

Handtorque™ Multipliers

What is a Torque Multiplier?

A torque multiplier is a device that increases the torque that can be applied by an operator. Because the power output can not exceed the power input, the number of output revolutions will be lower than the number of input revolutions ($\text{Torque} \times \text{rpm} = \text{Power}$).

How Handtorque™ Torque Multipliers Work

Handtorque multipliers incorporate an 'epicyclic' or 'planetary' gear train having one or more stages. Each stage of gearing increases the torque applied by a factor of 5, allowing Norbar to offer multipliers typically in ratios of 5:1, 25:1 and 125:1.

In the planetary gear system, torque is applied to the input gear or 'sun' gear. Three or four planet gears whose teeth are engaged with the sun gear therefore rotate. The outside casing of the multiplier, or 'annulus' is also engaged with the planet gear teeth, and would normally rotate in the opposite direction to the sun gear. A reaction arm prevents the annulus from rotating, and this causes the planet gears to orbit around the sun. The planet gears are held in a 'planetary' carrier which also holds the output square drive. Therefore as the planet gears orbit around the sun gear, the carrier and so the square drive turns.

Without the reaction arm to keep the annulus stationary, the output square will not apply torque.

Why use a Handtorque™ Torque Multiplier?

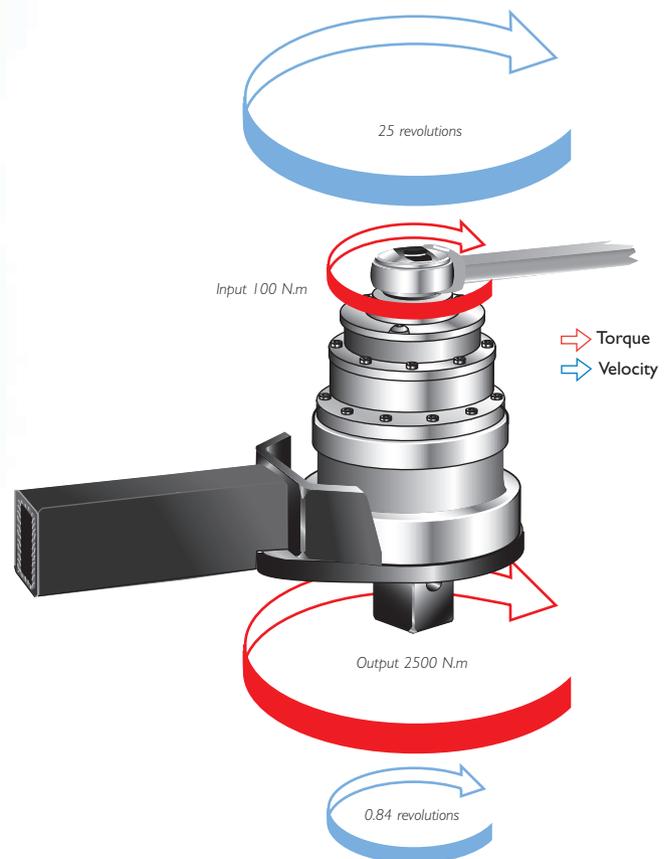
- **Safety** – use of long levers can be dangerous. Torque multipliers mean a reduction in the lever length or operator effort by a factor of 5, 25 or 125.
- **Space limitation** – the use of a long lever may be impossible due to the available space.
- **Accuracy** – torque will be applied most accurately when it is applied smoothly and slowly. Torque multipliers enable this by removing much of the physical effort from the tightening task.



Without a torque multiplier



With a torque multiplier



Advantages of the Norbar Handtorque™ System

Norbar gearboxes are built to an extremely high standard of precision. All gears rotate on needle roller bearings about hardened and ground journal pins. As a result, Norbar Handtorques can be relied upon to have a torque multiplication accuracy of $\pm 4\%$, throughout the operating range, taking the uncertainty out of high torque tightening.

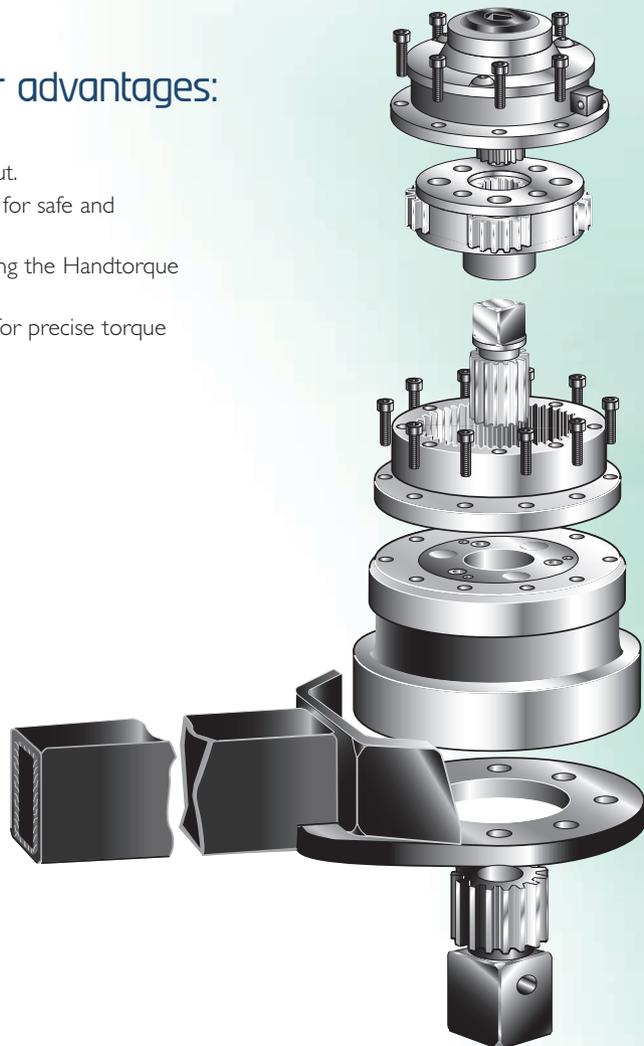
No gearbox is 100% efficient and so the velocity ratio (the number of turns that the input has to make to achieve one revolution of the output) is not the same as the torque multiplication ratio. Norbar multipliers are engineered such that each gear stage has a velocity ratio of typically 5.45:1 which results in a true torque multiplication factor of 5:1.

Torque output calculations are therefore a matter of simple arithmetic with little risk of incorrect bolt loading due to conversion errors. Other manufacturer's multipliers often require graphs or formulae to calculate the input torque to achieve a particular output.

The Norbar Handtorque is the most comprehensive multiplier range available. Standard products are available up to 47,500 N.m (35,000 lbf.ft) and 'specials' to 300,000 N.m (220,000 lbf.ft). A range of 'nose extensions' for reaching difficult to access bolts and a full range of torque transducers for highly accurate torque monitoring are available.

Summary of Norbar torque multiplier advantages:

- The ratio stated is the true torque multiplication factor.
- No correction charts are needed to determine torque output.
- Strong, safe Anti Wind-Up Ratchet available on most models for safe and comfortable operation.
- A wide range of alternative reaction styles are available making the Handtorque adaptable to many applications.
- Electronic torque transducers are available on most models for precise torque control.



Norbar Anti Wind-Up Ratchet

With any high ratio gearbox (25:1 or more) a certain amount of wind-up (backlash) has to be taken up before any useful tightening work is applied to the nut.

Each time the input device is released, the wind-up will rotate it back against the direction of operation.

The Anti Wind-Up Ratchet retains all of the wind-up forces as they are created with the following benefits:

1. The torque input device can not fly backwards against the direction of operation if it is suddenly released.
2. Without an Anti Wind-Up Ratchet, it will often be necessary to continue to make 360° sweeps with the torque input device otherwise the multiplier will 'unwind'. However, obstructions will often make this impossible.
3. With an Anti Wind-Up Ratchet fitted, the multiplier becomes locked onto the nut because the reaction plate is held hard against the reaction point. This means that even used upside down, the multiplier will support it's own weight.

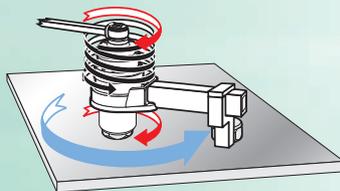
Anticlockwise



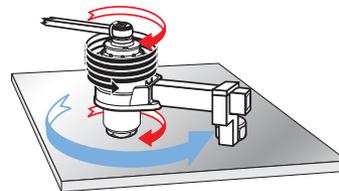
Neutral



Clockwise

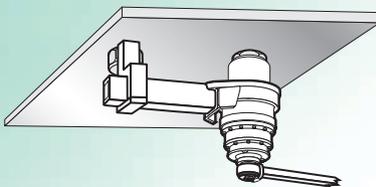


Multiplier behaves like a very stiff 'spring'

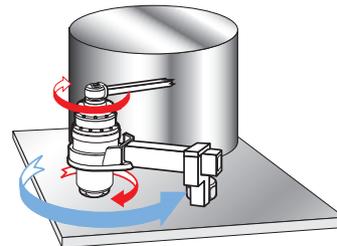


Multiplier will achieve maximum torque only after the 'spring' has been taken up

→ Torque
→ Reaction Force



In this application the Multiplier is used upside down and is able to support its own weight because the reaction plate is held hard against the reaction point



In this application, if it takes more than 180° to take up the wind-up at the required torque, this tightening operation will be impossible without an 'Anti Wind-Up Ratchet'

Safety Note:

Additional support is recommended as failure in the bolt, socket or multiplier will release the wind-up forces and cause the multiplier to drop.

HT3 Torque Multiplier

- 5:1 torque multiplication, accuracy guaranteed better than $\pm 4\%$.
- Supplied with two reaction bar styles for maximum versatility.
- Robust construction means minimal maintenance and long life.
- Supplied in a carrying case, the Highwayman is ideal for inclusion in the heavy vehicle tool kit.
- 1300 N.m version has a spare 3/4" output square included in the kit.
- Multiplier head only (no reaction bars or plastic box) also available. 1300 N.m version, part no. 17218. 2700 N.m version, part no. 17219.



HT3 Torque Multiplier

Model	Part No.	Range		Ratio	Input Square	Output Square	A	B	C	D	Tool Weight	Reaction Weight
		N.m	lbf.ft		in	in	mm	mm	mm	mm		
HT3 1300 N.m Version Kit	17220	1300	960	5:1	1/2	3/4	108	126	210	180	3.8	1.3
HT3 2700 N.m Version Kit	17221	2700	2000	5:1	3/4	1	108	128	210	186	3.8	1.3

Weight of entire kit, 7.1kg.

HT4 Torque Multiplier

- True 15.5:1 or 26:1 torque multiplication, accuracy guaranteed better than $\pm 4\%$.
- High ratios allow the use of a small torque wrench.
- Robust construction means minimal maintenance and long life.
- Supplied in carrying case with replacement square drive.
- Anti Wind-Up Ratchet (Anti Backlash) fitted to allow safer and more practical operation.
- Angle protractor for easy torque and angle tightening.



