

The background of the cover features a close-up, low-angle shot of several parallel, polished metal drill rods. The rods are highly reflective, showing bright highlights and deep shadows that emphasize their cylindrical texture. The lighting is dramatic, with a strong blue and white color palette. In the upper portion, there is a dark blue horizontal band containing the company name and product type. The lower portion of the cover is dominated by the detailed view of the drill rods, with some semi-transparent, light-colored curved shapes overlaid on the image.

NGT

HYDRAULIC DOWNHOLE MOTORS

PRODUCT CATALOGUE

About company

JSC «NGT» is one of the leading engineering companies in the development of hydraulic downhole motors (HDM) and equipment for multi-level hydrocarbonate recovery in one oil well. The company provides complete production cycle of HDM and single string selective production equipment:

- ✓ Design;
 - ✓ Production of prototypes;
 - ✓ Stand and field tests;
 - ✓ Continuous improvement of design;
 - ✓ Commercial production of HDM and equipment for single string selective production.
-

Main directions of the company's activity:

- ✓ Positive Displacement Motors (PDM's);
 - ✓ Bearing sections for PDM's and turbodrills;
 - ✓ Turbodrills;
 - ✓ Components for PDM's and turbodrills;
 - ✓ Bypass valves;
 - ✓ Centralizers;
 - ✓ Single string selective production equipment;
 - ✓ Complete service.
-

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

Certificate of conformance C–RU.AГ35.B.00018 number 0962920
«Hydraulic downhole motors».

Certificate of conformance C–RU.AГ35.B.00020 number 0962922
«Adjustable downhole assemblies»

Declaration of conformity of technical regulations of the Customs Union 010/2011 “On safety of machinery and equipment”, number TC N RU Д–RU.MMO4.B.06687

Certificates and Licenses

**Единая система оценки соответствия
в области промышленной, экологической
безопасности, безопасности в энергетике и
строительстве**

**СЭИВ
СНК**
СИСТЕМА НЕРАЗРУШАЮЩЕГО КОНТРОЛЯ

СВИДЕТЕЛЬСТВО ОБ АТТЕСТАЦИИ
№ 84А140159

Независимый орган по аттестации
лабораторий неразрушающего контроля
Общество с ограниченной ответственностью
Западно-Уральский аттестационный центр
«Нерконт плюс»

УДОСТОВЕРЯЕТ
Лаборатория неразрушающего контроля
Закрытого акционерного общества «НГТ»
(ЗАО «НГТ»)
614058, г. Пермь, ул. Фоминская, д.54

УДОВЛЕТВОРЯЕТ
требования Системы неразрушающего контроля
Ростехнадзора.

Область аттестации и условия действия Свидетельства
определены в приложении к настоящему Свидетельству

Дата регистрации 06 марта 2015 г.
Свидетельство действительно до 06 марта 2018 г.

Без приложения не действительно
(приложение на одном листе)

Руководитель
Независимого органа
по аттестации лабораторий
неразрушающего контроля


В.А. Пепеляев

№ 11484-(1)-12

**Единая система оценки соответствия
в области промышленной, экологической
безопасности, безопасности в энергетике и
строительстве**

Независимый орган по аттестации
лабораторий неразрушающего контроля
Общество с ограниченной ответственностью
Западно-Уральский аттестационный центр
«Нерконт плюс»

ПРИЛОЖЕНИЕ К СВИДЕТЕЛЬСТВУ ОБ АТТЕСТАЦИИ
№84А140159 от 06 марта 2015 г.
Лаборатория неразрушающего контроля
Закрытого акционерного общества «НГТ»
(ЗАО «НГТ»)
614058, г. Пермь, ул. Фоминская, д.54

На 1-ом листе Лист 1

ОБЛАСТЬ АТТЕСТАЦИИ
Наименование оборудования (объектов):

6. Оборудование нефтяной и газовой промышленности:

- 6.1. Оборудование для бурения скважин.
- 6.2. Оборудование для эксплуатации скважин.
- 6.3. Оборудование для освоения и ремонта скважин.

Виды (методы) неразрушающего контроля:

2. Ультразвуковой.
- 2.1. Ультразвуковая дефектоскопия.
- 2.2. Ультразвуковая толщинометрия.
4. Магнитный:
- 4.1. Магнитопорошковый.
11. Визуальный и измерительный.

Виды деятельности:
Проведение контроля оборудования и материалов неразрушающими методами при изготовлении, строительстве, монтаже, ремонте, реконструкции, техническом диагностировании и экспертизе промышленной безопасности вышеперечисленных объектов.

Условия действия свидетельства.
Свидетельство действительно в течение установленного срока при условии подтверждения результатами проверок соответствия требованиям Правил аттестации и основных требований к лабораториям неразрушающего контроля.

Руководитель
Независимого органа
по аттестации лабораторий
неразрушающего контроля


В.А. Пепеляев

№ 11484-(2)-12

**РОССИЙСКАЯ ФЕДЕРАЦИЯ
СЕРТИФИКАТ СООТВЕТСТВИЯ**
(обязательная сертификация)

№ **C-RU.A735.B.00020** **ТР 0962922**
(номер сертификата соответствия) (судетский номер бренда)

ЗАЯВИТЕЛЬ (наименование и место нахождения заявителя) Закрытое акционерное общество «НГТ», Адрес: РФ, 614068, Пермский край, г. Пермь, ул. Пушкина, 113. ОГРН: 1025900513935. Телефон (342) 238-61-01, факс (342) 238-61-02.

ИЗГОТОВИТЕЛЬ (наименование и место нахождения изготовителя продукции) Закрытое акционерное общество «НГТ», Адрес: РФ, 614068, Пермский край, г. Пермь, ул. Пушкина, 113. ОГРН: 1025900513935. Телефон (342) 238-61-01, факс (342) 238-61-02.

ОРГАН ПО СЕРТИФИКАЦИИ (наименование и местонахождение органа по сертификации, обязательной сертификации заявителем) ОБЩЕСТВО С ОГРАНИЧЕННОЙ ОТВЕТСТВЕННОСТЬЮ «ЦЕНТР СЕРТИФИКАЦИИ «СертиПромТест». РФ, 107078, г. Москва, ул. Новая Басманная, 23Б, стр. 20, тел. +7 (499) 346-29-85. ОГРН: 1107746715669. Аттестат рег. № РОСС RU.0001.11A735 выдан 15.06.2011 г. Федеральным агентством по техническому регулированию и метрологии.

ПОДТВЕРЖАЕТСЯ, ЧТО (наименование и место нахождения продукции) Управляемые забойные компоновки, выпускаемые по ТУ3663-101-52275083-2006. Серийный выпуск.

ПРОДУКЦИЯ (наименование и место нахождения продукции, подлежащей обязательной сертификации) Серийный выпуск.

СООТВЕТСТВУЕТ ТРЕБОВАНИЯМ ТЕХНИЧЕСКОГО РЕГЛАМЕНТА (ТЕХНИЧЕСКИХ РЕГЛАМЕНТОВ) (наименование технического регламента (стандартов, технических регламентов, правил, нормативных требований метрологии (включая правила обязательной сертификации)) Технический регламент о безопасности машин и оборудования (Постановление Правительства РФ от 15.09.2009 N 753) ГОСТ 5286-75; ГОСТ 28487-90, ГОСТ 12.2.003-91, ГОСТ 12.1.012-2004

ПРОВЕДЕННЫЕ ИССЛЕДОВАНИЯ (ИСПЫТАНИЯ) И ИЗМЕРЕНИЯ (наименование, адрес, дата проведения исследования) Протокол сертификационных испытаний № 02.2011-136 от 29.08.2011 г. Общество с ограниченной ответственностью ИЛ "АС РЕСУРС", рег. № РОСС RU.0001.21AB63 от 07.07.2011 до 07.07.2016, адрес: 105318, г. Москва, ул. Ибрагимова, д. 35, стр. 2, этаж 1, пом. 1, комн. 1а

ПРЕДСТАВЛЕННЫЕ ДОКУМЕНТЫ (наименование, адрес, дата представления документов) Протокол сертификационных испытаний № 02.2011-136 от 29.08.2011 г. Общество с ограниченной ответственностью ИЛ "АС РЕСУРС", рег. № РОСС RU.0001.21AB63 от 07.07.2011 до 07.07.2016, адрес: 105318, г. Москва, ул. Ибрагимова, д. 35, стр. 2, этаж 1, пом. 1, комн. 1а

СРОК ДЕЙСТВИЯ СЕРТИФИКАТА СООТВЕТСТВИЯ с 30.08.2011 по 29.08.2016

Руководитель (заместитель руководителя) органа по сертификации
Ильин, Александр Феофанович


Б. В. Позогин

Эксперт (эксперты)
Лукиянов, Александр Николаевич


А. Н. Лукьянов

**РОССИЙСКАЯ ФЕДЕРАЦИЯ
СЕРТИФИКАТ СООТВЕТСТВИЯ**
(обязательная сертификация)

№ **C-RU.A735.B.00018** **ТР 0962920**
(номер сертификата соответствия) (судетский номер бренда)

ЗАЯВИТЕЛЬ (наименование и место нахождения заявителя) Закрытое акционерное общество «НГТ», Адрес: РФ, 614068, Пермский край, г. Пермь, ул. Пушкина, 113. ОГРН: 1025900513935. Телефон (342) 238-61-01, факс (342) 238-61-02.

ИЗГОТОВИТЕЛЬ (наименование и место нахождения изготовителя продукции) Закрытое акционерное общество «НГТ», Адрес: РФ, 614068, Пермский край, г. Пермь, ул. Пушкина, 113. ОГРН: 1025900513935. Телефон (342) 238-61-01, факс (342) 238-61-02.

ОРГАН ПО СЕРТИФИКАЦИИ (наименование и местонахождение органа по сертификации, обязательной сертификации заявителем) ОБЩЕСТВО С ОГРАНИЧЕННОЙ ОТВЕТСТВЕННОСТЬЮ «ЦЕНТР СЕРТИФИКАЦИИ «СертиПромТест». РФ, 107078, г. Москва, ул. Новая Басманная, 23Б, стр. 20, тел. +7 (499) 346-29-85. ОГРН: 1107746715669. Аттестат рег. № РОСС RU.0001.11A735 выдан 15.06.2011 г. Федеральным агентством по техническому регулированию и метрологии.

ПОДТВЕРЖАЕТСЯ, ЧТО (наименование и место нахождения продукции) Двигатели гидравлические забойные, выпускаемые по ТУ3664-101-52275083-2006. Серийный выпуск.

ПРОДУКЦИЯ (наименование и место нахождения продукции, подлежащей обязательной сертификации) Серийный выпуск.

СООТВЕТСТВУЕТ ТРЕБОВАНИЯМ ТЕХНИЧЕСКОГО РЕГЛАМЕНТА (ТЕХНИЧЕСКИХ РЕГЛАМЕНТОВ) (наименование технического регламента (стандартов, технических регламентов, правил, нормативных требований метрологии (включая правила обязательной сертификации)) Технический регламент о безопасности машин и оборудования (Постановление Правительства РФ от 15.09.2009 N 753)

ПРОВЕДЕННЫЕ ИССЛЕДОВАНИЯ (ИСПЫТАНИЯ) И ИЗМЕРЕНИЯ (наименование, адрес, дата проведения исследования) Протокол сертификационных испытаний № 01.2011-136 от 26.08.2011 г. Общество с ограниченной ответственностью ИЛ "АС РЕСУРС", рег. № РОСС RU.0001.21AB63 от 07.07.2011 до 07.07.2016, адрес: 105318, г. Москва, ул. Ибрагимова, д. 35, стр. 2, этаж 1, пом. 1, комн. 1а

ПРЕДСТАВЛЕННЫЕ ДОКУМЕНТЫ (наименование, адрес, дата представления документов) Протокол сертификационных испытаний № 01.2011-136 от 26.08.2011 г. Общество с ограниченной ответственностью ИЛ "АС РЕСУРС", рег. № РОСС RU.0001.21AB63 от 07.07.2011 до 07.07.2016, адрес: 105318, г. Москва, ул. Ибрагимова, д. 35, стр. 2, этаж 1, пом. 1, комн. 1а

СРОК ДЕЙСТВИЯ СЕРТИФИКАТА СООТВЕТСТВИЯ с 29.08.2011 по 28.08.2016

Руководитель (заместитель руководителя) органа по сертификации
Ильин, Александр Феофанович


Б. В. Позогин

Эксперт (эксперты)
Лукиянов, Александр Николаевич


А. Н. Лукьянов

Positive Displacement Motors (PDM's)

In the early 60's the idea of creation of PDM based 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 worldwide.

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, during 47 years PDM's have passed evolutionary trend of development becoming one of the most efficient tools for well drilling.

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 significantly the torque and life due to increase of the power section length. The power section life at that time highly exceeded PDM spindle overhaul life.

Our company has developed high capacity reliable spindles featuring enhanced life and the longest overhaul period of PDM's among Russian producers.

The special attention of the company is paid to trouble-free run of PDM's produced. Each motor is equipped with two emergency devices:

- the emergency device on the spindle shaft, which in case of the shaft break (in its thin section) will not allow the shaft to drop out from the spindle housing;
- the top sub (safety sub) has the fishing tool to pull out PDM parts using the rotor in case of breaks or thread unscrewing.

This catalogue presents our most popular PDM's among our customers.



28 PDM's performance in the Kazakhstan Republic

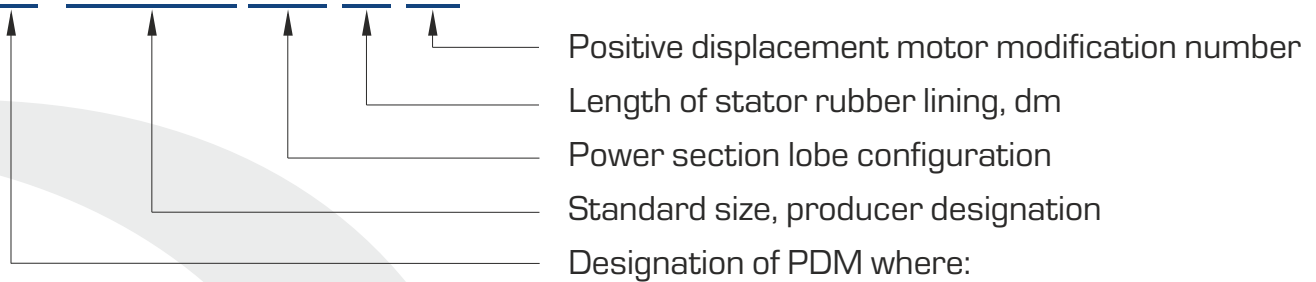
27 positive displacement motors of 178 mm diameter and 1 positive displacement motor of 210 mm dia. run under control in Kazakhstan in 2011–2013. The 28 positive displacement motors had an average overhaul interval exceeding 280 hrs, showing high stable quality of the drilling equipment developed and produced at JSC «NGT»:

PDM model, Serial number	Cumulative operating time, hour	Quantity of repairs, pcs	Interrepair time, hour	
			On PDM	Average
DR-178.NGT.5/6.M15, # 339	323,0	1	323,0	281,0
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	
DR-178.NGT.4/5.M15, # 390	629,0	2	314,5	
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:

DR-106.NGT.5/6.53.M1

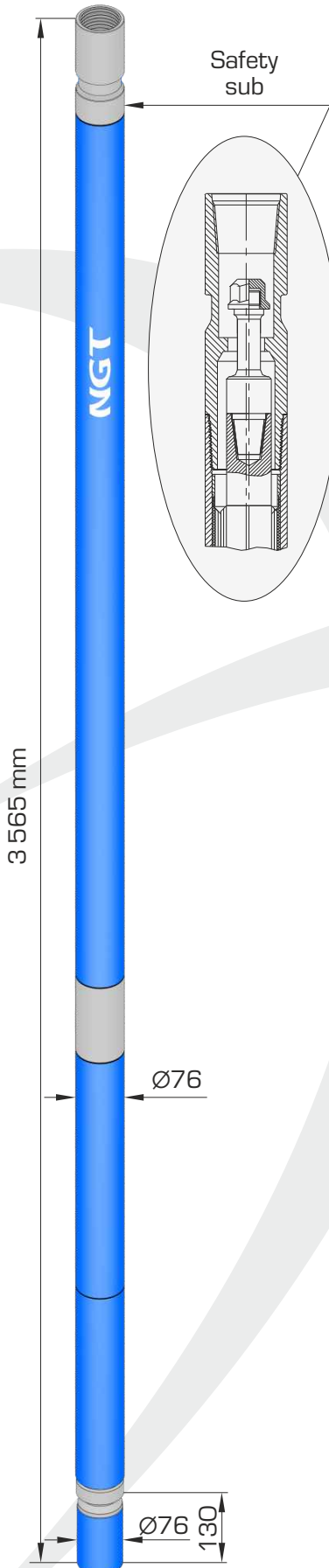


- D – positive displacement motor,
- DO – downhole motor–whipstock with fixed bend angle,
- DR – downhole motor–whipstock with adjustable housing

PDM's presented in the catalogue:

D-76.NGT.4/5.20.M1	DR-178.NGT.7/8.55.M15
DO-76.NGT.4/5.20.M1	DR-178.NGT.7/8.62.M15
DR-76.NGT.4/5.20.M2	DR-178.NGT.7/8.63.M15
DR-88.NGT.5/6.20.M1	DR-178.NGT.7/8.64.M15
DR-88.NGT.5/6.24.M1	DR-178.NGT.4/5.54.M23
DR-88.NGT.7/8.27.M1	DR-178.NGT.7/8.52.M23
DR-95.NGT.7/8.44.M1	DR-178.NGT.7/8.55.M23
DR-95.NGT.7/8.53.M1	DR-178.NGT.7/8.62.M23
DR-106.NGT.5/6.53.M1	DR-178.NGT.7/8.63.M23
DR-106.NGT.7/8.30.M1	DR-178.NGT.7/8.64.M23
DR-106.NGT.5/6.53.M2	DR-195.NGT.5/6.43.M1
DR-106.NGT.7/8.30.M2	DR-195.NGT.6/7.43.M1
DR-120.NGT.6/7.30.M2	DR-210.NGT.7/8.42.M1
DR-120.NGT.7/8.59.M2	DR-210.NGT.7/8.50.M1
DR-165.NGT.7/8.58.M1	DR-240.NGT.3/4.62.M1
DR-165.NGT.7/8.69.M1	DR-240.NGT.3/4.63.M1
DR-178.NGT.7/8.52.M15	DR-240.NGT.5/6.63.M1

D-76.NGT.4/5.20.M1



PDM D-76.NGT.4/5.20.M1 is a new universal 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 hard alloy bearings. All the threads are screwed applying 3M glue, and each motor is complete with 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.

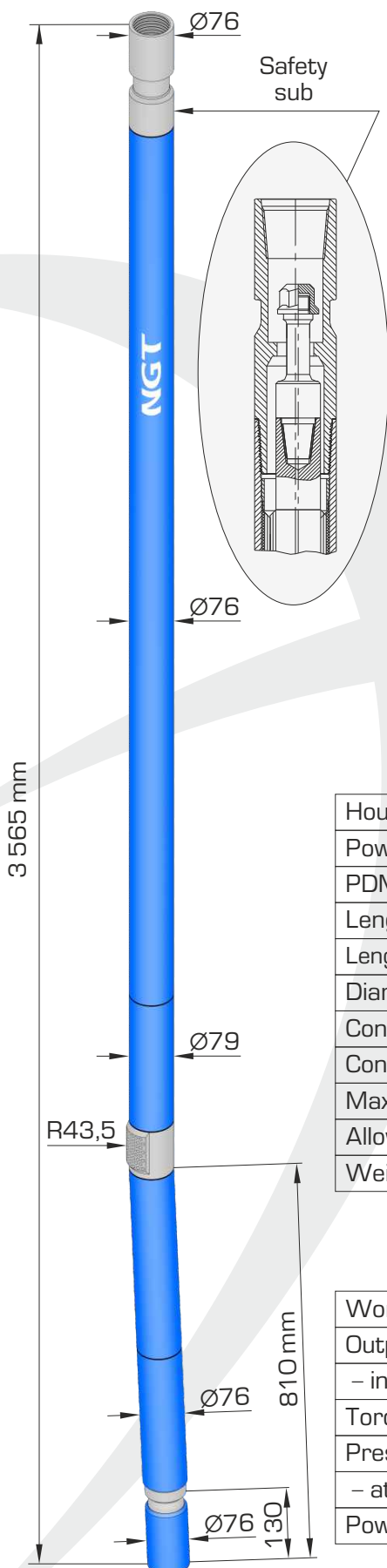
Technical specification

Housing OD, mm	76
Power section lobe configuration	4/5
PDM length, mm	3 565
Length of stator rubber lining, mm	2 000
Length of bearing section up to a curvature point, mm	–
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

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

DO-76.NGT.4/5.20.M1



PDM DO-76.NGT.4/5.20.M1 is a new 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.

