# MELSEC-L Multiple Input (Voltage/Current/Temperature) Module FB Library Reference Manual

Applicable module:
L60MD4-G

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# Reference Manual Revision History

| Reference Manual | Date      | Description   |  |
|------------------|-----------|---|--|
| Number           |           |   |  |
| FBM-M115-A       | 2014/6/30 | First edition   |  |
| FBM-M115-B       | 2015/9/25 | 1) Added applicable GX Works2 Version.                            |  |
|                  |           | This FB is able to install on GX Works2 of all language versions. |  |

#### 1. Overview

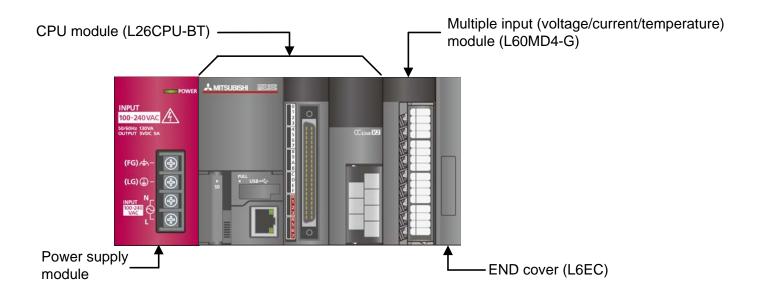
#### 1.1. Overview of the FB Library

This FB Library is for using MELSEC-L Multiple Input (Voltage/Current/Temperature) Module L60MD4-G (hereinafter L60MD4-G).

#### 1.2. Function of the FB Library

| Item                         | Description  |
|------------------------------|--|
| M+L60MD4-G_InitialSetting    | Sets the following data of the specified channel.                            |
|                              | Input type/range setting   |
|                              | Centigrade/Fahrenheit display setting  |
| M+L60MD4-G_SetAverage        | Sets the averaging processing of the specified channel.                      |
| M+L60MD4-G_SetScaling        | Sets the scaling of the specified channel.                                   |
| M+L60MD4-G_SetDisconnect     | Sets the disconnection detection of the specified channel.                   |
| M+L60MD4-G_SetInputSignalErr | Sets the input signal error detection of the specified channel.              |
| M+L60MD4-G_SetProcessAlarm   | Sets the process alarm of the specified channel.                             |
| M+L60MD4-G_SetRateAlarm      | Sets the rate alarm of the specified channel.                                |
| M+L60MD4-G_RequestSetting    | Validates the settings of each function.                                     |
| M+L60MD4-G_ReadVal           | Reads the conversion data of the specified channel.                          |
| M+L60MD4-G_ReadAllVal        | Reads the conversion data of all channels.                                   |
| M+L60MD4-G_ReadScalingVal    | Reads the scaling value of the specified channel.                            |
| M+L60MD4-G_ReadAllScalingVal | Reads the scaling value of all channels.                                     |
| M+L60MD4-G_ErrorOperation    | Monitors error codes and resets errors.                                      |
| M+L60MD4-G_ShiftOperation    | Adds the shift amount to the digital value.                                  |
| M+L60MD4-G_DiffOperation     | Outputs the difference obtained by subtracting the standard value from the   |
|                              | digital value.   |
| M+L60MD4-G_ClipOperation     | Limits a digital value at the digital clipping upper and lower limit values. |

#### 1.3. System Configuration Example



#### 1.4. Relevant Manuals

- MELSEC-L Multiple Input (Voltage/Current/Temperature) Module User's Manual
- MELSEC-L CPU Module User's Manual (Hardware Design, Maintenance and Inspection)
- GX Works2 Version 1 Operating Manual (Common)
- GX Works2 Version 1 Operating Manual (Simple Project, Function Block)

#### 1.5. Note

## 2. Details of the FB Library

#### 2.1. M+L60MD4-G\_InitialSetting (Initial setting)

# FB Name

M+L60MD4-G\_InitialSetting

| Item                             | Description  |   |                       |  |  |
|----------------------------------|--|---|-----------------------|--|--|
| Function overview                | Sets the following data of the specified channel.  |   |                       |  |  |
|                                  | Input type/range setting   |   |                       |  |  |
|                                  | Centigrade/Fahrenheit  | display setting   |                       |  |  |
| Symbol                           |  |   | FB_EROR: B            |  |  |
|                                  | Centigrade/Fahrenheit W display setting  | : iw_DisplayType  |                       |  |  |
| Applicable hardware and software | Multiple input (voltage/current/ temperature) module   | L60MD4-G  |                       |  |  |
|                                  | CPU module   |   |                       |  |  |
|                                  |  | Series  | Model                 |  |  |
|                                  |  | MELSEC-L Series   | LCPU                  |  |  |
|                                  | Engineering software   | GX Works2 *1  |                       |  |  |
|                                  |  | Language  | Software version      |  |  |
|                                  |  | Japanese version  | Version1.86Q or later |  |  |
|                                  |  | English version   | Version1.24A or later |  |  |
|                                  |  | Chinese (Simplified) version                                      | Version1.49B or later |  |  |
|                                  |  | Chinese (Traditional) version                                     | Version1.49B or later |  |  |
|                                  |  | Korean version  | Version1.49B or later |  |  |
|                                  |  | *1 For software versions applicable to the modules used, refer to |                       |  |  |
|                                  |  | "Relevant manuals".   |                       |  |  |
| Programming language             | Ladder   |   |                       |  |  |
| Number of steps                  | 298 steps (for MELSEC-L series CPU)  |   |                       |  |  |
|                                  | *The number of steps of the FB in a program depends on the CPU model that is used and input and output definition. |   |                       |  |  |



| Item                 | Description   |
|----------------------|---|
| Function description | 1) By turning ON FB_EN (Execution command), the input type/range setting and                |
|                      | Centigrade/Fahrenheit display setting of the specified channel are set.                     |
|                      | 2) FB operation is one-shot only, triggered by the FB_EN signal.                            |
|                      | 3) The setting value is validated when the Operating condition setting request signal (Yn9) |
|                      | is turned OFF → ON → OFF or the Operating condition setting request FB                      |
|                      | (M+L60MD4-G_RequestSetting) is executed.  |
|                      | 4) When the setting value of iw_CH (Target CH) is out of range, the FB_ERROR output         |
|                      | turns ON and processing is interrupted, and the error code 10 (Decimal) is stored in        |
|                      | ERROR_ID (Error code).  |
|                      | Refer to the error code explanation section for details.                                    |
| Compiling method     | Macro type  |
| Restrictions and     | The FB does not include error recovery processing. Program the error recovery               |
| precautions          | processing separately in accordance with the required system operation.                     |
|                      | 2) The FB cannot be used in an interrupt program.   |
|                      | 3) Please ensure that the FB_EN signal is capable of being turned OFF by the program. Do    |
|                      | not use this FB in programs that are only executed once such as a subroutine,               |
|                      | FOR-NEXT loop because it is impossible to turn OFF.   |
|                      | 4) When two or more of these FBs are used, precaution must be taken to avoid repetition of  |
|                      | iw_CH (Target CH).  |
|                      | 5) This FB uses index registers Z7 to Z9. Please do not use these index registers in an     |
|                      | interrupt program.  |
|                      | 6) Every input must be provided with a value for proper FB operation.                       |
|                      | 7) In either of the following cases 1) and 2), no errors occur in this FB; however an error |
|                      | occurs in the module at an operating condition setting request. Please read the             |
|                      | MELSEC-L Multiple Input (Voltage/Current/Temperature) Module User's Manual for the          |
|                      | errors on the module.   |
|                      | 1) When a value set for iw_TypeRange (Input type/range setting) or iw_DisplayType           |
|                      | (Centigrade/Fahrenheit display setting) is out of the setting range                         |
|                      | 2) When a value within 2 to 4 is set for iw_CH and a thermocouple input value is set for    |
|                      | iw_TypeRange while a value other than the thermocouple setting is set for CH1 Input         |
|                      | type/range setting (Un¥G500)  |
| FB operation type    | Pulsed execution (1 scan execution type)  |
| Application example  | Refer to "Appendix 1 FB Library Application Examples".                                      |



| Item             | Description  |  |  |  |  |  |
|------------------|--|--|--|--|--|--|
| Timing chart     | [When operation completes without error]   | [When an error occurs]   |  |  |  |  |
|                  | FB_EN (Execution command)  | FB_EN (Execution command)  |  |  |  |  |
|                  | FB_ENO (Execution status)  | FB_ENO (Execution status)  |  |  |  |  |
|                  | "Input type/range setting" and  "Centigrade/Fahrenheit display setting" write processing  Write  No processing | "Input type/range setting" and "Centigrade/Fahrenheit display setting" write processing  No processing |  |  |  |  |
|                  | FB_OK<br>(Completed without error)   | FB_OK<br>(Completed without error)   |  |  |  |  |
|                  | FB_ERROR (Error flag)  | FB_ERROR (Error flag)  |  |  |  |  |
|                  | ERROR_ID (Error code) 0  | ERROR_ID (Error code) 0 Error code 0   |  |  |  |  |
| Relevant manuals | MELSEC-L Multiple Input (Voltage/Current/Temperature) Module User's Manual                                     |  |  |  |  |  |
|                  | MELSEC-L CPU Module User's Manual (Hardware Design, Maintenance and Inspection)                                |  |  |  |  |  |
|                  | GX Works2 Version 1 Operating Manual (Common)  |  |  |  |  |  |
|                  | GX Works2 Version 1 Operating Manual (\$   | Simple Project, Function Block)  |  |  |  |  |

| Error code   | Description                                 | Action   |  |
|--------------|---|--|--|
| 10 (Decimal) | The specified channel is not valid. iw_CH   | Please try again after confirming the setting. |  |
|              | (Target CH) is not within the range of 1 to |  |  |
|              | 4.  |  |  |

## ●Input labels

| Name (comment)    | Label name     | Data  | Setting range                          | Description                              |
|-------------------|----------------|-------|--|--|
|                   |                | type  |  |  |
| Execution command | FB_EN          |       | ON, OFF                                | ON: The FB is activated.                 |
|                   |                | Bit   |  | OFF: The FB is not                       |
|                   |                |       |  | activated.                               |
| Module start XY   | iw_Start_IO_No |       | Depends on the I/O point               | Specify the starting XY                  |
| address           |                |       | range of the CPU.                      | address (in hexadecimal)                 |
|                   |                | Word  | For details, refer to the              | where the L60MD4-G is                    |
|                   |                |       | CPU user's manual.                     | connected. (For example,                 |
|                   |                |       |  | enter H10 for X10.)                      |
| Target CH         | iw_CH          | Word  | 1 to 4                                 | 1 to 4: Specify the channel              |
|                   |                | vvoid |  | number.                                  |
| Input type/range  | iw_TypeRange   |       | 0000 <sub>H</sub>                      | 0000 <sub>H</sub> : Conversion           |
| setting           |                |       | 0010 <sub>H</sub> to 0012 <sub>H</sub> | disabled                                 |
|                   |                |       | 0020 <sub>H</sub> to 0024 <sub>H</sub> | [Current]                                |
|                   |                |       | 0030 <sub>H</sub>                      | 0010 <sub>H</sub> : 4 to 20 mA           |
|                   |                |       | 0040 <sub>H</sub> to 0045 <sub>H</sub> | 0011 <sub>H</sub> : 0 to 20 mA           |
|                   |                |       | 0050 <sub>H</sub> to 005B <sub>H</sub> | 0012 <sub>H</sub> : 4 to 20 mA           |
|                   |                |       |  | (Expansion)                              |
|                   |                | Word  |  | [Voltage]                                |
|                   |                |       |  | 0020 <sub>H</sub> : 1 to 5 V             |
|                   |                |       |  | 0021 <sub>H</sub> : 0 to 5 V             |
|                   |                |       |  | 0022 <sub>H</sub> : -10 to 10 V          |
|                   |                |       |  | 0023 <sub>H</sub> : 0 to 10 V            |
|                   |                |       |  | 0024 <sub>H</sub> : 1 to 5 V (Expansion) |
|                   |                |       |  | [Low voltage]                            |
|                   |                |       |  | 0030 <sub>H</sub> : -100 to 100 mV       |

| Name (comment)      | Label name     | Data  | Setting range | Description                             |
|---------------------|----------------|-------|---------------|---|
|                     |                | type  |               |   |
|                     |                |       |               | [Thermometric resistor]                 |
|                     |                |       |               | 0040 <sub>H</sub> : Pt100 (-20 to 120   |
|                     |                |       |               | Centigrade)                             |
|                     |                |       |               | 0041 <sub>H</sub> : Pt100 (-200 to 850  |
|                     |                |       |               | Centigrade)                             |
|                     |                |       |               | 0042 <sub>H</sub> : JPt100 (-20 to 120  |
|                     |                |       |               | Centigrade)                             |
|                     |                |       |               | 0043 <sub>H</sub> : JPt100 (-200 to 600 |
|                     |                |       |               | Centigrade)                             |
|                     |                |       |               | 0044 <sub>H</sub> : Pt1000 (-200 to 850 |
|                     |                |       |               | Centigrade)                             |
|                     |                |       |               | 0045 <sub>H</sub> : Pt50 (-200 to 650   |
|                     |                |       |               | Centigrade)                             |
|                     |                |       |               | [Thermocouple]                          |
|                     |                |       |               | 0050 <sub>H</sub> : B thermocouple      |
|                     |                |       |               | 0051 <sub>H</sub> : R thermocouple      |
|                     |                |       |               | 0052 <sub>H</sub> : S thermocouple      |
|                     |                |       |               | 0053 <sub>H</sub> : K thermocouple      |
|                     |                |       |               | 0054 <sub>H</sub> : E thermocouple      |
|                     |                |       |               | 0055 <sub>H</sub> : J thermocouple      |
|                     |                |       |               | 0056 <sub>н</sub> : T thermocouple      |
|                     |                |       |               | 0057 <sub>H</sub> : N thermocouple      |
|                     |                |       |               | 0058 <sub>H</sub> : U thermocouple      |
|                     |                |       |               | 0059 <sub>H</sub> : L thermocouple      |
|                     |                |       |               | 005A <sub>H</sub> : PLII thermocouple   |
|                     |                |       |               | 005B <sub>H</sub> : W5Re/W26Re          |
|                     |                |       |               | thermocouple                            |
| Centigrade/Fahrenh  | iw_DisplayType | Word  | 0, 1          | 0: Centigrade display                   |
| eit display setting |                | vvoid |               | 1: Fahrenheit display                   |

#### Output labels

| Name (comment)    | Label name | Data    | Initial | Description                                       |
|-------------------|------------|---------|---------|---|
|                   |            | type    | value   |   |
| Execution status  | FB_ENO     | Bit OFF |         | ON: Execution command is ON.                      |
|                   |            |         |         | OFF: Execution command is OFF.                    |
| Completed without | FB_OK      | Bit     | OFF     | When ON, it indicates that the initial setting is |
| error             |            | DIL     | OFF     | completed.  |
| Error flag        | FB_ERROR   | D:t     | OFF     | When ON, it indicates that an error has           |
|                   |            | Bit     | OFF     | occurred.   |
| Error code        | ERROR_ID   | Word    | 0       | FB error code output.                             |

## **FB Version Upgrade History**

| Version | Date      | Description   |
|---------|-----------|---------------|
| 1.00A   | 2014/6/30 | First edition |

#### Note

This chapter includes information related to the function block.

It does not include information on restrictions of use such as combination with modules or programmable controller CPUs.



## 2.2. M+L60MD4-G\_SetAverage (Averaging process setting)

## **FB Name**

M+L60MD4-G\_SetAverage

| Item                                  | Description   |   |  |  |  |
|---------------------------------------|---|---|--|--|--|
| Function overview                     | Sets the averaging processing of the specified channel.                                     |   |  |  |  |
| Symbol                                | Target CH ——  Averaging process setting ——  | M+L60MD4-G_SetAverage  B: FB_EN   |  |  |  |
| Applicable hardware and software      | Multiple input (voltage/current/ temperature) module  | L60MD4-G  |  |  |  |
|                                       | CPU module  | Series MELSEC-L Series  | Model<br>LCPU  |  |  |
| Engineering software                  |   | GX Works2 *1  Language  Japanese version  English version  Chinese (Simplified) version  Chinese (Traditional) version  Korean version  *1 For software versions applica  "Relevant manuals". | Software version  Version1.86Q or later  Version1.24A or later  Version1.49B or later  Version1.49B or later  Version1.49B or later  ble to the modules used, refer to |  |  |
| Programming language  Number of steps | Ladder  417 steps (for MELSEC-L  *The number of steps of the input and output definitions.) | the FB in a program depends on the CPU model that is used and   |  |  |  |



| Item                  | Description  |
|-----------------------|--|
| Function description  | By turning ON FB_EN (Execution command), the averaging processing of the specified channel is set.   |
|                       |  |
|                       | <ul><li>2) FB operation is one-shot only, triggered by the FB_EN signal.</li><li>3) The setting value is validated when the Operating condition setting request signal (Yn9)</li></ul> |
|                       | is turned OFF → ON → OFF or the Operating condition setting request FB   |
|                       | (M+L60MD4-G_RequestSetting) is executed.   |
|                       | 4) When the setting value of iw_CH (Target CH) is out of range, the FB_ERROR output  |
|                       | turns ON and processing is interrupted, and the error code is stored in ERROR_ID (Error  |
|                       | code).   |
|                       | Refer to the error code explanation section for details.   |
|                       | 5) When the setting value of iw_Average_Type (Averaging process setting) is out of range,  |
|                       | the FB_ERROR output turns ON and processing is interrupted, and the error code is  |
|                       | stored in ERROR_ID (Error code).   |
|                       | Refer to the error code explanation section for details.   |
| Compiling method      | Macro type   |
| Restrictions and      | The FB does not include error recovery processing. Program the error recovery  |
| precautions           | processing separately in accordance with the required system operation.  |
|                       | 2) The FB cannot be used in an interrupt program.  |
|                       | 3) Please ensure that the FB_EN signal is capable of being turned OFF by the program. Do   |
|                       | not use this FB in programs that are only executed once such as a subroutine,  |
|                       | FOR-NEXT loop because it is impossible to turn OFF.  |
|                       | 4) When two or more of these FBs are used, precaution must be taken to avoid repetition of   |
|                       | iw_CH (Target CH).   |
|                       | 5) This FB uses index registers Z7 to Z9. Please do not use these index registers in an  |
|                       | interrupt program.   |
|                       | 6) Every input must be provided with a value for proper FB operation.  |
|                       | 7) To operate the L60MD4-G, set the input type/range setting according to the device and   |
|                       | system to be connected. Set the proper settings for the device and system with the   |
|                       | parameter setting in GX Works2 or the initial setting FB (M+L60MD4-G_InitialSetting).  |
|                       | For details on how to use the parameter setting in GX Works2, refer to GX Works2   |
|                       | Version 1 Operating Manual (Common).   |
|                       | 8) When a value set for iw_Average_Times (Time average/Count average/Moving average  |
|                       | settings) is out of the setting range, no errors occur in this FB; however an error occurs in the module at an operating condition setting request. Please read the MELSEC-L           |
|                       | Multiple Input (Voltage/Current/Temperature) Module User's Manual for the errors on the  |
|                       | module.  |
| FB operation type     | Pulsed execution (1 scan execution type)   |
| Application example   | Refer to "Appendix 1 FB Library Application Examples".   |
| , application oxample | Total to Appoint the Elevary Approximate Examples .  |



| Item             | Description   |   |  |  |
|------------------|---|---|--|--|
| Timing chart     | [When operation completes without error]  | [When an error occurs]  |  |  |
|                  | FB_EN (Execution command) FB_ENO (Execution status) Averaging process setting write processing FB_OK (Completed without error) FB_ERROR (Error flag) ERROR_ID (Error code)  0   | FB_EN (Execution command)  FB_ENO (Execution status)  Averaging process setting write processing  FB_OK (Completed without error)  FB_ERROR (Error flag)  ERROR_ID (Error code)  0 Error code |  |  |
| Relevant manuals | <ul> <li>MELSEC-L Multiple Input (Voltage/Current/Temperature) Module User's Manual</li> <li>MELSEC-L CPU Module User's Manual (Hardware Design, Maintenance and Inspection)</li> <li>GX Works2 Version 1 Operating Manual (Common)</li> <li>GX Works2 Version 1 Operating Manual (Simple Project, Function Block)</li> </ul> |   |  |  |

| Error code   | Description                                   | Action   |
|--------------|---|--|
| 10 (Decimal) | The specified channel is not valid. iw_CH     | Please try again after confirming the setting. |
|              | (Target CH) is not within the range of 1 to   |  |
|              | 4.  |  |
| 11 (Decimal) | The specified averaging processing type is    | Please try again after confirming the setting. |
|              | not valid. iw_Average_Type (Averaging         |  |
|              | process setting) is not within the range of 0 |  |
|              | to 3 <sub>H</sub> .                           |  |

## ●Input labels

| Name (comment)     | Label name       | Data  | Setting range                        | Description                 |
|--------------------|------------------|-------|--------------------------------------|-----------------------------|
|                    |                  | type  |                                      |                             |
| Execution command  | FB_EN            |       | ON, OFF                              | ON: The FB is activated.    |
|                    |                  | Bit   |                                      | OFF: The FB is not          |
|                    |                  |       |                                      | activated.                  |
| Module start XY    | iw_Start_IO_No   |       | Depends on the I/O point             | Specify the starting XY     |
| address            |                  |       | range of the CPU.                    | address (in hexadecimal)    |
|                    |                  | Word  | For details, refer to the            | where the L60MD4-G is       |
|                    |                  |       | CPU user's manual.                   | connected. (For example,    |
|                    |                  |       |                                      | enter H10 for X10.)         |
| Target CH          | iw_CH            | Word  | 1 to 4                               | Specify the channel         |
|                    |                  | vvoid |                                      | number.                     |
| Averaging process  | iw_Average_Type  |       | 0 <sub>H</sub> : Sampling processing | Specify the averaging       |
| setting            |                  | Word  | 1 <sub>H</sub> : Time average        | processing type.            |
|                    |                  | vvoid | 2 <sub>H</sub> : Count average       |                             |
|                    |                  |       | 3 <sub>H</sub> : Moving average      |                             |
| Time average/Count | iw_Average_Times |       | Time average                         | Set the time average, count |
| average/Moving     |                  |       | 8 to 18000 (100 ms)                  | average, and moving         |
| average settings   |                  | Word  | Count average                        | average of the specified    |
|                    |                  | vvoid | 4 to 36000 (times)                   | channel.                    |
|                    |                  |       | Moving average                       |                             |
|                    |                  |       | 2 to 1000 (times)                    |                             |

## Output labels

| Name (comment)    | Label name | Data      | Initial | Description                              |
|-------------------|------------|-----------|---------|--|
|                   |            | type      | value   |  |
| Execution status  | FB_ENO     | Dit       | OFF     | ON: Execution command is ON.             |
|                   |            | Bit OFF ( |         | OFF: Execution command is OFF.           |
| Completed without | FB_OK      | D:t       | 055     | When ON, it indicates that the averaging |
| error             |            | Bit OFF   |         | processing setting is completed.         |
| Error flag        | FB_ERROR   | Bit   OFF |         | When ON, it indicates that an error has  |
|                   |            |           |         | occurred.                                |
| Error code        | ERROR_ID   | Word      | 0       | FB error code output.                    |



## **FB Version Upgrade History**

| Version | Date      | Description   |
|---------|-----------|---------------|
| 1.00A   | 2014/6/30 | First edition |

#### Note

This chapter includes information related to the function block.

