1-AXIS PROGRAMABLE MOTION CONTROLLER

▣Features

- ●Smallest size and multi functioned 1shaft Controller
- ●32 Step position controlling function
- ●Stand-Alone type independent control system
- ●Various communication function, RS-232C, RS-485 and USB
- ●Various operating modes
  (BCD-SW, Correspond PLC, Control PC communication)
- ●JOG operation
- ●Best suited for stepping motors

⚠ **Please read "Caution for your safety" in operation manual before using.**

▣Ordering information

PMC – **1S** – ☐

232	RS-232C Communication function
485	RS-485 Communication function
USB	USB Communication function
1S	1-Axis Stand-Alone
PMC	Programmable Motion Controller

▣Specifications

Series	PMC-1S		
Model	**PMC-1S-232**	**PMC-1S-485**	**PMC-1S-USB**
Communication function	RS-232C communication	RS-485 communication	USB communication
Axis	1-Axis		
Power supply	24VDC ±10%		
Power consumption	Max. 3.6W		
Control position data	32 Step		
The method of setting position	Absolute coordinate type, Incremental coordinate type		
Setting position unit	PULSE[PULSE], Distance[mm]		
Position set range	0 ~ 99,999[PULSE]		
Set range of operating speed	4 ~ 32,764[PPS]		
Set range of starting speed	1 ~ 1,000[PPS]		
Time range of ascend and descend speed	2 ~ 1024[ms]		
Set number of operating speed data	16(When using the selected speed)		
Soft ORG range	0 ~ 99,999[PULSE]		
Soft limit range	0 ~ 99,999[PULSE]		
Output pulse type	2 pulse types[CW pulse, CCW pulse]		
Insulation of external input/output signals	by photo coupler		
Output	NPN open collector		
	Selectable input(13type) : Automatic/Manual(Jog), Emergency stop, Returning to origin, Common input, ect		
	3 Sensor input : LMT+, LMT-, ORG		
	2 Pulse types : CW pulse, CCW pulse		
External interface	6 Control output : OUT0, OUT1, OUT2, OUT3, OUT4, BUSY		
Ambient temperature	0 ~ 55℃(at non-freezing status)		
Ambient humidity	35% ~ 85%(at non-freezing status)		
Internal noise	250Vp-p 1us, 50us(noise stimulator)		
Withstand voltage	500VAC(50/60Hz) for 1minute		

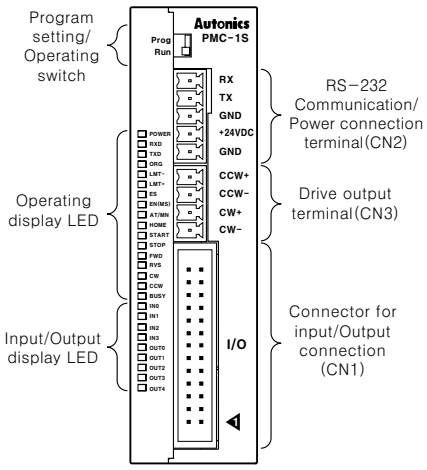
▣Specifications(External Input/Ouput)

Type	Pin number	Signal	Description	Function
Output	1	BUSY	Output on operating	ON at Pulse output
	2	OUT0	10^0	Switch COMMON at BCD-SW mode (Digital switch connection)
	3	OUT1	10^1	
	4	OUT2	10^2	
	5	OUT3	10^3	
	6	OUT4	10^4	
	7	+24VDC	+24VDC OUT	Sensor power output(Total max. 100mA)
	8			
	9	GND	GROUND	
	10			
	11			
Input	12	IN0	A	BCD DATA 2^0
	13	IN1	B	BCD DATA 2^1
	14	IN2	C	BCD DATA 2^2
	15	IN3	D	BCD DATA 2^3
	16	RVS	CCW Jog operating	Set pulse number is generated Pushing it more than 0.2sec continueously, set pulse number is generated
	17	FWD	CW Jog operating	
	18	STOP	Stop order	Stop order function
	19	START	Sequential order	Operation order(BCD-SW mode), Sequential order input(Normal mode)
	20	HOME	Returning to origin	Mechanical or returning soft origin function
	21	AT/MN	Automatic/manual	ON=Automatic, OFF=Manual, setting operation mode function
	22	EN(MS)	Enable/Module select	Valid data function and module selecting function
	23	ES	Inputting emergency stop	Emergency stop function for all systems
	24	LMT+	LMT+	+limit sensor function
	25	LMT-	LMT-	-limit sensor function
	26	ORG	ORG	Origin sensor function

