

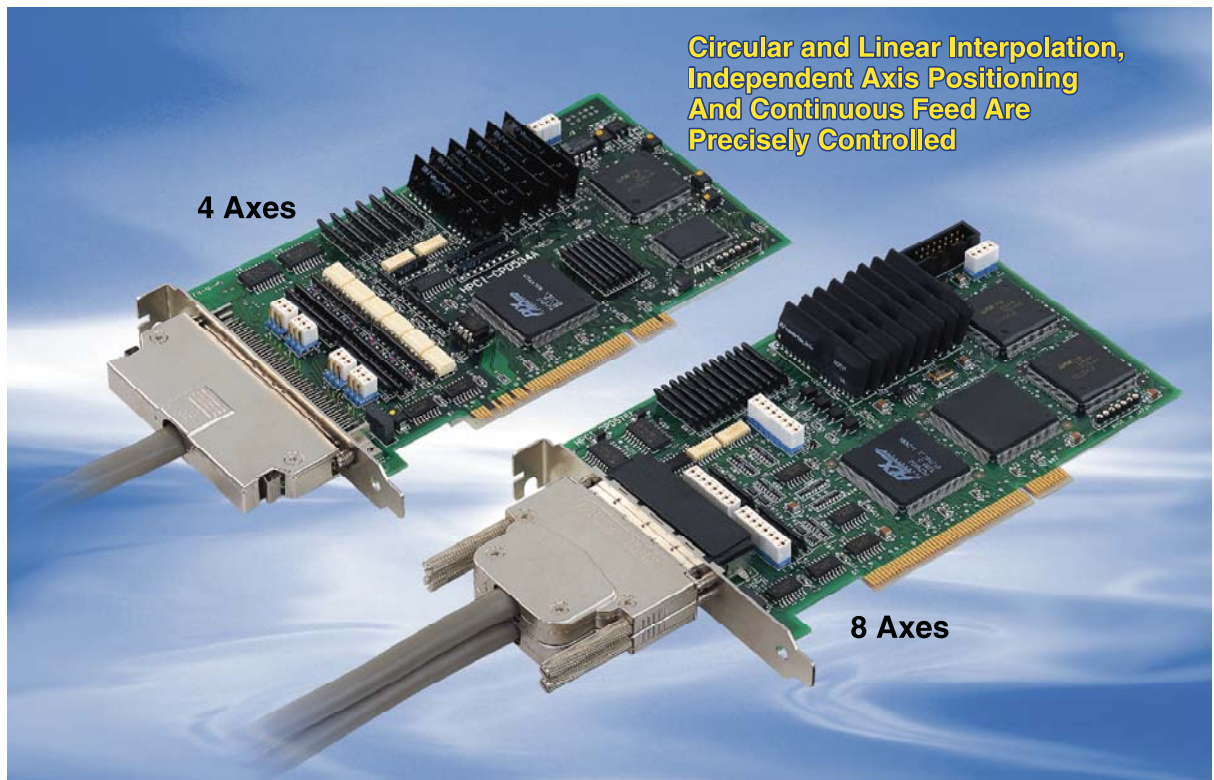
2-, 4- and 8-Axis Contouring Pulse Distribution Boards with PCI, CPCI, ISA PC104 or USB Connectivity

Powerful Control Over Circular/Linear Interpolation And Positioning

All PCL6045/PCL6025 Functions Embedded in One Single Board

CPD Board Series

Best used for semiconductor manufacturing and inspection equipment, robots, and automatic control systems



Lineup supports PCI, ISA, Compact PCI and PC/104 Buses.
CPD can be combined with USB I/F for easy construction of
FA systems with reduced wiring














