Digital Controller

Temperature/Process Controller

FZ Series

Reinforced Insulation
The outstanding design of the FZ which is beyond the common image of panel meters dramatically changes the first impression of your machine.

- Three Indicators
- Thin bezel
- Selectable PV (Universal input)
- Selectable Remote input (Universal input)
- Measuring Accuracy : ±0.1% of reading
- Sampling Time : 0.05 sec.
- Selectable Control method (Heat/Cool)
- Two Input Control (FZ400/900)
- Easy maintenance with plug-in construction (FZ400/900)
- Easy data back up through the front loader port

Makes the machine look sharp

Wide range display (5 digits)
Customizable versatile information display

Three Indicators (FZ400/900)

- Measuring Value (PV)
- Set Value (SV)
- Selectable Display

Control Output: %
Memory Area Soak Time (Progress time of segment): H:M / M:S
Current transformer (CT) Input Value: A

CT input display
Enables display of load factor of the heater controlling the process and detects potential errors at an early stage.

High accuracy type CT (CTL-6-P-Z) can be used too.
- Accurately measures current 1A or less.

Display Customization

Parameter Select Function
Select and display only necessary parameters.

“Set Value • Event 4”

Set value
Event 1
Event 2
Event 3
Event 4
Proportional Band
Integral Time
Derivative Time
Control Response
Proactive intensity
FF Amount

Numerous Inputs and Outputs

Universal input:
Thermocouple • RTD
DC voltage • DC current

Measuring input:
Universal input
Remote setting input

Up to 3 points *1
Digital input

Communication
• ANSI, MODBUS communication
• MITSUBISHI PLC communication

Output
• Up to 3 points *1
• Control Output
  - (Heat, Cool, Heat/Cool, Position proportioning)
  - Analog retransmission output
  - Event output

Up to 2 points
Digital output

Loader communication

Universal input:
Up to 2 points
Thermocouple • RTD
DC voltage • DC current

Measuring input,
Remote setting input

Up to 6 points
Digital input

Communication
• ANSI, MODBUS communication
• MITSUBISHI PLC communication

Output
• Up to 3 points
• Control Output
  - (Heat, Cool, Heat/Cool, Position proportioning)
  - Analog retransmission output
  - Event output

OUT3: Universal output
Up to 4 points
Digital output

*1 The number of inputs/outputs is limited depending on the specifications.
2 inputs for various applications

- Two-input type is available for FZ400/900 only.

**■ 2 Loop Control**

- **Cascade Control**
  (Control loop combination function)
  - Available with functions related to Cascade control and dedicated Autotuning.

- **Control with PV select**
  - This is a function to switch between Input 1 and Input 2 at a preset temperature.
  - This function may be appropriate in such an application where a thermocouple (whose operating temperature range is relatively low) and a radiation pyrometer (which can be used for high temperature applications) are used being switched between them.

- **Math Control**
  - This is a function to control to maintain constant difference between PV of Input 1 and Input 2.
Advanced control performance and function

- Suppresses fluctuations due to overshoot and external disturbance.

  - **Suppressing Overshoot**
    - Proactive function suppresses overshoot and provides fast and stable control.
    - Adjustable Proactive Intensity allows the FZ to be tuned appropriate for various process applications.
    - Determines response based on the deviation amount and speed and adjusts the PID factors using fuzzy logic operation.

  - **Bottom suppression function**
    - When the input fluctuation by external disturbance is detected, the amount of FF (Feed forward) is added to the output value to suppress the Bottom.

- **Level PID Function**
  - The FZ stores a maximum of 8 preset PID settings and automatically switches from one PID setting to another depending on the preset SV or PV level.
  - Thus, the process can be controlled with the optimum PID setting.

- **Automatic selection of PID values appropriate for temperature zones**

  - **Level PID Function**
    - Proportional band (Heat side/Cool side), Integral time (Heat side/Cool side), Derivative time (Heat side/Cool side), Control response, Overlap/Deadband, Manual reset, Proactive intensity, FF amount, LBA time, LBA dead band, Output limiter High/Low (Heat side/Cool side)

- **Switching Direct/Reverse action by DI (Digital Input)**
  - Also switchable by communication.

- **Ramp/Soak Program Control**
  - Up to 16-segment ramp/soak control is available by using the Memory Area function (area soak time, link area number, ramp-to-setpoint Up and Down).

