Melec

Stepping & Servo Motor Controller

C-VX870

C-VX872

Instructions Manual

(For designers' use)

USER'S MANUAL

Please ensure to read and understand this Instructions Manual before using the Product. Please keep this Instructions Manual at hand so that it is always available for reference.

CE

MN0147

Introduction

This instructions manual explains the handling of "Stepping Motor and Servo Motor Controller C-VX870, C-VX872" emphasizing the specifications to enable proper and safe use.
The manual is thus intended for designers of control systems using stepping motors or servo motors.
Before using the product, read this manual carefully for better understanding.
Keep the manual handy so that you can read it whenever you want.

The C-VX870,C-VX872 allows axes to be controlled independently and therefore referred to each axis as follows:

Product Name	Number of axes	1st axis	2nd axis	3rd axis	4th axis	5th axis	6th axis	7th axis	8th axis
C-VX870	4 axes	X axis	Y axis	Z axis	A axis	—	—	—	-
C-VX872	8 axes	X1 axis	Y1 axis	Z1 axis	A1 axis	X2 axis	Y2 axis	Z2 axis	A2 axis

This manual basically explains only the X axis.

Description of Safety

This product must be handled correctly.
Handling the product incorrectly may cause unexpected accidents resulting in personal injuries or damage to your properties.
Many of those accidents can be avoided if you have advance information on dangerous situations.
This manual provides precautions where dangerous situations are predicted. The manual provides the following alert marking and messages for this purpose:

⚠WARNING	This indicates a hazardous situation that could result in death or serious personal injury if you do not perform the procedure correctly.
⚠CAUTION	This indicates a potentially hazardous situation that could result in personal injury or physical damage if you do not perform the procedure correctly.

Before Use

■This product is not designed for use in the equipment related to nuclear power, aerospace equipment, vehicles, marine vessels, medcial equipment directly in touch with human body, equipment anticipated to give a serious impact to properties, and other equipment required to provide high reliability.

■Take failsafe measures so that the whole system operates safely even if the input power causes an error, a signal line is disconnected, or the main unit fails.

■This product is equipped with a LIMIT (overtravel) signal and an FSSTOP signal to prevent mechanical damage.
The initial values of these signals are set to ACTIVE OFF (B contact). Accordingly, even in a system configuration in which the FSSTOP and LIMIT signals are not used, pulses are not output unless NORMAL ON (GND connection) is enabled.

■Be sure to use this product within the scope of the specifications described in this instruction manual in accordance with the specification method described therein.

■Set up the product before operating it.
Refer to Section 3, "Setting."

■When board Contorller (C-VX870,C-VX872) is used on Windows, refer to separate manual "C-VX870 series Device Driver Manual (MN0105,MN0106)".

■When board Contorller (C-VX870,C-VX872) is used on any OS other than Windows, refer to separate manual "Technical Data A. (MN0110)"

Introduction
Description of Safety
Before Use

Contents PAGE

The main parts which revised by this manual

1. OVERVIEW

1-1. Features

- The C-VX870,C-VX872 are controller equipped with four or eight independently functioning axes. This controller supports servo and stepping motors that can directly be inserted into slots of a PCI bus system conforming to PCI bus specifications R2.2.
- The board shape is the universal short card size (107 x 170) of the PCI bus standard.
- The C-VX870,C-VX872 are equipped with our chip controller MCC07 to enable motor control using simple commands.
- C-VX870 enables four independently linear interpolation driving, 2-axis linear interpolation (fixed interpolation-axes) or 2-axis circular interpolation (fixed interpolation-axes) driving.
  C-VX872 enables eight independently linear interpolation driving, 2-axis linear interpolation (fixed interpolation-axes) or 2-axis circular interpolation (fixed interpolation-axes) driving.
- The 32-bit width address counter and the maximum output frequency of 6.5 MHz of the MCC07 enables high-precision, high-speed positioning.
- Also equipped with a multi-functional 32-bit pulse counter, and 16-bit pulse differential counter, the C-VX870,C-VX872 has a variety of application such as counting feedback pulses from the servo driver, detecting step-out of the stepping motor with an encoder. The applications also include interrupt output and external signal output using the comparator function of each counter.
- After the command being executed is finished, the commands stored in the reservation register are executed sequentially.Then this function can be allowed continuous drive. **(Applied function)**
- The C-VX870,C-VX872 are enable to optional axes liner interpolation drive or Optional 2-axis circular interpolation drive. **(Applied function)**
  (The C-VX872 is enable to optional axes interpolation drive within the scope of the four axes)

1-2. Product Configuration

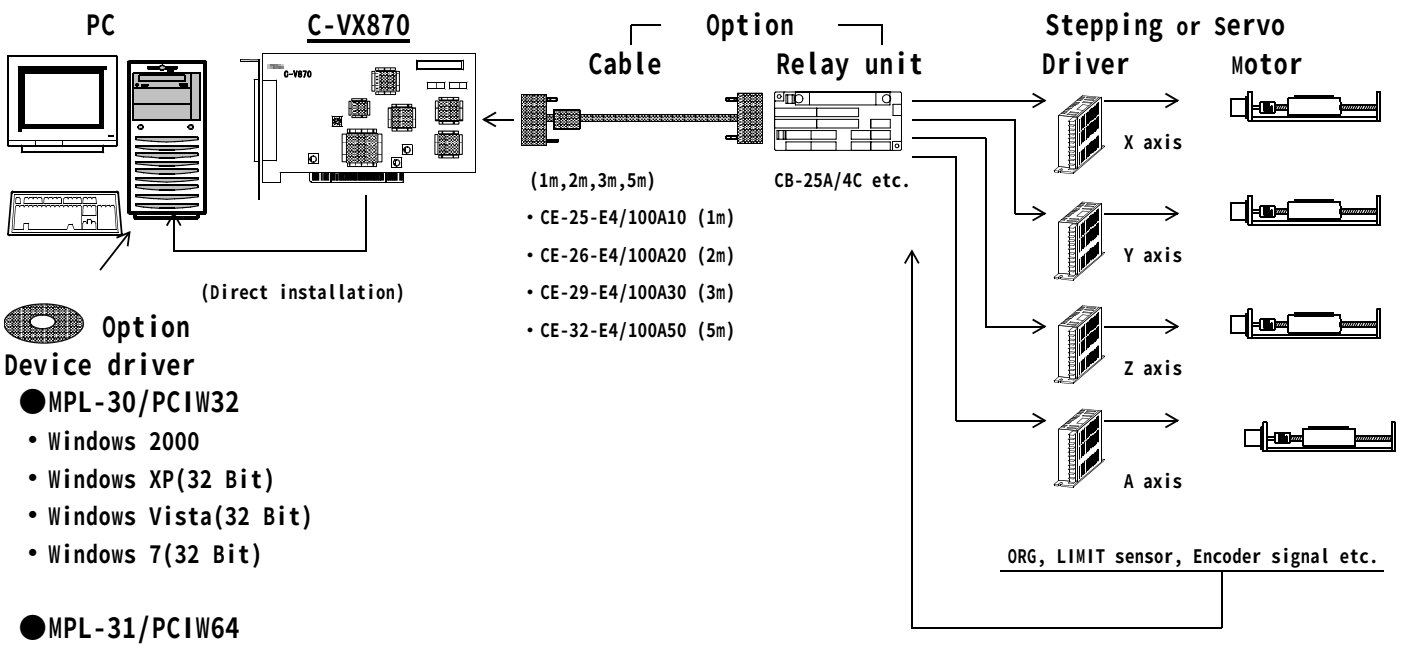
- C-VX870

Product name	Rating	Maker	Quantity	Remarks
Controller	C-VX870	Melec Inc.	1	(Main unit)

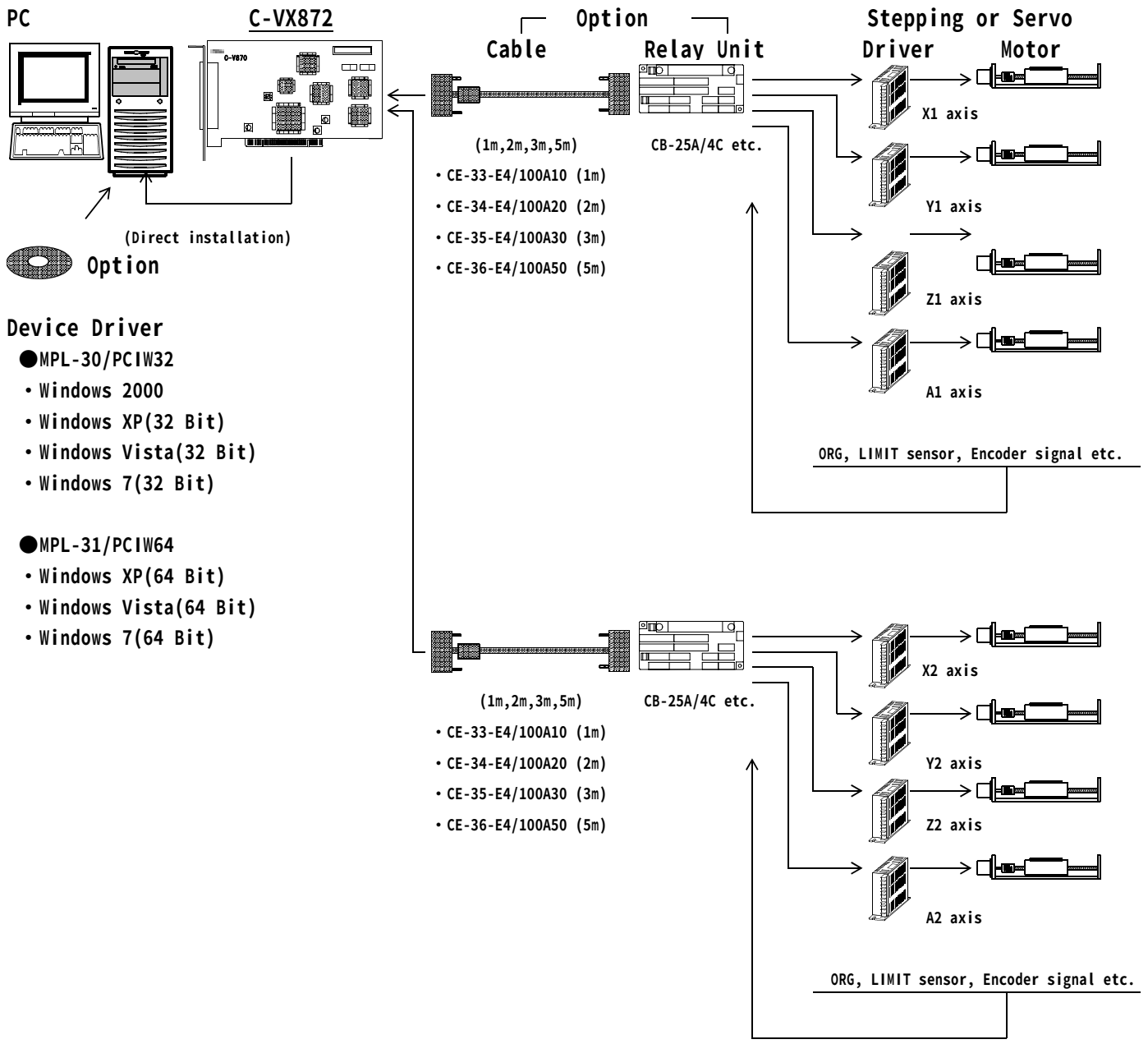
- C-VX872

Product name	Rating	Maker	Quantity	Remarks
Controller	C-VX872	Melec Inc.	1	(Main unit)

1-3. Example of System Configuration



● C-VX872



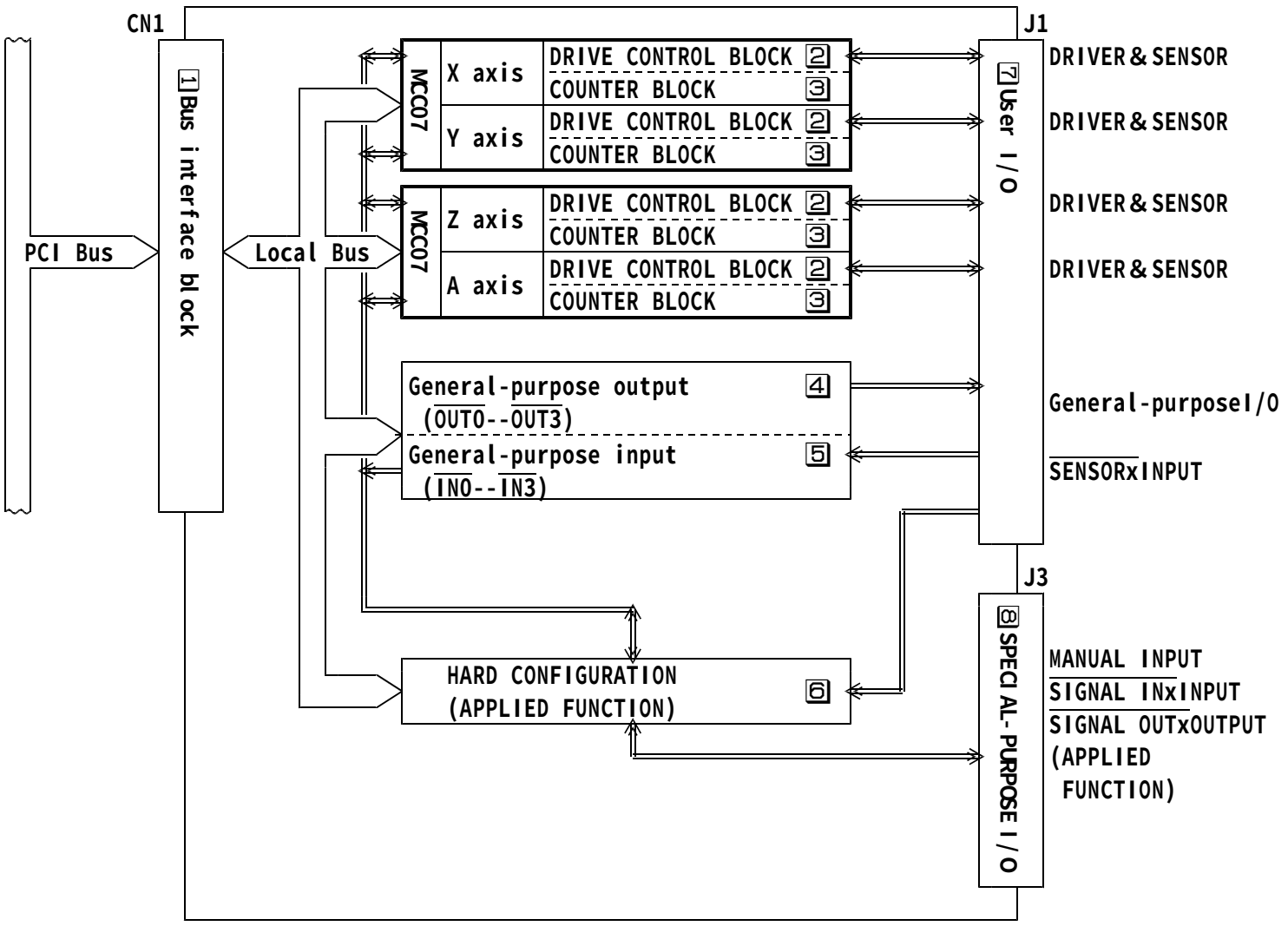
Device Driver

●MPL-30/PCIW32
- Windows 2000
- Windows XP(32 Bit)
- Windows Vista(32 Bit)
- Windows 7(32 Bit)

●MPL-31/PCIW64
- Windows XP(64 Bit)
- Windows Vista(64 Bit)
- Windows 7(64 Bit)

1-4. Function Block Diagram

● C-VX870



1 Bus interface block
Interface block with the PCI bus

2 Drive control block
The drive control block outputs serial pulses to the motor driver.

The 2-axis indicated by ▭ is interrelation.

It enables 2-axis linear interpolation or 2-axis circular interpolation.

3 Counter block
The counter block has three types of counters: ADDRESS COUNTER, PULSE COUNTER, and DFL COUNTER. (Can use as hard timer.)
ADDRESS COUNTER, PULSE COUNTER has 32-bit counter, DFL COUNTER has 16-bit counter.
These counters count pulses output by the controller or signals such as feedback signals from the encoder.
Each counter equipped with three compare registers. These registers count optional count.

