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RFID System Z Series

Technical Manual for Identification Processor

Type code: Z4-Q002

MELSEC-Q series BUS Interface

(ID dedicated instruction specification)



Thank you very much for purchasing the RFID system Z series of B&PLUS lately.

Before using this Processor, read this manual carefully and operate properly, paying attention to the safety aspects.

Safety Considerations

(Please read this before use)

Before using this Processor, read this manual carefully and operate properly, paying attention to the safety aspects.

Incorrect handling may cause not only malfunction or failure, leading to an accident or injury. In this manual, the instructions are described in the following two levels.



The incorrect handling may cause hazardous conditions that lead to death or serious injury.

The incorrect handling may cause hazardous conditions that lead to injury of human or equipment.

Application	 This manual applies to Processors in Z4-Q002. Carefully read this manual before using the Processor and handle the product correctly. Installation and operation should be carried out by trained personnel who has knowledge of electrical equipment.
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Design considerations	 Even if the abnormality of power supply and this product break down, please design the system so that the whole system acts on the safe side. About power supply and using conditions, be carefle not to exceed the range of specifications. 		
▲ Caution	 About the standard or the rule, to which your equipment should adapt, please do appropriate measures after confirm by yourself. It is the responsibility of the operator to ensure that the locally applicable safety regulations are maintained. 		

Wiring	Wiring should be carried out after the power is turned off.
considerations	igoplus When wiring the Processor, follow the chapters containing the wiring diagrams
Attention	closely, and wire all connections properly. Incorrectly connected wiring may cause malfunction or unexpected problems.

Usage considerations	 Unauthorized work and improper use will void the warranty and liability. Please carry out the periodical confirmation of the system including setting environment and the apparatus concerned. The Processor must be operated only using approved power supplies. There is a risk of fire or heat generation exceeds the rated voltage power is being supplied. Be sure to turn off the power before cleaning, maintenance and failure treatment. Do not touch the terminals while the electricity is on. Do not disassemble or modify the Processor. It may cause failure, malfunction, injury or fire. When disposing of the Processor, treat it as industrial waste.
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< Note >

(1) Specifications and contents in this manual are subject to change without notice

(2) Please let us know if there is any mistake or notice in this manual

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1.1 Description

[B&PLUS RFID System Z series] is an RFID System for factory automation which read or writes data wirelessly by inductive coupling principal.

Identification Processor / Z4-Q002 is an interface unit for factory automation systems, which connects directly to Sequencer unit "MELSEC-Q series" by Mitsubishi (2 Read/Write heads are connectable).

1.2 Features

(1) Easy to program

Data reading/writing of Data carrier via Processor can be performed easily by the Dedicated instruction. By using dedicated instruction, shorter program can be created than using the existing FROM/TO instruction.

- (2) In 2-channel equipped Processor, the Read/Write head operates independently Z4-Q002 can communicate with Data carrier by the different instructions for each channel
- (3) By data copy Instruction, data can be copied amoung the Data carriers.Without of the Sequencer CPU, it can copy the data amoung the Data carriers
- (4) Batch communication can ensure the data simultaneity
 Maximum 1000words data (344words, when bank function is effective) can be batch communicated by one Instruction.
 By this mothod, it communicates with the Data carrier while ensuring data simultaneity.
- (5) Write protect function to prevent for write-errors.(when bank function is effective) Prevents the loss for important data such as product type number or model number which are stored in the data carrier by careless data writing
- (6) Possible to writing lifetime control*(when bank function is effective) "writing-lifetime control function" can manage the number of writing, and "Data carrier writing-lifetime" management can easily be achieved
- (7) Data carrier life extention is possible by the bank swithcing* (when bank function is effective)
 By life-extention bank switching, Data carrier(Z1-xxxx-128) writing lifetime(100,000times) can be increased up to 1,200,000 times. (Lifetime of Z1-AA02-02K is 100 billion times)

*Writing lifetime control and Bank function are effective for using Data carrier : Z1-AA02-02K

[Note for System configuration]

- Dedicated instruction of this Processor(Z4-Q002) is compatible to Interface unit for MELSEC Q-series (by Mitsubishi Electric Co. Ltd.)
 - However, except the dedicated instruction, other features such as transmission rate, memory construction and anti-interference function are not the same.

And communication distances and installation conditions are different, so please confirm this instruction manual and Mitsubishi Electric's instruction manual when designing.

In the system which using the Processor Z4-Q002, Z4-Q002 for CC-Link can be used together.
 However, the bank function setting (enabled / disabled) must be the same for all Processors. When other controllers are mixed or bank function setting is not identical, each functions may not work properly.

1.3 System configuration



Function of each component

Component	Function	
Data carrier	Nemorize and save information (data).	
Read/Write head	Read and write information (data) of Data carrier non-contact.	
	Supply power for operating of Data carriers.	
Processor	Follows to the Instruction from CPU unit, read data from Data carrier and write data to	
	Data carrier. One or two Read/Write head(s) are connectable.	

[Note for Construction of the System]

 Processor (Z4-Q002) is a special unit for MELSEC-Q series which occupies I/O 32 signals.
 The maximum numbers that Melsec CPU can control are as follows.
 Q00JCPU/Q00UJ : 8 pieces, Q00CPU/Q00UCPU/Q01CPU/Q01UCPU : 24 pieces, Q02UCPU : 36 pieces,

Q12PRHCPU/Q25PRHCPU : 53 pieces (except Basic base units), other CPU : 64 pieces

- Consider the following points to determine the number of Processors to be controlled by 1 CPU unit.

- (1) I/O signals and data memory capacity of CPU unit.
- (2) Number of occupied signals of other unit (input/output card) except Processor.
- (3) Influence of programming (ladder) to processing time or tact time.
- The Processor can perform concurrent processing of separate orders by connected 2 channels of the Read/Write head .
- But communication is not carried out properly when there are plural Data carriers in the communication area of the Read/Write head.
- Please design the system so that only one communicating Data carrier enters the communication area of each Read/Write head.

1.4 Components and Applicable Unit

Components and applicable unit of MELSEC-Q series including Processor (Z4-Q002) is indicated as follows. This Identification System can only be used following applicable units.



Memory capacity 2000byte(1000word) Writing 10 billion times/reading Unlimited



2.1 Specification

Type code	Z4-Q002				
Power supply	24 VDC+/-10 % 5 VDC(Sec			electric supply source)	
	(External power supply)				
Current consumption	0.75 A(External power supply) 0.5 A(Sequencer electric supply source				
Occupied I/O signals	32 signals				
Applicable Data carrier	2K byte: Z1-AA04-02K 112 byte: Z1-CB16-112, Z	1-CB27-112, Z1	-CB45-112, Z1-BB	10-112, Z1-B011-128	
Applicabel R/W head	Z3-A010-CN				
Read/Write heads	Connectable up to two Re	ead/Write head	S		
Connecting Heads	Terminal connecting				
Cable length R/W heads	5 m standard (max.25 m)				
Operating temperature, humidity	, 0+55 degree C, 3585 % RH (not in dew condensation)				
Storage temperature, humidity	-25+70 degree C, 358	35 % RH (not ir	n dew condensatior	ו)	
Vibration rating	Frequency	Acceleration	Amplitude	Sweepage	
	10 - 57 Hz	-	0.075 mm	10 times	
	57 - 150 Hz	1 G	-	1 octave/1 min. *	
Shock rating	10 G, 3 times each axis to x-y-z				
Noise-proof	Noise voltage for 24 VDC power supply 800 V P-P, amplitude of noise 1 microS, Noise frequency: operating normally with noise simulator 2560 Hz				
Operating atmosphere	Without corrosive gas and heavy dust				
Weight	approx. 230 g				

(*) 1 octave ... Initial frequency increases to double or decreases to half. ex. 10 Hz --> 20 Hz, 20 Hz --> 40 Hz, 40 Hz --> 20 Hz, 20 Hz --> 0 Hz / each of these change is called as 1 octave

2.2 Dimension





2.3 LED indication and Connecting Terminal



LED indication

Monitor the operating condition, errors etc. by LED indication. When error has occurred, error code would be shown

LED	ED LED indication		● : On	⊖:Off
0		Normal operation	OK	NG
1		Transmission status	Data in transit	Unsent
2	CH1	Receiving status	Data receiving	Unreceived
3]	Error indication	Occurrence of an error	OK
8		Power supply status to read/write head	OK	NG
9		Transmission status	Data in transit	Unsent
Α	CH2	Receiving status	Data receiving	Unreceived
В		Error indication	Occurrence of an error	OK
F ^{*1}		Watch dog timer (WDT) error	Occurrence of an error	OK

*1 : It lights on at the time of startup but it is not an error

Connecting terminal

- (1) Read/Write head (CH 1) connecting terminal
- (2) Read/Write head (CH 2) connecting terminal
- (3) External power unit (DC 24V) and earthing terminal
- : use 7 terminals
- : use 7 terminals
- : use 3 terminals

Describes the installation environment and Handling Precautions in installation of Processor.

3.1 Procedure of Installation



3.2 Processor Installation

3.2.1 Setting condition

Please install Processor avoiding situations where ;

- May be subjected to direct sunlight, such as outdoors.
- Operating temperature exceeds 0..55 degree C.
- Dew condensation caused by severe tempareture change.
- Relative humidity exceeds 35...85%RH.
- Processor is exposed to heavy corrosive gas, combustible gas, or dust.
- Shock or vibration directly to Processor.
- Water, oil or chemical is sprayed on the Processor.

Although this product suits EMC instructions and CE mark is displayed, I am doing the examination in the state of the installation in an operator control panel like the Sequencer.

<Note>

Please install Processor in board with particular attention to following points.

- Well ventilated space.

- Processor should not be installed close to devices which generates high heat, such as a heater, transformer or High capacity resistor.

- The surface temperature of Processor may become more than 55 deg.C. by self-fever.

Some measure to install a fan or a heat exchanger should be taken so that the board inside keeps under 55 deg.C.

- Please remove the dustproof label, after all wiring is completed.

3.2.2 Processor fixation

This Processor should be installed in a Mitsubishi basic base unit or an additional unit by Mitsubishi. Please refer to "1.4 Components and Applicable Unit" for available base unit.

When installing, please take in consideration the current capacity of the power supply, as well as the voltage drop of additional cable. For details, please refer to the Sequencer CPU user manual.



3.3 Wiring

① Wiring of FG and an external power(24VDC)

Install wiring by following the steps below

- \cdot Connect [+] of 24V DC to terminal indicated [24V DC], [-] to terminal indicated [OV].
- · Connect to terminal indicated [FG], and wire to the same point of Frame Ground of Sequencer CPU unit.



② Read/Write head

Wire Read/Write head to connecting terminal for Read/Write head with reference to [Wiring diagram] below. To connect 2 Read/Write heads, there are terminals for CH1/CH2 and Read/Write heads are connectable to each terminal.

[Wiring diagram] Wiring of Read/Write head with cable





<Note for wiring>

- Read/Write head Cable should be kept apart from power cable or high voltage unit.

- When Read/Write head is installed on unit which has metal housing, make the unit to D-class grounding.

-This product is in conformity with EMC directive and indicated CE marking.

Appropriate measures should be taken to avoid excessive surges when the cable length to the power unit is longer than 10m.

3.4 Setting of Switches ([GX Developer])

Switch settings set the parameters of the Processor with [GX Developer]. The switch assignments are written to the Processor from CPU unit when the Sequencer of CPU unit is started-up or reset.



!! Refer to user's manual of CPU unit about detail of setting.

Switch 1:Bank function

O=Valid (Maximum avaiable memory 688 bytes:344 words) 1=Invalid (Available all the usable area of Data carrier)

POINT

Only Z1 - xxx - 02K (tag capacity 2000 bytes) can activate the bank function. Bank function can not be used with Z1 - xxx - 128. For Z1 - xxx - 128, switch 1 must be set to "1 = Bank function invalid". When Bank function is enabled, ID tag communication error (Error code ** 14H) when reading or writing.

4.1 Communication Function

The following features can be performed through the ID interface unit.

