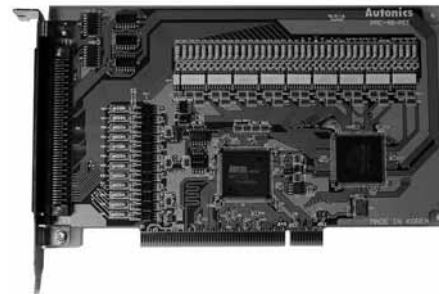


## 4-Axis board type programmable motion controller

### ■ Features

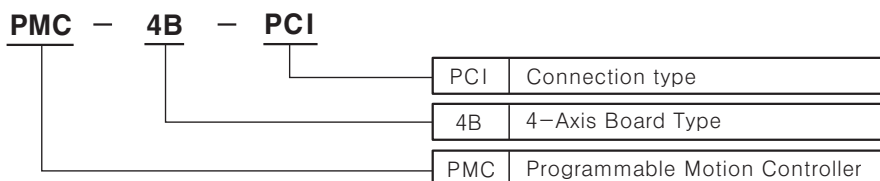
- Available to control 4-axis independent AC servo motor and stepping motor
- PC-PCI Card
- Auto home search and synchronous operation
- Interpolation on circular/linear, Bit pattern/continuous/ ac • deceleration drive
- 2/3-Axis constant linear velocity.
- Compatible with Windows 98, NT, 2000, XP
- Apply the library which can be operated in C++



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



### ■ Ordering information



### ■ Specifications

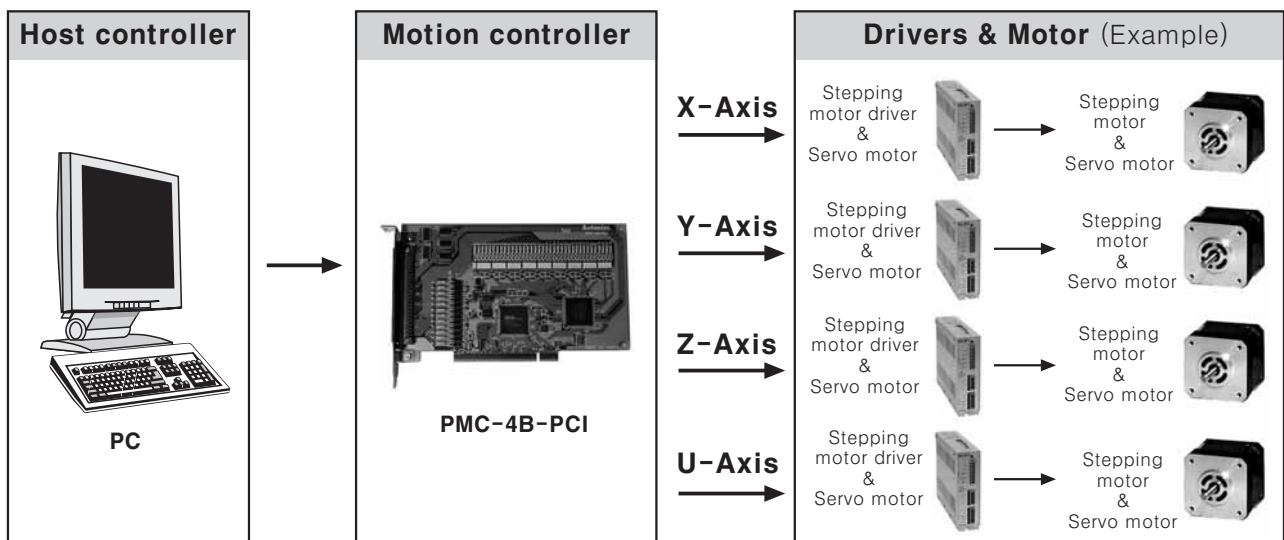
Model		<b>PMC-4B-PCI</b>
Control axis		4-Axis
CPU Data bus		8/16 Bit selectable
2/3-Axis linear interpolation	Interpolation range	Axis -2,147,483,648 ~ +2,147,483,647
	Interpolation speed	1pps ~ 4 Mpps
	Shortcut position accuracy	Max. ±0.5LSB(Within interpolation range)
Circular interpolation	Interpolation range	Axis -2,147,483,648 ~ +2,147,483,647
	Interpolation speed	1pps ~ 4 Mpps
	Shortcut position accuracy	Max. ±1 LSB(Within the whole interpolation range)
2/3-Axis bit pattern interpolation speed		1~4MPPS(Dependent only on CPU data setup)
Other interpolation function		Selectable axis, Linear speed, Continuous interpolation, Interpolation step(Command, External signal)
Driver pulse output (X, Y common specifications) (CLK=16MHz)		Output speed range : 1 pps ~ 4 Mpps
		Output speed accuracy : Max ±0.1%(For setting value)
		Speed rate : 1 ~ 500
		S-curve Ac.acceleration rate : 954 ~ 62.5×10 <sup>6</sup> PPS/SEC <sup>2</sup> (At rate=1) (Rate of increase) 477×10 <sup>3</sup> ~ 31.25×10 <sup>6</sup> PPS/SEC <sup>2</sup> (At rate=500)
		Ac.deceleration : 125 ~ 1×10 <sup>6</sup> PPS/SEC <sup>2</sup> (At rate=1) 62.5×10 <sup>3</sup> ~ 500×10 <sup>6</sup> PPS/SEC <sup>2</sup> (At rate=500)
		Super high speed : 1 ~ 8,000PPS (At rate=1) 500 ~ 4×10 <sup>6</sup> PPS/SEC <sup>2</sup> (At rate=500)
		Drive speed : 1 ~ 8,000PPS (At rate=1) 500 ~ 4×10 <sup>6</sup> PPS/SEC <sup>2</sup> (At rate=500)
		Output pulse : 0 ~ 4,294,967,295(Fixed quantity pulse drive)
		Speed curve:Constant speed/Linear ac.deceleration/Parabola S-curve Ac.acceleration drive
		Deceleration mode of fixed pulse drive (Available asymmetry linear ac.deceleration speed) / Manual deceleration
		Output pulse on Driving, Available to change drive speed
		Selectable dependent 2pulse / 1pulse direction type
		Selectable logic level, Changeable output terminal
Encoder input pulse		2-Phase pulse / Up down pulse input, 2-Phase pulse 1, 2, 4 magnifying selectable

