

For Motor Torque Measurement
Torque Station Pro

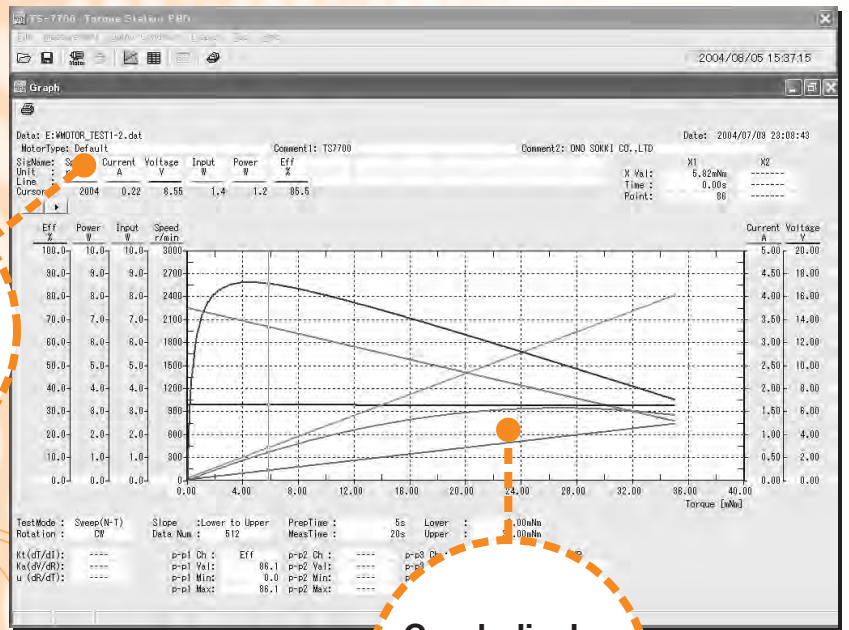
TS-7700B system

The Torque Station Pro is designed to automatically measure motor torque characteristics. The compact configuration includes a built-in brake control amplifier and user-friendly application software for easy computer operation.



ONOSOKKI

Easy-to-read display



Graph display of motor characteristics

Overview

The Torque Station Pro TS-7700B System is designed to measure motor torque characteristics. The TS-7700B main unit can be combined with a computer and an MT Series torque detector to measure the torque characteristics of various types of motors.

System Configuration

Torque Detector MT Series



Control / Measurement TS-7700B

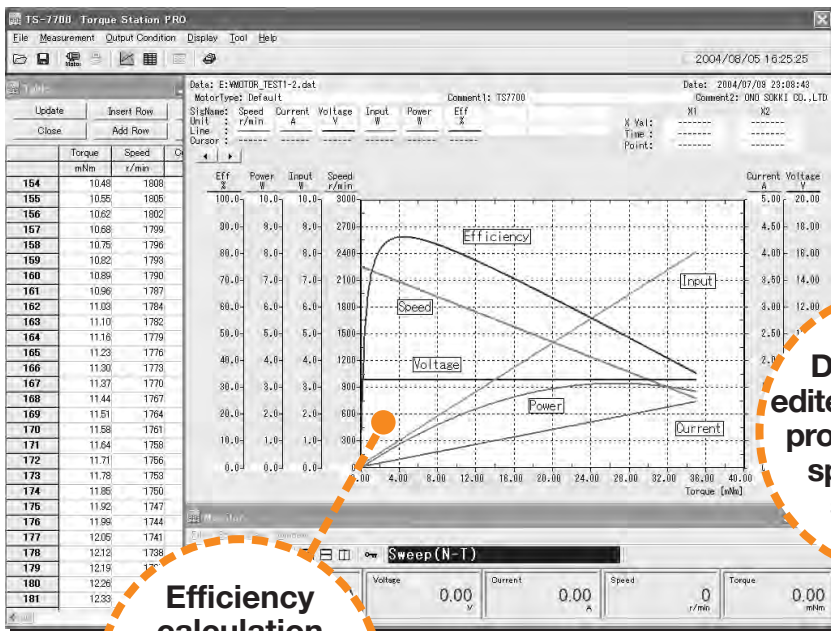
Operation / Data Processing Computer

Equipment that must be provided by the customer

- Motor power supply
- Power meter
- Printer, etc.

