



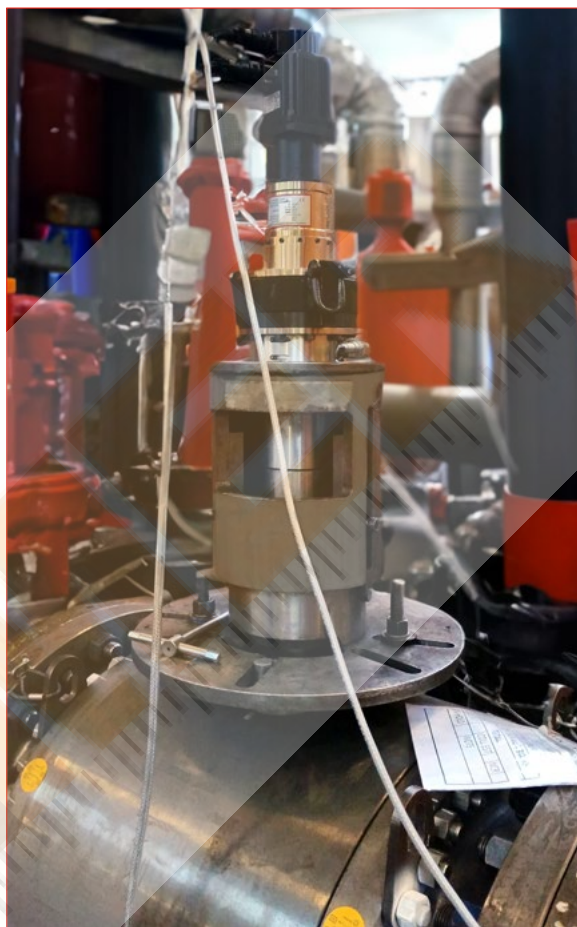
VALVE TESTING & ACTUATION

VALVE TESTING SYSTEM

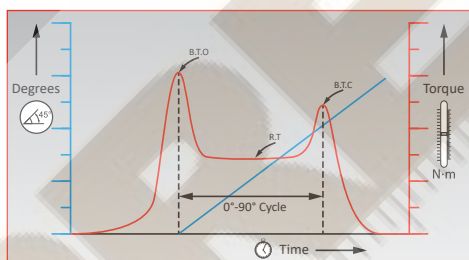
Engineered to Order Valve Testing System

Typical applications include the testing of Ball Valves requiring cyclical rotation $0 - 90^\circ / 90 - 0^\circ$, whilst recording torque vs angle data. Testing of Gate Valves / Valve Actuators by opening and closing whilst recording torque vs angle / turns data. The test must be remotely controlled from outside of the test chamber, where the test valve is pressurised.

- 10" touchscreen HMI & PLC housed in painted steel enclosure for indoor / workshop use
- Test data capture and output in CSV format onto external USB drive, time and date stamped
- Up to 20 targets can be set against a test
- Generate customer test reports and produce graphs
- Real time torque & angle or torque & turns data streaming via RS232 serial port
- Using the AC servo drive an optional lock can be added to hold a butterfly valve at a prescribed angle
- Dedicated input ports for pressure, temperature and proximity sensors
- Controller available as separate component to upgrade existing valve testing kits
- Automatic recognition of Smart transducers
- Forward / reverse cycling - user programmable number of cycles, variable up to 32,000 sweeps
- Emergency stop button and torque overload limit function
- Torque Range: 100 - 300,000 N·m (capacities up to 500,000 available on application)
- Option to include network capability
- Operates with Pneumatic, or AC servo drive tools
 - AC Servo brushless motor is quiet and maintenance free
 - Pneumatic tool shut-off control via solenoid operated valves
 - Annular torque & angle transducers are available to fit either tool type



Example of an engineered to order Valve Testing System in application



This diagram represents what we would expect to occur during a "break to open" to "break to close" cycle of a typical ball valve, with R.T. being the "run torque".



