Operation Panel
for REX - B850

OPL - B

Instruction Manual
INTRODUCTION

Thank you for purchasing the "Operation panel for REX—B850; OPL—B". This manual explains the operation panel instruction and installation used when operating the "OPL—B". Please carefully read and fully understand the content of this manual before starting operation. And please keep the manual somewhere so that you will know where it is when you need it.

USERS OF THIS MANUAL

This manual is intended to be read by everyone who used the "OPL—B". This manual is written on the premises that the reader already has basic knowledge about electricity and process control.

CAUTIONS

● This manual is subject to change without prior notice.

● Examples of figures, diagrams and numeric values used in this manual are for a better understanding of the text, but not for assuring the resultant operation.

● This manual may not be reproduced or copied in whole or in part without RKC’s prior consent.

● This instrument and manual are manufactured, prepared, then shipped under strict quality control. However, if any defect is found, please contact your nearest RKC sales office or agent from which you bought the system.

● RKC assumes no responsibility for any of the following damage which the user or third party may suffer.
   (1) Damage incurred as a result of using this product.
   (2) Damage caused by product failure which cannot be predicted by RKC.
   (3) Other indirect damage.

● If there is any conflict between the screens described in this manual and those on the product, the screens on the product take priority over the screens in this manual.


**WARNING**

- **Wiring precautions**
  - If failure or error of this instrument could result in a critical accident of the system, install an external protection circuit to prevent such an accident.
  - In order to prevent instrument damage or failure, protect the power line and the input/output lines from high currents by using fuses with appropriate ratings.

- **Power supply**
  - In order to prevent instrument damage or failure, supply power of the specified rating.
  - In order to prevent electric shock or instrument failure, do not turn on the power supply until all of the wiring is completed.

- **Never use the instrument near inflammable gases.**
  - In order to prevent fire, explosion or instrument damage, never use this instrument at a location where inflammable or explosive gases or vapour exist.

- **Never touch the inside of the instrument.**
  - In order to prevent electric shock or burns, never touch the inside of the instrument. Only RKC service engineers can touch the inside of the instrument to check the circuit or to replace parts. High voltage and high temperature sections inside the instrument are extremely dangerous.

- **Never modify the instrument.**
  - In order to prevent accident or instrument failure, never modify the instrument.

- **Maintenance**
  - In order to prevent electric shock, burns or instrument failure, only RKC service engineers may replace parts.
  - In order to use this instrument continuously and safely, conduct periodic maintenance. Some parts used in this instrument have a limited service life and may deteriorate over time.
INSTRUMENT SAFETY CAUTIONS

1. This instrument is designed to be mounted on instrumentation panels. It is therefore manufactured as part of the final product to facilitate wiring. This means that unauthorized personnel can easily access the high-voltage sections in this instrument such as power terminals, etc. Therefore, when this instrument is installed on the final product, the user should take the necessary measures for the final product to ensure that unauthorized personnel cannot access the high-voltage sections, etc.

2. In order to use this instrument correctly and safely, always observe the cautions described in this manual when performing operations and maintenance. RKC assumes no responsibility for any injury or accident resulting from not following these cautions.

NOTES ON INDICATIONS

For safe operation of "Operation panel for REX—B850; OPL—B", the following "Signal Words" and "Symbol Mark" are used in this manual.

**<Signal Words>**

**WARNING** : Where there are possible dangers such as electric shock, fire (burns), etc. which could cause loss of life or injury, precautions to avoid such dangers are described.

**CAUTION** : These describe precautions to be taken if unit damage may result if operating procedures are not strictly followed.

**NOTE** : Extra notes or precautions are added to operating procedures and explanations.

**<Symbol Mark>**

⚠️ : This mark is used when great care is needed especially for safety.

★ : This mark is used to add extra notes, precautions or supplementary explanations to table and figures.
In order to prevent electric shock or instrument failure, never turn on the power until all the wiring is completed.

In order to prevent instrument failure, electric shock or fire, carefully read "Cautions for mounting" and "Mounting", then mount the operation panel in a suitable area and method.