- Camera triggers can be activated at specified positions while moving
 - Synchronous count pulse output
 - Target positions can be changed during actions
 - Position override feature
 - Elimination of detouring loss time
 - Starts actions of other axes at specified pass points
 - Positioning can start from any sensor detection point while moving
 - Positioning-Control-Start (PCS)
 - Asymmetrical acceleration/deceleration control possible for reduced vibration on a machine
 - Acceleration and deceleration times can be independently set with different values
 - Acceleration or deceleration for high-speed movements made possible by interpolation
 - Acceleration, deceleration and constant-speed blocks independently executed
 - Connects easily to servo drivers and stepping-motor drivers
 - Windows XP/2000/NT/98 & MS-DOS compatible
- Library software, driver software, sample software, and quick start programs are included

 **Hivertec, inc.**
<http://www.hivertec.com>

2-, 4- and 8-Axis Contouring Pulse Distribution Boards with PCI, CPCI, ISA PC104 or USB Connectivity

Powerful Control Over Circular/Linear Interpolation And Positioning

Series Lineup

Bus	8-Axis Board	Axis	Models	Specific Features	Information
PCI		2	HPCI-CPD532	In addition to standard specifications of the CPD: ●Optical-isolator for axis-sensor inputs and servo I/Fs except for command outputs (differential drivers). ●High-speed optical-isolator receiving of inputs from encoders for each axis. (Differential driver or open collector type receiver available)	· Cable:HCL-015W (50-pin MDR connector) · Connector board: ACB-MU502/ *
		4	HPCI-CPD534		· Cable:HCL-018W (100-pin MDR connector) · Connector board: ACB-MU1004/ *
		8	HPCI-CPD578	In addition to standard specifications of the CPD: ●Camera trigger signal output by coordinate matching. ●Capable of receiving complete encoder input signals (phase A, B and Z) on all axis.	· Cable:HCL-051W(x2) (100-pin x2 HDR connector) · Connector board: 2 sets of ACB-HU1004/ *
		8	HPCI-CPD508	In addition to standard specifications of the CPD: ●Suitable for stepping motor control. ●High-speed optical-isolator receiving of inputs from encoders for each axis. ●Input signal from the encoder restricted to phase Z only.	· Cable:HCL-018W (100-pin MDR connector) · Connector board: ACB-MU1008/ *
ISA		4	HPC-CPD234	●ISA version of HPCI-CPD534 model. ●Same pin-arrangement of 100-pin connector as the CPD534.	· Cable:HCL-018W (100-pin MDR connector) · Connector board: ACB-MU1004/ *
	Under development	8	HPC-CPD278	●ISA version of HPCI-CPD578 model. ●Same pin-arrangement of double 100-pin connectors as the CPD578.	· Cable:HCL-051W(x2) (100-pin x2 HDR connector) · Connector board: 2 sets of ACB-HU1004/ *
Compact PCI		4	HCPCI-CPD734	●Compact PCI version of HPCI-CPD534 model. ●Same pin-arrangement of 100-pin connector as the CPD534. ●Sized 3U for rack-mount housing.	· Cable:HCL-018W (100-pin MDR connector) · Connector board: ACB-MU1004/ *
		8	HCPCI-CPD738	●8-axis version of HPCI-CPD734 model. ●Double 100-pin connectors. ●Sized 6U for rack-mount housing.	· Cable:HCL-018W (x2) (100-pin MDR connector) · Connector board: 2 sets of ACB-MU1004/ *
Embedded PC/104		2	HPC104-CPD132	●Compact-sized (96 x 90 mm) 2-axis (PCL6025) board with PC104 bus. ●Optical-isolator insulation for all outputs except for command output. ●Differential driver for command output.	8-bit bus system
		4	HPC104-CPD134	●Compact-sized (96 x 90 mm) 4-axis (PCL6045) board with PC104 bus. ●Differential driver for command output.	16-bit bus system
	Under development	4	HPC104-CPD364	●4-axis (PCL6045) + DIO 16-in/16-out with PC104 bus connectivity. ●Board dimensions: 215.3 mm x 101.6 mm. ●Stackable on PC104 CPU and 3.5-inch CPU boards. ●Expandable to 8-axis by stacking two boards.	Both 8-bit & 16-bit bus systems available
Reduced wiring USB I/F		4	HUSB-CPD434MS	●Reduced wiring USB expandable with more axes using HUB. ●4-axis motion. ●+5V and +24V power supply required.	DIO 32-in/32-out with USB I/F is also available. HUSB-DIO464
			HUSB-CPD434MS(D)	●MS model with DIN-mount added.	
			HUSB-CPD434CB	●MS model with connector board added. ●Only +24 V power supply required.	
			HUSB-CPD434CB(D)	●CB model with DIN-mount added. ●Only +24 V power supply required.	