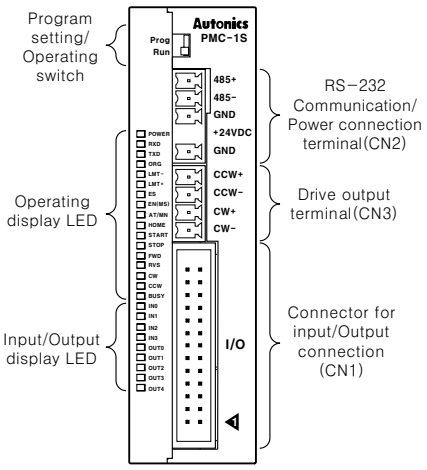
※The function of CN1 terminal is changed by the operating mode.

▣Identification

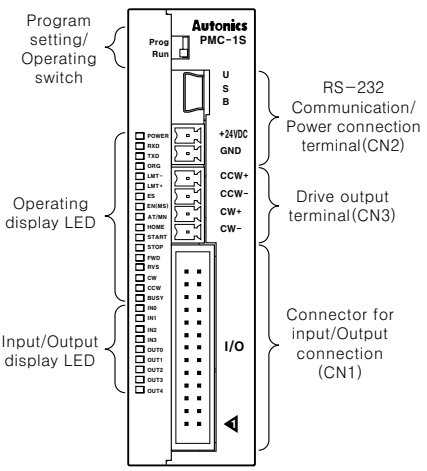
●PMC-1S-232



●PMC-1S-485



●PMC-1S-USB



▣Power and Communication connector CN2

Type	Pin number	Signal	Description	Function
Output	1	485+/RX	RS-485+/RS-232C RXD	RS-485 model -A(+)/RS-232C model -RXD
	2	485-/TX	RS-485-/RS-232C TXD	RS-485 model-B(-)/RS-232C model -TXD
	3	GND	Ground for communication	
Input	4	+24VDC	+24VDC power input	
	5	GND		

▣Pulse Output CN3

Type	Pin number	Signal	Description	Function
Output	1	CCW+	CCW Pulse output+	Connect motor driver CCW+
	2	CCW-	CCW Pulse output-	Connect motor driver CCW-
	3	CW+	CW Pulse output+	Connect motor driver CW+
	4	CW-	CW Pulse output-	Connect motor driver CW+

▣USB Connector JP1(Only for PMC-1S-USB)

Type	Pin number	Signal	Description
Power	1	V+	USB 2.0
Communication	2	DM	
	3	DP	
	4	ID	
Power	5	GND	

▣Operation/Program mode

Model	Operating mode		Description	Remarks
PMC-1S-232 PMC-1S-485 PMC-1S-USB	PC-232 PC-485 PC-USB	COM-A	Position Data[PD] + Speed Data[SD]	
		COM-B	Position Data[PD] + Speed Adress[SA]	
		COM-C	Position Adress[PA]	
PMC-1S-485	PLC-485	PLC-A	Position Data[PD] + Speed Data[SD]	Applying RS-485 only for PLC
		PLC-B	Position Data[PD] + Speed Adress[SA]	
		PLC-C	Position Adress[PA]	
PMC-1S-232 PMC-1S-485 PMC-1S-USB	PLC-BCD	BCD-A	Position Data[PD] + Speed Data[SD]	Available for using PLC for all models
		BCD-B	Position Data[PD] + Speed Adress[SA]	
		BCD-C	Position Adress[PA]	
PMC-1S-232 PMC-1S-485 PMC-1S-USB	BCD-SW		Considering setting value of digital switch(BCD 4×5) as an absolute value Operating after scanning the BCD value by Inputting start Speed Date[SD] operates at the operating speed set in internal system parameter.	Digital Switch (4×5)
PMC-1S-232 PMC-1S-485 PMC-1S-USB	NORMAL		The position address set in internal is operated sequently one step by input START.	
PMC-1S-232 PMC-1S-485 PMC-1S-USB	MANUAL		Operated by manual input(FWD, RVS, HOME)	
Model	Program mode		Description	Remarks
PMC-1S-232 PMC-1S-485 PMC-1S-USB	PROGRAM		Setting system parameter, Destination and speed of internal Controller	

