

ORDERING INFORMATION

MODEL : 54U

PLEASE FILL IN THIS SECTION



| |
|---------|
| Model |
| Company |
| Name |
| P/O No. |

FACTORY USE ONLY



| | |
|---------|-------------------------------|
| Job No. | Approved by (Sales office) |
| Ser No. | Issued by (Sales office) |
| Sales | Approved by (Factory) |
| | Set by (Factory) |
| | Ser No. |

Specify the items you want to change. Default setting will be used if not specified.

■ MODBUS SETTING *1

| ITEM | AVAILABLE VALUE | DEFAULT VALUE | SET VALUE | Factory Internal check |
|--|---|---------------|-----------|----------------------------------|
| Modbus node address | 1 to 247 | 1 | | <input type="checkbox"/> Checked |
| Transfer rate | 1200 bps 2400 bps 4800 bps 9600 bps 19200 bps 38400 bps | 38400 | | <input type="checkbox"/> Checked |
| Parity bit | None Odd Even | Odd | | <input type="checkbox"/> Checked |
| Stop bit | 1 bit 2 bits | 1 | | <input type="checkbox"/> Checked |
| T1.5 timer length | 0 to 6.0, in 0.1 increments (Modbus protocol standard: 1.5) | 1.5 | | <input type="checkbox"/> Checked |
| T3.5 timer length | 0 to 6.0, in 0.1 increments (Modbus protocol standard: 3.5) | 3.5 | | <input type="checkbox"/> Checked |
| Long register (32-bit words assignments) | Normal: (Lower digit word at the lower address) Swap: (Lower digit word at the higher address) | Normal | | <input type="checkbox"/> Checked |

*1. Setting available when Modbus is chosen for external interface code.

■ SETTING

| ITEM | AVAILABLE VALUE | DEFAULT VALUE | SET VALUE | Factory Internal check | |
|----------------------|--|---|---|------------------------|-------------------------------------|
| Input setting | Wiring configuration | 1P2W: Single-phase/2-wire 1P3W: Single-phase/3-wire 3P3W-B: 3-phase/3-wire, balanced load 3P3W-UB: 3-phase/3-wire, unbalanced load 3P4W-B: 3-phase/4-wire, balanced load 3P4W-UB: 3-phase/4-wire, unbalanced load (*) 3P3W-3CT: 3-phase/3-wire, unbalanced load (3CT) | (*) | | <input type="checkbox"/> Checked |
| | CT primary rating | 1 to 20 000 A | 1 A or 5 A | | <input type="checkbox"/> Checked |
| | VT primary rating | 50 to 400 000 V | 110 V | *4 | <input type="checkbox"/> Checked |
| | VT secondary rating | 50 to 500 V | 110 V | *4 | <input type="checkbox"/> Checked |
| | AC frequency | U1N:Voltage I1:Current | U1N | | <input type="checkbox"/> Checked |
| | Low-end cut out, current | 0.0 thr. 99.9% of the rating | 1.0 % | | <input type="checkbox"/> Checked |
| | Low-end cut out, voltage | 0.0 thr. 99.9% of the rating | 1.0 % | | <input type="checkbox"/> Checked |
| Style setting | 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) | 0 | | <input type="checkbox"/> Checked |
| | 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) | 0 | | <input type="checkbox"/> Checked |
| LCD bargraph setting | Current (I) | Maximum value:0.000 to 20 000.000 A | Input code "1" ... 1.000 A Input code "2" ... 5.000 A | | <input type="checkbox"/> Checked |
| | | Minimum value:0.000 to 20 000.000 A | 0.000 A | | <input type="checkbox"/> Checked |
| | Voltage (U) | Maximum value:0.00 to 400 000.00 V | 300.00 V | | <input type="checkbox"/> Checked |
| | | Minimum value:0.00 to 400 000.00 V | 0.00 V | | <input type="checkbox"/> Checked |
| | Active power (P) | Maximum value:0 to 2 000 000 000 | Input code "1" ... 300 W Input code "2" ... 1500 W | | <input type="checkbox"/> Checked |
| | | Minimum value:-2 000 000 000 to 2 000 000 000 | 0 W | | <input type="checkbox"/> Checked |
| | Reactive power (Q) | Maximum value:0 to 2 000 000 000 *2 | Input code "1" ... 300 var Input code "2" ... 1500 var | | <input type="checkbox"/> Checked |
| | | Minimum value:-2 000 000 000 to 2 000 000 000 | 0 var | | <input type="checkbox"/> Checked |
| | Apparent Power (S) | Maximum value:0 to 2 000 000 000 | Input code "1" ... 300 VA Input code "2" ... 1500 VA | | <input type="checkbox"/> Checked |
| | | Minimum value:0 to 2 000 000 000 | 0 VA | | <input type="checkbox"/> Checked |
| | Power factor (PF) | Maximum value:0.0000 to 1.0000 *2 | 1.0000 COSφ | | <input type="checkbox"/> Checked |
| | | Minimum value:-1.0000 to 1.0000 | 0.0000 COSφ | | <input type="checkbox"/> Checked |
| | Frequency (F) | Maximum value:45.00 to 65.00 | 65.00 Hz | | <input type="checkbox"/> Checked |
| | | Minimum value:45.00 to 65.00 | 45.00 Hz | | <input type="checkbox"/> Checked |
| | Total harmonic distortion (THD) | Maximum value:0.0 to 999.9 | 100.0 % | | <input type="checkbox"/> Checked |
| | | Minimum value:0.0 to 999.9 | 0.0 % | | <input type="checkbox"/> Checked |
| | Phase angle between voltages (PHASE DIF) | Maximum value:0 to 180 | 180 Deg *3 | | <input type="checkbox"/> Checked |
| | | Minimum value:-180 to 180 | -180 Deg *3 | | <input type="checkbox"/> Checked |

