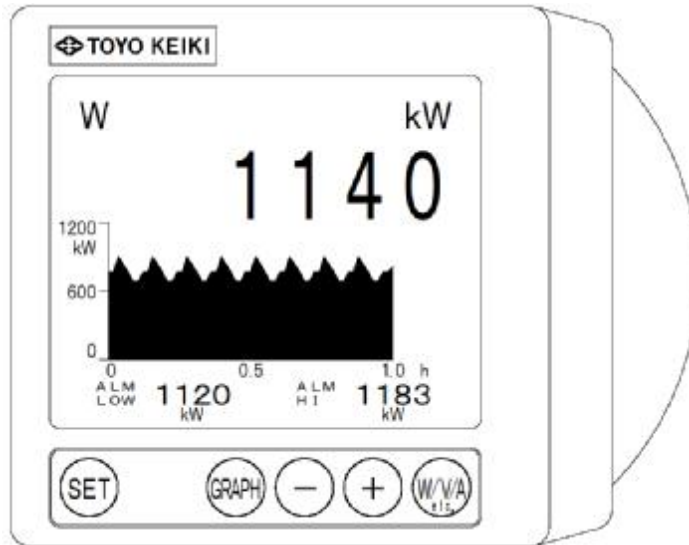


Multi-power meter
Type TMW
Instruction manual digest version



Precautions

Precautions in safety

The handling of this product shall be carried out persons who have sufficient knowledge and skill to correctly use this.

Connect all wirings without any wrong connection after identifying this connection diagram sufficiently.

Tighten screws surely. Slackening of screws may cause generation heat and damage.

Do not use this at any value exceeding the rated specification. It may cause a failure and an accident.

Do not touch to the live part. Always cut out the circuit when maintained and inspected it.

Keep this manual in the place which can be seen at any time.

This manual may be changed in the future.

1. Summary

Digital multi-power meter "TMW" measures power/ voltage/ current, etc and it is a instrument which can perform the display of multi-display, bar graph, and trend graph.

Analog output, pulse output, and digital-data-transmission output are prepared by option specification.

2. TYPE NAME and SPEC No

TMW—①—②—③—④

Item	No.	Specification
① Circuit	31	1P2W / 1P3W / 3P3W 110 / 220V , 5A
	32	1P2W / 1P3W / 3P3W 440V , 5A
	33	1P2W / 1P3W / 3P3W 110 / 220V , 5A With a leakage current input
	34	1P2W / 1P3W / 3P3W 440V , 5A With a leakage current input
	35	1P2W / 1P3W / 3P3W Current input only 5A
	41	3P4W 110/√3V , 220/√3V 5A
	42	3P4W 440/√3V 5A
	45	3P4W Current input only 5A
	99	Others
② Auxiliary power supply	1	DC 19 ~ 31V
	2	AC 80-264V and DC 80-143V
	9	Others
③ Out put	00	Non
	11	DC 1-5V (4ch)
	12	DC 4-20mA (4ch)
	21	DC 1-5V (4ch) + Pulse (2ch)
	22	DC 4-20mA (4ch) + Pulse (2ch)
	31	DC 1-5V (4ch) + Alarm relay (2ch)
	32	DC 4-20mA (4ch) + Alarm relay (2ch)
	41	DC 1-5V (4ch) + Pulse + Alarm relay
	42	DC 4-20mA (4ch) + Pulse + Alarm relay
	51	DC 1-5V (4ch) +RS— 485
	52	DC 4-20mA (4ch) +RS— 485
	61	RS— 485
	51	DC 4-20mA (3ch) + Pulse (1ch)
	④ Display for indication	Blank
D		Instrument screen of viewing angle to 6 o'clock

3. Specification

3.1 Rated input

Rated voltage and rated current are indicated on the label.

Please check that the demanded specification and it are in agreement.

3.2 Range of operation and consumption

Voltage Input

Rated voltage	Range of operation	Consumption
100 V	0 ~ 150 V	0.1 VA
110 V	0 ~ 150 V	0.11 VA
200 V	0 ~ 300 V	0.2 VA
220 V	0 ~ 300 V	0.22 VA
400 V	0 ~ 600 V	0.4 VA
440 V	0 ~ 600 V	0.44 VA
110/√3 V	0 ~ 86.6 V	0.04 VA
220/√3 V	0 ~ 173 V	0.08 VA
440/√3 V	0 ~ 364.4 V	0.16 VA

