

PRODUCT CATALOGUE



About company

JSC «NGT» is one of the leading engineering companies in the development of hydraulic downhole motors (HDM) equipment for bottom assembly, and production equipment. Main directions of the company's activity are:

- ✓ Positive Displacement Motors (PDMs);
- ✓ Turbodrills;
- Bearing sections for PDMs and turbodrills;
- ✓ Components for PDMs and turbodrills;
- ✓ Hydraulic jars;
- ✓ Float and dump valves;
- ✓ Circulating subs;
- ✓ Stabilizers;
- ✓ Single string selective production equipment for multi–level hydrocarbon deposit in one well;

We do:

- ✓ Design;
- ✓ Production of prototypes;
- ✓ Stand and field tests;
- ✓ Continuous improvement of design;
- ✓ Commercial production;
- ✓ Complete service.

The company has all necessary certificates of conformance of technical regulations for designing, producing and exploiting drilling equipment on the territory of Eurasian Union:

– Certificate of Conformance TC RU C–RU.AЛ16.B.16859, series RU, number 0465743 "Geology–prospecting drilling equipment: hydraulic downhole motors of NGT trade mark, models D, DO, DR, T, TB, TBS"

JSC NGT has its own certified nondestructive testing lab (NTL) which is an independent structural department of the company and is periodically certified on compliance with United Conformity System requirements in the sphere of industrial, environmental safety, safety in energy and construction regarding equipment for oil and gas industry. Our NTL is certified as per the clauses 6.1, 6.2, 6.3 of United Conformity System and is dealing with testing of drilling equipment and tools for drilling oil and gas wells in the course of their production and run.



Certificates and Licenses









Positive Displacement Motors (PDMs)

In the early 60's the idea of creation of PDM basing on multilobe screw gerotor mechanism was first born at the Perm Branch of VNIIBT. In 1966 the idea was patented. Further work was provided in cooperation with VNIIBT. The Perm Branch of VNIIBT produced the first 42 mm dia. PDM model, followed by 172 mm dia. prototype of 9/10 power section lobe configuration which was successfully field tested. Later, all standard size PDM's within the range of 42–240 mm were developed and produced.

The new Russian design was recognized worldover.

In the early 1980's the production licenses were sold to Drilex company. In the early 1990's the term of the licenses sold expired and currently there are more than 30 companies dealing with the production of PDM multilobe power sections all over the world.

Since then, within 47 years PDMs have passed evolutionary trend of development becoming one of the most efficient tools for bit drive while drilling wells of all types. High torque PDC bits featuring enhanced operation life have set up new demands to the power section characteristics. Recently the leading manufacturers have managed to increase the torque and life significantly due to the power section length increasing. Thus, the power section life at that time highly exceeded PDM bearing section overhaul life.

Our company has developed high capacity reliable bearing sections featuring enhanced life and the longest overhaul period of PDMs among Russian producers.

The special attention of the company is paid to trouble–free run of PDMs produced. Each motor is equipped with two emergency devices:

- the emergency device on the bearing section shaft doesn't allow losing the bit in the hole in case of the shaft break in its thin section;
- the top sub (safety sub) has the catcher tool to pull out PDM parts using the rotor in case of housing breaks or thread unscrewing.

This catalogue presents our most popular PDMs among our customers.







28 PDM's performance in the Kazakhstan Republic

27 positive displacement motors of 178 mm diameter (bearing sections S–178.NGT.M15, power sections of different lobe configuration) and 1 positive displacement motor DR–210.NGT.7/8.M1 were delivered to one of our Kazakhstan partners in 2011. These motors run within a period of 2011 – 2013. According to the agreement of our partner with the general customer, our motors run till critical leeway of bearing section shaft or till other reasons to stop PDM running occurred, not limited to the usual limits set by the general customer as «50% of the guaranteed resource», «80 hours», and other similar requirements. Thus, all revisions and repairs of these motors were done exclusively in the service center of our company in Perm, meaning done in proper manner and using original spare parts. Above stated circumstances allowed getting reliable statistical information on resource operating life (till critical leeway occurance) of NGT motors which made up 281 hours averagely, but also 300–400 hours in some cases. It stands to mention that there wasn't any case of NGT motor tentative rejecting or failure (event beyond guaranteed operating period of 180 hours). We think that operating hours stated in the table below are great performance indicator of our equipment.

PDM model,	Cumulative operating time, hour	Quantity of repairs, pcs	Overhaul p	eriod, hour
Serial number			By PDM	Average
DR-178.NGT.5/6.M15, # 339	323,0	1	323,0	
D-178.NGT.4/5.M15, # 343	434,0	2	217,0	
D-178.NGT.4/5.M15, # 344	508,0	2	254,0	
DR-178.NGT.5/6.M15, # 345	455,0	2	227,5	
D-178.NGT.4/5.M15, # 347	439,0	2	219,5	
DR-178.NGT.4/5.M15, # 371	371,0	1	371,0	
DR-178.NGT.4/5.M15, # 372	1045,0	4	261,3	
DR-178.NGT.4/5.M15, # 373	261,0	1	261,0	
DR-178.NGT.4/5.M15, # 374	607,0	2	303,5	
DR-178.NGT.4/5.M15, # 375	776,0	3	258,7	
DR-178.NGT.4/5.M15, # 379	543,0	2	271,5	
DR-178.NGT.4/5.M15, #387	582,0	2	291,0	
DR-178.NGT.4/5.M15, #388	498,0	2	249,0	
DR-178.NGT.4/5.M15, # 389	588,0	2	294,0	2910
DR-178.NGT.4/5.M15, # 390	629,0	2	314,5	201,0
DR-178.NGT.4/5.M15, # 391	284,0	1	284,0	
DR-178.NGT.4/5.M15, # 392	580,0	2	290,0	
DR-178.NGT.3/4.M15, # 398	525,0	2	262,5	
DR-178.NGT.4/5.M15, # 411	298,0	1	298,0	
DR-178.NGT.4/5.M15, # 412	273,0	1	273,0	
DR-178.NGT.4/5.M15, # 414	264,0	1	264,0	
DR-178.NGT.4/5.M15, # 415	369,0	1	369,0	
DR-178.NGT.4/5.M15, # 416	286,0	1	286,0	
DR-178.NGT.4/5.M15, # 417	384,0	1	384,0	
DR-178.NGT.4/5.M15, # 418	395,0	1	395,0	
DR-178.NGT.4/5.M15, # 425	406,0	1	406,0	
DR-178.NGT.4/5.M15, # 426	328,0	1	328,0	
DR-210NGT.7/8.M1, # 31	196,0	1	196,0	



Designation of Positive Displacement Motors

JSC «NGT» company offers a wide range of PDM's for drilling to customers. For convenience of the catalogue use, please, see below the PDM designation description:



PDM's presented in the catalogue:

2D0-43.NGT.5/6.3.M1 DO-55.NGT.7/8.15.M1 D-76.NGT.4/5.20.M1 DO-76.NGT.4/5.20.M1 DR-76.NGT.4/5.20.M2 DR-88.NGT.5/6.20.M1 DR-88.NGT.5/6.24.M1 DR-88.NGT.7/8.27.M1 DR-95.NGT.7/8.40.M2 DR-106/95.NGT.7/8.40.M4 DR-106.NGT.7/8.30.M1 DR-106.NGT.7/8.30.M3 DR-120.NGT.7/8.44.M2 DR-120.NGT.7/8.59.M2 DR-127/120.NGT.7/8.44.M2 DR-127/120.NGT.7/8.59.M2 DR-165.NGT.7/8.58.M1 DR-178.NGT.7/8.52.M15 DR-178.NGT.7/8.55.M15 DR-178.NGT.7/8.63.M15 DR-178.NGT.7/8.52.M23 DR-178.NGT.7/8.55.M23 DR-178.NGT.7/8.63.M23 DR-178.NGT.7/8.52.M26 DR-178.NGT.7/8.63.M26 DR-195.NGT.7/8.63.M26 DR-195.NGT.5/6.43.M1 DR-240.NGT.3/4.62.M1 DR-240.NGT.5/6.61.M1



Safety

sub

2D0-43.NGT.5/6.3.M1

PDM 2D0-43.NGT.5/6.3.M2 is a two-section hydraulic downhole motor used for:

- Sidetracking when constructing multihole wells using radial drilling with 58,0–60,0 mm bits.
- Well workover operations.

PDMs distinctive features are its two bend points. Two fixed bend subs are installed between the bearing section and two power sections. Each sub has 5° bend settings.

Bearing section has axial multi-row rolling bearing and radial bearings with integrated hard alloy plates, and also two-point driveshafts.

Due to double bends and very short distance between them the PDM allows drilling wells from diameter of 7 m.

Technical specification of PDM

Housing OD, mm	43/47
Power section lobe configuration	5/6
PDM length, mm	1 897
Length of top stator active part, mm	343
Length of bottom stator active part, mm	312
Length of bearing section up to a curvature point, mm	393
Length of bearing section up to the second curvature point, mm	1 191
Diameter of bits used, mm	58–60
Connecting thread to drill pipes	NC 12
Connecting thread to bits	NC 12
Maximum density of drilling mud, g/cm ³	1,25
Allowed axial load, kN	3,0
Weight, kg	16

Power specification of PDM

0,8–1,6
435-870
0,037
4,6
3,0

1897 mm

<u>5</u>°





DO-55.NGT.7/8.15.M1

PDM DO-55.NGT.7/8.15.M1 is a hydraulic downhole motor used for:

- Milling up a casing window,

– Sidetracking when constructing multihole wells using radial drilling with 68,0-76,0 mm bits;

- Well workover operations.

A fixed bend sub with 5° bend settings is installed between bearing section and power section.

Bearing section has axial multi-row rolling bearing and radial bearings with integrated hard alloy plates, and also two-point driveshaft.

All threads are screwed with glue, and each motor is completed with safety sub.

Technical specification of PDM

Housing OD, mm		55
Power section lobe configuration		7/8
PDM length, mm		2 738
Length of stator active part, mm		1 525
Length of bearing section up to a curvature point, mm		700
Diameter of bits used, mm		68,0–76,0
Connecting thread to drill pipes		3–42
Connecting thread to bits		NC 12
Maximum density of drilling mud, g/cm^3		1,25
Allowed axial load, kN		10
Weight, kg		41

Power specification of PDM

Working fluid flow rate, l/s	3,0–5,0
Output shaft rotation speed:	
– in no–load conditions, RPM	351-585
Torque at maximum power, kN*m	0,314
Pressure drop:	
– at maximum power, Mpa	4,5
Power, kW	14,0



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<u>5°</u>

Safety

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D-76.NGT.4/5.20.M1

PDM D-76.NGT.4/5.20.M1 is a hydraulic downhole motor used for:

- drilling of oil and gas wells with 83,0-98,4 mm bits,
- well workover operations with rock bits, PDC bits, including bicentric ones.

Bearing section has axial multi-row rolling bearing and radial bearings with integrated hard alloy plates, and also two-point driveshaft. All the threads are screwed with glue, and each motor is completed with a safety sub.

A large volume of work can be done with one motor (it is especially important for hard-to-reach regions) as the overhaul life reaches approximately 200 hrs.

Technical specification of PDM

Housing OD, mm	76
Power section lobe configuration	4/5
PDM length, mm	3 565
Length of stator active part, mm	2 000
Length of bearing section up to a curvature point, mm	-
Diameter of bits used, mm 83,0–98	
Connecting thread to drill pipes	23/8 Reg
Connecting thread to bits	2 3/8 Reg
Maximum density of drilling mud, g/cm ³	1,6
Allowed axial load, kN	25
Weight, kg	94

Power specification of PDM

Working fluid flow rate, l/s	3–5	
Output shaft rotation speed:		
– in no–load conditions, RPM	240-396	
Torque at maximum power, kN*m	0,6–0,8	
Pressure drop:		
– at maximum power, MPa	8–10	
Power, kW	11–25	

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DO-76.NGT.4/5.20.M1

PDM D0-76.NGT.4/5.20.M1 is a hydraulic downhole motor used for:

- drilling of oil and gas wells with 83,0–98,4 mm bits,
- well reconstruction by sidetracking with rock bits, PDC bits, including bicentric ones;
- well workover operations.

A fixed bend sub is placed between bearing section and power section.

Bearing section has axial multi-row rolling bearing and radial bearings with integrated hard alloy plates, and also two-point driveshaft. All threads are screwed with glue, and each motor is completed with safety sub. Due to a very short shoulder up to the point of axes misalignment (only 810 mm) drillers can:

- perform tripping without significant pressing of a bit to internal walls in the production string;
- perform sidetracking of complex profile where it is required to alternate deviated intervals of more than $5^{\circ}/10$ m built rate and stabilization intervals with rotation of a drill string without the assembly tripping-out to replace the bend angle.
- minimize risk of leaving the motor parts in the well, as all the threads are screwed with glue, and each motor is complete with safety sub.
- do a large volume of work with one motor (it is especially important for hard-to-reach regions) as the overhaul life reaches approximately 200 hrs.

Technical specification of PDM

Housing OD, mm	76/79
Power section lobe configuration	4/5
PDM length, mm 3565	
Length of stator active part, mm	2 000
Length of bearing section up to a curvature point, mm	810
Diameter of bits used, mm	83,0-98,4
Connecting thread to drill pipes	2 3/8 Reg
Connecting thread to bits	2 3/8 Reg
Maximum density of drilling mud, g/cm ³	1,6
Allowed axial load, kN	25
Weight, kg 94	

Power specification of PDM

Working fluid flow rate, l/s	3–5	
Output shaft rotation speed:		
– in no–load conditions, RPM	240-396	
Torque at maximum power, kN*m 0,6–0,8		
Pressure drop:		
– at maximum power, MPa	8–10	
Power, kW	11–25	



Ø76 8

Ø76





Ø80

855 mm

Ø80

Ø76 8

DR-76.NGT.4/5.20.M2

PDM DR-76.NGT.4/5.20.M2 is a universal hydraulic downhole motor used for:

- drilling of oil and gas wells with 83,0–98,4 mm bits,
- well reconstruction by sidetracking with rock bits, PDC bits, including bicentric ones;
- well workover operations.

