DOWNHOLE
SERVICE EQUIPMENT

Commissioning, Operation and Maintenance

Model 1689/8025 TorqueMaster with 8018 Control Console

REFERENCE	REFERENCE DESCRIPTION

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NOV CONNECTIONTOOLS

DOWNHOLE SERVICE EQUIPMENT

REVISION HISTORY

Revision	Date	Reason for Issue	Prepared	Checked	Approved
A to C		No Revision History Extant			
D	14 Jan 2009	New Manual Format	DN	MB	KJM
E	25 Jul 2010	Correction of Errors in Equipment Specifications	DN	MB	KJM
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CHANGE DESCRIPTION

Revision	Change Description
A to C	No Revision History Extant
D	New Manual Format
E	Correction of Errors in Equipment Specifications
F	Revision of Introduction, correction of headstock tool diameters; Revision of Section 2.2.2, clarification of anchoring procedures
	Revision of Section 3.1, addition of warnings concerning excessive forces; Revision of Section 4.3, addition of new maintenance procedure
	Revision of Section 4.5, addition of new maintenance procedure
G	Revision of Specifications, addition of 20 ft bed specifications, revision of electrical specifications, addition of exteneded tong die specifications
	Revision of Specifications, addition of reference to NOV Document SD055
	Revision of Section 4.1, addition of SD055 reference; Section 4.2 addition of note regarding damaged parts
	Revision of Section 4.3, revision of tailstock wheel maintenance; Section 4.5.1, complete revision of chain tension setting procedure
	Revision of Section 4.7.2, correction of filter part number; Revision of Section 5.8, change of "low torque" to "high torque" and "high torque" to "low torque" in 3rd bullet point
	Addition of schematics and parts list for 8025 TorqueMaster

A Note on This Document

This electronic document has been hyper-linked to allow quick reference of its contents. Clicking on any of the chapter headers in the table of contents will link the user directly to that part of the document. Furthermore, clicking on either the page header or the page number at the bottom will return the user to the table of contents. Text in blue denotes internal links to relevant information. Corporate logos have been linked to their respective web-sites. A series of PDF bookmarks has also been added. To use them, activate the bookmarks pane in your Acrobat Reader.

To aid in quickly identifying where revisions have been made, a revision marker:  , will be placed in the margin next to the section that has been revised. The letter or number within the triangle will represent in which revision the change has been made.

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EQUIPMENT INFORMATION & SPECIFICATIONS

General Specifications	U.S. Imperial	Metric
Height:		
1689 Headstock	71 Inches	180 cm
8025 Headstock	75 Inches	190 cm
Width:		
1689 Headstock	54.5 Inches	138 cm
8025 Headstock	62.5 Inches	159 cm
Length (Customer Specified):	12 Feet	3.66 m
	14 Feet	4.27 m
	16 Feet	4.88 m
	18 Feet	5.49 m
	20 Feet	6.10 m
Weight (approx.):		
1689 (16' bed):	13, 206 lb	5990 kg
8025 (16' bed):	13, 353 lb	6057 kg
Console:	1, 500 lb	680 kg

Electric Motor:					
Work:		20 HP			14.9 kW
Power Supply[1]	Voltage	Frequency	Full Load	Breaker	Fuse[2]
	208 V	60 Hz	53 A	125 A	90 A
	220 V	50 Hz	48 A	110 A	80 A
	230 V	60 Hz	46 A	110 A	80 A
	240 V	60 Hz	48 A	110 A	80 A
	380 V	50 Hz	28 A	70 A	45 A
	415 V	50 Hz	26 A	60 A	45 A
	440 V	50 Hz	24 A	60 A	40 A
	460 V	60 Hz	23 A	60 A	40 A
	480 V	60 Hz	24 A	60 A	40 A
	550 V	60 Hz	19 A	60 A	40 A
	575 V	60 Hz	18 A	60 A	40 A
	600 V	60 Hz	18 A	60 A	40 A
	690 V	60 Hz	16 A	60 A	35 A

[1]Customer to specify at time of order

[2]Time Delay Fuses Only

Hydraulic Oil – Standard Service	U.S. Imperial	Metric
Tank Capacity:	47 gal.	178 L
for hydraulic oil specifications see NOV Document SD055		
Hydraulic Oil – Cold Weather Service	47 gal.	178 L
Tank Capacity:	47 gal.	178 L
for hydraulic oil specifications see NOV Document SD055		
Filter:	Particle Filter 6 Microns Absolute	
replace when indicated by filter or yearly		

Chucking Capacity		
Tailstock:	3 ½ to 14 Inch Ø	8.89 to 35.56 cm Ø
Tailstock extended tong dies:	2 ½ to 13 inch Ø	7 to 33.7 cm Ø
Headstock 1689:	3 ½ to 14 Inch Ø	8.89 to 35.56 cm Ø
Headstock extended tong dies:	2 ½ to 17 inch Ø	7 to 43.81 cm Ø
Headstock 8025:	3 ½ to 18 Inch Ø	8.89 to 45.72 cm Ø

Torquing Capacity		
Make Up:	5, 000 to 150, 000 lb·ft	6779.1 to 203 372.8 N·m
Break Out (max):	190, 000 lb·ft	257 605.5 N·m

Airborne Noise Emission Rating	
Equivalent Continuous A-weighted sound pressure at workstation:	80 dB (A)
Peak C-weighted instantaneous sound pressure at workstation:	82 dB (A)
NOTE: HEARING PROTECTION IS RECOMMENDED	

INTRODUCTION

The TorqueMaster is a hydraulically driven breakout machine with the ability to service tools ranging in size from 3½ inch to 14 inch (18 inch headstock on model 8025) in diameter, with a make-up torque output of 5,000 to 150,000 lb·ft. With the use of tong die extensions, the size range can be adjusted from 2 ½ inch to 13 inch in diameter. It has been engineered and built with safety, ease of operation and longevity in mind.

To take full advantage of these features please familiarize yourself with the contents of this manual. It has been written to provide you with guidelines on how to get the most out of your TorqueMaster and related accessories. You will find sections on setting up or moving the equipment, safe operation of the unit and how to maintain your machine for maximum life.

Please feel free to contact us with any questions, comments or suggestions regarding this equipment.

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SECTION 01

GENERAL DESCRIPTION & SAFETY INSTRUCTIONS

1.1 General Description

The Model 1689/8025 TorqueMaster is a rugged, self-contained machine designed to accurately make-up or breakout the rotary-shouldered connections on tubular components such as oil and gas well drilling tools and similar equipment. The application of torque about the axial centre-line of the work piece eliminates any bending moment about the threaded connection to assure accurate make up values and prevent damage to the threads.

The Model 1689/8025 TorqueMaster comes with a power traverse that gives the machine operator remote control over axial movement of the tailstock assembly and offers increased safety and productivity by minimizing physical exertion and allowing the operator to adjust tailstock position from the console. With the tailstock remotely controlled, its position can be quickly and accurately adjusted to work on a connection or make room for other operations. To further ensure the safety of personnel, the power traverse is designed to move at a controlled rate of speed and movement halts quickly when the control lever is released.

The unit may be safely and efficiently operated by one person from the self-contained hydraulic control console and requires only an electrical power source for operation. The control console contains the hydraulic reservoir electric motor and controls, hydraulic pump, control valves and direct reading torque and pressure gauges.

1.2 Recommended Safety Guidelines

1.2.1 Work Apparel

The safety guidelines that follow are recommended by National Oilwell Varco and are in no way intended to supersede the specific health and safety regulations and guidelines of our clients' workplace. Workplace rules and regulations are the responsibility of the client.

To ensure employee safety, it is recommended that the following equipment be worn when using and working around the *TorqueMaster*:

- **Eye Protection (safety glasses)**

  To avoid risk of eye damage due to:

  - fracture/failure of tong dies under load
  - fracture/failure of tool under load
  - failure of hydraulic hose or component under pressure

- **Ear Protection (ear plugs)**

  To prevent hearing damage due to:

  - electric motor and hydraulic system noise
  - sudden and loud noises that may occur during the work process

- **Head Protection (hard-hat)**

  To reduce danger to:

  - overhead cranes and hooks
  - fracture/failure of tong dies under load
  - fracture/failure of tool under load

- **Hand Protection (leather gloves)**

  To avoid danger due to:

  - metal slivers on the tool or dies produced during the work process
  - chemicals used during the work process
  - failure of hydraulic hose or components under pressure

- **Foot Protection (steel-toed boots)**

  To prevent injury due to:

  - falling or rolling work pieces

1.3 Operating Safety

The Model 1689/8025 TorqueMaster was designed with safety in mind, but it has the potential to cause serious injury if not maintained and used properly. Safety around this unit is ultimately the operator's responsibility and involves more than just operating the unit. To minimize any danger it is recommended that the following safety measures be taken:

- Keep the TorqueMaster, work area, hand tools and equipment clean and free of drilling mud, pipe dope, oil and debris. Clean up spills as soon as they occur, avoid clutter and return tools to their assigned storage places when not in use. Keep the hoses in a neat & tidy bundle. These precautions will help prevent the serious injuries that can occur from slipping or tripping.
- Never stand directly under any tools being moved to and hoisted into the TorqueMaster. Always think ahead about what will happen to your load if your lifting straps fail. Never put yourself in the position of getting crushed underneath or between the load. Never put your fingers or arms between the tool and the machine when placing the tool in the TorqueMaster.
- Keep clear of all moving parts and pinch points while the TorqueMaster is in operation. A safety zone of three feet should be maintained around the TorqueMaster while in operation. Personnel should stay out of this zone anytime the unit is running. The parts may seem to move slowly but they generate enough force to cause severe injury.
- Do not stand near hydraulic hoses and cylinders while they are under load. Do not inspect any leaks under pressure without wearing suitable safety equipment. The stream of fluid from a small pinhole leak can easily penetrate the skin and will cause severe blood poisoning. The temperature of hydraulic fluid will increase during the normal course of operation. Be aware that hydraulic hoses and fittings may become hot. Be sure that hydraulic fluid temperature does not exceed maximum set by the fluid supplier.
- Do not clamp on a work piece with less than the full length of tong die. Avoid clamping on any hardened surfaces. Catastrophic failure of the tong die can result from these practices.
- Service and inspect the TorqueMaster as per Section 4 and Section 5 of this manual. Replace any cracked, worn or broken parts immediately. This will reduce your maintenance costs as well as ensuring a safer unit. If one seemingly unimportant part fails it can place additional stress on another part and cause it to fail. This cascade effect can lead to a critical failure of the TorqueMaster or the tool being serviced. To avoid accidents in the field from under or over torquing, the torque gauges must be checked for accuracy on a regular basis.

