SCHMIDT
control instruments

Screw cap torque tester
Instruction manual

DTXS/DTXA series

Read through this manual before using this gauge.

FORCE MEASUREMENT
IMADA

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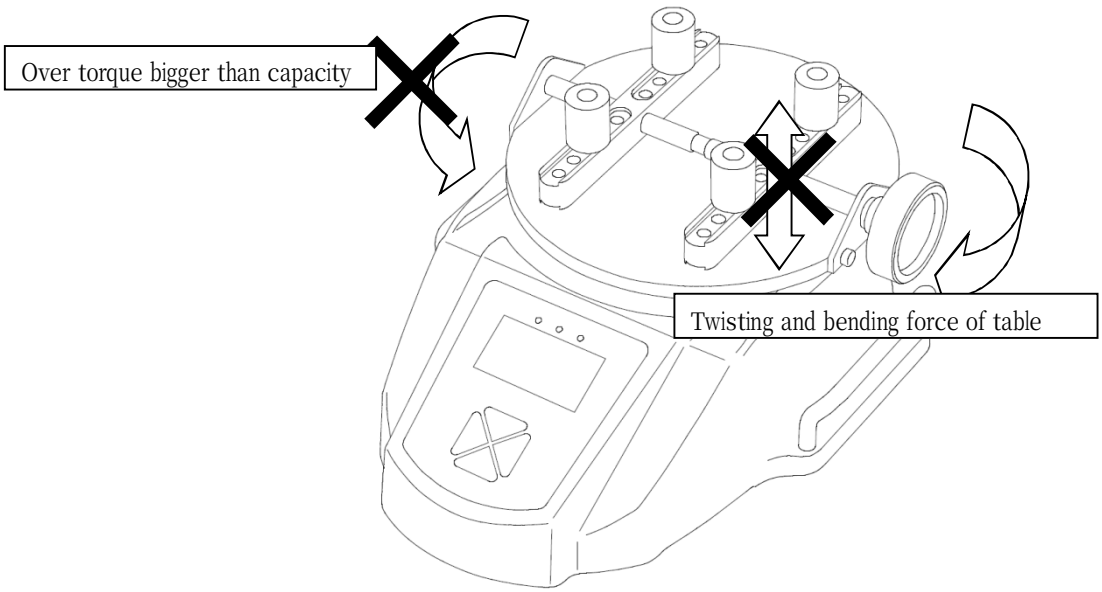
Precautions

Cautions of overload



●Keep in mind that this unit will break down if the force exceeding capacity is applied irrespective of power status.

●If the force exceeding approx. 110% of capacity is applied,
The following message shows up while the power is on.
In this case, please stop applying force immediately.
The sensor brakes down when it is overload.

●The sensor breaks down when apply force to bend or twist the measuring shaft.

Cautions of use

●Use this product only for measurement purpose.

●Read these instructions before using this product. Use it based on this instruction.

●Avoid misuse or rough treatment.

●Do not disassemble or tamper with this product.

●Do not hold table or attachment part to bring the instrument. Hold handle or DTXS/A itself, otherwise, it will fall.

Cautions of storage

●Please avoid oil, dust, and heat and high humidity, and keep it in a cool place.

●In case you remove the dirt of this unit, please do not use organic solvents, such as thinner.

●Very small electrical current is consumed also at the time of a power OFF.
Please use it after charging, when it is not used for a long period of time.

●The battery usable time after the full charge might be shorten by the degradation due to over discharge. To avoid over discharge, charge the battery regularly even if the product is not used for a long term

Cautions of an accuracy warranty

●Although based on operating frequency of force range, measurement accuracy deteriorates little by little. We recommend periodical calibration.

●The specification temperature range of this is 0 to 40 Celsius degrees.
In order to carry out more exact measurement, please use it by temperature within the limits set to the inspection certificate.

Cautions on safe

●During destruction, breaking points, or performing another test where fragments could fly out, always wear protection for the eyes and body.

●Be sure to use attached AC adapter. Otherwise, it may cause inaccuracy of measuring, fire, or a breakdown.

Technical terms in this manual

●There are some phrase using “force” instead of “torque”, and “displacement scale” instead of “angle scale” and “rotary encoder” in this manual.

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Features

DTXS/DTXA is an instrument for many purpose of torque measurement such as opening-closing torque of screw cap of bottles and rotational torque of switches with useful functions and high usability. DTXA is advanced model and there is function of input and output of angle from angle scale and rotary encoder.
Organic EL display, on-demand multi display and information in English lead easy operation.
The high speed data sampling (2000 data / sec.) also helps more accurate measurement even for the measurement of sudden force change such as destruction test.
The accurate graph can be made with optional software, which supports evaluation and analyze of measurement.
Please make sure to thoroughly read this instruction manual before use to obtain the maximum benefit from this instrument.

1. Models

DTXA/DTXS series consists of DTXA series with USB memory connection and displacement output function, and DTXS series without the connection and function. Besides, there are various set models combining several attachment.

Model name of DTX itself (Excludes an attachment)

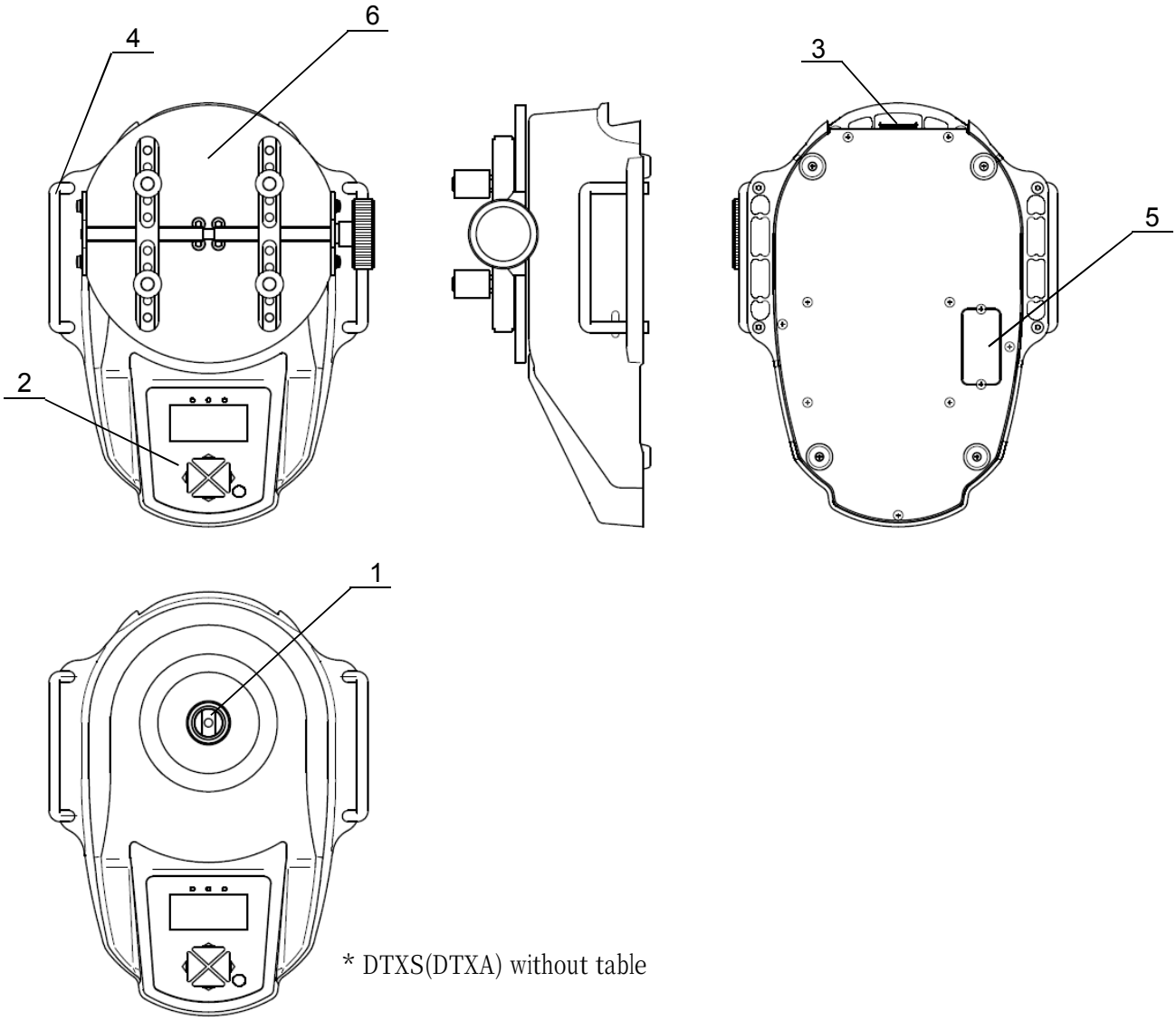
Model	Capacity	Display	Resolution
DTXS(DTXA)-0.5N-Z	0.5 Nm	50.00 Ncm	0.01 Ncm
DTXS(DTXA)-2N-Z	2 Nm	2.000 Nm	0.001 Nm
DTXS(DTXA)-5N-Z	5 Nm	5.000 Nm	0.001 Nm
DTXS(DTXA)-10N-Z	10 Nm	10.000 Nm	0.01 Nm

Unit name of DTX series (Includes an attachment)