Actuator performance testing is also available through our ETO offering:

Working with the same proven hardware as the Valve Testing equipment, Norbar's ETO section have developed an effective means to test and evaluate rotary valve actuators, giving the ability to test rotary actuators from 50 to 300 kN·m with stepped loading in both the CW and CCW directions.

The end user has the ability to map the performance (torque and angular position) of the actuator over full angular sweep, with the load being locked off at user set points across the range of the selected tool device with all data being recorded in an easy to read .CSV format.



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Norbar has worked closely with the oil and gas industry to produce a range of torque instruments and transducers suitable for use in the harshest environments such as ship decks, oil rigs and refineries. Norbar uses a variety of corrosion resistant materials, high specification connectors and sealing techniques meaning that products in our HE range can be used in such environments without impairing their performance or life span. Although originally designed to meet the needs of the oil and gas industry, Norbar's HE range is the ideal choice whenever it is necessary to apply or measure torque outdoors in potentially wet or dusty conditions.



HARSH ENVIRONMENT INSTRUMENT

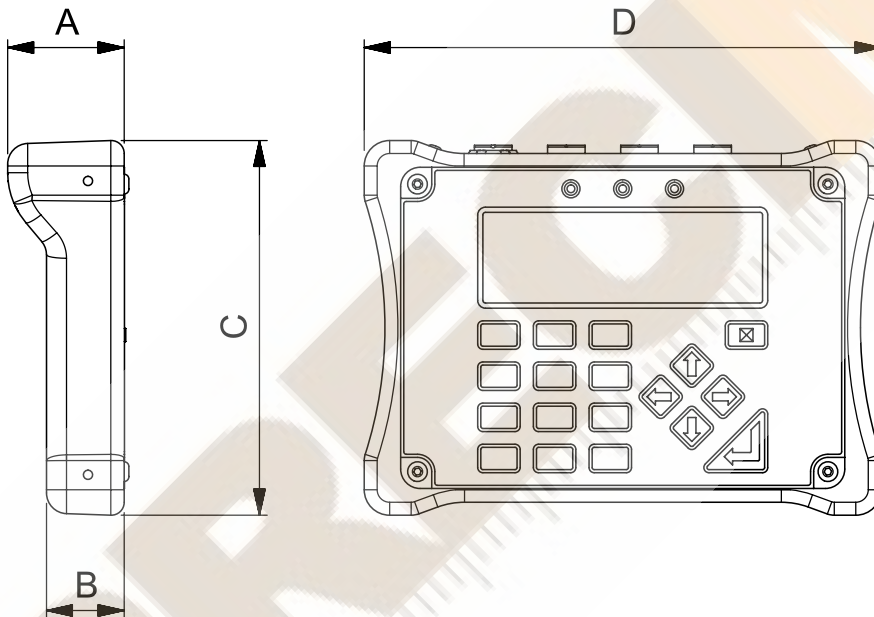
Calibration
details

4 HARSH ENVIRONMENT RANGE

43217 TTL-HE Instrument (inc. IP67 rated carry case)
Supplied with clockwise and counter-clockwise calibration.

TTL-HE is a portable torque measuring instrument designed for use in harsh environments. The TTL-HE operating on battery power with one of the 'HE' range of transducers connected, has an ingress protection rating of IP65/IP67. Typical operating environments are where high humidity, water or salt water spray and dust may be an issue. Features include; 10 measurement modes, 13 units of torque (with additional user units feature), 12 pairs of limits and text displayed in 11 languages.