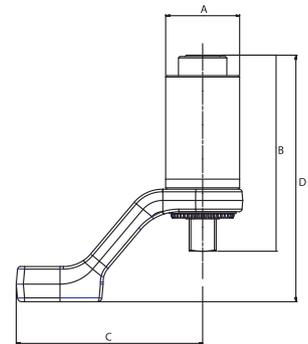
HT4 Torque Multiplier

Model	Part No.	Range		Ratio	Input Square	Output Square	A	B	C	Tool Weight	Reaction Weight
		N.m	lbf.ft		in	in	mm	mm	mm		
HT4/15.5	17022	3000	2200	15.5:1	1/2	1	108	156	450	6.1	1.9
HT4/26	17021	4500	3300	26:1	1/2	1	108	173	450	7.0	1.9



HandTorque™ Compact Series HT-52 & HT-72

- Compact size allows easy access to applications.
- Light weight for torque capacity.
- Supplied as standard with an aluminium reaction arm. Other options are available on request, including customised reactions.
- Robust, 48 tooth Anti Wind-Up Ratchet (AWUR) contains the forces generated during tightening for safe and easy operation.
- Guaranteed multiplication accuracy of $\pm 4\%$.
- Each multiplier is supplied with its own unique calibration certificate allowing the accurate calculation of input torque for critical applications
- Supplied in a carry case

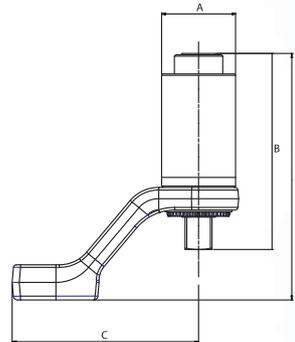


HT-52 and HT-72

Model	Part No.	Range		Ratio	Input Square in	Output Square in	A mm	B mm	C mm	D mm	Tool Weight kg	Reaction Weight kg
		N.m	lbf.ft									
HT-52/4.5	180200	1000	740	4.5:1	½	¾	52	115	131	150.3	1.0	0.85
HT-52/22	180201	1000	740	22:1	¾	¾	52	139	131	175	1.3	0.85
HT-52/22	180202	1000	740	22:1	½	¾	52	139	131	175	1.4	0.85
HT-52/22 Fitted with AWUR	180203	1000	740	22:1	¾	¾	52	153	131	189	1.4	0.85
HT-52/22 Fitted with AWUR	180204	1000	740	22:1	½	¾	52	153	131	189	1.4	0.85
HT-52/22 Fitted with AWUR	180205	1000	740	22:1	¾	1	52	157.9	131	190	1.4	0.85
HT-52/22 Fitted with AWUR	180206	1000	740	22:1	½	1	52	156.6	131	190	1.4	0.85
HT-72/5	180207	1000	740	5:1	½	¾	72	144.1	165.5	188.1	2.4	0.66
HT-72/5	180208	1500	1100	5:1	½	1	72	143.6	165.5	188.1	2.4	0.66
HT-72/5	180209	1000	740	5:1	¾	¾	72	163.2	165.5	207.6	2.4	0.66
HT-72/5	180210	2000	1450	5:1	¾	1	72	163.2	165.5	207.6	2.4	0.66
HT-72/27	180211	1000	740	27:1	½	¾	72	164.8	165.5	208.7	2.7	0.66
HT-72/27	180212	2000	1450	27:1	½	1	72	164.8	165.5	208.7	2.7	0.66
HT-72/27 Fitted with AWUR	180213	1000	740	27:1	½	¾	72	182.3	165.5	226.4	3.0	0.66
HT-72/27 Fitted with AWUR	180214	2000	1450	27:1	½	1	72	182.3	165.5	226.4	3.0	0.66

Handtorque™ Compact Series HT-92 & HT-119

- Compact size allows easy access to applications.
- Light weight for torque capacity.
- Supplied as standard with an aluminium reaction arm. Other options are available on request, including customised reactions.
- Robust, 48 tooth Anti Wind-Up Ratchet (AWUR) contains the forces generated during tightening for safe and easy operation.
- Guaranteed multiplication accuracy of $\pm 4\%$.
- Each multiplier is supplied with its own unique calibration certificate allowing the accurate calculation of input torque for critical applications
- Supplied in a carry case



HT-92 and HT-119

Model	Part No.	Range		Ratio	Input Square	Output Square	A	B	C	D	Tool Weight	Reaction Weight
		N.m	lbf.ft		in	in	mm	mm	mm	mm	kg	kg
HT-92/25 Fitted with AWUR	18092	4000	2950	25:1	½	1	92	220.3	204.9	277.4	5.4	1.35
HT-119/25 Fitted with AWUR	18091	7000	5000	25:1	½	1 ½	119.2	252.4	198.6	329.7	9.3	2.10

Handtorque™ Compact Series Kits

For convenience, it is now possible to purchase a torque multiplier from the 'Compact Series' packaged with the appropriate torque wrench. This allows the operator to arrive at the bolting application with everything needed in one robust carry case. Space has also been allowed in the carry case for accessories such as sockets.

The torque wrench and torque multiplier are each supplied with their own unique calibration certificate, allowing accurate calculation of input torque to the multiplier for critical applications.

Also available with N.m or lbf.ft only torque wrenches.

Handtorque™ Kits

Part No.	Handtorque Supplied	Torque Wrench Supplied	Kit Length	Kit Width	Kit Depth	Kit Weight
			mm	mm	mm	Kg
18186	HT-52, 22:1, ¾" Out	TTi60 (Dual Scale)	360	228	135	5.4
18189	HT-52, 22:1, 1" Out	TTi60 (Dual Scale)	360	225	135	5.47
18192	HT-72, 27:1, 1" Out	TTi100 (Dual Scale)	459	319	160	7.7
18195	HT-92, 25:1, 1" Out	TTi200 (Dual Scale)	459	319	160	12.25





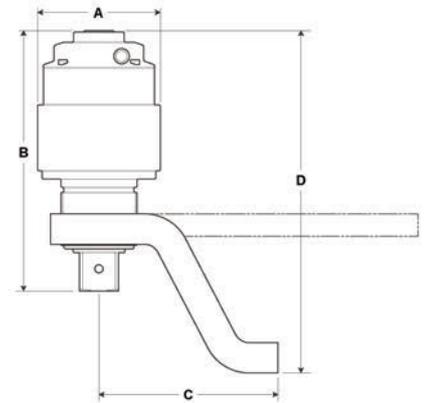
Handtorque™ Small Diameter Series

Handtorque models HT30 and 60 have all the features of the Standard Series, but have a higher torque output for a given gearbox diameter.

- Reduced diameter allows better access, particularly on pipe flanges.
- Reaction taken from high strength spline.
- Reaction foot can slide on the spline to allow for sockets of various lengths.
- Anti Wind-Up Ratchet available on all models allowing safer and more practical operation.



HT60/25



Alternative 350mm long, straight reaction plate; may be modified by customer to suit their applications.

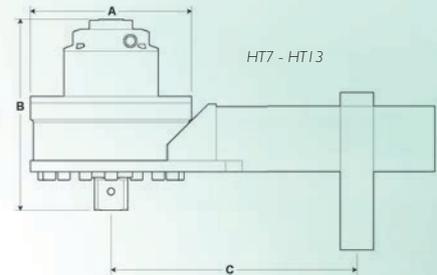
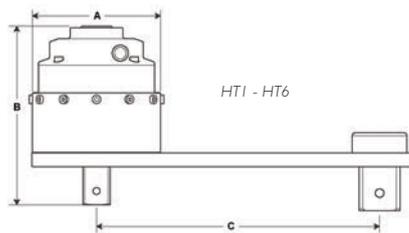
HT30 Part No. 16686
HT60 Part No. 16687

Small Diameter Series

Model	Part No.	Range		Ratio	Input Square		A	B	C	D min	D max	Tool Weight	Reaction Weight
		N.m	lbf.ft		in	in							
30/5	18003	3000	2200	5:1	¾	1	108	192	140	224.2	252.4	5.0	2
30/5 Fitted with AWWUR	18002	3000	2200	5:1	¾	1	108	187	140	219.7	247.9	6.1	2
30/15	18004	3000	2200	15:1	½	1	108	210.9	140	243.2	271.4	7.0	2
30/25 Fitted with AWWUR	18006	3000	2200	25:1	½	1	108	210.9	140	243.2	241.4	7.0	2
60/25	18008	6000	4400	25:1	½	1½	119	256	174	311.5	337	10.6	4
60/75 Fitted with AWWUR	18010	6000	4400	75:1	½	1½	119	283.2	174	340.5	366	12.1	4
60/125 Fitted with AWWUR	18012	6000	4400	125:1	½	1½	119	284.7	174	340.5	366	12.1	4

Handtorque™ Standard Series

- True torque multiplication guaranteed better than $\pm 4\%$.
- High ratios allow the use of a small torque wrench, multipliers can be used where access is limited.
- Anti Wind-Up Ratchet available on models of 25:1 ratio and above.
- Other reaction styles can be designed to suit specific applications.
- Electronic torque transducers can be fitted for precise torque monitoring. See page 83.
- Other models available up to 300,000 N.m.



Standard Series

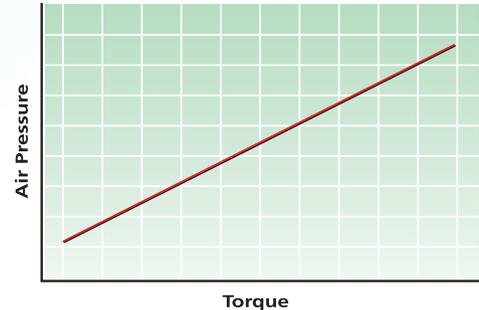
Model	Part No.	Range		Ratio	Input Square		A	B	C		Tool Weight	Reaction Weight
		N.m	lbf.ft		in	in			min	max		
1	16010	1700	1250	5:1	½	¾	108	106	83	217	3	2.2
2/5	16012	1700	1250	5:1	¾	1	108	126	83	217	3	2.2
2/25 Fitted with AWUR	16089	1700	1250	25:1	½	1	108	141.5	83	217	5.6	2.2
5/5	16014	3400	2500	5:1	¾	1	119	142.1	86	264	4.7	2.5
5/25 Fitted with AWUR	16090	3400	2500	25:1	½	1	119	167.6	86	264	7.5	2.5
6/5	16016	3400	2500	5:1	¾	1½	119	144.7	86	264	4.7	2.5
6/25 Fitted with AWUR	16092	3400	2500	25:1	½	1½	119	172	86	264	7.5	2.5
7/5	16067	6000	4500	5:1	¾	1½	144	174.8	146	333	8.1	6.3
7/25 Fitted with AWUR	16065	6000	4500	25:1	½	1½	144	201.1	146	333	10.7	6.3
7/125 Fitted with AWUR	16068	6000	4500	125:1	½	1½	144	226	146	333	12.2	6.3
9/25 Fitted with AWUR	16070	9500	7000	25:1	¾	1½	184	200.1	171	351	17.4	8.3
9/125 Fitted with AWUR	16071	9500	7000	125:1	½	1½	184	220.1	171	351	18.9	8.3
11/25	16082	20000	14700	25:1	¾	2½	212	265.6	-	500	30.1	13.3
11/125 Fitted with AWUR	16049	20000	14700	125:1	½	2½	212	293.4	-	500	32.1	13.3
12/87.5 Fitted with AWUR	18085	34,000	25000	87.5:1	¾	2½	240	337	-	-	41.5	6.5
13/125 Fitted with AWUR	16053	47500	35000	125:1	¾	2½	315	379	-	-	95.2	6.9

Pneutorque® Pneumatic Multipliers

What is a Pneutorque® Pneumatic Wrench?