Options sold separately

- Motor coupling
- Motor metal fitting
- Motor XY table
- Personal computer, display monitor
- Current/Voltage detector
- Large-capacity brake control amplifier



	Torque	Speed	Current	Voltage	Input	Power	EH
	mNm	r/min	A	V	W	W	%
114	7.74	1923	0.28	6.55	1.9	1.6	83.6
115	7.81	1920	0.29	6.55	1.9	1.6	88.5
116	7.88	1917	0.29	6.55	1.9	1.6	83.4
117	7.95	1914	0.29	6.55	1.9	1.6	88.3
118	8.01	1912	0.29	6.55	1.9	1.6	83.2
119	8.08	1909	0.30	6.55	1.9	1.6	83.1
120	8.15	1906	0.30	6.55	2.0	1.6	88.0
121	8.22	1903	0.30	6.55	2.0	1.6	88.0
	8.29	1900	0.30	6.55	2.0	1.6	88.0
	8.36	1897	0.31	6.55	2.0	1.7	82.8
	8.42	1894	0.31	6.55	2.0	1.7	82.7
	8.49	1891	0.31	6.55	2.0	1.7	82.6
	8.56	1888	0.31	6.55	2.1	1.7	82.5
	8.63	1886	0.32	6.55	2.1	1.7	82.4
	8.70	1883	0.32	6.55	2.1	1.7	82.3
	8.77	1880	0.32	6.55	2.1	1.7	82.2
	8.84	1877	0.32	6.55	2.1	1.7	82.1
	8.91	1874	0.33	6.55	2.1	1.7	82.0

Data can be edited with word-processing and spreadsheet software.

Efficiency calculation display enabled
(Some models require a separately sold current/voltage detector.)

- Motor torque detector switching functions are built in.
- Two channels are provided as standard, and can be increased up to a maximum of four channels.

- A wide variety of detectors are provided for use with various types of motors.
- There are 3 series and 28 models, such as for high-speed motors, large-capacity motors, torque ripple measurement, and cogging torque measurement.

TORQUE STATION Pro TS-7700B system

Functions

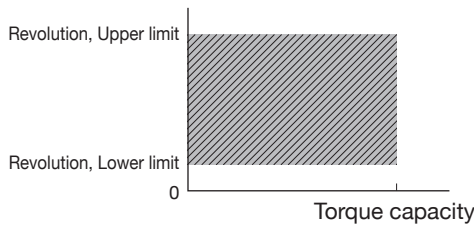
- **Auto-measurement of motor characteristics**
Torque-revolution characteristics, torque ripple, and cogging torque are automatically measured to create graphs*.
* Depending on the detector in combination with. Please refer to the next page.
- **Automatic Saving of Measurement Results**
The measurement results are saved automatically to a file without file-saving operations. Eliminating the need to input a file name shortens the overall measurement time.
- **Data output of Specified Value**
The measured value at specified points can be displayed in a list format. This display method is faster than using cursors on a graph to select data for display, and therefore enables faster confirmation of measured values.
- **Component Analysis of Torque Ripple and Cogging Torque**
This function analyzes the size of the cyclic variations that occur during one revolution, for each cycle, and identifies the primary factor influencing the overall torque variations.
- **Data utilization on Microsoft® Excel®**
Numerical data table is exported to Microsoft® Excel® sheet with one-click operation. Graph image is easily pasted also.
- **Comparator Function**
This function enables comparison and judgment of the upper and lower limits. The judgment results are displayed on the screen, and can be output externally if required.
- **Measurement Data Secondary Processing Functions**
Several processing functions, such as the smoothing of data fluctuations during low revolutions, the combining data of 16 times of measurement operations, and the addition of no-load data, are provided.

