# OVERVIEW

## LIST OF FUNCTION BLOCKS (FB)

The following table lists the FBs providing Balluff BNI CIB-508-105-Z015 CC-Link IE Field Basic IO-Link Master control for the FX5U(C)/FX5UJ CPU built-in Ethernet/CC-Link IE Field Basic interface.

|  |  |
| --- | --- |
| Name[[1]](#endnote-1) | Description |
| P+Balluff\_CCLinkIEFieldBasicIOLinkP1\_R | Initialization and control of a Balluff Network Interface BNI CIB-508-105-Z015 CC-Link IE Field Basic IO-Link Master with 8 IO-Link ports configured as Profile 1 (2 occupied stations). |
| P+Balluff\_CCLinkIEFieldBasicIOLinkP2\_F | Initialization and control of a Balluff Network Interface BNI CIB-508-105-Z015 CC-Link IE Field Basic IO-Link Master with 8 IO-Link ports configured as Profile 2 (3 occupied stations). |
| P+Balluff\_CCLinkIEFieldBasicIOLinkP3\_F | Initialization and control of a Balluff Network Interface BNI CIB-508-105-Z015 CC-Link IE Field Basic IO-Link Master with 8 IO-Link ports configured as Profile 3 (4 occupied stations). |
| P+Balluff\_DetectDevicesCIB\_F | Detects IO-Link devices connected to the ports of a Balluff Network Interface BNI CIB-508-105-Z015 CC-Link IE Field Basic IO-Link Master. |
| P+Balluff\_ReadDataStorageContentCIB\_F | Reads the data storage content from the specified IO-Link port of a Balluff Network Interface BNI CIB-508-105-Z015 CC-Link IE Field Basic IO-Link Master. |
| P+Balluff\_ReadDataStorageSettingsCIB\_F | Reads the data storage setting configuration for the specified IO-Link port of a Balluff Network Interface BNI CIB-508-105-Z015 CC-Link IE Field Basic IO-Link Master. |
| P+Balluff\_ReadEventDataCIB\_F | Reads pending event data from the event buffer assigned to the specified IO-Link port of a Balluff Network Interface BNI CIB-508-105-Z015 CC-Link IE Field Basic IO-Link Master. |
| P+Balluff\_ReadIdentificationDataCIB\_F | Reads the module identification data of a Balluff Network Interface BNI CIB-508-105-Z015 CC-Link IE Field Basic IO-Link Master. |
| P+Balluff\_ReadInitOperationSettingCIB\_F | Reads the initial processing enable/disable setting of a Balluff Network Interface BNI CIB-508-105-Z015 CC-Link IE Field Basic IO-Link Master. |
| P+Balluff\_ReadISDUDataCIB\_F | Reads the IO-Link parameter data for the specified IO-Link port of a Balluff Network Interface BNI CIB-508-105-Z015 CC-Link IE Field Basic IO-Link Master. |
| P+Balluff\_ReadOutputHoldSettingCIB\_F | Reads the outputs hold/clear setting of a Balluff Network Interface BNI CIB-508-105-Z015 CC-Link IE Field Basic IO-Link Master. |
| P+Balluff\_ReadValidationDataCIB\_F | Reads the IO-Link device validation configuration and data for the specified IO-Link port of a Balluff Network Interface BNI CIB-508-105-Z015 CC-Link IE Field Basic IO-Link Master. |
| P+Balluff\_WriteDataStorageSettingsCIB\_F | Writes the data storage configuration for the specified IO-Link port of a Balluff Network Interface BNI CIB-508-105-Z015 CC-Link IE Field Basic IO-Link Master. |
| P+Balluff\_WriteInitOperationSettingCIB\_F | Writes the initial processing enable/disable setting of a Balluff Network Interface BNI CIB-508-105-Z015 CC-Link IE Field Basic IO-Link Master. |
| P+Balluff\_WriteISDUDataCIB\_F | Writes the IO-Link parameter data for the specified IO-Link port of a Balluff Network Interface BNI CIB-508-105-Z015 CC-Link IE Field Basic IO-Link Master. |
| P+Balluff\_WriteOutputHoldSettingCIB\_F | Writes the outputs hold/clear setting of a Balluff Network Interface BNI CIB-508-105-Z015 CC-Link IE Field Basic IO-Link Master. |
| P+Balluff\_WriteValidationDataCIB\_F | Writes the IO-Link device validation configuration and data for the specified IO-Link port of a Balluff Network Interface BNI CIB-508-105-Z015 CC-Link IE Field Basic IO-Link Master. |

## VERSION HISTORY

The following table lists the version history of the FB library (P+Balluff\_CCLinkIEFieldBasicIOLink\_F).

|  |  |
| --- | --- |
| Version | Description |
| 00A | First edition. |
| 00B | Updated control FB for BNI CIB-508-105-Z015 CC-Link IE Field Basic IO-Link Master connected as Profile 2 (3 occupied stations) – IO-Link port 5 output data write fix. |

## FUNCTION BLOCK OPERATION

There are two FB operation types: Pulsed execution type and real-time execution type.

The FBs of this library operate in the real-time execution type.

|  |  |  |
| --- | --- | --- |
| Operation Type | | Description |
| Pulsed execution type | One scan execution type | There are two pulsed execution types: One scan execution type which completes in one scan after the start of a FB, and Multiple scan execution type which processes over multiple scans.  The FB is executed when an execution command (Execute or Enable) turns ON, and normal completion or error completion turns ON when the FB execution is completed. When an execution completion (normal completion or error completion) turns ON, no processing is performed in the FB even if the execution command is ON. Changes in the input label data under this condition are not reflected to the FB processing.  Hold the execution command until the normal completion or error completion turns ON. If the execution command is turned OFF before the normal completion or error completion turns ON, the FB aborts and ends the processing with the normal completion and error completion being OFF. |
| Multiple scan execution type |
| Real-time execution type | | The FB is executed when an execution command turns ON, and normal completion or error completion turns ON when the FB execution is completed.  Even if the execution completion (normal completion) turns ON, a processing is performed in the FB when the execution command is ON. Changes in the input label data under this condition are reflected to the FB processing. When the execution completion (error completion) turns ON, the processing is aborted. |

## RELEVANT MANUALS

* Balluff BNI CIB-508-105-Z015 CC-Link IE Field Basic IO-Link Master User’s Guide.
* [CC-Link IE Field Network Basic Reference Manual](SH081684ENG) [SH081684ENG].
* [MELSEC iQ-F FX5 User's Manual (Ethernet Communication)](JY997D56201) [JY997D56201].
* [MELSEC iQ-F FX5 User's Manual (Application)](JY997D55401) [JY997D55401].
* [GX Works3 Operating Manual](SH081215ENG)[SH081215ENG].

## NOTES

This manual describes the function blocks functionality.

The manual does not include the information on restrictions for using modules, PLC CPUs, and the combination of both.

Please read the user's manuals of the products before using them.

Please note the followings and use the FBs described in this manual:

* When using the FBs in an actual system, confirm that the FBs do not cause system control problems.
* Consider the locations where interlock conditions are required in the system and insert interlock conditions.
* Mitsubishi Electric Corporation will not compensate any damages caused by the FBs.
* Contents may be deleted or changed without prior notice

# DETAILS OF THE FB LIBRARY

## P+Balluff\_CCLinkIEfieldBasicIOLinkP1\_F

#### Name

P+Balluff\_CCLinkIEfieldBasicIOLinkP1\_F

#### Overview

|  |  |
| --- | --- |
| Item | Description |
| Function overview | Initialization and control of a Balluff Network Interface BNI CIB-508-105-Z015 CC-Link IE Field Basic IO-Link Master configured as Profile 1 (2 occupied stations), using the MELSEC FX5U(C)/FX5UJ CPU built-in Ethernet/CC-Link IE Field Basic interface. |
| Symbol  [Function Block Diagram] |  |

#### Labels

##### Input Labels

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| No. | Variable Name | Name | Data type | Setting Range | Description |
| (1) | i\_bEN | CC-Link IE Field Basic IO-Link Master control enable/disable command | Bit | ON, OFF | ON: Control of the BNI CIB-508-105-Z015 CC-Link IE Field Basic IO-Link Master is enabled.  OFF: Control of the BNI CIB-508-105-Z015 CC-Link IE Field Basic IO-Link Master is disabled. |
| (2) | i\_uStationNumber | IO-Link Master station number | Word [Unsigned]/Bit String [16-bit] | 1 to 16 | Specify the CC-Link IEF Basic station number of the BNI CIB-508-105-Z015 CC-Link IE Field Basic IO-Link Master. |
| (3) | i\_uIOLinesDirection | IO lines Direction | Word [Unsigned]/Bit String [16-bit] | 0000h to FFFFh | Select the direction (digital input or output) for each I/O signal line corresponding to the BNI CIB-508-105-Z015 CC-Link IE Field Basic IO-Link Master ports.   * 0: Digital input * 1: Digital output     b0: Port direction for Port 0 Pin 4  b1: Port direction for Port 0 Pin 2  b2: Port direction for Port 1 Pin 4  b3: Port direction for Port 1 Pin 2  .  .  .  b14: Port direction for Port 7 Pin 4  b15: Port direction for Port 7 Pin 2 |
| (4) | i\_uDigitalOutputs | Digital outputs | Word [Unsigned]/Bit String [16-bit] | 0000h to FFFFh | Specify the digital output data that will be written to the digital output signal lines (Pin 2 and Pin 4) of each BNI CIB-508-105-Z015 CC-Link IE Field Basic IO-Link Master port.   * 0: Digital output signal set to OFF * 1: Digital output signal set to ON     b0: Digital output signal Port 0 Pin 4  b1: Digital output signal Port 0 Pin 2  b2: Digital output signal Port 1 Pin 4  b3: Digital output signal Port 1 Pin 2  .  .  .  b14: Digital output signal Port 7 Pin 4  b15: Digital output signal Port 7 Pin 2 |
| (5) | i\_uIOLinkPortsEnable | Ports operating mode | Word [Unsigned]/Bit String [16-bit] | 0000h to FFFFh | Select the operating mode (IO-Link mode or Digital I/O mode) for each BNI CIB-508-105-Z015 CC-Link IE Field Basic IO-Link Master IO-Link compatible port.   * 0: Digital I/O operating mode * 1: IO-Link operating mode     b0: IO-Link Port 0 enable  b1: IO-Link Port 1 enable  .  .  .  b6: IO-Link Port 6 enable  b7: IO-Link Port 7 enable |
| (6) | i\_uIOLinkEventsClear | Ports events clear | Word [Unsigned]/Bit String [16-bit] | 0000h to FFFFh | Select the BNI CIB-508-105-Z015 CC-Link IE Field Basic IO-Link Master IO-Link operating mode ports for which event data buffer clear will be performed.   * 0: Do not clear events * 1: Clear all events     b0: IO-Link Port 0 event clear  b1: IO-Link Port 1 event clear  .  .  .  b6: IO-Link Port 6 event clear  b7: IO-Link Port 7 event clear |
| (7) | i\_uIOLinkByteSwap | Byte swap setting | Word [Unsigned]/Bit String [16-bit] | 0000h to FFFFh | Specify the High byte/Low byte swap setting for each IO-Link port of the BNI CIB-508-105-Z015 CC-Link IE Field Basic IO-Link Master.   * High byte/Low byte swapping enabled:      * High byte/Low byte swapping disabled     Byte swap configuration data word structure:   * 0: Byte swapping disabled * 1: Byte swapping enabled     b0: IO-Link Port 0 byte swap  b1: IO-Link Port 1 byte swap  .  .  .  b6: IO-Link Port 6 byte swap  b7: IO-Link Port 7 byte swap |
| (8) | i\_bAutoOrManualIOCfg | Auto/Manual digital I/O ports configuration | Bit | ON, OFF | OFF: Automatic digital I/O ports configuration.  ON: Manual digital I/O ports configuration. |
| (9) | i\_uIOLinkOutputDataPort0 | Output Data port 0 | Word [Unsigned]/Bit String [16-bit](0..3) | - | Specify the start address of the memory area storing the output data that will be written to IO-Link Port 0 of the BNI CIB-508-105-Z015 CC-Link IE Field Basic IO-Link Master. |
| (10) | i\_uIOLinkOutputDataPort1 | Output Data port 1 | Word [Unsigned]/Bit String [16-bit](0..3) | - | Specify the start address of the memory area storing the output data that will be written to IO-Link Port 1 of the BNI CIB-508-105-Z015 CC-Link IE Field Basic IO-Link Master. |
| (11) | i\_uIOLinkOutputDataPort2 | Output Data port 2 | Word [Unsigned]/Bit String [16-bit](0..3) | - | Specify the start address of the memory area storing the output data that will be written to IO-Link Port 2 of the BNI CIB-508-105-Z015 CC-Link IE Field Basic IO-Link Master. |
| (12) | i\_uIOLinkOutputDataPort3 | Output Data port 3 | Word [Unsigned]/Bit String [16-bit](0..3) | - | Specify the start address of the memory area storing the output data that will be written to IO-Link Port 3 of the BNI CIB-508-105-Z015 CC-Link IE Field Basic IO-Link Master. |
| (13) | i\_uIOLinkOutputDataPort4 | Output Data port 4 | Word [Unsigned]/Bit String [16-bit](0..3) | - | Specify the start address of the memory area storing the output data that will be written to IO-Link Port 4 of the BNI CIB-508-105-Z015 CC-Link IE Field Basic IO-Link Master. |
| (14) | i\_uIOLinkOutputDataPort5 | Output Data port 5 | Word [Unsigned]/Bit String [16-bit](0..3) | - | Specify the start address of the memory area storing the output data that will be written to IO-Link Port 5 of the BNI CIB-508-105-Z015 CC-Link IE Field Basic IO-Link Master. |
| (15) | i\_uIOLinkOutputDataPort6 | Output Data port 6 | Word [Unsigned]/Bit String [16-bit](0..3) | - | Specify the start address of the memory area storing the output data that will be written to IO-Link Port 6 of the BNI CIB-508-105-Z015 CC-Link IE Field Basic IO-Link Master. |
| (16) | i\_uIOLinkOutputDataPort7 | Output Data port 7 | Word [Unsigned]/Bit String [16-bit](0..3) | - | Specify the start address of the memory area storing the output data that will be written to IO-Link Port 7 of the BNI CIB-508-105-Z015 CC-Link IE Field Basic IO-Link Master. |
| (17) | i\_bErrorReset | Error reset signal | Bit | ON, OFF | On the rising edge of this signal issue an error clear request to the BNI CIB-508-105-Z015 CC-Link IE Field Basic IO-Link Master. |
| (18) | i\_bWarningReset | Warning reset signal | Bit | ON, OFF | On the rising edge of this signal issue a warning clear request to the BNI CIB-508-105-Z015 CC-Link IE Field Basic IO-Link Master. |
| (19) | i\_bReInitialization | Re initialization signal | Bit | ON, OFF | On the rising edge of this signal issue a re-initialization request (Operation condition setting request) to the BNI CIB-508-105-Z015 CC-Link IE Field Basic IO-Link Master. |

##### I/O Labels

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| No. | Variable Name | Name | Data type | Setting Range | Description |
| (20) | io\_stLinkBasicIn1 | Frequency inverter cyclic input data area 1 | [stRemoteDataBasicIn](#_stRemoteDataBasicIn) | - | Specifies the CC-Link IE Field Basic cyclic input data area structure storing the Remote inputs and Remote Read registers corresponding to the first occupied station of the BNI CIB-508-105-Z015 CC-Link IE Field Basic IO-Link Master (Profile 1). |
| (21) | io\_stLinkBasicOut1 | Frequency inverter cyclic output data area 1 | [stRemoteDataBasicOut](#_stRemoteDataBasicOut) | - | Specifies the CC-Link IE Field Basic cyclic output data area structure storing the Remote outputs and Remote Write registers corresponding to the first occupied station of the BNI CIB-508-105-Z015 CC-Link IE Field Basic IO-Link Master (Profile 1). |
| (22) | io\_stLinkBasicIn2 | Frequency inverter cyclic input data area 2 | [stRemoteDataBasicIn](#_RJ71PB91V_stMgmtInputs) | - | Specifies the CC-Link IE Field Basic cyclic input data area structure storing the Remote inputs and Remote Read registers corresponding to the second occupied station of the BNI CIB-508-105-Z015 CC-Link IE Field Basic IO-Link Master (Profile 1). |
| (23) | io\_stLinkBasicOut2 | Frequency inverter cyclic output data area 2 | [stRemoteDataBasicOut](#_stRemoteRegBasicOut) | - | Specifies the CC-Link IE Field Basic cyclic output data area structure storing the Remote outputs and Remote Write registers corresponding to the second occupied station of the BNI CIB-508-105-Z015 CC-Link IE Field Basic IO-Link Master (Profile 1). |

##### Output Labels

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| No. | Variable Name | Name | Data type | Setting Range | Description |
| (24) | o\_bENO | CC-Link IE Field Basic IO-Link Master control command output status | Bit | OFF | ON: CC-Link IE Field Basic IO-Link Master control command signal is active.  OFF: CC-Link IE Field Basic IO-Link Master control command signal is inactive. |
| (25) | o\_bDataLinkOk | Data link status | Bit | OFF | Signals if the data link with the BNI CIB-508-105-Z015 CC-Link IE Field Basic IO-Link Master station is up. |
| (26) | o\_bUnitReady | Unit operation status | Bit | OFF | Signals if the BNI CIB-508-105-Z015 CC-Link IE Field Basic IO-Link Master is initialized and ready for operation. |
| (27) | o\_bUnitError | Unit error status | Bit | OFF | Signals if an error has occurred during the BNI CIB-508-105-Z015 CC-Link IE Field Basic IO-Link Master initialization or operation. |
| (28) | o\_bUnitWarning | Unit warning status | Bit | OFF | Signals if a warning has occurred during the BNI CIB-508-105-Z015 CC-Link IE Field Basic IO-Link-Master initialization or operation. **Note:** This signal will be automatically cleared after a defined time (approx. 10 seconds). |
| (29) | o\_uUnitErrorCode | Unit error code | Word[Unsigned]/Bit String[16-bit] | 0000h | Stores the unit error code in case an error has occurred on the BNI CIB-508-105-Z015 CC-Link IE Field Basic IO-Link-Master.  For details of the error status, please refer to the [**Detail error check**.](#_List_of_Gateway) |
| (30) | o\_uUnitWarningCode | Unit warning code | Word[Unsigned]/Bit String[16-bit] | 0000h | Stores the unit warning code in case a warning has occurred on the BNI CIB-508-105-Z015 CC-Link IE Field Basic IO-Link-Master.  For details of the error status, please refer to the [**Detail error check**.](#_List_of_Gateway) |
| (31) | o\_bUSVoltageLow | US voltage low | Bit | OFF | Signal is ON if the US voltage is below 18V. |
| (32) | o\_bUAVoltageLow | UA voltage off | Bit | OFF | Signal is ON if the UA voltage is below 18V. |
| (33) | o\_bUAVoltageOff | UA voltage off | Bit | OFF | Signal is ON if the UA voltage is below 11V. |
| (34) | o\_bIOLinkReady | IO-Link control cycle status | Bit | OFF | Signals if the BNI CIB-508-105-Z015 CC-Link IE Field Basic IO-Link Master is operational and the IO-Link devices control cycle is in progress (IO-Link devices connected). |
| (35) | o\_uIOLinesDiagnostic | I/O signal lines status | Word[Unsigned]/Bit String[16-bit] | 0000h | Stores the error status of each BNI CIB-508-105-Z015 CC-Link IE Field Basic IO-Link Master port's I/O signal lines.   * 0: No error * 1: Error (over-current, short-circuit)     b0: Port 0 Pin 4 I/O line diagnostic  b1: Port 0 Pin 2 I/O line diagnostic  b2: Port 1 Pin 4 I/O line diagnostic  b3: Port 1 Pin 2 I/O line diagnostic  .  .  .  b14: Port 7 Pin 4 I/O line diagnostic  b15: Port 7 Pin 2 I/O line diagnostic |
| (36) | o\_uPortsDiagnostic | Power supply line status | Word[Unsigned]/Bit String[16-bit] | 0000h | Stores the error status of each BNI CIB-508-105-Z015 CC-Link IE Field Basic IO-Link Master port's power supply line.   * 0: No error * 1: Error (over-current, short-circuit)     b0: Port 0 Pin 1 power-supply diagnostic  b1: Port 1 Pin 1 power-supply diagnostic  .  .  .  b6: Port 6 Pin 1 power-supply diagnostic  b7: Port 7 Pin 1 power-supply diagnostic |
| (37) | o\_uDigitalInputs | Digital input signal lines status | Word[Unsigned]/Bit String[16-bit] | 0000h | Stores the digital input status read from the digital input signal lines (Pin 2 and Pin 4) of each BNI CIB-508-105-Z015 CC-Link IE Field Basic IO-Link Master port.   * 0: Digital input signal set to OFF * 1: Digital input signal set to ON     b0: Digital input signal Port 0 Pin 4  b1: Digital input signal Port 0 Pin 2  b2: Digital input signal Port 1 Pin 4  b3: Digital input signal Port 1 Pin 2  .  .  .  b14: Digital input signal Port 7 Pin 4  b15: Digital input signal Port 7 Pin 2 |
| (38) | o\_uIOLinkValidPorts | Validation Status | Word[Unsigned]/Bit String[16-bit] | 0000h | Stores the validation status of the IO-Link devices connected to the BNI CIB-508-105-Z015 CC-Link IE Field Basic IO-Link Master IO-Link operating mode ports.   * 0: IO-Link port invalid * 1: IO-Link port valid     b0: IO-Link Port 0 valid  b1: IO-Link Port 1 valid  .  .  .  b6: IO-Link Port 6 valid  b7: IO-Link Port 7 valid |
| (39) | o\_uIOLinkPortEvents | Event status | Word[Unsigned]/Bit String[16-bit] | 0000h | Stores the pending event status of the BNI CIB-508-105-Z015 CC-Link IE Field Basic IO-Link Master IO-Link operating mode ports.   * 0: No event * 1: Event from the connected IO-Link device     b0: IO-Link Port 0 event status  b1: IO-Link Port 1 event status  .  .  .  b6: IO-Link Port 6 event status  b7: IO-Link Port 7 event status |
| (40) | o\_uDataValidIOLinkPorts | Validation status | Word[Unsigned]/Bit String[16-bit] | 0000h | Stores the validation status of the process data sent using IO-Link communication for valid devices connected to the BNI CIB-508-105-Z015 CC-Link IE Field Basic IO-Link Master IO-Link operating mode ports.   * 0: Process data invalid * 1: Process data valid     b0: Data valid IO-Link Port 0  b1: Data valid IO-Link Port 1  .  .  .  b6: Data valid IO-Link Port 6  b7: Data valid IO-Link Port 7 |
| (41) | o\_uIOLinkInputDataPort0 | Input data port 0 | Word [Unsigned]/Bit String [16-bit](0..3) | - | Specify the start address of the memory area storing the input data read from IO-Link Port 0 of the BNI CIB-508-105-Z015 CC-Link IE Field Basic IO-Link Master. |
| (42) | o\_uIOLinkInputDataPort1 | Input data port 1 | Word [Unsigned]/Bit String [16-bit](0..3) | - | Specify the start address of the memory area storing the input data read from IO-Link Port 1 of the BNI CIB-508-105-Z015 CC-Link IE Field Basic IO-Link Master. |
| (43) | o\_uIOLinkInputDataPort2 | Input data port 2 | Word [Unsigned]/Bit String [16-bit](0..3) | - | Specify the start address of the memory area storing the input data read from IO-Link Port 2 of the BNI CIB-508-105-Z015 CC-Link IE Field Basic IO-Link Master. |
| (44) | o\_uIOLinkInputDataPort3 | Input data port 3 | Word [Unsigned]/Bit String [16-bit](0..3) | - | Specify the start address of the memory area storing the input data read from IO-Link Port 3 of the BNI CIB-508-105-Z015 CC-Link IE Field Basic IO-Link Master. |
| (45) | o\_uIOLinkInputDataPort4 | Input data port 4 | Word [Unsigned]/Bit String [16-bit](0..3) | - | Specify the start address of the memory area storing the input data read from IO-Link Port 4 of the BNI CIB-508-105-Z015 CC-Link IE Field Basic IO-Link Master. |
| (46) | o\_uIOLinkInputDataPort5 | Input data port 5 | Word [Unsigned]/Bit String [16-bit](0..3) | - | Specify the start address of the memory area storing the input data read from IO-Link Port 5 of the BNI CIB-508-105-Z015 CC-Link IE Field Basic IO-Link Master. |
| (47) | o\_uIOLinkInputDataPort6 | Input data port 6 | Word [Unsigned]/Bit String [16-bit](0..3) | - | Specify the start address of the memory area storing the input data read from IO-Link Port 6 of the BNI CIB-508-105-Z015 CC-Link IE Field Basic IO-Link Master. |
| (48) | o\_uIOLinkInputDataPort7 | Input data port 7 | Word [Unsigned]/Bit String [16-bit](0..3) | - | Specify the start address of the memory area storing the input data read from IO-Link Port 7 of the BNI CIB-508-105-Z015 CC-Link IE Field Basic IO-Link Master. |

