



HCFA Comprehensive system

To build the best drive control system, HCFA will provide the servo drive, motor, programmable controller, touch screen and advanced solutions for customer.

HMI



HMI TP25XX

PLC

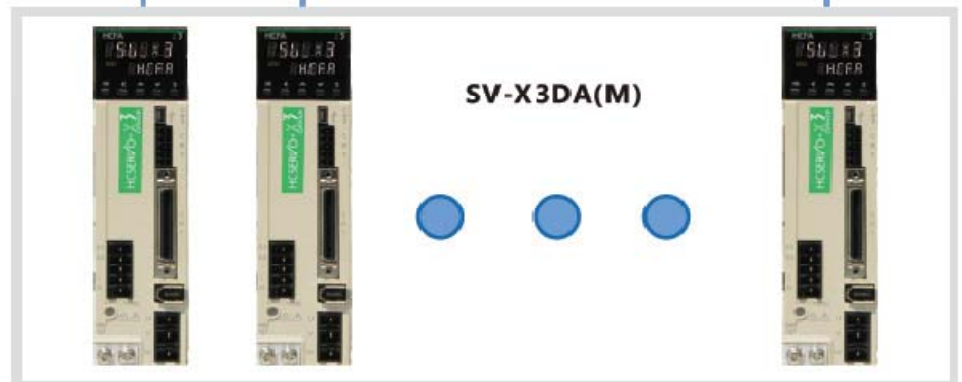


PLC + Module m-net
 A8/A8C/A2/A2C/LX1N
Internet M-NET
 Single internet 64 axes
 2 axis linear circular interpolation
 synchronous---

Pulse

Pulse input

Servo motor



SV-X3DA(M)

Motor series

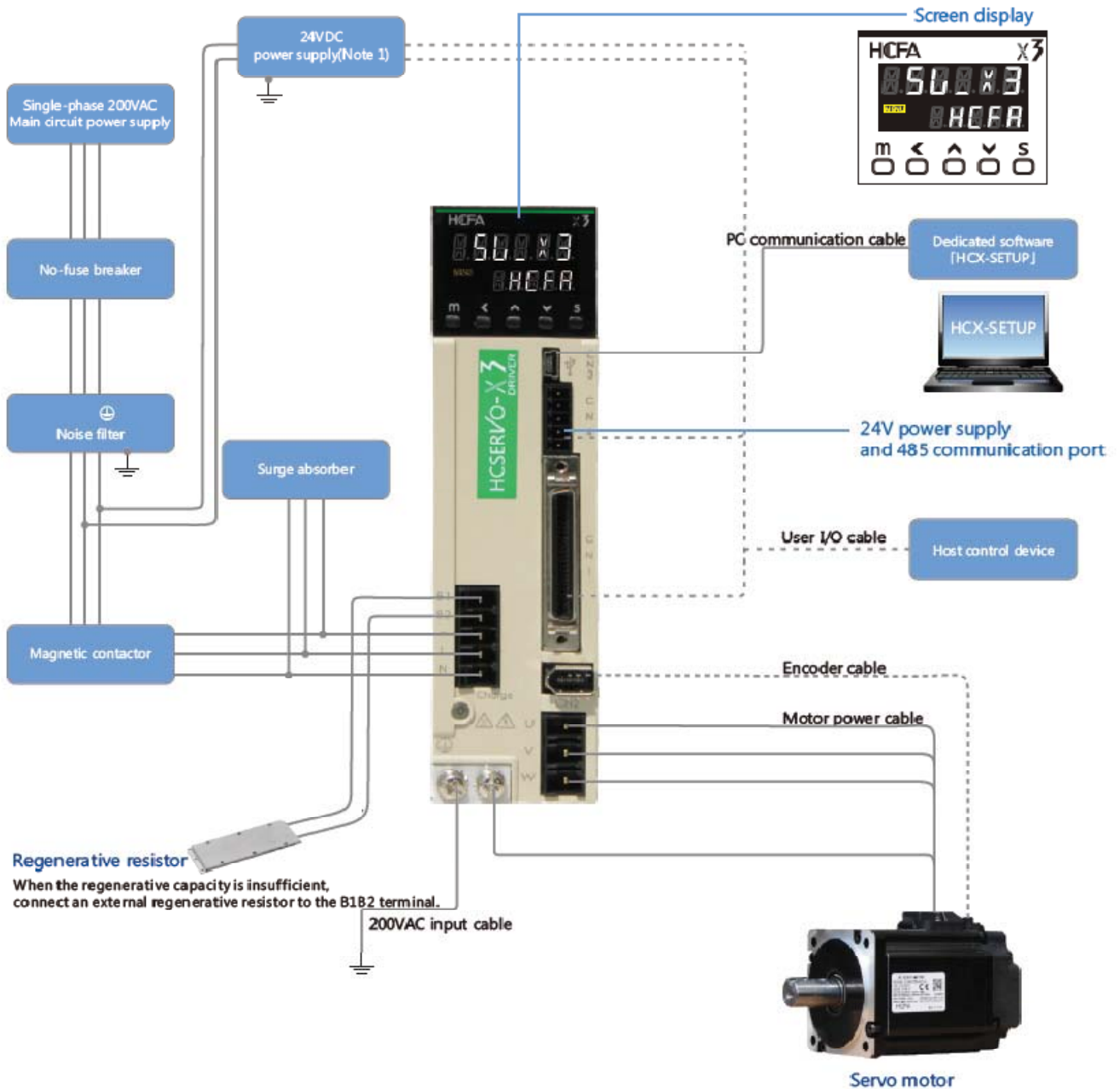
50 ~ 100 middle inertia

400 ~ 700 middle inertia

1 ~ 2KW middle inertia



Wiring Diagram for X3 Series



***Note 1)** The control power for models of 750W or less is supplied from external 24VDC. For 1kW or more, is supplied from internal.

[Points for Correct Wiring]

- ※24VDC power supply and 200VAC input power(main circuit) should be wiring from the same 200VAC ma in circuit power supply.
- ※No switch between 24VDC power supply and drives. If the switch needed, connect it to the 200V AC cable as the 24V DC input power supply.
- ※A twisted shielded cable should be used when I/O communication cable, between upper control device and drive, is over 50cm.
- ※The encoder cable should be less than 20m when wiring.



SV-X3 Series Drive

Servo drive with setting panel has been designed and developed to take up the least space in the industry of servo.

Independent command response and disturbance compensation are realized by model match observation and feedforward.



