AC Type Controller Integrated 2-Phase Closed-Loop Stepper Motor Driver

▣ Features

- Real-time position controllable with closed-loop system
- Motor driver and controller integral type
- As AC power type, possible to omit SMPS and perform higher torque than DC power type
- Able to check alarm and status with Alarm/Status display part (7 segment)
- Controllable maximum 31 axis with RS485 communication
- Auto Current Down Mode available
- C language library provided (32-bit, 64-bit)
- Dedicated Windows program (atMotion) provided
- Easy to set various Gain with program (GUI)
- Applicable to the precision equipment such as optical inspection equipment with the features of maintaining torque in stop and having no micro vibration (hunting)
- 10 levels of resolutions available
- Frame size 42mm, 56mm, 60mm motor supported (Applied motor: AiA-M Series)

Please read "Safety Considerations" in the instruction manual before using.

▣ Applications

- Filed requiring preciseness such as semiconductor equipment, 3D printer, optical inspection equipment, chip mounter, cartesian robot, conveying equipment, and alignment stage.

▣ Manual

For the detail information and instructions, please refer to user manual, user manual for communication manual and library manual and be sure to follow cautions written in the technical descriptions (catalog, website).
Visit our website (www.autonics.com) to download manuals.

▣ Software (atMotion)

- atMotion is a comprehensive motion device management program that can be used with Autonics motion controllers.
- atMotion provides GUI control for easy and convenient parameter setting and monitoring data management of multiple devices.
- Visit our website (www.autonics.com) to download the user manual and software.

< Computer specification for using software>

Item	Minimum requirements
System	IBM PC compatible computer with Intel Pentium III or above
Operations	Microsoft Windows 98/NT/XP/Vista/7/8/10
Memory	256MB+
Hard disk	1GB+ of available hard disk space
VGA	Resolution: 1024×768 or higher
Others	RS-232 serial port (9-pin), USB port

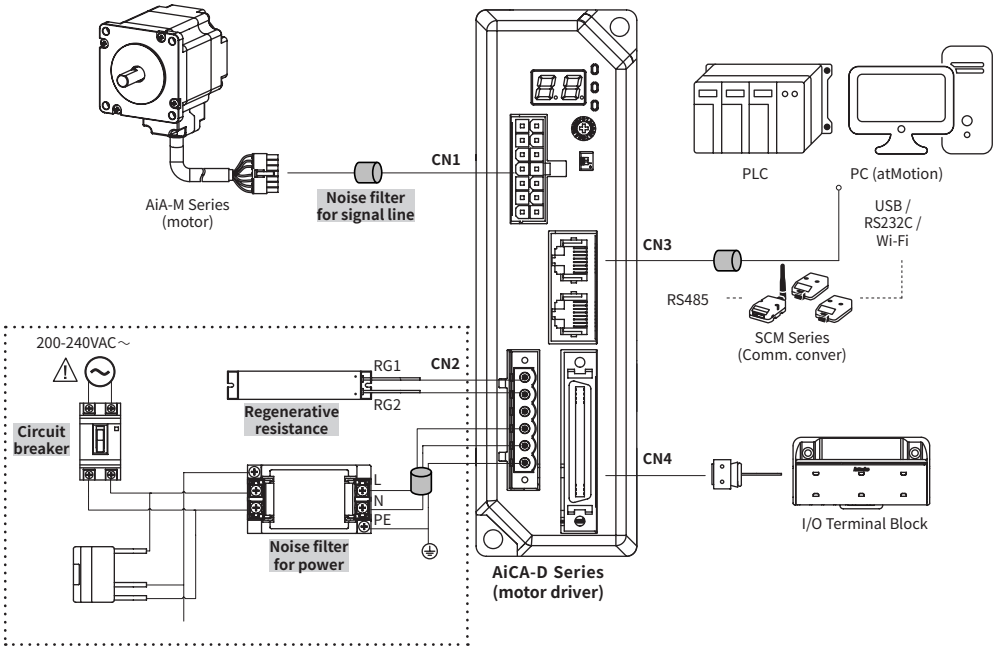
< atMotion screen >

▣ Ordering Information

Ai	C	A	-	D	-	60	M	A

- Encoder resolution
  - **A** 10,000PPR(2,500PPR×4-multiply)
- Motor length
- Motor frame size
  - **60** (60×60mm)
    - **M** 82.8mm
    - **L** 103.8mm
  - **86** (86×86mm)
    - **M** 94.9mm
    - **L** 109.4mm
- Item
  - **D** Driver
- Voltage
  - **A** AC power
- Category
  - **C** Controller
- Series
  - **Ai** Artificial intelligence

▣ Configuration Diagram



※1: The thickness of cable should be same or thicker than the below specifications when connecting the cable for connector.
① CN1(motor+encoder connector): AWG22, AWG24
② CN2(power connector): AWG18
③ CN3(communication connector): AWG28
④ CN4(I/O connector): AWG28
※2: In case of unstable communication due to noise from peripherals and power, use ferrite core in the wiring.
※3: Sold separately.

