

AD-4402 OP-20

INSTRUCTION MANUAL

CC-Link Interface



This is a hazard alert mark.



This mark informs you about the operation of the product.

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1. Compliance

1.1.1. Compliance with FCC rules

- Please note that this equipment generates, uses and can radiate radio frequency energy. This equipment has been tested and has been found to comply with the limits of a Class a computing device pursuant to Subpart J of Part 15 of FCC rules. These rules are designed to provide reasonable protection against interference when this equipment is operated in a commercial environment. If this unit is operated in a residential area it may cause some interference and under these circumstances the user would be required to take, at his own expense, whatever measures are necessary to eliminate the interference.
(FCC = Federal Communications Commission in the U.S.A.)

1.1.2. Compliance with European Directive

CE This appliance complies with the statutory EMC (Electromagnetic Compatibility) directive 89/336/EEC and the Low Voltage Directive 73/23/EEC for safety of electrical equipment designed for certain voltages.

Note: The displayed value may be adversely affected under extreme electromagnetic influences.



2. Outline and Features

- The CC link (Control & Communication link) is used to connect devices of the factory automation and control it by the master unit. Refer to CC-link information of the partner vender regarding the detail of this open system and each device.

The AD-4402 OP-20 is the **remote device station** of the CC link interface version 1.10.

- It is easy to make the program to control the AD-4402 because the option can control the indicator with the remote I/O and remote registers or communication command.
- The system communication only uses a shield cable (twisted-pair and three wires) basically.



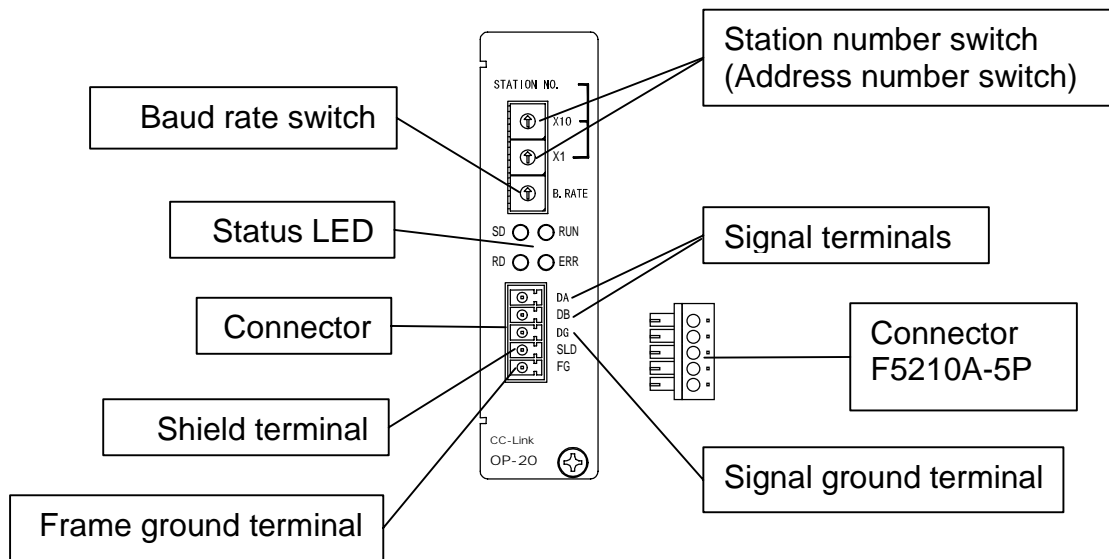
2.1. Precaution

Before any use, confirm the following articles for the safe operation.

- CC-link connection
Accord with the specification of the CC link version 1.10.
- Grounding the option
Ground the option certainly.
- Wiring the cable
Separate wires from other wires like a motor, inverter or a power source. Unless the CC-link wires is separated, it may cause to receive an electric shock, be happen operation error.
- Test mode
When using test mode of the indicator, remove CC-link connection to avoid mis-operation.



3. Panel



Station number switch

Station number range: 1 to 61.

Set a station number (address number) of CC-link.

This option occupies four station numbers.

Example: When the station number "1" is set, the "1", "2", "3" and "4" are occupied.

Avoid any overlapped station numbers.

Baud rate switch

| Switch No. | Baud rate |
|------------|-----------|
| 0 | 156 kbps |
| 1 | 625 kbps |
| 2 | 2.5 Mbps |
| 3 | 5 Mbps |
| 4 | 10 Mbps |

Status LED

| Name | Lighting | Off | Blinking |
|------|---|------------------------|--------------------|
| RUN | Normal | Resetting No signal | |
| SD | Transmitting | | |
| RD | Receiving | | |
| ERR | Parameter error CRC error Station trouble | Normal | Changing parameter |