  - **Need more segment**
    - The PF900 is a powerful ramp/soak controller with a large program storage capacity of 1024 segments (99 patterns with 10 segments each to 10 patterns with 99 segments each).
Easy Data Management

The power to COM-K2 is supplied from the PC via the USB port so no power supply is necessary. Simply download “PROTEM2” from the RKC Instrument website (www.rkcinst.com).

USB communication converter

COM-K2

COM-K2-4
(With loader communication cable)
COM-K2-N
(Without loader communication cable)

Length : 1m
(Complete with loader communication cable)

Easy connection to PC and PLC

A loader communication port is available on the 48mm square sized front panel.

All models are supplied with a front loader port as standard. Configuration software can be used without removing the controller from the panel.

The power to COM-K2 is supplied from the PC via the USB port so no power supply is necessary.

Front loader communication port

Loader communication cable
Length : 1.5m
Model code for cable only:
W-BV-05-1500

Programless connection to PLCs (Optional)

PLC Special Protocol (MAPMAN Function)

A PLC special protocol (MAPMAN) function becomes a Master Unit to PLC, and automatically stores temperature data into registers in a PLC. This enables easy handling of temperature control system to the exiting PLC system is available.

Easy Data Management

Communication Tool

PROTEM 2

Data monitoring, setting, storage, copy, transfer, logging, and report creation

Simply download “PROTEM2” from the RKC Instrument website (www.rkcinst.com).

MELSEC

RS-485 RD

CARD

FX5U-32M

IN  0  1  2  3  4  5  6  7
10 11 12 13 14 15 16

IN  0  1  2  3  4  5  6  7

PWR
ERR
P.RUN
BAT

10 11 12 13 14 15 16

SD
SDLAN
PULL

Programless connection to PLCs (Optional)

(MITSUBISHI PLC Protocol : QnA compatible, 3C frame (type 4))
Functions and performance designed for easy maintainability

- **Easy Maintenance**
  The internal assembly of the FZ400/900 can be removed from the front.

- **Flexible Output Configuration**
  OUT1, OUT2:
  - Relay contact/Voltage pulse/Current/Continuous voltage/Transistor output
  OUT3:
  - Voltage pulse/Current (Universal output)
  DO1, DO2, DO3, DO4 *1
  - Relay contact
  Output type is freely changeable to meet the requirements of different applications.
  (*1) FZ110: 2 points (DO1, DO2)

- **Universal Output (OUT3)**
  OUT3 (Output 3) can be configured to voltage pulse output or continuous current output.
  The output can be configured to control output or retransmission output.

- **Long Operation Life**
  Use of high performance control relay assures long term operation.

- **Electrical Life**
  (Relay contact output):
  - 300,000 operations or more

- **Mechanical life**
  (Relay contact output):
  - 50,000,000 operations or more

- **Reinforced Insulated Power Supply Circuit**
  Power supply circuit of the FZ Series has been designed to provide reinforced insulation, eliminating the necessity of providing basic insulation on the machine side for cost saving.
  <Requirements for electrical equipment according to safety standards>
  The safety standard for electrical equipment (IEC 61010-1 and JIS C1010-1) requires the secondary side of the equipment which may be accessible by the operator to be double insulated or reinforced insulated* for protection of the operators against electric shock.
  - Insulation equal to or better than double insulation for protecting personnel from electric shock is termed "reinforced insulation".

* Data when used at a rated value. Depending on the operating conditions, there may be some exceptions that we cannot guarantee.
* Applies to the control output relays mounted on OUT1 and OUT2 of FZ400/900.
Specifications

● Measured Input (Universal Inputs)