The Pneutorque consists of a robust air motor driving a Norbar multiplier with three or more stages of epicyclic gearing.

Torque control is achieved by adjustment of the air pressure. An air pressure versus torque graph and a calibration certificate is supplied with each tool and allows specific torque values to be set. For more critical applications, Pneutorques can be fitted with a torque transducer and the precise torque output displayed. The tool can then be shut off at the desired torque either manually or automatically using suitable control circuitry.



Air pressure graph supplied with each tool.



The Lubro Control Unit, 16074, is Norbar's filter / regulator / lubricator. It is supplied with 3m of high quality steel braided air hose and a 100mm pressure gauge for accurate setting.



The Twin Lubro, 16075, allows for a quick change of air pressure or direction by virtue of a two direction switch on the side.



The Multi Channel Lubro, 60290, offers an ideal solution for customers wishing to use a Pneutorque or other pneumatic tool on multiple applications without having to refer constantly back to air pressure graphs.

Why use Pneutorque® Pneumatic Wrenches?

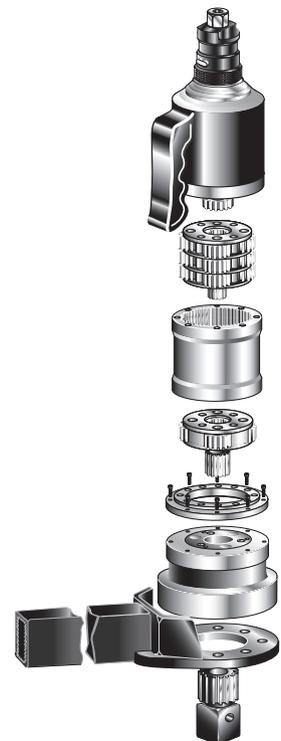
Hand operated torque multipliers are ideal for low volume or intermittent use or when there is no power source available. However, for production lines or whenever a large number of bolts is involved, a powered multiplier will save a considerable amount of time.

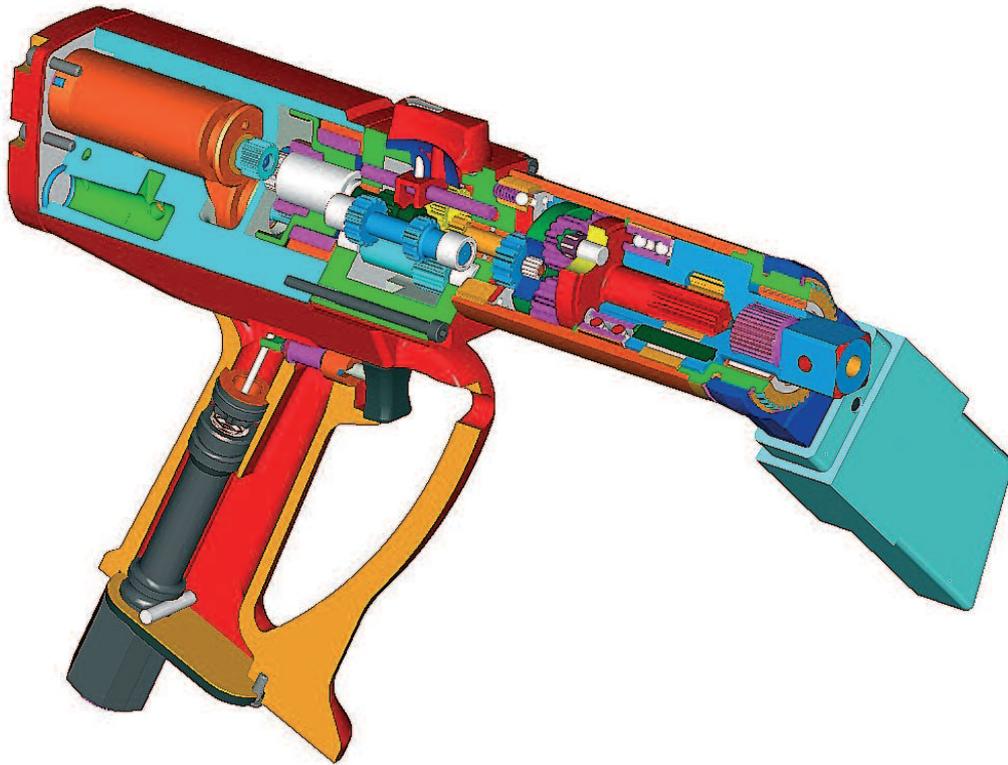
Pneutorque operation is quiet – less than 85dB(A) with absolutely no impacting. These two factors make Pneutorques comfortable for the operator to use, reducing fatigue and consequently increasing safety.

Pneutorques provide accurate torque control – on a given joint they will stall repeatedly to within $\pm 5\%$. Using electronic shut off, this repeatability can be improved to $\pm 2\%$.

Summary of Pneutorque® Advantages

- Sound pressure level does not exceed 85dB(A) when tested in accordance with ISO3744:1994.
- No impacting means less damage to the tool, socket and bolted assembly.
- Less operator fatigue, results in increased safety.
- Powerful – models available up to 300,000 N.m (220,000 lbf.ft).
- Repeatability of $\pm 5\%$ for accurate torque control.
- A wide range of attachments and accessories make Pneutorques adaptable to many applications.





Pneutorque Applications

The smooth and continuous torque output of the Pneutorque makes these tools suitable for a wide range of bolting and non-bolting applications.

Bolting

Pneutorques are ideally suitable for tightening and untightening bolts of up to 150mm diameter. The following is just a small selection of applications:

- Wheel nuts on trucks, buses and large machinery.
- Structural steelwork.
- High pressure joints eg. Pipelines, boiler feed pumps and pressure vessels.
- Engine head bolts.
- Injector heads on plastic injection moulding machines.
- Heat exchangers.
- Heavy vehicle production eg. Chassis and suspension bolts.

Non-bolting

Whenever a high continuous torque is needed, Pneutorques can be used as the power source. Typical applications include:

- Ball valve operation.
- Powering wagons and gantries.
- Barring of large diesel engines (turning the crankshaft) during build.
- Weld testing by applying test torques.
- Roller adjustment in steel mills and paper mills.
- Valving of gas bottles.



Ball valve actuation using PT13



Gas bottle valving and de-valving using PT1500

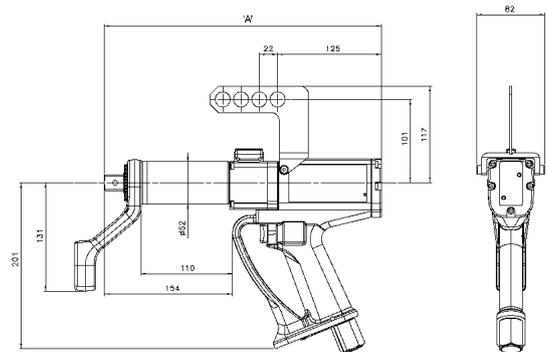
Pneutorque® PTM-52 Series Stall Models

The PTM-52 is engineered to be one of the lightest and fastest tools of its type on the market. The exceptionally compact 52mm diameter gearbox means that the tool is well balanced, light weight and provides excellent access to bolts.



PTM-52-800-B

- Fast – 800 N.m version has a free speed of 148 rpm for rapid bolt run-down.
- Light weight – single direction stall tool weighs just 3.8 kg.
- Quiet – less than 85 dB(A) when under load.
- Non impacting – low vibration levels make these tools comfortable and safe to use.
- Square drive is quickly and easily replaceable.
- On Bi-directional tools, the direction control knob is locked while the tool is running to prevent accidental damage to the gearbox.
- ‘Soft Start’ trigger control aids socket location and allows gradual and safe reaction location.
- For safety, gearbox can rotate independently from the handle so that reaction forces are not transmitted back to the operator.
- 1” square drive available, Part No. 18545.



500 and 800 N.m Tools - Stall

Model	Direction of Operation	Square Drive	Part No.	Range		Free Speed †	Length 'A'	Tool Weight	Reaction Weight
				N.m	lbf.ft				
PTM-52-500-F	Forward only	¾	18100.F06	100-500	74-370	224	284	3.8	0.85
PTM-52-500-B	Bi-directional	¾	18100.B06	100-500	74-370	224	333	4.1	0.85
PTM-52-800-F	Forward only	¾	18101.F06	160-800	118-590	148	284	3.8	0.85
PTM-52-800-B	Bi-directional	¾	18101.B06	160-800	118-590	148	333	4.1	0.85

† Speed at maximum air pressure.

Pneutorque® PTM-52 Series Internal Control and External Control Models

The integration of electronic torque measurement and control into the PTM-52 Series is achieved with the minimum impact on overall tool size and weight. The actual applied torque is accurately measured at the output of the tool meaning that a repeatability of $\pm 2\%$ can be guaranteed.

Shut-Off, Internal Control – these tools include a torque transducer, easy to read LED display, control panel and a solenoid valve to shut off the air supply once the desired torque has been reached. The tolerance band within which the bolt must be tightened can be set on the tool handle control panel. When the tool is operated, the actual applied torque is displayed along with one of three coloured LEDs to indicate a low, within tolerance or high result. The tool can be operated in either N.m or lbf.ft.

Shut-Off, External Control – this version of the PTM-52 incorporates a transducer, solenoid valve and three coloured LEDs for the indication of low, within tolerance or high results. However, all control functions and torque display are housed in an external controller unit (purchased separately). External controllers can give a much greater range of functionality than is possible on the 'Internal Control' version of the tool.



PTM-52-800-B-IC

Tool controller in wall box for external control versions.
Part No. 60244 without printer or 60254 with printer.
Cable for use with PTM tools, Part No. 61127.600.



