TOSHIBA MACHINE

Synchronous AC Servo

VELCONIC®

BS Servo X Series

BS Servo Amplifiers

Standard servo amplifier	VLASX-008P2-HXX ~ 400P4
Tiny positioner amplifier	VLPSX-008P2-HBX ~ 400P4
VLBus-V servo amplifier	VLASX-008P2-HVX ~ 400P4

BS X

Catalog BSX0012-CED-01

With an eye to realizing 100 % customer satisfaction

BS Servo X Series

The X series BS servo amplifier has further improved the quick response and high accuracy of the predecessor amplifier by employing a new high-speed calculation system.
A variety of functions and extensive personal computer (PC) tools simplify the servo adjustment.
The X series whose servo performance is enhanced significantly contributes to remarkable machine performance.

High-speed calculation system: Dramatic improvement of servo performance with Velconic V/C Engine

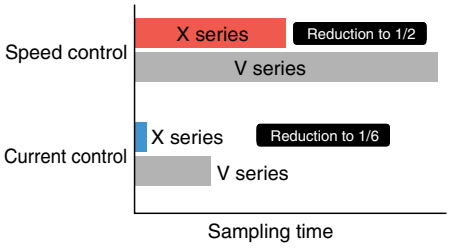
Development of new LSI (V-Engine, C-Engine)

A control loop is configured by hardware to realize high-speed calculation

- Speed control sampling time: Reduction to 1/2, compared with our V series.
- Current control sampling time: Reduction to 1/6, compared with our V series.

(Effects)

The settling time can be shortened sharply with improved takt time (or cycle time).
The control range extends with easy servo adjustment.
Strong servo rigidity can be assured against disturbance



Evolving resolver feedback type servo system

The resolver type which is overwhelmingly superior to the encoder type in environment resistance has now the performance as good as the encoder type. The BS servo assuring quick response and high accuracy can not only withstand a hostile environment, but build up an ideal servo system.
In the machine employing a quick response servo, vibration will be caused easily. Generally, deterioration is facilitated by the vibration, and a serious trouble will occur suddenly.
The resolver has a coil structure without an electronic circuit and assures outstanding durability against vibration. Thanks to this durability, the BS servo is popularized in a diversity of machines including a loom, spring fabricating machine, transport and loading/unloading equipment, and transfer system.
Durability, quick response and high accuracy are improving continuously.

Resolver

Features of BS servo X series

Consisting of the following three different amplifiers.

The standard amplifier has a pulse train input/analog input command system and allows operations of the speed, current, position, speed/current/position, direct feed and draw control modes.

The tiny positioner amplifier is specially designed for the PTP positioning purpose. It has the point designation method and position data direct command system and supports the DeviceNet, CCl-Link, RS485 and I/O.

The VLBus-V amplifier is a link amplifier which connects positioning unit NCBOY-200 or -3200 on the master side via optical communication when high-grade positioning control, synchronous operation, etc. are required.

High speed

High-speed control is realized by the use of speed/current control loop hardware and high-speed sampling of motor sensor.

High performance

The amplifier incorporates the damping function. When it is used for a machine of low rigidity construction, stable transfer operation is possible.

Easy adjustment

- You can select either of the four auto tuning modes according the servo system condition.
- You can perform setting of various parameters, frequency analysis, profile measurement, input/output status display, alarm display, etc. on the personal computer, using VelWin, the software designed for the Windows.

Protection function

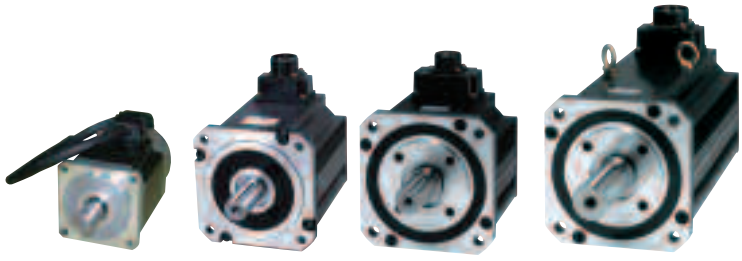
The servo system is protected by strengthening the main circuit protection function and by various servo alarms detecting function.

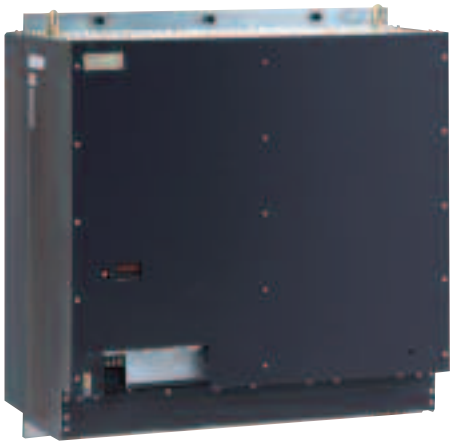
Strictly observing RoHs Directive (008P2 ~ 200P3).

Lead, mercury, cadmium or any other hazardous substance, use of which is prohibited, is not contained.

Overseas standards (CE and UL certification applied for) (008P2 ~ 200P3)

Lineup from 30W to 55 kW





Control and Function

Simple servo adjustment

You can perform servo adjustment by only three steps, using the inertia measurement function of the personal computer (PC) tool (SHANX).

STEP1: Set the target loop gain to a value not causing hunting. (20 rad/s or so)
(TP01 = 0, TP02 = 20)

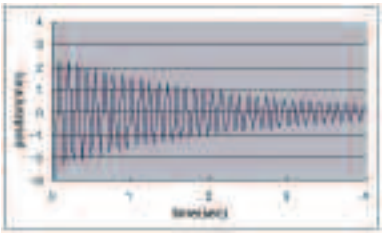
STEP2: Execute the inertia measurement menu of SHANX.
(TP03 = Result of measurement is automatically set.)

STEP3: Set the target loop gain suited for machine characteristics.
(TP02 = Target loop gain)

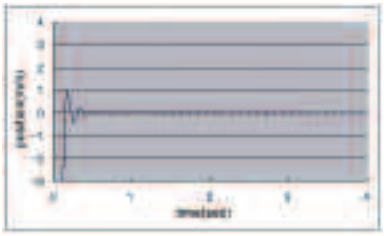
Damping function

In the machine system with low rigidity, vibration caused at stop can be controlled.
This function is very effective in the range of a few Hz to several of tens Hz which is caused in the servo system, excluding disturbance. Vibration at high frequency has been controlled by using notch filters in the past. The X series is equipped with an increased number of notch filters.

Damping control not provided



Damping control provided.



Option

The high-speed pulse I/O option or high-resolution analog I/O option can be selected for the option slot. (This function cannot be used for the VLBus-V servo amplifier or tiny positioner amplifier.) The standard specification does not include the analog output. When you wish to use this function, contact us.

Option	I/O	Specification
High-speed pulse I/O	Pulse input	Phase AB 1 MHz UP/DOWN 4 Mpps PULS/SIGN 4 Mpps
	Pulse output	Phase A/B 1 MHz UP/DOWN 4 Mpps
High-resolution analog I/O	Analog input	2 ch ±10 V, 16-bit A/D
	Analog output	2 ch ±10 V, 16-bit D/A

VLBus amplifier

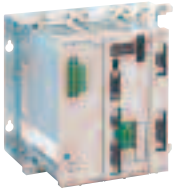
When this amplifier is connected with NCBOY-200 or -3200 incorporating the synchronous operation command, multi-task command, NC command and sequence command via high-speed communication, up to 32 axes can be controlled. VLBus-V is the communication system realized by connecting an optical fiber cable.

Features

1. Optical fiber cable connection.
2. High-speed communication as fast as 10 Mbps.
3. Transmission interval of highest speed is 0.8 ms, which can be changed with the number of axes controlled.
4. Connection of up to 32 axes.
5. Data transmission of 64/64 bytes per axis.
6. Cyclic communication function and message communication function are available.

NCBOY-200

NCBOY-3200

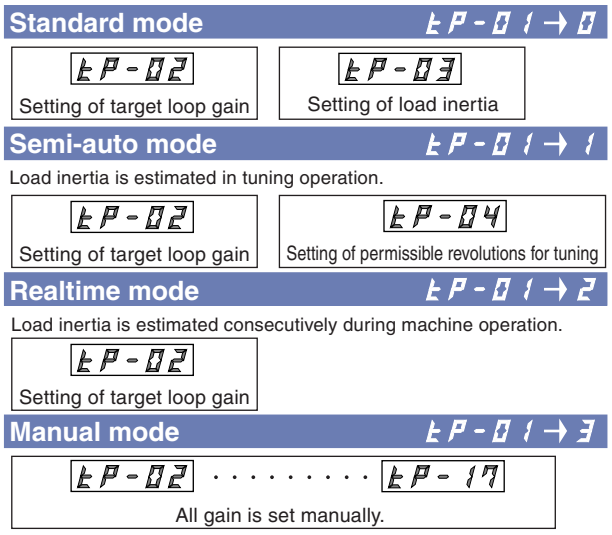


Personal computer (PC) tool

PC tool SHANX allows you to select the servo motor, perform simulation as per the predetermined operation pattern, various monitor, parameter setting, profile and frequency analysis, auto tuning, etc., through the personal computer. It is very useful when you start up and adjust the servo system.

Auto tuning

The auto turning mode comes in the four modes; standard mode, semi-auto mode, realtime mode and manual mode, and complex servo adjustment is possible all the way from designing to real operation.



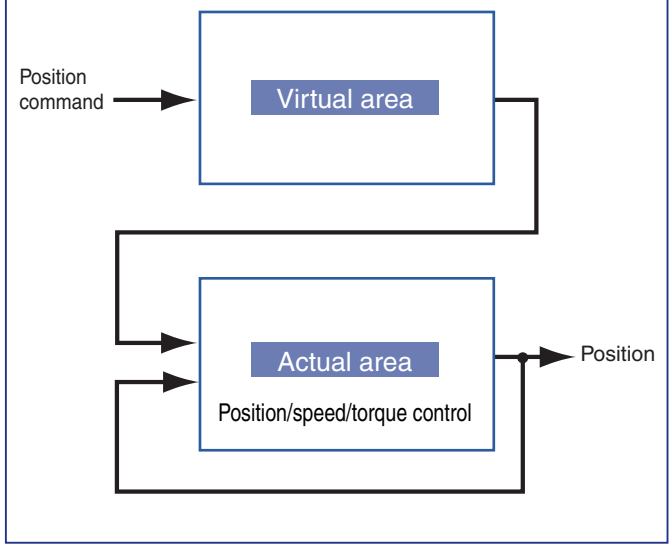
Motor sensor

Either sensor with high accuracy, quick response and environment resistance can be selected. Additionally, ABZ/UVW encoder and interpolator are also available.

Item	Resolver	17-bit serial ABS encoder	Resolver multi-turn ABS
Permissible speed of revolution	10000 min^{-1}	6000 min^{-1}	10000 min^{-1}
Resolution	24000 pulses/rev.	131072 pulses/rev.	24000 pulses/rev.
Angular error	4min.	1min.	4min.
Vibration resistance	20G	10G	20G
Impact resistance	100G	20G	100G
Ambient temperature	-55 ~ +155℃	-10 ~ +85℃	-55 ~ +155℃
Cable length	120m	30m	120m

TFC control

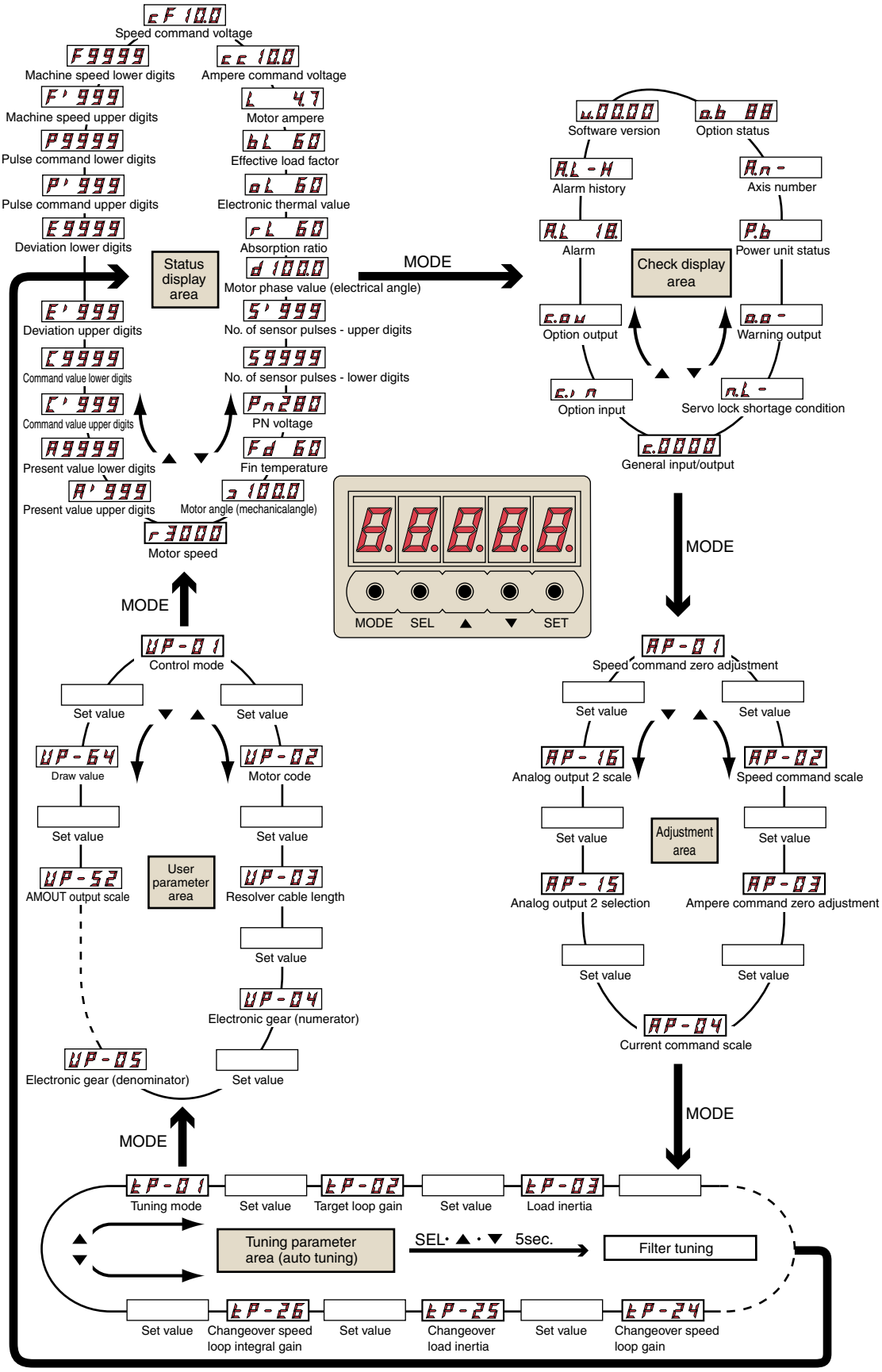
The new control system can improve the frequency characteristic in a low-rigidity machine liable to cause vibration. Vibration is controlled by estimating the machine characteristics. Thus the gain of the control system can be enhanced and the settling time can be reduced.



Display and Operation

Hierarchal operation

On the display & operation unit, you can perform display of servo motor operation status, check of sequence or alarm, adjustment of each control command value, setting of user parameters including selection of control mode and resolution, and setting of turning parameters for servo adjustment.



Double-click [MODE].

User parameters

Specify the servo amplifier parameters according to the operation characteristic of the machine. For the electronic gear, setting of a fraction is possible, and the acceleration/deceleration comes with two types; S-type acceleration/deceleration and linear acceleration/deceleration. Also, joint use of holding and dynamic brakes is possible.

No.	Parameter name	No.	Parameter name	No.	Parameter name
UP-01	Control mode (*1)	UP-23	Common power supply mode (*4)	UP-45	Sequence output reversal
UP-02	Motor code	UP-24	Feedrate 1	UP-46	Sequence input/output selection
UP-03	Resolver cable length	UP-25	Feedrate 2	UP-47	In-position timer
UP-04	Numerator of electronic gear	UP-26	Feedrate 3	UP-48	Electronic gear factor
UP-05	Denominator of electronic gear	UP-27	Feedrate 4	UP-49	VMOUT output selection
UP-06	Home point shift value	UP-28	Stop detection speed	UP-50	VMOUT output scale
UP-07	In-position length	UP-29	Coincident speed	UP-51	AMOUT output selection
UP-08	Ampere limit value	UP-30	Width of coincident speed detection	UP-52	AMOUT output scale
UP-09	Soft start acceleration time	UP-31	Motor test speed	UP-53	Split count of position feedback pulse (upper-digit)
UP-10	Soft start deceleration time	UP-32	Analog I/O selection	UP-54	Split count of position feedback pulse (lower-digit)
UP-11	S-type acceleration/deceleration time	UP-33	Load factor time constant	UP-55	Setting of VLBus-V operation check
UP-12	ABS mode	UP-34	Limit changeover type	UP-56	Setting of rotation coordinate system (upper-digit)
UP-13	Holding brake operation	UP-35	Speed limit value	UP-57	Setting of rotation coordinate system (lower-digit)
UP-14	Brake ON speed (*2)	UP-36	Forward drive current limit value	UP-58	Selection of LS function
UP-15	Analog command polarity	UP-37	Forward rotation absorption current limit value	UP-59	Selection of LS function reversal
UP-16	Pulse command type	UP-38	Reverse drive current limit value	UP-60	Home point stop method
UP-17	Pulse output type	UP-39	Reverse rotation absorption current limit value	UP-61	Monitor type of analog input
UP-18	Differential output type (*3)	UP-40	Width of drive/absorption detection	UP-62	Permission/prohibition of level 4 alarm detection
UP-19	Position control polarity	UP-41	Numerator of display magnification	UP-63	Overrun stop time
UP-20	Draw factor	UP-42	Denominator of display magnification	UP-64	Draw value
UP-21	External reverse-current absorption resistance	UP-43	Decimal point position of display		
UP-22	Capacity of external reverse-current absorption resistor	UP-44	Sequence input reversal		

*1: Specify the speed control, current control, speed/current/position control, direct feed or draw control mode. For the VLBus-V specification, "31" is predetermined.
*2: Specify the operation speed of the holding brake.
*3: Select the differential output function and content (i.e., pulse output, display output, ABS present value, command pulse, or draw pulse).
*4: Specify when you wish to use the main circuit DC power in common.

