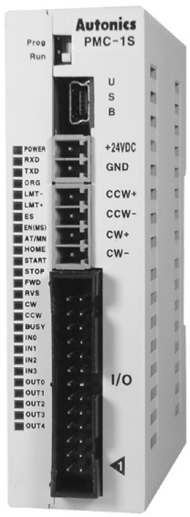
Technology for Human being and Environment

USER MANUAL

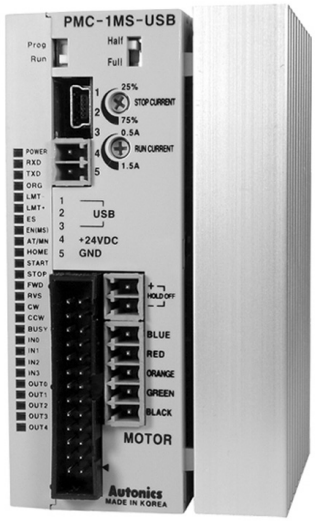
PROGRAMMABLE MOTION CONTROLLER
1-AXIS STAND-ALONE SERIES

1-Axis Motion Controller (PMC-1S/PMC-1MS Series)

PMC-1S



PMC-1MS



< Key features >

- ●Six types of mode function
- ●Parameter configuration by dedicated software
- ●Maximum 32kHz operations
- ●32 steps positioning function
- ●Motor driver built-in type (PMC-1MS series)

Autonics

SENSOR & CONTROLLER

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▣ Safety cautions

※Please keep "Caution for your safety" to avoid accidents or damages as using it correctly.

※The meaning of 'Warning' and 'Caution' is as follows;

⚠ Warning Serious injury may result if instructions are not followed.

⚠ Caution Product may be damaged, or injury may result if instructions are not followed.

※The meaning of the mark on the product and manual is as follows;

⚠ is a caution mark for danger in special condition.

※This manual offers important information, please read carefully, and after reading this guide, please keep it in the place that can be accessed easily.

◉Use of Product

⚠ Warning

1. **Do not operate this device until the proper safety devices have been installed(fuses, breakers, etc.) as required by local codes.**
   Non-compliance may cause fire, bodily injury or damage to property.
2. **For the safe operation of the entire system ensure that all safety devices are of the proper size and type.**
   Non-compliance may result in fire, bodily injury or damage to property.
3. **It is recommended that an isolation transformer, of the proper size, be used for the applied power.**
   Non-compliance may lead to electric shock or bodily injury.
4. **Do not modify the product.**
   Non-compliance may cause electric shock, fire, bodily injury or damage to property.

◉Installation of the product

⚠ Caution

1. **Installation of a limit switch is suggested.**
   Non-compliance may cause personal injury or damage to property.
2. **Install with the plan for power failure.**
   Non-compliance may lead to personal injury or damage to property.
3. **Avoid from using in a place emitting corrosive gas, flammable gas, high temperature, high humidity, vibration or electromagnetic wave.**
   Non-compliance may result in electric shock, wrong operation, damage to the product and performance deterioration.
4. **Prevent metals from entering the vent of the controller.**
   Non-compliance may bring out fire, failure, wrong operation damage to the product and performance deterioration.
5. **Attach the power and signal wiring to the controller body and mount on a DIN rail or a panel.**
   Non-compliance may invite electric shock, fire, failure, wrong operation damage to the product and performance deterioration.
6. **Confirm the power input specification and connect the power after checking the input terminal.**
   Non-compliance may lead to fire.

1. Introduction

1.1 Product Overview

This product is a 1-Axis programmable motion controller with various built in operational modes, it can easily control a variety of positions and has the functions to configure a parameter via communication and diagnose H/W via S/W. For PMC-1MS series it is easy to set a system without other motor driver because of built-in motor driver.

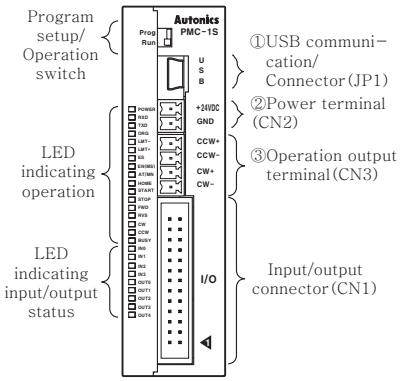
Product name	1-Axis programmable motion controller	Built-in type 1-Axis programmable motion controller
Model name	PMC-1S	PMC-1MS
Software supported	PmcMan(for Window 98, Windows 2000 and Windows XP)	

1.2 System configurations

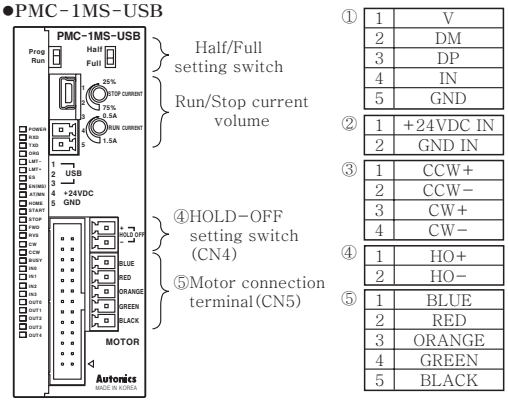
1.2.1 Name of parts

On the controller, the system configuration of each model and the names of terminals and connectors are shown below.

●PMC-1S-USB

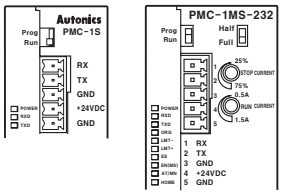


●PMC-1MS-USB



①	1	V
	2	DM
	3	DP
	4	IN
	5	GND
②	1	+24VDC IN
	2	GND IN
③	1	CCW+
	2	CCW-
	3	CW+
	4	CW-
④	1	HO+
	2	HO-
⑤	1	BLUE
	2	RED
	3	ORANGE
	4	GREEN
	5	BLACK

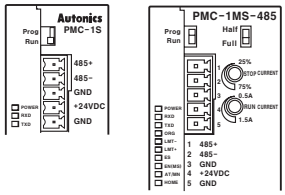
●PMC-1S-232 ●PMC-1MS-232



RS-232 communication/ Power connector

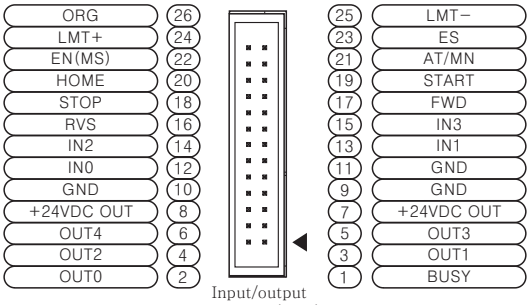
1	RX
2	TX
3	GND
4	+24VDC IN
5	GND IN

●PMC-1S-485 ●PMC-1MS-485



RS-232 communication/ Power connector

1	RS485+
2	RS485-
3	GND
4	+24VDC IN
5	GND IN

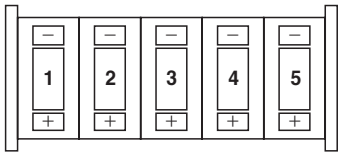


Input/output connector(CN1)

1.2.2 Connecting I/O devices for general use

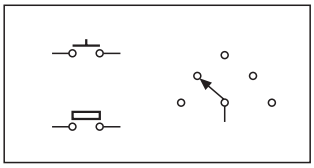
General-purpose input/output of the controller is carried out using the following external devices.

●Digital switch



The switch is used to configure position data in BCD-SW mode.

●Switch



The dedicated I/O can be used for a position determination control command or motor driver connection.

- Forward/Reverse pulse commands
- Emergency stop command
- Start/stop commands
- Auto/manual commands

※Refer to page 37 ~42 for connecting ways. (**6. Connection/wiring diagram**)

2. Product specification and wiring

⚠ Warning

●**To ensure the safety of the entire system when the external power is abnormal or the controller has failed, install safety devices external of the controller.**

Electric shock, fire and poor contact may cause abnormal operation.

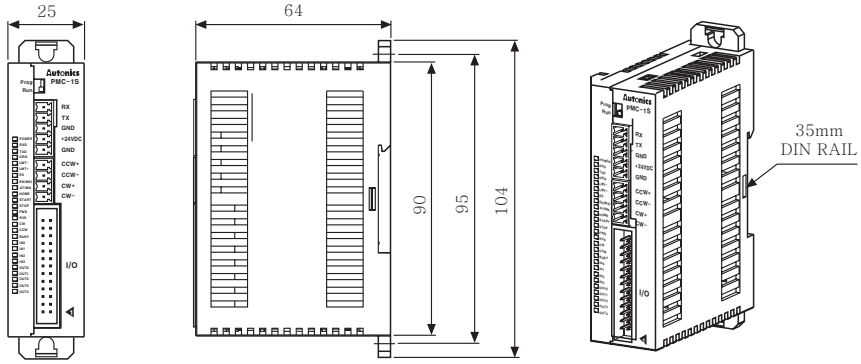
(1) The power output for a sensor varies depending on models.

For the safe operation of a machine, verify that the correct voltage is present.

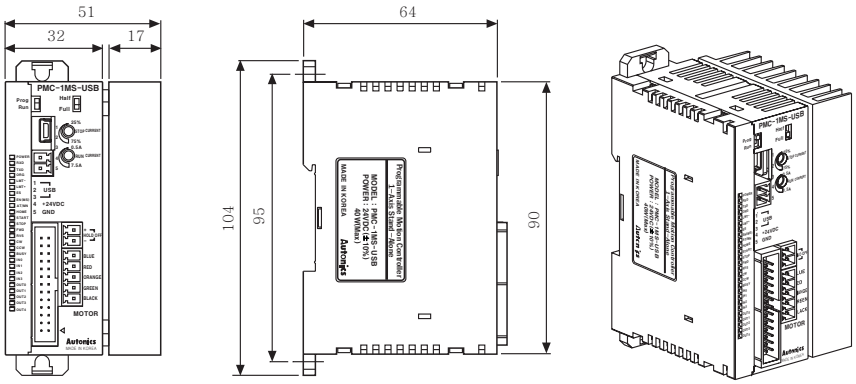
(2) The output signal may persist in an On/Off status with a fault of the output circuit, therefore, the external circuit and equipment parts must be carefully configured to assure proper system operation.

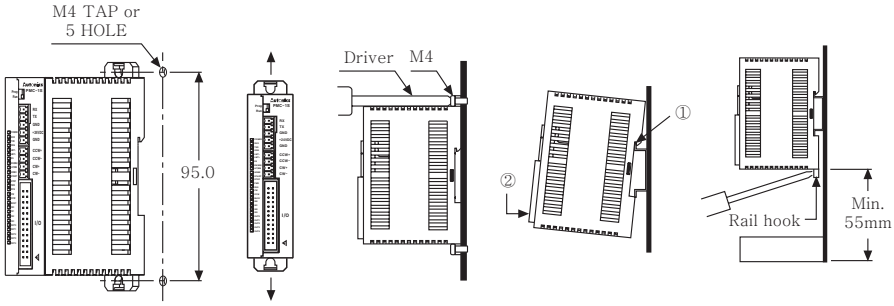
2.1 Dimensions

●PMC-1S Series



●PMC-1MS Series





▶Mountings 1. Panels should be mounted to sub plates
2. Rail
- −Attachment to DIN rails ① → ②
- −Width for installing DIN rails(35mm)
- −Withstand vibration in DIN rail installation(0.5G)
- −Keep more than 55mm gap from the floor (easy to detach the controller)

2.2 Specifications

Series name			PMC-1S Series	PMC-1MS Series
Model	RS-232C communication		PMC-1S-232	PMC-1MS-232
	RS-485 communication		PMC-1S-485	PMC-1MS-485
	USB communication		PMC-1S-USB	PMC-1MS-USB
Controlling axis			1-axis	
Control object			————	5-phase stepping motor
Max. run current			————	1.4A / Phase(max.)
Operation type			————	Bipolar pentagon drive 0.72° (Full Step), 0.36° (Half Step) / Step
Supply voltage			24VDC ±10%	
Power consumption			3.6W Max.(With the exception of external sensor power)	40W Max.(With the exception of external sensor power)
Number of position determination data			32 steps(In case of Normal Mode)	
Position configuration methods			Absolute coordinate method, Incremental coordinate method	
Position configuration units			Pulse, Distance(mm)	
Range to configure a position			0 ~ 99,999 PULSE	
Range to configure the operating speed			4 ~ 32,764 PPS	
Range to configure the start speed			1 ~ 1,000 PPS	
Range of acceleration/ Deceleration time			2 ~ 1023 ms	
Numbers of data configuration to configure speed			16(when a specified speed is used)	
Range to configure soft ORG			0 ~ 99,999 Pulse	
Range to configure soft limit			0 ~ 99,999 Pulse	
Output pulse type			Clockwise(CW), Counter-clockwise(CCW)	
Disconnecting external signal			Disconnecting photo coupler	
Output			NPN open collector	
Interface	Input	Operation input	ES(Emergency stop), AT/MN(Auto/manual), START(Sequential command input), STOP(Stop), HOME(return to the ORG), FWD(Manually forwarded), RVS(Manually reversed), EN(Enable), IN0, IN1, IN2, IN3(Input for general use)	
	Output	Sensor input	+ Limit(LMT+), - Limit(LMT-), ORG(ORG)	
		Pulse output	Clockwise(CW) pulse, Counter-clockwise(CCW) pulse	
		Control output	OUT0, OUT1, OUT2, OUT3, OUT4, BUSY	
Ambient temperature			0 ~ 55℃(at non-freezing status)	0 ~ 40℃(at non-freezing status)
Ambient humidity			-10 ~ 60℃(at non-freezing status)	-10 ~ 45℃(at non-freezing status)
Storage temperature			35 ~ 85% RH	
Noise strength			Square wave noise by noise simulator (pulse width 1us) on ±250V R/S, Repetition frequency 60Hz)	
Withstand voltage			500VAC(50/60Hz) for 1 min.	
Vibration	Mechanical		0.75mm amplitude at frequency of 10 to 55Hz in each of X, Y, Z directions for 2 hours	
	Malfunction		0.5mm amplitude at frequency of 10 to 55Hz in each of X, Y, Z directions for 10 minutes	
Shock	Mechanical		300m/s² (30G) in X, Y, Z directions for 3 times	
	Malfunction		100m/s² (10G) in X, Y, Z directions for 3 times	
Weight			Approx. 85g	Approx. 222g

2.3 Setting up and wiring

⚠ Warning

1. **Install a limit switch by all means.**
   Non-compliance may cause personal injury or damage to property.
2. **Emergency stop switch must be installed on proper place.**
   Non-compliance may lead to personal injury or damage to property.
3. **Install with the plan for power failure.**
   Non-compliance may lead to personal injury or damage to property.
4. **Avoid from using in a place emitting corrosive gas, flammable gas, high temperature, high humidity, vibration or electromagnetic wave.**
   Non-compliance may result in electric shock, wrong operation, damage to the product and performance deterioration.
5. **Prevent metals from entering the vent of the controller.**
   Non-compliance may bring out fire, failure, wrong operation damage to the product.
6. **Attach the power and signal wiring to the controller body and mount on a DIN rail or a panel.**
   Non-compliance may invite electric shock, fire, failure, wrong operation damage to the product and performance deterioration.
7. **Confirm the power input specification and connect the power after checking the input terminal.**
   Non-compliance may lead to fire.
8. **Only professional engineer can do jumper setting of limit and ORG sensor.**
   Non-compliance may invite electric shock, fire, personal injury, damage to property.

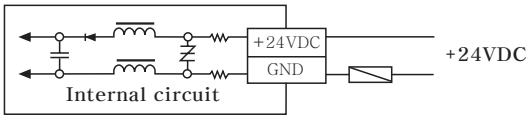
⚠ Caution

1. **Connection must be held based on connection diagram.**
   Non-compliance may cause electric shock, damage to the product.
2. **Emergency stop must be available during operation.**
   Non-compliance may cause personal injury, damage to the product.
3. **Off the power for installing and wiring.**
   Non-compliance may cause electric shock, damage to the product.
4. **After installing and wiring, make sure to install a cover on product terminals to operate.**
   Non-compliance may cause electric shock.
5. **Please install the product not floor and ceiling but wall to avoid temperature ascending.**
   Non-compliance may cause fire, damage to the product.
6. **Make a space, min. 50mm, between controller and connector or structure.**
   Avoid high voltage cable and system, power distributor, and etc.
   Non-compliance may cause fire, electric shock or malfunction.

2.4 Power specifications and wiring

This section describes the power specifications and the wiring of the controller.

Series name	PMC-1S Series / PMC-1MS Series	
Supply voltage	24VDC ±10%	
Power range	90 to 110% of rated voltage	
Power consumption	3.6W max.(With the exception of external sensor power)	40W max.(With the exception of external sensor power)



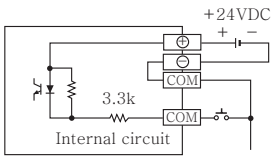
⚠Caution

To protect the controller in the event of a short circuit, do not connect the power cable until attaching a fuse(3-5A).

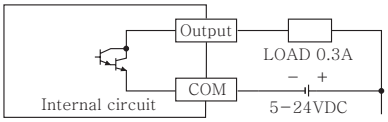
2.5 Input/output specifications and wiring

This section describes the connection with external devices or specifications.

2.5.1 Input specifications and wiring

Items	PMC-1S Sereis / PMC-1MS Sereis	
Input circuit configuration		
Input specifications	FWD	Input of manually forwarded operation(CW)
	RVS	Input of manually reversed operation(CCW)
	START	Run command(BCD-SW mode), Sequential command(NORMAL mode)
	STOP	Input of stop command
	HOME	Input of return to the ORG command
	AT/MN	Auto/manual selection(In manual selection, MANUAL mode)
	EN(MS)	Enable/Module selection
	ES	Input of emergency stop
	LMT+	Input of + limit sensor
	LMT−	Input of − limit sensor
	ORG	Input of the ORG sensor
	IN0	BCD DATA (2^0)
	IN1	BCD DATA (2^1)
	IN2	BCD DATA (2^2)
	IN3	BCD DATA (2^3)
Circuit isolation	Photo coupler isolation	
Signal voltage	24VDC(±10%)	
Input current	20mA/24VDC	
Signal input	Contact input or NPN open collector transistor input	

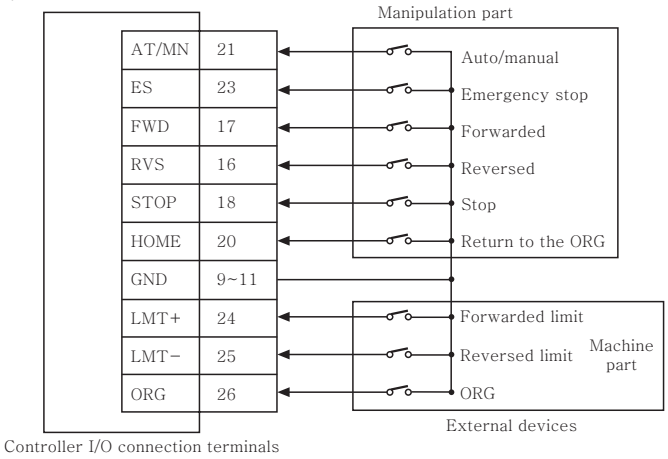
2.5.2 Output specifications and wiring

Items	PMC-1S Sereis / PMC-1MS Sereis	
Output circuit configuration		
Signal name	BUSY	Output on working
	OUT0	10^0 digit(Switch is common in BCD-SW mode)
	OUT1	10^1 digit(Switch is common in BCD-SW mode)
	OUT2	10^2 digit(Switch is common in BCD-SW mode)
	OUT3	10^3 digit(Switch is common in BCD-SW mode)
	OUT4	10^4 digit(Switch is common in BCD-SW mode)
Circuit isolation	Photo coupler isolation	
Load current	200mA/Point	

●Circuit isolation : A photo coupler isolates the internal circuit of the controller and the output transistor.
●Indication of operation : When the photo coupler is operating, the led is turned on and the output transistor is enabled.
●Output current : When the output current is max. (200mA per 1 point) and semi-conductor elements are driven;note the input voltage characteristics of the elements.

2.5.3 Wiring of manipulation inputs

This section describes the input of the manipulation system such as Start/Stop or AT/MN conversion.



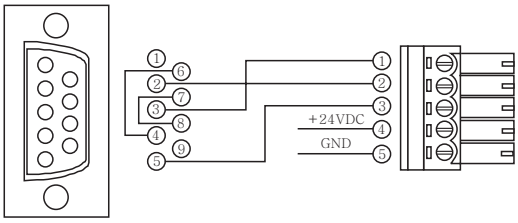
●AT/MN : Abbreviations of Auto/manual.
MN enables to operate in Manual mode and AT enables to operate in 5 modes.
●ES : Abbreviation of Emergency Stop.

