KCFA

Installation and Wiring for SV-X2/X6 Series Servo Motor (180-flange)

Hardware Instruction

| Manual Number | MQ400P059A01EN |
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| Manual Version | V1.1 |
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http://www.hcfa.com.cn

Thank you for purchasing this product. This manual mainly describes the safety use, installation and wiring for SV- X2/ X6 series servo motor (180-flange). For more details, please refer to < SV- X2/ X6 Series Servo Motor User Manual>.

Confirm the following items when unpacking:

| Number | | Name Quantity | | | | |
|--------|---------------|---|---|--|--|--|
| 1 | Servo motor | | 1 | | | |
| | | Flat key | 1 | | | |
| 2 | Accessories | Extension cable for 4PIN connector | 1 | | | |
| Z | Accessories | Extension cable for 10PIN connector | 1 | | | |
| | | Extension cable for 2PIN connector (for servo motor with brake) | 1 | | | |
| 3 | | Installation and Wiring for SV-X2/X6 Series Servo Motor Hardware Instructior | | | | |
| 4 | Certificate o | f Quality | 1 | | | |

 \bigcirc Check if there are some damage to the products during transportation. \bigcirc Any questions, please contact the HCFA Corporation.

Safety precautions(Read carefully before use)

Please pay attention to the following safety precautions anywhere and any time during acceptance inspection, installation, wiring, operation and maintenance. In this manual, the safety precautions are ranked as "DANGER" and "CAUTION"

DANGER Indicates that incorrect handling may result in death or severe injury.

 CAUTION
 Indicates that incorrect handling may result in medium or slight personal injury or physical damage.

Nindicates "Prohibitions" (Indicates what must not be done.)

Indicates "Forced".(Indicates what must be done.)

| DANGER | | | | | |
|------------|---|---|--|--|--|
| | Installing and wiring | | | | |
| | Do not connect the motor to the commercial power. | To prevent fire or malfunction | | | |
| \bigcirc | Do not place the combustibles around the servo motor and drive. | To prevent fire. | | | |
| | Be sure to protect the drives through the case, and leave specified clearances between the case or other equipment and the drive. | To prevent electric shock, fire or malfunction. | | | |
| | Install it at the place free from excessive dust and dirt, water and oil mist | To prevent electric shock, fire , malfunction or damage | | | |
| - | Install the equipment to incombustibles, such as metal. | To prevent fire. | | | |
| | Any person who is involved in wiring and inspection should be fully competent to do the work. | To prevent electric shock. | | | |
| | FG terminal of motor and drive must be grounded. | To prevent electric shock. | | | |
| | Perform the wiring correctly after cut off the breaker. | To prevent electric shock, injury, malfunction or damage | | | |
| | Have the insulation processing when connecting cables. | To prevent electric shock, fire or malfunction. | | | |
| | Operation and running | - | | | |
| | During operation, never touch the internal parts of the drive. | To prevent burns or electric shock. | | | |
| | The cables should not be damaged, stressed loaded, or pinched. | To prevent electric shock, malfunction or damage. | | | |
| \bigcirc | During operation, never touch the rotating parts of the servo motor. | To prevent injury. | | | |
| \bigcirc | Do not install the equipment under the conditions with water, corrosive and flammable gas. | To prevent fire. | | | |
| | Do not use it at the location with great vibration and shock. | To prevent electric shock, injury or fire. | | | |
| | Do not use the servo motor with its cable soaked in oil or water. | To prevent electric shock, malfunction or damage | | | |

| | Operate the switches and wiring with dry hand. | To prevent electric shock, injury or fire. |
|------------|--|---|
| \bigcirc | Do not touch the keyway directly when using the motor with shaft-end keyway | To prevent injury. |
| \bigcirc | Do not touch the motor and drive heat sink, as they are very hot. | To prevent burns or parts damaged. |
| | Do not drive the motor by external drive. | To prevent fire. |
| | Other safety instructions | |
| | Confirm the equipment's safety after the earthquake happens. | To prevent electric shock, injury or fire. |
| 0 | Installing and setting correctly to prevent the fire and personal injury when earthquake happens. | To prevent injury, electric shock, fire, malfunction or damage. |
| | Provide an external emergency stop circuit to ensure that operation can be stopped and power switched off immediately. | To prevent injury, electric shock, fire, malfunction or damage. |
| | About maintenance and inspecti | on |
| 0 | As there's dangerous and high-voltage parts inside the drive, before wiring or inspection, turn off the power and wait for 5 minutes or more. Moreover, do not disassemble the drive. | To prevent electric shock. |