200W or less



1KW or more



400W-750W

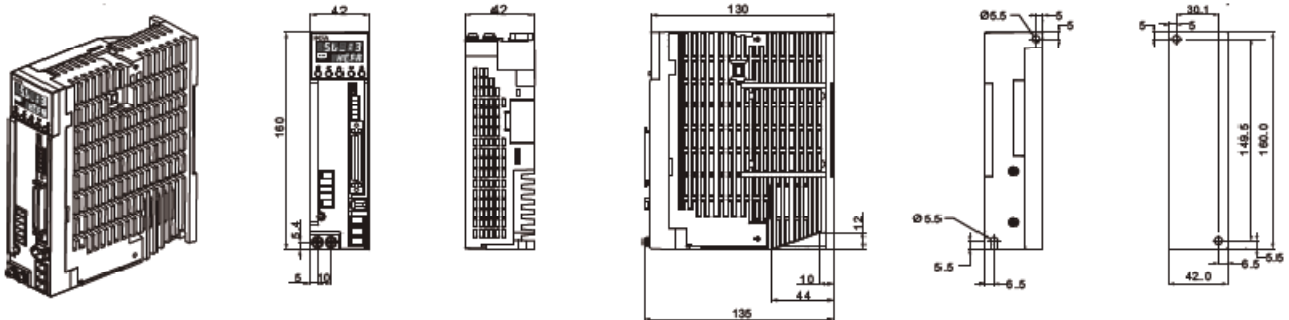
The servo drive take up the least space.
 Max. 4Mpps positioning command resolution of I/O pulse are provide d.
 High liquid crystal display and Single-phase/ three-phase 200VAC power input.

Model name identification

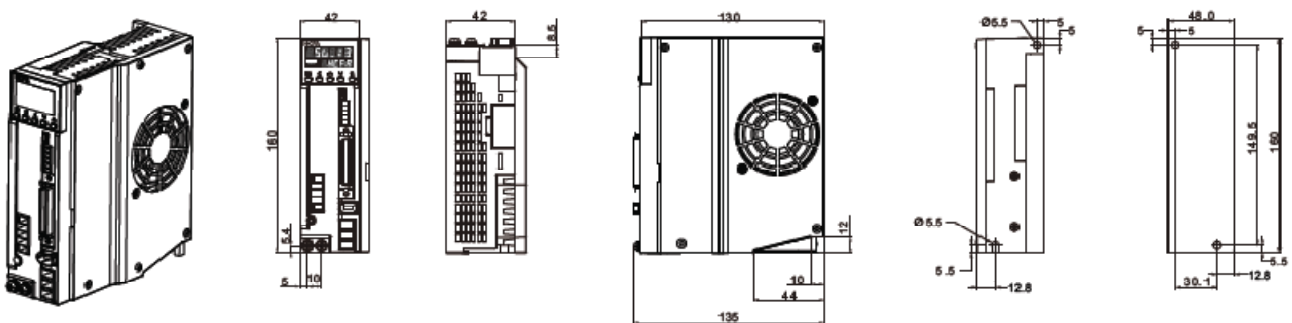
HC-SVX3	—DA	075A-	D
HCFA Servo X3: X3 series	DA: SERVO DRIVE	Output 005A : 50W 010A : 100W 020A : 200W 040A : 400W 075A : 750W 100A : 1000W 150A : 1500W 200A : 2000W	Control power supply D: 24VDC input A: 220VAC input