Function	Instruction	Dedicated	Instruction	Descriptions	Page
		instruction *1	code		
Initial setting	Initial setting			Initial setting of ID interface unit	P.27
Reading	Reading Continuous reading	IDRD 🗌		Reading the data from the Data carrier Read/Write head continuously performs reading until the Data carrier is in its communication range, and after the Data carrier is in the communication range, it will read out the data from Data carrier.	
	Comparison reading			Read the data from Data carrier and compare the data.	P.28
	Continuous & comparison reading	IDSRD 🗆		Read/Write head continuously performs reading until the Data carrier is in its communication range, and after the Data carrier is in the communication range, it will read out the data from Data carrier and then compare the data.	
	Writing	IDWD 🗌		Writing the data to the Data carrier	
	Continuous writing			Read/Write head continuously performs writing until the Data carrier is in its communication range, and after the Data carrier is in the communication range, it will write the data to Data carrier.	
Writing	Comparison writing			Write the data to Data carrier and compare the data.	P.31
	Continuous & comparison writing	IDSWD 🗆		Read/Write head continuously performs writing until the Data carrier is in its communication range, and after the Data carrier is in the communication range, it will write the data to Data carrier and then compare the data.	
	Writing at the sametime	IDFILL 🗌		Write the specified data into the specified area of Data carrier at the same time.	
Checking	Comparison			Compare the Processor data to the Data carrier data.	P.36
Сору	Data copy	IDCOPY 🗌		Copy the Data carrier data between CH1 and CH2.	P.38
Delete	Clear	IDCLR 🗌		Clear the all data of Data carrier with "O".	P.40
	Count writing	IDMW		Perform data writing to Data carrier and update the number of writing.	
Life Management ^{*2}	Continuous count writing	IDLW		Read/Write head continuously performs writing until the Data carrier is in its communication range, and after the Data carrier is in the communication range, it will write the data to Data carrier and then update the number of writing.	P.42
	Batch update of the number of writing	IDMD		Adding the number of optional writing	

4. Communicating Function



	Reading the write protect	 RP (5052H)	Reading write protect information from Data carrier.	
Write protect*2	Writing write protect	 WP (5057H)	Writing write protect information to Data carrier.	P.48
Memory setting ^{*2}	life extension bank switching	 BK (4B42H)	Setting the momory type (No of bank) in the Data carrier.	P.52
	Cancel sequential instruction	 	Forced termination of sequential instruction	
Instruction	Clear error	 	Clear error process(turn of the error LED, reset the error detection signal, clear the error code strage area of Buffer memory)	P.63

*1 : 🗌 in the dedicated instruction column indicates "1" for CH1 and "2" for CH2 (ex : IDRD1 IDRD2)

*2 : When the bank function is invalid by switch setting, BK, IDMW, IDLW, IDMD, RP and WP become unavailable.

4.2 Memory of Data carrier

Data carrier memory that can communicate with Processor are shown below.

Depending on the setting of memory type, the data capacity and data range will be changed, please refer to P.49 for details.

1) Bank function valied : Only for Z1-xxx-O2K (tag capacity 2000 bytes)



POINT

The difference between byte and word-processing, please refer to P.22. Number of write storage area is automatically allocated to each bank and when executing IDMD,IDMW,IDLW instructions it stores the count value of writing.

Points to be noted for using bank function

(1)Data carrier data is erased when you change the number of banks.

(2)Mixing the Data carrier with different number of banks may be unable to read or write data due to ifferences in their capacity.

(3)With the tag Z1 - xxx - 128, the bank function can not be used.

2) Bank function invalied

If bank function is unused, all area of Data carrier is available.

- · Z1-xxxx-128: 56 word (112 byte)
- · Z1-xxxx-02K : 1000 word (2000 byte)

< Notes >

Read / write instruction is up to 1000 words (3E8 H) to accept.

Even the instruction which exceeds the memory capacity of Data carrier of 112 byte(56 word) is issued. Processor will accept it and try to execute the instruction. In that case, within the memory of the Data carrie, reading and writing will be executed correctly, but when trying to access an address out of range, it becomes status of "Data carrier communication error"

For example, when executing writing instructions of 1000 words from the address 0 to Z1-xxxx-128 (56 words), it will write in up to 56 words and it becomes status of "Data carrier communication error"

4.3 I/O signals to Sequencer CPU

I/O signals to the Sequencer CPU when using Processor are descrived below.(n) with X or Y is specified the upper 2 digits of 3 digits (Hexadecimal), which represents first input/output number of the slot which the Processor is mounted.

CPU	16signal UNIT	32signal UNIT	Processor	
-----	------------------	------------------	-----------	--

48 signals has been used before Processor, the first I/O number will be "O3O" therefore, "Xn1" would be "X31" and "Y(n+1)4" would be "Y44"

(1) Input signal(Processor \rightarrow Sequencer CPU)

There are 32 Input signals (XnO \sim X(n+1)F, and every input signals are to be ON/OFF by the Processor.

Input s	signals CH2	Signal name	Description
			After power supplied and Sequencer CPU is reset, when Processor
			become ready, it will be ON (After Power is ON, it becomes ON in
Xı	nO	UNIT READY	seconds)
			When Processor failes for continuous operation or DC24V LED turns
			off, in such error happens, it become OFF.
١X	าไ		not use
Vn2	ΧnΛ		During continuous instruction execution(IDARD,IDSRD,IDAWD,IDSW
		INZUNE CUNTACT	D,IDLW,IDCOPY), when it detects INZONE it becomes ON.
			When ID instruction is in execution, it becomes On and after it is
ХnЗ	XnB	ID-BUSY	completed, it becomes OFF.
			At the error, it keep ON status until error cancellation is executed
			After $Y(n+1)4/Y(n+1)C,Y(n+1)5/Y(n+1)D$ becomes ON, then when
Vp4	VnC	ID Instruction	ID instruction execution is completed, it becomes ON.
A114		completed*1	At the error, it will not become ON and error detection signal
			(Xn5,XnD) becomes ON in stead.
VaE		Error dotoction	ON by error and Off by error cancellation(Y(n+1)1)
CIIX		Enor detection	Without of error cancelation, dedicated instruction will not work
Xn6 -	~ Xn9		
$XnE \sim 2$	X(n+1)F		

*1 During using dedicated instruction, it will not ON/OFF

POINT

 Please don't use the unavailable devices as they are used by the system, and in case if used, apolopriate operation of the device can not be guaranteed
 During using dedicated instruction,

do not use CH.1 Xn2, Xn3, Xn4/CH.2 XnA, XnB, XnC at interlock.

(2) Output signal(Sequencer CPU \rightarrow Processor)

There are 32 Onput signals YnO to Y(n+1)F, and every onput signals is to be ON/OFF by the sequence program.

Output	signal	Signal name	Description
Yn0 ~	0 <u>H∠</u> ~ YnF		not use
Y(n+1)0	Y(n+1)8		
			not use
Y(n+1)3	Y(n+1)B		
Y(n+1)1	Y(n+1)9	Error cancellation*1	By making it ON at the error, it cancels the error
V(n±1)2	$V(n \perp 1) \Lambda$	Stop continuous	By turning ON during continuous instruction (IDARD,IDSRD,IDAWD,IDSW
1(11+1)2	T (IIT I)A	instruction*1	D,IDLW,IDCOPY) execution, it stops the continuous instruction.
$V(n\pm 1)/$	V(n+1)C	Require ID instruction	ON by sequence program, it will execute present ID instruction
1 (1111)4	1(111)0	execusion*2	
Y(n+1)5	Y(n+1)D	Require special instruction execusion *2	During dedicated instruction, it is invalied. ON by sequence program, it will execute special instruction(RP,WP,BK). Require ID instruction execusion (Y(n+1)4/Y(n+1)C) Require special instruction execusion (Y(n+1)5/Y(n+1)D) ID-BUSY (Xn3/XnB) ID instruction completed (Xn4/Xnc)
Y(n+1)6 Y(n+1)7	Y(n+1)E Y(n+1)F		not use

*1 Only available during using dedicated instruction *2 Invalied during using dedicated instruction

POINT

Please don't use the unavailable devices as they are used by the system, and in case if used, apolopriate operation of the device can not be guaranteed

4.4 Data processing time

Data processing time for Reading and writing is shown below

<2000 byte / Data carrier> (FRAM)					
Data \	/olumo	Processing time ⁽¹⁾			
	olume	Reading	Writing		
1 word	2 byte	0.1 sec.	0.4 sec.		
32 word	64 byte	0.2 sec.	0.8 sec.		
250 word	500 byte	1.3 sec.	2.9 sec.		
500 word	1000 byte	2.7 sec.	5.7 sec.		
750 word	1500 byte	3.9 sec.	8.4 sec.		
1000 word	2000 byte	5.0 sec.	11.2 sec.		

<112 byte / Data carrier> (icode-sli EEPROM)

Deta Valuma		Processing time ⁽¹⁾		
Data	volume	Reading	Writing	
1 word	2 byte	0.2 sec.	0.2 sec.	
32 word	64 byte	0.2 sec.	0.6 sec.	
56 word	112 byte	0.3 sec.	0.8 sec.	

(1)Processing time is the time to complete the ID instruction on the ladder when each No. of data were processed continuously.

(eg.)RD instruction



4.5 Buffer memory

Buffer memory is a area to store the read/write data of Data carrier as well as store the control information to perform the data exchange between Data carrier and Sequencer CPU.

From the sequence program, the Buffer memory can be accessed with MOV instruction. Also the contents of the Buffer memory will be returned to default value by powered off and Sequencer CPU reset.

4.5.1 Buffer memory list

Buffer memory is consisted as 1 address 16 bits (one word) and is not battery backuped. Therefore, please store the error code to Sequencer CPU file register as needed.

Address						1	
CH.1	CH.2			Initial		Dama	
Intelligent function	Intelligent function	Buffer memory address name			value	R/W ″I	Page
Unit device	Unit device						
Un ¥GO	Un ¥G4000	Instruction code sp	becify area	*2,*3	4452H	R/W	P.20
Un ¥G1	Un ¥G4001	Initial address spec	cify area	*2,*3	0	R/W	P.24
Un ¥G2	Un ¥G4002	Number of process	ing specify area	*2	1	R/W	P.24
Un ¥G3	Un ¥G4003	Continuous instru interval specify are (Every 100ms)	uction execution a	*2	0	R/W	P.20
Un ¥G4	Un ¥G4004	Matchied data resu	ult storage area	*2	0	R/W	P.21
Un ¥G5	Un ¥G4005	Mismatched data area	a result storage	*2	0	R/W	P.21
Un ¥G6	Un ¥G4006	Lifetime determi writing specify area (10000times/unit)	nation value of a		10	R/W	P.42
Un ¥G7	Un ¥G4007	Writing life deter storage area	rmination result	*2	0	R/W	P.42
Un ¥G8	Un ¥G4008	Number of retries s	specified area	*3,*4	3	R/W	P.25
Un ¥G9		Processing unit sp	ecify area	*3,*4	0	R/W	P.25
	Un ¥G4010	Data copy direction	n specify area	*2,*3	12	R/W	P.25
Un ¥G11	Un ¥G4011	Inzone detection tir (Every 10ms)	me specify area	*3,*4	0	R/W	P.26
Un ¥G12	Un ¥G4012	Error LED status storage area		0	R	P.21	
Un ¥G13	Un ¥G4013	Not use			İ		
Un ¥G14	Un ¥G4014	Latest error code s	storage area		0	R	P.21
Un ¥G15	Un ¥G4015	Error history 1			0	R	
Un ¥G16	Un ¥G4016	Error history 2	Error history		0	R	
Un ¥G17	Un ¥G4017	Error history 3	Storage area		0	R	P.21
Un ¥G18	Un ¥G4018	Error history 4			0	R	
	Un ¥G4019 \sim Un	Notuse	•				
	¥G4021	Not use					
Un ¥G22	Un ¥G4022	Write count storage area(lower 16bit)		0	R	P.25	
Un ¥G23	Un ¥G4023	Write count storage area(Upper16bit)		0	R	P.25	
	Un ¥G4024 \sim Un	Netwoo					
011 ¥ G24 ~ 011 ¥ G25	¥G4025	Not use					
Un ¥G26	Un ¥G4026	Number of writing additional value specify area (MD dedicated instruction)		1	R/W	P.25	
	Un ¥G4027~Un						
Un ¥G27 ~ Un ¥G31 ¥G4031		Not use					
Un ¥G27~Un ¥G31	Un ¥G4032	Write protect setting	g area		0	R/W	P.48
Un ¥G33	Un ¥G4033	Write protect start area	page address sp	ecified	0	R/W	P.48
Un ¥G34	Un ¥G4034	Write protect finis area	h page address s	pecify	0	R/W	P.48

*1 Indicates whether it is possible to reading / writing from the sequence program. R:Readable W:Writable

- *2 Settings will be retained after execution, in order to prevent malfunctions, please initialize the necessary items by TOP instruction.
- *3 When using a dedicated instruction, setting to Buffer memory is automatically performed by the Processor. (When ID instruction abend, it will not be set)
- *4 After power is ON, or after resetting the Sequencer CPU, only until the first ID instruction execution request or special instruction execution request becomes ON, it can be changed.