*1. System configuration factory setting

54U-1: 3P3W-UB
54U-2: 3P4W-UB

*2. Bi-directional indication is available when the maximum value is 0. Refer to "SETTING BARGRAPH INDICATION" in "SETTING EXAMPLE" section.

*3. No unit indication on the module

*4. Leave blank, when single-phase / 3-wire, phase voltage 110 V (line to line 220 V) and VT is not used.

| ITEM | | AVAILABLE VALUE | DEFAULT VALUE | SET VALUE | Factory Internal check | |
|---|---------------------------------------|-----------------------|---|-----------|----------------------------------|----------------------------------|
| Energy setting | Tariff switching | Disable (*) Enable | (*) | | <input type="checkbox"/> Checked | |
| Discrete input/output setting | Discrete output 1 (Contact output) | Function | NO FUNC:No function(*) ENERGY:Energy count pulse ALARM:Alarm output | (*) | | <input type="checkbox"/> Checked |
| | | Contact type | N-O:Normal open N-C:Normal closed | N-O | | <input type="checkbox"/> Checked |
| | Discrete output 2 (Contact output) | Function | NO FUNC:No function(*) ENERGY:Energy count pulse ALARM:Alarm output | (*) | | <input type="checkbox"/> Checked |
| | | Contact type | N-O:Normal open N-C:Normal closed | N-O | | <input type="checkbox"/> Checked |
| | Discrete input (Contact input) | Function | NO FUNC:No function(*) DEMAND:Update demand value RESET E:Reset energy count CLR ALARM:Reset alarm TARIFF:Switch tariff | (*) | | <input type="checkbox"/> Checked |
| | | Contact type | N-O:Normal open N-C:Normal closed | N-O | | <input type="checkbox"/> Checked |
| Energy setting *1 (Discrete output option) | Discrete output 1 | Energy count 1 | See Table 1. | 0 | | <input type="checkbox"/> Checked |
| | | Pulse weight | 0.1 to 10 000.0 kWh/kvarh/kVAh | 1.0 | | <input type="checkbox"/> Checked |
| | | Pulse duration | 100 to 2 000 milliseconds (in 100 msec. increments) | 100 | | <input type="checkbox"/> Checked |
| | Discrete output 2 | Energy count 2 | See Table 1. | 0 | | <input type="checkbox"/> Checked |
| | | Pulse weight | 0.1 to 10 000.0 kWh/kvarh/kVAh | 1.0 | | <input type="checkbox"/> Checked |
| | | Pulse duration | 100 to 2 000 milliseconds (in 100 msec. increments) | 100 | | <input type="checkbox"/> Checked |
| Alarm output setting *1 | Power ON delay time | | 0 thr. 999 seconds | 0 | | <input type="checkbox"/> Checked |
| | Latching | | Disable (*) Enable | (*) | | <input type="checkbox"/> Checked |
| | Measurands | Discrete Output 1 | Assigned measurand: See Table 2. | - | | <input type="checkbox"/> Checked |
| | | | High setpoint: See Table 2. | 0 | | <input type="checkbox"/> Checked |
| | | | Low setpoint: See Table 2. | 0 | | <input type="checkbox"/> Checked |
| | | | Hysteresis: 0.0 thr. 99.9% | 0.0 | | <input type="checkbox"/> Checked |
| | | | Alarm ON delay time: 0 thr. 999 seconds | 0 | | <input type="checkbox"/> Checked |
| | | | Alarm output DISABLE:Disable alarm (*) DISP ONLY:Display only DOUT1:Discrete output 1 + display | (*) | | <input type="checkbox"/> Checked |
| | Measurands | Discrete Output 2 | Assigned measurand: See Table 2. | - | | <input type="checkbox"/> Checked |
| | | | High setpoint: See Table 2. | 0 | | <input type="checkbox"/> Checked |
| | | | Low setpoint: See Table 2. | 0 | | <input type="checkbox"/> Checked |
| | | | Hysteresis: 0.0 thr. 99.9% | 0.0 | | <input type="checkbox"/> Checked |
| | | | Alarm ON delay time: 0 thr. 999 seconds | 0 | | <input type="checkbox"/> Checked |
| | | | Alarm output DISABLE:Disable alarm (*) DISP ONLY:Display only DOUT2:Discrete output 2 + display | (*) | | <input type="checkbox"/> Checked |