※For other inputs, refer to **"3-4-3 Detect timing of various input signals"**.

2.5.4 Wiring of communication cables

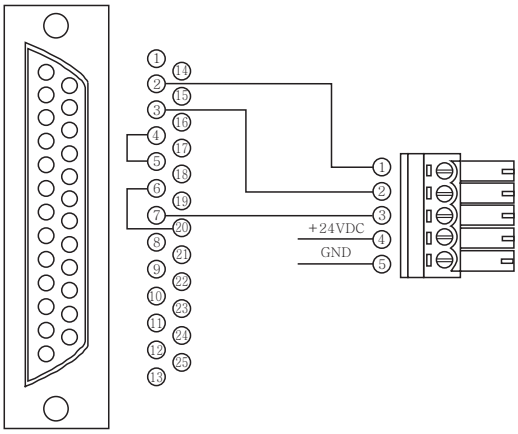
This section describes the wiring of communication cables.

(1) 9-pin D-SUB connector



※Connect pin 4 and pin 7 to pin 6 and pin 8 separately.

(2) 25-pin D-SUB connector



※Connect pin 4 and pin 6 to pin 5 and pin 20 separately.

2.6 Cables and connectors

This section describes the cables and connectors of the controller.

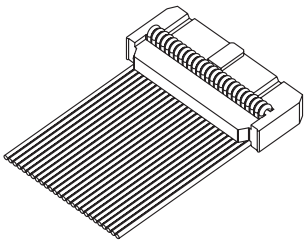
2.6.1 I/O cables and connectors

●I/O connector CN1

Types	Pin No.	Signal names	Contents	Functions
Output	1	BUSY	Output during operation	ON during pulse output
Output	2	OUT0	10^0	Switch Common in BCD−SW mode
Output	3	OUT1	10^1	Switch Common in BCD−SW mode
Output	4	OUT2	10^2	Switch Common in BCD−SW mode
Output	5	OUT3	10^3	Switch Common in BCD−SW mode
Output	6	OUT4	10^4	Switch Common in BCD−SW mode
Output	7	+24VDC	+24VDC OUT	Sensor power output (Less than 100mA)
Output	8	+24VDC	+24VDC OUT	
Output	9	GND	GROUND	
Output	10	GND	GROUND	
Output	11	GND	GROUND	
Input	12	IN0	A	BCD DATA 2^0
Input	13	IN1	B	BCD DATA 2^1
Input	14	IN2	C	BCD DATA 2^2
Input	15	IN3	D	BCD DATA 2^3
Input	16	RVS	Manual input of reversed operation	Generation of reversed pulse Continuous pulse output when pressed for 0.2 sec.
Input	17	FWD	Manual input of forwarded operation	Generation of forwarded pulse Continuous pulse output when pressed for 0.2 sec.
Input	18	STOP	Stop command	Stop mode function(See 4−2−1 Stop mode function description)
Input	19	START	Input of Sequential command	Run command(BCD−SW mode) Sequential command input (NORMAL mode)
Input	20	HOME	Return to the ORG	Return to mechanical/ Soft ORG function
Input	21	AT/MN	Auto/manual select	ON = Auto, OFF = ManualRun mode configuration function
Input	22	EN(MS)	ENABLE / MODULE SELECT	Data validity evaluation and module selection functions
Input	23	ES	EMERGENCY STOP Enable/Module select	Emergency stop function for the entire system
Input	24	LMT+	+ Limit sensor	+ Limit sensor function
Input	25	LMT−	− Limit sensor	− Limit sensor function
Input	26	ORG	ORG sensor	ORG sensor function

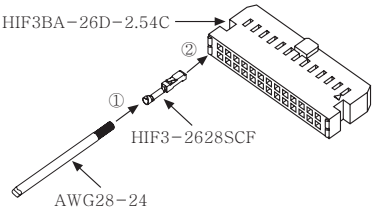
●Example of 26-pin connector and wiring method

(1)HIF3BA-26D-2.54R



(2)HIF3BA-26D-2.54C

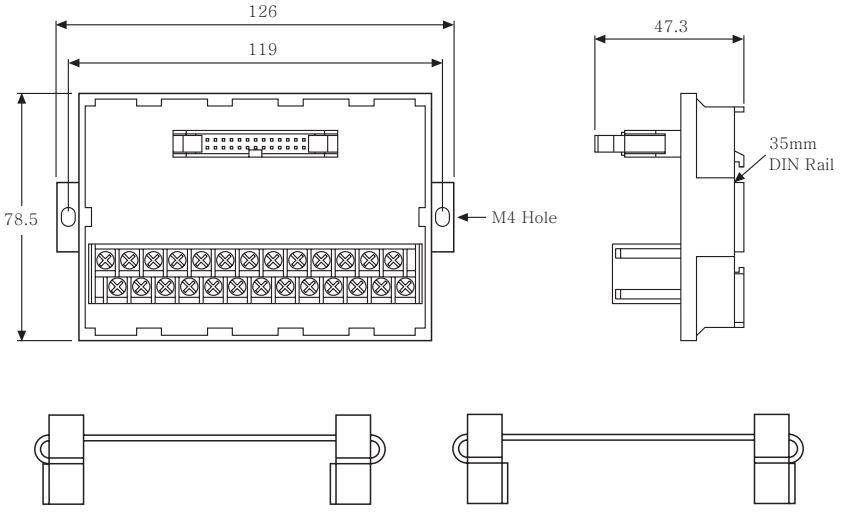
Strip off the end of the AWG28-24 standard wire and insert to HIF3-2428SCF(or other compatible products)(see ①).
After then, insert to the desired position of the HIF3BA-26D-2.54C(or other compatible products)(see ②).



2.6.2 Terminal block

An I/O connector of the controller is converted into a terminal base.

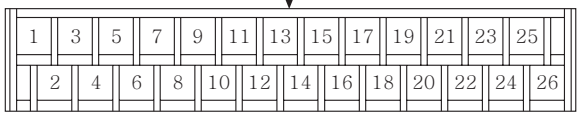
※Optional item



In the connection with a ribbon cable, match the projection direction as shown above.

PMC-1S/PMC-1MS CN1 ribbon cable

2	4	6	8	10	12	14	16	18	20	22	24	26
1	3	5	7	9	11	13	15	17	19	21	26	25



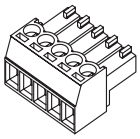
Terminal

The relationship between the connector CN1 of the controller and the terminal base of the terminal block are as shown the above figure.

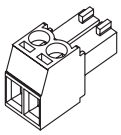
2.6.3 Power and communication connector

The power input and communication connector CN2 is as follows:

Types	Pin No.	Signal names	Contents	Functions
Communication	1	485+/RX	RS485+ / RS232C RXD	RS485 model -A(+) / RS232C model -RXD
Communication	2	485-/TX	RS485- / RS232C TXD	RS485 model -B(-) / RS232C model -TXD
Communication	3	GND	Ground for communication	
Input	4	+24VDC	+ 24VDC power	
Input	5	GND		



- Manufacturer:PTR Messtechnik
- Model name:AK1550-5P-3.5
- Tightening torque 0.4Nm



- anufacturer:PTR Messtechnik
- Model name:AK1550-2P-3.5
- Tightening torque 0.4Nm

●It is power input connector for PMC-1S-USB/ PMC-1MS-USB

2.6.4 HOLD-OFF signal input(PMC-1MS-USB Series)

●HOLD-OFF CN4

Type	Pin No.	Signal name	Contents
HOLD OFF	1	HO+	Motor HOLD OFF for applying signal
	2	HO-	

2.6.5 Motor connection(PMC-1MS Series)

●Motor connection CN5

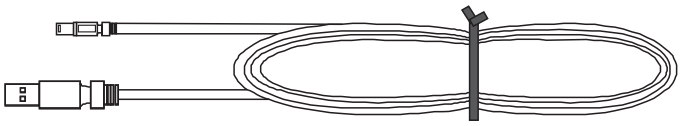
Type	Pin No.	Signal name
Motor connection terminals	1	BLUE
	2	RED
	3	ORANGE
	4	GREEN
	5	BLACK

2.6.6 USB connector and cable

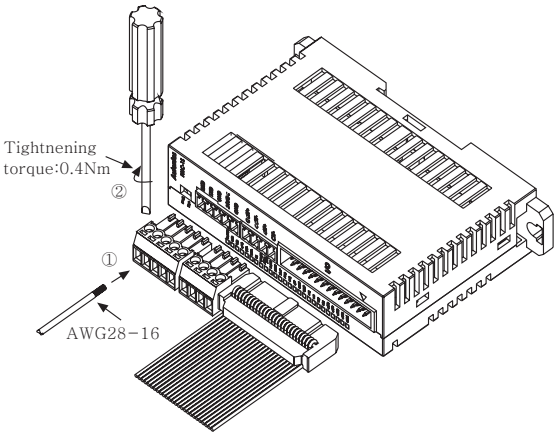
●USB connector JP1 **(Only for PMC-1S-USB and PMC-1MS-USB model)**

Types	Pin No.	Signal name	Contents
Power	1	V+	USB 2.0 Standard
Communication	2	DM	//
Communication	3	DP	//
Communication	4	ID	//
Power	5	GND	//

※The USB cable included in the PMC-1S-USB and PMC-1MS-USB model is as shown below. The length of the cable is approx. 1.5m.



●The wiring method for overall cable, power and pulse output connections is as shown below.



Like ①, insert the connection part for wiring.
After inserting the connection part entirely, fix the screws, rotating a screw driver clockwise.

⚠ Caution

1. **Since the tightening torque of the controller is 0.4Nm, do not impose excessive torque.**
   Non-compliance may cause poor contact and damage to the screws.
2. **Do the wiring for the power and the pulse output with using wires in compliance with local codes.**
   Non-compliance may result in fire.
3. **Connect a ribbon cable to I/O, wiring correctly, and protect from poor contact by the ribbon cable.**
   Non-compliance may cause malfunction.
4. **Use a screw driver for the attachment of the M2 screw.**
   Non-compliance may result in damage to the structure of the screw part in the connector.

3. Operation and pre- check

This chapter describes various operations and preparation/inspection before running.

⚠ Warning

1. Do not wire, inspect or repair after the power is applied.
It may cause electric shock or malfunction.

2. Do not attempt to repair the product if you are not authorized.
It may result in a risk of electric shock or fire.
※If necessary, contact you local distributor or sales office for assistance.

3. Do not put any metal objects in openings on the product.
It may lead to electric shock, fire, malfunction or damage to the product.

4. Fully understand the manual for operations such as return to mechanical ORG, JOG, auto/manual operation and install or drive the product considering safety in all cases.
Non-compliance may result in machinery loss, bodily injury or malfunction.

5. Do not detach the terminal base during operation.
It may result in bodily injury, damage to property, or malfunction.

6. Do not off the power during operation.
Non-compliance may cause personal injury, damage to property or malfunction.

7. Do not clean using water or organic solvents
It may result in electric shock, fire or damage to the product.

8. Please handle it as an industrial waste for exhausting.

3.1 Operation mode

The operation modes of the controller consist of six run modes and one program mode.

Mode		Contents	
Run mode			
AUTO	COM-A (RS-232)	PD + SD	PC-232 mode
	COM-B (RS-232)	PD + SA	
	COM-C (RS-232)	PA	
	COM-A (RS-485)	PD + SD	PC-485 mode
	COM-B (RS-482)	PD + SA	
	COM-C (RS-485)	PA	
	COM-A (USB)	PD + SD	PC-USB mode
	COM-B (USB)	PD + SA	
	COM-C (USB)	PA	
	PLC-A (RS-485)	PD + SD	PLC-485 mode
	PLC-B (RS-485)	PD + SA	
	PLC-C (RS-485)	PA	
	BCD-A	PD + SD (digit 5 + 5)	PLC-BCD mode
	BCD-B	PD + SA (digit 5 + 2)	
	BCD-C	PA (digit 2)	
	BCD-SW	PD (BCD4×5), Only absolute values are available	BCD-SW mode
	NORMAL	Internally memorized data can be sequentially repeated in single step by the "Start" signal.	NORMAL mode
MANUAL	MANUAL	Manual operation for JOG driving	MANAUL mode

PROGRAM MODE		Input of system parameters, speed and position data
Help	[PD]	POSITION DATA
	[PA]	POSITION ADDRESS
	[SD]	SPEED DATA
	[SA]	SPEED ADDRESS
	Position dataPosition addressSpeed DataSpeed Address	
	A position address [PA] includes position data and speed data. Only absolute coordinate method is available in BCD-SW mode, and a value in the absolute coordinate method is called an absolute value.	
	Make sure that the system is completely stopped to convert the RUN mode to the program mode or the program is completed to convert the PROGRAM mode to the driving mode.	

3.1.1 I/O function by RUN modes

Item	Pin No.	Signal name	BCD-SW	PLC-BCD	PC-232 PC-485 PC-USB PLC-485	NORMAL	MANUAL
Input	23	ES	ES	ES	ES	ES	ES
	21	AT/MN	AT/MN	AT/MN	AT/MN	AT/MN	AT/MN
	20	HOME	HOME	HOME	HOME	HOME	HOME
	18	START	START	CLOCK	X	START	X
	17	STOP	STOP	STOP	STOP	STOP	STOP
	16	FWD	FWD	FWD	FWD	FWD	FWD
	15	RVS	RVS	RVS	RVS	RVS	RVS
	22	EN(MS)	X	EN(MS)	X	X	X
	12	IN0	(A)	DATA IN (A)	X		
	13	IN1	(B)	DATA IN (B)	X		
	14	IN2	(C)	DATA IN (C)	X		
	15	IN3	(D)	DATA IN (D)	X		
Output	2	OUT0	(10^0)		X		
	3	OUT1	(10^1)		X		
	4	OUT2	(10^2)		X		
	5	OUT3	(10^3)		X		
	6	OUT4	(10^4)		X		
	1	BUSY	BUSY	BUSY	BUSY	BUSY	BUSY

Help	Signal name Description	[ES] Emergency stop input
		[AT/MN] Auto/Manual selection
		[HOME] Return to the ORG
		[START] Sequential command input
		[STOP] Stop command
		[FWD] Manually forwarded operation input
		[RVS] Manually reversed operation input
		[EN(MS)] Enable, Module selection signal
		[BUSY] ON during pulse output

3.1.2 Run mode

Run mode		Contents	비 고
Run mode (Operation mode)			
PC-232 PC-485 PC-USB	PC-232 PC-485 PC-USB	Position data [PD] + Speed data [SD] Position data [PD] + Speed address [SA] Position address [PA]	RS-232C RS-485 USB
PLC-485-A		Position data [PD] + Speed data [SD]	RS-485
PLC-485-B		Position data [PD] + Speed address [SA]	
PLC-485-C		Position address [PA]	
PLC-BCD-A		Position data [PD] + Speed data [SD]	
PLC-BCD-B		Position data [PD] + Speed address [SA]	
PLC-BCD-C		Position address [PA]	
BCD-SW		Execute the coordinate configured in a digital switch (BCD 4×5) as an absolute value. Execute after scanning BCD values by entering the start command. Operate the speed data [SD] configured at internal system parameter 'Operation speed'.	DIGITAL SWITCH (4×5)
NORMAL		Sequentially repeat the position address [PA] configured in the inside of the system. Execute the run command (START) in single step at every input.	
MANUAL		Operate by manual operation input (FWD, RVS, ORG).	
Program mode			
PROGRAM		Program mode Configure system parameters, positions and speeds in the inside of the system.	RS-232C RS-485 USB
Help		●PC-232, 485, USB, PLC-485 and PLC-BCD modes are executed according to the data via communication. (For detailed information, refer to communication protocols by modes) ●Only the absolute coordinate method is available in BCD-SW mode, so the data to be used should be absolute values.	

3.1.3 Setting the run mode data

Run mode	The operation mode can be configured by setting "Run mode" of the system parameter in the program mode.				
Data types/mode	PC-232, 485, USB	PLC-485	PLC-BCD	BCD-SW	NORMAL
Position address [PA]	○	○	○	X	Inside
Position data [PD]	○	○	○	○	X
Speed address [SA]	○	○	○	X	X
Speed data [SD]	○	○	○	Inside	X
Return to the ORG	○	○	○	○	○

※Data types by modes are as follows:
○:Available, X:Non-available. Inside:Specification by the system parameter of the controller

3.2 Setting up the program mode data

Program mode (PROGRAM)	The program modes can be configured by the conversion of the external switch on standby status. (When BUSY output is OFF)			
Specification	Data types	Minimum	Maximum	Unit
Position configuration	Position address [PA]	1	32	EA
	Moving distance	1	99,999	PULSE
Speed configuration	Speed address [SA]	1	16	EA
	Running speed	4	32,764	PPS

●Method to configure positions and speeds

Position configuration method	Direct configuration	Specifies by configuring position data directly.
	Indirect configuration	Specifies position addresses
Speed configuration method	Direct configuration	Specifies by configuring speed data directly
	Indirect configuration	Specifies speed addresses.

3.3 Preparation before running

Check the following before operating the system.

●Devices design inspection

Make sure that a motor and motor driver are properly matched.

- Load torque
- Load inertia
- Acceleration/deceleration time
- Running speed
- Stop-precision
- Extent of operational repetition

●Preliminary inspection

Make sure that the power and I/O lines are properly connected.

- Correct contact of the power terminal
- Input lines
- Proper connection of the power and output lines
- Contact of communication terminals
- Communication cables
- Input of an ORG sensor and a limit sensor
- Emergency stop switch
- Other lines (motor driver and other peripheral devices)

3.4 Run operations

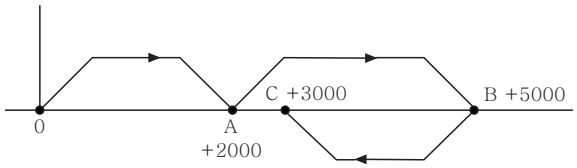
This section describes the run operation of the controller.

3.4.1 Absolute/incremental coordinates

The absolute coordinate method is a method that indicates the position from the base point as specifying the moving distant (rotation angle) of a machine, and the incremental coordinate method is a method that indicates the moving distant from the current position.

●Absolute coordinate :

The absolute coordinate method is used to specify the distant from the base point(Zero point).

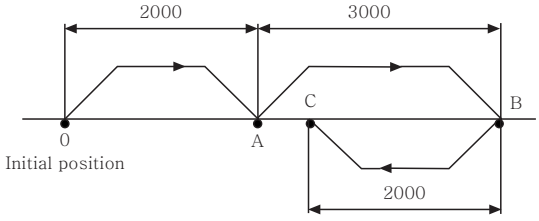


Ex)Let's suppose position data are ; A point (2000), B point (5000) and C point (3000).

A point has the absolute position of 2000 for the base point(Zero point).
B point has the absolute position of 5000 for the base point(Zero point).
C point has the absolute position of 3000 for the base point(Zero point).
In addition, if you see the path to the C point from the B point, it moves 2000 in a negative direction. However, its real position is the absolute position of 3000.
The standard position in the absolute coordinate method is always zero point.

●Incremental coordinat

The relative (incremental) coordinate is a method that specifies the moving distance to the current position.



Ex)Let's suppose the position data are ; A point(2000), B point(5000) and C point(3000).
A point has the relative position of +2000 for the initial position(Zero point) as the standard position.
B point has the relative position of +3000 for the A point as the standard position.
C point has the absolute position of −2000 for the B point as the base point.
If here, the C point is converted in the absolute coordinate method, its absolute position is 3000.
The base point in the incremental coordinate method is the last point moved.

3.4.2 Connecting a limit switch

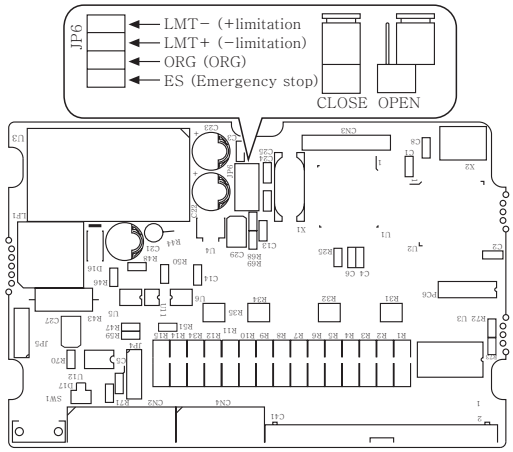
The usage for the limit switch is as follows:

Classification	Connecting to a stepping motor	Connecting to a servo motor
Limit signal connection	Connecting to the motor controller side Off to the motor driver side	Connecting to the motion controller and the motor driver sides (Note 2)
LMT+	If the LMT+ signal is turned on, the CW pulse stops and the signal can deviate the + limit by entering the RVS operation. (Note 1)	If the LMT+ signal is turned on, the CW pulse stops in the inside of the servo motor driver and only the CCW pulse operates.
LMT−	If the LMT− signal is turned on, the CCW pulse stops and the signal can deviate − limitation by entering the FWD operation.	If the LMT− signal is turned on, the CCW pulse stop in the inside of the servo motor driver and only the CW pulse operates.

