

## Communication Unit Supporting Code Scanner WB9Z-CU100

# PLC Connection User's Manual



**IDEC CORPORATION** 

## Introduction

## Attention

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### General terms, abbreviations, and terminology used in this manual

ltem	Definition					
Communication unit	Indicates "WB9Z-CU100".					
PoE	Stands for Power over Ethernet.					
	Technology to supply power using Ethernet cables.					
Receive buffer	This is a storage area for temporarily storing received data.					
Transmit buffer	This is a storage area for temporarily storing data before transmission.					
Control character	ASCII code 00H - 1FH, 7FH. In this document, is used for expressing these values.					
Profix	This is character data attached to the beginning of output data or a communication com-					
FIEIIX	mand.					
Suffix	This is character data appended to the end of output data or a communication command.					
Our website	www.idec.com/					

The general terms, abbreviations, and terminology used in this manual are as follows.

## **Graphic Symbol Glossary**

This manual uses the following graphic symbols to simplify explanations:

#### Notes

Graphic Symbol	Description
A Warning	Failure to operate the product in accordance with the information provided may result in severe per-
	sonal injury or death.
A Caution	Failure to operate the product in accordance with the information provided may result in personal
	injury or damage to equipment.
NA4	Notes information that should be carefully noted. Failure to operate the product in accordance with
	the information provided may affect the appearance and performance of the main unit as well as any
~~~	peripheral devices.
	Denotes additional information that may prove useful for using a given function.

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## **Related manuals**

Manuals related to the Communication Unit are as follows. Refer to them together with this manual. All related manuals are available for download from our website.

Туре	Manual name	Details
B-2024	Communication Unit Supporting Code Scanner WB9Z-CU100 PLC Connection Use's Manua (this manual)	Explains the Ethernet protocol-based PLC connection.
B-1945	Instruction Sheet: WB2F 2D Code Scanner	Included with the product.
B-1946	Instruction Sheet: WB9Z-CU100 Communication Unit	Included with the product.
B-1952	WB2F 2D Code Scanner User's Manual	Gives an overview of the functions and capabilities of the WB2F, and instructions on its use.
B-1960	WB2F 2D Code Scanner PLC Connection User's Manual	Explains about PLC Connection.
B-1964	Communication Unit Supporting Code Scanner WB9Z-CU100 User's Manual	Gives an overview of the functions and capabilities of the communication unit as well as instructions on its use.

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This chapter provides an overview of the PLC connection function (Ethernet), its limitations, supported models, supported PLC, supported code scanners and its settings items.

## 1.1 PLC connection

The PLC connection is a device in which the read result of symbols is directly written to the data memory of a PLC (Programmable Logic Controller).

Because the communication unit supports the PLC and code scanner communication protocols, there is no need to create a special program in the PLC for communication.

Communication between the communication unit and the PLC utilizes Ethernet, while communication between the communication unit and the code scanner utilizes RS-232.





#### What is data memory?

It is the general storage area incorporated in PLC, allowing read and write. The data exchange between the Code scanner and PLC uses data memory. The name and size corresponding to the data memory depends on the PLC. For details, refer to Cm [1. 5 Applicable Code scanner] on page 1-3.

#### 1.2 Limitation

Follow the limiations below when using the PLC connection.

- The maximum volume of symbol data transmittable to the PLC is 256 bytes.
- The maximum amount of symbol data which can be received from the code scanner is 256 bytes.
- The function does not support the reading of symbol data containing a NULL(0x00)".
- Reading operation is available only at single read.
- The communication unit's setting values cannot be obtained or changed via Ethernet.
- The code scanner's setting values cannot be obtained or changed via Ethernet.

### 1.3 Applicable Models

The Communication Unit that supports the function is as follows:

Model Version of main application		Remarks		
WB9Z-CU100	A-001.010.00 and higher	March 2018 release version		

### 1.4 Applicable PLC

The function is supported by the following PLCs:

Manufacturer	Series	Model	Connection method	Protocol		
		RJ71EN71				
		RnCPU <sup>*1</sup>				
	MELSEC iQ-R	RnENCPU				
		RnPCPU				
		RnSFCPU-SET		SLMP (ST model, TCP/IP)		
	MELSEC iQ-F	FX5U CPU				
		(FX5U-32MT/ES) <sup>*1</sup>				
Floctric		FX5UC CPU	Ethernet			
	MELSEC Q	QJ71E71-100 <sup>*1, *2</sup>				
		QnUDVCPU				
		QnUDECPU				
		QnUDPVCPU				
		Q12DCCPU-V				
		LnCPU <sup>*1</sup>				
	IVIELJEC L	LnCPU-BT				

\*1 In IDEC, the operation check is performed by these models.

For the other models, please perform the operation check at the customer's side before use.

\*2 Devices with serial number 15042 (first five digits) and higher

\*1

### 1.5 Applicable Code scanner

The function is supported by the following Code scanner:

Manufacturer	Series	Model	Connection method	Protocol
10.5.0		·····		WB series communication commands
IDEC	WB series	WB2F-100S1B	RS-232	(Communication command function: Initial setting values)

In IDEC, the operation check is performed by these models.

#### 1.6 Setting Parameters (WB9Z-CU100)

The setting parameters and setting values necessary for the PLC connection are as follows: Adjust the setting according to the using environment.

•All the settings of the Communication unit should be performed before using the PLC connection.

- Please configure the communication unit's settings via the maintenance port (USB port).
  - Do not access or change any settings that are not listed here.
  - Do not access or change any settings in reserved areas.
  - When the setting values have been changed, save the setting value by "Save Set Values" on the control command.

Turning OFF the power, resetting, or changing the operation mode without performing "Save Set Values" will return to the setting value that existed before change.

