MULTI POWER MONITOR

MODEL **53U**

BEFORE USE ....

Thank you for choosing M-System. Before use, check the contents of package you received as outlined below.
If you have any problems or questions with the product, please contact M-System's Sales Office or representatives.

■ PACKAGE INCLUDES:

Multi Power Monitor ..... (1)

■ MODEL NO.

Check that model No. described on specification label is exactly what you ordered.

■ INSTRUCTION MANUAL

This manual describes the operation and the programming of this product, in addition to necessary points of caution when you use it, including installation, connection and basic maintenance procedures.

POINTS OF CAUTION

■ CONFORMITY WITH EC DIRECTIVES

• This equipment is suitable for use in a Pollution Degree 2 environment and in Installation Category III, with the maximum operating voltage of 550V between signal input and output or power and 300V between output and power.
Prior to installation, check that the insulation class of this unit satisfies the system requirements.
• Altitude up to 2000 meters
• The equipment must be mounted inside a panel.
• Insert a noise filter for the power source connected to the unit. Cosel Noise Filter Model NAC-06-472 or equivalent is recommended.

■ AUXILIARY POWER INPUT RATINGS

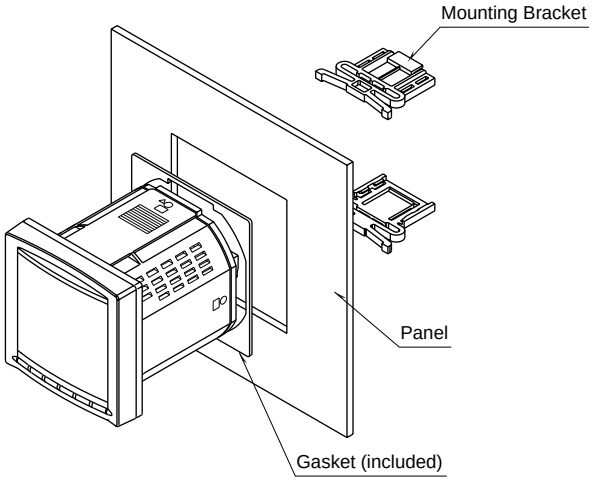
• Power input ratings are specified by the model number suffix code.
100 – 240V AC rating: 85 – 264V, 45 – 400 Hz, ≤4VA
110 – 240V DC rating: 99 – 264V DC, ≤4W

■ GENERAL PRECAUTION

• Before you remove or mount the unit, turn off the power supply and input signal for safety.

■ ENVIRONMENT

• Indoor use
• Do not install the unit where it is directly exposed to rain, water droplets or sunlight.
• When heavy dust or metal particles are present in the air, install the unit inside proper housing with sufficient ventilation.
• Do not install the unit where it is subjected to continuous vibration. Do not apply physical impact to the unit.
• Environmental temperature must be within -10 to +50°C (14 to 122°F) with relative humidity within 90% RH in order to ensure adequate life span and operation.
• Contrast of the LCD screen depends upon viewing angles. Choose the height and angle where it is the most legible.
• Do not apply physical impact to the front face.
• For IP 50 protection, insert the gasket as shown below before attaching the mounting brackets.



■ WIRING

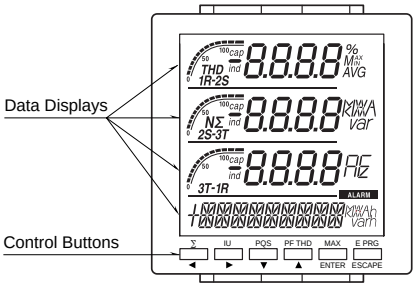
• Wiring to the unit must be conducted by qualified service personnel.
• Do not install cables (power supply, input and output) close to noise sources (relay drive cable, high frequency line, etc.).
• Do not bind these cables together with those in which noises are present. Do not install them in the same duct.

■ AND ....

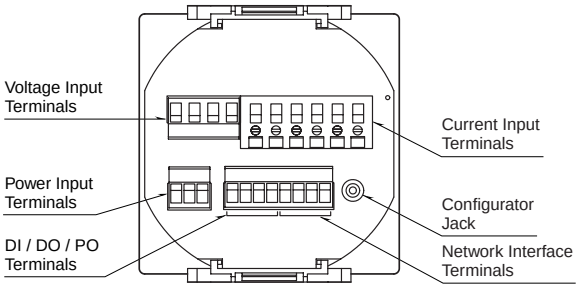
• The unit is designed to function as soon as power is supplied, however, a warm up for 30 minutes is required for satisfying complete performance described in the data sheet.

COMPONENT IDENTIFICATIONS

■FRONT VIEW



■REAR VIEW

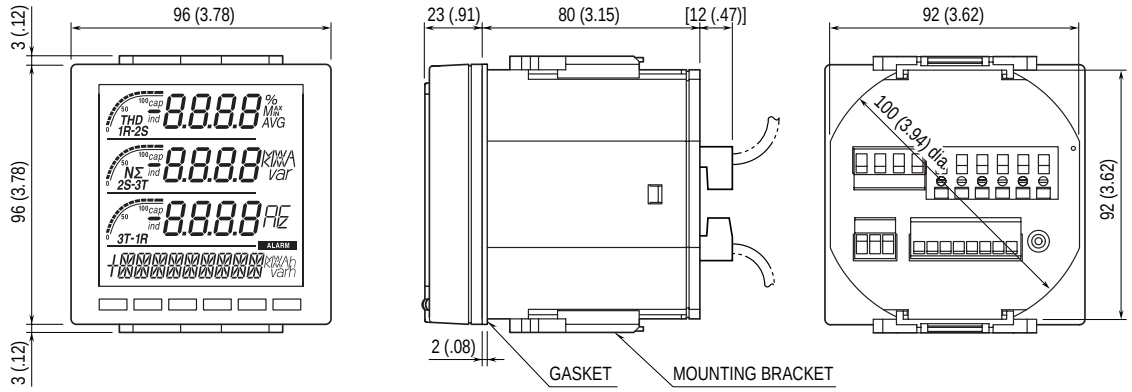


■CONTROL BUTTON OPERATIONS

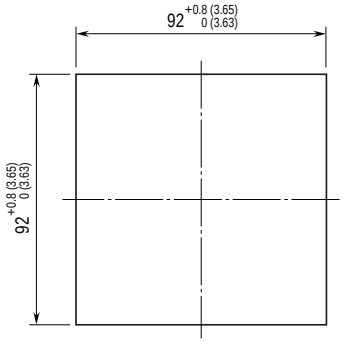
BUTTON OPERATION	FUNCTIONS	
	NORMAL MODE	SETTING MODE
[∑ ◄]	Indicates ∑ values	Go Left
[IU ►]	Indicates Voltage or Current	Go Right
[PQS ▼]	Indicates Powers	Go Down
[PF THD ▲]	Indicates Power Factor or THD	Go Up
[MAX ENTER]	Indicates totalized values (max., min., average/demand)	Selects menu; Enables setting changes
[E PRG ESCAPE]	Switches Energy readings	Cancels setting changes
[∑ ◄] Press longer	Switches to My Default mode	----
[E PRG ESCAPE] Press longer	Switches to Setting mode	----
[IU ►] + [PF THD ▲] Press longer	Indicates THD by degrees	----
[∑ ◄] + [E PRG ESCAPE] Press longer	Switches Energy reading units	----

INSTALLATION

■ EXTERNAL DIMENSIONS mm (inch)

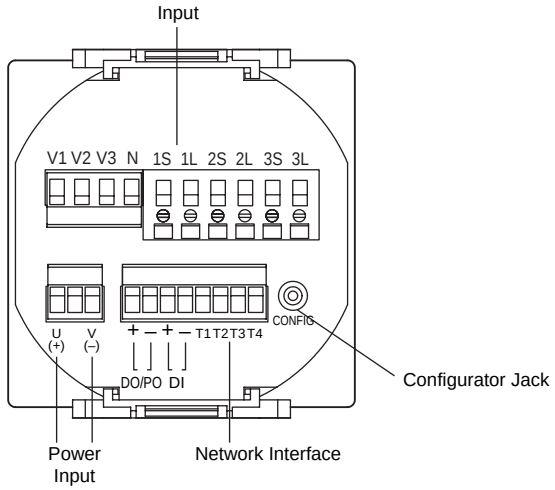


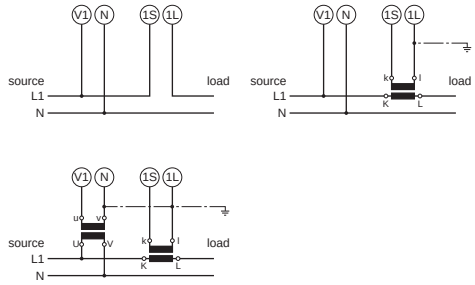
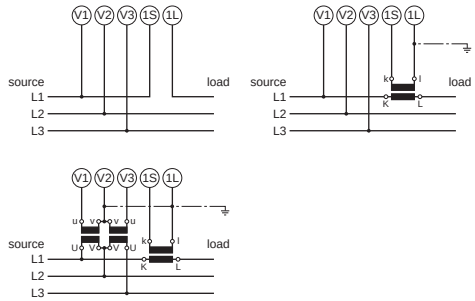
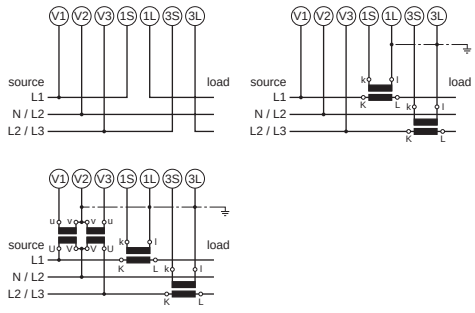
■ PANEL CUTOUT mm (inch)

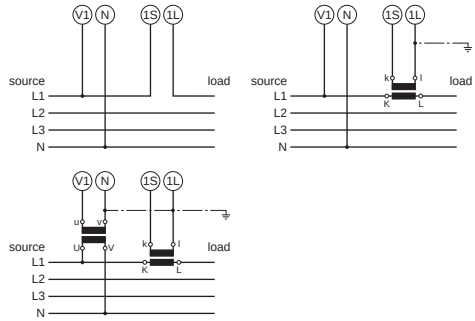
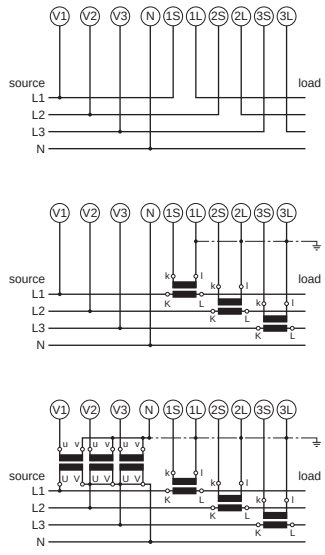


Panel thickness : 2 to 15 mm (0.08 to 0.59 inch)

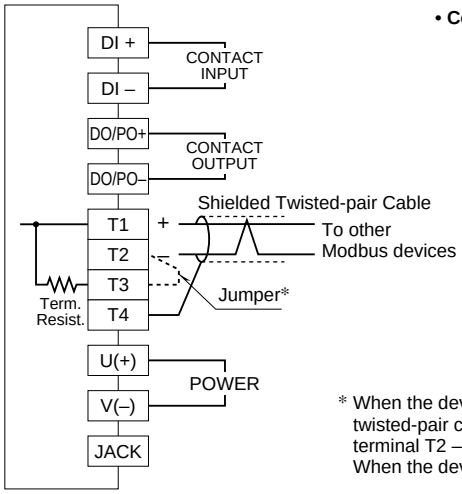
TERMINAL CONNECTIONS



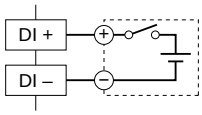
System / Application	Terminal
Single phase / 2-wire	
Three phase / 3-wire, balanced load	
Single phase / 3-wire Three phase / 3-wire, unbalanced load	

System / Application	Terminal
Three phase / 4-wire, balanced load	
Three phase / 4-wire, unbalanced load	

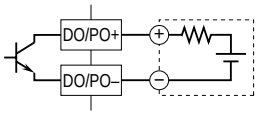
No need of grounding for a low voltage circuit.



• Contact Input Connection Example

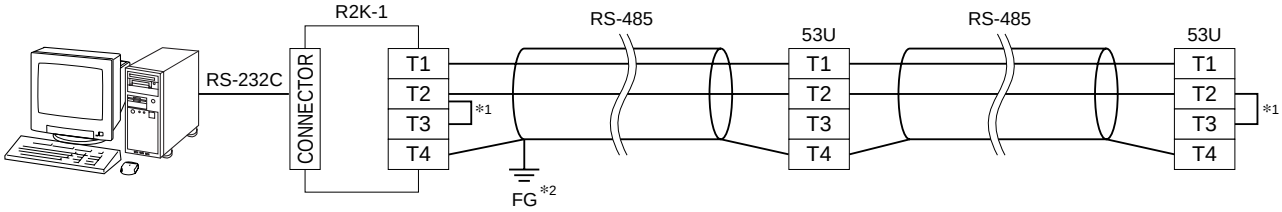


• Contact Output Connection Example



* When the device is located at the end of a transmission line via twisted-pair cable, (when there is no cross-wiring), close across the terminal T2 – T3 with a leadwire.
When the device is not at the end, no shortcircuit wire is required.

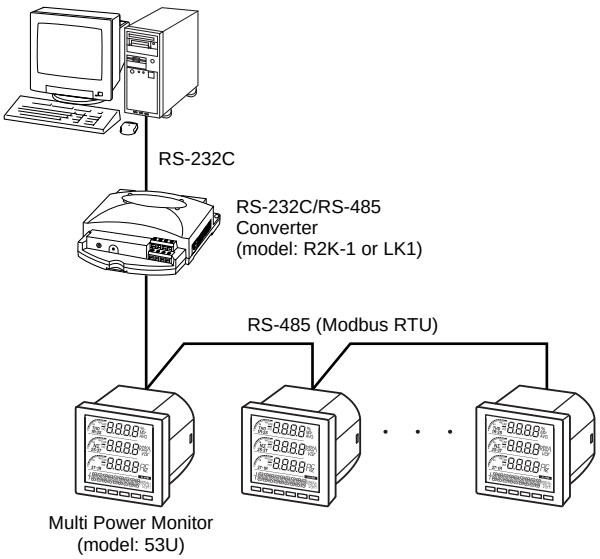
MODBUS WIRING CONNECTION



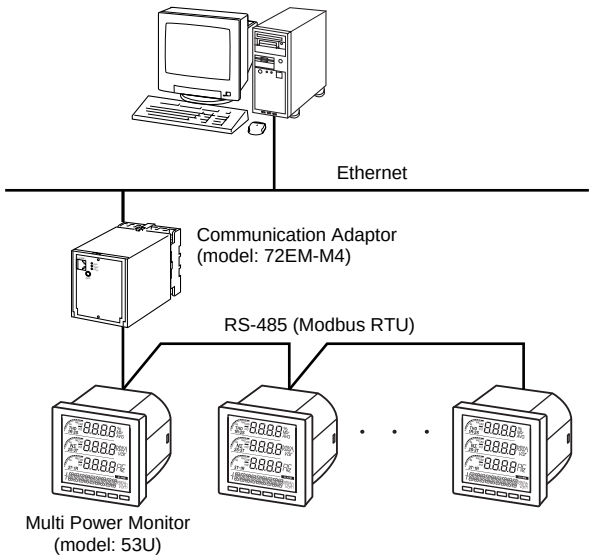
*1. Internal terminating resistor is used when the device is at the end of a transmission line.
*2. Install shield cables to all sections and ground them at single point.