SECTION 02

COMMISSIONING

2.1 Safety Note

Care and caution must be used when unloading and unpacking the new equipment, or when moving it to a new location. Only approved and unworn chains, slings and lifting devices can be used for lifting the equipment whether it is crated or not. The equipment must be lifted using the proper lifting lugs and lifting points only (see Figure 1 for headstock lug locations and Figure 3 for lug locations on the bed). Any loose components must be secured in place before lifting, the tailstock must be strapped to the headstock (the tailstock traverse motor can free-wheel, so the tailstock can travel and unbalance the bed). Secure all hoses in a manner that will not allow them to fall under the machine.

Fig. 1 Headstock Lifting Lug Locations

Fig. 2 Example of Unit being lifted

Lift so that the tailstock end of the bed lifts first. All personnel must stay out from under or around the equipment while it is suspended and being moved. If the equipment is packed in wooden crates, safety eyewear and gloves must be worn while handling the crates. Any strapping or crating should be disposed of from the work area immediately to avoid creating a safety hazard.

2.2 Installation Procedures

2.2.1 Equipment Inspection

Inspect the equipment carefully for shipping damage or missing parts. Pay particular attention to all hoses and tubing, look for any spots that show signs of rubbing, crimping or impact damage. Record any damage and contact us immediately as the damage may affect the operation or safety of the machine.

2.2.2 Positioning the Unit

Position the breakout unit on a flat and level floor, leaving sufficient clearance on both ends to allow the insertion and removal of the longest tools expected to be serviced. If necessary, shims may be used under the support legs to level the bed. When using shims make sure they are larger in area than the legs they are supporting. It is not necessary to anchor the TorqueMaster bed to the floor, but if the extension beams are used they must be fastened to the bed, shimmed level and fastened to the floor. It is recommended that the Headstock be bolted to the floor to keep it from shifting. If the machine is equipped with a Push/Pull Cylinder, ensure that its beam is bolted to the floor to prevent the beam from bending when the cylinder is used.

It is not recommended to install any anchors prior to receiving the equipment; the TorqueMaster and Push/Pull beams should be used as a template for anchor placement. Legs can be bolted down, or if mounted on a concrete floor Hilti anchored (HSL M24/30). A minimum concrete thickness of 10 inches and strength of 27.5 MPa is required. If the unit has a Push/Pull attachment, the Push/Pull beam and the headstock/tailstock (depending on where the Push/Pull is located) must be anchored.

Place the control console in a position that will allow a clear view of, and convenient access to, the breakout unit. Place all accessories in their proper positions making sure to tighten all lock bolts and retaining plates.

WHEN MOVING AND LOCATING ACCESSORIES USE EXTRA CARE TO ENSURE FINGERS, HANDS AND OTHER BODY PARTS ARE NOT PLACED IN A LOCATION WHERE A SUDDEN SHIFT IN THE EQUIPMENT COULD CRUSH THEM.

Run all accessory hoses through any hose retainers that may be on the beams and through the rectangular hose conduit in the bed (if equipped, see Figure 3).

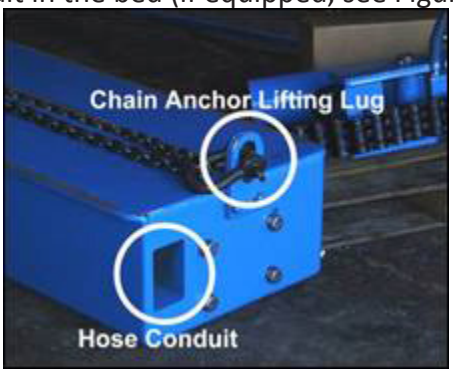


Fig. 3

2.2.3 Connecting the Hoses

Attach the hydraulic hoses that connect the control console to the breakout unit. The hoses will be numbered and should be connected to the matching numbered console fittings (number tags are on the tubing inside the console). Start by attaching the bottom row of lines first, working from the centre outwards. This allows for all connections to be tightened properly.

If you are moving an existing unit make sure to check for these tags before disconnecting the hoses. If the tags are not present, mark all hoses and fittings in a manner that will allow proper reconnection upon assembly. It is recommended that a brightly coloured cover be made to go over the hoses leading from the console to the machine. This will protect the hoses as well as reduce any danger of tripping over the hoses. Wipe off all connections completely to remove any hydraulic fluid.

2.2.4 Hydraulic Fluid

Check hydraulic reservoir for adequate oil level. (Filler plug and sight gauge are located inside the console - see Figure 16, Page 21). Proper fluid level should be ¾ full in the sight glass to permit fluid discharge. Ensure that the clamp cylinders and all accessories are in the fully retracted position.

2.2.5 Electrical Requirements

Have a qualified and competent electrician check that the main power supply matches the nameplate rating on the side of the console. Have him ensure that the power running to the machine meets these minimum requirements or the local electrical codes whichever is greater.

NOTE: IF THE CABLE RUNNING FROM THE ELECTRICAL SERVICE TO THE MACHINE IS OVER 30 METERS OR 100 FEET YOU MUST GO TO THE NEXT LARGER SIZE WIRE, E.G.: A #8 APPLICATION OVER A HUNDRED FEET WOULD REQUIRE USING A #6 WIRE. This is very important, as improper electrical service will decrease the life of the electrical components, cause malfunctions and can create a fire hazard. ANY DAMAGE CAUSED BY IMPROPER ELECTRICAL SERVICE WILL NOT BE COVERED BY WARRANTY.

2.2.6 Motor Rotation

Check motor rotation by jogging the start/stop switch quickly. Proper rotation is clearly marked on the "Motor Rotation Warning Tag" and on the motor, bell housing or pump.

If rotation is incorrect, the electrician must switch any two of the three phase wires at the motor starter box. Running the hydraulic pump (longer than momentarily) with the incorrect rotation will result in severe damage to the pump. ANY DAMAGE OCCURRING WILL NOT BE COVERED BY WARRANTY.

2.3 Start Up Procedures for 8018 Console

Fig 4. Console Front View Fig. 5 Console Rear View

1. Check Reservoir for proper fluid level, top up if required. Proper fluid level should be ¾ full in the sight glass to permit fluid discharge. If the console is connected to the breakout unit, ensure the clamp cylinders are fully retracted.
2. Start the Motor Hold the torque lever in the "make" or "break" position and adjust the torque adjustment control until the system pressure reads 1,000 PSI. Cycle all operations through their full stroke several times to purge air from the system. Adjust the system pressure to 3000 PSI, cycle all operations several more times, and check for leaks.
3. For the Power Traverse carefully shift the power traverse control lever to "right" position (tailstock travelling away from headstock) and run the tailstock fully to the end of the bed. Shift the control lever to the "left" position. Cycle the tailstock travel several times until the speed stabilizes to ensure that all air is worked out of the system. NOTE: ENSURE THAT ALL PERSONNEL ARE CLEAR OF THE TAILSTOCK WHILE AIR IS PURGED FROM THE SYSTEM. THE TAILSTOCK WILL LEAP QUICKLY AND UNCONTROLLABLY IF THE VALVE LEVER IS NOT "FEATHERED" WHEN THE SYSTEM IS OPERATED FOR THE FIRST TIME AFTER INSTALLATION.
4. Turn the Unit Off and check all hoses, tubing, connections, cylinders and components on the equipment for leaks. Tighten all connections as required.

SECTION 03

OPERATING INSTRUCTIONS

Fig. 6 8018 Operating Console with independent clamp

Fig. 6-2 8018 Operating Console without independent clamp

3.1 Make/Break Functions

The start/stop switch controls the power to the electric motor. The torque adjustment knob controls the hydraulic pressure supplied to clamp, torque, push/pull and jar tester. Torque adjustment setting is indicated on the two torque gauges (see Figure 7). The low torque gauge reads to 40,000 lb·ft "make" 50,000 lb·ft "break". The high torque gauge reads from 25,000 lb·ft "make/break" to maximum capacity of the unit. The two gauges will not always display the same values through the range in which they overlap; this is normal.

NOTE: USE "BREAK" SCALES WHEN MAKING UP LEFT HAND THREADS.

Fig. 7 Torque Guages

Fig. 8 8018 Control Levers

1. Shift the control levers into their neutral positions. Check to make sure the torque adjustment valve is backed out all the way. Ensure all personnel are out of the three-foot safety zone around the unit.
2. Depress the motor start switch to activate the power unit.
3. Ensure the clamp cylinders are in their fully retracted position. Shift the "torque" lever to the "break" direction to prepare for joint makeup or to the "make" direction to prepare for joint breakout. Hold the "torque" lever until the tailstock rotates to limit, increase the torque adjustment valve until you see a torque value of approximately 20% below your desired target on the appropriate scale and then release the "torque" lever.

4. Position the work piece just below the centre-line of the headstock, shift the headstock control lever to the "clamp" position. Headstock control lever must be left in "clamp" position while making or breaking connections.
5. Position tailstock as required over the work piece by moving the tailstock power traverse lever in the required direction.
6. Shift the tailstock control lever to "clamp" position.
7. Using torque control lever apply "make-up" or "break-out" torque, hold the lever shifted until the torque cylinders have come within 1 inch of full travel and repeat as necessary until the tool joint stops turning. Rotate chuck so that full travel can be achieved for final torque setting. Re-clamp tailstock, shift torque lever and increase torque adjustment valve until final torque is reached. Make sure that torque cylinder stroke is not exceeded before final torque is reached.

