

G

**Series
Nutrunner**

**Extension Unit
Version 1.2**



URYU SEISAKU , LTD.

Revision History

Revision Date	Revision	What has been updated
2021/10/28	Version 1.0	
2022/11/16	Version 1.1	<ul style="list-style-type: none">• Output data format correction• Added Data example of G-unit, Judgment Data, Error Data• Correction of wordings
2023/08/24	Version 1.2	<ul style="list-style-type: none">• Added 2-6.Fieldbus message setting (PLCs → CC-Link Master Spindle)• Correction of wordings (3-6,4-6,5-6,6-6. Fieldbus message setting)

TABLE OF COMENTS

Chapter1. Fieldbus Message Setting	1-1
1-1. Fieldbus message setting (Base unit → PLCs).....	1-2
1-1-1. Main format	1-2
1-1-2. G-Unit Format	1-3
1-1-3. Judgment Data	1-6
1-1-4. Error Data.....	1-7
1-1-5. Fieldbus Message Settings Clear.....	1-7
Chapter2. CC-Link	2-1
2-1. System Configuration (CC-Link).....	2-2
2-2. Hardware Description (CC-Link).....	2-3
2-2-1. Module.....	2-4
2-2-2. Cable.....	2-5
2-3. I/O data type (CC-Link)	2-6
2-3-1. INPUT SPECIFICATIONS (PLC → Master-Spindle	2-8
2-3-2. Output Signal Specifications (Master Spindle → PLCs).....	2-9
2-4. Fieldbus setting (CC-Link)	2-10
2-5. Fieldbus message setting (CC-Link Master Spindle → PLCs).....	2-10
2-6. Fieldbus message setting (PLCs → CC-Link Master Spindle).....	2-12
2-7. PLC handshake in the system area	2-13
Chapter3. DeviceNet	3-1
3-1. System Configuration (DeviceNet).....	3-2
3-2. Hardware Description (DeviceNet).....	3-3
3-2-1. Module.....	3-4
3-2-2. Cable.....	3-5
3-2-3. EDS files.....	3-5
3-3. I/O Signaling Specifications (DeviceNet)	3-6
3-3-1. INPUT SPECIFICATIONS (PLC → Master-unit).....	3-6
3-3-2. Output-Signal Specifications (Master G-Unit → PLCs).....	3-8
3-4. Fieldbus setting (DeviceNet)	3-9
3-5. Fieldbus message setting (DeviceNet Master unit → PLCs).....	3-10
3-6. Fieldbus message setting (DeviceNet PLC → Master-unit).....	3-11
Chapter4. EtherNet/IP	4-1
4-1. System Configuration (EtherNet/IP).....	4-2
4-2. Hardware Description (EtherNet/IP)	4-3
4-2-1. Module.....	4-4
4-2-2. Cable.....	4-5
4-2-3. EDS files.....	4-5
4-3. I/O data type (EtherNet/IP)	4-6
4-3-1. INPUT SPECIFICATIONS (PLC → Master-Spindle Unit).....	4-6
4-3-2. Output-signal spec. (Master spindle unit → PLCs).....	4-8
4-4. Fieldbus setting (EtherNet/IP)	4-9
4-5. Fieldbus message setting (EtherNet/IP Master spindle unit → PLCs).....	4-10
4-6. Fieldbus message setting (EtherNet/IP PLC → Master-spindle unit).....	4-11
Chapter5. PROFIBUS DP-V1	5-1
5-1. System Configuration (PROFIBUS DP-V1)	5-2

Chapter 1 Fieldbus Message Setting

5-2. Hardware Description (PROFIBUS DP-V1).....	5-3
5-2-1. Module.....	5-4
5-2-2. Cable.....	5-5
5-2-3. GSD files.....	5-5
5-3. I/O Signaling Specifications (PROFIBUS DP-V1).....	5-6
5-3-1. INPUT SPECIFICATIONS (PLC → Master-unit).....	5-6
5-3-2. Output-Signal Specifications (Master unit → PLCs).....	5-8
5-4. Fieldbus setting (PROFIBUS DP-V1).....	5-9
5-5. Fieldbus message setting (Master G-Unit → PLCs).....	5-10
5-6. Fieldbus message setting (PLC → Master-unit).....	5-11
Chapter6. PROFINET IO.....	6-1
6-1. System Configuration (PROFINET IO).....	6-2
6-2. Hardware Description (PROFINET IO).....	6-3
6-2-1. Module.....	6-4
6-2-2. Cable.....	6-5
6-2-3. GSDML files.....	6-5
6-3. I/O data type (PROFINET IO).....	6-6
6-3-1. Input signal ratings (PLC → Master-unit).....	6-6
6-3-2. Output Signal Specifications (Master unit → PLCs).....	6-8
6-4. Fieldbus setting (PROFINET IO).....	6-9
6-5. Fieldbus message setting (Master unit → PLCs).....	6-10
6-6. Fieldbus message setting (PLC → Master-unit).....	6-11
Chapter7. EtherCAT.....	7-1
7-1. System Configuration (EtherCAT).....	7-2
7-2. Hardware Description (EtherCAT).....	7-3
7-2-1. Module.....	7-4
7-2-2. Cable.....	7-5
7-2-3. ESI files.....	7-5
7-3. I/O Signaling Specifications (EtherCAT).....	7-6
7-3-1. INPUT SPECIFICATIONS (PLC → Master-unit).....	7-6
7-3-2. Output Signal Specifications (Master unit → PLCs).....	7-8
7-4. Fieldbus setting (EtherCAT).....	7-9
Chapter8. CC-Link IE Field.....	8-1
8-1. System Configuration (CC-Link IE Field).....	8-2
8-2. Hardware Description (CC-Link IE Field).....	8-3
8-2-1. Module.....	8-4
8-2-2. Cable.....	8-5
8-3. I/O data type (CC-Link IE Field).....	8-6
8-3-1. INPUT SPECIFICATIONS (PLC → Master-unit).....	8-7
8-3-2. Output-Signal Specifications (Master G-Unit → PLCs).....	8-8
8-4. Fieldbus setting (CC-Link IE Field).....	8-9
8-5. Connecting to MELSEC-Q Series.....	8-10
8-5-1. Connection example.....	8-10
8-5-2. MELSEC-Q networking parameter setting.....	8-11

Chapter1. Fieldbus Message Setting

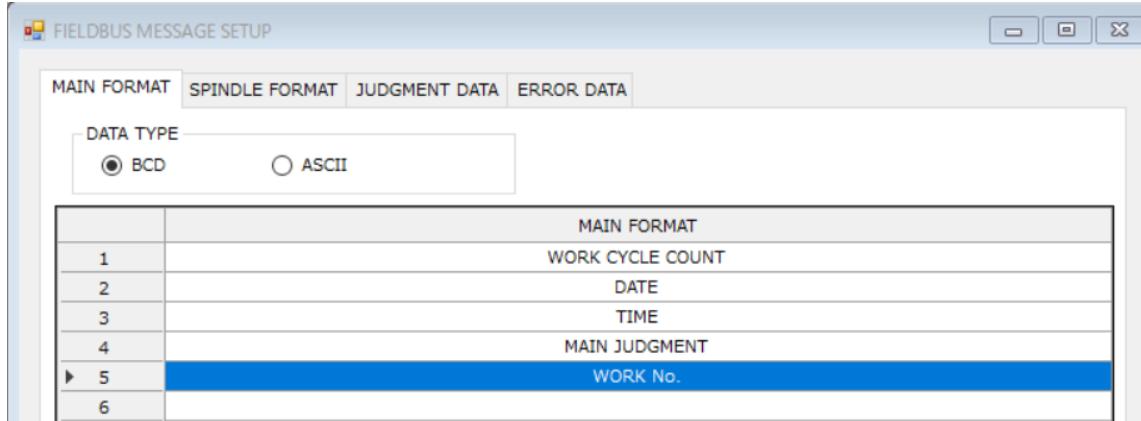
1

1-1. Fieldbus message setting (Base unit → PLCs)

By setting Fieldbus Message, the tightening result can be output from Fieldbus connection. On the menu bar "Main" → "Fieldbus Message setting", the setting screen is displayed.

1-1-1. Main format

In the main format screen, you can select the output data format and assign the output contents.



● **Data format**

Select "BCD" or "ASCII".

● **Main format output item (BCD)**

Output items	In bytes	Tightening data	Main format			
			1 word		2 word	
Work cycle Count	4	123456	00	12	34	56
Date	4	2018/9/28	20	18	09	28
Time	4	12:34:56	12	34	56	00
Main judgment	2	NOK	00	01	-	-
		OK	00	02	-	-
		ALARM	00	04	-	-
		STOP	00	08	-	-
Work No. (1 to 24)	2	2	00	02	-	-

● **Main Format Output Items (ASCII)**

Output items	In bytes	Tightening data	Main format									
			1word		2word		3word		4word		5word	
Work cycle Count	8	123456	—	—	1	2	3	4	5	6		
Date	10	2018/09/28	2	0	1	8	/	0	9	/	2	8
Time	8	12:34:56	1	2	:	3	4	:	5	6		
Main judgment ※1	4	NOK	N	O	K	—						
		OK	O	K	—	—						
		ALARM	A	L	A	—						
		STOP	S	T	O	P						
Work No. (1 to 24)	2	2	—	2								

※1: (20H) is the space code (blank).

1-1-2. G-Unit Format

●G-Unit Format Output Item (BCD)

Output items	In bytes	Tightening Data	G-Unit Format			
			1word		2word	
Peak torque*2	4	123.4	00	12	34	01
Final angle*2	4	123.4	00	12	34	01
Fasten time ※2	4	123.4	00	12	34	01
Gradient rate	4	12.3	00	01	23	01
Snug Torque*2	4	123.4	00	12	34	01
Final torque*2	4	123.4	00	12	34	01
Spindles number (1 to 32)	2	1	00	01	-	-
Mode No. (1 to 48)	2	2	00	02	-	-
Parameter No. (1 to 96)	2	3	00	03	-	-
Spindle step count*3	4	123456	00	12	34	56
Step No.	2	4	00	04	-	-
Spindle judgment *4	4	-	①	②	③	00
Peak current*2	4	12.3	00	01	23	01
Angle at Peak Current *2	4	123.4	00	12	34	01
Thread number per turn*2	4	12.3	00	01	23	01
CAL voltage*2	4	3.512	00	35	12	03
ZERO voltage*2	4	-0.123	00	01	23	13
NOK code (BIN)	4	0000	00	00	00	00
Alarm code (BIN)	4	5-1	05	01	00	00
Torque low limit value *2	4	123.4	00	12	34	01
Torque high limit value*2	4	123.4	00	12	34	01
Final angle low limit degree *2	4	123.4	00	12	34	01
Final angle high limit degree *2	4	123.4	00	12	34	01
Final torque low limit value *2	4	123.4	00	12	34	01
Final torque high limit value *2	4	123.4	00	12	34	01
Snug torque high limit value*2	4	123.4	00	12	34	01

※2: 2word displays up to six digits (no decimal point), in the order of signs and decimal points.

12 34

56 0 2

(A)(B)

(A)Code

(B)Digits after the decimal point

Display	Content
0	+ value
1	-Value

Display	Content
0	No decimal point
1	1 digit after the decimal point
2	2 decimal places
3	3 decimal places
4	Four decimal places
5	Five decimal places

※3: "Spindle step count" outputs up to 7 digits (millions of digits).

※4: Set the output items on the "JUDGMENT DATA" and "ERROR DATA" tabs respectively.

① JUDGMENT DATA 1, ② JUDGMENT DATA 2, ③ ERROR DATA

●G-Unit Format Output Items (ASCII)

Output items	In bytes	Tightening Data	G-Unit Format									
			1word		2word		3word		4word		5word	
Peak torque*4	8	123.4	—	1	2	3	.	4	Judgment	—		
Final angle*4	8	123.4	—	1	2	3	.	4	Judgment	—		
Fasten time ※4	6	12.3	—	1	2	.	3	Judgment				
Gradient rate	6	12.3	—	—	1	2	.	3		—		
Snug Torque*4	8	123.4	—	1	2	3	.	4	Judgment	—		
Final torque*4	8	123.4	—	1	2	3	.	4	Judgment	—		
Spindle number (1 to 32)	2	1	—	1								
Mode No. (1 to 48)	2	2	—	2								
Parameter No. (1 to 96)	2	3	—	3								
Spindle step count*5	8	123456	0	0	1	2	3	4	5	6		
Step No.	2	4	—	4								
Spindle judgment *6	4	---	①	②	③	—						
Peak current ※4	10	12.3	—	—	—	—	1	2	.	3	Judgment	—
Angle at Peak current*4	6	123.4	—	1	2	3	.	4				
Thread number per turn*4	8	12.3	—	1	2	.	3	Judgment	—	—		
CAL voltage*4	6	3.70	—	3	.	7	0	—				
ZERO voltage*4	6	-0.123	-	0	.	1	2	3				
NOK code (BIN)	4	0000	00 00 00 00									
Alarm code (BIN)	4	5-1	00 00 05 01									
Torque low limit value	6	123.4	—	1	2	3	.	4				
Torque high limit value	6	123.4	—	1	2	3	.	4				
Final angle low limit degree	6	123.4	—	1	2	3	.	4				
Final angle high limit degree	6	123.4	—	1	2	3	.	4				
Final torque low limit value	6	123.4	—	1	2	3	.	4				
Final torque high limit value	6	123.4	—	1	2	3	.	4				
Snug torque high limit value	6	123.4	—	1	2	3	.	4				

※4: Output items with set values in the upper/lower limit range are output in the order of sign, result display (including decimal point), judgment code, and first tightening NG item.

'- 123. 5L'

(A) (B)

(A)Code

Display	Content
Space (20 H)	+ value
- (2DH)	-Value

(B) Judgment code

Display	Content
Space (20 H)	Within upper/lower limit range, without warning (peak current)
H (48H)	High limit out/high limit warning (peak current)
L (4CH)	Lower/Lower limit warning (Peak current)

※5: " Spindle step count" outputs up to 7 digits (millions of digits).

※6: Set the output items on the "JUDGMENT DATA" and "ERROR DATA" tabs respectively.

① JUDGMENT DATA 1, ② JUDGMENT DATA 2, ③ ERROR DATA

● **Output Items: G-unit Judgment Data Example (Commonly used to BCD & ASCII)**

The judgment data of G-unit is set by bit-assignment of 2 bytes.

By combining the logical "OR/AND", you can change the condition of the output data.

• **Judgment Data Setting**

Items	Judgment Data 2 (BIT)								Judgment Data 1 (BIT)							
	7	6	5	4	3	2	1	0	7	6	5	4	3	2	1	0
LOGIC	OR	OR	OR	OR	OR	OR	OR	OR	OR	OR	OR	OR	OR	OR	OR	OR
FASTENIN OK																○
FASTENING NOK															○	
FASTENING ERROR														○		
BYPASS													○			
EMMERGENCY STOP												○				
PEAK TORQUE HIGH LIMIT NOK								○								
PEAK TORQUE LOW LIMIT NOK							○									
FINAL TORQUE HIGH LIMIT NOK						○										
FINAL TORQUE LOW LIMIT NOK					○											
FINAL ANGLE HIGH LIMIT NOK				○												
FINAL ANGLE LOW LIMIT NOK			○													
}																

• **Error Data Setting**

The error data of G-unit is set by bit-assignment of 1 byte.

This corresponds to the alarm number when an alarm occurs.

Item	Error Data (BIT)							
	7	6	5	4	3	2	1	0
Alarm 1								○
Alarm 3							○	
Alarm 4						○		
Alarm 5					○			
Alarm 6				○				
Alarm 8			○					
Alarm 9		○						
Alarm 10	○							

1-1-3. Judgment Data

The judgment data of G-unit is set by bit-assignment of 2 bytes.

By combining the logics "OR/AND", the condition of the output data can be changed.

MAIN FORMAT SPINDLE FORMAT JUDGMENT DATA ERROR DATA										
	JUDGMENT	JUDGMENT	JUDGMENT	JUDGMENT	JUDGMENT	JUDGMENT	JUDGMENT	JUDGMENT	JUDGMENT	JUDGMENT
▶ LOGIC	OR	OR	OR	OR	OR	OR	OR	OR	OR	OR
FASTENING OK										
FASTENING NOK										
FASTENING ERROR										
BYPASS										
EMERGENCY STOP										
PEAK TORQUE HIGH LIMIT NOK										
PEAK TORQUE LOW LIMIT NOK										
FINAL ANGLE HIGH LIMIT NOK										
FINAL ANGLE LOW LIMIT NOK										
FINAL TORQUE HIGH LIMIT NOK										
FINAL TORQUE LOW LIMIT NOK										
SNUG TORQUE NOK										
PLASTIC AREA GRADIENT RATE NOK										
SLIP NOK										
INITIAL CROSS THREAD NOK										
CYCLE NOK										
TORQUE DOWN NOK										
ANGLE RATE HIGH LIMIT NOK										
ANGLE RATE LOW LIMIT NOK										
INFORMATION1										

Item	Contents
LOGIC	Combine OR and AND to configure the output.
FASTENING OK	When the tightening result is within the judgment range, it is output.
FASTENING NOK	When the tightening result is out of the setting range., it is output.
FASTENING ERROR	When an error occurs during the system or tightening operation, it is output.
BYPASS	When tightening is performed with the bypass activated, it is output.
EMERGENCY STOP	When tightening cannot be continued, it is output.
PEAK TORQUE HIGH LIMIT NOK	When the peak torque upper limit is NOK, it is output.
PEAK TORQUE LOW LIMIT NOK	When the peak torque lower limit is NOK, it is output.
FINAL ANGLE HIGH LIMIT NOK	When the final angle upper limit is NOK, it is output.
FINAL ANGLE LOW LIMIT NOK	When the final angle upper limit is NOK, it is output.
FINAL TORQUE HIGH LIMIT NOK	When the final torque upper limit is NOK, it is output.
FINAL TORQUE LOW LIMIT NOK	When the final torque lower limit is NOK, it is output.
SNUG TORQUE NOK	When the snug torque is NOK, it is output.
PLASTIC AREA GRADIENT RATE NOK	When the plastic area gradient rate is NOK, it is output.
SLIP NOK	When the slip NOK is generated, it is output.
INITIAL CROSS THREAD NOK	When the initial cross thread NOK is generated, it is output.
CYCLE NOK	When the cycle NOK is generated, it is output.
TORQUE DOWN NOK	When the torque down NOK is generated, it is output.
ANGLE RATE HIGH NOK	When the angle rate high NOK is generated, it is output.
ANGLE RATE LOW NOK	When the angle rate low NOK is generated, it is output.
INFORMATION 1 - 4	When the condition of information signal setting INFO1 to 8 is detected, it is output.

1-1-4. Error Data

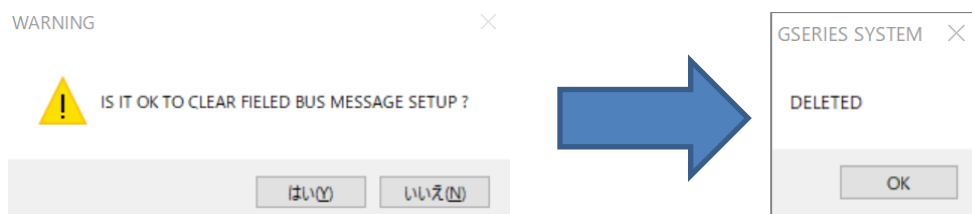
The error data of G-unit is set by bit-assignment of 1 byte. This corresponds to the alarm number when an error occurs.


	Bit 7	Bit 6	Bit 5	Bit 4	Bit 3	Bit 2	Bit 1	Bit 0
▶ ALARM 1								
ALARM 3								
ALARM 4								
ALARM 5								
ALARM 6								
ALARM 8								
ALARM 9								
ALARM 10								

Items	Contents
Alarm 1	Torque Transducer Error
Alarm 3	Pre-amplifier Error
Alarm 4	System Memory Error
Alarm 5	Servo Response Error
Alarm 6	Servo Type Error
Alarm 8	Servo Amplifier Error
Alarm 9	Setting Data Error
Alarm 10	Main Signal Error

1-1-5. Fieldbus Message Settings Clear

Clear Fieldbus Message settings. Select "Main" → "Fieldbus MSG Clear" to display the window.



 **Clear settings only erases the data on the user console.**
To change the unit setting, write "RS232C input/output format" in the setting value UL/DL.

注意

Memo

Chapter2. CC-Link

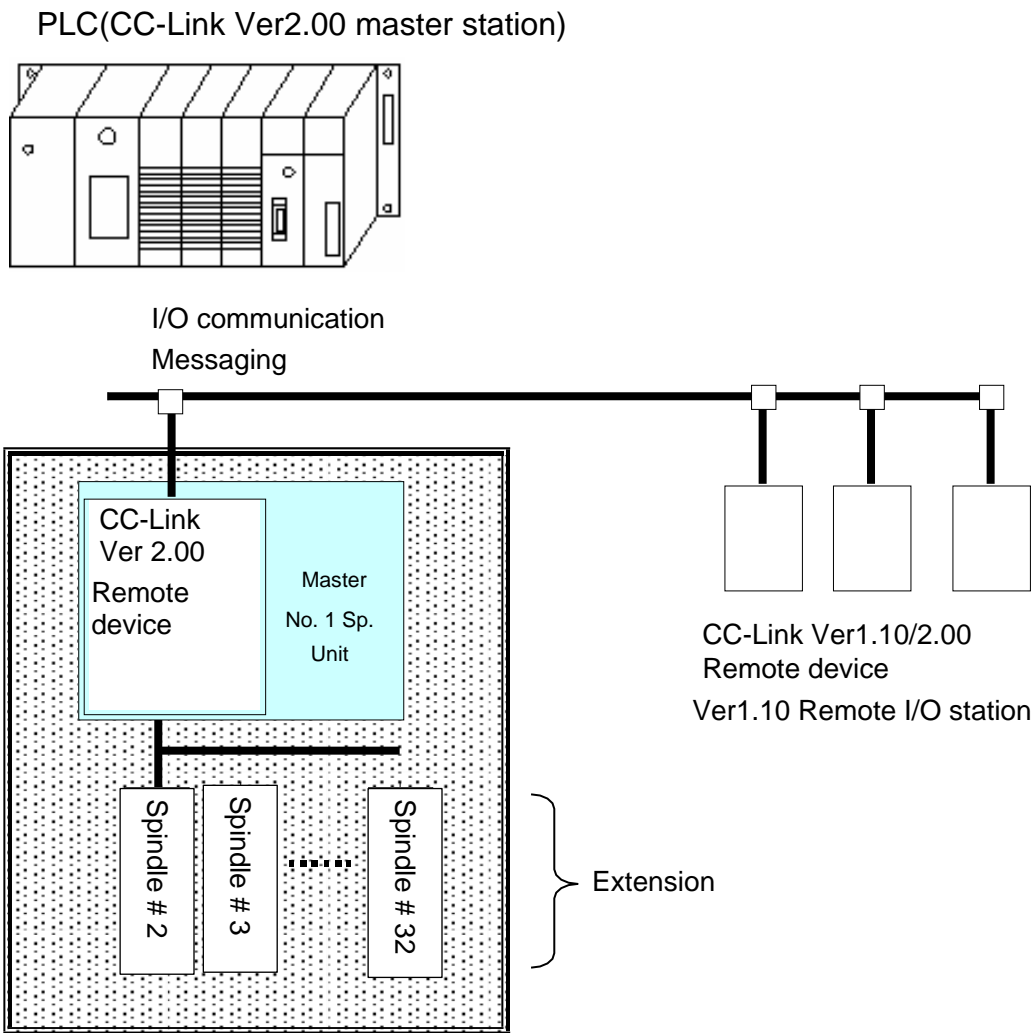
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2-1. System Configuration (CC-Link)

UNR-G NR CC-Link is compliant with the Open Field Network CC-Link Ver2.00. I/O is controlled and messaging is executed via communication.

