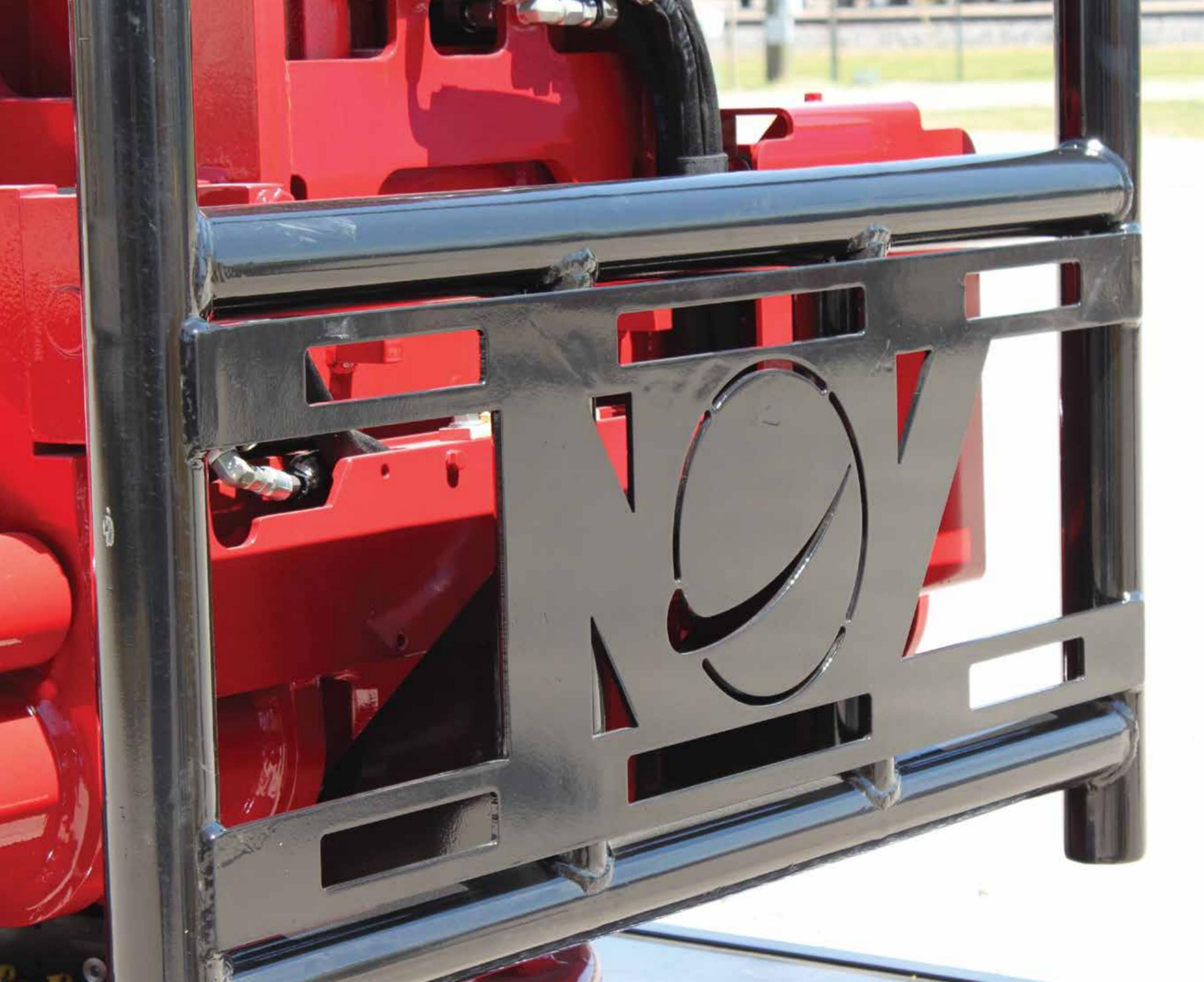


Iron Roughnecks





Stemming from the development of “Big Foot” in the 1970s, NOV Iron Roughnecks are the most versatile and dependable solutions for handling tubular connections on the drill floor. Building from our experience in equipment manufacturing, we offer a fleet of iron roughnecks - both for land and offshore. Evidenced by our ST-80C² Iron Roughneck, we continuously improve our models based on customer feedback and engineering analysis. In addition to control responsiveness, ease in serviceability and compact construction, our iron roughnecks are designed to minimize rig floor hazards and streamline the make and break process, providing you maximized uptime and improved crew safety. We also support our Iron Roughnecks in the field through our global aftermarket services team.