a) Group 1

<table>
<thead>
<tr>
<th>Input</th>
<th>Measured range</th>
<th>Reference</th>
</tr>
</thead>
<tbody>
<tr>
<td>K</td>
<td>-200.0 to +400.0°C, -328.0 to +752.0°F</td>
<td>JIS/IEC</td>
</tr>
<tr>
<td>J</td>
<td>-200.0 to +400.0°C, -328.0 to +752.0°F</td>
<td>JIS/IEC</td>
</tr>
<tr>
<td>T</td>
<td>-200.0 to +400.0°C, -328.0 to +752.0°F</td>
<td>JIS/IEC</td>
</tr>
<tr>
<td>S</td>
<td>-50.0 to +1768.0°C, -58.0 to +3214.0°F</td>
<td>JIS/IEC</td>
</tr>
<tr>
<td>R</td>
<td>-50.0 to +1768.0°C, -58.0 to +3214.0°F</td>
<td>JIS/IEC</td>
</tr>
<tr>
<td>E</td>
<td>-200.0 to +1000.0°C, -328.0 to +1832.0°F</td>
<td>JIS/IEC</td>
</tr>
<tr>
<td>B</td>
<td>0.0 to 1800.0°C, 0.0 to 3272.0°F</td>
<td>DIN</td>
</tr>
<tr>
<td>N</td>
<td>0.0 to 1300.0°C, 0.0 to 2372.0°F</td>
<td>DIN</td>
</tr>
<tr>
<td>PLII</td>
<td>0.0 to 1590.0°C, 0.0 to 2534.0°F</td>
<td>DIN</td>
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<tr>
<td>W5Re/W26Re</td>
<td>0 to 2300°C, 0 to 4200°F</td>
<td>ASTM</td>
</tr>
<tr>
<td>U</td>
<td>-200.0 to +600.0°C, -328.0 to +1112.0°F</td>
<td>DIN</td>
</tr>
<tr>
<td>L</td>
<td>0.0 to 950.0°C, 0.0 to 1652.0°F</td>
<td>DIN</td>
</tr>
<tr>
<td>PR40-20</td>
<td>0.0 to 1800.0°C, 0.0 to 3200.0°F</td>
<td>ASTM</td>
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<tr>
<td>Pf100</td>
<td>-200.0 to +650.0°C, -328.0 to +1562.0°F</td>
<td>JIS/IEC</td>
</tr>
<tr>
<td>Jp100</td>
<td>-200.0 to +640.0°C, -328.0 to +1184.0°F</td>
<td>JIS/IEC</td>
</tr>
</tbody>
</table>

Low Voltage

- 0 to 10mV DC, 0 to 100mV DC

b) Group 2

<table>
<thead>
<tr>
<th>Input</th>
<th>Measured range</th>
</tr>
</thead>
<tbody>
<tr>
<td>Voltage</td>
<td>0 to 1V DC, 0 to 5V DC, 0 to 10V DC</td>
</tr>
<tr>
<td>Voltage</td>
<td>&lt; 5V DC, -10V to 10V DC</td>
</tr>
</tbody>
</table>

Number of inputs
FZ400/FZ900 : Max. 2 points
FZ110 : 1 point

Influence of external resistance : Approx. 0.18% / V (Thermocouple input)
Influence of lead resistance : Approx. 0.006% of Span (RTD input)

Input Impedance (Voltage/Current Input)
Low voltage : 1MΩ or more, High voltage : 1MΩ or more
Current : Approx. 50Ω

b) Group 3

<table>
<thead>
<tr>
<th>Input</th>
<th>Measured range</th>
</tr>
</thead>
<tbody>
<tr>
<td>Current</td>
<td>0 to 20mA DC, 4 to 20mA DC</td>
</tr>
</tbody>
</table>

Number of inputs
FZ400/FZ900 : Max. 2 points
FZ110 : 1 point

CT Type
CTL-SP-Z, CTL-SP-N, CTL-12-S56-10L-N

CT input range
CTL-SP-Z : 0 to 10.0A (High accuracy type)
CTL-SP-N : 0.0 to 30.0A
CTL-12-S56-10L-N : 0.0 to 100.0A

Sampling Time : 0.5 sec

Digital Input (DI) <Optional>

<table>
<thead>
<tr>
<th>Input</th>
<th>Measured range</th>
</tr>
</thead>
<tbody>
<tr>
<td>Voltage</td>
<td>0 to 100.00% of span</td>
</tr>
</tbody>
</table>

Number of inputs
FZ400/FZ900 : Max. 6 points (D11 to D16)
FZ110 : Max. 3 points (D11 to D13)

Control

Control method : Control Brilliant II PID control
Control action : PID control, Heat/Cool type PID control
Position proportioning control without feedback resistance
- PI, PD, ON/OFF control selectable
- Direct action/Reverse action is selectable

Other control function : Manual control, Cascade control, 2 inputs control (Differential temperature control, Control with PV select, Input circuit error alarm, Proactive intensity, Level PID, Startup tuning

Additional function : Inverting the Input, Temperature compensation calculation, Parameter select

Proportional band :
TC/RTD input : 0.00% to 10.00% of span
Voltage/Current input : 0.00% to 100.00% of span

Cool side proportional band :
TC/RTD input : 0.00% to 10.00% of span
Voltage/Current input : 0.00% to 100.00% of span

Controller response : Slow, Medium, Fast
Proportional cycle time : 0.1 to 100.0 sec (Heat/Cool individual setting)