MAKE UP NOTE: WHEN MAKING UP THE CONNECTIONS THE TAILSTOCK WILL STOP ROTATING WHEN SELECTED TORQUE HAS BEEN APPLIED TO THE JOINT OR WHEN THE TORQUE CYLINDERS HAVE REACHED THE END OF THEIR STROKE. TO ENSURE THAT CORRECT TORQUE HAS BEEN APPLIED, MAKE CERTAIN THAT TAILSTOCK ROTATION STOPS (POWERS OUT) BEFORE THE TORQUE CYLINDERS HAVE REACHED THE END OF THEIR STROKE.

BREAK OUT NOTE: AFTER BREAKING THE CONNECTION, CONTINUE ROTATING THE TAILSTOCK UNTIL THE GAUGES INDICATE LITTLE RESISTANCE TO ROTATION. THIS ASSURES THE OPERATOR THAT THE CONNECTION MAY BE EASILY DISASSEMBLED WHEN REMOVED FROM THE "TORQUEMASTER".

AUXILIARY EQUIPMENT: FOR OPERATING PROCEDURES OF AUXILIARY (OPTIONAL) EQUIPMENT PLEASE SEE THE APPROPRIATE MANUAL INCLUDED WITH THE OPTIONAL EQUIPMENT.

IMPORTANT

- **DO NOT** GRIP THE WORKPIECE WITH LESS THAN THE FULL LENGTH OF TONG DIE.
- **DO NOT** GRIP ON HARD SURFACED AREAS.
- **DO NOT** GRIP ON "BENT" ASSEMBLIES TO AVOID DAMAGE TO BREAKOUT MACHINE AND/ OR WORKPIECE.
- **DO NOT** GRIP OVER THE CONNECTION THREADS (BOX OR PIN).
- ALWAYS USE ROLLING OR STEADY REST JACKS TO SUPPORT THE TOOLS IN THE TORQUEMASTER. CANTILEVERED OR UNSUPPORTED TOOLS IN EITHER THE HEADSTOCK OR TAILSTOCK WILL CAUSE PRESSURE INTENSIFICATION IN THE CLAMP CYLINDERS. THIS PRESSURE CAN LEAD TO REDUCED CYLINDER LIFE.
- WHEN USING THE INDEPENDENT CLAMP FEATURE DO NOT USE EXCESSIVE CLAMP PRESSURE OR LEAVE THE VALVE IN A FULLY CLAMPED POSITION. THIS MAY ALSO LEAD TO REDUCED CYLINDER LIFE.
- AVOID EXCESSIVE SHOCK FORCES TO A TOOL WHILE CLAMPED. THE FORCES WILL TRANSMIT TO THE LOAD THROUGH THE CLAMP CYLINDERS AND CAUSE DAMAGE.

SECTION 04

MAINTENANCE INSTRUCTIONS

4.1 General

The TorqueMaster must be maintained and serviced on a regular basis to ensure a long, trouble free life. Failure to do this can result in unsafe operating conditions and lead to a premature breakdown of parts. For recommended hydraulic fluid and lubrication refer to NOV Document SD055

4.2 Daily

- Wash machine down to remove spilled mud, oil and debris. Avoid directing water into the cylinder end caps on the units' upper cylinders (see Figure 9).

Fig. 9 Typical cylinder end-cap locations

- With clamp cylinders fully retracted, check hydraulic reservoir oil level on sight glass in rear or side of console. Fill as required.
- Check hoses for cracks, splits or unusual wear.
- Check around control console and breakout unit for leaks.
- Clean tong dies with a wire brush and replace as necessary.
- Ensure torque gauges rest at "zero" before start up.
- Check torque gauge calibration as described in Section 5.8.
- Check for any cracked, worn or broken parts. If found, replace immediately.

4.3 Weekly

In addition to the daily maintenance:

- Inspect the welds on the T-slot and spinner mount brackets for signs of wear or cracking
- Grease the tailstock chuck and torque cylinder grease fittings (10 in total, see Figure 10).
- Grease the tailstock chuck until excess grease begins to appear between the chuck retainer ring and the tailstock frame (at the opposite end from the retaining ring). Use a flashlight to assist in checking this area.

Fig. 10 Typical locations of grease fittings

NOTE: A LACK OF GREASE IN THE TAILSTOCK BEARING CAUSES EXCESSIVE WEAR AND BINDING ON THE TAILSTOCK CHUCK BEARING TUBE. THIS BINDING WILL HAVE AN ADVERSE EFFECT ON THE MACHINE'S ACCURACY. With no tool in the chuck it should take approximately 100 PSI to free-wheel or rotate the tailstock. If it requires pressure significantly higher than 100 PSI, ensure that the machine is greased as per instructions. If pressures remain high, contact the manufacturer, National Oilwell Varco Downhole Tools.

- Grease the idler sprocket bearings, 4 in total (see Figure 12).

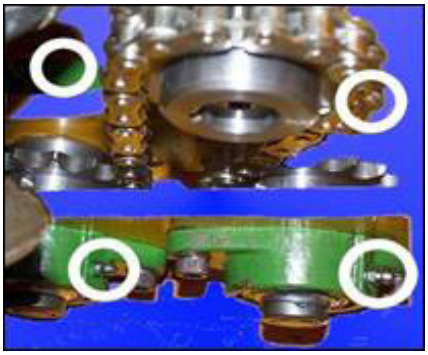


Fig. 12 Traverse Drive Sprocket/Idler Bearings
(top two are hidden in photo)

- Grease the 8 tailstock wheels:
  - Ensure no work piece is in the tailstock
  - Remove axle plug
  - Install extended grease fitting in axle
  - Add recommended grease (NOV Document SD055)
  - Remove extended grease fitting
  - Re-install axle plug
  - Grease 4 guide wheels

4.4 Monthly

In addition to the weekly maintenance:

- Check return oil filter element after the first month as described in Section 4.7.1. Change if necessary as per instructions in Section 4.7.2.
- Inspect the traverse drive sprocket for wear and replace before teeth become "sharp".
- Check the bolts on the chuck retainer ring, the torque cylinder pins, cylinder end caps and the top of the leveling jacks and tighten as required (see Figures 13 and 14).
- Check and adjust the chain tension as per instruction in Section 4.5.1.

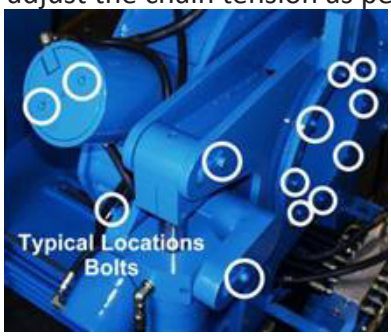


Fig. 13 Typical bolt locations


Fig. 14 Jack bolt

4.5 Semi-Annual

In addition to the monthly maintenance:

- The return filter housing is equipped with a gauge to indicate the filter condition. To check the filter, the hydraulic oil must be at operating temperature. Fully clamp either the headstock or the tailstock. Then shift the lever to un-clamp and while the cylinders are moving, look at the gauge on the filter housing. If the needle is in the red area, the filter element should be replaced.
- Replace the return oil filter element as described in the Section 4.7.2 that is relevant to your console.
- Inspect all flexible lines inside the console for wear at any point that the rubber covering contacts any components.
- Inspect traverse chain and replace if stretched.

F
- Inspect the welds on the T-slot and spinner mount using ultraviolet dye penetrant or similar method to check for cracks.

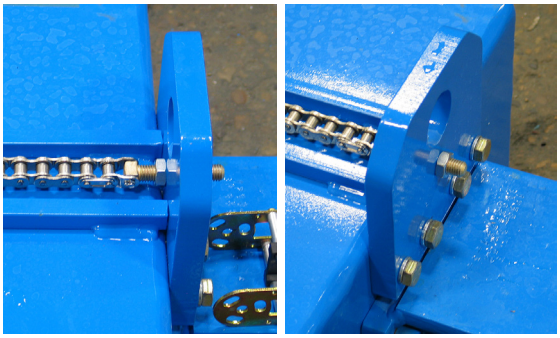
G
4.5.1 Setting Chain Tension

- Move the tailstock against the headstock and return power traverse lever to the neutral position.
- Turn off power supply at console.
- Measure the distance from the front plate of the flow divider to the end of the bed.
- Mark the mid point between the two.

- Using a spring scale, pull the chain upward with approximately 30 pounds of force.
- Measure the distance between the bottom of the chain to the top of the bed.
- Check the distance measured against the chart below and adjust chain length to match.

Bed Length (feet)	Bed to Chain Height (inches ± ¼ in.)
12	2 ⅛
14	2 5/16
16	2 ½
18	2 11/16
20	2 ⅞
24	3 1/16
26	3 5/16
30	3 9/16
35	3 ⅞

- If the chain tension needs only a small adjustment: use the chain anchor bolt located at the headstock end of the TorqueMaster bed (*see photos below*). To tighten the chain, loosen the nut on the tailstock side of the anchor plate and tighten the nut on opposite side of the plate. To loosen the chain, reverse the above procedure. Once the desired tension is reached, tighten the loosened nut until wrench tight.



Chain Anchor Bolt

- If the chain requires large adjustment, links may need to be removed from the chain:
- Disassemble the master link/half link from the chain anchor bolt.
- Remove one link from the chain (more if necessary).
- Extend the chain anchor so that when the chain is pulled taut by hand and the connection of the master half link is still possible.
- Re-tension the chain with the chain anchor bolt as above.
- If the chain is still loose additional links may need to be removed.
- Once the chain tension is correctly set, tighten nut on the tailstock side of the anchor plate.

