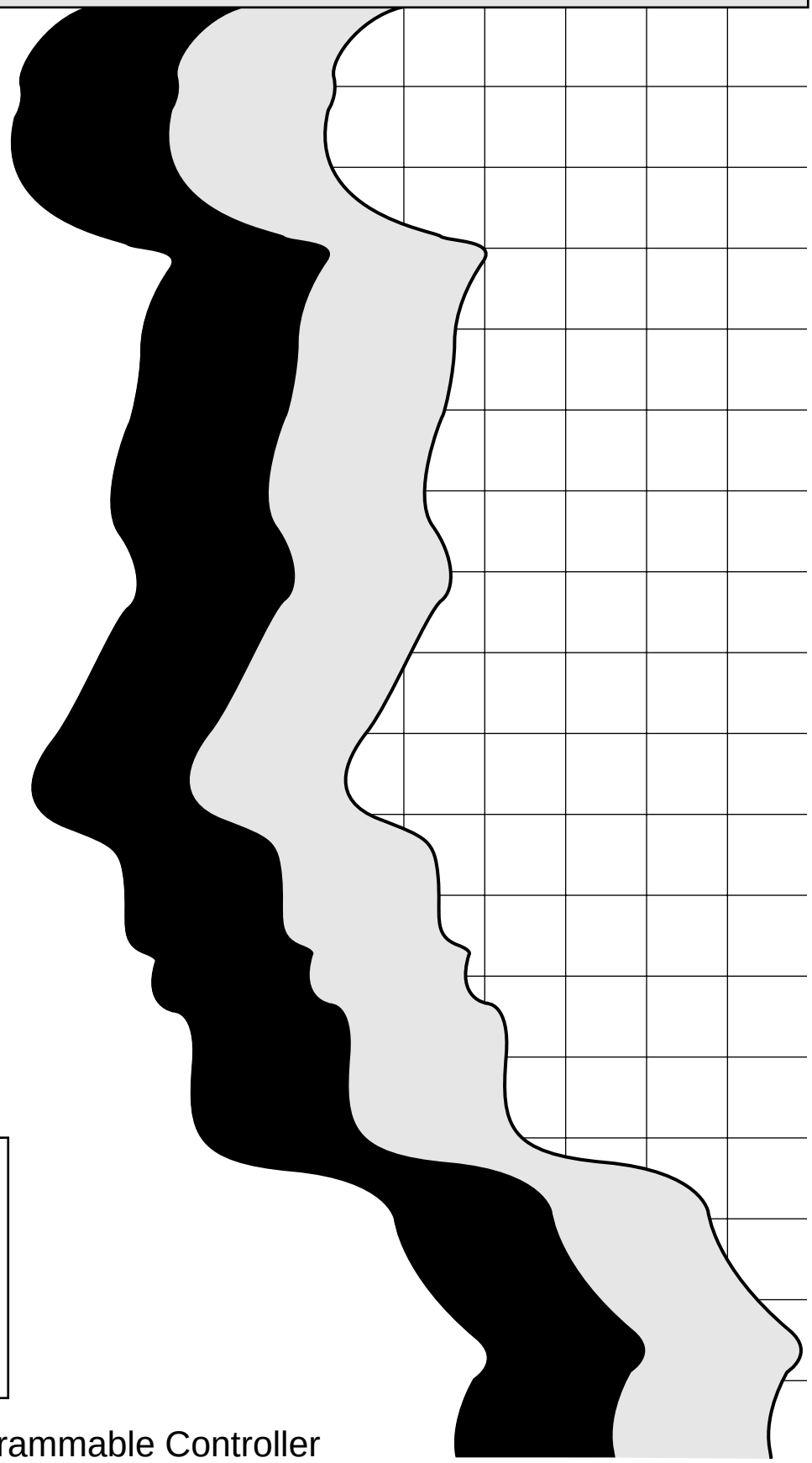
MITSUBISHI

ID Interface Module
type AJ71ID1-R4/AJ71ID2-R4/A1SJ71ID1-R4/A1SJ71ID2-R4

User's Manual



MELSEC

Mitsubishi Programmable Controller

● SAFETY PRECAUTIONS ●

(Read these precautions before using.)

When using Mitsubishi equipment, thoroughly read this manual and the associated manuals introduced in this manual. Also pay careful attention to safety and handle the module properly.

These precautions apply only to Mitsubishi equipment. Refer to the CPU module user's manual for a description of the PC system safety precautions.

These ● SAFETY PRECAUTIONS ● classify the safety precautions into two categories: "DANGER" and "CAUTION".

⚠DANGER	Procedures which may lead to a dangerous condition and cause death or serious injury if not carried out properly.
⚠CAUTION	Procedures which may lead to a dangerous condition and cause superficial to medium injury, or physical damage only, if not carried out properly.

Depending on circumstances, procedures indicated by ⚠CAUTION may also be linked to serious results.

In may case, it is important to follow the directions for usage.

Store this manual in a safe place so that you can take it out and read it whenever necessary. Always forward it to the end user.

[DESIGN PRECAUTIONS]

⚠DANGER

- Install a safety circuit external to the PC that keeps the entire system safe even when there are problems with the external power supply or the PC main unit.
  Otherwise, trouble could result from erroneous output or erroneous operation.
- Build a circuit that turns on the external power supply when the PC main unit power is turned on. If the external power supply is turned on first, it could result in erroneous output or erroneous operation.

[DESIGN PRECAUTIONS]

⚠CAUTION

- Do not bunch the communication cables with the main circuit or power wires, or install them close to each other.
  They should be installed 100mm (3.94 inch) or more from each other.
- Not doing so could result in noise that would cause erroneous operation.

[INSTALLATION PRECAUTIONS]

⚠CAUTION

- Use the PC in an environment that meets the general specifications contained in this manual. Using this PC in an environment outside the range of the general specifications could result in electric shock, fire, erroneous operation, and damage to or deterioration of the product.
- Install so that the pegs on the bottom of the unit fit securely into the base unit peg holes. (Tighten the A1S series module screws to the base unit within the specified torque range.) Not installing the unit correctly could result in erroneous operation, damage, or pieces of the product falling.
- When installing more cables, be sure that the base unit and the unit connectors are installed correctly. After installation, check them for looseness. Poor connections could result in erroneous input and erroneous output.
- Do not touch the electronic parts or the unit conducting area. It may cause erroneous operation or failure.

[WIRING PRECAUTIONS]

⚠DANGER

- Completely turn off the external power when installing or placing wiring. Not completely turning off all power could result in electric shock or damage to the product.
- When turning on the power or operating the unit after installation or wiring work, be sure that the unit's terminal covers are correctly attached. Not attaching the terminal covers could result in electric shock.

[WIRING PRECAUTIONS]

⚠CAUTION

- Be sure to ground the FG terminals and LG terminals with a special PC ground of Type III or above. Not doing so could result in electric shock or erroneous operation.
- When wiring in the PC, be sure that it is done correctly by checking the product's rated voltage and the terminal layout. Connecting a power supply that is different from the rating or incorrectly wiring the product could result in fire or damage.
- Do not connect multiple power supply units in parallel. Doing so could cause overheating, fire, or damage to the power supply unit.
- Tighten the terminal screws with the specified torque. If the terminal screws are loose, it could result in short circuits, fire, or erroneous operation.
- Be sure there are no foreign substances such as sawdust or wiring debris inside the unit. Such debris could cause fires, damage, or erroneous operation.
- External connections shall be crimped or pressure welded with the specified tools, or correctly soldered. For information regarding the crimping and pressure welding tools, refer to the I/O unit's user manual. Imperfect connections could result in short circuit, fires, or erroneous operation.

[STARTUP AND MAINTENANCE PRECAUTIONS]

⚠DANGER

- Do not touch the terminals while power is on. Doing so could cause shock or erroneous operation.
- Correctly connect the battery. Also, do not charge, disassemble, heat, place in fire, short circuit, or solder the battery. Mishandling of a battery can cause overheating or cracks which could result in injury and fires.
- Turn the power off when cleaning the unit or tightening the terminal screws. Conducting these operations when the power is on could result in electric shock.

[STARTUP AND MAINTENANCE PRECAUTIONS]

⚠CAUTION

- Do not disassemble or modify the units. Doing so could cause trouble, erroneous operation, injury, or fire.
- Turn the power off when removing a unit. Trying to remove the unit while the power is on could damage the unit or result in erroneous operation.

[DISPOSAL PRECAUTIONS]

⚠CAUTION

- When disposing of this product, treat it as industrial waste.

Revisions

* The manual number is noted at the lower left of the back cover.

Print Date	*Manual Number	Revision
Mar. 1996	IB (NA)-66595-A	First printing
Sep. 1996	IB (NA)-66595-B	Addition: D-03CS, D-8PX, D-422RWL, Command CR, SR, FR, CW, SW, FW, Item 1.3, 2.2 (4), 4.6, 5.4 (2), 5.6.4, 5.6.7, 5.6.8, 5.6.11 Correction: Item 1.2, 1.4, 3.2, 5.1, 5.2, 5.3 (Table), 5.5 (Table), 6.8.1, 6.9.1

INTRODUCTION

Thank you for choosing a Mitsubishi MELSEC-QnA Series General Purpose Programmable Controller.
Before using your new PC, please read this manual thoroughly to gain an understanding of its functions so you can use it properly.
Please forward a copy of this manual to the end user.

Table of Contents

About This Manual

The following is a list of manuals related to the ID interface Module.

Related Manuals

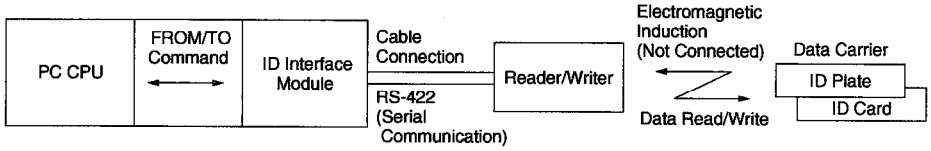
Manual Name	Manual Number (Type Code)
D-20HC Handy Controller Operation Manual Describes the system configuration, controller specification, and operation method when using the handy controller. (Included with the controller.)	IB-66641 (13JF27)
SW1IVW-AIDP ID Operation Manual Describes the operation methods of the ID System Software Package for MS Windows 3.1 and Windows NT 3.51. (Included with the software package.)	IB-66697 (13J909)

1 Overview

This user's manual describes the ID interface module specifications, usage, communication method with data carrier, etc., for AJ71ID1-R4, AJ71ID2-R4, A1SJ71ID1-R4, and A1SJ71ID2-R4.

1.1 Overview of the ID Interface Module

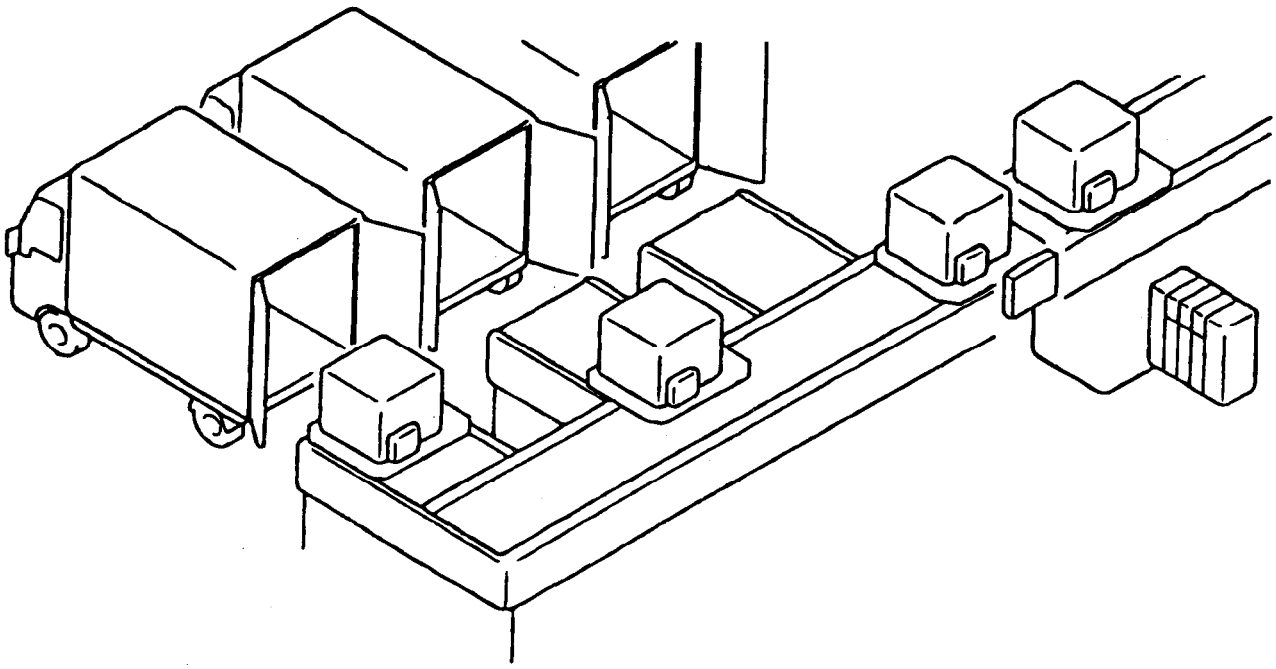
The ID interface module has one or two connection channels for the reader/writer. It functions as an interface for the PC CPU to the data carrier for data reading/writing.



The following are enabled though the use of the ID interface module:

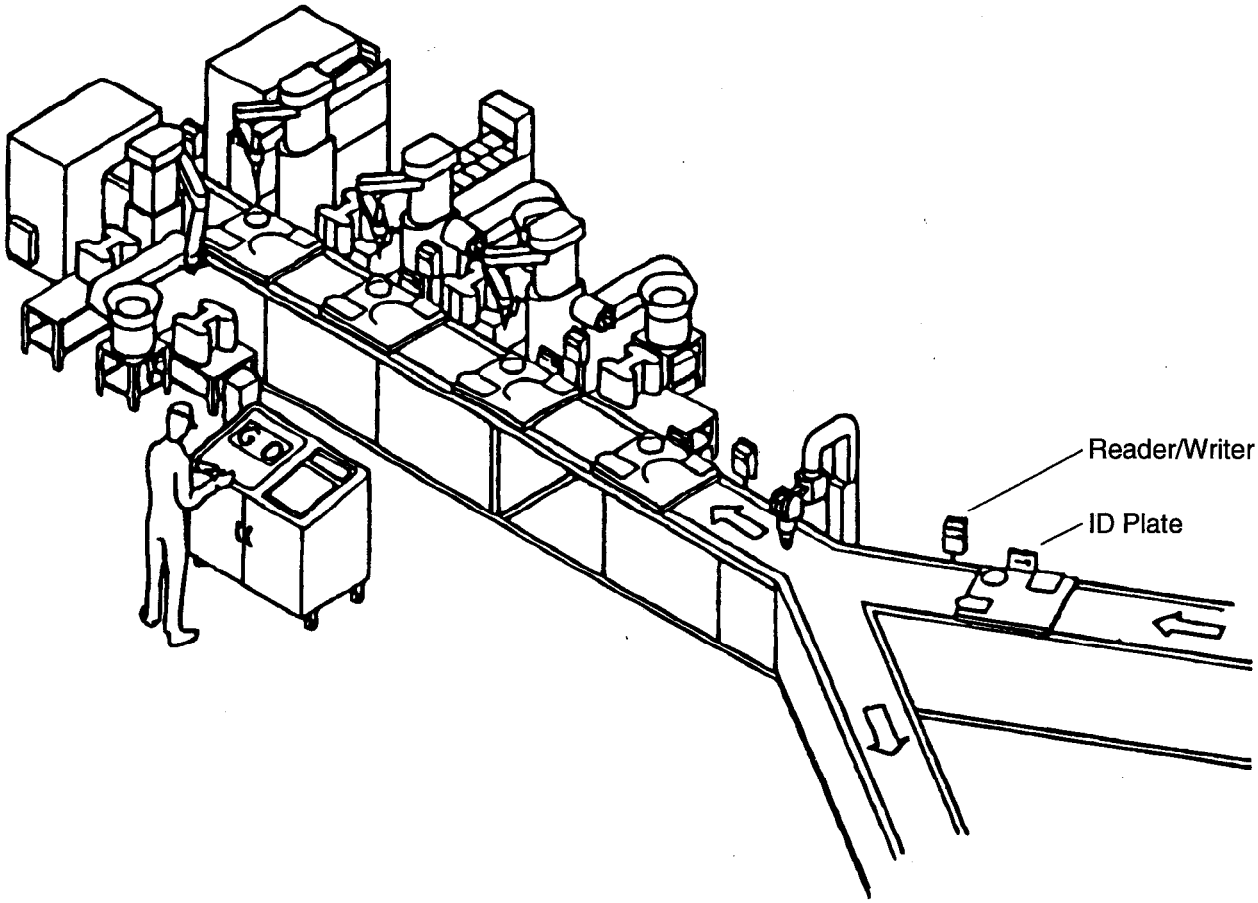
Usage for Product Distribution Systems

By incorporating this module into shipping, product-separation lines and automated warehouses, the flow of products can be managed via distributed control.



Usage for Production Lines

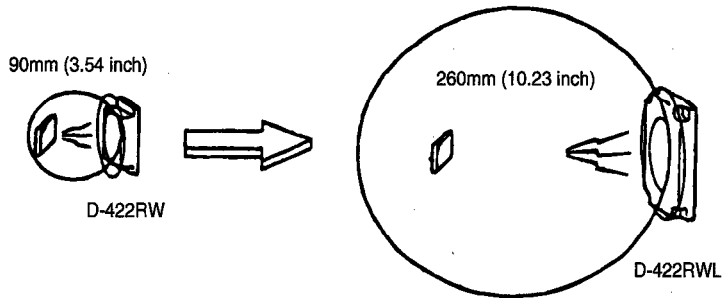
By incorporating this module into production or inspection lines, distributed control is possible for automated device control, installation specification in combination with a display device, quick correspondence with production plans, and inspection-data management.



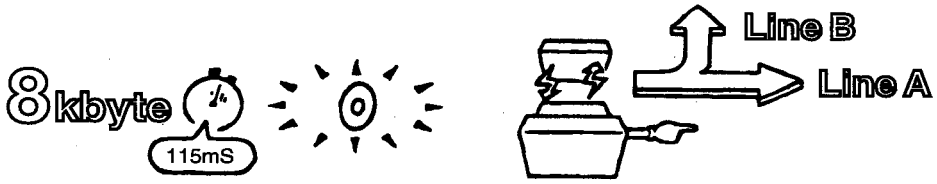
1.2 ID Interface Module Characteristics

The characteristics of the ID interface module are described below:

(1) The communication distance can be extended simply by replacing the reader/writer.
The communication distance can easily be extended by replacing the reader/writer, while staying on the same data carrier.

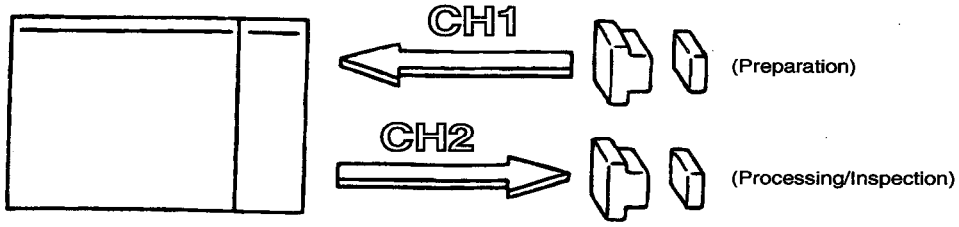


(2) With abundant ID commands, data communication with the data carrier can be performed easily.
Besides the basic read/write commands, there are commands such as repeat reading until read successfully, repeat writing until written successfully, compare data with the data in the data carrier, and clear all data in the data carrier to zero.

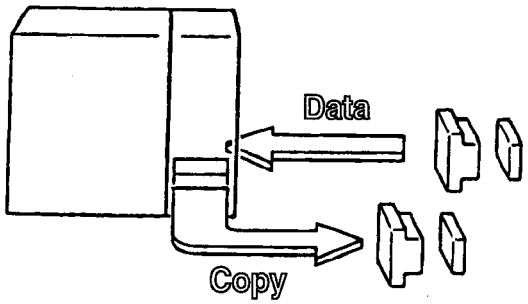


(3) Data communication of up to 3,900 words can be performed.
With one command, a maximum 3,900-words communication can be performed at once.

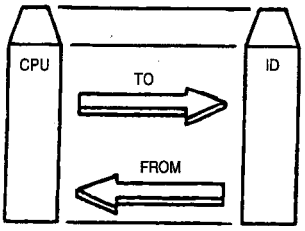
(4) With the two-channel ID interface module, the reader/writer operates independently.
For AJ71ID2-R4 and A1SJ71ID2-R4, each channel communicates to the data carrier using different commands.



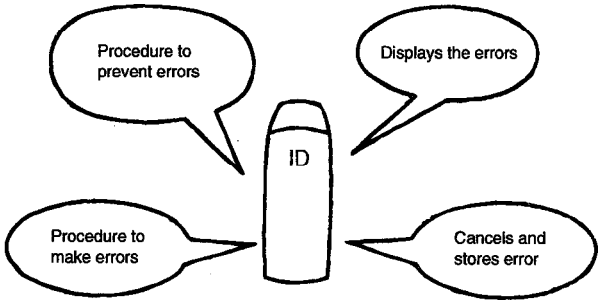
(5) With the data-copy command, data can be copied between data carriers. Data can be copied between data carriers without going through the PC CPU.



(6) Easy programming.
Data can be read and written with from/to commands.



(7) With an abundance of error procedures, high-level sequence control can be performed. The sequence program can confirm the error LED display status, cancel the program error, confirm the error codes for most recent four occurrences, and set the number of communication-error retries.



1.3 Difference from the Older Version

Supporting chart for each functions.

	Commands/Functions	Command Code	Old Version	New Version	Reference
Read	Read	RD	O	O	6.6.1
	Comparison read	CR	X	O	6.6.2
	Continuous read	AR	O	O	6.6.3
	Continuous comparison read	SR	X	O	6.6.4
	Continuous fast read	FR	X	O	6.6.5
Write	Write	WD	O	O	6.7.1
	Comparison write	CW	X	O	6.7.2
	Continuous write	AW	O	O	6.7.3
	Continuous comparison write	SW	X	O	6.7.4
	Continuous fast write	FW	X	O	6.7.5
	Batch write	FI	O	O	6.7.6
Compare	Compare	CM	Δ	O	6.8.1
Copy	Data copy	CO	Δ	O	6.9.1
Erase	Clear	CL	O	O	6.10.1
Set	End usage	OF	O	O	6.11.1
	Start usage	ON	O	O	6.11.2
Commands	Continuous-command-cancel command	—	O	O	6.12
	Error cancel command	—	O	O	6.13
Initial setting	Continuous-command execution interval specification	—	X	O	6.4
	Battery life evaluation value specification	—	X	O	6.4
	Number of retries	—	O	O	6.4
	Processing unit specification	—	O	O	6.4

O: Supported
Δ: The command function is not improved
X: Unsupported

1.4 Abbreviations/Names Used in This Manual

(1) Abbreviations/Names for the ID Interface Module

This manual uses the following abbreviations and generic names in describing the ID interface module.

Abbreviation/Name	Description
ID interface module	Generic name for all of the following modules
AJ71ID1-R4	AJ71ID1-R4 ID interface module
AJ71ID2-R4	AJ71ID2-R4 ID interface module
A1SJ71ID1-R4	A1SJ71ID1-R4 ID interface module
A1SJ71ID2-R4	A1SJ71ID2-R4 ID interface module

(2) Names for the PC CPU

This manual uses the following abbreviations and names in describing the ID interface module PC CPU.

The model name of the PC CPU module is indicated as needed in the manual.

Abbreviation/Name	Description
PC CPU	Generic name for all PC CPUs
QnA series CPU	Q2ACPU, Q2ACPU-S1, Q3ACPU, Q4ACPU
QnAS series CPU	Q2ASCPU, Q2ASCPU-S1, Q2ASHCPU, Q2ASHCPU-S1
A series CPU	A1NCPU, A2NCPU, A2NCPU-S1, A3NCPU, A2ACPU, A2ACPU-S1, A3ACPU, A2UCPU, A2UCPU-S1, A3UCPU, A4UCPU
AnS series CPU	A1SCPU, A1SJCPU, A2SCPU, A2ASCPU, A2ASCPU-S1

(3) Other Abbreviations/Names

This manual uses the following abbreviations and names in describing the ID interface module.

Abbreviation/Name	Description
Data Carrier	Generic name for "ID Plate, ID Card"
ID Plate	D-03P, D-8P, D-8PS, D-8PX
ID Card	D-03C, D-03CS
D-03C	D-03C ID Card
D-03CS	D-03CS ID Card
D-03P	D-03P ID Plate
D-8P	D-8P ID Plate
D-8PS	D-8PS ID Plate
D-8PX	D-8PX ID Plate
Reader/Writer	D-422RW, D-422RWL, D-232RW
D-422RW	D-422RW Reader/Writer
D-422RWL	D-422RWL Reader/Writer
D-20HC	D-20HC Handy Controller
Cable	D-422CAB□, D232CAB□, AC30R2, F2-232CAB
D-422CAB□	D422CAB□ Cable
D-232CAB□	D-232CAB□Cable

2 System Configuration

Systems that can be used with the ID interface module are described in this chapter.

2.1 Overall Configuration

2.1.1 Overall Configuration of AJ71ID1-R4/AJ71ID2-R4

Figure 2.1 shows the overall configuration of the A-series system with AJ71ID1-R4/ AJ71ID2-R4.

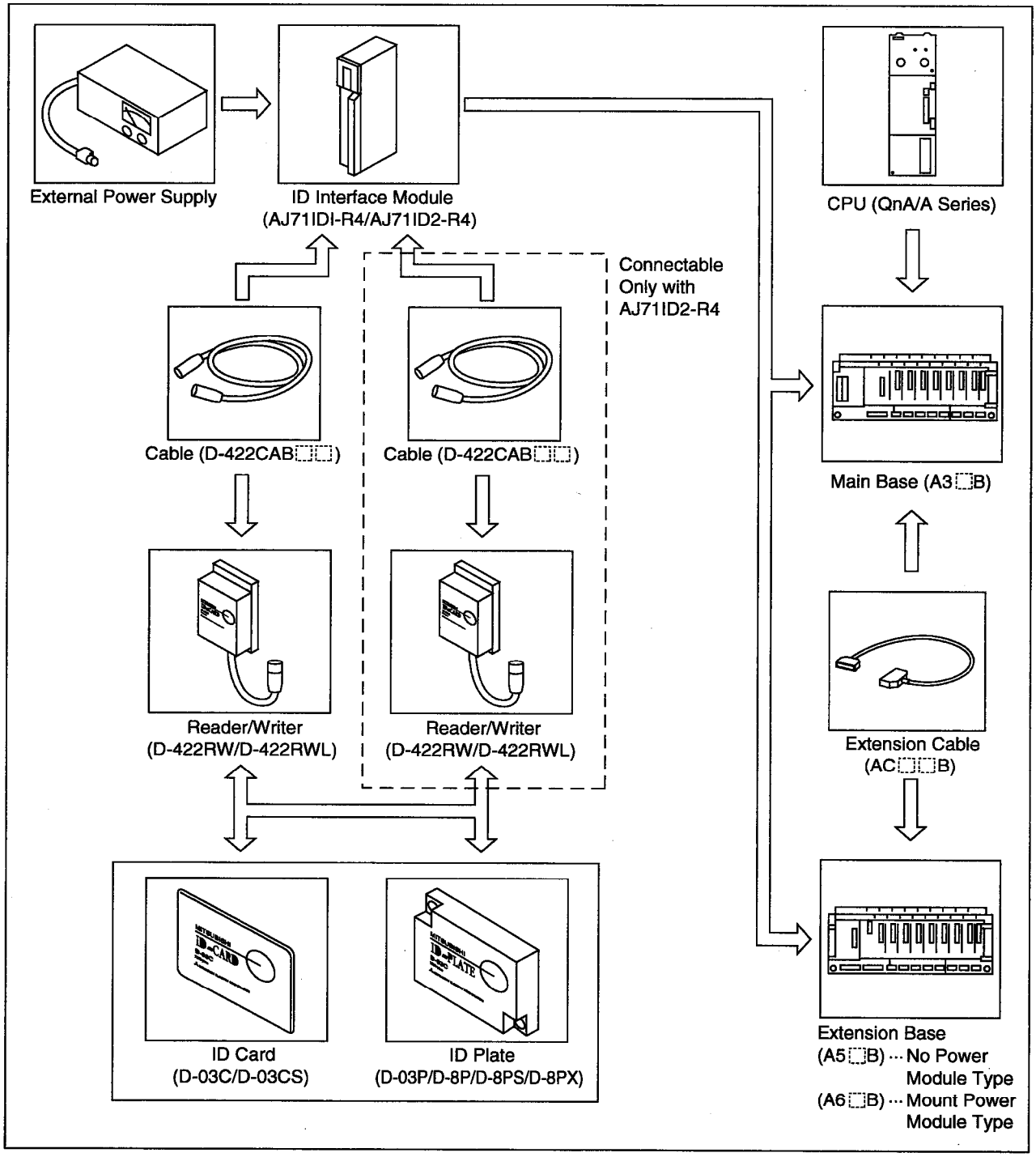


Fig. 2.1

2.1.2 Overall Configuration of A1SJ71ID1-R4/A1SJ71ID2-R4

Figure 2.2 shows the overall configuration of the AnS-series system with A1SJ71ID1-R4/ A1SJ71ID2-R4.

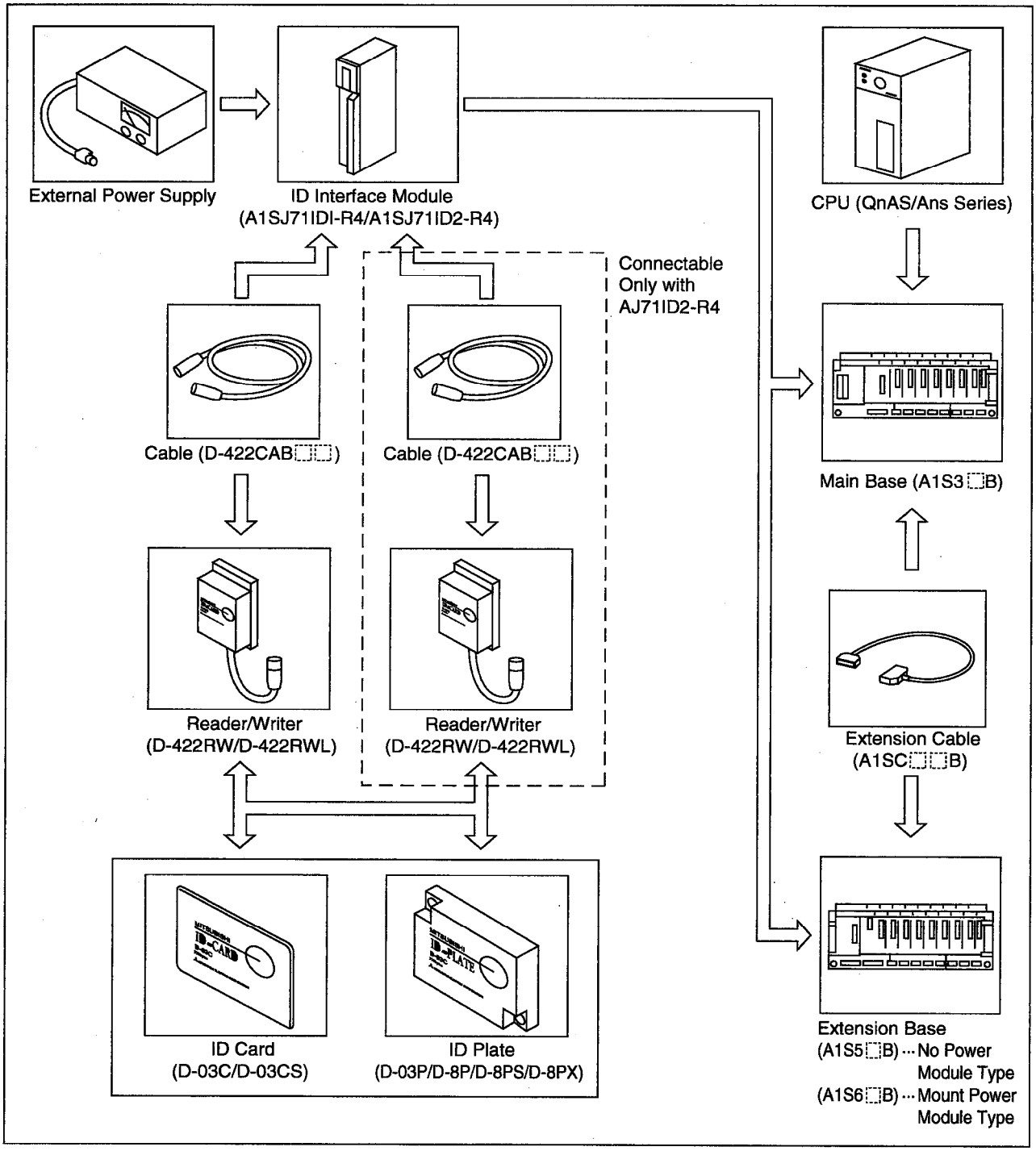


Fig. 2.2

2.2 Precautions

(1) Maximum Installable Units

The maximum number that can be installed depends on the number of I/O points for the applied CPU. The ID interface module uses 32 I/O points, one slot.

(2) Base Unit for the use with ID interface module

The ID interface module can be used by installing it to the basic base unit or additional base unit slot, except in conditions described below: When installed to an additional base unit without a power module (A5xB, A1Sx5 model base unit), there may be insufficient power capacity. Refrain from installing in this manner as much as possible.

If installing in this manner, select the power module and additional cable with consideration to the electric current capacity of the basic base unit's power module and voltage decrease of the additional cable. (Refer to the sequencer CPU user's manual for details.)

(3) Cannot Install to Remote I/O Station

The ID interface module cannot be installed to the remote I/O station.

(4) Applicable PC CPU

ID Interface Module	Applicable PC CPU
AJ71ID1-R4 AJ71ID2-R4	A1, A1N A2, A2N (S1), A2A (S1) A3, A3N, A3A, A3U A4U Q2A (S1), Q3A, Q4A
A1SJ71ID1-R4 A1SJ71ID2-R4	A1S, A1SJ A2S, A2AS (S1) Q2ASCPU (S1), Q2ASHCPU (S1)

2.3 Configuration Device List

(1) The required devices to use the ID interface module are indicated below:

Item Name		Model Name	Reference	
ID Interface Module		AJ71ID1-R4	A-Series ID Interface Module with One Reader/Writer Connection 1 unit	
		AJ71ID2-R4	A-Series ID Interface Module with One Reader/Writer Connection 2 units	
		A1SJ71ID1-R4	AnS-Series ID Interface Module with One Reader/Writer Connection 1 unit	
		A1SJ71ID2-R4	AnS-Series ID Interface Module with One Reader/Writer Connection 2 units	
Reader/Writer		D-422RW	For Communication with Data Carrier	
		D-422RWL		
Cable		D-422CAB10	10m (32.81 ft.) Length	For Connection with Reader/Writer (D422RW/D422RWL) and ID Interface Module
		D-422CAB30	30m (98.34 ft.) Length	
		D-422CAB50	50m (164.04 ft.) Length	
		D-422CAB100	100m (328.03 ft.) Length	
Data Carrier	ID Card	D-03C	Memory Size: 320 Bytes (160 Words)	
		D-03CS	Memory Size: 320 Bytes (160 Words), Small Type	
	ID Plate	D-03P	Memory Size: 320 Bytes (160 Words)	
		D-8P	Memory Size: 8 K Bytes (4 K Words)	
		D-8PS	Memory Size: 8 K Bytes (4 K Words), Small Type	
		D-8PX	Memory Size: 8K Bytes (4 K Words), Battery Replacement Type	

(2) ID Sytem

Item Name	Model Name	Reference	
Reader/Writer	D232RW	RS-232C Communication with ID Interface Module	
Handy Controller	D-20HC	Portable Handy Controller	
Reader/Writer for Handy Controller	D-20HC-RW	Handy Controller (D-20HC) Add-On Installation	
Conversion Module	D-232IF	RS-422/RS-232C Conversion Interface	
Application Software	SW1IVW-AIDP	General PC Software Package for Windows Ver. 3.1 and Windows NT Ver. 3.51 (3.5 in. FD)	1.44M Format
Cable	D-232CAB10	Connection cable for D-232RW and general PC 10 m (32.81 ft.) Length	
	AC30R2	DSUB 25 Pins ↔ DSUB 25 Pins	Data Transfer Cable (Connect between D-20HC and D232IF, D-20HC and PC, PC and D-232IF)
	AC30N2A		
	F2-232CAB		
	F2-232CAB-1	DSUB 9 Pins ↔ DSUB 25 Pins	
	F2-232CAB-2	DSUB 14 Pin Half Pitch ↔ DSUB 25 Pins	
Power Supply Adapter	D-20HC-PS	For D-232IF Power Supply	

*1 When communicating with the data carrier, one of the following is required: D-20HC-RW, D-232CAB□ + D-232RW, or cable + D-232IF (D-422RW/D-422RWL).

3 Specification

This chapter describes the specification and functions of the ID system.

3.1 ID System Specification

This section describes about the ID system specification.

3.1.1 ID Interface Module Specification

The following describes the ID interface module specification.

Item		Specification			
Model		AJ71ID1-R4	AJ71ID2-R4	A1SJ71ID1-R4	A1SJ71ID2-R4
Connectable Reader/Writer		D-422RW, D-422RWL			
Maximum Number of Reader/Writers		1	2	1	2
Cable		D-422CAB10 (10 m (32.81 ft.)), D-422CAB30 (30 m (98.43 ft.)), D-422CAB50 (50 m (164.04 ft.)), D-422CAB100 (100 m (328.03 ft.)			
Data Carrier		D-03C, D-03CS, D-03P, D-8P, D-8PS, D-8PX			
Number of Points		32 Points			
Number of Slots		1 Slot			
Consumed Electricity	5 VDC	0.25 A (Internal Supply from PC)			
	External Power Supply 24 VDC	0.1 A	0.15 A	0.1 A	0.15 A
Weight		0.63 kg (1.39 lb)			

Supply 24 VDC externally for the operation of the reader/writer. If the power is not supplied, the reader/writer will not operate.

3.1.2 Data Carrier Specification

(1) ID Plate (D-03P, D-8P, D8PS, D-8PX)

The following indicates the ID plate specification.

Item				Specification			
Model				D-03P	D-8P	D-8PS	D-8PX
Memory Size				160 Words (320 Bytes)	4095 Words (8,190 Bytes)		
Communication Distance (D-422RW)	Recommended	Static		30 to 40 mm (1.18 to 1.57 in.)	50 to 60 mm (1.97 to 2.36 in.)	30 to 40 mm (1.18 to 1.57 in.)	30 to 40 mm (1.18 to 1.57 in.)
		Moving		30 mm (1.18 in.)	50 to 60 mm (1.97 to 2.36 in.)	40 to 50 mm (1.57 to 1.97 in.)	40 to 50 mm (1.57 to 1.97 in.)
	Max.	No Metal		70 mm (2.76 in.)	90 mm (3.54 in.)	70 mm (2.76 in.)	70 mm (2.76 in.)
		Metal Surface Mount		50 mm (1.97 in.)	70 mm (2.76 in.)	50 mm (1.97 in.)	50 mm (1.97 in.)
Communication Distance (D-422RWL)	Recommended	Static	No Metal	80 to 150 mm (3.15 to 5.91 in.)	100 to 200 mm (3.94 to 7.87 in.)	80 to 170 mm (3.15 to 6.70 in.)	80 to 170 mm (3.15 to 6.70 in.)
			Metal Surface Mount *1	60 to 100 mm (2.36 to 3.94 in.)	60 to 140 mm (2.36 to 5.51 in.)	80 to 120 mm (3.15 to 4.72 in.)	80 to 120 mm (3.15 to 4.72 in.)
			Metal Surface Mount *2	50 to 60 mm (1.97 to 2.36 in.)	60 to 90 mm (2.36 to 3.54 in.)	50 to 70 mm (1.97 to 2.76 in.)	50 to 70 mm (1.97 to 2.76 in.)
		Moving	Metal Surface Mount *3	60 to 100 mm (2.36 to 3.94 in.)	60 to 140 mm (2.36 to 5.51 in.)	80 to 120 mm (3.15 to 4.72 in.)	80 to 120 mm (3.15 to 4.72 in.)
	Max.	No Metal		200 mm (7.87 in.)	260 mm (10.24 in.)	220 mm (8.66 in.)	220 mm (8.66 in.)
		Metal Surface Mount *1		140 mm (5.51 in.)	180 mm (7.09 in.)	160 mm (6.30 in.)	160 mm (6.30 in.)
		Metal Surface Mount *2		90 mm (3.54 in.)	140 mm (5.51 in.)	100 mm (3.94 in.)	100 mm (3.94 in.)
Response Speed				Approx. 110 mS/20 Words			
Power Supply				Built-In Lithium Battery (Not Replaceable)			Built-in Lithium Battery (Replaceable)
Battery Life	Data Saved			8 Years (at 25°C)		10 years (at 25°C)	3 Years (at 25°C)
	Number of Communications			2 Million Times Condition: (16 Words/transmission, 20°C)			1 Million Times Condition: (16 Words/transmission, 20°C)
Send/Receive Element				Dedicated Coil			
Modulation Frequency				409.6 kHz			
Usage Ambient Temperature				−20 to 70°C			−10 to 60°C
Usage Ambient Humidity				10 to 90 %RH			
Protection Structure				IP67 (IEC Regulation)			IP54 (IEC Regulation)
Vibration Durability				Durability 10 to 55 kHz Vibration Width 1.5 mm (0.059 in.) 30 minutes for each direction X, Y, and Z			
Shock Durability				Durability 981 m/S^2 (Approx. 100 g, 0.22 lb), Three times for each direction X, Y, and Z			
Material				Main Unit Case: PBT Resin, Filling Area: Urethane Resin			
Weight				0.04 kg (0.08 lb)	0.08 kg (0.17 lb)	0.05 kg (0.11 lb)	0.035 kg (0.077 lb)

*1 Mount metal surface with a 20 mm (0.79 in.) spacer for both reader/writer and data carrier.

*2 Mount metal surface for both reader/writer and data carrier.

*3 Mount metal surface with a 40 mm (1.57 in.) spacer for data carrier and a 20 mm (0.79 in.) spacer for the reader/writer.

(2) ID Card (D-03C, D-03CS)

The ID card specification is as follows:

Item				Specification	
Model				D-03C	D-03CS
Memory Size				160 words (320 bytes)	
Communication Distance (D-422RW)	Recommended	Static		40 to 50 mm (1.57 to 1.97 in.)	
		Moving		40 to 50 mm (1.57 to 1.97 in.)	
	Max.	No Metal		70 mm (2.76 in.)	
Communication Distance (D-422RWL)	Recommended	Static	No Metal	80 to 170 mm (3.15 to 6.69 in.)	
			Metal Surface Mount *1	80 to 120 mm (3.15 to 4.72 in.)	
			Metal Surface Mount *2	Impossible	
		Moving	Metal Surface Mount *3	80 to 120 mm (3.15 to 4.72 in.)	
	Max.	No Metal		220 mm (8.66 in.)	
		Metal Surface Mount *1		160 mm (6.30 in.)	
		Metal Surface Mount *2		Impossible	
Response Speed				Approx. 110 mS/20 Words	
Power Supply				Built-In Lithium Battery (Not Replaceable)	
Battery Life		Data Saved		5 Years (at 25°C)	
		Number of Communications		200,000 Times (Condition: 16 Word Read/Transmission, 20°C)	
Send/Receive Element				Dedicated Coil	
Modulation Frequency				409.6 kHz	
Usage Ambient Temperature				−10 to 60°C	
Usage Ambient Humidity				10 to 90 %RH	
Protection Structure				IP67 (IEC Regulation)	IP54 (IEC Regulation)
Vibration Durability				Durability 10 to 55 kHz Vibration Width 1.5 mm (0.059 in.) 30 minutes for each direction X, Y, and Z	
Shock Durability				Durability 981 m/S^2 (Approx. 100 g (0.22 lb)), Three times for each direction X, Y, and Z	
Weight				0.012 kg (0.026 lb)	0.020 kg (0.044 lb)

*1 Mount metal surface with a 20 mm (0.79 in.) spacer for both reader/writer and data carrier.

*2 Mount metal surface for both reader/writer and data carrier.

*3 Mount metal surface with a 40 mm (1.57 in.) spacer for data carrier and a 20 mm (0.79 in.) spacer for the reader/writer.

3.1.3 Reader Writer (D-422RW, D-422RWL) Specification

The reader/writer specification for D-422RW and D-422RWL is as follows:

Item	Specification	
Model	D-422RW	D-422RWL
Power Supply	24 VDC	
Consumed Electricity	0.05 A	
Communication Distance	It is differed according to data carrier. Details regarding the specification refer to data carrier	
Communication Speed	9600BPS	
Send/Receive Element	Dedicated Coil	
Modulation Frequency	409.6 kHz	
Usage Ambient Temperature	–20 to 70°C	–20 to 60°C
Usage Ambient Humidity	10 to 90%RH	
Display Lamp	POWER, SD, RD	
Protection Structure	IP67 (IEC Regulation)	
Vibration Durability	Durability 10 to 55 Hz Vibration Width 1.5 mm (0.059 in.) 30 minutes for each direction X, Y, and Z	
Shock Durability	Durability 981 m/S^2 (Approx. 100 g, 0.22 lb), Three times for each direction X, Y, and Z	
Voltage Durability	Between Cable Terminal and Case (500 VAC) 50/60Hz	
Insulation Resistance	Between Cable Terminal and Case 50MΩ (500 VDCM)	
Meterial	Main Unit Case: PBT Resin, Filling Area: Urethane Resin	
Weight	Approx. 0.32 kg (0.71 lb)	Approx. 0.85 kg (1.87 lb)

3.2 ID Interface Module Functions

The following indicates the functions that can be performed by the ID interface module.

Function	Command	Command Code (ASCII Code)	Details	Application	Reference
Read	Read	RD (4452H)	Read data from data carrier.	Read data	6.6.1
	Comparison Read	CR (5243H)	Read data from data carrier and compare data.	Read highly reliable data	6.6.2
	Continuous Read	AR (5241H)	Perform read data carrier continuously until the data carrier is within the communication range of reader/writer. When in the communication range, read data from the data carrier.	Read data from a moving object	6.6.3
	Continuous Comparison Read	SR (5253H)	Perform read data carrier continuously until the data carrier is within the communication range of the reader/writer. When in the communication range, read data from the data carrier, and compare data.	Read data from a highly reliable moving object	6.6.4
	Continuous Fast Read	FR (5246H)	Same as AR but the processing speed is 25% increased.	Read data from a high speed moving object	6.6.5
Write	Write	WD (4457H)	Write data to the data carrier.	Write data	6.7.1
	Comparison read	CW (5743H)	Write data to the data carrier and compare data.	Write highly reliable data	6.7.2
	Continuous Write	AW (5741H)	Perform continuous write until the data carrier is within the communication range of the reader/writer. When in the communication range, the data is written to the data carrier.	Write data to a moving object	6.7.3
	Continuous Comparison Write	SW (5753H)	Perform continuous write until the data carrier is within the communication range of the reader/writer. When in the communication range, the data is written to the data carrier and comparison is performed.	Write data to a highly reliable moving object	6.7.4
	Continuous Fast Write	FW (5746H)	Same as AW but the processing speed is increased by 10%.	Write data to a high speed moving object	6.7.5
	Batch Write	FI (4946H)	Write specified data to the data carrier.	Clear all of specified data	6.7.6
Verify	Comparison	CM (4D43H)	Compare data on the ID interface module with data at carrier.	Search data carrier	6.8.1
Copy	Data Copy	CO (4F43H)	Copy data between the data carriers via channels 1 and 2.	Create copy Move line data	6.9.1
Erase	Clear	CL (4C43H)	Clears all areas of data carrier to zero. (Overwrites "0" in all areas.)	Clear all with zero	6.10.1
Set	End Usage (Set Sleep Mode)	OF (464FH)	Prevent built-in battery consumption by changing the data carrier mode to save state (sleep mode).	Quite usage at normal distance	6.11.1
	Start Usage (Cancel Sleep Mode)	ON (4E4FH)	Change the data carrier mode to normal use state. This is the factory default.	Start usage at normal distance	6.11.2

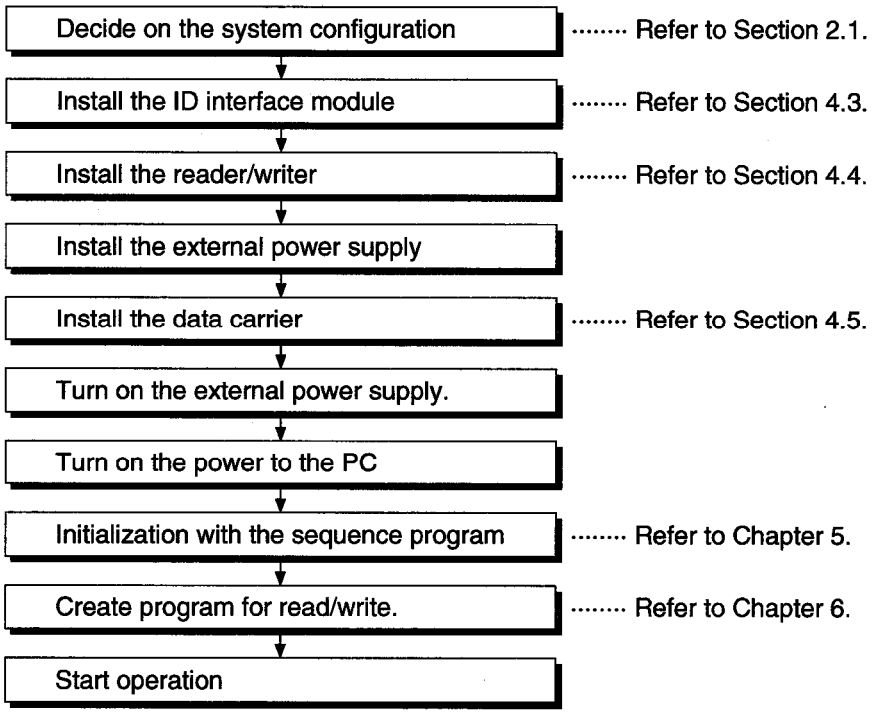
Function	Command	Command Code (ASCII Code)	Details	Application	Reference
Command	Cancel Continuous Command	—	Force exit continuous command.	To cancel the continuous command.	6.12
	Error Cancel Command	—	Perform error cancel procedure (turn off error LED, reset error detection signal, clear error code storage area in the buffer memory).	To cancel the error.	6.13
Initial Setting	Continuous Command Execute Interval Specification	—	Specify the continuous command execution interval. (AR, SR, FR, AW, SW, FW, CO) From Oms to 3276.S are specified in 100 ms intervals.	To set the continuous command execution interval.	6.4
	Battery Life Evaluation Value Specification	—	Battery life is judged expired when the total transmission number exceeds this value.	To manage the battery life of the data carrier.	6.4
	Number of Retries	—	When the command cannot be executed normally, the error processing is not performed, but retries the command for the specified number of times. (Default: 3 times)	Error prevention from noise and maximum communication distance.	6.4
	Processing Module Specification	—	Select whether to perform the data processing in the word unit or byte unit. Default is word unit.	To specify the data processing module for transmission to/from PC, etc.	6.4

4 Settings and Procedures Before Operation

4.1 Settings Before Operation

4.1.1 Pre-operation Procedure Overview

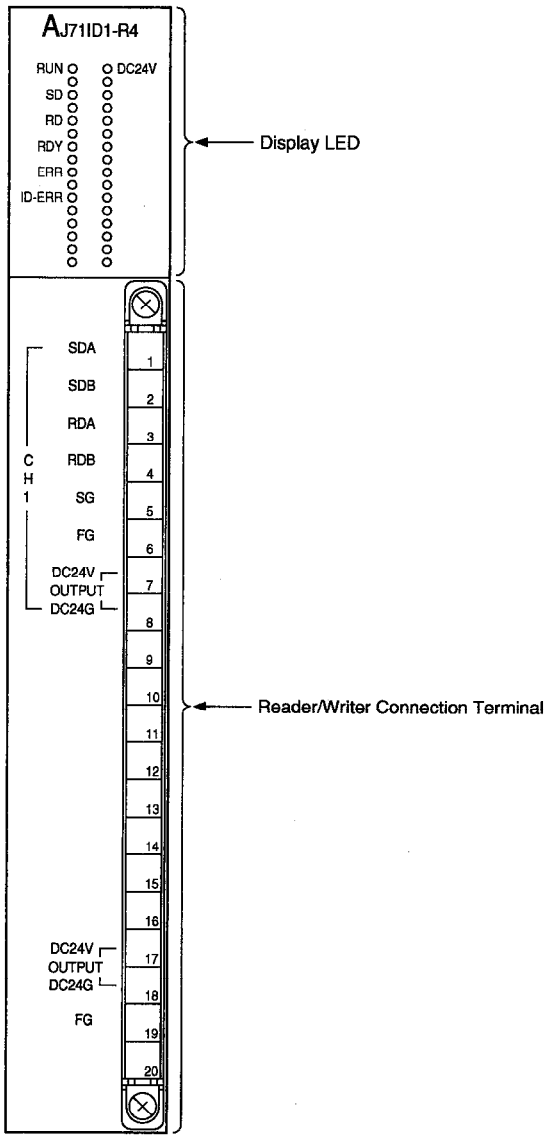
The preparation procedure for the system start up with the ID interface module is summarized below:



4.1.2 Names of Parts in Each Module

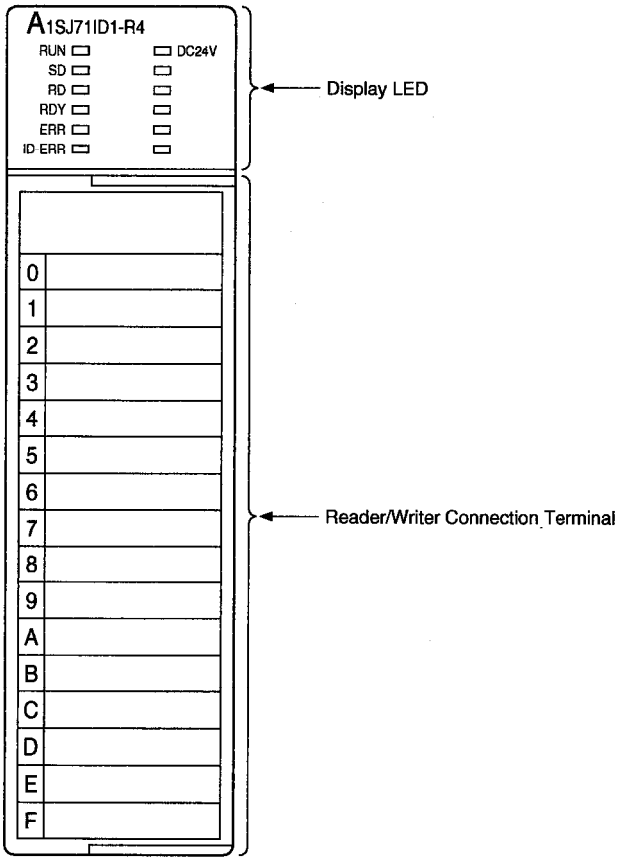
(1) AJ71ID1-R1/AJ71ID2-R4

The module diagram shows AJ71ID1-R4.



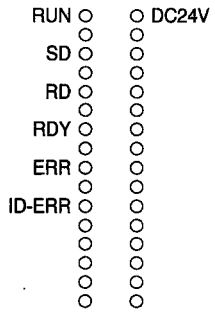
(2) A1SJ71ID1-R4/A1SJ71ID2-R4

The module diagram shows A1SJ71ID1-R4.

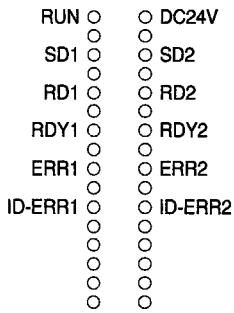


4.2 Details of the LED Display

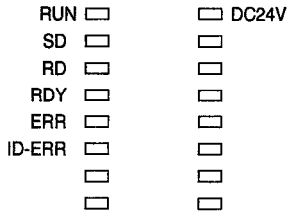
(1) Display LED of AJ71ID1-R4



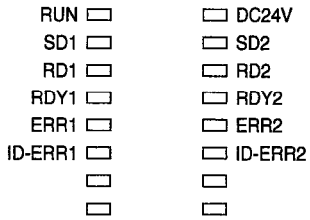
(2) Display LED of AJ71ID2-R4



(3) Display LED of A1SJ71ID1-R4



(4) Display LED of A1SJ71ID2-R4



LED Name		LED Display Detail	When LED is On (Lit/Flashing)	When LED is Off (No Light)	Initial State of LED
AJ71ID1-R4 A1SJ71ID1-R4	**AJ71ID2-R4 A1SJ71ID2-R4**				
RUN	RUN	Normal Operation Status	Normal	Error	ON
SD	SD1	CH.1 Transmission Status	Flashing During Data Transmission		OFF
RD	RD1	CH.1 Receive Status	Flashing During Data Receive		OFF
RDY	DRY1	CH.1 Ready	Normal	Error	ON
ERR	ERR1	CH.1 CPU Communication Error	Error Occurred	Normal	OFF
ID-ERR	ID-ERR1	CH.2 Data Carrier Communication Error	Error Occurred	Normal	OFF
DC24 V	DC24 V	External Power Supply	Normal	Error	ON
—	SD2	CH.2 Transmission Status	Flashing During Data Transmission		OFF
	RD2	CH.2 Receive Status	Flashing During Data Receive		OFF
	RDY2	CH.2 Ready	Normal	Error	ON
	ERR2	CH.2 CPU Communication Error	Error Occurred	Normal	OFF
	ID-ERR2	CH.2 Data Carrier Communication Error	Error Occurred	Normal	OFF

POINT

If continuous command execution interval has been specified, the RDY (RDY1, RDY2) signal flashes during the timer is working.

4.3 Installing ID Interface Module

This section describes the precautions and installation environment of the ID interface module from unpacking to complete installation.
Refer to the user's manual of your PC CPU module for the details of the installation and setting of the ID interface module itself.

4.3.1 Precautions on Handling

The following is the precautions on handling the ID interface module:

(1) The ID interface module case is made of resin, so do not drop or give a great shock to it.
(2) Do not remove the print board of each module from the case. This could be a cause of module malfunction.
(3) Be careful not to allow for particles such as piece of wire to enter the module through the upper area when wiring. When particles do enter, make sure to remove them.
(4) Perform tightening of the module hold screws, terminal screws, etc. in the following range:

Refer to ex-version 4-6

Screw Location	Tightening Torque Range
Terminal Screw (M3.5 Screw) A1SJ71ID ⬚-R4	59 to 88 N·cm (6 to 9 kg·cm) [5.2 to 7.8 lb·inch]
Terminal Screw (M3 Screw) AJ71ID ⬚-R4	78 to 112 N·cm (8 to 12 kg·cm) [6.93 to 10.4 lb·inch]
Terminal Hold Screw (M3.5 Screw)	59 to 88 N·cm (6 to 9 kg·cm) [5.2 to 7.8 lb·inch]
Module Hold Screw (M4 Screw)	78 to 112 N·cm (8 to 12 kg·cm) [6.93 to 10.4 lb·inch]

4.3.2 Installation Environment

Avoid installing the A-series sequencer in the following environment:

(1) Areas where the ambient temperature exceeds the range of 0 to 55°C.
(2) Areas where the ambient humidity exceeds the range of 10 to 90% RH.
(3) Areas where frost develops from sudden temperature change.
(4) Areas with corrosive gas or flammable gas.
(5) Areas with a lot of superconductor elements such as dust, metal dust, oil mist, sodium, or organic solvent.
(6) Areas with direct sunlight.
(7) Areas with strong power fields or strong magnetic fields.
(8) Areas where the main module may receive direct vibration or shock.

4.4 Installing Reader/Writer (D-422RW/D422RWL)

The Installation for the reader/writer is described below:

4.4.1 Precautions for Wiring

In order to have the ID interface module to its full functions and to create a highly reliable system, an external wiring with least susceptibility to noise is necessary.
The following indicates the external wiring precautions for the ID interface module:

(1) Do not bundle with nor leave the wires close to loaded wires other than the main circuit wire, high voltage wire, and PC
This causes noises and surge induction.
Wire cables at least 100 mm (3.94 inches) away from above wires.

(2) The ID interface module SG and FG are cross-wired when shipped. Perform class 3 grounding of the ID interface module as cross-wired. If the grounding is not performed, a module malfunction may result.

(3) When using the devices such as the invertor and servo motor, they might malfunction due to the magnetic effects of the main module or cable. Make sure to perform class 3 grounding.

(4) The wiring is not completed for the ID interface module connection side of the D-422CAB ☐☐ cable. Complete the wiring with solderless terminals, etc.

(5) Supply 24VDC from an external power source to the ID interface module to operate the reader/writer.
When 24VDC is not supplied, the reader/writer does not operate.

(6) Do not switch the connection of the polarity for +24V and 24G of the external power. The internal fuse of the ID interface module will blow and the system will not operate.