Alarm code table

The self-diagnosis function is provided, and the content of a trouble is displayed by code. The alarm history function records the order of alarm generation if two or more alarms have occurred at the same time, thus the maintenance can be facilitated.

No.	Alarm message	No.	Alarm message	No.	Alarm message
AL01	Overcurrent (OC)	AL18	Instant thermal (POL)	AL36	ABS battery cable breakage (ABT)
AL02	Overvoltage (OV)	AL19	Resolver phase error (RESERR)	AL37 (*2)	Coordinate counter over (COVER)
AL03	PN voltage drop (PNLV)	AL20	Overspeed (OSPD)	AL38 (*3)	Overrun (OVTR)
AL04	Main power input error (ACINF)	AL21	Deviation counter over (FULL)	AL39 (*2)	Limit error (LIMERR)
AL05	Charging resistor overheat (CROH)	AL22	Resolver ABS phase error (ABSE)	AL40	Encoder breakage (EREE)
AL06	Resolver cable breakage (RELV)	AL23	Resolver ABS breakage (ACN)	AL41	Encoder communication error (ETER)
AL07	Power status error (POWFAIL)	AL24	ABS battery alarm (BAL)	AL42	Encoder backup error (EBACK)
AL08	Servo amplifier overheat (SOH)	AL25	Option alarm (OPALM)	AL43	Encoder checksum error (ECKER)
AL09	Reverse-current absorption resistor overheat (RGOH)	AL26	Parameter setting error (CERR)	AL44	Encoder battery alarm (EBAL)
AL10	Reverse-current absorption error (RGST)	AL27	Resolver ABS error (AEERR)	AL45	Encoder ABS phase error (EABSE)
AL11	Undefined	AL28 (*1)	Link error (LINKERR)	AL46	Encoder overspeed (EOSPD)
AL12	Undefined	AL29	Home point unsaved error (MZE)	AL47	Encoder interrupt error (EWER)
AL13	ABS battery voltage drop (BLV)	AL30	Command value over (CONDV)	AL48	Encoder initialize error (EINIT)
AL14	Brake error (BERR)	AL32	Present value over (ACTOV)	AL49	Encoder sensor phase error (PHSERR)
AL15	Overcurrent detection (OCS)	AL33	ABS home point invalid (CLD)	AL50 (*2)	Data input error (DATAE)
AL16	Speed amplifier saturation (VAS)	AL34 (*3)	Soft limit + over (SOTP)	AL51 (*2)	Present value undecided error (ACTE)
AL17	Motor overload (MOL)	AL35 (*3)	Soft limit - over (SOTM)	AL52 (*2)	Communication error (COM)

*1: Available only when the VLBus-V specification is selected.
*2: Available only when the tiny positioner specification is selected.
*3: Available only when the VLBus-V and tiny positioner specifications are selected.

Sequence Input/Output for Each Control Mode

Standard sequence input/output

You can select either of the speed, current, position, speed/current/position, direct feed and draw control modes. Standard input/output signals are assigned to each control mode. Assignment of input/output signals other than the standard input/output signals is also possible.

Control mode / Assignment	01 Speed control	02 Current control	03 Position control	04 Speed, current, position control	05 Direct feed	06 Draw control
REF	Speed command	Speed limit	—	Speed command or speed limit	Feedrate 1	—
CLI	Current limit	Current command	Current limit	Current limit or current command	Feedrate 2	—
VMON, AMON	Speed, current monitor (Output selection is possible by parameter. Option is supported.)					
FMA, FMB	—	—	Pulse command	Pulse command	—	Pulse command
AP,BP,ZP	Encoder output, display output, present value output, command pulse output, draw pulse output					
IN7	Operation	Operation	Operation	Operation	Operation	Operation
IN6	Reset	Reset	Reset	Reset	Reset	Reset
IN5	MB check	MB check	MB check	MB check	MB check	MB check
IN4	Forward rotation permit	—	Forward rotation permit	Deviation clear	Speed selection 2	DRAW3
IN3	Reverse rotation permit	Monitor changeover	Reverse rotation permit	Current control changeover	Speed selection 1	DRAW2
IN2	Present value clear	Present value clear	Deviation clear	Position control changeover	Forward rotation command	DRAW1
IN1	Home point stop	Speed limit changeover	Home point stop	Home point stop	Reverse rotation command	DRAW0
IN0	PON input	PON input	PON input	PON input	PON input	PON input
OUT4	Servo normal	Servo normal	Servo normal	Servo normal	Servo normal	Servo normal
OUT3	Servo ready	Servo ready	Servo ready	Servo ready	Servo ready	Servo ready
OUT2	During home point stop	Stop detection	In-position / During home point stop	In-position / During home point stop	Stop detection	Stop detection
OUT1	Warning	Warning	Warning	Warning	Warning	Warning
OUT0	MB output	MB output	MB output	MB output	MB output	MB output

Example of special sequence input/output

When you wish to use a sequence function other than the standard sequence, you can select it within the number of I/Os. (Option)

Type / Assignment	Special 1 for mode 01	Special 2 for mode 01	Special 3 for mode 02	Special 4 for mode 03	Special 5 for mode 03	Special 6 for mode 04	Special 7 for mode 05	Special 8 for mode 06
IN5	Current limit change-over	MB check	MB check	Current limit change-over	MB check	MB check	Speed selection 2	MB check
IN4	DB check	DB check	DB check	DB check	DB check	DB check	DB check	DB check
IN3	Zero command	Monitor change-over	Monitor change-over	Present value clear	Present value clear	Current control change-over	Speed selection 1	Pulse prohibit
IN2	Present value clear	Present value clear	Present value clear	Deviation clear	Deviation clear	Position control change-over	Forward rotation command	Forward rotation command
IN1	Home point stop	Home point stop	Limit change-over	Home point stop	Home point stop	Limit change-over	Reverse rotation command	Reverse rotation command
OUT2	Home point stop ON	Home point stop ON	Stop detection	In-position / Home point stop ON	In-position / Home point stop ON	In-position / Stop detection	Stop detection	Stop detection
OUT1	DB output	DB output	DB output	DB output	DB output	DB output	DB output	DB output
OUT0	Warning	MB output	MB output	Warning	MB output	MB output	Warning	MB output

Input/output sequence of VLBus-V specification

Assignment	NCBOY mode 31	Assignment	NCBOY mode 31
REF	Analog input A	IN7	General-purpose input
CLI	Analog input B	IN6	Home point slowdown limit
FMA, FMB	Pulse input	IN5	MB input
APD, BPD, ZPD	Display output Present value output Command value output User's defined pulse output	IN4	DB input
		IN3	"+" overrun
		IN2	"-" overrun
		IN1	Skip
		IN0	Main circuit ON
		OUT2 ~ 4	General-purpose output
		OUT1	DB output
		OUT0	MB output

Each input/output of VLBus-V servo amplifier allows analog connection and pulse connection. You can assign a desired function to general-purpose input/output.

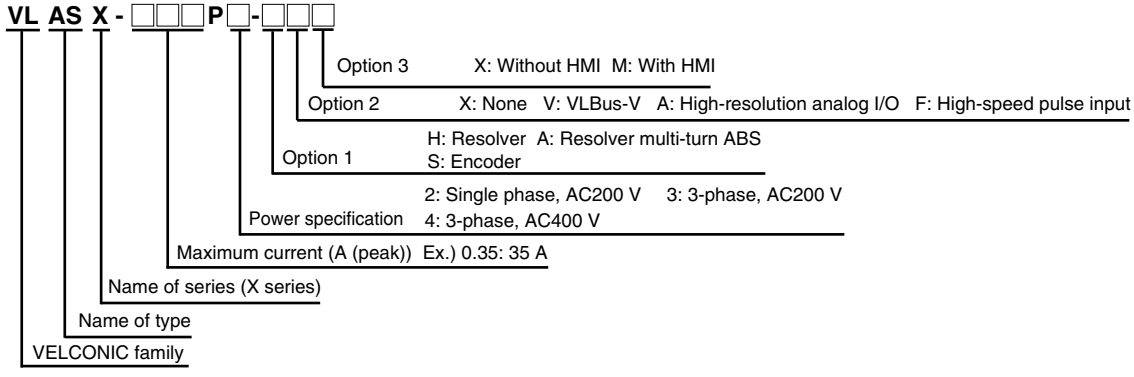
Specifications Table

General specifications/Performance specifications

Type of amplifier		008P2	012P2	025P2	035P3	070P3	100P3	200P3	320P3	500P3	400P4
Control system		PWM, 3-phase sine-wave									
Main circuit	Master power voltage	Single phase AC200 ~ 230V -15 % ~ +10 % 50/60 Hz			Three-phase AC200 ~ 230V -15 % ~ +10 % 50/60 Hz						Three-phase (neutral point grounding) AC380 ~ 460 V -15 % ~ +10 % 50/60 Hz
	Power capacity	250VA	1.2kVA	1.7kVA	2.6kVA	5.4kVA	8.0kVA	18kVA	35kVA	59kVA	83KVA
Control circuit	Master power voltage	Single phase AC200 ~ 230 V -15 % ~ +10 % 50/60 Hz			Single phase AC200 ~ 230 V -15 % ~ +10 % 50/60 Hz						
	Power capacity	50VA	50VA	50VA	65VA	80VA	80VA	100VA	150VA	150VA	350VA
Max. motor combination		200W	500W	1kW	1.5kW	3.4kW	5.0kW	11kW	20kW	33kW	55Kw
Continuous output current		2.2A(rms)	3.4A(rms)	5.7A(rms)	8.3A(rms)	18.4A(rms)	28.3A(rms)	56.6A(rms)	99A(rms)	166A(rms)	134 A(rms)
Instantaneous max. current		5.7A(rms)	8.5A(rms)	17.7A(rms)	25.0A(rms)	49.5A(rms)	71.0A(rms)	141A(rms)	226A(rms)	353A(rms)	283 A(rms)
Speed position sensor		Resolver or 17-bit serial encoder (Both resolver and encoder can have absolute specifications.)									
Range of speed control		1:5000 (Ratio of lower limit speed and rated speed, which allows output of motor rated current.)									
Speed fluctuation ratio		±0.02 % or less under load of 0 ~ 100 % or at power of -15 ~ 10 %. ±0.2 % or less at temperature of 0 ~ 55℃(The specified values are obtainable at rated speed.)									
Heat loss	Main circuit	15W	22W	39W	58W	98W	178W	310W	720W	1200W	1900W
	Control circuit	20W	20W	20W	26W	32W	32W	40W	50W	50W	140W
Reverse-current absorption resistor capacity (*1)		20W	20W	30W	60W	80W	100W	180W	Changes with external resistor capacity.		
Mass (standard)		1.3Kg	1.3Kg	2.3Kg	2.4Kg	4.5Kg	7Kg	12Kg	31kg	63kg	120kg
Outer dimensions (W*H*D)		65*170*150	65*170*150	110*170*180	110*170*180	110*250*180	130*307*197	220*410*230	350*500*315	585*500*353	670*710*410
General-purpose input		DC24V, 6 mA , 8 numbers (For speed control: Operation, reset, MB check, forward rotation permit, reverse rotation permit, present value clear, home point stop and PON input) Both sink ("-" common) connection and source ("+" common) connection are possible.									
General-purpose output		DC24V, 50 mA, 5 numbers (For speed control: Servo normal, servo ready, stop detection, warning and MB output) Both sink ("-" common) connection and source ("+" common) connection are possible.									
Speed current control	Speed command	DC0 ~ ±10V; Maximum motor speed at ±10V (Setting of ratio is possible.) Input resistance 49 kΩ, AD resolution 12-bit (Speed limit in current control mode)									
	Current command	DC0 ~ ±10V; Maximum motor torque at ±10V (Setting of ratio is possible.) Input resistance 49 kΩ, AD resolution 12-bit (Current command in current control mode)									
Position control	Split count	Resolver 24,000 P/rev, encoder 131,072 P/rev (Travel distance per pulse can be set by 65535/65535.)									
	Command type	Forward/reverse rotation pulse (Phase A/phase B pulse and forward/reverse rotation signal/feed pulse are also permitted.) DC3.5 V ~ 5.5 V, 11 mA photo coupler input, frequency 500 kHz (max.)									
Pulse output	Split count	Resolver 24,000 P/rev, encoder 131,072 P/rev (Travel distance per pulse can be set by 65535/65535.)									
	Output type	Phase A/phase B pulse (forward/reverse pulse), Vout: 3 V (typ) 20 mA (max.), output equivalent to AM26LS31, frequency 500 kHz (max.)									
Acceleration /deceleration	Soft start	Acceleration/deceleration time can be set separately for the speed command. Linear acceleration/deceleration in the range of 0.000 ~ 65.535 s in increments of 0.001 s.									
	S-type acceleration /deceleration	Acceleration/deceleration time can be specified for speed command or pulse command. S-type acceleration/deceleration in the range of 0.000 ~ 65.535 s in increments of 0.001 s.									
Monitor function	Monitor output	Speed or current monitor, 0 ~ ±10 V, output resistance 330 Ω (protection against short-circuit), DA resolution 12-bit (option).									
	Display	LED 5-digit (Various monitor display, check, adjustment and parameter setting are possible.) (Without HMI: Option)									
	External display	DPA-80 (extra price) can be connected. (Monitor of speed, current, present value, electronic thermal, etc., is possible.)									
Auto tuning function		Auto gain setting by repeated tuning operation.									
Protection function		Overcurrent, overvoltage, voltage drop, motor overload (electronic thermal, instant thermal), fin overheat, reverse-current resistor overload, resolver breakage, encoder breakage, etc.									
General specifications	Operating environment	Temperature: 0 ~ 55°C (non-freezing), humidity: 10 ~ 90 %RH (non-condensing) Atmosphere: Neither dust, metal chip or corrosive gas is included. Altitude for installation: 1,000 m or less									
	Vibration resistance (*2)	Pursuant to IEC60068-2-6. Frequency: 10 ~ 57 Hz, single amplitude: 0.075 m Frequency: 57 ~ 150 Hz, acceleration 9.8 m/s2							–		
	Storing environment	Temperature: -10 ~ 70°C (non-freezing), humidity: 35 ~ 90 %RH (non-condensing) Atmosphere: Neither dust, metal chip or corrosive gas is included.									
	Protective structure	IP10									
	Division of overvoltage	Overvoltage category II									
	Protective insulation	Protective insulation is done for all interfaces (CN1, CN2, CN5, CN9) from the primary power supply.									

*1: The reverse-current absorption resistor capacity is the absorption capacity of the resistor incorporated in the servo amplifier. It is possible to increase the capacity by adding an external resistor.
*2: Normal amplifier operation is already verified under these conditions.

Type of X series standard amplifier

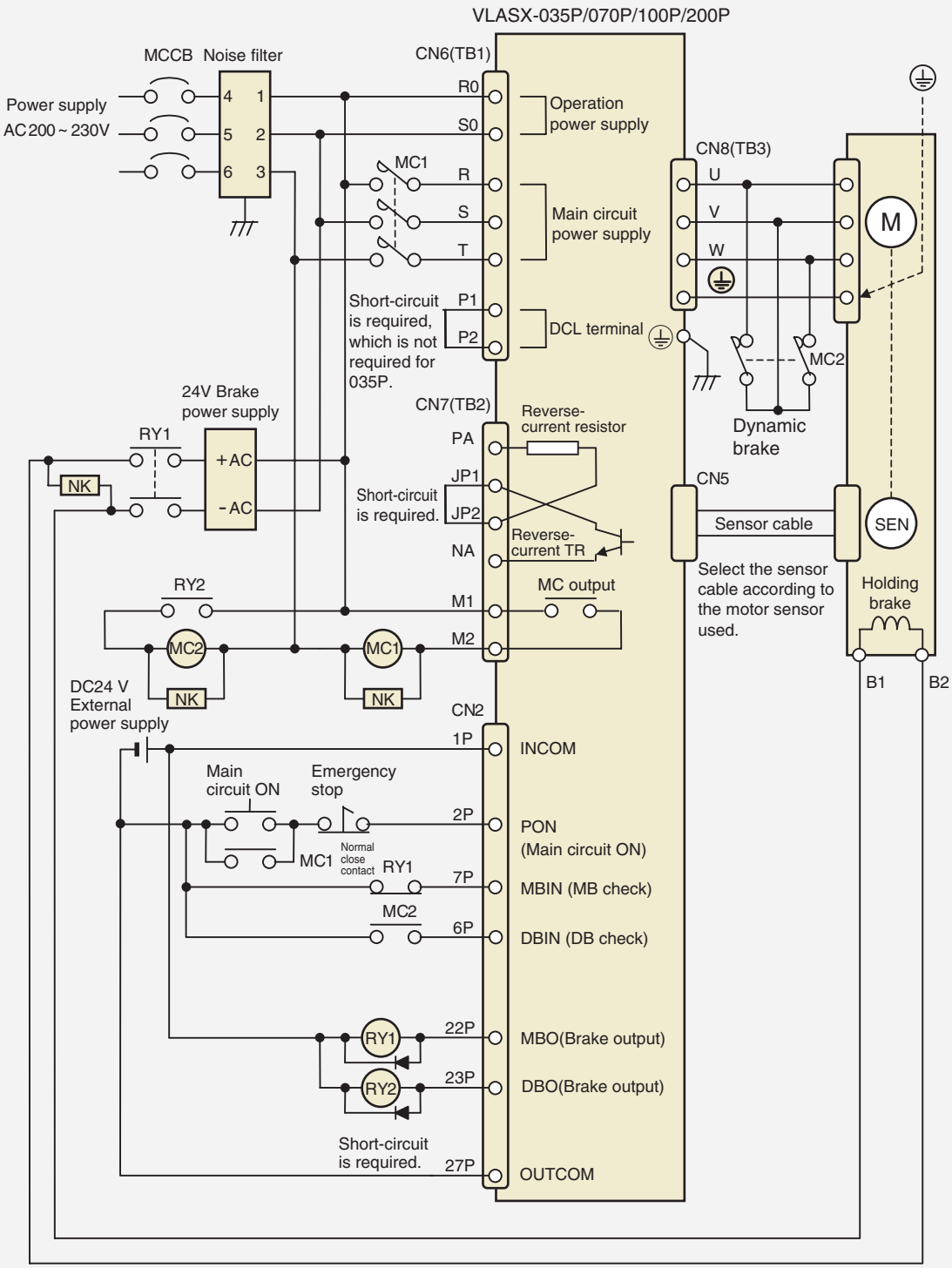


Main Circuit

Example of main circuit connection

To assure the safety of the servo system, single operation sequences and joint operation sequence of holding and dynamic brakes are provided. The control power is separated from the main circuit power, and only the main circuit can be blocked by PON signal.