# 4-Axis Motion Controller

## ■ Specifications

Position Counter	Logic position counter (For output pulse) count range : -2,147,483,648 ~ +2,147,483,647 Real position counter (For input pulse) count range : -2,147,483,648 ~ +2,147,483,647
Compare register	COMP+ register position compare range : -2,147,483,648 ~ +2,147,483,647
	COMP- register position compare range : -2,147,483,648 ~ +2,147,483,647
	Status output and signal output the magnitude with position counter Available operating as a software limit
Auto home search	Step 1 (High speed near home search) → Step 2 (Low speed near home search) → Step 3 (Low speed encoder nearby search) → Step 4 (Selectable enable/disable, detection direction for each step)
Interrupt function (Except for interpolation)	<ul style="list-style-type: none"> <li>• 1 drive pulse output</li> <li>• On changing position counter ≥ COMP+</li> <li>• On changing position counter &lt; COMP-</li> <li>• On changing position counter &lt; COMP-</li> <li>• Starting fixed speed on ac.deceleration drive</li> <li>• On changing position counter ≥ COMP+</li> <li>• On changing position counter &lt; COMP+</li> <li>• Completing fixed speed on ac.deceleration drive</li> <li>• On drive ending</li> </ul>
Drive shortcut by external signal	Able to drive fixed quantity • continual speed of +/- direction by EXPP, EXPM signal
	2-Phase encoder signal mode (Encoder input) drive
E decelerate stop / Immediate stop signal	INO ~ 3 axis 4 points Selectable enable/disable signal and detection of direction, able to use as a common input
Input signal for servo motor	Selectable enable/disable signal and detection direction
Output signal for common	OUT4 ~ 7 square axis 4 points (Multiple 4 combines MULT CHIP shortcut signal and terminal)
Signal output on drive	ASND (Ascend speed), DSND (Descend speed)
	CMPP (Position ≥ COMP+), CPM (Position < COMP-)
	DRIVE (Driver pulse output), Read at status register
Overrun limit signal input	Direction +, - each one, Selectable logic level
	Selectable emergency stop/deceleration stop for active
Emergency stop signal input	EMG 1 point in all axis, make drive pulse of all axis immediately stop
Integral type filter built-in	Built-in integration filter on each input terminal, selectable passing time (8 hours)
Etc.	Selectable axis, Constant linear speed, Continuous interpolation, Interpolation step transmission (Command, External signal)
Power supply	5VDC (Using PC inner power)
External power supply	12-24VDC
Allowable voltage fluctuation range	90~100% of power supply
Operation temp. range	0°C ~ +45°C (at non-dew or non-freezing status)
Storage temperature	-10°C ~ +55°C (at non-dew or non-freezing status)
Ambient humidity	35 ~ 85%RH