Overall Features

- Compact size and lightweight - ideal for small drill floors; some models have ability to relocate away from personnel by raising/lowering when fully retracted to provide clearance underneath
- Flexible mounting methods - linear track mounted and/or on a rotating pedestal system using NOV's patented scissor arm design and NOV Timing Link
- Intuitive control methods - via local control panel on tool, hard-wired remote control, wireless remote control, or through the integrated driller's controls in the driller's cabin (model dependent). Advanced remote controls on certain models automatically perform complete make/break cycles, providing increased levels of automation and safety for the drilling rig.
- Soft clamp - minimal clamp force is applied to box connection during spinning operations and is aimed to eliminate "belling" of thin-walled connections, extend tool joint life, and quicken makeup/breakout times.
- Tool shutdowns - primary method to disable any iron roughneck functions via an easily accessible button, lanyard or detection sensor, enabling complete control to the user
- Hydraulic and electrical interlocks - enable/disable certain tool functions, serving as additional safety features to the user (model dependent)
- Proximity and analog position sensors - identify tool's position in relation to the tubular (model dependent)
- All assemblies are 200,000 cycle tested

Overall Benefits

- Enhanced safety by mechanizing or automating dangerous drill floor tasks; need for tongs, pipe spinners, and catheads reduced or eliminated
- Proven efficiency of routine make/break operations while prioritizing safety
- Intuitive control panels for ease in tool operation and unparalleled, quick responsiveness
- Configurable to your needs with an established set of spare parts for streamlined maintenance
- Ideal balance of torque, reach and footprint to provide the maximum cost per square foot of rig floor space
- Quality construction provides structural stability, impact resistance and durability, equating to longer duty life and lower cost of ownership

1975 1987 1993 1996 2000 2001 2003 2005 2006 2008 2011 2013 2015

• Varco International introduces the first Iron Roughneck, "Big Foot"

• National and Oilwell merge to become National Oilwell

• AR-3200 - the first model of the AR-3000 series. Over 300 AR-3200 models have been sold to date

• ST-80 - first generation model released

• AR-4000 - the first model of the AR-4000 series

• ARN-166 - the first model of the ARN series

• ST-80 - third generation model released. To date, close to 1,300 ST-80 models have been sold

• National Oilwell merges with Varco to become National Oilwell Varco
• MPT-200 - first model of the MPT series
• Casing tong incorporated on MPT, ARN, and later, the ST-160

• ST-80C - first generation model released. To date, over 630 ST-80C models have been sold

• ST-120 released
• MPT and ARN models incorporated into automated drill floor operation (MMC)

• ST-100 released
• ST-160 released

• NOV breaks the 200,000 ft-lb torque limit
• ST-80C² - second generation model of ST-80C
• ARN-270 released
• MPT-270 released

• New high torque casing tong introduced



ST-80C2

A combination of customer-feedback-based improvements and engineering analysis.

ST-80C2 Installation / Technical Specifications

Controls	Local manual
Mount	Pedestal with floor mounted socket
Shutoff Valve	Manual
Pedestal Rotation	±90° (manual)
Hydraulic Requirements (Min)	28 GPM @ 2,100 psi (106 LPM @ 145 bar)
Hydraulic Requirements (Max)	40 GPM @ 3,000 psi (151 LPM @ 207 bar)
Assembly Weight	7,800/8,320 lbs (3,538/3,773 kg)
Tool Joint Connection (OD) Range	*4½" to 8½"
Spin Speed	75 RPM with 5" DP, 35 GPM
Spin Torque	1,750 ft-lbs (2,373 N-m) with 5" DP, 35 GPM
Maximum Makeup Torque	60,000 ft-lb (81,349 N-m)
Maximum Breakout Torque	80,000 ft-lb (108,465 N-m)
Connection Height	23" to 59" (584 mm to 1,498 mm)
Horizontal Travel**	60" (1,524 mm)
	***Optional 15" to 25" added reach
Vertical Adjustment	36" (914 mm) or 72" (1,828 mm)
Casing Ready	No
Torque Wrench Angle	30°

* ST-80 and ST-100 can make/break certain tool joints on 2½" drill pipe
 ** NOV classifies total horizontal travel as the distance between points A and B. Point A is defined as the centerline of the jaw dies when the iron roughneck is fully retracted. Point B is defined as the centerline of the jaw dies when the iron roughneck is fully extended.
 *** Horizontal travel may be increased upon request with use of an extender plate.