A rigid bent sub is placed between bearing section and power section.

Bearing section has axial multi-row rolling bearing and radial hard alloy bearings. 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°/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 applying 3M 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.

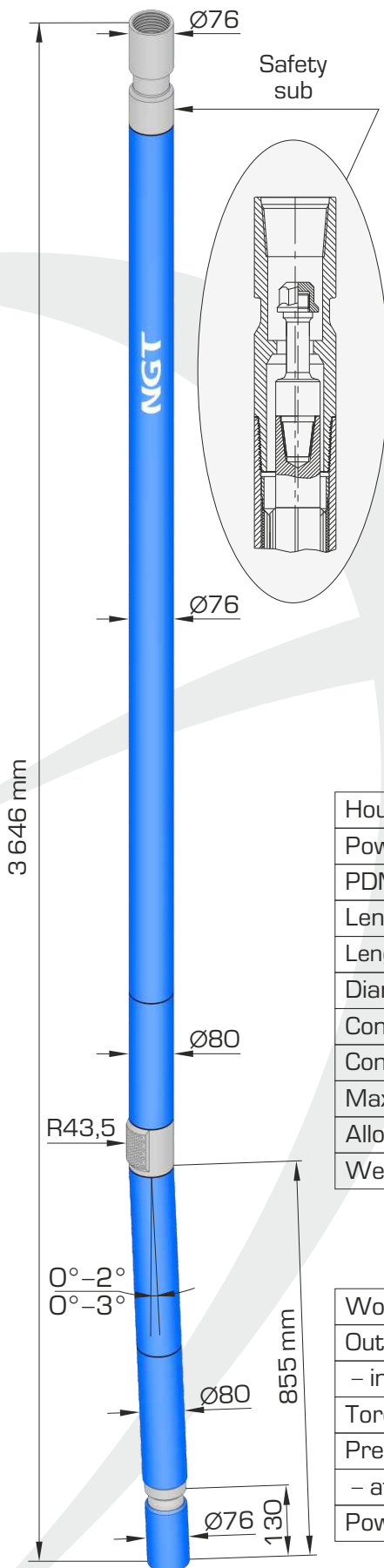
Technical specification

Housing OD, mm	76/79
Power section lobe configuration	4/5
PDM length, mm	3 565
Length of stator rubber lining, 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

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

DR-76.NGT.4/5.20.M2



PDM DR-76.NGT.4/5.20.M2 is a new 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.

An adjustable bent sub 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 hard alloy bearings. 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°/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 applying 3M 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.

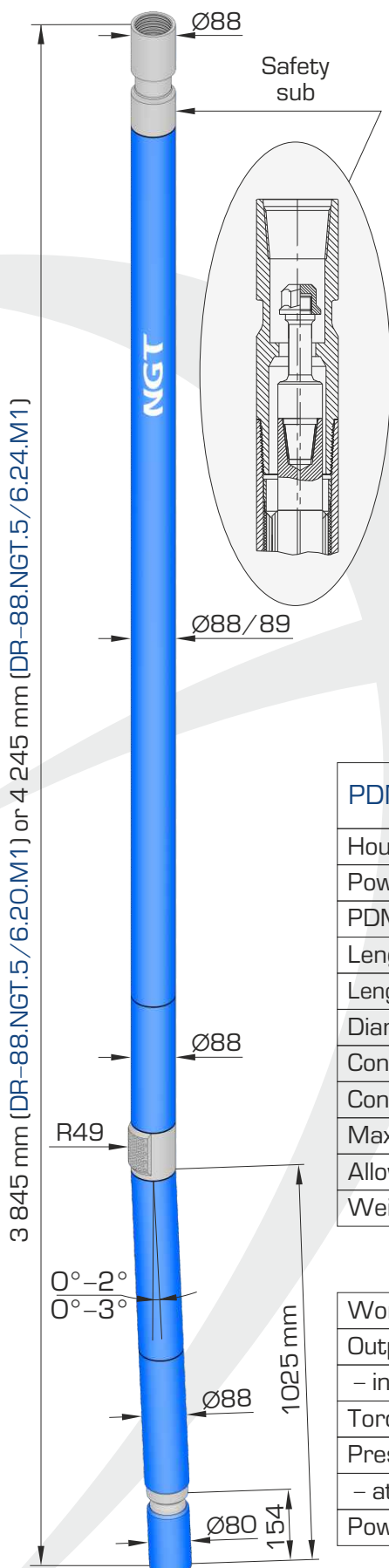
Technical specification

Housing OD, mm	76/80
Power section lobe configuration	4/5
PDM length, mm	3 646
Length of stator rubber lining, 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

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

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



PDM's DR-88.NGT.5/6.20.M1 and DR-88.NGT.5/6.24.M1 are new 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.

An adjustable bent sub 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 hard alloy bearings. 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 applying 3M 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.

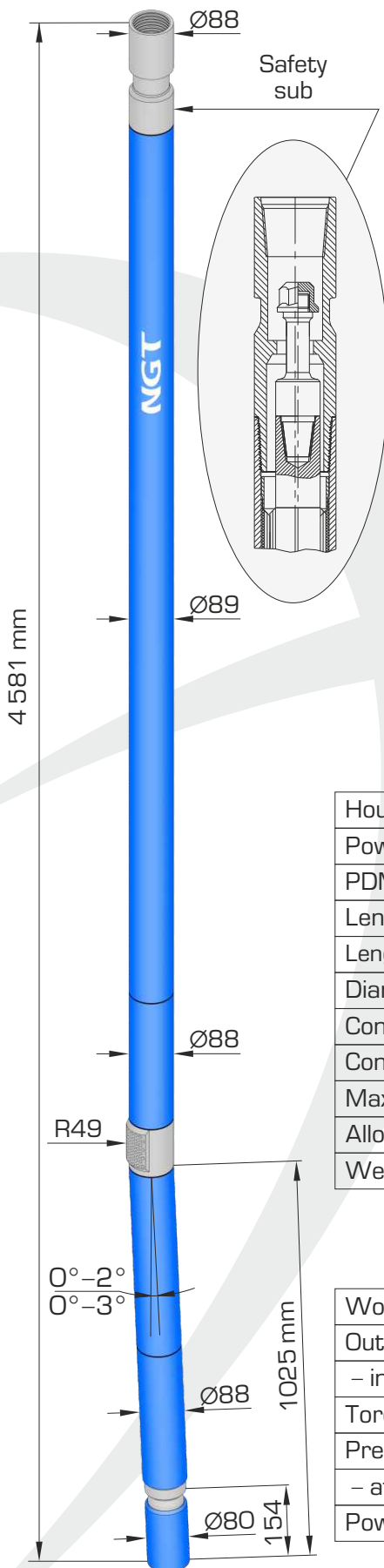
Technical specification

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 rubber lining, 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

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

DR-88.NGT.7/8.27.M1



PDM DR-88.NGT.7/8.27.M1 is a new 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.

An adjustable bent sub 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 hard alloy bearings. 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 applying 3M 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.

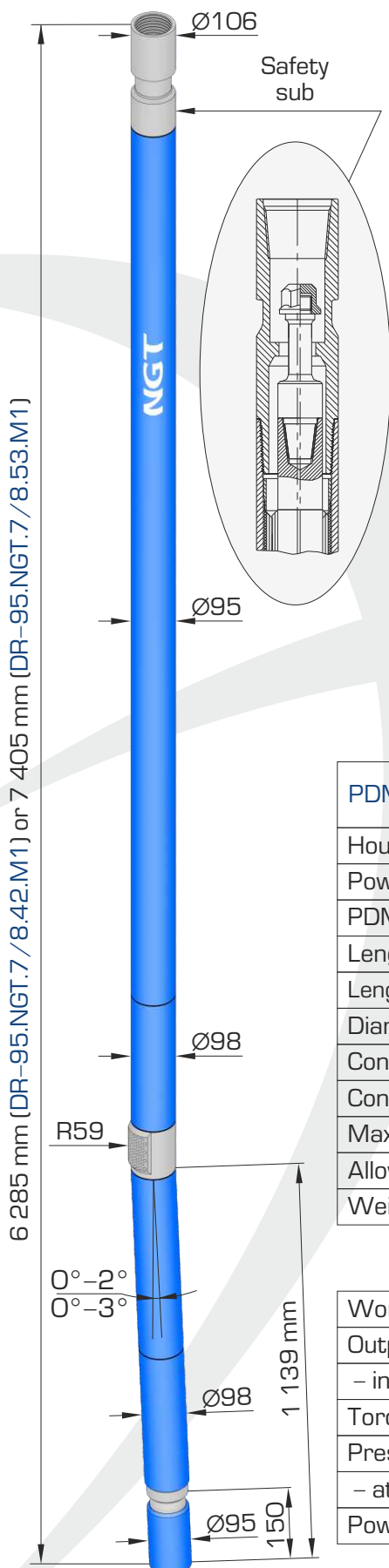
Technical specification

Housing OD, mm	88/89
Power section lobe configuration	7/8
PDM length, mm	4 581
Length of stator rubber lining, mm	2 736
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

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.7/8.42.M1 and DR-95.NGT.7/8.53.M1



PDM's DR-95.NGT.7/8.42.M1 and DR-95.NGT.7/8.53.M1 are new universal hydraulic downhole motors 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.

An adjustable bent sub 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 hard alloy bearings. 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°/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 applying 3M 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.

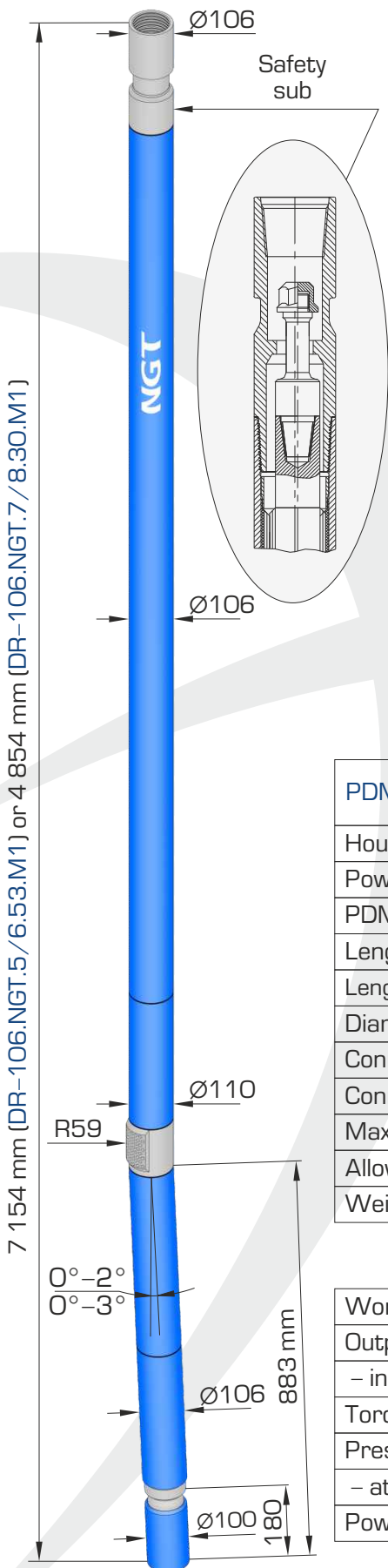
Technical specification

PDM model	DR-95.NGT.7/8.42.M1	DR-95.NGT.7/8.53.M1
Housing OD, mm	95/98	95/98
Power section lobe configuration	7/8	7/8
PDM length, mm	6 285	7 405
Length of stator rubber lining, mm	4 180	5 300
Length of bearing section up to a curvature point, mm	1 139	1 139
Diameter of bits used, mm	112–132	112–132
Connecting thread to drill pipes	NC 31	NC 31
Connecting thread to bits	2 7/8 Reg	2 7/8 Reg
Maximum density of drilling mud, g/cm ³	1,6	1,6
Allowed axial load, kN	55	55
Weight, kg	260	307

Power specification

Working fluid flow rate, l/s	5–10	5–10
Output shaft rotation speed:		
- in no-load conditions, RPM	126–257	150–340
Torque at maximum power, kN*m	2,46	3,12
Pressure drop:		
- at maximum power, MPa	5,36	8,0
Power, kW	60	100

DR-106.NGT.5/6.53.M1 and DR-106.NGT.7/8.30.M1



PDM's DR-106.NGT.5/6.53.M1 and DR-106.NGT.7/8.30.M1 are new universal hydraulic downhole motors 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.

An adjustable bent sub 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°/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 applying Loctite 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.

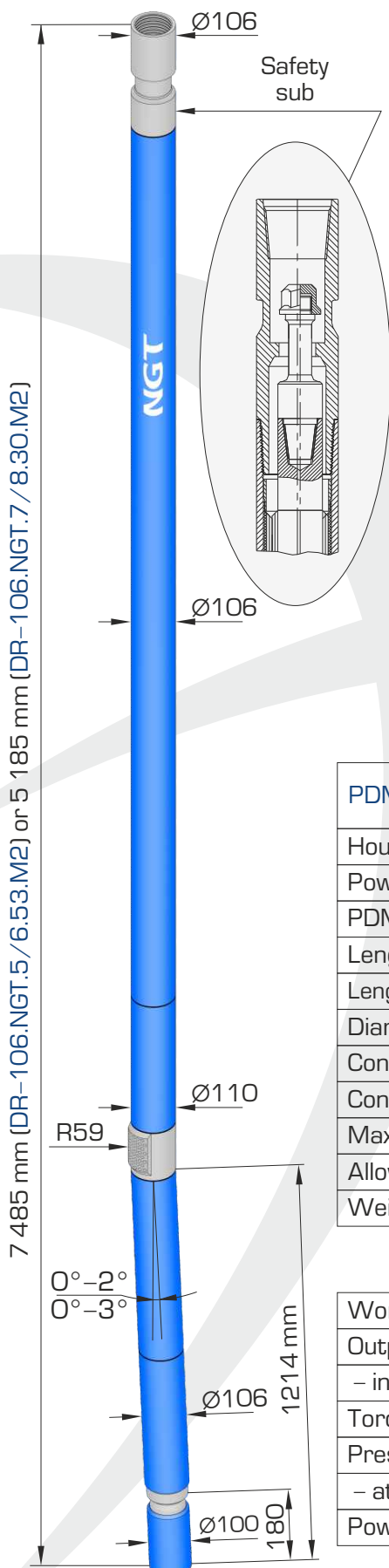
Technical specification

PDM model	DR-106.NGT.5/6.53.M1	DR-106.NGT.7/8.30.M1
Housing OD, mm	105/110	106/110
Power section lobe configuration	5/6	7/8
PDM length, mm	7 154	4 854
Length of stator rubber lining, mm	5 320	3 000
Length of bearing section up to a curvature point, mm	883	883
Diameter of bits used, mm	120,6–149,2	120,6–149,2
Connecting thread to drill pipes	NC 31	NC 31
Connecting thread to bits	2 7/8 Reg	2 7/8 Reg
Maximum density of drilling mud, g/cm ³	1,6	1,6
Allowed axial load, kN	80	80
Weight, kg	369	250

Power specification

Working fluid flow rate, l/s	6–12	6–12
Output shaft rotation speed:		
- in no-load conditions, RPM	161–321	96–192
Torque at maximum power, kN*m	3,25	2,3–3,5
Pressure drop:		
- at maximum power, MPa	8	5–10
Power, kW	99	53

DR-106.NGT.5/6.53.M2 and DR-106.NGT.7/8.30.M2



PDM's DR-106.NGT.5/6.53.M2 and DR-106.NGT.7/8.30.M2 are new universal hydraulic downhole motors 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.

An adjustable bent sub 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 hard alloy bearings. Due to a very short shoulder up to the point of axes misalignment (only 1214 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 applying Loctite 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.

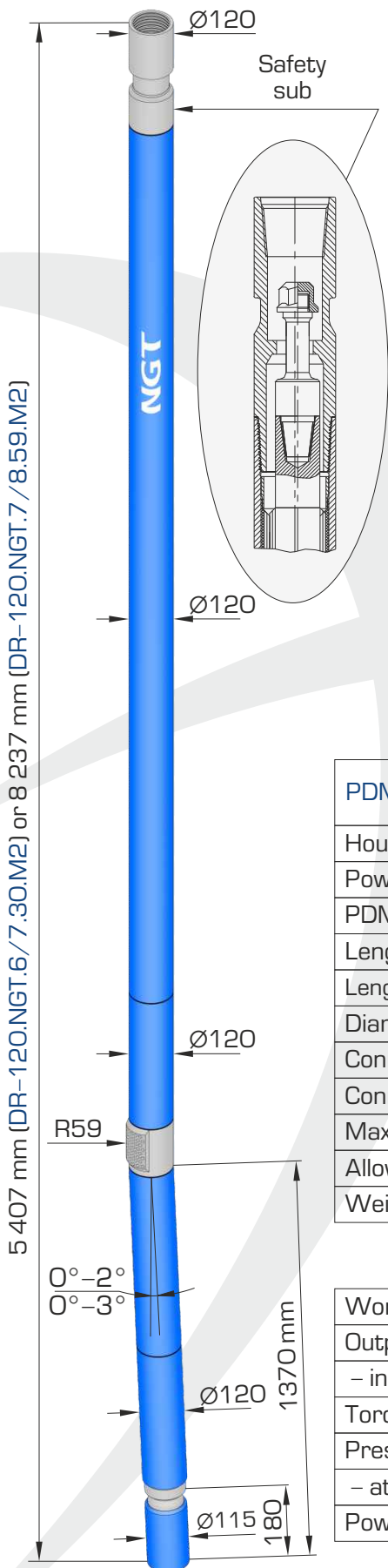
Technical specification

PDM model	DR-106.NGT.5/6.53.M2	DR-106.NGT.7/8.30.M2
Housing OD, mm	105/110	106/110
Power section lobe configuration	5/6	7/8
PDM length, mm	7 485	5 185
Length of stator rubber lining, mm	5 320	3 000
Length of bearing section up to a curvature point, mm	1 214	1 214
Diameter of bits used, mm	120,6–149,2	120,6–149,2
Connecting thread to drill pipes	NC 31	NC 31
Connecting thread to bits	2 7/8 Reg	2 7/8 Reg
Maximum density of drilling mud, g/cm ³	1,6	1,6
Allowed axial load, kN	80	80
Weight, kg	386	267

Power specification

Working fluid flow rate, l/s	6–12	6–12
Output shaft rotation speed:		
- in no-load conditions, RPM	161–321	96–192
Torque at maximum power, kN*m	3,25	2,3–3,5
Pressure drop:		
- at maximum power, MPa	8	5–10
Power, kW	99	53

DR-120.NGT.6/7.30.M2 and DR-120.NGT.7/8.59.M2



PDM's DR-120.NGT.6/7.30.M2 and DR-120.NGT.7/8.59.M2 are new 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.

An adjustable bent sub 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 hard alloy bearings. 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°/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 applying Loctite 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.