#### FB details

|  |  |  |
| --- | --- | --- |
| Item | Description | |
| Applicable hardware and software | Applicable CPU | FX5U(C)/FX5UJ CPU |
| Applicable engineering tool | GX Works3 |
| Language | Function Block Diagram (FBD/LD) | |
| Number of basic steps | 581 steps  The number of steps of the FB in a program varies depending on the CPU module used, input and output definition, and the option settings of GX Works3. For the option settings of GX Works3, refer to the [GX Works3 Operating Manual](SH081215ENG). | |
| Function description and operation | This function block is used for performing initialization and control of a Balluff Network Interface BNI CIB-508-105-Z015 CC-Link IE Field Basic IO-Link Master configured as Profile 1 (2 occupied stations), using the MELSEC FX5U(C)/FX5UJ CPU built-in Ethernet/CC-Link IE Field Basic interface.  The function block provides the following functionality:   * Port direction selection (digital Input or Output) for each I/O signal line corresponding to the BNI CIB-508-105-Z015 CC-Link IE Field Basic IO-Link Master ports * Digital output data write to the I/O signal lines of the BNI CIB-508-105-Z015 CC-Link IE Field Basic IO-Link Master ports * Operating mode selection (IO-Link mode or digital I/O mode) for each BNI CIB-508-105-Z015 CC-Link IE Field Basic IO-Link Master IO-Link compatible port * Event data buffer clear for selected BNI CIB-508-105-Z015 CC-Link IE Field Basic IO-Link Master IO-Link operating mode ports * Automatic/manual digital I/O ports configuration selection * Automatic byte swap setting, on initialization processing, for all IO-Link ports of the BNI CIB-508-105-Z015 CC-Link IE Field Basic IO-Link Master * Output data write to the BNI CIB-508-105-Z015 CC-Link IE Field Basic IO-Link Master IO-Link operating mode ports * Clear the error status (Error clear request) of the BNI CIB-508-105-Z015 CC-Link IE Field Basic IO-Link Master * Re-Initialization (Operation condition setting request) of the BNI CIB-508-105-Z015 CC-Link IE Field Basic IO-Link Master's IO-Link operating mode ports * I/O signal lines diagnostic monitoring for the BNI CIB-508-105-Z015 CC-Link IE Field Basic IO-Link Master ports * Power-supply line diagnostic monitoring for the BNI CIB-508-105-Z015 CC-Link IE Field Basic IO-Link Master ports * Digital input data read from the I/O signal lines of the BNI CIB-508-105-Z015 CC-Link IE Field Basic IO-Link Master ports * Validation status monitoring for the IO-Link devices connected to the BNI CIB-508-105-Z015 CC-Link IE Field Basic IO-Link Master IO-Link operating mode ports * Process data validation status monitoring for IO-Link devices connected to the BNI CIB-508-105-Z015 CC-Link IE Field Basic IO-Link Master IO-Link operating mode ports * Pending event data status monitoring for the BNI CIB-508-105-Z015 CC-Link IE Field Basic IO-Link Master IO-Link operating mode ports * Input data read from the BNI CIB-508-105-Z015 CC-Link IE Field Basic IO-Link Master IO-Link operating mode ports. | |
| Restrictions and precautions | * The function block will only perform an automatic initialization (Initial data processing) each time the BNI CIB-508-105-Z015 CC-Link IE Field Basic IO-Link Master is powered ON, also setting the I/O signal lines direction and activating the IO-Link mode channels with their byte swap settings as configured by the <i\_uIOLinesDirection>, <i\_uIOLinkPortsEnable> and <i\_uIOLinkByteSwap> input labels respectively. * For any changes in validation settings, data storage configuration, an I/O signal line's direction (<i\_uIOLinesDirection> input label) or an IO-Link compatible port's operating mode selection (<i\_uIOLinkPortsEnable> input label) made during function block operation to come into effect, a BNI CIB-508-105-Z015 CC-Link IE Field Basic IO-Link Master re-initialization (rising edge of the <i\_bReInitialization> input label) will be required. | |
| FB compiling method | Macro | |
| FB operation type | Real-time execution | |
| Timing chart | * When the operation is completed successfully      * When the operation is completed with an error | |

## P+Balluff\_CCLinkIEFieldBasicIOLinkP2\_F

#### Name

P+Balluff\_CCLinkIEFieldBasicIOLinkP2\_F

#### Overview

|  |  |
| --- | --- |
| Item | Description |
| Function overview | Initialization and control of a Balluff Network Interface BNI CIB-508-105-Z015 CC-Link IE Field Basic IO-Link Master configured as Profile 2 (3 occupied stations), using the MELSEC FX5U(C)/FX5UJ CPU built-in Ethernet/CC-Link IE Field Basic interface. |
| Symbol  [Function Block Diagram] |  |

#### Labels

##### Input Labels

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| No. | Variable Name | Name | Data type | Setting Range | Description |
| (1) | i\_bEN | CC-Link IE Field Basic IO-Link Master control enable/disable command | Bit | ON, OFF | ON: Control of the BNI CIB-508-105-Z015 CC-Link IE Field Basic IO-Link Master is enabled.  OFF: Control of the BNI CIB-508-105-Z015 CC-Link IE Field Basic IO-Link Master is disabled. |
| (2) | i\_uStationNumber | IO-Link Master station number | Word [Unsigned]/Bit String [16-bit] | 1 to 16 | Specify the CC-Link IEF Basic station number of the BNI CIB-508-105-Z015 CC-Link IE Field Basic IO-Link Master. |
| (3) | i\_uIOLinesDirection | IO lines Direction | Word [Unsigned]/Bit String [16-bit] | 0000h to FFFFh | Select the direction (digital input or output) for each I/O signal line corresponding to the BNI CIB-508-105-Z015 CC-Link IE Field Basic IO-Link Master ports.   * 0: Digital input * 1: Digital output     b0: Port direction for Port 0 Pin 4  b1: Port direction for Port 0 Pin 2  b2: Port direction for Port 1 Pin 4  b3: Port direction for Port 1 Pin 2  .  .  .  b14: Port direction for Port 7 Pin 4  b15: Port direction for Port 7 Pin 2 |
| (4) | i\_uDigitalOutputs | Digital outputs | Word [Unsigned]/Bit String [16-bit] | 0000h to FFFFh | Specify the digital output data that will be written to the digital output signal lines (Pin 2 and Pin 4) of each BNI CIB-508-105-Z015 CC-Link IE Field Basic IO-Link Master port.   * 0: Digital output signal set to OFF * 1: Digital output signal set to ON     b0: Digital output signal Port 0 Pin 4  b1: Digital output signal Port 0 Pin 2  b2: Digital output signal Port 1 Pin 4  b3: Digital output signal Port 1 Pin 2  .  .  .  b14: Digital output signal Port 7 Pin 4  b15: Digital output signal Port 7 Pin 2 |
| (5) | i\_uIOLinkPortsEnable | Ports operating mode | Word [Unsigned]/Bit String [16-bit] | 0000h to FFFFh | Select the operating mode (IO-Link mode or Digital I/O mode) for each BNI CIB-508-105-Z015 CC-Link IE Field Basic IO-Link Master IO-Link compatible port.   * 0: Digital I/O operating mode * 1: IO-Link operating mode     b0: IO-Link Port 0 enable  b1: IO-Link Port 1 enable  .  .  .  b6: IO-Link Port 6 enable  b7: IO-Link Port 7 enable |
| (6) | i\_uIOLinkEventsClear | Ports events clear | Word [Unsigned]/Bit String [16-bit] | 0000h to FFFFh | Select the BNI CIB-508-105-Z015 CC-Link IE Field Basic IO-Link Master IO-Link operating mode ports for which event data buffer clear will be performed.   * 0: Do not clear events * 1: Clear all events     b0: IO-Link Port 0 event clear  b1: IO-Link Port 1 event clear  .  .  .  b6: IO-Link Port 6 event clear  b7: IO-Link Port 7 event clear |
| (7) | i\_uIOLinkByteSwap | Byte swap setting | Word [Unsigned]/Bit String [16-bit] | 0000h to FFFFh | Specify the High byte/Low byte swap setting for each IO-Link port of the BNI CIB-508-105-Z015 CC-Link IE Field Basic IO-Link Master.   * High byte/Low byte swapping enabled:      * High byte/Low byte swapping disabled     Byte swap configuration data word structure:   * 0: Byte swapping disabled * 1: Byte swapping enabled     b0: IO-Link Port 0 byte swap  b1: IO-Link Port 1 byte swap  .  .  .  b6: IO-Link Port 6 byte swap  b7: IO-Link Port 7 byte swap |
| (8) | i\_bAutoOrManualIOCfg | Auto/Manual digital I/O ports configuration | Bit | ON, OFF | OFF: Automatic digital I/O ports configuration.  ON: Manual digital I/O ports configuration. |
| (9) | i\_uIOLinkOutputDataPort0 | Output Data port 0 | Word [Unsigned]/Bit String [16-bit](0..7) | - | Specify the start address of the memory area storing the output data that will be written to IO-Link Port 0 of the BNI CIB-508-105-Z015 CC-Link IE Field Basic IO-Link Master. |
| (10) | i\_uIOLinkOutputDataPort1 | Output Data port 1 | Word [Unsigned]/Bit String [16-bit](0..7) | - | Specify the start address of the memory area storing the output data that will be written to IO-Link Port 1 of the BNI CIB-508-105-Z015 CC-Link IE Field Basic IO-Link Master. |
| (11) | i\_uIOLinkOutputDataPort2 | Output Data port 2 | Word [Unsigned]/Bit String [16-bit](0..7) | - | Specify the start address of the memory area storing the output data that will be written to IO-Link Port 2 of the BNI CIB-508-105-Z015 CC-Link IE Field Basic IO-Link Master. |
| (12) | i\_uIOLinkOutputDataPort3 | Output Data port 3 | Word [Unsigned]/Bit String [16-bit](0..7) | - | Specify the start address of the memory area storing the output data that will be written to IO-Link Port 3 of the BNI CIB-508-105-Z015 CC-Link IE Field Basic IO-Link Master. |
| (13) | i\_uIOLinkOutputDataPort4 | Output Data port 4 | Word [Unsigned]/Bit String [16-bit](0..7) | - | Specify the start address of the memory area storing the output data that will be written to IO-Link Port 4 of the BNI CIB-508-105-Z015 CC-Link IE Field Basic IO-Link Master. |
| (14) | i\_uIOLinkOutputDataPort5 | Output Data port 5 | Word [Unsigned]/Bit String [16-bit](0..7) | - | Specify the start address of the memory area storing the output data that will be written to IO-Link Port 5 of the BNI CIB-508-105-Z015 CC-Link IE Field Basic IO-Link Master. |
| (15) | i\_uIOLinkOutputDataPort6 | Output Data port 6 | Word [Unsigned]/Bit String [16-bit](0..7) | - | Specify the start address of the memory area storing the output data that will be written to IO-Link Port 6 of the BNI CIB-508-105-Z015 CC-Link IE Field Basic IO-Link Master. |
| (16) | i\_uIOLinkOutputDataPort7 | Output Data port 7 | Word [Unsigned]/Bit String [16-bit](0..7) | - | Specify the start address of the memory area storing the output data that will be written to IO-Link Port 7 of the BNI CIB-508-105-Z015 CC-Link IE Field Basic IO-Link Master. |
| (17) | i\_bErrorReset | Error reset signal | Bit | ON, OFF | On the rising edge of this signal issue an error clear request to the BNI CIB-508-105-Z015 CC-Link IE Field Basic IO-Link Master. |
| (18) | i\_bWarningReset | Warning reset signal | Bit | ON, OFF | On the rising edge of this signal issue a warning clear request to the BNI CIB-508-105-Z015 CC-Link IE Field Basic IO-Link Master. |
| (19) | i\_bReInitialization | Re initialization signal | Bit | ON, OFF | On the rising edge of this signal issue a re-initialization request (Operation condition setting request) to the BNI CIB-508-105-Z015 CC-Link IE Field Basic IO-Link Master. |

##### I/O Labels

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| No. | Variable Name | Name | Data type | Setting Range | Description |
| (20) | io\_stLinkBasicIn1 | Frequency inverter cyclic input data area 1 | [stRemoteDataBasicIn](#_RJ71PB91V_stMgmtInputs) | - | Specifies the CC-Link IE Field Basic cyclic input data area structure storing the Remote inputs and Remote Read registers corresponding to the first occupied station of the BNI CIB-508-105-Z015 CC-Link IE Field Basic IO-Link Master (Profile 2). |
| (21) | io\_stLinkBasicOut1 | Frequency inverter cyclic output data area 1 | [stRemoteDataBasicOut](#_stRemoteRegBasicOut) | - | Specifies the CC-Link IE Field Basic cyclic output data area structure storing the Remote outputs and Remote Write registers corresponding to the first occupied station of the BNI CIB-508-105-Z015 CC-Link IE Field Basic IO-Link Master (Profile 2). |
| (22) | io\_stLinkBasicIn2 | Frequency inverter cyclic input data area 2 | [stRemoteDataBasicIn](#_RJ71PB91V_stMgmtInputs) | - | Specifies the CC-Link IE Field Basic cyclic input data area structure storing the Remote inputs and Remote Read registers corresponding to the second occupied station of the BNI CIB-508-105-Z015 CC-Link IE Field Basic IO-Link Master (Profile 2). |
| (23) | io\_stLinkBasicOut2 | Frequency inverter cyclic output data area 2 | [stRemoteDataBasicOut](#_stRemoteRegBasicOut) | - | Specifies the CC-Link IE Field Basic cyclic output data area structure storing the Remote outputs and Remote Write registers corresponding to the second occupied station of the BNI CIB-508-105-Z015 CC-Link IE Field Basic IO-Link Master (Profile 2). |
| (24) | io\_stLinkBasicIn3 | Frequency inverter cyclic input data area 3 | [stRemoteDataBasicIn](#_RJ71PB91V_stMgmtInputs) | - | Specifies the CC-Link IE Field Basic cyclic input data area structure storing the Remote inputs and Remote Read registers corresponding to the third occupied station of the BNI CIB-508-105-Z015 CC-Link IE Field Basic IO-Link Master (Profile 2). |
| (25) | io\_stLinkBasicOut3 | Frequency inverter cyclic output data area 3 | [stRemoteDataBasicOut](#_stRemoteRegBasicOut) | - | Specifies the CC-Link IE Field Basic cyclic output data area structure storing the Remote outputs and Remote Write registers corresponding to the third occupied station of the BNI CIB-508-105-Z015 CC-Link IE Field Basic IO-Link Master (Profile 2). |

##### Output Labels

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| No. | Variable Name | Name | Data type | Setting Range | Description |
| (26) | o\_bENO | CC-Link IE Field Basic IO-Link Master control command output status | Bit | OFF | ON: CC-Link IE Field Basic IO-Link Master control command signal is active.  OFF: CC-Link IE Field Basic IO-Link Master control command signal is inactive. |
| (27) | o\_bDataLinkOk | Data link status | Bit | OFF | Signals if the data link with the BNI CIB-508-105-Z015 CC-Link IE Field Basic IO-Link Master station is up. |
| (28) | o\_bUnitReady | Unit operation status | Bit | OFF | Signals if the BNI CIB-508-105-Z015 CC-Link IE Field Basic IO-Link Master is initialized and ready for operation. |
| (29) | o\_bUnitError | Unit error status | Bit | OFF | Signals if an error has occurred during the BNI CIB-508-105-Z015 CC-Link IE Field Basic IO-Link Master initialization or operation. |
| (30) | o\_bUnitWarning | Unit warning status | Bit | OFF | Signals if a warning has occurred during the BNI CIB-508-105-Z015 CC-Link IE Field Basic IO-Link-Master initialization or operation. **Note:** This signal will be automatically cleared after a defined time (approx. 10 seconds). |
| (31) | o\_uUnitErrorCode | Unit error code | Word[Unsigned]/Bit String[16-bit] | 0000h | Stores the unit error code in case an error has occurred on the BNI CIB-508-105-Z015 CC-Link IE Field Basic IO-Link-Master.  For details of the error status, please refer to the [**Detail error check**.](#_List_of_Gateway) |
| (32) | o\_uUnitWarningCode | Unit warning code | Word[Unsigned]/Bit String[16-bit] | 0000h | Stores the unit warning code in case a warning has occurred on the BNI CIB-508-105-Z015 CC-Link IE Field Basic IO-Link-Master.  For details of the error status, please refer to the [**Detail error check**.](#_List_of_Gateway) |
| (33) | o\_bUSVoltageLow | US voltage low | Bit | OFF | Signal is ON if the US voltage is below 18V. |
| (34) | o\_bUAVoltageLow | UA voltage off | Bit | OFF | Signal is ON if the UA voltage is below 18V. |
| (35) | o\_bUAVoltageOff | UA voltage off | Bit | OFF | Signal is ON if the UA voltage is below 11V. |
| (36) | o\_bIOLinkReady | IO-Link control cycle status | Bit | OFF | Signals if the BNI CIB-508-105-Z015 CC-Link IE Field Basic IO-Link Master is operational and the IO-Link devices control cycle is in progress (IO-Link devices connected). |
| (37) | o\_uIOLinesDiagnostic | I/O signal lines status | Word[Unsigned]/Bit String[16-bit] | 0000h | Stores the error status of each BNI CIB-508-105-Z015 CC-Link IE Field Basic IO-Link Master port's I/O signal lines.   * 0: No error * 1: Error (over-current, short-circuit)     b0: Port 0 Pin 4 I/O line diagnostic  b1: Port 0 Pin 2 I/O line diagnostic  b2: Port 1 Pin 4 I/O line diagnostic  b3: Port 1 Pin 2 I/O line diagnostic  .  .  .  b14: Port 7 Pin 4 I/O line diagnostic  b15: Port 7 Pin 2 I/O line diagnostic |
| (38) | o\_uPortsDiagnostic | Power supply line status | Word[Unsigned]/Bit String[16-bit] | 0000h | Stores the error status of each BNI CIB-508-105-Z015 CC-Link IE Field Basic IO-Link Master port's power supply line.   * 0: No error * 1: Error (over-current, short-circuit)     b0: Port 0 Pin 1 power-supply diagnostic  b1: Port 1 Pin 1 power-supply diagnostic  .  .  .  b6: Port 6 Pin 1 power-supply diagnostic  b7: Port 7 Pin 1 power-supply diagnostic |
| (39) | o\_uDigitalInputs | Digital input signal lines status | Word[Unsigned]/Bit String[16-bit] | 0000h | Stores the digital input status read from the digital input signal lines (Pin 2 and Pin 4) of each BNI CIB-508-105-Z015 CC-Link IE Field Basic IO-Link Master port.   * 0: Digital input signal set to OFF * 1: Digital input signal set to ON     b0: Digital input signal Port 0 Pin 4  b1: Digital input signal Port 0 Pin 2  b2: Digital input signal Port 1 Pin 4  b3: Digital input signal Port 1 Pin 2  .  .  .  b14: Digital input signal Port 7 Pin 4  b15: Digital input signal Port 7 Pin 2 |
| (40) | o\_uIOLinkValidPorts | Validation Status | Word[Unsigned]/Bit String[16-bit] | 0000h | Stores the validation status of the IO-Link devices connected to the BNI CIB-508-105-Z015 CC-Link IE Field Basic IO-Link Master IO-Link operating mode ports.   * 0: IO-Link port invalid * 1: IO-Link port valid     b0: IO-Link Port 0 valid  b1: IO-Link Port 1 valid  .  .  .  b6: IO-Link Port 6 valid  b7: IO-Link Port 7 valid |
| (41) | o\_uIOLinkPortEvents | Event status | Word[Unsigned]/Bit String[16-bit] | 0000h | Stores the pending event status of the BNI CIB-508-105-Z015 CC-Link IE Field Basic IO-Link Master IO-Link operating mode ports.   * 0: No event * 1: Event from the connected IO-Link device     b0: IO-Link Port 0 event status  b1: IO-Link Port 1 event status  .  .  .  b6: IO-Link Port 6 event status  b7: IO-Link Port 7 event status |
| (42) | o\_uDataValidIOLinkPorts | Validation status | Word[Unsigned]/Bit String[16-bit] | 0000h | Stores the validation status of the process data sent using IO-Link communication for valid devices connected to the BNI CIB-508-105-Z015 CC-Link IE Field Basic IO-Link Master IO-Link operating mode ports.   * 0: Process data invalid * 1: Process data valid     b0: Data valid IO-Link Port 0  b1: Data valid IO-Link Port 1  .  .  .  b6: Data valid IO-Link Port 6  b7: Data valid IO-Link Port 7 |
| (43) | o\_uIOLinkInputDataPort0 | Input data port 0 | Word [Unsigned]/Bit String [16-bit](0..3) | - | Specify the start address of the memory area storing the input data read from IO-Link Port 0 of the BNI CIB-508-105-Z015 CC-Link IE Field Basic IO-Link Master. |
| (44) | o\_uIOLinkInputDataPort1 | Input data port 1 | Word [Unsigned]/Bit String [16-bit](0..3) | - | Specify the start address of the memory area storing the input data read from IO-Link Port 1 of the BNI CIB-508-105-Z015 CC-Link IE Field Basic IO-Link Master. |
| (45) | o\_uIOLinkInputDataPort2 | Input data port 2 | Word [Unsigned]/Bit String [16-bit](0..3) | - | Specify the start address of the memory area storing the input data read from IO-Link Port 2 of the BNI CIB-508-105-Z015 CC-Link IE Field Basic IO-Link Master. |
| (46) | o\_uIOLinkInputDataPort3 | Input data port 3 | Word [Unsigned]/Bit String [16-bit](0..3) | - | Specify the start address of the memory area storing the input data read from IO-Link Port 3 of the BNI CIB-508-105-Z015 CC-Link IE Field Basic IO-Link Master. |
| (47) | o\_uIOLinkInputDataPort4 | Input data port 4 | Word [Unsigned]/Bit String [16-bit](0..3) | - | Specify the start address of the memory area storing the input data read from IO-Link Port 4 of the BNI CIB-508-105-Z015 CC-Link IE Field Basic IO-Link Master. |
| (48) | o\_uIOLinkInputDataPort5 | Input data port 5 | Word [Unsigned]/Bit String [16-bit](0..3) | - | Specify the start address of the memory area storing the input data read from IO-Link Port 5 of the BNI CIB-508-105-Z015 CC-Link IE Field Basic IO-Link Master. |
| (49) | o\_uIOLinkInputDataPort6 | Input data port 6 | Word [Unsigned]/Bit String [16-bit](0..3) | - | Specify the start address of the memory area storing the input data read from IO-Link Port 6 of the BNI CIB-508-105-Z015 CC-Link IE Field Basic IO-Link Master. |
| (50) | o\_uIOLinkInputDataPort7 | Input data port 7 | Word [Unsigned]/Bit String [16-bit](0..3) | - | Specify the start address of the memory area storing the input data read from IO-Link Port 7 of the BNI CIB-508-105-Z015 CC-Link IE Field Basic IO-Link Master. |