- Instrument accuracy of $\pm 0.05\%$ ($\pm 0.1\%$ when below 10% of transducer capacity)
- System accuracy with a typical Norbar transducer, $\pm 0.5\%$ from 20% of transducer capacity
- IP65/67 rated
- Bi-directional calibration
- Battery power use in harsh environments (mains supply for charging)
- All features are in common with TST and TTT instruments
- Supplied in IP67 rated carry case
- 5 digit resolution for all Norbar transducers
- 240 x 64 pixel dot matrix display with update rate of twice per second
- Please contact Norbar for full details of available transducers



Model		TTL-HE
Part Number		43217
Dimensions (mm)	A	45
	B	30
	C	145
	D	200
Weight (kg)		4.9

TTL-HE INSTRUMENT AND TRANSDUCER KITS

Calibration
details

4	TTL-HE INSTRUMENT AND TRANSDUCER KITS
60287.LOG	5,000 N·m M/M TTL-HE Kit, inc. Lead (Class 4)
60295.LOG	10,000 N·m M/M TTL-HE Kit, inc. Lead (Class 5)
60289.LOG	40,000 N·m M/M TTL-HE Kit, inc. Lead (Class 7)

Note: Kits for use with Intervention Tool Test Pots



HARSH ENVIRONMENT TRANSDUCERS



Calibration
details



The accuracy and quality of the Norbar torque transducers has made them the first choice of many calibration laboratories throughout the world. The Harsh Environment range of transducers has been specifically designed for use with the Norbar TTL-HE instrument.

- Class 1 accuracy over the 'Primary' classification range ($\pm 0.5\%$ of reading from 20 to 100% of full scale)
- Stainless steel design with Smart intelligence
- IP65/IP67 rated
- Bi-direction calibration as standard

Harsh Environment Annular Transducers are available as ETO (Engineer to Order).

4	STATIC TRANSDUCERS
50787.xxx	300 - 3,000 N·m, 1½" M/F sq. dr.
50751.xxx*	300 - 3,000 N·m, 1½" M/M sq. dr.
50705.xxx	500 - 5,000 N·m, 1½" M/F sq. dr.
50729.LOG	500 - 5,000 N·m, 1½" M/M sq. dr.
50706.xxx	500 - 5,000 lbf·ft, 1½" M/F sq. dr.
50728.xxx	1,000 - 10,000 N·m, 2½" M/F sq. dr.
50788.xxx	1,000 - 10,000 N·m, 2½" M/ 2" M sq. dr.
50789.xxx	1,500 - 15,000 N·m, 2½" M/ 2½" M sq. dr.
50726.xxx	2,500 - 25,000 N·m, 3½" M/M sq. dr.
50727.xxx	4,000 - 40,000 N·m, 3½" M/M sq. dr.
50743.xxx*	10,000 - 100,000 lbf·ft, 3½" M/M sq. dr.

* Suitable for use in Hydraulic Test Pots.

* UKAS accredited calibration up to 80,000 lbf·ft. A non-accredited value at 100,000 lbf·ft is extrapolated and provided for reference only. Static Transducers 3,000 N·m and above supplied in carry case.



Designed for use with the Harsh Environment Instrument range (TTL-HE) of products

4	INSTRUMENTATION LEADS
60245.200	TTL-HE to HE Transducer
60250.200	TTL-HE to Norbar Static & Annular Transducers
60263.200	TTL-HE to Rotary Transducers
60266.200	HE Transducer to TTT, TST and T-Box 2
60261.200	Serial Data Lead for TTL-HE

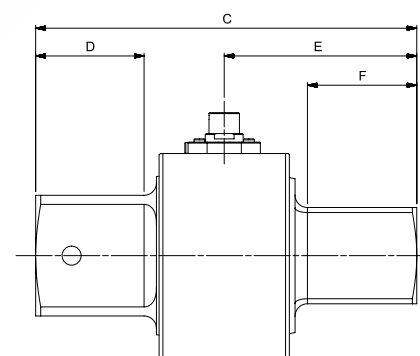
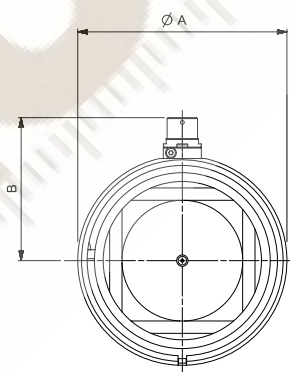
Other lengths can be ordered at an additional cost.