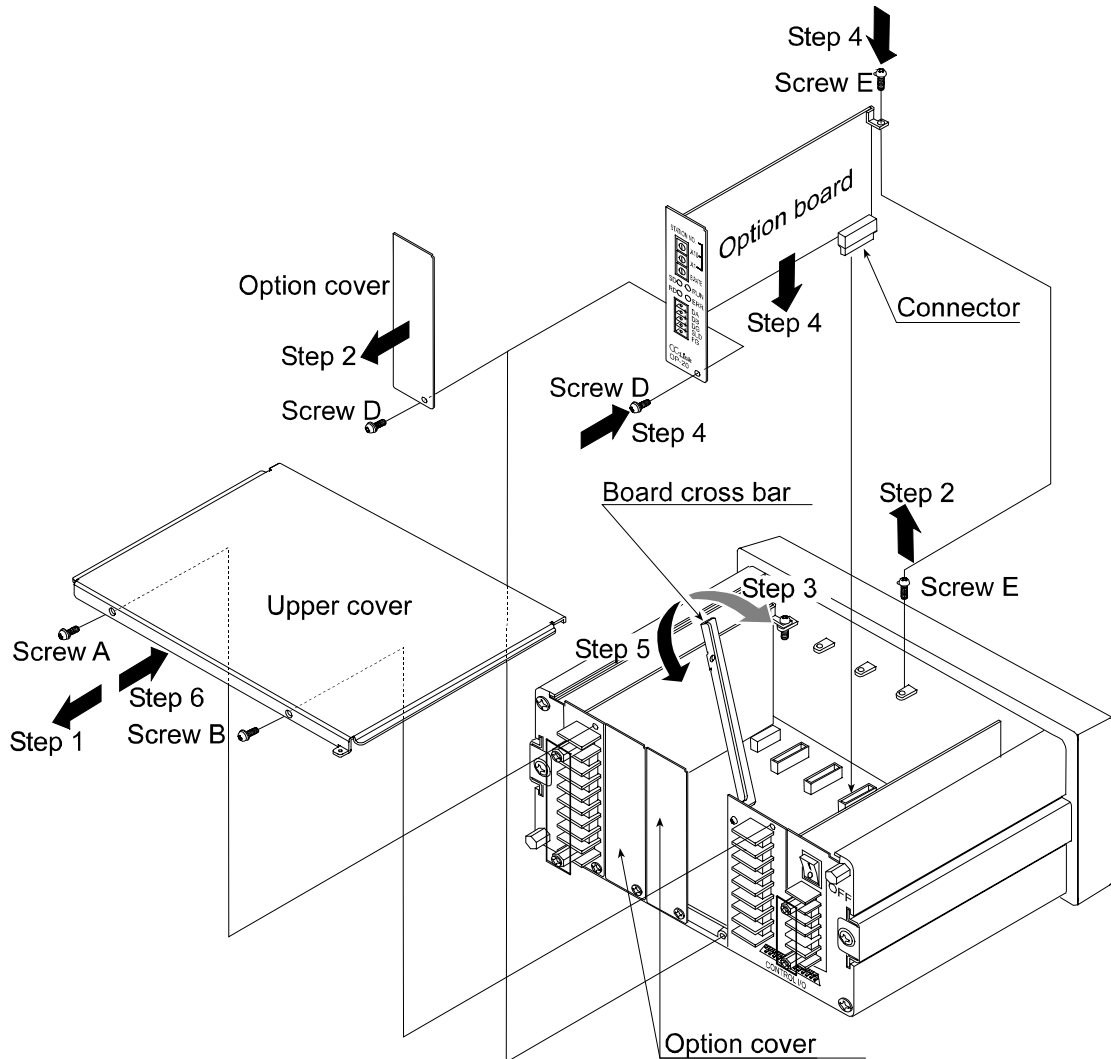


3.1. Installing the option

Caution

- ❑ Remove the power cord before installing the option.
- ❑ Do not touch an inside parts within ten seconds after removing the power cord because you may receive an electric shock.
- ❑ Do not forget to tighten the screw. If the screw is not tightened, it may cause short circuit or an error due to noise.

- ❑ Three option boards can install in the slots.
- ❑ Initialize the RAM data in accordance with proper procedure.
Refer to the instruction manual of AD-4402 for other information.





4. Function

- The installed option can read a weighing data of AD-4402 and write parameters to control it from the master station (EX:program controller of CC-link).
- There are two ways to operate the option.
 - The direct operation of the remote input and remote output with remote register.
 - The communication command operation.



4.1. Remote I/O and Remote Register

4.1.1. Address Map of Remote Register

Assumed that station No. is "1".

Remote Register for AD-4402 to Master Unit

Caution

- Do not write any parameter to address "Not used" of the remote output RY and remote register RWw. it may cause error and mis-operation.
- The address "Not used" of the remote input RX and remote register RWr are variable.

| Station No. | Remote register | Buffer | Description |
|-------------|-----------------|--------|---|
| 1 | RWr000 | 2E0 | Net |
| | RWr001 | 2E1 | |
| | RWr002 | 2E2 | Gross |
| | RWr003 | 2E3 | |
| 2 | RWr004 | 2E4 | Total weight |
| | RWr005 | 2E5 | |
| | RWr006 | 2E6 | Kind of error 0: No alarm, no error 1: Weighing sequence error 2: Zero error 3: Alarm 1 4: Alarm 2 |
| | RWr007 | 2E7 | Error No. |
| 3 | RWr008 | 2E8 | 8 bits current material code |
| | RWr009 | 2E9 | |
| | RWr00A | 2EA | Not used |
| | RWr00B | 2EB | |
| 4 | RWr00C | 2EC | Command data reply 32 bits, |
| | RWr00D | 2ED | |
| | RWr00E | 2EE | Command code reply 16 bits, |
| | RWr00F | 2EF | Not used |