In order to prevent electric shock or instrument failure, mount or remove the operation panel after turning off the power.

Only trained, experienced electricians must perform the wiring.

In order to prevent electric shock or instrument failure, connect or disconnect the connector after turning off the power to this instrument and peripheral equipment.

In order to prevent instrument damage or failure, do not drop the instrument or do not give a strong shock to the instrument.

In order to prevent instrument damage or failure, supply power which meets the specification.

Do not strike or scratch the surface of the touch panel (display unit) with a sharp object such as a ball-point pen or screwdriver. Since this may scratch or damage the panel.

Avoid indelibly staining the touch panel (display unit), or the display may become unclear or be damaged.

In order to prevent scratches and damage, do not press the touch switches with anything other than fingers.

Press the touch switches lightly to avoid damaging them.

Do not spray insecticide or clean the operation panel with a volatile organic solvent (thinner or benzene), chemicals or chemical dustcloth to avoid damaging or discoloring the panel.
**PRECAUTIONS PRIOR TO USE**

- Avoid the following when selecting the mounting location:
  - Ambient temperature less than 0 °C or more than 40 °C.
  - Ambient humidity of less than 45% or more than 85% RH.
  - Rapid changes in ambient temperature which may cause condensation.
  - Corrosive or inflammable gases.
  - Direct vibration or shock to the mainframe.
  - Water, oil, chemicals, vapor or steam splashes.
  - Excessive dust, salt or iron particles.
  - Excessive induction noise, static electricity, magnetic fields or noise.
  - Direct air flow from an air conditioner.
  - Should be used indoors where the system is not exposed to direct sunlight.
  - Heat to be accumulated due to radiation heat.

* The front operation panel has a dust-proof, splash-proof construction equivalent to IP55 when the instrument is mounted on the panel, allowing it to be used safely even in harsh environments.

- Do not ground this OPL-B together with high-voltage equipment or rotating machinery.

- Mount this OPL-B to prevent noise.
  - To prevent the communication cables from being affected by noise, make sure that you place the wiring so that it is as far away as possible from power and load lines.
  - If you think that power line noise is going to affect the OPL-B, use a noise filter.

- Avoid high temperature and high humidity
  - As backup batteries are included in the mainframe, do not store the instrument at a location where the ambient temperature and humidity are high.
Name and number of this instruction manual:

Name: Operation Panel for REX-B850 (OPL-B) Instruction Manual
Manual number: IMOPL01-E1

<table>
<thead>
<tr>
<th>Date of revision</th>
<th>Manual number</th>
<th>Reason for revision</th>
</tr>
</thead>
<tbody>
<tr>
<td>September 25, 1997</td>
<td>IMOPL01-E1</td>
<td>The First edition issue</td>
</tr>
</tbody>
</table>
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Supplementary Manual

OPC initialize/Controller initialize
1. OUTLINE

1.1 Handling procedure

Proceed with the work according to the following procedures.

1. **Confirmation of the accessories**
   Refer to Chapter 1: "1.2 Confirmation of the products".

2. **Confirmation of the model code**
   Refer to Chapter 1: "1.4 Model code".

3. **Mounting and wiring**
   Refer to Chapter 2: "MOUNTING AND WIRING".

4. **Preparations before operation**
   Refer to Chapter 3: "OPERATIONS".

5. **Turn ON the power**
   Refer to Chapter 3: "OPERATIONS".

6. **Settings concerning the communications**
   Refer to Chapter 3: "OPERATIONS".

7. **Operations**
   Refer to Chapter 3: "OPERATIONS",
   and Chapter 4: "OPERATING PROCEDURE".

* When carrying out the above procedure, be sure to follow each of the caution items.
1.2 Confirmation of the products

When first opening the packing box, confirm that the following products are all included. In the worst case, if any of the packaged products are missing or damaged, or if there are missing pages or erratic pagination in the manual, etc., please contact your nearest RKC sales office or agent from which you bought the instrument.