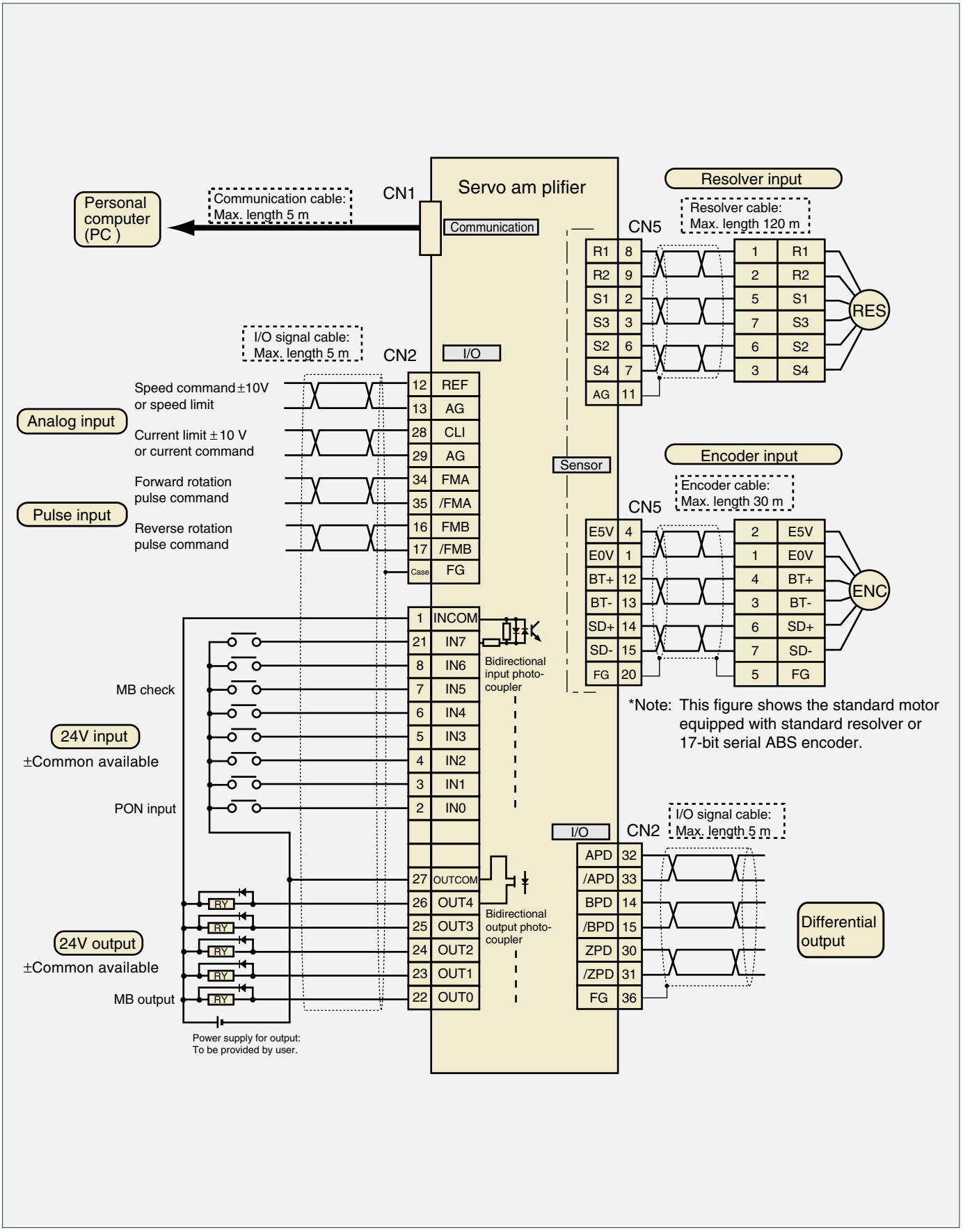
Example of main circuit connection (when holding and dynamic brakes are used jointly)



*For 200P, connectors CN6, CN7 and CN8 are TB1, TB2 and TB3 terminal blocks, respectively.

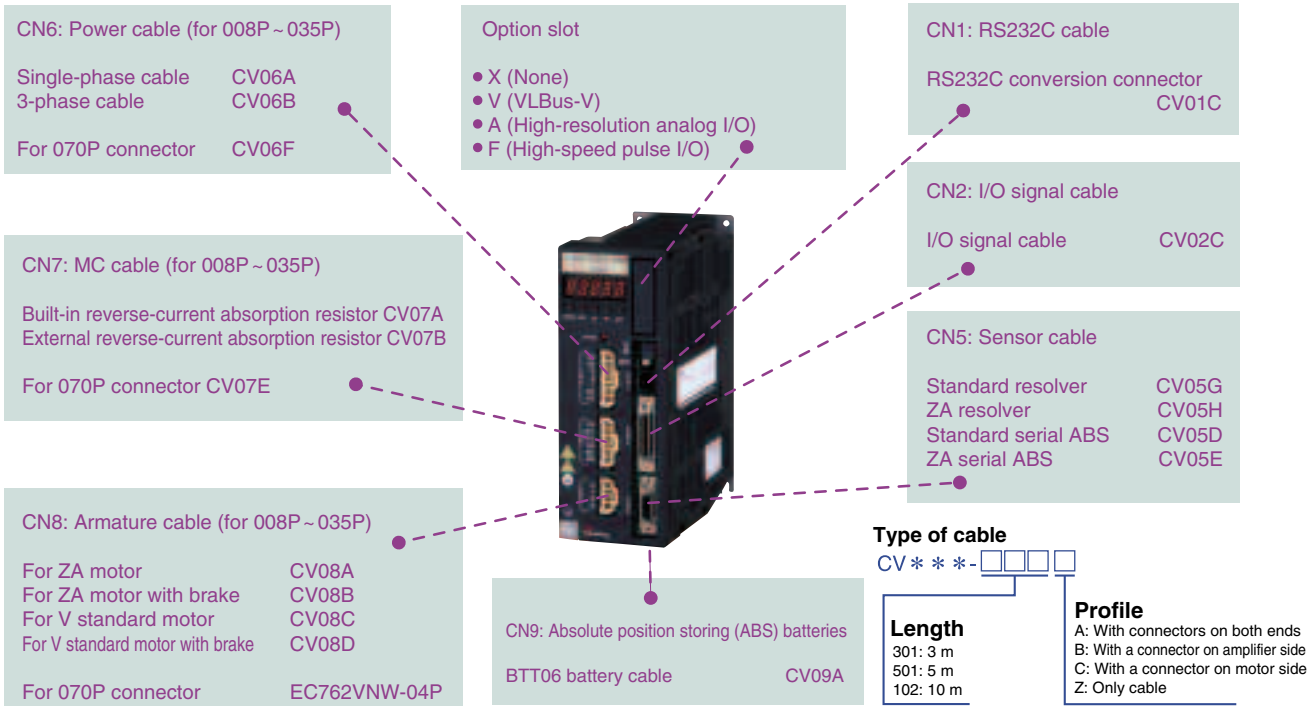
Example of control circuit connection

As bidirectional photocouplers are used for the sequence I/O interface, both sink ("-" common) connection and source ("+" common) connection are possible. Connection of analog input, pulse train input, etc. of an FA controller on the master side is also possible.



Selecting Cables

The X series servo amplifier is not provided with cables or connectors.
For the small-capacity amplifiers of 035P or less, cables for the power circuit, brake circuit and motor main circuit are available optionally. For amplifier 070P, only connector is available for an extra price. For servo amplifier 100P or over, a terminal block is used.



Main circuit cable for 035P or less, and 070P connector

Connector	Cable name	With connectors on both ends	With a connector on amp. side alone	Type of amplifier
CN6	Single-phase power cable	-	CV06A-□□□B	008P2, 012P2, 025P2
	3-phase power cable	-	CV06B-□□□B	035P3
	070P power connector	-	CV06F	070P3
CN7	MC cable (for built-in reverse-current absorption resistor)	-	CV07A-□□□B	008P2, 012P2, 025P2, 035P3
	MC cable (for external reverse-current absorption resistor)	-	CV07B-□□□B	008P2, 012P2, 025P2, 035P3
	070P MC connector	-	CV07E	070P3
CN8	V ZA motor armature cable	CV08A-□□□A	CV08A-□□□B	008P2, 012P2, 025P2, 035P3
	V ZA motor armature cable (with brake)	CV08B-□□□A	CV08B-□□□B	008P2, 012P2, 025P2, 035P3
	V standard motor armature cable	CV08C-□□□A	CV08C-□□□B	008P2, 012P2, 025P2, 035P3
	V standard motor armature cable (with brake)	CV08D-□□□A	CV08D-□□□B	008P2, 012P2, 025P2, 035P3
	T standard motor armature cable	-	CV08C-□□□B	008P2, 012P2, 025P2, 035P3
	T standard motor armature cable (with brake)	-	CV08D-□□□B	008P2, 012P2, 025P2, 035P3
	070P armature connector	-	EC762VNM-04P	070P3

Motor sensor cable

Note: For ZA11K15 and ZA14K15, use the standard motor sensor cable.

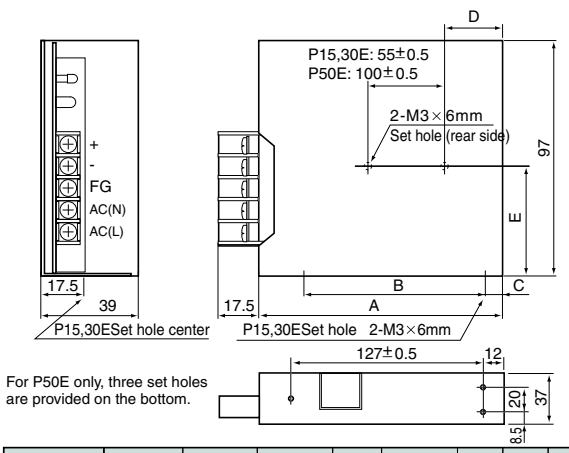
Connector	Cable name	With connectors on both ends	With a connector on amp. side alone	Type of amplifier
CN5	V standard motor resolver cable	CV05G-□□□A	CV05G-□□□B	All types
	V ZA motor resolver cable (Note)	CV05H-□□□A	CV05H-□□□B	All types
	V standard motor serial ABS cable	CV05D-□□□A	CV05D-□□□B	All types
	V ZA motor serial ABS cable (Note)	CV05E-□□□A	CV05E-□□□B	All types

Communication cable and ABS battery cable

Connector	Cable name	With connectors on both ends	With a connector on amp. side alone	Type of amplifier
CN1	RS232C communication cable	-	CV01C-□□□A	All types
CN2	I/O signal cable	CV02C-□□□A	CV02C-□□□B	All types
CN9	BTT06 battery cable (resolver ABS spec.)	CV09A-500A	-	All types
CN3, CN4	VLBus-V optical fiber cable (for connection in control panel)	CV23A-□□□A	-	All types
	VLBus-V optical fiber cable (for connection outside control panel)	CV24B-□□□A	-	All types
CN17	High-resolution analog I/O connector	-	EC381VM-08P	All types

As the small brake power supply, noise filter, etc., are made by other makers, only the reference specifications are given below. For detailed specifications, see the material made out by each maker.

Brake power supply

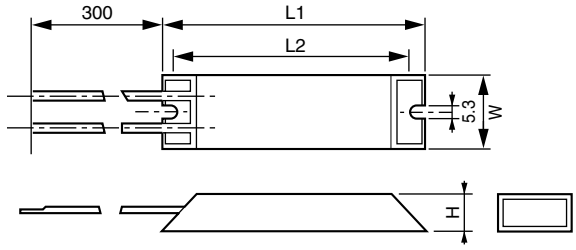


Type	Input voltage	Output voltage	Output current	A	B	C	D	E
P15E-24-N	Single phase, AC85 ~ 264 V	DC24V	0.7A	99.5	74±0.5	7	23.5	45.5
P30E-24-N		DC24V	1.3A	124.5	83±0.5	15	34	42.5
P50E-24-N		DC24V	2.1A	160	127±0.5	12	22.5	38.5

External reverse-current absorption resistor

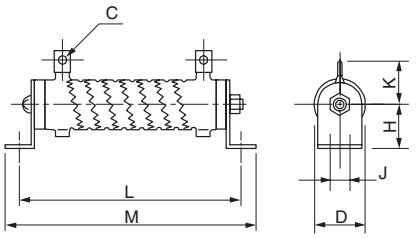
This resistor prevents increase in PN voltage caused by energy which returns to the amplifier at the time braking. If the capacity of the built-in resistor is not enough, add an external resistor.

Fig. A



Type	Absorption capacity	L1	L2	W	H	Fig.
RGH60A 100Ω	30W	115	100	40	20	A
RGH200A 30Ω	100W	215	200	50	25	A
RGH400A 30Ω	200W	265	250	60	30	A

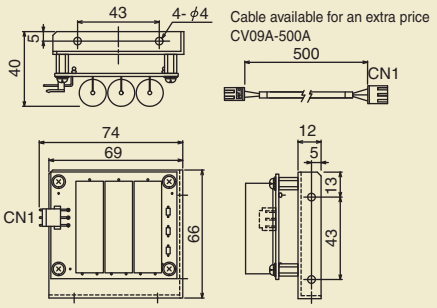
Fig. B



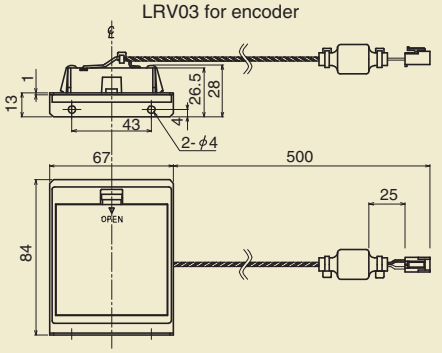
Type	Absorption capacity	L	M	H	K	D	J	C	Fig.
GRZG400 3R0K	200W	385	411	40	46	47	9.5	ϕ8.2	B

Absolute position storing batteries

BTT06 for resolver



LRV03 for encoder

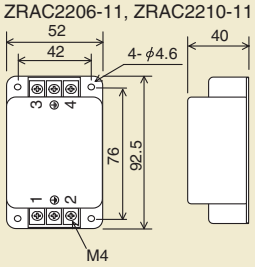


Noise filter

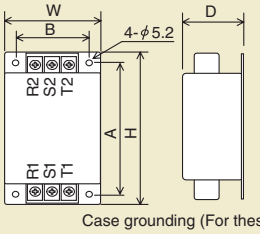
Applicable types

Motor output	Type	
30W~500W	ZRAC2206-11	With terminals 3 and 4 on the power supply side, terminals 1 and 2 are connected with terminals R and S of the amplifier main circuit power supply.
600W~800W	ZRAC2210-11	
1.0kW~1.5kW	ZRWT2210-ME	With terminals 4, 5 and 6 on the power supply side, terminals 1, 2 and 3 are connected to the primary side of the main circuit MC (contactor).
1.8kW~3.0kW	ZRWT2220-ME	
4.5kW~5.0kW	ZRWT2230-ME	
7.0kW~10kW	ZRCT5050-MF	
11kW~14kW	ZRCT5080-MF	
20kW, 55kW	ZRCT5150-MF	
33kW	ZRCT5200-MF	

ZRAC2206-11, ZRAC2210-11



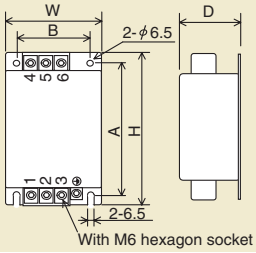
ZRWT2210-ME, ZRWT2220-ME, ZRWT2230-ME



Type	H	W	D	A	B	Screw
ZRWT2210-ME	194	90	40	170	68	M4 +
ZRWT2220-ME	214	100	50	190	78	M4 +
ZRWT2230-ME	236	125	60	190	101	With M6 hexagon socket head cap screw

Case grounding (For these types, clamp the grounding wire to the set screw together.)