It does not include information on restrictions of use such as combination with modules or programmable controller CPUs.



## 2.3. M+L60MD4-G\_SetScaling (Scaling setting)

## **FB Name**

M+L60MD4-G\_SetScaling

| Item                | Description   |                                   |                                      |  |
|---------------------|---|-----------------------------------|--------------------------------------|--|
| Function overview   | Sets the scaling of the specified channel.  |                                   |                                      |  |
| Symbol              |   | M+L60MD4-G_SetScaling             |                                      |  |
|                     | Execution command ———   | B : FB_EN                         | FB_ENO : B Execution status          |  |
|                     | Module start XY address ———   | W : iw_Start_IO_No                | FB_OK : B —— Completed without error |  |
|                     | Target CH ——  | W : iw_CH                         | FB_ERROR : B Error flag              |  |
|                     | Scaling enable/disable ———  | B : ib_Scl_Enable                 | ERROR_ID : W Error code              |  |
|                     | Scaling upper limit value   | W : iw_Scl_U_Lim W : iw_Scl_L_Lim |                                      |  |
|                     | Scaling lower limit value ———   | W . IW_5U_L_LIIII                 |                                      |  |
| Applicable hardware | Multiple input  | L60MD4-G                          |                                      |  |
| and software        | (voltage/current/   |                                   |                                      |  |
|                     | temperature) module   |                                   |                                      |  |
|                     | CPU module  |                                   |                                      |  |
|                     |   | Series                            | Model                                |  |
|                     |   | MELSEC-L Series                   | LCPU                                 |  |
|                     | Engineering software  | GX Works2 *1                      |                                      |  |
|                     |   | Language                          | Software version                     |  |
|                     |   | Japanese version                  | Version1.86Q or later                |  |
|                     |   | English version                   | Version1.24A or later                |  |
|                     |   | Chinese (Simplified) version      | Version1.49B or later                |  |
|                     |   | Chinese (Traditional) version     | Version1.49B or later                |  |
|                     |   | Korean version                    | Version1.49B or later                |  |
|                     |   | *1 For software versions applical | ble to the modules used, refer to    |  |
|                     |   | "Relevant manuals".               |                                      |  |
| Programming         | Ladder  |                                   |                                      |  |
| language            |   |                                   |                                      |  |
| Number of steps     | 352 steps (for MELSEC-L   | series CPU)                       |                                      |  |
|                     | *The number of steps of the FB in a program depends on the CPU model that is used and |                                   |                                      |  |
|                     | input and output definition.  |                                   |                                      |  |



| Item                 | Description   |
|----------------------|---|
| Function description | By turning ON FB_EN (Execution command), the scaling setting of the specified               |
|                      | channel is configured.  |
|                      | 2) FB operation is one-shot only, triggered by the FB_EN signal.                            |
|                      | 3) The setting value is validated when the Operating condition setting request signal (Yn9) |
|                      | is turned OFF → ON → OFF or the Operating condition setting request FB                      |
|                      | (M+L60MD4-G_RequestSetting) is executed.  |
|                      | 4) When the setting value of iw_CH (Target CH) is out of range, the FB_ERROR output         |
|                      | turns ON and processing is interrupted, and the error code is stored in ERROR_ID            |
|                      | (Error code).   |
|                      | Refer to the error code explanation section for details.                                    |
| Compiling method     | Macro type  |
| Restrictions and     | The FB does not include error recovery processing. Program the error recovery               |
| precautions          | processing separately in accordance with the required system operation.                     |
|                      | 2) The FB cannot be used in an interrupt program.   |
|                      | 3) Please ensure that the FB_EN signal is capable of being turned OFF by the program.       |
|                      | Do not use this FB in programs that are only executed once such as a subroutine,            |
|                      | FOR-NEXT loop because it is impossible to turn OFF.   |
|                      | 4) When two or more of these FBs are used, precaution must be taken to avoid repetition     |
|                      | of iw_CH (Target CH).   |
|                      | 5) This FB uses index registers Z7 to Z9. Please do not use these index registers in an     |
|                      | interrupt program.  |
|                      | 6) Every input must be provided with a value for proper FB operation.                       |
|                      | 7) To operate the L60MD4-G, set the input type/range setting according to the device and    |
|                      | system to be connected. Set the proper settings for the device and system with the          |
|                      | parameter setting in GX Works2 or the initial setting FB (M+L60MD4-G_InitialSetting).       |
|                      | For details on how to use the parameter setting in GX Works2, refer to GX Works2            |
|                      | Version 1 Operating Manual (Common).  |
|                      | 8) In either of the following cases 1) and 2), no errors occur in this FB; however an error |
|                      | occurs in the module at an operating condition setting request. Please read the             |
|                      | MELSEC-L Multiple Input (Voltage/Current/Temperature) Module User's Manual for the          |
|                      | errors on the module.   |
|                      | 1) When a value set for iw_Scl_U_Lim (Scaling upper limit value) or iw_Scl_L_Lim            |
|                      | (Scaling lower limit value) is out of the setting range                                     |
|                      | 2) When the values set for iw_Scl_U_Lim (Scaling upper limit value) and iw_Scl_L_Lim        |
| ED                   | (Scaling lower limit value) are the same  |
| FB operation type    | Pulsed execution (1 scan execution type)  |
| Application example  | Refer to "Appendix 1 FB Library Application Examples".                                      |



| Item             | Description  |   |  |  |
|------------------|--|---|--|--|
| Timing chart     | [When operation completes without error]   | [When an error occurs]  |  |  |
|                  | FB_EN (Execution command)  FB_ENO (Execution status)  Scaling setting write processing  FB_OK (Completed without error)  FB_ERROR (Error flag)  ERROR_ID (Error code)  0   | FB_EN (Execution command)  FB_ENO (Execution status)  Scaling setting write processing  FB_OK (Completed without error)  FB_ERROR (Error flag)  ERROR_ID (Error code)  0 Error code |  |  |
| Relevant manuals | MELSEC-L Multiple Input (Voltage/Current/Temperature) Module User's Manual     MELSEC-L CPU Module User's Manual (Hardware Design, Maintenance and Inspection)     GX Works2 Version 1 Operating Manual (Common)     GX Works2 Version 1 Operating Manual (Simple Project, Function Block) |   |  |  |

| Error code   | Description                                 | Action   |
|--------------|---|--|
| 10 (Decimal) | The specified channel is not valid. iw_CH   | Please try again after confirming the setting. |
|              | (Target CH) is not within the range of 1 to |  |
|              | 4.  |  |

## ●Input labels

| Name (comment)      | Label name     | Data  | Setting range      | Description                            |
|---------------------|----------------|-------|--------------------|--|
|                     |                | type  |                    |  |
| Execution command   | FB_EN          | Bit   | ON, OFF            | ON: The FB is activated.               |
|                     |                | ום    |                    | OFF: The FB is not activated.          |
| Module start XY     | iw_Start_IO_No |       | Depends on the     | Specify the starting XY address (in    |
| address             |                |       | I/O point range    | hexadecimal) where the L60MD4-G        |
|                     |                | Word  | of the CPU.        | is connected. (For example, enter      |
|                     |                | vvolu | For details, refer | H10 for X10.)                          |
|                     |                |       | to the CPU         |  |
|                     |                |       | user's manual.     |  |
| Target CH           | iw_CH          | Word  | 1 to 4             | Specify the channel number.            |
| Scaling             | ib_Scl_Enable  | Bit   | ON, OFF            | ON: Enable the scaling.                |
| enable/disable      |                | DIL   |                    | OFF: Disable the scaling.              |
| Scaling upper limit | iw_Scl_U_Lim   | Word  | -32,000 to         | Specify the scaling upper limit value. |
| value               |                | vvolu | 32,000             |  |
| Scaling lower limit | iw_Scl_L_Lim   | Word  | -32,000 to         | Specify the scaling lower limit value. |
| value               |                | vvoiu | 32,000             |  |

## Output labels

| Name (comment)    | Label name | Data      | Initial | Description                                    |
|-------------------|------------|-----------|---------|--|
|                   |            | type      | value   |  |
| Execution status  | FB_ENO     | Dit       | OFF     | ON: Execution command is ON.                   |
|                   |            | Bit OFF ( |         | OFF: Execution command is OFF.                 |
| Completed without | FB_OK      | Di+       | OFF     | When ON, it indicates that the scaling setting |
| error             |            | Bit OFF   |         | is completed.                                  |
| Error flag        | FB_ERROR   | Bit OFF   |         | When ON, it indicates that an error has        |
|                   |            |           |         | occurred.                                      |
| Error code        | ERROR_ID   | Word      | 0       | FB error code output.                          |

## **FB Version Upgrade History**

| Version | Date      | Description   |
|---------|-----------|---------------|
| 1.00A   | 2014/6/30 | First edition |

#### Note

This chapter includes information related to the function block.

It does not include information on restrictions of use such as combination with modules or programmable controller CPUs.



## 2.4. M+L60MD4-G\_SetDisconnect (Disconnection detection setting)

#### **FB Name**

M+L60MD4-G\_SetDisconnect

| Item                             | Description  |   |  |
|----------------------------------|--|---|--|
| Function overview                | Sets the disconnection detection of the specified channel.                               |   |  |
| Symbol                           | Module start XY address ——  Target CH ——  Conversion setting for disconnection detection |   | FB_ENO : B —— Execution status  FB_OK : B —— Completed without error  FB_ERROR : B —— Error flag  ERROR_ID : W —— Error code   |
| Applicable hardware and software | Multiple input (voltage/current/ temperature) module CPU module                          | Series MELSEC-L Series  | Model<br>LCPU  |
|                                  | Engineering software   | GX Works2 *1  Language  Japanese version  English version  Chinese (Simplified) version  Chinese (Traditional) version  Korean version  *1 For software versions applica  "Relevant manuals". | Software version  Version1.86Q or later  Version1.24A or later  Version1.49B or later  Version1.49B or later  Version1.49B or later  ble to the modules used, refer to |
| Programming language             | Ladder   |   |  |
| Number of steps                  | 372 steps (for MELSEC-L *The number of steps of the input and output definition          | ne FB in a program depends on th  | ne CPU model that is used and  |



| Item                 | Description   |
|----------------------|---|
| Function description | 1) By turning ON FB_EN (Execution command), the disconnection detection setting of the      |
|                      | specified channel is configured.  |
|                      | 2) FB operation is one-shot only, triggered by the FB_EN signal.                            |
|                      | 3) The setting value is validated when the Operating condition setting request signal (Yn9) |
|                      | is turned OFF → ON → OFF or the Operating condition setting request FB                      |
|                      | (M+L60MD4-G_RequestSetting) is executed.  |
|                      | 4) When the setting value of iw_CH (Target CH) is out of range, the FB_ERROR output         |
|                      | turns ON and processing is interrupted, and the error code is stored in ERROR_ID            |
|                      | (Error code).   |
|                      | Refer to the error code explanation section for details.                                    |
| Compiling method     | Macro type  |
| Restrictions and     | The FB does not include error recovery processing. Program the error recovery               |
| precautions          | processing separately in accordance with the required system operation.                     |
|                      | 2) The FB cannot be used in an interrupt program.   |
|                      | 3) Please ensure that the FB_EN signal is capable of being turned OFF by the program.       |
|                      | Do not use this FB in programs that are only executed once such as a subroutine,            |
|                      | FOR-NEXT loop because it is impossible to turn OFF.   |
|                      | 4) When two or more of these FBs are used, precaution must be taken to avoid repetition     |
|                      | of iw_CH (Target CH).   |
|                      | 5) This FB uses index registers Z7 to Z9. Please do not use these index registers in an     |
|                      | interrupt program.  |
|                      | 6) Every input must be provided with a value for proper FB operation.                       |
|                      | 7) To operate the L60MD4-G, set the input type/range setting according to the device and    |
|                      | system to be connected. Set the proper settings for the device and system with the          |
|                      | parameter setting in GX Works2 or the initial setting FB (M+L60MD4-G_InitialSetting).       |
|                      | For details on how to use the parameter setting in GX Works2, refer to GX Works2            |
|                      | Version 1 Operating Manual (Common).  |
|                      | 8) When a value set for iw_DisconnType (Conversion setting for disconnection detection)     |
|                      | is out of the setting range, no errors occur in this FB; however an error occurs in the     |
|                      | module at a operating condition setting request. Please read the MELSEC-L Multiple          |
|                      | Input (Voltage/Current/Temperature) Module User's Manual for the errors on the              |
|                      | module.   |
| FB operation type    | Pulsed execution (1 scan execution type)  |
| Application example  | Refer to "Appendix 1 FB Library Application Examples".                                      |



| Item             | Description  |   |  |
|------------------|--|---|--|
| Timing chart     | [When operation completes without error]   | [When an error occurs]  |  |
|                  | FB_EN (Execution command) FB_ENO (Execution status) Disconnection detection setting write processing FB_OK (Completed without error) FB_ERROR (Error flag) | FB_EN (Execution command)  FB_ENO (Execution status)  Disconnection detection setting write processing  FB_OK (Completed without error)  FB_ERROR (Error flag)  ERROR ID (Error code) |  |
|                  | ERROR_ID (Error code) 0  | ERROR_ID (Error code) 0 Error code 0  |  |
| Relevant manuals | MELSEC-L Multiple Input (Voltage/Current/Te  | mperature) Module User's Manual   |  |
|                  | MELSEC-L CPU Module User's Manual (Hard  | dware Design, Maintenance and Inspection)   |  |
|                  | GX Works2 Version 1 Operating Manual (Common)  |   |  |
|                  | GX Works2 Version 1 Operating Manual (Sim  | ple Project, Function Block)  |  |

| Error code   | Description                                    | Action                                |
|--------------|--|---------------------------------------|
| 10 (Decimal) | The specified channel is not valid. iw_CH      | Please try again after confirming the |
|              | (Target CH) is not within the range of 1 to 4. | setting.                              |

## ●Input labels

| Name (comment)     | Label name     | Data  | Setting range               | Description                          |
|--------------------|----------------|-------|-----------------------------|--------------------------------------|
|                    |                | type  |                             |                                      |
| Execution command  | FB_EN          | Bit   | ON, OFF                     | ON: The FB is activated.             |
|                    |                | DIL   |                             | OFF: The FB is not activated.        |
| Module start XY    | iw_Start_IO_No |       | Depends on the              | Specify the starting XY address (in  |
| address            |                |       | I/O point range             | hexadecimal) where the L60MD4-G      |
|                    |                | Word  | of the CPU.                 | is connected. (For example, enter    |
|                    |                | vvoid | For details, refer          | H10 for X10.)                        |
|                    |                |       | to the CPU                  |                                      |
|                    |                |       | user's manual.              |                                      |
| Target CH          | iw_CH          | Word  | 1 to 4                      | Specify the channel number.          |
| Conversion setting | iw_DisconnType |       | 0 <sub>H</sub> : Value just | Specify the conversion setting for   |
| for disconnection  |                |       | before                      | disconnection detection.             |
| detection          |                | Word  | disconnection               |                                      |
|                    |                | vvoid | 1 <sub>H</sub> : Upscale    |                                      |
|                    |                |       | 2 <sub>H</sub> : Downscale  |                                      |
|                    |                |       | 3 <sub>H</sub> : Any value  |                                      |
| Conversion setting | iw_DisconnVal  |       | -32768 to 32767             | Specify the conversion setting value |
| value for          |                | Word  |                             | for disconnection detection.         |
| disconnection      |                | vvoid |                             |                                      |
| detection          |                |       |                             |                                      |

#### Output labels

| 1                 |            |         |         |  |
|-------------------|------------|---------|---------|--|
| Name (comment)    | Label name | Data    | Initial | Description                                  |
|                   |            | type    | value   |  |
| Execution status  | FB_ENO     | Bit     | OFF     | ON: Execution command is ON.                 |
|                   |            | DIL     | OFF     | OFF: Execution command is OFF.               |
| Completed without | FB_OK      | Bit     | OFF     | When ON, it indicates that the disconnection |
| error             |            | DIL     | OFF     | detection setting is completed.              |
| Error flag        | FB_ERROR   | Bit OFF |         | When ON, it indicates that an error has      |
|                   |            |         |         | occurred.                                    |
| Error code        | ERROR_ID   | Word    | 0       | FB error code output.                        |

## **FB Version Upgrade History**

| Version | Date      | Description   |
|---------|-----------|---------------|
| 1.00A   | 2014/6/30 | First edition |

#### Note

This chapter includes information related to the function block.

It does not include information on restrictions of use such as combination with modules or programmable controller CPUs.



## 2.5. M+L60MD4-G\_SetInputSignalErr (Input signal error detection setting)

## **FB Name**

M+L60MD4-G\_SetInputSignalErr

| Item                 | Description   |                                     |  |
|----------------------|---|-------------------------------------|--|
| Function overview    | Sets the input signal error detection of the specified conversion channel (CH1 to CH4). |                                     |  |
| Symbol               | Module start XY address ——  Target CH ——  Input signal error detection                  |                                     | FB_ENO : B —— Execution status  FB_OK : B —— Completed without error  FB_ERROR : B —— Error flag  ERROR_ID : W —— Error code |
| Applicable hardware  | Multiple input  | L60MD4-G                            |  |
| and software         | (voltage/current/   |                                     |  |
|                      | temperature) module   |                                     |  |
|                      | CPU module  |                                     | _  |
|                      |   | Series                              | Model  |
|                      |   | MELSEC-L Series                     | LCPU   |
|                      | Engineering software  | GX Works2 *1                        |  |
|                      |   | Language                            | Software version   |
|                      |   | Japanese version                    | Version1.86Q or later  |
|                      |   | English version                     | Version1.24A or later  |
|                      |   | Chinese (Simplified) version        | Version1.49B or later  |
|                      |   | Chinese (Traditional) version       | Version1.49B or later  |
|                      |   | Korean version                      | Version1.49B or later  |
|                      |   | *1 For software versions applica    | ble to the modules used, refer to  |
| _                    |   | "Relevant manuals".                 |  |
| Programming language | Ladder  |                                     |  |
| Number of steps      | 389 steps (for MELSEC-L series CPU)   |                                     |  |
|                      | *The number of steps of the input and output definition                                 | ne FB in a program depends on thon. | e CPU model that is used and   |



| Item                 | Description   |
|----------------------|---|
| Function description | By turning ON FB_EN (Execution command), the input signal error detection setting of        |
|                      | the specified channel is configured.  |
|                      | 2) FB operation is one-shot only, triggered by the FB_EN signal.                            |
|                      | 3) The setting value is validated when the Operating condition setting request signal (Yn9) |
|                      | is turned OFF → ON → OFF or the Operating condition setting request FB                      |
|                      | (M+L60MD4-G_RequestSetting) is executed.  |
|                      | 4) When the setting value of iw_CH (Target CH) is out of range, the FB_ERROR output         |
|                      | turns ON and processing is interrupted, and the error code is stored in ERROR_ID            |
|                      | (Error code).   |
|                      | Refer to the error code explanation section for details.                                    |
|                      | 5) When the input signal error detection setting is out of range, the FB_ERROR output       |
|                      | turns ON and processing is interrupted, and the error code is stored in ERROR_ID.           |
|                      | Refer to the error code explanation section for details.                                    |
| Compiling method     | Macro type  |

| Item                | Description  |  |  |
|---------------------|--|--|--|
| Restrictions and    | The FB does not include error recovery processing. Program the error recovery  |  |  |
| precautions         | processing separately in accordance with the required system operation.  |  |  |
|                     | 2) The FB cannot be used in an interrupt program.  |  |  |
|                     | 3) Please ensure that the FB_EN signal is capable of being turned OFF by the program.  |  |  |
|                     | Do not use this FB in programs that are only executed once such as a subroutine,   |  |  |
|                     | FOR-NEXT loop because it is impossible to turn OFF.  |  |  |
|                     | 4) When two or more of these FBs are used, precaution must be taken to avoid repetition  |  |  |
|                     | of iw_CH (Target CH).  |  |  |
|                     | 5) This FB uses index registers Z7 to Z9. Please do not use these index registers in an  |  |  |
|                     | interrupt program.   |  |  |
|                     | 6) Every input must be provided with a value for proper FB operation.  |  |  |
|                     | 7) To operate the L60MD4-G, set the input type/range setting according to the device and   |  |  |
|                     | system to be connected. Set the proper settings for the device and system with the   |  |  |
|                     | parameter setting in GX Works2 or the initial setting FB (M+L60MD4-G_InitialSetting).  |  |  |
|                     | For details on how to use the parameter setting in GX Works2, refer to GX Works2   |  |  |
|                     | Version 1 Operating Manual (Common).   |  |  |
|                     | 8) In either of the following cases 1) and 2), no errors occur in this FB; however an error  |  |  |
|                     | occurs in the module at an operating condition setting request. Please read the  |  |  |
|                     | MELSEC-L Multiple Input (Voltage/Current/Temperature) Module User's Manual for the   |  |  |
|                     | errors on the module.  |  |  |
|                     | 1) When iw_Sig_Err_Type (Input signal error detection setting) is set to "4 <sub>H</sub> : Simple  |  |  |
|                     | disconnection detection" while either of "4 to 20 mA (Expansion)" or "0 to 5 V   |  |  |
|                     | (Expansion) is not selected in Input type/range setting (Un¥G500 to 503) of iw_CH  |  |  |
|                     | (Target CH)  |  |  |
|                     | 2) When a value set for iw_Sig_Err_Level (Input signal error detection setting value) is   |  |  |
|                     | out of the setting range   |  |  |
| FB operation type   | Pulsed execution (1 scan execution type)   |  |  |
| Application example | Refer to "Appendix 1 FB Library Application Examples".   |  |  |
| Timing chart        | [When operation completes without error] [When an error occurs]  |  |  |
|                     | FB_EN (Execution command)  |  |  |
|                     | FB_ENO (Execution status)  |  |  |
|                     | Input signal error detection setting write processing  Write  No processing  Write  No processing  Write  No processing  Write  No processing  No processing |  |  |
|                     | FB_OK (Completed without error) FB_OK (Completed without error)  |  |  |
|                     | FB_ERROR (Error flag)         FB_ERROR (Error flag)           ERROR ID (Error code)         0         ERROR_ID (Error code)         0                        |  |  |
|                     | ERROR_ID (Error code) 0 ERROR_ID (Error code) 0  |  |  |

| Item             | Description   |
|------------------|---|
| Relevant manuals | MELSEC-L Multiple Input (Voltage/Current/Temperature) Module User's Manual      |
|                  | MELSEC-L CPU Module User's Manual (Hardware Design, Maintenance and Inspection) |
|                  | GX Works2 Version 1 Operating Manual (Common)                                   |
|                  | GX Works2 Version 1 Operating Manual (Simple Project, Function Block)           |

| Error code   | Description  | Action                                |
|--------------|--|---------------------------------------|
| 10 (Decimal) | The specified channel is not valid. iw_CH                    | Please try again after confirming the |
|              | (Target CH) is not within the range of 1 to 4.               | setting.                              |
| 11 (Decimal) | The input signal error detection setting is not              | Please try again after confirming the |
|              | valid. iw_Sig_Err_Type (Input signal error                   | setting.                              |
|              | detection setting) is not within the range of 0 <sub>H</sub> |                                       |
|              | to 4 <sub>H</sub> .  |                                       |



