



OPERATING MANUAL

MO.ATCplus.R1



Manual drive for calibration of torque wrenches according to ISO 6789-1 and ISO 6789-2

According to the standard, the calibration of the torque wrenches must be performed every 12 months or every 5000 tightenings.

To better perform this operation, AEP presents the new **ATC plus** manual drive designed in compliance with all the requirements of the **ISO 6789-1** and **ISO 6789-2** norms of 2017.

The support consists of a load-bearing structure made with an extruded aluminum profile, a combined reducer for manual generation and constant maintenance of torque, a trolley with adjustable reaction system to adapt to the key length and a series of professional high precision standard torque transducers complete with ACCREDIA certification (ISO 17025).

The main advantages of the system are:

- Calibration system compliant with ISO 6789-1 and ISO 6789-2: 2017.
- Extreme ease of use.
- Reduction of calibration times.
- Minimum physical effort of the operator.
- Increased repeatability of the torque wrench.
- Gradual generation of the torque in compliance with the standard.
- Constant torque maintenance by reduction gear.
- Adjustable reaction system to reduce unwanted displacements and lateral forces.
- During calibration the reaction system keeps the torque application point constant.
- Light and easy to assemble to facilitate transport and movement in the production departments.
- Prepared for quick replacement of BTR2 standard torque transducers.
- Rotation of the sample guarantees the application of the torque at an angle of 90 ° with respect to the torque wrench.
- The support is to be combined with one or more BTR2 series digital torque meters to be purchased separately.
- 2 models available from 0... 1000 Nm (1: 1500) or from 0... 2000 Nm (1: 1200)

The system can be completed with the following accessories to be purchased separately:

- Digital torque transducers **BTR2** with measuring ranges from 0.5 to 2000 Nm.
- **TorqueKAL** software for the management of calibration, archiving and printing of calibration reports with calculation of uncertainty and declaration of conformity.



AVVERTENZE sulla SICUREZZA

The following section of the manual identifies the delicate operations and possible sources of risk for the user or for the instrument with the following symbol.

Before using the bench, please read this manual carefully to prevent damage to operators and the equipment used.

We recommend keeping the manual always available to operators.

**Safety information**

During the application of the torque, small metal parts can be detached, therefore operators and surrounding staff must always wear safety glasses.

**Entanglement risk**

Keep away from rotating components to prevent clothing, jewelry or hair from hanging on the device.

**Improper use**

Read the use and maintenance instructions.

Use the drive only for the calibration of torque wrenches.

Make sure that the torque wrenches are not damaged or that they can break during the application of the torque.

Pay attention to any accessories, adapters or sockets used: they must not be broken or damaged.

When using the ratchets make sure they rotate in the direction of rotation.

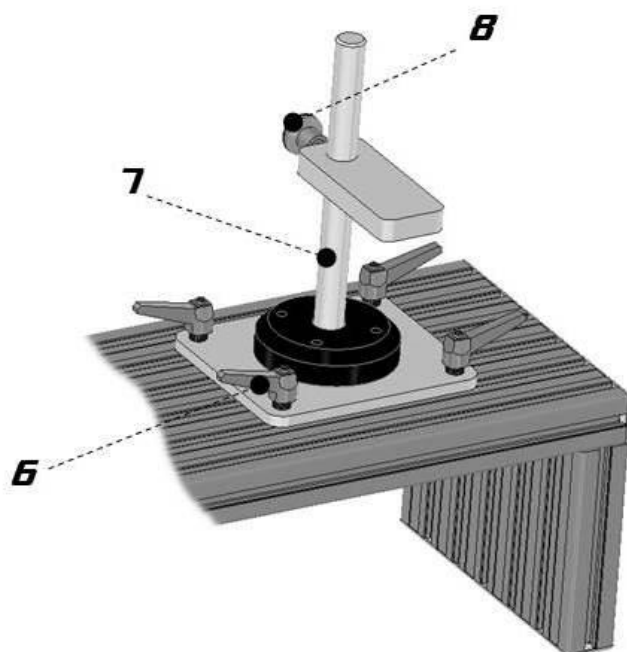
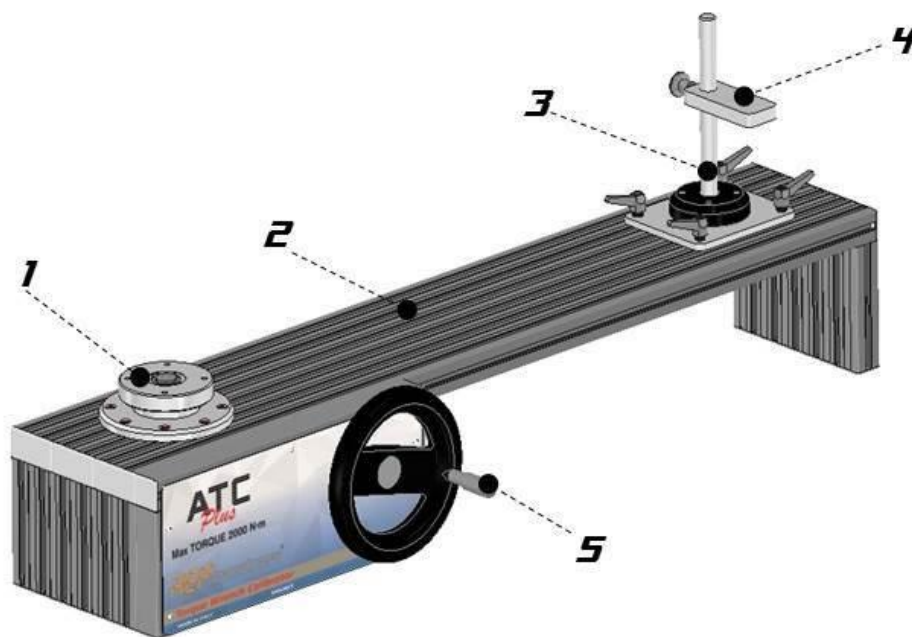
**Overload**