| Installing and wiring | | ▲ CAUTION | |
|--|------------|---|--|
| Please follow the specified combination of the motor and drive. To prevent fire or malfunction. Do not buch the terminals of connector directly. To prevent electric shock or malfunction. To prevent electric shock or fire. To prevent electric shock or fire. The the motor and have the test run away from the motor can be securely mounted to mechanical system. To prevent electric shock or fire. To prevent electric shock or fire. To prevent injury or malfunction. Install the equipment correctly in accordance with its weight and rated output. To prevent injury or malfunction. Do not tolm or state output. To prevent electric shock, injury, fault or damage. The parameter settings must not be changed excessively. Operation and running To prevent injury. When power is restored after an instantaneous power failure, keep away from the anchine because the machine so that it is secured against hazard if restarted. To prevent injury. When power is restored after an instantaneous power failure, seep away from the direct sunlight. To prevent injury or malfunction. Do not install or operate a faulty servo motor or drive. To prevent injury or malfunction. The electromagnetic brake on the servo motor is designed to hold the servo motor is not aff. To ensure safely, install a stopper on the machine is de. To prevent injury. Audden restart is made if an alarm is reset with the run signa | | | |
| Do not touch the terminals of connector directly. To prevent electric shock or mafunction. To not block intake and prevent the foreign matters from entering into the motor and drive. To prevent electric shock or free from entering into the motor and have the test run way from the motor can be securely mounted to mechanical system. To prevent electric shock or free direction. The service notor must be installed in the specified direction. To prevent injury or malfunction. Install the equipment correctly in accordance with its service not on service equipment. Do not put heavy objects on equipment. To prevent injury or malfunction. Operation and running To prevent injury. To prevent injury. When power is restored after an instantaneous power failure, keep away from the machine because the machine may be restarted suddenly (design the machine may be restarted suddenly (design the machine so that it is secured against hazard if To prevent injury. Weep ta way from the direct sunlight To prevent injury or malfunction. To prevent injury or malfunction. Do not turb dror grate a faulty servo motor or drive. To prevent injury or malfunction. To prevent injury. Check the power specification. To prevent injury. To prevent injury. To prevent injury. Check the power specification. To prevent injury. To prevent injury. To prevent injury. Do not insta | | Please follow the specified combination of the motor | To prevent fire or malfunction. |
| from entering into the motor and drive. To prevent idective should of life. Image: the motor and have the test run away from the mechanical system. To prevent injury. Image: the motor and have the test run away from the mechanical system. To prevent injury. Image: the second provide the mechanical system. To prevent injury. Image: the second provide the mechanical system. To prevent injury or malfunction. Image: the second provide the second provide the specified direction. To prevent injury or malfunction. Image: the second provide the | | | |
| mechanical system. After confirming the operation, the motor can be securely mounted to mechanical system. The servo motor must be installed in the specified direction. Install the equipment correctly in accordance with its weight and rated uptut. Operation and running Do not climb or stand on serve equipment. Do not put injury, fault or damage. The parameter settings must not be changed excessively. Operation will be instable. When power is restored after an instantaneous power failure, keep away from the machine because the machine so that it is secured against hazard if ro prevent injury. Keep it away from the direct sunlight. To prevent malfunction. The electromagnetic brake on the servo motor is designed to off or shaft. Do not install or operate a faulty servo motor or drive. The electromagnetic brake on the servo motor or drive. Check the power specification. To prevent injury. The electromagnetic brake may not hold the servo motor shaft. To prevent injury. The electromagnetic brake may not hold the servo motor shaft. To prevent injury. The electromagnetic brake may not hold the servo motor motor shaft. To prevent injury. The nect relay for emergency stop and for brake in series. Transportation and storage Do not subject the equipment to the place with rain, waterdrop, poisonous gases or liquids. To prevent malfunction. To prevent malfunction. To prevent malfunction. To studen the relay for emergency stop and for brake in series. Transportation and storage Do not subject the equipment to the place with rain, waterdrop, poisonous gases or liquids. To prevent malfunction. To prevent malfunction. Do | | | To prevent electric shock or fire. |