◎ Noise filter for signal line

-Connect to wiring to suppress external noise.
-Depending on frequency, filtered noise may different.

Model	Specification	Manufacture
Comm. line	28A2025-0A2	Lairdtech
Motor line	28A5776-0A2	
Power line	28A5131-0A2	

◎ Regenerative resistance

-Connect Pin no. 1, 2 on power connector (CN2).
-Use in condition of the high inertia load or the short deceleration time.
-Forced cooling is required in condition of high surface temperature of regenerative resistance.

Model	Specification	Manufacture
IRC100	• Resistance: 100Ω ±5%, • Rated Power: 60W(standby), 100W(heatsink attached)	Rara Electronics Corp.

◎ Noise filter for power

-Connect the power to suppress external noise.
-The wires should be connected as short as possible and grounded.

Model	Specification	Manufacture
RNS-2006	• Rated voltage: 250V • Rated current: 6A • Max. leakage current: 1mA	Orient Electronics

◎ Surge protector

Protect the product from external noise and surge by connecting power.
※ Be sure to disconnect the surge protector when testing internal pressure.
It may result in porduct damage.

Model	Specification	Manufacture
LT-C12G801W	—	OTOWA Electric Co. Ltd

▣ Specifications

Model		AiCA-D-60MA	AiCA-D-60LA	AiCA-D-86MA	AiCA-D-86LA
Power supply		200-240VAC～ 50/60Hz			
Power consumption	STOP※1	Max. 60W		Max. 65W	
	Max. during operation	Max. 160W	Max. 220W	Max. 250W	Max. 300W
Max. RUN current※2		2.0A/Phase			
STOP current		20% of max. RUN current			
Rotation speed		0 to 3000rpm			
Resolution※3		500 (factory default), 1000, 1600, 2000, 3200, 3600, 5000, 6400, 7200, 10000 PPR			
Motor GAIN		0 to 30, Fine Gain			
Positioning range		-2,147,483,648 to +2,147,483,647			
In-Position		Fast Response: 0 to 7 Accurate Response: 0 to 7			
Motor rotation direction※2		CW, CCW			
Status display		• Power/Alarm indicator: green/red LED • In-Position indicator: orange LED • Servo On/Off indicator: blue LED • Alarm/Status display part: red LED 7seg.			
I/O voltage level		[H]: 15-30VDC⎓, [L]: 0-2VDC			
I/O	Input	Exclusive input: 20, general input: 9			
	Output	Exclusive output: 4, general output: 10			
External power supply		VEX(recommended: 24VDC⎓): 2, GEX(GND): 2			
Operation mode		Jog / Continuous / Index / Program / Position / Torque mode			
Index step numbers		64 steps			
Program Function	Step	256 steps			
	Control Command	ABS(move absolute position), INC(move incremental position), HOM(home search), ICJ(jump input condition), IRD(waiting input), OPC(ON/OFF of output port), OPT(on pulse from output port), JMP(jump), REP(start repetition), RPE(end repetition), END(end program), POS(position set), TIM(timer), CMP(compare output), TOQ(torque control)			
	Start	Power ON program auto-start function			
	Home search	Power ON home search auto-start function			
RS485 Comm.	Comm. Speed※3	9600, 19200, 38400, 57900, 115200(factory default) [bps]			
Multiaxial control		31-axis			
ID setting switch		16bit rotary switch(0~F), 1bit DIP switch			
Alarm output		Overcurrent, overspeed, position tracking, overload, overheat, motor connection, encoder connection, overvoltage, undervoltage, motor misalignment, command speed, In-Position, memory, emergency stop, program mode, index mode, home search mode			
Warning output		±Software limit, ±hardware limit, overload			
Input resistance		4.7kΩ(Anode Pull-up)			
Insulation resistance		Over 200MΩ (at 500VDC megger)			
Dielectric strength		1,500VAC 60Hz for 1 min			
Vibration		1.5mm amplitude at frequency of 10 to 55Hz(for 1 min) in each X, Y, Z direction for 2 hours			
Shock		300m/s^2(approx 30G) in each X, Y, Z direction for 3 times			
Environment	Ambient temp.	0 to 50℃, storage: -10 to 60℃			
	Ambient himi.	35 to 85%RH, storage: 10 to 90%RH			
Protection structure		IP20(IEC standard)			
Sold separately		• I/O cable: CO50-MP□-R※4(standard: AiC TAG) • Motor+Encoder cable - normal: C1D14M-□※5 / moving: C1DF14M-□※5 • Communication converter: SCM-WF48, SCM-US48I, SCM-38I			
Approval		CE			
Weight※6		Approx. 1,080g (approx. 800g)			