4 General-purpose OUTPUT block
The block can control $\overline{OUT0}$～$\overline{OUT3}$

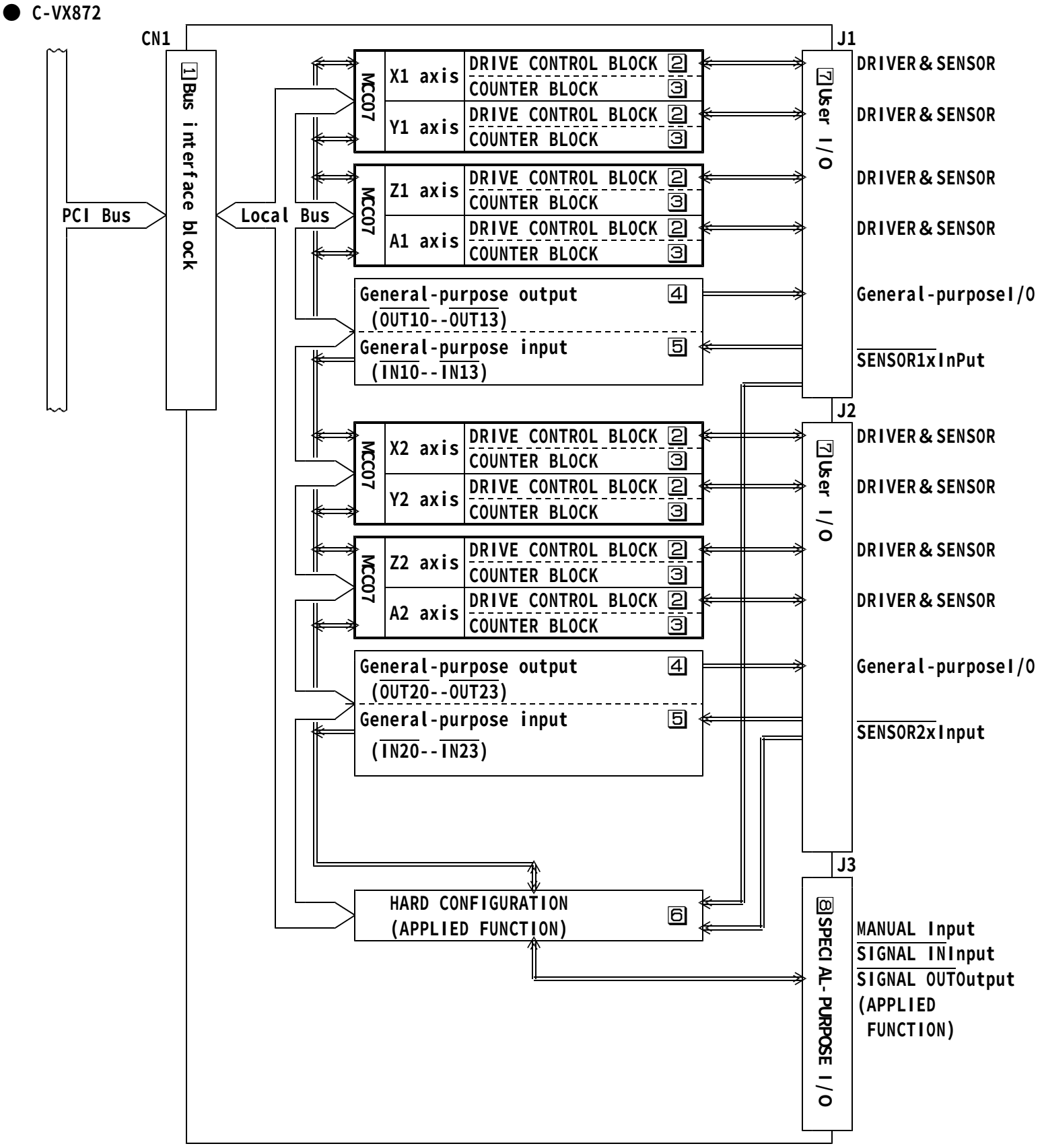
5 General-purpose INPUT block
The block can control $\overline{IN0}$～$\overline{IN3}$

6 HARD CONFIGURATION block (APPLIED FUNCTION)
The HARD CONFIGURATION block is a control block that allows the user to connect User I/O and Special-purpose I/O to signals: Multipurpose sensor signal input to each axis, signal for synchronization control, status signal.
The control block is used for multipurpose sensor function, Synchronous drive function, Status output function.

7 User I/O block
The user I/O block interfaces with motor drivers, sensors, and general-purpose I/O equipment signals.

8 Special-purpose I/O block (APPLIED FUNCTION)
The block interfaces with input signals what motors can be operated manually, and what can output status signals to the outside.

● C-VX872



1 Bus interface block
Interface block with the PCI bus

2 Drive control block
The drive control block outputs serial pulses to the motor driver.

The 2-axis indicated by ▭ is interrelation.

It enables 2-axis linear interpolation or 2-axis circular interpolation.

3 Counter block
The counter block has three types of counters: ADDRESS COUNTER, PULSE COUNTER, and DFL COUNTER (Can use as hard timer.)
ADDRESS COUNTER, PULSE COUNTER has 32-bit counter, DFL COUNTER has 16-bit counter.

These counters count pulses output by the controller or signals such as feedback signals from the encoder.
Each counter equipped with three compare registers. These registers count optional count.

4 General-purpose OUTPUT block
The block can control $\overline{\text{OUTn0}}$～$\overline{\text{OUTn3}}$

5 General-purpose INPUT block
The block can control $\overline{\text{INn0}}$～$\overline{\text{INn3}}$

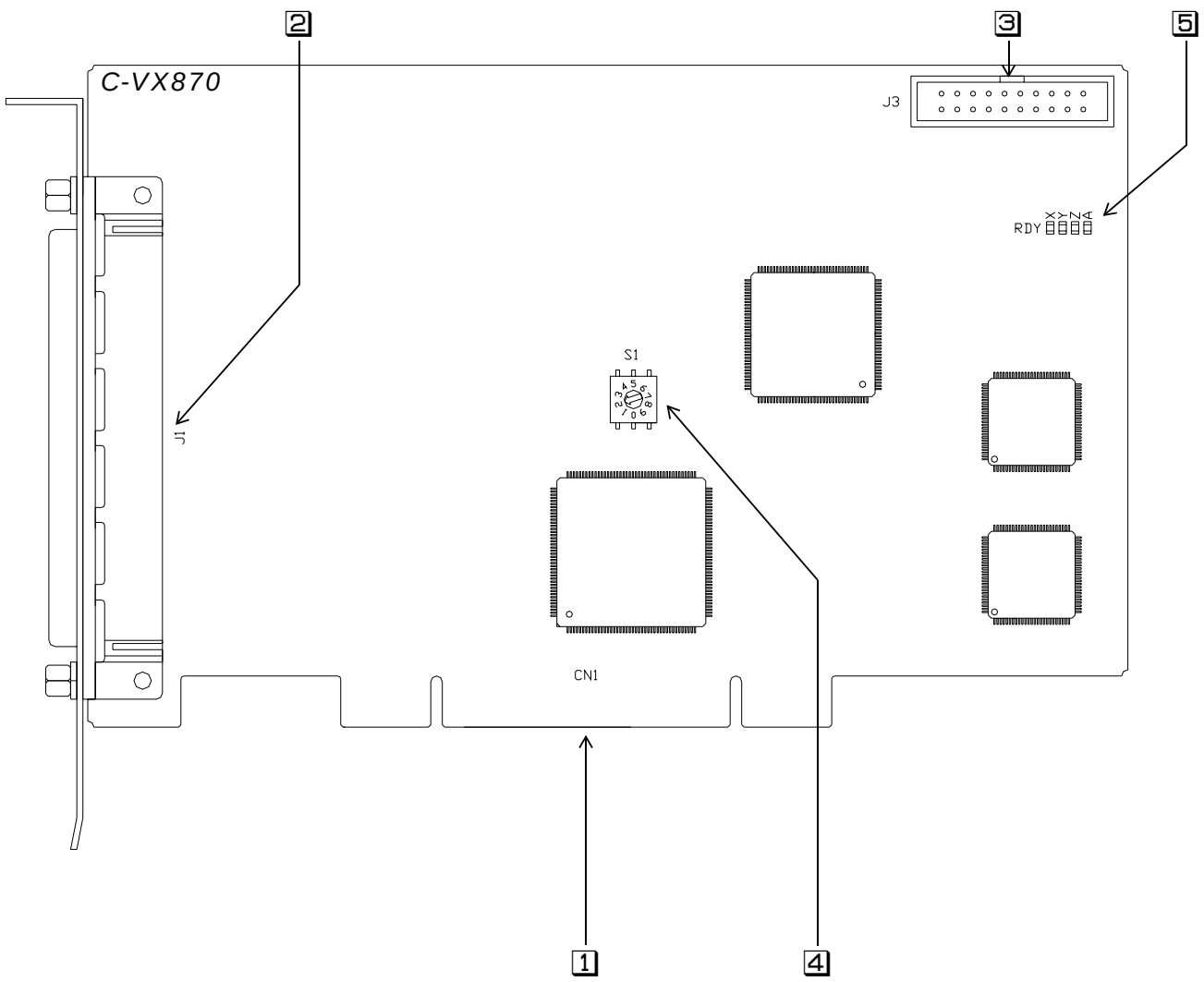
6 HARD CONFIGURATION block (APPLIED FUNCTION)
The HARD CONFIGURATION block is a control block that allows the user to connect User I/O and Special-purpose I/O to signals: Multipurpose sensor signal input to each axis, signal for synchronization control, status signal.
The control block is used for multipurpose sensor function, Synchronous drive function, Status Output function.

7 User I/O block
The user I/O block interfaces with motor drivers, sensors, and general-purpose I/O equipment signals.

8 Special-purpose I/O block (APPLIED FUNCTION)
The block interfaces with input signals what motors can be operated manually,and what can output status signals to the outside.

1-5. Externals of product

● C-VX870



1 CN1 ------- Universal (5V/3.3V) board edge connector inserted into a PCI bus.

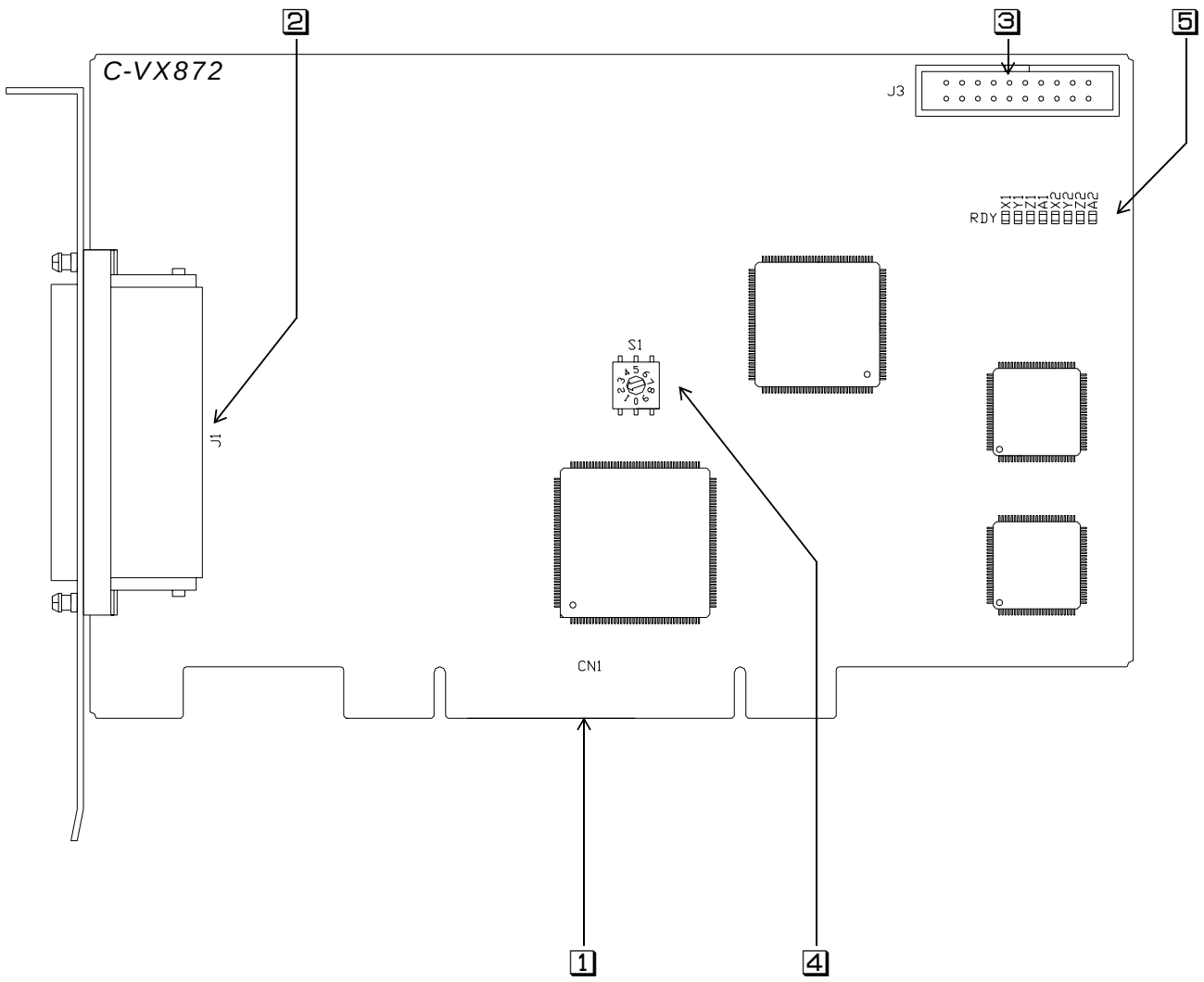
2 J1 --------- 100-pin half pitch connector that interfaces the motor driver, sensor signals, and equipment having +24V interface I/O.
Dedicated interface cables (1m, 2m, 3m, and 5m) and relay units are available.

3 J3 --------- Connector that interfaces with external signals at TTL level.
(APPLIED FUNCTION) Motors can be operated by manual operation through this connector.
External input signals can be assigned as input signals to signals for the SENSOR and signal for synchronization control.
Signals can be output to the outside by status signal of each axis.
A general-purpose standard MIL connector is used.

4 S1 ---------- Rotary switch that is set so that PCI can recognize the board number.
If two or more boards are inserted into the PC simultaneously, set the switch properly so that every board number is unique.

5 RDY LED -- LEDs that allows the user to simply monitor the X, Y, Z, and A axes to check whether the axes are operating normally. The RDY LED corresponding to each axis is on while the axis is waiting for a command and is off during command processing.

● C-VX872



1CN1 ------- Universal (5V/3.3V) board edge connector inserted into a PCI bus slot

2J1,J2 ------ 100-pin 0.8mm pitch connector that interfaces the motor driver, sensor signals, and equipment having +24V interface I/O.
Dedicated interface cables (1m, 2m, 3m, and 5m) and relay units are available.

3J3 --------- Connector that interfaces with external signals at TTL level.
(APPLIED FUNCTION) Motors can be operated by manual operation through this connector.
External input signals can be assigned as input signals to signals for the SENSOR and signal for synchronization control.
Signals can be output to the outside by status signal of each axis.
A general-purpose standard MIL connector is used.

4S1 ---------- Rotary switch that is set so that PCI can recognize the board number.
If two or more boards are inserted into the PC simultaneously, set the switch properly so that every board number is unique.

5RDY LED -- LEDs that allows the user to simply monitor the X1, Y1, Z1, A1, X2, Y2, Z2 and A2 axes to check whether the axes are operating normally.
The RDY LED corresponding to each axis is on while the axis is waiting for a command and is off during command processing.

2. SPECIFICATIONS

2-1. PCI Specifications

No.	Item	Specifications
1	Applicable standard	PCI Local Bus Specification Rev2.2
2	Bus interface	・32-bit bus, 33 MHz clock ・5V/3.3V Signal system (Universal) ※ It is nesessary +5V power supplied from the bus slot.
3	Interrupt	・INTA#
4	system resouce	・I/O : 128-byte + 256-byte
5	Dimensions	Short card size (107mm×170mm×17mm)

2-2. General Specifications

No.	Item	Specifications
1	Supply voltage, power consumption	●C-VX870 ・+5V ±5%, 1.0 A or less ・+24Vdc ±2V, 200 mA or less (for photocoupler interface) ●C-VX872 ・+5V ±5%, 1.6 A or less ・+24Vdc ±2V, 400 mA or less (for photocoupler interface)
2	Operating ambient temperature and humidity	・0℃ ～ +45℃ ・80%RH or less (without dew condensation)
3	Storage temperature and humidity	・0℃ ～ +55℃ ・80%RH or less (without dew condensation)
4	Installation environment	・Inside a well-ventilated cabinet installed indoor, free from direct sunlight ・Not exposed to corrosive and flammable gasses, and not affected by oil mist, dust,salt, iron powder, water, and chemicals ・Not subject to constant vibration or excessive shock ・Not affected by electromagnetic noise caused by power equipment ・Free of radioactive materials and magnetic fields, and not in vacuum
5	Weight	・About 0.2 kg

2-3. Basic Specifications

No.	Item	Specifications	
1	Number of control axes	●C-VX-870：4 axes ●C-VX-872：8 axes	
2	Pulse output function	Output type	• Independent direction output/Specified direction output/ Phase-differential signal output • Line driver output
		Output frequency	• Independent drive ：0.1 Hz to 6.5 MHz • Interpolation drive：0.1 Hz to 5 MHz
		Acceleration/deceleration time constant	5000 ms/kHz to 0.0025 ms/kHz (Trapezoid/S-curve)
		Acceleration/deceleration shape	Trapezoid/S-curve(This feature enables to set asymmetrical shape)
		Triangular drive prevention function	• During S-shaped acceleration/deceleration drive, INDEX drive may end before the maximum speed is reached. In this event, triangular drive can be automatically avoided.
		Number of output pulses	• JOG drive : -65,535 to +65,535 pulse • SCAN drive : Up to infinite pulses • INDEX drive : -2,147,483,647 to + 2,147,483,647 pulses
3	Encoder function	Input type	• Incremental • Line receiver input
		Input range	• ～5MHz
		External signal output	• External signals such as hand pulser signals that are input to the EA and EB signals can be output as CWP and CCWP signals.
4	Drive function	JOG drive	• Pulses are constantly output until the specified pulses.
		SCAN drive	• Pulses are continuously output until a stop command is detected.
		INDEX drive	• Pulses are output until the specified relative or absolute address is reached.
		ORIGIN drive	• The specified drive processes are performed. This drive is finished when the ORG signal specified edge is detected.
		2-axis linear interpolation drive	• Linear interpolation is performed toward the specified coordinates from the current coordinates. • Driving type is selected from INDEX drive or SCAN drive. • Max speed is 5MHz. • Positional errors for the specified straight line are ±0.5 LSB. • The absolute and relative addresses that can be specified for coordinates range from -2,147,483,647 to +2,147,483,647 (32 bits).
		2-axis circular interpolation drive	• Circular interpolation is performed toward the specified coordinates from the current coordinates on the circular curve specified by the center-point or passing-point coordinates. • Driving type is selected from INDEX drive or SCAN drive. • Max speed is 5MHz. • Positional errors for the specified circuit curve are ±1 LSB. • The relative addresses range from -8,388,607 to +8,388,607 (24 bits). • Short axis pulses range from -2,147,483,648 to +2,147,483,647 (32 bits).
		Linear speed constant control	• Control is performed to keep the synthesized speed of the two axes working for interpolation drive constant.

