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http://www.delta.com.tw/industrialautomation/

ASDA-A Servo Drive Instruction Sheet

1 General Notes

This instruction sheet will be helpful in the installation, wiring, inspection, and operation of Delta ASDA-A series AC servo drive and ASMT series servo motor. Before using the product, please read this instruction sheet to ensure correct use. You should thoroughly understand all safety precautions before proceeding with the installation, wiring and operation. If you do not understand please contact your local Delta sales representative. Place this instruction sheet in a safe location for future reference. Please observe the following precautions:

- Do not use the product in a potentially explosive environment.
- Install the product in a clean and dry location free from corrosive and inflammable gases or liquids.
- Do not connect a commercial power supply to the U, V, W terminals of motor. Failure to observe this precaution will damage either the Servo motor or drive.
- Ensure that the motor and drive are correctly connected to a ground. The grounding method must comply with the electrical standard of the country.
- Do not disconnect the AC servo drive and motor while the power is ON.
- Do not attach, modify or remove wiring when power is applied to the AC servo drive and motor.
- Before starting the operation with a mechanical system connected, make sure the emergency stop equipment can be energized and work at any time.
- Do not touch the drive heat sink or the servo motor during operation. Otherwise, it may result in serious personnel injury.

Further information on the AC servo drive and motor can be obtained from the manual. You can download the manual via the link http://www.delta.com.tw/industrialautomation/ above in PDF format.

2 Safety Precautions

Carefully note and observe the following safety precautions when receiving, inspecting, installing, operating, maintaining and troubleshooting. The following words, DANGER, WARNING and STOP are used to mark safety precautions when using the Delta's servo product. Failure to observe these precautions may void the warranty!

ASDA-A series drives are open type servo drives and must be installed in an NEMA enclosure such as a protection control panel during operation to comply with the requirements of the international safety standards. They are provided with precise feedback control and high-speed calculation function incorporating DSP (Digital Signal Processor) technology, and intended to drive three-phase permanent magnet synchronous motors (PMSM) to achieve precise positioning by means of accurate current output generated by IGBT (Insulated Gate Bipolar Transistor).

ASDA-A series drives can be used in industrial applications and for installation in an end-use enclosure that do not exceed the specifications defined in the ASDA-A series user manual (Drives, cables and motors are for use in a suitable enclosure with a minimum of a UL Type 1 rating).

Unpacking Check

DANGER

- *Please ensure that both the servo drive and motor are correctly matched for size (power rating). Failure to observe this precaution may cause fire, seriously damage the drive / motor or cause personal injury.*

Installation

DANGER

- *Do not install the product in a location that is outside the stated specification for the drive and motor. Failure to observe this caution may result in electric shock, fire, or personal injury.*

Wiring

DANGER

- *Connect the ground terminals to a class-3 ground (Ground resistance should not exceed 100Ω). Improper grounding may result in electric shock or fire.*
- *Do not connect any power supplies to the U, V, W terminals. Failure to observe this precaution may result in serious injury, damage to the drive or fire.*
- *Ensure that all screws, connectors and wire terminations are secure on the power supply, servo drive and motor. Failure to observe this caution may result in damage, fire or personal injury.*

Operation

WARNING

- *Before starting the operation with a mechanical system connected, change the drive parameters to match the user-defined parameters of the mechanical system. Starting the operation without matching the correct parameters may result in servo drive or motor damage, or damage to the mechanical system.*
- *Ensure that the emergency stop equipment or device is connected and working correctly before operating the motor that is connected to a mechanical system.*

STOP

- *Do not approach or touch any rotating parts (e.g. shaft) while the motor is running. Failure to observe this precaution may cause serious personal injury.*

DANGER

- *In order to prevent accidents, the initial trial run for servo motor should be conducted under no load conditions (separate the motor from its couplings and belts).*
- *For the initial trial run, do not operate the servo motor while it is connected to its mechanical system. Connecting the motor to its mechanical system may cause damage or result in personal injury during the trail run. Connect the servo motor once it has successfully completed a trail run.*
- *Caution: Please perform trial run without load first and then perform trial run with load connected. After the servo motor is running normally and regularly without load, then run servo motor with load connected. Ensure to perform trial run in this order to prevent unnecessary danger.*
- *Do not touch either the drive heat sink or the motor during operation as they may become hot and personal injury may result.*