●PC-232, 485, USB mode, PLC-485, PLC-BCD mode is operated by communication order.
●Since in BCD-SW mode is available in absolute coordinate type, data must be absolute value sequentially Position address set in internal.

▣Operating mode data

Operating mode(RUN)	Operating mode is set in program mode by setting "Operating mode".				
Data type/mode	PC-232, 485, USB	PLC-485	PLC-BCD	BCD-SW	NOMAL
Position Address[PA]	O	O	O	X	Internal
Position Data[PD]	O	O	O	O	X
Speed Address[SA]	O	O	O	X	X
Speed Data[SD]	O	O	O	Internal	X
Returning to origin	O	O	O	O	O

▣Function(Input/Output)

Type	Pin number	Operating mode / Signal	BCD-SW	PLC-BCD	PC-232 PC-USB PC-485 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
	19	START	START	START	X	START	X
	18	STOP	STOP	STOP	STOP	STOP	STOP
	17	FWD	FWD	FWD	FWD	FWD	FWD
	16	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

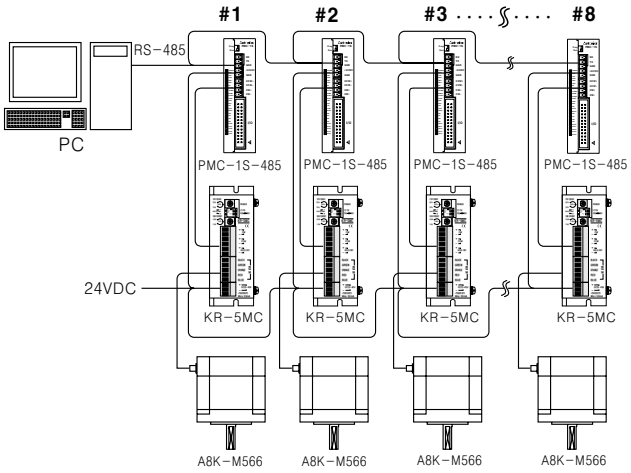
[ES]:Emergency stop [AT/MN]:Select automatic/manual [HOME]:Back to origin [START]:Repeat sequential order [Stop]:Stop
[FWD]:Manually forward operation [RVS]:Manually reverse operation [EN(MS)]:ENABLE, Module selecting signal [BUSY]:Pulse output