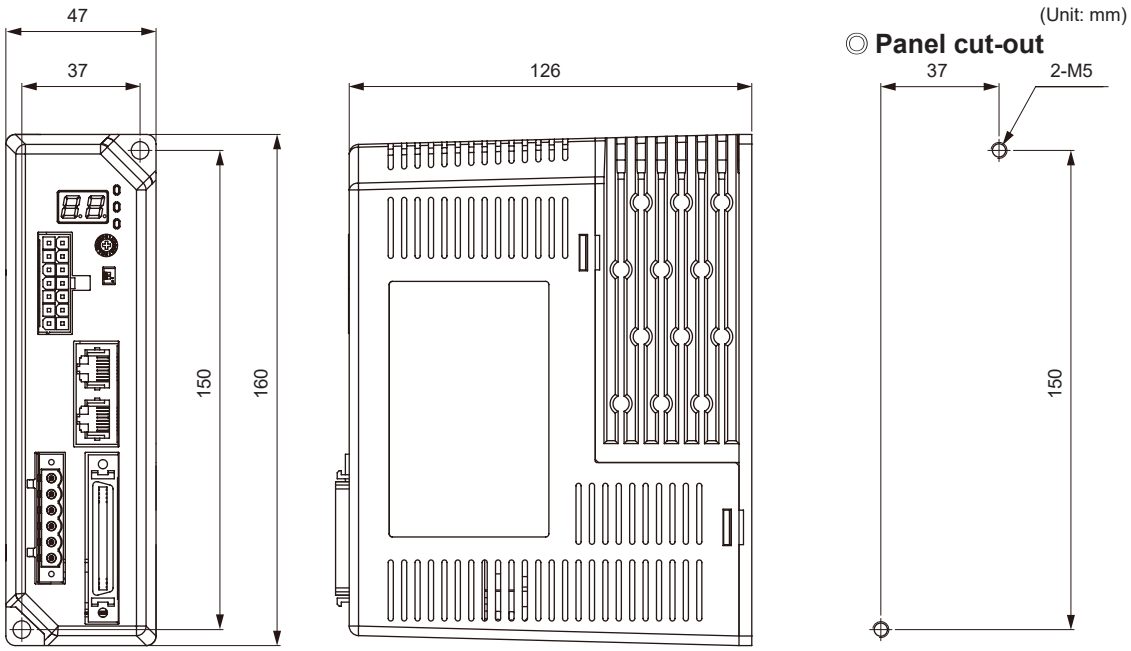
※1: Based on the ambient temperature 25℃, ambient humidity 55%RH and STOP current 20%.
※2: RUN current varies depending on the input RUN frequency and max. RUN current at the moment varies also.
※3: Settable with the dedicated program (atMotion).
※4: □of model name indicates cable length (010, 020, 030, 050, 070, 100, 150, 200)
E.g.) CO50-MP070-R: 7m I/O cable.
For corresponding EMC standard, cable length should be below 2m.
※5: □ of model name indicates cable length (1, 2, 3, 5, 7, 10, 15, 20)
E.g.) C1DF14M-10: 10m moving type motor+encoder cable.
※6: The weight includes packaging. The weight in parenthesis is for unit only.
※Environment resistance is rated at no freezing or condensation.

▣ Factory Default

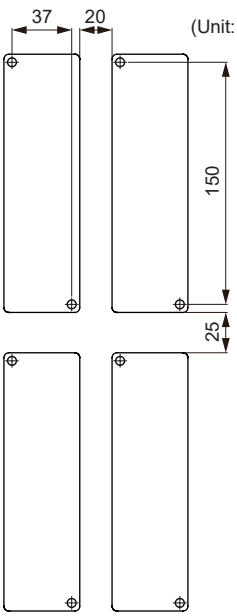
Function		Factory default
Resolution		500PPR
Motor GAIN		0
In-Position		0
Comm. speed		115,200bps
Communication ID setting switch (ID Sel)		1
Communication ID setting/Terminating resistance setting DIP switch(ID, TERM)	Communication ID setting (ID)	OFF
	Terminating resistance setting (TERM)	OFF

▣ Dimensions

(Unit: mm)

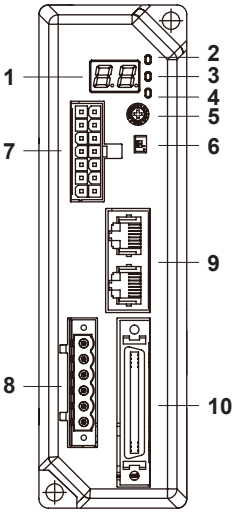


▣ Installation



※Install on the metal plate with high thermal conductivity for heat dissipation of the driver.
※Install in the well-ventilated area and install the cooling fan in the unventilated environment.
※Failure to heat dissipation may result in damage or malfunction due to the stress on the product.
Check the environment of use within the rated specifications and install on the well-heat dissipated area.
※In case of installing the drivers more than two,
keep distance at least 20mm in the horizontal direction and at least 25mm in the vertical direction.

