MOTO TORK®

TORQUE WRENCH FOR MOTORCYCLIST.

MT70N

OPERATING INSTRUCTION

To use this product properly and safely, please read this manual carefully before use. If you have any question about the product and its operations, please contact your nearest distributor or TOHNICHI MFG. CO., LTD.

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⚠ Warning

- Do not use this product for any other purpose than to tighten bolts.
  This product is a torque wrench designed for tightening bolts.
- Keep the grip handle free of oil, grease, etc.
  Oil or grease on the grip handle causes a slip of hand during tightening work, resulting in an accident or injury.
- Check the product for any crack, flaw or rust.
  Crack, flaw or rust may damage the product, resulting in an accident or injury.
  Have it checked and repaired.
- Do not use this product for tightening work at a high place.
  Dropping of the torque wrench or socket may cause a serious accident or injury.
- Do not extend the handle by connecting a pipe, etc.
  It may damage the torque wrench or cause an accuracy failure.

⚠ Caution

- When applying force by hand to the torque wrench, do not use your weight or momentum or do not step on the torque wrench.
  The torque wrench may be damaged or bolts may come off, resulting in an accident or injury.
- Do not use the product with a torque exceeding the maximum torque value.
  It may damage the product, resulting in an accident or injury.
- Do not use a torque wrench with any missing part, for example, no pin or no scale plate.
  Contact your nearest distributor or TOHNICHI MFG. CO., LTD. and have it inspected or repaired.
- Do not modify the torque wrench.
  Modifications may decrease the strength or cause an accuracy failure, resulting in an accident or injury.
- Do not drop the torque wrench or give a strong impact to it.
  It may damage or deform the torque wrench and cause degradation of the accuracy and the durability, resulting in an accident or injury.
- Before you turn around having a large torque wrench in your hand, look around carefully.
  Turning around without looking around carefully may result in an accident or injury.
- Do not place the torque wrench in an upright position.
  The torque wrench may fall down or drop, causing an accident or injury.
- Do not use any other part than that approved by TOHNICHI for repair of the torque wrench.
  For repair of the torque wrench, contact your nearest distributor or TOHNICHI MFG. CO., LTD. and use the parts approved by TOHNICHI.

Precautions for Use

1. Do not use the product to measure out of its torque scale.
2. Do not set the value under the minimum graduation.
3. Before use, be sure to set the torque value.
   The factory default is the minimum graduation value.
4. Be careful not to mistake the unit of torque measurement. (N·m, kgf·cm, etc.)
   Before use, check the unit of torque measurement.
5. Do not use the torque wrench in water or in the sea.
   It may deteriorate the internal structure, leading to an accident or injury.
   If you drop the torque wrench in water or in the sea, have it inspected or repaired.
6. Before using this product for tightening work at a high place, take a measure to prevent it from dropping.
   Dropping of the torque wrench or socket may cause a serious accident or injury.
7. Use sockets which fit the hexagonal sides of bolts.
   Using sockets that do not fit the hexagonal sides of bolts may result in an accident or injury.
8. Apply torque gripping the handle of torque wrench on the effective length line.
   Unless you grip the handle on the effective length line, a correct torque value cannot be applied.
9. Stop tightening when you hear a "click" sound.
   If you continue tightening after a click sound, excessive torque will be applied.
10. When using the product in a limited space, be careful not to be injured in your hand or elbow.
    When operating the torque wrench, be careful not to bump your hand or elbow against the surrounding objects.
11. Do not use the torque wrench as a substitute for hammer or leverage.
    If the head or tube is deformed, a malfunction occurs, causing an adverse affect on the accuracy.
12. Be sure to conduct a periodic inspection.
    The torque wrench needs a periodic inspection.
13. Direction of force
    Apply force in the direction at right angles to the torque wrench.
    Keep the vertical and horizontal angles within ±15 degrees of the right angles to the torque wrench.
14. After use of the product, remove dirt, dust, mud, oil, water, etc., and then store it.
    If the soiled product is stored, a malfunction or an accuracy failure may occur.
15. Before the torque wrench is kept unused for a long time, set the torque value to the minimum, apply rust-proof oil, and store it in a dry place.
    Improper storing expedites degradation in the accuracy and the durability.