No.	Item	Specifications	
5	Stop function	Slow stop function	• SLOW STOP command • Detection of a match of the comparator of each counter. • $\overline{INn0}$--$\overline{INn3}$ signal setting the DALM input function, the DALM signal can be used as the slow stop signal. • Multipurpose sensor signal(SS0,SS1)
		Immediate stop function	• FAST STOP command • FSTOPn singal (User I/O) • $\overline{FSTOP}$ signal (Special-purpose I/O) • Detection of a match of the comparator of each counter. • $\overline{INn0}$--$\overline{INn3}$ signal setting the DALM input function, the DALM signal can be used as the immdiate stop signal. • Multipurpose sensor signal(SS0,SS1)
		LIMIT signal	● + direction stop • Immediate stop by CWLM signal and slow stop can be selected. • Slow stop or immediate stop can be performed for each axis upon detection of a match of the comparator(COMP2) of each counter. ● - direction stop • Immediate stop by CCWLM signal and slow stop can be selected. • Slow stop or immediate stop can be performed for each axis upon detection of a match of the comparator(COMP3) of each counter.
6	Counter function	Address counter	• 32-bit counter that manages absolute addresses by counting drive output pulses
		Pulse counter	• 32-bit counter that countes external pulse signals or encoder feedback pulses.
		Pulse differential counter	• 16-bit counter that detects differences in the number of pulses by counting external pulse signals and encoder feedback pulses. • It can also be used as a 16-bit timer.
		Comparator function	• Detection of a match of the three comparators of each counter. • Upon detection of a match by the comparator, pulse output can be decelerated and then stopped, or stopped immediately. • Upon detection of a match by the comparator, output external status signal.
		AUTO CLEAR function	• The comparator of each counter:The counter can automatically be cleared upon detection of a match of COMP1 of each counter.
		AUTO ADD function	• The comparator of each counter:If the couter value reaches the COMP1, a value that is set by the data add to COMPARE REGISITER1.
7	Other functions	Servo driver support function	• The signals are specially prepared as servo driver suport signals. • Servo positioning completion input/phase ($\overline{DEND}$/$\overline{PO}$) signal input • Servo reset output ($\overline{DRST}$) • General-purpose input signal(DALM .etc) ($\overline{INn0}$--$\overline{INn3}$) • General-purpose output signal(S.ON .etc) ($\overline{OUTn0}$--$\overline{OUTn3}$)
		Data reading function	• Current status information can be read in real time. Current status information includes status data, count data of a counter etc.

2-4. Applied Functions

No.	Item	Description of specifications	
1	Drive function	UP/DOWN/CONST drive CHANGE function	・Drive change for acceleration, deceleration, or constant speed can be performed upon detection of signal at an arbitrary change operation point.
		SPEED CHANGE function	・The drive pulse speed is changed upon detection of signal at an arbitrary change operation point.
		RATE CHANGE function	・The rate is changed upon detection of signal at an arbitrary change to the specified rate.
		INDEX CHANGE function	・Upon detection of signal at an arbitrary change operation point, the stop position at which drive is to be finished is changed. ・Upon detection of the INC INDEX CHANGE command, the system performs INC INDEX drive by setting the specified data at the stop position of the relative address for which the start position is the origin. ・Upon detection of the ABS INDEX CHANGE command, the system performs ABS INDEX drive by setting the specified data at the stop position of the absolute address managed with the address counter.
		Optional axes liner interpolation drive	●C-VX870 Linear interpolation is performed toward the specified coordinates from the current coordinates. Then long axis outputs pulses. ●C-VX872 Linear interpolation is performed toward the specified coordinates from the current coordinates. Then long axis outputs pulses. Optional axes are as follows: (First affiliated axis :X1 to A1 axis, Second affiliated axis:X2 to A2 axis)
		Optional 2-axis circular interpolation drive	●C-VX870 Circular interpolation is performed toward the specified coordinates from the current coordinates on the circular curve. ●C-VX872 Circular interpolation is performed toward the specified coordinates from the current coordinates on the circular curve. Optional axes are as follows: (First affiliated axis :X1 to A1 axis, Second affiliated axis:X2 to A2 axis)
		INDEX drive controll the start point at auto deceleration	・This function is allowed to set OFFSET of the start point at auto deceleration. This function can be used When INDEX drive,liner interpolation INDEX drive, and circular interpolation INDEX drive.
		MANUAL SCAN drive	・MANUAL SCAN/JOG drive in the + or - direction is performed by operation of SELA to D,$\overline{\text{MAN}}$, $\overline{\text{CWMS}}$, $\overline{\text{CCWMS}}$ signal input through the J3 connector.
2	Count function	Ring counter function	・The address counter, pulse counter each are a ring counter in which any maximum count can be set.
		Count data latch/clearance function	・This function latches count data of a counter at a specific latch timing and holds it till the next latch timing. ・Each counter can latch counter value at arbitrary timing. It is possible to clear a counter value at the latch timing.

No.	Item	Description of specifications	
3	Other functions	Interrupt function	・Each axis can output interrupt signals to the CPU. ・Each interrupt signal is output when an interrupt is caused by drive end, state of a reservation register, and detection of a match by the counter.
		Command reservation function	・Each axis has a reservation register that can store data commands for ten instructions. ・General-purpose commands of Drive commands can be reserved in the reservation register. ・After the command being executed is finished, the commands stored in the reservation register are executed sequentially.Then this function can be allowed continuous drive.
		Input signal logical switch function	・The input signal can be changed to logic as follows: ・CWLM ・CCWLM ・$\overline{\text{DALM}}$ ($\overline{\text{INnx}}$ is used for DALM function)
		Input signal time constant function	・The input signal can be set time constant as follows: ・CWLM ・CCWLM ・$\overline{\text{DALM}}$ ($\overline{\text{INnx}}$ is used for DALM function) ・$\overline{\text{DEND}}$/$\overline{\text{PO}}$ ・$\overline{\text{ORG}}$ ・$\overline{\text{NORG}}$ ・±ZORG ・±EA,EB
		Multipurpose sensor signal input	Each axis has multipurpose sensor signal input used as stop signal, trigger signal of a counter latch data and drive CHANGE operating signal. The signal can be used as multipurpose sensor as follows: ・$\overline{\text{SENSORnx}}$ input signal ・$\overline{\text{SIGNAL INnx}}$ input signal ・A status in any axis
		Status external signal output function	・The compare register value, STATUS, output signal of each counter can output as $\overline{\text{SIGNAL OUTnx}}$ output signal.
		Synchronized start function	・You can perform synchronized start with any axis. ・A condition of start can be set by the condition as follows: ・$\overline{\text{SENSORnx}}$ input signal ・$\overline{\text{SIGNAL INnx}}$ input signal ・A status in any axis ・PAUSE command
		Status read Data reading	・Current status information can be read in real time. ・Current status information includes setting data any axis, latch data of a counter etc.

※Applied function. Refer to the separate manual 「MPL-30/PCIW32 Applied Functions Part」

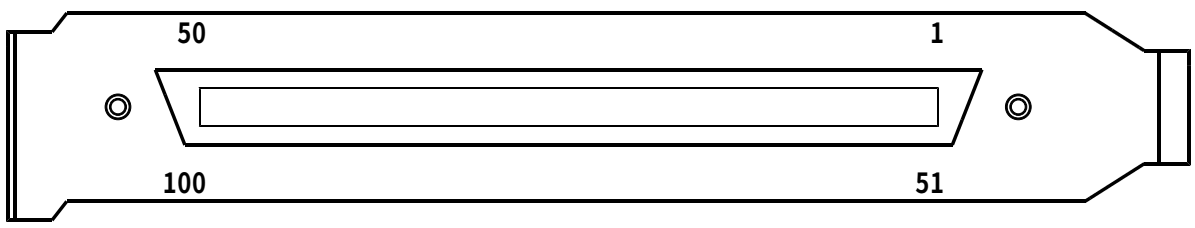
2-5. Input and Output Signal Table

(1) User I/O connector

■Pin assignments

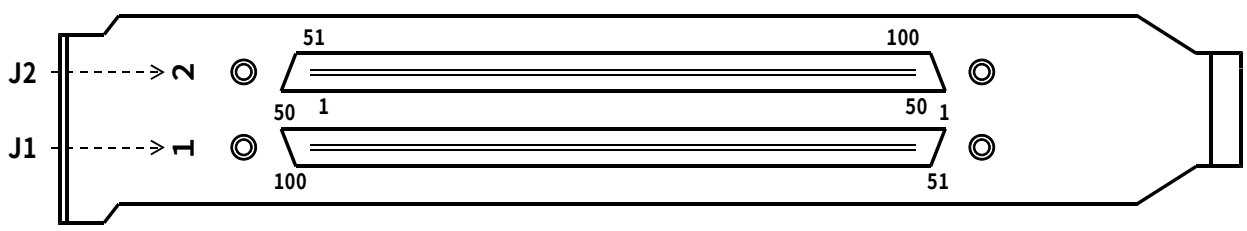
●C-VX870(J1)

- Connector type name : DX10A -100S(50) (HIROSE Electric)
- Adaptable socket : DX30A -100P(50) ,DX31A -100P etc.
  (Hirose Electric, not included in attached accessories)
- Adaptable cable : 1m , 2m, 3m, or 5m shielded cable (option)



●C-VX872(J1,J2)

- Connector type name : HDRA-E100W1LFDT1EC-SL+ (HONDA TSUSHIN KOGYO)
- Adaptable socket : HDRA-E100MA1+ ,HDRA-E100M1+ etc.
  (HONDA TSUSHIN KOGYO, not included in attached accessories)
  (Adaptable socket is 100-pin)
- Adaptable cable : 1m , 2m, 3m, or 5m shielded cable (option)



■Signal table

> ⚠CAUTION
> This product may be damaged.
> Do not connect +24V to any pin other than EXTV.
> After wiring, be sure to confirm the wiring before power-on.

- A signal indicated by [ ] is photocoupler-insulated.
- A signal is enable to set time constants marked with ☆.(Applied function)
- Logic switching is enabled for an input signal marked with ★.(Applied function)
  Logic switching is enabled for general-purpose input signal $\overline{\text{INnx}}$,
  when this signal is used for DALM function

(Note 1)

An external power supply is required for a signal that is photocoupler-insulated.
The specified input voltage range is +24V ±2V.
C-VX870: Current consumption at +24V is up to 200mA.
C-VX872: Current consumption at +24V is up to 400mA.
The initial values of the CWLM and CCWLM signals of each axis and the FSSTOP signal are ACTIVE OFF input (B contact).
An external power supply must be connected even if these signals are not used.
The default contact B is recommended for the CWLM and CCWLM signals.
However, A-contact signal input can also be used by switching logic.

(Note 2)

$\overline{\text{SENSORnx}}$ input signals are used for multipurpose sensor function, synchronization control function. These input signals is used by any functions setting.(Applied function)

The initial value after resetting is as follows:

$\overline{\text{SENSORn0}}$ signal is SS0 of Zn axis, $\overline{\text{SENSORn1}}$ signal is SS0 of An axis.

When $\overline{\text{SENSORnx}}$ input signal is used for multipurpose sensor function, this signal can not use in MANUAL mode.

When MANUAL mode, the functions of multipurpose sensor assigned to the $\overline{\text{SENSORnx}}$ input signal are invalid.

When BUS mode, this function are valid.

●C-VX870(J1)

Pin No.	Direction	Signal name	Description	Pin No.	Direction	Signal name	Description
1	In	XCWLM	X axis + (CW) direction limit signal ☆★	51	In	ZCWLM	Z axis + (CW) direction limit signal ☆★
2	In	XCCWLM	X axis - (CCW) direction limit signal ☆★	52	In	ZCCWLM	Z axis - (CCW) direction limit signal ☆★
3	In	$\overline{\text{XNORG}}$	X axis machine origin proximity signal ☆	53	In	$\overline{\text{ZNORG}}$	Z axis machine origin proximity signal ☆
4	In	$\overline{\text{XORG}}$	X axis machine origin signal ☆	54	In	$\overline{\text{ZORG}}$	Z axis machine origin signal ☆
5	In	YCWLM	Y axis + (CW) direction limit signal ☆★	55	In	ACWLM	A axis + (CW) direction limit signal ☆★
6	In	YCCWLM	Y axis - (CCW) direction limit signal ☆★	56	In	ACCWLM	A axis - (CCW) direction limit signal ☆★
7	In	$\overline{\text{YNORG}}$	Y axis machine origin proximity signal ☆	57	In	$\overline{\text{ANORG}}$	A axis machine origin proximity signal ☆
8	In	$\overline{\text{YORG}}$	Y axis machine origin signal ☆	58	In	$\overline{\text{AORG}}$	A axis machine origin signal ☆
9	In	$\overline{\text{SENSOR0}}$	Multipurpose sensor,synchronous start signal (Note 2)	59	In	$\overline{\text{SENSOR1}}$	Multipurpose sensor,synchronous start signal (Note 2)
10	In	$\overline{\text{IN0}}$	General-purpose input 0 signal (This signal allows X axis driver error signal) ☆(★)	60	Out	$\overline{\text{OUT0}}$	General-purpose output 0 signal
11	In	$\overline{\text{IN1}}$	General-purpose input 1 signal (This signal allows Y axis driver error signal) ☆(★)	61	Out	$\overline{\text{OUT1}}$	General-purpose output 1 signal
12	In	$\overline{\text{IN2}}$	General-purpose input 2 signal (This signal allows Z axis driver error signal) ☆(★)	62	Out	$\overline{\text{OUT2}}$	General-purpose output 2 signal
13	In	$\overline{\text{IN3}}$	General-purpose input 3 signal (This signal allows A axis driver error signal) ☆(★)	63	Out	$\overline{\text{OUT3}}$	General-purpose output 3 signal
14	—	EXTV	External power supply for coupler (Note 1)	64	—	EXTVGND	External power supply for coupler GND (Note 1)
15	—	EXTV		65	—	EXTVGND	
16	Out	+COM	$\overline{\text{XCWP}}$,$\overline{\text{XCCWP}}$ +common (+5V)	66	Out	+COM	$\overline{\text{ZCWP}}$,$\overline{\text{ZCCWP}}$ +common (+5V)
17	Out	XCWP	X axis + (CW) direction positive logic pulse output	67	Out	ZCWP	Z axis + (CW) direction positive logic pulse output
18	Out	$\overline{\text{XCWP}}$	X axis + (CW) direction negative logic pulse output	68	Out	$\overline{\text{ZCWP}}$	Z axis + (CW) direction negative logic pulse output
19	Out	XCCWP	X axis -(CCW) direction positive logic pulse output	69	Out	ZCCWP	Z axis -(CCW) direction positive logic pulse output
20	Out	$\overline{\text{XCCWP}}$	X axis -(CCW) direction negative logic pulse output	70	Out	$\overline{\text{ZCCWP}}$	Z axis -(CCW) direction negative logic pulse output
21	Out	XDRSTCOM	XDRST current output (+24V)	71	Out	ZDRSTCOM	ZDRST current output (+24V)
22	Out	$\overline{\text{XDRST}}$	X axis servo reset signal (This signal is used for general purpose output)	72	Out	$\overline{\text{ZDRST}}$	Z axis servo reset signal (This signal is used for general purpose output)
23	In	$\overline{\text{XDEND}}$/$\overline{\text{XPO}}$	X axis positioning completion signal /X axis PO signal ☆	73	In	$\overline{\text{ZDEND}}$/$\overline{\text{ZPO}}$	Z axis positioning completion signal /Z axis PO signal ☆
24	—	N.C	Reserved	74	—	N.C	Reserved
25	In	+XEA	X axis encoder +A phase signal ☆	75	In	+ZEA	Z axis encoder +A phase signal ☆
26	In	-XEA	X axis encoder -A phase signal ☆	76	In	-ZEA	Z axis encoder -A phase signal ☆
27	In	+XEB	X axis encoder +B phase signal ☆	77	In	+ZEB	Z axis encoder +B phase signal ☆
28	In	-XEB	X axis encoder -B phase signal ☆	78	In	-ZEB	Z axis encoder -B phase signal ☆
29	In	+XZORG	X axis encoder +Z phase signal ☆	79	In	+ZZORG	Z axis encoder +Z phase signal ☆
30	In	-XZORG	X axis encoder -Z phase signal ☆	80	In	-ZZORG	Z axis encoder -Z phase signal ☆
31	Out	N.C	Reserved(No connecting)	81	—	N.C	Reserved
32	Out	+COM	$\overline{\text{YCWP}}$,$\overline{\text{YCCWP}}$ +common (+5V)	82	Out	+COM	$\overline{\text{ACWP}}$,$\overline{\text{ACCWP}}$ +common (+5V)
33	Out	YCWP	Y axis + (CW) direction positive logic pulse output	83	Out	ACWP	A axis + (CW) direction positive logic pulse output
34	Out	$\overline{\text{YCWP}}$	Y axis + (CW) direction negative logic pulse output	84	Out	$\overline{\text{ACWP}}$	A axis + (CW) direction negative logic pulse output
35	Out	YCCWP	Y axis - (CCW) direction positive logic pulse output	85	Out	ACCWP	A axis - (CCW) direction positive logic pulse output
36	Out	$\overline{\text{YCCWP}}$	Y axis - (CCW) direction negative logic pulse output	86	Out	$\overline{\text{ACCWP}}$	A axis - (CCW) direction negative logic pulse output
37	Out	YDRSTCOM	YDRST current output (+24V)	87	Out	ADRSTCOM	ADRST current output (+24V)
38	Out	$\overline{\text{YDRST}}$	Y axis servo reset signal (This signal is used for general purpose output)	88	Out	$\overline{\text{ADRST}}$	A axis servo reset signal (This signal is used for general purpose output)
39	In	$\overline{\text{YDEND}}$/$\overline{\text{YPO}}$	Y axis positioning completion signal /Y axis PO signal ☆	89	In	$\overline{\text{ADEND}}$/$\overline{\text{APO}}$	A axis positioning completion signal /A axis PO signal ☆
40	—	N.C	Reserved	90	—	N.C	Reserved
41	In	+YEA	Y axis encoder +A phase signal ☆	91	In	+AEA	A axis encoder +A phase signal ☆
42	In	-YEA	Y axis encoder -A phase signal ☆	92	In	-AEA	A axis encoder -A phase signal ☆
43	In	+YEB	Y axis encoder +B phase signal ☆	93	In	+AEB	A axis encoder +B phase signal ☆
44	In	-YEB	Y axis encoder -B phase signal ☆	94	In	-AEB	A axis encoder -B phase signal ☆
45	In	+YZORG	Y axis encoder +Z phase signal ☆	95	In	+AZORG	A axis encoder +Z phase signal ☆
46	In	-YZORG	Y axis encoder -Z phase signal ☆	96	In	-AZORG	A axis encoder -Z phase signal ☆
47	Out	N.C	Reserved(No connecting)	97	—	N.C	Reserved
48	In	FSSTOP	All axes immediate stop signal	98	In	$\overline{\text{RESET}}$	All-axis reset signal
49	—	N.C	Reserved	99	—	N.C	Reserved
50	—	D.GND	Internal +5V digital GND	100	—	D.GND	Internal +5V digital GND