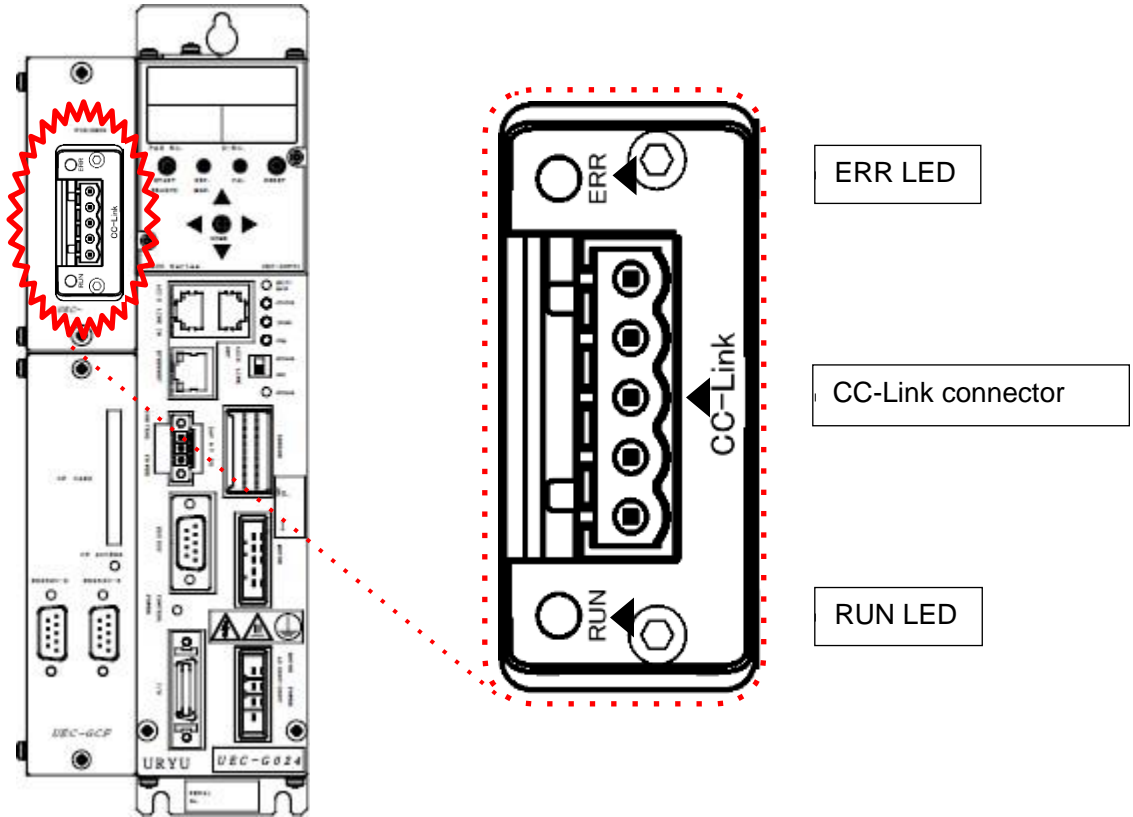
Compliant with the Open Field Network CC-Link Ver2.00 system, you can connect to CC-Link Ver2.00 master station, Ver1.10/2.00 remote device, and Ver1.10 remote I/O station. In addition, I/O communication and messaging can be executed simultaneously.

※PLC must implement a system-area handshake (see PAGE2-12).



2-2. Hardware Description (CC-Link)

● CC-Link Modules Location

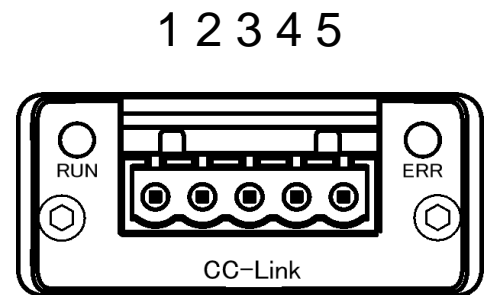


2-2-1. Module

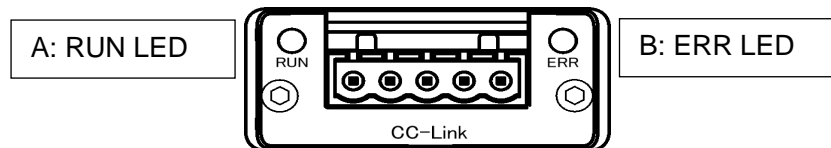
UNR-G displays the node status and network status of the type NR CC-Link system.

● Pin assignment

No.	Signal name	Description
1	DA	Sending side
2	DB	Receiving side
3	DG	Signal ground
4	SLD	Shield
5	FG	Earth



● LED List



LED name	Color	Status State	Inside Description	
A	RUN LED	OFF	Off Offline Connection not established	
		Green	Lights up Online Normal communication in progress	
		Red	Lights up Error Fatal Error Occurrence	
B	ERR LED	OFF	Off No error -	
		Red	Lights up	Error Fatal Error Occurrence
			Flicker- ing	CRC failure Cyclic Redundancy Check (CRC) error occurred
Blinking	Minor error Change the station number and baud rate settings after turning on the power.			

2-2-2. Cable

The connector is included, but the cable is not included. Be prepared by the customer.

The creation method is the same as that of the control power supply of the unit.

"UNR-G-type G-Unit unit User's Manual": Please refer to PAGE3-4.



• Even when RUN LED is lit in green and ERR LED is off, communication is not possible unless PLC implements a system-area. (See PAGE2-11.)

● Applicable connector

Manufacturer: Phoenix Contact

Type : Connector plug

Model :MSTB 2.5/5-ST-5.08 AU M

Applicable wire size AWG14 ~ 23 or 0.25mm²~2.5mm²



●What you prepare

Type	Recommended product		Supplement
	Model	Manufacturer	
Connector	MC 2.5/5-ST-5.08	Phoenix Contact	Unit accessories
Electric wire	-	-	Applicable wire size AWG 14 ~ 23 or 0.25 mm ² ~ 2.5 mm ²
Ferrule terminal	AI 2,5-6 WH	Phoenix Contact	-
Crimping tool	CRIMPFOX6	Phoenix Contact	-



• Connect the cabling with all power supplies turned OFF.

2-3. I/O data type (CC-Link)

	I/O input/output		Message input/output	
	Master unit → PLCs	PLC → Master unit	Master unit → PLCs	PLC → Master unit
Maximum setting	110 bytes (880 Points)	110 bytes (880 Points)	87words(174bytes)	88words(176bytes)
Standard setting	110 bytes (880 Points)	110 bytes (880 Points)	71words(142bytes)	72words(144bytes)

<1 Area/1x setting per station >

※PLC CC-Link V1.10 Master station ▼

Type	1 Station occupied		2 Station occupied		3 Station occupied		4 Station occupied	
	No. of occupied points	Effective points	No. of occupied points	Effective points	No. of occupied points	Effective points	No. of occupied points	Effective points
RX	32 Points	*1 16 Points	64 Points	*1 48 Points	96 Points	*1 80 Points	128 Points	*1 112 Points
RY		16 Points		48 Points		80 Points		112 Points
RWw	4 words		8 words		12 words		16 words	
RWr*2	3 words		7 words		11 words		15 words	

<1 Area per station · Double setting >

Type	1 Station occupied		2 Station occupied		3 Station occupied		4 Station occupied	
	No. of occupied points	Effective points	No. of occupied points	Effective points	No. of occupied points	Effective points	No. of occupied points	Effective points
RX	32 Points	*1 16 Points	96 Points	*1 80 Points	160 Points	*1 144 Points	224 Points	*1 208 Points
RY		16 Points		80 Points		144 Points		208 Points
RWw	8 words		16 words		24 words		32 words	
RWr*2	7 words		15 words		23 words		31 words	

<1 Area per station/ Quadruple setting >

Type	1 Station occupied		2 Station occupied		3 Station occupied		4 Station occupied	
	No. of occupied points	Effective points	No. of occupied points	Effective points	No. of occupied points	Effective points	No. of occupied points	Effective points
RX	64 Points	*1 48 Points	192 Points	*1 176 Points	320 Points	*1 304 Points	448 Points	*1 432 Points
RY		48 Points		176 Points		304 Points		432 Points
RWw	16 words		32 words		48 words		64 words	
RWr*2	15 words		31 words		47 words		63 words	

<1 Area/ Octuple per station setting >

※Default ▼

Type	1 Station occupied		2 Station occupied		3 Station occupied		4 Station occupied	
	No. of occupied points	Effective points	No. of occupied points	Effective points	No. of occupied points	Effective points	No. of occupied points	Effective points
RX	128 Points	112 Points	384 Points	368 Points	640 Points	624 Points	896 Points	880 Points
RY		112 Points		368 Points		624 Points		880 Points
RWw	32 words		64 words		88 words		72 words	
RWr*2	31 words		63 words		87 words		71 words	

*1: Since 16 points of the number of occupied points are used in CC-Link system area, the number of effective points decreases.

*2: RWr's 1word is used in error codes, so it is 1word less than RWw.

*3: The setting of message input/output is maximal 256bytes (640 points +88words, 896 points +72words) by summing the remote input/output (RX/RX) and remote register (RWw/RWr).

2-3-1. INPUT SPECIFICATIONS (PLC → Master-Spindle)

Address	BIT	Signal name	Address	BIT	Signal name
RY(n+0h)0h	0	Operation Preparation	RY(n+2h)0h	32	
RY(n+0h)1h	1	Reset	RY(n+2h)1h	33	
RY(n+0h)2h	2	Reverse	RY(n+2h)2h	34	
RY(n+0h)3h	3	Forward	RY(n+2h)3h	35	
RY(n+0h)4h	4	Start	RY(n+2h)4h	36	
RY(n+0h)5h	5	Cycle Start	RY(n+2h)5h	37	
RY(n+0h)6h	6	Cycle Count Up	RY(n+2h)6h	38	
RY(n+0h)7h	7	Cycle Count clear	RY(n+2h)7h	39	
RY(n+0h)8h	8	Step IN 1	RY(n+2h)8h	40	
RY(n+0h)9h	9	Step IN 2	RY(n+2h)9h	41	
RY(n+0h)Ah	10	Step IN 3	RY(n+2h)Ah	42	
RY(n+0h)Bh	11	Step IN 4	RY(n+2h)Bh	43	
RY(n+0h)Ch	12	Step IN 5	RY(n+2h)Ch	44	
RY(n+0h)Dh	13	Step IN 6	RY(n+2h)Dh	45	
RY(n+0h)Eh	14	Step IN 7	RY(n+2h)Eh	46	
RY(n+0h)Fh	15	Work Select 9-16	RY(n+2h)Fh	47	
RY(n+1h)0h	16	Work Select 17-24	RY(n+3h)0h	48	
RY(n+1h)1h	17	Work Select 1 (9/17)	RY(n+3h)1h	49	
RY(n+1h)2h	18	Work Select 2 (10/18)	RY(n+3h)2h	50	
RY(n+1h)3h	19	Work Select 3 (11/19)	RY(n+3h)3h	51	
RY(n+1h)4h	20	Work Select 4 (12/20)	RY(n+3h)4h	52	
RY(n+1h)5h	21	Work Select 5 (13/21)	RY(n+3h)5h	53	
RY(n+1h)6h	22	Work Select 6 (14/22)	RY(n+3h)6h	54	
RY(n+1h)7h	23	Work Select 7 (15/23)	RY(n+3h)7h	55	
RY(n+1h)8h	24	Work Select 8 (16/24)	RY(n+3h)8h	56	
RY(n+1h)9h	25	Auto/Each (unused)	RY(n+3h)9h	57	
RY(n+1h)Ah	26	Switch Off Auto Zero/Cal Check	RY(n+3h)Ah	58	
RY(n+1h)Bh	27	ID data clear	RY(n+3h)Bh	59	
RY(n+1h)Ch	28	Manual Z/C checking	RY(n+3h)Ch	60	
RY(n+1h)Dh	29		RY(n+3h)Dh	61	
RY(n+1h)Eh	30		RY(n+3h)Eh	62	
RY(n+1h)Fh	31		RY(n+3h)Fh	63	



● To disable the self-check function prior to starting the tightening operation, set Auto Zero/Cal Check Off to "ON". When set, the tightening operation starts without performing the self-check.

● The 32 points of addresses RY(n)0h to RY(n+1)Fh are fixed assignments. The 32 points of addresses RY(n+2)0h to RY(n+3)Fh are freely allocated.

2-3-2. Output Signal Specifications (Master Spindle → PLCs)

The factory default settings have been made. The signal assignment is set in the "PLC Out Layout" of the UNR-G NR user console. For the setting method, refer to the "G-NR User Console User's Manual" See "PLC Out Layout".

Address	BIT	Signal name	Address	BIT	Signal name
RX(n+0h) <u>Factory set value</u>	0	Total NOK	RX(n+2h) <u>Factory set value</u>	0	
	1	Total OK		1	
	2	NR Failure		2	
	3	Ready		3	
	4	Working		4	
	5	End		5	
	6	Cycle NOK Judgment		6	
	7	Cycle OK Judgment		7	
	8	Z/C NOK		8	
	9	Z/C OK		9	
	10	Bypass Yes		10	
	11	Work Select Bit 1 (9/17)		11	
	12	Work Select Bit 2 (10/18)		12	
	13	Work Select Bit 3 (11/19)		13	
	14	Work Select Bit 4 (12/20)		14	
15	Step Out 1	15			
RX(n+1h) <u>Factory set value</u>	0	Sp. # 1 NOK Judgment	RX(n+3h) <u>Factory set value</u>	0	
	1	Sp. # 1 OK Judgment		1	
	2	Sp. # 1 NR Failure		2	
	3	Sp. # 1 Initial Cross Thread NOK		3	
	4	Sp. # 1 Cycle NOK		4	
	5	Sp. # 1 Bypass		5	
	6	Sp. # 1 Low Limit NOK		6	
	7	Sp. # 1 High Limit NOK		7	
	8	Sp. # 2 NOK Judgment		8	
	9	Sp. # 2 OK Judgment		9	
	10	Sp. # 2 NR Failure		10	
	11	Sp. # 2 Initial Cross Thread NOK		11	
	12	Sp. # 2 Cycle NOK		12	
	13	Sp. # 2 Bypass		13	
	14	Sp. # 2 Low Limit NOK		14	
15	G-Unit 2 High Limit NOK	15			



The unused areas of RX(n+10h) ~ RX (n+37h) are reserved.

2-4. Fieldbus setting (CC-Link)

Fieldbus setting is set from "Fieldbus setting" of the Type G NR user console.

● Initial settings (same as the factory settings)

Setting	CC-Link V2	CC-Link V1
Station number	1	
Baud rate	10Mbps	
Occupied station number	4 Stations	
Extended cyclic setting	Octuple	Single

※The message block data length is fixed to 144 bytes.

● Station number

Setting range: 1 to 64

● Baud rate

Setting range: 156 kbps, 625 kbps, 2.5 Mbps, 5 Mbps, & 10 Mbps

● Version selection

Setting range: CC-Link V2, CC-Link V1

● Occupied station number

Setting range: 1 station, 2 stations, 3 stations, 4 stations (* CC-Link V1 is fixed to 4 stations.)

● Extended cyclic setting

Setting range: 1x, 2x, 4x, 8x (* CC-Link V1 is fixed at 1x.)

● I/O points (RX / RY)

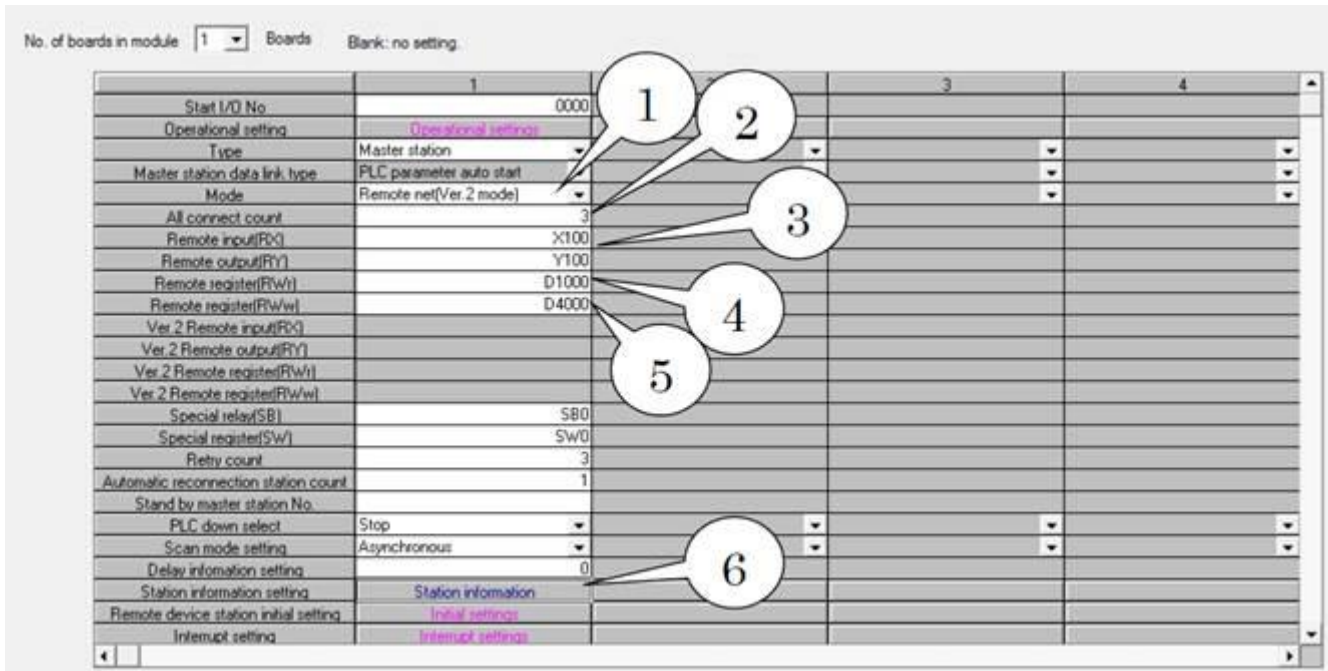
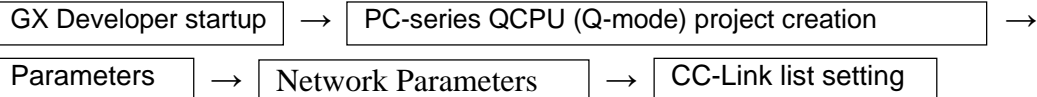
● Number of register words (RWw/RWr)

It can be set by the combination of extended cyclic setting and number of occupied stations.

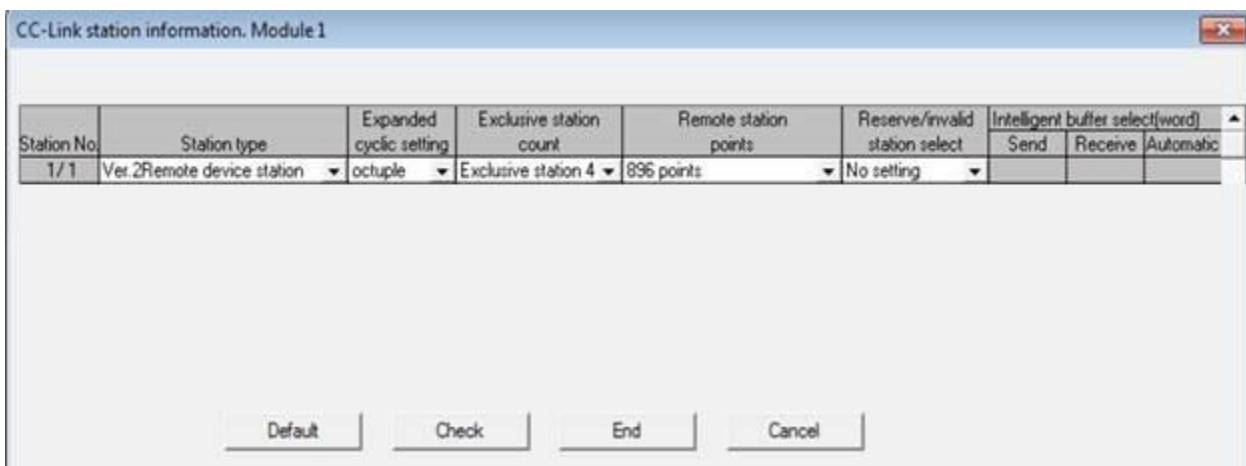
2-5. Fieldbus message setting (CC-Link Master Spindle → PLCs)

Refer to Chapter 1 when outputting the tightening result by the fieldbus message setting.

Parameter setting of MELSEC-Q series

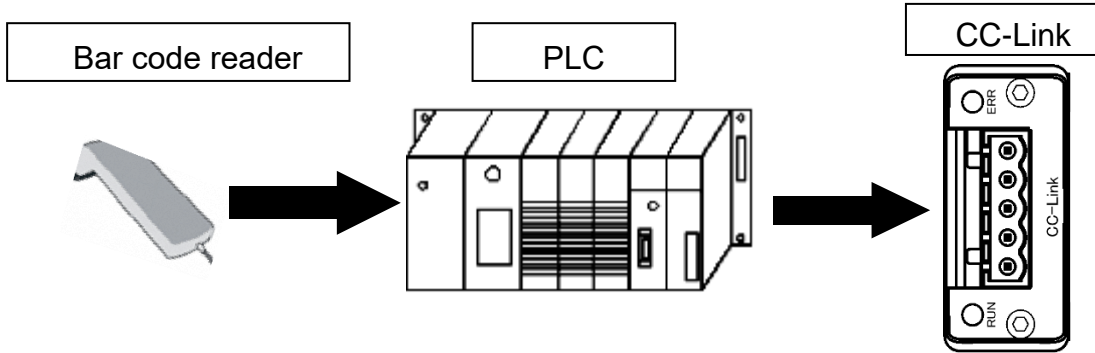


1. Select "Remote Net Ver. 2 Mode" from the mode selection.
 2. Set the remote input (RX) refresh device. (X100)
 3. Set the remote output (RY) refresh device. (Y100)
 4. Set the remote register (RWr) refresh device. (D1000)
 5. Set the remote register (RWw) refresh device. (D4000)
- ※The setting value assigned depends on the station number of the module to be used.
6. Set the station information in Station Info Setting. (The illustration below is a reference screen.)



