Torque Wrench Loader
TWL1500

The design of the TWL1500 includes features that will provide an accurate and cost effective method for the calibration or testing of torque wrenches.

Designed to suit the majority of torque wrenches available with a torque value between 1 to 1500 N.m, the TWL1500 has been manufactured using quality materials that will provide many years of continuous, trouble-free operation.

The most significant feature of the TWL1500 is its compatibility with our wide range of Flange Mounted, Pro-Test and Smart Torque Block transducers. All fixtures, fastener kits and instructions are supplied allowing for complete flexibility and functionality.

With Pro-Test

TWL1500 shown with Flange Mounted Transducers, TTT and Model 1000 torque wrench

TWL1500 Torque Wrench Loader - Part No. 60246

Transducer Mounting Position	Transducer Options	Transducer Part No.	Calibrated Range	Torque Wrench	
				min	max
With FMT Range (see main photograph)					
Position 1	FMT10	50672.LOG	0.5-10 N.m	145mm	1310mm
-	FMT25	50673.LOG	1.25-25 N.m	145mm	1310mm
Position 2	FMT150	50674.LOG	7.5-150 N.m	240mm	1405mm
-	FMT400	50675.LOG	20-400 N.m	240mm	1405mm
Position 3	FMT1500	50676.LOG	30-1500 N.m	336mm	1500mm
With Pro-Test					
Position 1	Pro-Test 400	43219	8-400 N.m	240mm	1405mm
-	Pro-Test 1500	43220	30-1500 N.m	240mm	1405mm
Position 2	Pro-Test 1500	43220	30-1500 N.m	336mm	1500mm
With STB1000					
Position 1	STB1000	50683.LOG	20-1000 N.m	240mm	1405mm
Position 2	STB1000	50683.LOG	20-1000 N.m	336mm	1500mm

Note 1: Min and Max torque wrench lengths are from the square drive to the centre of the handle.
Note 2: Position 1 is closest to the loading carriage and position 3 is furthest away.

With STB1000

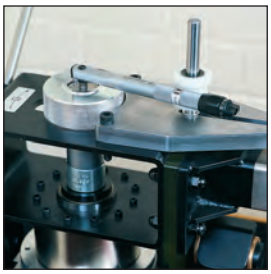
Dimensions

Max Width: 753 mm
(inc. handle & Instrument tray)

Max Height: 342 mm
(excluding instrument)

Max Length: 1721 mm

ISO 1500



ISO 1500 fitted with Small Reaction Plate, Part No. 20588.

Torque Wrench Loader
ISO 1500 and 2700

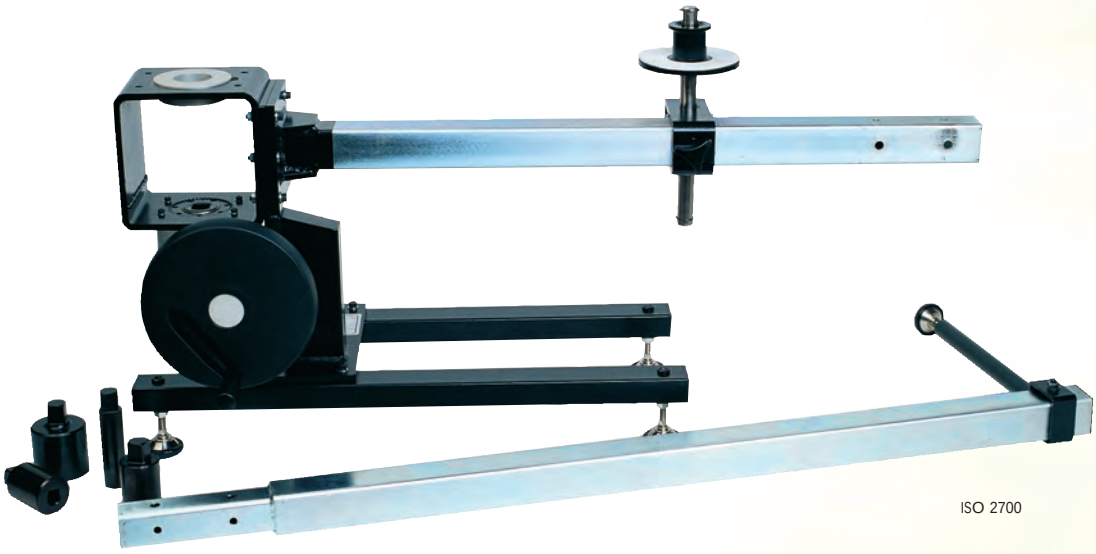
These loaders allow torque wrenches to be calibrated or tested in accordance with ISO 6789:2003, BS EN 26789:2003 and American military standard GGG-W-686. Their function is to take full advantage of the accuracy of Norbar's torque measuring system by reducing operator induced variations in the calibration process.