*1. Specify the channel which requires setting.

| ITEM | | AVAILABLE VALUE | DEFAULT VALUE | SET VALUE | Factory Internal check |
|---|---|---------------------|---|----------------------------------|----------------------------------|
| Analog output setting (Analog output option) | CH 1 | Assigned measurand | See Table 3 | - | <input type="checkbox"/> Checked |
| | | Proportional Output | Input 0% : -15.00 to +140.00% *2 | 0.00 | <input type="checkbox"/> Checked |
| | | | Output 0% : 1.6 to 22.4 mA (0.4 to 5.6 V) | 4.0(1.0) | <input type="checkbox"/> Checked |
| | | | Input 100% : -15.00 to +140.00% *2 | 100.00 | <input type="checkbox"/> Checked |
| | Output 100% : 1.6 to 22.4 mA (0.4 to 5.6 V) | | 20.0(5.0) | <input type="checkbox"/> Checked | |
| | CH 2 | Assigned measurand | See Table 3. | - | <input type="checkbox"/> Checked |
| | | Proportional Output | Input 0% : -15.00 to +140.00% *2 | 0.00 | <input type="checkbox"/> Checked |
| | | | Output 0% : 1.6 to 22.4 mA (0.4 to 5.6 V) | 4.0(1.0) | <input type="checkbox"/> Checked |
| | | | Input 100% : -15.00 to +140.00% *2 | 100.00 | <input type="checkbox"/> Checked |
| | Output 100% : 1.6 to 22.4 mA (0.4 to 5.6 V) | | 20.0(5.0) | <input type="checkbox"/> Checked | |
| | CH 3 | Assigned measurand | See Table 3. | - | <input type="checkbox"/> Checked |
| | | Proportional Output | Input 0% : -15.00 to +140.00% *2 | 0.00 | <input type="checkbox"/> Checked |
| | | | Output 0% : 1.6 to 22.4 mA (0.4 to 5.6 V) | 4.0(1.0) | <input type="checkbox"/> Checked |
| | | | Input 100% : -15.00 to +140.00% *2 | 100.00 | <input type="checkbox"/> Checked |
| | Output 100% : 1.6 to 22.4 mA (0.4 to 5.6 V) | | 20.0(5.0) | <input type="checkbox"/> Checked | |
| | CH 4 | Assigned measurand | See Table 3. | - | <input type="checkbox"/> Checked |
| | | Proportional Output | Input 0% : -15.00 to +140.00% *2 | 0.00 | <input type="checkbox"/> Checked |
| | | | Output 0% : 1.6 to 22.4 mA (0.4 to 5.6 V) | 4.0(1.0) | <input type="checkbox"/> Checked |
| | | | Input 100% : -15.00 to +140.00% *2 | 100.00 | <input type="checkbox"/> Checked |
| | Output 100% : 1.6 to 22.4 mA (0.4 to 5.6 V) | | 20.0(5.0) | <input type="checkbox"/> Checked | |

*2. Use following parameter to convert input actual value to input value [%].

For active power and reactive power

$$\text{INPUT} [\%] = \left(\frac{\text{INPUT}}{\text{ENERGY}^{(1)} \times 2} + 0.5 \right) \times 100 \quad (1) \quad \begin{array}{l} \text{P: Active power} = \text{VT primary rating} \times \text{CT primary rating} \times n \\ \text{Q: Reactive power} = \text{VT primary rating} \times \text{CT primary rating} \times n \end{array}$$

Single-phase/2-wire: $n = 1$, Single-phase/3-wire: $n = 2$, Three-phase/3-wire: $n = \frac{3}{\sqrt{3}}$, Three-phase/4-wire: $n = 3$

For apparent power

$$\text{INPUT} [\%] = \left(\frac{\text{INPUT}}{\text{ENERGY}^{(1)}} \right) \times 100 \quad (1) \quad \text{S: Apparent power} = \text{VT primary rating} \times \text{CT primary rating} \times n$$

Single-phase/2-wire: $n = 1$, Single-phase/3-wire: $n = 2$, Three-phase/3-wire: $n = \frac{3}{\sqrt{3}}$, Three-phase/4-wire: $n = 3$