(Note 1) The different limit operation levels can be configured depending on the operation levels of a sensor or a switch connected to the LMT+ or the LMT− signals.

※Default specification: The jumper is closed, so it operates in low status.

< Jumper position and configuration method >



(Note 2) It is ideal that you configure the limit switches LMT+ & LMT− and connect them in the motion controller and the servo motor driver. If you want to avoid duplication, you connect them to the motion controller like the stepping motor and turn the motor driver off in common.

⚠ Warning

1. **Only professional engineer can set a limit sensor jumper.**
   Contact to Autonics corportation to set limit sensor.
   Non−compliance may cause personal injury, damage to property or malfunction.
2. **Correctly configure jumpers according to sensor output.**
   It may result in bodily injury, damage to the product or malfunction.
3. **Do not configure jumpers after the power is applied.**
   It may result in the risk of damage to the product.
4. **Do not dissemble the product except for jumper setting.**
   Non−compliance may cause damage to the product
5. **Do not modify the product.**
   It may result in bodily injury, damage to property or malfunction.

3.4.3 Detect timing of various input signals

When you detect the operation about various signals of the motion controller it is important to understand the operation and to program correctly.

●Detect timing

The basic operation mode of the controller is divided into manual and auto modes.

Input signals	MANUAL		AUTO	
	Motor stop	Motor operation	Motor stop	Motor operation
HOME	Before operation	Return to the ORG	Before operation	Return to the ORG
START	———	———	When non-busy, monitoring PLC-BCD mode	———
STOP	Always monitoring			
ES	Always monitoring			
AT/MN	Always monitoring			
FWD	Always monitoring		———	———
RVS	Always monitoring		———	———
LMT+	Before operation	Before operation	Before operation	Before operation
LMT-	Before operation	Before operation	Before operation	Before operation
ORG	Before operation	Before operation	Before operation	Before operation
IN0~IN3	———	———	Monitoring BCD-SW mode	———
EN(MS)			Monitoring PLC-BCD mode	
Serial communication	Always monitoring			

●Operational input function

Classification	Operation overview
AT/MN	When input is enabled/disabled, the system is configured as AT(Auto) or MN(Manual) respectively. If the MN is configured, the controller is converted into Manual mode in other mode and JOG operation (FWD, RVS) is available. If the AT is configured, the operation by all modes other than Manual mode is available. (Note 3)
FWD	If the signal is entered in Manual mode, the CW pulse comes out. If the signal is entered for less than 0.2 seconds, the CW pulses come out as many as specified JOG pulse numbers. If the signal is entered for more than 0.2 seconds, the CW pulses continuously come out as the specified JOG speed. (See 3.4.4 JOG operation description)
RVS	If the signal is entered in Manual mode, the CCW pulse comes out. If the signal is entered for less than 0.2 seconds, the CCW pulses come out as many as specified JOG pulse numbers. If the signal is entered for more than 0.2 seconds, the CCW pulses continuously come out as the specified JOG speed. (See 3.4.4 JOG operation description)
START	The controller operates, following the contents of the configured program. (Note4)
STOP	If the signal is entered in running, stop mode is configured and the system is decelerated or stopped at once. (Note 5)
ES	If the signal is entered as an emergency stop signal input, the system is immediately stopped.
EN(ES)	If various controllers are connected in PLC-BCD operation mode, the signal is used to select the controller to be operated. ※See PLC-BCD mode operation.
HOME	The controller returns to mechanical ORG and the soft ORG. (Note 6)

(Note 3) AT means Auto. MN means Manual. All modes other than Manual mode are only operable in the Auto mode. Home is operated in both the Auto mode and Manual mode.

(Note 4) The Start signal is the position determination program execution command in BCD-SW mode and the clock signal in PCL-BCD mode.

(Note 5) Refer to 4.2.1 Stop modes.

(Note 6) Refer to 3.4.4 Returns to the ORG.

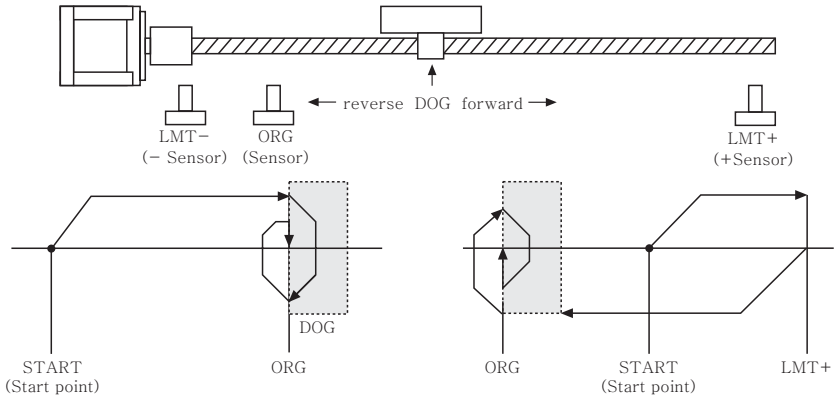
3.4.4 Returns to the ORG

The controller controls the position increasing/decreasing the CW pulse or the CCW pulse internally. The method to return to the ORG varies depending on the position of DOG after returning to the ORG, the direction to return and the use of the ORG sensor.

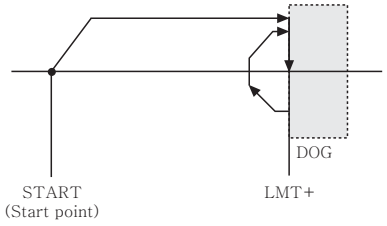
※Since the controller cannot memorize the current position when the power turns off, it should return to mechanical ORG when the power is initially turned on.

The return to mechanical ORG:

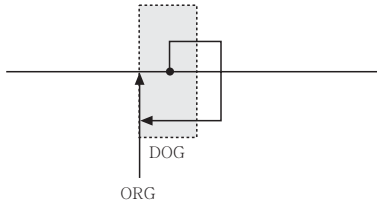
1. Give the return to mechanical ORG command.
2. The direction to return to the ORG is the direction of system parameters(basically reversed direction), and the speed is determined by the speed parameter to return to the ORG(5000).
3. The controller operates in eight ways according to the current position, the use of the ORG sensor and the direction to return to the ORG. (see the following figure)
4. The following figure shows a sketch of a general one-axis system.



1. Position of the start point :
   In the position of the CCW.
   Use of the ORG sensor :
   Used Direction to return to the ORG(CW)

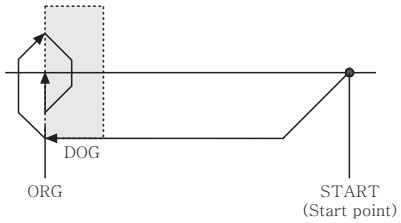


2. Position of the start point :
   In the position of the CW.
   Use of the ORG sensor :
   Used direction to return to the ORG(CW)

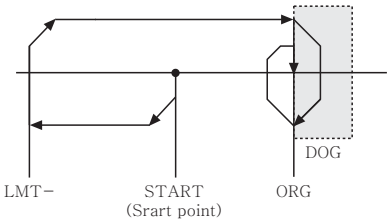


3. Position of the start point :
   In the position of the CW.
   Use of the ORG sensor :
   Disabled(Use of LMT+ sensor) Direction to return to the ORG(CW)

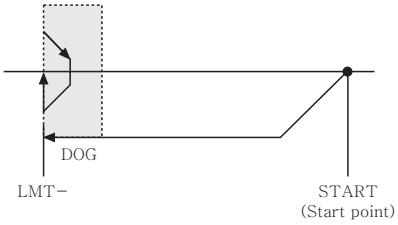
4. Position of the start point :
   Inside of the ORG sensor.
   Use of the ORG sensor :
   Used Direction to return to the ORG(CW)



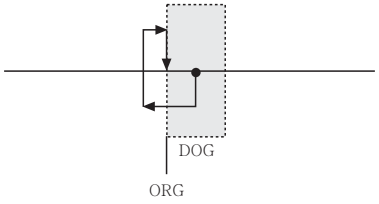
5. Position of the start point :
In the position of the CW.
Use of the ORG sensor : Used Direction to return to the ORG(CCW)



6. Position of the start point :
In the position of the CCW.
Use of the ORG sensor: used Direction to return to the ORG: CCW



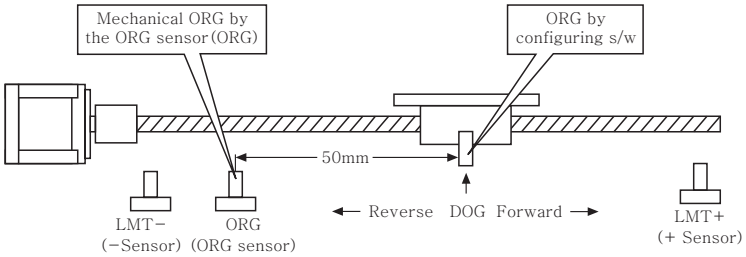
7. Position of the start point :
In the position of the CCW.
Use of the ORG sensor :
Disabled(use of LMT− sensor) Direction to return to the ORG(CCW)



8. Position of the start point :
In the position of ORG sensor
Use of the ORG sensor :
used Direction to return to the ORG(CCW)

3.4.5 Soft ORG setup and return operation

The soft ORG can be configured in the system parameter of the controller.



As shown in the above figure, the soft ORG is configured in the position located 50mm away from the mechanical ORG. After that, the controller moves to the mechanical ORG from a certain position and confirms the ORG. Now, the return to the ORG is completed by moving to the soft ORG. (See description of system parameters)

●S/W limit

The S/W limit can be configured in S/W method via the configuration of the system parameter as well as the mechanical limit. (See System parameters)

※Caution

To configure the soft ORG and limit, you should grasp the current positions of all sensors and it should be configured within the range.

3.4.6 JOG operations

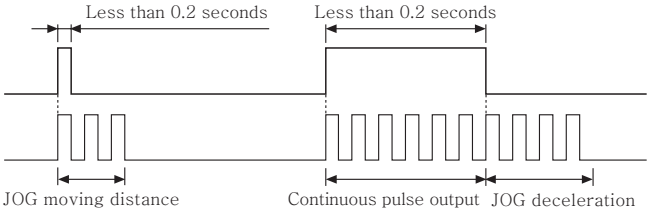
Soft ORG is available to set on system parameter of controller.

●**Operation outline**

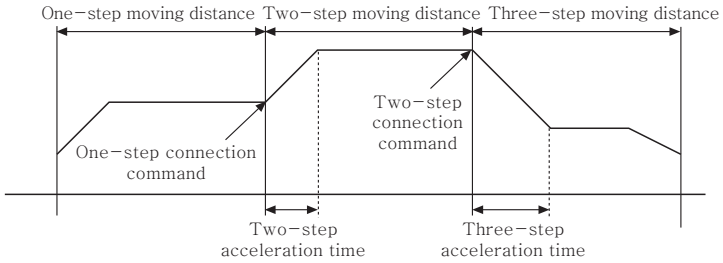
If FWD(manually forwarded operation) or RVS(manually reversed operation) inputs are enabled, the JOG is forwarded or reversed to the value configured in a system parameter.

●**Operation condition**

The JOG only operates in manual mode and gives priority to the previous input when FWD and RVS are entered together.



3.4.7 Connection operations



●If the connection command of the relevant step is continuous, the JOG operates connecting the next step without waiting the start signal.

●The connection operation can be executed up to maximum three steps.

●The steps are simultaneously transmitted in PC−232, 485, USB mode.
(The way to input the acceleration time for the connection operation is the same as above.)

3.4.8 Function S/W

−Program/Run switch(SW1)

No	Display	Description
1	Prog	When setting a system parameter via PmcMan editor
2	Run	Operation for each mode(Including jog operation)

−Full/Half switch (SW2) **(PMC-1MS Series)**

No	Display	Description
1	Half	Selecting rotation degree, 0.36° / Step(Half step)
2	Full	Selecting rotation degree, 0.72° / Step(Half step)

3.4.9 HOLD-OFF signal input type(PMC-1MS Series)

1)Motor excitation OFF control input−> OFF for [H]

2)When the power for pulse operation is over than +5V, attatch an additional resistance.

3)Motor shaft can be controlled for [H] because every inflew current is locked.

3.4.10 Control RUN CURRENT(PMC-1MS Series)

1) Run current of factory default is rated current.

2) RUN CURRENT is variable from 0.5A to 1.4A by volume controlling.

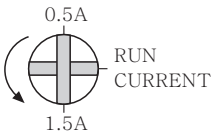
3) Set a run current within rated range max. 1.4A.

4) How to set a run current

Connect **blue wire** of motor connector to ampere meter in series.

-Motor run current[*A*] = Measured current value[*A*] ×2

-Factory default is 1.4A



※Current setting can be differs according to model.

<Cautions>For measuring a run current, operation must be stop status.

<Cautions>Supplying over current causes motor heating.

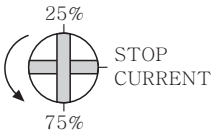
3.4.11 Control STOP CURRENT(PMC-1MS Series)

1) Stop current is variable from 25% to 75% of set value by volume controlling.

2) Stop current of factory default is 50% of rated current.

Ex) Set a run current as 1.0A and stop volume as 50%.

Stop current will be 0.5A.



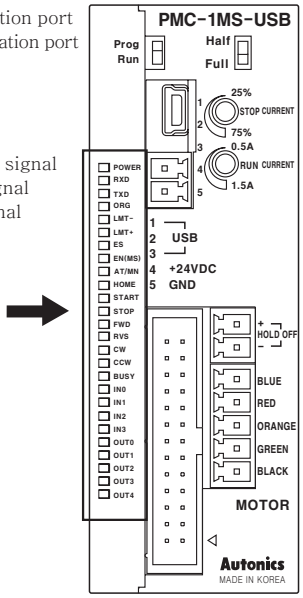
<Cautions>For changing a stop current, operation must be stop status.

3.5 Operation inspections

3.5.1 I/O display

<LED for various I/O>

☐ POWER : Indicates the power
☐ RXD : Indicates the data reception to a serial communication port
☐ TXD : Indicates the data transmission to a serial communication port
☐ ORG : Indicates the input of the ORG sensor signal
☐ LMT+ : Indicates the input of the LMT+ sensor signal
☐ LMT− : Indicates the input of the LMT− sensor signal
☐ ES : Indicates the input of the emergency stop signal
☐ EN(MS) : Indicates the input of the Enable Module select) signal
☐ AT/MN : Indicates the input of the Auto/Manual select signal
☐ HOME : Indicates the input of the Return to the ORG signal
☐ START : Indicates the input of the Start signal
☐ STOP : Indicates the input of the Stop signal
☐ FWD : Indicates the input of the FWD signal
☐ RVS : Indicates the input of RVS signal
☐ CW : Indicates the output of the CW pulse
☐ CCW : Indicates the output of the CCW pulse
☐ BUSY : Indicates the signal output in running
☐ IN0 : Indicates 0−operation of input signal
☐ IN1 : Indicates 1−operation of input signal
☐ IN2 : Indicates 2−operation of input signal
☐ IN3 : Indicates 3−operation of input signal
☐ OUT0 : OUT0−Indicates 0−operation of output signal
☐ OUT1 : OUT1−Indicates 1−operation of output signal
☐ OUT2 : OUT2−Indicates 2−operation of output signal
☐ OUT3 : OUT3−Indicates 3−operation of output signal
☐ OUT4 : OUT4−Indicates 4−operation of output signal



※The LED for input signal is turned on when input signal is enabled.

※The LED for output signal is turned on when output signal is enabled.

※Refer when you inspect the wiring and operation of various signal inputs.

4. Parameters

4.1 System parameters

The system parameters can be configured in the standby status after the pulse output is completed.
Description of system parameters

System parameters						
	Types		Maximum	Minimum	Unit	Note
System parameters	Run mode		PC-232, 485, USB		RS-232C, RS-485, USB communication	
			PLC-485		Serial communication with PLC	
			PLC-BCD		Parallel communication with PLC(4Bit)	
			BCD-SW		Digital switch(4×5)	
			NORMAL		Independent run mode	
	Coordinate unit		Pulse			
			Distance(mm)			
	Speed to return to the ORG		4	32,764	PPS	
	Start speed to return to the ORG		1	1,000	PPS	
	Acceleration/deceleration time		2	1,023	ms	
	Direction to return to the ORG		CW			
			CCW			
	※Soft ORG		0	99,999	PULSE	Soft ORG function is invalid where the value is zero
	※Soft + limit		0	99,999	PULSE	Absolute value in the ORG
	※Soft - limit		0	99,999	PULSE	Absolute value in the ORG
	Stop mode		0 - 5			
	Coordinate standard		Absolute coordinate			
			Incremental		Specification of the stop mode operation method	
	JOG moving distance		1	100	PULSE	
	JOG operation speed		4	32,764	PPS	
	Start speed		1	1,000	PPS	
	Operation speed		4	32,764	PPS	
	ORG sensor		Enable			
			Disable			
	Data format		HEX DATA		Hexadecimal data format (PLC-BCD mode)	
			DECIMAL DATA		Decimal data format(PLC-BCD mode)	
	Connection operation		Connection operation ON		Continuous operation	
			Connection operation OFF			
	Moving distance per pulse		0.0001	1.0000	mm	Valid where the coordinate unit is distance
	Position address configuration numbers		0		The position address configuration is invalid where the number is zero.	
			32		1 ~ 32(Normal mode)	
	Communication speed	Speed	9600 bps			
			19200 bps			
			38400 bps			
			57600 bps			
		DATA BIT	8			
		PARITY BIT	NON			
		STOP BIT	1			
	PLC ID		0 - 7			
	PMC ID		0 - 7		Within the range of the PLC output driver	
	INS		0 - 99,999		PULSE	Moved distance after stop

※The configuration is invalid where the number is zero.

4.2 Description of system parameters

4-2-1 Description of the Stop mode function

Stop mode	Function for the stop input according to the system parameter configuration Only available in Auto mode
Stop mode 0	Stop mode function as invalid
Stop mode 1	After decelerating/stopping by the stop signal, proceed from 'remained distance' by the start signal.
Stop mode 2	After decelerating/stopping by the stop signal, run the next step ignoring 'remained distance' by the start signal.
Stop mode 3	After decelerating/stopping by the stop signal, jump to end ignoring 'remained distance' and 'remained steps'.
Stop mode 4	By the stop signal, decelerate or stop after moving as many as the distance configured in the system parameter 'INS'. After then, run the next step by the start signal.
Stop mode 5	By the stop signal, decelerate or stop after moving as many as the distance configured in the system parameter 'INS'. After than, jump to end.
Help	The 'remained distance' means the remnant of the moving distance initially configured from the position stopped by the stop signal. When the system is decelerated and stopped in Stop mode, the deceleration time is determined by the deceleration data of the relevant step.

4.2.2 Return to the ORG, JOG operations

System parameter		Minimum	Maximum	Unit	Note
Common part		1	1,000	PPS	
		4	32,764	PPS	
JOG		1	100	PULSE	
ORG	ORG sensor[ORG]	Enable			Default value : Use
		Disable			
	Direction to return to the ORG	CW			Default value : CCW
		CCW			
	Soft ORG coordinate	0	99,999	PULSE	Soft ORG function is invalid where the value is zero
Soft limit	S-LMT+	0	99,999	PULSE	Absolute value in the ORG in the direction CW
	S-LMT+	0	99,999	PULSE	Absolute value in the ORG in the direction CCW
Help	●When the ORG sensor is not used, the limit sensor in the direction to return to the ORG is used as the ORG sensor. -If the direction is CCW, LMT-sensor is used as the ORG sensor -If the direction is CW, LMT+ sensor is used as the ORG sensor. ●If the soft ORG or the soft limit configuration value is zero, the configuration function is invalid.				