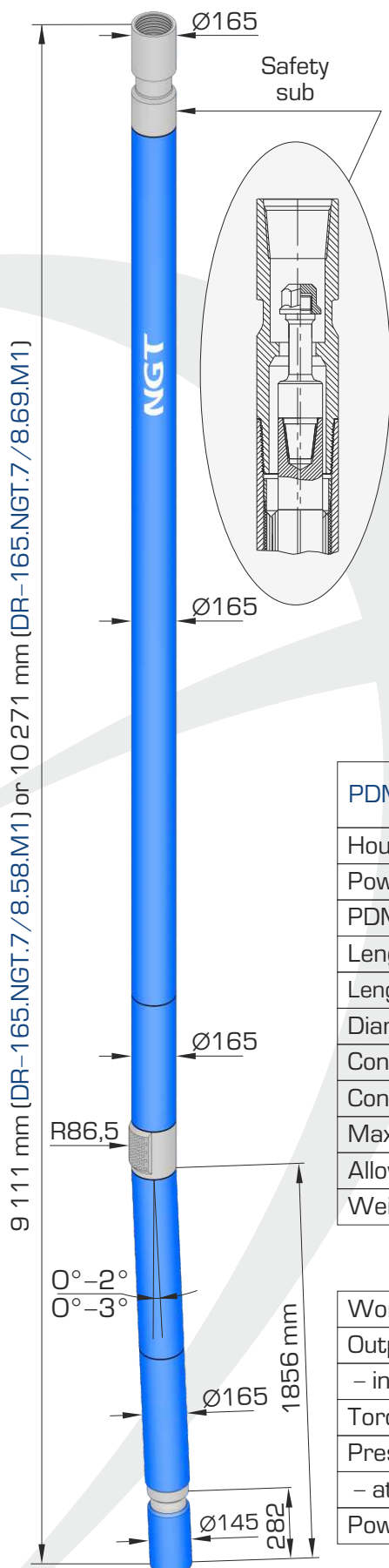
Technical specification

PDM model	DR-120.NGT.6/7.30.M2	DR-120.NGT.7/8.59.M2
Housing OD, mm	120	120
Power section lobe configuration	6/7	7/8
PDM length, mm	5 407	8 237
Length of stator rubber lining, mm	3 000	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	100	100
Weight, kg	358	545

Power specification

Working fluid flow rate, l/s	10–20	12–25
Output shaft rotation speed:		
- in no-load conditions, RPM	162–324	130–261
Torque at maximum power, kN*m	4,7	5,3
Pressure drop:		
- at maximum power, MPa	9,0–13,5	5,2–7,3
Power, kW	101	122

DR-165.NGT.7/8.58.M1 and DR-165.NGT.7/8.69.M1



PDM's DR-165.NGT.7/8.58.M1 and DR-165.NGT.7/8.69.M1 are new universal hydraulic downhole motors used for drilling of oil and gas wells with 190,5 – 250,8 mm rock and PDC bits.

An adjustable bent sub is placed between bearing section and power section. The adjustment range is between 0° and 2° or between 0° and 3°.

Bearing section has multi-row thrust ball bearing of enhanced load-carrying capacity and radial hard alloy bearings. The PDM is completed with imported extended power sections with enhanced operation life. Due to a very short shoulder up to the point of axes misalignment (only 1800 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 applying Loctite 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.

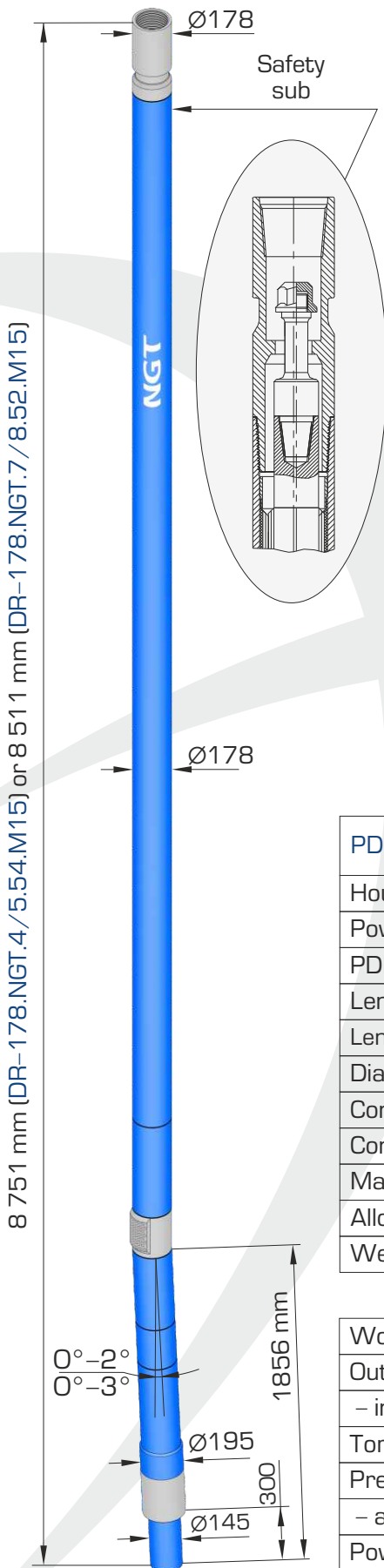
Technical specification

PDM model	DR-165.NGT.7/8.58.M1	DR-165.NGT.7/8.69.M1
Housing OD, mm	165	165
Power section lobe configuration	7/8	7/8
PDM length, mm	9 111	10 271
Length of stator rubber lining, mm	5 720	6 880
Length of bearing section up to a curvature point, mm	1 856	1 856
Diameter of bits used, mm	190,5–250,8	190,5–250,8
Connecting thread to drill pipes	NC 50	NC 50
Connecting thread to bits	4 1/2 Reg	4 1/2 Reg
Maximum density of drilling mud, g/cm ³	1,9	1,9
Allowed axial load, kN	250	250
Weight, kg	1 138	1 283

Power specification

Working fluid flow rate, l/s	17–38	17–38
Output shaft rotation speed:		
- in no-load conditions, RPM	71–160	71–160
Torque at maximum power, kN*m	10,9	13,1
Pressure drop:		
- at maximum power, MPa	7	7
Power, kW	164	197

DR-178.NGT.4/5.54.M15 and DR-178.NGT.7/8.52.M15



PDM's DR-178.NGT.4/5.54.M15 and DR-178.NGT.7/8.52.M15 are new universal hydraulic downhole motors used for drilling of oil and gas wells with rock and PDC bits of 212.7 – 250.8 mm diameter.

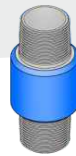
An adjustable bent sub is placed between bearing section and power section. The adjustment range is between 0° and 2° or between 0° and 3°.

The bearing section has multi-row thrust ball bearing of enhanced load-carrying capacity and radial hard alloy bearings.

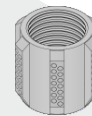
PDMs are completed with imported extended power sections with enhanced operation life. Due to very short shoulder up to the point of axes misalignment (only 1856 mm) drillers can:

- 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 applying Loctite 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 centralizer and calibrator sub:



Calibrator sub



Centralizer

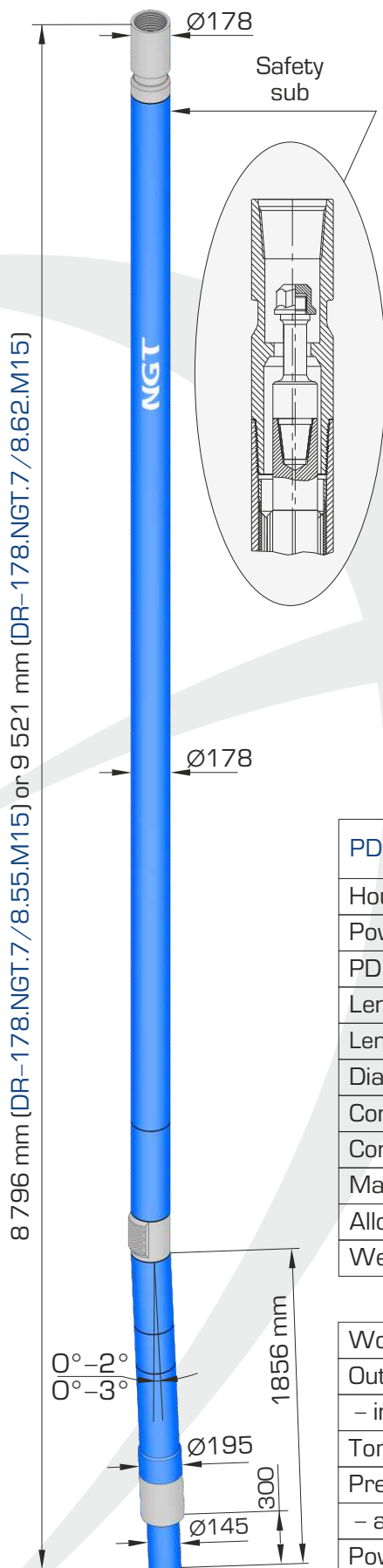
Technical specification

PDM model	DR-178.NGT.4/5.54.M15	DR-178.NGT.7/8.52.M15
Housing OD, mm	178/195	178/195
Power section lobe configuration	4/5	7/8
PDM length, mm	8 751	8 511
Length of stator rubber lining, mm	5 400	5 210
Length of bearing section up to a curvature point, mm	1 856	1 856
Diameter of bits used, mm	212,7-250,8	212,7-250,8
Connecting thread to drill pipes	NC 50/5 1/2 FH	NC 50/5 1/2 FH
Connecting thread to bits	4 1/2 Reg	4 1/2 Reg
Maximum density of drilling mud, g/cm ³	1,9	1,9
Allowed axial load, kN	250	250
Weight, kg	1 273	1 239

Power specification

Working fluid flow rate, l/s	30	25-40
Output shaft rotation speed:		
- in no-load conditions, RPM	248	100-160
Torque at maximum power, kN*m	10	13,4
Pressure drop:		
- at maximum power, MPa	13	13
Power, kW	230	164

DR-178.NGT.7/8.55.M15 and DR-178.NGT.7/8.62.M15



PDM's DR-178.NGT.7/8.55.M15 and DR-178.NGT.7/8.62.M15 are new universal hydraulic downhole motors used for drilling of oil and gas wells with rock and PDC bits of 212.7 – 250.8 mm diameter.

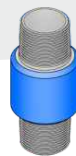
An adjustable bent sub is placed between bearing section and power section. The adjustment range is between 0° and 2° or between 0° and 3°.

The bearing section has multi-row thrust ball bearing of enhanced load-carrying capacity and radial hard alloy bearings.

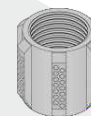
PDMs are completed with imported power sections with enhanced operation life. Due to very short shoulder up to the point of axes misalignment (only 1856 mm) drillers can:

- 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 applying Loctite 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 centralizer and calibrator sub:



Calibrator sub



Centralizer

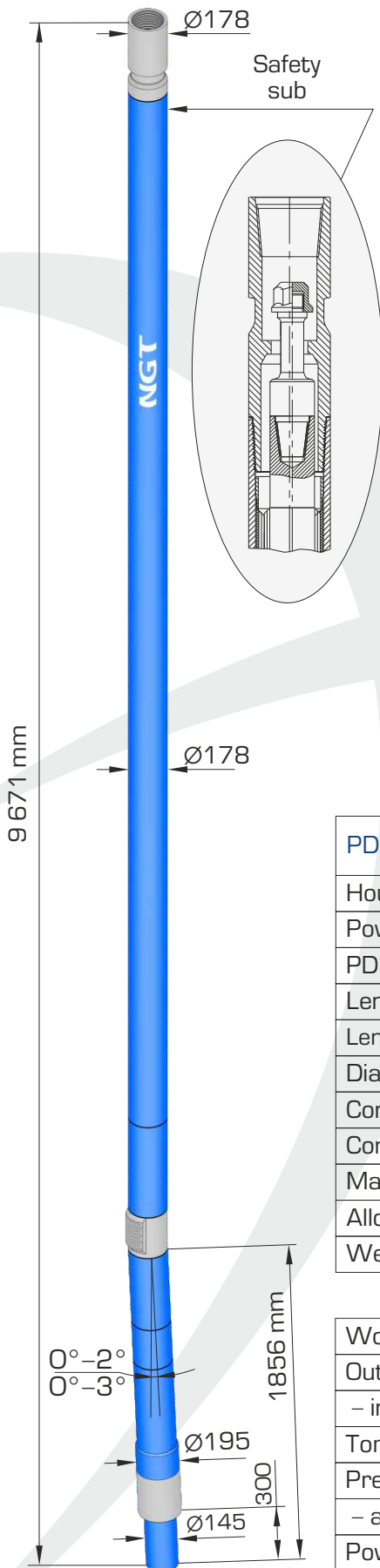
Technical specification

PDM model	DR-178.NGT.7/8.55.M15	DR-178.NGT.7/8.62.M15
Housing OD, mm	178/195	178/195
Power section lobe configuration	7/8	7/8
PDM length, mm	8 796	9 521
Length of stator rubber lining, mm	5 500	6 200
Length of bearing section up to a curvature point, mm	1 856	1 856
Diameter of bits used, mm	212,7-250,8	212,7-250,8
Connecting thread to drill pipes	NC 50/5 1/2 FH	NC 50/5 1/2 FH
Connecting thread to bits	4 1/2 Reg	4 1/2 Reg
Maximum density of drilling mud, g/cm ³	1,9	1,9
Allowed axial load, kN	250	250
Weight, kg	1 279	1 385

Power specification

Working fluid flow rate, l/s	30	30
Output shaft rotation speed:		
- in no-load conditions, RPM	138	118
Torque at maximum power, kN*m	15	19
Pressure drop:		
- at maximum power, MPa	12	11
Power, kW	161	157

DR-178.NGT.7/8.63.M15 and DR-178.NGT.7/8.64.M15



PDM's DR-178.NGT.7/8.63.M15 and DR-178.NGT.7/8.64.M15 are new universal hydraulic downhole motors used for drilling of oil and gas wells with rock and PDC bits of 212.7 – 250.8 mm diameter.

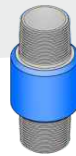
An adjustable bent sub is placed between bearing section and power section. The adjustment range is between 0° and 2° or between 0° and 3°.

The bearing section has multi-row thrust ball bearing of enhanced load-carrying capacity and radial hard alloy bearings.

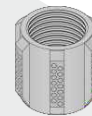
PDMs are completed with imported extended power sections with enhanced operation life. Due to very short shoulder up to the point of axes misalignment (only 1856 mm) drillers can:

- 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 applying Loctite 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 centralizer and calibrator sub:



Calibrator sub



Centralizer

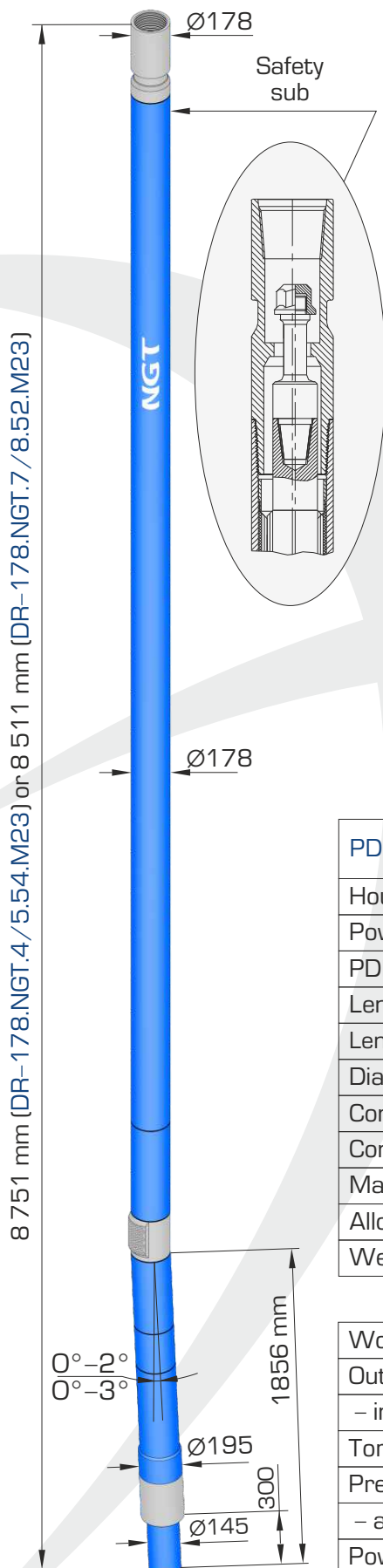
Technical specification

PDM model	DR-178.NGT.7/8.63.M15	DR-178.NGT.7/8.64.M15
Housing OD, mm	178/195	178/195
Power section lobe configuration	7/8	7/8
PDM length, mm	9 671	9 671
Length of stator rubber lining, mm	6 360	6 400
Length of bearing section up to a curvature point, mm	1 856	1 856
Diameter of bits used, mm	212,7-250,8	212,7-250,8
Connecting thread to drill pipes	NC 50/5 1/2 FH	NC 50/5 1/2 FH
Connecting thread to bits	4 1/2 Reg	4 1/2 Reg
Maximum density of drilling mud, g/cm ³	1,9	1,9
Allowed axial load, kN	250	250
Weight, kg	1 309	1 309

Power specification

Working fluid flow rate, l/s	20-35	30
Output shaft rotation speed:		
- in no-load conditions, RPM	102-179	170
Torque at maximum power, kN*m	12,6	14
Pressure drop:		
- at maximum power, MPa	13	13
Power, kW	213	211

DR-178.NGT.4/5.54.M23 and DR-178.NGT.7/8.52.M23



PDM's DR-178.NGT.4/5.54.M23 and DR-178.NGT.7/8.52.M23 are new universal hydraulic downhole motors used for drilling of oil and gas wells with rock and PDC bits of 212.7 – 250.8 mm diameter.

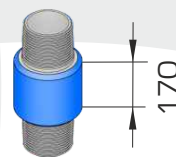
An adjustable bent sub is placed between bearing section and power section. The adjustment range is between 0° and 2° or between 0° and 3°.

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.

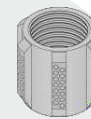
PDMs are completed with imported extended power sections with enhanced operation life. Due to very short shoulder up to the point of axes misalignment (only 1856 mm) drillers can:

- 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 applying Loctite 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 centralizer and calibrator sub:



Calibrator sub



Centralizer

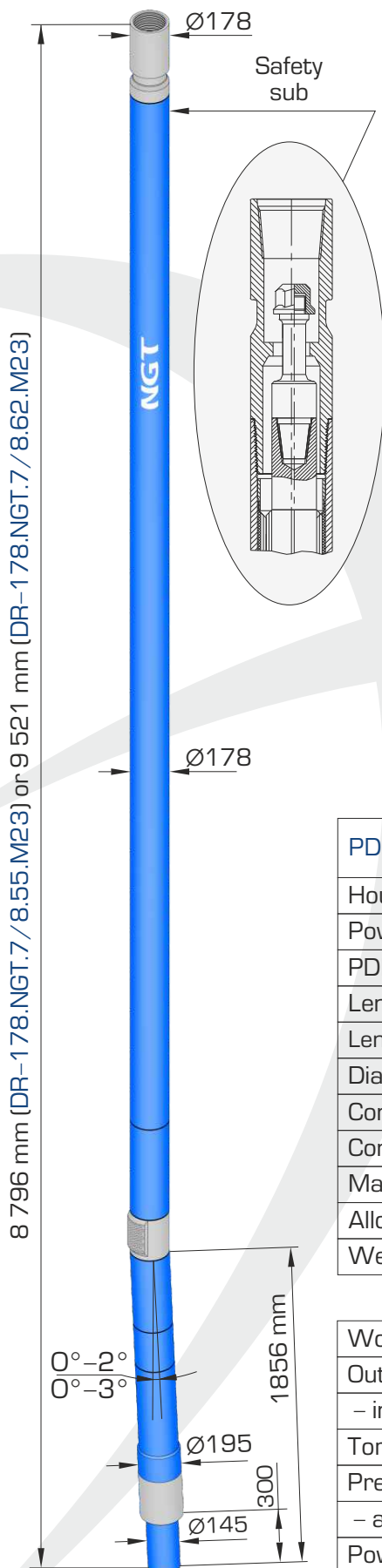
Technical specification

PDM model	DR-178.NGT.4/5.54.M23	DR-178.NGT.7/8.52.M23
Housing OD, mm	178/195	178/195
Power section lobe configuration	4/5	7/8
PDM length, mm	8 751	8 511
Length of stator rubber lining, mm	5 400	5 210
Length of bearing section up to a curvature point, mm	1 856	1 856
Diameter of bits used, mm	212,7–250,8	212,7–250,8
Connecting thread to drill pipes	NC 50/5 1/2 FH	NC 50/5 1/2 FH
Connecting thread to bits	4 1/2 Reg	4 1/2 Reg
Maximum density of drilling mud, g/cm ³	1,9	1,9
Allowed axial load, kN	250	250
Weight, kg	1 273	1 239

Power specification

Working fluid flow rate, l/s	30	25–40
Output shaft rotation speed:		
– in no-load conditions, RPM	248	100–160
Torque at maximum power, kN*m	10	13,4
Pressure drop:		
– at maximum power, MPa	13	13
Power, kW	230	164

DR-178.NGT.7/8.55.M23 and DR-178.NGT.7/8.62.M23



PDM's DR-178.NGT.7/8.55.M23 and DR-178.NGT.7/8.62.M23 are new universal hydraulic downhole motors used for drilling of oil and gas wells with rock and PDC bits of 212.7 – 250.8 mm diameter.