●C-VX872(J1)

Pin No.	Direction	Signal name	Description	Pin No.	Direction	Signal name	Description
1	In	X1CWLM	X1 axis + (CW) direction limit signal ☆★	51	In	Z1CWLM	Z1 axis + (CW) direction limit signal ☆★
2	In	X1CCWLM	X1 axis - (CCW) direction limit signal ☆★	52	In	Z1CCWLM	Z1 axis - (CCW) direction limit signal ☆★
3	In	X1NORG	X1 axis machine origin proximity signal ☆	53	In	Z1NORG	Z1 axis machine origin proximity signal ☆
4	In	X1ORG	X1 axis machine origin signal ☆	54	In	Z1ORG	Z1 axis machine origin signal ☆
5	In	Y1CWLM	Y1 axis + (CW) direction limit signal ☆★	55	In	A1CWLM	A1 axis + (CW) direction limit signal ☆★
6	In	Y1CCWLM	Y1 axis - (CCW) direction limit signal ☆★	56	In	A1CCWLM	A1 axis - (CCW) direction limit signal ☆★
7	In	Y1NORG	Y1 axis machine origin proximity signal ☆	57	In	A1NORG	A1 axis machine origin proximity signal ☆
8	In	Y1ORG	Y1 axis machine origin signal ※ ☆	58	In	A1ORG	A1 axis machine origin signal ☆
9	In	SENSOR10	Multipurpose sensor,synchronous start signal (Note 2)	59	In	SENSOR11	Multipurpose sensor,synchronous start signal (Note 2)
10	In	IN10	General-purpose input 10 signal (This signal allows X1 axis driver error signal) ☆(★)	60	Out	OUT10	General-purpose output 10 signal
11	In	IN11	General-purpose input 11 signal (This signal allows Y1 axis driver error signal) ☆(★)	61	Out	OUT11	General-purpose output 11 signal
12	In	IN12	General-purpose input 12 signal (This signal allows Z1 axis driver error signal) ☆(★)	62	Out	OUT12	General-purpose output 12 signal
13	In	IN13	General-purpose input 13 signal (This signal allows A1 axis driver error signal) ☆(★)	63	Out	OUT13	General-purpose output 13 signal
14	—	EXTV	External power supply for coupler (Note 1)	64	—	EXTVGND	External power supply for coupler GND (Note 1)
15	—	EXTV		65	—	EXTVGND	
16	Out	+COM	X1CWP,X1CCWP +common (+5V)	66	Out	+COM	Z1CWP,Z1CCWP +common (+5V)
17	Out	X1CWP	X1 axis + (CW) direction positive logic pulse output	67	Out	Z1CWP	Z1 axis + (CW) direction positive logic pulse output
18	Out	X1CWP	X1 axis + (CW) direction negative logic pulse output	68	Out	Z1CWP	Z1 axis + (CW) direction negative logic pulse output
19	Out	X1CCWP	X1 axis -(CCW) direction positive logic pulse output	69	Out	Z1CCWP	Z1 axis -(CCW) direction positive logic pulse output
20	Out	X1CCWP	X1 axis -(CCW) direction negative logic pulse output	70	Out	Z1CCWP	Z1 axis -(CCW) direction negative logic pulse output
21	Out	X1DRSTCOM	X1DRST current output (+24V)	71	Out	Z1DRSTCOM	Z1DRST current output (+24V)
22	Out	X1DRST	X1 axis servo reset signal (This signal is used for general purpose output)	72	Out	Z1DRST	Z1 axis servo reset signal (This signal is used for general purpose output)
23	In	X1DEND/X1PO	X1 axis positioning completion signal /X1 axis PO signal ☆	73	In	Z1DEND/Z1PO	Z1 axis positioning completion signal/Z1 axis PO signal ☆
24	—	N.C	Reserved	74	—	N.C	Reserved
25	In	+X1EA	X1 axis encoder +A phase signal ☆	75	In	+Z1EA	Z1 axis encoder +A phase signal
26	In	-X1EA	X1 axis encoder -A phase signal ☆	76	In	-Z1EA	Z1 axis encoder -A phase signal
27	In	+X1EB	X1 axis encoder +B phase signal ☆	77	In	+Z1EB	Z1 axis encoder +B phase signal
28	In	-X1EB	X1 axis encoder -B phase signal ☆	78	In	-Z1EB	Z1 axis encoder -B phase signal
29	In	+X1ZORG	X1 axis encoder +Z phase signal ☆	79	In	+Z1ZORG	Z1 axis encoder +Z phase signal ☆
30	In	-X1ZORG	X1 axis encoder -Z phase signal ☆	80	In	-Z1ZORG	Z1 axis encoder -Z phase signal ☆
31	Out	N.C	Reserved(No connecting)	81	—	N.C	Reserved
32	Out	+COM	Y1CWP,Y1CCWP +common (+5V)	82	Out	+COM	A1CWP,A1CCWP +common (+5V)
33	Out	Y1CWP	Y1 axis + (CW) direction positive logic pulse output	83	Out	A1CWP	A1 axis + (CW) direction positive logic pulse output
34	Out	Y1CWP	Y1 axis + (CW) direction negative logic pulse output	84	Out	A1CWP	A1 axis + (CW) direction negative logic pulse output
35	Out	Y1CCWP	Y1 axis - (CCW) direction positive logic pulse output	85	Out	A1CCWP	A1 axis - (CCW) direction positive logic pulse output
36	Out	Y1CCWP	Y1 axis - (CCW) direction negative logic pulse output	86	Out	A1CCWP	A1 axis - (CCW) direction negative logic pulse output
37	Out	Y1DRSTCOM	Y1DRST current output (+24V)	87	Out	A1DRSTCOM	A1DRST current output (+24V)
38	Out	Y1DRST	Y1 axis servo reset signal (This signal is used for general purpose output)	88	Out	A1DRST	A1 axis servo reset signal (This signal is used for general purpose output)
39	In	Y1DEND/Y1PO	Y1 axis positioning completion signal /Y1 axis PO signal ☆	89	In	A1DEND/A1PO	A1 axis positioning completion signal /A1 axis PO signal ☆
40	—	N.C	Reserved	90	—	N.C	Reserved
41	In	+Y1EA	Y1 axis encoder +A phase signal ☆	91	In	+A1EA	A1 axis encoder +A phase signal ☆
42	In	-Y1EA	Y1 axis encoder -A phase signal ☆	92	In	-A1EA	A1 axis encoder -A phase signal ☆
43	In	+Y1EB	Y1 axis encoder +B phase signal ☆	93	In	+A1EB	A1 axis encoder +B phase signal ☆
44	In	-Y1EB	Y1 axis encoder -B phase signal ☆	94	In	-A1EB	A1 axis encoder -B phase signal ☆
45	In	+Y1ZORG	Y1 axis encoder +Z phase signal ☆	95	In	+A1ZORG	A1 axis encoder +Z phase signal ☆
46	In	-Y1ZORG	Y1 axis encoder -Z phase signal ☆	96	In	-A1ZORG	A1 axis encoder -Z phase signal ☆
47	Out	N.C	Reserved(No connecting)	97	—	N.C	Reserved
48	In	FSSTOP1	X1,Y1,Z1,A1axis immediate stop signal	98	In	RESET1	All-axis reset signal
49	—	N.C	Reserved	99	—	N.C	Reserved
50	—	D.GND	Internal +5V digital GND	100	—	D.GND	Internal +5V digital GND

●C-VX872(J2)

Pin No.	Direction	Signal name	Description		Pin No.	Direction	Signal name	Description	
1	In	X2CWLM	X2 axis + (CW) direction limit signal	☆★	51	In	Z2CWLM	Z2 axis + (CW) direction limit signal	☆★
2	In	X2CCWLM	X2 axis - (CCW) direction limit signal	☆★	52	In	Z2CCWLM	Z2 axis - (CCW) direction limit signal	☆★
3	In	X2NORG	X2 axis machine origin proximity signal	☆	53	In	Z2NORG	Z2 axis machine origin proximity signal	☆
4	In	X2ORG	X2 axis machine origin signal	☆	54	In	Z2ORG	Z2 axis machine origin signal	☆
5	In	Y2CWLM	Y2 axis + (CW) direction limit signal	☆★	55	In	A2CWLM	A2 axis + (CW) direction limit signal	☆★
6	In	Y2CCWLM	Y2 axis - (CCW) direction limit signal	☆★	56	In	A2CCWLM	A2 axis - (CCW) direction limit signal	☆★
7	In	Y2NORG	Y2 axis machine origin proximity signal	☆	57	In	A2NORG	A2 axis machine origin proximity signal	☆
8	In	Y2ORG	Y2 axis machine origin signal※	☆	58	In	A2ORG	A2 axis machine origin signal	☆
9	In	SENSOR20	Multipurpose sensor,synchronous start signal (Note 2)		59	In	SENSOR21	Multipurpose sensor,synchronous start signal (Note 2))	
10	In	IN20	General-purpose input 20 signal (This signal allows X2 axis driver error signal)	☆(★)	60	Out	OUT20	General-purpose output 20 signal	
11	In	IN21	General-purpose input 21 signal (This signal allows Y2 axis driver error signal)	☆(★)	61	Out	OUT21	General-purpose output 21 signal	
12	In	IN22	General-purpose input 22 signal (This signal allows Z2 axis driver error signal)	☆(★)	62	Out	OUT22	General-purpose output 22 signal	
13	In	IN23	General-purpose input 23 signal (This signal allows A2 axis driver error signal)	☆(★)	63	Out	OUT23	General-purpose output 23 signal	
14	—	EXTV	External power supply for coupler (Note 1)		64	—	EXTVGND	External power supply for coupler GND (Note 1)	
15	—	EXTV			65	—	EXTVGND		
16	Out	+COM	X2CWP,X2CCWP +common (+5V)		66	Out	+COM	Z2CWP,Z2CCWP +common (+5V)	
17	Out	X2CWP	X2 axis + (CW) direction positive logic pulse output		67	Out	Z2CWP	Z2 axis + (CW) direction positive logic pulse output	
18	Out	X2CWP	X2 axis + (CW) direction negative logic pulse output		68	Out	Z2CWP	Z2 axis + (CW) direction negative logic pulse output	
19	Out	X2CCWP	X2 axis -(CCW) direction positive logic pulse output		69	Out	Z2CCWP	Z2 axis -(CCW) direction positive logic pulse output	
20	Out	X2CCWP	X2 axis -(CCW) direction negative logic pulse output		70	Out	Z2CCWP	Z2 axis -(CCW) direction negative logic pulse output	
21	Out	X2DRSTCOM	X2DRST current output (+24V)		71	Out	Z2DRSTCOM	Z2DRST current output (+24V)	
22	Out	X2DRST	X2 axis servo reset signal (This signal is used for general purpose output)		72	Out	Z2DRST	Z2 axis servo reset signal (This signal is used for general purpose output)	
23	In	X2DEND/X2PO	X2 axis positioning completion signal /X2 axis PO signal	☆	73	In	Z2DEND/Z2PO	Z2 axis positioning completion signal /Z2 axis PO signal	☆
24	—	N.C	Reserved		74	—	N.C	Reserved	
25	In	+X2EA	X2 axis encoder +A phase signal	☆	75	In	+Z2EA	Z2 axis encoder +A phase signal	☆
26	In	-X2EA	X2 axis encoder -A phase signal	☆	76	In	-Z2EA	Z2 axis encoder -A phase signal	☆
27	In	+X2EB	X2 axis encoder +B phase signal	☆	77	In	+Z2EB	Z2 axis encoder +B phase signal	☆
28	In	-X2EB	X2 axis encoder -B phase signal	☆	78	In	-Z2EB	Z2 axis encoder -B phase signal	☆
29	In	+X2ZORG	X2 axis encoder +Z phase signal	☆	79	In	+Z2ZORG	Z2 axis encoder +Z phase signal	☆
30	In	-X2ZORG	X2 axis encoder -Z phase signal	☆	80	In	-Z2ZORG	Z2 axis encoder -Z phase signal	☆
31	Out	N.C	Reserved(No connecting)		81	—	N.C	Reserved	
32	Out	+COM	Y2CWP,Y2CCWP +common (+5V)		82	Out	+COM	A2CWP,A2CCWP +common (+5V)	
33	Out	Y2CWP	Y2 axis + (CW) direction positive logic pulse output		83	Out	A2CWP	A2 axis + (CW) direction positive logic pulse output	
34	Out	Y2CWP	Y2 axis + (CW) direction negative logic pulse output		84	Out	A2CWP	A2 axis + (CW) direction negative logic pulse output	
35	Out	Y2CCWP	Y2 axis - (CCW) direction positive logic pulse output		85	Out	A2CCWP	A2 axis - (CCW) direction positive logic pulse output	
36	Out	Y2CCWP	Y2 axis - (CCW) direction negative logic pulse output		86	Out	A2CCWP	A2 axis - (CCW) direction negative logic pulse output	
37	Out	Y2DRSTCOM	Y2DRST current output (+24V)		87	Out	A2DRSTCOM	A2DRST current output (+24V)	
38	Out	Y2DRST	Y2 axis servo reset signal (This signal is used for general purpose output)		88	Out	A2DRST	A2 axis servo reset signal (This signal is used for general purpose output)	
39	In	Y2DEND/Y2PO	Y2 axis positioning completion signal /Y2 axis PO signal	☆	89	In	A2DEND/A2PO	A2 axis positioning completion signal /A2 axis PO signal	☆
40	—	N.C	Reserved		90	—	N.C	Reserved	
41	In	+Y2EA	Y2 axis encoder +A phase signal	☆	91	In	+A2EA	A2 axis encoder +A phase signal	☆
42	In	-Y2EA	Y2 axis encoder -A phase signal	☆	92	In	-A2EA	A2 axis encoder -A phase signal	☆
43	In	+Y2EB	Y2 axis encoder +B phase signal	☆	93	In	+A2EB	A2 axis encoder +B phase signal	☆
44	In	-Y2EB	Y2 axis encoder -B phase signal	☆	94	In	-A2EB	A2 axis encoder -B phase signal	☆
45	In	+Y2ZORG	Y2 axis encoder +Z phase signal	☆	95	In	+A2ZORG	A2 axis encoder +Z phase signal	☆
46	In	-Y2ZORG	Y2 axis encoder -Z phase signal	☆	96	In	-A2ZORG	A2 axis encoder -Z phase signal	☆
47	Out	N.C	Reserved(No connecting)		97	—	N.C	Reserved	
48	In	FSSTOP2	X2,Y2,Z2,A2 axis immediate stop signal		98	In	RESET2	All-axis reset signal	
49	—	N.C	Reserved		99	—	N.C	Reserved	
50	—	D.GND	Internal +5V digital GND		100	—	D.GND	Internal +5V digital GND	

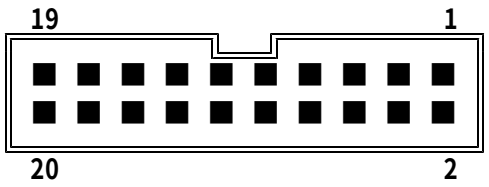
(2) Special-purpose I/O connector

The conector of the applied function.

■Pin assignment

●C-VX870,C-VX872(Common to C-VX870 and C-VX872)

- Connector type name : XG4C-2031 (OMRON)
- Adaptable connector socket : XG4M-2030 (OMRON, not included in attached accessories)
- Adaptable cable : MIL 20P 1.5m flat cable (option)



■Signal table

- All input signal is not able to set time constants, to switch logic.

(Note 1) When the $\overline{\text{MAN}}$ signal goes low, this bord is MANUAL mode.
When the $\overline{\text{MAN}}$ signal goes high, this bord return to BUS mode.
The $\overline{\text{MAN RDY}}$ signal is enable to go high by MAN MASK command.
When the $\overline{\text{MAN}}$ signal is low level, this bord is not MANUAL mode by setting $\overline{\text{MAN}}$ signal low level.

(Note 2) $\overline{\text{SIGNAL INnx}}$ input signal can be use general-purpose sensor function and synchronous start function.
If these signal is used, set the functions that need to be changed from their values.
The initial value after the relevant signal is reset is "No function" .
If this bord is MANUAL mode, You can not use $\overline{\text{SIGNAL INnx}}$ input signal.
When this bord is MANUAL mode, this signal(SEL A-D) enable to select an axis that perfoms MANUAL SCAN drive.
The functions assigned to the $\overline{\text{SIGNAL INnx}}$ input signal are invalid. And when this bord returns to BUS mode, the functions assigned to this signal are valid.

(Note 3) $\overline{\text{SIGNAL OUTnx}}$ output signal can be output status signals of any axes by setting status output function.
The initial values after the relevant signal is reset are as follows:
$\overline{\text{SIGNAL OUTn0}}$ is CNTINT signal of Xn axis.
$\overline{\text{SIGNAL OUTn1}}$ is CNTINT signal of Yn axis.

(Note 4) When this bord is MANUAL mode, $\overline{\text{SS0}}$,$\overline{\text{SS1}}$ input signal(SEL A-D) enables general-purpose sensor that MANUAL SCAN drive specified axis.
When general-purpose sensor function is set as "UP/DOWN/CONST command", this input signal enable acceleration/deceleration command signal of MANUAL SCAN drive.