(example)

Three-phase/3-wire VT 3300 V/110 V, CT 250 A/5 A
INPUT RANGE for -1000 to +1000 kW

$$\text{ENERGY "P"} = 3300 \times 250 \times \frac{3}{\sqrt{3}} = 1,428,941 = 1429 \text{ kW}$$

$$\text{INPUT } 0 [\%] = \left(\frac{-1000 \text{ kW}}{1429 \text{ kW} \times 2} + 0.5 \right) \times 100 = 15.01 [\%]$$

$$\text{INPUT } 100 [\%] = \left(\frac{1000 \text{ kW}}{1429 \text{ kW} \times 2} + 0.5 \right) \times 100 = 84.99 [\%]$$

| ITEM | | AVAILABLE VALUE | DEFAULT VALUE | SET VALUE | Factory Internal check | |
|--|---|--|---|----------------------------------|----------------------------------|----------------------------------|
| Display setting | My default view | ≥0: Save the view on display (See Table 4) -1: Σ view auto cyclic switching | 0: Σ1 | | <input type="checkbox"/> Checked | |
| | Recover to default time | 0: Disable 1 to 999: seconds | 0 | | <input type="checkbox"/> Checked | |
| | Σ view customization | Σ1 View | Choose measurands to be displayed on Line 1 See Table 5. | 1 | | <input type="checkbox"/> Checked |
| | | | Choose measurands to be displayed on Line 2 See Table 5. | 3 | | <input type="checkbox"/> Checked |
| | | | Choose measurands to be displayed on Line 3 See Table 5. | 6 | | <input type="checkbox"/> Checked |
| | | | Choose measurands to be displayed on Line 4 See Table 5. | 100 | | <input type="checkbox"/> Checked |
| | | Σ2 View | Choose measurands to be displayed on Line 1 See Table 5. | 1 | | <input type="checkbox"/> Checked |
| | | | Choose measurands to be displayed on Line 2 See Table 5. | 3 | | <input type="checkbox"/> Checked |
| | | | Choose measurands to be displayed on Line 3 See Table 5. | 2 | | <input type="checkbox"/> Checked |
| | | | Choose measurands to be displayed on Line 4 See Table 5. | 100 | | <input type="checkbox"/> Checked |
| | | Σ3 View | Choose measurands to be displayed on Line 1 See Table 5. | 1 | | <input type="checkbox"/> Checked |
| | | | Choose measurands to be displayed on Line 2 See Table 5. | 4 | | <input type="checkbox"/> Checked |
| | | | Choose measurands to be displayed on Line 3 See Table 5. | 2 | | <input type="checkbox"/> Checked |
| | | | Choose measurands to be displayed on Line 4 See Table 5. | 100 | | <input type="checkbox"/> Checked |
| | | Σ4 View | Choose measurands to be displayed on Line 1 See Table 5. | 1 | | <input type="checkbox"/> Checked |
| | | | Choose measurands to be displayed on Line 2 See Table 5. | 5 | | <input type="checkbox"/> Checked |
| | | | Choose measurands to be displayed on Line 3 See Table 5. | 7 | | <input type="checkbox"/> Checked |
| | | | Choose measurands to be displayed on Line 4 See Table 5. | 100 | | <input type="checkbox"/> Checked |
| | | Σ5 View | Choose measurands to be displayed on Line 1 See Table 5. | 3 | | <input type="checkbox"/> Checked |
| | | | Choose measurands to be displayed on Line 2 See Table 5. | 8 | | <input type="checkbox"/> Checked |
| | | | Choose measurands to be displayed on Line 3 See Table 5. | 9 | | <input type="checkbox"/> Checked |
| | | | Choose measurands to be displayed on Line 4 See Table 5. | 10 | | <input type="checkbox"/> Checked |
| | | Σ6 View | Choose measurands to be displayed on Line 1 See Table 5. | 3 | | <input type="checkbox"/> Checked |
| | | | Choose measurands to be displayed on Line 2 See Table 5. | 12 | | <input type="checkbox"/> Checked |
| | | | Choose measurands to be displayed on Line 3 See Table 5. | 13 | | <input type="checkbox"/> Checked |
| | | | Choose measurands to be displayed on Line 4 See Table 5. | 14 | | <input type="checkbox"/> Checked |
| | My default energy reading display view | Choose measurands to be displayed on Line 4 in 'my default view'. See Table 5 | 100 | | <input type="checkbox"/> Checked | |
| My default energy reading display view | 0: 0.1 kWh, 0.1 kvarh, 0.1 kVA 1: 0.1 Wh, 0.1 varh, 0.1 VA | 0 | | <input type="checkbox"/> Checked | | |