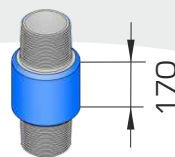
An adjustable bent sub is placed between bearing section and power section. The adjustment range is between 0° and 2° or between 0° and 3°.

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.

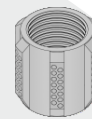
PDMs are completed with imported extended power sections with enhanced operation life. Due to very short shoulder up to the point of axes misalignment (only 1856 mm) drillers can:

- 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 applying Loctite 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 centralizer and calibrator sub:



Calibrator sub



Centralizer

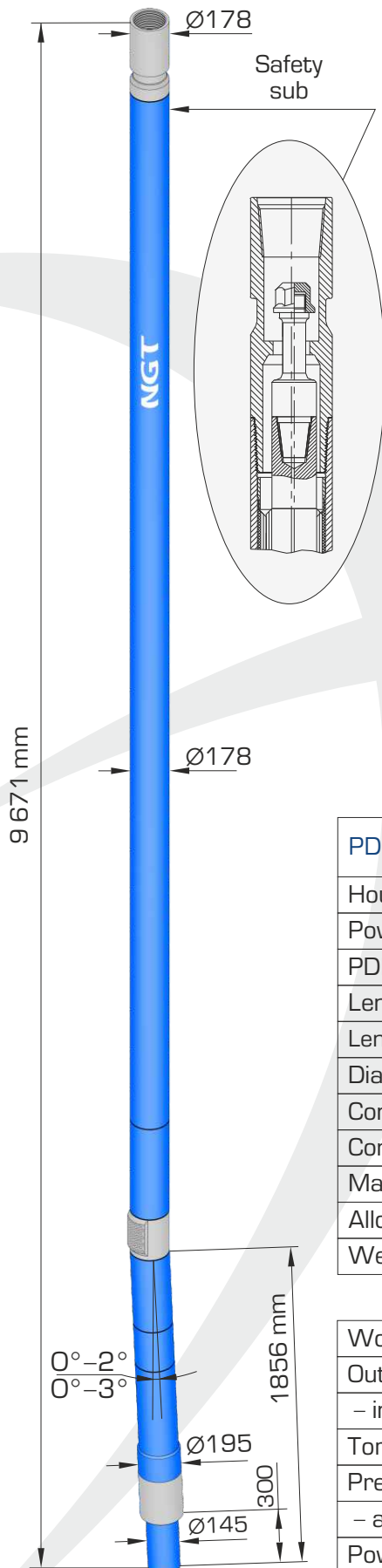
Technical specification

PDM model	DR-178.NGT.7/8.55.M23	DR-178.NGT.7/8.62.M23
Housing OD, mm	178/195	178/195
Power section lobe configuration	7/8	7/8
PDM length, mm	8 796	9 521
Length of stator rubber lining, mm	5 500	6 200
Length of bearing section up to a curvature point, mm	1 856	1 856
Diameter of bits used, mm	212,7-250,8	212,7-250,8
Connecting thread to drill pipes	NC 50/5 1/2 FH	NC 50/5 1/2 FH
Connecting thread to bits	4 1/2 Reg	4 1/2 Reg
Maximum density of drilling mud, g/cm ³	1,9	1,9
Allowed axial load, kN	250	250
Weight, kg	1 279	1 385

Power specification

Working fluid flow rate, l/s	30	30
Output shaft rotation speed:		
- in no-load conditions, RPM	138	118
Torque at maximum power, kN*m	15	19
Pressure drop:		
- at maximum power, MPa	12	11
Power, kW	161	157

DR-178.NGT.7/8.63.M23 and DR-178.NGT.7/8.64.M23



PDM's DR-178.NGT.7/8.63.M23 and DR-178.NGT.7/8.64.M23 are new universal hydraulic downhole motors used for drilling of oil and gas wells with rock and PDC bits of 212.7 – 250.8 mm diameter.

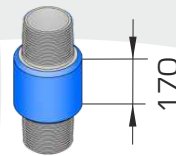
An adjustable bent sub is placed between bearing section and power section. The adjustment range is between 0° and 2° or between 0° and 3°.

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.

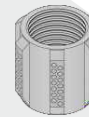
PDMs are completed with imported extended power sections with enhanced operation life. Due to very short shoulder up to the point of axes misalignment (only 1856 mm) drillers can:

- 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 applying Loctite 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 centralizer and calibrator sub:



Calibrator sub



Centralizer

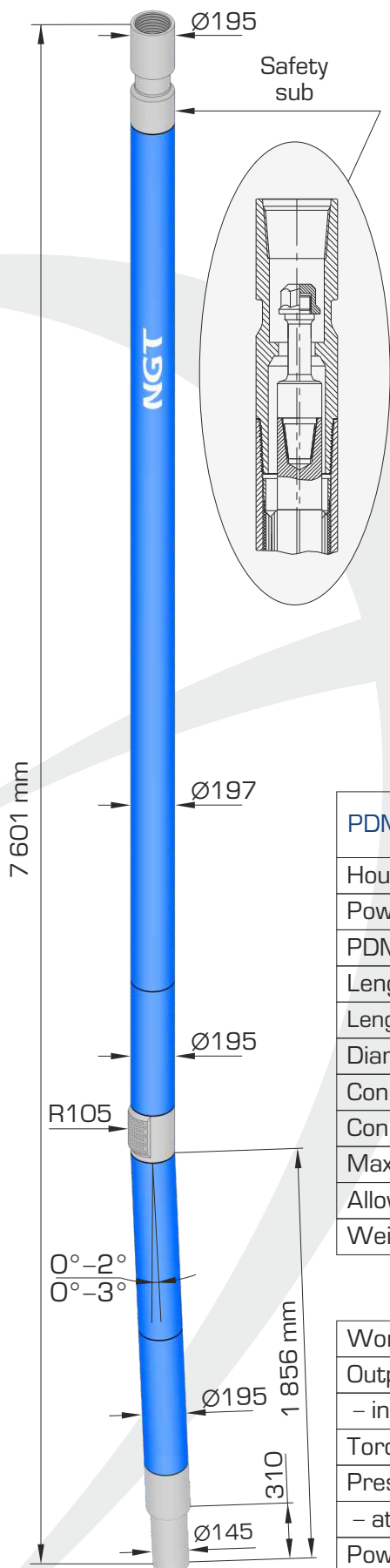
Technical specification

PDM model	DR-178.NGT.7/8.63.M23	DR-178.NGT.7/8.64.M23
Housing OD, mm	178/195	178/195
Power section lobe configuration	7/8	7/8
PDM length, mm	9 671	9 671
Length of stator rubber lining, mm	6 360	6 400
Length of bearing section up to a curvature point, mm	1 856	1 856
Diameter of bits used, mm	212,7–250,8	212,7–250,8
Connecting thread to drill pipes	NC 50/5 1/2 FH	NC 50/5 1/2 FH
Connecting thread to bits	4 1/2 Reg	4 1/2 Reg
Maximum density of drilling mud, g/cm ³	1,9	1,9
Allowed axial load, kN	250	250
Weight, kg	1 309	1 309

Power specification

Working fluid flow rate, l/s	20–35	30
Output shaft rotation speed:		
– in no-load conditions, RPM	102–179	170
Torque at maximum power, kN*m	12,6	14
Pressure drop:		
– at maximum power, MPa	13	13
Power, kW	213	211

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



PDM's DR-195.NGT.5/6.43.M1 and DR-195.NGT.6/7.43.M1 are new universal hydraulic downhole motors used for drilling of oil and gas wells with rock and PDC bits of 215,9–269,9 mm diameter.

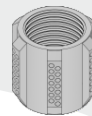
An adjustable bent sub is placed between bearing section and power section. The adjustment range is between 0° and 2° or between 0° and 3°.

The bearing section has multi-row thrust ball bearing of enhanced load-carrying capacity and 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 1856 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°/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 applying Loctite 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.

PDMs can be completed with replaceable centralizer:



Centralizer

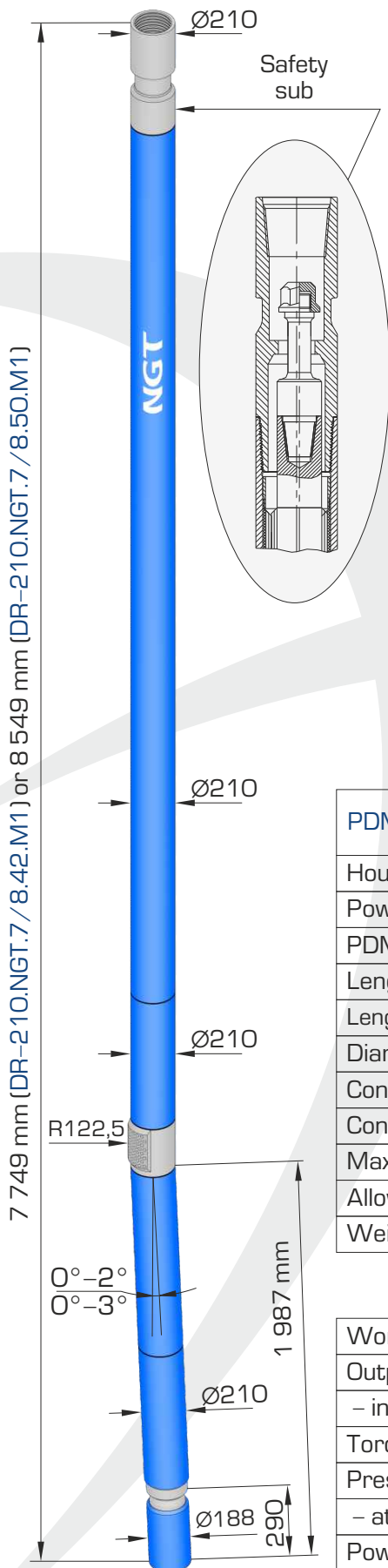
Technical specification

PDM model	DR-195.NGT.5/6.43.M1	DR-195.NGT.6/7.43.M1
Housing OD, mm	195/197	195/197
Power section lobe configuration	5/6	6/7
PDM length, mm	7 601	7 601
Length of stator rubber lining, mm	4 250	4 250
Length of bearing section up to a curvature point, mm	1 856	1 856
Diameter of bits used, mm	212,7–250,8	212,7–250,8
Connecting thread to drill pipes	5 1/2 FH	5 1/2 FH
Connecting thread to bits	4 1/2 Reg	4 1/2 Reg
Maximum density of drilling mud, g/cm ³	1,9	1,9
Allowed axial load, kN	250	250
Weight, kg	1 328	1 328

Power specification

Working fluid flow rate, l/s	18,5–37	20–53
Output shaft rotation speed:		
- in no-load conditions, RPM	79–158	82–217
Torque at maximum power, kN*m	8,9	11,1
Pressure drop:		
- at maximum power, MPa	5,6	5,6
Power, kW	130	226

DR-210.NGT.7/8.42.M1 and DR-210.NGT.7/8.50.M1



PDM's DR-210.NGT.7/8.42.M1 and DR-210.NGT.7/8.50.M1 are new universal hydraulic downhole motors used for drilling of oil and gas wells with rock and PDC bits of 250,8 – 374,6 mm diameter.

An adjustable bent sub is placed between bearing section and power section. The adjustment range is between 0° and 2° or between 0° and 3°.

The bearing section has multi-row thrust ball bearing of enhanced load-carrying capacity and 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 1987 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°/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 applying Loctite 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.

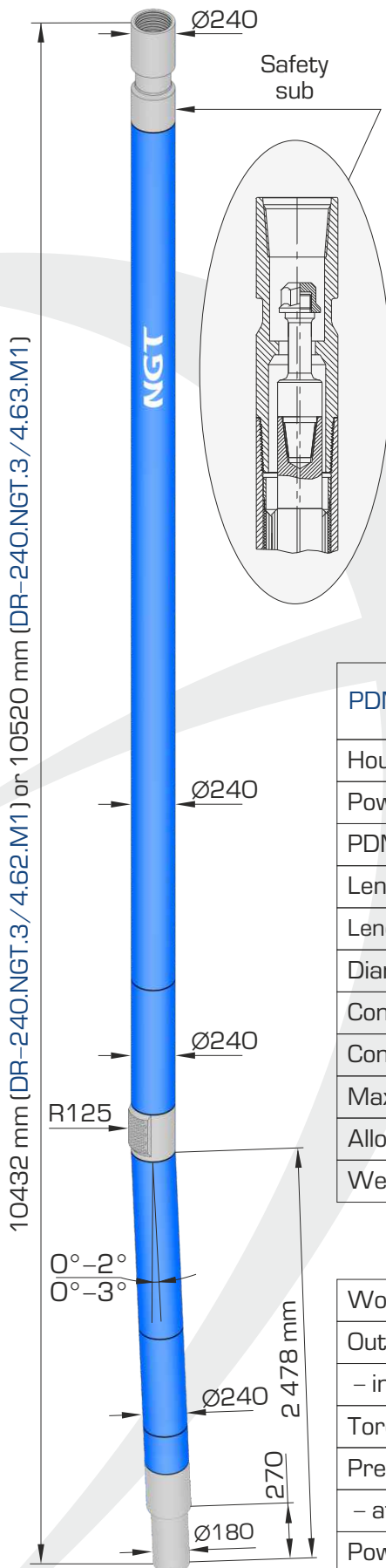
Technical specification

PDM model	DR-210.NGT.7/8.42.M1	DR-210.NGT.7/8.50.M1
Housing OD, mm	210	210
Power section lobe configuration	7/8	7/8
PDM length, mm	7 749	8 549
Length of stator rubber lining, mm	4 200	5 040
Length of bearing section up to a curvature point, mm	1 987	1 987
Diameter of bits used, mm	250,8–374,6	250,8–374,6
Connecting thread to drill pipes	6 5/8 Reg	6 5/8 Reg
Connecting thread to bits	6 5/8 Reg	6 5/8 Reg
Maximum density of drilling mud, g/cm ³	1,9	1,9
Allowed axial load, kN	300	300
Weight, kg	1 570	1 730

Power specification

Working fluid flow rate, l/s	22,4–44,2	26,3–52,7
Output shaft rotation speed:		
- in no-load conditions, RPM	69–138	121–242
Torque at maximum power, kN*m	13,8	16,2
Pressure drop:		
- at maximum power, MPa	5,6	5,6
Power, kW	179	216

DR-240.NGT.3/4.62.M1 and DR-240.NGT.3/4.63.M1



PDM's DR-240.NGT.3/4.62.M1 and DR-240.NGT.3/4.63.M1 are new universal hydraulic downhole motors used for drilling of oil and gas wells with rock and PDC bits of 295.3 – 374.6 mm diameter.

An adjustable bent sub is placed between bearing section and power section. The adjustment range is between 0° and 2° or between 0° and 3°.

The bearing section has multi-row thrust ball bearing of enhanced load-carrying capacity and radial hard alloy bearings.

PDMs are completed with imported extended power sections with enhanced operation life. The overhaul life reaches approximately 200 hrs.

PDMs can be completed with replaceable centralizer:



Centralizer

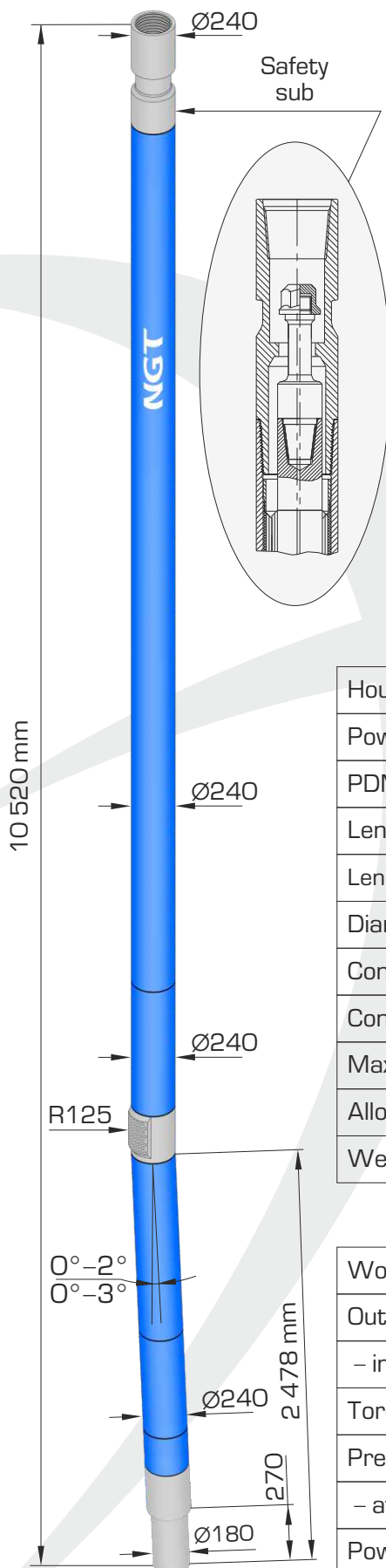
Technical specification

PDM model	DR-240.NGT.3/4.62.M1	DR-240.NGT.3/4.63.M1
Housing OD, mm	240/244	240/244
Power section lobe configuration	3/4	3/4
PDM length, mm	10 432	10 520
Length of stator rubber lining, mm	6 200	6 300
Length of bearing section up to a curvature point, mm	2 478	2 478
Diameter of bits used, mm	295,3–444,5	295,3–444,5
Connecting thread to drill pipes	6 5/8 FH	6 5/8 FH
Connecting thread to bits	6 5/8 Reg	6 5/8 Reg
Maximum density of drilling mud, g/cm ³	1,9	1,9
Allowed axial load, kN	400	400
Weight, kg	2 761	2 784

Power specification

Working fluid flow rate, l/s	22–45	22,4–44,8
Output shaft rotation speed:		
– in no-load conditions, RPM	75–151	75–150
Torque at maximum power, kN*m	15,3	14,8
Pressure drop:		
– at maximum power, MPa	6,8	6,8
Power, kW	179	179

DR-240.NGT.5/6.63.M1



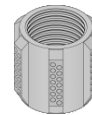
PDM DR-240.NGT.5/6.63.M1 is a new universal hydraulic downhole motor used for drilling of oil and gas wells with rock and PDC bits of 295.3 – 374.6 mm diameter.

An adjustable bent sub is placed between bearing section and power section. The adjustment range is between 0° and 2° or between 0° and 3°.

The bearing section has multi-row thrust ball bearing of enhanced load-carrying capacity and radial hard alloy bearings.

PDM is completed with imported extended power sections with enhanced operation life. The overhaul life reaches approximately 200 hrs.