External Dimensions of X3 Series Servo Drive

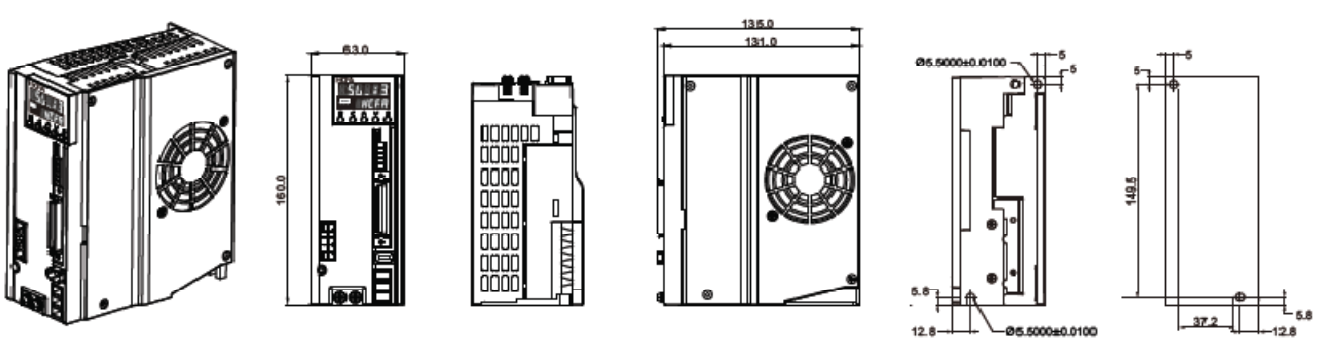
Drive 200W or less



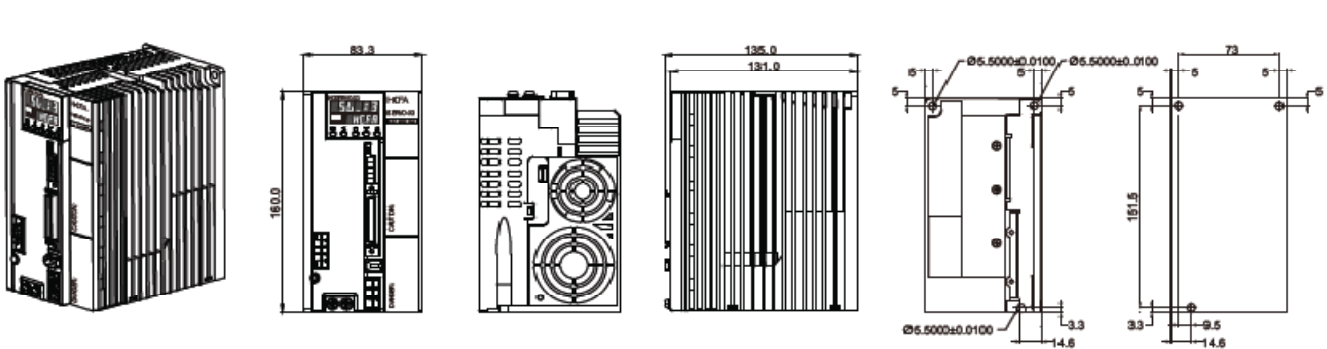
Drive 400W / 750W



Drive 1000W



Drive 1500W or more





Servo drive Specification

Items		Specification								
Model Name		DA005A	DA010A	DA020A	DA040A	DA075A	DA100A	DA150A	DA200A	
General specification	Applicable motor	50W	100W	200W	700W	750W	1000W	1500W	2000W	
	External dimension	W (mm)	40			48		84		
		H (mm)	160							
		D (mm)	130							
	Weight (Kg)		0.7			0.8		1.6		
	Input power	Main circuit power	Single-phase 200~240V ±10% 50/60Hz Note 1: In case of three-phase power, connect only two phases.					Three-phase 200~240V ±10% 50/60Hz		
		Control power	DC24V±10% Use SELV power							
		Current consumption (Typ)	170mA			210mA	260mA	350mA		
			Inrush current is excluded.							
	Control type		Three-phase PWM inverters sine-wave driven							
	Output specification	Rated current (Arms)	0.6	0.9	1.7	2.7	4.3	5.6	9.9	12.2
		Output frequency (Hz)	0 ~ 400		0 ~ 333		0 ~ 300		0 ~ 250	
	Encoder feedback		17-bit serial incremental/ absolute encoder							
Control signal	Input	Switched by 8-point (24VDC system, photo-coupler input insulation) control mode								
	Output	Switched by 8-point (24VDC system, open collector output insulation) control mode								
Analog signal	Input	Switched by 1-point (±10V)								
Pulse signal	Input	RS-422 differential Open collector								
	Output	A/B/Z-phase RS-422 differential Open collector output enabled for Z-phase alone.								
Communication function		USB: Connection with PC(Using the [HCX-SETUP] connection) RS-485: host remote control communication								
Servo drive state indication function		Normal/fault indication by LED(STATUS) Power ON normal: lit green; Power OFF: unlit; power ON fault: flashing red								
Regeneration function		Regenerative resistor mountable externally								
Dynamic brake		None								
Control mode		Position control, speed control, torque mode								
Control input		Servo ON, alarm reset, command input prohibition, deviation counter clear, torque limiter selection, CCW/CW drive restriction								
Control output		Alarm state, servo ready, positioning completion, brake release, servo status, torque limit output								
Pulse in put	Maximum command pulse frequency	RS-422 differential : 4Mpps Open collector: 200kpps								
	Input pulse signal form	Pulse + direction, A-/B-phase orthogonal phase difference pulse, CW+CCW pulse								
	Command pulse division / multiplication	Provided								
	Smoothing filter	Provided								
Pulse output	Output pulse signal format	Encoder position pulse released in the following manner: A-/B-phase orthogonal phase difference pulse and Z-phase index pulse released in RS-422 differential format, Z-phase index pulse released through open collector								

Servo drive Specification

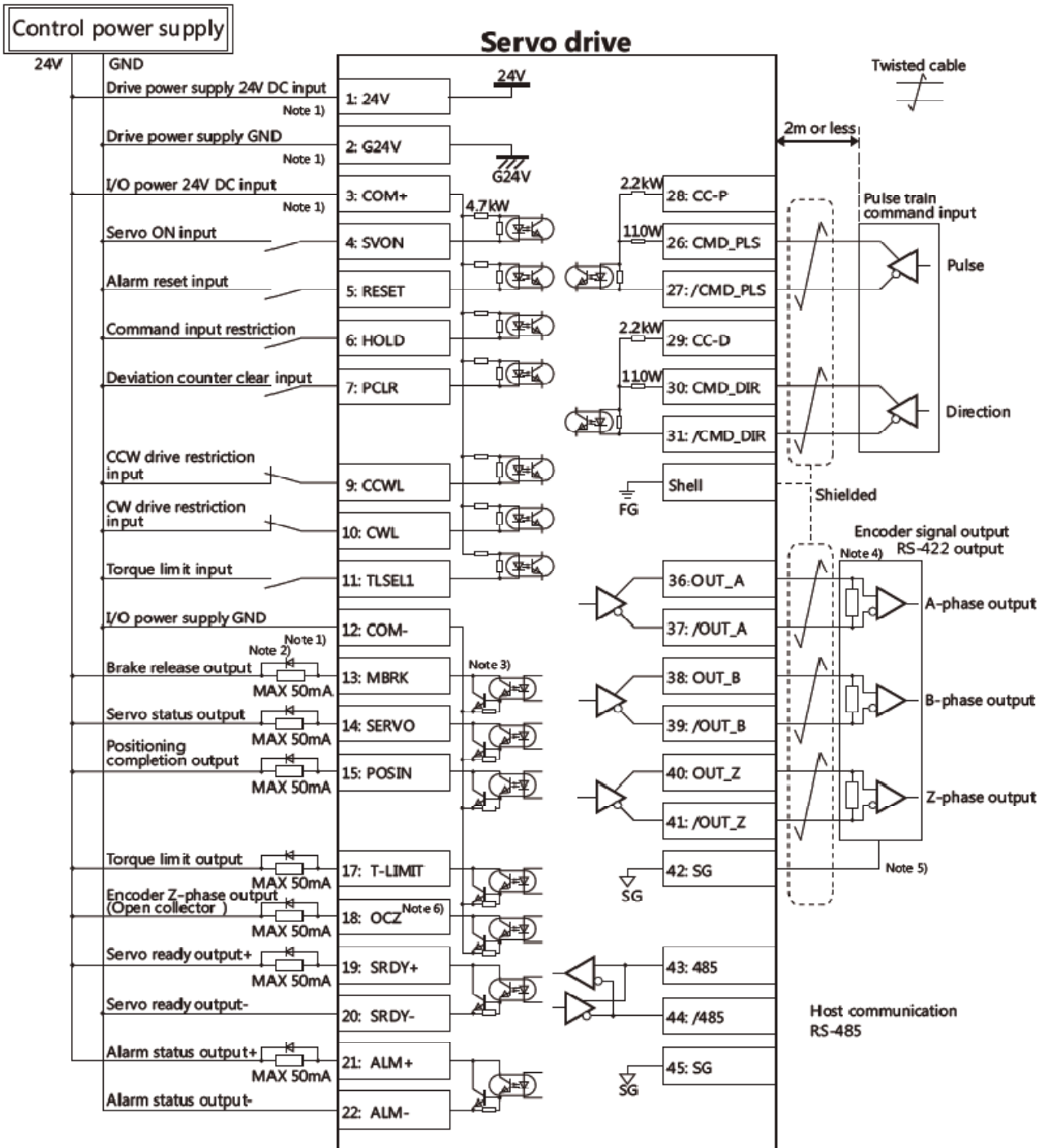
Items		Specification		
Function	Position control	Control input	Servo ON, alarm reset, deviation counting clear, Point table selection 1, Point table selection 2, Point table selection 3, Point table selection 4, home position sensor input	
		Control output	Alarm state, servo ready, brake release, servo status, torque limit output, transport completion, home position reset completion	