## ●Input labels

| Name (comment)     | Label name       | Data  | Setting range                | Description                          |
|--------------------|------------------|-------|------------------------------|--------------------------------------|
|                    |                  | type  |                              |                                      |
| Execution command  | FB_EN            | Bit   | ON, OFF                      | ON: The FB is activated.             |
|                    |                  | ы     |                              | OFF: The FB is not activated.        |
| Module start XY    | iw_Start_IO_No   |       | Depends on the               | Specify the starting XY address (in  |
| address            |                  |       | I/O point range              | hexadecimal) where the L60MD4-G      |
|                    |                  | Word  | of the CPU.                  | is connected. (For example, enter    |
|                    |                  | vvoid | For details, refer           | H10 for X10.)                        |
|                    |                  |       | to the CPU                   |                                      |
|                    |                  |       | user's manual.               |                                      |
| Target CH          | iw_CH            | Word  | 1 to 4                       | Specify the channel number.          |
| Input signal error | iw_Sig_Err_Type  |       | 0 <sub>H</sub> : Disable     | Set the input signal error detection |
| detection setting  |                  |       | 1 <sub>H</sub> : Upper and   | setting value.                       |
|                    |                  |       | lower limit                  |                                      |
|                    |                  |       | detection                    |                                      |
|                    |                  |       | 2 <sub>H</sub> : Lower limit |                                      |
|                    |                  | Word  | detection                    |                                      |
|                    |                  |       | 3 <sub>H</sub> : Upper limit |                                      |
|                    |                  |       | detection                    |                                      |
|                    |                  |       | 4 <sub>H</sub> : Simple      |                                      |
|                    |                  |       | disconnection                |                                      |
|                    |                  |       | detection                    |                                      |
| Input signal error | iw_Sig_Err_Level |       | 0 to 250                     | Specify the input signal error       |
| detection setting  |                  | Word  | (Unit: 0.1%)                 | detection setting value.             |
| value              |                  |       |                              |                                      |

#### Output labels

|                   |            |         |   | ·   |
|-------------------|------------|---------|---|---|
| Name (comment)    | Label name | Data    | Initial                                 | Description                                 |
|                   |            | type    | value                                   |   |
| Execution status  | FB_ENO     | Bit     | OFF                                     | ON: Execution command is ON.                |
|                   |            | DIL     | OFF                                     | OFF: Execution command is OFF.              |
| Completed without | FB_OK      | Bit     | OFF                                     | When ON, it indicates that the input signal |
| error             |            | DIL     | OFF                                     | error detection setting is completed.       |
| Error flag        | FB_ERROR   | Bit OFF | When ON, it indicates that an error has |   |
|                   |            | DIL     | OFF                                     | occurred.                                   |
| Error code        | ERROR_ID   | Word    | 0                                       | FB error code output.                       |



## **FB Version Upgrade History**

| Version | Date      | Description   |
|---------|-----------|---------------|
| 1.00A   | 2014/6/30 | First edition |

#### Note

This chapter includes information related to the function block.

It does not include information on restrictions of use such as combination with modules or programmable controller CPUs.



## 2.6. M+L60MD4-G\_SetProcessAlarm (Process alarm setting)

#### **FB Name**

 $M+L60MD4-G\_SetProcessAlarm$ 

| Item                                 | Description   |  |  |  |  |
|--------------------------------------|---|--|--|--|--|
| Function overview                    | Sets the process alarm of the specified channel.  |  |  |  |  |
| Symbol                               | Execution command —— B: FB_EN  Module start XY address —— W: iw_Start_IO_No  Target CH —— W: iw_CH  Process alarm upper upper limit value Process alarm lower upper limit value Process alarm lower upper limit value Process alarm lower lower limit value  W: iw_Pro_UL_Lim  W: iw_Pro_LU_Lim |  | FB_ENO : B —— Execution status  FB_OK : B —— Completed without error  FB_ERROR : B —— Error flag  ERROR_ID : W —— Error code                                     |  |  |
| Applicable hardware and software     | Multiple input (voltage/current/ temperature) module CPU module   | L60MD4-G  Series   | Model  |  |  |
|                                      | Engineering software  | MELSEC-L Series  GX Works2 *1  Language  Japanese version  English version  Chinese (Simplified) version  Chinese (Traditional) version  Korean version  *1 For software versions application  "Relevant manuals". | Software version Version1.86Q or later Version1.24A or later Version1.49B or later Version1.49B or later Version1.49B or later ble to the modules used, refer to |  |  |
| Programming language Number of steps | Ladder  241 steps (for MELSEC-L  *The number of steps of t input and output definit   | he FB in a program depends on the  | ne CPU model that is used and  |  |  |



| Item                 | Description  |
|----------------------|--|
| Function description | By turning ON FB_EN (Execution command), the process alarm of the specified channel                        |
|                      | is set.  |
|                      | FB operation is one-shot only, triggered by the FB_EN signal.  |
|                      | 3) The setting value is validated when the Operating condition setting request signal (Yn9)                |
|                      | is turned OFF $ ightharpoonup$ ON $ ightharpoonup$ OFF or the Operating condition setting request FB       |
|                      | (M+L60MD4-G_RequestSetting) is executed.   |
|                      | 4) When the setting value of iw_CH (Target CH) is out of range, the FB_ERROR output                        |
|                      | turns ON and processing is interrupted, and the error code is stored in ERROR_ID (Error                    |
|                      | code).   |
|                      | Refer to the error code explanation section for details.   |
| Compiling method     | Macro type   |
| Restrictions and     | 1) The FB does not include error recovery processing. Program the error recovery                           |
| precautions          | processing separately in accordance with the required system operation.                                    |
|                      | 2) The FB cannot be used in an interrupt program.  |
|                      | 3) Please ensure that the FB_EN signal is capable of being turned OFF by the program. Do                   |
|                      | not use this FB in programs that are only executed once such as a subroutine,                              |
|                      | FOR-NEXT loop because it is impossible to turn OFF.  |
|                      | 4) When two or more of these FBs are used, precaution must be taken to avoid repetition of                 |
|                      | iw_CH (Target CH).   |
|                      | 5) This FB uses index registers Z7 to Z9. Please do not use these index registers in an interrupt program. |
|                      | 6) Every input must be provided with a value for proper FB operation.                                      |
|                      | 7) To operate the L60MD4-G, set the input type/range setting according to the device and                   |
|                      | system to be connected. Set the proper settings for the device and system with the                         |
|                      | parameter setting in GX Works2 or the initial setting FB (M+L60MD4-G_InitialSetting).                      |
|                      | For details on how to use the parameter setting in GX Works2, refer to GX Works2                           |
|                      | Version 1 Operating Manual (Common).   |
|                      | 8) In any of the following cases 1) to 3), no errors occur in this FB; however an error occurs             |
|                      | in the module at an operating condition setting request. Please read the MELSEC-L                          |
|                      | Multiple Input (Voltage/Current/Temperature) Module User's Manual for the errors on the module.            |
|                      | 1) When a value that exceeds iw_Pro_LU_Lim (Process alarm lower upper limit value) is                      |
|                      | set for iw_Pro_LL_Lim (Process alarm lower lower limit value)  |
|                      | 2) When a value that exceeds iw_Pro_UL_Lim (Process alarm upper lower limit value) is                      |
|                      | set for iw_Pro_LU_Lim (Process alarm lower upper limit value)  |
|                      | 3) When a value that exceeds iw_Pro_UU_Lim (Process alarm upper upper limit value)                         |
|                      | is set for iw_Pro_UL_Lim (Process alarm upper lower limit value)   |
| FB operation type    | Pulsed execution (1 scan execution type)   |



| Item                | Description   |   |  |
|---------------------|---|---|--|
| Application example | Refer to "Appendix 1 FB Library Application Ex  | amples".  |  |
| Timing chart        | [When operation completes without error]  | [When an error occurs]  |  |
|                     | FB_EN (Execution command) FB_ENO (Execution status) Process alarm setting write processing FB_OK (Completed without error) FB_ERROR (Error flag) ERROR_ID (Error code)  0 | FB_EN (Execution command)  FB_ENO (Execution status)  Process alarm setting write processing  FB_OK (Completed without error)  FB_ERROR (Error flag)  ERROR_ID (Error code)  0 Error code |  |
| Relevant manuals    | MELSEC-L Multiple Input (Voltage/Current/Temperature) Module User's Manual  |   |  |
|                     | MELSEC-L CPU Module User's Manual (Hardware Design, Maintenance and Inspection)   |   |  |
|                     | GX Works2 Version 1 Operating Manual (Common)   |   |  |
|                     | GX Works2 Version 1 Operating Manual (Sim   | pple Project, Function Block)   |  |

| Error code   | Description                                 | Action   |
|--------------|---|--|
| 10 (Decimal) | The specified channel is not valid. iw_CH   | Please try again after confirming the setting. |
|              | (Target CH) is not within the range of 1 to |  |
|              | 4.  |  |

## ●Input labels

| Name (comment)      | Label name     | Data  | Setting range             | Description                  |
|---------------------|----------------|-------|---------------------------|------------------------------|
|                     |                | type  |                           |                              |
| Execution command   | FB_EN          |       | ON, OFF                   | ON: The FB is activated.     |
|                     |                | Bit   |                           | OFF: The FB is not           |
|                     |                |       |                           | activated.                   |
| Module start XY     | iw_Start_IO_No |       | Depends on the I/O point  | Specify the starting XY      |
| address             |                |       | range of the CPU.         | address (in hexadecimal)     |
|                     |                | Word  | For details, refer to the | where the L60MD4-G is        |
|                     |                |       | CPU user's manual.        | connected. (For example,     |
|                     |                |       |                           | enter H10 for X10.)          |
| Target CH           | iw_CH          | Word  | 1 to 4                    | Specify the channel number.  |
| Process alarm       | ib_Pro_Enable  |       | ON, OFF                   | ON: Enable the warning       |
| enable/disable      |                | Bit   |                           | output of the process alarm. |
|                     |                | Dit   |                           | OFF: Disable the warning     |
|                     |                |       |                           | output of the process alarm. |
| Process alarm upper | iw_Pro_UU_Lim  | Word  | -32,768 to 32,767         | Specify the process alarm    |
| upper limit value   |                | vvoid |                           | upper upper limit value.     |
| Process alarm upper | iw_Pro_UL_Lim  | Word  | -32,768 to 32,767         | Specify the process alarm    |
| lower limit value   |                | vvolu |                           | upper lower limit value.     |
| Process alarm lower | iw_Pro_LU_Lim  | Word  | -32,768 to 32,767         | Specify the process alarm    |
| upper limit value   |                | vvoiu |                           | lower upper limit value.     |
| Process alarm lower | iw_Pro_LL_Lim  | Word  | -32,768 to 32,767         | Specify the process alarm    |
| lower limit value   |                | vvoiu |                           | lower lower limit value.     |

## Output labels

| Name (comment)    | Label name | Data    | Initial | Description                                  |
|-------------------|------------|---------|---------|--|
|                   |            | type    | value   |  |
| Execution status  | FB_ENO     | Bit     | OFF     | ON: Execution command is ON.                 |
|                   |            | DIL     | OFF     | OFF: Execution command is OFF.               |
| Completed without | FB_OK      | Bit     | OFF     | When ON, it indicates that the process alarm |
| error             |            | DIL     | OFF     | setting is completed.                        |
| Error flag        | FB_ERROR   | Bit OFF |         | When ON, it indicates that an error has      |
|                   |            | DIL     | OFF     | occurred.                                    |
| Error code        | ERROR_ID   | Word    | 0       | FB error code output.                        |



## **FB Version Upgrade History**

| Version | Date      | Description   |
|---------|-----------|---------------|
| 1.00A   | 2014/6/30 | First edition |

#### Note

This chapter includes information related to the function block.

It does not include information on restrictions of use such as combination with modules or programmable controller CPUs.



### 2.7. M+L60MD4-G\_SetRateAlarm (Rate alarm setting)

#### **FB Name**

 $M+L60MD4-G\_SetRateAlarm$ 

| Item                | Description   |                                   |                                      |  |
|---------------------|---|-----------------------------------|--------------------------------------|--|
| Function overview   | Sets the rate alarm of the specified channel.   |                                   |                                      |  |
| Symbol              |   | M+L60MD4-G_SetRateAlarm           |                                      |  |
|                     | Execution command ———   | B : FB_EN                         | FB_ENO : B Execution status          |  |
|                     | Module start XY address   | W : iw_Start_IO_No                | FB_OK : B —— Completed without error |  |
|                     | Target CH ——  | W : iw_CH                         | FB_ERROR : B Error flag              |  |
|                     | Rate alarm enable/disable ———   | B : ib_Rate_Enable                | ERROR_ID : W Error code              |  |
|                     | Rate alarm alert detection cycle ———  | W : iw_Rate_Out                   |                                      |  |
|                     | Rate alarm upper limit value ———  Rate alarm lower limit value ———                    | W: iw_Rate_U_Lim W: iw_Rate_L_Lim |                                      |  |
|                     | reate alaim lower limit value   | W . W_Nato_L_LIIII                |                                      |  |
| Applicable hardware | Multiple input  | L60MD4-G                          |                                      |  |
| and software        | (voltage/current/   |                                   |                                      |  |
|                     | temperature) module   |                                   |                                      |  |
|                     | CPU module  |                                   |                                      |  |
|                     |   | Series                            | Model                                |  |
|                     |   | MELSEC-L Series                   | LCPU                                 |  |
|                     | Engineering software  | GX Works2 *1                      |                                      |  |
|                     |   | Language                          | Software version                     |  |
|                     |   | Japanese version                  | Version1.86Q or later                |  |
|                     |   | English version                   | Version1.24A or later                |  |
|                     |   | Chinese (Simplified) version      | Version1.49B or later                |  |
|                     |   | Chinese (Traditional) version     | Version1.49B or later                |  |
|                     |   | Korean version                    | Version1.49B or later                |  |
|                     |   | *1 For software versions applica  | ble to the modules used, refer to    |  |
|                     |   | "Relevant manuals".               |                                      |  |
| Programming         | Ladder  |                                   |                                      |  |
| language            |   |                                   |                                      |  |
| Number of steps     | 233 steps (for MELSEC-L series CPU)   |                                   |                                      |  |
|                     | *The number of steps of the FB in a program depends on the CPU model that is used and |                                   |                                      |  |
|                     | input and output definition.  |                                   |                                      |  |
|                     | pat and output domini   | <b></b>                           |                                      |  |



| Item                    | Description  |  |  |
|-------------------------|--|--|--|
| Function description    | By turning ON FB_EN (Execution command), the rate alarm of the specified channel is                  |  |  |
| T direction description | set.   |  |  |
|                         | 2) FB operation is one-shot only, triggered by the FB_EN signal.                                     |  |  |
|                         | 3) The setting value is validated when the Operating condition setting request signal (Yn9)          |  |  |
|                         | is turned OFF $ ightharpoonup$ ON $ ightharpoonup$ OFF or the Operating condition setting request FB |  |  |
|                         | (M+L60MD4-G_RequestSetting) is executed.   |  |  |
|                         | 4) When the setting value of iw_CH (Target CH) is out of range, the FB_ERROR output                  |  |  |
|                         | turns ON and processing is interrupted, and the error code is stored in ERROR_ID (Error              |  |  |
|                         | code).   |  |  |
|                         | Refer to the error code explanation section for details.   |  |  |
| Compiling method        | Macro type   |  |  |
| Restrictions and        | 1) The FB does not include error recovery processing. Program the error recovery                     |  |  |
| precautions             | processing separately in accordance with the required system operation.                              |  |  |
|                         | 2) The FB cannot be used in an interrupt program.  |  |  |
|                         | 3) Please ensure that the FB_EN signal is capable of being turned OFF by the program. Do             |  |  |
|                         | not use this FB in programs that are only executed once such as a subroutine,                        |  |  |
|                         | FOR-NEXT loop because it is impossible to turn OFF.  |  |  |
|                         | 4) When two or more of these FBs are used, precaution must be taken to avoid repetition of           |  |  |
|                         | iw_CH (Target CH).   |  |  |
|                         | 5) This FB uses index registers Z7 to Z9. Please do not use these index registers in an              |  |  |
|                         | interrupt program.   |  |  |
|                         | 6) Every input must be provided with a value for proper FB operation.                                |  |  |
|                         | 7) To operate the L60MD4-G, set the input type/range setting according to the device and             |  |  |
|                         | system to be connected. Set the proper settings for the device and system with the                   |  |  |
|                         | parameter setting in GX Works2 or the initial setting FB (M+L60MD4-G_InitialSetting).                |  |  |
|                         | For details on how to use the parameter setting in GX Works2, refer to GX Works2                     |  |  |
|                         | Version 1 Operating Manual (Common).   |  |  |
|                         | 8) In either of the following cases 1) and 2), no errors occur in this FB; however an error          |  |  |
|                         | occurs in the module at an operating condition setting request. Please read the                      |  |  |
|                         | MELSEC-L Multiple Input (Voltage/Current/Temperature) Module User's Manual for the                   |  |  |
|                         | errors on the module.  |  |  |
|                         | When a value set for iw_Rate_Out (Rate alarm alert detection cycle) is out of the                    |  |  |
|                         | setting range  |  |  |
|                         | 2) When a value that exceeds iw_Rate_U_Lim (Rate alarm upper limit value) is set for                 |  |  |
| ED operation to a       | iw_Rate_L_Lim (Rate alarm lower limit value)   |  |  |
| FB operation type       | Pulsed execution (1 scan execution type)   |  |  |
| Application example     | Refer to "Appendix 1 FB Library Application Examples".   |  |  |



| Item             | Description  |   |  |  |
|------------------|--|---|--|--|
| Timing chart     | [When operation completes without error]   | [When an error occurs]  |  |  |
|                  | FB_ENO (Execution status) Rate alarm setting write processing  FB_OK (Completed without error)  FB_ERROR (Error flag)  | FB_EN (Execution command)  FB_ENO (Execution status)  Rate alarm setting write processing  FB_OK (Completed without error)  FB_ERROR (Error flag)  ERROR_ID (Error code)  0 Error code  0 |  |  |
| Relevant manuals | MELSEC-L Multiple Input (Voltage/Current/Temperature) Module User's Manual     MELSEC-L CPU Module User's Manual (Hardware Design, Maintenance and Inspection)     GX Works2 Version 1 Operating Manual (Common)     GX Works2 Version 1 Operating Manual (Simple Project, Function Block) |   |  |  |

### ●Error code list

| Error code   | Description                                 | Action   |
|--------------|---|--|
| 10 (Decimal) | The specified channel is not valid. iw_CH   | Please try again after confirming the setting. |
|              | (Target CH) is not within the range of 1 to |  |
|              | 4.  |  |

### Labels

### ●Input labels

| Name (comment)    | Label name     | Data  | Setting range             | Description                  |
|-------------------|----------------|-------|---------------------------|------------------------------|
|                   |                | type  |                           |                              |
| Execution command | FB_EN          |       | ON, OFF                   | ON: The FB is activated.     |
|                   |                | Bit   |                           | OFF: The FB is not           |
|                   |                |       |                           | activated.                   |
| Module start XY   | iw_Start_IO_No |       | Depends on the I/O point  | Specify the starting XY      |
| address           |                |       | range of the CPU.         | address (in hexadecimal)     |
|                   |                | Word  | For details, refer to the | where the L60MD4-G is        |
|                   |                |       | CPU user's manual.        | connected. (For example,     |
|                   |                |       |                           | enter H10 for X10.)          |
| Target CH         | iw_CH          | Word  | 1 to 4                    | Specify the channel          |
|                   |                | vvoid |                           | number.                      |
| Rate alarm        | ib_Rate_Enable |       | ON, OFF                   | ON: Enable the alert output  |
| enable/disable    |                | Bit   |                           | of the rate alarm.           |
|                   |                | Dit   |                           | OFF: Disable the alert       |
|                   |                |       |                           | output of the rate alarm.    |
| Rate alarm alert  | iw_Rate_Out    | Word  | 1 to 36000                | Specify the rate alarm alert |
| detection cycle   |                | vvoid |                           | detection cycle.             |
| Rate alarm upper  | iw_Rate_U_Lim  | Word  | -32,768 to 32,767         | Specify the rate alarm       |
| limit value       |                | vvoid |                           | upper limit value.           |
| Rate alarm lower  | iw_Rate_L_Lim  | Word  | -32,768 to 32,767         | Specify the rate alarm       |
| limit value       |                | vvoid |                           | lower limit value.           |

### Output labels

| Name (comment)    | Label name | Data | Initial | Description                               |
|-------------------|------------|------|---------|---|
|                   |            | type | value   |   |
| Execution status  | FB_ENO     | Di+  | OFF     | ON: Execution command is ON.              |
|                   |            | Bit  | OFF     | OFF: Execution command is OFF.            |
| Completed without | FB_OK      | Bit  | OFF     | When ON, it indicates that the rate alarm |
| error             |            | DIL  | OFF     | setting is completed.                     |
| Error flag        | FB_ERROR   | Bit  | OFF     | When ON, it indicates that an error has   |
|                   |            | DIL  | OFF     | occurred.                                 |
| Error code        | ERROR_ID   | Word | 0       | FB error code output.                     |



### **FB Version Upgrade History**

| Version | Date      | Description   |
|---------|-----------|---------------|
| 1.00A   | 2014/6/30 | First edition |

#### Note

This chapter includes information related to the function block.