Note: The system should be calibrated with the increased length lead, as calibration may be affected.

Note: The maximum permissible cable length 15 m for Transducer Leads, 7 m if using 60266 with a T-Box™ XL. Contact Norbar for further details.

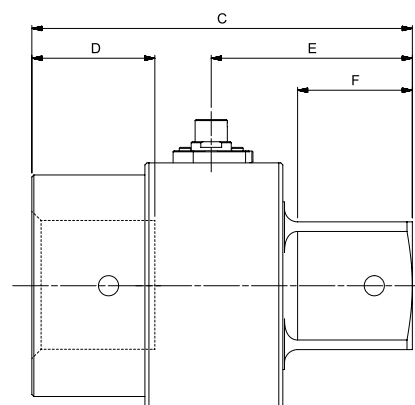
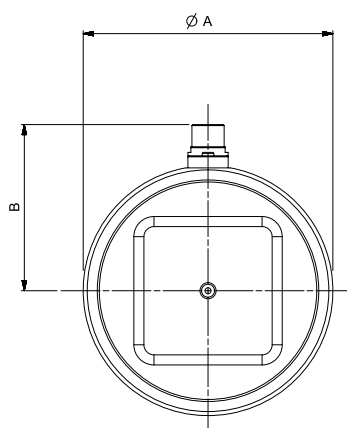
Static Transducers - Male to Male (M/M) Square Drives

Model		3,000 N·m 5,000 N·m	10,000 N·m	15,000 N·m	25,000 N·m 40,000 N·m 100,000 lbf·ft
Part Number		50751.xxx 50729.xxx	50788.xxx	50789.xxx	50726.xxx 50727.xxx 50743.xxx
Dimensions (mm)	ØA	95	110	110	164
	B	68	75	75	103
	C	168	200	225	271
	D	38	57	57	76
	E	84	101	101	135
	F	38	57	58	76
Weight (kg)		3.4 (3,000 N·m) 5.0 (5,000 N·m)	11.4	11.4	21.5 (25,000 N·m) 22.0 (40,000 N·m) 25.0 (100,000 lbf·ft)



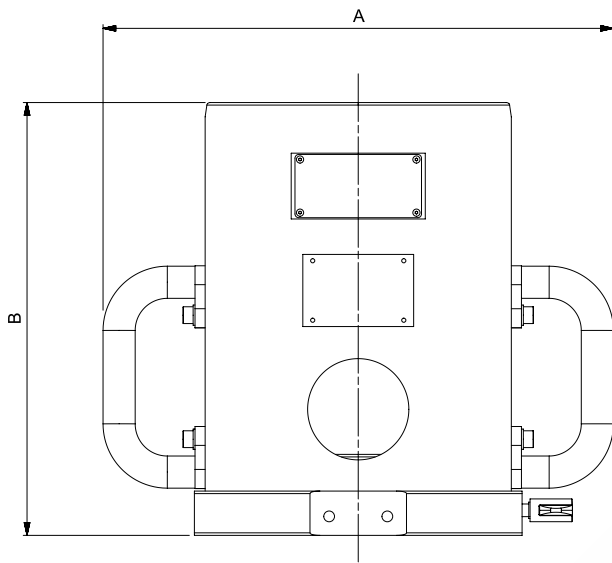
Static Transducers - Male to Female (M/F) Square Drives

Model		3,000 N·m 5,000 N·m 5,000 lbf·ft	10,000 N·m
Part Number		50787.xxx 50705.xxx 50706.xxx	50728.xxx
Dimensions (mm)	ØA	95	110
	B	68	83
	C	160	189
	D	41	59
	E	84	100
	F	38	57
Weight (kg)		5.0	9.1





INTERVENTION TOOL TEST POTS



These reaction pots allow for the accurate testing of API rotary intervention tools.