PDM can be completed with replaceable centralizer:



Centralizer

Technical specification

Housing OD, mm	240/244
Power section lobe configuration	5/6
PDM length, mm	10 520
Length of stator rubber lining, mm	6 300
Length of bearing section up to a curvature point, mm	2 478
Diameter of bits used, mm	295,3–444,5
Connecting thread to drill pipes	6 5/8 FH
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	2 784

Power specification

Working fluid flow rate, l/s	27,5–45
Output shaft rotation speed:	
– in no-load conditions, RPM	64–129
Torque at maximum power, kN*m	19,3
Pressure drop:	
– at maximum power, MPa	6,8
Power, kW	234

Specification PDM

Parameter	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.7/8.42.M1
Technical specification							
Housing OD, mm	76	76/79	76/80	88	88/89	88/89	95/98
Power section lobe configuration	4/5	4/5	4/5	5/6	5/6	7/8	7/8
PDM length, mm	3 565	3 565	3 646	3 845	4 245	4 581	6 285
Length of stator rubber lining, mm	2 000	2 000	2 000	2 000	2 400	2 736	4 180
Length of bearing section up to a curvature point, mm	–	810	855	1 025	1 025	1 025	1 139
Diameter of bits used, mm	83,0–98,4	83,0–98,4	83,0–98,4	98,4–120,6	98,4–120,6	98,4–120,6	112–132
Connecting thread to drill pipes	2 3/8 Reg	2 3/8 Reg	2 3/8 Reg	2 3/8 Reg	2 3/8 Reg	2 3/8 Reg	NC 31
Connecting thread to bits	2 3/8 Reg	2 3/8 Reg	2 3/8 Reg	2 3/8 Reg	2 3/8 Reg	2 3/8 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	1,6
Allowed axial load, kN	25	25	45	50	50	50	55
Weight, kg	94	94	97	137	151	162	260
Power specification							
Working fluid flow rate, l/s	3–5	3–5	3–5	5–7	4,3–12,8	2,8–8,2	5–10
Output shaft rotation speed:							
– in no-load conditions, RPM	240–396	240–396	240–396	270–400	108–325	74–215	126–257
Torque at maximum power, kN*m	0,6–0,8	0,6–0,8	0,6–0,8	1,1–1,3	1,53	1,34	2,46
Pressure drop:							
– at maximum power, MPa	8–10	8–10	8–10	10–13	4,5	4,3	5,36
Power, kW	11–25	11–25	11–25	27–43	47	28	60

Specification PDM

Parameter	DR-95.NGT.7/8.53.M1	DR-106.NGT.5/6.53.M1	DR-106.NGT.7/8.30.M1	DR-106.NGT.5/6.53.M2	DR-106.NGT.7/8.30.M2	DR-120.NGT.6/7.30.M2	DR-120.NGT.7/8.59.M2
Technical specification							
Housing OD, mm	95/98	105/110	106/110	105/110	106/110	120	120
Power section lobe configuration	7/8	5/6	7/8	5/6	7/8	6/7	7/8
PDM length, mm	7 405	7 154	4 854	7 485	5 185	5 407	8 237
Length of stator rubber lining, mm	5 300	5 320	3 000	5 320	3 000	3 000	5 900
Length of bearing section up to a curvature point, mm	1 139	883	883	1 214	1 214	1 370	1 370
Diameter of bits used, mm	112–132	120,6–149,2	120,6–149,2	120,6–149,2	120,6–149,2	139,7–165,1	139,7–165,1
Connecting thread to drill pipes	NC 31	NC 31	NC 31	NC 31	NC 31	NC 38	NC 38
Connecting thread to bits	2 7/8 Reg	2 7/8 Reg	2 7/8 Reg	2 7/8 Reg	2 7/8 Reg	3 1/2 Reg	3 1/2 Reg
Maximum density of drilling mud, g/cm ³	1,6	1,6	1,6	1,6	1,6	1,6	1,6
Allowed axial load, kN	55	80	80	80	80	100	100
Weight, kg	307	369	250	386	267	358	545
Power specification							
Working fluid flow rate, l/s	5–10	6–12	6–12	6–12	6–12	10–20	12–25
Output shaft rotation speed:							
– in no-load conditions, RPM	150–340	161–321	96–192	161–321	96–192	162–324	130–261
Torque at maximum power, kN*m	3,12	3,25	2,3–3,5	3,25	2,3–3,5	4,7	5,3
Pressure drop:							
– at maximum power, MPa	8	8	5–10	8	5–10	9–13,5	5,2–7,3
Power, kW	100	99	53	99	53	101	122

Specification PDM

Parameter	DR-165.NGT.7/8.58.M1	DR-165.NGT.7/8.69.M1	DR-178.NGT.4/5.54.M15 DR-178.NGT.4/5.54.M23	DR-178.NGT.7/8.52.M15 DR-178.NGT.7/8.52.M23	DR-178.NGT.7/8.55.M15 DR-178.NGT.7/8.55.M23	DR-178.NGT.7/8.62.M15 DR-178.NGT.7/8.62.M23	DR-178.NGT.7/8.63.M15 DR-178.NGT.7/8.63.M23	DR-178.NGT.7/8.64.M15 DR-178.NGT.7/8.64.M23
Technical specification								
Housing OD, mm	165	165	178/195	178/195	178/195	178/195	178/195	178/195
Power section lobe configuration	7/8	7/8	4/5	7/8	7/8	7/8	7/8	7/8
PDM length, mm	9 111	10 271	8 751	8 511	8 796	9 521	9 671	9 671
Length of stator rubber lining, mm	5 720	6 880	5 400	5 210	5 500	6 200	6 360	6 400
Length of bearing section up to a curvature point, mm	1 856	1 856	1 856	1 856	1 856	1 856	1 856	1 856
Diameter of bits used, mm	190,5–250,8	190,5–250,8	212,7–250,8	212,7–250,8	212,7–250,8	212,7–250,8	212,7–250,8	212,7–250,8
Connecting thread to drill pipes	NC 50	NC 50	NC 50/5 1/2 FH	NC 50/5 1/2 FH	NC 50/5 1/2 FH	NC 50/5 1/2 FH	NC 50/5 1/2 FH	NC 50/5 1/2 FH
Connecting thread to bits	4 1/2 Reg	4 1/2 Reg	4 1/2 Reg	4 1/2 Reg	4 1/2 Reg	4 1/2 Reg	4 1/2 Reg	4 1/2 Reg
Maximum density of drilling mud, g/cm ³	1,9	1,9	1,9	1,9	1,9	1,9	1,9	1,9
Allowed axial load, kN	250	250	250	250	250	250	250	250
Weight, kg	1 138	1 283	1 273	1 239	1 279	1 385	1 309	1 309
Power specification								
Working fluid flow rate, l/s	17–38	17–38	30	25–40	30	30	20–35	30
Output shaft rotation speed:								
– in no-load conditions, RPM	71–160	71–160	248	100–160	138	118	102–179	170
Torque at maximum power, kN*m	10,9	13,1	10	13,4	15	19	12,6	14
Pressure drop:								
– at maximum power, MPa	7	7	13	13	12	11	13	13
Power, kW	164	197	230	164	161	157	213	211

Specification PDM

Parameter	DR-195.NGT.5/6.43.M1	DR-195.NGT.6/7.43.M1	DR-210.NGT.7/8.42.M1	DR-210.NGT.7/8.50.M1	DR-240.NGT.3/4.62.M1	DR-240.NGT.3/4.63.M1	DR-240.NGT.5/6.63.M1
Technical specification							
Housing OD, mm	195/197	195/197	210	210	240/244	240/244	240/244
Power section lobe configuration	5/6	6/7	7/8	7/8	3/4	3/4	5/6
PDM length, mm	7 601	7 601	7 749	8 549	10 432	10 520	10 520
Length of stator rubber lining, mm	4 250	4 250	4 200	5 040	6 200	6 300	6 300
Length of bearing section up to a curvature point, mm	1 856	1 856	1 987	1 987	2 478	2 478	2 478
Diameter of bits used, mm	212,7–250,8	212,7–250,8	250,8–374,6	250,8–374,6	295,3–444,5	295,3–444,5	295,3–444,5
Connecting thread to drill pipes	5 1/2 FH	5 1/2 FH	6 5/8 Reg	6 5/8 Reg	6 5/8 FH	6 5/8 FH	6 5/8 FH
Connecting thread to bits	4 1/2 Reg	4 1/2 Reg	6 5/8 Reg	6 5/8 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	300	300	400	400	400
Weight, kg	1 328	1 328	1 570	1 730	2 761	2 784	2 784
Power specification							
Working fluid flow rate, l/s	18,5–37	20–53	22,4–44,2	26,3–52,7	22–45	22,4–44,8	27,5–45
Output shaft rotation speed:							
– in no-load conditions, RPM	79–158	82–217	69–138	121–242	75–151	75–150	64–129
Torque at maximum power, kN*m	8,9	11,1	13,8	16,2	15,3	14,8	19,3
Pressure drop:							
– at maximum power, MPa	5,6	5,6	5,6	5,6	6,8	6,8	6,8
Power, kW	130	226	179	216	179	179	234



04.03.2011

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 PDM's within the range of 76 – 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:

1. **Short lower shoulder to the bend angle 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 $5^\circ / 10 \text{ m}$ and the sections of stabilization with drill string rotation.
2. **Enhanced operation life.** Bearing sections of our production, having multi-row 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-hinged universal joints** are the result of increase of the universal joint OD and use of large diameter balls. Load-carrying capacity and durability of the universal joint 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 silicomolybdc 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 of the companies 3M are used.

Performance of 13 bearing sections run in the Tatarstan Republic

In 2011–2013 13 positive displacement motors of 178 mm dia. run under control in cooperation with RIPNO Ltd. – Tatarstan. The bearing sections used were: S-178.NGT.M14 and S-178.NGT.M16. The PDM's 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, Serial number	Cumulative operating time, hour	Quantity of repairs, pcs	Interrepair time, hour	
			On PDM	Average
S-178.NGT.M14, number 223	871	4	218	280
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	3	263	
S-178.NGT.M16, number 1	919	4	230	
S-178.NGT.M16, number 2	666	3	222	
S-178.NGT.M16, number 3	641	2	321	
S-178.NGT.M16, number 4	871	3	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

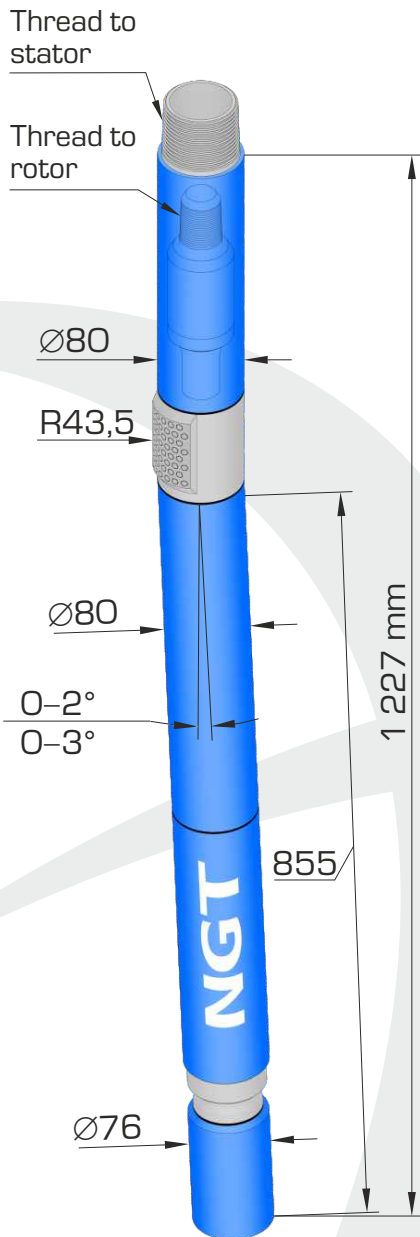
Standard size

Bearing section designation

Bearing sections presented in the catalogue:

S-76.NGT.M2	S-178.NGT.M12
S-88.NGT.M1	S-178.NGT.M15
S-95.NGT.M1	S-178.NGT.M16
S-106.NGT.M1	S-178.NGT.M23
S-106.NGT.M2	S-195.NGT.M4
S-120.NGT.M2	S-210.NGT.M1
S-165.NGT.M1	S-240.NGT.M1

S-76.NGT.M2



Bearing section **S-76.NGT.M2** is a new short 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 drive shaft with two joints to connect to the power section rotor. The bearing section design has adjustable bent sub. The adjustment range is from 0° up to 2° or from 0° up to 3°.

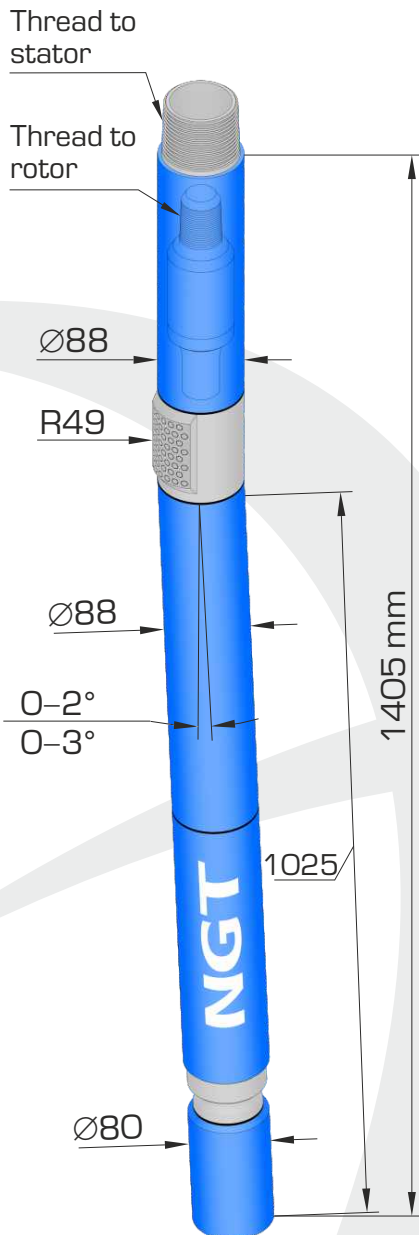
Meeting customers' requirements, the bearing section can be produced with the connecting threads for specific power section.

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

Technical specifications

Housing OD, mm	80
Bearing section length, mm	1 227
Bearing section length to curvature plane, mm	855
Range of angle adjuster change, degree	0-2 или 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 new short bearing section featuring enhanced operation life.

The bearing section is used in PDM power sections of 88 – 89 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 drive shaft with two joints to connect to the power section rotor. The bearing section design has adjustable bent sub. The adjustment range is from 0° up to 2° or from 0° up to 3°.

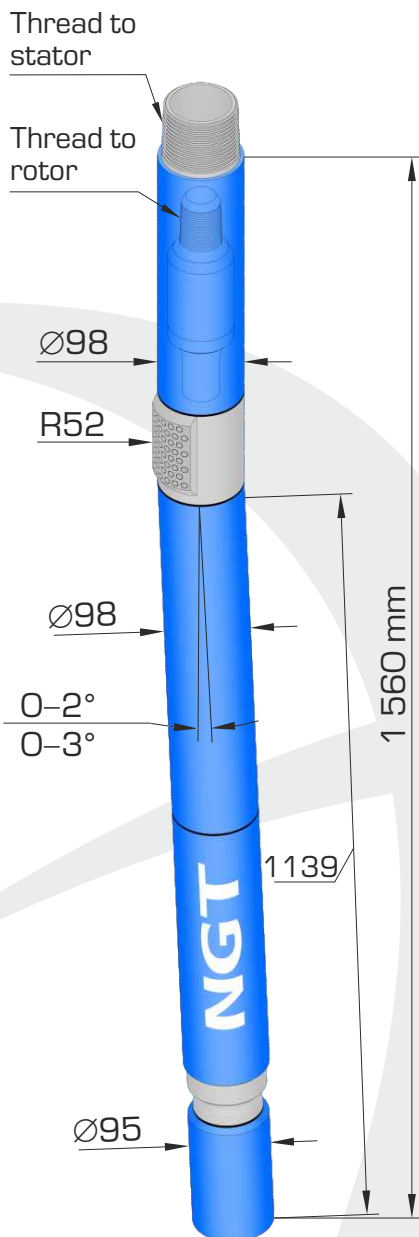
Meeting customers' requirements, the bearing section can be produced with the connecting threads for specific power section.

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

Technical specifications

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 или 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.M1



Bearing section **S-95.NGT.M1** is a new short 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 drive shaft with two joints to connect to the power section rotor. The bearing section design has adjustable bent sub. The adjustment range is from 0° up to 2° or from 0° up to 3°.

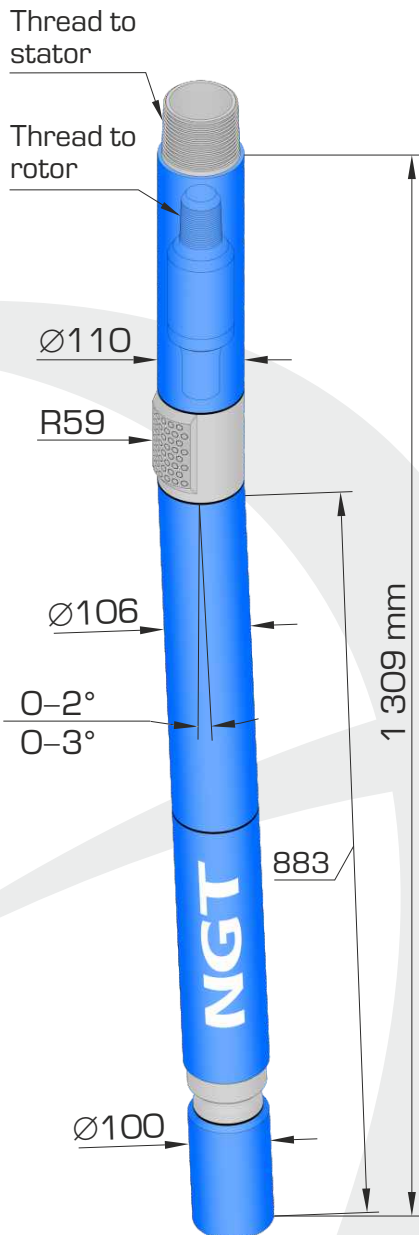
Meeting customers' requirements, the bearing section can be produced with the connecting threads for specific power section.

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

Technical specifications

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 или 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 new ultra-short 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.

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 drive shaft with two joints to connect to the power section rotor. The bearing section design has adjustable bent sub. The adjustment range is from 0° up to 2° or from 0° up to 3°.

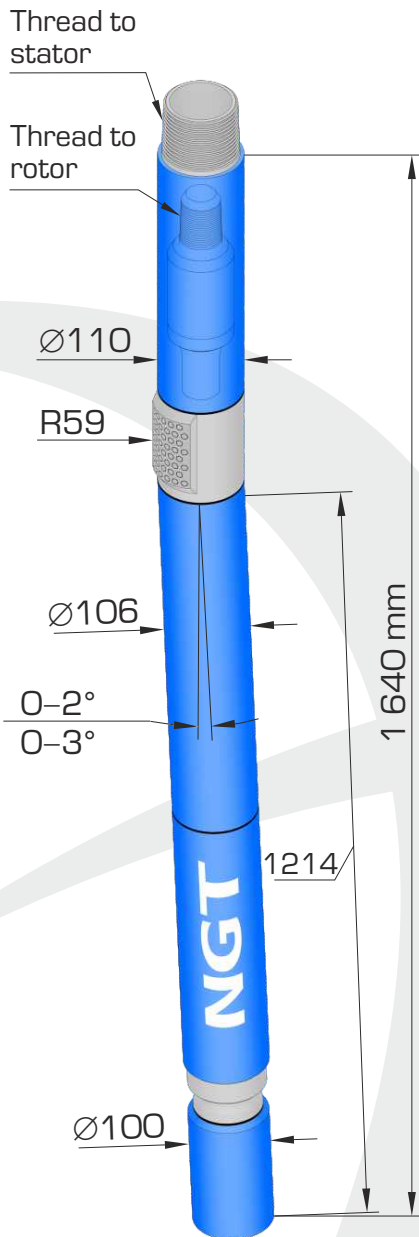
Meeting customers' requirements, the bearing section can be produced with the connecting threads for specific power section.

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

Technical specifications

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 или 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.M2



Bearing section S-106.NGT.M2 is a new short 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 drive shaft with two joints to connect to the power section rotor. The bearing section design has adjustable bent sub. The adjustment range is from 0° up to 2° or from 0° up to 3°.