- You will need to perform a general system restart after the setting values are saved.
- The communication unit has three power supply systems: external power, PoE and maintenance port (USB port).

To turn OFF the power, you will need to cut off all three systems.

When configuring settings that specify ASCII code for the setting value, be aware of the following points. • NUL (00H) cannot be used as a setting value.

• The characters up to the first **NUL** (00H) are considered the data and any data after that is not valid.

Setting value (hex) of bold face is default value (Setting at the time of factory shipments).

		Address	Size	Default	Setting value			
Item	Subitem	(hex)	(dec)	(hex)	(hex)	Remarks		
					00: 1,200bps			
					01: 2,400bps			
					02 : 4,800bps			
	Communication				03: 9,600bps			
	communication	8100	1	03	04 : 19,200bps			
	speed				05 : 38,400bps			
					06 : 57,600bps	After saving the settings are		
PS_222 cotting							07: 115,200bps	reflected when the power is
no-202 setting					0a : 600bps	turned on		
	Data length	8101	1	01	00 : 7bits			
		8101		01	01 : 8bits			
					00 : NONE			
	Parity	8102	1	01	01 : EVEN			
					02 : ODD			
	Stop bits	0102	1	00	00 : 1stop			
		0103		00	01 : 2stop			

ltem	Subitem	Address	Size	Default	Setting value	Remarks
liteni	Subitem	(hex)	(dec)	(hex)	(hex)	
RS-232 setting	Flow control	8104	1	00	<b>00 : NONE</b> 01 : CTS/RTS	After saving, the settings are reflected when the power is turned on.
	Reserved	8105 - 810F	11	-	-	
Reserved		8110 - 811F	16	-	-	
	Reserved	8200	1	-	-	
	Reserved	8201	1	-	-	
		8202		64		After saving, the settings will be
		8203		01		reflected upon resetting.
	IP address	8204	4	A8	00000000-FFFFFFFF :	IP address of the
		8205		C0	IP address	COMMUNICATION UNIT (WB92- CU100). Initial value is 192.168.1.100.
		8206		01		After saving the settings will be
	Default gateway	8207	4	01	00000000-FFFFFFFF :	reflected upon resetting
	Deladic gateway	8208		A8	Default gateway	Initial value is 192.168.1.1.
		8209		C0		
		820A		00		After saving, the settings will be
	Subnet mask	820B	4		0000000-+++++++	reflected upon resetting.
		820C			Subnet mask	Initial value is 255.255.255.0.
		820D		FF po		After caving the settings will be
	TCP server port	820F	2	OB	0000-FFFF : port number	reflected upon resetting. Listen port when the communication unit (WB9Z- CU100) is running a TCP/IP server. Initial value 3000
	Reserved	8210 - 8219	10	-	-	
		821A		32		After saving, the settings will be
Ethernet setting		821B		01		reflected upon resetting.
		821C		A8	00000000-FFFFFFFF : IP address	IP address for connection
	Remote TCP client IP address	821D	4	C0		destination when the communication unit (WB9Z- CU100) is running a TCP/IP client. Initial value is 192.168.1.50.
	Reserved	821E - 8221	4	-	-	
		8222		48		After saving, the settings will be
	Remote TCP client port	8223	2	0D	0000-FFFF : port number	reflected upon resetting. Connection port when the communication unit (WB9Z- CU100) is running a TCP/IP client. Initial value 3400
	Reserved	8224	1	-	-	
	Keserved	8225	1	-	-	After an ing the set in the
	TCP client port	8226	2	00	0000-FFFF : port number	Arter saving, the settings will be reflected upon resetting. Own port when the communication unit (WB9Z- CU100) is running a TCP/IP client. Initial value 0 (Automatic assignment)
	Reserved	8228 - 823F	24	-	-	

Overview

ltem	Subitem	Address Size De		Default	Setting value	Remarks
item	Subitem	(hex)	(dec)	(hex)	(hex)	nemarks
Ethernet setting	RS-232 character timeout automatic setting	8240	1	01	00 : Disabled (manual) <b>01 : Enabled (auto)</b>	When Enabled (auto) is selected, data received on scanner port from Ethernet port, the time to transmit is automatically calculated from the RS-232 communication speed.
	RS-232 character Timeout	8241	1	05	02 - FF : Setting value by 10 ms step	Enables to freely set the time to send data received on via scanner port to the Ethernet port.
	Reserved	8242 - 827F	62	-	-	
Reserved		8280 - 84FF	352	-	-	
	Function enabled	8500	1	00	<b>00 : Disabled</b> 01 : Enabled	If enabled, it will begin the process to establish a connection with connected external devices at start up. New settings will be reflected after saving and resetting the device.
	Protocol Select	8501	1	00	00 : SLMP (ST model, TCP/IP)	Select the communication protocol of the external device that is to be connected to the WB9Z-CU100
	Reserved	8502	1	-	-	
	Reserved	8503	1	-	-	
	Monitoring cycle	8504 8505 8506 8507	4	64 00 00 00	0000000A-0000FFFF : Setting Value × 1 ms (10ms to 65,535ms)	Configure the monitoring interval for the special area.
PLC Connection - PLC	Timeout	8508 8509 850A 850B	4	C8 00 00 00	0000000A-0000FFFF : Setting Value × 1 ms (10ms to 65,535ms)	Configures response timeout from a PLC.
	Retry Count	850C	1	05	01 - FF : Times	Sets the number of command retransmissions to a PLC.
	Symbol data storage endian	850D	1	00	<b>00 : Lower→Upper</b> 01 : Upper <b>→</b> Lower	To configure the order of stocked data in data memory of PLC.