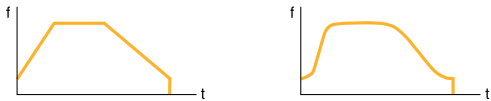
Note1: Cable form is HCL-015 or HCL-018 when a connector board is not used(single-sided separation).

Note2: *indicates MR (right-angle connector), MS (straight connector), or MS (D)(with DIN-mount).(See photos of accessories in the next page)

得意技 Specific Features

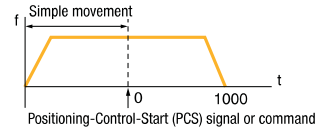
Acceleration/deceleration function

- Asymmetric acceleration/deceleration is possible (Automatic acceleration/deceleration control starts when the deceleration time is less than twice the acceleration time)



Positioning-Control-Start (PCS) functions

- Starts positioning control, during a simple movement, by detecting the PCS signal at a pass point



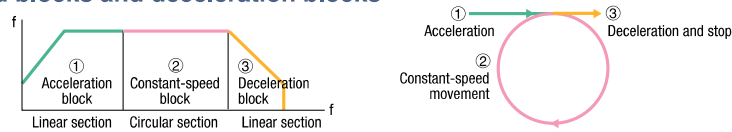
Linear interpolation functions

- Multiaxial interpolation for 2 to 4 axes
- Constant speed control (3-axis speed control principle is also applied to 4-axis systems)
- Acceleration/deceleration control available

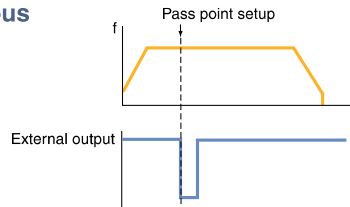
Circular interpolation functions

- Capable of circular interpolation of any two axes out of four
- Circular constant-speed control
- Circular control with acceleration/deceleration but with constant speed control disabled
- Forced finishing of circular movement at the end point

Linear high-speed or circular constant-speed movement using acceleration blocks, constant speed blocks and deceleration blocks

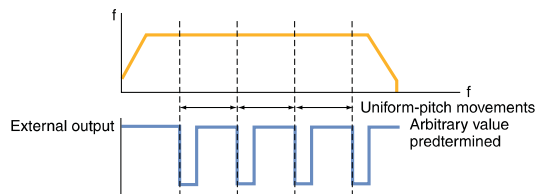


Timing output of pass points and synchronous output



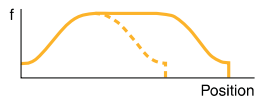
Timing output of pass points

Synchronous output (Example: External synchronization output for every 1000-pulse movement)

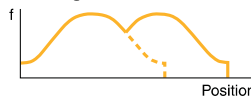


Position override function

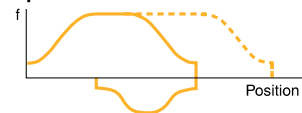
Change to a farther point



Change to a farther point during deceleration

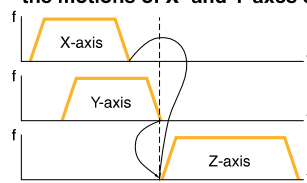


Change to a previous pass point

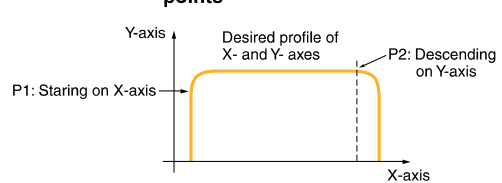


Conditional starts

Z axis automatically starts moving when the motions of X- and Y-axes end



Other axes start at specified pass points



添付ソフトウェア Accompanying Software

[Driver Software]