| direction. Install the equipment correctly in accordance with its To prevent injury or malfunction. Operation and running Do not climb or stand on servo equipment Do not put heavy objects on equipment. To prevent injury. The parameter settings must not be changed excessively. Operation will be instable. To prevent injury. When power is restored after an instantaneous power failure, keep away from the machine because the machine so that it is secured against hazard if restarted). To prevent injury. Keep it away from the direct sunlight To prevent malfunction. To prevent malfunction. Do not putstrong impact on the motor, drive and motor shaft. To prevent malfunction. To prevent injury or malfunction. Do not install or operate a faulty servo motor is designed to hold the servo motor or drive. To prevent injury. Fo prevent injury. On the used for ordinary braking. To prevent injury. To prevent injury. Do not install or operate a faulty servo motor or drive. To prevent injury. To prevent injury. A sudden restart is made if an alarm is reset with the in series. To prevent injury. To prevent injury. Connect the relay for emergency stop and for brake in series. To prevent malfunction. To prevent malfunction. Do not subject the equipment to the place with rain, waterdrop, poisonous gases of ilquids | 0 | mechanical system. After confirming the operation, the motor can be securely mounted to mechanical | To prevent injury. |
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| Image: Construction of the serve motor shaft. To ensure safety, install a stopper on the machine side. To prevent injury. A sudden restart is made if an alarm is reset with the run signal on. To prevent injury. Connect the relay for emergency stop and for brake in series. To prevent injury or malfunction. Do not subject the equipment to the place with rain, waterdrop, poisonous gases or liquids. To prevent malfunction. Do not carry the servo motor by the cables, shaft or encoder during transportation. To prevent injury or malfunction. Do not drop or dump the motor during transportation and installation. To prevent malfunction. If you want to store it for a long time, follow the instruction manual. To prevent malfunction. Store the unit in a place in accordance with the instruction manual. To prevent malfunction. Other safety instructions Please dispose the battery according to your local laws and regulations. When disposing of the product, handle it as industrial waste. Maintenance and inspection Do not turn on or switch off the main power frequently. To prevent malfunction. Do not turn on or for some time after power-off, high while power is on or for some time after power-off. To prevent malfunction. Image: the unit in a place in accordance with the instruction manual. To prevent malfunction. Image: the dispose the battery according to your local laws an | | Do not install or operate a faulty servo motor or drive. | |
| Image: Start To ensure safety, install a stopper on the machine side. To prevent injury. A sudden restart is made if an alarm is reset with the run signal on. To prevent injury. Connect the relay for emergency stop and for brake in series. To prevent injury or malfunction. Do not subject the equipment to the place with rain, waterdrop, poisonous gases or liquids. To prevent malfunction. Do not carry the servo motor by the cables, shaft or encoder during transportation. To prevent injury or malfunction. Do not drop or dump the motor during transportation and installation. To prevent malfunction. If you want to store it for a long time, follow the instruction manual. To prevent malfunction. Store the unit in a place in accordance with the instruction manual. To prevent malfunction. Other safety instructions Please dispose the battery according to your local laws and regulations. When disposing of the product, handle it as industrial waste. Maintenance and inspection Do not touch the servo drive heat sink, regenerative resistor, servo motor etc. Their temperatures may be high while power is on or for some time after power-off. To prevent time. When the drive become faulty, switch off the control circuit and main power. To prevent time. To prevent time. | | Check the power specification. | To prevent fault. |
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About maintenance and inspection