Unit model	Capacity	Including
DTXS(DTXA)-2N	2 Nm	Standard table + Standard pins
DTXS(DTXA)-5N	5 Nm	
DTXS(DTXA)-10N	10 Nm	
DTXS(DTXA)-2N-TB-01	2 Nm	Standard table + Notch pins
DTXS(DTXA)-5N-TB-01	5 Nm	
DTXS(DTXA)-10N-TB-01	10 Nm	
DTXS(DTXA)-2N-TB-02	2 Nm	Standard table + Long pins
DTXS(DTXA)-5N-TB-02	5 Nm	
DTXS(DTXA)-10N-TB-02	10 Nm	
DTXS(DTXA)-2N-ST	2 Nm	Small table + Standard pins
DTXS(DTXA)-5N-ST	5 Nm	
DTXS(DTXA)-2N-ST-01	2 Nm	Small table + Notch pins
DTXS(DTXA)-5N-ST-01	5 Nm	
DTXS(DTXA)-2N-ST-02	2 Nm	Small table + Long pins
DTXS(DTXA)-5N-ST-02	5 Nm	
DTXS(DTXA)-0.5N-STL	50 Ncm	Small table + Standard pins
DTXS(DTXA)-2N-STL	2 Nm	
DTXS(DTXA)-0.5N-STL-01	50 Ncm	Small table + Notch pins
DTXS(DTXA)-2N-STL-01	2 Nm	
DTXS(DTXA)-0.5N-STL-02	50 Ncm	Small table + Long pins
DTXS(DTXA)-2N-STL-02	2 Nm	
DTXS(DTXA)-0.5N-STLW	50 Ncm	Small, wide table + Standard pins
DTXS(DTXA)-2N-STLW	2 Nm	
DTXS(DTXA)-0.5N-STLW-01	50 Ncm	Small, wide table + Notch pins
DTXS(DTXA)-2N-STLW-01	2 Nm	
DTXS(DTXA)-0.5N-STLW-02	50 Ncm	Small, wide table + Long pins
DTXS(DTXA)-2N-STLW-02	2 Nm	

2. Names and Functions

DTXS (DTXA) with standard table and pins



* DTXS(DTXA) without table

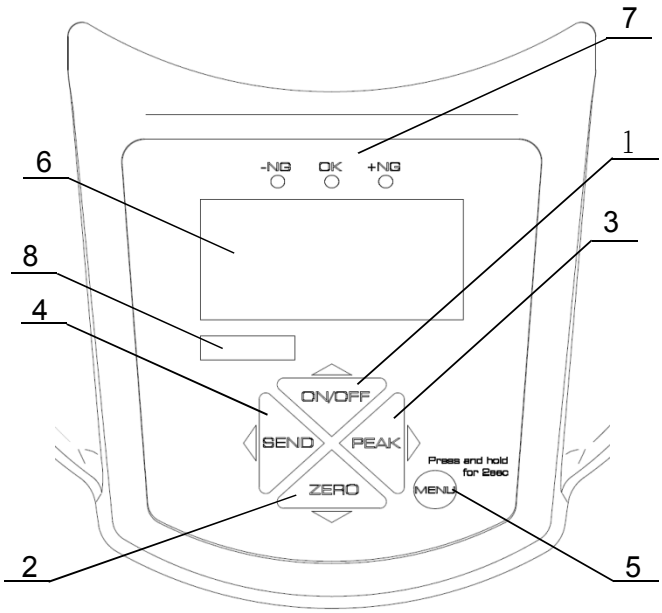
Functions

1	**Torque sensor**	Detecting part of torque.
2	**Operation panel**	Display torque and operating functions.
3	**Rear panel**	Connecting part with USB cable/ AC adaptor/ Communication cable.
4	**Handles**	Torque can be applied by holding the handle. Fixing is available the body with the holes after removing the handle.
5	**Battery cover**	Rechargeable battery inside. The battery can be replaced. (*1)
6	**Attachment**	The holding part of samples. The attachment is different by the model. The above picture is the combination of Standard table and Standard pins.

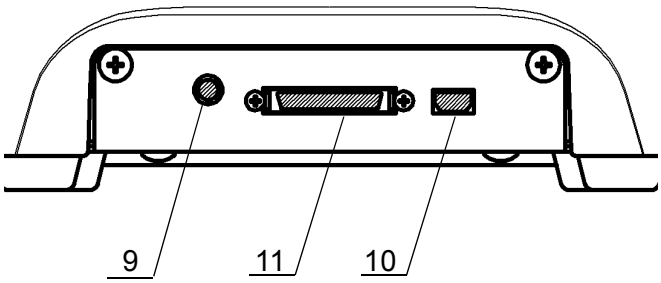
*1 Refer to the page 36.

2. Names and Functions

Operation panel



Connector panel

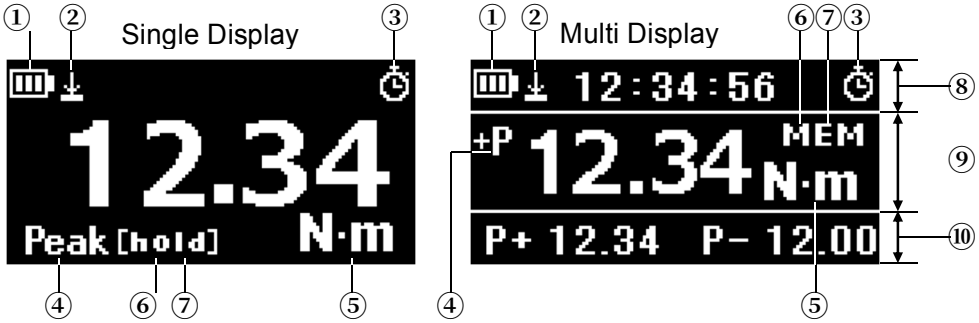


* The design of operation panel is different between DTXS and DTXA.

Functions of each part

1	**ON/OFF button**	Turn ON/OFF the power. Select menu.
2	**ZERO button**	Zero values. Select menu.
3	**PEAK button**	Toggle between “Peak mode” and “Track mode”. Select menu.
4	**SEND button**	Save data. Send data to a printer and a computer. Select menu.
5	**MENU button**	Go to Set up mode and measurement mode. Enter settings.
6	**Display**	Show values, settings and the status.
7	**Comparator Judgment LED**	Judge force values according to set comparator values.
8	**Model label**	It shows the model and the range. -Z, end of the label, indicates the model of the body itself.
9	**AC adaptor connector**	Recharge battery with AC adaptor.
10	**USB connector**	For data sending to PC with USB cable (included). DTXA only: Save data on USB memory (excluded).
11	**I/O connector**	Connector for other equipment, i.e. PC, printer, and displacement scale.

2. Display



① **Battery** / Battery status

② **Displacement value zero** / Valid or invalid: Zero displacement value at arbitrary force value.

(Refer to page 19, [8.Function Setting, Displacement reset]) (*)

③ **Auto Zero Timer** / Valid or invalid: Zero force value after arbitrary time.

(Refer to page 19, [8.Function Setting, Auto Zero Timer])

④ **Peak mode** / Valid or invalid (Refer to page 19, [8.Function Setting, Auto Zero Timer])

(Refer to page 19, [8.Function Setting, Peak Functions])

⑤ **Unit /** Measurement units

⑥ **Data hold** / Valid or invalid: Holding measuring values.

([Hold] is displayed instead of [mem] on Multi display, while holding values.)

⑦ **USB memory** / On: Connected, Flashing: Sending data.

([mem] is displayed on Simple display, while USB memory is connected.)

⑧ **Header** / (Refer to page 13, [6.Single display / Multi display])

⑨ **Middle display**

⑩ **Footer** / (Refer to page 13, [6.Single display / Multi display])

* Only for DTXA

3. Accessories

The following accessories are included. Make sure to keep them in the packaging box.
The box is necessary when transport to protect the torque gauge.

●Instruction manual(This book)●Inspection certificate ●Warranty ●AC adapter ●USB cable ●Driver CD-ROM ●Force Recorder Professional Trial（30 days limits）●Adapter for USB memory(DTXA only)● Attachments (It is depending on the model)

4. Preparation

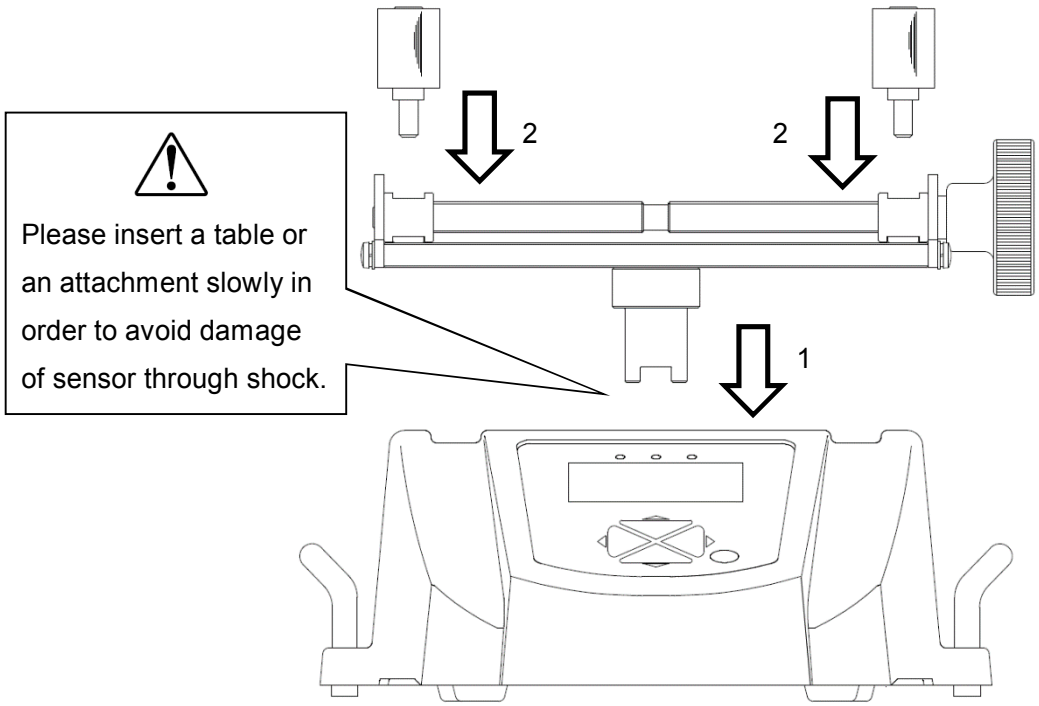
4.1 Charge

Charge the battery with included AC adapter when use the torque gauge at the first time.
Charging completes in approx. 8hours (when power is off).
Three types of battery mark show up depending on remaining power.
Charge the battery when  shows up. Battery mark flashes while charging, and stop flashing when completed.