	Reserved	850E	1	-	-	
	Reserved	850F	1	-	-	
		8510		00		
	Special Area Start	8511	л	00	Special Area Start	When configuring the settings
	Address	8512	4	00	Address	ensure that the special area and the scanner information
		8513		00		area do not overlap. The special
		8514		10	00000000 - FFFFFFF :	area requires 4 words (8 bytes)
	Scanner Information	8515	4	00	Scanner Information	oi data memory.
	Area Start Address	8516			Area Start Address	
	Reserved	001/ 8518 - 852E	40	00		
	neserveu	0010-0001	40		_	

Network         Mean         (dec)         (hex)         (hex) <t< th=""><th>Items</th><th>Cult it and</th><th>Address</th><th colspan="2">dress Size De</th><th>Setting value</th><th colspan="2">Domestic</th></t<>	Items	Cult it and	Address	dress Size De		Setting value	Domestic	
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PLC Connection -         Protocol         8550         2         0000         First col         protocol         8550         2         0000         First col         setting and Wringl on page         3-1.           Protocol         8551         2         0000         FIF :         Frotocol Parameter         Setting and Wringl on page         3-1.           Parameter [19]         8553         2         0000         Protocol Parameter         3-1.           Protocol         8554         2         0000         Protocol Parameter         3-1.           Protocol         8556         2         0000         Protocol Parameter         3-1.           Protocol         8556         2         0000         Protocol Parameter         3-1.           Protocol         8557         2         0000         Protocol Parameter         3-1.           Protocol         8556         2         0000         Protocol Parameter         3-1.           Protocol         8556         2         0000         Protocol Parameter         3-1.           Protocol         8556         2         0000         Protocol Parameter         3-1.           Protocol         8557         32         -         - <td< td=""><td></td><td>Protocol</td><td>854E</td><td>2</td><td>0000</td><td>Drotocol Daramotor</td><td>depends on each protocol</td></td<>		Protocol	854E	2	0000	Drotocol Daramotor	depends on each protocol	
PLC         Induction         3330         2         0000         0000-FFFF:         Induction state index of parameter           Parameter [8]         8551         2         0000         0000-FFFF:         3-1.           Protocol         8552         2         0000         0000-FFFF:         3-1.           Protocol         8554         2         0000         0000-FFFF:         3-1.           Protocol         8556         2         0000         0000-FFFF:         3-1.           Parameter [10]         8555         2         0000         0000-FFFF:         3-1.           Protocol         8556         2         0000         0000-FFFF:         3-1.           Protocol         8556         2         0000         Protocol Parameter         3-1.           Protocol         8556         2         0000         Protocol Parameter         3-1.           Protocol         8557         2         0000         Protocol Parameter         3-1.           Protocol         8557         2         0000         Protocol Parameter         3-1.           Protocol         8557         2         0000         Protocol Parameter         3-1.           Protocol Select	PLC Connection -	Parameter [7]	854F				Selected. For datails, refer to $\sim = 12$	
Protocol         8552         2         0000         Protocol Parameter         3-1.           Parameter [9]         8553         2         0000         Protocol Parameter         3-1.           Parameter [10]         8555         2         0000         Protocol Parameter         3-1.           Parameter [11]         8557         2         0000         Protocol Parameter         3-1.           Protocol         8558         2         0000         Protocol Parameter         3-1.           Protocol         8558         2         0000         Protocol Parameter         3-1.           Protocol         8558         2         0000         Protocol Parameter         3-1.           Protocol         8556         2         0000         Protocol Parameter         3-1.           Protocol         8556         2         0000         Protocol Parameter         3-1.           Protocol         8556         2         0000         Protocol Parameter         3-1.           Protocol         8555         2         0000         0000 - FFFF :         3-1.           Protocol         8556         2         0000         0000 - FFFF :         3-1.           Reserved <t< td=""><td>PLC</td><td>Protocol Paramotor [8]</td><td>8551</td><td>2</td><td>0000</td><td>Protocol Paramotor</td><td>Setting and Wiringlop page</td></t<>	PLC	Protocol Paramotor [8]	8551	2	0000	Protocol Paramotor	Setting and Wiringlop page	
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$ \begin{array}{ c c c c c c c c c c c c c c c c c c c$		Parameter [12]	8559	2	0000	Protocol Parameter		
Parameter [13]         855B         2         0000         Protocol Parameter           Protocol         855C         2         0000         Protocol Parameter           Protocol         855C         2         0000         Protocol Parameter           Protocol         855F         2         0000         Protocol Parameter           Protocol         855F         2         0000         Protocol Parameter           Reserved         8560 - 857F         32         -         -         -           Protocol Select         8581         1         -         -         -           Reserved         8582         1         -         -         -           Reserved         8581         1         00         00:WB2F communication connected code scanner.           Reserved         8582         1         -         -         -           Reserved         8583         1         -         -         -           Beserved         8585         1         -         -         Sets the time until code scanner.           Timeout (normal)         8586         4         01         00         0000000A-0000FFFF : Setting Value × 1 ms (100ms to 65,535ms)         Sets the time until code scann		Protocol	855A			0000 - FFFF :		
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Parameter [14]         855D         2         0000         Protocol Parameter           Protocol         855E         2         0000         000 - FFFF : Protocol Parameter         0000 - FFFF : Protocol Parameter           Reserved         8560 - 857F         32         -         -         -           Protocol Select         8581         1         00         00: WB2F communication command         Configures the protocol for the command           Reserved         8582         1         -         -         -           Reserved         8581         1         00         00: WB2F communication command         Configures the protocol for the command           Reserved         8583         1         -         -         -           Reserved         8584         -         -         -         -           Timeout (normal)         8586         4         00         0000000A-0000FFFF : Setting Value x 1 ms         Sets the time until code scanner response timeout. (other than for reading) Initial value 500ms           Code Scanner         13         8588         00         0000000A-0000FFFF : Sets the time until code scanner response timeout. (for reading) Initial value 5,000ms           Reserved         8586         00         00         -         -         -		Protocol	855C			0000 - FFFF :	-	