<Warranty period> The term of warranty for the product is 18 months from the date of manufacture. It's exceptional to brake motors as they are warranted when acceleration / deceleration times is not beyond the specified service life.

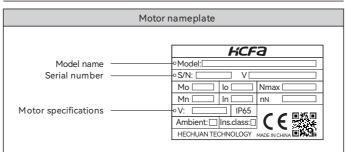
< Warranty coverage >

< Warranty coverage > This warranty applies only when the condition, method, environment, etc. of use are in compliance with the terms and conditions and instructions that are stated in the instruction manual and user manual for the Product. However, even during warranty period, the repair cost will be charged on customer in the following cases. 1) A failure caused by improper storing or handling, repair and modification. 2) A failure caused by the parts which have dropped down or damaged during transportation 3) A failure caused when the products have been used beyond the product specification (4) A failure caused when the products have been used beyond the product specification

3) A failure caused when the products have been used beyond the product specification (4) A failure caused by external factors such as inevitable accidents, including but not limited to fire, earthquake, lightning stroke, windstorm disaster, flood, salt damage, abnormal fluctuation of voltage and other natural disaster. 5) A failure caused by the intrusion of water, oil, metal and other foreign matters. The warranty coverage is only for the product itself. We assume no responsibilities for any losses of opportunity and/or profit incurred by you due to a failure of the product

1. Product introduction and model selection

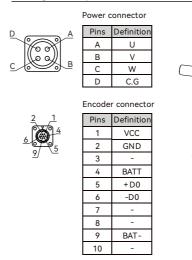
Introduction for motor nameplate

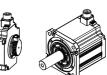


Model name identification

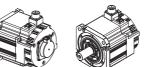
| SV-> | <2 | MM | 40 | 0A | - | N | 4 | | L | <u>N * *</u> |
|--------------|---------|-----------|-----------|-----------|---|-------------|------------------------|------|-----------------------|-------------------------|
| X2/X6 Series | | | | /mbol | specificat Voltag | е | Sym | | | |
| I | nertia | specifica | itions | | | | C 280 ~ 3 C 200 ~ 2 | | | |
| Symbol | | Specifica | ations | | | V | AC200~2 | .301 | | Absolute 17bit |
| MA | Low in | ertia | | | | | | _ | | |
| MM | Middle | e inertia | | | | <u> </u> | ake speci | fica | tions | Customized version |
| MH | High i | nertia | | | | Symb | ol E | Brak | e | Customized version |
| MG | - × | peed and | d hiah-ta | orque | | N No brake | | | | |
| MQ | Flat ty | | , mgn u | | | B 24V brake | | | | |
| | T luc y | pe | | | | Х | 7V bra | ke(u | Itrathin) | |
| | | | | | | | | | Sha | aft-end specifications |
| | | Pow | ver spec | cificatio | ns | | | | Symbol | Shaft-end/oil seal |
| Sym | Ibol | 200A | 300A | 40 | 0A | 500/ | A 750A | | L | Lead-wire/with oil seal |
| Specific | ations | 2KW | 3KW | 4K | W 5KW 7.5KV | | V | К | Lead-wire/no oil seal | |
| Sym | bol | 290 | A | 44 | 0A | DA 550A | | | С | Connector/with oil seal |
| Specific | ations | 2.9K | w | 4.4 | <w< td=""><td></td><td>5.5KW</td><td></td><td>D</td><td>Connector/no oil seal</td></w<> | | 5.5KW | | D | Connector/no oil seal |

Wiring description for servo motor





No brake



With brake

Combination of the drive and the motor

| Capacity | Servo motor SV-X6 | | Servo drive | Motor flange (mm) |
|----------|-------------------------|--------|----------------|----------------------|
| 2kW | High inertia | MH200A | SV-X6FA3001T-A | |
| 3kW | Middle inertia | MM300A | 5V-X0FA30011-A | |
| 4kW | Middle inertia | MM400A | SV-X6FA5001T-A | |
| 5kW | Middle inertia | MM500A | 5V-X6FA50011-A | □180 |
| 7.5kW | Middle inertia | MM750A | SV-X6FA7502T-A | |
| 2.9kW | Low-speed & high-torque | MG290A | SV-X6FA3001T-A | |
| 4.4kW | Low-speed & high-torque | MG440A | SV-X6FA5001T-A |] |
| 5.5kW | Low-speed & high-torque | MG550A | SV-X6FA7502T-A | |