POINT

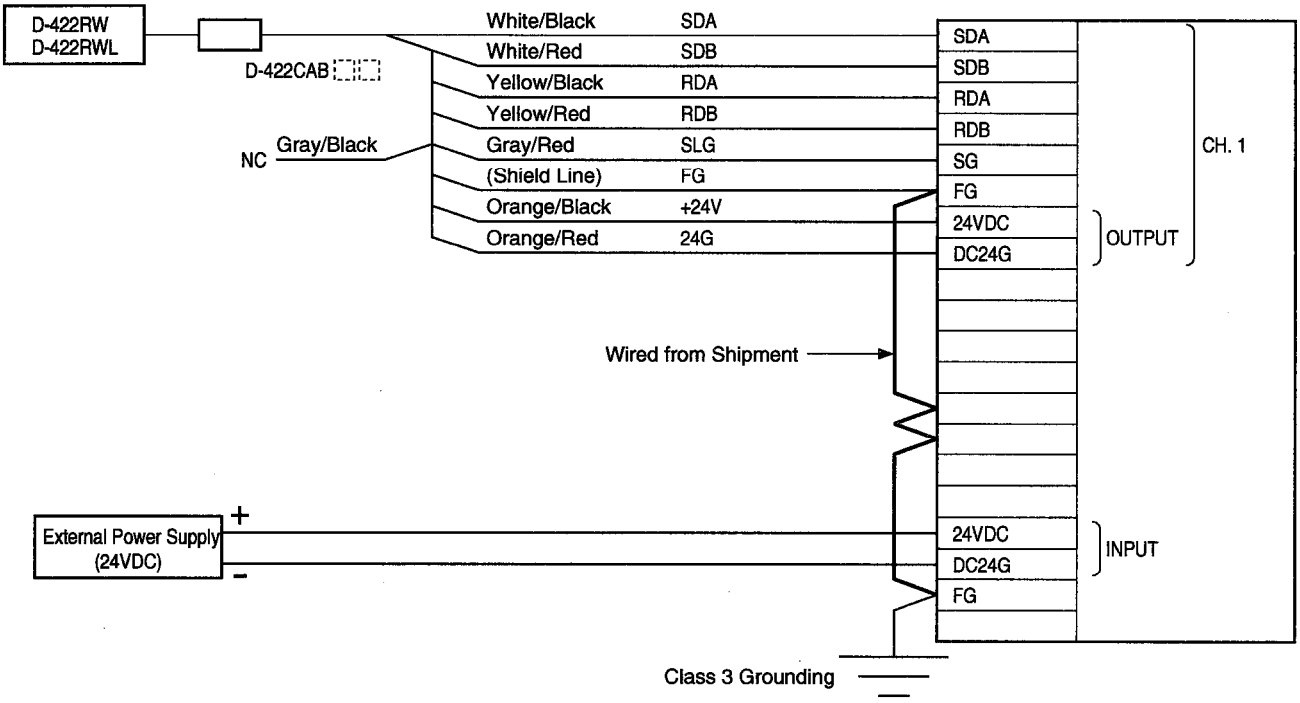
Make sure to confirm the following items. If any of following is not set accordingly, the ID interface module may operate erroneously.

- The SG and FG if the ID interface module is cross-wired at the time of shipment. Make sure to perform a class 3 grounding of the ID interface module, without removing the cross-wiring. If not, a module malfunction may occur.
- When using devices such as the invertor or servo motor, a module malfunction may occur from the magnetic effects of the main module or cable. Be sure to perform class 3 grounding.
- Do not switch the connection of the polarity for +24V and 24G of the external power. The internal fuse of the ID interface module will blow and the system will not operate.

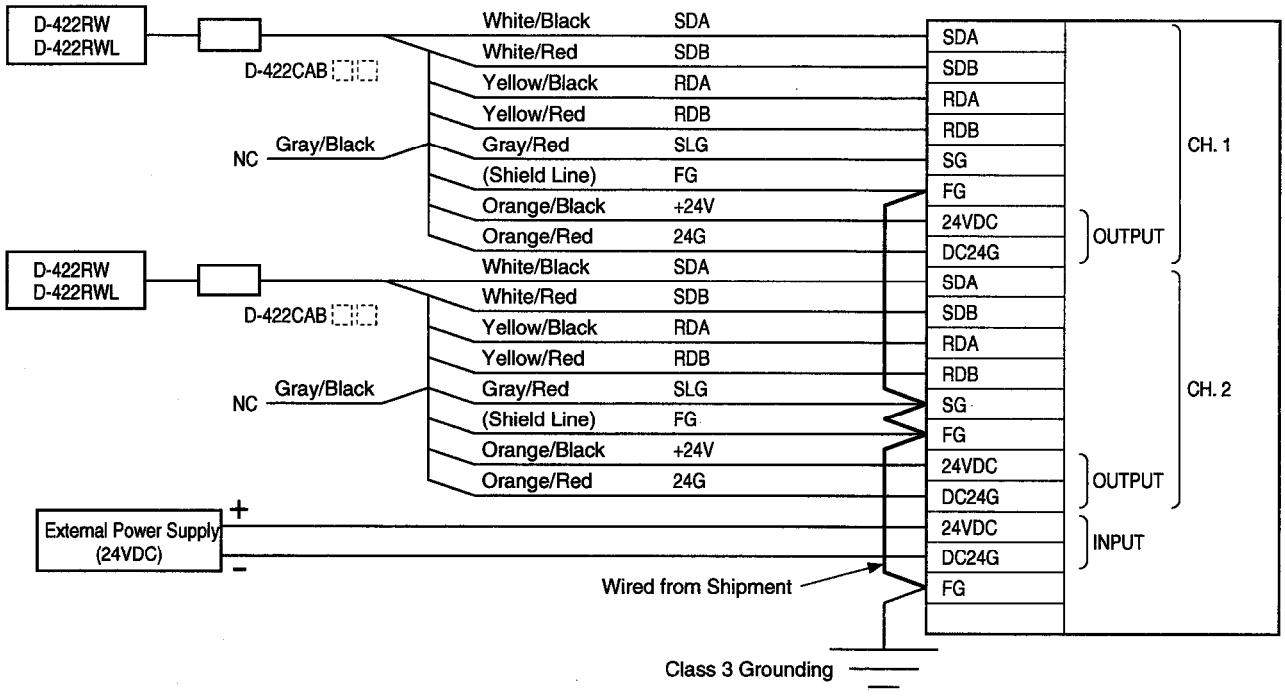
4.4.2 Wiring Reader/Writer (D-422RW / D-422RWL)

The wiring between the reader/writer and ID interface module is indicated below:

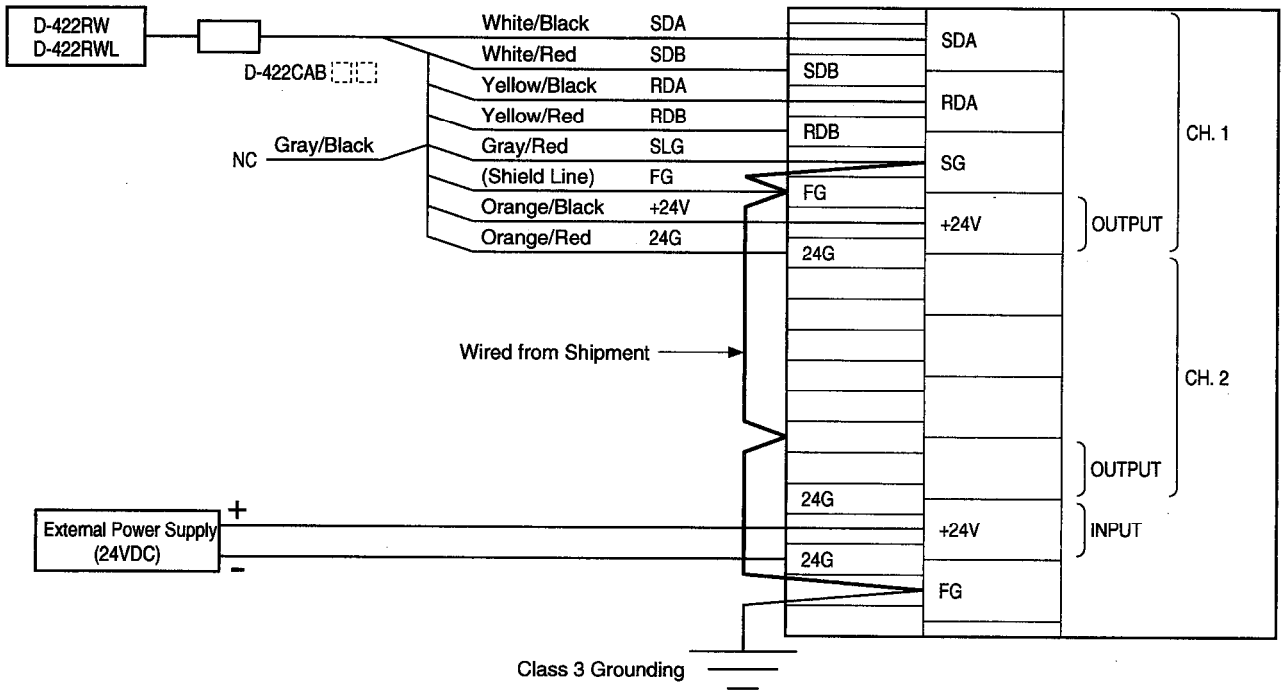
(1) AJ71ID1-R4



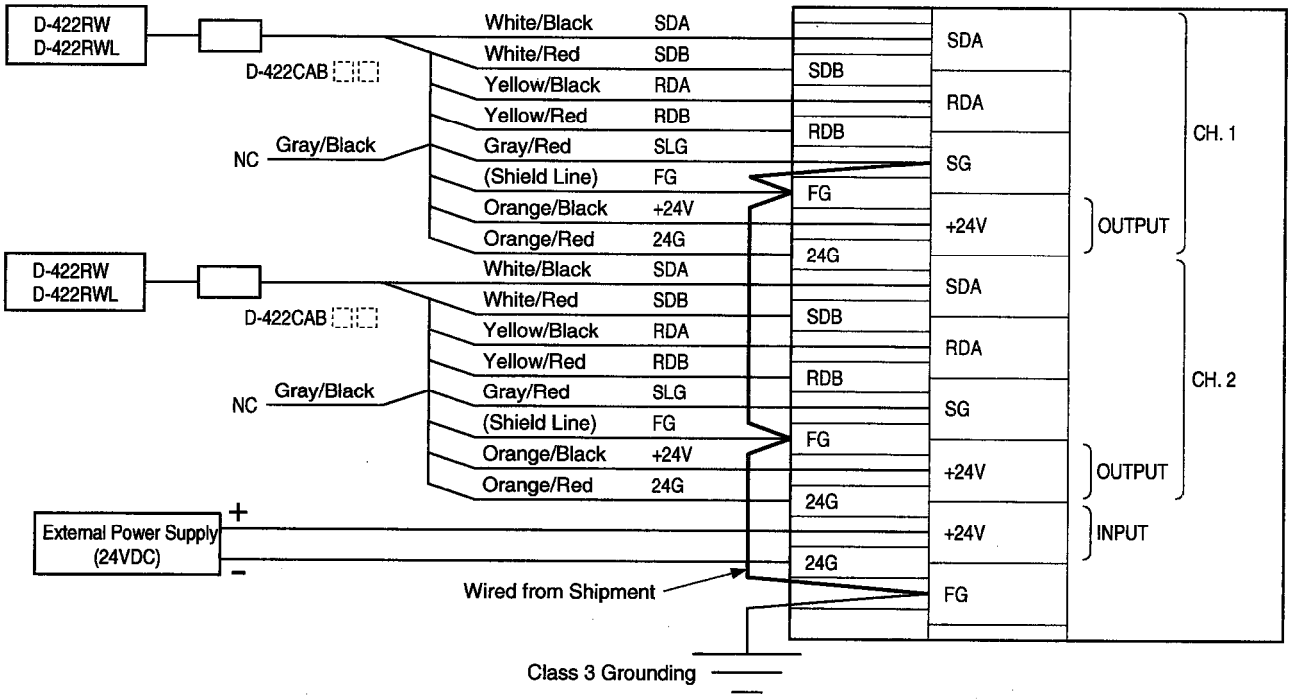
(2) AJ71ID2-R4



(3) A1SJ71ID1-R4



(4) A1SJ71ID2-R4



4.4.3 Precautions for Installation

Make sure to set the reader/writer and data carrier facing each other's front surface (printed surface).

(1) Precautions When Using D-422RW

(a) Communication Range

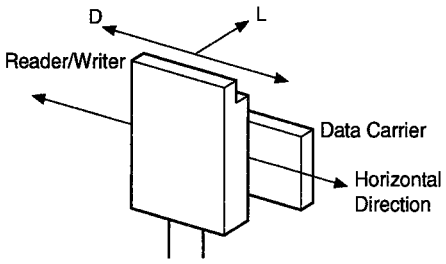
The following indicates the communication range of the reader/writer (D-422RW) and data carrier. If the data carrier exists in the communication range, a normal communication can be established.

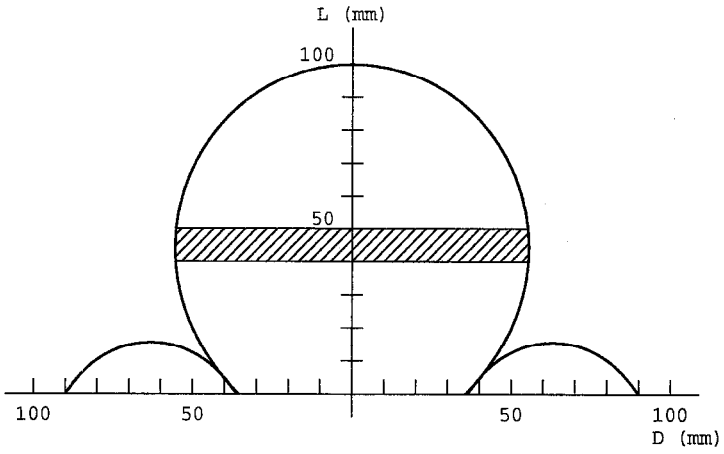
POINT

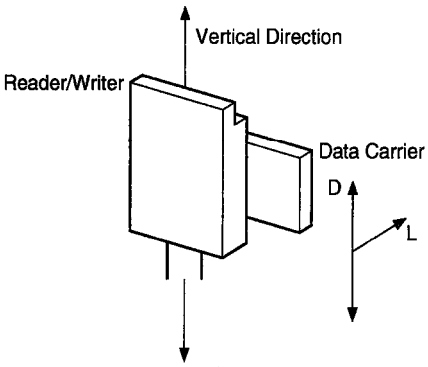
- The moving speed varies greatly when used at the maximum or minimum communication distance. Using from the distance with maximum communication range (optimal communication distance) is recommended.
- When the communication distance is short (less than 20 mm (0.77 inches), a communication error occurs because of the side rope effect (two small communication ranges on both sides).

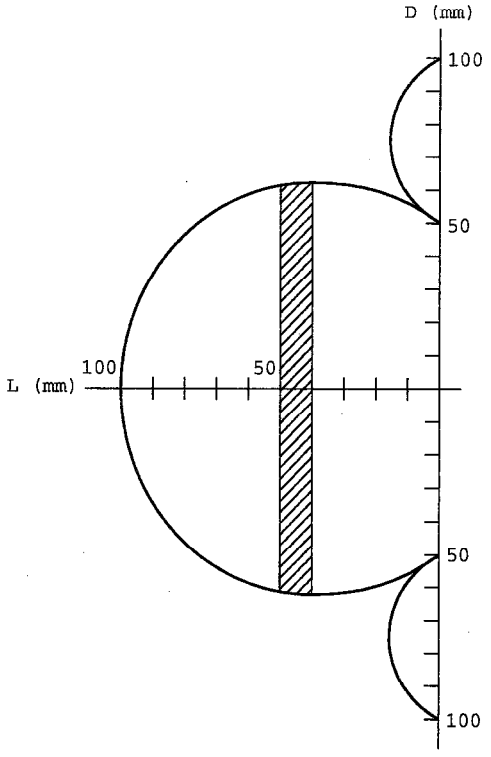
1) ID Card (D-03C) (Actual Value) +D-422RW

Optimal Communication Distance: 40 to 50 mm (1.57 to 1.97 inches)







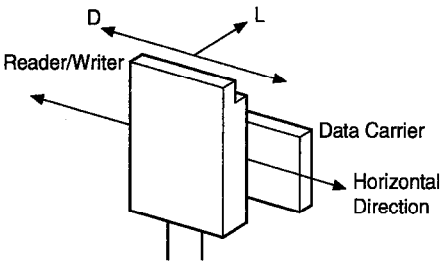


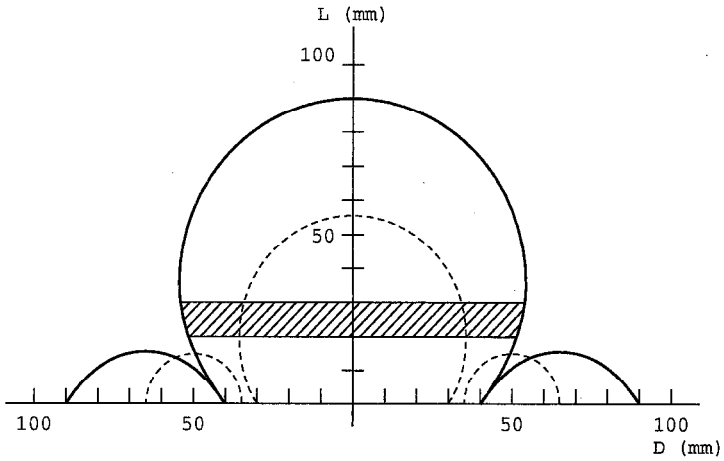
- Solid Line : No Metal

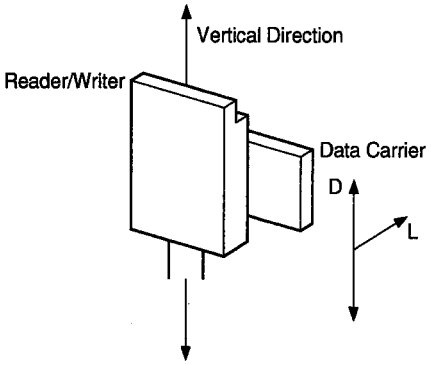
2) ID Plate (D-03P) (Actual Value) +D-422RW

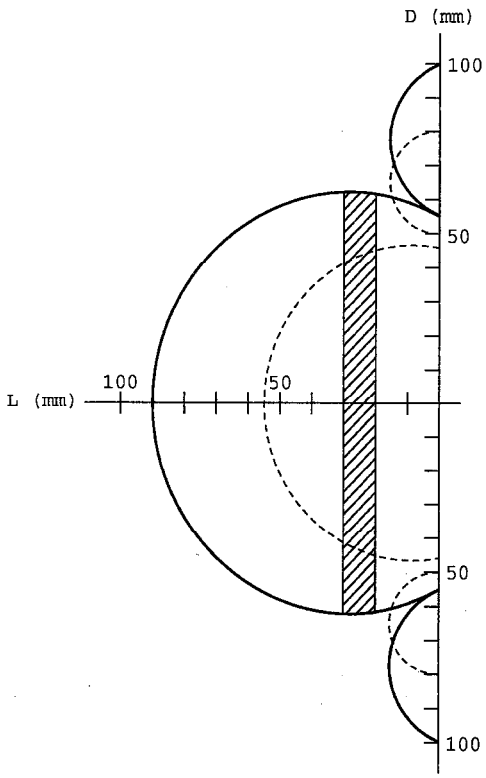
Optimal Communication Distance: 30 to 40 mm (1.18 to 1.57 inches)

- Solid Line : No Metal
- Dotted Line : Metal Mount

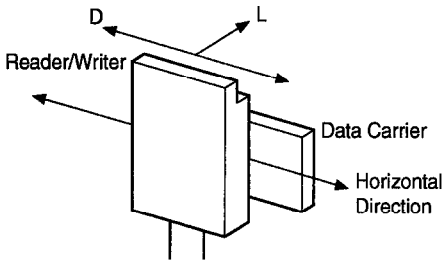


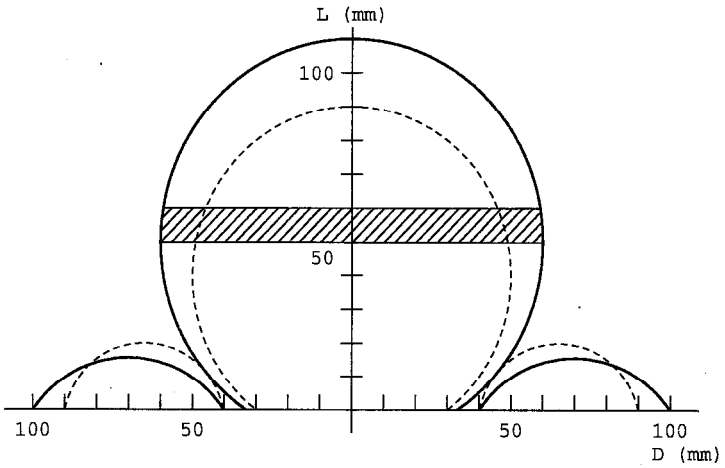


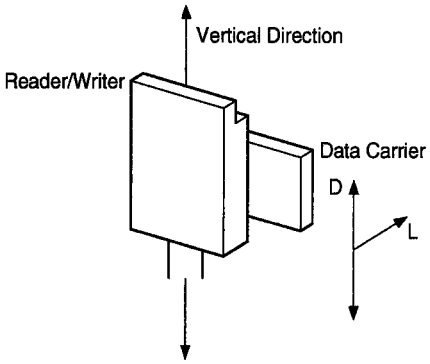


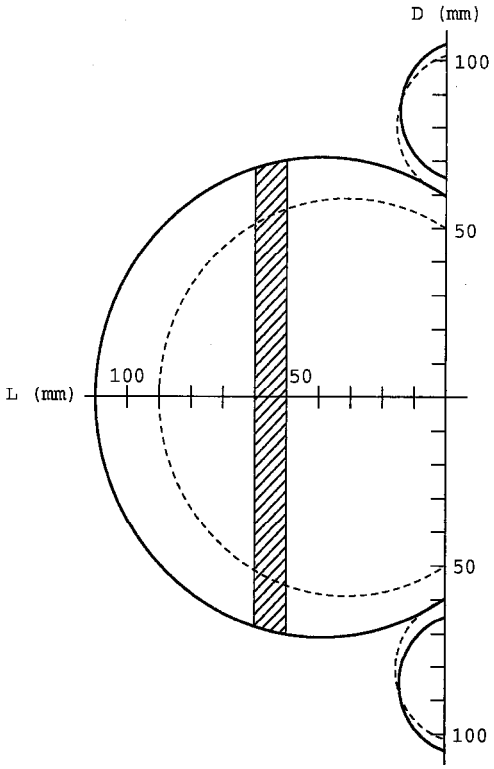


3) ID Plate (D-8P) (Actual Value) +D-422RW
Optimal Communication Distance: 50 to 60 mm (1.97 to 2.36 inches)
- Solid Line : No Metal
- Dotted Line : Metal Mount

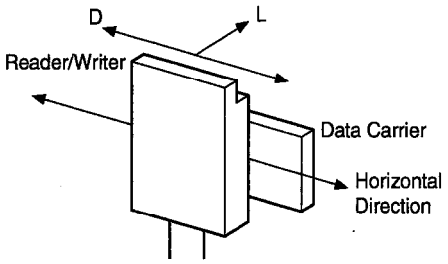


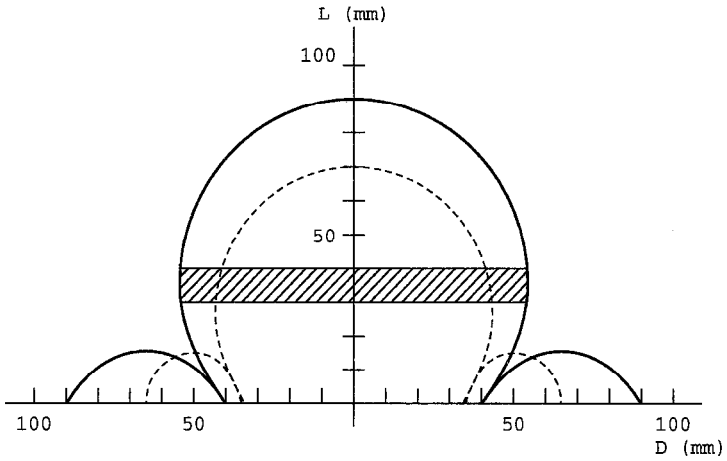


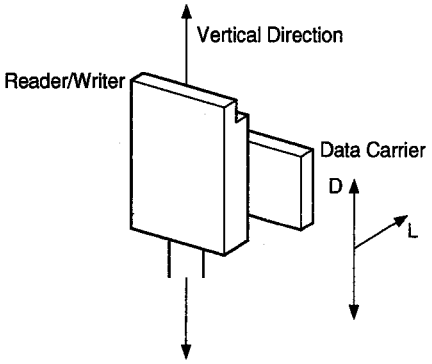


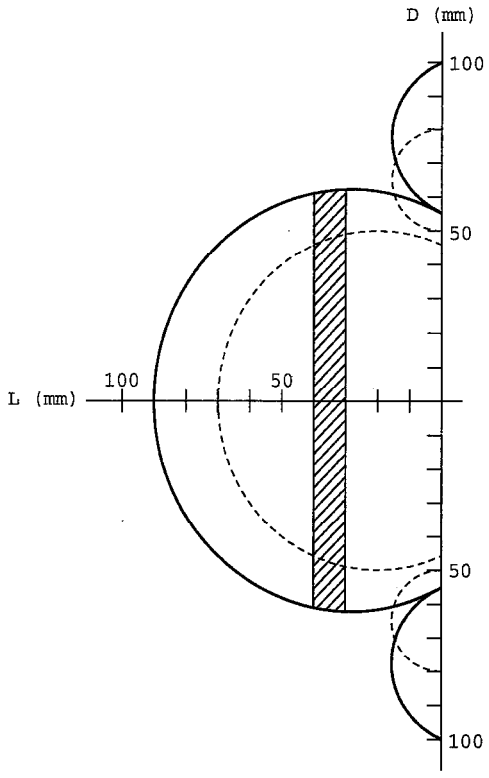


4) ID Plate (D-8PS, D-8PX, No Metal D-03CS) (Actual Value) +D-422RW
Optimal Communication Distance: 30 to 40 mm (1.18 to 1.57 inches)
- Solid Line : No Metal
- Dotted Line : Metal Mount (Excludes D-03CS)









(b) Movement Speed

The data carrier movement speed for successful communication with the reader/writer (D-422RW) is determined by its moving distance within the communication range, which is determined by the distance between the reader/writer (D-422RW) and data carrier moved, and the response time corresponding to the word count.

The movement speed data is measured under the following conditions:

- Continuous read command (AR) and metal plate installation (20 mm (0.79 inch) spacer for reader/writer, D-03C metal plate direct installation for the data carrier, no metal for D-03CS.)

For the continuous write command (AW), the moving speed decreases by 10%.

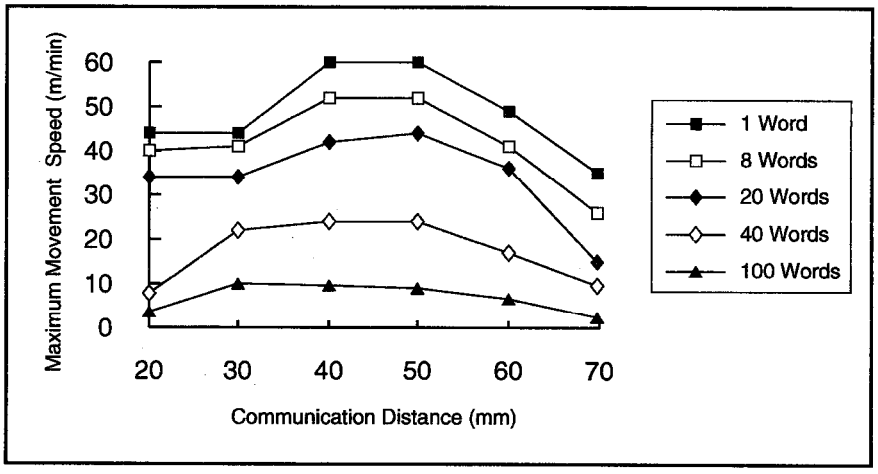
POINT

- To improve the system reliability, it is recommended to set the movement speed at least having twice as much time for allowance. This allows retries communication even if a communication error occurs due to movement speed variation of noises, which in turn improves the reliability.
- The movement speed becomes smaller when the communication distance is either far or close, so use the recommended distance (shaded area in the chart below).
- When the moving speed is low (less than 3 m/min (1.97 inches/s), the ID plate swing or communication error near the communication range border may occur. To prevent this, perform the ID plate position detection (communicate within the communication range) or verify the communication data (execute the comparison command).

1) ID Card (No metal D-03C) + D-422RW

Unit: m/min (inch/s)

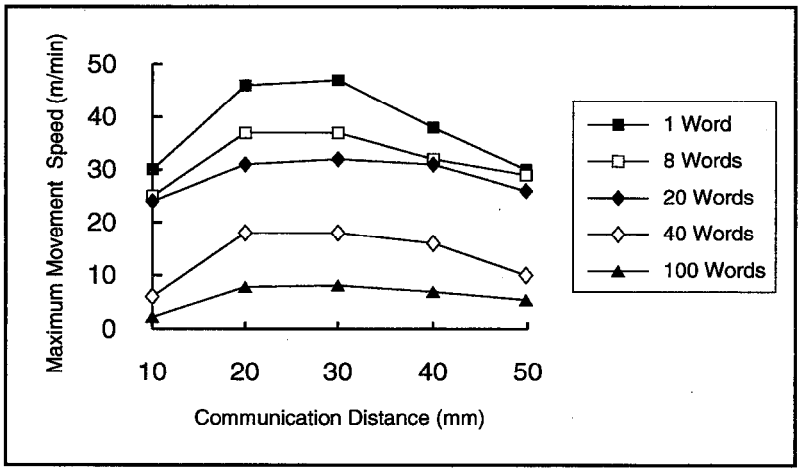
Distance / Number of Words	20 mm (0.79 inch)	30 mm (1.18 inch)	40 mm (1.57 inch)	50 mm (1.97 inch)	60 mm (2.36 inch)	70 mm (2.76 inch)
1 word	44 (28.87)	44 (28.87)	60 (39.37)	60 (39.37)	49 (32.15)	35 (22.97)
8 words	40 (26.25)	41 (26.90)	52 (34.12)	52 (34.12)	41 (26.90)	26 (17.06)
20 words	34 (22.31)	34 (22.31)	42 (27.56)	44 (28.87)	36 (23.62)	15 (9.84)
40 words	7.8 (5.12)	22 (14.44)	24 (15.75)	24 (15.75)	17 (11.16)	9.6 (6.30)
100 words	3.6 (2.36)	10 (6.56)	9.6 (6.30)	9.0 (5.91)	6.6 (4.33)	2.4 (1.58)



2) ID Plate (D-03P) + D-422RW

Unit: m/min (inch/s)

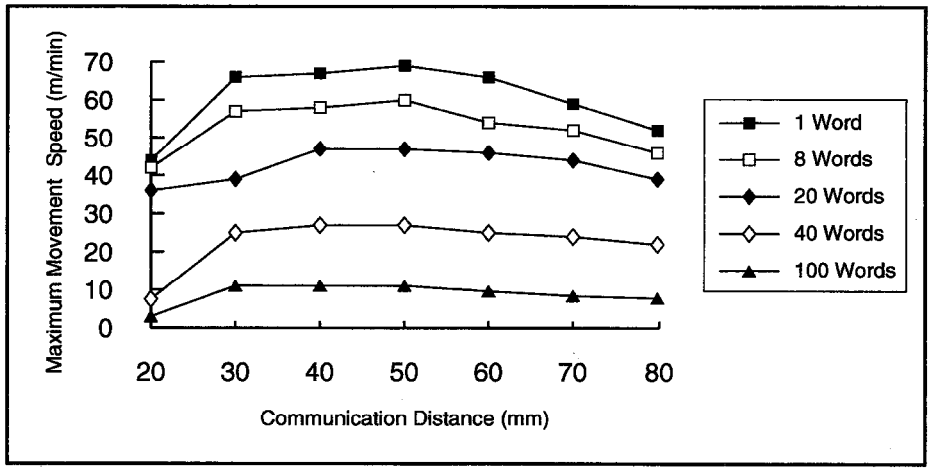
Distance / Number of Words	10 mm (0.39 inch)	20 mm (0.79 inch)	30 mm (1.18 inch)	40 mm (1.57 inch)	50 mm (1.97 inch)
1 word	30 (19.67)	46 (30.18)	47 (30.84)	38 (24.93)	30 (19.69)
8 words	25 (16.40)	37 (24.28)	37 (24.28)	32 (21.00)	29 (19.03)
20 words	24 (15.75)	31 (20.34)	32 (21.00)	31 (20.34)	26 (17.06)
40 words	6 (3.94)	18 (11.81)	18 (11.81)	16 (10.50)	10 (6.56)
100 words	2.2 (1.44)	7.8 (5.12)	8.1 (5.32)	6.9 (4.53)	5.4 (3.54)



3) ID Plate (D-8P) + D-422RW

Unit: m/min (inch/s)

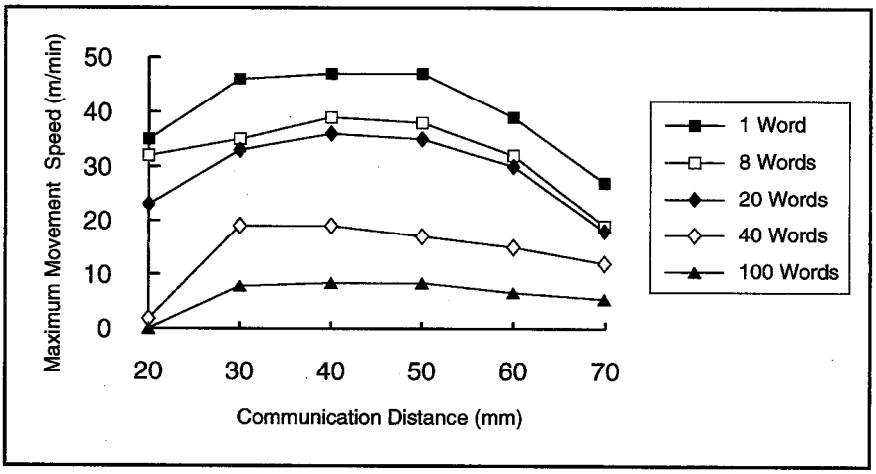
Distance / Number of Words	20 mm (0.79 inch)	30 mm (1.18 inch)	40 mm (1.57 inch)	50 mm (1.97 inch)	60 mm (2.36 inch)	70 mm (2.76 inch)	80 mm (3.15 inch))
1 word	44 (28.87)	66 (43.31)	67 (43.96)	69 (45.28)	66 (43.31)	59 (38.71)	52 (34.12)
8 words	42 (27.56)	57 (37.40)	58 (38.06)	60 (39.37)	54 (35.43)	52 (34.12)	46 (30.18)
20 words	36 (23.62)	39 (25.60)	47 (30.84)	47 (30.84)	46 (30.18)	44 (28.87)	39 (25.59)
40 words	7.5 (4.92)	25 (16.40)	27 (17.72)	27 (17.72)	25 (16.40)	24 (15.75)	22 (14.44)
100 words	3.0 (1.97)	11 (7.22)	11 (7.22)	11 (7.22)	9.6 (6.30)	8.4 (5.52)	7.8 (5.12)



4) ID Plate (D-8PS, D-8PX, No metal D-03CS) + D-422RW

Unit: m/min (inch/s)

Distance / Number of Words	20 mm (0.79 inch)	30 mm (1.18 inch)	40 mm (1.57 inch)	50 mm (1.97 inch)	60 mm (2.36 inch)	70 mm (2.76 inch)
1 word	35 (22.97)	46 (30.18)	47 (30.84)	47 (30.84)	39 (25.59)	27 (17.72)
8 words	32 (21.00)	35 (22.97)	39 (25.59)	38 (24.93)	32 (21.00)	19 (12.47)
20 words	23 (15.09)	33 (21.65)	36 (23.62)	35 (22.97)	30 (19.69)	18 (11.81)
40 words	1.8 (1.18)	19 (12.47)	19 (12.47)	17 (11.16)	15 (9.84)	12 (7.87)
100 words	0 (0)	7.8 (5.12)	8.4 (5.51)	8.4 (5.51)	6.6 (4.33)	5.4 (3.54)



(2) Precautions When Using D-422RWL

(a) Communication Range

The following indicates the communication range of the reader/writer (D-422RWL) and data carrier. If the data carrier exists in the communication range, a normal communication can be established.

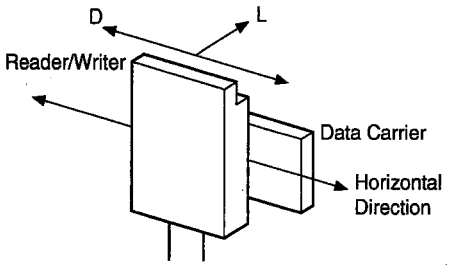
POINT

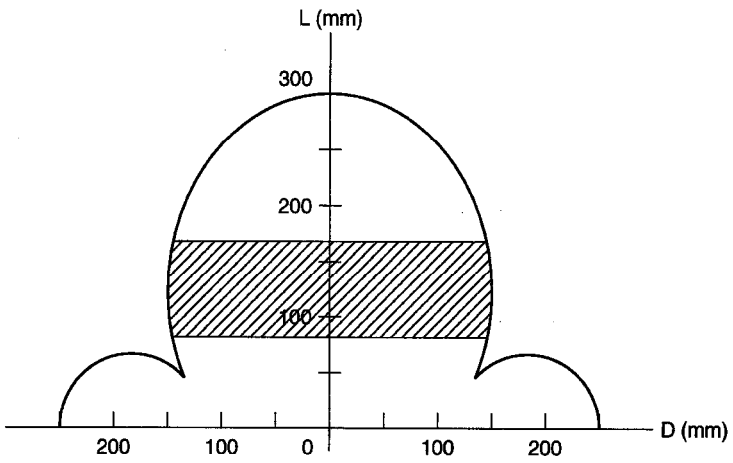
- The moving speed varies greatly when used at the maximum or minimum communication distance. Using from the distance with maximum communication range (optimal communication distance) is recommended.
- When the communication distance is short (less than 50 mm (1.97 inches), a communication error occurs because of the side rope effect (two small communication ranges on both sides).

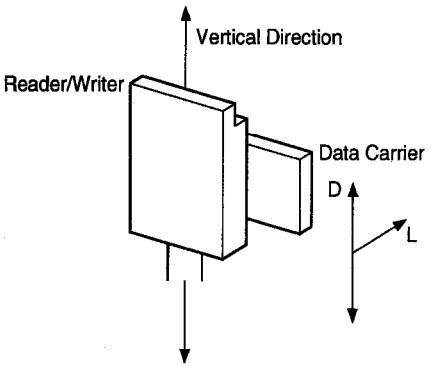
1) ID Card (D-03C) (Actual Value) +D-422RWL

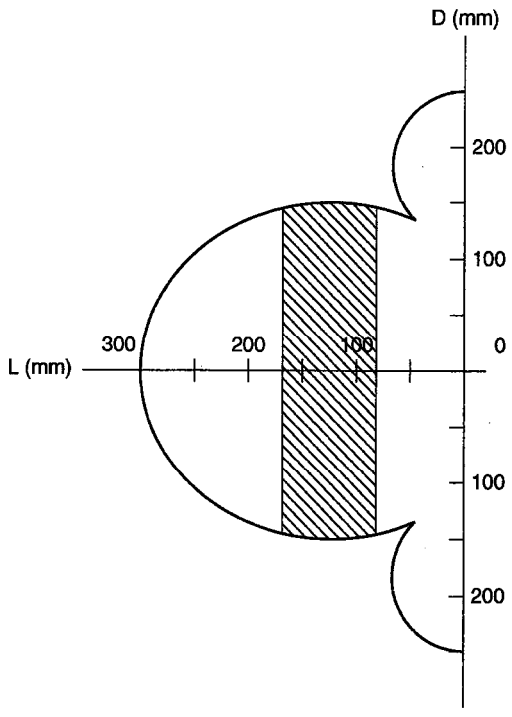
Optimal Communication Distance: 80 to 120 mm (3.15 to 4.72 inches)

- Solid Line : No Metal





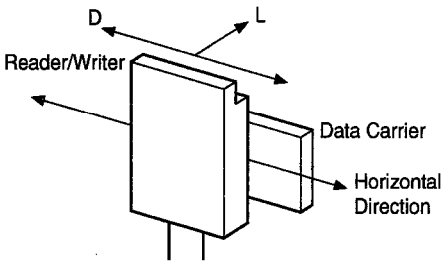


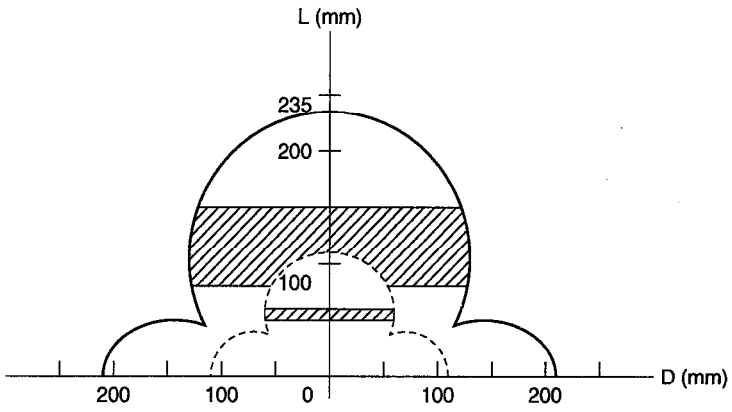


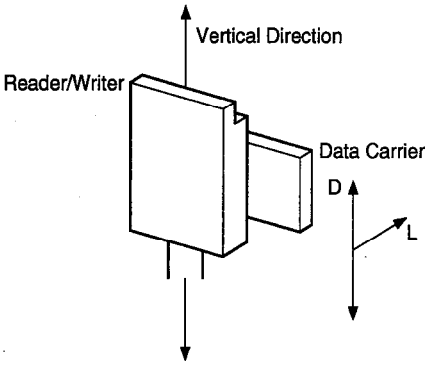
2) ID Plate (D-03P) (Actual Value) +D-422RWL

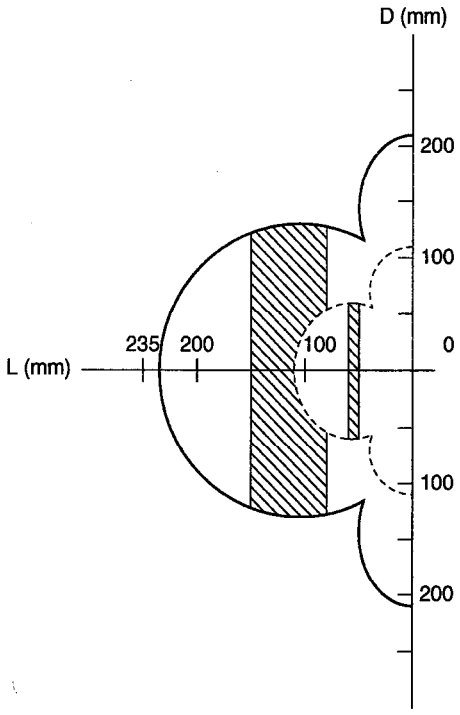
Optimal Communication Distance: 60 to 100 mm (2.36 to 3.94 inches)

- Solid Line : No Metal
- Dotted Line : Metal Mount

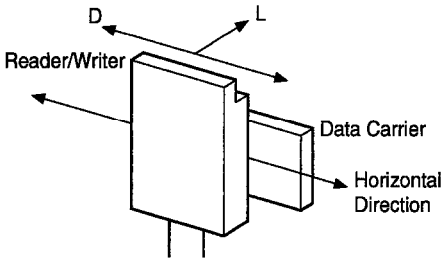


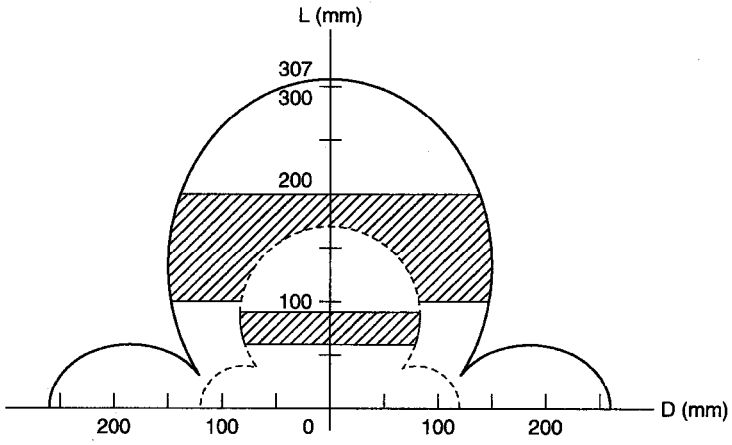


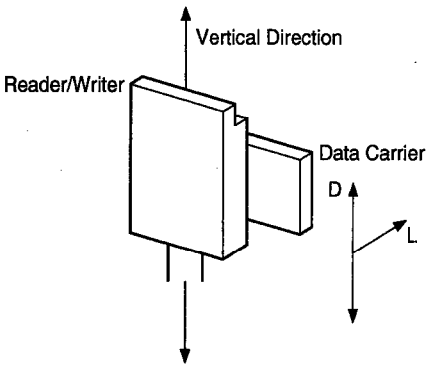


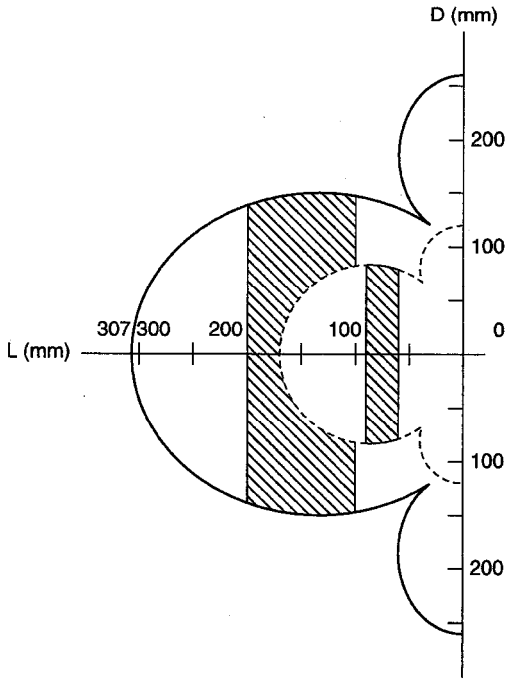


3) ID Plate (D-8P) (Actual Value) +D-422RWL
Optimal Communication Distance: 60 to 140 mm (2.36 to 5.51 inches)
- Solid Line : No Metal
- Dotted Line : Metal Mount





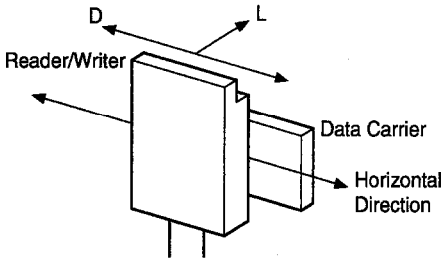


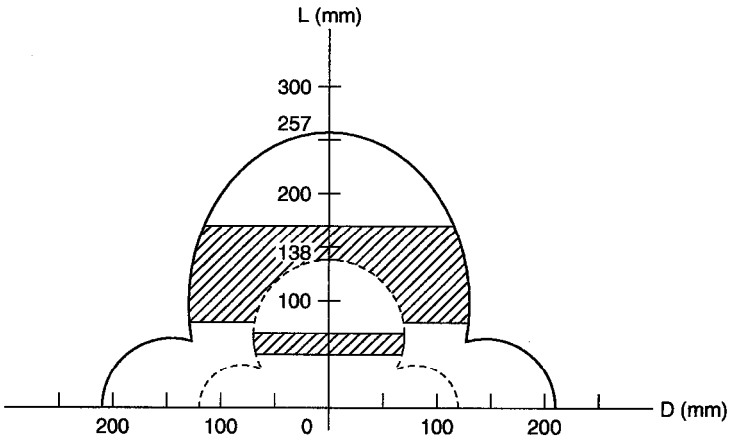


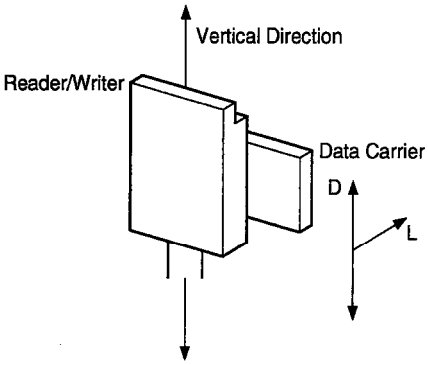
4) ID Plate (D-8PS) (Actual Value) +D-422RWL

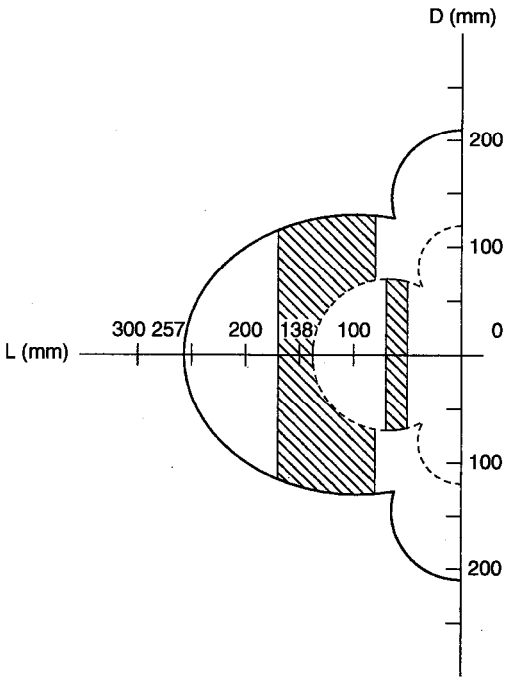
Optimal Communication Distance: 80 to 120 mm (3.15 to 4.72 inches)

- Solid Line : No Metal
- Dotted Line : Metal Mount

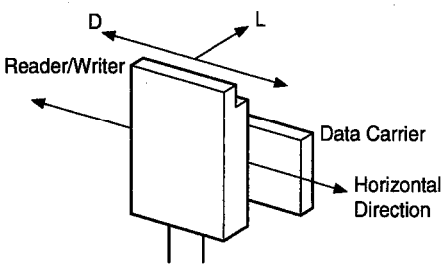


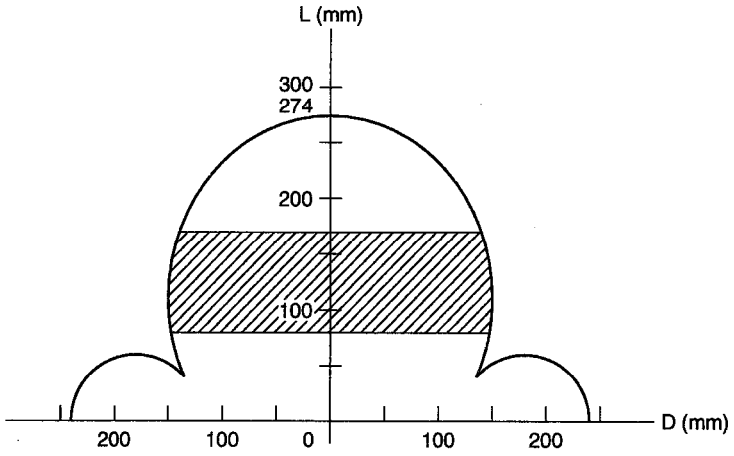


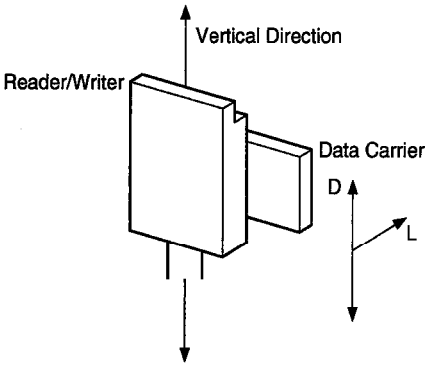


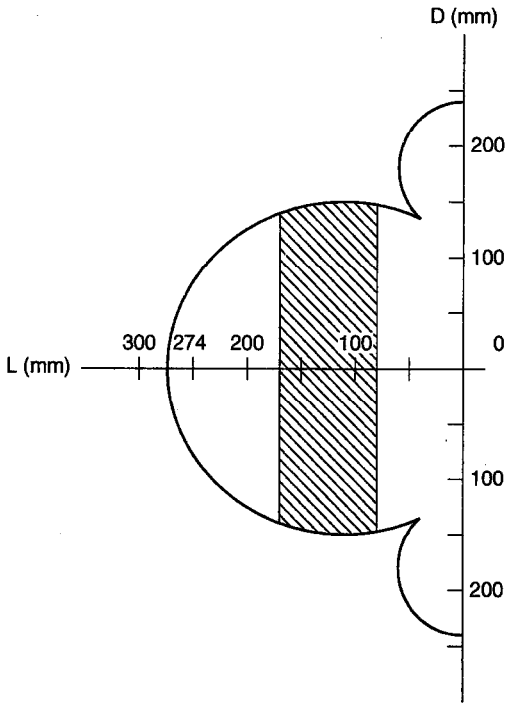


5) ID Plate (D-03CS) (Actual Value) +D-422RWL
Optimal Communication Distance: 80 to 120 mm (3.15 to 4.72 inches)
• Solid Line : No Metal

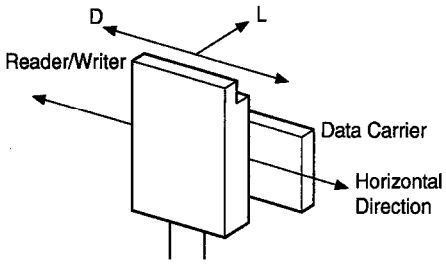


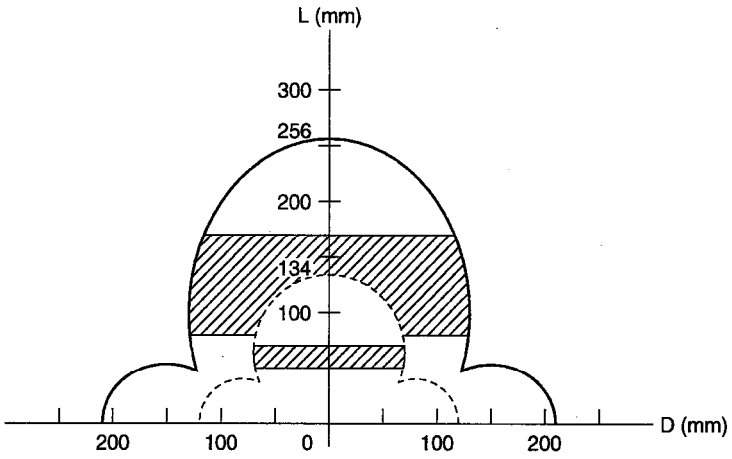


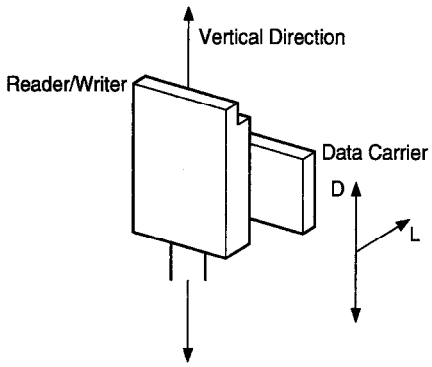


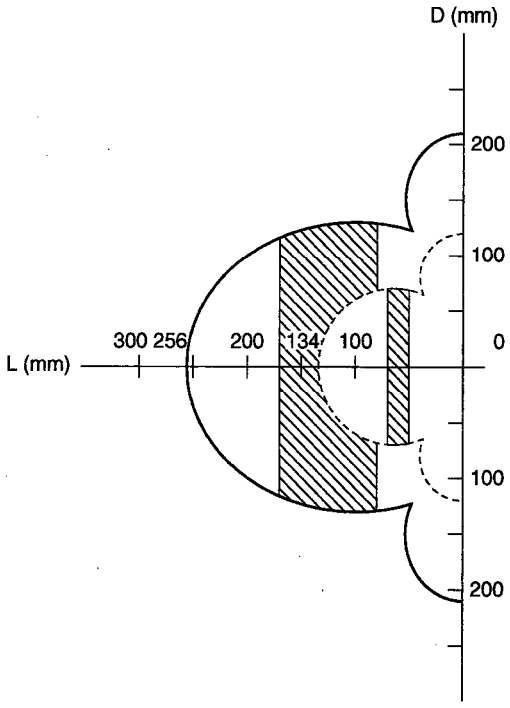


6) ID Plate (D-8PX) (Actual Value) +D-422RWL
Optimal Communication Distance: 80 to 120 mm (3.15 to 4.72 inches)
- Solid Line : No Metal
- Dotted Line : Metal Mount









(b) Movement Speed

The data carrier movement speed for successful communication with the reader/writer (D-422RWL) is determined by its moving distance within the communication range, which is determined by the distance between the reader/writer (D-422RWL) and data carrier moved, and the response time corresponding to the word count.

The movement speed data is measured under the following conditions:

- Fast read (FR), metal plate installation (D-03C, D-03CS no metal)
- Fast write (FW), the moving speed decreases by 10%.

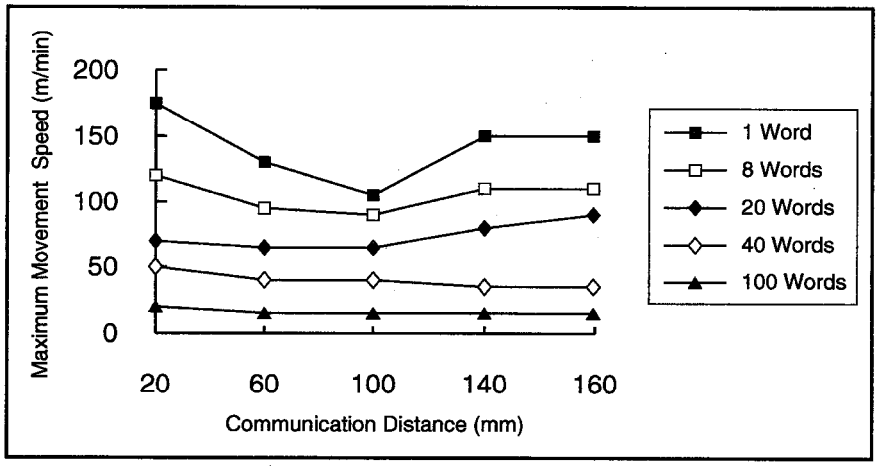
POINT

- To improve the system reliability, it is recommended to set the movement speed at least having twice as much time for allowance. This allows retries communication even if a communication error occurs due to movement speed variation of noises, which in turn improves the reliability.
- The movement speed becomes smaller when the communication distance is either far or close, so use the recommended distance (shaded area in the chart below).
- When the moving speed is low (less than 3 m/min (1.97 inches/s), the ID plate swing or communication error near the communication range border may occur. To prevent this, perform the ID plate position detection (communicate within the communication range) or verify the communication data (execute the comparison command).