▣System parameter

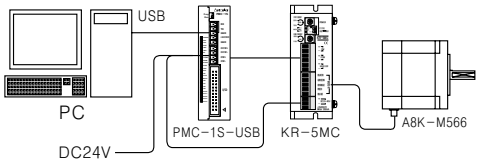
Type		Description	Remarks
Operating mode		PC-232, 485, USB	RS-232C, RS-485, USB serial communication
		PLC-485	Serial communication with PLC
		PLC-BCD	Paralell communication with PLC (4bits)
		BCD-SW	Digital switch (4×5)
		NOLMAL	Independent operation
Coordinate unit		PULSE	
		mm	
The speed of returning to origin		4~32,764[PPS]	
Starting speed of returning to origin		1~1,000[PPS]	
Ascend/Descend time		2~1,024[ms]	
The direction of returning to origin		CW	
		CCW	
Soft origin		0~99,999[PULSE]	Unavailable soft ORG function for 0
Soft +Limit (S-LMT+)		0~99,999[PULSE]	Absolute value at ORG
Soft -Limit (S-LMT-)		0~99,999[PULSE]	
Stop mode		0-5	Absolute value at ORG
Standard of coordinate		Absolute(ABS)	
		Incremental(INC)	
Jog moving distance		1~100[PULSE]	
Jog operating speed		4~32,764[PPS]	
Starting speed		1~1,000[PPS]	
Operating speed		3~32,764[PPS]	
ORG sensor		Using	
		Non using	
Data type		HEX DATA	Hexadecimal data type
		DECIMAL DATA	Decimal data type
Connecting operation		Connecting operation ON	Operating connecting operation
		Connecting operation OFF	
Moving direction per Pulse		0.0001~1.0000[mm]	Availabe for direction(mm) coordinate unit
Number of setting position address		0	Setting position address is unavailable for 0
		32	0~31 Total 32
Communication speed	Speed	9,600[bps]	
		19,200[bps]	
		38,400[bps]	
		57,600[bps]	
	DATA BIT	8	
	PARITY BIT	NON	
	STOP BIT	1	
PLC ID(For PLC-485)		0-8	
PMC ID		0-8	Within PLC output driver range
INS		0-99,999[PULSE]	

▣Connection applications

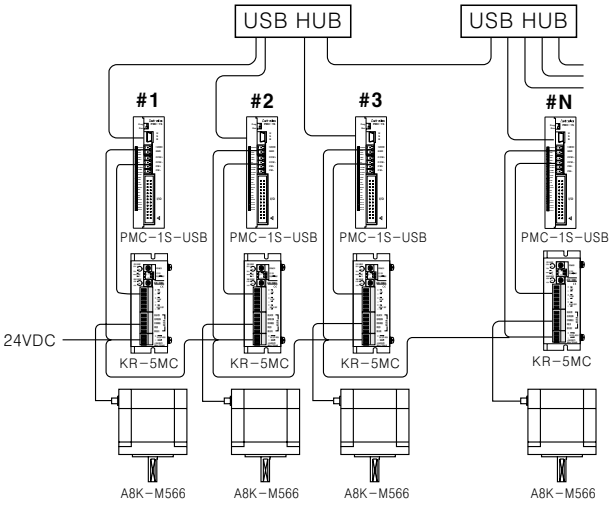
●PC-485 mode



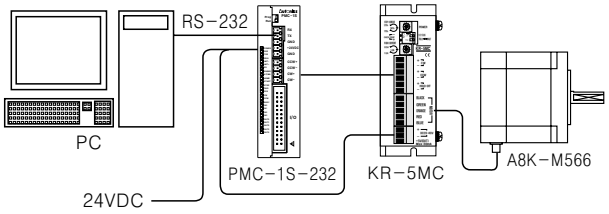
●PC-USB mode(Single-stage)



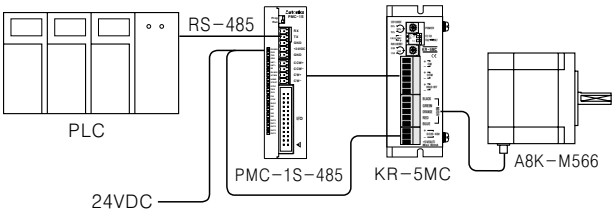
●PC-USB mode(Multi-stage)



