|
| 1 - CNS 240-1900-... (i=15) | 5 - CNS 240-1422-... (i=11) |
| 2 - CNS 240-1775-... (i=14) | 6 - CNS 240-1275-... (i=10) |
| 3 - CNS 240-1650-... (i=13) | 7 - CNS 240-1150-... (i=9) |
| 4 - CNS 240-1525-... (i=12) | 8 - CNS 240-1050-... (i=8) |
- where *i* – number of pump stages

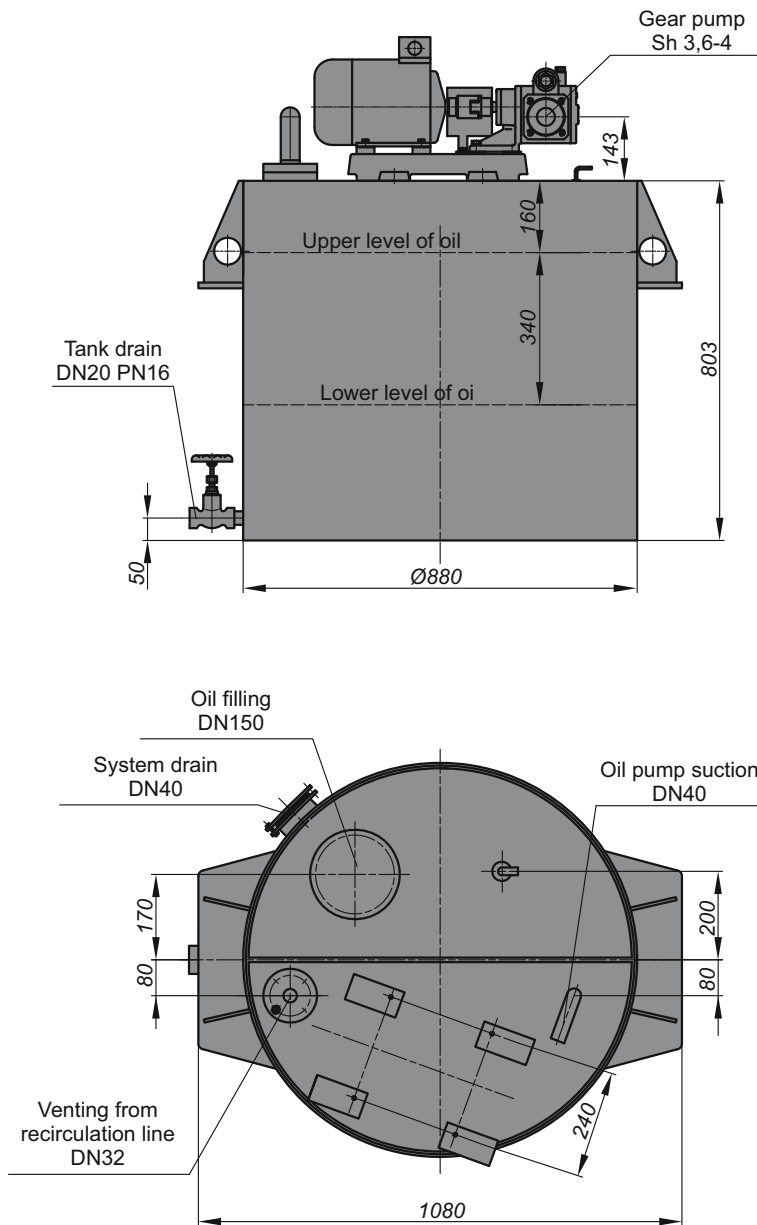
Directions and results of modernization

1. Improvement of pump rotor bundle for the purpose of gain in economic efficiency, expansion of operating head area, reduction of pump vibration activity.
2. Application of mechanical seals, conforming to API 682 requirements, with introduction of flushing system for products of erosion, corrosion and other suspended particles, or gland seals made of up-to-date packing material "Graphlex".
3. Application of flexible plate coupling instead of gear-type coupling intended for reduction of vibration activity, reduction of axial motor rotor displacement, reduction of fire hazard due to non-availability of oil for lubrication, etc.
4. Gain in life of interstage impellers seals.
5. Installation of axial displacement meter for providing the pump protection against drastic destruction in case of axial rotor displacement due to wear of parts and hydraulic discharging device.
6. Optimization of hydraulic discharging device design intended for reliability improvement and achievement of acceptable leakage level through it.
7. Introduction of protection against overflows in the area of impeller seating on the shaft to prevent the washing of the latter or collection of products of erosion, corrosion and other suspended particles in this area.
8. Improved maintainability, reduced repair cycles, increased time between overhauls.

