



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.
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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.АГ35.В.00018 number 0962920
«Hydraulic downhole motors».

Certificate of conformance C–RU.АГ35.В.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**

**СЭПБ
СНКС**
(СИСТЕМА НЕРАЗРУШАЮЩЕГО КОНТРОЛЯ)

СВИДЕТЕЛЬСТВО ОБ АТТЕСТАЦИИ
№ 84A140159

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

УДОВЛЕТВОРИТЕЛЬ
требованиям 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)-42

**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
№ 84A110159 от 06 марта 2015 г.
Лаборатория неразрушающего контроля
Закрытого акционерного общества «НГТ» (ЗАО «НГТ»)
614058, г. Пермь, ул. Фоминская, д.54

Лист 1

На 1-ом листе

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)-42

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

№ C-RU.AT35.B.00020 TP 0962922
(номер сертификата соответствия) (участный номер бренда)

ЗАЯВИТЕЛЬ
(наименование и адрес)
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 адрес)
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 адрес)
Общество с ограниченной ответственностью «ЦЕНТР
СЕРТИФИКАЦИИ «СертиПромТест». РФ, 107078, г. Москва, ул. Новая
Басманная, 23Б, стр. 20, тел. +7 (499) 346-20-85. ОГРН: 1107746715669. Аттестат рег. № РОСС RU.0001.11AT35 выдан
15.06.2011 г. Федеральным агентством по техническому регулированию и метрологии.

ПОДТВЕРЖДАЕТ, ЧТО
ПРОДУКЦИЯ
(наименование и адрес)
Управляемые забойные компрессоры, выпускаемые по
ТУ3664-102-52275083-2006.
Серийный выпуск.

код ОК 005 (ОКП)
36 6322

код ЕКПС

код ТН ВЭД России

**СООТВЕТСТВУЕТ ТРЕБОВАНИЯМ
ТЕХНИЧЕСКОГО РЕГЛАМЕНТА
(ТЕХНИЧЕСКИХ РЕГЛАМЕНТОВ)**
(наименование технического регламента (технических регламентов)
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**
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 документов)
Сопровождающие документы в форме из-
вестия о сертификации в области декларирования соответствия
протоколам применения технического регламента
(технических регламентов)

СРОК ДЕЙСТВИЯ СЕРТИФИКАТА СООТВЕТСТВИЯ с 30.08.2011 по 29.08.2016

Руководитель
(заместитель руководителя)
органа по сертификации

Б. В. Пожогин

Эксперт (эксперты)
(наименование, фамилия)

А. Н. Лукьянов

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

№ C-RU.AT35.B.00018 TP 0962920
(номер сертификата соответствия) (участный номер бренда)

ЗАЯВИТЕЛЬ
(наименование и адрес)
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 адрес)
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 адрес)
Общество с ограниченной ответственностью «ЦЕНТР
СЕРТИФИКАЦИИ «СертиПромТест». РФ, 107078, г. Москва, ул. Новая
Басманная, 23Б, стр. 20, тел. +7 (499) 346-20-85. ОГРН: 1107746715669. Аттестат рег. № РОСС RU.0001.11AT35 выдан
15.06.2011 г. Федеральным агентством по техническому регулированию и метрологии.

ПОДТВЕРЖДАЕТ, ЧТО
ПРОДУКЦИЯ
(наименование и адрес)
Двигатели гидравлические забойные, выпускаемые по
ТУ3664-101-52275083-2006.
Серийный выпуск.

код ОК 005 (ОКП)
36 6400

код ЕКПС

код ТН ВЭД России

**СООТВЕТСТВУЕТ ТРЕБОВАНИЯМ
ТЕХНИЧЕСКОГО РЕГЛАМЕНТА
(ТЕХНИЧЕСКИХ РЕГЛАМЕНТОВ)**
(наименование технического регламента (технических регламентов)
технический регламент о безопасности машин и оборудования (Постановление
Правительства РФ от 15.09.2009 N 753)

**ПРОВЕДЕННЫЕ ИССЛЕДОВАНИЯ
(ИСПЫТАНИЯ) И ИЗМЕРЕНИЯ**
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 документов)
Сопровождающие документы в форме из-
вестия о сертификации в области декларирования соответствия
протоколам применения технического регламента
(технических регламентов)

СРОК ДЕЙСТВИЯ СЕРТИФИКАТА СООТВЕТСТВИЯ с 29.08.2011 по 28.08.2016

Руководитель
(заместитель руководителя)
органа по сертификации

Б. В. Пожогин

Эксперт (эксперты)
(наименование, фамилия)

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 1.50" dia. PDM model, followed by 6.75" dia. prototype of 9/10 power section lobe configuration which was successfully field tested. Later, all standard size PDM's within the range of 1.50"-9.50" mm were developed and produced.

The new Russian design was recognized worldwide.

In the early 1980's the production licenses were sold to Drillex 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.

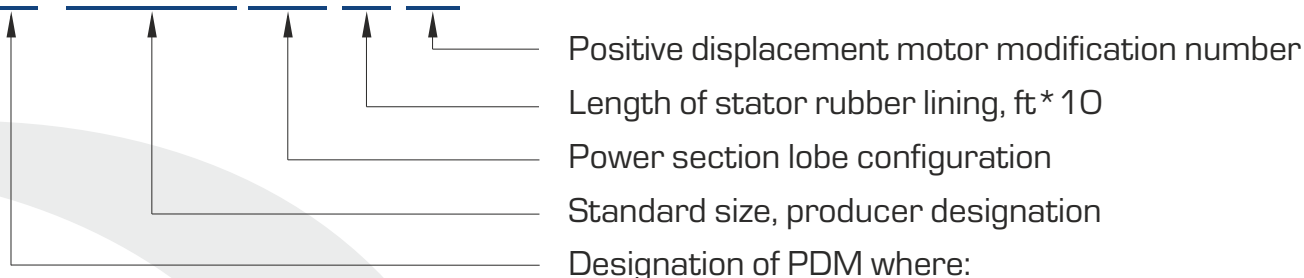
This catalogue presents our most popular PDM's among our customers.



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-475.NGT.5/6.98.M2

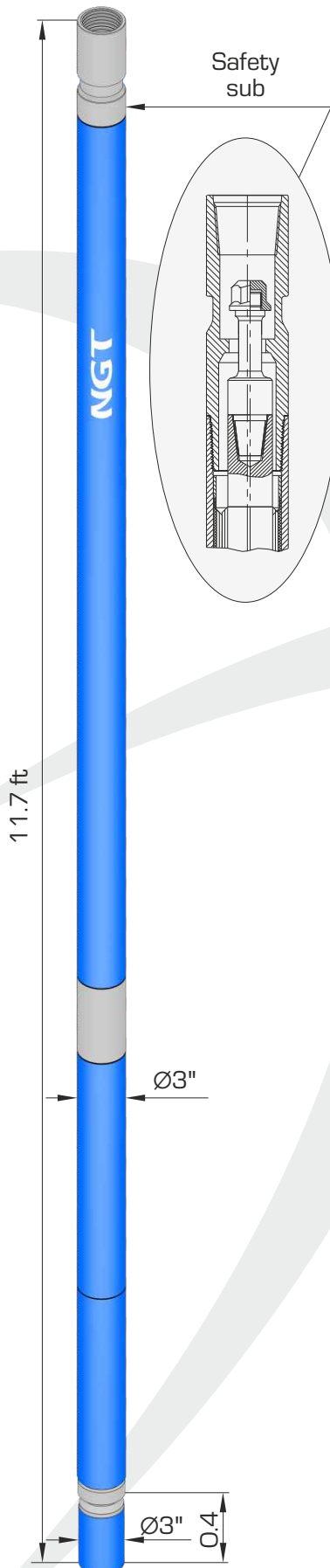


- D – positive displacement motor,
- DO – downhole motor–whipstock with fixed bend angle,
- DR – downhole motor–whipstock with adjustable housing

PDM's presented in the catalogue:

D-300.NGT.4/5.66.M1	DR-700.NGT.7/8.180.M15
DO-300.NGT.4/5.66.M1	DR-700.NGT.7/8.203.M15
DR-300.NGT.4/5.66.M2	DR-700.NGT.7/8.209.M15
DR-350.NGT.5/6.66.M1	DR-700.NGT.7/8.210.M15
DR-350.NGT.5/6.79.M1	DR-700.NGT.4/5.177.M23
DR-350.NGT.7/8.90.M1	DR-700.NGT.7/8.171.M23
DR-375.NGT.7/8.137.M1	DR-700.NGT.7/8.180.M23
DR-375.NGT.7/8.174.M1	DR-700.NGT.7/8.203.M23
DR-416.NGT.5/6.98.M1	DR-700.NGT.7/8.209.M23
DR-416.NGT.7/8.175.M1	DR-700.NGT.7/8.210.M23
DR-416.NGT.5/6.98.M2	DR-768.NGT.5/6.141.M1
DR-416.NGT.7/8.175.M2	DR-768.NGT.6/7.141.M1
DR-475.NGT.6/7.194.M2	DR-825.NGT.7/8.138.M1
DR-475.NGT.7/8.98.M2	DR-825.NGT.7/8.165.M1
DR-650.NGT.7/8.188.M1	DR-950.NGT.3/4.203.M1
DR-650.NGT.7/8.226.M1	DR-950.NGT.3/4.207.M1
DR-700.NGT.4/5.177.M15	DR-950.NGT.5/6.207.M1
DR-700.NGT.7/8.171.M15	

D-300.NGT.4/5.66.M1



PDM D-300.NGT.4/5.66.M1 is a new universal hydraulic downhole motor used for:

- drilling of oil and gas wells with 3 1/4" – 3 7/8" 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.

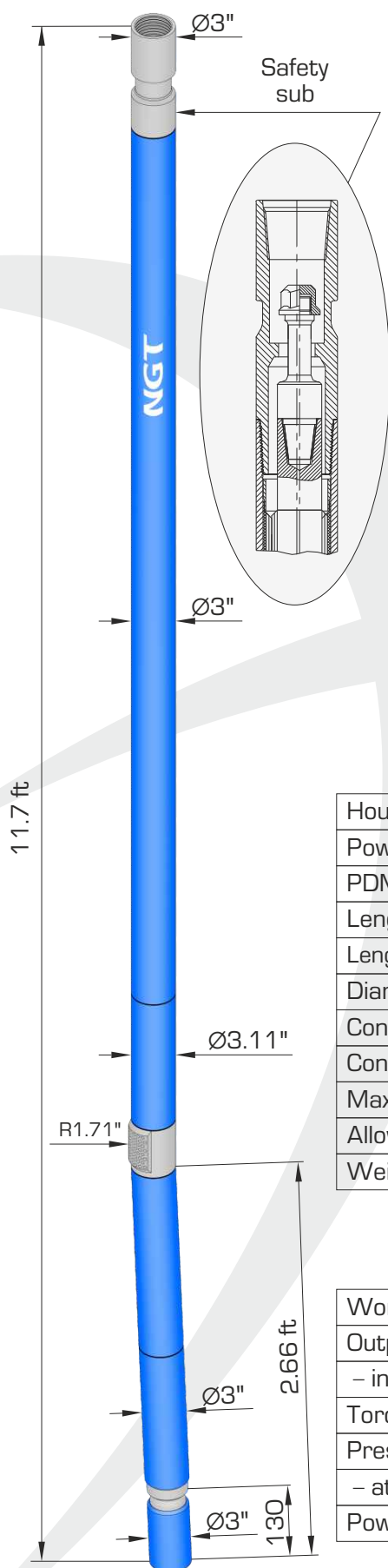
Technical specification

Housing OD, inch	3
Power section lobe configuration	4/5
PDM length, ft	11.7
Length of stator rubber lining, ft	6.6
Length of bearing section up to a curvature point, ft	–
Diameter of bits used, inch	3 1/4 – 3 7/8
Connecting thread to drill pipes	2 3/8 Reg
Connecting thread to bits	2 3/8 Reg
Maximum density of drilling mud, ppg	13.3
Allowed axial load, lbs	5618
Weight, lbs	207

Power specification

Working fluid flow rate, gpm	48–80
Output shaft rotation speed:	
– in no-load conditions, RPM	240–396
Torque at maximum power, ft*lbs	442–590
Pressure drop:	
– at maximum power, psi	1160–1450
Power, hp	15–34

DO-300.NGT.4/5.66.M1



PDM DO-300.NGT.4/5.66.M1 is a new universal hydraulic downhole motor used for:

- drilling of oil and gas wells with 3 1/4" – 3 7/8" 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 2.66 ft) 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°/32.8 ft 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.

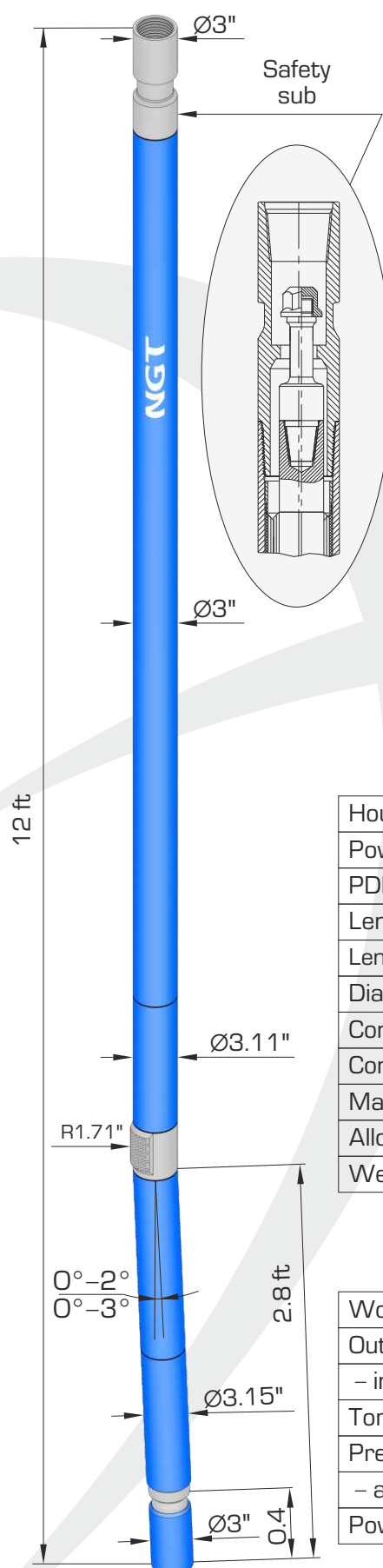
Technical specification

Housing OD, inch	3 – 3.11
Power section lobe configuration	4/5
PDM length, ft	11.7
Length of stator rubber lining, ft	6.6
Length of bearing section up to a curvature point, ft	2.66
Diameter of bits used, inch	3 1/4 – 3 7/8
Connecting thread to drill pipes	2 3/8 Reg
Connecting thread to bits	2 3/8 Reg
Maximum density of drilling mud, ppg	13.3
Allowed axial load, lbs	5618
Weight, lbs	207

Power specification

Working fluid flow rate, gpm	48–80
Output shaft rotation speed:	
– in no-load conditions, RPM	240–396
Torque at maximum power, ft*lbs	442–590
Pressure drop:	
– at maximum power, psi	1160–1450
Power, hp	15–34

DR-300.NGT.4/5.66.M2



PDM DR-300.NGT.4/5.66.M2 is a new universal hydraulic downhole motor used for:

- drilling of oil and gas wells with 3 1/4 – 3 7/8" 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 2.8 ft) 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°/32.8 ft 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.

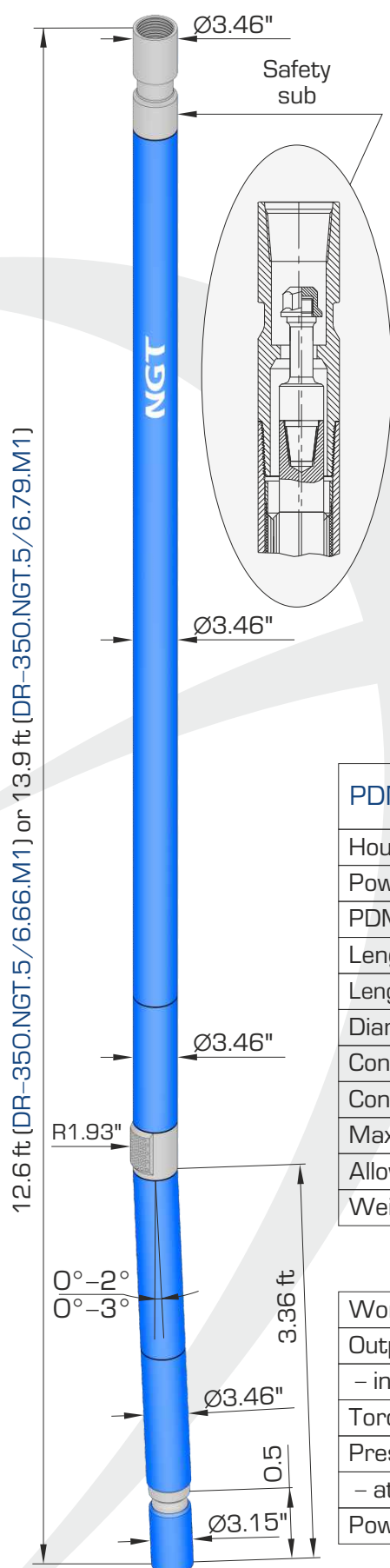
Technical specification

Housing OD, inch	3 – 3.11
Power section lobe configuration	4/5
PDM length, ft	12
Length of stator rubber lining, ft	6.6
Length of bearing section up to a curvature point, ft	2.8
Diameter of bits used, inch	3 1/4 – 3 7/8
Connecting thread to drill pipes	2 3/8 Reg
Connecting thread to bits	2 3/8 Reg
Maximum density of drilling mud, ppg	13.3
Allowed axial load, lbs	10113
Weight, lbs	214

Power specification

Working fluid flow rate, gpm	48–80
Output shaft rotation speed:	
– in no-load conditions, RPM	240–396
Torque at maximum power, ft*lbs	442–590
Pressure drop:	
– at maximum power, psi	1160–1450
Power, hp	15–34

DR-350.NGT.5/6.66.M1 and DR-350.NGT.5/6.79.M1



PDM's DR-350.NGT.5/6.66.M1 and DR-350.NGT.5/6.79.M1 are new universal hydraulic downhole motors used for:

- drilling of oil and gas wells with 3 7/8 – 4 3/4" 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 3.36 ft) 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°/32.8 ft 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.

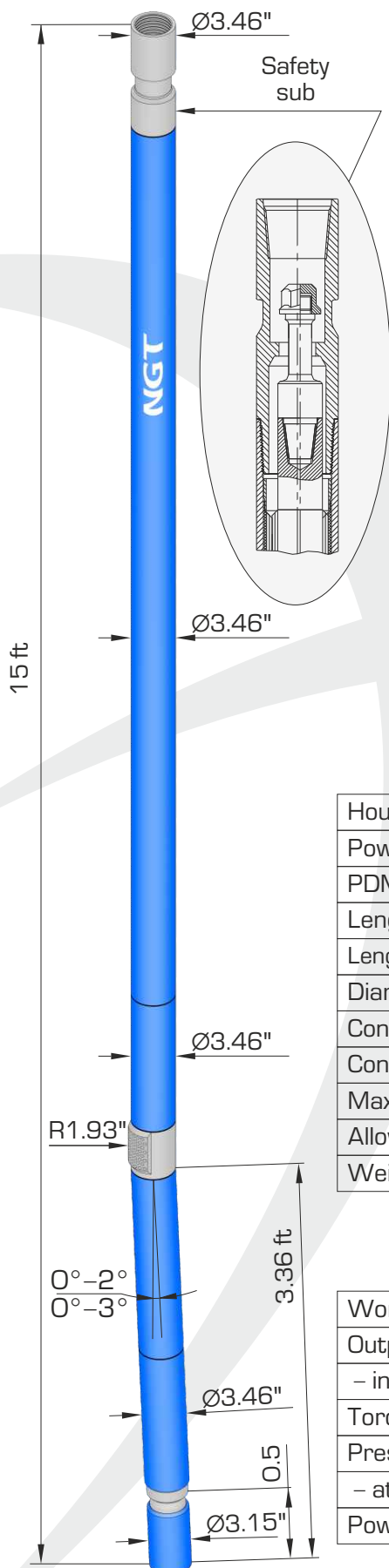
Technical specification

PDM model	DR-350.NGT.5/6.66.M1	DR-350.NGT.5/6.79.M1
Housing OD, inch	3.46	3.46
Power section lobe configuration	5/6	5/6
PDM length, ft	12.6	13.9
Length of stator rubber lining, ft	6.6	7.9
Length of bearing section up to a curvature point, ft	3.36	3.36
Diameter of bits used, inch	3 7/8 – 4 3/4	3 7/8 – 4 3/4
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, ppg	13.3	13.3
Allowed axial load, lbs	11236	11236
Weight, lbs	302	333

Power specification

Working fluid flow rate, gpm	80–112	69–204
Output shaft rotation speed:		
– in no-load conditions, RPM	270–400	108–325
Torque at maximum power, ft*lbs	811–958	1128
Pressure drop:		
– at maximum power, psi	1450–1885	653
Power, hp	37–58	64

DR-350.NGT.7/8.90.M1



PDM DR-350.NGT.7/8.90.M1 is a new universal hydraulic downhole motor used for:

- drilling of oil and gas wells with 3 7/8 – 4 3/4" 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 3.36 ft) 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°/32.8 ft 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.