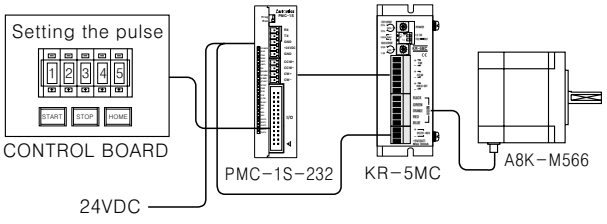
●PC-232 mode



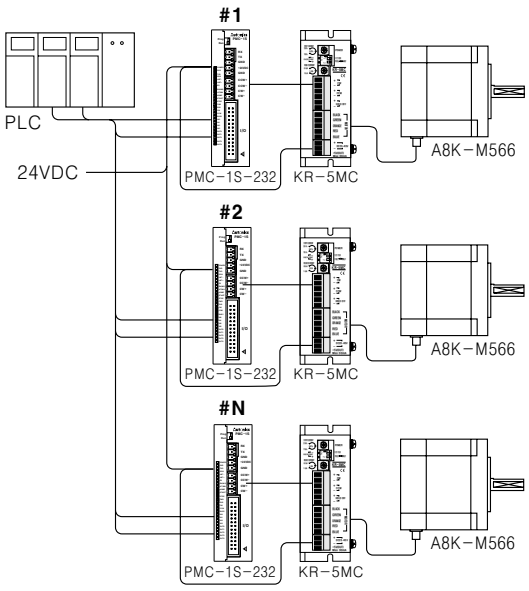
●PLC-485 mode



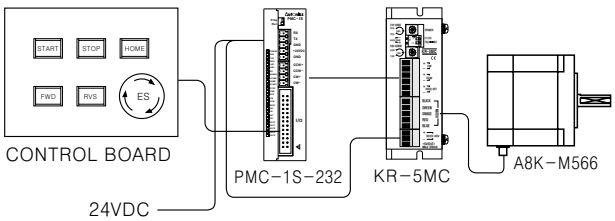
●BCD-SW mode



●PLC-BCD mode



●NORMAL mode



▣Stop mode function

Stop mode(STOP)	Stop input function by setting system parameter, only for AUTO
0	STOP mode function ineffective
1	Process from remain distance by input START after descend stop by input stop mode (The Remain distance is effective)
2	Operate next step with disregard Remain distance by input START after descend stop by input STOP
3	Disregard remain distance and remain step, and jump to END after descend stop by STOP
4	After move and descend stop as much as set direction set in system parameter "INS" by input STOP, Operate next step by input START
5	After move and descend stop as much as set direction set in system parameter "INS" by input STOP, Jump to END

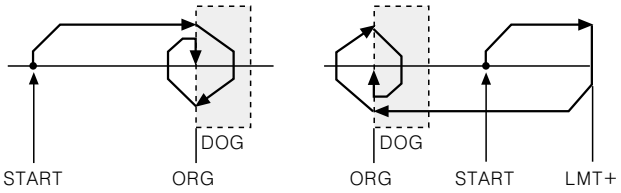
※"Remain distance" indicates from stop point input to the rest of set distance.
※Descend time during descend stop in stop mode is operated by descend data of relevant step.
※The shipping set value is "STOP mode 0".

▣Returning to origin, JOG operation

Type		Min.	Max.	Unit	Remarks
Common part	Starting speed	1	1,000	PPS	
	Speed	4	32,764	PPS	
JOG	JOG moving distance	1	100	PULSE	
Origin	Origin sensor(ORG)	Using			Basic set value:Use
		Non using			
	The direction of returning to origin	CW			Basic set value : CCW
		CCW			
	Soft origin coordinate	0	99,999	PULSE	Soft origin function is ineffective for 0
Soft limit	S-LMT +	0	99,999	PULSE	Absolute value at origin
	S-LMT −	0	99,999	PULSE	Absolute value at origin

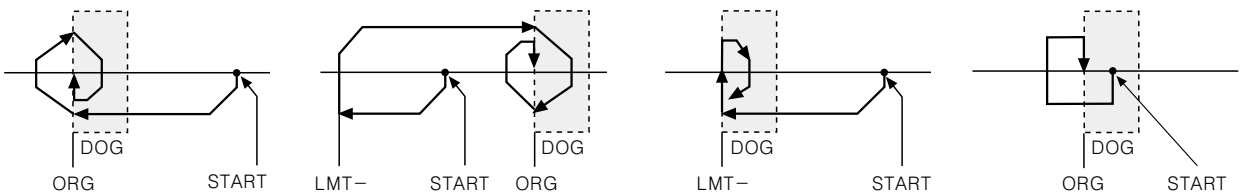
●Limit sensor in direction of returning to origin is used as an origin sensor during not using origin sensor.
 −If the direction of returning to origin is CCW, LMT− sensor operates as an origin sensor
 −If the direction of returning to origin is CW, LMT+ sensor operates as an origin sensor
●Setting function is unavailable when the setting value of soft origin and soft limit is 0.