		Operation mode	Point table, communication, manual pulse input	
		Pulse output	Output pulse signal format	Encoder position pulse released in the following manner: A-/B-phase orthogonal phase difference pulse and Z-phase index pulse released in RS-422 differential format, Z-phase index pulse released through open collector
	Speed control	Control input	Servo ON, alarm reset, command input restriction (Zero-clamp speed), torque limit 2-phase, CCW/CW drive restriction	
		Control output	Alarm state, servo ready, brake release, servo status, torque limit output,	
		Analog input	Speed command input	Input voltage -10V to +10V (Maximum speed occurs at ±10V)
			Smoothing	Provided
		Pulse output	Output pulse signal format	Encoder position pulse released in the following manner: A-/B-phase orthogonal phase difference pulse and Z-phase index pulse released in RS-422 differential format, Z-phase index pulse released through open collector
	Internal speed control	Control input	Servo ON, alarm reset, internal speed command-start 1,2, Internal speed command 8 phases, torque limit 2 phases	
		Control output	Servo alarm, servo ready, brake release, servo state, torque limit output	
		Pulse output	Output pulse signal format	Encoder position pulse released in the following manner: A-/B-phase orthogonal phase difference pulse and Z-phase index pulse released in RS-422 differential format, Z-phase index pulse released through open collector
	Torque control	Control input	Servo ON, alarm reset, command input prohibition (Zero speed clamp), torque limiter selection, CCW/CW drive restriction	
		Control output	Alarm state, servo ready, brake release, servo state, torque limit output	
		Analog input	torque input	Input voltage -10V to +10V (Maximum speed occurs at ±10V)
		Pulse output	Output pulse signal format	Encoder position pulse released in the following manner: A-/B-phase orthogonal phase difference pulse and Z-phase index pulse released in RS-422 differential format, Z-phase index pulse released through open collector
	Common	Multi-axial corresponding function		None
		Speed observer function		Provided
		Vibration		Provided
		Auto-tuning function		Provided
		Encoder output division / multiplication		Provided
		Tuning/function setting		Adjusted using "HCX-SETUP" dedicated software
		Protection function	Hardware alarm Software alarm	Overvoltage, undervoltage, overcurrent, temperature error, overload, encoder error / overspeed, large position deviation, parameter error
	Environmental specifications	Temperature	Ambient temperature for use	0~55°C(Without condensation)
Ambient temperature for storage			-20~65°C(Without condensation)	
Humidity		Ambient humidity for use	20~85%RH or less(Without condensation)	
		Ambient humidity for storage	20~85%RH or less(Without condensation)	
Atmosphere for use& storage		Indoors(Not subject to direct sunlight); free from corrosive gas, flammable gas, oil mist, or dust		
Altitude		1000m or less above sea level		
Vibration		5.8m/s ² (0.6G) or less, 10~60Hz(No continuous operation allowed at frequency of resonance)		
Dielectric strength		1 minute at 1500 VAC across the primary and FG		
Points to note		Class I products for which grounding is mandatory. "Over voltage category II" products "Pollution degree 2" products		



