Introduction

Thank you for purchasing the PR300 Power and Energy Meter. This manual provides information about the procedure for installing, wiring and operating the PR300 Power and Energy Meter, as well as precautions for handling the product. Read this manual carefully before use, in order to use the product correctly and safely. (Record the parameter settings of the PR300 on MEMO column in Appendix 4, “Parameter List” of this manual.)

- Intended Readers
  This manual is intended for personnel in charge of the installation and wiring, instrumentation and control equipment, maintenance of equipment, and operation and monitoring.

- Related Documents
  The following user's manuals all relate to the PR300 Power and Energy Meter. Read them as necessary.

Printed manuals

| Model PR300 Power and Energy Meter Startup Manual <Installation> | Document number: IM 77C01E01-02E |
| Model PR300 Power and Energy Meter Startup Manual <Initial Setup Operations> | Document number: IM 77C01E01-03E |

Electronic manual (PDF file)

| Model PR300 Power and Energy Meter Communication Interface User’s Manual (RS-485 and Ethernet Communications) | Document number: IM 77C01E01-10E |

- Notes on This Manual
  - The contents of this manual are subject to change without prior notice for reasons of performance and/or functional enhancements.
  - Every effort has been made to ensure accuracy in the preparation of this manual. Should any errors or omissions come to your attention however, please contact your nearest Yokogawa branch or sales office.
  - Reprinting and reproducing the contents of this manual either in part or in their entirety, is prohibited without the prior consent of Yokogawa.
  - The document concerning TCP/IP software has been created by Yokogawa based on the BSD Networking Software, Release 1 that has been licensed from the University of California.

- Trademark
  - All the brands or names of Yokogawa Electric's products used in this manual are either trademarks or registered trademarks of Yokogawa Electric Corporation.
  - Ethernet is a registered trademark of XEROX Corporation in the United States.
  - Company and product names that appear in this manual are trademarks or registered trademarks of their respective holders.

- Documentation Conventions
  - Symbols
    - Symbols Used in the Main Text
      - NOTE Draws attention to information that is essential to understanding the operation and/or features of the product.
      - TIP Gives additional information to complement the present topic.
      - See Also Gives reference locations for further information on the topic.

- Description of Displays
  - (1) Some of the representations of product displays shown in this manual may be exaggerated, simplified, or partially omitted for reasons of convenience when explaining them.
  - (2) Figures and illustrations representing the PR300’s displays may differ from the real displays in regard to the position and/or indicated characters (uppercase or lowercase, for example), the extent of difference does not impair a correct understanding of the functions and the proper operations and monitoring of the system.

- Revision Information
  - 1st Edition: April, 2006
  - 2nd Edition: August, 2006
  - 4th Edition: June 2008
  - 5th Edition: September, 2017
Notices

Regarding This User’s Manual

• This manual should be passed on to the end user. Keep the manual in a safe place.
• Read this manual carefully to gain a thorough understanding of how to operate this product before you start using it.
• This manual is intended to describe the functions of this product. Yokogawa Electric Corporation (hereinafter referred to as Yokogawa) does not guarantee that these functions are suited to the particular purpose of the user.
• Under absolutely no circumstances may the contents of this manual, in part or in whole, be transcribed or reproduced without prior consent.
• The contents of this manual are subject to change without prior notice.
• Every effort has been made to ensure accuracy in the preparation of this manual. Should any errors or omissions come to your attention however, please contact your nearest Yokogawa representative or our sales office.

Regarding Protection, Safety, and Prohibition Against Unauthorized Modification

• In order to protect the product and the system controlled by it against damage and ensure its safe use, be certain to strictly adhere to all of the instructions and precautions relating to safety contained in this document. Yokogawa does not guarantee safety if products are not handled according to these instructions.
• The following safety symbols are used on the product and/or in this manual.

Symbols Used on the Product and in This Manual

⚠ This symbol on the product indicates that the operator must refer to an explanation in the user’s manual in order to avoid the risk of injury or death of personnel or damage to the instrument. The manual describes how the operator should exercise special care to avoid electric shock, electrocution or other dangers that may result in injury or loss of life.

Protective Grounding Terminal
This symbol indicates that the terminal must be connected to ground prior to operating the equipment.

⚠ CAUTION

○ Power supply
  Check that the voltage of the power supply agrees with the rated supply voltage of the Meter.
○ Protective grounding
  To avoid electric shock, be sure to provide protective grounding before turning on the Meter.
○ Need for protective grounding
  Do not cut the internal or external protective grounding conductor of the Meter or disconnect the conductor from the protective grounding terminal. In either case, the protective functions of the Meter will become ineffective, resulting in a hazardous situation.
○ Defect of protective grounding
  If the protective functions of protective grounding or fuses are assumed to be defective, do not operate the Meter. Before putting the Meter into operation, check that the protective functions are normal.
○ Use in a gaseous environment
  Do not put the Meter in operation in a location where any combustible or explosive gases or fumes are present. It is extremely dangerous to use the Meter under such conditions.
○ Removal of casing
  No person except Yokogawa service personnel is allowed to remove the casing. Removing the casing is hazardous since the Meter contains high-voltage parts.
○ External wiring
  Securely provide protective grounding before wiring the Meter to the measuring object or external control circuit.
○ Damage to protective construction
  Operating the Meter in a way not described in this manual may impair the protective construction of the Meter.
**Force Majeure**

- Yokogawa does not make any warranties regarding the product except those mentioned in the WARRANTY that is provided separately.
- Yokogawa assumes no liability to any party for any loss or damage, direct or indirect, caused by the use or any unpredictable defect of the product.
- Be sure to use the spare parts approved by Yokogawa when replacing parts or consumables.
- Modification of the product is strictly prohibited.
- Reverse engineering such as the disassembly or decompilation of the product is strictly prohibited.
- No portion of the product supplied by Yokogawa may be transferred, exchanged, leased, or sublet for use by any third party without the prior permission of Yokogawa.

**Checking the Package**

Verify the package as explained below before starting to use the product. Should the delivered product be wrong or the package be missing any item, contact the vendor from which you purchased the product.

**Checking the Model and Suffix Codes**

The PR300 bears a nameplate. Confirm that “MODEL” and “SUFFIX” (suffix codes) shown on the nameplate agree with those of the product ordered.

<table>
<thead>
<tr>
<th>Model</th>
<th>Suffix Codes</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>PR300</td>
<td>-3</td>
<td>Power and Energy Meter</td>
</tr>
<tr>
<td>Phase and wire system</td>
<td>-3</td>
<td>Universal three-phase three-wire system (single-phase two-wire, single-phase three-wire, and three-phase three-wire systems)</td>
</tr>
<tr>
<td></td>
<td>-4</td>
<td>Universal three-phase four-wire system (single-phase two-wire, single-phase three-wire, and three-phase three-wire, and three-phase four-wire systems)</td>
</tr>
<tr>
<td></td>
<td>-5</td>
<td>Three-phase four-wire system (2.5 element) *1</td>
</tr>
<tr>
<td>Input voltage/input current</td>
<td>1</td>
<td>Universal voltage input *2 (150 V, 300 V, 600 V) / 1 A</td>
</tr>
<tr>
<td></td>
<td>2</td>
<td>Universal voltage input *2 (150 V, 300 V, 600 V) / 5 A</td>
</tr>
<tr>
<td>Additional input and output function</td>
<td>1</td>
<td>1 digital input</td>
</tr>
<tr>
<td></td>
<td>2</td>
<td>1 digital input, 1 analog output</td>
</tr>
<tr>
<td></td>
<td>3</td>
<td>1 digital input, 1 pulse output</td>
</tr>
<tr>
<td>Communication function</td>
<td>0</td>
<td>RS-485 communication</td>
</tr>
<tr>
<td></td>
<td>3</td>
<td>RS-485 communication, Ethernet communication *3</td>
</tr>
<tr>
<td>Optional measuring function</td>
<td>0</td>
<td>None</td>
</tr>
<tr>
<td></td>
<td>3</td>
<td>Demand measurement (1 demand alarm output)</td>
</tr>
<tr>
<td>Power supply</td>
<td>-6</td>
<td>100-240 V AC ±10% (50/60 Hz) or 130-300 V DC ±15%</td>
</tr>
<tr>
<td>Phase indication format</td>
<td>A</td>
<td>A, B, and C indications</td>
</tr>
<tr>
<td></td>
<td>R</td>
<td>R, S, and T indications</td>
</tr>
<tr>
<td></td>
<td>-0</td>
<td>Always 0</td>
</tr>
</tbody>
</table>

*1 Can be used only when the voltage is in a state of equilibrium.
In cases where “Three-phase four-wire system (2.5 element)” is specified, the input current specification of 1 A AC is not applicable.

*2 Set the voltage range (150 V, 300 V or 600 V) according to the rated input voltage to be measured.

<table>
<thead>
<tr>
<th>Rated input voltage</th>
<th>Voltage range</th>
<th>Allowable input voltage</th>
</tr>
</thead>
<tbody>
<tr>
<td>120 V</td>
<td>150 V</td>
<td>150 V</td>
</tr>
<tr>
<td>240 V</td>
<td>300 V</td>
<td>300 V</td>
</tr>
<tr>
<td>480 V</td>
<td>600 V</td>
<td>600 V</td>
</tr>
</tbody>
</table>

*3 For Ethernet communication, the RS-485 communication interface is exclusively for the Ethernet-serial gateway function.

**Serial Number (NO.)**

Also inform this number shown in “NO.” on the nameplate when contacting the vendor from which you purchased the PR300.
### Checking the Accessories

#### (1) JIS/ANSI-mounting kit
- **Item Name**: Bezel, Panel-mounting bracket
- **Remarks**: Used to mount the PR300 according to the ANSI 4-inch round form size or JIS110-square instrument size.

#### (2) DIN-mounting brackets
- **Item Name**: Panel-mounting kit, Panel-mounting bracket, Panel-mounting bolts, Bracket-fixing screws, Nuts, Flat washers, Spring washers
- **Remarks**: Used to mount the PR300 according to the DIN 96-square instrument size.

#### (3) Dust cover
- **Item Name**: (with 1 fixing screw)
- **Remarks**: Attached onto the top of the PR300 main unit.

#### (4) Terminal cover
- **Item Name**: (with 3 fixing screws)
- **Remarks**: Attached to the PR300 terminal section. (Must always be attached to avoid a possible electric shock.)

#### (5) Shorting bar
- **Item Name**: (for RS-485 communication termination)
- **Remarks**: Used in RS-485 communication if the PR300 is a terminal device.

#### (6) Tag number labels

#### (7) Startup Manuals
- **Item Name**: (Installation/Initial Setup Operations)
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1.1 Installation with the ANSI 4-inch Round Form or JIS 110-square Instrument Size

The PR300 can be installed so that it handles ANSI 4-inch round form or JIS 110-square instruments panel cutouts by attaching the "JIS/ANSI-mounting kit" accessory.

External Dimensions

Panel Cutout Dimensions

When installing the PR300, provide spacing of 50 mm or more between each face of the PR300 body and the instrument next to the PR300 or between each face and the wall surface.

- Normal Allowable Deviation = ± (Value of JIS B 0401-1998 Tolerance Grade IT18) / 2
1.1 Installation with the ANSI 4-inch Round Form or JIS 110-square Instrument Size

**WARNING**
- Install the PR300 in the secondary side of the existing breaker.
- Provide spacing of 50 mm or more between the products.

**NOTE**
- Do not install the PR300 in the following types of environments, as they may cause the PR300 to malfunction or fail. Avoid sites:
  - exposed to significant shock or vibration;
  - where corrosive gases are present;
  - where large amounts of dust are present;
  - exposed to water;
  - exposed to direct sunlight;
  - outside;
  - at altitudes above 2000 m.
- The PR300 mounting position is for vertical panels only.

Mounting Method

1. **Set the direction of the panel-mounting bracket.**
   The diagram on the right shows the front of the bracket (the side into which the panel-mounting bolt is inserted). Rotating the bracket 90° makes the bracket compatible with either ANSI or JIS panel cutouts. Set the bracket to either the ANSI or JIS mark according to which type of panel you are installing, as shown in the diagram on the right.

2. **Insert two panel-mounting bolts into the front of the panel-mounting bracket as shown in the diagram on the left.**

3. **Fix the panel-mounting bracket securely to the back of the PR300 with two bracket-fixing screws as shown in the diagram on the left.**
   (Recommended tightening torque: 0.8 N·m)

4. **Attach the bezel from the front of the PR300.**

5. **Insert the PR300 from its rear through the mounting cutout in the panel as shown in the diagram.**

6. **Secure the PR300’s panel-mounting bolts by tightening them with the washers and nuts.**
   (Recommended tightening torque: 2.0 N·m)
1.2 Installation with the DIN 96-square Instrument Size

External Dimensions

Panel Cutout Dimensions

When installing the PR300, provide spacing of 50 mm or more between each face of the PR300 body and the instrument next to the PR300 or between each face and the wall surface.

● Normal Allowable Deviation = ± (Value of JIS B 0401-1998 Tolerance Grade IT18) / 2
1.2 Installation with the DIN 96-square Instrument Size

**WARNING**
- Install the PR300 in the secondary side of the existing breaker.
- Provide spacing of 50 mm or more between the products.

**NOTE**
- Do not install the PR300 in the following types of environments, as they may cause the PR300 to malfunction or fail. Avoid sites: exposed to significant shock or vibration; where corrosive gases are present; where large amounts of dust are present; exposed to water; exposed to direct sunlight; outside; at altitudes above 2000 m.
- The PR300 mounting position is for vertical panels only.

### Mounting Method

1. Insert the PR300 from its rear through the mounting cutout in the panel as shown in the diagram.

2. Affix the mounting brackets to the left and right sides of the PR300. Secure the brackets to the PR300 by tightening the screws in the end of the mounting brackets with a screwdriver as shown in the diagram. (recommended tightening torque: 0.4 N-m)

Mounting bracket (standard accessory: 2 brackets)
1.3 Wiring

**WARNING**

- As there is a danger of electric shock, turn off the power supply and check that the cables to be connected are not conducting electricity before carrying out the wiring procedure.
- For safety, be sure to install a circuit breaker switch that conforms to an IEC60947-compatible product, 5 A, 100 V or 220 V AC near the PR300 so as to be operated easily, and clearly indicate that the device is used to de-energize the PR300.
- The wiring procedure for the PR300 should be carried out by a qualified person (an electrician etc.) with knowledge of electrical matters and who has actual experience.
- Install a current transformer (CT) inside a panel when using a conduit for wiring.
- Use a UL Listed Panel only for the panel on which the PR300 is installed.
- If the voltage is below 600 V AC, it is possible to connect the PR300 directly without using a voltage transformer (VT) and if the current is below 5 A AC, it is possible to do so without using a current transformer (CT). However, in order to use the PR300 safely, the use of VT and CT is recommended. Use a UL Listed VT and CT for the PR300.
- Perform wiring for the voltage and current input in the same circuit.
- Check the following before turning on the power. Using the PR300 beyond the stated specifications may cause it to heat up and burn out.
  - Check that the power supply voltage, input voltage, and input current values to be applied to the PR300 agree with its specifications.
  - Check that the external wiring is connected to the terminals in accordance with the specifications.
- Do not touch the screws in locations (a) to (f) shown in the wiring diagrams. They are an essential part of the structure of the PR300. Loosening or tightening them may result in a malfunction or failure of the PR300.
- Be sure to attach the terminal cover to prevent electric shock (refer to Section 1.4).

**NOTE**

- When attaching the terminal cover
  Since the terminal cover of PR300 has the structure of preventing electric shock, the terminal cover cannot be attached after completing all wiring. Refer to Section 1.4, “ Attaching the Dust Cover and Terminal Cover” before wiring.
  1. Attach the terminal cover after completing the wiring to the terminals 2, 4, 6, 8, 23, 24, and 25.
  2. Execute the wiring to the terminals other than those mentioned above after attaching the terminal cover.
  If the dust cover is required, attach it before attaching the terminal cover.
- Do not ground the input circuit when connecting voltage and current directly without using VT and CT.

Crimping Terminal Recommendations

<table>
<thead>
<tr>
<th>Applicable terminals</th>
<th>ed (mm)</th>
<th>A (mm)</th>
<th>F (mm)</th>
<th>Recommended tightening torque</th>
</tr>
</thead>
<tbody>
<tr>
<td>M4</td>
<td>4.4 max.</td>
<td>7.0 max.</td>
<td>7.8 max.</td>
<td>1.2 N·m</td>
</tr>
<tr>
<td>M3</td>
<td>3.3 max.</td>
<td>5.8 max.</td>
<td>6.7 max.</td>
<td>0.6 N·m</td>
</tr>
</tbody>
</table>

Applicable wire size: 1.04 to 2.63 mm² for M4, 0.25 to 1.65 mm² for M3
1.3 Wiring

Single-phase two-wire system (voltage input, current input, power supply)

Power-source side

Load side

**NOTE**
Do not ground the input circuit when connecting voltage and current directly without using VT and CT.

Refer to “Other Wiring”

Single-phase three-wire system (voltage input, current input, power supply)

Power-source side

Load side

**NOTE**
Do not ground the input circuit when connecting voltage and current directly without using VT and CT.

Refer to “Other Wiring”

Three-phase three-wire system (voltage input, current input, power supply)

Power-source side

Load side

**NOTE**
Do not ground the input circuit when connecting voltage and current directly without using VT and CT.

Refer to “Other Wiring”

Power supply

Power supply voltage 100-240V AC ±10% or 130-300V DC ±15%

NOTE
Do not ground the input circuit when connecting voltage and current directly without using VT and CT.
1.3 Wiring

Three-phase four-wire system (voltage input, current input, power supply)

Power-source side

<table>
<thead>
<tr>
<th>A</th>
<th>B (S)</th>
<th>C (T)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Load side

*NOTE: Do not ground the input circuit when connecting voltage and current directly without using VT and CT.

Refer to "Other Wiring"

Three-phase four-wire system (2.5 element) (voltage input, current input, power supply)

Power-source side

<table>
<thead>
<tr>
<th>A (R)</th>
<th>B (S)</th>
<th>C (T)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Load side

*NOTE: Do not ground the input circuit when connecting voltage and current directly without using VT and CT.

Refer to "Other Wiring"
1.3 Wiring

**Other Wiring**

### Analog output

- **Output signal:** 4 to 20 mA DC

### Pulse output

- **Contact capacity:** 30V DC, 200mA (resistive load)

### Demand alarm output

- **Contact capacity:** 30V DC, 200mA (resistive load)

### Ethernet communication

<table>
<thead>
<tr>
<th>Link LED</th>
<th>Color</th>
<th>Description</th>
<th>Speed</th>
</tr>
</thead>
<tbody>
<tr>
<td>Off</td>
<td>Orange</td>
<td>Stopped</td>
<td>10Mbps 100Mbps</td>
</tr>
<tr>
<td>Active LED</td>
<td>Orange</td>
<td>Full duplex</td>
<td>100Mbps</td>
</tr>
</tbody>
</table>

### RS-485 communication

- **Voltage signal:**
  - ON signal: 4.5 to 25 V DC
  - OFF signal: within ±1V DC

### Optional integration control signal or demand alarm release

- **Voltage signal:**
  - ON signal: 4.5 to 25 V DC
  - OFF signal: within ±1V DC

---

*1 If Ethernet communication is used, the RS-485 communication interface is used specifically for the Ethernet-serial gateway function.