◎The direction of returning to origin-CW



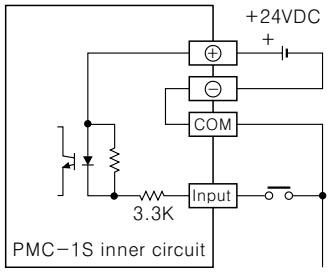
〈 Reverse direction of origin sensor 〉 〈 Non− origin sensor〉 〈 Start point in ORG 〉

◎The direction of returning to origin-CCW

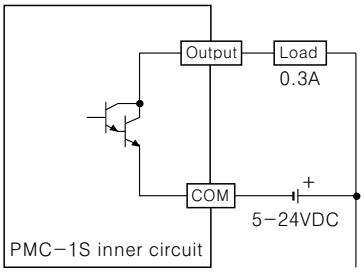


〈 Reverse direction of origin sensor 〉 〈 Non− origin sensor〉 〈 Start point in ORG 〉

▣Connections(Input/Output)

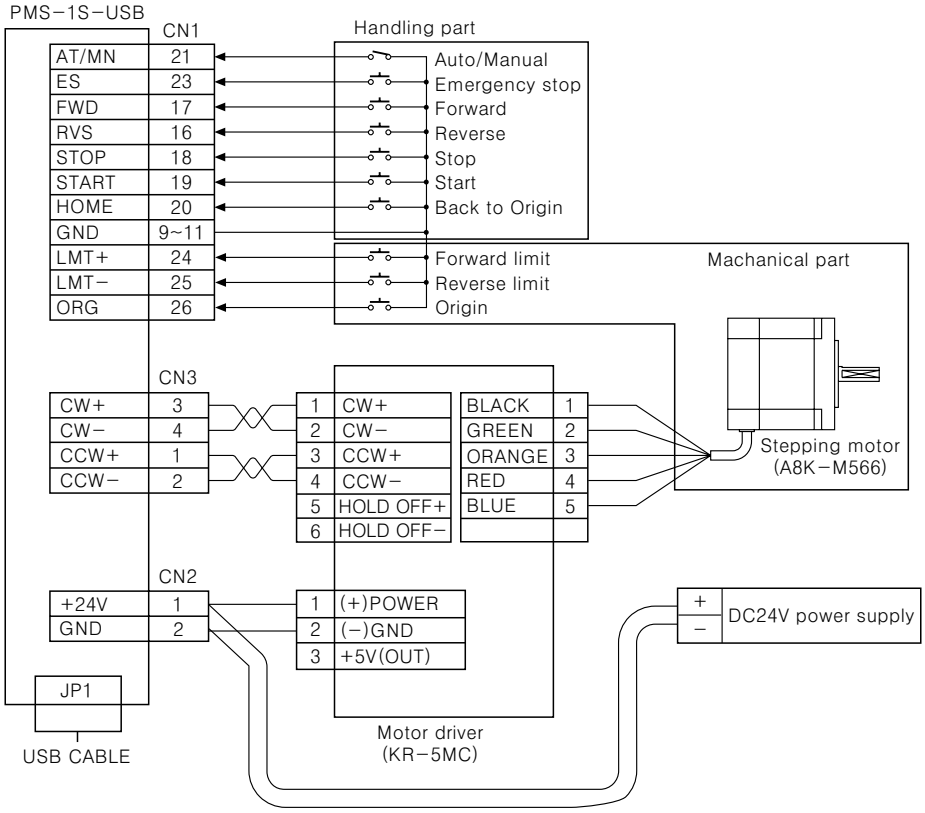


Input circuit

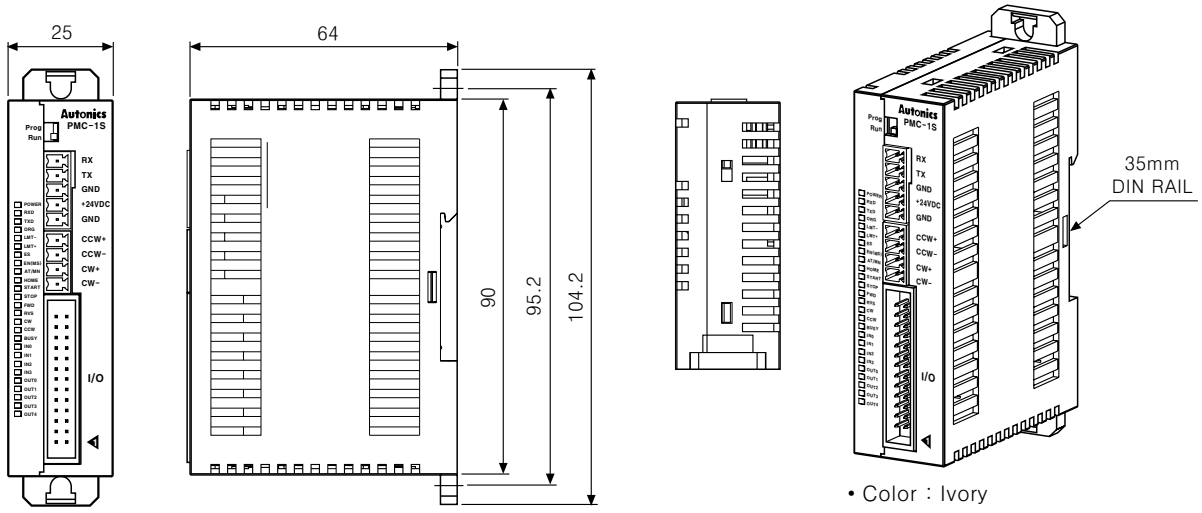


Output circuit

▣Entire connection(Motor driver+Motor)



▣Dimensions



- Color : Ivory
- DIN rail : 35mm
- Allowable vibration DIN rail : 0.5G
- Unit : mm

▣Proper usage

◎Precaution for wiring

- ●Even in case of trouble of external power or controller problem, please make sure the product is installed under safety protection.
  - − It may cause malfunction by electric shock, fire, inferior connection.

◎Precaution for setting up

- ●Set the limit switch by all means.
  - −It may result in human injury or product damage.
- ●Set the emergency stop switch by all means.
  - −It may result in human injury or product damage.
- ●Please install this unit after considering countplan against power failure.
  - −It may result in human injury or product damage.
- ●Please use this unit with the common environment mentioned in Caution for Safety.