4. Communicating Function



Address					
CH.1	CH.2		Initial		
Intelligent function	Intelligent function	Buπer memory address	value		Page
Unit device	Unit device				
	Un ¥G4035∼Un	Netwoo			
011 #635 ~ 011 #639	¥G4039				
Un ¥G40	Un ¥G4040	Memory type storage area	0	R/W	P.52
Un ¥G41	Un ¥G4041	Memory type storage area	0	R	P.54
	Un ¥G4042 \sim Un	Netwo			
01 ¥642 ~ 01 ¥699	¥G4099	INOL USE			
Un ¥G100 ~ Un Un ¥G4100 ~ U		Data atomas area $(1000word)$ * ²	Indefinite		
¥G1099	¥G5099		Indefinite	R/W	

*1 Indicates whether it is possible to reading / writing from the sequence program.

R:Readable W:Writable

*2 When using a dedicated instruction, setting to Buffer memory is automatically performed by the Processor. (When ID instruction abend, it will not be set)

POINT

(1)Buffer memory as shown A-series for Z4-Q002, it When using the dedicate automatically unless you the sequence program.	in this section, when diverting the sequence program for the will access FROM/TO instruction. ed instruction, access to the Buffer memory is done is specify particularly, there is no need to access directly from
(2)In specific use of the bu	ffer area of memory, by setting a predetermined value,
communication condition	or processing unit with Data carrier can be selected.
Since the default value h	has been preset, unit can be operate without setting.
(3)Unavailable Buffer memo	bry is used by the system, therefore please do not use it by
user. In case if it is used	d, normal operation is not guaranteed.
(4)Un¥G □ is an inteligent	function unit devices. This devices directly accesses from
QCPU the Buffer memory	/ of Inteligent function unit and special function unit which
are mounted to base uni	t and expansion base.
To specify : U 🗌 ¥G 🗌	 Buffer memory address (Setting range : 0 ~ 16383 decimally) I/O number of Intelligent function unit/special function unit Setting : Upper 2 digits of when I / O output number are expressed in three digits
	In case of X/YF0 ······ <u>X/Y1F0</u> LSpecify : 1F • Setting range : 00H ~ FEH

4.5.2 Buffer memory details

(1) Instruction code specify area (Address CH.1 Un¥G0/ CH.2 Un¥G4000), it specify the instruction to Data carrier.

When dedicated instruction is in execution, executed instruction code will be stored along with successful completion of the instruction.

Initial value : 4452H

[Example] When specify the write protect reading instruction(RP) Exchange the high and low bytes of the instruction to be set, then convert it to the ASCII code and store it.



(2) Continuous instruction execution interval specify area (Address CH.1 Un¥G3/CH.2 Un¥G4003) It specify the interval of Instruction execution of continuous instruction per 100ms.

Specified range : 0 \sim 32767(Oms \sim 327670Oms) Initial value : 0





(3) Matched data result storage area(Adress CH.1) Un ¥G4 / CH.2) Un ¥G4004) After comparison instruction (IDCRD,IDSRD,IDCWD,IDSWD,IDCM) has executed, it will store the result only when data matched

Initial value : 0

Point

Match result will remain stored unless it will be reset by sequence program. Before re-running the comparison instruction, write "O" to the matched data result storage area and clear it.

(4) Mismatched data result storage area(Adress CH.1 Un ¥G5 / CH.2 Un ¥G4005) After comparison instruction (IDCRD,IDSRD,IDCWD,IDSWD,IDCM) has executed, it will store the result only when data mismatched

Initial value : 0

Point
Mismatch result will remain stored unless it will be reset by sequence
program.
Before re-running the comparison instruction, write "O" to the mismatched
data result storage area and clear it.

(5) Error LED status storage area(Address CH.1) Un ¥G12 / CH.2 Un ¥G4012) Information of Error LED will be stored by Processor OS "O" in normal operation, "1" in error will be stored

Initial value : KO



(6) Latest error code storage area(Address CH.1) Un ¥G14 / CH.2 Un ¥G40014)

When error happens, the latest error code will be stored. Please refer P.64 for error code After error cancel instruction(refer to P.63) is executed, the latest error code will be "O" cleared as well as it will be sequentially stored shifting to the error history storage area.

[Example] In CH1, when error happens while reading(IDRD) instruction is in execution, and also error happens while writing(IDWD) instruction is in execution.



(7) Error code history storage area(Address $\underline{CH.1}$ Un \pm G15 ~ Un \pm G18 / $\underline{CH.2}$ Un \pm G40015 ~ Un \pm G40018) 4 error codes, which were occured in the past will be stored. Please refer to P.64 for error code



5.1 Communication with Data carrier

5.1.1 System connection and handling data

ID system reads and writes the memory data of PC and Sequencer device to Data carrier. Also, when communicating with the Data carrier, either one of byte (8 bits) or word(16 bits 2 bytes) can be used as the data processing unit. However, to ensure data compatibility, if there are Sequencer and PC are mixed in upper system, integrate the processing unit to either one of word unit or byte unit and use it.

5.1.2 Data structure (Unit processing)

In the data processing of ID system, there are word unit processing and byte unit processing, however, default data structure of ID system is word unit. When using system with byte unit, set the "1" into the process unit specified divice of controle data by initial setting instruction(IDINIT \Box).

Point

Byte unit processing has a special data structure and therefore, writing data and reading data are different. This manual is written in word unit processing and when using ID system, it is recommended to use it by word unit processing.

(1) Data flow by word unit



(2) Data flow by byte unit





5.1.3 Notes at the time of Programming

Indicates precautions that should be known before creating the program, which to communicate with the Data carrier by the Processor.

(1) About the execution instruction on each channel

It is not possible to execute multiple instructions simultaneously in one channel. Please take the interlock with the program to not run more than one instruction per channel. It is possible to execute instruction simultaneously to CH1 & CH2 on Z4-Q002. In addition, please do not exist more than one Data carrier in the communication area of Read/Write head of each channel.

(2) The default of Buffer memory

If it needs to change the default value of the Buffer memory specific use area to communicate with the Data carrier, sequence program needed to be built-in.

(3) About the data retention status of Data carrier at the error.

If an error occurs while communicating with the Data carrier, data will be overwritten by mixed of new data and original data in 8 word unit.

As a countermeasure, if an error occurs during writing instruction execution (IDWD \Box , IDCWD \Box , IDAWD \Box , IDSWD \Box , IDFILL \Box , IDMW, IDLW, WP, IDCOPY \Box , BK, IDMD), please run the instruction execution again after the error cancel Instruction.

[When using dedicated instruction]

- (4) About changing the data that is specified in the dedicated instruction When executing dedicated instruction, please don't change the each data(device data or related data of the Buffer memory specific use area), which dedicated instruction specifies.
- (5) About the multiple execution of the dedicated instruction

Please do not run multiple instructions simultaneously in one channel. If run the multiple dedicated instructions, or run the same dedicated instructions repeatedly, please execute the next dedicated instruction by the ON of the completed device.

(6) About the execution format of the dedicated instruction Dedicated instruction must be executed with GP.****, and do not executed with always running G.****.

[When using RP/WP/BK instruction]

- (7) About the insertion of the handshaking signals Please be sure to insert the handshake signals with the Sequencer CPU to the program.
- (8) About the Buffer memory backup The Buffer memory is not battery back-up. When it is powered or CPU is reset, all the data which were rewritten beforehand is returned to default values. Each time, setting and changing data needs to be written.
- (9) About the ON/OFF of the Error cancel contact, stop continuous instruction contact When executing the RP, WP, BK instruction, please do not turn ON/OFF the "error cancel Instruction(CH.1) Y(n+1)1/CH.2)Y(n+1)9)" or the "stop continuous instruction Instruction(CH.1) Y(n+1)2/CH.2)Y(n+1)A)", which are used with dedicated instruction.

5.2 About the dedicated instruction

Dedicated instruction is the instruction to facilitate the programming, which to use the features of the intelligent function module. Processor simplifies the sequence program by the dedicated instruction. For programming, please use the dedicated instruction.

Point

- (1)When executing the dedicated instruction, please do not change the each data(device data, data in specific use area of related Buffer memory), which specified by its dedicated instruction
- (2)When executing the dedicated instruction, please do not ON/OFF the execution request contact (Y(n+1)4, Y(n+1)5, Y(n+1)C, Y(n+1)D), which is used with FROM/TO instruction.
- (3) If the dedicated instruction is executed under the following conditions, dedicated instruction does not work. Completed device will also not turn ON.
 - ① When dedicated instruction is executed to the channel where the dedicated instruction is in execution(dedicated instruction, FROM/TO instruction)
 - 0 When dedicated instruction is executed to the channel where the status is error (Xn5/XnD is ON status)

(4) Please do not run multiple instructions simultaneously in one channel. If run the multiple dedicated instructions, or run the same dedicated instructions repeatedly, please execute the next dedicated instruction by the ON of the completed device.

- (5) Dedicated instruction must be executed with GP.****, and do not executed with always running G.****.
- (6) While executing the dedicated instruction, please do not perform RUN → STOP operation of Sequencer CPU.

5.2.1 Details of setting data

Describes the setting data, which is used with dedicated instruction.

(1) Reading/writing first address(specified by reading/writing instruction)

It specifies the first address of Data carrier by word unit, and it is not Buffer memory address. By the type of instruction which is executed, the area of the first address is different. If the setting is out of range, it will be "setting address error ".

Specify processing units	First address area
Word unit(Default)	К0 ~ К999
Byte unit	K0 ~ K1999

Also, when the instruction execution completed, the specified data is stored to the next area. Buffer memory specified use address : CH.1 Un¥G1 CH.2 Un¥G4001

(2) Number of reading/writing word (Number of data)(specified byreading/writing instruction)

It specifies the number of the word(if specified by byte, numuber of byte), which read/wirte to Data carrier by word unit.

By the type of instruction which is executed, the area of the number of word(number of byte) is different. If the setting is out of range, it will be "setting number of word error" or "OPERATION ERROR" of the Sequencer CPU.

Specify processing units	First address area		
Word unit(Default)	К0 ~ К1000		
Byte unit	К0 ~ К2000		

Also, when the instruction execution completed, the specified data is stored to the next area. Buffer memory specified use address : CH.1]Un¥G2CH.2]Un¥G4002



(3) Specify the direction of the copy instruction (During executing the copy instruction, the contents will be reflected)

When copy instruction (IDCOPY \Box) is in execution, it will set the direction of the copy.

Specify direction of the copy	Setting area
From CH.1 to CH.2(Default)	K12
From CH.2 to CH.1	K21

If an invalid setting, it will work at the default value (K12).

Also, when the instruction execution completed, the specified data is stored to the next area.

Buffer memory specified use address :	CH.1	CH.2	Un¥G4010
---------------------------------------	------	------	----------

(4) Store the value of the number of writing(During executing the life management instruction, the contents will be reflected)

During the IDMD / IDLW instruction execution, it will write to the device, which specifies the value of number of writing of communicated Data carrier with 2 words unit.

Setting	Setting area
The value of the number of	K0 ~ K2147483647
writing	(H0 \sim HFFFFFFF)

Also, when the instruction execution completed, the specified data is stored to the next area. Buffer memory specified use address : CH.1 Un¥G22,Un¥G23CH.2 Un¥G4022,Un¥G4023

(5)Number of writing additional value specify area(Specified with batch update of the number of writing instruction)

During the batch update of the number of writing instruction (IDMD) execution, it will set the number of writing.

Setting	First address area
Number of writing additional	К0 ~ К32767
value	(When K0 is specified, it won't update the number of writing, it reads current value of the number of writing and life determination)

If an invalid setting, it will work at the default value(K1)

Also, when the instruction execution completed, the specified data is stored to the next area. Buffer memory specified use address : CH.1 Un¥G26 CH.2 Un¥G40026

(6) Setting the Number of retry (Specified with Initial setting instruction)

If an error occurs during data communication, it sets the number of retry of the Processor

Setting	Setting area		
Number of retry	K0 ~ K32767		

Also, when the instruction execution completed, the specified data is stored to the next area. Buffer memory specified use address : CH.1 Un¥G8 CH.2 Un¥G4008



(7)Specify processing units(Specified with Initial setting instruction)

Default value is word unit. Specified at the initial setting instruction, upper 8 bit data of Sequencer device per 1 word will be ignored, and it will read/write to Data carrier the 1 byte from the lower 8 bit as a valid data.