SYSTEM CONFIGURATION EXAMPLE

■ RS-485 / RS-232C



■ RS-485 / ETHERNET



MODBUS PROTOCOL

This device conforms with Modbus-RTU protocol (MODBUS APPLICATION PROTOCOL V1.1a / Modbus over Serial Line Specification & Implementation Guide V1.0).
The following communication parameters are selectable.

COMM. PROPERTY	SELECTION
Modbus address	1 to 247
Baud rate	1200 bps 2400 bps 4800 bps 9600 bps 19200 bps 38400 bps (*)
Parity bit	None Odd (*) Even
Stop bit	1 bit (*) 2 bits
T1.5 timer length	0 to 6.0, in 0.1 increments (Modbus protocol standard: 1.5)
T3.5 timer length	0 to 6.0, in 0.1 increments (Modbus protocol standard: 3.5)

(*) Factory setting

When appropriately set, the host PC connected via RS-485 can read measurands from and write configurations (setting) to the device.
All registers are assigned to Read Holding Registers, can be read out using this command. If reading an address with no assigned register is attempted, '0' is given.
Write Multiple Registers command is used to write registers. If writing an address with no assigned register is attempted, 'Exception' is given.

FUNCTION CODE	COMMAND	RECOMMENDED TIME OUT VALUE
03	Read Holding Registers	0.5 seconds
16	Write Multiple Registers	2 seconds

These commands enable reading measurands and writing configurations.
One (1) word registers are represented in 16-bit integers, while two (2) word registers are in 32-bit. All registers are in the form of integer unless specifically given in the explanations.
The lower digit word in a 32-bit register is assigned to the lower address (n), while the upper digit word is assigned to the higher address (n+1). The order can be reversed by programming.
The 32-bit register must be read out and written in single command sequence.

CAUTION : DO NOT apply new setting via Modbus and the front control buttons at once.

It is recommended to wait for a time period indicated under 'recommended time out value' in the above table to receive a response for a command. If no response is received for these time periods, take appropriate error processing such as retrying.

KEY OPERATIONS

Modbus registers are assigned to program and operate the unit via Modbus network. It can also disable the view switching control via the front keys to fix the display view to a specific parameter combination.

■ MODBUS REGISTER ACCESS SETTING

ADDR.	WORD	PARAMETER
4943	2	Deactivate Modbus register writing protection Writing a preset passcode in this register deactivates the writing protection via Modbus. When the Modbus passcode set in this register matches the preset one, setting '1' or '2' in the register address 4945 becomes available to enable writing in Modbus registers. Reading out the register value is not possible. It reads always '-1' regardless of the code setting. After writing is complete, be sure to set a value other than the passcode ('0' is recommended) to activate the writing protection again. Note : This register is usable with Firmware version 1.01 or higher.
4945	1	Modbus register access setting 0 : Write disable (*) 1 : Write enable 2 : Write enable the count values Other : Write disable This setting is erased when the power supply to the unit is removed. It always starts with '0' (Write disable) when the power supply is turned on. Set '1' or '2' before starting writing at other registers. In order to write a count value (e.g. active energy), set '2' at this register address. When it is set, the unit stops counting so that a new count value can be written in the register address. Be careful to use '2' setting because no counting will be performed if the unit remains with this setting. When the Modbus register writing protection is enabled, this register setting cannot be changed from '0' to '1' or '2' unless a correct security code is set in the register address 4943.

■ USER OPERATIONS

User operations include switching the display views and resetting alarm trips.

ADDR.	WORD	PARAMETER
5201	1	Key operation lock 0 : All key operations available (*) 1 : All key operations locked 2 : Lock the key operation to go to Setting mode only
5202	1	Data display view Shows the parameter set displayed on the three data displays. The display can be switched by writing at this address from the host.
5203	1	Energy display view Shows the parameter type displayed on the bottom data display. The display can be switched by writing at this address from the host.
5204	1	Energy reading display unit 0 : 0.1 kWh, 0.1 kvarh, 0.1 kVA (*) 1 : 0.1 Wh, 0.1 varh, 0.1 VA Shows the unit (factor) of the parameter on the energy display (k = kilo). The display unit can be switched by writing at this address from the host. Exception: Count time (unit: h) is displayed always 'without kilo'.
5205	1	Reset alarm trip 1 : Reset 0 : No resetting

■ SYSTEM OPERATIONS

System operations include switching or resetting the energy count, switching the discrete output function (only when the function has been undefined), and rebooting.

ADDR.	WORD	PARAMETER
5329	1	Switch tariff 0 : High tariff (peak time) (*) 1 : Low tariff (off-peak time)
5330	1	Reset energy count 1 : Reset all values 2 : Reset all MAX / MIN values and set the present values. 3 : Reset all average (demand) values 0 : No resetting Specify the extent of count resetting. The register is automatically set to '0' when the resetting procedure is complete after one of these values is written at this address. If another value is written before '0' has been set, the former resetting procedure ends indefinitely. Specific values can be preset to each register by writing at this address from the host.

ADDR.	WORD	PARAMETER
5331	1	Reboot system Write '10001' to reboot the system. (Any other values can be written but invalid.)
5332	1	Backup / restore setting 20002 : Backup the present setting 30003 : Restore the device with the backup setting data The register is automatically set to '0' when the procedure is complete after one of these values is written at this address. If another value is written before '0' has been set, the former procedure ends indefinitely.
5333	1	Passcode 0000 to 9999 0000 : Factory setting Set and read out a passcode used to go into the Setting Mode using the front control keys.
5334	2	Modbus register writing protection passcode Setting a passcode to control writing registers via Modbus. 1 to 999 999 999 0 : Cancel writing protection (*) The Modbus passcode must be set to the register address 4943 before setting '1' or '2' in the address 4945 to deactivate the writing protection. The value in this register is encripted when it is read out. Only '0' (Cancel protection) is read out as it is. When a new code is set in this register, the register address 4945 is immedicately reset to '0' so that a next command will be already limited in access. Note : This register is usable with Firmware version 1.01 or higher.

PARAMETER SETTING

■ **SYSTEM SETTING**

ADDR.	WORD	PARAMETER	UNIT
5601	1	System configuration 0 : Single-phase / 2-wire (1CT) 1 : Single-phase / 3-wire (2CT) 2 : 3-phase / 3-wire, balanced load (1CT) 3 : 3-phase / 3-wire, unbalanced load (2CT) 4 : 3-phase / 4-wire, balanced load (1CT) 5 : 3-phase / 4-wire, unbalanced load (3CT) (*)	
5602	1	CT rating, Primary 1 to 20 000 : Current (A) Factory setting : 1 or 5	A
5603	1	CT rating, Secondary 1 : 1A 5 : 5A Factory setting : 1 or 5	A
5604	2	VT rating, Primary 50 to 400 000 : Voltage (V) Factory setting : 110	V
5606	1	VT rating, Secondary 50 to 500 : Voltage (V) Factory setting : 110	V
5607	1	Frequency input 0 : Voltage (*) 1 : Current	----
5608	1	Low-end cutout, Current 0 to 999 : Rated current × 0.001 × Specified value Factory setting : 10	%/10
5609	1	Low-end cutout, Voltage 0 to 999 : Rated voltage × 0.001 × Specified value Factory setting : 10	%/10

■ MODBUS SETTING

The device must be reset or the power supply to it must be turned off and on in order to enable the Modbus setting.

ADDR.	WORD	PARAMETER
5729	1	Modbus address 1 to 247 Factory setting : 1
5730	1	Baud rate 0 : 1200 1 : 2400 2 : 4800 3 : 9600 4 : 19200 (*) 5 : 38400
5731	1	Parity bit 0 : None 1 : Odd (*) 2 : Even
5732	1	Stop bit 0 : 1 bit (*) 1 : 2 bits
5733	1	T1.5 timer length 1 to 60 : Specified value × 0.1 character length Factory setting : 15
5734	1	T3.5 timer length 1 to 60 : Specified value × 0.1 character length Factory setting : 35
5735	1	Long register (32-bit words assignments) 0 : Normal (*) Lower digit word at the lower address 1 : Swap Lower digit word at the higher address

■ DEMAND SETTING

ADDR.	WORD	PARAMETER	UNIT
5857	1	Average (demand) current update interval 0 : External trigger signal 1 to 60 : Minutes Factory setting : 30	Minutes
5858	1	Average (demand) power update interval 0 : External trigger signal 1 to 60 : Minutes Factory setting : 30	Minutes

■ STYLE SETTING

ADDR.	WORD	PARAMETER
5985	1	Input line indication 0 : 1 – 2 – 3 (*) 1 : R – S – T
5986	1	Phase difference direction indication 0 : IND / CAP (*) 1 : LEAD / LAG
5987	1	Power factor (PF1 through PF3, PF) sign 0 : Standard (IEC) (*) Identical to the active energy 1 : Special type 1 (IEEE) Positive in LAG, Negative in LEAD
5988	1	Reactive power (Q1 through Q3, Q) sign 0 : Standard (IEC) (*) Positive from [PF = 1.0] to 180° in LAG direction; Negative for the other direction 1 : Special type 1 Positive in LAG, Negative in LEAD
5989	1	Reactive power (Q1 through Q3) calculation (Q = Q1 + Q2 + Q3) 0 : Standard (*) $Qn = \sqrt{Sn^2 - Pn^2}$ 1 : Reactive power meter method $Qn = \frac{1}{Nsmp} \sum_{i=1}^{Nsmp} (Un_i - Nu_i)\, I_{i+(Nsmp/4)}$
5990	1	Apparent power (S) calculation 0 : Standard (*) $S = \sqrt{P^2 + Q^2}$ 1 : Sum $S = S1 + S2 + S3$

■ **DISCRETE I/O SETTING**

ADDR.	WORD	PARAMETER
6113	1	Discrete output function 0 : Undefined (*) 1 : Energy count 2 : Alarm
6114	1	Discrete output contact type 0 : Normally open contact (*) 1 : Normally closed contact The contact opens at the power OFF regardless of this setting.
6115	1	Discrete input function 0 : Undefined (*) 1 : Update demand 2 : Reset energy count
6116	1	Discrete input contact type 0 : Normally open contact (*) 1 : Normally closed contact

■ **ENERGY SETTING**

ADDR.	WORD	PARAMETER	UNIT
6241	1	Energy count assigned to the pulse output 0 : Active energy, incoming (*) 1 : Active energy, outgoing 2 : Reactive energy, LAG 3 : Reactive energy, LEAD 4 : Reactive energy, incoming, LEAD 5 : Reactive energy, outgoing, LEAD 6 : Reactive energy, incoming, LAG 7 : Reactive energy, outgoing, LAG 8 : Apparent energy	----
6242	2	Pulse weight 0 : No pulse output (disabled) 1 to 100 000 : Specified value × 0.1 (kWh / kvarh / kVA) Factory setting : 10	kWh kvarh kVA
6244	1	Pulse duration (width) 1 to 20 : Specified value × 100 msec. Factory setting : 1	sec / 10
6245	1	Tariff setting 0 : Disable (*) 1 : Enable	----

■ **ALARM SETTING**

ADDR.	WORD	PARAMETER	UNIT
6369	1	Power ON delay time 0 to 999 : Seconds Factory setting : 0	Seconds
6370	1	Latching 0 : No latching (*) 1 : Latching (Alarm trip is held until a reset command is received or power OFF)	----
6371	2	I1 thr. I3 - Current : High setpoint Factory setting : 0	mA
6373	2	I1 thr. I3 - Current : Low setpoint Factory setting : 0	mA
6375	1	I1 thr. I3 - Current : Alarm output 0 : Disable (*) 1 : Display only 2 : Display + contact output	----
6376	1	I1 thr. I3 - Current : Hysteresis (deadband) 0 to 999 : Specified value × 0.1 (%) Factory setting : 0	%/10
6377	1	I1 thr. I3 - Current : ON delay time 0 to 999 : Seconds Factory setting : 0	Seconds

ADDR.	WORD	PARAMETER	UNIT
6379	2	IN - Neutral current : High setpoint Factory setting : 0	mA
6381	2	IN - Neutral current : Low setpoint Factory setting : 0	mA
6383	1	IN - Neutral current : Alarm output 0 : Disable (*) 1 : Display only 2 : Display + contact output	----
6384	1	IN - Neutral current : Hysteresis (deadband) 0 to 999 : Specified value × 0.1 (%) Factory setting : 0	%/10
6385	1	IN - Neutral current : ON delay time 0 to 999 : Seconds Factory setting : 0	Seconds
6387	2	U12 thr. U31 - Delta voltage : High setpoint Factory setting : 0	V/100
6389	2	U12 thr. U31 - Delta voltage : Low setpoint Factory setting : 0	V/100
6391	1	U12 thr. U31 - Delta voltage : Alarm output 0 : Disable (*) 1 : Display only 2 : Display + contact output	----
6392	1	U12 thr. U31 - Delta voltage : Hysteresis (deadband) 0 to 999 : Specified value × 0.1 (%) Factory setting : 0	%/10
6393	1	U12 thr. U31 - Delta voltage : ON delay time 0 to 999 : Seconds Factory setting : 0	Seconds
6395	2	U1N thr. U3N - Phase voltage : High setpoint Factory setting : 0	V/100
6397	2	U1N thr. U3N - Phase voltage : Low setpoint Factory setting : 0	V/100
6399	1	U1N thr. U3N - Phase voltage : Alarm output 0 : Disable (*) 1 : Display only 2 : Display + contact output	----
6400	1	U1N thr. U3N - Phase voltage : Hysteresis (deadband) 0 to 999 : Specified value × 0.1 (%) Factory setting : 0	%/10
6401	1	U1N thr. U3N - Phase voltage : ON delay time 0 to 999 : Seconds Factory setting : 0	Seconds
6403	2	P - Active power : High setpoint Factory setting : 0	W
6405	2	P - Active power : Low setpoint Factory setting : 0	W
6407	1	P - Active power : Alarm output 0 : Disable (*) 1 : Display only 2 : Display + contact output	----
6408	1	P - Active power : Hysteresis (deadband) 0 to 999 : Specified value × 0.1 (%) Factory setting : 0	%/10
6409	1	P - Active power : ON delay time 0 to 999 : Seconds Factory setting : 0	Seconds
6411	2	Q - Reactive power : High setpoint Factory setting : 0	var
6413	2	Q - Reactive power : Low setpoint Factory setting : 0	var
6415	1	Q - Reactive power : Alarm output 0 : Disable (*) 1 : Display only 2 : Display + contact output	----