*2 In the case of the PR300 with the demand measuring function, the demand alarm release is selected.

Switching between 10BASE-T and 100BASE-TX takes place automatically.

Switching between half and full duplex takes place automatically.

When terminating, short-circuit terminals 17 and 18 with the shorting bar.

* If Ethernet communication is used, the RS-485 communication interface is used specifically for the Ethernet-serial gateway function.

* In the case of the PR300 with the demand measuring function, the demand alarm release is selected.
1.4 Attaching the Dust Cover and Terminal Cover

**WARNING**
As there is a danger of electric shock, do not attach the dust cover and terminal cover while the wires are live.

**NOTE**
- Attach the dust cover before attaching the terminal cover.
- The recommended tightening torque for the screws for attaching the dust cover and terminal cover is 0.8N•m.

### Attaching the Dust Cover

1. Insert the two protruding portions on the underside of the dust cover into the grooves on the upper side of the PR300 as shown in the diagram below.

2. Secure the dust cover with the screw provided as shown in the diagram below.

### Attaching the Terminal Cover

1. Complete the wiring to the terminals 2, 4, 6, 8, 23, 24 and 25, then secure the terminal cover in the open state shown in the diagram below with the two screws provided.

2. Complete the wiring to other terminals with the terminal cover open shown in the diagram below.

3. Close the terminal cover and secure it with the screw provided as shown in the diagram below.
Chapter 2  Preparations before Starting Measurement (Set up the PR300 First)

2.1 Component Names and Functions

<table>
<thead>
<tr>
<th>Name</th>
<th>Display Color</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>&lt;1&gt; Power lamp</td>
<td>Green</td>
<td>Lights up and remains lit when the PR300 is turned on and operating normally. Blinks (4 times/second) if a communication error occurs, and continues to blink until the PR300 returns to normal.</td>
</tr>
<tr>
<td>&lt;2&gt; Phase and Wire System lamps</td>
<td>Green</td>
<td>The phase and wire system option set in the PR300 lights up.</td>
</tr>
<tr>
<td>&lt;3&gt; Input Range lamps</td>
<td>Green</td>
<td>The voltage range option set in the PR300 and the current range (rated input) option specified at the time of ordering light up.</td>
</tr>
<tr>
<td>&lt;4&gt; Measured Value display</td>
<td>Red</td>
<td>Shows a measured value of power, energy, etc. Also shows a parameter symbol and its setpoint at the time of parameter setting.</td>
</tr>
<tr>
<td>&lt;5&gt; Unit lamps</td>
<td>Red</td>
<td>Show the unit symbol of a measured value for each measurement item. These unit symbols are shown in combination depending on the type of measured value.</td>
</tr>
<tr>
<td>&lt;6&gt; MAX and MIN lamps</td>
<td>Red</td>
<td>Light up when the maximum or minimum measured value is displayed.</td>
</tr>
<tr>
<td>&lt;7&gt; Phase Indication lamps</td>
<td>Red</td>
<td>Light up to tell for which phase the voltage or current value is being measured.</td>
</tr>
<tr>
<td>&lt;8&gt; DEMAND lamp</td>
<td>Red</td>
<td>Lights up when the measured value of demand power or demand current is displayed. (Only supported for a PR300 with the demand measuring function.)</td>
</tr>
<tr>
<td>&lt;9&gt; Demand Alarm lamp</td>
<td>Red</td>
<td>Lights up if the demand value exceeds the demand alarm point at any point in time other than the demand alarm mask time.</td>
</tr>
<tr>
<td>&lt;10&gt; Pulse Output lamp</td>
<td>Green</td>
<td>Lights up when the output is turned on in the pulse output mode and goes out when the output is turned off.</td>
</tr>
<tr>
<td>&lt;11&gt; Communication lamp</td>
<td>Green</td>
<td>Blinks while RS-485 or Ethernet communication is in progress.</td>
</tr>
<tr>
<td>&lt;12&gt; Operation keys</td>
<td></td>
<td>On the Measured Value screen, these keys are used, for example, to switch the display pattern. Also used to set parameters on the Parameter screen.</td>
</tr>
</tbody>
</table>
2.2 Setting the Phase and Wire System

This section explains how to set the phase and wire system by taking as an example the case when a three-phase four-wire system is changed to a three-phase three-wire system.

Operation

**Startup screen**

1. Turn on the PR300.

The PR300 shows the station number for about 5 seconds, then the Measured Value screen appears.

**Measured Value screen**

2. Hold down \( \text{for at least 3 seconds.} \)

**VT Ratio screen**

3. Simultaneously hold down \( \text{for at least 3 seconds.} \)

The parameter \( \text{(VT ratio) appears.} \)

**Specification Change Confirmation screen**

4. Using \( \text{or } \text{, show } \text{ on the lower display.} \)

**Specification Change Confirmation screen**

5. Press \( \text{ once.} \)

**Phase and Wire System screen**

6. Press \( \text{ once.} \)

7. Using \( \text{ or } \text{, select the setpoint.} \)

**Phase and Wire System Setting screen**

8. Press \( \text{ once to blink the setpoint.} \)

9. Press \( \text{ once while the setpoint is blinking.} \)

The setpoint is confirmed and the PR300 returns to the Phase and Wire System screen. The phase and wire system thus set is shown as the current value.

To re-set the parameter:
Press any key other than \( \text{ while all digits of the setpoint are blinking.} \) The PR300 returns to the initial setting screen.

When proceeding to set the voltage range, start from step 6 in Section 2.3, “Setting the Voltage Range,” with this screen (figure on the left) shown as is.

To re-set the parameter:
Press any key other than \( \text{ while all digits of the setpoint are blinking.} \) The PR300 returns to the initial setting screen.

**Phase and Wire System screen**

10. Hold down \( \text{ for at least 3 seconds.} \)
2.2 Setting the Phase and Wire System

Startup screen
The PR300 shows the Startup screen for about 5 seconds, then the Measured Value screen appears.

Measured Value screen

NOTE
If you change the phase and wire system, all parameters other than those related to RS-485 and Ethernet communications are initialized (to factory-set values). Change the phase and wire system before setting parameters such as the VT and CT ratios.

Range of Phase and Wire System Options

<table>
<thead>
<tr>
<th>Parameter Symbol</th>
<th>Parameter Name</th>
<th>Setting Type</th>
<th>Model and Suffix Codes</th>
<th>Setting Range (Details)</th>
<th>Initial Value (Factory-set Value)</th>
</tr>
</thead>
<tbody>
<tr>
<td>PH-41</td>
<td>Phase and wire system</td>
<td>Selection</td>
<td>PR300-3□□□□□□-6□-0</td>
<td>Single-phase two-wire system</td>
<td>1P2V</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Single-phase three-wire system</td>
<td>1P3V</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Three-phase three-wire system</td>
<td>3P3V</td>
</tr>
<tr>
<td>PR300-4□□□□□□-6□-0</td>
<td></td>
<td></td>
<td>Single-phase two-wire system</td>
<td>1P2V</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Single-phase three-wire system</td>
<td>1P3V</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Three-phase three-wire system</td>
<td>3P3V</td>
<td></td>
</tr>
<tr>
<td>PR300-5□□□□□□-6□-0</td>
<td></td>
<td></td>
<td>Three-phase four-wire system</td>
<td>3P4V</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Three-phase four-wire system</td>
<td>2SE</td>
</tr>
</tbody>
</table>

NOTE
- If single-phase three-wire system is selected, the voltage range is fixed at 300 V (between P0 and P1, P0 and P2). The voltage range cannot be selected.
- Three-phase four-wire system (2.5 element) can be used only when the voltage is in a state of equilibrium. In addition, the phase and wire system cannot be changed.
This section explains how to set the voltage range by taking as an example the case when the voltage range is changed from 300 V to 600 V.

**Operation**

1. **Startup screen**
   - Turn on the PR300.

   The PR300 shows the station number for about 5 seconds, then the Measured Value screen appears.

2. **Measured Value screen**
   - Hold down for at least 3 seconds.

3. **VT Ratio screen**
   - The parameter (VT ratio) appears.

   Simultaneously hold down + for at least 3 seconds.

4. **Specification Change Confirmation screen**
   - The Specification Change Confirmation screen appears.

   Using or , show on the lower display.

5. **Specification Change Confirmation screen**
   - Press once.

6. **Phase and Wire System screen**
   - The Phase and Wire System screen appears.

   Using or show the Voltage Range screen.

7. **Voltage Range screen**
   - The Voltage Range screen appears.

   Current value

   Parameter symbol for voltage range

   Press once.

8. **Voltage Range Setting screen**
   - The Voltage Range Setting screen appears.

   Using or select the setpoint.

9. **Voltage Range Setting screen**
   - Press once to blink the setpoint.

10. **Voltage Range Setting screen**
    - To re-set the parameter: Press any key other than while all digits of the setpoint are blinking. The PR300 returns to the initial setting screen.

    Press once while the setpoint is blinking.
Preparations before Starting Measurement (Set up the PR300 First)

2.3 Setting the Voltage Range

Hold down \( \text{⑯} \) for at least 3 seconds.

![Image of Voltage Range screen](image)

The setpoint is confirmed and the PR300 returns to the Voltage Range screen. The voltage range thus set is shown as the current value.

When proceeding to set the phase and wire system, press \( \text{⑩} \) or \( \text{⑩} \) to show the Phase and Wire System screen, with this screen (figure in the upper-left corner) shown as is. After showing the Phase and Wire System screen, start from step 6 in Section 2.2, “Setting the Phase and Wire System.”

![Image of Startup screen](image)

The PR300 shows the Startup screen for about 5 seconds, then the Measured Value screen appears.

![Image of Measured Value screen](image)

Setting completed.

**NOTE**

If you change the voltage range, all parameters other than those related to RS-485 and Ethernet communications are initialized (to factory-set values). Change the voltage range before setting parameters such as the VT and CT ratios.

Range of Voltage Range Options

<table>
<thead>
<tr>
<th>Parameter Symbol</th>
<th>Parameter Name</th>
<th>Setting Type</th>
<th>Setting Range (Details)</th>
<th>Initial Value (Factory-set Value)</th>
</tr>
</thead>
<tbody>
<tr>
<td>( \text{⑯} )</td>
<td>Voltage range</td>
<td>Selection</td>
<td>150V, 300V, 600V</td>
<td>300V</td>
</tr>
</tbody>
</table>

**NOTE**

- The voltage range of single-phase three-wire system is fixed at 300V (between P0 and P1, P0 and P2). The voltage range cannot be selected.
- Select the voltage range of three-phase four-wire system by the phase voltage (between P0 and P1, P0 and P2, P0 and P3).
3.1 Basic Parameter Setting Operations

NOTE
Set parameters only after setting the phase and wire system and the voltage range. If you change the phase and wire system or voltage range after setting a parameter, the parameter will be initialized (to a factory-set value). Parameters related to RS-485 and Ethernet communications will not be initialized, however.

Methods of Changing Parameter Setpoints
Four setting types - integral numeric value, fixed-point numeric value, floating-point numeric value, and selection - have been defined for the parameters of the PR300. For each setting type, the following explains basic operations used to set parameters.

Integral numeric value or fixed-point numeric value
1. Using \( \text{or } \), change the numeric value.
2. After changing the numeric value, press \( \text{once.} \)
3. Press \( \text{while all digits of the setpoint are blinking.} \)
4. Press any key other than \( \text{while all digits of the setpoint are blinking.} \)

Floating-point numeric value
1. Using \( \text{, confirm the number of decimal places.} \)
2. Using \( \text{or } \), change the numeric value.
3. After changing the numeric value, press \( \text{once.} \)
4. Press \( \text{while all digits of the setpoint are blinking.} \)

Selection
1. Change the setpoint using \( \text{or } \).
2. After changing the setpoint, press \( \text{once.} \)
3. Press \( \text{while all digits of the setpoint are blinking.} \)

Key operations used to set parameters
- Moves from the Measured Value screen to the Parameter screen (hold down the key), or confirms the setpoint.
- Shows a parameter from the menu, moves through the digits of a setpoint (numeric value) to the right, or moves the decimal point to the right.
- Shows the next parameter or menu item, or changes the setpoint.
- Shows the previous parameter or menu item, or changes the setpoint.
- Returns from the Parameter screen to the Menu screen, moves through the digits of a setpoint (numeric value) to the left, or moves the decimal point to the left.
3.2 Setting the VT and CT Ratios

Setting the VT Ratio

This section explains how to set the VT ratio by taking as an example the case when the VT ratio is changed from the initial value (1) to 4.

**Operation**

1. Hold down \[\text{SEL}\] for at least 3 seconds.

2. Press \[\text{VT}\] once.

3. Using \[\uparrow\] or \[\downarrow\], change the setpoint.

4. Press \[\text{VT}\] once to blink the setpoint.

5. Press \[\text{VT}\] once while the setpoint is blinking.

VT ratio setting completed.

Parameter Setting Types and Ranges

<table>
<thead>
<tr>
<th>Parameter Symbol</th>
<th>Parameter Name</th>
<th>Setting Type</th>
<th>Setting Range (Details)</th>
<th>Initial value (Factory-set Value)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ut</td>
<td>VT ratio</td>
<td>Integral numeric</td>
<td>1 to 6000</td>
<td>1</td>
</tr>
</tbody>
</table>
### 3.2 Setting the VT and CT Ratios

**Setting the CT Ratio**

This section explains how to set the CT ratio by taking as an example the case when the CT ratio is changed from the initial value (1.00) to 10.00.

#### Operation

1. **Measured Value screen**
   - Hold down \( \text{SET} \) for at least 3 seconds.

2. **VT Ratio screen**
   - Press \( \text{ } \) once.
   - The parameter \( \text{VT} \) (VT ratio) appears.

3. **CT Ratio screen**
   - Press \( \text{ } \) once.
   - The parameter \( \text{CT} \) (CT ratio) appears.

4. **CT Ratio Setting screen**
   - Press \( \text{\textit{SET}} \) once to fix the position of the decimal point.

5. **CT Ratio Setting screen**
   - The alterable digit blinks.
   - Using \( \text{V} \) or \( \text{ } \), change the setpoint.

6. **Using \( \text{V} \) or \( \text{ } \), change the setpoint.**
   - Press \( \text{\textit{SET}} \) once to blink the setpoint.

7. **Press \( \text{\textit{SET}} \) once while the setpoint is blinking.**
   - The setpoint is confirmed and the PR300 returns to the CT Ratio screen.
   - CT ratio setting completed.

8. **Press \( \text{\textit{SET}} \) once while the setpoint is blinking.**
   - To move to the digit to be changed, use the following keys:
     - To the left
     - To the right

#### Parameter Setting Types and Ranges

<table>
<thead>
<tr>
<th>Parameter Symbol</th>
<th>Parameter Name</th>
<th>Setting Type</th>
<th>Setting Range (Details)</th>
<th>Initial Value (Factory-set Value)</th>
</tr>
</thead>
<tbody>
<tr>
<td>( \text{CT} )</td>
<td>CT ratio</td>
<td>Floating-point numeric value</td>
<td>0.05 to 32000</td>
<td>1.00</td>
</tr>
</tbody>
</table>

**NOTE**

Set the VT and CT ratios so that the value of “secondary rated power \( \times \) VT ratio \( \times \) CT ratio” is smaller than 10 GW. If this value exceeds 10 GW, the updated VT or CT ratio will not be incorporated but revert to the current value before change.
### 3.3 Setting the Integrated Low-cut Power

This section explains how to set the integrated low-cut power by taking as an example the case when the integrated low-cut power is changed from the initial value (0.05%) to 0.1%.

#### Operation

**Measured Value screen**

1. Hold down \( \downarrow \) for at least 3 seconds.

**VT Ratio screen**

2. Press \( \uparrow \) twice.

**Integrated Low-cut Power setting screen**

3. Press \( \uparrow \) once.

**Integrated Low-cut Power setting screen**

4. Using \( \uparrow \) or \( \downarrow \), change the setpoint.

**Integrated Low-cut Power setting screen**

5. Press \( \uparrow \) once to blink the setpoint.

**Integrated Low-cut Power setting screen**

6. Press \( \downarrow \) once while the setpoint is blinking.

**To return to the Measured Value screen, hold down \( \uparrow \) for at least 3 seconds.**

**To re-set the parameter:**

- Press any key other than \( \uparrow \) while all digits of the setpoint are blinking.
- The PR300 returns to the initial setting screen.

**If you do not operate any key for more than 5 minutes on the Parameter screen, the PR300 automatically returns to the Measured Value screen.**

---

**To move the digit to be changed, use the following keys:**

- \( \downarrow \) to the left
- \( \uparrow \) to the right

---

**Current value**

**Setpoint**

- **To return to the Measured Value screen, hold down \( \uparrow \) for at least 3 seconds.**
3.3 Setting the Integrated Low-cut Power

Parameter Setting Types and Ranges

<table>
<thead>
<tr>
<th>Parameter Symbol</th>
<th>Parameter Name</th>
<th>Setting Type</th>
<th>Setting Range (Details)</th>
<th>Initial Value (Factory-set Value)</th>
</tr>
</thead>
<tbody>
<tr>
<td>( LoCut )</td>
<td>Integrated low-cut</td>
<td>Fixed-point numeric</td>
<td>0.05 to 20.00 (%)</td>
<td>0.05</td>
</tr>
</tbody>
</table>

Integrated low-cut power
This parameter is used to prevent active power (regenerative power), reactive power (LEAD/LAG) and apparent power from being calculated as energy if they are smaller than the integrated low-cut power. Set this parameter as a percent (%) of the rated power.
3.4 Setting RS-485 Communication Conditions

This section explains how to set RS-485 communication conditions by taking as an example the case when the protocol is changed from the initial value to Modbus/RTU.

**Operation**

**Measured Value screen**

The parameter VT ratio appears.

1. Hold down for at least 3 seconds.

**VT Ratio screen**

2. Using or , show .

**RS-485 Communication Menu screen**

3. Press once.

**Station Number screen**

4. Press once.

**Protocol screen**

5. Press once.

**Protocol Setting screen**

The screen changes to the one for setting the parameter Conn.

6. Using or , select the setpoint.

7. Press once to blink the setpoint.

8. Press once while the setpoint is blinking.

Refer to “Parameter Setting Types and Ranges” on the next page to set other parameters in the same manner.