4.6 Annual

In addition to the semi-annual maintenance:

- Drain and clean hydraulic reservoir.
- Remove and clean suction strainer.

Fig. 15 Intake Suction Strainer

- Refill reservoir with new recommended oil (see Section 5.1 Hydraulic Reservoir Filling Procedure).
- Check that all breakout machine functions work through the complete torque range, from 5,000 lb·ft to maximum.
- Check torque gauges for accuracy (see Section 5.8 Gauge Calibration Check).
- Inspect clamp cylinders for twist, repair as necessary, and also replace any sheared off cap screws in clamp head, torque to 170 lb·ft.

4.7 Oil Filter Check & Replacement Procedure

4.7.1 Oil Filter Condition Check Procedure

The return filter housing is equipped with a gauge to indicate the filter condition. To check the condition of the filter, enact the following steps:

- Start the console and bring the hydraulic oil to operating temperature.
- Fully clamp either the head- or tailstock.
- Shift the lever to un-clamp and while the cylinders are moving, look at the gauge on the filter housing. If the needle is in the red area, the oil filter should be replaced.

4.7.2 Return Oil Filter Replacement Procedure

G Model 8018, Filter Number: 20670205 Tools required: ½ inch combination wrench or socket.

- Loosen the four cap-screws retaining the filter cover, and turn them out about ¾ inch. While pushing down slightly on the cover, twist it clockwise to release it from the screws.
- Remove the spring and bypass valve from the top of the old filter element (Figure 17). Discard the element and install a new element in the filter housing.

- Replace bypass valve (spring up) and then the larger spring. Ensure the O-ring in the top of the housing is intact. Reinstall filter cover and tighten the four screws. Ensure the O-ring is not protruding.
- Start the pump and check for leaks.

Fig 16.Oil Filler Cap & Oil Level Guage

Fig. 17 Oil Filter Assembly

SECTION 05

HYDRAULIC MAINTENANCE INSTRUCTIONS

5.1 Hydraulic Reservoir Filling Procedure

When topping up the hydraulic oil reservoir in the console you must use the installed fill port (see Figure 18). This will ensure that the reservoir is filled with filtered hydraulic oil.

- Start unit and operate console until oil reaches operating temperature.
- Check return filter condition gauge (see Section 4.7.1). Replace the filter element if indicator is getting close to the yellow markings (see Section 4.7.2).
- Ensure clamp cylinders are fully retracted.
- Remove the cap on the fill port.
- Attach the hose assembly from a hand pump to the fill port (90° adapter). A #12 female JIC 37° swivel fitting is required on the end of the hose.
- Use the hand pump to fill the reservoir to the proper level.
- Disconnect hand pump filler hose.
- Replace cap on fill port.

When refilling the hydraulic reservoir in the console after a complete oil change you must use the supplied fill port (see Figure 18). This will ensure that the reservoir is filled with filtered hydraulic oil.

- Drain and clean the reservoir.
- Replace the return filter element (see Section 4.7.2).
- Remove the cap on fill port.
- Attach the hose assembly from a hand pump to the fill port (90° adapter). A #12 female J.I.C. 37° swivel fitting is required on the end of the hose.
- Use the hand pump to fill the reservoir to the proper level.
- Disconnect hand pump filler hose.
- Replace cap on fill port.
- Start unit and operate console until oil reaches operating temperature.
- Check for leaks.
- Check oil level and fill as required as per top up procedure.
- Check the return filter condition (see Section 4.7.1).

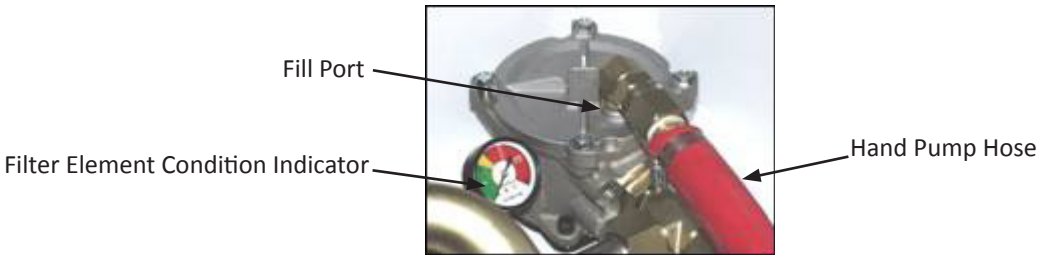


Fig 18. Fill Port detail

5.2 Hydraulic System Adjustment Procedure

The Model 1689/8025 TorqueMaster hydraulic system incorporates a number of pressure control and relief valves. These valves are correctly adjusted and set prior to shipment from our factory. The settings may be re-adjusted using the sequence as follows:

5.3 Flow Divider Protection Manifolds

Tools required: 9/16 inch combination wrench, 5/32 inch hex key wrench

Flow divider protection manifolds are located under the steel covers at the headstock and tailstock end of the main frame. The adjustment procedure for both the headstock and tailstock manifolds is identical. Each manifold contains two relief valves as shown in Figure 19.

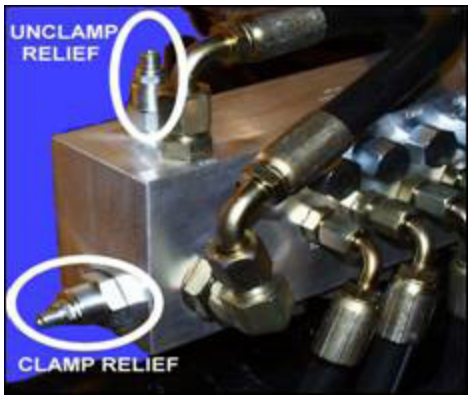


Fig. 19 Relief Valves

5.4 Headstock Manifold

5.4.1 Clamp Relief Valve

Loosen the relief valve lock nut. With the pump running, set the torque adjustment valve to its highest setting. Shift the headstock control lever to the “clamp” position. On the horizontally mounted clamp relief valve, turn the adjusting screw counterclockwise until the valve begins to bypass. Turn the screw clockwise until bypassing stops, plus one-quarter turn. Tighten the lock nut.

5.4.2 Un-clamp Relief Valve

With the torque adjustment valve turned to the highest setting, shift the headstock control lever in the "un-clamp" position. On the vertically mounted un-clamp relief valve loosen the lock nut on the cartridge adjustment, turn the adjusting screw as required to show 2500 PSI on the system pressure gauge. Tighten the lock nut.

5.4.3 Tailstock (Rotating Head) Manifold

Follow the same procedure as used for the headstock manifold adjustment except using tailstock "clamp / un-clamp" control lever.

5.5 Minimum Clamping Pressure

ON MODELS EQUIPPED WITH THE INDEPENDENT CLAMPING PRESSURE ADJUSTING OPTION:

The minimum initial pressure is adjusted by turning the clamping force knob mounted on the console control panel (see Figure 20). Start the pump. With the torque/force control knob backed out all the way counter clockwise, move the lever for either the tailstock or Headstock to the "clamp" position. Turn the clamping pressure knob clockwise until the system pressure gauge reads the desired pressure.

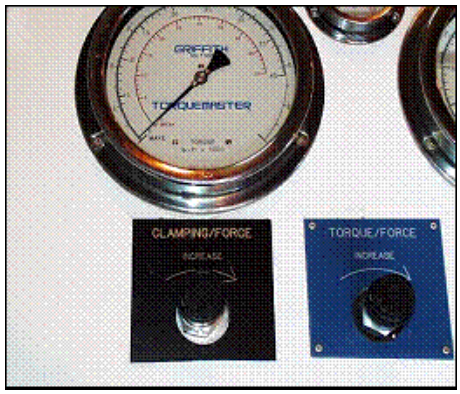


Fig. 20 Independent Clamping Force Option

ON 8018 MODELS WITHOUT THE INDEPENDENT CLAMPING PRESSURE ADJUSTMENT OPTION:

Tools required: 9/16 inch combination wrench, 5/32 inch hex key wrench

Although more difficult, this adjustment can be made on models without the Independent Clamping Pressure Adjustment option.

- Loosen the lock nuts on the two valves located on the back of the clamp control manifold block. Start the pump. With the torque control knob backed out all the way counter clock wise, move the headstock lever to the "clamp" position.
- Adjust the setscrew on the left valve (as viewed from rear of console) to obtain a reading of 500 PSI on the system pressure gauge. Return the headstock lever to the neutral position. Move the tailstock lever to the "clamp" position.
- Adjust the setscrew on the right valve to obtain a 500 PSI reading on the system pressure gauge. Return the lever to the neutral position and tighten both lock nuts (see Figure 21).

Fig. 21

5.6 Power Traverse

The power traverse valve on this console is preset at the factory for the maximum speed. However due to the design of the control valve, "feathering" the control lever to the power traverse can precisely control the velocity and acceleration of the tailstock.

5.7 Low Torque Gauge (Limit Setting)

Tools required: 9/16 inch combination wrench, 5/32 inch hex key wrench

When the torque adjustment is increased above the range of the low torque gauge, the needle on the low torque gauge should continue to travel beyond the graduations to approximately 900 PSI, at which point the needle should return to zero.

If the gauge does not function as described, the following adjustment should be made:

- Locate the low torque gauge protection valve on the low torque gauge line (see Figure 22). Loosen the lock nut and turn adjusting screw fully counter-clockwise.