ADDR.	WORD	PARAMETER	UNIT
6416	1	Q - Reactive power : Hysteresis (deadband) 0 to 999 : Specified value × 0.1 (%) Factory setting : 0	%/10
6417	1	Q - Reactive power : ON delay time 0 to 999 : Seconds Factory setting : 0	Seconds
6419	2	S - Apparent power : High setpoint Factory setting : 0	VA
6421	2	S - Apparent power : Low setpoint Factory setting : 0	VA
6423	1	S - Apparent power : Alarm output 0 : Disable (*) 1 : Display only 2 : Display + contact output	----
6424	1	S - Apparent power : Hysteresis (deadband) 0 to 999 : Specified value × 0.1 (%) Factory setting : 0	%/10
6425	1	S - Apparent power : ON delay time 0 to 999 : Seconds Factory setting : 0	Seconds
6427	2	PF - Power factor : High setpoint Factory setting : 0	%/100
6429	2	PF - Power factor : Low setpoint Factory setting : 0	%/100
6431	1	PF - Power factor : Alarm output 0 : Disable (*) 1 : Display only 2 : Display + contact output	----
6432	1	PF - Power factor : Hysteresis (deadband) 0 to 999 : Specified value × 0.1 (%) Factory setting : 0	%/10
6433	1	PF - Power factor : ON delay time 0 to 999 : Seconds Factory setting : 0	Seconds
6435	2	F - Frequency : High setpoint Factory setting : 6500	Hz/100
6437	2	F - Frequency : Low setpoint Factory setting : 4500	Hz/100
6439	1	F - Frequency : Alarm output 0 : Disable (*) 1 : Display only 2 : Display + contact output	----
6440	1	F - Frequency : Hysteresis (deadband) 0 to 999 : Specified value × 0.1 (%) Factory setting : 0	%/10
6441	1	F - Frequency : ON delay time 0 to 999 : Seconds Factory setting : 0	Seconds
6443	2	I1 AVG thr. I3 AVG - Average (demand) current : High setpoint Factory setting : 0	mA
6445	2	I1 AVG thr. I3 AVG - Average (demand) current : Low setpoint Factory setting : 0	mA
6447	1	I1 AVG thr. I3 AVG - Average (demand) current : Alarm output 0 : Disable (*) 1 : Display only 2 : Display + contact output	----
6448	1	I1 AVG thr. I3 AVG - Average (demand) current : Hysteresis (deadband) 0 to 999 : Specified value × 0.1 (%) Factory setting : 0	%/10
6449	1	I1 AVG thr. I3 AVG - Average (demand) current : ON delay time 0 to 999 : Seconds Factory setting : 0	Seconds

ADDR.	WORD	PARAMETER	UNIT
6451	2	IN AVG - Average (demand) neutral current : High setpoint Factory setting : 0	mA
6453	2	IN AVG - Average (demand) neutral current : Low setpoint Factory setting : 0	mA
6455	1	IN AVG - Average (demand) neutral current : Alarm output 0 : Disable (*) 1 : Display only 2 : Display + contact output	----
6456	1	IN AVG - Average (demand) neutral current : Hysteresis (deadband) 0 to 999 : Specified value × 0.1 (%) Factory setting : 0	%/10
6457	1	IN AVG - Average (demand) neutral current : ON delay time 0 to 999 : Seconds Factory setting : 0	Seconds
6459	2	P AVG - Average (demand) active power : High setpoint Factory setting : 0	W
6461	2	P AVG - Average (demand) active power : Low setpoint Factory setting : 0	W
6463	1	P AVG - Average (demand) active power : Alarm output 0 : Disable (*) 1 : Display only 2 : Display + contact output	----
6464	1	P AVG - Average (demand) active power : Hysteresis (deadband) 0 to 999 : Specified value × 0.1 (%) Factory setting : 0	%/10
6465	1	P AVG - Average (demand) active power : ON delay time 0 to 999 : Seconds Factory setting : 0	Seconds
6467	2	Q AVG - Average (demand) reactive power : High setpoint Factory setting : 0	var
6469	2	Q AVG - Average (demand) reactive power : Low setpoint Factory setting : 0	var
6471	1	Q AVG - Average (demand) reactive power : Alarm output 0 : Disable (*) 1 : Display only 2 : Display + contact output	----
6472	1	Q AVG - Average (demand) reactive power : Hysteresis (deadband) 0 to 999 : Specified value × 0.1 (%) Factory setting : 0	%/10
6473	1	Q AVG - Average (demand) reactive power : ON delay time 0 to 999 : Seconds Factory setting : 0	Seconds
6475	2	S AVG - Average (demand) apparent power : High setpoint Factory setting : 0	VA
6477	2	S AVG - Average (demand) apparent power : Low setpoint Factory setting : 0	VA
6479	1	S AVG - Average (demand) apparent power : Alarm output 0 : Disable (*) 1 : Display only 2 : Display + contact output	----
6480	1	S AVG - Average (demand) apparent power : Hysteresis (deadband) 0 to 999 : Specified value × 0.1 (%) Factory setting : 0	%/10
6481	1	S AVG - Average (demand) apparent power : ON delay time 0 to 999 : Seconds Factory setting : 0	Seconds
6483	2	THD I1 thr. THD I3 - Current total harmonic distortion : High setpoint Factory setting : 0	%/10
6485	2	THD I1 thr. THD I3 - Current total harmonic distortion : Low setpoint Factory setting : 0	%/10
6487	1	THD I1 thr. THD I3 - Current total harmonic distortion : Alarm output 0 : Disable (*) 1 : Display only 2 : Display + contact output	----

ADDR.	WORD	PARAMETER	UNIT
6488	1	THD I1 thr. THD I3 - Current total harmonic distortion : Hysteresis (deadband) 0 to 999 : Specified value × 0.1 (%) Factory setting : 0	%/10
6489	1	THD I1 thr. THD I3 - Current total harmonic distortion : ON delay time 0 to 999 : Seconds Factory setting : 0	Seconds
6491	2	THD IN - Neutral current total harmonic distortion : High setpoint Factory setting : 0	%/10
6493	2	THD IN - Neutral current total harmonic distortion : Low setpoint Factory setting : 0	%/10
6495	1	THD IN - Neutral current total harmonic distortion : Alarm output 0 : Disable (*) 1 : Display only 2 : Display + contact output	----
6496	1	THD IN - Neutral current total harmonic distortion : Hysteresis (deadband) 0 to 999 : Specified value × 0.1 (%) Factory setting : 0	%/10
6497	1	THD IN - Neutral current total harmonic distortion : ON delay time 0 to 999 : Seconds Factory setting : 0	Seconds
6499	2	THD U12 thr. THD U31 - Delta voltage total harmonic distortion : High setpoint Factory setting : 0	%/10
6501	2	THD U12 thr. THD U31 - Delta voltage total harmonic distortion : Low setpoint Factory setting : 0	%/10
6503	1	THD U12 thr. THD U31 - Delta voltage total harmonic distortion : Alarm output 0 : Disable (*) 1 : Display only 2 : Display + contact output	----
6504	1	THD U12 thr. THD U31 - Delta voltage total harmonic distortion : Hysteresis (deadband) 0 to 999 : Specified value × 0.1 (%) Factory setting : 0	%/10
6505	1	THD U12 thr. THD U31 - Delta voltage total harmonic distortion : ON delay time 0 to 999 : Seconds Factory setting : 0	Seconds
6507	2	THD U1N thr. THD U3N - Phase voltage total harmonic distortion : High setpoint Factory setting : 0	%/10
6509	2	THD U1N thr. THD U3N - Phase voltage total harmonic distortion : Low setpoint Factory setting : 0	%/10
6511	1	THD U1N thr. THD U3N - Phase voltage total harmonic distortion : Alarm output 0 : Disable (*) 1 : Display only 2 : Display + contact output	----
6512	1	THD U1N thr. THD U3N - Phase voltage total harmonic distortion : Hysteresis (deadband) 0 to 999 : Specified value × 0.1 (%) Factory setting : 0	%/10
6513	1	THD U1N thr. THD U3N - Phase voltage total harmonic distortion : ON delay time 0 to 999 : Seconds Factory setting : 0	Seconds

■ **LCD SETTING**

ADDR.	WORD	PARAMETER
6625	1	LCD backlight operating mode 0 : AUTO (*) ON at alarm and operating; OFF after the OFF TIMER time has been elapsed after the last operating. 1 : ON Continuously ON 2 : OFF Continuously OFF
6626	1	LCD backlight OFF timer 1 to 999 : Seconds Time to be elapsed after the last operating before the backlight is turned off. Factory setting : 600
6627	1	LCD backlight brightness 1 to 3 (dark) 1 << brightness >> 3 (bright) Factory setting : 2

■ **LCD BARGRAPH SETTING**

The bargraph is indicated proportionally to the specified rating (100%). For the energy values, it indicates [Current × Voltage] as 100%.

ADDR.	WORD	PARAMETER	UNIT
6753	1	Current 100% 1 to 20 000 : Current (A) Factory setting : 1 or 5	A
6754	2	Voltage 100% 1 to 400 000 : Voltage (V) Factory setting : 300	V

■ **'MY DEFAULT' SETTING**

Custom default view setting

ADDR.	WORD	PARAMETER	UNIT
6881	1	'My default' time 0 : Disable (*) 1 to 999 : Seconds The display returns to the preset view if the control keys are untouched for the preset time.	Seconds
6882	1	'My default' data display view Shows the parameter set displayed on 'My default' view.	----
6883	1	'My default' energy display view Shows the parameter type displayed on the bottom data display.	----
6884	1	'My default' energy reading display unit 0 : 0.1 kWh, 0.1 kvarh, 0.1 kVA (*) 1 : 0.1 Wh, 0.1 varh, 0.1 VA Shows the unit (factor) of the parameter on the energy display (k = kilo).	----

MEASURED VARIABLES

Measured variables, except for the nth harmonic distortion, are read out as signed 32-bit integer.

Each variable has different engineering unit (Refer to the table below). For example, when 40000 is read at the address 41 for the 1 – N delta voltage, the actual voltage value equals to 400.0V = 40000 × 0.01, as the engineering unit for this item is V/100 (0.01V).

Readable range for each parameter depends upon the parameter type, as shown in the table below. For example, Current unit is applied to Line current or Neutral current, and Voltage unit is applied to the 1 – N delta voltage or the minimum value voltage.

PARAMETER	UNIT	RANGE
Current	mA	0 to 2 000 000 000 mA
Voltage	V/100	0 to 20 000 000.00 V
Active power	W	-2 000 000 000 to 2 000 000 000 W
Reactive power	var	-2 000 000 000 to 2 000 000 000 var
Apparent power	VA	0 to 2 000 000 000 VA
Power factor	%/100	-1.0000 to 1.0000
Frequency	Hz/100	0 or 40.00 Hz to 70.00 Hz
Active energy	kWh/10	0 to 99 999 999.9 kWh
Reactive energy	kvarh/10	0 to 99 999 999.9 kvarh
Apparent energy	kVAh/10	0 to 99 999 999.9 kVAh
Energy count time	h/10	0 to 99 999 999.9 hours
Harmonic distortion	%/10	0 to 999.9%

Two-word long data are composed of 32-bit signed integers.

■ MOMENTARY VALUE

ADDR.	WORD	ID	PARAMETER	UNIT
1	2	I	Current	mA
3	2	U	Voltage	V/100
5	2	P	Active power	W
7	2	Q	Reactive power	var
9	2	S	Apparent power	VA
11	2	PF	Power factor	%/100
13	2	F	Frequency	Hz/100
15	2	DIR	Phase difference direction (0 = inductive or lag, 1 = capacitive or lead)	----
33	2	I1	Current, Line 1	mA
35	2	I2	Current, Line 2	mA
37	2	I3	Current, Line 3	mA
39	2	IN	Neutral current	mA
41	2	U12	Delta voltage, 1 – 2	V/100
43	2	U23	Delta voltage, 2 – 3	V/100
45	2	U31	Delta voltage, 3 – 1	V/100
47	2	U1N	Phase voltage, 1 – N (VN)	V/100
49	2	U2N	Phase voltage, 2 – N (VN)	V/100
51	2	U3N	Phase voltage, 3 – N (VN)	V/100
53	2	P1	Active power, Phase 1	W
55	2	P2	Active power, Phase 2	W
57	2	P3	Active power, Phase 3	W
59	2	Q1	Reactive power, Phase 1	var
61	2	Q2	Reactive power, Phase 2	var
63	2	Q3	Reactive power, Phase 3	var
65	2	S1	Apparent power, Phase 1	VA
67	2	S2	Apparent power, Phase 2	VA
69	2	S3	Apparent power, Phase 3	VA
71	2	PF1	Power factor, Phase 1	%/100
73	2	PF2	Power factor, Phase 2	%/100
75	2	PF3	Power factor, Phase 3	%/100
77	2	DIR1	Phase difference direction, Phase 1 (0 = inductive or lag, 1 = capacitive or lead)	----
79	2	DIR2	Phase difference direction, Phase 2 (0 = inductive or lag, 1 = capacitive or lead)	----
81	2	DIR3	Phase difference direction, Phase 3 (0 = inductive or lag, 1 = capacitive or lead)	----

■ **ENERGY**

Writing the following registers enables energy presetting. Set Modbus Register Access in order to write in the energy and fractions.