Example of I/O connection | I/O connector (CN1) pin configuration

Pin No	Signal name	Classification	Control mode	Contents
1	VCC	Power supply	All	Drive control power supply 24V input
2	G24V	Power supply	All	Drive control power supply GND
3	COM1	Power supply	All	I/O power supply 24V input
4	I1	Input	All	Servo ON
5	I2	Input	All	Alarm reset
6	I3	Input	Position	Command input prohibition
			Analog speed	Command input prohibition (Zero speed clamp)
			Internal speed	Internal speed command-start 1
7	I4	Input	Position	Deviation counter clear
			Analog speed	Reserved
			Internal speed	Internal speed command-start 2
8	I5	Input	Position	Reserved
			Analog speed	Reserved
			Internal speed	Internal speed command -speed command selection 1
9	I6	Input	Position	CCW drive prohibition
			Analog speed	CCW drive prohibition
			Internal speed	Internal speed command -speed command selection 2
10	I7	Input	Position	CCW drive prohibition
			Analog speed	CCW drive prohibition
			Internal speed	Internal speed command -speed command selection 3
11	I8	Input	All	Torque limit
12	COM2	Power supply	All	I/O power supply GND
13	O1	Output	All	Brake release
14	O2	Output	All	Servo status output
15	O3	Output	Position	Positioning completion output
			Analog speed	Reserved
			Internal speed	Reserved
16	O4	Output	All	Reserved
17	O5	Output	All	Reserved
18	O6	Output	All	Encoder Z phase output
19	O7+	Output	All	Servo ready +
20	O7-	Output	All	Servo ready -
21	O8+	Output	All	Alarm ready +
22	O8-	Output	All	Alarm ready -
23	VCC	—	—	Reserved
24	Sp1	—	—	Reserved
25	SP2	—	—	Reserved
26	CMD_PLS	Input	Position	Differential input) ①Pulse + direction pulse ②Orthogonal phase difference A phase ③CCW + CW pulse CCW [5V open collector circuit] ④5V power input of /CMD_PLS

Pin No	Signal name	Classification	Control mode	Contents
27	/CMD_PLS	Input	Position	[Differential input] ①Pulse + direction / pulse ②Orthogonal phase difference / A phase ③CCW + CW pulse CCW [5V open collector circuit] ④Pulse + direction pulse ⑤Orthogonal phase difference A phase ⑥CCW + CW pulse CCW
28	CC-P	Input	Position	[24V open collector circuit input] ①24V of /CMD_PLS
29	CC-D	Input	Position	[24V open collector circuit input] ①24V of /CMD_DIR
30	CMD_DIR	Input	Position	[Differential input] ①Pulse + direction /direction ②Orthogonal phase difference B phase ③CCW + CW pulse CW [5V open collector circuit] ④5V power supply input of /CMD_DIR
31	/CMD_DIR	Input	Position	[Differential input] ①Pulse + direction /direction ②Orthogonal phase difference / B phase ③CCW + CW pulse /CW [5V/24V open collector circuit] ④Pulse + direction direction ⑤Orthogonal phase difference B phase ⑥CCW + CW pulse CW
32	A_SPEED	Input	Analog speed / torque	Analog speed / torque command input
33	A_GND	Input	Analog speed	Analog ground
34	A_TRQ	Input	—	Reserved
35	A_GND	Input	—	Reserved
36	OUT_A	Output	All	Encoder A phase
37	OUT_/A	Output	All	Encoder /A phase
38	OUT_B	Output	All	Encoder B phase
39	OUT_/B	Output	All	Encoder /B phase
40	OUT_Z	Output	All	Encoder Z phase
41	OUT_/Z	Output	All	Encoder /Z phase
42	SG	Power supply	All	Signal ground
43	485	Input	All	EIA-485 communication
44	/485	Input	All	EIA-485 communication
45	SG	Power supply	All	Signal ground
46	G24	—	—	Reserved
47	SP3	—	—	Reserved
48	SP4	—	—	Reserved
49	EDM+	—	—	Reserved
50	EDM-	—	—	Reserved



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*Note 2) If there is drive inductive load(relay), please use protective circuits(diode).