Specify processing units	Setting value
Word unit(Default)	КО
Byte unit	K1

If an invalid setting, it will work at the default value(KO)

Point
(1) Buffer memory cannot be handled by 1 byte. Please note that address and
data of the Buffer memory is word unit.
(2) Data carrier won't record the identification of byte/word, therefore, please
manage it in the sequence program.
(3) When the processing unit is specified, CH1 &CH2 will become same setting.

Also, when the instruction execution completed, the specified data is stored to the next area. Buffer memory specified use address : CH.1 CH.2 Un¥G9

(8) INZONE detection time (Specified with Initial setting instruction, and used in contiunous instruction) INZONE detection time is a standby time, and it is the time after Data carrier comes into communication area and until starts the in-zone detection(start communication), while continuous instruction is in execution.

OUT-ZONE detection time is a standby time, and it is the time after Data carrier gets out from communication area and until finishes the out-zone detection(finish communication), while continuous instruction is in execution.

(OUT ZONE detection time and INZONE detection time are the same setting)



If an invalid setting, it will work at the default value(KO).

In zone detection time is set during initial setting instruction. Setting time can be set from Oms to 32767ms at the interval of 10ms. In zone detection time for CH.1 and CH.2 can be set separately.

Also, when the instruction execution completed, the specified data is stored to the next area. Buffer memory specified use address : CH.1 Un ¥G11 CH.2 Un¥G4011



5.3 Initial setting(IDINIT \Box)

When performing data communication with the Data carrier other than the default, please make sure to write the next Buffer memory area.

		Available device							
Setting data	Inside (Systen	device 1, User)	file	MELSECNET/10(H) Direct J		Special unit	Index register	Constant	Others
	bit	Word	register	bit	word	U L + G L	211		
(S)		0			iiii				



Setting data

Setting data	Description	Setting side	Data format
Un	First I/O signal number of the unit $(00 \sim FE : The upper 2 digits of 3 digits, when it describes the I/O signals by 3 digits.)$	User	BIN16bit
(S)	First number of device which stores controle data	User	Device name

File register for each program unit and the local device can not be used as a setting data.

Controle data

Device	Item	Setting data	Setting are	Setting side	Page
(S)+0	Specify the No.	Setting the number of retry	$0 \sim 32767$	User	P25
(3)10	of retry				5.2.1(6)
(S)+1	Specify processing units	Setting the data processing unit 0 : Word unit 1 : Byte unit	0,1	User	P26 5.2.1(7)
(S)+2	Specify INZONE detection time	Set the INZONE detection time $0 \sim 327670$ ms (10ms unit)	0~32767	User	P26 5.2.1(8)

Function

(1) Writing the initial data to the unit specified by the "Un", in accordance with the initial setting data which is later than the device which is specified by (S).

(2) IDINIT1 instruction is executed for the channel 1 of the Processor, IDINIT2 instruction is executed for channel 2 of the Processor.

Programming Example

In zone detection time ······· 10ms



Point

(1)Writing to the initial setting of Buffer memory, please perform only once at the rising of the Processor.

(2)The initial setting is effective until the first instruction is executed and after the instruction, even if contents of initial setting is changed, it will be ignored. To change the initial setting, it needed to CPU reset.

(3)The setting of the processing unit should be in common in channels 1 and 2. If the setting is different, the value which set later will be valid.

5.4 Data reading instruction (IDRD \Box /IDARD \Box /IDCRD \Box /IDSRD \Box)

Descrive the instruction to read the data from Data carrier.

Instruction	Description
Reading instruction	Ctore the data which read from the Data corrier into Coguenear device
(IDRD1/IDRD2)	Store the data which read from the Data camer into Sequencer device.
Continuous reading	Continuously performs reading until the Data carrier is in its communication range,
instruction	and after the Data carrier is in the communication range, it will read out the data
(IDARD1/IDARD2)	from Data carrier and store the data into sequence device.
Comparison reading	Road the data from Data carrier and compare the data and store the data into
instruction (IDCRD1/IDCRD2)	sequence device
Continuous & comparison reading instruction (IDSRD1/IDSRD2)	Read/Write head continuously performs comparison and reading until the Data carrier is in its communication range When the Data carrier is in the communication range, it reads the data from the Data carrier and compare it, and then it will be stored to Sequencer device.

		Available devices							
Setting data	Inside (Syster	device n,User)	File	MELSEC Direct	NET/10(H) ∶J□¥□	Special unit	Indexregister Zn	Constant	Others
	bit	word		bit	word				
nl	0		0				K,H		
(D1)			0						
n2			0				K,H		
(D2)	0		0						

[Instruction symbols]	[Execution condition]	
IDRD1,IDRD2 IDARD1,IDARD2 IDCRD1,IDCRD2 IDSRD1,IDSRD2	GP. Instruction Un n1 (D1) n2 (D2)	

Setting data

				· · · · · · · · · · · · · · · · · · ·
Setting data	Description	Setting side	Data format	Page
Un	First I/O signal number of the unit $(OO \sim FE$: The upper 2 digits of 3 digits, when it describes the I/O signals by 3 digits.)	User	BIN16 bit	
nl	First address of Data carrier	User	BIN16 bit	P24 / 5.2.1(1)
(D1)	First number of the device, which stores the data which read out from Data carrier	System	Device name	
n2 Number of data read from the Data carrier		User	BIN16 bit	P24 / 5.2.1(2)
(D2)	The bit device number to be turned ON with the execution completed. When the abnormal completion, (D2) +1 also to be ON	System	bit	

File register for each program unit and the local device can not be used as a setting data.

Function

- (1) Through the unit specified by the "Un", read the number of data specified in the "n2" from the address that is specified by "n1" of the Data carrier and then stored it to later than the device which specified by (D1).
- (2) IDRD1/IDARD1/IDCRD1/IDSRD1 instruction is executed on Channel 1 of the unit, and IDRD2/IDARD2/ IDCRD2/IDSRC2 instruction is executed on Channel 2 of the unit.
- (3) In comparison reading instruction or continuous comparison reading instruction, it read the data again from Data carrier and compares it to the data which has already been read and then store it. If the comparison result is mismatched, it will be abnormal completion
- (4) In continuous reading instruction or continuous comparison reading instruction, if Data carrier is not in the communication range of Read/Write head, it waits the Data carrier until it comes into the communication range, and once the Data carrier comes in to the communication range, it reads out the data from the data carrier.
- (5) In continuous reading instruction or quit the continuous comparison reading instruction executes the quit continuous instruction Instruction.
- (6) When reading is completed, while END instruction of the instruction completed scan is in execution, it turns ON the bit device which specified in (D2) and turns it OFF automatically after 1 scan. When the abnormal completion, completion status display device (D2) +1 also to be ON.

Error

- (1) When error, which detected by the Processor occurs, it performs the action below.
 - ① Error contact(CH.1 Xn5/CH.2 XnD) tunrs ON.
 - (For canceling the error contact, use the error cancel Instruction)
 - ② Completion status display device (D2) +1 will turn the 1 scan ON.
 - ③ Error code will be stored to the Buffer memory CH.1 Un¥G14/CH.2 Un¥G4014.

Programming Example

- (1) Programming Example
 - The programming example of the next condition is shown as follows InstructionCH.1 Reading instruction(IDRD1) ID interface first I/O output numberOO Data carrier reading start addressK100 No. of reading wordK5
 - Reading data storage location $\cdots D100 \sim D104$
 - Error code storage location ······RO



(2) Operation timing

Operation timing is shown below



Point

(1)While reading instruction is in execution, if Data carrier doesn't exist, it executes the instruction of the number of retry and become error.
(2)When continuous reading instruction(IDARD //IDSRD) is executed, it continuously performs reading until the Data carrier come into communication area
If Data carrier doesn't come into communication area, it executes instructions permanently. To stop execution, please execute the quit the continuous instruction Instruction .

5.5 Data writing instruction

5.6.1 Data writing insturction(IDWD \Box /IDAWD \Box /IDCWD \Box /IDSWD \Box)

Descrive the instruction to write the data from Data carrier.

Instruction	Description
Writing instruction (IDWD1/IDWD2)	Write the data, which stored in Sequencer device to Data carrier
Continuous writing instruction (IDAWD1/IDAWD2)	Read/Write head continuously performs writing until the Data carrier is in its communication range. Once cata carrier is in the communication range, it will write the data, which stored in Sequencer device to Data carrier.
Comparison writing instruction (IDCWD1/IDCWD2)	After write the data, which stored in Sequencer device to Data carrier, it compares the Data carrier data with the Sequencer device.
Continuous & comparison writing instruction (IDSWD1/IDSWD2)	Read/Write head continuously performs comparison writing until the Data carrier is in its communication range. When the Data carrier is in the communication range, it writes and compares the data and stores it to Sequencer device.

	Available devices									
Setting data	Inside (Syster	device m,User)	File	MELSEC Direct	NET/10(H) :J□¥□	Special unit	Indexregister Zn	Constant	Others	
	bit	word	100,000	bit	word					
nl		(\supset					K,H		
(D1)		()							
n2		()					K,H		
(D2)	0	()							



Setting data

Setting data	Description	Setting side	Data format	Page
Un	First I/O signal number of the unit $(OO \sim FE$: The upper 2 digits of 3 digits, when it describes the I/O signals by 3 digits.)	User	BIN16 bit	
nl	First address of Data carrier	User	BIN16 bit	P24 / 5.2.1(1)
(S)	First number of the device, which stores the data which write to Data carrier	User	Device name	
n2	Number of data read from the Data carrier	User	BIN16 bit	P24 / 5.2.1(2)
(D)	The bit device number to be turned ON with the execution completed. When the abnormal completion, (D)+1 also to be ON	System	bit	

File register for each program unit and the local device can not be used as a setting data.

Function

(1) Through the unit specified by the "Un", write the n2 signals of data from the specified address with (S) to later than the address specified in the Data carrier n1.

(2) IDWD1/IDAWD1/IDCWD1/IDSWD1 instruction is executed on Channel 1 of the unit, and IDWD2/IDAWD2/ IDCWD2/IDSWD2 instruction is executed on Channel 2 of the unit.

(3) In comparison writing instruction or continuous comparison writing instruction, it reads the data after the data was written and then compares it to the data which has already been written. If the comparison result is mismatched, it will be abnormal completion.

(4) In continuous writing instruction or continuous comparison writing instruction, if Data carrier is not in the communication range of Read/Write head, it waits the Data carrier until it comes into the communication range, and once the Data carrier comes in to the communication range, it writes the data to the Data carrier.

(5) In continuous writing instruction or quit the continuous comparison writing instruction executes the quit continuous instruction Instruction.

(6) When writing is completed, while END instruction of the instruction completed scan is in execution, it turns ON the bit device which specified in (D) and turns it OFF automatically after 1 scan.

When the abnormal completion, completion status display device (D) + 1 also to be ON.

(7) Only 1 word (when the processing unit is byte, 1 byte) in the writing area falls under the write protect setting area, it will be write protect error and it can not be written even for non-protected area.

Error

(1) When error, which detected by the Processor occurs, it performs the action below.

- ① Error contact(CH.1 Xn5/ CH.2 XnD) tunrs ON.
- (For canceling the error contact, use the error cancel Instruction)
- ② Completion status display device (D) +1 will turn the 1 scan ON.
- ③ Error code will be stored to the Buffer memory CH.1 Un¥G14/CH.2 Un¥G4014.

Programming Example

(1) Programming Example

The programming example of the next condition is shown as follows Instruction ······· CH.1 Writing instruction(IDWD1) ID Processor first I/O output number ··OO Data carrier writing start address ······ K100 No. of writing word ······· K5 Writing data storage location ······ D100 ~ D104 Error code storage location ······ R0

L	External signals in	Extremal nterlock signals					—[SET	M1] Start
_	M1 [—[MOVP	H3130	D100	Set the writing data
						[MOVP	H3332	D101	3
						—[MOVP	H3534	D102	3
						—[MOVP	H3736	D103	Э
						—[MOVP	H3938	D104	£
			[GP. IDWD1	UO	K100	D100	К5	M100] IDWD1 instruction execution
		M100 M101					[SET	M51	Set normal completion signal(M51)
							[rst	M1] Completion
		M101				—[MOVP	U0¥ G14	RO	When normal completion, store the error code to R0

(2) Operation timing

Operation timing is shown below



To stop execution, please execute the quit the continuous instruction Instruction .