●C-VX870(J3)

Pin No.	Direction	Signal name	Description	
			BUS mode	MANUAL mode
1	—	D.GND	GND(internal +5V GND)	
2	In	$\overline{\text{MAN}}$	MANUAL mode select signal	(Note 1)
3	In	$\overline{\text{FSSTOP}}$	All axes immediate stop signal	
4	In	$\overline{\text{CWMS}}$	Invalid	CW direction MANUAL SCAN drive command signal
5	In	$\overline{\text{CCWMS}}$		CCW direction MANUAL SCAN drive command signal
6	—	D.GND	GND(internal +5V GND)	
7	In	$\overline{\text{SIGNAL IN0}}$ / SEL A	General-purpose, synchronous start signal (Note 2)	The signals can be combined to select the axis used for manual operation.
8	In	$\overline{\text{SIGNAL IN1}}$ / SEL B		
9	In	SEL C	Invalid	
10	In	SEL D		
11	Out	$\overline{\text{SIGNAL OUT0}}$	(The initial value after resetting : XCNTINT) Staus output signal (Note 3)	
12	Out	$\overline{\text{SIGNAL OUT1}}$	(The initial value after resetting : YCNTINT)	
13	Out	NC	Reserved	
14	Out	NC		
15	—	D.GND	GND(internal +5V GND)	
16	Out	+5V	Internal +5V	
17	In	$\overline{\text{SS0}}$	Invalid	MANUAL SCAN drive acceleration/ deceleration command signal (General-purpse sensor signal) (Note 4)
18	In	$\overline{\text{SS1}}$		
19	Out	$\overline{\text{MAN RDY}}$	Permission signal switching MANUAL mode	(Note 1)
20	—	D.GND	GND(internal +5V GND)	

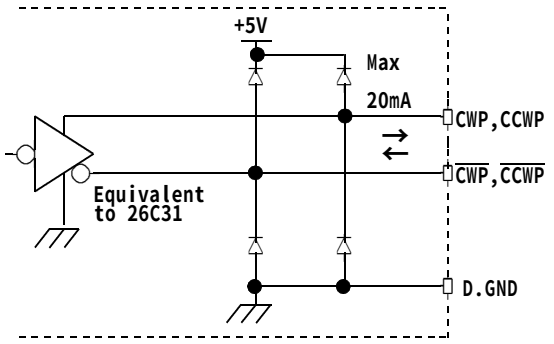
●C-VX872(J3)

Pin No.	Direction	Signal name	Description	
			BUS mode	MANUAL mode
1	—	D.GND	GND(internal +5V GND)	
2	In	$\overline{\text{MAN}}$	MANUAL mode select signal	(Note 1)
3	In	$\overline{\text{FSSTOP}}$	All axes immediate stop signal	
4	In	$\overline{\text{CWMS}}$	Invalid	CW direction MANUAL SCAN drive command signal
5	In	$\overline{\text{CCWMS}}$		CCW direction MANUAL SCAN drive command signal
6	—	D.GND	GND(internal +5V GND)	
7	In	$\overline{\text{SIGNAL IN10}}$ / SEL A	X1,Y1,Z1,A1 axis general-purpose, synchronous start signal (Note 2)	MANUAL SCAN drive select axis signal
8	In	$\overline{\text{SIGNAL IN11}}$ / SEL B		
9	In	$\overline{\text{SIGNAL IN20}}$ / SEL C	X2,Y2,Z2,A2 axis general-purpose, synchronous start signal (Note 2)	
10	In	$\overline{\text{SIGNAL IN21}}$ / SEL D		
11	Out	$\overline{\text{SIGNAL OUT10}}$	(The initial value after resetting : X1CNTINT) X1,Y1,Z1,A1 axis status output signal (Note 3)	
12	Out	$\overline{\text{SIGNAL OUT11}}$	(The initial value after resetting : Y1CNTINT)	
13	Out	$\overline{\text{SIGNAL OUT20}}$	(The initial value after resetting : X2CNTINT) X2,Y2,Z2,A2 axis status output signal (Note 3)	
14	Out	$\overline{\text{SIGNAL OUT21}}$	(The initial value after resetting : Y2CNTINT)	
15	—	D.GND	GND(internal +5V GND)	
16	Out	+5V	Internal +5V	
17	In	$\overline{\text{SS0}}$	Invalid	MANUAL SCAN drive acceleration/ deceleration command signal (General-purpose sensor signal) (Note4)
18	In	$\overline{\text{SS1}}$		
19	Out	$\overline{\text{MAN RDY}}$	Permission signal switching MANUAL mode	(Note 1)
20	—	D.GND	GND(internal +5V GND)	

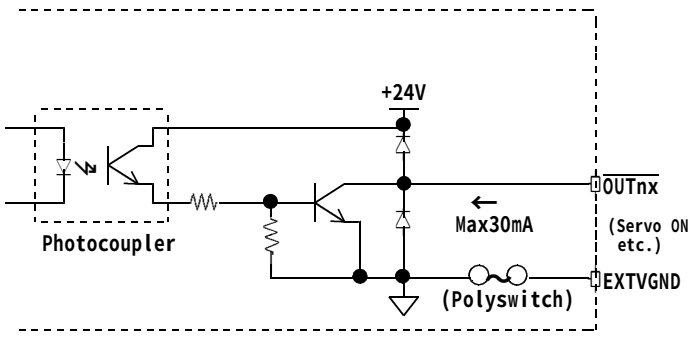
2-6. Input and Output Specifications

(1) Output specifications

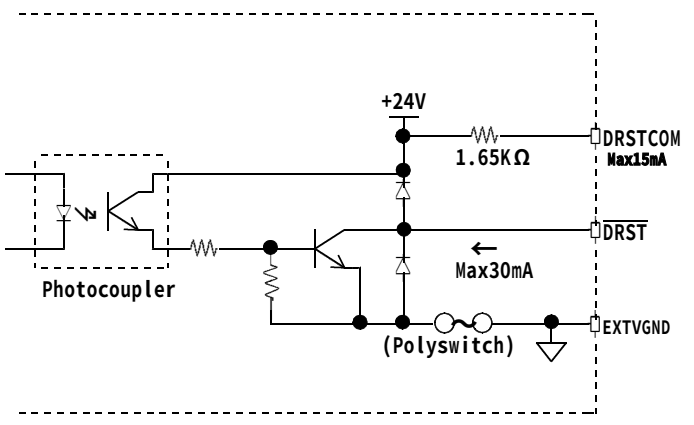
●Output specifications 1

Circuit	Description	
 Common for all axes	Signal name	CWP,$\overline{CWP}$,CCWP,$\overline{CCWP}$
	Output method	Line driver (differential) output (Equivalent to 26C31: Compliant with RS422A)
	Output current	±20mA
	Output frequency	Maximum 6.5MHz(Indipendent drive)
	Insulation	Non-insulated

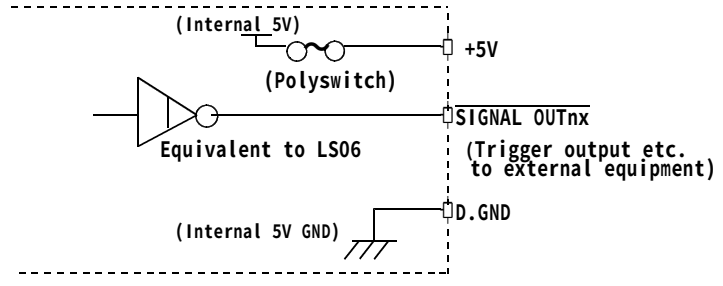
●Output specifications 2

Circuit	Description	
 Common for $\overline{OUTn0}$ to $\overline{OUTn3}$	Signal name	$\overline{OUTn0\text{-}n3}$
	Interface voltage	+24V
	Output method	Nch transistor Open collector output
	Output current	ON :30mA(Vce=1V or less) 50mA(Vce=2V or less) OFF :0.1mA or less
	Output response time	1ms or less (ON→OFF、OFF→ON)
	Insulation	Photocoupler insulation (between internal circuits and external circuits)

●Output specifications 3

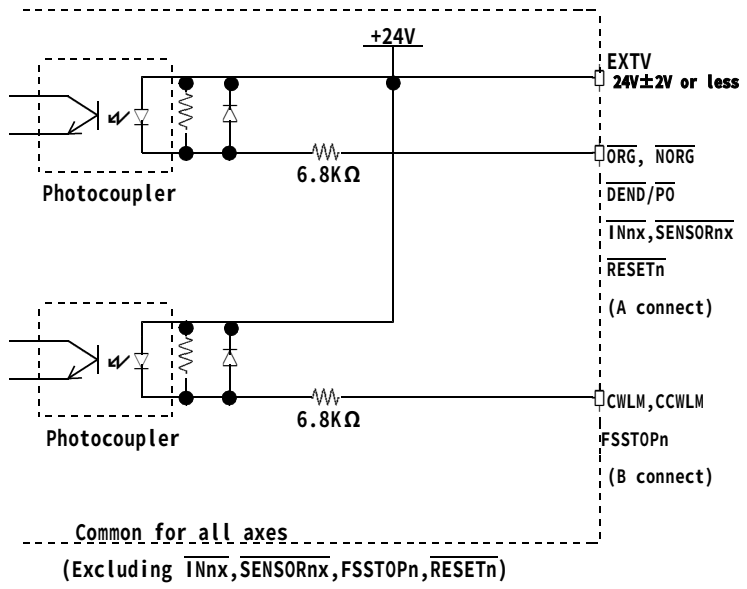
Circuit	Description	
 Common for all axes	Signal name	$\overline{DRST}$ (Can be connected from DRSTCOM to the +5V current limiting circuit: up to 15 mA)
	Interface voltage	+24V
	Output method	Nch transistor Open collector output
	Output current	ON :30mA(Vce=1V or less) 50mA(Vce=2V or less) OFF :0.1mA or less
	Output response time	1ms or less (ON→OFF、OFF→ON)
	Insulation	Photocoupler insulation (between internal circuits and external circuits)

●Output specifications 4(Applied function)

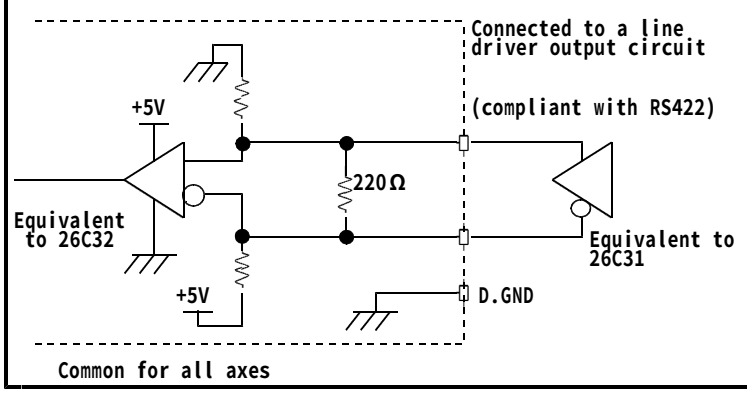
Circuit	Description	
 J3 connector signal	Signal name	$\overline{SIGNAL\ OUTn0,n1}$
	Interface voltage	+30V or less
	Output method	Open collector output
	Output current	ON :10mA(Vce=0.6V or less) OFF :0.3mA or less
	Output response time	1μs or less (A latch and output time width can be set for output.) (ON→OFF、OFF→ON)
	Insulation	Non-insulated

(2) Input specifications

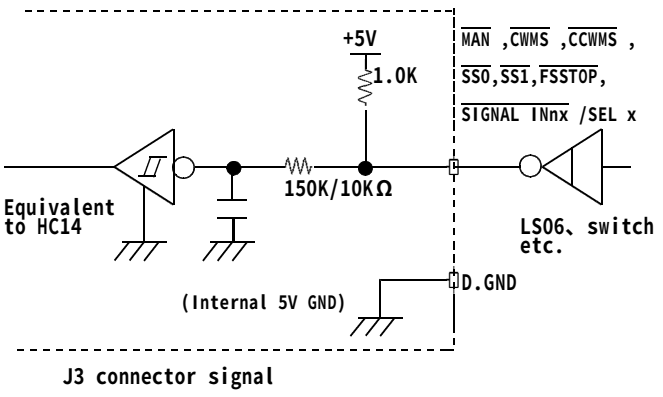
●Input specifications 1

Circuit	Description	
	Signal name	ORG, NORG, DEND/PO , INn0-n3 SENSORn0,n1,RESETn (A contact) FSSTOPn,CWLM,CCWLM (B contact)
	Interface voltage	+24V
	Input impedance	6.8KΩ
	ON/OFF level	ON :2.5mA or more OFF :0.8mA or less
	Input response time	1ms or less (a signal other than the RESETn) 5ms or less(RESETn) (ON→OFF、OFF→ON)
	Insulation	Photocoupler insulation (between internal circuits and external circuits)

●Input specifications 2

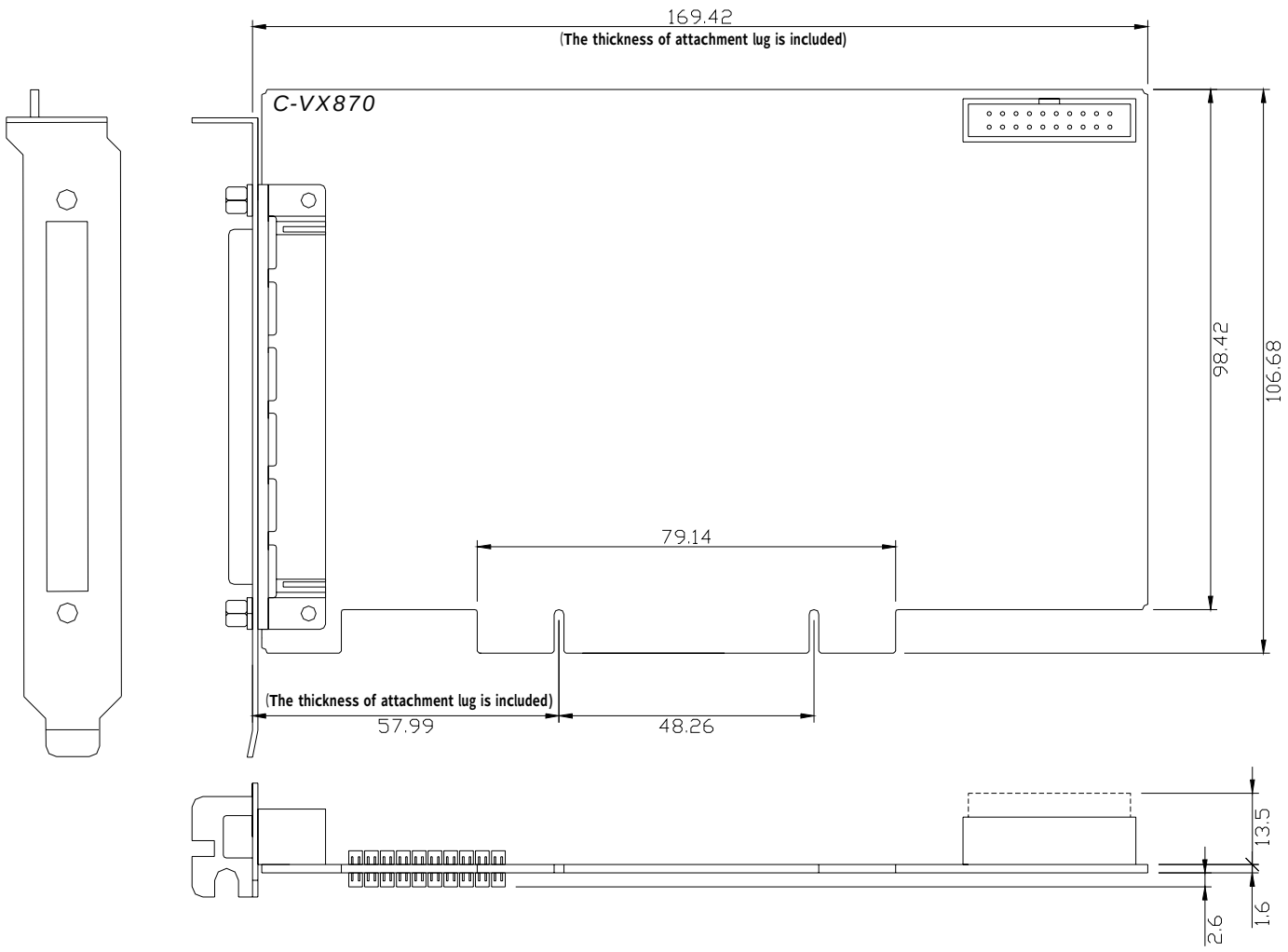
Circuit	Description	
	Signal name	±EA、±EB、±ZORG
	Interface specifications	Line receiver input (should be connected to an RS422-compliant line driver)
	Input terminating resistor	220Ω
	Response frequency	±EA,EB : 5MHz ±ZORG : 100KHz
	Insulation	Non-insulated

●Input specifications 3 (Applied function)