Angle adjustment unit is placed between bearing section and power section. The adjustment range is between 0° and 2° or between 0° and З°.

Bearing section has axial multi-row rolling bearing and radial bearings with integrated hard alloy plates, and also two-point driveshaft. Due to a very short shoulder up to the point of axes misalignment (only 855 mm) drillers can:

- perform tripping without significant pressing of a bit to internal walls in the production string;
- perform sidetracking of complex profile where it is required to alternate deviated intervals of more than $5^{\circ}/10$ m built rate and stabilization intervals with rotation of a drill string without the assembly tripping-out to replace the bend angle;
- minimize risk of leaving the motor parts in the well, as all the threads are screwed withiglue, and each motor is complete with safety sub;
- do a large volume of work with one motor (it is especially important hard-to-reach regions) as the overhaul life reaches for approximately 200 hrs.

Technical specification of PDM

Housing OD, mm	76/80	
Power section lobe configuration	4/5	
PDM length, mm	3 646	
Length of stator active part, mm	2 000	
Length of bearing section up to a curvature point, mm	855	
Diameter of bits used, mm 83,0–98,4		
Connecting thread to drill pipes	2 3/8 Reg	
Connecting thread to bits	2 3/8 Reg	
Maximum density of drilling mud, g/cm ³	1,6	
Allowed axial load, kN	45	
Weight, kg	97	

Power specification of PDM

Working fluid flow rate, l/s	3–5	
Output shaft rotation speed:		
– in no–load conditions, RPM	240-396	
Torque at maximum power, kN*m	0,6–0,8	
Pressure drop:		
– at maximum power, MPa	8–10	
Power, kW	11–25	

646 mm ന

R43,5

0°-2° 0°-3°



DR-88.NGT.5/6.20.M1 and DR-88.NGT.5/6.24.M1



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025 mm

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⊗80 ₽,

PDMs DR-88.NGT.5/6.20.M1 and DR-88.NGT.5/6.24.M1 are universal hydraulic downhole motors used for:

- drilling of oil and gas wells with 98.4 – 120.6 mm bits,

- well reconstruction by sidetracking with rock bits, PDC bits,
- including bicentric ones;
- well workover operations.

Angle adjustment unit is placed between bearing section and power section. The adjustment range is between 0° and 2° or between 0° and 3°.

Bearing section has axial multi-row rolling bearing and radial bearings with integrated hard alloy plates, and also two-point driveshaft. Due to a very short shoulder up to the point of axes misalignment (only 1025 mm) drillers can:

- perform tripping without significant pressing of a bit to internal walls in the production string;
- perform sidetracking of complex profile where it is required to alternate deviated intervals of more than $5^{\circ}/10$ m built rate and stabilization intervals with rotation of a drill string without the assembly tripping-out to replace the bend angle;
- minimize risk of leaving the motor parts in the well, as all the threads are screwed with glue, and each motor is complete with safety sub;
- do a large volume of work with one motor (it is especially important for hard-to-reach regions) as the overhaul life reaches approximately 200 hrs.

Technical specification of PDM

PDM model	DR-88.NGT. 5/6.20.M1	DR-88.NGT. 5/6.24.M1
Housing OD, mm	88	88/89
Power section lobe configuration	5/6	5/6
PDM length, mm	3 845	4 245
Length of stator active part, mm	2 000	2 400
Length of bearing section up to a curvature point, mm	1 025	1 025
Diameter of bits used, mm	98,4–120,6	98,4–120,6
Connecting thread to drill pipes	2 3/8 Reg	2 3/8 Reg
Connecting thread to bits	2 3/8 Reg	2 3/8 Reg
Maximum density of drilling mud, g/cm ³	1,6	1,6
Allowed axial load, kN	50	50
Weight, kg	137	151

Power specification of PDM

Working fluid flow rate, l/s	5–7	4,3–12,8
Output shaft rotation speed:		
– in no–load conditions, RPM	270-400	108-325
Torque at maximum power, kN*m	1,1–1,3	1,53
Pressure drop:		
– at maximum power, MPa	10–13	4,5
Power, kW	27–43	47

R49

0°-2° 0°-3°

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581 mm

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DR-88.NGT.7/8.27.M1

PDM DR-88.NGT.7/8.27.M1 is a universal hydraulic downhole motor used for:

- drilling of oil and gas wells with 98.4 120.6 mm bits,
- well reconstruction by sidetracking with rock bits, PDC bits, including bicentric ones;
- well workover operations.

Angle adjustment unit is placed between bearing section and power section. The adjustment range is between 0° and 2° or between 0° and 3°

Bearing section has axial multi-row rolling bearing and radial bearings with integrated hard alloy plates, and also two-point driveshaft. Due to a very short shoulder up to the point of axes misalignment (only 1025 mm) drillers can:

- perform tripping without significant pressing of a bit to internal walls in the production string;
- perform sidetracking of complex profile where it is required to alternate deviated intervals of more than 5°/10 m built rate and stabilization intervals with rotation of a drill string without the assembly tripping-out to replace the bend angle.
- minimize risk of leaving the motor parts in the well, as all the threads are screwed with glue, and each motor is complete with safety sub.
- do a large volume of work with one motor (it is especially important for hard-to-reach regions) as the overhaul life reaches approximately 200 hrs.

Technical specification of PDM

Housing OD, mm	88/89		
Power section lobe configuration	7/8		
PDM length, mm	4 581		
Length of stator active part, mm	2736		
Length of bearing section up to a curvature point, mm	1 025		
Diameter of bits used, mm	98,4–120,6		
Connecting thread to drill pipes	2 3/8 Reg		
Connecting thread to bits	2 3/8 Reg		
Maximum density of drilling mud, g/cm ³	1,6		
Allowed axial load, kN	50		
Weight, kg	162		

Power specification of PDM

Working fluid flow rate, l/s	2,8-8,2		
Output shaft rotation speed:			
– in no–load conditions, RPM	74–215		
Torque at maximum power, kN*m	1,34		
Pressure drop:			
– at maximum power, MPa	4,3		
Power, kW	28		





DR-95.NGT.7/8.40.M2

PDM DR-95.NGT.7/8.40.M2 is a universal hydraulic downhole motor used for:

- drilling of oil and gas wells with 112 132 mm bits,
- well reconstruction by sidetracking with rock bits, PDC bits, including bicentric ones;
- well workover operations.

Angle adjustment unit is placed between bearing section and power section. The adjustment range is between 0° and 2° or between 0° and 3° .

Bearing section has axial multi-row rolling bearing and radial bearings with integrated hard alloy plates, and also two-point driveshaft. Due to a very short shoulder up to the point of axes misalignment (only 1139 mm) drillers can:

- perform tripping without significant pressing of a bit to internal walls in the production string;
- perform sidetracking of complex profile where it is required to alternate deviated intervals of more than $5^{\circ}/10$ m built rate and stabilization intervals with rotation of a drill string without the assembly tripping-out to replace the bend angle.
- minimize risk of leaving the motor parts in the well, as all the threads are screwed with glue, and each motor is completed with safety sub.
- do a large volume of work with one motor (it is especially important for hard-to-reach regions) as the overhaul life reaches approximately 200 hrs.

Housing OD, mm	95/98	
Power section lobe configuration	7/8	
PDM length, mm	6 1 4 5	
Length of stator active part, mm	4 000	
Length of bearing section up to a curvature point, mm	1 139	
Diameter of bits used, mm	112–132	
Connecting thread to drill pipes	NC 31	
Connecting thread to bits	2 7/8 Reg	
Maximum density of drilling mud, g/cm ³	1,6	
Allowed axial load, kN	65	
Weight, kg	260	

Technical specification of PDM

Power specification of PDM

Working fluid flow rate, l/s	5–10		
Output shaft rotation speed:			
– in no–load conditions, RPM	105-210		
Torque at maximum power, kN*m	3,2		
Pressure drop:			
– at maximum power, MPa	10,7		
Power, kW	60		

Safety sub





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Safety

sub

DR-106/95.NGT.7/8.40.M4

PDM DR-106/95.NGT.7/8.40.M4 is a «hybrid» hydraulic downhole motor combining power characteristic of a power section of 95 mm size and mechanical load capacity and reliability of a bearing section of 106 mm size. This allows resolving specific technological tasks, for example, implementing maximum power capacity of a power section of a smaller size under the circumstances of the lack of equipment hydraulic power, or enhance mechanical reliability of PDM, using more powerful bearing section with other power sections at hand.

- This motor is designed for:
- drilling of oil and gas wells with 120,6 149,2 mm bits;

- well reconstruction by sidetracking with rock bits, PDC bits, including bicentric ones;

- well workover operations.

Angle adjustment unit is placed between bearing section and power section. The adjustment range is between 0° and 2° or between 0° and 3° .

6 430 mm

Ø95

Technical specification of PDM

Housing OD, mm	95–112	
Power section lobe configuration	7/8	
PDM length, mm	6 430	
Length of stator active part, mm	4 000	
Length of bearing section up to a curvature point, mm	1 323	
Diameter of bits used, mm	120,6-149,2	
Connecting thread to drill pipes	NC 31	
Connecting thread to bits	27/8 Reg	
Maximum density of drilling mud, g/cm ³	1,6	
Allowed axial load, kN	100	
Weight, kg	260	

Power specification of PDM

Working fluid flow rate, l/s	5–10		
Output shaft rotation speed:			
– in no–load conditions, RPM	105–210		
Torque at maximum power, kN*m	3,2		
Pressure drop:			
– at maximum power, Mpa	10,7		
Power, kW	60		





DR-106.NGT.7/8.30.M1

PDM DR-106.NGT.7/8.30.M1 is a universal hydraulic downhole motor used for:

- drilling of oil and gas wells with 120.6 149.2 mm bits,
- well reconstruction by sidetracking with PDC bits;
- well workover operations.

Agle adjustment unit is placed between bearing section and power section. The adjustment range is between 0° and 2° or between 0° and 3° . PDMs are completed with the bearing section of enhanced operational life, exceeding 300 hrs. The bearing section is fitted with the axial sliding bearing, having operating surfaces made of synthetic diamond, and the radial hard alloy bearings.

Due to a very short shoulder up to the point of axes misalignment (only 883 mm) drillers can:

- perform tripping without significant pressing of a bit to internal walls in the production string;
- perform sidetracking of complex profile where it is required to alternate deviated intervals of more than $5^{\circ}/10$ m built rate and stabilization intervals with rotation of a drill string without the assembly tripping–out to replace the bend angle;
- minimize risk of leaving the motor parts in the well, as all the threads are screwed with glue, and each motor is completed with safety sub;
- do a large volume of work with one motor (it is especially important for hard-to-reach regions) as the overhaul life reaches approximately 300 hrs.

Housing OD, mm	106/110	
Power section lobe configuration	7/8	
PDM length, mm	4854	
Length of stator active part, mm	3 000	
Length of bearing section up to a curvature point, mm	883	
Diameter of bits used, mm	120,6-149,2	
Connecting thread to drill pipes	NC 31	
Connecting thread to bits	27/8 Reg	
Maximum density of drilling mud, g/cm ³	1,6	
Allowed axial load, kN	100	
Weight, kg	230	

Technical specification of PDM

Power specification of PDM

Working fluid flow rate, l/s	6–12		
Output shaft rotation speed:			
– in no–load conditions, RPM	95–190		
Torque at maximum power, kN*m	3.5		
Pressure drop:			
– at maximum power, MPa	9		
Power, kW	53		



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854 mm

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Safety

sub



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Safety sub

DR-106.NGT.7/8.30.M3

PDM DR-106.NGT.7/8.30.M3 is a universal hydraulic downhole motor used for:

- drilling of oil and gas wells with 120.6 149.2 mm bits,
- well reconstruction by sidetracking with rock bits, PDC bits, including bicentric ones;

- well workover operations.

Angle adjustment unit is placed between bearing section and power section. The adjustment range is between 0° and 2° or between 0° and $3^\circ.$

Bearing section has axial multi-row rolling bearing and radial bearings with integrated hard alloy plates, and also two-point driveshaft. Due to a very short shoulder up to the point of axes misalignment (only 1323 mm) drillers can:

- perform tripping without significant pressing of a bit to internal walls in the production string;
- perform sidetracking of complex profile where it is required to alternate deviated intervals of more than $5^{\circ}/10$ m built rate and stabilization intervals with rotation of a drill string without the assembly tripping–out to replace the bend angle.
- minimize risk of leaving the motor parts in the well, as all the threads are screwed with glue, and each motor is completed with safety sub.
- do a large volume of work with one motor (it is especially important for hard-to-reach regions) as the overhaul life reaches approximately 200 hrs.

Technical specification of PDM

Housing OD, mm	106/112	
Power section lobe configuration	7/8	
PDM length, mm	5 296	
Length of stator active part, mm	3 000	
Length of bearing section up to a curvature point, mm	1 323	
Diameter of bits used, mm	120,6-149,2	
Connecting thread to drill pipes	NC 31	
Connecting thread to bits	27/8 Reg	
Maximum density of drilling mud, g/cm ³	1,6	
Allowed axial load, kN	100	
Weight, kg	270	

Power specification of PDM

Working fluid flow rate, l/s	6–12		
Output shaft rotation speed:			
– in no–load conditions, RPM	95–190		
Torque at maximum power, kN*m	3,5		
Pressure drop:			
– at maximum power, MPa	9		
Power, kW	53		





DR-120.NGT.7/8.44.M2 and DR-120.NGT.7/8.59.M2



Ø120

۵120 mm 1370 mm

Ø1158

17

PDMs $\,$ DR-120.NGT.7/8.44.M2 and $\,$ DR-120.NGT.7/8.59.M2 are universal hydraulic downhole motors used for:

- drilling of oil and gas wells with 139.7 165.1 mm bits,
- well reconstruction by sidetracking with rock bits, PDC bits, including bicentric ones;
- well workover operations.