Motor Torque Detectors **MT Series**

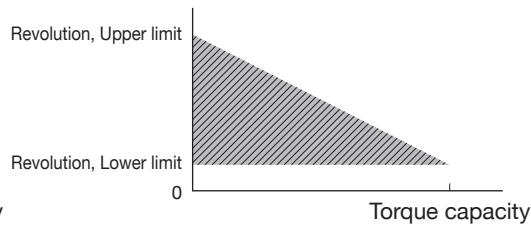
MT Series Common Specification

- Torque detection method : Magnetic phase-differential principle
- Shaft mounting method : Ball-bearing type
- Torque measurement accuracy : $\pm 0.2\%$ /full scale (When the N-0 compensation function is used together with the TS-7700B.)
- Current/voltage detection accuracy : $\pm 0.5\%$ /full scale (The current/voltage detector is provided as an option with some models.)
- Motor power supply : Not included
- Options :
 1. Motor coupling
 2. Motor metal fitting
 3. Motor XY table
 4. Large current detector (Exceeds the ranges covered by each detector. (MT-0710 series))
 5. AC power supply / Power meter for 3-phase power measurement
- Operating temperature range : 0 to +40°C
- Power supply : 100 VAC $\pm 10\%$, 50/60 Hz
- Brake functions : Can be used within the ranges indicated by the areas shaded by diagonal lines in the diagrams below.

MT-6200B series



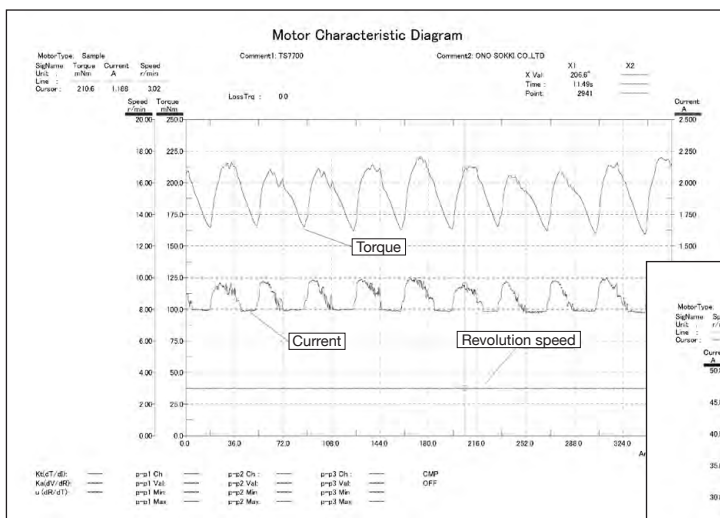
MT-6400B / 6500B series



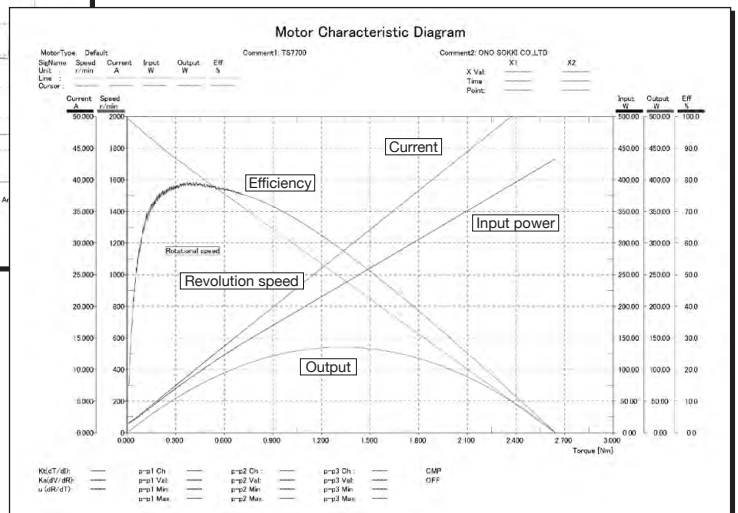
* MT-6400B/6500B series can be used within the shaded area, and it must also be used within the range of braking capacity W. Braking capacity W= Torque N·m x Revolution r/min x 0.10472

- In addition to the MT series, we also provide detectors with various revolution ranges and torque ranges. Please consult to your nearest distributor or Ono Sokki sales office nearby.

Example of measurement data



◀ Torque ripple measurement data [When MT-6253B is used.]



▶ Revolution-torque characteristics measurement data [When MT-6454B is used.]

MT-6200B Series Torque Detectors for Torque Ripple and Cogging Torque



Features

- Can measure torque ripple when the motor is excited, and cogging torque when the motor is in the non-excited state.
- Constant control measurement is possible at intervals of 0.5 to 5 r/min.