Maintenance and Inspection

STOP

- *Do not touch any internal or exposed parts of servo drive and servo motor as electrical shock may result.*
- *Do not remove the operation panel while the drive is connected to an electrical power source otherwise electrical shock may result.*
- *Wait at least 10 minutes after power has been removed before touching any drive or motor terminals or performing any wiring and/or inspection as an electrical charge may still remain in the servo drive and servo motor with hazardous voltages even after power has been removed.*
- *Do not disassemble the servo drive or motor as electric shock may result.*
- *Do not connect or disconnect wires or connectors while power is applied to the drive and motor.*
- *Only qualified personnel who have electrical knowledge should conduct maintenance and inspection.*

Main Circuit Wiring

WARNING

- *Install the encoder cables in a separate conduit from the motor power cables to avoid signal noise. Separate the conduits by 11.8inches (30cm) above.*
- *Use multi-stranded twisted-pair wires or multi-core shielded-pair wires for signal, encoder (PG) feedback cables. The maximum length of command input cable is 9.84ft. (3m) and the maximum length of encoder (PG) feedback cables is 65.62ft. (20m).*
- *As a charge may still remain in the drive with hazardous voltages even after power has been removed, be sure to wait at least 10 minutes after power has been removed before performing any wiring and/or inspection.*

STOP

- *It is not recommended to frequently power the drive on and off. Do not turn the drive off and on more than once per minute as high charging currents within the internal capacitors may cause damage.*

Main Circuit Terminal Wiring

WARNING

- *Please performing the wiring after the terminal blocks are all removed from the drive.*
- *Insert only one wire into one terminal on the terminal block.*
- *When inserting wires, please ensure that the conductors are not shorted to adjacent terminals or wires.*
- *Ensure to double check the wiring before applying power to the drive.*
- *If the wiring is in error, perform the wiring again with proper tools. Never use force to remove the terminals or wires. Otherwise, it may result in malfunction or damage.*

3 Servo Drive and Servo Motor Combinations

Power		Servo drive	Servo motor
Low inertia	100W	ASD-A0121L□	ASMT01L250□□
	200W	ASD-A0221L□	ASMT02L250□□
	400W	ASD-A0421L□	ASMT04L250□□
	750W	ASD-A0721L□	ASMT07L250□□
Low inertia	1000W	ASD-A1021L□	ASMT10L250□□
	2000W	ASD-A2023L□	ASMT20L250□□
	3000W	ASD-A3023L□	ASMT30L250□□
Middle inertia	1000W	ASD-A1021M□	ASMT10M250□□
	1500W	ASD-A1521M□	ASMT15M250□□
	2000W	ASD-A2023M□	ASMT20M250□□
	3000W	ASD-A3023M□	ASMT30M250□□

The boxes (□) at the ends of the model names are for optional configurations.

4 Installation and Storage Conditions

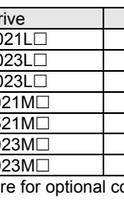
The product should be kept in the shipping carton before installation. In order to retain the warranty coverage, the AC drive should be stored properly when it is not to be used for an extended period of time. Some storage suggestions are:

- Store in a clean and dry location free from direct sunlight.
- Store within an ambient temperature range of -4°F to 149°F (-20°C to +65°C).
- Store within a relative humidity range of 0% to 90% and non-condensing.
- Do not store in a place subjected to corrosive gases and liquids.
- Correctly packaged and placed on a solid surface.
- Do not mount the servo drive or motor adjacent to heat-radiating elements or in direct sunlight.
- Do not mount the servo drive or motor in a location subjected to corrosive gases, liquids, or airborne dust or metallic particles.
- Do not mount the servo drive or motor in a location where temperatures and humidity will exceed specification.
- Do not mount the servo drive or motor in a location where vibration and shock will exceed specification.
- Do not mount the servo drive or motor in a location where it will be subjected to high levels of electromagnetic radiation.