Protocol Parameter [15]         855E 855F         2         0000         0000 - FFFF : Protocol Parameter           Reserved         8560 - 857F         32         -         -         -           Reserved         8580         1         -         -         -           Protocol Select         8581         1         00         00: WB2F communication command         Configures the protocol for the connected code scanner.           Reserved         8582         1         -         -         -           Reserved         8583         1         -         -         -           Beserved         8583         1         -         -         -           Timeout (normal)         8586         4         00         0000000A-0000FFFF : Setting Value × 1 ms (10ms to 65,535ms)         Sets the time until code scanner response timeout. (other than for reading)           Code Scanner         858B         00         00         -         -           858B         00 </td <td></td> <td>Parameter [14]</td> <td>855D</td> <td>2</td> <td>0000</td> <td>Protocol Parameter</td> <td></td>		Parameter [14]	855D	2	0000	Protocol Parameter		
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Reserved         8582         1         -         -         -           Reserved         8583         1         -         -         -         -           Reserved         8583         1         -         -         -         -           Reserved         8583         1         -         -         -         -           Timeout (normal)         8585         4         01         0000000A-0000FFFF : Setting Value × 1 ms (10ms to 65,535ms)         Sets the time until code scanner response timeout. (other than for reading) Initial value 500ms           PLC Connection - Code Scanner         8588         888         0000000A-0000FFFF : Setting Value × 1 ms (10ms to 65,535ms)         Sets the time until code scanner response timeout. (for reading)           Code Scanner         8586         00         000         -         Sets the time until code scanner response timeout. (for reading)           Reserved         858C - 85AF         36         -         -         -           Reserved         858C - 85AF         36         -         -         -           Basel         0D         00 - FF : ASCII code         Designates a suffix identical to the suffix appended to the code scanner's symbol reading results.         -         -		Protocol Select	8581	1	00	00 : WB2F communication command	Configures the protocol for the connected code scanner.	
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PLC Connection - Code Scanner       13       00       0000000A-0000FFFF : Setting Value × 1 ms       (other than for reading)         Image: Note of Scanner       8588       88       0000000A-0000FFFF : Setting Value × 1 ms       Sets the time until code scanner response timeout.         Code Scanner       8580       00       00       000000A-0000FFFF : Setting Value × 1 ms       Sets the time until code scanner response timeout.         Reserved       858C - 85AF       36       -       -         8581       00       00 - FF : ASCII code       Designates a suffix identical to the suffix appended to the code scanner's symbol reading results.         Global Suffix       85B3       8       00       00 - FF : ASCII code       results.		Timeout (normal)	8585	4	01	Setting Value x 1 ms	scanner response timeout.	
Bit PLC Connection - Code Scanner     8587     00     Code Scanner     Initial value 500ms       PLC Connection - Code Scanner     13     8588     0000000A-0000FFFF : Setting Value × 1 ms     Sets the time until code scanner response timeout.       Reserved     858C - 85AF     36     -     -       8580     00     00 - FF : ASCII code     Designates a suffix identical to the suffix appended to the code scanner's symbol reading       Global Suffix     85B3     8     00     00 - FF : ASCII code     results.			8586		00	(10ms to 65.535ms)	(other than for reading)	
BS88       BS88       BS88       BS89       BS89       BS89       BS89       BS89       BS89       BS89       BS88       BS89       BS88			8587		00	(	Initial value 500ms	
PLC Connection - Code Scanner       Timeout (reading)       8589 858A       4       13 00       Setting Value × 1 ms (10ms to 65,535ms)       scanner response timeout. (for reading)         Reserved       858C - 85AF       36       -       -         8580       00       00 - FF : ASCII code       Designates a suffix identical to the suffix appended to the code scanner's symbol reading         Global Suffix       85B3       8       00       00 - FF : ASCII code       results.			8588		88	0000000A-0000FFFF :	Sets the time until code	
Code Scanner     858A     00     (10ms to 65,535ms)     (for reading)       Reserved     858C - 85AF     36     -     -       8580     0D     00 - FF : ASCII code     Designates a suffix identical       8581     0A     00 - FF : ASCII code     Designates a suffix identical       8582     0D     00 - FF : ASCII code     to the suffix appended to the       8583     8     00     00 - FF : ASCII code     code scanner's symbol reading	PLC Connection -	Timeout (reading)	8589	4	13	Setting Value $\times$ 1 ms	scanner response timeout.	
Reserved     858C     858C     00     Initial value 5,000ms       Reserved     858C - 85AF     36     -     -       85B0     0D     00 - FF : ASCII code     Designates a suffix identical to the suffix appended to the suffix appended to the suffix appended to the code scanner's symbol reading       Global Suffix     85B3     00     00 - FF : ASCII code     results.	Code Scanner		858A		00	(10ms to 65,535ms)	(for reading)	
Reserved     858C - 85AF     36     -     -       85B0     0D     00 - FF : ASCII code     Designates a suffix identical       85B1     0A     00 - FF : ASCII code     to the suffix appended to the       85B2     00     00 - FF : ASCII code     code scanner's symbol reading       Global Suffix     8     00     00 - FF : ASCII code     results.			858B	2.6	00		Initial value 5,000ms	
8580     0D     00 - FF : ASCII code     Designates a suffix identical       85B1     0A     00 - FF : ASCII code     to the suffix appended to the       85B2     00     00 - FF : ASCII code     code scanner's symbol reading       Global Suffix     8     00     00 - FF : ASCII code     results.		Reserved	858C - 85AF	36	-			
8581     0A     00 - FF : ASCII code     to the sumx appended to the       85B2     00     00 - FF : ASCII code     code scanner's symbol reading       Global Suffix     8     00     00 - FF : ASCII code     results.			85B0			00 - FF : ASCII code	Designates a suffix identical	
85B2     00     00 - FF : ASCII code     code scanner s symbol reading       Global Suffix     85B3     8     00     00 - FF : ASCII code     results.			85B1		00	00 - FF : ASCII code	to the sumx appended to the	
Global Suffix 8 00 00 - FF : ASCII code results.			85B2		00	00 - FF : ASCII code	code scanner's symbol reading	
		Global Suffix	0503	8			The communication unit	
00     00     00     100     100     100       9585     00     00     EE + ASCH code     Idetermines that and assesses			0504 0505		00		dotorminos that code scanner	
			0202		00		symbol roading is complete	
ODDO     UU     UU     FF : ASCII code     Symbol reading IS complete       9587     00     00     EE : ASCII code     when it receives this value			0500 0507				when it receives this value	
ODD/         UU         UU - FF : ASCILCODE         WHEN IT RECEIVES THIS VALUE.           Pacaruad         95P8         95EE         72         1		Pacanyad	05D0 05FF	70	00			

This chapter describes the operation specification of the PLC connection.