Current Input

Rated current	Range of operation	Consumption
5 A	0 ~ 5 A	0.5 VA

Auxiliary power supply

Rated voltage	Range of operation	Consumption
DC 24 V	DC 19 ~ 31V	3.0W(125mA)
DC 100/110 V	DC 80 ~ 143 V	3.0W(27mA)
AC 100/110 V AC 200/220 V	AC 80 ~ 264 V	5 VA

3.3 Performance (23°C±2°C)

Measurement item	Accuracy
Voltage (L-L,L-N)	0.5 %
Current (per phase)	0.5 %
Frequency	0.5 %
Power factor	0.03
Active power	0.5 %
Reactive power	1.0 %
Apparent power	1.0 %
Active energy	2.0 %
Reactive energy	2.5 %
Watt demand	1.0 %
Amp demand(R,S,T)	1.0 %
Voltage THD	1.0 %
Current THD	1.0 %
Operating time	1 hour

3.4 Environment

- (1) Operating temp -10 ~ 55°C
- (2) Storage temp -20 ~ 70°C
- (3) Humidity Under 85% RH
- (4) Altitude Under 1000m
- (5) Poisonous gas Non

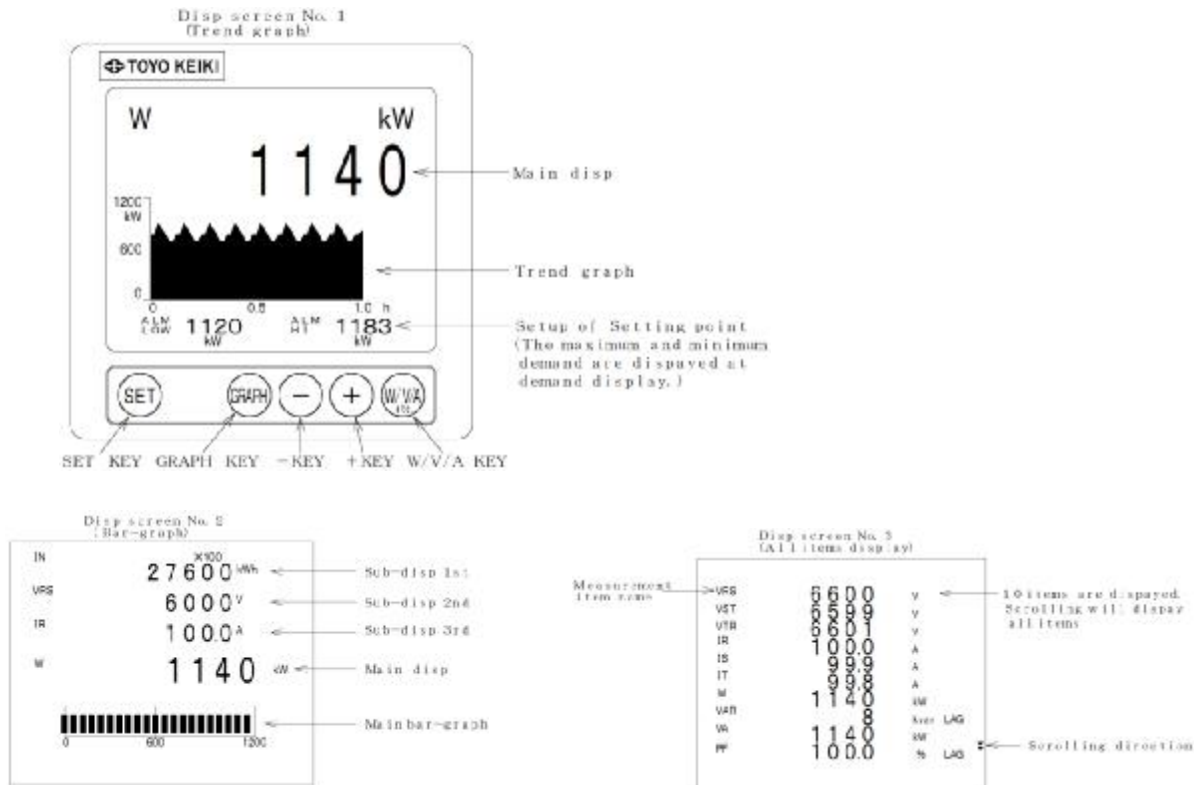
3.5 Weight

About 580 g

4. Installation

The operation method is explained by this description under the conditions installed and connected properly.)

5. Operating features



6. Initial setting

It is required to perform an initial configuration, before using it. The flow of setting operation is explained below.

6.1 The state at the time of factory shipments

The equipment has no power-on switch.

When voltage is applied to the power supply terminal, the equipment begins to measure.