5.5.2 Data writing at once instrucion(IDFILL \square)

Describe the instruction to read the data from Data carrier at once.

Instruction	Description
Data writing at once	By the specified data of 1 word, it will clear the data of the number of processing
instrucion	from the specified address.
(IDFILL 1/IDFILL2)	When zero clear the all data, use the clear instruction (IDCLR1/IDCLR2).

	Available devices								
Setting	Inside	device	Filo	MELSE	CNET/10(H)	Special unit	Indovrogistor		
data	(Syster	n,User)	register	Direc	ctJ□¥□		7n	Constant	Others
	bit	word	10610101	bit	word		211		
nl		(\supset					K,H	
(S)		(\supset				-		
n2		(\supset					K,H	
(D)	0	($\overline{)}$				-		

[Instruction symbols]	[Execution condition]					
IDFILL1		-	GP.IDFILL1	Un n1	(S) n2	(D)
IDFILL2			GP.IDFILL2	Un n1	(S) n2	(D)

Setting data

Setting data	Description	Setting side	Data format	Page
Un	First I/O signal number of the unit (OO \sim FE : The upper 2 digits of 3 digits, when it describes the I/O signals by 3 digits.)	User	BIN16 bit	
nl	First address of Data carrier	User	BIN16 bit	P24 / 5.2.1(1)
(S)	First number of the device, which stores the data which write to Data carrier	User	Device name	
n2	Number of data write to the Data carrier	User	BIN16 bit	P24 / 5.2.1(2)
(D)	The bit device number to be turned ON with the execution completed. When the abnormal completion, (D)+1 also to be ON	System	bit	

File register for each program unit and the local device can not be used as a setting data.

Function

- (1) Through the unit specified by the "Un", clear the n2 signals of data from the specified address with (S) to later than the address specified in the Data carrier n1.
- (2) IDFILL1 instruction is executed on Channel 1 of the unit, and IDFILL2 instruction is executed on Channel 2 of the unit.
- (3) When writing is completed, while END instruction of the instruction completed scan is in execution, it turns ON the bit device which specified in (D) and turns it OFF automatically after 1 scan. When the abnormal completion, completion status display device (D) +1 also to be ON.
- (4) Only 1 word (when the processing unit is byte, 1 byte) in the writing area falls under the write protect setting area, it will be write protect error and it can not be written even for non-protected area.

Error

(1) When error, which detected by the Processor occurs, it performs the action below.

- ① Error contact(CH.1 Xn5/CH.2 XnD) tunrs ON.
- (For canceling the error contact, use the error cancel Instruction)

② Completion status display device (D) +1 will turn the 1 scan ON.

③ Error code will be stored to the Buffer memory CH.1 Un¥G14/CH.2 Un¥G4014.



Programming Example

(1) Programming Example

/		
	The programming example of the next	condition is shown as follows
	Instruction	CH.1 writing at the sametime(IDFILL1)
	ID interface first I/O output number	00
	Data carrier writing start address	K100
	No. of writing word	K5
	Writing data storage location	D100
	Error code storage location	RO



(2) Operation timing

Operation timing is shown below



Point

(1)While writing at the sametime(IDFILL) is in execution, if Data carrier doesn't exist, it executes the instruction of the number of retry and become error.
(2)If writing area contains the write protect setting area, it will be the write protect error. (It also can not be written even for non-protected area.)



5.6 Comparison instruction(IDCM \Box)

Describe the instruction to compare the data.

Instruction	Description
Comparison instruction	Compare the data with Data carrier and the data, which stored to the
(IDCM1/IDCM2)	Sequencer device, and returns the comparison results.

	Available devices								
Setting	Inside	device	File	MELSEC	NET/10(H)	Crocial unit	Indovragiator		
data	(Syster	n,User)	register	Direct	J□¥□		7n	Constant	Others
	bit	word	10813101	bit	word		211		
nl		()					K,H	
(S)		(\supset						
n2		(\supset					K,H	
(D)	0	()						

[Instruction symbols]	[Execution condition]			
IDCM1		 GP.IDCM1	Un n1	(S) n2 (D)
IDCM2		 GP.IDCM2	Un n1	(S) n2 (D)

Setting data

Setting data	Description	Setting side	Data format	Page
Un	First I/O signal number of the unit $(OO \sim FE$: The upper 2 digits of 3 digits, when it describes the I/O signals by 3 digits.)	User	BIN16 bit	
nl	First address of Data carrier	User	BIN16 bit	P24 / 5.2.1(1)
(S)	First number of the device, which stores the data which to be compared	User	Device name	
n2	Number of the data to be compared	User	BIN16 bit	P24 / 5.2.1(2)
(D)	The bit device number to be turned ON with the execution completed. When the abnormal completion, (D)+1 also to be ON	System	bit	

File register for each program unit and the local device can not be used as a setting data.

Function

- (1) Through the unit specified by the "Un", compare the n2 signals of data from the specified address with data carrier n1 with n2 signals of data from the specified address with (S).
- (2) IDCM1 instruction is executed on Channel 1 of the unit, and IDCM2instruction is executed on Channel 2 of the unit.
- (3)As the result of comparison, if the data mismatched, it will be abnormal completion. (However, error contact $\overline{CH.1}$ Xn5/ $\overline{CH.2}$ XnD won't be turned ON)
- (4) When comparison is completed, while END instruction of the instruction completed scan is in execution, it turns ON the bit device which specified in (D) and turns it OFF automatically after 1 scan. When the abnormal completion, completion status display device (D) +1 also to be ON.

Error

- (1) When error, which detected by the Processor occurs, it performs the action below. ① Error contact(CH.1 Xn5/ CH.2 XnD) が ON します。
 - (For canceling the error contact, use the error cancel Instruction)
 - () Completion status display device (D) + 1 will turn the 1 scan ON.
 - ③ Error code will be stored to the Buffer memory CH.1 Un¥G14/CH.2 Un¥G4014.



Programming Example

(1) Programming Example

.,	
	The programming example of the next condition is shown as follows
	Instruction
	ID interface first I/O output number00
	Data carrier compare start address K100
	No. of compare wordK5
	Compare data storage location \ldots D100 \sim D104
	Error code storage locationRO



(2) Operation timing Operation timing is shown below



(1)While comparison instruction(IDCM □) is in execution, if Data carrier doesn't exist, it executes the instruction of the number of retry and become error. (2)Before executing comparison instruction, please be sure to 0 clear the comparison result storage area of Buffer memory(CH.1) Un¥G4,Un¥G5/CH.2 Un¥G4004,Un¥G4005)



5.7 Data copy instrucion(IDCOPY \Box)

Describe the instruction to copy the data between Data carriers.

Instruction	Description
Data copy instrucion	The direct data transfer the Data carrier data between the CH.1 and CH.2
(IDCOPY1/IDCOPY2)	without a PLC device.

					Available of	devices					
Setting	etting Inside device lata (System,User)		Inside device		Inside device		MELSECNET/10(H)		Indevregister		
data				Direct J 🗆 ¥ 🗌			7n	Constant	Others		
	bit	word	IEGISTEI	bit	word		211				
nl		(C			K,H					
n2		(С					K,H			
n3		0					K,H				
(D)	0 0										

[Instruction symbols]	[Execution condition]	
IDCOPY1	⊢	GP.IDCOPY1 Un n1 n2 n3 (D)
IDCOPY2		GP.IDCOPY2 Un n1 n2 n3 (D)

Setting data

Setting data	Description	Setting side	Data format	Page
Un	First I/O signal number of the unit (00 \sim FE : The upper 2 digits of 3 digits, when it describes the I/O signals by 3 digits.)	User	BIN16 bit	
nl	First address of Data carrier of data source	User	BIN16 bit	P24 / 5.2.1(1)
n2	First address of Data carrier of data source	User	BIN16 bit	P24 / 5.2.1(1)
nЗ	Number of the data to be copied	User	BIN16 bit	P24 / 5.2.1(2)
(D)	The bit device number to be turned ON with the execution completed. When the abnormal completion, (D)+1 also to be ON	System	bit	

File register for each program unit and the local device can not be used as a setting data.

Function

- (1) Through the unit specified by the "Un", copy the n3 signals of data from the address specified with the copy to Data carrier n1 to after the address specified with Data carrier n2
- (2) IDCOPY1 instruction copy from channel 1 to channel 2 of the unit and IDCOPY2 instruction copy from channel 2 to channel 1.
- (3) When copy is completed, while END instruction of the instruction completed scan is in execution, it turns ON the bit device which specified in (D) and turns it OFF automatically after 1 scan. When the abnormal completion, completion status display device (D) +1 also to be ON.
- (4) If the number of the data specified with n3 is 0, no processing.
- (5) Only 1word (when the processing unit is byte, 1byte) in the writing area falls under the write protect setting area, it will be the write protect error and it can not be written even for non-protected area.

Error

(1) When error, which detected by the Processor occurs, it performs the action below.

- 1) Error contact(CH.1 Xn5/CH.2 XnD) tunrs ON.
- (For canceling the error contact, use the error cancel Instruction)
- O Completion status display device (D) +1 will turn the 1 scan ON.
- 3 Error code will be stored to the Buffer memory CH.1 Un¥G14/CH.2 Un¥G4014.



Programming Example

(1) Programming Example

/		
	The programming example of the next condition is sh	nown as follows
	Instruction CH.	$1 \rightarrow CH.2$ Data copy instruction(IDCOPY1)
	ID interface first I/O output number	
	Data source Data carrier reading start address . K10	00
	Data carrier carrier writing start address to copy K20	00
	No. of data to be copied	
	Error code storage location	



(2) Operation timing Operation timing is shown below



Point

(1)Data copy instruction(IDCOPY \square) copy the data between Data carriers without a PLC device.

(2)If Data carrier to copy contains the write protect setting area, it will be the write protect error.



5.8 Clear instruction(IDCLR \Box)

Describe the instruction to clear the data.

Instruction	Description
Clear instruction	Clear Data carrier memory with "0"
(IDCLR1/IDCLR2)	

		Available devices							
Setting	Inside device		Filo	MELSEC	NET/10(H)	Special unit	Index		
data	(Systen	n,User)	register	Direct J 🗆 ¥ 🗌			register	Constant	Others
	bit	word		bit	word		Zn		
(D)	0	0							



Setting data

Setting data	Description	Setting side	Data format	Page
Un	First I/O signal number of the unit (00 \sim FE : The upper 2 digits of 3 digits, when it describes the I/O signals by 3 digits.)	User	BIN16 bit	
(D)	The bit device number to be turned ON with the execution completed. When the abnormal completion, (D)+1 also to be ON	System	bit	

File register for each program unit and the local device can not be used as a setting data.

Function

- (1) Through the unit specified by the "Un", it will O clear the all of Data carrier data area.
- (2) IDCLR1 instruction is executed on Channel 1 of the unit, and IDCLR2 instruction is executed on Channel 2 of the unit.
- (3) When O clear is completed, while END instruction of the instruction completed scan is in execution, it turns ON the bit device which specified in (D) and turns it OFF automatically after 1 scan. When the abnormal completion, completion status display device (D) +1 also to be ON.
- (4) If the write protect setting is set in the area, where will be cleared, it will clear all area except the area, where the write protect setting is set.

Error

- (1) When error, which detected by the Processor occurs, it performs the action below.
 - ① Error contact(CH.1 Xn5/ CH.2 XnD) turns ON.
 - (For canceling the error contact, use the error cancel Instruction)
 - ② Completion status display device (D) +1 will turn the 1 scan ON.
 - ③ Error code will be stored to the Buffer memory CH.1] Un¥G14/CH.2] Un¥G4014.



Programming Example

(1) Programming Example

The programming example of the next condition is shown as follows

- - Error code storage location. RO



(2) Operation timing Operation timing is shown below



Point

(1)While clear instruction(IDCLR) is in execution, if Data carrier doesn't exist, it executes the instruction of the number of retry and become error.
(2)Clear instruction(IDCLR) clears all data with "0". If clear it with specified data, use Writing at the sametime(IDFILL).
(3)The area, which is set for write protect, it will no be cleard and will have no write protect error.

5.9 Lifetime control instruction

For program details, please refer to P.61.

Describe the instruction, which to be used for lifetime control of the Data carrier.

Point

Number of writing will not be automatically updated, please update it with the IDMD,IDMW,IDLW instruction.