ZRCT5050-MF, ZRCT5080-MF, ZRCT5150-MF, ZRCT5200-MF



Type	H	W	D	A	B	Screw
ZRCT5050-MF	396	164	68	369	135	M6
ZRCT5080-MF	445	169	72	418	141	M6
ZRCT5150-MF	517	190	87	490	160	M8
ZRCT5200-MF	605	197	107	590	152	M10

With M6 hexagon socket head cap screw

Selecting Peripheral Equipment

High frequency control ACL, DCL

ACL(008P2, 012P2, 025P2, 035P3)

Motor capacity	Type of amp	Amp. spec.	Reactor spec.												Fig
			Type of reactor	Inductance	Rated current	W	H	D	E	A	B	G	Cable size	Mass	
				(mH)	(A)	(mm)	(mm)	(mm)	(mm)	(mm)	(mm)	(mm)	(mm^2)	(kg)	
200W or lower	-008P2	200V Single phase	#P0243601	2.5	3.3	60	55	40	50	40	32	4	1.25	0.4	A
400W 500W	-012P2		#P0243602	2.5	8.1	95	65	45	70	55	45	4	5.5	1,2	
600W 800W	-025P2		#P0243603	2	13	See the figure.								1.9	B
1kW 1.5kW	-035P3	200V 3-phase	#P0243604	0.7	15	See the figure.								3	C

Fig. A

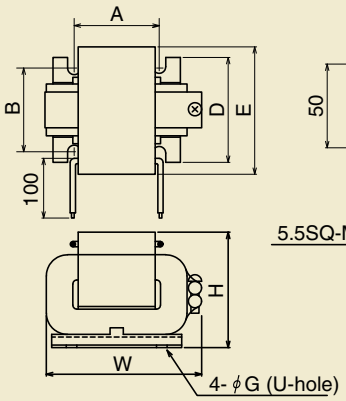


Fig. B

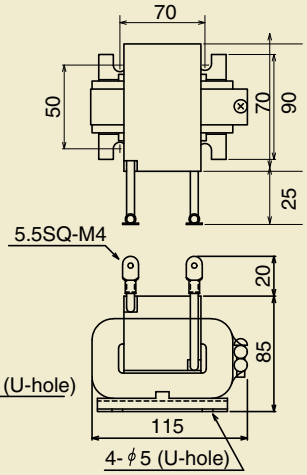
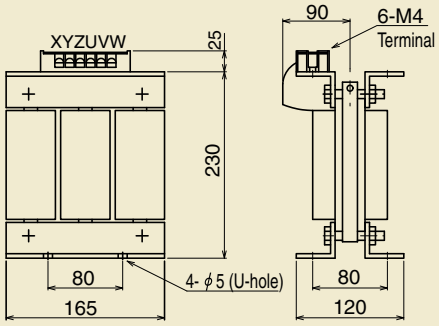
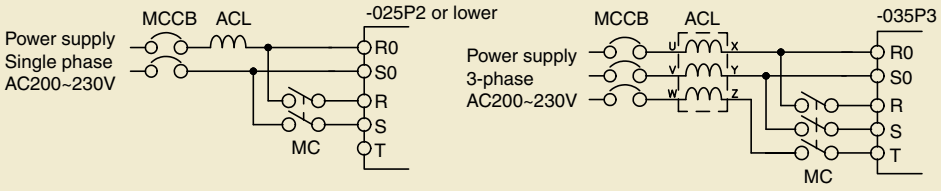


Fig. C



ACL connection



DCL(070P3)

Motor capacity	Type of amp.	Amp. spec.	Reactor spec.												Fig.
			Type of reactor	Inductance	Rated current	W	H	D	E	A	B	G	Cable size	Mass	
				(mH)	(A)	(mm)	(mm)	(mm)	(mm)	(mm)	(mm)	(mm)	(mm^2)	(kg)	
1.8kW	-070P3	200V 3-phase	#P0210905	2	11	115	80	45	75	70	35	5	5.5	1.2	D
2.0kW 2.4kW 3.0kW			#P0210906	1.5	20	135	100	63	90	80	47	5	8	2.8	

DCL connection

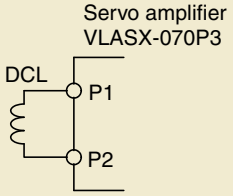
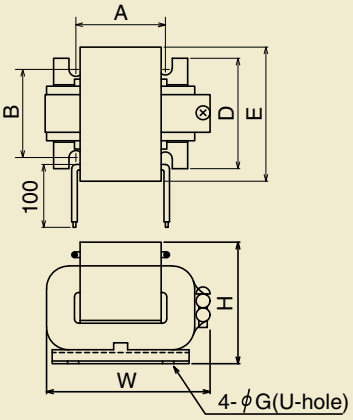


Fig.D



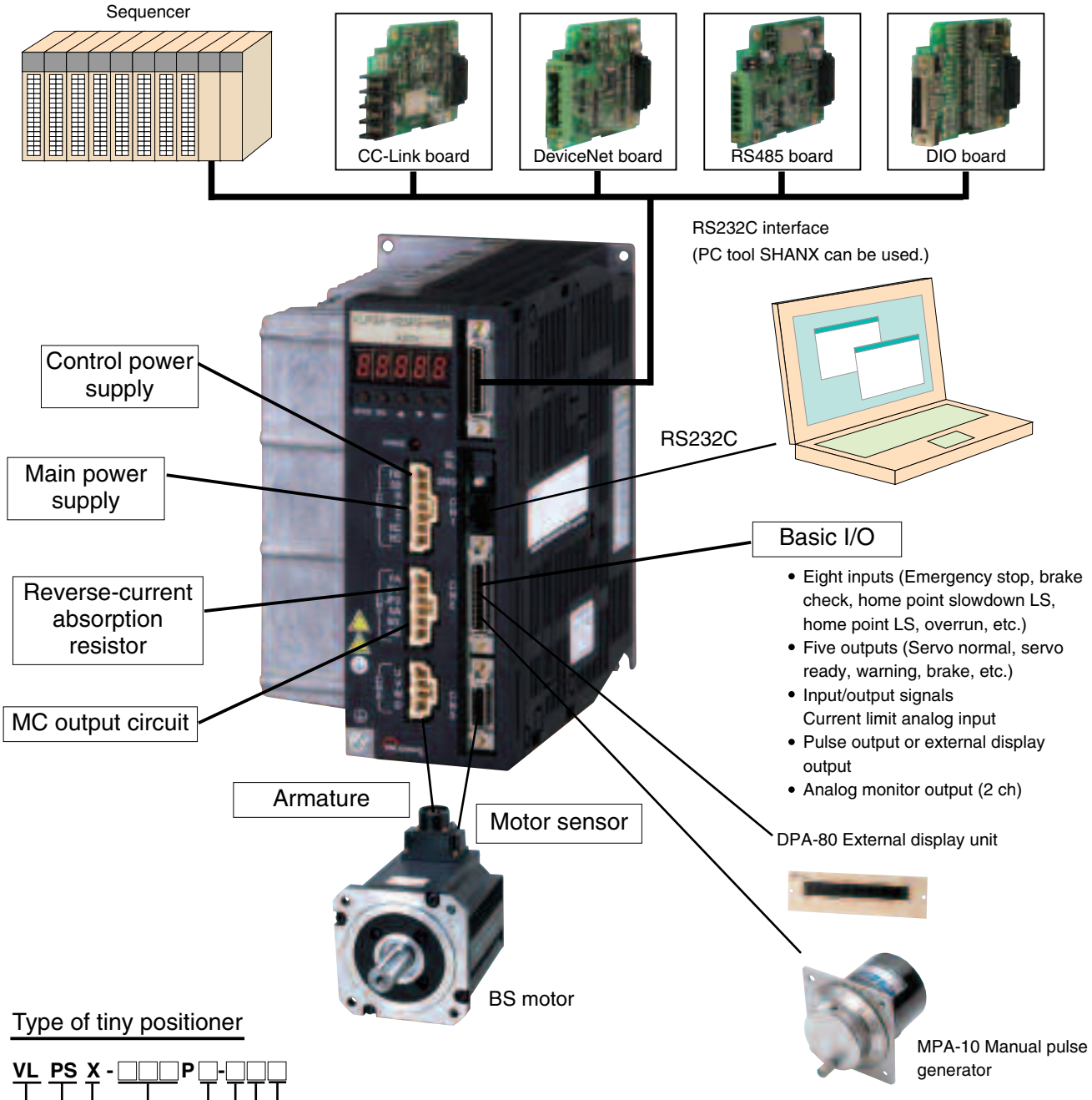
For your order entry

Model	Standard servo amplifier	VLASX-_ _ _ P_ -_ X _ ASSY		
Part	Name	Type	Power specification	Q'ty
Main body (amplifier)	X series servo amplifier	VLASX-008P2	Single phase, AC200 V	
		VLASX-012P2	Single phase, AC200 V	
		VLASX-025P2	Single phase, AC200 V	
		VLASX-035P3	Three-phase, AC200 V	
		VLASX-070P3	Three-phase, AC200 V	
		VLASX-100P3	Three-phase, AC200 V	
		VLASX-200P3	Three-phase, AC200 V	
		VLASX-320P3	Three-phase, AC200 V	
		VLASX-500P3	Three-phase, AC200 V	
		VLASX-400P4	Three-phase, AC400 V	
Sensor	H: Resolver (20 kHz), S: Encoder, A: Resolver ABS			
Option	VLBus-V servo amplifier	VLASX-_ _ _ P_ -_ V _ ASSY		
	High-resolution analog I/O	VLASX-_ _ _ P_ -_ A _ ASSY		
	High-speed pulse I/O	VLASX-_ _ _ P_ -_ F _ ASSY		
HMI option	With HMI (Display/operation unit)	VLASX-_ _ _ P_ -_ _ M		
	Without HMI(Display/operation unit)	VLASX-_ _ _ P_ -_ _ X		
Amplifier cable	RS232C conversion connector	CN1	CV01C	To be connected with commercially available LAN cable.
	RS232C conversion connector cable	(Recom-mended)	NWNMC5E-STN-SSMB-BL-3 (made by Misumi; 3m-long)	Category 5 or over, with shield/straight
	I/O standard cable	CN2	CV02C-_ _ _A, B	Standard length: 1, 3 m
	Standard resolver cable	CN5	CV05G-_ _ _A, B, C, Z	Standard length: 3, 5, 10 m
	V ZA motor resolver cable		CV05H-_ _ _A, B, C, Z	Standard length: 3, 5, 10 m
	Standard serial ABS cable		CV05D-_ _ _A, B, C, Z	Standard length: 3, 5, 10 m
	V ZA motor serial ABS cable		CV05E-_ _ _A, B, C, Z	Standard length: 3, 5, 10 m
	Single phase power cable	CN6	CV06A-_ _ _B	Standard length: 1, 3, 5 m
	3-phase power cable		CV06B-_ _ _B	Standard length: 1, 3, 5 m
	Internal reverse-current absorption resistor MC cable	CN7	CV07A-_ _ _B	Standard length: 1, 3, 5 m
	External reverse-current absorption resistor MC cable		CV07B-_ _ _B	Standard length: 1, 3, 5 m
	V ZA motor armature cable	CN8	CV08A-_ _ _A, B, C, Z	Standard length: 3, 5, 10 m
	V ZA motor armature cable for motor with brake		CV08B-_ _ _A, B, C, Z	Standard length: 3, 5, 10 m
	Standard 130-sq. armature cable		CV08C-_ _ _A, B, C, Z	Standard length: 3, 5, 10 m
	Standard 130-sq. armature cable for motor with brake		CV08D-_ _ _A, B, C, Z	Standard length: 3, 5, 10 m
Connector	Power connector for 070P	CN6	EC762VNM-07P	
	MC connector for 070P	CN7	EC762VNM-06P	
	Armature connector for 070P	CN8	EC762VNM-04P	
VLBus-V optical communi-cation cable	Optical communication cable (for connection inside control panel)	CN3,4	CV23A-_ _ _ A	Standard length 0.3, 0.5, 1 m, etc.
	Optical communication cable (for connection outside control panel)	CN3,4	CV24A-_ _ _ A	Standard length: None
Peripheral equipment	Absolute position storing (ABS) battery	CN9	LRV03 (with 0.5 m-long battery cable. Battery change is possible.)	
	Absolute position storing (ABS) battery	CN9	BTT06 (Battery cable is available for an extra price. Battery change is not possible.)	
	BTT06 battery cable	CN9	CV09A-500A	Standard length 0.5 m
	External display unit	CN2	DPA-80	
	External reverse-current absorption resistor	CN7,TB2	RGH60A-100Ω	
	External reverse-current absorption resistor	CN7,TB2	RGH200A-30Ω	
	External reverse-current absorption resistor	CN7,TB2	RGH400A-30Ω	
	External reverse-current absorption resistor	TB2	GRZG400 3R0 (3Ω)	
	Brake power 15W	—	P15E-24-N	
	Brake power 30W	—	P30E-24-N	
	Brake power 50W	—	P50E-24-N	
	ACL / DCL	—	To be selected by motor output. (See the appropriate instruction manual.)	
	Noise filter	—	To be selected by motor output. (See the appropriate instruction manual.)	
Software	VELWIN	—	VELWIN	

Simple Positioner Amplifier Integrated with Servo Amplifier

Tiny Positioner (NCBOY-80)

NCBOY-80 is the servo amplifier incorporating the PTP (point-to-point positioning) function. It can be connected with a sequencer (or programmable ladder controller), user controller or other NCBOY through the interface of DIO, CC-Link, DeviceNet or RS485.



Type of tiny positioner

VL PS X - □□□ **P** □ - □□□

- **Option 3** X: Without HMI M: With HMI
- **Option 2** B: DIO C: CC-Link D: DeviceNet R: RS485
- **Option 1** H: Resolver A: Resolver multi-turn ABS S: Encoder
- **Power specification** 2: Single phase, AC200 V 3: 3-phase, AC200 V 4: 3-phase, AC400 V
- **Maximum current (A (peak))** Ex.) 0.35: 35 A
- **Name of series** (X series)
- **Name of type**
- **VELCONIC family**

Only the functions required for positioning are selected. A low-priced, highly accurate positioner can be created in conjunction with the host controller.

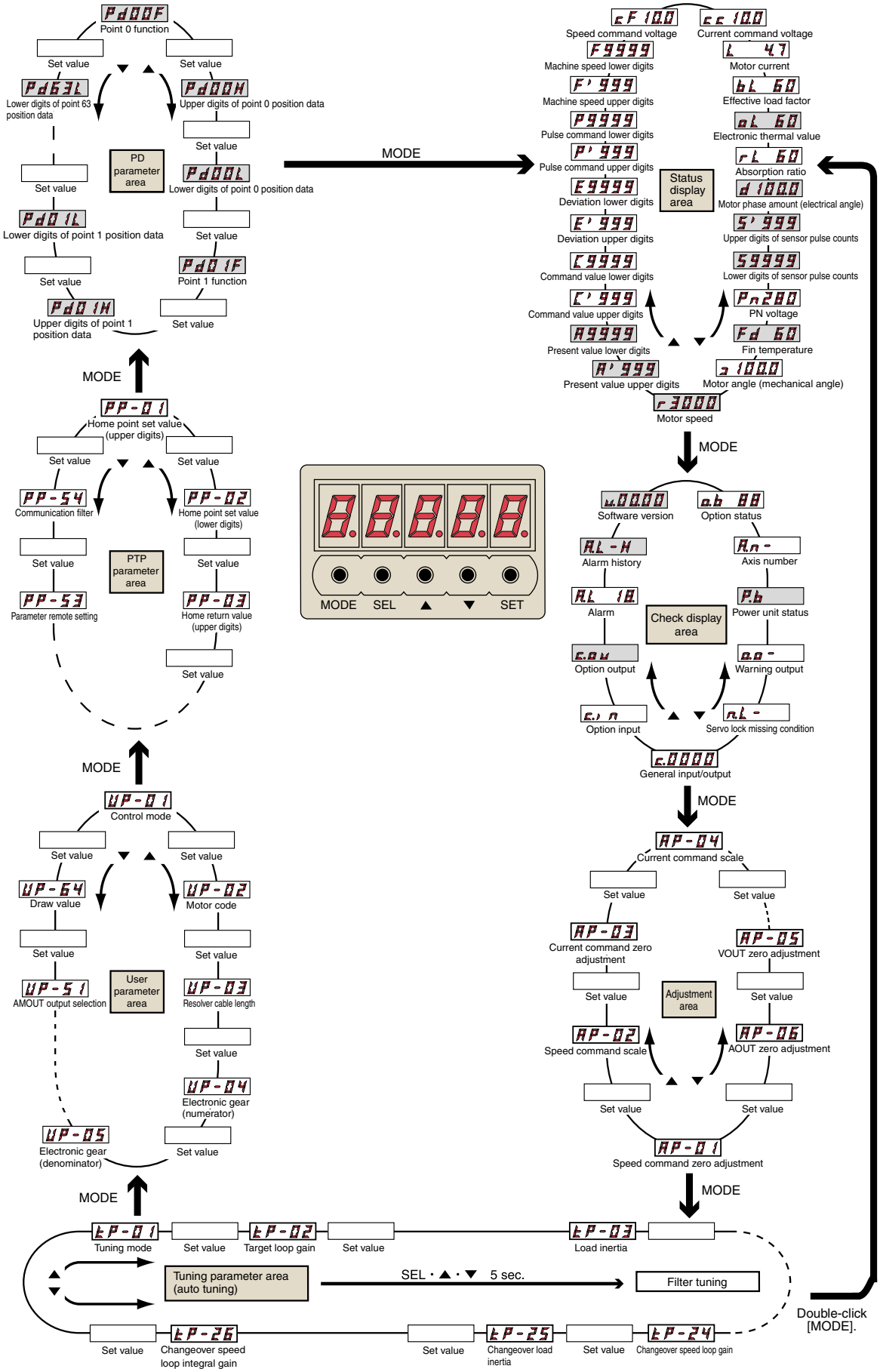
Operation mode	Jog	Jog operation is possible. Either of four (4) different feedrates can be selected. Override is also operative.
	Set home	Set home operation is possible to establish the coordinate system. Motor shaft origin pulse, limit switch input edge and preset in stop condition can be selected. Also, the automatic search function can be selected.
	MPG/Step	Synchronous pulse operation by external pulse input and step feed operation with ON/OFF of JOGP, JOGM signals are possible. For the MPG mode, the function of multiplying input pulse by 10 or 100 is provided. The step feed distance is specified by parameter.
	Auto mode	In all, four (4) commands are available for positioning operation; absolute coordinate command, incremental feed distance command, point number command and home return command.
Auxiliary function	Coordinate system	Selection of linear coordinate system or rotary coordinate system is possible. In the rotary coordinate system, designation of revolving direction, revolving direction in absolute programming mode, and shortcut is possible by using appropriate parameters.
	Acceleration and deceleration pattern	Selection of linear acceleration/deceleration or S-type acceleration/deceleration can be selected by parameter. For the linear acceleration/deceleration, four (4) acceleration/deceleration times can be changed over by sequence signals.
	Current limit	Current limit can be changed over by sequence signal. It is also possible to change over the four (4) current limits.
	Speed selection	Four (4) feedrates for auto, jog and set home modes can be changed over by speed select signals. These four (4) feedrates should be specified in advance by parameters.
	Override	Feedrate override function. Override is effected on the reference feedrate as determined by parameter and speed selection, and the feedrate can be changed during operation. Weight per bit can be selected by parameter. Override of 0.01 %, 0.1 %, 1 % or 10 % can be chosen. Ex.) When the increment is 0.1 %, up to 13 bits are available, and override can be commanded up to 819.2 %..
	Limit feed	Positioning function, using an external limit switch. This function can be selected by using limit feed select signal. Selection of limit positioning after inching feed or inching feed positioning after limit ON is possible by parameter.
	Feed hold	The feed hold function can be selected, using feed hold signal.
	Backlash compensation	Backlash compensation function. Feedrate during backlash compensation can also be specified.
	Overtravel	Protection against overtravel by means of limit switch and soft limit is possible. Also, the stop method at overtravel alarm and alarm detecting method can be selected.
Others	Teaching	Teaching of point data is possible.
	Remote setting	Remote setting of parameter is possible through the communication line, which is called the "parameter remote setting function." Rewriting of parameter value is possible by combined use of sequence signals.
	Multiplex	To save the number of sequence signals (especially for DIO), multiplex input and output can be used, which are specified by parameters.
	Interface	It is possible to set baudrate and error detecting method of each interface.