500 and 800 N.m Tools - Shut-Off, Internal

Model	Direction of Operation	Square Drive	Part No.	Range		Free Speed †	Length 'A'	Tool Weight	Reaction Weight
		in		N.m	lbf.ft	rpm			
PTM-52-500-B-IC	Bi-directional	3/4	18110.B06	100-500	74-370	224	397	4.9	0.85
PTM-52-800-B-IC	Bi-directional	3/4	18111.B06	160-800	118-590	148	397	4.9	0.85

500 and 800 N.m Tools - Shut-Off, External

Model	Direction of Operation	Square Drive	Part No.	Range		Free Speed †	Length 'A'	Tool Weight	Reaction Weight
		in		N.m	lbf.ft	rpm			
PTM-52-500-B-EC	Bi-directional	3/4	18120.B06	100-500	74-370	224	397	4.9	0.85
PTM-52-800-B-EC	Bi-directional	3/4	18121.B06	160-800	118-590	148	397	4.9	0.85

† Speed at maximum air pressure.

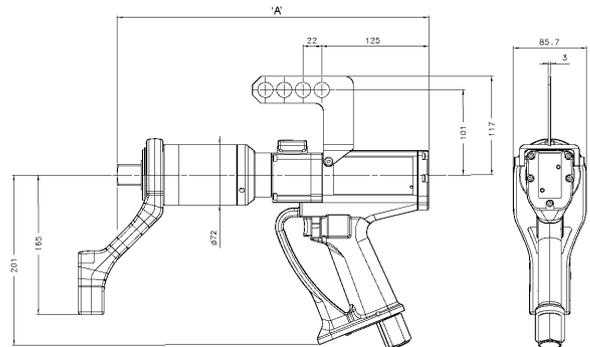
Pneutorque® PTM-72 Series Stall Models

PTM-72 tools use the same 'twin motor' handle as the PTM-52 but fitted with a durable 72mm gearbox to allow higher torque outputs. The 'twin motor' concept gives the benefit of high run-down speeds while adding very little to the size and weight of the tool.



PTM-72-1000-B

- Fast - 1000 N.m version has a free speed of 122 rpm for rapid bolt run-down.
- Light weight - single direction 2000 N.m stall tool weighs just 6.2 kg.
- Quiet - less than 85 db(A) when under load.
- Non impacting - low vibration levels make these tools comfortable and safe to use.
- Square drive is quickly and easily replaceable.
- On Bi-directional tools, the direction control knob is locked while the tool is running to prevent accidental damage to the gearbox.
- 'Soft Start' trigger control aids socket location and allows gradual and safe reaction location.
- For safety, gearbox can rotate independently from the handle so that reaction forces are not transmitted back to the operator.
- 1" square drive available for the 1000 N.m version, Part No. 18492.



1000, 1350 and 2000 N.m Tools - Stall

Model	Direction of Operation	Square Drive in	Part No.	Range		Free Speed † rpm	Length 'A' mm	Tool Weight kg	Reaction Weight kg
				N.m	lbf.ft				
PTM-72-1000-F	Forward only	¾	18102.F06	200-1000	147-738	122	316	5.8	0.7
PTM-72-1000-B	Bi-directional	¾	18102.B06	200-1000	147-738	122	365	6.1	0.7
PTM-72-1350-F	Forward only	1	18103.F08	270-1350	200-1000	86	316	5.8	0.7
PTM-72-1350-B	Bi-directional	1	18103.B08	270-1350	200-1000	86	365	6.1	0.7
PTM-72-2000-F	Forward only	1	18104.F08	400-2000	295-1475	58	349	6.2	0.7
PTM-72-2000-B	Bi-directional	1	18104.B08	400-2000	295-1475	58	398	6.5	0.7

† Speed at maximum air pressure.

Pneutorque® PTM-72 Series Internal Control and External Control Models

The integration of electronic torque measurement and control into the PTM-72 Series is achieved with the minimum impact on overall tool size and weight. The actual applied torque is accurately measured at the output of the tool meaning that a repeatability of $\pm 2\%$ can be guaranteed.

Shut-Off, Internal Control - these tools include a torque transducer, easy to read LED display, control panel and a solenoid valve to shut off the air supply once the desired torque has been reached. The tolerance band within which the bolt must be tightened can be set on the tool handle control panel. When the tool is operated, the actual applied torque is displayed along with one of three coloured LEDs to indicate a low, within tolerance or high result. The tool can be operated in either N.m or lbf.ft.

Shut-Off, External Control - this version of the PTM-72 incorporates a transducer, solenoid valve and three coloured LEDs for the indication of low, within tolerance or high results. However, all control functions and torque display are housed in an external controller unit (purchased separately), see page 43 for details. External controllers can give a much greater range of functionality than is possible on the 'Internal Control' version of the tool.



PTM-72-2000-B-EC

1000, 1350 and 2000 N.m Tools - Shut-Off, Internal

Model	Direction of Operation	Square Drive	Part No.	Range		Free Speed †	Length 'A'	Tool Weight	Reaction Weight
		in		N.m	lbf.ft				
PTM-72-1000-B-IC	Bi-directional	$\frac{3}{4}$	18112.B06	200-1000	147-738	122	422	7.4	0.7
PTM-72-1350-B-IC	Bi-directional	1	18113.B08	270-1350	200-1000	86	422	7.4	0.7
PTM-72-2000-B-IC	Bi-directional	1	18114.B08	400-2000	295-1475	58	453	7.8	0.7

1000, 1350 and 2000 N.m Tools - Shut-Off, External

Model	Direction of Operation	Square Drive	Part No.	Range		Free Speed †	Length 'A'	Tool Weight	Reaction Weight
		in		N.m	lbf.ft				
PTM-72-1000-B-EC	Bi-directional	$\frac{3}{4}$	18122.B06	200-1000	147-738	122	422	7.4	0.7
PTM-72-1350-B-EC	Bi-directional	1	18123.B08	270-1350	200-1000	86	422	7.4	0.7
PTM-72-2000-B-EC	Bi-directional	1	18124.B08	400-2000	295-1475	58	453	7.8	0.7

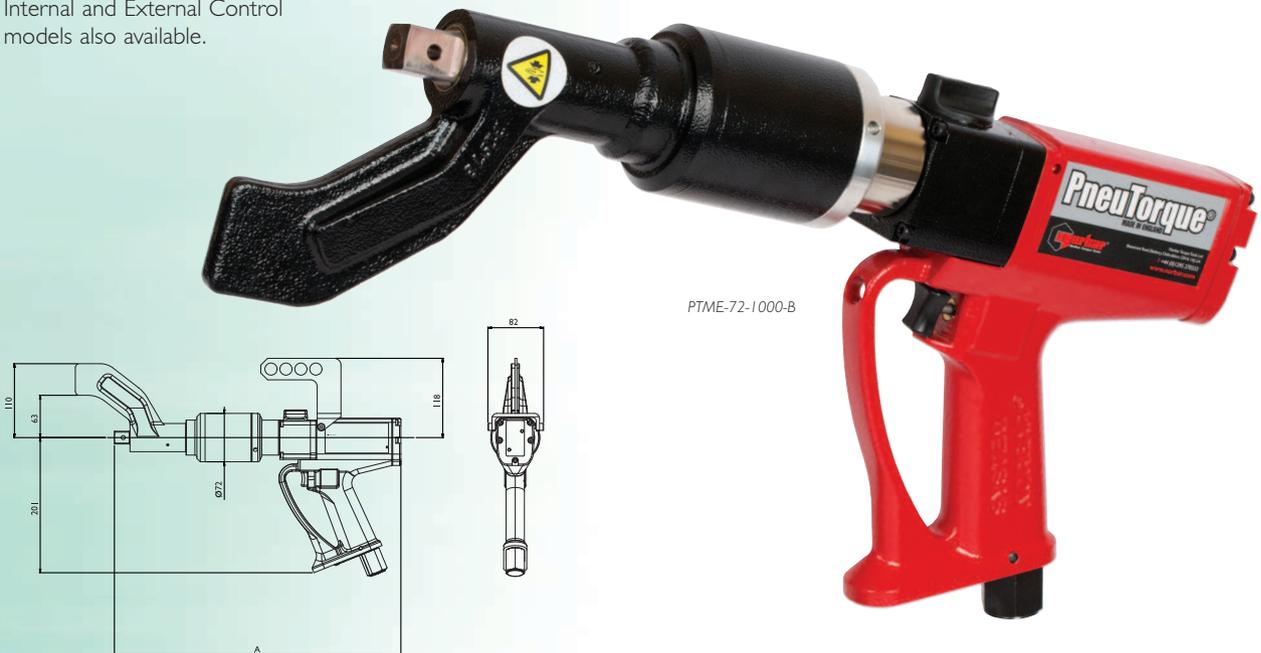
† Speed at maximum air pressure.

Pneutorque® PTME-72 Series Stall Models

The PTME-72 series of tools was designed to meet the needs of the commercial vehicle wheel market.

The integrated reaction foot is designed specifically to reach recessed wheel bolts and the 72mm diameter gearbox is selected to cope with the high frequency of use demanded by busy tyre shops.

- Fast - 1000 N.m version has a free speed of 122 rpm for rapid bolt run-down time.
- Light weight, for ease of handling.
- Quiet - less than 85 db(A) when under load.
- Non-impacting - low vibration levels make these tools comfortable and safe to use.
- Square drive is quickly and easily replaceable.
- On Bi-directional tools, the direction control knob is locked while the tool is running to prevent accidental damage to the gearbox.
- 'Soft Start' trigger control aids socket location and allows gradual and safe reaction location.
- For safety, gearbox can rotate independently from the handle so that reaction forces are not transmitted back to the operator.
- Internal and External Control models also available.



1000 and 2000 N.m Tools - Stall

Model	Direction of Operation	Square Drive	Part No.	Range		Free Speed †	Length 'A'	Tool Weight	Reaction Weight
				N.m	lbf.ft				
PTME-72-1000-F	Forward only	¾	18140.F06	200-1000	147-738	122	378.9	6.9	n/a
PTME-72-1000-B	Bi-directional	¾	18140.B06	200-1000	147-738	122	428.4	7.2	n/a
PTME-72-1000-B	Bi-directional	1	18149.B08	200-1000	147-738	122	434.6	7.2	n/a
PTME-72-2000-F	Forward only	1	18141.F08	400-2000	295-1475	58	437.2	7.4	n/a
PTME-72-2000-B	Bi-directional	1	18141.B08	400-2000	295-1475	58	486.9	7.7	n/a

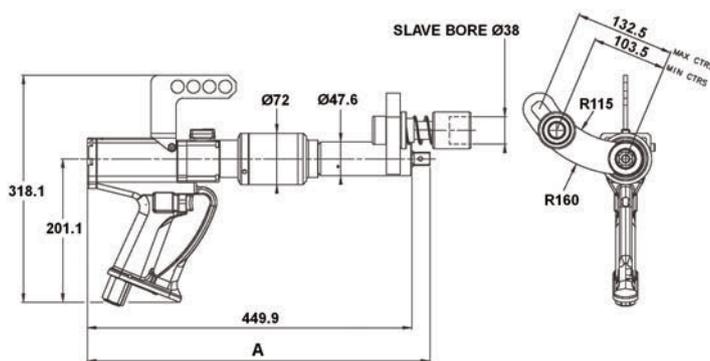
† Speed at maximum air pressure.