- Drivers for Windows XP/2000/NT/98 & MS-DOS included *1

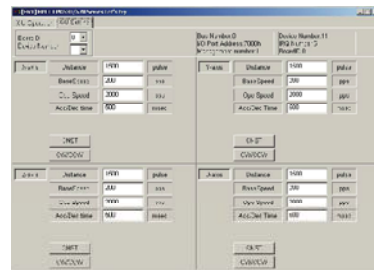
[Quick Start]

- Fundamental operations easily confirmed on the board immediately after installation.
- Test run, wiring and connection checks possible from the simple operation screen.
- Useful as a reference when creating/debugging software applications.
- Source files are also provided as reference.

Operation screen



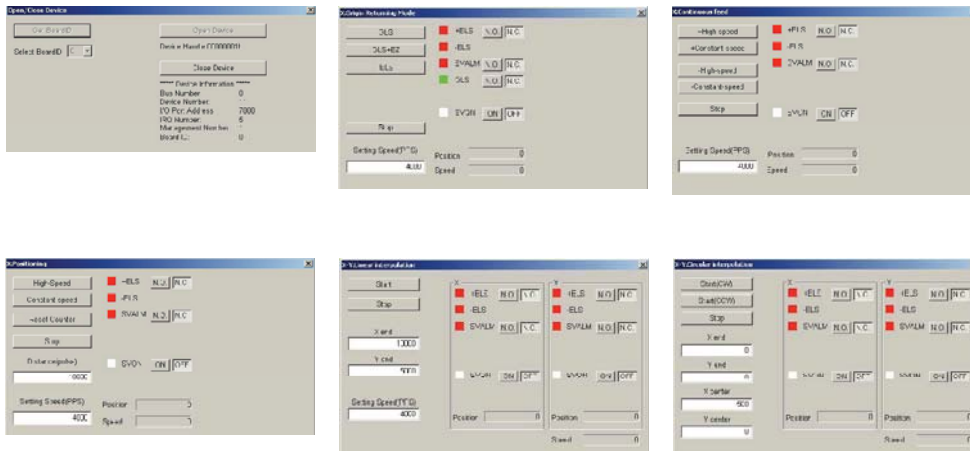
Setting screen



[Sample Programs and Library Functions]

- Sample programs and all source programs of library functions for C and BASIC are provided.
- You can build, debug, and trace sample programs immediately after installation because the files required for VC or VB environment are provided as a whole project (the program content for VB is equivalent to that for VC).
- You can also use other development environments (Borland C++ Builder, etc.) using their respective DLL functions.*2
- Since sample programs, organized by their basic operation, are tabulated under the main menu, you can easily understand their initialization and setup procedures required by each function. Also, they are easy to refer to and incorporate in your own programs.

Sample Programs screens



*1 ● The supported OS may be limited on some products such as USB.

● Please contact us about the DOS version.

● Windows XP, Windows 2000, Windows NT, Windows 98, MS-DOS, Visual C++, and Visual Basic are registered trademarks of Microsoft Corporation in the US and other countries.

*2 ● Borland C++ Builder is a registered trademark of Borland Software Corporation in the US and other countries.