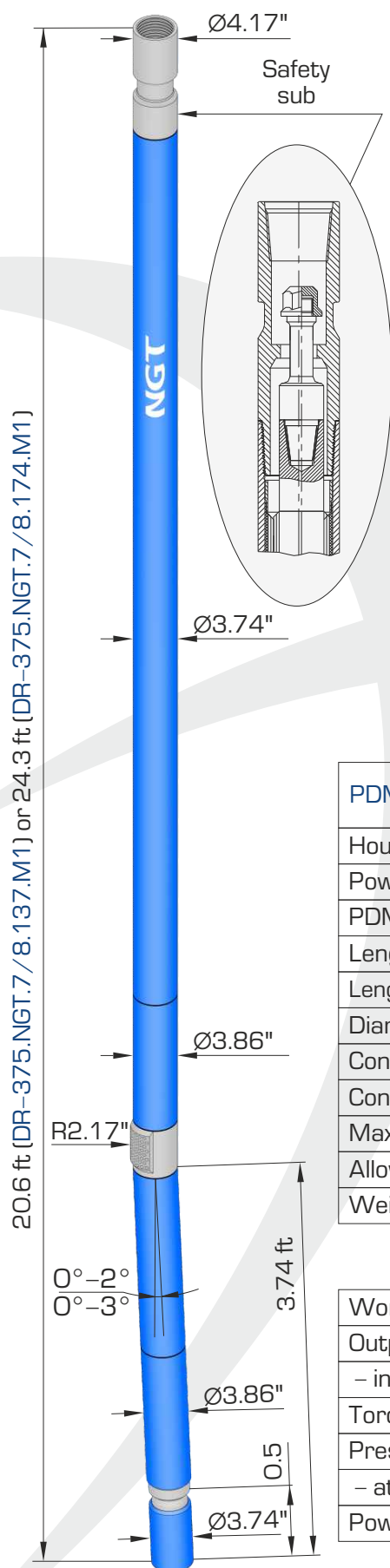
Technical specification

Housing OD, inch	3.46
Power section lobe configuration	7/8
PDM length, ft	15
Length of stator rubber lining, ft	9
Length of bearing section up to a curvature point, ft	3.36
Diameter of bits used, inch	3 7/8 – 4 3/4
Connecting thread to drill pipes	2 3/8 Reg
Connecting thread to bits	2 3/8 Reg
Maximum density of drilling mud, ppg	13.3
Allowed axial load, lbs	11236
Weight, lbs	357

Power specification

Working fluid flow rate, gpm	45–131
Output shaft rotation speed:	
– in no-load conditions, RPM	74–215
Torque at maximum power, ft*lbs	988
Pressure drop:	
– at maximum power, psi	624
Power, hp	38

DR-375.NGT.7/8.137.M1 and DR-375.NGT.7/8.174.M1



PDM's DR-95.NGT.7/8.42.M1 and DR-375.NGT.7/8.174.M1 are new universal hydraulic downhole motors used for:

- drilling of oil and gas wells with 4 3/8 – 5 1/4" 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 3.74 ft) 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°/32.8 ft 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.

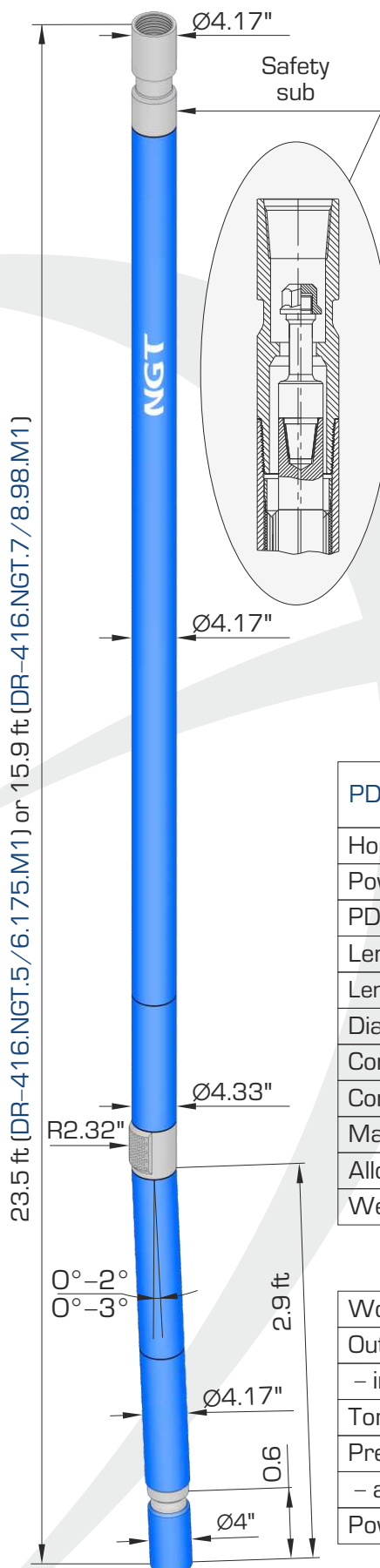
Technical specification

PDM model	DR-375.NGT.7/8.137.M1	DR-375.NGT.7/8.174.M1
Housing OD, inch	3.74–4.17	3.74–4.17
Power section lobe configuration	7/8	7/8
PDM length, ft	20.6	24.3
Length of stator rubber lining, ft	13.7	17.4
Length of bearing section up to a curvature point, ft	3.74	3.74
Diameter of bits used, inch	4 3/8 – 5 1/4	4 3/8 – 5 1/4
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, ppg	13.3	13.3
Allowed axial load, lbs	12360	12360
Weight, lbs	573	677

Power specification

Working fluid flow rate, gpm	80–160	80–160
Output shaft rotation speed:		
– in no-load conditions, RPM	126–257	150–340
Torque at maximum power, lb * fts	1814	2300
Pressure drop:		
– at maximum power, psi	777	1160
Power, hp	82	136

DR-416.NGT.5/6.175.M1 and DR-416.NGT.7/8.98.M1



PDM's DR-416.NGT.5/6.175.M1 and DR-416.NGT.7/8.98.M1 are new universal hydraulic downhole motors used for:

- drilling of oil and gas wells with 4 3/4 – 5 7/8" 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 2.9 ft) 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°/32.8 ft 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.

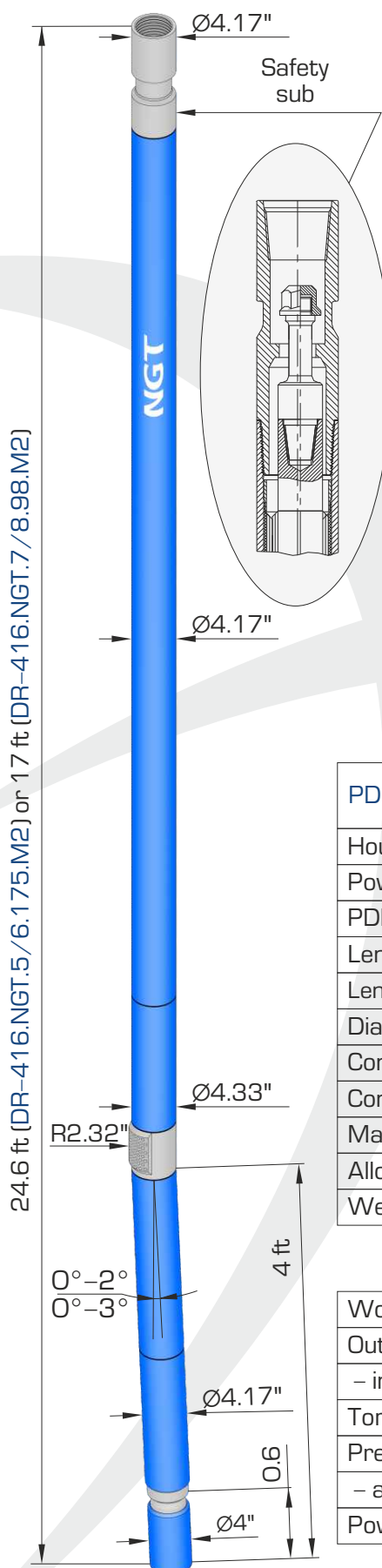
Technical specification

PDM model	DR-416.NGT.5/6.175.M1	DR-416.NGT.7/8.98.M1
Housing OD, inch	4.17–4.33	4.17–4.33
Power section lobe configuration	5/6	7/8
PDM length, ft	23.6	15.9
Length of stator rubber lining, ft	17.5	9.8
Length of bearing section up to a curvature point, ft	2.9	2.9
Diameter of bits used, inch	4 3/4–5 7/8	4 3/4–5 7/8
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, ppg	13.3	13.3
Allowed axial load, lbs	17978	17978
Weight, lbs	813	551

Power specification

Working fluid flow rate, gpm	96–192	96–192
Output shaft rotation speed:		
– in no-load conditions, RPM	161–321	96–192
Torque at maximum power, ft * lbs	2396	1696–2580
Pressure drop:		
– at maximum power, psi	1160	725–1450
Power, hp	135	72

DR-416.NGT.5/6.175.M2 and DR-416.NGT.7/8.98.M2



PDM's DR-416.NGT.5/6.175.M2 and DR-106.NGT.7/8.98.M2 are new universal hydraulic downhole motors used for:

- drilling of oil and gas wells with 4 3/4 – 5 7/8" 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 4 ft) 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°/32.8 ft 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.

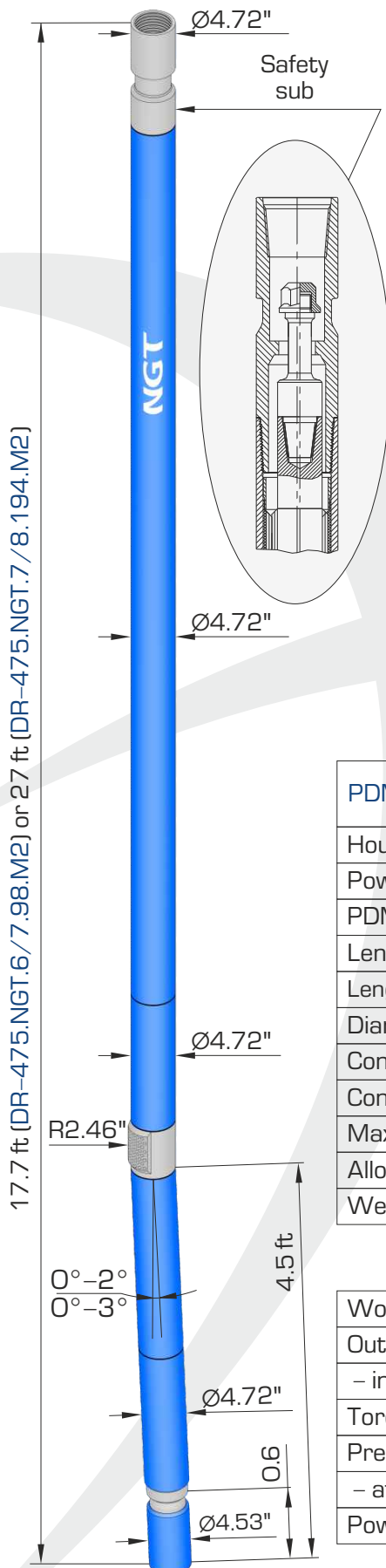
Technical specification

PDM model	DR-416.NGT.5/6.175.M2	DR-416.NGT.7/8.98.M2
Housing OD, inch	4.17–4.33	4.17–4.33
Power section lobe configuration	5/6	7/8
PDM length, ft	24.6	17
Length of stator rubber lining, ft	17.5	9.8
Length of bearing section up to a curvature point, ft	4	4
Diameter of bits used, inch	4 3/4 – 5 7/8	4 3/4 – 5 7/8
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, ppg	13.3	13.3
Allowed axial load, lbs	17978	17978
Weight, lbs	851	589

Power specification

Working fluid flow rate, gpm	96–192	96–192
Output shaft rotation speed:		
– in no-load conditions, RPM	161–321	96–192
Torque at maximum power, ft * lbs	2396	1696–2580
Pressure drop:		
– at maximum power, psi	1160	725–1450
Power, hp	135	72

DR-475.NGT.6/7.98.M2 and DR-475.NGT.7/8.194.M2



PDM's DR-475.NGT.6/7.98.M2 and DR-475.NGT.7/8.194.M2 are new universal hydraulic downhole motors used for:

- drilling of oil and gas wells with 5 1/2 – 6 1/2" 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 4.5 ft) 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°/32.8 ft 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.

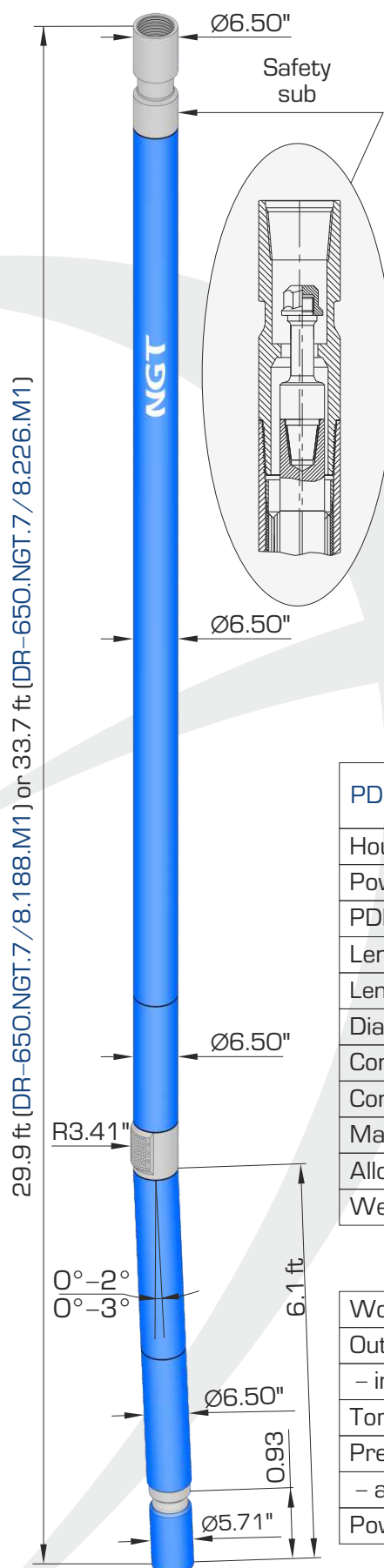
Technical specification

PDM model	DR-475.NGT.6/7.98.M2	DR-475.NGT.7/8.194.M2
Housing OD, inch	4.72	4.72
Power section lobe configuration	6/7	7/8
PDM length, ft	17.7	27
Length of stator rubber lining, ft	9.8	19.4
Length of bearing section up to a curvature point, ft	4.5	4.5
Diameter of bits used, inch	5 1/2 – 6 1/2	5 1/2 – 6 1/2
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, ppg	13.3	13.3
Allowed axial load, lbs	22473	22473
Weight, lbs	789	1202

Power specification

Working fluid flow rate, gpm	160–319	192–399
Output shaft rotation speed:		
– in no-load conditions, RPM	162–324	130–261
Torque at maximum power, ft*lbs	3465	3908
Pressure drop:		
– at maximum power, psi	1305–1958	754–1059
Power, hp	137	166

DR-650.NGT.7/8.188.M1 and DR-650.NGT.7/8.226.M1



PDM's DR-650.NGT.7/8.188.M1 and DR-650.NGT.7/8.226.M1 are new universal hydraulic downhole motors used for drilling of oil and gas wells with 7 1/2 – 9 7/8" 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 6.1 ft) 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°/32.8 ft 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.

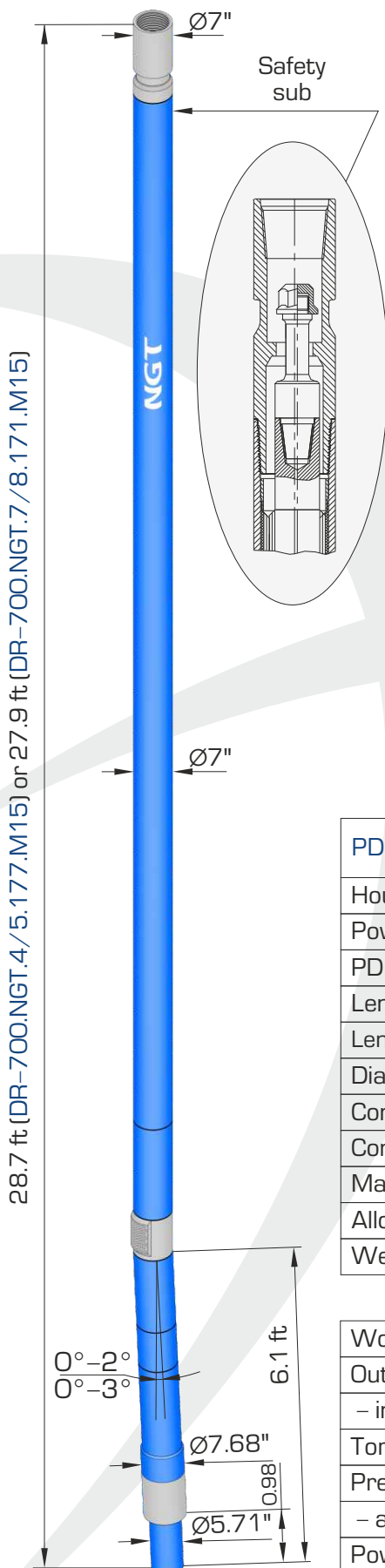
Technical specification

PDM model	DR-650.NGT.7/8.188.M1	DR-650.NGT.7/8.226.M1
Housing OD, inch	6.50	6.50
Power section lobe configuration	7/8	7/8
PDM length, ft	29.9	33.7
Length of stator rubber lining, ft	18.8	22.6
Length of bearing section up to a curvature point, ft	6.1	6.1
Diameter of bits used, inch	7 1/2 – 9 7/8	7 1/2 – 9 7/8
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, ppg	15.8	15.8
Allowed axial load, lbs	56182	56182
Weight, lbs	2509	2828

Power specification

Working fluid flow rate, gpm	271–607	271–607
Output shaft rotation speed:		
– in no-load conditions, RPM	71–160	71–160
Torque at maximum power, ft * lbs	8037	9659
Pressure drop:		
– at maximum power, psi	1015	1015
Power, hp	362	434

DR-700.NGT.4/5.177.M15 and DR-700.NGT.7/8.171.M15



PDM's DR-700.NGT.4/5.177.M15 and DR-700.NGT.7/8.171.M15 are new universal hydraulic downhole motors used for drilling of oil and gas wells with rock and PDC bits of 8 3/8 – 9 7/8" diameter.

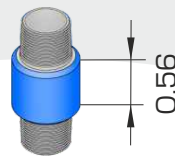
An adjustable bent sub is placed between bearing section and power section. The adjustment range is between 0° and 2° or between 0° and 3°.