## 2.1 Overview

The communication unit periodically reads the PLC data memory. When the data memory which is being read has any change, the function assigned to the data memory is performed. A command is also sent to the connected code scanner. This mechanism allows to perform each function of the code scanner only by setting the data memory of PLC to the specified value.

## 2.2 Assigning Data Memory

The communication unit performs reading and writing to the "Special area" and the "Scanner Information Area" assigned to the PLC data memory. When using this function, set where to assign these two areas in the data memory. For details of the setting, refer to CP [1.6 Setting Parameters (WB9Z-CU100)] on page 1-3.

## 2.3 Special Area

With the special memory area starting address as a header, the following functions shown in the table below are assigned to the data memory.By setting the corresponding bit of the corresponding address to "1", each function can be performed. The communication unit performs the requested function, and then performs zero clear of the special area.

The zero clear after the function is executed targets not only the corresponding bit of the corresponding address, but the special area entirely.

Address (OFFSET)	bit	Function	Contents
	0	Reserved	
	1		
	2		
	3		
	4		
0	5		
	6		
	7	Reserved	
	8	Symbol read stop	Stops the symbol reading
	9	Symbol read start	Starts the symbol reading.
	10 - 15	Reserved	
	0	OK Output OFF	Stops the OK Output.
	1	OK Output ON	Starts the OK Output (the operation logic and operation time follows the setting value.)
	2	NG Output OFF	Stops the NG Output.
	3	NG Output ON	Starts the NG Output (the operation logic and operation time follows the setting value.)
	4 - 7	Reserved	
	8	Status LED (Red) OFF	Sets the Status LED (Red) to the OFF state.
1	9	Status LED (Red) ON	Sets the Status LED (Red) to the ON state (the lighting pattern and the lighting time follows the setting value.)
	10	Status LED (Orange) OFF	Sets the Status LED (Orange) to OFF state.
	11	Status LED (Orange) ON	Sets the Status LED (Orange) to ON state (the lighting pattern and the lighting time follows the setting value.)
	12	Status LED (Green) OFF	Sets the Status LED (Green) to OFF state.
	13	Status LED (Green) ON	Sets the Status LED (Green) to ON state (the lighting pattern and the lighting time follows the setting value.)
	14	Reserved	
	15	Reserved	
2	0-15	Reserved	
3	0-15	Reserved	

When multiple bits are set to 1 at the same time, the lowest one is preferably executed for both address and bit. The other functions are ignored.

- e.g. When the following thee bits are set to 1 at the same time:
  - [Bit 8 of Address 0]
  - [Bit 9 of Address 0]
  - [Bit 0 of Address 1]

The function only assigned to Bit 8 of Address 0 is executed.

- e.g. When the following three bits are set to 1 at the same time:
  - [Bit 0 of Address 0]
  - [Bit 9 of Address 0]
  - [Bit 0 of Address 1]

The function only assigned to Bit 0 of Address 0 is executed.

## 2.4 Scanner Information Area

With the scanner information area starting address as a header, the functions shown in the table below are assigned to the data memory of PLC. The communication unit writes the symbol data and the data length in the scanner information area.

Address (OFFSET)	bit	Function	Contents			
0	0 - 15	Data length	Writes the data length of the symbol data.			
1	0 - 7	Data [0]				
	8 - 15	Data [1]				
2	0 - 7	Data [2]				
2	8 - 15	Data [3]	Writes the read symbol data.			
2	0 - 7	Data [4]	The storage order of the symbol data follows the setting values.			
5	8 - 15	Data [5]				
•	•	•				



The symbol data quantity is variable. Assure an adequate area of expected data length or more.

e.g. Storage example to the scanner information area

The below shows an example of storing data into the scanner information area. The setting of the symbol data storage order can change the storage order to the data memory.

#### [Condition]

Scanner information area starting address: 100

Data memory Data length: 16 bits

Symbol data:

"ABCDEFGHI[CR][LF]"11 bytes

Position	0	1	2	3	4	5	6	7	8	9	10
ASCII	А	В	С	D	E	F	G	Н		[CR]	[LF]
HEX	41H	42H	43H	44H	45H	46H	47H	48H	49H	0DH	0AH

• [Storing image] (Symbol data storing order: Lower → Upper)

Address	Upper byte	Lower byte	Remarks			
100	000BH		<- Number of symbol data: 11 bytes			
101	42H	41H	<- Stored in the order of lower byte and upper byte.			
102	44H	43H				
103	46H 45H					
104	48H	47H				
105	0DH	49H				
106	00H	0AH	<- The upper byte is padded with 00H .			