It does not include information on restrictions of use such as combination with modules or programmable controller CPUs.



### 2.8. M+L60MD4-G\_RequestSetting (Operating condition setting request)

#### **FB Name**

M+L60MD4-G\_RequestSetting

| Item                             | Description  |                                   |   |  |
|----------------------------------|--|-----------------------------------|---|--|
| Function overview                | Validates the settings of each function.   |                                   |   |  |
| Symbol                           |  |                                   | FB_ENO : B —— Execution status  FB_OK : B —— Completed without error  B_ERROR : B —— Error flag  ERROR_ID : W —— Error code |  |
| Applicable hardware and software | Multiple input (voltage/current/ temperature) module CPU module  | L60MD4-G                          |   |  |
|                                  |  | Series                            | Model   |  |
|                                  |  | MELSEC-L Series                   | LCPU  |  |
|                                  | Engineering software   | GX Works2 *1                      |   |  |
|                                  |  | Language                          | Software version  |  |
|                                  |  | Japanese version                  | Version1.86Q or later   |  |
|                                  |  | English version                   | Version1.24A or later   |  |
|                                  |  | Chinese (Simplified) version      | Version1.49B or later   |  |
|                                  |  | Chinese (Traditional) version     | Version1.49B or later   |  |
|                                  |  | Korean version                    | Version1.49B or later   |  |
|                                  |  | *1 For software versions applical | ble to the modules used, refer  |  |
| Dan anno anno in a               | Laddan   | to "Relevant manuals".            |   |  |
| Programming                      | Ladder   |                                   |   |  |
| language                         |  |                                   |   |  |
| Number of steps                  | 278 steps (for MELSEC-L series CPU)  |                                   |   |  |
|                                  | *The number of steps of the FB in a program depends on the CPU model that is used and input and output definition. |                                   |   |  |
|                                  | Input and odiput demilit   | OII.                              |   |  |



| Item                 | Description  |  |  |  |
|----------------------|--|--|--|--|
| Function description | 1) By turning ON FB_EN (Execution command), the settings of all channels (CH1 to CH4)  |  |  |  |
|                      | are enabled. For information on the settings that are enabled, refer to MELSEC-L   |  |  |  |
|                      | Multiple Input (Voltage/Current/Temperature) Module User's Manual.   |  |  |  |
|                      | 2) After FB_EN (Execution command) is turned ON, the execution of this FB continues  |  |  |  |
|                      | until each function setting is completed.  |  |  |  |
| Compiling method     | Macro type   |  |  |  |
| Restrictions and     | 1) When this FB is executed while the L60MD4-G is being operated, the conversion is  |  |  |  |
| precautions          | stopped. The conversion restarts after FB_OK turns ON.   |  |  |  |
|                      | 2) The FB does not include error recovery processing. Program the error recovery   |  |  |  |
|                      | processing separately in accordance with the required system operation.  |  |  |  |
|                      | 3) Please ensure that the FB_EN signal is capable of being turned OFF by the program.  |  |  |  |
|                      | Do not use this FB in programs that are only executed once such as a subroutine,   |  |  |  |
|                      | FOR-NEXT loop because it is impossible to turn OFF.  |  |  |  |
|                      | 4) The FB cannot be used in an interrupt program.  |  |  |  |
|                      | 5) This FB uses index register Z9. Please do not use the index register in an interrupt  |  |  |  |
|                      | program.   |  |  |  |
|                      | 6) Every input must be provided with a value for proper FB operation.  |  |  |  |
|                      | 7) When this FB is used in two or more places, a duplicated coil warning may occur   |  |  |  |
|                      | during compile operation due to the Y signal being operated by index modification.   |  |  |  |
|                      | However this is not a problem and the FB will operate without error.   |  |  |  |
|                      | 8) To operate the L60MD4-G, set the input type/range setting according to the device and   |  |  |  |
|                      | system to be connected. Set the proper settings for the device and system with the   |  |  |  |
|                      | parameter setting in GX Works2 or the initial setting FB (M+L60MD4-G_InitialSetting).  |  |  |  |
|                      | For details on how to use the parameter setting in GX Works2, refer to GX Works2   |  |  |  |
|                      | Version 1 Operating Manual (Common).   |  |  |  |
| FB operation type    | Pulsed execution (multiple scan execution type)  |  |  |  |
| Application example  | Refer to "Appendix 1 FB Library Application Examples".   |  |  |  |
| Timing chart         | [When operation completes without error]   |  |  |  |
|                      | FB_EN (Execution command) FB_ENO (Execution status) Operating condition setting request (Yn9) Operating condition setting completed flag (Xn9) FB_OK (Completed without error) FB_ERROR (Error flag)  ERROR_ID (Error code)  0 |  |  |  |



| Item             | Description   |  |
|------------------|---|--|
| Relevant manuals | MELSEC-L Multiple Input (Voltage/Current/Temperature) Module User's Manual        |  |
|                  | • MELSEC-L CPU Module User's Manual (Hardware Design, Maintenance and Inspection) |  |
|                  | GX Works2 Version 1 Operating Manual (Common)                                     |  |
|                  | GX Works2 Version 1 Operating Manual (Simple Project, Function Block)             |  |

### ●Error code list

| Error code | Description | Action |  |
|------------|-------------|--------|--|
| None       | None        | None   |  |

### Labels

### ●Input labels

| Name (comment)    | Label name     | Data  | Setting range      | Description                         |
|-------------------|----------------|-------|--------------------|-------------------------------------|
|                   |                | type  |                    |                                     |
| Execution command | FB_EN          | Bit   | ON, OFF            | ON: The FB is activated.            |
|                   |                | ום    |                    | OFF: The FB is not activated.       |
| Module start XY   | iw_Start_IO_No |       | Depends on the     | Specify the starting XY address (in |
| address           |                |       | I/O point range    | hexadecimal) where the L60MD4-G     |
|                   |                | Word  | of the CPU.        | is connected. (For example, enter   |
|                   |                | vvoid | For details, refer | H10 for X10.)                       |
|                   |                |       | to the CPU         |                                     |
|                   |                |       | user's manual.     |                                     |

### Output labels

| Name (comment)    | Label name | Data    | Initial | Description                              |
|-------------------|------------|---------|---------|--|
|                   |            | type    | value   |  |
| Execution status  | FB_ENO     | Dit OFF |         | ON: Execution command is ON.             |
|                   |            | Bit     | OFF     | OFF: Execution command is OFF.           |
| Completed without | FB_OK      | D:t     | D:4 OFF | When ON, it indicates that the operating |
| error             |            | Bit     | OFF     | condition setting is completed.          |
| Error flag        | FB_ERROR   | Bit     | OFF     | Always OFF                               |
| Error code        | ERROR_ID   | Word    | 0       | Always 0                                 |



### **FB Version Upgrade History**

| Version | Date      | Description   |
|---------|-----------|---------------|
| 1.00A   | 2014/6/30 | First edition |

#### Note

This chapter includes information related to the function block.

It does not include information on restrictions of use such as combination with modules or programmable controller CPUs.



### 2.9. M+L60MD4-G\_ReadVal (Read conversion data)

### **FB Name**

M+L60MD4-G\_ReadVal

| Item              | Description   |                                   |  |  |  |
|-------------------|---|-----------------------------------|--|--|--|
| Function overview | Reads the conversion data of the specified channel.                                   |                                   |  |  |  |
| Symbol            | M+L60MD4-G_ReadVal  |                                   |  |  |  |
|                   | Execution command — B :   | FB_EN                             | FB_ENO : B Execution status                            |  |  |
|                   |   | iw_Start_IO_No                    | FB_OK : B Completed without error                      |  |  |
|                   | Target CH — W:  | iw_CH                             | ow_Value : W Conversion data                           |  |  |
|                   |   |                                   | FB_ERROR : B —— Error flag  ERROR_ID : W —— Error code |  |  |
|                   |   |                                   |  |  |  |
| Applicable        | Multiple input  | L60MD4-G                          |  |  |  |
| hardware and      | (voltage/current/   |                                   |  |  |  |
| software          | temperature) module   |                                   |  |  |  |
|                   | CPU module  |                                   |  |  |  |
|                   |   | Series                            | Model  |  |  |
|                   |   | MELSEC-L Series                   | LCPU   |  |  |
|                   | Engineering software  | GX Works2 *1                      |  |  |  |
|                   |   | Language                          | Software version                                       |  |  |
|                   |   | Japanese version                  | Version1.86Q or later                                  |  |  |
|                   |   | English version                   | Version1.24A or later                                  |  |  |
|                   |   | Chinese (Simplified) version      | Version1.49B or later                                  |  |  |
|                   |   | Chinese (Traditional) version     | Version1.49B or later                                  |  |  |
|                   |   | Korean version                    | Version1.49B or later                                  |  |  |
|                   |   | *1 For software versions applical | ble to the modules used, refer to                      |  |  |
|                   |   | "Relevant manuals".               |  |  |  |
| Programming       | Ladder  |                                   |  |  |  |
| language          |   |                                   |  |  |  |
| Number of steps   | 305 steps (for MELSEC-L series CPU)   |                                   |  |  |  |
|                   | *The number of steps of the FB in a program depends on the CPU model that is used and |                                   |  |  |  |
|                   | input and output definit  | ion.                              |  |  |  |



| Item              | Description  |  |
|-------------------|--|--|
| Function          | 1) By turning ON FB_EN (Execution command), the conversion data of the specified                           |  |
| description       | channel (CH1 to CH4) is read.  |  |
|                   | 2) The read ow_Value (Conversion data) depends on the input type/range setting and                         |  |
|                   | averaging processing function setting.   |  |
|                   | 3) When the conversion completed flag (XnE) is OFF, reading the conversion data of the                     |  |
|                   | specified channel is not executed.   |  |
|                   | 4) When the setting value of iw_CH (Target CH) is out of range, the FB_ERROR output                        |  |
|                   | turns ON and processing is interrupted, and the error code 10 (Decimal) is stored in                       |  |
|                   | ERROR_ID (Error code).   |  |
|                   | Refer to the error code explanation section for details.   |  |
|                   | 5) When the digital output value is set in the auto refresh setting of the intelligent function            |  |
|                   | module, this FB is unnecessary.  |  |
| Compiling method  | Macro type   |  |
| Restrictions and  | The FB does not include error recovery processing. Program the error recovery                              |  |
| precautions       | processing separately in accordance with the required system operation.                                    |  |
|                   | 2) The FB cannot be used in an interrupt program.  |  |
|                   | 3) Please ensure that the FB_EN signal is capable of being turned OFF by the program. Do                   |  |
|                   | not use this FB in programs that are only executed once such as a subroutine,                              |  |
|                   | FOR-NEXT loop because it is impossible to turn OFF.  |  |
|                   | 4) When two or more of these FBs are used, precaution must be taken to avoid repetition of                 |  |
|                   | iw_CH (Target CH).   |  |
|                   | 5) This FB uses index registers Z7 to Z9. Please do not use these index registers in an interrupt program. |  |
|                   | 6) Every input must be provided with a value for proper FB operation.                                      |  |
|                   | 7) To operate the L60MD4-G, set the input type/range setting according to the device and                   |  |
|                   | system to be connected. Set the proper settings for the device and system with the                         |  |
|                   | parameter setting in GX Works2 or the initial setting FB (M+L60MD4-G_InitialSetting).                      |  |
|                   | For details on how to use the parameter setting in GX Works2, refer to GX Works2                           |  |
|                   | Version 1 Operating Manual (Common).   |  |
| FB operation type | Real-time execution  |  |
| Application       | Refer to "Appendix 1 FB Library Application Examples".   |  |
| example           |  |  |



| Item             | Description  |   |  |  |  |
|------------------|--|---|--|--|--|
| Timing chart     | [When operation completes without error]  FB_EN (Execution command) FB_ENO (Execution status) ow_Value (Conversion data) FB_OK (Completed without error) FB_ERROR (Error flag) ERROR_ID (Error code)  0  | [When an error occurs]  FB_EN (Execution command) FB_ENO (Execution status) ow_Value (Conversion data) FB_OK (Completed without error) FB_ERROR (Error flag) ERROR_ID (Error code)  0  Error code 0 |  |  |  |
| Relevant manuals | MELSEC-L Multiple Input (Voltage/Current/Temperature) Module User's Manual     MELSEC-L CPU Module User's Manual (Hardware Design, Maintenance and Inspection)     GX Works2 Version 1 Operating Manual (Common)     GX Works2 Version 1 Operating Manual (Simple Project, Function Block) |   |  |  |  |

### ●Error code list

| Error code   | Description                                 | Action   |
|--------------|---|--|
| 10 (Decimal) | The specified channel is not valid. iw_CH   | Please try again after confirming the setting. |
|              | (Target CH) is not within the range of 1 to |  |
|              | 4.  |  |

### Labels

### ●Input labels

| Name (comment)    | Label name     | Data  | Setting range             | Description              |
|-------------------|----------------|-------|---------------------------|--------------------------|
|                   |                | type  |                           |                          |
| Execution command | FB_EN          |       | ON, OFF                   | ON: The FB is activated. |
|                   |                | Bit   |                           | OFF: The FB is not       |
|                   |                |       |                           | activated.               |
| Module start XY   | iw_Start_IO_No |       | Depends on the I/O point  | Specify the starting XY  |
| address           |                |       | range of the CPU.         | address (in hexadecimal) |
|                   |                | Word  | For details, refer to the | where the L60MD4-G is    |
|                   |                |       | CPU user's manual.        | connected. (For example, |
|                   |                |       |                           | enter H10 for X10.)      |
| Target CH         | iw_CH          | Word  | 1 to 4                    | Specify the channel      |
|                   |                | vvolu |                           | number.                  |



#### Output labels

| Name (comment)    | Label name | Data      | Initial | Description                               |
|-------------------|------------|-----------|---------|---|
|                   |            | type      | value   |   |
| Execution status  | FB_ENO     | Bit OFF   |         | ON: Execution command is ON.              |
|                   |            |           |         | OFF: Execution command is OFF.            |
| Completed without | FB_OK      | Bit   OFF |         | When ON, it indicates that the conversion |
| error             |            |           |         | value is being read.                      |
| Conversion data   | ow_Value   | Word      | 0       | The conversion value is stored.           |
| Error flag        | FB_ERROR   | Bit OFF   |         | When ON, it indicates that an error has   |
|                   |            |           |         | occurred.                                 |
| Error code        | ERROR_ID   | Word      | 0       | FB error code output.                     |

### **FB Version Upgrade History**

| Version | Date      | Description   |
|---------|-----------|---------------|
| 1.00A   | 2014/6/30 | First edition |

#### Note

This chapter includes information related to the function block.

It does not include information on restrictions of use such as combination with modules or programmable controller CPUs.



#### **FB Name**

M+L60MD4-G\_ReadAllVal

| Item                                 | Description   |   |   |  |
|--------------------------------------|---|---|---|--|
| Function overview                    | Reads the conversion data of CH1 to CH4.  |   |   |  |
| Symbol                               | Execution command ————————————————————————————————————                                    | W: iw_Start_IO_No  ow_Valu  ow_Valu  ow_Valu  ow_Valu  FB_E |   | B_ENO : B — Execution status  FB_OK : B — Completed without error  Le_CH1 : W — CH1 Conversion data  Le_CH2 : W — CH2 Conversion data  Le_CH3 : W — CH3 Conversion data  Le_CH4 : W — CH4 Conversion data  ERROR : B — Error flag  ROR_ID : W — Error code |
| Applicable hardware and software     | Multiple input (voltage/current/ temperature) module  CPU module  Series  MELSEC-L Series |   | Model<br>LCPU   |  |
|                                      | Engineering software  |   | GX Works2 *1  Language  Japanese version  English version  Chinese (Simplified) version  Chinese (Traditional) version  Korean version  *1 For software versions applicate to "Relevant manuals". | Software version  Version1.86Q or later  Version1.24A or later  Version1.49B or later  Version1.49B or later  Version1.49B or later  ole to the modules used, refer  |
| Programming language Number of steps | Ladder  267 steps (for MELSE  *The number of steps input and output de                    | of th   | series CPU)<br>he FB in a program depends on th   | e CPU model that is used and   |



| Item                 | Description   |  |  |  |  |  |
|----------------------|---|--|--|--|--|--|
| Function description | By turning ON FB_EN (Execution command), the conversion data of CH1 to CH4 are read.            |  |  |  |  |  |
|                      | 2) The read ow_Value_CH1 (CH1 Conversion data) to ow_Value_CH4 (CH4 Conversion                  |  |  |  |  |  |
|                      | data) depend on the input type/range setting and averaging processing function setting.         |  |  |  |  |  |
|                      | 3) When the conversion completed flag (XnE) is OFF, reading the conversion data of CH1          |  |  |  |  |  |
|                      | to CH4 is not executed.   |  |  |  |  |  |
|                      | 4) When the digital output value is set in the auto refresh setting of the intelligent function |  |  |  |  |  |
|                      | module, this FB is unnecessary.   |  |  |  |  |  |
| Compiling method     | Macro type  |  |  |  |  |  |
| Restrictions and     | The FB does not include error recovery processing. Program the error recovery                   |  |  |  |  |  |
| precautions          | processing separately in accordance with the required system operation.                         |  |  |  |  |  |
|                      | 2) The FB cannot be used in an interrupt program.   |  |  |  |  |  |
|                      | 3) Please ensure that the FB_EN signal is capable of being turned OFF by the program.           |  |  |  |  |  |
|                      | Do not use this FB in programs that are only executed once such as a subroutine,                |  |  |  |  |  |
|                      | FOR-NEXT loop because it is impossible to turn OFF.   |  |  |  |  |  |
|                      | 4) This FB uses index registers Z8 and Z9. Please do not use these index registers in an        |  |  |  |  |  |
|                      | interrupt program.  |  |  |  |  |  |
|                      | 5) Every input must be provided with a value for proper FB operation.                           |  |  |  |  |  |
|                      | 6) To operate the L60MD4-G, set the input type/range setting according to the device and        |  |  |  |  |  |
|                      | system to be connected. Set the proper settings for the device and system with the              |  |  |  |  |  |
|                      | parameter setting in GX Works2 or the initial setting FB (M+L60MD4-G_InitialSetting).           |  |  |  |  |  |
|                      | For details on how to use the parameter setting in GX Works2, refer to GX Works2                |  |  |  |  |  |
| ED                   | Version 1 Operating Manual (Common).  |  |  |  |  |  |
| FB operation type    | Real-time execution   |  |  |  |  |  |
| Application example  | Refer to "Appendix 1 FB Library Application Examples".  |  |  |  |  |  |
| Timing chart         | [When operation completes without error]  |  |  |  |  |  |
|                      | FB_EN   |  |  |  |  |  |
|                      | (Execution command)  FB ENO   |  |  |  |  |  |
|                      | (Execution status)  |  |  |  |  |  |
|                      | OW_Value_CH  (CH□Conversion data)  Refresh stop  Refresh stop                                   |  |  |  |  |  |
|                      | FB_OK (Completed without error)   |  |  |  |  |  |
|                      | FB_ERROR (Error flag)   |  |  |  |  |  |
|                      | ERROR_ID (Error code) 0   |  |  |  |  |  |
| Relevant manuals     | MELSEC-L Multiple Input (Voltage/Current/Temperature) Module User's Manual                      |  |  |  |  |  |
|                      | MELSEC-L CPU Module User's Manual (Hardware Design, Maintenance and Inspection)                 |  |  |  |  |  |
|                      | GX Works2 Version 1 Operating Manual (Common)   |  |  |  |  |  |
|                      | GX Works2 Version 1 Operating Manual (Simple Project, Function Block)                           |  |  |  |  |  |



#### ●Error code list

| Error code | Description | Action |
|------------|-------------|--------|
| None       | None        | None   |

# Labels

### ●Input labels

| Name (comment)    | Label name     | Data | Setting range      | Description                         |
|-------------------|----------------|------|--------------------|-------------------------------------|
|                   |                | type |                    |                                     |
| Execution command | FB_EN          | Bit  | ON, OFF            | ON: The FB is activated.            |
|                   |                | ы    |                    | OFF: The FB is not activated.       |
| Module start XY   | iw_Start_IO_No |      | Depends on the     | Specify the starting XY address (in |
| address           |                |      | I/O point range    | hexadecimal) where the L60MD4-G     |
|                   |                | Mord | of the CPU.        | is connected. (For example, enter   |
|                   |                | Word | For details, refer | H10 for X10.)                       |
|                   |                |      | to the CPU         |                                     |
|                   |                |      | user's manual.     |                                     |

#### Output labels

| Output labels     |              | 1      |         |  |
|-------------------|--------------|--------|---------|--|
| Name (comment)    | Label name   | Data   | Initial | Description                                |
|                   |              | type   | value   |  |
| Execution status  | FB_ENO       | Bit    | OFF     | ON: Execution command is ON.               |
|                   |              | DIL    | OFF     | OFF: Execution command is OFF.             |
| Completed without | FB_OK        | Bit    | OFF     | When ON, it indicates that the conversion  |
| error             |              | DIL    | OFF     | value is being read.                       |
| CH1 Conversion    | ow_Value_CH1 | \\/ord | 0       | The digital output value of CH1 is stored. |
| data              |              | Word   | 0       |  |
| CH2 Conversion    | ow_Value_CH2 | Word   | 0       | The digital output value of CH2 is stored. |
| data              |              | vvoid  | U       |  |
| CH3 Conversion    | ow_Value_CH3 | Word   | 0       | The digital output value of CH3 is stored. |
| data              |              | vvoid  | U       |  |
| CH4 Conversion    | ow_Value_CH4 | \\/a=d | 0       | The digital output value of CH4 is stored. |
| data              |              | Word   | 0       |  |
| Error flag        | FB_ERROR     | Bit    | OFF     | Always OFF                                 |
| Error code        | ERROR_ID     | Word   | 0       | Always 0                                   |



### **FB Version Upgrade History**

| Version | Date      | Description   |
|---------|-----------|---------------|
| 1.00A   | 2014/6/30 | First edition |

#### Note

This chapter includes information related to the function block.