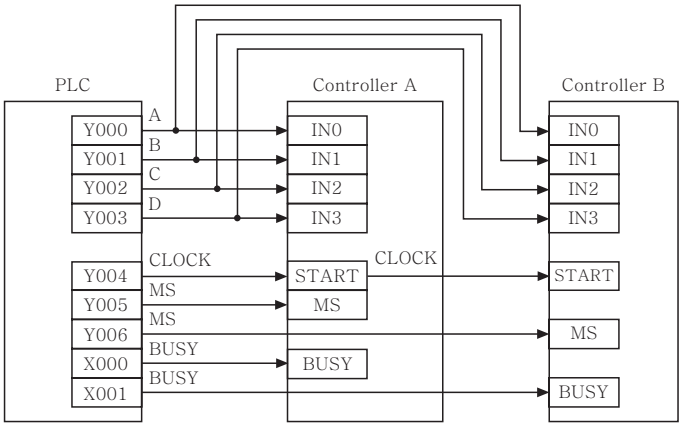
4-3 Initial values of system parameters(Default values when shipping)

System parameter	Default value	Note
Run mode	PC-232, 485, USB mode	
Coordinate unit	Pulse	
Speed to return to the ORG	5,000	PPS
Start speed to return to the ORG	1,000	PPS
Acceleration/deceleration time	100	ms
Direction to return to the ORG	CCW	CCW
Soft ORG	0	Disable
Soft limit+ (S-LMT+)	0	Disable
Soft limit- (S-LMT-)	0	Disable
Stop mode	Stop mode 0	Disable
Coordinate standard	Absolute coordinate(ABS)	
JOG moving distance	100	Pulse
JOG operation speed	5,000	PPS
Start speed	1,000	PPS
Operation speed	5,000	PPS
Use of the ORG sensor	Enable	Use of an ORG sensor
Data format	HEX DATA	Use in PLC-BCD mode
Connection operation	Connection operation OFF	
Moving distance per pulse	1	Valid where the coordinate unit is distance(mm)
Number of Position address configurations	0	Enabled in Normal mode
Communication speed	9,600	bps
PLC ID	0	0 - 7
PMC ID	0	0 - 7
INS(INCREMENTAL STOP)	0	Disable

5. Communication protocol

5-1 PLC-BCD parallel protocol(Parallel 4-bit)
5-1-1 Specifying data from PLC

1) Connecting



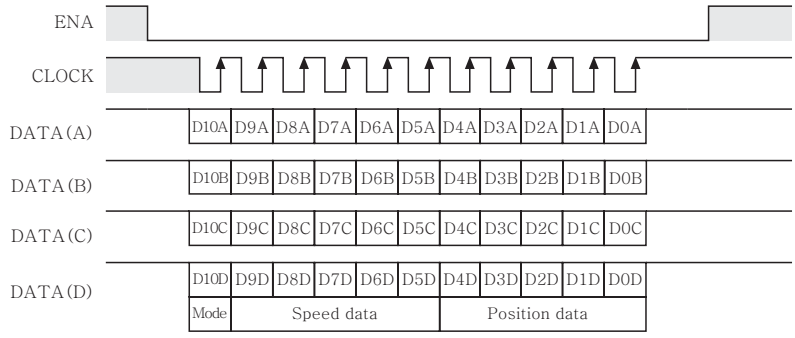
D0A~D0D function				
	Operation mode		Moving direction	Connection operation
BCD-A	D10A	D10B	D10C	D10D
BCD-B	D7A	D7B	D7C	D7D
BCD-C	D2A	D2B	D2C	D2D
	01:BDC-A 10:BCD-B 11:BCD-C		0 : CW 1 : CCW	0 : ON 1 : OFF

HOME operation BCD-A, B, C operation mode=0H				
Parallel data	A	B	C	D
Operation mode	0	0	0	0

-MS(Module Select) : is used to select the controller to be operated when various controllers are connected.
-Data: 4-Bit Hexadecimal Code. < D0-D10 : F (Hex) > 1 1 1 1
-Description of connection operation: Refer to 3.4.7 Connection operations.

5.1.2 BCD-A mode: Position data [PD] + Speed data [SD]

D10 : Operation mode
D10A, B : Operation mode(D10A : 0, D0B : 1)
D10C : Connection operation
D10D : Moving direction
D0 – D9 : Data
D0 – D4 : Position data[PD] configuration range : 1–262,143(1H–3FFFFH)
D5 – D9 : Speed data[SD] configuration range : 4–32764(4H–7FFCH)

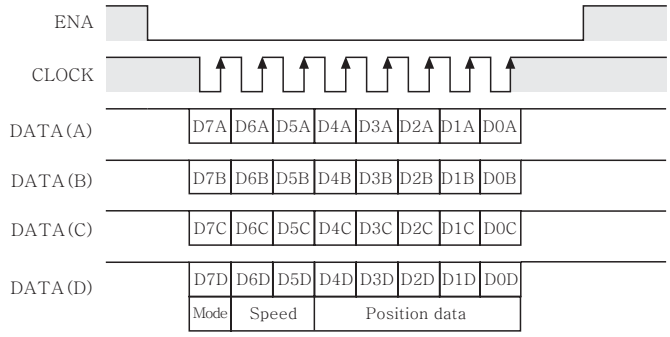


Example)
–Mode : BCD–A mode. Moving direction: CW, Connection operation $1010_{(2)}$ if ON.
–Speed data : $0000_{(2)}$, $0000_{(2)}$, $1001_{(2)}$, $1100_{(2)}$, $0100_{(2)}$ if 2500.
–Position data : $0000_{(2)}$, $0001_{(2)}$, $0011_{(2)}$, $1000_{(2)}$, $1000_{(2)}$ of 5,000.

	Description	Mode	Speed data					Position data				
LSB	DATA (A)	D10A	D9A	D8A	D7A	D6A	D5A	D4A	D3A	D2A	D1A	D0A
	Actual input value	0	0	0	1	0	0	0	1	1	0	0
	DATA (B)	D10B	D9B	D8B	D7B	D6B	D5B	D4B	D3B	D2B	D1B	D0B
	Actual input value	1	0	0	0	0	0	0	0	1	0	0
	DATA (C)	D10C	D9C	D8C	D7C	D6C	D5C	D4C	D3C	D2C	D1C	D0C
	Actual input value	0	0	0	0	1	1	0	0	0	0	0
MSB	DATA (D)	D10D	D9D	D8D	D7D	D6D	D5D	D4D	D3D	D2D	D1D	D0D
	Actual input value	1	0	0	1	1	0	0	0	0	1	1
	Hexadecimal value	A	0	0	9	C	4	0	1	3	8	8

5.1.3 BCD-B mode : Position data[PD] + Speed data [SD]

D7 : Operation mode
D7A, B : Operation mode (D7A : 1 D7B : 0)
D0-D6 : Data
Position data[PD] : D0-D4 Configuration range : <1-262,143 (1H-3FFFFH)>
Speed address[SD] : D5-D6 Configuration range : <(0-15 (0H-FH)>

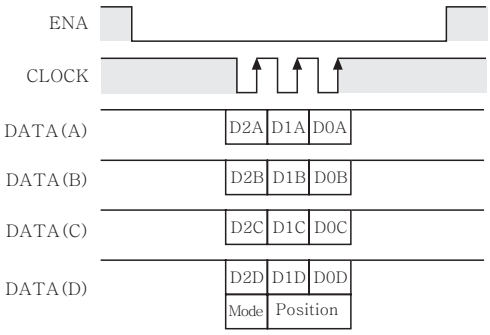


Example)
-Mode : BCD-B mode. Moving direction : CW, Connection operation : $1001_{(2)}$ if ON.
-Speed data : $0000_{(2)}$, $0001_{(2)}$ if 1.
-Position data : $0000_{(2)}$, $0001_{(2)}$, $0011_{(2)}$, $1000_{(2)}$, $1000_{(2)}$ is 5000.

	Description	Mode	Speed data		Position data				
LSB	DATA (A)	D7A	D6A	D5A	D4A	D3A	D2A	D1A	D0A
	Actual input value	1	0	1	0	1	1	0	0
	DATA (B)	D7B	D6B	D5B	D4B	D3B	D2B	D1B	D0B
	Actual input value	0	0	0	0	0	1	0	0
	DATA (C)	D7C	D6C	D5C	D4C	D3C	D2C	D1C	D0C
	Actual input value	0	0	0	0	0	0	0	0
MSB	DATA (D)	D7D	D6D	D5D	D4D	D3D	D2D	D1D	D0D
	Actual input value	1	0	0	0	0	0	1	1
	Hexadecimal value	9	0	1	0	1	3	8	8

5.1.4 BCD-C modes : Position address[PA]

D2 : Operation mode
D2A, B : Operation mode (D2A : 1, D2B : 0)
D0-D1 : Position address [PA] Configuration range : 0-31 (0H-1FH)

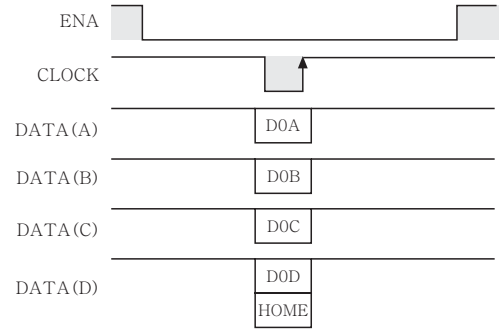


	Description	Mode	Position	
LSB	DATA (A)	D2A	D1A	D0A
	Actual input value	1	0	0
	DATA (B)	D2B	D1B	D0B
	Actual input value	1	0	1
	DATA (C)	D2C	D1C	D0C
	Actual input value	0	0	0
MSB	DATA (D)	D2D	D1D	D0D
	Actual input value	1	0	0
	Hexadecimal value	B	0	2

Example)
-Mode : BCD-C mode. Moving direction: CW, Connection operation : 1011 for ON.
-Position address : $0000_{(2)}$, $0002_{(2)}$ for 2.

5.1.5 Home operation mode (Return to the ORG mode)

D0 : Operation mode
D0A, B : Operation mode (D0 : 0 D0B : 0 D0C 0 0 DOD 0)
(D0A : 0, D0B : 0, D0C : 0, D0D : 0)



	Description	Mode
LSB	DATA (A)	D0A
	Actual input value	0
	DATA (B)	D0B
	Actual input value	0
	DATA (C)	D0C
	Actual input value	0
MSB	DATA (D)	D0D
	Actual input value	0
	Hexadecimal value	0

Example)
-$0000_{(2)}$ if Home operation mode

5.2 PLC serial protocol (PLC-485 mode)

*PLC support : Samsung N70Plus(Communication protocol & procedure, refer to Samsung N70Plus user's manual)

5.2.1 Specifying data from PLC

COM-A mode [PD] + [SD]																
	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
W1000	[CMD]				[MODE]				[OUT]					[D]	[PD]	
W1001	[PD]															
W1002	[SD]															
W1003	[STATUS]															

COM-B mode [PD] + [SA]																
	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
W1000	[CMD]				[MODE]				[OUT]					[D]	[PD]	
W1001	[PD]															
W1002	[SA]															
W1003	[STATUS]															

COM-B mode [PA]																
	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
W1000	[CMD]				[MODE]				[OUT]					[D]	X	
W1001	X								[PA]							
W1002	X								X							
W1003	[STATUS]															

[CMD]																
W1000	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
15	NOP(non-operated)															
14	Stop															
13	Decelerating stop															
12	Return to the ORG															

[MODE]																
W1000	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
11	NOP(non-operated)															
10	COM-A MODE															
9	COM-B MODE															
8	COM-C MODE															

[OUT]																
W1000	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
7	OUT4															
6	OUT3															
5	OUT2															
4	OUT1															
3	OUT0															

[DIRECTION]																
W1000	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
2	0 : CW 1 : CCW															

[PD] : 1 – 3FFFh(2 – 262,134)																
W1000	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
W1001	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0

[PA] : 0 – 1Fh(0 – 31)																
W1001	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0

[SD] : 1 – 3FFEh(1 – 16,382)																
W1002	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0

[SA] : 0 – 0Fh(0 – 15)																
W1002	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0

[STATUS]																
W1003	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
3	+ Limit sensor(LMT+)															
2	_ Limit sensor(LMT−)															
1	ORG sensor(ORG)															
0	At working(RUN)															

5.3 PC PC serial protocol

5.3.1 PC-232, 485, USB mode protocols

This section describes protocols for PC-232, 485, USB mode.

1. Communication format to a PMC from a PC (PC → PMC)

1Byte	2Byte	1Byte	1Byte		1Byte	2Byte
STX	1D	Command	Mode	Data	ETX	CHECKSUM
0x02	'00'~'07'	Command	Mode based on commands	Composed of '0'~'F'	0x03	Sum from ID~ETX

① STX - Initial character of communication
② ID - PMC ID(0x00 ~ 0x07)
③ COMMAND & MODE
④ DATA

●COM-A Mode [SD] + [PD] - 12 BYTE

4Byte	8Byte
Speed data	Position data

Ex)Speed address - 2500Hz, Position data - 15000

'09C4'	'00003A98'
30394334	3030303033413938

●COM-B Mode [SA] + [PD] - 10 BYTE

2Byte	8Byte
Speed address	Position data

Ex)Speed address - 10, Position data - 15000

'0A'	'00003A98'
3041	3030303033413938

●COM-C Mode [PA] - 2 BYTE

2Byte
Position data

Ex)Position data - 13

'0D'
3044

Classification	Command	Mode	Code		Description
COM-A	'A'	'0'	0x41	0x30	Connection operation ON, CW, Speed data, Position data
		'1'		0x31	Connection operation ON, CCW, Speed data, Position data
		'2'		0x32	Connection operation OFF, CW, Speed data, Position data
		'3'		0x33	Connection operation OFF, CCW, Speed data, Position data
COM-B	'B'	Same as COM-A	0x42		Speed dddress, Position data
COM-C	'C'	Same as COM-A	0x43		Position address
HOME RETURN	'H'	'0'	0x48	0x30	Return to H/W ORG
		'1'		0x31	Return to S/W ORG
STATUS	'S'	'0'	0x53	0x30	Reading PMC status excluding position
		'1'		0x31	Reading PMC status including position
STOP	'N'	'0'	0x4D	0x30	Stop
		'1'		0x31	Decelerating stop
Read Port	'R'	'1'	0x52	0x31	Port byte read
Write Port	'W'	'1'	0x57	0x31	Port byte write
Get Position	'P'	'0'	0x50	0x30	Reading the current position.
Jog Move	'J'	'0'	0x4A	0x30	Moving as many as the JOG step in CW.
		'1'		0x31	Moving as many as the JOG step in CCW.
		'2'		0x32	Continuously moving as many as the JOG step in CW.
		'3'		0x33	Continuously moving as many as the JOG step in CCW.

●For Read Port

2Byte	2Byte
Port Address	Length

Ex) When the input port is read from input 0 to input 3 via byte read.

'00'	'01'
3030	3031

<Reference>
Composition of port addresses

Address	Description
00	Input Port
01	Output Port

●For Write Port

2 Byte	2 Byte	Length *2 Byte
Port Address	Length	Data
'00' ~ 'FF'	'00' ~ 'FF'	'0' ~ 'F'

Ex) When Byte Write is used to make output 0 into ON, output 2 into Off, output 3 into on and output 4 into Off.

'01'	'01'	'OB'
3030	3031	3042

⑤ ETX(0x03) – Communication end code
⑥ Checksum – Sum from Mode to EXT
Checksum = value that low 1-byte byte of ② + ③ + ④ + ⑤ is converted to Hex ASCII

2. 2 Communication format to a PC from a PMC

①For COM-A, COM-B, COM-C, HOME RETURN, STOP, WRITE Port, JOG Move

1 Byte	2 Byte	1 Byte	1 Byte	1 Byte	2 Byte
STX	ID	COMMAND	ACK/NAK	ETX	CHECKSUM
0x02	PMC ID	Same as the command transmitted from a PC	Normal : ACK Abnormal : NAK	0x03	Sum from Command to ETX

②For Get Position

1 Byte	2 Byte	1 Byte	1 Byte	1 Byte	2 Byte
STX	ID	COMMAND	ACK/NAK	ETX	CHECKSUM
0x02	PMC ID	Same as the command transmitted from a PC	Current Position	0x03	Sum from Command to ETX

③For Status

1 Byte	2 Byte	1 Byte	8 Byte	1 Byte	2 Byte
STX	ID	COMMAND	STATUS	ETX	CHECKSUM
0x02	PMC ID	Same as the command transmitted from a PC	Current position in Busy, Limit sensor, I/O port status	0x03	Sum from Command to ETX

<Reference>

※Status structure

2 Byte	2 Byte	2 Byte	2 Byte	8 Byte
BUSY	Limit Sensor	In Port	Out Port	Current Position

• Busy
'00' : Non Busy
'01' : Busy

• Limit Sensor

7	6	5	4	3	2	1	0
					High Limit	Low Limit	Home

• In Port

7	6	5	4	3	2	1	0
				Input 3	Input 2	Input 1	Input 0

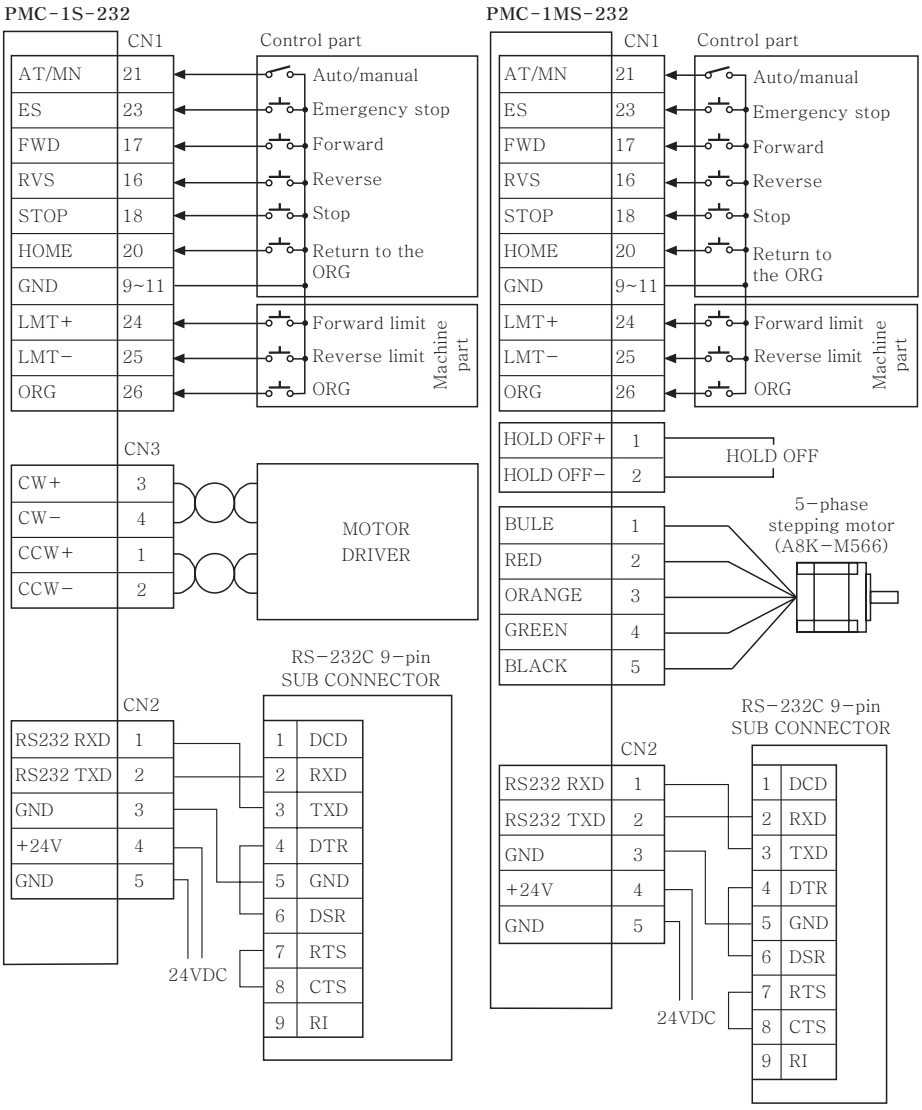
• Out Port

7	6	5	4	3	2	1	0
			Output 4	Output 3	Output 2	Output 1	Output 0

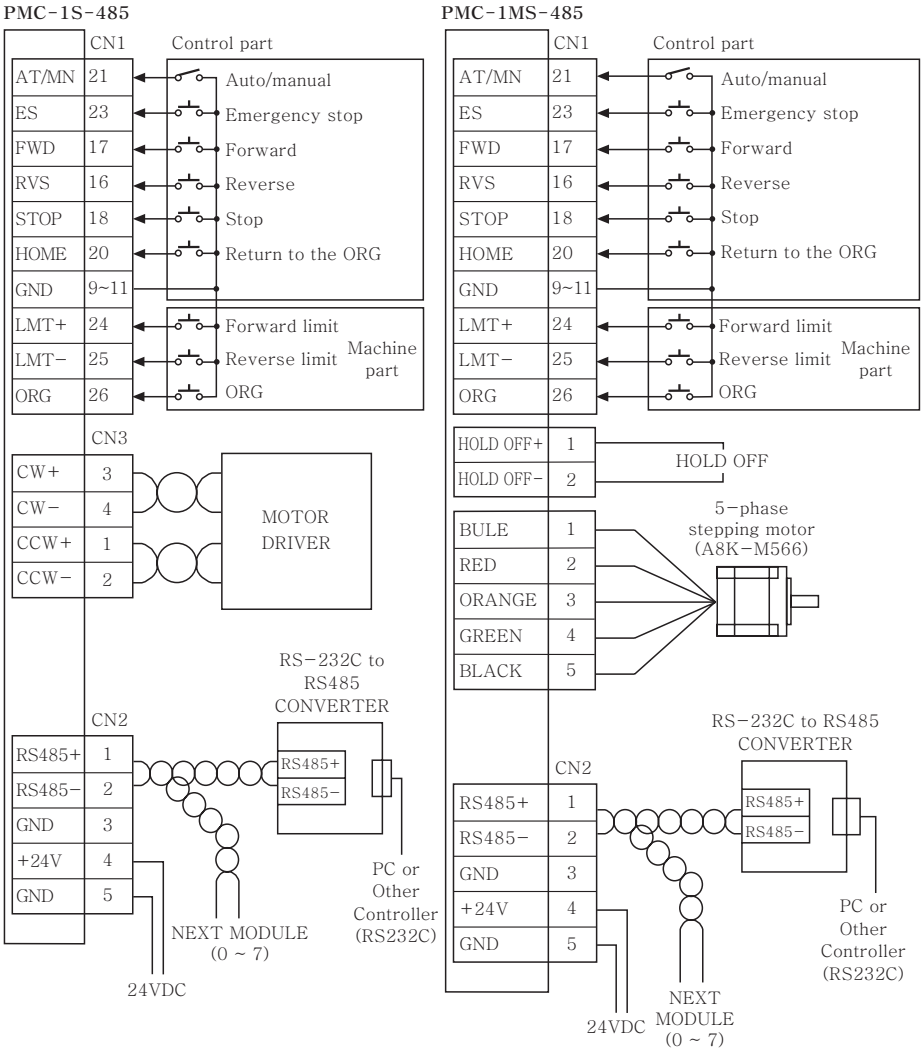
• Position-When the PMC reads the status, it can read the current position if the mode is '1'.