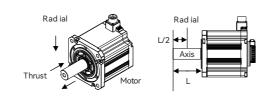
2. Product specifications

Motor specifications

| | lte | ems | Unit | | | Specific | cations | |
|-------------------------------|---------------------|----------------------|------------|---------------------------|-----------------------------|-----------------------------|-----------------------------|-----------------------------|
| | Vo | oltage | V | | | AC380V | | |
| Model name (SV-X2/X6 ****) | | | _ | MH200A High inertia | MM300A Middle inertia | MM400A Middle inertia | MM500A Middle inertia | MM750A Middle inertia |
| F | lange ins | tallation size | mm | | □180 | | | |
| Ma | ~ | Vithout brake | kg | 12.7 | 14.3 | 16.5 | 19.4 | 25 |
| | Mass Without brake | | | 17.4 | 19 | 21.2 | 28.5 | 29.7 |
| | Rated o | output | W | 2 | 3 | 4 | 5 | 7.5 |
| | Rated to | | N∙m | 9.55 | 14.3 | 19.1 | 23.9 | 47.8 |
| | Max. ins torque | stantaneous | N∙m | 28.6 | 42.9 | 57.3 | 71.6 | 119 |
| | Rated c | urrent | Arms | 5.8 | 8.7 | 11.5 | 13.5 | 21.8 |
| | Max. ins current | stantaneous | Arms | 19 | 30 | 38 | 45 | 75 |
| | Rated s | peed | r /min | 2000 | 2000 | 2000 | 2000 | 1500 |
| | Max. sp | eed | r /min | | 30 | 00 | | 2500 |
| su | | constant | N ∙ m/Arms | 1.83 | 1.8 | 1.82 | 2.04 | 2.5 |
| Common specifications | voltage | nductive constant | mV/(r/min) | 63.9 | 62.9 | 63.5 | 71.3 | 87.2 |
| pecifi | Rated power | Without brake | kW/s | 29 | 47 | 66.7 | 85.6 | 230.1 |
| s uor | change rate | With brake | | 20.4 | 32.3 | 53.6 | 70.7 | 200.1 |
| Comn | Mechanical time | Without brake | ms | 1.58 | 1.33 | 1.24 | 1.07 | 0.84 |
| | constant | With brake | | 2.38 | 1.8 | 1.59 | 1.3 | 0.97 |
| | Electrical | time constant | ms | 17.18 | 18.17 | 18.43 | 20.53 | 19.22 |
| | Motor rotor | Without brake | ×10⁻⁴kqm² | 31.4 | 43.5 | 54.7 | 66.7 | 99.3 |
| | Inertia | With brake | | 44.6 | 63.2 | 68 | 80.8 | 114.2 |
| | Permissible | Radial load | N | | 1 | 470 | | 2058 |
| | load | Axial load | | | | 490 | | 980 |
| | Encoder | | | | | munication (I | | |
| | Usage | | | H | lolding(Note: | not for brak | ing) | |
| su | Powers | | - | SELV por | | ed insulation | <u> </u> | s voltage. |
| atio | Rated v | 5 | V | | [| DC24V±105 | % | |
| cific | Rated c | urrent | A | | | A | | |
| s spe | Power suppry | | | | | | ore | |
| rake | Absorpt | | ms | | | S | | |
| <u>۵</u> | Release | | ms | | | S | | |
| | Release | e voltage | V | | DC | 0.5V or mo | ore | |