ADDR.	WORD	ID	PARAMETER	UNIT
129	2	EP	Active energy, high tariff, incoming	kWh/10
131	2	EQ	Reactive energy, high tariff, LAG	kvarh/10
133	2	ES	Apparent energy, high tariff	kVAh/10
135	2	EP–	Active energy, high tariff, outgoing	kWh/10
137	2	EQ–	Reactive energy, high tariff, LEAD	kvarh/10
139	2	EQ+ LAG	Reactive energy, high tariff, incoming, LAG	kvarh/10
141	2	EQ+ LEAD	Reactive energy, high tariff, incoming, LEAD	kvarh/10
143	2	EQ– LAG	Reactive energy, high tariff, outgoing, LAG	kvarh/10
145	2	EQ– LEAD	Reactive energy, high tariff, outgoing, LEAD	kvarh/10
147	2	TIMER	Energy count time, high tariff	h/10
161	2	L-EP	Active energy, low tariff, incoming	kWh/10
163	2	L-EQ	Reactive energy, low tariff, LAG	kvarh/10
165	2	L-ES	Apparent energy, low tariff	kVAh/10
167	2	L-EP–	Active energy, low tariff, outgoing	kWh/10
169	2	L-EQ–	Reactive energy, low tariff, LEAD	kvarh/10
171	2	L-EQ+ LAG	Reactive energy, low tariff, incoming, LAG	kvarh/10
173	2	L-EQ+ LEAD	Reactive energy, low tariff, incoming, LEAD	kvarh/10
175	2	L-EQ– LAG	Reactive energy, low tariff, outgoing, LAG	kvarh/10
177	2	L-EQ– LEAD	Reactive energy, low tariff, outgoing, LEAD	kvarh/10
179	2	L-TIMER	Energy count time, low tariff	h/10
193	2	EP_L	Active energy fraction, high tariff, incoming	kWh/(10×2^{32})
195	2	EQ_L	Reactive energy fraction, high tariff, LAG	kvarh/(10×2^{32})
197	2	ES_L	Apparent energy fraction, high tariff	kVAh/(10×2^{32})
199	2	EP–_L	Active energy fraction, high tariff, outgoing	kWh/(10×2^{32})
201	2	EQ–_L	Reactive energy fraction, high tariff, LEAD	kvarh/(10×2^{32})
203	2	EQ+ LAG_L	Reactive energy fraction, high tariff, incoming, LAG	kvarh/(10×2^{32})
205	2	EQ+ LEAD_L	Reactive energy fraction, high tariff, incoming, LEAD	kvarh/(10×2^{32})
207	2	EQ– LAG_L	Reactive energy fraction, high tariff, outgoing, LAG	kvarh/(10×2^{32})
209	2	EQ– LEAD_L	Reactive energy fraction, high tariff, outgoing, LEAD	kvarh/(10×2^{32})
211	2	TIMER_L	Energy fraction count time, high tariff	seconds/1 000
225	2	L-EP_L	Active energy fraction, low tariff, incoming	kWh/(10×2^{32})
227	2	L-EQ_L	Reactive energy fraction, low tariff, LAG	kvarh/(10×2^{32})
229	2	L-ES_L	Apparent energy fraction, low tariff	kVAh/(10×2^{32})
231	2	L-EP–_L	Active energy fraction, low tariff, outgoing	kWh/(10×2^{32})
233	2	L-EQ–_L	Reactive energy fraction, low tariff, LEAD	kvarh/(10×2^{32})
235	2	L-EQ+ LAG_L	Reactive energy fraction, low tariff, incoming, LAG	kvarh/(10×2^{32})
237	2	L-EQ+ LEAD_L	Reactive energy fraction, low tariff, incoming, LEAD	kvarh/(10×2^{32})
239	2	L-EQ– LAG_L	Reactive energy fraction, low tariff, outgoing, LAG	kvarh/(10×2^{32})
241	2	L-EQ– LEAD_L	Reactive energy fraction, low tariff, outgoing, LEAD	kvarh/(10×2^{32})
243	2	L-TIMER_L	Energy fraction count time, low tariff	seconds/1 000

■ **AVERAGE VALUE**

ADDR.	WORD	ID	PARAMETER	UNIT
257	2	I AVG	Current AVG	mA
259	2	I1 AVG	Current AVG, Line 1	mA
261	2	I2 AVG	Current AVG, Line 2	mA
263	2	I3 AVG	Current AVG, Line 3	mA
265	2	IN AVG	Neutral current AVG	mA
273	2	I AVG 1	Current AVG, History 1	mA
275	2	I1 AVG 1	Current AVG, Line 1, History 1	mA
277	2	I2 AVG 1	Current AVG, Line 2, History 1	mA
279	2	I3 AVG 1	Current AVG, Line 3, History 1	mA
281	2	IN AVG 1	Neutral current AVG, History 1	mA
289	2	I AVG 2	Current AVG, History 2	mA
291	2	I1 AVG 2	Current AVG, Line 1, History 2	mA
293	2	I2 AVG 2	Current AVG, Line 2, History 2	mA
295	2	I3 AVG 2	Current AVG, Line 3, History 2	mA
297	2	IN AVG 2	Neutral current AVG, History 2	mA
305	2	I AVG 3	Current AVG, History 3	mA
307	2	I1 AVG 3	Current AVG, Line 1, History 3	mA
309	2	I2 AVG 3	Current AVG, Line 2, History 3	mA
311	2	I3 AVG 3	Current AVG, Line 3, History 3	mA
313	2	IN AVG 3	Neutral current AVG, History 3	mA
321	2	I AVG 4	Current AVG, History 4	mA
323	2	I1 AVG 4	Current AVG, Line 1, History 4	mA
325	2	I2 AVG 4	Current AVG, Line 2, History 4	mA
327	2	I3 AVG 4	Current AVG, Line 3, History 4	mA
329	2	IN AVG 4	Neutral current AVG, History 4	mA
513	2	P AVG	Active power AVG	W
515	2	Q AVG	Reactive power AVG	var
517	2	S AVG	Apparent power AVG	VA
529	2	P AVG 1	Active power AVG, History 1	W
531	2	Q AVG 1	Reactive power AVG, History 1	var
533	2	S AVG 1	Apparent power AVG, History 1	VA
545	2	P AVG 2	Active power AVG, History 2	W
547	2	Q AVG 2	Reactive power AVG, History 2	var
549	2	S AVG 2	Apparent power AVG, History 2	VA
561	2	P AVG 3	Active power AVG, History 3	W
563	2	Q AVG 3	Reactive power AVG, History 3	var
565	2	S AVG 3	Apparent power AVG, History 3	VA
577	2	P AVG 4	Active power AVG, History 4	W
579	2	Q AVG 4	Reactive power AVG, History 4	var
581	2	S AVG 4	Apparent power AVG, History 4	VA

■ **MAXIMUM / MINIMUM VALUE**

ADDR.	WORD	ID	PARAMETER	UNIT
769	2	I MAX	Current MAX	mA
771	2	U MAX	Voltage MAX	V/100
773	2	P MAX	Active power MAX	W
775	2	Q MAX	Reactive power MAX	var
777	2	S MAX	Apparent power MAX	VA
779	2	PF MAX	Power factor MAX	%/100
781	2	F MAX	Frequency MAX	Hz/100
801	2	I1 MAX	Current MAX, Line 1	mA
803	2	I2 MAX	Current MAX, Line 2	mA
805	2	I3 MAX	Current MAX, Line 3	mA
807	2	IN MAX	Neutral current MAX	mA
809	2	U12 MAX	Delta voltage MAX, 1 – 2	V/100
811	2	U23 MAX	Delta voltage MAX, 2 – 3	V/100
813	2	U31 MAX	Delta voltage MAX, 3 – 1	V/100
815	2	U1N MAX	Phase voltage MAX, 1 – N (VN)	V/100
817	2	U2N MAX	Phase voltage MAX, 2 – N (VN)	V/100
819	2	U3N MAX	Phase voltage MAX, 3 – N (VN)	V/100
821	2	P1 MAX	Active power MAX, Phase 1	W
823	2	P2 MAX	Active power MAX, Phase 2	W
825	2	P3 MAX	Active power MAX, Phase 3	W
827	2	Q1 MAX	Reactive power MAX, Phase 1	var
829	2	Q2 MAX	Reactive power MAX, Phase 2	var
831	2	Q3 MAX	Reactive power MAX, Phase 3	var
833	2	S1 MAX	Apparent power MAX, Phase 1	VA
835	2	S2 MAX	Apparent power MAX, Phase 2	VA
837	2	S3 MAX	Apparent power MAX, Phase 3	VA
839	2	PF1 MAX	Power factor MAX, Phase 1	%/100
841	2	PF2 MAX	Power factor MAX, Phase 2	%/100
843	2	PF3 MAX	Power factor MAX, Phase 3	%/100
865	2	THD I1 MAX	Current total harmonic distortion MAX, Line 1	%/10
867	2	THD I2 MAX	Current total harmonic distortion MAX, Line 2	%/10
869	2	THD I3 MAX	Current total harmonic distortion MAX, Line 3	%/10
871	2	THD IN MAX	Neutral current total harmonic distortion MAX	%/10
873	2	THD U12 MAX	Delta voltage total harmonic distortion MAX, 1 – 2	%/10
875	2	THD U23 MAX	Delta voltage total harmonic distortion MAX, 2 – 3	%/10
877	2	THD U31 MAX	Delta voltage total harmonic distortion MAX, 3 – 1	%/10
879	2	THD U1N MAX	Phase voltage total harmonic distortion MAX, 1 – N (VN)	%/10
881	2	THD U2N MAX	Phase voltage total harmonic distortion MAX, 2 – N (VN)	%/10
883	2	THD U3N MAX	Phase voltage total harmonic distortion MAX, 3 – N (VN)	%/10
897	2	I MAX AVG	Current MAX AVG	mA
899	2	I1 MAX AVG	Current MAX AVG, Line 1	mA
901	2	I2 MAX AVG	Current MAX AVG, Line 2	mA
903	2	I3 MAX AVG	Current MAX AVG, Line 3	mA
905	2	IN MAX AVG	Neutral current MAX AVG	mA
907	2	P MAX AVG+	Active power MAX AVG, incoming	W
909	2	P MAX AVG–	Active power MAX AVG, outgoing	W
911	2	Q MAX AVG+	Reactive power MAX AVG, incoming	var
913	2	Q MAX AVG–	Reactive power MAX AVG, outgoing	var
915	2	S MAX AVG	Apparent power MAX AVG	VA
929	2	I MIN	Current MIN	mA
931	2	U MIN	Voltage MIN	V/100
933	2	P MIN	Active power MIN	W
935	2	Q MIN	Reactive power MIN	var
937	2	S MIN	Apparent power MIN	VA
939	2	PF MIN	Power factor MIN	%/100
941	2	F MIN	Frequency MIN	Hz/100
961	2	I1 MIN	Current MIN, Line 1	mA
963	2	I2 MIN	Current MIN, Line 2	mA
965	2	I3 MIN	Current MIN, Line 3	mA
967	2	IN MIN	Neutral current MIN	mA
969	2	U12 MIN	Delta voltage MIN, 1 – 2	V/100
971	2	U23 MIN	Delta voltage MIN, 2 – 3	V/100
973	2	U31 MIN	Delta voltage MIN, 3 – 1	V/100

ADDR.	WORD	ID	PARAMETER	UNIT
975	2	U1N MIN	Phase voltage MIN, 1 – N (VN)	V/100
977	2	U2N MIN	Phase voltage MIN, 2 – N (VN)	V/100
979	2	U3N MIN	Phase voltage MIN, 3 – N (VN)	V/100
981	2	P1 MIN	Active power MIN, Phase 1	W
983	2	P2 MIN	Active power MIN, Phase 2	W
985	2	P3 MIN	Active power MIN, Phase 3	W
987	2	Q1 MIN	Reactive power MIN, Phase 1	var
989	2	Q2 MIN	Reactive power MIN, Phase 2	var
991	2	Q3 MIN	Reactive power MIN, Phase 3	var
993	2	S1 MIN	Apparent power MIN, Phase 1	VA
995	2	S2 MIN	Apparent power MIN, Phase 2	VA
997	2	S3 MIN	Apparent power MIN, Phase 3	VA
999	2	PF1 MIN	Power factor MIN, Phase 1	%/100
1001	2	PF2 MIN	Power factor MIN, Phase 2	%/100
1003	2	PF3 MIN	Power factor MIN, Phase 3	%/100

■ TOTAL HARMONIC DISTORTION

ADDR.	WORD	ID	PARAMETER	UNIT
1281	2	THD I1	Current total harmonic distortion, Line 1	%/10
1283	2	THD I2	Current total harmonic distortion, Line 2	%/10
1285	2	THD I3	Current total harmonic distortion, Line 3	%/10
1287	2	THD IN	Neutral current total harmonic distortion	%/10
1289	2	THD U12	Delta voltage total harmonic distortion, 1 – 2	%/10
1291	2	THD U23	Delta voltage total harmonic distortion, 2 – 3	%/10
1293	2	THD U31	Delta voltage total harmonic distortion, 3 – 1	%/10
1295	2	THD U1N	Phase voltage total harmonic distortion, 1 – N (VN)	%/10
1297	2	THD U2N	Phase voltage total harmonic distortion, 2 – N (VN)	%/10
1299	2	THD U3N	Phase voltage total harmonic distortion, 3 – N (VN)	%/10

■ HARMONIC DISTORTION

ADDR.	WORD	ID	PARAMETER	UNIT
1537	1	HD I1 2	Current harmonic distortion, Line 1, 2nd	%/10
1538	1	HD I1 3	(id) 3rd	%/10
1539	1	HD I1 4	(id) 4th	%/10
1540	1	HD I1 5	(id) 5th	%/10
1541	1	HD I1 6	(id) 6th	%/10
1542	1	HD I1 7	(id) 7th	%/10
1543	1	HD I1 8	(id) 8th	%/10
1544	1	HD I1 9	(id) 9th	%/10
1545	1	HD I1 10	(id) 10th	%/10
1546	1	HD I1 11	(id) 11th	%/10
1547	1	HD I1 12	(id) 12th	%/10
1548	1	HD I1 13	(id) 13th	%/10
1549	1	HD I1 14	(id) 14th	%/10
1550	1	HD I1 15	(id) 15th	%/10
1551	1	HD I1 16	(id) 16th	%/10
1552	1	HD I1 17	(id) 17th	%/10
1553	1	HD I1 18	(id) 18th	%/10
1554	1	HD I1 19	(id) 19th	%/10
1555	1	HD I1 20	(id) 20th	%/10
1556	1	HD I1 21	(id) 21st	%/10
1557	1	HD I1 22	(id) 22nd	%/10
1558	1	HD I1 23	(id) 23rd	%/10
1559	1	HD I1 24	(id) 24th	%/10
1560	1	HD I1 25	(id) 25th	%/10
1561	1	HD I1 26	(id) 26th	%/10
1562	1	HD I1 27	(id) 27th	%/10
1563	1	HD I1 28	(id) 28th	%/10
1564	1	HD I1 29	(id) 29th	%/10
1565	1	HD I1 30	(id) 30th	%/10
1566	1	HD I1 31	(id) 31st	%/10