6. Connection diagrams

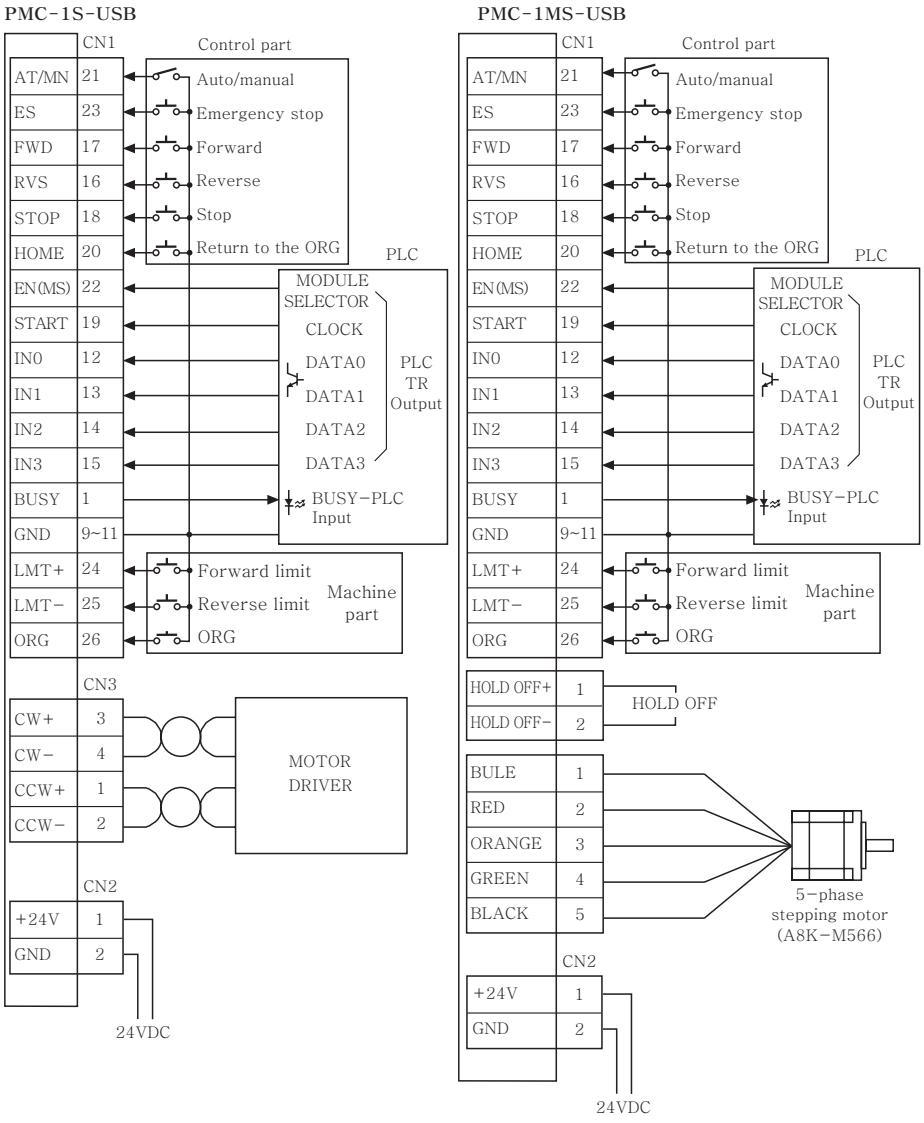
6.1 PC-232 serial connection diagram



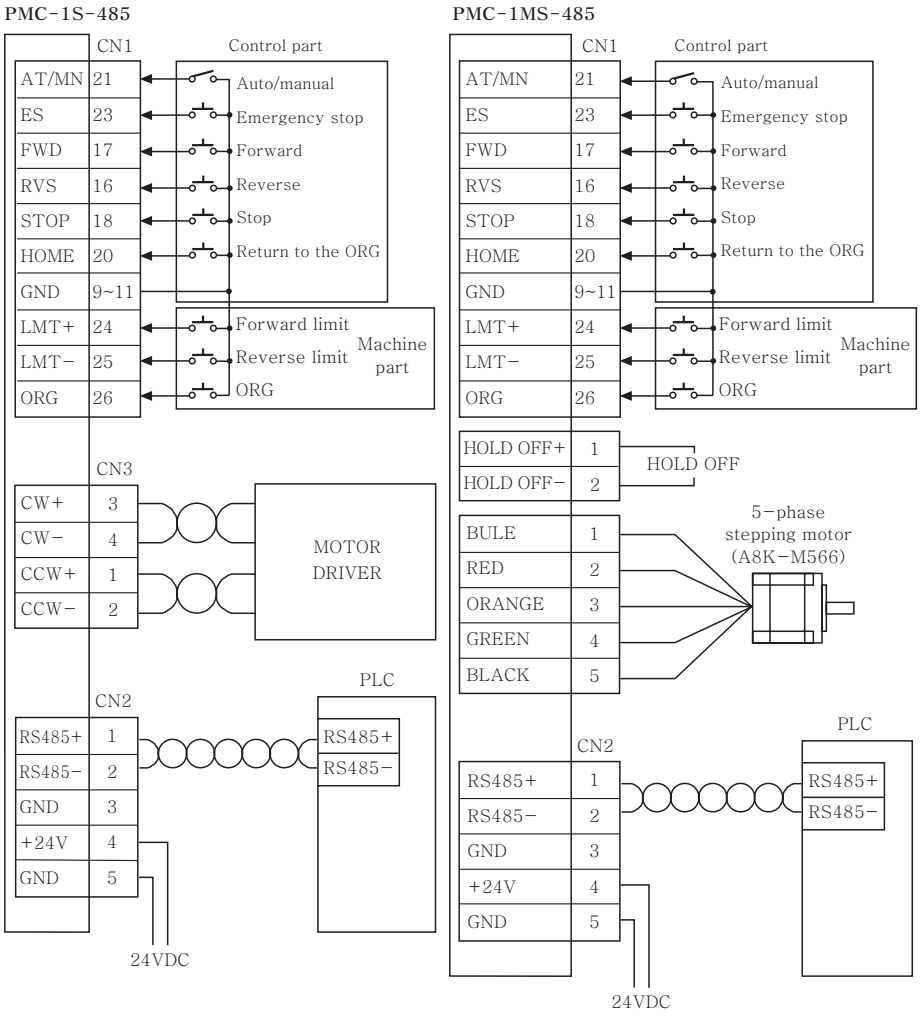
6.2 PC-485 serial connection diagram



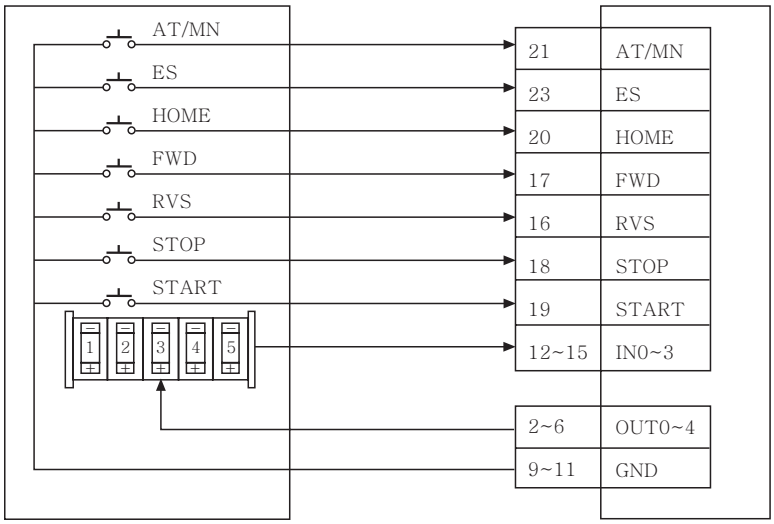
6.3 PLC-BCD parallel connection diagram



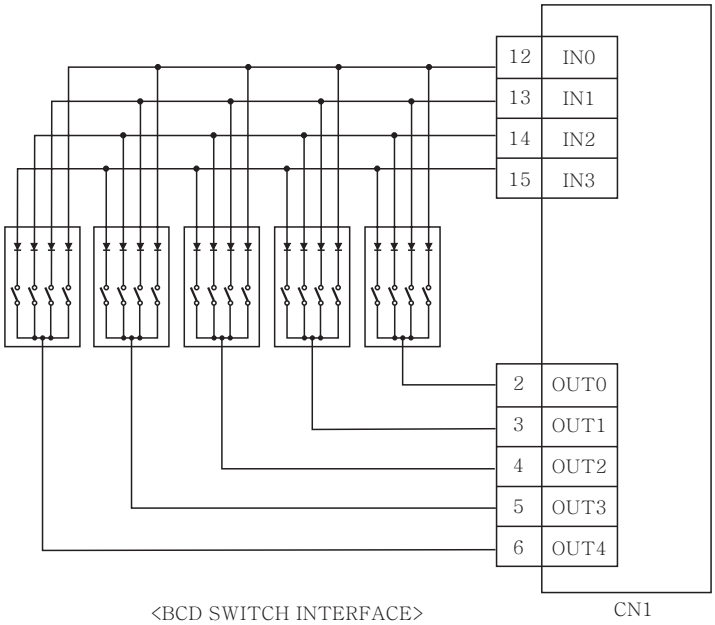
6.4 PLC-485 Serial connection diagram



6.5 BCD-SW connection diagram

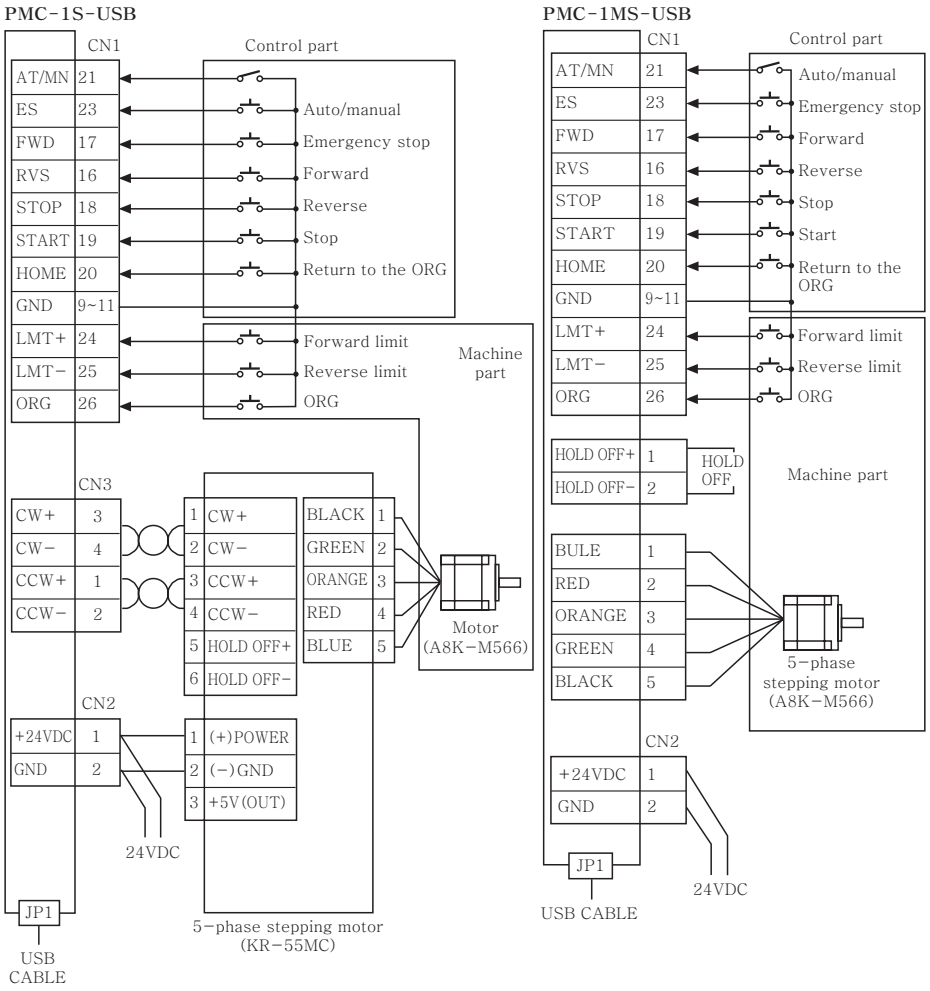


<BCD-SW mode connection diagram>



<BCD SWITCH INTERFACE>

6.6 Overall connection diagram(Motor driver + Motor)

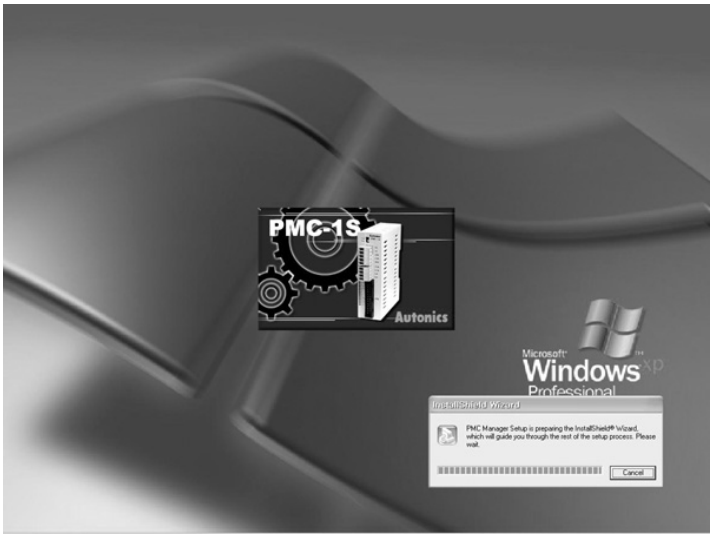


7. Utilization of the operation program(PmcMan)

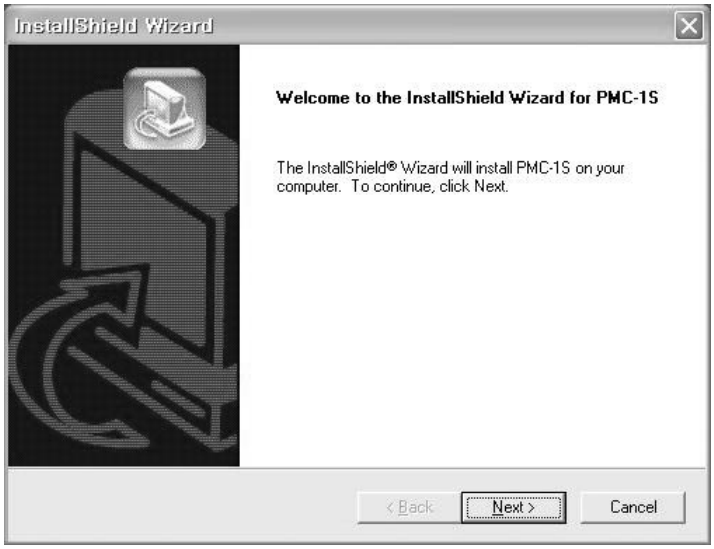
7.1 Installing the operation program

-If you insert the S/W CD into a CD-ROM drive, the PmcMan program is automatically installed.

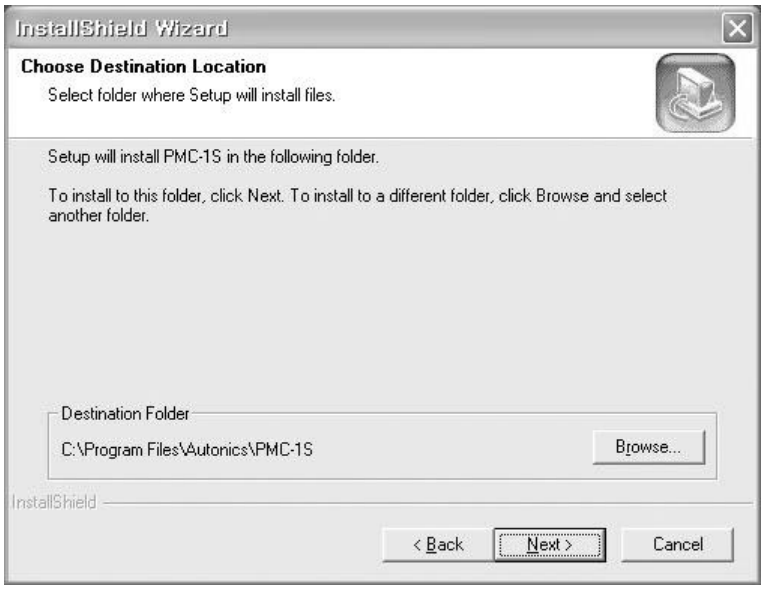
①



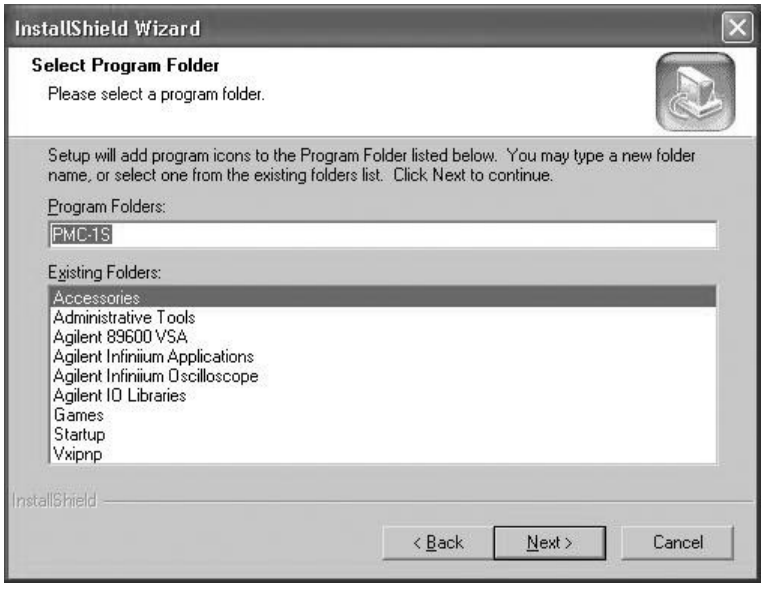
②



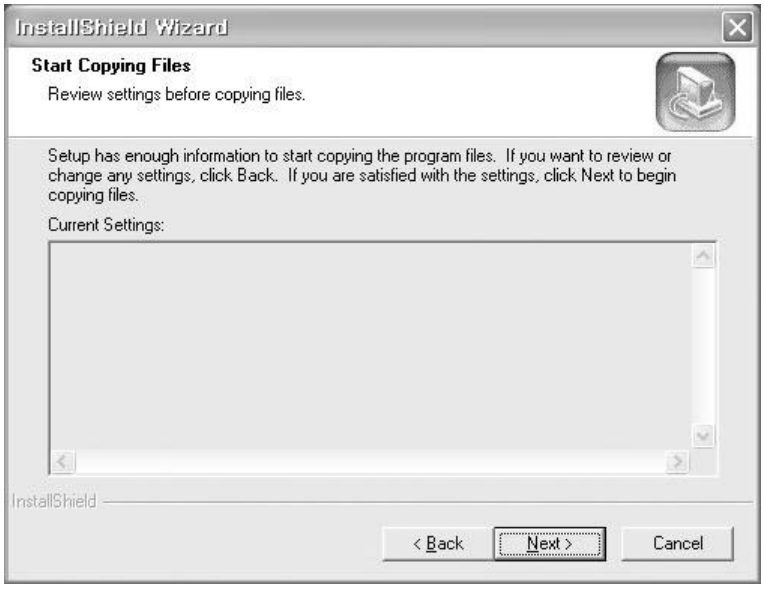
③


InstallShield Wizard
Choose Destination Location
Select folder where Setup will install files.
Setup will install PMC-1S in the following folder.
To install to this folder, click Next. To install to a different folder, click Browse and select another folder.
Destination Folder
C:\Program Files\Autonics\PMC-1S
Browse...
InstallShield
< Back
Next >
Cancel