Pneutorque® TrukTorque™ Stall Models

The TrukTorque pneumatic torque multiplier features a special curved reaction arm designed to handle bolt tightening on the front and rear wheels of trucks and buses. The design easily accommodates wheel trims and deeply recessed wheel bolts.

TrukTorque has none of the noise and vibration problems associated with impact wrenches and can provide accurate torque control without the need to check every wheel bolt with a manual torque wrench.

- Maximum torque of 1000 N.m (738 lbf.ft) covers all truck and buses.
- Free running speed of 122 rpm for rapid bolt rundown.
- The reaction socket is spring loaded to locate on the next available nut for safe and secure reaction.
- Robust and lightweight. TrukTorque is lighter than comparable impact wrenches.
- Compatible with most trucks and bus wheels.



Application Guide

Wheel Stud PCD	Number of Studs	Nut A/F
335 mm	10	30 - 33 mm
285.75 mm	10	30 - 33 mm
285 mm	8	30 - 33 mm
275 mm	8	30 - 33 mm
225 mm	10	30 - 33 mm

TrukTorque™

Model	Direction of Operation	Square Drive	Part No.	Range		Free Speed †	Length 'A'	Tool Weight	Reaction Weight
		in		N.m	lbf.ft	rpm	mm	kg	kg
TrukTorque™	Bi-directional	¾	18162.B06	200-1000	147-738	122	474.9	9.4	n/a
TrukTorque™	Bi-directional	1	18162.B08	200-1000	147-738	122	483	9.4	n/a

† Speed at maximum air pressure.



PneuTorque® PTM-92 and PTM-119 Series Stall Models

The latest extension to the PTM tool range brings the speed advantage of the twin motor handle to higher capacity PneuTorque models.

Coupled with new gearbox designs, these new models deliver an ideal balance between robustness, speed and weight.



PTM-92-4000

- Fast - 2700 N.m version has a free speed of 46 rpm for rapid bolt run-down time.
- Light weight - PTM-92-2700 weighs just 8.5kg. All models are fitted as standard with a light but robust aluminium reaction plate.
- Other reaction styles are available for maximum versatility.
- Quiet - less than 85 db(A) when under load.
- Non impacting - low vibration levels make these tools comfortable and safe to use.
- Square drive is quickly and easily replaceable.
- Bi-directional. The direction control knob is locked while the tool is running to prevent accidental damage to the gearbox.
- 'Soft Start' trigger control aids socket location and allows gradual and safe reaction location.
- For safety, gearbox can rotate independently from the handle so that reaction forces are not transmitted back to the operator.



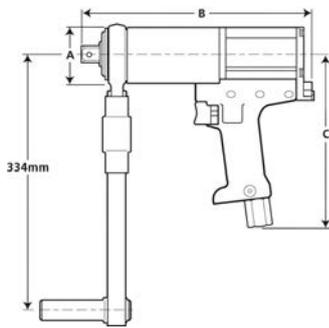
2700, 4000, 4500 and 6000 N.m Tools - Stall

Model	Square Drive	Part No.	Range		Free Speed †	Length 'A'	B	C	D	E	Tool Weight	Reaction Weight
	in		N.m	lbf.ft								
PTM-92-2700-B	1	18106.B08	540-2700	400-2000	46	424	178	243	205	92	8.5	1.35
PTM-92-4000-B	1	18119.B08	800-4000	590-2950	32	424	178	243	205	92	8.5	1.35
PTM-119-4500-B	1½	18108.B12	900-4500	660-3300	23	456	197	277	200	119	12.5	2.1
PTM-119-6000-B	1½	18109.B12	1200-6000	885-4500	15.5	456	197	277	200	119	12.5	2.1

† Speed at maximum air pressure.

Pneutorque® 72mm Series Single Speed and Automatic Two Speed Models

- 72mm gearbox diameter allows excellent access.
- Powerful – up to 2000 N.m output.
- Switchable forward and reverse operation.
- Quiet – less than 81 dB(A), and non impacting for low operator fatigue.
- 'Soft Start' trigger control aids socket location and allows gradual and safe reaction take up.
- For safety, gearbox can turn independently from the handle. Torque reaction is never transmitted back to the operator.
- All torques can be achieved at less than 6 bar (90 psi).
- Automatic Two Speed models offer all of the advantages of the single speed versions but with the additional benefit of a run down speed five times greater than the final torque speed.



72mm Series, Single Speed

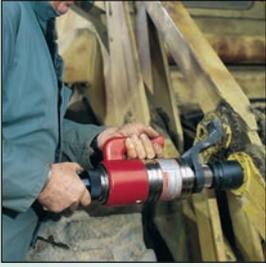
Model	Square Drive	Part No.	Range		Free Speed [†]	A	B	C	Tool Weight	Reaction Weight
	in		N.m	lbf.ft						
PT 72/500	3/4	18023	90-500	66-370	35	72	301	223	6.4	1.7
PT 72/1000	3/4	18022	190-1000	140-740	15	72	301	223	6.4	1.7
PT 72/1000	1	18026	190-1000	140-740	15	72	301	223	6.4	1.7
PT 72/1500	1	18021	300-1500	220-1110	9	72	301	223	6.4	1.7
PT 72/2000	1	18033	400-2000	300-1450	6	72	301	223	6.4	1.7

[†] Speed at maximum air pressure.

72mm Series, Automatic Two Speed

Model	Square Drive	Part No.	Range		Free Speed [†]	A	B	C	Tool Weight	Reaction Weight
	in		N.m	lbf.ft						
PT 72/500 AUT	3/4	18023.AUT	203-500	150-370	170	72	373	223	8.7	1.7
PT 72/1000 AUT	3/4	18022.AUT	488-1000	360-740	75	72	373	223	8.7	1.7
PT 72/1000 AUT	1	18026.AUT	488-1000	360-740	75	72	373	223	8.7	1.7
PT 72/1500 AUT	1	18021.AUT	760-1500	560-1110	45	72	373	223	8.7	1.7
PT 72/2000 AUT	1	18033.AUT	1000-2000	750-1450	30	72	373	223	8.7	1.7

[†] Speed at maximum air pressure and in high gear.



Pneutorque® Small Diameter Series Single Speed Models

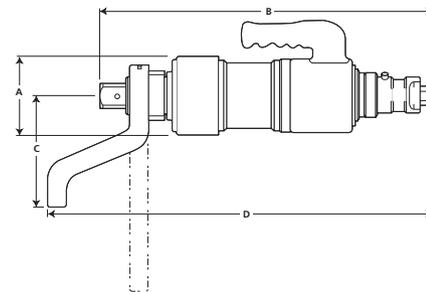
These Pneutorque models share the same features as the 'Standard' Series, but have a higher torque output for a given gearbox diameter.

- Reduced diameter allows improved access.
- High torque output – up to 5500 N.m.
- Reversible – Pneutorques can be used for tightening and untightening.
- Reaction foot can slide on the spline to allow for sockets of various lengths.
- Electronic torque transducers can be fitted for precise torque monitoring.



PT5500

Alternative 350mm long, straight reaction plate; may be modified by customer to suit their applications.
PT2700 Part No. 16686
PT4500 and PT5500 Part No. 16687



Small Diameter Series, Single Speed

Model	Square Drive	Part No.	Range		Free Speed†	A	B	C	D min	D max	Tool Weight	Reaction Weight
	in		N.m	lbf.ft		mm	mm	mm	mm	mm		
PT 2700	1	18027	880-2700	650-2000	5	108	437	140	469	498	14.5	2
PT 5500	1½	18028	1200-5500	885-4000	2.5	119	512	154	566	592	17.9	4

† Speed at maximum air pressure.

Pneutorque® Small Diameter Series Two Speed Models

- Two Speed Models offer all of the advantages of single speed versions but with the additional benefit of a run down speed five times greater than the final torque speed.
- Reduced diameter allows improved access.
- High torque output – up to 5500 N.m.
- Reversible – Pneutorques can be used for tightening and untightening.
- Reaction foot can slide on the spline to allow for sockets of various lengths
- Electronic torque transducers can be fitted for precise torque monitoring.



Manual 2 Speed



PT5500 AUT

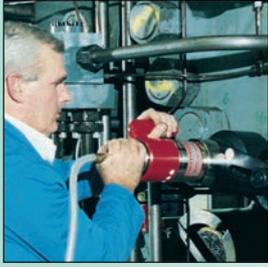
Small Diameter Series, Manual Two Speed

Model	Square Drive	Part No.	Range		Free Speed†	A	B	C	D min	D max	Tool Weight	Reaction Weight
	in		N.m	lbf.ft	rpm	mm	mm	mm	mm	mm	kg	kg
PT 2700 MTS	1	18027.MTS	880-2700	650-2000	25	108	524	140	556	585	18.0	2
PT 5500 MTS	1½	18028.MTS	1200-5500	885-4000	12.5	119	598	154	652	678	21.4	4

Small Diameter Series, Automatic Two Speed

Model	Square Drive	Part No.	Range		Free Speed†	A	B	C	D min	D max	Tool Weight	Reaction Weight
	in		N.m	lbf.ft	rpm	mm	mm	mm	mm	mm	kg	kg
PT 2700 AUT	1	18027.AUT	880-2700	650-2000	25	108	506	140	538	567	18	2
PT 5500 AUT	1½	18028.AUT	1762-5500	1300-4000	12.5	119	581	154	635	661	21.4	4

† Speed at maximum air pressure and in high gear

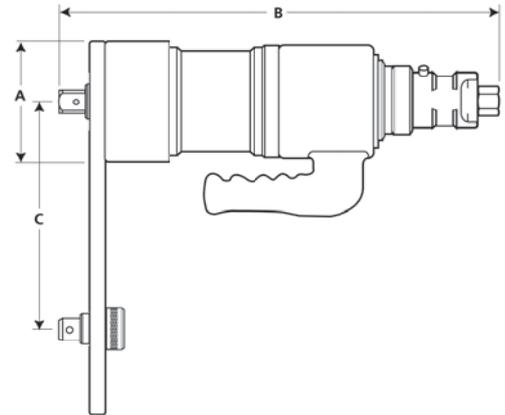


Pneutorque® Standard Series Models to 3400 N.m, Single Speed

Based on the original Pneutorque, the 'Standard Series' Range is a direct result of over 40 years of refinement and development necessary to keep pace with industry's requirements today.

In use on many thousands of applications worldwide, Pneutorque Wrenches continue to represent the foundation of Norbar's powered tool range.

