

## Torque Tool

The Tornado Torque Tool is designed for operation with a ROV system and incorporates several unique features which have resulted in a highly versatile, simple and lightweight tool design. The Torque Tool is designed to be compliant with API17D & H standards (as incorporated in ISO 13628-8), and the one tool provides the operator with the capability to cover all four classes of torque rating (1-4) up to a maximum of 2,000 ft lbs.

Converting the Torque Tool between the different classes is easily achieved without removing the hydraulic motor, and the necessary components can be readily changed without disassembly of any oil filled parts.

The host ROV is required to supply the Tornado Torque Tool with two solenoid valve controlled functions; one for rotating the torque tool end effector, and one to operate the torque tool clamping latches. The clamping latches are fail-safe, allowing removal of the tool from the API receptacle when hydraulic pressure is removed.

The number of turns are displayed subsea using a battery powered, digital LCD display with 1½ " high yellow colored numerals for easy underwater viewing. A power saving system is included which allows the electronics to be switched on and off subsea using the vehicle's lights to activate a photocell switch. If required, the display can also be powered from the host ROV using an optional power adaptor module.

The complete Tornado Torque Tool system incorporates all end effectors, drive shafts and secondary gearboxes for the four classes of tool configuration, and a surface torque calibrator with digital readout is also included for calibrating the tool on deck. Optional transit cases with foam padding can also be supplied to offer protective storage and a suitable means for transport offshore.



**Specifications:****Tornado Torque Tool**

- API 17D & H, Class 1-4 Torque Output:
  - Class 1: 0 to 50 ft lbs (0 Nm to 68 Nm)
  - Class 2: 0 to 200 ft lbs (0 Nm to 270 Nm)
  - Class 3: 0 to 1000 ft lbs (0 Nm to 1360 Nm)
  - Class 4: 0 to 2000 ft lbs (0 Nm to 2700 Nm)
- Max Weight
  - In Air 58 lbs (26kg) / In Water 42lbs (19 kg)
- Hydraulic Power Requirements
  - 2450 psi (169 Bar) Nominal – Adjustable to 3000 psi max
  - 0.7 gpm (2.5 lpm) Nominal
  - 2ea. Solenoid valve functions
- Dimensions: 25" x 9 1/2" x 8"  
(635mm x 241mm x 203mm)
- Change sockets (end effectors) simply by removing nose piece
- Change maximum torque class simply by removing socket and sliding in new secondary reducer
- Planocentric primary reduction gearset provides maximum reduction in minimum space
- Large (1.5" numerals) LCD turns display
- Battery status indicator (Battery life > 72 hours)
- Turns count accuracy +/- 18 degrees
- Power saving feature turns indicator on and off with flash of ROV lights
- Mechanical latch indication
- Handle can be custom manufactured to suit FLOT tool or manipulator preferences

**End Effector Profiles**

**Class 1 & 2**  
1 1/16" Square



**Class 3**  
1-1/8" Square



**Class 4**  
1-1/2" Square

**Torque Calibrator**

- Dimensions: 8 1/2" x 12" x 12 1/2"  
(216 mm x 302 mm x 318 mm)
- Weight: 33 lbs (15 kg)
- Torque: 0 ft lbs to 2000 ft lbs (0 Nm to 2700 Nm)

**Torque Calibration Tool**