Angle adjustment unit is placed between bearing section and power section. The adjustment range is between 0° and 2° or between 0° and 3° . Bearing section has axial multi–row rolling bearing and radial bearings with integrated hard alloy plates, and also two–point driveshaft. Due to a very short shoulder up to the point of axes misalignment (only 1370 mm) drillers can:

- perform tripping without significant pressing of a bit to internal walls in the production string;
- perform sidetracking of complex profile where it is required to alternate deviated intervals of more than $5^{\circ}/10$ m built rate and stabilization intervals with rotation of a drill string without the assembly tripping–out to replace the bend angle.
- minimize risk of leaving the motor parts in the well, as all the threads are screwed with glue, and each motor is completed with safety sub.
- do a large volume of work with one motor (it is especially important for hard-to-reach regions) as the overhaul life reaches approximately 200 hrs.

PDM model	DR-120.NGT. 7/8.44.M2	DR-120.NGT. 7/8.59.M2
Housing OD, mm	120	120
Power section lobe configuration	7/8	7/8
PDM length, mm	6 775	8 237
Length of stator active part, mm	4 400	5 900
Length of bearing section up to a curvature point, mm	1 370	1 370
Diameter of bits used, mm	139,7–165,1	139,7–165,1
Connecting thread to drill pipes	NC 38	NC 38
Connecting thread to bits	3 1/2 Reg	3 1/2 Reg
Maximum density of drilling mud, g/cm ³	1,6	1,6
Allowed axial load, kN	120	120
Weight, kg	500	550

Technical specification of PDM

Power specification of PDM

Working fluid flow rate, l/s	9–18	12–25
Output shaft rotation speed:		
– in no–load conditions, RPM	150-300	140-290
Torque at maximum power, kN*m	4.0	5.3
Pressure drop:		
– at maximum power, MPa	7.9	7.3
Power, kW	101	122

R59

0°-2° 0°-3°



DR-127/120.NGT.7/8.44.M6 and DR-127/120.NGT.7/8.59.M6



Ø1108

PDMs DR-127/120.NGT.7/8.44.M6 and DR-127/120.NGT. 7/8.59.M6 are «hybrid» hydraulic downhole motor combining power characteristic of a power section of 120 mm size and mechanical load capacity and reliability of a bearing section of 127 mm size. This allows resolving specific technological tasks, for example, implementing maximum power capacity of a power section of a smaller size under the circumstances of the lack of equipment hydraulic power, or enhance mechanical reliability of PDM, using more powerful bearing section with other power sections at hand. This motor is designed for:

- drilling of oil and gas wells with 143,0 165,1 mm bits;
- well reconstruction by sidetracking with rock bits, PDC bits, including bicentric ones;
- -wellworkoveroperations.

Bearing section has axial multi-row rolling bearing and radial bearings with integrated hard alloy plates, and also two-point driveshaft.

Angle adjustment unit is placed between bearing section and power section. The adjustment range is between 0° and 2° or between 0° and 3° .

Technical specification of PDM

PDM model	DR- 127/120.NGT. 7/8.44.M6	DR- 127/120.NGT. 7/8.59.M6
Housing OD, mm	120–127	120-127
Power section lobe configuration	7/8	7/8
PDM length, mm	6 775	8 237
Length of stator active part, mm	4 400	5 900
Length of bearing section up to a curvature point, mm	1 370	1 370
Diameter of bits used, mm	143,0–165,1	143,0-165,1
Connecting thread to drill pipes	NC 38	NC 38
Connecting thread to bits	3 1/2 Reg	3 1/2 Reg
Maximum density of drilling mud, g/cm ³	1,6	1,6
Allowed axial load, kN	140	140
Weight, kg	500	550

Power specification of PDM

Working fluid flow rate, l/s	9–18	12–25
Output shaft rotation speed:		
– in no–load conditions, RPM	150-300	140-290
Torque at maximum power, kN*m	4,0	5,3
Pressure drop:		
– at maximum power, MPa	7,9	7,3
Power, kW	101	122



DR-165.NGT.7/8.58.M1



PDM DR-165.NGT.7/8.58.M1 is a universal hydraulic downhole motor used for drilling of oil and gas wells with 190,5 - 250,8 mm rock and PDC bits.

Angle adjustment unit is placed between bearing section and power section. The adjustment range is between 0° and 2° or between 0° and $3^\circ.$

Bearing section has axial multi-row rolling bearing and radial bearings with integrated hard alloy plates, and also two-point driveshaft. The PDM is completed with imported extended power sections with enhanced operation life. The most powerful construction of bearing section allows transferring high torque of the power section longer than 6 m to the bit.

Due to a very short shoulder up to the point of axes misalignment (only 1856 mm) drillers can:

- perform tripping without significant pressing of a bit to internal walls in the production string;
- perform sidetracking of complex profile where it is required to alternate deviated intervals of more than 5°/10 m built rate and stabilization intervals with rotation of a drill string without the assembly tripping-out to replace the bend angle;
- minimize risk of leaving the motor parts in the well, as all the threads are screwed with glue, and each motor is completed with safety sub;
- do a large volume of work with one motor (it is especially important for hard-to-reach regions) as the overhaul life reaches approximately 280 hrs.

Housing OD, mm	165
Power section lobe configuration	7/8
PDM length, mm	9111
Length of stator active part, mm	5720
Length of bearing section up to a curvature point, mm	1 856
Diameter of bits used, mm	190,5–250,8
Connecting thread to drill pipes	NC 50
Connecting thread to bits	4 1/2 Reg
Maximum density of drilling mud, g/cm ³	1,9
Allowed axial load, kN	250
Weight, kg	1 140

Technical specification of PDM

Power specification of PDM

Working fluid flow rate, l/s	19–38
Output shaft rotation speed:	
– in no–load conditions, RPM	85–170
Torque at maximum power, kN*m	14.5
Pressure drop:	
– at maximum power, MPa	9.5
Power, kW	164



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Ø165 <u>B86,5</u> <u>O°-2°</u> O°-3° Ø165 <u>Ø165</u> <u>Ø165</u> <u>Ø165</u>



DR-178.NGT.7/8.52.M15 and DR-178.NGT.7/8.55.M15



20

7/8

1796

1,9

250

15.0

13

164



DR-178.NGT.7/8.63.M15

PDM DR-178.NGT.7/8.63.M15 are new universal hydraulic downhole motor used for drilling of oil and gas wells with rock and PDC bits of 212.7 -250.8 mm diameter.

Angle adjustment unit is placed between bearing section and power section. The adjustment range is between 0° and 2° or between 0° and 3° . Bearing section has axial multi-row rolling bearing and radial bearings with integrated hard alloy plates, and also two-point driveshaft.

PDMs are completed with imported extended power sections with enhanced operation life. Due to very short shoulder up to the point of axes misalignment (only 1796 mm) drillers can:

- perform tripping without significant pressing of a bit to internal walls in the production strina:
- perform sidetracking of complex profile where it is required to alternate deviated intervals of more than $5^{\circ}/10$ m built rate and stabilization intervals with rotation of a drill string without the assembly tripping-out to replace the bend angle.
- minimize risk of leaving the motor parts in the well, as all the threads are screwed with glue, and each motor is completed with safety sub.
- do a large volume of work with one motor (it is especially important for hard-to-reach regions) as the overhaul life reaches approximately 280 hrs

PDMs can be completed with replaceable stabilizer:



Stabilizer

Technical specification of PDM

Housing OD, mm	178/195	
Power section lobe configuration	7/8	
PDM length, mm	9610	
Length of stator active part, mm	6 360	
Length of bearing section up to a curvature point, mm	1 796	
Diameter of bits used, mm	212,7-250,8	
Connecting thread to drill pipes	NC 50/51/2FH	
Connecting thread to bits	4 1/2 Reg	
Maximum density of drilling mud, g/cm ³	1,9	
Allowed axial load, kN	250	
Weight, kg	1 309	

Power specification of PDM

Working fluid flow rate, l/s	20–35
Output shaft rotation speed:	
– in no–load conditions, RPM	102–179
Torque at maximum power, kN*m	12.6
Pressure drop:	
– at maximum power, MPa	13
Power, kW	213

610 mm

Ø178

1796 mm

250

Ø195

Ø145

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<u>0°-2°</u> 0°-3°

Ø178

Safety

sub



DR-178.NGT.7/8.52M23 and DR-178.NGT.7/8.55M23



22



DR-178.NGT.7/8.63M23

PDM DR-178.NGT.7/8.63.M23 is a universal hydraulic downhole motor used for drilling of oil and gas wells with PDC bits of 212.7 - 250.8 mm diameter. Angle adjustment unit is placed between bearing section and power

section. The adjustment range is between O° and 2° or between O° and 3°. PDMs are completed with the bearing section of enhanced operational life, exceeding 300 hrs. The bearing section is fitted with the axial sliding bearing, having operating surfaces made of synthetic diamond, and the radial hard alloy bearings.

PDMs are completed with imported extended power sections with enhanced operation life. Due to very short shoulder up to the point of axes misalignment (only 1796 mm) drillers can:

- perform tripping without significant pressing of a bit to internal walls in the production string;
- perform sidetracking of complex profile where it is required to alternate deviated intervals of more than $5^{\circ}/10$ m built rate and stabilization intervals with rotation of a drill string without the assembly tripping-out to replace the bend angle.
- minimize risk of leaving the motor parts in the well, as all the threads are screwed with glue, and each motor is completed with safety sub.
- do a large volume of work with one motor (it is especially important for hard-to-reach regions) as the overhaul life reaches approximately 350 hrs.

PDMs can be completed with replaceable stabilizer:

Ø178



Stabilizer

Technical specification of PDM

Housing OD, mm	178/195	
Power section lobe configuration	7/8	
PDM length, mm	9610	
Length of stator active part, mm	6 360	
Length of bearing section up to a curvature point, mm	1 796	
Diameter of bits used, mm	212,7-250,8	
Connecting thread to drill pipes	NC 50/5 1/2 FH	
Connecting thread to bits	4 1/2 Reg	
Maximum density of drilling mud, g/cm ³	1,9	
Allowed axial load, kN	250	
Weight, kg	1 309	

Power specification of PDM

· · · · · ·	
Working fluid flow rate, I/s	20–35
Output shaft rotation speed:	
– in no–load conditions, RPM	102–179
Torque at maximum power, kN*m	12.6
Pressure drop:	
– at maximum power, MPa	13
Power, kW	213

610 mm

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Ø178

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Safety

sub



DR-178.NGT.7/8.52.M26 and DR-178.NGT.7/8.55.M26



24



DR-178.NGT.7/8.63.M26



230

Ø145

PDM DR-178.NGT.7/8.63.M26 is a universal hydraulic downhole motor for drilling of oil and gas wells with rock and PDC bits of 212,7 - 250,8 mm dia.

The motors have the newest product of our company – the bearing section featuring enhanced operation life and short distance up to curvature point in their construction. Angle adjustment unit with the adjustment range from O° to 2° or from O° to 3° is installed between the bearing section and the power section.

PDM are equipped with import elongated power sections with enhanced operation life. Due to very short shoulder up to the bend point (only 1639 mm) drillers can:

- perform tripping in the casing string without significant pressing of a bit to internal walls;
- perform sidetracking of complex profile where it is required to alternate deviated intervals of more than 5° / 10 m built rate and stabilization intervals with rotation of a drill string without the assembly tripping-out to change the bend angle;
- minimize the risk of leaving the motor parts in the well as all the key threads are screwed with the glue and each motor is completed with the safety sub;
- do a large volume of work with one motor, which is extremely important for hard-to-reach regions, as the overhaul life reaches approximately 280 hours;
- meet the customers' existing requirements for providing necessary rpm of the BHA with bend angle set points.

The motor can be completed with replaceable stabilizer:



Stabilizer

Technical specification of PDM

Housing OD, mm	178/195
Power section lobe configuration	7/8
PDM length, mm	9 454
Length of stator active part, mm	6 360
Length of bearing section up to a curvature point, mm	1 639
Diameter of bits used, mm	212,7-250,8
Connecting thread to drill pipes	NC 50 / 51/2 FH
Connecting thread to bits	4 1/2 Reg
Maximum density of drilling mud, g/cm ³	1,9
Allowed axial load, kN	250
Weight, kg	1 280

Power specification of PDM

Working fluid flow rate, l/s	20–35
Output shaft rotation speed:	
– in no–load conditions, RPM	102–179
Torque at maximum power, kN*m	12,6
Pressure drop:	
– at maximum power, MPa	13
Power, kW	213



DR-195.NGT.5/6.43.M1 and DR-195.NGT.6/7.43.M1





DR-210.NGT.7/8.60.M2

PDM DR-210.NGT.7/8.60.M2 is a universal hydraulic downhole motor used for drilling of oil and gas wells with rock and PDC bits of 250,8 -374.6 mm diameter.

Angle adjustment unit is placed between bearing section and power section. The adjustment range is between 0° and 2° or between 0° and 3° . Bearing section has axial multi-row rolling bearing and radial bearings with integrated hard alloy plates, and also two-point driveshaft.

PDMs are completed with imported extended power sections with enhanced operation life. Due to very short shoulder up to the point of axes misalignment (only 2059 mm) the drillers can:

- perform tripping without significant pressing of a bit to internal walls in the production string;
- perform sidetracking of complex profile where it is required to alternate deviated intervals of more than $5^{\circ}/10$ m built rate and stabilization intervals with rotation of a drill string without the assembly tripping-out to replace the bend angle.
- minimize risk of leaving the motor parts in the well, as all the threads are screwed with glue, and each motor is completed with safety sub.
- do a large volume of work with one motor (it is especially important for hard-to-reach regions) as the overhaul life reaches approximately 280 hrs.