2-6. Fieldbus message setting (PLCs → CC-Link Master Spindle)

To send message information from PLC to master G-Unit, select ASCII character. Message information sent from PLC to master unit of I/O (PLC) control is reflected in fieldbus communication, UNR-G user console, unit RS232C, and extended RS232C.



• For notes on ID data input, refer to the PAGE4-19 of the UNR-G spindle unit.

Device batch monitor-4

Device: D4000

Monitor format: Bit & Word Bit Word

Display: 16bit integer 32bit integer Real number (single precision) Real number (double precision) ASCII character

Value: DEC HEX

T/C set value Reference program: MAIN

Buttons: Start monitor, Stop monitor, Option setup, Device test, Close

Device	+F E D C	+B A 9 8	+7 6 5 4	+3 2 1 0	
D4000	0 0 1 0	0 0 0 0	0 0 1 1	1 0 0 1	9
D4001	0 0 1 1	0 0 0 0	0 0 1 1	0 1 1 1	70
D4002	0 0 1 1	0 0 0 0	0 0 1 1	0 0 0 0	00
D4003	0 0 1 1	0 0 0 0	0 0 1 1	0 0 0 0	00
D4004	0 0 1 0	0 0 0 0	0 0 1 0	0 0 0 0	00
D4005	0 0 1 1	0 0 1 1	0 0 1 1	0 0 1 0	23
D4006	0 0 1 1	0 0 0 1	0 1 0 0	0 1 1 0	F1
D4007	0 0 1 1	0 1 0 0	0 0 1 1	0 0 0 0	04
D4008	0 0 1 1	0 1 0 0	0 0 1 1	0 0 1 1	34
D4009	0 0 1 1	0 1 0 1	0 1 0 0	0 1 0 1	E5
D4010	0 1 0 0	1 1 1 0	0 1 0 1	1 0 0 0	XN
D4011	0 0 1 0	0 0 0 0	0 0 1 0	0 0 0 0	00
D4012	0 0 1 1	0 0 0 0	0 0 1 1	0 0 0 0	00
D4013	0 0 1 1	0 0 0 0	0 0 1 1	0 0 0 1	10
D4014	0 0 0 0	0 0 0 0	0 0 0 0	0 0 0 0	00
D4015	0 0 0 0	0 0 0 0	0 0 0 0	0 0 0 0	--

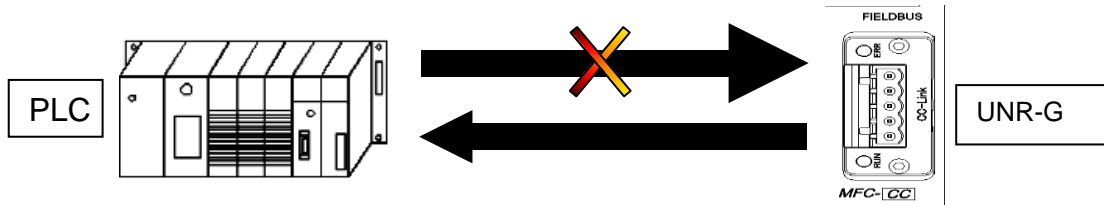
Fastening Data

Preferences Monitor Data Stored Data Display Panel

Date	Time	ID	SEQ. #	SE
2014-03-17	08:13:09	9070000 321F40435ENX 0001	1	SE

2-7. PLC handshake in the system area

PLC must implement a handshake of the system area. If this is not implemented, UNR-G cannot receive the signal output from PLC. PLC can receive signals from UNR-G. Handshake is performed when the control power of the unit is turned on.



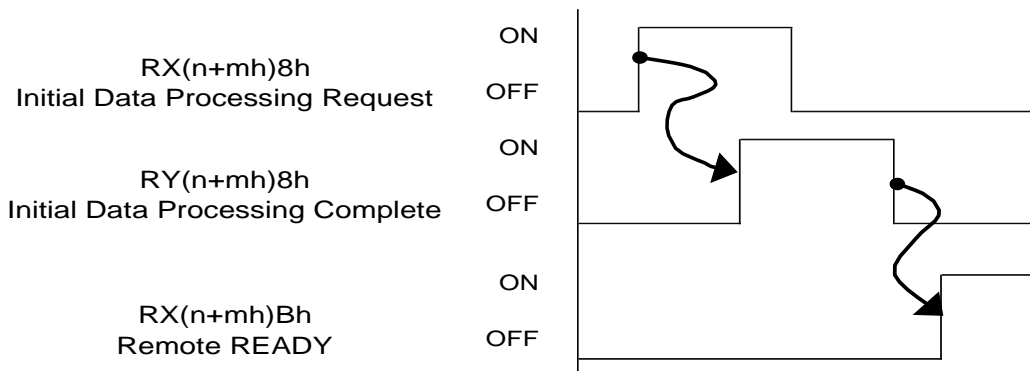
To implement the handshake, the flags in the system area must be set. The last 16 bits of both input and output are CC-LINK system setting area regardless of the setting content. The location to set the flag depends on the number of occupied stations and the content of extended cyclic setting.

●CCLINK configuration area

Address	Signal name	Address	Signal name
RX(n+mh)0h	Reserved	RY(n+mh)0h	Reserved
RX(n+mh)1h	Reserved	RY(n+mh)1h	Reserved
RX(n+mh)2h	Reserved	RY(n+mh)2h	Reserved
RX(n+mh)3h	Reserved	RY(n+mh)3h	Reserved
RX(n+mh)4h	Reserved	RY(n+mh)4h	Reserved
RX(n+mh)5h	Reserved	RY(n+mh)5h	Reserved
RX(n+mh)6h	Reserved	RY(n+mh)6h	Reserved
RX(n+mh)7h	Reserved	RY(n+mh)7h	Reserved
RX(n+mh)8h	Initial Data Processing Request	RY(n+mh)8h	Initial Data Processing Complete
RX(n+mh)9h	Initial Data Setting Complete	RY(n+mh)9h	Initial Data Setting Request
RX(n+mh)Ah	Error Status	RY(n+mh)Ah	Reserved
RX(n+mh)Bh	Remote READY	RY(n+mh)Bh	Reserved
RX(n+mh)Ch	Reserved	RY(n+mh)Ch	Reserved
RX(n+mh)Dh	Reserved	RY(n+mh)Dh	Reserved
RX(n+mh)Eh	Reserved	RY(n+mh)Eh	Reserved
RX(n+mh)Fh	Reserved	RY(n+mh)Fh	Reserved

●System Area Flag Timing Chart

If the handshake is successful, Remote READY is set to ON.



•List of System Area Flags for Handshake

Type	1 Station occupied	2 Station occupied	3 Station occupied	4 Station occupied
Single setting	24 Bit 18h (10h+8h)	56 Bit 38h (30h+8h)	88 Bit 58h (50h+8h)	120 Bit 78h (70h+8h)
Double setting	24 Bit 18h (10h+8h)	88 Bit 58h (50h+8h)	152 Bit 98h (90h+8h)	216 Bit D8h (D0h+8h)
Quadruple setting	56 Bit 38h (30h+8h)	184 Bit B8h (B0h+8h)	312 Bit 138h (130h+8h)	440 Bit 1B8h (1B0h+8h)
Octuple setting	120 Bit 78h (70h+8h)	376 Bit 178h (170h+8h)	632 Bit 278h (270h+8h)	888 Bit 378h (370h+8h)

Program setting example

Remote input (RX) refresh device: X100 Remote

output (RY) refresh device: Y100

• In the case of 4 stations occupied by Octuple setting

When the 888 (378h) bit (Initial Data Processing Request) in the system X area turns on, the 888 (378h) bit (Initial Data Processing Complete) in the system Y area turns on.

If you are allocating a remote input (RX) or remote output (RY) refresh device from 100h, specify an X area and a Y area for 478h (100h+378h).

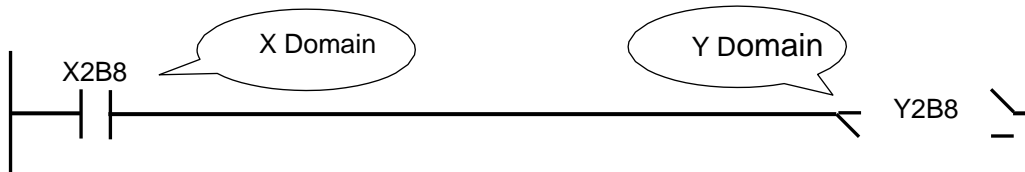
Successful handshaking turns on 47Bh (1000h+378h+3h): Remote READY.



• In the case of 4 stations occupied by Quadruple setting

When the 440 (1B8h) bit (Initial Data Processing Request) in the system X area is turned on, the 440 (1B8h) bit (Initial Data Processing Complete) in the system Y area is turned on.

If you are allocating remote-input (RX) or remote-output (RY) refresh devices from 100h, specify the X area and the Y area is 2B8h (100h+1B8h). Successful handshaking turns on 2BBh(100h+1B8h+3h): Remote READY.



Chapter3. DeviceNet

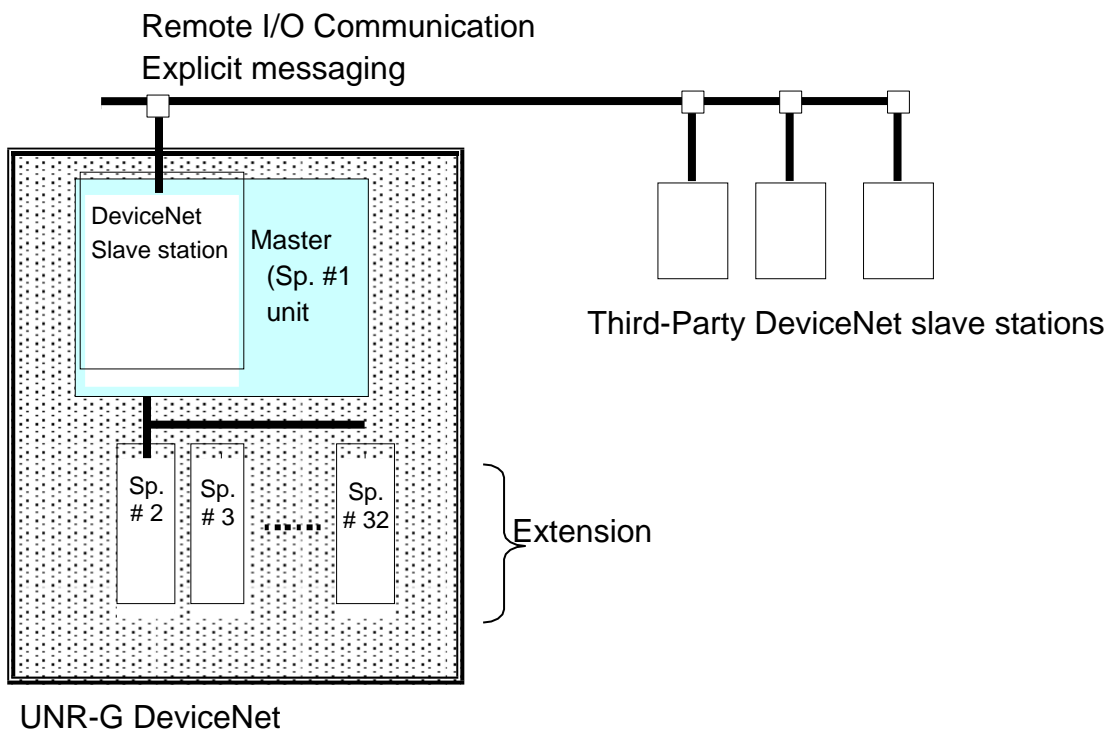
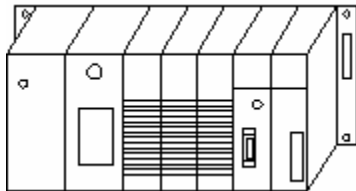


3

3-1. System Configuration (DeviceNet)

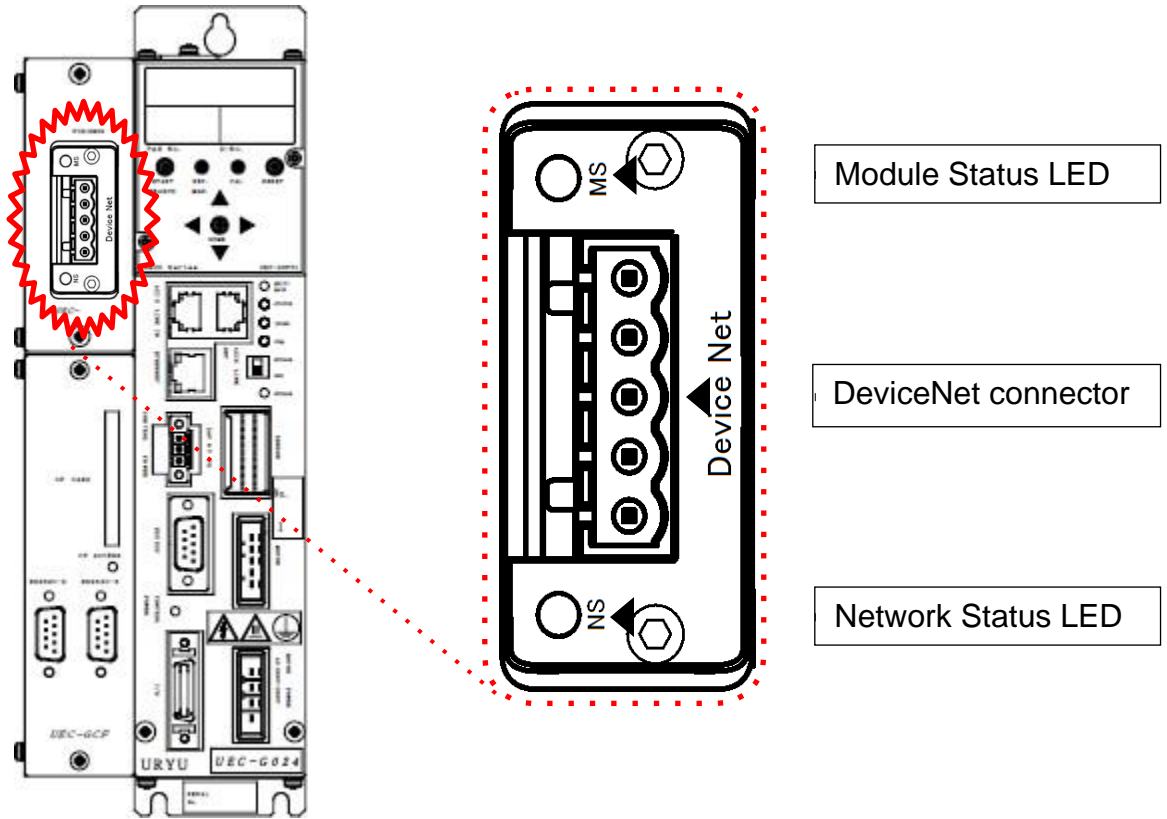
UNR-G DeviceNet is compliant with the Open Field Network DeviceNet. Tool control and message information are executed via DeviceNet Explicit messaging. It is compliant with the Open Field Network DeviceNet system and can be connected to third-party DeviceNet devices (master/slave). You can also perform remote I/O communication and Explicit messaging at the same time.

PLCs (DeviceNet master station)



3-2. Hardware Description (DeviceNet)

● DeviceNet Modules Location

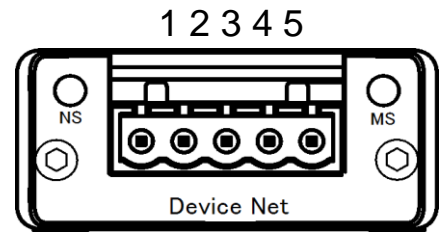


3-2-1. Module

UNR-G displays the node status and network status of the type NR DeviceNet system.

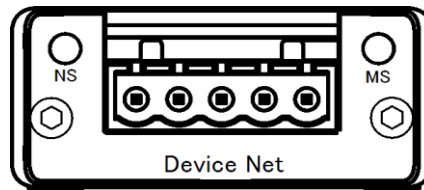
● Pin assignment

No.	Signal name	Wire color	Description
1	V-	Black	Power cable-side
2	CAL L	Blue	Communication data Low
3	SHUELD	-	Shield
4	CAL H	White	Communication data High
5	V+	Red	Power cable + side



● LED List

A: Network
Status LED



B: Module
Status LED

LED name		Color	Status State		Description
A	Network Status LED	OFF	Off	Offline	Offline or power is not supplied
		Green	Lights up	Online	Normal communication in progress
			Blinking	Connection not established	Online, but no connection established.
		Red	Lights up	Error	Fatal Error Occurrence
			Blinking	Connection timeout	Connection timed-out more than once
Red/Green	Lights up	Repeat	Test Mode		
B	Module Status LED	OFF	Off	Power is not turned on.	Power is not supplied
		Green	Lights up	Online	Normal condition
			Blinking	Connection not established	Due to incomplete configuration or connection failure, the device must be recognized again.
		Red	Lights up	Error	Fatal Error Occurrence
			Blinking	Error	Recoverable Error Occurrence
Red/Green	Lights up	Repeat	Test Mode		

3-2-2. Cable

The connector is included, but the cable is not included. Please be prepared by the customer.
The creation method is the same as that of the control power supply of the unit.
Please refer to PAGE3-4 "UNR-G spindle unit manual":.

● Applicable connector

Manufacturer: Phoenix Contact
Type : Connector plug
Model :MSTB 2.5/5-ST-5.08 AU M
Applicable wire size AWG14 ~ 23 or 0.25mm²~2.5mm²



●What you prepare

Type	Recommended product		Supplement
	Model	Manufacturer	
Connector	MC 2.5/5-ST-5.08	Phoenix Contact	Unit accessories
Electric wire	-	-	Applicable wire size: AWG 14 ~ 23 or 0.25 mm ² ~ 2.5 mm ²
Ferrule terminal	AI 2,5-6 WH	Phoenix Contact	-
Crimping tool	CRIMPFOX6	Phoenix Contact	-



3-2-3. EDS files

An EDS file is an information file related to the communication specifications of DeviceNet compatible devices. A separate file exists for each device. If you want to use DeviceNet configuration software to connect ABCC-DEV to PLC, an EDS file is required.

An EDS file is included on the installation CD in the UNR-G User's Manual. For proper use of EDS file, refer to DeviceNet Configuration Software User's Manual.

3-3. I/O Signaling Specifications (DeviceNet)

	I/O input/output		Message input/output	
	Master unit → PLCs	PLC → Master unit	Master unit → PLCs	PLC → Master-unit
Maximum setting	32 bytes (256 Points)	12 bytes (96 Points)	4096 bytes (2048Ch.)	32 bytes (16Ch.)
Standard setting	32 bytes (256 Points)	12 bytes (96 Points)	4096 bytes (2048Ch.)	32 bytes (16Ch.)

3-3-1. INPUT SPECIFICATIONS (PLC → Master-unit)

IN Ch.	BIT	Signal name	IN Ch.	BIT	Signal name
No.01	0	Operation Preparation	No.03	0	
	1	Reset		1	
	2	Reverse		2	
	3	Forward		3	
	4	Start		4	
	5	Cycle start		5	
	6	Cycle Count Up		6	
	7	Cycle Count clear		7	
	8	STEP IN 1		8	
	9	STEP IN 2		9	
	10	STEP IN 3		10	
	11	STEP IN 4		11	
	12	STEP IN 5		12	
	13	STEP IN 6		13	
	14	STEP IN 7		14	
	15	Work Select 9-16	15		
No.02	0	Work Select 17-24	No.04	0	
	1	Work Select 1 (9/17)		1	
	2	Work Select 2 (10/18)		2	
	3	Work Select 3 (11/19)		3	
	4	Work Select 4 (12/20)		4	
	5	Work Select 5 (13/21)		5	
	6	Work Select 6 (14/22)		6	
	7	Work Select 7 (15/23)		7	
	8	Work Select 8 (16/24)		8	
	9	Auto / Each (unused)		9	
	10	Switch off Auto Zero/Cal Check		10	
	11	ID data clear		11	
	12	Manual Z/C Check		12	
	13			13	
	14			14	
15		15			

※Please confirm that PLC's Ch..No depends on the setting of the node-address, etc. Please use it after checking.



- To disable the self-check function before starting the tightening operation, Set Auto Z/C check OFF to "ON". When set, the tightening operation starts without performing the self-check.
- IN ChOOB. The 32 points 01 to 02 are fixed assignments.
IN ChOOB. 32 points from 03 to 04 are freely assigned.

3-3-2. Output-Signal Specifications (Master G-Unit → PLCs)

The factory default settings have been made. The signal assignment is set in the "PLC Out Layout" of the UNR-G user console. For the setting method, refer to the "PLC Out Layout" of "UNR-G User Console User's Manual".

OUT Ch.	BIT	Signal name	OUT Ch.	BIT	Signal name
No.1 <u>Factory set value</u>	0	Total NOK	No.3 <u>Factory set value</u>	0	
	1	Total OK		1	
	2	NR Failure		2	
	3	Ready		3	
	4	Working		4	
	5	End		5	
	6	Cycle NOK Judgment		6	
	7	Cycle OK Judgment		7	
	8	Z/C NOK		8	
	9	Z/C OK		9	
	10	Bypass Yes		10	
	11	Work Select Bit 1 (9/17)		11	
	12	Work Select Bit 2 (10/18)		12	
	13	Work Select Bit 3 (11/19)		13	
	14	Work Select Bit 4 (12/20)		14	
15	Step Out 1	15			
No.2 <u>Factory set value</u>	0	Sp. # 1 NOK Judgment	No.4 <u>Factory set value</u>	0	
	1	Sp. # 1 OK Judgment		1	
	2	Sp. # 1 NR Failure		2	
	3	Sp. # 1 Initial Cross Thread NOK		3	
	4	Sp. # 1 Cycle NOK		4	
	5	Sp. # 1 Bypass		5	
	6	Sp. # 1 Low Limit NOK		6	
	7	Sp. # 1 High Limit NOK		7	
	8	Sp. # 2 NOK Judgment		8	
	9	Sp. # 2 OK Judgment		9	
	10	Sp. # 2 NR Failure		10	
	11	Sp. # 2 Initial Cross Thread NOK		11	
	12	Sp. # 2 Cycle NOK		12	
	13	Sp. # 2 Bypass		13	
	14	Sp. # 2 Low Limit NOK		14	
15	G-Unit 2 High Limit NOK	15			

※PLC input Ch.No varies depending on the setting of the node-address, etc. Please use it after confirming. For the description of each signal, refer to "Input/Output Signal Description" in Chapter 2 and "Output Signal Description" in Chapter 4 of "Operation Manual for UNR-G spindle unit".