NEVER generate torque greater than the maximum torque of the torque wrench.

NEVER generate torque greater than the maximum torque of the sample torque meter.

DESCRIPTION OF PARTS

1. Rotary plate with sample torque meter fixing.
2. Supporting structure with Rexroth aluminum profile.
3. Saddle with reaction system.
4. Support plate and torque wrench adjustment.
5. Hand wheel for the generation of the torque.
6. Adjustable handle.
7. Reaction shaft.
8. Fixing knob

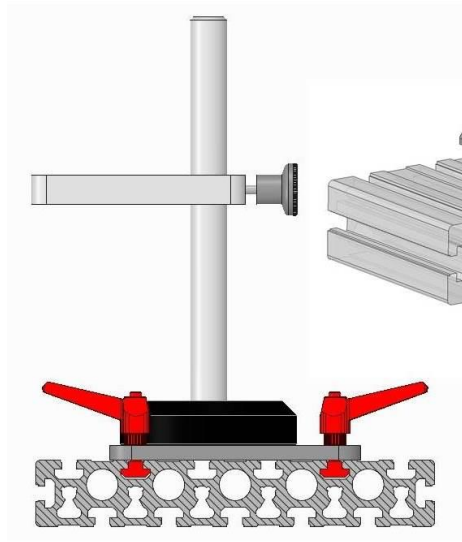


INSTALLATION

The drive must be placed on a bench with the possibility of adjusting the feet for the leveling. If possible, fix the drive on the bench with the appropriate devices provided. Mount the reaction trolley on the aluminum profile.



Always check that the 4 nuts are inserted in the guides and screwed correctly.



Mount the BTR2 torque meter on the fixing plate and insert it on the rotation shaft.

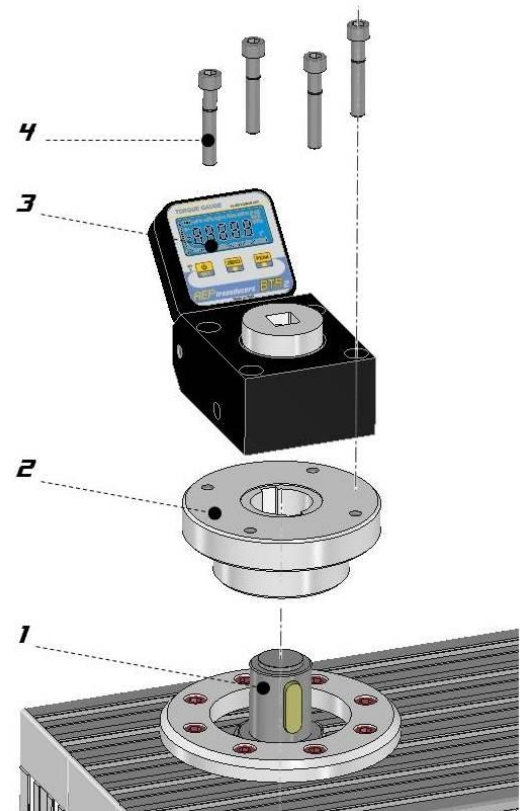
1. Torsion shaft with double key.
2. Rotating fixing plate.
3. Sample torque meter BTR2.
4. M10 x 50 mm fixing screws.
5. Check that the ambient temperature is between 18 and 28 ° C and stable within ± 1 ° C.