Master Unit to AD-4402

| Station No. | Remote register | Buffer | Description |
|-------------|-----------------|--------|--------------------------------|
| 1 | RWw000 | 1E0 | Final, 24 bits |
| | RWw001 | 1E1 | Material code to store, 8 bits |
| | RWw002 | 1E2 | Optional preliminary 32 bits |
| | RWw003 | 1E3 | |
| 2 | RWw004 | 1E4 | Preliminary 16 bits |
| | RWw005 | 1E5 | Free fall 16 bits |
| | RWw006 | 1E6 | Over 16 bits |
| | RWw007 | 1E7 | Under 16 bits |
| 3 | RWw008 | 1E8 | Full 32 bits |
| | RWw009 | 1E9 | |
| | RWw00A | 1EA | Zero band 16 bits |
| | RWw00B | 1EB | |
| 4 | RWw00C | 1EC | Command data 32 bits |
| | RWw00D | 1ED | |
| | RWw00E | 1EE | Command code 16 bits |
| | RWw00F | 1EF | Not used |

Example of Numerical Number

| Decimal numbers | Hexadecimal numbers | | |
|-----------------|---------------------|---------|-----------|
| | 16 bits | 24 bits | 32 bits |
| -10 | FFF6 | FFFFFF6 | FFFFFFFF6 |
| -1 | FFFF | FFFFFFF | FFFFFFFFF |
| 0 | 0000 | 000000 | 00000000 |
| 1 | 0001 | 000001 | 00000001 |
| 10 | 000A | 00000A | 0000000A |

4.1.2. Address Map of Remote Input / Output

Flags (bits) and CC-link handshake in the **remote input**,

AD-4402 to Master Unit

Assumed that station No. is "1".

| Station No. | Flags (bits) and CC-link Handshake of Remote Input | Buffer | Description | |
|-------------|--|--|-------------------------------|-------------------|
| 1 | RX0000 | 0E0 | Reply flag to store setpoints | |
| | RX0001 | | Not used | |
| | RX0002 | | Command replay flag | |
| | RX0003 | | Read / Write replay flag | |
| | RX0004 | | Not used | |
| | RX0005 | | | |
| | RX0006 | | CPU normal operation | |
| | RX0007 | | Not used | |
| | RX0008 | | Decimal point 2^0 | Three bits binary |
| | RX0009 | | Decimal point 2^1 | |
| | RX000A | | Decimal point 2^2 | |
| | RX000B to RX000F | | Not used | |
| | RX0010 | | 0E1 | Zero band |
| | RX0011 | Full flow | | |
| | RX0012 | Medium flow | | |
| | RX0013 | Dribble flow | | |
| | RX0014 | Over | | |
| | RX0015 | OK | | |
| | RX0016 | Under | | |
| | RX0017 | Stable | | |
| | RX0018 | Batch finish | | |
| | RX0019 | Capacity exceeded | | |
| | RX001A | Hold | | |
| | RX001B | Full | | |
| | RX001C | Not used | | |
| | RX001D | Discharge | | |
| | RX001E | Weighing sequence error | | |
| | RX001F | Abnormal weighing without weighing sequence error.(Zero error, Alarm 1, Alarm 2) | | |
| | 2 | RX0020 | 0E2 | Stable |
| RX0021 | | Zero band | | |
| RX0022 | | Full | | |
| RX0023 | | Full flow | | |
| RX0024 | | Medium flow | | |
| RX0025 | | Dribble flow | | |
| RX0026 | | Over | | |
| RX0027 | | OK | | |
| RX0028 | | Under weight | | |
| RX0029 | | Internal reservation | | |
| RX002A | | | | |

| Station No. | Flags (bits) and CC-link Handshake of Remote Input | Buffer | Description |
|-------------|--|--------|------------------------------|
| 2 | RX002B | 0E2 | Mixture |
| | RX002C | | Discharge |
| | RX002D | | Batch finish |
| | RX002E | | Recipe finish |
| | RX002F | | Discharge finish |
| | RX0030 | 0E3 | Mixture finish |
| | RX0031 | | Nozzle down |
| | RX0032 | | Online |
| | RX0033 | | Weighing sequence in process |
| | RX0034 | | Input acknowledged |
| | RX0035 | | Weighing sequence error |
| | RX0036 | | Alarm 1 |
| | RX0037 | | Alarm 2 |
| | RX0038 | | Zero error |
| | RX0039 | | Capacity exceeded |
| | RX003A | | Buzzer |
| | RX003B | | Tare |
| | RX003C | | Center of zero |
| | RX003D | | Gross display |
| | RX003E | | Net display |
| RX003F | Hold | | |
| 3 | RX0040 | 0E4 | Material hopper 1 |
| | RX0041 | | Material hopper 2 |
| | RX0042 | | Material hopper 3 |
| | RX0043 | | Material hopper 4 |
| | RX0044 | | Material hopper 5 |
| | RX0045 | | Material hopper 6 |
| | RX0046 | | Material hopper 7 |
| | RX0047 | | Material hopper 8 |
| | RX0048 | | Material hopper 9 |
| | RX0049 | | Material hopper 10 |
| | RX004A | | Material hopper 11 |
| | RX004B | | Material hopper 12 |
| | RX004C | | Material hopper 13 |
| | RX004D | | Material hopper 14 |
| | RX004E | | Material hopper 15 |
| | RX004F | | Material hopper 16 |
| | RX0050 | 0E5 | Material hopper 17 |
| | RX0051 | | Material hopper 18 |
| | RX0052 | | Material hopper 19 |
| | RX0053 | | Material hopper 20 |
| | RX0054 to RX005F | | Not used |