Specification

Measurement parameters : Torque, revolution, current, voltage
 Current measurement range : 10 A / 2 A : MT-6221B to 6253B
 Voltage measurement range : 50 V / 10 V : MT-6221B to 6253B
 Weight : Varies according to the model selected.

*Resonance may influence the measurement. Please consult to your nearest distributor or Ono Sokki sales office nearby.

Model MT	Torque Capacity (mN·m)	Revolution Measurement Range (r/min)
6221B	2	0.5 to 5
6251B	5	0.5 to 5
6212B	10	0.5 to 5
6222B	20	0.5 to 5
6252B	50	0.5 to 5
6213B	100	0.5 to 5
6223B	200	0.5 to 5
6253B	500	0.5 to 5
6214B	1,000	0.5 to 5
6224B	2,000	0.5 to 5
6254B	5,000	0.5 to 5
6215B	10,000	0.5 to 5
6225B	20,000	0.5 to 5

MT-6400B Series Torque Detectors Equipped with a Hysteresis Brake



Features

- Can measure high speed motors.
- When combined with the TS-7700B, enable automatic measurement of motor revolutions and torque characteristics.
- Perform both torque and revolution control, and are suitable for the measurement of both AC and DC motors.

Specification

Measurement parameters : Torque, revolution, current, voltage
 Current and voltage measurement are options for the MT-6424B or higher torque capacity models
 Current measurement range : 10A/2A ; MT-6422B to MT-6414B
 Voltage measurement range : 50V/10V ; MT-6422B to MT-6414B
 Weight : Varies according to the model selected

Model MT	Torque Capacity (N·m)	Brake Power (W)	Revolution Measurement Range (r/min)
6422B	0.02	5	100 to 20,000
6452B	0.05	8	100 to 20,000
6413B	0.1	12	100 to 20,000
6423B	0.2	23	100 to 15,000
6453B	0.5	75	100 to 12,000
6414B	1	75	100 to 12,000
6424B	2	160	100 to 10,000
6454B	5	200	100 to 10,000
6415B	10	350	100 to 7,000
6425B	20	600	100 to 7,000

Note 1: Drag torque may occur in the brake, and cannot be measured under no-load conditions.

MT-6500B Series Torque Detectors Equipped with a Powder Brake



Features

- Can measure comparatively high-capacity low-revolution motors such as gear motors.
- When combined with the TS-7700B, enables automatic measurement of motor revolution and torque characteristics.
- A movable support stand with an X-Y table is provided as a standard accessory.

Specification

Measurement parameters : Torque, revolution
 Brake power : Please refer to the table on the right (when used continuously).
 Weight : Varies according to the model selected

Model MT	Torque Capacity (N·m)	Brake Power (W)	Revolution Measurement Range (r/min)
6514B	1	20	5 to 1,800
6524B	2	50	5 to 1,800
6554B	5	130	5 to 1,800
6515B	10	320	5 to 1,800
6525B	20	450	5 to 1,800
Made to order	50	1,400	5 to 1,800
	100	2,200	5 to 1,800
	200	3,200	5 to 1,800

Note 1: Drag torque may occur in the brake, and cannot be measured under no-load conditions.

2: An XY table is provided as standard with MT-6514B to 6525B.