ADDR.	WORD	ID	PARAMETER	UNIT
1601	1	HD I2 2	Current harmonic distortion, Line 2, 2nd	%/10
1602	1	HD I2 3	(id) 3rd	%/10
1603	1	HD I2 4	(id) 4th	%/10
1604	1	HD I2 5	(id) 5th	%/10
1605	1	HD I2 6	(id) 6th	%/10
1606	1	HD I2 7	(id) 7th	%/10
1607	1	HD I2 8	(id) 8th	%/10
1608	1	HD I2 9	(id) 9th	%/10
1609	1	HD I2 10	(id) 10th	%/10
1610	1	HD I2 11	(id) 11th	%/10
1611	1	HD I2 12	(id) 12th	%/10
1612	1	HD I2 13	(id) 13th	%/10
1613	1	HD I2 14	(id) 14th	%/10
1614	1	HD I2 15	(id) 15th	%/10
1615	1	HD I2 16	(id) 16th	%/10
1616	1	HD I2 17	(id) 17th	%/10
1617	1	HD I2 18	(id) 18th	%/10
1618	1	HD I2 19	(id) 19th	%/10
1619	1	HD I2 20	(id) 20th	%/10
1620	1	HD I2 21	(id) 21st	%/10
1621	1	HD I2 22	(id) 22nd	%/10
1622	1	HD I2 23	(id) 23rd	%/10
1623	1	HD I2 24	(id) 24th	%/10
1624	1	HD I2 25	(id) 25th	%/10
1625	1	HD I2 26	(id) 26th	%/10
1626	1	HD I2 27	(id) 27th	%/10
1627	1	HD I2 28	(id) 28th	%/10
1628	1	HD I2 29	(id) 29th	%/10
1629	1	HD I2 30	(id) 30th	%/10
1630	1	HD I2 31	(id) 31st	%/10
1665	1	HD I3 2	Current harmonic distortion, Line 3, 2nd	%/10
1666	1	HD I3 3	(id) 3rd	%/10
1667	1	HD I3 4	(id) 4th	%/10
1668	1	HD I3 5	(id) 5th	%/10
1669	1	HD I3 6	(id) 6th	%/10
1670	1	HD I3 7	(id) 7th	%/10
1671	1	HD I3 8	(id) 8th	%/10
1672	1	HD I3 9	(id) 9th	%/10
1673	1	HD I3 10	(id) 10th	%/10
1674	1	HD I3 11	(id) 11th	%/10
1675	1	HD I3 12	(id) 12th	%/10
1676	1	HD I3 13	(id) 13th	%/10
1677	1	HD I3 14	(id) 14th	%/10
1678	1	HD I3 15	(id) 15th	%/10
1679	1	HD I3 16	(id) 16th	%/10
1680	1	HD I3 17	(id) 17th	%/10
1681	1	HD I3 18	(id) 18th	%/10
1682	1	HD I3 19	(id) 19th	%/10
1683	1	HD I3 20	(id) 20th	%/10
1684	1	HD I3 21	(id) 21st	%/10
1685	1	HD I3 22	(id) 22nd	%/10
1686	1	HD I3 23	(id) 23rd	%/10
1687	1	HD I3 24	(id) 24th	%/10
1688	1	HD I3 25	(id) 25th	%/10
1689	1	HD I3 26	(id) 26th	%/10
1690	1	HD I3 27	(id) 27th	%/10
1691	1	HD I3 28	(id) 28th	%/10
1692	1	HD I3 29	(id) 29th	%/10
1693	1	HD I3 30	(id) 30th	%/10
1694	1	HD I3 31	(id) 31st	%/10
1729	1	HD IN 2	Neutral current harmonic distortion, 2nd	%/10
1730	1	HD IN 3	(id) 3rd	%/10
1731	1	HD IN 4	(id) 4th	%/10
1732	1	HD IN 5	(id) 5th	%/10
1733	1	HD IN 6	(id) 6th	%/10
1734	1	HD IN 7	(id) 7th	%/10
1735	1	HD IN 8	(id) 8th	%/10
1736	1	HD IN 9	(id) 9th	%/10
1737	1	HD IN 10	(id) 10th	%/10
1738	1	HD IN 11	(id) 11th	%/10
1739	1	HD IN 12	(id) 12th	%/10

ADDR.	WORD	ID	PARAMETER	UNIT
1740	1	HD IN 13	Neutral current harmonic distortion, 13th	%/10
1741	1	HD IN 14	(id) 14th	%/10
1742	1	HD IN 15	(id) 15th	%/10
1743	1	HD IN 16	(id) 16th	%/10
1744	1	HD IN 17	(id) 17th	%/10
1745	1	HD IN 18	(id) 18th	%/10
1746	1	HD IN 19	(id) 19th	%/10
1747	1	HD IN 20	(id) 20th	%/10
1748	1	HD IN 21	(id) 21st	%/10
1749	1	HD IN 22	(id) 22nd	%/10
1750	1	HD IN 23	(id) 23rd	%/10
1751	1	HD IN 24	(id) 24th	%/10
1752	1	HD IN 25	(id) 25th	%/10
1753	1	HD IN 26	(id) 26th	%/10
1754	1	HD IN 27	(id) 27th	%/10
1755	1	HD IN 28	(id) 28th	%/10
1756	1	HD IN 29	(id) 29th	%/10
1757	1	HD IN 30	(id) 30th	%/10
1758	1	HD IN 31	(id) 31st	%/10
1793	1	HD U12 2	Delta voltage, 1 – 2, 2nd	%/10
1794	1	HD U12 3	(id) 3rd	%/10
1795	1	HD U12 4	(id) 4th	%/10
1796	1	HD U12 5	(id) 5th	%/10
1797	1	HD U12 6	(id) 6th	%/10
1798	1	HD U12 7	(id) 7th	%/10
1799	1	HD U12 8	(id) 8th	%/10
1800	1	HD U12 9	(id) 9th	%/10
1801	1	HD U12 10	(id) 10th	%/10
1802	1	HD U12 11	(id) 11th	%/10
1803	1	HD U12 12	(id) 12th	%/10
1804	1	HD U12 13	(id) 13th	%/10
1805	1	HD U12 14	(id) 14th	%/10
1806	1	HD U12 15	(id) 15th	%/10
1807	1	HD U12 16	(id) 16th	%/10
1808	1	HD U12 17	(id) 17th	%/10
1809	1	HD U12 18	(id) 18th	%/10
1810	1	HD U12 19	(id) 19th	%/10
1811	1	HD U12 20	(id) 20th	%/10
1812	1	HD U12 21	(id) 21st	%/10
1813	1	HD U12 22	(id) 22nd	%/10
1814	1	HD U12 23	(id) 23rd	%/10
1815	1	HD U12 24	(id) 24th	%/10
1816	1	HD U12 25	(id) 25th	%/10
1817	1	HD U12 26	(id) 26th	%/10
1818	1	HD U12 27	(id) 27th	%/10
1819	1	HD U12 28	(id) 28th	%/10
1820	1	HD U12 29	(id) 29th	%/10
1821	1	HD U12 30	(id) 30th	%/10
1822	1	HD U12 31	(id) 31st	%/10
1857	1	HD U23 2	Delta voltage, 2 – 3, 2nd	%/10
1858	1	HD U23 3	(id) 3rd	%/10
1859	1	HD U23 4	(id) 4th	%/10
1860	1	HD U23 5	(id) 5th	%/10
1861	1	HD U23 6	(id) 6th	%/10
1862	1	HD U23 7	(id) 7th	%/10
1863	1	HD U23 8	(id) 8th	%/10
1864	1	HD U23 9	(id) 9th	%/10
1865	1	HD U23 10	(id) 10th	%/10
1866	1	HD U23 11	(id) 11th	%/10
1867	1	HD U23 12	(id) 12th	%/10
1868	1	HD U23 13	(id) 13th	%/10
1869	1	HD U23 14	(id) 14th	%/10
1870	1	HD U23 15	(id) 15th	%/10
1871	1	HD U23 16	(id) 16th	%/10
1872	1	HD U23 17	(id) 17th	%/10
1873	1	HD U23 18	(id) 18th	%/10
1874	1	HD U23 19	(id) 19th	%/10
1875	1	HD U23 20	(id) 20th	%/10
1876	1	HD U23 21	(id) 21st	%/10
1877	1	HD U23 22	(id) 22nd	%/10
1878	1	HD U23 23	(id) 23rd	%/10

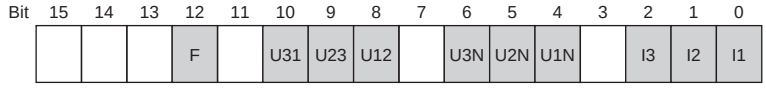
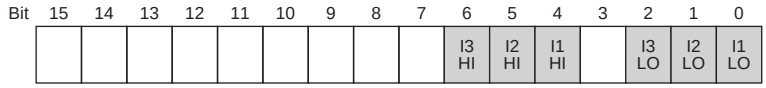
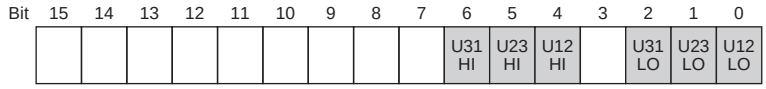
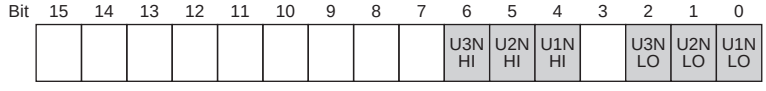
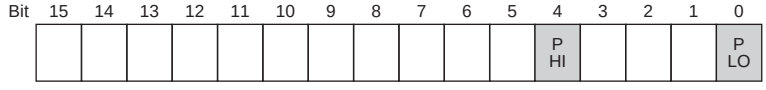
ADDR.	WORD	ID	PARAMETER	UNIT
1879	1	HD U23 24	Delta voltage, 2 – 3, 24th	%/10
1880	1	HD U23 25	(id) 25th	%/10
1881	1	HD U23 26	(id) 26th	%/10
1882	1	HD U23 27	(id) 27th	%/10
1883	1	HD U23 28	(id) 28th	%/10
1884	1	HD U23 29	(id) 29th	%/10
1885	1	HD U23 30	(id) 30th	%/10
1886	1	HD U23 31	(id) 31st	%/10
1921	1	HD U31 2	Delta voltage, 3 – 1, 2nd	%/10
1922	1	HD U31 3	(id) 3rd	%/10
1923	1	HD U31 4	(id) 4th	%/10
1924	1	HD U31 5	(id) 5th	%/10
1925	1	HD U31 6	(id) 6th	%/10
1926	1	HD U31 7	(id) 7th	%/10
1927	1	HD U31 8	(id) 8th	%/10
1928	1	HD U31 9	(id) 9th	%/10
1929	1	HD U31 10	(id) 10th	%/10
1930	1	HD U31 11	(id) 11th	%/10
1931	1	HD U31 12	(id) 12th	%/10
1932	1	HD U31 13	(id) 13th	%/10
1933	1	HD U31 14	(id) 14th	%/10
1934	1	HD U31 15	(id) 15th	%/10
1935	1	HD U31 16	(id) 16th	%/10
1936	1	HD U31 17	(id) 17th	%/10
1937	1	HD U31 18	(id) 18th	%/10
1938	1	HD U31 19	(id) 19th	%/10
1939	1	HD U31 20	(id) 20th	%/10
1940	1	HD U31 21	(id) 21st	%/10
1941	1	HD U31 22	(id) 22nd	%/10
1942	1	HD U31 23	(id) 23rd	%/10
1943	1	HD U31 24	(id) 24th	%/10
1944	1	HD U31 25	(id) 25th	%/10
1945	1	HD U31 26	(id) 26th	%/10
1946	1	HD U31 27	(id) 27th	%/10
1947	1	HD U31 28	(id) 28th	%/10
1948	1	HD U31 29	(id) 29th	%/10
1949	1	HD U31 30	(id) 30th	%/10
1950	1	HD U31 31	(id) 31st	%/10
1985	1	HD U1N 2	Phase voltage, 1 – N (VN), 2nd	%/10
1986	1	HD U1N 3	(id) 3rd	%/10
1987	1	HD U1N 4	(id) 4th	%/10
1988	1	HD U1N 5	(id) 5th	%/10
1989	1	HD U1N 6	(id) 6th	%/10
1990	1	HD U1N 7	(id) 7th	%/10
1991	1	HD U1N 8	(id) 8th	%/10
1992	1	HD U1N 9	(id) 9th	%/10
1993	1	HD U1N 10	(id) 10th	%/10
1994	1	HD U1N 11	(id) 11th	%/10
1995	1	HD U1N 12	(id) 12th	%/10
1996	1	HD U1N 13	(id) 13th	%/10
1997	1	HD U1N 14	(id) 14th	%/10
1998	1	HD U1N 15	(id) 15th	%/10
1999	1	HD U1N 16	(id) 16th	%/10
2000	1	HD U1N 17	(id) 17th	%/10
2001	1	HD U1N 18	(id) 18th	%/10
2002	1	HD U1N 19	(id) 19th	%/10
2003	1	HD U1N 20	(id) 20th	%/10
2004	1	HD U1N 21	(id) 21st	%/10
2005	1	HD U1N 22	(id) 22nd	%/10
2006	1	HD U1N 23	(id) 23rd	%/10
2007	1	HD U1N 24	(id) 24th	%/10
2008	1	HD U1N 25	(id) 25th	%/10
2009	1	HD U1N 26	(id) 26th	%/10
2010	1	HD U1N 27	(id) 27th	%/10
2011	1	HD U1N 28	(id) 28th	%/10
2012	1	HD U1N 29	(id) 29th	%/10
2013	1	HD U1N 30	(id) 30th	%/10
2014	1	HD U1N 31	(id) 31st	%/10