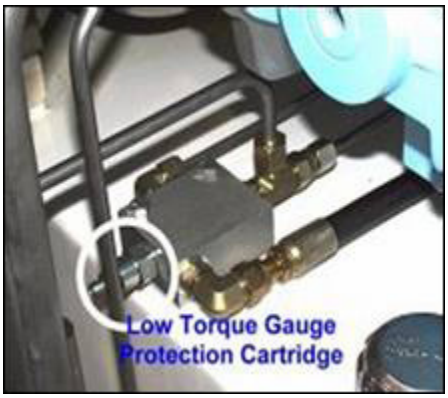


Fig. 22 Low Torque Gauge Protection Valve

- With pump running, hold the torque lever to "make" or "break" position. Adjust the pressure (torque) to the minimum setting.
- Increase pressure (torque) until the system pressure gauge reads 900 PSI. Carefully screw in the adjustment screw on the valve until the low torque gauge needle moves from "zero" to approximately 900 PSI. This adjustment causes the gauge to "vent" as soon as the needle points to 900 PSI. (This can be checked by slowly increasing and decreasing the torque setting to see where the gauge needle points just as it vents off or pressures up.)
- Once the gauge operates as described, lock down the gauge valve protection nut and recheck operation.

5.8 High & Low Torque Gauge Calibration Check

To ensure the accuracy of the indicated torque, the low and high torque gauges should be checked on a regular basis and re-calibrated when required.

The following test can be performed daily as a simple check of gauge accuracy:

- Ensure that both torque gauges read zero when the system is not operating.

- Start the pump and set the torque adjustment at its lowest setting. Hold the torque lever to the "make" position.
- Increase the torque setting until the high torque gauge registers 25,000 lb·ft on the "make" scale. Compare the reading on the "make" scale of the low torque gauge. Continue to increase torque setting while comparing the two gauges in increments of 5000 lb·ft up to 40,000 lb·ft.

If both gauges read the same value (within 2000 lb·ft), it is safe to assume that the gauges are accurate.

If the readings vary by more than 2,000 lb·ft the following procedure must be performed to establish which gauge requires re-calibration:

- For calibration purposes, both gauges have a "PSI" scale located near the outer edge of the gauge faces. This can be used to compare the two gauges to each other as well as to a master gauge.
- Connect a certifiably accurate (¼% accuracy) PSI test gauge to the test tee in the gauge line. Use a 2000 PSI max gauge for low torque, and a 5000 PSI max gauge in the high torque.
- Set torque adjustment at its lowest setting and start the pump.
- For the Low Torque Gauge: With the torque control lever shifted, gradually increase the torque adjustment until the test gauge reads 100 PSI and compare with the reading on the low torque gauge. Increase pressure in 50 PSI increments (using torque control valve) while comparing the low torque and certified gauge.
- For the High Torque Gauge: With the torque control lever shifted, gradually increase the torque adjustment until the test gauge reads 500 PSI and compare with the reading on the high torque gauge. Increase pressure in 250 PSI increments (using torque control valve) while comparing the high torque and certified gauge.

If any of the readings differ by more than 5%, the gauge or gauges should be re-calibrated or replaced.

SECTION 06

ORDERING PARTS

6.1 Information Required by Vendor

Please provide the following information when ordering parts:

- Description of part
- Part number from parts list (included)
- Parts list drawing number and revision
- Size, model and serial number of the unit as shown in the following chart

CUSTOMER:		CONSOLE SERIAL #:	
LOCATION:		SPINNER SERIAL #:	
TORQUEMASTER SERIAL #:		PUSH/PULL SERIAL #:	
BED LENGTH:		JAR TESTER SERIAL #:	
Headstock Diameter:		Custom Modifications:	

6.2 Orders

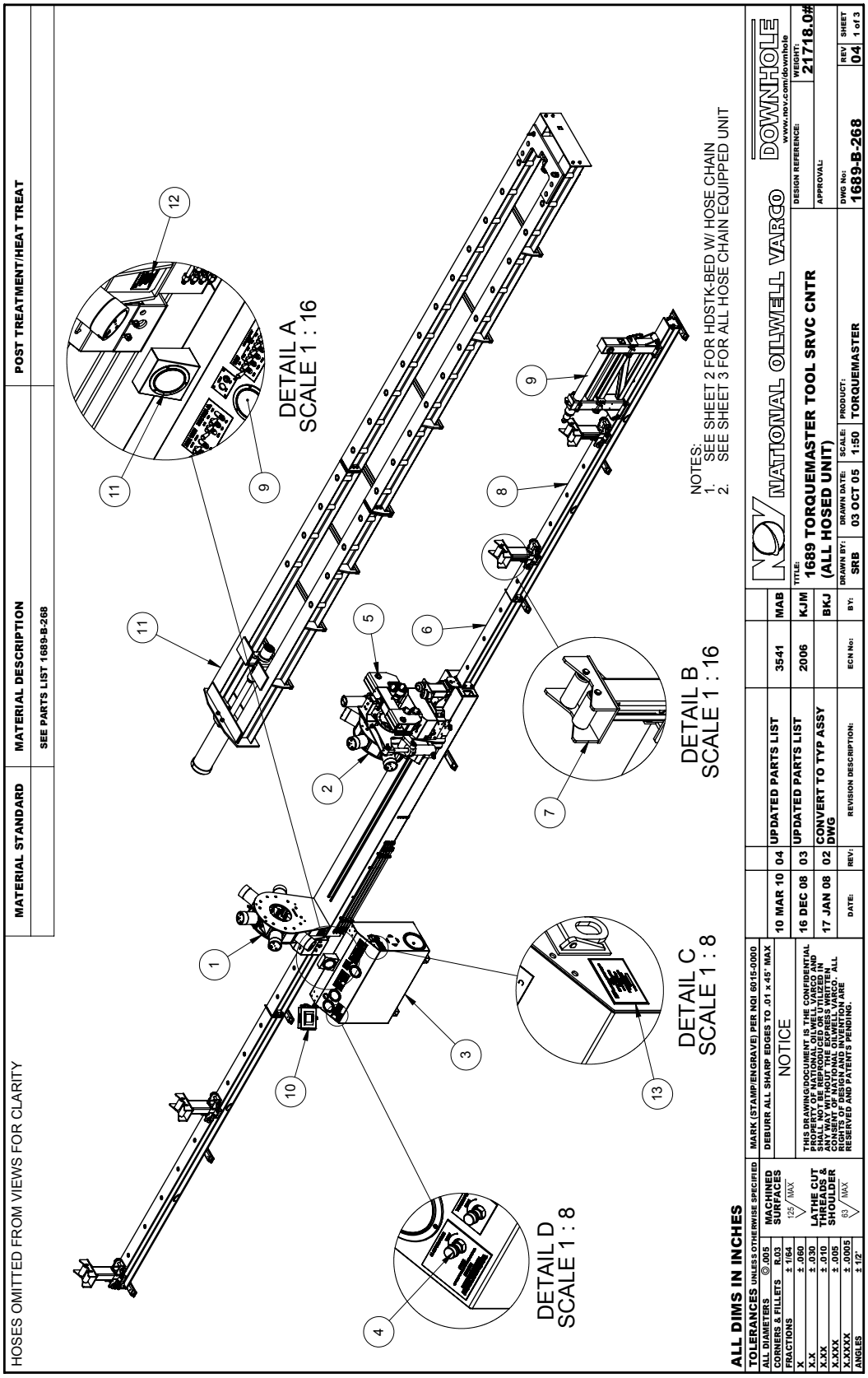
Orders may be placed by telephone, fax, e-mail or written request to the following:

NATIONAL OILWELL VARCO
Downhole Tools
1507 - 4th Street
Nisku, Alberta
Canada T9E 7M9
Telephone Number: 780 944 3929
Fax Number: 780 436 3492 or 780 468 2348
E-mail: DHPSales@nov.com

6.2.1 Note

- A Purchase Order Number and Shipping Instructions must be provided at the time an order is placed
- Payment terms are Net 30 days (OAC) from the date of invoice
- All parts will be sold F.O.B. Edmonton
- Consignee will be responsible for all Export Preparation, Crafting, Documentation and Freight
- Consignee will be responsible for all applicable Taxes, Customs Duties and Tariffs