- Operation panel for REX-B850 [OPL-B] main unit ....... 1 unit
- Operation panel mounting brackets ................................ 4 brackets
- Instruction Manual (This manual) ............................... 1 copy
- Modular connector cable (Sold separately) ..................... 1 cable
  Model code: W-BF-02-3000 [Standard cable length: 3m]
- Connector for host communication
  D-SUB 9 pin connector (With host communication) ...... 1 cable

1.3 Manual configuration (Instruction manuals)

The composition of the REX-B850 and OPL-B instruction manuals are as shown below. Refer to each of the manuals when necessary. Additionally, if a required manual is not included, it can be requested from your nearest RKC sales office or agent from which you bought the instrument.

Concerning the operation of REX-B850

REX-B850 Installation Manual (IM850B01-E □ )

Concerning the operation of the operation panel [OPL-B]

Operation Panel for REX-B850 [OPL-B] Instruction Manual (This manual, IMOPL01-E □ )

Concerning the operation of the operation panel [OPL-B] host communications

Operation panel for REX-B850 [OPL-B] Communications Instruction Manual (IMOPL03-E □ )
1.4 Model code

Confirm whether the delivered product is the model that was ordered by referring to the following model code list.

In the worst situation, if the delivered product differs from the required specification, please contact your nearest RKC sales office or agent from which you bought the instrument.

<table>
<thead>
<tr>
<th>OPL-B *</th>
<th>\square</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>1</strong></td>
<td>Communication protocol for a host computer</td>
</tr>
<tr>
<td><strong>N</strong>: No function</td>
<td></td>
</tr>
<tr>
<td>1: RS-232C [Option]</td>
<td></td>
</tr>
<tr>
<td>4: RS-422A [Option]</td>
<td></td>
</tr>
<tr>
<td>5: RS-485 [Option]</td>
<td></td>
</tr>
</tbody>
</table>

* The operation panel is provided with one relay contact (SUB output) as standard.
* The communication protocol for REX-B850 should conform to RS-422A.
1.5 System configuration

Host computer

RS - 422A
RS - 485
RS - 232C [Option]

Specify when ordering

Operation panel [OPL - B]

RS - 422A

Maximum of 16 units.
(Multi-drop connection)

REX - B850
1.6 Name of parts

- Front

<table>
<thead>
<tr>
<th></th>
<th>Name</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Power indicator lamp</td>
<td>Light when power to the operation panel is turned on. (Green LED)</td>
</tr>
<tr>
<td>2</td>
<td>SUB indicator lamps</td>
<td>Lights during alarm output. (Red LED)</td>
</tr>
<tr>
<td>3</td>
<td></td>
<td></td>
</tr>
<tr>
<td>4</td>
<td>Failure output indicator lamp</td>
<td>Light when there is an abnormality in the operation panel. (Red LED)</td>
</tr>
<tr>
<td>5</td>
<td>Display</td>
<td>Displaying and setting unit for all data.</td>
</tr>
<tr>
<td>6</td>
<td>MENU switch</td>
<td>Return to displayed screen before.</td>
</tr>
<tr>
<td>7</td>
<td>PARA switch</td>
<td>Change to setting item switch.</td>
</tr>
<tr>
<td>8</td>
<td>Display screen ON/OFF switch</td>
<td>Switch that changes between displaying or not displaying the display screen.</td>
</tr>
<tr>
<td>9</td>
<td>Function switch</td>
<td>Selection of functions displayed on screen and set switches.</td>
</tr>
</tbody>
</table>
**Rear**

<table>
<thead>
<tr>
<th></th>
<th>Name</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Terminal board</td>
<td>Terminals for the power supply, grounding and SUB outputs. (Refer to &quot;2.4 Wiring&quot; about terminals.)</td>
</tr>
<tr>
<td>2</td>
<td>Modular connector</td>
<td>For connection with REX - B850.</td>
</tr>
<tr>
<td>3</td>
<td>D - SUB connector for Host computer communications</td>
<td>For communications with the host computer. One of the RS - 232C, RS - 422A or RS - 485 connectors can be specified.</td>
</tr>
</tbody>
</table>

*③ is option.*
Chapter 2
MOUNTING AND WIRING
2. MOUNTING AND WIRING

⚠️ WARNING

● In order to prevent electric shock, mount the operation panel after turning off the power.