1) ID Card (No metal D-03C) + D-422RWL

Unit: m/min (inch/s)

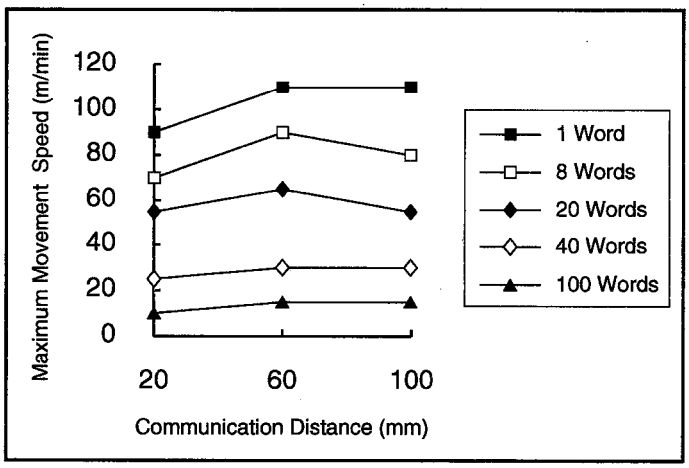
Distance / Number of Words	20 mm (0.79 inch)	60 mm (2.36 inch)	100 mm (3.94 inch)	140 mm (5.52 inch)	160 mm (6.30 inch)
1 word	175 (114.83)	130 (85.30)	105 (68.90)	150 (98.43)	150 (98.43)
8 words	120 (78.74)	95 (62.34)	90 (59.06)	110 (72.18)	110 (72.18)
20 words	70 (45.93)	65 (42.65)	65 (42.65)	80 (52.49)	90 (59.06)
40 words	50 (32.81)	40 (26.25)	40 (26.25)	35 (22.97)	35 (22.97)
100 words	20 (13.12)	15 (9.84)	15 (9.84)	15 (9.84)	15 (9.84)



2) ID Plate (D-03P) + D-422RWL

Unit: m/min (inch/s)

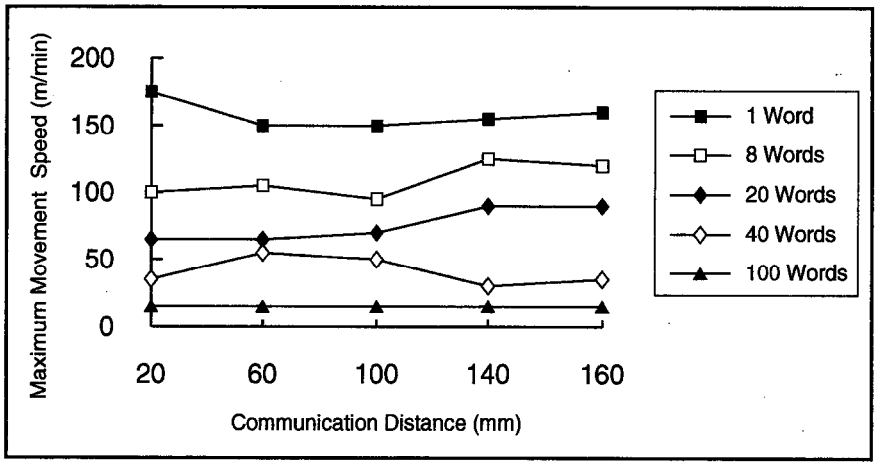
Number of Words \ Distance	20 mm (0.79 inch)	60 mm (2.36 inch)	100 mm (3.94 inch)
1 word	90 (59.06)	110 (72.18)	110 (72.18)
8 words	70 (45.93)	90 (59.06)	80 (52.49)
20 words	55 (36.09)	65 (42.65)	55 (36.09)
40 words	25 (16.40)	30 (19.69)	30 (19.69)
100 words	10 (6.56)	15 (9.84)	15 (9.84)



3) ID Plate (D-8P) + D-422RWL

Unit: m/min (inch/s)

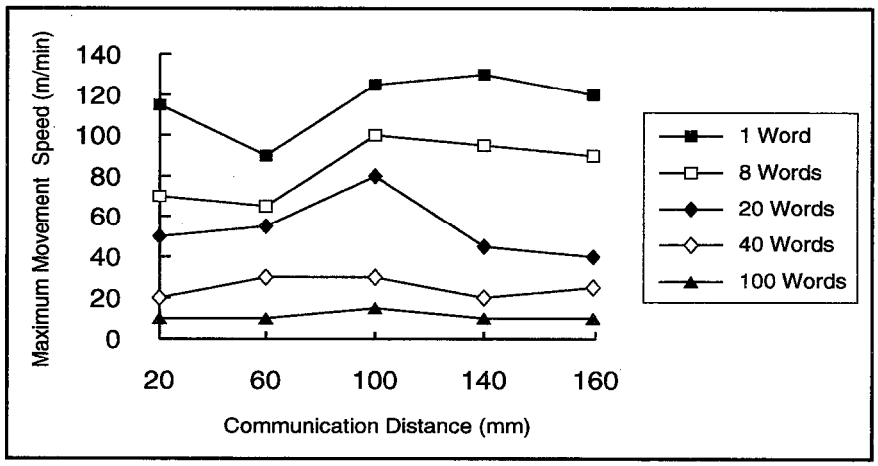
Number of Words \ Distance	20 mm (0.79 inch)	60 mm (2.36 inch)	100 mm (3.94 inch)	140 mm (5.51 inch)	160 MM (6.30 inch)
1 word	175 (114.83)	150 (98.43)	150 (98.43)	155 (101.70)	160 (104.99)
8 words	100 (65.62)	105 (68.90)	95 (62.34)	125 (82.02)	120 (78.74)
20 words	65 (42.65)	65 (42.65)	70 (45.93)	90 (59.06)	90 (59.06)
40 words	35 (22.97)	55 (36.09)	50 (32.81)	30 (19.69)	35 (22.97)
100 words	15 (9.84)	15 (9.84)	15 (9.84)	15 (9.84)	15 (9.84)



4) ID Plate (D-8PS) + D-422RWL

Unit: m/min (inch/s)

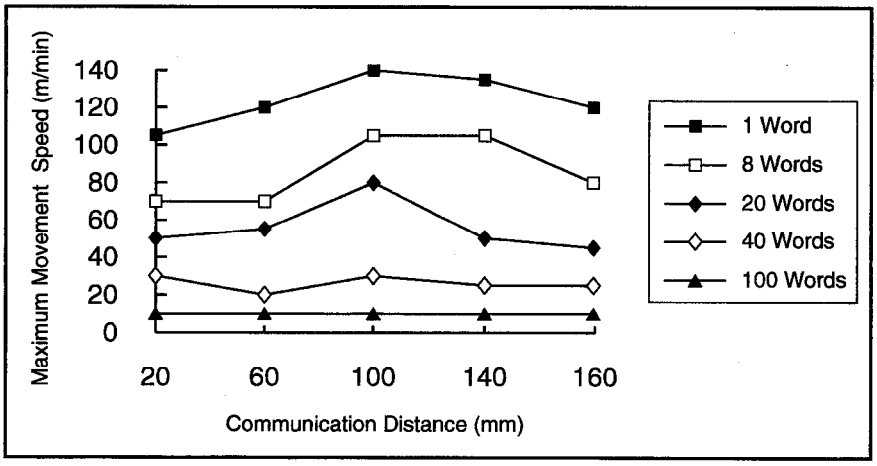
Distance / Number of Words	20 mm (0.79 inch)	60 mm (2.36 inch)	100 mm (3.94 inch)	140 mm (5.51 inch)	160 mm (6.30 inch)
1 word	115 (75.46)	90 (59.06)	125 (82.02)	130 (85.30)	120 (78.74)
8 words	70 (45.93)	65 (42.65)	100 (65.62)	95 (62.37)	90 (59.06)
20 words	50 (32.81)	55 (36.09)	80 (52.49)	45 (29.53)	40 (26.25)
40 words	20 (13.12)	30 (19.69)	30 (19.69)	20 (13.12)	25 (16.40)
100 words	10 (6.56)	10 (6.56)	15 (9.84)	10 (6.56)	10 (6.56)



5) ID Plate (D-8PX) + D-422RWL

Unit: m/min (inch/s)

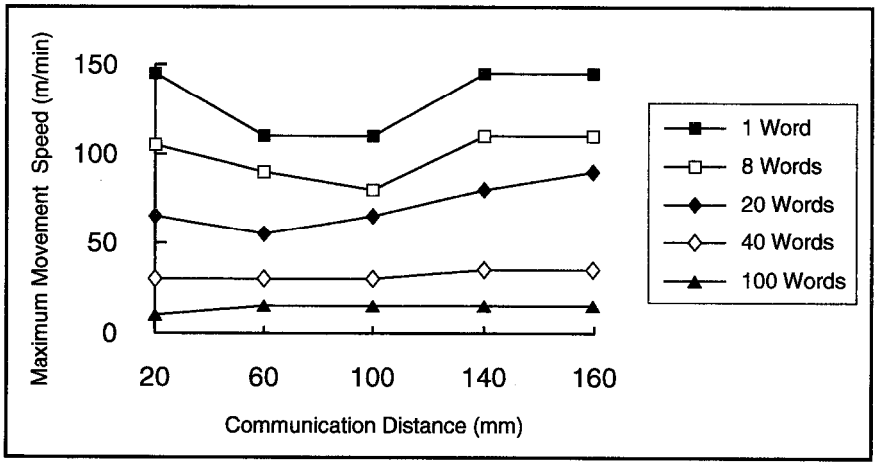
Distance / Number of Words	20 mm (0.79 inch)	60 mm (2.36 inch)	100 mm (3.94 inch)	140 mm (5.51 inch)	160 mm (6.30 inch)
1 word	105 (68.90)	120 (78.74)	140 (91.86)	135 (88.58)	120 (78.74)
8 words	70 (45.93)	70 (45.93)	105 (68.90)	105 (68.90)	80 (52.49)
20 words	50 (32.81)	55 (36.09)	80 (52.49)	50 (32.81)	45 (29.53)
40 words	30 (19.69)	20 (13.12)	30 (19.69)	25 (16.40)	25 (16.40)
100 words	10 (6.56)	10 (6.56)	10 (6.56)	10 (6.56)	10 (6.56)



6) ID Plate (No metal D-03CS) + D-422RWL

Unit: m/min (inch/s)

Distance / Number of Words	20 mm (0.79 inch)	60 mm (2.36 inch)	100 mm (3.94 inch)	140 mm (5.51 inch)	160 mm (6.30 inch)
1 word	145 (95.14)	110 (72.18)	110 (72.18)	145 (95.14)	145 (95.14)
8 words	105 (68.90)	90 (59.06)	80 (52.49)	110 (72.18)	110 (72.18)
20 words	65 (42.65)	55 (36.09)	65 (42.65)	80 (52.49)	90 (59.06)
40 words	30 (19.69)	30 (19.69)	30 (19.69)	35 (22.97)	35 (22.97)
100 words	10 (6.56)	15 (9.84)	15 (9.84)	15 (9.84)	15 (9.84)



(3) Installation Environment

(a) The communication distance may be shortened when installed on metal or multiple reader/writers are installed next to each other.

(b) Do not install devices which may be the source of high frequency noises such as invertors, CRTs, and switching power source. This may affect the communication distance.

(c) Please avoid installation near the high-voltage power line or device that consumes a lot of electricity. A module malfunction may occur from induction.

(d) Do not directly touch organic solvents such as thinners.

(e) Do not bundle nor install close to the loaded wire other than the main circuit line, invertor, high-voltage line, and PC.
It becomes susceptible to noise and surge induction.
Wire at least 100 mm (3.94 inches) away from the above wires.

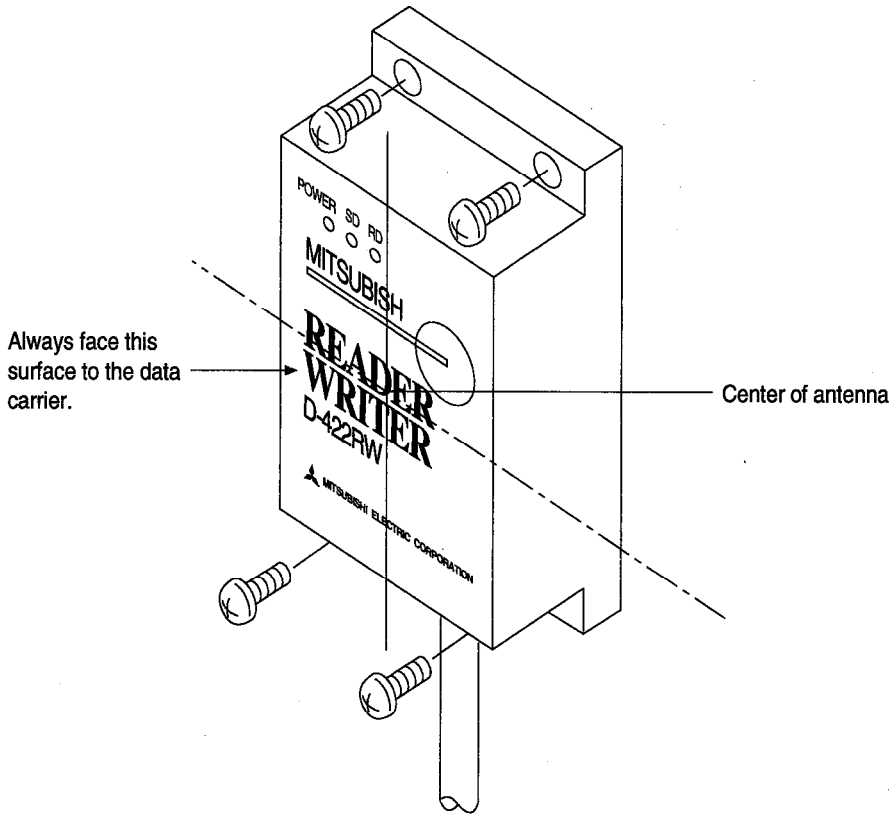
(f) Tighten the reader/writer installation screws in the following range:

Screw Position	Tightening Torque Range
Reader/Writer Installation Screw (M4 Screw)	78 to 112 N·cm (8 to 12 kg·cm) [6.93 to 10.4 lb·inch]

(g) Keep more than 200 mm (7.87 inches) for the reader/writer installation interval. If the installation interval is too close, jamming occurs and normal communication is not established.

4.4.4 Installation

The following indicates the reader/writer installation method.
Use the four installation holes on the top and bottom of the reader/writer.



POINT

The center of the antenna is positioned at the center of the reader/writer.
When communicating, try to have the center of the data carrier pass through the center of the reader/writer.

4.4.5 Reader/Writers Movement

When the reader/writer is moved around, the cable may be severed. Use the reader/writer in a fixed position.

4.5 Data Carrier Installation

The following describes the data carrier installation.

4.5.1 Precautions for Installation

The following indicates the precautions when installing the data carrier:

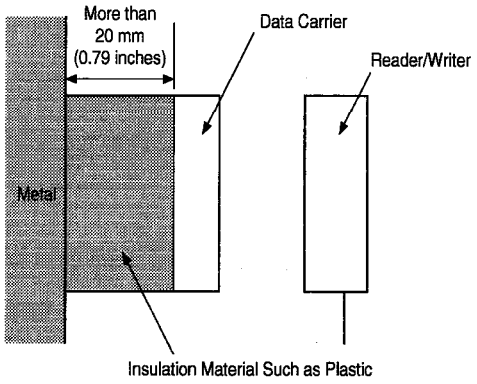
(1) Installing Data Carrier on Metal

When the data carrier is installed on metal through the holder or directly, the communication distance decreases by approximately 30% due to the effect of metal.

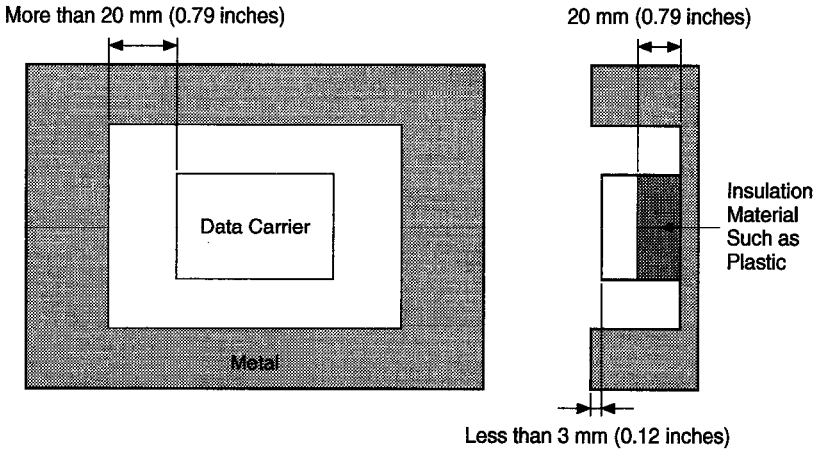
When maximizing the data carrier communication distance, install the data carrier at least 20 mm (0.79 inches) away from the metal.

(a) Installation Conditions of the Data Carrier

1) When installing to a flat surface



2) When Mounting Inside Metal



(b) Maximum Communication Distance (Actual Value) When Mounting Inside Metal

1) 20 mm (0.79 inches) Spacer on Both Reader/Writer and Data Carrier

Unit: mm (inch)

Reader/Writer \ Data Carrier	D-03C	D-03P	D-8P	D-8PS	D-8PX	D-03CS
D-422RW	55 (2.17)	55 (2.17)	80 (3.15)	65 (2.56)	65 (2.56)	65 (2.56)
D422RWL	185 (7.28)	143 (5.63)	188 (7.40)	160 (6.30)	170 (6.69)	140 (5.51)

2) Direct Metal Installation for Reader/Writer and 20 mm (0.79 inch) Spacer for Data Carrier

Unit: mm (inch)

Reader/Writer \ Data Carrier	D-03C	D-03P	D-8P	D-8PS	D-8PX	D-03CS
D-422RW	55 (2.17)	55 (2.17)	80 (3.15)	65 (2.56)	65 (2.56)	55 (2.17)
D-422RWL	142 (5.59)	130 (5.12)	155 (6.10)	123 (4.84)	128 (5.04)	95(3.74)

3) Direct Metal Installation on Both Reader/Writer and Data Carrier

Unit: mm (inch)

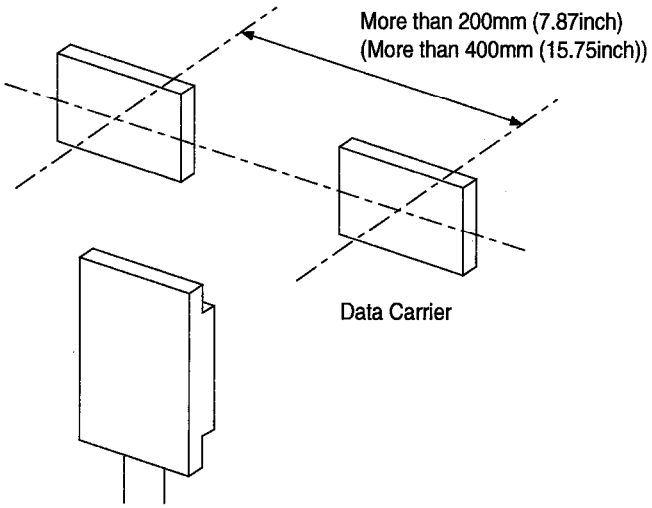
Reader/Writer \ Data Carrier	D-03C	D-03P	D-8P	D-8PS	D-8PX	D-03CS
D-422RW	—	45 (1.77)	75 (2.95)	60 (2.36)	60 (2.36)	—
D-422RWL	—	105 (4.13)	143 (5.63)	117 (4.61)	120 (4.72)	—

(2) Installation Interval Between Data Carriers

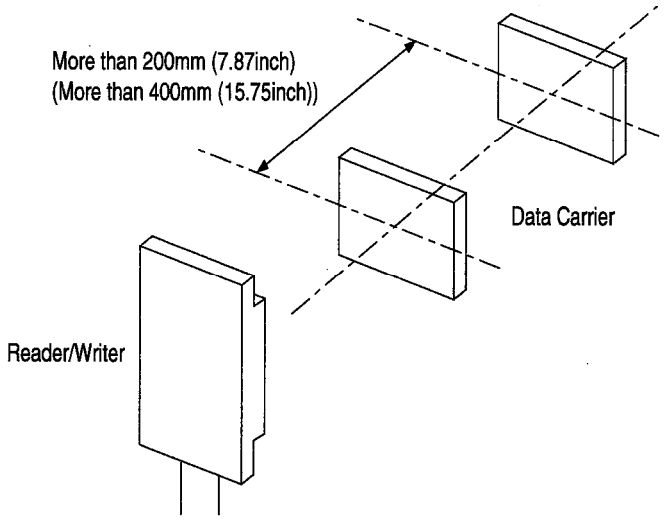
When two data carriers are installed too close, normal communication cannot be performed because of interference.

Install the data carriers with intervals as shown below:

(a) Placing side-by-side



(b) Placing overlapped



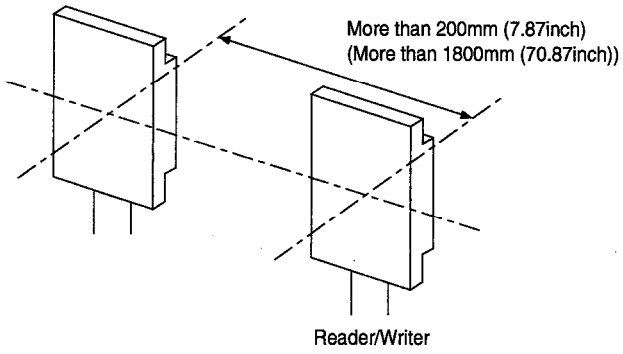
* The values in parenthesis ( ) are when D-422RWL is used.

(3) Installation Interval Between Reader/Writer

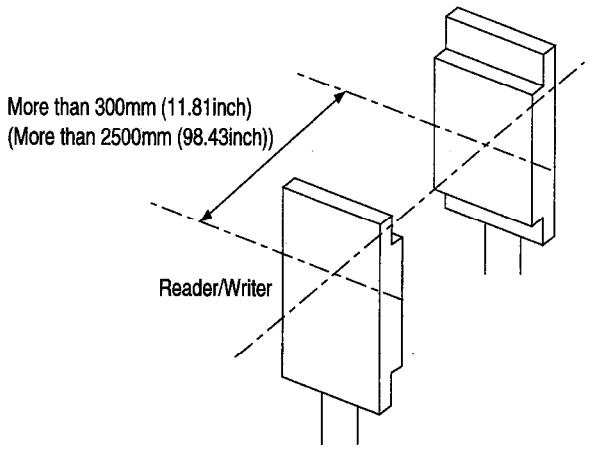
When two reader/writer are installed too close, normal communication cannot be performed because of interference.

Install the data carriers with intervals as shown below:

(a) Placing side-by-side



(b) Placing overlapped

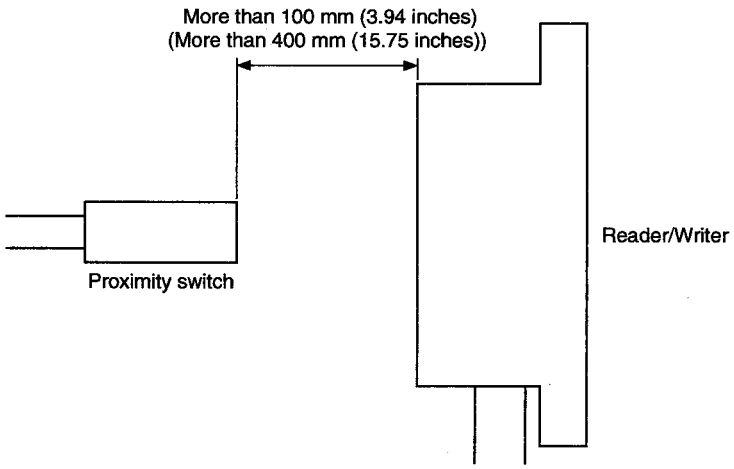


* The values in parenthesis ( ) are when D-422RWL is used.

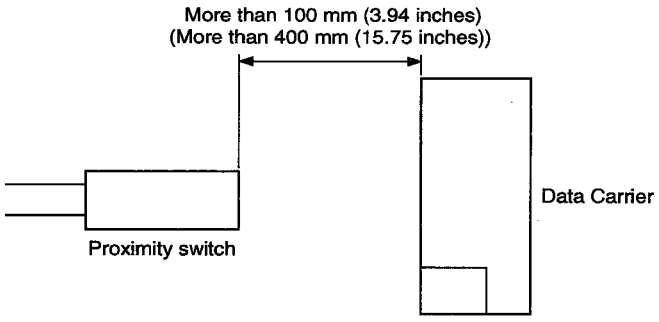
(4) Distance from the Proximity Switch

When the proximity switch is faced against the reader/writer or data carrier, allow following intervals:

(a) When facing the reader/writer:



(b) When facing the data carriers:



(5) Avoid installation near the source of high frequency noises such as the invertor, CRT, or switching power source.

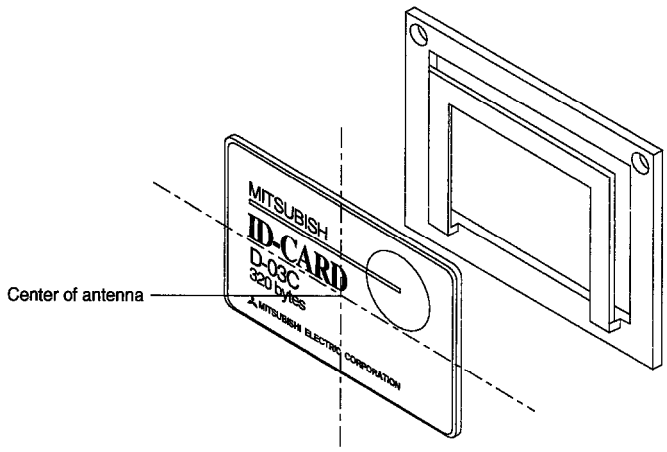
This may effect the performance such as communication distance.

4.5.2 Installation

The following indicates the installation method of the data carrier.

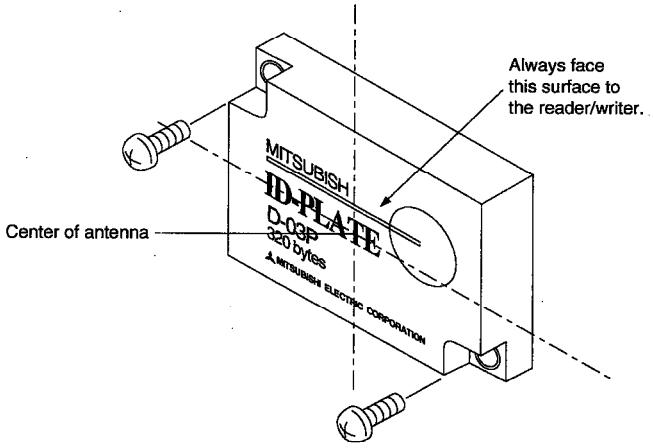
(1) ID Card (D-03C, D-03CS)

Use the ID card as carrying by hand or in a resin holder (metal holder cannot be used). (A specific resin holder (D-03CS-HLD) is available separately for D-03CS.)



(2) ID Plate (D-03P, D-8P, D-8PS, D-8PX)

Attach the ID plate by using the installation hole on opposite sides.



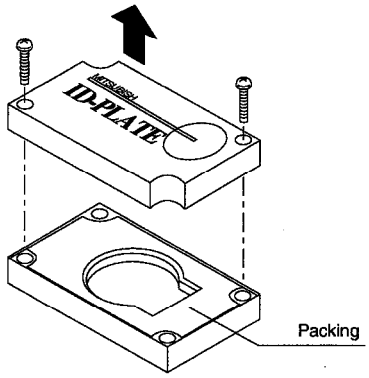
POINT

Position the antenna center to be at the center of the data carrier.
For communication, try to have the data carrier pass through the center of the reader/writer.

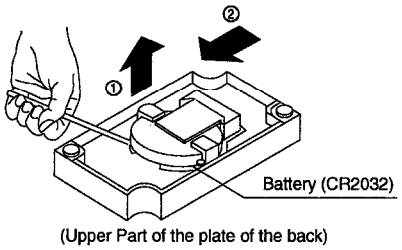
4.6 Replacing the Battery for the Data Carrier (D-8PX)

When replacing the battery for the D-8PX, follow the procedure below:

(1) Remove the two screws on the upper part of the plate.

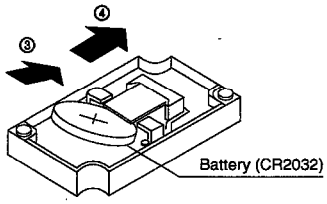


(2) Insert your finger or a rod-type material to the concave side of the battery holder, lift the battery toward direction 1, and remove by sliding toward direction 2.

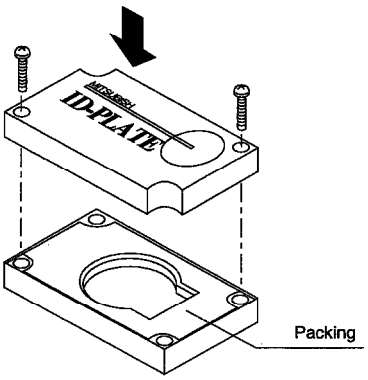


(Upper Part of the plate of the back)

(3) When inserting the battery, place the positive (+) side of the battery on top. Insert diagonally toward direction 3, then push toward direction 4. (Diagram 3)



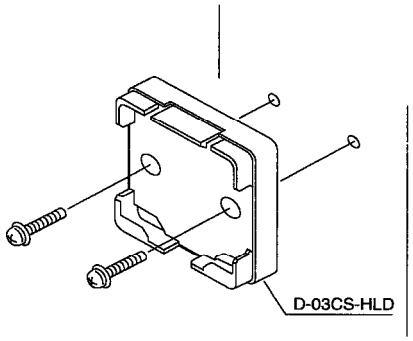
(4) Place the upper portion of the plate to the bottom portion, and tighten with the two screws.



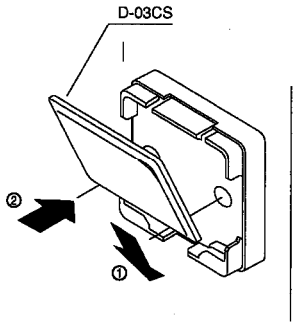
4.7 Installation Method of the Data Carrier (D-03CS)

When installing the D-03CS to the holder, follow the procedure below:

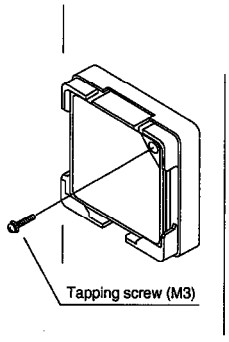
(1) Use the screw (M3 to M3.5) to secure the holder (D-03CS-HLD). Place two holders to use as a 20 mm (0.79 inch) spacer.



(2) Insert the data carrier (D-03CS) diagonally toward the direction 1. Keep pressing toward direction 2 until it snaps.



(3) Fix the data carrier (D-03CS) with the tapping screw (M3) included with the holder (D-03CS-HLD).



5 Things to Know Before Starting Programming

The following are things to be noted before starting programming.

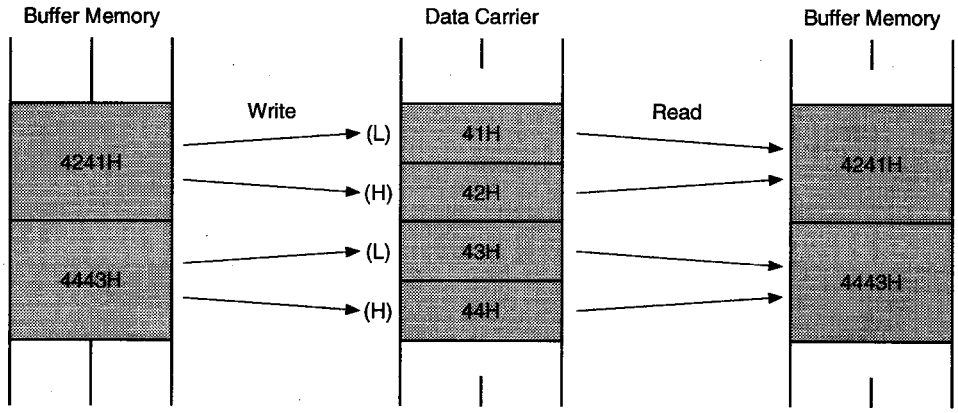
5.1 Data Structure (Processing Unit)

The ID system has two types of data processing: processing in word units and processing in byte units.
The default data structure for the ID system processing is in word units. To use byte units, set K1 to the processing unit specification area (K9) in the buffer memory specific application area.

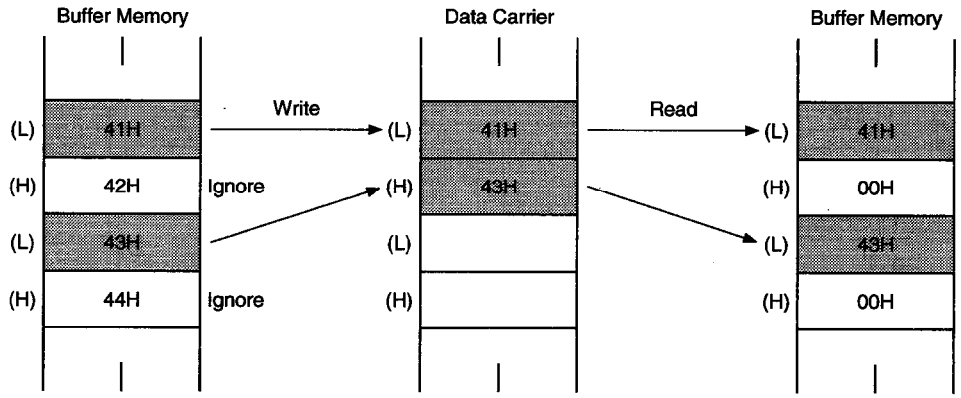
POINT

The data processed in byte units has a special data structure: the data written and read are different.
This manual describes data processing in word units.
When using the ID system, use the processing in word units.

(1) Data Flow in Word Units



(2) Data Flow in Byte Units



5.2 Communication Time

The response time is the time the system takes to complete an ID command in the ladder program.
The response time indicates the time required for processing between the data carrier and reader/writer, and includes the communication time. The following indicates the calculation method for the communication time:

The symbols used for the communication time calculation are shown below:

α : Communication time (mS)
Kt1 : Processing time for one word (mS)
Kt2 : Basic time for 20 words (mS)
Kt3 : Constant (mS)
n : Number of read/write words (word)

$$\alpha[mS] = Kt1 \times n + Kt2 \times \frac{n}{20} + Kt3$$

n/20 is rounded down after the decimal point.

Instruction Name	Commands		Kt1	Kt2	Kt3
Read	RD		2.9	47	0
Comparison Read	CR		5.2	112	0
Continuous Read	AR		2.9	47	0
Continuous Comparison read	SR		5.2	112	0
Continuous Fast Read	FR		2.8	33	0
Write	WD		3.2	47	0
Comparison Write	CW		5.4	112	0
Continuous Write	AW		3.2	47	0
Continuous Comparison Write	SW		5.4	112	0
Continuous Fast Write	FW		3.1	33	0
Batch Write	FI		3.2	47	0
Compare	CM	Match	3.2	47	0
		Non-match	3.2	47	35
Data Copy	CO		6.1	94	0
Clear	CL		0	0	115
End Usage	OF		0	0	46
Start Usage	ON		0	0	37

5.3 I/O Signal List for the PC CPU

The I/O signals for the PC CPU when using the ID interface module are as follows:
The (n) indicated next to X and Y is determined by the I/O number of the slot where the ID interface is mounted.
(Ex: If AJ71ID1-R4 is installed in slot 1 of the base unit, Xn0 → X10.)

(1) Input Signals (ID Interface Module → PC CPU)
There are 16 points for the input signals, Xn0 - XnF. All input signals are turned on or off by the ID interface module.

Table 5.1 Input Signal List for the PC CPU

Input Signal		Signal Name	Details	Reference
CH. 1	CH. 2			
Xn0		Watchdog Timer Error	Turns on when the watchdog timer error occurs on the ID interface module. It is off during normal operation.	5.4 (1)
Xn1	Xn9	Comparison Result Signal	Turns on when the execution result of the comparison command matches.	5.4 (2)
Xn2	XnA	—	Not-used	—
Xn3	XnB	ID-BUSY	Turns on when the ID command is being executed. Xn3/XnB turns off when Y(n+1) 4/Y(n+1) C is turned off.	5.4 (3)
Xn4	XnC	ID CommandComplete	Turns on when Y(n+1) 4/Y(n+1) C turns on and the ID command execution is complete. Xm4/XnB turns off when Y (n+1) 4Y (n+1) C is turned off	5.4 (4)
Xn5	XnD	Error Detection Signal	Turns on when an error occurs or the external power supply (24VDC) does not exist.	5.4 (5)
Xn6		ID Ready Signal	(1) Turns on when the power is turned on, the PC CPU is reset, and the ID interface module is ready. (Turns on a few seconds after turning the power on.)	5.4 (6)
			(2) Turns off when the ID interface operation error occurs (operation cannot continue) or in an error where the 24VDC LED turns off.	
			(3) Does not turn off in an error where the ERR/ID-ERR LED flashes.	
Xn7	XnE	—	Not-used	—
Xn8	XnF			

POINT

The ID interface module can use Y (Yn0-YnF), which is the same as Xn0-XnF, as internal relay.

(2) Output Signals (PC CPU → ID Interface Module)
There are 16 points for the output signals, Y(n+1)0 - Y(n+1)F. All output signals are turned on and off by the ID interface module.

Table 5.2 Output Signals

Input Signal		Signal Name	Details	Reference
CH. 1	CH. 2			
Y(n+1)0 to Y(n+1)3	Y(n+1)8 to Y(n+1)B	—	Not-used	—
Y(n+1)4	Y(n+1)C	ID Command Execution Request	When turned on by the sequence program, it executes the specified ID command. (After Xn4/XnC is on, Y(n+1)4/Y(n+1)C is turned off.)	5.4 (7)
Y(n+1)5 to Y(n+1)7	Y(n+1)D to Y(n+1)F	—	Not-used	—

IMPORTANT

Since the following output signals are used in the system, users are not allowed to use them. If they are used (turned on/off) in the sequence program for any reason, the functions as of the ID interface module is not guaranteed.

- Y(n+1)0 to Y(n+1)3
- Y(n+1)5 to Y(n+1)B
- Y(n+1)D to Y(n+1)F

5.4 Detailed Description of the I/O Signals

The following describes the on/off timing and conditions for the I/O signals:

(1) Watchdog Timer Error (Xn0)

This turns on when the self-diagnosis function of the ID interface module detects a watchdog timer error.

(2) Comparison Result Signal (Xn1, Xn9)

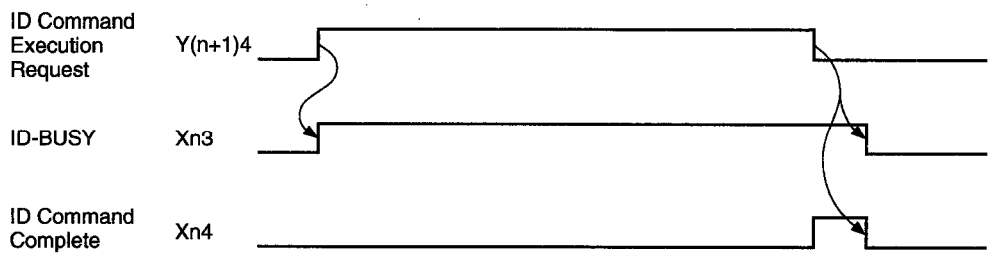
This turns on when the execution result of the comparison command is matched. This cannot be used for ID only command of QmA. This is cleared when Y(n+1)4 and Y(n+1)C are reset. To maintain the comparison result, latch another contact with SET command, etc.

(3) ID-BUSY (Xn3, XnB)

This turns on when executing a command, and turns off when the command execution is complete.

(4) ID Command Complete (Xn4, XnC)

This turns on when the command execution is completed successfully. This does not turn on even when a command cancel is successfully performed using the continuous-command-cancel command while executing the continuous read command (AR) or continuous-write command (AW). When an error occurs, the error detection signal (Xn5, XnD) turns on instead of this signal.



(5) Error Detection Signal (Xn5, XnD)

This turns on when an error occurs, and turns off when the ID command execution request (Y(n+1)4/Y(n+1)C) is off.

(6) ID Ready Signal (Xn6)

This turns on when the start-up procedure of ID interface module operation is complete after starting up or resetting the PC CPU.

This turns off when the reader/writer external power supply does not exist.

(7) ID Command Execution Request (Y(n+1)4, Y(n+1)C)

Executes command when the ID command execution request is turned on.

5.5 Buffer Memory Allocation List

The buffer memory is an area to store the control data to perform data send/receive between the data carrier and PC CPU as well as read/write data. The buffer memory can be accessed using from/to commands from the sequence program.

(1) Buffer Memory Usage

The buffer memory consists areas where the user can freely use and areas where the usage is already determined.

(a) User Area (Address CH. 1 K100 to K3999, CH. 2 K4100 to K7999)

The user area is for storing read/write data from/to the data carrier.

Store data from the starting address of K100 or K4100.

(b) Specific Use Area (Address K0 to K99, K4000 to K4099)

These are areas where the usage is already determined. These areas are used to set the read/write commands and store error status.

The values are reset to defaults in the specific use area when the power is turned on, during PC CPU reset operation, and when the mode is changed.

The default values can be changed to match the commands and usage.

(2) Buffer Memory Allocation List

The buffer memory has a structure of 16 bit (1 word) address, and is not backed up by battery.

Store the error codes, etc. as necessary in the PC CPU file register, etc.

A list of address names and default values of the buffer memory is shown on the next page.

POINT

The areas marked as "Unusable" in the buffer memory address K0 to K99, K4000 to K4099 are used by the system. Users should not write any data in these areas.

When data is written in those arears, the ID interface module will not operate normally.

The following indicates the buffer memory allocation details:

Table. Buffer Memory List

Address		Buffer Memory Address Name		Default Value	Read/Write	Reference
CH. 1	CH. 2					
K0	K4000	Command Code Specification Area		K0	O	5.6.1
K1	K4001	Starting Address Specification Area		K0	O	5.6.2
K2	K4002	Processing Point Specification Area		K0	O	5.6.3
K3	K4003	Continuous Command Execution Interval Specification Area		K0	O	5.6.4
K4	K4004	Data Matching Result Storage Area		K0	O	5.6.5
K5	K4005	Data Non-matching Result Storage Area		K0	O	5.6.6
K6	K4006	Battery Life Evaluation Value Specification Area		K200	O	5.6.7
K7	K4007	Battery Life Evaluation Result Storage Area		K0	O	5.6.8
K8	K4008	Number of Retries Specification Area *1		K3	O	5.6.9
K9	—	Processing Unit Specification Area *1		K0	O	5.6.10
—	K4010	Data Copy Direction Specification Area		K0	O	5.6.11
K11	K4011	Unusable		—	—	—
K12	K4012	Error LED Display Status Storage Area		K0	Δ	5.6.12
K13	K4013	Unusable		—	—	—
K14	K4014	Last Error Code Storage Area		K0	Δ	5.6.13
K15	K4015	Error Log 1	Error Log Storage Area	K0	Δ	5.6.14
K16	K4016	Error Log 2		K0	Δ	
K17	K4017	Error Log 3		K0	Δ	
K18	K4018	Error Log 4		K0	Δ	
K19 to K21	K4019 to K4021	Unusable		—	—	—
K22	K4022	(Lower)	Total Number of Communications Storage Area	K0	Δ	5.6.15
K23	K4023	(Upper)				
K24 to K99	K4024 to K4099	Unusable		—	—	—
K100 to K3999	K4100 to K7999	Data Storage Area (3,900 Words)		—	O	5.6.16

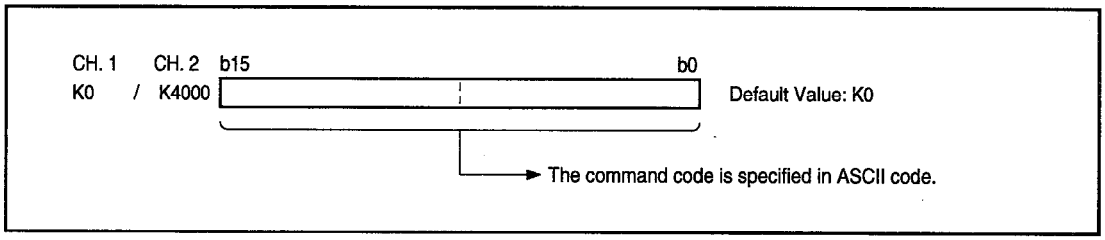
O : Area where read/write from/to the PC CPU can be performed.
Δ : Area where only read can be performed from the PC CPU.
— : Area where read/write from/to the PC CPU can not be performed.

*1 : The specification can only be changed until the first ID command execution request (Y(n+1)4/ Y(n+1)C) is turned on, after the power is turned on or the PC CPU is reset.

5.6 Detailed Description of the Buffer Memory

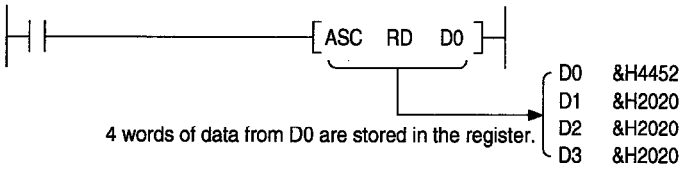
5.6.1 Command Code Specification Area (Address K0/ K4000)

Commands for the data carrier are specified.
Refer to Section 3.2 for the command codes to write in.

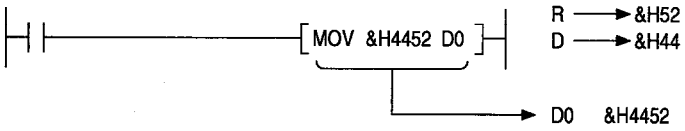


[Example]

When writing in a command code using ASC command:



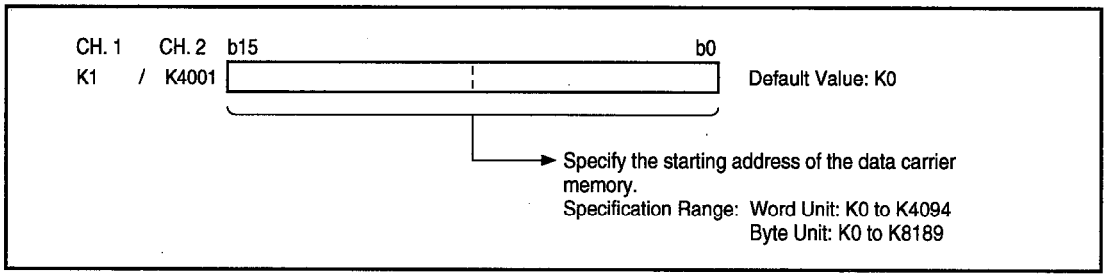
When writing in the command code using the MOV command:



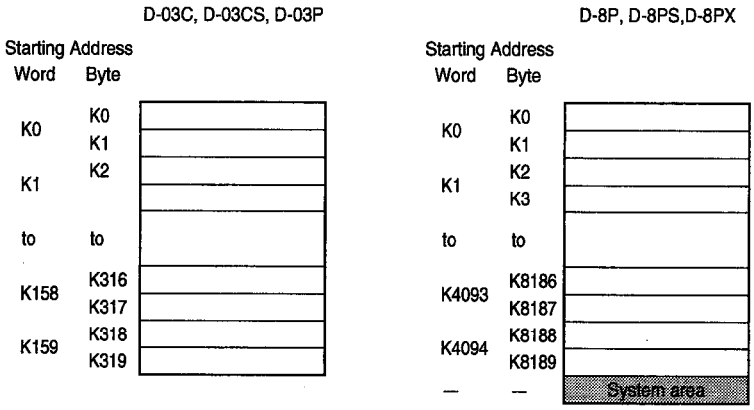
One word of data from D0 is stored.
When setting the command code with the MOV command, convert the command to be set into ASCII code, then switch the upper and lower bytes.

5.6.2 Starting Address Specification Area (Address K1/ K4001)

This area specifies the starting address of the data carrier memory where the data will be read or written.



The address that can be set for each data carrier is as shown below. Please make sure that the (starting address + points to be processed) does not exceed the data carrier address.

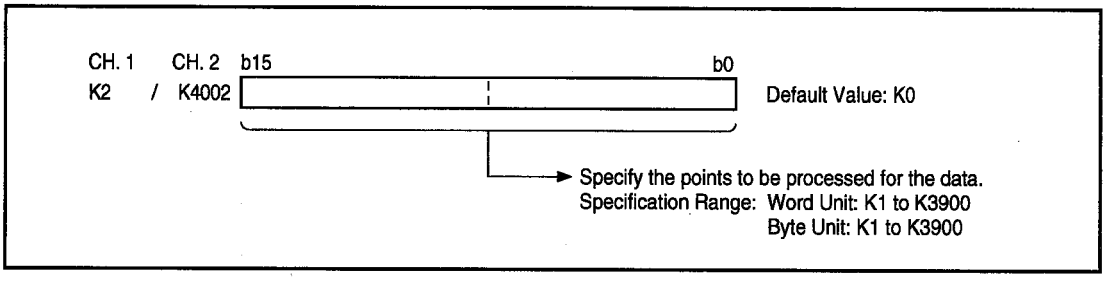


POINT

When the (starting address + points to be processed) exceeds 160 words (320 bytes) while using D-03C or D-03P for the data carrier, no error will occur even if continuous read (AR) or continuous write (AW) is used.

5.6.3 Points-To-Be-Processed Specification Area (Address K2/K4002)

This area is used to specify the points to be processed for the data to read/write.

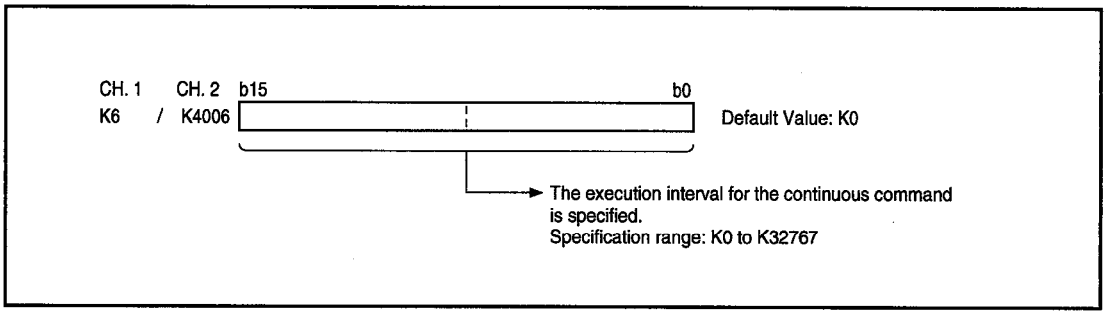


POINT

When the (starting address + points to be processed) exceeds 160 words (320 bytes) while using D-03C or D-03P for the data carrier, no error will occur even if continuous read (AR) or continuous write (AW) is used.

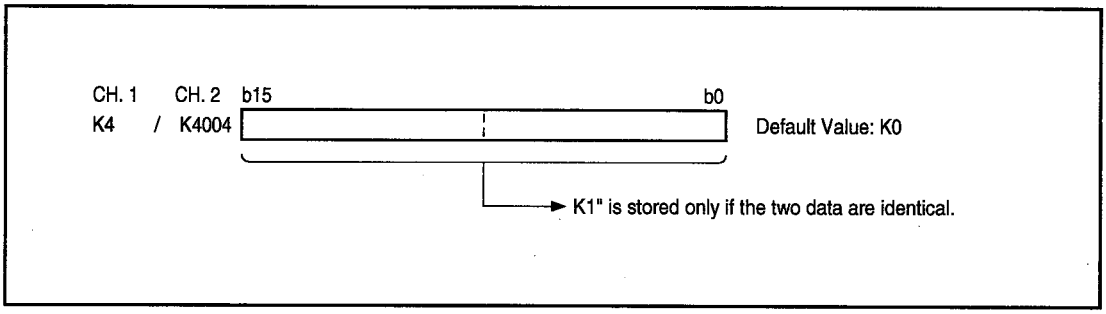
5.6.4 Continuous Command Execution Interval Area (Address K3/K4003)

The command execution interval for the continuous command is specified in 100 mS intervals.



5.6.5 Data Matching Result Storage Area (Address K4/ K4004)

The result is stored only when the comparison data match after the comparison command (CM) is executed.

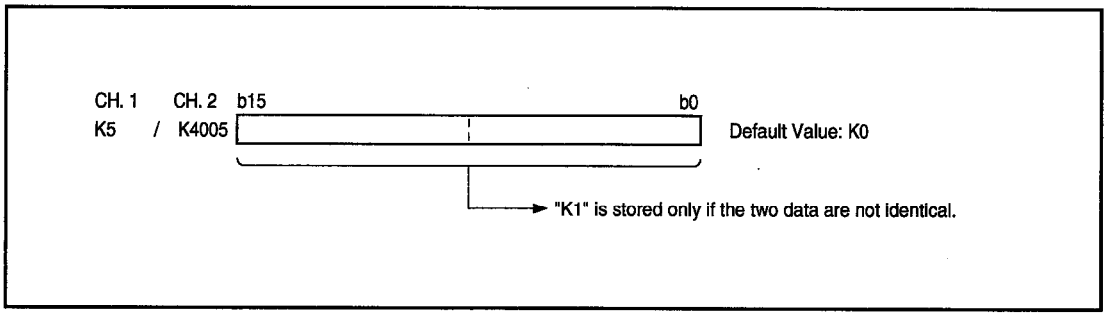


POINT

The match result remains stored as long as it is not reset by the PC program. Clear this area by writing a "0" before executing another comparison command.

5.6.6 Data Non-Matching Result Storage Area (Address K5/K4005)

The result is stored only when the comparison data do not match after executing the comparison command (CM).

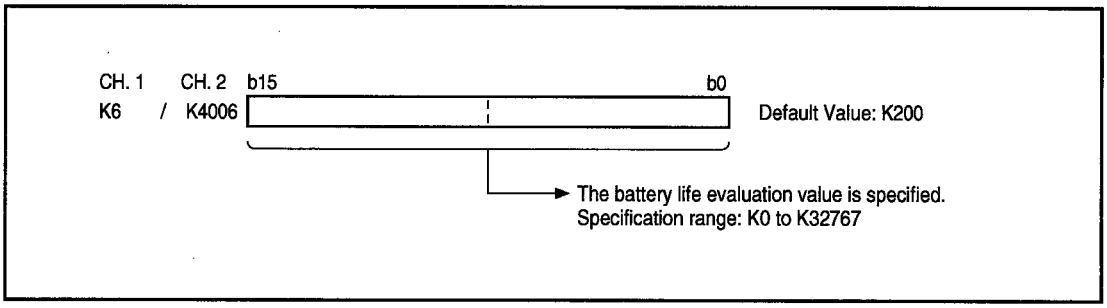


POINT

The non-match result remains stored as long as it is not reset by the PC program. Clear this area by writing a "0" before executing another comparison command.

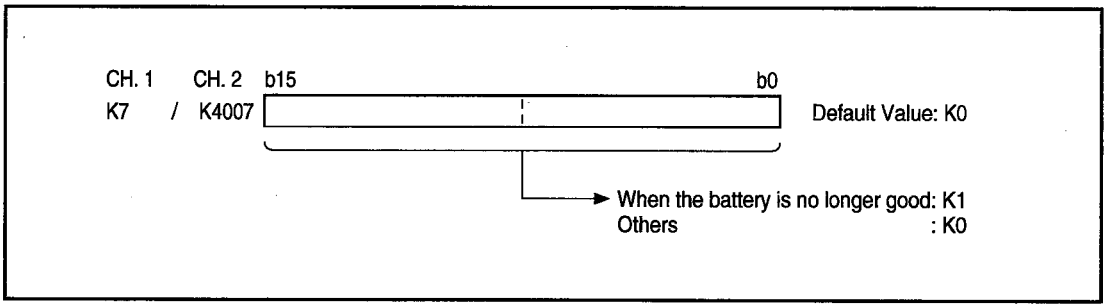
5.6.7 Battery Life Evaluation Value Specification Area (Address K6/K4006)

The battery life evaluation value is specified. This value is specified in the number of communications (in 10,000 time units) possible with the battery life. When K0 is specified, the battery life evaluation is not performed.



5.6.8 Battery Life Evaluation Result Storage Area (Address K7/K4007)

The evaluation result of the battery life is stored.

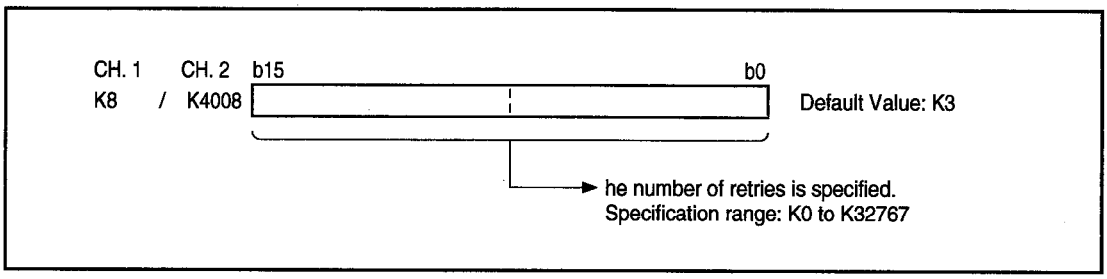


POINT

Since the evaluation result is overwritten during data communication, specify the data carrier using the system or ladder program.

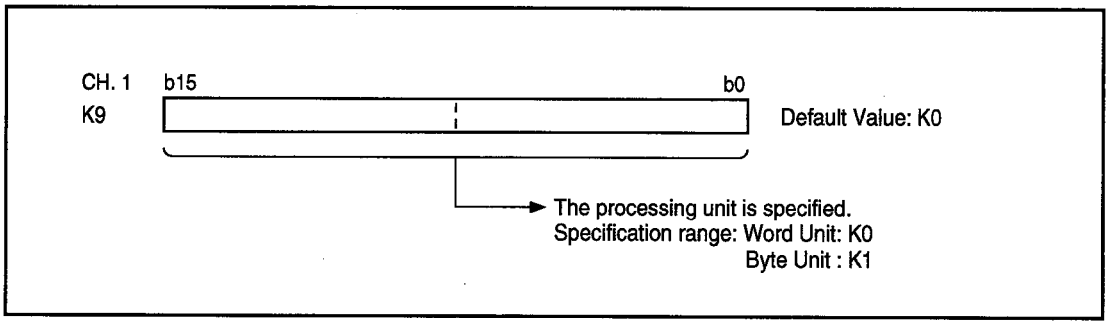
5.6.9 Number of Retries Specification Area (Address K8/K4008)

Specifies the number of retries that the ID interface unit executes a command when an error occurs during data communication.



5.6.10 Processing Unit Specification Area (Address K9/—)

The processing unit (words/bytes) during data communication is specified.

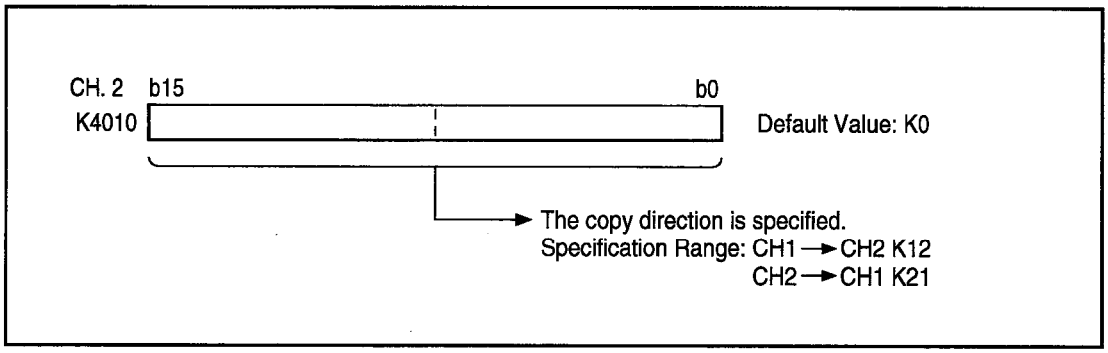


POINT

When the byte unit is specified as the processing unit, the formats of write data and read data will be different. Refer to Section 5.1 for the data structure.

5.6.11 Data Copy Direction Specification Area (—/ K4010)

The copy direction for the data copy command (CO) is specified.

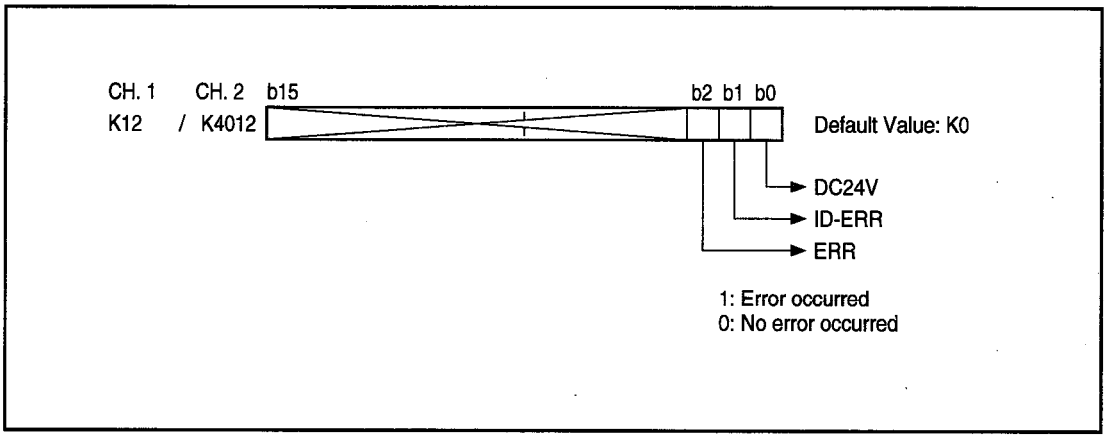


POINT

When K0 is specified, copying cannot be performed between CH.1 and CH.2.

5.6.12 Error LED Display Status Storage Area (Address K12/K4012)

The error LED data is stored by the operating system of ID interface module.

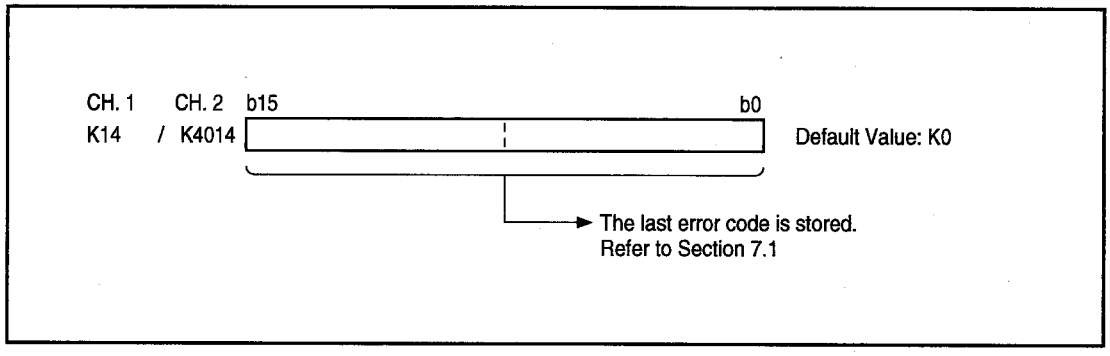


POINT

The operating system of ID interface module stores the value for the error LED display status storage area. Therefore, do not write on it from the PC program, but perform only reads.

5.6.13 Last Error Code Storage Area (Address K14/K4014)

The last error code is stored when an error occurs. Refer to Section 7.1 for error codes. The last error code is cleared with a zero after the error cancel command (Section 6.13) is executed, and shifted sequentially to the error log storage area.