☐The positioning operation comes in the four modes; positioning by coordinate designation, positioning by travel distance designation, positioning by point number designation and positioning for home return. ☐Selection of limit positioning after auto-sizing feed or auto-sizing feed after limit ON is possible. ☐Jog operation, MPG/step operation and home point setting operation (with automatic search) are possible. ☐Selection of linear coordinate system or rotation coordinate system is possible. ☐Overtravel soft limit function ☐Setting of four types of feedrate and override in each operation mode is possible. ☐Up to 64 points can be saved and teaching of point data is possible. ☐Selection of BIN or BCD data code is possible. ☐Backlash compensation function ☐Parameter remote setting function (excluding DIO)

Display and Operation

Hierarchal operation

On the display & operation unit, you can perform display of positioning point data and servo motor operation status, check of sequence or alarm, setting of user parameters including selection of control mode and resolution, and setting of turning parameters for servo adjustment.



Basic input and output

The basic input and output are assigned to CN2. The pulse input specification, etc. is the same as in the standard servo amplifier.

Pin No.	Symbol	Modes 11, 12, 21, 22, 23, 24	Pin No.	Symbol	Modes 11, 12, 21, 22, 23, 24
34	FMA	Pulse input	2	IN0	PON (Emergency stop input)
35	/FMA		3	IN1	OTP (+ Overtravel)
16	FMB		4	IN2	OTM (- Overtravel)
17	/FMB		5	IN3	HLLS (Home point slowdown/Home point/LS)
28	CLI	Current limit input	6	IN4	DBI (Brake check input)
29	AG		7	IN5	MBI (Holding brake check input)
32	APD	Pulse output or external display output	8	IN6	RESET (Reset); Not provided for modes 21, 22, 23, 24.
33	/APD		21	IN7	RUN (Operation); Not provided for modes 21, 22, 23, 24.
14	BPD		22	OUT0	MBOUT (Holding brake control output)
15	/BPD		23	OUT1	DBOUT (Brake control output)
30	ZPD		24	OUT2	WARN (Warning)
31	/ZPD		25	OUT3	SRDY (Servo ready)
10	NC	Not used	26	OUT4	SST (Servo normal output)
9	NC		1	INCOM	Input common
11	NC		27	OUTCOM	Output common
Case	FG	Frame ground			

Internal sequence input and output

The internal sequence input and output are assigned to each control mode (11, 12, 21, 22, 23 and 24) according to the application.

Internal sequence input			
PON	Emergency stop input	TEACH	Teaching
OTP	+ Overtravel	CCD	Current limit selection
OTM	- Overtravel	MODE0, MODE1	Operation mode
HLLS	Home point slowdown/ Home point/ LS	CSEL0, CSEL1	Command selection
DBI	Brake check input	FSEL0, FSEL1	Speed selection
MBI	Holding brake check input	MPGM0, MPGM1	MPG/Step factor
RUN	Operation	CCD0, CCD1	4-step current limit selection
RESET	Reset	ACSEL0, ACSEL1	4-step acceleration/deceleration time selection
START	Start	PCMD0 ~ PCMD31	Position command
JOGP	Jog +	OVRD0 ~ OVRD13	Override
JOGM	Jog -	PNCMD0 ~PNCMD6	Point command
FSTP	Feed hold	ECLR	Deviation counter clear
LSSEL	LS positioning selection		
DCNT	Start check signal	PCLR	Present position clear
RPAMOD	Parameter change mode	RPASTB	Parameter change strobe

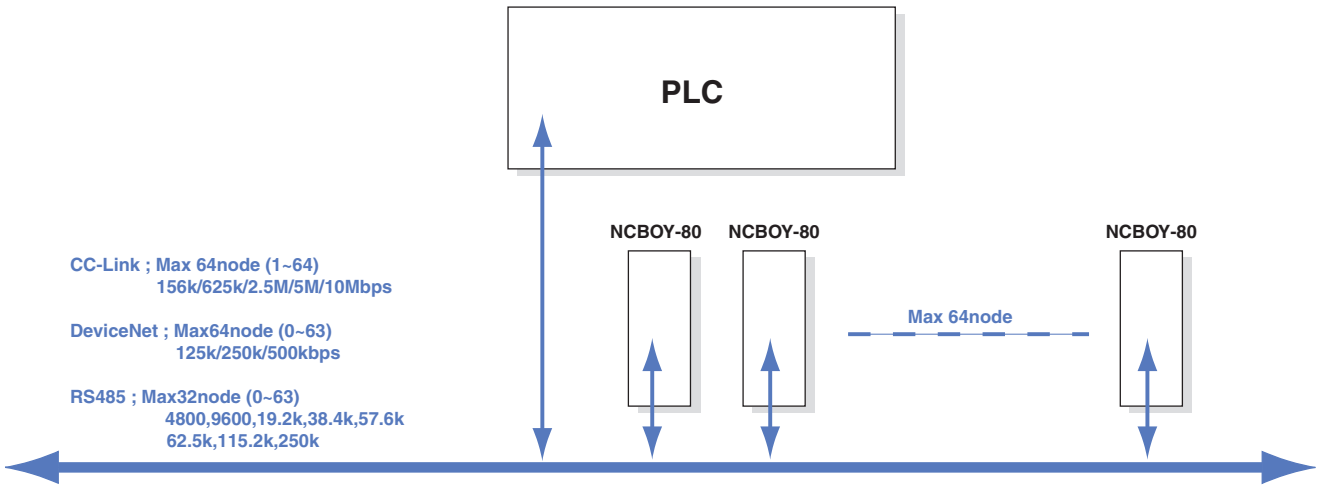
Internal sequence output			
MBOUT	Holding brake control output	MINSEL2	Multi input 2 selection
DBOUT	Brake control output	MINSEL3	Multi input 3 selection
WARN	Warning	BLV	Battery voltage drop
SRDY	Servo ready	GRUN	During servo lock
SST	Servo normal output	POK	Positioning OK
MZM	During home point saving	MIN0 ~ MIN7	IN□input monitor
HOME	During home point stop	MFEED	Revolution speed monitor
DEN	Motion end	MCURR	Current monitor
INP	In-position	POSI0 ~ POSI31	Present value
AFSTP	During feed hold	PN0 ~ PN6	Point number
LSALM	LS alarm	FEED0 ~ FEED15	Revolution speed
TENBL	Teaching permit	CURR0 ~ CURR15	Current
MINSEL1	Multi input 1 selection	SSTOP	During abnormal stop
CLA	During current limit	RPAFIN	Parameter change response
		HZONE	Near home point

DIO input and output for modes 11 and 12

In modes 11 and 12, a DIO board is equipped on the unit. The following I/Os are added to the basic I/Os.

Pin No.	Symbol	Mode 11	Mode 12
1	IN10	PCMD0/PCMD16/OVR0	PNCMD0/PCMD0
2	IN11	PCMD1/PCMD17/OVR1	PNCMD1/PCMD1
3	IN12	PCMD2/PCMD18/OVR2	PNCMD2/PCMD2
4	IN13	PCMD3/PCMD19/OVR3	PNCMD3/PCMD3
5	IN14	PCMD4/PCMD20/OVR4	PNCMD4/PCMD4
6	IN15	PCMD5/PCMD21/OVR5	PNCMD5/PCMD5
7	IN16	PCMD6/PCMD22/OVR6	OVR0/PCMD6
8	IN17	PCMD7/PCMD23/OVR7	OVR1/PCMD7
9	IN18	PCMD8/PCMD24/OVR8	OVR2/PCMD8
11	IN19	PCMD9/PCMD25/PNCMD0	OVR3/PCMD9
12	IN1A	PCMD10/PCMD26/PNCMD1	FSEL0/PCMD10
14	IN1B	PCMD11/PCMD27/PNCMD2	FSEL1/PCMD11
15	IN1C	PCMD12/PCMD28/PNCMD3/ACSEL0/PNCMD3	CCD0/PCMD12
16	IN1D	PCMD13/PCMD29/PNCMD4/ACSEL1/GCHG	CCD1/PCMD13
17	IN1E	PCMD14/PCMD30/FSEL0	ACSEL0/PCMD14
18	IN1F	PCMD15/PCMD31/FSEL1	ACSEL1/PCMD15
13	INCOM1	Input common	Same as left.
29	INCOM2	Input common	Same as left.
19	IN20	START	Same as left.
20	IN21	JOGP	Same as left.
21	IN22	JOGM	Same as left.
22	IN23	FSTP/TEACH/LSSEL/ECLR	Same as left.
23	IN24	MODE0	Same as left.
24	IN25	MODE1	Same as left.
25	IN26	CSEL0	Same as left.
26	IN27	CSEL1	Same as left.
27	OUT10	MZM	Same as left.
28	OUT11	HOME/HZONE	Same as left.
30	OUT12	DEN/INP	Same as left.
31	OUT13	AFSTP/TENBL/LSALM	Same as left.
32	OUT14	MINSEL1	Same as left.
33	OUT15	MINSEL2	Same as left.
34	OUT16	MINSEL3	Same as left.
35	OUT17	POK	Same as left.
10	OUTCOM	Output common	Same as left.
36	FG	Frame ground	Same as left.

NCBOY-80 network



Field bus input and output for modes 21, 22, 23 and 24

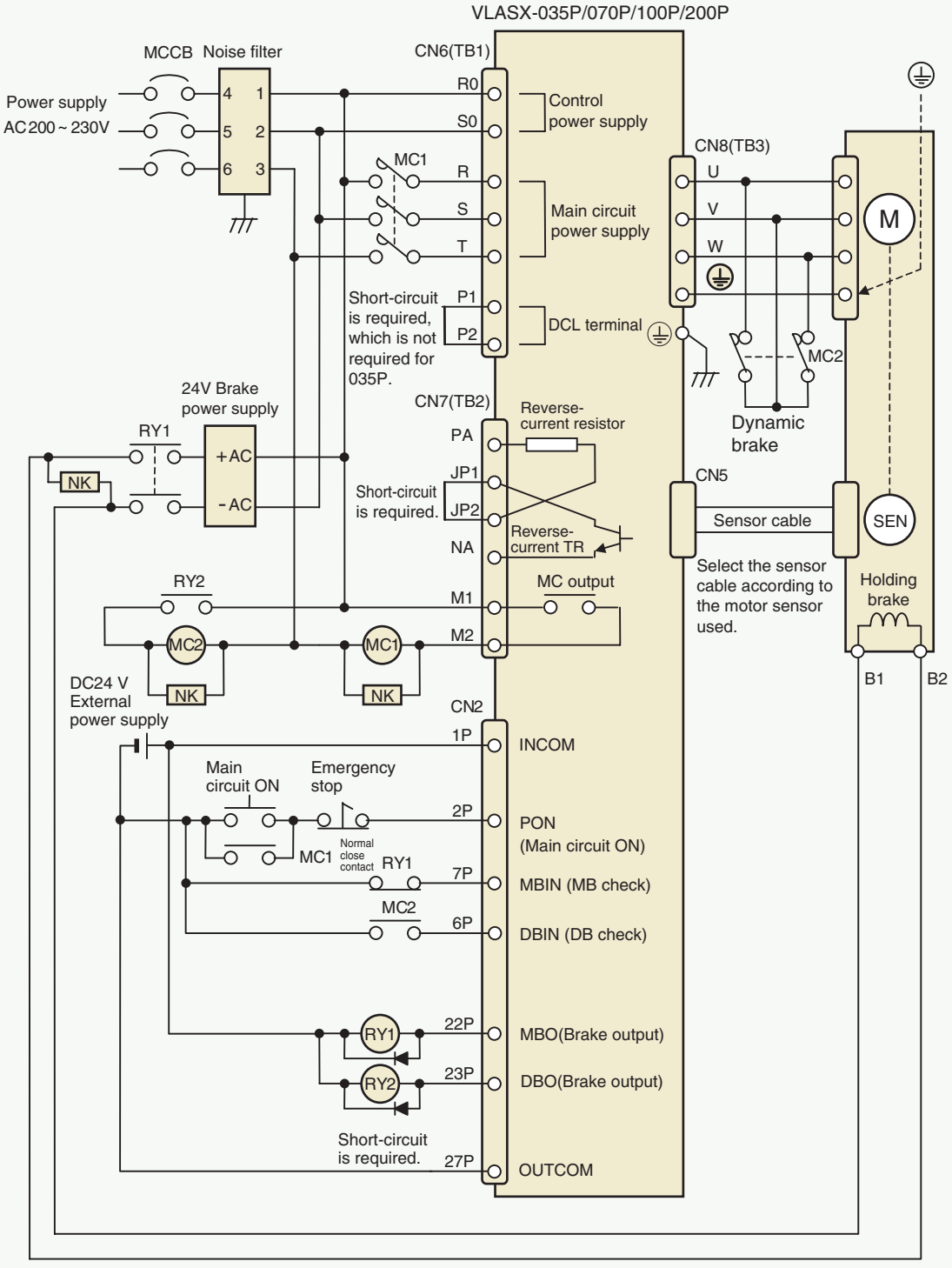
In modes 21, 22, 23 and 24, CC-Link, DeviceNet and RS485 boards are equipped on the unit, respectively. The following I/Os are added to the basic I/Os.

CC-Link(Mode 21)	DeviceNet(Mode 22)	RS485 (Mode 23)	RS485(Mode 24)	I/O	Signal name
RY00	OUT BASE +0.0	Bit 0 of D9	Y+50	IN10	RUN (Run)
RY01	OUT BASE +0.1	Bit 1 of D9	Y+51	IN11	RESET (Reset)
RY02	OUT BASE +0.2	Bit 2 of D9	Y+52	IN12	START (Start)
RY03	OUT BASE +0.3	Bit 3 of D9	Y+53	IN13	JOGP (Jog +)
RY04	OUT BASE +0.4	Bit 4 of D9	Y+54	IN14	JOGM (Jog -)
RY05	OUT BASE +0.5	Bit 5 of D9	Y+55	IN15	FSTP (Feed hold)
RY06	OUT BASE +0.6	Bit 6 of D9	Y+56	IN16	LSSEL (LS positioning selection)
RY07	OUT BASE +0.7	Bit 7 of D9	Y+57	IN17	ECLR (Deviation counter clear)
RY08	OUT BASE +0.8	Bit 0 of D8	Y+58	IN18	TEACH (Teaching)
RY09	OUT BASE +0.9	Bit 1 of D8	Y+59	IN19	MODE0 (Operation mode)
RY0A	OUT BASE +0.10	Bit 2 of D8	Y+5A	IN1A	MODE1 (Operation mode)
RY0B	OUT BASE +0.11	Bit 3 of D8	Y+5B	IN1B	CSEL0 (Command selection)
RY0C	OUT BASE +0.12	Bit 4 of D8	Y+5C	IN1C	CSEL1 (Command selection)
RY0D	OUT BASE +0.13	Bit 5 of D8	Y+5D	IN1D	FSEL0 (Feedrate selection)
RY0E	OUT BASE +0.14	Bit 6 of D8	Y+5E	IN1E	FSEL1 (Feedrate selection)
RY0F	OUT BASE +0.15	Bit 7 of D8	Y+5F	IN1F	PCLR (Present position clear)
RWW0-0 ~ 1-F	OUT BASE +1.0 ~ +2.15	Bit 0 of D7 ~ Bit 7 of D4	Y+60 ~ Y+7F	IN20 ~ 3F	PCMD0 ~ PCMD31 (Position command)
RWW2-0 ~ 2-D	OUT BASE +3.0 ~ +3.13	Bit 0 of D3 ~ Bit 5 of D2	Y+80 ~ Y+8D	IN40 ~ 4D	OVRD0 ~ OVRD13 (Override)
RWW2-E	OUT BASE +3.14	Bit 6 of D2	Y+8E	IN4E	Undefined
RWW2-F	OUT BASE +3.15	Bit 7 of D2	Y+8F	IN4F	DCNT (Start signal check)
RWW3-0 ~ 3-6	OUT BASE +4.0 ~ 4.6	Bit 0 of D1 ~ Bit 6 of D1	Y+90 ~ Y+96	IN50 ~ 56	PNCMD0 ~ PNCMD6 (Point command)
RWW3-7	OUT BASE +4.7	Bit 7 of D1	Y+97	IN57	Undefined
RWW3-8	OUT BASE +4.8	Bit 0 of D0	Y+98	IN58	MPGM0 (MPG/step scale factor)
RWW3-9	OUT BASE +4.9	Bit 1 of D0	Y+99	IN59	MPGM1 (MPG/step scale factor)
RWW3-A	OUT BASE +4.10	Bit 2 of D0	Y+9A	IN5A	CCD0 (4-step current limit selection)
RWW3-B	OUT BASE +4.11	Bit 3 of D0	Y+9B	IN5B	CCD1 (4-step current limit selection)
RWW3-C	OUT BASE +4.12	Bit 4 of D0	Y+9C	IN5C	ACSEL0 (4-step acceleration/deceleration time selection)
RWW3-D	OUT BASE +4.13	Bit 5 of D0	Y+9D	IN5D	ACSEL1 (4-step acceleration/deceleration time selection)
RWW3-E	OUT BASE +4.14	Bit 6 of D0	Y+9E	IN5E	RPAMOD (Parameter change mode)
RWW3-F	OUT BASE +4.15	Bit 7 of D0	Y+9F	IN5F	RPASTB (Parameter change strobe)
RX00	IN BASE +0.0	Bit 0 of D9'	X+0	OUT10	SST (Servo normal output)
RX01	IN BASE +0.1	Bit 1 of D9'	X+1	OUT11	SRDY (Servo ready)
RX02	IN BASE +0.2	Bit 2 of D9'	X+2	OUT12	GRUN (During servo lock)
RX03	IN BASE +0.3	Bit 3 of D9'	X+3	OUT13	MZM (During home point saving)
RX04	IN BASE +0.4	Bit 4 of D9'	X+4	OUT14	HOME (During home point stop)
RX05	IN BASE +0.5	Bit 5 of D9'	X+5	OUT15	DEN (Operation finish)
RX06	IN BASE +0.6	Bit 6 of D9'	X+6	OUT16	INP (In-position)
RX07	IN BASE +0.7	Bit 7 of D9'	X+7	OUT17	AFSTP (During feed hold) /CLA (During current limit)
RX08	IN BASE +0.8	Bit 0 of D8'	X+8	OUT18	LSALM (LS alarm)
RX09	IN BASE +0.9	Bit 1 of D8'	X+9	OUT19	TENBL (Teaching permit)
RX0A	IN BASE +0.10	Bit 2 of D8'	X+A	OUT1A	BLV (Battery voltage drop)
RX0B	IN BASE +0.11	Bit 3 of D8'	X+B	OUT1B	WARN (Warning)
RX0C	IN BASE +0.12	Bit 4 of D8'	X+C	OUT1C	POK (Positioning OK)
RX0D	IN BASE +0.13	Bit 5 of D8'	X+D	OUT1D	MFEED (Revolution speed monitor)
RX0E	IN BASE +0.14	Bit 6 of D8'	X+E	OUT1E	MCURR (Current monitor)
RX0F	IN BASE +0.15	Bit 7 of D8'	X+F	OUT1F	SSTP (During error stop)
RWR0-0 ~ 1-F	IN BASE +1.0 ~ +2.15	Bit 0 of D7' ~ Bit 7 of D4'	X+10 ~ X+2F	OUT20 ~ 3F	POSI0 ~ POSI31 (Present value)
RWR2-0 ~ 2-F	IN BASE +3.0 ~ +3.15	Bit 0 of D3' ~ Bit 7 of D2'	X+30 ~ X+3F	OUT40 ~ 4F	FEED0/CURR0 ~ 15/15 (Revolution speed / Current)
RWR3-0 ~ 3-6	IN BASE +4.0 ~ +4.6	Bit 0 of D1' ~ Bit 6 of D1'	X+40 ~ X+46	OUT50 ~ 56	PN0 ~ PN6 (Point number)
RWR3-7	IN BASE +4.7	Bit 7 of D1'	X+47	OUT57	RPAFIN (Reply to parameter change)
RWR3-8 ~ 3-F	IN BASE +4.8 ~ +4.15	Bit 0 of D0' ~ Bit 7 of D0'	X+48 ~ X+4F	OUT58 ~ 5F	MIN0 ~ MIN7 (IN□ Input monitor)