#### FB details

|  |  |  |
| --- | --- | --- |
| Item | Description | |
| Applicable hardware and software | Applicable CPU | FX5U(C)/FX5UJ CPU |
| Applicable engineering tool | GX Works3 |
| Language | Function Block Diagram (FBD/LD) | |
| Number of basic steps | 637 steps  The number of steps of the FB in a program varies depending on the CPU module used, input and output definition, and the option settings of GX Works3. For the option settings of GX Works3, refer to the [GX Works3 Operating Manual](SH081215ENG). | |
| Function description and operation | This function block is used for performing initialization and control of a Balluff Network Interface BNI CIB-508-105-Z015 CC-Link IE Field Basic IO-Link Master configured as Profile 2 (3 occupied stations), using the MELSEC FX5U(C)/FX5UJ CPU built-in Ethernet/CC-Link IE Field Basic interface.  The function block provides the following functionality:   * Port direction selection (digital Input or Output) for each I/O signal line corresponding to the BNI CIB-508-105-Z015 CC-Link IE Field Basic IO-Link Master ports * Digital output data write to the I/O signal lines of the BNI CIB-508-105-Z015 CC-Link IE Field Basic IO-Link Master ports * Operating mode selection (IO-Link mode or digital I/O mode) for each BNI CIB-508-105-Z015 CC-Link IE Field Basic IO-Link Master IO-Link compatible port * Event data buffer clear for selected BNI CIB-508-105-Z015 CC-Link IE Field Basic IO-Link Master IO-Link operating mode ports * Automatic/manual digital I/O ports configuration selection * Automatic byte swap setting, on initialization processing, for all IO-Link ports of the BNI CIB-508-105-Z015 CC-Link IE Field Basic IO-Link Master * Output data write to the BNI CIB-508-105-Z015 CC-Link IE Field Basic IO-Link Master IO-Link operating mode ports * Clear the error status (Error clear request) of the BNI CIB-508-105-Z015 CC-Link IE Field Basic IO-Link Master * Re-Initialization (Operation condition setting request) of the BNI CIB-508-105-Z015 CC-Link IE Field Basic IO-Link Master's IO-Link operating mode ports * I/O signal lines diagnostic monitoring for the BNI CIB-508-105-Z015 CC-Link IE Field Basic IO-Link Master ports * Power-supply line diagnostic monitoring for the BNI CIB-508-105-Z015 CC-Link IE Field Basic IO-Link Master ports * Digital input data read from the I/O signal lines of the BNI CIB-508-105-Z015 CC-Link IE Field Basic IO-Link Master ports * Validation status monitoring for the IO-Link devices connected to the BNI CIB-508-105-Z015 CC-Link IE Field Basic IO-Link Master IO-Link operating mode ports * Process data validation status monitoring for IO-Link devices connected to the BNI CIB-508-105-Z015 CC-Link IE Field Basic IO-Link Master IO-Link operating mode ports * Pending event data status monitoring for the BNI CIB-508-105-Z015 CC-Link IE Field Basic IO-Link Master IO-Link operating mode ports * Input data read from the BNI CIB-508-105-Z015 CC-Link IE Field Basic IO-Link Master IO-Link operating mode ports. | |
| Restrictions and precautions | * The function block will only perform an automatic initialization (Initial data processing) each time the BNI CIB-508-105-Z015 CC-Link IE Field Basic IO-Link Master is powered ON, also setting the I/O signal lines direction and activating the IO-Link mode channels with their byte swap settings as configured by the <i\_uIOLinesDirection>, <i\_uIOLinkPortsEnable> and <i\_uIOLinkByteSwap> input labels respectively. * For any changes in validation settings, data storage configuration, an I/O signal line's direction (<i\_uIOLinesDirection> input label) or an IO-Link compatible port's operating mode selection (<i\_uIOLinkPortsEnable> input label) made during function block operation to come into effect, a BNI CIB-508-105-Z015 CC-Link IE Field Basic IO-Link Master re-initialization (rising edge of the <i\_bReInitialization> input label) will be required. | |
| FB compiling method | Macro | |
| FB operation type | Real-time execution | |
| Timing chart | * When the operation is completed successfully      * When the operation is completed with an error | |

## P+Balluff\_CCLinkIEFieldBasicIOLinkP3\_F

#### Name

P+Balluff\_CCLinkIEfieldBasicIOLinkP3\_F

#### Overview

|  |  |
| --- | --- |
| Item | Description |
| Function overview | Initialization and control of a Balluff Network Interface BNI CIB-508-105-Z015 CC-Link IE Field Basic IO-Link Master configured as Profile 3 (4 occupied stations), using the MELSEC FX5U(C)/FX5UJ CPU built-in Ethernet/CC-Link IE Field Basic interface. |
| Symbol  [Function Block Diagram] |  |

#### Labels

##### Input Labels

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| No. | Variable Name | Name | Data type | Setting Range | Description |
| (1) | i\_bEN | CC-Link IE Field Basic IO-Link Master control enable/disable command | Bit | ON, OFF | ON: Control of the BNI CIB-508-105-Z015 CC-Link IE Field Basic IO-Link Master is enabled.  OFF: Control of the BNI CIB-508-105-Z015 CC-Link IE Field Basic IO-Link Master is disabled. |
| (2) | i\_uStationNumber | IO-Link Master station number | Word [Unsigned]/Bit String [16-bit] | 1 to 16 | Specify the CC-Link IEF Basic station number of the BNI CIB-508-105-Z015 CC-Link IE Field Basic IO-Link Master. |
| (3) | i\_uIOLinesDirection | IO lines Direction | Word [Unsigned]/Bit String [16-bit] | 0000h to FFFFh | Select the direction (digital input or output) for each I/O signal line corresponding to the BNI CIB-508-105-Z015 CC-Link IE Field Basic IO-Link Master ports.   * 0: Digital input * 1: Digital output     b0: Port direction for Port 0 Pin 4  b1: Port direction for Port 0 Pin 2  b2: Port direction for Port 1 Pin 4  b3: Port direction for Port 1 Pin 2  .  .  .  b14: Port direction for Port 7 Pin 4  b15: Port direction for Port 7 Pin 2 |
| (4) | i\_uDigitalOutputs | Digital outputs | Word [Unsigned]/Bit String [16-bit] | 0000h to FFFFh | Specify the digital output data that will be written to the digital output signal lines (Pin 2 and Pin 4) of each BNI CIB-508-105-Z015 CC-Link IE Field Basic IO-Link Master port.   * 0: Digital output signal set to OFF * 1: Digital output signal set to ON     b0: Digital output signal Port 0 Pin 4  b1: Digital output signal Port 0 Pin 2  b2: Digital output signal Port 1 Pin 4  b3: Digital output signal Port 1 Pin 2  .  .  .  b14: Digital output signal Port 7 Pin 4  b15: Digital output signal Port 7 Pin 2 |
| (5) | i\_uIOLinkPortsEnable | Ports operating mode | Word [Unsigned]/Bit String [16-bit] | 0000h to FFFFh | Select the operating mode (IO-Link mode or Digital I/O mode) for each BNI CIB-508-105-Z015 CC-Link IE Field Basic IO-Link Master IO-Link compatible port.   * 0: Digital I/O operating mode * 1: IO-Link operating mode     b0: IO-Link Port 0 enable  b1: IO-Link Port 1 enable  .  .  .  b6: IO-Link Port 6 enable  b7: IO-Link Port 7 enable |
| (6) | i\_uIOLinkEventsClear | Ports events clear | Word [Unsigned]/Bit String [16-bit] | 0000h to FFFFh | Select the BNI CIB-508-105-Z015 CC-Link IE Field Basic IO-Link Master IO-Link operating mode ports for which event data buffer clear will be performed.   * 0: Do not clear events * 1: Clear all events     b0: IO-Link Port 0 event clear  b1: IO-Link Port 1 event clear  .  .  .  b6: IO-Link Port 6 event clear  b7: IO-Link Port 7 event clear |
| (7) | i\_uIOLinkByteSwap | Byte swap setting | Word [Unsigned]/Bit String [16-bit] | 0000h to FFFFh | Specify the High byte/Low byte swap setting for each IO-Link port of the BNI CIB-508-105-Z015 CC-Link IE Field Basic IO-Link Master.   * High byte/Low byte swapping enabled:      * High byte/Low byte swapping disabled     Byte swap configuration data word structure:   * 0: Byte swapping disabled * 1: Byte swapping enabled     b0: IO-Link Port 0 byte swap  b1: IO-Link Port 1 byte swap  .  .  .  b6: IO-Link Port 6 byte swap  b7: IO-Link Port 7 byte swap |
| (8) | i\_bAutoOrManualIOCfg | Auto/Manual digital I/O ports configuration | Bit | ON, OFF | OFF: Automatic digital I/O ports configuration.  ON: Manual digital I/O ports configuration. |
| (9) | i\_uIOLinkOutputDataPort0 | Output Data port 0 | Word [Unsigned]/Bit String [16-bit](0..11) | - | Specify the start address of the memory area storing the output data that will be written to IO-Link Port 0 of the BNI CIB-508-105-Z015 CC-Link IE Field Basic IO-Link Master. |
| (10) | i\_uIOLinkOutputDataPort1 | Output Data port 1 | Word [Unsigned]/Bit String [16-bit](0..11) | - | Specify the start address of the memory area storing the output data that will be written to IO-Link Port 1 of the BNI CIB-508-105-Z015 CC-Link IE Field Basic IO-Link Master. |
| (11) | i\_uIOLinkOutputDataPort2 | Output Data port 2 | Word [Unsigned]/Bit String [16-bit](0..11) | - | Specify the start address of the memory area storing the output data that will be written to IO-Link Port 2 of the BNI CIB-508-105-Z015 CC-Link IE Field Basic IO-Link Master. |
| (12) | i\_uIOLinkOutputDataPort3 | Output Data port 3 | Word [Unsigned]/Bit String [16-bit](0..11) | - | Specify the start address of the memory area storing the output data that will be written to IO-Link Port 3 of the BNI CIB-508-105-Z015 CC-Link IE Field Basic IO-Link Master. |
| (13) | i\_uIOLinkOutputDataPort4 | Output Data port 4 | Word [Unsigned]/Bit String [16-bit](0..11) | - | Specify the start address of the memory area storing the output data that will be written to IO-Link Port 4 of the BNI CIB-508-105-Z015 CC-Link IE Field Basic IO-Link Master. |
| (14) | i\_uIOLinkOutputDataPort5 | Output Data port 5 | Word [Unsigned]/Bit String [16-bit](0..11) | - | Specify the start address of the memory area storing the output data that will be written to IO-Link Port 5 of the BNI CIB-508-105-Z015 CC-Link IE Field Basic IO-Link Master. |
| (15) | i\_uIOLinkOutputDataPort6 | Output Data port 6 | Word [Unsigned]/Bit String [16-bit](0..11) | - | Specify the start address of the memory area storing the output data that will be written to IO-Link Port 6 of the BNI CIB-508-105-Z015 CC-Link IE Field Basic IO-Link Master. |
| (16) | i\_uIOLinkOutputDataPort7 | Output Data port 7 | Word [Unsigned]/Bit String [16-bit](0..11) | - | Specify the start address of the memory area storing the output data that will be written to IO-Link Port 7 of the BNI CIB-508-105-Z015 CC-Link IE Field Basic IO-Link Master. |
| (17) | i\_bErrorReset | Error reset signal | Bit | ON, OFF | On the rising edge of this signal issue an error clear request to the BNI CIB-508-105-Z015 CC-Link IE Field Basic IO-Link Master. |
| (18) | i\_bWarningReset | Warning reset signal | Bit | ON, OFF | On the rising edge of this signal issue a warning clear request to the BNI CIB-508-105-Z015 CC-Link IE Field Basic IO-Link Master. |
| (19) | i\_bReInitialization | Re initialization signal | Bit | ON, OFF | On the rising edge of this signal issue a re-initialization request (Operation condition setting request) to the BNI CIB-508-105-Z015 CC-Link IE Field Basic IO-Link Master. |

##### I/O Labels

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| No. | Variable Name | Name | Data type | Setting Range | Description |
| (20) | io\_stLinkBasicIn1 | Frequency inverter cyclic input data area 1 | [stRemoteDataBasicIn](#_RJ71PB91V_stMgmtInputs) | - | Specifies the CC-Link IE Field Basic cyclic input data area structure storing the Remote inputs and Remote Read registers corresponding to the first occupied station of the BNI CIB-508-105-Z015 CC-Link IE Field Basic IO-Link Master (Profile 3). |
| (21) | io\_stLinkBasicOut1 | Frequency inverter cyclic output data area 1 | [stRemoteDataBasicOut](#_stRemoteRegBasicOut) | - | Specifies the CC-Link IE Field Basic cyclic output data area structure storing the Remote outputs and Remote Write registers corresponding to the first occupied station of the BNI CIB-508-105-Z015 CC-Link IE Field Basic IO-Link Master (Profile 3). |
| (22) | io\_stLinkBasicIn2 | Frequency inverter cyclic input data area 2 | [stRemoteDataBasicIn](#_RJ71PB91V_stMgmtInputs) | - | Specifies the CC-Link IE Field Basic cyclic input data area structure storing the Remote inputs and Remote Read registers corresponding to the second occupied station of the BNI CIB-508-105-Z015 CC-Link IE Field Basic IO-Link Master (Profile 3). |
| (23) | io\_stLinkBasicOut2 | Frequency inverter cyclic output data area 2 | [stRemoteDataBasicOut](#_stRemoteRegBasicOut) | - | Specifies the CC-Link IE Field Basic cyclic output data area structure storing the Remote outputs and Remote Write registers corresponding to the second occupied station of the BNI CIB-508-105-Z015 CC-Link IE Field Basic IO-Link Master (Profile 3). |
| (24) | io\_stLinkBasicIn3 | Frequency inverter cyclic input data area 3 | [stRemoteDataBasicIn](#_RJ71PB91V_stMgmtInputs) | - | Specifies the CC-Link IE Field Basic cyclic input data area structure storing the Remote inputs and Remote Read registers corresponding to the third occupied station of the BNI CIB-508-105-Z015 CC-Link IE Field Basic IO-Link Master (Profile 3). |
| (25) | io\_stLinkBasicOut3 | Frequency inverter cyclic output data area 3 | [stRemoteDataBasicOut](#_stRemoteRegBasicOut) | - | Specifies the CC-Link IE Field Basic cyclic output data area structure storing the Remote outputs and Remote Write registers corresponding to the third occupied station of the BNI CIB-508-105-Z015 CC-Link IE Field Basic IO-Link Master (Profile 3). |
| (26) | io\_stLinkBasicIn4 | Frequency inverter cyclic input data area 4 | [stRemoteDataBasicIn](#_RJ71PB91V_stMgmtInputs) | - | Specifies the CC-Link IE Field Basic cyclic input data area structure storing the Remote inputs and Remote Read registers corresponding to the fourth occupied station of the BNI CIB-508-105-Z015 CC-Link IE Field Basic IO-Link Master (Profile 3). |
| (27) | io\_stLinkBasicOut4 | Frequency inverter cyclic output data area 4 | [stRemoteDataBasicOut](#_stRemoteRegBasicOut) | - | Specifies the CC-Link IE Field Basic cyclic output data area structure storing the Remote outputs and Remote Write registers corresponding to the fourth occupied station of the BNI CIB-508-105-Z015 CC-Link IE Field Basic IO-Link Master (Profile 3). |

##### Output Labels

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| No. | Variable Name | Name | Data type | Setting Range | Description |
| (28) | o\_bENO | CC-Link IE Field Basic IO-Link Master control command output status | Bit | OFF | ON: CC-Link IE Field Basic IO-Link Master control command signal is active.  OFF: CC-Link IE Field Basic IO-Link Master control command signal is inactive. |
| (29) | o\_bDataLinkOk | Data link status | Bit | OFF | Signals if the data link with the BNI CIB-508-105-Z015 CC-Link IE Field Basic IO-Link Master station is up. |
| (30) | o\_bUnitReady | Unit operation status | Bit | OFF | Signals if the BNI CIB-508-105-Z015 CC-Link IE Field Basic IO-Link Master is initialized and ready for operation. |
| (31) | o\_bUnitError | Unit error status | Bit | OFF | Signals if an error has occurred during the BNI CIB-508-105-Z015 CC-Link IE Field Basic IO-Link Master initialization or operation. |
| (32) | o\_bUnitWarning | Unit warning status | Bit | OFF | Signals if a warning has occurred during the BNI CIB-508-105-Z015 CC-Link IE Field Basic IO-Link-Master initialization or operation. **Note:** This signal will be automatically cleared after a defined time (approx. 10 seconds). |
| (33) | o\_uUnitErrorCode | Unit error code | Word[Unsigned]/Bit String[16-bit] | 0000h | Stores the unit error code in case an error has occurred on the BNI CIB-508-105-Z015 CC-Link IE Field Basic IO-Link-Master.  For details of the error status, please refer to the [**Detail error check**.](#_List_of_Gateway) |
| (34) | o\_uUnitWarningCode | Unit warning code | Word[Unsigned]/Bit String[16-bit] | 0000h | Stores the unit warning code in case a warning has occurred on the BNI CIB-508-105-Z015 CC-Link IE Field Basic IO-Link-Master.  For details of the error status, please refer to the [**Detail error check**.](#_List_of_Gateway) |
| (35) | o\_bUSVoltageLow | US voltage low | Bit | OFF | Signal is ON if the US voltage is below 18V. |
| (36) | o\_bUAVoltageLow | UA voltage off | Bit | OFF | Signal is ON if the UA voltage is below 18V. |
| (37) | o\_bUAVoltageOff | UA voltage off | Bit | OFF | Signal is ON if the UA voltage is below 11V. |
| (38) | o\_bIOLinkReady | IO-Link control cycle status | Bit | OFF | Signals if the BNI CIB-508-105-Z015 CC-Link IE Field Basic IO-Link Master is operational and the IO-Link devices control cycle is in progress (IO-Link devices connected). |
| (39) | o\_uIOLinesDiagnostic | I/O signal lines status | Word[Unsigned]/Bit String[16-bit] | 0000h | Stores the error status of each BNI CIB-508-105-Z015 CC-Link IE Field Basic IO-Link Master port's I/O signal lines.   * 0: No error * 1: Error (over-current, short-circuit)     b0: Port 0 Pin 4 I/O line diagnostic  b1: Port 0 Pin 2 I/O line diagnostic  b2: Port 1 Pin 4 I/O line diagnostic  b3: Port 1 Pin 2 I/O line diagnostic  .  .  .  b14: Port 7 Pin 4 I/O line diagnostic  b15: Port 7 Pin 2 I/O line diagnostic |
| (40) | o\_uPortsDiagnostic | Power supply line status | Word[Unsigned]/Bit String[16-bit] | 0000h | Stores the error status of each BNI CIB-508-105-Z015 CC-Link IE Field Basic IO-Link Master port's power supply line.   * 0: No error * 1: Error (over-current, short-circuit)     b0: Port 0 Pin 1 power-supply diagnostic  b1: Port 1 Pin 1 power-supply diagnostic  .  .  .  b6: Port 6 Pin 1 power-supply diagnostic  b7: Port 7 Pin 1 power-supply diagnostic |
| (41) | o\_uDigitalInputs | Digital input signal lines status | Word[Unsigned]/Bit String[16-bit] | 0000h | Stores the digital input status read from the digital input signal lines (Pin 2 and Pin 4) of each BNI CIB-508-105-Z015 CC-Link IE Field Basic IO-Link Master port.   * 0: Digital input signal set to OFF * 1: Digital input signal set to ON     b0: Digital input signal Port 0 Pin 4  b1: Digital input signal Port 0 Pin 2  b2: Digital input signal Port 1 Pin 4  b3: Digital input signal Port 1 Pin 2  .  .  .  b14: Digital input signal Port 7 Pin 4  b15: Digital input signal Port 7 Pin 2 |
| (42) | o\_uIOLinkValidPorts | Validation Status | Word[Unsigned]/Bit String[16-bit] | 0000h | Stores the validation status of the IO-Link devices connected to the BNI CIB-508-105-Z015 CC-Link IE Field Basic IO-Link Master IO-Link operating mode ports.   * 0: IO-Link port invalid * 1: IO-Link port valid     b0: IO-Link Port 0 valid  b1: IO-Link Port 1 valid  .  .  .  b6: IO-Link Port 6 valid  b7: IO-Link Port 7 valid |
| (43) | o\_uIOLinkPortEvents | Event status | Word[Unsigned]/Bit String[16-bit] | 0000h | Stores the pending event status of the BNI CIB-508-105-Z015 CC-Link IE Field Basic IO-Link Master IO-Link operating mode ports.   * 0: No event * 1: Event from the connected IO-Link device     b0: IO-Link Port 0 event status  b1: IO-Link Port 1 event status  .  .  .  b6: IO-Link Port 6 event status  b7: IO-Link Port 7 event status |
| (44) | o\_uDataValidIOLinkPorts | Validation status | Word[Unsigned]/Bit String[16-bit] | 0000h | Stores the validation status of the process data sent using IO-Link communication for valid devices connected to the BNI CIB-508-105-Z015 CC-Link IE Field Basic IO-Link Master IO-Link operating mode ports.   * 0: Process data invalid * 1: Process data valid     b0: Data valid IO-Link Port 0  b1: Data valid IO-Link Port 1  .  .  .  b6: Data valid IO-Link Port 6  b7: Data valid IO-Link Port 7 |
| (45) | o\_uIOLinkInputDataPort0 | Input data port 0 | Word [Unsigned]/Bit String [16-bit](0..3) | - | Specify the start address of the memory area storing the input data read from IO-Link Port 0 of the BNI CIB-508-105-Z015 CC-Link IE Field Basic IO-Link Master. |
| (46) | o\_uIOLinkInputDataPort1 | Input data port 1 | Word [Unsigned]/Bit String [16-bit](0..3) | - | Specify the start address of the memory area storing the input data read from IO-Link Port 1 of the BNI CIB-508-105-Z015 CC-Link IE Field Basic IO-Link Master. |
| (47) | o\_uIOLinkInputDataPort2 | Input data port 2 | Word [Unsigned]/Bit String [16-bit](0..3) | - | Specify the start address of the memory area storing the input data read from IO-Link Port 2 of the BNI CIB-508-105-Z015 CC-Link IE Field Basic IO-Link Master. |
| (48) | o\_uIOLinkInputDataPort3 | Input data port 3 | Word [Unsigned]/Bit String [16-bit](0..3) | - | Specify the start address of the memory area storing the input data read from IO-Link Port 3 of the BNI CIB-508-105-Z015 CC-Link IE Field Basic IO-Link Master. |
| (49) | o\_uIOLinkInputDataPort4 | Input data port 4 | Word [Unsigned]/Bit String [16-bit](0..3) | - | Specify the start address of the memory area storing the input data read from IO-Link Port 4 of the BNI CIB-508-105-Z015 CC-Link IE Field Basic IO-Link Master. |
| (50) | o\_uIOLinkInputDataPort5 | Input data port 5 | Word [Unsigned]/Bit String [16-bit](0..3) | - | Specify the start address of the memory area storing the input data read from IO-Link Port 5 of the BNI CIB-508-105-Z015 CC-Link IE Field Basic IO-Link Master. |
| (51) | o\_uIOLinkInputDataPort6 | Input data port 6 | Word [Unsigned]/Bit String [16-bit](0..3) | - | Specify the start address of the memory area storing the input data read from IO-Link Port 6 of the BNI CIB-508-105-Z015 CC-Link IE Field Basic IO-Link Master. |
| (52) | o\_uIOLinkInputDataPort7 | Input data port 7 | Word [Unsigned]/Bit String [16-bit](0..3) | - | Specify the start address of the memory area storing the input data read from IO-Link Port 7 of the BNI CIB-508-105-Z015 CC-Link IE Field Basic IO-Link Master. |