Contents

1. Components

1) MT70N
2) Carrying case
3) Operating instruction

2. Specifications

Model	Torque range	Loading direction	Effective length	Total length
MT70N	10 to 70 N·m	Clockwise	240	245

Accuracy	Torque adjusting tool	Gripping diameter	Gripping length	Weight
±5 %	W4 (hexagon wrench)	ø30	95	0.65 kg

[Features]

1) Setting your tool to the Moto Tork makes a torque wrench.
2) Torque can be controlled when you tighten bolts in a limited space or with limited tools.
3) When you tighten a large bolt (with a higher tightening torque), torque can be controlled by changing the effective length.
4) Basic open end spanner, ring spanner, hexagonal wrench key, 3/8 socket wrench and wheel wrench can be set for torque control.

3. Maintenance

Torque wrenches are measurement tools.

With a proper daily use and maintenance, adequate performance can be maintained.

Before use, be sure to check the operation and make sure that it properly works.

1) Periodic inspection of torque wrench

   The Moto Tork is maintenance-free. However, it is recommended to conduct a periodic torque calibration.

2) Request for repair

   The Moto Tork needs repair if the following symptoms appear:

   (1) It does not operate (no click sound is heard) even if the set torque is reached.

   (2) It is impossible to clamp a tool.

   (3) It is impossible to set a torque.

   (4) Even after the torque value is changed, the tightening torque is not changed.

4. How to Set a Tool

First, push the push rod in with the thumb of your right hand to spread the holder. (See Fig. 1.)

Next, insert the tool in the large holder and release your finger from the push rod to secure the tool. (See Fig. 2.)

If the tool is not secured firmly and it moves easily, set the tool to the small holder.

※ Set a large tool to the large holder and a small tool, such as a hexagonal wrench key, to the small holder.

Finally, align the bolt center of the tool with a point 50 mm away from the holder end. (See Fig. 3.)

Now, the tool setting is completed.

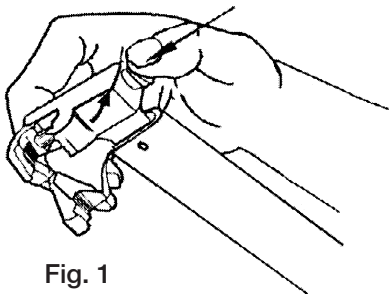


Fig. 1

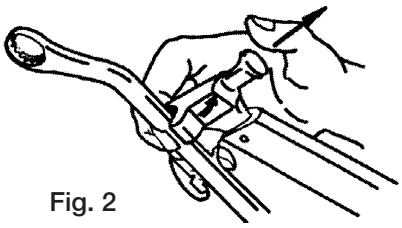


Fig. 2

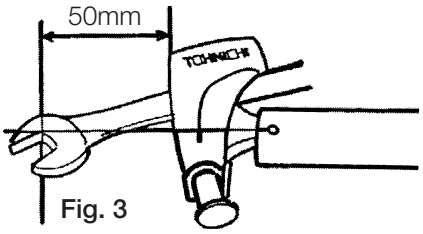


Fig. 3

To remove the tool, spread the holder in the same way as when setting the tool.

5. How to Adjust the Tightening Torque

1. Refer to the service manual of your motor cycle, etc. to check the tightening torque.
2. Using the supplied hex key (across flats: 4 mm), set the torque. The main scale is located on the side of the grip and its white lines are seen through the scale window. (See Fig. 6.)
3. The basic torque can be set in the range from 10 to 70 N·m by adjusting the zero point (white point) of the graduation adjusting part located on the end of the grip to the main scale inside the scale window. (See Figs. 4 and 5.)

   The one place of the torque value can be set by clicking the hex key: one click increases or decreases 0.5 N·m. One turn (20 clicks) increases or decreases 10 N·m.