●Make sure to use the included AC adapter only.
The accuracy is not guaranteed and break down and fire may occur when use other AC adapters.
●The battery may be dying when charged power is low or not charged at all.
Replacement of battery is recommended. Please refer to the page 36.
●Please note the date and time setting is reset when battery dies and replaced.

4.2. Installation of an Attachment

This product is separated the attachment from the body at the shipping. So, Install the matching attachment before measurement. Insert the attachment shaft to the mounting hole of the body.
Below is the image of installing standard table.



The torque sensor is at the inside of the mounting hole. Insert the shaft softly and horizontally and engage the sensor (1).
Install the pins to the holes of the clamping bars. At this time, match the pins to the grooves of the clamping bar(2).Check the fitting after the installations.
It might not measure proper torque if the table is not fitting on the torque sensor or the pins are not fitting the grooves.

●To protect the inner torque sensor, turn on the power and check the torque on the display. Be careful not to be over the maximum capacity during this work.
●When applied force is beyond the capacity of attachments or a torque sensor, it could cause the breakdown.

5. Basic Operation

The display indicates either clockwise or counter-clockwise torque.

The measurement is done on Peak mode or Track mode.

Functions	Operation	Description
Power on	 Press	Turn on power. The introduction message shows up first, and measurement can be started after the message disappears. The introduction message and multi display (Header) show time setting.
Shut off	 Hold for more than one second.	Turn off power.
Zero values	 Press	Zero values. Refer to the page 16 for detail.
Peak / Track mode	 Press	Toggle Peak mode and Track mode.
Memory saving / Data sending	 Press	Save data to the internal memory. Enable to send data to PC and other equipments at the same time. Refer to the page 158 for detail of transferred data..

6. Single display /Multi display

Select either Single display or Multi display.
Refer to the page 23 for detail of toggling.

6.1.Single display

Display torque value only.
*Displacement value can be checked on
Multi display (DTXA only).

Single display

6.2. Multi display

Display torque value on the middle display.
The contents on the header and footer
are selectable.

Multi display

6.3. Setting of Multi display

Press MENU (MENU button) at measurement-ready display and header lights on.

Press SEND PEAK (SEND, PEAK button) to select contents while lighting on.

Press MENU (MENU button) and the footer lights on.

Press SEND PEAK (SEND, PEAK button) to select contents while lighting on.

Press MENU (MENU button) and go back to measurement-ready display.

Refer to the page 16 for how to set each content.

Multi Display：Menu on header.

	Contents	Description	Valid Model
Header	**Date**	Date	DTXA/DTXS
	Time	Time	DTXA/DTXS
	Number of memory	The number of saved force value.	DTXA/DTXS
	Number of +NG	The number of force exceeding set comparator (High) value. Zero with  (ZERO button) while this content lights on.(*)	DTXA/DTXS
	Displacement	Displacement. Zero with  (ZERO button) while this content lights on.(*)	DTXA
	Average	Average of saved force value. Unit is disregarded.	DTXA

* Angle scale or rotary encoder is necessary to indicate displacement.

Multi Display：Menu on footer

	Contents	Description	Valid Model
Footer	**Comparator High / Low values**	Set comparator High / Low values. Enable to set the values with MENU (MENU button) while this content lights on. Change values with ON/OFF ZERO (ON/OFF,ZERO button) and enter with MENU (MENU button).	DTXA/DTXS
	+/- Peak	Torque peak value. Zero with ZERO (ZERO button) while this content lights on. Show either or both peak value of clockwise / counter-clockwise directions, depending on [AND][OR] selection.	DTXA/DTXS
	1st / 2nd Peak	1st and 2nd torque peak value. Zero with ZERO (ZERO button) while this content lights on. P1 shows 1st, and P2 shows 2nd peak values.	DTXA
	Force bar graph	The rate of torque value among capacity.	DTXA/DTXS
	The latest memory value	Show the latest memory data. Press MENU (MENU button) to show all the memory data with ON/OFF ZERO (ON/OFF, ZERO button) while this content lights on.	DTXA/DTXS
	Max. / Min. values of memory	Show maximum and minimum values among memory data. Torque data only.	DTXA

7. Initial Setting

1.Turn off power.

2.Hold 

（MENU button）and turn on power with 

（ON/OFF button）.

3.Select menu in Main menu with 

（ON/OFF,ZERO buttons）,and go to Sub menu with

（ PEAK button）.(Some menu doesn’t have Sub menu.)

4.Select menu in Sub menu with 

（ON/OFF,ZERO buttons）,and go to Setting menu with

（PEAK button）.Go back to Main menu with 

（SEND button）.

5.Select menu in Setting menu with 

（ON/OFF,ZERO buttons）,and enter the setting with

（MENU button）.

（The setting can be saved only when entered with MENU button.）

6. The display automatically goes back to Sub menu after entering.

Go back to Main menu with 

（SEND button）.

7.Hold 

（MENU button）for more than two seconds and go back to measurement-ready display.

Initial Setting(Setup Menu)

Main menu	Sub menu	Setting menu	Description	Valid model	Initial setting
Units	Force Units	[N-m] / [N-cm] /[Kgf-m] /[Kgf-cm] / [lbf-in] / [ozf-in] (*1)	Change torque units.	DTXA / DTXS	N-m
	Displacement Units	[°] / [inch] / [mm] (*1)	Change displacement units	DTXA	°

*1 Selectable units differ between Japan model and non-Japan model

7. Initial Setting

Main menu	Sub menu	Setting menu	Description	Valid model	Initial setting
+/- Indicator	+/- Force	[+/-Normal] / [+/-Reverse]	Change +/- signs of torque value. [Normal] (+)clockwise、 (-)counter clockwise [Opposite] (+)counter clockwise、 (-)clockwise	DTXA / DTXS	Normal
	+/- Displacement	[+/-Normal] / [+/-Reverse]	Change +/- signs of displacement value.	DTXA	Normal
Sensitivity	—	[Max] / [High] / [Medium] / [Low]	Change sensitivity of torque measurement. [Max] is the highest sensitivity. [Max] is suitable for rapid change like impact test.	DTXA / DTXS	Max
Displacement Type	—	[OFF] / [Type A] / [Type B] / [Type C] / [Type D] / [Type E] / [Manual]	Select when connect with displacement scale. Enable to manually set at [Manual].Refer to the page 24 for detail.	DTXA	OFF
Zero / Tare Reset	—	[All reset] / [Peak only]	Select zero contents. [All reset]: Zero all the displayed values. [Peak only]: Press the zero button to zero peak value. Hold the zero button to zero the measuring torque value. Displacement value is not reset.	DTXA / DTXS	All reset

Main menu	Sub menu	Setting menu	Description	Valid model	Initial setting
Send function In addition,the selected data is memorized into the inner memory when press[SEND],and sent to external equipments via USB/RS232C/Digimatic.	—	[Display value] / [+Peak] / [-Peak] / [+/-Peak] / [1st Peak] / [2nd Peak] / [1st/2nd Peak]	Select data sent to external equipment. [Display value]: Send displayed value. On multi display the value on the middle display is sent. [+Peak]: Send + Peak value. [-Peak]: Send - Peak value. [+/-Peak]: Send + and - Peak values. [1st Peak]: Send 1st Peak value. [2nd Peak]: Send 2nd Peak value. [1st / 2nd Peak]: Send 1st and 2nd Peak values. Refer to the page 27-Page 28 for detail. page 13, [6.Single display / Multi display]	DTXA / DTXS (*2)	Display value
Date Format	—	[YYYY/MM/DD] / [MM/DD/YYYY] / [DD/MM/YYYY]	Select display type. Y:Year,M:Month,D:Date	DTXA / DTXS	YYYY/ MM/ DD
Language	—	[Japanese] [English] And more	Select languages.	DTXA / DTXS	Japanese

*2 The function of 1st / 2nd Peak is valid only for DTXA.

8. Function Setting

1.Hold 

（MENU button）for more than two seconds while power is on.

2.Select menu in Main menu with 

（ON/OFF,ZERO button）,and go to Sub menu with 

（PEAK button）.(Some menu doesn't have Sub menu.)

3.Select menu in Sub menu with 

（ON/OFF,ZERO button）,and go to Setting menu with 

（PEAK button）.

Go back to Main menu with 

(SEND button.)

4.Select menu in Setting menu with 

（ON/OFF,ZERO button）,and enter the setting with 

（MENU button）.

(The setting can be saved only when entered with MENU button.)

5. The display automatically goes back to Sub menu after entering.

Go back to Main menu with 

（SEND button）.

6. Hold 

（MENU button）for more than two seconds and go back to measurement-ready display.