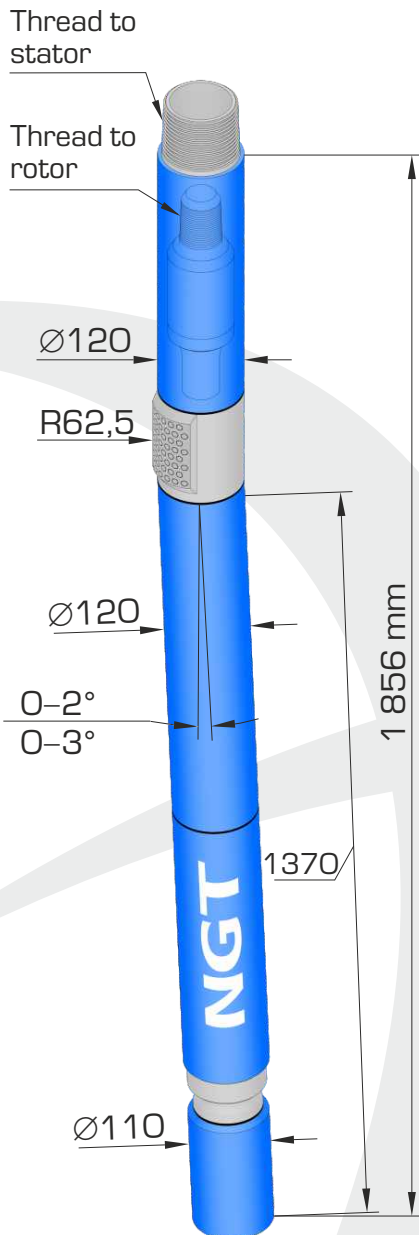
Meeting customers' requirements, the bearing section can be produced with the connecting threads for specific power section.

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

Technical specifications

Housing OD, mm	106
Bearing section length, mm	1 640
Bearing section length to curvature plane, mm	1 214
Range of angle adjuster change, degree	0-2 или 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	200

S-120.NGT.M2



Bearing section S-120.NGT.M2 is a new short 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 drive shaft with two joints to connect to the power section rotor. The bearing section design has adjustable bent sub. The adjustment range is from 0° up to 2° or from 0° up to 3°.

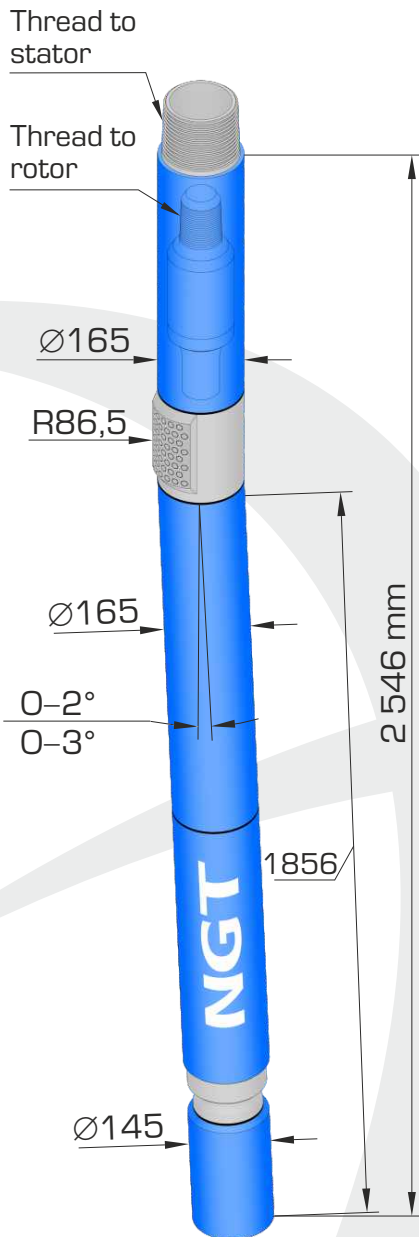
Meeting customers' requirements, the bearing section can be produced with the connecting threads for specific power section.

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

Technical specifications

Housing OD, mm	120
Bearing section length, mm	1 856
Bearing section length to curvature plane, mm	1 370
Range of angle adjuster change, degree	0–2 или 0–3
Connecting thread to bit	3 1/2 Reg
Torque transmitted, max. kN*m	6,0
Tolerance of axial loading, kN	100
Overhaul period, hour	200

S-165.NGT.M1



Bearing section S-165.NGT.M1 is a new short 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 drive shaft with two joints to connect to the power section rotor. The bearing section design has adjustable bent sub. The adjustment range is from 0° up to 2° or from 0° up to 3°.

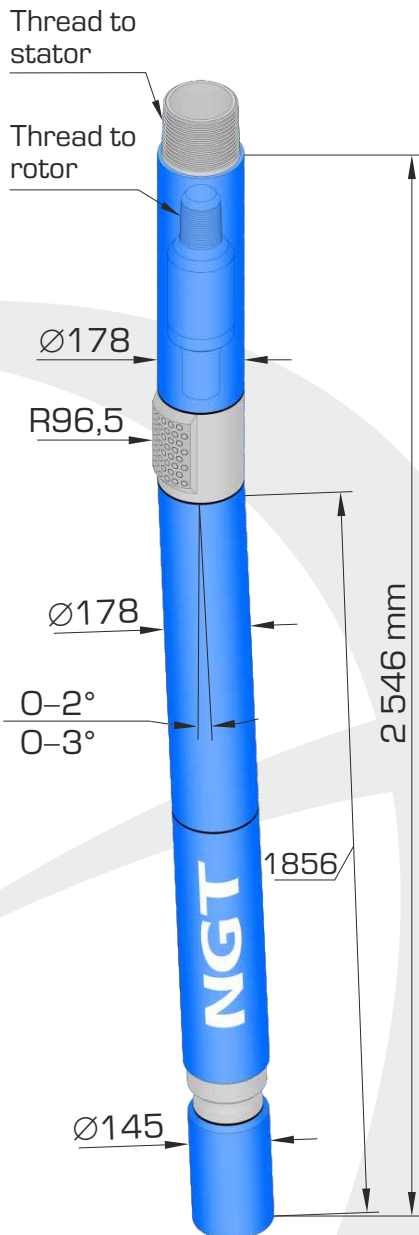
Meeting customers' requirements, the bearing section can be produced with the connecting threads for specific power section.

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

Technical specifications

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 или 0-3
Connecting thread to bit	4 1/2 Reg
Torque transmitted, max. kN*m	19,0
Tolerance of axial loading, kN	200
Overhaul period, hour	200

S-178.NGT.M12



Bearing section S-178.NGT.M12 is a new short 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 drive shaft with two joints to connect to the power section rotor. The bearing section design has adjustable bent sub. The adjustment range is from 0° up to 2° or from 0° up to 3°.

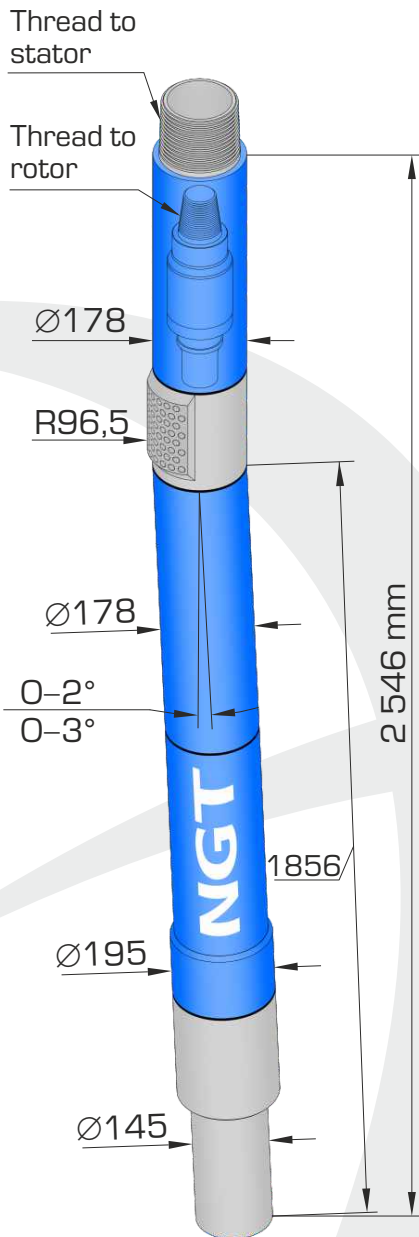
Meeting customers' requirements, the bearing section can be produced with the connecting threads for specific power section.

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

Technical specifications

Housing OD, mm	178
Bearing section length, mm	2 546
Bearing section length to curvature plane, mm	1 856
Range of angle adjuster change, degree	0–2 или 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.M15



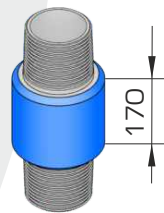
Bearing section S-178.NGT.M15 is a new short bearing section featuring enhanced operation life. The bearing section is used in PDM power sections of 172 – 178 mm diameter and for drilling oil and gas wells with 212,5 – 250,8 mm bits.

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.

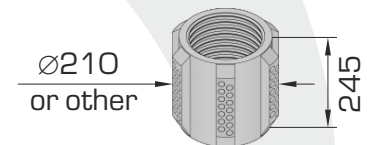
The bearing section is furnished with drive shaft with two joints to connect to the power section rotor. The bearing section design has adjustable bent sub. The adjustment range is from 0° up to 2° or from 0° up to 3°.

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

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



Calibrator sub

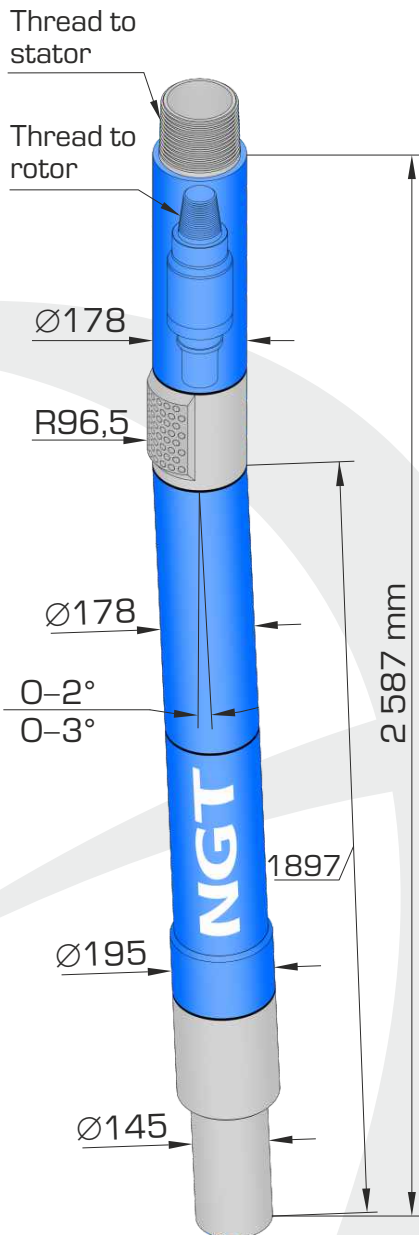


Centralizer

Technical specifications

Housing OD, mm	178
Bearing section length, mm	2 546
Bearing section length to curvature plane, mm	1 856
Range of angle adjuster change, degree	0-2 или 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.M16



Bearing section S-178.NGT.M16 is a new short 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.

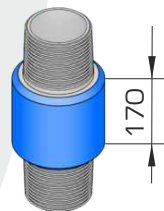
Axial bearing of bearing section is a multi-row thrust ball bearing with toroidal raceways, radial bearings of bearing section are steel sleeves, having the friction surfaces reinforced with hard-alloy plates.

The bearing section is furnished with drive shaft with two joints to connect to the power section rotor. The bearing section design has adjustable bent sub. The adjustment range is from 0° up to 2° or from 0° up to 3°.

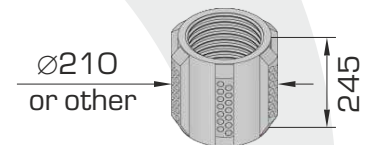
Meeting customers' requirements, the bearing section can be produced with the connecting threads for specific power section.

In the bottom part of a bearing section there is a nut on the sub which can replace, if necessary, nipple centralizer.

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



Calibrator
sub

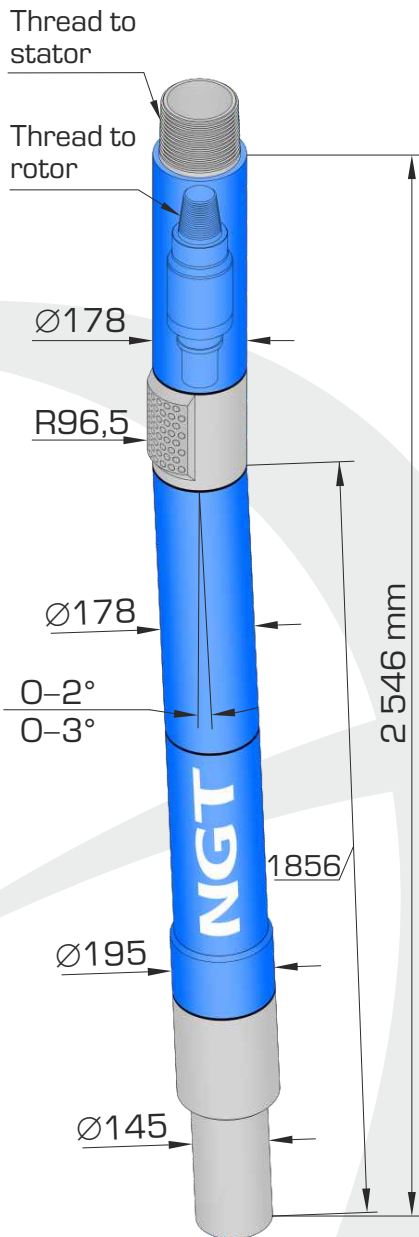


Centralizer

Technical specifications

Housing OD, mm	178
Bearing section length, mm	2 587
Bearing section length to curvature plane, mm	1 897
Range of angle adjuster change, degree	0-2 или 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



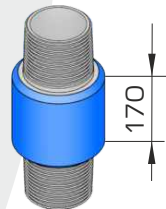
Bearing section S-178.NGT.M23 is a new short bearing section featuring enhanced overhaul period of around 350 hours. The bearing section is used in PDM power sections of 172 – 178 mm diameter and for drilling oil and gas wells with 212,5 – 250,8 mm bits.

The bearing section is fitted with the axial sliding bearing, having operating surfaces made of synthetic diamond, and the radial hard alloy bearings.

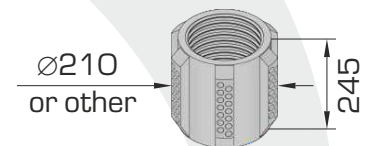
The bearing section is furnished with drive shaft with two joints to connect to the power section rotor. The bearing section design has adjustable bent sub. The adjustment range is from 0° up to 2° or from 0° up to 3°.

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

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



Calibrator sub

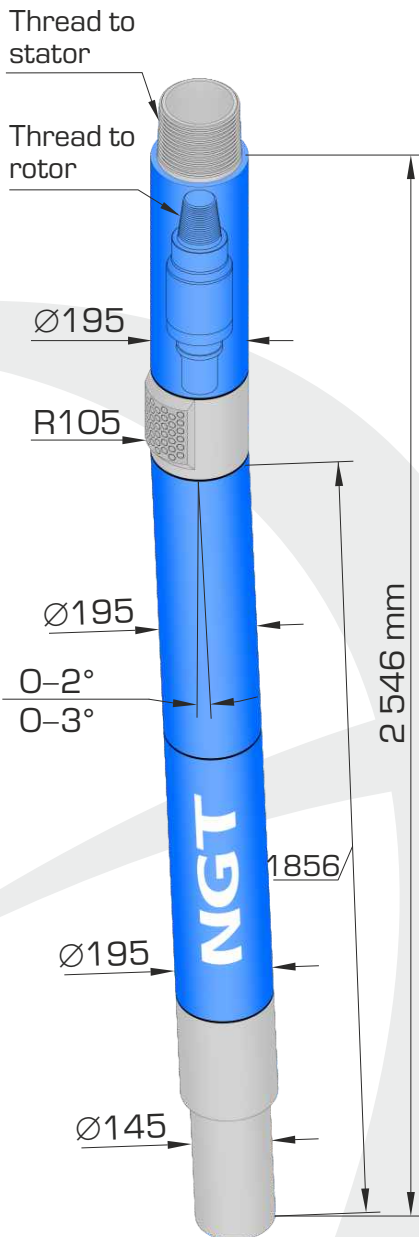


Centralizer

Technical specifications

Housing OD, mm	178
Bearing section length, mm	2 546
Bearing section length to curvature plane, mm	1 856
Range of angle adjuster change, degree	0–2 или 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-195.NGT.M4



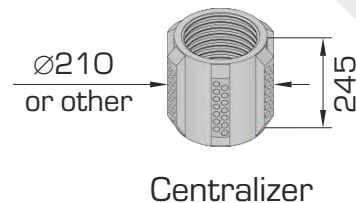
Bearing section S-195.NGT.M4 is a new short bearing section featuring enhanced operation life. The bearing section is used in PDM power sections of 195 mm diameter and for drilling oil and gas wells with 215.9 – 269.9 mm rock and PDC bits.

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 drive shaft with two joints to connect to the power section rotor. The bearing section design has adjustable bent sub. 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.

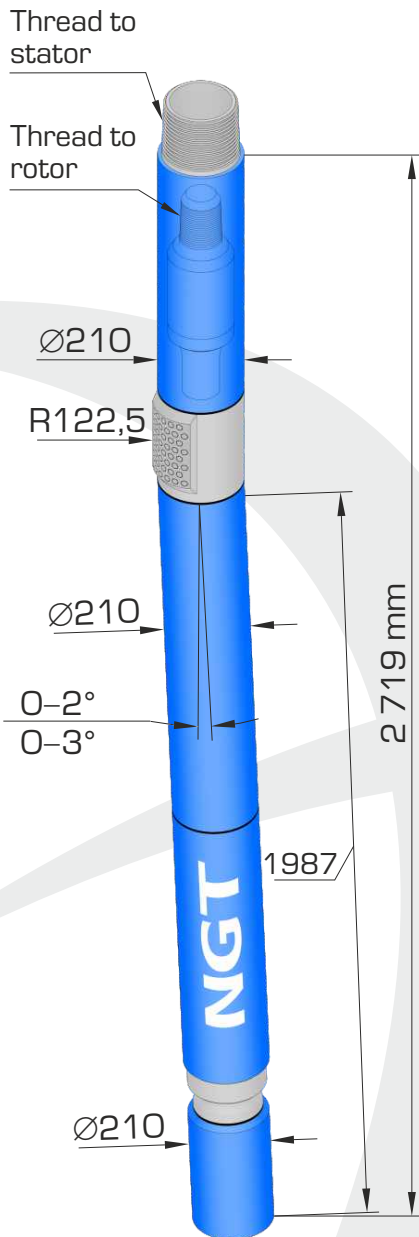
Top sub (safety sub) and replaceable centralizer are available with the bearing section to connect the power section to drill pipes:



Technical specifications

Housing OD, mm	195
Bearing section length, mm	2 546
Bearing section length to curvature plane, mm	1 856
Range of angle adjuster change, degree	0-2 или 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.M1



Bearing section S-210.NGT.M1 is a new short 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 – 374.6 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 drive shaft with two joints to connect to the power section rotor. The bearing section design has adjustable bent sub. The adjustment range is from 0° up to 2° or from 0° up to 3°.