SCHEMATICS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POST TREATMENT/HEAT TREAT
DETAIL A SCALE 1 : 16
DETAIL B SCALE 1 : 16
DETAIL C SCALE 1 : 8
DETAIL D SCALE 1 : 8
NOTES:
1. SEE SHEET 2 FOR HDSTK-BED W/ HOSE CHAIN
2. SEE SHEET 3 FOR ALL HOSE CHAIN EQUIPPED UNIT
NOV NATIONAL OILWELL VARCO
DOWNHOLE
www.nov.com/downhole
TITLE: 1689 TORQUEMASTER TOOL SRVC CNTR (ALL HOSED UNIT)
DESIGN REFERENCE:
WEIGHT: 21718.0#
APPROVAL:
DRAWN BY: SRB
DRAWN DATE: 03 OCT 05
SCALE: 1:50
PRODUCT: TORQUEMASTER
DWG No: 1689-B-268
REV: 04
SHEET 1 of 3
ALL DIMS IN INCHES
TOLERANCES UNLESS OTHERWISE SPECIFIED
ALL DIAMETERS ± .005
CORNERS & FILLETS ± 1/64
FRACTIONS ± 1/64
X ± .090
X.X ± .030
X.XX ± .010
X.XXX ± .005
X.XXXX ± .0005
ANGLES ± 1/2°
MACHINED SURFACES 125 MAX
LATHE CUT THREADS & SHOULDER 63 MAX
MARK (STAMP/ENGRAVE) PER NOI 60-15-0000
DEBURR ALL SHARP EDGES TO .01 x 45° MAX
NOTICE
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DATE: 10 MAR 10 | 16 DEC 08 | 17 JAN 08
REV: 04 | 03 | 02
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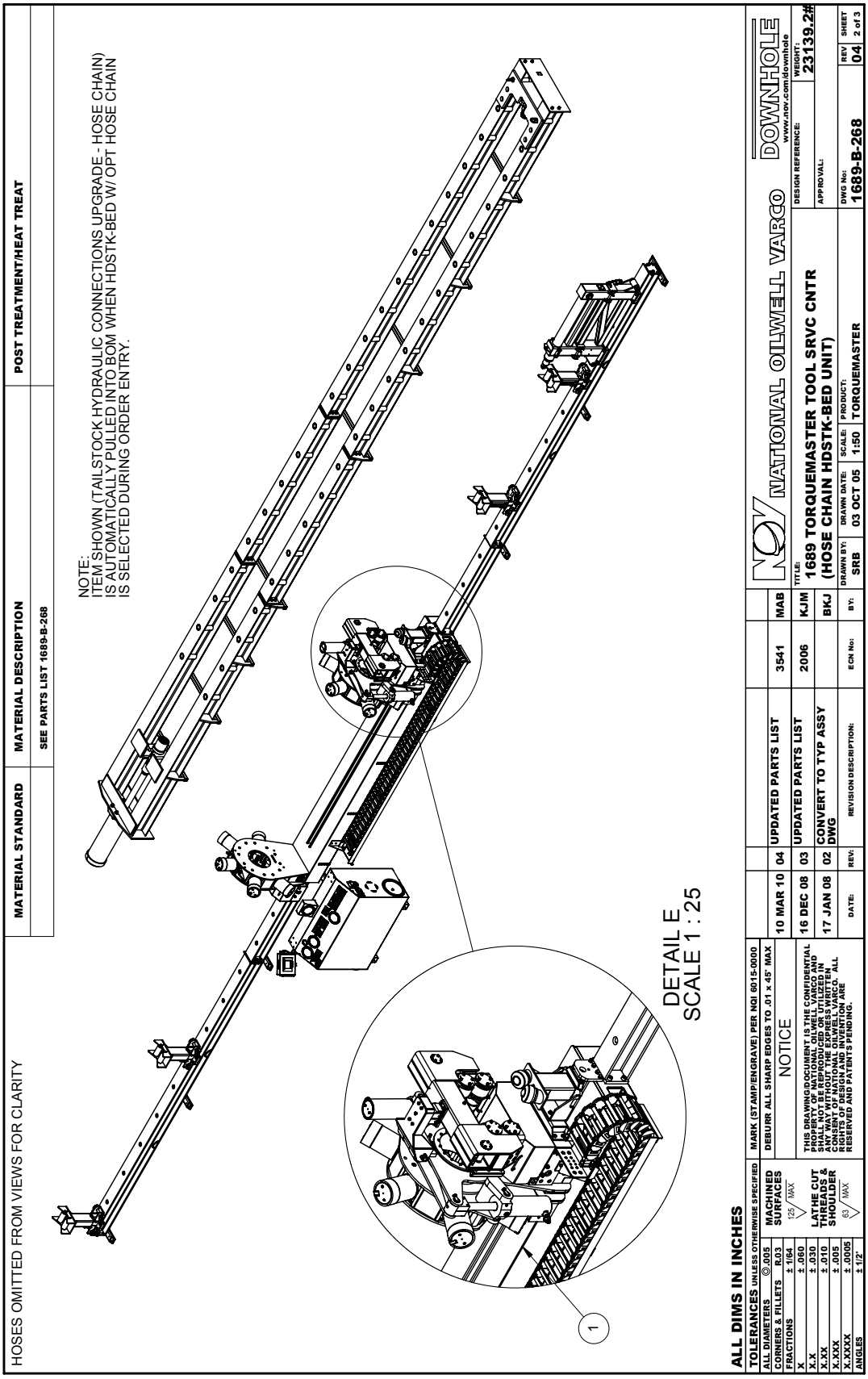
ECN No: 3541 | 2006
BY: MAB | KJM | BKJ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ITEM SHOWN (TAILSTOCK HYDRAULIC CONNECTIONS UPGRADE - HOSE CHAIN) IS AUTOMATICALLY PULLED INTO BOM WHEN HDSTK-BED W/ OPT HOSE CHAIN IS SELECTED DURING ORDER ENTRY.
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TOLERANCES UNLESS OTHERWISE SPECIFIED
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CORNERS & FILLETS R.03
FRACTIONS ± 1/64
X ± .060
X.X ± .030
X.XX ± .010
X.XXX ± .005
X.XXXX ± .0005
ANGLES ± 1/2°
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LATHE CUT THREADS & SHOULDER 63 MAX
MARK (STAMP/ENGRAVE) PER NQI 6015-0000
DEBURR ALL SHARP EDGES TO .01 x 45° MAX
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ECN No: 3541 | 2006
BY: MAB | KJM | BKJ
NOV NATIONAL OILWELL VARCO
DOWNHOLE
www.nov.com/downhole
TITLE: 1689 TORQUEMASTER TOOL SRVC CNTR (HOSE CHAIN HDSTK-BED UNIT)
DRAWN BY: SRB
DRAWN DATE: 03 OCT 05
SCALE: 1:50
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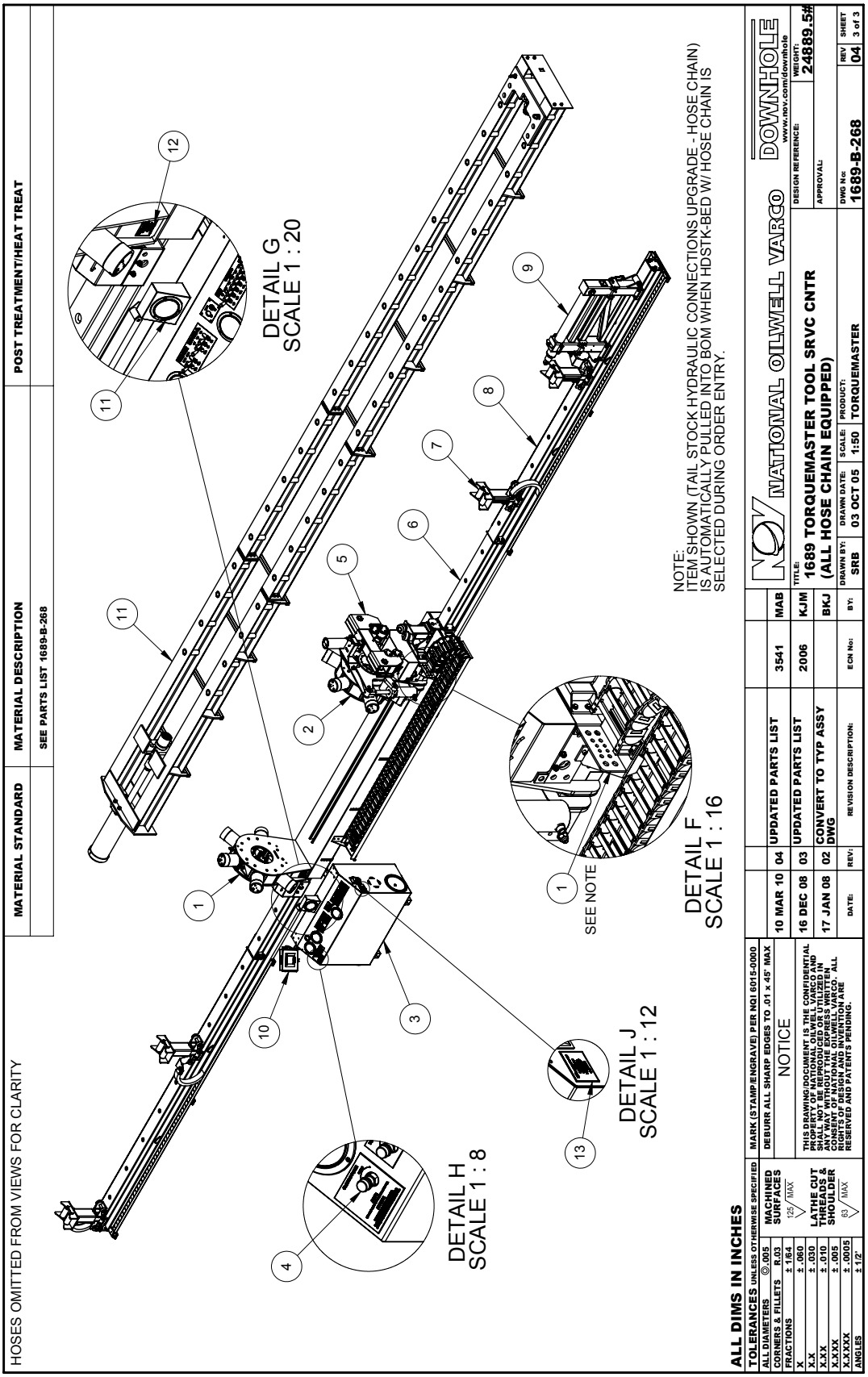
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DETAIL J
SCALE 1 : 12
DETAIL F
SCALE 1 : 16
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ITEM SHOWN (TAIL STOCK HYDRAULIC CONNECTIONS UPGRADE - HOSE CHAIN)