Check that the sample torque meter and the keys are kept at a stable temperature for at least 24 hours.

Check that the surrounding area is free from dangers.

Check that the maximum torque of the sample torque meter is greater than or equal to that of the torque wrench.

During use, always use safety glasses.

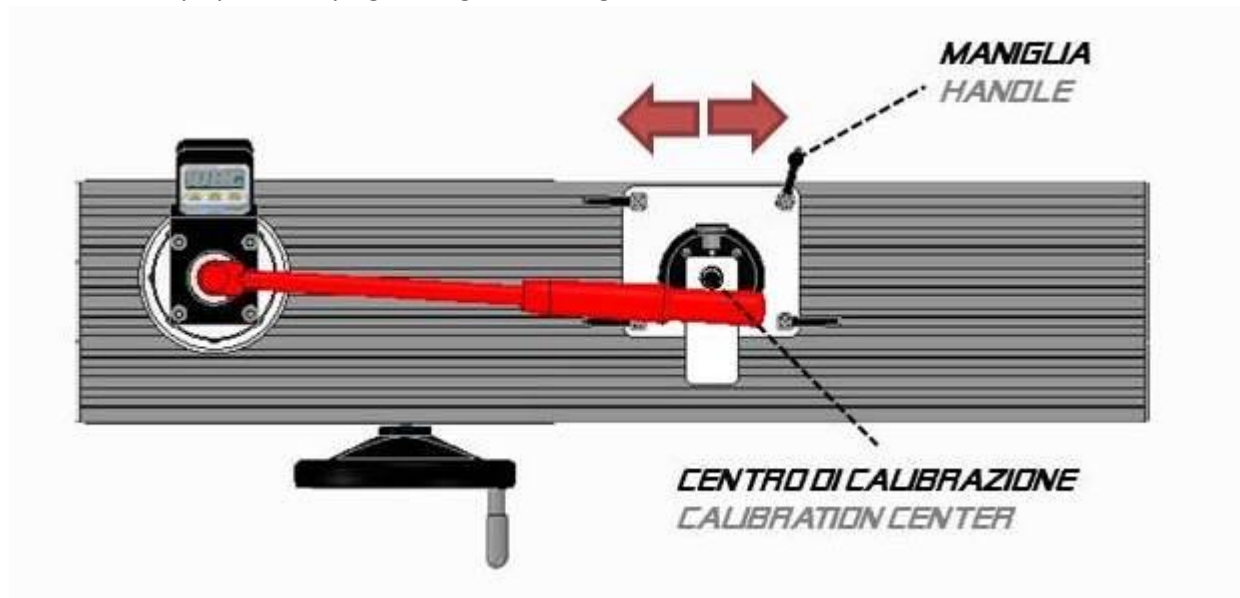


POSITIONING THE TORQUE WRENCH

Adjust the reaction trolley according to the length of the torque wrench.

The reaction point must be positioned in the center of the wrench handle or in the point indicated by the manufacturer of the torque wrench.