- The high ratio, 1200:1 (ISO 2700, 1250:1) gearbox allows high torques to be applied, whilst ensuring that the operator does not exceed the rate of increase of torque specified in the standards.
- The design allows for easy interchange of transducers using the Norbar Static Transducer system.
- The ISO 1500 90° facility allows performance of torque wrenches to be checked in two planes. Many wrenches give different torque values according to their orientation in use.
- Floating reaction point minimises side loads on wrench.
- ISO 2700 reaction extension bar allows wrenches up to 2200mm to be tested. This can be removed to save space. Wrenches up to 1100mm can be tested when the extension bar is not fitted
- Optional Small Reaction Plate (part no. 20588) allows torque wrenches down to 125 mm in length (centre of square to centre of handle) to be tested.
- Motorised version with speed control is available for the ISO 1500. This can be purchased as a kit to motorise an existing ISO or as a complete ISO 1500 Motorised Torque Wrench Loader.

ISO 1500 and 2700 Torque Wrench Loaders

Part No.	Description	Range		Torque Wrench Length (mm)		Adaptors
		N.m	lbf.ft	min	max	
60118	ISO 1500 with 90° rotation	1-1500	1-1100	200	1200	¼, ⅜, ½, ¾
60193	ISO 1500 Motorised Torque Wrench Tester	1-1500	1-1100	200	1200	¼, ⅜, ½, ¾
60194	Kit to motorise an ISO 1500	-	-	-	-	-
20502	ISO 2700	1-2700	1-2000	200	2250	¼, ⅜,½, ¾, 1, 1½
20588	Small Reaction Plate	-	-	125	180	-

Note: Min and Max torque wrench lengths are from the centre of the square drive to the centre of the handle.



ISO 2700

Calibration Beams and Weights Principals of Operation

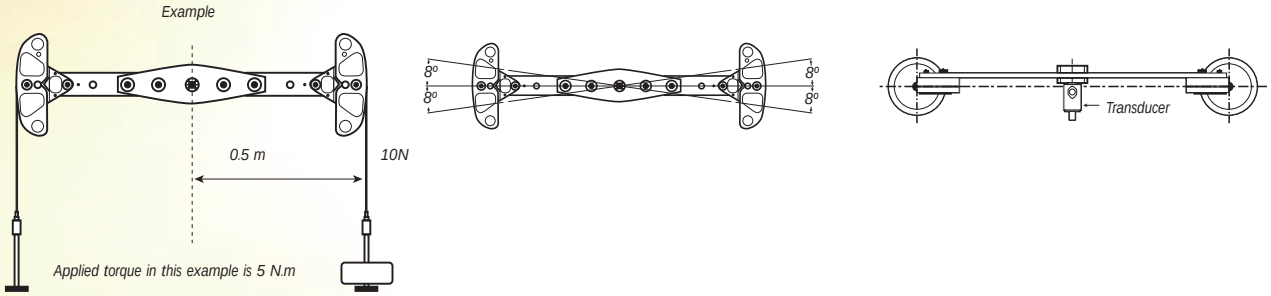
Norbar's Test Beams are designed for the static calibration of Torque Transducers. They are ideally suited to Norbar's transducers, but can be employed on other manufacturer's equipment.

Torque is generated by the application of a known force at a known radius from the centre of rotation of the torque transducer.

The Beams are designed with square drives machined to the top limit of ISO 2725. This minimises any play between the beam and the transducer. However, a combination of square drive tolerances, misalignment of fittings and elastic rotation of the transducer shaft inevitably cause the beam to rotate from the horizontal under load.

Norbar's Radius Ended Beams are designed with a +/-8 degree usable arc within which the calibration accuracy is unaffected.

Additionally the beams are designed to apply load on a vertical plane which cuts through the square drive inside the transducer. This minimises bending moments on the transducer and, for safe operation, ensures that the beam will not fall out of the transducer.



Gravitational Effects

It is very important that the gravitational value for the Laboratory is established. The effect of not doing this could be a variation in the force produced by the weight of perhaps 0.5% of reading.