#### FB details

|  |  |  |
| --- | --- | --- |
| Item | Description | |
| Applicable hardware and software | Applicable CPU | FX5U(C)/FX5UJ CPU |
| Applicable engineering tool | GX Works3 |
| Language | Function Block Diagram (FBD/LD) | |
| Number of basic steps | 653 steps  The number of steps of the FB in a program varies depending on the CPU module used, input and output definition, and the option settings of GX Works3. For the option settings of GX Works3, refer to the [GX Works3 Operating Manual](SH081215ENG). | |
| Function description and operation | This function block is used for performing initialization and control of a Balluff Network Interface BNI CIB-508-105-Z015 CC-Link IE Field Basic IO-Link Master configured as Profile 3 (4 occupied stations), using the MELSEC FX5U(C)/FX5UJ CPU built-in Ethernet/CC-Link IE Field Basic interface.  The function block provides the following functionality:   * Port direction selection (digital Input or Output) for each I/O signal line corresponding to the BNI CIB-508-105-Z015 CC-Link IE Field Basic IO-Link Master ports * Digital output data write to the I/O signal lines of the BNI CIB-508-105-Z015 CC-Link IE Field Basic IO-Link Master ports * Operating mode selection (IO-Link mode or digital I/O mode) for each BNI CIB-508-105-Z015 CC-Link IE Field Basic IO-Link Master IO-Link compatible port * Event data buffer clear for selected BNI CIB-508-105-Z015 CC-Link IE Field Basic IO-Link Master IO-Link operating mode ports * Automatic/manual digital I/O ports configuration selection * Automatic byte swap setting, on initialization processing, for all IO-Link ports of the BNI CIB-508-105-Z015 CC-Link IE Field Basic IO-Link Master * Output data write to the BNI CIB-508-105-Z015 CC-Link IE Field Basic IO-Link Master IO-Link operating mode ports * Clear the error status (Error clear request) of the BNI CIB-508-105-Z015 CC-Link IE Field Basic IO-Link Master * Re-Initialization (Operation condition setting request) of the BNI CIB-508-105-Z015 CC-Link IE Field Basic IO-Link Master's IO-Link operating mode ports * I/O signal lines diagnostic monitoring for the BNI CIB-508-105-Z015 CC-Link IE Field Basic IO-Link Master ports * Power-supply line diagnostic monitoring for the BNI CIB-508-105-Z015 CC-Link IE Field Basic IO-Link Master ports * Digital input data read from the I/O signal lines of the BNI CIB-508-105-Z015 CC-Link IE Field Basic IO-Link Master ports * Validation status monitoring for the IO-Link devices connected to the BNI CIB-508-105-Z015 CC-Link IE Field Basic IO-Link Master IO-Link operating mode ports * Process data validation status monitoring for IO-Link devices connected to the BNI CIB-508-105-Z015 CC-Link IE Field Basic IO-Link Master IO-Link operating mode ports * Pending event data status monitoring for the BNI CIB-508-105-Z015 CC-Link IE Field Basic IO-Link Master IO-Link operating mode ports * Input data read from the BNI CIB-508-105-Z015 CC-Link IE Field Basic IO-Link Master IO-Link operating mode ports. | |
| Restrictions and precautions | * The function block will only perform an automatic initialization (Initial data processing) each time the BNI CIB-508-105-Z015 CC-Link IE Field Basic IO-Link Master is powered ON, also setting the I/O signal lines direction and activating the IO-Link mode channels with their byte swap settings as configured by the <i\_uIOLinesDirection>, <i\_uIOLinkPortsEnable> and <i\_uIOLinkByteSwap> input labels respectively. * For any changes in validation settings, data storage configuration, an I/O signal line's direction (<i\_uIOLinesDirection> input label) or an IO-Link compatible port's operating mode selection (<i\_uIOLinkPortsEnable> input label) made during function block operation to come into effect, a BNI CIB-508-105-Z015 CC-Link IE Field Basic IO-Link Master re-initialization (rising edge of the <i\_bReInitialization> input label) will be required. | |
| FB compiling method | Macro | |
| FB operation type | Real-time execution | |
| Timing chart | * When the operation is completed successfully      * When the operation is completed with an error | |

## P+Balluff\_DetectDevicesCIB\_F

#### Name

P+Balluff\_DetectDevicesCIB\_F

#### Overview

|  |  |
| --- | --- |
| Item | Description |
| Function overview | Detects IO-Link devices connected to the ports of a Balluff Network Interface BNI CIB-508-105-Z015 CC-Link IE Field Basic IO-Link Master, using the MELSEC FX5U(C)/FX5UJ CPU built-in Ethernet/CC-Link IE Field Basic interface. |
| Symbol  [Function Block Diagram] |  |

#### Labels

##### Input Labels

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| No. | Variable Name | Name | Data type | Setting Range | Description |
| (1) | i\_bEN | Device detection start command | Bit | ON, OFF | ON: The IO-Link device detection command is enabled.  OFF: The IO-Link device detection command is disabled. |
| (2) | i\_udRemoteIPAddress | Remote IP address | Double Word [Unsigned]/Bit String [32-bit] | 1h to FFFFFFFFh | Specify the remote IP address of the BNI CIB-508-105-Z015 CC-Link IE Field Basic IO-Link Master. Specify the third and fourth octets to the 1st word, and first and second octets to the 2nd word. |
| (3) | i\_uStationNumber | IO-Link Master station number | Word [Unsigned]/Bit String [16-bit] | 1 to 16 | Specify the CC-Link IEF Basic station number of the BNI CIB-508-105-Z015 CC-Link IE Field Basic IO-Link Master. |

##### Output Labels

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| No. | Variable Name | Name | Data type | Default Value | Description |
| (4) | o\_bENO | Device detection command output status | Bit | OFF | ON: The IO-Link device detection command control signal is active.  OFF: The IO-Link device detection command control signal is inactive. |
| (5) | o\_bDataLinkOk | Data link status | Bit | OFF | ON: The data link with the BNI CIB-508-105-Z015 CC-Link IE Field Basic IO-Link Master station is active.  OFF: The data link with the BNI CIB-508-105-Z015 CC-Link IE Field Basic IO-Link Master station is inactive. |
| (6) | o\_bOK | Command completed | Bit | OFF | The signal turns ON for one program scan if the IO-Link device detection command is normally completed. |
| (7) | o\_bErr | Command error | Bit | OFF | The signal turns ON for one program scan if an error has occurred during the IO-Link device detection command execution. |
| (8) | o\_uCommErrID | Communication error code | Word [Unsigned]/Bit String [16-bit] | 0000h | Stores the error code if an error has occurred during the SLMP acyclic communication.  For details of the error status, please refer to the [MELSEC iQ-F FX5 User's Manual (Ethernet Communication)](JY997D56201). |
| (9) | o\_uIOLinkErrID | IO Link Error ID | Word [Unsigned]/Bit String [16-bit] | 0000h | Stores the error code if an error has occurred during the IO-Link command execution.  For details of the error status, please refer to the [**Detail error check**.](#_List_of_Gateway) |
| (10) | o\_st8DetectedDevices | Detected devices | [stDeviceIdent](#_stDeviceIdent)(0..7) | 0000h | Stores the information corresponding to detected IO-Link devices connected on the IO-Link ports of the BNI CIB-508-105-Z015 CC-Link IE Field Basic IO-Link Master. |
| (11) | o\_uNoOfDetectedDevices | Number of detected devices | Word [Unsigned]/Bit String [16-bit] | 0000h | Stores the number of detected devices. |

#### FB details

|  |  |  |
| --- | --- | --- |
| Item | Description | |
| Applicable hardware and software | Applicable CPU | FX5U(C)/FX5UJ CPU |
| Applicable engineering tool | GX Works3 |
| Language | Function Block Diagram (FBD/LD) | |
| Number of basic steps | 629 steps  The number of steps of the FB in a program varies depending on the CPU module used, input and output definition, and the option settings of GX Works3. For the option settings of GX Works3, refer to the [GX Works3 Operating Manual](SH081215ENG). | |
| Function description and operation | This function block is used for detecting IO-Link devices connected to the ports of the Balluff Network Interface BNI CIB-508-105-Z015 CC-Link IE Field Basic IO-Link Master via acyclic communication (SLMP), using the MELSEC FX5U(C)/FX5UJ CPU built-in Ethernet/CC-Link IE Field Basic interface.. | |
| Restrictions and precautions |  | |
| FB compiling method | Macro | |
| FB operation type | Real-time execution | |
| Timing chart | * When the operation is completed successfully      * When the operation is completed with an error | |

## P+Balluff\_ReadDataStorageContentCIB\_F

#### Name

P+Balluff\_ReadDataStorageContentCIB\_F

#### Overview

|  |  |
| --- | --- |
| Item | Description |
| Function overview | Reads the data storage content from the specified IO-Link port of a Balluff Network Interface BNI CIB-508-105-Z015 CC-Link IE Field Basic IO-Link Master, using the MELSEC FX5U(C)/FX5UJ CPU built-in Ethernet/CC-Link IE Field Basic interface. |
| Symbol  [Function Block Diagram] |  |

#### Labels

##### Input Labels

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| No. | Variable Name | Name | Data type | Setting Range | Description |
| (1) | i\_bEN | Read data storage content start command | Bit | ON, OFF | ON: The IO-Link port data storage content read command is enabled.  OFF: The IO-Link port data storage content read command is disabled. |
| (2) | i\_udRemoteIPAddress | Remote IP address | Double Word [Unsigned]/Bit String [32-bit] | 1h to FFFFFFFFh | Specify the remote IP address of the BNI CIB-508-105-Z015 CC-Link IE Field Basic IO-Link Master. Specify the third and fourth octets to the 1st word, and first and second octets to the 2nd word. |
| (3) | i\_uStationNumber | IO-Link Master station number | Word [Unsigned]/Bit String [16-bit] | 1 to 16 | Specify the CC-Link IEF Basic station number of the BNI CIB-508-105-Z015 CC-Link IE Field Basic IO-Link Master. |
| (4) | i\_uIOLinkPortNo | IO-Link port number | Word [Unsigned]/Bit String [16-bit] | 0 to 7 | Specify the IO-Link port number for which the data storage content is read. |

##### Output Labels

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| No. | Variable Name | Name | Data type | Default Value | Description |
| (5) | o\_bENO | Read data storage content command output status | Bit | OFF | ON: The IO-Link port data storage content read command control signal is active.  OFF: The IO-Link port data storage content read command control signal is inactive. |
| (6) | o\_bDataLinkOK | Data link status | Bit | OFF | ON: The data link with the BNI CIB-508-105-Z015 CC-Link IE Field Basic IO-Link Master station is active.  OFF: The data link with the BNI CIB-508-105-Z015 CC-Link IE Field Basic IO-Link Master station is inactive. |
| (7) | o\_bOK | Read completed | Bit | OFF | The signal turns ON for one program scan if the IO-Link port data storage content read command is normally completed. |
| (8) | o\_bErr | Read error | Bit | OFF | The signal turns ON for one program scan if an error has occurred during the IO-Link port data storage content read command execution. |
| (9) | o\_uCommErrID | Read error code | Word [Unsigned]/Bit String [16-bit] | 0000h | Stores the error code if an error has occurred during the SLMP acyclic communication.  For details of the error status, please refer to the [MELSEC iQ-F FX5 User's Manual (Ethernet Communication)](JY997D56201). |
| (10) | o\_uIOLinkErrID | IO-Link request error code | Word [Unsigned]/Bit String [16-bit] | 0000h | Stores the error code if an error has occurred during the IO-Link command execution.  For details of the error status, please refer to the [**Detail error check**](#_List_of_Gateway). |
| (11) | o\_u1024DataStorage | Data Storage | Word [Unsigned]/Bit String [16-bit](0..1023) | - | Specify the memory area where the data storage content read from the selected IO-Link port of the BNI CIB-508-105-Z015 CC-Link IE Field Basic IO-Link Master will be stored.  The actual data is always constructed in the same way:   * Index LSB + Index MSB + Subindex + Length + Parameter (if present) |

#### FB details

|  |  |  |
| --- | --- | --- |
| Item | Description | |
| Applicable hardware and software | Applicable CPU | FX5U(C)/FX5UJ CPU |
| Applicable engineering tool | GX Works3 |
| Language | Function Block Diagram (FBD/LD) | |
| Number of basic steps | 766 steps  The number of steps of the FB in a program varies depending on the CPU module used, input and output definition, and the option settings of GX Works3. For the option settings of GX Works3, refer to the [GX Works3 Operating Manual](SH081215ENG). | |
| Function description | This function block is used for reading the data storage content from the specified IO-Link port of the Balluff Network Interface BNI CIB-508-105-Z015 CC-Link IE Field Basic IO-Link Master via acyclic communication (SLMP), using the MELSEC FX5U(C)/FX5UJ CPU built-in Ethernet/CC-Link IE Field Basic interface. | |
| Restrictions and precautions |  | |
| FB compiling method | Macro | |
| FB operation type | Real-time execution | |
| Timing chart | * When the operation is completed successfully      * When the operation is completed with an error | |

## P+Balluff\_ReadDataStorageSettingsCIB\_F

#### Name

P+Balluff\_ReadDataStorageSettingsCIB\_F

#### Overview

|  |  |
| --- | --- |
| Item | Description |
| Function overview | Reads the data storage setting configuration for the specified IO-Link port of a Balluff Network Interface BNI CIB-508-105-Z015 CC-Link IE Field Basic IO-Link Master, using the MELSEC FX5U(C)/FX5UJ CPU built-in Ethernet/CC-Link IE Field Basic interface. |
| Symbol  [Function Block Diagram] |  |

#### Labels

##### Input Labels

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| No. | Variable Name | Name | Data type | Setting Range | Description |
| (1) | i\_bEN | Read data storage settings start command | Bit | ON, OFF | ON: The IO-Link port data storage settings read command is enabled.  OFF: The IO-Link port data storage settings read command is disabled. |
| (2) | i\_udRemoteIPAddress | Remote IP address | Double Word [Unsigned]/Bit String [32-bit] | 1h to FFFFFFFFh | Specify the remote IP address of the BNI CIB-508-105-Z015 CC-Link IE Field Basic IO-Link Master. Specify the third and fourth octets to the 1st word, and first and second octets to the 2nd word. |
| (3) | i\_uStationNumber | IO-Link Master station number | Word [Unsigned]/Bit String [16-bit] | 1 to 16 | Specify the CC-Link IEF Basic station number of the BNI CIB-508-105-Z015 CC-Link IE Field Basic IO-Link Master. |
| (4) | i\_uIOLinkPortNo | IO-Link port number | Word [Unsigned]/Bit String [16-bit] | 0 to 7 | Specify the IO-Link port number for which the data storage settings are read. |

##### Output Labels

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| No. | Variable Name | Name | Data type | Default Value | Description |
| (5) | o\_bENO | Read data storage settings command output status | Bit | OFF | ON: The IO-Link port data storage settings read command control signal is active.  OFF: The IO-Link port data storage settings read command control signal is inactive. |
| (6) | o\_bDataLinkOK | Data link status | Bit | OFF | ON: The data link with the BNI CIB-508-105-Z015 CC-Link IE Field Basic IO-Link Master station is active.  OFF: The data link with the BNI CIB-508-105-Z015 CC-Link IE Field Basic IO-Link Master station is inactive. |
| (7) | o\_bOK | Read completed | Bit | OFF | The signal turns ON for one program scan if the IO-Link port data storage settings read command is normally completed. |
| (8) | o\_bErr | Read error | Bit | OFF | The signal turns ON for one program scan if an error has occurred during the IO-Link port data storage settings read command execution. |
| (9) | o\_uCommErrID | Read error code | Word [Unsigned]/Bit String [16-bit] | 0000h | Stores the error code if an error has occurred during the SLMP acyclic communication.  For details of the error status, please refer to the [MELSEC iQ-F FX5 User's Manual (Ethernet Communication)](JY997D56201). |
| (10) | o\_uIOLinkErrID | IO-Link request error code | Word [Unsigned]/Bit String [16-bit] | 0000h | Stores the error code if an error has occurred during the IO-Link command execution.  For details of the error status, please refer to the [**Detail error check**](#_List_of_Gateway). |
| (11) | o\_bDataStorageSetup | Data storage function status | Bit | OFF | Stores the data storage function status (enabled or disabled) for the specified IO-Link port of the BNI CIB-508-105-Z015 CC-Link IE Field Basic IO-Link Master.   * OFF: Data storage function disabled * ON: Data storage function enabled |
| (12) | o\_bDataStorageUpload | Data storage upload status | Bit | OFF | Stores the data storage upload status (enabled or disabled) for the specified IO-Link port of the BNI CIB-508-105-Z015 CC-Link IE Field Basic IO-Link Master.   * OFF: Data storage upload disabled * ON: Data storage upload enabled |
| (13) | o\_bDataStorageDownload | Data storage download status | Bit | OFF | Stores the data storage download status (enabled or disabled) for the specified IO-Link port of the BNI CIB-508-105-Z015 CC-Link IE Field Basic IO-Link Master.   * OFF: Data storage download disabled * ON: Data storage download enabled |
| (14) | o\_bDataStorageClear | Data storage clear status | Bit | OFF | Stores the data storage clear status (enabled or disabled) for the specified IO-Link port of the BNI CIB-508-105-Z015 CC-Link IE Field Basic IO-Link Master.   * OFF: Data storage clear disabled * ON: Data storage clear enabled |

#### FB details

|  |  |  |
| --- | --- | --- |
| Item | Description | |
| Applicable hardware and software | Applicable CPU | FX5U(C)/FX5UJ CPU |
| Applicable engineering tool | GX Works3 |
| Language | Function Block Diagram (FBD/LD) | |
| Number of basic steps | 570 steps  The number of steps of the FB in a program varies depending on the CPU module used, input and output definition, and the option settings of GX Works3. For the option settings of GX Works3, refer to the [GX Works3 Operating Manual](SH081215ENG). | |
| Function description and operation | This function block is used for reading the data storage setting configuration for the specified IO-Link port of a Balluff Network Interface BNI CIB-508-105-Z015 CC-Link IE Field Basic IO-Link Master via acyclic communication (SLMP), using the MELSEC FX5U(C)/FX5UJ CPU built-in Ethernet/CC-Link IE Field Basic interface. | |
| Restrictions and precautions |  | |
| FB compiling method | Macro | |
| FB operation type | Real-time execution | |
| Timing chart | * When the operation is completed successfully      * When the operation is completed with an error | |

## P+Balluff\_ReadEventDataCIB\_F

#### Name

P+Balluff\_ReadEventDataCIB\_F

#### Overview

|  |  |
| --- | --- |
| Item | Description |
| Function overview | Reads pending event data from the event buffer assigned to the specified IO-Link port of a Balluff Network Interface BNI CIB-508-105-Z015 CC-Link IE Field Basic IO-Link Master, using the MELSEC FX5U(C)/FX5UJ CPU built-in Ethernet/CC-Link IE Field Basic interface. |
| Symbol  [Function Block Diagram] |  |

#### Labels

##### Input Labels

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| No. | Variable Name | Name | Data type | Setting Range | Description |
| (1) | i\_bEN | Read event data start command | Bit | ON, OFF | ON: The IO-Link port event data read command is enabled.  OFF: The IO-Link port event data read command is disabled. |
| (2) | i\_udRemoteIPAddress | Remote IP address | Double Word [Unsigned]/Bit String [32-bit] | 1h to FFFFFFFFh | Specify the remote IP address of the BNI CIB-508-105-Z015 CC-Link IE Field Basic IO-Link Master. Specify the third and fourth octets to the 1st word, and first and second octets to the 2nd word. |
| (3) | i\_uStationNumber | IO-Link Master station number | Word [Unsigned]/Bit String [16-bit] | 1 to 16 | Specify the CC-Link IEF Basic station number of the BNI CIB-508-105-Z015 CC-Link IE Field Basic IO-Link Master. |
| (4) | i\_uIOLinkPortNo | IO-Link port number | Word [Unsigned]/Bit String [16-bit] | 0 to 7 | Specify the IO-Link port number for which the event data is read. |

##### Output Labels

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| No. | Variable Name | Name | Data type | Default Value | Description |
| (5) | o\_bENO | Read event data command output status | Bit | OFF | ON: The IO-Link port event data read command control signal is active.  OFF: The IO-Link port event data read command control signal is inactive. |
| (6) | o\_bDataLinkOK | Data link status | Bit | OFF | ON: The data link with the BNI CIB-508-105-Z015 CC-Link IE Field Basic IO-Link Master station is active.  OFF: The data link with the BNI CIB-508-105-Z015 CC-Link IE Field Basic IO-Link Master station is inactive. |
| (7) | o\_bOK | Read completed | Bit | OFF | The signal turns ON for one program scan if the IO-Link port event data read command is normally completed. |
| (8) | o\_bErr | Read error | Bit | OFF | The signal turns ON for one program scan if an error has occurred during the IO-Link port event data read command execution. |
| (9) | o\_uCommErrID | Read error code | Word [Unsigned]/Bit String [16-bit] | 0000h | Stores the error code if an error has occurred during the SLMP acyclic communication.  For details of the error status, please refer to the [MELSEC iQ-F FX5 User's Manual (Ethernet Communication)](JY997D56201). |
| (10) | o\_uIOLinkErrID | IO-Link request error code | Word [Unsigned]/Bit String [16-bit] | 0000h | Stores the error code if an error has occurred during the IO-Link command execution.  For details of the error status, please refer to the [**Detail error check**](#_List_of_Gateway). |
| (11) | o\_uEventQualifier | Event qualifier | Word [Unsigned]/Bit String [16-bit] | 0000h | Stores the event qualifier code read for the specified IO-Link port. |
| (12) | o\_uEventCode | Event code | Word [Unsigned]/Bit String [16-bit] | 0000h | Stores the event data code read for the specified IO-Link port. |

#### FB details

|  |  |  |
| --- | --- | --- |
| Item | Description | |
| Applicable hardware and software | Applicable CPU | FX5U(C)/FX5UJ CPU |
| Applicable engineering tool | GX Works3 |
| Language | Function Block Diagram (FBD/LD) | |
| Number of basic steps | 600 steps  The number of steps of the FB in a program varies depending on the CPU module used, input and output definition, and the option settings of GX Works3. For the option settings of GX Works3, refer to the [GX Works3 Operating Manual](SH081215ENG). | |
| Function description and operation | This function block is used for reading pending event data from the event buffer assigned to the specified IO-Link port of a Balluff Network Interface BNI CIB-508-105-Z015 CC-Link IE Field Basic IO-Link Master via acyclic communication (SLMP), using the MELSEC FX5U(C)/FX5UJ CPU built-in Ethernet/CC-Link IE Field Basic interface.  The event data consists of two components, each stored in a data word:     • Event qualifier     • Event code.  The event qualifier and event code values range along with their corresponding description vary depending on the IO-Link module connected through the specified IO-Link port.  A pending event is indicated by the <o\_uIOLinkPortEvents> output label of the [**P+Balluff\_CCLinkIEFieldBasicIOLinkP1**](#_MEU+RCPU_CCLinkIEfieldBasicIOLinkP1)**\_F**, [**P+Balluff\_CCLinkIEFieldBasicIOLinkP2\_F** or  **P+Balluff\_CCLinkIEFieldBasicIOLinkP3**](#_MEU+RCPU_CCLinkIEFieldBasicIOLinkP3)**\_F** function blocks. Once the event is read, if the corresponding's IO-Link port event buffer is clear, the IO-Link channel event status changes to 0. | |
| Restrictions and precautions |  | |
| FB compiling method | Macro | |
| FB operation type | Real-time execution | |
| Timing chart | * When the operation is completed successfully      * When the operation is completed with an error | |