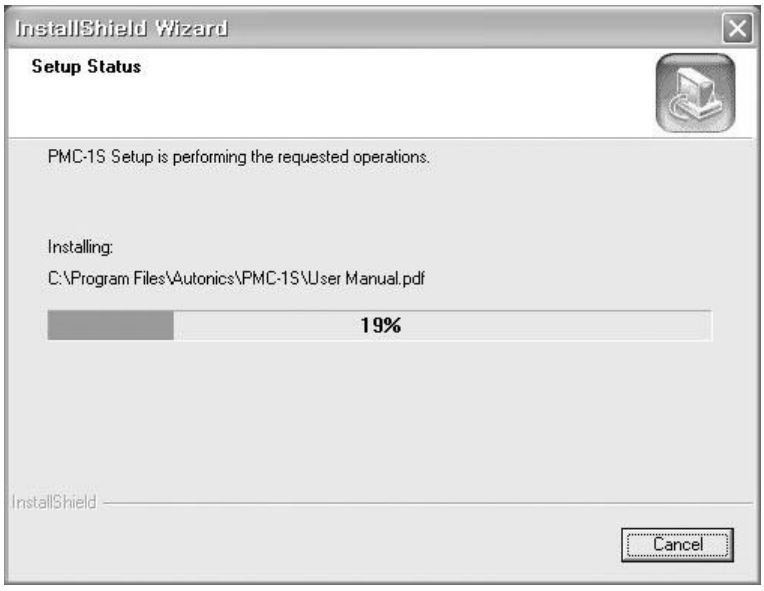
④


InstallShield Wizard
Select Program Folder
Please select a program folder.
Setup will add program icons to the Program Folder listed below. You may type a new folder name, or select one from the existing folders list. Click Next to continue.
Program Folders:
PMC-1S
Existing Folders:
Accessories
Administrative Tools
Agilent 89600 VSA
Agilent Infiniium Applications
Agilent Infiniium Oscilloscope
Agilent IO Libraries
Games
Startup
Vxipnp
InstallShield
< Back
Next >
Cancel

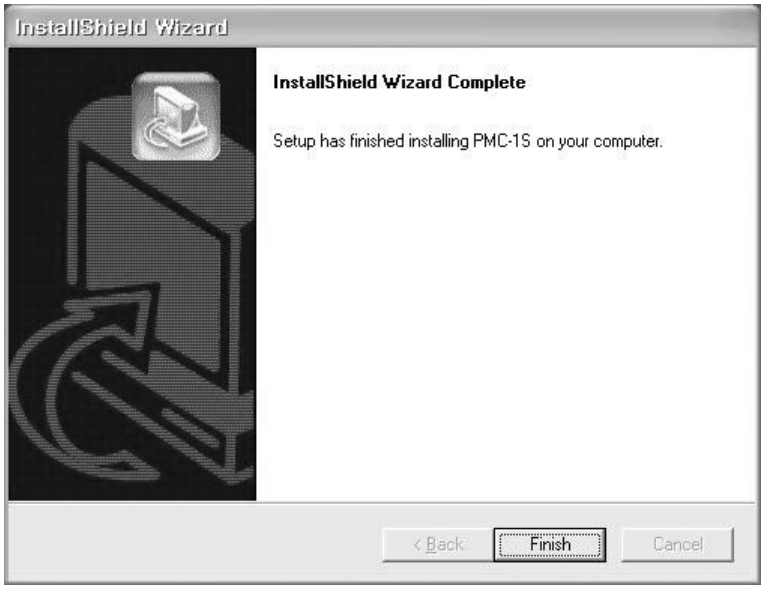
⑤


InstallShield Wizard
Start Copying Files
Review settings before copying files.
Setup has enough information to start copying the program files. If you want to review or change any settings, click Back. If you are satisfied with the settings, click Next to begin copying files.
Current Settings:
InstallShield
< Back
Next >
Cancel

⑥


InstallShield Wizard
Setup Status
PMC-1S Setup is performing the requested operations.
Installing:
C:\Program Files\Autonics\PMC-1S\User Manual.pdf
19%
InstallShield
Cancel

⑦


InstallShield Wizard
InstallShield Wizard Complete
Setup has finished installing PMC-1S on your computer.
< Back
Finish
Cancel

Programmable Motion Controller
1-Axis Stand-Alone

Software User's Guide

Thanks for choosing Autonics product.
Carefully read the notices for safety before use.

Contents

▣Introduction

PmcMan is an editor S/W for 1-axis programmable motion controller.
(Include PMC-1S / PMC-1MS Series)

1. Mode configuration function built in.

2. Convenient parameter edit function supported.

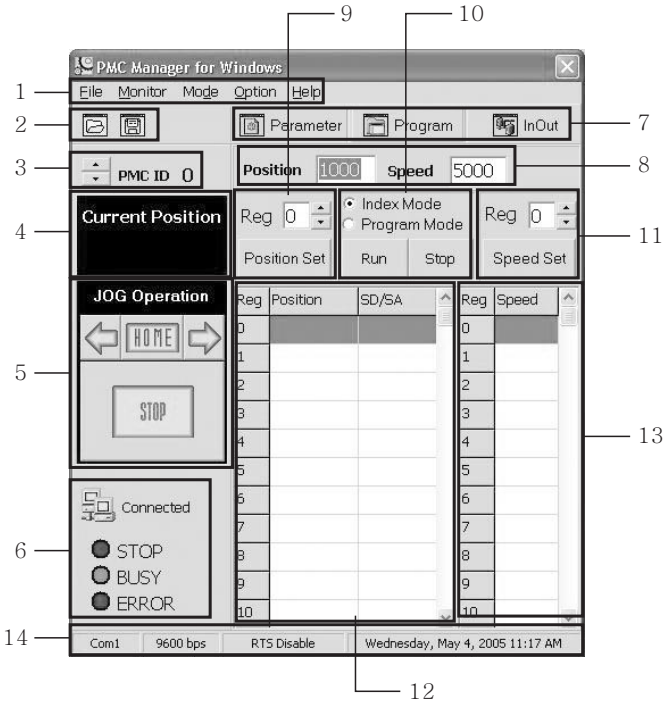
3. Communication monitoring function built in.

4. Reading/Writing parameter and data supported.

5. Data up/download function with the controller.

6. Microsoft Windows 98/ME/2000/XP based environment.

▣Main screen



1. File part

File	Monitor	Mode	Option	Help
Open	Start	Parameter Mode	Environment Option	PmcMan HelpFile
Save		Program Mode	Communication Setting	About PmcMan
Exit		Input & Output Mode		

2. Icon part
Open/Save icon.

3. PMC ID configuration part
PMC IDcan be available with up to eight IDs from 0 to 7, so a PC can communicate with eight PMC-1S/PMC-1MS. You can select the ID of the PMC-1S to control by clicking the **Up/Down** button or entering directly.

4. Current position display window
The window is only enabled in the monitoring status of PMC-1S.
If you click Main menu / **Monitor / Start** and H/W, communication monitoring for PMC-1S/PMC-1MS is started and the current position is displayed in current.

5. JOG operation part

CCW direction, Home operation. CW direction, Stop command. If you click the CW and the CCW buttons once, the jog moves a jog step. In addition, if the buttons are continuously pressed for more than 700ms(0.7 sec), the jog is continuously moved.


CCW

HOME operation


CW

Stop

6. Communication and H/W status display part

- −Connected : Success to connect communication
- −Disconnected : Failure to connect communication
- −Monitoring : Start to monitoring
- −BUSY : H/W busy
- −ERROR : Communication error and other errors

7. Shortcut icons by modes

- −Parameter : Parameter mode shortcut icon to configure system parameters
- −Program : Program mode shortcut icons to configure position data and speed data
- −InOut : I/O mode shortcut icon to monitor I/O

8. Position & Speed edit part

If you double click Speed, a combo−box to configure an address is displayed.

9. Position data configuration part

If you click the Position Set button after clicking the desired part or entering the desired Register number, input data is entered to the Position Data window.

10. Program mode & Index mode configuration part

- −The program mode is a mode that can execute three steps back to back.
- −The index mode can only execute one step.

<Reference> A step has position data and a speed data.

11. Speed data configuration part

If you click the speed set button after clicking the desired part or entering the desired register number, input data is entered to the speed data window.

12. Position data part

This part can edit or save 32 positions and speed data.

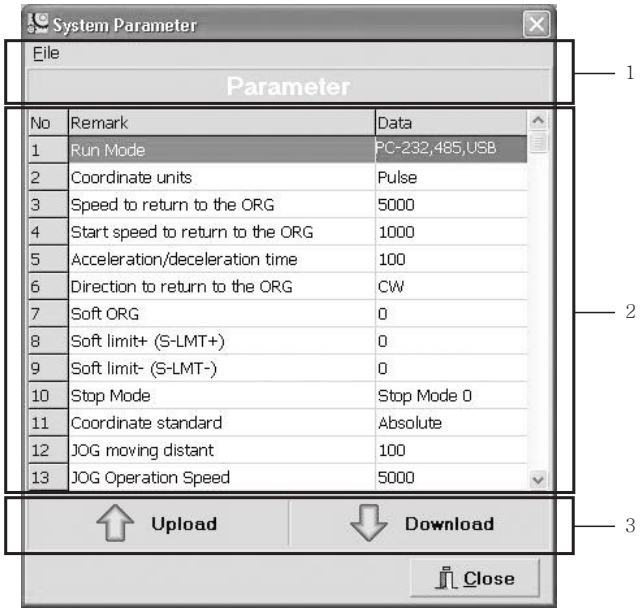
13. Speed data part

This part can edit or save 16 speed data.

14. Status bar part

COM	Baudat	RTS	Time
Com1	9600 bps	Enable	Year−month−date day hr: min
Com2	19200 bps	Disable	
Com3	38400 bps		
Com4	57600 bps		
Com5			
Com6			

▣Parameter mode screen



1. File part

The File part in main pop-up is a menu for reading/saving parameters.

File	
Open Para.	Open the saved system parameter
Save Para.	Save new system parameter
Exit	Close (Exit)

2. Parameter content part

This part shows the configured value of each system parameter.

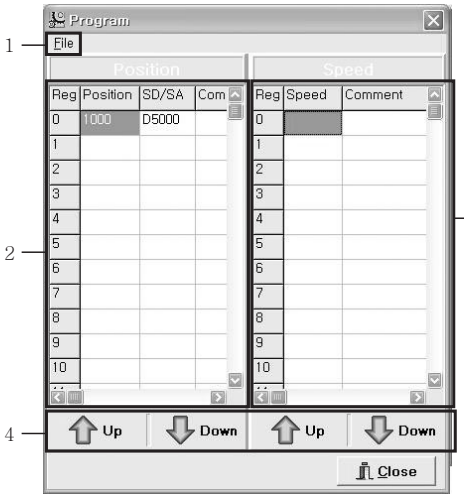
3. Parameter data up/download part

Clicking the Download button can configure the parameter value of PMC-1S/PMC-1MS.

The parameter value of PMC-1S/PMC-1MS can be displayed by clicking the Upload button.

▣Program mode screen

1. File part



File		
Open	Position Data	Open position data
	Speed Data	Open speed data
Save	Position Data	Save position data
	Speed Data	Save speed data
Exit	Close (Exit)	

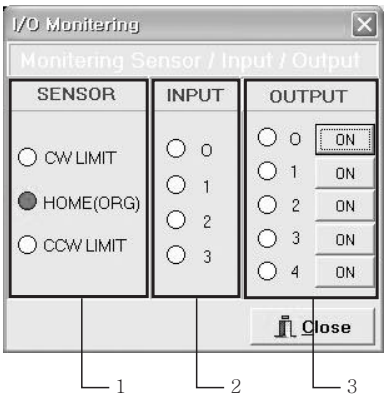
The File part in main pop-up is a menu for reading/saving program data.

2. Editing position data
   32-Position address edit window.

3. Editing speed data
   16-Speed data edit window.

4. Up/download
   Up/download of Position data and Speed data.

▣I/O mode screen



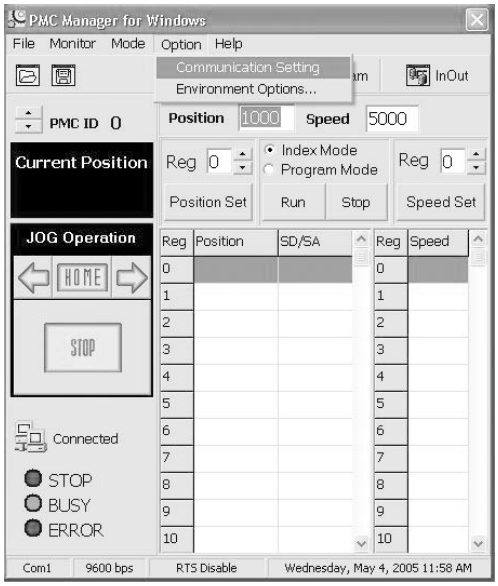
1. Sensor part
   White : Normal mode,
   Red : when detected by a sensor

2. PMC-1S/PMC-1MS input part
   There are 4 inputs. Red when the input is given.

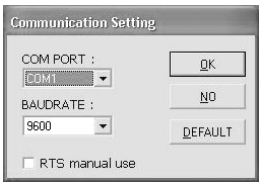
3. PMC-1S/PMC-1MS output part
   There are 5 outputs and the indicating lamp turns Red when output is ON.
   If a button is pressed during ON status, the output becomes ON and the letters of the button are changed to OFF.

▣Configuring communication port

1. Select Option/ Communication Setting in main menu.



2. Select the desired communication port. The default value of a communication port is Com1 and the port can be selected from Com1 to Com6.



⚠ Caution

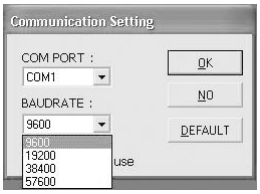
※There is a checkbox to show "RTS manual use" on the bottom of the screen.

Fill in the box according to your OS.
−Windows 98 : Checked O
−Windows 2000/XP : Unchecked X

3. Check the status bar in main screen.
   Check the port No. and the speed.

▣Configuring communication speed

1. The communication speed can be chosen on the communication select screen. Select the desired speed and press the OK button.



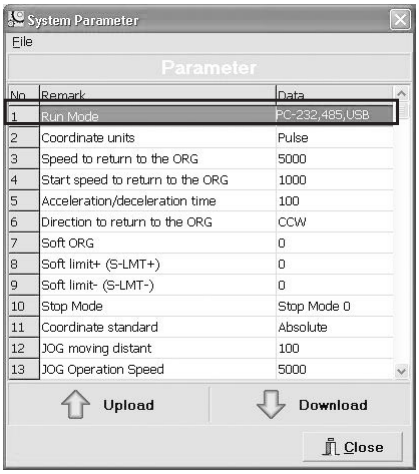
⚠ Caution

※The communication speed of parameter mode is fixed in 9600 bps. To enable monitoring and other operations in PC−232, 485, USB mode, the communication speeds of PMC−1S parameters must be configured at the same speed.
PMC−1S supports the communication speed from 9600 bps to 57600 bps.

▣Configuring JOG operation in the beginning

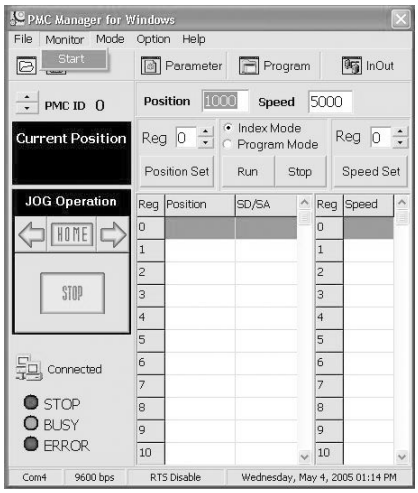
Before operating a JOG, you should configure the following;

1. In communication mode of PMC−1S/PMC−1MS, the parameter should be configured as PC−232, 485, USB mode. The run mode in the system parameter mode screen should be configured as PC−232, 485, USB mode before download.

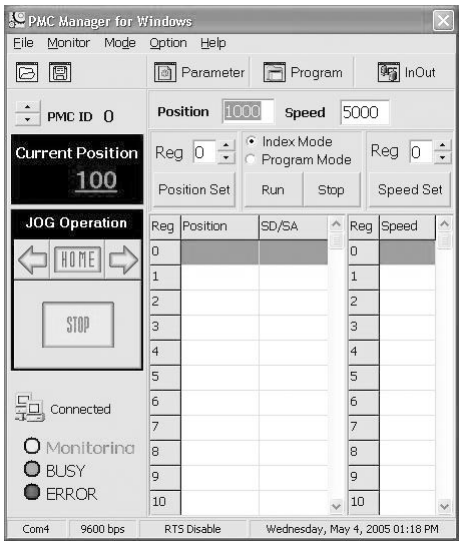


2. AT/MN of PMC−1S/PMC−1MS should be configured as Auto mode.

3. Start remote control by clicking Monitor/Start in main menu.



4. Use the short icon of JOG operation.

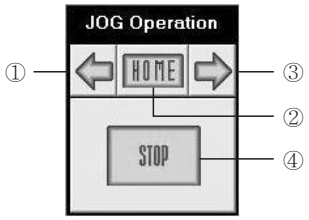


<Reference>
If you click Monitor/Start in main menu, you can monitor the current operating position of the JOG.

▣JOG operation

1. If the initial configuration is completed, the normal JOG operation is enabled.

2. The operation method is as follows:



<JOG function button screen>

① CCW operation
② HOME Search
③ CW operation
④ STOP

- The HOME button and the STOP button are executed by a click.
- The CW button and the CCW button are executed by a click.
  If the buttons are pressed for more than 0.7 seconds, the continuous pulse is outputted.

▣Default parameters

System parameter	Configuration value	Note
Run mode	PC−232, 485, USB mode	
Coordinate unit	PULSE	
Speed to return to the ORG	5,000	PPS
Start speed to return to the ORG	1,000	PPS
Acceleration/deceleration time	100	ms
Direction to return to the ORG	CCW	CCW
Soft ORG	0	Disable
Soft limit+ (S−LMT+)	0	Disable
Soft limit− (S−LMT−)	0	Disable
Stop mode	STOP MODE 0	Disable
Coordinate standard	Absolute coordinate(ABS)	
JOG moving distant	100	PULSE
JOG operation speed	5,000	PPS
Start speed	1,000	PPS
Operation speed	5,000	PPS
ORG sensor	Enable	ORG sensor enabled
Data format	HEX DATA	PLC−BCD mode
Connection operation	Connection operation disabled OFF	
Moving distance per pulse	1	Valid when the unit is distance(mm)
Number of position address configurations	0	Use in Normal mode
Communication speed	9,600	bps
PLC ID	0	0 − 7
PMC ID	0	0 − 7
INS(INCREMENTAL STOP)	0	Disable

▣Parameter description

1. Run mode

Configuration value	Description
PC−232, 485, USB mode	Remote control mode by RS−232C communication
PLC−485 mode	Remote control mode by RS−485 communication
PLC−BCD mode	Parallel communication (4−bit) control mode with PLC
BCD−SW mode	Control mode by digital switch(4×5)
NORMAL mode	Independent run mode

2. Coordinate units

Configuration value	Description
Pulse	Pulse in unit
Distance	mm in unit

3. Speed to return to the ORG

Configuration range	Description
4 – 32,764	PPS in unit

4. Start speed to return to the ORG

Configuration range	Description
1 – 1,000	PPS in unit

5. Direction to return to the ORG

Configuration range	Description
CW	Return to the ORG in CW direction
CCW	Return to the ORG in CCW direction

6. Soft ORG, soft limit− (S−LMT−), soft limit+ (S−LMT+)

Configuration value	Description
0	Function disabled
1 – 99,999	Configuration range

7. Stop mode

Configuration value	Description
Stop mode 0	Disables the function
Stop mode 1	Runs from the remained distance by entering start after the decelerating stop.
Stop mode 2	Runs the next step ignoring the remained distance by entering start after the decelerating stop.
Stop mode 3	Jumps to END ignoring the remained distance and steps after the decelerating stop.
Stop mode 4	Runs the next step after moving the distance configured by INS.
Stop mode 5	Jumps after moving the distance configured by INS.

