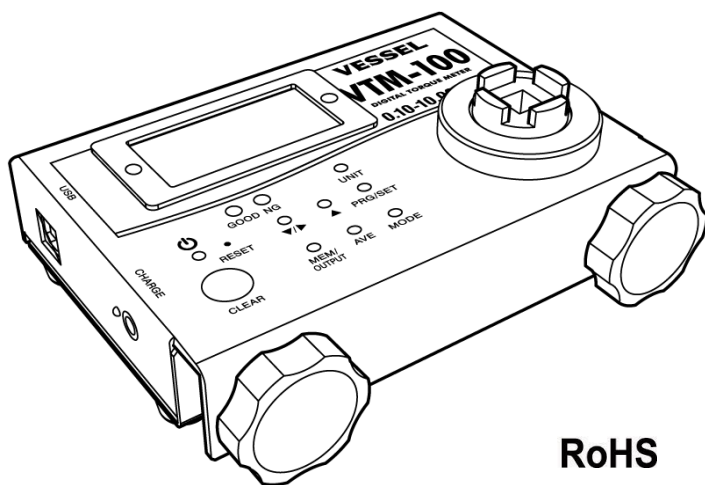


Torque Meter

No.VTM-8, 10, 100

Instruction Manual



RoHS

Read this instruction manual thoroughly before starting to use the product.

After reading, keep the instruction manual around so the operators can refer the content whenever necessary.



Table of Contents




■For Safe Use.....	2
■Product Features	4
■Production Specifications	4
■Name of Each Part	7
■Installation	7
■Measurement.....	7
■Setting.....	10
■Saving, displaying, and outputting data.....	12
■Maintenance and Inspection	16
■Procedures in Abnormal Conditions	17
■Troubleshooting.....	17
■Storage.....	18
■MEMO	19
■Warranty Certificate.....	20







■For Safe Use

Safety Precautions

- Read this section, “ Safety Precautions, ” thoroughly before starting to use the product, and handle the product correctly.
- Precautions are classified into following two categories according to the degrees of danger.

 WARNING	Conditions where incorrect handling may lead to death or serious injury
 CAUTION	Conditions where incorrect handling may lead to moderate injury or property damage

	This symbol indicates “ Warning and Caution. ”
	This symbol indicates “ Prohibition ” of actions.
	This symbol indicates mandatory required actions.

 WARNING	
 PROHIBITED	Do not use the product in an environment with an abrupt temperature change or dew condensation. Risk of product breakdown.
 DO NOT WET	Do not use the product where water, oil, or solvent may be poured or in a place with high humidity. Risk of electric shock or product breakdown.
 PROHIBITED	Do not use the product with specifications other than those specified in the Specifications section. Risk of fire or electric shock.
 PROHIBITED	Do not install, use, or conduct maintenance of the product unless the contents of this manual are fully understood.
 REMEMBER	Be sure to store this manual near the product so the operators can refer to the contents easily.

Warning

- 1) Do not apply a torque exceeding the tolerable load. There is a risk of detector damage, accidents, or injury if a load exceeding the tolerable load is applied.
- 2) When measuring a high torque, securely fix this device so it does not swing around.
- 3) Always keep the workplace clean. An untidy workplace or work table may lead to an accident.
- 4) Consider the surrounding conditions of the workplace.
 - * Avoid using the product in places where it is hot, highly humid, the product is exposed to direct sunlight, and there are dirt or dusts.
 - * Keep the workplace at a constant temperature (approx. 20°C) as much as possible for use.
 - * Keep the workplace sufficiently bright.
 - * Do not use or charge the product in an environment where flammable liquid or gas exists.