When operating for the first time, this meter begins operation with the setting value at the time of factory shipments. When each parameter is specified at the time of order, there is no necessity for the following setting operation. Since this meter starts operation by the demanded specification, please confirm it. Please perform the following operation to change a setup anew.

In addition, when you use except the specification at the time of an order, please set up by the first setup of 17 items.

6.2 Initial setup

● Procedure of an initial setup

- (1) Please setup only a necessary item. During setting operation in each setup item, when key operation is not performed more than for 3 minutes, operation becomes invalid and returns at the state before operation.
- (2) The setup will be determined, if the key of "SET" is pressed while setting up each item. And it returns to a setting menu. Moreover, when it returns to a setting menu by the "W/V/A" key, the setup till then disappears.
- (3) Please press the "W/V/A" key to return from a setup state to measurement mode.

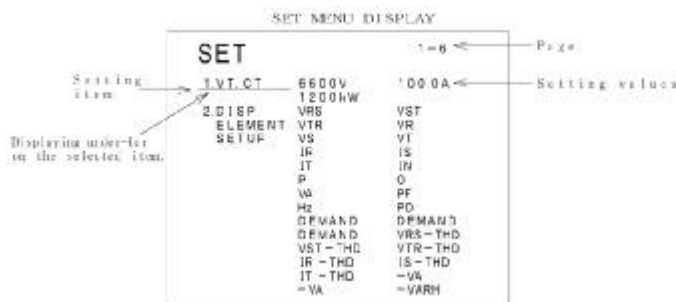
● Accessing a setup mode.

Key operation	Setting state	Explanation
[SET] key	Measurement state	Explanation of key operation is displayed. It will become setting mode if it continues pressing the [SET] key for more than 3 seconds. And the setting menu is displayed.
[SET] key	Setup mode	
[+] or [-] key	Item No. input mode	
[GRAPH] key	Item setup mode	























● Key work.

Display state	Key operation	Explanation
Arbitrary setup display	[+] or [-] key	Cursor movement, numerical increase and decrease.
	[SET] key	Decision of a setup. It returns to a setting menu after decision.
	[GRAPH] key	It shifts to the next setup operation.
	[W/V/A] key	It returns to pre-setup operation.
Setup menu display	[W/V/A] key	It returns to measurement mode.
	[SET] key	Explanation of key operation is displayed.

● The key function in setup mode.



• Setup steps of each item

Key operation	Item No.	Explanation
<p>  or  key ↓ GRAPH key  or  key Each item common  or  key ↓ GRAPH key </p>	<p>1.</p>	<p>The setup of VT or CT It is chosen whether standard VT , CT are used or arbitrary VT , CT are used.</p> <p>Standard VT or CT</p> <p>Choose whether standard VT ,CT or arbitrary VT,CT.</p> <p>Arbitrary VT or CT It sets up with the following procedure. (1) Choose a figure. (2) Next, input a numerical value for every figure. (3) And set up a decimal point.</p>
<p>  or  key ↓ GRAPH key </p>	<p>2.</p>	<p>Display measurement item setup Set up the measurement item which main display hides. Next, set up the display measurement item of 3rd step from 1st of sub-display.</p> <p>Choose the measurement item of main display and sub-display by the  or  key. Determine a display and un-display by the GRAPH key. The hidden measurement item is highlighted. The display measurement item of each stair of sub-display is only one.</p>
<p>  or  key ↓ GRAPH key ↓  or  key ↓ GRAPH key ↓  or  key ↓ GRAPH key ↓  or  key ↓ GRAPH key ↓ To the following measurement item </p>	<p>3.</p>	<p>Bar graph setup Selection of the display mode in the bar graph of bar graph type, each measurement item, and setup scaling. Select bar graph type from a straight line type and a circle type. The measurement item to setup are voltage, current, active power, reactive power, power factor, and frequency. Apparent power and watt demand are the same as active power. And amp demand is the same as current. Select bar graph type by the  or  key.</p> <p>If the GRAPH key is pressed, it will shift to measurement item selection. Press the  or  key and select a measurement item.</p> <p>If the GRAPH key is pressed, it will shift to a setup of display mode.</p> <p>Bar graph display mode is set up. Display mode is different with the measurement item. Voltage : % absolute value, % deviation, absolute value scale, deviation scale. Current : %, scale. Active and reactive power : 0~100% scale, -100~100% scale,Watt(var) unit scale, setting range at the Watt unit scale. Power factor : 0~100%,-0~100~0%. Frequency : Range of frequency</p> <p>It progresses to standard value selection at the time of the mode with voltage standard value. And it progresses to a scaling input at the time of the mode with scaling.</p> <p>Input standard value selection or scaling. Voltage deviation mode : Standard value selection. Current, active and reactive power : Full-scale value input.</p>