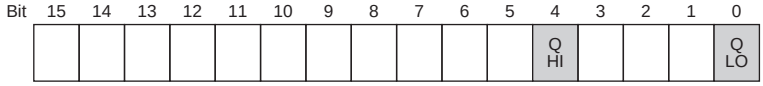
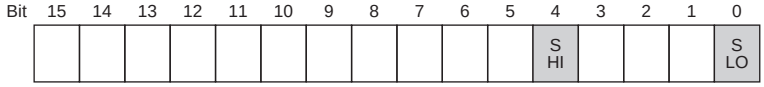
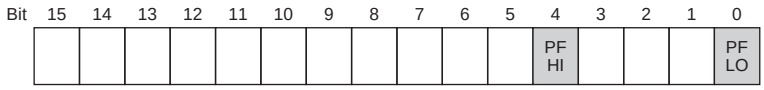
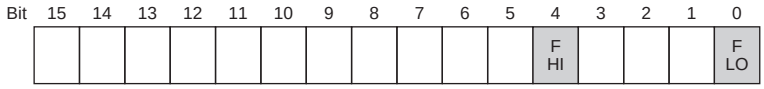
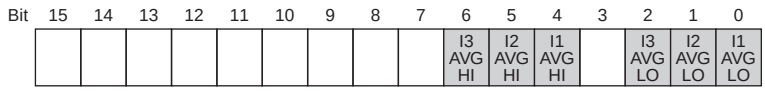
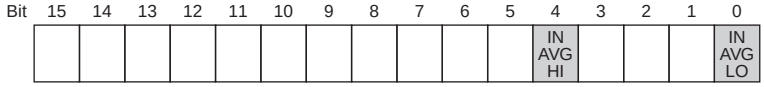
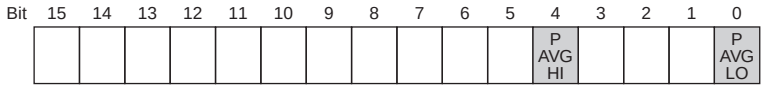
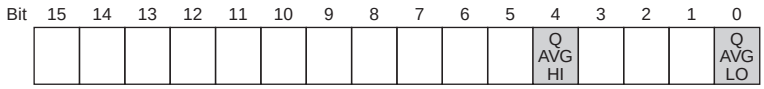
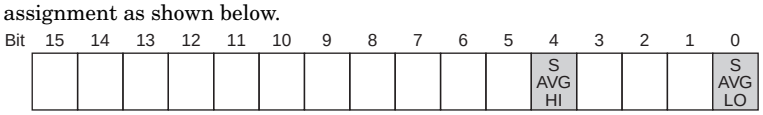
ADDR.	WORD	ID	PARAMETER	UNIT
2049	1	HD U2N 2	Phase voltage, 2 – N (VN), 2nd	%/10
2050	1	HD U2N 3	(id) 3rd	%/10
2051	1	HD U2N 4	(id) 4th	%/10
2052	1	HD U2N 5	(id) 5th	%/10
2053	1	HD U2N 6	(id) 6th	%/10
2054	1	HD U2N 7	(id) 7th	%/10
2055	1	HD U2N 8	(id) 8th	%/10
2056	1	HD U2N 9	(id) 9th	%/10
2057	1	HD U2N 10	(id) 10th	%/10
2058	1	HD U2N 11	(id) 11th	%/10
2059	1	HD U2N 12	(id) 12th	%/10
2060	1	HD U2N 13	(id) 13th	%/10
2061	1	HD U2N 14	(id) 14th	%/10
2062	1	HD U2N 15	(id) 15th	%/10
2063	1	HD U2N 16	(id) 16th	%/10
2064	1	HD U2N 17	(id) 17th	%/10
2065	1	HD U2N 18	(id) 18th	%/10
2066	1	HD U2N 19	(id) 19th	%/10
2067	1	HD U2N 20	(id) 20th	%/10
2068	1	HD U2N 21	(id) 21st	%/10
2069	1	HD U2N 22	(id) 22nd	%/10
2070	1	HD U2N 23	(id) 23rd	%/10
2071	1	HD U2N 24	(id) 24th	%/10
2072	1	HD U2N 25	(id) 25th	%/10
2073	1	HD U2N 26	(id) 26th	%/10
2074	1	HD U2N 27	(id) 27th	%/10
2075	1	HD U2N 28	(id) 28th	%/10
2076	1	HD U2N 29	(id) 29th	%/10
2077	1	HD U2N 30	(id) 30th	%/10
2078	1	HD U2N 31	(id) 31st	%/10
2113	1	HD U3N 2	Phase voltage, 3 – N (VN), 2nd	%/10
2114	1	HD U3N 3	(id) 3rd	%/10
2115	1	HD U3N 4	(id) 4th	%/10
2116	1	HD U3N 5	(id) 5th	%/10
2117	1	HD U3N 6	(id) 6th	%/10
2118	1	HD U3N 7	(id) 7th	%/10
2119	1	HD U3N 8	(id) 8th	%/10
2120	1	HD U3N 9	(id) 9th	%/10
2121	1	HD U3N 10	(id) 10th	%/10
2122	1	HD U3N 11	(id) 11th	%/10
2123	1	HD U3N 12	(id) 12th	%/10
2124	1	HD U3N 13	(id) 13th	%/10
2125	1	HD U3N 14	(id) 14th	%/10
2126	1	HD U3N 15	(id) 15th	%/10
2127	1	HD U3N 16	(id) 16th	%/10
2128	1	HD U3N 17	(id) 17th	%/10
2129	1	HD U3N 18	(id) 18th	%/10
2130	1	HD U3N 19	(id) 19th	%/10
2131	1	HD U3N 20	(id) 20th	%/10
2132	1	HD U3N 21	(id) 21st	%/10
2133	1	HD U3N 22	(id) 22nd	%/10
2134	1	HD U3N 23	(id) 23rd	%/10
2135	1	HD U3N 24	(id) 24th	%/10
2136	1	HD U3N 25	(id) 25th	%/10
2137	1	HD U3N 26	(id) 26th	%/10
2138	1	HD U3N 27	(id) 27th	%/10
2139	1	HD U3N 28	(id) 28th	%/10
2140	1	HD U3N 29	(id) 29th	%/10
2141	1	HD U3N 30	(id) 30th	%/10
2142	1	HD U3N 31	(id) 31st	%/10

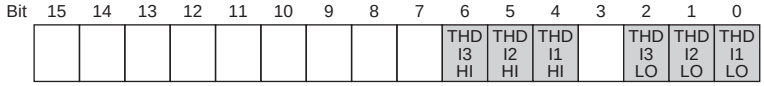
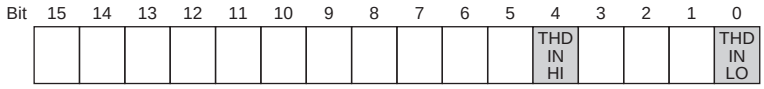
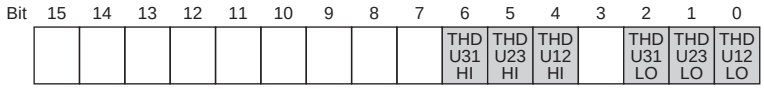
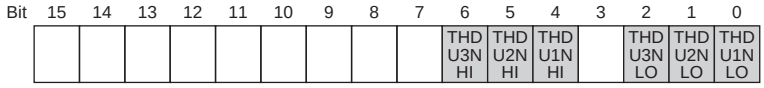
■ **DISCRETE I/O**

ADDR.	WORD	PARAMETER
3073	1	Discrete input status
3105	1	Discrete output The discrete output status can be changed by writing at this address from the host.

■ **ERROR, ALARM**

ADDR.	WORD	PARAMETER
8001	1	Overload input Bit assignment as shown below.  '1' is placed when the respective inputs are overload.
8002	1	Number of alarm trips Shows number of alarms presently triggered.
8003	1	System error Bit assignment as shown below.  PGR : Control software error FDT : Factory calibration data error SET : User setting data error ENE : Energy data error AVG : Average data error STAT : Maximum / minimum data error '1' is placed when the respective errors are detected. All measuring operations stop while one or more system errors are detected.
8004	1	Reserved
8005	1	I1 thr. I3 - Current : Alarm Bit assignment as shown below.  '1' is placed when the respective values are out of the predetermined ranges. '0' in all bits means that no alarm is tripped.
8006	1	IN - Neutral current : Alarm Bit assignment as shown below.  '1' is placed when the value is out of the predetermined range. '0' in all bits means that no alarm is tripped.
8007	1	U12 thr. U31 - Delta voltage : Alarm Bit assignment as shown below.  '1' is placed when the respective values are out of the predetermined ranges. '0' in all bits means that no alarm is tripped.
8008	1	U1N thr. U3N - Phase voltage : Alarm Bit assignment as shown below.  '1' is placed when the respective values are out of the predetermined ranges. '0' in all bits means that no alarm is tripped.
8009	1	P - Active power : Alarm Bit assignment as shown below.  '1' is placed when the value is out of the predetermined range. '0' in all bits means that no alarm is tripped.

ADDR.	WORD	PARAMETER
8010	1	Q - Reactive power : Alarm Bit assignment as shown below.  '1' is placed when the value is out of the predetermined range. '0' in all bits means that no alarm is tripped.
8011	1	S - Apparent power : Alarm Bit assignment as shown below.  '1' is placed when the value is out of the predetermined range. '0' in all bits means that no alarm is tripped.
8012	1	PF - Power factor : Alarm Bit assignment as shown below.  '1' is placed when the value is out of the predetermined range. '0' in all bits means that no alarm is tripped.
8013	1	F - Frequency : Alarm Bit assignment as shown below.  '1' is placed when the value is out of the predetermined range. '0' in all bits means that no alarm is tripped.
8014	1	I1 AVG thr. I3 AVG - Average (demand) current : Alarm Bit assignment as shown below.  '1' is placed when the respective values are out of the predetermined ranges. '0' in all bits means that no alarm is tripped.
8015	1	IN AVG - Average (demand) neutral current : Alarm Bit assignment as shown below.  '1' is placed when the value is out of the predetermined range. '0' in all bits means that no alarm is tripped.
8016	1	P AVG - Average (demand) active power : Alarm Bit assignment as shown below.  '1' is placed when the value is out of the predetermined range. '0' in all bits means that no alarm is tripped.
8017	1	Q AVG - Average (demand) reactive power : Alarm Bit assignment as shown below.  '1' is placed when the value is out of the predetermined range. '0' in all bits means that no alarm is tripped.
8018	1	S AVG - Average (demand) apparent power : Alarm Bit assignment as shown below.  '1' is placed when the value is out of the predetermined range. '0' in all bits means that no alarm is tripped.

ADDR.	WORD	PARAMETER
8019	1	THD I1 thr. THD I3 - Current total harmonic distortion : Alarm Bit assignment as shown below.  '1' is placed when the respective values are out of the predetermined ranges. '0' in all bits means that no alarm is tripped.
8020	1	THD IN - Neutral current total harmonic distortion : Alarm Bit assignment as shown below.  '1' is placed when the value is out of the predetermined range. '0' in all bits means that no alarm is tripped.
8021	1	THD U12 thr. THD U31 - Delta voltage total harmonic distortion : Alarm Bit assignment as shown below.  '1' is placed when the respective values are out of the predetermined ranges. '0' in all bits means that no alarm is tripped.
8022	1	THD U1N thr. THD U3N - Phase voltage total harmonic distortion : Alarm Bit assignment as shown below.  '1' is placed when the respective values are out of the predetermined ranges. '0' in all bits means that no alarm is tripped.

■ **ALARM HISTORY**

Latest alarm data is updated whenever a new alarm is tripped, and the second latest one is shifted to 'History 1,' the third one to 'History 2,' and so forth.

ADDR.	WORD	PARAMETER
8129	1	Latest alarm trip, parameter number 0 : I1 thr. I3 - Current 1 : IN - Neutral current 2 : U12 thr. U31 - Delta voltage 3 : U1N thr. U3N - Phase voltage 4 : P - Active power 5 : Q - Reactive power 6 : S - Apparent power 7 : PF - Power factor 8 : F - Frequency 9 : I1 AVG thr. I3 AVG - Average (demand) current 10 : IN AVG - Average (demand) neutral current 11 : P AVG - Average (demand) active power 12 : Q AVG - Average (demand) reactive power 13 : S AVG - Average (demand) apparent power 14 : THD I1 thr. THD I3 - Current total harmonic distortion 15 : THD IN - Neutral current total harmonic distortion 16 : THD U12 thr. THD U31 - Delta voltage total harmonic distortion 17 : THD U1N thr. THD U3N - Phase voltage total harmonic distortion
8130	1	Latest alarm trip, parameter point Shows which point triggered the latest alarm. Bit assignments are identical to those for 'Alarm', register address starting from 8005. For example, '0' at 'parameter number' (8128) and '1' at Bit 0 of this register address means that I1 value is lower than the low setpoint, triggering the alarm. If another point within the same parameter number goes into alarm after one (e.g. if I2 value goes above the high setpoint while I1 thr. I3 alarm is triggered), the second trip is not recorded in the history.
8131	2	Latest alarm trip, value Shows the data value at the moment of alarm.
8133	1	Alarm trip, parameter number, History 1
8134	1	Alarm trip, parameter point, History 1
8135	2	Alarm trip, value, History 1
8137	1	Alarm trip, parameter number, History 2
8138	1	Alarm trip, parameter point, History 2
8139	2	Alarm trip, value, History 2
8141	1	Alarm trip, parameter number, History 3
8142	1	Alarm trip, parameter point, History 3
8143	2	Alarm trip, value, History 3
8145	1	Alarm trip, parameter number, History 4
8146	1	Alarm trip, parameter point, History 4
8147	2	Alarm trip, value, History 4
8149	1	Alarm trip, parameter number, History 5
8150	1	Alarm trip, parameter point, History 5
8151	2	Alarm trip, value, History 5
8153	1	Alarm trip, parameter number, History 6
8154	1	Alarm trip, parameter point, History 6
8155	2	Alarm trip, value, History 6
8157	1	Alarm trip, parameter number, History 7
8158	1	Alarm trip, parameter point, History 7
8159	2	Alarm trip, value, History 7
8161	1	Alarm trip, parameter number, History 8
8162	1	Alarm trip, parameter point, History 8
8163	2	Alarm trip, value, History 8
8165	1	Alarm trip, parameter number, History 9
8166	1	Alarm trip, parameter point, History 9
8167	2	Alarm trip, value, History 9

■ **DIAGNOSTIC**

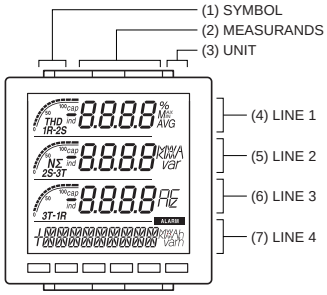
ADDR.	WORD	PARAMETER	UNIT
9201	2	Received Modbus frames	times
9203	2	Discarded Modbus frames	times
9205	2	Responded Modbus frames	times
9207	2	Responded Modbus Exception (error) frames	times
9209	2	Detected Modbus Framing Error frames	times
9211	2	Detected Modbus Overrun Error frames	times
9213	2	Detected Modbus Parity Error frames	times
9215	2	Detected Modbus CRC Error frames	times
9217	2	Processing delays	times
9219	2	Processing delay sequence number	No.