   (Ex.) To set the tightening torque at 25N·m:

   (1) Using the supplied hex key, set the zero point (white point) seeing the main scale (20) and the basic line. (See Fig. 6)

   (2) Then, turn the hex key and click 10 times. (See Fig. 5.)

   Now, the torque setting is completed.

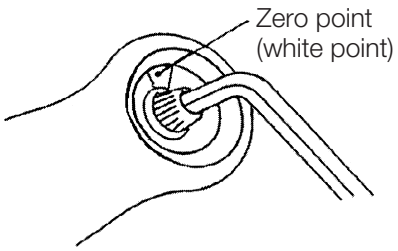


Fig. 4

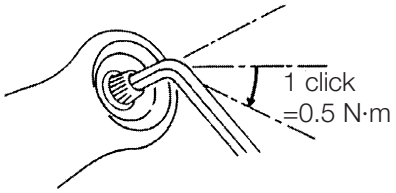


Fig. 5

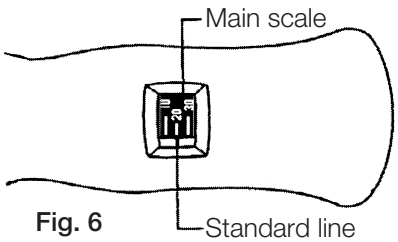
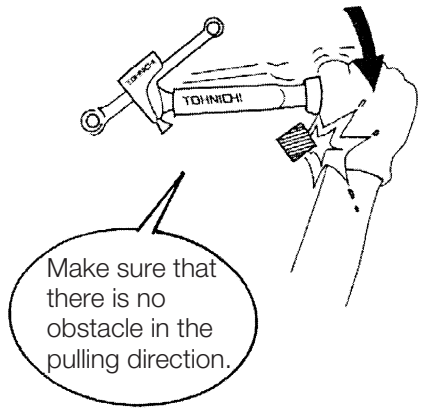


Fig. 6

6. How to Tighten Bolts

1) Pretighten the bolt to some degree.
2) Fit the Moto Tork, to which the tool has been set, to the pretightened bolt, and pull the grip in the arrow direction (turn clockwise). (See the right figure.)
3) The torque detection part of the Moto Tork starts operating, and if a clink sound is heard, the tightening is completed.
   Do not tighten further.
   It may cause over-torque.



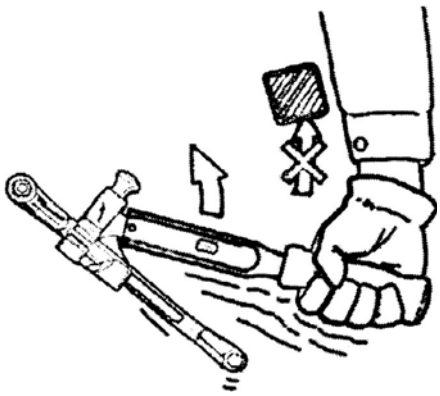
7. How to Loosen the Tightened Bolt

If the Moto Tork is used to loosen the tightened bolt, reverse the Moto Tork with the same conditions as those when tightening the bolt, and turn it in the arrow direction (turn counterclockwise).

At this time, it may makes a rapid turn. Be careful not to bump your hand against any surrounding object. (Right figure)

[Cautions]

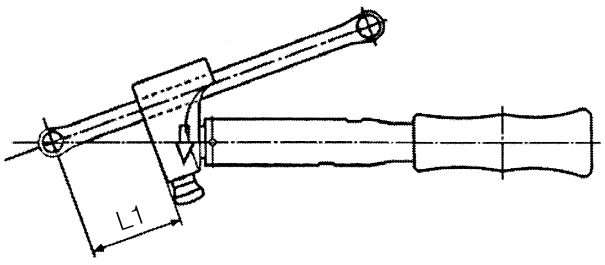
- Do not loosen any rusty bolt or thick bolt using the Moto Tork.
- Do not loosen bolts using the Moto Tork which is in a tightening position.