- 5) Keep children away from the product. Do not allow anyone other than the operator to approach the workplace.
- 6) Handle the cord gently. Do not carry the product with the cord, or pull on the cord to disconnect the product from an outlet or connector.
- 7) For safe and efficient work:
 - * Periodically inspect the main unit, bits, and sockets, etc. Do not use parts that are deformed or worn.
 - * Replace the accessories as explained in the instruction manual.
 - * Periodically inspect the cord and extension cord. Replace any cords that are damaged.In the following cases, turn the main switch OFF, and unplug the power from the outlet.
 - * When not using or charging the system.
 - * When repairing the system.
 - * In other cases where hazards are anticipated.
- 8) Inspect the product whether there is any damaged section.
 - * Before using the product, thoroughly inspect that it is not damaged, and check that it successfully works and fulfills prescribed functions.
 - * For use, check if there is anything wrong in all sections that make an effect.
 - * Replace the parts as explained in the instruction manual.
- 9) Use the designated accessories and suitable bits and sockets. Do not use accessories, bits, or sockets that are not listed in this instruction manual.
- 10) Ask repair of your dealer.
 - * Do not remodel the product.
 - * When repairing, be sure to contact the dealer at which you purchased the product. Repair by a person with insufficient knowledge or skills may not only lead to an accident or injury, but not provide competent performance.
- 11) Do not disassemble the product, or apply strong impact or vibration on it. This product is a precision device. It must not be disassembled. Damage from excessive impact or vibration could prevent the required performance from being attained, and could lead to accidents or injuries.
- 12) Properly charge the unit.
 - * Charge the unit with the indicated voltage. Do not use a DC power source or engine generator. The unit could heat up abnormally and catch on fire.
 - * Charge the unit in a well-ventilated place. Do not cover the unit, such as with a cloth, while charging.
- 13) Pay attention to electric shock. Do not touch the power plug with wet hands. There is a risk of an electric shock.
- 14) Do not place the battery (built-in unit) into flames. There is a risk of rupture, or harmful substances could leak out.
- 15) Vessel products use nickel-cadmium batteries or nickel-hydrogen batteries. These are recyclable resources. Contact Vessel for battery replacements.
- 16) Always turn the power of all devices off before connecting this product with an external device. There is a risk of electric shock or device damage.
- 17) If a situation other than those described in the instruction manual occurs, stop using immediately and contact Vessel.

■For Safe Use

Caution

- 1) Store this product in a dedicated place if it is not used. Keep the product in a dry space, as high as children cannot reach, or which can be locked. Also, re-use the original carton that the product was delivered in when the product is transported to another place.
- 2) Wear appropriate clothes when operating. Do not wear loose clothes or accessories such as a necklace. These may get caught in rotating sections.
- 3) Do not operate in an inappropriate posture. Always keep your foot firm on the ground, and maintain your balance.
- 4) Always pay close attention when using this product.
 - * When using this product, operate it very carefully while paying full attention to the handling method, operating method, surrounding conditions, etc.
 - * Do not use this product when fatigued.

■Product Features / Specifications

This product measures the output torque of a tool used to tighten or loosen a screw.
(Impact type power tools cannot be measured.)

Features

- Measurement mode, peak hold/peak down hold
- Up to three models between 0.002 N·m and 10.0 N·m can be measured. The appropriate measurement unit can be selected according to the measurement torque.
- The meter determines whether the measurement results are within the standards or not, and notifies the operator with a lamp or buzzer.
The maximum, minimum, and average values from multiple measurement values can be measured.
- The torque can be measured for either CW (tightening direction) or CCW (loosening direction).
- Up to 800 items of data can be stored internally. The upper limit value and lower limit value, etc., settings can be saved.
- USB output (ASCII format baud rate 19200 bps)
- Charging type enables portability. Use consecutively for up to approx. 12 hours.
- Inspection report, proof of calibration, and traceability system diagram are enclosed.

■Product Features / Specifications

Product Features / Specifications

Model	VTM-8	VTM-10	VTM-100
Measurement range	0.002~0.8 N·m	0.01~1.0 N·m	0.1~10 N·m
Measurement display	2.0~800.0 (mN·m)	1.0~100.0 (cN·m)	10~1000 (cN·m)
	LCD 4-digit digital display		
Measurement accuracy	±0.5%(499 digits or less is ±3 digits)*	±0.5%(199 digits or less is ±1 digit) *	
Measurement direction	CW-CCW (right/left directions)		
Measurement mode	Peak hold/peak down		
Measurement unit	cN·m /mN·m	N·m /cN·m	
Pass/fail judgment	Pass or fail is judged within the set range.		
Maximum, minimum, average	The maximum value, minimum value, and average value of the saved data are displayed. Measure either CW (tightening direction) or CCW (loosening direction).		
Data memory	Measurement value 800 data items		
Data output	ASCII format (baud rate 19200 bps)		
Power	Nickel-cadmium battery 1.2 V x 5 cells (700 mAh)		
Charging/operating time	Charging approx. 3 hours/continuous use approx. 12 hours (at max. charge)		
Battery life	300 or more charges (Note that this may vary according to situation of use)		
Automatic power OFF	Power turns OFF when left idle for 10 minutes		
Socket fitting section dimensions	20×20mm / 9.5×9.5mm		
Operating temperature/humidity range	Temperature 19°C to 29°C/humidity 48 to 63% RH (with no dew condensation)		
Outline dimensions	160 (W) ×125 (D) ×55 (H)		
Weight	Approx. 1.0 kg		
Accessories	Torque adapter VJ-3	Torque adapter VJ-3, VJ-10	Torque adapter VJ-10K, VJ-50
	H5 mm bits x 4 pcs	H5 mm bits x 4 pcs	H6 mm bits x 4 pcs
	AC adapter (Input: 100 VAC to 240 VAC, 50/60 Hz, 0.3 A, Output: 12 VDC, 0.5 A)		
	Inspection report, proof of calibration, and traceability system diagram		
	Instruction manual (this manual), terminal block		