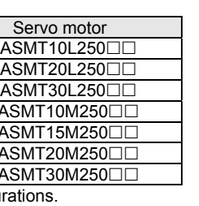
5 Installation Note and Minimum Clearances

Installation Note:

- Incorrect installation may result in a drive malfunction or premature failure of the drive and or motor. Please follow the guidelines in this instruction when installing the servo drive and motor.
- The AC servo drive should be mounted perpendicular to the wall or in the control panel.



Correct

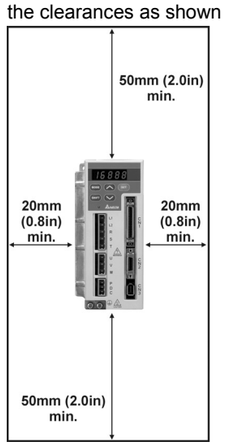


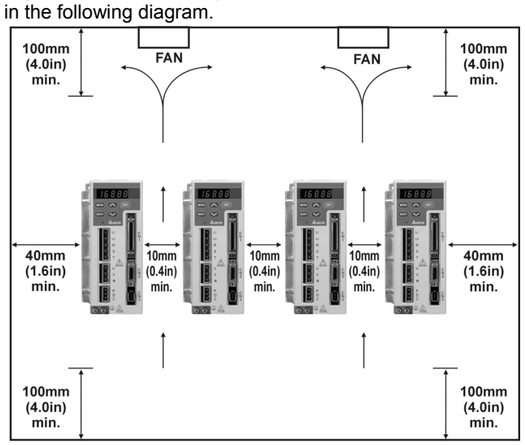
Incorrect

- In order to ensure the drive is well ventilated, ensure that the all ventilation holes are not obstructed and sufficient free space is given to the servo drive.
- Do not install the drive in a horizontal position or malfunction and damage will occur.

Minimum Clearances:

Install a fan to increase ventilation to avoid ambient temperatures that exceed the specification. When installing two or more drive adjacent to each other please follow the clearances as shown in the following diagram.





6 Cable Specifications for Servo Drive

Servo Drive	Power Cable - Wire Gauge AWG (mm²)			
	L1, L2	R, S, T	U, V, W	P, C
ASD-A0121L□	AWG16 (1.25)	AWG14 (2)	AWG14 (2)	AWG14 (2)
ASD-A0221L□	AWG16 (1.25)	AWG14 (2)	AWG14 (2)	AWG14 (2)
ASD-A0421L□	AWG16 (1.25)	AWG14 (2)	AWG14 (2)	AWG14 (2)
ASD-A0721L□	AWG16 (1.25)	AWG14 (2)	AWG14 (2)	AWG14 (2)
ASD-A1021L□	AWG16 (1.25)	AWG14 (2)	AWG14 (2)	AWG14 (2)
ASD-A1021M□	AWG16 (1.25)	AWG14 (2)	AWG14 (2)	AWG14 (2)
ASD-A1521M□	AWG16 (1.25)	AWG14 (2)	AWG14 (2)	AWG14 (2)
ASD-A2023L□	AWG16 (1.25)	AWG14 (2)	AWG14 (2)	AWG14 (2)
ASD-A2023M□	AWG16 (1.25)	AWG14 (2)	AWG14 (2)	AWG14 (2)
ASD-A3023L□	AWG16 (1.25)	AWG12 (3.5)	AWG12 (3.5)	AWG14 (2)
ASD-A3023M□	AWG16 (1.25)	AWG12 (3.5)	AWG12 (3.5)	AWG14 (2)