The unused area of OUT Ch. No. 03 to 16 is also allocated.

3-4. Fieldbus setting (DeviceNet)

The fieldbus settings are configured in "Fieldbus Settings" of the UNR-G User Console.

●Initial settings (same as the factory settings)

Setting		Device Net
Node address		0
Baud rate		500 kbps
I/O Settings	PLC → Mas-unit	12 bytes [96bits]
	Master unit → PLCs	32 bytes [256bits]
Number of bytes in the message	PLC → Master-unit	32 bytes [256bits]
	Master unit → PLCs	4096 bytes [32768bits]
Number of Message Block Bytes		250 bytes

●Node address setting range :0~63

●Baud rate

Setting range: 156 kbps, 250 kbps, 500 kbps

●I/O Settings

- Data length [PLC → Master-spindle]

Setting range: 2 bytes [16 bits] to 12 bytes [96 bits]

- Data length [Master spindle → PLCs]

Setting range: 2 bytes [16 bits] to 32 bytes [256 bits]

●Message Byte Count Setting

- Data length [PLC → Master-spindle]

Setting range: 0 byte [0 bit] to 32 bytes [256bits]

- Data length [Master spindle → PLCs]

Setting range: 0 byte [0bit] to 4096 bytes [32768bits]

● Message block byte number setting range: 1 to 250

3-5. Fieldbus message setting (DeviceNet Master unit → PLCs)

Refer to Chapter 1 when outputting the tightening result by the fieldbus message setting.

•Fieldbus Message Communication Command (Master unit output → PLC input)

CMND instruction executes Explicit messaging. For more information about CMND instructions, Please refer to PLC manufacturer's instruction manual.

• Command format (CMND instruction)

00 09 01 04 00 01 3F 10 00 00 00 64
 ① ② ③ ④ ⑤ ⑥ ⑦

No.	Control data	Setting example	Remarks
1	Number of bytes to send command data	00 09	9 Byte
2	Number of response data bytes	01 04	Number of message block bytes: 250 bytes +10 Byte = 260 bytes (104hex)
3	Destination network address	00 01	PLC routing table Own network address: 1
4	Destination node address	3F	PLC DeviceNet node address: 63 (3Fhex)
5	Destination Unit Number	10	PLC DeviceNet unit No.:0+10hex
6	Response required etc	00 00	Response required, communication port No.0, Number of retransmissions 0
7	Response monitoring time	00 64	10.0 Seconds (64hex)

After CMND instruction, the tightening result data is acquired by Explicit messaging.

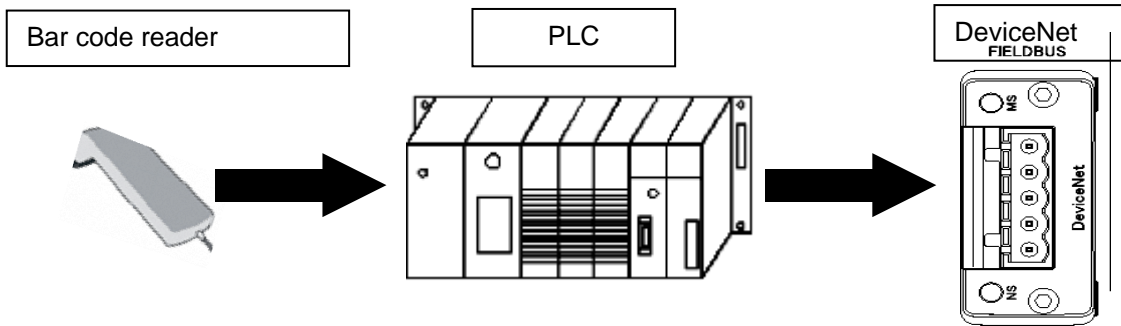
• Command format (Explicit messaging)

28 01 00 0E 00 A2 00 01 05 00
 ① ② ③ ④ ⑤ ⑥

No.	Command name	Setting example	Fixed value	Remarks
1	Command code	28 01	○	Explicit messaging
2	Standby node Address	00		ABCC-DEV node address: 0
3	Service code	0E	○	-
4	Class ID	00 A2	○	-
5	Instance ID	00 01		Define which blocks in the object class to send message information to:01 Example: Number of Message Block Bytes: 250 Bytes Message Output Bytes: 4096 Bytes 00 01: 1 block 1-250 Byte 00 02: 2 blocks 251-500 Byte 00 03: 3 blocks 501-750 Byte 00 11:17 blocks 4001-4096 Byte Maximum message output 4096 bytes
6	Service data	05 00	○	-

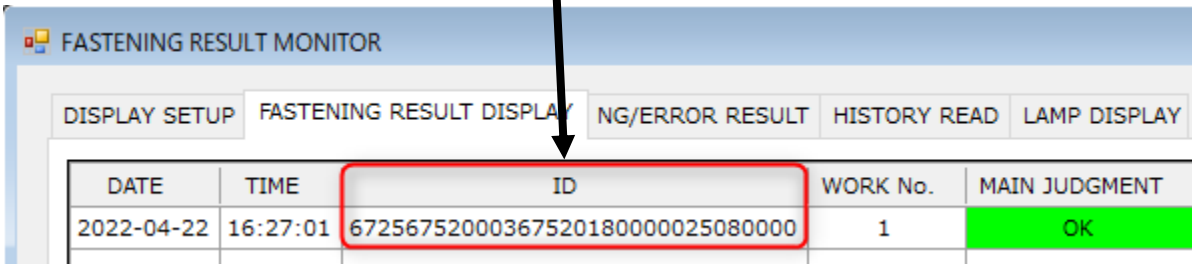
3-6. Fieldbus message setting (DeviceNet PLC → Master-unit)

To send message information from PLC to master G-Unit, select ASCII character.
 Message information sent from PLC to master unit of I/O (PLC) control is reflected in fieldbus communication, UNR-G user console, unit RS232C, and extended RS232C.



注意 (Caution) · For notes on ID data input, refer to the PAGE4-19 of the UNR-G spindle unit.

Ch.	+1	+2	+3	+4	+5	+6	+7	+8	+9
D2000	67	25	67	52	00	03	67	52	01
D2010	80	00	00	25	08	00	00		



●Fieldbus Message Communication Command (PLC Out → Master unit input)

CMND instruction executes explicit messaging. For more information about CMND instructions, refer to PLC manufacturer's instruction manual.

• Command format (CMND instruction)

00 29 00 20 00 01 3F 10 00 00 00 64
 ① ② ③ ④ ⑤ ⑥ ⑦

No.	Control data	Setting example	Remarks
1	Number of bytes to send command data	00 29	ID data: 32 bytes + 9 commands bytes =41 Byte (29 hex)
2	Number of response data bytes	00 20	32 Byte (20 hex)
3	Destination network address	00 01	PLC routing table Own network address: 1
4	Destination node address	3F	PLC DeviceNet node address: 63 (3Fhex)
5	Destination Unit Number	10	PLC DeviceNet unit No.:0+10 hex
6	Response required etc	00 00	Response required, communication port No.0, Number of retransmissions 0
7	Response monitoring time	00 64	10.0 Seconds (64hex)

After CMND instruction, ID-data is transmitted by Explicit messaging.

• Command format (Explicit messaging)

28 01 00 10 00 A2 00 01 05 41 42 43 ... 38 39 30
 ① ② ③ ④ ⑤ ⑥ ⑦

No.	Command name	Setting example	Fixed value	Remarks	
1	Command code	28 01	○	Explicit messaging	
2	Standby node Address	00	/	ABCC-DEV node address: 0	
3	Service code	10		○	-
4	Class ID	00 A2		○	-
5	Instance ID	00 01		○	-
6	Service data	05		○	-
7	Transmit ID data	41		/	Transmit ID data 1st byte (A)
		42 43	Transmit ID data Byte 2 and 3 (B C)		
		44 45	Transmit ID data Byte 4, 5th (DDE)		
		}	}		
		36 37	Transmit ID data 28, 29th byte (6 7)		
		38 39	Transmit ID Data Byte 30, 31 (8 9)		
		30	Transmit ID data byte 32 (0)		

Chapter 4. EtherNet/IP



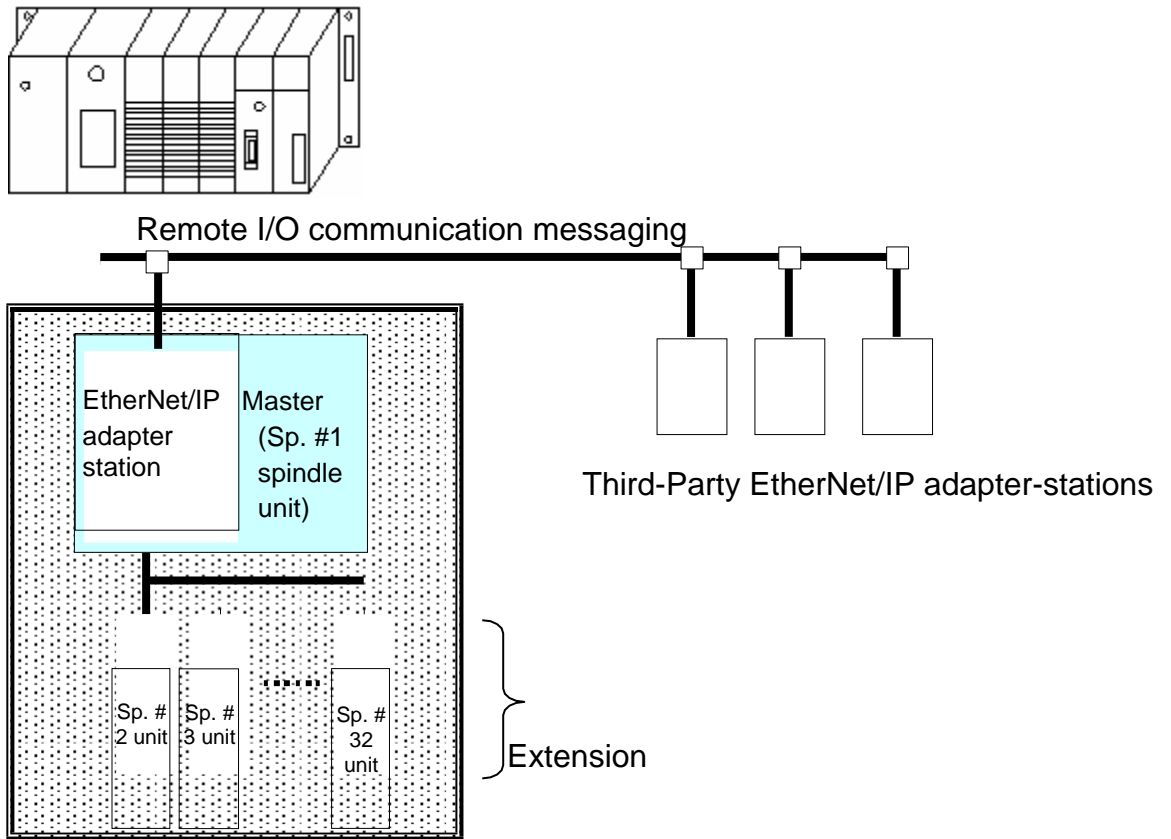
4

4-1. System Configuration (EtherNet/IP)

UNR-G EtherNet/IP is compliant with the Open Field Network EtherNet/IP. This will help you control the tool and execute message information via EtherNet/IP Explicit messaging.

It is compliant with the Open Field Network EtherNet/IP system and can be connected to third-party EtherNet/IP devices (scanner / adapter). In addition, remote I/O communication and messaging can be performed simultaneously.

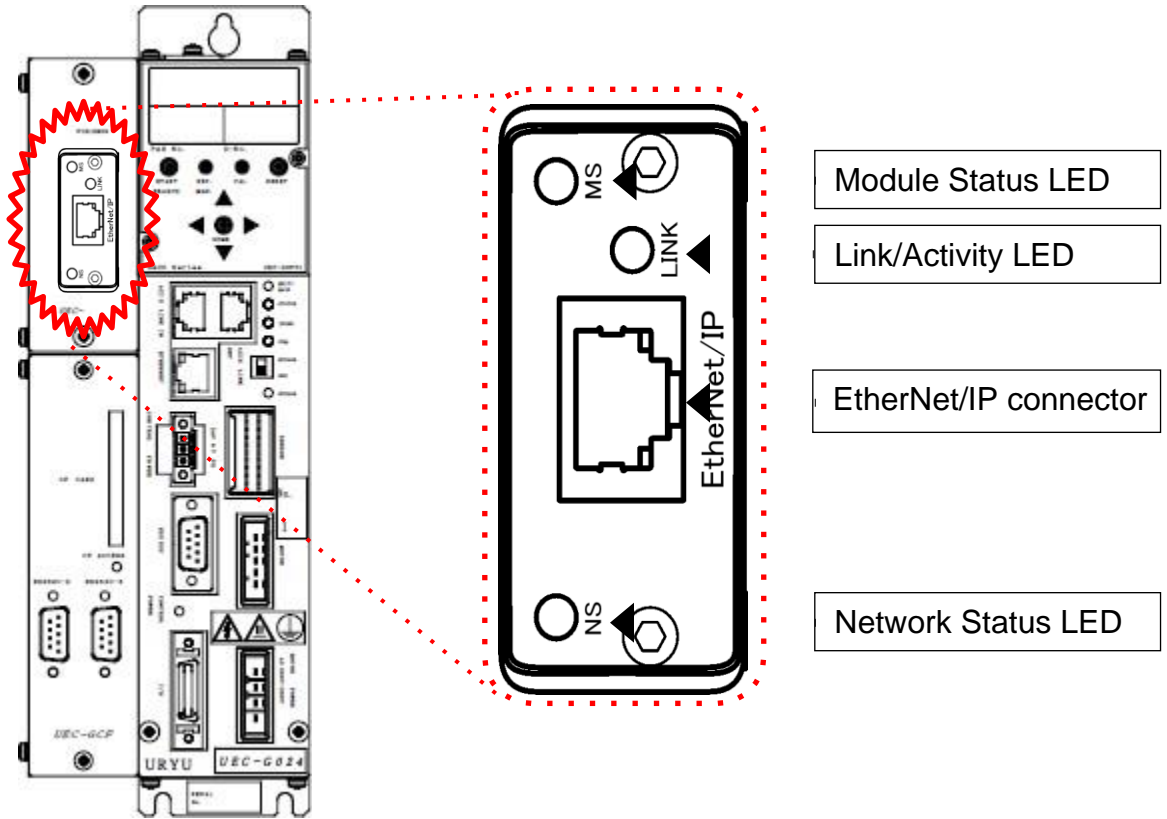
PLCs (EtherNet/IP scanner station)



UNR-G EtherNet/IP

4-2. Hardware Description (EtherNet/IP)

- Locating EtherNet/IP Modules

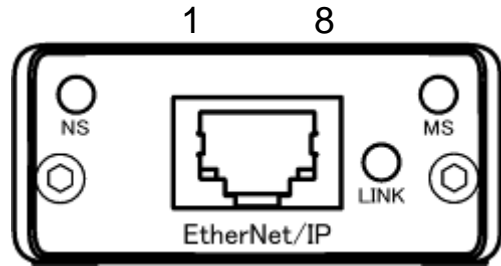


4-2-1. Module

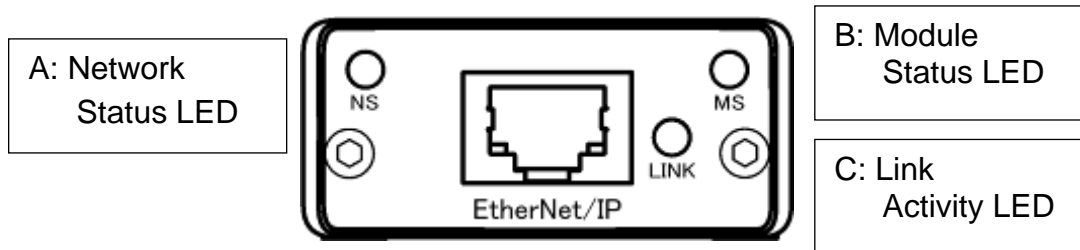
The node status and network status of UNR-G EtherNet/IP system are displayed.

•Pin assignment

No.	Signal name	Description
1	TD+	Transmit data +
2	TD-	Transmit data-
3	RD+	Received data +
4	-	Not used.
5	-	Not used.
6	RD-	Received data -
7	-	Not used.
8	-	Not used.



•LED List



LED name		Color	Status State		Inside Description
A	Network Status LED	OFF	Off	Off-line	Off-line or power is not supplied
		Green	Lights up	On-line	Normal communication in progress
			Blinking	Connection not established	On-line, but no connection established.
		Red	Lights up	Error	Fatal error/duplicate IP address
Blinking	Connection timeout		1 connection timed out more than once		
B	Module Status LED	OFF	Off	Power is not turned on.	Power is not supplied
		Green	Lights up	On-line	Normal condition
			Blinking	Connection not established	Due to incomplete configuration or connection failure, you need to re-recognize the vice.
		Red	Lights up	Error	Fatal Error Occurrence
Blinking	Error		Recoverable Error Occurrence		
C	Link Activity LED	OFF	Off	Communication not established	ETHERNET communication is not established and no communication is performed.
		Green	Lights up	No communication	ETHERNET communication is established, but no communication is performed.
			Blinking	Communicating	ETHERNET communication is established and communication is in progress.

4-2-2. Cable

The cable is not included in the package. Provide Category 5e or higher LAN cabling for your convenience.



4-2-3. EDS files

An EDS file is an information file related to the communication specifications of EtherNet/IP compatible devices. A separate file exists for each device. If you want to use EtherNet/IP configuration software to connect ABCC-EIPT to PLC, an EDS file is required.

EDS file is included on the installation CD in the UNR-G User's Manual. For proper use of EDS file, refer to EtherNet/IP Configuration Software User's Manual.

4-3. I/O data type (EtherNet/IP)

	I/O input/output		Message input/output	
	Master spindle → PLCs	PLC → Master spindle	Master spindle → PLCs	PLC → Master spindle
Maximum setting	32 bytes (256 Points)	12 bytes (96 Points)	4096 bytes (2048Ch.)	32 bytes (16Ch.)
Standard setting	32 bytes (256 Points)	12 bytes (96 Points)	4096bytes(2048Ch.)	32bytes(16Ch.)

4-3-1. INPUT SPECIFICATIONS (PLC → Master-Spindle Unit)

IN Ch.	BIT	Signal name	IN Ch.	BIT	Signal name
No.01	0	Operation Preparation	No.03	0	
	1	Reset		1	
	2	Reverse		2	
	3	Forward		3	
	4	Start		4	
	5	Cycle start		5	
	6	Cycle Count Up		6	
	7	Cycle Count clear		7	
	8	STEP IN 1		8	
	9	STEP IN 2		9	
	10	STEP IN 3		10	
	11	STEP IN 4		11	
	12	STEP IN 5		12	
	13	STEP IN 6		13	
	14	STEP IN 7		14	
	15	Work Select 9-16	15		
No.02	0	Work Select 17-24	No.04	0	
	1	Work Select 1 (9/17)		1	
	2	Work Select 2 (10/18)		2	
	3	Work Select 3 (11/19)		3	
	4	Work Select 4 (12/20)		4	
	5	Work Select 5 (13/21)		5	
	6	Work Select 6 (14/22)		6	
	7	Work Select 7 (15/23)		7	
	8	Work Select 8 (16/24)		8	
	9	Auto / Each (unused)		9	
	10	Switch off Auto Zero/Cal Check		10	
	11	ID data clear		11	
	12	Manual Z/C Check		12	
	13			13	
	14			14	
15		15			

※Please confirm that PLC's Ch..No depends on the setting of the node-address, etc. Please use it after checking.



● To disable the self-check function prior to starting the tightening operation, set [Auto Z/C checkO] to "ON". When set, the tightening operation starts without performing the self-check.

● The 32 points of IN Ch. 01 to 02 are fixed assignments.
The 32 points of IN Ch. 03 to 04 are freely assigned.

4-3-2. Output-signal spec. (Master spindle unit → PLCs)

The factory default settings have been made. The signal assignment is set in the "PLC Out Layout" of the UNR-G user console. For the setting method, refer to the "PLC Out Layout" of "UNR-G User Console User's Manual".

OUT Ch.	BIT	Signal name	OUT Ch.	BIT	Signal name
No.1 <u>Factory set value</u>	0	TOTAL NOK	No.3 <u>Factory set value</u>	0	
	1	TOTAL OK		1	
	2	NR Failure		2	
	3	Ready		3	
	4	Working		4	
	5	End		5	
	6	Cycle NOK judgement		6	
	7	Cycle OK judgment		7	
	8	Z/C NOK		8	
	9	Z/C OK		9	
	10	BYPASS Yes		10	
	11	Work Select BIT 1 (9/17)		11	
	12	Work Select BIT 2 (10/18)		12	
	13	Work Select BIT 3 (11/19)		13	
	14	Work Select BIT 4 (12/20)		14	
15	Step OUT 1	15			
No.2 <u>Factory set value</u>	0	Sp. 1 NOK judgment	No.4 <u>Factory set value</u>	0	
	1	Sp. 1 OK Judgment		1	
	2	Sp. 1 NR Failure		2	
	3	Sp. 1 Initial cross thread NOK		3	
	4	Sp. 1 cycle NOK		4	
	5	Sp. 1 Bypass		5	
	6	Sp. 1 low limit NOK		6	
	7	Sp. 1 high limit NOK		7	
	8	Sp. 2 NOK judgment		8	
	9	Sp. 2 OK Judgment		9	
	10	Sp. 2 NR Failure		10	
	11	Sp. 2 Initial cross thread NOK		11	
	12	Sp. 2 cycle NOK		12	
	13	Sp. 2 Bypass		13	
	14	Sp. 2 low limit NOK		14	
15	Sp. 2 high limit NOK	15			

※Please confirm that PLC's Ch..No depends on the setting of the node-address, etc. Please use it after checking. Refer to Chapter 2 "I/O Signal Description" and Chapter 4 "Output Signal Description" of UNR-G Spindle unit" operation manual for the description of each signal..



OUT Ch. No. Unused area of 03 to 16 is also allocated.

4-4. Fieldbus setting (EtherNet/IP)

The fieldbus settings are configured in "Fieldbus Settings" of the UNR-G User Console.