| Items | | | Unit | | Specificatio | ons | |
|-----------------------------------|--------------------|----------------------------------|--------------------------------------|---------------------------|---------------------------|--------------------|--|
| | V | oltage | V | | AC380V | | |
| Model name (SV-X2/X6□□□□-****) | | _ | MG290A High inertia | MG440A High inertia | MG550A High inertia | | |
| F | lange ins | stallation size | mm | | □180 | | |
| Ма | | Without brake | kg | 16 | 19.4 | 23.9 | |
| I*Id | 155 | With brake | ĸġ | 20.7 | 24.1 | 28.5 | |
| | Rated | output | W | 2.9 | 4.4 | 5.5 | |
| | Rated t | | N∙m | 18.6 | 28 | 35 | |
| | Max. in torque | stantaneous | N∙m | 45.1 | 71.1 | 87.6 | |
| | Rated | current | Arms | 10 | 15.7 | 19.5 | |
| | Max. in current | stantaneous | Arms | 33.5 | 52 | 66 | |
| | Rated | speed | r /min | | 1500 | | |
| | Max. s | beed | r /min | | 3000 | | |
| JS | | constant | N ∙ m/Arms | 2.01 | 2.13 | 1.98 | |
| catio | | inductive constant | mV/(r/min) | 70.2 | 74.2 | 69.6 | |
| Common specifications | Rated power | Without brake | kW/s | 73.3 | 114.3 | 134 | |
| s uou | change rate | with brake | | 55.5 | 93.7 | 115 | |
| Comm | Mechanica time | Without brake | ms | 1.28 | 1.16 | 1.04 | |
| 0 | constant | With brake | | 1.7 | 1.41 | 1.22 | |
| | Electrica | time constant | ms | 195 | 18.3 | 20.1 | |
| | Motor rotor | Without brake | × 10 ⁻⁴ kg m ² | 47.2 | 68.6 | 91.4 | |
| | Inertia | With brake | . To kym | 62.3 | 83.7 | 106.5 | |
| | Permissible | Radial load | N | 1470 | 1470 | 1764 | |
| | load | Axial load | | 490 | 490 | 588 | |
| | Encode | r | | | communication (EIA4 | 22) | |
| | Usage | | ļ, | ţ | not for braking) | | |
| ons | Power | | - | SELV power, rein | forced insulation for d | langerous voltage. | |
| cati | Rated voltage | | V | | DC24V±10% | | |
| ecifi | Rated | | A | | A | | |
| s p(| | riction torque | N∙m | | 74Nm or more | | |
| Brake specifications | <u> </u> | tion time | ms | | S | | |
| B | Releas | | ms | | S | | |
| | I Keleas | Release voltage V DC0.5V or more | | | | | |

Output shaft permissible load



| Permissible load | Unit | 2KW | 3KW | 4KW | 5KW | 7.5KW | 2.9KW | 4.4KW | 5.5KW |
|-------------------------|------|------|-----|-----|------|-------|-------|-------|-------|
| Permissible radial load | N | 1470 | | | 2058 | 14 | 70 | 1764 | |
| Permissible axial load | N | | 49 | 70 | | 980 | 49 | 90 | 588 |

Note: % indicates the highest speed for X2 series motor.

Ambient conditions and safety precautions for servo motor

| | Rated time | Continuous |
|--------------------|------------------------------------|---|
| | 11000 01110 | Conunuous |
| | Ambient temperature for use | 0~40°C(Without condensation) |
| | Ambient humidity for use | 20~85% R H(Without condensation) |
| | Ambient temperature for storage | -20~65 $^{\circ}$ C(Highest temperature guaranteed: 80 degrees, 72hours) |
| ions | Ambient humidity for storage | 20~85% RH (Without condensation) |
| Ambient conditions | Atmosphere for use/storage | Indoors(Not subject to rainwater or direct sunlight); free from corrosive gas, flammable gas, flammables, grinding fluid, oil mist, or dust |
| Ibie | Insulation class | Class B |
| Am | Insulation resistance | 1000 VDC megger $5M\Omega$ or more |
| | Dielectric strength | 1500 VAC for 1 minute |
| | Altitude | 1000m or less above sea level |
| | Vibration class | V 15(JEC2121) |
| | Vibration resistance | 49 m/s² (5G) |
| | Impact resistance | 98 m/s² (10G) |
| | Protective class | IP65 |
| | | Grounding is mandatory. Class I applicable. |
| | | Over voltage category II applicable |
| Poi | nts to note | Pollution degree 2 applicable |
| | | Brake cables have polarity. Red: connected with +24V. Black: connected with GND |