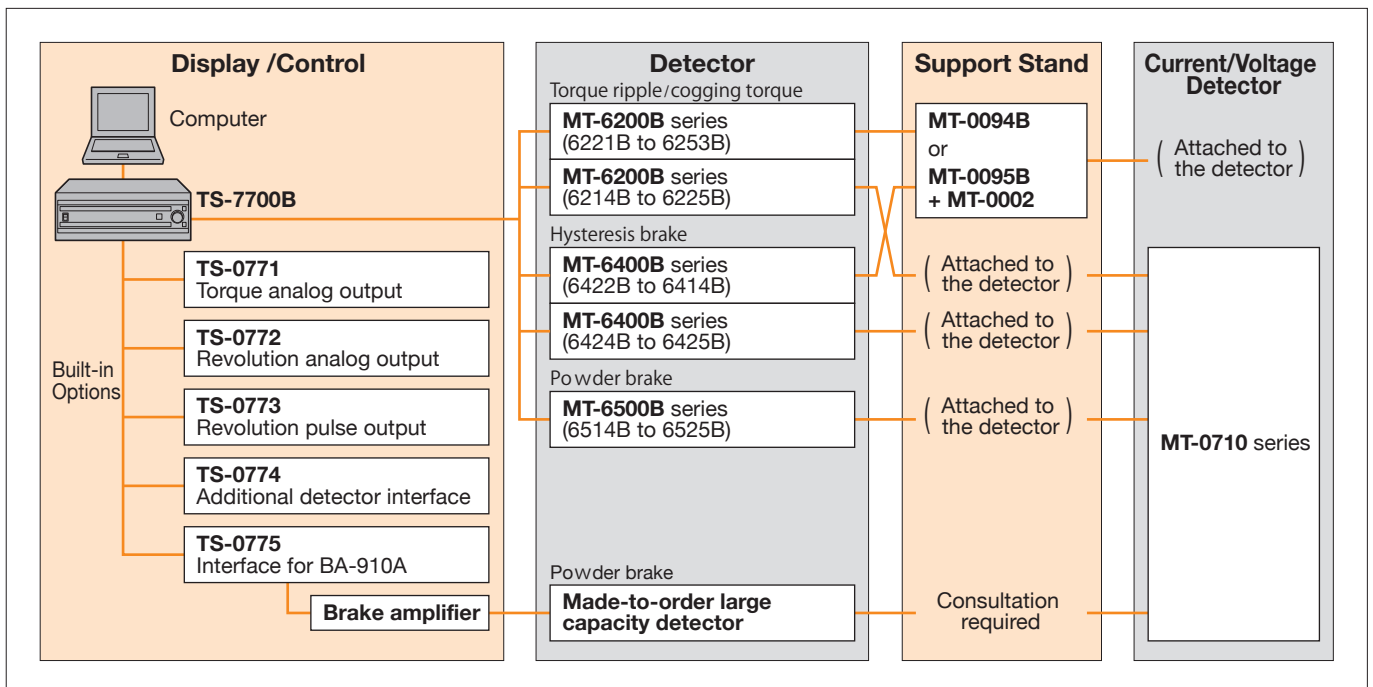
3: Please consult to your nearest distributor or Ono Sokki sales office nearby for made-to-order large capacity detector.

TS-7700B Torque Station Pro

Specification

Applicable motors	: DC motors, AC motors (stepping motors excluded)	Graph display	: Specified X-axis and Y-axis display from the measured data Graph enlargement/reduction display, line colors and line widths can be specified. Comment input (Text can be displayed on the graph and saved). Cursor, peak search functions Overlaid display function of up to a maximum of 16 files
Measurement parameters	: Torque, revolution, voltage signal input data	Table display	: List display of measured values Data editing function
Torque input	: Use signals from Ono Sokki's dedicated detectors.	Comparator	: Upper/lower limit specification of specified parameters, up to a maximum of 20 points Display and output of the judgment results
Revolution input	: Use signals from Ono Sokki's MP-981 or RP series detectors.	MT Series detector: interface	: 2 channels, an additional two channels available as an option
Analog input	: 0 to ± 10 VDC 16 channels with 16-bit A/D converters	Saving of measurement results	: Data saved in the computer's own proprietary format or as a text format.
Measurement accuracy (1-second averaged values)	: Torque $\pm 0.2\%$ /full scale Revolution $\pm 0.02\%$ /full scale Analog $\pm 0.2\%$ /full scale	Compatible computers (sold separately)	: Operating system; Windows® 7 Professional Edition (32 bit / 64 bit) Windows® 10 Pro (64 bit)
Computation settings	: 4 user-specified settings (four arithmetic operation) Based on the input signals and existing computed data.	Interface required;	USB (2.0) x 1 CD-ROM drive (for installing the application software)
Measurement condition: settings	: Torque detector and tachometer settings Control method; Revolution/torque control Measurement mode; Automatic/manual All these settings can be assigned a file name and saved.	Recommended specifications;	CPU: Pentium 4 or higher Memory: 512 MB or more Display resolution: 1280 x 1024, 1600 x 1200, 1920 x 1440 1280 x 800 (laptop)
Measurement functions	: Sweep ; Measurement time: 2 to 1,000 seconds No. of data: 512 or 1,024 Constant ; Measurement time: 2 to 100,000 seconds No. of data: 512 or 1,024 Step ; No. of steps: Max. 128 Step time: 5 to 100 seconds Pattern ; No. of patterns: Max. 128 Switching time: 0 to 100 seconds Overlaid measurement 4-point measurement	*The performance of the above specification is not guaranteed in all types of PCs.	
Monitor display	: Numeric values ; A maximum of 23 data display items can be displayed simultaneously. Trend display ; Time axis display	Operating temperature range	: 5 to +35°C
		Operating power supply	: 100 to 240 VAC, 50/60 Hz
		Power consumption	: 130 VA (100 VAC) or less
		Weight	: Approx. 14 kg
		Standard accessories	: Instruction manual, AC power cable, application software (CD-ROM), 2 m USB cable