## P+Balluff\_ReadIdentificationDataCIB\_F

#### Name

P+Balluff\_ReadIdentificationDataCIB\_F

#### Overview

|  |  |
| --- | --- |
| Item | Description |
| Function overview | Reads the module identification data of the Balluff Network Interface BNI CIB-508-105-Z015 CC-Link IE Field Basic IO-Link Master, using the MELSEC FX5U(C)/FX5UJ CPU built-in Ethernet/CC-Link IE Field Basic interface. |
| Symbol  [Function Block Diagram] |  |

#### Labels

##### Input Labels

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| No. | Variable Name | Name | Data type | Setting Range | Description |
| (1) | i\_bEN | Read identification data start command | Bit | ON, OFF | ON: The BNI CIB-508-105-Z015 CC-Link IE Field Basic IO-Link Master identification data read command is enabled.  OFF: The BNI CIB-508-105-Z015 CC-Link IE Field Basic IO-Link Master identification data read command is disabled. |
| (2) | i\_udRemoteIPAddress | Remote IP address | Double Word [Unsigned]/Bit String [32-bit] | 1h to FFFFFFFFh | Specify the remote IP address of the BNI CIB-508-105-Z015 CC-Link IE Field Basic IO-Link Master. Specify the third and fourth octets to the 1st word, and first and second octets to the 2nd word. |
| (3) | i\_uStationNumber | IO-Link Master station number | Word [Unsigned]/Bit String [16-bit] | 1 to 16 | Specify the CC-Link IEF Basic station number of the BNI CIB-508-105-Z015 CC-Link IE Field Basic IO-Link Master. |

##### Output Labels

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| No. | Variable Name | Name | Data type | Default Value | Description |
| (4) | o\_bENO | Read identification data command output status | Bit | OFF | ON: The BNI CIB-508-105-Z015 CC-Link IE Field Basic IO-Link Master identification data read command control signal is active.  OFF: The BNI CIB-508-105-Z015 CC-Link IE Field Basic IO-Link Master identification data read command control signal is inactive. |
| (5) | o\_bDataLinkOK | Data link status | Bit | OFF | ON: The data link with the BNI CIB-508-105-Z015 CC-Link IE Field Basic IO-Link Master station is active.  OFF: The data link with the BNI CIB-508-105-Z015 CC-Link IE Field Basic IO-Link Master station is inactive. |
| (6) | o\_bOK | Read completed | Bit | OFF | The signal turns ON for one program scan if the BNI CIB-508-105-Z015 CC-Link IE Field Basic IO-Link Master identification data read command is normally completed. |
| (7) | o\_bErr | Read error | Bit | OFF | The signal turns ON for one program scan if an error has occurred during the BNI CIB-508-105-Z015 CC-Link IE Field Basic IO-Link Master identification data read command execution. |
| (8) | o\_uCommErrID | Read error code | Word [Unsigned]/Bit String [16-bit] | 0000h | Stores the error code if an error has occurred during the SLMP acyclic communication.  For details of the error status, please refer to the [MELSEC iQ-F FX5 User's Manual (Ethernet Communication)](JY997D56201). |
| (9) | o\_uIOLinkErrID | IO-Link request error code | Word [Unsigned]/Bit String [16-bit] | 0000h | Stores the error code if an error has occurred during the IO-Link command execution.  For details of the error status, please refer to the [**Detail error check**](#_List_of_Gateway). |
| (10) | o\_sManufacturerName | Manufacturer name | String (56) | - | Stores the manufacturer name for the BNI CIB-508-105-Z015 CC-Link IE Field Basic IO-Link Master. |
| (11) | o\_sManufacturerText | Manufacturer text | String (56) | - | Stores the manufacturer text for the BNI CIB-508-105-Z015 CC-Link IE Field Basic IO-Link Master. |
| (12) | o\_sProductName | Product name | String (56) | - | Stores the product name (website for example) for the BNI CIB-508-105-Z015 CC-Link IE Field Basic IO-Link Master. |
| (13) | o\_udProductID | Product ID | Double Word [Unsigned]/Bit String [32-bit] | 00000000h | Stores the product ID for the BNI CIB-508-105-Z015 CC-Link IE Field Basic IO-Link Master. |
| (14) | o\_sProductText | Product text | String (56) | - | Stores the product text for the BNI CIB-508-105-Z015 CC-Link IE Field Basic IO-Link Master. |

#### FB details

|  |  |  |
| --- | --- | --- |
| Item | Description | |
| Applicable hardware and software | Applicable CPU | FX5U(C)/FX5UJ CPU |
| Applicable engineering tool | GX Works3 |
| Language | Function Block Diagram (FBD/LD) | |
| Number of basic steps | 576 steps  The number of steps of the FB in a program varies depending on the CPU module used, input and output definition, and the option settings of GX Works3. For the option settings of GX Works3, refer to the [GX Works3 Operating Manual](SH081215ENG). | |
| Function description and operation | This function block is used for reading the module identification data of the Balluff Network Interface BNI CIB-508-105-Z015 CC-Link IE Field Basic IO-Link Master via acyclic communication (SLMP), using the MELSEC FX5U(C)/FX5UJ CPU built-in Ethernet/CC-Link IE Field Basic interface. | |
| Restrictions and precautions |  | |
| FB compiling method | Macro | |
| FB operation type | Real-time execution | |
| Timing chart | * When the operation is completed successfully      * When the operation is completed with an error | |

## P+Balluff\_ReadInitOperationSettingCIB\_F

#### Name

P+Balluff\_ReadInitOperationSettingCIB\_F

#### Overview

|  |  |
| --- | --- |
| Item | Description |
| Function overview | Reads the initial processing enable/disable setting of a Balluff Network Interface BNI CIB-508-105-Z015 CC-Link IE Field Basic IO-Link Master, using the MELSEC FX5U(C)/FX5UJ CPU built-in Ethernet/CC-Link IE Field Basic interface. |
| Symbol  [Function Block Diagram] |  |

#### Labels

##### Input Labels

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| No. | Variable Name | Name | Data type | Setting Range | Description |
| (1) | i\_bEN | Read initial operation setting start command | Bit | ON, OFF | ON: The BNI CIB-508-105-Z015 CC-Link IE Field Basic IO-Link Master initial operation setting read command is enabled.  OFF: The BNI CIB-508-105-Z015 CC-Link IE Field Basic IO-Link Master initial operation setting read command is disabled. |
| (2) | i\_udRemoteIPAddress | Remote IP address | Double Word [Unsigned]/Bit String [32-bit] | 1h to FFFFFFFFh | Specify the remote IP address of the BNI CIB-508-105-Z015 CC-Link IE Field Basic IO-Link Master. Specify the third and fourth octets to the 1st word, and first and second octets to the 2nd word. |
| (3) | i\_uStationNumber | IO-Link Master station number | Word [Unsigned]/Bit String [16-bit] | 1 to 16 | Specify the CC-Link IEF Basic station number of the BNI CIB-508-105-Z015 CC-Link IE Field Basic IO-Link Master. |

##### Output Labels

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| No. | Variable Name | Name | Data type | Default Value | Description |
| (4) | o\_bENO | Read initial operation setting command output status | Bit | OFF | ON: The BNI CIB-508-105-Z015 CC-Link IE Field Basic IO-Link Master initial operation setting read command control signal is active.  OFF: The BNI CIB-508-105-Z015 CC-Link IE Field Basic IO-Link Master initial operation setting read command control signal is inactive. |
| (5) | o\_bDataLinkOK | Data link status | Bit | OFF | ON: The data link with the BNI CIB-508-105-Z015 CC-Link IE Field Basic IO-Link Master station is active.  OFF: The data link with the BNI CIB-508-105-Z015 CC-Link IE Field Basic IO-Link Master station is inactive. |
| (6) | o\_bOK | Read completed | Bit | OFF | The signal turns ON for one program scan if the BNI CIB-508-105-Z015 CC-Link IE Field Basic IO-Link Master initial operation setting read command is normally completed. |
| (7) | o\_bErr | Read error | Bit | OFF | The signal turns ON for one program scan if an error has occurred during the BNI CIB-508-105-Z015 CC-Link IE Field Basic IO-Link Master initial operation setting read command execution. |
| (8) | o\_uCommErrID | Read error code | Word [Unsigned]/Bit String [16-bit] | 0000h | Stores the error code if an error has occurred during the SLMP acyclic communication.  For details of the error status, please refer to the [MELSEC iQ-F FX5 User's Manual (Ethernet Communication)](JY997D56201). |
| (9) | o\_uIOLinkErrID | IO-Link request error code | Word [Unsigned]/Bit String [16-bit] | 0000h | Stores the error code if an error has occurred during the IO-Link command execution.  For details of the error status, please refer to the [**Detail error check**](#_List_of_Gateway). |
| (10) | o\_bInitOperationSetting | Initial operation status | Bit | OFF | Stores the requested initial operation setting status for the BNI CIB-508-105-Z015 CC-Link IE Field Basic IO-Link Master.   * ON: No Initial processing request flag necessary. After booting up the device goes to "Ready" mode. The ports are configured as inputs. * OFF: The device can only be brought to "Ready" mode by means of the "Initial processing request flag". |

#### FB details

|  |  |  |
| --- | --- | --- |
| Item | Description | |
| Applicable hardware and software | Applicable CPU | FX5U(C)/FX5UJ CPU |
| Applicable engineering tool | GX Works3 |
| Language | Function Block Diagram (FBD/LD) | |
| Number of basic steps | 551 steps  The number of steps of the FB in a program varies depending on the CPU module used, input and output definition, and the option settings of GX Works3. For the option settings of GX Works3, refer to the [GX Works3 Operating Manual](SH081215ENG). | |
| Function description and operation | This function block is used for reading the initial processing enable/disable setting of a Balluff Network Interface BNI CIB-508-105-Z015 CC-Link IE Field Basic IO-Link Master via acyclic communication (SLMP), using the MELSEC FX5U(C)/FX5UJ CPU built-in Ethernet/CC-Link IE Field Basic interface. | |
| Restrictions and precautions |  | |
| FB compiling method | Macro | |
| FB operation type | Real-time execution | |
| Timing chart | * When the operation is completed successfully      * When the operation is completed with an error | |

## P+Balluff\_ReadISDUDataCIB\_F

#### Name

P+Balluff\_ReadISDUDataCIB\_F

#### Overview

|  |  |
| --- | --- |
| Item | Description |
| Function overview | Reads the IO-Link parameter data for a specified IO-Link port of a Balluff Network Interface BNI CIB-508-105-Z015 CC-Link IE Field Basic IO-Link Master, using the MELSEC FX5U(C)/FX5UJ CPU built-in Ethernet/CC-Link IE Field Basic interface. |
| Symbol  [Function Block Diagram] |  |

#### Labels

##### Input Labels

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| No. | Variable Name | Name | Data type | Setting Range | Description |
| (1) | i\_bEN | Read ISDU data start command | Bit | ON, OFF | ON: The IO-Link port parameter data read command is enabled.  OFF: The IO-Link port parameter data read command is disabled. |
| (2) | i\_udRemoteIPAddress | Remote IP address | Double Word [Unsigned]/Bit String [32-bit] | 1h to FFFFFFFFh | Specify the remote IP address of the BNI CIB-508-105-Z015 CC-Link IE Field Basic IO-Link Master. Specify the third and fourth octets to the 1st word, and first and second octets to the 2nd word. |
| (3) | i\_uStationNumber | IO-Link Master station number | Word [Unsigned]/Bit String [16-bit] | 1 to 16 | Specify the CC-Link IEF Basic station number of the BNI CIB-508-105-Z015 CC-Link IE Field Basic IO-Link Master. |
| (4) | i\_uIOLinkPortNo | IO-Link port number | Word [Unsigned]/Bit String [16-bit] | 0 to 7 | Specify the IO-Link port number from which the parameter data is read. |
| (5) | i\_uIndex | Index | Word [Unsigned]/Bit String [16-bit] | 0 to 65535 | Specify the index (start) address of the IO-Link parameter object from which data will be read using a BNI CIB-508-105-Z015 CC-Link IE Field Basic IO-Link Master Read Device Parameter/ISDU request. |
| (6) | i\_uSubIndex | Subindex | Word [Unsigned]/Bit String [16-bit] | 0 to 255 | Specify the subindex (offset) address of the IO-Link parameter object data element to be read using a BNI CIB-508-105-Z015 CC-Link IE Field Basic IO-Link Master Read Device Parameter/ISDU request. |

##### Output Labels

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| No. | Variable Name | Name | Data type | Default Value | Description |
| (7) | o\_bENO | Read ISDU data command output status | Bit | OFF | ON: The IO-Link port parameter data read command control signal is active.  OFF: The IO-Link port parameter data read command control signal is inactive. |
| (8) | o\_bDataLinkOK | Data link status | Bit | OFF | ON: The data link with the BNI CIB-508-105-Z015 CC-Link IE Field Basic IO-Link Master station is active.  OFF: The data link with the BNI CIB-508-105-Z015 CC-Link IE Field Basic IO-Link Master station is inactive. |
| (9) | o\_bOK | Read completed | Bit | OFF | The signal turns ON for one program scan if the BNI CIB-508-105-Z015 CC-Link IE Field Basic IO-Link Master ISDU data read command is normally completed. |
| (10) | o\_bErr | Read error | Bit | OFF | The signal turns ON for one program scan if an error has occurred during the BNI CIB-508-105-Z015 CC-Link IE Field Basic IO-Link Master ISDU data read command execution. |
| (11) | o\_uCommErrID | Read error code | Word [Unsigned]/Bit String [16-bit] | 0000h | Stores the error code if an error has occurred during the SLMP acyclic communication.  For details of the error status, please refer to the [MELSEC iQ-F FX5 User's Manual (Ethernet Communication)](JY997D56201). |
| (12) | o\_uIOLinkErrID | IO-Link request error code | Word [Unsigned]/Bit String [16-bit] | 0000h | Stores the error code if an error has occurred during the IO-Link command execution.  For details of the error status, please refer to the [**Detail error check**](#_List_of_Gateway). |
| (13) | o\_uISDUReadErrID | ISDU Error ID | Word [Unsigned]/Bit String [16-bit] | 0000h | Stores the ISDU request data read error code. |
| (14) | o\_uISDUDataRead | IO-Link parameter data | Word [Unsigned]/Bit String [16-bit] | OFF | Specify the head address of the memory area storing the IO-Link parameter data read from the BNI CIB-508-105-Z015 CC-Link IE Field Basic IO-Link Master using a Read Device Parameter/ISDU request. |
| (15) | o\_uISDUDataLength | Data length | Word [Unsigned]/Bit String [16-bit] | 0 to 232 | Stores the length of the IO-Link parameter data read from the BNI CIB-508-105-Z015 CC-Link IE Field Basic IO-Link Master in BYTE units. |

#### FB details

|  |  |  |
| --- | --- | --- |
| Item | Description | |
| Applicable hardware and software | Applicable CPU | FX5U(C)/FX5UJ CPU |
| Applicable engineering tool | GX Works3 |
| Language | Function Block Diagram (FBD/LD) | |
| Number of basic steps | 625 steps  The number of steps of the FB in a program varies depending on the CPU module used, input and output definition, and the option settings of GX Works3. For the option settings of GX Works3, refer to the [GX Works3 Operating Manual](SH081215ENG). | |
| Function description and operation | This function block is used for reading the IO-Link parameter data for a specified IO-Link port of a Balluff Network Interface BNI CIB-508-105-Z015 CC-Link IE Field Basic IO-Link Master via acyclic communication (SLMP), using the MELSEC FX5U(C)/FX5UJ CPU built-in Ethernet/CC-Link IE Field Basic interface.   * To perform IO-Link parameter data read, the function block sends a Read Device Parameters/ISDU(Index Service Data Unit) request to the gateway. * An IO-Link parameter data object is addressed in an ISDU request through an **Index** and a **SubIndex** (if the parameter data object contains multiple data elements). | |
| Restrictions and precautions |  | |
| FB compiling method | Macro | |
| FB operation type | Real-time execution | |
| Timing chart | * When the operation is completed successfully      * When the operation is completed with an error | |

## P+Balluff\_ReadOutputHoldSettingCIB\_F

#### Name

P+Balluff\_ReadOutputHoldSettingCIB\_F

#### Overview

|  |  |
| --- | --- |
| Item | Description |
| Function overview | Reads the outputs hold/clear setting of a Balluff Network Interface BNI CIB-508-105-Z015 CC-Link IE Field Basic IO-Link Master, using the MELSEC FX5U(C)/FX5UJ CPU built-in Ethernet/CC-Link IE Field Basic interface. |
| Symbol  [Function Block Diagram] |  |

#### Labels

##### Input Labels

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| No. | Variable Name | Name | Data type | Setting Range | Description |
| (1) | i\_bEN | Read output hold/clear settings start command | Bit | ON, OFF | ON: The BNI CIB-508-105-Z015 CC-Link IE Field Basic IO-Link Master output hold/clear setting read command is enabled.  OFF: The BNI CIB-508-105-Z015 CC-Link IE Field Basic IO-Link Master output hold/clear setting read command is disabled. |
| (2) | i\_udRemoteIPAddress | Remote IP address | Double Word [Unsigned]/Bit String [32-bit] | 1h to FFFFFFFFh | Specify the remote IP address of the BNI CIB-508-105-Z015 CC-Link IE Field Basic IO-Link Master. Specify the third and fourth octets to the 1st word, and first and second octets to the 2nd word. |
| (3) | i\_uStationNumber | IO-Link Master station number | Word [Unsigned]/Bit String [16-bit] | 1 to 16 | Specify the CC-Link IEF Basic station number of the BNI CIB-508-105-Z015 CC-Link IE Field Basic IO-Link Master. |

##### Output Labels

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| No. | Variable Name | Name | Data type | Default Value | Description |
| (4) | o\_bENO | Read output hold/clear settings command output status | Bit | OFF | ON: The BNI CIB-508-105-Z015 CC-Link IE Field Basic IO-Link Master output hold/clear setting read command control signal is active.  OFF: The BNI CIB-508-105-Z015 CC-Link IE Field Basic IO-Link Master output hold/clear setting read command control signal is inactive. |
| (5) | o\_bDataLinkOK | Data link status | Bit | OFF | ON: The data link with the BNI CIB-508-105-Z015 CC-Link IE Field Basic IO-Link Master station is active.  OFF: The data link with the BNI CIB-508-105-Z015 CC-Link IE Field Basic IO-Link Master station is inactive. |
| (6) | o\_bOK | Read completed | Bit | OFF | The signal turns ON for one program scan if the outputs hold/clear setting read command is normally completed. |
| (7) | o\_bErr | Read error | Bit | OFF | The signal turns ON for one program scan if an error has occurred during the outputs hold/clear setting read command execution. |
| (8) | o\_uCommErrID | Read error code | Word [Unsigned]/Bit String [16-bit] | 0000h | Stores the error code if an error has occurred during the SLMP acyclic communication.  For details of the error status, please refer to the [MELSEC iQ-F FX5 User's Manual (Ethernet Communication)](JY997D56201). |
| (9) | o\_uIOLinkErrID | IO-Link request error code | Word [Unsigned]/Bit String [16-bit] | 0000h | Stores the error code if an error has occurred during the IO-Link command execution.  For details of the error status, please refer to the [**Detail error check**](#_List_of_Gateway). |
| (10) | o\_bHoldClear | Output hold/clear status | Bit | OFF | Stores the requested outputs hold/clear setting for the BNI CIB-508-105-Z015 CC-Link IE Field Basic IO-Link Master.   * ON: The last state of the outputs is held when the module is disconnected from the fieldbus network or the CPU is in the STOP state. * OFF: The outputs are reset when the named events occur. |

#### FB details

|  |  |  |
| --- | --- | --- |
| Item | Description | |
| Applicable hardware and software | Applicable CPU | FX5U(C)/FX5UJ CPU |
| Applicable engineering tool | GX Works3 |
| Language | Function Block Diagram (FBD/LD) | |
| Number of basic steps | 551 steps  The number of steps of the FB in a program varies depending on the CPU module used, input and output definition, and the option settings of GX Works3. For the option settings of GX Works3, refer to the [GX Works3 Operating Manual](SH081215ENG). | |
| Function description | This function block is used for reading the outputs hold/clear setting of a Balluff Network Interface BNI CIB-508-105-Z015 CC-Link IE Field Basic IO-Link Master via acyclic communication (SLMP), using the MELSEC FX5U(C)/FX5UJ CPU built-in Ethernet/CC-Link IE Field Basic interface. | |
| Restrictions and precautions |  | |
| FB compiling method | Macro | |
| FB operation type | Real-time execution | |
| Timing chart | * When the operation is completed successfully      * When the operation is completed with an error | |

## P+Balluff\_ReadValidationDataCIB\_F

#### Name

P+Balluff\_ReadValidationDataCIB\_F

#### Overview

|  |  |
| --- | --- |
| Item | Description |
| Function overview | Reads the IO-Link device validation configuration and data for the specified IO-Link port of a Balluff Network Interface BNI CIB-508-105-Z015 CC-Link IE Field Basic IO-Link Master, using the MELSEC FX5U(C)/FX5UJ CPU built-in Ethernet/CC-Link IE Field Basic interface. |
| Symbol  [Function Block Diagram] |  |

#### Labels

##### Input Labels

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| No. | Variable Name | Name | Data type | Setting Range | Description |
| (1) | i\_bEN | Read validation data start command | Bit | ON, OFF | ON: The IO-Link port device validation data read command is enabled.  OFF: The IO-Link port device validation data read command is disabled. |
| (2) | i\_udRemoteIPAddress | Remote IP address | Double Word [Unsigned]/Bit String [32-bit] | 1h to FFFFFFFFh | Specify the remote IP address of the BNI CIB-508-105-Z015 CC-Link IE Field Basic IO-Link Master. Specify the third and fourth octets to the 1st word, and first and second octets to the 2nd word. |
| (3) | i\_uStationNumber | IO-Link Master station number | Word [Unsigned]/Bit String [16-bit] | 1 to 16 | Specify the CC-Link IEF Basic station number of the BNI CIB-508-105-Z015 CC-Link IE Field Basic IO-Link Master. |
| (4) | i\_uIOLinkPortNo | IO-Link port number | Word [Unsigned]/Bit String [16-bit] | 0 to 7 | Specify the IO-Link port number from which the device validation is read. |