Each press of cycles through the parameter options, as shown below.

<table>
<thead>
<tr>
<th>Baud rate</th>
<th>Parity</th>
<th>Stop bit</th>
<th>Data length</th>
</tr>
</thead>
<tbody>
<tr>
<td>b-rt</td>
<td>Pr-1</td>
<td>St-P</td>
<td>dl-n</td>
</tr>
</tbody>
</table>
### Parameter Setting Types and Ranges

<table>
<thead>
<tr>
<th>Parameter Symbol</th>
<th>Parameter Name</th>
<th>Setting Type</th>
<th>Setting Range (Details)</th>
<th>Initial Value (Factory-set Value)</th>
</tr>
</thead>
<tbody>
<tr>
<td>r485</td>
<td>RS-485 communication menu</td>
<td>Menu to shift to the parameters of RS-485 communication</td>
<td></td>
<td></td>
</tr>
<tr>
<td>st-no</td>
<td>Station number</td>
<td>Integral numeric value</td>
<td>1 to 99</td>
<td>1</td>
</tr>
<tr>
<td>Co-nn</td>
<td>Protocol</td>
<td>Selection</td>
<td>PC link without checksum</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>PC link with checksum</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Modbus/ASCII</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Modbus/RTU</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Modbus/TCP (*1)</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>PR201 original</td>
<td></td>
</tr>
<tr>
<td>b-rt</td>
<td>Baud rate</td>
<td>Selection</td>
<td>2400 bps</td>
<td>9600 bps</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>9600 bps</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>19200 bps</td>
<td></td>
</tr>
<tr>
<td>pr1</td>
<td>Parity(*3)</td>
<td>Selection</td>
<td>NONE</td>
<td>NONE</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>EVEN</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>ODD</td>
<td></td>
</tr>
<tr>
<td>stP</td>
<td>Stop bit(*3)</td>
<td>Selection</td>
<td>1 bit</td>
<td>1</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>2 bits</td>
<td></td>
</tr>
<tr>
<td>dLn</td>
<td>Data length(*2)(*3)</td>
<td>Selection</td>
<td>8 bits</td>
<td>8</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>7 bits</td>
<td></td>
</tr>
</tbody>
</table>

*1 Modbus/TCP can be selected for a PR300 with the Ethernet communication function only.

*2 When Modbus/RTU is selected for the protocol, select 8 for the data length.

*3 When PR201 original is selected for the protocol, select NONE for the parity, 1 for the stop bit and 8 for the data length.
### 3.5 Setting Ethernet Communication Conditions

This section explains how to set Ethernet communication conditions by taking as an example the case when the IP address is changed from the initial value to “192.168.1.2”. (Ethernet communication conditions can be set only when the protocol is set to Modbus/TCP. Refer to section 3.4.)

#### Operation

1. **Measured Value screen**
   - Hold down for at least 3 seconds.

2. **VT Ratio screen**
   - The parameter (VT ratio) appears.
   - Using or show .

3. **Ethernet Communication Menu screen**
   - Ethernet Communication Menu screen appears only when the protocol is set to Modbus/TCP.
   - Press once.

4. **IP Address-1 screen**
   - The parameter (IP address-1) appears.
   - Press three times.

5. **IP Address-4 screen**
   - The parameter (IP address-4) appears.
   - The parameter options change as shown below.
   - Current value
   - Press once.

6. **IP Address-4 Setting screen**
   - The screen changes to the one for setting the parameter .
   - Parameter IP-1 IP-2 IP-3 IP-4
   - IP address 192.168.1.2

7. **IP Address-4 Setting screen**
   - To move to the digit to be changed, use the following keys:
     - To the left
     - To the right
   - Press once to blink the setpoint.

8. **IP Address-4 Setting screen**
   - To re-set the parameter:
     - Press any key other than while all digits of the setpoint are blinking.
     - The PR300 returns to the initial setting screen.
   - Press once while the setpoint is blinking.

9. **IP address setting completed.**
   - Each press of cycles through the parameter options, as shown below.
   - Refer to “Parameter Setting Types and Ranges” on the next page to set other parameters in the same manner.
   - Port number
   - Ethernet setting switch
   - Subnet mask-1 Subnet mask-2 Subnet mask-3 Subnet mask-4
   - Default gateway-1 Default gateway-2 Default gateway-3 Default gateway-4

---

**Note:**
- The Ethernet Communication Menu screen appears only when the protocol is set to Modbus/TCP.
### 3.5 Setting Ethernet Communication Conditions

#### Parameter Setting Operations

- **Set the Ethernet setting switch to ON to enable the new settings. When the settings have been updated, the switch is automatically set back to OFF.**

- **Set the settings of parameter [E-Sy] to ON and press twice.**

- **The parameter settings have been updated.**

#### NOTE

- When using Ethernet communication, set the RS-485 communication protocol to Modbus/TCP (see Section 3.4).
- To be able to update the Ethernet parameter settings, the Ethernet setting switch must be set to ON.
- It takes about 20 seconds to update the setting. Ethernet communication cannot be used during this time.

#### Parameter Setting Types and Ranges

<table>
<thead>
<tr>
<th>Parameter Symbol</th>
<th>Parameter Name</th>
<th>Setting Type</th>
<th>Setting Range (Details)</th>
<th>Initial Value (Factory-set Value)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ethr</td>
<td>Ethernet communication menu</td>
<td>Menu to shift to the parameters of Ethernet communication</td>
<td></td>
<td></td>
</tr>
<tr>
<td>IP-1</td>
<td>IP address-1</td>
<td>Integral numeric value</td>
<td>0 to 255</td>
<td>192</td>
</tr>
<tr>
<td>IP-2</td>
<td>IP address-2</td>
<td>Integral numeric value</td>
<td>0 to 255</td>
<td>168</td>
</tr>
<tr>
<td>IP-3</td>
<td>IP address-3</td>
<td>Integral numeric value</td>
<td>0 to 255</td>
<td>1</td>
</tr>
<tr>
<td>IP-4</td>
<td>IP address-4</td>
<td>Integral numeric value</td>
<td>0 to 255</td>
<td>1</td>
</tr>
<tr>
<td>Să-1</td>
<td>Subnet mask-1</td>
<td>Integral numeric value</td>
<td>0 to 255</td>
<td>255</td>
</tr>
<tr>
<td>Să-2</td>
<td>Subnet mask-2</td>
<td></td>
<td>0 to 255</td>
<td>255</td>
</tr>
<tr>
<td>Să-3</td>
<td>Subnet mask-3</td>
<td></td>
<td>0 to 255</td>
<td>255</td>
</tr>
<tr>
<td>Să-4</td>
<td>Subnet mask-4</td>
<td></td>
<td>0 to 255</td>
<td>0</td>
</tr>
<tr>
<td>dG-1</td>
<td>Default gateway-1</td>
<td>Integral numeric value</td>
<td>0 to 255</td>
<td>0</td>
</tr>
<tr>
<td>dG-2</td>
<td>Default gateway-2</td>
<td></td>
<td>0 to 255</td>
<td>0</td>
</tr>
<tr>
<td>dG-3</td>
<td>Default gateway-3</td>
<td></td>
<td>0 to 255</td>
<td>0</td>
</tr>
<tr>
<td>dG-4</td>
<td>Default gateway-4</td>
<td></td>
<td>0 to 255</td>
<td>0</td>
</tr>
<tr>
<td>Port</td>
<td>Port number</td>
<td>Integral numeric value</td>
<td>502, 1024 to 65535</td>
<td>502</td>
</tr>
<tr>
<td>E-Sy</td>
<td>Ethernet setting switch</td>
<td>Selection</td>
<td>[ON OFF]</td>
<td>[ON OFF]</td>
</tr>
</tbody>
</table>
3.6 Setting Pulse Output Conditions

This section explains how to set pulse output conditions by taking as an example the case when the ON pulse width is changed from the initial value to 100 ms.

**Operation**

1. **Measured Value screen**
   - **Operation**
     - **ON Pulse Width screen**
       - The parameter \( P_{-on} \) (ON pulse width) appears.

2. **VT Ratio screen**
   - **Operation**
     - Using \( \uparrow \) or \( \downarrow \), show PULSE.

3. **Pulse Output Menu screen**
   - **Operation**
     - **ON Pulse Width Setting screen**
       - The screen changes to the one for setting the parameter \( P_{-on} \) and the alterable digit blinks.

4. **Measurement Item for Pulse Output screen**
   - **Operation**
     - **ON Pulse Width Setting screen**
       - To move to the digit to be changed, use the following keys:
         - To the left: \( \leftarrow \)
         - To the right: \( \rightarrow \)

5. **Pulse Unit screen**
   - **Operation**
     - **ON Pulse Width screen**
       - The setpoint is confirmed and the PR300 returns to the ON Pulse Width screen.

6. **ON Pulse Width screen**
   - **Operation**
     - **ON Pulse Width Setting screen**
       - The parameter \( P_{-on} \) (ON pulse width) appears.

7. **ON Pulse Width Setting screen**
   - **Operation**
     - **ON Pulse Width Setting screen**
       - To re-set the parameter:
         - Press any key other than \( \leftarrow \) while all digits of the setpoint are blinking.
         - The PR300 returns to the initial setting screen.

8. **ON Pulse Width Setting screen**
   - **Operation**
     - **ON Pulse Width screen**
       - (ON pulse width setting completed)

9. **ON Pulse Width screen**
   - **Operation**
     - **ON Pulse Width screen**
       - To return to the Pulse Output Menu screen, press \( \uparrow \).

   - **Operation**
     - **ON Pulse Width screen**
       - To return to the Measured Value screen, hold down \( \downarrow \).

   - **Operation**
     - **ON Pulse Width screen**
       - If you do not operate any key for more than 5 minutes on the Parameter screen, the PR300 automatically returns to the Measured Value screen.
### Parameter Setting Types and Ranges

<table>
<thead>
<tr>
<th>Parameter Symbol</th>
<th>Parameter Name</th>
<th>Setting Type</th>
<th>Setting Range (Details)</th>
<th>Initial Value (Factory-set Value)</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>PULSE</strong></td>
<td>Pulse output menu</td>
<td>——</td>
<td>Menu to shift to the parameters of pulse output</td>
<td>——</td>
</tr>
<tr>
<td><strong>P-SEL</strong></td>
<td>Measurement item for pulse output</td>
<td>Selection</td>
<td>Active energy $\frac{U_n}{U_n}$, Regenerative energy $\frac{U_n}{U_n}$, LEAD reactive energy $\frac{U_R}{U_R}$, LAG reactive energy $\frac{U_R}{U_R}$, Apparent energy $\frac{U_R}{U_R}$</td>
<td>Active energy</td>
</tr>
<tr>
<td><strong>PLS</strong></td>
<td>Pulse unit</td>
<td>Fixed-point numeric value</td>
<td>0.1 to 5000.0 k (pulse)</td>
<td>1.0</td>
</tr>
<tr>
<td><strong>P-on</strong></td>
<td>ON pulse width</td>
<td>Integral numeric value</td>
<td>10 to 1270 (ms) (changeable in increments of 10 ms)</td>
<td>50</td>
</tr>
</tbody>
</table>

### NOTE

If the pulse unit and ON pulse width do not satisfy the following conditional expression, the updated pulse unit setpoint or ON pulse width setpoint reverts to the value before change.

\[
\text{ON pulse width [ms]} \leq \frac{\text{Pulse unit [kWh]} \times 3600 \times 1000^2}{\text{Primary rated power} \times 1.2 \times 2}
\]
3.7 Setting Analog Output Conditions

This section explains how to set analog output conditions by taking as an example the case when the measurement item for analog output is changed to the current-1 and lower limit of scaling to 0% from their respective initial values.

**Operation**

1. **Measured Value screen**
   
   ![Image of Measured Value screen]
   
   Hold down [SET] for at least 3 seconds.

2. **VT Ratio screen**
   
   ![Image of VT Ratio screen]
   
   The parameter (VT ratio) appears.

3. **Analog Output Menu screen**
   
   ![Image of Analog Output Menu screen]
   
   Press once.

4. **Measurement Item for Analog Output screen**
   
   ![Image of Measurement Item for Analog Output screen]
   
   The parameter (measurement item for analog output) appears.

5. **Measurement Item for Analog Output Setting screen**
   
   ![Image of Measurement Item for Analog Output Setting screen]
   
   Using or , select the setpoint.

6. **Measurement Item for Analog Output Setting screen**
   
   ![Image of Measurement Item for Analog Output Setting screen]
   
   Press once to blink the setpoint.

7. **Measurement Item for Analog Output screen**
   
   ![Image of Measurement Item for Analog Output screen]
   
   The setpoint is confirmed and the PR300 returns to the initial setting screen.

8. **Measurement item for analog output setting completed.**

9. **Lower Limit of Scaling screen**
   
   ![Image of Lower Limit of Scaling screen]
   
   The parameter (lower limit of scaling) appears.

10. **Lower Limit of Scaling Setting screen**
    
    ![Image of Lower Limit of Scaling Setting screen]
    
    Press once while the setpoint is blinking.

To re-set the parameter:
- Press any key other than [SET] while all digits of the setpoint are blinking. The PR300 returns to the initial setting screen.

To move to the digit to be changed, use the following keys:
- To the left
- To the right

Using or , change the setpoint.

Press once.
Parameter Setting Operations

3.7 Setting Analog Output Conditions

To change the upper limit of scaling, set a new limit using the parameter \( R-HI \) that follows.

NOTE

If the upper and lower limits of scaling do not satisfy the following conditional expression, the updated upper or lower limit of scaling setpoint will not be incorporated but revert to the value before change.

\[
\text{Upper limit of scaling} - \text{Lower limit of scaling} \geq 50
\]

Parameter Setting Types and Ranges

<table>
<thead>
<tr>
<th>Parameter Symbol</th>
<th>Parameter Name</th>
<th>Setting Type</th>
<th>Setting Range (Details)</th>
<th>Initial Value (Factory-set Value)</th>
</tr>
</thead>
<tbody>
<tr>
<td>( A Lo )</td>
<td>Analog output menu</td>
<td>Menu to shift to the parameters of analog output</td>
<td></td>
<td></td>
</tr>
<tr>
<td>( A-SEL )</td>
<td>Measurement item for analog output</td>
<td>Selection</td>
<td>Active power, Reactive power, Apparent power, Voltage-1, Voltage-2, Voltage-3, Current-1, Current-2, Current-3, Power factor, Frequency</td>
<td>Active power</td>
</tr>
<tr>
<td>( A-Lo )</td>
<td>Lower limit of scaling</td>
<td>Fixed-point numeric value</td>
<td>0.0 to 50.0 (%)</td>
<td>50.0</td>
</tr>
<tr>
<td>( A-HI )</td>
<td>Upper limit of scaling</td>
<td>Fixed-point numeric value</td>
<td>50.0 to 100.0 (%)</td>
<td>100.0</td>
</tr>
</tbody>
</table>

Relationship between Scale Values and Measurement Inputs (Example)

- **Active power**
  - When setting output proportional to -1000 to 1000 W
  - Scale values to be set

- **Reactive power**
  - When setting output proportional to 0 to 1000 W
  - Scale values to be set

- **Voltage**
  - When setting output proportional to 0 to 1000 (VAR) (LAG)

- **Apparent power**
  - When setting output proportional to 0 to 1000 (VA)

- **Current**
  - When setting output proportional to 0 to 1000 (A)

- **Power factor**
  - When setting output proportional to 0 to 600 (V)

- **Frequency**
  - When setting output proportional to 0 to 100 (Hz)
3.8 Setting Demand Measurement Conditions

This section explains how to set demand measurement conditions by taking as an example the case when the demand alarm point is changed to 300 kW and demand alarm release function to manual release, from their respective initial values.

**Operation**

1. **Measured Value screen**
   - Holding down the button for at least 3 seconds.

2. **VT Ratio screen**
   - Using the keys to show the VT ratio.

3. **Demand Measurement Menu screen**
   - Press once.

4. **Demand Power/Current screen**
   - Press once.

5. **Demand Period screen**
   - Press once.

6. **Demand Alarm Mask Time screen**
   - Press once.

7. **Demand Alarm Point screen**
   - Press once.

8. **Demand Alarm Point Setting screen**
   - Using the keys to change the setpoint.

9. **Demand Alarm Point Setting screen**
   - Press once to blink the setpoint.

10. **Demand Alarm Point Setting screen**
    - Once while the setpoint is blinking.

---

To move to the digit to be changed, use the following keys:

- To the left
- To the right

To re-set the parameter:

Press any key other than while all digits of the setpoint are blinking. The PR300 returns to the initial setting screen.
3.8 Setting Demand Measurement Conditions

### Parameter Setting Types and Ranges

<table>
<thead>
<tr>
<th>Parameter Symbol</th>
<th>Parameter Name</th>
<th>Setting Type</th>
<th>Setting Range (Details)</th>
<th>Initial Value (Factory-set Value)</th>
</tr>
</thead>
<tbody>
<tr>
<td>$d\bar{n}nd$</td>
<td>Demand measurement menu</td>
<td>____________</td>
<td>Menu to shift to the parameters of demand measurement</td>
<td>____________</td>
</tr>
<tr>
<td>$d\bar{-}sel$</td>
<td>Demand power/current</td>
<td>Selection</td>
<td>Active power</td>
<td>Active power</td>
</tr>
<tr>
<td>$d\bar{-}bl\bar{n}$</td>
<td>Demand period</td>
<td>Integral numeric value</td>
<td>1 to 60 (min) (Demand alarm mask time to 60) (min)</td>
<td>30</td>
</tr>
<tr>
<td>$d\bar{-}sl\bar{t}$</td>
<td>Demand alarm mask time</td>
<td>Integral numeric value</td>
<td>1 to 59 (min) (1 to demand period) (min)</td>
<td>1</td>
</tr>
<tr>
<td>$d\bar{-}ln$</td>
<td>Demand alarm point</td>
<td>Integral numeric value</td>
<td>1 to 1000 (kW): When active power is selected, or 1 to 1000 (A): When current is selected</td>
<td>100</td>
</tr>
<tr>
<td>$d\bar{-}st$</td>
<td>Demand alarm release function</td>
<td>Selection</td>
<td>Automatic release Manual release</td>
<td>Automatic release</td>
</tr>
</tbody>
</table>

**NOTE**

If the demand period and demand alarm mask time do not satisfy the following conditional expression, the updated demand period or demand alarm mask time will not be incorporated but revert to the value before change.

\[ \text{Demand alarm mask time} \leq \text{Demand period} \]
3.9 Setting the Measured Value Display Pattern

This section explains how to set the measured value display pattern by taking as an example the case when the number of display patterns is changed to 3 and the display pattern-1 upper display to maximum demand value, from their respective initial values.

**Operation**

1. **Measured Value screen**
   - Hold down  for at least 3 seconds.