TS-7700B System Configuration



Options Sold Separately

TS-0771

Torque Analog Output

Output format:
Voltage 0 to $\pm 10V$
/full scale
Response: 16 ms to 1 s

TS-0772

Revolution analog output

Output format:
Voltage 0 to $+10V$
/full scale
Response: 16 ms to 1 s

TS-0773

Revolution pulse output

Output: Outputs converted
revolution input signals.
Output format:
Output by pulling up
the open collector
output to $+5 V$ with
 340Ω resistance.

TS-0774

Additional detector interface

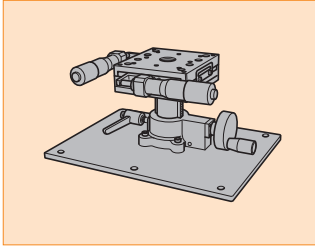
This interface adds
two channels to the
detector connector,
and enables
computer switching
of the connector used.

TS-0775

Interface for BA-910A

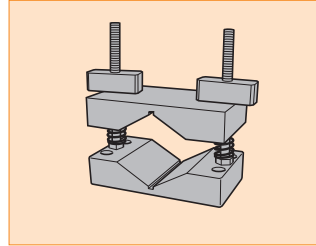
This interface is
required when using
the made to order
large capacity
detector or when
using TS-7700B with
brake control amplifier.

MT-0094B Motor support table



XYZ table. Used for motors
with a micro torque and a small
diameter.
XY axes are adjustable by a
micro meter.
Table top: 80-square mm
Moving quantity:
X (left and right) ± 12.5 mm
Y (back and forth) ± 12.5 mm
Z (up and down) 45 mm

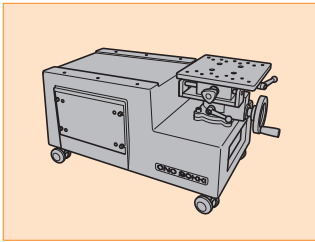
V Block



The V-Block is a jig to fix the
motor in place. The motor is
held in place between the
upper and lower blocks. The V
block can be used with several
different motors.

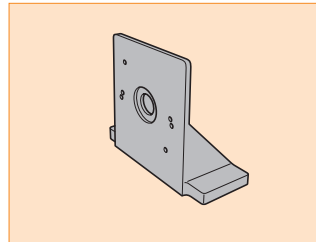
*Dimensions: consultation required.

MT-0095B Movable stand with XY Table



Used for motors with a large
diameter. Casters supplied.
Table load bearing: approx. 5 kg
Table top: 200-square mm
Moving quantity:
X (left and right) ± 10 mm
Y (back and forth) ± 15 mm
Z (up and down) 70 mm

L-Bracket



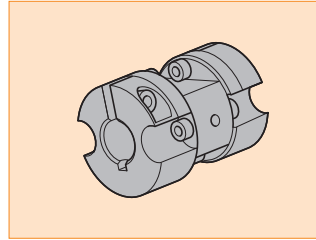
The L-bracket is a jig to fix the
motor in place. The motor is
fastened by the jig, and then
attached to a support stand.
If the mounting holes are in the
same location, the jig can be
used with several different
motors by machining the screw
hole.

*Dimensions: consultation required.