* 1 digit refers to the minimum value of the last digit that can be displayed regardless of the decimal point position.

VTM-8 : 3digit = 0.0003 N·m / 0.3 mN·m

VTM-10 : 1digit = 0.001 N·m / 0.1 cN·m

VTM-100 : 1digit = 0.01 N·m / 1 cN·m

■Product Features / Specifications

Torque adapter usage range

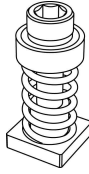
VJ-3: 0.25 N·m or less

VJ-10(K): 0.3 to 1.0 N·m

VJ-50: 0.5 to 5.0 N·m

VJ-100: 10 N·m or less (selling separately)

Purchase VJ-100 when using VTM-100 to measure torque of 5.0 N·m or more with an electric screwdriver.



Management of torque adapter

Replace the torque adapter after approx. 2,500 times of use. If there are any abnormalities such as wear of the hexagon section or unstable measurement value, replace the adapter.

Details of enclosed bit set

5mm across flat

A16 H5×50/ B34 H5×50/ D73 H5×50 /D76 H5×50

6mm across flat

A16 H6×50/ B34 H6×50 /D73 H6×50 / D76 H6×50

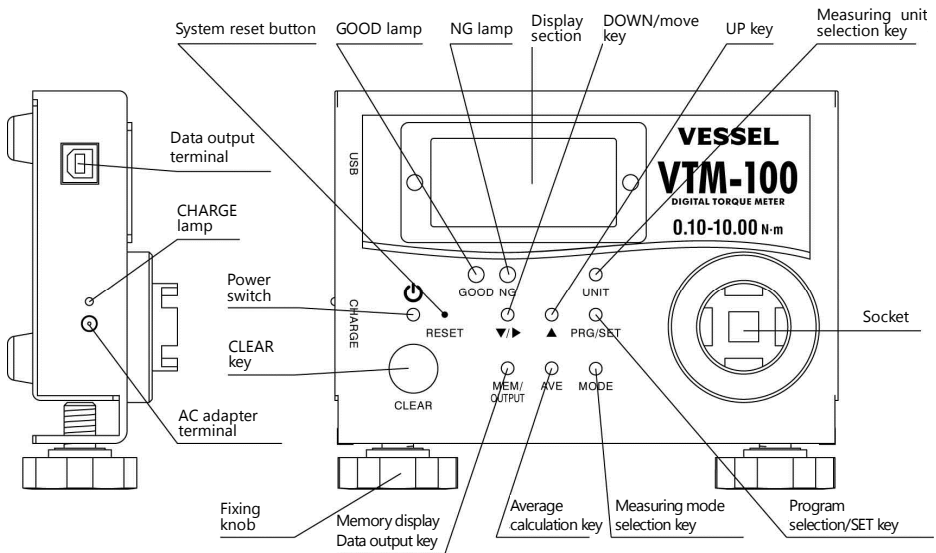
Replacement parts

Torque adapter: VJ-3/VJ-10(K)/VJ-50/VJ-100

Single bit part: A16 H5×50/ B34 H5×50/ D73 H5×50 /D76 H5×50
 A16 H6×50/ B34 H6×50 /D73 H6×50 / D76 H6×50

A16 H5×50 A16 H6×50	B34 H5×50 B34 H6×50
D73 H5×50 D73 H6×50	D76 H5×50 D76 H6×50

■Name of Each Part



■Installation



CAUTION

REMEMBER

Install this product in an environment that is specified in this manual; otherwise, the product may deteriorate or cause malfunction.