##### Output Labels

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| No. | Variable Name | Name | Data type | Default Value | Description |
| (5) | o\_bENO | Read validation data command output status | Bit | OFF | ON: The IO-Link port device validation data read command control signal is active.  OFF: The IO-Link port device validation data read command control signal is inactive. |
| (6) | o\_bDataLinkOK | Data link status | Bit | OFF | ON: The data link with the BNI CIB-508-105-Z015 CC-Link IE Field Basic IO-Link Master station is active.  OFF: The data link with the BNI CIB-508-105-Z015 CC-Link IE Field Basic IO-Link Master station is inactive. |
| (7) | o\_bOK | Read completed | Bit | OFF | The signal turns ON for one program scan if the IO-Link port device validation data read command is normally completed. |
| (8) | o\_bErr | Read error | Bit | OFF | The signal turns ON for one program scan if an error has occurred during the IO-Link port device validation data read command execution. |
| (9) | o\_uCommErrID | Read error code | Word [Unsigned]/Bit String [16-bit] | 0000h | Stores the error code if an error has occurred during the SLMP acyclic communication.  For details of the error status, please refer to the [MELSEC iQ-F FX5 User's Manual (Ethernet Communication)](JY997D56201). |
| (10) | o\_uIOLinkErrID | IO-Link request error code | Word [Unsigned]/Bit String [16-bit] | 0000h | Stores the error code if an error has occurred during the IO-Link command execution.  For details of the error status, please refer to the [**Detail error check**](#_List_of_Gateway). |
| (11) | o\_uValidationType | Validation type | Word [Unsigned]/Bit String [16-bit] | 00h to 02h | Stores the current configuration of the IO-Link device validation for the selected IO-Link compatible port read from the BNI CIB-508-105-Z015 CC-Link IE Field Basic IO-Link Master.  Depending on the configuration of the IO-Link device validation, the connected device's information is verified and the result is indicated by the corresponding port valid bit (see the <o\_uIOLinkValidPorts> output label of the  [**P+Balluff\_CCLinkIEFieldBasicIOLinkP1**](#_MEU+RJ71GF11T2_CCLinkIEfieldIOLinkB)**\_F**, [**P+Balluff\_CCLinkIEFieldBasicIOLinkP2**](#_MEU+RJ71GF11-T2_CCLinkIEfieldIOLink_1)**\_F** and [**P+Balluff\_CCLinkIEFieldBasicIOLinkP3**](#_MEU+RCPU_CCLinkIEFieldBasicIOLinkP3)**\_F** IO-Link Master control function blocks). |
| (12) | o\_u2VendorID | Vendor ID | Word [Unsigned]/Bit String [16-bit](0..1) | - | Stores the current IO-Link device validation Vendor ID read from the BNI CIB-508-105-Z015 CC-Link IE Field Basic IO-Link Master. |
| (13) | o\_u3DeviceID | Device ID | Word [Unsigned]/Bit String [16-bit](0..2) | - | Stores the current IO-Link device validation Device ID read from the BNI CIB-508-105-Z015 CC-Link IE Field Basic IO-Link Master. |
| (14) | o\_u16SerialNumber | Serial number | Word [Unsigned]/Bit String [16-bit](0..15) | - | Stores the current IO-Link device validation Serial Number read from the BNI CIB-508-105-Z015 CC-Link IE Field Basic IO-Link Master. |

#### FB details

|  |  |  |
| --- | --- | --- |
| Item | Description | |
| Applicable hardware and software | Applicable CPU | FX5U(C)/FX5UJ CPU |
| Applicable engineering tool | GX Works3 |
| Language | Function Block Diagram (FBD/LD) | |
| Number of basic steps | 579 steps  The number of steps of the FB in a program varies depending on the CPU module used, input and output definition, and the option settings of GX Works3. For the option settings of GX Works3, refer to the [GX Works3 Operating Manual](SH081215ENG). | |
| Function description | This function block is used for reading the IO-Link device validation configuration and data for the specified IO-Link port of a Balluff Network Interface BNI CIB-508-105-Z015 CC-Link IE Field Basic IO-Link Master via acyclic communication (SLMP), using the MELSEC FX5U(C)/FX5UJ CPU built-in Ethernet/CC-Link IE Field Basic interface.  The IO-Link device validation configuration specifies whether validation is activated and if so, what IO-Link device parameters are verified.  Validation data specifies the three types of IO-Link device parameters for which validation is performed:     • Vendor ID     • Device ID     • Serial Number.  **NOTE:** If validation is performed, the connected IO-Link device's information is verified and the result is indicated by a port valid bit (see the <o\_uIOLinkValidPorts> output label of the [**P+Balluff\_CCLinkIEFieldBasicIOLinkP1**](#_MEU+RJ71GF11T2_CCLinkIEfieldIOLinkB)**\_F**, [**P+Balluff\_CCLinkIEFieldBasicIOLinkP2**](#_MEU+RJ71GF11-T2_CCLinkIEfieldIOLink_1)**\_F** and [**P+Balluff\_CCLinkIEFieldBasicIOLinkP3**](#_MEU+RCPU_CCLinkIEFieldBasicIOLinkP3)**\_F** IO-Link Master control function blocks). | |
| Restrictions and precautions |  | |
| FB compiling method | Macro | |
| FB operation type | Real-time execution | |
| Timing chart | * When the operation is completed successfully      * When the operation is completed with an error | |

## P+Balluff\_WriteDataStorageSettingsCIB\_F

#### Name

P+Balluff\_WriteDataStorageSettingsCIB\_F

#### Overview

|  |  |
| --- | --- |
| Item | Description |
| Function overview | Writes the data storage configuration for the specified IO-Link port of a Balluff Network Interface BNI CIB-508-105-Z015 CC-Link IE Field Basic IO-Link Master, using the MELSEC FX5U(C)/FX5UJ CPU built-in Ethernet/CC-Link IE Field Basic interface. |
| Symbol  [Function Block Diagram] |  |

#### Labels

##### Input Labels

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| No. | Variable Name | Name | Data type | Setting Range | Description |
| (1) | i\_bEN | Write data storage config start command | Bit | ON, OFF | ON: The IO-Link ports data storage function configuration write command is enabled.  OFF: The IO-Link ports data storage function configuration write command is disabled. |
| (2) | i\_udRemoteIPAddress | Remote IP address | Double Word [Unsigned]/Bit String [32-bit] | 1h to FFFFFFFFh | Specify the remote IP address of the BNI CIB-508-105-Z015 CC-Link IE Field Basic IO-Link Master. Specify the third and fourth octets to the 1st word, and first and second octets to the 2nd word. |
| (3) | i\_uStationNumber | IO-Link Master station number | Word [Unsigned]/Bit String [16-bit] | 1 to 16 | Specify the CC-Link IEF Basic station number of the BNI CIB-508-105-Z015 CC-Link IE Field Basic IO-Link Master. |
| (4) | i\_uIOLinkPortNo | IO-Link port number | Word [Unsigned]/Bit String [16-bit] | 0 to 7 | Specify the IO-Link port number from which the device validation is read. |
| (5) | i\_bDataStorageSetup | Data storage function setting | Bit | 0000h to FFFFh | Specify the data storage function setting (enabled or disabled) for the specified IO-Link port of the BNI CIB-508-105-Z015 CC-Link IE Field Basic IO-Link Master.   * OFF: Data storage function disabled * ON: Data storage function enabled |
| (6) | i\_bDataStorageUpload | Data storage upload setting | Bit | ON, OFF | Specify the data storage upload setting (enabled or disabled) for the specified IO-Link port of the BNI CIB-508-105-Z015 CC-Link IE Field Basic IO-Link Master.   * OFF: Data storage upload disabled * ON: Data storage upload enabled |
| (7) | i\_bDataStorageDownload | Data storage download setting | Bit | ON, OFF | Specify the data storage download setting (enabled or disabled) for the specified IO-Link port of the BNI CIB-508-105-Z015 CC-Link IE Field Basic IO-Link Master.   * OFF: Data storage download disabled * ON: Data storage download enabled |
| (8) | i\_bDataStorageClear | Data storage clear setting | Bit | ON, OFF | Specify the data storage clear setting (enabled or disabled) for the specified IO-Link port of the BNI CIB-508-105-Z015 CC-Link IE Field Basic IO-Link Master.   * OFF: Data storage clear disabled * ON: Data storage clear enabled |

##### Output Labels

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| No. | Variable Name | Name | Data type | Default Value | Description |
| (9) | o\_bENO | Write data storage config command output status | Bit | OFF | ON: The IO-Link ports data storage function configuration write command control signal is active.  OFF: The IO-Link ports data storage function configuration write command control signal is inactive. |
| (10) | o\_bDataLinkOK | Data link status | Bit | OFF | ON: The data link with the BNI CIB-508-105-Z015 CC-Link IE Field Basic IO-Link Master station is active.  OFF: The data link with the BNI CIB-508-105-Z015 CC-Link IE Field Basic IO-Link Master station is inactive. |
| (11) | o\_bOK | Write completed | Bit | OFF | The signal turns ON for one program scan if the IO-Link ports data storage function configuration write command is normally completed. |
| (12) | o\_bErr | Write error | Bit | OFF | The signal turns ON for one program scan if an error has occurred during the IO-Link ports data storage function configuration write command execution. |
| (13) | o\_uCommErrID | Write error code | Word [Unsigned]/Bit String [16-bit] | 0000h | Stores the error code if an error has occurred during the SLMP acyclic communication.  For details of the error status, please refer to the [MELSEC iQ-F FX5 User's Manual (Ethernet Communication)](JY997D56201). |
| (14) | o\_uIOLinkErrID | IO-Link request error code | Word [Unsigned]/Bit String [16-bit] | 0000h | Stores the error code if an error has occurred during the IO-Link command execution.  For details of the error status, please refer to the [**Detail error check**](#_List_of_Gateway). |

#### FB details

|  |  |  |
| --- | --- | --- |
| Item | Description | |
| Applicable hardware and software | Applicable CPU | FX5U(C)/FX5UJ CPU |
| Applicable engineering tool | GX Works3 |
| Language | Function Block Diagram (FBD/LD) | |
| Number of basic steps | 709 steps  The number of steps of the FB in a program varies depending on the CPU module used, input and output definition, and the option settings of GX Works3. For the option settings of GX Works3, refer to the [GX Works3 Operating Manual](SH081215ENG). | |
| Function description | This function block is used for writing the data storage configuration for the specified IO-Link port of a Balluff Network Interface BNI CIB-508-105-Z015 CC-Link IE Field Basic IO-Link Master via acyclic communication (SLMP), using the MELSEC FX5U(C)/FX5UJ CPU built-in Ethernet/CC-Link IE Field Basic interface. | |
| Restrictions and precautions | * The data storage configuration of a BNI CIB-508-105-Z015 CC-Link IE Field Basic IO-Link Master can be written during operation. The new settings however will only be applied after a IO-Link Master re-initialization using the <i\_bReInitialization> input label of the [**P+Balluff\_CCLinkIEFieldBasicIOLinkP1**](#_MEU+RJ71GF11T2_CCLinkIEfieldIOLinkB)**\_F**, [**P+Balluff\_CCLinkIEFieldBasicIOLinkP2**](#_MEU+RJ71GF11-T2_CCLinkIEfieldIOLink_1)**\_F** and [**P+Balluff\_CCLinkIEFieldBasicIOLinkP3**](#_MEU+RCPU_CCLinkIEFieldBasicIOLinkP3)**\_F** IO-Link Master control function blocks. | |
| FB compiling method | Macro | |
| FB operation type | Real-time execution | |
| Timing chart | * When the operation is completed successfully      * When the operation is completed with an error | |

## P+Balluff\_WriteInitOperationSettingCIB\_F

#### Name

P+Balluff\_WriteInitOperationSettingCIB\_F

#### Overview

|  |  |
| --- | --- |
| Item | Description |
| Function overview | Writes the initial processing enable/disable setting of a Balluff Network Interface BNI CIB-508-105-Z015 CC-Link IE Field Basic IO-Link Master, using the MELSEC FX5U(C)/FX5UJ CPU built-in Ethernet/CC-Link IE Field Basic interface. |
| Symbol  [Function Block Diagram] |  |

#### Labels

##### Input Labels

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| No. | Variable Name | Name | Data type | Setting Range | Description |
| (1) | i\_bEN | Write initial operation setting start command | Bit | ON, OFF | ON: The BNI CIB-508-105-Z015 CC-Link IE Field Basic IO-Link Master initial operation setting write command is enabled.  OFF: The BNI CIB-508-105-Z015 CC-Link IE Field Basic IO-Link Master initial operation setting write command is disabled. |
| (2) | i\_udRemoteIPAddress | Remote IP address | Double Word [Unsigned]/Bit String [32-bit] | 1h to FFFFFFFFh | Specify the remote IP address of the BNI CIB-508-105-Z015 CC-Link IE Field Basic IO-Link Master. Specify the third and fourth octets to the 1st word, and first and second octets to the 2nd word. |
| (3) | i\_uStationNumber | IO-Link Master station number | Word [Unsigned]/Bit String [16-bit] | 1 to 16 | Specify the CC-Link IEF Basic station number of the BNI CIB-508-105-Z015 CC-Link IE Field Basic IO-Link Master. |
| (4) | i\_bInitOperationSetting | Initial operation setting | Bit | ON, OFF | Specify the initial operation setting for the BNI CIB-508-105-Z015 CC-Link IE Field Basic IO-Link Master.   * ON: No Initial processing request flag necessary. After booting up the device goes to "Ready" mode. The ports are configured as inputs. * OFF: The device can only be brought to "Ready" mode by means of the "Initial processing request flag". |

##### Output Labels

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| No. | Variable Name | Name | Data type | Default Value | Description |
| (5) | o\_bENO | Write initial operation setting command output status | Bit | OFF | ON: The BNI CIB-508-105-Z015 CC-Link IE Field Basic IO-Link Master initial operation setting write command control signal is active.  OFF: The BNI CIB-508-105-Z015 CC-Link IE Field Basic IO-Link Master initial operation setting write command control signal is inactive. |
| (6) | o\_bDataLinkOK | Data link status | Bit | OFF | ON: The data link with the BNI CIB-508-105-Z015 CC-Link IE Field Basic IO-Link Master station is active.  OFF: The data link with the BNI CIB-508-105-Z015 CC-Link IE Field Basic IO-Link Master station is inactive. |
| (7) | o\_bOK | Write completed | Bit | OFF | The signal turns ON for one program scan if the BNI CIB-508-105-Z015 CC-Link IE Field Basic IO-Link Master initial operation setting write command is normally completed. |
| (8) | o\_bErr | Write error | Bit | OFF | The signal turns ON for one program scan if an error has occurred during the BNI CIB-508-105-Z015 CC-Link IE Field Basic IO-Link Master initial operation setting write command execution. |
| (9) | o\_uCommErrID | Write error code | Word [Unsigned]/Bit String [16-bit] | 0000h | Stores the error code if an error has occurred during the SLMP acyclic communication.  For details of the error status, please refer to the [MELSEC iQ-F FX5 User's Manual (Ethernet Communication)](JY997D56201). |
| (10) | o\_uIOLinkErrID | IO-Link request error code | Word [Unsigned]/Bit String [16-bit] | 0000h | Stores the error code if an error has occurred during the IO-Link command execution.  For details of the error status, please refer to the [**Detail error check**](#_List_of_Gateway). |

#### FB details

|  |  |  |
| --- | --- | --- |
| Item | Description | |
| Applicable hardware and software | Applicable CPU | FX5U(C)/FX5UJ CPU |
| Applicable engineering tool | GX Works3 |
| Language | Function Block Diagram (FBD/LD) | |
| Number of basic steps | 702 steps  The number of steps of the FB in a program varies depending on the CPU module used, input and output definition, and the option settings of GX Works3. For the option settings of GX Works3, refer to the [GX Works3 Operating Manual](SH081215ENG). | |
| Function description | This function block is used for writing the initial processing enable/disable setting of a Balluff Network Interface BNI CIB-508-105-Z015 CC-Link IE Field Basic IO-Link Master via acyclic communication (SLMP), using the MELSEC FX5U(C)/FX5UJ CPU built-in Ethernet/CC-Link IE Field Basic interface. | |
| Restrictions and precautions |  | |
| FB compiling method | Macro | |
| FB operation type | Real-time execution | |
| Timing chart | * When the operation is completed successfully      * When the operation is completed with an error | |

## P+Balluff\_WriteISDUDataCIB\_F

#### Name

P+Balluff\_WriteISDUDataCIB\_F

#### Overview

|  |  |
| --- | --- |
| Item | Description |
| Function overview | Writes the IO-Link parameter data for the specified IO-Link port of a Balluff Network Interface BNI CIB-508-105-Z015 CC-Link IE Field Basic IO-Link Master, using the MELSEC FX5U(C)/FX5UJ CPU built-in Ethernet/CC-Link IE Field Basic interface. |
| Symbol  [Function Block Diagram] |  |

#### Labels

##### Input Labels

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| No. | Variable Name | Name | Data type | Setting Range | Description |
| (1) | i\_bEN | Write ISDU data start command | Bit | ON, OFF | ON: The IO-Link port parameter data write command is enabled.  OFF: The IO-Link port parameter data write command is disabled. |
| (2) | i\_udRemoteIPAddress | Remote IP address | Double Word [Unsigned]/Bit String [32-bit] | 1h to FFFFFFFFh | Specify the remote IP address of the BNI CIB-508-105-Z015 CC-Link IE Field Basic IO-Link Master. Specify the third and fourth octets to the 1st word, and first and second octets to the 2nd word. |
| (3) | i\_uStationNumber | IO-Link Master station number | Word [Unsigned]/Bit String [16-bit] | 1 to 16 | Specify the CC-Link IEF Basic station number of the BNI CIB-508-105-Z015 CC-Link IE Field Basic IO-Link Master. |
| (4) | i\_uIOLinkPortNo | IO-Link port number | Word [Unsigned]/Bit String [16-bit] | 0 to 7 | Specify the IO-Link port number for which the IO-Link parameter data is written. |
| (5) | i\_uIndex | Index | Word [Unsigned]/Bit String [16-bit] | 0 to 65535 | Specify the index (start) address of the IO-Link parameter object to which data will be written using a BNI CIB-508-105-Z015 CC-Link IE Field Basic IO-Link Master Write Device Parameter/ISDU request. |
| (6) | i\_uSubIndex | Subindex | Word [Unsigned]/Bit String [16-bit] | 0 to 255 | Specify the subindex (offset) address of the IO-Link parameter object data element to be written using a BNI CIB-508-105-Z015 CC-Link IE Field Basic IO-Link Master Write Device Parameter/ISDU request. |
| (7) | i\_uISDUDataLength | Data length | Word [Unsigned]/Bit String [16-bit] | 0 to 232 | Specify the length of the IO-Link parameter data to be written to the BNI CIB-508-105-Z015 CC-Link IE Field Basic IO-Link Master, in BYTE units. |
| (8) | i\_uISDUWriteData | IO-Link write parameter data | Word [Unsigned]/Bit String [16-bit] | - | Specify the head address of the memory area storing the IO-Link parameter data to be written to the BNI CIB-508-105-Z015 CC-Link IE Field Basic IO-Link Master using a Write Device Parameter/ISDU request. |

##### Output Labels

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| No. | Variable Name | Name | Data type | Default Value | Description |
| (9) | o\_bENO | Write ISDU data command output status | Bit | OFF | ON: The IO-Link port parameter data write command control signal is active.  OFF: The IO-Link port parameter data write command control signal is inactive. |
| (10) | o\_bDataLinkOK | Data link status | Bit | OFF | ON: The data link with the BNI CIB-508-105-Z015 CC-Link IE Field Basic IO-Link Master station is active.  OFF: The data link with the BNI CIB-508-105-Z015 CC-Link IE Field Basic IO-Link Master station is inactive. |
| (11) | o\_bOK | Write completed | Bit | OFF | The signal turns ON for one program scan if the IO-Link parameter data write command (ISDU request) is normally completed. |
| (12) | o\_bErr | Write error | Bit | OFF | The signal turns ON for one program scan if an error has occurred during the IO-Link parameter data write command (ISDU request) execution. |
| (9) | o\_uCommErrID | Write error code | Word [Unsigned]/Bit String [16-bit] | 0000h | Stores the error code if an error has occurred during the SLMP acyclic communication.  For details of the error status, please refer to the [MELSEC iQ-F FX5 User's Manual (Ethernet Communication)](JY997D56201). |
| (10) | o\_uIOLinkErrID | IO-Link request error code | Word [Unsigned]/Bit String [16-bit] | 0000h | Stores the error code if an error has occurred during the IO-Link command execution.  For details of the error status, please refer to the [**Detail error check**](#_List_of_Gateway). |
| (15) | o\_uISDUWriteErrID | ISDU Write error code | Word [Unsigned]/Bit String [16-bit] | 0000h | Stores the ISDU request data write error code. |

#### FB details

|  |  |  |
| --- | --- | --- |
| Item | Description | |
| Applicable hardware and software | Applicable CPU | FX5U(C)/FX5UJ CPU |
| Applicable engineering tool | GX Works3 |
| Language | Function Block Diagram (FBD/LD) | |
| Number of basic steps | 613 steps  The number of steps of the FB in a program varies depending on the CPU module used, input and output definition, and the option settings of GX Works3. For the option settings of GX Works3, refer to the [GX Works3 Operating Manual](SH081215ENG). | |
| Function description | This function block is used for writing the IO-Link parameter data for the specified IO-Link port of a Balluff Network Interface BNI CIB-508-105-Z015 CC-Link IE Field Basic IO-Link Master via acyclic communication (SLMP), using the MELSEC FX5U(C)/FX5UJ CPU built-in Ethernet/CC-Link IE Field Basic interface.   * To perform IO-Link parameter data write, the function block sends a Read Device Parameters/ISDU(Index Service Data Unit) request to the gateway. * An IO-Link parameter data object is addressed in an ISDU request through an **Index** and a **SubIndex** (if the parameter data object contains multiple data elements). | |
| Restrictions and precautions |  | |
| FB compiling method | Macro | |
| FB operation type | Real-time execution | |
| Timing chart | * When the operation is completed successfully      * When the operation is completed with an error | |

## P+Balluff\_WriteOutputHoldSettingCIB\_F

#### Name

P+Balluff\_WriteOutputHoldSettingCIB\_F

#### Overview

|  |  |
| --- | --- |
| Item | Description |
| Function overview | Writes the outputs hold/clear setting of a Balluff Network Interface BNI CIB-508-105-Z015 CC-Link IE Field Basic IO-Link Master, using the MELSEC FX5U(C)/FX5UJ CPU built-in Ethernet/CC-Link IE Field Basic interface. |
| Symbol  [Function Block Diagram] |  |

#### Labels

##### Input Labels

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| No. | Variable Name | Name | Data type | Setting Range | Description |
| (1) | i\_bEN | Write output hold/clear settings start command | Bit | ON, OFF | ON: The BNI CIB-508-105-Z015 CC-Link IE Field Basic IO-Link Master output hold/clear setting write command is enabled.  OFF: The BNI CIB-508-105-Z015 CC-Link IE Field Basic IO-Link Master output hold/clear setting write command is disabled. |
| (2) | i\_udRemoteIPAddress | Remote IP address | Double Word [Unsigned]/Bit String [32-bit] | 1h to FFFFFFFFh | Specify the remote IP address of the BNI CIB-508-105-Z015 CC-Link IE Field Basic IO-Link Master. Specify the third and fourth octets to the 1st word, and first and second octets to the 2nd word. |
| (3) | i\_uStationNumber | IO-Link Master station number | Word [Unsigned]/Bit String [16-bit] | 1 to 16 | Specify the CC-Link IEF Basic station number of the BNI CIB-508-105-Z015 CC-Link IE Field Basic IO-Link Master. |
| (4) | i\_bHoldClear | Hold/Clear settings | Bit | ON, OFF | Specify the outputs hold/clear setting to be written to the BNI CIB-508-105-Z015 CC-Link IE Field Basic IO-Link Master.   * ON: The last state of the outputs is held when the module is disconnected from the fieldbus network or the CPU is in the STOP state. * OFF: The outputs are reset when the module is disconnected from the fieldbus network or the CPU is in the STOP state |

##### Output Labels

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| No. | Variable Name | Name | Data type | Default Value | Description |
| (5) | o\_bENO | Write output hold/clear settings command output status | Bit | OFF | ON: The BNI CIB-508-105-Z015 CC-Link IE Field Basic IO-Link Master output hold/clear setting write command control signal is active.  OFF: The BNI CIB-508-105-Z015 CC-Link IE Field Basic IO-Link Master output hold/clear setting write command control signal is inactive. |
| (6) | o\_bDataLinkOK | Data link status | Bit | OFF | ON: The data link with the BNI CIB-508-105-Z015 CC-Link IE Field Basic IO-Link Master station is active.  OFF: The data link with the BNI CIB-508-105-Z015 CC-Link IE Field Basic IO-Link Master station is inactive. |
| (7) | o\_bOK | Write completed | Bit | OFF | The signal turns ON for one program scan if the outputs hold/clear setting write command is normally completed. |
| (8) | o\_bErr | Write error | Bit | OFF | The signal turns ON for one program scan if an error has occurred during the outputs hold/clear setting write command execution. |
| (9) | o\_uCommErrID | Write error code | Word [Unsigned]/Bit String [16-bit] | 0000h | Stores the error code if an error has occurred during the SLMP acyclic communication.  For details of the error status, please refer to the [MELSEC iQ-F FX5 User's Manual (Ethernet Communication)](JY997D56201). |
| (10) | o\_uIOLinkErrID | IO-Link request error code | Word [Unsigned]/Bit String [16-bit] | 0000h | Stores the error code if an error has occurred during the IO-Link command execution.  For details of the error status, please refer to the [**Detail error check**](#_List_of_Gateway). | |