*Note 3) Transistor output is an open collector output circuit of the Darlington-connected. It should be connected with relay or optocoupler.

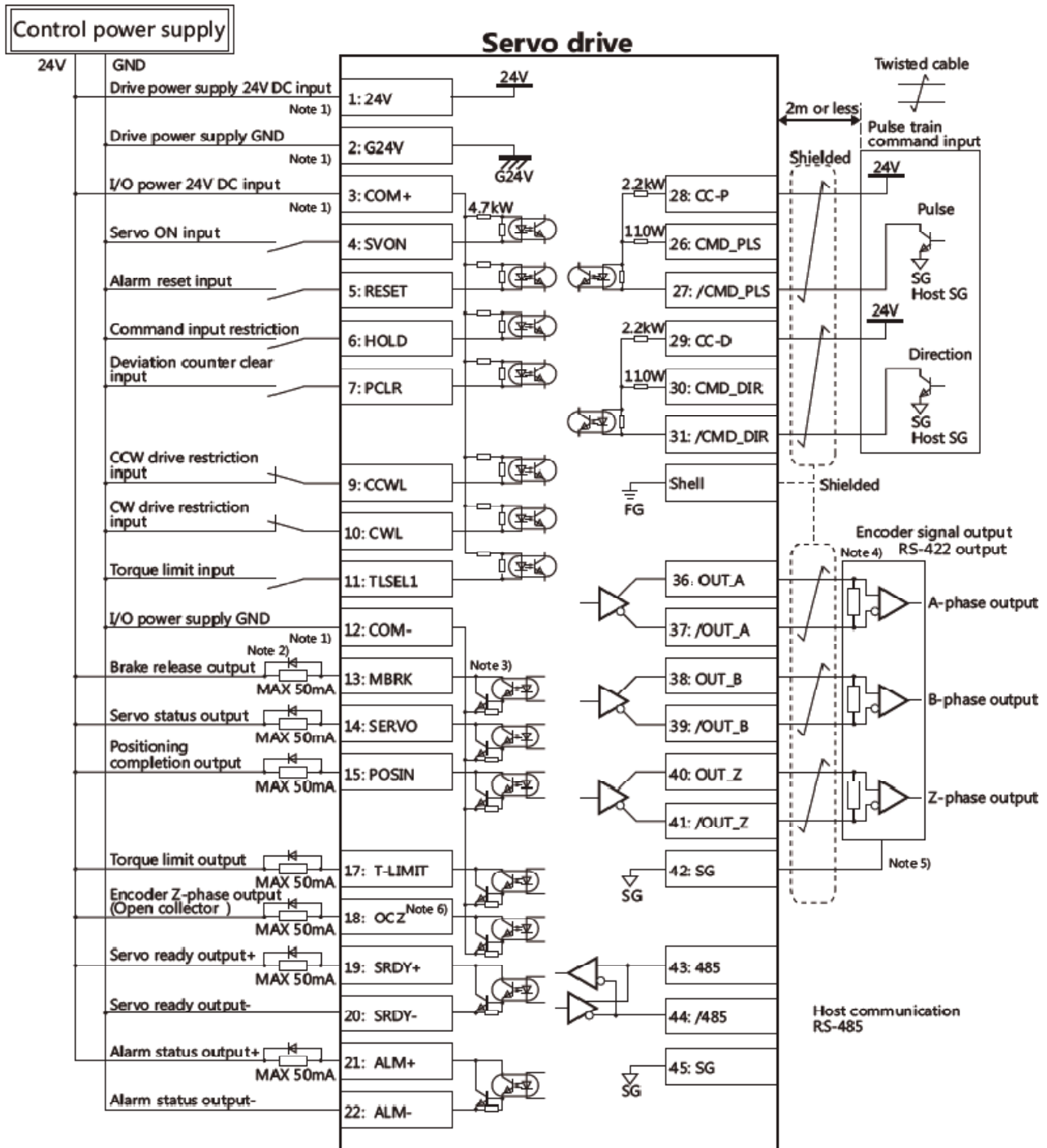
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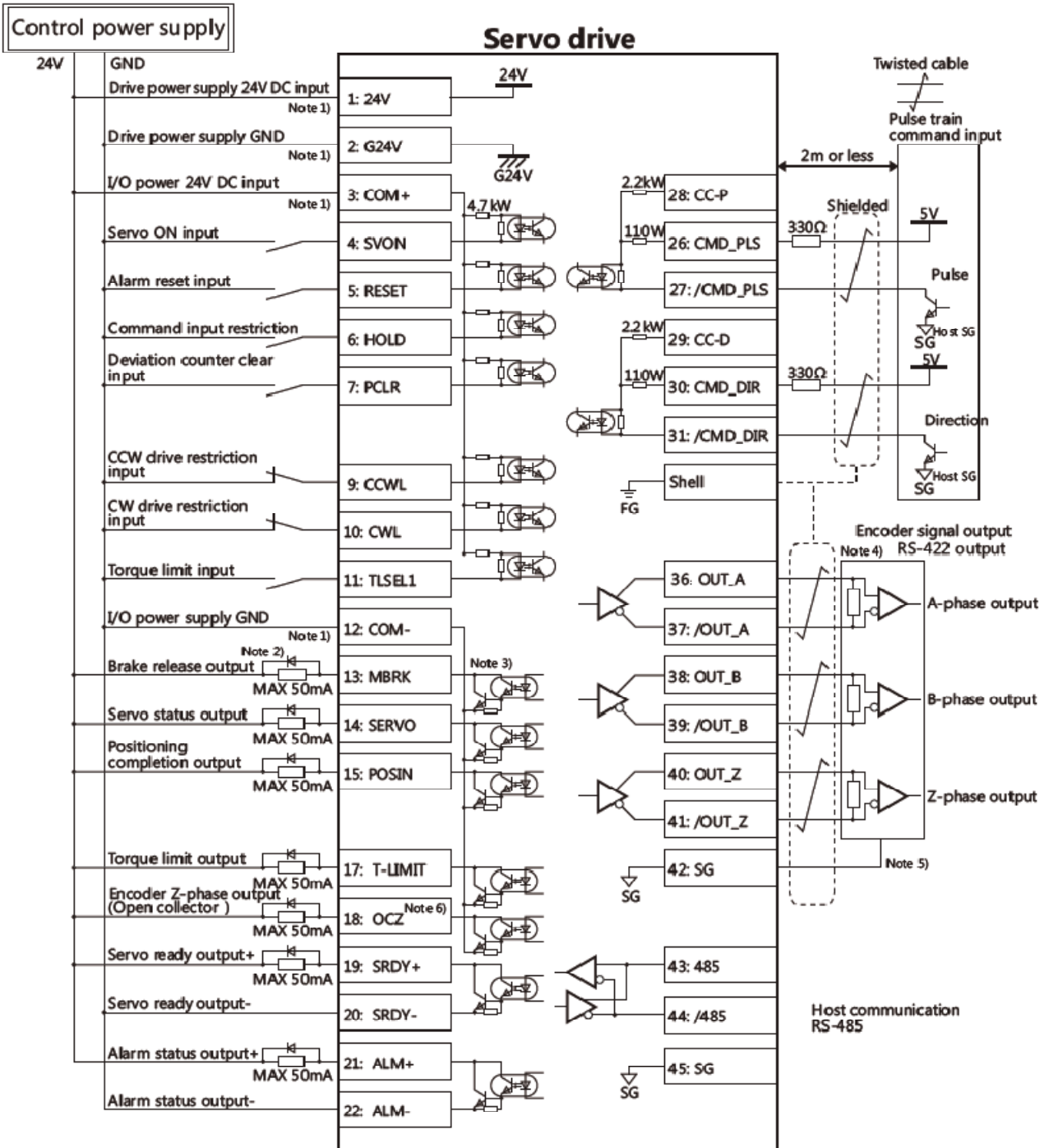
*Note 5) Connect the signal ground on the host control device of output signal of the encoder.