ST-80CL

A consistent, reliable tool featured on our most popular land rigs

ST-80CL Installation / Technical Specifications

Controls	Local manual Hard-wired remote console Integrated into NOV driller's controls
Mount	Pedestal with floor mounted socket
Shutoff Valve	Manual
Pedestal Rotation	±90° (manual and power slew)
Hydraulic Requirements (Min)	28 GPM @ 2,100 psi (106 LPM @ 145 bar)
Hydraulic Requirements (Max)	40 GPM @ 3,000 psi (151 LPM @ 207 bar)
Assembly Weight	Approximately 9,400 lbs (4,263 kg)
Tool Joint Connection (OD) Range	*4½" to 8½"
Spin Speed	75 RPM with 5" DP, 35 GPM
Spin Torque	1,750 ft-lbs (2,373 N-m) with 5" DP, 35 GPM
Maximum Makeup Torque	60,000 ft-lb (81,349 N-m)
Maximum Breakout Torque	80,000 ft-lb (108,465 N-m)
Connection Height	23" to 65" (584 mm to 1,651 mm)
Horizontal Travel**	100" (2,540 mm)
Vertical Adjustment	42" (1,067 mm)
Casing Ready	No
Torque Wrench Angle	30°

* ST-80 and ST-100 can make/break certain tool joints on 2½" drill pipe
 ** NOV classifies total horizontal travel as the distance between points A and B. Point A is defined as the centerline of the jaw dies when the iron roughneck is fully retracted. Point B is defined as the centerline of the jaw dies when the iron roughneck is fully extended.



ST-100

The embodiment of offshore equipment power into a package fit for a land rig

ST-100 Installation / Technical Specifications

Controls

Local manual
Hard-wired remote console
Integrated into NOV driller's controls

Mount

Pedestal with floor mounted socket

Shutoff Valve

Manual

Pedestal Rotation

±90° (power slew)

Hydraulic Requirements (Min)

45 GPM @ 2,500 psi
(170 LPM @ 172 bar)

Hydraulic Requirements (Max)

55 GPM @ 3,000 psi
(208 LPM @ 207 bar)

Assembly Weight

11,500 lbs (5,216 kg)

Tool Joint Connection (OD) Range

*3½" to 9¾"

Spin Speed

80 RPM with 5" DP, 45 GPM

Spin Torque

3,000 ft-lbs (4,067 N-m)
with 5" DP, 45 GPM

Maximum Makeup Torque

100,000 ft-lb (135,582 N-m)

Maximum Breakout Torque

120,000 ft-lb (162,698 N-m)

Connection Height

30" to 66" (762 mm to 1,676 mm)

Horizontal Travel**

60" (1,524 mm) or 96" (2,438 mm)

Vertical Adjustment

36" (914 mm)

Casing Ready

No

Torque Wrench Angle

60°

* ST-80 and ST-100 can make/break certain tool joints on 2½" drill pipe

** NOV classifies total horizontal travel as the distance between points A and B. Point A is defined as the centerline of the jaw dies when the iron roughneck is fully retracted. Point B is defined as the centerline of the jaw dies when the iron roughneck is fully extended.



ST-120

A pairing of compact design with maximum reach to suit both land and offshore rigs

ST-120 Installation / Technical Specifications

Controls

Local manual
Wireless Remote
Integrated into NOV driller's controls

Mount

Pedestal with floor mounted socket

Shutoff Valve

Manual

Pedestal Rotation

±90°

Hydraulic Requirements (Min)

45 GPM @ 2,500 psi
(170 LPM @ 172 bar)

Hydraulic Requirements (Max)

65 GPM @ 3,000 psi
(246 LPM @ 207 bar)

Assembly Weight

19,800 lbs (8,981 kg)
(installed weight)

Tool Joint Connection (OD) Range

3½" to 10"

Spin Speed

80 RPM (nominal on 5" DP)

Spin Torque

3,000 ft-lbs (4,067 N-m)

Maximum Makeup Torque

100,000 ft-lb (135,582 N-m)

Maximum Breakout Torque

120,000 ft-lb (162,698 N-m)

Connection Height

31.5" to 73.4" (800 mm to 1,864 mm)

Horizontal Travel*

144" (3,658 mm)

Vertical Adjustment

42" (1,067 mm)

Casing Ready

No

Torque Wrench Angle

60°

* NOV classifies total horizontal travel as the distance between points A and B. Point A is defined as the centerline of the jaw dies when the iron roughneck is fully retracted. Point B is defined as the centerline of the jaw dies when the iron roughneck is fully extended.