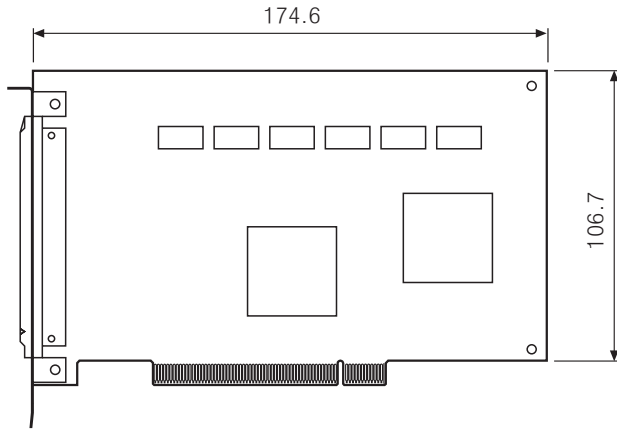
## ■ System



- (A) Counter
- (B) Timer
- (C) Temp. controller
- (D) Power controller
- (E) Panel meter
- (F) Tacho/Speed/Pulse meter
- (G) Display unit
- (H) Sensor controller
- (I) Switching power supply
- (J) Proximity sensor
- (K) Photo electric sensor
- (L) Pressure sensor
- (M) Rotary encoder
- (N) Stepping motor & Driver & Controller
- (O) Graphic panel
- (P) Production stoppage models & replacement

# PMC-4B-PCI

## 외형치수도



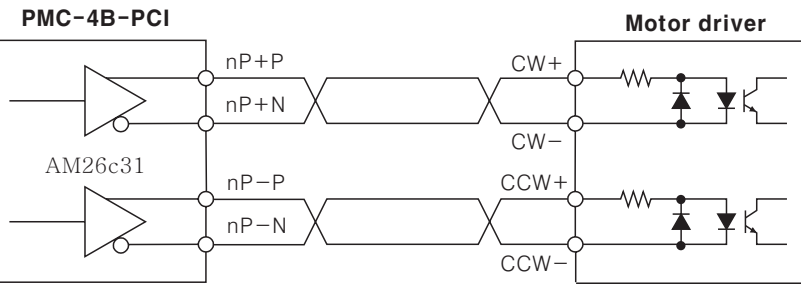
(단위: mm)

## 접속도

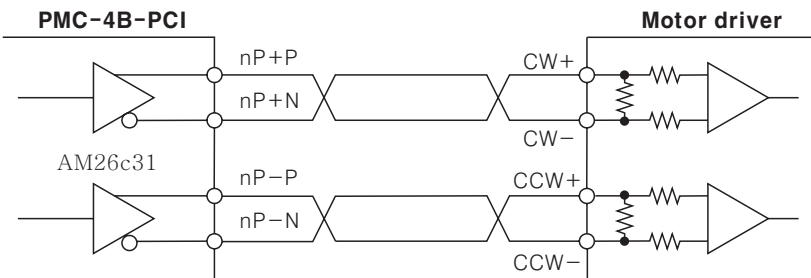
### Drive pulse 출력 신호의 접속(nP+P/N, nP-P/N) Connection of output signal

Driver pulse의 출력은 +방향/-방향의 Drive pulse신호를 차동출력의 Line driver(AM26c31)를 이용하여 출력합니다. Photo coupler 및 Line driver입력을 갖는 Motor driver와의 접속예를 나타냅니다.

#### The connection example for Motor driver with photo coupler input



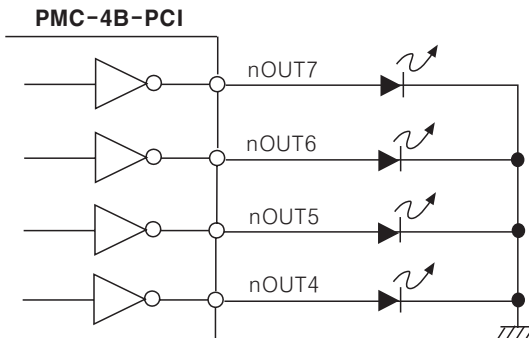
#### The connection example for Motor driver with Line drive input



※ If consider EMC effect, you should use a twisted pair shield line for drive pulse output signal.