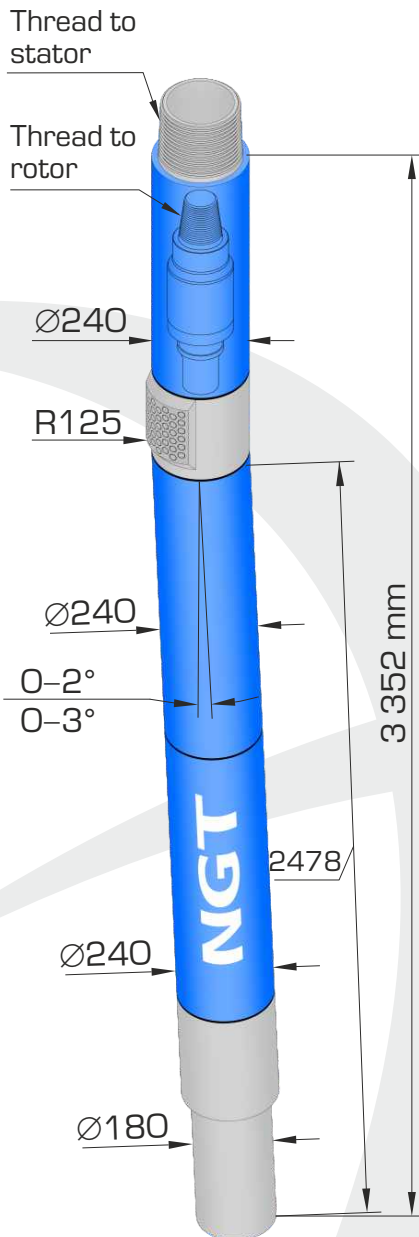
Meeting customers' requirements, the bearing section can be produced with the connecting threads for specific power section.

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

Technical specifications

Housing OD, mm	210
Bearing section length, mm	2 719
Bearing section length to curvature plane, mm	1 987
Range of angle adjuster change, degree	0-2 или 0-3
Connecting thread to bit	6 5/8 Reg
Torque transmitted, max. kN*m	25,0
Tolerance of axial loading, kN	350
Overhaul period, hour	250

S-240.NGT.M1



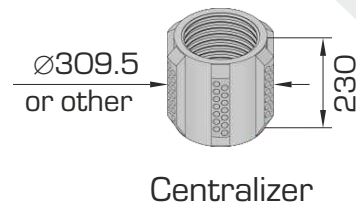
Bearing section S-240.NGT.M1 is a new short bearing section featuring enhanced operation life. The bearing section is used in PDM power sections of 240 mm diameter and for drilling oil and gas wells with 295.3 – 444.5 mm rock and PDC bits.

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 drive shaft with two joints to connect to the power section rotor. The bearing section design has adjustable bent sub. 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 centralizer are available with the bearing section to connect the power section to drill pipes:



Technical specifications

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 или 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 specification

Bearing section code	S-76.NGT.M2	S-88.NGT.M1	S-95.NGT.M1	S-106.NGT.M1	S-106.NGT.M2	S-120.NGT.M2	S-165.NGT.M1	S-178.NGT.M12 S-178.NGT.M15	S-178.NGT.M16	S-178.NGT.M23	S-195.NGT.M4	S-210.NGT.M1	S-240.NGT.M1
Housing OD, mm	76	88	95	106	106	120	165	178	178	178	195	210	240
Bearing section length, mm	1 227	1 405	1 560	1 309	1 640	1 856	2 546	2 546	2 587	2 546	2 546	2 719	3 352
Bearing section length to curvature plane, mm	855	1 025	1 139	883	1 214	1370	1 856	1856	1 897	1 856	1 856	1 987	2 478
Range of angle adjuster change, degree	0-2 or 0-3												
Connecting thread to bit	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	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	3,0	2,0	3,5	5,0	5,0	6,0	19	24	24	24	27	25	25
Tolerance of axial loading, kN	45	55	65	80	80	100	200	250	250	250	250	350	400
Overhaul period, hour	200	200	200	300	200	200	200	280	280	350	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 10 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 have allowed 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 and significant expenses. 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 (cone, impregnated and PDC).

Today the company produces the turbines for 4 main standard sizes of the turbodrills – 127mm (4 3/4”), 178 mm (6 3/4”), 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 at different conditions of operation: high temperatures, large range of chemical reagents used to support mud parameters required and effect of formation ingresses: H_2S ; H_2SO_3 ; H_2SO_4 ; HCl ; Cl_2 . Warranty life of the turbodrill till writing off reaches 900 hrs; 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 adjustable sub

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

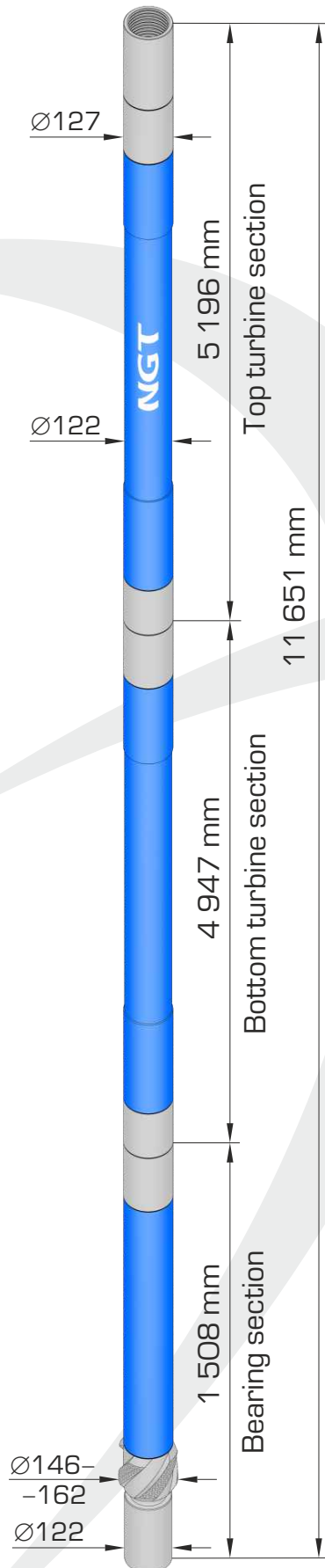
T2-240.NGT.M2

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).



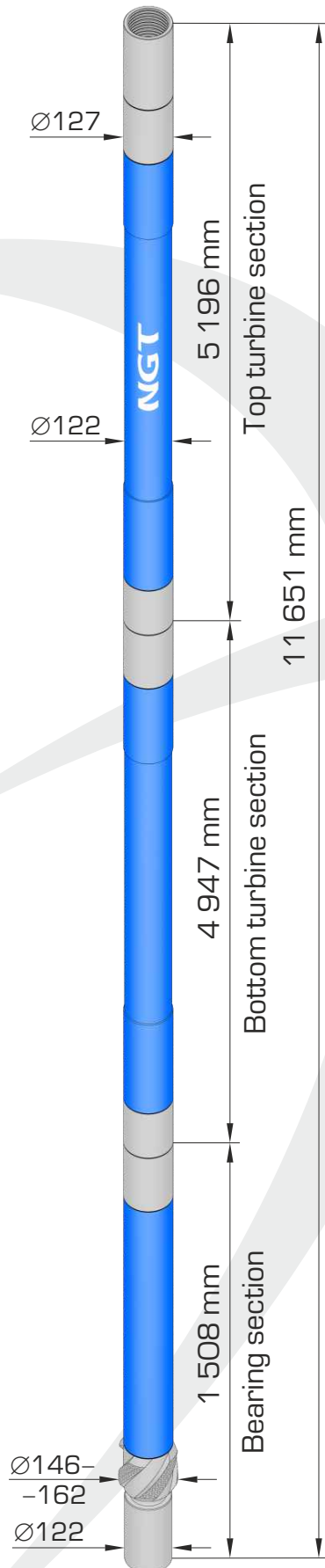
Turbodrill specification

Housing OD, mm	122
OD of threaded connections, mm	127
Diameters of bits used, mm	146,0–171,4
Turbodrill length, mm	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

Turbodrill power characteristic

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).

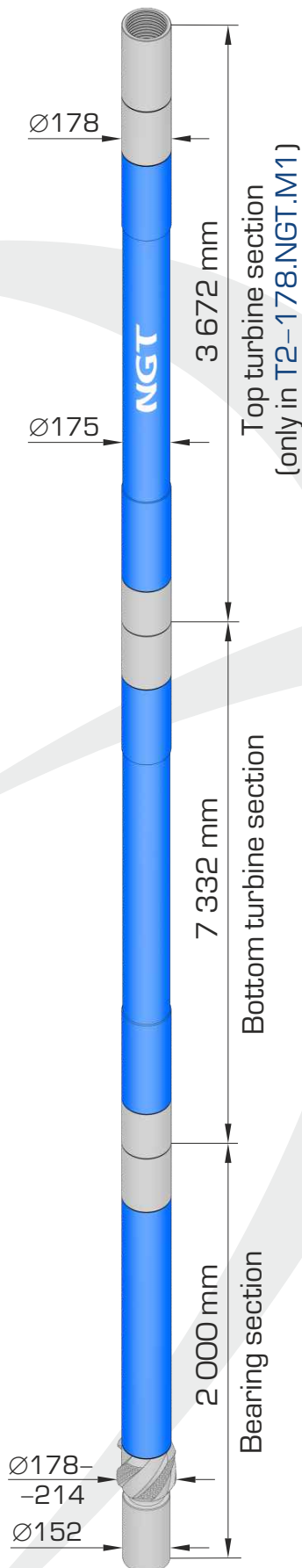
Turbodrill specification

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

Turbodrill power characteristic

Quantity of turbine sections, pc.	2
Mud flow rate, l/sec	10
Mud density, g/cm ³	1,0
Stall torque, N*m	988
Speed of rotation at operating condition, min ⁻¹	1236
Pressure drop, MPa	9,2
Max. power, kW	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.

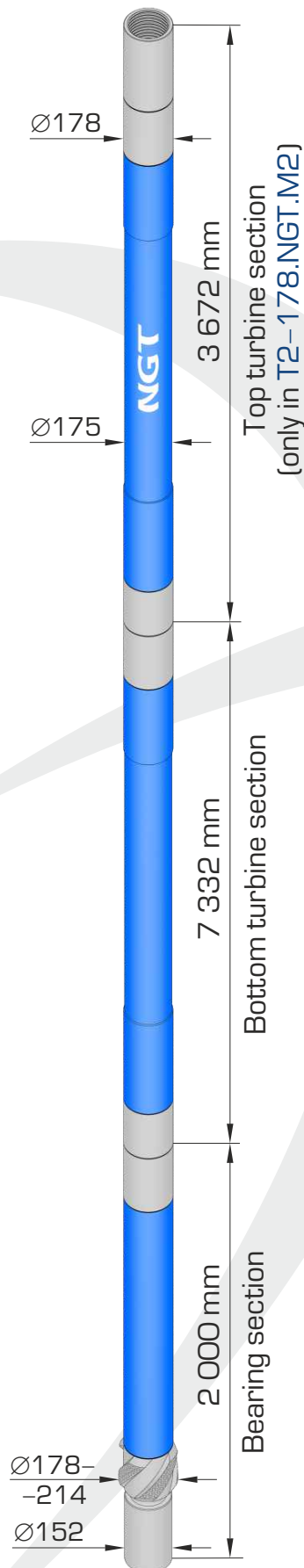
Turbodrill specification

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	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	5 1/2 FH	
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	

Turbodrill power characteristic

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 T2-178.NGT.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.

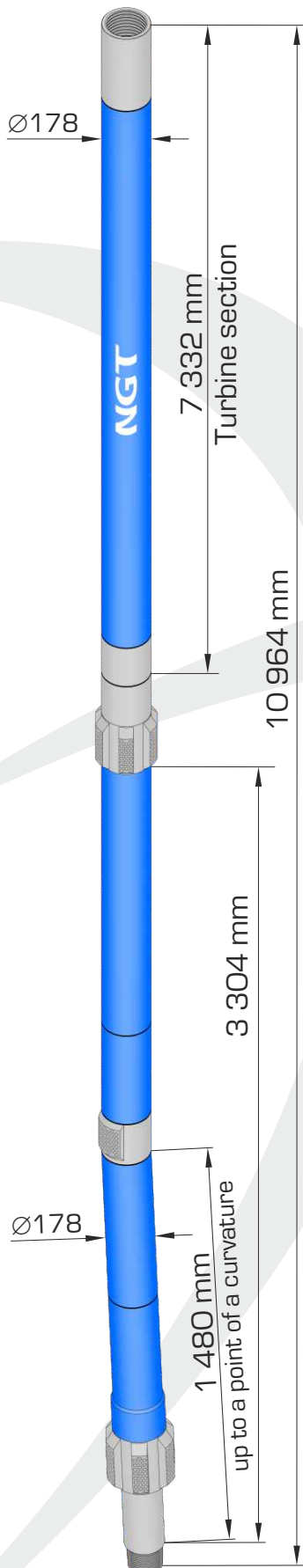
Turbodrill specification

Code of turbodrill	T1-178.NGT.M2	T2-178.NGT.M2
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	5 1/2 FH	
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	

Turbodrill power characteristic

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°00', 0°13', 0°25', 0°37', 0°49', 1°00', 1°11', 1°20', 1°29', 1°37', 1°44', 1°50', 1°54', 2°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.

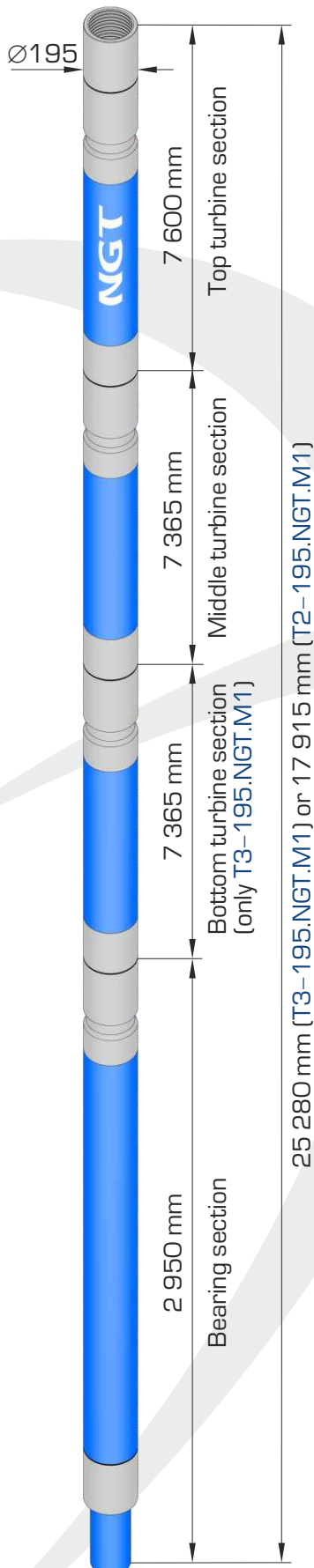
Turbodrill specification

Code of turbodrill	TBS1-178.NGT.M1	TBS1-178.NGT.M2
OD of threaded connections, mm	178	
Diameters of bits used, mm	212,7–215,9	
Turbodrill length, mm	10 964	10 964
Length of turbine section, mm	7 332	7 332
Bearing section length to curvature plane, mm	1 480	1 480
Connecting thread to drill pipes	5 1/2 FH (NC-50)	
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	2 100
Max. temperature in well, °C	250	

Turbodrill power characteristic

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 heels. Friction surfaces of radial bearings are reinforced with plates made of hard alloy. This allows reaching high power characteristics and increased overhaul life.

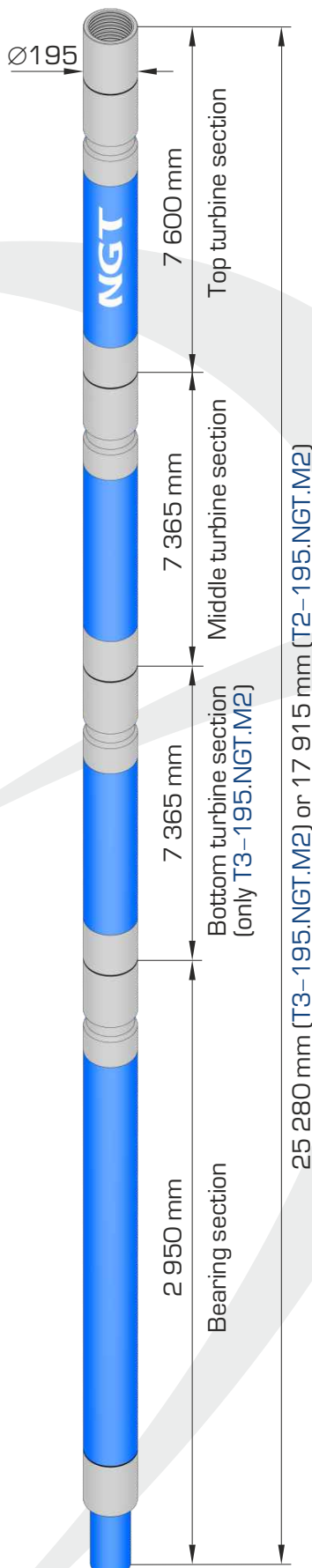
Turbodrill specification

Code of turbodrill	T2-195.NGT.M1	T3-195.NGT.M1
OD of threaded connections, mm	195	
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	5 1/2 FH	
Connecting thread to bit	4 1/2 Reg	
Max. density of mud, g/cm ³	1,9	
Max. axial load, kN	250	
Weight, kg	3 340	4 720
Max. temperature in well, °C	110	

Turbodrill power characteristic

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	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 heels. Friction surfaces of radial bearings are reinforced with plates made of hard alloy. This allows reaching high power characteristics and increased overhaul life.

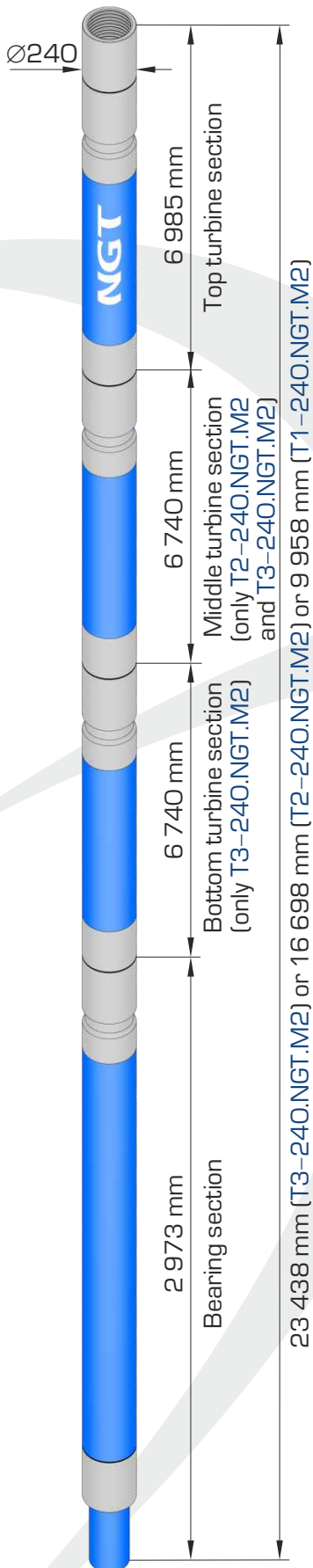
Turbodrill specification

Code of turbodrill	T2-195.NGT.M2	T3-195.NGT.M2
OD of threaded connections, mm	195	
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	5 1/2 FH	
Connecting thread to bit	4 1/2 Reg	
Max. density of mud, g/cm ³	1,9	
Max. axial load, kN	250	
Weight, kg	3 340	4 720
Max. temperature in well, °C	110	

Turbodrill power characteristic

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 heels. 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	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	–	6 740	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	6 5/8 FH		
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	4 275	6 015
Max. temperature in well, °C	110		

Turbodrill power characteristic

Quantity of turbine sections, pc.	1	2	3
Mud flow rate, l/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

Turbo-drill specification

Code	Dia. of bits used, mm	Length, mm	Weight, kg	Quantity of turbine sections, pcs		Quantity of turbine stages in turbo-drill, pcs	Mud flow rate, l/sec	Speed of rotation at operating condition, min ⁻¹	Stall torque, N*m	Pressure drop, MPa	Max. power, kW	Connecting thread		Range of bend angles, deg
				Turbine	Bearing section							to drill pipes	to bit	
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	5 1/2 FH	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	5 1/2 FH	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	5 1/2 FH	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	5 1/2 FH	4 1/2 Reg	-
TBS1-178.NGT.M1	212,7-215,9	10 964	2100	1	1	170	32-36	827-931	2843-3599	5,8-7,4	107-152	5 1/2 FH	4 1/2 Reg	0° - 2°
TBS1-178.NGT.M2	212,7-215,9	10 964	2 100	1	1	150	25-28	926-1037	2254-2827	6,4-8,0	100-140	5 1/2 FH	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	5 1/2 FH	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	5 1/2 FH	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	5 1/2 FH	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	5 1/2 FH	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	6 5/8 FH	6 5/8 Reg	-
T3-240.NGT.M2	269,9-393,7	23 438	6 015	3	1	327	32-34	440-468	5501-6210	5,7-6,4	127-152	6 5/8 FH	6 5/8 Reg	-

Note: turbo-drill power characteristics are given at mud density of 1.0 g/cm³

Components and spare parts for turbodrills and PDM

Research and development, made by the company during the recent 10 years in certain area have become the basis for designing of up-to-date DHM's with enhanced power, technological and performance features. The area of developments is creation of long-lasting axial and radial bearings, new types of turbines, universal joints, adjustable subs, improvement of production technologies, and application of corrosion- and wear-resistant materials. The most important step was change to cylindrical and cone threads with trapezoidal profile. The reason to start this rather expensive work was very critical: life of modern supported and unsupported bits has exceeds manifold overhaul period of DHM bearing sections. Quite often bit operation life was higher than the life of PDM power sections.