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SELECTED DURING ORDER ENTRY.
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X.X ± .030
X.XX ± .010
X.XXX ± .005
X.XXXX ± .0005
ANGLES ± 1/2°
MACHINED SURFACES 125 MAX
LATHE CUT THREADS & SHOULDER 63 MAX
MARK (STAMP/ENGRAVE) PER NQI 6015-0000
DEBURR ALL SHARP EDGES TO .01 x 45° MAX
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ECN No: 3541 | 2006
BY: MAB | KJM | BKJ
NOV NATIONAL OILWELL VARCO
DOWNHOLE
www.nov.com/downhole
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REV 04
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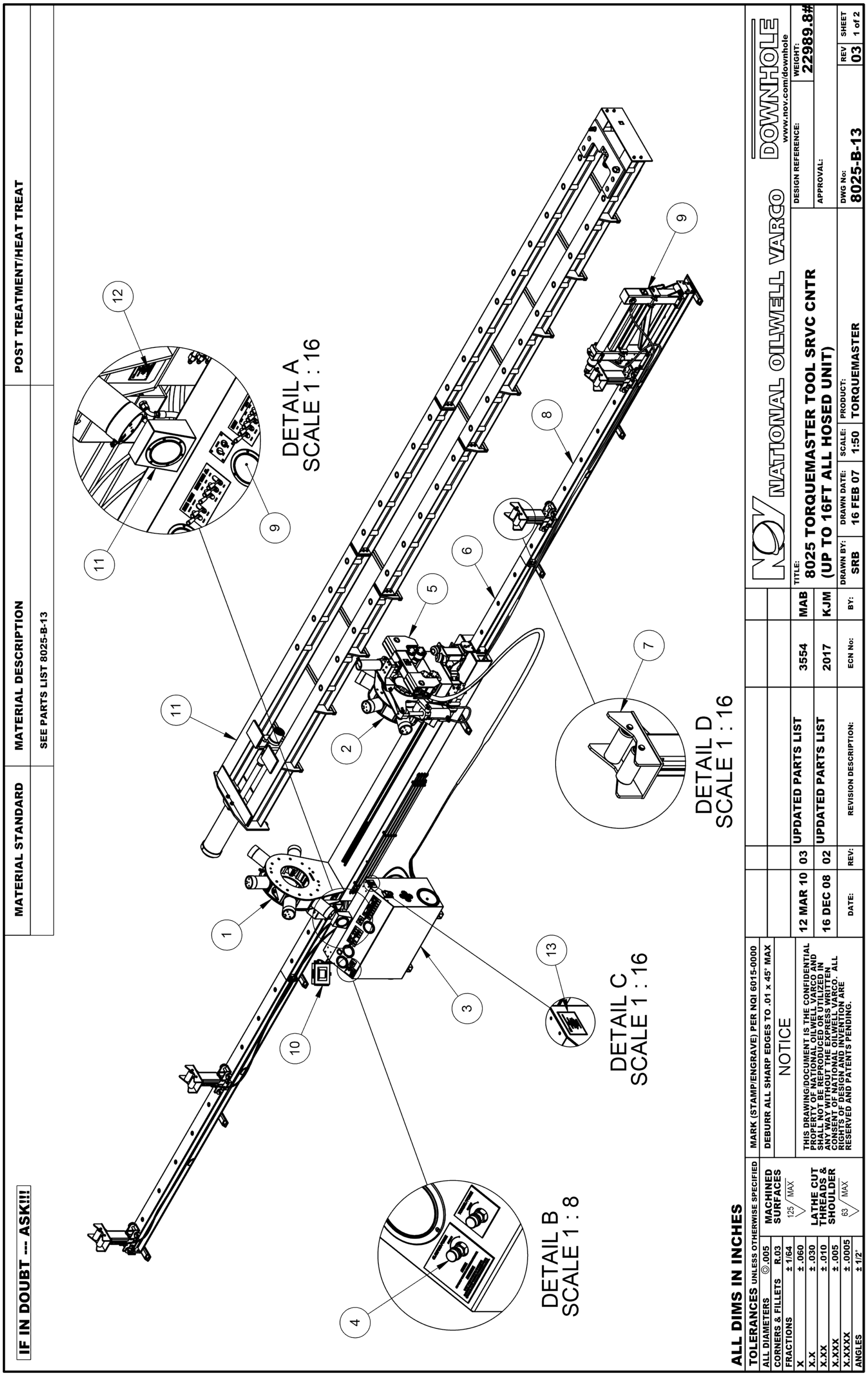
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DETAIL B
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DETAIL D
SCALE 1 : 16
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MARK (STAMP/ENGRAVE) PER NQI 6015-0000
DEBURR ALL SHARP EDGES TO .01 x 45° MAX
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16 DEC 08 | 02 | UPDATED PARTS LIST | 2017 | KJM
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DOWNHOLE
www.nov.com/downhole
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8025 TORQUEMASTER TOOL SRVC CNTR
(UP TO 16FT ALL HOSED UNIT)
DESIGN REFERENCE:
WEIGHT: 22989.8#
APPROVAL:
DRAWN BY: SRB
DRAWN DATE: 16 FEB 07
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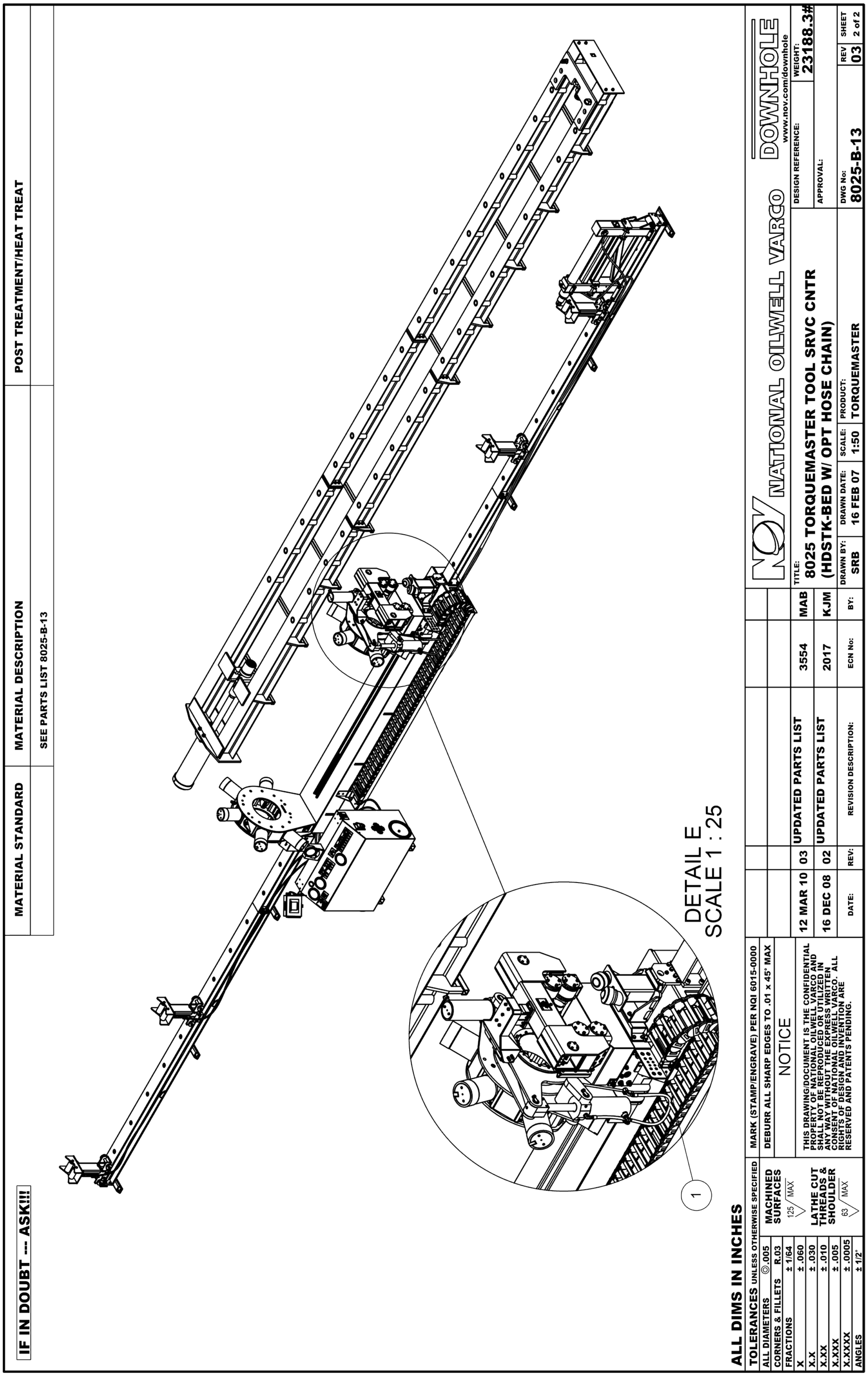
DWG No: 8025-B-13
REV 03
SHEET 1 of 2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TOLERANCES UNLESS OTHERWISE SPECIFIED
ALL DIAMETERS ◎.005
CORNERS & FILLETS R.03
FRACTIONS ± 1/64
X ±.060
X.X ±.030
X.XX ±.010
X.XXX ±.005
X.XXXX ±.0005
ANGLES ± 1/2°
MACHINED SURFACES 125 MAX
LATHE CUT THREADS & SHOULDER 63 MAX
MARK (STAMP/ENGRAVE) PER NQI 6015-0000
DEBURR ALL SHARP EDGES TO .01 x 45° MAX
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12 MAR 10 03 UPDATED PARTS LIST 3554 MAB
16 DEC 08 02 UPDATED PARTS LIST 2017 KJM
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NOV NATIONAL OILWELL VARCO
DOWNHOLE
www.nov.com/downhole
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DESIGN REFERENCE:
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APPROVAL:
DRAWN BY: SRB
DRAWN DATE: 16 FEB 07
SCALE: 1:50
PRODUCT: TORQUEMASTER
DWG No: 8025-B-13
REV 03
SHEET 2 of 2