The connection of signal ground and power supply GND may cause malfunction.

*Note 6) If the pulse width of Z-phase is too narrow to identify the host control device, please reduce the encoder pulse output division and multiplication No.276.0, 278.0 or reduce the speed to increase the pulse width. (Pulse width)=1/speed/(division and multiplication×2¹⁷)



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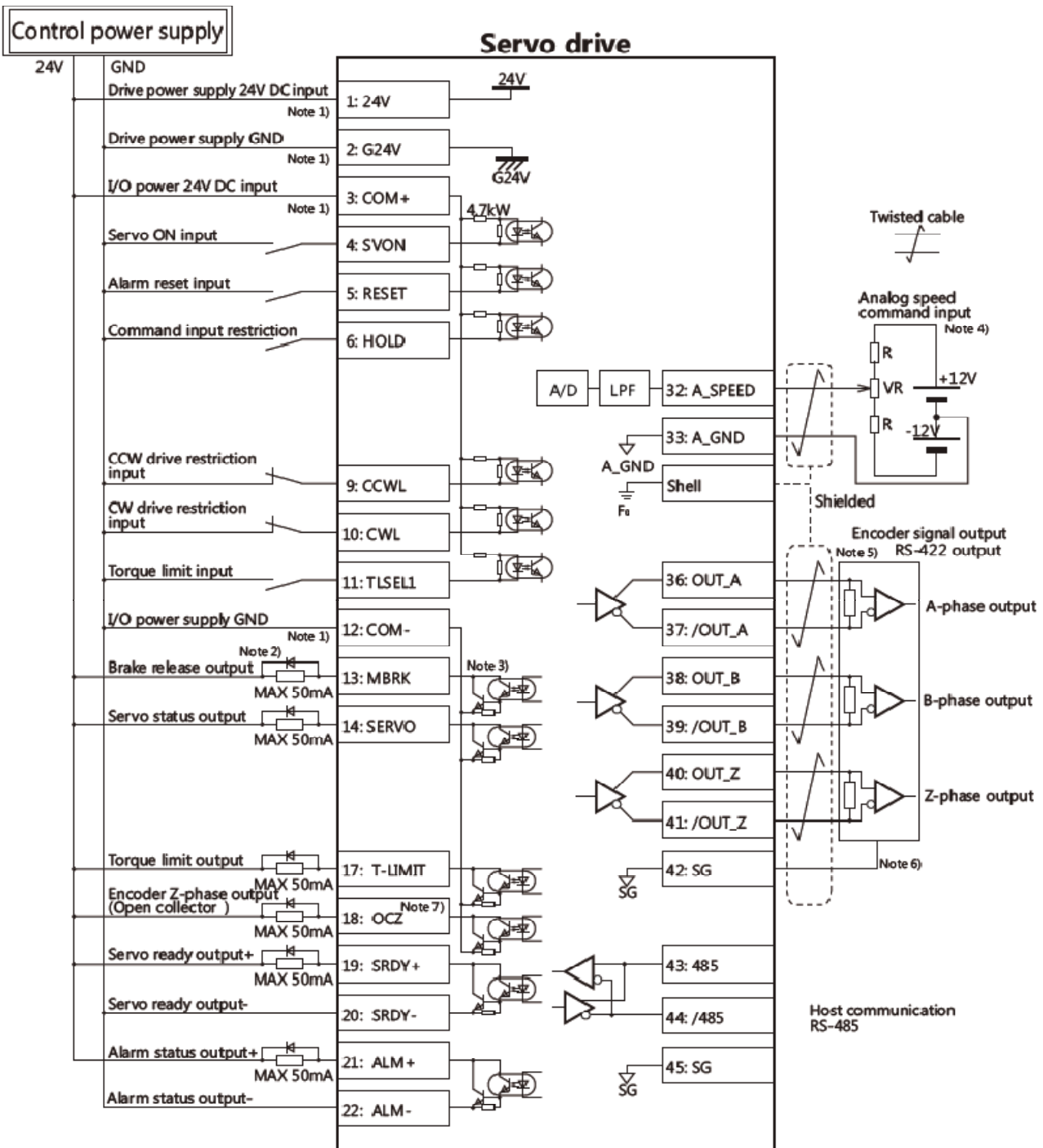
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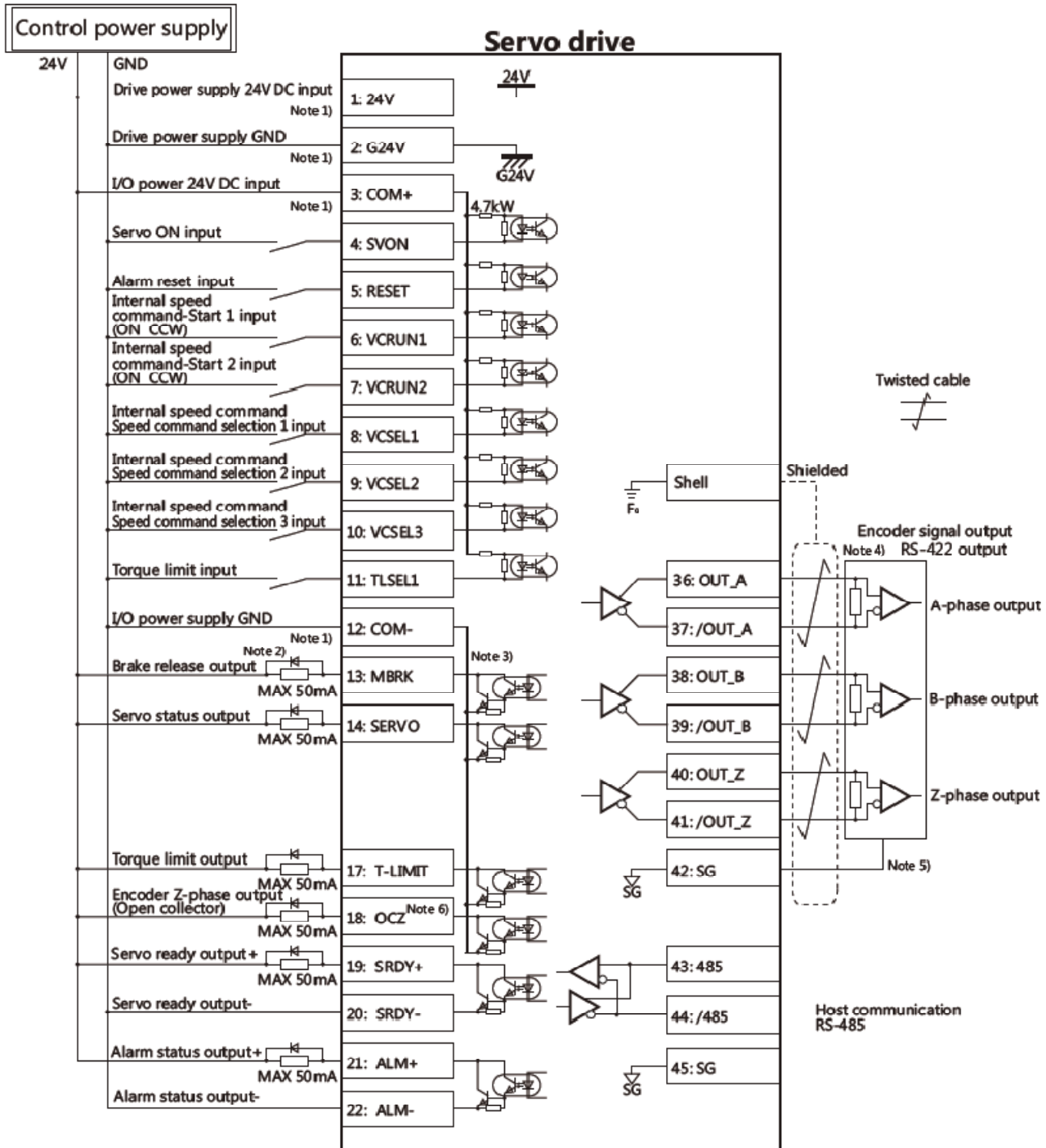
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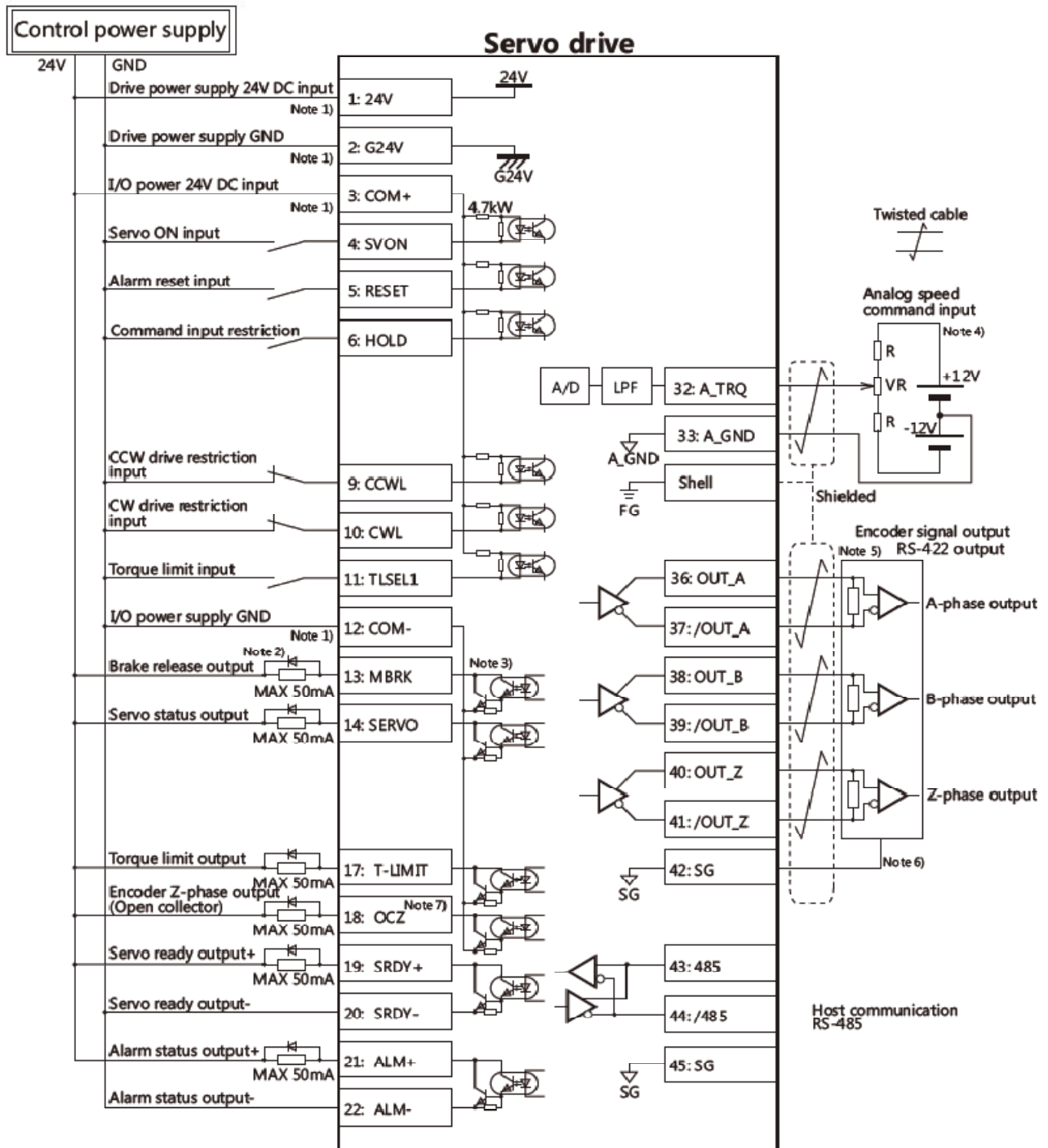
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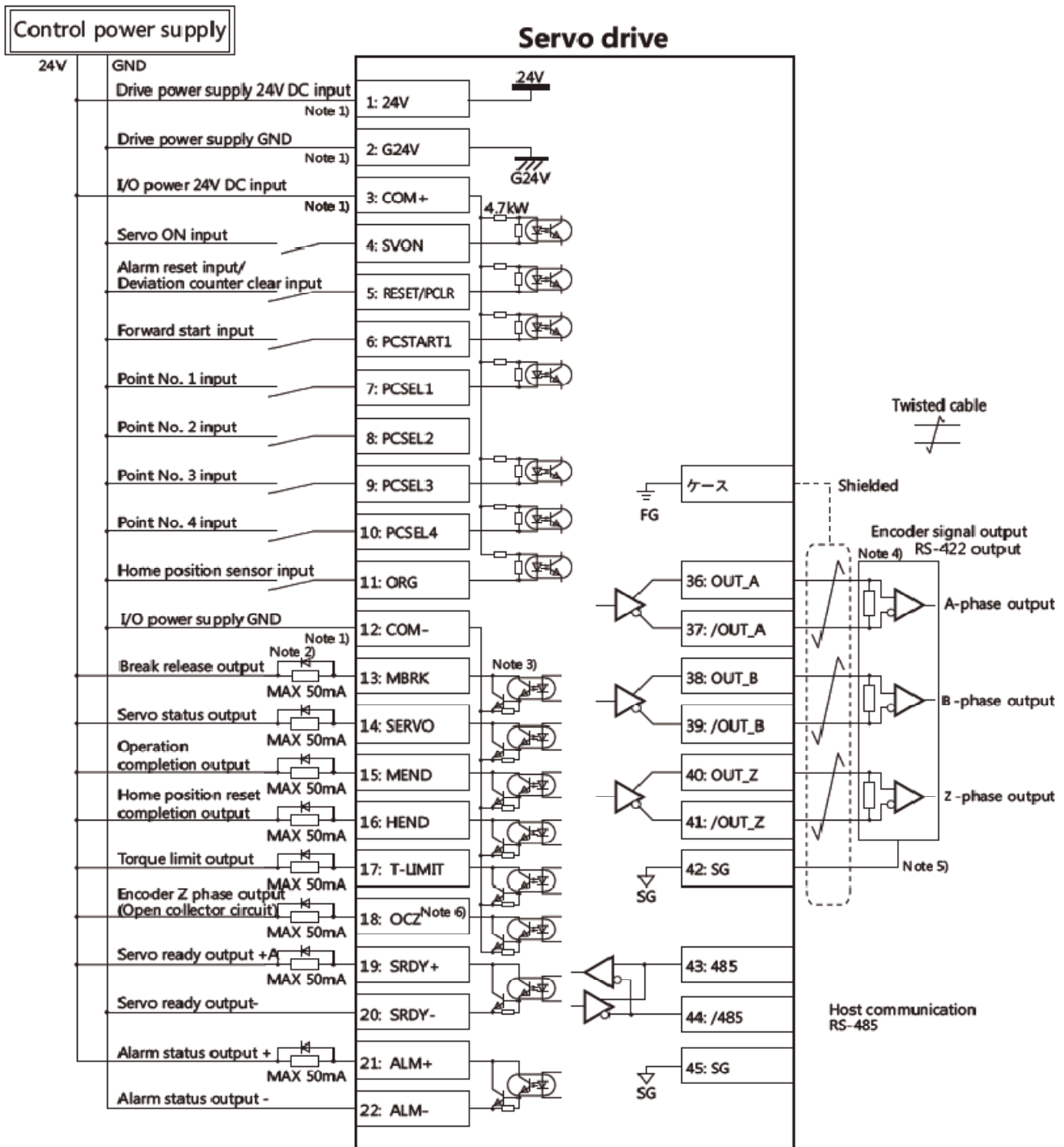
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Items	Description
Peripheral device	Conform to European EC Directive. Select the device which meets corresponding standards and install them in accordance with User's Manual.
Installation environment	Install the servo drive to the environment which conform to Pollution degree 2 or 1 of IEC60664-1.
Power supply 1: 200 ~ 240VAC (main circuit)	This product can be used under the conditions that conform to IEC60664-1 and overvoltage category II.
Power supply 2: 24VDC †control power supply of drive †I/O power supply †Power supply for brake release	The specification of 24VDC external power supply should satisfy the following conditions. Using SELV power supply(※) and power less than 150W. This is the CE corresponding conditions. ※SELV: safety extra low voltage (Reinforced insulation is needed for safety extra low voltage, non-dangerous voltage and dangerous voltage.)