Before loosening bolts, be sure to reverse the Moto Tork (as shown in the above).

8. To Tighten with the Torque of 10 N·m or Less or 70 N·m or More:

If the tool is set to the Moto Tork so that the distance between the holder end and the bolt center is 50 mm (effective length: 240 mm), the bolt can be tightened with the set torque indicated on the scale. By changing the tool setting length, bolts can be tightened with 10N·m or less or 70N·m or more. (See the tables below.)



Setting torque 10N·m

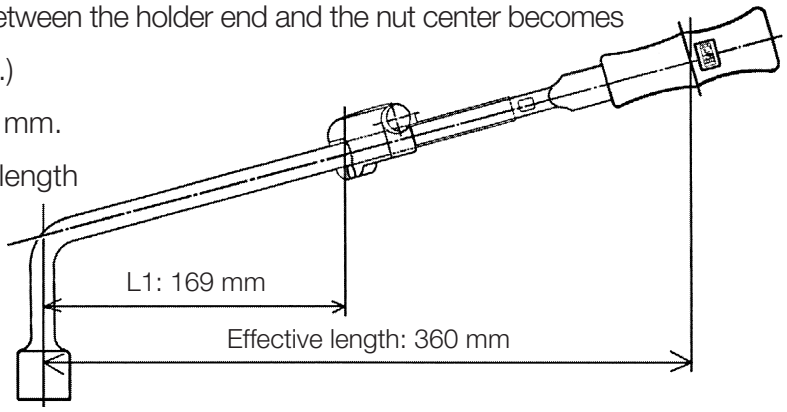
L1 (mm)	30	40	50
T (N·m)	9.1	9.55	10.0

Setting torque 70N·m

L1 (mm)	50	60	70	80	90	100
T (N·m)	70	72.8	75.6	78.4	81.2	84.0

9. To Tighten Vehicle Tire Wheel Nuts with the Torque of 105N·m:

1) Set the scale of the Moto Tork with 70N·m.
2) Set the tool so that the distance between the holder end and the nut center becomes
   ≒169 mm. (See the figure below.)
   The effective length shall be 360 mm.
   [Reference expression: Effective length
   = (105/70) x 240 = 360 mm]



10. Bolt Diameters and Tightening Torques by Motorcycle Manufacturers (Reference)

Unit: N·m

Bolt diameter [mm]	Width across flat [mm]	Honda		Suzuki		Yamaha	Kawasaki
		Bolt/nut	Flange	Standard bolt	Heavy-duty bolt	Bolt/nut	Bolt/nut
4				1 to 2	1.5 to 3		
5	8	5	4	2 to 4	3 to 6	3 to 4	3 to 5
6	10	10	9	4 to 7	8 to 12	5 to 8	6 to 8
8	12	22	12	10 to 16	18 to 23	12 to 19	14 to 19
10	14	35	27	22 to 35	40 to 60	24 to 39	26 to 35
12	17	55	40	35 to 55	70 to 100	45 to 72	45 to 62
14	19			50 to 80	110 to 160		74 to 100
16	22			80 to 130	170 to 250		115 to 160
18	24			130 to 190	200 to 280		170 to 230
20	27						230 to 330

* Note 1) Values in white fields indicate the torque values within the range of the Moto Tork scale.
2) For values in shaded fields, refer to "Tightening torque and tool setting length".
3) The values in the above table are just for reference. Refer to the service manual of your motor cycle to check the tightening torque.