▣ Unit Descriptions



1. Alarm/Status display part (orange)
: Displays the corresponding number, status, model, etc. when Alarm occurs.
2. Power/Alarm indicator (PWR/ALM) (green/red)
3. In-Position indicator (INP) (orange)
:Turns ON when motor is placed at command position after positioning input.
4. Servo On/Off indicator (SERVO) (blue)
: Turns ON when Servo is operating
Turns OFF when Servo is not operating
5. Communication ID setting rotary switch (ID Sel setting: 0 to F)
: [ID OFF] ID Sel setting 0~F → Node ID 0(disable)~15
[ID ON] ID Sel setting 0~F → Node ID 16~31
6. Communication ID setting/Terminating resistance DIP switch (ID, TERM)
: ID - Communication ID setting,
TERM - Set to use terminating resistance
7. Motor+Encoder connector (CN1)
8. Power connector (CN2)
9. Communication cable connector (CN3)
10. I/O connector (CN4)

▣ Driver Status Indicators

Indicator & Display part	LED color	Function	Descriptions
PWR/ALM	Green	Power indicator	Turns ON when the unit operates normally after supplying power.
	Red	Alarm indicator	When alarm occurs, it flashes in various ways depending on the situation. Refer to '▣ **Control Input/Output** → ◎ **Output** → **3. Alarm/Warning**'.
INP.	Orange	In-Position indicator	Turns ON when motor is placed at command position after positioning input.
SERVO	Blue	Servo On/Off indicator	Turns ON when Servo is operating, turns OFF when servo is not operating.
Alarm/Status display part	Red	Alarm, status indicator	Displays the corresponding number, status, model, etc. when Alarm occurs.
RxD IN※1	Yellow	RS485 Data I/O display	Flashes when receiving data.
TxD OUT※1	Green		Flashes when sending data.

※1: Although RS485 OUT is disconnected, RXD IN/TXD OUT operates normally, if RS485 IN is communicating.

▣ Driver Setting

◎ ID Sel: Communication ID setting switch

※Set Node ID of the driver.
※Depending on the ID setting of the ID/Term switch, it is possible to connect max. 31-axis.

Setting switch	Setting	ID		Setting	ID	
		ID OFF	ID ON		ID OFF	ID ON
 ID Sel	0	Disable	16	8	8	24
	1	1 (factory default)	17	9	9	25
	2	2	18	A	10	26
	3	3	19	B	11	27
	4	4	20	C	12	28
	5	5	21	D	13	29
	6	6	22	E	14	30
	7	7	23	F	15	31

◎ ID, TERM: Communication ID setting/Terminating resistance DIP switch

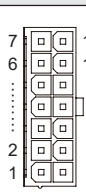
※Set Node ID of the driver.
※Set to use terminating resistance.

	No.	Function	Switch position	
			ON	OFF(factory default)
	1	ID setting	ID: 16~31	ID: 1~15
	2	Terminating resistance	Use terminating resistance (120Ω)	Do not use terminating resistance

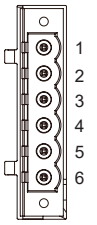
▣ Driver Connectors

◎ Connector function

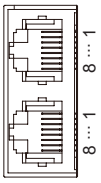
● CN1: Motor+Encoder connector

Pin arrangement	Pin no.	Fuction	Pin no.	Function
	1	GND	8	+5VDC
	2	Encoder A	9	Encoder $\overline{A}$
	3	Encoder B	10	Encoder $\overline{B}$
	4	Encoder Z	11	Encoder $\overline{Z}$
	5	PE	12	N·C
	6	Motor A	13	Motor B
	7	Motor $\overline{A}$	14	Motor $\overline{B}$

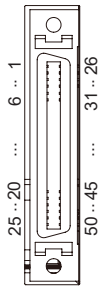
● CN2: Power connector

Pin arrangement	Pin no.	Function
	1	Connect regenerative resistance
	2	
	3	N·C
	4	AC power input
	5	
	6	PE

● CN3: RS485 Communication cable connector

Pin arrangement	Pin no.	Input/Output	Function	Pin no.	Input/Output	Function
	1	—	N·C	5	—	N·C
	2	—	N·C	6	Input/Output	RS485 DATA-
	3	Input/Output	RS485 DATA+	7	—	N·C
	4	—	N·C	8	—	N·C

● CN4: I/O connector

Pin arrangement	Pin no.	Input/Output	Function	Pin no.	Input/Output	Function
	1	—	N·C	26	Input	IN0
	2	—	N·C	27	Input	IN1
	3	Input	Reset	28	Input	IN2
	4	Input	Start	29	—	N·C
	5	Input	Stop	30	Input	IN3
	6	Input	EMG	31	Input	IN4
	7	Input	Step0/+Run/+Jog	32	Input	IN5
	8	Input	Step1/-Run/-Jog	33	Input	IN6
	9	Input	Step2/SSP0	34	Input	IN7
	10	Input	Step3/SSP1	35	Input	IN8
	11	Input	Step4/MSP0	36	Input	VEX
	12	Input	Step5/MSP1	37	Input	GEX
	13	Input	MD0/HMD0	38	Output	Alarm
	14	Input	MD1/HMD1	39	Output	Compare1(Trigger)
	15	Input	Pause	40	Output	Compare2(Trigger)
	16	Input	Servo On/Off	41	Output	OUT0
	17	Input	Home	42	Output	OUT1
	18	Input	Alarm Reset	43	Output	OUT2
	19	Input	+Limit	44	Output	OUT3
	20	Input	-Limit	45	Output	OUT4
	21	Input	ORG	46	Output	OUT5
	22	Input	SD	47	Output	OUT6
	23	Output	In-Position	48	Output	OUT7
	24	Input	VEX	49	Output	OUT8
	25	Input	GEX	50	Output	OUT9