PDMs can be completed with replaceable stabilizer:



Technical specification of PDM

Housing OD, mm	210/236
Power section lobe configuration	7/8
PDM length, mm	9670
Length of stator active part, mm	6 048
Length of bearing section up to a curvature point, mm	2 059
Diameter of bits used, mm	250.8-490.0
Connecting thread to drill pipes	6 5/8 Reg
Connecting thread to bits	6 5/8 Reg
Maximum density of drilling mud, g/cm ³	1.9
Allowed axial load, kN	400
Weight, kg	1 900

Power specification of PDM

Working fluid flow rate, l/s	30–60
Output shaft rotation speed:	
– in no–load conditions, RPM	80–160
Torque at maximum power, kN*m	19.4
Pressure drop:	
– at maximum power, MPa	5.6
Power, kW	216





🔊 Ø210

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Ø210

Safety

sub



L D N

Ø240

Ø240

Ø240

2 478 mm

270

Ø240

Ø188

Safety

sub

DR-240.NGT.3/4.62.M1

PDM DR-240.NGT.3/4.62.M1 is a universal hydraulic downhole motor used for drilling of oil and gas wells with rock and PDC bits of 285.8 - 584.2 mm diameter.

Angle adjustment unit is placed between bearing section and power section. The adjustment range is between 0° and 2° or between 0° and 3°.

Bearing section has axial multi-row rolling bearing and radial bearings with integrated hard alloy plates, and also two-point driveshaft. PDM is completed with imported extended power sections with enhanced operation life. The overhaul life reaches approximately 280 hrs.

PDM can be completed with replaceable stabilizer:



Stabilizer

Technical specification of PDM

Housing OD, mm	240/244
Power section lobe configuration	3/4
PDM length, mm	10 432
Length of stator active part, mm	6 200
Length of bearing section up to a curvature point, mm	2 478
Diameter of bits used, mm	285.8-584.2
Connecting thread to drill pipes	65/8FH
Connecting thread to bits	6 5/8 Reg
Maximum density of drilling mud, g/cm ³	1,9
Allowed axial load, kN	400
Weight, kg	2 530

Power specification of PDM

Working fluid flow rate, l/s	32–65
Output shaft rotation speed:	
– in no–load conditions, RPM	110-120
Torque at maximum power, kN*m	15.3
Pressure drop:	
– at maximum power, MPa	6.8
Power, kW	179



179

DR-240.NGT.5/6.61.M1

PDM DR-240.NGT.5/6.61.M1 is a universal hydraulic downhole motor used for drilling of oil and gas wells with rock and PDC bits of 285.8 – 584.2 mm diameter.

Angle adjustment unit is placed between bearing section and power section. The adjustment range is between 0° and 2° or between 0° and 3°.

Bearing section has axial multi-row rolling bearing and radial bearings with integrated hard alloy plates, and also two-point driveshaft. PDM is completed with imported extended power sections with enhanced operation life. The overhaul life reaches approximately 280 hrs.

PDM can be completed with replaceable stabilizer:



Stabilizer

		Housing OD, mm	240/244
		Power section lobe configuration	5/6
	_Ø240	PDM length, mm	10 330
		Length of stator active part, mm	6 100
		Length of bearing section up to a curvature point, mm	2 478
		Diameter of bits used, mm	285,8-584,2
		Connecting thread to drill pipes	65/8FH
	~2.40	Connecting thread to bits	6 5/8 Reg
->	<u>Ø240</u>	Maximum density of drilling mud, g/cm ³	1.9
R125		Allowed axial load, kN	400
		Weight, kg	2510
		Power specification	on of PDM
<u>0°-2°</u>		Working fluid flow rate, I/s	32-65
0'-3'	E	Output shaft rotation speed:	
	78 r	– in no–load conditions, RPM	75-150
	₹ N	Torque at maximum power, kN*m	19.5
		Pressure drop:	
		– at maximum power, MPa	6.8

Technical specification of PDM

Ø240

Ø180

Power, kW

L D N

10 330 mm

Safety

sub





Technical and power specifications of PDM

Parameter	2D0-43.NGT.5/6.3.M1	DO-55.NGT.7/8.15.M1	D-76.NGT.4/5.20.M1	D0-76.NGT.4/5.20.M1	DR-76.NGT.4/5.20.M2	DR-88.NGT.5/6.20.M1
Technical specification of PDM	1	1	1	1	1	
Housing OD, mm	43/47	55	76	76/79	76/80	88
Power section lobe configuration	5/6	7/8	4/5	4/5	4/5	5/6
PDM length, mm	1 897	2 7 3 8	3 565	3 565	3 646	3 845
Length of stator active part, mm	343+312	1 525	2 000	2 000	2 000	2 000
Length of bearing section up to a curvature point, mm	393	700	_	810	855	1 025
Diameter of bits used, mm	58,0–60,0	68,0–76,0	83,0–98,4	83,0–98,4	83,0-98,4	98,4–120,6
Connecting thread to drill pipes	NC 12	3–42	2 3/8 Reg	2 3/8 Reg	2 3/8 Reg	2 3/8 Reg
Connecting thread to bits	NC 12	NC 12	2 3/8 Reg	2 3/8 Reg	2 3/8 Reg	2 3/8 Reg
Maximum density of drilling mud, g/cm ³	1,25	1,25	1,6	1,6	1,6	1,6
Allowed axial load, kN	3	10	25	25	45	50
Weight, kg	16	41	94	94	97	137
Power specification of PDM						
Working fluid flow rate, l/s	0,8–1,6	3–5	3–5	3–5	3–5	5–7
Output shaft rotation speed:						
– in no–load conditions, RPM	435–870	351–585	240-396	240-396	240–396	270-400
Torque at maximum power, kN*m	0,037	0,314	0,6–0,8	0,6–0,8	0,6–0,8	1,1–1,3
Pressure drop:						
– at maximum power, MPa	4,6	4,5	8–10	8–10	8–10	10–13
Power, kW	3	14	11–25	11–25	11–25	27-43

NGT

Technical and power specifications of PDM

Parameter	DR-88.NGT.5/6.24.M1	DR-88.NGT.7/8.27.M1	DR-95.NGT.7/8.40.M2	DR-106/95.NGT.7/8.40.M4	DR-106.NGT.7/8.30.M1	DR-106.NGT.7/8.30.M3
Technical specification of PDM		1	1		1	
Housing OD, mm	88/89	88/89	95/98	95/112	106/110	106/112
Power section lobe configuration	5/6	7/8	7/8	7/8	7/8	7/8
PDM length, mm	4 245	4 581	6 145	6 430	4 854	5 296
Length of stator active part, mm	2 400	2 7 3 6	4 000	4 000	3 000	3 000
Length of bearing section up to a curvature point, mm	1 025	1 025	1 139	1 323	883	1 323
Diameter of bits used, mm	98,4–120,6	98,4–120,6	112–132	120,6–149,2	120,6–149,2	120,6–149,2
Connecting thread to drill pipes	2 3/8 Reg	2 3/8 Reg	NC 31	NC 31	NC 31	NC 31
Connecting thread to bits	2 3/8 Reg	2 3/8 Reg	2 7/8 Reg	2 7/8 Reg	2 7/8 Reg	2 7/8 Reg
Maximum density of drilling mud, g/cm ³	1,6	1,6	1,6	1,6	1,6	1,6
Allowed axial load, kN	50	50	65	100	100	100
Weight, kg	151	162	260	260	230	270
Power specification of PDM						
Working fluid flow rate, I/s	4,3–12,8	2,8-8,2	5–10	5–10	6–12	6–12
Output shaft rotation speed:						
– in no–load conditions, RPM	108–325	74–215	105–210	105-210	95–190	95–190
Torque at maximum power, kN * m	1,53	1,34	3,2	3,2	3,5	3,5
Pressure drop:						
– at maximum power, MPa	4,5	4,3	10,7	10,7	9	9
Power, kW	47	28	60	60	53	53

Technical and power specifications of PDM

Parameter	DR-120.NGT.7/8.44.M2	DR-120.NGT.7/8.59.M2	DR-127/120.NGT.7/8.44.M6	DR-127/120.NGT.7/8.59.M6	DR-165.NGT.7/8.58.M1	DR-178.NGT.7/8.52.M15 DR-178.NGT.7/8.52.M23 DR-178.NGT.7/8.52.M26
Technical specification of PDM	1	1	1		1	
Housing OD, mm	120	120	120/127	120/127	165	178/195
Power section lobe configuration	7/8	7/8	7/8	7/8	7/8	7/8
PDM length, mm	6 7 7 5	8 2 3 7	6 775	8 237	9111	8450/8294*
Length of stator active part, mm	4 400	5 900	4 400	5 900	5 720	5210
Length of bearing section up to a curvature point, mm	1 370	1 370	1 370	1 370	1 856	1 796/1 639*
Diameter of bits used, mm	139,7–165,1	139,7–165,1	143,0–165,1	143,0–165,1	190,5–250,8	212,7–250,8
Connecting thread to drill pipes	NC 38	NC 38	NC 38	NC 38	NC 50	NC 50/ 51/2FH
Connecting thread to bits	3 1/2 Reg	3 1/2 Reg	3 1/2 Reg	3 1/2 Reg	4 1/2 Reg	4 1/2 Reg
Maximum density of drilling mud, g/cm ³	1,6	1,6	1,6	1,6	1,9	1,9
Allowed axial load, kN	120	120	140	140	250	250
Weight, kg	500	550	500	550	1 140	1 240 / 1 210*
Power specification of PDM				-		
Working fluid flow rate, l/s	9–18	12–25	9–18	12–25	19–38	20-40 (45)
Output shaft rotation speed:						
– in no–load conditions, RPM	150–300	140-290	150–300	140-290	85–170	100-200
Torque at maximum power, kN*m	4,0	5,3	4,0	5,3	14,5	13,4
Pressure drop:						
– at maximum power, MPa	7,9	7,3	7,9	7,3	9,5	13
Power, kW	101	122	101	122	164	164

Note: * - DR-178.NGT.7/8.52.M26



Technical and power specifications of PDM

Parameter	DR-178.NGT.7/8.55.M15 DR-178.NGT.7/8.55.M23 DR-178.NGT.7/8.55.M26	DR-178.NGT.7/8.63.M15 DR-178.NGT.7/8.63.M23 DR-178.NGT.7/8.63.M26	DR-195.NGT.5/6.43.M4	DR-195.NGT.6/7.43.M4	DR-210.NGT.7/8.60.M2	DR-240.NGT.3/4.62.M1	DR-240.NGT.5/6.61.M1
Technical specification of PDM							
Housing OD, mm	178/195	178/195	195/197	195/197	210/236	240/244	240/244
Power section lobe configuration	7/8	7/8	5/6	6/7	7/8	3/4	5/6
PDM length, mm	8 735 / 8 579**	9610/9454***	7 601	7 601	9670	10 432	10 330
Length of stator active part, mm	5 484	6 360	4 250	4 250	6 048	6 200	6 100
Length of bearing section up to a curvature point, mm	1 796 / 1 639**	1 796 / 1 639***	1 856	1 856	2 059	2 478	2 478
Diameter of bits used, mm	212,7–250,8	212,7–250,8	215,9–269,9	215,9–269,9	250,8–490,0	285,8–584,2	285,8–584,2
Connecting thread to drill pipes	NC 50/	51/2FH	51/2FH	51/2FH	6 5/8 Reg	65/8FH	65/8FH
Connecting thread to bits	4 1/2 Reg	4 1/2 Reg	4 1/2 Reg	4 1/2 Reg	6 5/8 Reg	6 5/8 Reg	6 5/8 Reg
Maximum density of drilling mud, g/cm ³	1,9	1,9	1,9	1,9	1,9	1,9	1,9
Allowed axial load, kN	250	250	250	250	400	400	400
Weight, kg	1 240 / 1 250**	1 309 / 1 280***	1 328	1 328	1 900	2 530	2 510
Power specification of PDM							
Working fluid flow rate, I/s	20–40 (45)	20–35	18,5–37	20–53	30–60	32–65	32–65
Output shaft rotation speed:							
– in no–load conditions, RPM	90–180	102-179	79–158	82–217	80–160	110-220	75–150
Torque at maximum power, kN*m	15,0	12,6	8,9	11,1	19,4	15,3	19,5
Pressure drop:							
– at maximum power, MPa	13	13	5,6	5,6	5,6	6,8	6,8
Power, kW	164	213	130	226	216	179	179

Note: ** - DR-178.NGT.7/8.55.M26; *** - DR-178.NGT.7/8.63.M26





Bearing sections for turbodrills and PDM

Production of bearing sections for PDMs and turbodrills is the main direction of the company's activity. The complete cycle of operations on the bearing section production is provided: design, prototype production, stand and field tests, design improvement, production of commercial batches, service.

As the result of significant increase of power and torque, when using long length power section PDMs of foreign production, the problem has occurred which is reliability and durability of all the transmission members (clutches, universal joints, threads, shafts of bearing sections) transferring the torque from the PDM rotor to bit.

Our company has carried out a large volume of works to increase load-carrying capacity of the transmission members of the PDMs within the range of 43 – 244 mm. Production of the bearing sections featuring enhanced operation life has been mastered.