The detector may swing around when measuring a high torque. Use a fixing knob or instrument, etc., to securely fix the unit.

■Measurement

Setting and changing the measurement mode

- ① To change the measurement mode, depress the "MODE" button for approx. 1 second. The button must be depressed for a longer time to prevent the measurement mode from switching because of incorrect operations during measurement.
- ② The LCD measurement mode display will change.
- ③ The measurement mode will change in order each time the button is pressed. Select the required measurement mode. The display will change if the button is held down for a long time.
Track (no display) → Peak hold (PP) → Peak Down (PD) → Track

■Measurement

Measurement mode	Display	Details
Peak Hold	<p>"PP" is displayed at bottom of LCD.</p> 	<p>The maximum value being measured is always displayed. The value is held when the load is 10 digits (20 digits for VTM-8) or more.</p> <p>Usually, this mode is used.</p>
Peak Down	<p>"PD" is displayed at bottom of LCD.</p> 	<p>The value when the load torque value peaks then starts to drop is displayed. When applying a load again, press the CLEAR button once first. This starts when the load is 10 digits (20 digits for VTM-8) or more. This mode is suitable for measuring torque wrenches, etc.</p>
Track	<p>Nothing is displayed.</p> 	<p>This is mainly used for calibration, etc. The load torque value applied on the detector is displayed.</p>

Setting and changing the measurement unit

- (1) Depress the "UNIT" button for approx. 1 second. The button must be depressed for a longer time to prevent the measurement unit from switching due to incorrect operation during measurement.
- (2) The LCD measurement unit display will change. The unit will change in order each time the button is pressed. Select the required unit.

Selecting the torque adapter




This model has a "torque adapter" used when measuring an electric screwdriver. Always use a suitable adapter when measuring an electric screwdriver.

Powers supply

This model uses "nickel-cadmium rechargeable batteries". Charge the batteries with the dedicated AC adapter.

The battery level is displayed on the upper right of the display plate.

LCD display

LCD display	Details
	The battery still has a charge. The product can still be used.
	The battery charge is dropping. Charge the batteries soon. When using the lamps or buzzers at a high frequency, such as for pass/fail judgment, charge the batteries at an early stage.
	The batteries are low. Charge the batteries as soon as possible. The power will turn OFF immediately when there is no charge left.

Use the enclosed AC adapter to charge the batteries.

If no key is operated for 10 minutes, the power will automatically turn OFF. (Automatic power OFF)

* When the AC adapter is connected, the display may indicate fully charged batteries. However, continue charging while the pilot lamp is on.

Zero adjustment

This model automatically performs zero adjustment in the following cases.

- (1) When the power is turned ON.
- (2) When the measurement mode is changed.

If a torque is applied on the detection section during the above operation, that state will be set as "zero" and correct measurements will not be possible.

Make sure that no load is applied on the detection section when turning the power ON and changing the measurement mode.

If the display does not return to "zero" even when the CLEAR key is pressed during measurement, the zero point may be deviated. In this case, perform zero adjustment with the following method.

- (1) Confirm that no torque is applied on the detection section.
- (2) Set the measurement mode to "TRACK" with the measurement mode selection key.
- (3) Press the "CLEAR key", and set the display to "0".

Measuring the electric screwdriver

- (1) Set the torque adapter on the torque detection section.
- (2) Turn the power switch ON. Zero adjustment is performed at this time, so make sure that no load is applied on the detection section.
- (3) Confirm that the measurement mode is set to "PP" peak hold mode. ("PP" is displayed on LCD display.)
If "PP" is not displayed on the LCD display, change the measurement mode to "PP".
- (4) Fit the electric screwdriver's bit onto the head of the torque adapter. Start the electric screwdriver and perform tightening. Before starting measurement, confirm that **the torque adapter spring is loose**. If it is not loose, always loosen it before starting the measurement.
- (5) When finished tightening, confirm the torque value on the display plate.
- (6) Use the driver's reverse rotation to loosen the torque adapter spring.
- (7) The display will be cleared when the "CLEAR" button is pressed, and the next measurement can be performed.

Using the various functions

Pass/fail judgment

The meter determines whether the measurement results are within the standards or not, and notifies the operator with a lamp or buzzer.