5.9.1 About the lifetime determination of writing

By counting the number of writes the Data carrier, the lifetime of the Data carrier can be determined. When performing the lifetime determination of writing, use Buffer memory and also following instructions, count writing instruction(IDMW), continuous count writing instruction(IDLW)(refer to 5.9.2) or the update Number of writing at the same time instruction(refer to 5.9.3)

(1) The value of lifetime determination of writing specified area(Address CH.1 Un¥G6/CH.2 Un¥G4006) will specify the determination value for the lifetime of writing.

This value specifies the number of writing of Data carrier per 10,000 times The following 3 kinds are the only instructions to determaine the lifetime of writing, the update Number of writing at the same time instruction, count writing instruction(IDMW), continuous count writing instruction(IDLW).

Specified range : $0 \sim 32767$ (When "0" specified, lifetime determination is not performed.) Initial value : K10 (100,000times)

(2) The result of lifetime determination of writing storage area(Address CH.1 Un¥G7/CH.2 Un¥G4007) will store the result of determination for the lifetime of writing.

The following 3 kinds are the only instructions to determaine the lifetime of writing, the update Number of writing at the same time instruction, count writing instruction(IDMW), continuous count writing instruction(IDLW).

Initial value : 0 At the end of their life : 1 is stored Not yet at the end of life : 0 is stored

Point

The result of lifetime determination of writing continue to be stored unless it is reset by the sequence program.

Before executing IDMD,IDMW,IDLW instruction again, please write the "O" to clear the result of lifetime determination of writing storage area.

5.9.2 Count writing instruction (IDMW), Continuous count writing instruction (IDLW)

(!!This instruction is available only when the bank function is valid)

Instruction	Description
Count writing	After the writing instruction is completed, it updates one time of the total number of Data
instruction	carrier writing.
(IDMW)	Regardless of the number of writing or the writing address, it updates one time
	constantly.
	In the normal communication, it stores the value of the total number of writing to
	Sequencer device. Also, it performs the lifetime determination by comparing the value
	of determination of lifetime writing, if the lifetime of the Data carrier is at the end, it is
	stored to Sequencer devices.
Continuous count	It keeps writing until the Data carrier come into the communication range of Read/Write
writing instruction	head and then after, it will update one time of the total number of Data carrier writing.
(IDLW)	Regardless of the number of writing or the writing address, it updates one time
	constantly.
	In the normal communication, it stores the value of the total number of writing to
	Sequencer device. Also, it performs the lifetime determination by comparing the value
	of determination of lifetime writing, if the lifetime of the Data carrier is at the end, it is
	stored to Sequencer devices.

		Available devices									
Setting data	Inside (Syster	device n,User)	File register	MELSECNET/10(H) Direct J 🗆 ¥ 🗆		Special unit U□¥G□	Indexregister Zn	Constant	Others		
	bit	word		bit	word						
nl		Ó						K,H			
n2		(\supset					K,H			
(S)		()					~			
n3	0							K,H			
(D1)		0									
(D2)	0	()								

[Instruction symbols]	[Execution condition]									
IDMW IDLW		$\left \right $		GP.IDCLR1	Unn	n1 n2	(S)	n3 (D1) (D	2)

Setting data

Setting data	Description	Setting side	Data format	Page
Un	First I/O signal number of the unit (OO \sim FE : The upper 2 digits of 3 digits, when it describes the I/O signals by 3 digits.)	User	BIN16 bit	
nl	Channel used / Setting rage is 1 or 2	User	BIN16 bit	
n2	First address of Data carrier	User	BIN16 bit	P19/ 5.3.1(1)
(S)	First number of the device, which stores the data which write to Data carrier	User	Device name	
nЗ	Number of data write to the Data carrier	User	BIN16 bit	P19 / 5.3.1(2)
(D1)	First number of the device, which stores the current number of data writing information.	User	Device name	
(D2)	The bit device number to be turned ON with the execution completed. When the abnormal completion, (D2)+1 also to be ON	System	bit	

File register for each program unit and the local device can not be used as a setting data.

Setting data	Item	Description	Setting area	Setting side	Page
(D1)+0	Value of no. of	Stores the value of number of		System	
(D1)+1	writing	writing		System	F 13 / 0.0.1(4)
(D1)+2	Value of the lifetime determination	Stores the Value of the lifetime determination		System	P37 / 5.10.1(1)
(D1)+3	Result of the lifetime determination	Stores the result of the lifetime determination		System	P37 / 5.10.1(2)
(D1)+4	Data carrier memory type	Stores the Data carrier memory type		System	P47 / 5.12.1

Data of the number of data writing information

Function

- (1) Through the unit specified by the "Un", write the n3 signals of data from the device specified with (S) into the after the address, which specified with n2 of the Data carrier of the channel, which is specified by n1. If the update was successful, update one time of total number of writing of the Data carrier, write the current number of writing to 2 words from the device, which specified with (D1), write the determination value of the writing lifetime to the (D1)+2 device, write Data carrier memory type to (D1)+4 device, and then compare the value of the number of writing to the value of lifetime determination and performs the lifetime determination
- (2) As the result of the lifetime determination, if the lifetime of the Data carrier is at the end, it store "1" to the device of (D1)+3 and become abnormal completion. However, error contact CH.1 Xn5/CH.2 XnD will not turn ON, normally "O" is stored to (D1)+3.
- (3) When writing is completed, while END instruction of the instruction completed scan is in execution, it turns ON the bit device which specified in (D2) and turns it OFF automatically after 1 scan. When the abnormal completion, completion status display device (D2) + 1 also to be ON.
- (4) Only 1 word (when the processing unit is byte, 1 byte) in the writing area falls under the write protect setting area, it will be the write protect error and it can not be written even for non-protected area.

Error

- (1) When error, which detected by the Processor occurs, it performs the action below. ① Error contact(CH.1Xn5/ CH.2XnD) turns ON
 - (For canceling the error contact, use the error cancel Instruction)
 - ② Completion status display device (D2) +1 will turn the 1 scan ON. ③ Error code will be stored to the Buffer memory CH.1 Un¥G14/CH.2 Un¥G4014.



Programming Example

5

(1) Programming Example

The programming example of the next condition is shown as follows
InstructionCount writing instruction(IDMW)
ID Processor first I/O output number
Channel usedK1(CH.1)
Data carrier writing start addressK100
No. of writing word
Writing data storage location
Current value of the number of writing storage location D22,D23
Current value of writing lifetime determination storage location D24
Result of writing lifetime determination storage location D25
Memory type storage location
Error code storage locationRO



(2) Operation timing

Operation timing is shown below



Point

(1)While count writing instruction(IDMW) is in execution, if Data carrier doesn't exist, it executes the instruction of the number of retry and become error.
(2)If writing area contains the write protect setting area, it will be the write protect error.(It also can not be written even for non-protected area.)
(3)When continuous count writing instruction(IDLW) is executed, it ntinuously performs writing until the Data carrier come into communication area. If Data carrier doesn't come into communication area, it executes instructions permanently.
To stop execution, please execute the quit the continuous instruction truction.



5.9.3 Batch update of the number of writing instruction (IDMD)

(!!This instruction is available only when the bank function is valid)

Instruction		Description								
Batch update of the		Adding the number of writing which is stored in the Data carrier number of								
number of	writing		writing storage area upto the specified additional value, and then use the							
instructio	ſ		Value of (value of determination of writing lifetime (CH.1]Un¥G6/CH.2]Un¥G4006)						
(IDMD)			The value	The value of the writing number addition value CH.1Un¥G26/CH.2						
(.=)			Un¥G40	26) will b	e changed t	to the set ad	dition value af	ter it is ad	ded.	
					Available	devices				
Setting	Inside	device	F 11-	MELSEC	NET/10(H)		Indevregister			
data	(Syster	m,User)	register	Direct	J□¥□	Special unit	7-	Constant	Others	
	bit	word	10510101	bit	word					
nl		(C				K,H			
n2		(C				K,H			
(D1)		(C							
(D2)	\bigcirc	(<u> </u>				-			
[Instruction symbols] [Execution condition] IDMD										
Setting da	ata									

Description Setting side Setting data Data format Page First I/O signal number of the unit Un $(00 \sim FE$: The upper 2 digits of 3 digits, when User BIN16 bit it describes the I/O signals by 3 digits.) n1 Channel used / Setting rage is 1 or 2 User BIN16 bit P20 / Number of writing additional value User BIN16 bit n2 5.3.1(5) First number of the device, which stores the (D1) User Device name ---current number of data writing information. The bit device number to be turned ON with the execution completed. (D2) System bit ---When the abnormal completion, (D2)+1 also to be ON

File register for each program unit and the local device can not be used as a setting data.

Data of the number of data writing formation

Setting data	Item	Description	Setting area	Setting side	Page
(D1)+0	Value of no. of	Stores the value of number of		System	P25 / 5.2.1(4)
(DT)+T	writing	whung			. ,
(01)+2	Value of	Stores the Value of the lifetime		System	P40 / 5 9 1(1)
	determination	determination		Oystem	1 40 7 0.0.1(1)
(D1)+3	Result of the lifetime determination	Stores the result of the lifetime determination		System	P40 / 5.9.1(2)
(D1)+4	Data carrier memory type	Stores the Data carrier memory type		System	P54 / 5.11.1

Function

- (1) Through the unit specified by the "Un", add the value of the total number of writing of the Data carrier of the channel, which is specified by n1 upto the number specified with n2. Then write the current number of writing to 2 words from the device, which specified with (D1), write the determination value of the writing lifetime to the (D1)+2 device, write Data carrier memory type to (D1)+4 device, and then compare the value of the number of writing to the value of lifetime determination and performs the lifetime determination.
- (2) As the result of the lifetime determination, if the lifetime of Data carrier is at the end, it store "1" to the device (D1)+3 and become abnormal completion. However, error contact CH.1Xn5/CH.2XnD will not turn ON, normally "0" is stored to (D1)+3.
- (3) When writing is completed, while END instruction of the instruction completed scan is in execution, it turns ON bit device which specified in (D2) and turns it OFF automatically after 1 scan. When the abnormal completion, completion status display device ((D2) +1) also to be ON.



(4) If the number of data specified with n2 is 0, it read out the value of the total number of writing without of the increase of the number of writing

- Error (1) When error, which detected by the Processor occurs, it performs the action below. ① Error contact(CH.1Xn5/CH.2XnD) turns ON (For canceling the error contact, use the error cancel Instruction) ② Completion status display device (D2) +1 will turn the 1 scan ON. ③ Error code will be stored to the Buffer memory CH.1 Un¥G14/CH.2 Un¥G4014.

Programming Example

(1) Pr∩ør ming Example

) Piogra	mining Example	
The pro	ogramming example of the next condition is	s shown as follows
Instruc	tion	Batch update of the number of writinginstruction(IDMD)
ID inter	rface first I/O output number	00
Channe	el used	CH.1
Value o	of the determination of the writing lifetime .	100,000times (Default)
Additio	n value of the number of writing	10
Curren	t value of the number of writing storage loc	ation D22,D23
The va	lue of writing lifetime determination	D24
Result	of writing lifetime determination	D25
Data c	arrier memory type	D26
Error c	ode storage location	RO



(2) Operation timing



(2) Regardless of whether write protect setting is set, IDMD instruction is executed

5.10 Write protect information instruction

Describe the instruction, which to set/cancel the write protect area to the Data carrier (!!This instruction is available only when the bank function is valid)

5.10.1 About write protect

Write protect is to prevent writing to the memory of the Data carrier, which is specified by user By using Buffer memory below and the write protect information instruction(WP)(refer to P51), write-protect is set per 8word(16byte).



(1) Write protect specified (storage) area(Address CH.1 Un ¥G32/CH.2 Un ¥G4032) Specify the setting(1) and cancel(0) write protect setting

Specified range : 0 (cancel write protect), 1 (set write protect) Initial value 0

Point

Please set write protect to sequental areas. It is not possible to set more than two write protect areas in one Data carrier

(2) Write protect start page specity (storage) area (address CH.1 Un ¥G33/ CH.2 Un ¥G4033) Specify the start page address of when setting the write-protect with 8word(16byte) This setting will be the start page address agains to the Data carrier bank

Specified range : K0 \sim K42 (However, \leq value of the write protect end page address) Initial value \$:0\$

(3) Write protect end page specity (storage) area (address CH.1 Un ¥G34/ CH.2 Un ¥G4034) Specify the end page address of when setting the write-protect with 8word(16byte) This setting will be the end page address agains to the Data carrier bank

Specified range : K0 \sim K42 (However, $~\geq$ value of the write protect start page address) Initial value ~~ : 0

< NOTE >

 \cdot Write protect of this Processor is per 8 word.