Main Circuit

Example of main circuit connection

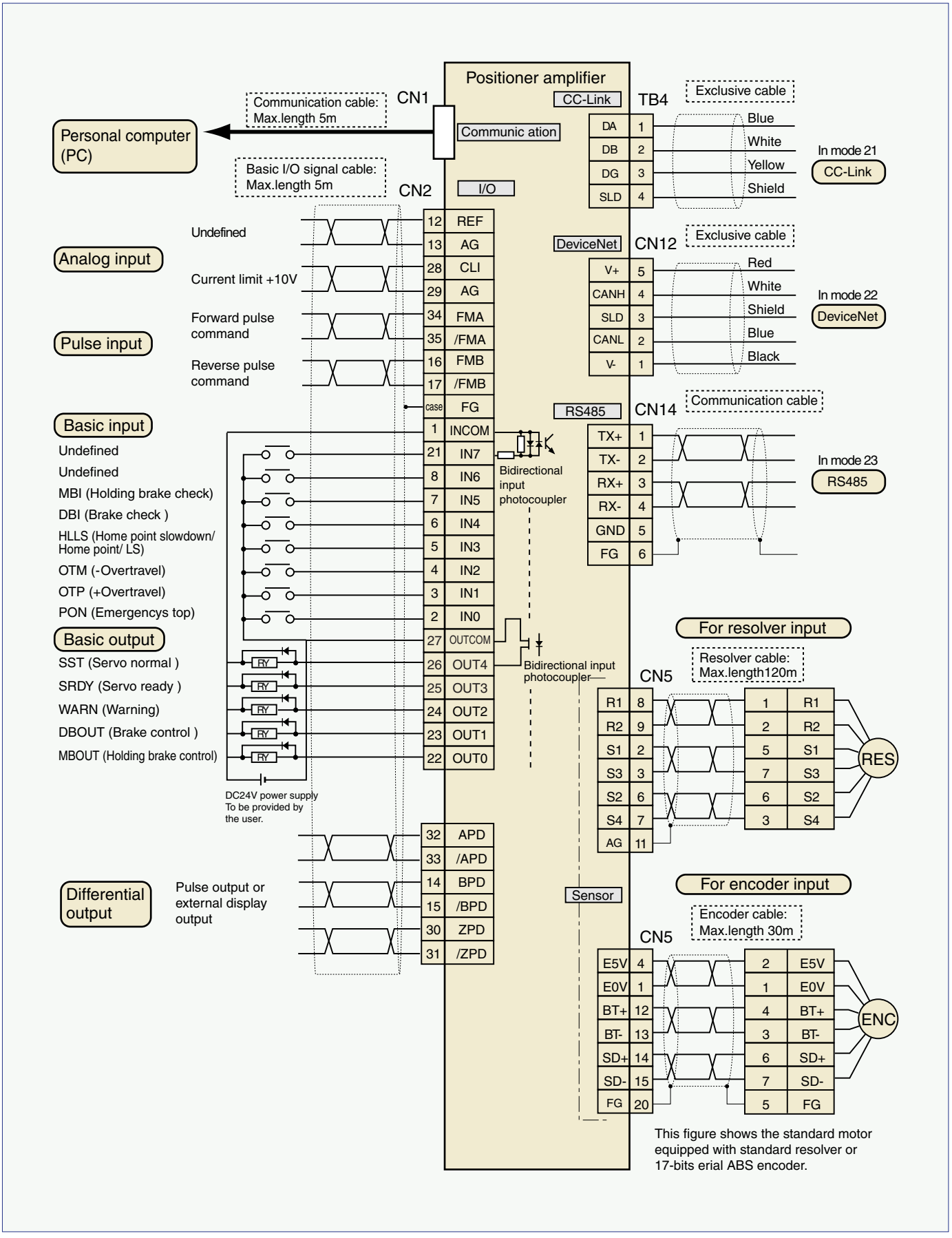
To assure the safety of the servo system, single operation sequences and joint operation sequence of holding and dynamic brakes are provided. The control power is separated from the main circuit power, and only the main circuit can be blocked by PON signal.



*For 200P, connectors CN6, CN7 and CN8 are TB1, TB2 and TB3 terminal blocks, respectively.

Example of control circuit connection

As bidirectional photocouplers are used for the sequence I/O interface, both sink ("-" common) connection and source ("+" common) connection are possible. Connection with various FA controllers is also possible through various networks.



Servo specifications

The NCBOY-80 incorporates a servo amplifier. It is wiring-saving and space-saving, and maintenance is very easy because the main circuit power is supplied separately from the control power source. The brake circuit is designed for both holding brake and dynamic brake, and joint use of them is also possible. The tuning function is provided. Parameter setting is very easy by using the personal computer tool.

Type of amplifier		008P2	012P2	025P2	035P3	070P3	100P3	200P3	320P3	500P3	400P4
Control system		PWM, 3-phase sine-wave									
Main circuit	Master power voltage	Single phase AC200 ~ 230 V -15 % ~ +10 % 50/60 Hz			Three-phase AC200 ~ 230 V -15 % ~ +10 % 50/60 Hz						Three-phase (neutral point grounding) AC380 ~ 460 V -15 % ~ +10 % 50/60 Hz
	Power capacity	250VA	1.2kVA	1.7kVA	2.6kVA	5.4kVA	8.0kVA	18kVA	35kVA	59kVA	83kVA
Control circuit	Master power voltage	Single phase AC200 ~ 230 V -15% ~ +10% 50/60Hz			Single phase AC200 ~ 230 V -15 % ~ +10 % 50/60Hz						
	Power capacity	50VA	50VA	50VA	65VA	80VA	80VA	100VA	150VA	150VA	350VA
Max. motor combination		200W	500W	1kW	1.5kW	3.4kW	5.0kW	11kW	20kW	33kW	55kW
Continuous output current		2.2A(rms)	3.4A(rms)	5.7A(rms)	8.3A(rms)	18.4A(rms)	28.3A(rms)	56.6A(rms)	99A(rms)	166A(rms)	134 A(rms)
Instantaneous max. current		5.7A(rms)	8.5A(rms)	17.7A(rms)	25.0A(rms)	49.5A(rms)	71.0A(rms)	141A(rms)	226A(rms)	353A(rms)	283 A(rms)
Speed position sensor		Resolver or 17-bit serial encoder (Both resolver and encoder can have absolute specifications.)									
Range of speed control		1:5000 (Ratio of lower limit speed and rated speed, which allows output of motor rated current.)									
Speed fluctuation ratio		±0.02 % or less under load of 0 ~ 100 % or at power of -15 ~ 10 %. ±0.2 % or less at temperature of 0 ~ 55℃ (The specified values are obtainable at rated speed.)									
Heat loss	Main circuit	15W	22W	39W	58W	98W	178W	310W	720W	1200W	1900W
	Control circuit	20W	20W	20W	26W	32W	32W	40W	50W	50W	140W
Reverse-current absorption resistor capacity		20W	20W	30W	60W	80W	100W	180W	Changes with external resistor capacity.		
Mass (standard)		1.3kg	1.3kg	2.3kg	2.4kg	4.5kg	7kg	12kg	31kg	63kg	120kg
Outer dimensions (W*H*D)		65*170*150	65*170*150	110*170*180	110*170*180	110*250*180	130*307*197	220*410*230	350*500*315	585*500*353	670*710*410
DIO specification	24V input	DC24V, 6 mA, 32 numbers (8<CN2>+24<CN10>) Both sink ("-" common) connection and source ("+" common) connection are possible.									
	24V output	DC24V, 50 mA, 13 numbers (5<CN2>+8<CN10>) Both sink ("-" common) connection and source ("+" common) connection are possible.									
CC-Link specification	CC-Link communication	Remote device station									
	24V input	DC24V, 6 mA, 8 numbers <CN2> Both sink ("-" common) connection and source ("+" common) connection are possible.									
	24V output	DC24V, 50 mA, 5 numbers <CN2> Both sink ("-" common) connection and source ("+" common) connection are possible.									
Device Net specification	DeviceNet communication	Multi-number slave station									
	24V input	DC24V, 6 mA, 8 numbers <CN2> Both sink ("-" common) connection and source ("+" common) connection are possible.									
	24V output	DC24V, 50 mA, 5 numbers <CN2> Both sink ("-" common) connection and source ("+" common) connection are possible.									
RS485 specification	RS485 communication	VLBus-A protocol (slave station), TCD protocol (slave station)									
	24V input	DC24V, 6 mA, 8 numbers <CN2> Both sink ("-" common) connection and source ("+" common) connection are possible.									
	24V output	DC24V, 50 mA, 5 numbers <CN2> Both sink ("-" common) connection and source ("+" common) connection are possible.									
Current limit		DC0 ~ ±10V; Maximum motor Torque at ±10V (Setting of ratio is possible.) Input resistance 49 kΩ, AD resolution 12-bit									
Position control	Split count	Resolver 24,000 P/rev, encoder 131,072 P/rev (Travel distance per pulse can be set by 65535/65535.)									
	Command type	Forward/reverse pulse (Phase A/phase B pulse and forward/reverse signal/feed pulse are also permitted.) DC3.5 V ~ 5.5 V, 11 mA photo coupler input, frequency 500 kHz (max.)									
Pulse output	Split count	Resolver 24,000 P/rev, encoder 131,072 P/rev (Travel distance per pulse can be set by 65535/65535.)									
	Output type	Phase A/phase B pulse (forward/reverse pulse), Vout: 3 V (typ) 20 mA (max.), output equivalent to AM26LS31, frequency 500 kHz (max.)									
Acceleration/ deceleration	Soft start	Acceleration/deceleration time can be set separately for the speed command. Linear acceleration/deceleration in the range of 0.000 ~ 65.535 s in increments of 0.001 s.									
	S-type acceleration/deceleration	Acceleration/deceleration time can be specified for speed command or pulse command. S-type acceleration/deceleration in the range of 0.000 ~ 65.535 s in increments of 0.001 s.									
Monitor function	Monitor output	Speed or current monitor, 0 ~ ±10 V, output resistance 330 Ω (protection against short-circuit), DA resolution 12-bit (Option)									
	Display	LED 5-digit (Various monitor display, check, adjustment and parameter setting are possible.) (option)									
	External display	DPA-80 (extra price) can be connected. (Monitor of speed, current, present value, electronic thermal, etc., is possible.)									
Auto tuning function		Auto gain setting by repeated tuning operation.									
Protection function		Overcurrent, overvoltage, voltage drop, motor overload (electronic thermal, instant thermal), fin overheat, reverse-current resistor overload, resolver breakage, encoder breakage, etc.									
General specifications	Operating environment	Temperature: 0 ~ 55℃(non-freezing), humidity: 10 ~ 90 %RH (non-condensing) Atmosphere: Neither dust, metal chip or corrosive gas is included. Altitude for installation: 1,000 m or less									
	Vibration resistance (*1)	Pursuant to IEC60068-2-6. Frequency: 10 ~ 57 Hz, single amplitude: 0.075 m Frequency: 57 ~ 150 Hz, acceleration 9.8 m/s2							–		
	Storing environment	Temperature: -10 ~ 70℃ (non-freezing), humidity: 10 ~ 90 %RH (non-condensing) Atmosphere: Neither dust, metal chip or corrosive gas is included.									
	Protective structure	IP10									
	Division of overvoltage	Category II									
	Protective insulation	Protective insulation is done for all interfaces (CN1, CN2, CN5, CN9) from the primary power supply.									

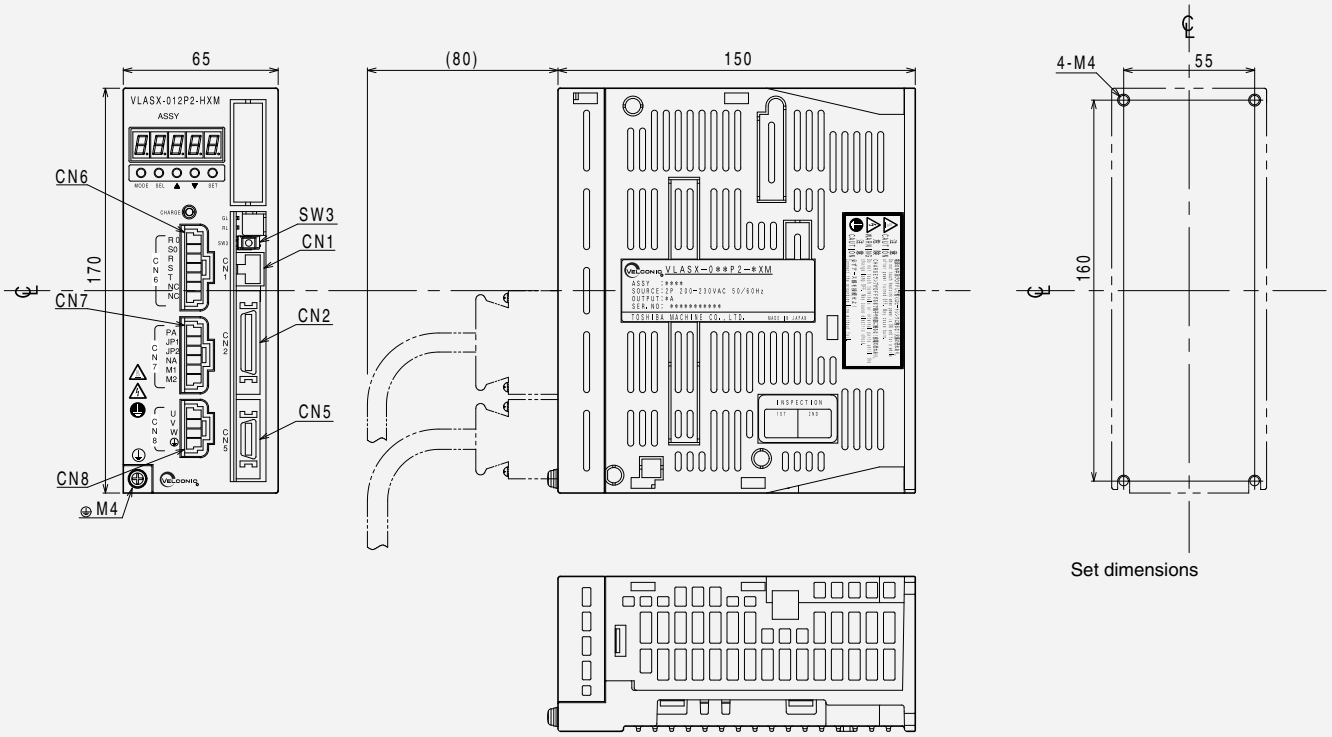
*1: Normal amplifier operation is already verified under these conditions.