Table 1 ENERGY COUNT TYPE

| SET VALUE | ID | PARAMETER *1 |
|-----------|-----------|---|
| 0 | T-EP | Active energy, incoming (*) |
| 1 | T-EQ | Reactive energy, LAG |
| 2 | T-ES | Apparent energy |
| 3 | T-EP- | Active energy, outgoing |
| 4 | T-EQ- | Reactive energy, LEAD |
| 5 | T-EQ+LAG | Reactive energy, incoming, LAG |
| 6 | T-EQ+LEAD | Reactive energy, incoming, LEAD |
| 7 | T-EQ-LAG | Reactive energy, outgoing, LAG |
| 8 | T-EQ-LEAD | Reactive energy, outgoing, LEAD |
| 9 | ---- | Reserved. DO NOT USE. |
| 10 | T-EQ+P | Reactive energy, incoming |
| 11 | T-EQ-P | Reactive energy, outgoing |
| 12 | ---- | Reserved. DO NOT USE. |
| 13 | T-EQA | Reactive energy, (incoming + outgoing) |
| 200 | EP | Active energy, high tariff, incoming |
| 201 | EQ | Reactive energy, high tariff, LAG |
| 202 | ES | Apparent energy, high tariff |
| 203 | EP- | Active energy, high tariff, outgoing |
| 204 | EQ- | Reactive energy, high tariff, LEAD |
| 205 | EQ+LAG | Reactive energy, high tariff, incoming, LAG |
| 206 | EQ+LEAD | Reactive energy, high tariff, incoming, LEAD |
| 207 | EQ-LAG | Reactive energy, high tariff, outgoing, LAG |
| 208 | EQ-LEAD | Reactive energy, high tariff, outgoing, LEAD |
| 209 | ---- | Reserved. DO NOT USE. |
| 210 | EQ+P | Reactive energy, high tariff, incoming |
| 211 | EQ-P | Reactive energy, high tariff, outgoing |
| 212 | ---- | Reserved. DO NOT USE. |
| 213 | EQA | Reactive energy, high tariff, (incoming + outgoing) |
| 300 | L-EP | Active energy, low tariff, incoming |
| 301 | L-EQ | Reactive energy, low tariff, LAG |
| 302 | L-ES | Apparent energy, low tariff |
| 303 | L-EP- | Active energy, low tariff, outgoing |
| 304 | L-EQ- | Reactive energy, low tariff, LEAD |
| 305 | L-EQ+LAG | Reactive energy, low tariff, incoming, LAG |
| 306 | L-EQ+LEAD | Reactive energy, low tariff, incoming, LEAD |
| 307 | L-EQ-LAG | Reactive energy, low tariff, outgoing, LAG |
| 308 | L-EQ-LEAD | Reactive energy, low tariff, outgoing, LEAD |
| 309 | ---- | Reserved. DO NOT USE. |
| 310 | L-EQ+P | Reactive energy, low tariff, incoming |
| 311 | L-EQ-P | Reactive energy, low tariff, outgoing |
| 312 | ---- | Reserved. DO NOT USE. |
| 313 | L-EQA | Reactive energy low tariff, (incoming + outgoing) |

*1. When choose measurand of low, "Tariff switching" of "Energy setting" to "Enable."

Table 2 ALARM OUTPUT SETTING

| ID | DEFINITION | LOW SETPOINT | HIGH SETPOINT | UNIT |
|-----------|---|----------------|---------------|------|
| I1-3 | Current, Line 1 thr. Line 3 | 0.000 | 20 000.000 | A |
| IN | Neutral current 3P4W | 0.000 | 20 000.000 | A |
| U12-31 | Delta voltage, Line 1 - 2, 2 - 3, 3 - 1 | 0.00 | 400 000.00 | V |
| U1N-3N | Phase voltage, Phase 1 thr. Phase 3 | 0.00 | 400 000.00 | 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) | 0.000 | 20 000.000 | A |
| IN AVG | Average neutral current (demand) 3P4W | 0.000 | 20 000.000 | 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 3P4W | 0.0 | 999.9 | % |
| THDU12-31 | THD, Delta voltage, Line 1 -2, 2 - 3, 3 - 1 | 0.0 | 999.9 | % |
| THDU1N-3N | THD, Phase voltage, Phase 1 thr. Phase 3 | 0.0 | 999.9 | % |
| UT12-31 | Phase angle between voltages, Phase 1 - 2, 2 - 3, 3 - 1 | -180 | 180 | ° |