### Connection diagram of common output signal

출력 신호는 버퍼(74LS06)로 출력되며, Reset 후에는 모든 출력은 OFF 됩니다.

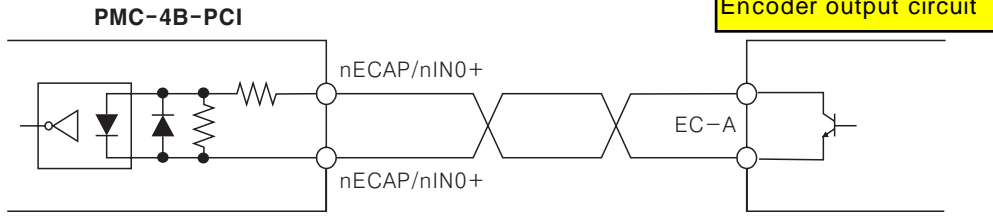


Output signal should be out by buffer (74LS06), All kind of output will be OFF after reset.

# 4축 모션 컨트롤러

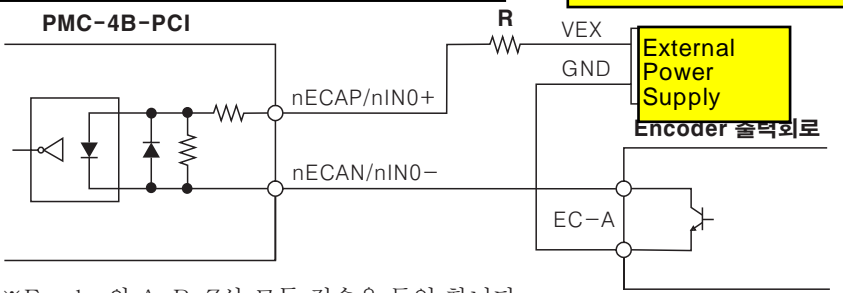
## Encoder Input (nECAP/N, nECBP/N) & nIN0+/- signal connection.

### Connection example of Encoder line drive



※Encoder의 A, B, Z상 모두 접속은 동일 합니다.

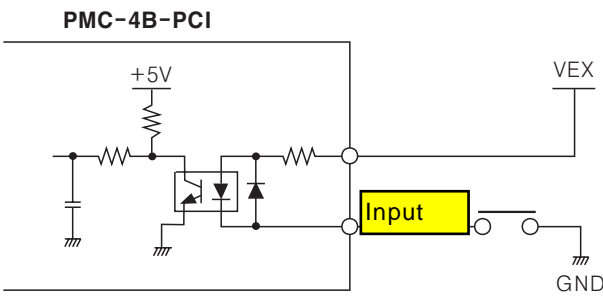
### Connection example of Encoder NPN open collector



※Encoder의 A, B, Z상 모두 접속은 동일 합니다.

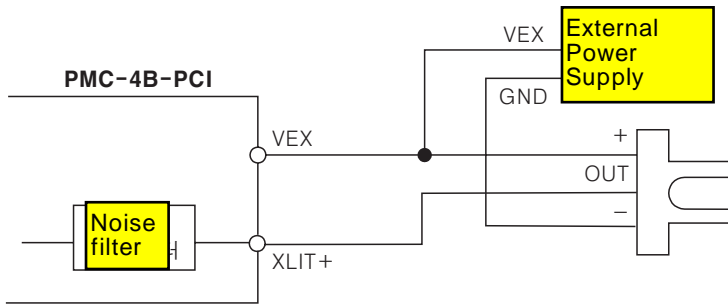
Voltage	Resistance
5V	0
12V	820Ω 1/4W
24V	2kΩ 1W