● Initial settings (same as the factory settings)

Setting		PROFINET I/O
Network Settings	IP address	192.168.11.50
	Subnet Mask	255.255.255.0
	Default gateway	192.168.11.1
I/O Settings	PLC → Master-spindle	12 bytes [96bits]
	Master spindle → PLCs	32 bytes [256bits]
Number of bytes in the message	PLC → Master-spindle	32 bytes [256bits]
	Master spindle → PLCs	4096 bytes [32768bits]
Number of Message Block Bytes		250 bytes

● Network Settings

- IP address: 0.0.0.0 to 255.255.255.255
- Subnet mask: 0.0.0.0 to 255.255.255.255
- Default gateway :0.0.0.0].255.255

● I/O Settings

- Data length [PLC → Master-spindle]
Setting range: 2 bytes [16 bits] to 12 bytes [96 bits]
- Data length [Master spindle → PLCs]
Setting range: 2 bytes [16 bits] to 32 bytes [256 bits]

● Message Byte Count Setting

- Data length [PLC → Master-spindle]
Setting range: 0 byte [0 bit] to 32 bytes [256 bits]
- Data length [Master spindle → PLCs]
Setting range: 0 byte [0 bit] to 4096 bytes [32768 bits]

● Message block byte number setting range: 1 to 250

4-5. Fieldbus message setting (EtherNet/IP Master spindle unit → PLCs)

Refer to Chapter 1 when outputting the tightening result by the fieldbus message setting.

•Fieldbus Message Communication Command (Master G-Unit Output → PLC Input)

Explicit messaging is executed by CMND command. For more information about CMND instructions, refer to PLC manufacturer's instruction manual.

• Command format (CMND instruction)

00 09 01 04 00 01 01 10 00 00 00 64
 ① ② ③ ④ ⑤ ⑥ ⑦

No.	Control data	Setting example	Remarks
1	Number of bytes to send command data	00 29	9 Byte
2	Number of response data bytes	01 04	Number of message block bytes: 250 bytes +10 Byte = 260 bytes (104 hex)
3	Destination network address	00 01	PLC routing table Own network address: 1
4	Destination node address	01	PLC EtherNet/IP node address: 01
5	Destination Unit Number	10	PLC EtherNet/IP unit No.:0+10 hex
6	Response required etc.	00 00	Response required, communication port No.0, Number of retransmissions 0
7	Response monitoring time	00 64	10.0 Seconds (64hex)

After CMND instruction, the tightening result data is acquired by Explicit messaging.

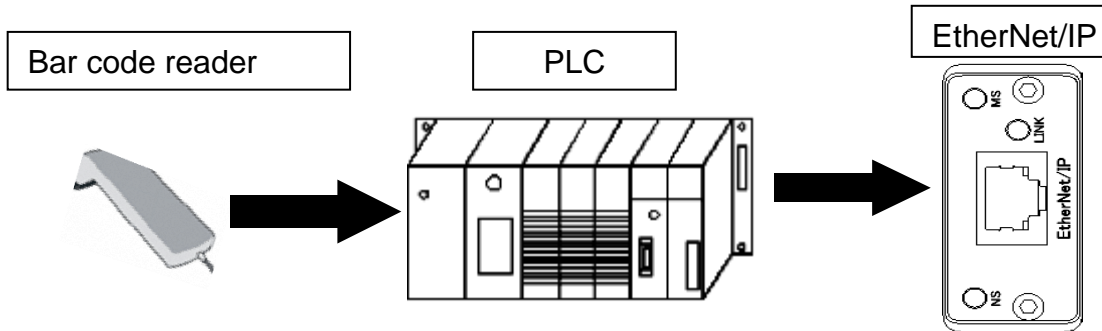
• Command format (Explicit messaging)

28 01 32 0E 00 A2 00 01 05 00
 ① ② ③ ④ ⑤ ⑥

No.	Command name	Setting example	Fixed value	Remarks
1	Command code	28 01	○	Explicit messaging
2	Standby node Address	32		ABCC-EIPT node address: 50 (32 hex) (IP address: 192.168.11.50)
3	Service code	0E	○	-
4	Class ID	00 A2	○	-
5	Instance ID	00 01		Define which blocks in the object class to send message information to:01 Example: Number of Message Block Bytes: 250 Bytes Message Output Bytes: 4096 Bytes 00 01: 1 block 1-250 Byte 00 02: 2 blocks 251-500 Byte 00 03: 3 blocks 501-750 Byte 00 11:17 blocks 4001-4096 Byte Maximum message output 4096 bytes
6	Service data	05 00	○	-

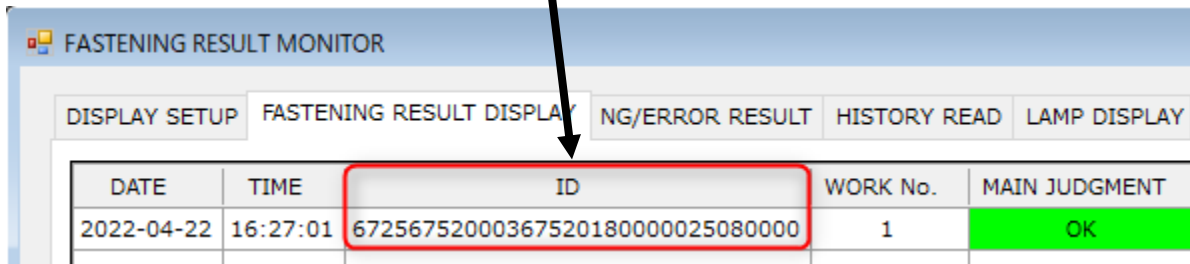
4-6. Fieldbus message setting (EtherNet/IP PLC → Master-spindle unit)

To send message information from PLC to master spindle unit, select ASCII character. Message information sent from PLC to master spindle unit of I/O (PLC) control is reflected in fieldbus communication, UNR-G user console, unit RS232C, and extended RS232C.



注意 - For notes on ID data input, refer to the PAGE4-19 of operation manual for UNR-G spindle unit.

Ch.	+1	+2	+3	+4	+5	+6	+7	+8	+9
D2000	67	25	67	52	00	03	67	52	01
D2010	80	00	00	25	08	00	00		



•Fieldbus Message Communication Command (PLC Out → Master Spindle Unit Input)

CMND instruction executes Explicit messaging. For more information about CMND instructions, refer to PLC manufacturer's instruction manual.

• Command format (CMND instruction)

00 29 00 20 00 01 01 10 00 00 00 64
 ① ② ③ ④ ⑤ ⑥ ⑦

No.	Control data	Setting example	Remarks
1	Number of bytes to send command data	00 29	ID data: 32 bytes + 9 bytes of command = 41 Byte (29 hex)
2	Number of response data bytes	00 20	32 Byte(20 hex)
3	Destination network address	00 01	PLC routing table local network address: 1
4	Destination node address	01	PLC EtherNet/IP node address: 01
5	Destination Unit Number	10	PLC EtherNet/IP unit No.:0+10 hex
6	Response required etc	00 00	Response required, communication port No.0, retransmission number 0
7	Response monitoring time	00 64	10.0 Seconds (64hex)

After CMND instruction, ID-data is transmitted by Explicit messaging.

• Command format (Explicit messaging)

28 01 32 10 00 A2 00 01 05 41 42 43 ... 38 39 30
 ① ② ③ ④ ⑤ ⑥ ⑦

No.	Command name	Setting example	Fixed value	Remarks
1	Command code	28 01	○	Explicit messaging
2	Standby node Address	32		ABCC-EIPT node address: 50 (32h) (IP address: 192.168.11.50)
3	Service code	10	○	-
4	Class ID	00 A2	○	-
5	Instance ID	00 01	○	-
6	Service data	05	○	-
7	Transmit ID data	41		Transmit ID data 1st byte (A)
		42 43		Transmit ID data Byte 2 and 3 (B C)
		44 45		Transmit ID data Byte 4, 5th (DDE)
		}		}
		36 37		Transmit ID data 28, 29th byte (6 7)
		38 39		Transmit ID Data Byte 30, 31 (8 9)
		30 00		Transmit ID data byte 32 (0)

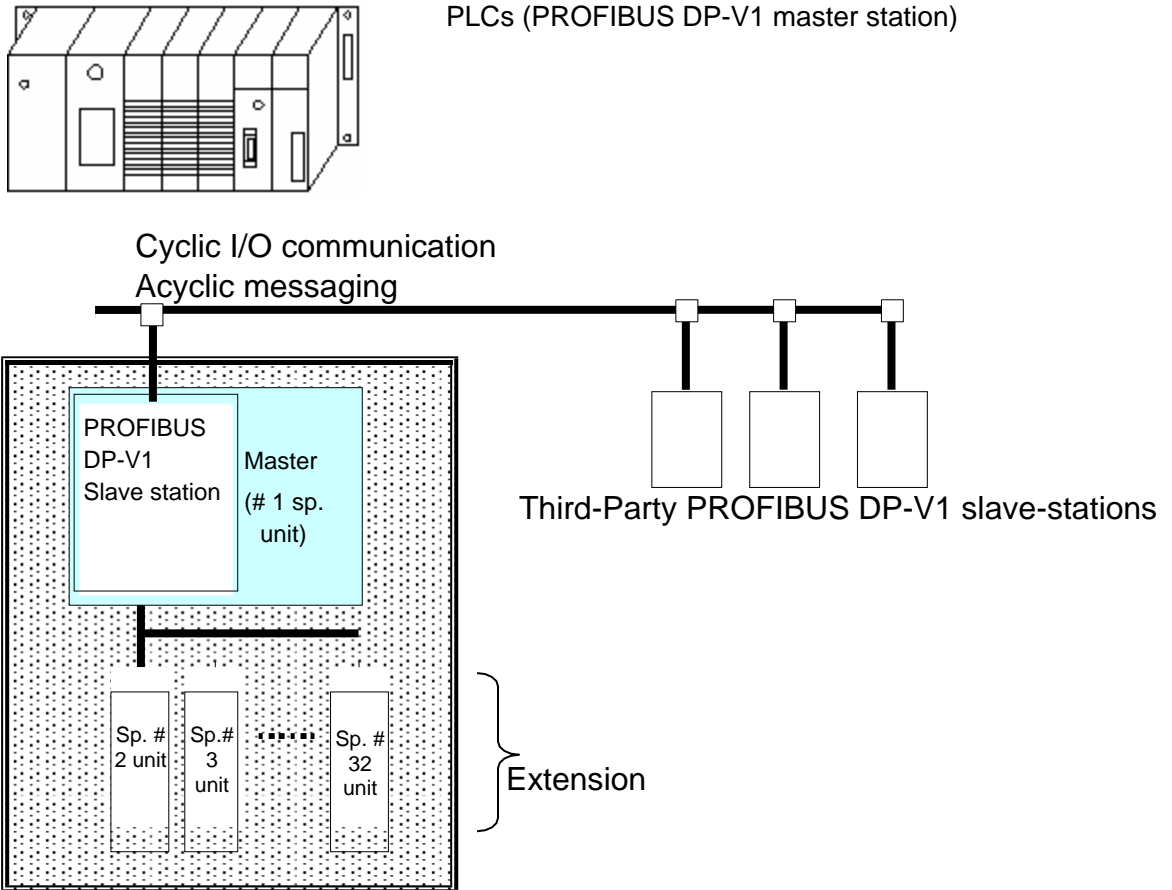
Chapter 5. PROFIBUS DP-V1



5

5-1. System Configuration (PROFIBUS DP-V1)

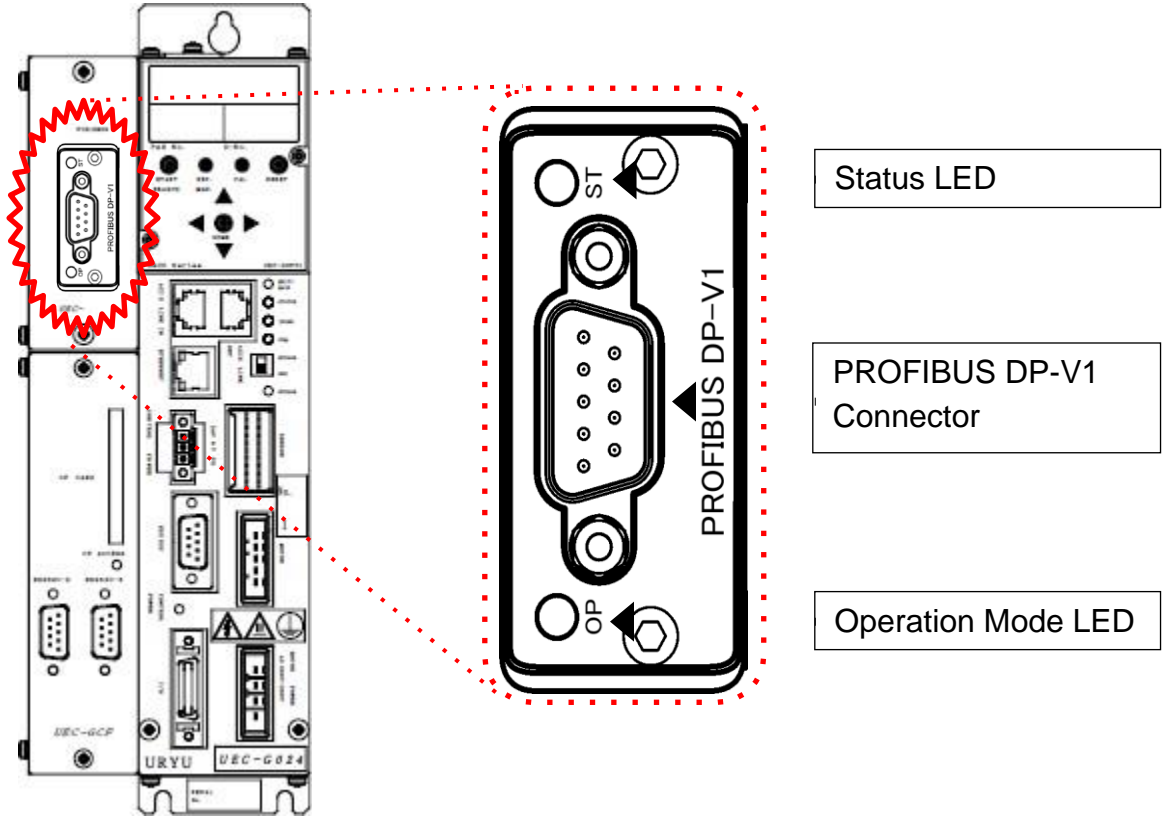
UNR-G PROFIBUS DP-V1 is compliant with the Open Field Network PROFIBUS DP-V1. Control and message info of the tool are executed by cyclic I/O (I/O) messages and acyclic (I/O) messages. It is compliant with the Open Field Network PROFIBUS DP-V1 system and can be connected to third-party PROFIBUS DP-V1 devices (master / slave). In addition, cyclic I/O (I/O) messages and acyclic (I/O) messages can be executed simultaneously.



UNR-G NR PROFIBUS DP-V1

5-2. Hardware Description (PROFIBUS DP-V1)

● PROFIBUS DP-V1 Modules Location

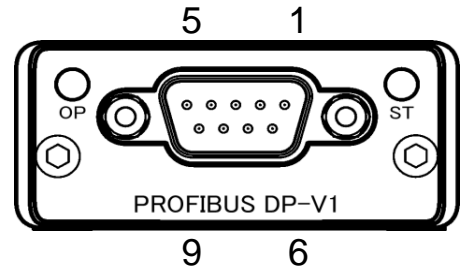


5-2-1. Module

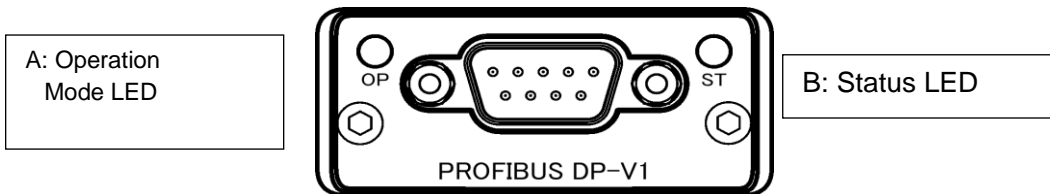
UNR-G Displays the node status and network status of the type NR PROFIBUS DP-V1 system.

●Pin assignment

No.	Signal name	Description
1	-	Connection prohibited
2	-	Connection prohibited
3	RxD/TxD-P	Data send/receive + (B line, P side)
4	CNTR-P	RTS
5	DGND	Communication power (for Ground)
6	VP+5	Communication power supply (+5V side)
7	-	Connection prohibited
8	RxD/TxD-N	Data Transmission/Reception- (A line N side)
9	-	Connection prohibited



●LED List



LED name		Color	Status		Description
A	Operation Mode LED	OFF	Off	Offline	Offline or power is not supplied.
		Green	Lights up	Online	Data communication in progress
			Blinking	Online	Data clear in progress
		Red	Blinking 1	Parameter error	There is an error in the parameter setting.
Flashing 2	Configuration Error		With an error in the profile bus configuration (setting) occurred.		
B	Status LED	OFF	Off	Not powered on Initialized	Power is not supplied. The network is being initialized or the module is being set up.
		Green	Lights up	Normal operation	The module has moved from the initial state.
			Blinking 1	Diagnostic Events	Diagnostic event in progress
		Red	Lights up	Exception error	A severe problem has occurred.

5-2-2. Cable

Cables and connectors (D-SUB 9pin male) are not provided by us. Be prepared by the customer.



• **Connect the cables with all power supplies turned OFF.**

5-2-3. GSD files

A GSD file is an information file related to the communication specifications of PROFIBUSDP-V1 compatible devices. A separate file exists for each device. If you want to use the configuration software to connect ABCC-DPV1 to PLC, you will need a GSD file.

GSD file is included on the installation CD in the UNR-G User's Manual. For proper use of GSD file, refer to PROFIBUSDP-V1 Configuration Software User's Manual.

5-3. I/O Signaling Specifications (PROFIBUS DP-V1)

	I/O input/output		Message input/output	
	Master unit → PLCs	PLC → Master-unit	Master unit → PLCs	PLC → Master-unit
Maximum setting	32 bytes (256 Points)	12 bytes (96 Points)	2048 words (4096 bytes)	16 words (32 bytes)
Standard setting	32 bytes (256 Points)	12 bytes (96 Points)	2048 words (4096 bytes)	16 words (32 bytes)

5-3-1. INPUT SPECIFICATIONS (PLC → Master-unit)

IN Ch.	BIT	Signal name	IN Ch.	BIT	Signal name
Entry word No.01	0	Operation Preparation	Entry word No.03	0	
	1	Reset		1	
	2	Reverse		2	
	3	Forward		3	
	4	Start		4	
	5	Cycle start		5	
	6	Cycle Count Up		6	
	7	Cycle Count clear		7	
	8	STEP IN 1		8	
	9	STEP IN 2		9	
	10	STEP IN 3		10	
	11	STEP IN 4		11	
	12	STEP IN 5		12	
	13	STEP IN 6		13	
	14	STEP IN 7		14	
	15	Work Select 9-16	15		
Entry word No 02	0	Work Select 17-24	Entry word No.04	0	
	1	Work Select 1 (9/17)		1	
	2	Work Select 2 (10/18)		2	
	3	Work Select 3 (11/19)		3	
	4	Work Select 4 (12/20)		4	
	5	Work Select 5 (13/21)		5	
	6	Work Select 6 (14/22)		6	
	7	Work Select 7 (15/23)		7	
	8	Work Select 8 (16/24)		8	
	9	Auto / Each (unused)		9	
	10	Switch off Auto Zero/Cal Check		10	
	11	ID data clear		11	
	12	Manual Z/C Check		12	
	13			13	
	14			14	
15		15			

※Please confirm that PLC's Ch..No depends on the setting of the node-address, etc. Please use it after checking.



- To disable the self-check function prior to starting the tightening operation, set [Auto Zero/Cal Check] to "ON". When set, the tightening operation starts without performing the self-check.
- The 32 points of input Word No.01 to 02 are fixed assignments. The 32 points of input Word No.03 to 04 are freely assigned.

5-3-2. Output-Signal Specifications (Master unit → PLCs)

The factory default settings have been made. The signal assignment is set in the "PLC Out Layout" of the UNR-G user console. For the setting method, refer to the "PLC Out Layout" of "UNR-G User Console User's Manual".

OUT Ch.	BIT	Signal name	OUT Ch.	BIT	Signal name
No.1 <u>Factory set value</u>	0	TOTAL NOK	No.3 <u>Factory set value</u>	0	
	1	TOTAL OK		1	
	2	NR Failure		2	
	3	Ready		3	
	4	Working		4	
	5	End		5	
	6	Cycle NOK judgement		6	
	7	Cycle OK judgment		7	
	8	Z/C NOK		8	
	9	Z/C OK		9	
	10	BYPASS Yes		10	
	11	Work Select BIT 1 (9/17)		11	
	12	Work Select BIT 2 (10/18)		12	
	13	Work Select BIT 3 (11/19)		13	
	14	Work Select BIT 4 (12/20)		14	
15	Step OUT 1	15			
No.2 <u>Factory set value</u>	0	Sp. 1 NOK judgment	No.4 <u>Factory set value</u>	0	
	1	Sp. 1 OK Judgment		1	
	2	Sp. 1 NR Failure		2	
	3	Sp. 1 Initial cross thread NOK		3	
	4	Sp. 1 cycle NOK		4	
	5	Sp. 1 Bypass		5	
	6	Sp. 1 low limit NOK		6	
	7	Sp. 1 high limit NOK		7	
	8	Sp. 2 NOK judgment		8	
	9	Sp. 2 OK Judgment		9	
	10	Sp. 2 NR Failure		10	
	11	Sp. 2 Initial cross thread NOK		11	
	12	Sp. 2 cycle NOK		12	
	13	Sp. 2 Bypass		13	
	14	Sp. 2 low limit NOK		14	
15	Sp. 2 high limit NOK	15			

※Please confirm that PLC's Ch.No depends on the setting of the node-address, etc. Please use it after checking. See Chapter 2 "I/O Signal Description" and Chapter 4 "Output Signal Description" of UNR-G Spindle unit" manual for the description of each signal.



OUT Ch. No. Unused area 02 to 16 is also allocated.

5-4. Fieldbus setting (PROFIBUS DP-V1)

Fieldbus settings are configured in "Fieldbus Settings" of the G-type NR user console.