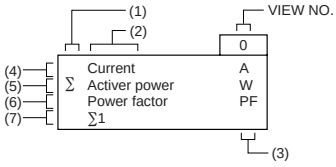
■ **DEVICE INFORMATION**

ADDR.	WORD	PARAMETER
9601	1	Device ID
9602	1	Device Version No.
9603	4	Serial No. (8-bit characters, 8 digits)
9607	8	Tag No. (8-bit characters, 16 digits)

FLOWCHART

■ **DISPLAY**



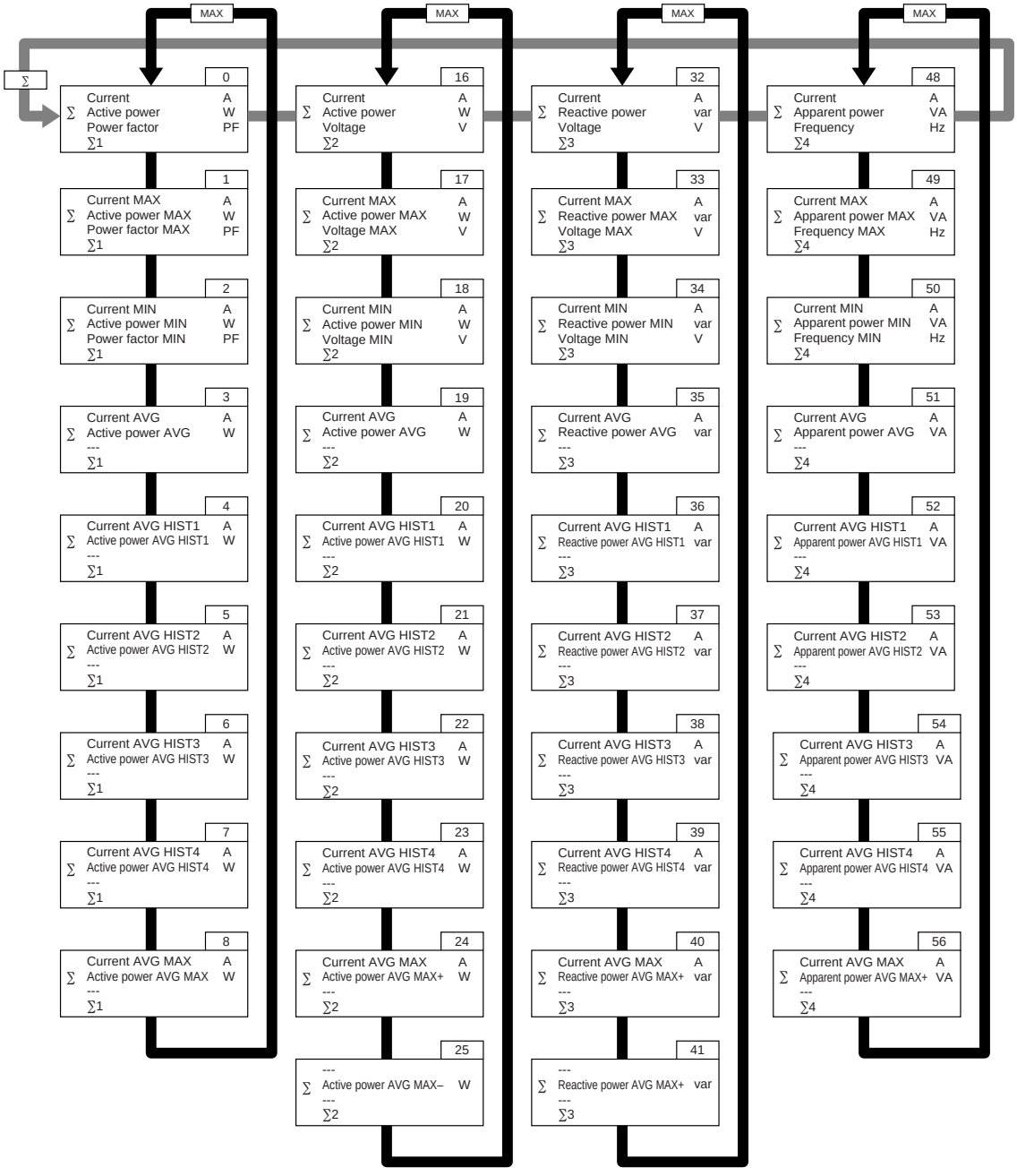


Legend
MAX : Maximum value
MIN : Minimum value
AVG : Average value (demand)
HIST : History
\+ : Incoming
– : Outgoing

■ **HOW TO SWITCH THE DISPLAY FOR LINE 1 THR. LINE 3**

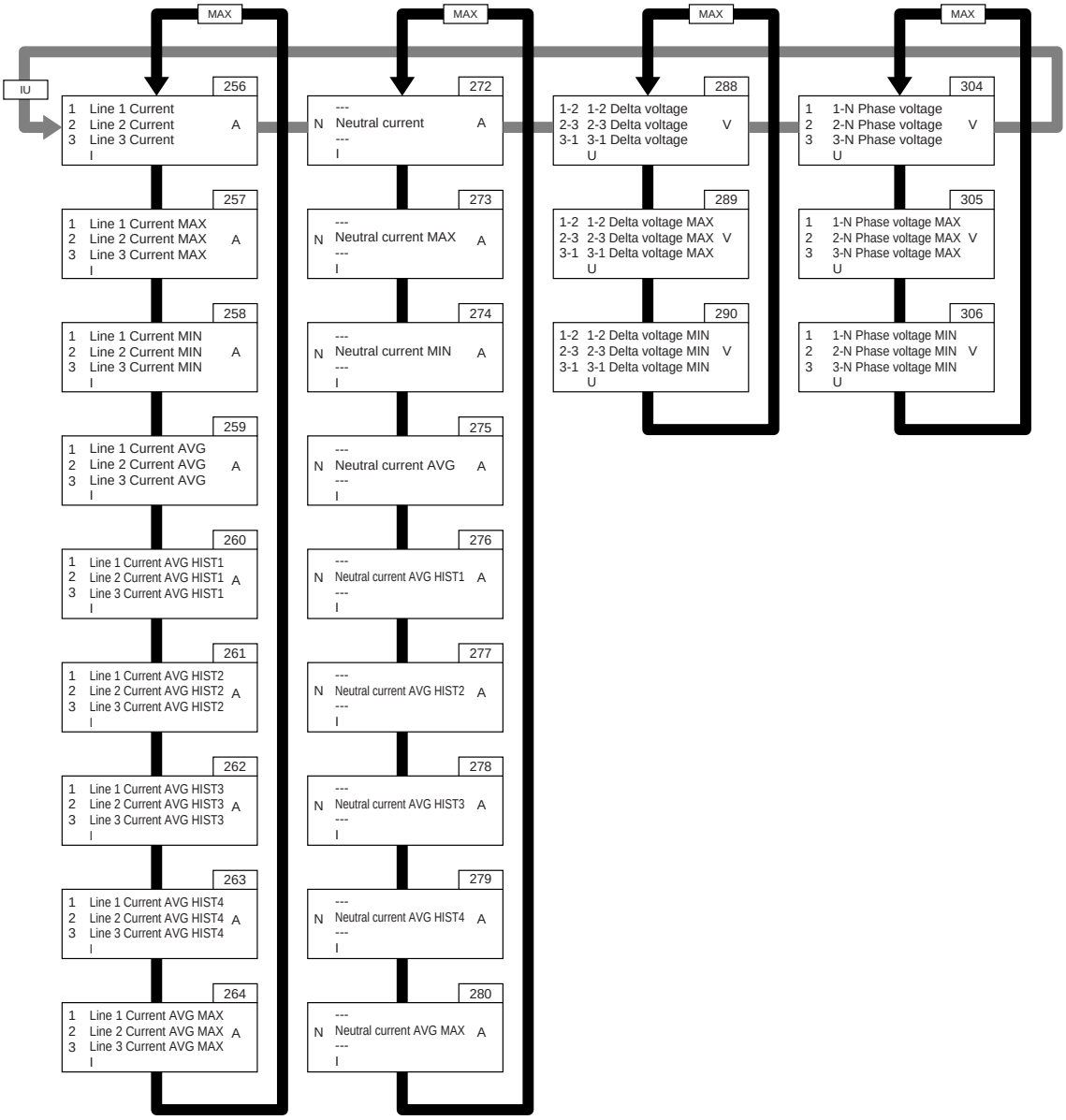
• ∑ **Setting**

Pressing [∑] while the display shows the view at the top of each group (∑1 thr. ∑4) switches it in turn from ∑1 thr. ∑4.
Pressing [∑] while it shows one of the other views switches it back to the one at the top of each group.
[Example] Pressing [∑] when the display shows the view No. 23, it switches back to No. 16.



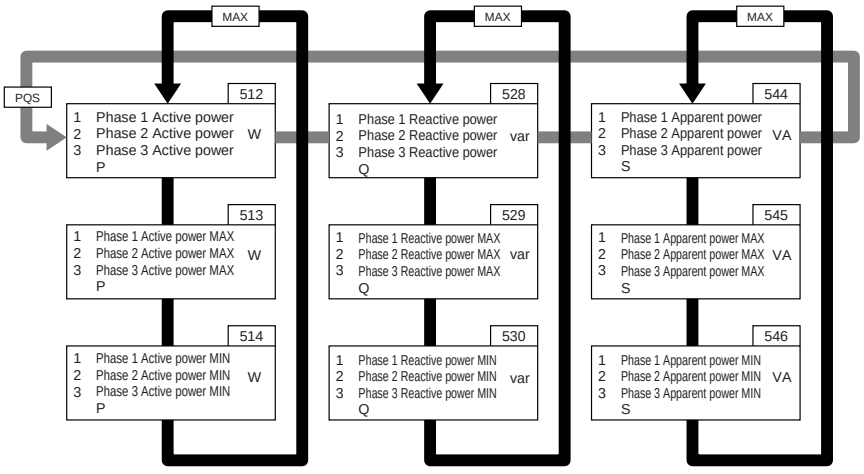
The Line 4 measurand indicated in the above flowchart is shown only for 2 seconds after the view has been switched.
After that the Line 4 display will show the measurand as specified by 'HOW TO SWITCH LINE 4 DISPLAY.'

• Voltage / Current Setting



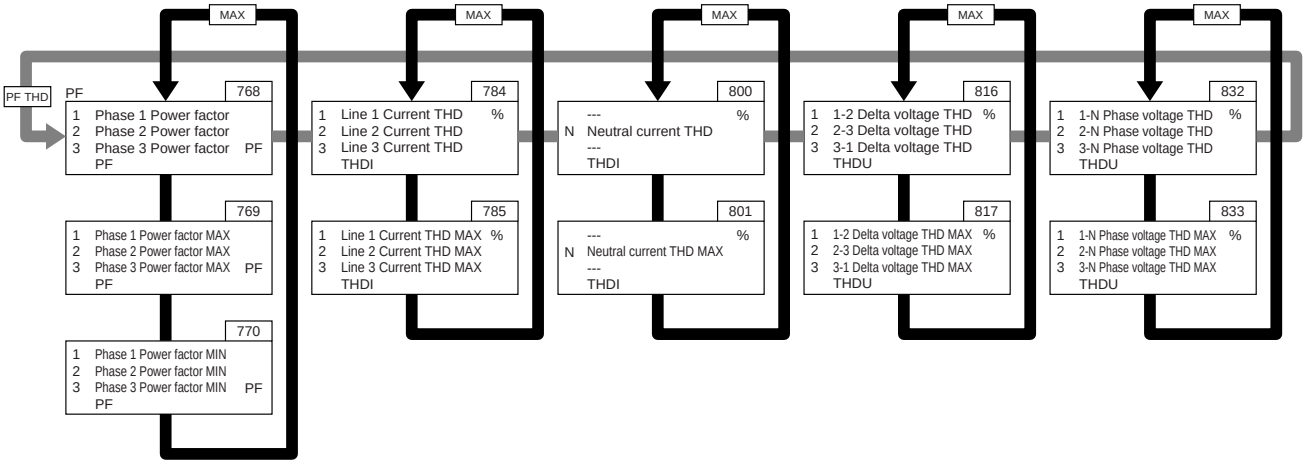
The Line 4 measurand indicated in the above flowchart is shown only for 2 seconds after the view has been switched.
After that the Line 4 display will show the measurand as specified by 'HOW TO SWITCH LINE 4 DISPLAY.'

• Power Setting



The Line 4 measurand indicated in the above flowchart is shown only for 2 seconds after the view has been switched.
After that the Line 4 display will show the measurand as specified by 'HOW TO SWITCH LINE 4 DISPLAY.'

• Power Factor / Total Harmonic Distortion Setting

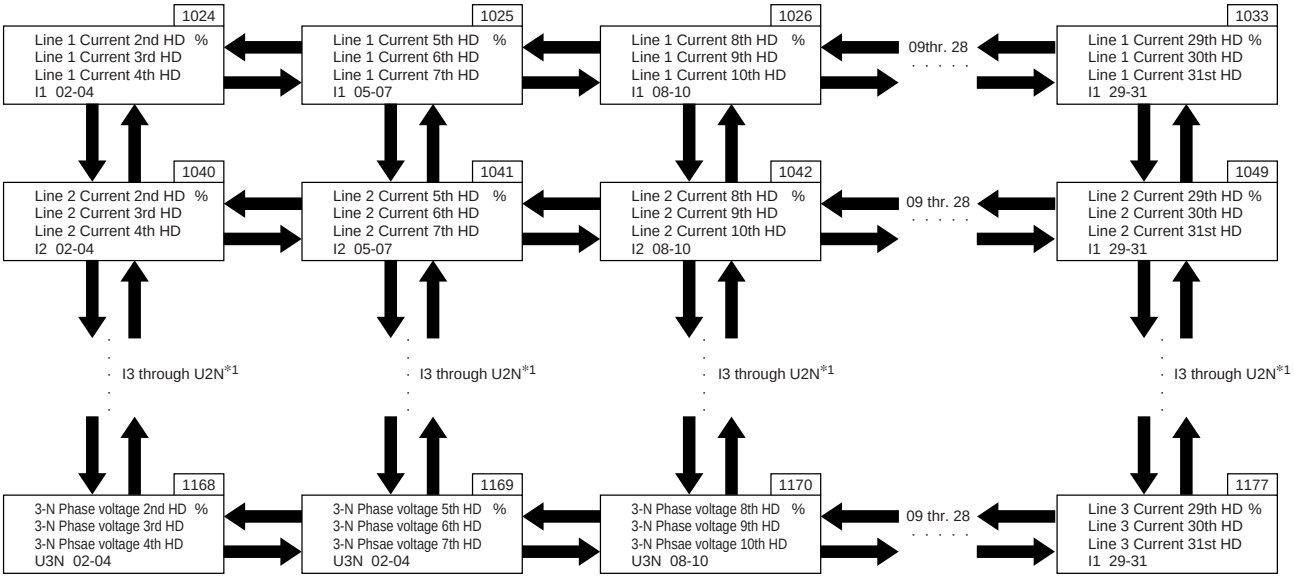


The Line 4 measurand indicated in the above flowhchart is shown only for 2 seconds after the view has been switched.
After that the Line 4 display will show the measurand as specified by 'HOW TO SWITCH LINE 4 DISPLAY.'

• Harmonic Distortion Setting

IU + PF THD Press both buttons for 1 second or longer to switch from various setting mode to the harmonic contents setting.