## Input signal connection (nIN1~3, nINPOS, nALRAM, nEXP+/-, EMG)



### Limit input signal connection (nLMIT+/-)

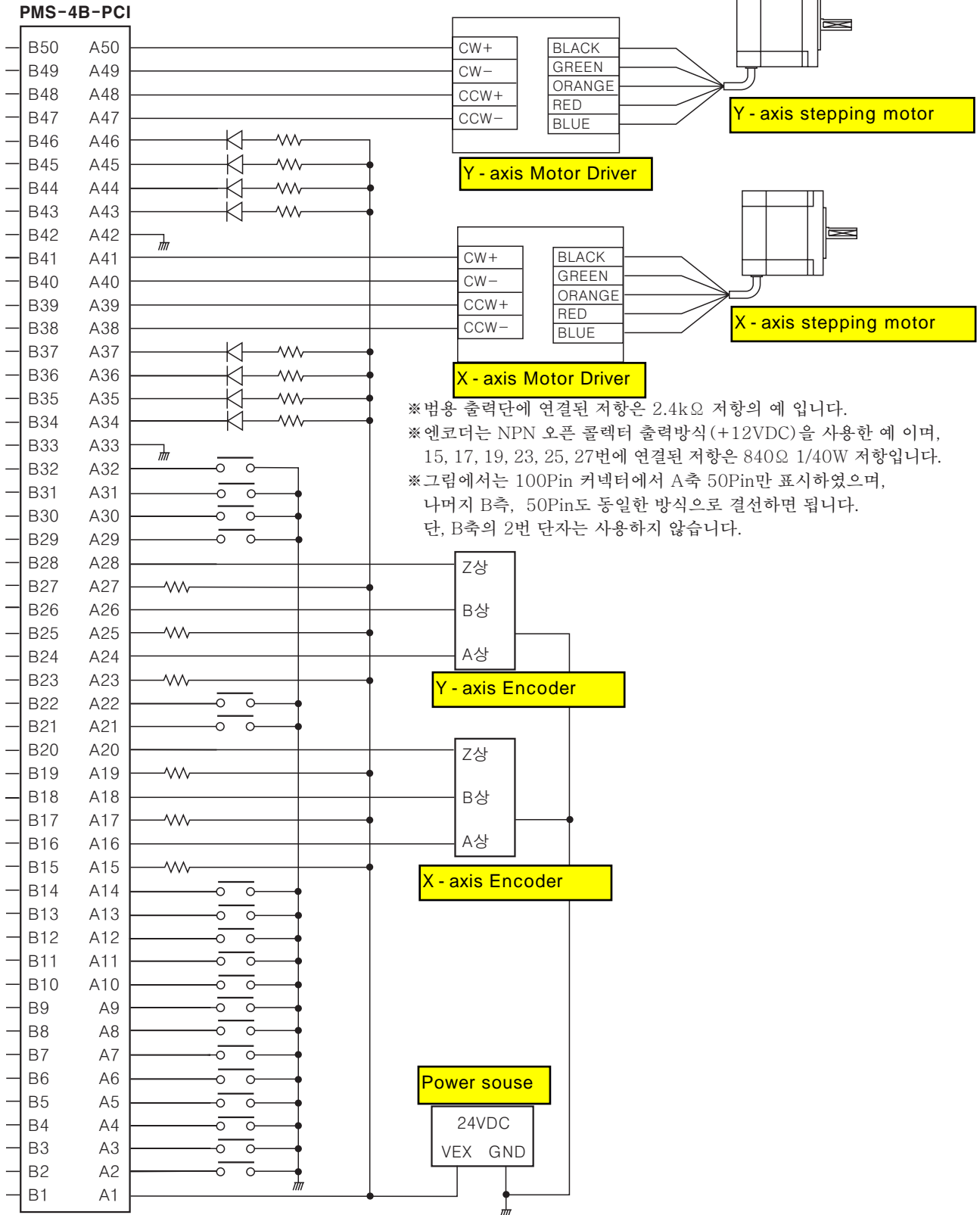
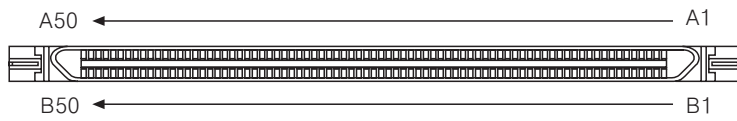
Limit신호는 일반적으로, 외부로 배선의 노출이 불가피하므로 노이즈에 취약합니다. Photo-coupler 만으로는 노이즈 제거가 불가능하여 PMc-4B-PCI 내부에 필터회로를 내장하였으므로 적당한 통과시간(FL=2, 3)을 설정하여야 합니다.