● Initial settings (same as the factory settings)

Setting		PROFIBUS DP-V1
Node address		3
I/O Settings	PLC → Master-unit	12 bytes [96 bits]
	Master unit → PLCs	32 bytes [256 bits]
Number of bytes in the message	PLC → Master-unit	32 bytes [256 bits]
	Master unit → PLCs	4096 bytes [32768 bits]
Number of Message Block Bytes		64 bytes

● Node address

Setting range: 0 to 125

● I/O Settings

- Data length [PLC → Master-unit]

Setting range: 2 bytes [16 bits] to 12 bytes [96 bits]

- Data length [Master unit → PLCs]

Setting range: 2 bytes [16 bits] to 32 bytes [256 bits]

● Message Byte Count Setting

- Data length [PLC → Master-unit]

Setting range: 0 byte [0 bit] to 32 bytes [256 bits]

- Data length [Master-Unit → PLCs]

Setting range: 0 byte [0 bit] to 4096 bytes [32768 bits]

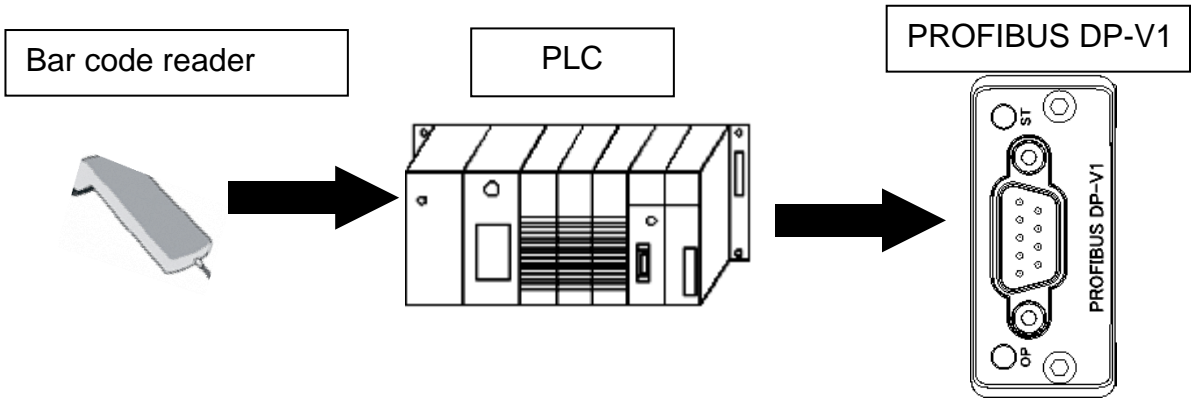
● Message block byte number setting range: 1 to 64

5-5. Fieldbus message setting (Master G-Unit → PLCs)

Refer to Chapter 1 when outputting the tightening result by the fieldbus message setting.

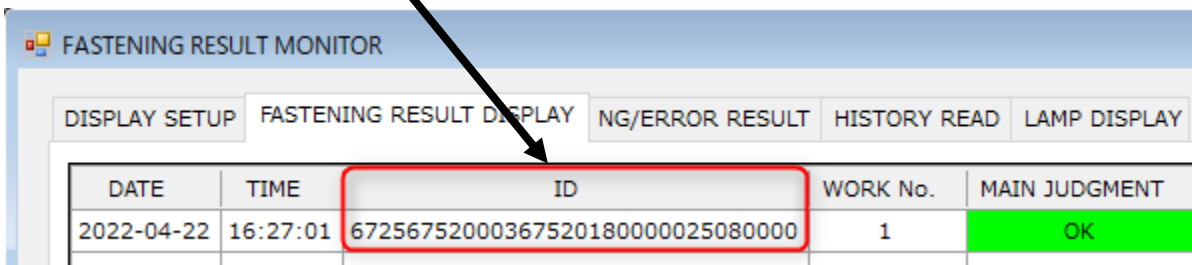
5-6. Fieldbus message setting (PLC → Master-unit)

To send message information from PLC to master unit, select ASCII character. Message information sent from PLC to master unit is reflected in fieldbus communication, UNR-G user console, unit RS232C, and extended RS232C.



注意 • Refer to PAGE 4-19 of UNR-G Spindle Unit for notes on ID data input.

	ID		ID
MW2001	67	MW2011	00
MW2002	25	MW2012	00
MW2003	67	MW2013	25
MW2004	52	MW2014	08
MW2005	00	MW2015	00
MW2006	03	MW2016	00
MW2007	67	MW2017	
MW2008	52	MW2018	
MW2009	01	MW2019	
MW2010	80	MW2020	



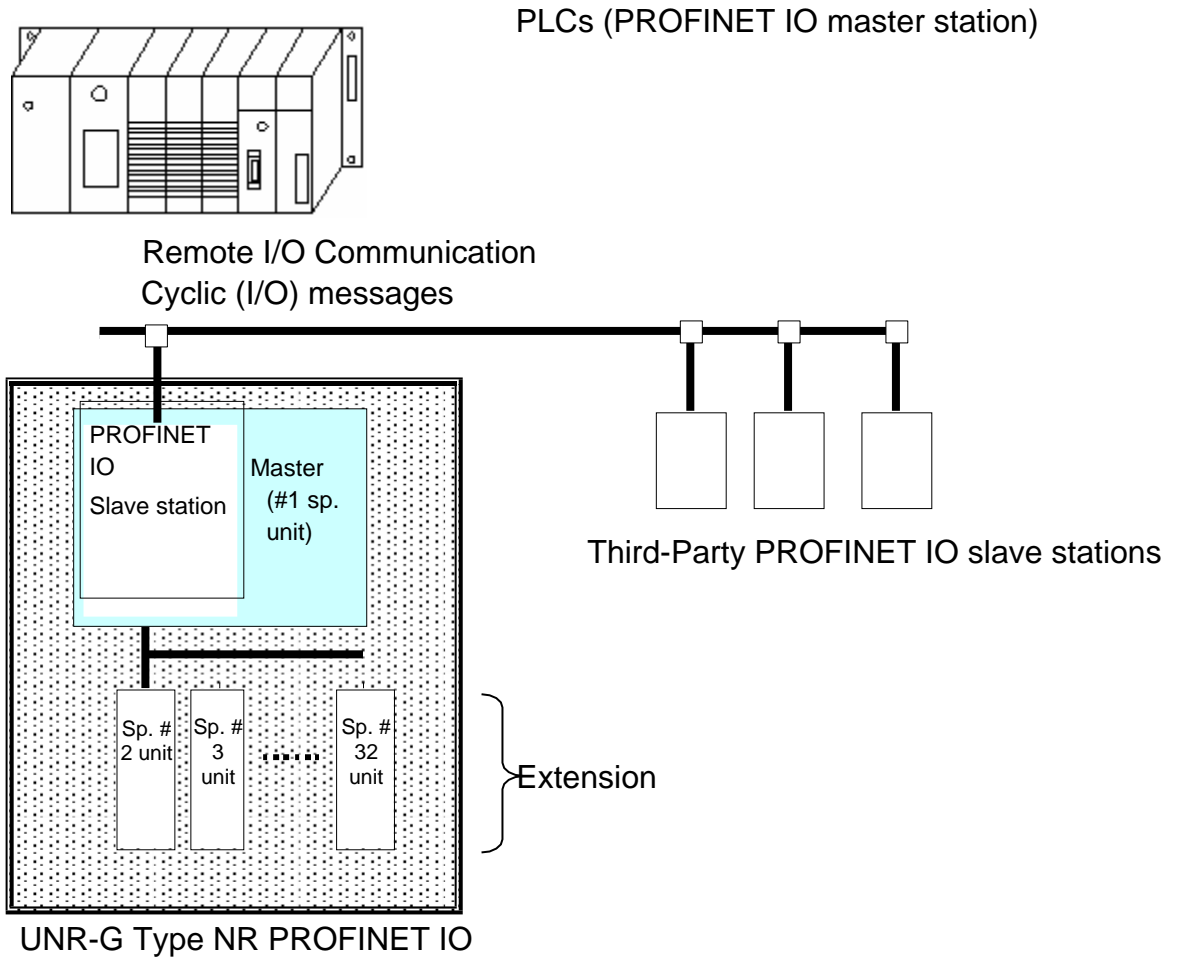
Chapter6. PROFINET IO



6

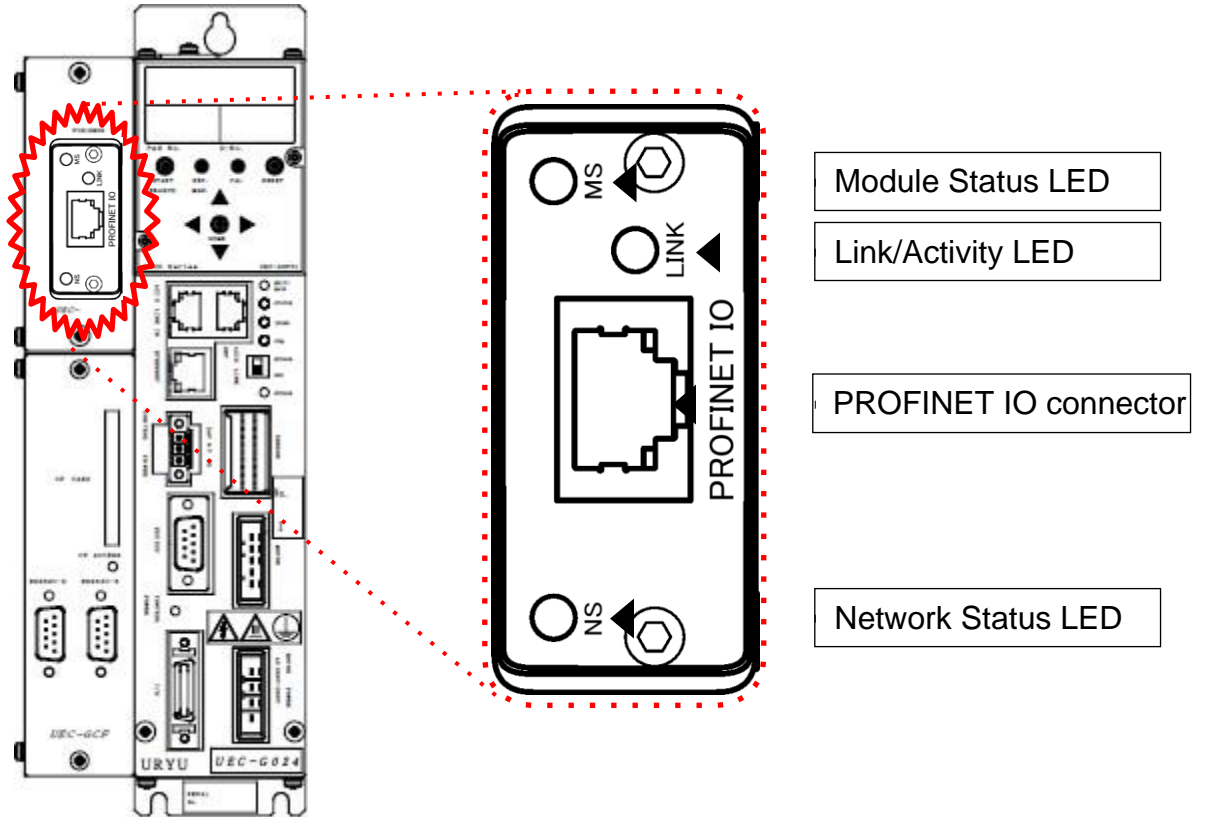
6-1. System Configuration (PROFINET IO)

UNR-G PROFINET IO is compliant with the Open Field Network PROFINET IO. Tool control and message information are executed by cyclic message communication. It is compliant with the Open Field Network PROFINET IO system and can be connected to third-party PROFINET IO devices (master / slave). In addition, remote I/O communication and cyclic RECODE DATA communication can be executed simultaneously.



6-2. Hardware Description (PROFINET IO)

● PROFINET IO Modules Location

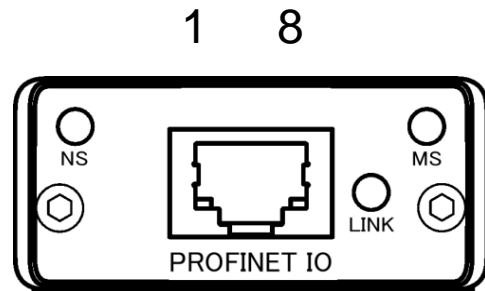


6-2-1. Module

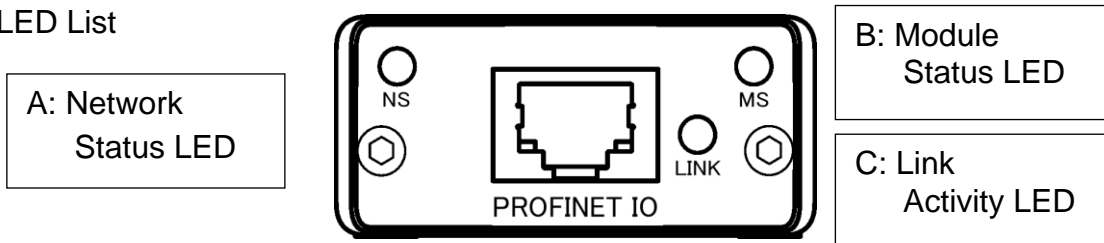
UNR-G displays the node status and network status of the type NR PROFINET IO system.

●Pin assignment

No.	Signal name	Description
1	TD+	Transmit data +
2	TD-	Transmit data-
3	RD+	Received data +
4	-	Not used.
5	-	Not used.
6	RD-	Received data -
7	-	Not used.
8	-	Not used.



●LED List



LED name		Color	Status State		Inside Description
A	Network Status LED	OFF	Off	Offline	Offline or power is not supplied
		Green	Lights up	Online	Normal communication in progress
			Blinking	Connection not established	Online, but no connection established.
		Red	Lights up	Error	Fatal error/duplicate IP address
Blinking	Connection timeout		1 Connection timed out more than once		
B	Module Status LED	OFF	Off	Power is not turned on.	Power is not supplied
		Green	Lights up	Online	Normal condition
			Blinking	Connection not established	Due to incomplete configuration or connection failure, you need to re-recognize the device.
		Red	Lights up	Error	Fatal Error Occurrence
Blinking	Error		Recoverable Error Occurrence		
C	Link Activity LED	OFF	Off	Communication not established	ETHERNET communication is not established and communication is not performed.
		Green	Lights up	No communication	ETHERNET communication is established, but it is not communicating.
			Blinking	Communicating	ETHERNET communication is established and communication is in progress.

6-2-2. Cable

The cable is not included in the package.

Provide Category 5e or higher LAN cabling for your convenience.



6-2-3. GSDML files

A GSDML file is an information file related to the communication specifications of PROFINET IO compatible devices. A separate file exists for each device. If you want to use PROFINET IO configuration software to connect ABCC-PRT to PLC, you will need a GSDML file.

GSDML file is included in the installation CD in the Type G NR User's Manual. For proper use of GSDML file, refer to PROFINET IO Configuration Software User's Manual.

6-3. I/O data type (PROFINET IO)

	I/O input/output		Message input/output	
	Master unit → PLCs	PLC → Master-unit	Master unit → PLCs	PLC → Master-unit
Maximum setting	32 bytes (256 Points)	12 bytes (96 Points)	2048 words (4096bytes)	16 words (32bytes)
Standard setting	32 bytes (256 Points)	12 bytes (96 Points)	2048 words (4096bytes)	16 words (32bytes)

6-3-1. Input signal ratings (PLC → Master-unit)

IN Ch.	BIT	Signal name	IN Ch.	BIT	Signal name
Entry word No.01	0	Operation Preparation	Entry word No.03	0	
	1	Reset		1	
	2	Reverse		2	
	3	Forward		3	
	4	Start		4	
	5	Cycle start		5	
	6	Cycle Count Up		6	
	7	Cycle Count clear		7	
	8	STEP IN 1		8	
	9	STEP IN 2		9	
	10	STEP IN 3		10	
	11	STEP IN 4		11	
	12	STEP IN 5		12	
	13	STEP IN 6		13	
	14	STEP IN 7		14	
	15	Work Select 9-16		15	
Entry word No.02	0	Work Select 17-24	Entry word No.04	0	
	1	Work Select 1 (9/17)		1	
	2	Work Select 2 (10/18)		2	
	3	Work Select 3 (11/19)		3	
	4	Work Select 4 (12/20)		4	
	5	Work Select 5 (13/21)		5	
	6	Work Select 6 (14/22)		6	
	7	Work Select 7 (15/23)		7	
	8	Work Select 8 (16/24)		8	
	9	Auto / Each (unused)		9	
	10	Switch off Auto Zero/Cal Check		10	
	11	ID data clear		11	
	12	Manual Z/C Check		12	
	13			13	
	14			14	
	15			15	

※Please confirm that PLC's Ch..No depends on the setting of the node-address, etc.
Please use it after checking.



● To disable the self-check function prior to starting the tightening operation, set [Auto Z/C check] to "ON". When set, the tightening operation starts without performing the self-check.

● The 32 points of input Word No.01 to 02 are fixed assignments. The 32 points of input Word No.03 to 04 are freely assigned.

6-3-2. Output Signal Specifications (Master unit → PLCs)

The factory default settings have been made. The signal assignment is set in the "PLC Out Layout" of the UNR-G user console. For the setting method, refer to the "PLC Out Layout" of "UNR-G User Console User's Manual".

OUT Ch.	BIT	Signal name	OUT Ch.	BIT	Signal name
No.1 <u>Factory set value</u>	0	TOTAL NOK	No.3 <u>Factory set value</u>	0	
	1	TOTAL OK		1	
	2	NR Failure		2	
	3	Ready		3	
	4	Working		4	
	5	End		5	
	6	Cycle NOK judgement		6	
	7	Cycle OK judgment		7	
	8	Z/C NOK		8	
	9	Z/C OK		9	
	10	BYPASS Yes		10	
	11	Work Select BIT 1 (9/17)		11	
	12	Work Select BIT 2 (10/18)		12	
	13	Work Select BIT 3 (11/19)		13	
	14	Work Select BIT 4 (12/20)		14	
15	Step OUT 1	15			
No.2 <u>Factory set value</u>	0	Sp. 1 NOK judgment	No.4 <u>Factory set value</u>	0	
	1	Sp. 1 OK Judgment		1	
	2	Sp. 1 NR Failure		2	
	3	Sp. 1 Initial cross thread NOK		3	
	4	Sp. 1 cycle NOK		4	
	5	Sp. 1 Bypass		5	
	6	Sp. 1 low limit NOK		6	
	7	Sp. 1 high limit NOK		7	
	8	Sp. 2 NOK judgment		8	
	9	Sp. 2 OK Judgment		9	
	10	Sp. 2 NR Failure		10	
	11	Sp. 2 Initial cross thread NOK		11	
	12	Sp. 2 cycle NOK		12	
	13	Sp. 2 Bypass		13	
	14	Sp. 2 low limit NOK		14	
15	Sp. 2 high limit NOK	15			

※Please confirm that PLC's Ch.No depends on the setting of the node-address, etc. Please use it after checking. See Chapter 2 "I/O Signal Description" and Chapter 4 "Output Signal Description" of UNR-G Spindle unit" manual for the description of each signal.



OUT Ch. No. Unused area 02 to 16 is also allocated.

6-4. Fieldbus setting (PROFINET IO)

Fieldbus settings are configured in "Fieldbus Settings" of the UNR-G NR user console.

● Initial settings (same as the factory settings)

Setting		PROFINET I/O
Network Settings	IP address	192.168.11.50
	Subnet Mask	255.255.255.0
	Default gateway	192.168.11.1
Station name		UECG400PRT01
I/O Settings	PLC → Master-unit	12 bytes [96bits]
	Master unit → PLCs	32 bytes [256bits]
Number of bytes in the message	PLC → Master-unit	32 bytes [256bits]
	Master unit → PLCs	4096 bytes [32768bits]
Number of Message Block Bytes		250bytes

● Network Settings

- IP address: 0.0.0.0 to 255.255.255.255
- Subnet mask: 0.0.0.0 to 255.255.255.255
- Default gateway :0.0.0.0].255.255

● Station name

Setting range: ASCII characters (up to 16 single-byte alphanumeric characters)

Make sure that the name matches the name registered by PLC. If there is a mismatch, you cannot connect to PLC.

● I/O Settings

- Data length [PLC → Master-unit]
Setting range: 2 bytes [16bits] to 12 bytes [96bits]
- Data length [Master unit → PLCs]
Setting range: 2 bytes [16bits] to 32 bytes [256bits]

● Message Byte Count Setting

- Data length [PLC → Master-unit]
Setting range: 0 byte [0bit] to 32 bytes [256bits]
- Data length [Master unit → PLCs]
Setting range: 0 byte [0bit] to 4096 bytes [32768 bits]

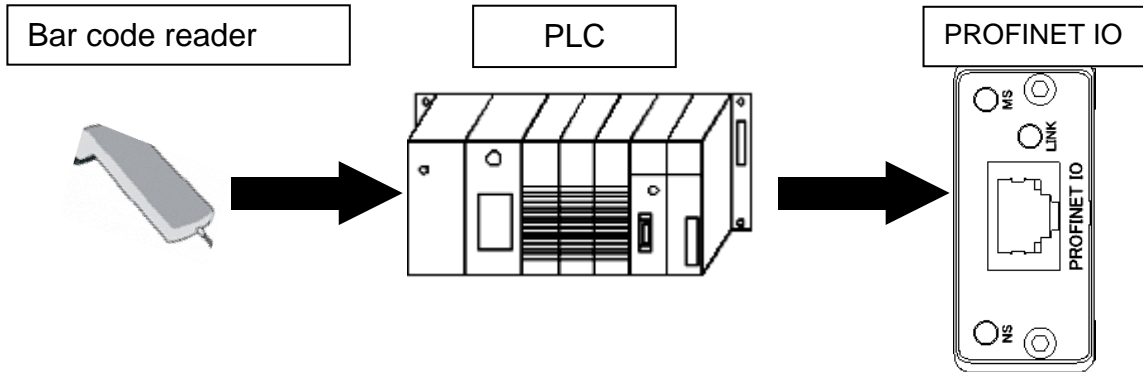
● Message block byte number setting range: 1 to 250

6-5. Fieldbus message setting (Master unit → PLCs)

Refer to Chapter 1 when outputting the tightening result by the fieldbus message setting.

6-6. Fieldbus message setting (PLC → Master-unit)

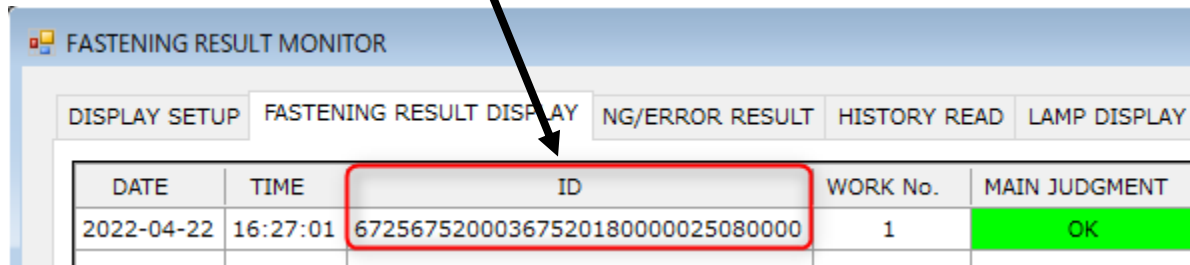
To send message information from PLC to master unit, select ASCII character. Message information sent from PLC to master unit is reflected in fieldbus communication, UNR-G user console, unit RS232C, and extended RS232C.



注意 • Refer to PAGE 4-19 of UNR-G Spindle Unit for notes on ID data input.