2. **VT Ratio screen**
   - The parameter \( \text{VT ratio} \) appears.
   - Using  or  , show \( \text{di} \ SP \).

3. **Display Setting Menu screen**
   - Press  once.
   - Press  twice.

4. **Number of Display Patterns Setting screen**
   - Press  once.

5. **Number of Display Patterns Setting screen**
   - The screen changes to the one for setting the parameter \( \text{Ptnum} \).

6. **Number of Display Patterns Screen**
   - To re-set the parameter: Press any key other than \( \text{SET} \) while all digits of the setpoint are blinking. The PR300 returns to the initial setting screen.
   - Press  once while the setpoint is blinking.

7. **Display Pattern-1 Upper Display screen**
   - The parameter (display pattern-1 upper display) appears.
   - Press  once.

8. **Display Pattern-1 Upper Display Setting screen**
   - The screen changes to the one for setting the parameter \( \text{Pl-1-U} \).
   - Using  or , select the setpoint.
   - Press  once to blink the setpoint.

9. **Display Pattern-1 Upper Display Setting screen**
   - Press  once while the setpoint is blinking.

To re-set the parameter:
- Press any key other than \( \text{SET} \) while all digits of the setpoint are blinking. The PR300 returns to the initial setting screen.

- Press  once while the setpoint is blinking.

- The setpoint is confirmed and the PR300 returns to the Number of Display Patterns screen.

- Press  once.

- Press  once.

- Press  once while the setpoint is blinking.

- To re-set the parameter: Press any key other than \( \text{SET} \) while all digits of the setpoint are blinking. The PR300 returns to the initial setting screen.

- Press  once while the setpoint is blinking.

- The setpoint is confirmed and the PR300 returns to the initial setting screen.
### Parameter Setting Types and Ranges

<table>
<thead>
<tr>
<th>Parameter Symbol</th>
<th>Parameter Name</th>
<th>Setting Type</th>
<th>Setting Range (Details)</th>
<th>Initial Value (Factory-set Value)</th>
</tr>
</thead>
<tbody>
<tr>
<td>$d_1$ $SP$</td>
<td>Display setting menu</td>
<td>Menu to shift to the parameters of display setting</td>
<td></td>
<td>___________________________</td>
</tr>
<tr>
<td>$P_n$ $nu\tilde{n}$</td>
<td>Number of display patterns</td>
<td>Integral numeric value</td>
<td>1 to 8</td>
<td>1</td>
</tr>
<tr>
<td>$Pt_1$ $U$</td>
<td>Display pattern-1 upper display</td>
<td>Selection</td>
<td>A measurement item can be selected from the following: Current (phase switch indication)</td>
<td></td>
</tr>
<tr>
<td>$Pt_1$ $\tilde{n}$</td>
<td>Display pattern-1 middle display</td>
<td>Selection</td>
<td>None, Active energy, Regenerative energy, LEAD reactive energy, LAG reactive energy, Apparent energy, Active power</td>
<td></td>
</tr>
<tr>
<td>$Pt_1$ $L$</td>
<td>Display pattern-1 lower display</td>
<td>Selection</td>
<td>Voltage, Voltage-1, Voltage-2, Voltage-3</td>
<td></td>
</tr>
<tr>
<td>$Pt_2$ $U$</td>
<td>Display pattern-2 upper display</td>
<td>Selection</td>
<td>Apparent energy, Active power, Reactive power</td>
<td></td>
</tr>
<tr>
<td>$Pt_2$ $\tilde{n}$</td>
<td>Display pattern-2 middle display</td>
<td>Selection</td>
<td>Apparent energy, Voltage (phase switch indication), Voltage-1</td>
<td></td>
</tr>
<tr>
<td>$Pt_2$ $L$</td>
<td>Display pattern-2 lower display</td>
<td>Selection</td>
<td>Voltage, Voltage-2, Voltage-3</td>
<td></td>
</tr>
<tr>
<td>$Pt_3$ $U$</td>
<td>Display pattern-3 upper display</td>
<td>Selection</td>
<td>Current (phase switch indication), Current-1, Current-2, Current-3, Current-4, Current-5, Current-6, Current-7, Current-8, Current-9</td>
<td></td>
</tr>
<tr>
<td>$Pt_3$ $\tilde{n}$</td>
<td>Display pattern-3 middle display</td>
<td>Selection</td>
<td>Current (phase switch indication), Current-1, Current-2, Current-3</td>
<td></td>
</tr>
<tr>
<td>$Pt_3$ $L$</td>
<td>Display pattern-3 lower display</td>
<td>Selection</td>
<td>Current, Current-2, Current-3</td>
<td></td>
</tr>
<tr>
<td>$Pt_4$ $U$</td>
<td>Display pattern-4 upper display</td>
<td>Selection</td>
<td>Power factor, Frequency, Optional active energy, Demand value, Maximum demand value</td>
<td></td>
</tr>
<tr>
<td>$Pt_4$ $\tilde{n}$</td>
<td>Display pattern-4 middle display</td>
<td>Selection</td>
<td>Optional active energy, Demand value</td>
<td></td>
</tr>
<tr>
<td>$Pt_4$ $L$</td>
<td>Display pattern-4 lower display</td>
<td>Selection</td>
<td>Maximum demand value</td>
<td></td>
</tr>
</tbody>
</table>

- Continued to next page -
### Parameter Setting Types and Ranges (Continued)

<table>
<thead>
<tr>
<th>Parameter Symbol</th>
<th>Parameter Name</th>
<th>Setting Type</th>
<th>Setting Range (Details)</th>
<th>Initial Value (Factory-set Value)</th>
</tr>
</thead>
<tbody>
<tr>
<td>PtS-U</td>
<td>Display pattern-5 upper display</td>
<td>Selection</td>
<td>A measurement item can be selected from the following:</td>
<td>Voltage-1</td>
</tr>
<tr>
<td>PtS-1</td>
<td>Voltage-1</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>PtS-2</td>
<td>Voltage-2</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>PtS-3</td>
<td>Voltage-3</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>PtL</td>
<td>Display pattern-5 lower display</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>PtL-1</td>
<td>Current (phase switch indication)</td>
<td></td>
<td></td>
<td>Voltage-1</td>
</tr>
<tr>
<td>PtL-2</td>
<td>Current (phase switch indication)</td>
<td></td>
<td></td>
<td>Voltage-2</td>
</tr>
<tr>
<td>PtL-3</td>
<td>Current (phase switch indication)</td>
<td></td>
<td></td>
<td>Voltage-3</td>
</tr>
<tr>
<td>PtL-4</td>
<td>Current (phase switch indication)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>PtL-5</td>
<td>Current (phase switch indication)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>PtL-6</td>
<td>Current (phase switch indication)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>PtL-7</td>
<td>Current (phase switch indication)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>PtL-8</td>
<td>Current (phase switch indication)</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**Voltage (phase switch indication)**

**Current (phase switch indication)**

### Number of Display Patterns and Individual Display Patterns

Allocate desired measurement items to the upper, middle and lower displays of the PR300, respectively, to define the display view as a single display pattern. It is possible to define a maximum of 8 patterns. For the number of display patterns, specify how many of these defined display patterns the PR300 should show.

**NOTE**

- As shown in the table below, some measurement items cannot be measured depending on the type of phase and wire system. Measurement items that cannot be measured cannot be selected as options for a display pattern.
- In the case of a three-phase four-wire system, the initial values of Display patterns-1 to 8 can all be shown on the PR300. For phase and wire systems other than a three-phase four-wire system, measurement items that cannot be measured are shown as "\(^*1\)

<table>
<thead>
<tr>
<th>Phase and wire system</th>
<th>Single-phase two-wire system</th>
<th>Single-phase three-wire system</th>
<th>Three-phase three-wire system</th>
<th>Three-phase four-wire system</th>
<th>Three-phase four-wire system (2.5 element)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Current</td>
<td><img src="image" alt="Measurable" /></td>
<td><img src="image" alt="Measurable" /></td>
<td><img src="image" alt="Measurable" /></td>
<td><img src="image" alt="Measurable" /></td>
<td><img src="image" alt="Measurable" /></td>
</tr>
<tr>
<td>Current-1</td>
<td><img src="image" alt="Measurable" /></td>
<td><img src="image" alt="Measurable" /></td>
<td><img src="image" alt="Measurable" /></td>
<td><img src="image" alt="Measurable" /></td>
<td><img src="image" alt="Measurable" /></td>
</tr>
<tr>
<td>Current-2</td>
<td><img src="image" alt="Not measurable" /></td>
<td><img src="image" alt="Measurable" /></td>
<td><img src="image" alt="Measurable" /></td>
<td><img src="image" alt="Not measurable" /></td>
<td><img src="image" alt="Not measurable" /></td>
</tr>
<tr>
<td>Current-3</td>
<td><img src="image" alt="Not measurable" /></td>
<td><img src="image" alt="Measurable" /></td>
<td><img src="image" alt="Measurable" /></td>
<td><img src="image" alt="Not measurable" /></td>
<td><img src="image" alt="Not measurable" /></td>
</tr>
<tr>
<td>Voltage-2</td>
<td><img src="image" alt="Measurable" /></td>
<td><img src="image" alt="Measurable" /></td>
<td><img src="image" alt="Measurable" /></td>
<td><img src="image" alt="Not measurable" /></td>
<td><img src="image" alt="Not measurable" /></td>
</tr>
<tr>
<td>Voltage-3</td>
<td><img src="image" alt="Not measurable" /></td>
<td><img src="image" alt="Not measurable" /></td>
<td><img src="image" alt="Not measurable" /></td>
<td><img src="image" alt="Not measurable" /></td>
<td><img src="image" alt="Not measurable" /></td>
</tr>
</tbody>
</table>

\(^*1\) For a three-phase four-wire system (2.5 element), it is possible to set the following measurement items only when the current is in a state of equilibrium:

Current (phase switch indication), Current-1, Current-3, Reactive power, Apparent power, Power factor, LEAD reactive energy, LAG reactive energy, and Apparent energy.

- The demand value and maximum demand value can only be selected for a PR300 with the demand measuring function. For a PR300 without the demand measuring function, the initial values of demand value and maximum demand value are shown as "\(^*1\)\\(\text{non}}\)".
3.10 Setting the “Indicator-out” Mode and Locking Parameters

Setting the Indicator-out Mode

This section explains how to set the indicator-out mode by taking as an example the case when the indicator-out mode is changed to ON and the indicator-out mode wait time to 5 min, from their respective initial values.

**Operation**

1. **Measured Value screen**
   - Press the keys while holding down for at least 3 seconds.

2. **VT Ratio screen**
   - The parameter (VT ratio) appears.
   - Using or , show .

3. **Display Setting Menu screen**
   - Press once.

4. **Indicator-out Mode screen**
   - The parameter (indicator-out mode) appears.
   - Press once.

5. **Indicator-out Mode Setting screen**
   - The screen changes to the one for setting the parameter .
   - Using or , select the setpoint.
   - Press once while the setpoint is blinking.

6. **Indicator-out Mode screen**
   - The setpoint is confirmed and the PR300 returns to the Indicator-out Mode screen.
   - Press once while the setpoint is blinking.

7. **Indicator-out Mode Wait Time screen**
   - Parameter (indicator-out mode wait time) is displayed.
   - Press once.

8. **Indicator-out Mode Wait Time Setting screen**
   - The screen changes into a screen for setting parameter .
   - Using or , change the setpoint.
   - Press once to blink the setpoint.
   - Press once while the setpoint is blinking.

9. **Indicator-out Mode Wait Time screen**
   - The setpoint is confirmed and the PR300 returns to the Indicator-out Mode Wait Time screen.
   - Press once while the setpoint is blinking.

To return to the Display Setting Menu screen, press .

To return to the Measured Value screen, hold down .

If you do not operate any key for more than 5 minutes on the Parameter screen, the PR300 automatically returns to the Measured Value screen.
3.10 Setting the “Indicator-out” Mode and Locking Parameters

Parameter Setting Types and Ranges

<table>
<thead>
<tr>
<th>Parameter Symbol</th>
<th>Parameter Name</th>
<th>Setting Type</th>
<th>Setting Range (Details)</th>
<th>Initial Value (Factory-set Value)</th>
</tr>
</thead>
<tbody>
<tr>
<td>dISP</td>
<td>Display setting menu</td>
<td>Menu to shift to the parameters of display setting</td>
<td></td>
<td></td>
</tr>
<tr>
<td>RtoFF</td>
<td>Indicator-out mode</td>
<td>Selection</td>
<td>ON</td>
<td>OFF</td>
</tr>
<tr>
<td>oftIM</td>
<td>Indicator-out mode wait time</td>
<td>Integral numeric value</td>
<td>1 to 60 (min)</td>
<td>10 (min)</td>
</tr>
</tbody>
</table>

**Indicator-out mode**

The indicator-out mode is designed to turn off the PR300 display when no key operation is performed within the indicator-out mode wait time that has been set while measured values are on display. The PR300 switches to the Measured Value screen in about 5 minutes when no key operation is performed while the Parameter screen is on display. Then, the PR300 display turns off after the elapse of the indicator-out mode wait time from when the PR300 switched to the Measured Value screen.

To turn on the PR300 display to show measured values during indicator-out mode, press any key.

**Locking and Unlocking Parameters**

Executing the following operations locks or unlocks all parameters. (A parameter cannot be locked or unlocked individually.) If a parameter is locked, it will be impossible to shift to the Parameter Setting screen. Use the Parameter screen showing the current value or the Menu screen to lock or unlock parameters. Operations used on an individual parameter setting screen or on the Measured Value screen in an attempt to lock parameters will have no effect.

**Locking Parameters**

**Operation**

<table>
<thead>
<tr>
<th>Measured Value screen</th>
<th>1</th>
<th>Hold down ( \text{FREE} ) for at least 3 seconds.</th>
</tr>
</thead>
<tbody>
<tr>
<td>VT Ratio screen</td>
<td>2</td>
<td>Simultaneously hold down ( A ) and ( \text{FREE} ) for at least 5 seconds.</td>
</tr>
</tbody>
</table>

The measured value display (middle display) first shows \( \text{Lock} \), then returns to the Parameter screen.

All parameters are locked now. Pressing \( \text{FREE} \) will no longer switch the display to any parameter setting screen.

**Unlocking Parameters**

**Operation**

<table>
<thead>
<tr>
<th>Measured Value screen</th>
<th>1</th>
<th>Hold down ( \text{FREE} ) for at least 3 seconds.</th>
</tr>
</thead>
<tbody>
<tr>
<td>VT Ratio screen</td>
<td>2</td>
<td>Simultaneously hold down ( A ) and ( \text{FREE} ) for at least 5 seconds.</td>
</tr>
</tbody>
</table>

The measured value display (middle display) first shows \( \text{FREE} \), then returns to the Parameter screen.

All parameters are unlocked now.
Chapter 4  Operation for Display of Measurement Items and Measurement Method

4.1 Measurement Items

<table>
<thead>
<tr>
<th>Measurement items</th>
<th>Single-phase two-wire system</th>
<th>Single-phase three-wire system</th>
<th>Three-phase three-wire system</th>
<th>Three-phase four-wire system (2.5 element)</th>
<th>Unit and symbol</th>
</tr>
</thead>
<tbody>
<tr>
<td>Active energy (+)</td>
<td>✔</td>
<td>✔</td>
<td>✔</td>
<td>✔</td>
<td>kWh/MWh</td>
</tr>
<tr>
<td>Active energy (-)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>(regenerative energy)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>LEAD reactive energy (-)</td>
<td>*1</td>
<td>✔</td>
<td>✔</td>
<td></td>
<td>kvarh/Mvarh</td>
</tr>
<tr>
<td>LAG reactive energy (+)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Apparent energy</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>kVAh/MVAh</td>
</tr>
<tr>
<td>Optional active energy</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Active power</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Instantaneous value</td>
<td>Maximum value</td>
<td>Minimum value</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Reactive power</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Instantaneous value</td>
<td>Maximum value</td>
<td>Minimum value</td>
<td></td>
<td></td>
<td>Wh</td>
</tr>
<tr>
<td>Apparent power</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Instantaneous value</td>
<td>Maximum value</td>
<td>Minimum value</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Voltage-1</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Instantaneous value</td>
<td>Maximum value</td>
<td>Minimum value</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Voltage-2</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Instantaneous value</td>
<td>Maximum value</td>
<td>Minimum value</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Voltage-3</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Instantaneous value</td>
<td>Maximum value</td>
<td>Minimum value</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Current-1</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Instantaneous value</td>
<td>Maximum value</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Current-2</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Instantaneous value</td>
<td>Maximum value</td>
<td></td>
<td></td>
<td></td>
<td>A/kA</td>
</tr>
<tr>
<td>Current-3</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Instantaneous value</td>
<td>Maximum value</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Frequency</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Hz</td>
</tr>
<tr>
<td>Instantaneous value</td>
<td>Maximum value</td>
<td>Minimum value</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Power factor</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>COSøe</td>
</tr>
<tr>
<td>Instantaneous value</td>
<td>Maximum value</td>
<td>Minimum value</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Demand power</td>
<td>*2</td>
<td>✔</td>
<td>✔</td>
<td></td>
<td>kWh/MMW</td>
</tr>
<tr>
<td>Demand current-1</td>
<td>*2</td>
<td>✔</td>
<td>✔</td>
<td></td>
<td>A/kA</td>
</tr>
<tr>
<td>Demand current-2</td>
<td>*2</td>
<td>–</td>
<td>–</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Demand current-3</td>
<td>*2</td>
<td>–</td>
<td>–</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

*1: An integrated low-cut power can be set to the energy parameters listed in the table (refer to Section 3.3).

*2: Either the demand power or demand current can be set as a measurement item.

**NOTE**

When the current is in a state of equilibrium, the three-phase four-wire system (2.5 element) can measure the following items: LEAD reactive energy, LAG reactive energy, Apparent energy, Reactive power, Apparent power, Current-1, Current-3, Power factor, Demand current-1, and Demand current-3.
4.2 Switching Display Pattern

According to Display patterns-1 to 8, the PR300 can change the measurement items to be assigned to the upper, middle, and lower displays (refer to Section 3.9, “Setting the Measured Value Display Pattern”). The procedure to change the display pattern and initial values are explained below.

### Switching Display Pattern

<table>
<thead>
<tr>
<th>Display pattern-1</th>
<th>Display pattern-2</th>
<th>Display pattern-n (up to 8)</th>
</tr>
</thead>
<tbody>
<tr>
<td><img src="image1" alt="Image of Display pattern-1" /></td>
<td><img src="image2" alt="Image of Display pattern-2" /></td>
<td><img src="image3" alt="Image of Display pattern-n" /></td>
</tr>
</tbody>
</table>

The initial value is “Display pattern-1,” and the display pattern number will be incremented by 1 every time \( \text{EXT} \) is pressed. After the number reaches \( n \), it will return to 1.