It does not include information on restrictions of use such as combination with modules or programmable controller CPUs.



### 2.11. M+L60MD4-G\_ReadScalingVal (Read scaling value)

#### **FB Name**

M+L60MD4-G\_ReadScalingVal

| Item                             |  | Description  |  |
|----------------------------------|--|--|--|
| Function overview                | Reads the scaling value of the specified channel.              |  |  |
| Symbol                           | Module start XY address —— W                                   | M+L60MD4-G_ReadScalingVal  : FB_EN  : iw_Start_IO_No  : iw_CH ow_Start_IO_NO | FB_ENO : B — Execution status  FB_OK : B — Completed without error  caling_Value : W — Scaling value  FB_ERROR : B — Error flag  ERROR_ID : W — Error code |
| Applicable hardware and software | Multiple input (voltage/current/ emperature) module CPU module | L60MD4-G Series  | Model  |
|                                  |  |  |  |
|                                  |  | MELSEC-L Series  | LCPU   |
|                                  | Engineering software   | GX Works2 *1   |  |
|                                  |  | Language   | Software version   |
|                                  |  | Japanese version   | Version1.86Q or later  |
|                                  |  | English version  | Version1.24A or later  |
|                                  |  | Chinese (Simplified) version   | Version1.49B or later  |
|                                  |  | Chinese (Traditional) version  | Version1.49B or later  |
|                                  |  | Korean version   | Version1.49B or later  |
|                                  |  | *1 For software versions applica "Relevant manuals".                         | ble to the modules used, refer to  |
| Programming language             | Ladder   |  |  |
| Number of steps                  | 380 steps (for MELSEC-   | L series CPU)  |  |
|                                  | *The number of steps of  | the FB in a program depends on   | the CPU model that is used and   |
|                                  | input and output defin   | ition.   |  |



| Item                 | Description  |
|----------------------|--|
| Function description | By turning ON FB_EN (Execution command), the scaling value of the specified                |
|                      | conversion channel (CH1 to CH4) is read.   |
|                      | 2) The read ow_Scaling_Value (Scaling value) depends on the input type/range setting, the  |
|                      | averaging processing function setting, and scaling function setting.                       |
|                      | 3) In either of the following cases, the scaling value is not read.                        |
|                      | <ul> <li>When the scaling enable/disable setting (Un¥G53) is disabled</li> </ul>           |
|                      | When the conversion completed flag (XnE) is OFF  |
|                      | 4) When the setting value of iw_CH (Target CH) is out of range, the FB_ERROR output        |
|                      | turns ON and processing is interrupted, and the error code 10 (Decimal) is stored in       |
|                      | ERROR_ID (Error code).   |
|                      | Refer to the error code explanation section for details.                                   |
|                      | 5) When the scaling value is set in the auto refresh setting of the intelligent function   |
|                      | module, this FB is unnecessary.  |
| Compiling method     | Macro type   |
| Restrictions and     | 1) The FB does not include error recovery processing. Program the error recovery           |
| precautions          | processing separately in accordance with the required system operation.                    |
|                      | 2) The FB cannot be used in an interrupt program.  |
|                      | 3) Please ensure that the FB_EN signal is capable of being turned OFF by the program. Do   |
|                      | not use this FB in programs that are only executed once such as a subroutine,              |
|                      | FOR-NEXT loop because it is impossible to turn OFF.  |
|                      | 4) When two or more of these FBs are used, precaution must be taken to avoid repetition of |
|                      | iw_CH (Target CH).   |
|                      | 5) This FB uses index registers Z7 to Z9. Please do not use these index registers in an    |
|                      | interrupt program.   |
|                      | 6) Every input must be provided with a value for proper FB operation.                      |
|                      | 7) To operate the L60MD4-G, set the input type/range setting according to the device and   |
|                      | system to be connected. Set the proper settings for the device and system with the         |
|                      | parameter setting in GX Works2 or the initial setting FB (M+L60MD4-G_InitialSetting).      |
|                      | For details on how to use the parameter setting in GX Works2, refer to GX Works2           |
|                      | Version 1 Operating Manual (Common).   |
| FB operation type    | Real-time execution  |
| Application example  | Refer to "Appendix 1 FB Library Application Examples".                                     |

| Item             | Description  |  |
|------------------|--|--|
| Timing chart     | [When operation completes without error] [When an error occurs]  FB_EN (Execution command) FB_ENO (Execution status) ow_Scaling_Value (Scaling value) FB_OK (Completed)  FB_OK (Completed)  FB_OK (Completed)  FB_OK (Completed)   |  |
| Relevant manuals | without error) FB_ERROR (Error flag) ERROR_ID (Error code)  • MELSEC-L Multiple Input (Voltage/Current/Temperature) Module User's Manual • MELSEC-L CPU Module User's Manual (Hardware Design, Maintenance and Inspection) • GX Works2 Version 1 Operating Manual (Common) |  |
|                  | GX Works2 Version 1 Operating Manual (Simple Project, Function Block)  |  |

### ●Error code list

| Error code   | Description                                 | Action   |
|--------------|---|--|
| 10 (Decimal) | The specified channel is not valid. iw_CH   | Please try again after confirming the setting. |
|              | (Target CH) is not within the range of 1 to |  |
|              | 4.  |  |

# Labels

### ●Input labels

| Name (comment)    | Label name     | Data  | Setting range      | Description                         |
|-------------------|----------------|-------|--------------------|-------------------------------------|
|                   |                | type  |                    |                                     |
| Execution command | FB_EN          | Bit   | ON, OFF            | ON: The FB is activated.            |
|                   |                | DIL   |                    | OFF: The FB is not activated.       |
| Module start XY   | iw_Start_IO_No |       | Depends on the     | Specify the starting XY address (in |
| address           |                |       | I/O point range    | hexadecimal) where the L60MD4-G     |
|                   |                | Word  | of the CPU.        | is connected. (For example, enter   |
|                   |                | vvoid | For details, refer | H10 for X10.)                       |
|                   |                |       | to the CPU         |                                     |
|                   |                |       | user's manual.     |                                     |
| Target CH         | iw_CH          | Word  | 1 to 4             | Specify the channel number.         |



#### Output labels

| Name (comment)    | Label name       | Data      | Initial | Description                                  |
|-------------------|------------------|-----------|---------|--|
|                   |                  | type      | value   |  |
| Execution status  | FB_ENO           | Dit       | OFF     | ON: Execution command is ON.                 |
|                   |                  | Bit OFF ( |         | OFF: Execution command is OFF.               |
| Completed without | FB_OK            | Bit       | OFF     | When ON, it indicates that the scaling value |
| error             |                  |           |         | is being read.                               |
| Scaling value     | ow_Scaling_Value | Word      | 0       | The scaling value is stored.                 |
| Error flag        | FB_ERROR         | Bit OFF   |         | When ON, it indicates that an error has      |
|                   |                  |           |         | occurred.                                    |
| Error code        | ERROR_ID         | Word      | 0       | FB error code output.                        |

### **FB Version Upgrade History**

| Version | Date      | Description   |
|---------|-----------|---------------|
| 1.00A   | 2014/6/30 | First edition |

#### Note

This chapter includes information related to the function block.

It does not include information on restrictions of use such as combination with modules or programmable controller CPUs.



#### **FB Name**

M+L60MD4-G\_ReadAllScalingVal

| Reads the scaling value of CH1 to CH4.   | Item              | Description                            |                                    |                                      |
|--|-------------------|--|------------------------------------|--------------------------------------|
| Execution command  | Function overview | Reads the scaling value of CH1 to CH4. |                                    |                                      |
| Module start XY address   W: iw_Start_IO_No  FB_OK: B  Ow_Scaling_CH1: W  Ow_Scaling_CH2: W  Ow_Scaling_CH3: W  Ow_Scaling_CH3: W  Ow_Scaling_CH4: W  Ow_Scaling_CH4: W  FB_ERROR: B  ERROR_ID: W  FB_ERROR: B  ERROR_ID: W  FB_ERROR : B  ERROR_ID: W  FB_ERROR: B  ERROR_ID: W  FB_ERROR_ID: W  FB_ERROR_I | Symbol            |  | M+L60MD4-G_ReadAllScalingVal       |                                      |
| Applicable hardware and software  CPU module  Ow_Scaling_CH1 : W — CH1 Scaling value Ow_Scaling_CH3 : W — CH2 Scaling value Ow_Scaling_CH3 : W — CH3 Scaling value Ow_Scaling_CH3 : W — CH4 Scaling value Ow_Scaling_CH4 : W — CH4 Scaling value FB_ERROR : B — Error flag ERROR_ID : W — Error code  L60MD4-G  Series Model  Melsec-L Series LCPU  Engineering software  GX Works2 *1  Language Software version  |                   | Execution command — B                  | : FB_EN                            | FB_ENO : B Execution status          |
| Applicable hardware and software  CPU module  Multiple input (voltage/current/ temperature) module  CPU module  Series Model  MELSEC-L Series LCPU  CH2 Scaling value  CH3 Scaling value  CH3 Scaling value  CH4 Scaling value  CH4 Scaling value  CH4 Scaling value  CH5 Scaling value  CH4 Scaling value  CH5 Scaling value  CH6 Scaling value  CH7 Scaling value  CH8 Scaling value |                   | Module start XY address — W            | : iw_Start_IO_No                   | FB_OK : B —— Completed without error |
| Applicable hardware and software    Multiple input (voltage/current/ temperature) module    CPU module   CPU module   CPU module   |                   |  |                                    |                                      |
| Applicable hardware and software    Multiple input (voltage/current/ temperature) module   CPU module   Engineering software   GX Works2 *1  |                   |  |                                    |                                      |
| Applicable hardware and software  Multiple input (voltage/current/ temperature) module  CPU module  Series Model MELSEC-L Series LCPU  Engineering software  GX Works2 *1  Language Software version   |                   |  |                                    |                                      |
| Applicable hardware and software  CPU module  ERROR_ID: W Error code  L60MD4-G  L60MD4-G  Series Model  MELSEC-L Series LCPU  Engineering software  GX Works2 *1  Language Software version  |                   |  |                                    |                                      |
| hardware and software   (voltage/current/ temperature) module   CPU module   Series  |                   |  |                                    |                                      |
| hardware and software   (voltage/current/ temperature) module   CPU module   Series  |                   |  |                                    |                                      |
| software temperature) module  CPU module  Series Model  MELSEC-L Series LCPU  Engineering software  GX Works2 *1  Language Software version  | Applicable        | Multiple input                         | L60MD4-G                           |                                      |
| CPU module  Series Model  MELSEC-L Series LCPU  Engineering software  GX Works2 *1  Language Software version  | hardware and      | (voltage/current/                      |                                    |                                      |
| Series Model  MELSEC-L Series LCPU  Engineering software  GX Works2 *1  Language Software version  | software          | temperature) module                    |                                    |                                      |
| Engineering software  GX Works2 *1  Language  Software version   |                   | CPU module                             |                                    |                                      |
| Engineering software  GX Works2 *1  Language Software version  |                   |  | Series                             | Model                                |
| Language Software version  |                   |  | MELSEC-L Series                    | LCPU                                 |
| Language Software version  |                   |  |                                    |                                      |
| 3 3  |                   | Engineering software                   | GX Works2 *1                       |                                      |
| Japanese version Version1.86Q or later   |                   |  | Language                           | Software version                     |
|  |                   |  | Japanese version                   | Version1.86Q or later                |
| English version Version1.24A or later  |                   |  | English version                    | Version1.24A or later                |
| Chinese (Simplified) version Version1.49B or later   |                   |  | Chinese (Simplified) version       | Version1.49B or later                |
| Chinese (Traditional) version Version1.49B or later  |                   |  | Chinese (Traditional) version      | Version1.49B or later                |
| Korean version Version1.49B or later   |                   |  | Korean version                     | Version1.49B or later                |
| *1 For software versions applicable to the modules used, refer to  |                   |  | *1 For software versions applicate | ble to the modules used, refer to    |
| "Relevant manuals".  |                   |  | "Relevant manuals".                |                                      |
| Programming Ladder   | Programming       | Ladder                                 |                                    |                                      |
| language   | language          |  |                                    |                                      |
| Number of steps 319 steps (for MELSEC-L series CPU)  | Number of steps   | 319 steps (for MELSEC-                 | L series CPU)                      |                                      |
| *The number of steps of the FB in a program depends on the CPU model that is used and  |                   | *The number of steps of                | the FB in a program depends on t   | he CPU model that is used and        |
| input and output definition.   |                   | input and output defini                | tion.                              |                                      |



| Item              | Description   |  |  |  |
|-------------------|---|--|--|--|
| Function          | 1) By turning ON FB_EN (Execution command), the scaling values of CH1 to CH4 are read.    |  |  |  |
| description       | 2) The read ow_Scaling_CH1 (CH1 Scaling value) to ow_Scaling_CH4 (CH4 Scaling             |  |  |  |
|                   | value) depend on the input type/range setting, the averaging processing function setting, |  |  |  |
|                   | and scaling function (conversion) setting.  |  |  |  |
|                   | 3) The scaling value is not read from the channel for which the scaling enable/disable    |  |  |  |
|                   | setting (Un¥G53) is disabled.   |  |  |  |
|                   | 4) When the conversion completed flag (XnE) is OFF, reading the scaling value of CH1 to   |  |  |  |
|                   | CH4 is not executed.  |  |  |  |
|                   | 5) When the scaling value is set in the auto refresh setting of the intelligent function  |  |  |  |
|                   | module, this FB is unnecessary.   |  |  |  |
| Compiling method  | Macro type  |  |  |  |
| Restrictions and  | The FB does not include error recovery processing. Program the error recovery             |  |  |  |
| precautions       | processing separately in accordance with the required system operation.                   |  |  |  |
|                   | 2) The FB cannot be used in an interrupt program.   |  |  |  |
|                   | 3) Please ensure that the FB_EN signal is capable of being turned OFF by the program. Do  |  |  |  |
|                   | not use this FB in programs that are only executed once such as a subroutine,             |  |  |  |
|                   | FOR-NEXT loop because it is impossible to turn OFF.                                       |  |  |  |
|                   | 4) This FB uses index registers Z8 and Z9. Please do not use these index registers in an  |  |  |  |
|                   | interrupt program.  |  |  |  |
|                   | 5) Every input must be provided with a value for proper FB operation.                     |  |  |  |
|                   | 6) To operate the L60MD4-G, set the input type/range setting according to the device and  |  |  |  |
|                   | system to be connected. Set the proper settings for the device and system with the        |  |  |  |
|                   | parameter setting in GX Works2 or the initial setting FB (M+L60MD4-G_InitialSetting).     |  |  |  |
|                   | For details on how to use the parameter setting in GX Works2, refer to GX Works2          |  |  |  |
|                   | Version 1 Operating Manual (Common).  |  |  |  |
| FB operation type | Real-time execution   |  |  |  |
| Application       | Refer to "Appendix 1 FB Library Application Examples".                                    |  |  |  |
| example           |   |  |  |  |
| Timing chart      | [When operation completes without error]  |  |  |  |
|                   | FB_EN (Execution command)   |  |  |  |
|                   | FB_ENO (Execution status)   |  |  |  |
|                   | ow_Scaling_CH□ (CH□Scaling value)  Refresh stop   |  |  |  |
|                   | FB_OK (Completed without error)   |  |  |  |
|                   | FB_ERROR (Error flag)   |  |  |  |
|                   | ERROR_ID (Error code) 0   |  |  |  |

| Item             | Description   |
|------------------|---|
| Relevant manuals | MELSEC-L Multiple Input (Voltage/Current/Temperature) Module User's Manual      |
|                  | MELSEC-L CPU Module User's Manual (Hardware Design, Maintenance and Inspection) |
|                  | GX Works2 Version 1 Operating Manual (Common)                                   |
|                  | GX Works2 Version 1 Operating Manual (Simple Project, Function Block)           |

#### ●Error code list

| Error code | Description | Action |
|------------|-------------|--------|
| None       | None        | None   |

### Labels

### ●Input labels

| Name (comment)    | Label name     | Data | Setting range      | Description                         |
|-------------------|----------------|------|--------------------|-------------------------------------|
|                   |                | type |                    |                                     |
| Execution command | FB_EN          | Bit  | ON, OFF            | ON: The FB is activated.            |
|                   |                | ы    |                    | OFF: The FB is not activated.       |
| Module start XY   | iw_Start_IO_No |      | Depends on the     | Specify the starting XY address (in |
| address           |                |      | I/O point range    | hexadecimal) where the L60MD4-G     |
|                   |                | Mord | of the CPU.        | is connected. (For example, enter   |
|                   |                | Word | For details, refer | H10 for X10.)                       |
|                   |                |      | to the CPU         |                                     |
|                   |                |      | user's manual.     |                                     |

#### Output labels

| - Catpat labole   | 1              |      | 1       | 1  |
|-------------------|----------------|------|---------|--|
| Name (comment)    | Label name     | Data | Initial | Description                                  |
|                   |                | type | value   |  |
| Execution status  | FB_ENO         | Bit  | OFF     | ON: Execution command is ON.                 |
|                   |                | DIL  | OFF     | OFF: Execution command is OFF.               |
| Completed without | FB_OK          | Bit  | OFF     | When ON, it indicates that the scaling value |
| error             |                | DIL  | OFF     | is being read.                               |
| CH1 Scaling value | ow_Scaling_CH1 | Word | 0       | The scaling value of CH1 is stored.          |
| CH2 Scaling value | ow_Scaling_CH2 | Word | 0       | The scaling value of CH2 is stored.          |
| CH3 Scaling value | ow_Scaling_CH3 | Word | 0       | The scaling value of CH3 is stored.          |
| CH4 Scaling value | ow_Scaling_CH4 | Word | 0       | The scaling value of CH4 is stored.          |
| Error flag        | FB_ERROR       | Bit  | OFF     | Always OFF                                   |
| Error code        | ERROR_ID       | Word | 0       | Always 0                                     |



### **FB Version Upgrade History**

| Version | Date      | Description   |
|---------|-----------|---------------|
| 1.00A   | 2014/6/30 | First edition |

#### Note

This chapter includes information related to the function block.

It does not include information on restrictions of use such as combination with modules or programmable controller CPUs.