- (1) Set the "upper limit value" and "lower limit value" to be used as the standard.
- (2) Confirm that the measurement mode is "PP".
- (3) The GOOD lamp lights when the measurement value is more than the lower limit value and less than the upper limit value.
If the measurement value is less than the lower limit value or exceeds the upper limit value, the NG (Not Good) lamp will flash and the buzzer will sound.
- (4) When the measurement is completed, press the CLEAR key and clear the display to zero.
The pass/fail judgment lamp and buzzer will also stop at this time.

The pass/fail judgment is made only when the measurement mode is set to the peak mode.
(Measurement value 10 digits or more)

If the peak down value is detected in the peak down mode, the green (GOOD) lamp will light to notify the operator.

Setting the values for each function

Set the values required to use each function. Set the values with the following method.
The PRG/SET, and the UP and DOWN keys are used.

Selecting the setting mode and setting the upper limit value

- (1) When the PRG/SET key is pressed for approx. 1 second, the green LED (GOOD lamp) will turn ON, [HI] will display, and then the upper limit value will display.
 - (2) Use the UP and DOWN keys to set the upper limit value of the torque measurement value.
When the DOWN key is pressed first, the 4th digit (1st place) will flash. Select the number with the UP key. The number will increment by one each time the UP key is pressed.
 - (3) When finished setting the number for the 4th digit, press the DOWN key again.
The 3rd digit (1/10th place) will flash. Set the number in the same manner.
 - (4) Set the 2nd digit (1/100 place) and 1st digit (1/1000 place) in the same manner. The number will increment when the UP key is pressed. The number will decrement by one when the DOWN key is pressed. When the DOWN key is pressed after setting the 1st digit, all digits will appear. Check the set value.
 - (5) To correct the value, press the DOWN key again, and set the value from the 4th digit.
 - (6) When finished setting the upper limit value, press the PRG/SET key again.
- * If the PRG/SET key is pressed while setting any of the digits, the value set up to that point will display, and then the unit will shift to the next setting item.

Setting the lower limit value

- (1) After [$L \square$] is displayed, the lower limit value will display.
- (2) Use the UP and DOWN keys to set the lower limit value for the torque measurement in the same manner as the upper limit value.
The pass/fail judgment will not be made if the set lower limit value is larger than the upper limit value.
- (3) When finished setting the lower limit value, press the PRG/SET key again.

Setting the peak down start value

- (1) After [$PdL \square$] is displayed, the peak down start value will display.
- (2) Use the UP and DOWN keys to set the peak down start value in the same manner as the upper limit value.
 (Peak down is activated when the torque value exceeding this value drops by 15 digits or more.)
- (3) When finished setting value, press the PRG/SET key again.

Setting auto clear

- (1) After [RC] is displayed, the auto clear time setting will appear.
- (2) Use the UP and DOWN keys to set the time for clearing the display to zero.
 (Set in 0.5 sec. increments between 0.1 and 3.0 seconds.) The time increases with the UP key, and decreases with the DOWN key.
- (3) Set time selection $0.0C \leftrightarrow 0.1C \leftrightarrow 0.5C \leftrightarrow 1.0C \leftrightarrow 1.5C \leftrightarrow 2.0C \leftrightarrow 2.5C \leftrightarrow 3.0C \leftrightarrow 0.0C$
 When $0.0C$ is set, the value is cleared to zero manually.
 * If a value other than $0.0C$ is set, the display will not be cleared to zero even if the CLEAR key is pressed.
- (4) When finished setting value, press the PRG/SET key again.

Setting the buzzer

- (1) After [bP] displays, the buzzer ON, OFF, FF setting will appear.
 Use the UP and DOWN keys to set how to sound the buzzer.
 (On : Sound all OFF : Sound only for over torque FF : Sound only for NG)
- (2) When finished setting value, press the PRG/SET key again.

Quitting the settings

- (1) [$-S-$] appears and the setting mode is quit. The green LED (GOOD lamp) turns OFF.
The green LED (GOOD lamp) is lit during the setting mode.
 * To quit the settings midway, press the CLEAR key. [$-S-$] is displayed, and the measuring state is enabled. The green LED (GOOD lamp) turns OFF.
 * To confirm which value is currently being set, press the "MODE" key.
 The value items currently being set will appear on the LCD. (Hi , LQ , $PdLQ$, RC , bP)

■Setting

Pass/fail judgment	Lower limit value or less*	Within upper/lower limit	Upper limit value or more	Over torque
Lamp	Red (NG) flashes (slow)	Green (GOOD) lights	Red (NG) flashes (fast)	Red (NG) lights
Buzzer	Intermittent sound (slow)	Continuous sound	Intermittent sound (fast)	Continuous sound

Lower limit value or less* Judges when the load during measurement does not reach the lower limit value, and instead the load is almost gone (less than 15 digits). (Does not make a judgment when the maximum value does not reach 15 digits.)