Wiring	Please use withstand voltage cables which are equivalent to AWG18/600V or AWG14/600V for motor power cable, encoder cable, AC220 input cable, FG cable and main circuit power distribution cable under multi-axis drive structure respectively when drives are less than 750W or more than 1kW.
Breaker	Switch off the power supply to protect power cord when overcurrent occurs. Make sure to use the breaker between power supply and interference filter that conforms to IEC specification and UL recognition in accordance with the User manual. Please use the breaker with leakage function recommended by HCFA in order to meet EMC standards.
Interference filter	To prevent the outside interference from power cables. Please use the interference filter recommended by HCFA in order to meet EMC standards.
Magnetic contactor	Switch main power supply (ON/OFF). And use it after installing a surge absorber.
Surge absorber	Please use the surge absorber recommended by HCFA in order to meet EMC standards.
Interference filter for signal cable / ferrite filter	Please use the interference filter recommended by HCFA in order to meet EMC standards.
Regenerative resistor	This product is not equipped with regenerative resistor. The external regenerative resistor is necessary when the internal capacitor cannot absorb more regenerative power. Confirm the regenerative status on the panel. When the regenerative voltage alarm is ON, a regenerative resistor is needed. For the reference specification of regenerative resistor, please refer to user manual. Use a built-in thermostat and set overheat protect circuit.
Grounding	This product belongs to Class 1 and need grounding protection. Using protection grounding terminal. Grounding should be executed by the case and cabinet that conforms to EMC. The following symbol indicates the protection grounding terminal. 