#### FB details

|  |  |  |
| --- | --- | --- |
| Item | Description | |
| Applicable hardware and software | Applicable CPU | FX5U(C)/FX5UJ CPU |
| Applicable engineering tool | GX Works3 |
| Language | Function Block Diagram (FBD/LD) | |
| Number of basic steps | 702 steps  The number of steps of the FB in a program varies depending on the CPU module used, input and output definition, and the option settings of GX Works3. For the option settings of GX Works3, refer to the [GX Works3 Operating Manual](SH081215ENG). | |
| Function description | This function block is used for writing the outputs hold/clear setting of a Balluff Network Interface BNI CIB-508-105-Z015 CC-Link IE Field Basic IO-Link Master via acyclic communication (SLMP), using the MELSEC FX5U(C)/FX5UJ CPU built-in Ethernet/CC-Link IE Field Basic interface. | |
| Restrictions and precautions |  | |
| FB compiling method | Macro | |
| FB operation type | Real-time execution | |
| Timing chart | * When the operation is completed successfully      * When the operation is completed with an error | |

## P+Balluff\_WriteValidationDataCIB\_F

#### Name

P+Balluff\_WriteValidationDataCIB\_F

#### Overview

|  |  |
| --- | --- |
| Item | Description |
| Function overview | Writes the IO-Link device validation configuration and data for the specified IO-Link port of a Balluff Network Interface BNI CIB-508-105-Z015 CC-Link IE Field Basic IO-Link Master, using the MELSEC FX5U(C)/FX5UJ CPU built-in Ethernet/CC-Link IE Field Basic interface. |
| Symbol  [Function Block Diagram] |  |

#### Labels

##### Input Labels

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| No. | Variable Name | Name | Data type | Setting Range | Description |
| (1) | i\_bEN | Write validation data start command | Bit | ON, OFF | ON: The IO-Link port device validation data write command is enabled.  OFF: The IO-Link port device validation data write command is disabled. |
| (2) | i\_udRemoteIPAddress | Remote IP address | Double Word [Unsigned]/Bit String [32-bit] | 1h to FFFFFFFFh | Specify the remote IP address of the BNI CIB-508-105-Z015 CC-Link IE Field Basic IO-Link Master. Specify the third and fourth octets to the 1st word, and first and second octets to the 2nd word. |
| (3) | i\_uStationNumber | IO-Link Master station number | Word [Unsigned]/Bit String [16-bit] | 1 to 16 | Specify the CC-Link IEF Basic station number of the BNI CIB-508-105-Z015 CC-Link IE Field Basic IO-Link Master. |
| (4) | i\_uIOLinkPortNo | IO-Link port number | Word [Unsigned]/Bit String [16-bit] | 0 to 7 | Specify the IO-Link port number for which the device validation data is written. |
| (5) | i\_uValidationType | Validation type | Word [Unsigned]/Bit String [16-bit] | 00h to 02h | Specify the IO-Link device validation configuration for the selected IO-Link compatible port to be written to the BNI CIB-508-105-Z015 CC-Link IE Field Basic IO-Link Master.  Depending on the configuration of the IO-Link device validation, the connected device's information is verified and the result is indicated by the corresponding port valid bit (see the <o\_uIOLinkValidPorts> output label of the [**P+Balluff\_CCLinkIEFieldBasicIOLinkP1**](#_MEU+RJ71GF11T2_CCLinkIEfieldIOLinkB)**\_F**, [**P+Balluff\_CCLinkIEFieldBasicIOLinkP2**](#_MEU+RJ71GF11-T2_CCLinkIEfieldIOLink_1)**\_F** and [**P+Balluff\_CCLinkIEFieldBasicIOLinkP3**](#_MEU+RCPU_CCLinkIEFieldBasicIOLinkP3)**\_F** IO-Link Master control function blocks). |
| (6) | i\_u2VendorID | Vendor ID | Word [Unsigned]/Bit String [16-bit](0..1) | - | Specify the IO-Link device validation Vendor ID setting to be written to the BNI CIB-508-105-Z015 CC-Link IE Field Basic IO-Link Master. The **Vendor ID** is an identifier specified on 2 data bytes. Each byte must be stored on the Least Significant Byte of the **VendorID** array's word elements, as detailed in the image below: |
| (7) | i\_u3DeviceID | Device ID | Word [Unsigned]/Bit String [16-bit](0..2) | - | Specify the IO-Link device validation Device ID setting to be written to the BNI CIB-508-105-Z015 CC-Link IE Field Basic IO-Link Master. The **Device ID** is an identifier specified on 3 data bytes. Each byte is stored on the Least Significant Byte of the **DeviceID** array's word elements, as detailed in the image below: |
| (8) | i\_u16SerialNumber | Serial number | Word [Unsigned]/Bit String [16-bit](0..15) | - | Specify the IO-Link device validation Serial Number setting to be written to the BNI CIB-508-105-Z015 CC-Link IE Field Basic IO-Link Master. The **Serial Number** is an identifier specified on 16 data bytes. Each byte is stored on the Least Significant Byte of the **SerialNumber** array's word elements, as detailed in the image below: |

##### Output Labels

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| No. | Variable Name | Name | Data type | Default Value | Description |
| (9) | o\_bENO | Write validation data command output status | Bit | OFF | ON: The IO-Link port device validation data write command control signal is active.  OFF: The IO-Link port device validation data write command control signal is inactive. |
| (10) | o\_bDataLinkOK | Data link status | Bit | OFF | ON: The data link with the BNI CIB-508-105-Z015 CC-Link IE Field Basic IO-Link Master station is active.  OFF: The data link with the BNI CIB-508-105-Z015 CC-Link IE Field Basic IO-Link Master station is inactive. |
| (11) | o\_bOK | Write completed | Bit | OFF | The signal turns ON for one program scan if the IO-Link device validation data write command is normally completed. |
| (12) | o\_bErr | Write error | Bit | OFF | The signal turns ON for one program scan if an error has occurred during the IO-Link device validation data write command execution. |
| (13) | o\_uCommErrID | Write error code | Word [Unsigned]/Bit String [16-bit] | 0000h | Stores the error code if an error has occurred during the SLMP acyclic communication.  For details of the error status, please refer to the [MELSEC iQ-F FX5 User's Manual (Ethernet Communication)](JY997D56201). |
| (14) | o\_uIOLinkErrID | IO-Link request error code | Word [Unsigned]/Bit String [16-bit] | 0000h | Stores the error code if an error has occurred during the IO-Link command execution.  For details of the error status, please refer to the [**Detail error check**](#_List_of_Gateway). | |

#### FB details

|  |  |  |
| --- | --- | --- |
| Item | Description | |
| Applicable hardware and software | Applicable CPU | FX5U(C)/FX5UJ CPU |
| Applicable engineering tool | GX Works3 |
| Language | Function Block Diagram (FBD/LD) | |
| Number of basic steps | 717 steps  The number of steps of the FB in a program varies depending on the CPU module used, input and output definition, and the option settings of GX Works3. For the option settings of GX Works3, refer to the [GX Works3 Operating Manual](SH081215ENG). | |
| Function description | This function block is used for writing the IO-Link device validation configuration and data for the specified IO-Link port of a Balluff Network Interface BNI CIB-508-105-Z015 CC-Link IE Field Basic IO-Link Master via acyclic communication (SLMP), using the MELSEC FX5U(C)/FX5UJ CPU built-in Ethernet/CC-Link IE Field Basic interface.  The IO-Link device validation configuration specifies whether validation is activated and if so, what IO-Link device parameters are verified.  Validation data specifies the three types of IO-Link device parameters for which validation is performed:     • Vendor ID     • Device ID     • Serial Number.  **NOTE:** If validation is performed, the connected IO-Link device's information is verified and the result is indicated by a port valid bit (see the <o\_uIOLinkValidPorts> output label of the [**P+Balluff\_CCLinkIEFieldBasicIOLinkP1**](#_MEU+RJ71GF11T2_CCLinkIEfieldIOLinkB)**\_F**, [**P+Balluff\_CCLinkIEFieldBasicIOLinkP2**](#_MEU+RJ71GF11-T2_CCLinkIEfieldIOLink_1)**\_F** and [**P+Balluff\_CCLinkIEFieldBasicIOLinkP3**](#_MEU+RCPU_CCLinkIEFieldBasicIOLinkP3)**\_F** IO-Link Master control function blocks. | |
| Restrictions and precautions | * The validation configuration of an IO-Link port can be written during operation. The new settings however will only be applied after a IO-Link Master re-initialization using the <i\_bReInitialization> input label of the [**P+Balluff\_CCLinkIEFieldBasicIOLinkP1**](#_MEU+RJ71GF11T2_CCLinkIEfieldIOLinkB)**\_F**, [**P+Balluff\_CCLinkIEFieldBasicIOLinkP2**](#_MEU+RJ71GF11-T2_CCLinkIEfieldIOLink_1)**\_F** and [**P+Balluff\_CCLinkIEFieldBasicIOLinkP3**](#_MEU+RCPU_CCLinkIEFieldBasicIOLinkP3)**\_F** gateway control function blocks. | |
| FB compiling method | Macro | |
| FB operation type | Real-time execution | |
| Timing chart | * When the operation is completed successfully      * When the operation is completed with an error | |

# LIST OF STRUCTURED DATA TYPES

The following table lists the Structure Data Types provided by the **P+Balluff\_CCLinkIEFieldBasicIOLink\_F** library to be used for cyclic remote I/O data specification.

|  |  |  |
| --- | --- | --- |
| Structure Name | Access Type | Description |
| stRemoteDataBasicIn | Read | Stores the cyclic Remote input data ((Remote inputs and Remote Read registers) corresponding to a single CC-Link IE Field Basic station number (1 occupied station). |
| stRemoteDataBasicOut | Read/Write | Stores the cyclic Remote output data ((Remote outputs and Remote Write registers) corresponding to a single CC-Link IE Field Basic station number (1 occupied station). |

## stRemoteDataBasicIn

The **stRemoteDataBasicIn** Data Unit Type stores the cyclic input data corresponding to a single CC-Link IE Field Basic station number (1 occupied station).

The Data Unit Type structure, detailed descriptions and data access rights for all component labels are listed in the table below.

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Label Name | Data Type | Access Type | Description | Details |
| b64RX | Bit(0..63) | Read | CC-Link IE Field Basic cyclic data Remote inputs corresponding to 1 occupied station (64 points). | - |
| u32RWr | Word [Unsigned]/Bit String [16-bit](0..31) | Read | CC-Link IE Field Basic cyclic data Remote Read registers corresponding to 1 occupied station (32 points). | - |

## stRemoteDataBasicOut

The **stRemoteDataBasicOut** Data Unit Type stores the cyclic output data corresponding to a single CC-Link IE Field Basic station number (1 occupied station).

The Data Unit Type structure, detailed descriptions and data access rights for all component labels are listed in the table below.

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Label Name | Data Type | Access Type | Description | Details |
| b64RY | Bit(0..63) | Read/Write | CC-Link IE Field Basic cyclic data Remote outputs corresponding to 1 occupied station (64 points). | - |
| u32RWw | Word [Unsigned]/Bit String [16-bit](0..31) | Read/Write | CC-Link IE Field Basic cyclic data Remote Write registers corresponding to 1 occupied station (32 points). | - |

## stDeviceIdent

The **stDeviceIdent** Data Unit Type stores the information corresponding to a single detected IO-Link device.

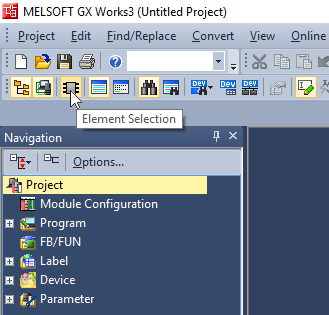
The Data Unit Type structure, detailed descriptions and data access rights for all component labels are listed in the table below.

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Label Name | Data Type | Access Type | Description | Details |
| uPortNo | Word [Unsigned]/Bit String [16-bit] | Read | IO-Link port number (0 t0 7). | - |
| uVendorID | Word [Unsigned]/Bit String [16-bit] | Read | IO-Link device Vendor ID code. | - |
| udDeviceID | Double Word [Unsigned]/Bit String [32-bit] | Read | IO-Link device Device ID code. | - |
| u8SerialNo | Word [Unsigned]/Bit String [16-bit](0..7) | Read | IO-Link device Serial number. | - |

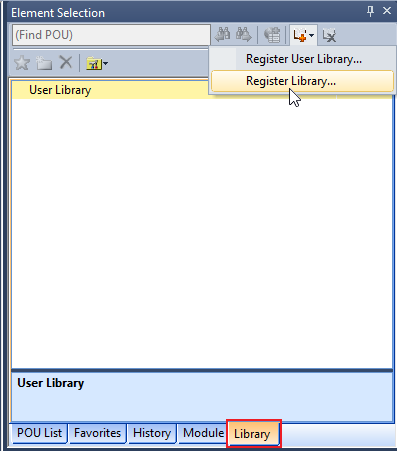
# PROJECT SETTING EXAMPLE

## Library Registration Procedure

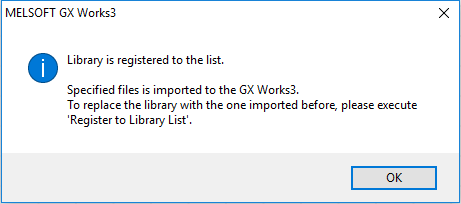
1. Start GX Works3, select [Project] ➱ [New] menu, and select a CPU type. Display the “Element Selection” window.



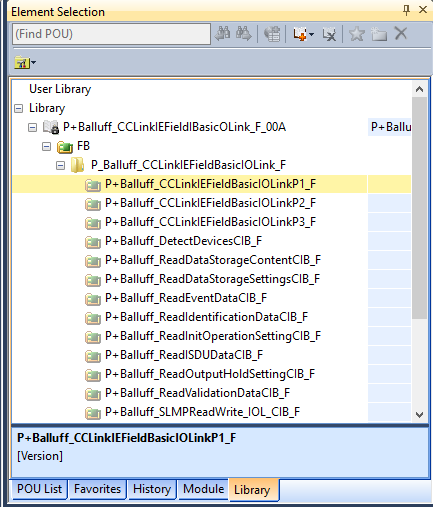
1. In the “Element Selection” window select the Library tab and select the "Register Library..." option after pressing the "Register to Library List" icon.



1. The following dialog box appears. Click the [OK] button.



1. The "Register Library to Library List" window is displayed. Browse the disk for the "P+Balluff\_CCLinkIEFieldBasicIOLink\_F\_\*\*\*.mslm" file, select it and click the [Open] button.
2. The list of FBs and data structures imported from the library is displayed in the “Element Selection” window.

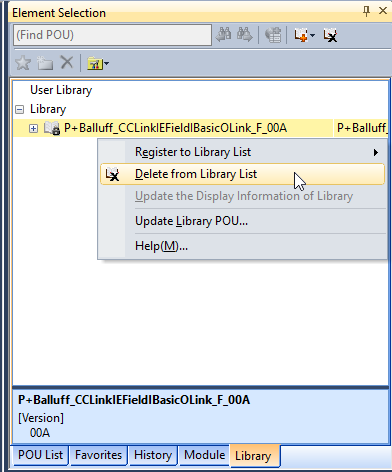


1. Select a FB in the “Element Selection” window, then drag and drop it into the work window or right-click it and select [Add to Project] ➱ [*FB File*] in the shortcut menu. The FB is added in the “Navigation” window in the selected FB File along with all the support structure (internally used FBs and necessary data structures).

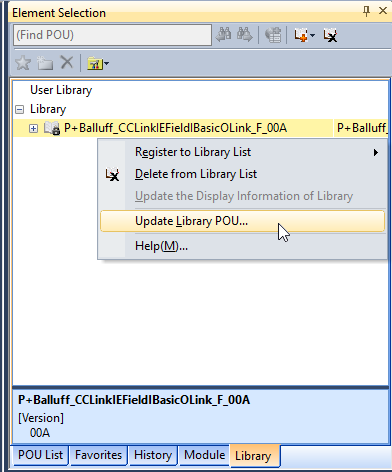
## Library Update Procedure

To update the version of the FB library, delete the old library version from the Library List and register the new library version (see previous section).

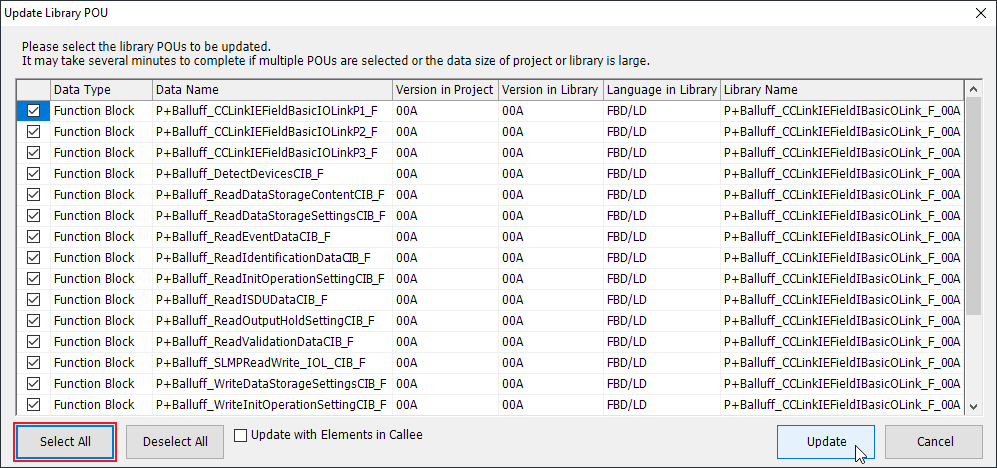
1. Select the old library in the Library List, then right-click it and select [Delete from Library List] in the shortcut menu.



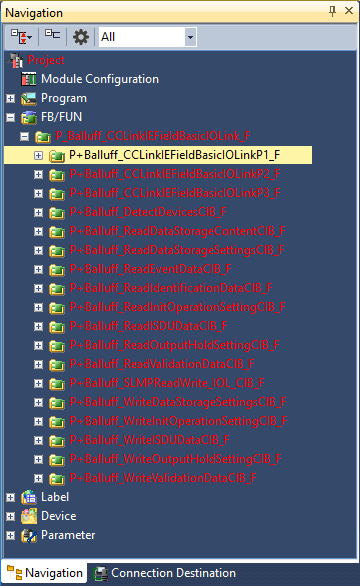
1. Register the new library version, following the procedure outlined in the previous section.
2. Select [Project] ➱ [Library Operation] ➱ [Update Library POU], or right-click the library in the “Element Selection” window and select [Update Library POU] in the shortcut menu.



1. Select the FBs and structures of the new version in the “Update Library POU” window and click [Update].



1. The selected FBs and structures are updated in the project’s “Navigation” window. In case new FBs or structures have been added to the library, it might be necessary to add them to the project separately.



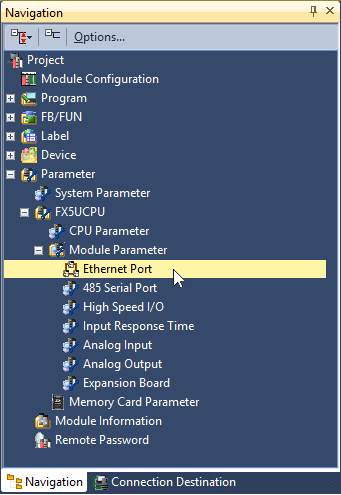
1. Execute a project Rebuild All once the update is completed and rewrite the project to the PLC.

## CC-Link IE Field Basic Network Parameters Setting Example

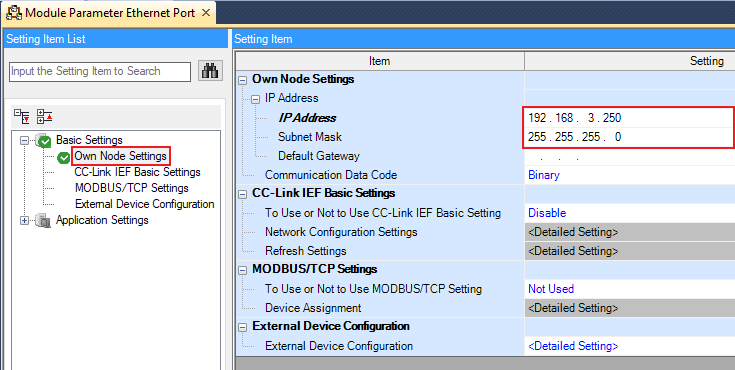
#### FX5U(C)/FX5UJ CPU built-in CC-Link IE Field Basic Network Master Setting

This section describes the procedure used for enabling the MELSEC FX5U(C)/FX5UJ CPU built-in Ethernet port as a CC-Link IE Field Basic network Master in a GX Works3 project.

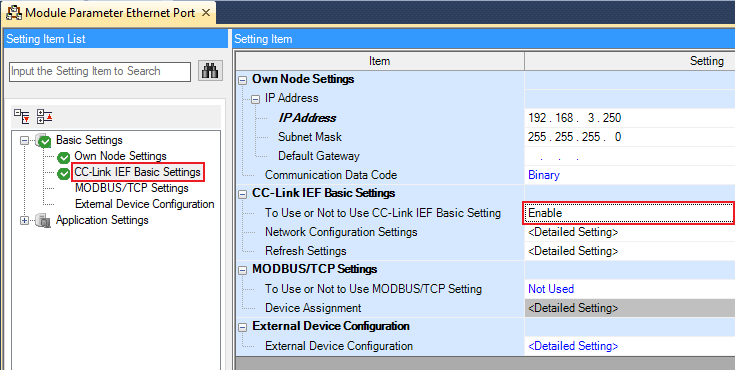
1. In the “Navigation” window open the [Parameter] ➱ [FX5UCPU] ➱ [Module Information] ➱ [Ethernet Port] section.



1. In the [Module Parameter Ethernet Port] window, first make the basic settings for the built-in Ethernet interface (IP Address, Subnet Mask, Default Gateway IP Address) according to the specific Local Area Network configuration.



1. Next, in the “CC-Link IEF Basic Settings” section of the [Module Parameter Ethernet Port] window, enable the use of the MELSEC FX5U(C)/FX5UJ CPU CC-Link IE Field Basic Settings.



#### CSP+ Profile - BNI CIB-508-105-Z015 CC-Link IE Field Basic IO-Link Master node integration

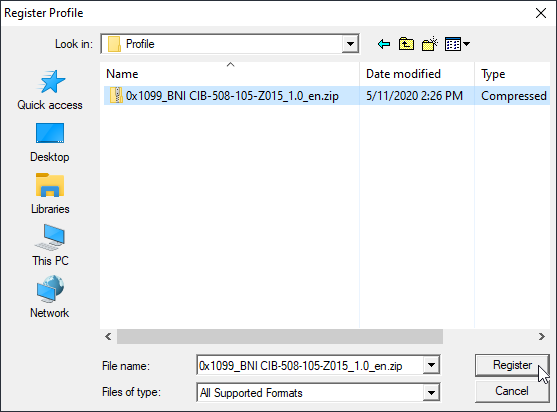
To be able to use and set the BNI CIB-508-105-Z015 CC-Link IE Field Basic IO-Link Master node in a CC-Link IEF Basic network configuration in GX Works3, you will need to register the corresponding CSP+ profile to GX Works3.