Function Setting (Program Menu)

Main menu	Sub menu	Setting menu	Description	Valid model	Initial setting
High / Low Set points	High	+/- [0000 to 9999]	Set Hi and Low values. LED and output signal show whether the measurement value is below, within, or above the set values. -NG: Displayed value < Low set point OK: Low set point ≦ Displayed value ≦ Hi set point +NG: Displayed value > Hi set point	DTXA / DTXS	+Capacity
	Low	+/- [0000 to 9999]			-Capacity
High / Low Output	Value No.1	+/- [0000 to 9999]	Set sub comparator value to judge whether displayed value reaches the set value. The result is output to external equipment. OFF: Displayed value < No.1 or No.2 set point. ON: No.1 or No.2 set point ≦ Displayed value This function is only for output.	DTXA	0000
	Value No.2	+/- [0000 to 9999]			0000

8. Function Setting

Main menu	Sub menu	Setting menu	Description	Valid model	Initial setting
Peak Functions	[and] [or] Peak	[and] / [or]	[and] Both clockwise and counter clockwise peak values are displayed in order of clockwise peak, counter clockwise peak, torque value, with  (PEAK button). [or] Either clockwise or counter clockwise peak value which is higher absolute value is displayed. Refer to the page 27 for detail.	DTXA / DTXS	OR
	Auto Peak Memory	[ON] / [OFF]	The data is automatically saved Whenever  (ZERO button) is pressed.	DTXA / DTXS	OFF
	1st/2nd Peak Drop	Absolute value [0000 to 9999]	The peak drops to detect 1st and 2nd peak values. Refer to the page 28 for detail.	DTXA	0000

Main menu	Sub menu	Setting menu	Description	Valid model	Initial setting
Displacement Reset	Reset Condition	[OFF] / [Once] / [Each time]	The condition to zero displacement value. [Once] Rest displacement value once when the torque value reaches to the set reset value after zero values. [Each time] Zero displacement value whenever the force value reaches to the set reset value.	DTXA	OFF
	Reset value	Absolute value [0000 to 9999]	Zero the displacement value when the torque value reached to the set value.		0000
Internal Memory	Data recall		The saved data in the internal memory is displayed.	DTXA / DTXS	--
	Data Delete	[Last Data Delete] / [All Data Delete]	Delete the saved data.		--
USB Memory	Export to USB	—	Transport data in internal memory to USB memory. Refer to the page 30 for detail.	DTXA	--
	USB disconnect	—	Disconnect USB memory from force gauge.		--
Auto Zero Timer	—	[1~60sec] / [OFF]	Automatically zero values after set time period.	DTXA / DTXS	OFF
Sound	Keypad Beep	[ON] / [OFF]	Operating sound of buttons.	DTXA / DTXS	ON
	High / Low Alarm	[ON] / [OFF]	Alarm when the force value exceeds the comparator High set point.		OFF

8. Function Setting

Main menu	Sub menu	Setting menu	Description	Valid model	Initial setting
Display Functions	Display Format	[Single Display] / [Multi Display]	[Single Display] Display torque value only. [Multi Display] Display torque value on the middle display. The contents on the header and footer are selectable.	DTXA / DTXS	Multi Display
	Brightness	[Bright] / [Power Save]	Adjust brightness of the display. It automatically turns to [Power Save] mode even chosen [Bright] when no-operation conducted. It goes back to [Bright] when use. (*1)	DTXA / DTXS	Power Save
	Reverse Display	[ON] / [OFF]	Reverse the display up-side down.	DTXA / DTXS	OFF
	Auto Shut Off	[OFF] / [5 min] / [10 min] / [30 min] / [60 min]	Automatically shut off after the set time period when no operation conducted.	DTXA / DTXS	10min
Data and Time	Date Set	[Year] / [Month] / [Date]	Date & Time setting. [Hour] is on 24 hours basis.	DTXA / DTXS	----/--/--
	Time Set	[Hour] / [Minute]			--:--

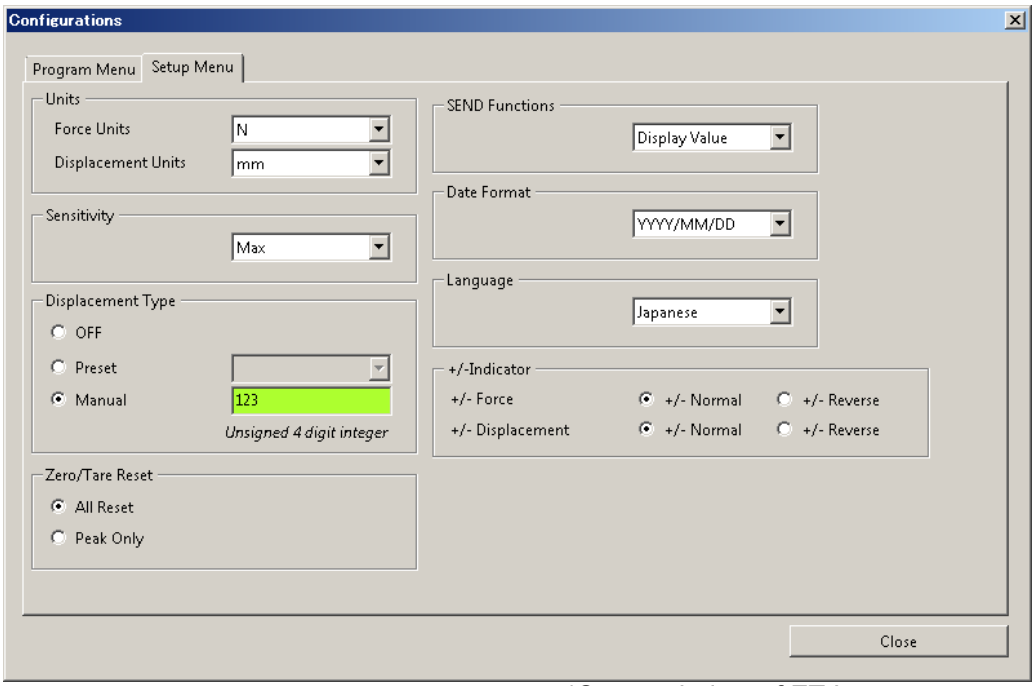
*1 [Bright] mode consumes the battery more than [Power Save] mode.

9. Measurement of Displacement (DTXA series only)

DTXA series can detect both force and displacement values.
(A displacement meter needed.)　Displacement Type is [OFF] at default.
Select appropriate Displacement Type depending on displacement meters.

9.1 Scale setup

When you choose “Manual” in “Displacement type,” you can input Manual coefficient values from “Set up Torque Gauge” of ZT-logger (Included software) or Force Recorder (Optional software).



*Setup window of ZT-Logger

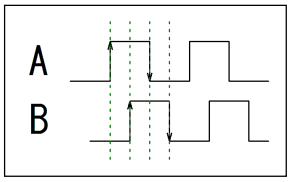
This window is opened by the following procedures.

ZT-Logger
“Gauge Setup” in menu bar ->“Gauge Setup” .

Force Recorder
“Setting” in menu bar ->“Set up Force Gauge.”

Please refer to “Displacement Type” in “Initial Setup 1” of “Set up Force Gauge”.
Please select “Manual” and input displacement per 1 count of the displacement meter in the left box.
After pressing Enter key, the color of the box will change, which means the manual coefficient values has been successfully reflected.

9. Measurement of Displacement (DTXA only)



It uses phaseA and phaseB together to know the direction.
It reads incremental signals input in the 2 phases.
An up/down edge is regarded as 1 count,
in other words, please input a quarter of 1 signal period.

For example

In the case when you combine a DTXA with the displacement scale which uses line driver output with 20μm signal period.

->20μm/4 = 5μm, therefore, “0.005” should be input as a manual coefficient values.

● When you choose [Manual], make sure to check the difference between the displayed displacement value and the actual displacement, by using digital length meter and so on.
●The battery is consumed more when connected with a test stand with linear scale. Please connect AC adapter or charge frequently when long hours operation.

9.2 Connectable displacement scale

Please use displacement scale to meet the followings.

Output specifications of displacement scale
- Line driver output * Line receiver in accordance with RS-422/485must be built-in.
- Open collector output *Voltage difference between points of contact must be below 0.5V.

* Some displacement scale may not work.
* There are some displacement scales which we have inspected their working condition with DTXA series. Please contact us for further information.

Providable Voltage and current from a DTXA torque gauge to a displacement meter
DTXA series can provide voltage up to DC+5V, and current up to 200mA to displacement meters.
When you would like to supply power from a DTXA to external equipment, please
Make sure to connect it to an included AC adapter.
* Operation of this instrument could be unstable when over 200mA is provided.

9.3 Display of displacement

The displacement is displayed on the header on Multi display.
Please refer to the page 13 for setting.

9.4 Display of displacement at peak torque

This function is recommended when graphing is not needed such as peak measurement.
When displacement is displayed on the header at Peak mode on Multi display, the displacement at peak torque is displayed.

*The displacement corresponds to the torque value on the middle display on Multi display.

* The displacement is not displayed when [1st Peak], [2nd Peak] and [1st / 2nd Peak] is chosen as 

button setting. In this case, the displacement can be only saved and sent to external equipment. (Send Functions: Refer to page 19.)

9.5 Displacement Zero

Zero displacement only.

Press 

(MENU button) at measurement display and choose displacement on the header on Multi display. Press 

(ZERO button) to zero displacement.

*When a peak torque value is indicated in middle display, you cannot zero displacement. In this case, displacement value at peak torque value is indicated.

10. Peak Value

Press 

(PEAK button) and [P] or [Peak] is displayed at left side of display.

[P] and [Peak] mean Peak mode.

●In case of [OR] at Peak mode, higher peak value among clockwise and counter clockwise peak values is displayed.

Press 

(PEAK button) and peak value, measuring value, and peak value are displayed in order.