Maximum, minimum, average value

The maximum value, minimum value, and average value of multiple measurement values can be displayed and confirmed.

- (1) Confirm that the measurement mode is "PP" or "PD".
- (2) Press the average calculation key (AVE). ("AVE" will flash at the bottom of the LCD.)
- (3) Perform several measurements.
- (4) Press the AVE key.
- (5) The following information regarding the data measured while "AVE" is flashing will appear in order.

Number of data items	....	No. of items (up to past 30 items)	.....	No display at bottom of LCD
Max. value	....	Torque value	.....	"MAX" displayed at bottom of LCD
Min. value	....	Torque value	.....	"MIN" displayed at bottom of LCD
Average value	....	Torque value	.....	"AVE" displayed at bottom of LCD

Automatically clearing the display

When making repeated measurements, the display can be automatically cleared without pressing the CLEAR button after each measurement.

- (1) Set the value "Auto Clear Time".
- (2) When the measurement is finished, the load applied on the detector section is removed, and the set time elapses, the display will be cleared.

* When the auto clear time is set, the display will not be cleared even if the CLEAR key is pressed.

■Saving, displaying, and outputting data

Saving, displaying, and outputting data

The measurement data can be saved in the unit, and displayed and output.

The data is recorded in the memory each time the CLEAR key is pressed or auto clear is performed.

Signals can be output with the USB output terminal.

Measurement data

Saving the measurement data

The memory data is always saved each time the CLEAR key is pressed or auto clear is performed. When handling large volumes of data, it is recommended to erase the data before starting.

- * The data in the memory starts from data No. 001. If data is already recorded, the new data will be saved from the next memory No. Up to 800 data items can be saved. When 800 data items are exceeded, the data will be overwritten from No. 001. The previous data is erased, so if 800 data items will be exceeded, output the data to a personal computer, etc., to save it.

Displaying and erasing the saved measurement data

- (1) When the MEM/OUTPUT key is pressed, "MEM" appears at the bottom of the LCD, and the data No. and measurement value saved last alternately display.
- (2) Press the UP or DOWN key to change the memory No. and search for another data.
If a button is not pressed for six seconds, the "MEM" display will disappear, and the mode will change to the measurement mode.

* Erasing individual memory data items

- (3) When the CLEAR key is pressed while the memory No. and torque value are alternately displaying, [\overline{CL}] will flash.
- (4) When the CLEAR key is pressed again while [\overline{CL}] is flashing, [- - - -] will appear, and the selected data will be erased.
When memory data is erased, data saved subsequently will slide up to that data No.
- (5) If nothing is pressed while [\overline{CL}] is flashing, the mode will change to the measurement mode.
(The data is not erased.)

* To erase memory data in a designated range

- (3) Press the UP or DOWN key to display the first data item to be erased.
- (4) If the CLEAR key is pressed while the memory No. and torque value are alternately displaying, [\overline{CL}] will flash.
- (5) The data No. will increase when the UP key is pressed. Display the last data item of the range to be erased.
- (6) When the CLEAR key is pressed while the memory No. and torque value are alternately displaying, [- - - -] will display, and the data in the selected range will be erased. If no button is pressed at this time, [\overline{CL}] will flash to confirm whether to erase the data. To erase the data, press the CLEAR key while [\overline{CL}] is flashing. To cancel the erasing process, press nothing. The display will return to the torque display, and the data will not be erased.

■Saving, displaying, and outputting data

Outputting the saved measurement data

- (1) When the MEM/OUTPUT key is pressed, the data No. and measurement value saved last will alternately display.
 - (2) Press the MEM/OUTPUT key once again while the data No. and measurement value are displayed. (The unit will prepare to output the data.)
 - (3) [\overline{F} \overline{R}] (first address) will appear, and then the data No. will display. Use the UP or DOWN key to select the number of the first data item to be output. After making the selection, press the MEM/OUTPUT key.
 - (4) [\overline{L} \overline{R}] (last address) will appear, and then the data No. will display. Use the UP or DOWN key to select the number of the last data item to be output. After making the selection, press the MEM/OUTPUT key.
 - (5) [$\overline{-P-}$] will appear, and the data will be output. When the output finishes, the unit will return to the measurement state.
- * Press the CLEAR key for approx. one second to cancel an output in progress.