- Conform to ISO 13628-8:2002 and API 17D
- Customer specific solutions also available
- Lightweight construction, major components made in aluminium
- Incorporated lifting handles
- Eye bolts provided on larger units



4	INTERVENTION TOOL TEST POTS
80019	ISO 13628-8:2002 Class 4 Intervention Tool Test Pot
80024	ISO 13628-8:2002 Class 5 Intervention Tool Test Pot
80025	ISO 13628-8:2002 Class 6 Intervention Tool Test Pot
80020	API 17D Class 7 Intervention Tool Test Pot

Model	Class 4	Class 5	Class 6	Class 7
Part Number	80019	80024	80025	80020
Dimensions (mm)	A	372	403	428
	B	215	246	326
Weight (kg)	17.5	22.0	51.0	48.0

INTERVENTION TOOL VERIFICATION KITS



4	INTERVENTION TOOL TORQUE VERIFICATION KIT
60278.xxx	3,000 N·m ISO 13628 Class 4 Intervention Tool Torque Verification Kit
60281.xxx	10,000 N·m ISO 13628 Class 5 Intervention Tool Torque Verification Kit
60280.xxx	40,000 N·m API 17D Class 7 (short) Intervention Tool Test Kit

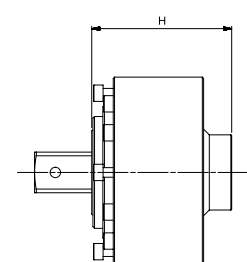
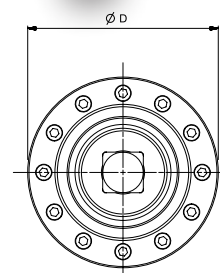
Other test pots and Torque Verification Kits are available for standard and non-standard API Intervention tool test and verification. Please contact Norbar.

MULTIPLIERS FOR SUBSEA

4	MULTIPLIERS FOR INTEGRATION INTO SUBSEA INTERVENTION TOOLS
77331	HT5 5:1 for Subsea Intervention Tools
77301	HT5 5:1 for Subsea Splined Output



Model	HT5 5:1 Subsea
Part Number	77331 77301
Dimensions (mm)	D
	H
Weight (kg)	TBC





ENGINEER TO ORDER

Norbar's wide range of standard equipment may not meet your exact requirements as there are applications when something special is required.

As an ISO 9001 certified company, Norbar will undertake the design and manufacture of special equipment against agreed customer specifications.

These projects range from modified torque wrench end fittings to complete torque and angle control of valve testing kits. Relevant safety directives are applied where appropriate, leading to well engineered reliable products that are designed to make tasks safer and easier.

For more information on Norbar's Engineer to Order service please e-mail your enquiry to TechSales@norbar.com or visit the Engineer to Order section of the Norbar website at: www.norbar.com/Services/Engineer-to-Order

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ETO EXAMPLE 1 - SPECIALIST REACTION TO ASSIST RAIL TRACK BOLTING

Project Number: Q5321

Introduction & Application

Specialist reaction to assist in the assembly and disassembly of rail track bolts (assembled using an impact tool) used to secure stock during transit. This is to replace a heavy electric impact tool that was no longer preferred by the end user. Long studding made this a unique application therefore a bespoke reaction design was required.

Solution

EBT-80-2700 was fitted with a special reaction and a deep socket. The reaction can be placed over the stud and nut prior to engaging with the tool, allowing the tool to be more manoeuvrable. As the reaction engages with the application, the bespoke lock ring ensures that the tool does not disengage with the reaction.



Technical Specification / Data Highlights

We were able to take advantage of our in-house 3D printing facility to ensure compliance with both the customers expectations, and of course the application.