#### **FB Name**

M+L60MD4-G\_ErrorOperation

| Item                             | Description  |  |   |  |
|----------------------------------|--|--|---|--|
| Function overview                | Monitors error codes and resets errors.  |  |   |  |
| Symbol                           | Execution command ———  Module start XY address ———  Error reset request ———  |  | FB_ENO : B — Execution status  FB_OK : B — Completed without error  UNIT_ERROR : B — Module error flag  _ERR_CODE : W — Module error code  FB_ERROR : B — Error flag  ERROR_ID : W — Error code |  |
| Applicable hardware and software | Multiple input (voltage/current/ temperature) module CPU module  | L60MD4-G   |   |  |
|                                  |  | Series   | Model   |  |
|                                  |  | MELSEC-L Series                                      | LCPU  |  |
|                                  | Engineering software   | GX Works2 *1   |   |  |
|                                  |  | Language   | Software version  |  |
|                                  |  | Japanese version                                     | Version1.86Q or later   |  |
|                                  |  | English version                                      | Version1.24A or later   |  |
|                                  |  | Chinese (Simplified) version                         | Version1.49B or later   |  |
|                                  |  | Chinese (Traditional) version                        | Version1.49B or later   |  |
|                                  |  | Korean version                                       | Version1.49B or later   |  |
|                                  |  | *1 For software versions applica "Relevant manuals". | able to the modules used, refer to  |  |
| Programming language             | Ladder   |  |   |  |
| Number of steps                  | 291 steps (for MELSEC-L series CPU)  |  |   |  |
|                                  | *The number of steps of the FB in a program depends on the CPU model that is used and input and output definition. |  |   |  |



| Item                 | Description   |  |  |  |
|----------------------|---|--|--|--|
| Function description | By turning on FB_EN (Execution command), the current error code in the target             |  |  |  |
|                      | intelligent function module is output.  |  |  |  |
|                      | 2) After FB_EN (Execution command) is turned ON, the error is reset when                  |  |  |  |
|                      | ib_Error_Reset (Error reset request) is turned ON during error occurrence.                |  |  |  |
| Compiling method     | Macro type  |  |  |  |
| Restrictions and     | 1) The FB does not include error recovery processing. Program the error recovery          |  |  |  |
| precautions          | processing separately in accordance with the required system operation.                   |  |  |  |
|                      | 2) The FB cannot be used in an interrupt program.   |  |  |  |
|                      | 3) Please ensure that the FB_EN signal is capable of being turned OFF by the program.     |  |  |  |
|                      | Do not use this FB in programs that are only executed once such as a subroutine,          |  |  |  |
|                      | FOR-NEXT loop because it is impossible to turn OFF.                                       |  |  |  |
|                      | 4) This FB uses index registers Z8 and Z9. Please do not use these index registers in an  |  |  |  |
|                      | interrupt program.  |  |  |  |
|                      | 5) Every input must be provided with a value for proper FB operation.                     |  |  |  |
|                      | 6) When this FB is used in two or more places, a duplicated coil warning may occur during |  |  |  |
|                      | compile operation due to the Y signal being operated by index modification. However       |  |  |  |
|                      | this is not a problem and the FB will operate without error.                              |  |  |  |
|                      | To operate the L60MD4-G, set the input type/range setting according to the device and     |  |  |  |
|                      | system to be connected. Set the proper settings for the device and system with the        |  |  |  |
|                      | parameter setting in GX Works2 or the initial setting FB (M+L60MD4-G_InitialSetting).     |  |  |  |
|                      | For details on how to use the parameter setting in GX Works2, refer to GX Works2          |  |  |  |
|                      | Version 1 Operating Manual (Common).  |  |  |  |
| FB operation type    | Real-time execution   |  |  |  |
| Application example  | Refer to "Appendix 1 FB Library Application Examples".                                    |  |  |  |
| Timing chart         | [When operation completes without error]  |  |  |  |
|                      | FB_EN (Execution command)   |  |  |  |
|                      | FB_ENO (Execution status)   |  |  |  |
|                      | ib_Error_Reset (Error reset command)  |  |  |  |
|                      | Error clear request (YnF)   |  |  |  |
|                      | Error flag (XnF)  |  |  |  |
|                      | ob_UNIT_ERR (Module error flag)   |  |  |  |
|                      | ow_UNIT_ERR_CODE (Module error code) 0 Module error code                                  |  |  |  |
|                      | FB_OK (Completed without error)   |  |  |  |
|                      | FB_ERROR (Error flag)   |  |  |  |
|                      | ERROR_ID (Error code) 0   |  |  |  |
|                      | <u>,                                      </u>  |  |  |  |



| Item             | Description   |
|------------------|---|
| Relevant manuals | MELSEC-L Multiple Input (Voltage/Current/Temperature) Module User's Manual      |
|                  | MELSEC-L CPU Module User's Manual (Hardware Design, Maintenance and Inspection) |
|                  | GX Works2 Version 1 Operating Manual (Common)                                   |
|                  | GX Works2 Version 1 Operating Manual (Simple Project, Function Block)           |

#### ●Error code list

| Error code | Description | Action |
|------------|-------------|--------|
| None       | None        | None   |

## Labels

### ●Input labels

| Name (comment)      | Label name     | Data  | Setting range      | Description                         |
|---------------------|----------------|-------|--------------------|-------------------------------------|
|                     |                | type  |                    |                                     |
| Execution command   | FB_EN          | Bit   | ON, OFF            | ON: The FB is activated.            |
|                     |                | Dit   |                    | OFF: The FB is not activated.       |
| Module start XY     | iw_Start_IO_No |       | Depends on the     | Specify the starting XY address (in |
| address             |                |       | I/O point range    | hexadecimal) where the L60MD4-G     |
|                     |                | Word  | of the CPU.        | is connected. (For example, enter   |
|                     |                | vvoid | For details, refer | H10 for X10.)                       |
|                     |                |       | to the CPU         |                                     |
|                     |                |       | user's manual.     |                                     |
| Error reset request | ib_Error_Reset | Bit   | ON, OFF            | Turn ON for the error reset.        |
|                     |                | DIL   |                    | Turn OFF after the error reset.     |



#### Output labels

| Name (comment)    | Label name     | Data      | Initial                                   | Description                                  |   |   |
|-------------------|----------------|-----------|---|--|---|---|
|                   |                | type      | value                                     |  |   |   |
| Execution status  | FB_ENO         |           |   | Execution command is ON. (Module errors      |   |   |
|                   |                | Bit       | OFF                                       | are being monitored.)                        |   |   |
|                   |                |           |   | OFF: Execution command is OFF.               |   |   |
| Completed without | FB_OK          | Bit       | OFF                                       | When ON, it indicates that an error reset is |   |   |
| error             |                | DIL       | OFF                                       | completed.                                   |   |   |
| Module error flag | ob_UNIT_ERROR  | Bit OFF   | When ON, it indicates that a module error |  |   |   |
|                   |                |           |   | has occurred.                                |   |   |
| Module error code | ow_UNIT_ERR_CO | \\/ o = d | <b>\</b>                                  | Word   | 0 | Stores the error code of the current error. |
|                   | DE             | vvoid     | U   |  |   |   |
| Error flag        | FB_ERROR       | Bit       | OFF                                       | Always OFF                                   |   |   |
| Error code        | ERROR_ID       | Word      | 0   | Always 0                                     |   |   |

### **FB Version Upgrade History**

| Version | Date      | Description   |
|---------|-----------|---------------|
| 1.00A   | 2014/6/30 | First edition |

#### Note

This chapter includes information related to the function block.

It does not include information on restrictions of use such as combination with modules or programmable controller CPUs.



#### **FB Name**

M+L60MD4-G\_ShiftOperation

| Item                             | Description  |   |                                   |  |  |
|----------------------------------|--|---|-----------------------------------|--|--|
| Function overview                | Adds the shift amount to the digital value.  |   |                                   |  |  |
| Symbol                           | -  |   | FB_ENO : B                        |  |  |
| Applicable hardware and software | Multiple input (voltage/current/ temperature) module CPU module  | L60MD4-G  |                                   |  |  |
|                                  | or o modulo  | Series  | Model                             |  |  |
|                                  |  | MELSEC-L Series                                       | LCPU                              |  |  |
|                                  | Engineering software   | GX Works2 *1  |                                   |  |  |
|                                  |  | Language  | Software version                  |  |  |
|                                  |  | Japanese version                                      | Version1.86Q or later             |  |  |
|                                  |  | English version                                       | Version1.24A or later             |  |  |
|                                  |  | Chinese (Simplified) version                          | Version1.49B or later             |  |  |
|                                  |  | Chinese (Traditional) version                         | Version1.49B or later             |  |  |
|                                  |  | Korean version  | Version1.49B or later             |  |  |
|                                  |  | *1 For software versions applical "Relevant manuals". | ble to the modules used, refer to |  |  |
| Programming language             | Ladder   |   |                                   |  |  |
| Number of steps                  | 166 steps (for MELSEC-L series CPU)  |   |                                   |  |  |
|                                  | *The number of steps of the FB in a program depends on the CPU model that is used and input and output definition. |   |                                   |  |  |

| Item                 | Description   |
|----------------------|---|
| Function description | By turning ON FB_EN (Execution command), the shift amount is added to a digital value*1.                    |
|                      | *1 Input the conversion data read from the L60MD4-G with M+L60MD4-G_ReadVal or others as the digital value. |
|                      | 2) If the value after the addition is out of the range from -32,768 to 32,767, the value is                 |
|                      | fixed to -32,768 or 32,767.   |
| Compiling method     | Macro type  |
| Restrictions and     | The FB does not include error recovery processing. Program the error recovery                               |
| precautions          | processing separately in accordance with the required system operation.                                     |
|                      | 2) The FB cannot be used in an interrupt program.   |
|                      | 3) Please ensure that the FB_EN signal is capable of being turned OFF by the program.                       |
|                      | Do not use this FB in programs that are only executed once such as a subroutine,                            |
|                      | FOR-NEXT loop because it is impossible to turn OFF.   |
|                      | 4) Every input must be provided with a value for proper FB operation.                                       |
|                      | 5) To operate the L60MD4-G, set the input type/range setting according to the device and                    |
|                      | system to be connected. Set the proper settings for the device and system with the                          |
|                      | parameter setting in GX Works2 or the initial setting FB (M+L60MD4-G_InitialSetting).                       |
|                      | For details on how to use the parameter setting in GX Works2, refer to GX Works2                            |
|                      | Version 1 Operating Manual (Common).  |
|                      | 6) When FB_OK (Completed without error) is ON, ow_Dig_Out_Val (Digital output value) is                     |
|                      | enabled.  |
|                      | 7) By turning OFF FB_EN, ow_Dig_Out_Val (Digital output value) is cleared to 0.                             |
| FB operation type    | Real-time execution   |
| Application example  | Refer to "Appendix 1 FB Library Application Examples".  |
| Timing chart         | [When operation completes without error]  |
|                      | FB_EN (Execution command)   |
|                      | FB_ENO (Execution status) Shift processing Shift  |
|                      | processing stop processing stop   |
|                      | FB_OK (Completed without error)   |
|                      | FB_ERROR (Error flag)   |
|                      | ERROR_ID (Error code) 0   |
| Relevant manuals     | MELSEC-L Multiple Input (Voltage/Current/Temperature) Module User's Manual                                  |
|                      | MELSEC-L CPU Module User's Manual (Hardware Design, Maintenance and Inspection)                             |
|                      | GX Works2 Version 1 Operating Manual (Common)   |
|                      | GX Works2 Version 1 Operating Manual (Simple Project, Function Block)                                       |



#### ●Error code list

| Error code | Description | Action |  |
|------------|-------------|--------|--|
| None       | None        | None   |  |

#### Labels

#### Input labels

| Name (comment)    | Label name       | Data   | Setting range | Description                   |
|-------------------|------------------|--------|---------------|-------------------------------|
|                   |                  | type   |               |                               |
| Execution command | FB_EN            | Bit    | ON, OFF       | ON: The FB is activated.      |
|                   |                  | DIL    |               | OFF: The FB is not activated. |
| Digital value     | iw_Digital_Value | \\/ord | -32,768 to    | Specify a digital value.      |
|                   |                  | Word   | 32,767        |                               |
| Shift amount      | iw_Shift_Value   | Mord   | -32,768 to    | Specify the shift amount.     |
|                   |                  | Word   | 32,767        |                               |

#### Output labels

| Name (comment)       | Label name     | Data      | Initial | Description                                    |
|----------------------|----------------|-----------|---------|--|
|                      |                | type      | value   |  |
| Execution status     | FB_ENO         | Rit       | OFF     | ON: Execution command is ON.                   |
|                      |                | Bit OFF ( |         | OFF: Execution command is OFF.                 |
| Completed without    | FB_OK          | Bit OFF   |         | When ON, it indicates that the shift operation |
| error                |                |           |         | is being executed.                             |
| Digital output value | ow_Dig_Out_Val | Word 0    |         | The digital value after the shift amount is    |
|                      |                |           |         | added is stored.                               |
| Error flag           | FB_ERROR       | Bit       | OFF     | Always OFF                                     |
| Error code           | ERROR_ID       | Word      | 0       | Always 0                                       |

### **FB Version Upgrade History**

| Version | Date      | Description   |
|---------|-----------|---------------|
| 1.00A   | 2014/6/30 | First edition |

#### Note

This chapter includes information related to the function block.

It does not include information on restrictions of use such as combination with modules or programmable controller CPUs.



#### **FB Name**

M+L60MD4-G\_DiffOperation

| Item                             | Description   |  |   |  |
|----------------------------------|---|--|---|--|
| Function overview                | Outputs the difference obtained by subtracting the standard value from the digital value. |  |   |  |
| Symbol                           |   | ow_S   | FB_ENO : B — Execution status  FB_OK : B — Completed without error  Dig_Out_Val : W — Digital output value  Differential conversion  standard  FB_ERROR : B — Error flag  ERROR_ID : W — Error code |  |
| Applicable hardware and software | Multiple input (voltage/current/ temperature) module CPU module                           | L60MD4-G   |   |  |
|                                  |   | Series   | Model   |  |
|                                  |   | MELSEC-L Series                                      | LCPU  |  |
|                                  | Engineering software  | GX Works2 *1   |   |  |
|                                  |   | Language   | Software version  |  |
|                                  |   | Japanese version                                     | Version1.86Q or later   |  |
|                                  |   | English version                                      | Version1.24A or later   |  |
|                                  |   | Chinese (Simplified) version                         | Version1.49B or later   |  |
|                                  |   | Chinese (Traditional) version                        | Version1.49B or later   |  |
|                                  |   | Korean version                                       | Version1.49B or later   |  |
|                                  |   | *1 For software versions applica "Relevant manuals". | ble to the modules used, refer to   |  |
| Programming language             | Ladder  |  |   |  |
| Number of steps                  | 183 steps (for MELSEC-L   | series CPU)  |   |  |
|                                  | *The number of steps of the FB in a program depends on the CPU model that is used and     |  |   |  |
|                                  | input and output definiti   | on.  |   |  |



| Item                 | Description  |  |  |  |
|----------------------|--|--|--|--|
| Function description | By turning ON FB_EN (Execution command), the differential conversion process is          |  |  |  |
|                      | executed.  |  |  |  |
|                      | 2) iw_Digital_Value (Digital value) when FB_EN (Execution command) changes from OFF      |  |  |  |
|                      | to ON is ow_Standard_Val (Differential conversion standard). As long as FB_EN            |  |  |  |
|                      | (Execution command) remains ON, the difference obtained by subtracting                   |  |  |  |
|                      | ow_Standard_Val (Differential conversion standard) from iw_Digital_Value (Digital        |  |  |  |
|                      | value) is output.  |  |  |  |
|                      | 1 Input the conversion data read from the L60MD4-G with M+L60MD4-G_ReadVal or            |  |  |  |
|                      | others as the digital value.   |  |  |  |
| Compiling method     | Macro type   |  |  |  |
| Restrictions and     | The FB does not include error recovery processing. Program the error recovery            |  |  |  |
| precautions          | processing separately in accordance with the required system operation.                  |  |  |  |
|                      | 2) The FB cannot be used in an interrupt program.  |  |  |  |
|                      | 3) Please ensure that the FB_EN signal is capable of being turned OFF by the program.    |  |  |  |
|                      | Do not use this FB in programs that are only executed once such as a subroutine,         |  |  |  |
|                      | FOR-NEXT loop because it is impossible to turn OFF.                                      |  |  |  |
|                      | 4) Every input must be provided with a value for proper FB operation.                    |  |  |  |
|                      | 5) To operate the L60MD4-G, set the input type/range setting according to the device and |  |  |  |
|                      | system to be connected. Set the proper settings for the device and system with the       |  |  |  |
|                      | parameter setting in GX Works2 or the initial setting FB (M+L60MD4-G_InitialSetting).    |  |  |  |
|                      | For details on how to use the parameter setting in GX Works2, refer to GX Works2         |  |  |  |
|                      | Version 1 Operating Manual (Common).   |  |  |  |
|                      | 6) When FB_OK (Completed without error) is ON, ow_Dig_Out_Val (Digital output value)     |  |  |  |
|                      | and ow_Standard_Val (Differential conversion standard) are enabled.                      |  |  |  |
|                      | 7) By turning OFF FB_EN, ow_Dig_Out_Val (Digital output value) and ow_Standard_Val       |  |  |  |
|                      | (Differential conversion standard) are cleared to 0.                                     |  |  |  |
| FB operation type    | Real-time execution  |  |  |  |
| Application example  | Refer to "Appendix 1 FB Library Application Examples".                                   |  |  |  |
| Timing chart         | [When operation completes without error]   |  |  |  |
|                      | FB_EN (Execution command)  |  |  |  |
|                      | FB_ENO (Execution status)  |  |  |  |
|                      | Differential conversion No conversion No conversion                                      |  |  |  |
|                      | ow_Standard_Val (Differential conversion standard)  0 Differential conversion standard 0 |  |  |  |
|                      | FB_OK (Completed without error)  |  |  |  |
|                      | FB_ERROR (Error flag)  |  |  |  |
|                      | ERROR_ID (Error code) 0  |  |  |  |
|                      |  |  |  |  |



| Item             | Description   |
|------------------|---|
| Relevant manuals | MELSEC-L Multiple Input (Voltage/Current/Temperature) Module User's Manual      |
|                  | MELSEC-L CPU Module User's Manual (Hardware Design, Maintenance and Inspection) |
|                  | GX Works2 Version 1 Operating Manual (Common)                                   |
|                  | GX Works2 Version 1 Operating Manual (Simple Project, Function Block)           |

#### ●Error code list

| Error code | Description | Action |  |
|------------|-------------|--------|--|
| None       | None        | None   |  |

### Labels

### ●Input labels

| Name (comment)    | Label name       | Data   | Setting    | Description                                |
|-------------------|------------------|--------|------------|--|
|                   |                  | type   | range      |  |
| Execution command | FB_EN            | D:4    | ON, OFF    | ON: The FB is activated.                   |
|                   |                  | Bit    |            | OFF: The FB is not activated.              |
| Digital value     | iw_Digital_Value | \\/ord | -32,768 to | Specify a digital value for which the      |
|                   |                  | Word   | 32,767     | differential conversion is to be executed. |

#### Output labels

| Name (comment)       | Label name      | Data  | Initial | Description                                     |
|----------------------|-----------------|-------|---------|---|
|                      |                 | type  | value   |   |
| Execution status     | FB_ENO          | Bit   | OFF     | ON: Execution command is ON.                    |
|                      |                 | סו    | OFF     | OFF: Execution command is OFF.                  |
| Completed without    | FB_OK           | Bit   | OFF     | When ON, it indicates that the differential     |
| error                |                 | סו    | OFF     | conversion is being executed.                   |
| Digital output value | ow_Dig_Out_Val  | Word  | 0       | The digital value for which the differential    |
|                      |                 |       |         | conversion has been executed is stored.         |
| Differential         | ow_Standard_Val | Word  | 0       | The differential conversion standard (a digital |
| conversion standard  |                 | vvoid | U       | value when FB_EN is turned ON) is stored.       |
| Error flag           | FB_ERROR        | Bit   | OFF     | Always OFF                                      |
| Error code           | ERROR_ID        | Word  | 0       | Always 0  |

# FB Version Upgrade History

| Version | Date      | Description   |
|---------|-----------|---------------|
| 1.00A   | 2014/6/30 | First edition |



### Note

This chapter includes information related to the function block.

It does not include information on restrictions of use such as combination with modules or programmable controller CPUs.