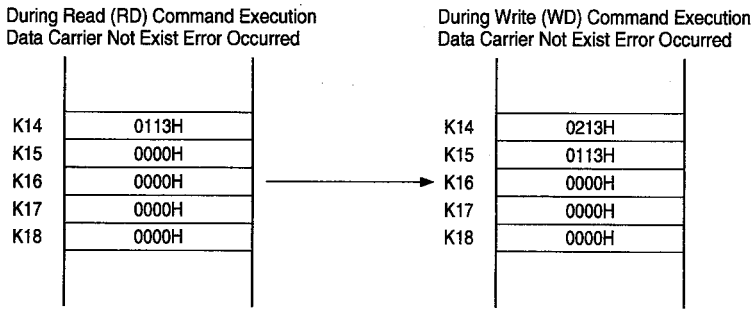


[Example]

- When an error occurred during the read (RD) command is executed in CH.1, and another error occurred when the next write (WD) command is executed:

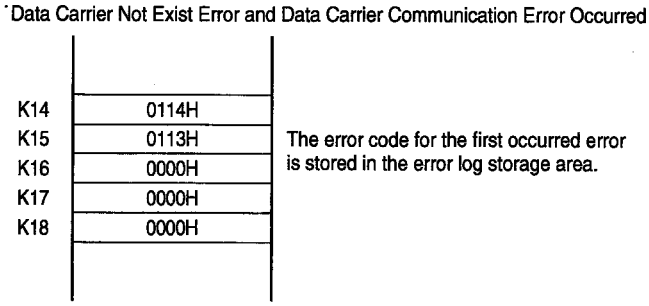
During Read (RD) Command Execution
Data Carrier Not Exist Error Occurred

During Write (WD) Command Execution
Data Carrier Not Exist Error Occurred



- When multiple errors occurred at once in CH.1

Data Carrier Not Exist Error and Data Carrier Communication Error Occurred

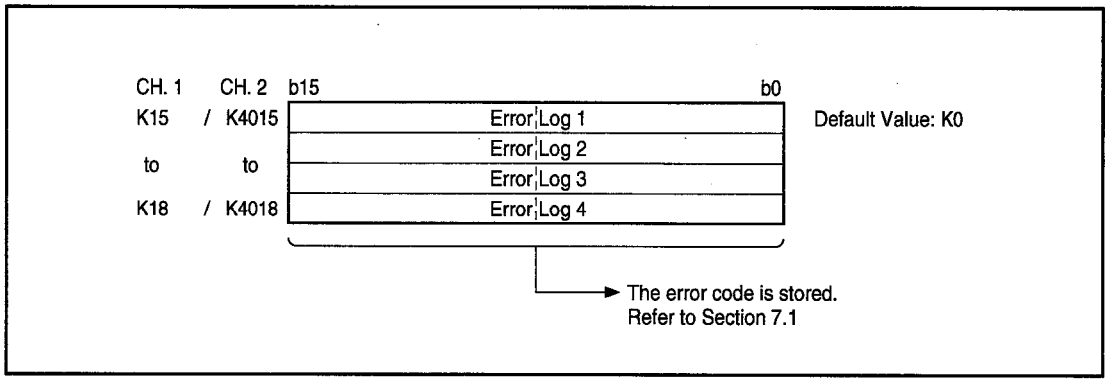


POINT

The operating system of ID interface module stores the value in the error code storage area . Therefore, do not write on this area from the PC program, but perform only reads.

5.6.14 Error Log Storage Area (Address K15 to K18/K4015 to K4018)

Up to four error codes that occurred in the past are stored. Refer to Section 7.1 for the error codes.



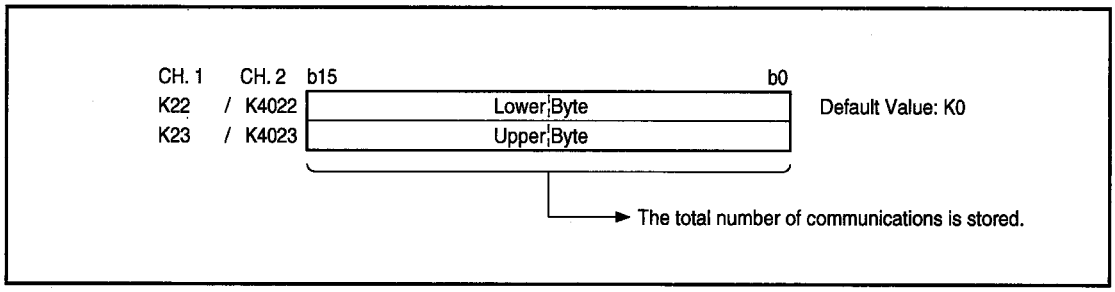
POINT

The operating system of ID interface module stores the value in the error log storage area. Therefore, do not write on this area from the PC program, but perform only reads.

5.6.15 Total Number of Communications Storage Area (Address K22 to K23/K4022 to K4023)

The number of communications with the data carrier is stored.
The following commands do not update the total number of communications. Thus, the actual number of communications may differ.

- Continuous Fast read (FR)
- Continuous Fast write (FW)
- Comparison Command (CM)
- Clear Command (CL)
- End Usage Command (OF)
- Start Usage Command (ON)
- Continuous Comparison Read (SR)
- Continuous Comparison Write (SW)
- Comparison Read (CR)
- Comparison Write (CW)

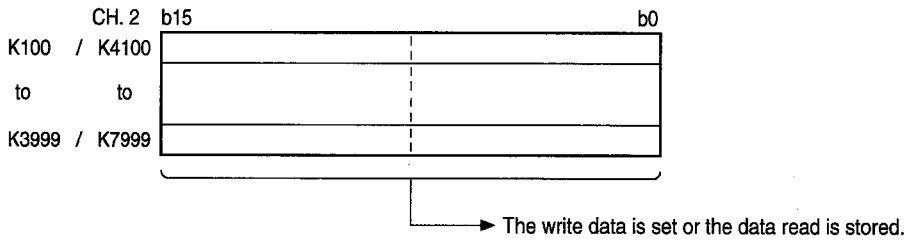


POINT

- Since the area stores in 2 words, use 32-bit commands.
- The operating system of ID interface module stores the value in the total number of communications storage area. Therefore, do not write on this area from the PC program, but perform only reads.

5.6.16 Data Storage Area (3,900 Words) (Address K100 to K3999/K4100 to K7999)

The write data is set or the data read is stored.

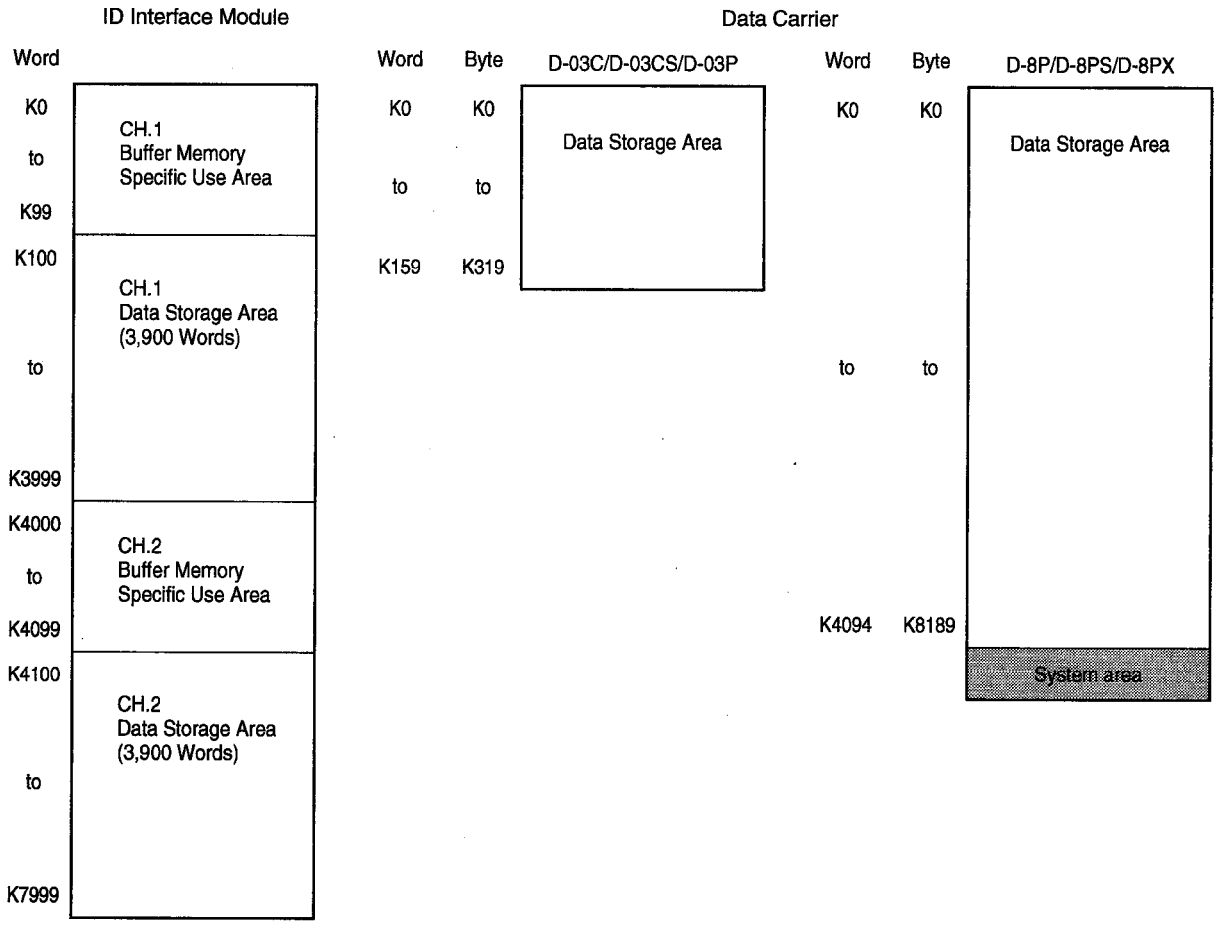


POINT

When writing, the data from the starting address (K100/ K4100) of the buffer memory is written from the specified starting address of the data carrier. When reading, the specified points of data from the specified starting address in the data carrier is stored in the buffer memory from the starting address (K100/ K4100).

5.7 Memory Mapping

The following describes the memory correspondences with the ID interface module and data carrier.



POINT

Refer to Section 5.1 Data Structure (Processing Unit) for the differences between the word unit processing and byte-unit processing.

6 Communication Method with the Data Carrier

This chapter describes the programming method to communicate with the data carrier using commands.

6.1 Precautions for Programming

The following describes the precautions that users should know before writing a program to communicate with the data carrier using the ID interface module.

(1) The I/O Signals for PC CPU Handshaking

Signals to execute the ID command from the sequence program or to identify that the ID command is complete are called handshaking I/O signals. These are necessary to communicate with the data carrier.

Always insert handshake signals in the program. Refer to Section 6.3 for handshaking signals.

(2) Reading/Writing Buffer Memory

A sequence program is necessary to perform read/write the buffer memory to communicate with the data carrier. (Refer to Section 5.5 for the buffer memory.) Create a sequence program for the required areas.

When the ID interface module is started, default values are written in the specific use area of the buffer memory.

(a) The buffer memory is not backed up by battery.

Once the power is turned on, the CPU is reset, or the mode is changed, the overwritten data is all reset to the default values. Data setting must be performed every time these actions are taken.

(b) Changing the default values of the specific use area of the buffer memory

When the default values must be changed for data carrier communication, a sequence program to change the values must be created. (Refer to Section 5.5.)

(3) Data Storage Condition at the Data Carrier When Error Occurs

When an error occurs during communication with the data carrier, the data is overwritten in 20-word units and there will exist old and new data mixed together.

To resolve this problem, when an error occurs during a write-type command (CW, SW, FW, WD, AW, FI and CO) is being executed, execute the command again after the error cancel command.

6.2 Command List

The following describes the commands that can be used for the ID interface module.

Function	Command	Command Code (ASCII Code)	Details	Application	Reference
Read	Read	RD (4452H)	Read data from the data carrier.	• To read data	6.6.1
	Comparison Read	CR (5243H)	Read data from the data carrier and compare data.	• To read highly reliable data	6.6.2
	Continuous Read	AR (5241H)	Perform read continuously until the data carrier enters communication range of the reader/writer. When in the communication range, read data from the data carrier.	• To read data from a moving object	6.6.3
	Continuous Comparison Read	SR (5253H)	Perform read continuously until the data carrier enters the communication range of the reader/writer. When in the communication range, read data from the data carrier, and compare data.	• To read data from a highly reliable moving object	6.6.4
	Continuous Fast Read	FR (5246H)	Same as AR with increased processing speed by 25%	• To read data from a fast moving object	6.6.5
Write	Write	WD (4457H)	Write data to the data carrier.	• To write data	6.7.2
	Comparison Write	CW (5743H)	Write data to the data carrier and compare data.	• To write highly reliable data	6.7.2
	Continuous Write	AW (5741H)	Perform write continuously until the data carrier is within the communication range of the reader/writer. When in the communication range, data is written to the data carrier.	• To write data to a moving object	6.7.3
	Continuous Comparison Write	SW (5753H)	Perform write continuously until the data carrier is within the communication range of the reader/writer. When in the communication range, data is written to the data carrier and comparison is performed.	• To write data to a highly reliable moving object	6.7.4
	Continuous Fast Write	FW (5746H)	AW, processing speed increased by 10%.	• To write data to a fast moving object	6.7.5
	Batch Write	FI (4946H)	Write specified data to the data carrier.	• Clear all of specified data	6.7.6
Verify	Comparison	CM (4D43H)	Compare data in the ID interface module with data in the data carrier.	• Data carrier inspection	6.8.1
Copy	Data Copy	CO (4F43H)	Copy data between the data carriers at channel 1 and 2.	• To create copy. • Move line data	6.9.1
Erase	Clear	CL (4C43H)	Clears all areas of data carrier to zero. (Overwrites "0" to all areas.)	• To clear all with zero	6.10.1
Set	End Usage (Sleep Setting)	OF (464FH)	Prevent built-in battery consumption by changing the data carrier mode to save state (sleep mode).	• End usage at normal distance	6.11.1
	Start Usage (Sleep Cancel)	ON (4E4FH)	Change the data carrier to normal use state. This is the factory default.	• Start usage at normal distance	6.11.2
Command	Continuous Command Cancel	—	Forcefully exits the continuous command during execution.	• To cancel continuous command.	6.12
	Error Cancel Command	—	Performs error cancel processing (turn off error LED, reset the error detection signal, clear the error code storage area in the buffer memory.)	• To cancel error.	6.13

Function	Command	Command Code (ASCII Code)	Details	Application	Reference
Initial Setting	Continuous Command Execution Interval Specification	—	The command execution interval for the continuous command is specified. An interval between 0mS and 3276.7S can be set by 100 mS scale.	• To set the command execution interval for a continuous command.	6.4
	Battery Life Evaluation Value Specification	—	When the total number of communications for a data carrier exceeds the battery life evaluation value, the battery life is judged to be over.	• Data carrier battery life management	6.4
	Number of Retries	—	When a command could not be executed successfully, the command is retried for the specified number of times (default value: 3 times) automatically without performing an error processing.	• Error prevention from noise or maximum communication distance	6.4
	Processing Unit Specification	—	Selects whether to have the data processing unit in words or bytes. The default is in word units.	• To specify data processing unit with PC, etc.	6.4

6.3 Combinations between Commands and I/O Signals

Listed below are the combinations of commands an I/O signals
Design interlocks according to the combination.

Command	Command Code (ASCII Code)	Command Code (Hex.)	I/O Signals					
Read	RD	4452H	Interlock 1	Interlock 2	Interlock 3	Interlock 4	Interlock 5	Interlock 6
Comparison Read	CR	5243H	Xn0 Watchdog timer error	Xn6 ID ready signal	Xn3 ID-BUSY when CH. 1 / XnB ID-BUSY when CH. 2	Xn4 ID command when CH. 1 / XnC ID command complete when CH. 2	Y(n+1)C ID command execution request when CH. 1 / Y(n-1)C ID command execution request when CH. 2	Xn5 error detection signal when CH. 1 / XnD error detection signal when CH. 2
Continuous Read	AR	5241H						
Continuous Comparison Read	SR	5253H						
Continuous Fast Read	FR	5246H						
Write	WD	4457H						
Comparison Write	CW	5743H						
Continuous Write	AW	5741H						
Continuous Comparison Write	SW	5753H						
Continuous Fast Write	FW	5746H						
Batch Write	FI	4946H						
Comparison	CM	4D43H						
Data Copy	CO	4F43H						
Clear	CL	4C43H						
End Usage	OF	464FH						
Start Usage (Sleep Cancel)	ON	4E4FH						
Continuous Command Cancel	—	—			—	—		
Error Cancel Command	—	—			—	—		
Continuous Command Execution Interval Specification	—	—			—	—	—	
Battery Life Evaluation Value Specification	—	—			—	—	—	
Number of Retries	—	—			—	—	—	
Processing Unit Specification	—	—			—	—	—	

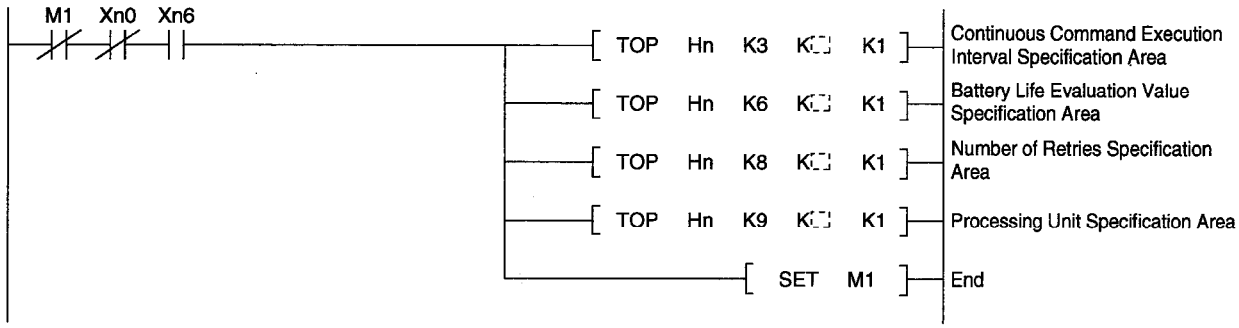
6.4 Initial Setting

When performing data communication with the data carrier other than with default, always write to the following buffer memory areas:

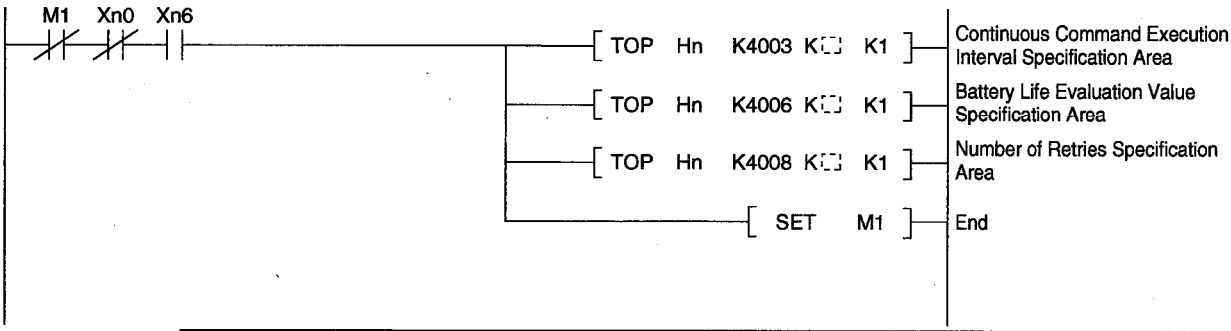
CH1. CH.2

K3	/K4003	Continuous Command Execution Interval Specification Area
K6	/K4006	Battery Life Evaluation Value Specification Area
K8	/K4008	Number of Retries Specification Area
K9	/—	Processing Unit Specification Area (Word/Byte Specification)

(1) CH.1 Program



(2) CH.2 Program



POINT

- Perform the write to the buffer memory for initial setting only once during the ID interface module startup.
- The initial setting is valid until the first command execution. After the command execution, the values are ignored.

6.5 Basic Format of Program

Basic programs to communicate between the PC CPU and data carrier are described below:

(1) The basic program when using the following commands is described:

- Read (RD)
- Comparison Read (CR)
- Continuous Read (AR)
- Continuous Comparison Read (SR)
- Continuous Fast Read (FR)
- Write (WD)
- Comparison Write (CW)
- Continuous Write (AW)
- Continuous Comparison Write (SW)
- Continuous Fast Write (FW)
- Batch Write (FI)

Clear (CL)

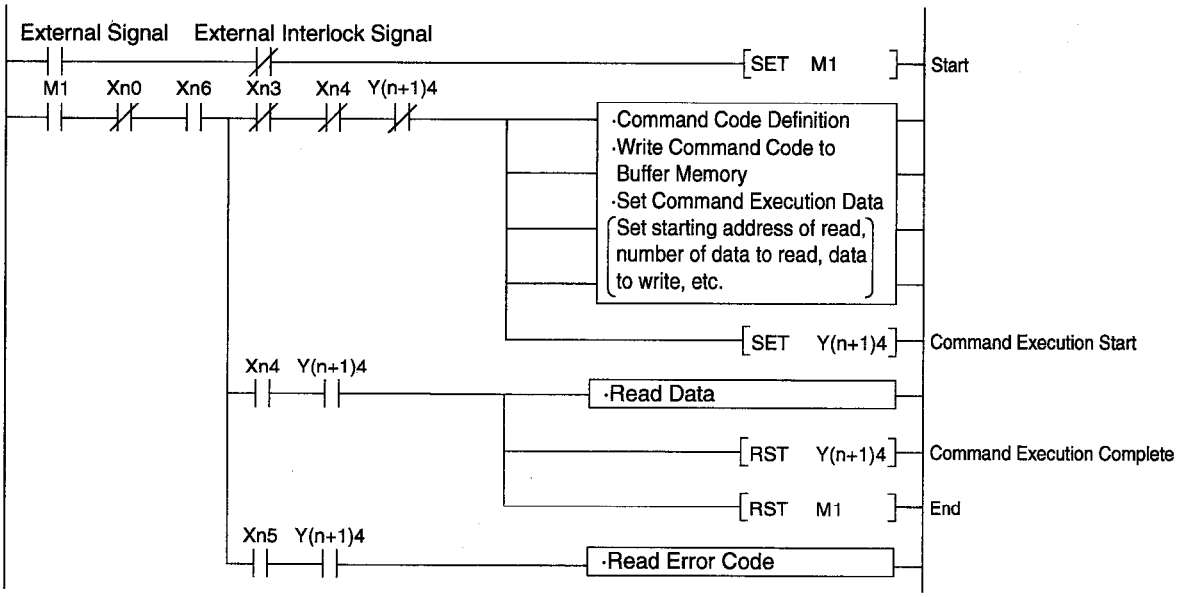
End Usage (OF)

Start Usage (ON)

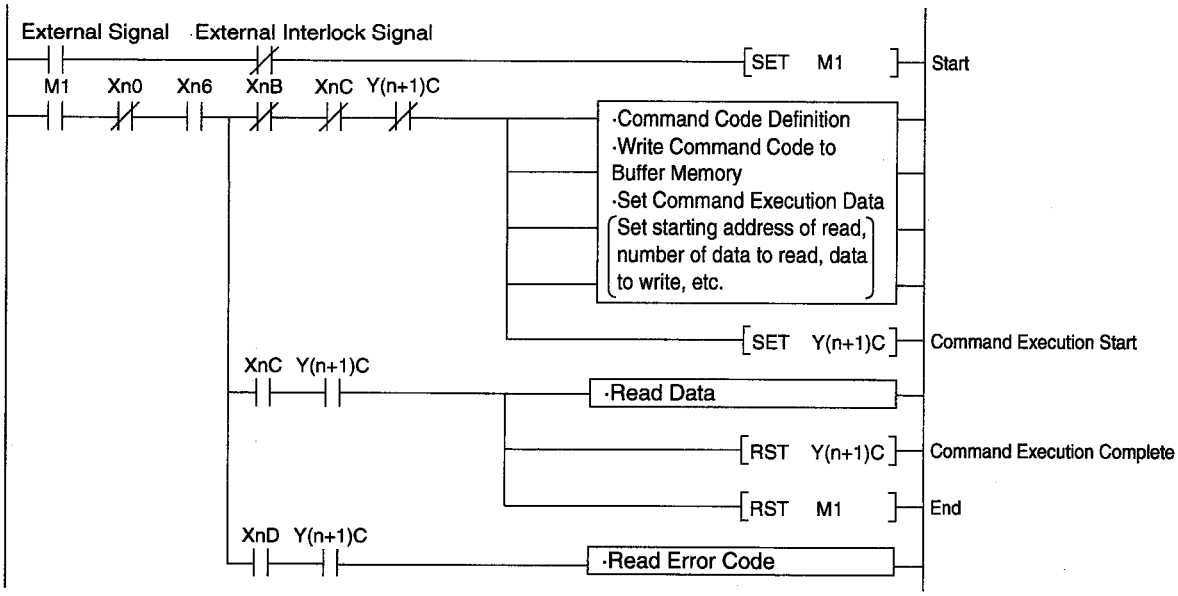
POINT

There are items that do not need to be set depending on the command. Refer to the section for each command for details.

(a) CH.1 Program



(b) CH.2 Program

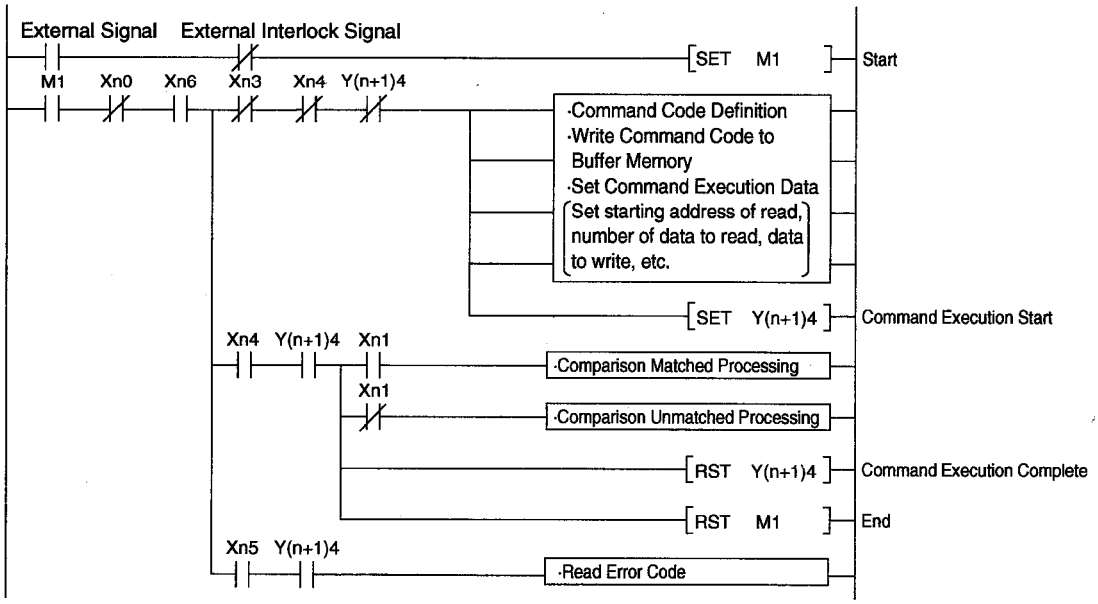


POINT

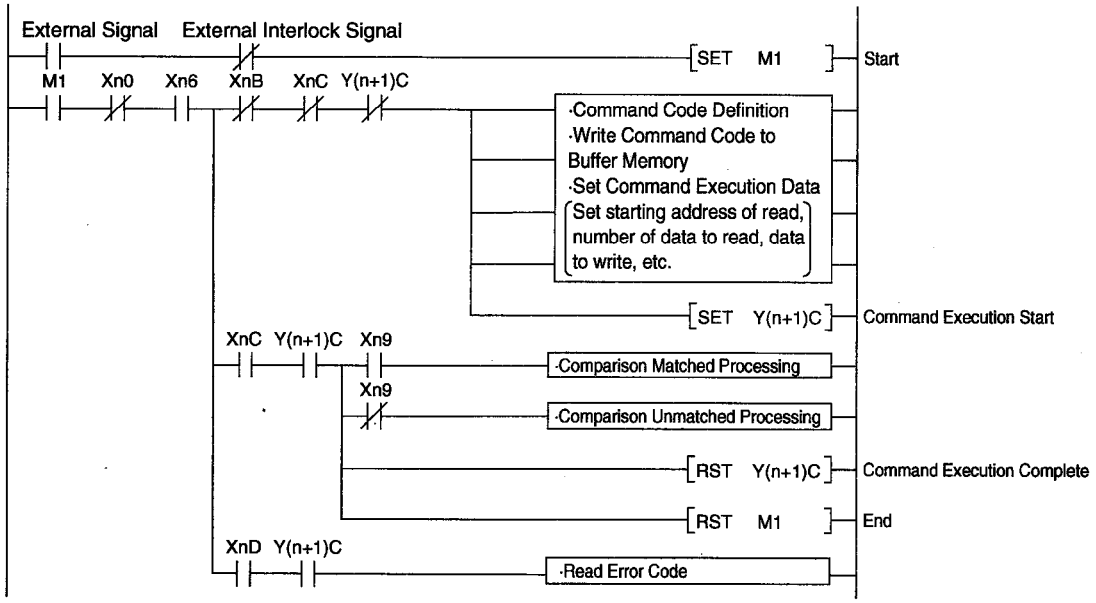
Input pulse signals for external signals. When signals other than pulses are input, commands are executed continuously.
When commands are executed continuously, it shortens the data carrier battery life.

(2) The basic program when using the comparison (CM) command is described:

(a) CH. 1 Program



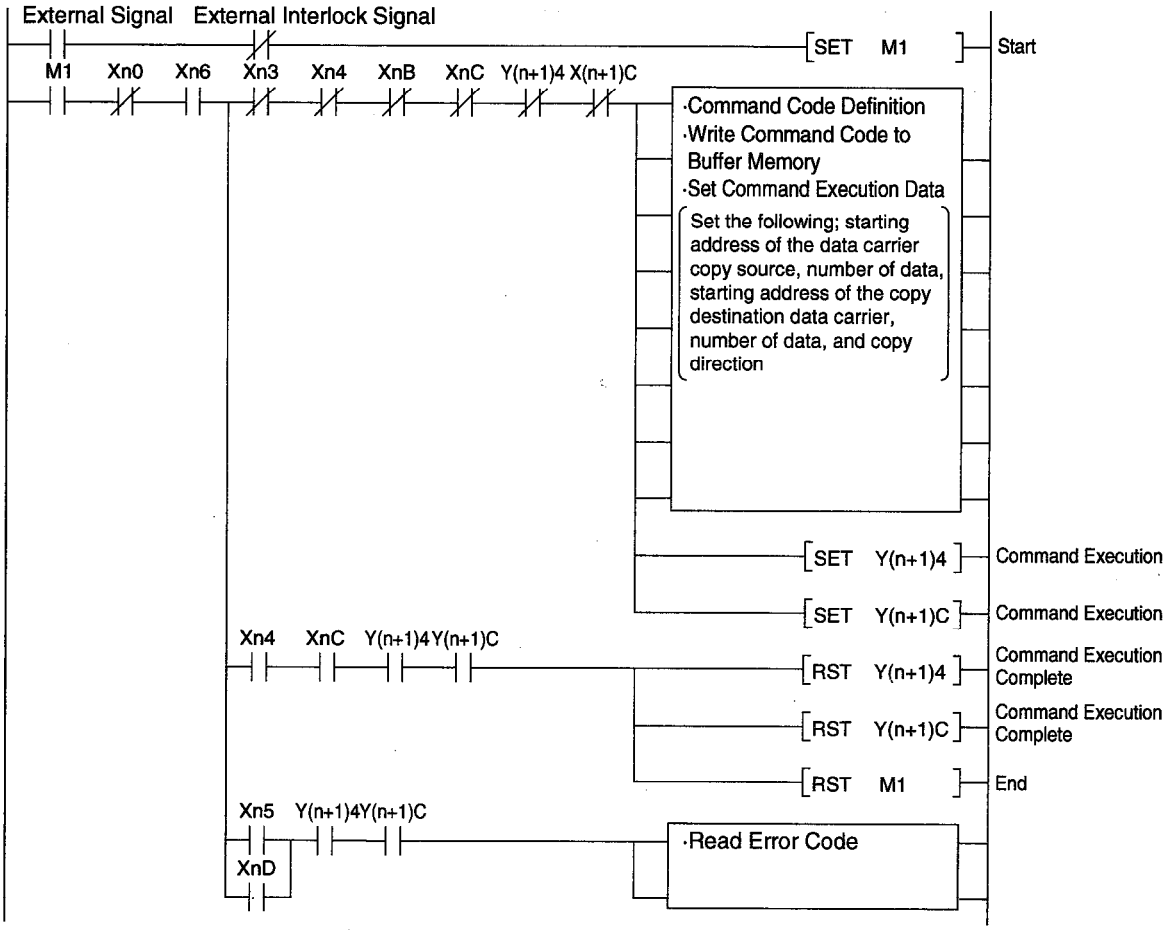
(b) CH. 2 Program



POINT

Input pulse signals for external signals. When signals other than pulses are input, commands are executed continuously.
When commands are executed continuously, it shortens the data carrier battery life.

(3) The basic program when using the data copy (CO) command is described:
(Common program for CH1, CH2))

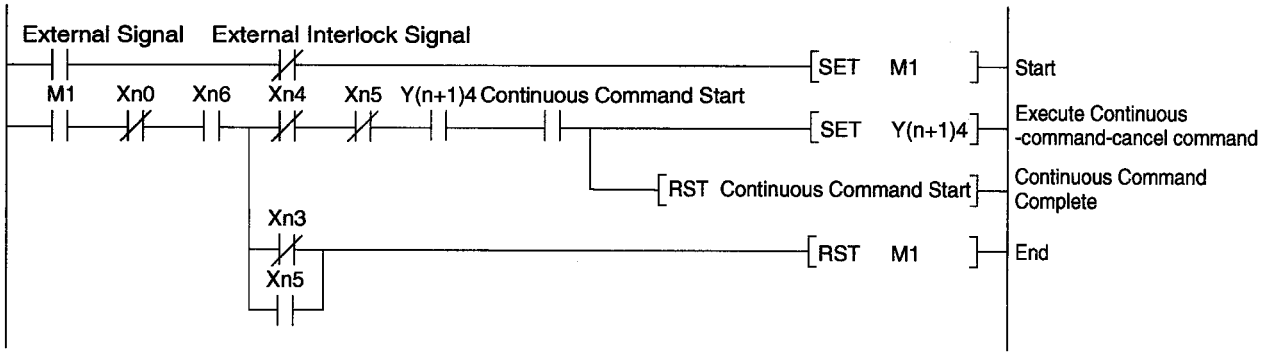


POINT

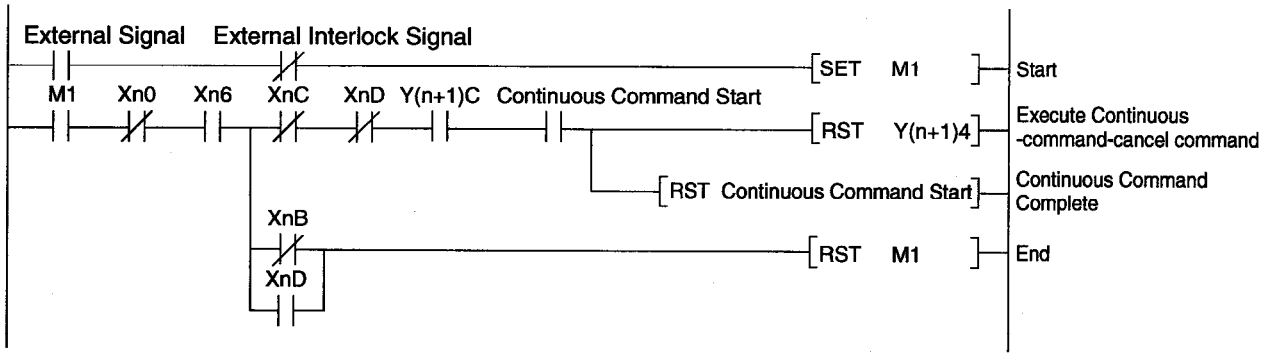
Input pulse signals for external signals. When signals other than pulses are input, commands are executed continuously.
When commands are executed continuously, it shortens the data carrier battery life.

(4) The basic program when using the continuous-command-cancel command is shown below.

(a) CH.1 Basic Program



(b) CH.2 Basic Program

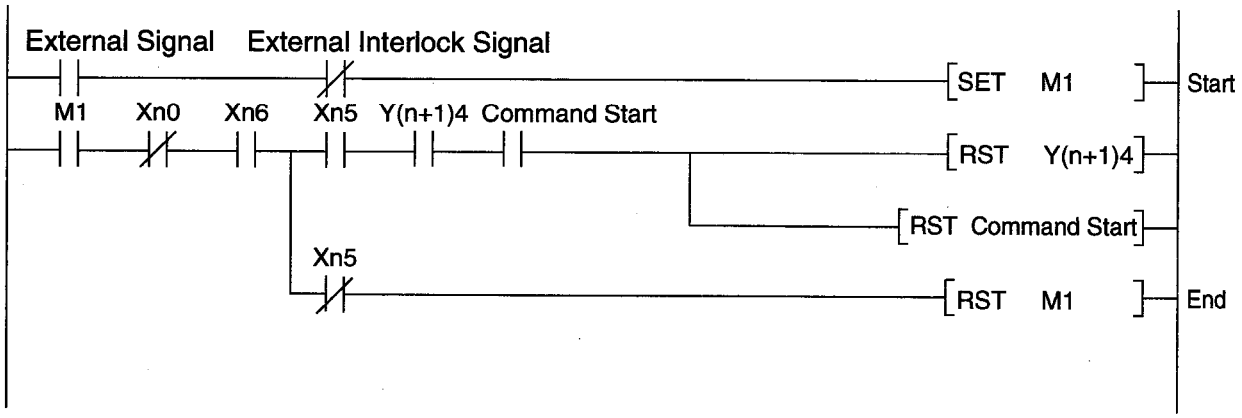


POINT

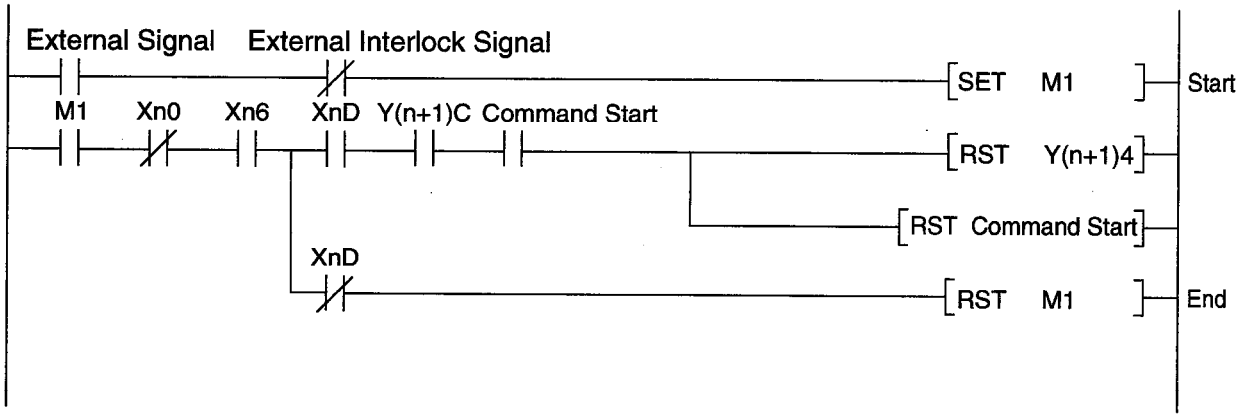
Input pulse signals for external signals. When signals other than pulses are input, commands are executed continuously.
When commands are executed continuously, it shortens the data carrier battery life.

(5) The basic program when using the error cancel command is shown below.

(a) CH.1 Basic Program



(b) CH 2 Basic Program



POINT

Input pulse signals for external signals. When signals other than pulses are input, commands are executed continuously.
When commands are executed continuously, it shortens the data carrier battery life.

6.6 Reading from the Data Carrier

The command to read data from the data carrier is described below.

6.6.1 Read Command (RD)

The read command (RD) reads data from the data carrier, and stores the data to the buffer memory of the ID interface module.

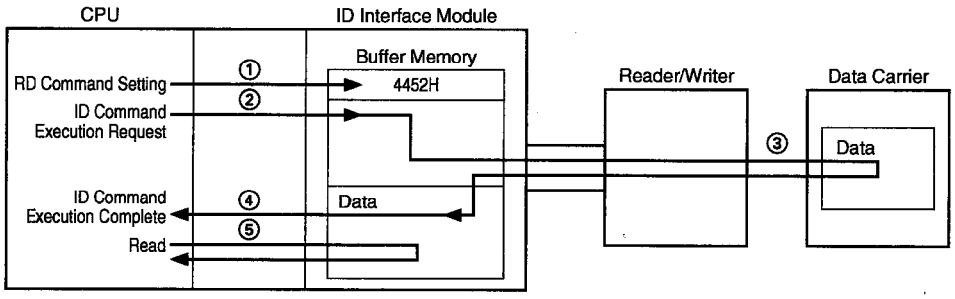
Command Code

Command: RD Code: 4452H

Usage

- Read data.

Command Execution Flow

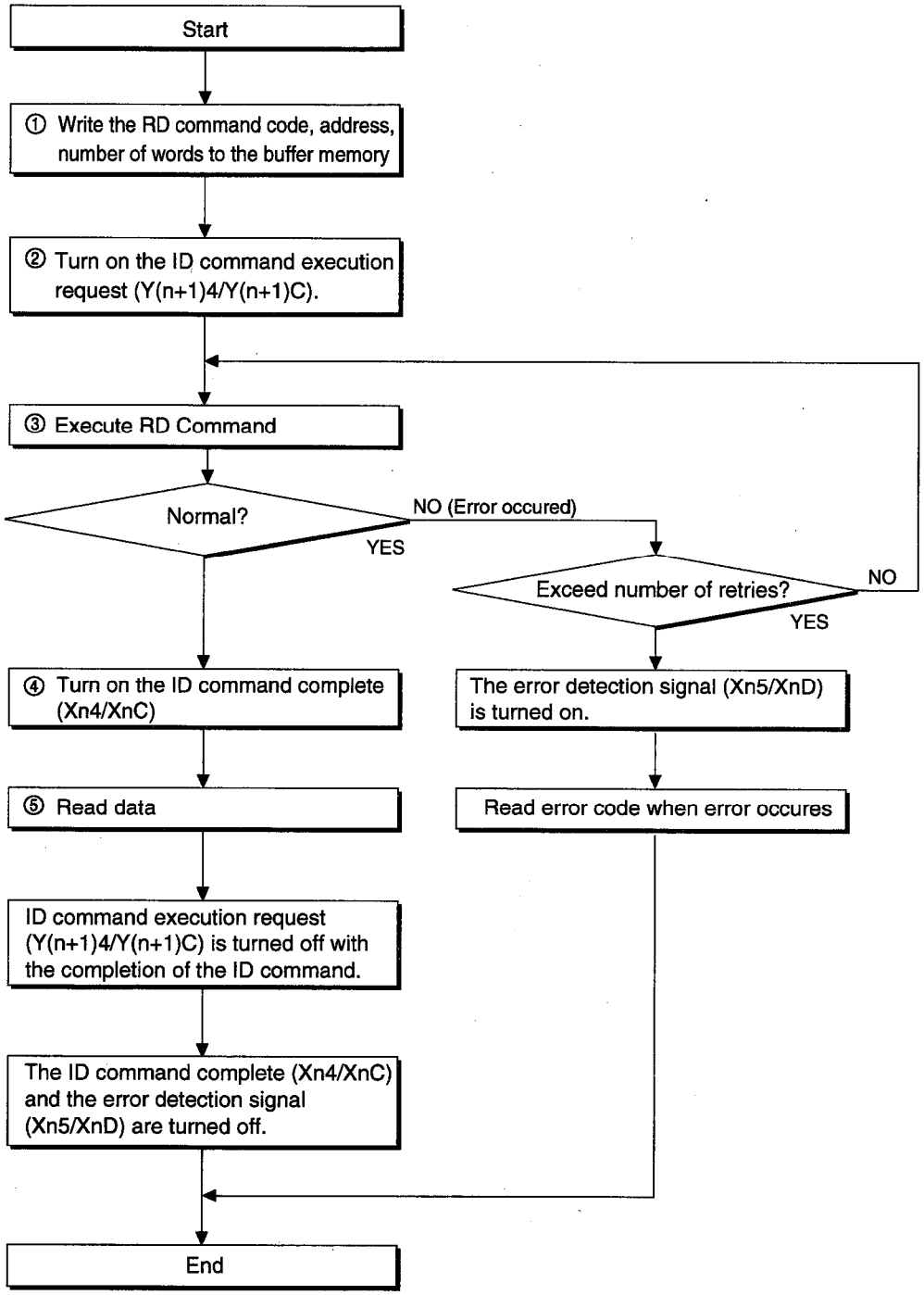


POINT

When data carrier does not exist when the read command (RD) is executed, the command is re-executed up to the number of retries, then if the command still cannot be completed, an error occurs.

Programming

The programming flow is shown below.

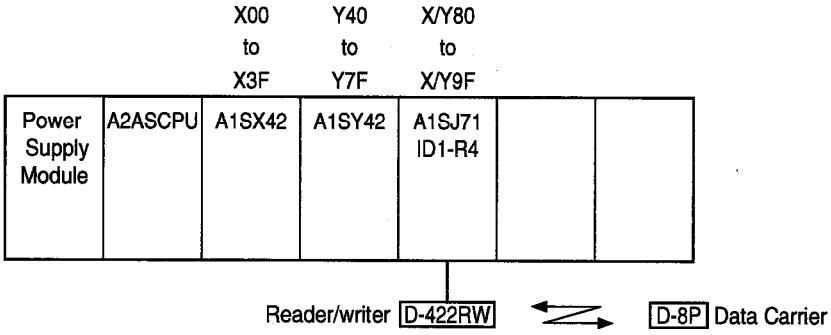


[Programming Example]

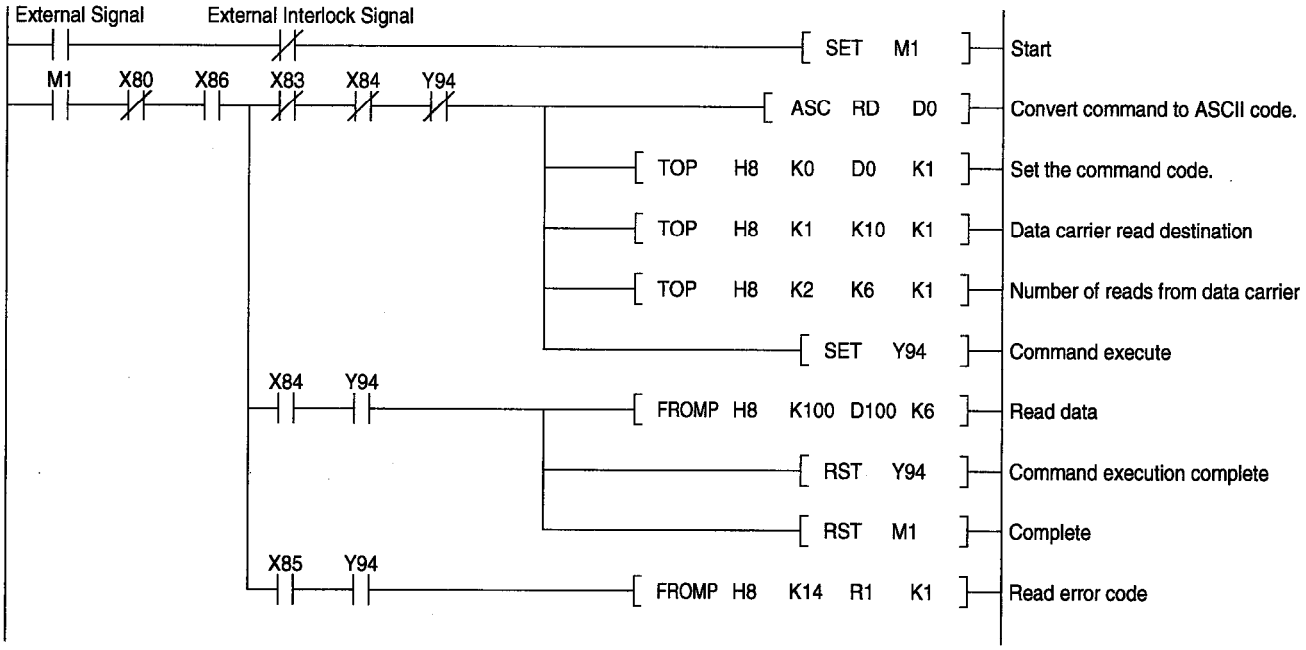
6 words of data from the starting address K10 of data carrier is read from CH.1. This is stored in the data register D100-D105 of the PC CPU.

(a) System Configuration

Suppose the I/O address in the ID interface module starts from 80.



(b) Program



POINT

Input pulse signals for external signals. When signals other than pulses are input, commands are executed continuously.
When commands are executed continuously, it shortens the data carrier battery life.

6.6.2 Comparison Read Command (CR)

The read command (CR) compares the data after reading the data from the data carrier, and stores the data to the ID interface module buffer memory.

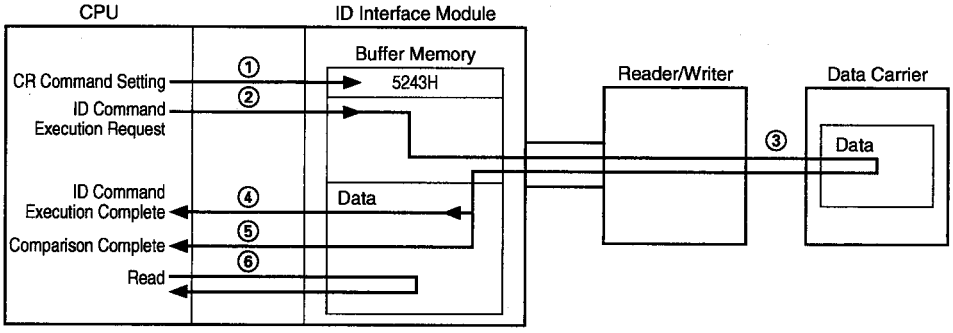
Command Code

Command: CR Code: 5243H

Usage

- Read high reliable data.

Command Execution Flow

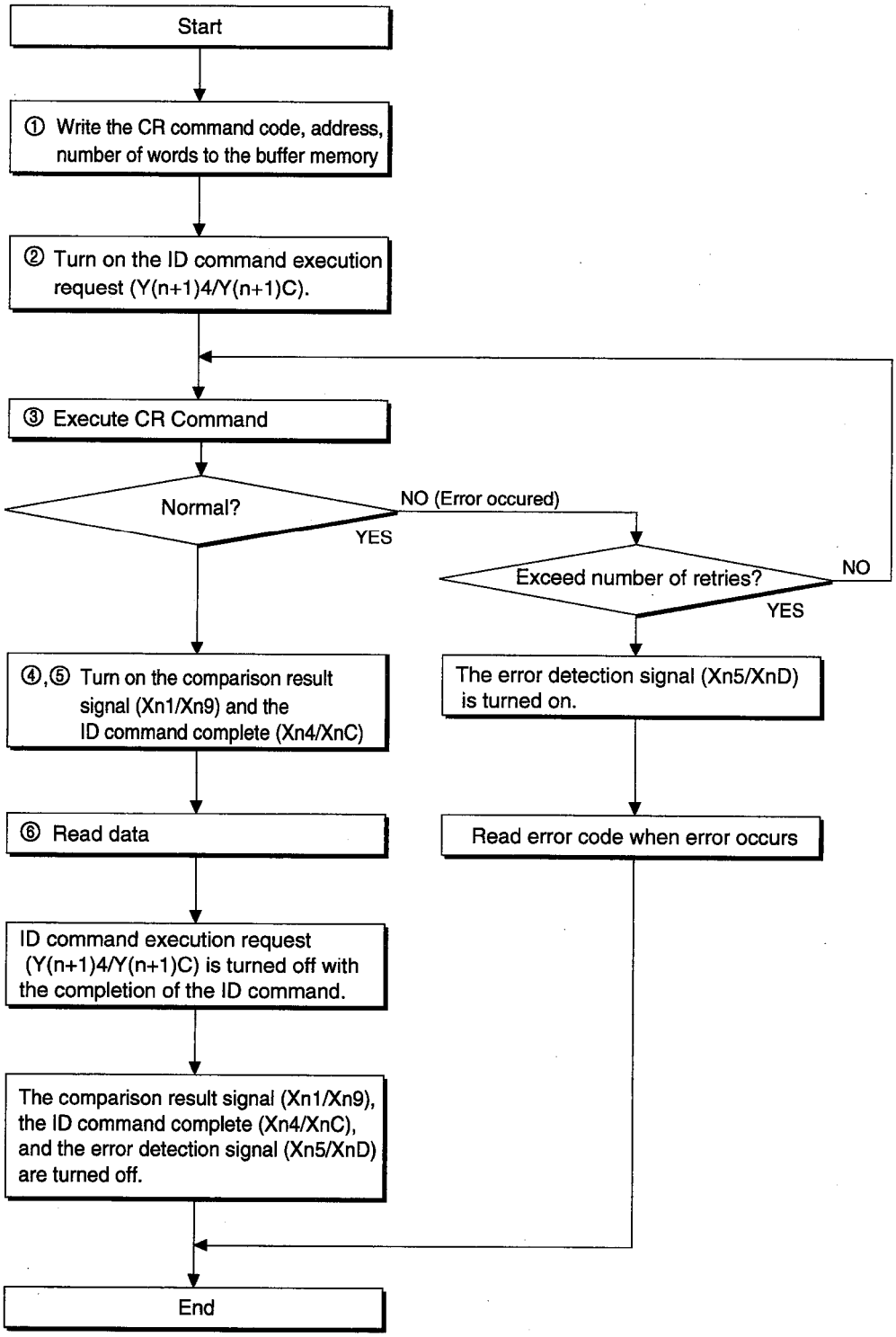


POINT

When data carrier does not exist when the read command (CR) is executed, the command is re-executed up to the number of retries, then if the command still cannot be completed, an error occurs.

Programming

The programming flow is shown below.

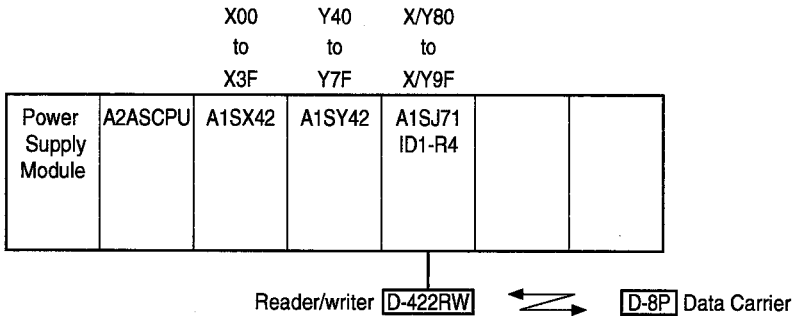


[Programming Example]

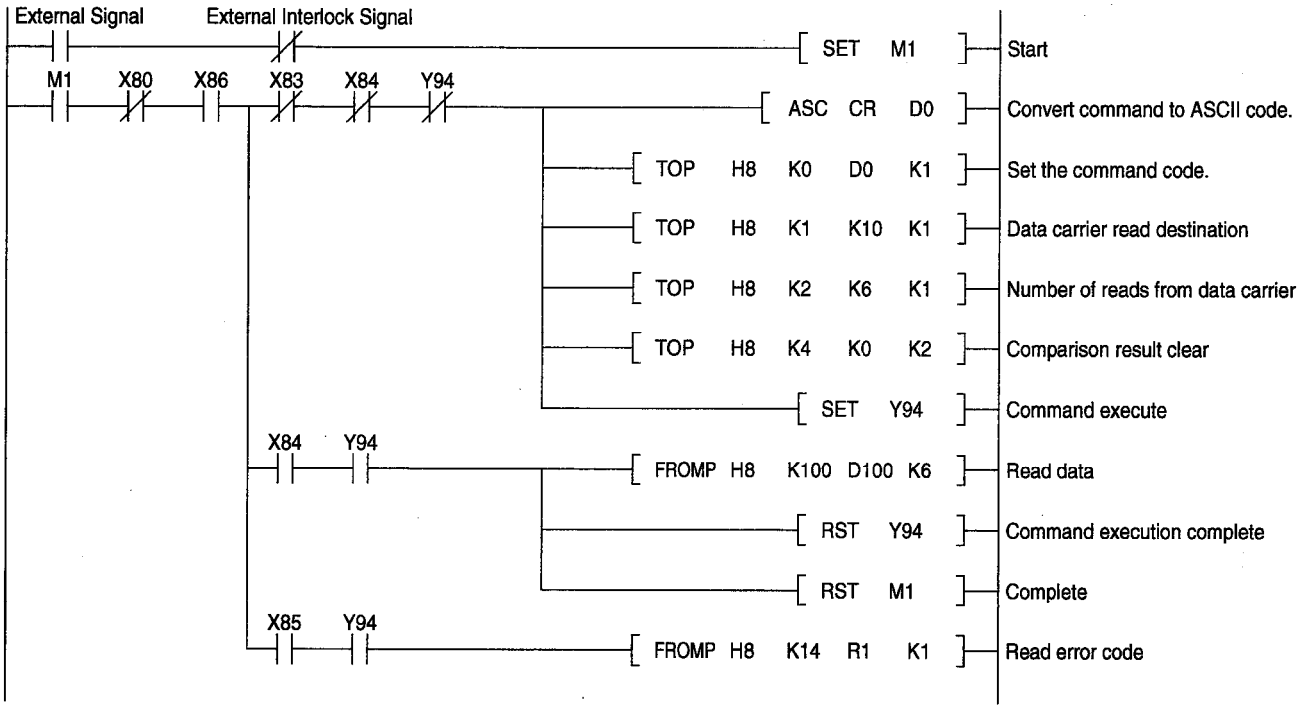
6 words of data from the starting address K10 of data carrier is read from CH.1. This is stored in the data register D100-D105 of the PC CPU.

(a) System Configuration

Suppose the I/O address in the ID interface module starts from 80.



(b) Program



POINT

Input pulse signals for external signals. When signals other than pulses are input, commands are executed continuously.
When commands are executed continuously, it shortens the data carrier battery life.

6.6.3 Continuous Read Command (AR)

The continuous read command (AR) keeps trying to execute the command until the data carrier enters the reader/writer communication range. When the data carrier enters the communication range, the data is read and stored in the ID interface module buffer memory.

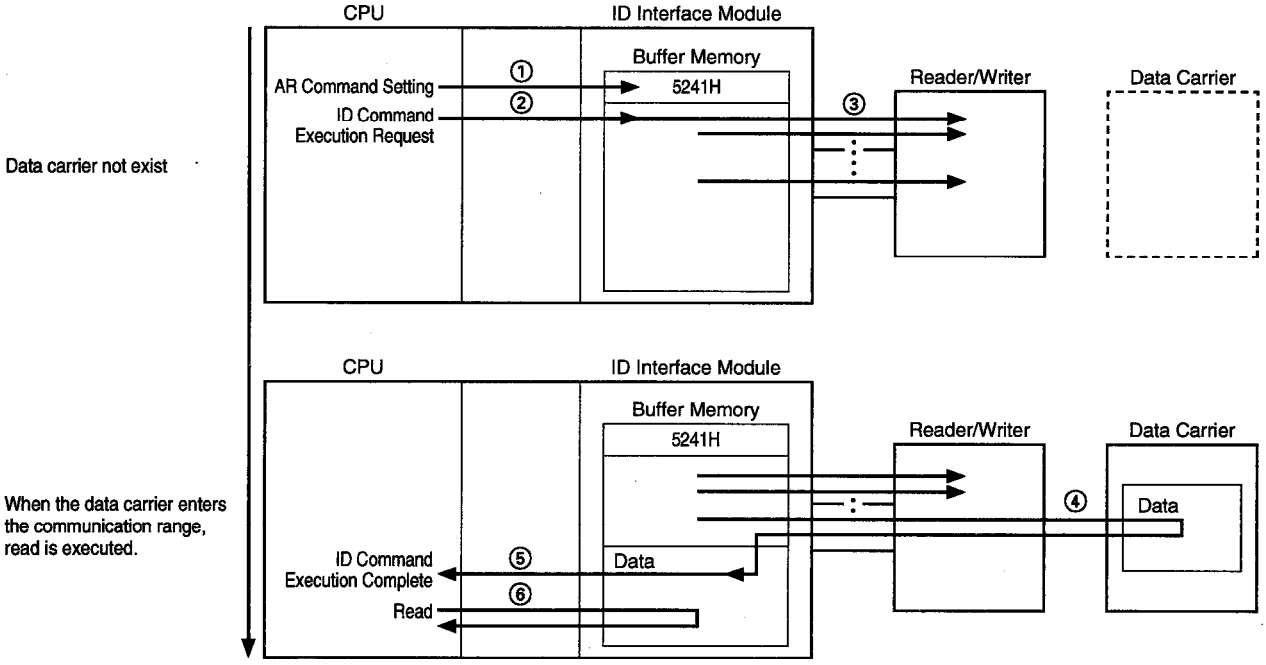
Command Code

Command: AR Code: 5241H

Usage

- Read data from a moving object.