MT-0002 Base plate

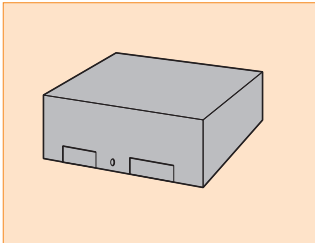
Required for the use in combination of MT-6221B to 6253B,
MT-6422B to 6414B and MT-0095B Movable stand with XY table.

Coupling



The coupling is used to connect
the detector to the shaft.
A coupling is required for each
diameter.

MT-0710 series Voltage current detector

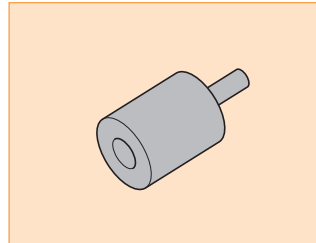


For DC measurement. Used by
setting between a motor and
power source device.
Voltage: 50 V

MT-0712 (for 30A)	MT-0715 (for 100A)
MT-0713 (for 50A)	MT-0717 (for 200A)

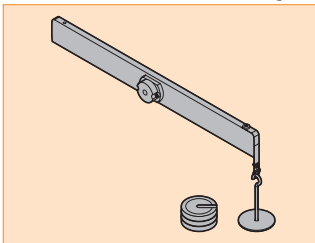
*MT-0710 series: RoHS non-compliant

Adapter



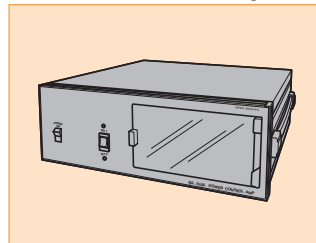
This is a jig to convert a shaft
of an unusual shape to a round
shape. Please indicate the
shape of the shaft with drawing
etc.

MT-0100 series Torque calibrator



Calibrator with a wide selection
from 50 mN·m to 20 N·m.
Calibration accuracy:
 $\pm 0.5\%$; 50 mN·m to 200 mN·m
 $\pm 0.4\%$; 500 mN·m to 20 N·m
Used for checking torque value
at measurement site.