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

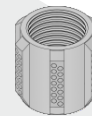
PDMs are completed with imported extended power sections with enhanced operation life. Due to very short shoulder up to the point of axes misalignment (only 6.1 ft) drillers can:

- 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°/32.8 ft 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

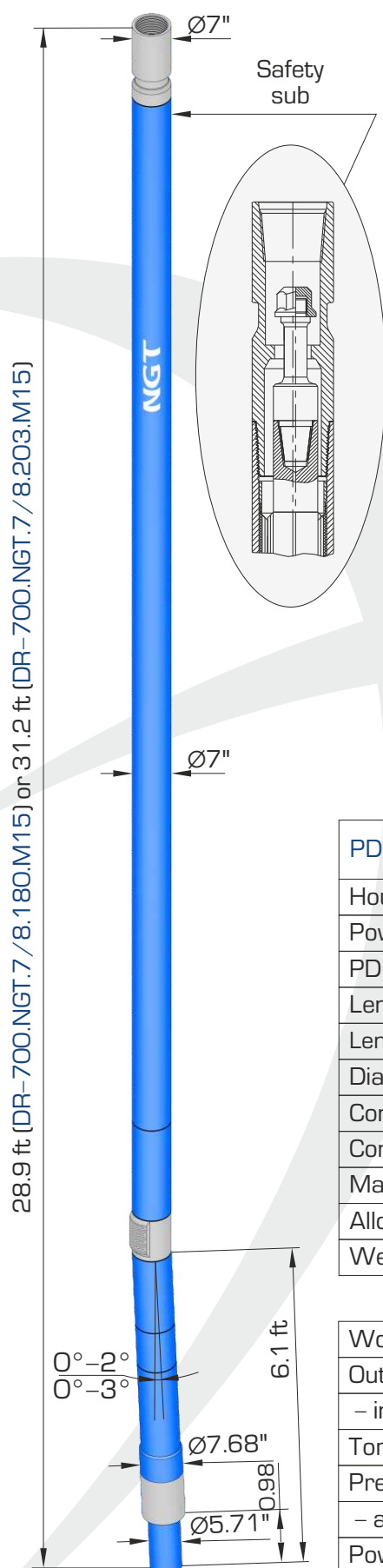
Technical specification

PDM model	DR-700.NGT.4/5.177.M15	DR-700.NGT.7/8.171.M15
Housing OD, inch	7-7.68	7-7.68
Power section lobe configuration	4/5	7/8
PDM length, ft	28.7	27.9
Length of stator rubber lining, ft	17.7	17.1
Length of bearing section up to a curvature point, ft	6.1	6.1
Diameter of bits used, inch	8 3/8 – 9 7/8	8 3/8 – 9 7/8
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, ppg	15.8	15.8
Allowed axial load, lbs	56182	56182
Weight, lbs	2806	2731

Power specification

Working fluid flow rate, gpm	479	399-639
Output shaft rotation speed:		
– in no-load conditions, RPM	248	100-160
Torque at maximum power, ft*lbs	7373	9880
Pressure drop:		
– at maximum power, psi	1885	1885
Power, hp	313	223

DR-700.NGT.7/8.180.M15 and DR-700.NGT.7/8.203.M15



PDM's DR-700.NGT.7/8.180.M15 and DR-700.NGT.7/8.203.M15 are new universal hydraulic downhole motors used for drilling of oil and gas wells with rock and PDC bits of 8 3/8 – 9 7/8" diameter.

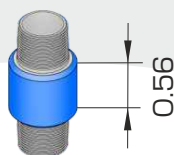
An adjustable bent sub is placed between bearing section and power section. The adjustment range is between 0° and 2° or between 0° and 3°.

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

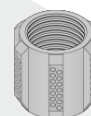
PDMs are completed with imported extended power sections with enhanced operation life. Due to very short shoulder up to the point of axes misalignment (only 6.1 ft) drillers can:

- 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°/32.8 ft 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

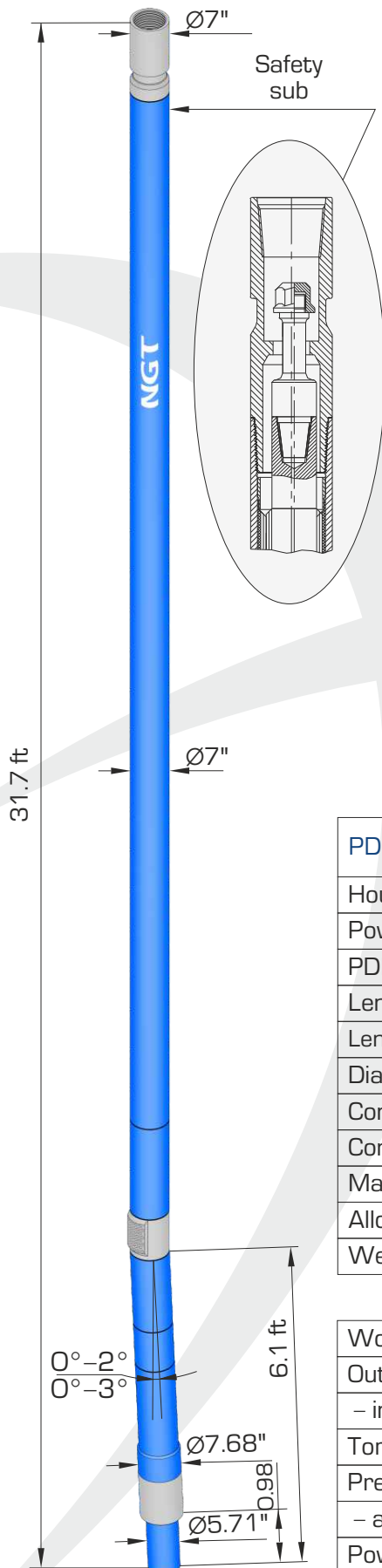
Technical specification

PDM model	DR-700.NGT.7/8.180.M15	DR-700.NGT.7/8.203.M15
Housing OD, inch	7-7.68	7-7.68
Power section lobe configuration	7/8	7/8
PDM length, ft	28.9	31.2
Length of stator rubber lining, ft	18	20.3
Length of bearing section up to a curvature point, ft	6.1	6.1
Diameter of bits used, inch	8 3/8 – 9 7/8	8 3/8 – 9 7/8
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, ppg	15.8	15.8
Allowed axial load, lbs	56182	56182
Weight, lbs	2820	3053

Power specification

Working fluid flow rate, gpm	479	479
Output shaft rotation speed:		
– in no-load conditions, RPM	138	118
Torque at maximum power, ft*lbs	11059	14009
Pressure drop:		
– at maximum power, psi	1740	1595
Power, hp	219	213

DR-700.NGT.7/8.209.M15 and DR-700.NGT.7/8.210.M15



PDM's DR-700.NGT.7/8.209.M15 and DR-700.NGT.7/8.210.M15 are new universal hydraulic downhole motors used for drilling of oil and gas wells with rock and PDC bits of 8 3/8 – 9 7/8" diameter.

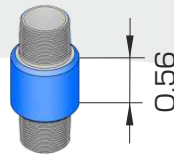
An adjustable bent sub is placed between bearing section and power section. The adjustment range is between 0° and 2° or between 0° and 3°.

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

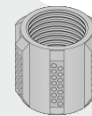
PDMs are completed with imported extended power sections with enhanced operation life. Due to very short shoulder up to the point of axes misalignment (only 6.1 ft) drillers can:

- 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°/32.8 ft 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

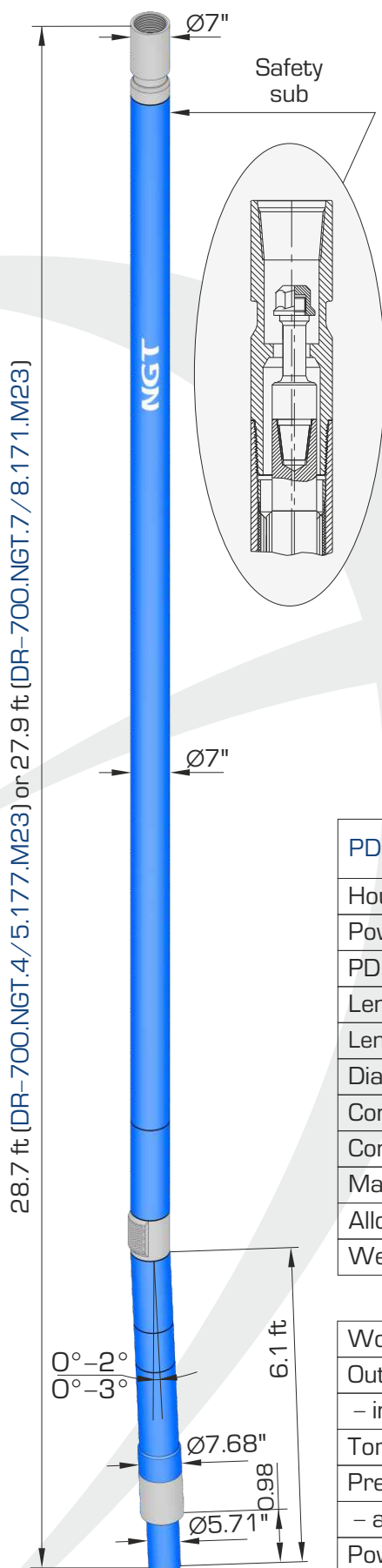
Technical specification

PDM model	DR-700.NGT.7/8.209.M15	DR-700.NGT.7/8.210.M15
Housing OD, inch	7-7.68	7-7.68
Power section lobe configuration	7/8	7/8
PDM length, ft	31.7	31.7
Length of stator rubber lining, ft	20.9	21
Length of bearing section up to a curvature point, ft	6.1	6.1
Diameter of bits used, inch	8 3/8 – 9 7/8	8 3/8 – 9 7/8
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, ppg	15.8	15.8
Allowed axial load, lbs	56182	56182
Weight, lbs	2886	2886

Power specification

Working fluid flow rate, gpm	319-559	479
Output shaft rotation speed:		
– in no-load conditions, RPM	102-179	170
Torque at maximum power, ft*lbs	9290	10322
Pressure drop:		
– at maximum power, psi	1885	1885
Power, hp	290	287

DR-700.NGT.4/5.177.M23 and DR-700.NGT.7/8.171.M23



PDM's DR-700.NGT.4/5.177.M23 and DR-700.NGT.7/8.171.M23 are new universal hydraulic downhole motors used for drilling of oil and gas wells with rock and PDC bits of 8 3/8 – 9 7/8" diameter.

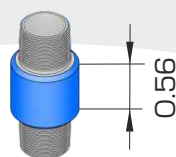
An adjustable bent sub is placed between bearing section and power section. The adjustment range is between 0° and 2° or between 0° and 3°.

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 6.1 ft) 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°/32.8 ft 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

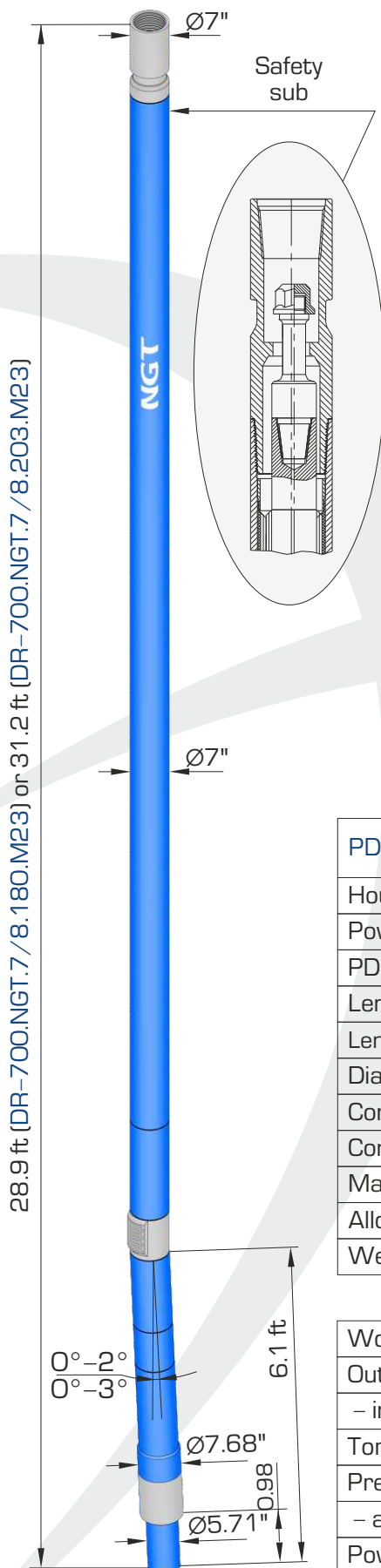
Technical specification

PDM model	DR-700.NGT.4/5.177.M23	DR-700.NGT.7/8.171.M23
Housing OD, inch	7-7.68	7-7.68
Power section lobe configuration	4/5	7/8
PDM length, ft	28.7	27.9
Length of stator rubber lining, ft	17.7	17.1
Length of bearing section up to a curvature point, ft	6.1	6.1
Diameter of bits used, inch	8 3/8 – 9 7/8	8 3/8 – 9 7/8
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, ppg	15.8	15.8
Allowed axial load, lbs	56182	56182
Weight, lbs	2806	2739

Power specification

Working fluid flow rate, gpm	479	399-639
Output shaft rotation speed:		
– in no-load conditions, RPM	248	100-160
Torque at maximum power, ft*lbs	7373	9880
Pressure drop:		
– at maximum power, psi	1885	1885
Power, hp	313	223

DR-700.NGT.7/8.180.M23 and DR-700.NGT.7/8.203.M23



PDM's DR-700.NGT.7/8.180.M23 and DR-700.NGT.7/8.203.M23 are new universal hydraulic downhole motors used for drilling of oil and gas wells with rock and PDC bits of 8 3/8 – 9 7/8" diameter.

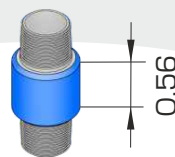
An adjustable bent sub is placed between bearing section and power section. The adjustment range is between 0° and 2° or between 0° and 3°.

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.

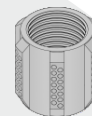
PDMs are completed with imported extended power sections with enhanced operation life. Due to very short shoulder up to the point of axes misalignment (only 6.1 ft) drillers can:

- 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°/32.8 ft 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

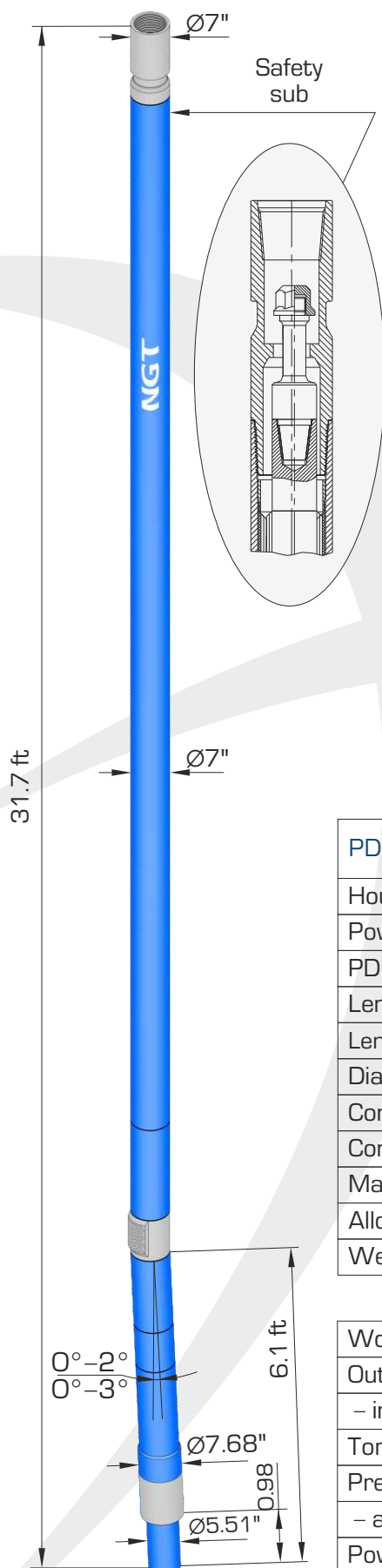
Technical specification

PDM model	DR-700.NGT.7/8.180.M23	DR-700.NGT.7/8.203.M23
Housing OD, inch	7-7.68	7-7.68
Power section lobe configuration	7/8	7/8
PDM length, ft	28.9	31.2
Length of stator rubber lining, ft	18	20.3
Length of bearing section up to a curvature point, ft	6.1	6.1
Diameter of bits used, inch	8 3/8 – 9 7/8	8 3/8 – 9 7/8
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, ppg	15.8	15.8
Allowed axial load, lbs	56182	56182
Weight, lbs	2820	3053

Power specification

Working fluid flow rate, gpm	479	479
Output shaft rotation speed:		
– in no-load conditions, RPM	138	118
Torque at maximum power, ft*lbs	11059	14009
Pressure drop:		
– at maximum power, psi	1740	1595
Power, hp	219	213

DR-700.NGT.7/8.209.M23 and DR-700.NGT.7/8.210.M23



PDM's DR-700.NGT.7/8.209.M23 and DR-700.NGT.7/8.210.M23 are new universal hydraulic downhole motors used for drilling of oil and gas wells with rock and PDC bits of 8 3/8 – 9 7/8" diameter.

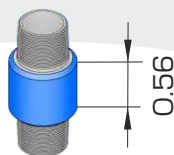
An adjustable bent sub is placed between bearing section and power section. The adjustment range is between 0° and 2° or between 0° and 3°.

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.

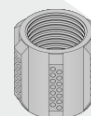
PDMs are completed with imported extended power sections with enhanced operation life. Due to very short shoulder up to the point of axes misalignment (only 6.1 ft) drillers can:

- 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°/32.8 ft 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

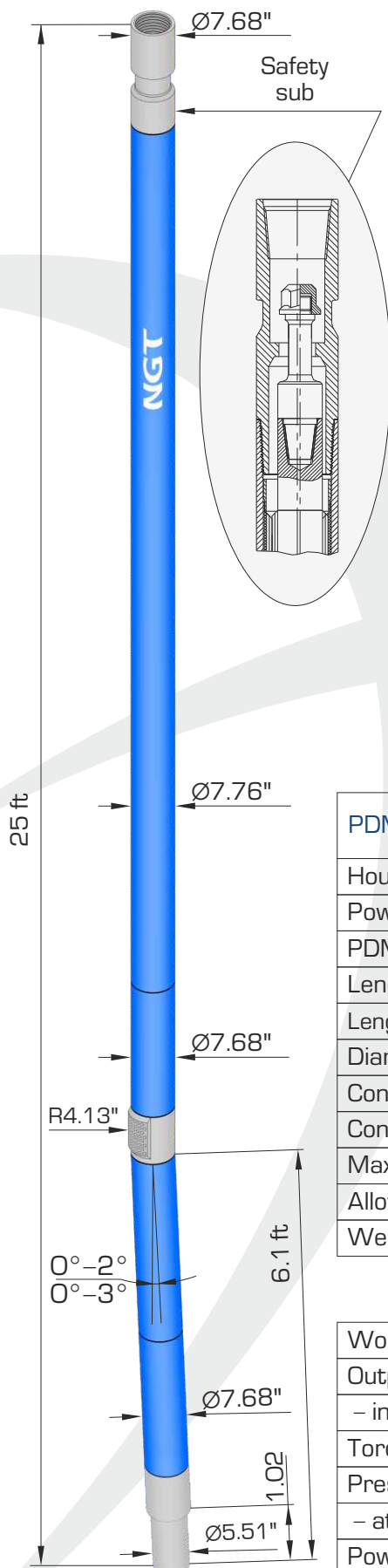
Technical specification

PDM model	DR-700.NGT.7/8.209.M23	DR-700.NGT.7/8.210.M23
Housing OD, inch	7-7.68	7-7.68
Power section lobe configuration	7/8	7/8
PDM length, ft	31.7	31.7
Length of stator rubber lining, ft	20.9	21
Length of bearing section up to a curvature point, ft	6.1	6.1
Diameter of bits used, ft	8 3/8 – 9 7/8	8 3/8 – 9 7/8
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, ppg	15.8	15.8
Allowed axial load, lbs	56182	56182
Weight, lbs	2886	2886

Power specification

Working fluid flow rate, gpm	319-559	479
Output shaft rotation speed:		
– in no-load conditions, RPM	102-179	170
Torque at maximum power, ft*lbs	9290	10322
Pressure drop:		
– at maximum power, psi	1885	1885
Power, hp	290	287

DR-768.NGT.5/6.140.M1 and DR-768.NGT.6/7.140.M1



PDM's DR-768.NGT.5/6.140.M1 and DR-768.NGT.6/7.140.M1 are new universal hydraulic downhole motors used for drilling of oil and gas wells with rock and PDC bits of 8 3/8 – 9 7/8" diameter.