### Initial Values and Example Display Patterns

Initial value of the number of display patterns: 1  (Only display pattern-1 appears.)
Initial value of each display pattern:

<table>
<thead>
<tr>
<th>Display pattern-1</th>
<th>Display pattern-2</th>
<th>Display pattern-3</th>
<th>Display pattern-4</th>
</tr>
</thead>
<tbody>
<tr>
<td><img src="image4" alt="Image of Display pattern-1" /></td>
<td><img src="image5" alt="Image of Display pattern-2" /></td>
<td><img src="image6" alt="Image of Display pattern-3" /></td>
<td><img src="image7" alt="Image of Display pattern-4" /></td>
</tr>
</tbody>
</table>

As below, “NONE” appears in the display of a measurement item whose value cannot be displayed due to the specifications of the PR300.
4.3 Displaying Measured, Instantaneous, and Maximum/Minimum Values

Example Display and Measuring Ranges of Active Power (Regenerative Power)

Example Display and Measuring Ranges of Reactive Power

Example Display and Measuring Ranges of Apparent Power
### Example Display and Measuring Ranges of Voltage

#### Supplementary unit (refer to the table on the right)

**Voltage-1**

**Voltage-2**

**Voltage-3**

The following will appear when the input value is less than \( 0.1 \times \text{VT ratio} \) or \( 1.2 \times \text{VT ratio} \) or more.

\[ \text{r - oUt} \]

and the measured value blink alternately.

### Example Display and Measuring Ranges of Current

#### Supplementary unit (refer to the table on the right)

**Current-1**

**Current-2**

**Current-3**

The following will appear when the input value is \( 0.1 \times \text{CT ratio} \) or more.

\[ \text{r - oUt} \]

and the measured value blink alternately.

### Example Display and Measuring Ranges of Power Factor

Symbol indicated when the value is LAG power factor.

Symbol indicated when the value is LEAD power factor.

The following will appear when the measurement is out of range:

\[ \text{r - oUt} \]

and the measured value blink alternately.

Measuring range: (LEAD) 0.500 to 1 to 0.500 (LAG)

* When the power factor is 1, the symbols indicating LEAD and LAG power factors are not displayed.
4.3 Displaying Measured, Instantaneous, and Maximum/Minimum Values

Example Display and Measuring Ranges of Frequency

The frequency of Voltage-1 is displayed.

Measuring range: 45.0 to 65.0 Hz

How to Switch between Instantaneous Value, Maximum Value, and Minimum Value

- For active power (regenerative power), reactive power, apparent power, voltage, power factor, and frequency, the instantaneous value, the maximum value, and the minimum value can be switched for display using the operation keys ( or ).
- For current, the instantaneous value and the maximum value can be switched for display also using operation keys.
- The maximum and minimum values being displayed are those after resetting the maximum/minimum value or after turning on the power.

**Display of instantaneous value**

<table>
<thead>
<tr>
<th>Minimum value</th>
<th>Instantaneous value</th>
<th>Maximum value</th>
</tr>
</thead>
<tbody>
<tr>
<td>[ ]</td>
<td>[ ]</td>
<td>[ ]</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Minimum value</th>
<th>Instantaneous value</th>
<th>Maximum value</th>
</tr>
</thead>
<tbody>
<tr>
<td>[ ]</td>
<td>[ ]</td>
<td>[ ]</td>
</tr>
</tbody>
</table>

NOTE

Turn the PR300 off/on by the power supply or perform remote resetting via communication in order to reset the instantaneous, maximum, and minimum values of measurements.
4.4 Phase Switching for Voltage and Current

Using an operation key (SEL) of the PR300, the user can switch the phase of voltage, current, and demand current (*1) for display.

- For this phase switching, “Voltage (phase switch indication),” “Current (phase switch indication),” and “Demand current (*1)” must be set to the display pattern, and those settings seen on the Measured Value screen.

*1 Only the PR300 with the demand measuring function can handle demand current.

### How to Switch the Phase for Single-phase Three-wire, Three-phase Three-wire and Three-phase Four-wire (2.5 element) Systems

#### Phase Indication lamps

- Voltage-1
- Current-1
- Voltage-2 or Voltage-3
- Current-2 or Current-3

### How to Switch the Phase for Three-phase Four-wire System

#### Phase Indication lamps

- Voltage-1
- Current-1
- Voltage-2
- Current-2
- Voltage-3
- Current-3

### How to Read the Phase Indication Lamp

<table>
<thead>
<tr>
<th>Phase and wire system</th>
<th>Voltage</th>
<th>Phase indication lamp turning on on</th>
<th>Current</th>
<th>Phase indication lamp turning on</th>
</tr>
</thead>
<tbody>
<tr>
<td>Single-phase two-wire system</td>
<td>Voltage-1</td>
<td>A, B, C</td>
<td>Current-1</td>
<td>A, R</td>
</tr>
<tr>
<td>Single-phase three-wire system</td>
<td>Voltage-1</td>
<td>A, B, C</td>
<td>Current-1</td>
<td>A, R</td>
</tr>
<tr>
<td></td>
<td>Voltage-2</td>
<td>B, C, S, T</td>
<td>Current-2</td>
<td>R, T</td>
</tr>
<tr>
<td>Three-phase three-wire system</td>
<td>Voltage-1</td>
<td>A, B, C</td>
<td>Current-1</td>
<td>A, R</td>
</tr>
<tr>
<td></td>
<td>Voltage-3</td>
<td>B, C, S, T</td>
<td>Current-3</td>
<td>C, T</td>
</tr>
<tr>
<td>Three-phase four-wire system</td>
<td>Voltage-1</td>
<td>A</td>
<td>Current-1</td>
<td>A, R</td>
</tr>
<tr>
<td></td>
<td>Voltage-2</td>
<td>B</td>
<td>Current-2</td>
<td>B, S</td>
</tr>
<tr>
<td></td>
<td>Voltage-3</td>
<td>C</td>
<td>Current-3</td>
<td>C, T</td>
</tr>
<tr>
<td>Three-phase four-wire system (2.5 element)</td>
<td>Voltage-1</td>
<td>A</td>
<td>Current-1</td>
<td>A, R</td>
</tr>
<tr>
<td></td>
<td>Voltage-2</td>
<td>B</td>
<td>Current-2</td>
<td>B, S</td>
</tr>
<tr>
<td></td>
<td>Voltage-3</td>
<td>C</td>
<td>Current-3</td>
<td>C, T</td>
</tr>
</tbody>
</table>

### NOTE

- The phase indication lamps (“A,B,C” or “R,S,T”) chosen at the time of ordering are turned on. This setting cannot be changed after delivery.
- In the single-phase two-wire system, phase indication lamp “A” or “R” turns on. This setting cannot be changed.
- In the three-phase four-wire system (2.5 element), the current can be measured only when it is in a state of equilibrium.
4.5 Displaying Energy Values

This section explains the measuring range and display method of active energy, regenerative energy, LEAD reactive energy, LAG reactive energy, and apparent energy.

Example Display and Measuring Ranges of Active Energy and Regenerative Energy

* For all the four types in the table, decimal places that are not appearing can be displayed by key operation (refer to “Operation for Energy Value Display” on the next page).

Example Display and Measuring Ranges of LEAD Reactive Energy and LAG Reactive Energy

* For all the four types in the table, decimal places that are not appearing can be displayed by key operation (refer to “Operation for Energy Value Display” on the next page).

Example Display and Measuring Ranges of Apparent Energy

* For all the four types in the table, decimal places that are not appearing can be displayed by key operation (refer to “Operation for Energy Value Display” on the next page).

NOTE

When the power is below the integrated low-cut power, it is not integrated as energy.
4.5 Displaying Energy Values

Operation for Energy Value Display

For all measurement ranges of active energy, regenerative energy, LEAD reactive energy, LAG reactive energy, and apparent energy, decimal places that are not appearing can be displayed by key operation.

- The digits being displayed are in the table below. The figures that are not highlighted are not displayed and not visible.
- Every time \( \Rightarrow \) is pressed, the display order is incremented by 1. If \( \Rightarrow \) is pressed when the smallest digit is appearing, the display will return to the initial value (the display order returns to 1).
- If there is no key entry for 60 minutes after shifting the displayed digits, the display will automatically return to the initial value (the display order returns to 1).

<table>
<thead>
<tr>
<th>Display order</th>
<th>Type A</th>
<th>Display order</th>
<th>Type B</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>123456</td>
<td>1</td>
<td>1234567</td>
</tr>
<tr>
<td>2</td>
<td>23456</td>
<td>2</td>
<td>234567</td>
</tr>
<tr>
<td>3</td>
<td>34567</td>
<td>3</td>
<td>34567</td>
</tr>
<tr>
<td></td>
<td>4567</td>
<td></td>
<td>4567</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Display order</th>
<th>Type C</th>
<th>Display order</th>
<th>Type D</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>12345678</td>
<td>1</td>
<td>123456789</td>
</tr>
<tr>
<td>2</td>
<td>2345678</td>
<td>2</td>
<td>23456789</td>
</tr>
<tr>
<td>3</td>
<td>345678</td>
<td>3</td>
<td>345678</td>
</tr>
<tr>
<td>4</td>
<td>45678</td>
<td>4</td>
<td>45678</td>
</tr>
<tr>
<td>5</td>
<td>5678</td>
<td></td>
<td>5678</td>
</tr>
</tbody>
</table>

As can be seen in the figures below, the energy value returns to 0 after reaching the maximum energy value.
4.5 Displaying Energy Values

Optional Integrating Function

The optional integrating function integrates the active power while the control signal for optional integration is activated (ON for activating and OFF for deactivating). The operation for this signal can be performed via communication or by digital input.

**NOTE**

- The control signal for optional integration of the PR300 with the demand measuring function can be controlled only via communication. It is not possible by digital input.
- The active power below the integrated low-cut power cannot be integrated.
- Once the control signal for optional integration is controlled via communication, communication is the only means for controlling that signal until system reset* is performed. The same applies to control by digital input.
  * System reset can be performed by turning off/on the power supply for the PR300 or by executing remote reset via communication.
- When the system is reset, the optional integrated value is reset to 0.
- If power failure occurs during integration, an optional integrated value is reset to 0.

Example operation of the control signal for optional integration via communication

The active power during this time period is integrated.

![Diagram of control signal for optional integration via communication]

Example operation of the control signal for optional integration by digital input

The active power during this time period is integrated.

![Diagram of control signal for optional integration by digital input]

Digital input

- Number of inputs: 1
- Input signal: ON signal 4.5 to 25 V DC, OFF signal within ±1 V DC

Maximum integrated value

99999 Wh (After the integrated value reaches this maximum value, it returns to “0.”)

Data update

When the control signal for optional integration is turned off and then turned on:

- The displayed measured value is reset to 0, and integration starts. The integrated value before resetting (previous value) can be confirmed via communication.

When the control signal for optional integration is turned on for a while and turned off later:

- The displayed measured value is the integrated value. This value display is retained until the control signal for optional integration is turned on again.
4.6 Resetting Measured Values

Resetting Maximum and Minimum Values

**Operation**

1. Simultaneously hold down and for at least 5 seconds.

2. Press once.

   - The Reset Item Selection screen appears.
   - Display the reset items on the screen (refer to the figure on the left) using or and press once.

   **Reset items**

3. Press once.

   - The Reset Item Confirmation screen appears, and the reset items blinks.
   - To stop resetting
     - Press any key other than while the reset items are blinking.
   - The PR300 returns to the Reset Item Selection screen.

   **Display the reset items on the screen (refer to the figure on the left)**

   **To return to the Measured Value screen without resetting, refer to “Canceling Reset Item Selection” on the next page.**

   **The maximum and minimum values are reset, and the PR300 returns to the Measured Value screen.**

   **“RESET” appears for about 1 second, then a measured value appears.**

   *(“RESET” will not appear if returning to the screen not showing the maximum or minimum value after resetting.)*

   **To return to the Measured Value screen without resetting, refer to “Canceling Reset Item Selection” on the next page.**

Resetting Energy Value

**Operation**

1. Simultaneously hold down and for at least 5 seconds.

2. Press once.

   - The Reset Item Selection screen appears.
   - Display the reset items on the screen (refer to the figure on the left) using or and press once.

   **Reset items**

3. Press once.

   - The Reset Item Confirmation screen appears, and the reset items blinks.
   - To stop resetting
     - Press any key other than while the reset items are blinking.
   - The PR300 returns to the Reset Item Selection screen.

   **Display the reset items on the screen (refer to the figure on the left)**

   **To return to the Measured Value screen without resetting, refer to “Canceling Reset Item Selection” on the next page.**

   **The energy value is reset, and the PR300 returns to the Measured Value screen.**

   **“RESET” appears for about 1 second, then a measured value appears.**

   *(“RESET” will not appear if returning to the screen not showing the energy value after resetting.)*

   **To return to the Measured Value screen without resetting, refer to “Canceling Reset Item Selection” on the next page.**
Canceling Reset Item Selection (Returning to the Measured Value screen without resetting)

When the screen moves to the Reset Item Selection screen from the Measured Value screen, in order to return to the Measured Value screen without resetting a measured value, carry out the following operations.

**Operation**

**Reset Item Selection screen**

On the Reset Item Selection screen, press \( \text{RESET} \) or \( \text{CANCEL} \) to bring up \( \text{RESET} \) and press \( \text{CANCEL} \) once.

**Reset Item Confirmation screen**

The Reset Item Confirmation screen appears, and the reset item blinks.

Press \( \text{Cancel} \) once.

**Measured Value screen**

The measured value is not reset, and the PR300 returns to the Measured Value screen.

**Reset Items and Details**

<table>
<thead>
<tr>
<th>Reset Item Symbol</th>
<th>Reset Item Names</th>
<th>Details</th>
</tr>
</thead>
<tbody>
<tr>
<td>( \text{All} )</td>
<td>Maximum/minimum value reset</td>
<td>The maximum/minimum values of active power, regenerative power, reactive power, apparent power, voltage, power factor, and frequency are reset to the current value. The maximum value of current is reset to the current value.</td>
</tr>
<tr>
<td>( \text{VATt} )</td>
<td>Energy value reset</td>
<td>The values of active energy, regenerative energy, LEAD reactive energy, LAG reactive energy, and apparent energy are reset to &quot;0.&quot;</td>
</tr>
<tr>
<td>( \text{CANCl} )</td>
<td>Cancellation</td>
<td>Resetting is not performed. The PR300 returns to the Measured Value screen from the Reset Item Selection screen.</td>
</tr>
</tbody>
</table>
4.7 Demand Measurement (Optional Measuring Function)

The PR300 (with the demand measuring function) can measure the average power or current during the set demand period. This section explains the example display of measured value, measuring range, measurement operation, and example measurement. For setting conditions related to the demand measurement such as demand period, refer to Section 3.8, “Setting Demand Measurement Conditions.”

Example Demand Display and Measuring Ranges

Demand power

<table>
<thead>
<tr>
<th>Supplementary unit (refer to the table on the right)</th>
<th>Measuring range</th>
</tr>
</thead>
<tbody>
<tr>
<td>Demand power</td>
<td></td>
</tr>
<tr>
<td>Turn on during demand measurement</td>
<td></td>
</tr>
<tr>
<td>Turn on during demand alarm</td>
<td></td>
</tr>
<tr>
<td>Turn on while the value is displayed</td>
<td></td>
</tr>
<tr>
<td>Turn on during demand measurement</td>
<td></td>
</tr>
<tr>
<td>Start/stop of demand measurement and alarm release</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Secondary rated power (\times 1.2 \times \text{VT ratio} \times \text{CT ratio})</th>
<th>Measuring range</th>
</tr>
</thead>
<tbody>
<tr>
<td>6 W to less than 100 W</td>
<td>0.00 to 99.99 W</td>
</tr>
<tr>
<td>100 W to less than 1 kW</td>
<td>0.0 to 999.9 W</td>
</tr>
<tr>
<td>1 kW to less than 10 kW</td>
<td>0.00 to 9999 W</td>
</tr>
<tr>
<td>10 kW to less than 100 kW</td>
<td>0.00 to 99999 W</td>
</tr>
<tr>
<td>100 kW to less than 1 MW</td>
<td>0.0 to 9999.9 kW</td>
</tr>
<tr>
<td>1 MW to less than 10 MW</td>
<td>0.0 to 99999 W</td>
</tr>
<tr>
<td>10 MW to less than 100 MW</td>
<td>0.00 to 999.9 MW</td>
</tr>
<tr>
<td>100 MW to less than 1 GW</td>
<td>0.0 to 9999.9 MW</td>
</tr>
<tr>
<td>1 GW or greater</td>
<td>0.0 to 99999 MW</td>
</tr>
</tbody>
</table>

Demand current

<table>
<thead>
<tr>
<th>Supplementary unit (refer to the table on the right)</th>
<th>Measuring range</th>
</tr>
</thead>
<tbody>
<tr>
<td>Demand current</td>
<td></td>
</tr>
<tr>
<td>Turn on during demand measurement</td>
<td></td>
</tr>
<tr>
<td>Turn on during demand alarm</td>
<td></td>
</tr>
<tr>
<td>Turn on while the value is displayed</td>
<td></td>
</tr>
<tr>
<td>Turn on during demand measurement</td>
<td></td>
</tr>
<tr>
<td>Start/stop of demand measurement and alarm release</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Current range (\times 1.2 \times \text{CT ratio})</th>
<th>Measuring range</th>
</tr>
</thead>
<tbody>
<tr>
<td>0.06 A to less than 10 A</td>
<td>0.000 to 9.999 A</td>
</tr>
<tr>
<td>10 A to less than 100 A</td>
<td>0.00 to 99.99 A</td>
</tr>
<tr>
<td>100 A to less than 1 kA</td>
<td>0.0 to 999.9 A</td>
</tr>
<tr>
<td>1 kA to less than 10 kA</td>
<td>0.00 to 9999 A</td>
</tr>
<tr>
<td>10 kA to less than 100 kA</td>
<td>0.00 to 99999 A</td>
</tr>
<tr>
<td>100 kA to less than 1 MA</td>
<td>0.0 to 9999.9 kA</td>
</tr>
</tbody>
</table>

Demand Measurement Procedure

Equation: \((Pt - Ps) \times (60 \text{ minutes} \times 60 \text{ seconds} \div t)\)

- Pt: Current integrated value
- Ps: Integrated value at the beginning of the demand period
- t: Demand elapsed time (data update period: 10 seconds)

<table>
<thead>
<tr>
<th>Start demand measurement</th>
<th>Demand period</th>
<th>Stop demand measurement</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

The phase indication lamp indicates which phase of the phase of the demand current being measured can be switched for display.
4.7 Demand Measurement (Optional Measuring Function)

Operation for Demand Measurement

Demand measurement can be started and stopped by the operation key ()
or via communication. This section only explains control by the operation key
(for operation via communication, refer to the PR300 Communication Interface
User’s Manual: IM77C01E01-10E). In the demand measurement mode,
either the demand power or the demand current can be measured. To set either
of these, refer to Section 3.8, “Setting Demand Measurement Conditions.”