| Station No. | Flags (bits) and CC-link Handshake of Remote Input | Buffer | Description |
|-------------|--|----------|------------------------------------|
| 4 | RX0060 to RX006F | 0E6 | Not used |
| | RX0070 to RX0077 | 0E7 | Not used |
| | RX0078 | | Request flag of initialization |
| | RX0079 | | Reply flag of initial data setting |
| | RX007A | | Error status flag |
| | RX007B | | Remote READY flag |
| | RX007C to RX007F | Not used | |

Flags (bits) and CC-link handshake in the **remote output**,

Master Unit to AD-4402

Assumed that station No. is "1".

| Station No. | Flags (bits) and CC-link Handshake of Remote Input | Buffer | Description |
|-------------|--|--------|---|
| 1 | RY0000 | 160 | Request flag to store setpoints |
| | RY0001 | | Not used |
| | RY0002 | | Command request flag |
| | RY0003 | | Read/Write selection flag |
| | RY0004 to RY000F | | Not used |
| | RY0010 | 161 | Zero |
| | RY0011 | | Zero clear |
| | RY0012 | | Tare |
| | RY0013 | | Tare clear |
| | RY0014 | | Hold |
| | RY0015 | | Net display |
| | RY0016 | | Gross display |
| | RY0017 | | Not used |
| | RY0018 | | Total command |
| | RY0019 | | Total clear(Current material code) |
| | RY001A | | Reset error. (Zero error, Alarm 1, Alarm 2) |
| | RY001B to RY001F | | Not used |
| 2 | RY0020 | 162 | Zero |
| | RY0021 | | Zero clear |
| | RY0022 | | Tare |
| | RY0023 | | Tare clear |
| | RY0024 | | Batch start |
| | RY0025 | | Recipe start |
| | RY0026 | | Discharge start |
| | RY0027 | | Mixture start |

| Station No. | Flags (bits) and CC-link Handshake of Remote Input | Buffer | Description |
|------------------|--|--------|--|
| 2 | RY0028 | 162 | Internal reservation |
| | RY0029 | | Manual free fall compensation |
| | RY002A | | Total command |
| | RY002B | | Cancel the last total |
| | RY002C | | Emergency stop |
| | RY002D | | Clear total of each material code that specified at the storing command No.33. |
| | RY002E | | Clear total of each recipe code that specified at the storing command No.57. |
| | RY002F | | Not used |
| | RY0030 to RY0034 | 163 | Not used |
| | RY0035 | | Pause |
| | RY0036 | | Re-start |
| | RY0037 | | Clear total of current material code |
| | RY0038 | | Clear all totals of material code |
| | RY0039 | | Clear total of current recipe code |
| | RY003A | | Clear all totals of recipe code |
| | RY003B to RY003F | | Not used |
| 3 | RY0040 | 164 | Not used |
| | RY0041 | | Not used |
| | RY0042 | | Not used |
| | RY0043 | | Force batch finish |
| | RY0044 | | Force recipe finish |
| | RY0045 | | Force discharge finish |
| | RY0046 to RY004A | | Not used |
| | RY004B | | Error reset |
| | RY004C | | Not used |
| | RY004D | | Not used |
| | RY004E | | Manual print |
| | RY004F | | Not used |
| | RY0050 | 165 | Gross display |
| | RY0051 | | Net display |
| RY0052 to RY005F | Not used | | |
| 4 | RY0060 to RY006F | 166 | Not used |
| | RY0070 to RY0077 | 167 | Not used |
| | RY0078 | | Reply flag of initialization |
| | RY0079 | | Request flag of initial data setting |
| | RY007A | | Request flag of error reset |
| | RY007B to RY007F | | Not used |



