OPERATOR'S MANUAL

HANDTORQUE™ MULTIPLIER WITH INTEGRAL TORQUE TRANSDUCER

Part Number 34392 | Issue 1 | Original Instructions (English)

CONTENTS

PART NUMBERS COVERED BY THIS MANUAL

Model	Description
19108	Handtorque™ multiplier with integral torque transducer calibrated with TTT or similar Norbar display instrument. The calibration data is stored in the transducer.
19108.TRS	Handtorque™ multiplier with integral torque transducer calibrated as a system with a dedicated TRS-65 display.

SAFETY

Safety

Important: Do not operate the tool before reading these instructions.
Failure to do so may result in personal injury or damage to the tool.

This tool is intended for use with threaded fasteners. Any other use is not recommended.

These tools require a reaction bar. See section on Torque Reaction.

There is a risk of crushing between the reaction bar and work piece.
Keep hands away from reaction bar.
Keep hands away from tool output.

INTRODUCTION

This operator's manual covers the setup and use of Norbar Handtorque™ multipliers with integral torque transducer. The multiplier retains all the features of the standard Norbar Handtorque™ including the anti wind-up ratchet safety device In addition there is an integral torque transducer to ensure the applied torque can be measured (display instrument not included).

Parts Included

Part	Part Number
Cranked Reaction Bar	18494
Wrench	39635
Carry Case	26978
Operators Manual	34392

Accessories

Accessory	Options	Part Number
Drive Square	1" Drive Square (fixing screw)	18492 (25352.45)
Reaction Bars	Consult Norbar	Various
Display Instrument	TTT, TST, T-Box, Pro-Log, TTL-HE, TRS-65, etc.	Various
Transducer Lead	TTT, TST, T-Box, Pro-Log	60266.200
	TTL-HE	60245.200
	TRS-65	60292.200

NOTE: The Transducer Lead suffix after the part number indicates the length of the lead in cm, thus XXXXX.200 = 2 meters. If transducer leads are required of a non-standard length (to the nearest meter), the new suffix must be added to the part number when ordering.

FUNCTIONS AND FEATURES

- Compact dimensions allow excellent access and easy handling.
- Anti Wind-Up Ratchet (AWUR) keeps the multiplier loaded for easier and safe operation.
- Integral torque transducer for accurate torque application; separate torque display required.
- A UKAS accredited certificate of calibration is supplied with each multiplier as standard. When the calibration is performed with a T-Box, TTT, TST, Pro-Log or the TTL-HE display the multiplier can be interchanged between similar displays without affecting the validity of the calibration.

NOTE: This does NOT include the TRS-65 display which is a system calibration only with a specific multiplier. The multiplier is not available with an ".IND" calibration.

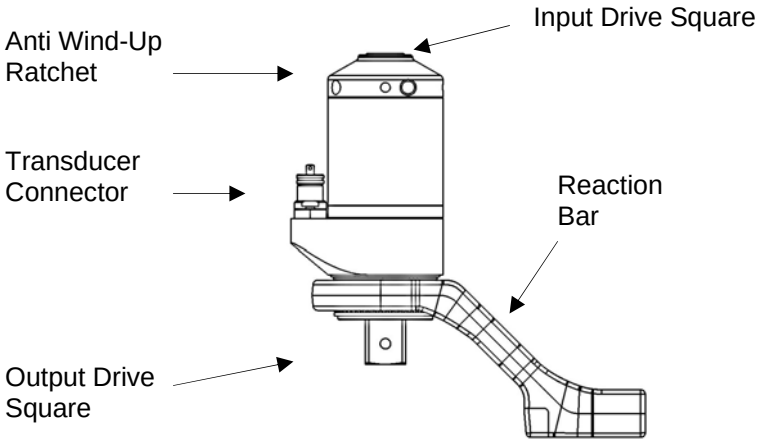

FIGURE 1 Multiplier Features

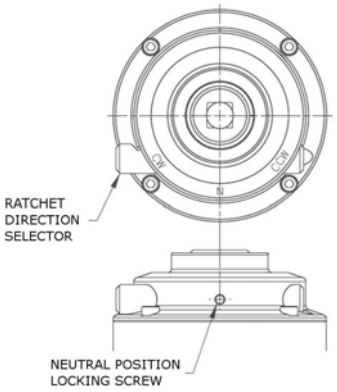

FIGURE 2 AWUR Details

SET-UP INSTRUCTIONS

Preparation

NOTE: If the equipment is used in a manner not specified by the manufacturer, the protection provided by the equipment may be impaired.