Main advantages of the bearing sections developed and produced by our company:

- Short lower shoulder to the curvative point. Due to the short shoulder, drillers are able to perform PDM tripping without considerable pressing of a bit to internal borehole walls. It is possible to drill without pulling out of the assembly to change the bend angle while complicated profile sidetracking where it is required to alternate the sections of borehole deviation with the build rate exceeding 5°/10 m and the sections of stabilization with drill string rotation.
- 2. Enhanced operation life. Bearing sections of our production, having multi-raw thrust ball bearing as an axial bearing, have enhanced operation life. Its average overhaul period is 200 280 hours. Bearing sections of three standard sizes (106, 120 and 178 mm) are designed to have even more enhanced operation life. The bearing sections are fitted with the axial sliding bearing, the operating surfaces made of synthetic diamond. Average overhaul period is 300 350 hours.
- 3. **Powerful double-point driveshaft** are the result of increase of the driveshaft OD and use of large diameter balls. Load-carrying capacity and durability of the driveshaft have been increased significantly. Rubber cups are produced out of special rubber at the aircraft factory. The friction pair "mushroom-insert" is made out of steel and bronze selected under the recommendations of Sukhoy Engineering Department which are used in aircraft building for production of sliding bearings.
- 4. **Bearing section axial bearing** is multi-row radial-thrust ball bearing of enhanced load-carrying capacity. The company has organized production of ball bearings. Modifying different members of axial bearing (rolling bearing profile, ball diameters, retainer sizes) at the stage of development and production, the following has been obtained:
 - significant increase of load-carrying capacity of the axial bearings compared with the bearings of commercial production of the same overall sizes,
 - extension of the range: the company produces the bearings of non-standard overall sizes for both – new designs and repair of imported bearing sections,
 - best possible material: the bearings are made of imported silicomolybdic steel of vacuum-arc remelting, featuring high impact resilience and strength,
 - high accuracy: due to high accuracy, while producing the bearing retainers, distribution of the load among the rows and, therefore, high load–carrying capacity and durability are obtained.
- 5. **Reinforced lower radial bearing** impregnated with hard alloy plates is placed at minimum available distance from the bit. The bearing advantages are:
 - high mechanical properties of the casing: the radial bearing casing is produced of alloy steel, retaining high hardness and strength after sintering procedure, that allows the bearing to thread and use it as the bearing section nipple nut,
 - high wear-resistance. Friction surfaces of the bearings are reinforced with hard alloy plates.
- 6. Forged blanks for bearing section shafts and universal joint shafts. The shaft blanks are forged on radial-forging machine. During forging procedure the internal structure of metal is compressed, internal fibers, taking the form of the shaft surface that improves the mechanical properties significantly. This leads to significant reduction of the shaft damage risk at the places of diameter change.
- 7. **All critical threaded connections are assembled using glue.** While assembling hydraulic downhole motors (DHM), thread glues of different fixation degree are used.


Performance of 13 bearing sections run in the Tatarstan Republic

13 positive displacement motors of 178 mm dia. run under control in cooperation with RIPNO Ltd. – Tatarstan in 2011–2013. The bearing sections used were: S-178.NGT.M14 and S-178.NGT.M16.

The PDMs lessee was Bureniye Ltd. 13 positive displacement motors had average overhaul period exceeding 280 hrs, proving high stable quality of the drilling equipment developed and produced at JSC «NGT».

PDM model,	Cumulative	Quantity of	Interrepair time, hour	
Serial number	hour	repairs, pcs	On PDM	Average
S–178.NGT.M14, number 223	871	4	218	
S–178.NGT.M14, number 224	865	4	216	
S–178.NGT.M14, number 225	642	2	321	
S–178.NGT.M14, number 226	789	З	263	
S–178.NGT.M16, number 1	919	4	230	
S–178.NGT.M16, number 2	666	З	222	
S–178.NGT.M16, number 3	641	2	321	280
S–178.NGT.M16, number 4	871	З	290	
S–178.NGT.M16, number 5	988	2	494	
S–178.NGT.M16, number 6	513	2	257	
S–178.NGT.M16, number 7	538	1	538	
S–178.NGT.M16, number 9	830	3	277	
S–178.NGT.M16, number 10	937	3	312	



Bearing section designation

JSC «NGT» offers wide range of bearing sections for turbodrills and positive displacement motors to its customers. For convenience of the catalogue use, please, see the designation structure of bearing sections:

S-178.NGT.M15



- Number of bearing section modification
- Standard size
- Designation of bearing section where:
- S bearing section-wipstock with angle adjustment unit,
- SB bearing section-wipstock with fixed bend angle.

Bearing sections presented in the catalogue:

SB-43.NGT.M1 SB-55.NGT.M1 S-76.NGT.M2 S-88.NGT.M1 S-95.NGT.M2 S-106.NGT.M1 S-106.NGT.M3 S-120.NGT.M2 S-127.NGT.M8 S-165.NGT.M1 S-178.NGT.M15 S-178.NGT.M23 S-178.NGT.M26 S-195.NGT.M4 S-210.NGT.M2 S-240.NGT.M1





SB-43.NGT.M1

Bearing section SB-43.NGT.M1 is a modern compact bearing section featuring enhanced operation life. The bearing section is used with power sections of 43 mm dia for casing string milling and sidetracking when constructing multihole wells using radial drilling with 58,0 - 60,0 mm bits.

Axial bearing of the bearing section is a multi-row thrust ball bearing with toroidal raceways, radial bearings of the bearing section are steel sleeves the friction surfaces of which are reinforced with tungsten carbide.

PDM is equipped with the bearing section bent housing. Meeting customers' requirements, the bend angle can be from 0° to 5° .

Driveshaft with two joints is installed between the bearing section and the power section.

Housing OD, mm	43/47
Bearing section length, mm	491
Bearing section length to curvature plane, mm	400
Range of angle adjuster change, degree	0–5
Connecting thread to bit	NC 12
Torque transmitted, max. kN*m	56
Tolerance of axial loading, kN	3
Overhaul period, hour	80



SB-55.NGT.M1



Bearing section SB–55.NGT.M1 is a modern compact bearing section featuring enhanced operation life. The bearing section is used with power sections of 55 mm dia for casing string milling and sidetracking when constructing multihole wells using radial drilling with 68,0 - 75,0 mm bits.

Axial bearing of the bearing section is a multi-row thrust ball bearing with toroidal raceways, radial bearings of the bearing section are steel sleeves the friction surfaces of which are reinforced with tungsten carbide.

PDM is equipped with the bearing section bent housing. Meeting customers' requirements, the bend angle can be set from 0° to 5°.

Driveshaft with two joints is installed between the bearing section and the power section.

Housing OD, mm	55
Bearing section length, mm	763
Bearing section length to curvature plane, mm	700
Range of angle adjuster change, degree	0–5
Connecting thread to bit	NC 12
Torque transmitted, max. kN*m	350
Tolerance of axial loading, kN	10
Overhaul period, hour	80





S-76.NGT.M2

Bearing section S-76.NGT.M2 is a modern compact bearing section featuring enhanced operation life. The bearing section is used in PDM power sections of 76 mm dia. and for:

- well rehabilitation in housing pipes;

- well drilling with bits of 83 – 98.4 mm diameter.

Axial bearing of bearing section is a multi-row thrust ball bearing with toroidal raceways, radial bearings of bearing section are steel sleeves, having the friction surfaces reinforced with hard-alloy plates.

The bearing section is furnished with driveshaft with two joints to connect to the power section rotor. The bearing section design has angle adjustment unit. The adjustment range is from 0° up to 2° or from 0° up to 3° .

Meeting customers' requirements, the bearing section can be produced with the connecting threads for specific power section.

Top sub (safety sub) is available with the bearing section to connect the power section to drill pipes.

Housing OD, mm	76/80
Bearing section length, mm	1 229
Bearing section length to curvature plane, mm	855
Range of angle adjuster change, degree	0–2 or 0–3
Connecting thread to bit	2 3/8 Reg
Torque transmitted, max. kN*m	3,0
Tolerance of axial loading, kN	45
Overhaul period, hour	200





S-88.NGT.M1

Bearing section S-88.NGT.M1 is a modern compact bearing section featuring enhanced operation life.

The bearing section is used in PDM power sections of $88-89\ \text{mm}$ dia. and for:

- drilling of oil and gas wells;
- well reconstruction by sidetracking with rock and PDC bits, including bicentric ones, with the diameter of 98.4 – 120.6 mm;
- well workover.

Axial bearing of bearing section is a multi-row thrust ball bearing with toroidal raceways, radial bearings of bearing section are steel sleeves, having the friction surfaces reinforced with hard-alloy plates.

The bearing section is furnished with driveshaft with two joints to connect to the power section rotor. The bearing section design has angle adjustment unit. The adjustment range is from 0° up to 2° or from 0° up to 3° .

Meeting customers' requirements, the bearing section can be produced with the connecting threads for specific power section.

Top sub (safety sub) is available with the bearing section to connect the power section to drill pipes.

Housing OD, mm	88
Bearing section length, mm	1 405
Bearing section length to curvature plane, mm	1 025
Range of angle adjuster change, degree	0–2 or 0–3
Connecting thread to bit	2 3/8 Reg
Torque transmitted, max. kN*m	2,0
Tolerance of axial loading, kN	55
Overhaul period, hour	200





S-95.NGT.M2

Bearing section S-95.NGT.M2 is a modern compact bearing section featuring enhanced operation life.

The bearing section is used in PDM power sections of 95 mm dia. and for:

- drilling of oil and gas wells;
- well reconstruction by sidetracking with rock and PDC bits, including bicentric ones, with the diameter of 114.3 – 132 mm;
- well workover.

Axial bearing of bearing section is a multi-row thrust ball bearing with toroidal raceways, radial bearings of bearing section are steel sleeves, having the friction surfaces reinforced with hard-alloy plates.

The bearing section is furnished with driveshaft with two joints to connect to the power section rotor. The bearing section design has angle adjustment unit. The adjustment range is from 0° up to 2° or from 0° up to 3° .

Meeting customers' requirements, the bearing section can be produced with the connecting threads for specific power section.

Top sub (safety sub) is available with the bearing section to connect the power section to drill pipes.

Housing OD, mm	95/98
Bearing section length, mm	1 560
Bearing section length to curvature plane, mm	1 139
Range of angle adjuster change, degree	0–2 or 0–3
Connecting thread to bit	2 7/8 Reg 2 3/8 Reg
Torque transmitted, max. kN*m	3,5
Tolerance of axial loading, kN	65
Overhaul period, hour	200





S-106.NGT.M1

Bearing section S-106.NGT.M1 is a modern compact bearing section featuring enhanced operation life.

The bearing section is used in PDM power sections of 106 mm dia. and for:

- drilling of oil and gas wells;
- well reconstruction by sidetracking with PDC bits with the diameter of 120.6 – 149.2 mm;
- well workover.

The bearing section is fitted with the axial sliding bearing, having operating surfaces made of synthetic diamond, and the radial bearings are steel sleeves, having friction surfaces reinforced with hard alloy plates. The bearing section is furnished with driveshaft with two joints to connect to the power section rotor. The bearing section design has angle adjustment unit. The adjustment range is from 0° up to 2° or from 0° up to 3° .

Meeting customers' requirements, the bearing section can be produced with the connecting threads for specific power section.

Top sub (safety sub) is available with the bearing section to connect the power section to drill pipes.

Housing OD, mm	106
Bearing section length, mm	1 309
Bearing section length to curvature plane, mm	883
Range of angle adjuster change, degree	0–2 or 0–3
Connecting thread to bit	2 7/8 Reg
Torque transmitted, max. kN*m	5,0
Tolerance of axial loading, kN	80
Overhaul period, hour	300





S-106.NGT.M3

Bearing section S-106.NGT.M3 is a modern compact bearing section featuring enhanced operation life.

The bearing section is used in PDM power sections of 106 mm dia. and for:

- drilling of oil and gas wells;
- well reconstruction by sidetracking with rock and PDC bits, including bicentric ones, with the diameter of 120.6 – 149.2 mm;
- well workover.

Axial bearing of bearing section is a multi-row thrust ball bearing with toroidal raceways, radial bearings of bearing section are steel sleeves, having the friction surfaces reinforced with hard-alloy plates.

The bearing section is furnished with driveshaft with two joints to connect to the power section rotor. The bearing section design has angle adjustment unit. The adjustment range is from 0° up to 2° or from 0° up to 3° .

Meeting customers' requirements, the bearing section can be produced with the connecting threads for specific power section.

Top sub (safety sub) is available with the bearing section to connect the power section to drill pipes.

Housing OD, mm	106/112
Bearing section length, mm	1 751
Bearing section length to curvature plane, mm	1 323
Range of angle adjuster change, degree	0–2 or 0–3
Connecting thread to bit	27/8 Reg
Torque transmitted, max. kN*m	5,0
Tolerance of axial loading, kN	100
Overhaul period, hour	200





S-120.NGT.M2

Bearing section S-120.NGT.M2 is a modern compact bearing section featuring enhanced operation life.

The bearing section is used in PDM power sections of 120 – 127 mm dia. and for:

- drilling of oil and gas wells;
- well reconstruction by sidetracking with rock and PDC bits, including bicentric ones, with the diameter of 132 – 165.1 mm;
- well workover.

Axial bearing of bearing section is a multi-row thrust ball bearing with toroidal raceways, radial bearings of bearing section are steel sleeves, having the friction surfaces reinforced with hard-alloy plates.

The bearing section is furnished with driveshaft with two joints to connect to the power section rotor. The bearing section design has angle adjustment unit. The adjustment range is from 0° up to 2° or from 0° up to 3° .

Meeting customers' requirements, the bearing section can be produced with the connecting threads for specific power section.

Top sub (safety sub) is available with the bearing section to connect the power section to drill pipes.

Housing OD, mm	120
Bearing section length, mm	1 857
Bearing section length to curvature plane, mm	1 370
Range of angle adjuster change, degree	0–2 or 0–3
Connecting thread to bit	3 1/2 Reg
Torque transmitted, max. kN*m	6,0
Tolerance of axial loading, kN	120
Overhaul period, hour	200





S-127.NGT.M8

Bearing section S-127.NGT.M8 is a modern compact bearing section featuring enhanced operation life.

The bearing section is used in PDM power sections of 120 - 127 mm dia. and for:

- drilling of oil and gas wells;
- well reconstruction by sidetracking with rock and PDC bits, including bicentric ones, with the diameter of 132 – 165.1 mm;
- well workover.