Servo Drive	Encoder Cable - Wire Gauge AWG (mm²)			
	Wire Size	Core Number	UL Rating	Wire Length
ASD-A0121L□	AWG26 (0.4)	10 core (4 pair)	UL2464	9.84ft. (3m)
ASD-A0221L□	AWG26 (0.4)	10 core (4 pair)	UL2464	9.84ft. (3m)
ASD-A0421L□	AWG26 (0.4)	10 core (4 pair)	UL2464	9.84ft. (3m)
ASD-A0721L□	AWG26 (0.4)	10 core (4 pair)	UL2464	9.84ft. (3m)
ASD-A1021L□	AWG26 (0.4)	10 core (4 pair)	UL2464	9.84ft. (3m)
ASD-A1021M□	AWG26 (0.4)	10 core (4 pair)	UL2464	9.84ft. (3m)
ASD-A1521M□	AWG26 (0.4)	10 core (4 pair)	UL2464	9.84ft. (3m)
ASD-A2023L□	AWG26 (0.4)	10 core (4 pair)	UL2464	9.84ft. (3m)
ASD-A2023M□	AWG26 (0.4)	10 core (4 pair)	UL2464	9.84ft. (3m)
ASD-A3023L□	AWG26 (0.4)	10 core (4 pair)	UL2464	9.84ft. (3m)
ASD-A3023M□	AWG26 (0.4)	10 core (4 pair)	UL2464	9.84ft. (3m)

NOTE

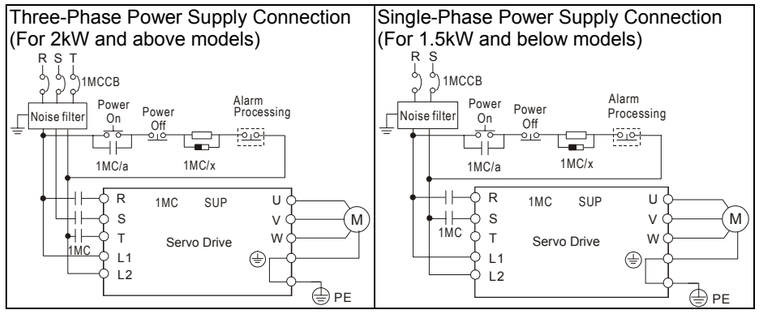
1) Please use shielded twisted-pair cables for wiring to prevent voltage coupling and eliminate electrical noise and interference.
2) The shield of shielded twisted-pair cables should be connected to the SHIELD end (terminal marked ⏚) of the servo drive.

7 Basic Inspection

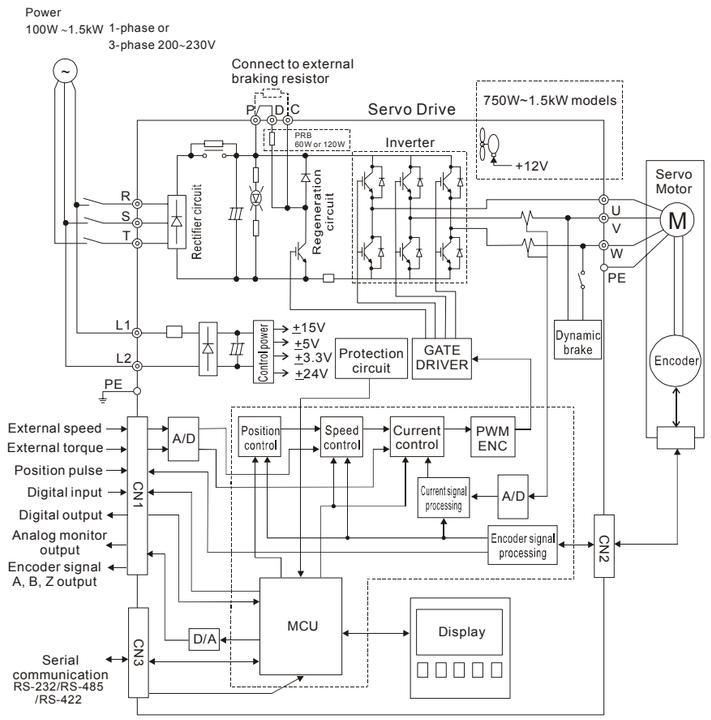
After power in connected to the AC servo drive, the charge LED will be lit which indicates that the AC servo drive is ready.