2-, 4- and 8-Axis Contouring Pulse Distribution Boards with PCI, CPCI, ISA PC104 or USB Connectivity

Powerful Control Over Circular/Linear Interpolation And Positioning

Specifications

	Item	8-Axis Board	4-Axis Board	2-Axis Board	8-Axis Board					
		PCI and Compact PCI	PCI,ISA,USB,Compact PCI and PC104	PCI and PC104	(Suited for stepping motors) HPCI-CPD508					
Basic Specifications	■ Axis control system	(1) Positioning	1 to 8 axes	1 to 4 axes	1 to 2 axes	1 to 8 axes				
		(2) Linear interpolation	2 to 4 axes simultaneously & 2 to 4 axes simultaneously	2 to 4 axes simultaneously	2 axes simultaneously	2 to 4 axes simultaneously & 2 to 4 axes simultaneously				
		(3) Circular interpolation	2 axes simultaneously & 2 axes simultaneously	2 axes simultaneously	2 axes simultaneously	2 axes simultaneously & 2 axes simultaneously				
		(4) Pulse feed	1 to 8 axes	1 to 8 axes	1 to 2 axes	—				
	■ Position command	Command pulses	Positioning pulse-train output by differential driver							
		Position command range	-134, 217, 728 to 134, 217, 727 pulses							
		Command coordinate	Relative coordinate command							
		Command range for continuous feed	Unlimited (linear movement counter overflows if movement goes beyond the end, and rotation counter resets to zero at every 360 degrees of rotation)							
	■ Speed control	Position override	Possible only in positioning control							
		Speed range	0.1pps to 6.5Mpps (x0.1 to x100) (Encoder counting frequency limited to 4MHz max. in x4 mode.)							
Principle of constant-speed control		2-axis circular,linear interpolation:√2 control 3-axis linear interpolation:√3 control 4-axis linear interpolation:√3 control								
Speed override		(1) Available in any constant-speed operation (2) Available only with positioning, linear interpolation and continuous feed when acceleration and/or deceleration involved								
■ Acceleration /deceleration control	Automatic acceleration/ deceleration system	(1) Positioning and linear interpolation: Linear acceleration/deceleration, S-curve acceleration/deceleration, and partial s-curve acceleration/deceleration ● Automatic damping function available in case of abrupt acceleration reversal ● Asymmetrically sloped acceleration/deceleration possible								
		(2) For circular interpolation: Automatic acceleration / deceleration possible (constant-speed control not possible) Acceleration and deceleration blocks to be used for circular interpolation at constant movement.								
Function Specifications	■ Origin-returning control	Origin-returning method	As many as 13 ways of returning to origin (such as sensor's origin, Z-phase origin and ELS shared origin) available. Each returning is done in a single process.							
		Origin search	Available							
		Getting out of origin area	Available							
	■ UP/DOWN counters	Command position counter (Command pulse count: Length 2 ²⁶)				4 counters per axis				
		Machine position counter (Encoder pulse count: Length 2 ²⁶)								
	■ Comparators	General-purpose counter (Pulse count: Length 2 ²⁶)				5 comparators per axis				
		Error counter for runaway detection (Difference between values of the encoder and command pulse: Count length 2 ¹⁶)								
	■ Inputs from encoder or pulse	Each axis has a common input terminal for the encoder and pulser input signal.				Not available				
	■ Backlash compensation	Compensated for at every turn of the direction of movement by correction pulse				See left.				
	■ Slip compensation	Compensated for immediately before moving regardless of the direction (good for positioning system only)				See left.				
■ Positioning-Control-Start (PCS) signal	Starts positioning by PCS signal during continuous feed (positioning system only)				Alternatingly shared with OLS of 8 axis					
■ Idling pulse function	Function to improve stepping motor acceleration characteristics				See left.					
■ Vibration suppression at stop	Function to suppress vibration when the stepping motor stops				See left.					
■ Machine interface	±ELS, OLS, DLS, A-, B-, and Z-phases per axis (All insulated with optical isolator)				Equipped only with Z-phase input on the encoder I/F					
	Command-pulse output (differential)				See left.					
■ Servo interface	Input: Servo alarm and in-position signal on each axis (all insulated with optical isolator)				2 inputs on the entire board					
	Output: Servo reset, servo ON, and clear-servo-error-counter signals on each axis (all insulated with optical isolator)				8 general-purpose outputs on the entire board					
Environmental Conditions	■ Ambient temperature		8-Axis Board		4-Axis Board		2-Axis Board		8-Axis Board (HPCI-CPD508)	
			0 to 50°C (no condensation)		0 to 50°C (no condensation)		0 to 50°C (no condensation)		0 to 50°C (no condensation)	
	■ Dimensions (mm) & power consumption on the bus		Dimensions	+5V Power	Dimensions	+5V Power	Dimensions	+5V Power	Dimensions	+5V Power
	HPCI-CPD578 (PCI)		175×107	2A	—	—	—	—	175×107	1.7A
	HPCI-CPD534 (PCI)		—	—	175×107	1.15A	—	—	—	—
	HPCI-CPD532 (PCI)		—	—	—	—	175×107	0.7A	—	—
	HPC-CPD234 (ISA)		—	—	half 162×122	1.1A	—	—	—	—
	HCPCI-CPD738 (Compact PCI)		6U 160×233	2A	—	—	—	—	—	—
	HCPCI-CPD734 (Compact PCI)		—	—	3U 160×100	1.15A	—	—	—	—
	HUSB-CPD434MS (USB) (MS:without connector board)		—	—	160×107.5×18	1.15A	—	—	—	—
	HUSB-CPD434CB (USB) (CB: with connector board)		—	—	160×107.5×54	24V,0.5A only	—	—	—	—
	HPC104-CPD134 (PC/104)		—	—	90.2×95.9	1A	—	—	—	—
HPC104-CPD132 (PC/104)		—	—	—	—	90.2×95.9	0.6A	—	—	
HPC104-CPD364 (PC/104)		—	—	1422×110	1.1A	—	—	—	—	