AR-3200

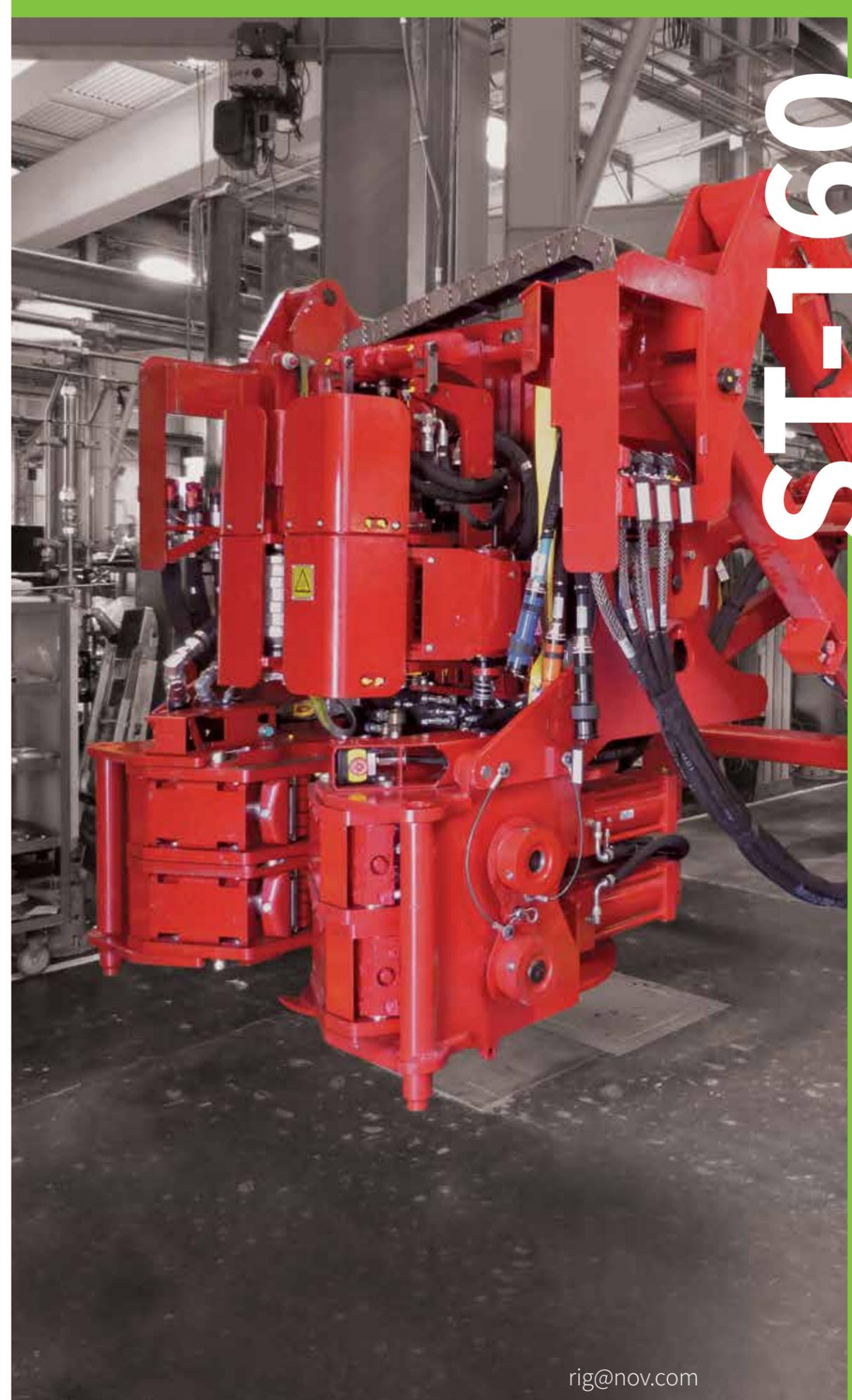
“ We love the AR-3200; it’s a really good machine ”
- Drilling Contractor