International control setting : 0 to 3600 sec, 0.00 to 3600.00 sec or 360.00 sec (PD control when I = 0) (Heat/Cool individual setting) Derivative time : 0 to 3600 sec, 0.00 to 3600.00 sec or 360.00 sec (PD control when I = 0) (Heat/Cool individual setting)

Output change rate limiter : -5.0 to +105.0% (High/Low individual setting)

Output at Control Stop mode :
-5.0 to +105.0% (Heat/Cool individual setting)

Overlap/Deadband :
TC/RTD input : -5.0 to +105.0% (Heat/Cool individual setting)
Voltage/Current input : -5.0 to +105.0% (Heat/Cool individual setting)

Level PID function

Level PID function

Level PID function parameters are selectable according to the position of the Set value (SV) or the Measured value (PV).

- Number of levels : 8 levels (PID memory group 1 to 8)
- Stored parameters :
  - Proportional band (Heat side/Cool side)
  - Derivative time (Heat side/Cool side)
  - Proportional band (Heat side/Cool side)
  - Proportional band (Heat side/Cool side)
Output

Output signal: OUT1, 2: Relay contact output, Voltage pulse output, Current output, Continuous voltage output. OUT3: Voltage pulse, Current output (Universal output) OUT1, DO2 (FZ110): Relay contact output DO1 to DO4 (FZ400/900): Relay contact output

Output function:
- Control output (Heat/Cool), Event output, LBA (Control loop break alarm output), HBA (Heater break alarm output), RUN status monitor, Output of communication monitoring result, Manual status output, Remote status output, AT status output, SV change status output, FAIL output, Reconnection output, Event output (2), [OUT1, OUT2, OUT3 of FZ110/400/900]

Number of event/alarm: Up to 4 points

Output specification
- Relay contact output (1), [OUT1, OUT2 of FZ110]a) Contact type: 1a contact, 250V AC 3A, 30V DC 1A (Resistive load) b) Electric life: 100,000 operations or more (Rated load) c) Mechanical life: 20,000,000 operations or more (Switching: 300 times/min)
- Relay contact output (2), [OUT1 of FZ400/900]a) Contact type: 1c contact, 250V AC 3A, 30V DC 1A (Resistive load) b) Electric life: 300,000 operations or more (Rated load) c) Mechanical life: 50,000,000 operations or more (Switching: 180 times/min)

Voltage pulse output (1), [OUT1, OUT2 of FZ110/400/900]
0/12V DC (Load resistance: More than 500Ω)
0/12V DC (Load resistance: More than 500Ω)
0/14V DC (Load resistance: More than 500Ω)

Current output:
- 4 to 20mA, 0 to 20mA (Load resistance: Less than 500Ω)
- 4 to 20mA, 0 to 20mA (Load resistance: Less than 500Ω)

Voltage pulse output (2), [OUT3 of FZ110/400/900]0/14V DC (Load resistance: More than 600Ω)

Transistor output:
- Output logic calculation: OR logic calculation from event 1 to 4, HBA1/2, LBA1/2

Analog Retransmission Output (AO)

Output type: Measured value (PV), Set value (SV), Manipulated value (MV), Deviation (between PV and SV), Current transformer (CT) input value

Type: Process high, Process low, Process high/low, 1 Band, 1 Set value, High set value, Low set value, Low set value, MV value high (Heat/Cool), MV value low (Heat/Cool), FBR input

- 1: Two types of alarm settings are field-selectable.
- 2: Common high/low setting (Factory setting unless specified in alarm code when ordering)
- Hold/Release hold action, Delay timer, Energized/de-energized action, Interlock (latch) function, Alarm lamp ON condition available.

Control loop break alarm output (LBA):
- LBA time: 0 to 7200 sec (LBA is OFF when 0 is set.)
- Dead band: 0 to input span

Heater break alarm (HBA):
- Number of alarm: FZ110: 1 point, FZ400/900 2 points (1 point per CT input)
- Setting range: 0 to 100.0A
- Setting unit: OFF (Current value monitoring is still available)
- CT does not detect current value when the control output ON time or control output OFF time is less than 250 ms.
- Delay times: 0 to 255 times

- Heater break alarm is available for time proportioning output only.