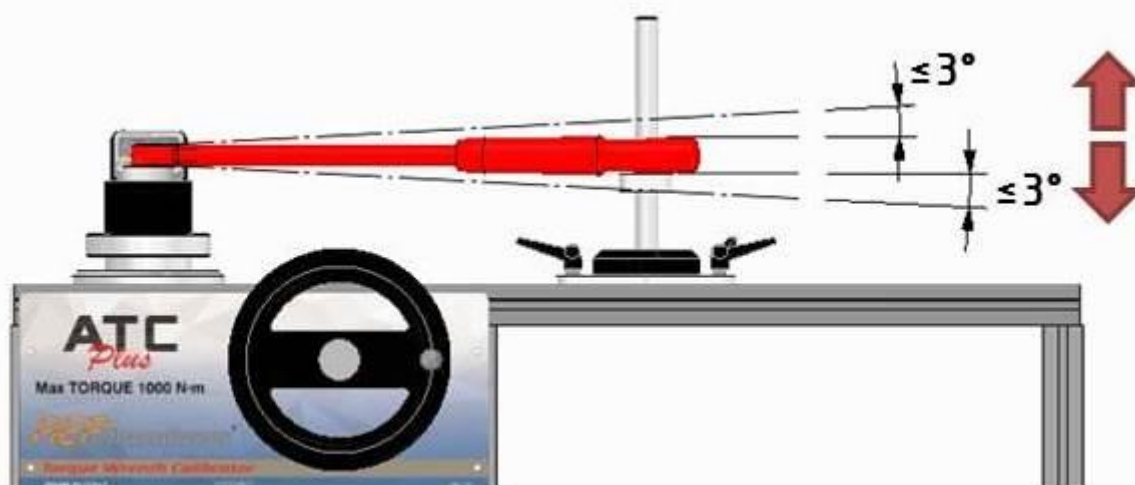
Lock the trolley by manually tightening the 4 fixing handles.



Adjust the height of the support in order to maintain the torque wrench horizontal to the structure, for greater precision, use a leveling bubble applied to the center of the key.

The standard indicates alignment tolerance $\pm 3^\circ$

Secure the support with the appropriate knob.



TORQUE GENERATION

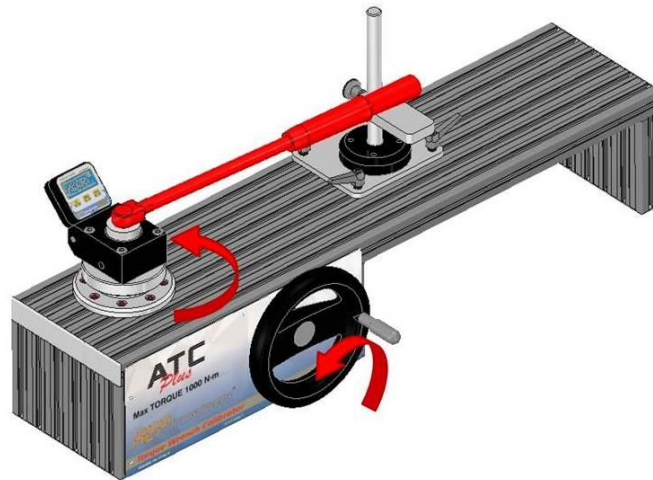
Before generating the torque, always check:



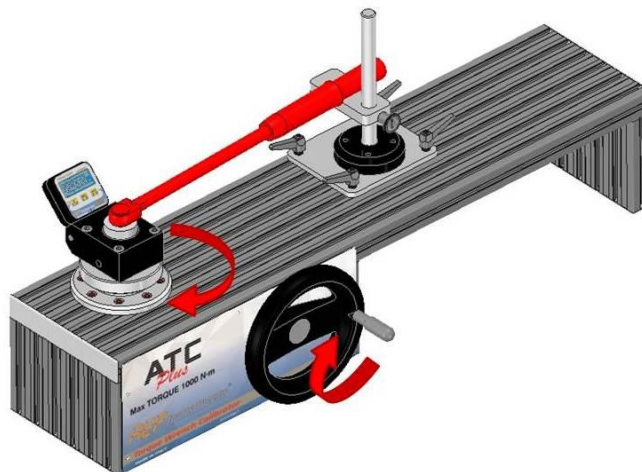
The full scale of the sample torque meter must not be **LOWER** than the torque to be generated.

The release torque set on the torque wrench must not be **HIGHER** than the full scale of the sample torque meter.

To generate the torque, turn the handwheel manually at a constant speed in the direction indicated