### **FB Name**

M+L60MD4-G\_ClipOperation

## **Function Overview**

| Item                             | Description  |   |   |
|----------------------------------|--|---|---|
| Function overview                | Limits a digital value at the digital clipping upper and lower limit values.       |   |   |
| Symbol                           | Digital clipping upper limit value ———   | M+L60MD4-G_ClipOperation  B:FB_EN  W:iw_Digital_Value  W:iw_Clip_U_Lim  w:iw_Clip_L_Lim | FB_ENO : B —— Execution status  FB_OK : B —— Completed without error  Dig_Out_Val : W —— Digital output value  FB_ERROR : B —— Error flag  ERROR_ID : W —— Error code |
| Applicable hardware and software | Multiple input (voltage/current/ temperature) module CPU module                    | L60MD4-G  |   |
|                                  | CPO module   | Series  | Model   |
|                                  |  | MELSEC-L Series   | LCPU  |
|                                  | Engineering software   | GX Works2 *1  |   |
|                                  |  | Language  | Software version  |
|                                  |  | Japanese version  | Version1.86Q or later   |
|                                  |  | English version   | Version1.24A or later   |
|                                  |  | Chinese (Simplified) version  | Version1.49B or later   |
|                                  |  | Chinese (Traditional) version   | Version1.49B or later   |
|                                  |  | Korean version  | Version1.49B or later   |
|                                  |  | *1 For software versions applica "Relevant manuals".                                    | ble to the modules used, refer to   |
| Programming language             | Ladder   |   |   |
| Number of steps                  | 175 steps (for MELSEC-L *The number of steps of the input and output definitions.) | ne FB in a program depends on the   | ne CPU model that is used and   |



| Item                                   | Description   |  |  |
|--|---|--|--|
| Function description                   | 1) By turning ON FB_EN (Execution command), the digital clipping operation is started.  |  |  |
|  | 2) If iw_Digital_Value (Digital value)*1 exceeds iw_Clip_U_Lim (Digital clipping upper limit  |  |  |
|  | value) or falls below iw_Clip_L_Lim (Digital clipping lower limit value) while FB_EN  |  |  |
|  | (Execution command) is ON, iw_Digital_Value (Digital value) is limited at the upper or  |  |  |
|  | lower limit value.  |  |  |
|  | *1 Input the conversion data read from the L60MD4-G with M+L60MD4-G_ReadVal or  |  |  |
|  | others as the digital value.  |  |  |
|  | 3) If iw_Clip_U_Lim (Digital clipping upper limit value) is equal to or less than   |  |  |
|  | iw_Clip_L_Lim (Digital clipping lower limit value), the FB_ERROR output turns ON and  |  |  |
|  | processing is interrupted, and the error code is stored in ERROR_ID.  |  |  |
|  | Refer to the error code explanation section for details.  |  |  |
| Compiling method                       | Macro type  |  |  |
| Restrictions and                       | The FB does not include error recovery processing. Program the error recovery   |  |  |
| precautions                            | processing separately in accordance with the required system operation.   |  |  |
|  | 2) The FB cannot be used in an interrupt program.   |  |  |
|  | 3) Please ensure that the FB_EN signal is capable of being turned OFF by the program.   |  |  |
|  | Do not use this FB in programs that are only executed once such as a subroutine,  |  |  |
|  | FOR-NEXT loop because it is impossible to turn OFF.   |  |  |
|  | 4) Every input must be provided with a value for proper FB operation.   |  |  |
|  | 5) To operate the L60MD4-G, set the input type/range setting according to the device and  |  |  |
|  | system to be connected. Set the proper settings for the device and system with the  |  |  |
|  | parameter setting in GX Works2 or the initial setting FB (M+L60MD4-G_InitialSetting).   |  |  |
|  | For details on how to use the parameter setting in GX Works2, refer to GX Works2  |  |  |
|  | Version 1 Operating Manual (Common).  |  |  |
|  | 6) When FB_OK (Completed without error) is ON, ow_Dig_Out_Val (Digital output value) is   |  |  |
|  | enabled.  |  |  |
| EP operation type                      | 7) By turning OFF FB_EN, ow_Dig_Out_Val (Digital output value) is cleared to 0.   |  |  |
| FB operation type  Application example | Real-time execution   |  |  |
| Timing chart                           | Refer to "Appendix 1 FB Library Application Examples".  [When operation completes without error] [When an error occurs]   |  |  |
| Tilling Graft                          |   |  |  |
|  | FB_EN (Execution command)   |  |  |
|  | FB_ENO (Execution status)  FB_ENO (Execution status)  FB_ENO (Execution status)   |  |  |
|  | Digital clipping operation  Digital clipping processing  Digital clipping processing |  |  |
|  | FB_OK (Completed without error)  FB_ERROR (Error flag)  FB_ERROR (Error flag)   |  |  |
|  | ERROR_ID (Error code) 0 ERROR_ID (Error code) 0 Error code)   |  |  |
|  |   |  |  |

| Item             | Description   |
|------------------|---|
| Relevant manuals | MELSEC-L Multiple Input (Voltage/Current/Temperature) Module User's Manual      |
|                  | MELSEC-L CPU Module User's Manual (Hardware Design, Maintenance and Inspection) |
|                  | GX Works2 Version 1 Operating Manual (Common)                                   |
|                  | GX Works2 Version 1 Operating Manual (Simple Project, Function Block)           |

# **Error codes**

### ●Error code list

| Error code   | Description                                  | Action   |
|--------------|--|--|
| 11 (Decimal) | The digital clipping upper limit value is    | Please try again after confirming the setting. |
|              | equal to or less than the lower limit value. |  |

# Labels

## ●Input labels

| Name (comment)         | Label name       | Data  | Setting range | Description                              |
|------------------------|------------------|-------|---------------|--|
|                        |                  | type  |               |  |
| Execution command      | FB_EN            | Bit   | ON, OFF       | ON: The FB is activated.                 |
|                        |                  | ום    |               | OFF: The FB is not activated.            |
| Digital value          | iw_Digital_Value |       | -32,768 to    | Specify a digital value for which the    |
|                        |                  | Word  | 32,767        | digital clipping operation is to be      |
|                        |                  |       |               | executed.                                |
| Digital clipping upper | iw_Clip_U_Lim    | Word  | -32,768 to    | Specify the digital clipping upper limit |
| limit value            |                  | vvoid | 32,767        | value.                                   |
| Digital clipping lower | iw_Clip_L_Lim    | Word  | -32,768 to    | Specify the digital clipping lower limit |
| limit value            |                  | vvolu | 32,767        | value.                                   |

### Output labels

| Name (comment)       | Label name     | Data  | Initial | Description                                      |
|----------------------|----------------|-------|---------|--|
|                      |                | type  | value   |  |
| Execution status     | FB_ENO         | Bit   | OFF     | ON: Execution command is ON.                     |
|                      |                | DIL   | OFF     | OFF: Execution command is OFF.                   |
| Completed without    | FB_OK          | Dit   | OFF     | When ON, it indicates that the digital clipping  |
| error                |                | Bit   | OFF     | operation is being executed.                     |
| Digital output value | ow_Dig_Out_Val | Word  | 0       | The digital value for which the digital clipping |
|                      |                | vvora | old 0   | operation has been executed is stored.           |
| Error flag           | FB_ERROR       | Bit   | OFF     | When ON, it indicates that an error has          |
|                      |                | DIL   | UFF     | occurred.  |
| Error code           | ERROR_ID       | Word  | 0       | FB error code output.                            |



## **FB Version Upgrade History**

| Version | Date      | Description   |
|---------|-----------|---------------|
| 1.00A   | 2014/6/30 | First edition |

### Note

This chapter includes information related to the function block.

It does not include information on restrictions of use such as combination with modules or programmable controller CPUs.

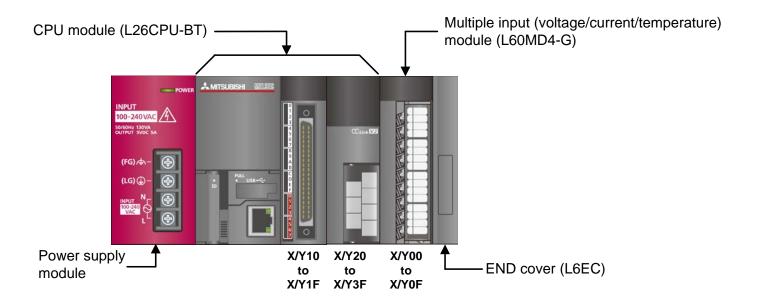
Please make sure to read user's manuals for the corresponding products before using the products.



#### Appendix 1. FB Library Application Examples

L60MD4-G FB application examples are as follows.

### 1) System configuration



#### Reminder

- Every input must be provided with a value for proper FB operation. If not set, the values will be unspecified.
- Abbreviations may be used in the label comments due to the limitation on the number of the characters to display in GX Works2.

#### 2) Global label setting

None

#### 3) Application example settings

#### a) Common setting

| Input and output item   | Value | Description                               |
|-------------------------|-------|---|
| Module start XY address | 0     | Specify the starting XY address where the |
|                         |       | L60MD4-G is connected.                    |



# List of devices

## a) External input (command)

| Device | FB name                      | Application (ON details)         |
|--------|------------------------------|----------------------------------|
| MO     | M+L60MD4-G_InitialSetting    | Initial setting request          |
| M10    | M+L60MD4-G_SetAverage        | Averaging proc setting request   |
| M20    | M+L60MD4-G_SetScaling        | Scaling setting request          |
| M21    |                              | Scaling enable/disable setting   |
| M30    | M+L60MD4-G_SetDisconnect     | Disconnection detection set req. |
| M40    | M+L60MD4-G_SetInputSignalErr | Input signal error setting req.  |
| M50    | M+L60MD4-G_SetProcessAlarm   | Process alarm setting request    |
| M51    |                              | Process alarm enable/disable set |
| M60    | M+L60MD4-G_SetRateAlarm      | Rate alarm setting request       |
| M61    |                              | Rate alarm enable/disable set    |
| M70    | M+L60MD4-G_RequestSetting    | Operating condition setting req. |
| M80    | M+L60MD4-G_ReadVal           | Conversion value reading request |
| M90    | M+L60MD4-G_ReadAllVal        | Conv value all CHs reading req.  |
| M100   | M+L60MD4-G_ReadScalingVal    | Scaling value reading request    |
| M110   | M+L60MD4-G_ReadAllScalingVal | Scaling value all CHs read req.  |
| M120   | M+L60MD4-G_ErrorOperation    | Error operation request          |
| M121   |                              | Error reset request              |
| M130   | M+L60MD4-G_ShiftOperation    | Shift operation request          |
| D130   |                              | Digital value                    |
| M140   | M+L60MD4-G_DiffOperation     | Diff conversion process request  |
| D140   |                              | Digital value                    |
| M150   | M+L60MD4-G_ClipOperation     | Digital clipping operation req.  |
| D150   |                              | Digital value                    |



### b) External output (check)

| Device | FB name                      | Application (ON details)         |
|--------|------------------------------|----------------------------------|
| M1     | M+L60MD4-G_InitialSetting    | Initial setting FB ready         |
| M2     |                              | Initial setting complete         |
| F0     |                              | Initial setting FB error         |
| D0     |                              | Initial setting FB error code    |
| M11    | M+L60MD4-G_SetAverage        | Averaging proc setting FB ready  |
| M12    |                              | Averaging proc setting complete  |
| F1     |                              | Averaging proc setting FB error  |
| D10    |                              | Averaging proc set FB error code |
| M22    | M+L60MD4-G_SetScaling        | Scaling setting FB ready         |
| M23    |                              | Scaling setting complete         |
| F2     |                              | Scaling setting FB error         |
| D20    |                              | Scaling setting FB error code    |
| M31    | M+L60MD4-G_SetDisconnect     | Disconnection detect set FB rdy. |
| M32    |                              | Disconnection detection set comp |
| F3     |                              | Disconnection detect set FB err. |
| D30    |                              | Disconnect detect set FB err cod |
| M41    | M+L60MD4-G_SetInputSignalErr | Input signal error set FB ready  |
| M42    |                              | Input signal error setting comp. |
| F4     |                              | Input signal err setting FB err  |
| D40    |                              | Input signal err set FB err code |
| M52    | M+L60MD4-G_SetProcessAlarm   | Process alarm setting FB ready   |
| M53    |                              | Process alarm setting complete   |
| F5     |                              | Process alarm setting FB error   |
| D50    |                              | Process alarm set FB error code  |
| M62    | M+L60MD4-G_SetRateAlarm      | Rate alarm setting FB ready      |
| M63    |                              | Rate alarm setting complete      |
| F6     |                              | Rate alarm setting FB error      |
| D60    |                              | Rate alarm setting FB error code |
| M71    | M+L60MD4-G_RequestSetting    | Operate condition set req FB rdy |
| M72    |                              | Operating condition set req comp |



| Device | FB name                      | Application (ON details)         |
|--------|------------------------------|----------------------------------|
| M81    | M+L60MD4-G_ReadVal           | Conversion value read FB ready   |
| M82    |                              | Conversion value read complete   |
| F8     |                              | Conversion value read FB error   |
| D80    |                              | Conversion data                  |
| D81    |                              | Conversion value read FB err cod |
| M91    | M+L60MD4-G_ReadAllVal        | Conv value all CHs read FB rdy.  |
| M92    |                              | Conv value all CHs reading comp. |
| D90    |                              | CH1 Conversion data              |
| D91    |                              | CH2 Conversion data              |
| D92    |                              | CH3 Conversion data              |
| D93    |                              | CH4 Conversion data              |
| M101   | M+L60MD4-G_ReadScalingVal    | Scaling value reading FB ready   |
| M102   |                              | Scaling value reading complete   |
| F10    |                              | Scaling value reading FB error   |
| D100   |                              | Scaling value                    |
| D101   |                              | Scaling value read FB error code |
| M111   | M+L60MD4-G_ReadAllScalingVal | Scaling val all CHs read FB rdy. |
| M112   |                              | Scaling value all CHs read comp. |
| D110   |                              | CH1 Scaling value                |
| D111   |                              | CH2 Scaling value                |
| D112   |                              | CH3 Scaling value                |
| D113   |                              | CH4 Scaling value                |
| M122   | M+L60MD4-G_ErrorOperation    | Error operation FB ready         |
| M123   |                              | Error operation complete         |
| M124   |                              | Module error                     |
| D120   |                              | Module error code                |
| M131   | M+L60MD4-G_ShiftOperation    | Shift operation FB ready         |
| M132   |                              | Shift operation complete         |
| D131   |                              | Shift conversion value           |
| M141   | M+L60MD4-G_DiffOperation     | Diff conversion process FB ready |
| M142   |                              | Diff conversion process complete |
| D141   |                              | Differential conversion value    |
| D142   | ]                            | Differential conversion standard |

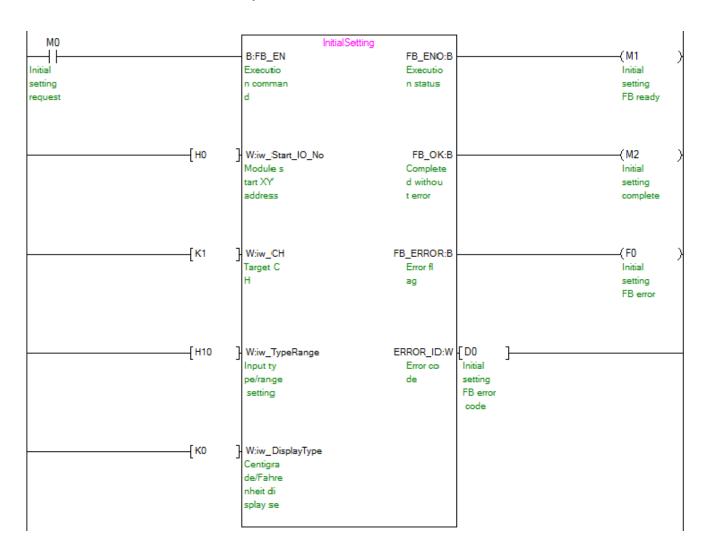
| Device | FB name                  | Application (ON details)         |
|--------|--------------------------|----------------------------------|
| M151   | M+L60MD4-G_ClipOperation | Digital clipping operate FB rdy. |
| M152   |                          | Digital clipping operation comp. |
| F15    |                          | Digital clipping operate FB err. |
| D151   |                          | Digital output value             |
| D152   |                          | Digital clip operate FB err code |



#### M+L60MD4-G\_InitialSetting (Initial setting)

| Label name     | Setting | Description  |  |
|----------------|---------|--|--|
|                | value   |  |  |
| iw_Start_IO_No | H0      | Set the starting XY address where the L60MD4-G is connected to 0H.       |  |
| iw_CH          | K1      | Set the target channel to channel 1.                                     |  |
| iw_TypeRange   | H10     | Set the input type/range setting to 4 to 20 mA.                          |  |
| iw_DisplayType | K0      | Set the Centigrade/Fahrenheit display setting to the Centigrade display. |  |

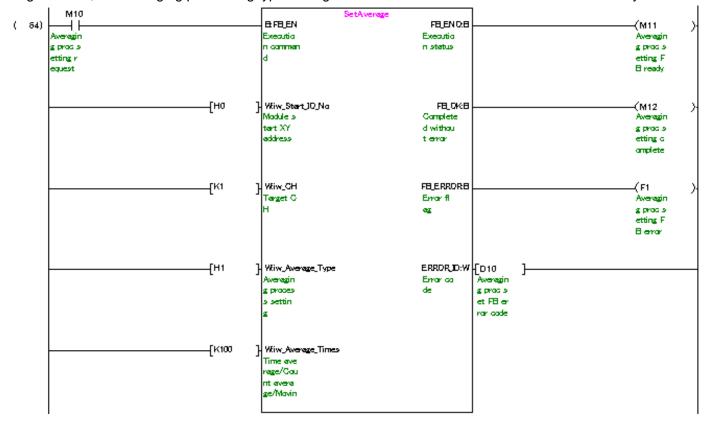
By turning ON M0, the setting values of the input type/range setting and Centigrade/Fahrenheit display setting of channel 1 are written to the buffer memory.



#### M+L60MD4-G\_SetAverage (Averaging process setting)

| Label name       | Setting | Description  |
|------------------|---------|--|
|                  | value   |  |
| iw_Start_IO_No   | H0      | Set the starting XY address where the L60MD4-G is connected to 0H. |
| iw_CH            | K1      | Set the target channel to channel 1.                               |
| iw_Average_Type  | H1      | Set the averaging process type to "Time average".                  |
| iw_Average_Times | K100    | Set the time average to 100.                                       |

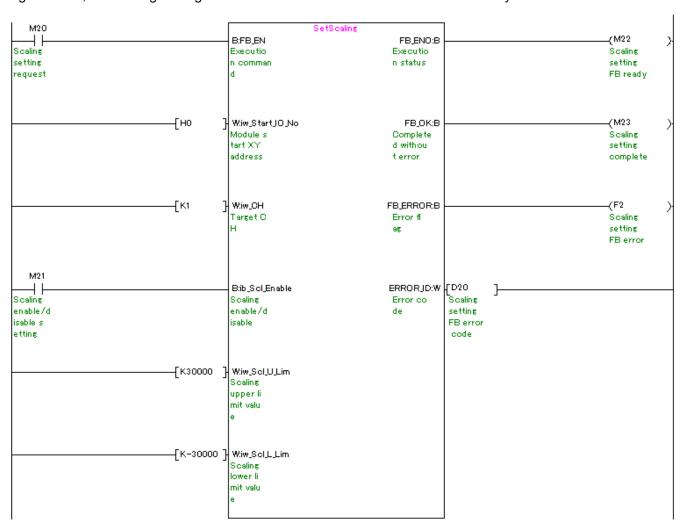
By turning ON M10, the averaging processing type setting value of channel 1 is written to the buffer memory.



#### M+L60MD4-G\_SetScaling (Scaling setting)

| Label name     | Setting | Description  |
|----------------|---------|--|
|                | value   |  |
| iw_Start_IO_No | H0      | Set the starting XY address where the L60MD4-G is connected to 0H. |
| iw_CH          | K1      | Set the target channel to channel 1.                               |
| ib_Scl_Enable  | ON/OFF  | Turn ON to enable the scaling.                                     |
| iw_Scl_U_Lim   | K30000  | Set the scaling upper limit value to 30,000.                       |
| iw_Scl_L_Lim   | K-30000 | Set the scaling lower limit value to -30,000.                      |

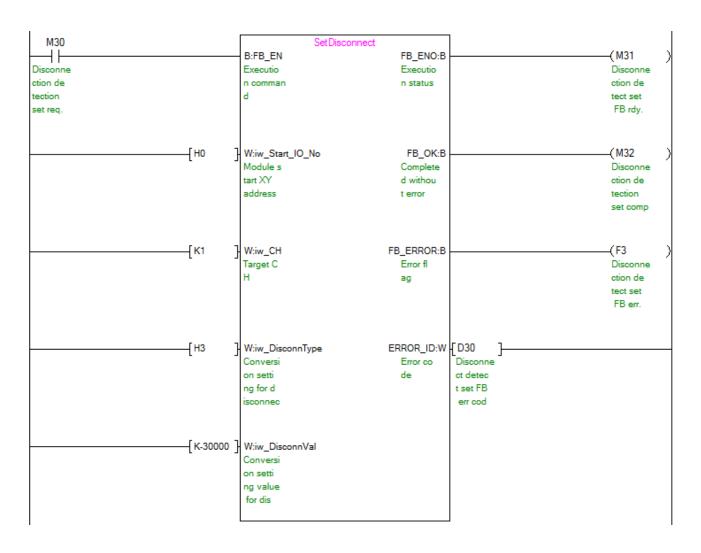
By turning ON M20, the scaling setting value of channel 1 is written to the buffer memory.



#### M+L60MD4-G\_SetDisconnect (Disconnection detection setting)

| Label name     | Setting | Description  |
|----------------|---------|--|
|                | value   |  |
| iw_Start_IO_No | H0      | Set the starting XY address where the L60MD4-G is connected to 0H.         |
| iw_CH          | K1      | Set the target channel to channel 1.                                       |
| iw_DisconnType | H3      | Set the conversion setting for disconnection detection of channel 1 to "3: |
|                |         | Any value".  |
| iw_DisconnVal  | K-30000 | Set the conversion setting value for disconnection detection to -30,000.   |

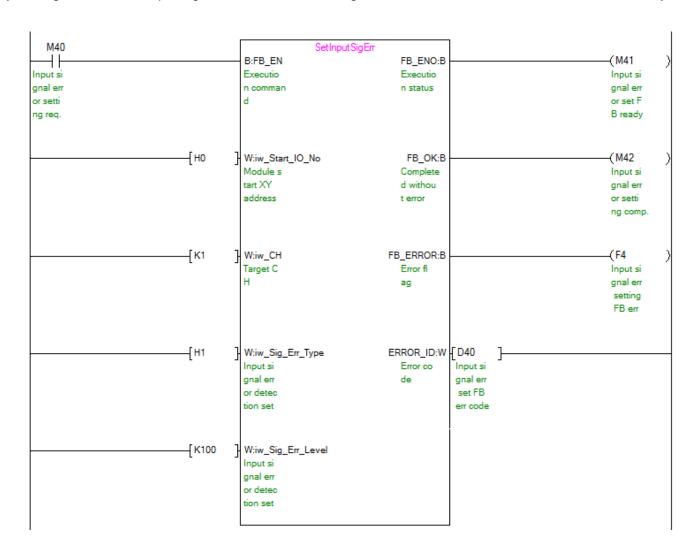
By turning ON M30, the conversion setting and conversion setting value for disconnection detection of channel 1 are written to the buffer memory.



#### M+L60MD4-G\_SetInputSignalErr (Input signal error detection setting)

| Label name       | Setting | Description   |
|------------------|---------|---|
|                  | value   |   |
| iw_Start_IO_No   | H0      | Set the starting XY address where the L60MD4-G is connected to 0H.            |
| iw_CH            | K1      | Set the target channel to channel 1.  |
| iw_Sig_Err_Type  | H1      | Set the input signal error detection setting of channel 1 to "Upper and lower |
|                  |         | limit detection".   |
| iw_Sig_Err_Level | K100    | Set the input signal error detection setting value to 10.0%.                  |

By turning ON M40, the input signal error detection setting value of channel 1 is written to the buffer memory.