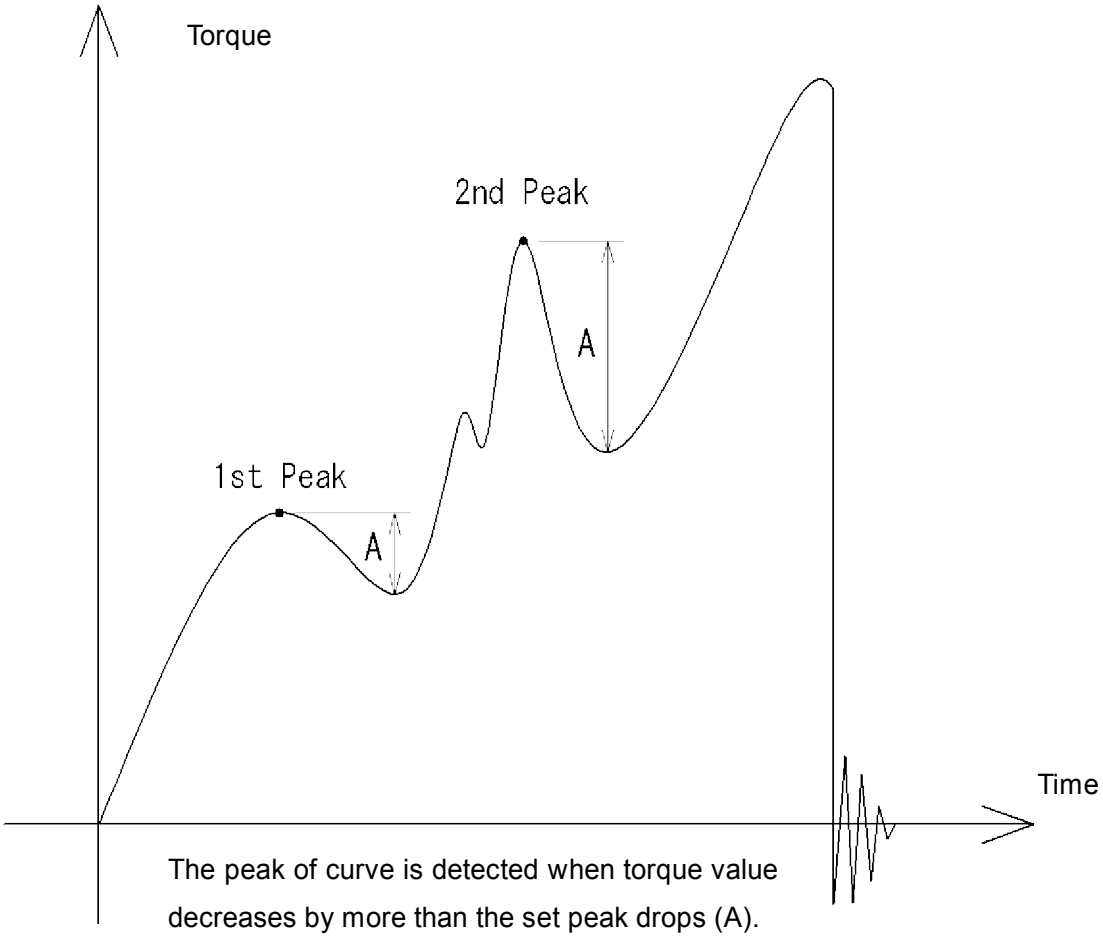
●In case of [AND] at Peak mode, both peak value of clockwise and tensile are displayed. Press 

(PEAK button) and clockwise peak, counter clockwise peak, measuring value, and clockwise peak are displayed in order. In case that +/- sign is chosen as [+/-Reverse], counter clockwise peak, clockwise peak and measuring value in order.

11. 1st /2nd Peak Value (DTXA series only)

The peaks of the first and the second curves, instead of the peak of whole measurement, can be detected.

The 1st peak as [P1] and the 2nd peak as [P2] are displayed on the footer on Multi display.



The 1st and the 2nd peak drops (decreasing value) can be set on “1st / 2nd Peak Drop” of “Peak Functions” in Program Menu. Refer to page 21. After force value increases, the peak of curve is detected as the 1st (2nd) peak when the force value decreases by more than the set peak drops. (See above picture)

*The set peak drop should be absolute value.

The 1st and the 2nd peaks can be detected on one direction (clockwise or counter clockwise).
The direction of the 2nd peak follows one of the 1st peak.

12. Output

12.1 Output to USB memory: (DTXA series only)

DTXA can be connected to USB memory (excluded) using the included adapter. Data of internal memory can be sent to USB memory and measuring data can be saved in USB memory at real time.

12.1.1. Connection to USB memory

Connect USB memory (excluded) to DTXA with included adapter. MEM (MEM mark) shows up on measurement-ready display when DTXA detects USB memory.

Valid USB memory

- ●USB mas storage class
- ●USB 2.0/1.1
- ●Max. current: less than 200mA
- ●Format: FAT16/FAT32

* Some USB memory may not be used even meeting the above conditions. Please try another USB memory. Please do not connect other equipment such as USB fan and USB cleaner.

- ● Data cannot be output to RS232C and digimatic interface when connected to USB memory.
- ●Please note that we do not guarantee data even if data in USB memory is lost when connecting to DTXA.
- ●Do not leave USB memory under the strong sun light to avoid transform and discoloration.
- ●The battery is more consumed when connected to USB memory. Please charge the battery frequently or keep the AC adapter connected to DTXA when use for a long hours.

12.1.2. Data transport

Transport data in the internal memory to USB memory.

Program Menu → USB Memory → Export to USB

The following message shows up during transport. (Do not remove the USB memory.)
The message disappears when transport ends.

* Data in the internal memory is not deleted when transported. Please delete it when needed.
* Please refer to the page 46 for file format of USB memory.
* The data is transported to the new file of USB memory. (Not re-written)

● Do not disconnect USB memory during transport.
●Please make sure to follow the direction to disconnect USB memory, otherwise data can be lost.

12.1.3 Data saving at real time

Save measuring data to USB memory at real time without saving to internal memory.
The saving speed is fixed as 100 data per second.

12.1.4. Start and stop of saving

While MEM (MEM mark) shows up, press SEND (SEND button) to start saving data in USB memory. Press SEND (SEND button) again to stop saving.

MEM (MEM mark) blinks during saving.

* Please refer to the page 46 for file format of USB memory.

*The data is saved in the new file of USB memory. (Not re-written)

12.1.5. Disconnect of USB memory

Please make sure to follow the direction below to disconnect USB memory from DTXA.

Program Menu → USB Memory → USB Disconnect

MEM disappears when USB memory is ready to be disconnected.
Make sure to disconnect USB memory after MEM disappears.

●100 data/sec. is saved in USB memory, while the sampling speed of DTXA is 2000 data/sec. The measuring value can differ between one displayed on DTXA and one saved in USB memory because of the speed difference.

●Optional software Force Recorder is recommended for measurement with sudden force change such as destruction test. Force Recorder can receive 2000 data/sec the same speed of DTXA series.

●Do not disconnect USB memory during saving.

●Please make sure to follow the direction to disconnect USB memory, otherwise data can be lost.

12.2. USB output (output to PC)

DTXS/DTXA can be connected to PC with included USB cable.
The connection with PC using the included data logger CD-ROM is as follows.

12.2.1. Operation environment

OS	Windows XP / Vista / 7 / 8/ 8.1 (32bit/64bit)
CPU	Higher than 1GHz
Port	USB 1.1/2.0 port
Memory	More than 1 GB (recommended)
Hard disk	2GB
Environment	Later than .NET Framework4 (included)

12.2.2. Connection to PC

Connect the DTXS/DTXA and USB port of PC with the included USB cable.

12.2.3 Installation of driver

Turn on the DTXS/DTXA while connected to PC.
The DTXS/DTXA is detected as the new device. Insert the included CD-ROM to PC and follow the direction of ZT Logger Installation manual.

●Installation of driver is necessary for data logger software ZT-Logger (included) and graphing software Force-Recorder (optional).

12.2.4. Installation of data logger software ZT-Logger

Install data logger software ZT-Logger after installation of driver.
Select CD drive in My Computer and click an icon of Setup. (CD-ROM is still inserted to PC.) Follow the direction of ZT Logger Installation manual to install.

●Some PC and environment may not correspond to the CD-ROM. Please get a contact with your local distributor or us in this case.

12.3. Output on RS232C/USB

Connecting with external equipments, data transport and control of this unit are possible. The connection is based on RS232C (optional cable) and USB (included cable).

Condition

Data bits	8 bit
Stop bit	1 bit
Parity bit	None
transmission rate	19200bps

Commands

The command is common among RS232C and USB interface.
This instrument basically responses after receiving commands.
Commands and responses are consisted of ASCII code.
Commands and responses are followed by code [CR]. This instrument responses when receive code [CR].
This instrument sends E[CR] when a wrong command is sent.
Please refer to the page 47 for commands in detail.

12.4. Analog output

12.4.1. Analog output: D/A (standard spec.)

Analog voltage is always output depending on measuring torque value. (+/- 2V when max. torque is applied.)

Torque value can be recorded at real time by connecting to external equipments with analog cable (excluded).

Analog output

Data update: 2000 data / sec.

Zero adjustment: within +/-20mV

Accuracy: 1% or less

*Connect to the external equipments with resistance 1kΩ and more.

●The analog output is unstable when the introduction message shows up on the display. Please use the analog output during measurement.

12.4.2 Analog output: RAW (optional spec.)

The raw analog data is output without digital processing.

The response speed is fast, but zero reset is invalid. (Noise may also be detected as the data is not filtered.)

Output voltage is approx. +/-1v when max. force is applied.

* Connect to the external equipments with input resistance 1kΩ and more.

* Please refer to the data sheet included to RAW option model.

12. Output

12.5. Digimatic Output

Torque value can be printed out by connecting to Mitutoyo Digimatic mini-processor DP-1VR with optional cable. Please refer to the instruction manual attached to DP-1VR.

Press 

(SEND button) to print data out to DP-1VR.

Data can be printed out with DATA (DATA button) on DP-1VR, too.

The sent data is the value chosen at “SEND function” of Setup Menu.

Print out all the saved data

To print out all the saved data, go to

Program Menu - Internal Memory - Data storage

and press DATA (DATA button) on DP-1VR. It takes time to print out big number of data.

To stop printing, turn off DP-1VR.