Operational combinations between axes (Independent axis: Positioning, Continuous Feed, Origin Returning and Pulse Feed)

Combinations	2-Axis CPD	4-Axis CPD	8-Axis CPD
Independent axes only	1 or 2 axes	1 to 4 axes	1 to 8 axes
Line-interpolation axes only	2 axes	2 to 4 axes	2 to 8 axes
Line-interpolation axes & independent axes	—	2 or 3 axes of line-interp & remaining independent axes	2 or 7 axes of line-interp & remaining independent axes
Circle-interpolation axes & other axes	A set of circle-interpolation	A set of circle-interp & remaining axes (line-interp or independent)	A set of circle-interpolation axes & (another set of circle-interpolation axes) & remaining independent axes
2 pairs of line-interpolation axes & independent axes	—	—	2 to 4 line-interpolation & 2 to 4 line-interpolation & remaining independent axes
2 pairs of circle-interpolation axes & independent axes	—	—	2 pairs of 2 circle-interpolation axes & 4 of independent axes
A pair of circle-interpolation axes & a pair of line-interpolation axes & independent axes	—	—	A pair of circle-interpolation axes & a pair of 2 to 4 line-interpolation axes & remaining independent axes

2-, 4- and 8-Axis Contouring Pulse Distribution Boards with PCI, CPCI, ISA PC104 or USB Connectivity

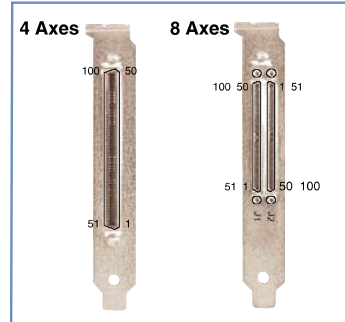
Powerful Control Over Circular/Linear Interpolation And Positioning