Axial bearing of bearing section is a multi-row thrust ball bearing with toroidal raceways, radial bearings of bearing section are steel sleeves, having the friction surfaces reinforced with hard-alloy plates.

The bearing section is furnished with driveshaft with two joints to connect to the power section rotor. The bearing section design has angle adjustment unit. The adjustment range is from 0° up to 2° or from 0° up to 3° .

Meeting customers' requirements, the bearing section can be produced with the connecting threads for specific power section.

Top sub (safety sub) is available with the bearing section to connect the power section to drill pipes and also with replaceable stabilizer.



Stabilizer Technical specifications of bearing section

Housing OD, mm	120/138
Bearing section length, mm	1 855
Bearing section length to curvature plane, mm	1 370
Range of angle adjuster change, degree	0–2 or 0–3
Connecting thread to bit	3 1/2 Reg
Torque transmitted, max. kN*m	6,0
Tolerance of axial loading, kN	140
Overhaul period, hour	200





S-165.NGT.M1

Bearing section S-165.NGT.M1 is a modern compact bearing section featuring enhanced operation life.

The bearing section is used in PDM power sections of 165 - 172 mm dia. and for drilling of oil and gas wells with bits of 190.5 - 250.8 mm diameter.

Axial bearing of bearing section is a multi-row thrust ball bearing with toroidal raceways, radial bearings of bearing section are steel sleeves, having the friction surfaces reinforced with hard-alloy plates. The bearing section is furnished with driveshaft with two joints to connect to the power section rotor. The bearing section design has angle adjustment unit. The adjustment range is from 0° up to 2° or from 0° up to 3° .

Meeting customers' requirements, the bearing section can be produced with the connecting threads for specific power section.

Top sub (safety sub) is available with the bearing section to connect the power section to drill pipes.

Housing OD, mm	165
Bearing section length, mm	2 546
Bearing section length to curvature plane, mm	1 856
Range of angle adjuster change, degree	0–2 or 0–3
Connecting thread to bit	4 1/2 Reg
Torque transmitted, max. kN*m	19,0
Tolerance of axial loading, kN	250
Overhaul period, hour	200





S-178.NGT.M15

Bearing section S–178.NGT.M15 is a modern compact bearing section featuring enhanced operation life. The bearing section is used in PDM power sections of 172 - 178 mm diameter and for drilling oil and gas wells with 212,5 - 250,8 mm bits.

Axial bearing of bearing section is a multi-row thrust ball bearing with toroidal raceways, radial bearings of bearing section are steel sleeves, having the friction surfaces reinforced with hard-alloy plates. The bearing section is furnished with driveshaft with two joints to connect to the power section rotor. The bearing section design has angle adjustment unit. The adjustment range is from 0° up to 2° or from 0° up to 3° .

Meeting customers' requirements, the bearing section can be produced with the connecting threads for specific power section.

Top sub (safety sub) and also replaceable stabilizer are available with the bearing section to connect the power section to drill pipes:



Housing OD, mm	178/195
Bearing section length, mm	2 485
Bearing section length to curvature plane, mm	1 796
Range of angle adjuster change, degree	0–2 or 0–3
Connecting thread to bit	4 1/2 Reg
Torque transmitted, max. kN*m	24
Tolerance of axial loading, kN	250
Overhaul period, hour	280





S-178.NGT.M23

Bearing section S–178.NGT.M23 is a modern compact bearing section featuring enhanced overhaul period of around 350 hours.

The bearing section is used in PDM power sections of 172 – 178 mm diameter and for drilling oil and gas wells with 212,5 – 250,8 mm bits. The bearing section is fitted with the axial sliding bearing, having operating surfaces made of synthetic diamond, and the radial hard alloy bearings.

The bearing section is furnished with driveshaft with two joints to connect to the power section rotor. The bearing section design has angle adjustment unit. The adjustment range is from O° up to 2° or from O° up to 3° .

Meeting customers' requirements, the bearing section can be produced with the connecting threads for specific power section.

Top sub (safety sub) and also replaceable stabilizer are available with the bearing section to connect the power section to drill pipes:



Housing OD, mm	178/195
Bearing section length, mm	2 485
Bearing section length to curvature plane, mm	1 796
Range of angle adjuster change, degree	0–2 or 0–3
Connecting thread to bit	4 1/2 Reg
Torque transmitted, max. kN*m	24
Tolerance of axial loading, kN	250
Overhaul period, hour	350





S-178.NGT.M26

Bearing section S–178.NGT.M26 is one of the newest products of our company. It is the bearing section featuring enhanced operation life and short distance up to curvature point.

Mentioned construction features help to meet customers' existing requirements for providing necessary rpm of the BHA with bend angle set points. Bearing section is used with power sections of 172–178 mm dia and is aimed for drilling of oil and gas wells with 212,7–250,8 mm bits.

Bearing section has an angle adjustment unit in its construction. The adjustment range is from O to 2° or from O to 3° . Upon customers' requirements, the bearing section is produced with necessary connecting threads for specific power section. The bearing section is furnished with a drive shaft with two joints to connect to the power section rotor.

There is a nut in the bearing section bottom part which can be replaced with the housing stabilizer if necessary right on the drill site.

The bearing section can be completed with the top sub (safety sub) to connect the power section to BHA. The bearing section can also be completed with replaceable stabilizer:



Housing OD, mm	178/195
Bearing section length, mm	2 329
Bearing section length to curvature plane, mm	1 639
Range of angle adjuster change, degree	0–2 or 0–3
Connecting thread to bit	4 1/2 Reg
Torque transmitted, max. kN*m	24
Tolerance of axial loading, kN	250
Overhaul period, hour	280



S-195.NGT.M4



Bearing section S–195.NGT.M4 is a new short bearing section featuring enhanced operation life. The bearing section is used in PDM power sections of 195 mm diameter and for drilling oil and gas wells with 215.9 - 269.9 mm rock and PDC bits.

Axial bearing of bearing section is a multi-row thrust ball bearing with toroidal raceways, radial bearings of bearing section are steel sleeves, having the friction surfaces reinforced with hard-alloy plates.

The bearing section is furnished with driveshaft with two joints to connect to the power section rotor. The bearing section design has angle adjustment unit. The adjustment range is from O° up to 2° or from O° up to 3° .

Meeting customers' requirements, the bearing section can be produced with the connecting threads for specific power section.

Top sub (safety sub) and replaceable stabilizer are available with the bearing section to connect the power section to drill pipes:



Housing OD, mm	195
Bearing section length, mm	2 485
Bearing section length to curvature plane, mm	1 796
Range of angle adjuster change, degree	0–2 or 0–3
Connecting thread to bit	4 1/2 Reg
Torque transmitted, max. kN*m	27,0
Tolerance of axial loading, kN	250
Overhaul period, hour	250





S-210.NGT.M2

Bearing section S–210.NGT.M2 is a modern compact bearing section featuring enhanced operation life. The bearing section is used in PDM power sections of 203 - 210 mm diameter and for drilling oil and gas wells with 250,8 - 490.0 mm bits.

Axial bearing of bearing section is a multi-row thrust ball bearing with toroidal raceways, radial bearings of bearing section are steel sleeves, having the friction surfaces reinforced with hard-alloy plates.

The bearing section is furnished with driveshaft with two joints to connect to the power section rotor. The bearing section design has angle adjustment unit. The adjustment range is from 0° up to 2° or from 0° up to 3° .

Meeting customers' requirements, the bearing section can be produced with the connecting threads for specific power section.

Top sub (safety sub) is available with the bearing section to connect the power section to drill pipes.

Housing OD, mm	210/236
Bearing section length, mm	2 789
Bearing section length to curvature plane, mm	2 056
Range of angle adjuster change, degree	0–2 or 0–3
Connecting thread to bit	6 5/8 Reg
Torque transmitted, max. kN*m	25,0
Tolerance of axial loading, kN	400
Overhaul period, hour	250



Thread to stator Thread to rotor Ø240 R125 352 mm Ø240 $0-2^{\circ}$ $0-3^{\circ}$ ന 2478 Ø240 Ø180

S-240.NGT.M1

Bearing section S–240.NGT.M1 is a modern compact bearing section featuring enhanced operation life. The bearing section is used in PDM power sections of 240 mm diameter and for drilling oil and gas wells with 285.8 - 584.2 mm rock and PDC bits.

Axial bearing of bearing section is a multi-row thrust ball bearing with toroidal raceways, radial bearings of bearing section are steel sleeves, having the friction surfaces reinforced with hard-alloy plates. The bearing section is furnished with driveshaft with two joints to connect to the power section rotor. The bearing section design has angle adjustment unit. The adjustment range is from 0° up to 2° or from 0° up to 3° .

Meeting customers' requirements, the bearing section can be produced with the connecting threads for specific power section.

Top sub (safety sub) and replaceable stabilizer are available with the bearing section to connect the power section to drill pipes:



Housing OD, mm	240
Bearing section length, mm	3 352
Bearing section length to curvature plane, mm	2 478
Range of angle adjuster change, degree	0–2 or 0–3
Connecting thread to bit	6 5/8 Reg
Torque transmitted, max. kN*m	25,0
Tolerance of axial loading, kN	400
Overhaul period, hour	250



Bearing sections technical specification

Bearing section code	SB-43.NGT.M1	SB-55.NGT.M1	S-76.NGT.M2	S-88.NGT.M1	S-95.NGT.M1	S-106.NGT.M1	S-106.NGT.M3	S-120.NGT.M2	S-127.NGT.M8	S-165.NGT.M1	S-178.NGT.M15	S-178.NGT.M23	S-178.NGT.M26	S-195.NGT.M4	S-210.NGT.M2	S-240.NGT.M1
Housing OD, mm	43	55	76/80	88	95/98	106	106/ 112	120	120⁄ 138	165	178⁄ 195	178⁄ 195	178⁄ 195	195	210⁄ 236	240
Bearing section length, mm	491	763	1 229	1 405	1 560	1 309	1 751	1 857	1 855	2 546	2 485	2 485	2 329	2 485	2 789	3 352
Bearing section length to curvature plane, mm	400	700	855	1 025	1 1 3 9	883	1 323	1370	1370	1 856	1796	1 796	1 639	1 796	2 056	2 478
Range of angle adjuster change, degree	0-	-5	0–2 or 0–3													
Connecting thread to bit	NC 12	NC 12	2 3/8 Reg	2 3/8 Reg	2 3/8 Reg 2 7/8 Reg	2 7/8 Reg	2 7/8 Reg	3 1/2 Reg	3 1/2 Reg	4 1/2 Reg	4 1/2 Reg	4 1/2 Reg	4 1/2 Reg	4 1/2 Reg	6 5/8 Reg	6 5/8 Reg
Torque transmitted, max. kN*m	0,06	0,35	3,0	2,0	3,5	5,0	5,0	6,0	6,0	19	24	24	24	27	25	25
Tolerance of axial loading, kN	3	10	45	55	65	80	100	120	140	250	250	250	250	250	400	400
Overhaul period, hour	80	80	200	200	200	300	200	200	200	200	280	350	280	250	250	250



Turbodrills

The company provides full cycle of operations of the turbodrill production: designing, prototype production, stand and field tests, design improvement, commercial production of turbodrills.

Over the past 15 years close attention was paid to development and production of new turbine types, featuring high efficiency (efficiency of 60–70%). The turbines are produced by precision casting technique with investment pattern. Huge experience and knowledge accumulated by leading experts of the company allow using different methods of calculation while developing the turbine blade profiles and designing new turbines based on the experience accumulated and statistic data of the turbine model tests results.

Designing and production of a new turbine is the process requiring long period of time. Meeting clients' requirements, the company's specialists fulfill complete cycle of work regarding design and production of the turbine stages, starting from provision of the turbine blade profile for a mould production and finishing with the turbine stages production. The experience accumulated allows producing the turbines for the turbodrills having different speed characteristics from 350 to 2500 RPM for different bit types (rock, impregnated and PDC).

Today the company produces the turbines for 4 main standard sizes of the turbodrills – 127mm (5"), 178 mm (5"), 195 mm (7 11/16 ") and 240 mm (9 1/2"). All the turbine types (except 195 and 240 mm turbines) are produced of stainless steel. A new generation of the turbodrills has been designed based on these turbines. Most of them are presented in the catalogue.

One more achievement of NGT which is used in turbodrill designs is bearing section as damper with PDC axial bearings. Damping components are selected to reduce the intensity of vibrations from the bit during rock destruction. The bearing section and turbine radial bearings have support surfaces reinforced with hard alloy components.

Combination of the abovementioned design features and technological approaches being realized within the production of a new turbodrill generation provides high

reliability and durability of all the main assemblies and members of the turbodrills different conditions of at operation: high temperatures, large range of chemical reagents used to support mud parameters required and effect of formation ingresses: H₂S; H₂SO; HSO₃; H₂Cl₄; Cl₂. Warranty life of the turbodrill till writing off reaches 900 hrs; average overhaul period for the bearing sections with PDC axial bearing is 350 hrs and more (depending on drilling conditions).





Turbodrills designation

JSC «NGT» offers wide range of turbodrills for drilling. For convenience of the catalogue use, please, see the designation structure of turbodrills:

TBS1-178.NGT.M1

Number of turbodrill modification

Standard size, producer's designation

Number of turbine sections

Designation of a turbodrill, where:

- T turbodrill,
- TB turbodrill-whipstock with fixed bend angle,
- TBS turbodrill-whipstock with angle adjustment unit

The turbodrills presented in the catalogue:

T2-127.NGT.M1 T2-127.NGT.M2 T1-178.NGT.M1 T2-178.NGT.M1 T1-178.NGT.M2 T2-178.NGT.M2

TBS1-178.NGT.M1 TBS1-178.NGT.M2 T2-195.NGT.M1 T3-195.NGT.M1 T2-195.NGT.M2 T3-195.NGT.M2 T1-240.NGT.M2 T2-240.NGT.M2 T3-240.NGT.M2



T2-127.NGT.M1



Turbodrill T2–127.NGT.M1 has high speed of rotation and is used for drilling of wells with combination and impregnated bits of small diameter.