*Unit should be the same among all the data saved in the display unit, otherwise it cannot be printed out.

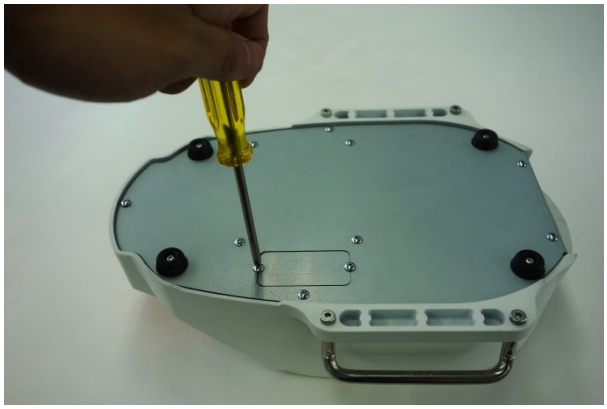
*Some equipment with digimatic output may not be used with the DTXA/DTXS.

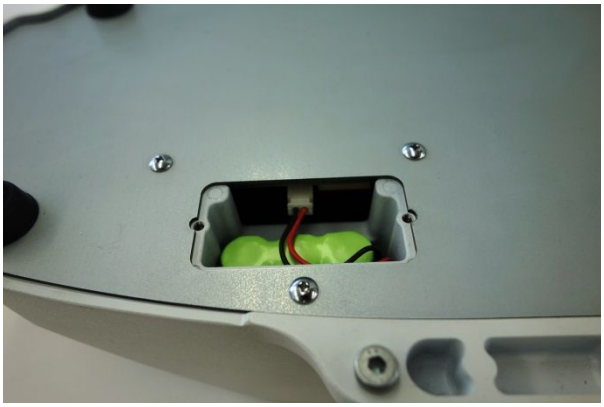
*Digimatic output is only for torque value. To output displacement value of DTXA series, save data in the internal memory of display unit which can be sent to USB memory.

13. Maintenance

13.1. Battery Change

The display unit has rechargeable battery inside.
If the battery is worn out soon after charging or not charged at all, the battery is dying. Please change the batteries. (Battery model: BP-308)
The direction is as follows.





Turn off the power.
Pull out the cables if connecting the USB cable or the AC adaptor.
Remove the attachment and make the body upside down. Remove the two screws and open the battery cover.
Remove the battery and pull the connector out.
(The extraction is by sliding the connector part with tweezers or radio pliers.)
*Note: The cable could be deteriorated when pulling out the connector by strong force.

Connect the new battery connector.
Put the battery into place and fix the cover with the screws as before. Do not clamp the battery cord between the cover and the battery place.

- ●Do not use any battery except BP-308. Other battery may lead break down and fire.
- ●The date and time setting is reset when battery is disconnected.
- ●Do not work this replacement with an attachment.

13. Maintenance

13.2 Calibration and Repair

We offer calibration service with charge. To maintain the best accuracy and reliable measurement, the periodical calibration is recommended.
Please ask your local distributor about fee and lead time.
Please note that the function setting (Program Menu) and saved data may be erased when repaired.
Please make sure to send this instrument with the carrying case to protect the gauge.

14. Warranty

We warrant the products to be free from defects in workmanship and material under normal use and proper maintenance for one year from original purchase.

* Please make sure to read through the included warranty for guarantee conditions.
* We cannot guarantee the products without warranty.

15. Specifications

Model	DTXA	DTXS
Feature	Advanced model with various functions such as data saving in USB memory stick, displacement I/O and more.	Standard model with the same benefit in performance as DTXA series but reduced functions.
Accuracy	±0.5%F.S.±1digit	
Unit of measurement	N-m, N-cm, Kgf-m, Kgf-cm, lbf-in,ozf-in (*1)	
Display	4-digit with sign	
Display update	10 times / sec.	
Sampling rate	2000 data / sec. at maximum(*2)	
Battery	8 hours (8 hours charge)	
Overload capacity	Approx.200% of capacity	
Operating environment	Temperature: 0 to +40 degree Celsius, Humidity: 20 to 80%RH	
Functions	On-demand display (header and footer), Peak hold (clockwise and counter clockwise), Internal memory (1000 data), High/Low Setpoints (judgment of OK or NG), Reversible display, Reversible sign, Auto Zero Timer, High/Low Alarm, Off timer (auto shut off), Sensitivity, Date and Time display	
	1st/2nd peak, Displacement detection at torque peak, Displacement zero at selected torque	—
Output	USB, RS232C, Mitutoyo digimatic (*3), 2 VDC analog output (D/A), Comparator judgment (-NG/OK/+NG) Overload warning	
	High/Low Output (output of judgment) / USB memory / Displacement	—
Overload warning	Approx.110% of capacity (Warning message and alarm)	
External connecting switch	Send (a point of contact holding), Zero, Peak ON/OFF setting	
Weight	Approx. 4.5kg including Standard table and Standard pins)	
Dimension	Refer to the dimensions	
Accessory	AC adapter, Inspection certificate, Driver CD-ROM (including simple software for data logging), Force Recorder Professional Trial（30days limited）, USB cable, Carrying case, Attachment (depending on the model)	
	Adapter for USB memory stick (*4)	—

*1 The displayed units are different between Japanese model and International model.

*2 When save data in USB memory stick, the sampling rate is 100 data/sec.

*3 Connection may be invalid with some Mitutoyo products even having digimatic output.

*4 USB memory stick is not included.

16. Optional Items

Changing attachments. More samples, more useful.

<table>
<tr><th colspan="5">Table Variations</th></tr>
<tr><th>Table</th><th></th><th>Clamp pin</th><th>Set models</th><th>Pin models (*)</th></tr>
<tr><td rowspan="4">Standard table
 
The table can put the sampleφ20mm ~φ160mm such as PET or glass bottles and cans.</td><td rowspan="4">+</td><td>Standard pin
  </td><td>DT-TB</td><td>TB-P</td></tr>
<tr><td>Notch pin
  </td><td>DT-TB-01</td><td>TB-01P</td></tr>
<tr><td>Long pin
  </td><td>DT-TB-02</td><td>TB-02P</td></tr>
<tr><td colspan="3">Sample stage for Standard table (The model: TB-SP)
  
It makes samples stable.</td></tr>
<tr><td rowspan="3">Small table
 
The table is suitable for φ7mm~φ50mm small samples.
*It is not able to be mounted 10-m type.</td><td rowspan="3">+</td><td>Standard pin
  </td><td>DT-ST</td><td>ST-P</td></tr>
<tr><td>Notch pin
  </td><td>DT-ST-01</td><td>ST-01P</td></tr>
<tr><td>Long pin
  </td><td>DT-ST-02</td><td>ST-02P</td></tr>
</table>

*Four pins become the set of pin models.

Pin chuck variations			
 The three claws clamp samples such as wire and round-bar samples. Choose the size from Large/Medium/Small size. Besides, made of stainless-steel type is available for the Medium size.			
Pin chuck Large Model:DT-DC-13 Open width:φ1.2～13mm Weight: Approx. 670g	Pin chuck Medium Model: DT-DC-6.5 Open width:φ0.5～6.5mm Weight: Approx. 290g	Pin chuck Medium (Stainless-steel) Model:DT-DC-6.5SUS Open width: φ0.5～6.5mm Weight: Approx. 290g	Pin chuck Small Model:DT-DC-4 Open width:φ0.5～4mm Weight: Approx. 190g * the capacity is up to 5N-m

Printer: DP-1VR	Battery: BP-308
	
Measuring value and saved data can be printed out. Optional cable CB-308 is needed.	Replacement battery.

Graphing Software: Force-Recorder			
A smooth and accurate graph with USB connection. (2000 data / sec.)			
Main Functions	Professional	Standard	Light
Force-Time graphing (Sampling rate : 2000 times/sec)	○	○	○
Function setting of force gauge	○	○	○
Data storage in CSV format	○	○	○
5 graphs (max.) can be displayed in a table.	○	○	—
Force-Displacement graphing	○	—	—

*Angle scale is necessary for force-displacement using professional version.