3P4W : 3-phase / 4-wire system option

Table 3 PARAMETERS TO BE ASSIGNED TO ANALOG OUTPUTS

| SYMBOL | DEFINITION |
|---------|---|
| CT1 | CT primary rating |
| VT1 | VT primary rating |
| 1P2W | Single-phase/2-wire |
| 1P3W | Single-phase/3-wire |
| 3P3W-B | 3-phase/3-wire balanced |
| 3P3W-UB | 3-phase/3-wire unbalanced |
| 3P4W-B | 3-phase/4-wire balanced |
| 3P4W-UB | 3-phase/4-wire unbalanced |
| P | CT1 × VT1 × n n=1P2W: 1, 1P3W: 2, 3P3W: $\sqrt{3}$, 3P4W: 3 |

| ID | DEFINITION | RANGE (0 to 100%) | 1P2W | 1P3W | 3P3W-B | 3P3W-UB (2CT) | 3P3W-UB (3CT) | 3P4W-B | 3P4W-UB |
|--------|--------------------------------|--------------------------|------|------|--------|---------------|---------------|--------|---------|
| NULL | Not assigned | | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ |
| I | Current | 0 to CT1 | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ |
| U | Voltage | 0 to VT1 | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ |
| P | Active power | ±P | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ |
| Q | Reactive power | ±P | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ |
| S | Apparent power | 0 to P | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ |
| PF | Power factor | -1.0000 to +1.0000 | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ |
| F | Frequency | 45.00 to 65.00 | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ |
| I1 | Current, Line 1 | 0 to CT1 | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ |
| I2 | Current, Line 2 | 0 to CT1 | | | * | * | ✓ | * | ✓ |
| I3 | Current, Line 3 | 0 to CT1 | | ✓ | * | ✓ | ✓ | * | ✓ |
| IN | Neutral current | 0 to CT1 3P4W | | ✓ | | | | | ✓ |
| U12 | Delta voltage, Line 1 – 2 | 0 to VT1 | | | ✓ | ✓ | ✓ | ✓ | ✓ |
| U23 | Delta voltage, Line 2 – 3 | 0 to VT1 | | | ✓ | ✓ | ✓ | ✓ | ✓ |
| U31 | Delta voltage, Line 3 – 1 | 0 to VT1 | | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ |
| U1N | Phase voltage, Phase 1 | 0 to VT1 | ✓ | ✓ | | | | ✓ | ✓ |
| U2N | Phase voltage, Phase 2 | 0 to VT1 | | | | | | * | ✓ |
| U3N | Phase voltage, Phase 3 | 0 to VT1 | | ✓ | | | | * | ✓ |
| P1 | Active power, Phase 1 | ±(VT1 × CT1) | ✓ | ✓ | | | | ✓ | ✓ |
| P2 | Active power, Phase 2 | ±(VT1 × CT1) | | | | | | * | ✓ |
| P3 | Active power, Phase 3 | ±(VT1 × CT1) | | ✓ | | | | * | ✓ |
| Q1 | Reactive power, Phase 1 | ±(VT1 × CT 1) | ✓ | ✓ | | | | ✓ | ✓ |
| Q2 | Reactive power, Phase 2 | ±(VT1 × CT) | | | | | | * | ✓ |
| Q3 | Reactive power, Phase 3 | ±(VT × CT) | | ✓ | | | | * | ✓ |
| S1 | Apparent power, Phase 1 | 0 to (VT1 × CT1) | ✓ | ✓ | | | | ✓ | ✓ |
| S2 | Apparent power, Phase 2 | 0 to (VT1 × CT1) | | | | | | * | ✓ |
| S3 | Apparent power, Phase 3 | 0 to (VT1 × CT1) | | ✓ | | | | * | ✓ |
| PF1 | Power factor, Phase 1 | -1.0000 to +1.0000 | ✓ | ✓ | | | | ✓ | ✓ |
| PF2 | Power factor, Phase 2 | -1.0000 to +1.0000 | | | | | | * | ✓ |
| PF3 | Power factor, Phase 3 | -1.0000 to +1.0000 | | ✓ | | | | * | ✓ |
| THDI1 | THD, Current, Line 1 | 0.0 to 100.0 | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ |
| THDI2 | THD, Current, Line 2 | 0.0 to 100.0 | | | | * | ✓ | | ✓ |
| THDI3 | THD, Current, Line 3 | 0.0 to 100.0 | | ✓ | | ✓ | ✓ | | ✓ |
| THDIN | THD, Neutral current | 0.0 to 100.0 3P4W | | ✓ | | | | | ✓ |
| THDU12 | THD, Delta voltage, Line 1 – 2 | 0.0 to 100.0 | | | ✓ | ✓ | ✓ | ✓ | ✓ |
| THDU23 | THD, Delta voltage, Line 2 – 3 | 0.0 to 100.0 | | | ✓ | ✓ | ✓ | ✓ | ✓ |
| THDU31 | THD, Delta voltage, Line 3 – 1 | 0.0 to 100.0 | | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ |
| THDU1N | THD, Phase voltage, Phase 1 | 0.0 to 100.0 | ✓ | ✓ | | | | ✓ | ✓ |
| THDU2N | THD, Phase voltage, Phase 2 | 0.0 to 100.0 | | | | | | ✓ | ✓ |
| THDU3N | THD, Phase voltage, Phase 3 | 0.0 to 100.0 | | ✓ | | | | ✓ | ✓ |

| ID | DEFINITION | RANGE (0 to 100%) | 1P2W | 1P3W | 3P3W-B | 3P3W-UB (2CT) | 3P3W-UB (3CT) | 3P4W-B | 3P4W-UB |
|------|--|-------------------|------|------|--------|---------------|---------------|--------|---------|
| T-Q | Reactive power for bidirectional current | | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ |
| T-PF | Power factor for bidirectional current | | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ |

✓: Measurable

*: Measured values calculated from the other inputs are calculated.

Table 4 MY DEFAULT VIEW

| SETVALUE | ID | LINE1 | LINE2 | LINE3 |
|----------|------|-----------------------------|------------------------|------------------------|
| 0 | Σ1 | See 'Σ view customization.' | | |
| 16 | Σ2 | | | |
| 32 | Σ3 | | | |
| 48 | Σ4 | | | |
| 64 | Σ5 | | | |
| 80 | Σ6 | | | |
| 256 | I | Line 1 Current | Line 2 Current | Line 3 Current |
| 272 | I | --- | Neutral current | --- |
| 288 | U | 1-2 Delta voltage | 2-3 Delta voltage | 3-1 Delta voltage |
| 304 | U | 1-N Phase voltage | 2-N Phase voltage | 3-N Phase voltage |
| 320 | U | 1-2 Phase angle | 2-3 Phase angle | 3-1 Phase angle |
| 512 | P | Phase 1 Active power | Phase 2 Active power | Phase 3 Active power |
| 528 | Q | Phase 1 Reactive power | Phase 2 Reactive power | Phase 3 Reactive power |
| 544 | S | Phase 1 Apparent power | Phase 2 Apparent power | Phase 3 Apparent power |
| 768 | PF | Phase 1 Power factor | Phase 2 Power factor | Phase 3 Power factor |
| 784 | THDI | Line 1 Current THD | Line 2 Current THD | Line 3 Current THD |
| 800 | THDI | --- | Neutral current THD | --- |
| 816 | THDU | 1-2 Delta voltage THD | 2-3 Delta voltage THD | 3-1 Delta voltage THD |
| 832 | THDU | 1-N Phase voltage THD | 2-N Phase voltage THD | 3-N Phase voltage THD |

Table 5 Σ VIEW MEASURANDS

| Σ view PRMTR | BASIC PARAMETER | EXTENSION | | | | | | | | |
|-----------------|----------------------------------|-----------|-----|-----|-----------|-----------|-----------|-----------|---------|---------------|
| | | MAX | MIN | AVE | AVE HIST1 | AVE HIST2 | AVE HIST3 | AVE HIST4 | MAX AVE | MAX AVE (out) |
| 0 | Not assigned | | | | | | | | | |
| 1 | Current | X | X | X | X | X | X | X | X | |
| 2 | Voltage | X | X | X | | | | | | |
| 3 | Active power | X | X | X | X | X | X | X | X | X |
| 4 | Reactive power | X | X | X | X | X | X | X | X | X |
| 5 | Apparent power | X | X | X | X | X | X | X | X | |
| 6 | Power factor | X | X | | | | | | | |
| 7 | Frequency | X | X | | | | | | | |
| 8 | Current, Line 1 | X | X | X | X | X | X | X | X | |
| 9 | Current, Line 2 | X | X | X | X | X | X | X | X | |
| 10 | Current, Line 3 | X | X | X | X | X | X | X | X | |
| 11 | Neutral current 3P4W | X | X | X | X | X | X | X | X | |
| 12 | Delta voltage, 1 - 2 | X | X | | | | | | | |
| 13 | Delta voltage, 2 - 3 | X | X | | | | | | | |
| 14 | Delta voltage, 3 - 1 | X | X | | | | | | | |
| 15 | Phase voltage, Phase 1 | X | X | | | | | | | |
| 16 | Phase voltage, Phase 2 | X | X | | | | | | | |
| 17 | Phase voltage, Phase 3 | X | X | | | | | | | |
| 18 | Active power, Phase 1 | X | X | | | | | | | |
| 19 | Active power, Phase 2 | X | X | | | | | | | |
| 20 | Active power, Phase 3 | X | X | | | | | | | |
| 21 | Reactive power, Phase 1 | X | X | | | | | | | |
| 22 | Reactive power, Phase 2 | X | X | | | | | | | |
| 23 | Reactive power, Phase 3 | X | X | | | | | | | |
| 24 | Apparent power, Phase 1 | X | X | | | | | | | |
| 25 | Apparent power, Phase 2 | X | X | | | | | | | |
| 26 | Apparent power, Phase 3 | X | X | | | | | | | |
| 27 | Power factor, Phase 1 | X | X | | | | | | | |
| 28 | Power factor, Phase 2 | X | X | | | | | | | |
| 29 | Power factor, Phase 3 | X | X | | | | | | | |
| 30 | THD, Current, Line 1 | X | | | | | | | | |
| 31 | THD, Current, Line 2 | X | | | | | | | | |
| 32 | THD, Current, Line 3 | X | | | | | | | | |
| 33 | THD, Neutral current 3P4W | X | | | | | | | | |
| 34 | THD, Delta voltage, 1 - 2 | X | | | | | | | | |
| 35 | THD, Delta voltage, 2 - 3 | X | | | | | | | | |
| 36 | THD, Delta voltage, 3 - 1 | X | | | | | | | | |