	ID
MW2001	67
MW2002	25
MW2003	67
MW2004	52
MW2005	00
MW2006	03
MW2007	67
MW2008	52
MW2009	01
MW2010	80

	ID
MW2011	00
MW2012	00
MW2013	25
MW2014	08
MW2015	00
MW2016	00
MW2017	
MW2018	
MW2019	
MW2020	



Chapter 7. EtherCAT

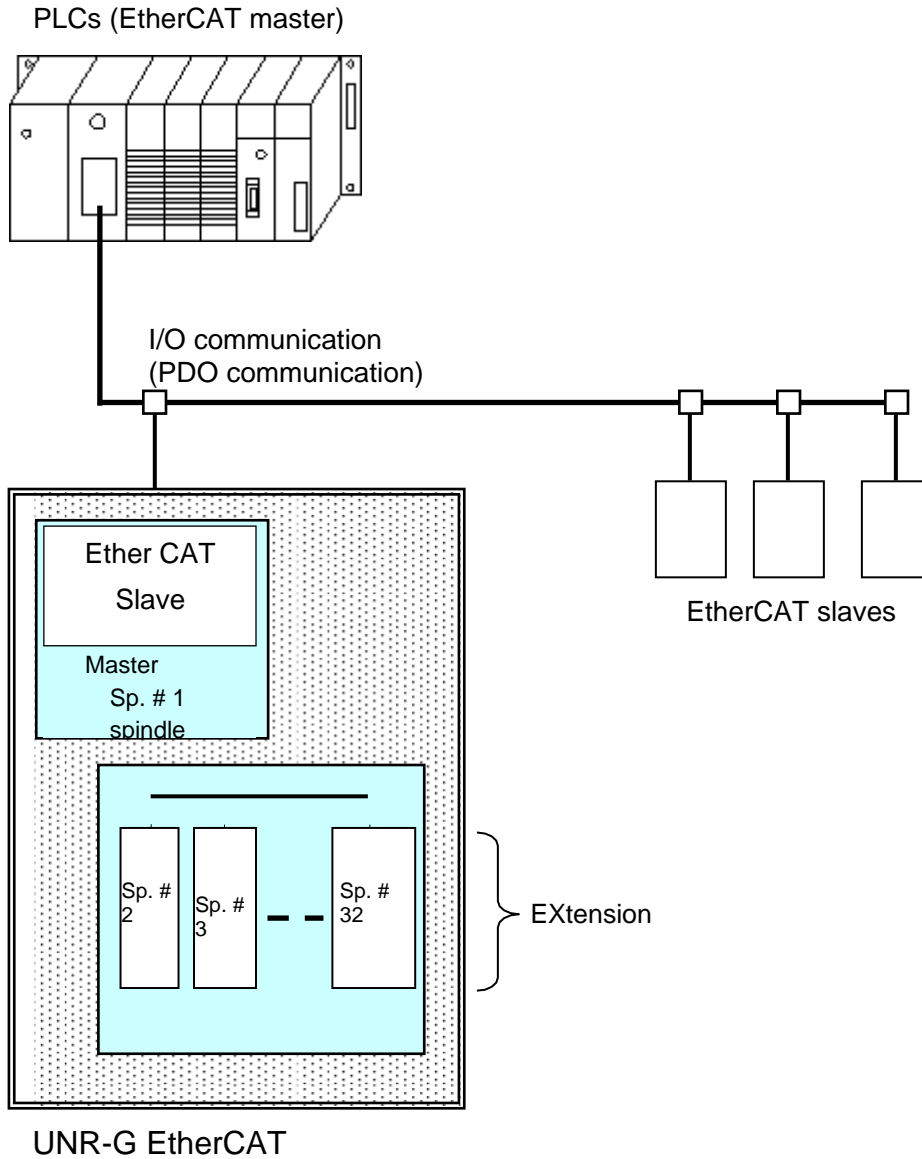


7

7-1. System Configuration (EtherCAT)

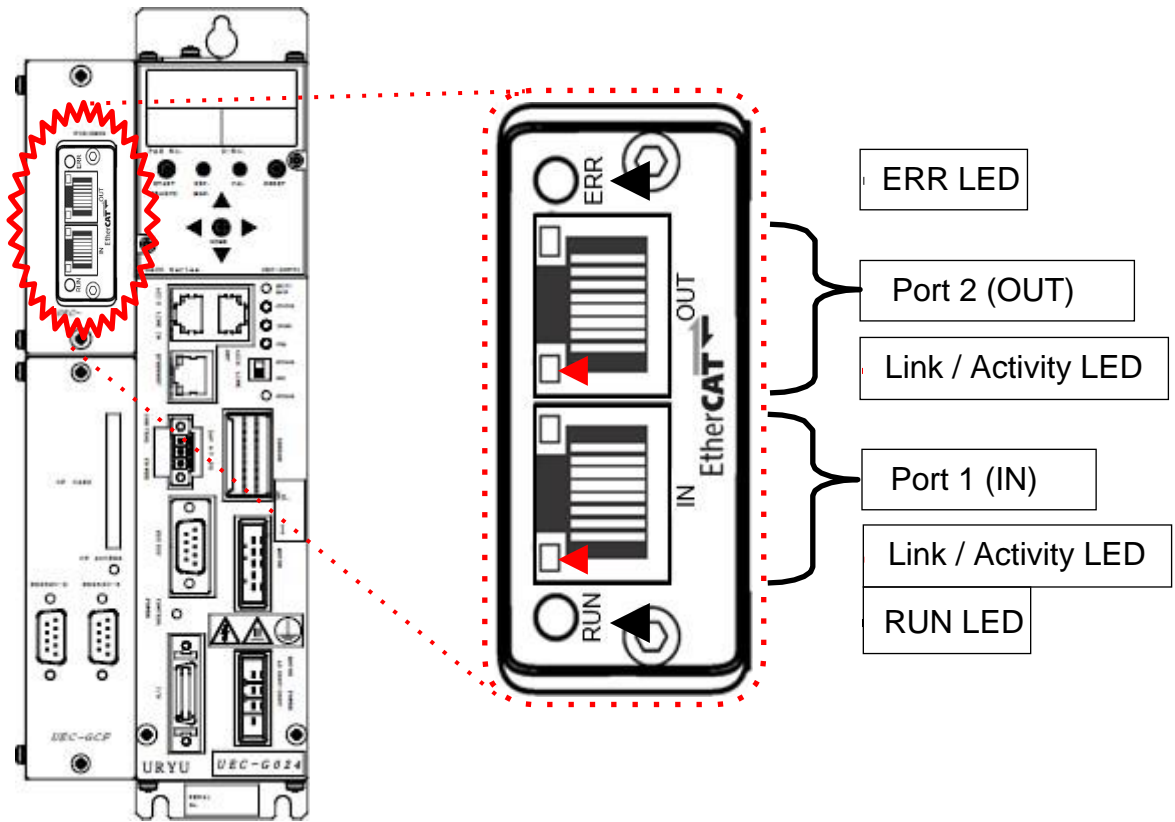
UNR-G EtherCAT is compliant with the Open Field Network EtherCAT. Tool control and message information are executed by I/O communication (PDO communication) and message communication (SDO communication).

It is compliant with the Open Field Network EtherCAT system. It can be connected to a third-party EtherCAT device (master/slave). In addition, I/O communication (PDO communication) and messaging (SDO communication) can be executed simultaneously.



7-2. Hardware Description (EtherCAT)

● EtherCAT Modules Location

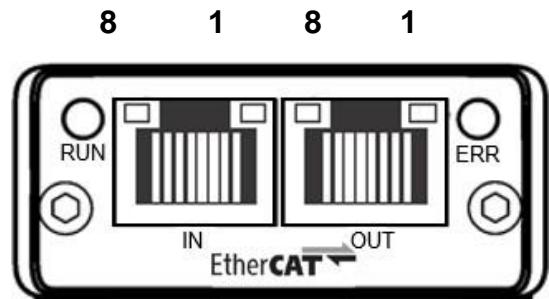


7-2-1. Module

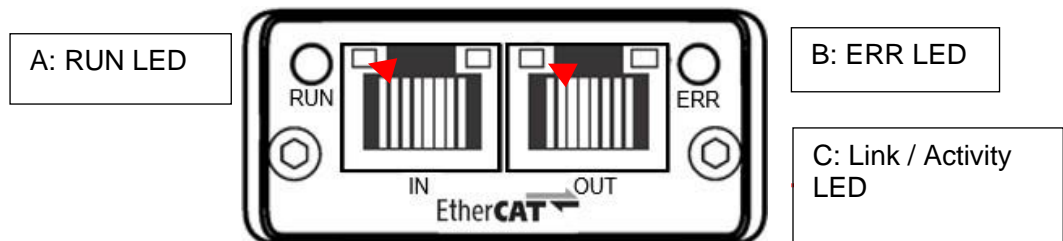
UNR-G displays the node status and network status of the type NR EtherCAT system.

● Pin assignment

No.	Signal name	Description
1	Tx+	Transmit data +
2	Tx-	Transmit data-
3	Rx+	Received data +
4	-	Not used.
5	-	Not used.
6	Rx-	Received data -
7	-	Not used.
8	-	Not used.



● LED List



LED name	Color	Status State		Description
A RUN LED	OFF	Off	INIT	Initial state or no power supplied
	Green	Lights up	OPERATIONAL	Operating status.
		Blinking	PRE-OPERATIONAL	Ready.
		1 Blinks repeatedly	SAFE-OPERATIONAL	Standby state.
Red	Lights up	Error	A fatal error occurred. Please turn it on again.	
B ERR LED	OFF	Off	Power is not turned on.	No error has occurred. Or, no power is supplied.
	Red	Blinking	Setting error	The network settings are not set correctly.
		2 Blinks repeatedly	Communication error	Communication with the master device failed.
		Lights up	Error	A fatal error occurred. Turn it off and on again.
C Link / Activity LED	OFF	Off	Communication not established	ETHERNET communication has not been established,
	Green	Lights up	No communication	ETHERNET communication is established, but it is not performing.
		Blinking	Communicating	ETHERNET communication is established and it is performed. Medium.

7-2-2. Cable

The cable is not included in the package.

Provide Category 5e or higher LAN cabling for your convenience.



• **Connect the cables with all power supplies turned OFF.**

7-2-3. ESI files

An ESI file is an information file related to the communication specifications of EtherCAT compatible devices. A separate file exists for each device. If you want to use EtherCAT configuration software to connect ABCC-EC to PLC, an ESI file is required. ESI file is included in the installation CD in the UNR-G User's Manual.

7-3. I/O Signaling Specifications (EtherCAT)

	I/O input/output		Message input/output	
	Master unit → PLCs	PLC → Master-unit	Master unit → PLCs	PLC → Master-unit
Maximum setting	32 bytes (256 Points)	12 bytes (96 Points)	2048 words (4096 bytes)	16 words (32 bytes)
Standard setting	32 bytes (256 Points)	12 bytes (96 Points)	2048 words (4096 bytes)	16 words (32 bytes)

7-3-1. INPUT SPECIFICATIONS (PLC → Master-unit)

● DO RxPDO-Map

Sub Index	BIT	Signal name	Sub Index	BIT	Signal name
001	0	Operation Preparation	005	0	
	1	Reset		1	
	2	Reverse		2	
	3	Forward		3	
	4	Start		4	
	5	Cycle start		5	
	6	Cycle Count Up		6	
	7	Cycle Count clear		7	
002	0	STEP IN 1	006	0	
	1	STEP IN 2		1	
	2	STEP IN 3		2	
	3	STEP IN 4		3	
	4	STEP IN 5		4	
	5	STEP IN 6		5	
	6	STEP IN 7		6	
	7	Work Select 9-16		7	
003	0	Work Select 17-24	007	0	
	1	Work Select 1 (9/17)		1	
	2	Work Select 2 (10/18)		2	
	3	Work Select 3 (11/19)		3	
	4	Work Select 4 (12/20)		4	
	5	Work Select 5 (13/21)		5	
	6	Work Select 6 (14/22)		6	
	7	Work Select 7 (15/23)		7	
004	0	Work Select 8 (16/24)	008	0	
	1	Auto / Each (unused)		1	
	2	Switch off Auto Zero/Cal Check		2	
	3	ID data clear		3	
	4	Manual Z/C Check		4	
	5			5	
	6			6	
	7			7	



- To disable the self-check function prior to starting the tightening operation, set [Auto Z/C check] to "ON". When set, the tightening operation starts without performing the self-check.
- The 32 points of input Sub Index 001 to 004 are fixed assignments. 32 points of input Sub Index 005 to 008 are freely assigned.


7-3-2. Output Signal Specifications (Master unit → PLCs)

The factory default settings have been made. The signal assignment is set in the "PLC Out Layout" of the UNR-G user console. For the setting method, refer to the "PLC Out Layout" of "UNR-G User Console User's Manual".

●DI TxPDO-Map

Sub Index	BIT	Signal name	Sub Index	BIT	Signal name
001 <u>Setting example</u>	0	TOTAL NOK	005 <u>Setting example</u>	0	
	1	TOTAL OK		1	
	2	NR Failure		2	
	3	Ready		3	
	4	Working		4	
	5	End		5	
	6	Cycle NOK judgement		6	
	7	Cycle OK judgement		7	
002 <u>Setting example</u>	0	Z/C NOK	006 <u>Setting example</u>	0	
	1	Z/C OK		1	
	2	BYPASS Yes		2	
	3	Work Select BIT 1 (9/17)		3	
	4	Work Select BIT 2 (10/18)		4	
	5	Work Select BIT 3 (11/19)		5	
	6	Work Select BIT 4 (12/20)		6	
	7	Step OUT 1		7	
003 <u>Setting example</u>	0	Sp. 1 NOK judgment	007 <u>Setting example</u>	0	
	1	Sp. 1 OK Judgment		1	
	2	Sp. 1 NR Failure		2	
	3	Sp. 1 Initial cross thread NOK		3	
	4	Sp. 1 cycle NOK		4	
	5	Sp. 1 Bypass		5	
	6	Sp. 1 low limit NOK		6	
	7	Sp. 1 high limit NOK		7	
004 <u>Setting example</u>	0	Sp. 2 NOK judgment	008 <u>Setting example</u>	0	
	1	Sp. 2 OK Judgment		1	
	2	Sp. 2 NR Failure		2	
	3	Sp. 2 Initial cross thread NOK		3	
	4	Sp. 2 cycle NOK		4	
	5	Sp. 2 Bypass		5	
	6	Sp. 2 low limit NOK		6	
	7	Sp. 2 high limit NOK		7	

※Please confirm that PLC's Ch..No depends on the setting of the node-address, etc. Please use it after checking. See Chapter 2 "I/O Signal Description" and Chapter 4 "Output Signal Description" of UNR-G Spindle unit" manual for the description of each signal.

 注意	<u>Sub Index: The unused space between 009 and 032 is reserved.</u>
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7-4. Fieldbus setting (EtherCAT)

The fieldbus settings are configured in "Fieldbus Settings" of the UNR-G User Console.

● Initial settings (same as the factory settings)

Setting		EtherCAT
Node address		1
I/O Settings	PLC → Master-unit	12 bytes [96 bits]
	Master unit → PLCs	32 bytes [256 bits]
Number of bytes in the message	PLC → Master-unit	32 bytes [256 bits]
	Master unit → PLCs	4096 bytes [32768 bits]
Number of Message Block Bytes		250 bytes

● Node address

Setting range: 1 to 255

● I/O Settings

- Data length [PLC → Master-unit]

Setting range: 2 bytes [16 bits] to 12 bytes [96 bits]

- Data length [Master unit → PLCs]

Setting range: 2 bytes [16 bits] to 32 bytes [256 bits]

● Message Byte Count Setting

- Data length [PLC → Master-unit]

Setting range: 0 byte [0 bit] to 32 bytes [256 bits]

- Data length [Master unit → PLCs]

Setting range: 0 byte [0 bit] to 4096 bytes [32768 bits]

● Message block byte number setting range: 1 to 250

Memo

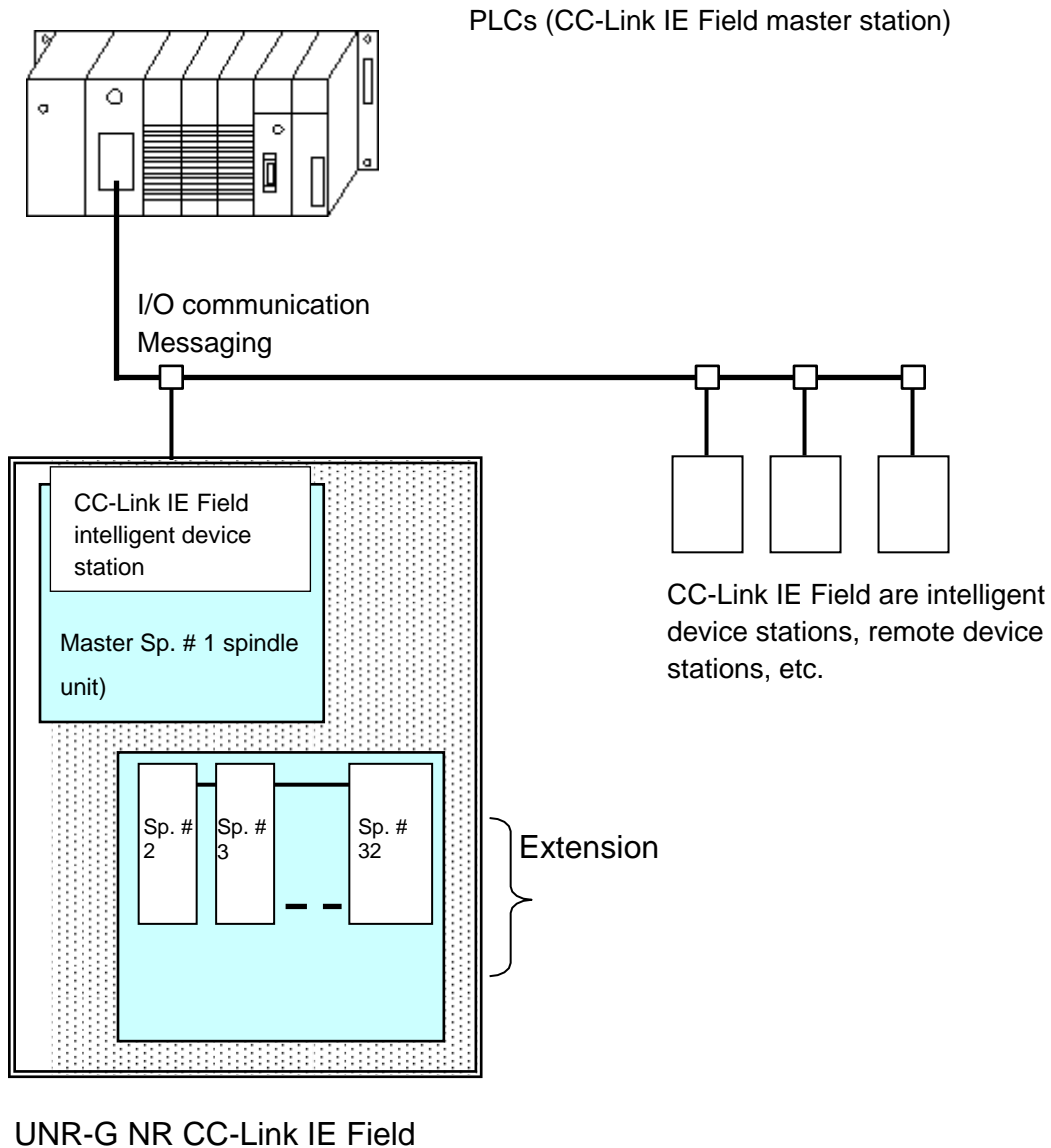
Chapter8. CC-Link IE Field



8

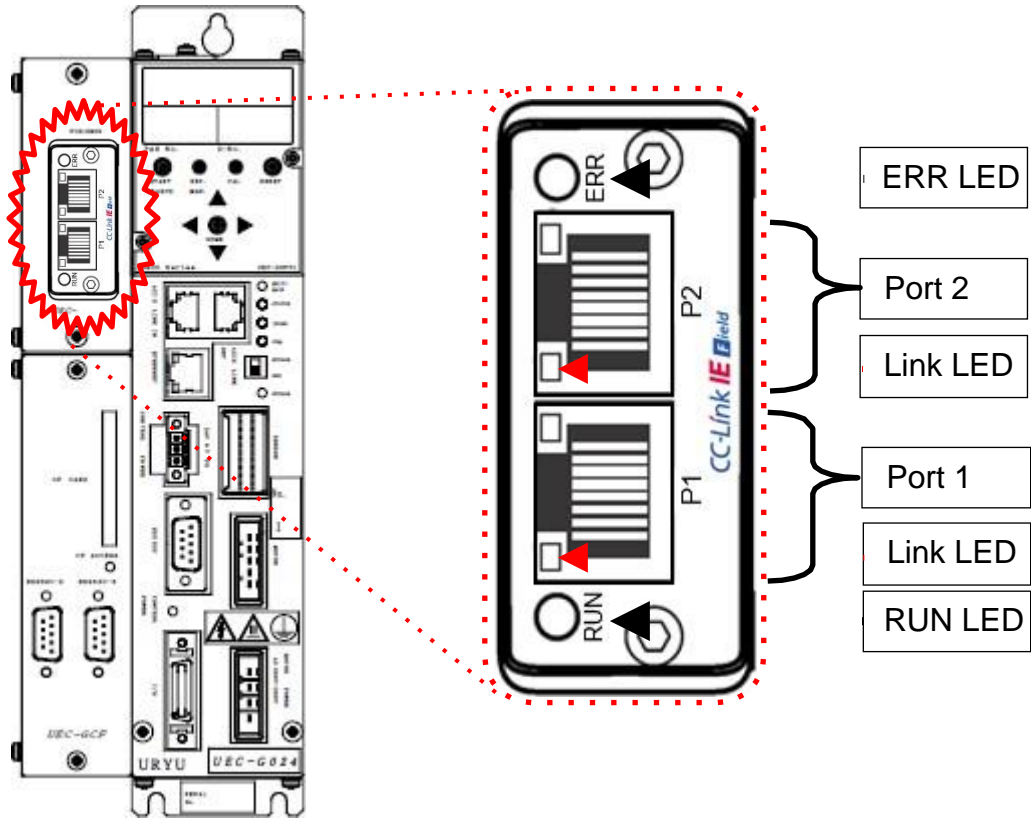
8-1. System Configuration (CC-Link IE Field)

UNR-G CC-Link IE Field is compliant with the Open Field Network CC-Link IE Field. You can control I/O and execute messaging information via communication. It conforms to the Open Field Network CC-Link IE Field system. It can be connected to CC-Link IE Field master stations and local stations (intelligent device stations, remote device stations, etc.). In addition, I/O communication and messaging can be executed simultaneously.