The turbodrill contains two turbine sections and bearing section. The turbine sections incorporate the turbine of high speed of rotation and low pressure drop. The turbine efficiency constitutes 68-70% at max. power. The turbodrill bearing section operates in mud and has axial sliding bearing, the operating surfaces made out of synthetic diamond. This allows reaching high power characteristics and overhaul operation life (not less than 300 hours).

Turbodrill specification

Housing OD, mm	122
OD of threaded connections, mm	127
Diameters of bits used, mm	146,0–171,4
Turbodrill length, mm	11651
Length of top turbine section, mm	5 196
Length of bottom turbine section, mm	4 947
Length of bearing section, mm	1 508
Connecting thread to drill pipes	3 1/2 Reg
Connecting thread to bit	3 1/2 Reg
Max. density of mud, g/cm ³	1,9
Max. axial load, kN	50
Weight, kg	750
Max. temperature in well, °C	250

Quantity of turbine sections, pc.	2
Mud flow rate, l/sec	14–16
Mud density, g/cm ³	1,0
Stall torque, N*m	1100–1450
Speed of rotation at operating condition, min ⁻¹	1151–1316
Pressure drop, MPa	6,3–8,2
Max. power, kW	63–93





T2-127.NGT.M2

Turbodrill T2–127.NGT.M2 has high speed of rotation and is used for drilling of wells with combination and impregnated bits of small diameter.

The turbodrill contains two turbine sections and bearing section. The turbine sections incorporate the turbine of high speed of rotation and low pressure drop. The turbine efficiency constitutes 68-70% at max. power. The turbodrill bearing section operates in mud and has axial sliding bearing, the operating surfaces made of synthetic diamond. This allows reaching high power characteristics and overhaul operation life (not less than 300 hours).

Turbodrill specification

Housing OD, mm	122
OD of threaded connections, mm	127
Diameters of bits used, mm	146,0–171,4
Turbodrill length, mm	11 651
Length of top turbine section, mm	5 196
Length of bottom turbine section, mm	4 947
Length of bearing section, mm	1 508
Connecting thread to drill pipes	3 1/2 Reg
Connecting thread to bit	3 1/2 Reg
Max. density of mud, g/cm ³	1,9
Max. axial load, kN	50
Weight, kg	750
Max. temperature in well, °C	250

2
10
1,0
988
1236
9,2
54



T1-178.NGT.M1 and T2-178.NGT.M1

High hydrodynamic alternating loads are created while tripping in a well using 212,7–215,9 mm dia. bits and 195 mm dia. downhole motor due to small annular distance between the well walls and the downhole motor. This leads to reduction of the well wall stability, layer breakage, decrease of well productivity. The turbodrills T1–178.NGT.M1 and T2–178.NGT.M1 of 178 mm OD are offered to increase the annular distance and, therefore, to improve conditions of well drilling with 212,7–215,9 mm bits. The turbodrill is available for drilling with impregnated and PDC bits.

The turbodrill incorporates one (T1-178.NGT.M1) or two (T2-178.NGT.M1) turbine sections and bearing section. High performance turbine made out of stainless steel by precision casting method is used in the turbine sections. The turbine efficiency constitutes 68-70% at max. power. The turbodrill is completed with the bearing section of enhanced operation life exceeding 400 hrs. The turbodrill bearing section operates in mud and has axial sliding bearing, the operating surfaces made of synthetic diamond. This allows reaching high power characteristics and increased overhaul life.

Code of turbodrill T1-178.NGT.M1 T2-178.NGT.M1 OD of threaded connections, mm 178 Diameters of bits used, mm 212,7-215,9 Turbodrill length, mm 9332 13004 Length of top turbine section, mm 7 3672 Length of bottom turbine section, mm 7 3 3 2 7 3 3 2 Length of bearing section, mm 2000 2000 51/2FH Connecting thread to drill pipes Connecting thread to bit 41/2 Reg Max. density of mud, g/cm^3 1,9 Max. axial load, kN 150 2 1 0 0 2 500 Weight, kg Max. temperature in well, °C 250

Turbodrill specification

Quantity of turbine sections, pc.	1	2		
Mud flow rate, l/sec	32-36	25-32		
Mud density, g/cm ³	1,0	1,0		
Stall torque, N*m	2843-3599	2450-4014		
Speed of rotation at operating condition, min ⁻¹	827-931	646-827		
Pressure drop, MPa	5,8–7,4	5,0–8,2		
Max. power, kW	107-152	72–151		







T1-178.NGT.M2 and T2-178.NGT.M2

High hydrodynamic alternating loads are created while tripping in a well using 212,7–215,9 mm dia. bits and 195 mm dia. downhole motor due to small annular distance between the well walls and the downhole motor. This leads to reduction of the well wall stability, layer breakage, decrease of well productivity. The turbodrills T1–178.NGT.M2 and T2–178NGT.M2 of 178 mm OD are offered to increase the annular distance and, therefore, to improve conditions of well drilling with 212,7–215,9 mm bits. The turbodrill is available for drilling with impregnated and PDC bits.

The turbodrill incorporates one (T1–178.NGT.M2) or two (T2– 178.NGT.M2) turbine sections and bearing section. High performance turbine made out of stainless steel by precision casting method is used in the turbine sections. The turbine efficiency constitutes 68–70% at max. power. The turbodrill is completed with the bearing section of enhanced operation life exceeding 400 hrs. The turbodrill bearing section operates in mud and has axial sliding bearing, the operating surfaces made of synthetic diamond. This allows reaching high power characteristics and increased overhaul life.

Turbodrill specification

Code of turbodrill	T1-178.NGT.M2 T2-178.NG			
OD of threaded connections, mm	178			
Diameters of bits used, mm	212,7–215,9			
Turbodrill length, mm	9 332	13 004		
Length of top turbine section, mm	-	3 672		
Length of bottom turbine section, mm	7 332	7 332		
Length of bearing section, mm	2 000	2 000		
Connecting thread to drill pipes	51/2FH			
Connecting thread to bit	4 1/2 Reg			
Max. density of mud, g/cm ³	1,9			
Max. axial load, kN	150			
Weight, kg	2 100	2 500		
Max. temperature in well, °C	250			

Quantity of turbine sections, pc.	1	2
Mud flow rate, l/sec	25–28	22–25
Mud density, g/cm ³	1,0	1,0
Stall torque, N*m	2254-2827	2443-3155
Speed of rotation at operating condition, min ⁻¹	926–1037	815–926
Pressure drop, MPa	6,4–8,0	6,9–8,9
Max. power, kW	100–140	95–140



TBS1-178.NGT.M1 and TBS1-178.NGT.M2



Turbodrills TBS1–178.NGT.M1 and TBS1–178.NGT.M2 are new universal turbodrill–whipstocks with an ultra–short arm to the point of axes curvature.

The turbodrill is available for drilling with impregnated and PDC bits in 212,7–220,7 mm dia.

Turbodrill contains turbine section and bearing section as whipstock with angle adjuster. Angle adjuster is available with the following bend angles: $0^{\circ}00'$, $0^{\circ}13'$, $0^{\circ}25'$, $0^{\circ}37'$, $0^{\circ}49'$, $1^{\circ}00'$, $1^{\circ}11'$, $1^{\circ}20'$, $1^{\circ}29'$, $1^{\circ}37'$, $1^{\circ}44'$, $1^{\circ}50'$, $1^{\circ}54'$, $2^{\circ}00'$.

Flexible shaft of titanium alloy is used for torque transmission.

Highly efficient turbines of M1 and M2 types are used in turbine section of turbodrills. Both turbines are made of stainless steel by precision casting method. The turbine efficiency constitutes 68–70% at max. power.

The turbodrill bearing sections have axial sliding bearing, the operating surfaces made of synthetic diamond. This allows obtaining high power characteristics and increased overhaul life.

Code of turbodrill TBS1-178.NGT.M1 TBS1-178.NGT.M2 OD of threaded connections, mm 178 212,7-215,9 Diameters of bits used, mm Turbodrill length, mm 10964 10964 Length of turbine section, mm 7 3 3 2 7 3 3 2 1 4 8 0 Bearing section length to curvature plane, mm 1480 51/2FH (NC-50) Connecting thread to drill pipes 41/2 Reg Connecting thread to bit Max. density of mud, g/cm^3 1,9 Max. axial load, kN 150 2 1 0 0 Weight, kg 2 1 0 0 Max. temperature in well, °C 250

Turbodrill specification

Quantity of turbine sections, pc.	1	1
Mud flow rate, l/sec	32–36	25–28
Mud density, g/cm ³	1,0	1,0
Stall torque, N*m	2843-3599	2254-2827
Speed of rotation at operating condition, min ⁻¹	827-931	926–1037
Pressure drop, MPa	5,8–7,4	6,4–8,0
Max. power, kW	107-152	100-140





T2-195.NGT.M1 and T3-195.NGT.M1

The turbodrill incorporates two (T2–195.NGT.M1) or three (T3–195.NGT.M1) turbine sections and bearing section. Medium speed turbine is used in the turbine sections.

The turbodrill bearing section operates in mud medium and has a combined axial bearing: multi-row thrust ball bearing with toroidal raceways and rubber-metal heals. Friction surfaces of radial bearings are reinforced with plates made of hard alloy. This allows reaching high power characteristics and increased overhaul life.

Turbodrill specification

Code of turbodrill	T2-195.NGT.M1	T3-195.NGT.M1		
OD of threaded connections, mm	19	95		
Diameters of bits used, mm	215,9	-250,8		
Turbodrill length, mm	17 915	25 280		
Length of top turbine section, mm	7 600	7 600		
Length of middle turbine section, mm	7 365	7 365		
Length of bottom turbine section, mm	-	7 365		
Length of bearing section, mm	2 950	2 950		
Connecting thread to drill pipes	51/2FH			
Connecting thread to bit	4 1/2 Reg			
Max. density of mud, g/cm ³	1	,9		
Max. axial load, kN	25	50		
Weight, kg	3 340	4 720		
Max. temperature in well, °C	1	10		

Quantity of turbine sections, pc.	2	3			
Mud flow rate, I/sec	32-36	32–36			
Mud density, g/cm ³	1,0				
Stall torque, N*m	2240-2835	3360-4252			
Speed of rotation at operating condition, min ⁻¹	411–463	411–463			
Pressure drop, MPa	3,0–3,7	4,4–5,6			
Max. power, kW	52-71	75–107			



T2-195.NGT.M2 and T3-195.NGT.M2



The turbodrill incorporates two (T2–195.NGT.M2) or three (T3–195.NGT.M2) turbine sections and bearing section. Highly productive turbine made with precision casting technique is used in the turbine sections.

The turbodrill bearing section operates in mud medium and has a combined axial bearing: multi-row thrust ball bearing with toroidal raceways and rubber-metal heals. Friction surfaces of radial bearings are reinforced with plates made of hard alloy. This allows reaching high power characteristics and increased overhaul life.

Turbodrill specification

Code of turbodrill	T2-195.NGT.M2	T3-195.NGT.M2			
OD of threaded connections, mm	19	195			
Diameters of bits used, mm	215,9	-250,8			
Turbodrill length, mm	17915	25 280			
Length of top turbine section, mm	7 600	7 600			
Length of middle turbine section, mm	7 365	7 365			
Length of bottom turbine section, mm	_	7 365			
Length of bearing section, mm	2 950	2 950			
Connecting thread to drill pipes	51/2FH				
Connecting thread to bit	4 1/2 Reg				
Max. density of mud, g/cm ³	1	,9			
Max. axial load, kN	2	50			
Weight, kg	3 340	4 720			
Max. temperature in well, °C	1	10			

Quantity of turbine sections, pc.	2	3	
Mud flow rate, l/sec	32-36	32–36	
Mud density, g/cm ³	1	,0	
Stall torque, N*m	3151-3988	4726-5982	
Speed of rotation at operating condition, min ⁻¹	594-669	594-669	
Pressure drop, MPa	4,0–5,1	6,0–7,6	
Max. power, kW	92–132	139–197	



T1-240.NGT.M2, T2-240.NGT.M2 and T3-240.NGT.M2



The turbodrill incorporates one (T1–240.NGT.M2), two (T2– 195.NGT.M1) or three (T3–195.NGT.M2) turbine sections and bearing section. Medium speed turbine is used in the turbine sections which provides suitable characteristics in double–section version. This turbine has high torque and is recommended to drill with rock bits in soft and medium rocks.

The turbodrill bearing section operates in mud medium and has a combined axial bearing: multi-row thrust ball bearing with toroidal raceways and rubber-metal heals. Friction surfaces of radial bearings are reinforced with plates made of hard alloy. This allows reaching high power characteristics and increased overhaul life.