<p> </p>	<p>4.</p>	<p>Setup of setting point The display is blinked when the input signal exceeds setting point. At the time of display screen No.1, the preset value is displayed numerically.</p> <p>And at the time of display screen No.2, the preset value is displayed by a bar- graph.</p> <p>Input upper limit set point by the or key after measurement item selection.</p> <p>It moves to a lower limit level setup.</p> <p>Input lower limit set point by the or key.</p> <p>It returns to measurement item selection.</p>
<p> To the following measurement item </p>	<p>5.</p>	<p>Minimum value setup Voltage and current minimum setting.</p> <p>(The screen displays "0" when the setting value for voltage and current are under zero.) Input upper limit set point by the or key after measurement item selection</p> <p>It returns to measurement item selection.</p>
<p> key Continues pushing for 3 seconds. key Continues pushing for 3 seconds. </p>	<p>6.</p>	<p>Demand setup. Demand time setting, reset of a maximum, a minimum demand, calculation type and adjusting of demand start.</p> <p>Choose an item by the or key.</p> <p>The key is pressed and it moves to each item.</p> <p>Demand calculation type : Choose which of themal instrument or arithmetical mean it is.</p> <p>As for arithmetical mean type, demand value is automatically reset by 0 after time progress.</p> <p>Demand time setting : Input demand time by the or key.(It is a minute unit)</p> <p>Demand reset : The maximum and the minimum demand value are reset. And, it agrees to a present demand value.</p> <p>Reset is not carried out although "EXECUTE" blinks. It will reset, if the key is pressed for 3 seconds. After reset, it returns to a setting menu.</p> <p>Adjustment of demand start : Watt demand and ampdemand are initialized and restarted to measure.</p> <p>Reset is not carried out although "EXECUTE" blinks. It will reset, if the key is pressed for 3 seconds. After reset, it returns to a setting menu.</p>

<p> </p> <p> Each item common </p>	<p>7.</p>	<p>Setting of alarm output When the input signal exceeds a preset value, the relay output becomes entering. Channel selection : Choose a channel by the or key. If the GRAPH key is pressed, it will shift to item selection. Press the or key and select an item. If the GRAPH key is pressed after item selection, it will move to each setting item. Measurement item selection : Select the measurement item of alarm by pushing the or key. High & low alarm value limit setup : Select the high & low limit setting point by pushing the or key. Setting alarm value : Press the or key and select an alarm value. The return time value selection : Select the return time. (unit minutes) 0(zero) is instantaneous output, OFF is manual reset.</p>
<p> </p> <p> Each item common </p>	<p>8.</p>	<p>Analog output setup Channel selection : Choose a channel by the or key. Press the or key and select an item. If the GRAPH key is pressed after item selection, it will move to each setting item. Measurement item selection : Select the measurement item of output by pushing the or key. High value limit setup : Select the high limit setting point by pushing the or key. Low value limit setup : Select the Low limit setting point by pushing the or key.</p>
<p> </p> <p> Each item common </p>	<p>9.</p>	<p>Setting of pulse output Setting up the value of multiplier and the kind for pulse. Channel selection : Choose a channel by the or key. If the GRAPH key is pressed, it will shift to item selection Press the or key and select an item. If the GRAPH key is pressed after item selection, it will move to each setting item. Measurement item selection : Select the measurement item of output by pushing the or key. Measurement item selection : Select the multiplier by pushing the or key.</p>

<p> <input type="checkbox"/> or <input type="checkbox"/> key ↓ <input type="checkbox"/> GRAPH key Each item common <input type="checkbox"/> or <input type="checkbox"/> key ↓ <input type="checkbox"/> GRAPH key ↓ It returns to item selection </p>	<p>10.</p>	<p> Setting of digital output (RS-485) Choose an item by the <input type="checkbox"/> or <input type="checkbox"/> key. The <input type="checkbox"/> GRAPH key is pressed and it moves to each item. Mode select : RTU mode or ASCII mode. Select baud rate : (2400,4800,9600,19.2k,38.4k) Select parity bit : (no, even number, odd number) Setting of address : Set address.(1~247) Select Whdata type : 【8byte(HEX), 4byte(HEX), 4byte(BCD)】 Select multiplier of transmission : (Only when 4byte is chosen) Setting error check code at ASCII-mode PAT1 : Checksum is made before changing to ASCII. PAT2 : Checksum is made after changing to ASCII. </p>
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