4-Axis Connector Pin-out [For HPCI-CPD534, HPC-CPD234, HCPCI-CPD734, HUSB-CPD434MS and HUSB-CPD434MS(D)]

J1 Connector		Signal Name & Function Note: *indicates X, Y, Z or U	
Pin No.	Pin No.		
1	51	+5V power out	
2	52	+5V power out	
3	53	GND	Ground for +5V
4	54	GND	Ground for +5V
5	55	*CWP	diff. positive out: CW pulse/pulse out
6	56	*CWN	diff. negative out: CW pulse/pulse out
7	57	*CCWP	diff. positive out: CCW pulse/direction
8	58	*CCWN	diff. negative out: CCW pulse/direction
9	59	*CWP	diff. positive out: CW pulse/pulse out
10	60	*CWN	diff. negative out: CW pulse/pulse out
11	61	*CCWP	diff. positive out: CCW pulse/pulse out
12	62	*CCWN	diff. negative out: CCW pulse/pulse out
13	63	*AP	Encoder A-phase positive input
14	64	*AN	Encoder A-phase negative input
15	65	*BP	Encoder B-phase positive input
16	66	*BN	Encoder B-phase negative input
17	67	*ZP	Encoder Z-phase positive input
18	68	*ZN	Encoder Z-phase negative input
19	69	*AP	Encoder A-phase positive input
20	70	*AN	Encoder A-phase negative input
21	71	*BP	Encoder B-phase positive input
22	72	*BN	Encoder B-phase negative input
23	73	*ZP	Encoder Z-phase positive input
24	74	*ZN	Encoder Z-phase negative input
25	75	GND	Ground for +5V
26	76	GND	Ground for +5V
27	77	*SVALM	Servo alarm input
28	78	*INPOS	Positioning completion input
29	79	*SVON	Servo ON output
30	80	*SVRST	Servo reset output
31	81	*SVCTRCL	Error counter clear output
32	82	*SVALM	Servo alarm input
33	83	*INPOS	Positioning completion input
34	84	*SVON	Servo ON output
35	85	*SVRST	Servo reset output
36	86	*SVCTRCL	Error counter clear output
37	87	COMMON	Common GND for +24V
38	88	COMMON	Common GND for +24V
39	89	EXTPOW2	+24V power input for isolation supply
40	90	EXTPOW2	+24V power input for isolation supply
41	91	+*ELS	Input for positive limit sensor
42	92	-*ELS	Input for negative limit sensor
43	93	*DLS*PCS	Input for deceleration sensor /Input for positioning control start
44	94	*OLS	Input for origin sensor
45	95	+*ELS	Input for positive limit sensor
46	96	-*ELS	Input for negative limit sensor
47	97	*DLS*PCS	Input for deceleration sensor /Input for positioning control start
48	98	*OLS	Input for origin sensor
49	99	EXTPOW1	+24V power input for isolation supply
50	100	EXTPOW1	+24V power input for isolation supply

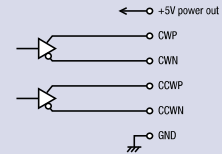
8-Axis Connector Pin-out [For HCPCI-CPD578]