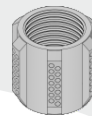
An adjustable bent sub is placed between bearing section and power section. The adjustment range is between 0° and 2° or between 0° and 3°.

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 6.1 ft) 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°/32.8 ft 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

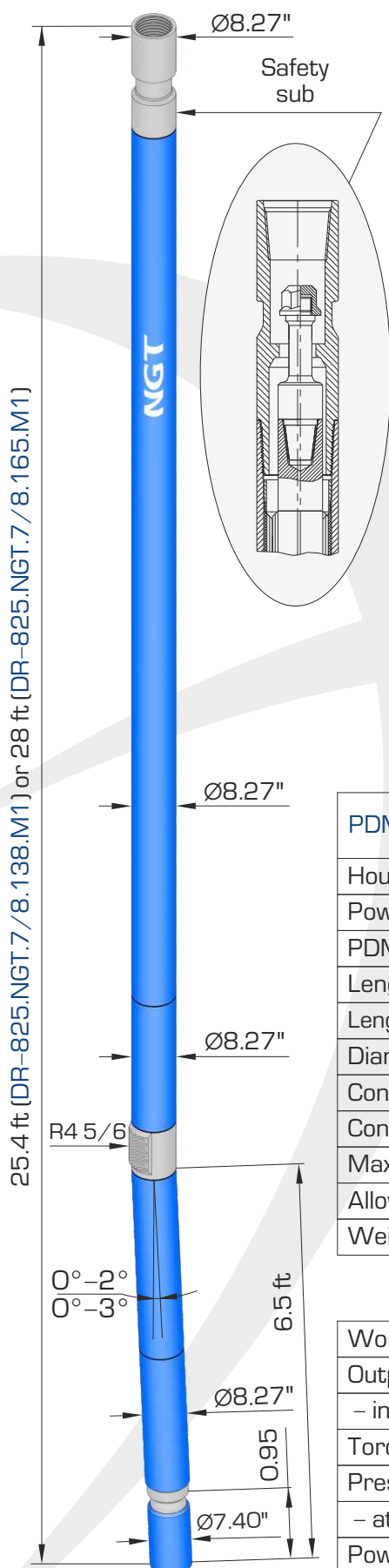
Technical specification

PDM model	DR-768.NGT.5/6.140.M1	DR-768.NGT.6/7.140.M1
Housing OD, inch	7.68–7.76	7.68–7.76
Power section lobe configuration	5/6	6/7
PDM length, ft	25	25
Length of stator rubber lining, ft	14	14
Length of bearing section up to a curvature point, ft	6.1	6.1
Diameter of bits used, ft	8 3/8 – 9 7/8	8 3/8 – 9 7/8
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, ppg	15.8	15.8
Allowed axial load, lbs	56182	56182
Weight, lbs	2928	2928

Power specification

Working fluid flow rate, gpm	295–590	319–846
Output shaft rotation speed:		
– in no-load conditions, RPM	79–158	82–217
Torque at maximum power, ft*lbs	6562	8184
Pressure drop:		
– at maximum power, psi	812	812
Power, hp	177	307

DR-825.NGT.7/8.138.M1 and DR-825.NGT.7/8.165.M1



PDM's DR-825.NGT.7/8.138.M1 and DR-825.NGT.7/8.165.M1 are new universal hydraulic downhole motors used for drilling of oil and gas wells with rock and PDC bits of 9 7/8 – 14 3/4" 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 6.5 ft) 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°/32.8 ft 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.

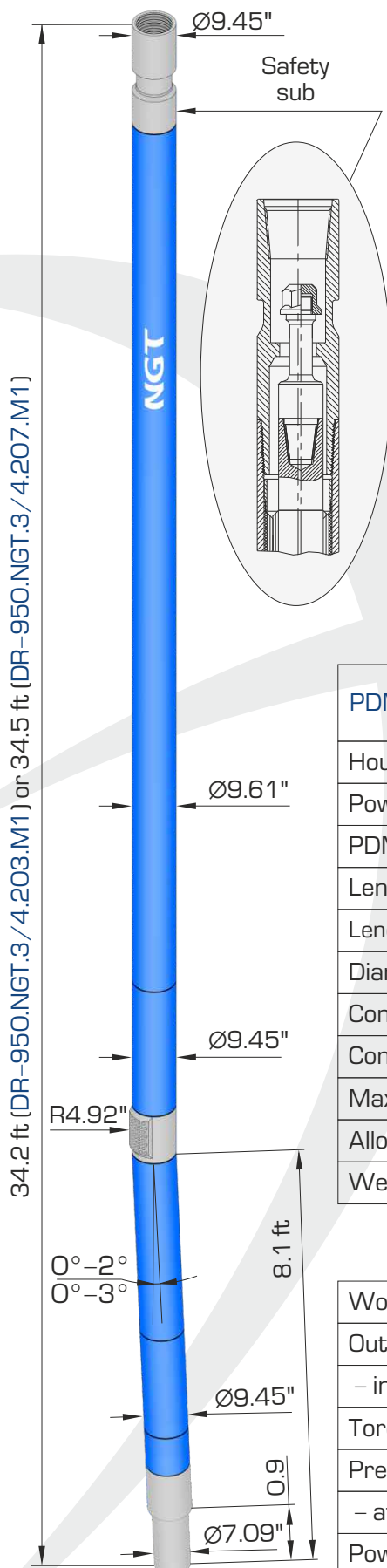
Technical specification

PDM model	DR-825.NGT.7/8.138.M1	DR-825.NGT.7/8.165.M1
Housing OD, inch	8.27	8.27
Power section lobe configuration	7/8	7/8
PDM length, ft	25.4	28
Length of stator rubber lining, ft	13.8	16.5
Length of bearing section up to a curvature point, ft	6.5	6.5
Diameter of bits used, inch	9 7/8–14 3/4	9 7/8–14 3/4
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, ppg	15.8	15.8
Allowed axial load, lbs	67419	67419
Weight, lbs	3461	3814

Power specification

Working fluid flow rate, gpm	358–706	420–841
Output shaft rotation speed:		
– in no-load conditions, RPM	69–138	121–242
Torque at maximum power, ft*lbs	10175	11944
Pressure drop:		
– at maximum power, psi	812	812
Power, hp	243	294

DR-950.NGT.3/4.203.M1 and DR-950.NGT.3/4.207.M1



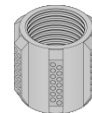
PDM's DR-950.NGT.3/4.203.M1 and DR-950.NGT.3/4.207.M1 are new universal hydraulic downhole motors used for drilling of oil and gas wells with rock and PDC bits of 11 5/8 – 17 1/2" diameter.

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

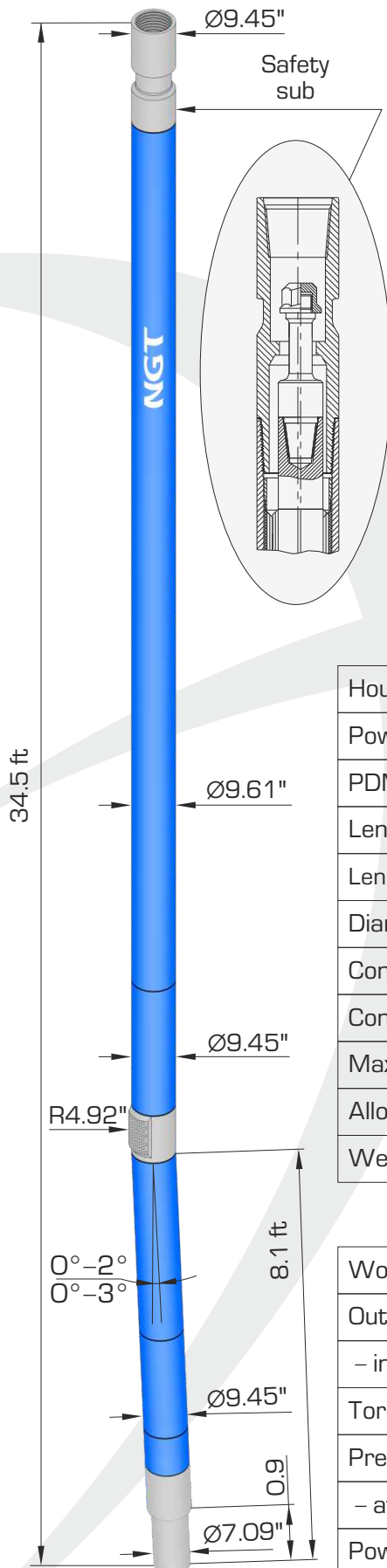
Technical specification

PDM model	DR-950.NGT.3/4.203.M1	DR-950.NGT.3/4.207.M1
Housing OD, inch	9.45–9.61	9.45–9.61
Power section lobe configuration	3/4	3/4
PDM length, ft	34.2	34.5
Length of stator rubber lining, ft	20.3	20.7
Length of bearing section up to a curvature point, ft	8.1	8.1
Diameter of bits used, inch	11 5/8–17 1/2	11 5/8–17 1/2
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, ppg	15.8	15.8
Allowed axial load, lbs	89891	89891
Weight, lbs	6087	6138

Power specification

Working fluid flow rate, gpm	351–718	358–715
Output shaft rotation speed:		
– in no-load conditions, RPM	75–151	75–150
Torque at maximum power, ft*lbs	11281	10912
Pressure drop:		
– at maximum power, psi	986	986
Power, hp	243	243

DR-950.NGT.5/6.207.M1



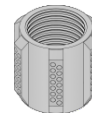
PDM DR-950.NGT.5/6.207.M1 is a new universal hydraulic downhole motor used for drilling of oil and gas wells with rock and PDC bits of 11 5/8 – 17 1/2" diameter.

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, inch	9.45–9.61
Power section lobe configuration	5/6
PDM length, ft	34.5
Length of stator rubber lining, ft	20.7
Length of bearing section up to a curvature point, ft	8.1
Diameter of bits used, inch	11 5/8 – 17 1/2
Connecting thread to drill pipes	6 5/8 FH
Connecting thread to bits	6 5/8 Reg
Maximum density of drilling mud, ppg	15.8
Allowed axial load, lbs	89891
Weight, lbs	6138

Power specification

Working fluid flow rate, gpm	439–718
Output shaft rotation speed:	
– in no-load conditions, RPM	64–129
Torque at maximum power, ft*lbs	14230
Pressure drop:	
– at maximum power, psi	986
Power, hp	318

Specification PDM

Parameter	D-300.NGT.4/5.66.M1	DO-300.NGT.4/5.66.M1	DR-300.NGT.4/5.66.M2	DR-350.NGT.5/6.66.M1	DR-350.NGT.5/6.79.M1	DR-350.NGT.7/8.90.M1	DR-375.NGT.7/8.137.M1
Technical specification							
Housing OD, inch	3	3.11	3.11	3.46	3.46	3.46	3.74–3.86
Power section lobe configuration	4/5	4/5	4/5	5/6	5/6	7/8	7/8
PDM length, ft	11.7	11.7	12	12.6	13.9	15	20.6
Length of stator rubber lining, ft	6.6	6.6	6.6	6.6	7.9	9	13.7
Length of bearing section up to a curvature point, ft	–	2.66	2.8	3.36	3.36	3.36	3.74
Diameter of bits used, inch	3 1/4–3 7/8	3 1/4–3 7/8	3 1/4–3 7/8	3 7/8–4 3/4	3 7/8–4 3/4	3 7/8–4 3/4	4 3/8–5 1/4
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, ppg	13.3	13.3	13.3	13.3	13.3	13.3	13.3
Allowed axial load, lbs	5618	5618	10113	11236	11236	11236	12360
Weight, lbs	207	207	214	302	333	357	573
Power specification							
Working fluid flow rate, gpm	48–80	48–80	48–80	80–112	69–204	45–131	80–160
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, ft*lbs	442–590	442–590	442–590	811–958	1128	988	1814
Pressure drop:							
– at maximum power, psi	1160–1450	1160–1450	1160–1450	1450–1885	653	624	777
Power, hp	15–34	15–34	15–34	37–58	64	38	82

Specification PDM

Parameter	DR-375.NGT.7/8.174.M1	DR-416.NGT.5/6.175.M1	DR-416.NGT.7/8.98.M1	DR-416.NGT.5/6.175.M2	DR-416.NGT.7/8.98.M2	DR-475.NGT.6/7.98.M2	DR-475.NGT.7/8.194.M2
Technical specification							
Housing OD, inch	3.74–3.86	4.17–4.33	4.17–4.33	4.17–4.33	4.17–4.33	4.72	4.72
Power section lobe configuration	7/8	5/6	7/8	5/6	7/8	6/7	7/8
PDM length, ft	24.3	23.6	15.9	24.6	17	17.7	27
Length of stator rubber lining, ft	17.4	17.5	9.8	17.5	9.8	9.8	19.4
Length of bearing section up to a curvature point, ft	3.74	2.9	2.9	4	4	4.5	4.5
Diameter of bits used, inch	4 3/8–5 1/4	4 3/4–5 7/8	4 3/4–5 7/8	4 3/4–5 7/8	4 3/4–5 7/8	5 1/2–6 1/2	5 1/2–6 1/2
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, ppg	13.3	13.3	13.3	13.3	13.3	13.3	13.3
Allowed axial load, lbs	12360	17978	17978	17978	17978	22473	22473
Weight, lbs	677	813	551	851	589	789	1202
Power specification							
Working fluid flow rate, gpm	80–160	96–192	96–192	96–192	96–192	160–319	192–399
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, ft*lbs	2300	2396	1696–2580	2396	1696–2580	3465	3908
Pressure drop:							
– at maximum power, psi	1160	1160	725–1450	1160	725–1450	1305–1958	754–1059
Power, hp	136	135	72	135	72	137	166

Specification PDM

Parameter	DR-650.NGT.7/8.188.M1	DR-650.NGT.7/8.226.M1	DR-700.NGT.4/5.177.M23	DR-700.NGT.4/5.177.M15	DR-700.NGT.7/8.171.M15	DR-700.NGT.7/8.180.M23	DR-700.NGT.7/8.180.M15	DR-700.NGT.7/8.203.M23	DR-700.NGT.7/8.203.M15	DR-700.NGT.7/8.209.M23	DR-700.NGT.7/8.209.M15	DR-700.NGT.7/8.210.M23	DR-700.NGT.7/8.210.M15
Technical specification													
Housing OD, inch	6.50	6.50	7-7.68	7-7.68	7-7.68	7-7.68	7-7.68	7-7.68	7-7.68	7-7.68	7-7.68	7-7.68	7-7.68
Power section lobe configuration	7/8	7/8	4/5	7/8	7/8	7/8	7/8	7/8	7/8	7/8	7/8	7/8	7/8
PDM length, ft	29.9	33.7	28.7	27.9	28.9	31.2	31.7	31.7	31.2	31.7	31.7	31.7	31.7
Length of stator rubber lining, ft	18.8	22.6	17.7	17.1	18	20.3	20.9	21	20.3	20.9	21	21	21
Length of bearing section up to a curvature point, ft	6.1	6.1	6.1	6.1	6.1	6.1	6.1	6.1	6.1	6.1	6.1	6.1	6.1
Diameter of bits used, inch	7 1/2-9 7/8	7 1/2-9 7/8	8 3/8-9 7/8	8 3/8-9 7/8	8 3/8-9 7/8	8 3/8-9 7/8	8 3/8-9 7/8	8 3/8-9 7/8	8 3/8-9 7/8	8 3/8-9 7/8	8 3/8-9 7/8	8 3/8-9 7/8	8 3/8-9 7/8
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	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	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, ppg	15.8	15.8	15.8	15.8	15.8	15.8	15.8	15.8	15.8	15.8	15.8	15.8	15.8
Allowed axial load, lbs	56182	56182	56182	56182	56182	56182	56182	56182	56182	56182	56182	56182	56182
Weight, lbs	2509	2509	2806	2731	2820	3053	2886	2886	3053	2886	2886	2886	2886
Power specification													
Working fluid flow rate, gpm	271-607	271-607	479	399-639	479	479	479	319-559	479	319-559	479	479	479
Output shaft rotation speed:													
– in no-load conditions, RPM	71-160	71-160	248	100-160	138	118	102-179	170	138	118	102-179	170	170
Torque at maximum power, ft*lbs	8037	9659	7373	9880	11059	14009	9290	10322	11059	14009	9290	10322	10322
Pressure drop:													
– at maximum power, psi	1015	1015	1885	1885	1740	1595	1885	1885	1740	1595	1885	1885	1885
Power, hp	362	434	313	223	219	213	290	287	219	213	290	287	287

Specification PDM

Parameter	DR-768.NGT.5/6.140.M1	DR-768.NGT.6/7.140.M1	DR-825.NGT.7/8.138.M1	DR-825.NGT.7/8.165.M1	DR-950.NGT.3/4.203.M1	DR-950.NGT.3/4.207.M1	DR-950.NGT.5/6.207.M1
Technical specification							
Housing OD, inch	7.76–7.68	7.76–7.68	8.27	8.27	9.45–9.61	9.45–9.61	9.45–9.61
Power section lobe configuration	5/6	6/7	7/8	7/8	3/4	3/4	5/6
PDM length, ft	25	25	25.4	28	34.2	34.5	34.5
Length of stator rubber lining, ft	14	14	13.8	16.5	20.3	20.7	20.7
Length of bearing section up to a curvature point, ft	6.1	6.1	6.5	6.5	8.1	8.1	8.1
Diameter of bits used, inch	8 3/8–9 7/8	8 3/8–9 7/8	9 7/8–14 3/4	9 7/8–14 3/4	11 5/8–17 1/2		
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, ppg	15.8	15.8	15.8	15.8	15.8	15.8	15.8
Allowed axial load, lbs	56182	56182	67419	67419	89891	89891	89891
Weight, lbs	2928	2928	3461	3814	6087	6138	6138
Power specification							
Working fluid flow rate, gpm	295–590	319–846	358–706	420–841	351–718	358–715	439–718
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, ft*lbs	6562	8184	10175	11944	11281	10912	14230
Pressure drop:							
– at maximum power, psi	812	812	812	812	986	986	986
Power, hp	177	307	243	294	243	243	318



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 3 – 9.61". 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 $5^\circ / 32.8 \text{ ft}$ 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 (4-1/6, 3-3/4 and 7") 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 silicomolybdenic 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.

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-700.NGT.M15

Number of bearing section modification

Standard size

Bearing section designation

Bearing sections presented in the catalogue:

S-300.NGT.M2

S-350.NGT.M1

S-375.NGT.M1

S-416.NGT.M1

S-416.NGT.M2

S-475.NGT.M2

S-650.NGT.M1

S-700.NGT.M12

S-700.NGT.M15

S-700.NGT.M16

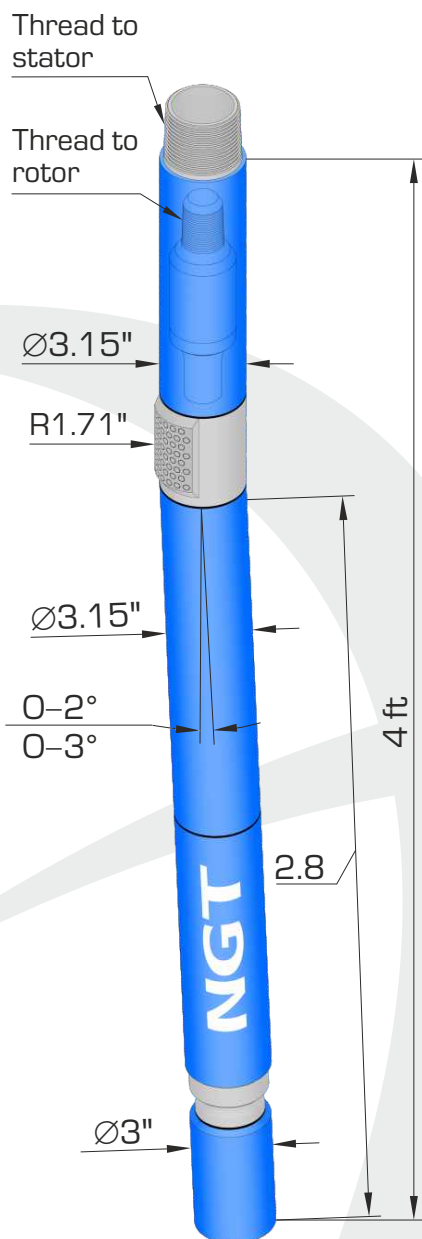
S-700.NGT.M23

S-768.NGT.M4

S-825.NGT.M1

S-950.NGT.M1

S-300.NGT.M2



Bearing section **S-300.NGT.M2** is a new short bearing section featuring enhanced operation life.