4.2. Communication Command

4.2.1. Reading command

| Command name | Command code at RWw000E | Description |
|---|-------------------------|--|
| Material name 1 (character no. 1 to 4) | 1 | The command for material code. |
| Material name 2 (character no. 5 to 8) | 2 | |
| Material name 3 (character no. 9 to 12) | 3 | |
| Material hopper | 5 | |
| Full | 6 | |
| Free fall | 7 | |
| Preliminary | 8 | |
| Optional preliminary | 9 | |
| Over | 10 | |
| Under | 11 | |
| Zero band | 12 | |
| Full | 13 | |
| Tare | 14 | |
| Supplementary flow open timer | 15 | |
| Supplementary flow close timer | 16 | |
| Automatic free fall range | 17 | |
| Initial dribble flow | 18 | |
| Initial medium flow | 19 | |
| Total weight | 20 | |
| Total count | 21 | |
| Current material code | 32 | Select material code before calling the code. Set the code number using "writing command code 33" |
| Material code to store | 33 | |
| Weighing result | 36 | To read the last result. |
| Recipe name 1 (character no. 1 to 4) | 40 | The command for recipe code. |
| Recipe name 2 (character no. 5 to 8) | 41 | |
| Recipe name 3 (character no. 9 to 12) | 42 | |
| Material 1 | 44 | |
| Material 2 | 45 | |
| Material 3 | 46 | |
| Material 4 | 47 | |
| Material 5 | 48 | |
| Material 6 | 49 | |
| Material 7 | 50 | |
| Material 8 | 51 | |
| Material 9 | 52 | |
| Material 10 | 53 | |
| Total weight | 54 | |
| Total count | 55 | Select recipe code before calling the code. Set the code number using "writing command code 57" |
| Current recipe code | 56 | |
| Recipe code to store | 57 | |

4.2.2. Storing command

| Command name | Command code at RWw000E | Data of RWw000C, RWw000D | Description |
|---|-------------------------|--------------------------|--|
| Material name 1 (character no. 1 to 4) | 1 | Characters | The command for material code. Select material code before calling the code. Set the code number using "writing command code 33" |
| Material name 2 (character no. 5 to 8) | 2 | | |
| Material name 3 (character no. 9 to 12) | 3 | | |
| Material hopper | 5 | Value | |
| Full | 6 | | |
| Free fall | 7 | | |
| Preliminary | 8 | | |
| Optional preliminary | 9 | | |
| Over | 10 | | |
| Under | 11 | | |
| Zero band | 12 | | |
| Full | 13 | | |
| Tare | 14 | | |
| Supplementary flow open timer | 15 | | |
| Supplementary flow close timer | 16 | | |
| Automatic free fall range | 17 | | |
| Initial dribble flow | 18 | | |
| Initial medium flow | 19 | | |
| Recall material code | 32 | | |
| Material code to store | 33 | | |
| Recipe name 1 (character no. 1 to 4) | 40 | Characters | The command for recipe code. Select recipe code before calling the code. Set the code number using "writing command code 57" |
| Recipe name 2 (character no. 5 to 8) | 41 | | |
| Recipe name 3 (character no. 9 to 12) | 42 | | |
| Material 1 | 44 | Value | |
| Material 2 | 45 | | |
| Material 3 | 46 | | |
| Material 4 | 47 | | |
| Material 5 | 48 | | |
| Material 6 | 49 | | |
| Material 7 | 50 | | |
| Material 8 | 51 | | |
| Material 9 | 52 | | |
| Material 10 | 53 | | |
| Recall recipe code | 56 | 0 to 99 | |
| Recipe code to store | 57 | | |

Caution

Use ASCII code.

Put a space code (20h) in material name or recipe name, when they is not used.

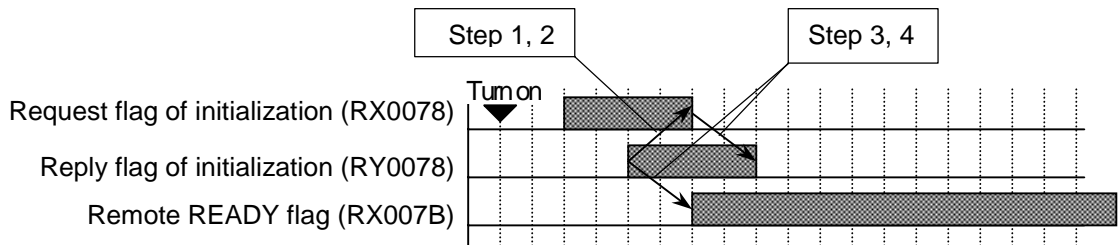
| Command name | Command code at RWw000E | Data of RWw000C, RWw000D | Description |
|--|----------------------------|--------------------------------|---|
| Zero | 0 | 1 | |
| Zero clear | 0 | 2 | |
| Tare | 0 | 3 | |
| Tare clear | 0 | 4 | |
| Batch start | 0 | 5 | |
| Recipe start | 0 | 6 | |
| Discharge start | 0 | 7 | |
| Mixture start | 0 | 8 | |
| Manual free fall compensation | 0 | 10 | |
| Total | 0 | 11 | |
| Cancel the last result | 0 | 12 | |
| Emergency stop | 0 | 13 | |
| Clear total of each material code | 0 | 14 | Set material code at storing command No.33 before use |
| Clear total of each recipe code | 0 | 15 | Set recipe code at storing command No.57 before use |
| Pause | 0 | 22 | |
| Re-start | 0 | 23 | |
| Clear accumulation data of active material code | 0 | 24 | |
| Clear all totals of material code | 0 | 25 | |
| Clear total of active recipe code | 0 | 26 | |
| Clear all totals of recipe code | 0 | 27 | |
| Forced batch finish | 0 | 36 | |
| Forced recipe finish | 0 | 37 | |
| Forced discharge finish | 0 | 38 | |
| Reset error | 0 | 44 | |
| Manual print command | 0 | 47 | |
| Net display | 0 | 49 | |
| Gross display | 0 | 50 | |