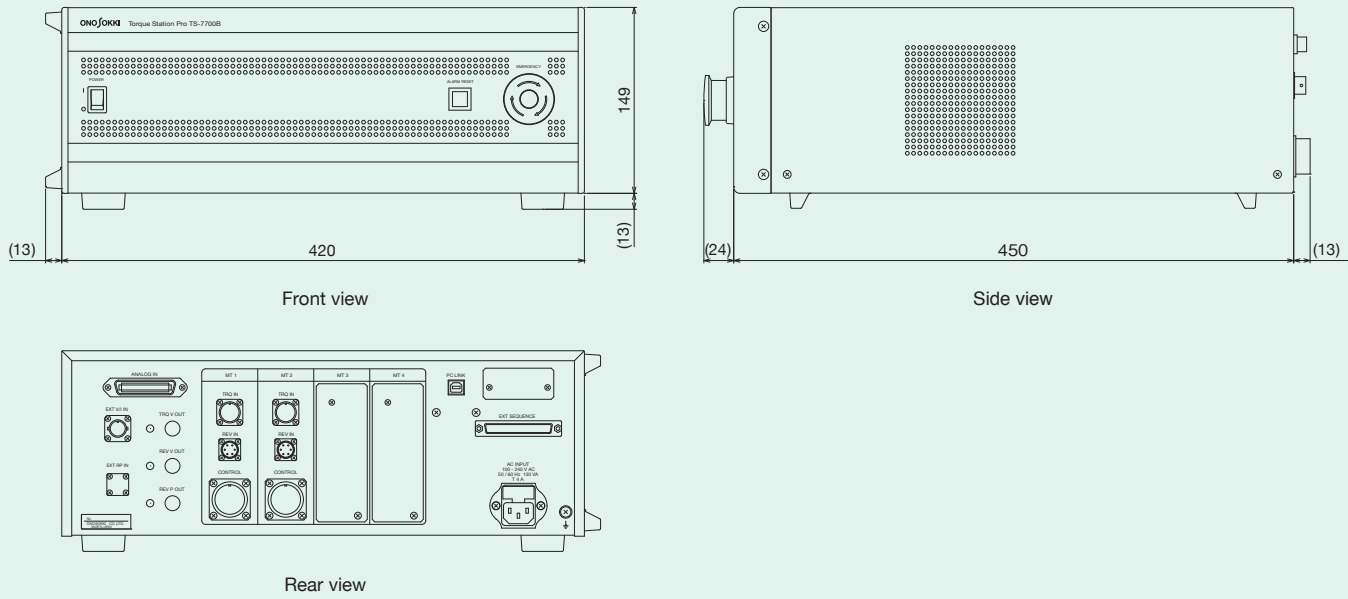
Brake control amplifier



Requires for the use of made-to-order large capacity detector.
The TS-0775 (sold separately)
is required for the TS-7700B.

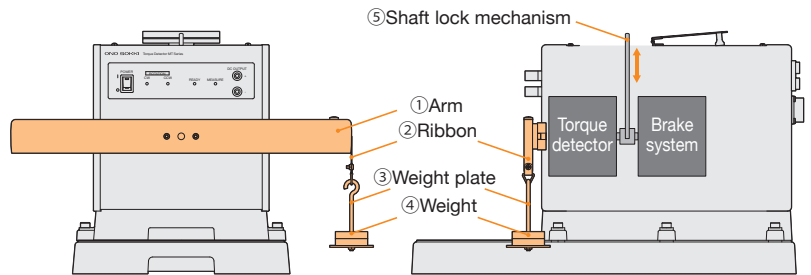
*Weight for the MT-0100 series: RoHS non-compliant.
Please consult to your nearest distributor or OnoSokki sales office nearby for RoHS compliant weight.

TS-7700B Outer Dimensions



MT-0100 series Torque Calibrator

- ① Highly accurate calibrator for MT series torque detector.
- ② Easy to use size. Enables calibration in the condition that the XY table is attached.
- ③ Subdivided weight has been adopted, which enables calibration of the intermediate torque. (The number of divisions: 4 or 5)
- ④ Supports torsion of a detection shaft. Highly accurate calibration is possible even though the angle of an arm is changed due to calibration weights.
- ⑤ Storage box provided.



Torque	Model name	Applicable detector					Effective length*1 Hole diameter	Weight
		MT-A series	MT-6100	MT-6200A/B	MT-6400A/B	MT-6500/B		
50 mN·m	MT-0152	MT-502A	MT-6152	MT-6252A/B	MT-6452A/B	—	50.985 mm, ø5 mm	20 g×5
100 mN·m	MT-0113	MT-103H	MT-6113	MT-6213A/B	MT-6413A/B	—		50 g×4
200 mN·m	MT-0123	MT-203A	—	MT-6223A/B	MT-6423A/B	—	100 g×4	100 g×4
500 mN·m	MT-0153	—	—	MT-6253A/B	MT-6453A/B	—		50 g×5
1 N·m ^{±2}	MT-0114K	—	—	—	MT-6414A/B	—	203.945 mm, ø8 mm	100 g×5
1 N·m ^{±2}	MT-0114G	—	—	MT-6214A/B	—	MT-6514/B		100 g×4
2 N·m	MT-0124	—	—	MT-6224A/B	MT-6424A/B	MT-6524/B	254.930 mm, ø8 mm	200 g×4
5 N·m	MT-0154	—	—	MT-6254A/B	MT-6454A/B	MT-6554/B		500 g×4
10 N·m	MT-0115	—	—	MT-6215A/B	MT-6415A/B	MT-6515/B	254.930 mm, ø14 mm	1 kg×4
20 N·m	MT-0125	—	—	MT-6225A/B	MT-6425A/B	MT-6525/B		2 kg×4

*1 Effective length includes the 1/2 thickness of the ribbon (metal fitting for hanging the weight) to the arm length of one side.

*2 You can select a calibrator for 1 N·m torque from two types, depending on the shaft diameter and shaft shape of the MT series detector. Please check the model name of the detector. The MT series detector from 2 to 20 mN·m should be calibrated at factory of Ono Sokki in Japan. Please consult to your nearest distributor or Ono Sokki sales office nearby.

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* Outer appearance and specifications are subject to change without prior notice.
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