Since the Mitsubishi Processor has its write protect area per 7word, even the identical ladder,

the area, which is write protect will be diffrenent.

< Address correspondence table >

Address correspondence table					
Page	e address	V	Vord unit	Ву	rte unit
decimal	Hexadecimal	decimal	Hexadecimal	decimal	Hexadecimal
0	ОН	0~7	$ m OH \sim 7H$	0~15	$ m OH\sim FH$
1	1H	8~15	$8 \mathrm{H} \sim \mathrm{FH}$	16~31	10H~1FH
2	2H	16~23	$10H \sim 17H$	32~47	20H ~ 2FH
3	ЗH	24~31	18H~1FH	48~63	30H ~ 3FH
4	4H	32~39	$20H \sim 27H$	$64 \sim 79$	$40H \sim 4FH$
5	5H	40~47	$28H \sim 2FH$	$80 \sim 95$	$50H \sim 5FH$
6	6H	$48 \sim 55$	$30H \sim 37H$	96~111	60H ~ 6FH
7	7H	$56 \sim 63$	38H ~ 3FH	112~127	70H ~ 7FH
8	8H	64~71	$40H \sim 47H$	128~143	80H ~ 8FH
9	9H	72~79	$48H \sim 4FH$	144~159	90H ~ 9FH
10	AH	80~87	$50H \sim 57H$	$160 \sim 175$	AOH \sim AFH
11	BH	88~95	$58H \sim 5FH$	176~191	BOH ~ BFH
12	СН	96~103	$60H \sim 67H$	192~207	COH ~ CFH
13	DH	104~111	68H~6FH	208~223	DOH ~ DFH
14	EH	112~119	$70H \sim 77H$	224~239	EOH ~ EFH
15	FH	120~127	$78 \text{H} \sim 7 \text{FH}$	240~255	FOH ~ FFH
16	10H	$128 \sim 135$	$80H \sim 87H$	256~271	100H~10FH
17	11H	136~143	88H ~ 8FH	272~287	110H~11FH
18	12H	144~151	$90H \sim 97H$	288~303	120H~12FH
19	13H	$152 \sim 159$	$98H \sim 9FH$	304~319	130H~13FH
20	14H	160~167	$AOH \sim A7H$	320~335	140H~14FH
21	15H	168~175	$A8H \sim AFH$	336~351	150H~15FH
22	16H	176~183	$BOH \sim B7H$	352~367	160H~16FH
23	17H	184~191	$B8H \sim BFH$	368~383	170H~17FH
24	18H	192~199	COH~C7H	384~399	180H~18FH
25	19H	$200 \sim 207$	$C8H \sim CFH$	400~415	190H~19FH
26	1 AH	$208 \sim 215$	$\rm DOH{\sim}D7H$	416~431	1AOH ~ 1AFH
27	1BH	216~223	${\sf D8H}{\sim}{\sf DFH}$	432~447	180H ~ 18FH
28	1CH	224~231	EOH~E7H	448~463	1COH ~ 1CFH
29	1 DH	232~239	$\rm E8H{\sim}\rm EFH$	464~479	1DOH~1DFH
30	1EH	240~247	$\rm FOH{\sim}F7H$	480~495	1EOH ~ 1EFH
31	1FH	248~255	$F8H \sim FFH$	496~511	1FOH ~ 1FFH
32	20H	256~263	100H~107H	512~527	200H ~ 20FH
33	21H	$264 \sim 271$	$108H \sim 10FH$	528~543	210H~21FH
34	22H	272~279	110H~117H	544~559	220H ~ 22FH
35	23H	280~287	118H~11FH	560~575	230H ~ 23FH
36	24H	288~295	120H~127H	576~591	240H ~ 24FH
37	25H	296~303	128H~12FH	592~607	250H ~ 25FH
38	26H	304~311	130H~137H	608~623	260H ~ 26FH
39	27H	312~319	138H~13FH	624~639	270H ~ 27FH
40	28H	320~327	$140H \sim 147H$	640~655	280H ~ 28FH
41	29H	328~335	148H ~ 14FH	656~671	290H ~ 29FH
42	2AH	336~343	150H~157H	672~687	2AOH ~ 2AFH

*The page address range will vary according to the memory type that is shown below

Momony type	Page address			
	decimal number	Hexadecimal number		
344Word (688byte spec.)	0~42	0H ~ 2AH		
168Word (336byte spec.)	0~20	$OH \sim 14H$		
112Word (224byte spec.)	0~13	$OH \sim DH$		
80Word (160byte spec.)	0~9	0H ~ 9H		
56Word (112byte spec.)	0~6	0H ~ 6H		
40Word (80byte spec.)	0~4	$OH \sim 4H$		
24Word (48byte spec.)	0~2	0H ~ 2H		



5.10.2 Write protect information reading instruction(RP)

Write protect information reading instruction(RP) read the information of write protec, which is set in the Data carrier

Instruction code Instruction : RP Code : 5052H

(1) Programming Example

The programming example of the next condition is shown as follows ID interface first I/O output number.....00 Channel used.....CH.1 Value of the write protect setting storage location D32 Start page address storage location.....D33 End page address storage location.....D34 Error code storage location.....R0



(2) Operation timing

Operation timing is shown below





Point

When write protect information reading instruction(RP) is executed, if no Data carrier, it will execute retry instruction with certain number of times and become error.

5.10.3 Write protect information writing instruction(WP)

Write protect information writing instruction (WP) set the specified write protect area in the Data carrier.

Instruction code Instruction : WP Code : 5057H

(1) Programming Example

The programming example of the next condition is shown as follows
ID interface first I/O output number 00
Channel used
Write protect setting value 1 (Write protect setting)
Write protect setting area
Error code storage ROO





(2) Operation timing Operation timing is shown below



5.11 Memory setting instruction

Describe the instruction, which to set memory type of the Data carrier. For program details, please refer to P.55.

5.11.1About the memory type

User can extend the lifetime of the Data carrier by sequentially changing the bank used The lifetime guarantee of the Data carrier "Z1"-xxxx-128 is up to 100,000 per bank. Memory type is set by using the Buffer memory below and the life extension bank switching instruction(BK)(refer to P.55)

(1) Memory type specify(address CH.1 Un¥G40/ CH.2 Un¥G4040)

Specify the memory type of Data carrier to be set by the life extension bank switching instruction(BK).

Initial value : 0 Following figure is a exampe with the number of the bank to be created : 3, used bank No. : 2







(a) Number of the bank to be created

Set the number of the bank to be created in the Data carrier. Following 7 kinds are the number of the bank which can be set

ιн•	344word spec (Nur	nber of	the bank to be created	=	1)
2H :	168word spec	nber of	the bank to be created	=	2)
3H :	112word spec(Nur	nber of	the bank to be created	=	3)
4H :	80word spec. (Number of the bank to be created	=	4)		
6H :	56word spec. (Number of the bank to be created	=	6)		
8H :	40word spec. (Number of the bank to be created	=	8)		
CH :	24word spec. (Number of the bank to be created	=	12)		

344 word spec. No. of bank : 1 168 word spec. No. of bank : 2 112 word spec. No. of bank : 3 80 word spec. No. of bank : 56 word spec. No. of bank : 6 40 word spec. No. of bank : 24 word spec. No. of bank : 12 (Factory default) 4 8 24 word BankNo.1 40 Bank No.1 56 word Bank No.1 word 24 80 Bank No.1 Bank No.2 word vord 112 Bank No.1 word 40 Bank No.2 24 word Bank No.3 word 168 56 Bank No.1 Bank No.2 word word 24 Bank No.4 40 word Bank No.3 word X 80 24 Bank No.2 Bank No.5 word word 56 Bank No.3 word 40 Bank No.4 24 word Bank No.6 word 344 112 Bank No 1 Bank No.2 word word 24 Bank No.7 40 Lword Bank No.5 56 word Bank No.4 word 80 24 Bank No.3 Bank No.8 word word X -40 Bank No.6 24 word Bank No.9 word 168 56 Bank No.2 Bank No.5 /ord word 24 Bank No.10 40 word Bank No.7 112 word Bank No.3 word 24 80 Bank No.11 Bank No.4 word word 56 Bank No.6 40 word Bank No.8 24 word Bank No.12 word _ *1 *1 *1 *1 *1 *1 *1

*1 : Number of writing storage area(IDMD,IDMW,IDLW instruction



(b) Used bank No.

Set the Data carrier bank No. to be read/write When read/write other bank No., it needed to be change the bank No. by BK instruction.

[Example] When setting number of the bank to be created : 6, Used bank No. : 5 Setting : 0605H Only Bank No.5 is available



*1 : Number of writing storage area(IDMD,IDMW,IDLW instrucion)

Point

If the number of the bank change is performed during Data carrier is in use, all data in the Data carrier will be deleted. Number of the bank setting should be performed only the first time of the memory setting.

(2) Memory type storage are(address CH.1]Un¥G41/ CH.2Un¥G4041)

After ID communication instruction completes normally, memory type of Data carrier is stored Contents to be stored is same as the memory type specified area(CH.1)Un¥G40/CH.2Un¥G4040)

Initial value : 0

Following figure is a exampe with the number of the existing bank : 8, used bank No : 7



Considerations when using bank function

(1) If the number of the bank and bank No. are changed, all the data of the Data carrier will be deleted.

(2) Mixing the Data carrier with different number of bank, due to differences of capacity, it may not able to have proper reading and writing.



5.11.2 Life extension bank switching instruction(BK)

(!!This instruction is available only when the bank function is valid) Life extension bank switching instruction(BK) set the number of the bank of Data carrier and the bank No. to be used.

Instruction code Instruction : BK

Code: 4B42H

(1) Programming Example The programming example of the next condition is shown as follows

ID Processor first I/O output number .00
Channel used
Bank No. to be set 6
Bank No, to be used
Error code storage locationRO



⁽²⁾ Operation timing Operation timing is shown below



Point

 Setting the memory type same as the memory type of before setting, it will not initialize the number of writing.
 f write protect is set when change the number of bank, it become write protect error and memory type cannot be set
 When write protect is set, the bank No. to be used is only changed, the setting of write protect also will be transfered.

5.12 Writing lifetime management and Life extension

Describe how to do the writing lifetime management and Life extension of Data carrier by using Writing lifetime management instruction(IDMW,IDLW,IDMD) and Life extension bank switching instruction(BK)

5.12.1 About the lifetime of Data carrier

The memory, which is used for Z series Data carrier has the characteristics of deterioration by the number of writing The lifetime of the Data carrier "Z1-xxxx-128" is up to 100,000 per bank and if keep writing more than this value, it may have inappropriate performance such as garbled data by the deterioration of memory. If normal writing instruction (IDWD \Box ,IDAWD \Box ,IDFILL \Box) is used in such case, it will be a successful completion with wrong data is written.

5.12.2 Prevention instruction for troubles caused by data-carrier lifetime of writing

(1) Using comparison writing instruction

Use comparison writing instruction(IDCWD \Box ,IDSWD \Box) instead of normal writing instruction (IDCWD \Box ,IDSWD \Box) After the normal writing is executed, comparison writing instruction will read and compare the written data and if wrong data is written, it will become error.

(2) Writing lifetime management (refer to 5.12)

With the writing lifetime management instruction(IDMW,IDLW,IDMD), it will control the number of writing of the Data carrier and prevents the number of writing for not exceeding the guaranteed value. Specifically it is used as follows.

(a) Count writing instruction(IDMW), Continuous count writing instruction(IDLW) The same usage with the normal writing instruction, replace the writing instruction(IDWD) and the continuous writing instruction(IDAWD) with "IDMW, IDLW", and by using it, updating of writing and number of writing can be performed at once.

After IDMW,IDLW instruction is executed, current number of writing of Data carrier is stored to the buffer memory number of writing storage area automatically.

(b) Batch update of the number of writing instruction(IDMD)

When IDMW, IDLW instruction cannot be used, by updating the number of writing communication of entire line at the same time, it controls the number of writing After IDMD instruction is executed, current number of writing of Data carrier is stored to the Buffer memory number of writing storage area automatically.

When set the number of writing setting value as "O", the number of writing will not be updated and it only confirms the number of writing upto that time.