The bearing section is used in PDM power sections of 3" dia. and for:

- well rehabilitation in housing pipes;
- well drilling with bits of 3 1/4 – 3 7/8" 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°.

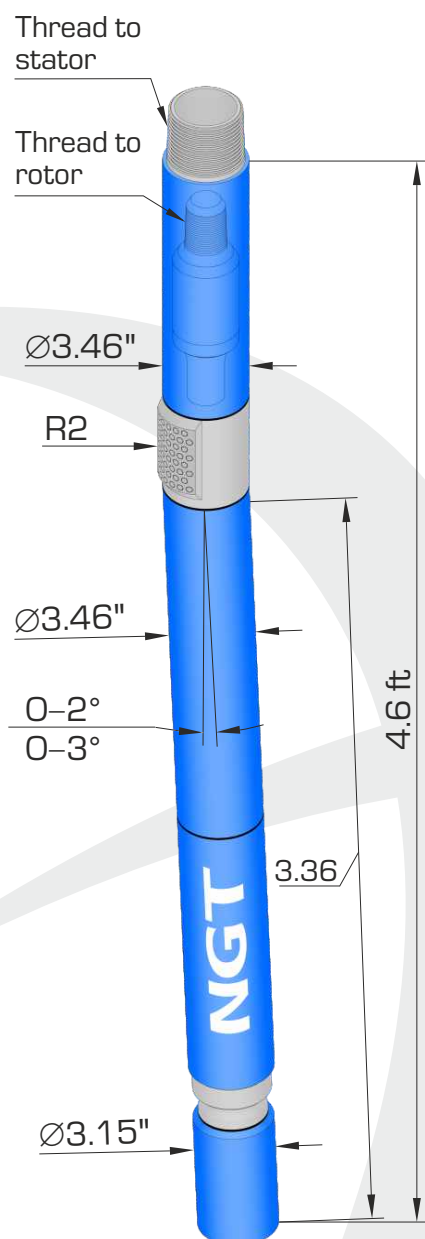
Meeting customers' requirements, the bearing section can be produced with the connecting threads for specific power section.

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

Technical specifications

Housing OD, inch	3.15
Bearing section length, ft	4
Bearing section length to curvature plane, ft	2.8
Range of angle adjuster change, degree	0–2 или 0–3
Connecting thread to bit	2 3/8 Reg
Torque transmitted, max., ft*lbs	2212
Tolerance of axial loading, lbs	10113
Overhaul period, hour	200

S-350.NGT.M1



Bearing section **S-350.NGT.M1** is a new short bearing section featuring enhanced operation life.

The bearing section is used in PDM power sections of 3 1/2" 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 3 7/8 – 4 3/4";
- 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°.

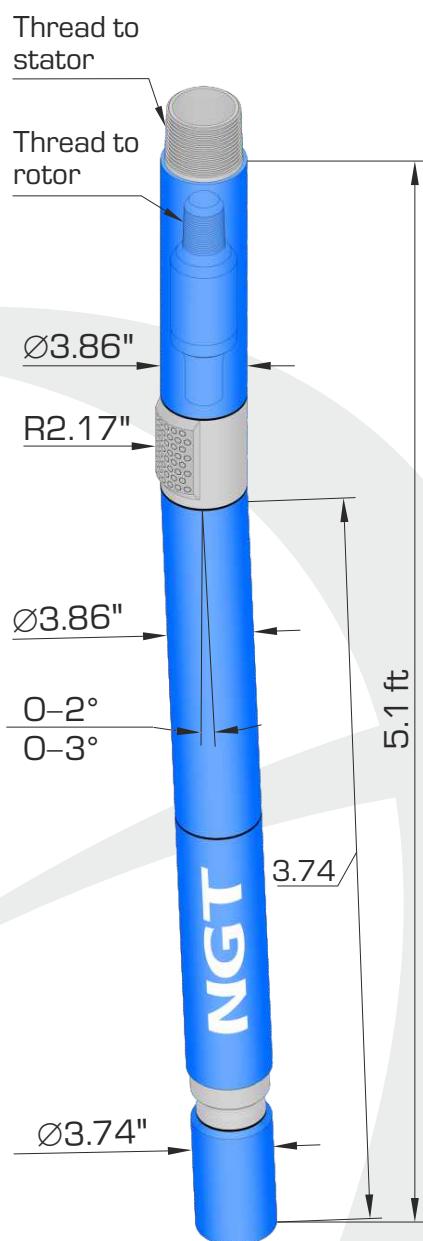
Meeting customers' requirements, the bearing section can be produced with the connecting threads for specific power section.

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

Technical specifications

Housing OD, inch	3.46
Bearing section length, ft	4.6
Bearing section length to curvature plane, ft	3.36
Range of angle adjuster change, degree	0–2 или 0–3
Connecting thread to bit	2 3/8 Reg
Torque transmitted, max., ft*lbs	1475
Tolerance of axial loading, lbs	12360
Overhaul period, hour	200

S-375.NGT.M1



Bearing section **S-375.NGT.M1** is a new short bearing section featuring enhanced operation life.

The bearing section is used in PDM power sections of 3 3/4" 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 4 3/8 – 5 1/4";
- 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°.

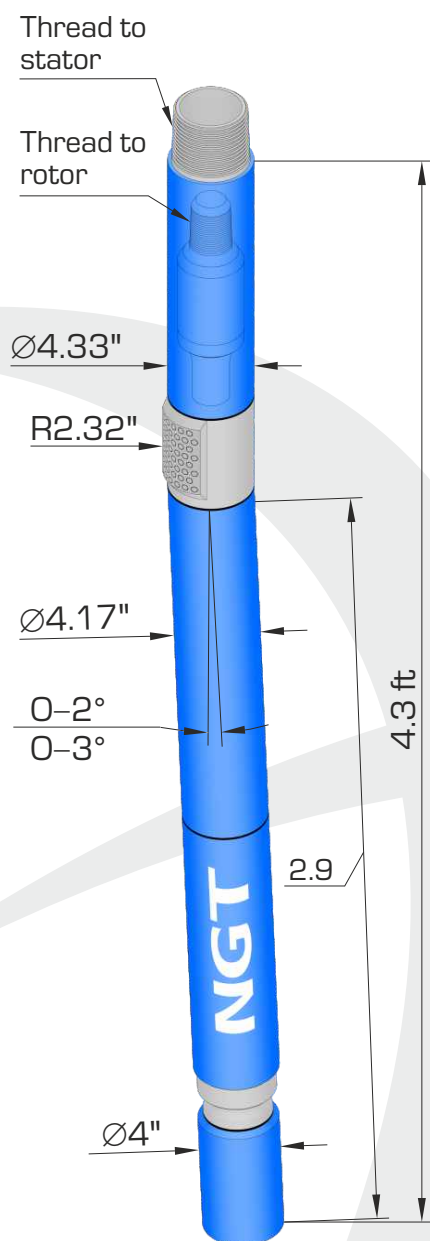
Meeting customers' requirements, the bearing section can be produced with the connecting threads for specific power section.

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

Technical specifications

Housing OD, inch	3.74–3.86
Bearing section length, ft	5.1
Bearing section length to curvature plane, ft	3.74
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., ft*lbs	2581
Tolerance of axial loading, lbs	14607
Overhaul period, hour	200

S-416.NGT.M1



Bearing section **S-416.NGT.M1** is a new ultra-short bearing section featuring enhanced operation life.

The bearing section is used in PDM power sections of 4.17" 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 4 3/4–5 7/8";
- 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°.

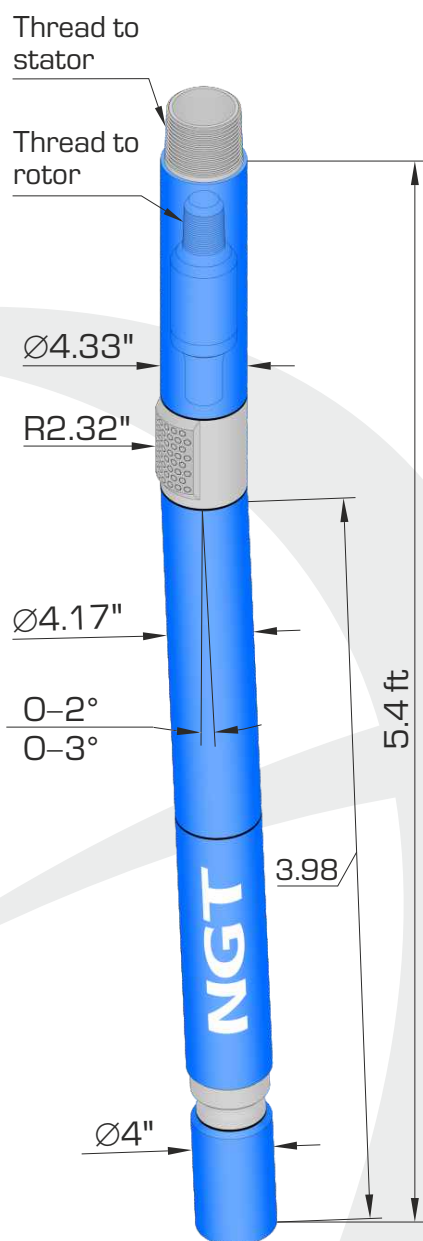
Meeting customers' requirements, the bearing section can be produced with the connecting threads for specific power section.

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

Technical specifications

Housing OD, inch	4.17–4.33
Bearing section length, ft	4.3
Bearing section length to curvature plane, ft	2.9
Range of angle adjuster change, degree	0–2 или 0–3
Connecting thread to bit	2 7/8 Reg
Torque transmitted, max., ft*lbs	3686
Tolerance of axial loading, lbs	17978
Overhaul period, hour	300

S-416.NGT.M2



Bearing section **S-416.NGT.M2** is a new short bearing section featuring enhanced operation life.

The bearing section is used in PDM power sections of 4.17" 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 4 3/4–5 7/8";
- 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°.

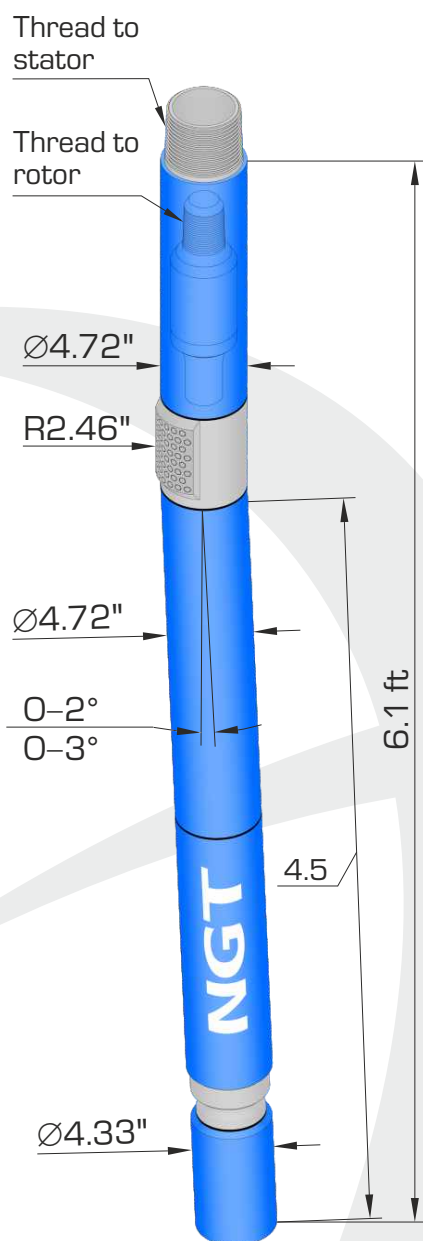
Meeting customers' requirements, the bearing section can be produced with the connecting threads for specific power section.

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

Technical specifications

Housing OD, inch	4.17–4.33
Bearing section length, ft	5.4
Bearing section length to curvature plane, ft	3.98
Range of angle adjuster change, degree	0–2 или 0–3
Connecting thread to bit	2 7/8 Reg
Torque transmitted, max., ft*lbs	3686
Tolerance of axial loading, lbs	17978
Overhaul period, hour	200

S-475.NGT.M2



Bearing section S-475.NGT.M2 is a new short bearing section featuring enhanced operation life.

The bearing section is used in PDM power sections of 4 3/4 – 5" 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 5 1/4 – 6 1/2";
- 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°.

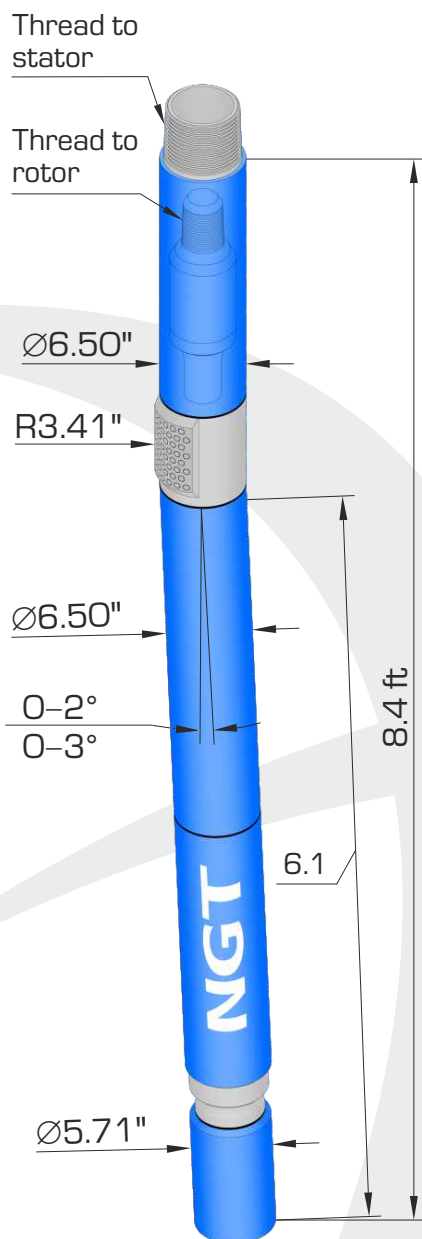
Meeting customers' requirements, the bearing section can be produced with the connecting threads for specific power section.

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

Technical specifications

Housing OD, inch	4.72
Bearing section length, ft	6.1
Bearing section length to curvature plane, ft	4.5
Range of angle adjuster change, degree	0–2 или 0–3
Connecting thread to bit	3 1/2 Reg
Torque transmitted, max., ft*lbs	4424
Tolerance of axial loading, lbs	22473
Overhaul period, hour	200

S-650.NGT.M1



Bearing section **S-650.NGT.M1** is a new short bearing section featuring enhanced operation life.

The bearing section is used in PDM power sections of 66 1/2 – 6 3/4" dia. and for drilling of oil and gas wells with bits of 7 1/2 – 9 7/8" 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°.

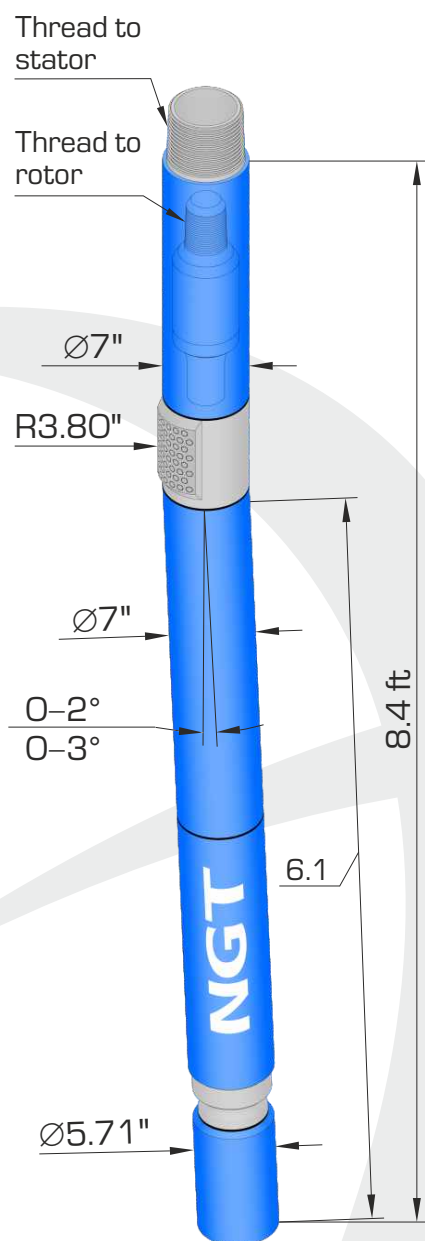
Meeting customers' requirements, the bearing section can be produced with the connecting threads for specific power section.

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

Technical specifications

Housing OD, inch	6.50
Bearing section length, ft	8.4
Bearing section length to curvature plane, ft	6.1
Range of angle adjuster change, degree	0–2 или 0–3
Connecting thread to bit	4 1/2 Reg
Torque transmitted, max., ft*lbs	14009
Tolerance of axial loading, lbs	44946
Overhaul period, hour	200

S-700.NGT.M12



Bearing section **S-700.NGT.M12** is a new short bearing section featuring enhanced operation life. The bearing section is used in PDM power sections of 6 3/4 – 7" diameter and for drilling oil and gas wells with 8 3/8 – 9 7/8" 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°.

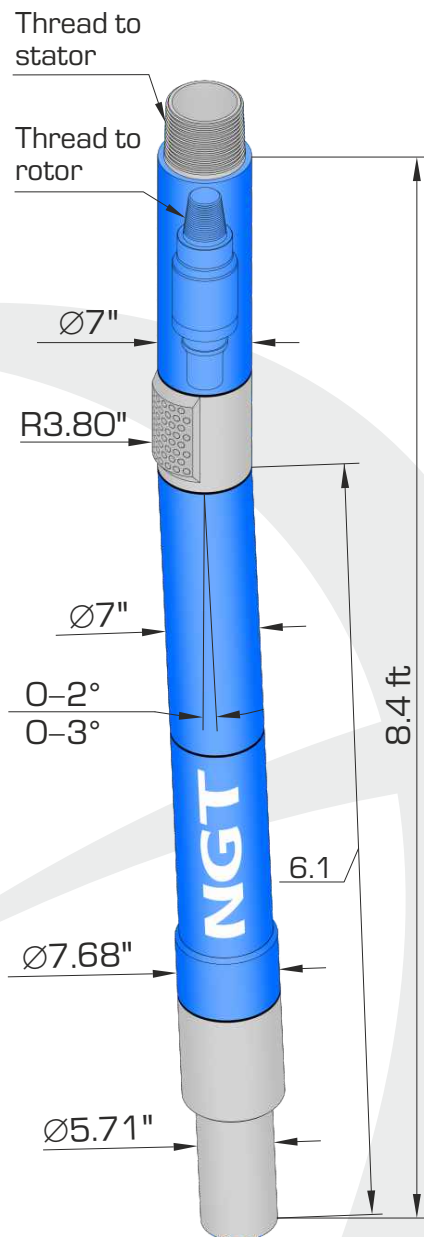
Meeting customers' requirements, the bearing section can be produced with the connecting threads for specific power section.