For your order entry

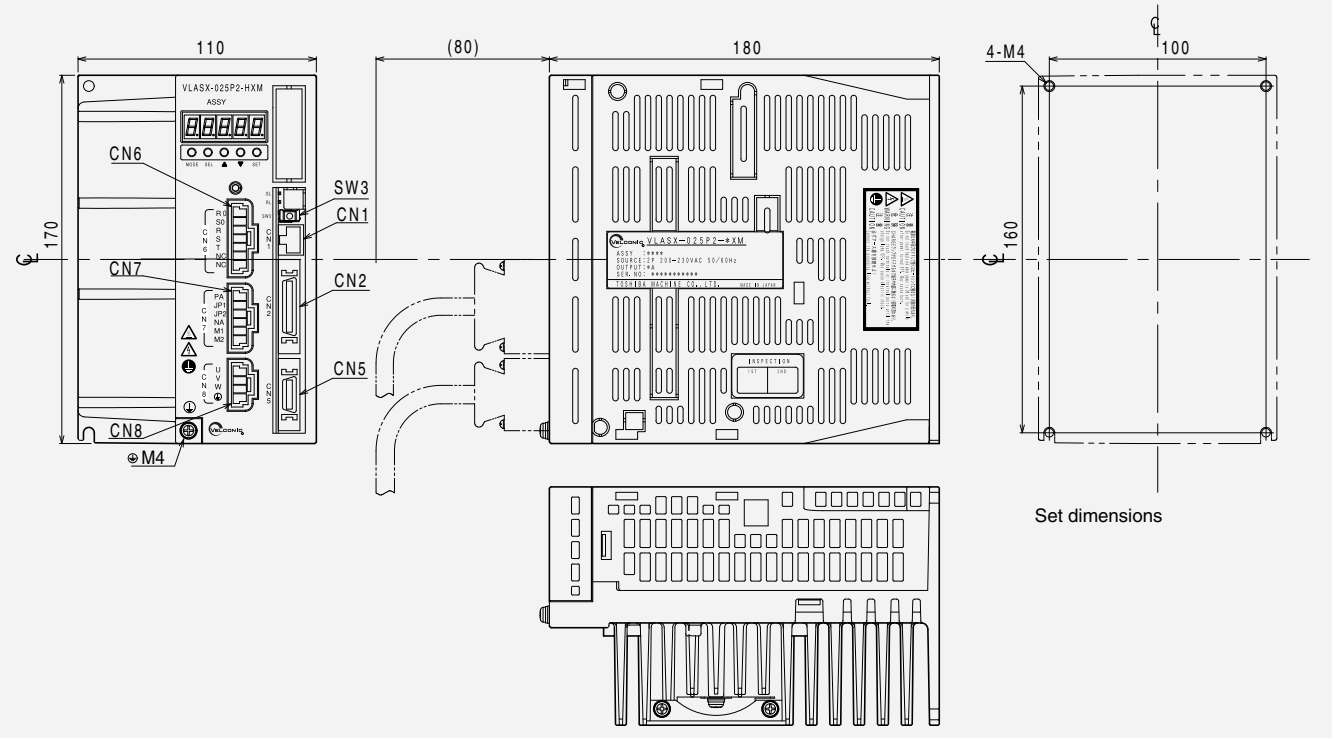
Model	DIO specification	VLPSX-_ _ _ P_ - _ B _ ASSY			
	CC-Link specification	VLPSX-_ _ _ P_ - _ C _ ASSY			
	DeviceNet specification	VLPSX-_ _ _ P_ - _ D _ ASSY			
	RS485 specification	VLPSX-_ _ _ P_ - _ R _ ASSY			
Part	Name		Type	Power specification	Q'ty
Main body (amplifier)	NCBOY-80		VLPSX-008P2	Single phase, AC200 V	
			VLPSX-012P2	Single phase, AC200 V	
			VLPSX-025P2	Single phase, AC200 V	
			VLPSX-035P3	Three-phase, AC200 V	
			VLPSX-070P3	Three-phase, AC200 V	
			VLPSX-100P3	Three-phase, AC200 V	
			VLPSX-200P3	Three-phase, AC200 V	
			VLPSX-320P3	Three-phase, AC200 V	
			VLPSX-500P3	Three-phase, AC200 V	
			VLPSX-400P4	Three-phase, AC400 V	
Sensor	H: Resolver (20 kHz), S: Encoder, A: Resolver ABS				
Option board	CC-Link board: W1XO DeviceNet board: W2XO DIO board: W3XO RS485 board: W4XO				
HMI option	With HMI (Display/operation unit)	VLPSX-_ _ _ P_ -_ _ M			
	Without HMI (Display/operation unit)	VLPSX-_ _ _ P_ -_ _ X			
Amplifier cable	RS232C conversion connector	CN1	CV01C	To be connected with commercially available LAN cable.	
	RS232C conversion connector cable	(Recom-mended)	NWNMC5E-STN-SSMB-BL-3 (made by Misumi; 3 m-long)	Category 5 or over, with shield/straight	
	I/O standard cable	CN2	CV02C-_ _ _A, B	Standard length: 1, 3 m	
	Standard resolver cable	CN5	CV05G-_ _ _A, B, C, Z	Standard length: 3, 5, 10 m	
	V ZA motor resolver cable		CV05H-_ _ _A, B, C, Z	Standard length: 3, 5, 10 m	
	Standard serial ABS cable		CV05D-_ _ _A, B, C, Z	Standard length: 3, 5, 10 m	
	V ZA motor serial ABS cable		CV05E-_ _ _A, B, C, Z	Standard length: 3, 5, 10 m	
	Single phase power cable	CN6	CV06A-_ _ _B	Standard length: 1, 3, 5 m	
	3-phase power cable		CV06B-_ _ _B	Standard length: 1, 3, 5 m	
	Internal reverse-current absorption resistor MC cable	CN7	CV07A-_ _ _B	Standard length: 1, 3, 5 m	
	External reverse-current absorption resistor MC cable		CV07B-_ _ _B	Standard length: 1, 3, 5 m	
	V ZA motor armature cable	CN8	CV08A-_ _ _A, B, C, Z	Standard length: 3, 5, 10 m	
	V ZA motor armature cable for motor with brake		CV08B-_ _ _A, B, C, Z	Standard length: 3, 5, 10 m	
	Standard 130-sq. armature cable		CV08C-_ _ _A, B, C, Z	Standard length: 3, 5, 10 m	
	Standard 130-sq. armature cable for motor with brake		CV08D-_ _ _A, B, C, Z	Standard length: 3, 5, 10 m	
Connector	Power connector for 070P	CN6	EC762VNM-07P		
	MC connector for 070P	CN7	EC762VNM-06P		
	Armature connector for 070P	CN8	EC762VNM-04P		
Option board cable	DIO I/O signal cable	CN10	CV21A-_ _ _B	Standard length: 3, 5 m	
	CC-Link cable	TB4	CV11A-_ _ _Z	Standard length: 5, 10 m, etc.	
	DeviceNet cable	CN12	CV12A-_ _ _Z	Standard length: 5, 10 m, etc.	
	RS485 cable	CN14	CV14A-_ _ _Z	Standard length: 5, 10 m, etc.	
Option board connector	DeviceNet connector	CN12	MSTB 2.5/5-STF-5.08AUM		
	RS485 connector	CN14	EC381VM-06P		
Peripheral equipment	Absolute position storing (ABS) battery	CN9	LRV03 (with 0.5 m-long battery cable. Battery change is possible.)		
	Absolute position storing (ABS) battery	CN9	BTT06 (Battery cable is available for an extra price. Battery change is not possible.)		
	BTT06 battery cable	CN9	CV09A-500A	Standard length 0.5 m	
	External display unit	CN2	DPA-80		
	External reverse-current absorption resistor	CN7,TB2	RGH60A-100 Ω		
	External reverse-current absorption resistor	CN7,TB2	RGH200A-30 Ω		
	External reverse-current absorption resistor	CN7,TB2	RGH400A-30 Ω		
	External reverse-current absorption resistor	TB2	GRZG400 3R0K (3Ω)		
	Brake power 15 W	—	P15E-24-N		
	Brake power 30 W	—	P30E-24-N		
	Brake power 50 W	—	P50E-24-N		
	ACL/DCL	—	To be selected by motor output. (See the appropriate engineering handbook.)		
	Noise filter	—	To be selected by motor output. (See the appropriate engineering handbook.)		
Option board peripheral equipment	CC-Link terminator	TB4	110 Ω 1/2W ±5%		
	DeviceNet terminator	CN12	121 Ω 1/4W ±1%		
	RS485 terminator	CN14	180 Ω 1/2W ±5%		
Software	VELWIN	—	VELWIN		