11. Tightening Torque of General Standard Bolts/Nuts (Reference)

Unit: N·m

Nominal diameter (mm)		M3	M4	M5	M6	M8	MIO	M12	M14	M16	M18	M20	M22	M24
Tightening torque	T (S45C)	0.63	1.5	3	5.2	12.5	24.5	42	68	106	146	204	282	360
	1.8T (SCM)	1.14	2.7	5.4	9.2	22	44	76	122	190	270	370	500	650
	2.4T (SNCM)	1.5	3.6	7.2	12.2	29.5	59	100	166	255	350	490	670	860

Standard axial stress: 210 N/mm^2 Effective cross section according to JIS B1082

12. Torque Unit and Conversion Value

	S. I. unit		Metric unit		American unit	
	cN·m	N·m	kgf·Cm	kgf·m	Lbf·in	Lbf·ft
cN·m	1	0.01	0.102	0.00102	0.0885	0.00738
N·m	100	1	10.2	0.102	8.85	0.738
kgf·Cm	9.81	0.0981	1	0.01	0.868	0.0723
kgf·m	981	9.81	100	1	86.8	7.23
Lbf·in	11.3	0.113	1.15	0.0115	1	0.833
Lbf·ft	136	1.36	13.8	0.138	12	1

1 N·m = 10.1972 kgf·cm ≒ 10.2 kgf·m

1 kgf·cm = 0.098066 N·m ≒ 0.0981 N·m

13. Screw Tightening Control

The torque control method is broadly used for controlling the tightening of screws.
According to the torque control method, the axial force (N) is produced by the tightening torque (T).
If the tightening torque (T) is insufficient, the following problems occur due to insufficient axial force (N):

1. The tightened object is not held stationary and it moves unsteadily. (A long-time loading causes looseness.)
2. The tightened objects are not held enclosed, resulting in a leakage. (A leak of oil, etc. is caused.)
3. The thermal conductivity of tightened objects becomes low, and they are heated. (Heat-transfer efficiency is reduced.)
4. The screw itself is not held stationary and it becomes loosened. (The screw is loosened and comes off.)

If the tightening torque (T) is excessive, the following problems occur:

1. Bolts or nuts are damaged.
2. The tightened object is damaged. (Especially, aluminum parts, etc.)
3. The bearing surface collapses. (Aluminum parts, low-intensity parts)

Thus, it is necessary to tighten screws with a proper tightening torque.

The relation between the tightening torque (T) and the axial force (N) is expressed using the torque coefficient for simplification as follows:

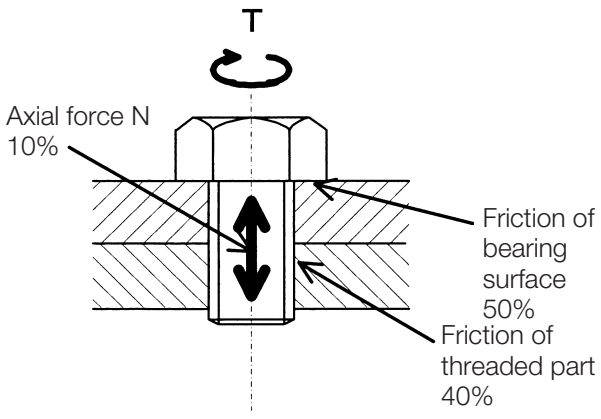
T=k x d x N

T: Tightening torque (N·m)

k: 0.1 ~ 0.2 ~ 0.3 (Torque coefficient)

d: Nominal diameter of bolt (m)

N: Axial force (N)



However, if the tightening torque value is specified in the service manual, follow the instruction in the service manual.

14. Conversion Table of Torque Units by kgf·cm (kgf·m) and N·m

Conversion factor: 1 kgf·cm = 0.098066 N·m

1 kgf·m = 9.8066 N·m

kgf·cm	0	1	2	3	4	5	6	7	8	9
10	0.98	1.08	1.18	1.27	1.37	1.47	1.57	1.67	1.77	1.86
20	1.96	2.06	2.16	2.26	2.35	2.45	2.55	2.65	2.75	2.84
30	2.94	3.04	3.14	3.24	3.33	3.43	3.53	3.63	3.73	3.82
40	3.92	4.02	4.12	4.22	4.31	4.41	4.51	4.61	4.71	4.81
50	4.90	5.00	5.10	5.20	5.30	5.39	5.49	5.59	5.69	5.79
60	5.88	5.98	6.08	6.18	6.28	6.37	6.47	6.57	6.67	6.77
70	6.86	6.96	7.06	7.16	7.26	7.35	7.45	7.55	7.65	7.75
80	7.85	7.94	8.04	8.14	8.24	8.34	8.43	8.53	8.63	8.73
90	8.83	8.92	9.02	9.12	9.22	9.32	9.41	9.51	9.61	9.71
100	9.81	9.90	10.0	10.1	10.2	10.3	10.4	10.5	10.6	10.7