Command Execution Flow

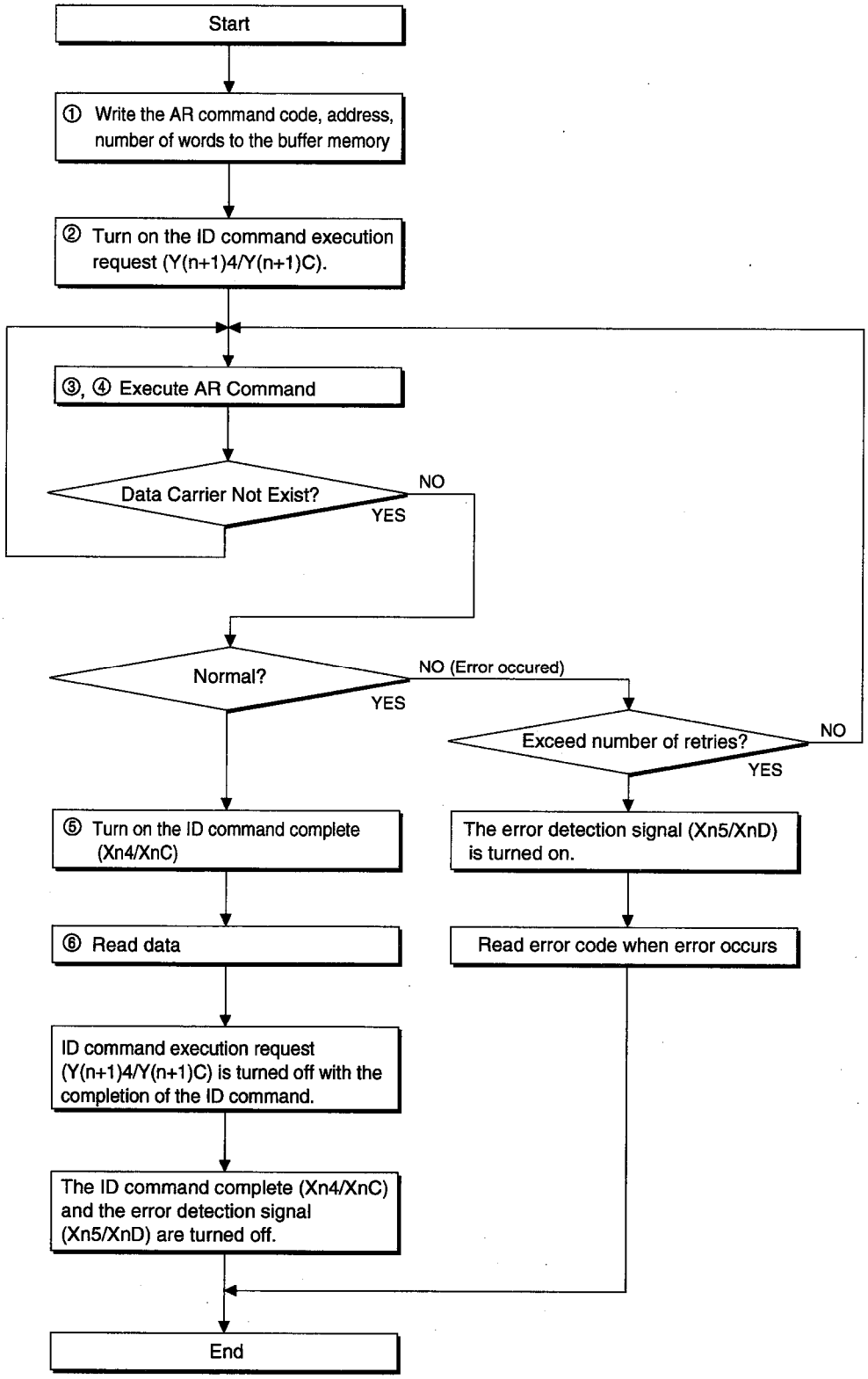


POINT

When the continuous read command (AR) is executed, it waits for the arrival of a data carrier and automatically performs read when the data carrier is detected. When the data carrier is not detected, the command is executed infinitely. To cancel execution, execute the continuous-command-cancel command. Refer to section 6.12 for the continuous-command-cancel command.

Programming

The programming flow is shown below.

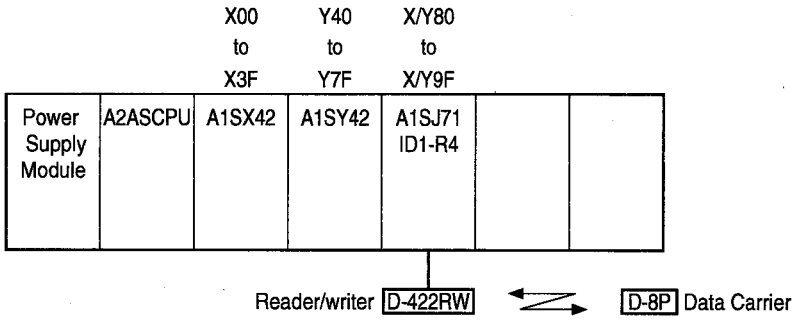


[Programming Example]

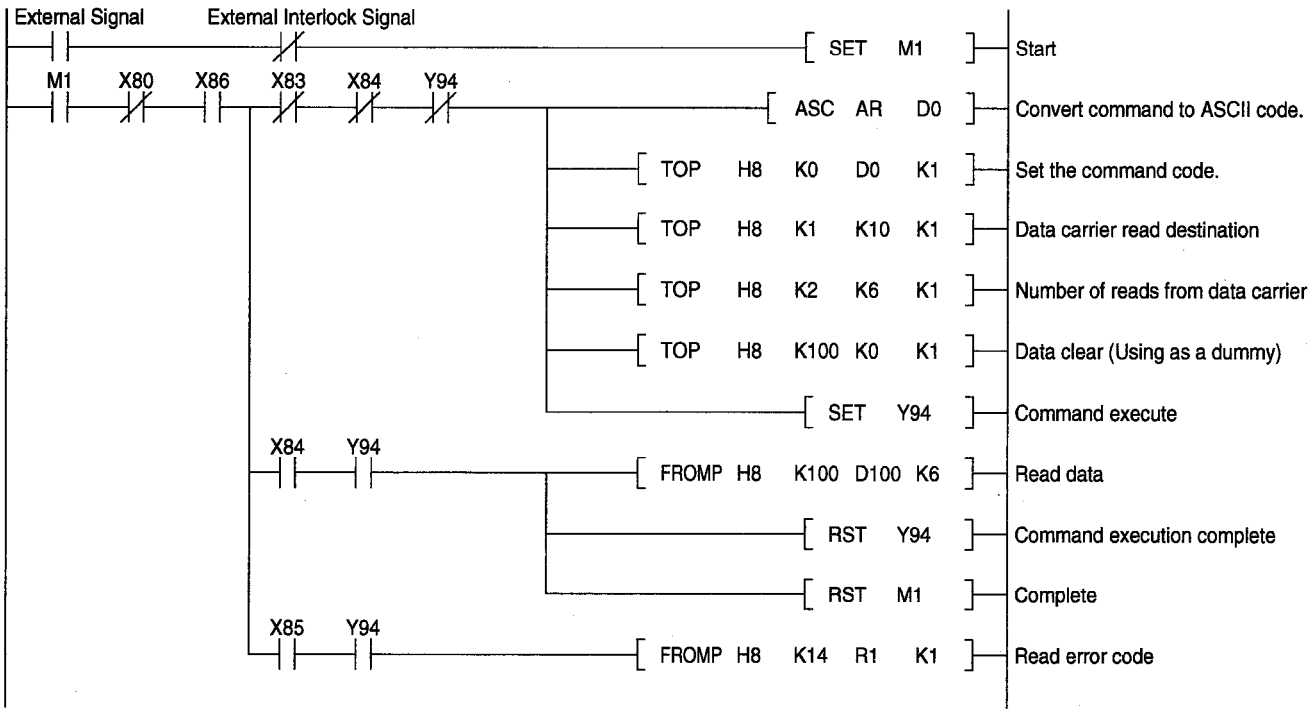
6 words of data from the starting address K10 of data carrier is read from CH.1. This is stored in the data register D100-D105 of the PC CPU.

(a) System Configuration

Suppose the I/O address in the ID interface module starts from 80.



(b) Program



When the moving speed is slow (less than 3m/min (1.97 inch/s) or is a hanging type, an unstable read is performed near the communication range borders because of the moving object's unstability. Perform a read in a stable communication range by detecting the moving object with a microswitch, etc. When the moving object cannot be detected, execute a continuous comparison read (SR), and confirm the data to increase reliability.

POINT

Input pulse signals for external signals. When signals other than pulses are input, commands are executed continuously.
When commands are executed continuously, it shortens the data carrier battery life.

6.6.4 Continuous Comparison Read Command (SR)

The continuous comparison read command (SR) keeps trying to execute the command until the data carrier enters the reader/writer communication range. When the data carrier enters the communication range, the data is read and stored in the ID interface module buffer memory.

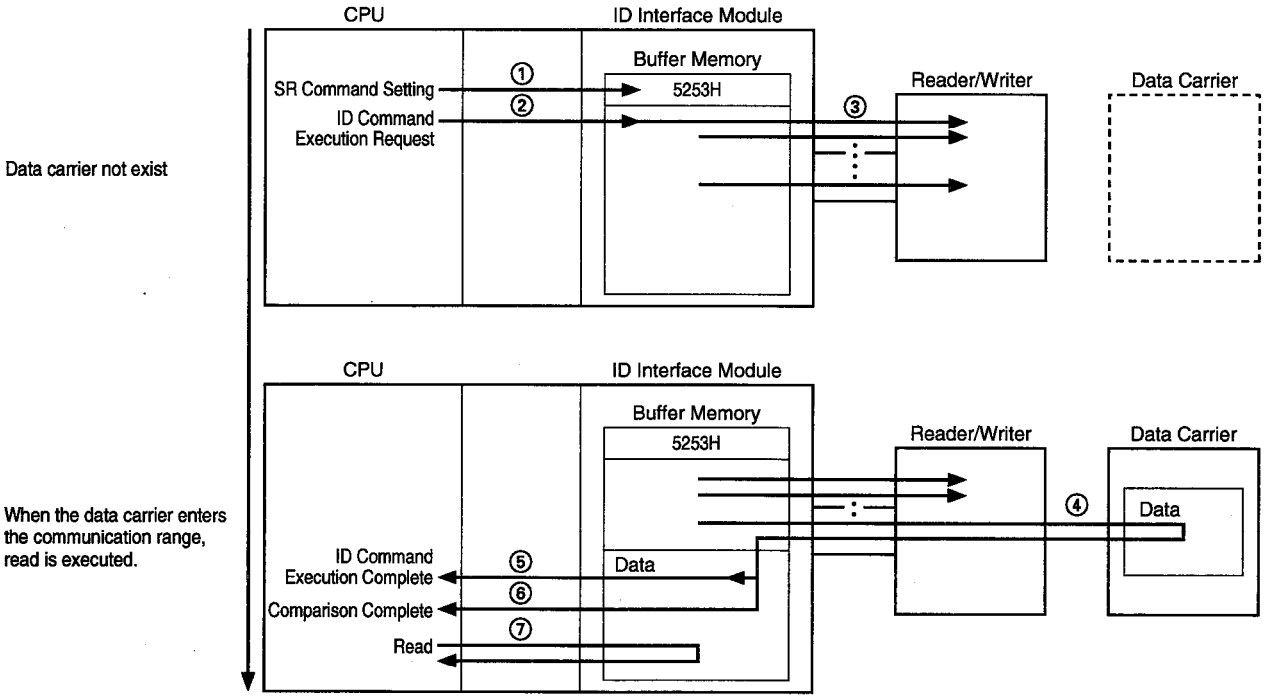
Command Code

Command: SR Code: 5253H

Usage

- Read data from a highly reliable moving object.

Command Execution Flow

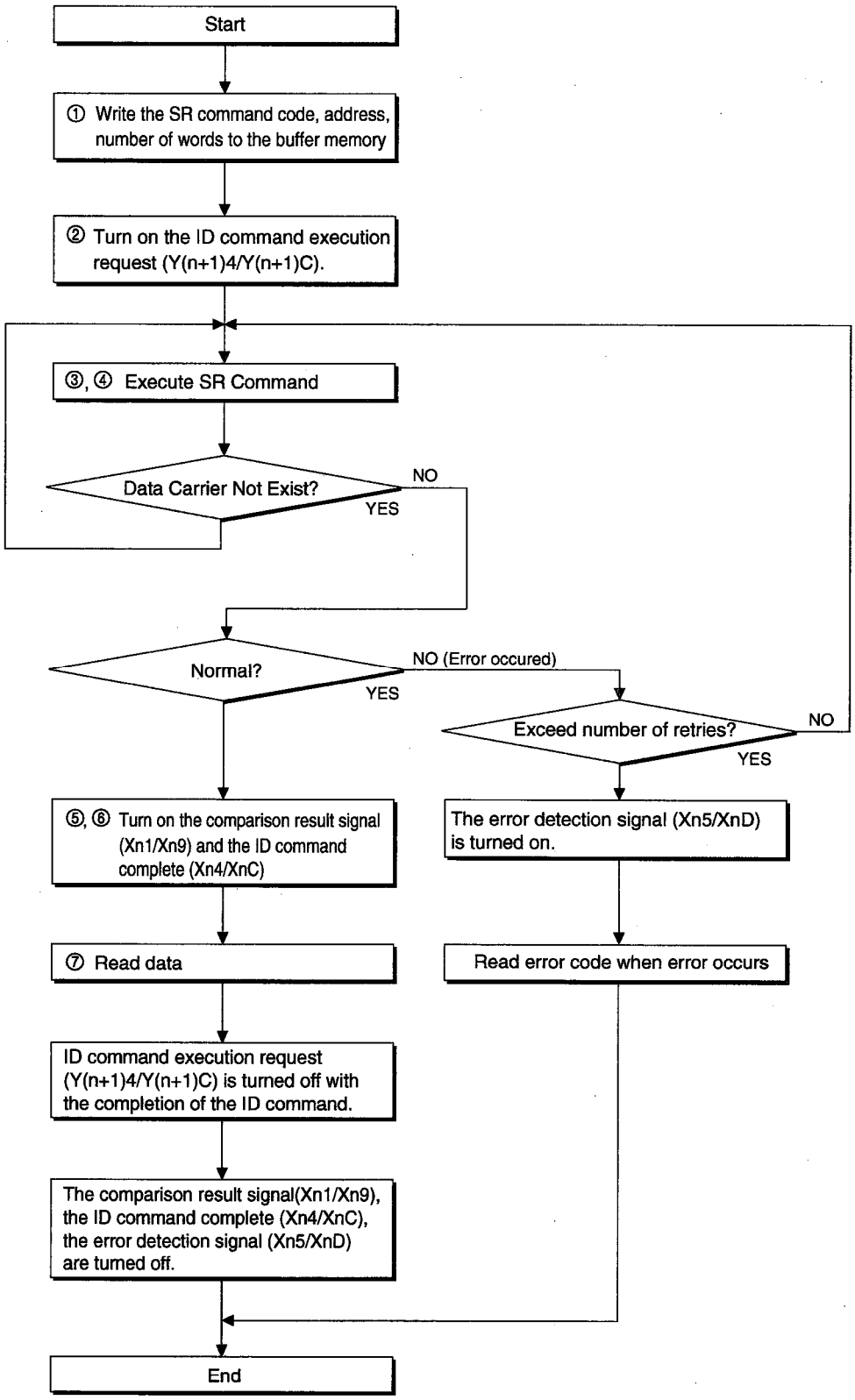


POINT

When the continuous comparison read command (SR) is executed, it waits for the arrival of a data carrier and automatically performs read when the data carrier is detected. When the data carrier is not detected, the command is executed infinitely. To cancel execution, execute the continuous-command-cancel command. Refer to section 6.12 for the continuous-command-cancel command.

Programming

The programming flow is shown below.

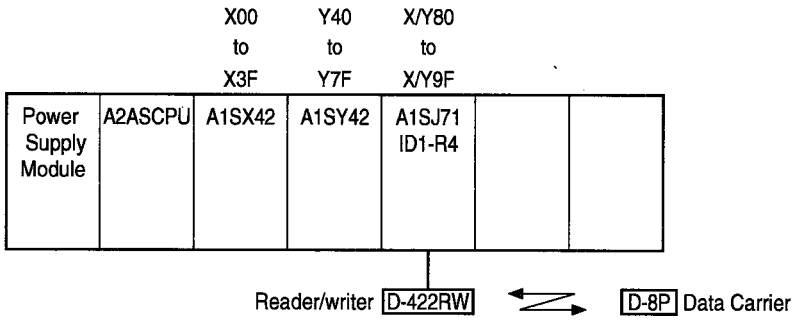


[Programming Example]

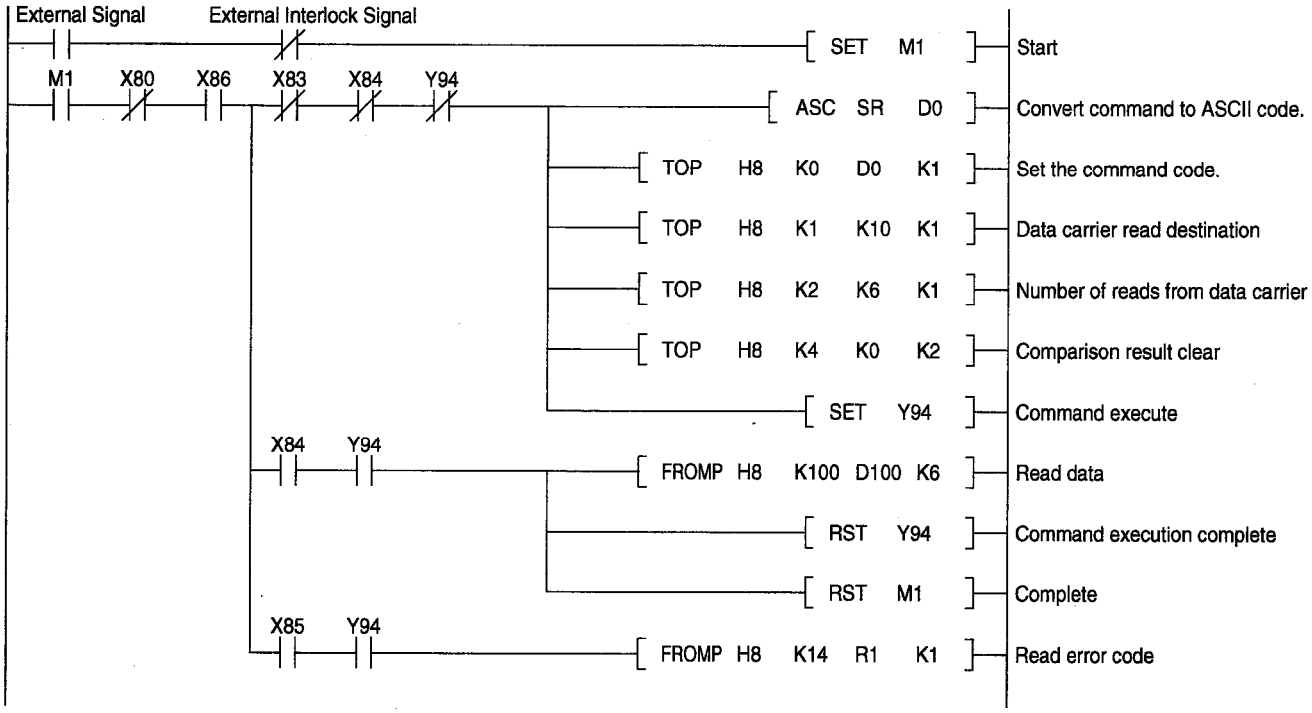
6 words of data from the starting address K10 of data carrier is read from CH.1. This is stored in the data register D100-D105 of the PC CPU.

(a) System Configuration

Suppose the I/O address in the ID interface module starts from 80.



(b) Program



POINT

Input pulse signals for external signals. When signals other than pulses are input, commands are executed continuously.
When commands are executed continuously, it shortens the data carrier battery life.

6.6.5 Continuous Fast Read Command (FR)

The continuous fast read command (FR) keeps trying to execute the command until the data carrier enters the reader/writer communication range. When the data carrier enters the communication range, the data is read and stored in the ID interface module buffer memory.

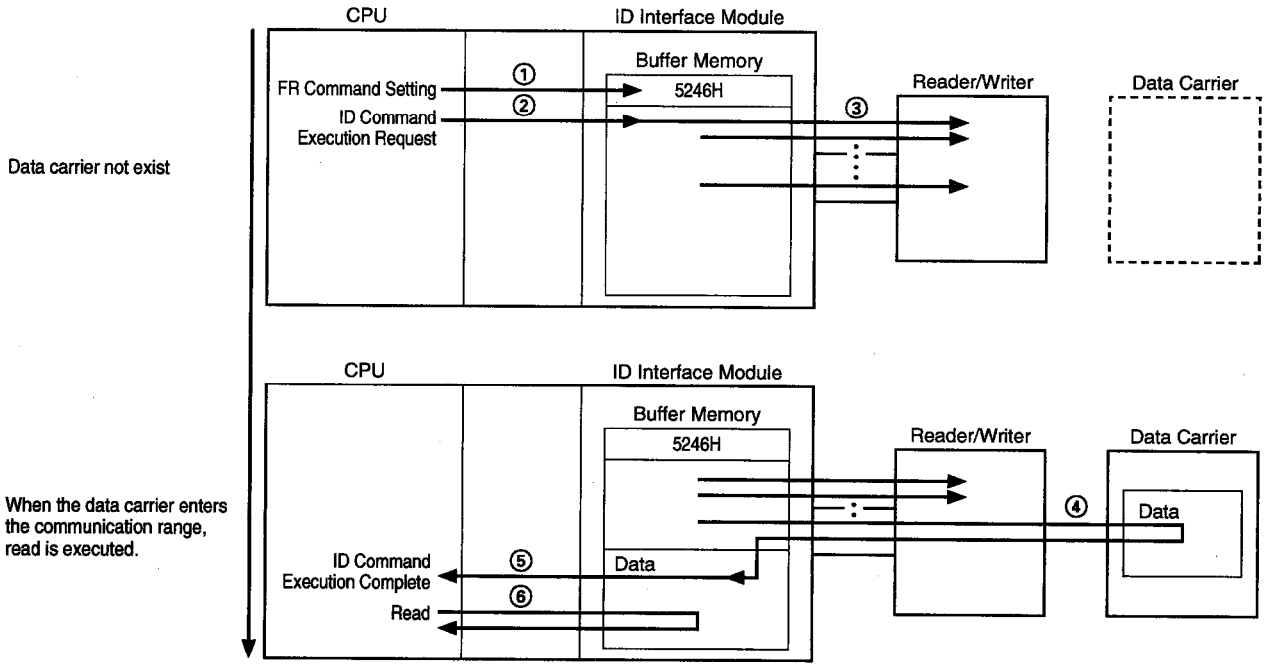
Command Code

Command: FR Code: 5246H

Usage

- Read data from the fast moving object.

Command Execution Flow

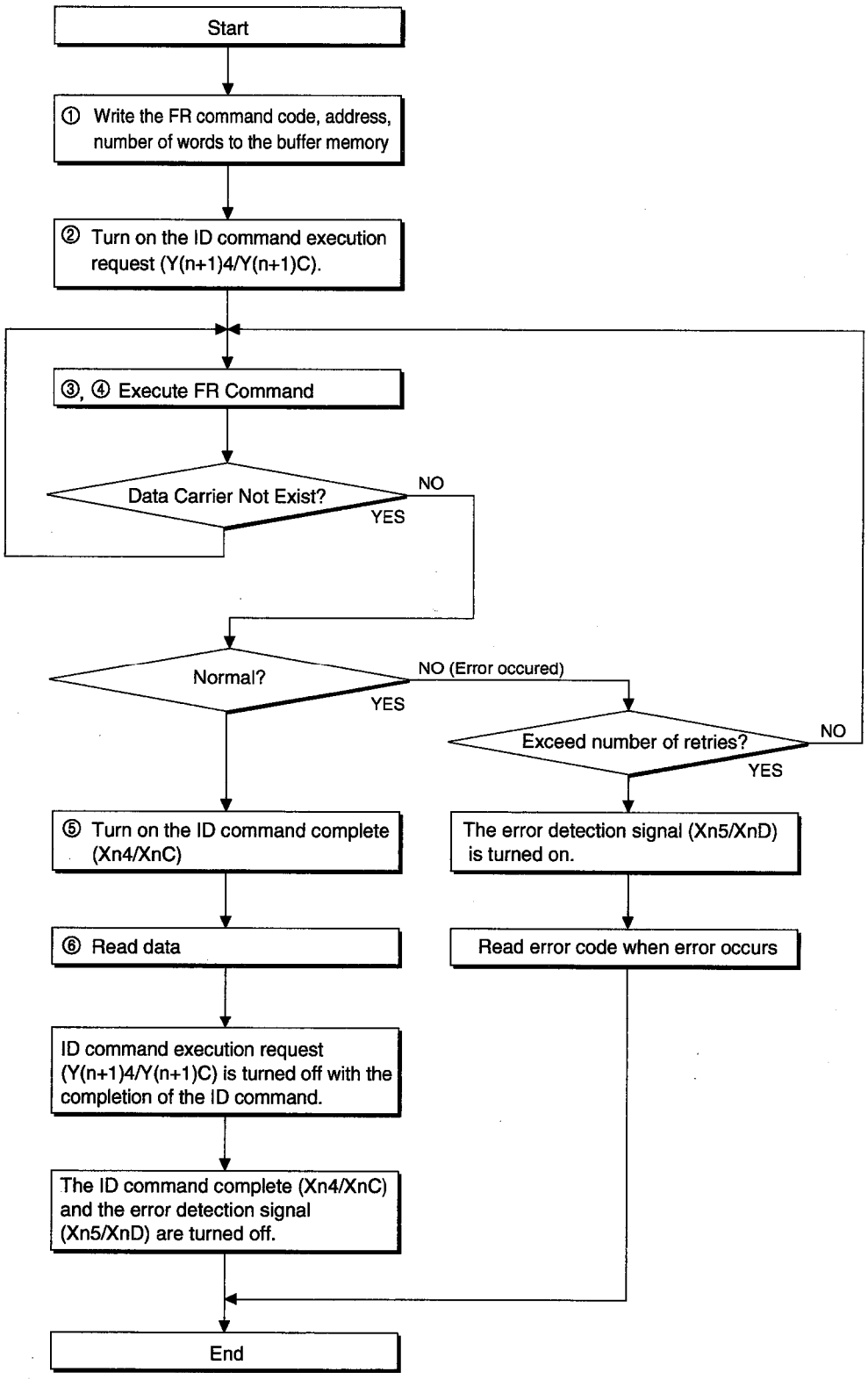


POINT

When the continuous fast read command (FR) is executed, it waits for the arrival of a data carrier and automatically performs read when the data carrier is detected. When the data carrier is not detected, the command is executed infinitely. To cancel execution, execute the continuous-command-cancel command. Refer to section 6.12 for the continuous-command-cancel command.

Programming

The programming flow is shown below.

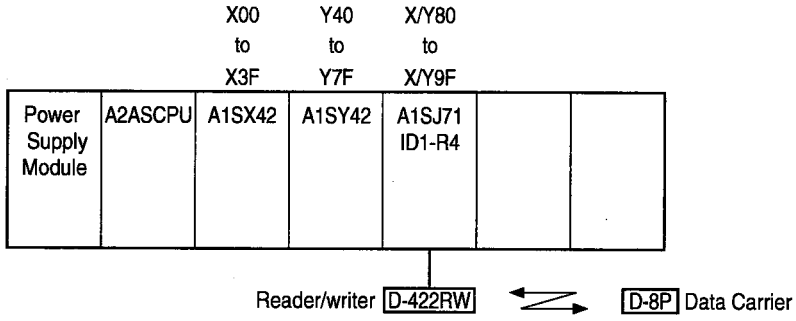


[Programming Example]

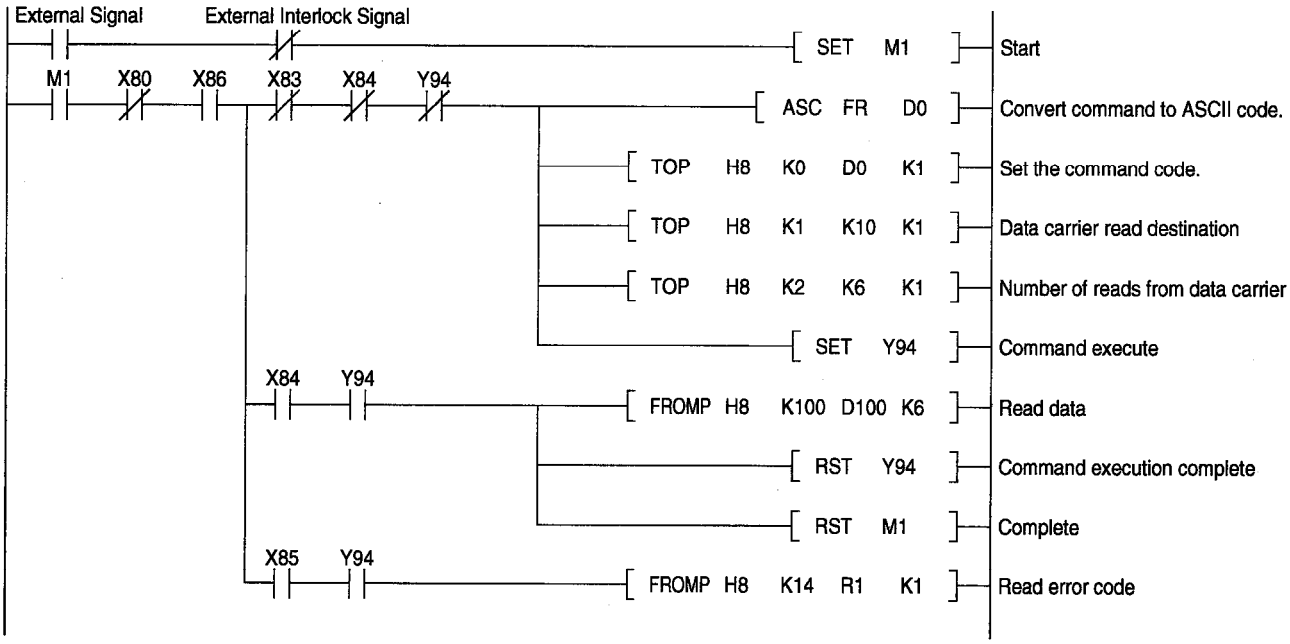
6 words of data from the starting address K10 of data carrier is read from CH.1. This is stored in the data register D100-D105 of the PC CPU.

(a) System Configuration

Suppose the I/O address in the ID interface module starts from 80.



(b) Program



When the moving speed is slow (less than 3m/min (1.97 inch/s) or is a hanging type, an unstable read is performed near the communication range borders because of the moving object's unstability. Perform a read in a stable communication range by detecting the moving object with a microswitch, etc. When the moving object cannot be detected, execute a continuous comparison read (SR), and confirm the data to increase reliability.

POINT

Input pulse signals for external signals. When signals other than pulses are input, commands are executed continuously.
When commands are executed continuously, it shortens the data carrier battery life.

6.7 Writing to the Data Carrier

The command to read data from the data carrier is described below.

6.7.1 Write Command (WD)

The write command (WD) writes the data set in the buffer memory to the data carrier.

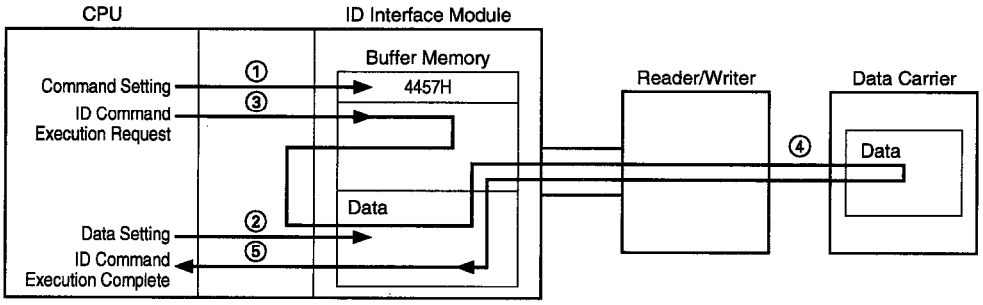
Command Code

Command: WD Code: 4457H

Usage

- Write data.

Command Execution Flow

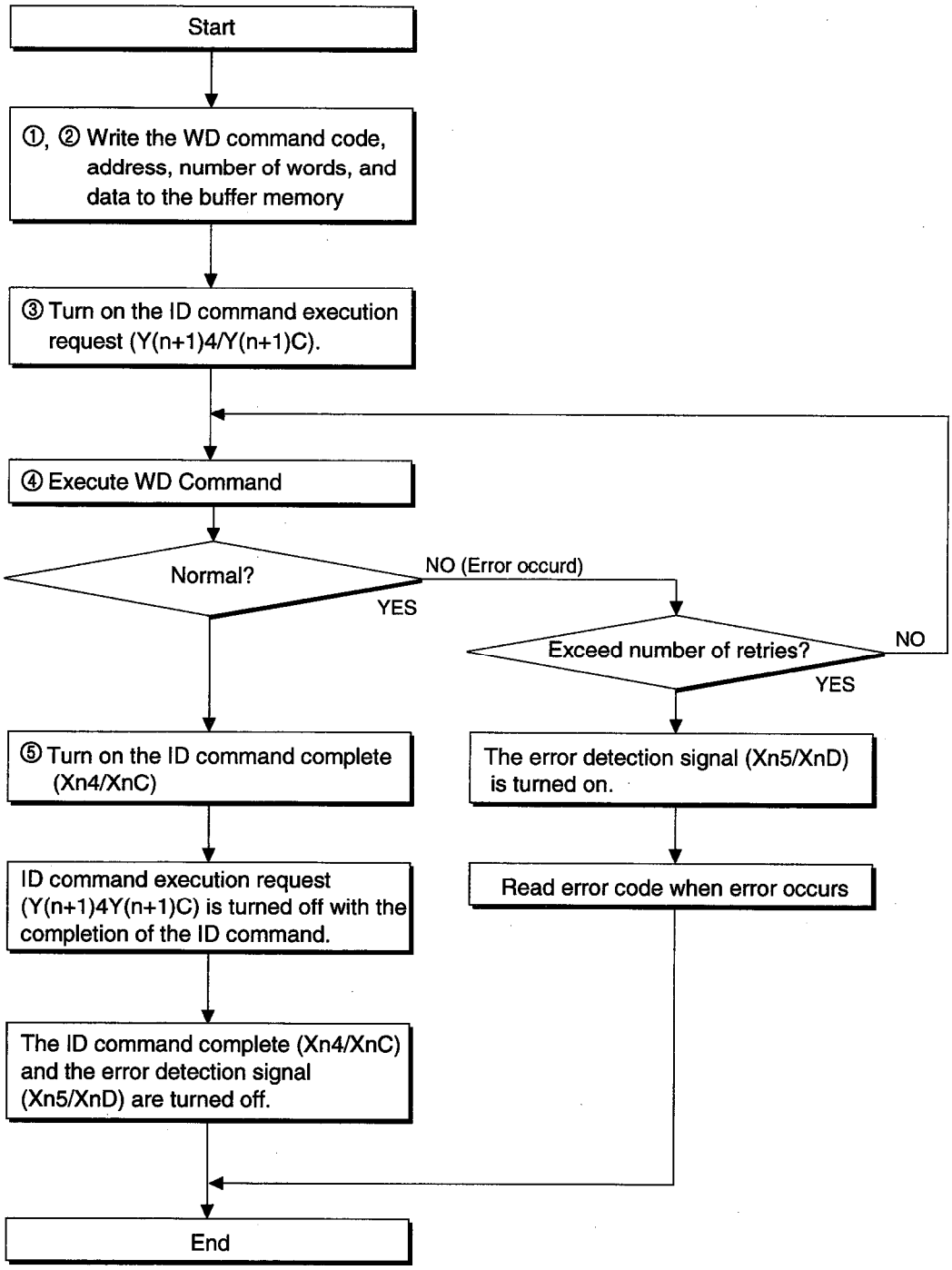


POINT

When data carrier does not exist when the write command (WD) is executed, the command is re-executed up to the number of retries, then if the command still cannot be completed, an error occurs.

Programming

The programming flow is shown below.

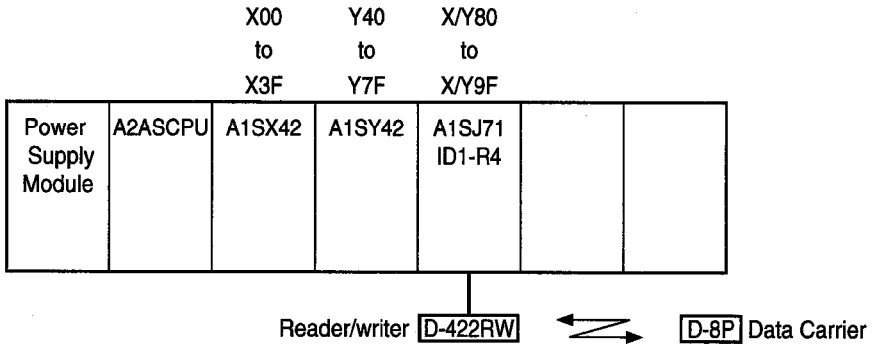


[Programming Example]

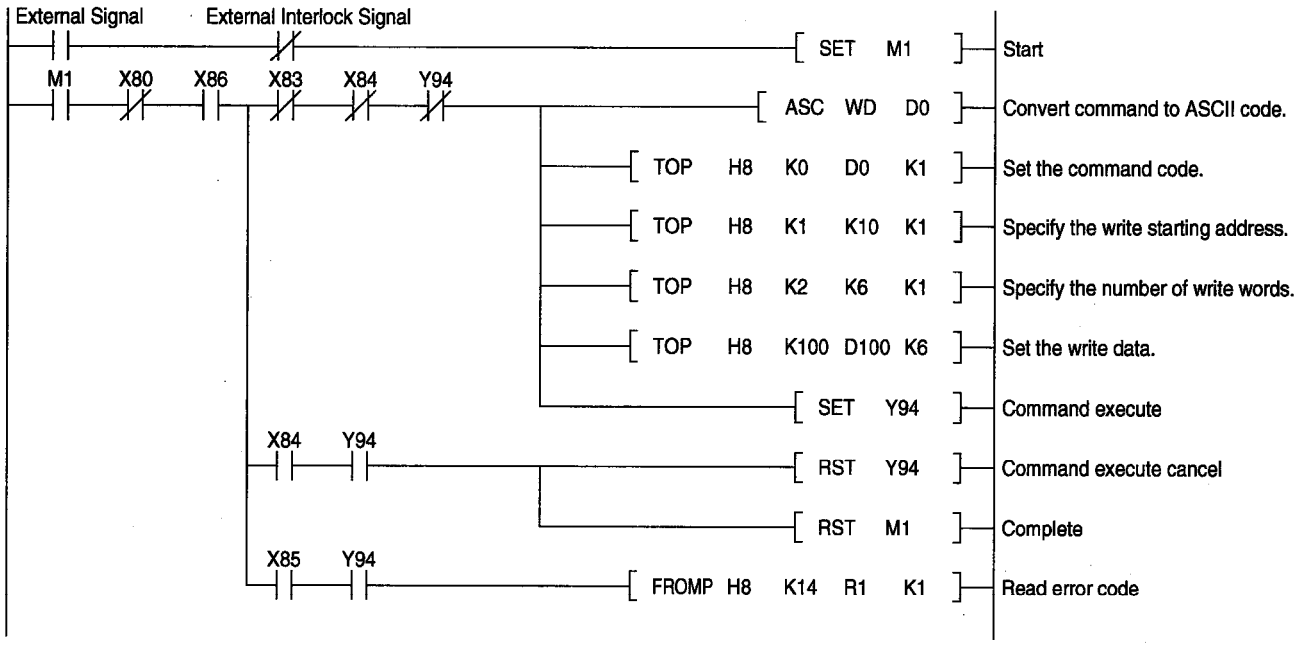
The data in D100-D105 is written in the data carrier from starting address K10 for K6 words.

(a) System Configuration

Suppose the I/O address in the ID interface module starts from 80.



(b) Program



POINT

Input pulse signals for external signals. When signals other than pulses are input, commands are executed continuously.
When commands are executed continuously, it shortens the data carrier battery life.

6.7.2 Comparison Write Command (CW)

The comparison write command (CW) writes the data set in the buffer memory to the data carrier.

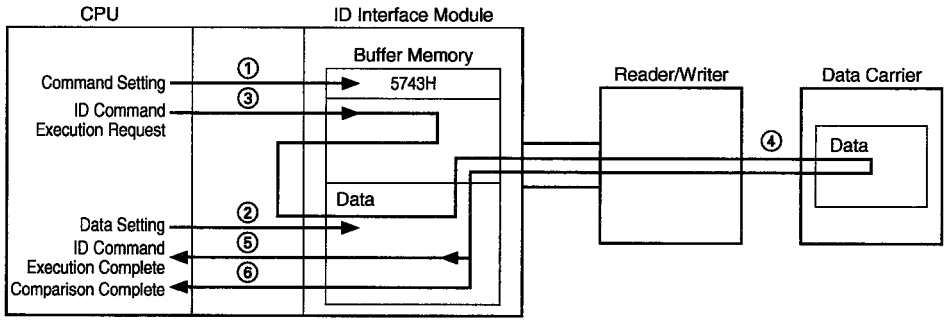
Command Code

Command: CW Code: 5743H

Usage

- Read high reliable data.

Command Execution Flow

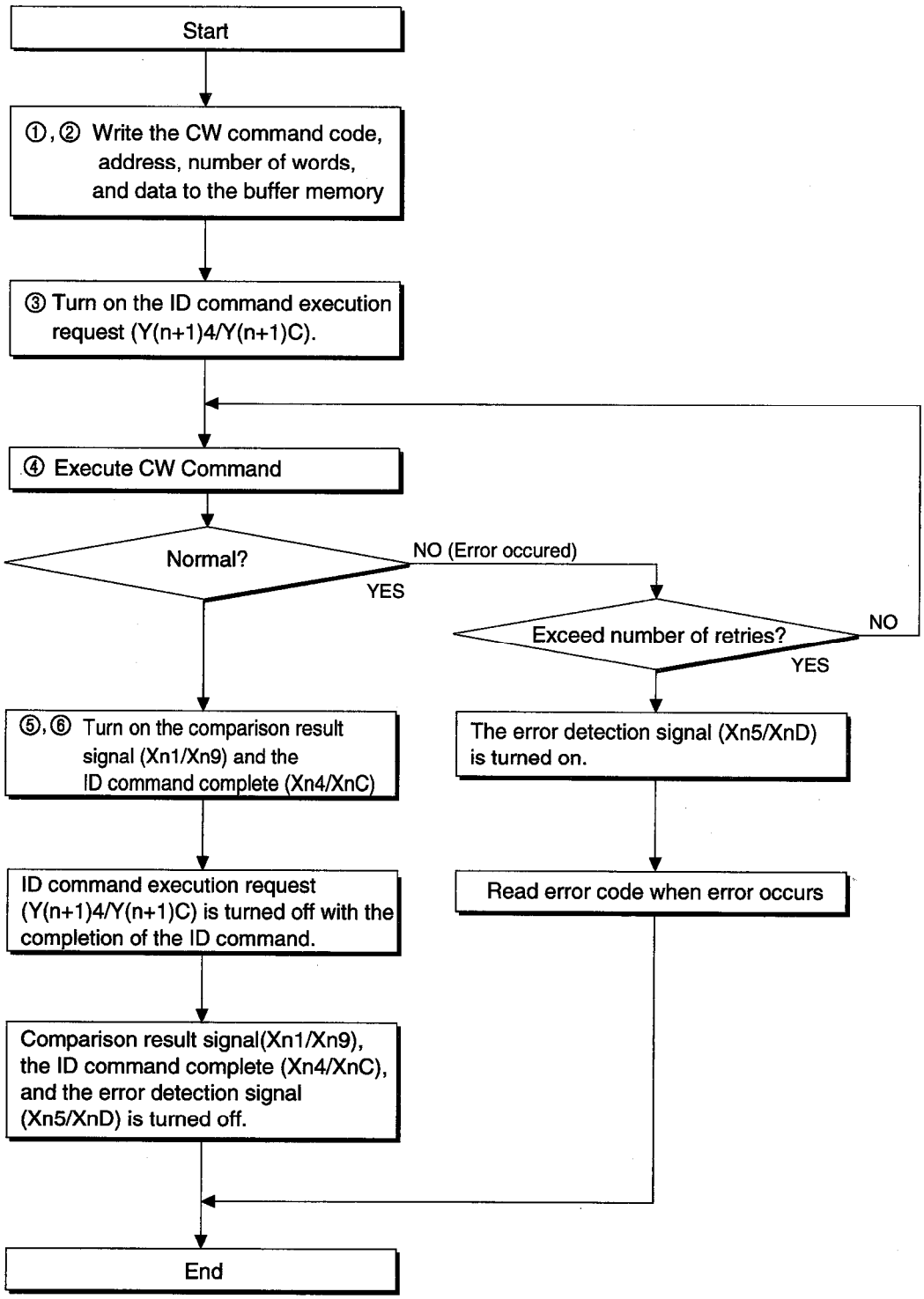


POINT

When data carrier does not exist when the comparison write command (CW) is executed, the command is re-executed up to the number of retries, then if the command still cannot be completed, an error occurs.

Programming

The programming flow is shown below.

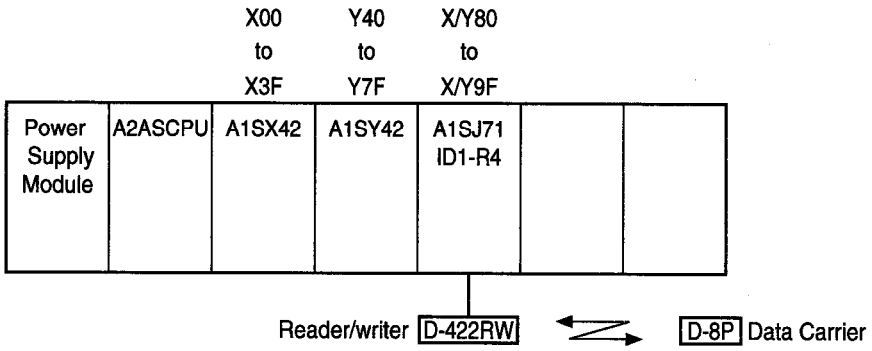


[Programming Example]

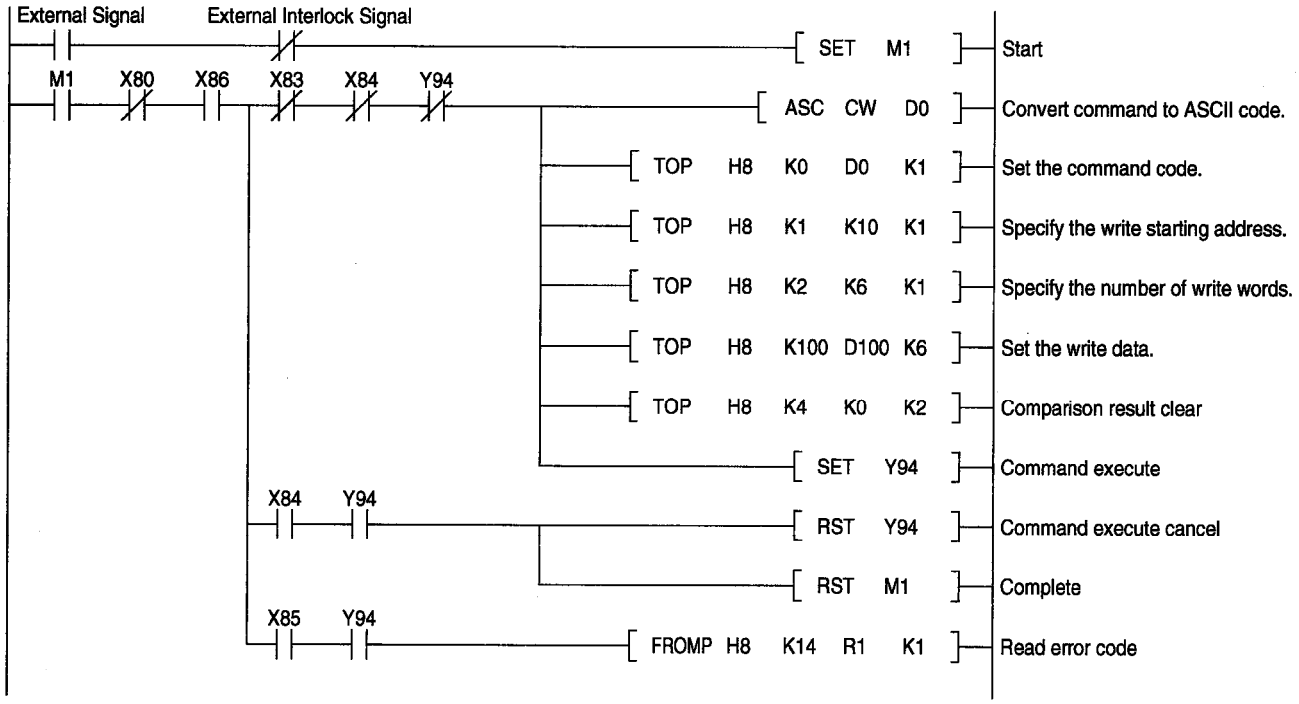
The data in D100-D105 is written in the data carrier from starting address K10 for K6 words.

(a) System Configuration

Suppose the I/O address in the ID interface module starts from 80.



(b) Program



POINT

Input pulse signals for external signals. When signals other than pulses are input, commands are executed continuously.
When commands are executed continuously, it shortens the data carrier battery life.

6.7.3 Continuous Write Command (AW)

The continuous write command (AW) keeps trying to execute the command until the data carrier enters the reader/writer communication range. When the data carrier enters the communication range, the data stored in the buffer memory is written to the data carrier.

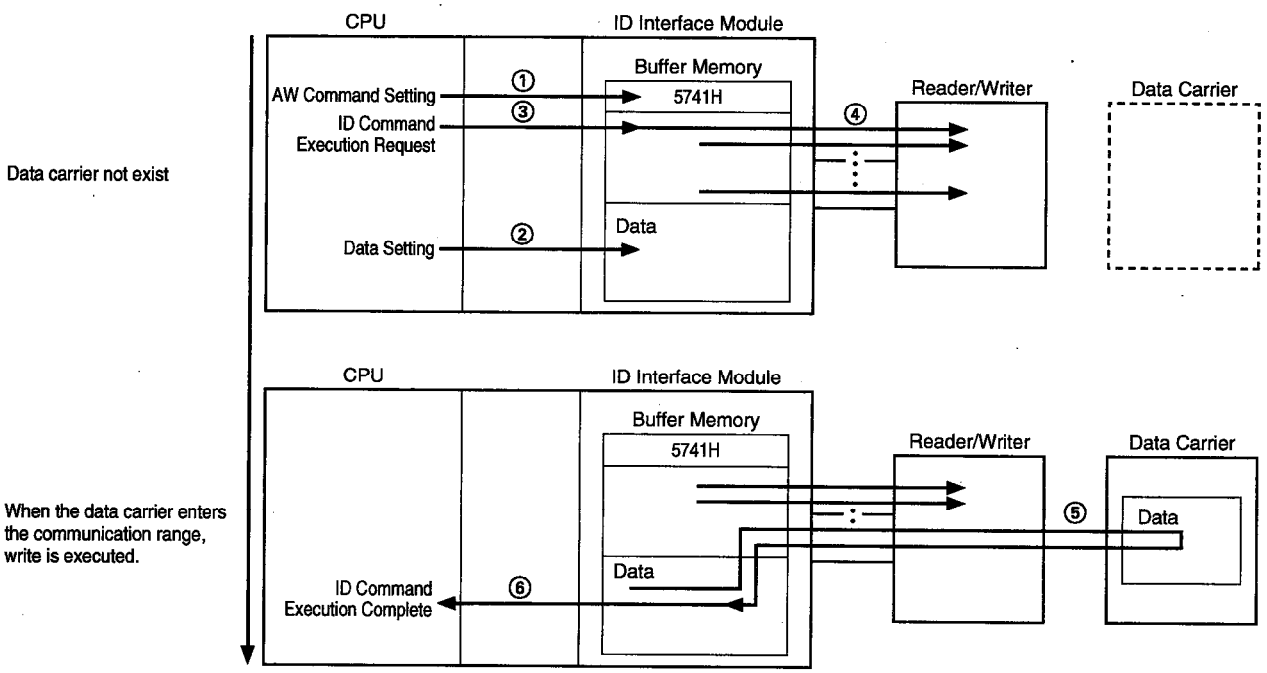
Command Code

Command: AW Code: 5741H

Usage

- Write data to the moving object.

Command Execution Flow

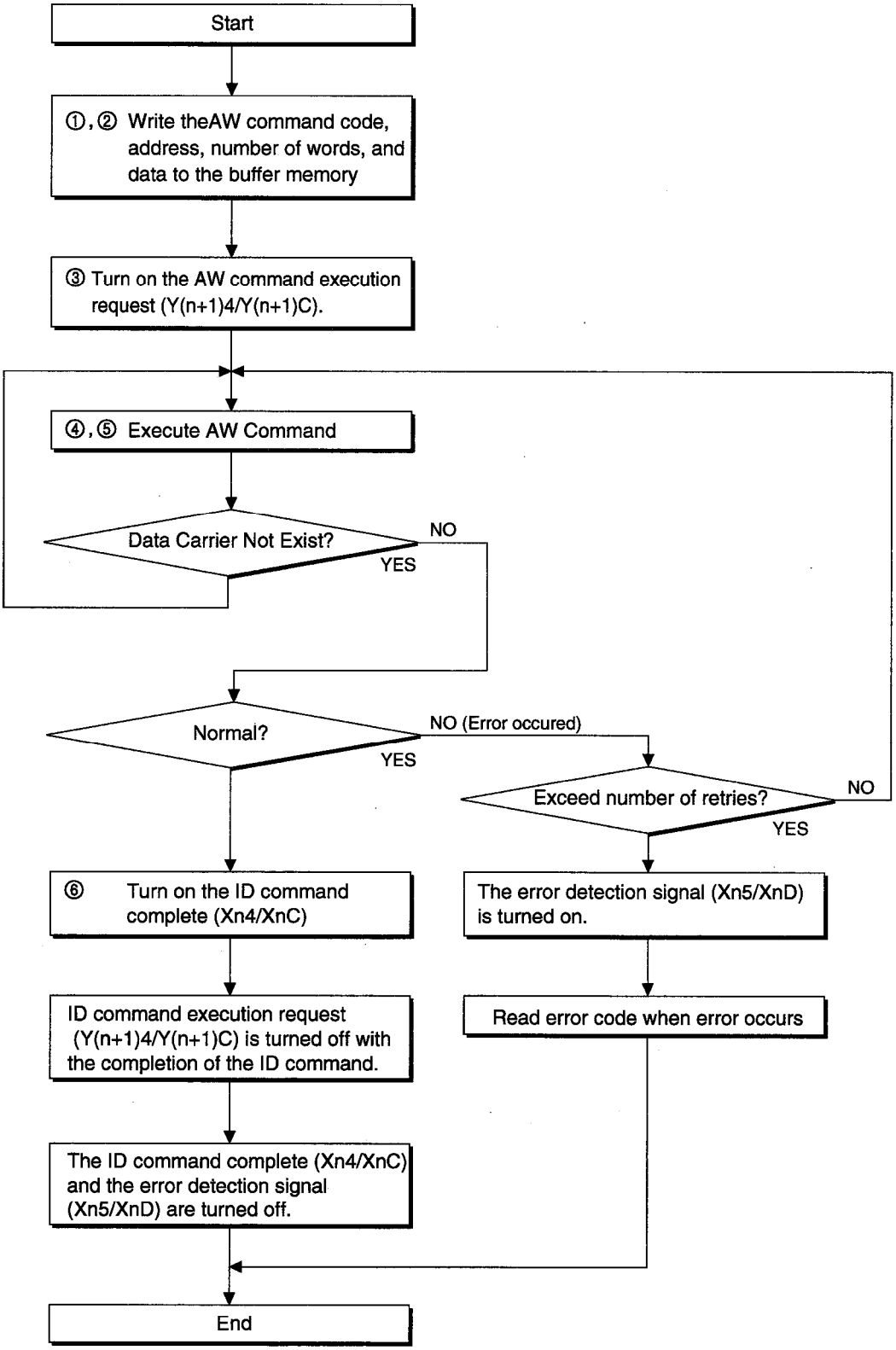


POINT

When the continuous write command (AW) is executed, it waits for the arrival of a data carrier and automatically performs read when the data carrier is detected. When the data carrier is not detected, the command is executed infinitely. To cancel execution, execute the continuous-command-cancel command. Refer to section 6.12 for the continuous-command-cancel command.

Programming

The programming flow is shown below.

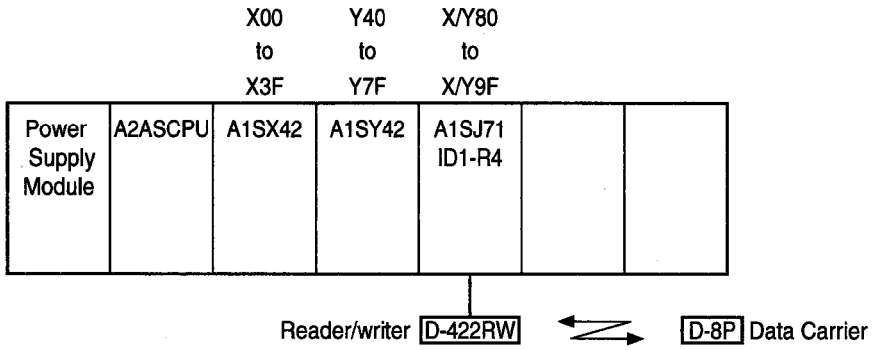


[Programming Example]

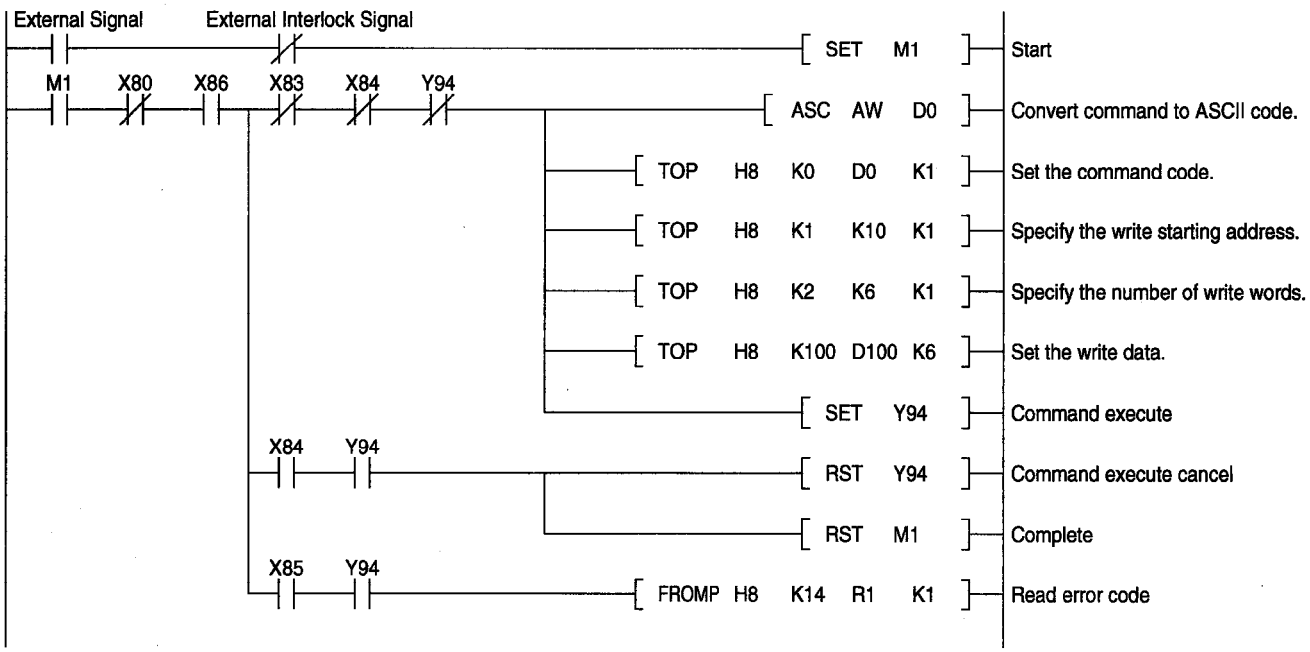
The data in D100-D105 is written in the data carrier from starting address K10 for K6 words.

(a) System Configuration

Suppose the I/O address in the ID interface module starts from 80.



(b) Program



When the moving speed is slow (less than 3m/min (1.97 inch/s) or is a hanging type, an unstable write is performed near the communication range borders because of the moving object's unstability. Perform a write in a stable communication range by detecting the moving object with a microswitch, etc. When the moving object cannot be detected, execute a continuous comparison write (SW), and confirm the data to increase reliability.

POINT

Input pulse signals for external signals. When signals other than pulses are input, commands are executed continuously.
When commands are executed continuously, it shortens the data carrier battery life.

6.7.4 Continuous Comparison Write Command (SW)

The continuous comparison write command (SW) keeps trying to execute the command until the data carrier enters the reader/writer communication range. When the data carrier enters the communication range, the data stored in the buffer memory is written to the data carrier.