4.3. Timing Chart

4.3.1. When Turning on the Indicator

- When initializing the interface from the indicator, use the following procedure. When initializing the interface from the master unit, refer to "4.3.3. Requesting to initialize the interface from the Master Unit".
- When turning on the indicator each time, the following procedure is performed to initialize the option interface.
 - 1 When turning on the indicator and the option interface is the status to be able to communicate, the **request flag of initialization** (RX0078) is active in AD-4402 side.
 - 2 The master unit initializes the option interface and turn on the **reply flag of initialization** (RY0078).
 - 3 AD-4402 turns off the **request flag of initialization** (RX0078) and turn on the **remote READY flag** (RX007B)
 - 4 Turn off the **reply flag of initialization** (RY0078) in the master unit side.

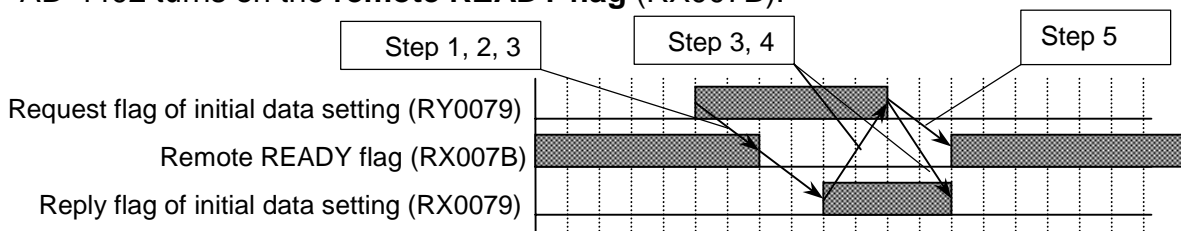


4.3.2. Resumption from suspended mode

- The calibration mode, function list mode and standby mode are turn off the **remote READY flag** (RX007B). When resuming from suspended mode, set the flag on the same procedure of "4.3.1. When Turning on the Indicator".

4.3.3. Requesting to initialize the interface from the Master Unit

- When initializing the interface from the master unit, use the following procedure. When initializing the interface from the indicator, refer to "4.3.1. When Turning on the Indicator".
 - 1 When requesting initial setting of the option interface from the master unit, turn on the **request flag of initial data setting** (RY0079) during turning on the **remote READY flag** (RX007B).
 - 2 AD-4402 turns off the **remote ready flag** (RX007B) and initializes it.
 - 3 The **reply flag of initial data setting** (RX0079) is turned on.
 - 4 Turn off the **request flag of initial data setting** (RY0079) in the master side.
 - 5 AD-4402 turns on the **remote READY flag** (RX007B).

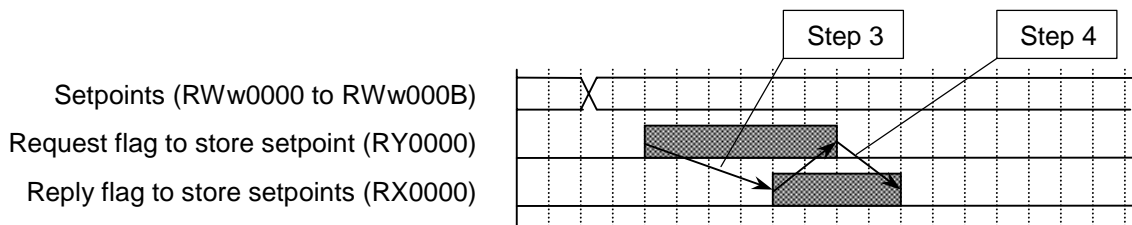


4.3.4. Storing Setpoints

- This command can store setpoints with referring the **remote register** (RWw0000 to RWw000B).
- 1 Set a **material code** to upper side 8 bits of the **remote register** (RWw0001) that is in hexadecimal numbers.
- 2 Set zero to the parameter that is not used.
- 3 Turn on the **request flag** (RY0000) after storing parameters of the **remote register** (RWw0000 to RWw000B) to the indicator.
- 4 When the **reply flag** (RX0000) is turned on, the **request flag** (RY0000) is tuned off.