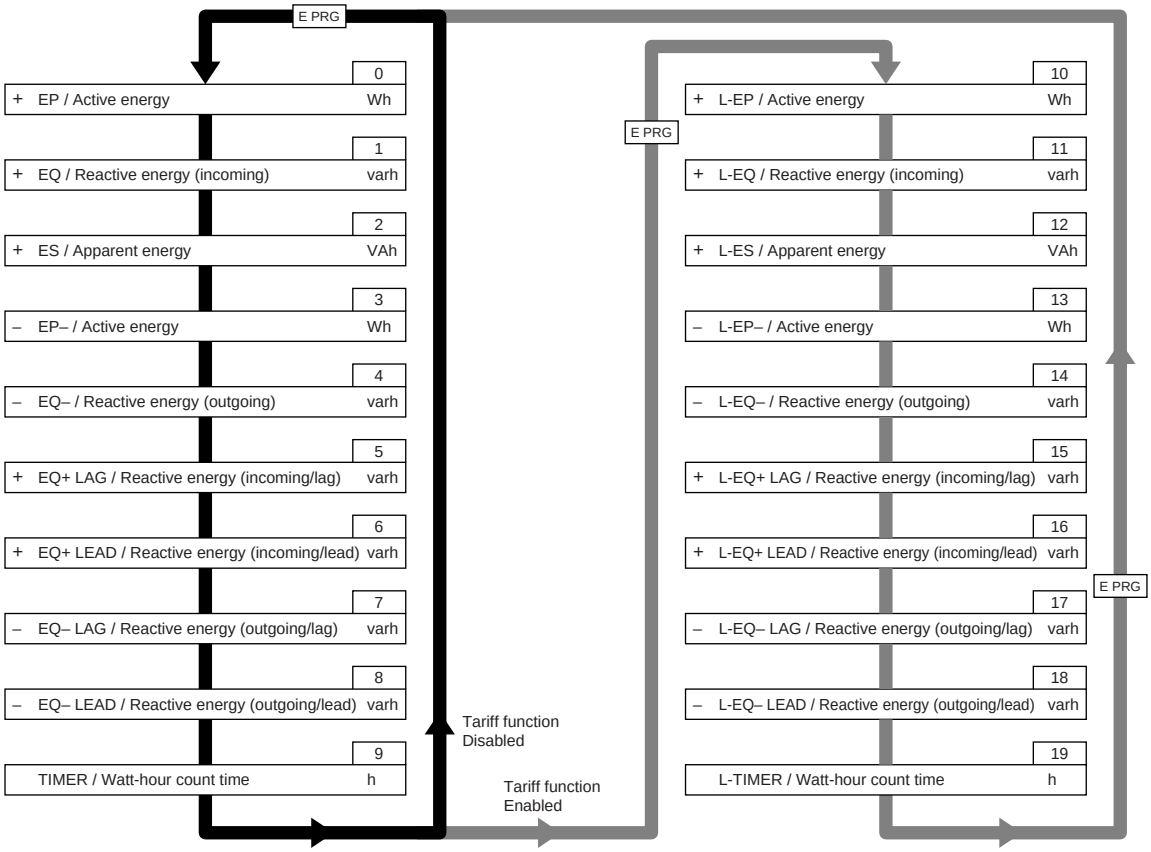
► ◄ ▲ ▼ Press triangle buttons to switch the views.



*1. I3 : Line 3 Current HD
IN : Neutral current HD
U12 : 1-2 Delta voltage HD
U23 : 2-3 Delta voltage HD
U31 : 3-1 Delta voltage HD
U1N : 1-N Phase voltage HD
U2N : 2-N Phase voltage HD

■ **HOW TO SWITCH THE DISPLAY FOR LINE 4**

∑ + E PRG Press both buttons for 1 second or longer to switch the watt-hour unit with or without 'k.'



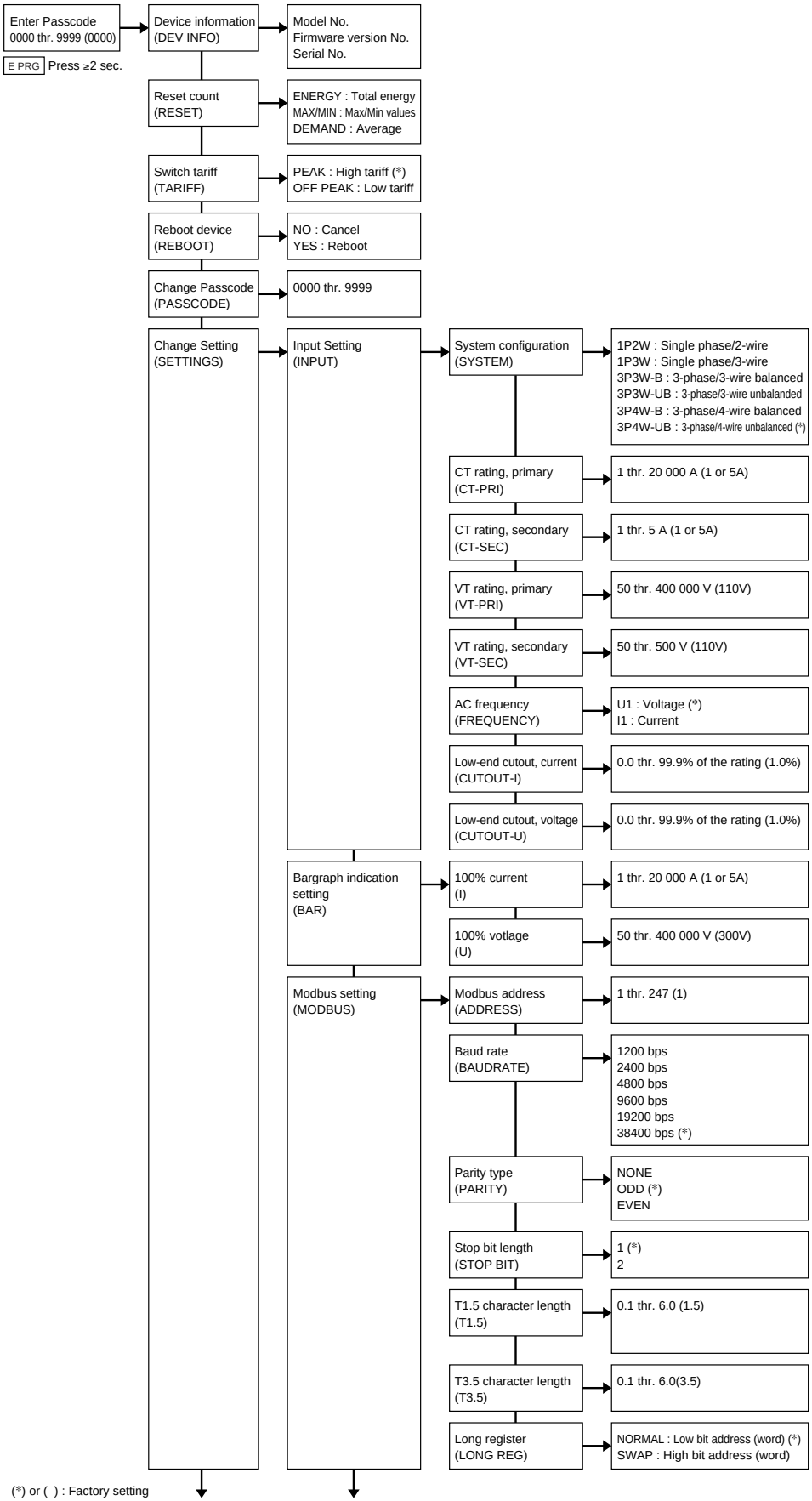
OL : Indicates Overrange Input
ERR : Indicates System Error

■ **PROGRAMMING FLOWCHART**

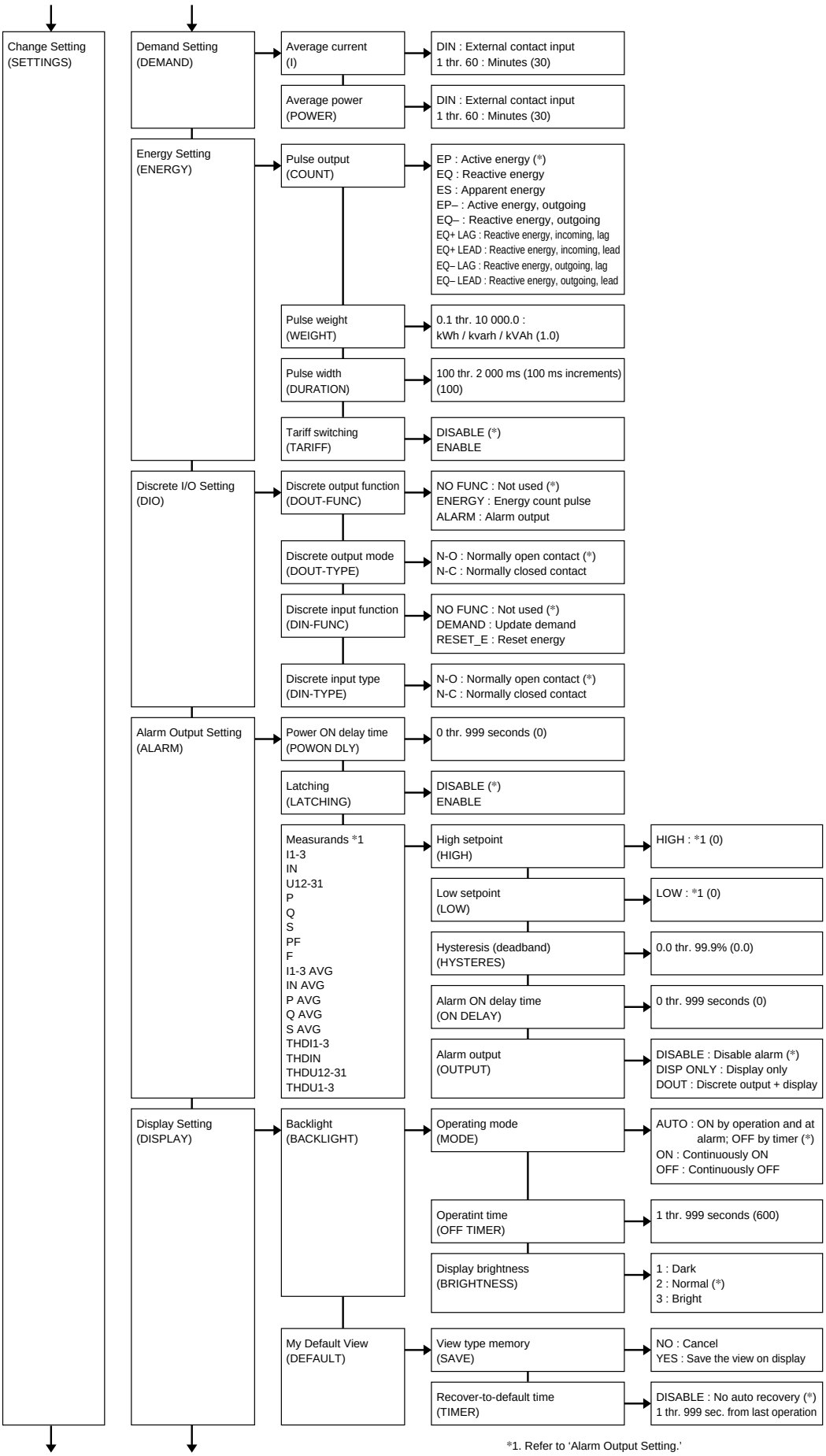
▼ ▲ : Move between menu items

ENTER : Select

ESCAPE : Go up one level in the chart

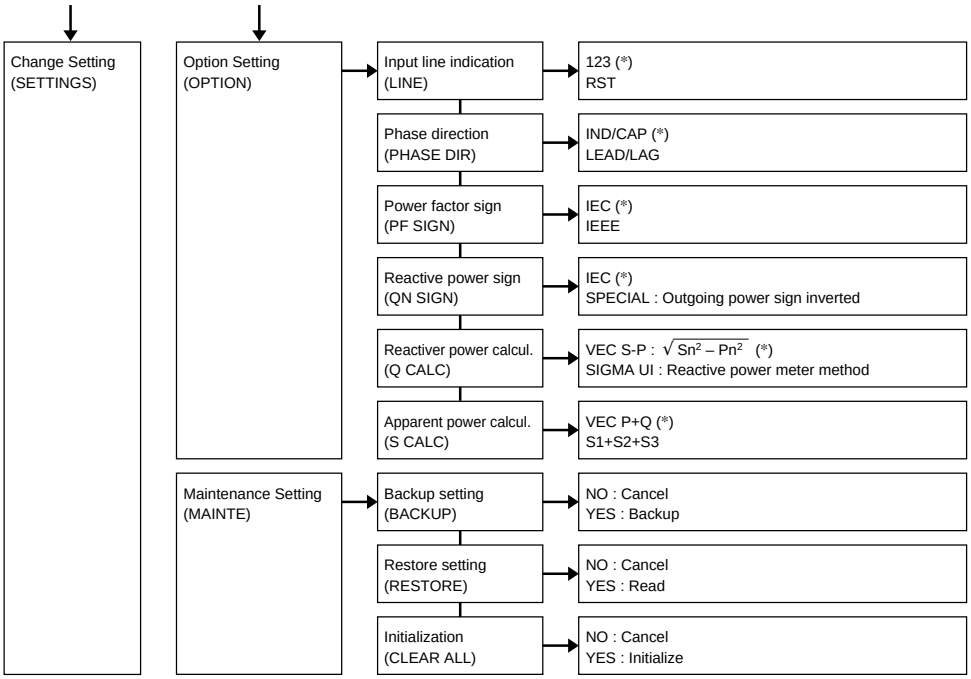


(*) or ( ) : Factory setting



*1. Refer to 'Alarm Output Setting.'
Factory setting for Frequency : HIGH = 6500, LO = 4500

(*) or ( ) : Factory setting



(*) or ( ) : Factory setting

■ **ALARM OUTPUT SETTING**

ID *1	DEFINITION	LOW SETPOINT	HIGH SETPOINT	UNIT
I1-3	Current, Line 1 thr. Line 3	0	20 000	A
IN	Neutral current	0	20 000	A
U12-31	Delta voltage, Line 1 – 2, 2 – 3, 3 – 1	0	400 000	V
U1-3	Phase voltage, Line 1 – N, 2 – N, 3 – N	0	400 000	V
P	Active power	-2 000 000 000	2 000 000 000	W
Q	Reactive power	-2 000 000 000	2 000 000 000	var
S	Apparent power	0	2 000 000 000	VA
PF	Power factor	-1.0000	1.0000	---
F	Frequency	45.00	65.00	Hz
I1-3 AVG	Average current, Line 1 thr. Line 3 (demand)	0	20 000	A
IN AVG	Average neutral current (demand)	0	20 000	A
P AVG	Average active power (demand)	-2 000 000 000	2 000 000 000	W
Q AVG	Average reactive power (demand)	-2 000 000 000	2 000 000 000	var
S AVG	Average apparent power (demand)	0	2 000 000 000	VA
THDI1-3	THD, Current, Line 1 thr. Line 3	0.0	999.9	%
THDIN	THD, Neutral current	0.0	999.9	%
THDU12-31	THD, Delta voltage, Line 1 – 2, 2 – 3, 3 – 1	0.0	999.9	%
THDU1-3	THD, Phase voltage, Line 1 – N, 2 – N, 3 – N	0.0	999.9	%

*1. Indicated while in alarm conditions.

LIGHTNING SURGE PROTECTION

In order to protect the unit from lightning surges entering through signal and power supply cables, use of appropriate lightning surge protectors are recommended. Please contact M-System.

M-System Co., Ltd., 5-2-55, Minamitsumori, Nishinari-ku, Osaka 557-0063 JAPAN, Phone: (06) 6659-8201, Fax: (06) 6659-8510, E-mail: info@m-system.co.jp