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

Technical specifications

Housing OD, inch	7
Bearing section length, ft	8.4
Bearing section length to curvature plane, ft	6.1
Range of angle adjuster change, degree	0–2 или 0–3
Connecting thread to bit	4 1/2 Reg
Torque transmitted, max., ft*lbs	17695
Tolerance of axial loading, lbs	56182
Overhaul period, hour	280

S-700.NGT.M15



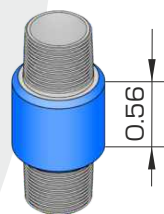
Bearing section **S-700.NGT.M15** is a new short bearing section featuring enhanced operation life. The bearing section is used in PDM power sections of 6 3/4 – 7" diameter and for drilling oil and gas wells with 8 3/8 – 9 7/8" bits.

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.

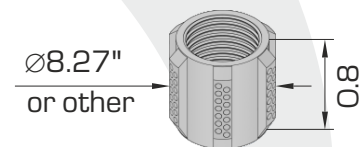
The bearing section is furnished with drive shaft with two joints to connect to the power section rotor. The bearing section design has adjustable bent sub. The adjustment range is from 0° up to 2° or from 0° up to 3°.

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

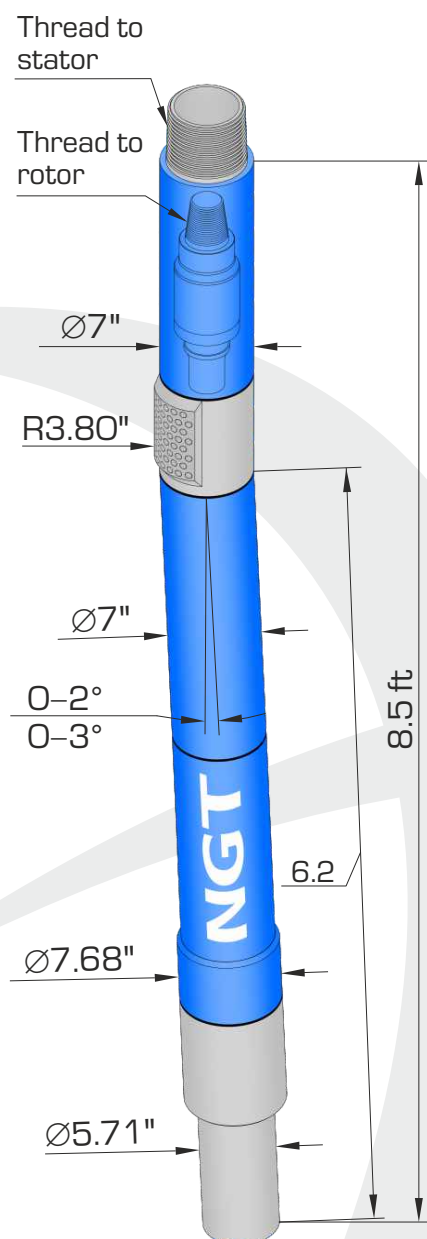


Centralizer

Technical specifications

Housing OD, inch	7
Bearing section length, ft	8.4
Bearing section length to curvature plane, ft	6.1
Range of angle adjuster change, degree	0–2 или 0–3
Connecting thread to bit	4 1/2 Reg
Torque transmitted, max., ft*lbs	17695
Tolerance of axial loading, lbs	56182
Overhaul period, hour	280

S-700.NGT.M16



Bearing section **S-700.NGT.M16** is a new short bearing section featuring enhanced operation life. The bearing section is used in PDM power sections of 6 3/4 – 7" diameter and for drilling oil and gas wells with 8 3/8 – 9 7/8" bits.

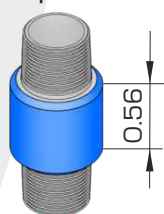
Axial bearing of bearing section is a multi-row thrust ball bearing with toroidal raceways, radial bearings of bearing section are steel sleeves, having the friction surfaces reinforced with hard-alloy plates.

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°.

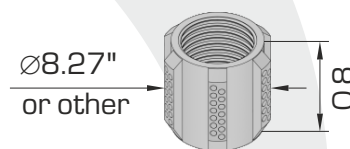
Meeting customers' requirements, the bearing section can be produced with the connecting threads for specific power section.

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

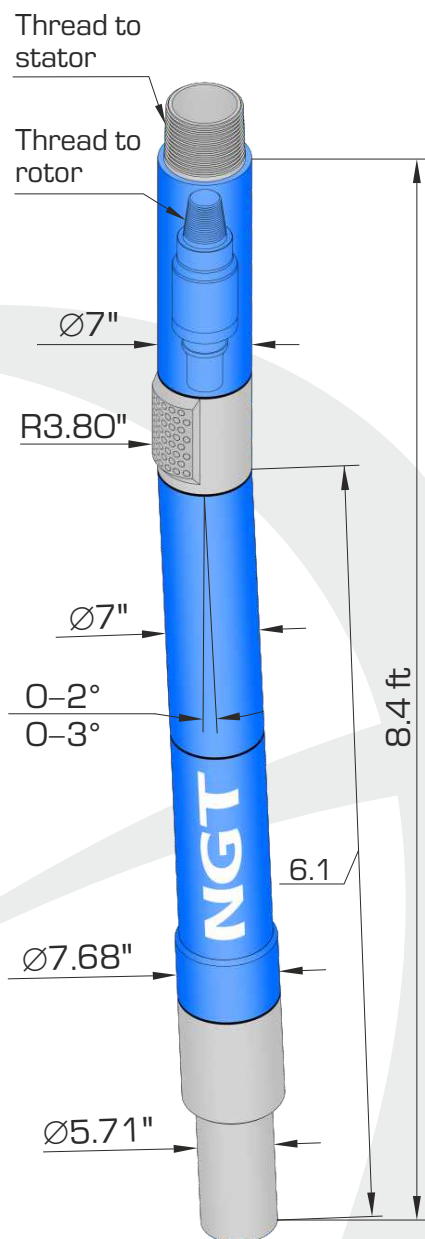


Centralizer

Technical specifications

Housing OD, inch	7
Bearing section length, ft	8.5
Bearing section length to curvature plane, ft	6.2
Range of angle adjuster change, degree	0–2 или 0–3
Connecting thread to bit	4 1/2 Reg
Torque transmitted, max., ft*lbs	17695
Tolerance of axial loading, lbs	56182
Overhaul period, hour	280

S-700.NGT.M23



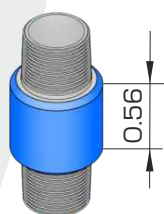
Bearing section **S-700.NGT.M23** is a new short bearing section featuring enhanced overhaul period of around 350 hours. The bearing section is used in PDM power sections of 6 3/4 – 7" diameter and for drilling oil and gas wells with 8 3/8 – 9 7/8" bits.

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

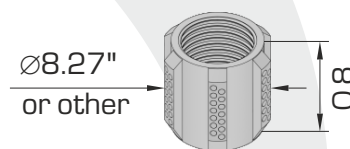
The bearing section is furnished with drive shaft with two joints to connect to the power section rotor. The bearing section design has adjustable bent sub. The adjustment range is from 0° up to 2° or from 0° up to 3°.

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

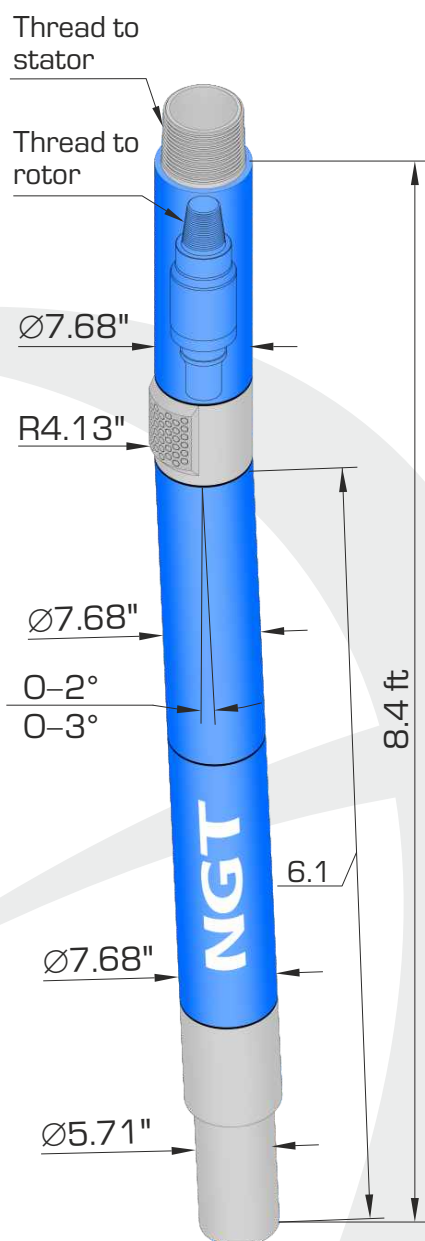


Centralizer

Technical specifications

Housing OD, inch	7
Bearing section length, ft	8.4
Bearing section length to curvature plane, ft	6.1
Range of angle adjuster change, degree	0–2 или 0–3
Connecting thread to bit	4 1/2 Reg
Torque transmitted, max., ft*lbs	17695
Tolerance of axial loading, lbs	56182
Overhaul period, hour	350

S-768.NGT.M4



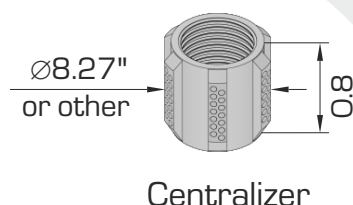
Bearing section **S-768.NGT.M4** is a new short bearing section featuring enhanced operation life. The bearing section is used in PDM power sections of 7 2/3" diameter and for drilling oil and gas wells with 8 3/8 – 9 7/8" rock and PDC bits.

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.

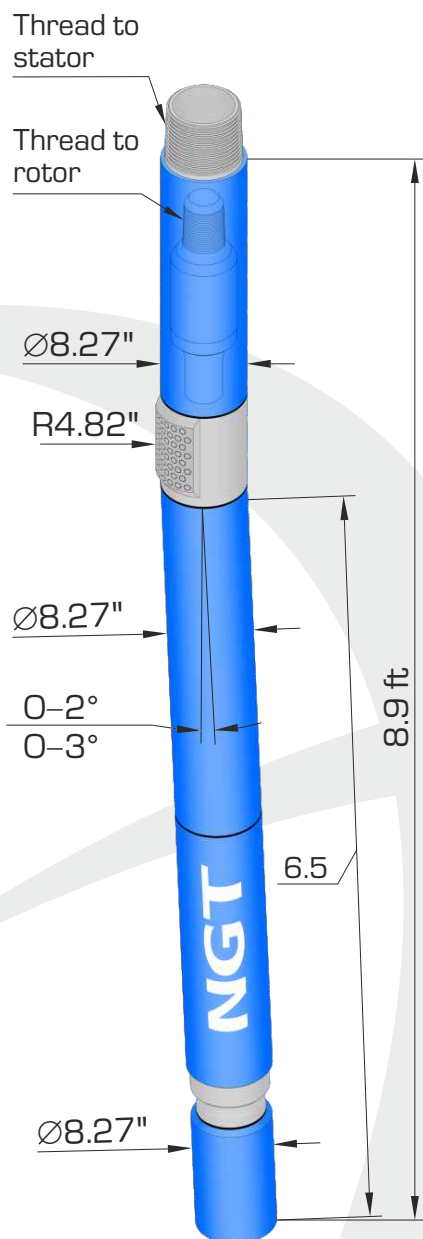
Top sub (safety sub) and replaceable centralizer are available with the bearing section to connect the power section to drill pipes:



Technical specifications

Housing OD, inch	7.68
Bearing section length, ft	8.4
Bearing section length to curvature plane, ft	6.1
Range of angle adjuster change, degree	0–2 или 0–3
Connecting thread to bit	4 1/2 Reg
Torque transmitted, max., ft*lbs	19907
Tolerance of axial loading, lbs	56182
Overhaul period, hour	250

S-825NGT.M1



Bearing section **S-825.NGT.M1** is a new short bearing section featuring enhanced operation life. The bearing section is used in PDM power sections of 8 – 8 1/2" diameter and for drilling oil and gas wells with 9 7/8 – 14 3/4" 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°.

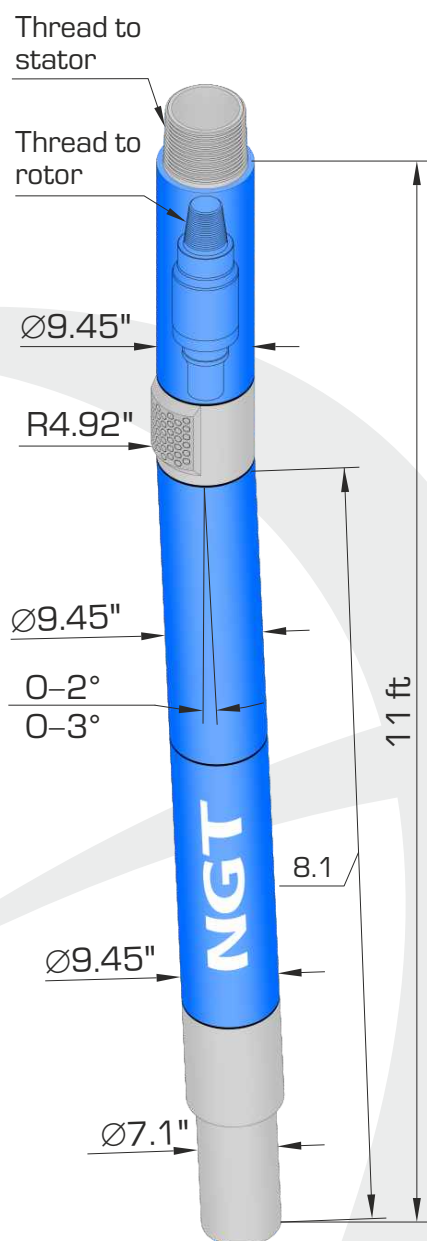
Meeting customers' requirements, the bearing section can be produced with the connecting threads for specific power section.

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

Technical specifications

Housing OD, inch	8.27
Bearing section length, ft	8.9
Bearing section length to curvature plane, ft	6.5
Range of angle adjuster change, degree	0–2 или 0–3
Connecting thread to bit	6 5/8 Reg
Torque transmitted, max., ft*lbs	18432
Tolerance of axial loading, lbs	78655
Overhaul period, hour	250

S-950.NGT.M1



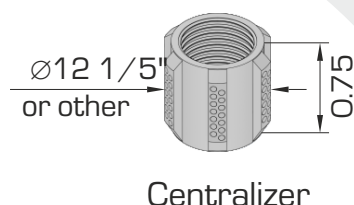
Bearing section **S-950.NGT.M1** is a new short bearing section featuring enhanced operation life. The bearing section is used in PDM power sections of 9 1/2" diameter and for drilling oil and gas wells with 1 1/8 – 17 1/2" rock and PDC bits.

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, inch	9.45
Bearing section length, ft	11
Bearing section length to curvature plane, ft	8.1
Range of angle adjuster change, degree	0–2 или 0–3
Connecting thread to bit	6 5/8 Reg
Torque transmitted, max., ft*lbs	18432
Tolerance of axial loading, lbs	89891
Overhaul period, hour	250

Bearing sections specification

Bearing section code	S-300.NGT.M2	S-350.NGT.M1	S-375.NGT.M1	S-416.NGT.M1	S-416.NGT.M2	S-475.NGT.M2	S-650.NGT.M1	S-700.NGT.M12 S-700.NGT.M15	S-700.NGT.M16	S-700.NGT.M23	S-768.NGT.M4	S-825.NGT.M1	S-950.NGT.M1
Housing OD, inch	3.15	3.46	3.74	4.17	4.17	4.72	6.50	7	7	7	7.68	8.27	9.45
Bearing section length, ft	4	4.6	5.1	4.3	5.4	6.1	8.4	8.4	8.5	8.4	8.4	8.9	11
Bearing section length to curvature plane, ft	2.8	3.36	3.74	2.9	3.98	4.5	6.1	6.1	6.2	6.1	6.1	6.5	8.1
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., ft*lbs	2212	1475	2581	3686	3686	4424	14009	17695	17695	17695	19907	18432	18432
Tolerance of axial loading, lbs	10113	12360	14607	17978	17978	22473	44946	56182	56182	56182	56182	78655	89891
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:

TBS1-700.NGT.M1

Number of turbodrill modification

Standard size, producer's designation

Quantity of turbine sections

Designation of a turbodrill, where:

T – turbodrill,

TB – steerable turbodrill with fixed bend angle,

TBS – steerable turbodrill with adjustable sub.

The turbodrills presented in the catalogue:

T2-500.NGT.M1

T2-500.NGT.M2

T1-700.NGT.M1

T2-700.NGT.M1

T1-700.NGT.M2

T2-700.NGT.M2

TBS1-700.NGT.M1

TBS1-700.NGT.M2

T2-768.NGT.M1

T3-768.NGT.M1

T2-768.NGT.M2

T3-768.NGT.M2

T1-950.NGT.M2

T2-950.NGT.M2

T3-950.NGT.M2

T2-500.NGT.M1

Turbodrill T2-500.NGT.M1 has high speed of rotation and is used for drilling of wells with combination and impregnated bits of small diameter.

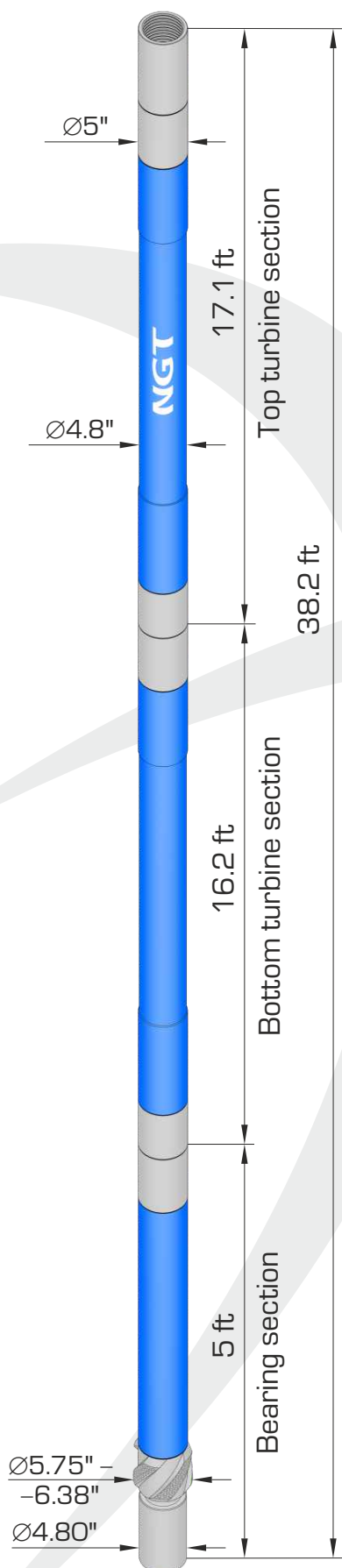
The turbodrill contains two turbine sections and bearing section. The turbine sections incorporate the turbine of high speed of rotation and low pressure drop. The turbine efficiency constitutes 68–70% at max. power. The turbodrill bearing section operates in mud and has axial sliding bearing, the operating 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, inch	4.8
OD of threaded connections, inch	5
Diameters of bits used, inch	5 3/4 – 6 3/4
Turbodrill length, ft	38.2
Length of top turbine section, ft	17.1
Length of bottom turbine section, ft	16.2
Length of bearing section, ft	5
Connecting thread to drill pipes	3 1/2 Reg
Connecting thread to bit	3 1/2 Reg
Max. density of mud, ppg	15.8
Max. axial load, lbs	11236
Weight, lbs	1653
Max. temperature in well, °F	482

Turbodrill power characteristic

Quantity of turbine sections, pc.	2
Mud flow rate, gpm	224–255
Mud density, ppg	8.35
Stall torque, ft * lbs	811–1069
Speed of rotation at operating condition, min ⁻¹	1151–1316
Pressure drop, psi	914–1189
Max. power, hp	86–126



T2-500.NGT.M2

Turbodrill T2-500.NGT.M2 has high speed of rotation and is used for drilling of wells with combination and impregnated bits of small diameter.