• [Storage image] (symbol data storage order:Upper→Lower

Address	Upper byte	Lower byte	Remarks
100	000BH		<- Number of symbol data: 11 bytes
101	41H	42H	<- Stored in the order of upper byte and lower byte.
102	43H	44H	
103	45H 46H		
104	47H	48H	
105	49H	0DH	
106	0AH	00H	<- The lower byte is padded with 00H.

### 2.5 Start and End

The PLC connection can be started and ended in the following conditions:

#### **Start condition**

With Address "8500 (PLC connection – function Enabled) in the setting parameter of the communication unit set and stored to "01 (Enable), turn the power from OFF to ON.

#### **End condition**

With Address "8500 (PLC connection – function Enabled) in the setting parameter of the communication unit set and stored to "00 (Disabled), turn the power from OFF to ON.

The communication unit has three power supply systems: external power, PoE and maintenance port (USB port).

To turn off the power, you will need to cut off all three systems.

## 2.6 Operation Sequence

The communication unit repeatedly performs the following four operations:

- **1** When symbol reading is completed, the writing of symbol data to the scanner information area is performed.
- **2** When the execution of the requested function is completed, the zero clear of the special area is performed.
- **3** When the bit in the special area is 1, and there is a request of function execution, the assigned function is performed.
- **4** If the above 1 to 3 is not applicable, reading of the special area is performed.



When creating a PLC program, note the following:

- After checking that the special area is all "0", make the bit in the special area to "1".
   (On the PLC program, even when the different bit is 1 in the different timing, it is regarded that plural bits are set to 1 at the same time depending on the communication timing.)
- (2) Before requesting to start reading the symbol, perform zero clear for the scanner information area (data length).
- (3) If the connection between the code scanner and PLC cannot be established after the specified times of retry, the process is transferred to the "Special Area Read".
- (4) When the bit in the special area is "1" when the communication is restored, the corresponding function is performed.

(Even for the function requested by the PLC program before the communication was unsuccessful, when the bit in the special area is "1" when the communication is established, the function is performed.)





e.g. PLC program and access to the data memory of communication unit

This chapter explains set-up and wiring for the communication unit, PLC and code scanner.

## 3.1 Set-up Procedure

#### 3.1.1 Overview

K

Set up the communication unit, PLC and code scanner and then connect each.

Communication between the communication unit and the PLC utilizes a LAN cable (Ethernet), while communication between the communication unit and the code scanner utilizes a DIN connector (RS-232).



Please refer to the appropriate manuals for the specifications of, as well as explanations of how to set up, the communication unit, PLC and code scanner.

1 Overview	2 Operation Specifications	Setting and Wiring

#### Set-up Procedure

#### 3.1.2 Set-up Process

The process from set-up to operation of the PLC connection function is represented below.



\*1 Before performing an operations check, switch the power for each device OFF and then back ON.

The communication unit has three power supply systems: external power, PoE and maintenance port (USB port). To turn OFF the power, you will need to cut off all three systems.

## 3.2 MC Protocol Setting

#### 3.2.1 Mitsubishi Electric (SLMP-Compatible Devices)

#### Overview

Data is sent and received between the communication unit and the SLMP-compatible MELSEC sequencer.

SLMP stands for "SeamLess Message Protocol," and it is a shared protocol for seamlessly transmitting data between applications without worrying about network layers or boundaries in-between the CC-Link family network and generic Ethernet devices.

Under the following conditions, the communication unit is able to send and receive data with SLMP-compatible devices. The communication unit is operated as a TCP/IP client.

Protocol	Format 4, 4C frame, Check sum
Series supported <sup>*1</sup>	MELSEC iQ-R/iQ-F/Q/L series
Connection method	RS-232/RS-422
Data memory	Data register

\*1 For the details of supporting devices, refer to 7 [1.4 Applicable PLC] on page 1-2.

#### Communication Unit (WB9Z-CU100) Setting examples

In order for the communication unit and the MELSEC sequencer to send and receive data, the communication unit's network settings and the PLC connection function settings need to be configured.

When selecting the MC protocol, the protocol parameters [0]to [15] means the following setting respecitvely.

Protocol Parameter [0]	Not used
Protocol Parameter [1]	No. of the network requested
Protocol Parameter [2]	No. of the station requested
Protocol Parameter [3]	I/O No. of the unit requested
Protocol Parameter [4]	Not used
Protocol Parameter [5]	Not used
Protocol Parameter [6]	Watchdog timer
Protocol Parameter [7] to [15]	Not used

#### Here describes the setting examples of the communication unit:

ltem	Sub item	MC protocol Parameter	Address (hex)	Size (dec)	Setting example (hex)	Remarks
			8202		64	
	IP address		8203	4	01	C0A80164 :
			8204		A8	IP address 192.168.1.100
			8205		CO	
			8206		01	_
	Default gateway		8207	4	01	C0A80101 :
	Delaan gateway		8208		A8	Default gateway : 192.168.1.1
			8209		CO	
			820A		00	_
	Subnet mask		820B	4	FF	FFFFFF00 :
Ethernet			820C		FF	Subnet mask : 255.255.255.0
setting			820D		FF	
	TCP server port		820E	2	B8	OBB8 : 3000
			820F		OB	
			821A		32	-
	Remote TCP		821B	4	01	_C0A80132 :
	client IP address		821C		A8	IP address : 192.168.1.50
			821D		C0	
	Remote TCP		8222	2	48	0D48:3400
	client port		8223		0D	
	TCP client port		8226	2	00	0000 : 0 (Automatic assignment)
	- ·		8227		00	
	Function enabled		8500	1	00	01 : Enabled
	Protocol Select		8501	1	00	00 : SLMP (ST model, TCP/IP)
			8504		64	
	Monitoring		8505	4	00	00000064 · 100mc
	cycle		8506		00	0000004.100ms
			8507		00	
			8508		C8	
	Timoqut		8509	4	00	]  000000C8.200mc
	Timeout		850A	4	00	1000000C8:200Ms
PLC			850B		00	
	Retry Count		850C	1	05	05 : 5Times
- PLC	Symbol data		0500	1	00	
	storage endian		0000	I	00	loo : Lower→opper
			8510		00	
	Special Area		8511	4	00	
	Start Address		8512	4	00	
			8513		00	
	Scanner		8514		10	
	Information		8515	4	00	
	Area Start		8516	4	00	10000010 : D16
	Address		8517		00	

ltem	Sub item	MC protocol Parameter	Address (hex)	Size (dec)	Setting example (hex)	Remarks
	Protocol		8540	2	0000	Sat to 0000
	Parameter [0]		8541	۷	0000	
	Protocol		8542	2	0000	0000:
	Parameter [1]		8543	2	0000	No. of the network requested 0
	Protocol		8544	2	0000	OOFF:
	Parameter [2]		8545	2		No. of the station requested FF
Connection	Protocol		8546	2	0000	O3FF:
	Parameter [3]		8547	2		I/O No. of the unit requested 03FF
- PLC	Protocol		8548	2	0000	Set to 0000.