External View

VLASX (VLPSX)-008P2·012P2

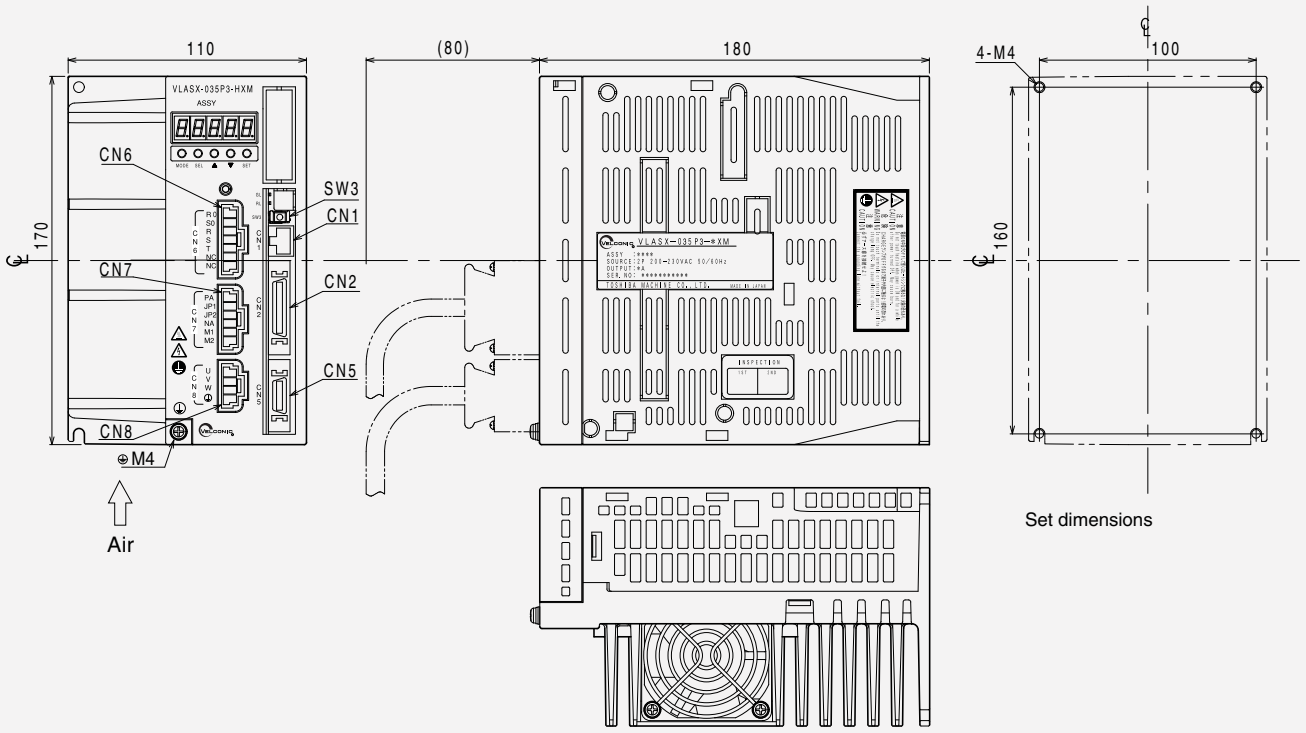


VLASX (VLPSX)-025P2

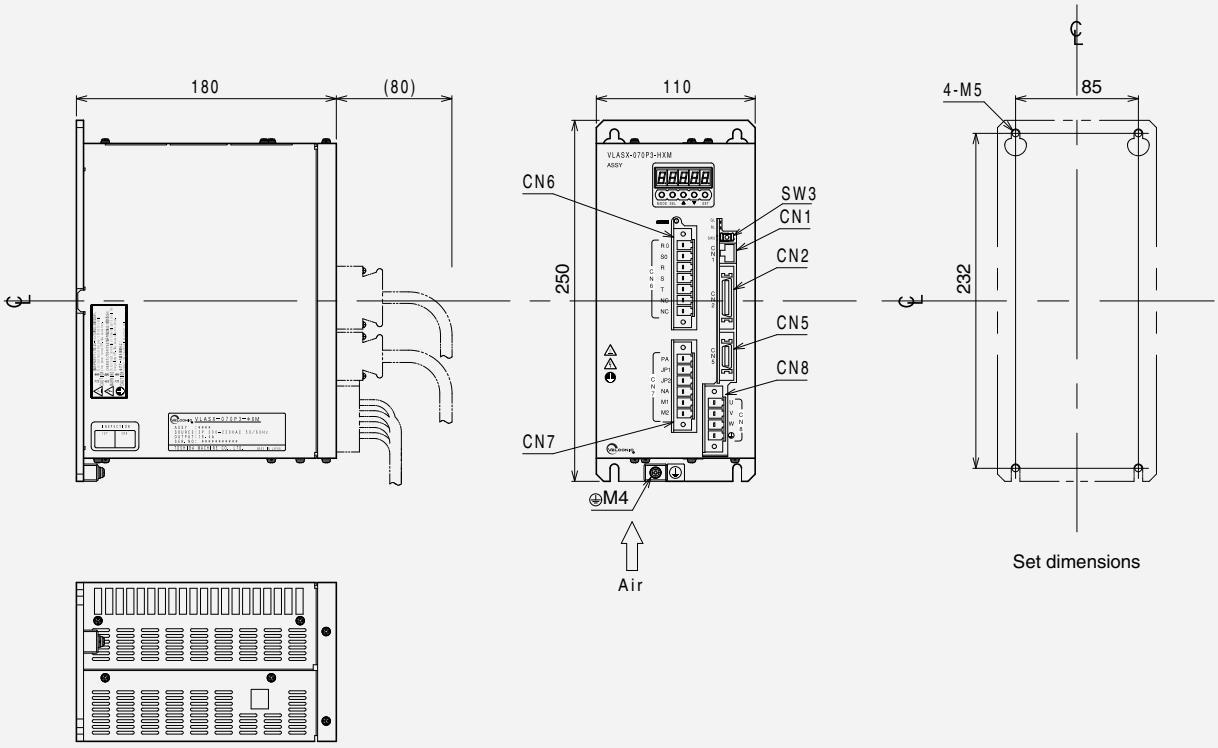


External View

VLASX (VLPSX)-035P3

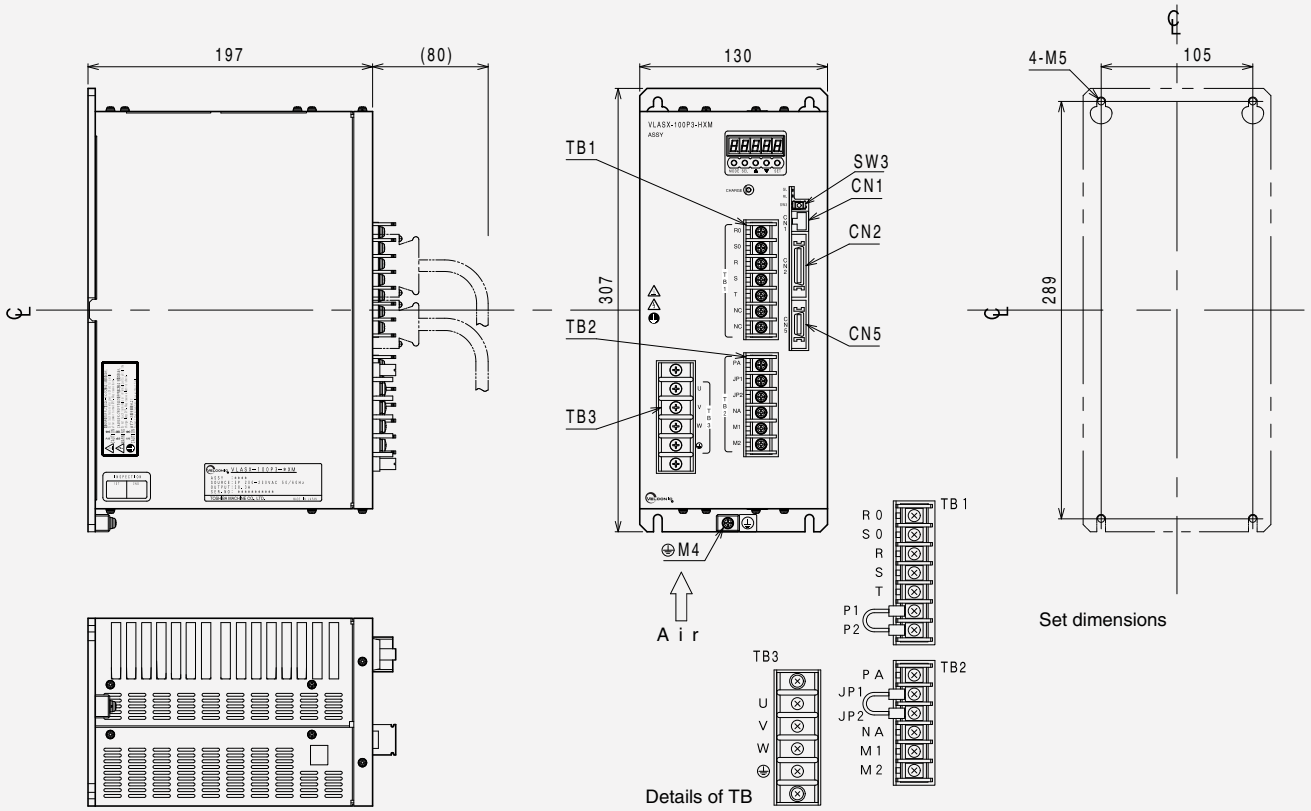


VLASX (VLPSX)-070P3

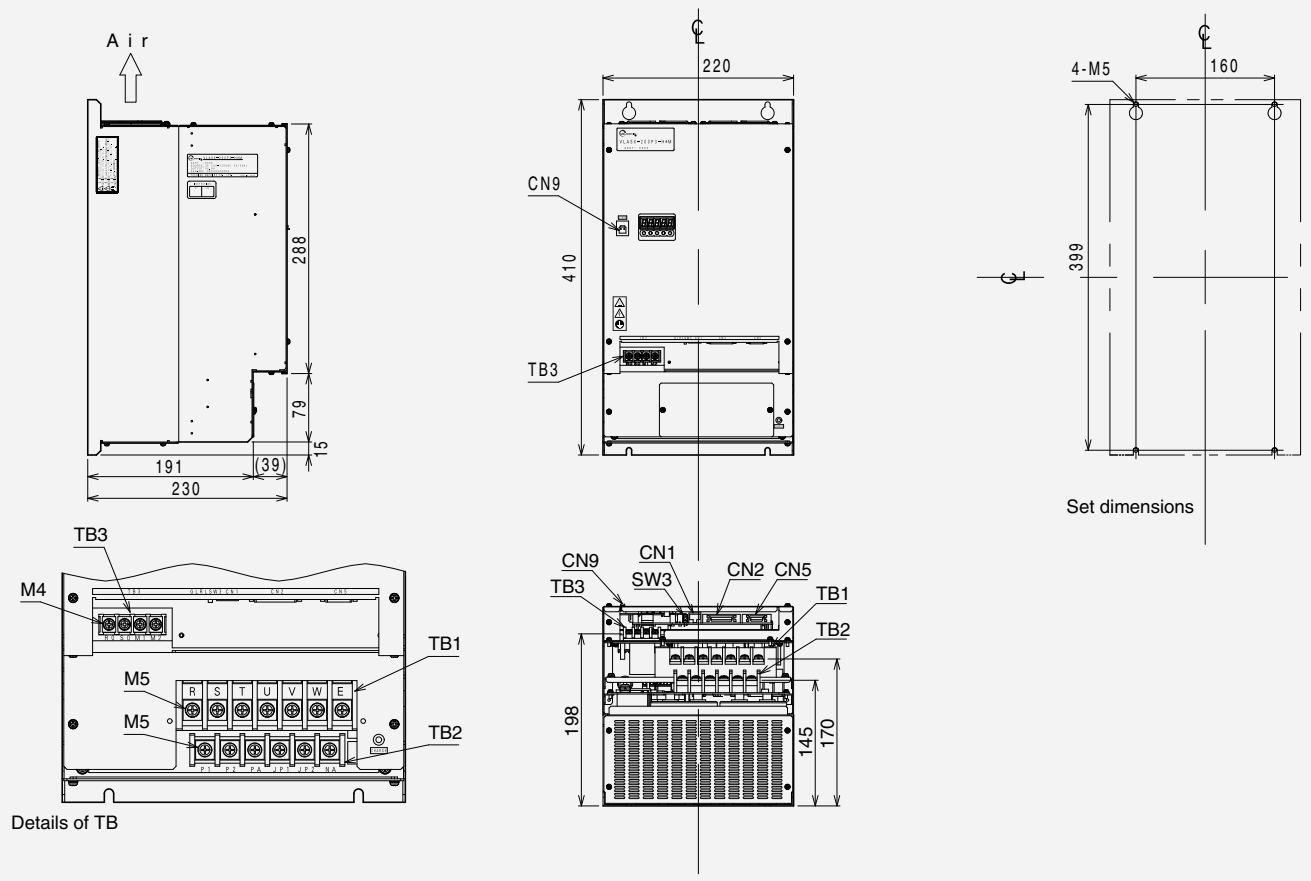


External View

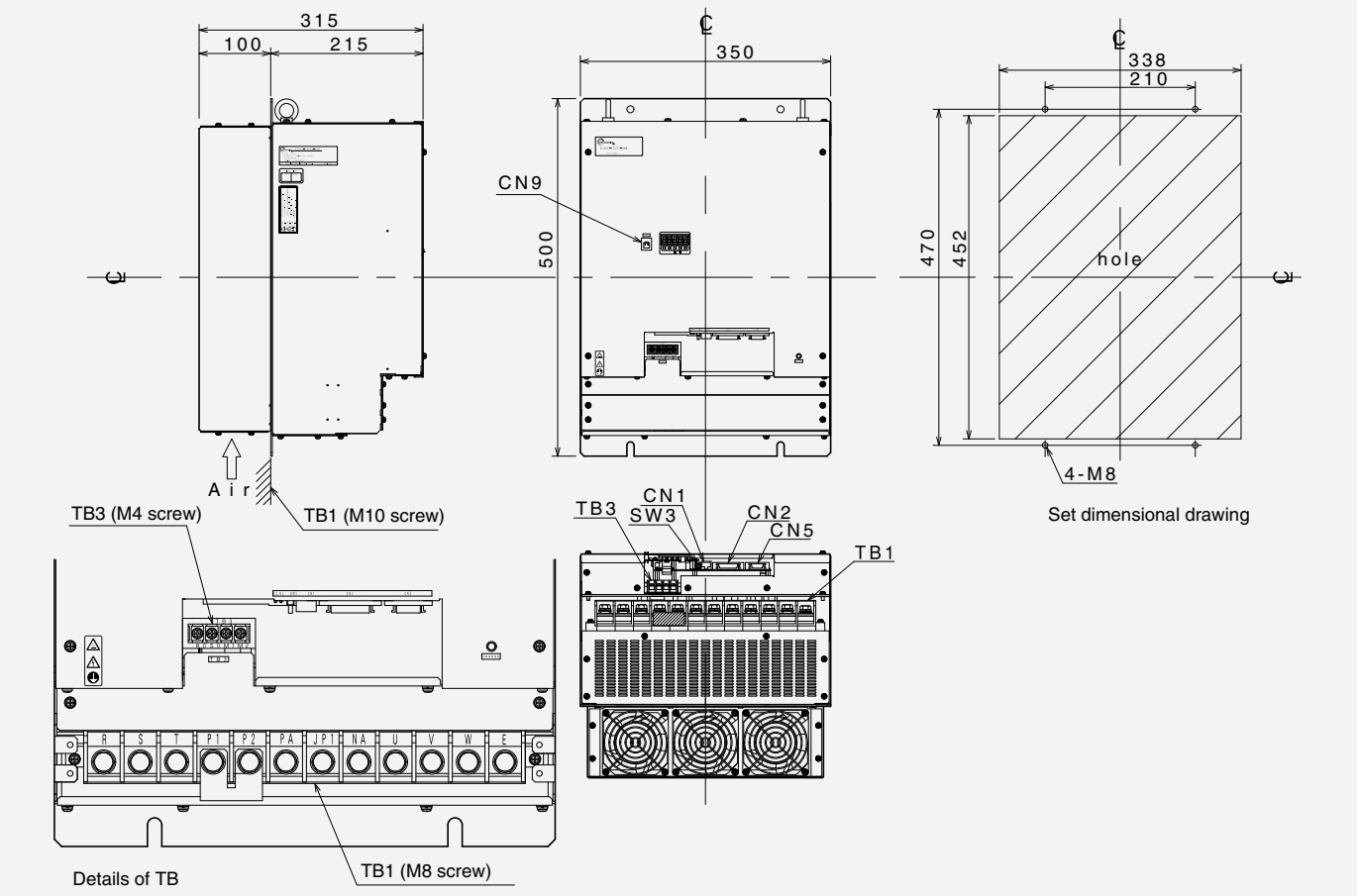
VLASX (VLPSX)-100P3



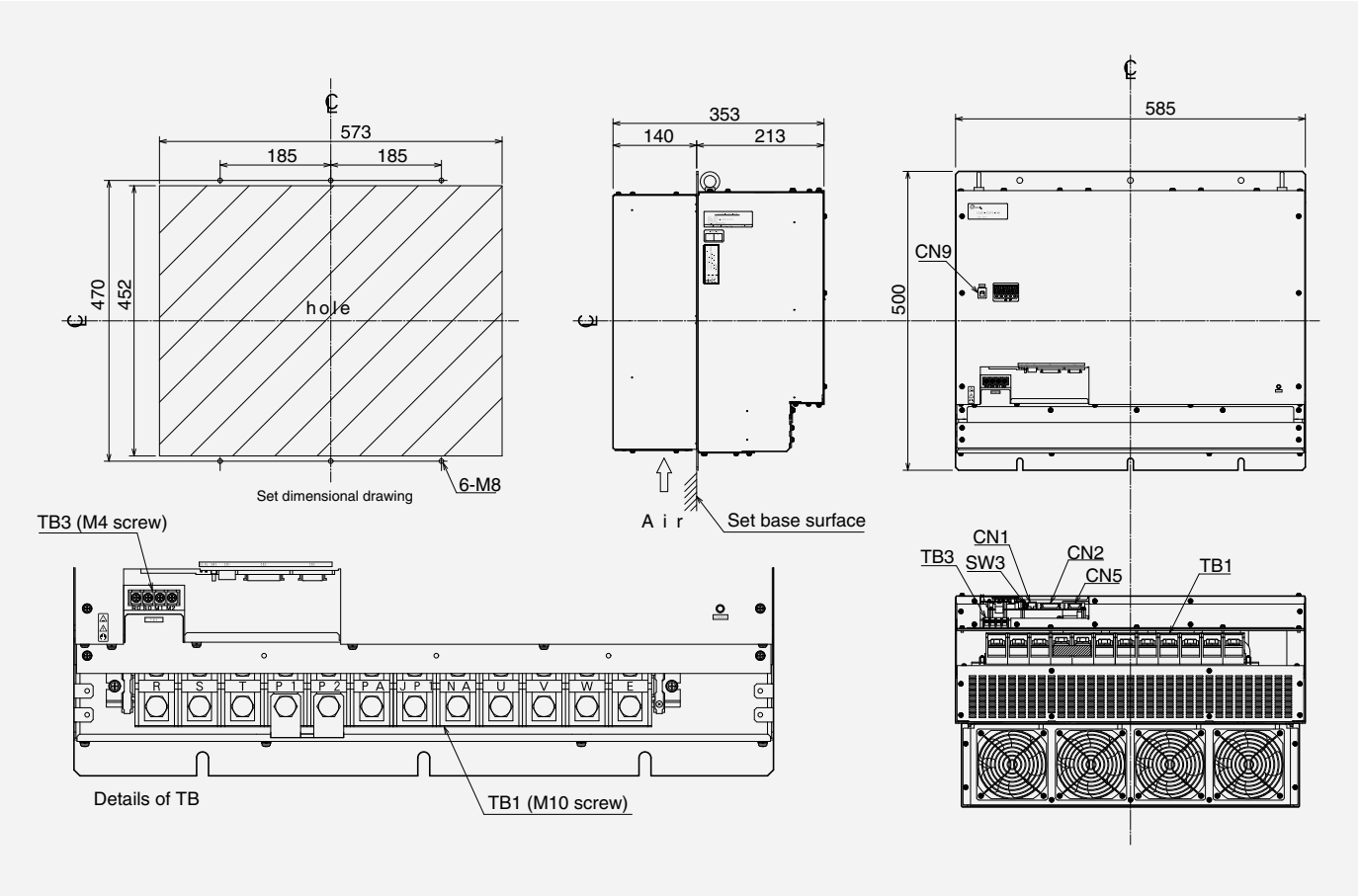
VLASX (VLPSX)-200P3



VLASX (VLPSX)-320P3

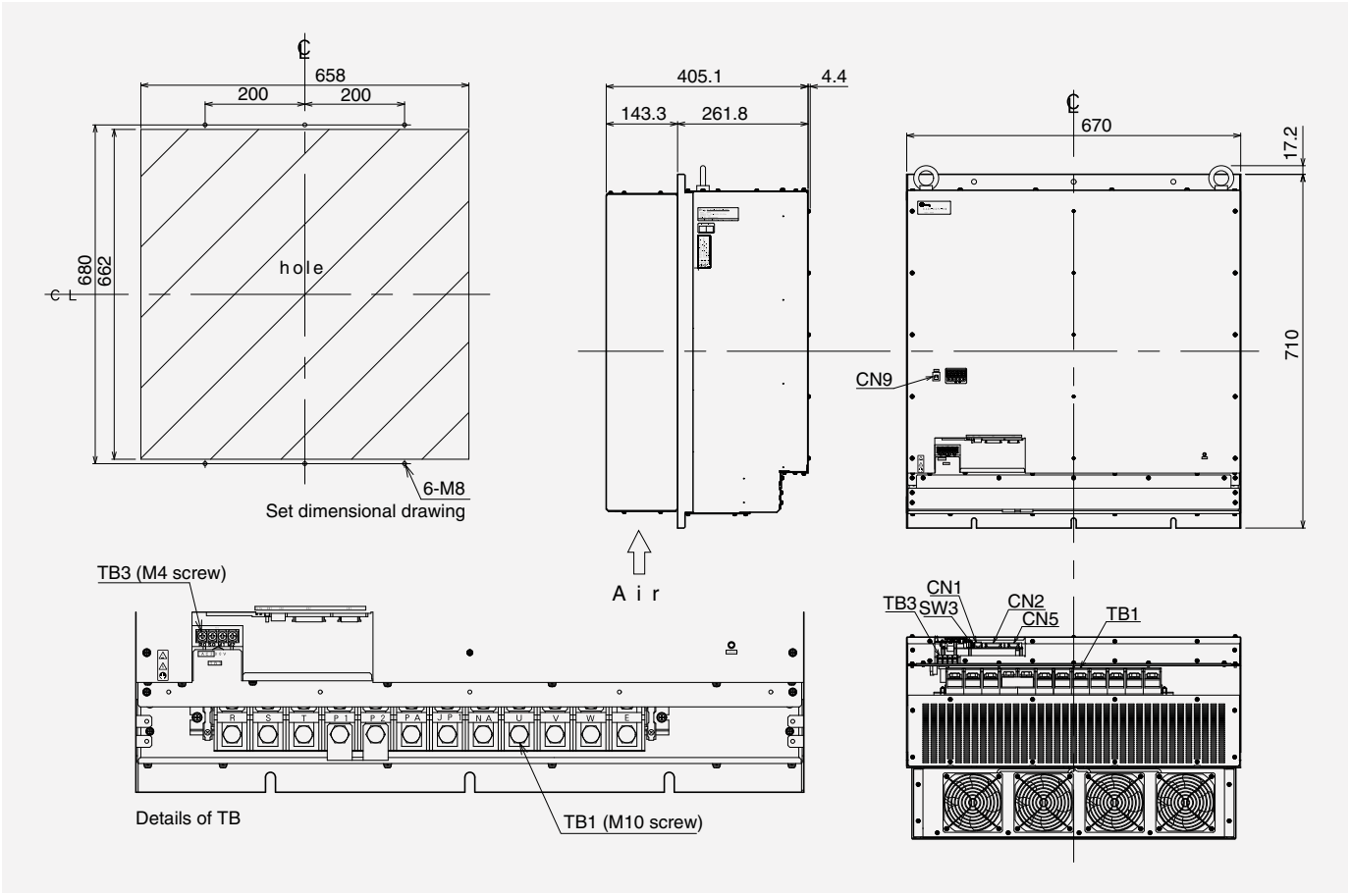


VLASX (VLPSX)-500P3



External View

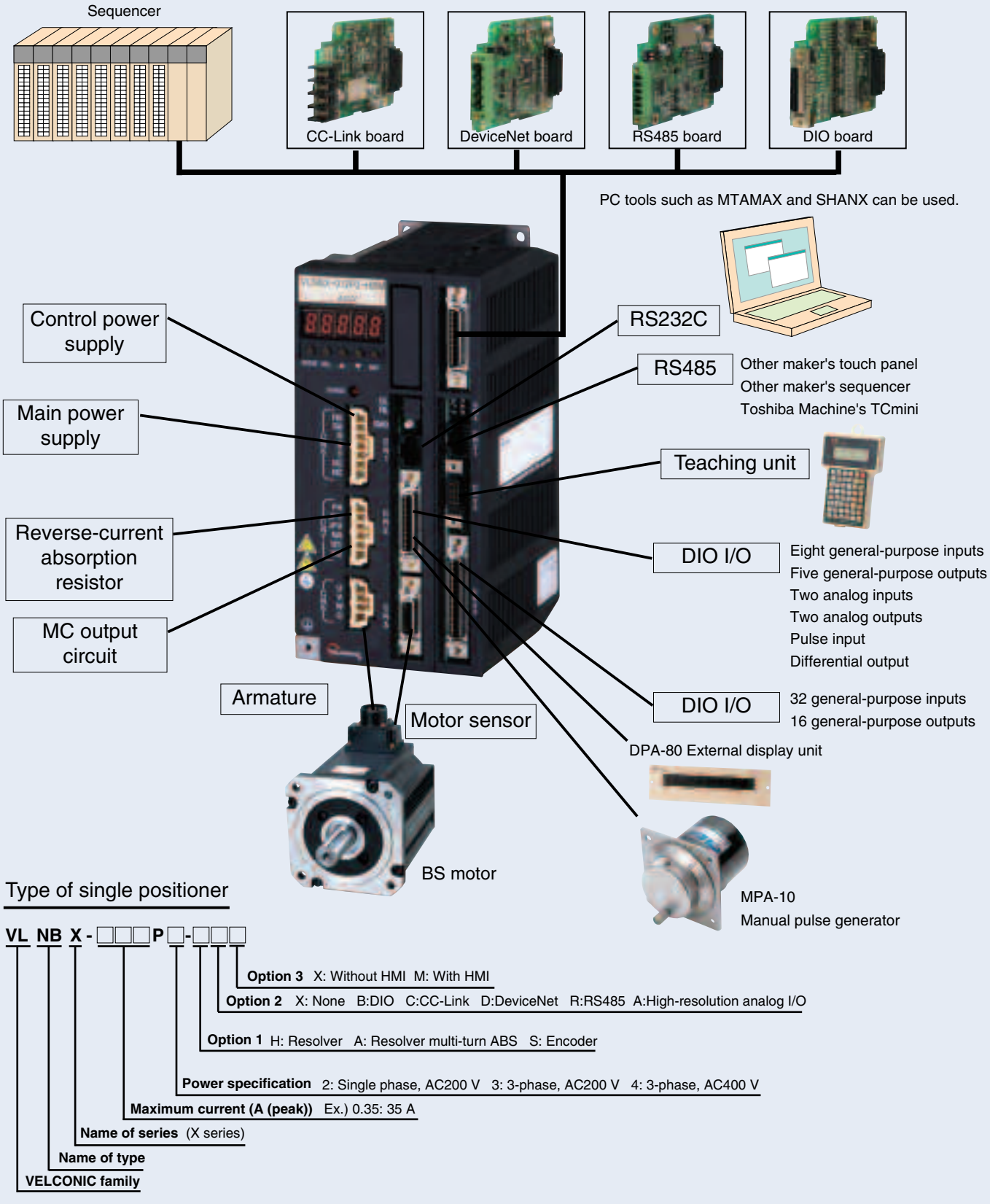
VLASX (VLPSX)-400P4



High-Performance Positioner Amplifier Integrated with Servo Amplifier

Single Positioner (NCBOY-120)

NCBOY-120 is the compact positioner amplifier with NC commands, sequence commands, multi-task function, etc. incorporated in the servo amplifier. Diversified operations such as cam operation (timer synchronization, master synchronization), pulse synchronization and position/speed/current mode changeover are possible. The teaching function is also available.



Type of single positioner

VL NB X - □□□P □ - □□□

- **VELCONIC family**
- **Name of type**
- **Name of series** (X series)
- **Maximum current (A (peak))** Ex.) 0.35: 35 A
- **Power specification** 2: Single phase, AC200 V 3: 3-phase, AC200 V 4: 3-phase, AC400 V
- **Option 1** H: Resolver A: Resolver multi-turn ABS S: Encoder
- **Option 2** X: None B:DIO C:CC-Link D:DeviceNet R:RS485 A:High-resolution analog I/O
- **Option 3** X: Without HMI M: With HMI