Output data

USB output

The output data is output from the USB cable in ASCII format. Separate driver software must be installed to import data. Refer to FTDI Chips Virtual COM Port Drivers <http://www.ftdichip.com/Drivers/VCP.htm>.

- * The USB cable is not enclosed. Purchase a separate USB Cable A To B Type (both ends male).

Downloading the dedicated format

A format for managing the output data can be downloaded from the Vessel website. Refer to <http://www.vessel.co.jp/html/electric/edata-dl.html>.

Output data specifications

Data bit length	Start bit 1 + data bit 8 + stop bit 2 + no parity		
Baud rate	19,200 bps	Connector shape	USB (B type)

Format

18	○○○	OE	20	±	○○○○○	20	OF	○○○○○	OD
CAN	※	SO	Space	Sign	Measurement value	Space	SI	Unit	CR
All data 21									

■Saving, displaying, and outputting data

Details of data

CAN	Cancel
※	"Data No." when outputting memory data. "Space" when output during clear.
SO	Double-width printing designate
±	Measurement symbol + tightening direction - - return direction
Measurement value	Includes decimal point. If there is no decimal point, the last digit is a space.
SI	Double-width printing cancel
Unit	For N·m, etc., the remainder will be filled with spaces
CR	Carriage return

Changing the speed for outputting saved data (USB output)

The speed for outputting saved data can be changed.

- (1) For printer output (low speed) ... setting "00" (2) For personal computer output (high speed) ... setting "0 1"
 ("00" is set as the default.)

Changing the setting:

- (1) While the power is OFF, operate the ON/OFF switch to turn the power ON while holding down the PRG key.
- (2) When the PRG key is released, "0 1" or "00" will appear. The display will alternate when the UP key is pressed. Select the desired setting.
- (3) When the PRG key is pressed again, [- 5 -] will appear, the torque will be displayed, and the state will return to the measurement state.

Erasing saved data in a batch

- (1) To erase all data in a batch, hold down the CLEAR key until [ALL] appears. (approx. 4 seconds)
 * The red LED will light while the key is held down (for approx. 2 seconds), but continue holding down the key.
 If the key is released while the red LED is lit, the zero adjustment operation will be activated.
- (2) If the CLEAR key is pressed again while [ALL] is flashing, [CLR] will flash.
- (3) If all data can be erased, press the CLEAR key again. [- - -] will appear, and all data will be erased.
 (The setting values for each function will not be cleared.)
- * If nothing is pressed while [ALL] or [CLR] is flashing, the state will return to the measurement state.
 (The memory is not cleared.)

■Saving, displaying, and outputting data

Resetting the system

There may be cases when the nickel-cadmium battery is completely discharged (when unit is not used for a long time, etc.) and the CPU in the system will not start up even when the power is turned ON after the battery is charged. In this case, press the SYSTEM RESET button once. The system will return to the default state (all memory contents are erased).

Use system reset only in the following cases.






- * When system has not been used for a long time, and nothing appears on the LCD even when the AC adapter is connected and the power is turned ON.
- * When the measuring instrument does not operate.

All contents of the memory will be erased when the system is reset. Make all settings again.

■Maintenance and Inspection



CAUTION

 PROHIBITED	This system must not be disassembled by any person other than a repair technician. Risk of electric shock or product breakdown, and injury.
 REMEMBER	Unplug the power plug before starting inspections. Risk of electric shock or product breakdown.
 PROHIBITED	Do not wipe the product by using detergent or solvent. Risk of cracking, electric shock, or product breakdown.
 PROHIBITED	Do not pour water on the product. Risk of electric shock or product breakdown.
 REMEMBER	Periodically inspect the system. Failure to perform inspections could result in early faults.

Periodic calibration

Periodic calibration is required to manage the torque meter accuracy. Vessel performs highly reliable calibration that follows national standards. We recommend calibrating the system once a year to ensure use within the accuracy.

(Periodic calibrations are available for a fee. Inspection report, proof of calibration, and traceability system diagram are enclosed.)