◎ Connector Specifications

Type		Specifications			Manufacture
		Connector	Connector terminal	Housing	
CN1	Motor+Encoder	5557-14R	5556T	—	Molex
CN2	Power	5ESDVM-06P-OR	—	—	Dinkle
CN3	Communication	LS-CV-J45BBKZ	—	—	EPN.
CN4	I/O connector	10150-3000PE	—	10350-52F0-008	3M

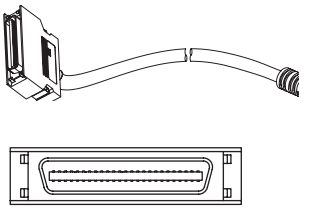
※Above connectors are suitable for AiCA-D Series

▣ Sold Separately

※Recommended to use ferrite core at both ends of the I/O cable and Motor+Encoder cable.

◎ I/O Cable

• CO50-MP□-R
(Standard: AiC TAG)

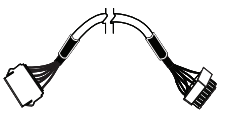


Pin no.	Function (Name TAG)	Cable color	Dot line color-numbers	Pin no.	Function (Name TAG)	Cable color	Dot line color-numbers
1	Brake+	Orange	Black-1	26	IN0	White	Red-3
2	Brake-		Red-1	27	IN1		Black-4
3	Reset		Black-2	28	IN2		Red-4
4	Start		Red-2	29	N·C		Black-5
5	Stop		Black-3	30	IN3		Red-5
6	EMG		Red-3	31	IN4	Gray	Black-1
7	Step0/+Run/+Jog		Black-4	32	IN5		Red-1
8	Step1/-Run/-Jog		Red-4	33	IN6		Black-2
9	Step2/SSP0		Black-5	34	IN7		Red-2
10	Step3/SSP1		Red-5	35	IN8		Black-3
11	Step4/MSP0	Yellow	Black-1	36	VEX		Red-3
12	Step5/MSP1		Red-1	37	GEX		Black-4
13	MD0/HMD0		Black-2	38	Alarm		Red-4
14	MD1/HMD1		Red-2	39	Compare1		Black-5
15	Pause		Black-3	40	Compare2		Red-5
16	Servo On/Off		Red-3	41	OUT0	Pink	Black-1
17	Home		Black-4	42	OUT1		Red-1
18	Alarm Reset		Red-4	43	OUT2		Black-2
19	+Limit		Black-5	44	OUT3		Red-2
20	-Limit		Red-5	45	OUT4		Black-3
21	ORG	White	Black-1	46	OUT5		Red-3
22	SD		Red-1	47	OUT6		Black-4
23	In-Position		Black-2	48	OUT7		Red-4
24	VEX		Red-2	49	OUT8		Black-5
25	GEX		Black-3	50	OUT9		Red-5

※□ of model name indicates cable length (010, 020, 030, 050, 070, 100, 150, 200).
E.g.)CJ-MP50-HP070: 7m I/O cable

◎ Motor+Encoder cable

• Normal: C1D14M- □, Moving: C1DF14M- □



※□ of model name indicates cable length (1, 2, 3, 5, 7, 10, 15, 20).
E.g.) C1DF14M-10: 10m moving type motor+encoder cable

◎ Communication converter

• SCM-WF48
(Wi-Fi to RS485·USB wireless communication converter)

CE K

• SCM-US48I
(USB to RS485 converter)

CE K

• SCM-38I
(RS232C to RS485 converter)

CE K

▣ Control Input/Output

Inner signal of all input/output consists of photocoupler.
ON [H]: photocoupler power ON
OFF [L]: photocoupler power OFF

◎ Input

1. Exclusive input (20)

Signal name	Descriptions	Pin no.	Signal name	Descriptions	Pin no.
Reset	Reset command	3	MD0/HMD0	Operation mode designate 0 / Home search mode designate 0	13
Start	Drive start command	4	MD1/HMD1	Operation mode designate 1 / Home search mode designate 1	14
Stop	Drive stop command	5	Pause	Pause	15
EMG	Drive emergency stop command	6	Servo On/Off	Servo On/Off	16
Step0/+Run/+Jog	Step designate 0 / +Run / +Jog	7	Home	Home search	17
Step1/-Run/-Jog	Step designate 1 / +Run / +Jog	8	Alarm Reset	Alarm reset command	18
Step2/SSP0	Step designate 2 / Start speed designate 0	9	+Limit	+direction limit sensor	19
Step3/SSP1	Step designate 3 / Start speed designate 1	10	-Limit	-direction limit sensor	20
Step4/MSP0	Step designate 4 / Max. Speed designate 0	11	ORG	Home sensor	21
Step5/MSP1	Step designate 5 / Max. Speed designate 1	12	SD	Dceleration (deceleration stop) signal	22