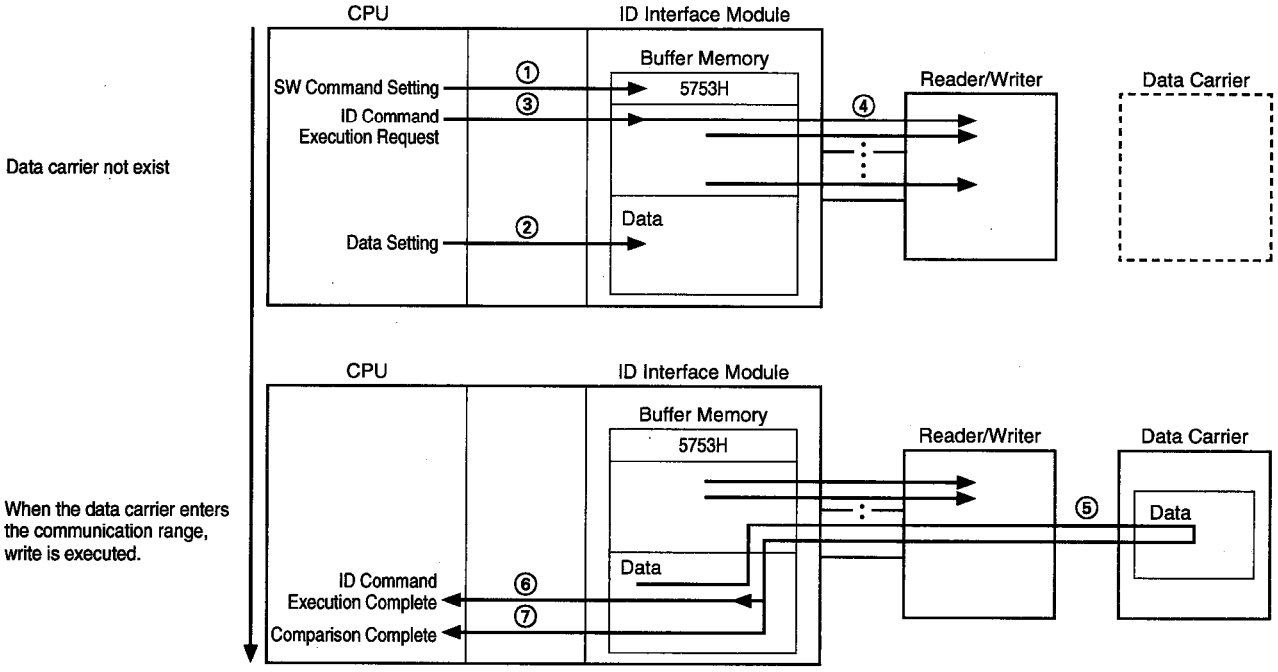
Command Code

Command: SW Code: 5753H

Usage

- Write highly reliable data to the moving object.

Command Execution Flow

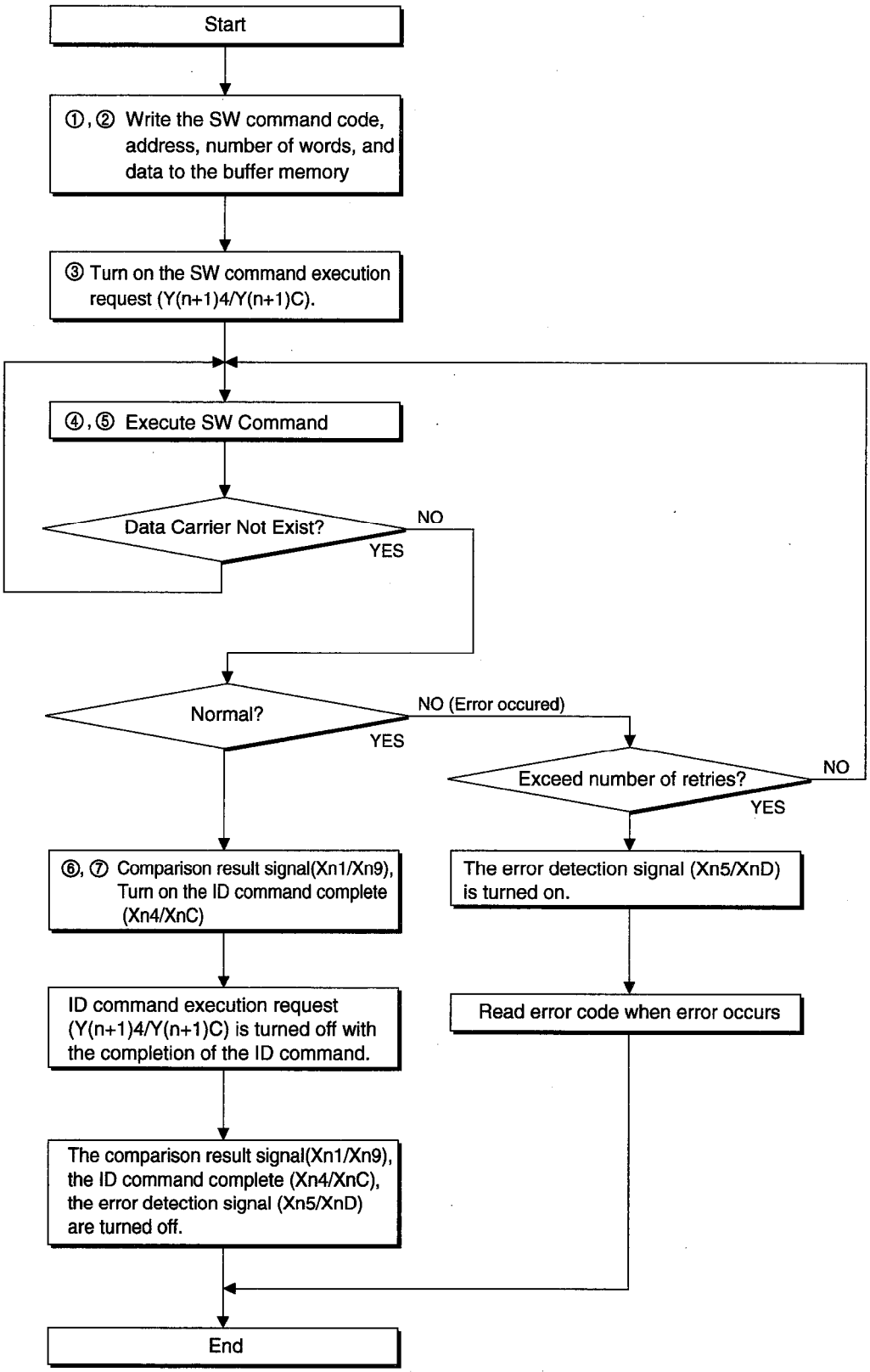


POINT

When the continuous comparison write command (SW) is executed, it waits for the arrival of a data carrier and automatically performs read when the data carrier is detected. When the data carrier is not detected, the command is executed infinitely. To cancel execution, execute the continuous-command-cancel command. Refer to section 6.12 for the continuous-command-cancel command.

Programming

The programming flow is shown below.

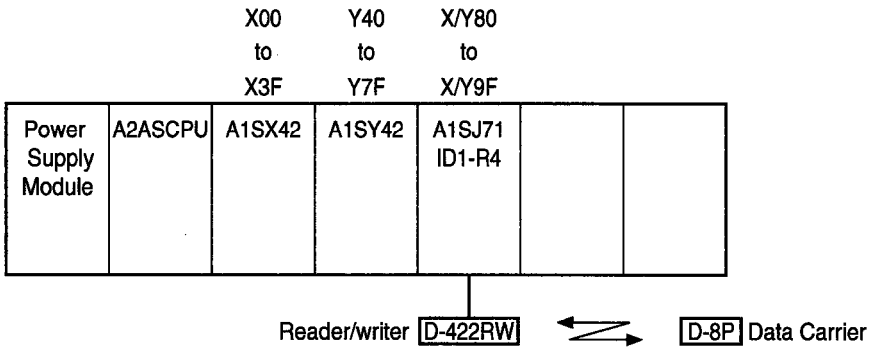


[Programming Example]

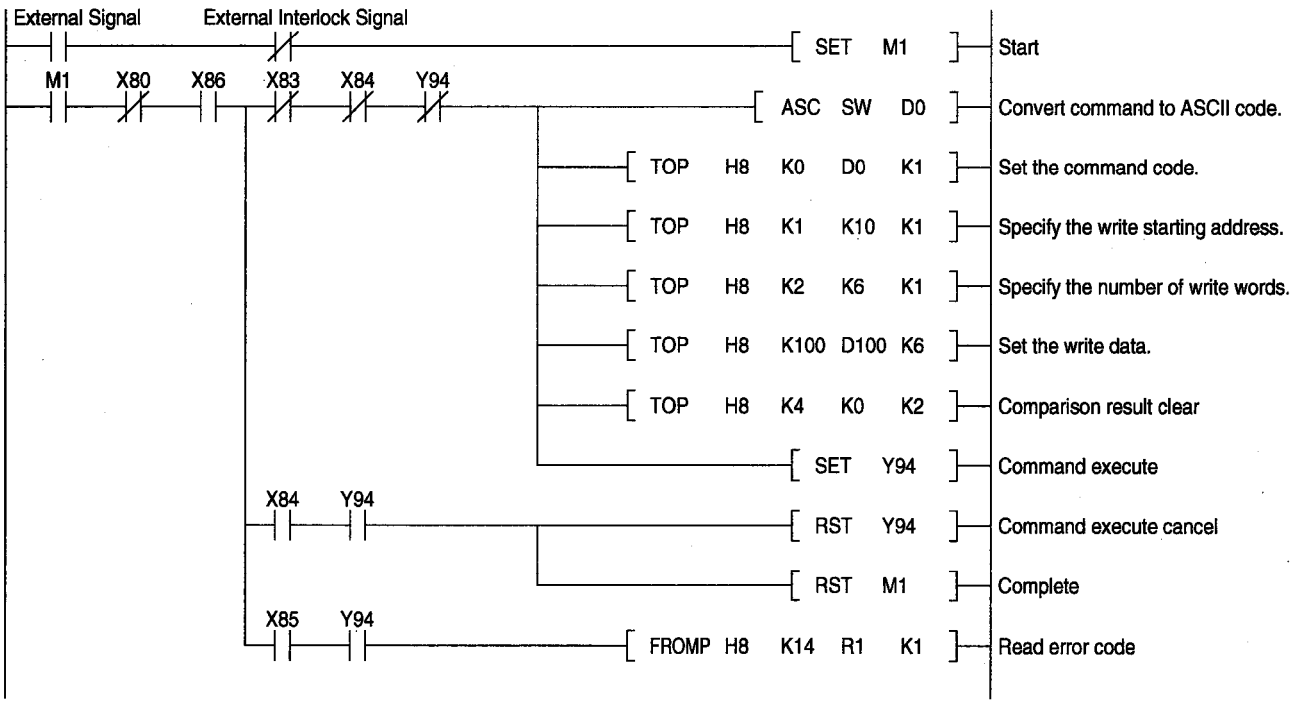
The data in D100-D105 is written in the data carrier from starting address K10 for K6 words.

(a) System Configuration

Suppose the I/O address in the ID interface module starts from 80.



(b) Program



POINT

Input pulse signals for external signals. When signals other than pulses are input, commands are executed continuously.
When commands are executed continuously, it shortens the data carrier battery life.

6.7.5 Continuous Fast Write Command (FW)

The continuous fast write command (FW) keeps trying to execute the command until the data carrier enters the reader/writer communication range. When the data carrier enters the communication range, the data stored in the buffer memory is written to the data carrier.

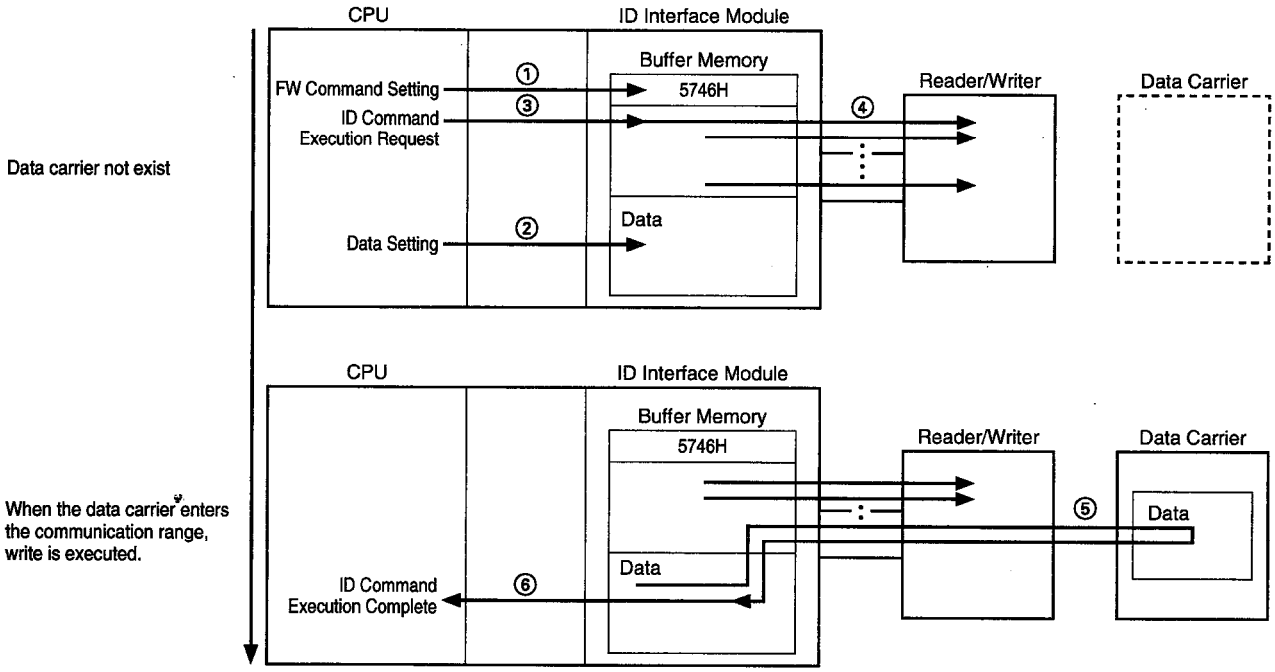
Command Code

Command: FW Code: 5746H

Usage

- Write data to the fast moving object.

Command Execution Flow

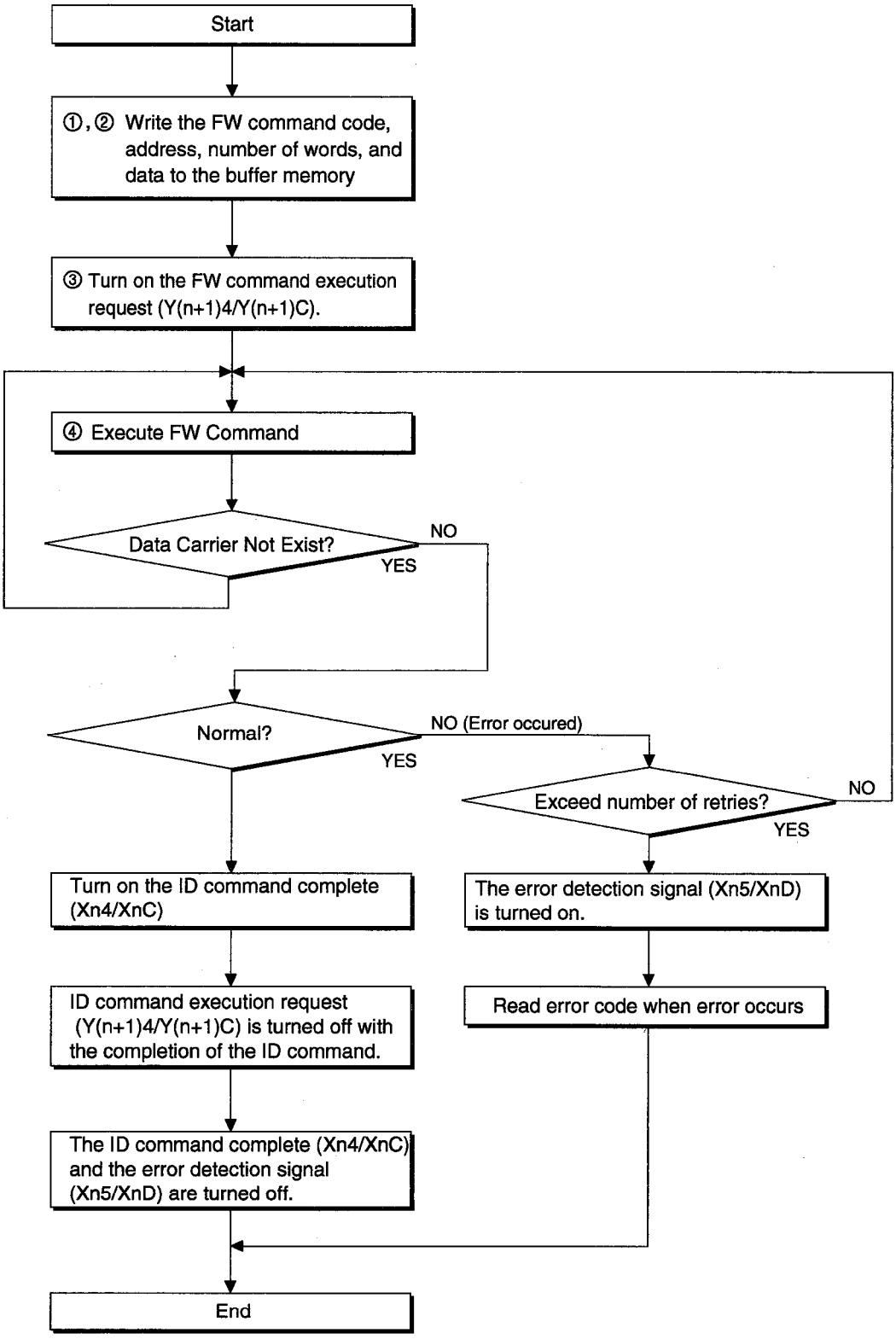


POINT

When the continuous fast write command (FW) is executed, it waits for the arrival of a data carrier and automatically performs read when the data carrier is detected. When the data carrier is not detected, the command is executed infinitely. To cancel execution, execute the continuous-command-cancel command. Refer to section 6.12 for the continuous-command-cancel command.

Programming

The programming flow is shown below.

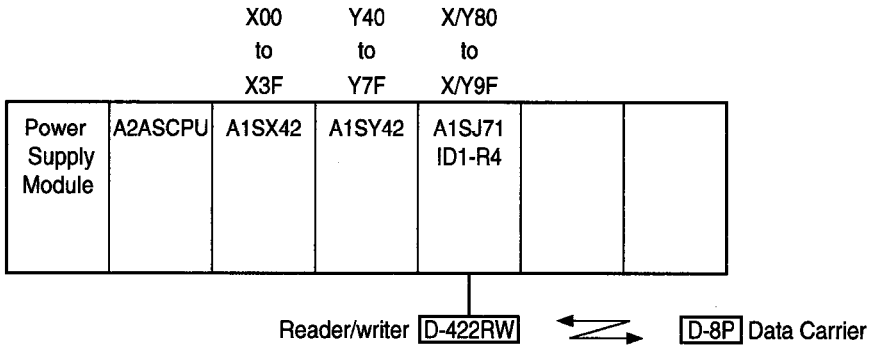


[Programming Example]

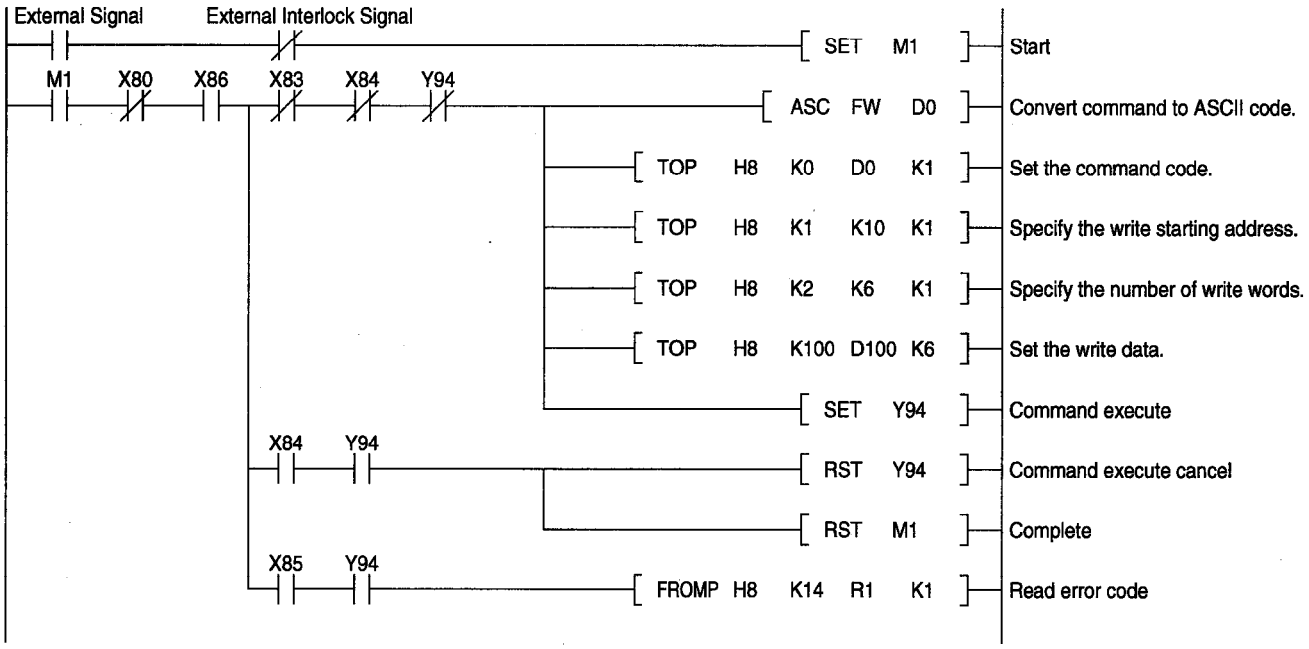
The data in D100-D105 is written in the data carrier from starting address K10 for K6 words.

(a) System Configuration

Suppose the I/O address in the ID interface module starts from 80.



(b) Program



When the moving speed is slow (less than 3m/min (1.97 inch/s) or is a hanging type, an unstable write is performed near the communication range borders because of the moving object's unstability. Perform a write in a stable communication range by detecting the moving object with a microswitch, etc. When the moving object cannot be detected, execute a continuous comparison write (SW), and confirm the data to increase reliability.

POINT

Input pulse signals for external signals. When signals other than pulses are input, commands are executed continuously.
When commands are executed continuously, it shortens the data carrier battery life.

6.7.6 Batch Write Command (FI)

The batch write command (FI) writes the data set in the buffer memory to the data carrier.

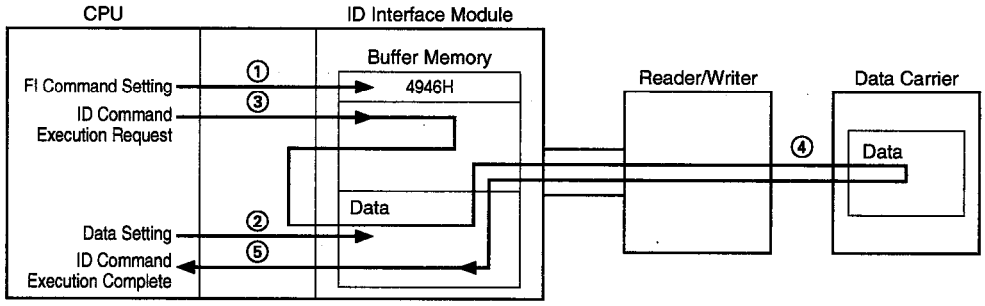
Command Code

Command: FI Code: 4946H

Usage

- Clearing all with the designated data.

Command Execution Flow

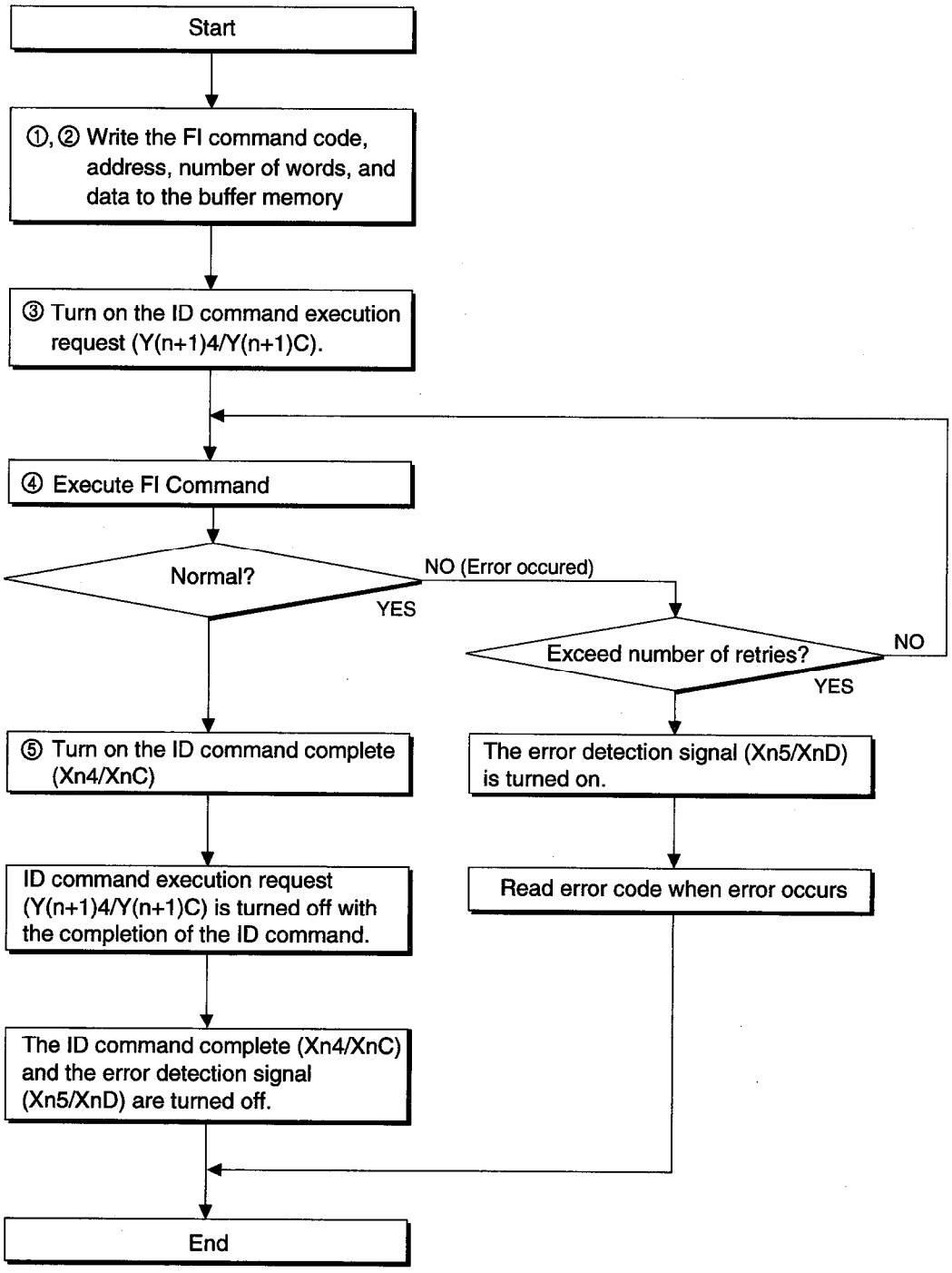


POINT

- The batch write command (FI) clears the data for the number of points from the specified address, using one word of the specification data. When clearing all data with "0," use the clear command (CL).
- When a data carrier does not exist when the batch write command (FI) is executed, the command is re-executed up to the number of retries specified. If the command still cannot be executed, an error results.

Programming

The programming flow is shown below.

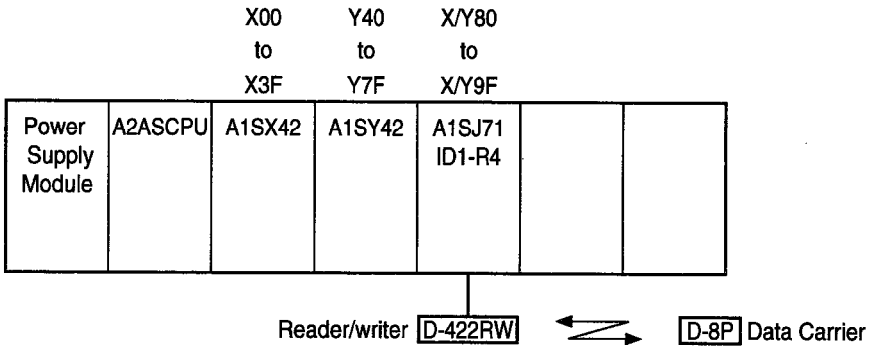


[Programming Example]

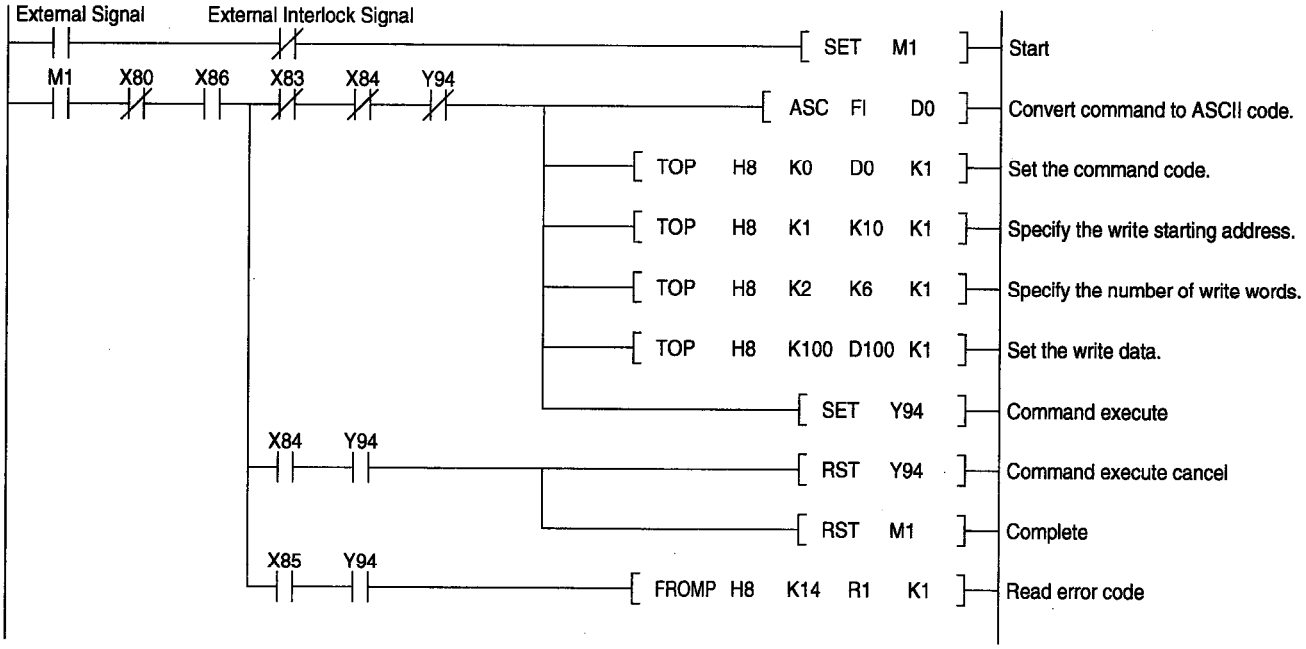
The data in D100-D105 is written in the data carrier from starting address K10 for K6 words.

(a) System Configuration

Suppose the I/O address in the ID interface module starts from 80.



(b) Program



POINT

Input pulse signals for external signals. When signals other than pulses are input, commands are executed continuously.
When commands are executed continuously, it shortens the data carrier battery life.

6.8 Comparing data with the Data Carrier

The command to compare data with the data carrier is indicated below.

6.8.1 Comparison Command (CM)

The comparison command (CM) compares the data set in the buffer memory with the data in the data carrier, and returns the result.

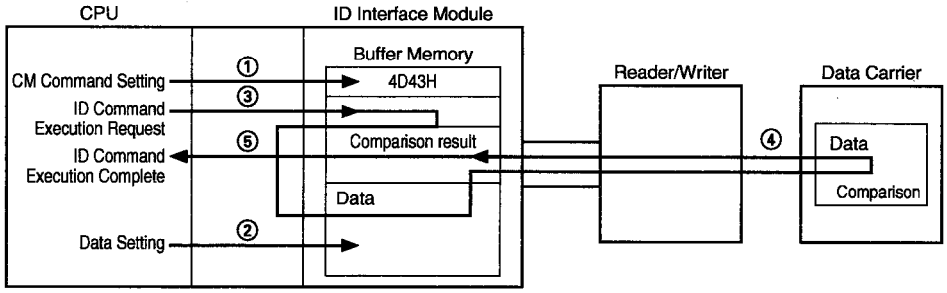
Command Code

Command: CM Code: 4D43H

Usage

- Search data carrier.
- Verify data.

Command Execution Flow

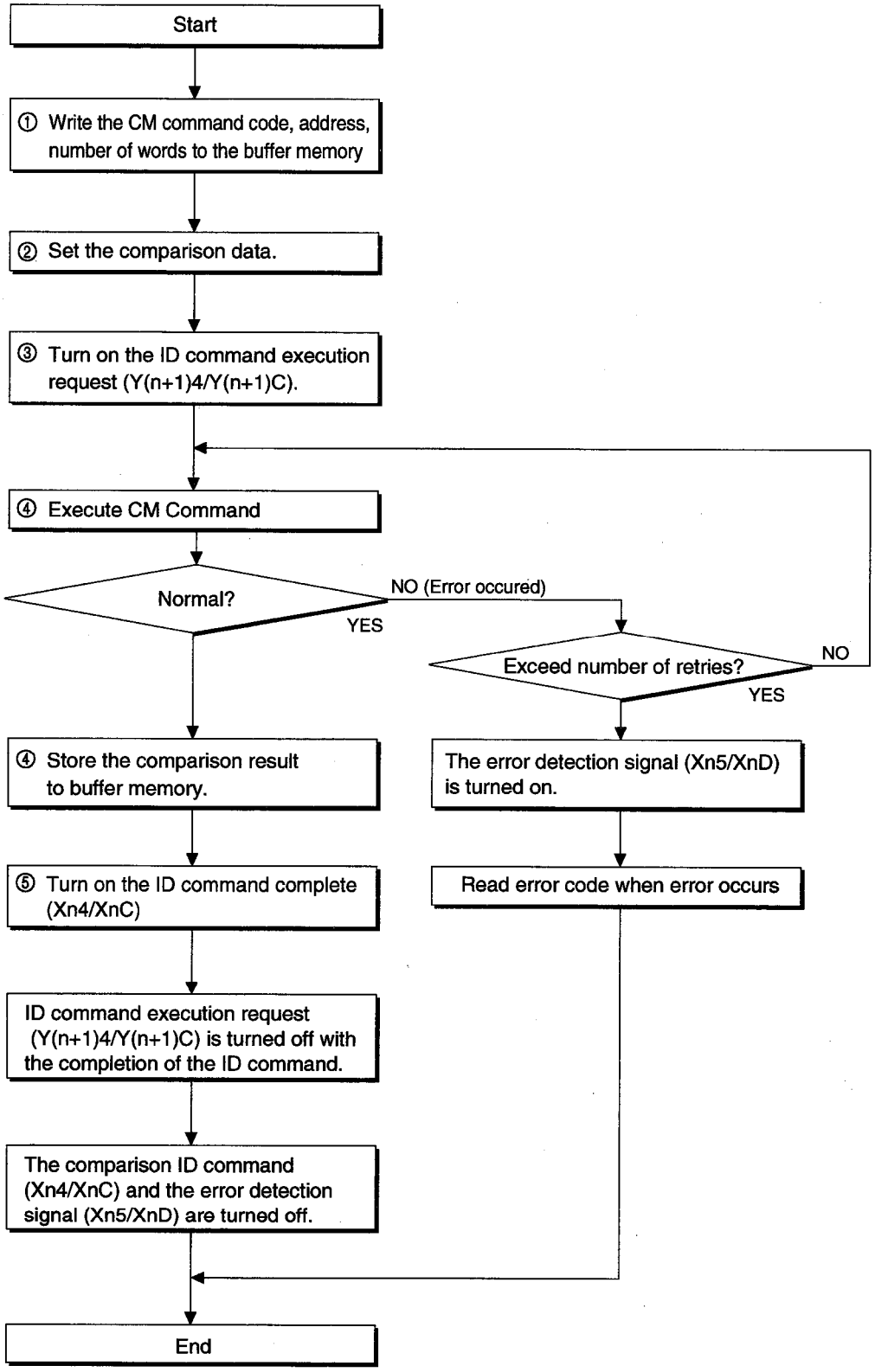


POINT

- The comparison command (CM) compares data in the data carrier, and returns whether the data is equal into the buffer memory.
- When the data carrier does not exist when the comparison command (CM) is executed, the command is executed up to the number of retries. If the command still cannot be executed, an error results.
- Before executing the comparison command, always clear the buffer memory comparison result storage area (K4, K5/K4004, K4005) to zero.

Programming

The programming flow is shown below.

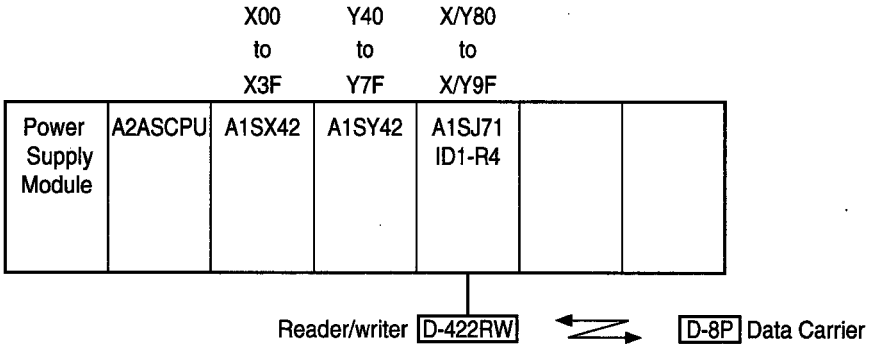


[Programming Example]

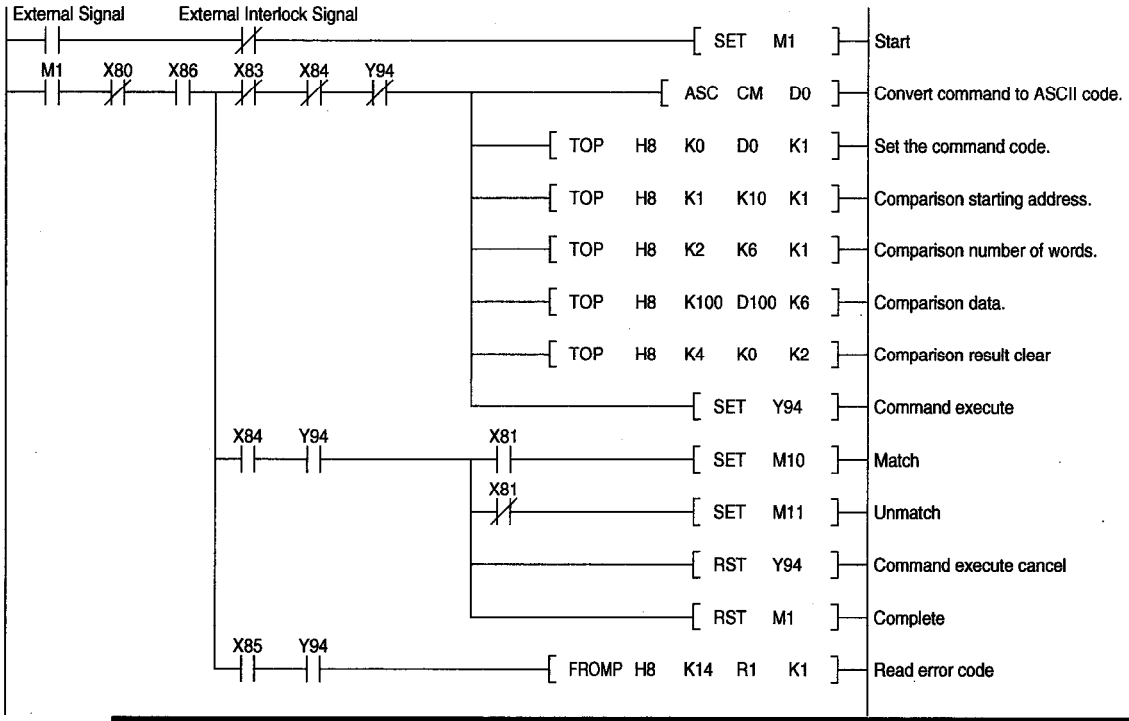
Comparing the data saved at D100 to D105 with the data of "K6" words starting from address K10 in the data carrier.

(a) System Configuration

Suppose the I/O address in the ID interface module starts from 80.



(b) Program



POINT

Input pulse signals for external signals. When signals other than pulses are input, commands are executed continuously.
When commands are executed continuously, it shortens the data carrier battery life.

6.9 Copying Between Data Carriers

(Can only be executed with AJ71ID2-R4 or A1SJ71ID2-R4)

The command to copy data between data carriers is described below.

6.9.1 Data Copy Command (CO)

The data copy command (CO) copies data between data carriers.

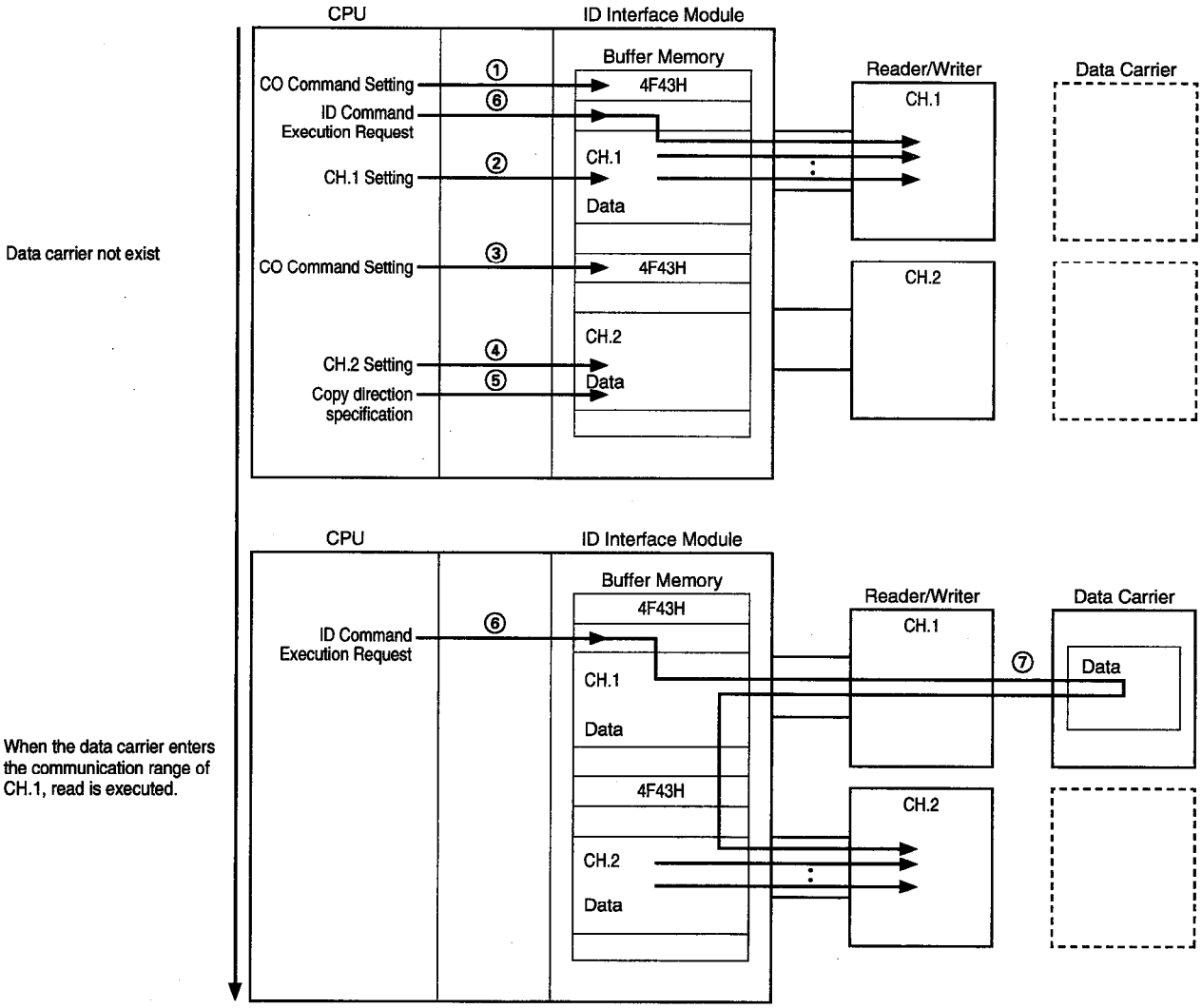
Command Code

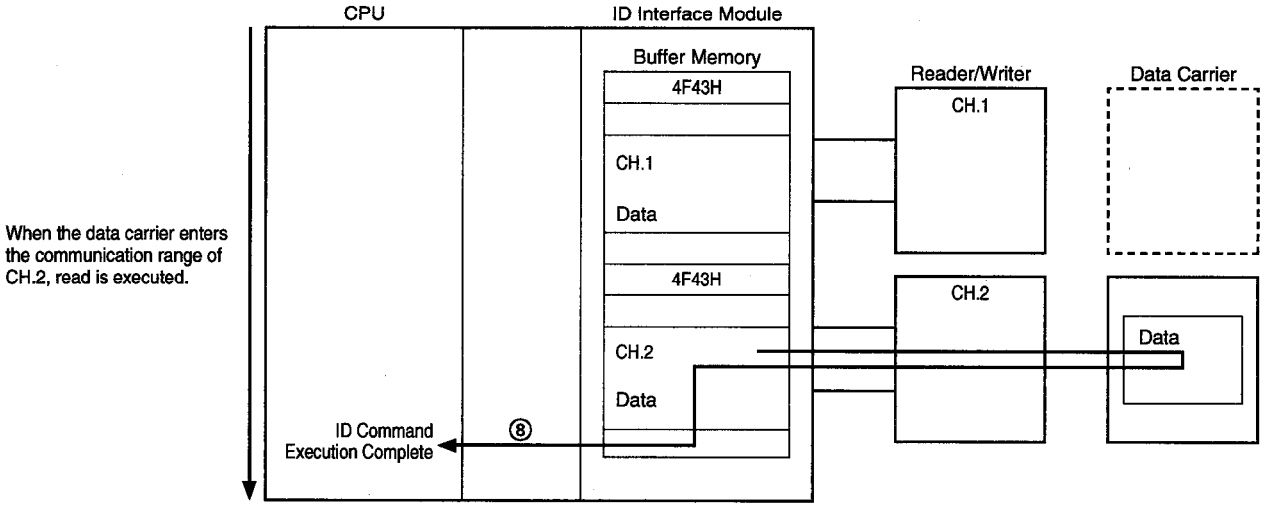
Command: CO Code: 4F43H

Usage

- Create data carrier copy.
- Move data between lines.

Command Execution Flow





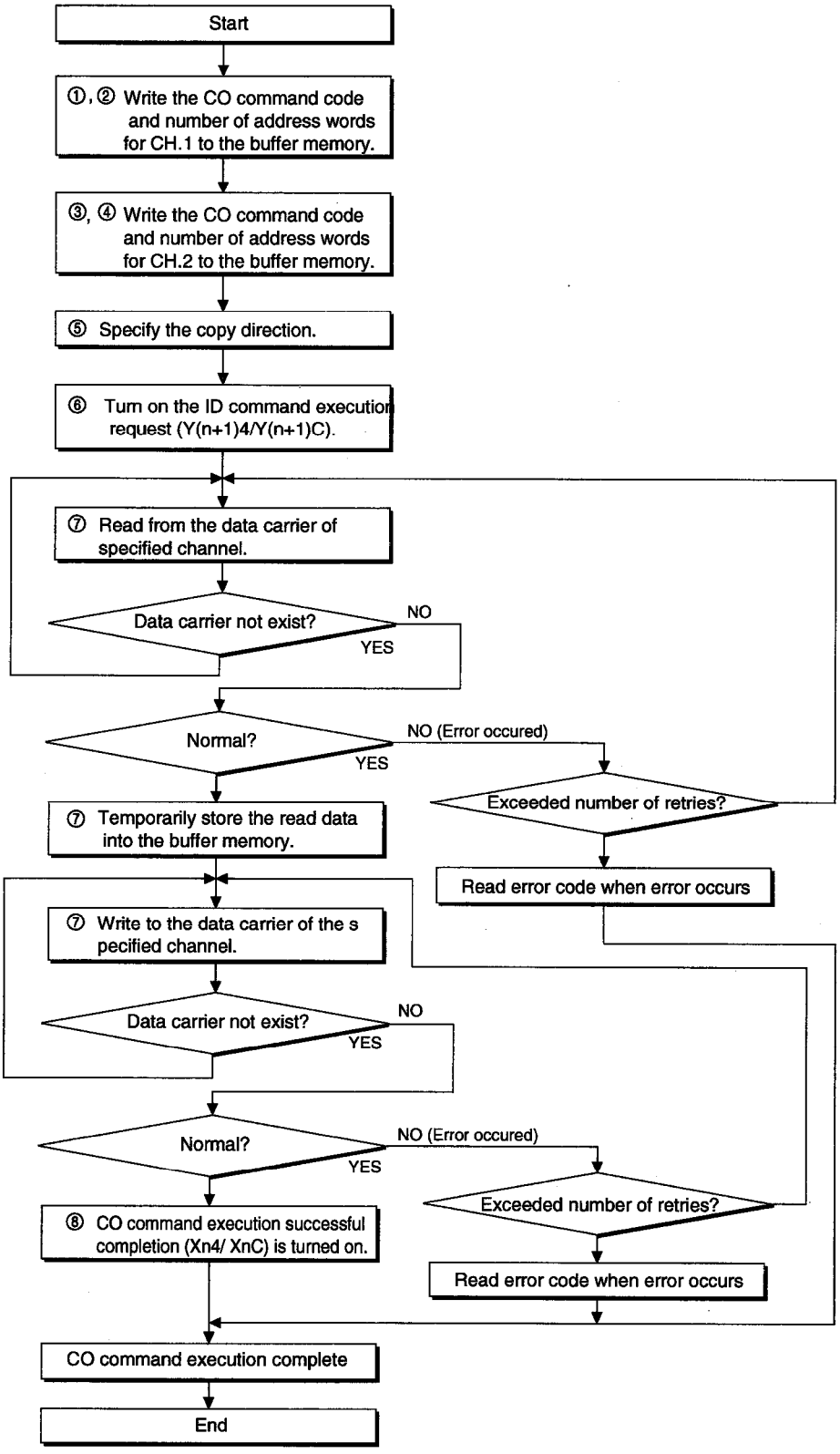
The above diagram describes the copy flow from CH.1 to CH.2. The flow of '7' is reversed for performing a copy from CH.2 to CH.1.

POINT

The data copy command (CO) copies data between the data carrier without using the PC CPU device.

Programming

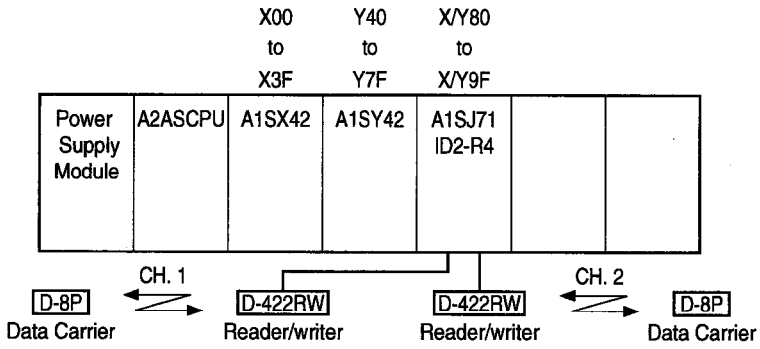
The programming flow is shown below.



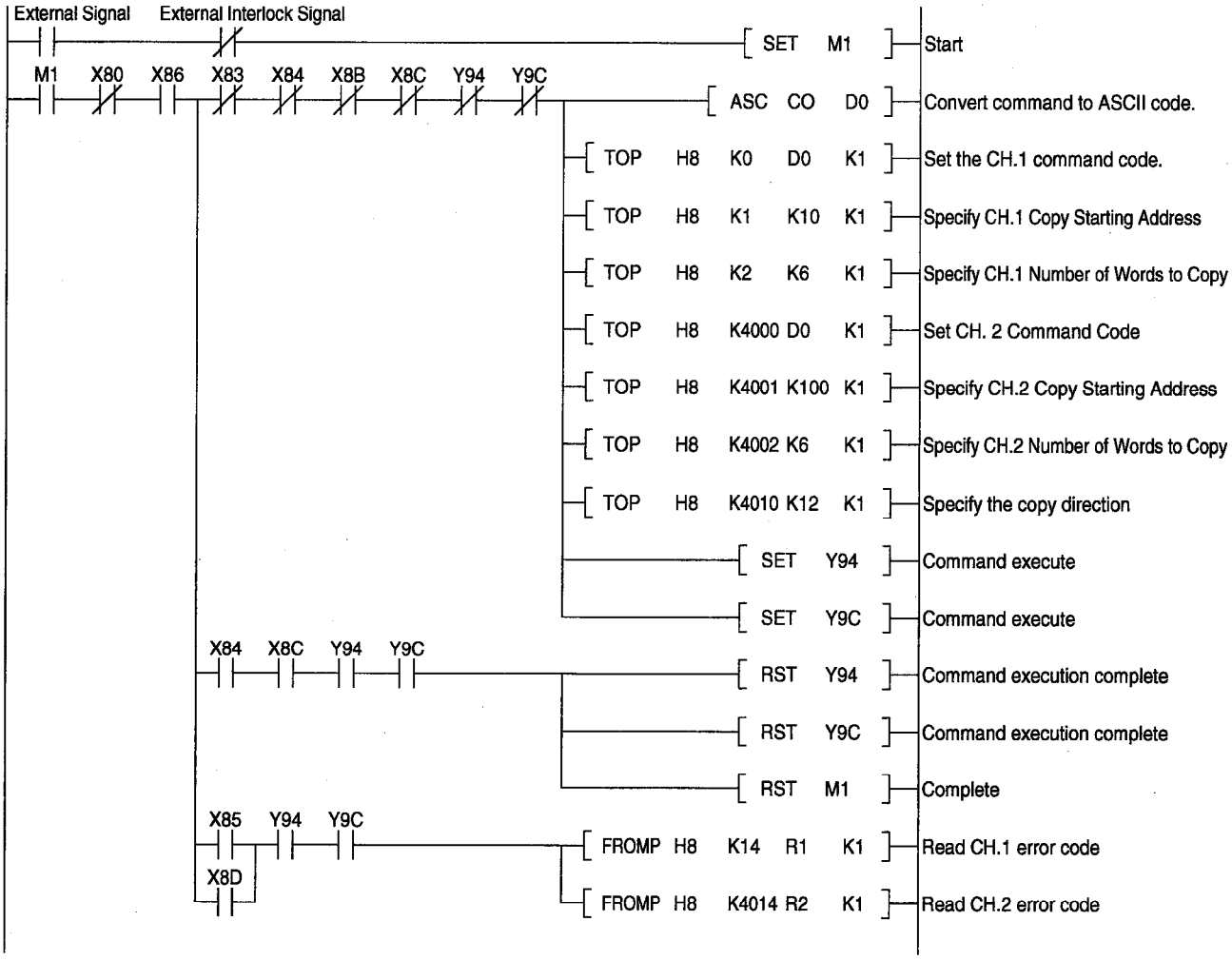
[Programming Example]

6 words of data from address K10 of CH. 1 data carrier is copied to address K100 of CH. 2 data carrier.

(a) System Configuration



(b) Program



POINT

Input pulse signals for external signals. When signals other than pulses are input, commands are executed continuously.
When commands are executed continuously, it shortens the data carrier battery life.

6.10 Clearing Data in the Data Carrier

The clear command for the data carrier data is described below.

6.10.1 Clear Command (CL)

The clear command (CL) clears all data in the data carrier with K0.

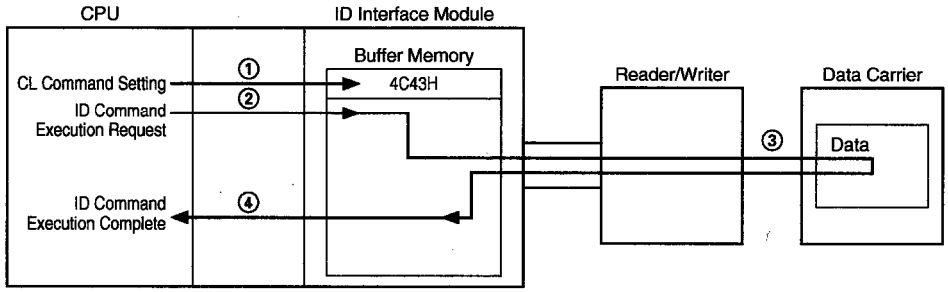
Command Code

Command: CL Code: 4C43H

Usage

- Clearing all data with zeros.

Command Execution Flow

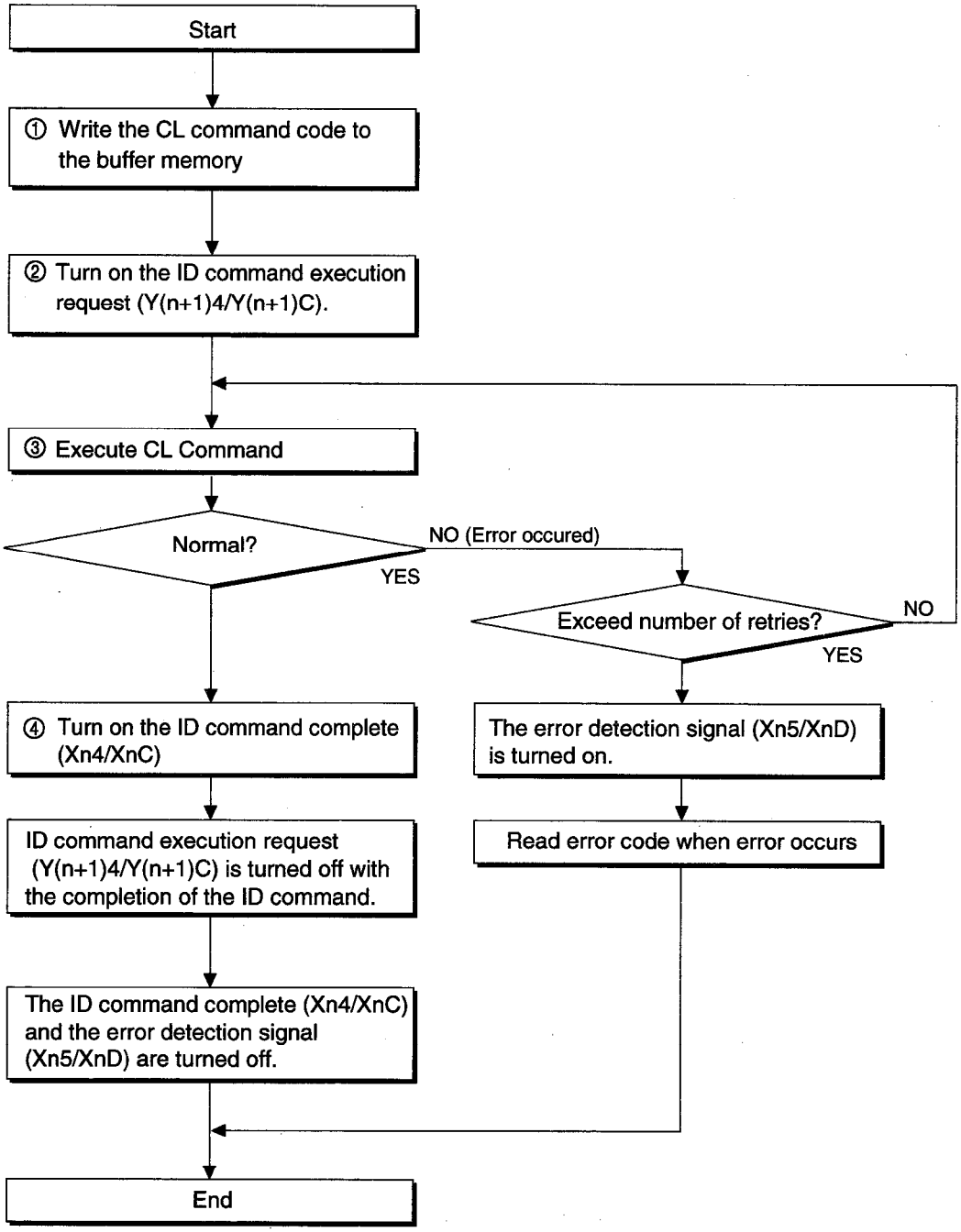


POINT

- The clear command (CL) clears all data in the data carrier at high speed. When clearing specified data, use the batch write command (FI).
- If data carrier does not exist when the clear command (CL) is executed, the command is retried for specified times, then an error occurs.

Programming

The programming flow is shown below.

