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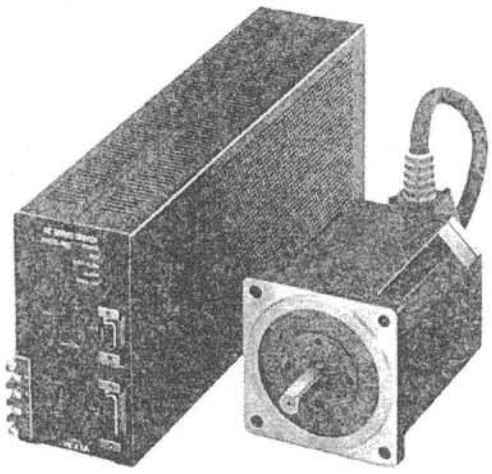
JAPANESE 800
PLEASE RETURN TO
J-SUPPORT CENTER

SUPER VEXTA™

AC Servo Motor System

KX SERIES

Instruction Manual



Thank you for purchasing our product.
To ensure correct usage, read this manual carefully before using the product.

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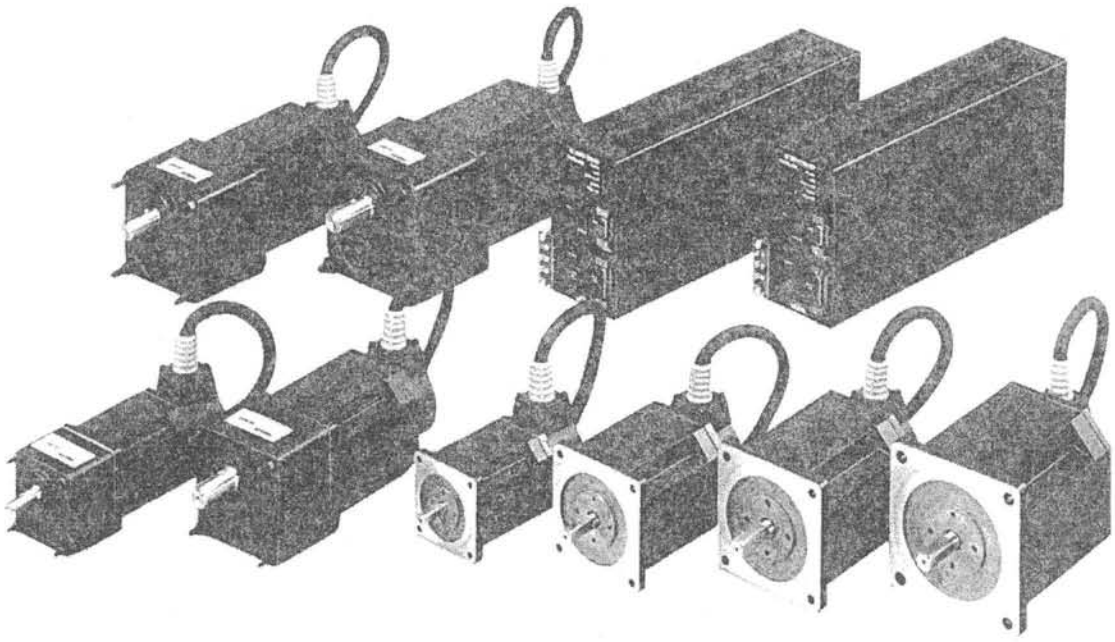
Motor-Driver Combinations

■ Round shaft type

System model number	Motor model number	Driver model number
KX230-ABZ	KXM230-AB	KXD30-ABZ
KX460-ABZ	KXM460-AB	KXD60-ABZ
KX5120-ABZ	KXM5120-AB	KXD120-ABZ
KX6180-ABZ	KXM6180-AB	KXD180-ABZ

■ Pinion shaft type

System model number	Motor model number	Driver model number
KX230GD-ABZ	KXM230GD-AB	KXD30-ABZ
KX460GD-ABZ	KXM460GD-AB	KXD60-ABZ
KX5120GD-ABZ	KXM5120GD-AB	KXD120-ABZ
KX6180GD-ABZ	KXM6180GD-AB	KXD180-ABZ

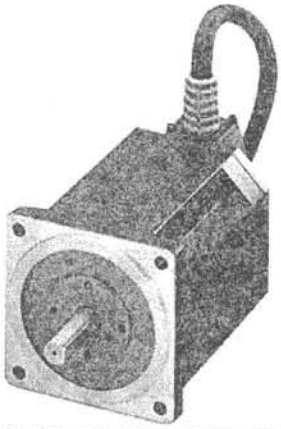


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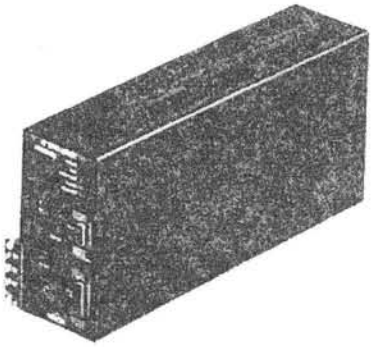
After Unpacking

Check that the package includes the main units and accessories shown below. Also check that the items are not damaged in transit.