- Models available for almost every bolting application.
- Forward and reverse operation.
- Low operator fatigue – quiet, non impacting or pulsing.
- Repeatability of $\pm 5\%$.
- Other reaction styles can be designed to suit specific applications.
- Electronic torque transducers can be fitted for precise torque monitoring.



Standard Series to 3400 N.m, Single Speed

Model	Square Drive	Part No.	Range		Free Speed†	A	B	C min	C max	Tool Weight	Reaction Weight
	in		N.m	lbf.ft							
PT 1	3/4	16031	160-680	120-500	30	108	368	83	217	10.6	2.2
PT 1	1	16011	160-680	120-500	30	108	373	83	217	10.6	2.2
PT 1A	3/4	16098	270-1200	200-900	15	105	368	83	217	11.1	2.2
PT 1A	1	16097	270-1200	200-900	15	108	373	83	217	11.1	2.2
PT 2	1	16013	515-1700	380-1250	9	108	373	83	217	11.1	2.2
PT 5	1	16015	880-3400	650-2500	5	119	424	83	264	14	2.5
PT 6	1 1/2	16017	880-3400	650-2500	5	119	430	83	264	14	2.5

† Speed at maximum air pressure.

Pneutorque® Standard Series Models to 3400 N.m, Two Speed

Two Speed models offer all of the advantages of single speed versions but with the additional benefit of a run down speed five times greater than the final torque speed.

- Models available for almost every bolting application.
- Forward and reverse operation.
- Low operator fatigue – quiet, no impacting or pulsing.
- Repeatability of $\pm 5\%$.
- Other reaction styles can be designed to suit specific applications.
- Electronic torque transducers can be fitted for precise torque monitoring.



PT5 AUT

PT2 MTS

Standard Series to 3400 N.m, Manual Two Speed

Model	Square Drive	Part No.	Range		Free Speed†	A	B	C min	C max	Tool Weight	Reaction Weight
	in		N.m	lbf.ft							
PT 1 MTS	¾	16031.MTS	160-680	120-500	150	108	454	83	217	14.1	2.2
PT 1 MTS	1	16011.MTS	160-680	120-500	150	108	459	83	217	14.1	2.2
PT 1A MTS	¾	16098.MTS	270-1200	200-900	75	108	454	83	217	14.3	2.2
PT 1A MTS	1	16097.MTS	270-1200	200-900	75	108	459	83	217	14.6	2.2
PT 2 MTS	1	16013.MTS	515-1700	380-1250	45	108	459	83	217	14.6	2.2
PT 5 MTS	1	16015.MTS	880-3400	650-2500	25	119	510	86	264	17.5	2.5
PT 6 MTS	1½	16017.MTS	880-3400	650-2500	25	119	516	86	264	17.5	2.5

Standard Series to 3400 N.m, Automatic Two Speed

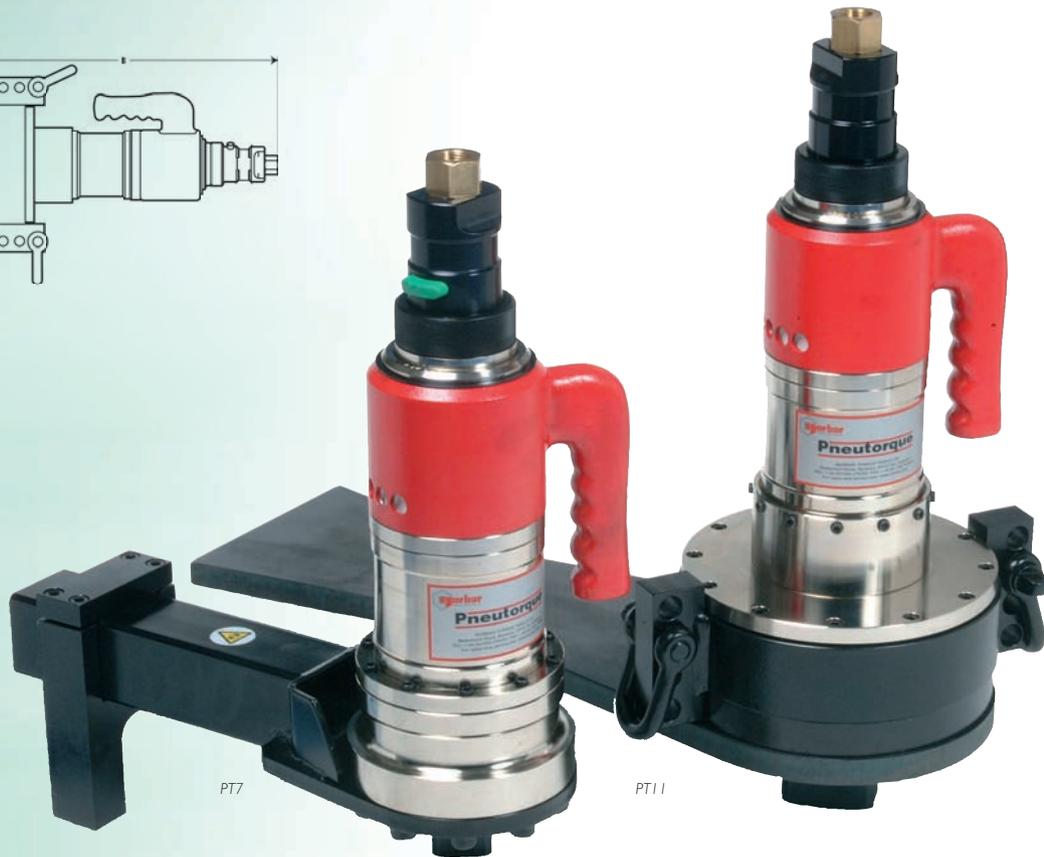
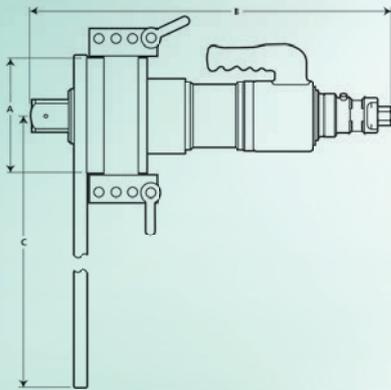
Model	Square Drive	Part No.	Range		Free Speed†	A	B	C min	C max	Tool Weight	Reaction Weight
	in		N.m	lbf.ft							
PT 1 AUT	¾	16031.AUT	160-680	120-500	150	108	437	83	217	14.1	2.2
PT 1 AUT	1	16011.AUT	160-680	120-500	150	108	442	83	217	14.1	2.2
PT 1A AUT	¾	16098.AUT	270-1200	200-900	75	108	437	83	217	14.6	2.2
PT 1A AUT	1	16097.AUT	270-1200	200-900	75	108	442	83	217	14.6	2.2
PT 2 AUT	1	16013.AUT	515-1700	380-1250	45	108	442	83	217	14.6	2.2
PT 5 AUT	1	16015.AUT	880-3400	650-2500	25	119	493	86	264	17.5	2.5
PT 6 AUT	1½	16017.AUT	880-3400	650-2500	25	119	499	86	264	17.5	2.5

†Speed at maximum air pressure and in high gear



Pneutorque® Standard Series Models to 100,000 N.m, Single Speed

- Models available for almost every bolting application, up to 100,000 N.m.
- Forward and reverse operation.
- Low operator fatigue – quiet, no impacting or pulsing.
- Repeatability of $\pm 5\%$.
- Other reaction styles can be designed to suit specific applications.
- Electronic torque transducers can be fitted for precise torque monitoring. See page 83.
- Models 13 and 14 supplied with blank reaction plate for fabrication to specific requirements.



Standard Series to 100,000 N.m, Single Speed

Model	Square Drive	Part No.	Range		Free Speed†	A	B	C min	C max	Tool Weight	Reaction Weight
	in		N.m	lbf.ft							
PT 7	1½	16066	1762-6000	1300-4500	2.5	144	457	146	333	19.7	6.3
PT 9	1½	16072	2710-9500	2000-7000	1.8	184	452	169	351	24.4	8.3
PT 11	2½	16046	4400-20000	3250-14700	1.2	212	546.3	-	500	38.6	13.3
PT 12	2½	18086	9500-34000	7000-25000	0.5	240	593	Blank Plate		49.8	6.5
PT 13	2½	16052	13550-47000	10000-35000	0.3	315	629	Blank Plate		102.2	6.9
PT 14	3½	16045	22375-100000	16500-73500	0.2	315	726	Blank Plate		119.4	10.4

† Speed at maximum air pressure.

Pneutorque® Standard Series Models to 300,000 N.m, Two Speed

Two Speed Models offer all of the advantages of single speed versions but with the additional benefit of a run down speed five times greater than the final torque speed.

- Models available for almost every bolting and torque application, up to 300,000 N.m.
- Forward and reverse operation.
- Low operator fatigue – quiet, no impacting or pulsing.
- Repeatability of ±5%.
- Other reaction styles can be designed to suit specific applications.
- Electronic torque transducers can be fitted for precise torque monitoring. See page 83.
- Models 13 and 14 supplied with blank reaction plate for fabrication to specific requirements.



PT13 and PT14 are supplied on a trolley and with a Lubro Control Unit

Standard Series to 300,000 N.m, Manual Two Speed

Model	Square Drive	Part No.	Range		Free Speed [†]	A	B	C min	C max	Tool Weight	Reaction Weight
	in		N.m	lbf.ft							
PT 7 MTS	1½	16066.MTS	1762-6000	1300-4500	12.5	144	543	146	333	23.2	6.3
PT 9 MTS	1½	16072.MTS	2710-9500	2000-7000	9	184	538	169	351	27.9	8.3
PT 11 MTS	2½	16046.MTS	4400-20000	3250-14700	6	212	632	-	500	42.1	13.3
PT 12 MTS	2½	18086.MTS	9500-34000	7000-25000	2.5	240	679	Blank Plate		53.3	6.5
PT 13 MTS	2½	16052.MTS	13550-47000	10000-35000	1.5	315	716	Blank Plate		105.7	6.9
PT 14 MTS	3½	16045.MTS	22375-100000	16500-73500	1	315	800	Blank Plate		122.9	10.4
PT 18 MTS	-	16054.MTS	85000-300000	62500-220000	0.3	520	930	-		380	-

[†] Speed at maximum air pressure.

PT 18 part number does not include an output drive or reaction. These components will be engineered uniquely for each application.