A track-mounted, industry-recognized model that has stood the test of time

AR-3200 Installation/ Technical Specifications

Controls
Local manual
Hard-wired
Integrated into NOV driller’s controls
Mount
Track mounted
Shutoff Valve
Manual
Pedestal Rotation
N/A
Hydraulic Requirements (Min)
45 GPM @ 2,000 psi (170 LPM @ 135 bar)
Hydraulic Requirements (Max)
45 GPM @ 2,500 psi (170 LPM @ 172 bar)
Assembly Weight
12,100 lbs (5,490 kg)
Tool Joint Connection (OD) Range
3½” to 9¾”
Spin Speed
100 RPM (nominal on 5” DP)
Spin Torque
2,000 ft-lbs (2,711 N-m)
Maximum Makeup Torque
100,000 ft-lb (135,582 N-m)
Maximum Breakout Torque
120,000 ft-lb (162,698 N-m)
Connection Height
31” to 64” (787 mm to 1,625 mm)
Horizontal Travel*
Variable - track
Vertical Adjustment
33” (838 mm)
Casing Ready
Yes
Torque Wrench Angle
30°
Optional Additions
Mud bucket, doper, bit breaker, casing module, rotation table

* NOV classifies total horizontal travel as the distance between points A and B. Point A is defined as the centerline of the jaw dies when the iron roughneck is fully retracted. Point B is defined as the centerline of the jaw dies when the iron roughneck is fully extended.



ST-160

“ We prefer the ST-160 due to its reliability and simplicity ”
- Drilling Contractor

Our high torque, floor socket mounted model with full automatic controls combines power with versatility.

ST-160 Installation/ Technical Specifications

Controls
Wireless Remote
Integrated into NOV driller’s controls
Mount
Pedestal with floor mounted socket
Shutoff Valve
Manual
Pedestal Rotation
±90°
Hydraulic Requirements (Min)
55 GPM @ 3,000 psi (208 LPM @ 207 bar)
Hydraulic Requirements (Max)
65 GPM @ 3,000 psi (246 LPM @ 207 bar)
Assembly Weight
26,600 lbs (12,065 kg) (installed weight)
Tool Joint Connection (OD) Range
3¾” to 10”
Spin Speed
80 RPM (nominal on 5” DP)
Spin Torque
3,467 ft-lbs (4,700 N-m)
Maximum Makeup Torque
140,000 ft-lb (189,815 N-m)
Maximum Breakout Torque
160,000 ft-lb (216,931 N-m)
Connection Height
31.88” to 73.88” (810 mm to 1,876 mm)
Horizontal Travel*
162” (4,115 mm)
Vertical Adjustment
42” (1,067 mm)
Casing Ready
Yes
Torque Wrench Angle
60°

* NOV classifies total horizontal travel as the distance between points A and B. Point A is defined as the centerline of the jaw dies when the iron roughneck is fully retracted. Point B is defined as the centerline of the jaw dies when the iron roughneck is fully extended.



MPT-270

The integration of the HydraTong multi-purpose tong concept with a modular design for optimized performance

MPT-270 Installation / Technical Specifications

Controls	Wireless remote Integrated into NOV driller's controls
Mount	Track mounted
Shutoff Valve	Manual
Pedestal Rotation	36° with additional rotation plate
Hydraulic Requirements (Min)	111 GPM @ 3,000 psi (420 LPM @ 207 bar)
Hydraulic Requirements (Max)	115 GPM @ 3,050 psi (435 LPM @ 210 bar)
Assembly Weight	14,990 lbs (6,799 kg)
Tool Joint Connection (OD) Range	3½" to 10" (2¾" kit optional)
Spin Speed	100 RPM (nominal on 5" DP)
Spin Torque	3,467 ft-lbs (4,700 N-m)
Maximum Makeup Torque	200,000 ft-lb (up to 270,000 N-m)
Maximum Breakout Torque	200,000 ft-lb (up to 270,000 N-m)
Connection Height	26.5" to 73.5" (673 mm to 1,866 mm)
Horizontal Travel*	Variable track
Vertical Adjustment	47" (1,193 mm)
Casing Ready	Yes
Torque Wrench Angle	60°
Optional Additions	Mud bucket, doper, bit breaker, stabbing guide, casing module, rotation table

* NOV classifies total horizontal travel as the distance between points A and B. Point A is defined as the centerline of the jaw dies when the iron roughneck is fully retracted. Point B is defined as the centerline of the jaw dies when the iron roughneck is fully extended.