ETO EXAMPLE 2 - OFFSET GEARBOX TO FIT PTS-72-2000 FOR TRAIN TRACTION LINKS

Project Number: Q4191

Introduction & Application

Railway maintenance application for removal and re-fitting of train traction link bolts, where bolt access is obstructed by the anti-roll bar.

Solution

PTS-72-2000 with offset gearbox kit.



Technical Specification / Data Highlights

M36 – 55 mm A/F hexagon head bolts tighten to 980 N·m / untighten at up to 2,000 N·m.

Q4191 kit includes offset gearbox having 3 gears, LH & RH reaction arms, PTS-72-2000 & Lubro control unit # 16074.



ETO EXAMPLE 3 - CUSTOM CLASS 7 MULTIPLIER KIT WITH HYDRAULIC LATCHING FOR SUBSEA

Project Number: Q3730

Introduction & Application

Oil & Gas industry requirement for a custom Class 7 torque multiplier kit with hydraulic latching, for integration into a pressure compensated subsea intervention tool.

Solution

Custom torque multiplier kit comprising:-

- Custom Class 7 nose housing with 2-stage torque multiplication gearing.
- HT5 / 5 torque multiplier & connecting input shaft.
- Hydraulic latching system with fail-safe spring return cylinders.

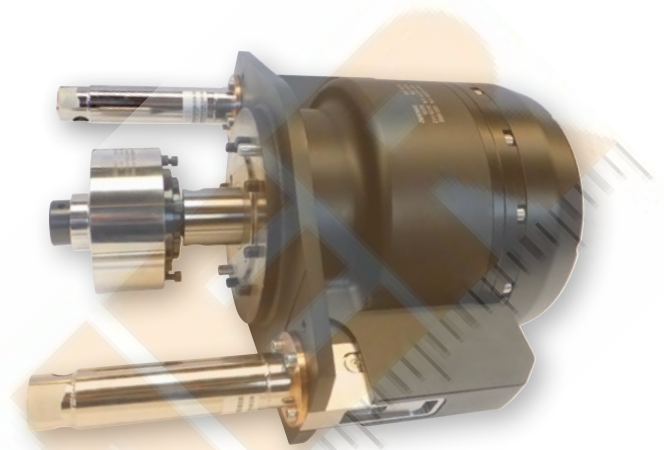
Technical Specification / Data Highlights

Class 7; 34,000 N·m (25,000 lbf·ft) with 61:1 torque multiplication.

Customised nose to suit end user's special receptacle (non-standard narrow reaction wings).

Sealed for use to 3,000 m (except input end), for connection to customer pressure compensation system.

High strength, lightweight materials for total weight in air of 59.9 kg.



ETO EXAMPLE 4 - SUBSEA VERTICAL USE INTERVENTION TORQUE MULTIPLIER

Project Number: Q5227

Introduction & Application

Oil & Gas industrial requirement for a subsea intervention torque multiplier (Super Duplex) with valve protection for vertical use only.

INPUT	OUTPUT INTERFACE	OUTPUT RATED
Class 4 to API 17D/ISO 13628-8 (2,700 N·m max. input)	Class 7 (short) to API 17D (1st edition) - 45,000 N·m normal operation / 67,500 N·m overload torque	45,000 N·m normal operation / 67,500 N·m overload torque

Technical Specification / Data Highlights

Torque Multiplication:	25:1 (28.41:1 true gear ratio)
Depth rating:	1,500 m with integral pressure compensation
Weights air/water:	160/135 kg
Latching:	Class 4 receptacle latching flange/No latching on class 6/7 (available as an option)
Materials:	Outside components Super Duplex (Norsok M-630/650)/Stainless Steel and POM nose bumper





ETO EXAMPLE 5 - CLASS 4-6 & 4-7 (LONG & SHORT) SUBSEA TORQUE MULTIPLIER KIT

Project Number: Q4636.01

Introduction & Application

Oil & Gas industry requirement for a subsea intervention torque multiplier kit, for horizontal and vertical use, and with the following interfaces/ratings:

INPUT	OUTPUT INTERFACE	OUTPUT RATED
Class 4 to API 17D/ ISO 13628-8	Class 7 (long) to API 17D (2nd edition) / ISO 13628-8	33,895 N·m / 25,000 lbf·ft
	Class 7 (short) to API 17D (1st edition)	33,895 N·m / 25,000 lbf·ft
	Class 6 to API 17D (2nd edition) / ISO 13628-8	13,558 N·m / 10,000 lbf·ft



Solution

Modular kit with interchangeable noses / output drives for the three configurations

Technical Specification / Data Highlights

Torque Multiplication: 12.93:1
Depth rating: 3,000 m with integral pressure compensation

Weights air/water:

Class 7 long 79.5/60.5 kg

Class 6 66.5/51.8 kg

Class 7 short 61.5/48.9 kg

Latching:

Class 4 receptacle latching flange/
No latching on class 6/7 (available as an option)

ETO EXAMPLE 6 - SPECIAL CRANKED SLIDING REACTION FOR USE WITH A PTS-119-6000

Project Number: Q4780

Introduction & Application

Customer required a reaction arm to work with a powered multiplier, to drive a series of pins positioned around a diameter, where the only point of reaction was the adjacent pin.

Solution

Special cranked sliding reaction for use with a PTS-119-6000

Technical Specification / Data Highlights

Solution includes a slave socket with a plain bore to clear 1½" AF hexagon.

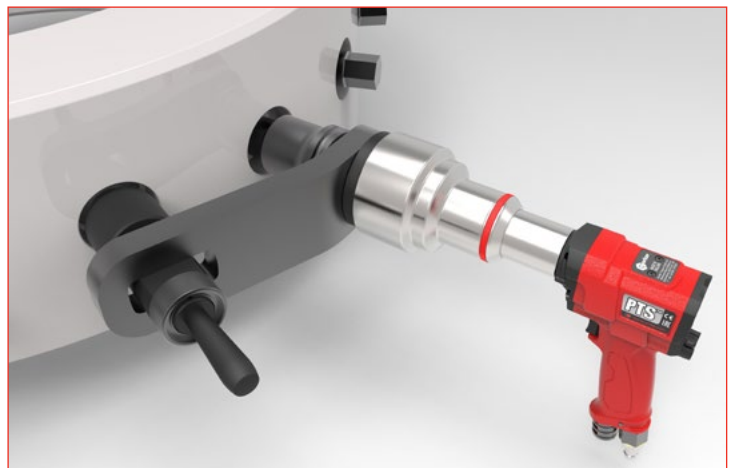
Reaction angled at 20° to the tool axis, with travelling centres to suit reaction off adjacent pin.

The axial travel is incorporated to accommodate potential pin movement on future wellhead designs.

The solution is designed to be used both in a workshop, and topside. Provided with a chemical black finish, the reaction will be cleaned and oiled after use if used in an offshore environment.

Max torque – 4,000 N·m

Weight – approx. 10.5 kg





ETO EXAMPLE 7 - PT12 KIT WITH 15 M SINGLE DIRECTION REMOTE CONTROL

Project Number: Q5174

Introduction & Application

Power tool required to rotate large 3 m gas turbine rotors at up to 34,000 N·m with 15 m remote operation.

Solution

PT 12 single speed pneumatic tool, 9,500 - 34,000 N·m range, 2½" square drive and direction change at tool.

Special control unit with air regulator / lubricator / filter, safety isolator valve on input, solenoid control valve on output and 15 m hose, USA power supply and remote grip switch pendant with 15 m lead.



BESPOKE REACTION ARMS

Norbar have a dedicated team ready to design any special bespoke reaction to suit your application.

We can offer any material, surface finish and levels of traceable certification.

The options are endless and only constrained by quality and safety.

Contact Norbar for more details.