Item	Content
General Inspection	● Periodically inspect the screws of the servo drive, motor shaft, terminal block and the connection to mechanical system. Tighten screws as necessary as they may loosen due to vibration and varying temperatures. ● Ensure that oil, water, metallic particles or any foreign objects do not fall inside the servo drive, motor, control panel or ventilation slots and holes. As these will cause damage. ● Ensure the correct installation and the control panel. It should be free from airborne dust, harmful gases or liquids. ● Ensure that all wiring instructions and recommendations are followed; otherwise damage to the drive and or motor may result.
Inspection before operation (Control power is not applied)	● Inspect the servo drive and servo motor to insure they were not damaged. ● To avoid an electric shock, be sure to connect the ground terminal of servo drive to the ground terminal of control panel. ● Before making any connection, wait 10 minutes for capacitors to discharge after the power is disconnected, alternatively, use an appropriate discharge device to discharge. ● Ensure that all wiring terminals are correctly insulated. ● Ensure that all wiring is correct or damage and or malfunction may result. ● Visually check to ensure that there are not any unused screws, metal strips, or any conductive or inflammable materials inside the drive. ● Never put inflammable objects on servo drive or close to the external regenerative resistor. ● Make sure control switch is OFF. ● If the electromagnetic brake is being used, ensure that it is correctly wired. ● If required, use an appropriate electrical filter to eliminate noise to the servo drive. ● Ensure that the external applied voltage to the drive is correct and matched to the controller.
Inspection during operation (Control power is applied)	● Ensure that the cables are not damaged, stressed excessively or loaded heavily. When the motor is running, pay close attention on the connection of the cables and notice that if they are damaged, frayed or over extended. ● Check for abnormal vibrations and sounds during operation. If the servo motor is vibrating or there are unusual noises while the motor is running, please contact the dealer or manufacturer for assistance. ● Ensure that all user-defined parameters are set correctly. Since the characteristics of various machinery are different, in order to avoid accident or cause damage, do not adjust the parameter abnormally and ensure the parameter setting is not an excessive value. ● Ensure to reset some parameters when the servo drive is off (Please refer to Chapter 7). Otherwise, it may result in malfunction. ● If there is no contact sound or there be any unusual noises when the relay of the servo drive is operating, please contact your distributor for assistance or contact with Delta. ● Check for abnormal conditions of the power indicators and LED display. If there is any abnormal condition of the power indicators and LED display, please contact your distributor for assistance or contact with Delta.

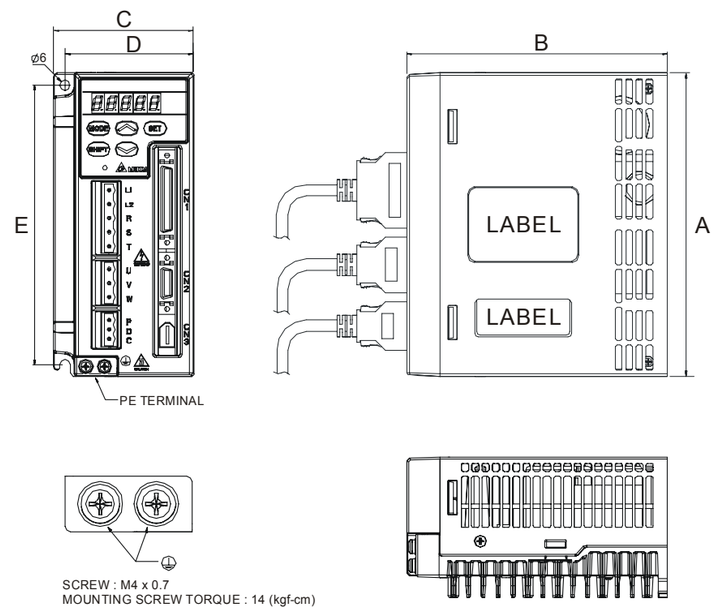
8 Wiring



9 Basic Wiring



10 Servo Drive Dimensions



	A	B	C	D	E	Weight
100W ~ 400W	6.38 (162)	5.51 (140)	2.95 (75)	2.72 (69)	5.91 (150)	3.3 (1.5)
750W ~ 1.5kW	6.38 (162)	7.52 (191)	3.66 (93)	3.27 (83)	5.87 (149)	4.4 (2.0)
2kW ~ 3kW	9.65 (245)	8.1 (206)	4.33 (110)	3.59 (91.2)	9.04 (229.5)	6.6 (3.0)

Dimensions are in inches and (millimeters). Weights are in pounds and (kilograms).