8. Coordinate standard

Configuration value	Description
Incremental coordinate	INCREMENT
Absolute coordinate	ABSOLUTE

9. JOG moving distance

Configuration value range	Description
1 – 100	Pulse in unit

10. JOG operation speed

Configuration value range	Description
4 – 32,764	PPS in unit

11. Start speed

Configuration value range	Description
1 – 100	PPS in unit

12. Data format(PLC–BCD mode)

Configuration value	Description
HEX DATA	Hexadecimal data
DECIMAL DATA	Decimal data

13. ORG sensor

Configuration value range	Description
Use	Use of the ORG sensor
No-use	Use of the limit sensor in the direction to return the ORG instead of the ORG sensor.

14. Connection operation

Configuration value range	Description
Connection operation ON	Runs the connection operation
Connection operation OFF	Does not run the connection operation

15. Moving distance per pulse

Configuration value range	Description
0.0001 – 1	mm/Pulse in unit

16. Number of position address configurations

Configuration value	Description
0	No-configuration(No-use)
1 – 32	Use in normal mode

17. Communication speed

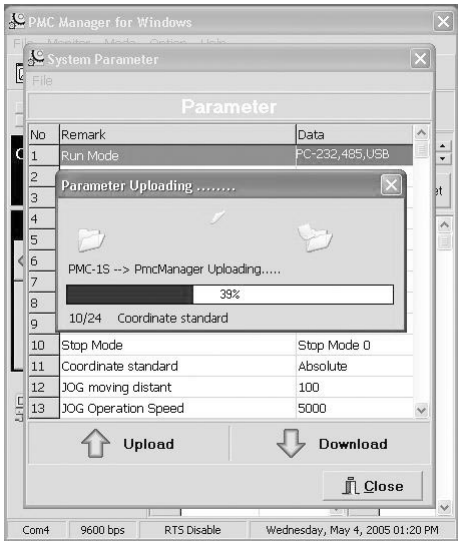
Configuration value	Description
9600	bps in unit
19200	bps in unit
38400	bps in unit
56700	bps in unit

18. Deceleration/Acceleration time

Configuration value	Description
2 – 1023ms	ms in unit

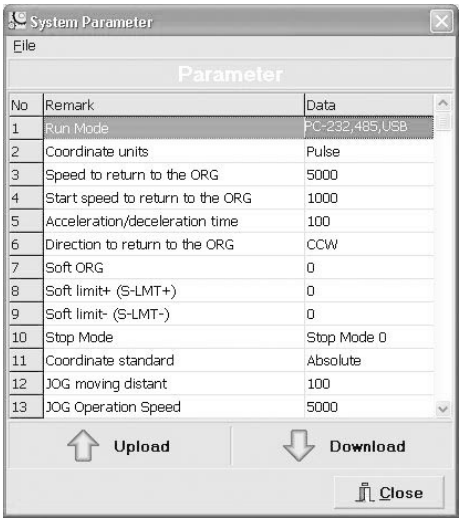
▣Editing Parameters

1. To convert to parameter mode, click a parameter icon in main menu or Menu/Mode/ Parameter in main pop-up menu.



If the system is connected to PMS-1S, you can display the parameters configured in the PMS-1S.

-Click the Data line related to the parameter to configure and type a configuration value.



⚠ Catuion

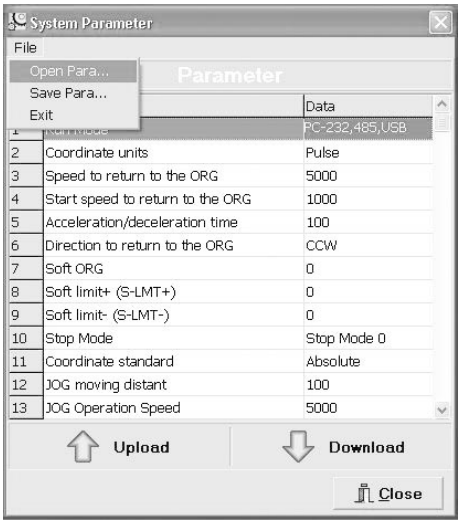
※Make sure that each parameter does not exceed the configuration limit value.
(Refer to Parameter description.)

▣Opening parameters

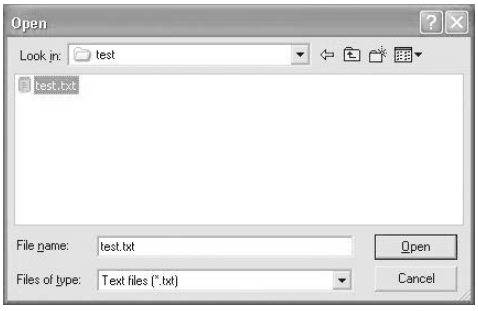
To open the saved parameter and save the configured parameter, click File/Open Parameter and File/Save Parameter in the pop-up menu respectively.

1. Opening parameter data

①Click File / Open Para...



②Select the file to open and click the Open button.

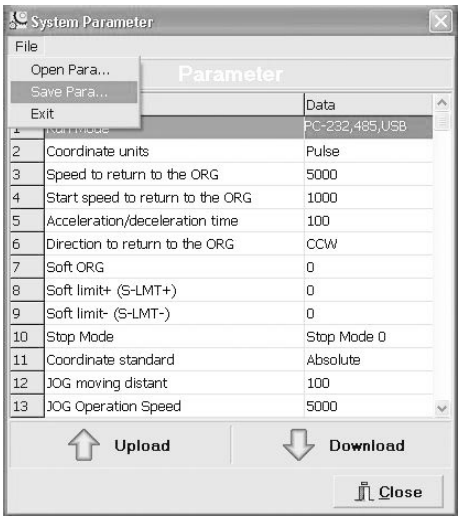


▣Saving parameters

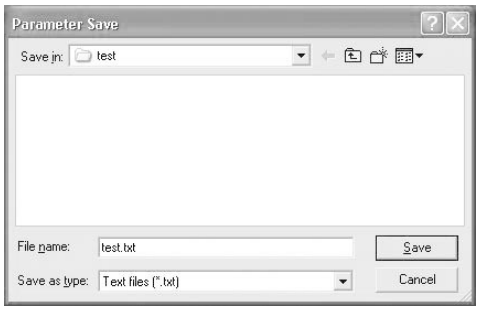
To save the configured parameter, click File/Save Parameter in the pop-up menu.

1. Saving parameter data

①Click File / Save Para....



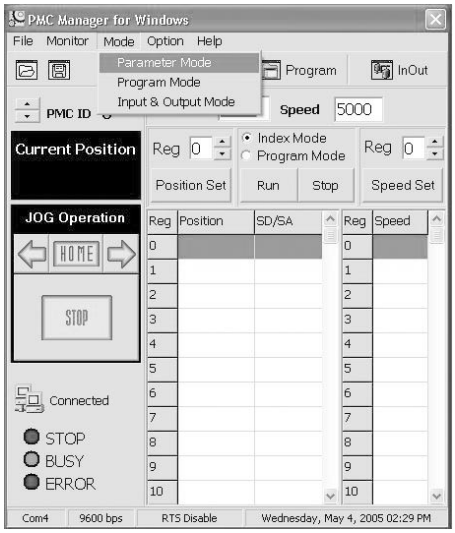
②To save data as a *.txt file (text file), enter the name of the file to save and press the Save button.



▣Transferring parameter data

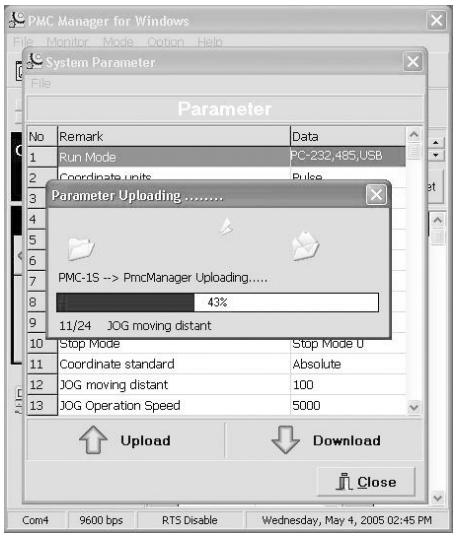
※After completing to edit or build the desired parameter, the parameter should be configured in PMC-1S/PMC-1MS. The upload and the download buttons allow the parameter to transfer. If you want to configure the parameter built, click the download button.

1. Configuring parameters



If you click the Parameter Mode, the para-meter of the current controller is uploaded and displayed in the editor screen.

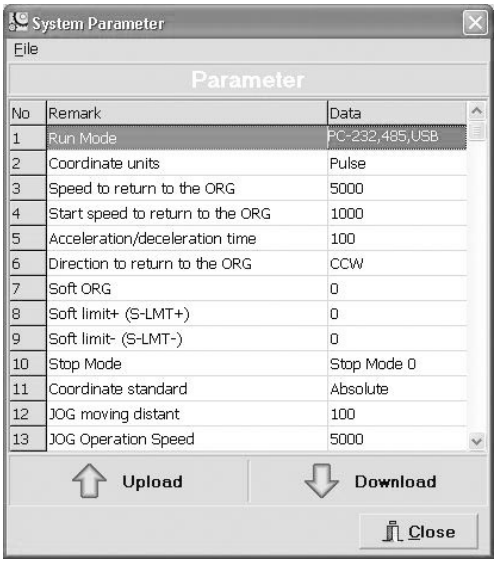
①Click the Parameter button in main screen.



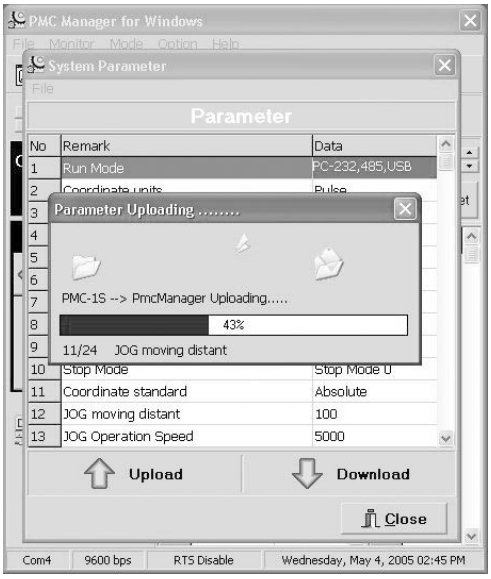
②The parameter screen and the progress bar showing the parameter values are displayed on the editor screed.

2. Uploading

①Click the Upload button.

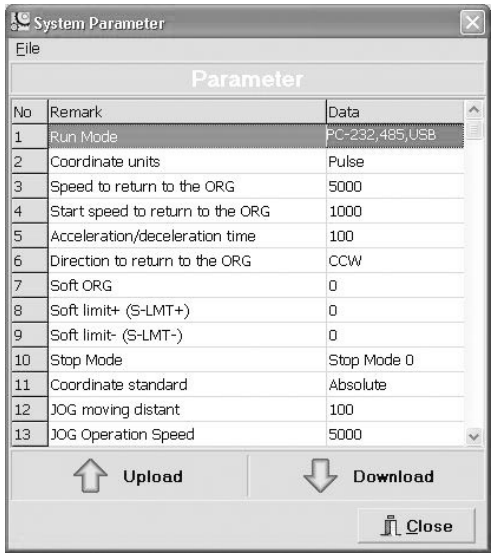


②Upload the parameter of PMC-1S/PMC-1MS.

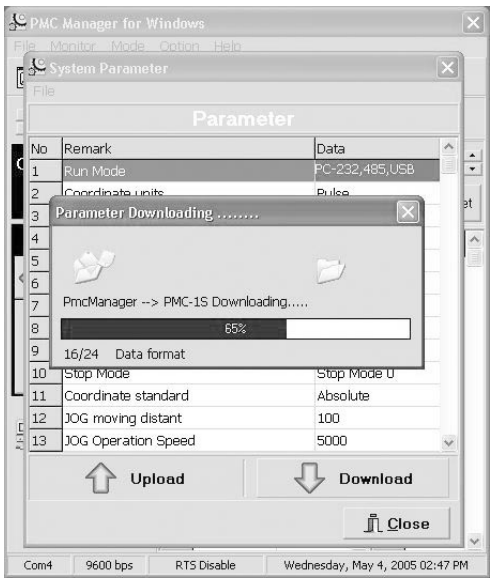


3. Downloading

①Click the download button.



②Download the parameter of PMC-1S/PMC-1MS.



<Reference>
If download/upload is completed, the progress window will automatically disappear.

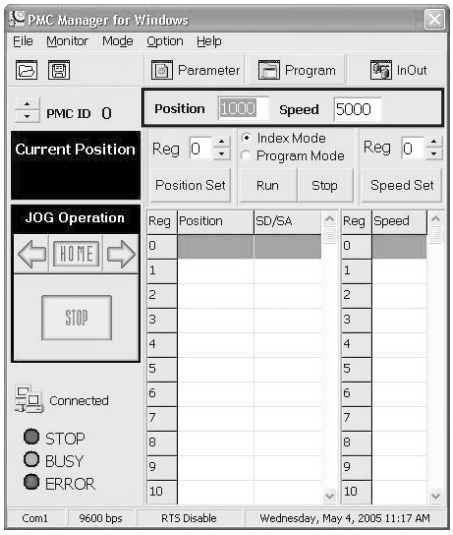
⚠ Caution

※If the communication status is not good, the download/upload of parameters may not be completed.
In this case, the progress window will not automatically disappeared.
To remove the screen, download/upload again or run PmcMan again after closing the program.

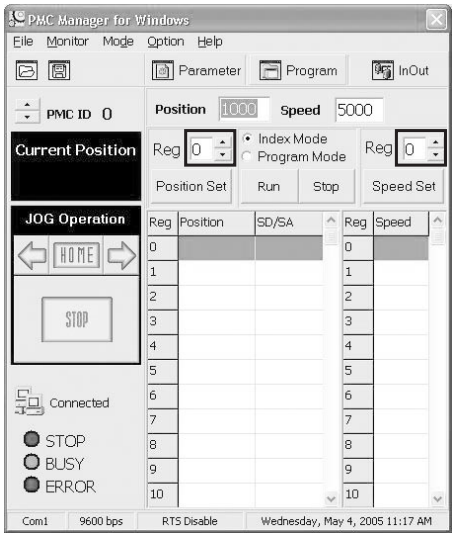
▣Editing Position/Speed data

1. There are two ways to edit: Editing in main screen and program mode.
   The editing procedure in main screen is as follows:

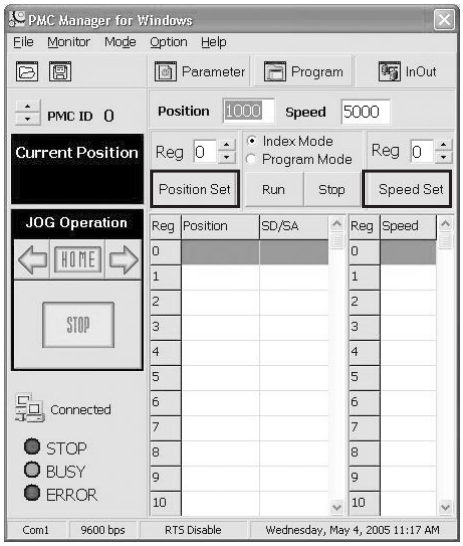
   ①Enter the desired value in the Position box and the Speed box in main screen.



   ②Select the number of the desired Register using the Upload/download button or click the line in the Register.



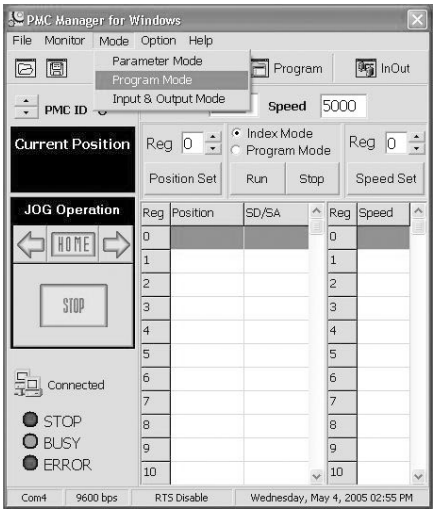
③If you click Position Data or Speed Data, Position Set and Speed Set are entered to the relevant Register respectively.



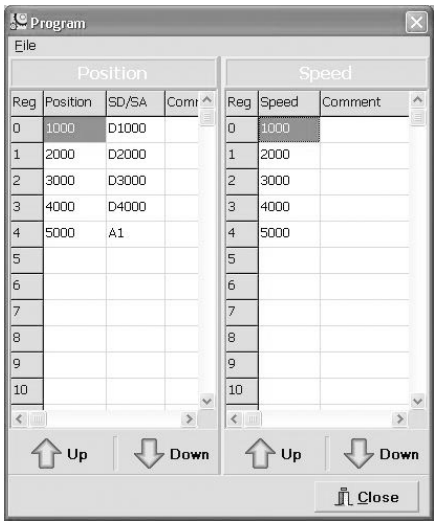
-If you click the Position set or the Speed set, the relevant value is automatically increased into the next register number.

2. The next procedure is to edit in program mode.

①Click the Program shortcut icon in the main screen or Main Menu/Mode/Program Mode.



②The program mode screen is created. Now, enter Data after clicking the relevant Register.



Ex)Speed Data : D4000, Speed Address : A1

D4000 and A1 indicate Speed data 4000 and Speed Address 1 separately. A1 means the reference about the data #1, which is 1000, of the Speed field that is at the right part of the above screen.

- You can extend the size of the screen by dragging its border.

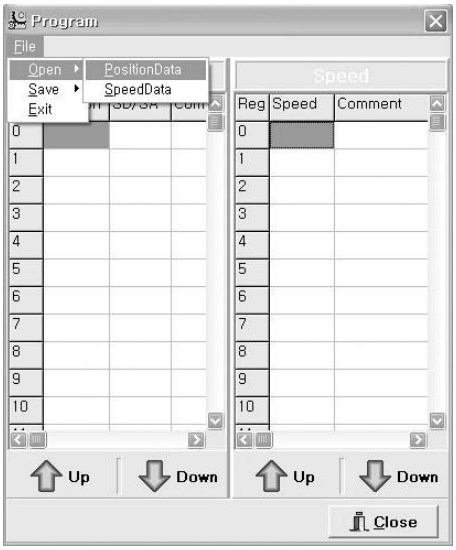
⚠ Caution

※To edit SA/SD data, actual data is entered after a letter D for the Speed Data or a letter A for the Speed Address.

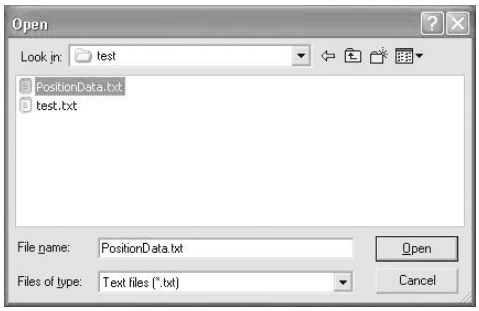
▣Opening Position/Speed data

1. Opening Position Data and Speed Data

①Click File/Open/Position Data for the Position Data and File/Open/Speed Data for the Speed Data.



②Select the data to open, and press the Open button.

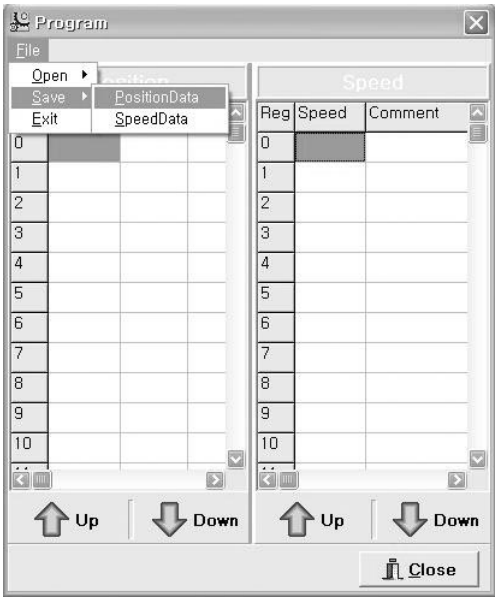


- The opening/saving method is similar to that in Microsoft Windows, and each data can be saved and opened as a *.txt file (text file).

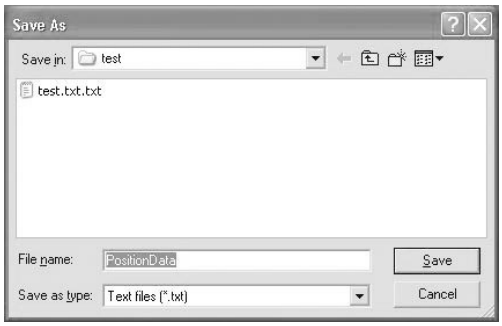
▣Saving Position/Speed data

1. Position Data / Speed Data Save

①Click File/Save/Position Data for the Position Data and File/Save/Speed Data for the Speed Data.



②Enter the name of the file to save and press the Save button. The file is saved as a *.txt file.