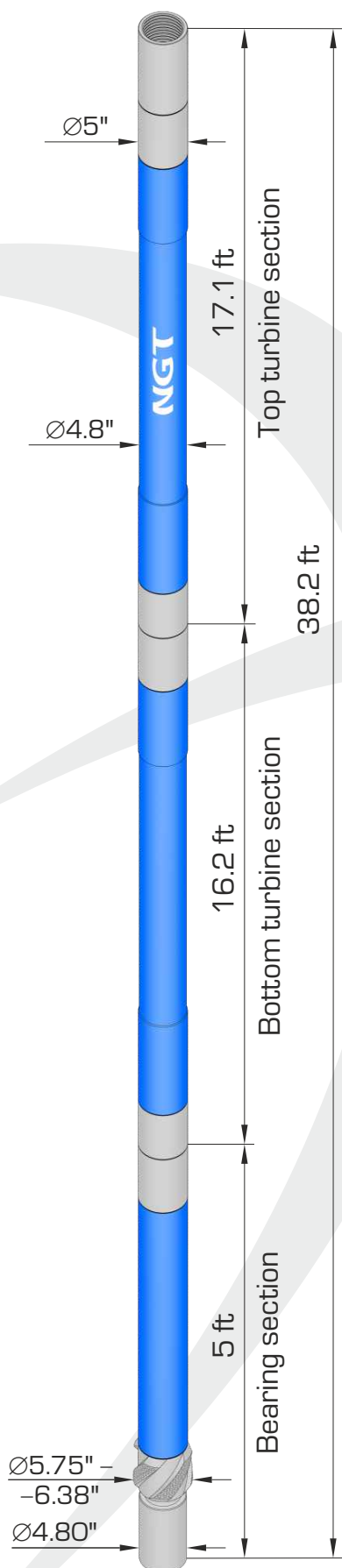
The turbodrill contains two turbine sections and bearing section. The turbine sections incorporate the turbine of high speed of rotation and low pressure drop. The turbine efficiency constitutes 68–70% at max. power. The turbodrill bearing section operates in mud and has axial sliding bearing, the operating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

Turbodrill specification

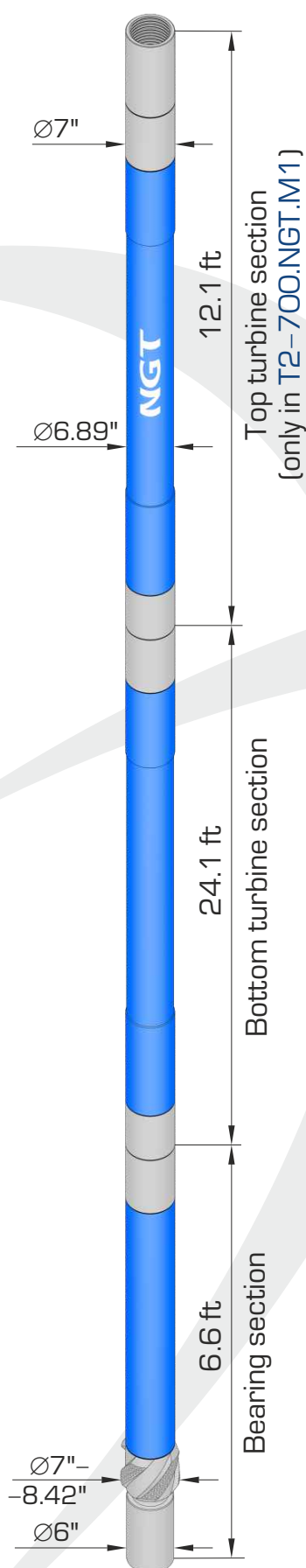
Housing OD, inch	4.8
OD of threaded connections, inch	5
Diameters of bits used, inch	5 3/4 – 6 3/4
Turbodrill length, ft	38.2
Length of top turbine section, ft	17.1
Length of bottom turbine section, ft	16.2
Length of bearing section, ft	5
Connecting thread to drill pipes	3 1/2 Reg
Connecting thread to bit	3 1/2 Reg
Max. density of mud, ppg	15.8
Max. axial load, lbs	11236
Weight, lbs	1653
Max. temperature in well, °F	482

Turbodrill power characteristic

Quantity of turbine sections, pc.	2
Mud flow rate, gpm	160
Mud density, ppg	8.35
Stall torque, ft * lbs	728
Speed of rotation at operating condition, min ⁻¹	1236
Pressure drop, psi	1334
Max. power, hp	73



T1-700.NGT.M1 and T2-700.NGT.M1



High hydrodynamic alternating loads are created while tripping in a well using 8 3/8 – 8 1/2" dia. bits and 7 2/3" 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 **T1-700.NGT.M1** and **T2-700.NGT.M1** of 7" OD are offered to increase the annular distance and, therefore, to improve conditions of well drilling with 8 3/8 – 8 1/2" bits. The turbodrill is available for drilling with impregnated and PDC bits.

The turbodrill incorporates one (**T1-700.NGT.M1**) or two (**T2-700.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.

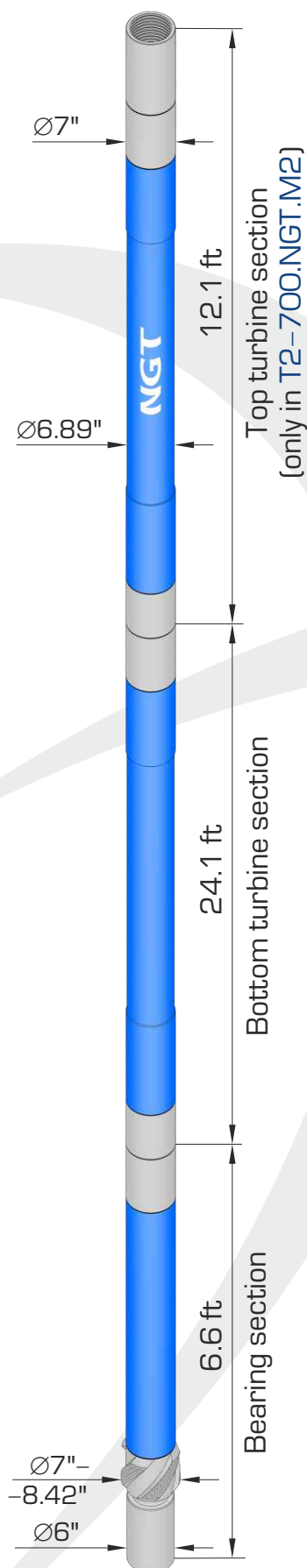
Turbodrill specification

Code of turbodrill	T1-700.NGT.M1	T2-700.NGT.M1
OD of threaded connections, inch	7	
Diameters of bits used, inch	8 3/8 – 8 1/2"	
Turbodrill length, ft	30.6	42.7
Length of top turbine section, ft	–	12.1
Length of bottom turbine section, ft	24.1	24.1
Length of bearing section, ft	6.6	6.6
Connecting thread to drill pipes	5 1/2 FH	
Connecting thread to bit	4 1/2 Reg	
Max. density of mud, ppg	15.8	
Max. axial load, lbs	33709	
Weight, lbs	4630	5511
Max. temperature in well, °F	482	

Turbodrill power characteristic

Quantity of turbine sections, pc.	1	2
Mud flow rate, gpm	511–575	399–511
Mud density, ppg	8.35	8.35
Stall torque, ft * lbs	2096–2654	1806–2960
Speed of rotation at operating condition, min ⁻¹	827–931	646–827
Pressure drop, psi	841–1073	725–1189
Max. power, hp	145–207	98–205

T1-700.NGT.M2 and T2-700.NGT.M2



High hydrodynamic alternating loads are created while tripping in a well using 8 3/8 – 8 1/2" dia. bits and 7 2/3" 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 **T1-700.NGT.M2** and **T2-700.NGT.M2** of 7" OD are offered to increase the annular distance and, therefore, to improve conditions of well drilling with 8 3/8 – 8 1/2" bits. The turbodrill is available for drilling with impregnated and PDC bits.

The turbodrill incorporates one (**T1-700.NGT.M2**) or two (**T2-700.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.

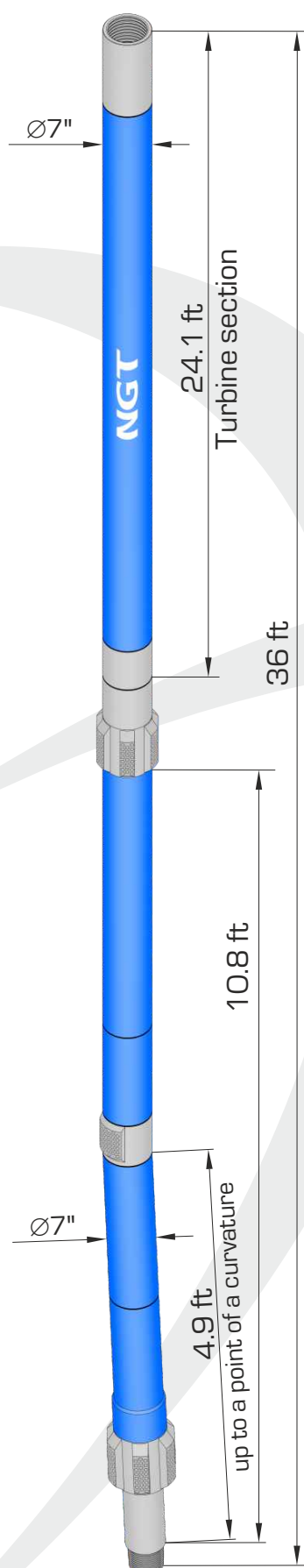
Turbodrill specification

Code of turbodrill	T1-700.NGT.M2	T2-700.NGT.M2
OD of threaded connections, inch	7	
Diameters of bits used, inch	8 3/8 – 8 1/2"	
Turbodrill length, ft	30.6	42.7
Length of top turbine section, ft	–	12.1
Length of bottom turbine section, ft	24.1	24.1
Length of bearing section, ft	6.6	6.6
Connecting thread to drill pipes	5 1/2 FH	
Connecting thread to bit	4 1/2 Reg	
Max. density of mud, ppg	15.8	
Max. axial load, lbs	33709	
Weight, lbs	4630	5511
Max. temperature in well, °F	482	

Turbodrill power characteristic

Quantity of turbine sections, pc.	1	2
Mud flow rate, l/sec	399–447	351–399
Mud density, ppg	8.35	8.35
Stall torque, ft * lbs	1662–2084	1801–2326
Speed of rotation at operating condition, min ⁻¹	926–1037	815–926
Pressure drop, psi	928–1160	1001–1291
Max. power, hp	136–190	129–190

TBS1-700.NGT.M1 and TBS1-700.NGT.M2



Turbodrills **TBS1-700.NGT.M1** and **TBS1-700.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 $8\frac{3}{8}$ – $8\frac{1}{2}$ " dia.

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

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

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

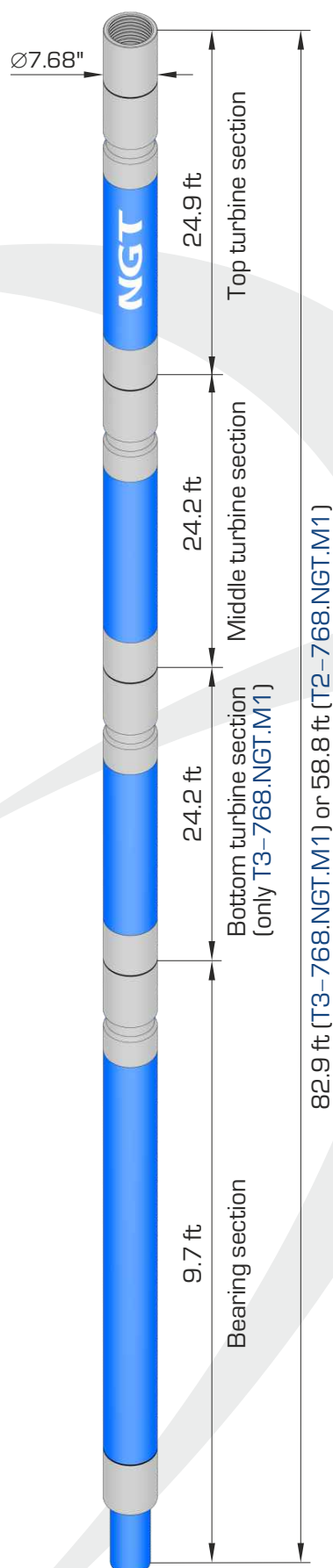
Turbodrill specification

Code of turbodrill	TBS1-700.NGT.M1	TBS1-700.NGT.M2
OD of threaded connections, inch	7	
Diameters of bits used, inch	$8\frac{3}{8}$ – $8\frac{1}{2}$	
Turbodrill length, ft	36	36
Length of turbine section, ft	24.1	24.1
Bearing section length to curvature plane, ft	4.9	4.9
Connecting thread to drill pipes	$5\frac{1}{2}$ FH (NC-50)	
Connecting thread to bit	$4\frac{1}{2}$ Reg	
Max. density of mud, ppg	15.8	
Max. axial load, lbs	33709	
Weight, lbs	4630	4630
Max. temperature in well, °F	482	

Turbodrill power characteristic

Quantity of turbine sections, pc.	1	1
Mud flow rate, l/sec	511–575	399–447
Mud density, ppg	8.35	8.35
Stall torque, ft * lbs	2096–2654	1662–2084
Speed of rotation at operating condition, min ⁻¹	827–931	926–1037
Pressure drop, psi	841–1073	928–1160
Max. power, hp	145–207	136–190

T2-768.NGT.M1 and T3-768.NGT.M1



The turbodrill incorporates two (T2-768.NGT.M1) or three (T3-768.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.

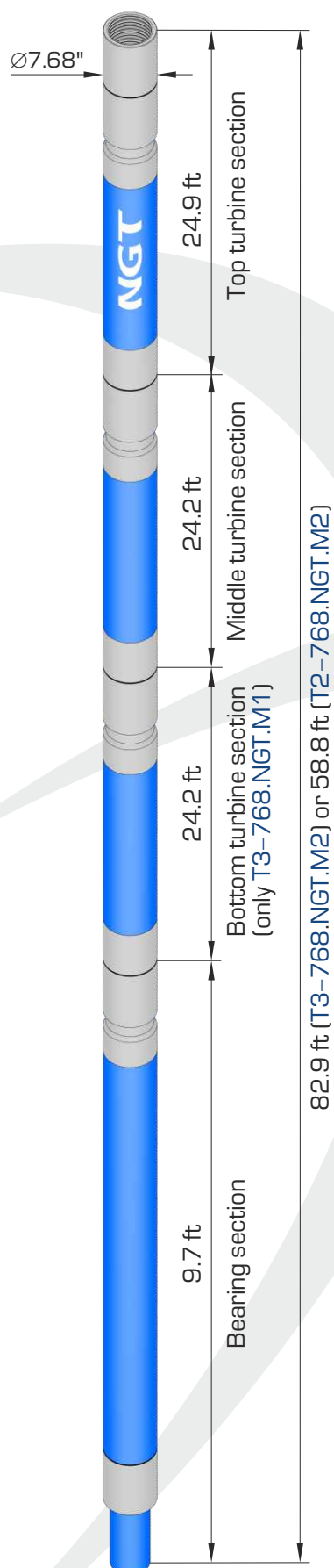
Turbodrill specification

Code of turbodrill	T2-768.NGT.M1	T3-768.NGT.M1
OD of threaded connections, inch	7.68	
Diameters of bits used, inch	8 1/2 – 9 7/8	
Turbodrill length, ft	58.8	82.9
Length of top turbine section, ft	24.9	24.9
Length of middle turbine section, ft	24.2	24.2
Length of bottom turbine section, ft	–	24.2
Length of bearing section, ft	9.7	9.7
Connecting thread to drill pipes	5 1/2 FH	
Connecting thread to bit	4 1/2 Reg	
Max. density of mud, ppg	15.8	
Max. axial load, lbs	56182	
Weight, lbs	7363	10406
Max. temperature in well, °F	230	

Turbodrill power characteristic

Quantity of turbine sections, pc.	2	3
Mud flow rate, gpm	511–575	511–575
Mud density, ppg	8.35	
Stall torque, ft * lbs	1652–2090	2477–3135
Speed of rotation at operating condition, min ⁻¹	411–463	411–463
Pressure drop, psi	435–537	638–812
Max. power, hp	71–97	102–145

T2-768.NGT.M2 and T3-768.NGT.M2



The turbodrill incorporates two (T2-768.NGT.M2) or three (T3-768.NGT.M2) turbine sections and bearing section. Highly productive turbine made with precision casting technique is used in the turbine sections.

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

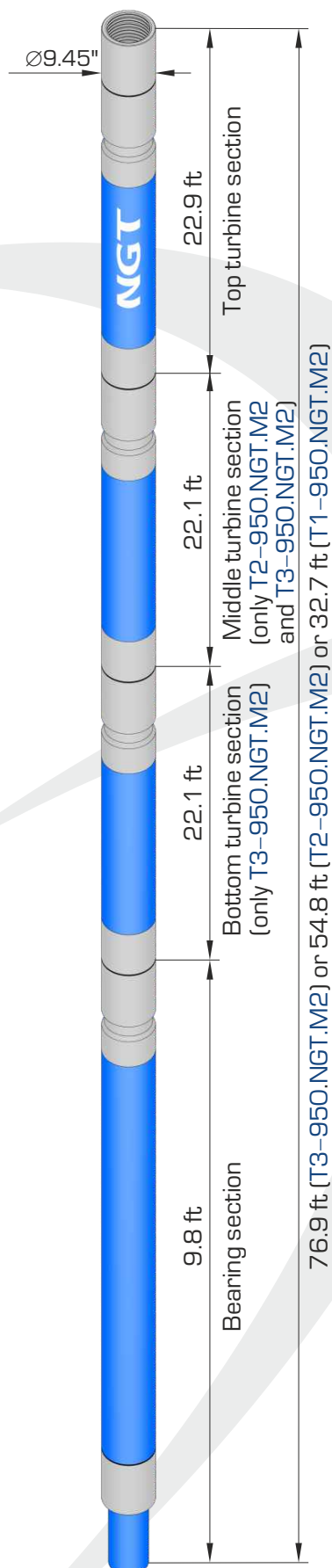
Turbodrill specification

Code of turbodrill	T2-768.NGT.M2	T3-768.NGT.M2
OD of threaded connections, inch	7.68	
Diameters of bits used, inch	8 1/2 – 9 7/8	
Turbodrill length, ft	58.8	82.9
Length of top turbine section, ft	24.9	24.9
Length of middle turbine section, ft	24.2	24.2
Length of bottom turbine section, ft	–	24.2
Length of bearing section, ft	9.7	9.7
Connecting thread to drill pipes	5 1/2 FH	
Connecting thread to bit	4 1/2 Reg	
Max. density of mud, ppg	15.8	
Max. axial load, lbs	56182	
Weight, lbs	7363	10406
Max. temperature in well, °F	230	

Turbodrill power characteristic

Quantity of turbine sections, pc.	2	3
Mud flow rate, gpm	511–575	511–575
Mud density, ppg	8.35	
Stall torque, ft * lbs	2323–2940	3511–4411
Speed of rotation at operating condition, min ⁻¹	594–669	594–669
Pressure drop, psi	580–740	870–1102
Max. power, hp	125–179	189–268

T1-950.NGT.M2, T2-950.NGT.M2 and T3-950.NGT.M2



The turbodrill incorporates one (T1-950.NGT.M2), two (T2-950.NGT.M1) or three (T3-950.NGT.M2) turbine sections and bearing section. Medium speed turbine is used in the turbine sections which provides suitable characteristics in double-section version. This turbine has high torque and is recommended to drill with rock bits in soft and medium rocks.