  - −Do not use this product with these places, where there are lots of flammable or corrosive gas, where is beyond of rating temperature, humidity and where strong magnet field, electric vibration, or impact. It may cause electric shock, fire, malfunction or flame.
- ●Do not insert any metal material in the controller pan.
  - −It may cause malfunction by electric shock, fire, inferior connection.
- ●Please confirm the power input specification and the terminal before connecting the power by all means.
  - −It may cause a fire.
- ●Connecting controller or sensor requires the engineer who has expert knowledges.
  - −It may cause a fire, electric shock, human injury or product injury.
- ●Wiring must be based on the connection diagram.
  - − It may cause a fire, electric shock or product injury.
- ●The emergency stop needed during operation.
  - −It may cause human injury or damage to product.

◎Precaution for operating and checking

- ●Do not wire, connect or repair when the power is applied.
  - −It may cause an electric shock and malfunction.
- ●Do not repair this product without our engineer.
  - −It may cause an electric shock and malfunction.
  - ※ Please contact our company, when you need repair.
- ●Do not insert any metal material into aperture part.
  - −It may cause a fire, electric shock, malfunction or product injury.
- ●Handling the operation such as, mechanical returning to origin, operating JOG, automatic and manual operation, and etc. is required enough knowledge about the manual and mind about safety.