To operate the Handtorque™ multiplier the operator will need the following:

- Power Drive or Impact Quality Sockets (not included)
- Reaction Bar
- Wrench
- Display and Transducer Lead (not included)

Torque Reaction

When the Handtorque™ is in operation, the reaction bar rotates in the opposite direction to the output drive square and must be allowed to rest squarely against a solid object or surface adjacent to the bolt to be tightened, see Figure 3.

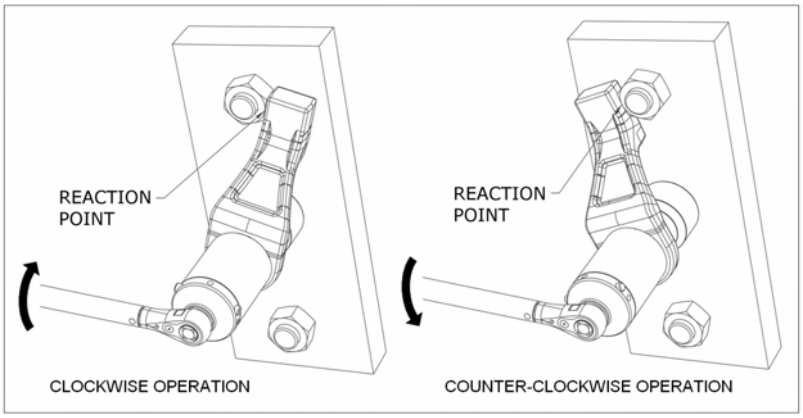

FIGURE 3

For special applications or where extra deep sockets must be used the standard reaction bar may be extended but only within the limitations shown on Figure 4.

Standard square drive extensions MUST NOT be used as these will cause serious damage to the multiplier output drive. Norbar manufacture a range of nose extensions for applications where access is restricted and these are designed to support the final drive correctly.

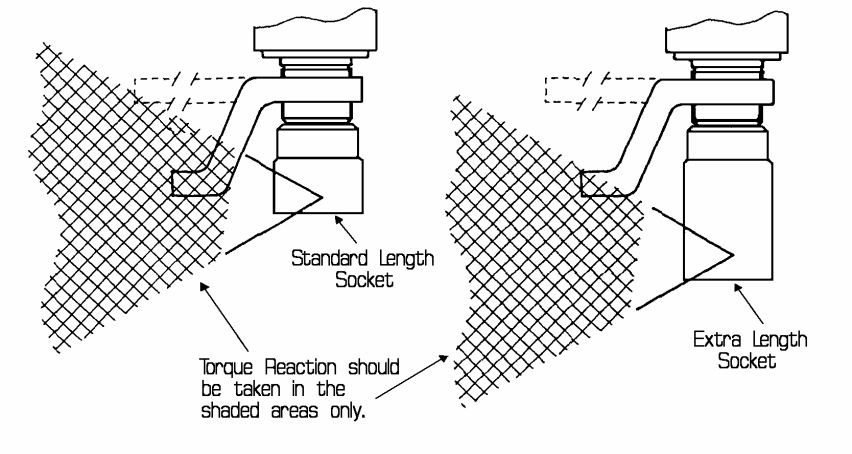

FIGURE 4

IMPORTANT: Care must be taken to ensure that the reaction plate is only used within the limitations shown in Figure 4.

WARNING

FAILURE TO OBSERVE THE LIMITATIONS SHOWN IN FIGURE 3 WHEN MODIFYING STANDARD REACTION PLATES OR MAKING SPECIALS MAY RESULT IN PREMATURE WEAR OR DAMAGE TO THE MULTIPLIER OUTPUT DRIVE.

Torque Measurement

Connect Handtorque™ multiplier to display instrument. Turn on display instrument and zero display.

OPERATING INSTRUCTIONS

WARNING

KEEP HANDS AWAY FROM REACTION BAR.

Before Use

Establish the correct torque figure for the bolt from manufacturer's instructions or by calculation. A torque tension calculator is available on the Norbar website (www.norbar.com), which can be used as a guide to help calculate the tension generated in a bolt for a given thread size, torque and friction value.

NOTE: Many factors have an effect on the torque/induced load relationship and care should be taken to consider factors such as surface finish and amount/type of lubrication. In critical applications, the relationship between torque and induced load should be determined by experimentation with the actual components and lubrication used.

Fit Multiplier To Bolt

1. Fit the multiplier with the correct size of power drive or impact quality socket to suit the bolt to be tightened.
2. Fit the multiplier to the bolt with the reaction bar adjacent to the reaction point. See Figure 3.
3. Fit wrench (supplied) to the multiplier.

TIP: Purpose of the AWUR: The multiplier can be thought of as a spring which must be fully wound before any tightening/untightening work can be applied to the bolt. The AWUR insures that the 'spring' stays wound and that any further torque input to the multiplier is applied directly to the bolt. Familiarise yourself with the tool by initially applying low torques and removing wind-up.