● In order to prevent electric shock, do not turn on the power before all the wiring is finished.

● In order to prevent electric shock or equipment failure, turn off the power of peripheral equipment.

2.1 Cautions for mounting

(1) Mounting environment

Avoid the following when selecting the mounting location.

● Ambient temperature of less than 0 °C or more than 40 °C.
● Ambient humidity of less than 45% or more than 85% RH.
● Rapid changes in ambient temperature which may cause condensation.
● Corrosive or inflammable gases.
● Direct vibration or shock to the mainframe.
● Water, oil, chemicals, vapor or steam splashes. *
● Excessive dust, salt or iron particles. *
● Excessive induction noise, static electricity, magnetic fields or noise.
● Direct air flow from an air conditioner.
● Should be used indoors where the system is not exposed to direct sunlight.
● Heat to be accumulated due to radiation heat.

*The front operation panel has a dust-proof, splash-proof construction equivalent to IP55 when the instrument is mounted on the panel, allowing it to be used safely even in harsh environments.
(2) Mounting cautions

When mounting the instrument within the panel, take into account the following.

- Allow enough ventilation space to radiate heat from around the instrument. Allow a minimum of 50 mm on the left and right and 80 mm on the top and bottom.

- Do not mount the instrument directly above equipment which generates much heat (heaters, transformers, semiconductor drive units, large resistors etc.).

- If the ambient temperature exceeds 40 °C, cool the panel inside using forced fans or coolers. However, do not directly expose the instrument to cooled air.

- In order to improve the noise rejection characteristics and safety, mount the instrument as far away from high-voltage equipment, power lines or rotating machinery as possible.

  - **High-voltage equipment**: Do not install it in the same panel as the instrument.
  - **Power line**: Mount the instrument more than 200 mm away from power lines.
  - **Rotating machinery**: Mount the instrument as far away from rotating machinery as possible.

(3) Mounting angle

Mount the operation panel within 30° in the forward direction, 90° in the backward direction, or 45° in the right or left direction to prevent malfunction.
(4) Mounting depth

The operation panels are connected to the host computer via cables with connectors. Therefore, when the operation panel is mounted on a panel, keep an interval of more than 100 mm including the length of the above cable from the rear of the operation panel to avoid a sharp bend of the cable. Leave enough space as much as possible by taking into account operability and safety.
2.2 Mounting

(1) External dimensions diagram & Panel cutout dimension diagram
(2) Mounting method

**CAUTION**

The maximum thickness of panel (applicable range of mounting brackets) to be mounted with the instrument is 1 to 10 mm. In order to improve safety, splash-proof and dustproof effects, mount the instrument as thick a panel as possible.

1. Prepare 4 mounting brackets supplied with the operation panel.

   ![Mounting brackets](image)

   Mounting brackets ⋯⋯⋯ 4 brackets
   (Attached to the operation panel)

2. Make a panel cutout through the panel by referring to the panel cutout dimensions.

3. Insert the operation panel main unit into the front face of the mounting panel.

4. The mounting brackets should be attached in 2 places on each of the top and bottom surfaces, and also in 2 places on both side surfaces (Total of 4 locations).
⑤ Tighten each bracket setscrew using a Phillips screwdriver to secure the operation panel.

**CAUTION**

Tighten the bracket setscrew so that the thickness of the dust-proof packing is uniform, otherwise the operation panel may not be fully dust-proof and splash-proof.

Attach the mounting brackets at the 4 locations at the top and bottom, left and right of the main unit, and tighten all the tightening screws in order that the packing becomes uniform.

*Tightening torque (Recommended value) : 0.3N·m (3kgf·cm)*
2.3 Cautions for wiring

**WARNING**
In order to prevent electric shock, do not turn on the power before all the wiring is finished.

(1) Measures for noise

Noise may adversely affect electronic equipment, causing equipment malfunction and many problems such as lost profit due to decrease in productivity, time loss, etc.