5.12.3 Life extention of wrting lifetime by bank switching

With the number of writing control of Data carrier and by using the life extension bank switching instruction(BK), it can be used for high frequency of writing For the details of the life extension bank switching instruction(BK), please refer to 5.11.2

(1) Features of the bank function

(a) By deviding Data carrier memory and by using bank switching, it is possible to write maximum 1,200,000 times.

(b) Data carrier memory type information(Number of bank and Bank No. in use) will be retaind as specific information by each Data carrier, it will be controlled by the Processor to access only the specified bank No. ,therefore, it is no problem if Data carrier with different bank No. exist mixed in the same assembly line.



(c) in the same number of bank, if only changing the Bank No., it will copy the bank data before switching to bank data after switching automatically, it is not need to change the access address of Data carrier or perform the data writing newly.

Write protect setting will also be copped autmatically.

[Example of switching bank No. of bank 4 (80word spec.)]



Processor Z4-Q002

(2) Bank switching using flow

Show the flow when using Data carrier with bank switching



Point

When the life extension bank switching instruction(BK) is executed, communication will be limited to a specified bank, therefore the data capacity also will be limited amount of the specified bank

Select the using memory type considering the data volume to be used and the number of writing

Memory type setting(from the inical 344word spec. to change the number of bank) of Data carrier, it is performed only once to one Data carrier when start using it.

After memory type setting, if the number of bank change is performed, the total number of writing up to that time will be "O" cleard.



(3) Data carrier memory map at the bank switching

Show the Data carrier memory map when bank switching is performed with using Data carrier of memory type 80word (160byte)

< Procedure >

No.	
1	Set the Data carrier memory type to the 0401H (80word spec./Bank No.1) in prior to using
2	Determine the lifetime of writing (100,000times) by the manage instruction (IDMD/IDMW/ IDLW) of writing lifetime
3	Up date the memory type to 0402H(80word spec./Bank No.2) with the life extension bank switching instruction(BK). Memory data value will be area copied from Bank No.1 to No.2.
4	Determine the lifetime of writing (100,000times) by ② (Total 200,000times)
5	Up date the memory type to 0403H(80word spec./Bank No.3 with the life extension bank switching instruction(BK). Memory data value will be area copied from Bank No.2 to No.3.
6	Determine the lifetime of writing (100,000times) by ② (Total 300,000times)
7	Up date the memory type to 0404H(80word spec./Bank No.4) with the life extension bank switching instruction(BK) Memory data value will be area copied from Bank No.3 to No.4.
8	Determine the lifetime of writing (100,000times) by ② (Total 400,000times)



Point

Bank No. Change is recommended to be done by numerical order from NO.1 to No.2, and from No. 2 to No.3 as described above. This makes it easier to memory management and programming. (For program example, refer to 5.12.4)



5.12.4 Programming Example

(1) Initial setting of memory type

The example of program for initial setting of Data carrier with momory type 0401H (number of bank 4, bank No.1) is shown below. Also, following program is specified to be performed only once to the unused Data carrier when start using it. At the start-up the assembly line, if following program is performed multiply to the same Data carrier or if perform the following program after the number of wiriting up date instruction(IDMW,IDLW,IDMD) is executed, it will become error and FO or F1 will be set, so please put this inconsideration.

Please also set the memory type for the Data carrier for maintenance in advance.

< Procedure >

ſ	No.	Contents		
	1	Execute the batch update of the number of writing instruction(IDMD) with the number of writing addion value O times and acquire the memory type and total number of writing of Data carrier. When Data carrier is unused status, start up the bank switching(M1O) turns ON. Also when memory type is not initial value set FO, when value of the number of writing is not 0, set F1		
	2	Set the momory type with the life extension bank switching instruction(BK)		



Point

(1)Memory type setting(from the inical 344word spec. to change the number of bank) of Data carrier, it is performed only once to one Data carrier when start using it, and once the Data carrier is set the number of bank, please do not change the number of bank until Data carrier is exchanged.

After memory type setting, if the number of bank change is performed, it will delete the data at that time as well as the number of writing and will not perform the normal lifetime controle. (2)In order to execute the life extension bank switching instruction(BK), communicate it remains stopped.



(2) Life extention by using the lifetime control instruction (IDMW/IDLW)

The example of program that using the bank switching extend the Data carrier writing lifetime up to 400,000 times is shown below. After executing count writing instruction (IDMW), if the number of writing exceed the determination value, it executes the bank switching.

In order to execute the life extension bank switching instruction(BK), communicate it remains stopped.

< preparation >

By the life extension bank switching instruction(BK), initialize(set) the Data carrier meomory type to number of bank 4 / Bank No. 1(0401H) (For the details of program, refer to (1)

Set the writing detemination value to K10(100,000 times) (It is the default value, therefore it doesn't need to be set)

< Procedure >

No.	c. Contents				
	With the lifetime control instruction(IDMW), it will do the writing				
1	If it exceeds writing lifetime, execute ②. However, if at Bank No.4, it will be the				
	lifetime end of data carrer and completed (Set F10).				
2	Update the bank No. with the life extension bank switching instruction(BK)				

< Programming Example >



- (3) Life extention by using the batch update of the number of writing instruction(IDMD) The example of program that using the bank switching extend the Data carrier writing lifetime up to 400,000 times is shown below. The Read/Write head $1 \sim 10$ uses continuous writing instruction (IDAWD \Box).
- < preparation >
 - By the life extension bank switching instruction(BK), initialize(set) the Data carrier meomory type to number of bank 4 / Bank No. 1(0401H) (For the details of program, refer to (1)
- < Procedure >

No.	o. Contents		
1	① By the continuous writing instruction(IDAWD), do the writing(Refer to 5.5.1)		
2	Set the writing lifetime determination value to 10(100,000times) and the writing additional value 10(Total writing number 10times) and execute the batch update of the number of writing instruction(IDMD). If it exceeds writing lifetime, execute ③. However, if at Bank No.4, it will be the lifetime end of data carrer and completed (Set F10).		
3	Up date the bank NO. with life extension bank switching instruction(BK)		

- External interlock signal External signal M50 -[SET Start 4 -1/4 2 Execute the IDMD instruction M50 with No. of writing 100,000times at writing lifetime determination value 100,000times(default GP. IDMD UO K1 K10 D22 M100 value)(Store memory type toD26) M100 M101 -Frst M50 --14 Reset M50 and complete Set F10 when exceeds the writing lifetime(Total M101 Χ5 H404 - SET D26 7 F10 400,000times) Set bank setting start-up H404 D26 -Set M60 7 contact M60 M50 -[RST Reset M50 Χ5 U0¥ When abnomal completion. -FMOVP G14 RO store error code to R0. 3 M60 X0 X4 --// Y15 X3 Set instruction code BK to D0 -[\$MOVP ″BK″ DO --1/ Up date the bank No. -[INC h D26 U0¥ Set the instruction code -[MOVP DO GO U0¥ Set the Memory type D26 to -[MOVP D26 G40 H K40 -[SET Y15 Start bank switching Y15 Χ4 U0¥ Set F11 if the momory type is G41 -\> D26 7 -SET F11 3 ┥┟ not setting value. Complete bank switching -[RST Y15 Reset the bank switching -RST M60 7 start-up contact M40. Χ5 Y15 U0¥ When abnomal completion, -[MOVP RO G14 store error code to R0
- < Programming Example >



(4) How to read the total times value of writings

The exaple of program to read out the total number of writing value by using the batch update of the number of writing instruction(IDMD) and store it to the device D100, 101 (D100: lower16 bit, D101: upper16 bit) is shown below

The writing lifetime determination value remain as default (100,000times)

By running the communication regularly, total number of writing value of the Data carrier can be monitored.



5.13 Error cancel Instruction

Error cancel Instruction cancel the error.

It will be executed by making error cancel request contact (Y(n+1)1/Y(n+1)9) to ON. When the Instruction is complted, error(Xn5/XnD) become OFF.

[Example program]

The following is a sample program for the next criteria.

(An example program to cancel the errors that occurred when using the instructions that are described in this chapter.)

Processor first I/O output number 00



6.1 List of Error code

Error codes, error contents and actions of the errors that occur when using Processor are shown below The latest error code is stored in the Buffer memory K14(CH.1)/K4014(CH.2)

Error code $\left[^{**}\right]\!$, the following values are stored by an instruction.

 All instruction00H 	· IDCLR,IDFILL 06H	• WP 14H
· IDRD01H	· IDCOPY OAH	• RP15H
· IDWD02H	· IDCRD OBH	• BK18H
· IDARD	· IDCWD OCH	· IDMD 19H
· IDAWD 04H	· IDSRD ODH	• IDMW 1 AH
· IDCM05H	· IDSWD OEH	· IDLW1BH

Error code				
Hex. decimal	Name of error	Eerror contents	LED	Action
**01H	No. of execution word error	In the communication with Data carrier, there is a mistake with no. of execution word.	ERR.	Check the the value of "No. of word + address" of the sequence program will not exceed the Data carrier end address (confirm the memory type)
**02H	Execution address error	In the communication with Data carrier, there's mistake with execution address. (When WP instruction, it is page address value)	ERR.	Check the "address" of sequence program(At the WP instrucion, the value of page address) will not exceed the Data carrier address range (confirm the memory type)
**11H	Setting address error	Setting address exceeds the valied value (When WP instruction, it is page address value)	ERR.	Check the "address" of sequence program (At the WP instrucion, the value of page address) will not exceed the valid value of the setting address.
**12H	No, of setting word error	No. of setting word exceeds the valid value (When WP instruction, it is page address value) (At the WP instruction, value of set/cancel)	ERR.	Confirm that the Sequence program "No. of ommunication word" (at the WPinstrucion, setting value / cancel value) does not exceed the valid value of the setting address.
**13H	Absense of date carrier error	Data carrier is out of communication rage. Data carrier/Read write head are not Z series.	ERR.	Place Data carrier in the communication range. Check the read write head wiring. Check Data carrier and read write head if they are Zseries or not.
**14H	Data carrier communication error	Error duing Data carrier ommunication (Such as varity error) An area that exceeds the ID tag memory capacity was read or written.	ERR.	Review the communication distance and movement speed Data carrier. Review the ground of the interface unit and the Sequencer CPU. Review the sequence program and Check that the tag does not read or write outside the memory capacity range.
**16H	Write protect error	Try to write into write protect setting area.	ERR.	Confirm that "address" and "address" + "number of communication words" of sequence program are not within the write protection setting range.
1821H	Memory type specify error	Specified memory type is not valid value	ERR.	Review the specified memory type. Or, review the setting of switch 1 (bank presence / absence).
**22H	Instruction code error	Setting the instrucion code that is not defined. ID instruction execution request contact is different.	ERR.	Review the instruction code Revie the Instruction execution request contact is correct
**24H	Continuous instruction execution interval timer setting error	Setting value of the continuous instruction execution interval time exceeds the valid setting value	ERR.	Review the setting value of the continuous instruction execution interval timer Sequencer program
0A26H	Copy direction specify setting error	Copy direction specify setting value is not valid value(12,21).	ERR.	Review the setting value of the copy direction specify of Sequencer program
**28H	No. of writing error	The number of writing addition setting value is not valid value(0 ~ 32767) (IDMD instruction)	ERR.	Review the number of writing addition value and lifetime determination value of Sequencer program.
0031H	Read write head disconnecttion DC24V error	External power supply (24VDC) is not supplied Read write head disconnected	DC24V	Supply DC24V Connect read write head

Appendix

Appendix 1 - Diversion of sequence program for A/QnA

When diverts the sequence program for A/QnA, please pay attention to following points.

(1) Diversion of sequence program for A series

Contacts (XnO, Xn6) which indicate the status of Processor specification is different for the Qseries and A series.

Therefore, if interlock are used as a contact, please modify the program as follows.

	AD35ID1/AD35ID2	Z4-Q002	
	A1SD35ID1/A1SD35ID2		
XnO	WDT error	UNIT READY	
	(ON : Error, OFF : Normal)	(ON : Normal, OFF : Error)	
Xn6	UNIT READY	Unused	
	(ON : Normal, OFF : Error)	(Always OFF)	



(2) Diversion of sequence program for QnA series

Dedicated instruction for QnA series can be used as it is, however following instruction needs to be replaced its name of instructions.

Compare instruction(IDCMP \Box) \rightarrow Compare instruction(IDCM \Box)

Continuous high speed reading(IDFRD \Box) \rightarrow Continuous reading(IDARD \Box) Continuous high speed writing(IDFWD \Box) \rightarrow Continuous writing(IDAWD \Box)





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