Start demand measurement

Measured Value screen

Demand measurement starts.

Stop demand measurement

Measured Value screen

Demand measurement stops.

NOTE

- Once the operation key is used for control to start and stop demand measurement,
it is the only means for controlling until system reset* is performed. The same applies
to control via communication.
* System reset can be performed by turning off/on the power supply for the PR300 or
by executing remote reset via communication.
- When the system is reset, the measured values of demand, maximum demand,
and demand alarm status are reset to 0.
- If power failure occurs during measurement, the measured values of demand, maximum
demand, and demand alarm status are reset to 0.

Example operation to start/stop demand measurement

These control signals are invalid.

<table>
<thead>
<tr>
<th>Time</th>
<th>Start command</th>
<th>Stop command</th>
</tr>
</thead>
<tbody>
<tr>
<td>Start</td>
<td>Communication</td>
<td>Data update</td>
</tr>
<tr>
<td>Start</td>
<td>Communication</td>
<td>Data update</td>
</tr>
<tr>
<td>Stop</td>
<td>Communication</td>
<td>Data update</td>
</tr>
<tr>
<td>Stop</td>
<td>Communication</td>
<td>Data update</td>
</tr>
</tbody>
</table>

This control signal is valid.
**4.7 Demand Measurement (Optional Measuring Function)**

**Demand Alarm**

**Demand alarm output**
- **Function:** When the set demand alarm point is exceeded, an alarm is output.
- **Output signal:** Open collector
- **Output capacity:** 30 V DC, 200 mA

**Demand alarm release function**
- **Automatic release:** When the demand value falls below the demand alarm point, the alarm is canceled.
- **Manual release:** The state of the alarm is maintained even if the demand value falls below the demand alarm point. It is canceled via communication or by digital input or the operation key.

**Digital input**
- **Number of inputs:** 1
- **ON signal:** 4.5 to 25 V DC
- **OFF signal:** within ±1 V DC

**Demand alarm mask time**
The demand alarm mask time is the time between the beginning of the demand period and the set time, during which a demand alarm is not recognized.

**Example Demand Measurement**

The diagram shows a 32-minute demand measurement period with an update interval of 10 seconds, resulting in 192 measurements. The demand period is divided into three segments, each 10 minutes long. The demand alarm point is indicated, and the demand alarm mask time is shown. The maximum demand value is highlighted, and the demand alarm output is described as open collector. The alarm can be manually canceled via communication or by digital input or the operation key.

**Maximum demand value**
The maximum demand value is the maximum value in the demand measuring time. This value is retained until system reset or start of the next demand measurement.
## 5.1 Error Display and Recommended Response

### Failure at the Time of Turning on the Power and during Operation

<table>
<thead>
<tr>
<th>Error display</th>
<th>Upper display of measured value display</th>
<th>Power lamp</th>
<th>Phase and wire system lamp</th>
<th>Communication lamp</th>
<th>Pulse lamp</th>
<th>Type of fault</th>
<th>Power calculation</th>
<th>Communication</th>
<th>Pulse output (contact point)</th>
<th>Analog output</th>
<th>Demand alarm</th>
<th>Recommended response</th>
</tr>
</thead>
<tbody>
<tr>
<td>£000</td>
<td>Unstable</td>
<td>Off</td>
<td>Off</td>
<td>Off</td>
<td>Off</td>
<td>RAM error</td>
<td>Disabled</td>
<td>Disabled</td>
<td>Disabled</td>
<td>Disabled</td>
<td>Disabled</td>
<td>Request repair.</td>
</tr>
<tr>
<td>£001</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>ROM error</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>£002</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>System data fault</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>£003</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Calibration data fault</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>£004</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Parameter fault</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>£005</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Backup fault</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>£006</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>EEPROM error</td>
<td>Normal action</td>
<td>Normal action</td>
<td>Normal action</td>
<td>Normal action</td>
<td>Normal action</td>
<td></td>
</tr>
<tr>
<td>£007</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>ADC error</td>
<td>Disabled</td>
<td>Disabled</td>
<td>Disabled</td>
<td>Disabled</td>
<td>Disabled</td>
<td></td>
</tr>
</tbody>
</table>

### Errors during Operation

<table>
<thead>
<tr>
<th>Error display</th>
<th>Upper display of measured value display</th>
<th>Power lamp</th>
<th>Phase and wire system lamp</th>
<th>Communication lamp</th>
<th>Pulse lamp</th>
<th>Type of fault</th>
<th>Power calculation</th>
<th>Communication</th>
<th>Pulse output (contact point)</th>
<th>Analog output</th>
<th>Demand alarm</th>
<th>Recommended response</th>
</tr>
</thead>
<tbody>
<tr>
<td>£000</td>
<td>Unstable</td>
<td>Off</td>
<td></td>
<td></td>
<td></td>
<td>RAM error</td>
<td>Disabled</td>
<td>Disabled</td>
<td>Disabled</td>
<td>Disabled</td>
<td>Disabled</td>
<td>Request repair.</td>
</tr>
<tr>
<td>£001</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>ROM error</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>£002</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>System data fault</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>£003</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Calibration data fault</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>£004</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Parameter fault</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>£005</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Backup fault</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>£006</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>EEPROM error</td>
<td>Normal action</td>
<td>Normal action</td>
<td>Normal action</td>
<td>Normal action</td>
<td>Normal action</td>
<td></td>
</tr>
<tr>
<td>£007</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>ADC error</td>
<td>Disabled</td>
<td>Disabled</td>
<td>Disabled</td>
<td>Disabled</td>
<td>Disabled</td>
<td></td>
</tr>
</tbody>
</table>

### Errors at the Measured input error

<table>
<thead>
<tr>
<th>Measurement items</th>
<th>Measured input error conditions</th>
<th>Error display</th>
<th>Recommended response</th>
</tr>
</thead>
<tbody>
<tr>
<td>Active power</td>
<td>120% or more of “secondary rated power × VT ratio × CT ratio”</td>
<td>£000 and the measured value blink alternately</td>
<td>The error is cleared by inputting a measured value less than 120%.</td>
</tr>
<tr>
<td>Reactive power</td>
<td>120% or more of “voltage range × VT ratio” Less than 10% of “voltage range × VT ratio”</td>
<td>£000 and the measured value blink alternately</td>
<td>The error is cleared by inputting a measured value 10% or more.</td>
</tr>
<tr>
<td>Apparent power</td>
<td>120% or more of “current range × CT ratio”</td>
<td>£000 and the measured value blink alternately</td>
<td>The error is cleared by inputting a measured value less than 120%.</td>
</tr>
<tr>
<td>Voltage</td>
<td>120% or more of “voltage range × VT ratio” Less than 10% of “voltage range × VT ratio”</td>
<td>£000 and the measured value blink alternately</td>
<td>The error is cleared by inputting a measured value 10% or more.</td>
</tr>
<tr>
<td>Current</td>
<td>Out of the measuring range (LEAD 0.5 to 1 to LAG 0.5)</td>
<td>£000 and the measured value blink alternately</td>
<td>The error is cleared by inputting a measured value within the measuring range.</td>
</tr>
<tr>
<td>Power factor</td>
<td>Out of the measuring range (45 to 65 Hz)</td>
<td>£000 and the measured value blink alternately</td>
<td>The error is cleared by inputting a measured value within the measuring range.</td>
</tr>
</tbody>
</table>

### Errors at the Time of Setting Parameters

<table>
<thead>
<tr>
<th>Example</th>
<th>Error display</th>
<th>Recommended response</th>
</tr>
</thead>
<tbody>
<tr>
<td>The setpoint is out of the range.</td>
<td>£000 and the setpoint blink alternately on the display.</td>
<td>The error is cleared by setting a value within the range.</td>
</tr>
</tbody>
</table>
5.2 Maintenance

Cleaning

The front panel and operation keys should be gently wiped with a dry cloth.

⚠️ NOTE

Do not use alcohol, benzine, or any other solvents.

Request for Repair in the Case of a Failure

• In the case of a failure, the failed product is to be exchanged for a replacement. We will accept the request for repair for a period of seven years from the date of the purchase.
• The parameter settings set to the failed product cannot be restored for a replacement.
  (Record the parameter settings of the PR300 on MEMO column in Appendix 4, “Parameter List” of this manual.)
• Return the failed product with the accessories in the package supplied at delivery.

In the case of a failure, check the following and contact the sales representative from which you purchased the product.
1. Serial number (shown in “NO.” on the nameplate)
2. Failed state and error display
### Appendix 1 Specifications of PR300

#### Measuring Function

| **Active energy (regenerative energy)** | The active power up to present is integrated, and the integrated value is output in units of kWh or MWh (only kWh in the communication mode). The sign of integrated values of regenerative power is "–", and they are output as different data. |
| **Reactive energy** | LAG and LEAD reactive power up to present are integrated and output in units of kvarh or Mvarh (only kvarh in the communication mode). The signs of LAG reactive power and LEAD reactive power are "+" and "–", respectively. |
| **Apparent energy** | Apparent power up to present is integrated and output in units of kVAh or MVAh (only kVAh in the communication mode). |
| **Optional active energy** | While the control signal for optional integration is turned on, the active power is integrated and output in units of Wh. The control signal for optional integration is turned on via communication or by digital input. |

**Active power (regenerative power)**

- The present active power is in units of W, kW, or MW. The sign of the value of regenerative power is always "–".
- **Minimum resolution**: 0.1 W (The minimum display resolution is the least significant value of \[\text{primary rated power} \times 0.001\]).
- **Maximum/minimum values**: They are calculated in the range of \[\pm \text{primary rated power} \times 1.2\] to \[\text{primary rated power} \times 1.2\].

**Apparent power**

- The present apparent power is in units of VA, kVA, or MVA.
- **Minimum resolution**: 0.1 VA (The minimum display resolution is the least significant digit of \[\text{primary rated power} \times 0.001\]).
- **Maximum/minimum values**: They are calculated in the range of 0 to \[\text{primary rated power} \times 1.2\].

**Reactive power**

- The present reactive power is in units of var, kvar, or Mvar. The value of LEAD reactive power is output with a "–" sign. The value of LAG reactive power is output without a positive sign. (The signs of LEAD/LAG calculates according to the phase difference between V1 and I1.)
- **Minimum resolution**: 0.1 var
- **Maximum value**: It is calculated in the range between 0 and \[\text{primary rated power} \times 1.2\] (whichever is larger of the LEAD or LAG value).
- **Minimum value**: It is calculated in the range between 0 and \[\text{primary rated power} \times 1.2\] (whichever is smaller of the LEAD or LAG value).

**Power factor**

- The present LEAD power factor is output as a value with a "–" sign. The present LAG power factor is output as a value without a positive sign (a power factor is an rms value. The signs of LEAD/LAG calculates according to the phase difference between V1 and I1.).
- **Minimum resolution**: 0.001
- **Maximum value**: It is calculated in the range between 0 and \[\text{primary rated power} \times 1.2\] (whichever is larger of the LEAD or LAG value).
- **Minimum value**: It is calculated in the range between 0 and \[\text{primary rated power} \times 1.2\] (whichever is smaller of the LEAD or LAG value).

**Frequency**

- The frequency of the voltage line input to Voltage-1 is output in units of Hz.
- **Minimum resolution**: 0.1 Hz

**Demand**

- The average power or the average current in the set demand period is measured (refer to "3.8 Setting Demand Measurement Conditions" and "4.7 Demand Measurement").

*Primary rated power = secondary rated power × VT ratio × CT ratio (Secondary rated power is the rated power of PR300).*
### Power Items and Equations

#### (V and A are rms values.)

<table>
<thead>
<tr>
<th>Phase and wire system</th>
<th>Apparent Power</th>
<th>Reactive Power</th>
<th>Power Factor</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Single-phase two-wire system</strong></td>
<td>$VA = V \times A$</td>
<td>$Q = \sqrt{((VA)^2 - P^2)}$</td>
<td>$\Sigma P / \Sigma VA$</td>
</tr>
<tr>
<td><strong>Single-phase three-wire system</strong></td>
<td>$VA_i = V_iA_i$</td>
<td>$Q_i = \sqrt{((VA_i)^2 - P_i^2)}$</td>
<td>(without using reactive power meter method)</td>
</tr>
<tr>
<td>$i = 1, 2$</td>
<td>$\Sigma VA = VA_1 + VA_2$</td>
<td>$\Sigma Q = Q_1 + Q_2$</td>
<td></td>
</tr>
<tr>
<td><strong>Three-phase three-wire system</strong></td>
<td>$VA_i = V_iA_i$</td>
<td>$Q_i = \sqrt{((VA_i)^2 - P_i^2)}$</td>
<td></td>
</tr>
<tr>
<td>$i = 1, 3$</td>
<td>$\Sigma VA = \sqrt{3}(VA_1 + VA_3)$</td>
<td>$\Sigma Q = Q_1 + Q_3$</td>
<td></td>
</tr>
<tr>
<td><strong>Three-phase four-wire system</strong></td>
<td>$VA_i = V_iA_i$</td>
<td>$Q_i = \sqrt{((VA_i)^2 - P_i^2)}$</td>
<td></td>
</tr>
<tr>
<td>$i = 1, 2, 3$</td>
<td>$\Sigma VA = VA_1 + VA_2 + VA_3$</td>
<td>$\Sigma Q = Q_1 + Q_2 + Q_3$</td>
<td></td>
</tr>
<tr>
<td><strong>Three-phase four-wire system (2.5 element)</strong></td>
<td>$VA_i = V_iA_i$</td>
<td>$Q_i = \sqrt{3/2[(VA_i)^2 - P_i^2]}$</td>
<td></td>
</tr>
<tr>
<td>$i = 1, 3$</td>
<td>$\Sigma VA = \sqrt{3/2}(VA_1 + VA_3)$</td>
<td>$\Sigma Q = Q_1 + Q_3$</td>
<td></td>
</tr>
</tbody>
</table>

* For distorted wave input, there may be differences between the PR300 and a measuring instrument that uses a different measurement principle.

### Input Specifications

#### Phase and wire system

- Universal three-phase three-wire system (switch the setting from single-phase two-wire system, single-phase three-wire system, or three-phase three-wire system)
- Universal three-phase four-wire system (switch the setting from single-phase two-wire system, single-phase three-wire system, three-phase three-wire system, or three-phase four-wire system)
- Three-phase four-wire system (2.5 element)

#### Frequency

- 45 to 65Hz

#### Rated input voltage

- 120 V: voltage range: 150 V (‡): 900kV (‴)
- 240 V: voltage range: 300 V (‡): 1800kV (‴)
- 480 V: voltage range: 600 V (‡): 3600kV (‴)

*The setting of the voltage range can be changed.
**The primary voltage of VT.

#### Allowable input voltage

- Within the voltage range

#### Rated input current

- 1 A; current range: 1 A (fixed): 32kA (‴)
- 5 A; current range: 5 A (fixed): 160kA (‴)

*The primary current of CT.

#### Allowable input current

- 1.2 times the current range (continuous); twice the current range (10 seconds); 10 times the current range (3 seconds)

### Rated input power and measuring range (when VT and CT are used, their respective secondary values)

#### Single-phase two-wire system

<table>
<thead>
<tr>
<th>Input (AC)</th>
<th>Rated power</th>
<th>Input measuring range</th>
<th>Approximate consumed VA</th>
<th>Voltage</th>
<th>Current</th>
</tr>
</thead>
<tbody>
<tr>
<td>120V/1A</td>
<td>100W</td>
<td>−120 to 120W</td>
<td>0.2VA</td>
<td>0.2VA</td>
<td></td>
</tr>
<tr>
<td>120V/5A</td>
<td>500W</td>
<td>−600 to 600W</td>
<td>0.4VA</td>
<td>0.4VA</td>
<td></td>
</tr>
<tr>
<td>240V/1A</td>
<td>200W</td>
<td>−240 to 240W</td>
<td>0.8VA</td>
<td>0.8VA</td>
<td></td>
</tr>
<tr>
<td>240V/5A</td>
<td>1000W</td>
<td>−1200 to 1200W</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>480V/1A</td>
<td>400W</td>
<td>−480 to 480W</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>480V/5A</td>
<td>2000W</td>
<td>−2400 to 2400W</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

#### Single-phase three-wire system

<table>
<thead>
<tr>
<th>Input (AC)</th>
<th>Rated power</th>
<th>Input measuring range</th>
<th>Approximate consumed VA</th>
<th>Voltage</th>
<th>Current</th>
</tr>
</thead>
<tbody>
<tr>
<td>120V/1A</td>
<td>100W</td>
<td>−240 to 240W</td>
<td>0.2VA/phase</td>
<td>0.2VA/phase</td>
<td></td>
</tr>
<tr>
<td>120V/5A</td>
<td>1000W</td>
<td>−1200 to 1200W</td>
<td>0.4VA/phase</td>
<td>0.4VA/phase</td>
<td></td>
</tr>
<tr>
<td>240V/1A</td>
<td>400W</td>
<td>−480 to 480W</td>
<td>0.8VA/phase</td>
<td>0.8VA/phase</td>
<td></td>
</tr>
<tr>
<td>240V/5A</td>
<td>2000W</td>
<td>−2400 to 2400W</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

#### Three-phase three-wire system

<table>
<thead>
<tr>
<th>Input (AC)</th>
<th>Rated power</th>
<th>Input measuring range</th>
<th>Approximate consumed VA</th>
<th>Voltage</th>
<th>Current</th>
</tr>
</thead>
<tbody>
<tr>
<td>120V/1A</td>
<td>100W</td>
<td>−240 to 240W</td>
<td>0.2VA/phase</td>
<td>0.2VA/phase</td>
<td></td>
</tr>
<tr>
<td>120V/5A</td>
<td>1000W</td>
<td>−1200 to 1200W</td>
<td>0.4VA/phase</td>
<td>0.4VA/phase</td>
<td></td>
</tr>
<tr>
<td>240V/1A</td>
<td>400W</td>
<td>−480 to 480W</td>
<td>0.8VA/phase</td>
<td>0.8VA/phase</td>
<td></td>
</tr>
<tr>
<td>240V/5A</td>
<td>2000W</td>
<td>−2400 to 2400W</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

#### Three-phase four-wire system

<table>
<thead>
<tr>
<th>Input (AC)</th>
<th>Rated power</th>
<th>Input measuring range</th>
<th>Approximate consumed VA</th>
<th>Voltage</th>
<th>Current</th>
</tr>
</thead>
<tbody>
<tr>
<td>120V/1A</td>
<td>300W</td>
<td>−360 to 360W</td>
<td>0.2VA/phase</td>
<td>0.2VA/phase</td>
<td></td>
</tr>
<tr>
<td>120V/5A</td>
<td>1500W</td>
<td>−1800 to 1800W</td>
<td>0.4VA/phase</td>
<td>0.4VA/phase</td>
<td></td>
</tr>
<tr>
<td>240V/1A</td>
<td>600W</td>
<td>−720 to 720W</td>
<td>0.8VA/phase</td>
<td>0.8VA/phase</td>
<td></td>
</tr>
<tr>
<td>240V/5A</td>
<td>3000W</td>
<td>−3600 to 3600W</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>480V/1A</td>
<td>1200W</td>
<td>−1440 to 1440W</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>480V/5A</td>
<td>6000W</td>
<td>−7200 to 7200W</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

*Input specification of 1A AC is not available for 2.5 element.