## M+L60MD4-G\_SetProcessAlarm (Process alarm setting)

| Label name     | Setting | Description  |
|----------------|---------|--|
|                | value   |  |
| iw_Start_IO_No | H0      | Set the starting XY address where the L60MD4-G is connected to 0H. |
| iw_CH          | K1      | Set the target channel to channel 1.                               |
| ib_Pro_Enable  | ON/OFF  | Turn ON to enable the process alarm.                               |
| iw_Pro_UU_Lim  | K3000   | Set the process alarm upper upper limit value to 3,000.            |
| iw_Pro_UL_Lim  | K2950   | Set the process alarm upper lower limit value to 2,950.            |
| iw_Pro_LU_Lim  | K2050   | Set the process alarm lower upper limit value to 2,050.            |
| iw_Pro_LL_Lim  | K2000   | Set the process alarm lower lower limit value to 2,000.            |

By turning ON M50, the process alarm setting value of channel 1 is written to the buffer memory.

| M50      |          | SetProcess   | :Alarm       |          |          |
|----------|----------|--|--------------|----------|----------|
|          |          | B:FB_EN  | FB_ENO:B —   |          | ———(M52  |
| Process  |          | Executio   | Executio     |          | Process  |
| alarm se |          | n comman   | n status     |          | alarm se |
| tting re |          | d  |              |          | tting FB |
| quest    |          |  |              |          | ready    |
| •        |          |  |              |          | •        |
|          |          |  |              |          |          |
|          | [H0      | W:iw_Start_IO_No   | FB_OK:B —    |          | (M53     |
|          | L        | Module s   | Complete     |          | Process  |
|          |          | tart XY  | d withou     |          | alarm se |
|          |          | address  | t error      |          | tting co |
|          |          |  |              |          | mplete   |
|          |          |  |              |          |          |
|          |          |  |              |          |          |
|          | [K1      | W:iw_CH  | FB_ERROR:B   |          | (F5      |
|          | L        | Target C   | Error fl     |          | Process  |
|          |          | Н  | ag           |          | alarm se |
|          |          |  | -3           |          | tting FB |
|          |          |  |              |          | error    |
|          |          |  |              |          |          |
| M51      |          |  |              |          |          |
|          |          | B:ib_Pro_Enable  | ERROR_ID:W [ | D50 ]    |          |
| Process  |          | Process  | Error co F   | Process  |          |
| alarm en |          | alarm en   | de a         | alarm se |          |
| able/dis |          | able/dis   | t            | FB err   |          |
| able set |          | able   | 0            | or code  |          |
|          |          |  |              |          |          |
|          |          |  |              |          |          |
|          | K3000    | W:iw_Pro_UU_Lim  |              |          |          |
|          | L        | Process  |              |          |          |
|          |          | alarm up   |              |          |          |
|          |          | per uppe   |              |          |          |
|          |          | r limit  |              |          |          |
|          |          |  |              |          |          |
|          |          |  |              |          |          |
|          | K2950    | W:iw_Pro_UL_Lim  |              |          |          |
|          | [        | Process  |              |          |          |
|          |          | alam up  |              |          |          |
|          |          | per lowe   |              |          |          |
|          |          | r limit  |              |          |          |
|          |          |  |              |          |          |
|          |          |  |              |          |          |
|          | K2050    | W:iw_Pro_LU_Lim  |              |          |          |
|          | [,12000  | Process  |              |          |          |
|          |          | alarm lo   |              |          |          |
|          |          | wer uppe   |              |          |          |
|          |          | r limit  |              |          |          |
|          |          |  |              |          |          |
|          |          |  |              |          |          |
|          | K2000    | W:iw_Pro_LL_Lim  |              |          |          |
|          | 7 1/2000 | Process  |              |          |          |
|          |          | alarm lo   |              |          |          |
|          |          | wer lowe   |              |          |          |
|          |          | r limit  |              |          |          |
|          |          | TO HOLD THE CONTRACT OF THE CO |              |          |          |

### M+L60MD4-G\_SetRateAlarm (Rate alarm setting)

| Label name     | Setting | Description  |
|----------------|---------|--|
|                | value   |  |
| iw_Start_IO_No | H0      | Set the starting XY address where the L60MD4-G is connected to 0H. |
| iw_CH          | K1      | Set the target channel to channel 1.                               |
| ib_Rate_Enable | ON/OFF  | Turn ON to enable the rate alarm.                                  |
| iw_Rate_Out    | K5      | Set the rate alarm alert detection cycle to 5 times.               |
| iw_Rate_U_Lim  | K50     | Set the rate alarm upper limit value to 50.                        |
| iw_Rate_L_Lim  | K-50    | Set the rate alarm lower limit value to -50.                       |

By turning ON M60, the rate alarm setting value of channel 1 is written to the buffer memory.

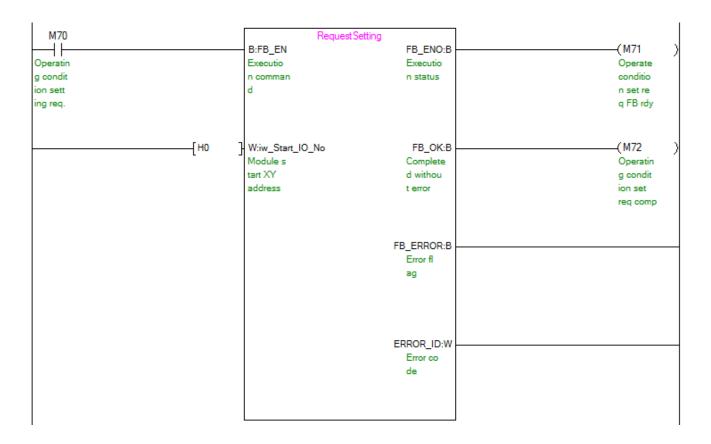
| M60      |        | Set Rate A       | lam            |      |          |
|----------|--------|------------------|----------------|------|----------|
| <b>—</b> |        | B:FB_EN          | FB_ENO:B       |      | ———(M62  |
| Rate ala |        | Executio         | Executio       |      | Rate ala |
| m setti  |        | n comman         | n status       |      | rm setti |
| ng reque |        | d                |                |      | ng FB re |
| st       |        |                  |                |      | ady      |
|          |        |                  |                |      |          |
|          |        |                  |                |      |          |
|          | (H0    | W:iw_Start_IO_No | FB_OK:B ——     |      | (M63     |
|          |        | Module s         | Complete       |      | Rate ala |
|          |        | tart XY          | d withou       |      | rm setti |
|          |        | address          | t error        |      | ng compl |
|          |        |                  |                |      | ete      |
|          |        |                  |                |      |          |
|          | K1     | ዝ W:iw_CH        | FB_ERROR:B     |      | (F6      |
|          | [ [ [  | Target C         | Error fl       |      | Rate ala |
|          |        | H                | ag Error 11    |      | rm setti |
|          |        | П                | ag             |      | ng FB er |
|          |        |                  |                |      | ror      |
|          |        |                  |                |      | 101      |
| M61      |        |                  |                |      |          |
|          |        | B:ib_Rate_Enable | ERROR_ID:W D60 | ) ]  |          |
| late ala |        | Rate ala         | Error co Rate  | ala  |          |
| m enabl  |        | rm enabl         | de m se        | etti |          |
| /disabl  |        | e/disabl         | ng F           | B er |          |
| set      |        | e                | ror co         | ode  |          |
|          |        |                  |                |      |          |
|          | _      |                  |                |      |          |
|          | K5     | W:iw_Rate_Out    |                |      |          |
|          |        | Rate ala         |                |      |          |
|          |        | rm alert         |                |      |          |
|          |        | detecti          |                |      |          |
|          |        | on cycle         |                |      |          |
|          |        |                  |                |      |          |
|          | K50    | W:iw_Rate_U_Lim  |                |      |          |
|          | [ 1/30 | Rate ala         |                |      |          |
|          |        | rm upper         |                |      |          |
|          |        | limit v          |                |      |          |
|          |        | alue             |                |      |          |
|          |        | alue             |                |      |          |
|          |        |                  |                |      |          |
|          | K-50   | W:iw_Rate_L_Lim  |                |      |          |
|          | 14-50  | Rate ala         |                |      |          |
|          |        | rm lower         |                |      |          |
|          |        | limit v          |                |      |          |
|          |        | alue             |                |      |          |
|          |        | ande             |                |      |          |

#### M+L60MD4-G\_RequestSetting (Operating condition setting request)

| Label name     | Setting value | Description  |
|----------------|---------------|--|
| iw_Start_IO_No | Н0            | Set the starting XY address where the L60MD4-G is connected to 0H. |

By turning ON M70, the following settings are enabled.

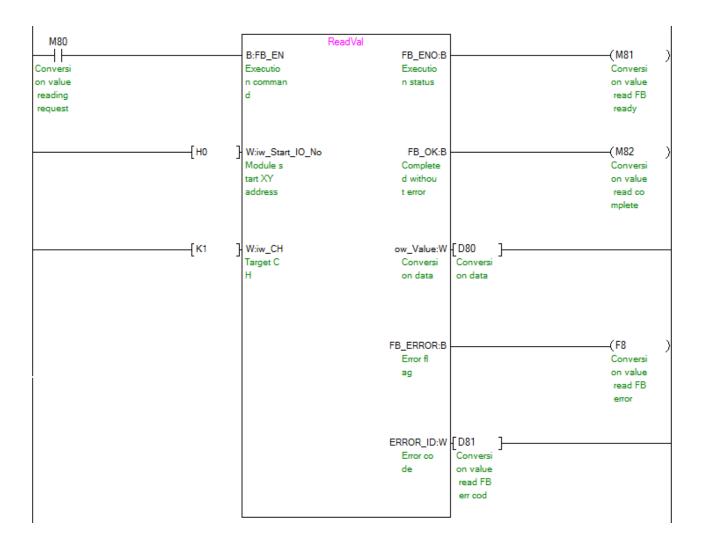
- Input type/range setting
- Centigrade/Fahrenheit display setting
- Averaging processing setting
- Scaling setting
- Disconnection detection setting
- Input signal error detection setting
- · Process alarm setting
- Rate alarm setting



#### M+L60MD4-G\_ReadVal (Read conversion data)

| Label name     | Setting value | Description  |
|----------------|---------------|--|
| iw_Start_IO_No | H0            | Set the starting XY address where the L60MD4-G is connected to 0H. |
| iw_CH          | K1            | Set the target channel to channel 1.                               |

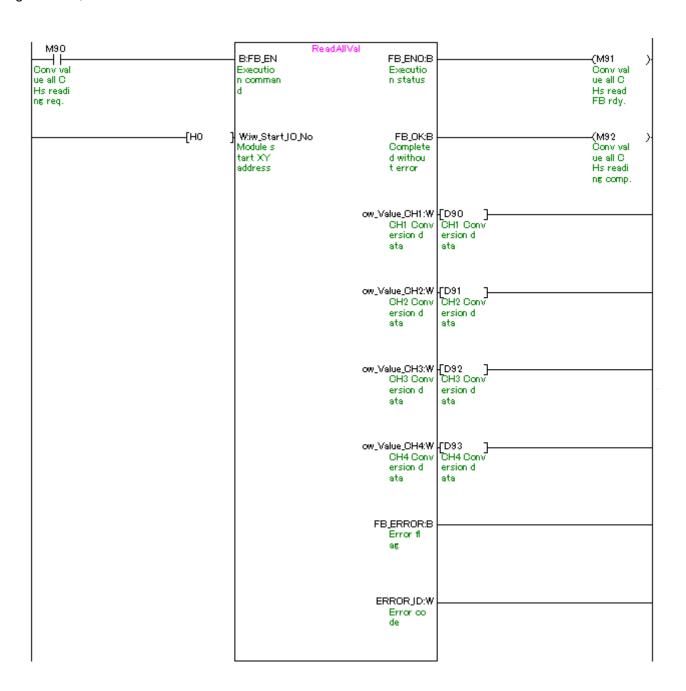
By turning ON M80, the conversion data of channel 1 is read.



#### M+L60MD4-G\_ReadAllVal (Read all A/D conversion data)

| Label name     | Setting value | Description  |
|----------------|---------------|--|
| iw_Start_IO_No | H0            | Set the starting XY address where the L60MD4-G is connected to 0H. |

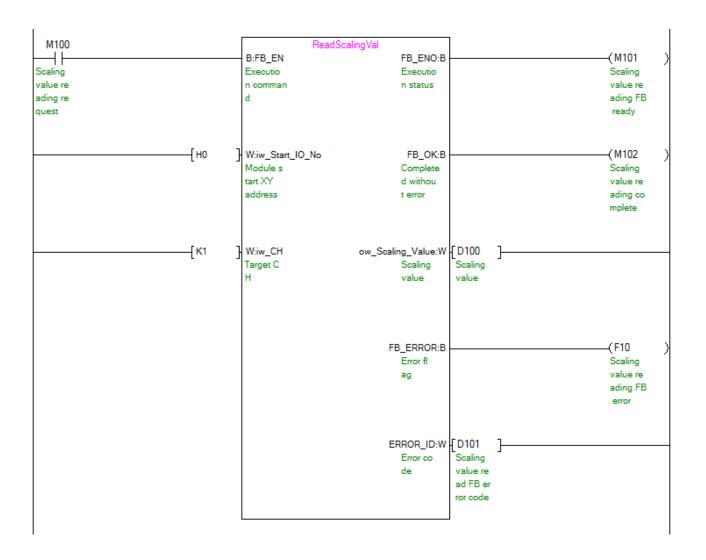
By turning ON M90, the conversion data of channel 1 to channel 4 are read.



#### M+L60MD4-G\_ReadScalingVal (Read scaling value)

| Label name     | Setting | Description  |
|----------------|---------|--|
|                | value   |  |
| iw_Start_IO_No | H0      | Set the starting XY address where the L60MD4-G is connected to 0H. |
| iw_CH          | K1      | Set the target channel to channel 1.                               |

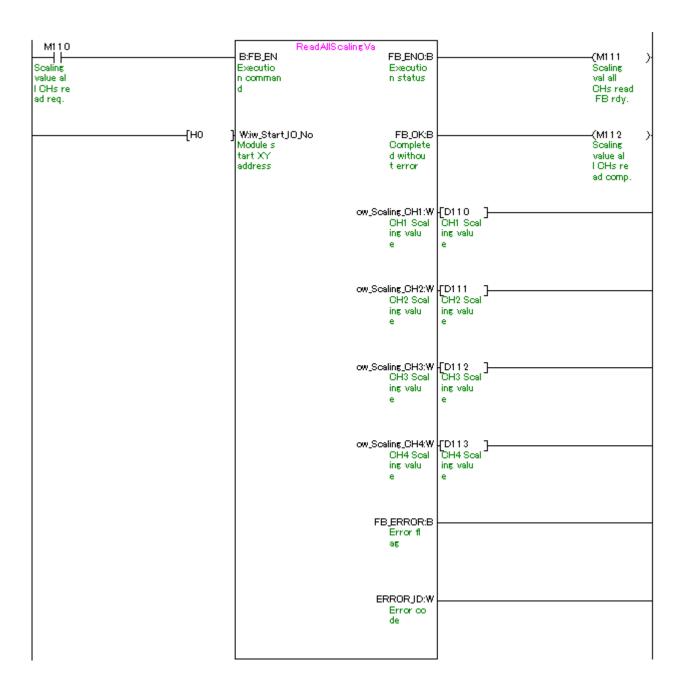
By turning ON M100, the scaling value of channel 1 is read.



#### M+L60MD4-G\_ReadAllScalingVal (Read all scaling values)

| Label name     | Setting value | Description  |
|----------------|---------------|--|
| iw_Start_IO_No | H0            | Set the starting XY address where the L60MD4-G is connected to 0H. |

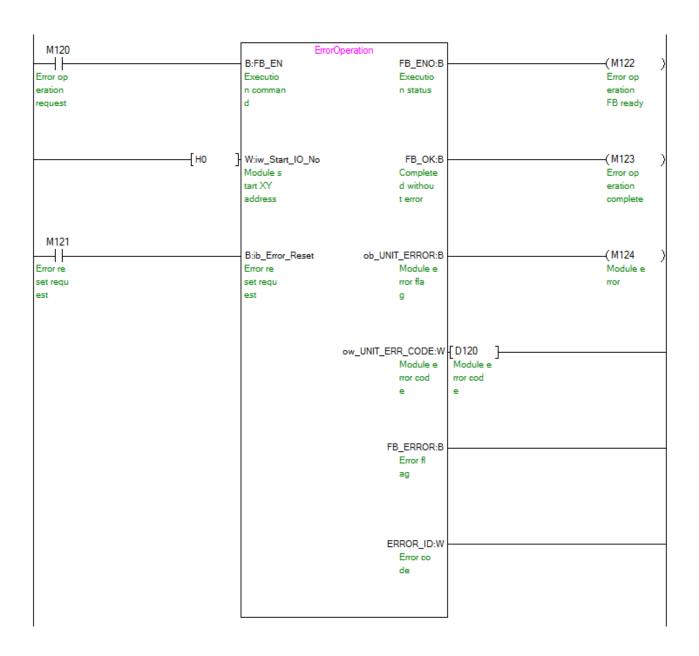
By turning ON M110, the scaling values of channel 1 to channel 4 are read.



#### M+L60MD4-G\_ErrorOperation (Error operation)

| Label name     | Setting | Description  |
|----------------|---------|--|
|                | value   |  |
| iw_Start_IO_No | H0      | Set the starting XY address where the L60MD4-G is connected to 0H. |
| ib_Error_Reset | ON/OFF  | Turn ON for the error reset.                                       |

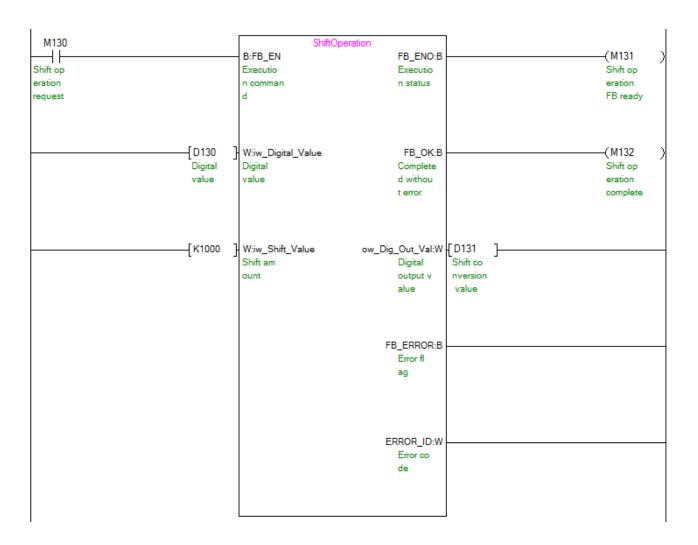
By turning ON M120, the error code is output when an error occurs. By turning ON M121 after the error output, the error is reset.



#### M+L60MD4-G\_ShiftOperation (Shift operation)

| Label name       | Setting value | Description   |
|------------------|---------------|---|
| iw_Digital_Value | -             | Store a digital output value for which the shift amount is to be added. |
| iw_Shift_Value   | K1000         | Set the shift amount to 1,000.  |

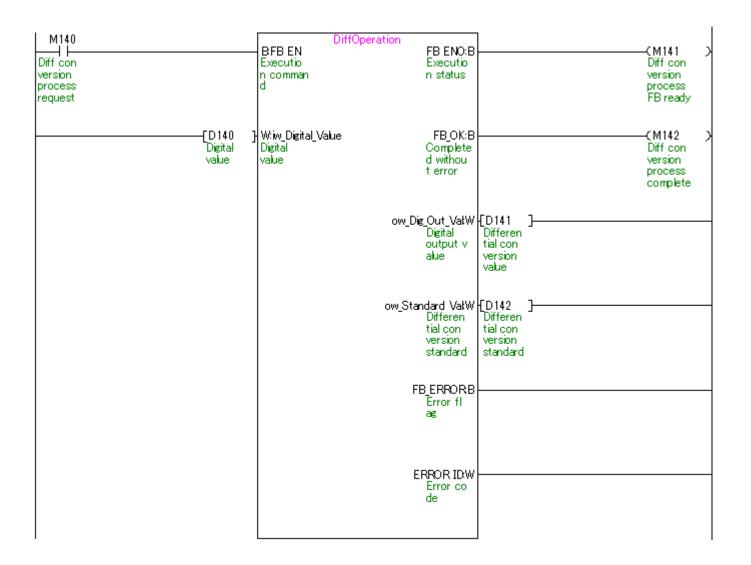
By turning ON M130, the digital value after the shift amount is added is output.



#### M+L60MD4-G\_DiffOperation (Differential conversion process)

| Label name       | Setting value | Description  |
|------------------|---------------|--|
| iw_Digital_Value | -             | Store a digital value for which the differential conversion is to be executed. |

By turning ON M140, the difference obtained by subtracting the standard value from the digital value is output.



#### M+L60MD4-G\_ClipOperation (Digital clipping operation)

| Label name       | Setting | Description   |
|------------------|---------|---|
|                  | value   |   |
| iw_Digital_Value | -       | Store a digital value for which the digital clipping operation is executed. |
| iw_Clip_U_Lim    | K12000  | Set the digital clipping upper limit value to 12,000.                       |
| iw_Clip_L_Lim    | K0      | Set the digital clipping lower limit value to 0.                            |

By turning ON M150, if the input digital value exceeds the digital clipping upper limit value or falls below the lower limit value, the value is limited at the upper or lower limit value and then output.