- (A) 카운터
- (B) 타이머
- (C) 온도 조절기
- (D) 전력 조절기
- (E) 패널메타
- (F) 타코/스피드/펄스메타
- (G) 디스플레이 유니트
- (H) 센서 컨트롤러
- (I) 스위칭파워 서플라이
- (J) 근접센서
- (K) 포토펜서
- (L) 압력센서
- (M) 엔코더
- (N) 스테핑 모터 & 드라이버 & 컨트롤러
- (O) 그래픽 패널
- (P) 기타

# PMC-4B-PCI

## I/O Connection diagram



※범용 출력단에 연결된 저항은 2.4kΩ 저항의 예입니다.  
 ※엔코더는 NPN 오픈 콜렉터 출력방식 (+12VDC)을 사용한 예이며, 15, 17, 19, 23, 25, 27번에 연결된 저항은 840Ω 1/40W 저항입니다.  
 ※그림에서는 100Pin 커넥터에서 A축 50Pin만 표시하였으며, 나머지 B축, 50Pin도 동일한 방식으로 결선하면 됩니다. 단, B축의 2번 단자는 사용하지 않습니다.

## I/O Specification

A1	VEX	12-24V	B1	VEX	12-24V
<a href="#">A2</a>	EMG	Emergency stop	B2	-	NO USE
A3	XLIMIT+	X-AXIS (+) LIMIT	B3	ZLIMIT+	Z-AXIS (+) LIMIT
<a href="#">A4</a>	XLIMIT-	X-AXIS (-) LIMIT	B4	ZLIMIT-	Z-AXIS (-) LIMIT
A5	XINO	X-AXIS INPUT SIGNAL (reference point signal)	B5	ZINO	Z-AXIS INPUT SIGNAL (reference point signal)
<a href="#">A6</a>	XIN1	X-AXIS INPUT SIGNAL (reference point adjacent signal)	B6	ZIN1	Z-AXIS INPUT SIGNAL (reference point adjacent signal)
A7	XIN2	X-AXIS INPUT SIGNAL	B7	ZIN2	Z-AXIS INPUT SIGNAL
<a href="#">A8</a>	YLIMIT+	Y-AXIS (+) LIMIT	B8	ULIMIT+	U-AXIS (+) LIMIT
A9	YLIMIT-	Y-AXIS (-) LIMIT	B9	ULIMIT-	U-AXIS (-) LIMIT
<a href="#">A10</a>	YINO	Y-AXIS INPUT SIGNAL (reference point signal)	B10	UINO	U-AXIS INPUT SIGNAL (reference point signal)
A11	YIN1	Y-AXIS INPUT SIGNAL (reference point adjacent signal)	B11	UIN1	U-AXIS INPUT SIGNAL (reference point adjacent signal)
<a href="#">A12</a>	YIN2	Y-AXIS INPUT SIGNAL	B12	UIN2	U-AXIS INPUT SIGNAL
A13	XINPOS	X-AXIS POSITION DECIDE INPUT	B13	ZINPOS	Z-AXIS POSITION DECIDE INPUT
<a href="#">A14</a>	XALRAM	X-AXIS ALRAM INPUT	B14	ZALRAM	Z-AXIS ALRAM INPUT
A15	XECAP	X-AXIS ENCODER A+ PHASE	B15	ZECAP	Z-AXIS ENCODER A+ PHASE
<a href="#">A16</a>	XECAN	X-AXIS ENCODER A- PHASE	B16	ZECAN	Z-AXIS ENCODER A- PHASE
A17	XECBP	X-AXIS ENCODER B+ PHASE	B17	ZECBP	Z-AXIS ENCODER B+ PHASE
<a href="#">A18</a>	XECBN	X-AXIS ENCODER B- PHASE	B18	ZECBN	Z-AXIS ENCODER B- PHASE
A19	XECZP	X-AXIS ENCODER Z+ PHASE	B19	ZECZP	Z-AXIS ENCODER Z+ PHASE
<a href="#">A20</a>	XECZN	X-AXIS ENCODER Z- PHASE	B20	ZECZN	Z-AXIS ENCODER Z- PHASE
A21	YINPOS	Y-AXIS POSITION DECIDE INPUT	B21	UINPOS	U-AXIS POSITION DECIDE INPUT
<a href="#">A22</a>	YALRAM	Y-AXIS ALRAM INPUT	B22	UALRAM	U-AXIS ALRAM INPUT