8-2. Hardware Description (CC-Link IE Field)

● CC-Link IE Field Modules Location

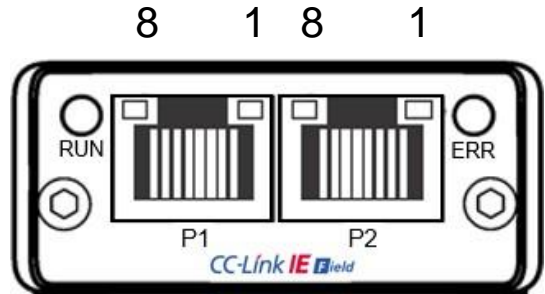


8-2-1. Module

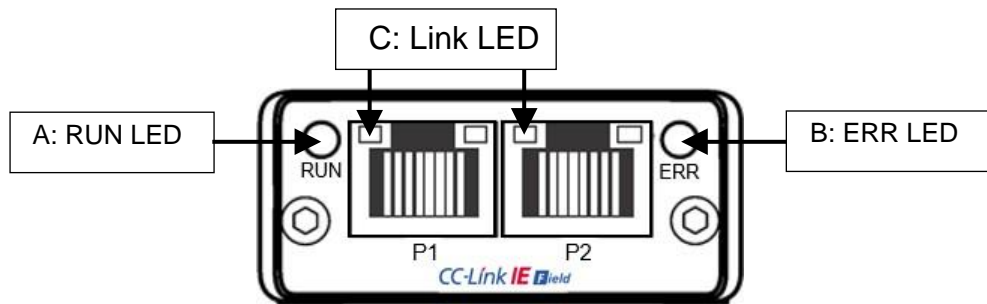
UNR-G displays the node status and network status of the type NR CC-Link IE Field system.

● Pin assignment

No	Signal name	Description
1	TP1+	Transmit/Receive 1 +
2	TP1-	Transmit/Receive 1 -
3	TP2+	Transmit/Receive 2 +
4	TP3+	Transmit/Receive 3 +
5	TP3-	Transmit/Receive 3 -
6	TP2-	Transmit/Receive 2 -
7	TP4+	Transmit/Receive 4 +
8	TP4-	Transmit/Receive 4 -



● LED List



LED name	Color	Status	State	Inside	Description
A	RUN LED	OFF	Off	Offline	Offline or no power supply
		Green	Lights up	Online	Normal communication in progress
		Red	Lights up	Error	Error occurring
B	ERR LED	OFF	Off	No error	No error or no power supply
		Red	Lights up	Error	Error occurring
C	Link LED	OFF	Off	Communication disabled	Link down or no power supply
		Green	Lights up	Communication enabled	Link up in progress



• If RUN LED does not light green, check the cabling and fieldbus settings. •
 CC-Link does not require a "PLC handshake of the system area".

8-2-2. Cable

The cable is not included in the package.

Provide Category 5e or higher LAN cabling for your convenience.



- Connect the cables with all power supplies turned OFF.
- There is no restriction on the order in which the P1 connectors and P2 connector wires are connected.

8-3. I/O data type (CC-Link IE Field)

	I/O input/output		Message input/output	
	Master unit → PLCs (RX)	PLC → Master-unit (RY)	Master unit → PLCs (RWr)	PLC → Master-unit (RWw)
Maximum setting	256 Points (32 bytes)	256 Points (32 bytes)	127 Points (word)	127 Points (word)
Standard setting	256 Points (32 bytes)	256 Points (32 bytes)	112 Points (word)	112 Points (word)

RX	16 Points	32 Points	48 Points	64 Points	80 Points	96 Points	112 Points	128 Points
RY								
RWr	127 Points (words)	126 Points (words)	125 Points (Words)	124 Points (Word)	123 Points (Words)	122 Points (Words)	121 Points (Words)	120 Points (Words)
RWw								

※Default ▼

RX	144 Points	160 Points	176 Points	192 Points	208 Points	224 Points	240 Points	256 Points
RY								
RWr	119 Points (Words)	118 Points (Words)	117 Points (Words)	116 Points (Words)	115 Points (Words)	114 Points (Words)	113 Points (Words)	112 Points (Words)
RWw								

8-3-1. INPUT SPECIFICATIONS (PLC → Master-unit)

Address	BIT	Signal name	Address	BIT	Signal name
RY(n+0h)0h	0	Operation Preparation	RY(n+2h)0h	32	
RY(n+0h)1h	1	Reset	RY(n+2h)1h	33	
RY(n+0h)2h	2	Reverse	RY(n+2h)2h	34	
RY(n+0h)3h	3	Forward	RY(n+2h)3h	35	
RY(n+0h)4h	4	Start	RY(n+2h)4h	36	
RY(n+0h)5h	5	Cycle start	RY(n+2h)5h	37	
RY(n+0h)6h	6	Cycle Count Up	RY(n+2h)6h	38	
RY(n+0h)7h	7	Cycle Count clear	RY(n+2h)7h	39	
RY(n+0h)8h	8	STEP IN 1	RY(n+2h)8h	40	
RY(n+0h)9h	9	STEP IN 2	RY(n+2h)9h	41	
RY(n+0h)Ah	10	STEP IN 3	RY(n+2h)Ah	42	
RY(n+0h)Bh	11	STEP IN 4	RY(n+2h)Bh	43	
RY(n+0h)Ch	12	STEP IN 5	RY(n+2h)Ch	44	
RY(n+0h)Dh	13	STEP IN 6	RY(n+2h)Dh	45	
RY(n+0h)Eh	14	STEP IN 7	RY(n+2h)Eh	46	
RY(n+0h)Fh	15	Work Select 9-16	RY(n+2h)Fh	47	
RY(n+1h)0h	16	Work Select 17-24	RY(n+3h)0h	48	
RY(n+1h)1h	17	Work Select 1 (9/17)	RY(n+3h)1h	49	
RY(n+1h)2h	18	Work Select 2 (10/18)	RY(n+3h)2h	50	
RY(n+1h)3h	19	Work Select 3 (11/19)	RY(n+3h)3h	51	
RY(n+1h)4h	20	Work Select 4 (12/20)	RY(n+3h)4h	52	
RY(n+1h)5h	21	Work Select 5 (13/21)	RY(n+3h)5h	53	
RY(n+1h)6h	22	Work Select 6 (14/22)	RY(n+3h)6h	54	
RY(n+1h)7h	23	Work Select 7 (15/23)	RY(n+3h)7h	55	
RY(n+1h)8h	24	Work Select 8 (16/24)	RY(n+3h)8h	56	
RY(n+1h)9h	25	Auto / Each (unused)	RY(n+3h)9h	57	
RY(n+1h)Ah	26	Switch off Auto Zero/Cal Check	RY(n+3h)Ah	58	
RY(n+1h)Bh	27	ID data clear	RY(n+3h)Bh	59	
RY(n+1h)Ch	28	Manual Z/C Check	RY(n+3h)Ch	60	
RY(n+1h)Dh	29		RY(n+3h)Dh	61	
RY(n+1h)Eh	30		RY(n+3h)Eh	62	
RY(n+1h)Fh	31		RY(n+3h)Fh	63	



- To disable the self-check function prior to starting the tightening operation, set [Auto Z/C check] to "ON". When set, the tightening operation starts without performing the self-check.
- The 32 points of addresses RY(n+0h)0h to RY(n+1h)Fh are fixed assignments. The 32 points of addresses RY(n+2h)0h to RY(n+3h)Fh are freely allocated.

8-3-2. Output-Signal Specifications (Master G-Unit → PLCs)

The factory default settings have been made. The signal assignment is set in the "PLC Out Layout" of the UNR-G user console. For the setting method, refer to the "PLC Out Layout" of "UNR-G User Console User's Manual".

OUT Ch.	BIT	Signal name	OUT Ch.	BIT	Signal name
RX(n+0h) <u>Setting example</u>	0	TOTAL NOK	RX(n+2h) <u>Setting example</u>	0	
	1	TOTAL OK		1	
	2	NR Failure		2	
	3	Ready		3	
	4	Working		4	
	5	End		5	
	6	Cycle NOK judgement		6	
	7	Cycle OK judgment		7	
	8	Z/C NOK		8	
	9	Z/C OK		9	
	10	BYPASS Yes		10	
	11	Work Select BIT 1 (9/17)		11	
	12	Work Select BIT 2 (10/18)		12	
	13	Work Select BIT 3 (11/19)		13	
	14	Work Select BIT 4 (12/20)		14	
15	Step OUT 1	15			
RX(n+1h) <u>Setting example</u>	0	Sp. 1 NOK judgment	RX(n+3h) <u>Setting example</u>	0	
	1	Sp. 1 OK Judgment		1	
	2	Sp. 1 NR Failure		2	
	3	Sp. 1 Initial cross thread NOK		3	
	4	Sp. 1 cycle NOK		4	
	5	Sp. 1 Bypass		5	
	6	Sp. 1 low limit NOK		6	
	7	Sp. 1 high limit NOK		7	
	8	Sp. 2 NOK judgment		8	
	9	Sp. 2 OK Judgment		9	
	10	Sp. 2 NR Failure		10	
	11	Sp. 2 Initial cross thread NOK		11	
	12	Sp. 2 cycle NOK		12	
	13	Sp. 2 Bypass		13	
	14	Sp. 2 low limit NOK		14	
15	Sp. 2 high limit NOK	15			



The unused area of RX(n+4h) ~ RX (n+Fh) are reserved.

8-4. Fieldbus setting (CC-Link IE Field)

Fieldbus setting is set from "Fieldbus setting" of the UNR-G user console.

●Initial settings (same as the factory settings)

Setting	CC-Link IE Field
Network No.	1
Station number	1
Remote I/O (RX/RX)	256 Point
Remote Register (RWw/RWr)	112 Point (words)

●Network No.

Setting range: 1 to 239

●Station number

Setting range: 1 to 120

●Remote I/O (RX/RX)

●Remote register (RWw/RWr)

Setting	Range							
Remote I/O (RX/RX)	16	32	48	64	80	96	112	128
Remote Register (RWw/RWr) *	127	126	125	124	123	122	121	120
Setting	Range							
Remote I/O (RX/RX)	144	160	176	192	208	224	240	256
Remote Register (RWw/RWr) *	119	118	117	116	115	114	113	112

* The setting of the remote register (RWw/RWr) is automatically determined by the setting of the remote input/output (RX/RX).

8-5. Connecting to MELSEC-Q Series

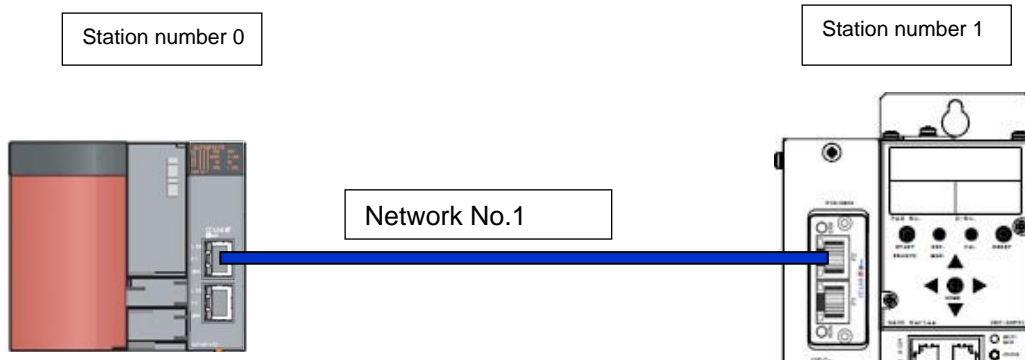
8-5-1. Connection example

● Fieldbus settings

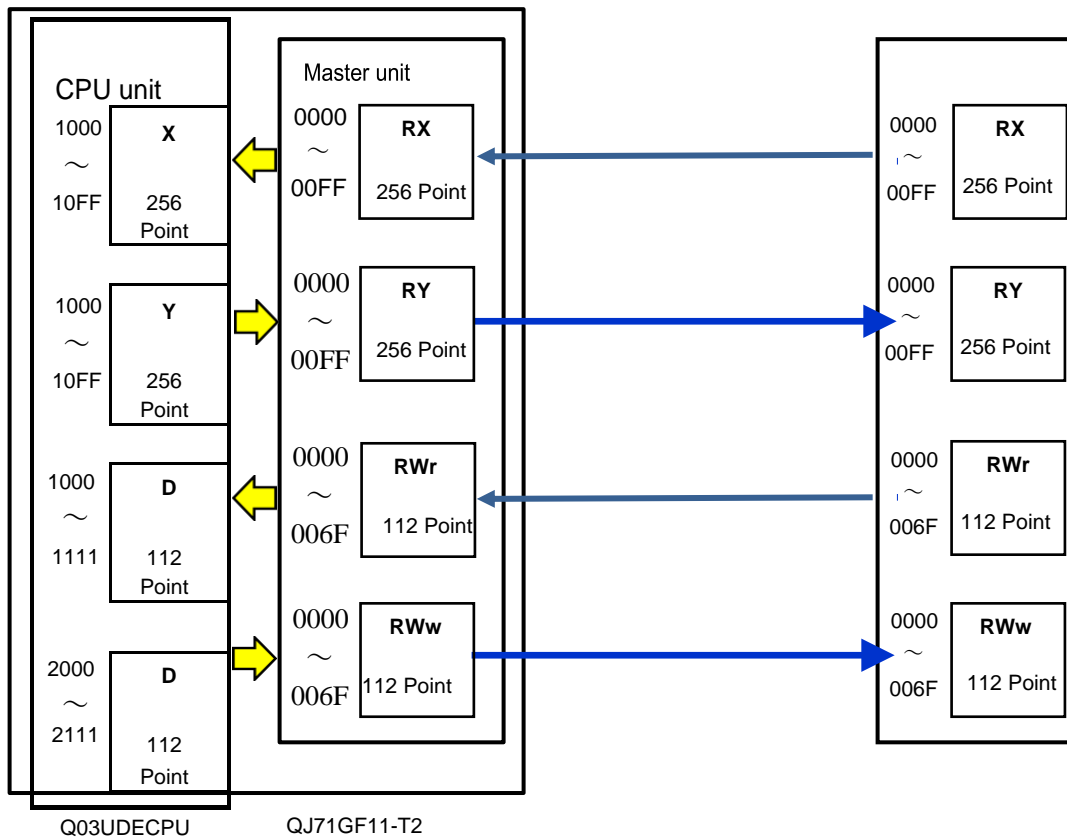
Network No.	1
Station number	1
Remote input/output (RX/Ry)	256 Points
Remote register (RWw/RWr)	112 Points

MELSEC-Q
Master station

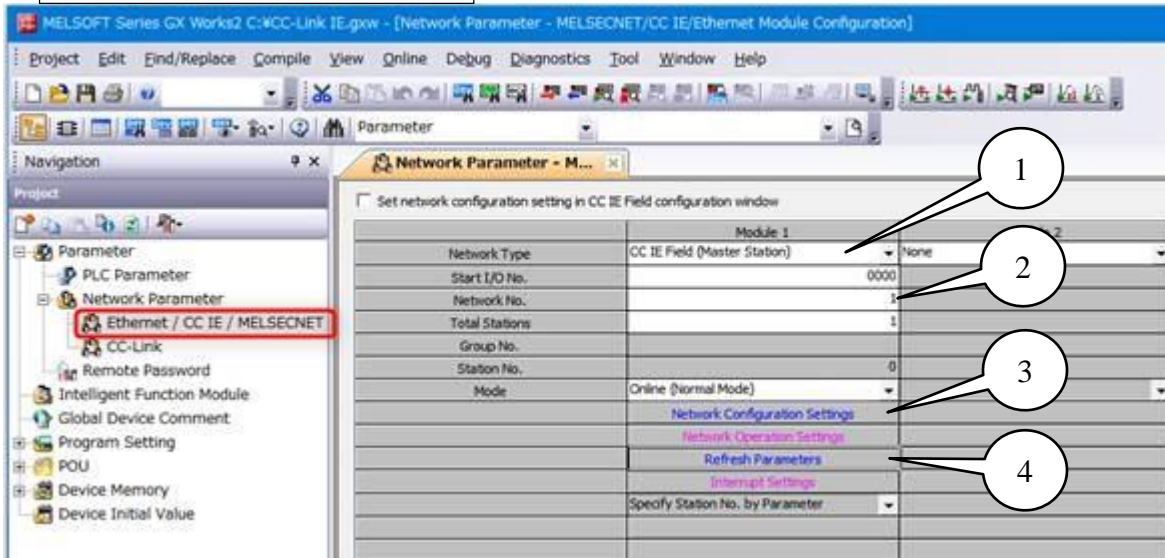
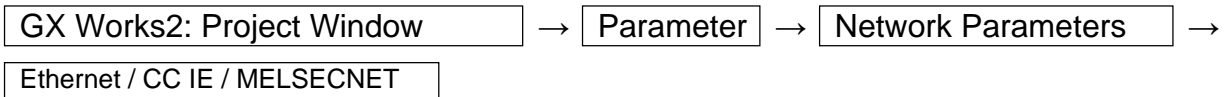
UEC-G400
Intelligent device



● MELSEC-Q networking parameter setting

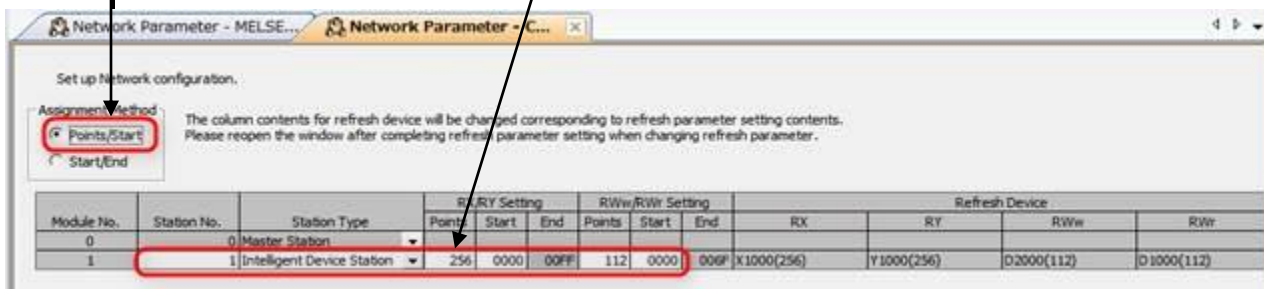


8-5-2. MELSEC-Q networking parameter setting



1. Select [CC IE Field (master station)] for [Network Type].
2. Set [1] for [Network No.].
3. Set the network configuration. (The illustration below is a reference screen.)

Item		Setting
Assignment method		Number of points/start
Station number		1
Station type		Intelligent device
RX/Ry Settings	Points	256
	Top	0000
RWw/RWr Settings	Points	112
	Top	0000

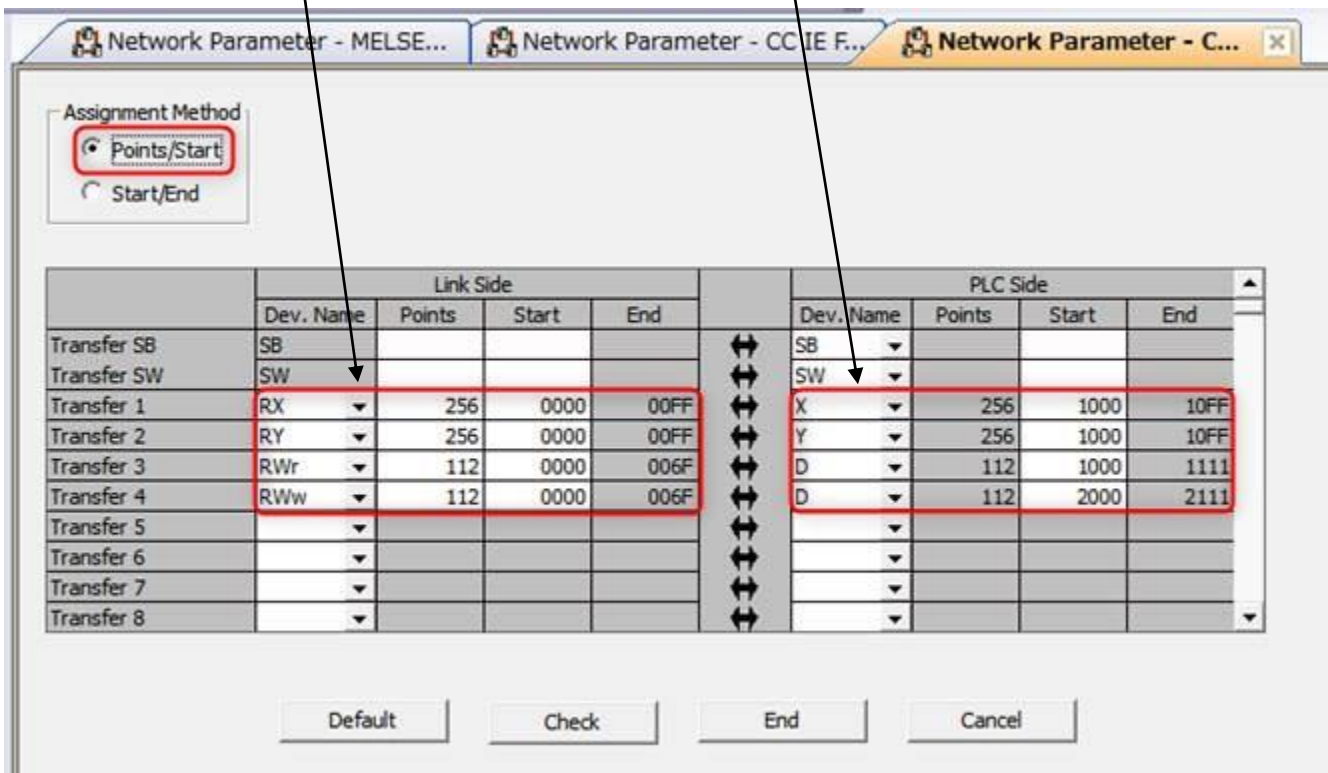


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- Set the link refresh range between the link device of the master module (QJ71GF11-T2) and the device of CPU module (Q03UDECPU) from the refresh parameter. (The illustration below is a reference screen.)

Master Unit (QJ71GF11-T2)		CPU unit (Q 03 UDECPU)	
Device	Points	Device	Points
RX0000 ~ RX00FF	256	X1000 ~ X10FF	256
RY0000 ~ RY00FF	256	Y1000 ~ Y10FF	256
RWr0000 ~ RWr006F	112	D1000 ~ D1111	112
RWw0000 ~ RWw006F	112	D2000 ~ D2111	112



- Turn PLC power off and on again.



- Specify Y for the remote output (RY) refresh device of CPU module.
If a value of M,L, and so on other than Y is specified, the status of the device prior to STOP is retained during STOP of CPU unit.
- CC-Link does not require a "PLC handshake of the system area".
- If the [Network No.] has been changed, turn PLC power off and on again.

Memo