Therefore the source of noise must be eliminated wherever possible.

*<Measures for suppressing power supply noise>*

If a noise source is near the instrument and could affect the instrument, use a noise filter.

(Select the noise filter after checking the power supply voltage of the instrument*)

Noise suppression is more effective if an insulating transformer is also used.

*Sufficient effect may not be obtained depending on the filter used. Therefore, select the suitable filter by referring to the filter frequency characteristics.

**CAUTIONS**

- If the instrument is likely to be affected by noise, twist the power supply leadwires used for connections to reduce the noise.
  
  The shorter the twists, the more effective the noise suppression. In addition, always ground the noise filter and insulating transformer.
  
- Always install the noise filter on the grounded panel. Also minimize the wiring distance between the noise filter output side and instrument power supply terminals to ensure the effectiveness of the noise filter.
  
- Do not connect fuses or switches on the wiring of the noise filter output side, since these may reduce the effectiveness of the noise filter.
<Measures for noise in input/output signal wires>

- Use independent ducts for the input/output wires and power circuits inside and outside the panel.
- If input/output wires have to be placed in the same duct as the power circuits, use shielded wires.
  Also ground the shield to reject any noise generated by the floating capacitance between the cores and shield or by a grounding potential.

[Example : When signal source is grounded] Connect the signal source to the grounding side.

[Example : When signal source is not grounded] Ground the signal source on the instrument side.

(2) Power supply line wiring

- Use a power supply is within the power supply voltage variation range.
  90 to 264 V AC [Including power supply voltage variations], Common 50/60 Hz
  (Rating : 100 to 240 V AC)
- Use twisted power supply wires with a cross section of 1.25 mm² or larger and use low resistance wires.
- For eliminating noise contained in the power supply use an insulating transformer.
  It is recommended to reject the noise before supplying the power to the unit.
- Separate each of the instrument power supply line, input/output circuit power supply line, equipment and motor power supply line, and operating circuit power supply line.
(3) Grounding—wire wiring

- Do not ground the instrument together with other equipment. The full grounding effect may not be produced depending on the grounding method.

<table>
<thead>
<tr>
<th>Operation panel</th>
<th>Other equipment</th>
</tr>
</thead>
<tbody>
<tr>
<td>Dedicated grounding:</td>
<td>Suitable</td>
</tr>
<tr>
<td>Common grounding:</td>
<td>Not suitable</td>
</tr>
</tbody>
</table>

- Do not mix this grounding wire with other grounding wires. Ground this grounding wire to a grounding resistance of less than 100 Ω.
- Do not use the same grounding wire as that for high-voltage equipment such as motors, etc.
- Do not ground grounding wires so that they form a grounding loop. Ground each wire at one point.
- The ground resistance is less than 100 Ω as shown in the following figure.
- Use grounding wires with a cross section of 2.0 mm² or more.

(4) FAIL output wiring

Configure the FAIL output in the external relay circuit so that a failure or error in the instrument does not affect the entire system, and configure an emergency stop circuit.
2.4 Wiring

(1) Terminal configuration

- 100 to 240V AC

**Operation panel (Rear view)**

<table>
<thead>
<tr>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
</tr>
</thead>
<tbody>
<tr>
<td>!</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4 5</td>
</tr>
</tbody>
</table>

Grounding terminal  Power terminals  Output terminals

**Screw tightening**

- Screw size: M3.5
- Tightening torque (Recommended value): 0.8 Nm (8kgf·cm)

The SUB output enables the contact signals corresponding to an alarm generated on REX-B850 side to be output even on the operation panel side.

For details on SUB output selection, see the supplementary manual for OPL initialize "1.8 SUB output LED/relay function selection screen".