A23	YECAP	Y-AXIS ENCODER A+ PHASE	B23	UECAP	U-AXIS ENCODER A+ PHASE
<a href="#">A24</a>	YECAN	Y-AXIS ENCODER A- PHASE	B24	UECAN	U-AXIS ENCODER A- PHASE
A25	YECBP	Y-AXIS ENCODER B+ PHASE	B25	UECBP	U-AXIS ENCODER B+ PHASE
<a href="#">A26</a>	YECBN	Y-AXIS ENCODER B- PHASE	B26	UECBN	U-AXIS ENCODER B- PHASE
A27	YECZP	Y-AXIS ENCODER Z+ PHASE	B27	UECZP	U-AXIS ENCODER Z+ PHASE
<a href="#">A28</a>	YECZN	Y-AXIS ENCODER Z- PHASE	B28	UECZN	U-AXIS ENCODER Z- PHASE
A29	XEXP+	X-AXIS MANUAL (+) DRIVER	B29	ZEZP+	Z-AXIS MANUAL (+) DRIVER
<a href="#">A30</a>	XEXP-	X-AXIS MANUAL (-) DRIVER	B30	ZEZP-	Z-AXIS MANUAL (-) DRIVER
A31	YEXP+	Y-AXIS MANUAL (+) DRIVER	B31	UEZP+	U-AXIS MANUAL (+) DRIVER
<a href="#">A32</a>	YEXP-	Y-AXIS MANUAL (-) DRIVER	B32	UEZP-	U-AXIS MANUAL (-) DRIVER
A33	GND	GROUND	B33	GND	GROUND
<a href="#">A34</a>	XOUT4/CMPP	X-AXIS COMMON OUTPUT	B34	ZOUT4/CMPP	Z-AXIS COMMON OUTPUT
A35	XOUT5/CMPP	X-AXIS COMMON OUTPUT	B35	ZOUT5/CMPP	Z-AXIS COMMON OUTPUT
<a href="#">A36</a>	XOUT6/CMPP	X-AXIS COMMON OUTPUT	B36	ZOUT6/CMPP	Z-AXIS COMMON OUTPUT
A37	XOUT7/CMPP	X-AXIS COMMON OUTPUT	B37	ZOUT7/CMPP	Z-AXIS COMMON OUTPUT
<a href="#">A38</a>	XP+P	X-AXIS +CW DRIVER SIGNAL OUTPUT	B38	ZP+P	Z-AXIS +CW DRIVER SIGNAL OUTPUT
A39	XP+N	X-AXIS -CW DRIVER SIGNAL OUTPUT	B39	ZP+N	Z-AXIS -CW DRIVER SIGNAL OUTPUT
<a href="#">A40</a>	XP-P	X-AXIS +CCW DRIVER SIGNAL OUTPUT	B40	ZP-P	Z-AXIS +CCW DRIVER SIGNAL OUTPUT
A41	XP-N	X-AXIS -CCW DRIVER SIGNAL OUTPUT	B41	ZP-N	Z-AXIS -CCW DRIVER SIGNAL OUTPUT
<a href="#">A42</a>	GND	GROUND	B42	GND	GROUND
A43	YOUT4/CMPP	Y-AXIS COMMON OUTPUT	B43	UOUT4/CMPP	U-AXIS COMMON OUTPUT
<a href="#">A44</a>	YOUT5/CMPP	Y-AXIS COMMON OUTPUT	B44	UOUT5/CMPP	U-AXIS COMMON OUTPUT
A45	YOUT6/CMPP	Y-AXIS COMMON OUTPUT	B45	UOUT6/CMPP	U-AXIS COMMON OUTPUT
<a href="#">A46</a>	YOUT7/CMPP	Y-AXIS COMMON OUTPUT	B46	UOUT7/CMPP	U-AXIS COMMON OUTPUT
A47	YP+P	Y-AXIS +CW DRIVER SIGNAL OUTPUT	B47	UP+P	U-AXIS +CW DRIVER SIGNAL OUTPUT
<a href="#">A48</a>	YP+N	Y-AXIS -CW DRIVER SIGNAL OUTPUT	B48	UP+N	U-AXIS -CW DRIVER SIGNAL OUTPUT
A49	YP-P	Y-AXIS +CCW DRIVER SIGNAL OUTPUT	B49	UP-P	U-AXIS +CCW DRIVER SIGNAL OUTPUT
<a href="#">A50</a>	YP-N	Y-AXIS -CCW DRIVER SIGNAL OUTPUT	B50	UP-N	U-AXIS -CCW DRIVER SIGNAL OUTPUT