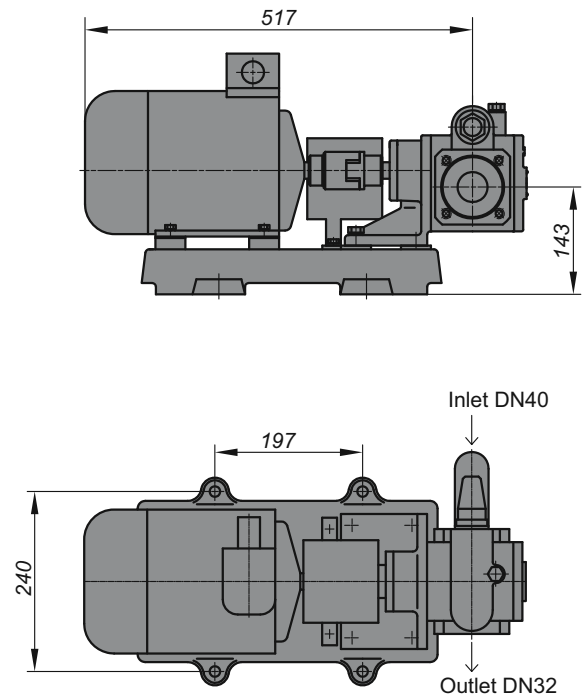
CNS 120-, 180-, 240- Centrifugal Multistage Pumps Lube System

Lube system to pump CNS, comprising of oil cooler and oil tank BM-0.32, together with motor-pump and gear pump unit, is intended for providing the lubrication delivery to CNS pump bearings.

Oil tank BM-0,32



Gear pump Sh 3,6-4

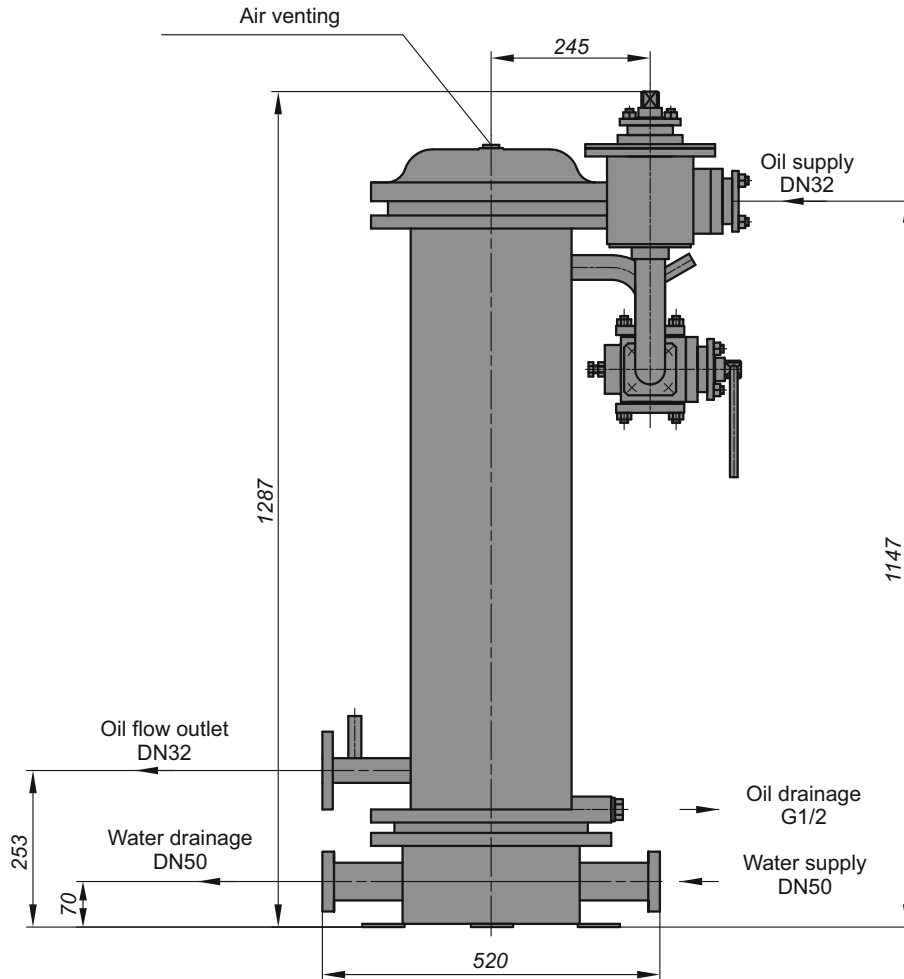


Capacity, m ³ /hour	3.6
Pump pressure, kgf/cm ²	4
Pump power, kW	1.1
Rotational speed, rpm (s ⁻¹)	1450 (24)
Allowable vacuum gage suction lift, m	5

Materials of main parts: C4 20, steel 20, 35, 38XMOA, bronze Бр.05Ц5С5

Tank volume, m ³	minimum	0.32
	maximum	0.36
Материал основных деталей:	carbon steel, steel 20K	

Oil cooler



Material of main parts: steel 20

AES is intended for unit control according to algorithm selected, for monitoring of its parameters, protection against emergency operation conditions and providing an operator with information on parameters status and operation modes.