Turbodrill specification

Code of turbodrill	T1-240.NGT.M2	T2-240.NGT.M2	T3-240.NGT.M2		
OD of threaded connections, mm	240				
Diameters of bits used, mm	2	269,9–393,	7		
Turbodrill length, mm	9 958	16 698	23 438		
Length of top turbine section, mm	6 985	6 985	6 985		
Length of middle turbine section, mm	-	6740	6 740		
Length of bottom turbine section, mm	-	-	6 740		
Length of bearing section, mm	2 973	2 973	2 973		
Connecting thread to drill pipes	65/8FH				
Connecting thread to bit	6 5/8 Reg				
Max. density of mud, g/cm ³	1,9				
Max. axial load, kN		300			
Weight, kg	2 535	4275	6015		
Max. temperature in well, °C		110			

Quantity of turbine sections, pc.	1	2	З
Mud flow rate, I/sec	45–50	34–45	32–34
Mud density, g/cm ³		1,0	
Stall torque, N*m	3626-4477	4140-7252	5501-6210
Speed of rotation at operating condition, min ⁻¹	619–688	468–619	440-468
Pressure drop, MPa	3,8–4,6	4,3–7,5	5,7–6,4
Max. power, kW	118–161	101-235	127–152

Turbodrill technical specification

				Quantity of turbine sections, pcs			O					Connecting thread		
Code	Dia. of bits used, mm	Length, mm	Weight, kg	Turbine	Bearing section	turbine stages in turbodrill, psc	Mud flow rate, I⁄sec	operating condition, min ⁻¹	Stall torque, N*m	Pressure drop, MPa	Max. power, kW	to drill pipes	to bit	Rage of bend angles, deg
T2-127.NGT.M1	146,0-171,4	11 651	750	2	1	220	14-16	1151–1316	1100-1450	6,3–8,2	63–93	3 1/2 Reg	3 1/2 Reg	-
T2-127.NGT.M2	146,0–171,4	11 651	750	2	1	220	10	1236	988	9,2	54	3 1/2 Reg	3 1/2 Reg	-
T1-178.NGT.M1	212,7–215,9	9 332	2 100	1	1	170	32-36	827-931	2843-3599	5,8-7,4	107–152	51/2FH	4 1/2 Reg	-
T2-178.NGT.M1	212,7–215,9	13 004	2 500	2	1	240	25-32	646-827	2450-4014	5,0-8,2	72–151	51/2FH	4 1/2 Reg	-
T1-178.NGT.M2	212,7–215,9	9 332	2100	1	1	150	25–28	926–1037	2254-2827	6,4-8,0	100-140	51/2FH	4 1/2 Reg	-
T2-178.NGT.M2	212,7–215,9	13 004	2 500	2	1	210	22-25	815-926	2443-3155	6,9-8,9	95–140	51/2FH	4 1/2 Reg	-
TBS1-178.NGT.M1	212,7–215,9	10964	2100	1	1	170	32–36	827–931	2843-3599	5.8-7.4	107–152	51/2FH	4 1/2 Reg	0° – 2°
TBS1-178.NGT.M2	212,7–215,9	10964	2 100	1	1	150	25–28	926-1037	2254-2827	6.4-8.0	100-140	51/2FH	4 1/2 Reg	0° - 2°
T2-195.NGT.M1	215,9–250,8	17 915	3 340	2	1	220	32–36	411–463	2240-2835	3,0–3,7	52-71	51/2FH	4 1/2 Reg	-
T3-195.NGT.M1	215,9–250,8	25 280	4 720	3	1	330	32-36	411-463	3360-4252	4,4–5,6	75–107	51/2FH	4 1/2 Reg	-
T2-195.NGT.M2	215,9–250,8	17 915	3 340	2	1	220	32–36	594-669	3151-3988	4,0–5,1	92–132	51/2FH	4 1/2 Reg	-
T3-195.NGT.M2	215,9-250,8	25 280	4 720	3	1	330	32–36	594-669	4726-5982	6,0-7,6	139–197	51/2FH	4 1/2 Reg	-
T1-240.NGT.M2	269,9–393,7	9 958	2 535	1	1	109	45-50	619–688	3626-4477	3,8-4,6	118–161	6 5/8 FH	6 5/8 Reg	-
T2-240.NGT.M2	269,9-393,7	16 698	4 275	2	1	218	34–45	468-619	4140-7252	4,3–7,5	101-235	65/8FH	6 5/8 Reg	-
T3-240.NGT.M2	269,9–393,7	23 438	6015	З	1	327	32–34	440-468	5501-6210	5,7–6,4	127–152	6 5/8 FH	6 5/8 Reg	-

Note: turbodrill power characteristics are given at mud density of 1.0 g/ cm 3





Components and spare parts for turbodrills and PDM

Research and development, having been made by the company during last 17 years, in the area of long–lasting axial and radial bearings, new types of turbines, universal joints, angle adjustment units, and also in the area of design and production technology improvement, and application of corrosion and wear–resistant materials created basis for the newest PDMs and additional equipment with enhanced power, technological and performance features.

The most significant result of the work has become creation of:

- own unique range of radial bearings with impregnated hard-alloy components;
- own unique range of multi-row ball axial bearings of extended precision;
- axial bearings with polycrystalline diamond inserts;

 high-performance turbine stages (up to 60–70% efficiency) produced by precision casting method of stainless steel as per smelted models.

As a result of this complex of long-term design and production works, the full range of PDM sizes was created, where bearing sections are able not only to stand loading of drilling according to modern methods and modes as long as possible without failing, but also to transfer maximum torque from the most modern, perspective and powerful power sections of both Russian and foreign production.







Slotted strainers

Slotted strainers are mounted above positive displacement motor and used to prevent foreign objects and coarse slurry getting into motor.

Main advantages of slotted strainers designed by NGT company in comparison with those of other manufacturers are listed below:

1. Filtering element is easy to extract to get cleaned in the field conditions.



2. Filter case works as "flex sub" reducing tension in stator thread of PDM when direct drilling part of the well with drill string rotation and going through the smaller radius part of the well.

		Designations							
Specifications	F-95 F-106	F-120	F–165	F–178	F-210	F-240			
Outer diameter, mm	106	120	165	178	210	240			
Total length, mm	889	870	1100	1100	1100	1 050			
Case length, mm 800		768	986	973	973	923			
Connecting thread, 3–86 top (box)		3–102	3–133	3–147	3–152	3–171			
Connecting thread, bottom (pin)	3–86	3-102	3–133	3–147	3–152	3–171			
Filter degree, mm	4	4	4	4	4	4			
Mud flow rate, max, l/s	18	21	31	45	45	70			
Weight, kg	27	40	87	93	134	183			

Sand content in the mud shouldn't exceed than 1%.



Float valves

Float valves are necessary to prevent motor sludging when drill string running down and also to prevent showings of oil, gas and water from the well through the drilling string when drilling oil and gas wells. Float valves are mounted above positive displacement motor. Main advantages of back-pressure valves designed by NGT



company in comparison with those of other manufacturers are listed below:

1. Float valve design doesn't have hard alloy units at all which simplifies it, ensures its reliability, and, consequently, ensures considerable valve operation life.

2. Float valve design doesn't have rubber sealing elements which allows applying back– pressure valves in any, even high–temperature, wells and also enhances its reliability and simplicity of its repairs.

3. Protective coverage of valve spring and its piston allows the valve working in any corrosive environment during longer period of time in comparison with the valves of other manufacturers. Due to the abovementioned design features, the overhaul period of our float valves is around 280 working hours.

	Designations									
Specifications	KO-76	KO-95 KO-106	KO-120	KO-165	KO-178	KO-195	KO-210	KO-240		
Outer diameter, mm	76	106	120	165	178	195	210	240		
Total length, mm	226	329	382	484	497	497	497	547		
Case length, mm	190	240	280	370	370	370	370	420		
Connecting thread, top (box)	3–66	3–86	3-102	3–133	3–147	3–147	3–152	3–171		
Connecting thread, bottom (pin)	3-66	3–86	3–102	3–133	3–147	3–147	3-152	3–171		
Valve closing pressure, kg/cm²	0,3	0,3	0,3	0,4	0,4	0,3	0,3	0,3		
Mud flow rate, max, l/s	5	13	20	40	40	55	60	70		
Weight, kg	6	13	18	47	52	66	78	116		

Sand content in the mud shouldn't exceed than 1%. Mud density shouldn't exceed than 2 g/cm? Valve proof-test pressure while underfeeding is 350 bar.



Dump valves

Dump valve is mounted above positive displacement motor and used to connect internal drill pipe chamber with annulus during trips. Use of the valve reduces hydrodynamic effect on bottom while drill sting trip and protects PDM from no-load rotation. While pulling out, PDM in conjunction with the valve excludes uncontrolled mud spilling.³The dump



values are suitable for the mud density of up to 2 g/cm at the bottomhole, the content of oil products of less than 10 %, sand of less than 1%, temperature of not exceeding 130 °C.

	Designations										
Specifications	KP-76	KP-88	KP-95 KP-106	KP-120	KP-127	KP-165	KP-178	KP-195	KP-210	KP-240	
Outer diameter, mm	76	88	105	120	127	165	178	195	210	240	
Diameter of flow area, mm	20	20	28	28	28	45	50	50	50	55	
Total length, mm	436	436	595 584	435	605	554	567	567	567	587	
Case length, mm	360	360	495	333	505	440	440	440	440	460	
Connecting thread, top (box)	3–66	3-66	3-86	3-102	3–102	3–133	3–147	3–147	3–152	3–171	
Connecting thread, bottom (pin)	3-66	3–66	3-86	3–102	3-102	3–133	3–147	3–147	3–152	3–171	
Valve closing pressure, kg/ cm²	1,4–2,1	1,4–2,1	2–3	2–3	2–3	2,4–3,1	2,3–3,0	2,3–3,0	2,3–3,0	2,8–3,7	
Mud flow rate, max, l⁄s	10	10	25	25	25	40	50	50	50	55	
Weight, kg	10	14	26	24	41	55	66	81	99	130	

Sand content in the mud shouldn't exceed than 1%. Mud density shouldn't exceed than 2 g/cm^3 .



Stabilizers

<u>70</u>

Stabilizers are used as components of bottom hole drill string assembly when drilling oil and gas wells.

Application

The stabilizers are used for:

- holding vertical borehole section when drilling vertical wells;
- steering parameters of well deviation and its stabilization.

Production versions

Meeting customer's requirements different centralizer versions are available:

- 98,4 311 mm diameter;
- straight blades;
- spiral blades;
- different lengths;
- different threads as per GOST P50864-96 or API Specs 7.

The stabilizer housings are produced of steel 40XH2MA. Operating surfaces of the blades and lead–in chamfers are reinforced with teeth made out of hard alloy VK6 or Vk8.



Single string selective production equipment

Main task during single string selective production of hydrocarbons in one well is observance of Rules for protection of subsurface resources PB 07–601–03 where main requirement is hydrocarbon production recording for every deposit and field test conducting. JSC «NGT» offers single string selective production equipment that solves abovementioned



challenges fully, and its usage fulfills all legal requirements in protection of subsurface resources.

What unique about the idea of the single string selective production equipment application is that it uses annular distance as water–carrying tunnel for temporary cutout of one of the oil formations. As a result there is a possibility of carrying out field tests of a certain field facility. Technically, this is solved by using packer system that isolates oil formations and shutdown safety valves that ensure temporary shutdown of the influx of one of the formations to make field tests in another one. Shutdown of the formations is done by hydraulic influence on the shutdown safety valves, that is, by injection of, for example, technical water to the tubular annulus. Reliability and distinction of the construction allows using every formation potential as formation pressure and efficiency of the object change during the working process.

UKORD-UKORD-UKORD-Parameter 89.NGT.M1 120.NGT.M1 120.NGT.M2 Throughput capacity, m^3/day up to 80 up to 400 up to 400 Apparent viscosity of the hydrocarbons Without limitations Quantity of formations for the tests 2 2 З Applicability in the production string, mm 114 146 146 120 Outer diameter of the equipment, mm 89 120 Possibility of pressure regulator installation Yes Yes Yes

The company has developed several modifications of multi-level equipment:

Main unique selling points of our single string selective production equipment are:

- possibility of using any standard downhole pumping equipment (one pipe lift, one pump);
- no limitation in regard with the depth of the well or gas/oil ratio;
- possibility of using in the small diameters wells and side tracks.

In order to understand the processes in the well when using this equipment there is a possibility to complete the equipment set with telemetric system.

Specialists of JSC «NGT» are ready to make a presentation and instruct you on the equipment application at any convenient time. We also provide engineering support for the single string selective production equipment during the first launches of the equipment at the client's worksite.


Hydraulic Jar

Ø165 160 mm Ø114 5500 - 6100 mm Ø165

Hydraulic Jar HJ–165.NGT.M1 is a hydraulic downhole double– acting jarring mechanism designed for permanent operation in BHA and freeing of the drill string in case of its sticking while drilling of oil and gas wells. Hydraulic Jar operates by delivering direct impacts to the stuck tool, both upwards and downwards or by turns depending on the type of sticking.

Jar design allows the transmission of torque during rotary drilling and ensures lowering of geophysical tools for measuring as well.

The force of upwards impact is adjusted by drill string straining force. The force of downward impact is adjusted by drill string off–loading force when stuck freeing.

Technical specification of jar

Jar code	HJ-165.NGT.M1
Housing OD (max), mm	165
Housing ID (min), mm	64
Length (max), mm	6 150
Full stroke, mm	600
Hydraulic delay time at stretching/ straining, sec	30–180
Maximum stretching/ straining load at hydraulic delay, kgf	80 000
Maximum axial load, kgf	230 000
Maximum torque, kgf*m	4 000
Connecting thread, top (box)	NC 50
Connecting thread, bottom (pin)	NC 50



Circulating Sub

Circulating Sub CS–105.NGT.M1 allows to reverse the flow of circulation fluid from drill pipe inner bore to the annulus and back.

The CS application allows protecting from sludging telemetry system, PDM and bit when it's necessary to inject plugging materials to BHA in a lost-circulation control zones during drilling or, sometimes, during well acidizing without tool tripping.

The switching of sub operation mode is done at rig floor by dropping Switchover Balls into the drill string.

Sub housing also operates as a «flexible» sub which makes BHA passing through the well parts with large building rates easier.

Technical specification

Circulating Sub code	CS-105.NGT.M1
OD, mm	105
Flow area minimum diameter, mm	24,6
Total length, mm	1 354
Connecting thread, top (box)	NC 31
Connecting thread, bottom (pin)	NC 31
Quantity of ports, pcs	2
Sub closing pressure, kg/cm ²	150±20
Pressure drop at sub opening, kg/ cm ²	8–10
Quantity of activation/deactivation cycles	9
Drilling fluid pumping flow rate (sub is open), I/sec	6–12
Mud weight, not more than kg/m ³	1 600
Maximum size of plugging materials, mm	7
Weight, kg	59



Ø105

465 mm Sub



Notes



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