2. General input (9)

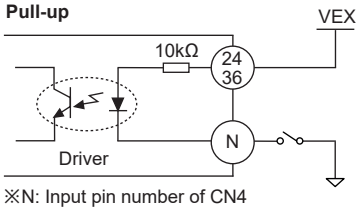
Signal name	Descriptions	Pin no.
IN0~IN2	General input 0 to 2	26 to 28
IN3~IN8	General input 3 to 8	30 to 35

3. Example of input circuit connection

-All input circuits are insulated with photocoupler, and separate external power (recommended: 24VDC) is necessary.
-Case of using external power 24VDC does not require R_L.
-In case using external power over 24VDC, select RL value that I_F (forward current of primary LED) of photocoupler to be around 2.5mA (max. 10mA).

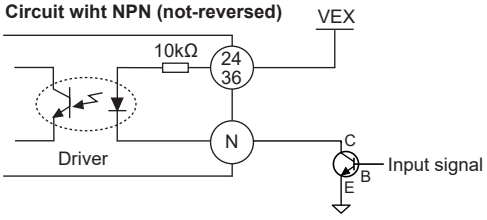
$$※R_L = \frac{VEX-1.25V}{0.0025A} - 10\times10^3\Omega$$

A. Pull-up



※N: Input pin number of CN4

B. Circuit wiht NPN (not-reversed)



◎ Output

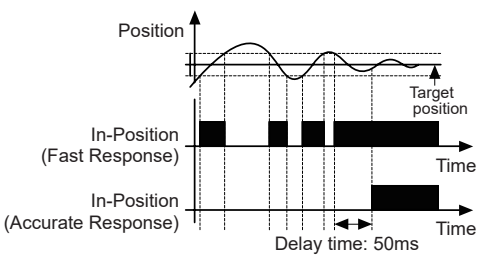
1. Exclusive output (4)

Signal name	Descriptions	Pin no.	Signal name	Descriptions	Pin no.
In-Position	Drive ending pulse	23	Compare1(Trigger)	Comparison output 1	39
Alarm	Alarm output	38	Compare2(Trigger)	Comparison output 2	40

2. In-Position

-In-Position output represents output is output of positioning completion signal.
-If the gap between target position and real position is under In-Position setting value after position command pulse has finished, In-Position output turns ON and In-Position indicator turns ON.
-In reverse, when the gap is over In-Position setting value, In-Position output turns OFF and the In-Position indicator turns OFF.
※For accurate drive, check the In-Position output again and execute the next drive.
※Refer to '**6. example of output circuit connection**'.

Fast Response		Accurate Response	
Setting	Value	Setting	Value
0 (factory default)	0	8	0
1	±1	9	±1
2	±2	10	±2
3	±3	11	±3
4	±4	12	±4
5	±5	13	±5
6	±6	14	±6
7	±7	15	±7



▣ Control Input/Output

3. Alarm/Warning

- **Alarm**
  - -This function stops motor to protect driver, depending on the error status such as overcurrent or overspeed.
  - -In case of normal status, output turns ON, and in case of alarming status, output turns OFF.
  - -When supplying alarm reset, driver returns to the normal status.
  - ※Refer to '**6. example of output circuit connection**'.
- **Warning**
  - -This function notices dangers with the alarm indicator prior to motor stop with limit signal or overload alarm.
  - -When turning out from the alarming condition, driver returns to the normal status automatically.
- **Alarm/Warning indicator**
  - -When alarm occurs, the alarm indicator (ALM, red) flashes as the times of corresponding alarm type.
  - -The alarm/status display part displays the number of the corresponding alarm type.

Alarm/Status	Alarm type	Descriptions	Motor status	Torque status
01	Overcurrent error	When overcurrent flows at motor RUN element	Stop	Release
02	Overspeed error	When motor speed is over 4,000rpm		
03	Position tracking error	When the gap between position command value and current position value is over 90°		
04	Overload error	When applying load over the rated load for over 1 sec		
05	Overheat error	When heatsink temperature is over 80℃		
06	Motor connection error	When motor cable connection error occurs at driver		
07	Encoder connection error	When encoder cable connection error occurs at driver		
08	Overvoltage error	When input voltage is over 240VAC +10%		
09	Undervoltage error	When input voltage is under 200VAC -10%		
10	Motor misalignment	When motor is in misalignment		
11	Command pulse error	When input pulse is over 3,500rpm		
		When pulse is input before initial alignment		
12	In-Position error	When position error (over 1) is kept over 3 sec, after motor stopped.		
13	Memory error	When memory error is detected as power supplied		
14	Emergency stop	When emergently stopped with emergency stop command	Stop	Remain
15	Program mode errer	When 'END' command is not exist at the last step		
16	Index mode error	When other instruction is used but 'INC', 'ABS'		
		When index command is not completed du to the stop command		
17	Home search mode error	When failed to find home		

※Depending on the alarm/warning type, it displays as a segment on the Alarm/Status display part.