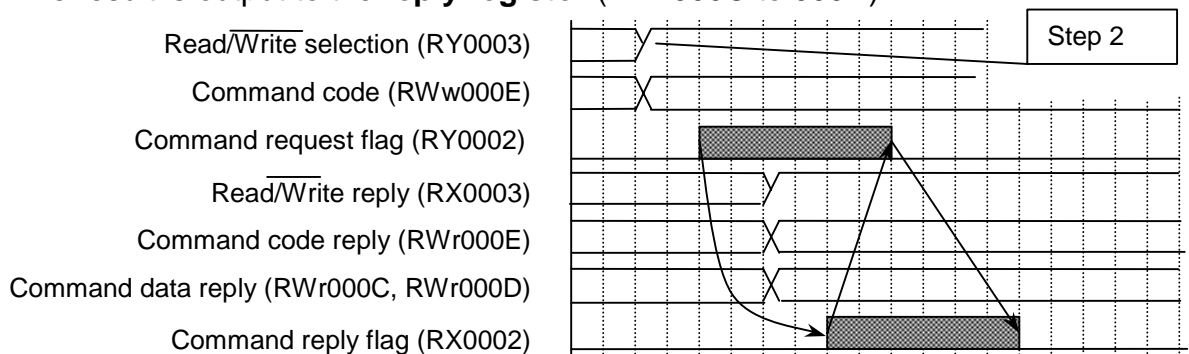
Master Unit to AD-4402

| Station No. | Remote register | Buffer | Description | |
|-------------|-----------------|--------|-------------------------|---------|
| 1 | RWr000 | 1E0 | Final, | 24 bits |
| | RWr001 | 1E1 | Material code to store, | 8 bits |
| | RWr002 | 1E2 | Optional preliminary | 32 bits |
| | RWr003 | 1E3 | | |
| 2 | RWr000 | 1E4 | Preliminary | 16 bits |
| | RWr001 | 1E5 | Free fall | 16 bits |
| | RWr002 | 1E6 | Over | 16 bits |
| | RWr003 | 1E7 | Under | 16 bits |
| 3 | RWr000 | 1E8 | Full | 32 bits |
| | RWr001 | 1E9 | | |
| | RWr002 | 1EA | Zero band | 16 bits |
| | RWr003 | 1EB | | |



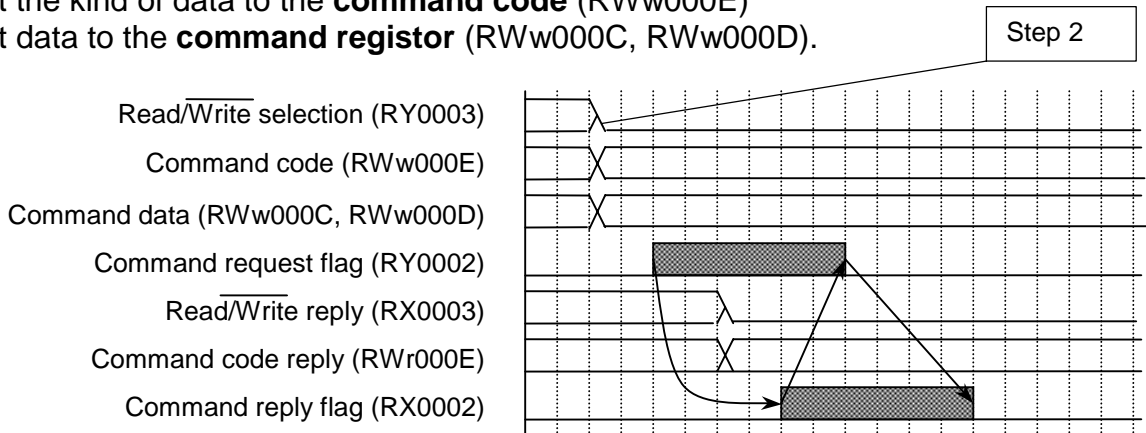
4.3.5. Reading command

- 1 Set a material code (No. 33) or recipe code (No. 57) in the **storing command** (RWw000E).
- 2 Turn on the **Read/Write selection** (RY0003).
- 3 Set the kind of data to the **command code** (RWw000E)
- 4 The result is output to the **reply register** (RWr000C to 000D).



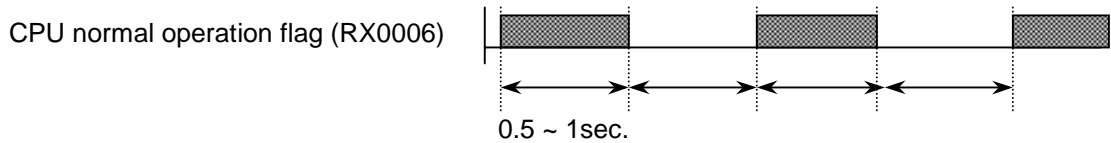
4.3.6. Storing command

- 1 Set a material code (No. 33) or recipe code (No. 57) in the **storing command** (RWw000E).
- 2 Turn off the **Read/Write selection** (RY0003).
- 3 Set the kind of data to the **command code** (RWw000E)
- 4 Set data to the **command register** (RWw000C, RWw000D).