J1 Connector		J2 Connector		Signal Name & Function Note: *indicates X, Y, Z, U, V, W, A or B	
Pin No.	Pin No.	Pin No.	Pin No.		
1	51	1	51	+5V power out	*Pin-51 = (GND)
2	52	2	52	+5V power out	*Pin-51 = (GND)
3	53	3	53	*CWP	diff. positive out: CW pulse/pulse out
4	54	4	54	*CWN	diff. negative out: CW pulse/pulse out
5	55	5	55	*CCWP	diff. positive out: CCW pulse/pulse out
6	56	6	56	*CCWN	diff. negative out: CCW pulse/pulse out
7	57	7	57	*CWP	diff. positive out: CW pulse/pulse out
8	58	8	58	*CWN	diff. negative out: CW pulse/pulse out
9	59	9	59	*CCWP	diff. positive out: CCW pulse/pulse out
10	60	10	60	*CCWN	diff. negative out: CCW pulse/pulse out
11	61	11	61	*AP	Encoder A-phase positive input
12	62	12	62	*AN	Encoder A-phase negative input
13	63	13	63	*BP	Encoder B-phase positive input
14	64	14	64	*BN	Encoder B-phase negative input
15	65	15	65	*ZP	Encoder Z-phase positive input
16	66	16	66	*ZN	Encoder Z-phase negative input
17	67	17	67	*AP	Encoder A-phase positive input
18	68	18	68	*AN	Encoder A-phase negative input
19	69	19	69	*BP	Encoder B-phase positive input
20	70	20	70	*BN	Encoder B-phase negative input
21	71	21	71	*ZP	Encoder Z-phase positive input
22	72	22	72	*ZN	Encoder Z-phase negative input
23	73	23	73	GND	
24	74	24	74	*Pin73, 74 = COMMON (GND for xSVCTRCL)	
25	75	25	75	*SVCTRCL	Error counter clear output
26	76	26	76	*SVCTRCL	Error counter clear output
27	77	27	77	*SVALM	Servo alarm input
28	78	28	78	*INPOS	Positioning completion input
29	79	29	79	*SVON	Servo ON output
30	80	30	80	*SVRST	Servo reset output
31	81	31	81	*SVALM	Servo alarm input
32	82	32	82	*INPOS	Positioning completion input
33	83	33	83	*SVON	Servo ON output
34	84	34	84	*SVRST	Servo reset output
35	85	35	85	EXTPOW2 (+24V power input for isolation supply)	
36	86	36	86	*Pin-85 and pin-86 = COMMON2 (+24V GND)	
37	87	37	87	+*ELS	Input for positive limit sensor
38	88	38	88	-*ELS	Input for negative limit sensor
39	89	39	89	*DLS	Input for deceleration sensor
40	90	40	90	*OLS	Input for positioning control start
41	91	41	91	+*ELS	Input for positive limit sensor
42	92	42	92	-*ELS	Input for negative limit sensor
43	93	43	93	*DLS	Input for deceleration sensor
44	94	44	94	*OLS	Input for positioning control start
45	95	45	95	*EXTPOW1	+24V power input for isolation supply
46	96	46	96	*EXTPOW1	+24V power input for isolation supply
47	97	47	97	+5V power out	*Pin-97 = (GND)
48	98	48	98	+5V power out	*Pin-98 = (GND)
49	99	49	99	CMP*	OUT (TTL type such as LS07)
50	100	50	100	CMP*	OUT (TTL Type such as LS07)

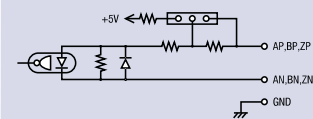


Common GND for EXTPOW2

1. Command pulse output



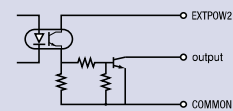
2. Encoder input



3. ELS, DLS, OLS, INPOS and SVALM Inputs



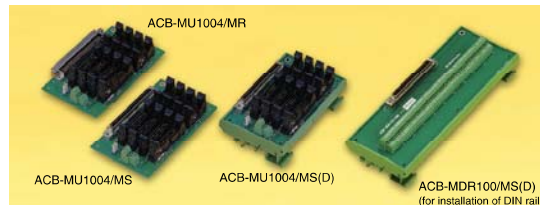
4. SVON, SVRST and CTRL outputs with optical-isolator insulation



Cables (See 「Series Lineup」 page)



Connector Boards (See 「Series Lineup」 page)



*Windows and WindowsNT are registered trademarks of Microsoft Corporation.



Safety Precautions

- Read the instruction manuals thoroughly before using the products in this catalog.
- Consult with our sales office before using the products in this catalog in medical and transportation applications.



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