When VT and CT are used, the input measuring range of the primary input power is smaller than 10 GW, and the value calculated by the following equation is within the input measuring range above.

$$\text{Input measuring range (W)} = \frac{\text{Primary input power (W)}}{\text{VT ratio} \times \text{CT ratio}}$$
Appendix 1 Specifications of PR300

Digital Input Specifications
It is used for control signals for optional integration or demand alarm release.

Control signal for optional integration: Starts and stops measurement of optional active energy.
Demand alarm release (with demand measuring function): Releases demand alarm.

| Number of inputs | 1 |
| Input signal     | Voltage signal; ON signal: 4.5 to 25 V DC; OFF signal: within ±1 V DC |
| Minimum ON time  | 50 ms |

(Note 1) The control signal for optional integration can be controlled via communication. Once it is controlled by digital input, it is the only means for controlling until the system is reset. System reset can be performed via communication or by turning off/on of the power of the PR300.
(Note 2) In the PR300 with the demand measuring function, digital input can be used only to cancel the demand alarm and cannot be used for control signals for optional integration.

Analog Output Specifications (additional output function)
The measured value is converted into the direct current signal for outputting.

| Measurement item for output | One of active power, reactive power, apparent power, voltage-1, voltage-2, voltage-3, current-1, current-2, current-3, power factor, and frequency |
| Output signal               | 4 to 20 mA DC |
| Output accuracy             | Measurement accuracy of measurement item for output + (±0.5% of F.S.) |
| Allowable load resistance   | 0 to 600 Ω |
| Response speed              | 2 seconds or less (until ±1% of the final value is reached) |
| Setting item                | Selection of measurement item for output, and lower, and upper limits of scaling |
| Setting range of lower/upper limits of scaling according to measurement item for output | |
| Active power                | – rated power (W) to rated power (W) |
| Reactive power              | – rated power (var) to rated power (var) |
| Apparent power              | 0 to rated power (VA) |
| Voltage-1 to 3              | 0 to voltage range (V) |
| Current-1 to 3              | 0 to current range (A) |
| Power factor                | (LEAD) 0.5 to 1 to (LAG) 0.5 |
| Frequency                   | 45 to 65 (Hz) |

Pulse Output Specifications (additional output function)
The pulse proportional to the energy is output.

| Measurement item for output | One of active energy, regenerative energy, LEAD reactive energy, LAG reactive energy, and apparent energy |
| Number of outputs           | 1 |
| Output signal               | Open collector |
| Contact capacity            | 30 V DC, 200 mA |
| Pulse unit                  | 0.1 to 5000.0 kWh/pulse (changeable in increments of 100 Wh) |
| Setting item                | Measurement items for output, pulse unit, and ON pulse width |
| ON pulse width              | The ON time of the output pulse is shown. |
| Setting range:              | 10 to 1270 ms (changeable in increments of 10 ms) |
| Maximum ON pulse width (ms) | \[
|                            | \frac{Pulse \text{ unit [kWh/pulse]} \times 3600 \times 1000}{Secondary \text{ rated power [W] \times VT \text{ ratio} \times CT \text{ ratio} \times 1.2 \times 2} \]
| The pulse unit of reactive energy is kvarh/pulse, and that of apparent energy is kVAh/pulse. |
Appendix 1 Specifications of PR300

Demand Alarm Output Specifications (optional measuring function)

When the demand measurement value exceeds the set demand alarm point, an alarm is triggered.

Output signal: Open collector
Contact capacity: 30 V DC, 200 mA
Set alarm range: 1 to 1000 kW (during demand power measurement); 1 to 1000 A (during demand current measurement)

Alarm release function

Automatic release: When the measured value falls below the demand alarm point during alarm output, the alarm is canceled.

Manual release: Used to keep the alarm turned on or to cancel it by digital input or the operation key, or via communication.

* The demand alarm mask time can be set for the PR300.

The demand alarm mask time is the time between the beginning of the demand period and the set time, during which an alarm is not recognized.

Allowable range of set time: 1 minute to demand period

Communication Specifications

RS-485 communication

Via RS-485 communication, various measured values are read, and values are written to various parameters using the command/response method.

(Example)

Maximum communication distance: 1.2 km
Maximum number of connectable slave stations: 31

Station number 01: 4567.2345, 9876.0123
Station number 02: 4567.2345, 9876.0123
Station number 31: 4567.2345, 9876.0123

Protocol: PC link (without checksum), PC link (with checksum), Modbus/ASCII, and Modbus/RTU
Transmission distance: Approximately 1.2 km maximum (with 24AWG twisted-pair cable(s))
Connection method: Multi-drop connection (a maximum of 32 units including a higher-level device)
Station number: 01 to 99 (maximum number of units to be connected: 31 [number of units that can be connected to a PC etc.]) (recommended value: 01 to 31)
Transmission method: Half-duplex communication
Synchronization: Start-stop synchronization
Baud rate: 19200/9600/2400 bps
Xon/Xoff control: None
Data format: Data length 8 bits, 7 bits
Parity: None, even, odd
Stop bit: 1 bit, 2 bits
Appendix 1 Specifications of PR300

Example of connection diagram

Maximum distance: about 1.2 km (31 units maximum)

For RS-485 communication, the PR300 employs the two-wire system.
SG: Connection to Terminal SG is made to adjust the signal level of the RS-485 communication line.
FG: For noise protection, a shield line must be connected to all wires in the RS-485 communication line and grounded at one location.

Use UL Listed RS-232C/RS-485 converter if the converter has AC/DC power supply input; this is optional for converters supplied by a Limited Power Source with input voltages less than 30 V AC or 60 V DC and which are separated from mains by double or reinforced insulation.

Ethernet communication

Via Ethernet communication, various measured values are read, and values are written to various parameters using the command/response method.

Connectable to an IEEE802.3-compliant network (10BASE-T/100BASE-TX).

Application layer
Transport layer
Network layer
Data link layer
Physical layer

MODBUS/TCP
TCP, UDP
IP, ICMP, ARP
Ethernet
10BASE-T/100BASE-TX

Communication specifications

<table>
<thead>
<tr>
<th>Protocol</th>
<th>Modbus/TCP</th>
</tr>
</thead>
<tbody>
<tr>
<td>Access control</td>
<td>CSMA/CD</td>
</tr>
<tr>
<td>Baud rate</td>
<td>10Mbps/100Mbps</td>
</tr>
<tr>
<td>Maximum segment length</td>
<td>100m (between HUB and module)</td>
</tr>
<tr>
<td>Maximum connection configuration</td>
<td>4 segments maximum (10BASE-T)</td>
</tr>
<tr>
<td></td>
<td>2 segments maximum (100BASE-TX)</td>
</tr>
<tr>
<td></td>
<td>(number of HUBs that can be cascade connected)</td>
</tr>
</tbody>
</table>

IP address
The IP address can be set using the operation keys on the front side of the PR300.
Appendix 1 Specifications of PR300

Modbus/TCP function

<table>
<thead>
<tr>
<th>Code</th>
<th>Function</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>03</td>
<td>Reads data from multiple D registers</td>
<td>Capable of reading data from up to 64 registers continuously.</td>
</tr>
<tr>
<td>06</td>
<td>Writes data into D register</td>
<td>Capable of writing data into one register.</td>
</tr>
<tr>
<td>08</td>
<td>Performs loopback test</td>
<td>Capable of performing a communication test.</td>
</tr>
<tr>
<td>16</td>
<td>Writes data into multiple D registers</td>
<td>Capable of writing data into up to 32 registers continuously.</td>
</tr>
</tbody>
</table>

Overview of Modbus/TCP protocol

The structure of the Modbus/TCP protocol is as follows:

<table>
<thead>
<tr>
<th>MBAP Header</th>
<th>Function code</th>
<th>Data</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

The Modbus Application Protocol Header (MBAP Header) is made of the following seven bytes:

<table>
<thead>
<tr>
<th>Byte No</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Transaction ID</td>
</tr>
<tr>
<td>2</td>
<td>Protocol ID</td>
</tr>
<tr>
<td>4</td>
<td>Number of bytes</td>
</tr>
<tr>
<td>5</td>
<td>Unit ID</td>
</tr>
</tbody>
</table>

Ethernet - Serial gateway function

Equipped with an Ethernet communication connector and an RS-485 communication terminal, the PR300 receives a Modbus/TCP command from Ethernet and relays it to the RS-485 communication terminal. The PR300 allows connection to RS-485 serial communication devices (Modbus/RTU protocol) via the network.

<table>
<thead>
<tr>
<th>Protocol communication</th>
<th>Protocol</th>
<th>Baud rate</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Modbus/RTU</td>
<td>9600bps</td>
</tr>
<tr>
<td>Baud rate</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Parity</td>
<td>None, even, odd</td>
<td></td>
</tr>
<tr>
<td>Stop bit</td>
<td>1 bit</td>
<td></td>
</tr>
<tr>
<td>Data length</td>
<td>8 bits</td>
<td></td>
</tr>
</tbody>
</table>

RS-485 communication

If Ethernet communication is used, the RS-485 communication interface is used specifically for the Ethernet-serial gateway function. Therefore, it is not possible for a higher-level device such as a PC to access the PR300 via the RS-485 communication interface.

Standard Performance

<table>
<thead>
<tr>
<th>Accuracy rating</th>
<th>Active energy/optional active energy (Wh)</th>
<th>±0.5% (EN60687 accuracy: Class 0.5 or equivalent)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Active power (W)</td>
<td>±0.5% of F.S.</td>
<td></td>
</tr>
<tr>
<td>Voltage (V)</td>
<td>±0.25% of F.S. (voltage rms)</td>
<td></td>
</tr>
<tr>
<td>Current (A)</td>
<td>±0.25% of F.S. (current rms)</td>
<td></td>
</tr>
<tr>
<td>Frequency (Hz)</td>
<td>±0.5Hz</td>
<td></td>
</tr>
<tr>
<td>Demand</td>
<td>±0.5%</td>
<td></td>
</tr>
</tbody>
</table>

Calculation accuracy

The value is calculated to ±1 digit from the measured value for reactive energy, apparent energy, reactive power, apparent power, power factor, or current. Current is only for the 2.5-element measurement.

Backup upon power failure

The last integrated values obtained immediately before the power failure are held for active energy, regenerative energy, reactive energy, and apparent energy.
Appendix 1 Specifications of PR300

Insulation resistance  
Between each of the voltage input, current input, power, ground, digital input, pulse output, analog output, RS-485 communication output, Ethernet communication output, and alarm output terminals: 100 MΩ minimum (at 500 V DC)

Withstand voltage  
Between each of the voltage input, current input, power, and ground terminals: 2500 V AC for 1 minute  
Between (the voltage input, current input, power, and ground terminals) and the digital input, pulse output, analog output, alarm output, RS-485 communication output, and Ethernet communication output terminals: 2500 V AC for 1 minute  
Between each of the digital input, pulse output, analog output, alarm output, and (RS-485 communication output, Ethernet communication output) terminals: 1000 V AC for 1 minute  
Between the RS-485 communication output and Ethernet communication output terminals: 500 V AC for 1 minute

Impulse withstand voltage  
Between all of the voltage input, current input, and power terminals and the ground terminal  
Between all of the output and ground terminals and all of the voltage and current input terminals: 6 kV (1.2/50 μs), 10 times for positive and negative

Effects of magnetic field  
400 A/m or less: Active power: ±0.5% of F.S., Voltage: ±0.25% of F.S.

Effects of changes in ambient temperature  
±0.03%/°C for a temperature change rate of 10°C/h or less (when 0.05ln ≤ I ≤ Imax and power factor = 1)  
±0.05%/°C for a temperature change rate of 10°C/h or less (when 0.1ln ≤ I ≤ Imax and power factor = LAG0.5)  
In: rated current; I: present current input

Effects of power supply voltage variations  
Active power: ±0.25%, Voltage/Current: ±0.125% (for variations within the power supply operating range (when 0.01In and power factor = 1))  
In: rated current

Effects of input frequency  
Active power: ±0.25%, Voltage/Current: ±0.125% (for variations of 45 to 65 Hz)

Power supply  
100 - 240 V AC ±10% (50/60 Hz) or 130 - 300 V DC ±15%

Power consumption  
AC drive 10 VA maximum  
DC drive 5 W maximum

Safety and EMC Standards

Safety standards  
Compliant with  
UL61010-1  
CAN/CSA C22.2 No.61010-1-04 (C-UL Listed)

Measurement category: 600V CAT.III

<table>
<thead>
<tr>
<th>Measurement category</th>
<th>Descriptions</th>
<th>Remarks</th>
</tr>
</thead>
<tbody>
<tr>
<td>CAT.I</td>
<td>Circuits not directly connected to the main power supply</td>
<td></td>
</tr>
<tr>
<td>CAT.II</td>
<td>Circuits directly connected to low-voltage facility</td>
<td>House-use equipment, portable tools, etc.</td>
</tr>
<tr>
<td>CAT.III</td>
<td>Circuits in building facility</td>
<td>Switchboards, circuit breakers, etc.</td>
</tr>
<tr>
<td>CAT.IV</td>
<td>Power sources for low-voltage facility</td>
<td>Overhead lines, cable systems, etc.</td>
</tr>
</tbody>
</table>

Mains supply installation category: CAT.II

Pollution degree: 2

Rated measurement input  
Voltage input: 600 V AC (between terminals)  
Current input: 600 V AC (across ground)

EMC-compliant standard  
KC marking: Electromagnetic wave interference prevention standard, electromagnetic wave protection standard compliance
Appendix 1 Specifications of PR300

Environmental Conditions

Normal operating conditions

<table>
<thead>
<tr>
<th>Condition</th>
<th>Specification</th>
</tr>
</thead>
<tbody>
<tr>
<td>Warm-up time</td>
<td>At least 30 minutes</td>
</tr>
<tr>
<td>Ambient temperature</td>
<td>0 to 50°C (reference temperature: 23±2°C)</td>
</tr>
<tr>
<td>Temperature change</td>
<td>10°C/h or less</td>
</tr>
<tr>
<td>Ambient humidity</td>
<td>20 to 90% RH (no condensation)</td>
</tr>
<tr>
<td>Magnetic field</td>
<td>400A/m or less</td>
</tr>
<tr>
<td>Continuous vibration</td>
<td>10 Hz to 60 Hz, 0.035 mm, 75 minutes; 60 Hz to 150 Hz, 4.9 m/s², 75 minutes</td>
</tr>
<tr>
<td>Short-time vibration</td>
<td>14.7 m/s² for 15 seconds or less</td>
</tr>
<tr>
<td>Shock</td>
<td>98 m/s² or less (for shock time of 11 ms)</td>
</tr>
<tr>
<td>Installation</td>
<td>Indoor installation only</td>
</tr>
<tr>
<td>Mounting position</td>
<td>Vertical surface mounting only</td>
</tr>
<tr>
<td>Installation altitude</td>
<td>2000 m or less</td>
</tr>
</tbody>
</table>

Effect on operating conditions

<table>
<thead>
<tr>
<th>Condition</th>
<th>Specification</th>
</tr>
</thead>
<tbody>
<tr>
<td>Effects of ambient temperature</td>
<td>Analog output: ±0.05% of F.S./°C or less</td>
</tr>
<tr>
<td>Effects on power supply voltage variations</td>
<td>Analog output: ±0.05% of F.S./°C or less</td>
</tr>
</tbody>
</table>

Transport and storage conditions

<table>
<thead>
<tr>
<th>Condition</th>
<th>Specification</th>
</tr>
</thead>
<tbody>
<tr>
<td>Temperature</td>
<td>-20 to 70°C</td>
</tr>
<tr>
<td>Humidity</td>
<td>5 to 95% RH (no condensation)</td>
</tr>
<tr>
<td>Shock and dropping of package</td>
<td>90 cm (provided that an external packing box is used)</td>
</tr>
</tbody>
</table>

Mounting and Shape

<table>
<thead>
<tr>
<th>Condition</th>
<th>Specification</th>
</tr>
</thead>
<tbody>
<tr>
<td>Materials</td>
<td>Casing Polycarbonate resin (PC), UL94 V-0</td>
</tr>
<tr>
<td></td>
<td>Terminal block Polybutylene terephthalate (PBT), UL94 V-0</td>
</tr>
<tr>
<td></td>
<td>Terminal cover Polyamide resin (PA6), UL94 V-2</td>
</tr>
<tr>
<td>Mounting method</td>
<td>Panel mounting</td>
</tr>
<tr>
<td>Connection Method</td>
<td>M3 screws for terminal connections (analog output, pulse output, demand alarm output, digital input, and RS-485 communication)</td>
</tr>
<tr>
<td></td>
<td>M4 screws for terminal connections (voltage/current input and power supply)</td>
</tr>
<tr>
<td></td>
<td>RJ45 connection (Ethernet communication, when the Ethernet communication function is specified)</td>
</tr>
<tr>
<td>External Dimensions (including a terminal cover)</td>
<td>110 × 110 × 128 mm (H × W × D)</td>
</tr>
<tr>
<td></td>
<td>96 × 96 × 126 mm (H × W × D)</td>
</tr>
<tr>
<td>Weight</td>
<td>Approx. 600 g (when accessories such as mounting bracket are attached)</td>
</tr>
</tbody>
</table>
Appendix 2  System Reset

There are two methods of performing system reset:
• Turn off the power of the PR300 and then turn it on again.
• Execute remote reset via communication (for remote reset, refer to the PR300 Power and Energy Meter Communication Interface User’s Manual: IM 77C01E01-10E)

Measured values to be reset
If system reset is executed, the following measured values will be reset.
• Maximum value, minimum value, and instantaneous value of voltage
• Maximum value and instantaneous value of current
• Optional active energy value

The values of active energy (regenerative energy), reactive energy, and apparent energy, as well as the settings set to parameters are not reset and are saved.

Actions after reset
The PR300 displays the Startup screen (where the station number can be seen) for about 5 seconds and then the Measured Value screen.
Appendix 3 Parameter Map

Some of the following parameters cannot be displayed due to the specifications of the PR300.

Power ON

Startup screen

Measured Value screen

Display pattern-1

Display pattern-2

Display pattern-n (a maximum of 8 patterns)

Hold down for at least 3 seconds.

Hold down for at least 3 seconds.