16. Optional Items

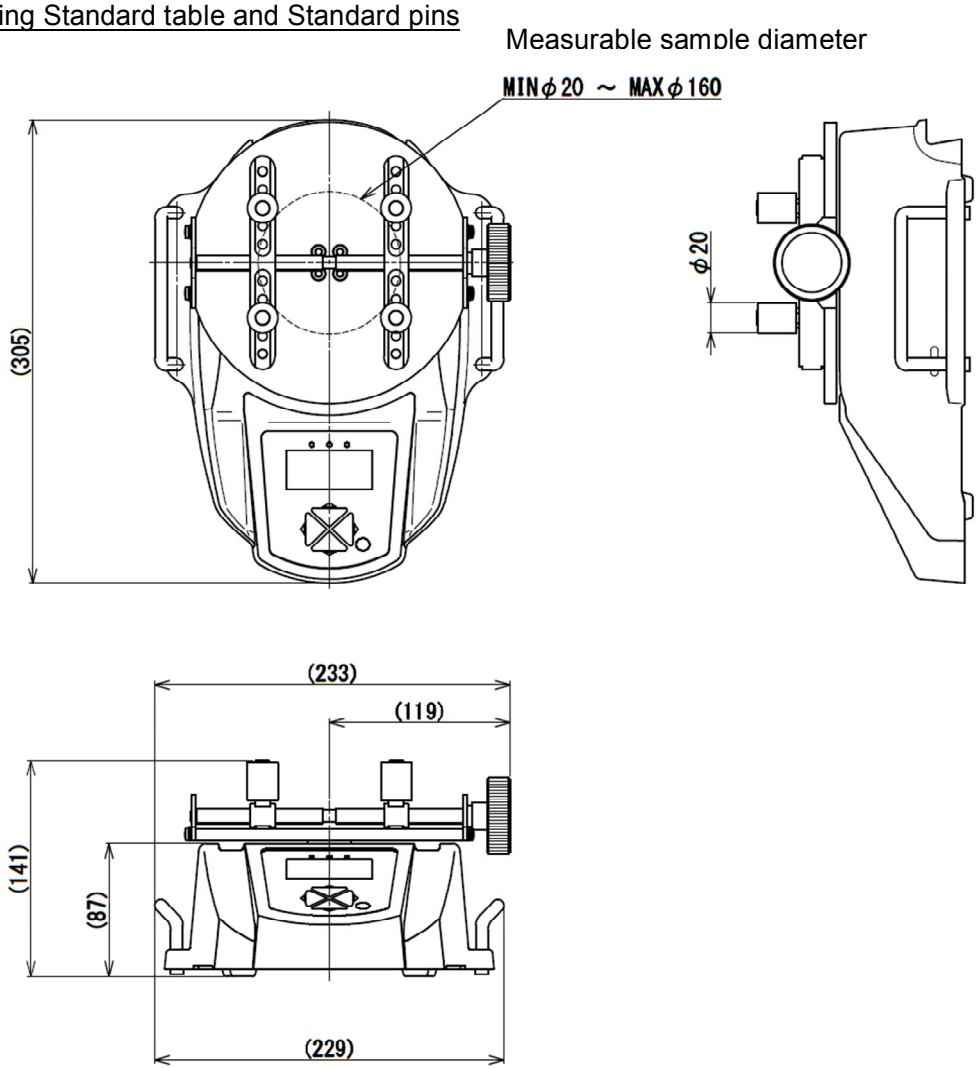
Optional cables

Model	Function	Description
CB-108	Analog cable	Connection with multi meter, oscilloscope and so on.
CB-118	Analog cable (for option code-AN)	Connection with multi meter, oscilloscope and so on.
CB-208	RS232C cable	Connection with PC and other external equipment.
CB-308	Digimatic cable	Connection with Mitutoyo printer DP-1VR
CB-908	Open-end cable	For customized connection use.

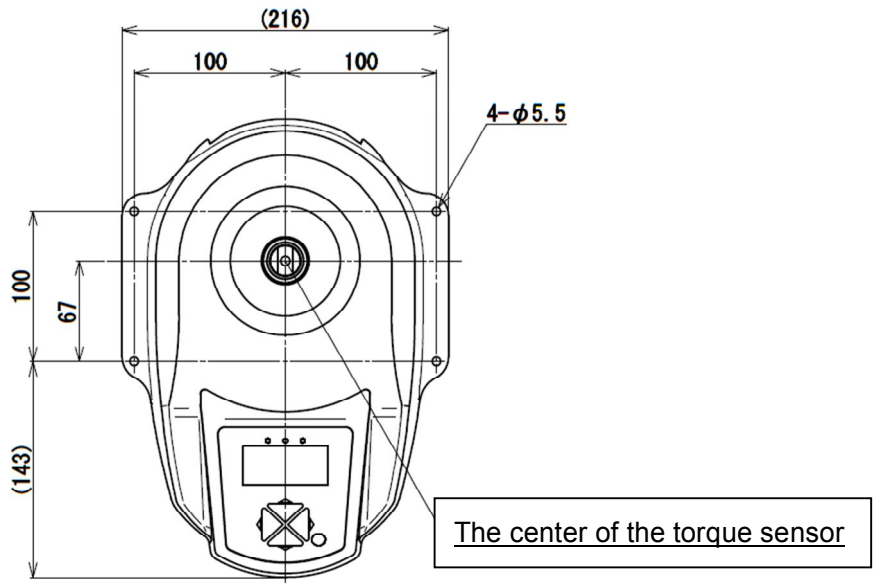
Please ask your local distributor for detail.

17. Dimensions

When mounting Standard table and Standard pins

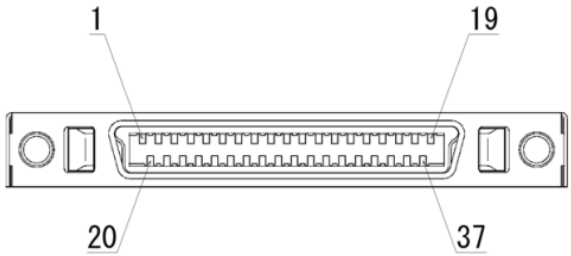


The no carry handle dimension for fixing the DTXS/DTXA with 4 holes.



18. Output Data

18.1. Output connector



Connector pin arrangement

Pin number	Signal name	Description	Model
1	-NG	High Low set points of comparator output. Either signal is output depending on comparator judgment. (*1)	DTXA/DTXS
2	OK		
3	+NG		
4	SC1	Output depending on set high / low output values. (*1)	DTXA
5	SC2		
6	OVL	Overload output. Output when warning overload. (*1)	DTXA/DTXA
7	READY	Measurement-ready signal. Output when the display is ready to start measurement. (*1)	DTXA/DTXS
8	OUT GND	Grand common through pin #1 to 7.	DTXA/DTXS
9	ANALOG RAW ＋	Analog output (RAW) (*2) (*3)	Optional
10	ANALOG RAW －		
11	ANALOG D/A ＋	Analog output (D/A) (*2) (*3) Approx. +/-2v is output when max. torque is applied.	DTXA/DTXS
12	ANALOG D/A －		
13	232C_TxD	RS232C signal	DTXA/DTXS
14	232C_RxD		
15	232C_GND		
16	NC	N/A	optional
17	NC		
18	NC		

*1 Open collector output. (Please keep source voltage less than 30V and current of 10mA.)

*2 Please keep resistance 1kΩ and more.

*3 Differential voltage output between 2 wires.

Pin number	Signal name	Description	Model
19	REQ	Digimatic output	DTXA/DTXS
20	READY		
21	CLOCK		
22	P-DATA		
23	GND		
24	EXSW1:POWER	Input signal The functions differ depending on signal of Shift. Refer to the bottom of the page for detail. (Detect edge signal when each pin connected to GND pin #30.) (*4)	DTXA/DTXS
25	EXSW2:ZERO		DTXA/DTXS
26	EXSW3:SEND		DTXA/DTXS
27	EXSW4:PEAK		DTXA/DTXS
28	Rec		DTXA/DTXS
29	Shift		DTXA/DTXS
30	GND	Input grand common through pin #24 to 29 and 31.	DTXA/DTXS
31	Mark Input	Input mark point	DTXA/DTXS
32	Scale A+	Displacement input (*5) Connectable linear scale and rotary encoder. (Corresponds to line driver output and open collector output.)	DTXA
33	Scale A- (OC1)		
34	Scale B+		
35	Scale B- (OC2)		
36	+5V	External power supply +5V (*6)	DTXA/DTXS
37	GND	External power supply Grand	DTXA/DTXS

*4 Pin # 24-29 and #30 are short-circuited: ON.

*5 Connect pin #32(A+) / #33(A-) and #34(B+) / #35(B-) in case of line driver output.
Connect pin #33(OC1) / #35(OC2) in case of open collector output. (Keep voltage drop 0.5v and less.)

*6 Enable to supply 5V 200mA at max. Make sure to charge with AC adapter when supply power to external equipments.

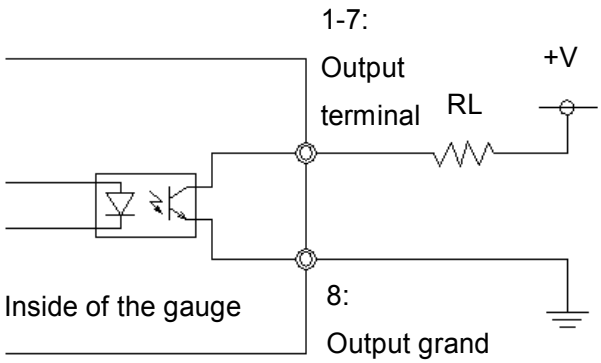
Input signal depending on Shift signal

	Shift Input invalid	Shift Input valid
EXSW1	Turn on	Shut off
EXSW2	Same operation with ZERO button	Zero measuring displacement
EXSW3	Same operation with SEND button	(RESERVE)
EXSW4	Same operation with PEAK button	(RESERVE)
Rec	Control recording on software Force-Recorder series.	

18. Output Data

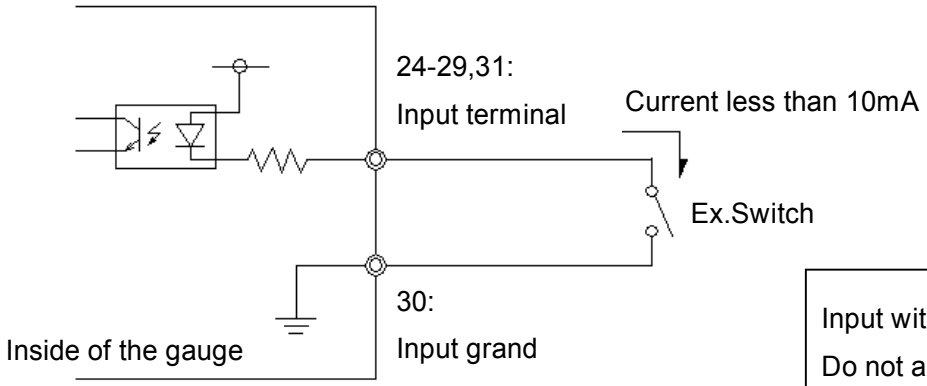
18.2. Connection example of I/O terminals

Connection example to output terminal of this instrument



Max.source:less than 30V
Max.current:less than 10mA

Connection example to input terminal of this instrument



Input without current.
Do not apply current.

18.3. File Format saved in USB memory (DTXA only)

The file format saved in USB memory is as follows.

The files are saved in root directory of USB memory.