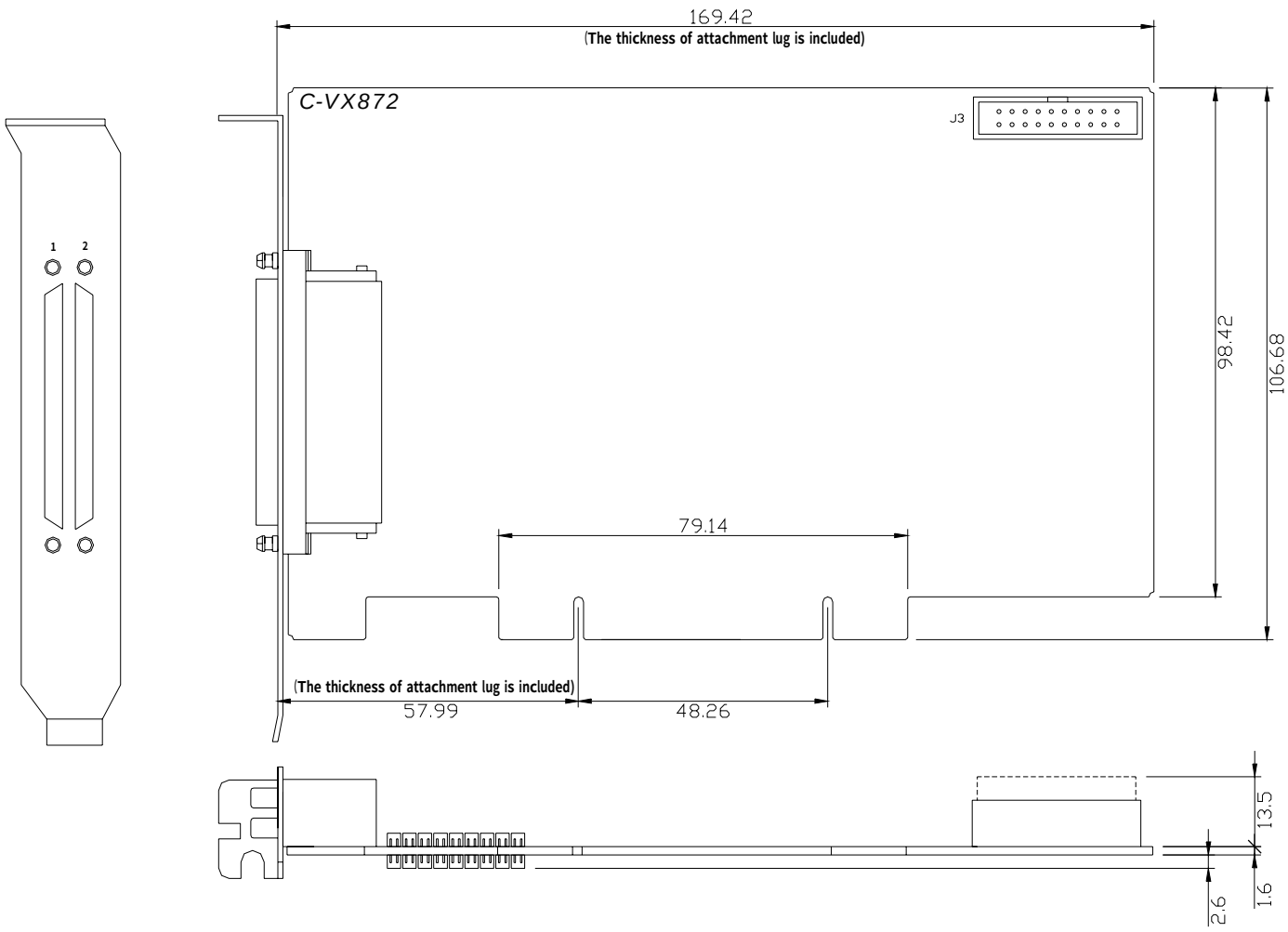
Circuit	Description	
	Signal name	MAN, CWMS, CCWMS, SS0,SS1,FSSTOP SIGNAL INn0,n1 /SEL x
	Interface specifications	TTL level CMOS schmitt input
	Input level	High level open Low level 0.8V or less
	Input response time	5ms or less(MAN,CWMS,CCWMS) 1ms or less(SS0,SS1,FSSTOP) 10us or less(SIGNAL INn0,n1 /SEL x) (ON→OFF、OFF→ON)
	Insulation	Non-insulated

2-7. Outside Dimensions

●C-VX870



●C-VX872

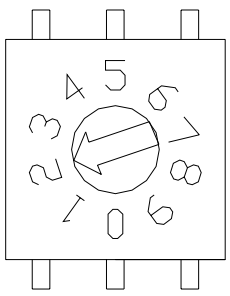


3. SETTING

Before integrating the C-VX870,C-VX872 into the PC, set the switches on the board.

3-1. Setting the Board Number(S1)

Assign a board number to the C-VX870,C-VX872 using the rotary switch S1 on the board.
(By default (before shipment from the factory), the rotary switch is bord number 1)
When two or more C-VX870,C-VX872 boards are used, assign board numbers to the second and any subsequent boards in such a way that no numbers are duplicated.
The following figure shows an example in which board number 2 is assigned.

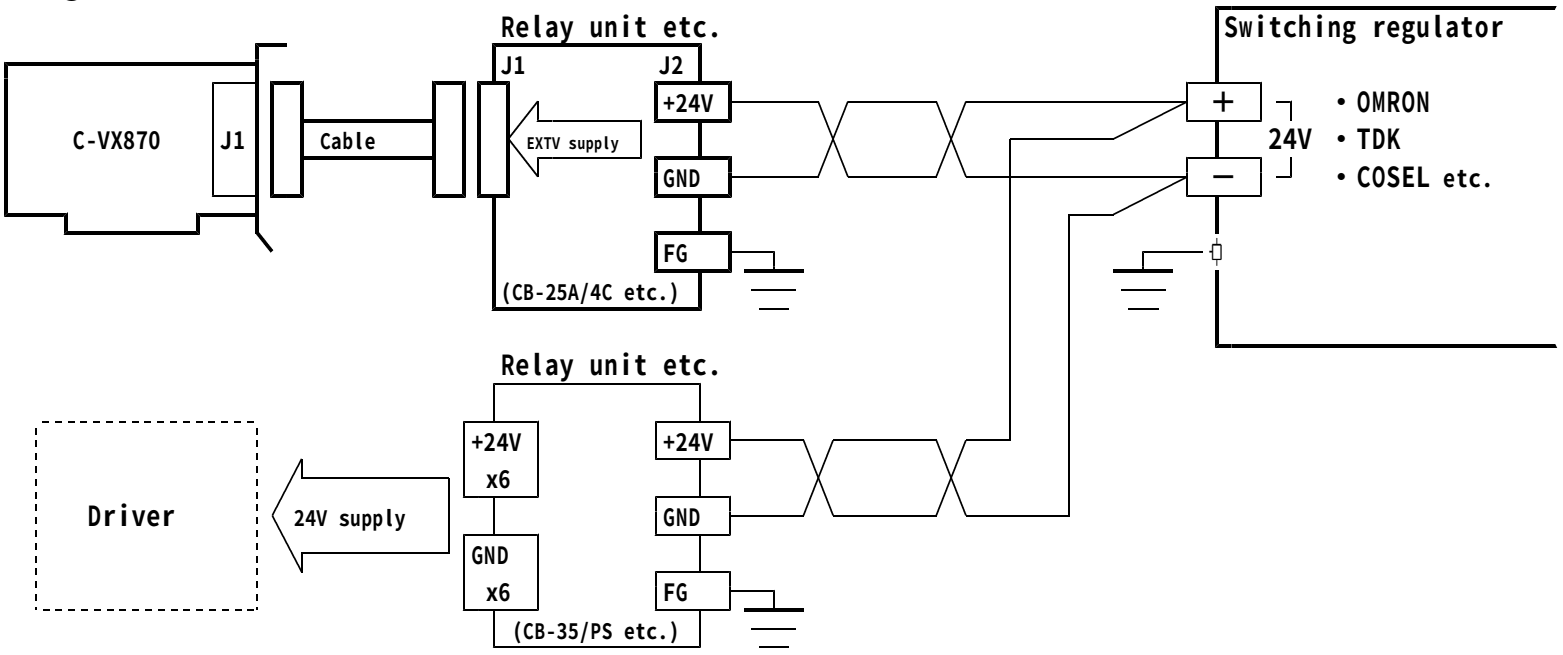


◆ The S1 setting is validated after power-on.
Set the switch with power off, and turn it on after changing the setting.

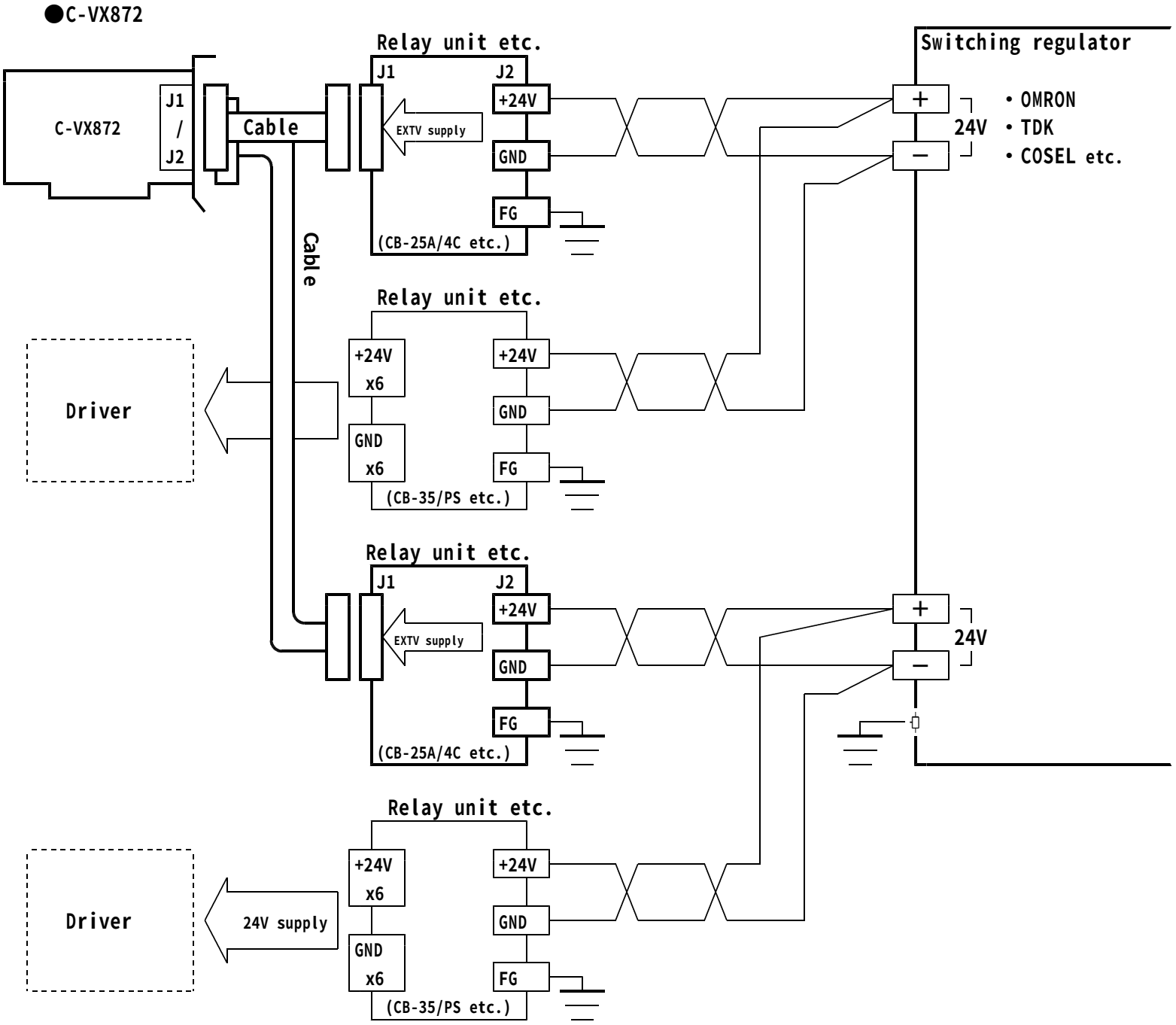
4. CONNECTION

4-1. Example of user I/O Interface Power Supply Connection

●C-VX870



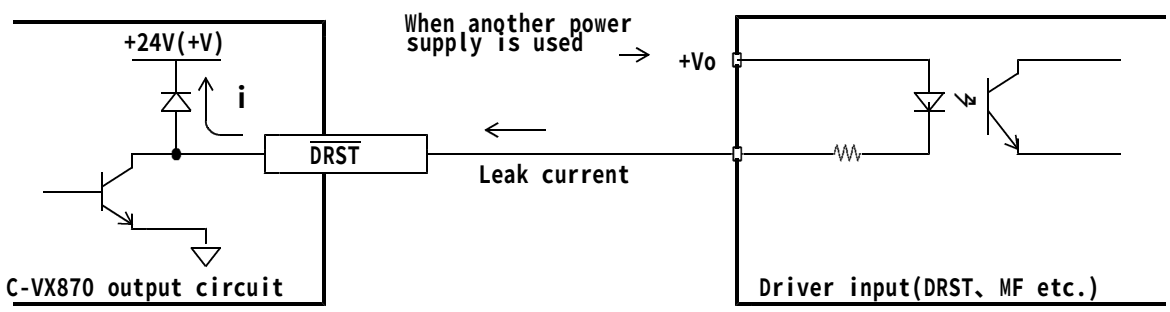
●C-VX872



- For the user interface power supply (EXTV) of controller C-VX870,C-VX872, connect +24Vdc from the common power supply so that it turns on and off in synchronization with externally connected equipment.
  For easy connection, use the optional relay unit.

- For the power supply used for the driver interface($\overline{\text{OUTnx}}$ signal,$\overline{\text{DRST}}$ signal), use one prepared by the controller, such as DRSTCOM.
  For details, refer to Section 4-2, "Examples of Connection to Drivers."

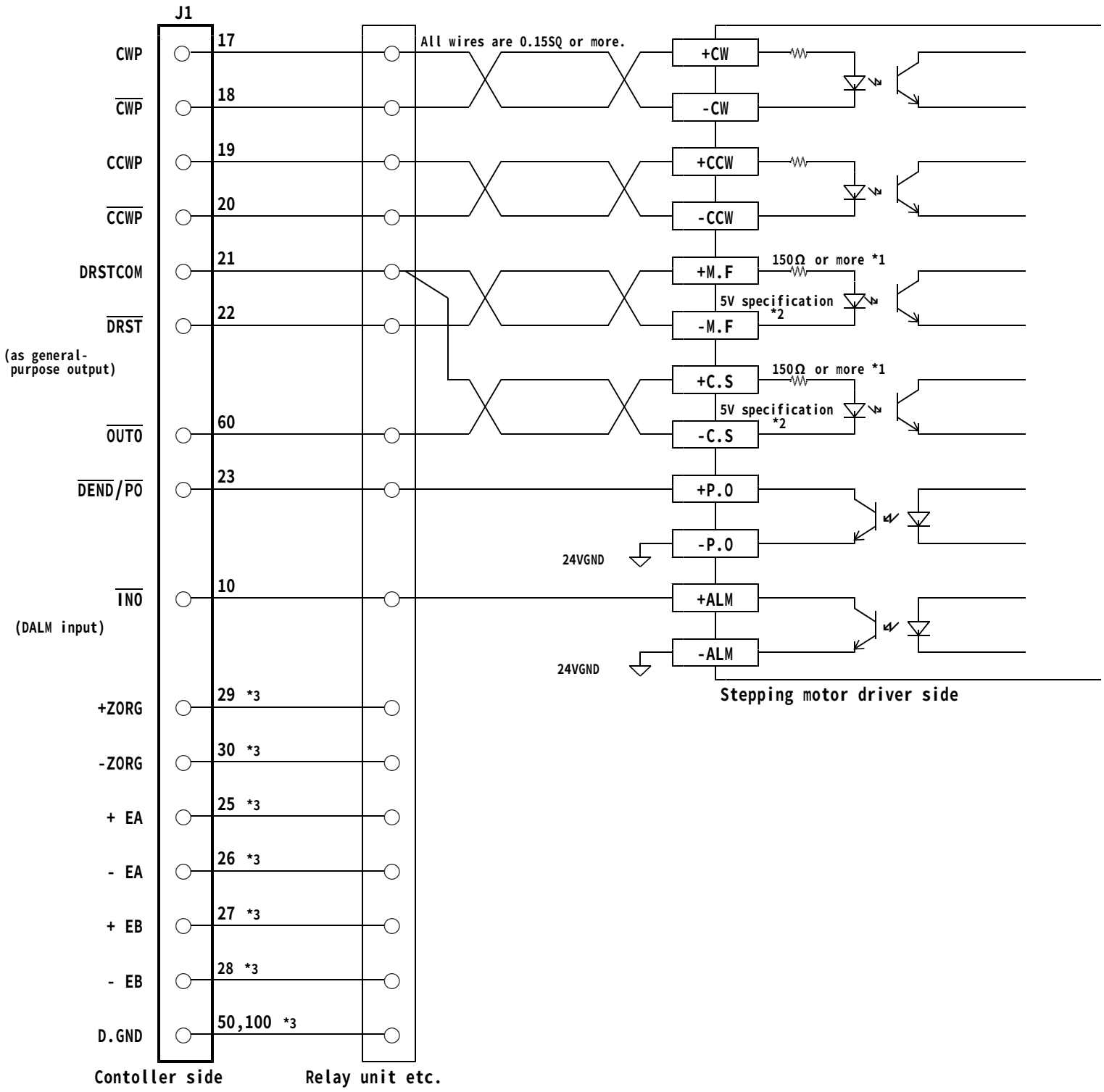
◆ Power may be supplied to the driver from a power supply different from the C-VX870,C-VX872 such as by connecting to the $\overline{\text{OUTnx}}$ or $\overline{\text{DRST}}$ signal of the servo driver or motor free (MF) signal of the stepping driver. If so and power supply to the driver (+Vo) is greater than power supply to the C-VX870,C-VX872 (+V), leak current i flows through the protection diode of the output circuit and the input circuit of the connection destination may be put in the ON state.



4-2. Examples of Connectinon to Drivers

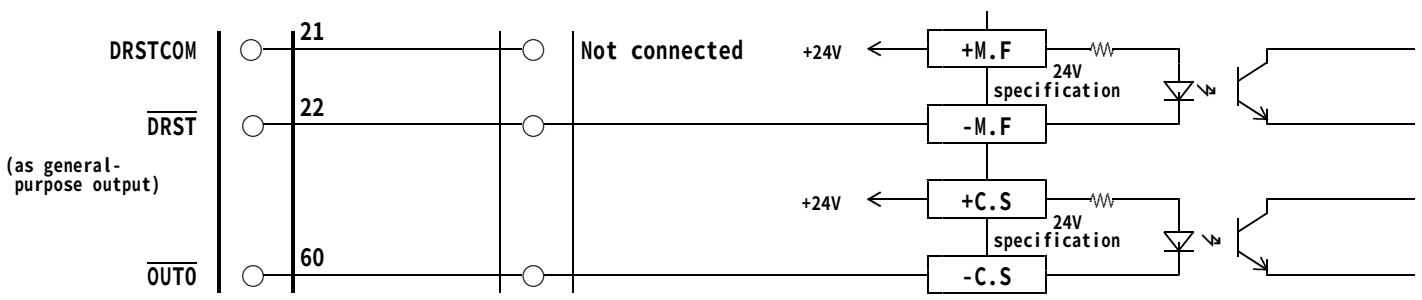
(1) Example of connection to the stepping motor driver

(x axis pin numbers are used in this example.)