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

Turbodrill specification

Code of turbodrill	T1-950.NGT.M2	T2-950.NGT.M2	T3-950.NGT.M2
OD of threaded connections, inch	9.45		
Diameters of bits used, inch	10 5/8 – 15 1/2		
Turbodrill length, ft	32.7	54.8	76.9
Length of top turbine section, ft	22.9	22.9	22.9
Length of middle turbine section, ft	–	22.1	22.1
Length of bottom turbine section, ft	–	–	22.1
Length of bearing section, ft	9.8	9.8	9.8
Connecting thread to drill pipes	7 5/8 Reg		
Connecting thread to bit	6 5/8 Reg		
Max. density of mud, ppg	15.8		
Max. axial load, lbs	67419		
Weight, lbs	5589	9423	13261
Max. temperature in well, °F	230		

Turbodrill power characteristic

Quantity of turbine sections, pc.	1	2	3
Mud flow rate, gpm	718–789	543–718	511–543
Mud density, ppg	8.35		
Stall torque, ft * lbs	2673–3301	3052–5347	4056–4579
Speed of rotation at operating condition, min ⁻¹	619–688	468–619	440–468
Pressure drop, psi	551–667	624–1088	827–928
Max. power, hp	160–215	137–320	173–207

Turbodrill specification

Code	Dia. of bits used, inch	Length, ft	Weight, lbs	Quantity of turbine sections, pcs		Quantity of turbine stages in turbodrill, psc	Mud flow rate, gpm	Speed of rotation at operating condition, min ⁻¹	Stall torque, ft*lbs	Pressure drop, psi	Max. power, hp	Connecting thread		Range of bend angles, deg
				Turbine	Bearing section							to drill pipes	to bit	
T2-500.NGT.M1	5 3/4 – 6 3/4	38.2	1653	2	1	220	224-255	1151-1316	811-1069	914-1189	86-126	3 1/2 Reg	3 1/2 Reg	–
T2-500.NGT.M2	5 3/4 – 6 3/4	38.2	1653	2	1	220	160	1236	728	1334	73	3 1/2 Reg	3 1/2 Reg	–
T1-700.NGT.M1	8 3/8 – 8 1/2	30.6	4630	1	1	170	511-575	827-931	2096-2654	841-1073	145-207	5 1/2 FH	4 1/2 Reg	–
T2-700.NGT.M1	8 3/8 – 8 1/2	42.7	5511	2	1	240	399-511	646-827	1806-2960	725-1189	98-205	5 1/2 FH	4 1/2 Reg	–
T1-700.NGT.M2	8 3/8 – 8 1/2	30.6	4630	1	1	150	399-447	926-1037	1662-2084	928-1160	136-190	5 1/2 FH	4 1/2 Reg	–
T2-700.NGT.M2	8 3/8 – 8 1/2	42.7	5511	2	1	210	351-399	815-926	1801-2326	1001-1291	129-190	5 1/2 FH	4 1/2 Reg	–
TBS1-700.NGT.M1	8 3/8 – 8 1/2	36.0	4630	1	1	170	511-575	827-931	2096-2654	841-1073	145-207	5 1/2 FH	4 1/2 Reg	0° – 2°
TBS1-700.NGT.M2	8 3/8 – 8 1/2	36.0	4630	1	1	150	399-447	926-1037	1662-2084	928-1160	136-190	5 1/2 FH	4 1/2 Reg	0° – 2°
T2-768.NGT.M1	8 1/2 – 9 7/8	58.8	7363	2	1	220	511-575	411-463	1652-2090	435-537	71-97	5 1/2 FH	4 1/2 Reg	–
T3-768.NGT.M1	8 1/2 – 9 7/8	82.9	10406	3	1	330	511-575	411-463	2477-3135	638-812	102-145	5 1/2 FH	4 1/2 Reg	–
T2-768.NGT.M2	8 1/2 – 9 7/8	58.8	7363	2	1	220	511-575	594-669	2323-2940	580-740	125-179	5 1/2 FH	4 1/2 Reg	–
T3-768.NGT.M2	8 1/2 – 9 7/8	82.9	10406	3	1	330	511-575	594-669	3511-4411	870-1102	189-268	5 1/2 FH	4 1/2 Reg	–
T1-950.NGT.M2	10 5/8 – 15 1/2	32.7	5589	1	1	109	718-798	619-688	2673-3301	551-667	160-215	7 5/8 Reg	6 5/8 Reg	–
T2-950.NGT.M2	10 5/8 – 15 1/2	54.8	9423	2	1	218	543-718	468-619	3052-5347	624-1088	137-320	7 5/8 Reg	6 5/8 Reg	–
T3-950.NGT.M2	10 5/8 – 15 1/2	76.9	13261	3	1	327	511-543	440-468	4056-4579	827-928	173-207	7 5/8 Reg	6 5/8 Reg	–

Note: turbodrill power characteristics are given at mud density of 8.35 ppg

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.

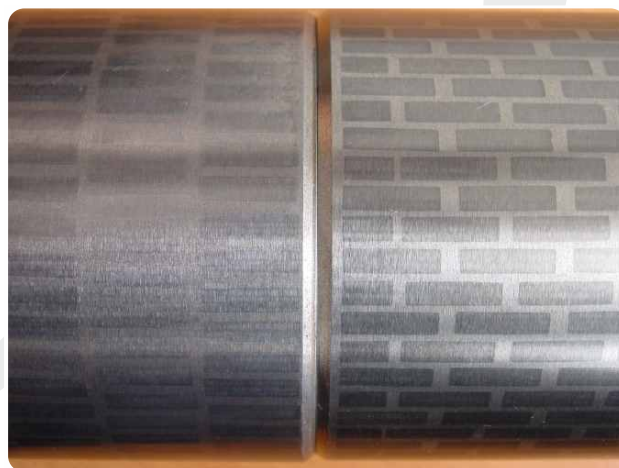
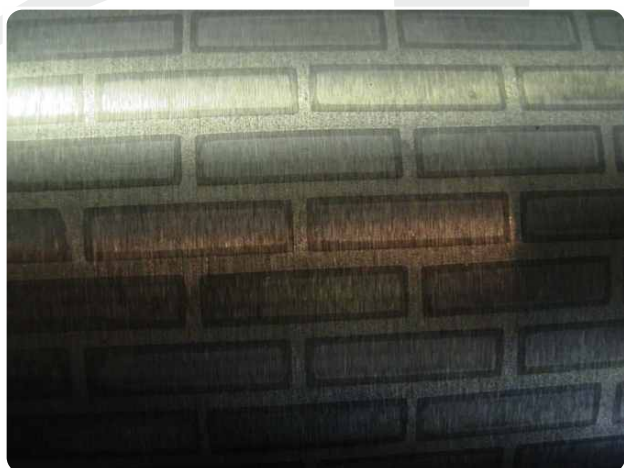
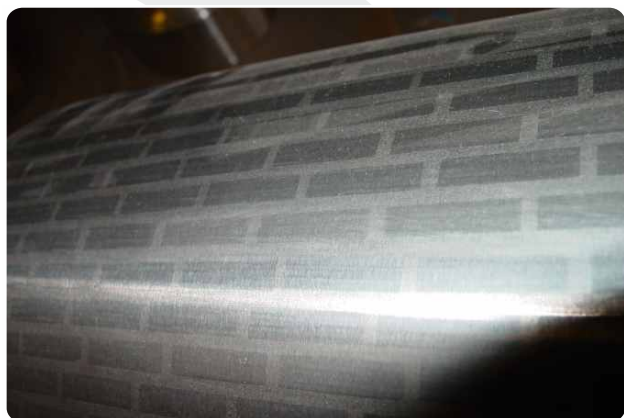
The company has terminated the field run cycle of PDM bearing sections in conjunction with long power sections (13–20 ft). All the transmission members transferring torque from rotor to bit (universal joint, bearing section shaft, threads, clutches) have increased load-carrying capacity. JSC «NGT» offers 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.

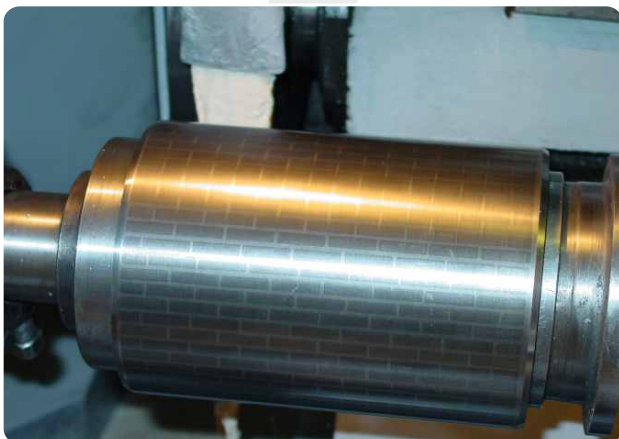
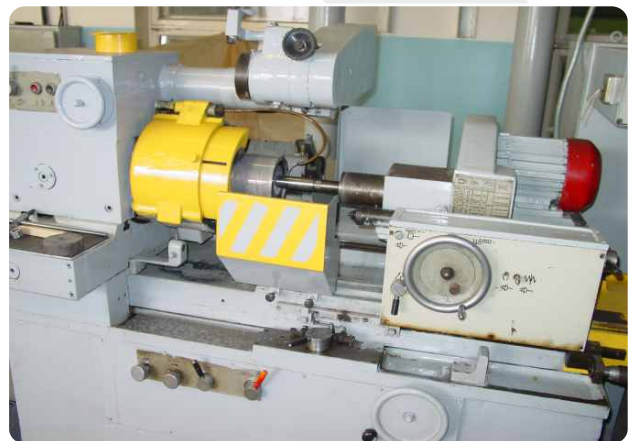
See below different versions of friction surfaces of the radial bearings which differ by configuration of hard alloy plates, density of their location on friction surfaces, width of intervals between the plates which vary depending on operating conditions of the PDM or turbodrill run.



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	1.75 – 9"	0.08 ft – 1.5 ft
Outer diameter	2" – 9.50	0.08 ft – 1.5 ft

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).

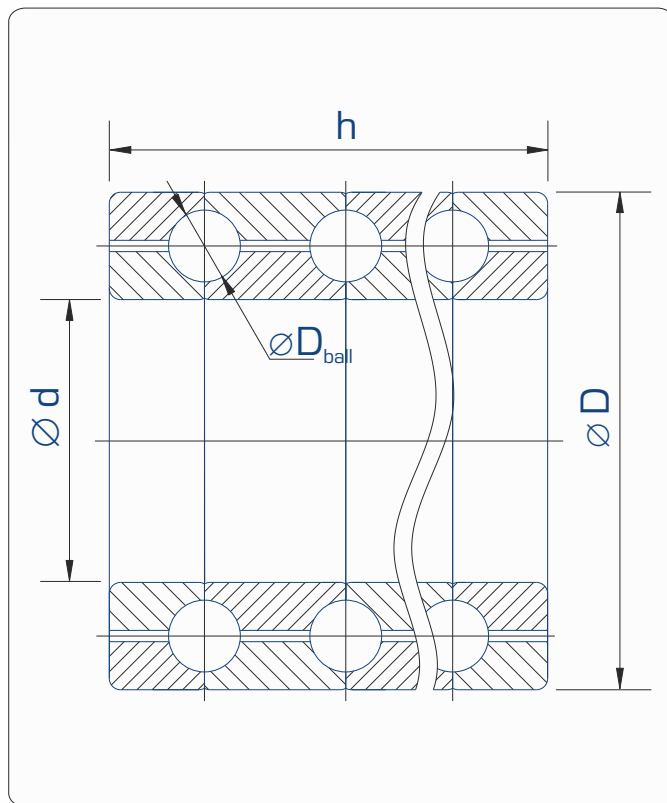
Materials, used while production of the composite hard alloy bearing are resistant to the temperature of up to 650°C and are compatible with all the chemical reagents such as water, oil, gas, salt, H_2S , H_2SO_3 , H_2SO_4 , HCl , Cl_2 .



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 silicomolybdenic 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, inch	D, inch	h, ft	N _{row}	D _{ball} , inch	C _d , lbs	M, lbs
OM-708	1.339	2.480	0.67	11	3/8	26977	6.4
OM-708-01	1.575	3.071	1.12	13	1/2	49008	20.7
OM-708-02	1.889	3.071	1.02	15	3/8	38891	13.7
OM-709-01	1.732	3.150	1.04	14	1/2	53729	16.1
OM-710-01	1.968	3.465	1.15	13	1/2	52605	25.4
OM-712-01	2.362	4.134	1.15	13	9/16	66993	34.2
OM-712-02	2.362	3.937	1.03	13	1/2	57551	18.5
OM-712-05	2.362	4.134	0.87	10	9/16	58000	23.1
OM-713	2.559	5.039	1.15	10	3/4	87675	48.9
OM-713-01	2.531	3.988	0.69	10	1/2	49233	18.7
OM-716-01	3.150	5.276	1.57	15	3/4	127241	72.8
OM-716-02	3.150	6.299	1.57	12	1	161188	114.6
OM-717-01	3.307	5.827	1.48	14	3/4	122071	88.2
OM-718	3.543	5.590	1.80	15	5/8	101838	77.2
OM-718-01	3.543	5.827	1.48	14	3/4	125893	72.8
OM-718-05	3.543	5.827	1.52	14	13/16	142753	77.2
OM-718-08	3.622	5.827	1.80	16	3/4	138032	82.7
OM-718-10	3.622	5.827	1.28	12	3/4	114427	58.4
OM-718-11	3.543	5.984	1.26	10	13/16	112179	67.2
OM-721	4.134	6.496	1.66	15	13/16	156641	90.4
OM-722	4.331	6.850	1.84	15	13/16	160513	114.6
OM-723	4.528	8.071	1.87	12	1 1/8	221886	185.2
OM-726	5.118	8.071	2.59	15	1	227057	233.7
OM-726-01	5.118	8.071	2.30	15	1	227057	205.0

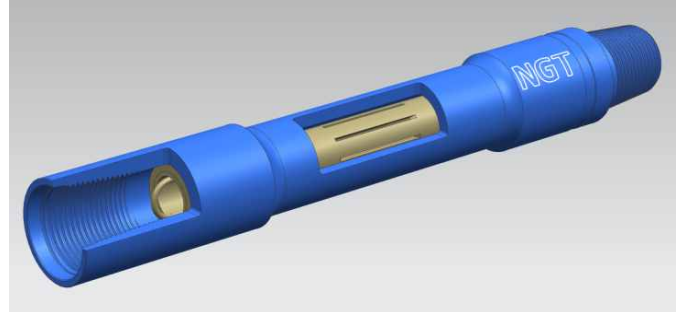
Note:

d – inner diameter, inch
 D – outer diameter, inch
 h – length, ft

N_{row} – ball rows quantity
 D_{ball} – ball diameter, inch
 C_d – dynamic load-carrying capacity, lbs
 M – weight, lb

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.

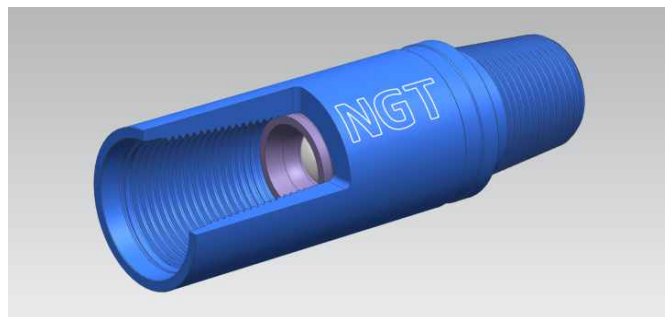
2. Filter case works as “flex sub” reducing tension in stator thread of PDM when going through the smaller radius part of the well.

Specifications	Designations					
	F-375 F-416	F-475	F-650	F-700	F-825	F-950
Outer diameter, inch	4.16	4.75	6.5	7.00	8.25	9.50
Total length, ft	2.92	2.85	3.61	3.61	3.61	3.44
Case length, ft	2.62	2.52	3.23	3.19	3.19	3.03
Connecting thread, top (box)	NC31	NC38	NC50	5 1/2 FH	6 5/8 Reg	6 5/8 FH
Connecting thread, bottom (pin)	NC31	NC38	NC50	5 1/2 FH	6 5/8 Reg	6 5/8 FH
Filter degree, ft	0.01	0.01	0.01	0.01	0.01	0.01
Mud flow rate, gpm, not more than	285	333	490	713	713	1110
Weight, lbm	59	88	192	205	295	403

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.

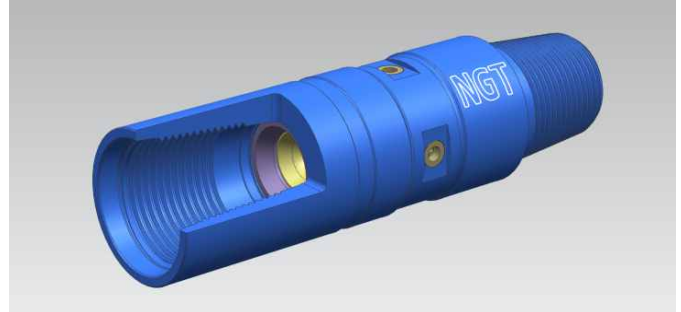
Due to the abovementioned design features, the overhaul period of our back-pressure valves is around 250 working hours.

Specifications	Designations							
	KO-300	KO-375 KO-416	KO-475	KO-650	KO-700	KO-768	KO-825	KO-950
Outer diameter, ft	3.00	4.16	4.75	6.50	7.00	7.68	8.25	9.50
Total length, ft	0.74	1.08	1.25	1.59	1.63	1.63	1.63	1.79
Case length, ft	0.62	0.78	0.92	1.21	1.21	1.21	1.21	1.38
Connecting thread, top (box)	2 3/8 Reg	NC31	NC38	NC50	5 1/2 FH	5 1/2 FH	6 5/8 Reg	6 5/8 FH
Connecting thread, bottom (pin)	2 3/8 Reg	NC31	NC38	NC50	5 1/2 FH	5 1/2 FH	6 5/8 Reg	6 5/8 FH
Valve closing pressure, psi	4.27	4.27	4.27	5.69	5.69	4.27	4.27	4.27
Mud flow rate, gpm, not more than	79	206	317	634	634	871	951	1109
Weight, lbm	13	29	40	104	115	145	172	256

Sand content in the mud shouldn't be more than 1%. Mud density shouldn't be more than 16.7 ppg. 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 16.7 ppg 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-300	KP-350	KP-375 KP-416	KP-475	KP-500	KP-650	KP-700	KP-768	KP-825	KP-950
Outer diameter, ft	3.00	3.50	4.16	4.75	5.00	6.50	7.00	7.68	8.25	9.50
Diameter of flow area, ft	0.78	0.78	1.1	1.1	1.1	1.77	1.97	1.97	1.97	2.16
Total length, ft	143	143	1.95 1.92	1.43	1.98	1.82	1.86	1.86	1.86	1.93
Case length, ft	1.18	1.18	1.62	1.08	1.66	1.44	1.44	1.44	1.44	1.51
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, psi	20-30	20-30	28-42	28-42	28-42	34-44	33-42	33-42	33-42	40-53
Mud flow rate, gpm, not more than	159	159	396	396	396	634	793	793	793	871
Weight, lbm	22	31	57	53	90	121	146	178	218	287

Sand content in the mud shouldn't be more than 1%.
 Mud density shouldn't be more than 16.7 ppg.

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:

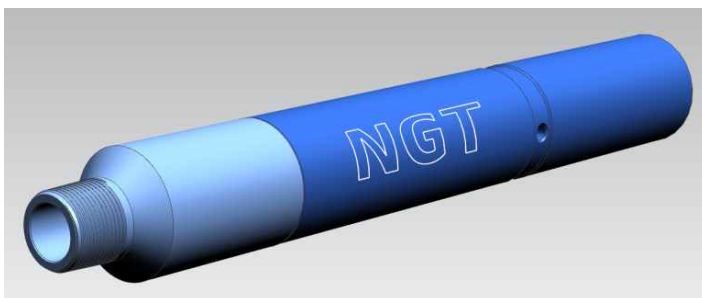
- 3 7/8 – 12 1/4" diameter;
- straight blades;
- spiral blades;
- different lengths;
- different threads as per GOST P50864–96 or API Specs 7.

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.



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–350.NGT.M1	UKORD–475.NGT.M1	UKORD–475.NGT.M2
Throughput capacity, gal/day	up to 21133	up to 105668	up to 105668
Apparent viscosity of the hydrocarbons	Without limitations		
Quantity of formations for the tests	2	2	3
Applicability in the production string, inch	4.50	5.75	5.75
Outer diameter of the equipment, inch	3.50	4.75	4.75
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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