Warning/Stauts	Warning type	Descriptions	Motor status	Torque status
Y1	+Software limit	When normal direction (CW) software limit is ON.	Stop	Remain
Y2	-Software limit	When reverse direction (CCW) software limit is ON.		
Y3	+Hardware limit	When normal direction (CW) hardware limit is ON.		
Y4	-Hardware limit	When reverse direction (CCW) hardware limit is ON.		
Y5	Overload warning	When maximum load is kept connected over 10 sec. (may cause overheat on motor and driver)	Remain	Remain

※Even though warning occurs, it drives as normal status and it may cause damage by fire.
It is recommended not to use the unit during warning status.

▣ Control Input/Output

4. Comparison output (Compare1, Compare2)

It outputs trigger pulse at the designated cycle.

Mode	Description
0	Not use comparison output.
1	Comparison output turns ON when the present absolute position value is same or bigger than the set position value.
2	Comparison output turns ON when the present absolute position value is same or smaller than the set position value.
3	Trigger pulses output with the set interval and width.

※Please refer to the user manual to learn how to set.

5. General output (10)

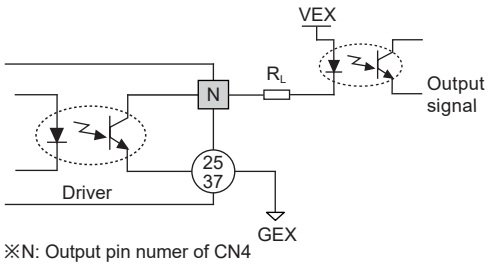
Signal name	Descriptions	Pin no.
OUT0 to OUT9	General output 0 to 9	41 to 50

6. Example of output circuit connection

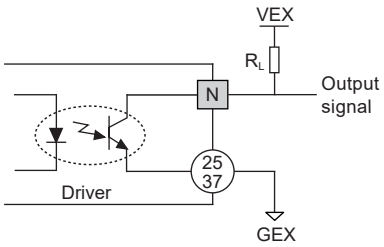
-All output circuits are insulate with photocoupler.
-External power input is available from 5VDC to 80VDC with the open collector method.
Select RL value that IC (collector current of secondary LED) of photocoupler to be around 10mA.

$※R_L = \frac{VEX-0.7V}{0.01A}$

A. Circuit with photocoupler



B. Circuit with pull-up(reversed)



※N: Output pin numer of CN4

▣ Communication Output

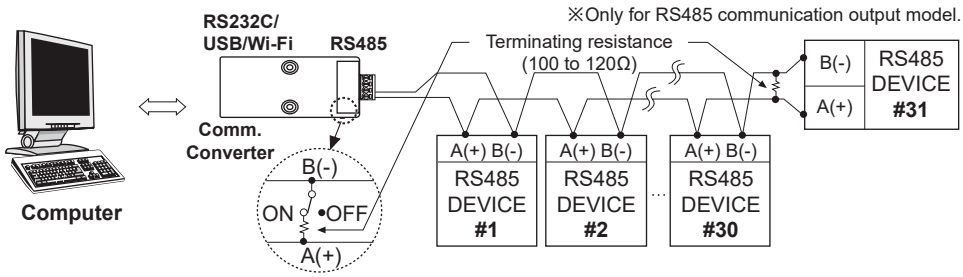
It is for parameter setting and monitoring via external devices (PC, PLC, etc.).

◎ Interface

Comm. protocol	Modbus RTU	Comm. speed	9600, 19200, 38400, 57600, 115200 bps
Connection type	RS485	Comm. response wait time	5 to 99ms
Application standard	Compliance with EIA RS485	Start bit	1bit (fixed)
Max. connections	31 units (address: 01 to 31)	Data bit	8bit (fixed)
Synchronous method	Asynchronous	Parity bit	None, Even, Odd
Comm. method	Two-wire half duplex	Stop bit	1-bit, 2-bit
Comm. distance	Max. 800m		