Parameter screen

Specification Change Confirmation screen

Hold down for at least 3 seconds.

When there are no changes to the specifications

To move to the previous or next step in the procedure indicated by the dotted line, use the following keys:

Go to the next screen

Go to the previous screen

Measured Value screen
Appendix 3  Parameter Setting Procedure

Parameter screen

To move to the previous or next step in the procedure indicated by the dotted line, use the following keys:

Go to the next screen
Go to the previous screen

*1 Displayed for a PR300 with Ethernet communication and when the protocol is set to Modbus/TCP.
*2 Displayed for a PR300 with pulse output.
*3 Displayed for a PR300 with analog output.
*4 Displayed for a PR300 with demand measuring function.
# Appendix 4 Parameter List

<table>
<thead>
<tr>
<th>Display Order</th>
<th>Parameter Symbol</th>
<th>Parameter Name</th>
<th>Setting Type</th>
<th>Setting Range (Details)</th>
<th>Initial Value (Factory-set Value)</th>
<th>MEMO</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>( y_t )</td>
<td>VT ratio</td>
<td>Integral numeric value</td>
<td>1 to 6000</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>2</td>
<td>( c_t )</td>
<td>CT ratio</td>
<td>Floating-point numeric value</td>
<td>0.05 to 32000</td>
<td>1.00</td>
<td></td>
</tr>
<tr>
<td>3</td>
<td>( L_{\text{Cu}t} )</td>
<td>Integrated low-cut power</td>
<td>Fixed-point numeric value</td>
<td>0.05 to 20.00 (%)</td>
<td>0.05</td>
<td></td>
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<tr>
<td>4</td>
<td>( r_{485} )</td>
<td>RS-485 communication menu</td>
<td>——</td>
<td>Menu to shift to the parameters of RS-485 communication</td>
<td>——</td>
<td></td>
</tr>
<tr>
<td>4-1</td>
<td>( St-no )</td>
<td>Station number</td>
<td>Integral numeric value</td>
<td>1 to 99</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>4-2</td>
<td>( Co-nn )</td>
<td>Protocol</td>
<td>Selection</td>
<td>PC link without checksum</td>
<td>PC link with checksum</td>
<td>PC link with checksum</td>
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<tr>
<td></td>
<td></td>
<td></td>
<td>Modbus/ASCII</td>
<td>Modbus/RTU</td>
<td>Modbus/TCP (*1)</td>
<td>PR201 original</td>
</tr>
<tr>
<td>4-3</td>
<td>( b-rt )</td>
<td>Baud rate</td>
<td>Selection</td>
<td>2400 bps</td>
<td>9600 bps</td>
<td>19200 bps</td>
</tr>
<tr>
<td>4-4</td>
<td>( Pr-I )</td>
<td>Parity (*3)</td>
<td>Selection</td>
<td>NONE</td>
<td>EVEN</td>
<td>ODD</td>
</tr>
<tr>
<td>4-5</td>
<td>( StP )</td>
<td>Stop bit (*3)</td>
<td>Selection</td>
<td>1 bit</td>
<td>2 bits</td>
<td>8</td>
</tr>
<tr>
<td>4-6</td>
<td>( dL-n )</td>
<td>Data length (*2) (*3)</td>
<td>Selection</td>
<td>8 bits</td>
<td>7 bits</td>
<td>1</td>
</tr>
</tbody>
</table>

*1 Only the PR300 with the Ethernet communication function can be selected.  
*2 Select "8" if you selected Modbus/RTU for the protocol.  
*3 Select NONE for Parity, 1 bit for Stop bit, and 8 bits for Data length if you have selected PR201 original for the protocol option.  

<table>
<thead>
<tr>
<th>Display Order</th>
<th>Parameter Symbol</th>
<th>Parameter Name</th>
<th>Setting Type</th>
<th>Setting Range (Details)</th>
<th>Initial Value (Factory-set Value)</th>
<th>MEMO</th>
</tr>
</thead>
<tbody>
<tr>
<td>5</td>
<td>( \text{Eth}r )</td>
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<td>——</td>
<td>Menu to shift to the parameters of Ethernet communication</td>
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<td>5-1</td>
<td>( IP-1 )</td>
<td>IP address-1</td>
<td>Integral numeric value</td>
<td>0 to 255</td>
<td>192</td>
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<tr>
<td>5-2</td>
<td>( IP-2 )</td>
<td>IP address-2</td>
<td>Integral numeric value</td>
<td>0 to 255</td>
<td>168</td>
<td></td>
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<tr>
<td>5-3</td>
<td>( IP-3 )</td>
<td>IP address-3</td>
<td>Integral numeric value</td>
<td>0 to 255</td>
<td>1</td>
<td></td>
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<td>5-4</td>
<td>( IP-4 )</td>
<td>IP address-4</td>
<td>Integral numeric value</td>
<td>0 to 255</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>5-5</td>
<td>( Sn-1 )</td>
<td>Subnet mask-1</td>
<td>Integral numeric value</td>
<td>0 to 255</td>
<td>255</td>
<td></td>
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<tr>
<td>5-6</td>
<td>( Sn-2 )</td>
<td>Subnet mask-2</td>
<td>Integral numeric value</td>
<td>0 to 255</td>
<td>255</td>
<td></td>
</tr>
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<td>5-7</td>
<td>( Sn-3 )</td>
<td>Subnet mask-3</td>
<td>Integral numeric value</td>
<td>0 to 255</td>
<td>255</td>
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### Appendix 4  Parameter List

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<tr>
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<th>Initial Value (Factory-set Value)</th>
<th>MEMO</th>
</tr>
</thead>
<tbody>
<tr>
<td>5-8</td>
<td>( s_{-4} )</td>
<td>Subnet mask-4</td>
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<td>0 to 255</td>
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<tr>
<td>5-9</td>
<td>( d_{-1} )</td>
<td>Default gateway-1</td>
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<td>0 to 255</td>
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<td>( d_{-2} )</td>
<td>Default gateway-2</td>
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<td>0 to 255</td>
<td>0</td>
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<tr>
<td>5-11</td>
<td>( d_{-3} )</td>
<td>Default gateway-3</td>
<td>Integral numeric value</td>
<td>0 to 255</td>
<td>0</td>
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</tr>
<tr>
<td>5-12</td>
<td>( d_{-4} )</td>
<td>Default gateway-4</td>
<td>Integral numeric value</td>
<td>0 to 255</td>
<td>0</td>
<td></td>
</tr>
<tr>
<td>5-13</td>
<td>( Port )</td>
<td>Port number</td>
<td>Integral numeric value</td>
<td>502, 1024 to 65535</td>
<td>502</td>
<td></td>
</tr>
<tr>
<td>5-14</td>
<td>( E-SV )</td>
<td>Ethernet setting switch</td>
<td>Selection</td>
<td>ON, OFF</td>
<td>Menu to shift to the parameters of pulse output</td>
<td></td>
</tr>
<tr>
<td>6</td>
<td>( PULSE )</td>
<td>Pulse output menu</td>
<td>Selection</td>
<td>Active energy</td>
<td>Menu to shift to the parameters of pulse output</td>
<td></td>
</tr>
<tr>
<td>6-1</td>
<td>( P-SEL )</td>
<td>Measurement item for pulse output</td>
<td>Selection</td>
<td>Active energy</td>
<td>Menu to shift to the parameters of pulse output</td>
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</tr>
<tr>
<td>6-2</td>
<td>( PS )</td>
<td>Pulse unit</td>
<td>Fixed-point numeric value</td>
<td>0.1 to 5000.0 (k)</td>
<td>1.0</td>
<td></td>
</tr>
<tr>
<td>6-3</td>
<td>( P-on )</td>
<td>ON pulse width</td>
<td>Integral numeric value</td>
<td>10 to 1270 (ms)</td>
<td>50</td>
<td></td>
</tr>
<tr>
<td>7</td>
<td>( AnLoG )</td>
<td>Analog output menu</td>
<td>Selection</td>
<td>Active energy</td>
<td>Menu to shift to the parameters of analog output</td>
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</tr>
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<td>7-1</td>
<td>( A-SEL )</td>
<td>Measurement item for analog output</td>
<td>Selection</td>
<td>Active energy</td>
<td>Menu to shift to the parameters of analog output</td>
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<tr>
<td>7-2</td>
<td>( A-Lo )</td>
<td>Lower limit of scaling</td>
<td>Fixed-point numeric value</td>
<td>0.0 to 50.0 (%)</td>
<td>50.0</td>
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<tr>
<td>7-3</td>
<td>( A-Hi )</td>
<td>Upper limit of scaling</td>
<td>Fixed-point numeric value</td>
<td>50.0 to 100.0 (%)</td>
<td>100.0</td>
<td></td>
</tr>
<tr>
<td>8</td>
<td>( d\text{nd} )</td>
<td>Demand measurement menu</td>
<td>Selection</td>
<td>Active energy</td>
<td>Menu to shift to the parameters of demand measurement</td>
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<tr>
<td>8-1</td>
<td>( d-SEL )</td>
<td>Demand power/current</td>
<td>Selection</td>
<td>Active energy</td>
<td>Menu to shift to the parameters of demand measurement</td>
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</tr>
<tr>
<td>Display Order</td>
<td>Parameter Symbol</td>
<td>Parameter Name</td>
<td>Setting Type</td>
<td>Setting Range (Details)</td>
<td>Initial Value (Factory-set Value)</td>
<td>MEMO</td>
</tr>
<tr>
<td>--------------</td>
<td>-----------------</td>
<td>----------------</td>
<td>--------------</td>
<td>-------------------------</td>
<td>----------------------------------</td>
<td>------</td>
</tr>
<tr>
<td>8-2</td>
<td>d-1</td>
<td>Demand period</td>
<td>Integral numeric value</td>
<td>1 to 60 (min) (Demand alarm mask time to 60) (min)</td>
<td>30</td>
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</tr>
<tr>
<td>8-3</td>
<td>d-3</td>
<td>Demand alarm mask time</td>
<td>Integral numeric value</td>
<td>1 to 59 (min) (1 to demand period) (min)</td>
<td>1</td>
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</tr>
<tr>
<td>8-4</td>
<td>d-6</td>
<td>Demand alarm point</td>
<td>Integral numeric value</td>
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<td>100</td>
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</tr>
<tr>
<td>8-5</td>
<td>d-rSt</td>
<td>Demand alarm release function</td>
<td>Selection</td>
<td>Automatic release Manual release</td>
<td>Automatic release</td>
<td></td>
</tr>
<tr>
<td>9</td>
<td>dSP</td>
<td>Display setting menu</td>
<td></td>
<td>Menu to shift to the parameters of display setting</td>
<td></td>
<td></td>
</tr>
<tr>
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<td>RtoFF</td>
<td>Indicator-out mode</td>
<td>Selection</td>
<td>ON OFF</td>
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<td></td>
</tr>
<tr>
<td>9-2</td>
<td>ofFt1</td>
<td>Indicator-out mode wait time</td>
<td>Integral numeric value</td>
<td>1 to 60 (min)</td>
<td>10 (min)</td>
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</tr>
<tr>
<td>9-3</td>
<td>3nuun</td>
<td>Number of display patterns</td>
<td>Integral numeric value</td>
<td>1 to 8</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>9-4</td>
<td>Pt1-U</td>
<td>Display pattern-1 upper display</td>
<td>Selection</td>
<td>None</td>
<td>Current (phase switch indication)</td>
<td></td>
</tr>
<tr>
<td>9-5</td>
<td>Pt1-n</td>
<td>Display pattern-1 middle display</td>
<td></td>
<td>Active energy Voltage (phase switch indication)</td>
<td></td>
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<tr>
<td>9-6</td>
<td>Pt1-L</td>
<td>Display pattern-1 lower display</td>
<td></td>
<td>Regenerative energy LAG reactive energy Active power</td>
<td></td>
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<tr>
<td>9-7</td>
<td>Pt2-U</td>
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<td>Display pattern-2 middle display</td>
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<td>Reactive power</td>
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<td>9-9</td>
<td>Pt2-L</td>
<td>Display pattern-2 lower display</td>
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<td>Voltage (phase switch indication) Power factor</td>
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<td>9-10</td>
<td>Pt3-U</td>
<td>Display pattern-3 upper display</td>
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<td>Voltage-1 Voltage-2 Voltage-3 Active energy</td>
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<td>9-11</td>
<td>Pt3-n</td>
<td>Display pattern-3 middle display</td>
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<td>Current (phase switch indication) LEAD reactive energy</td>
<td></td>
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</tr>
<tr>
<td>9-12</td>
<td>Pt3-L</td>
<td>Display pattern-3 lower display</td>
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<td>Current-1 Current-2 Current-3 Apparent energy</td>
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<td>Pt4-U</td>
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<td>Power factor Frequency Optional active energy Demand value</td>
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<td>Pt4-n</td>
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<td>Current-1 Current-2 Current-3</td>
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<td>Pt4-L</td>
<td>Display pattern-4 lower display</td>
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<td>Maximum demand value</td>
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<tr>
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<th>Setting Range (Details)</th>
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<th>MEMO</th>
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<tbody>
<tr>
<td>8-2</td>
<td>d-1</td>
<td>Demand period</td>
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<td>d-3</td>
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<td>1 to 59 (min) (1 to demand period) (min)</td>
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<td>8-4</td>
<td>d-6</td>
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## Appendix 4 Parameter List

### Display Order

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<th>MEMO</th>
</tr>
</thead>
<tbody>
<tr>
<td>9-19</td>
<td>Pt6 - U</td>
<td>Display pattern-6 upper display</td>
<td>Selection</td>
<td>Refer to the previous page.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>9-20</td>
<td>Pt6 - a</td>
<td>Display pattern-6 middle display</td>
<td></td>
<td></td>
<td>Current (phase switch indication)</td>
<td></td>
</tr>
<tr>
<td>9-21</td>
<td>Pt6 - l</td>
<td>Display pattern-6 lower display</td>
<td></td>
<td></td>
<td>Voltage (phase switch indication)</td>
<td></td>
</tr>
<tr>
<td>9-22</td>
<td>Pt7 - U</td>
<td>Display pattern-7 upper display</td>
<td></td>
<td></td>
<td>Frequency</td>
<td></td>
</tr>
<tr>
<td>9-23</td>
<td>Pt7 - a</td>
<td>Display pattern-7 middle display</td>
<td></td>
<td></td>
<td>Current (phase switch indication)</td>
<td></td>
</tr>
<tr>
<td>9-24</td>
<td>Pt7 - l</td>
<td>Display pattern-7 lower display</td>
<td></td>
<td></td>
<td>Power factor</td>
<td></td>
</tr>
<tr>
<td>9-25</td>
<td>Pt8 - U</td>
<td>Display pattern-8 upper display</td>
<td></td>
<td></td>
<td>Active power</td>
<td></td>
</tr>
<tr>
<td>9-26</td>
<td>Pt8 - a</td>
<td>Display pattern-8 middle display</td>
<td></td>
<td></td>
<td>Maximum demand value</td>
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</tr>
<tr>
<td>9-27</td>
<td>Pt8 - l</td>
<td>Display pattern-8 lower display</td>
<td></td>
<td></td>
<td>Demand value</td>
<td></td>
</tr>
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</table>

### Range of Phase and Wire System Options and Voltage Range Options

#### Phase and Wire System

<table>
<thead>
<tr>
<th>Parameter Symbol</th>
<th>Parameter Name</th>
<th>Setting Type</th>
<th>Setting Range (Details)</th>
<th>Initial Value (Factory-set Value)</th>
<th>MEMO</th>
</tr>
</thead>
<tbody>
<tr>
<td>PH - VI</td>
<td>Phase and wire system</td>
<td>Selection</td>
<td>Parameter Name</td>
<td>Setting Type</td>
<td>Setting Range (Details)</td>
</tr>
<tr>
<td>PR300-3□□□□-6□□-0</td>
<td>Single-phase two-wire system</td>
<td>IP2⁴</td>
<td>Three-phase three-wire system</td>
<td></td>
<td></td>
</tr>
<tr>
<td>PR300-4□□□□-6□□-0</td>
<td>Single-phase three-wire system</td>
<td>IP3⁴</td>
<td>Three-phase three-wire system</td>
<td></td>
<td></td>
</tr>
<tr>
<td>PR300-5□□□□-6□□-0</td>
<td>Three-phase four-wire system</td>
<td>25E</td>
<td>Three-phase four-wire system (2.5 element)</td>
<td></td>
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</tr>
</tbody>
</table>

#### Voltage Range

<table>
<thead>
<tr>
<th>Parameter Symbol</th>
<th>Parameter Name</th>
<th>Setting Type</th>
<th>Setting Range (Details)</th>
<th>Initial Value (Factory-set Value)</th>
<th>MEMO</th>
</tr>
</thead>
<tbody>
<tr>
<td>U - rnu</td>
<td>Voltage range</td>
<td>Selection</td>
<td>150V 150V</td>
<td>300V</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>300V 300V</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>600V 600V</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
## Appendix 5  Alphanumeric Characters Table for 7-segment LED

The PR300 uses a 7-segment LED as its display. It displays alphanumeric characters according to the table below (however, the table also contains characters that are not used by the PR300).

<p>| | | | | | | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td>0</td>
<td>A</td>
<td>A</td>
<td>J</td>
<td>J</td>
<td>T</td>
</tr>
<tr>
<td>1</td>
<td>1</td>
<td>b</td>
<td>B</td>
<td>K</td>
<td>K</td>
<td>U</td>
</tr>
<tr>
<td>2</td>
<td>2</td>
<td>C</td>
<td>C</td>
<td>L</td>
<td>L</td>
<td>u</td>
</tr>
<tr>
<td>3</td>
<td>3</td>
<td>d</td>
<td>D</td>
<td>n</td>
<td>M</td>
<td>B</td>
</tr>
<tr>
<td>4</td>
<td>4</td>
<td>E</td>
<td>E</td>
<td>n</td>
<td>N</td>
<td>y</td>
</tr>
<tr>
<td>5</td>
<td>5</td>
<td>F</td>
<td>F</td>
<td>o</td>
<td>O</td>
<td>X</td>
</tr>
<tr>
<td>6</td>
<td>6</td>
<td>G</td>
<td>G</td>
<td>P</td>
<td>P</td>
<td>y</td>
</tr>
<tr>
<td>7</td>
<td>7</td>
<td>H</td>
<td>H</td>
<td>q</td>
<td>Q</td>
<td>Z</td>
</tr>
<tr>
<td>8</td>
<td>8</td>
<td>h</td>
<td>h</td>
<td>r</td>
<td>R</td>
<td></td>
</tr>
<tr>
<td>9</td>
<td>9</td>
<td>i</td>
<td>I</td>
<td>s</td>
<td>S</td>
<td></td>
</tr>
</tbody>
</table>

**NOTE**

The PR300 displays H and U in two different forms (uppercase and lowercase) for easy viewing.
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