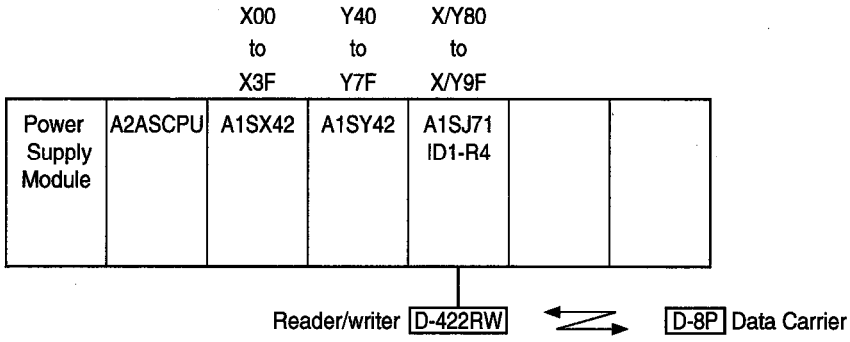


[Programming Example]

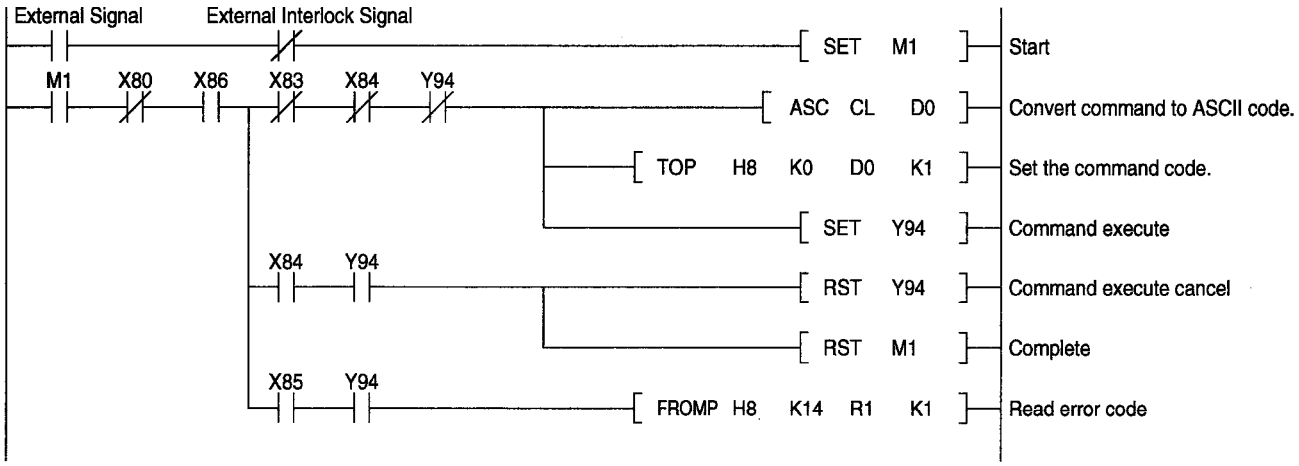
Clears all areas of data carrier to zero.

(a) System Configuration

Suppose the I/O address in the ID interface module starts from 80.



(b) Program



POINT

Input pulse signals for external signals. When signals other than pulses are input, commands are executed continuously.
When commands are executed continuously, it shortens the data carrier battery life.

6.11 Setting and Canceling the Sleep Setting/Cancel for a Data Carrier

The instructions used to set and cancel the sleep setting of the data carrier are indicated below.

6.11.1 Usage Command (OF)

The end usage command (OF) is a command to set the data carrier to the sleep state.

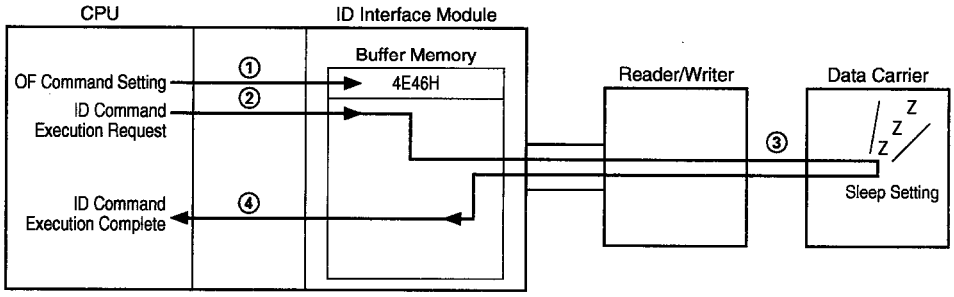
Command Code

Command: OF Code: 464FH

Usage

- Set to unusable in the normal communication distance. (Long-term storage of the data carrier.)
- Rest the data carrier.

Command Execution Flow

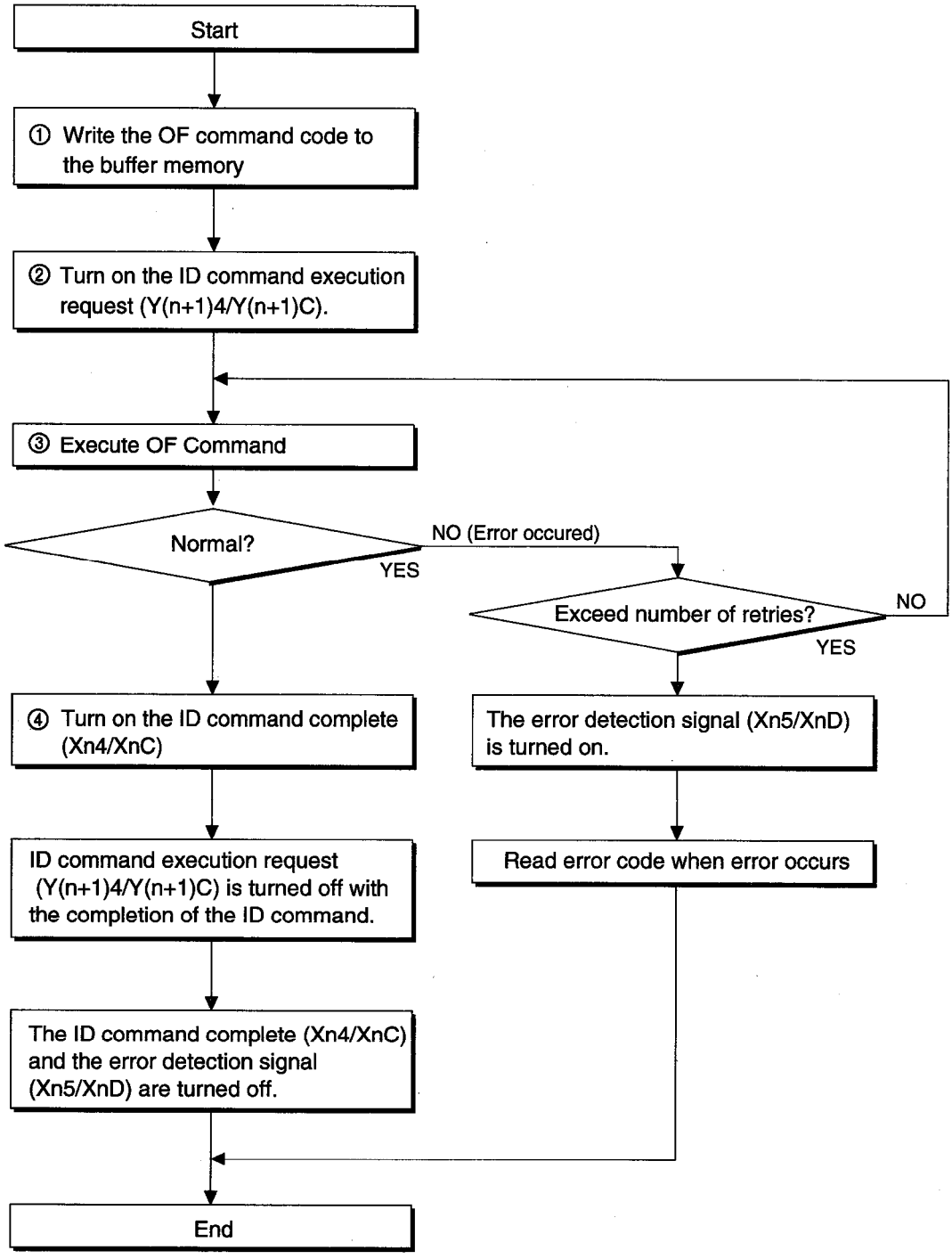


POINT

- The end usage (OF) execution is not necessary unless data is stored in the data carrier without using for a long time.
- When the end usage command (OF) is executed, the communication distance decreases to 10 mm (0.39 inches).
- To return the data carrier to its normal communication distance, execute the start usage command (ON). Refer to Section 6.11.2 for the start usage command (ON).
- If the data carrier does not exist when the end usage command (OF) is executed, the command is executed up to the number of retries and then results in error.

Programming

The programming flow is shown below.

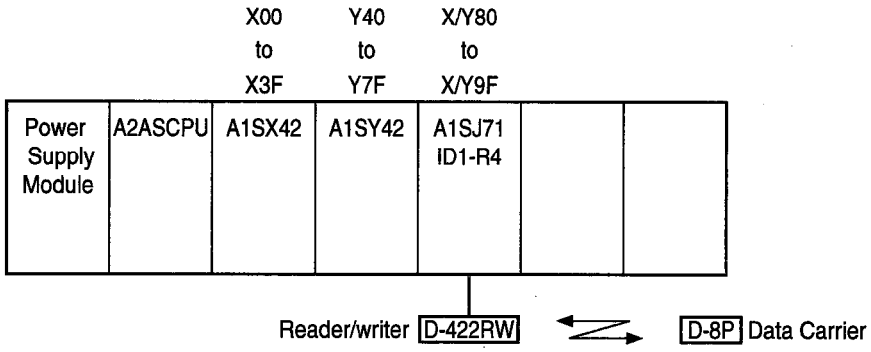


[Programming Example]

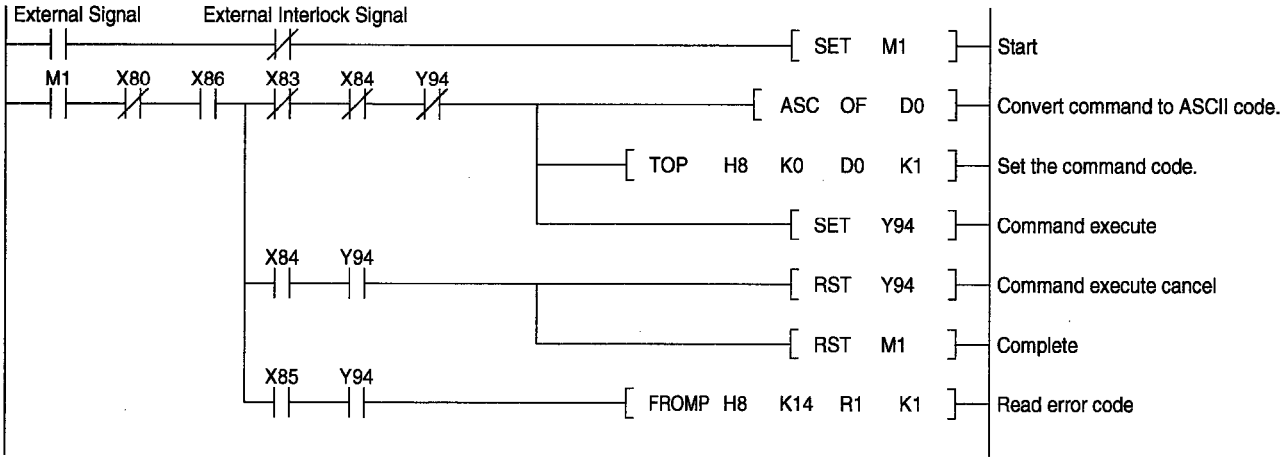
Setting the data carrier in the sleep state

(a) System Configuration

Suppose the I/O address in the ID interface module starts from 80.



(b) Program



POINT

Input pulse signals for external signals. When signals other than pulses are input, commands are executed continuously.
When commands are executed continuously, it shortens the data carrier battery life.

6.11.2 Start Usage Command (ON)

The start usage command (ON) is a command to set the data carrier to which the end usage command (OF) has been executed back to the ready state (sleep cancel).

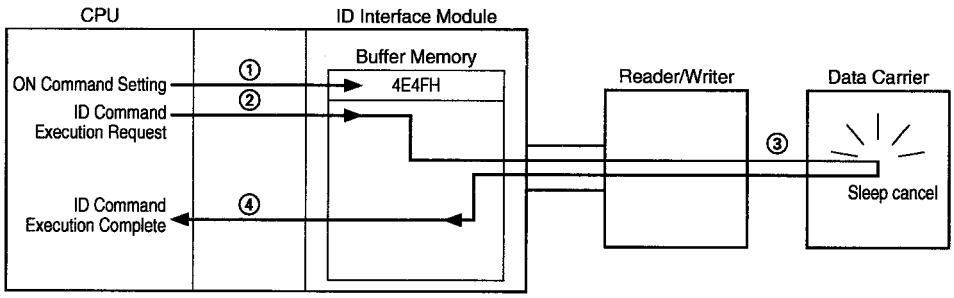
Command Code

Command: ON Code: 4E4FH

Usage

- To set the data carrier to be usable in normal communication distance.
- Recover the data carrier.

Command Execution Flow

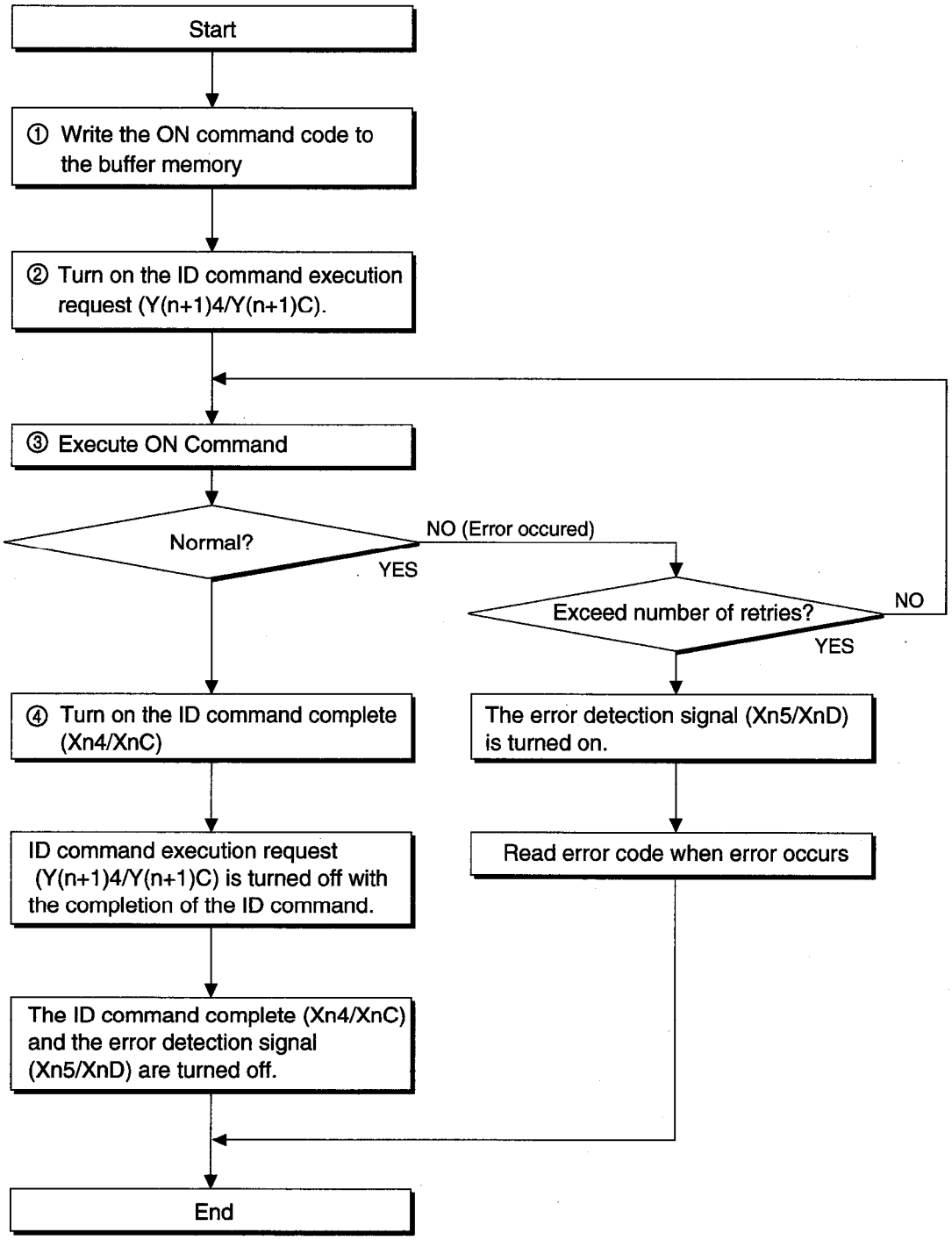


POINT

- Execute the start usage command (ON) in a communication distance less than 10 mm (0.39 inches).
- If the data carrier does not exist when the usage start command (ON) is executed, the command is executed up to the number of retries, and then results in error.

Programming

The programming flow is shown below.

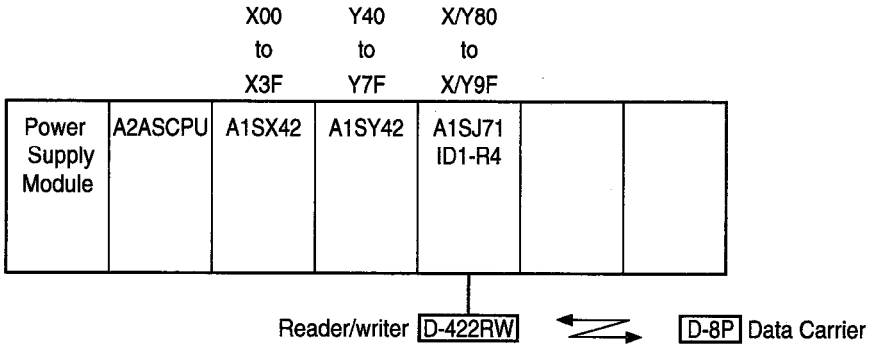


[Programming Example]

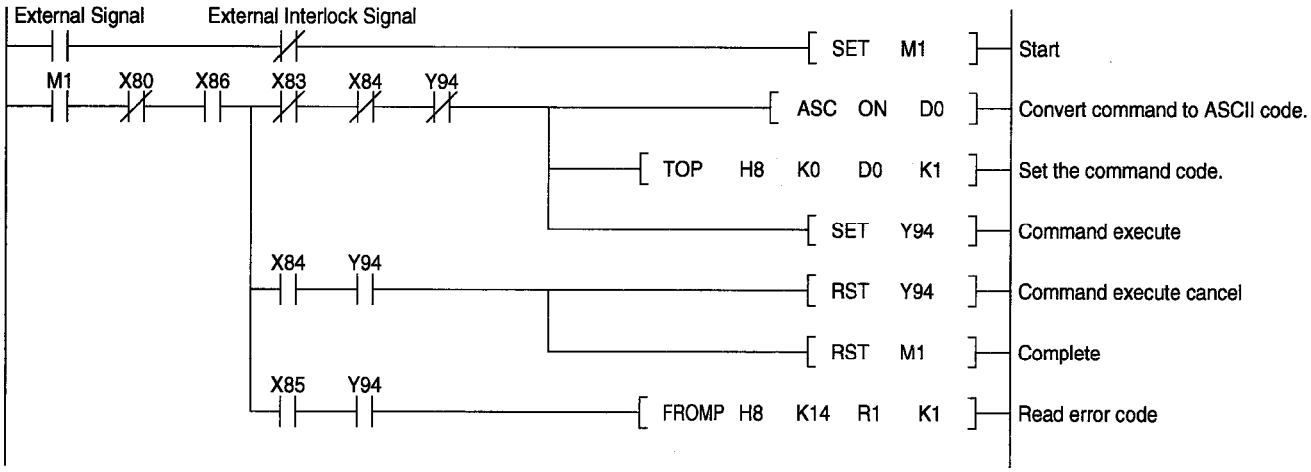
Sets the data carrier to the ready state (sleep cancel).

(a) System Configuration

Suppose the I/O address in the ID interface module starts from 80.



(b) Program



POINT

Input pulse signals for external signals. When signals other than pulses are input, commands are executed continuously.
When commands are executed continuously, it shortens the data carrier battery life.

6.12 Continuous-Command-Cancel Command

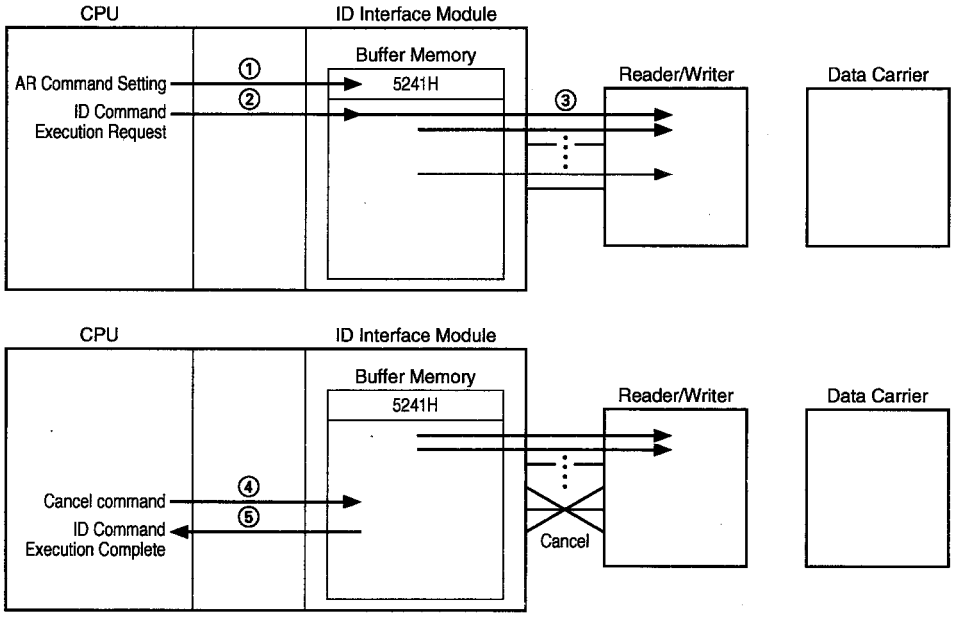
The continuous-command-cancel command cancels the execution of a continuous command (AR, SR, FR, AW, SW, FW, or CO).

Usage

- To cancel the execution of a continuous command.

Command Execution Flow

(The description uses the continuous read (AR) as the example, but other commands have the same flow.)

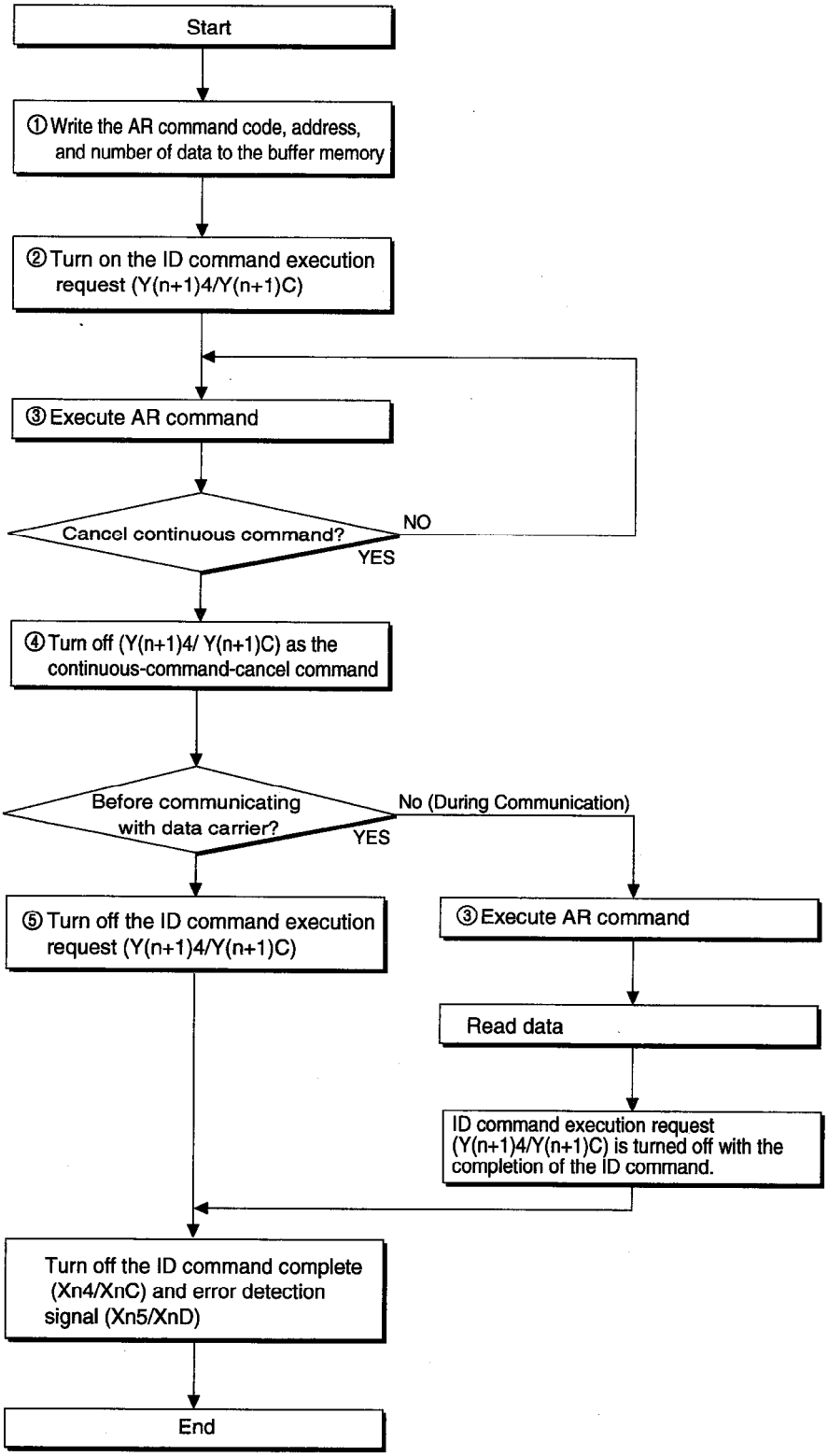


POINT

- If the continuous-command-cancel command is executed during communication with the data carrier (and data carrier exists), the communication is not canceled and the command is ignored, in order to not destroy data.
- If the continuous-command-cancel command is executed while the continuous command execution interval timer is operating, the command is reset after the timer count is complete.

Programming

The programming flow is shown below.
The description uses the continuous read (AR) as the example, but other commands have the same flow.

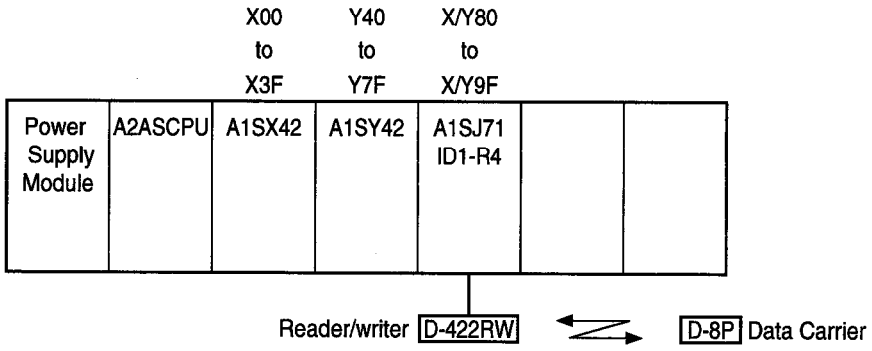


[Programming Example]

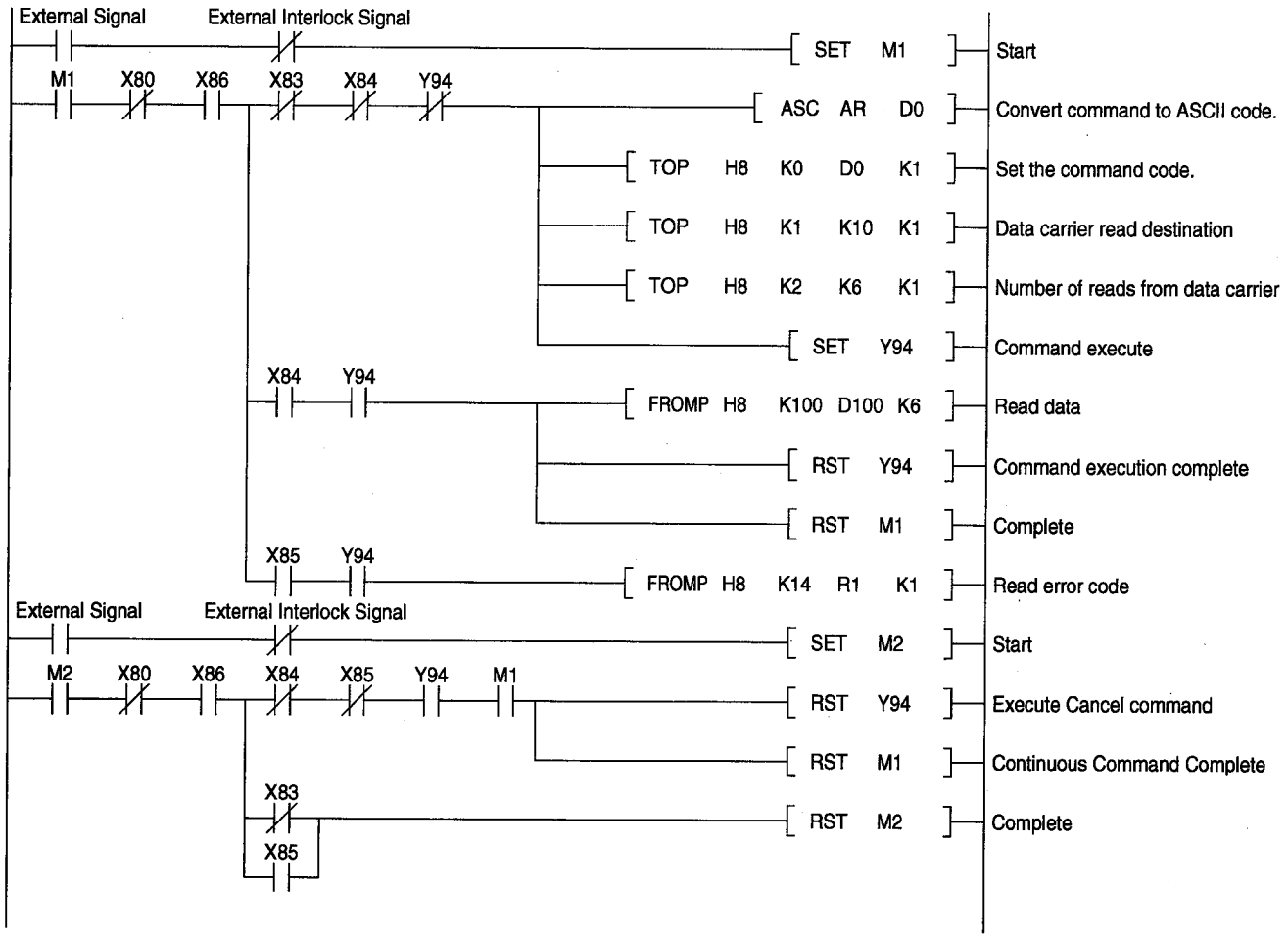
Executes the cancel command for a continuous command.

(a) System Configuration

Suppose the I/O address in the ID interface module starts from 80.



(b) Program



POINT

Input pulse signals for external signals. When signals other than pulses are input, commands are executed continuously.
When commands are executed continuously, it shortens the data carrier battery life.

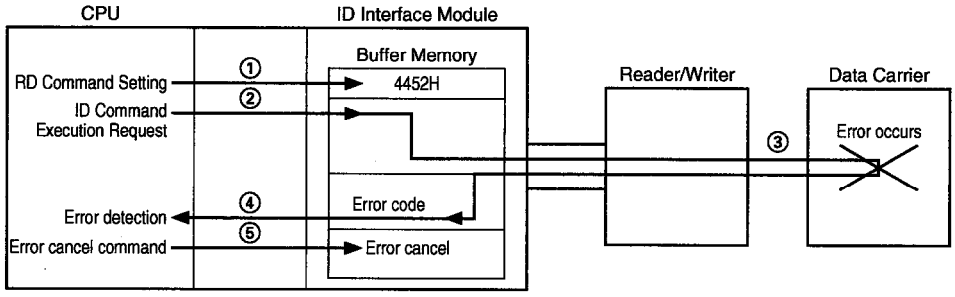
6.13 Error Cancel Command

The error cancel command cancels the error that occurred.

Usage

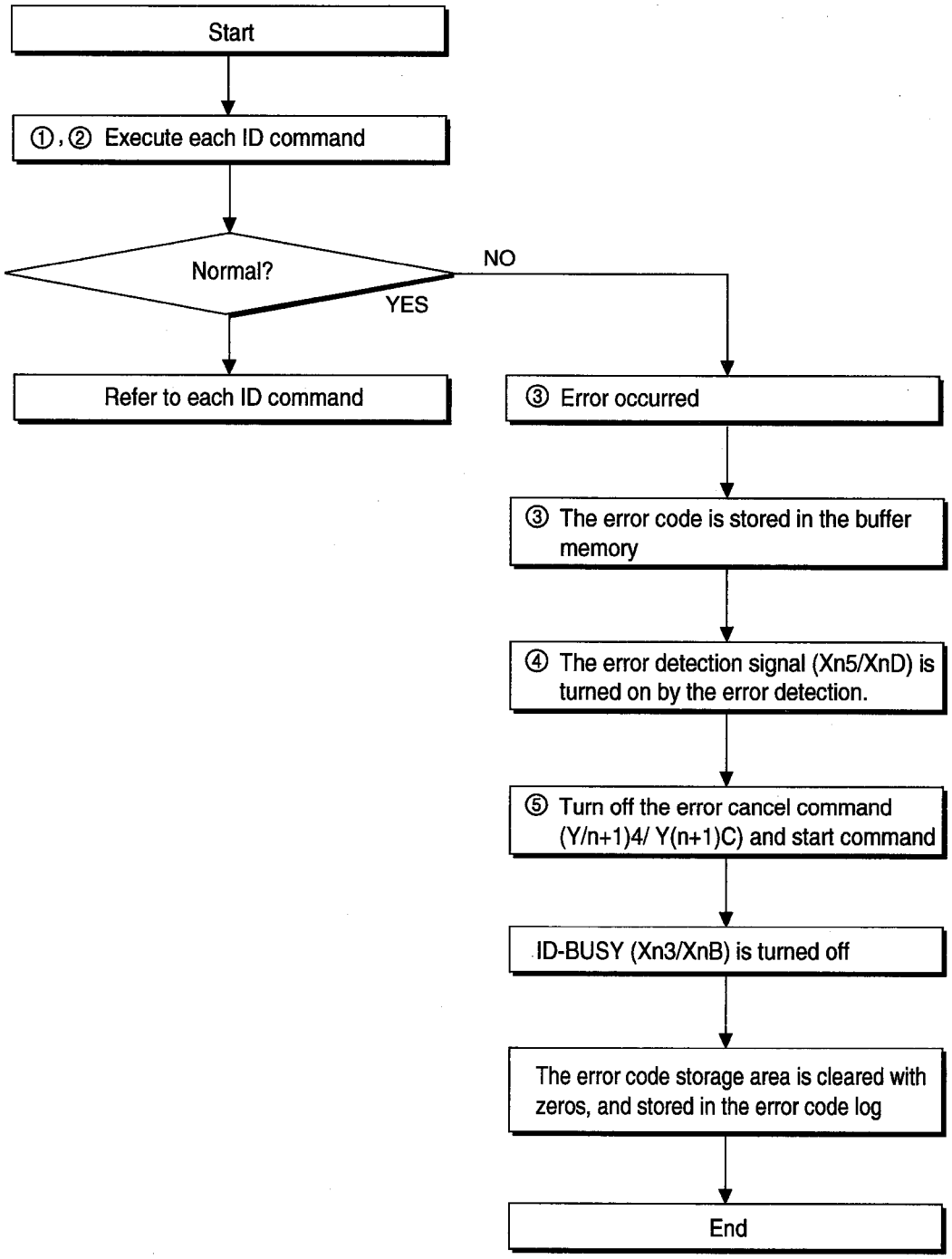
- To cancel the error.

Command Execution Flow



Programming

The programming flow is shown below.

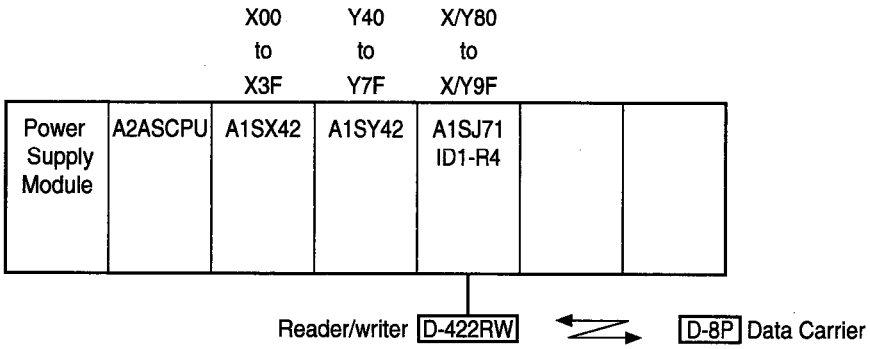


[Programming Example]

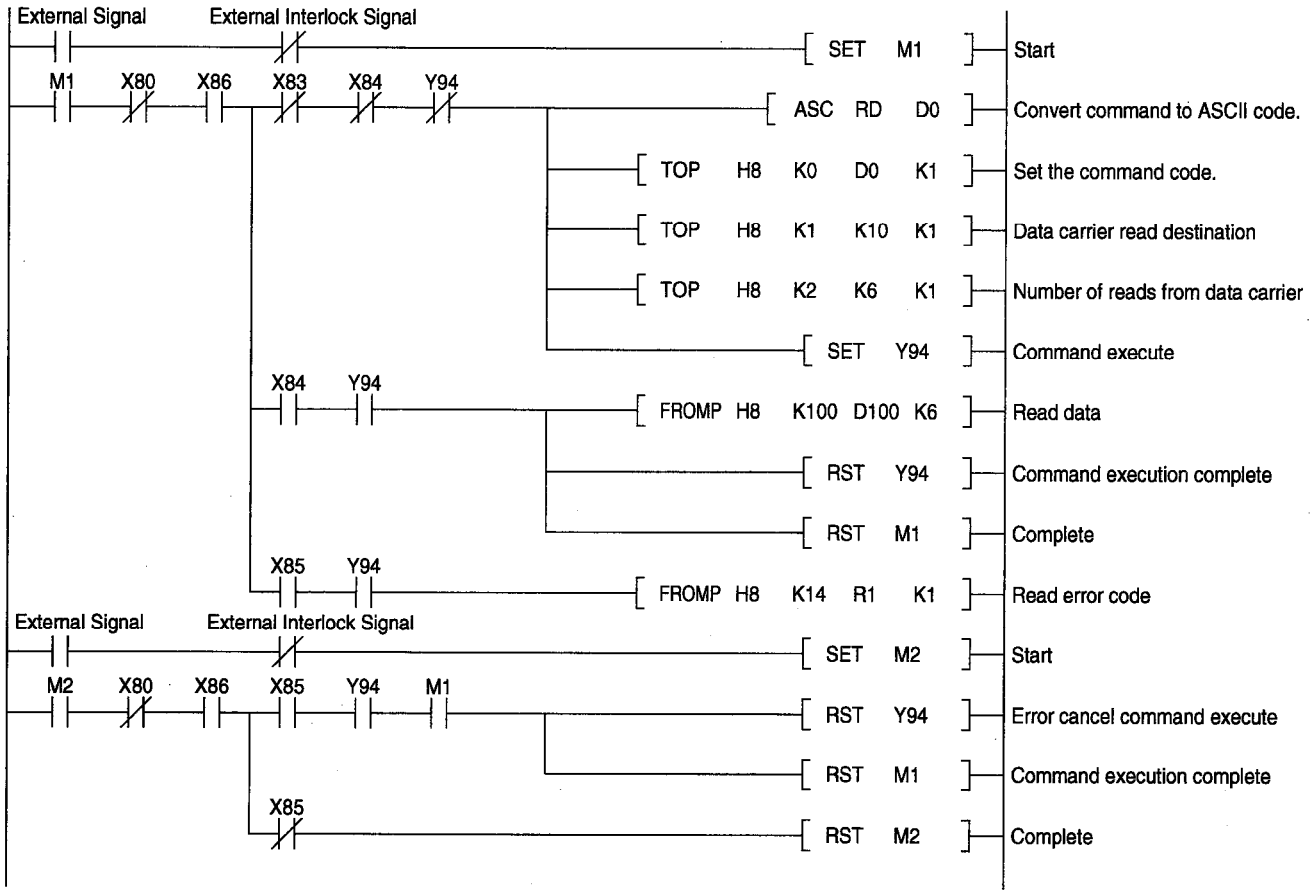
Executes the error cancel command.

(a) System Configuration

Suppose the I/O address in the ID interface module starts from 80.



(b) Program



POINT

Input pulse signals for external signals. When signals other than pulses are input, commands are executed continuously.
When commands are executed continuously, it shortens the data carrier battery life.

7 Troubleshooting

The details of errors that may occur when using the ID interface module and the troubleshooting are described below.

7.1 Error Code List

The error codes, error details, and resolution methods when using the ID interface module are described in Table 7.1.
Error code of the last error is stored in K14/K4014 in the buffer memory.
The following values are stored depending on the executed command in the ** digits in the error code.

- All commands . . 00
- RD 01
- WD 02
- AR 03
- AW 04
- CM 05
- CL, FI 06
- ON 07
- OF 08
- CO 0A
- CR 0B
- CW 0C
- SR 0D
- SW 0E
- FR 0F
- FW 10

Table 7.1 Error Code List

Error Code (Hex.)	Error	Details	LED	Resolution Method
**01H	Execution Number of Words Error	Error in the number of words for execution during data carrier communication.	ID-ERR	Check to see that the "number of words + address" value does not exceed the final address.
**02H	Execution Address Error	Error in the execution address during data carrier communication.	ID-ERR	Check if the address does not exceed the data carrier address range.
**05H	Write Incomplete Error	Cannot write during data carrier communication.	ID-ERR	Review the communication distance with the data carrier or the movement speed of data carrier. Check the address or number of words in the sequence program.
**11H	Set Address Error	Error in the set address during the ID interface module check.	ERR	Check if the address does not exceed the data carrier address range.
**12H	Set Number of Words Error	Error in the number of set words during the ID interface module check.	ERR	Check to see that the "number of words + address" value does not exceed the final address.
**13H	Data Carrier Not Exist Error	Data carrier not detected within the communication range. The reader/writer is not connected properly.	ID-ERR	Enter the data carrier in the communication range. Check the wiring of the reader/writer.
**14H	Data Carrier Communication Error	A communication error such as parity error occurred.	ID-ERR	Review the movement speed or communication distance of the data carrier.
**22H	Command Code Error	Undefined command is set.	ERR	Check the command.
**24H	Continuous Command Execution Interval Timer Setting Error	The continuous command execution interval timer set value exceeds the valid set values.	ERR	Review the set value of the continuous command execution interval timer of the sequence program.
**25H	Battery Life Evaluation Value Setting Error	The battery life evaluation value exceeds the range.	ERR	Review the battery life evaluation set value of the sequence program.
0031H	24 VDC Error	The external power (24 VDC) is not supplied.	24 VDC	Supply 24VDC.

POINT

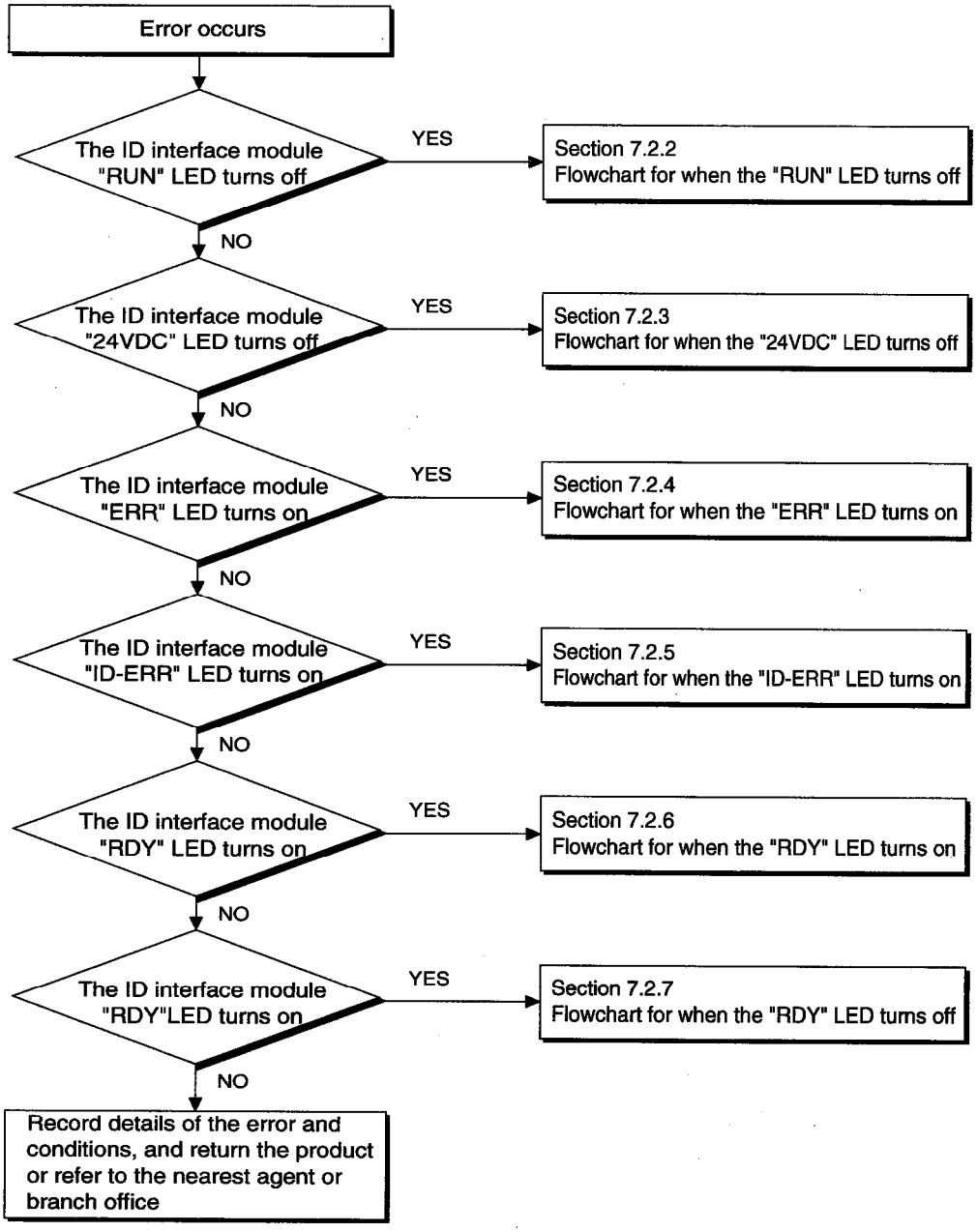
When an error code other than described above occurs, reissue the command issuing the error cancel command.

7.2 Troubleshooting

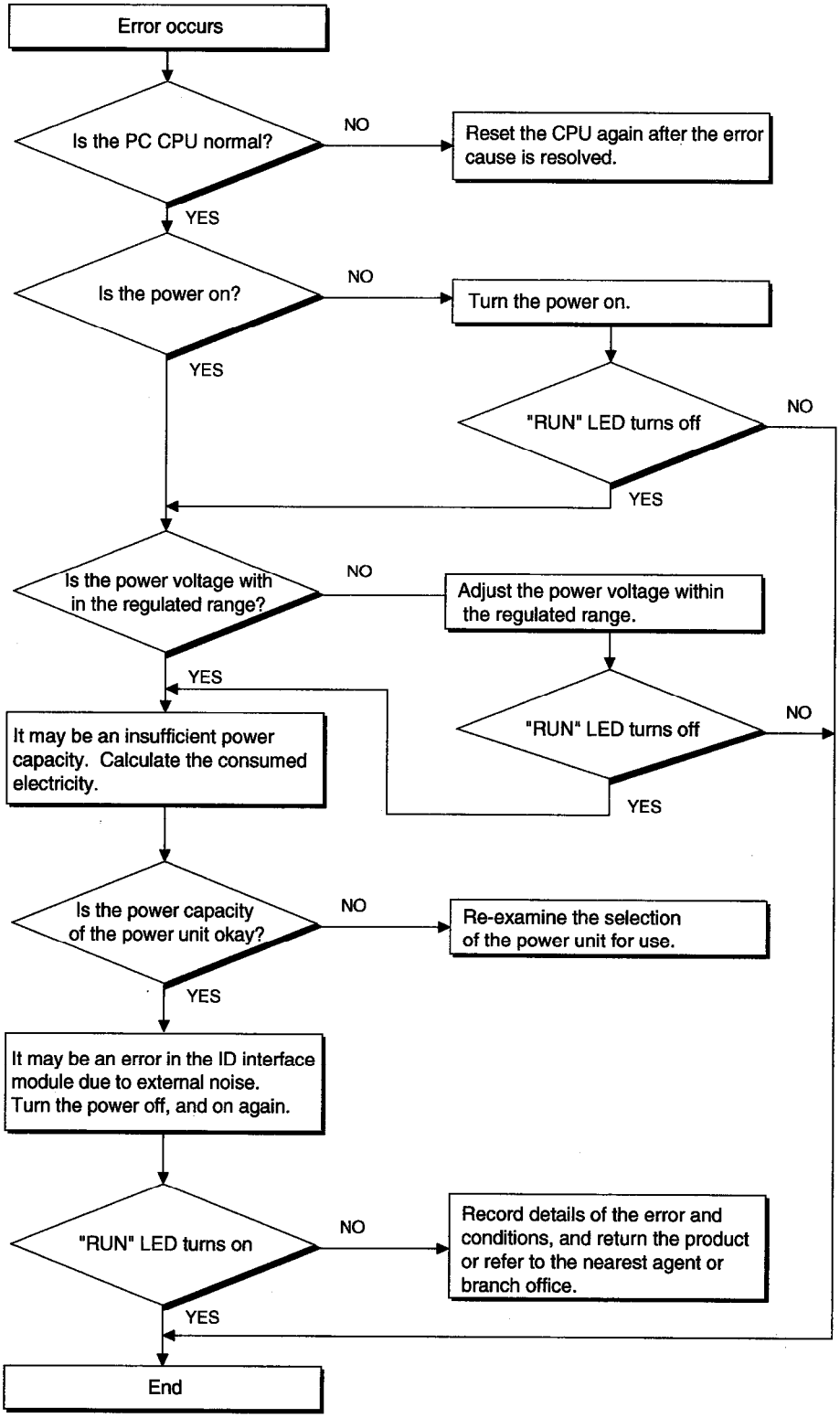
Simple troubleshooting methods on using the ID interface module is described below. Refer to the user's manual of the CPU module for CPU-related trouble.

7.2.1 Troubleshooting Flowchart

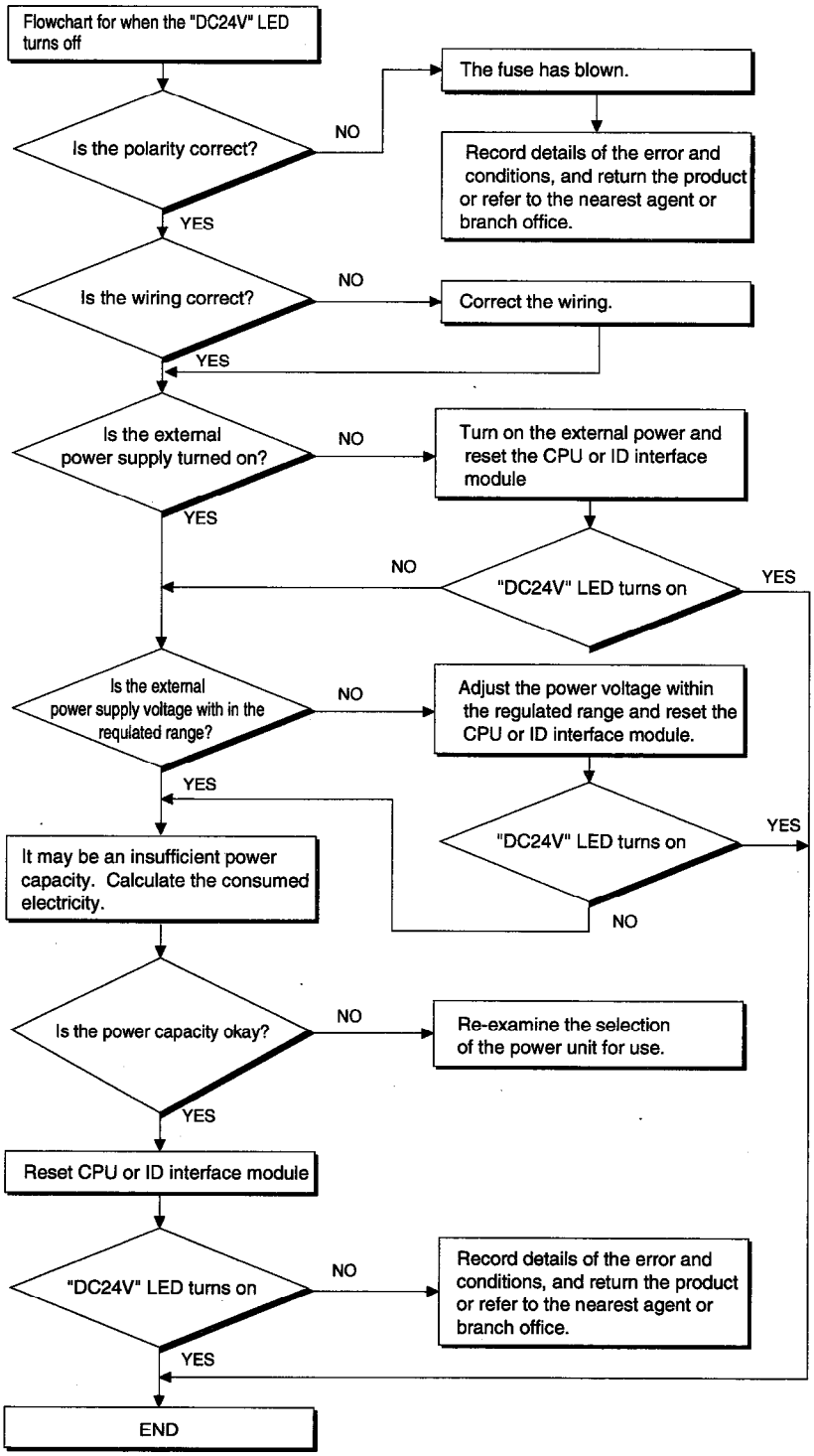
The error contents are described by the symptom.