4. Position the 'ratchet direction selector' for the appropriate direction of operation:

For Clockwise operation (bolt tightening) push ratchet to position marked:

"CW" or 

FIGURE 5

To position the multiplier for accurate alignment select neutral position. Push ratchet to central position marked:

"N" or 

Secure with hexagonal key if required.

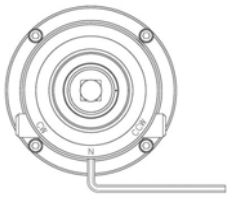

FIGURE 6

For Counter-Clockwise operation (bolt loosening) push ratchet to position marked:

"CCW" or 

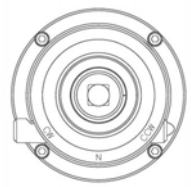

FIGURE 7

Test direction of rotation and ensure that the ratchet operates freely.

WARNING

DO NOT USE TOOL IF RATCHET HEAD DOES NOT OPERATE FREELY.

TIP: Familiarise yourself with this tool by initially applying low torques and removing wind-up.

5. Operate the wrench and measure the applied torque on the attached display.

WARNING

DO NOT APPLY MORE THAN 2,000 N·m WHEN TIGHTENING OR LOOSENING A BOLT

6. The tool may now be removed from the fastener.

Remove Multiplier From Bolt

Once a bolt has been tightened, the multiplier will appear 'locked' due to the AWUR; this is normal.

To remove the multiplier follow these steps:

A. Load the wrench.

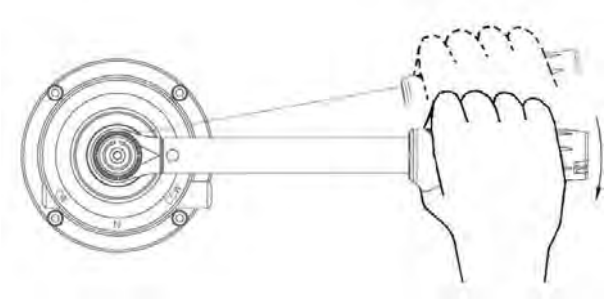

FIGURE 8

B. With the wrench loaded, move the 'ratchet direction selector' towards neutral position marked "N" or  .

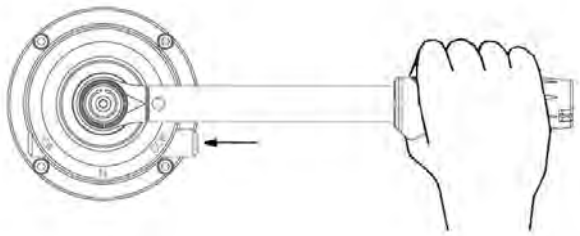

FIGURE 9

C. Allow the wrench to rotate slowly until the multiplier becomes free. Keep the 'ratchet direction selector' pushed into the multiplier.

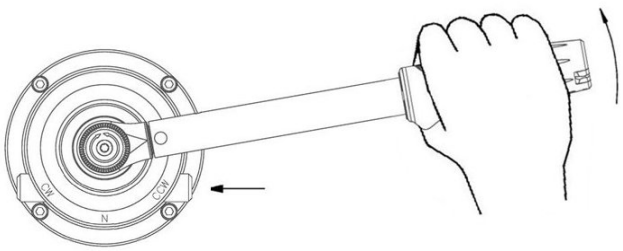

FIGURE 10

If the multiplier cannot be released with one sweep of the wrench, re-engage the ratchet by pushing the 'ratchet direction selector' back to the clockwise (CW) position. Reposition the wrench and follow the above procedure again.

MAINTENANCE

WARNING

ALWAYS COMPLETE MAINTENANCE TASKS IN A CLEAN WORK AREA
ALWAYS WEAR SUITABLE GLOVES AND EYE PROTECTION

General

To maintain optimum performance and safety, regular maintenance needs to be carried out. This section details the user maintenance required; other maintenance or repairs should only be carried out by Norbar or a Norbar approved agent. Service intervals will depend on the type of usage and the environment in which the multiplier is used. Do not disassemble the multiplier; there are no parts for operator repair inside.

It is recommended that the Anti Wind up assembly input gear and ratchet teeth are inspected annually by your Norbar approved distributor for wear or damage.

Output Square Drive

If the tool output drive is subject to torque overload there is potential for catastrophic tool damage. To reduce this risk the output drive square has been designed like a fuse, so will shear first. The output drive square is easy and quick to replace, for part numbers see Accessories listed in the Introduction.