ARN-270

A trackless, high torque, modular HydraTong design for ideal functionality

ARN-270 Installation / Technical Specifications

Controls	Wireless remote Integrated into NOV driller's controls
Mount	Trackless, optional with additional rails
Shutoff Valve	Manual
Pedestal Rotation	Slew base rotation 65°
Hydraulic Requirements (Min)	111 GPM @ 3,000 psi (420 LPM @ 207 bar)
Hydraulic Requirements (Max)	115 GPM @ 3,050 psi (435 LPM @ 210 bar)
Assembly Weight	18,500 lbs (8,391 kg)
Tool Joint Connection (OD) Range	3½" to 10" (2¾" kit optional)
Spin Speed	100 RPM (nominal on 5" DP)
Spin Torque	3,467 ft-lbs (4,700 N-m)
Maximum Makeup Torque	200,000 ft-lb (up to 270,000 N-m)
Maximum Breakout Torque	200,000 ft-lb (up to 270,000 N-m)
Connection Height	41" to 91" (1,041 mm to 2,311 mm)
Horizontal Travel*	122" (3,099 mm) (trackless, variable by track)
Vertical Adjustment	50" (1,270 mm)
Casing Ready	Yes
Torque Wrench Angle	60°
Optional Additions	Mud bucket, doper, bit breaker, stabbing guide, casing module, track base

* NOV classifies total horizontal travel as the distance between points A and B. Point A is defined as the centerline of the jaw dies when the iron roughneck is fully retracted. Point B is defined as the centerline of the jaw dies when the iron roughneck is fully extended.

Rig Aftermarket Services

Field Service

Our growing staff of proven field service personnel is available 24/7 to support all NOV products. Knowledgeable field service technicians can quickly deploy to your operating site to resolve your equipment issues, whether structural, mechanical, electrical or software-related. Our FAST solution service trucks are stocked with an extensive list of NOV's top drive, iron roughneck, BOP, EDS, and Amphion™ replacement parts, filters, consumables and tools to get your NOV equipment running at OEM specifications. Expert on-call technicians are ready to provide FAST, on-site service and repair.

Training

Field technicians train extensively on NOV Rig Systems product lines including competency training and evaluations through our NOV technical colleges and training facilities to ensure the highest quality service and support for your equipment repairs on-site.



Repair

Our highly skilled shop technicians overhaul, repair, rebuild, and recertify a wide range of NOV equipment to the NOV Quality Assurance and OEM specifications—using only OEM parts. Our worldwide network of repair centers provides unrivaled quality customer service, on-time delivery and unmatched technical integrity. In addition, equipment exchange programs are available at various facilities. Through the Used Equipment Refurbishment Program, we provide viable, short turnaround solutions to immediate capital equipment needs, complete with data books and certificates of conformance as required.

Technical Support

One phone call to one of our technical support centers initiates a technical support team of multi-skilled backgrounds to troubleshoot and resolve your worldwide equipment needs, 24/7/365. Our team of highly skilled and experienced technical support members work together with our global pool of qualified field service technicians and subject matter experts to keep your rigs operating. The technical support team utilizes our web-based application “Tracker” to record, manage, and resolve issues.