*1 If the current limiting resistor on the driver side is less than 150Ω, externally add resistor so that the total resistor value becomes 150Ω or more.

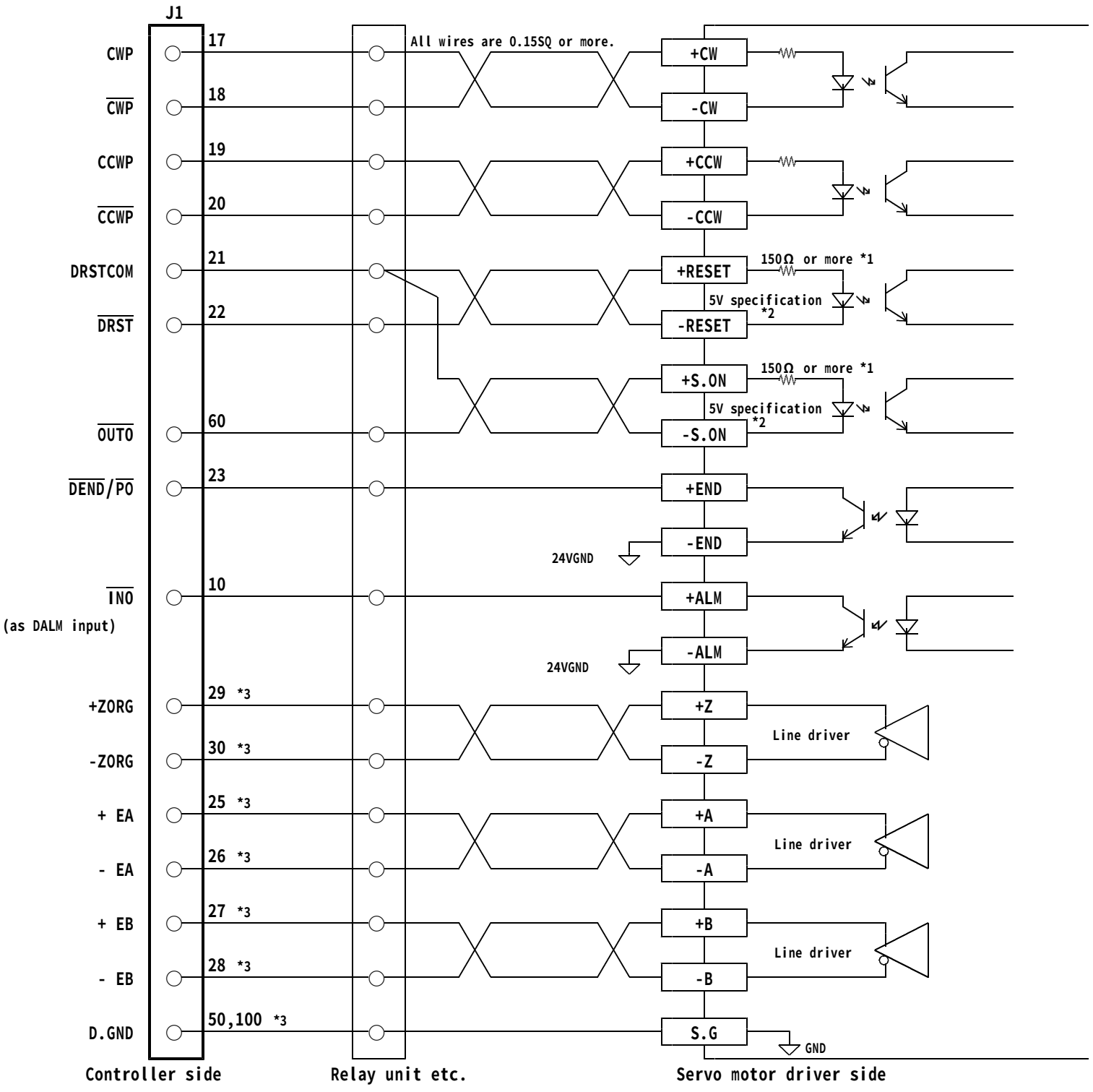
*2 When the input circuit uses a +24V interface,the connection is as follows:



*3 The signal is connected when the encorder is used.
Example of connection refers to "Example of connection to the servo motor driver".

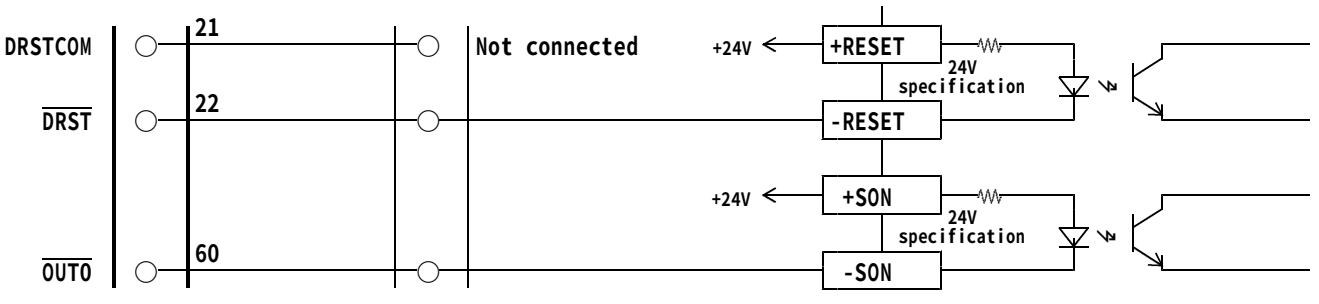
(2) Examples of Connection to the servo motor driver

(X axis pin numbers are used in this sample.)



*1 If the current limiting resistor on the driver side is less than 150 Ω, externally add resistor so that the total resistor value becomes 150 Ω or more.

*2 When input circuit of the servo driver uses a +24V interface, the connection is as follows:

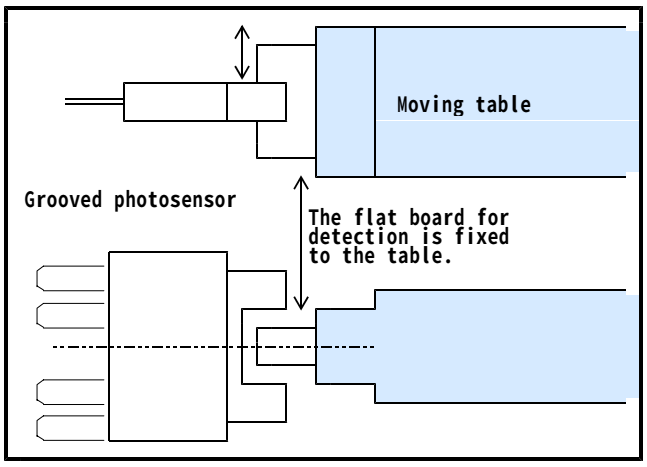


*3 The signal is connected when the encorder signal is used.
Connect the encorder signal to the line driver output circuit.

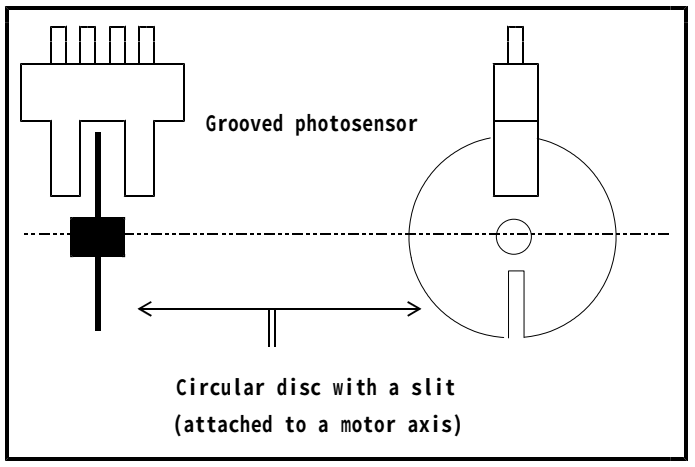
4-3. Examples of Connection to Sensor

(1) Example of sensor attachment(photosensor)

【Linear sensors(ORG,NORG,LIMIT)】



【Rotary sensor(ORG)】



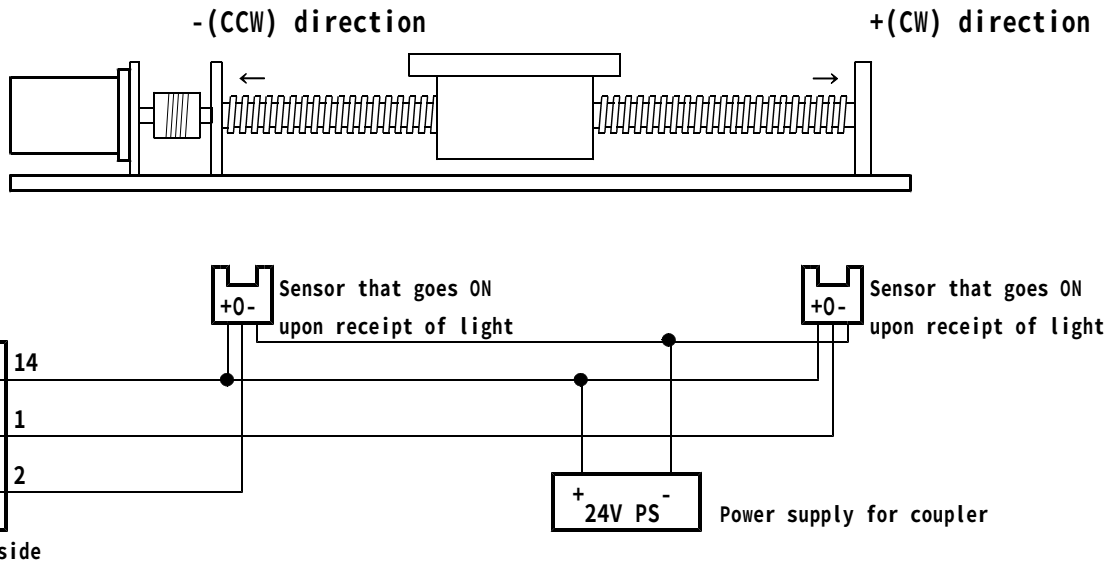
●Example of recommended sensors

Sensor that goes OFF upon receipt of light		Sensor that goes ON upon receipt of light		Remarks(Reference: Consumption current and type)
Maker	Rating	Maker	Rating	
SUNX	PM-□24	SUNX	PM-□24	15mA or less・NPN Type
	PM-□44		PM-□44	15mA or less・NPN Type
	PM-□54		PM-□54	15mA or less・NPN Type
	PM-□64		PM-□64	15mA or less・NPN Type
OMRON	EE-SX910R	OMRON	EE-SX910R	15mA or less・NPN Type

・Please contact us, when you use sensors other than the above.
(example: large 35mA article of consumption current etc.)

(2) Example of connection to a limit sensor

X axis pin number are used in this example.

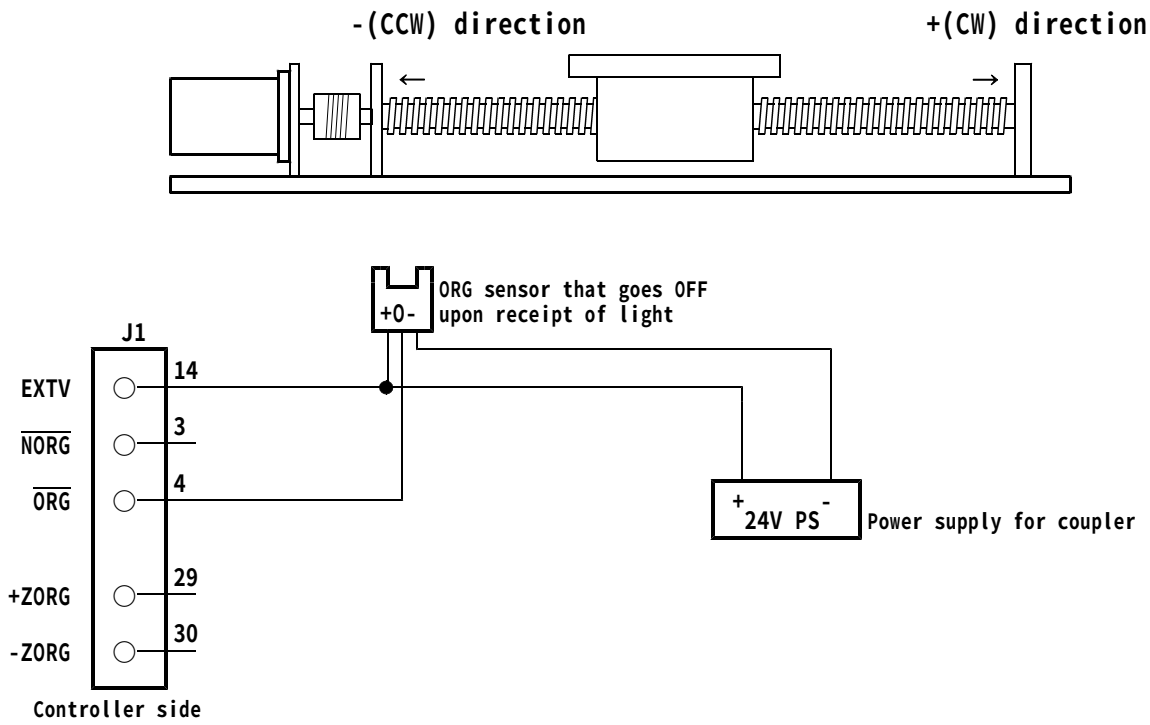


・The initial value of the limit signal is active-off (B contact) input.
Even when the limit signal is not used, the limit signal input must be connected to GND in order to output pulses.
* Input logic of the limit signal can be switched. (Applied function)

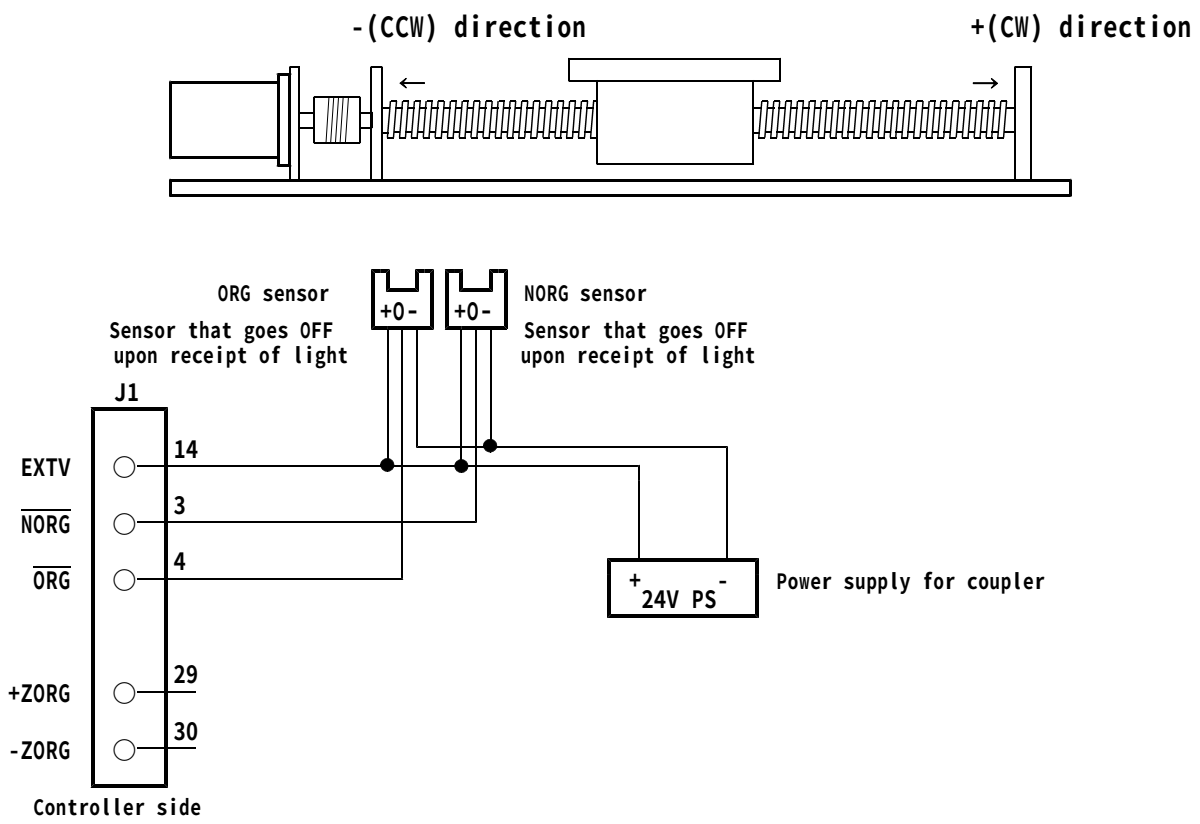
(3) Example of connection to an origin sensor

X axis pin numbers are used in this example.