CLOCKWISE release click

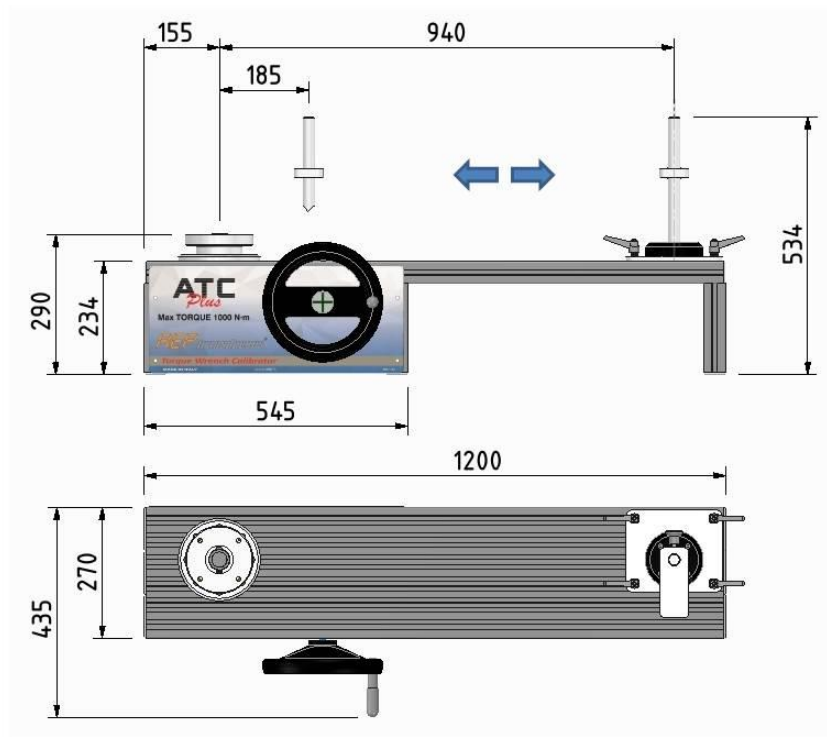


COUNTER-CLOCKWISE release click

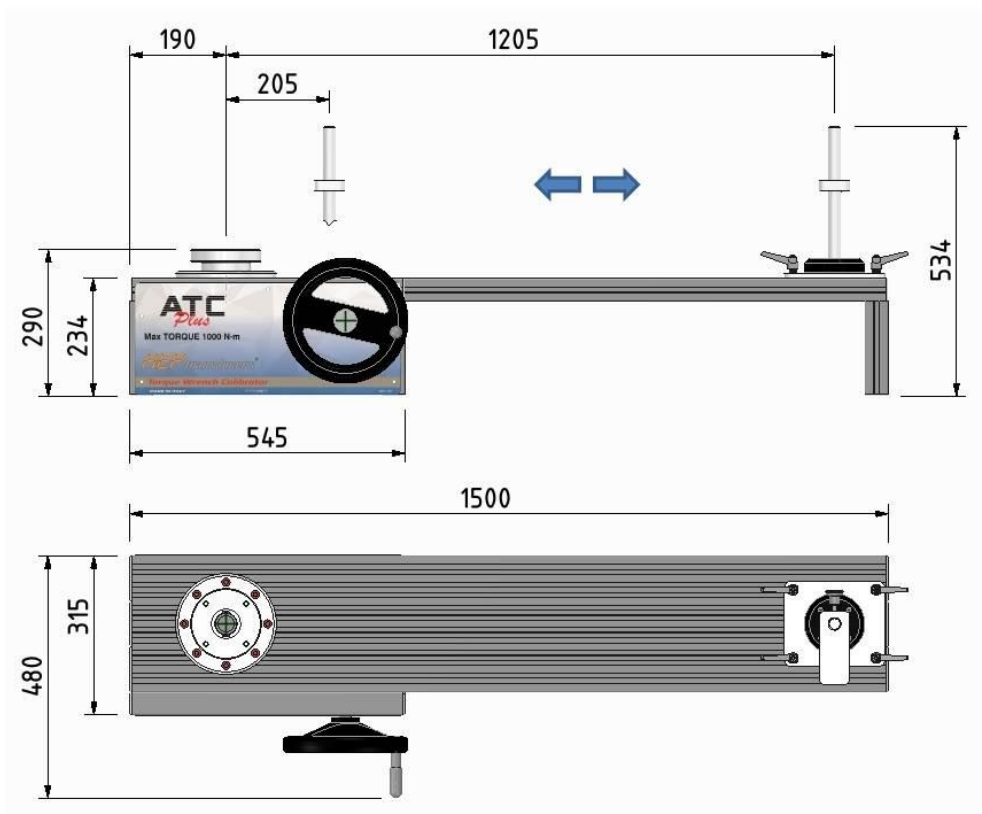
When the release click has been reached, rotate the handwheel in the opposite direction until you free the key and return to the starting position.

Before repeating the test, make sure that the key is free (without torque) and that the indicator of the sample torque meter is at zero.