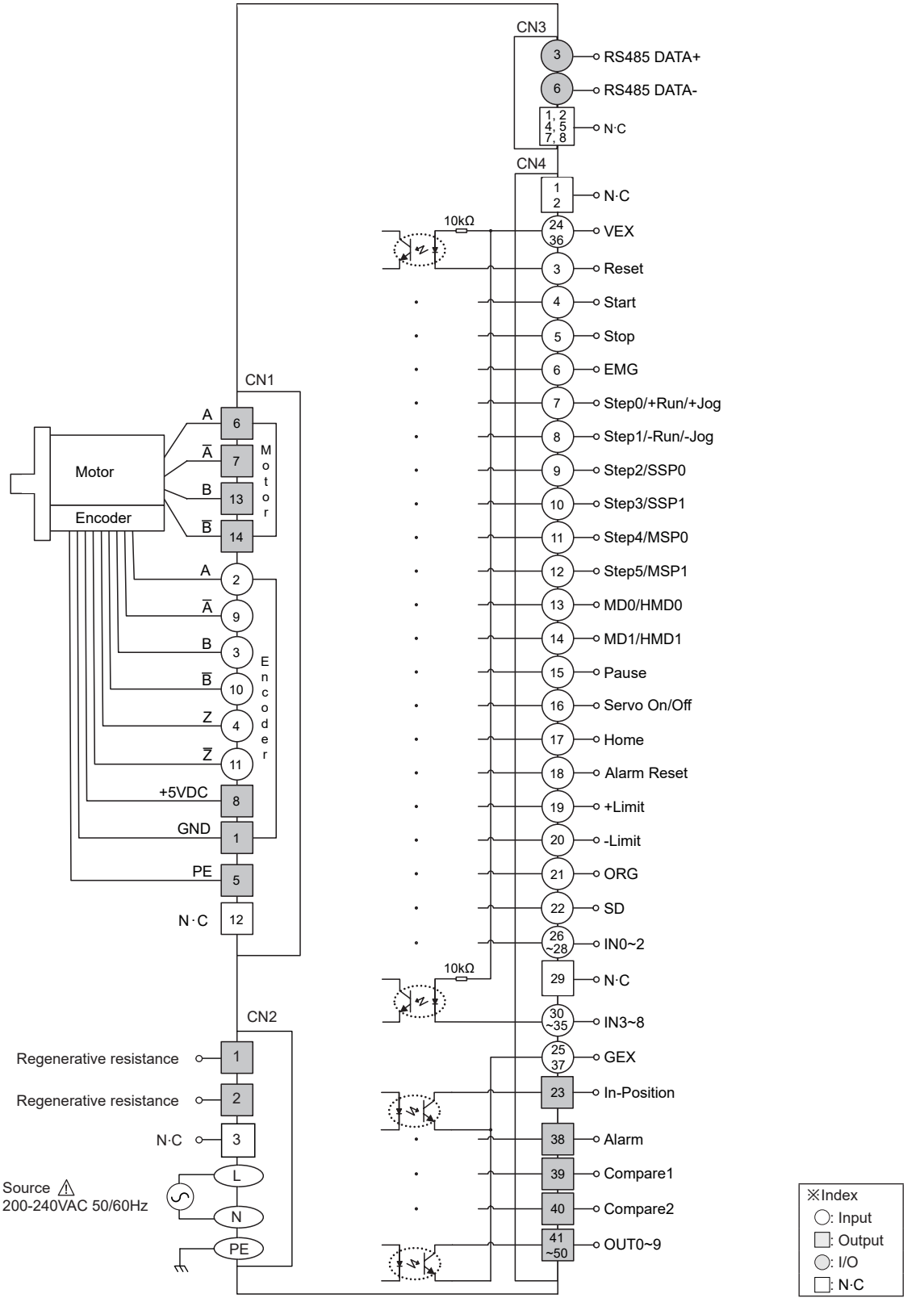
※It is not allowed to set overlapping communication address at the same communication line.
Use twisted pair wire for RS485 communication.

◎ Application of system organization



※It is recommended to use Autonics communication converter;
SCM-WF48 (Wi-Fi to RS485·USB wireless communication converter, sold separately),
SCM-US48I (USB to RS485 converter, sold separately), SCM-38I (RS232C to RS485 converter, sold separately).
Please use twisted pair wire, which is suitable for RS485 communication, for SCM-WF48, SCM-US48I and SCM-38I.

▣ Connection of Motor and Driver



▣ Troubleshooting

Malfunction	Causes	Troubleshooting
When communication is not connected	The communication cable is not connected.	Check communication cable wiring. Check communication cable connection correctly.
	The communication port or speed settings are not correct.	Check communication port and speed settings are correct.
When motor does not excite	Servo is not ON.	Check that servo On/Off input signal is [L]. In case of [H], servo is off and excitation of motor is released.
	Alarm occurs.	Check the alarm type and remove the cause of alarm.
When motor rotates to the opposite direction of the designated direction	MotorDir parameter setting is not correct.	Check the MotorDir parameter settings.
When motor drive is unstable	Connection between motor and encoder is unstable.	Check the Motor+Encoder connection cable.
	Motor gain value is not correct.	Change the Motor Gain parameter as the certain value.

▣ Proper Usage

- Follow instructions in 'Proper Usage'.
  Otherwise, It may cause unexpected accidents.
- It is recommended to use 485 converter with the separate power.
  (Autonics product, SCM-38I, recommended)
- Keep the distance between power cable and signal cable more than 10cm.
- Motor vibration and noise can occur in specific frequency period
  ①Change motor installation method or attach the damper.
  ②Use the unit out of the dedicated frequency range when vibration and noise occurs due to changing motor RUN speed.
- For using motor, it is recommended to maintenance and inspection regularly.
  ①Unwinding bolts and connection parts for the unit installation and load connection
  ②Strange sound from ball bearing of the unit
  ③Damage and stress of lead cable of the unit
  ④Connection error with motor
  ⑤Inconsistency between the axis of motor output and the center, concentric (eccentric, declination) of the load, etc.
- This product does not prepare protection function for a motor.
- This unit may be used in the following environments.
  ①Indoors (in the environment condition rated in 'Specifications')
  ②Altitude max. 2,000m
  ③Pollution degree 2
  ④Installation category II