■Measures at Abnormal Conditions



CAUTION

PROHIBITED	Do not use the product in the following conditions. Risk of fire or electric shock. <ul style="list-style-type: none"> • The product is broken due to dropping or shock. • The cord is damaged or heated up. • When the plug to the outlet is loose.
Turn the power OFF.	If any abnormality occurs, turn the power switch OFF and disconnect the AC adapter.
PROHIBITION OF DISASSEMBLY	Never dissemble the system.

Continuing use with faults or abnormalities could result in product failure or accidents.
Consult a dealer where the product is purchased for repairs.

■Troubleshooting

Troubleshooting

Check the following table of possible causes. If the fault cannot be remedied even after taking actions, the system may be faulty. Contact your nearest Vessel dealer for repairs.

Details	Cause, inspection	Measures
The power does not turn ON.	Check that the battery is charged.	Charge the battery for the specified time using the designated charger.
Power shuts off immediately after turning power switch ON.	The battery may be undercharged.	Charge the battery for the specified time using the designated charger.
Nothing displays when the power is turned ON after charging for the specified time.	If the system is not used for a long time, the internal battery will completely discharge.	Press the SYSTEM RESET button on the front panel to reset the system. After resetting and with no torque applied, use the CELAR key to perform zero adjustment.
Measurement cannot be made	Does the value fluctuate when torque is applied?	If the value does not fluctuate, the gauge may be broken. Request repairs.
	Measurement cannot be made while setting each function value.	Finish the settings, and return to the measurement mode.
Display returns to zero after measuring.	Auto clear is set and applied.	Check the section on setting the auto clear function. If the function is not required, set 0.0C.
The display does not clear even when using auto clear.	The zero point may be deviated.	If the zero point is deviated, a different zero point value may appear even after auto clear is activated. With no torque applied, press the CLEAR key and perform zero adjustment.
The zero point cannot be set.	Zero clear may not have been performed.	With no torque applied, press the CLEAR key and perform zero adjustment. 0 and 1 may alternately display for the final digit in the track mode, but this is not a fault.

■Storage



Do not store the product in the following locations. Risk of product breakdown.

- Where a marked vibration or shock is applied to the main body
- A place that is hot and highly humid beyond the range of the specifications
- Where dew condensation occurs
- Where an abrupt temperature change occurs
- Where the risk of ignition or explosion exists such as near flammable solvent or dust powder
- Where a considerable amount of dust, dust powder, or smoke exists
- Where water, oil, or chemicals may be poured on the product
- Where an intensive electric field or ferromagnetic field is generated

■Warranty Certificate

Thank you very much for choosing our product.

When the product is broken in a standard condition according to the instruction manual and precautions on the labels on the main body within the warranty period, we will repair the product free of charge according to the described content in this manual (excluding consumables).

When the product gets broken, request a repair from a dealer where the product is purchased. Proof and date of purchase must accompany any request.

Even during the warranty period, a repair will be considered payable in the following cases.

- 1) Damage and/or breakage occurred due to an incorrect usage method or negligence during operation
- 2) Damage and/or breakage occurred due to an unauthorized repair or modification
- 3) Damage and/or breakage occurred due to fire, earthquake, flood, thunder, other natural disasters, gas damage, salt damage, pollution, abnormal voltage, etc.
- 4) Damage and/or breakage occurred due to transfer or transportation after purchase
- 5) Loss of this warranty certificate, not filling out the specified section, or when the words of this warranty certificate are tampered with.

This warranty certificate cannot be re-issued. Keep it safely and do not lose it.

- This warranty certificate only warrants a free repair or replacement of the breakdown of this product. It does not imply that the Vessel incurs damages that occurred due to a use or a usage failure of this product.
- This warranty certificate promises a free repair under the specified period and conditions. Therefore, it does not limit any legal rights of the customer.

Model	VTM series	
Warranty Period	One year	The vessel is controlling the shipping date by using the product S/N.
Customer	Name	
	Address	Postal Code
	Phone Number	
Dealer	Store Name/Address/Phone Number	

Manufactured by:

VESSEL Co., Inc.

17-25, Fukae-Kita 2-chome,

Higashinari-ku, Osaka 537-0001 Japan

Tel : +81 6 6976 7778 Fax : +81 6 6972 9441

E-mail : export@vessel.co.jp URL : <http://www.vessel.jp>

180100.00