PARTS LIST

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Title: 1689 TORQUEMASTER TOOL SRVC CNTR		Page: Pg 1 OF 2

Revised By:	App'd. By:	App'd. Date:	Assy Dwg:	Rev:
MAB			1689-B-268	04

ITEM	QTY	PART #	DRAWING #	DESCRIPTION	LOCATION
1	1	1689-B-248	1689-B-248	12 FT HEADSTOCK-BED ASSEMBLY	STD ALL HOSED UNIT
OR	1	1689-B-291	1689-B-291	12FT HDSTK-BED ASSY-HOSE CHN-P	PLASTIC HOSE CHAIN UNIT
AND	1	1689-B-275	1689-B-275	TAILSTK HYD CONNEC UPGRADE-HC	
OR	1	1689-B-297	1689-B-297	12FT HDSTK-BED ASSY-HOSE CHN-M	METAL HOSE CHAIN UNIT
AND	1	1689-B-275	1689-B-275	TAILSTK HYD CONNEC UPGRADE-HC	
OR	1	1689-B-259	1689-B-259	14 FT HEADSTOCK-BED ASSEMBLY	STD ALL HOSED UNIT
OR	1	1689-B-316	1689-B-316	14FT HDSTK-BED ASSY-HOSE CHN-P	PLASTIC HOSE CHAIN UNIT
AND	1	1689-B-275	1689-B-275	TAILSTK HYD CONNEC UPGRADE-HC	
OR	1	1689-B-317	1689-B-317	14FT HDSTK-BED ASSY-HOSE CHN-M	METAL HOSE CHAIN UNIT
AND	1	1689-B-275	1689-B-275	TAILSTK HYD CONNEC UPGRADE-HC	
OR	1	1689-B-260	1689-B-260	16 FT HEADSTOCK-BED ASSEMBLY	STD ALL HOSED UNIT
OR	1	1689-B-303	1689-B-303	16FT HDSTK-BED ASSY-HOSE CHN-P	PLASTIC HOSE CHAIN UNIT
AND	1	1689-B-275	1689-B-275	TAILSTK HYD CONNEC UPGRADE-HC	
OR	1	1689-B-304	1689-B-304	16FT HDSTK-BED ASSY-HOSE CHN-M	METAL HOSE CHAIN UNIT
AND	1	1689-B-275	1689-B-275	TAILSTK HYD CONNEC UPGRADE-HC	
OR	1	1689-B-319	1689-B-319	18 FT HDSTK-BED ASSY HOSE CHN-P	PLASTIC HOSE CHAIN UNIT
AND	1	1689-B-275	1689-B-275	TAILSTK HYD CONNEC UPGRADE-HC	
OR	1	1689-B-320	1689-B-320	18 FT HDSTK-BED ASSY HOSE CHN-P	METAL HOSE CHAIN UNIT
AND	1	1689-B-275	1689-B-275	TAILSTK HYD CONNEC UPGRADE-HC	
OR	1	1689-B-326	1689-B-326	20 FT HDSTK-BED ASSY HOSE CHN-P	PLASTIC HOSE CHAIN UNIT
AND	1	1689-B-275	1689-B-275	TAILSTK HYD CONNEC UPGRADE-HC	
OR	1	1689-B-327	1689-B-327	20 FT HDSTK-BED ASSY HOSE CHN-P	METAL HOSE CHAIN UNIT
AND	1	1689-B-275	1689-B-275	TAILSTK HYD CONNEC UPGRADE-HC	
OR	1	1689-B-309	1689-B-309	24 FT HDSTK-BED ASSY HOSE CHN-P	PLASTIC HOSE CHAIN UNIT
AND	1	1689-B-275	1689-B-275	TAILSTK HYD CONNEC UPGRADE-HC	
OR	1	1689-B-312	1689-B-312	24 FT HDSTK-BED ASSY HOSE CHN-P	METAL HOSE CHAIN UNIT
AND	1	1689-B-275	1689-B-275	TAILSTK HYD CONNEC UPGRADE-HC	
2	1	1689-B-247	1689-B-247	14" TAILSTOCK ASSEMBLY	
3	1	8018-B-34	8018-B-34	BASIC CONSOLE W/ ELECT FEATURE	
4	1	8018-B-25	8018-B-25	CONSOLE UPGRADE KIT-INDEP CLAMP	OPT
5	1	1397-0001	1397-S-2	SPINNER ASSEMBLY (STD)	OPT
OR	1	1375-0002	1375-S-11	SPINNER ASSEMBLY - HEAVY DUTY	OPT
AND	1	1375-B-1	1375-B-1	SPINNER BUTTON UP KIT	NOT REQD IF SP ON TS w/ HC
6		1738-B-62-P	1738-B-62	PAINTED 6 FT BEAM ASSEMBLY	OPT
OR		1738-D-40-P	1738-D-40	PAINTED 10 FT BEAM ASSEMBLY	OPT
OR		1738-B-66-P	1738-B-66	PAINTED 12 FT BEAM ASSEMBLY	OPT
OR		1738-D-22-P	1738-D-22	PAINTED 19 FT BEAM ASSEMBLY	OPT (STD)

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NATIONAL OILWELL VARCO	Parts List: 1689 TORQUEMASTER	Rev: 04
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Revised By:	App'd. By:	App'd. Date:	Assy Dwg:	Rev:
MAB			1689-B-268	04

ITEM	QTY	PART #	DRAWING #	DESCRIPTION	LOCATION
7		1267-0004	1267-B-6	HYD STEADY REST JACK - ROLLING	OPT
OR		1267-B-40	1267-B-40	ROLLING JACK W/BALL TRANSPORT	OPT
AND	1	1267-B-44	1267-B-44	ROLLING JACK BUTTON UP KIT	FOR ALL HOSES BUTTON UP ONLY
8		1738-B-94-P	1738-B-94	PAINTED 19 FT EXTENSION BEAM	OPT
9	1	1356-0001	1356-B-2	STANDARD (HD) PUSH/PULL ASSEMBLY	OPT
AND	1	8018-B-24	8018-B-24	CONSOLE UPGRADE KIT-PUSH/PULL	FOR ALL HOSES BUTTON UP ONLY
10	1	8089-B-3	8089-B-3	LOG MASTER I ASSEMBLY	OPT
OR	1	8090-B-51	8090-B-51	LOGMASTER II ASSEMBLY	OPT
11	1	1360-A-1	1360-A-1	JAR TESTER - 30' CAPACITY	OPT
OR	1	1361-A-3	1361-A-3	JAR TESTER - 35' CAPACITY	OPT
AND	1	8018-B-23	8018-B-23	CONSOLE UPGRADE KIT-JAR TESTER	
AND	1	8018-A-83	8018-A-83	EXTRA GAUGE ENCLOSURE ASSY	OPT (PULLED IN IF PUSH/PULL REQ'D)
12	1	1689-A-397	1689-A-397	TORQUEMASTER SERIAL NUMBER TAG	HDSTK
13	1	8042-A-1	8042-A-1	CONSOLE TM SERIAL NUMBER TAG	CONSOLE
14	1	8018-B-40	8018-B-40	SAFETY SHIELD	OPT
15	1	1356-C-7	1356-C-7	PUSH/PULL ACTUATOR PIN	OPT
16	1	8104-B-13	8104-B-13	TRUETORQUE DIGITAL GAUGE	OPT

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NATIONAL OILWELL VARCO			Parts List: 8025-B-13	Rev: 03
Title: 8025 TORQUEMASTER TOOL SRVC CNTR				Page: Pg 1 of 1
Revised By: MAB	App'd. By:	App'd. Date:	Assy Dwg: 8025-B-13	Rev: 03

ITEM	QTY	PART #	DESCRIPTION	LOCATION
1	1	8025-B-12	16 FT HEADSTOCK-BED ASSEMBLY	STD ALL HOSED UNIT
OR	1	8025-B-27	16FT HDSTK-BED ASSY-HOSE CHN-P	PLASTIC HOSE CHAIN UNIT
AND	1	1689-B-275	TAILSTK HYD CONNEC UPGRADE-HC	
OR	1	8025-B-28	16FT HDSTK-BED ASSY-HOSE CHN-M	METAL HOSE CHAIN UNIT
AND	1	1689-B-275	TAILSTK HYD CONNEC UPGRADE-HC	
OR	1	8025-B-32	18FT HEADSTOCK-BED ASSY-P	PLASTIC HOSE CHAIN UNIT
OR	1	8025-B-33	18FT HEADSTOCK-BED ASSY-M	METAL HOSE CHAIN UNIT
AND	1	1689-B-275	TAILSTK HYD CONNEC UPGRADE-HC	
2	1	1689-B-247	14" TAILSTOCK ASSEMBLY	
3	1	8018-B-34	BASIC CONSOLE W/ ELECT FEATURE	
4	1	8018-B-25	CONSOLE UPGRADE KIT-INDEP CLAMP	OPT
5	1	1397-0001	SPINNER ASSEMBLY (STD)	OPT
OR	1	1375-0002	SPINNER ASSEMBLY - HEAVY DUTY	OPT
AND	1	1375-B-1	SPINNER BUTTON UP KIT	NOT REQD IF SP ON TS w/HC
6		1738-B-62-P	PAINTED 6 FT BEAM ASSEMBLY	OPT
OR		1738-D-40-P	PAINTED 10 FT BEAM ASSEMBLY	OPT
OR		1738-B-66-P	PAINTED 12 FT BEAM ASSEMBLY	OPT
OR		1738-D-22-P	PAINTED 19 FT BEAM ASSEMBLY	OPT (STD)
7		1267-0004	HYD STEADY REST JACK - ROLLING	OPT
OR		1267-B-40	ROLLING JACK W/BALL TRANSPORT	OPT
AND	1	1267-B-44	ROLLING JACK BUTTON UP KIT	HOSES/HOSE CHAIN BUTTON UP
8		1738-B-94-P	PAINTED 19 FT EXTENSION BEAM	OPT
9	1	1356-0001	STANDARD (HD) PUSH/PULL ASSEMBLY	OPT
AND	1	8018-B-24	CONSOLE UPGRADE KIT-PUSH/PULL	HOSES/HOSE CHAIN BUTTON UP
10	1	8089-B-3	LOG MASTER I ASSEMBLY	OPT
OR	1	8077-A-3	AXON UNIT ASSEMBLY	OPT
11	1	8018-B-23	CONSOLE UPGRADE KIT-JAR TESTER	OPT
AND	1	8018-A-83	EXTRA GAUGE ENCLOSURE ASSY	OPT (PULLED IN IF PUSH/PULL REQ'D)
12	1	1689-A-397	TORQUEMASTER SERIAL NUMBER TAG	HDSTK
13	1	8042-A-1	CONSOLE TM SERIAL NUMBER TAG	CONSOLE

PART LIST: 8025-B-13