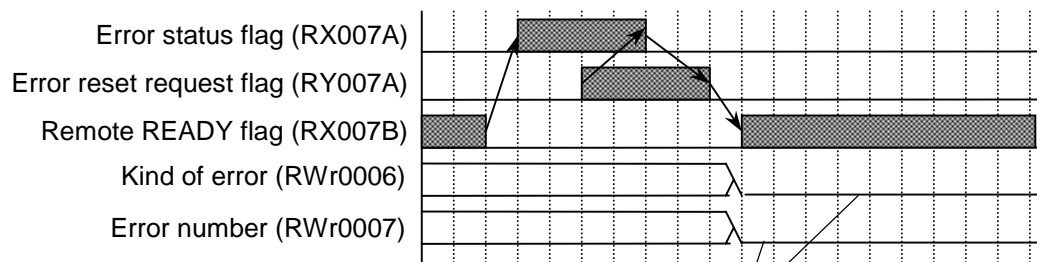
4.3.7. CPU Signal

- When the AD-4402 indicator is normal status, the **CPU normal operation flag register** (RX0006) outputs the following signal.



4.3.8. Error detection Flag

- 1 When an error is detected, the **remote READY flag** (RX007B) is turned off and turned on the **error status flag** (RX007A) to inform the error.
- 2 The master unit requests to reset the error with the **error reset request flag** (RY007A).



Kind of error and error number are reset to zero.



5. Maintenance



5.1. Monitor mode

- The monitor mode is used to check the indicator during the weighing sequence.

5.1.1. Operation and Display

To enter the maintenance

Press and hold the **ENTER** key and press the \uparrow key in weighing mode.

Select menu `check` using the \uparrow key and the **ENTER** key.

Select menu `Option` and OP-20 in the slot.

To select a kind of data
of RX, RY, RWr, RWw

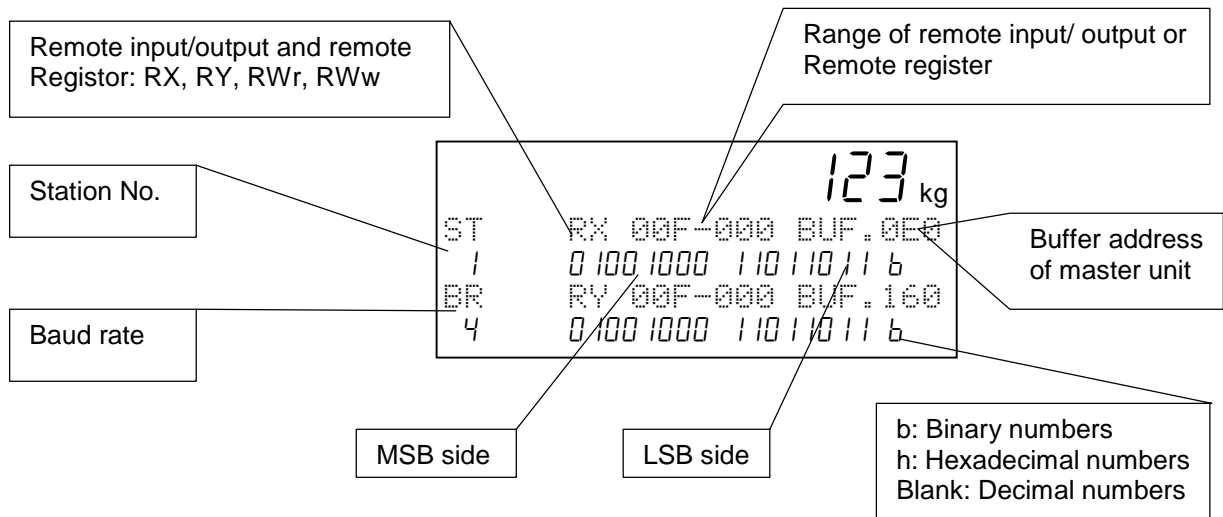
The \blacktriangle key or \blacktriangledown key

To select an I/O No. or register No.

The \uparrow , \blacktriangle key or \blacktriangledown key

To exit the mode
(To return to weighing mode)

The **ESC** key.





A&D Company, Limited

3-23-14 Higashi-Ikebukuro, Toshima-ku, Tokyo 170-0013 JAPAN
Telephone: [81] (3) 5391-6132 Fax: [81] (3) 5391-6148

A&D ENGINEERING, INC.

1555, McCandless Drive, Milpitas, CA. 95035 U.S.A.
Telephone: [1] (408) 263-5333 Fax: [1] (408)263-0119

A&D INSTRUMENTS LTD.

Unit 24/26 Blacklands Way, Abingdon Business Park, Abingdon, Oxon OX14 1DY United Kingdom
Telephone: [44] (1235) 550420 Fax: [44] (1235) 550485

<German Scales Office>

Berner Straße 64, 60437 Frankfurt/Main 50 GERMANY
Telephone: [49] (69) 507-1017 Fax:[49] (69) 507-2054

A&D MERCURY PTY. LTD.

32 Dew Street, Thebarton, South Australia 5031 AUSTRALIA
Telephone: [61] (8) 8352-3033 Fax: [61] (8) 8352-7409

A&D KOREA Limited

8th Floor, Manhattan Bldg. 36-2 Yoido-dong, Youngdeungpo-ku, Seoul, KOREA
Telephone: [82] (2) 780-4101 Fax: [82] (2) 782-4280