Standard Series to 100,000 N.m, Automatic Two Speed

Model	Square Drive	Part No.	Range		Free Speed [†]	A	B	C min	C max	Tool Weight	Reaction Weight
	in		N.m	lbf.ft							
PT 7 AUT	1½	16066.AUT	1762-6000	1300-4500	12.5	144	526	146	333	23.2	6.3
PT 9 AUT	1½	16072.AUT	2710-9500	2000-7000	9	184	521	169	351	27.9	8.3

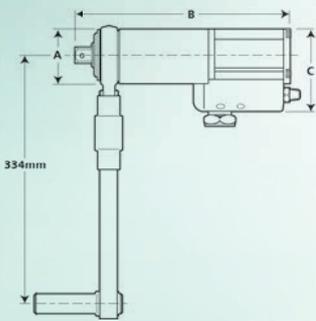
[†]Speed at maximum air pressure and in high gear



PneuTorque® Remote Control 72mm Series

Remote control versions have no direction/shut-off control on the tool but rely on external pneumatic circuitry to provide this function. This opens up numerous application possibilities for the PneuTorque ranging from simple stall shut-off in a hazardous working environment to sophisticated, multi-spindle torque and angle shut-off systems.

- Stall control gives repeatability of $\pm 5\%$ on a given joint.
- Torque transducers and angle encoders available for all models. These form the basis of sophisticated control systems giving repeatability of up to $\pm 2\%$. See page 83.
- Automatic Two Speed gearbox reduces run-down times.
- Each gearbox supplied with a standard reaction device or, on request, one specifically designed to suit the application.



PT1000 Remote

72mm Series, Remote Control

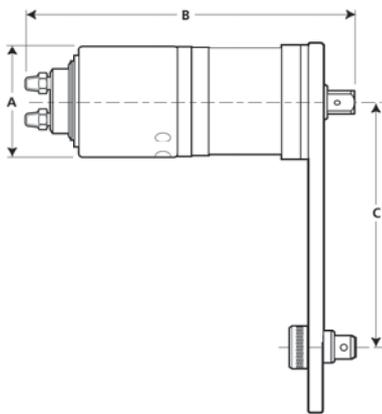
Model	Square Drive	Part No.	Range		Free Speed [†]	A	B	C	Tool Weight	Reaction Weight
	in		N.m	lbf.ft						
PT 500	$\frac{3}{8}$	18031	90-500	66-370	35	72	290.2	111	6.4	1.7
PT 500 AUT	$\frac{3}{8}$	18031.AUT	203-500	150-370	170	72	362.2	111	8.7	1.7
PT 1000	$\frac{3}{4}$	18030	190-1000	140-740	15	72	290.2	111	6.4	1.7
PT 1000 AUT	$\frac{3}{4}$	18030.AUT	488-1000	360-740	75	72	362.2	111	8.7	1.7
PT 1000	1	18032	190-1000	140-740	15	72	290.2	111	6.4	1.7
PT 1000 AUT	1	18032.AUT	488-1000	360-740	75	72	362.2	111	8.7	1.7
PT 1500	1	18029	300-1500	220-1110	9	72	290.2	111	6.4	1.7
PT 1500 AUT	1	18029.AUT	760-1500	560-1110	45	72	362.2	111	8.7	1.7
PT 2000	1	18034	400-2000	300-1450	6	72	290.2	111	6.4	1.7
PT 2000 AUT	1	18034.AUT	1000-2000	750-1450	30	72	362.2	111	8.7	1.7

[†]Speed at maximum air pressure and in high gear where applicable.

Pneutorque® Remote Control Standard Series

All Standard and Small Diameter Series Pneutorques are available fitted with the remote motor, most popular models tabulated below.

- Stall control gives repeatability of $\pm 5\%$ on a given joint.
- Torque transducers and angle encoders available for all models.
These form the basis of sophisticated control systems giving repeatability of up to $\pm 2\%$.
See page 83.
- Automatic Two Speed gearbox reduces run-down times.
- Each gearbox supplied with a standard reaction device or, on request, one specifically designed to suit the application.



PT2 Remote



Standard Series, Remote Control

Model	Square Drive	Part No.	Range		Free Speed†	A	B	C min	C max	Tool Weight	Reaction Weight
	in		N.m	lbf.ft							
PT 1	3/4	16031.X	160-680	120-500	30	108	292	83	217	10.6	2.2
PT 1 AUT	3/4	16031.XAUT	160-680	120-500	150	108	361	83	217	14.1	2.2
PT 1	1	16011.X	160-680	120-500	30	108	298	83	217	10.6	2.2
PT 1 AUT	1	16011.XAUT	160-680	120-500	150	108	366	83	217	14.1	2.2
PT 1A	3/4	16098.X	270-1200	200-900	15	108	298	83	217	11.1	2.2
PT 1A AUT	3/4	16098.XAUT	270-1200	200-900	75	108	366	83	217	14.6	2.2
PT 1A	1	16097.X	270-1200	200-900	15	108	298	83	217	11.1	2.2
PT 1A AUT	1	16097.XAUT	270-1200	200-900	75	108	366	83	217	14.6	2.2
PT 2	1	16013.X	515-1700	380-1250	9	108	298	83	217	11.1	2.2
PT 2 AUT	1	16013.XAUT	515-1700	380-1250	45	108	366	83	217	14.6	2.2
PT 5	1	16015.X	880-3400	650-2500	5	119	348	86	264	14	2.5
PT 5 AUT	1	16015.XAUT	880-3400	650-2500	25	119	417	86	264	17.5	2.5

†Speed at maximum air pressure and in high gear where applicable.



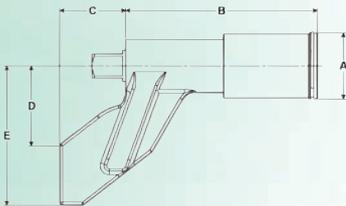
Reaction Nose Extensions

Special nose extension reaction devices are available for use in situations where the tool access is restricted. A typical application is the rear wheel nuts on heavy vehicles.



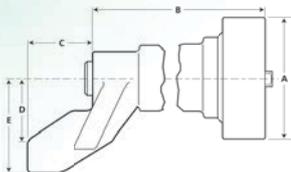
PTM-52 fitted with Nose Extension

Nose Extensions for PTM-52 and PTM-72 Series Multipliers



To Fit PT	Square Drive	Part No.	A	B	C	D	E	Weight
	in		mm	mm	mm	mm	mm	kg
PTM-52	3/4	18601.006	52	150	51	63	110	3.1
PTM-52	3/4	18601.009	52	228	51	63	110	3.5
PTM-52	3/4	18601.012	52	303	51	63	110	3.9
PTM-72	1	19007.006	72	181	60	67	110	3.25
PTM-72	1	19007.009	72	257	60	67	110	4.05
PTM-72	1	19007.012	72	327	60	67	110	5.00

Nose Extensions for 72mm Series Multipliers

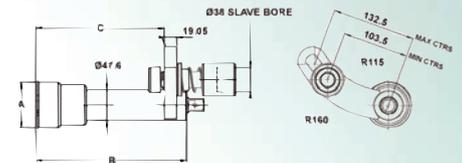


To Fit HT/PT	Square Drive	Part No.	A	B	C	D	E	Weight
	in		mm	mm	mm	mm	mm	kg
PT500 to PT2000 HT-72	Uses Square From Tool	18349.006	73	178	59	67	110	3.1
		18349.009	73	258	59	67	110	3.8
		18349.012	73	328	59	67	110	4.3
		18349.015	73	409	59	67	110	5.5
		18349.018	73	476.8	59	67	110	6.1

Reaction Nose Extensions

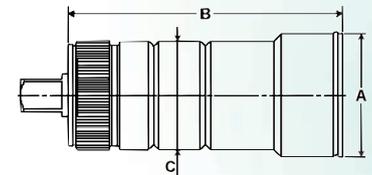
TrukTorque™ Nose Extensions for PTM-72 Series Multipliers

To Fit HT/PT	Square Drive	Part No.	A	B	C	Weight
	in		mm	mm	mm	
PTM-72	3/4	19087.009	72	237.5	202.5	5.5
PTM-72	3/4	19087.012	72	314.5	279.5	6.3
PTM-72	1	19089.009	73.2	257	222	5.3
PTM-72	1	19089.012	73.2	326.7	291.6	6.2



Splined Nose Extensions for PTM-52, PTM-72 and PTM-92 Series Multipliers

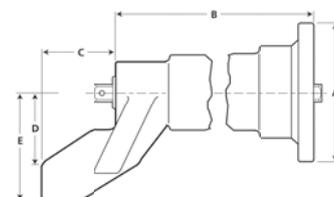
To Fit HT/PT	Square Drive	Part No.	A	B	C	Weight
	in		mm	mm	mm	
PTM-52	3/4	19045.006	52	150	48	1.8
PTM-52	3/4	19045.009	52	226	48	2.4
PTM-52	3/4	19045.012	52	303	48	3.2
PTM-72	3/4	19046.006	72	160	63.5	2.9
PTM-72	3/4	19046.009	72	236	63.5	3.8
PTM-72	3/4	19046.012	72	313	63.5	4.8
PTM-92	1	19047.006	72	161	63.5	3.0
PTM-92	1	19047.009	72	237	63.5	4.2
PTM-92	1	19047.012	72	313	63.5	5.4



Nose Extensions for Standard Series Multipliers

To Fit HT/PT	Square Drive	Part No.	A	B	C	D	E	Weight
	in		mm	mm	mm	mm	mm	
1	3/4	16480.006	108	146	51	63	110	2.9
1	3/4	16480.009	108	224	51	63	110	3.7
1	3/4	16480.012	108	300	51	63	110	4.5
1 & 2	1	16542.006	108	146	72	81	124	5.1
1 & 2	1	16542.009	108	221	72	81	124	6.2
1 & 2	1	16542.012	108	297	72	81	124	7.4
5	1	16694.006	119	146	72	81	124	5.4
5	1	16694.009	119	221	72	81	124	6.8
5	1	16694.012	119	297	72	81	124	8.2

Special nose extension reaction devices are available for use in situations where the tool access is restricted. A typical application is the rear wheel nuts on heavy vehicles.





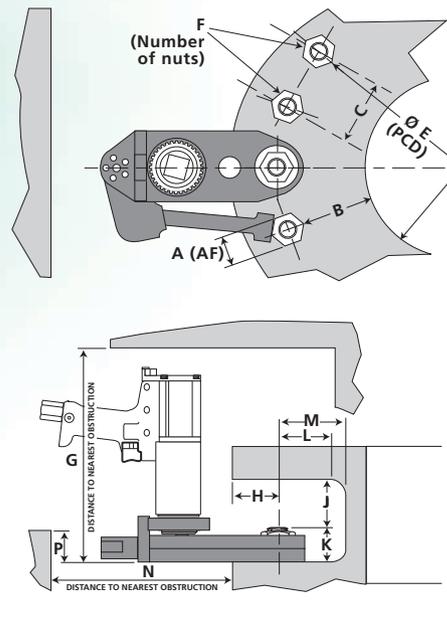
Geared Offsets

Offsets are invaluable in situations where access is limited due to headroom or tool diameter.

The Geared Offset has been developed to enable the tightening of fasteners in environments where access restrictions prevent the use of a standard multiplier or where excessive stud lengths prevent the tightening of a nut with standard sockets.