Output logic calculation:
- OR logic calculation from event 1 to 4, HBA1/2, LBA1/2
- Input abnormal 1/2 (High/Low)

Multi-Memory Area (recipe)

Number of memory area: 16 areas (recipes)

Stored parameters:
- Set value (SV), Ramp-to-setpoint (Up/Down), Output limiter
- High/Low [Heat/Cool], Soak time, Linking area number, Event set values to 1 to 4, Remote/Local select, Auto/Manual select, MV value, Area trigger select, Proportional band (Heat/Cool), Integral time (Heat/Cool), Derivative time (Heat/Cool), Control response parameter, Manual reset, Overlap/Deadband, Proactive intensity, FF amount, Control loop break alarm (LBA) time.

Memory area link set:
- Area soak time: 0 hr 00 min to 99 hr 59 min, 0 min 00 sec to 199min 59 sec
- Area soak time: 0 hr 00 min to 99 hr 59 min, 0 min 00 sec to 9 hr 59 min 59 sec (FZ400/900 only)
- Linking area number: 0 to 16

Host communication

Communication method: RS-485, RS-422A (FZ400/900 only) Protocol: a) ANSI X3.28 sub-category 2A4 (RSK standard) b) MODBUS-RTU c) PLC communication (MAPMAN)

Bit format:
- Data bit 7 or 8 (MODBUS-RTU - 9 bit fix)
- Parity bit 1 or 0 (odd or even) or none
- Stop bit 1 or 2

Communication speed:
- 2400bps, 4800bps, 9600bps, 19200bps, 38400bps
- 57600bps

Maximum connection: 31 units

Loader communication

Protocol: ANSI X3.28 sub-category 2.5 A4 Communication speed: 38400bps Connection: 1 unit Method of connection: Exclusive cable (COM-K2)

General Specifications

Supply voltage:
- a) 85 to 264V AC (50/60Hz, Selectable), Rating: 100 to 240V AC
- b) 20.4 to 26.4V AC (50/60Hz, Selectable), Rating: 24V AC
- c) 20.4 to 26.4V DC Rating: 24V DC

Power consumption/Rush current:
- a) 100 to 240V AC type
- b) 24V AC type
- c) 24V DC type

Power failure:
- a) Power failure of 20m sec or less will not affect the control action.
- b) Power failure of more than 20m sec occurs, controller will restart with the state of HOT start 1, HOT start 2 or COLD start (selectable)
- c) Power failure of 5m sec or less will not affect the control action.

Memory backup:
- Backed up by non-volatile memory (FRAM)
- Data saving period: Approx. 10 years
- Number of writing: Approx. 1,000,000,000,000,000 times.
- Depending on storage and operating conditions.

Waterproof/Dustproof protection only effective from the front in panel IP65 (IEC60529)

Air resistance:
- More than 20m/s(500VDC) between measured terminals and ground
- More than 20m/s(500VDC) between measured terminals and power terminals

Dielectric voltage:
- 1500V AC for one minute between measured terminals and ground
- 1500V AC for one minute between power terminals and ground
- 3000V AC for one minute between measured terminals and power terminals

Power failure:
- a) 100 to 240V AC, 24V AC type
- b) 24V AC type

Memory backup:
- a) UL: UL61010-1
- b) cUL: CAN/CSA-C22.2 No.61010-1
- c) CE Mark
- LVD: EN61010-1
- EMC: EN61326-1
- RoHS: EN50581
- d) RCM: EN50581

Weight:
- FZ110: Approx. 122g, FZ400: Approx.221g, FZ900: 291g
### Control Method

- Measured input 2
  - When quick start code not specified: 0 to 10V DC, The range will be the same as input 1.
- Heat/Cool PID control with AT (Reverse action)
- Heat/Cool PID control with AT for extruder (Air cooling type)

#### Communication

- When "Measured input 2" is specified at Option 3, "Auto/Manual transfer" will be assigned to Input 1 and Input 2.

### Digital input (DI)

- DI1 to D3: Memory area select (8 points, No set signal)
- DI4 to DI6: Auto/Manual
- DI6: Interlock release,
- DI7 to DI9: Memory area select (8 points, No set signal)
- DI10 to DI12: RUN/STOP

### Output 3 (OUT3)

- Position proportional PID control without FBR (Reverse action)
- Heat/Cool PID control with AT for extruder (Water cooling type)
- PID control with AT (Reverse action)

#### Display color

- Standard

#### Power Supply

- 100 to 240V AC

#### Option 3 (Caution1)

- Remote setting input
- Measured input 2

#### Option 3 (Caution2)

- Remote setting input
- Measured input 2

### Waterproof/Dustproof

- Not supplied

### Quick start code

- No quick start code (Default setting)