kgf·cm	0	10	20	30	40	50	60	70	80	90
100	9.81	10.8	11.8	12.7	13.7	14.7	15.7	16.7	17.7	18.6
200	19.6	20.6	21.6	22.6	23.5	24.5	25.5	26.5	27.5	28.4
300	29.4	30.4	31.4	32.4	33.3	34.3	35.3	36.3	37.3	38.2
400	39.2	40.2	41.2	42.2	43.1	44.1	45.1	46.1	47.1	48.1
500	49.0	50.0	51.0	52.0	53.0	53.9	54.9	55.9	56.9	57.9
600	58.8	59.8	60.8	61.8	62.8	63.7	64.7	65.7	66.7	67.7
700	68.6	69.6	70.6	71.6	72.6	73.5	74.5	75.5	76.5	77.5
800	78.5	79.4	80.4	81.4	82.4	83.4	84.3	85.3	86.3	87.3
900	88.3	89.2	90.2	91.2	92.2	93.2	94.1	95.1	96.1	97.1
1000	98.1	99.0	100	101	102	103	104	105	106	107

kgf·m	0	1	2	3	4	5	6	7	8	9
10	98.1	108	118	127	137	147	157	167	177	186
20	196	206	216	226	235	245	255	265	275	284
30	294	304	314	324	333	343	353	363	373	382
40	392	402	412	422	431	441	451	461	471	481
50	490	500	510	520	530	539	549	559	569	579
60	588	598	608	618	628	637	647	657	667	677
70	686	696	706	716	726	735	745	755	765	775
80	785	794	804	814	824	834	843	853	863	873
90	883	892	902	912	922	932	941	951	961	971
100	981	990	1000	1010	1020	1030	1039	1049	1059	1069

15. Torque and Unit of Torque

Derivation of torque

The term "torque" generally means "twisting moment" or "turning moment" and it is broadly used as an engineering term. In ancient times, however, it had a meaning of "collar". It derives from the unique ornament, which the Celt, who dominated the ancient Europe, wore around the neck as a symbol of eminences or as a talisman for warriors.

It is said that the ancient Roman termed the helical form of the collar which is twisted and curled "torque", which came from the Latin word "torquere" meaning "to twist/rotate". Its scrollwork was a sacred symbol to the Celt who believed a spirit dwells in it and was a menacing ornament to the Roman which was an enemy.

In recent times, the term "torque", which was inspired by the twisting image of the Celtic collar, became established as the term meaning the tightening force of screw or the turning force of engine. We may say that the purpose of torque changed from a talisman for warriors to a talisman of safety and power.

Unit of torque

Torque is expressed by "Force x Length".

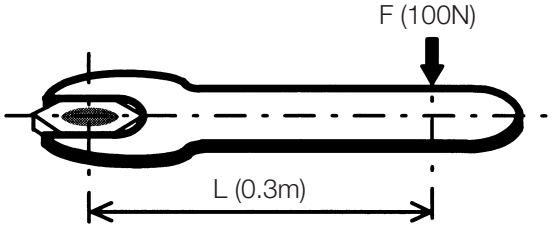
The unit of torque is N·m (Newton-meter) by multiplying the unit of force, N (Newton), by the unit of length, m (meter).

Torque (N·m) = Force (unit: N) x Length (unit: m)

T = F x L

= 100 N x 0.3 m

= 30 N·m ≒ 300 kgf·cm ≒ 3 kgf·m



Designs and specifications are subject to change without notice.

Your Torque Partner
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