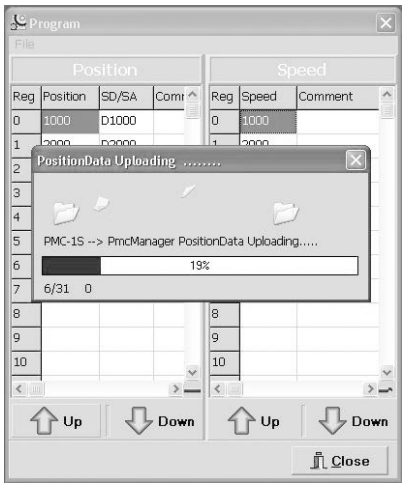


▣Downloading Position/Speed data

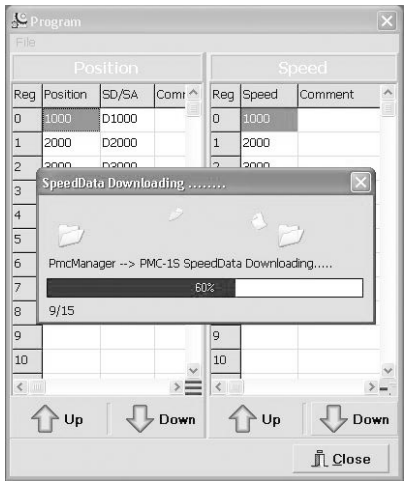
After creating/editing the position/speed data, you can configure the position/speed data in PMC-1S/PMC-1MS. Position/Speed data are transferred by means of the Upload button or the Download button. To configure the current data in PMC-1S/PMC-1MS, click the Download button.

1. Downloading Position Data and Speed Data(click the Download button)

①Position Data Downloading



②Speed Data Downloading



〈Reference〉

If the download or the upload is completed, the progress window will automatically disappear.

⚠ Caution

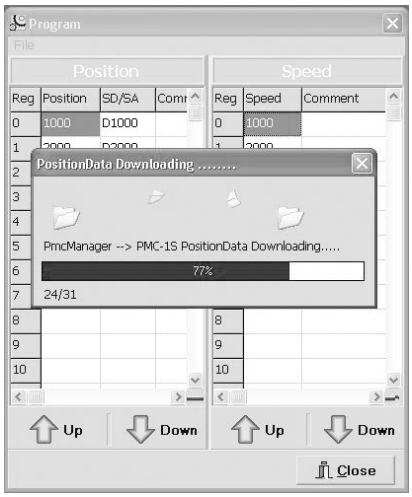
The download of position data and speed data is only enabled in program mode.
If the current mode of PMC-1S/PMC-1MS is Run mode, change the mode into the program mode by means of the slide switch and run PmaMan again.
Converting the mode during download/upload may result in error or loss to data.

▣Uploading Position/Speed data

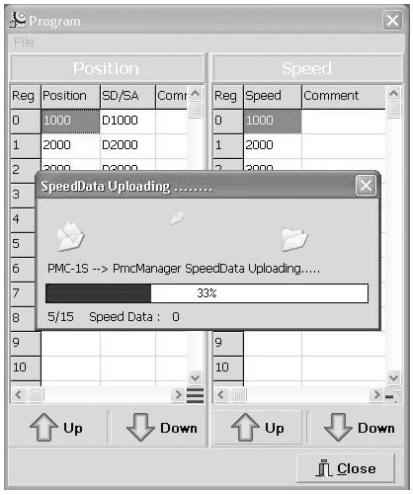
After creating/editing the position/speed data, you can configure the position/speed data in PMC-1S/PMC-1MS. Position/Speed data are transferred by means of the Upload button or the Download button.
To configure the current data in PMC-1S/PMC-1MS, click the Download button.

1. Uploading Position Data and Speed Data(click the Upload button).

①Position Data Uploading



②Speed Data Uploading



<Reference>

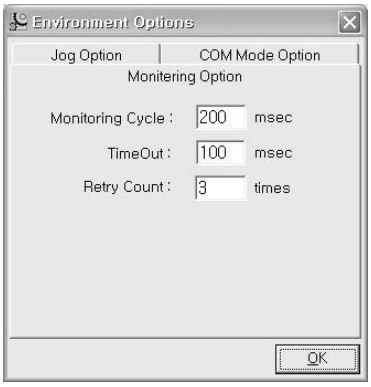
If the download or the upload is completed, the progress window will automatically disappear.

⚠ Caution

The upload of position data and speed data is only enabled in program mode.
If the current mode of PMC-1S/PMC-1MS is Run mode, change the mode into the program mode by means of the slide switch and run PmaMan again.
Converting the mode during download/upload may result in error or loss to data.

▣Configuring monitoring

Monitoring cycle, time-out and retry count are configured.



Contents	Description
Monitoring Cycle	Cycle to transfer data between a PC and a PMC-1S/PMC-1MS (monitoring cycle)
Time Out	Idle time of a PC or a PMC-1S/PMC-1MS
Retry Count	Retry count at time-out

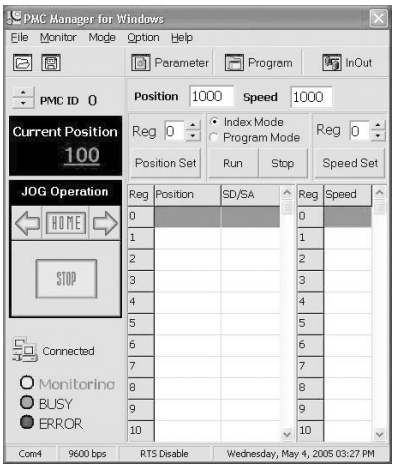
<Reference>

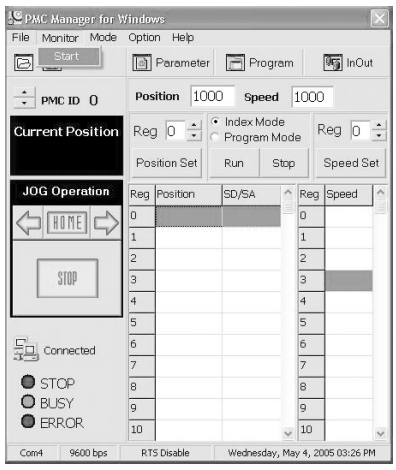
Time Out : Time out indicates the maximum time to respond to the data transferred to a PMC-1S/PMC-1MS from a PC.

⚠ Caution Do not configure Monitoring Cycle to less than 50ms. If the cycle is configured to less than 50 ms, the communication quality may be degraded.

▣Communication monitoring

1. Prerequisite condition to monitor communication is as follows:
   To monitor communication, PMC-1S/PMC-1MS should be configured to PC-232, 485,USB mode. Set the run mode to PC-232, 485,USB mode in System parameter screen. After that, convert PMC-1S/PMC-1MS to RUN mode in program mode and configure the AT/MN switch to AUTO.
2. Click Monitor/Start



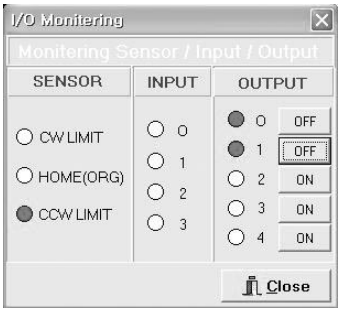


- The indicator displayed in STOP is changed into Monitoring as the communication monitoring starts and the indicating light is turned on.

⚠ Caution Check the communication port and speed and setting status of PMC-1S/PMC-1MS when Error indicator is flickering.

▣Hardware monitoring

1. You can monitor the hardware of PMC-1S/PMC-1MS in real time via the hardware monitoring. You can also check the I/O status and the sensor operation status through a monitor.



The Hardware monitoring is divided into three parts.

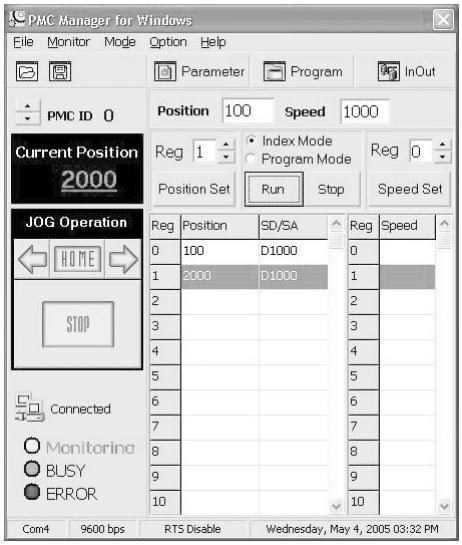
Classification	Description
SENSOR	Indicates the status of the sensor connected to the current PMC-1S/PMC-1MS.
	Turns an indicating light on when a sensor is detected.
INPUT	Monitors the input status of the current PMC-1S/PMC-1MS using an indicating light.
OUTPUT	Monitors the output status of the current PMC-1S/PMC-1MS using an indicating light.
	Controls the output of PMC-1S/PMC-1MS from a PC by clicking a button.

▣Index mode

The index mode on the main screen is a mode to run each register value step by step.
The communication with PMC-1S/PMC-1MS is performed in COM-A mode in default.

1. Set to PC-232, 485,USB mode.
2. Click the Register number you want after selecting Index Mode or select the Register to run by means of the up/down button.
3. If you click the Run button, PMC-1S/PMC-1MS moves the Position Data and Speed Data entered to the Register.

The figure below shows a screen where Register 0 is executed in Index mode.



-During the operation, a light indicating BUSY turns on.

▣Program mode

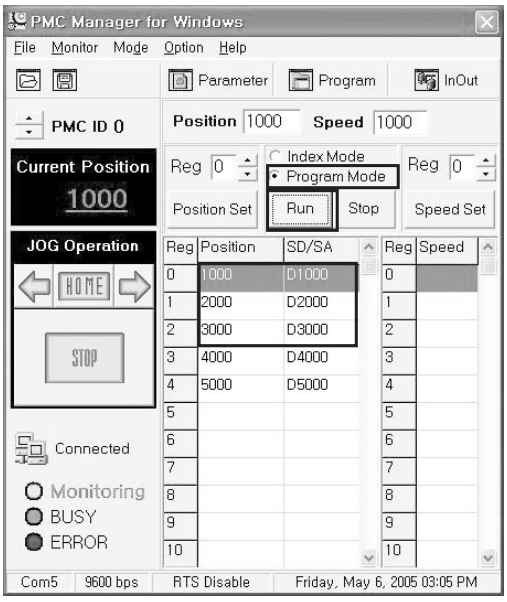
The program mode in the main screen is the connection operation mode.
The communication with PMC-1S/PMC-1MS is performed in COM-A mode in default

1. Configure PmcMan to PC-232, 485, USB mode.

2. After selecting the Program Modem, click the first Register number or select the first Register you want by means of the Up/down button.

3. If you click the Run button, PMC-1S/PMC-1MS continuously moves three steps with the Position Data and Speed Data in the Registers.

The following figure shows that Register 0~2 are executed in the Program mode.



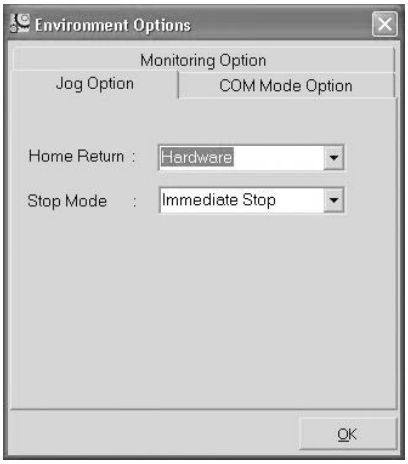
▣Setting up mode operation option

You can configure Return to the ORG and Stop Mode.
These configurations applies to all PC-232, 485, USB mode.
There are two configurations as shown in the figure below.

1. Home Return
   ①Return to Hardware ORG : Return to the mechanical home after searching.

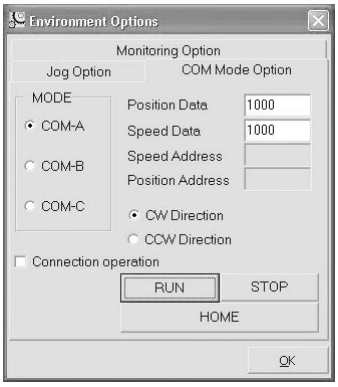
   ②Return to Software ORG Return : Return to the software home configured in a parameter after searching.

2. Stop Mode
   ①Stop immediately : Stop immediately without deceleration.
   ②Stop decelerating : Stop decelerating time configured in a parameter.



▣COM Mode Test

The PC-232, 485, USB mode can be tested for each of Com-A, B, and C modes.



Classification	Description
COM-A	Enter position data and Speed Data and configure the connection operation and the operation direction. After than, operates PMC-1S/PMC-1MS remotely by clicking the Run button.
COM-B	Enter position data and speed address and configure the connection operation and the operation direction. After than, operates PMC-1S/PMC-1MS remotely by clicking the Run button.
COM-C	Enter position address and configure the connection operation and the operation direction. After than, operates PMC-1S/ PMC-1MS remotely by clicking the Run button.

<Reference>
The default mode of PmcMan is the Com-A mode.
However, you can directly configure the program to Com-B mode or Com-C mode fitting with your specification.

COM-A mode has [PD] + [SD] structure.
COM-B mode has [PD]+ [SA]structure.
COM-C mode has [PA] structure.

[PD] : POSITION DATA
[SD] : SPEED DATA
[SA] : SPEED ADDRESS
[PA] : POSITION ADDRESS

▣Speed Data Structure

◆SPEED DATA(2 BYTE * 16 ADDRESS)

EEPROM ADDRESS	SPEED DATA	DATA
31	15	FL
30		FH
29	14	FL
28		FH
27	13	FL
26		FH
25	12	FL
24		FH
23	11	FL
22		FH
21	10	FL
20		FH
19	9	FL
18		FH
17	8	FL
16		FH
15	7	FL
14		FH
13	6	FL
12		FH
11	5	FL
10		FH
9	4	FL
8		FH
7	3	FL
6		FH
5	2	FL
4		FH
3	1	FL
2		FH
1	0	FL
0		FH

-FL : SPEED DATA HIGH BYTE -FH : SPEED DATA LOW BYTE

Example) Speed : 2500, Address : 1 at Speed Address 0.

EEPROM ADDRESS 0 - 0x09

EEPROM ADDRESS 0 - 0xC4

EEPROM ADDRESS 1 - 0x00

EEPROM ADDRESS 1 - 0x64

▣Position Data Structure

◆POSITION DATA (5 BYTE * 32 ADDRESS)

EEPROM ADDRESS	POSITION ADDRESS	DATA
191	31	PL
190		PM
189		PH
188		SD/SA
187		
186	30	PL
185		PM
184		PH
183		SD/SA
182		
181	29	PL
180		PM
179		PH
178		SD/SA
177		
176	28	PL
175		PM
174		PH
173		SD/SA
172		
171	27	PL
170		PM
169		PH
168		SD/SA
167		
166	26	PL
165		PM
164		PH
163		SD/SA
162		
161	25	PL
160		PM
159		PH
158		SD/SA
157		
156	24	PL
155		PM
154		PH
153		SD/SA
152		

EEPROM ADDRESS	POSITION ADDRESS	DATA
151	23	PL
150		PM
159		PH
158		SD/SA
157		
156	22	PL
155		PM
154		PH
153		SD/SA
152		
151	21	PL
150		PM
149		PH
148		SD/SA
147		
146	20	PL
145		PM
144		PH
143		SD/SA
142		
141	19	PL
140		PM
139		PH
138		SD/SA
137		
136	18	PL
135		PM
134		PH
133		SD/SA
132		
131	17	PL
130		PM
129		PH
128		SD/SA
127		
126	16	PL
125		PM
124		PH
123		SD/SA
122		

EEPROM ADDRESS	POSITION ADDRESS	DATA
111	15	PL
110		PM
109		PH
108		SD/SA
107		
106	14	PL
105		PM
104		PH
103		SD/SA
102		
101	13	PL
100		PM
99		PH
98		SD/SA
97		
96	12	PL
95		PM
94		PH
93		SD/SA
92		
91	11	PL
90		PM
89		PH
88		SD/SA
87		
86	10	PL
85		PM
84		PH
83		SD/SA
82		
81	9	PL
80		PM
79		PH
78		SD/SA
77		
76	8	PL
75		PM
74		PH
73		SD/SA
72		

EEPROM ADDRESS	POSITION ADDRESS	DATA
71	7	PL
70		PM
69		PH
68		SD/SA
67		
66	6	PL
65		PM
64		PH
63		SD/SA
62		
61	5	PL
60		PM
59		PH
58		SD/SA
57		
56	4	PL
55		PM
54		PH
53		SD/SA
52		
51	3	PL
50		PM
49		PH
48		SD/SA
47		
46	2	PL
45		PM
44		PH
43		SD/SA
42		
41	1	PL
40		PM
39		PH
38		SD/SA
37		
36	0	PL
35		PM
34		PH
33		SD/SA
32		

SD/SA - SPEED DATA OR SPEED ADDRESS

15	14	13	12	11	10	9	8
7	6	5	4	3	2	1	0

The MSB is FLAG BIT.

15th BIT 1 : SA (SPEED ADDRESS)
0 : SD (SPEED DATA)

PH - POSITION DATA HIGH BYTE
PM - POSITION DATA MIDDLE BYTE
PL - POSITION DATA LOW BYTE

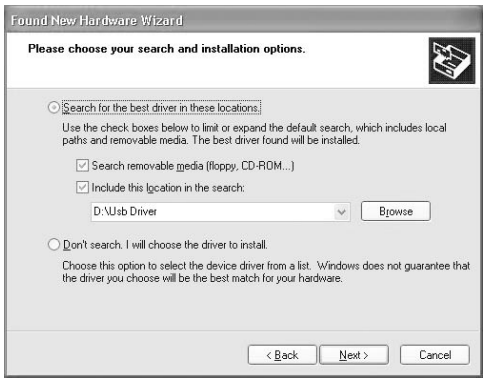
Ex) Speed Address : 10, Position Data : 5000 at Position Address 0.

EEPROM ADDRESS 32 - 0x00
EEPROM ADDRESS 33 - 0x0A } SPEED ADDRESS
EEPROM ADDRESS 34 - 0x00
EEPROM ADDRESS 35 - 0x13 } POSITION DATA
EEPROM ADDRESS 36 - 0x88

◆Installing USB Driver(for Window XP)

(1)Connect PMC-1S-USB to a PC with a USB cable.
Connect the USB cable to the USB port of the PC.
The following figure appears.

(2)Click the buttons on the following screen.

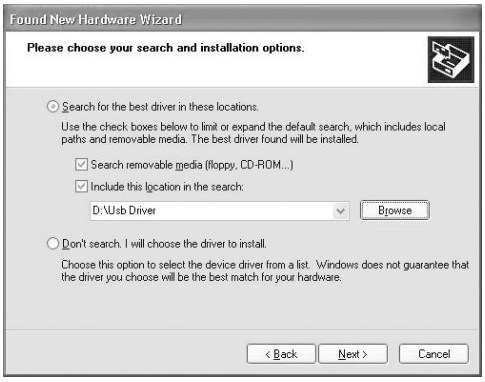


Select the position of ftidibus.sys.
Click the Confirm button after selecting E:\USB Driver.

(3) Driver is automatically installed.

Click the Finish button. The following screen appears.

(4) Click the buttons on the following screen.



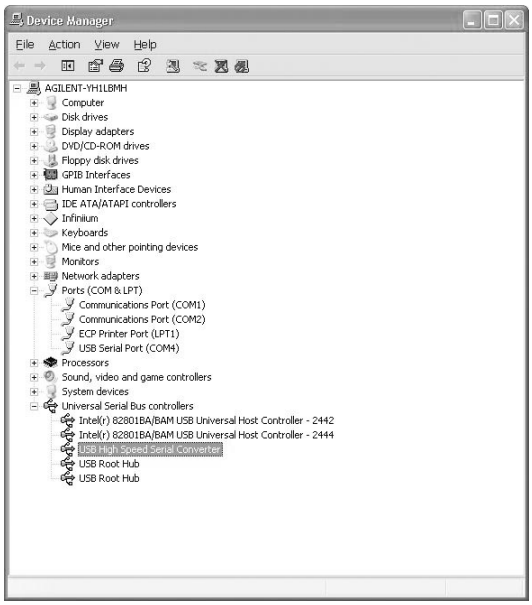
Select the position of ftser2k.sys.

Click the Confirm button after selection E:\USB Driver.

(5) The driver is automatically installed.

Click the Finish button. The USB driver is installed to the system.
The USB driver consists in USB High Speed Converter and USB Serial Port, so both of them should be installed.

(6) Click Start a Setting a Control Panel a System → Device Manager to check if the driver is correctly installed in the system.



Check General Serial Bus Controller a USB High Speed Serial Convert and Port (COM and LTP) a USB Serial Port (COM3).
If the installation was completed, two devices should be added.
Once the USB driver is installed in the beginning, you do not need to install again.

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