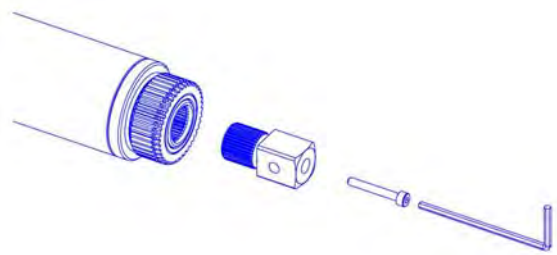

FIGURE 11 Removal of drive square

To replace drive square:

1. Support tool in a horizontal position
2. Remove the screw then remove drive square
   If the square has sheared it may be necessary to use pliers to remove the broken parts
3. Fit new drive square
4. Fit new screw and tighten to 4.7 N·m

TIP: If the drive square fails continually then seek advice from Norbar or Norbar distributor.

Transducer Calibration

To maintain the specified accuracy it is recommended that transducers are recalibrated at least once per year. Recalibration and repair should be carried out at Norbar or by a Norbar approved agent.

Cleaning

Keep the tool in a clean condition to aid safety. Do not use abrasives or solvent based cleaners.

Disposal

This symbol on the product indicates that it must not be disposed of in the general waste. Please dispose of according to your local recycling laws and regulations.

Contact your distributor or see the Norbar web site (www.norbar.com) for further recycling information.

SPECIFICATIONS

Maximum Torque	2000 N·m (1450 lbf·ft)	
Accuracy	+/- 1% of reading (400 – 2000 N·m).	
Calibration units	N·m (as standard).	
Calibration range	20% to 100% full scale.	
Input Square	1/2"	
Output Square	1”	
Ratio	25:1	
Dimensions	Height	240 mm
	Width	220 mm.
	Diameter	72 mm.
Weight	Multiplier	3.5 Kg.
	Reaction	0.7 Kg.

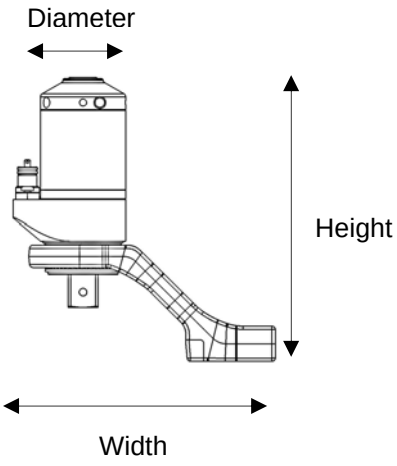

FIGURE 12 Dimensions

Important: The reported readings are only valid for the reaction path specified in the calibration method with the operator taking the input torque reaction. Any deviation from this path may invalidate the calibration.

NOTE: If the input torque is locked into the multiplier via the AWUR, the readings indicated by the display will increase by a factor of approximately 1.035.

Environment

Temperature Range:	0°C to +40°C. Storage -20°C to +60°C.
Altitude	Up to 2000m.
Maximum Operating Humidity:	Maximum relative humidity 80% for temperatures up to 31°C decreasing linearly to 50% relative humidity at 40°C.
IP code	IP 55

Due to continuous improvement all specifications are subject to change without prior notice.

Interfacing Transducers With Non Norbar Equipment

Excite the transducer with an accurate, stable and low noise power supply. We recommend the power supply output is short circuit protected.

Maximum Bridge Excitation	10 Volts D.C.	
Connector	Pin A	+VE EXCITATION
	Pin B	-VE EXCITATION
	Pin C	+VE SIGNAL OUT
	Pin D	-VE SIGNAL OUT
	Pin E	SMART MEMORY – DO NOT CONNECT TO.
	Pin F	SMART MEMORY – DO NOT CONNECT TO.

Electromagnetic compatibility is the responsibility of the system designer. To help in this task Norbar recommend the following:
(i) Use good quality screened transducer cable.
(ii) Keep transducer cable length to a minimum.
(iii) Keep transducer cable away from high voltage cables.

WARNING

DO NOT CONNECT TO PINS E OR F ON THE CONNECTOR

TROUBLESHOOTING

Tips are located within the manual to help with troubleshooting.

The following is only a guide, for more complex faults please contact your local Norbar agent or Norbar directly.

Problem	Likely Solutions
Input drive rotates but output will not	1. AWUR set to neutral, set 'ratchet direction selector' to clockwise or counter-clockwise 2. Drive square sheared, see maintenance section 3. Serious damage to internal gears, return to Norbar or agent for repair
Input drive will not rotate	Check AWUR 'ratchet direction selector' is in the correct position for clockwise or counter-clockwise operation
Display will not zero	Transducer overstrained; return to Norbar or agent for repair/recalibration

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