	Parameter [4]		8549		0000	
	Protocol		854A	2	0000	Sat to 0000
	Parameter [5]		854B	2	0000	
	Protocol		854C	2	0000	0000:
	Parameter [6]		854D	2	0000	Watchdog timer



The protocol parameters for SLMP configuration are those that are given in the SLMP item names.

1 Overview	2 Operation Specifications	Setting and Wiring

#### MC Protocol Setting

## • PLC Setting example

The following table shows the setting example of the MELSEQ-L Series CPU Unit L02CPU.

Parameter		Setting example	Remarks		
	IP Address Setting	IP Address	192.168.1.50		
		Subnet Mask Pattern	255.255.255.0	Please change to suit the	
		Default Router IP Address	192.168.1.1		
	Open Setting	Protocol	ТСР		
Built-in Ethernet Port Setting		Open System	MC Protocol		
		TCP Connection	-	Cannot be configured	
		Host Station Port No.	3400	Please change to suit the operating environment.	
		Destination IP Address	-		
		Destination Port No.	-	Cannot be configured	
		Start Device to Store Predefined Protocol Operation Status	-		

The above setting is available by GX Works2. Here is the step.

Double-click on [Project], [Parameter], [PLC Parameter] within the navigation window to pull up the L-Parameter Settings; then, select the [Start Device to Store Predefined Protocol Operation Status] tab and perform settings configuration. Afterwards, pull up the Open Setting window and configure the individual parameters.

Project	L Parameter Setting
Parameter	Of C Name         DI C System         DI C Elle         IPLC RAS         Boot File         Program         SFC         Device         I/O Assignment           Built-in Ethernet Port Setting         Built-in I/O Function Setting         Adapter Serial Setting         Adapter Serial Setting         Adapter Serial Setting
PUC Parameter     Wetwork Parameter     Wetwork Parameter     Wetwork Parameter     Wetwork Parameter     Goldan Device Comment     Pogram Setting     Pogram     Local Device Comment     Local Device Comment     Device Memory	IP Address Setting       Open Setting       Set Open Setting in Ethernet Configuration window         IP Address       192       168       1         Subnet Mask Pattern       255       255       0         Default Router IP Address       192       168       1         Communication Data Code       DNS Setting       In put Formation window
Device Initial Value	Binary Code     Code
	✓ Enable online change (FTP, MC Protocol)
Built-in Ethernet Port Open Setting	
	IP Address/Port No. Input Format DEC 👤
Protocol Open System TCP Conn 1 TCP   MC Protocol 2 TCP   MELSOFT Connection	Host Station     Destination     Destination       Port No.     IP Address     Port No.       Predefined Protocol Operation Status
3 TCP ▼ MELSOFT Connection ▼	

#### PLC Setting example 2

The following table shows the setting example of the MELSEQ-L Series CPU Unit L02CPU.

Parameter		Setting example	Remarks		
			IP Address	192.168.1.50	Please change to
	IP Address	Subnet Mask	255.255.255.0	suit the operating	
	Own Node		Default Gateway	-	environment.
Settings	Enable/Disable On	line Change	Disable All (SLMP)		
		Communication D	ata Code	Binary	
		Opening Method		Do Not Open by Program	
		To Use or Not to Us	se CC-Link IEF Basic Setting	Disable	
	CC-Link IEF Basic	Network Configura	ation Settings	-	No need
	Setting	Refresh Settings		-	configuration.
	Model Name		SLMP Connection Module		
Modulo		Communication M	ethod	SLMP	
Parameter		Protocol		TCP	
Evtornal Davisa		Fixed Buffer Send/Receive Setting		-	Cannot be configured
		IP Address	192.168.1.50	Please change to	
	External Device	PLC	Port No.	3400	suit the operating environment.
	Configuration		MAC Address	-	
			Host Name	-	
		Canaar/Davies	IP Address	-	Connethe conferred
		Sensor Device	Port No.	-	Cannot be configured
			Subnet Mask	-	
			Default Gateway	-	
		Existence Confirmation		KeepAlive	

The above setting is available by GX Works3. Here is the step.

Double-click on [Project], [Parameter], [R04CPU], [Module Parameter] within the navigation window to pull up the Settings Items window, and then perform individual parameter configuration.

Afterwards, open the Partner Connection Device Configuration Settings and configure the individual parameters.