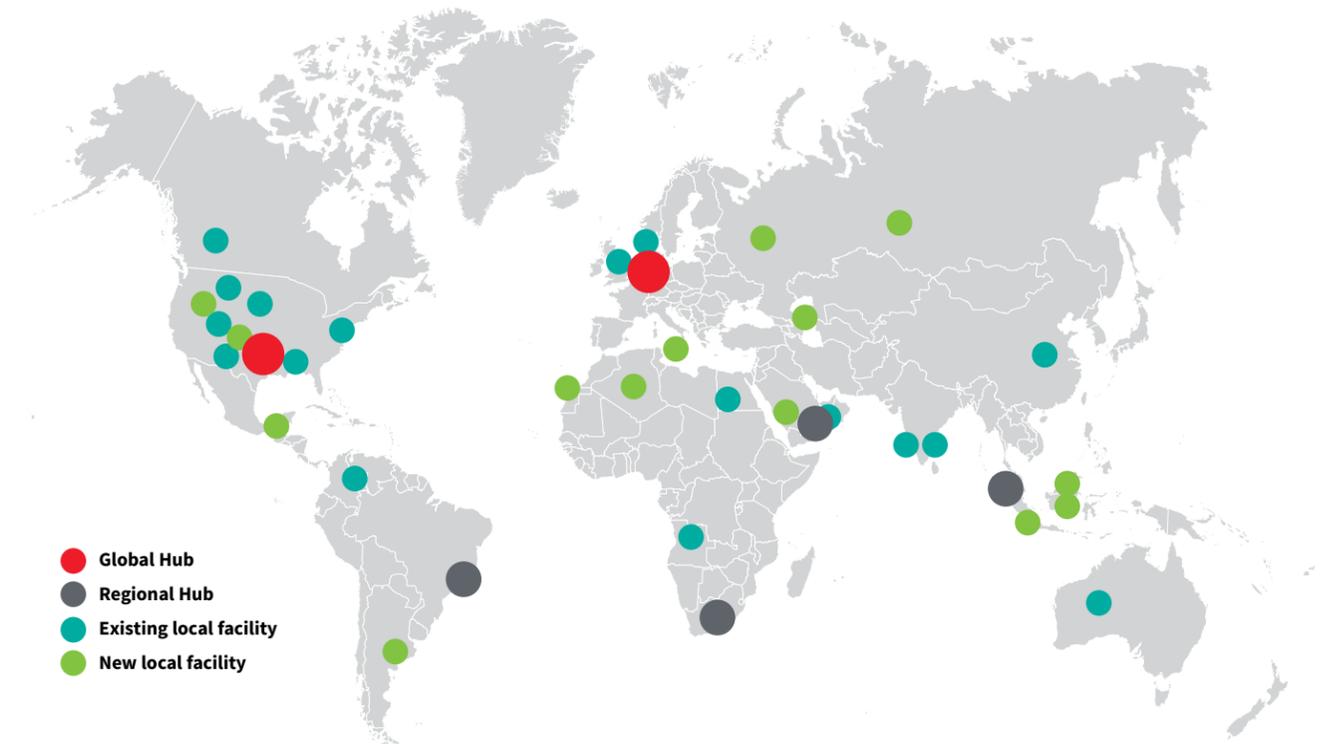
Field Engineering

Our field engineering groups offer the unique service of providing one-off, rig-specific equipment designs, modifications and solutions to your rig-specific issues.

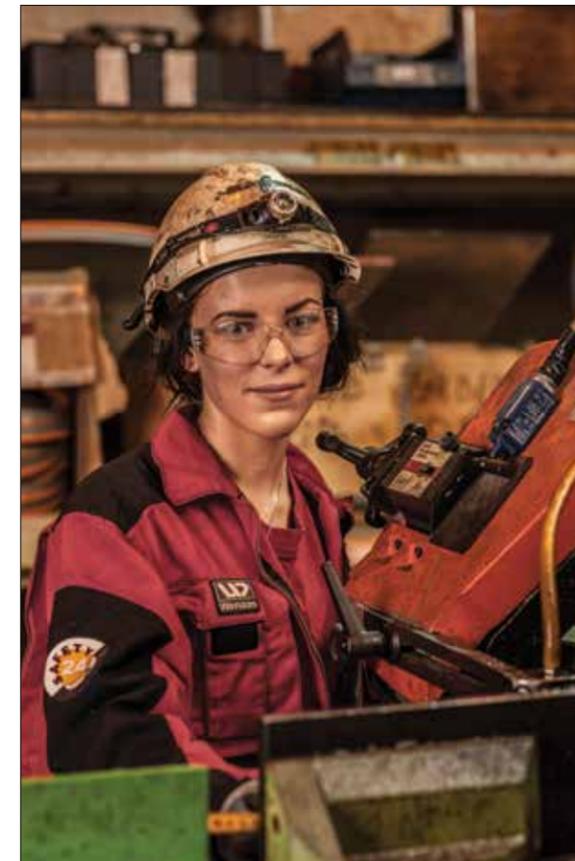
For 24/7 Support Services: [+1 281 569 3050](tel:+12815693050)



NOV is with you every step of the way



Comprehensive Aftermarket Products and Services



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