**Relay contact output (Closed when an error occurs.)**

- Contact capacity: 250V AC, 1A or less (Resistive load)  1 "a" contact
(2) Wiring example

- 100 to 240V AC

**Operation panel (Rear view)**

Terminals

Power supply terminals 100 to 240V AC

Output terminals

1 2 3 4 5

ground

SUB output

Power supply for the instrument

Insulating transformer 1:1
2.5 Connection

⚠️ WARNING ⚠️

In order to prevent electric shock or instrument failure, connect or disconnect the connector after turning off the power to this module and peripheral equipment.

⚠️ CAUTIONS ⚠️

- Connect the connector in the correct position and direction. If the connector is inserted incorrectly and forcibly into the socket, its pins may be bent to cause instrument failure.
- Connect or disconnect the connector in the direction parallel to the socket surface as much as possible. Otherwise, its pins may be bent to cause instrument failure.
- Disconnect the connector by holding the connector. If the connector is disconnected by pulling the cable, the instrument may become faulty.
- For preventing the instrument from the malfunction, do not touch the contact surface of the connector with bare or oily hands.
- For preventing the instrument from the malfunction, firmly connect the connector, then firmly fix the connector with set screws.
- For preventing the cable from damage, do not forcibly bent it. Keep a bending radius of more than 40 mm.

![Setscrew](image)

R: More than 40 mm
(1) Connection with REX-B850

Operation panel (Rear view)

RS-422A

To modular connector

To communication modular connector

RKC special cable type: W-BF-02-3000* (Sold separately)
[Standard cable length: 3m]
* The cable type partially differs depending on the cable length when ordering.

(2) Connector with a host computer [Option]

Operation panel (Rear view)

RS-422A

RS-485

RS-232C

Specify when ordering [Option]

To host communication connector (HOST)

To communication connector

* The customer must prepare the communication cables.

Recommended cable type:
AC126 (Manufactured by ARVEL CO., LTD) (RS-232C)
RS-422A

- Pin arrangement and signal names

<table>
<thead>
<tr>
<th>Pin No.</th>
<th>Symbol</th>
<th>Name</th>
<th>Signal direction</th>
</tr>
</thead>
<tbody>
<tr>
<td>2</td>
<td>T(A)</td>
<td>Send data</td>
<td>Operation panel</td>
</tr>
<tr>
<td>6</td>
<td>T(B)</td>
<td>Send data</td>
<td>Host computer</td>
</tr>
<tr>
<td>5</td>
<td>SG</td>
<td>Signal ground</td>
<td></td>
</tr>
<tr>
<td>4</td>
<td>R(A)</td>
<td>Receive data</td>
<td></td>
</tr>
<tr>
<td>8</td>
<td>R(B)</td>
<td>Receive data</td>
<td></td>
</tr>
</tbody>
</table>

- Communication cable core connection

RS-485

- Pin arrangement and signal names

<table>
<thead>
<tr>
<th>Pin No.</th>
<th>Symbol</th>
<th>Name</th>
<th>Signal direction</th>
</tr>
</thead>
<tbody>
<tr>
<td>2</td>
<td>T/R(A)</td>
<td>Send and receive data</td>
<td>Operation panel</td>
</tr>
<tr>
<td>6</td>
<td>T/R(B)</td>
<td>Send and receive data</td>
<td>Host computer</td>
</tr>
<tr>
<td>5</td>
<td>SG</td>
<td>Signal ground</td>
<td></td>
</tr>
</tbody>
</table>

- Communication cable core connection
RS-232C

- Pin arrangement and signal names

<table>
<thead>
<tr>
<th>Pin No.</th>
<th>Symbol</th>
<th>Name</th>
<th>Signal direction</th>
</tr>
</thead>
<tbody>
<tr>
<td>3</td>
<td>SD (TXD)</td>
<td>Send data</td>
<td>Operation panel</td>
</tr>
<tr>
<td>2</td>
<td>RD (RXD)</td>
<td>Receive data</td>
<td>Host computer</td>
</tr>
<tr>
<td>5</td>
<td>SG (GND)</td>
<td>Signal ground</td>
<td></td>
</tr>
</tbody>
</table>

- Communication cable core connection

*Maximum number of connections: 1 set

*Short RS and CS within connector.