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

- radial bearings with impregnated hard-alloy components;
- 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.

Different types of component parts for DHM are presented in the catalogue.

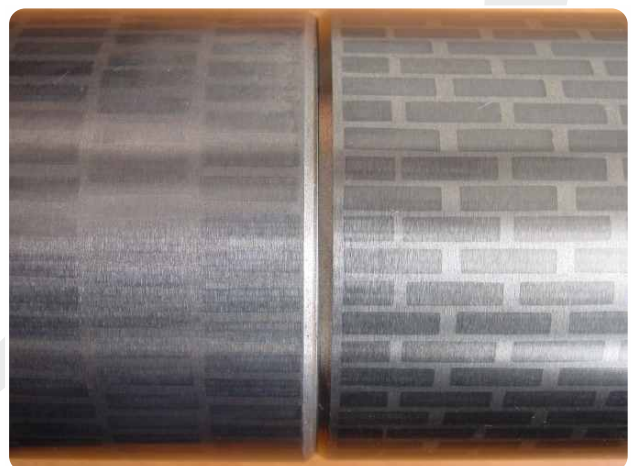
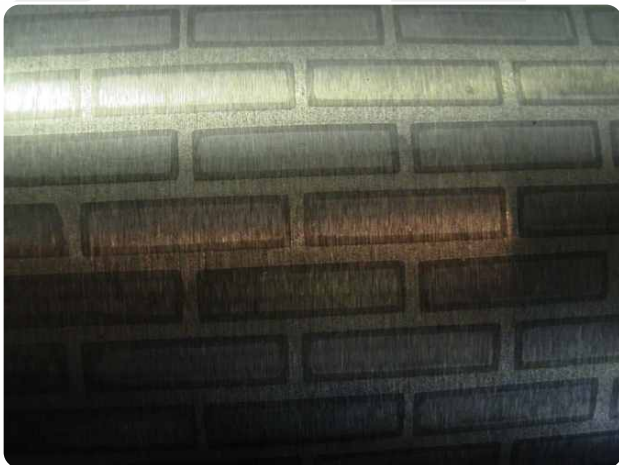
The company has terminated the field run cycle of PDM bearing sections in conjunction with long power sections (4–6 m). All the transmission members transferring torque from rotor to bit (universal joint, bearing section shaft, threads, clutches) have increased load-carrying capacity. JSC «NGT» offers a new generation of the bearing sections and transmission members (universal joints, bent subs etc.) to customers to operate in conjunction with the extended length PDM power sections.



Hard alloy radial bearings

JSC «NGT» has mastered production of hard alloy radial bearings using hard alloy plates of different configuration. Intervals between hard alloy plates are filled with wear-resistant material featuring much higher heat conductivity compared to the hard alloy. This excludes cracking of the hard alloy as the result of thermal shock at high radial loads or high sliding speeds.

See below different versions of friction surfaces of the radial bearings which differ by configuration of hard alloy plates, density of their location on friction surfaces, width of intervals between the plates which vary depending on operating conditions of the PDM or turbodrill run.



Hard alloy radial bearings

One of the main stages of the mentioned radial bearings production is grinding and polishing of operating surfaces. Specialized production area is organized for grinding and polishing of the hard alloy radial bearings using diamond grinding wheels and diamond polishing compounds. The photos show the production area and fragments of the grinding process of external and internal friction surfaces of the hard alloy radial bearing.

Combination of the abovementioned technological processes realized during the production of the hard alloy radial bearings provides good quality of the products, and, as the result, high reliability and durability of the bearings at different operating conditions for both positive displacement motors and turbodrills.



Hard alloy radial bearings

The hard alloy radial bearings for PDM's and turbodrills are produced in a wide range of sizes as per customers' drawings:

	Bearing diameter	Bearing length
Inner diameter	44 mm – 228 mm	25 mm – 460 mm
Outer diameter	51 mm – 242 mm	25 mm – 460 mm

The operating conditions of the radial bearing run are agreed beforehand: speed of rotation of the motor shaft, pressure drop across the bit, mud type (drilling fluid), well configuration (deviation parameters), places of the bearing location in the motor bearing section (at top, bottom).

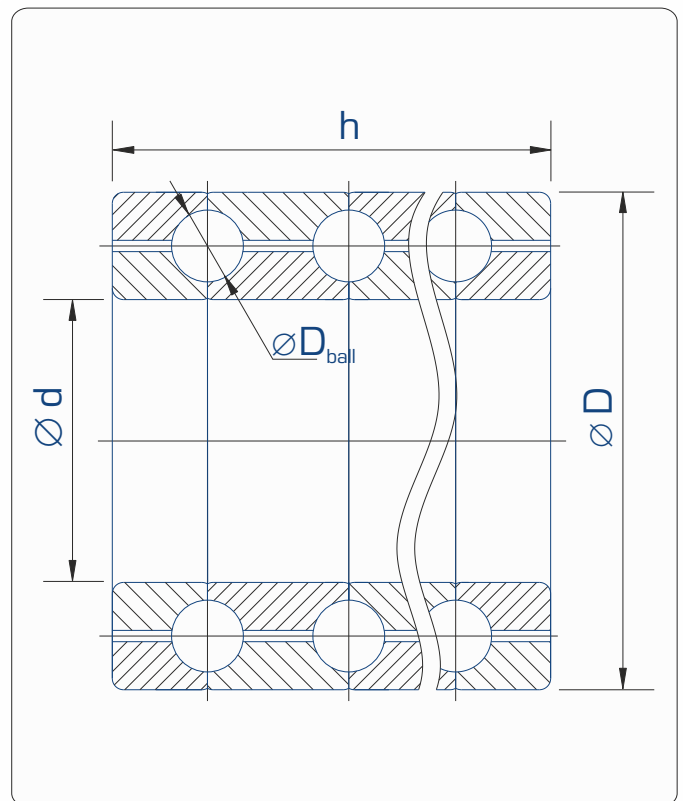
Materials, used while production of the composite hard alloy bearing are resistant to the temperature of up to 650°C and are compatible with all the chemical reagents such as water, oil, gas, salt, H₂S, H₂SO₃, H₂SO₄, HCl, Cl₂.



Radial thrust ball bearings

For more than 12 years the company has been developing and producing multi-row ball radial-thrust bearings with toroidal raceways for DHM's. The bearings of our production are used in bearing sections of PDM's and turbodrills operating in mud, as well as in geared turbodrills operating in oil.

Due to use of imported silicomolybdc steel of vacuum-arc remelting and high precision of production while the bearing manufacture, we have reached significant increase of load-carrying capacity and durability of the bearings. The average operation life constitutes approximately 250-400 hrs depending on drilling conditions. Except the range of the bearing standard sizes presented on the next page our company is developing and producing the bearings as per customers' size requirements.



Radial thrust ball bearings

Specification:

Code	d, mm	D, mm	h, mm	N _{row}	D _{ball} , mm	C _d , kN	M, kg
OM-708	34	63	204	11	9,525	120	2,9
OM-708-01	40	78	340	13	12,700	218	9,4
OM-708-02	48	78	310	15	9,525	173	6,2
OM-709-01	44	80	316	14	12,700	239	7,3
OM-710-01	50	88	350	13	12,700	234	11,5
OM-712-01	60	105	350	13	14,290	298	15,5
OM-712-02	60	100	315	13	12,700	256	8,4
OM-712-05	60	105	265	10	14,290	258	10,5
OM-713	65	128	352	10	19,050	390	22,2
OM-713-01	64,3	101,3	210	10	12,700	219	8,5
OM-716-01	80	134	480	15	19,050	556	33,0
OM-716-02	80	160	480	12	25,400	717	52,0
OM-717-01	84	148	450	14	19,050	543	40,0
OM-718	90	142	550	15	15,875	453	35,0
OM-718-01	90	148	450	14	19,050	560	33,0
OM-718-05	90	148	464	14	20,638	635	35,0
OM-718-08	92	148	550	16	19,050	614	37,5
OM-718-10	92	148	390	12	19,050	509	26,5
OM-718-11	90	152	385	10	20,638	499	30,5
OM-721	105	165	506	15	20,638	697	41,0
OM-722	110	174	560	15	20,638	714	52,0
OM-723	115	205	570	12	28,575	987	84,0
OM-726	130	205	788	15	25,400	1 010	106,0
OM-726-01	130	205	702	15	25,400	1010	93,0

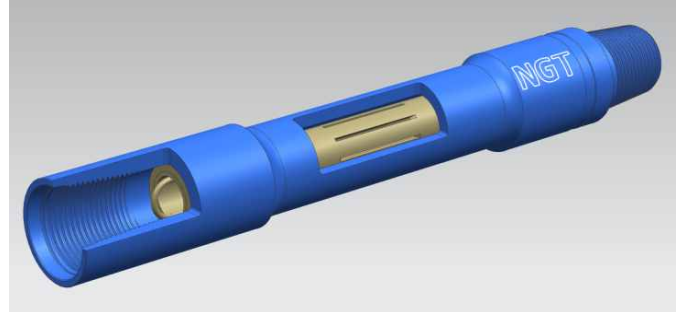
Note:

d – inner diameter, mm
 D – outer diameter, mm
 h – length, mm

N_{row} – ball rows quantity
 D_{ball} – ball diameter, mm
 C_d – dynamic load-carrying capacity, kN
 M – weight, kg

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.

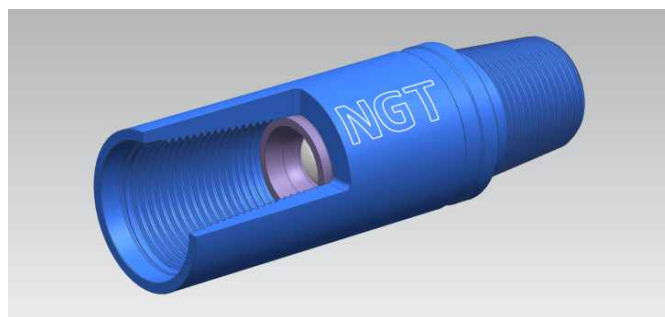
2. Filter case works as “flex sub” reducing tension in stator thread of PDM when going through the smaller radius part of the well.

Specifications	Designations					
	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, top (box)	3-86	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, l/s, not more than	18	21	31	45	45	70
Weight, kg	27	40	87	93	134	183

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

Back-pressure valves

Back-pressure valves are necessary to prevent motor when drill string running and also to prevent showings of oil, gas and water from the well through the drilling string when drilling oil and gas wells. Back-pressure 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. Back-pressure valve design doesn't have hard alloy units at all which simplifies it, ensures its reliability, and, consequently, ensures considerable valve operation life.

2. Back-pressure 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.

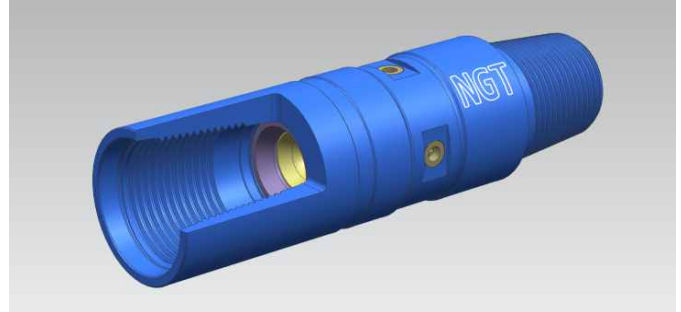
Due to the abovementioned design features, the overhaul period of our back-pressure valves is around 250 working hours.

Specifications	Designations							
	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/cm ²	0,3	0,3	0,3	0,4	0,4	0,3	0,3	0,3
Mud flow rate, l/s, not more than	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 be more than 1%. Mud density shouldn't be more than 2 g/cm³. Valve proof-test pressure while underfeeding is 350 bar.

Bypass valves

Bypass 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 string trip and protects PDM from no-load rotation. While pulling out, PDM in conjunction with the valve excludes uncontrolled mud spilling.



The bypass valves are suitable for the mud density of up to 2 g/cm³ at the bottomhole, temperature of not exceeding 130 °C, the content of oil products of less than 10%, sand of less than 1%.

Specifications	Designations									
	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/cm ²	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, l/s, not more than	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 be more than 1%.
Mud density shouldn't be more than 2 g/cm³.

Centralizers

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

Application

The centralizers 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 centralizer housings are produced out of steel 40XH2MA. Operating surfaces of the blades and lead-in chamfers are reinforced with teeth made out of hard alloy VK6 or VK8.

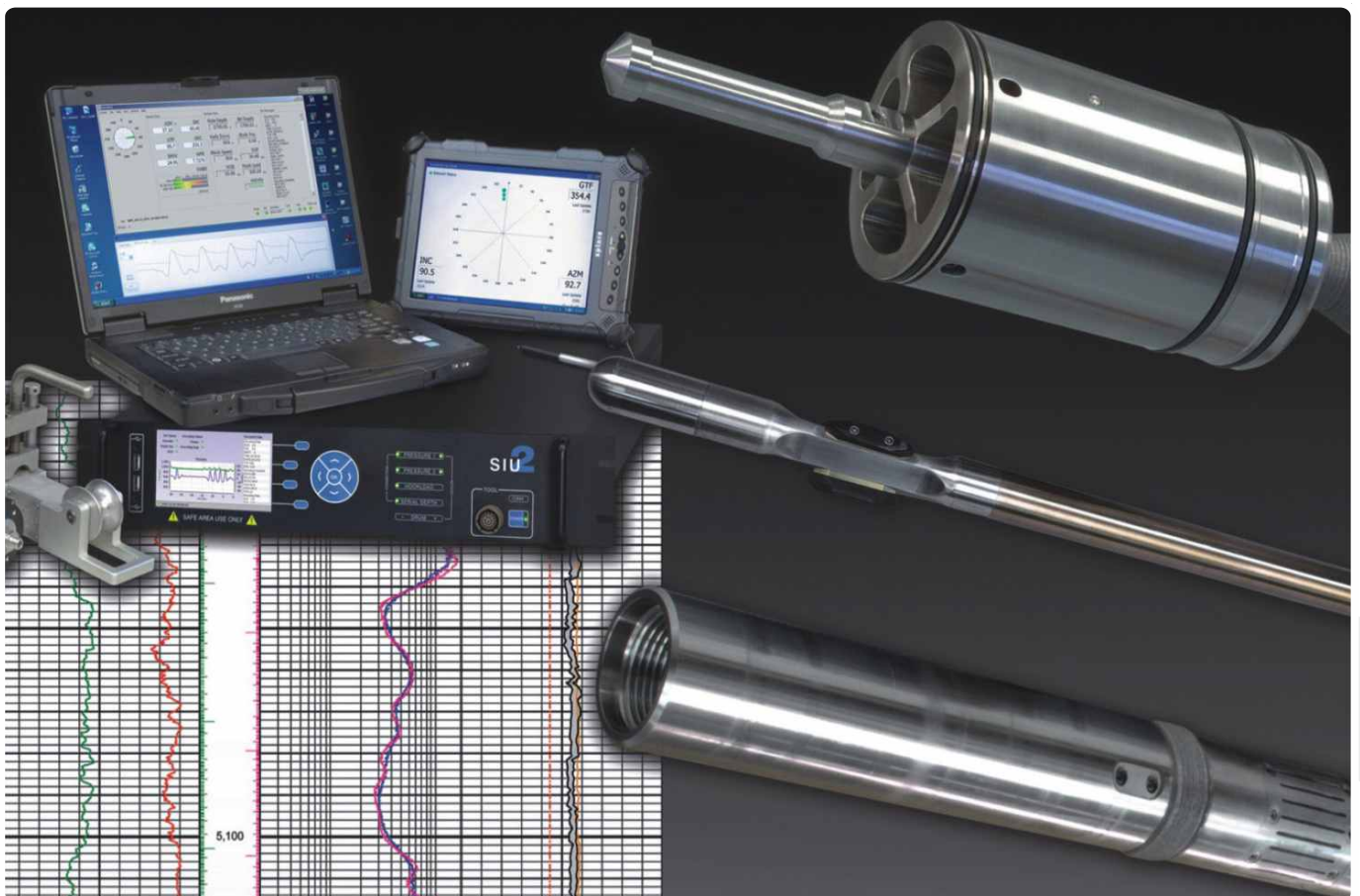


Telemetric systems service

Our company in cooperation with the partners can offer you engineering and technological supervision services of drilling directional and horizontal well of different constructions using modern telemetric systems with hydraulic channel, including gamma-ray logging while drilling.

We are using «ZTLS-U» or «APS Technology» hydraulic channel telemetric systems, which contain pulsators for signal transmission from the hardware at the bottom to the top receiver by drilling mud. Telemetric system provides direction control and lithologic partition of the rocks while drilling.

The equipment is designed to operate in the boreholes of 120 – 295mm ID. Telemetric system operates in mud-filled boreholes by means of positive pressure impulses to transmit the following data to the surface: azimuth angle, zenith angle, temperature of environment, magnetic field status, gravitational deviation, magnetic deviation, marking azimuth (tool orientation) with precision from $\pm 5^\circ$ to $\pm 1^\circ$.



Bit service

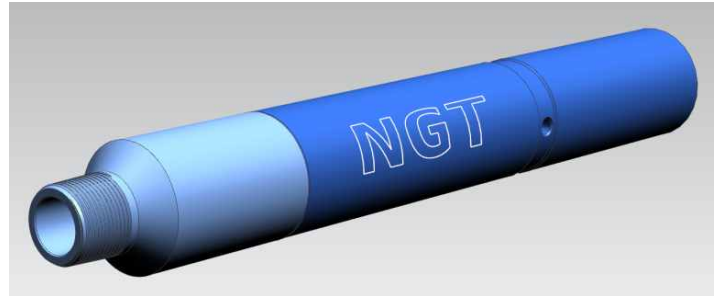
JSC «NGT» and partners can offer you bit services including development of the bit program, delivery of the bits, and engineer support of the drilling process. Close cooperation with bits producers allows our company to use the whole range of bits: from classic rock bits to modern PDC bits and high-speed impregnated bits. Field engineers are trained special manufacturer education programs and get all skills and knowledge needed to service bits properly and effectively.

Great experience gained in working with DHM allows us to provide optimal matching of Bit-DHM set at the development stage of project. Besides, provision of the complex Bit-DHM service leads to our full responsibility for this most important components of DHM as to its reliability & rate of penetration and high cost efficiency as a whole.



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.

The company has developed several modifications of multi level equipment:

Parameter	UKORD-89.NGT.M1	UKORD-120.NGT.M1	UKORD-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	3
Applicability in the production string, mm	114	146	146
Outer diameter of the equipment, mm	89	120	120
Possibility of pressure regulator installation	Yes	Yes	Yes

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

- 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 at any convenient time and instruct you on the equipment application. We also provide engineering support for the single string selective production equipment during the first launches of the equipment at the client's worksite.

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