#### Wiring example

A communication unit (WB9Z-CU100) and L02CPU wiring example is shown below.

Please refer to the diagram when performing wiring. Please also make sure that the power is OFF when performing wiring.

e.g. Communication Unit (WB9Z-CU100) and L02CPU Wiring



**Caution** Before performing wiring, please make sure to carefully read the user's manuals for the communication unit (WB9Z-CU100) and the L02CPU.

Connection via an Ethernet hub is also possible.



• Please use a cable which is Category 5 or higher.

• Please use a cable no longer than 100m.

• If cable length exceeds 30m, please use a shield cable.

## 3.3 Code Scanner Setting

#### 3.3.1 IDEC (WB2F)

#### Overview

Data is sent and received between the communication unit and the code scanner (WB2F).

Under the following conditions, the communication unit is able to send and receive data with WB2F.

Protocol	WB series communication commands <sup>*1</sup>
Series supported	WB2F-100S1B
Connection method	RS-232
Data memory	•The WB2F can only be used in slave mode.
	• Please use the default values as the setting values for the following WB2F functions.
	-Command alias function
	-Communication command function
	-PLC connection function
	•WB2F reading operations support a single read only.
	•While data is being transmitted, please do not use the WB2F READ/ENTER button, per-
	form external input or input communication commands via USB.

\*1 WB series communication commands are the communication protocol used for IDEC code scanner WB series and external device communication.

#### Communication unit (WB9Z-CU100) setting example

In order for the communication unit and the WB2F to send and receive data, RS-232 for the WB9Z-CU100 and the PLC connection function settings need to be configured.

Here describes the setting examples of the communication unit:

ltem	Sub Item	Address (hex)	Size (dec)	Setting example (hex)	Remarks
	Communication speed	8100	1	03	03 : 9,600bps
	Data length	8101	1	01	01 : 8bits
RS-232 setting	Parity	8102	1	01	01 : EVEN
	Stop bits	8103	1	00	00 : 1bit
	Flow control	8104	1	00	00 : NONE
	Protocol Select	8581	1	00	00 : WB2F communication command
		8584		F4	
	Timeout (normal)	8585	4	01	000001F4 : 500ms
		8586		00	
		8587		00	
	Timeout (reading)	8588	- 4	88	
		8589		13	00001288 · 5 000mc
PLC Connection -		858A		00	
Codo Scoppor		858B		00	
Code scariner		85B0		0D	0D : CR(Carriage Return)
		85B1		0A	0A : LF(Line Feed)
		85B2		00	00 : NUL(Null)
	Clobal Suffix	85B3	0	00	00 : NUL(Null)
		85B4	0	00	00 : NUL(Null)
		85B5		00	00 : NUL(Null)
		85B6	1	00	00 : NUL(Null)
		85B7		00	00 : NUL(Null)

#### • Code Scanner setting example

Here describes the setting examples of the code scanner (WB2F) :

Itom	Sub itom	Address	Size	Default	Setting value
nem	Subitem	(hex)	(dec)	(hex)	(hex)
	Communication speed	0100	1	03	03 : 9,600bps
RS-232 settings	Data length	0101	1	01	01 : 8bits
	Parity	0102	1	01	01 : EVEN
	Stop bits	0103	1	00	00 : 1bit
	Flow control	0104	1	00	00 : None
	Symbol Reading	0200	1	00	00 : Single read
	Reading Timeout	0201	1	14	14 : 1,400ms
	Preventing Double Read Time	0202	1	14	14 : 1,400ms
Symbol Reading	Reading start when power on	0204	1	00	01 : Enabled
	Decode limeout	0207	1	05	05 : 5ms
	Number of symbols read	020E	1	01	01:1
	Output mode	020F	1	00	00 : Output
	Reading Result Output Port	0210	1	00	00 : RS-232
	Global Prefix	1000	1	00	00 : Disabled
	Global Suffix	1001	1	01	01 : Enabled
	Output addition when reading failed	100F	1	01	01 : Enabled
	No response when reading failed	1010	1	00	00 : Disabled
		1048		OD	0D : CR(Carriage Return)
	Global Suffix data	1049		0A	0A : LF(Line Feed)
		104A		00	00 : NUL(NUII)
		104B	8	00	00 : NUL(Null)
Output data		104C		00	00 : NUL(NUII)
additional		104D		00	00 : NUL(Null)
information		104E		00	00 : NUL(Null)
		104F		00	00 : NUL(Null)
		1050		3F	3F: /
		1051	8	00	
		1052		00	
	Output string data when reading failed	1053		00	
		1054		00	
		1055		00	
		1056		00	
	From estimate and a land	1057	1	00	00 : NUL(NUII)
Command allas	Function enabled	2000	1	00	00 : Disabled
	Check digit addition	2101	1	00	00 : Disabled
	Uppercase response	2102			UU: Disabled (lowercase)
		2104		DE	
Communication	Prefix	2105	4	00	
command		2106		00	
Function		2107		00	
		2108			UD : CK(Carriage Keturn)
	Suffix	2109	4	UA	
		210A		00	
		210B		00	
IPLC Connection	Function enabled	2200	1	00	UU : Disabled

The above setting configuration can be achieved using the WB2F Support Tool.

For information on how to use this tool and for other details, please refer to the WB2F Support Tool User's Manual.

#### • Wiring example

A communication unit (WB9Z-CU100) and WB2F wiring example is shown below.

Please refer to the diagram when performing wiring. Please also make sure that the power is OFF when performing wiring

e.g. Communication Unit (WB9Z-CU100) and WB2F Wiring



**A** Caution

Before performing wiring, please make sure to carefully read the user's manuals for the communication unit (WB9Z-CU100) and the WB2F.

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