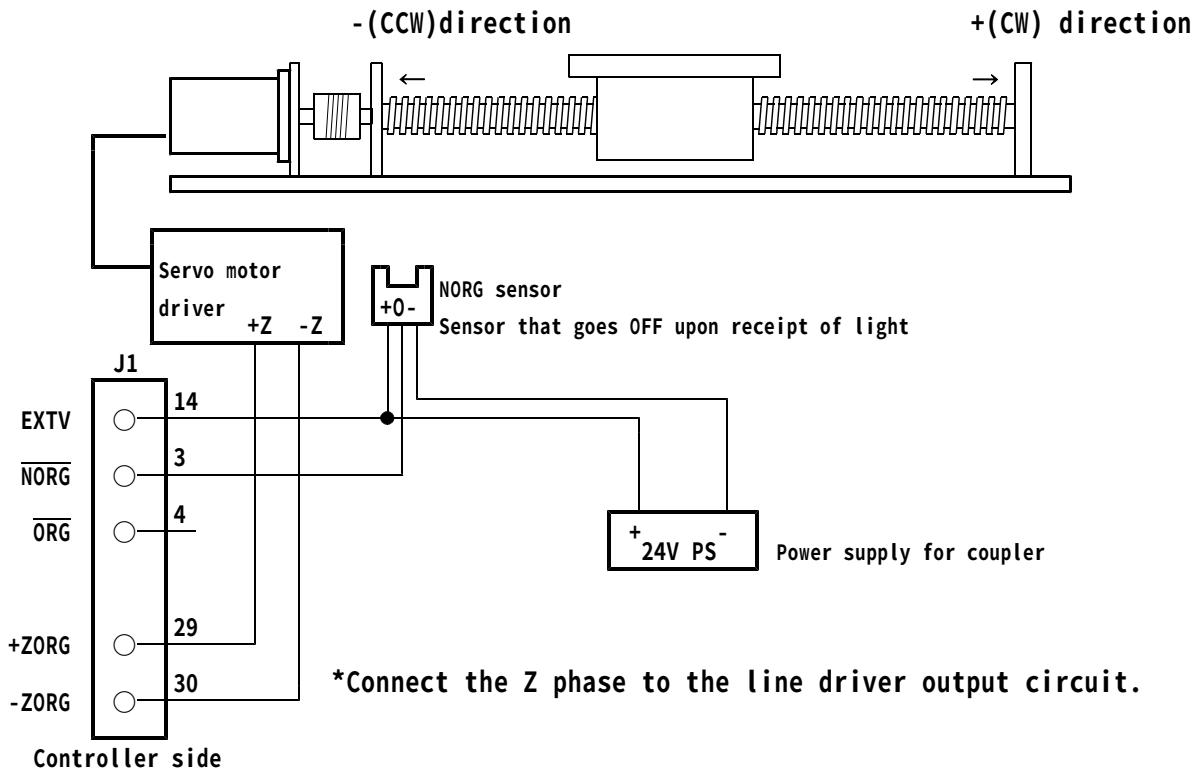
■When using the origin sensor only



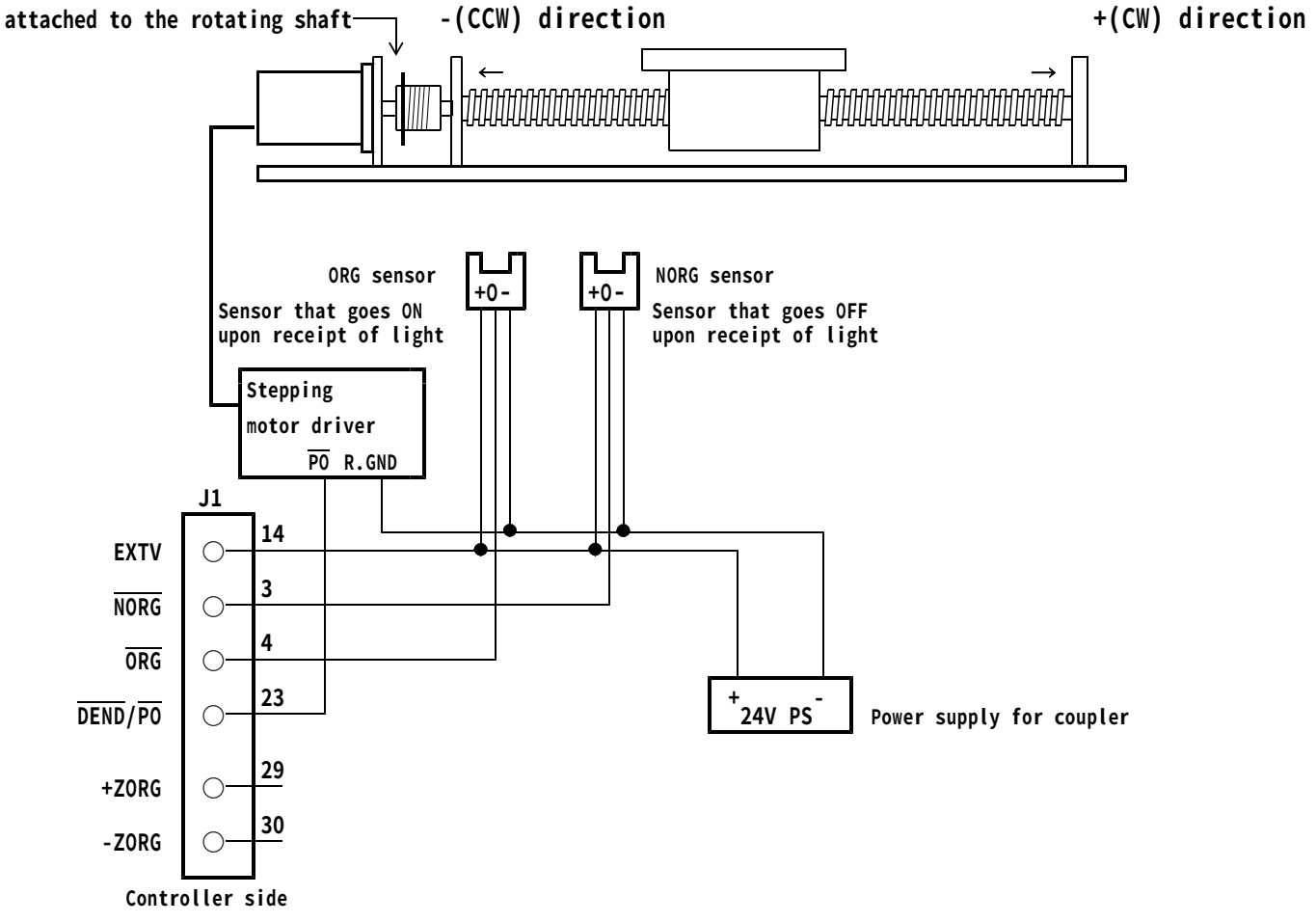
■When using the origin sensor+origin proximity signal



■When using the Z-phase signal of an encoder



■When using the P0 signal of stepping motor driver



5. Maintenance

> ⚠CAUTION
> Incorrect handling may lead to an electric shock.
> Inspection and maintenance need to be conducted by an expert engineer only.
> Before inspecting and maintaining this product, turn off the power.

> ⚠CAUTION
> An electric shock, injuries, and fire may be caused.
> Do not make repair and modification such as product disassembly and parts replacement.

5-1. Maintenance and Inspection

(1) Cleaning method

To use the product in a favorable condition, conduct cycleic cleaning as follows.

- During the cleaning of the terminal plating part, wipe it with a dry, soft cloth.
- If stain is not removed by the dry wiping, soak a cloth in a solution in which neutral detergent is diluted, wring it out, and wipe off the stain with it.
- Do not use a high-volatile solvent such as benzene and thinner, and a wipe. This may deteriorate gold plating by transformation and oxidation.

(2) Inspection method

To use the product in a favorable condition, conduct periodic inspection.
Usually conduct the inspection every six months or every year.
To use the product in an extremely hot and humid or dusty environment, shorten the inspection interval.

Inspection item	Inspection details	Criteria	Inspection method
Environment state	Check whether ambient and intra-device temperatures are appropriate.	0～+ 45℃	Thermometer
	Check whether ambient and intra-device humidifies are appropriate.	10%～80%RH(without dew condensation)	Hygrometer
	Check whether dust is deposited.	No dust	Visual check
Installation state	Check whether the product is firmly secured.	Not loose(6kg·cm)	Torque wrench
	Check whether connectors are completely inserted.	Not loose and removed	Visual check
	Check whether cables are to be removed.	Not loose and removed	Visual check
	Check whether connecting cables are to be broken.	Appearance is normal.	Visual check

(3) Replacement method

If the product becomes faulty, repair it immediately because the entire device system may be affected.
To make the repair smoothly, a spare product should be prepared.

- To prevent an accident such as an electric shock during replacement, stop the device and turn off the power.
- If poor contacting is assumed, wipe contacts with a clean cotton cloth that is wet with industrial alcohol.
- Take a record of switch settings during replacement and return them to their state before the replacement.
- After the replacement, confirm that the new product is normal.
- For the faulty product replaced, have it repaired by returning it to the company with a report indicating as much details on the failure as possible.

5-2. Saving and Disposal

(1) Saving method

Save the product in the following environment.

- Indoor (place in which the product is not in the path of direct sunlight)
- Place at ambient temperature and humidity within the specifications
- Place free of corrosive and inflammable gases
- Place free of dust, dirt, salt, and iron powder
- Place free of direct vibration and shock to the product body
- Place free of water, oil, and chemicals droplets
- Place where a person cannot ride or put objects on the product

(2) Disposal method

Handle the product as industrial waste.

6. Conforming to Europe standards

6-1. Low Voltage Directive

The product does not cover low voltagae directive on the conditions as follows:

●The product is placed in the PC(Enclosure) declared CE marking.
And the control power of PCI bus is fed by the PC.

●The power of the interface +24V is fed by the direct current power which primary and secondary are reinforced insulation.

●A signal should interface using the motor drivers with which strengthening insulation of a primary side and the secondary side was carried out. Or a signal should interface between the motor drivers with which a primary and secondary side is supplied by the power supply by which strengthening insulation was carried out.

6-2. EMC Directive

The product declare CE marking based on EMC(2004/108/EC) Directive.

●Applicable standard

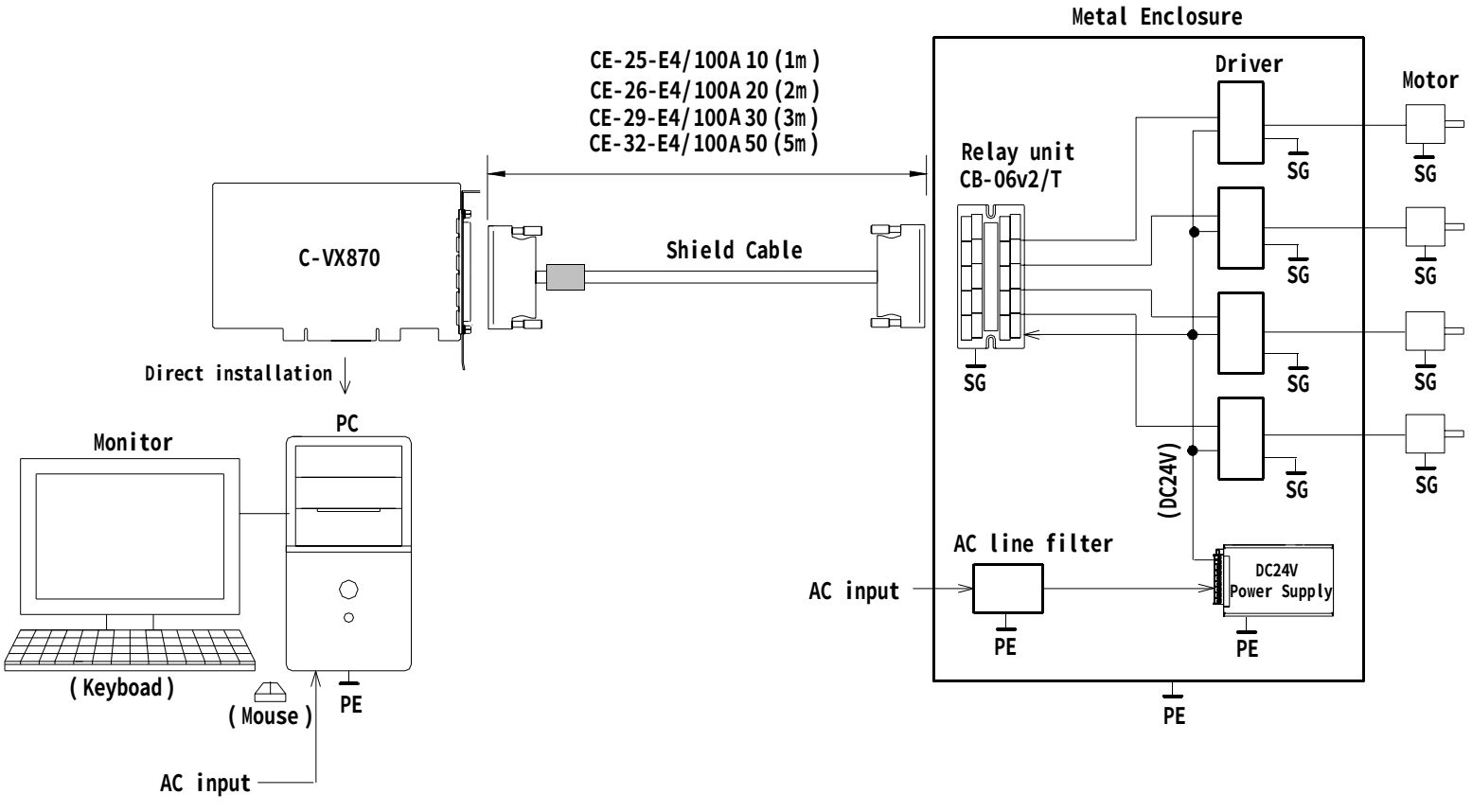
EN61000-6-4
EN61000-6-2
EN61000-3-2
EN61000-3-3

●The product is tested for EMC mesurement by EMC mesurement facilities.
EMC is changed by the equipment configuration including controllers and motor drivers.
Be sure to test EMC mesurement in the condition installed in the final equipment.

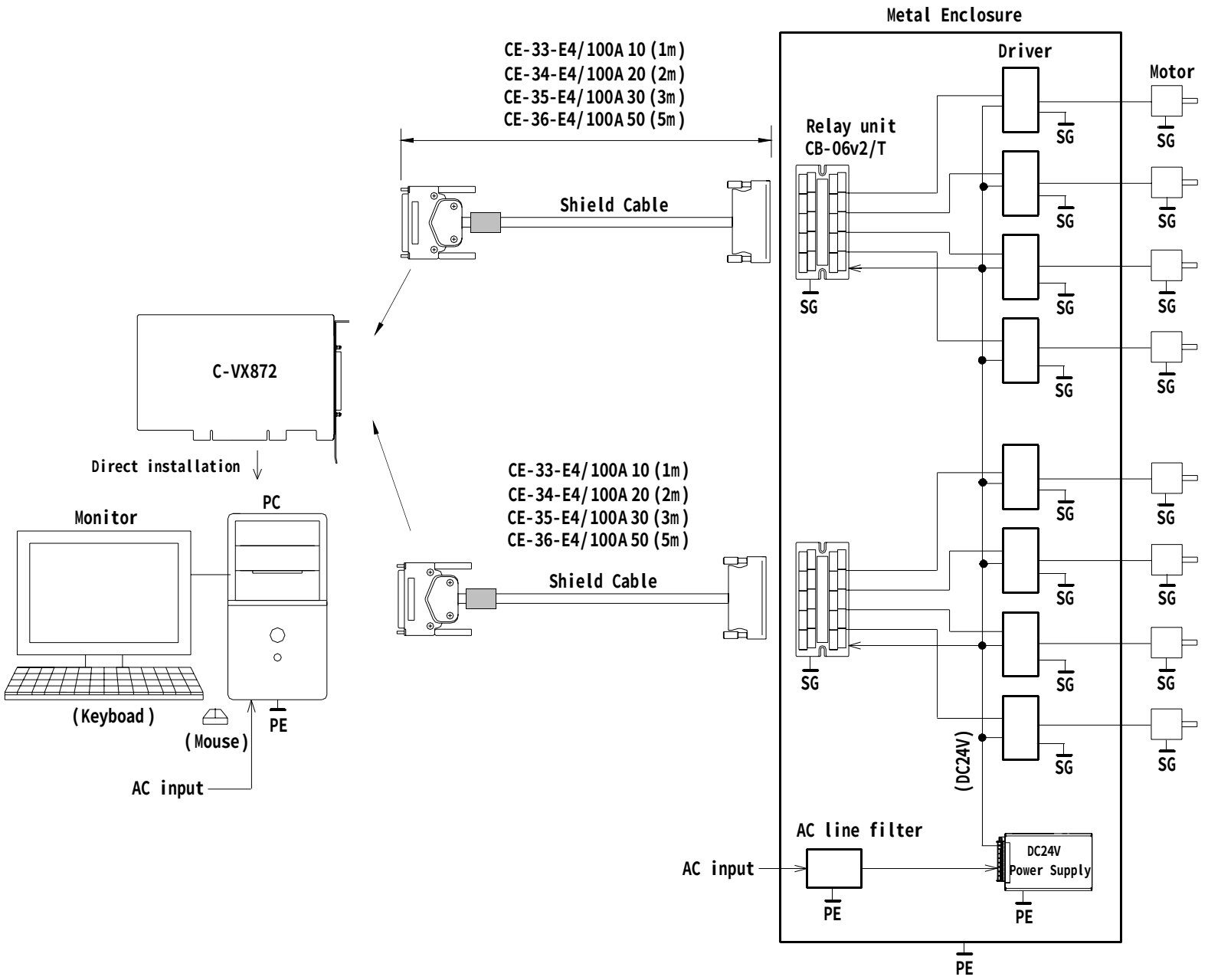
Configuration

The metalic enclosure (Metal Enclosure) and a metaled shielded cable (with a ferrite core) work to shield noise.

●C-VX870



●C-VX872


Metal Enclosure
CE-33-E4/100A 10 (1m)
CE-34-E4/100A 20 (2m)
CE-35-E4/100A 30 (3m)
CE-36-E4/100A 50 (5m)
Driver
Motor
Relay unit
CB-06v2/T
Shield Cable
SG
C-VX872
Direct installation
CE-33-E4/100A 10 (1m)
CE-34-E4/100A 20 (2m)
CE-35-E4/100A 30 (3m)
CE-36-E4/100A 50 (5m)
Monitor
PC
Shield Cable
(Keyboad)
(Mouse)
PE
AC input
(DC24V)
AC line filter
AC input
DC24V
Power Supply
PE
PE
PE

The main parts which revised by this manual

Parts	Content
None	

Technical Service

TEL.(042)664-5382 FAX.(042)666-5664
E-mail s-support@melec-inc.com

Sales and Service

TEL.(042)664-5384 FAX.(042)666-2031
URL:http://www.melec-inc.com

Melec Inc. Control equipment marketing department
516-10,Higashiasakawa-cho,Hachioji-shi,Tokyo 193-0834,Japan

C1006