It is therefore strongly recommended that you establish the local value of gravity (g) for your Laboratory and use weights that have been calibrated at that gravitational constant.

Norbar will supply weights calibrated to gravitational constants specified by the customer. However, if the customer does not specify a value for 'g' they will have been calibrated at an estimated gravitational constant for the customers' location.

Buoyancy Effects

The Norbar system uses calibrated weights to generate a downwards force.

This means that Archimedes principle applies, ie. air pressure under the weights causes an upwards force. This reduces the effective force generated by the weights and therefore the mass must be increased to allow for this.

Under standard conditions (ie. Air density 1.2 kg/m^3 and 20 degrees centigrade and working in conventional mass terms) the increase required is by a factor of 0.015%.

Weights purchased from Norbar will already have this factor taken into account.

Weights that are calibrated to standard procedures do not have this factor taken into account because the air buoyancy affects both sides of the mass balance and can be ignored. It is important that weights used for torque transducer calibration are adjusted for air buoyancy.

It should also be noted that the double ended beam design employed by Norbar means that each half of the beam is balanced with regard to buoyancy of the beam. This is a significant advantage over single-arm counterbalanced systems.

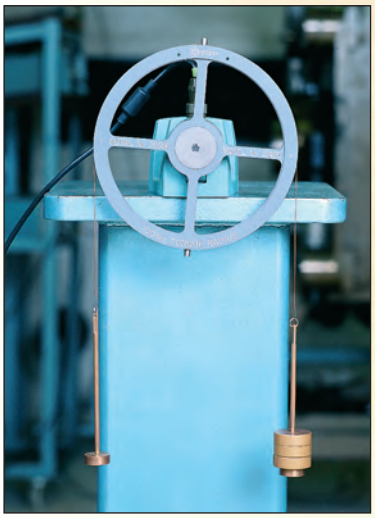
Calibration Disc

Designed to remove potential sources of measurement error, these Discs can be used to calibrate Norbar torque transducers, and torque transducers from other manufacturers (where design permits), as well as mechanical test devices. A UKAS accredited certificate for the measurement of torque radius is supplied with each beam.

- The < 0.04% uncertainty of applied torque achievable with this disc allows calibration to the high classes of accuracy specified by BS7882:2008.
- Machined to ±0.03% from aircraft alloys.
- Clockwise and counter-clockwise operation.
- Capable of SI or Imperial calibrations.
- Compatible with male and female 1/4" square transducer drives.
- No bearings to cause energy loss during loading.
- Brass weights with an accuracy better than ±0.01% are available in five sets to achieve a variety of calibration ranges.
- Special weight sets can be specified up to a maximum torque of 2.5N.m.

NOTE: A temperature controlled environment is essential for use of these beams. The selection of weights will be influenced by gravitational constant and air buoyancy values at the proposed laboratory site. See page 88.

Calibration Disc shown with more than one weight set.



Calibration Discs – S.I and Imperial

Range		Disc Part No.	Radius to Centre Line of Hanger	Weight Set Part No.s	Weight Set Comprising	Diameter of Weight Hanger Rod	Drive Square A/F in
Minimum	Maximum						
0.05 N.m	0.50 N.m	21400	100 mm	21452	10 x 0.5 N	4 mm	¼
0.10 N.m	1.00 N.m	21400	100 mm	21450	10 x 1.0 N	4 mm	¼
0.25 N.m	2.5 N.m	21400	100 mm	21479	10 x 2.5 N	4 mm	¼
5 ozf.in	50 ozf.in	21400	100 mm	21455	10 x 1.27 ozf	4 mm	¼
10 ozf.in	100 ozf.in	21400	100 mm	21453	10 x 2.54 ozf	4 mm	¼
16 ozf.in (1 lbf.in)	160 ozf.in (10 lbf.in)	21400	100 mm	21451	10 x 4.064 ozf	4 mm	¼

Radius Ended Beam

Designed to remove potential sources of measurement error, these beams can be used to calibrate Norbar torque transducers, and torque transducers from other manufacturers (where design permits), as well as mechanical test devices. A UKAS accredited certificate for the measurement of torque radius is supplied with each beam.

- The < 0.02% uncertainty of applied torque achievable with these beams allows calibration to the highest class of accuracy specified by BS7882:2008.
- Machined to ±0.01% (100 microns per meter) from aircraft alloys.
- Clockwise and counter-clockwise operation.
- All have interchangeable square drive to increase flexibility of use.
- Torque radius maintained throughout ±8 degrees of rotation from horizontal.
- No bearings to cause energy loss during loading.
- Balanced to maximise energy transfer to transducer during loading.
- Loading point offset to reduce bending moments on the transducer.
- High torque radius accuracy allows use of cast iron weights rather than stainless steel. Weight accuracy is required to be equal to or better than ±0.01%.