DIMENSIONS (mm) ATCplus 0....1000 Nm



DIMENSIONS (mm) ATCplus 0...2000 Nm



SAMPLE TORQUE METERS model BTR2

BTR2 is a torque bench for static torque measurements consisting of a digital indicator model DTR2 and a strain gauge torque with a precision better than 0.20%, extremely rugged, compact and reliable

It is ideal for the calibration and control of torque wrenches, screwdrivers direct reading and snap.

BTR₂ can operate in two different modes:

- **STANDARD** mode: direct readout that displays the torque in real-time at high resolution.
- **PEAK** mode: for measurements of maximum torque clockwise and counterclockwise, ideal for torque wrenches.



NOMINAL TORQUE (F.S.)	0.5 - 2.5 – 5 – 10 – 25 - 50 N•m 100 - 250 - 500 – 1000 - 2000 N•m
PRECISION CLASS UNI 113114 (EURAMET cg-14) LINEARITY AND HYSTERESIS	1 from 10% to 100% F.S. ≤ ± 0.20 % F.S.
PROCESS COUPLING (UNI ISO 1174-1): 0.5 - 2.5 – 5 - 10 N•m 25 - 50 N•m 100 – 250 N•m 500 – 1000 N•m 2000 N•m	<input type="checkbox"/> 1/4" female <input type="checkbox"/> 3/8" female <input type="checkbox"/> 1/2" female <input type="checkbox"/> 3/4" female <input type="checkbox"/> 1" female

For more information please download complete BTR2 data sheet from www.aep.it website

HOW TO CONFIGURE A COMPLETE SAMPLE SYSTEM

To calibrate a wide range of instruments it is necessary to determine:

- the **MINIMUM** torque of the smallest torque wrench.
- the **MAXIMUM** torque of the largest torque wrench.

With this information we can determine how many sample instruments are needed to cover the whole field, guaranteeing class 1 of the UNI 113114 standard.

Example:

To cover a range from 1 to 1000 N • m you need 3 tools:

- 1000 N BTR2 • m covering the range from 1000 to 100 N • m
- 100 N • m BTR2 covering the range from 100 to 10 N • m
- 10 N BTR2 • m covering the range from 10 to 1 N • m

TorqueKAL APPLICATION SOFTWARE



The program has been designed to perform the calibration of torque wrenches in accordance with UNI EN ISO 6789-1 (2017) and UNI EN ISO 6789-2 (20107) standards.

torquekal: versione 4.1

File Intestazione Rapporti di Taratura Archivio Strumenti Campioni Archivio Attrezzi Lingua Help

Coppia Impostata (N.m)

200.05

Archivio Attrezzi

Attezzo In Taratura

Oggetto: Chiave Dinamometrica
 Costruttore: GEDORE
 Tipo: TORCOFIX-SE
 Numero di Serie: TORCOFIX-SE
 Range (N.m): MAX 200 MIN 20
 Unità di Misura: N.m
 Risoluzione: 1 N.m
 Rapporto di Taratura: Prova ACCREDIA
 Decimal: #####
 Standard: Utilizza ISO 6789-1 e ISO 6789-2
 Tipo di Attacco: Quadrato Esagonale
 Tipo di Misura: Taratura in senso Oritario
 Tipo di Attrezzo: Con Indicatore (Type I)
 Modalità Picco:
 Reset Picco:
 Rileva Picco Picco Soglia: 0.00 N.m
 Temperatura Ambiente: 22.9 °C
 Umidità Relativa: 56.8 %
 ZERO
 MP10Plus Setup
 Log Corrente Visualizza Log
 Abilita le modifiche al Rapporto di Taratura aperto

Tabella di Conformità ISO 6789-1

Coppia	Ciclo 1	Ciclo 2	Ciclo 3	Ciclo 4	Ciclo 5
Impostata	N.m	N.m	N.m	N.m	N.m
1070.00	0.00	0.00	0.00	0.00	0.00
	0.00	0.00	0.00	0.00	0.00

Accetta la Misura (o premi la Barra Spaziatrice)

Campione Utilizzato

TRX Connetti

TRX Connetti

TRX Connetti

ISO 6789-1

Tipo Di Attrezzo: Fisso Aggiustabile
 Spostamento Ammissibile:
 N. di Cicli: 5 10
 Salva taratura nel Log Corrente

Coppia	Media	Scostamento
Impostata	%	Massimo
N.m	N.m	%
1070.00	0.00	-100.000
	0.00	0.000