| Σ view PRMTR | BASIC PARAMETER | EXTENSION | | | | | | | | |
|------------------------|---|-----------|-----|-----|-----------|-----------|-----------|-----------|---------|---------------|
| | | MAX | MIN | AVE | AVE HIST1 | AVE HIST2 | AVE HIST3 | AVE HIST4 | MAX AVE | MAX AVE (out) |
| 37 | THD, Phase voltage, Phase 1 | X | | | | | | | | |
| 38 | THD, Phase voltage, Phase 2 | X | | | | | | | | |
| 39 | THD, Phase voltage, Phase 3 | X | | | | | | | | |
| 40 | Phase angle between phase voltages, 1 - 2 | | | | | | | | | |
| 41 | Phase angle between phase voltages, 2 - 3 | | | | | | | | | |
| 42 | Phase angle between phase voltages, 3 - 1 | | | | | | | | | |
| 100 | Active energy, high tariff, incoming | | | | | | | | | |
| 101 | Reactive energy, high tariff, LAG | | | | | | | | | |
| 102 | Apparent energy, high tariff | | | | | | | | | |
| 103 | Active energy, high tariff, outgoing | | | | | | | | | |
| 104 | Reactive energy, high tariff, LEAD | | | | | | | | | |
| 105 | Reactive energy, high tariff, incoming/LAG | | | | | | | | | |
| 106 | Reactive energy, high tariff, incoming/LEAD | | | | | | | | | |
| 107 | Reactive energy, high tariff, outgoing/LAG | | | | | | | | | |
| 108 | Reactive energy, high tariff, outgoing/LEAD | | | | | | | | | |
| 109 | Energy count time, high tariff | | | | | | | | | |
| 110 | Active energy, low tariff, incoming | | | | | | | | | |
| 111 | Reactive energy, low tariff, LAG | | | | | | | | | |
| 112 | Apparent energy, low tariff | | | | | | | | | |
| 113 | Active energy, low tariff, outgoing | | | | | | | | | |
| 114 | Reactive energy, low tariff, LEAD | | | | | | | | | |
| 115 | Reactive energy, low tariff, incoming/LAG | | | | | | | | | |
| 116 | Reactive energy, low tariff, incoming/LEAD | | | | | | | | | |
| 117 | Reactive energy, low tariff, outgoing/LAG | | | | | | | | | |
| 118 | Reactive energy, low tariff, outgoing/LEAD | | | | | | | | | |
| 119 | Energy count time, low tariff | | | | | | | | | |
| 210 | Reactive energy, high tariff, incoming | | | | | | | | | |
| 211 | Reactive energy, high tariff, outgoing | | | | | | | | | |
| 212 | Active energy, high tariff, incoming - outgoing | | | | | | | | | |
| 213 | Reactive energy, high tariff, incoming + outgoing | | | | | | | | | |
| 310 | Reactive energy, low tariff, incoming | | | | | | | | | |
| 311 | Reactive energy, low tariff, outgoing | | | | | | | | | |
| 312 | Active energy, low tariff, incoming - outgoing | | | | | | | | | |
| 313 | Reactive energy, low tariff, incoming + outgoing | | | | | | | | | |

Note1. The parameters 100 through 313 are available only on the line 4. These parameters have no extension.

Note2. When choose measurand of low, "Tariff switching" of "Energy setting" to "Enable."

3P4W:3-phase/4-wire system option

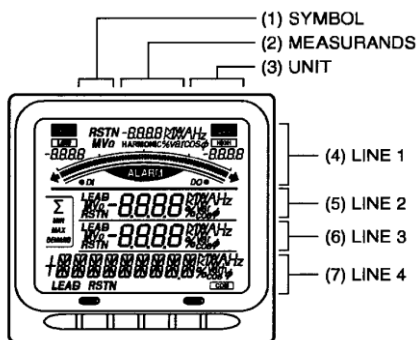


Fig.1 Σ View