NOTE: A temperature controlled environment is essential for use of these beams. The selection of weights will be influenced by gravitational constant and air buoyancy values at the proposed laboratory site. See page 88.

Radius Ended Beams - S.I. Calibration

Range		Beam Part No.	Radius to Centre Line of Hanger	Weight Set Part No.s	Weight Set Comprising	Diameter of Weight Hanger Rod	Drive Square A/F (in)
Minimum	Maximum						
0.5 N.m	5.0 N.m	21429	250 mm	21476	10 x 2 N	9.5 mm	¼, ⅜
1 N.m	10 N.m	21429	250 mm	21454	10 x 4 N	9.5 mm	¼, ⅜
5 N.m	60 N.m	21429	250 mm	21458	10 x 20 N	9.5 mm	¼, ⅜
5 N.m	50 N.m	21421	500 mm	21477	10 x 10 N	9.5 mm	⅜, ½
10 N.m	100 N.m	21421	500 mm	21458	10 x 20 N	9.5 mm	½, ⅜
5 N.m	250 N.m	21427	500 mm	21459	1 x 10 N 10 x 50 N	9.5 mm	½, ¾
5 N.m	500 N.m	21427	500 mm	21460	1 x 10 N 10 x 100 N	9.5 mm	½, ¾
10 N.m	500 N.m	21428	1000 mm	21459	1 x 10 N 10 x 50 N	9.5 mm	½, ¾, 1
10 N.m	1000 N.m	21428	1000 mm	21460	1 x 10 N 10 x 100 N	9.5 mm	½, ¾, 1
10 N.m	1500 N.m	21428	1000 mm	21483	14 x 100 N 1 x 50 N 2 x 20 N 1 x 10 N	9.5 mm	½, ¾, 1

Radius Ended Beams - Imperial Calibration

Range		Beam Part No.	Radius to Centre Line of Hanger	Weight Set Part No.s	Weight Set Comprising	Diameter of Weight Hanger Rod	Drive Square A/F (in)
Minimum	Maximum						
10 lbf.in	100 lbf.in	21430	10”	21465	10 x 1 lbf	9.5 mm	¼, ⅜
50 lbf.in	500 lbf.in	21430	10”	21466	10 x 5 lbf	9.5 mm	¼, ⅜
10 lbf.ft	100 lbf.ft	21424	12”	21467	10 x 10 lbf	9.5 mm	⅜, ½
50 lbf.ft	500 lbf.ft	21425	24”	21468	10 x 25 lbf	9.5 mm	½, ¾
100 lbf.ft	1000 lbf.ft	21426	48”	21468	10 x 25 lbf	9.5 mm	¾, 1

5000 lbf.ft Calibration Beam

Designed to remove potential sources of measurement error, these beams can be used to calibrate Norbar torque transducers, and torque transducers from other manufacturers (where design permits), as well as mechanical test devices. A UKAS accredited certificate for the measurement of torque radius is supplied with each beam.

- The < 0.04% uncertainty of applied torque achievable with this beam allows calibration to the high classes of accuracy specified by BS7882:2008.
- Beam length machined to +/-0.01% (100 microns per meter).
- Clockwise and counter-clockwise operation.
- Beams balanced to maximise energy transfer to transducer during loading.
- High beam accuracy allows use of cast iron weights rather than stainless steel. Weight accuracy is required to be equal to or better than 0.01%.
- High quality bearings to reduce energy losses.
- Gearbox provided to level beam and remove cosine errors.
- SI and Imperial Calibration possible with one beam (using different weights).

NOTE: A temperature controlled environment is essential for use of these beams. The selection of weights will be influenced by gravitational constant and air buoyancy values at the proposed laboratory site. See page 88.

5000 lbf.ft Calibration Beam

Range		Beam Part No.	Radius to Centre Line of Hanger	Weight Set Part No.s	Weight Set Comprising	Diameter of Weight Hanger Rod	Drive Square A/F (in)
Minimum	Maximum						
500 N.m	5000 N.m	21842	1275 mm	21469	20 x 50 lbf	12 mm	1½
500 lbf.ft	5000 lbf.ft	21842	60 in	21469	20 x 50 lbf	12 mm	1½