1. First, find and download the CSP+ profile file corresponding to the BNI CIB-508-105-Z015 CC-Link IE Field Basic IO-Link Master on the <https://www.balluff.com/> website.
2. Open the MELSOFT GX Works3 Engineering software and make sure no projects are open.
3. In the GX Works3 main menu select [Tools] ➱ [Profile Management] ➱ [Register…],

O imagine care conține captură de ecran, computer, monitor, computer

Descriere generată automat

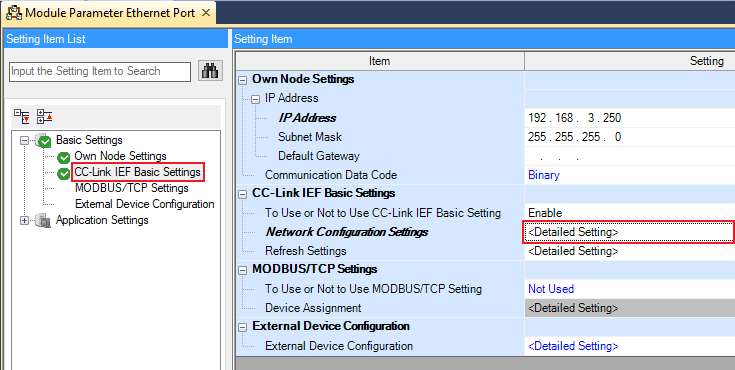
1. In the [Register Profile] dialog window navigate and select the downloaded CSP+ profile, then click the “Register” button to execute the profile registration,



#### CC-Link IE Field Basic Network Configuration and BNI CIB-508-105-Z015 CC-Link IE Field Basic IO-Link Master node Setting

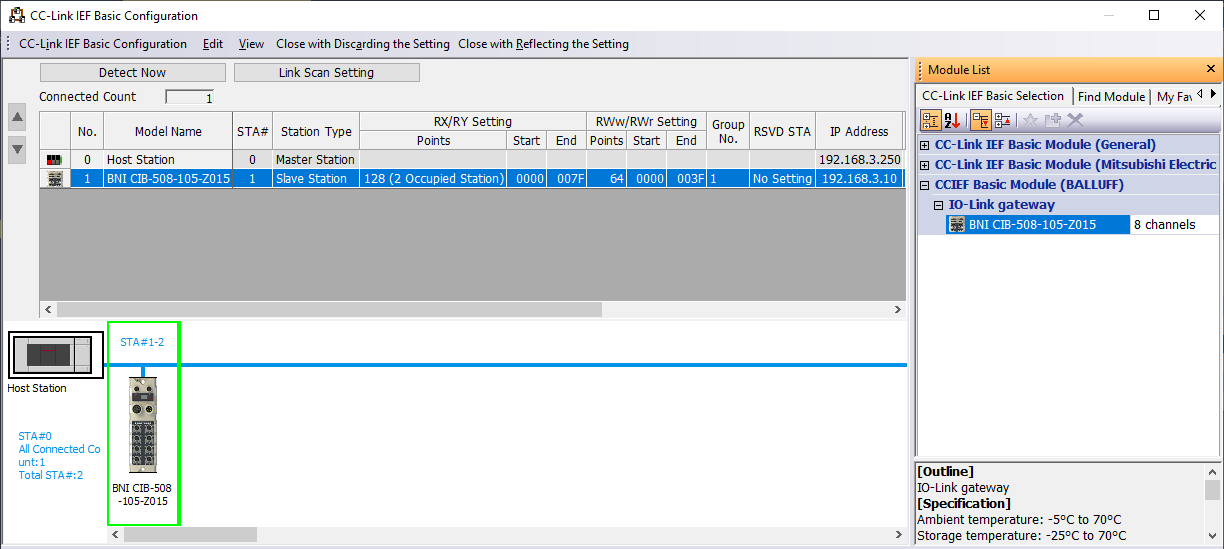
This section describes the procedure used for configuring the CC-Link IE Field Basic Network on the built-in Ethernet interface of a MELSEC FX5U(C)/FX5UJ CPU for successful communication with up to 16 BNI CIB-508-105-Z015 CC-Link IE Field Basic IO-Link Master nodes.

1. In the [Module Parameter Ethernet Port] window’s “CC-Link IEF Basic Settings” section, select and then double-click **Network Configuration Settings** <Detailed Setting>.



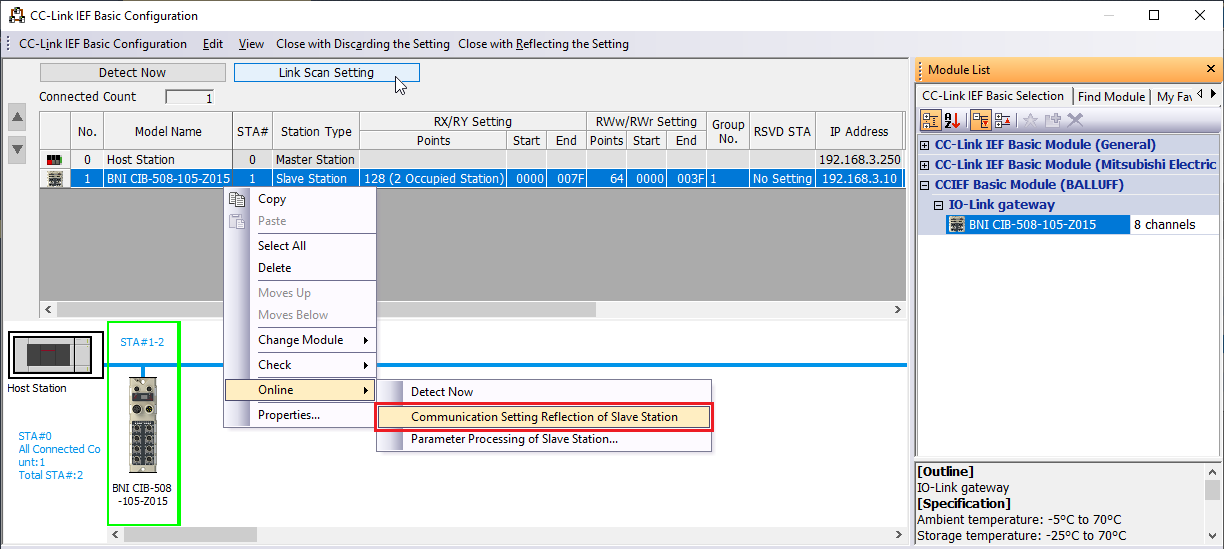
1. In the **"CC-Link IEF Basic Configuration"** window add the BNI CIB-508-105-Z015 CC-Link IE Field Basic IO-Link Master nodes to the configuration. In the Module List right panel expand the **CCIEF Basic Module (BALLUFF)** sectionand select an **IO-Link gateway -> BNI CIB-508-105-Z015** node from the list, then drag-and-drop it to the network line. If the module is installed and connected to the network, it is recommended to click the “Detect Now” button, to detect and add it to the network configuration.  
   The BNI CIB-508-105-Z015 CC-Link IE Field Basic IO-Link-Master station default parameters will automatically be set (Profile 1) :  
       • Slave station, 2 Occupied Stations  
       • occupies 128 RX/RY points  
       • occupies 64 RWr/RWw points  
   The default setting will allow a 4 data words input and 4 data words output data exchange with each IO-Link device connected on the IO-Link Master ports.

For more detailed information regarding the BNI CIB-508-105-Z015 CC-Link IE Field Basic IO-Link-Master specifications, configuration and operation please consult the corresponding "Balluff BNI CIB-508-105-Z015 CC-Link IE Field Basic IO-Link-Master User's Manual".



1. The number of stations occupied by the BNI CIB-508-105-Z015 CC-Link IE Field Basic IO-Link-Master can be changed to 3 (Profile 2) or 4 (Profile 3) and the IP address can also be set according to the specific network configuration. If the IO-Link Master is online and detected, right-click it in the configuration then select [Online] ➱ [Communication Setting Reflection of Slave Station] to write the new communication settings on it. Once the settings are made, make sure to reset the IO-Link master unit to ensure the settings are operational.

Once the setting is completed, click the “Link Scan Setting” button to set the Link scan settings for the CC-Link IE Field Basic group containing the IO-Link Master.

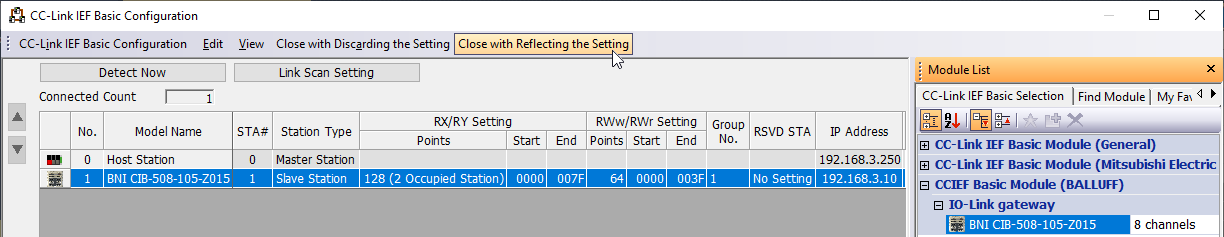


1. In the [Link Scan Setting] screen set the Slave station disconnect detected settings (Time-out, counts), then click the “OK” button to finalize the setting.

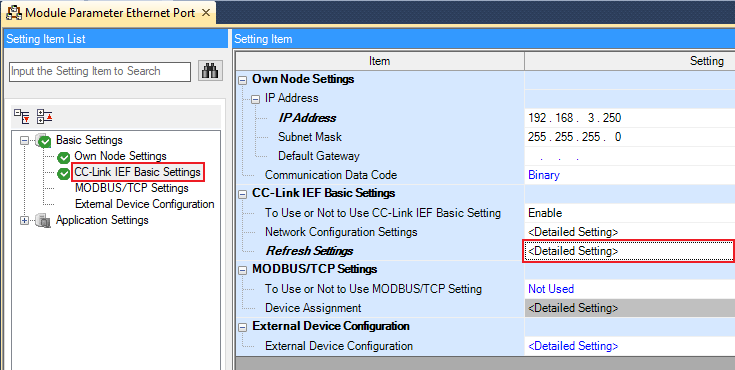
A screenshot of a social media post

Description automatically generated

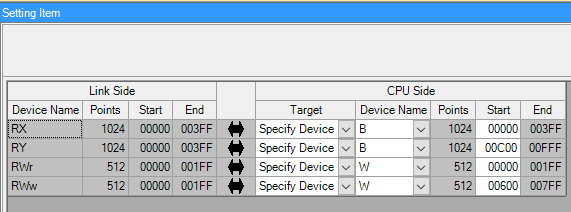
1. With the network configuration completed, click the “Close with Reflecting the Setting” button to save the changes for the project.



1. Next, to set the Refresh parameters for the CC-Link IEF Basic network, select and then double-click **Refresh Settings** <Detailed Setting> in the [Module Parameter Ethernet Port] window’s “CC-Link IEF Basic Settings” section.

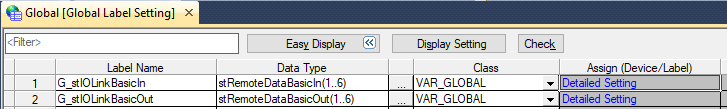


1. For each Remote device type (RX, RY, RWr, RWw) set the corresponding PLC CPU device type and start address. The remote device type refresh area for all the stations in the network will be a contiguous device memory area starting from the specified addresses.



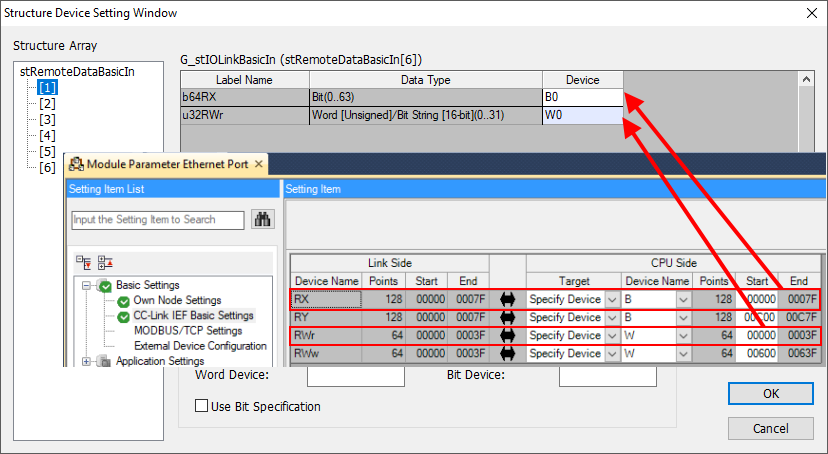
**IMPORTANT !:** The auto-refresh memory area associated to the selected Station Number must be directly provided by the user to the [**P+Balluff\_CCLinkIEFieldBasicIOLinkP1**](#_MEU+RJ71GF11T2_CCLinkIEfieldIOLinkB)**\_F**, [**P+Balluff\_CCLinkIEFieldBasicIOLinkP2**](#_MEU+RJ71GF11-T2_CCLinkIEfieldIOLink_1)**\_F** or [**P+Balluff\_CCLinkIEFieldBasicIOLinkP3**](#_MEU+RCPU_CCLinkIEFieldBasicIOLinkP3)**\_F** gateway control function blocks using the **io\_stLinkBasicIn*X*** and **io\_stLinkBasicOut*X*** input/output labels.

A typical Global label setup for multiple frequency inverters can be seen in the image below:



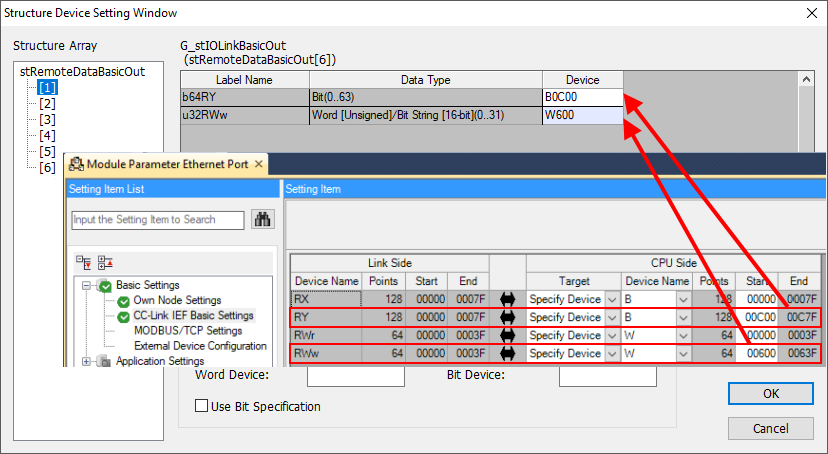
The **G\_stIOLinkBasicIn** global label is a data structure array mapped over the CC-Link IE Field Basic network auto-refresh memory area corresponding to the Remote input data (RX and RWr). One index of the array stores the cyclic input data corresponding to a single CC-Link IE Field Basic station number.

**Example:** **G\_stIOLinkBasicIn[2]** would store the cyclic input data (RX and RWr) corresponding to the CC-Link IE Field Basic station number 2.

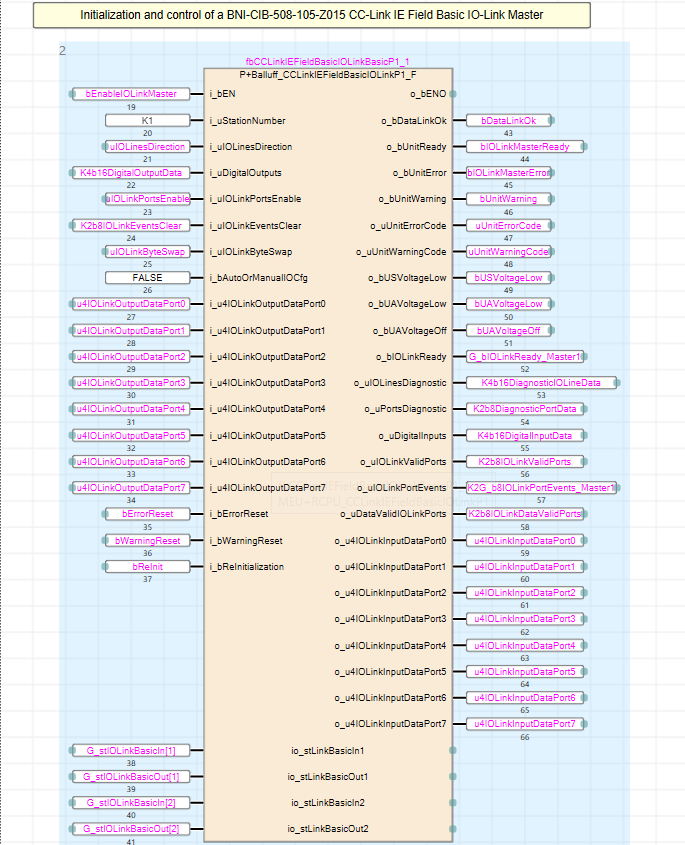


The **G\_sIOtLinkBasicOut** global label is a data structure array mapped over the CC-Link IE Field Basic network auto-refresh memory area corresponding to the Remote output data (RY and RWw). One index of the array stores the cyclic output data corresponding to a single CC-Link IE Field Basic station number.

**Example:** **G\_stIOLinkBasicOut[2]** would store the cyclic output data (RY and RWw) corresponding to the CC-Link IE Field Basic station number 2.



The **G\_stIOLinkBasicIn** global label indexes corresponding to an IO-Link Master’s station numbers would be used at the **io\_stLinkBasicIn*X*** input labels of the control function block instance associated to that specific IO-Link Master, and the same applies to the **G\_stIOLinkBasicOut** global label with respect to the **io\_stLinkBasicOut*X*** input labels of the same control function block instance.



# APPENDIX

## List of IO-Link Master error codes

The **o\_uUnitErrorCode / o\_uUnitWarningCode /** **o\_uIOLinkErrID** output labels are used to store the error code in case a BNI CIB-508-105-Z015 CC-Link IE Field Basic IO-Link Master error has occurred during communication.

Major errors are displayed when there is a network interruption under Major Error in the display.   
Moderate errors are displayed either in the **o\_uUnitErrorCode / o\_uUnitWarningCode /** **o\_uIOLinkErrID** output labels if they were triggered by the IO-Link Master, or within the network PLC.  
Moderate errors of an IO-Link device always begin with 0xE2XX. The actual IO-Link error code is in the lowest byte, e.g. 0xE235 for Function not available.  
If IO-Link errors occur which are not described in this manual, please refer to the manual for the respective IO-Link device. Warnings are displayed in the Word area.

|  |  |  |  |
| --- | --- | --- | --- |
| Error code Hex. | Source | Clasification | Description / Procedure |
| 0001H | Gateway | Critical | Watchdog was tripped. Take measures to prevent interference - use shielded cables. Then perform a restart. |
| 0002H | Gateway | Critical | Internal bus error. See 0x0001 |
| 0003H | Gateway | Critical | Flash memory error. See 0x0001 |
| 0004H | Gateway | Critical | Buffer RAM access error. See 0x0001 |
| 0005H | Gateway | Critical | Internal communication error. See 0x0001 |
| 0101H | Gateway | Moderate | Undervoltage. Check the cyclical bit range to see which voltage is affected. |
| 0102H | Gateway | Moderate | Diagnostics. Check the cyclical bit range to see which port or pin is affected. |
| 0103H | Gateway | Warning | Station or network number changed while the system is running. |
| 0104H | Gateway | Warning | Configuration changed while the system is running. |
| D529H | Gateway | Critical | LSI RAM error CIE initialization. See 0x001. Also check cable lengths and ground connections. A unit test can also be performed to preclude hardware errors. |
| D52AH | Gateway | Critical | LSI RAM error CIE MIB update. See 0x001. See 0xD529. |
| D52BH | Gateway | Critical | LSI error CIE MAC initialization. See 0x001. See 0xD529. |
| D52CH | Gateway | Critical | LSI error - opening of CIE communication. See 0x001. See 0xD529. |
| D0A0H | Network | Moderate | Transient reply timeout. If the station is disconnected from the network, try to localize the disconnection. |
| D0A1H | Network | Moderate | Transient completion timeout. Check the fieldbus wiring. Connect the device to a different fieldbus port. A unit test can also be performed to preclude hardware errors. |
| D0A2H | Network | Moderate | Transient transmission timeout. Check the transient communication frequency in the master. |
| D0A3H | Network | Moderate | Wrong or non-locatable station/network number. See 0xD0A0. In addition, the routing parameters can be checked in the master. |
| E106H | Gateway | Warning | Wrong data for the request. Check the data for the instruction RIWT. |
| E107H | Gateway | Warning | IO-Link request failed. Check the data for the instruction RIWT. |
| E108H | Gateway | Warning | Wrong IO-Link configuration data. Check the data for the instruction RIWT. |
| E109H | Gateway | Warning | Wrong attribute code, not externally byte-serial. Check the parameters for the instruction RIWT. |
| E110H | Gateway | Warning | Wrong attribute code, not internally word-serial. Check the parameters for the instruction RIWT. |
| E111H | Gateway | Warning | Number of telegram blocks greater than one. |
| E112H | Gateway | Warning | Wrong attribute code, not externally word-serial. Check the parameters for the instruction RIWT. |
| E113H | Gateway | Warning | Outside the address code. Check the parameters for the instruction RIWT. |
| E114H | Gateway | Warning | Outside the write size. Check the parameters for the instruction RIWT. |
| E115H | Gateway | Warning | Unknown Access codes. Check the parameters for the instruction RIWT. |
| E116H | Gateway | Warning | Wrong attribute code, not internally word-serial. Check the parameters for the instruction RIRD. |
| E117H | Gateway | Warning | Number of telegram blocks greater than one. |
| E118H | Gateway | Warning | Wrong attribute code, not externally word-serial. Check the parameters for the instruction RIRD. |
| E119H | Gateway | Warning | Outside the address code. Check the parameters for the instruction RIRD. |
| E120H | Gateway | Warning | Outside the read size. Check the parameters for the instruction RIRD. |
| E121H | Gateway | Warning | Unknown Access codes. Check the parameters for the instruction RIRD. |
| E123H | Gateway | Warning | Wrong data for the request. Check the data for the instruction RIRD. |
| E211H | IOL Device | Moderate | ISDU Index not available. |
| E123H | IOL Device | Moderate | ISDU Subindex not available. |
| E220H-E222H | IOL Device | Moderate | Service temporarily not available. |
| E223H | IOL Device | Moderate | - Access denied for ISDU Write command: Index is read-only.  - Access denied for ISDU Read command: Index is write-only. |
| E230H | IOL Device | Moderate | Parameter value out of range. |
| E231H | IOL Device | Moderate | Parameter value above limit. |
| E232H | IOL Device | Moderate | Parameter value below limit. |
| E233H | IOL Device | Moderate | Parameter length overrun. |
| E234H | IOL Device | Moderate | Parameter length underrun. |
| E235H | IOL Device | Moderate | Function not available. |
| E236H | IOL Device | Moderate | Function temporarily not available. |
| E240H | IOL Device | Moderate | Invalid parameter set. |
| E241H | IOL Device | Moderate | Inconsistent parameter set. |

# REVISIONS

\* The manual number is given on the bottom left of the back cover.

|  |  |  |
| --- | --- | --- |
| Revision date | \*Manual number | Description |
| July 2020 | MEU-F0016-001-A | First edition. |
| June 2021 | MEU-F0016-001-A | **Modified/corrected parts**:   * Updated library version history |

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1. Note that this reference does not describe the FB version information which is displayed, such as "\_00A" at the end of the FB name. [↑](#endnote-ref-1)