AES may be applied for control of pump units of analogous types, used for maintaining reservoir pressure in oil production wells as a part of cluster pump stations.

AES adaptation to type of equipment controlled is behind the software and is implemented on site from the operator panel.

AES is able to ensure the control functions performance from upper level system, without permanent control by operating personnel.

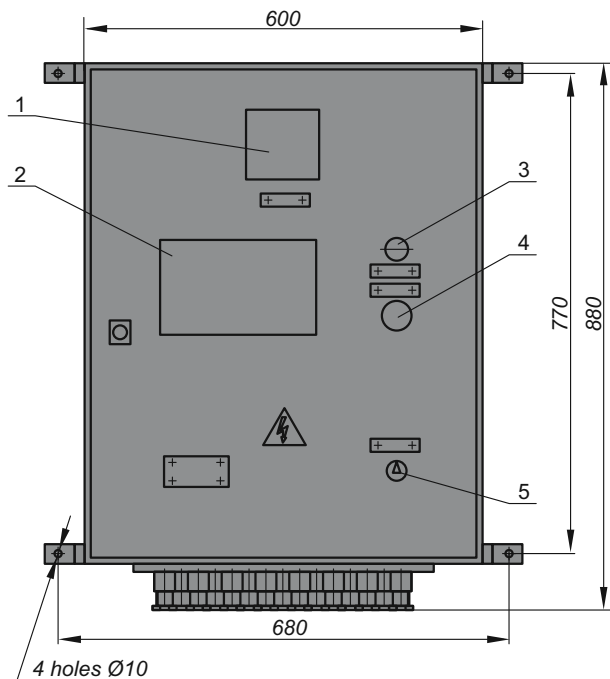
With regard to stability to the effects of environmental temperature and humidity the AES version corresponds to Group D4 as per GOST 12997-84 (operating temperature under service is ranging from 5 to 50°C and upper value of relative humidity is 85% at 35°C).

With regard to stability to effects of sinusoidal vibrations the AES corresponds to Group L1 as per GOST 12997-84.

AES is designed for service outside the explosion- hazardous premises.

Regarding protection against environmental effects the AES corresponds to protection class IP54 as per GOST 14254-80.

Protection and control board



- 1 - Ammeter
- 2 - Operator panel
- 3 - Voltage supply lamp
- 4 - Emergency shutdown button
- 5 - Line circuit breaker

AES receives the following inputs:

- analogous inputs of resistance temperature detectors of TSM type - 16 pcs.
- discrete (two-position) inputs of direct current
 - Level of logic "0", V - 0.5
 - Level of logic "1", V - 19 ... 30

AES delivers the following outputs:

- discrete outputs, 1A, 220 V - 8 pcs.
- discrete outputs, 25A, 380 V, 50Hz (3-phase) - 3 pcs.

AES has a radial serial interface available and ensures data exchange in standard industrial networks (Unitel-Way, FipWay, AS-1, Fipio, Sacva-date, etc.)

Minimum allowable electric resistance of AES circuits isolation regarding casing and between each other shall be, at least, 10 MOm.

Technical Data

AES power supply is three-phase AC voltage 380 V, frequency 50 Hz. Electronic components and units power supply is one-phase voltage 380 V, frequency 50 Hz.

Overall dimensions, mm, not more:

- control board - 800x600x350
- gage post - 154x650x360

Weight, kg, not more:

- control board - 52.76
- gage post - 24.7

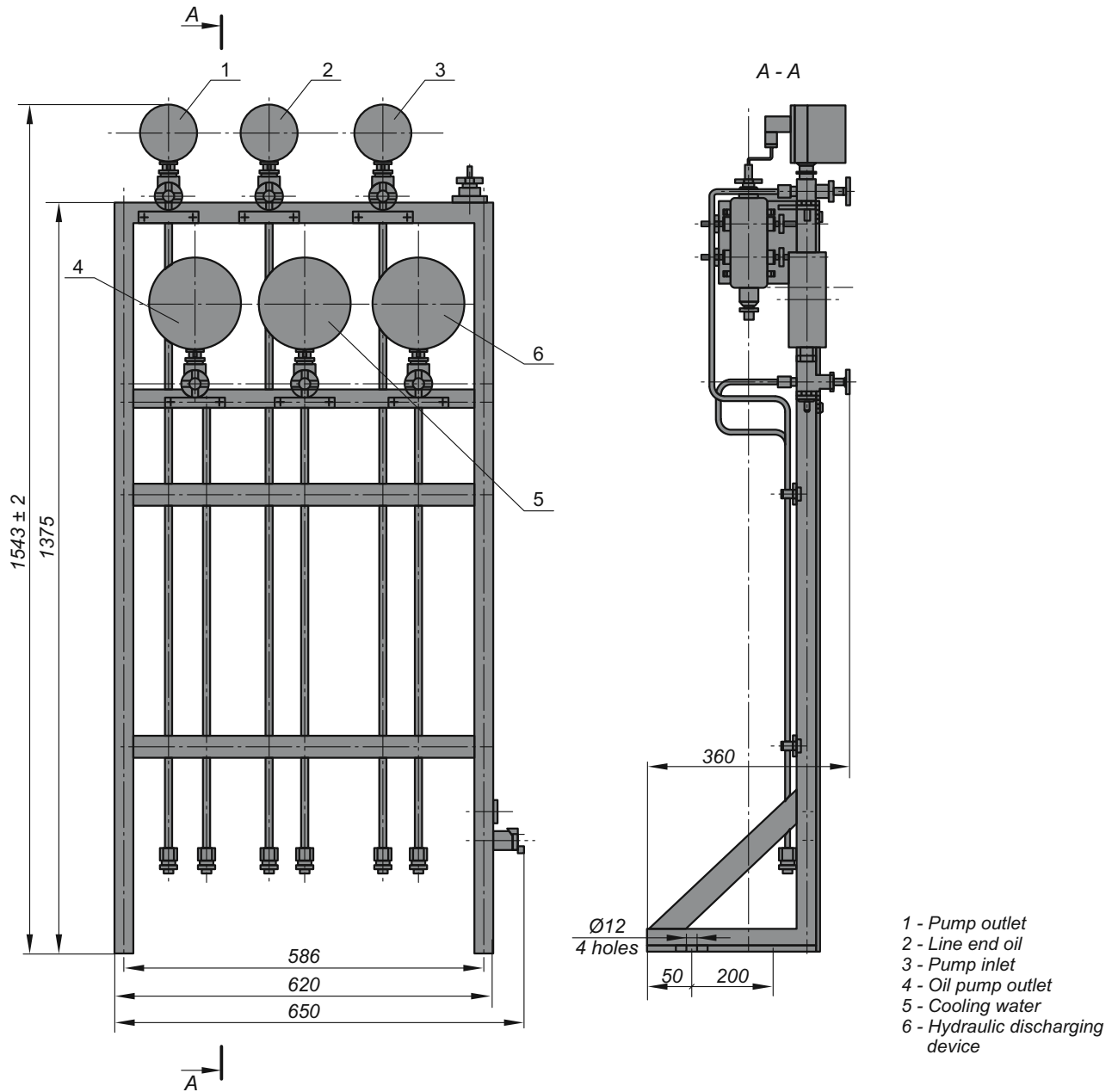
Power consumption of control circuits at rated

voltage of supply dc mains, kW, not more - 0.1

Product components:

- Protection and control board;
- Gage post;
- Junction box;
- Head-switch sensor DN-2.5 with terminal block;
- Stop-Start Console PKE 722-2 UKhL 1/2" Spec. TU 16-642.006-83;
- 2 Resistance temperature detectors TSM -1388.5 C2.822.034-6 Spec. TU 25-7363.032-89;
- 2 Resistance temperature detectors TSM -1088.5 C2.822.026 Spec. TU 25-7363.032-89.

Gage post



AES provides the following functions:

- Unit control in such operation modes as:
 - manual;
 - automatic;
 - remote.
- Delivery of audible and light warning and emergency alarms, at achieving set values of parameters with indication of description, time of entering and time of acknowledgement with further storing in alarm history files. Period of file information storing is unlimited.
- Delivery of audible and light alarms under malfunction of mechanisms with indication of its description.
- Emergency shutdown of pump unit under all operation conditions.
- Viewing of current parameters values.
- Delivery of information on operational progress of preparation to startup, operation, shutdown of pump unit.
- Status indication of acting mechanisms.
- Constant measurement of motor current by indicating pointer-type instrument.
- Timing of pump unit operation .
- Representation of information on status and malfunctions of controller modules.
- Power supply control of power circuits and control wiring circuits.