Risultati secondo norma ISO 6789-2

Coppia	W	W'
Impostata	%	%
N.m	%	%
1070.00		

ISO 6789-2

Riproducibilità

Coppia	Sequenza			
	I	II	III	IV
Impostata	N.m	N.m	N.m	N.m
0.00	0.00	0.00	20.00	120.00
0.00	0.00	17.82	123.91	
0.00	0.00	17.99	119.44	
0.00	0.00	17.53	118.84	
0.00	0.00	17.52	119.04	
Media	0.00	0.00	18.17	120.25

Media: 120.25 N.m

Effetto Punto di Applicazione della Forza

Coppia	Media					
Impostata	Posizione					
N.m	N.m	N.m	N.m	N.m	N.m	N.m
	-10mm	17.41	17.41	17.63	17.40	17.50
		17.42	17.41	17.40	17.43	17.38
	+10mm	17.54	17.39	17.49	17.47	17.43
		17.45	17.49	17.45	17.50	17.48
Media						17.47

Media: 17.47 N.m

Effetto Attacco della Chiave

Coppia	Posizione			
Impostata	0°	90°	180°	270°
N.m	N.m	N.m	N.m	N.m
0.00	17.57	17.45	17.61	
123.91	17.72	17.52	17.63	
119.44	17.54	18.59	17.59	
118.84	17.46	17.50	17.69	
119.04	17.50	17.47	17.65	
0.00	0.00	0.00	0.00	
0.00	0.00	0.00	0.00	
0.00	0.00	0.00	0.00	
0.00	0.00	0.00	0.00	
Media	48.12	8.78	8.85	8.82

Media: 33.34 N.m

Effetto Interfaccia Adattatore Attacco e Sistema di Calibrazione

Coppia	Posizione			
Impostata	0°	90°	180°	270°
N.m	N.m	N.m	N.m	N.m
	17.38	17.59	17.67	
	17.37	17.72	17.60	
	17.33	17.52	17.49	
	17.38	17.57	17.49	
	17.39	17.42	17.42	
	17.34	17.38	17.48	
	17.33	17.38	17.51	
	17.36	17.50	17.28	
	17.30	17.34	17.33	
	17.36	17.39	17.35	
Media	17.35	17.48	17.46	

Media: 17.35 N.m

Log Corrente Visualizza Log

Abilita le modifiche al Rapporto di Taratura aperto

AEP transducers

For more information please download TorqueKAL data sheet from www.aep.it website

It is possible to choose whether to perform the calibration only according to part 1 of the standard or completely, according to part 2 too.

The calibration, in accordance with part 1 of the standard, consists in performing five or ten measurements for each measuring point, normally defined at the lowest allowed torque (typically 20%), 60% and 100% of the maximum torque value of the device in calibration (these measuring points can however be modified).

At the end of the test, the program calculates, for each measuring point:

- a) the average of the readings;
- b) the maximum percentage deviation;

and defines the conformity or not of the tool being calibrated by comparing the values obtained with the maximum allowable deviation.

As for part 2 of the standard, the program allows you to perform all the required measures regarding the tests of:

- Reproducibility
- Effect of the connection of the torque wrench
- Effect of the force application point
- Effect of the interface between the torque wrench adapter and the calibration system

At the end, the uncertainties W and W' are calculated as required by the standard.

It is also possible to view all the partial contributions used for the calculation of W and W'

The calibrations can be performed either through a serial connection with sample instruments or manually by entering the values from the keyboard.

All certificates are subsequently printed and archived in a database that allows to keep the history of the calibrations performed.

It is possible to create an archive of torque tools to quickly retrieve their characteristic data before a calibration.

In addition to the calibration certificates for each individual test, it is possible to create logs (calibration archives) that allow statistical tests to be kept under control by calculating the quality factors cp and cpk .

MAINTENANCE

Clean the drive with a damp cloth, do not use solvents.

Periodically check the fixing and leveling.

Check that the bushes or accessories are not damaged.

Check the use of protective glasses by the operator.

Check the expiry of the calibration certificate of the sample torque meter.

Check that the rotation shaft is free to rotate unconstrained.

If the drive remains unused for a long time, store it in the cash box.

DO NOT place metal parts or tools on the aluminum profile with the guides.

WARRANTY

The drive is guaranteed against damage and manufacturing defects for 12 months.

PURCHASE CODES

CODE	TYPE
MATCP1K	1000 N•m ATCplus
MATCP2K	2000 N•m ATCplus