#### Specify quick start code (DO type)

- 1

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#### Caution 1: When Heat/Cool PID control or Position proportional PID control is selected, Select code "N" or "1".  
- < Default setting of Output 1 (OUT1), Output 2 (OUT2), and Digital output > Quick start code not specified: Output allocation code "1".
- < Default setting of Option function >
- • CT input
  - CT1 assignment: Output 1 (OUT1)
  - CT2 assignment: PID control (without measured input 2): Output 1 (OUT1)
  - P29: PID control (with measured input 2): Output 2 (OUT2)
  - DA9: Heat/Cool PID control
  - DA1: Position proportional PID control: Output 2 (OUT2)
  - • Output 3 (OUT3)
  - Current output (4 to 20mA). Analog retransmission output (Input 1 measured value)
  - • Digital input (DI)
    - Option 2oda 2 (Caution1)
      - Code "B", "E", "J"
      - D11 to D3: Memory area select (8 points, No set signal)
      - D14: "RUN/STOP" *1
      - D15: AUTO/MA N **
      - D16: Interlock release,
    - Option 2: Code "H"
      - D11 to D3: Memory area select (8 points, No set signal)
      - D14: "RUN/STOP" *1
    - When "Remote setting input" is specified at Option 3, this will be configured to "Remote/Local transfer".
    - When "Measured input 2" is specified at Option 3, "Auto/Manual transfer" will be assigned to Input 1 and Input 2.
  - • Communication
    - The digit of the communication data depends on the Input range code.
    - Remote setting input
      - When quick start code not specified: 0 to 10V DC, The range will be the same as input 1.
      - Measured input 2
        - 2-Loop control, Input range and the Control action will be the same as Measured input 1.
### Quick start code

<table>
<thead>
<tr>
<th>Quick start code</th>
<th>Specifications</th>
</tr>
</thead>
<tbody>
<tr>
<td>FZ110/400/900</td>
<td></td>
</tr>
<tr>
<td>N</td>
<td></td>
</tr>
<tr>
<td>1</td>
<td></td>
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<td>2</td>
<td></td>
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<tr>
<td>3</td>
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</table>

**Output allocation code table**

<table>
<thead>
<tr>
<th>Code</th>
<th>OUT1</th>
<th>OUT2</th>
<th>DO1</th>
<th>DO2</th>
<th>DO3</th>
<th>DO4</th>
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</thead>
<tbody>
<tr>
<td>1</td>
<td>HBA1</td>
<td>HBA2</td>
<td>Event 1</td>
<td>Event 2</td>
<td>Event 3</td>
<td>Event 4</td>
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<td>2</td>
<td>HBA1</td>
<td>HBA2</td>
<td>Event 1</td>
<td>Event 3</td>
<td>Event 3</td>
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<tr>
<td>8</td>
<td>Event 2</td>
<td>Event 4</td>
<td>Event 1</td>
<td>Event 3</td>
<td>Event 3</td>
<td>FAIL</td>
</tr>
</tbody>
</table>

**Output allocation depends on the Control action and the selection of Option 3.**

### Loop break alarm (LBA) Initial setting code:
- The output allocation has LBA output: 480
- The output allocation has no LBA output: 0
### Caution for the export trade

All transactions must comply with laws, regulations, and treaties.

### Caution for imitated products

As products imitating our product now appear on the market, be careful that you don’t purchase these imitated products. We will not warrant such products nor bear the responsibility for any damage and/or accident caused by their use.

### Accessories (Sold separately)

#### Terminal Cover
- **Model Code:** KA100-517

#### Front Cover
- **Model code:** KFB400-58
- **• Two pieces necessary**

#### Model Code:
- **FZ110:** KFB400-314
- **FZ400:** KRB400-36
- **FZ900:** KRB900-36

---

### Rear Terminals

- **Use a solderless terminal for screw size M3, width 5.8mm or less.**

### External Dimensions

**Unit:** mm

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### Cutout

- **L=48 x n-3**
  - n: Number of controllers (2≤n≤6)
  - Water proof/dust proof is not available for close horizontal mounting.

---

### Panel Cutout

- **L=95 x n-4**
  - n: Number of controllers (2≤n≤6)
  - Water proof/dust proof is not available for close horizontal mounting.

---

### Panel Cutout

- **L=95 x n-4**
  - n: Number of controllers (2≤n≤6)

---

### Warning

If it is possible that an accident may occur as a result of the failure of the product or some other abnormality, an appropriate independent protection device must be installed.

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Printed in Japan: OCT. 2018

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