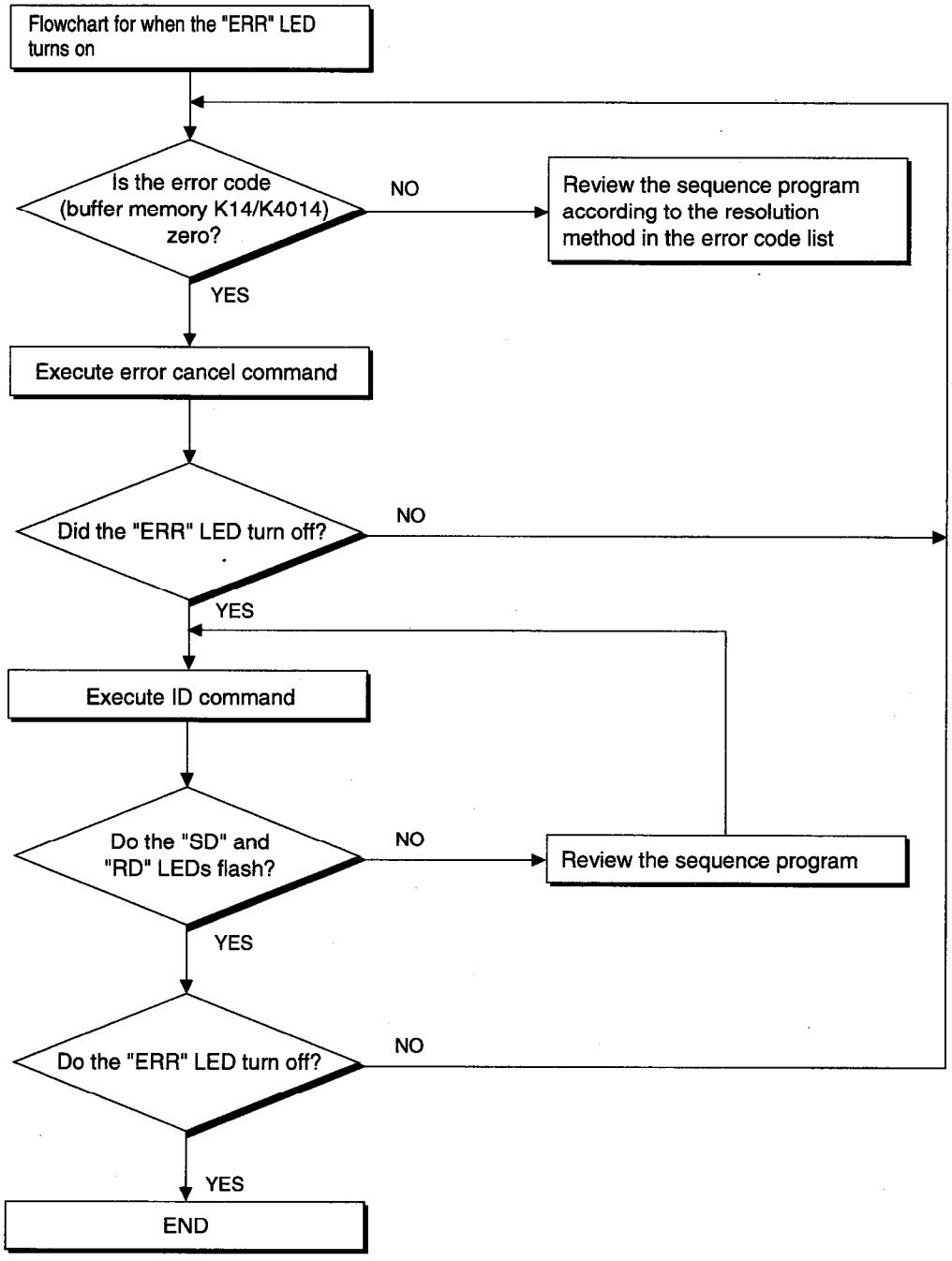
7.2.2 Flowchart for When the "RUN" LED Turns Off



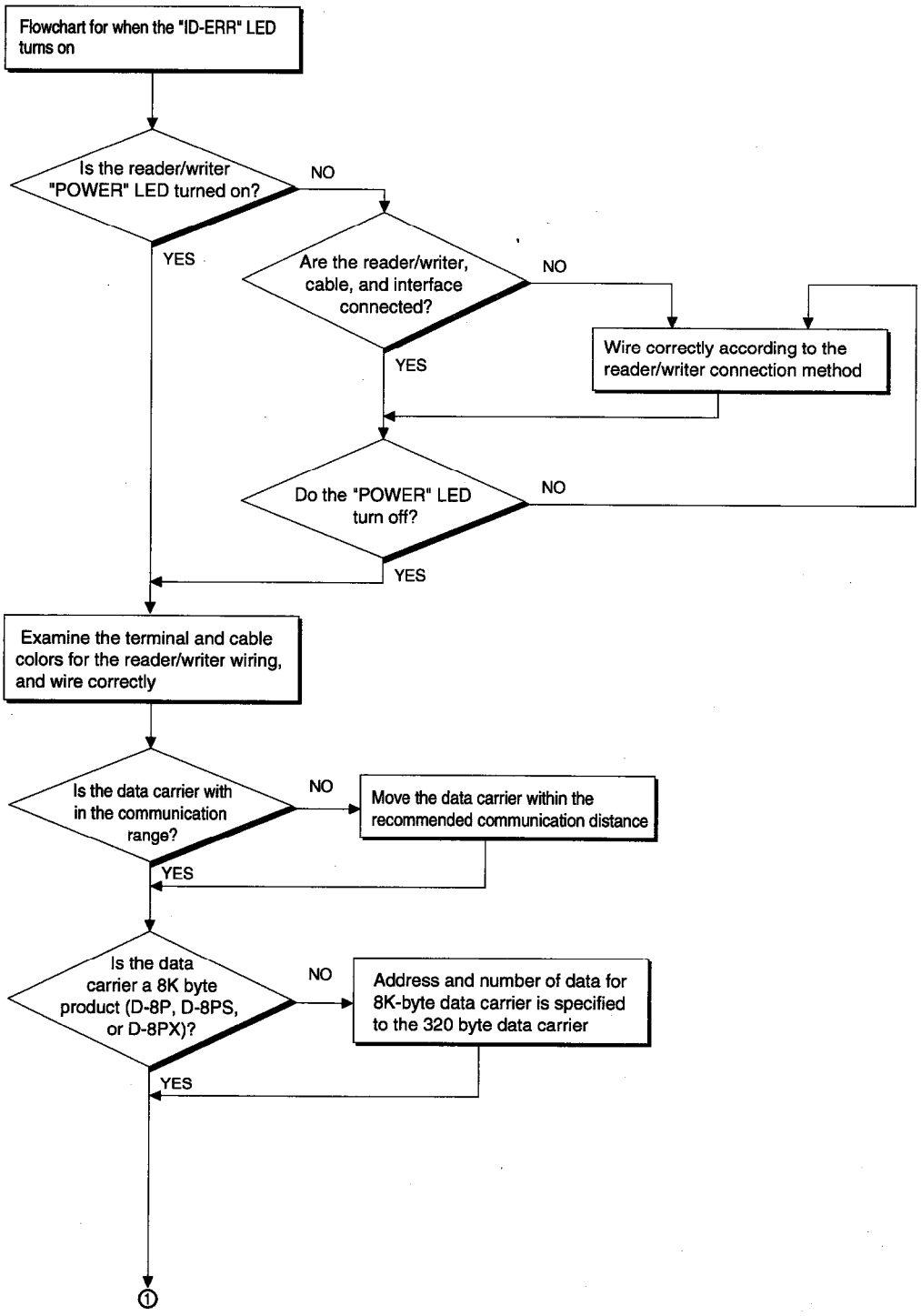
7.2.3 Flowchart for When the "DC24V" LED Turns Off

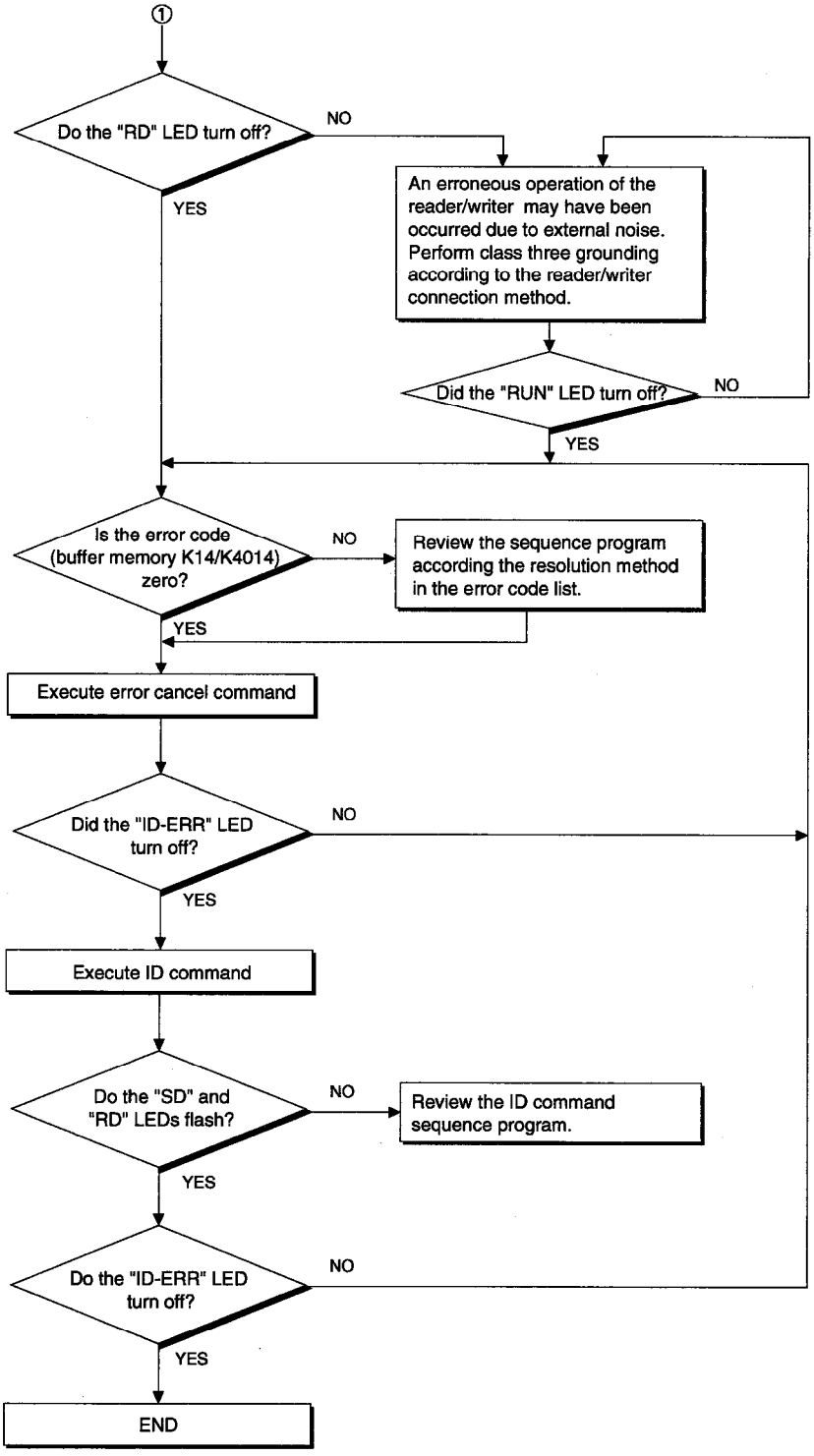


7.2.4 Flowchart for When the "ERR" LED Flashes

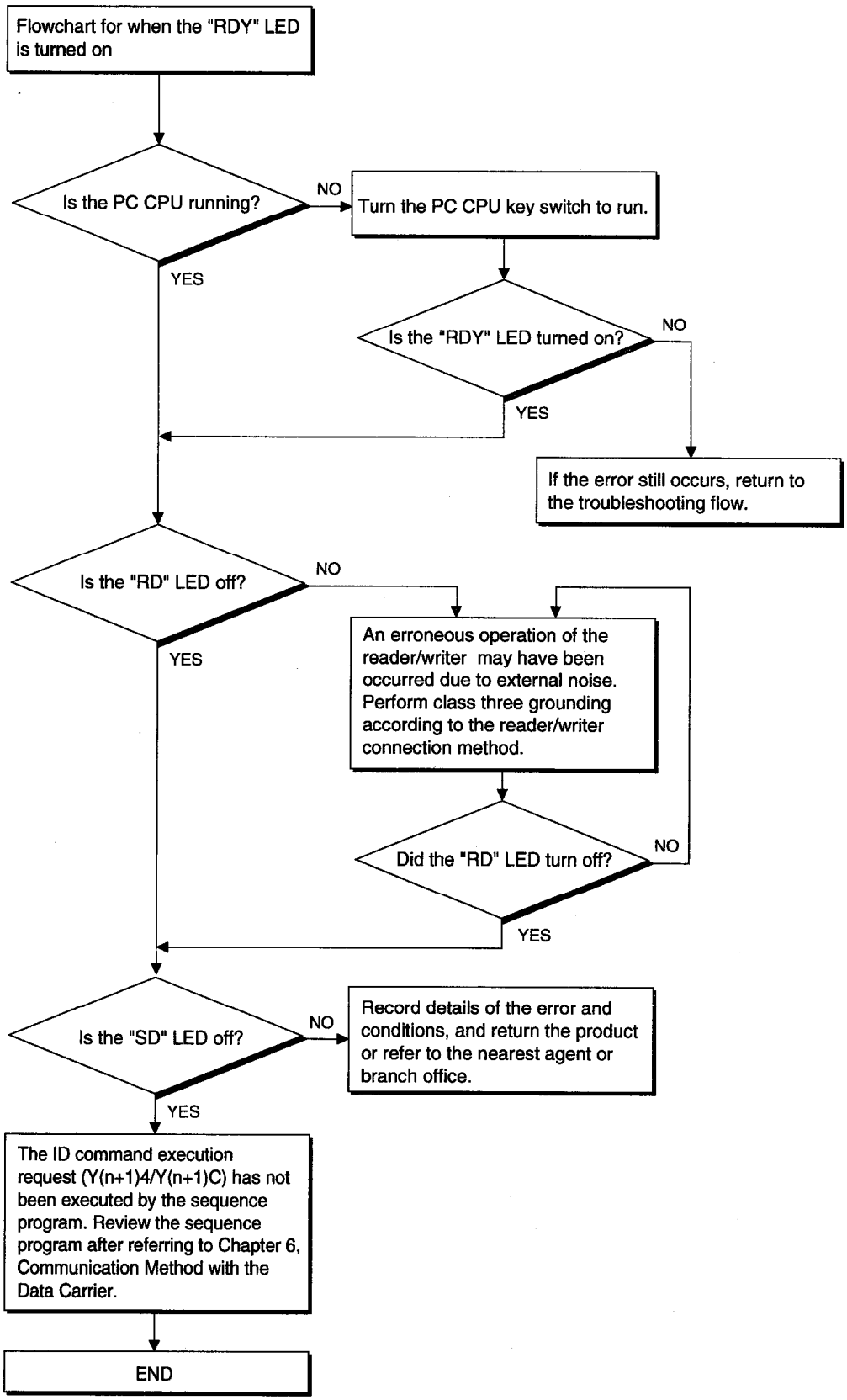


7.2.5 Flowchart for When the "ID-ERR" LED Flashes

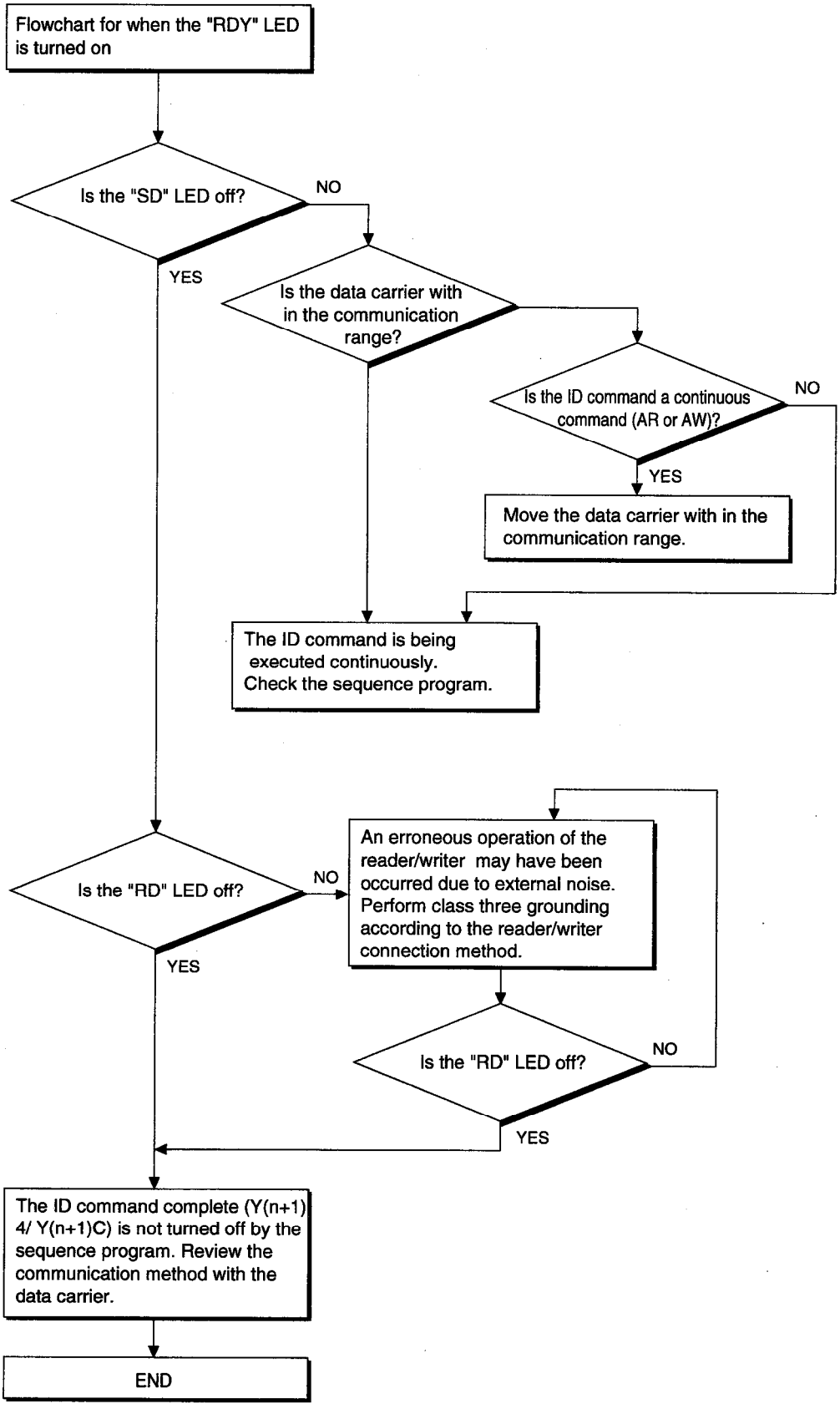



①
Do the "RD" LED turn off?
NO
YES
An erroneous operation of the reader/writer may have been occurred due to external noise. Perform class three grounding according to the reader/writer connection method.
Did the "RUN" LED turn off?
NO
YES
Is the error code (buffer memory K14/K4014) zero?
NO
Review the sequence program according the resolution method in the error code list.
YES
Execute error cancel command
Did the "ID-ERR" LED turn off?
NO
YES
Execute ID command
Do the "SD" and "RD" LEDs flash?
NO
Review the ID command sequence program.
YES
Do the "ID-ERR" LED turn off?
NO
YES
END

7.2.6 Flowchart for When the "RDY" LED Flashes



7.2.7 Flowchart for When the "RDY" LED Turns Off



7.3 Items to Check When in Trouble

The items to be checked when trouble occurs is described below:

No.	Category	Objective	Precautions	Details
1	Electromagnetic noise	Prevention of Erroneous Operation	Perform class 3 grounding to the FG-SG of the ID interface module.	Always perform a class 3 grounding to prevent reader/writer erroneous operations due to the high frequency of the grounding. Perform the wiring without removing the cross wiring of the ID interface module FG and SG.
2			Perform class 3 grounding to the invertor and servo motor.	
3			Connect the ID interface module and external power LG.	When class 3 grounding cannot be performed temporarily during debug or system startup, connect the external power LG and ID interface module FG and SG. However, always perform a class 3 grounding when using this system.
4	Communication Time	System Reliability	Keep at least twice as long as the required time for communication time.	Set the communication time twice as long as the required time so that retries can be performed when a communication error occurs.
5	Communication Distance	Data Reliability	Use at the 50% of the maximum value for the communication range, which is the optimal communication distance.	Reading and/or writing becomes unstable near the border of the communication range because of possible shift of the data carrier. Make sure to use it near the center of the communication range, which is its optimal communication range.
6	Moving Speed	System Reliability	Set the movement speed at less than 50% of the maximum value.	Set the moving speed less than 50% of the maximum speed so that retries can be performed when a change in moving speed or communication error occurs.
7	Moving Communication Distance	Data Reliability	When setting the data carrier to a moving object, use it within 40% - 70% of the maximum communication distance.	To obtain a stable communication, use at the communication distance that for the data carrier passes through the communication range for the longest duration. When the communication distance is too close, the siderope effect occurs and the communication gets cut off.
8	Moving Speed	Data Reliability	When the data carrier attached to the moving object swings, perform the data read or write after detecting the data carrier with a microswitch, etc.	When the moving speed is slow (less than 50 m/min (1.97 inch/ s) and it is a hanging type, an unstable read is performed near the communication range borders due to the moving object's unstability. Perform a read in a stable communication condition by detecting the moving object with a microswitch, etc. When the moving object cannot be detected, perform a continuous comparison read or write (SR, SW), to increase reliability.
9	Jammed Signals	Trouble Prevention from Jammed Signals	Set the reader/writer at the distance of more than 200 mm (7.87 inches) (1800 mm (70.87 inches) for D-422RWL) away.	Results in a communication error, and normal communication cannot be established. Re-evaluate the setting location.
10			Set the data carrier at a distance of 200 mm (400 mm for D-422RWL) or more.	Results in a communication error, and normal communication cannot be established. Re-evaluate the setting location.
11			Set the handy controller at a distance of 200 mm (1,800 mm for D-422RWL) or more.	Results in a communication error, and normal communication cannot be established. Re-evaluate the setting location.
12	Program	Error Prevention of PC CPU	Execute FROM (P)/ TO (P) to the buffer memory through the Xn connection point.	When FROM(P)/TO(P) is regularly executed, there are possibilities of SP. UNIT DOWN ERR or communication error. Also, the scan time becomes longer. Execute FROM (P)/TO (P) through ID command complete (Xn4/XnC), ID error detection (Xn5/Xnd)
		Prohibit Regular Usage of FROM/TO Commands	Do not perform constant FROM/ TO commands to the buffer memory, and use FROMP/TOP commands.	When FROM/TO commands are regularly executed, it affects the interface processing, and may result in communication error.
13	Address	Prevent Specification Outside the Regulated Area	For D-03C, D-03CS, and D-03P, do not specify a value (address plus number of words) beyond the regulated value of 160 words.	Be careful for the use of continuous read (AR) and continuous write (AW), for errors do not occur and the cause is difficult to pinpoint. For other commands, a communication error results after retries.

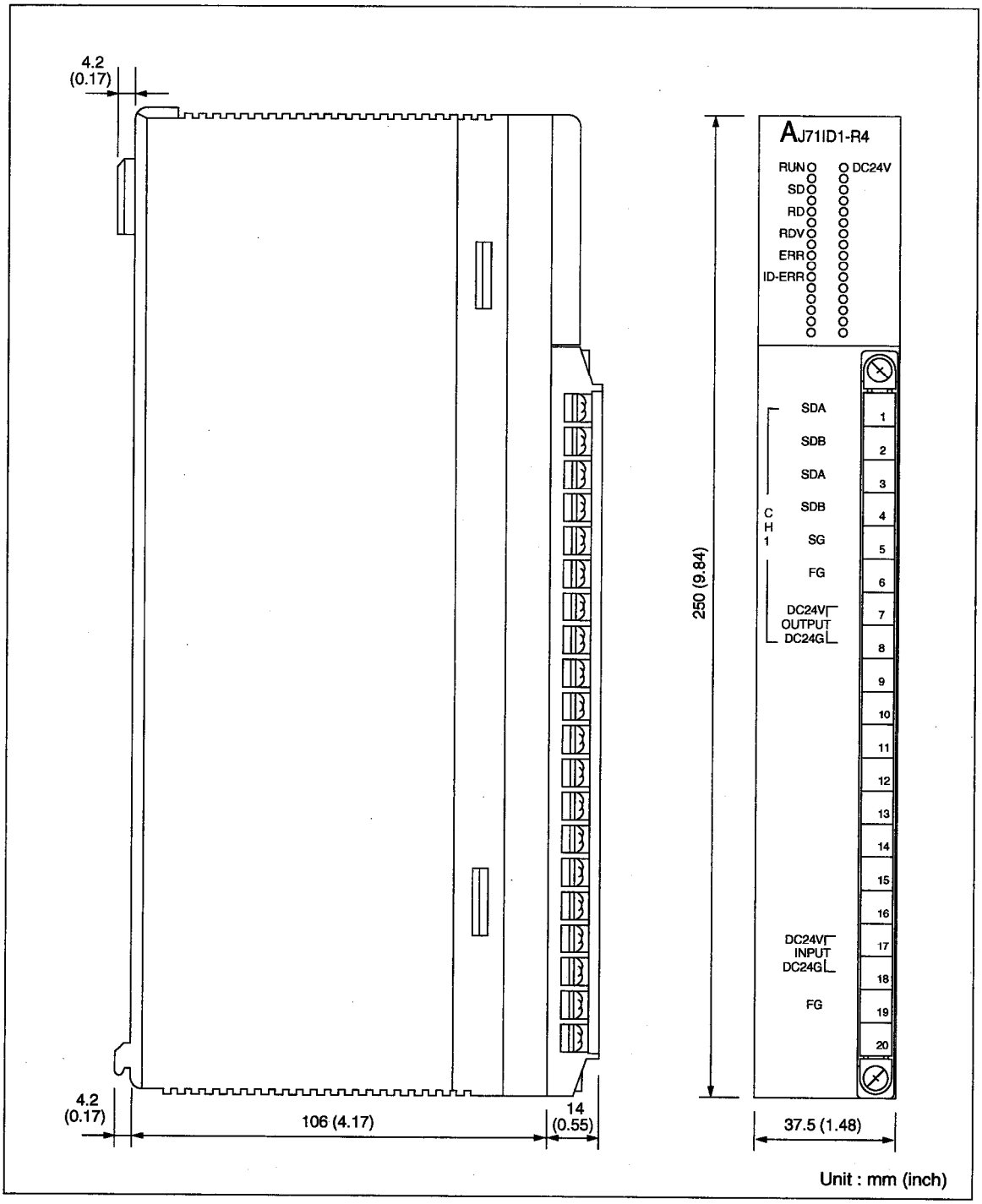
<table>
<tr><th>No.</th><th>Category</th><th>Objective</th><th>Precautions</th><th>Details</th></tr>
<tr><td>14</td><td>PC CPU Stop</td><td>Prevent Error Cancellation</td><td>Do not stop the PC CPU after an error occurs in the ID interface module.</td><td>When the PC CPU is stopped, the error is canceled because the Y contact point for the ID execution request is turned off.
When necessary, create a program for the external signal latch, storing error data into the file register, etc.</td></tr>
<tr><td>15</td><td>PC CPU Stop</td><td>Prevent Data Corruption</td><td>Even if the PC CPU is switched to STOP from RUN, the ID interface module does not interrupt the ID command.</td><td>When the PC CPU is set to STOP from RUN during communication, the communication is not interrupted and the running ID command is completed. (The data in the data carrier is changed normally.) ID commands are not executed after this one.</td></tr>
<tr><td>16</td><td>Re-run of PC CPU</td><td>Normal Completion of Program</td><td>When the PC CPU is stopped, then switched to RUN again, the ID interface module re-executes the ID command.</td><td>To recover the Y contact point state (ON) to before the stop, execute the ID command again. The program completes seeccessfully and stores data conectly.</td></tr>
<tr><td>17</td><td>Abnormal Operation</td><td>Prevent Troubles from Abnormal Operation</td><td>Do not disconnect the reader/writer connector during communication.</td><td>A communication error occurs and normal communication cannot be established. Cancel the ID command and check the connector.</td></tr>
<tr><td>18</td><td>Wiring</td><td>Prevent Malfunction</td><td>Do not reverse the wiring for the polarity of the external power 24 VDC to the ID interface module.</td><td>The ID interface module built-in fuse is blown.</td></tr>
<tr><td>19</td><td>Power Supply</td><td>Prevent Voltage Decrease</td><td>The external power 24 VDC to the ID interface module must endure inrush current.</td><td>The voltage of the external power may decrease due to the 1.8 A inrush current when the DC24V is supplied to the ID interface module. Select a power supply that can withstand this kind of malfunctions of the PC and sensor due to the voltage drop.</td></tr>
<tr><td>20</td><td>Space Noise</td><td>Prevent Erroneous Operation</td><td colspan="2">The data carrier and reader/writer must be installed with the following distances from each noise source to prevent malfunctions due to the noise in space.
<table>
<tr><th rowspan="2">Noise Source</th><th colspan="2">Data carrier</th></tr>
<tr><th>D-422RW</th><th>D-422RWL</th></tr>
<tr><td>Invertor/Servo Amp</td><td>10 cm (3.94 in.)</td><td>30 cm (11.81 in.)</td></tr>
<tr><td>Main Circuit Wiring</td><td>10 cm (3.94 in.)</td><td>30 cm (11.81 in.)</td></tr>
<tr><td>CRT/EL Display Device of the PC</td><td>30 cm (11.81 in.)</td><td>100 cm (39.37 in.)</td></tr>
<tr><td>Servo Motor (including robot), Generic-use Motor</td><td>30 cm (11.81 in.)</td><td>100 cm (39.37 in.)</td></tr>
<tr><td>Arc for Welder, etc. (Electric Sparks)</td><td>30 cm (11.81 in.)</td><td>100 cm (39.37 in.)</td></tr>
<tr><td>Electrical Discharge Machine/High Frequency Chamber</td><td>3000 cm (118.11 in.)</td><td>1000 cm (393.70 in.)</td></tr>
<tr><td>Switching Power Supply</td><td>30 cm (11.81 in.)</td><td>100 cm (39.37 in.)</td></tr>
</table></td></tr>
</table>

Appendix

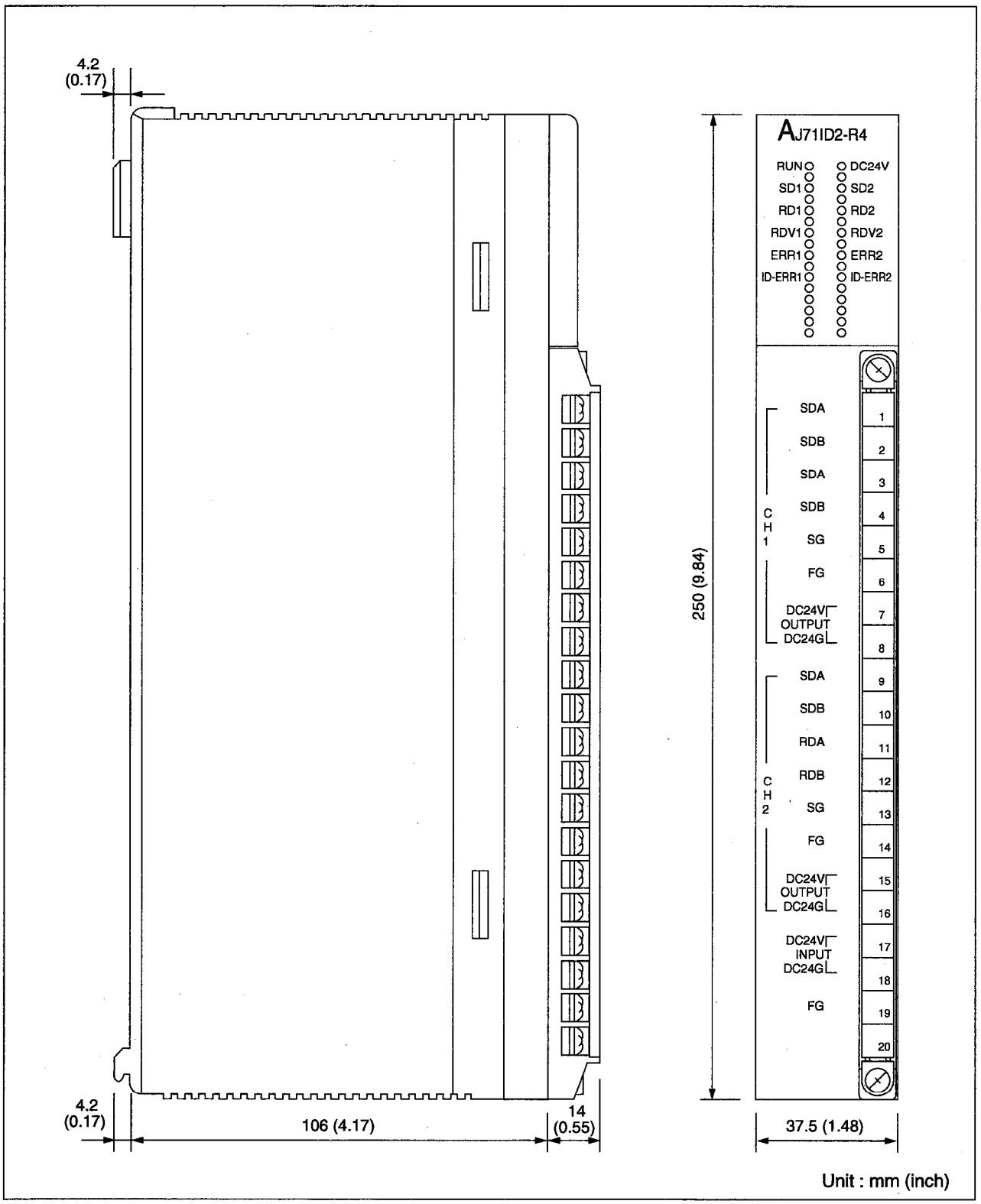
APPENDIX 1 External Dimension Diagram

1.1 ID Interface Module

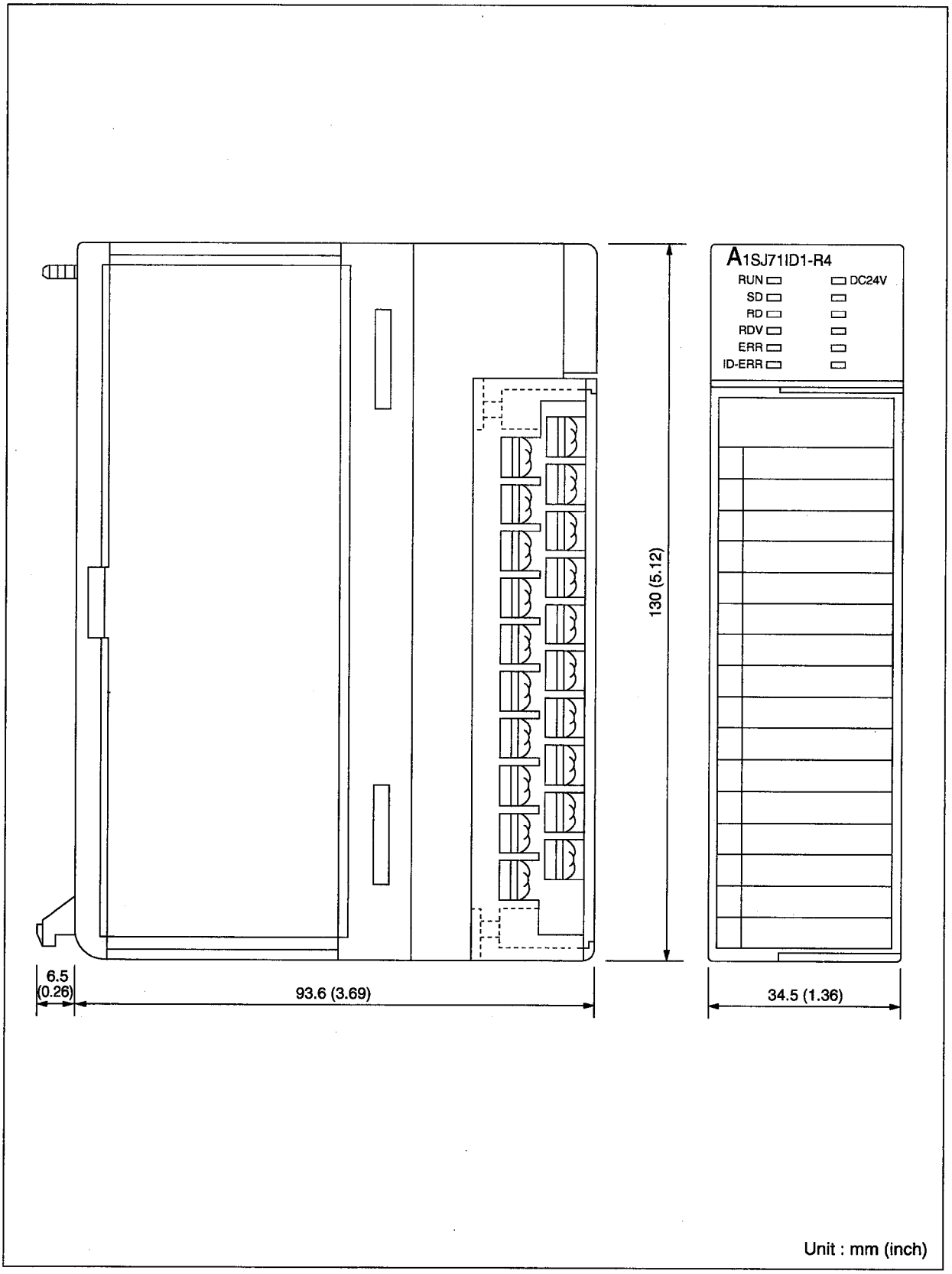
1.1.1 AJ71D1-R4



1.1.2 AJ71D2-R4

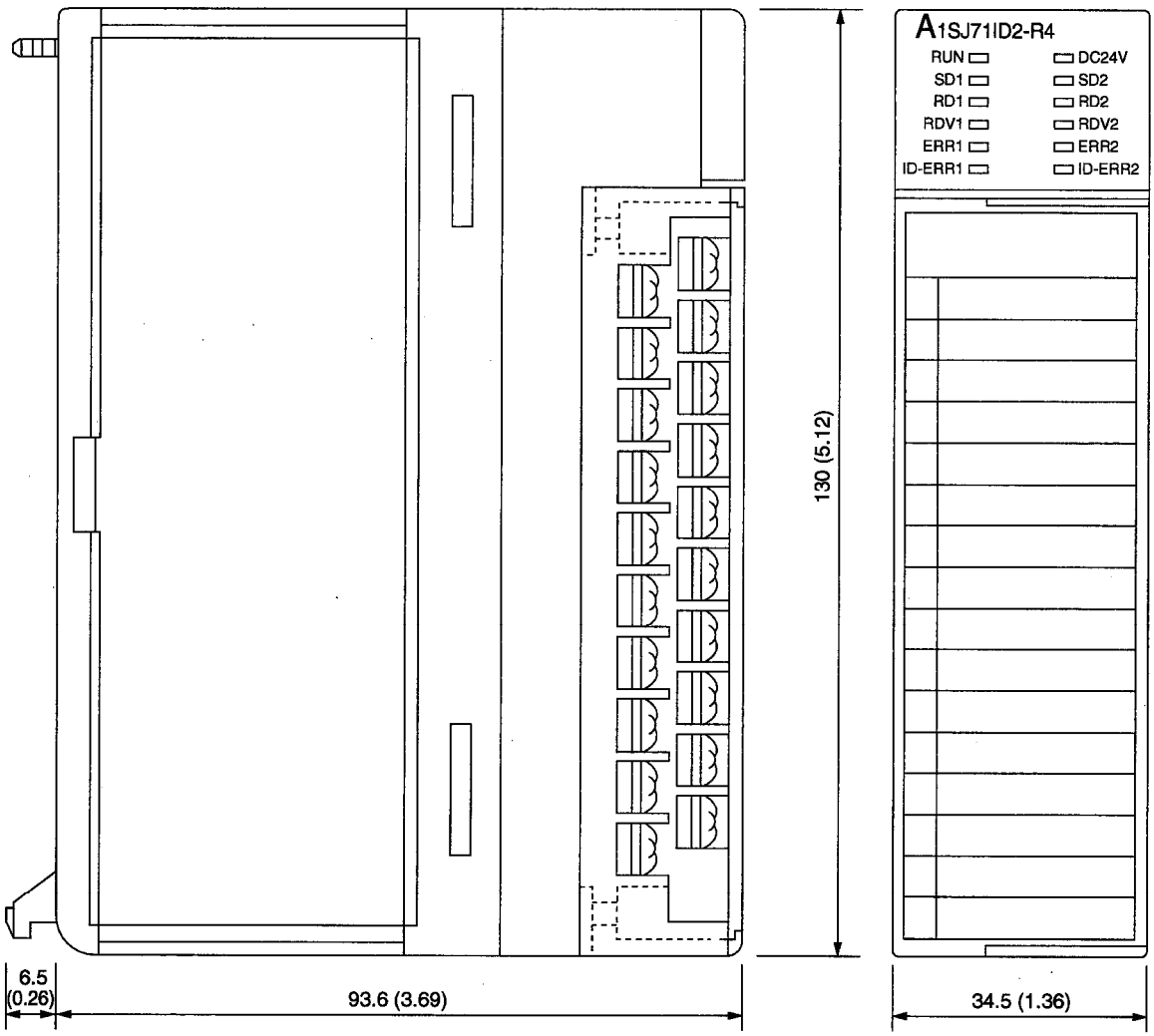


1.1.3 A1SJ71ID1-R4



Unit : mm (inch)

1.1.4 A1SJ71ID2-R4

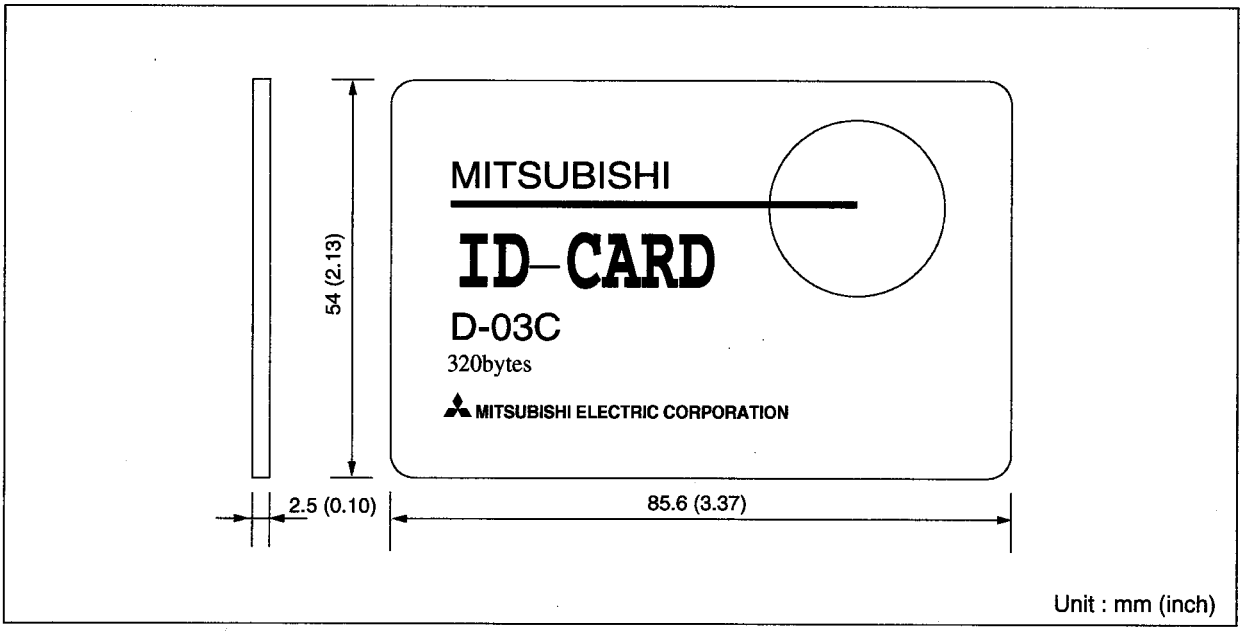


Unit : mm (inch)

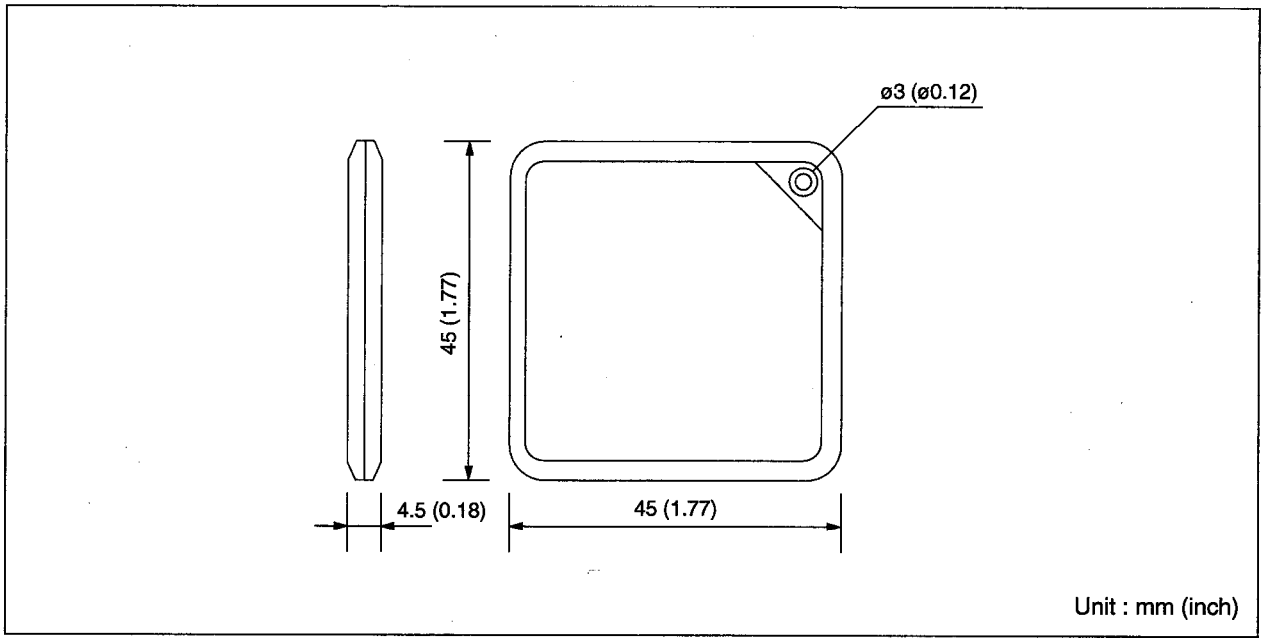
1.2 Data Carrier

1.2.1 ID Card

(1) D-03C

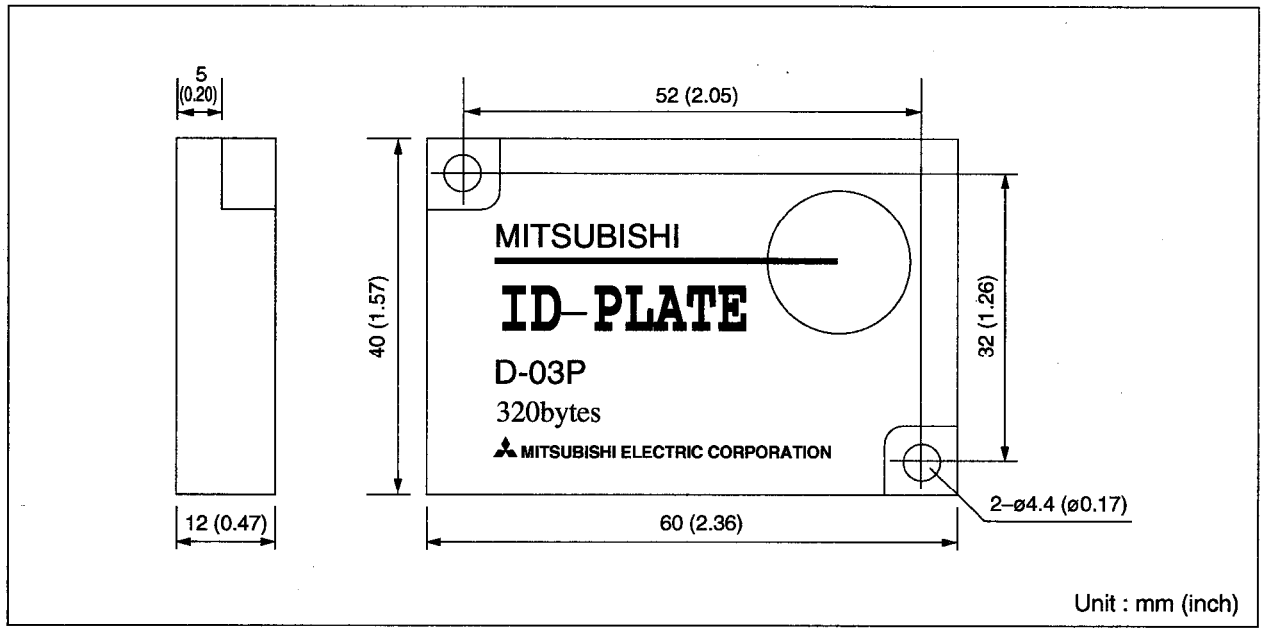


(2) D-03CS

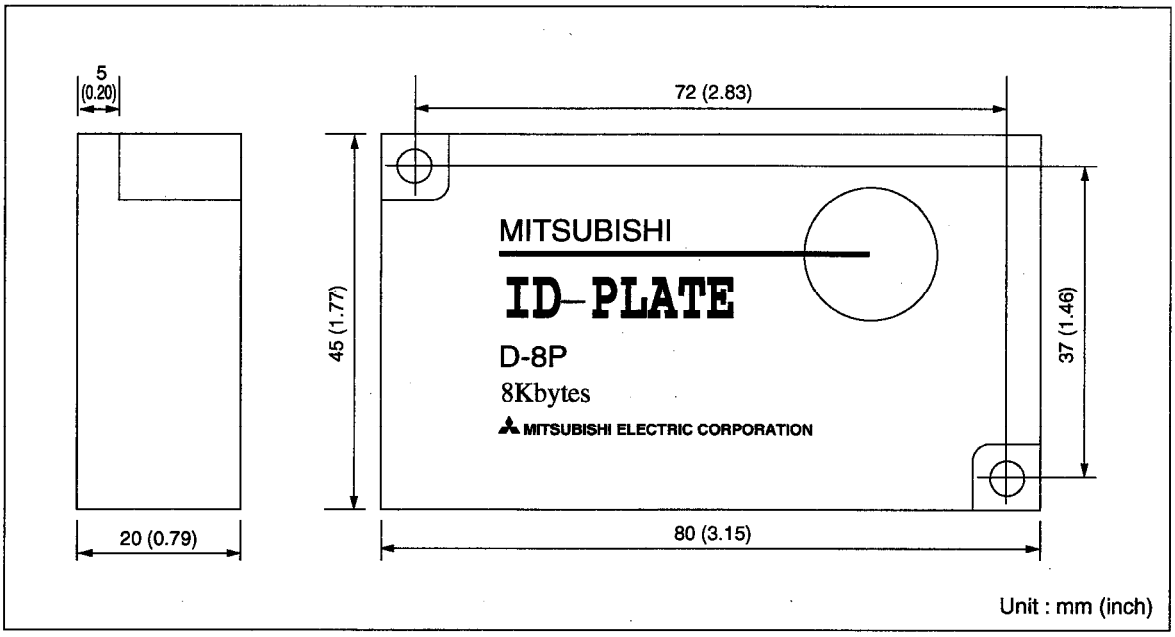


1.2.2 ID Plate

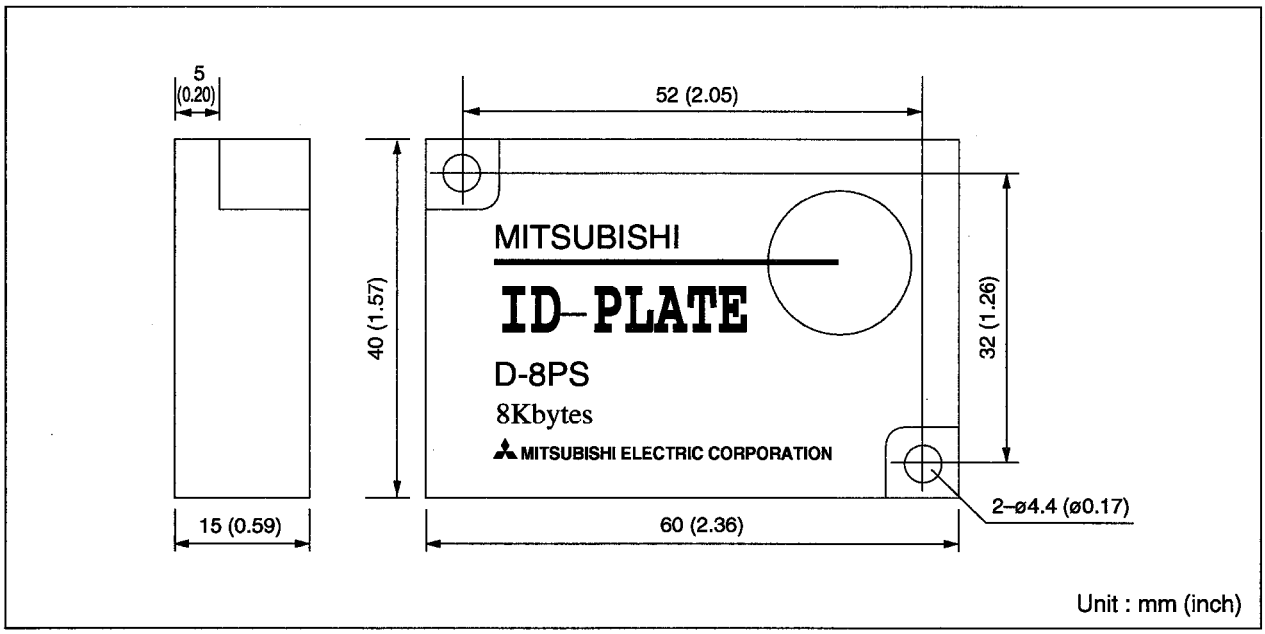
(1) D-03P



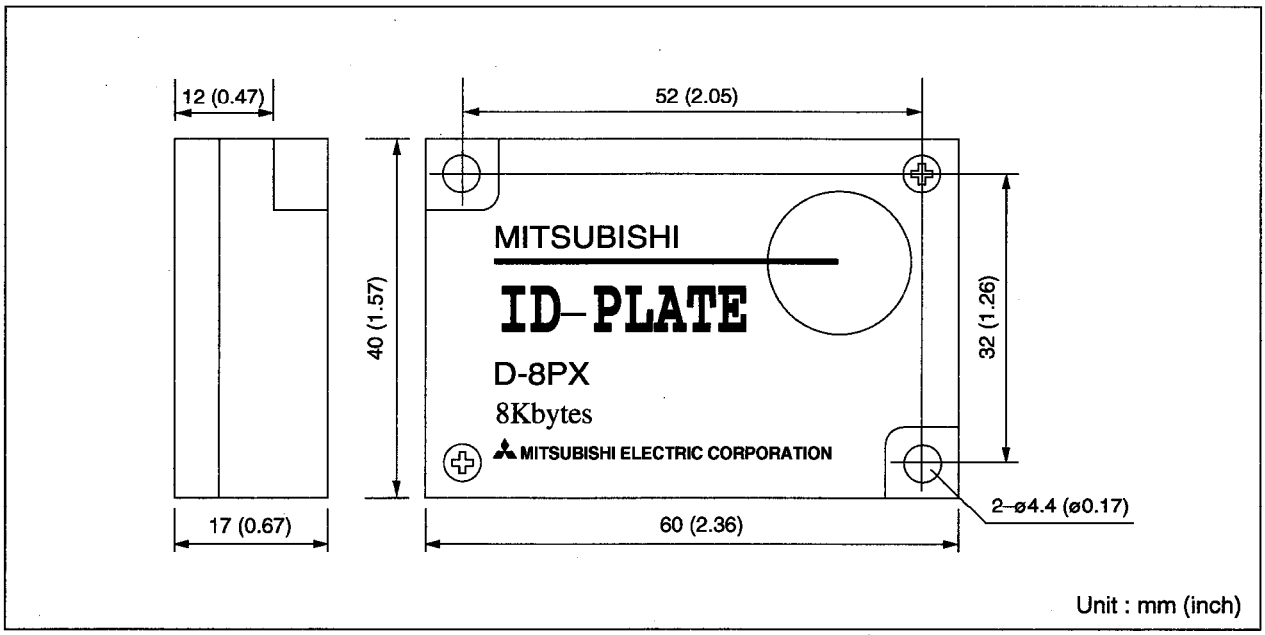
(2) D-8P



(3) D-08PS

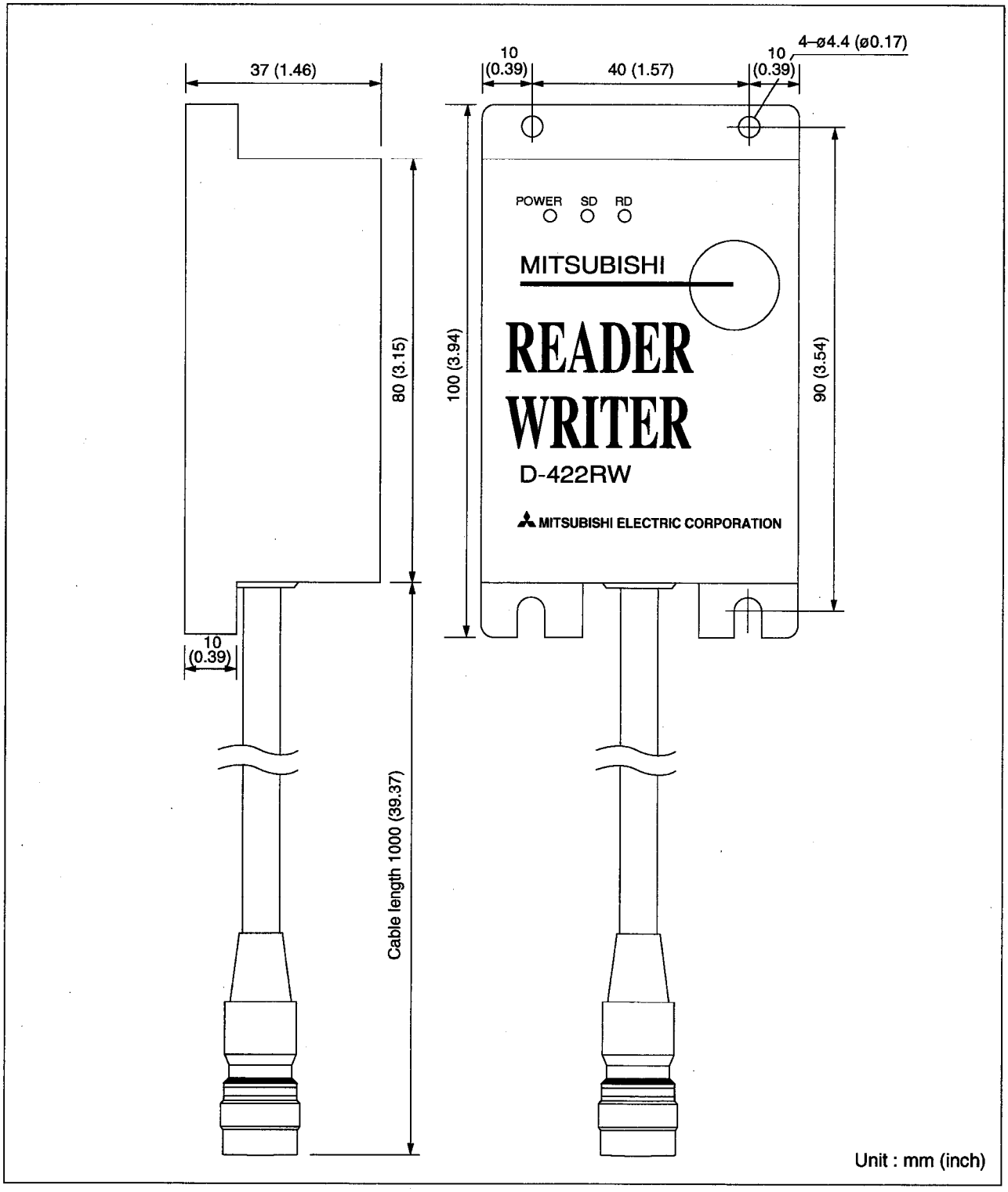


(4) D-08PX

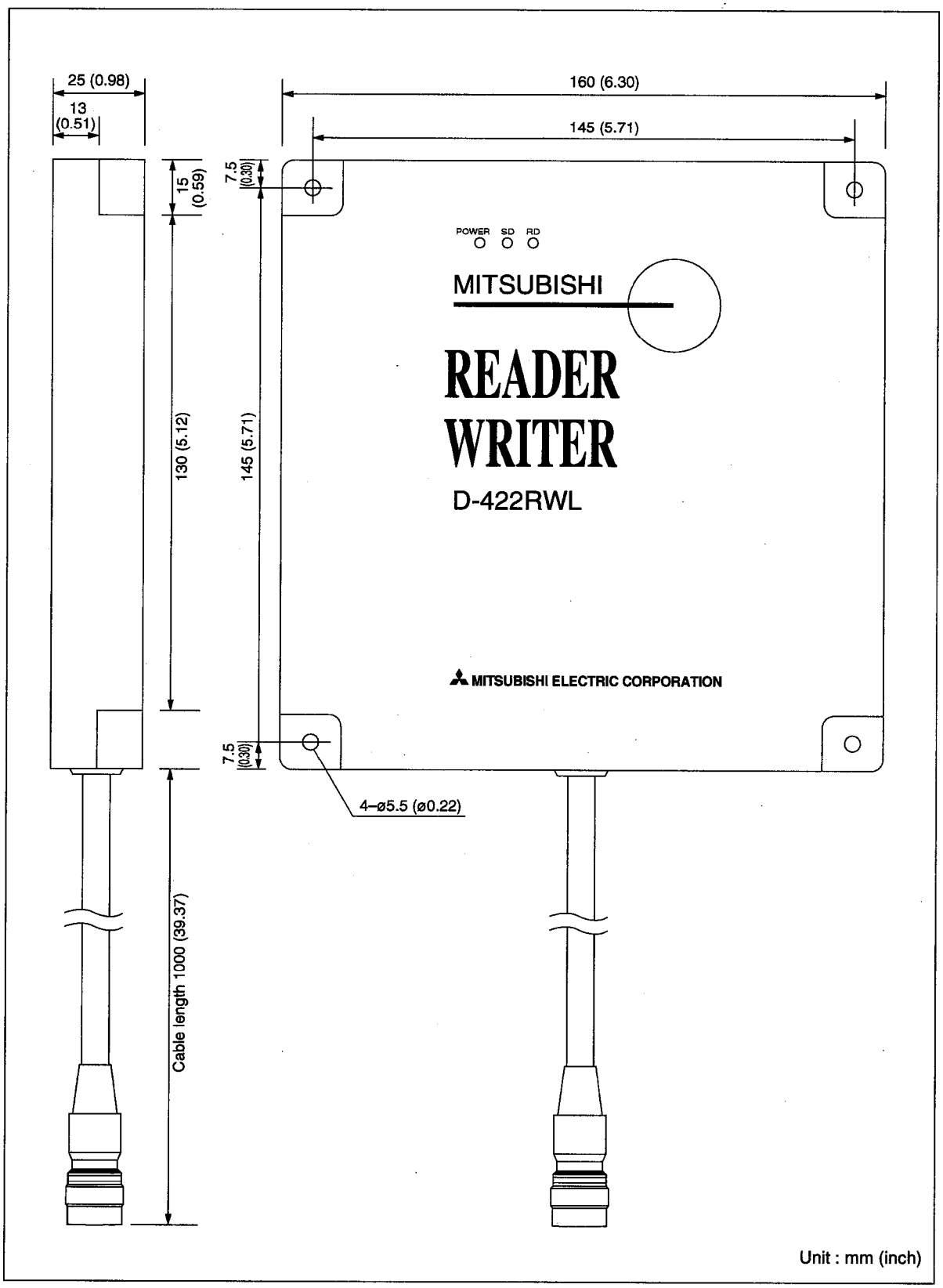


1.3 Reader/Writer

(1) D-422RW

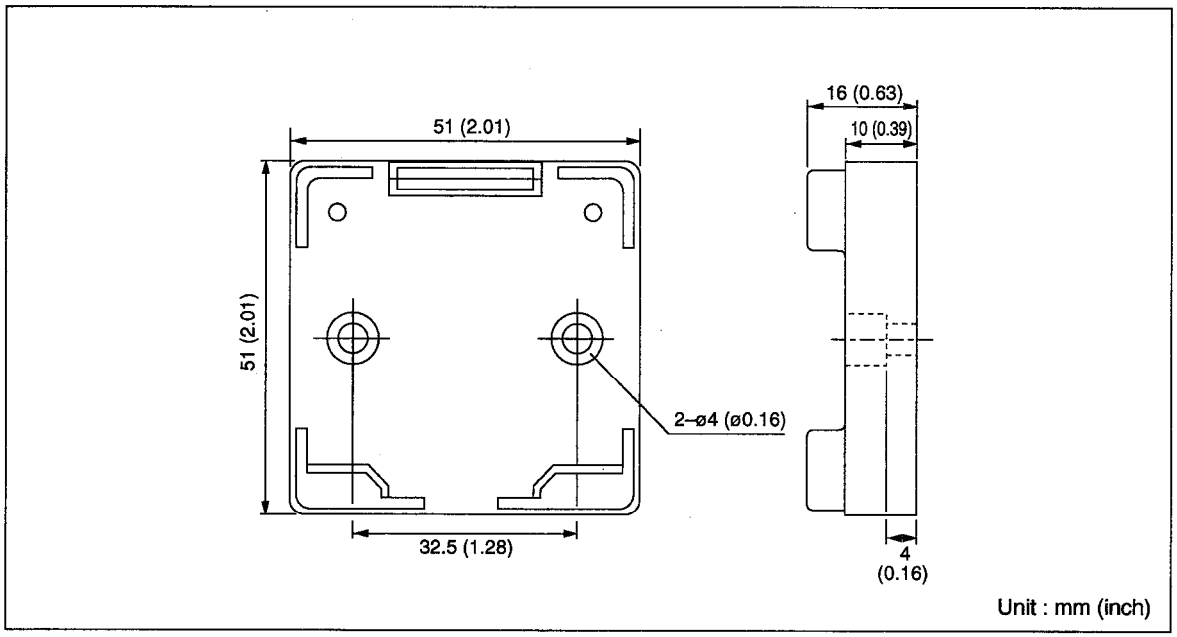


(2) D-422RWL


25 (0.98)
13
(0.51)
160 (6.30)
145 (5.71)
15
(0.59)
7.5
(0.30)
POWER SD RD
MITSUBISHI
READER
WRITER
D-422RWL
130 (5.12)
145 (5.71)
MITSUBISHI ELECTRIC CORPORATION
7.5
(0.30)
4–ø5.5 (ø0.22)
Cable length 1000 (39.37)
Unit : mm (inch)

1.4 Holder

(1) D-03CS-HLD



ID Interface Module
type AJ71ID1-R4/AJ71ID2-R4/A1SJ71ID1-R4/A1SJ71ID2-R4

User's Manual

MODEL	A1SJ71ID-U-E
MODEL CODE	13J818
IB(NA)66595-B(9608)MEE	

MITSUBISHI ELECTRIC CORPORATION

HEAD OFFICE : MITSUBISHI DENKI BLDG MARUNOUCHI TOKYO 100-0005 TELEX : J24532 CABLE MELCO TOKYO
NAGOYA WORKS : 1-14 , YADA-MINAMI 5 , HIGASHI-KU, NAGOYA , JAPAN