Each geared offset is manufactured to customers specifications and is therefore tailor-made to their application. For this reason it is essential that we obtain as much information as possible.

Please complete the diagram below and return to Norbar or your Norbar distributor.

A =	H =
B =	J =
C =	K =
D =	L =
E =	M =
F =	N =
G =	P =
Max Torque Required	
N.m	lbf.ft

Pneutorque® Lifting Assemblies

A variety of lifting assemblies have been developed to ensure that Pneutorques can be manoeuvred and operated safely in a production environment.

Standard Series Pneutorques

Gearboxes with a capacity exceeding 9500 N.m are fitted with lifting brackets as standard. These tools are best handled with mechanical assistance.

For applications that require the smaller tools to be suspended by the use of a hoist or counterbalance, Norbar can supply a special purpose lifting bracket Part No. 16490.

72mm Series Pneutorques

Unlike the Standard Series Multipliers all 72mm Series tools are supplied with a lifting handle as standard. This handle is for manual use only and has no provision for alternative mounting such as a hoist or counterbalance.

For applications that require the tool to be suspended using a hoist or counterbalance Norbar can supply a special purpose lifting handle.

Customers requiring lifting handles for tools fitted with an Annular Transducer will require the longer Auto Two Speed versions.



Part No. 16490



Part No. 18344.148

Description	Part No.
To fit PT Single Speed	18344.148
To fit PT Auto Two Speed (and transducer tools)	18344.220

Gearbox Sub Assemblies

- Sub Assemblies include reaction arm but exclude lifting handle.
- If fitting a non Norbar motor to a gearbox, always consult Norbar or your distributor to establish whether the motor is compatible.
- Always re-calibrate the tool after exchanging a motor or gearbox.

72mm Series Gearboxes

Description	Square Drive	Part No.
PT 500 Single Speed Gearbox Sub Assembly	$\frac{3}{4}$	18369
PT 500 Auto Two Speed Gearbox Sub Assembly	$\frac{3}{4}$	18369.AUT
PT 1000 Single Speed Gearbox Sub Assembly	$\frac{3}{4}$	18370
PT 1000 Auto Two Speed Gearbox Sub Assembly	$\frac{3}{4}$	18370.AUT
PT 1000 Single Speed Gearbox Sub Assembly	1	18373
PT 1000 Auto Two Speed Gearbox Sub Assembly	1	18373.AUT
PT 1500 Single Speed Gearbox Sub Assembly	1	18371
PT 1500 Auto Two Speed Gearbox Sub Assembly	1	18371.AUT
PT 2000 Single Speed Gearbox Sub Assembly	1	18372
PT 2000 Auto Two Speed Gearbox Sub Assembly	1	18372.AUT

Gearbox Assemblies also available up to 100000 N.m



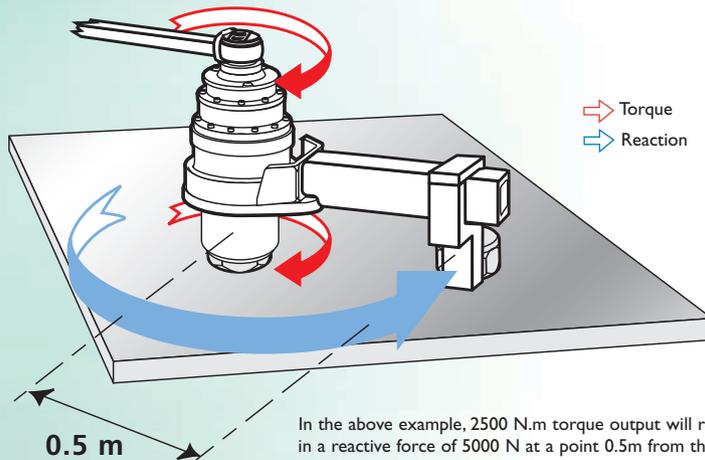
Torque Reaction

Principles of Torque Reaction

Newton's law dictates that for every applied force there is an equal and opposite reactive force. For applications requiring relatively low torques that can be applied with a torque wrench this does not present a problem as the reactive force is absorbed by the operator. However, if the desired torque necessitates the use of a multiplier, the resultant reactive force can only be absorbed using an appropriate reaction device.

For this reason all Norbar multipliers are supplied with a reaction plate or reaction foot fitted as standard.

All of the standard reaction plates and feet illustrated have been designed to enable the multiplier's use in a variety of environments but, due to an infinite number of bolting arrangements, it is impossible to have one reaction device that will satisfy every customer's requirement.



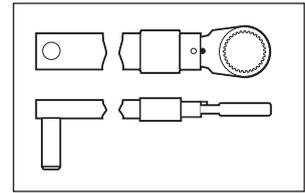
In the above example, 2500 N.m torque output will result in a reactive force of 5000 N at a point 0.5m from the axis of rotation or 2500 N at 1m (see page 63).

What to do if the standard reaction device is not suitable

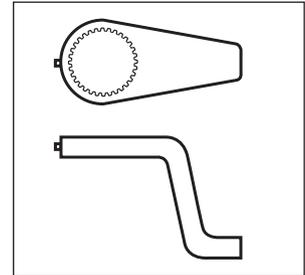
For those applications that do not permit the use of a standard reaction plate the customer has three options.

- Norbar or an authorised Norbar distributor will design and manufacture a special purpose reaction plate to the customer's requirements.
- The customer can modify the standard reaction plate to suit his requirements.
- The customer can fabricate his own reaction device after liaison with Norbar's technical department or a Norbar distributor.

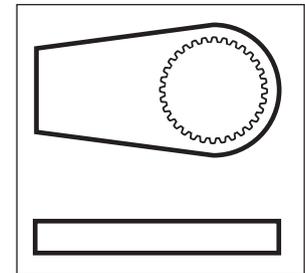
Customers wishing to either modify the original reaction plate or fabricate their own device should read the information on page 63 to avoid common torque reaction problems.



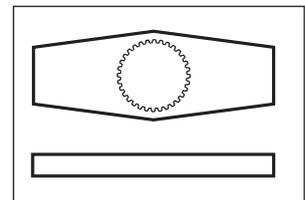
Optional on PTM-52 and PTM-72,
Standard on PT72mm Series



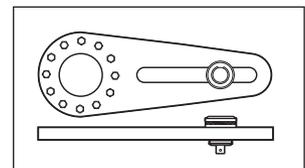
HT-52, HT-72, HT30/HT60,
PT2700/PT5500, PTM-52, PTM-72



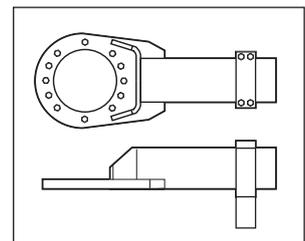
Optional Reaction Plate, 72mm
Series



Optional Double Ended Reaction
Plate, 72mm Series



Typical Reaction with sliding 'slave
square', PT/HT1 to PT/HT5



Typical Reaction with adjustable
reaction foot, PT/HT7 and PT/HT9

Torque Reaction Avoiding Torque Reaction Problems

It has already been mentioned that the reaction force is equal to the force being applied. However, the magnitude of the reaction force is dependent upon the perpendicular distance between the point of reaction and the centre line of the multiplier, ie. the greater the distance the lower the force.

For this reason the point of reaction should be kept as far away from the centre line of the gearbox as is practical.

Customers using or modifying reaction plates for Standard Series multipliers up to a capacity of 3400 N.m should note that if the reaction is taken on the radiused part, the reaction force is perpendicular to the tangent of the curve. Consequently, the further around the radius the reaction is taken, the smaller the perpendicular distance and therefore the greater the force.

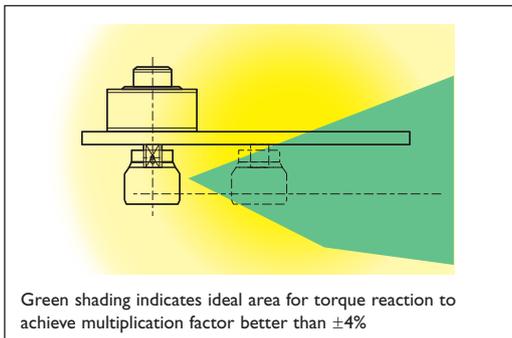
Although a longer reaction plate may mean lower forces, the bending moment close to the multiplier will increase.

Customers extending the length of Norbar's standard reaction plates should be aware that an increase in overall length will result in a larger induced bending stress and should not assume that because the reaction plate is strong enough at one length it will remain so when extended.

Excessive side loading, resulting from poor reaction, increases frictional forces inside the multiplier. This can lead to lower multiplication ratios (outside $\pm 4\%$).

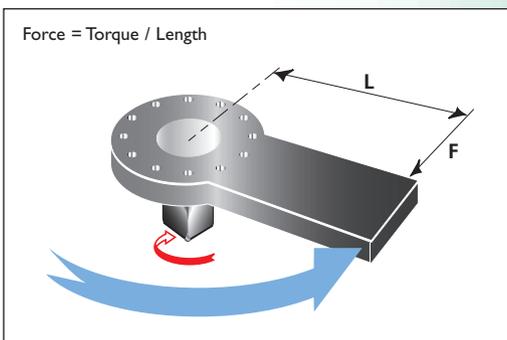
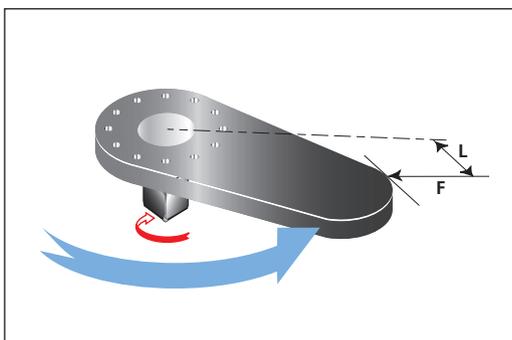


Signs of poor reaction are evident on this damaged foot. Reaction was taken at the wrong point on the foot and burring indicates that the foot was slipping off the reaction point.



Points to remember

- Take the reaction as far away from the multiplier as practical.
- Ensure that the reaction point remains square to the multiplier wherever possible as this will minimise any additional stress in the output square, which could result in premature failure. If the multiplier tilts under load, the reaction may not be square.
- For applications that do not allow the reaction to be taken securely it is advisable to use a double ended or balanced reaction plate.



Reaction Force

When using Multipliers and Pneutorques the reaction point must be capable of withstanding reaction force. Therefore, great care must be exercised where reaction is taken when applying high torques to studs and bolts.

By using the following formula you can calculate the force at the point of reaction. The greater the distance the lower the force.

$$\text{Formula to calculate Area of Stud} = \frac{\pi \times D^2}{4}$$

$$\text{Formula to calculate Shear Force: Shear Force} = \frac{\text{Reaction Force}}{\text{Area of Stud}}$$