	File Format	Description
Save of measuring values at real time	File name: R00001.csv Contents: yyyy,mm,dd,hh,nn,ss[CR][LF] ffffff,uuu,ddddddd,rrr[CR][LF] ffffff,uuu,ddddddd,rrr[CR][LF] ffffff,uuu,ddddddd,rrr[CR][LF] …	File name: The continuous numbers follow after [R]. Each number is followed by comma and saved in CSV style. Contents: yyyy: Year / mm: Month / dd: Day hh: hour (24 hours) / nn: minute / ss: second / ffffff: force value with sign and decimal point / uuu: unit for force / ddddddd: displacement value with sign and decimal point / rrr: unit for displacement The date and time is one when start saving. The file format of displacement is saved as 0 when the Displacement Type at Setup Menu is OFF.
Data transport saved in internal memory	File name: M00001.csv Contents: yyyy,mm,dd,hh,nn,ss[CR][LF] YYYY,MM,DD,HH,NN,SS,ffffff,uuu, ddddddd,rrr[CR][LF] YYYY,MM,DD,HH,NN,SS,ffffff,uuu, ddddddd,rrr[CR][LF] YYYY,MM,DD,HH,NN,SS,ffffff,uuu, ddddddd,rrr[CR][LF] …	File name: The continuous numbers follow after [M]. Each number is followed by comma and saved in CSV style. Contents: yyyy: Year / mm: Month / dd: Day hh: hour (24 hours) / nn: minute / ss: second / ffffff: force value with sign and decimal point / uuu: unit for force / ddddddd: displacement value with sign and decimal point / rrr: unit for displacement The date and time is one when start saving. The displacement data is saved as 0 when the Displacement Type at Setup Menu is OFF.

18.4. Command (RS232C / USB)

Category	Command	Setting Contents	Receive	Setting	Format	Example	Description
Comparator setting	XCW	Comparator High / Low	○	○	XCW[±UUUU] [±LLLL]	XCW+0100-0100	Pair of Integer With sign (*1) [+/-UUUU]: High [+/-LLLL]: Low
	XCS	High / Low output Value no. 1 / 2	○	○	XCS[±FFFF] [±SSSS]	XCS+0100-0100	Pair of integer with sign (*1) (*2) [+/-FFFF]: Value 1 [+/-SSSS]: Value 2
	XCR	Comparator (Judgment) result output	○	—	XCR[u]	XCRL	[u]:Comparator judgment H= +NG / O= OK / L= -NG / E= OVL
	XCO	High / Low Output Result, Value 1	○	—	XCO[f]	XCO1	(*2) [s]: Setting value ＞ Measuring value: 0 Setting value ≦ Measuring value: 1
	XCT	High / Low Output Result, Value 2	○	—	XCT[s]	XCT1	(*2) [s]: Setting value ＞ Measuring value: 0 Setting value ≦ Measuring value: 1
Peak setting	XDS	Peak setting change (middle display at multi display)	○	○	XDS[n]	XDS0	[n]: number setting of peak 0= measuring value 1= Either +/- Peak value 2= +Peak 3= -Peak
Other operations	XFU	Unit setting of force value	○	○	XFU[s]	XFU0	[S]: number setting of unit The corresponding units differ depending on models. Refer to XFC command
	XFT	1st / 2nd peak drop setting	○	○	XFT[bbbb]	XFT1234	[bbbb]: peak drops (four digits without sign) (*1) (*2)
	XFG	Peak Selection [AND] [OR]	○	○	XFG[t]	XFG0	[t]: 0=AND / 1=OR

*1 Decimal point is not included to setting and response. *2 Only for DTXA

Category	Command	Setting Contents	Receive	Setting	Format	Example	Description
Reset	XFY	Rest peak force value and its displacement	—	○	—	R	
	XFZ	Reset measuring force value	—	○	—	R	
	XLZ	Reset measuring displacement value	—	○	—	R	Only for DTXA
	XAZ	Reset peak, force, and displacement values	—	○	—	R	
Memory	XMM	Data save in internal Memory (Data contents depending on the setting of SEND button)	—	○	—	R	
	XMR	Output all the data in internal memory (1000 data)	○	—	—	[Memory Data 1] [Memory Data 2] … END	
	XMC	Delete all internal memory	—	○	—	R	
	XME	Delete the latest Internal memory	—	○	—	R	
Power	XQT	Turn off	—	○	—	R	
Measurement value output	XAR	Measuring value output (Force and displacement)	○	—	Q±fffff± ddddddddPLCSX	r+123.4+ 123456701L00	Refer to appended chart 1 for format.
	XFP	+peak / -peak output (Force and displacement)	○	—	Q±fffff± ddddddddPLCSX	p+123.4+ 123456701L00 n+123.4+ 123456701L00	Refer to appended chart 1 for format.

18. Command

Category	Command	Setting Contents	Receive	Setting	Format	Example	Description
Measurement value output	XFF	1st peak / 2nd peak output (Force and displacement)	○	—	Q±fffff± ddddddddPLCSX	1+123.4+ 123456701L00 2+123.4+ 123456701L00	Refer to appended chart 1 for format.
	XAg	Continuous data output (Force and displacement, 1/10sec.)	○	—	Q±fffff± ddddddddPLCSX	I+123.4+ 123456701L00	Refer to appended chart 1 for format.
	XAG	Continuous data output (Force and displacement, 1/2000 sec.) * Error when sent to RS232C port	○	—	Q±fffff± ddddddddPLCSX	f+123.4+ 123456701L00	Refer to appended chart 1 for format.
	XAS	Stop data output	—	○	—	R	
+NG	XCN	Number of +NG	○	—	XCN[nnnn]	XCN1234	[nnnn]：Number of +NG
	XCC	Reset number of +NG	—	○	—	R	
unit	XFC	Unit list output	○	—	XFC [0][1][2][3][4][5]	XFC020511000000	Pair out(Number of unit Setting and unit). 6 pairs with 2 digits integer are output. Refer to appended chart 2.

Category	Command	Setting Contents	Receive	Setting	Format	Example	Description
Compatible commands	D	Data output (Interchangeable with DTX2/DTX2-P format)	○	—	±FFFFFUMC	+123.4NTO	FFFFF:4 digits force value with decimal point U:Unit number M:Current mode C:Comparator judgment
	M	Save data	—	○	—	R	
	B	Delete the latest data	—	○	—	R	
	C	Delete all data	—	○	—	R	
	Z	Zero	○	—	—	R	Operation depends on the setting of ZERO button
	V	+/- Peak value output	○	—	V	P+123.4N P-123.4N	
	I	All data output (Interchangeable with DTX2/DTX2-P format)	○	—	I	+123.4NMO +234.5NMH … END	Output pattern is the same with command D. [END] is sent after all data is output.
	T	Change to real time mode	—	○	T	R	

18. Command

Category	Command	Setting Contents	Receive	Setting	Format	Example	Description
Compatible commands	P	Change to Peak Mode [OR]: Display the measuring value => either higher value among +/-peak values. [AND]: Display the measuring value => +peak value => -peak value => +peak value =>…	—	○	P	R	Operation depends on the setting of PEAK button.
	E	Comparator High / Low output (HHHH/LLLL) (Absolute value of 4digits integer)	—	○	E[HHHH][LLLL]	E12341234	HHHH=Comparator High LLLL=Comparator Low The values are absolute values.
	g	Data output every 0.1 sec. (Response is the same with command D.	○	—	g	R +123.4NTO …	Output pattern is the same with command D.
	Y	Output stop of command g.	—	○	Y	R	

Appended Chart 1. Format of force response

Q±fffff±ddddddddPLCSX

[Measuring value / Peak value]

m±fffff±ddddddddPLCSYYMMDDhhmmss

[Saved data]

Description of respond data format

Q	Status of requested force data	f	Continuous output Measuring value (Approx. 2000data/sec.)
		l	Continuous output Measuring value (Approx. 10data/sec.)
		a	Continuous output +peak value
		h	Continuous output -peak value
		r	Measuring value
		p	+peak value
		n	-peak value
		1	1st peak value
		2	2nd peak value
±fffff	4 digits force value with sign and decimal point	Ex., +123.4	
+ddddddd	7 digits displacement value with sign and no decimal point	Ex., +1234567	
P	Unit number setting of force, 1 digit integer	0 to 5 (*)	
L	Unit number setting of displacement, 1 digit integer	0 to 2 (*)	
C	Comparator judgment	H	Judgment: +NG
		O	Judgment: OK
		L	Judgment: -NG
		E	Overloaded
S	High / Low output	0	Less than No.1 / No.2
		1	On and more than No.1
		2	On and more than No.2
		3	On and more than No.1 / No.2
X	Status of REC signal and mark point	0	No Rec input / No mark point input
		1	No Rec input / Mark point input
		2	Rec input / No mark point input
		3	Rec input / Mark point input
		4	Rec+Shift input / No mark point input
		5	Rec+Shift input / Mark point input
YYMMDD	Saved date (YY：year /MM：month /DD：day)		
hhmmss	Saved time (hh：hour /mm：minute /ss：second)		

* Setting numbers and units are different depending on models. (Refer to page 50 of XFC command for detail.)

Appended chart 2. Unit list

*Setting units are different depending on models.

00	No Unit
01	mN
02	N
03	kN
04	g
05	kg
07	gf(*)
08	kgf(*)
10	ozf(*)
11	lbf(*)
12	klbf(*)
13	N-cm
14	N-m
16	kgf-cm(*)
17	kgf-m(*)
22	ozf-in(*)
23	lbf-in(*)

*Unit Selection differs between Japan model and on-Japan model.

Appended chart 3.
Unit setting numbers and units of displacement

* Setting units are different depending on models.

1	mm
2	inch(*)
3	°

*Units selection differs between Japan model and on-Japan model.

Please contact your local distributor or IMADA for any inquiries about products and measurements.