(1)Motor



(2) Driver



(3) Driver mounting brackets: 2
Driver mounting screws: 4
(M3 P0.5)



(4)Connector assembly for control I/O signals
Case, HDF-CTF: 1
Connector, HDAB-15P: 1



(5) Junction cable (1.6 m)



(6) Instruction manual



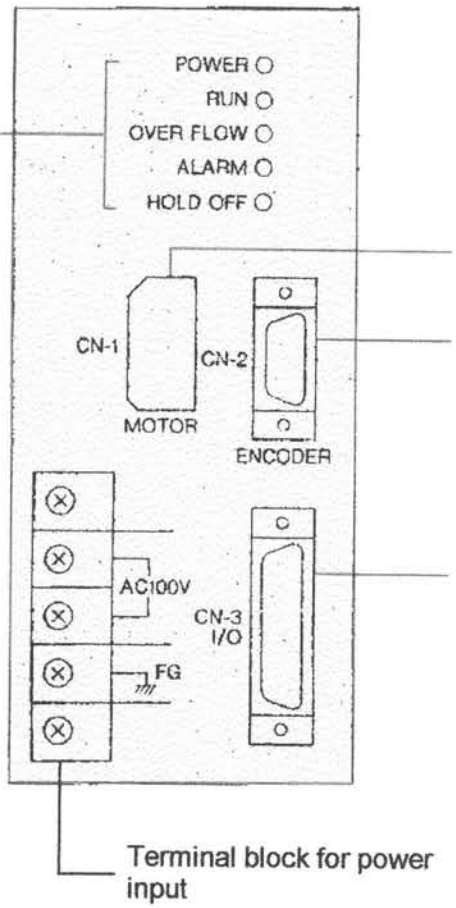
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Components and Functions

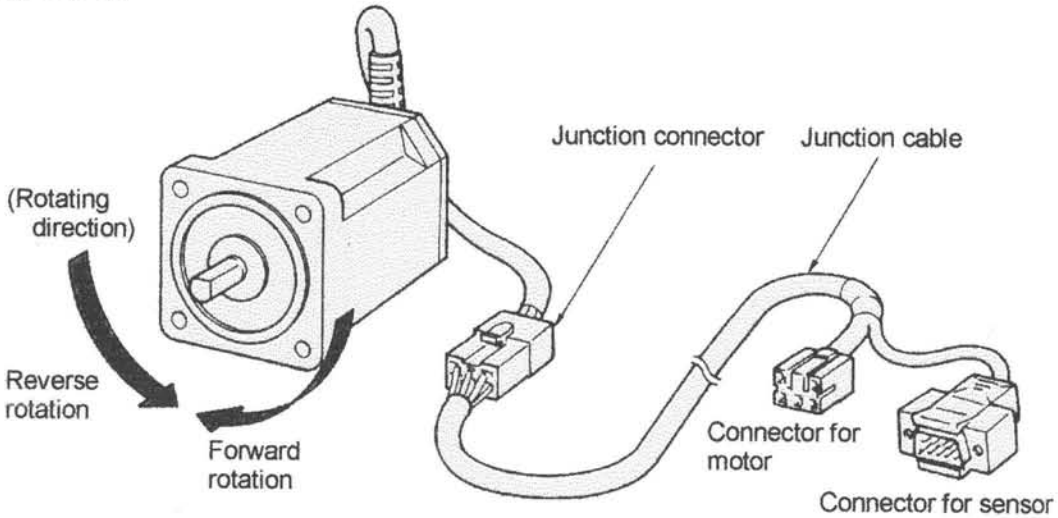
LED indicators

Indicator	Function
POWER	Indicates that power is On.
RUN	Indicates that the motor is properly running, or is overloaded at motor standstill.
OVER FLOW	The motor is not following up the specified pulse rate. (An alarm signal is generated and the motor stops itself.) ALARM
ALARM	Indicates that one of the following protection functions tripped. (1) Overcurrent protection: An instantaneous overcurrent is going to flow in the motor. (2) Overload protection: The motor has been running for a specified period at a load above the rating. (3) Overheat protection: The temperature of the radiator in the driver reached 80°C. (4) Output short-circuit protection: The motor output terminal is short-circuited. When a protection function trips, an alarm signal is generated and the motor stops itself. The protection function is reset by entering an alarm clear signal.
HOLD OFF	Indicates that a hold off signal was received. The motor enters the free state, but the deviation counter remains active.

AC servo driver



AC servo motor



The motor rotating direction is defined to be forward for clockwise direction, and reverse for counterclockwise direction, as viewed from the end of the motor output shaft.

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_____ CN1: Connector for motor

_____ CN2: Connector for sensor

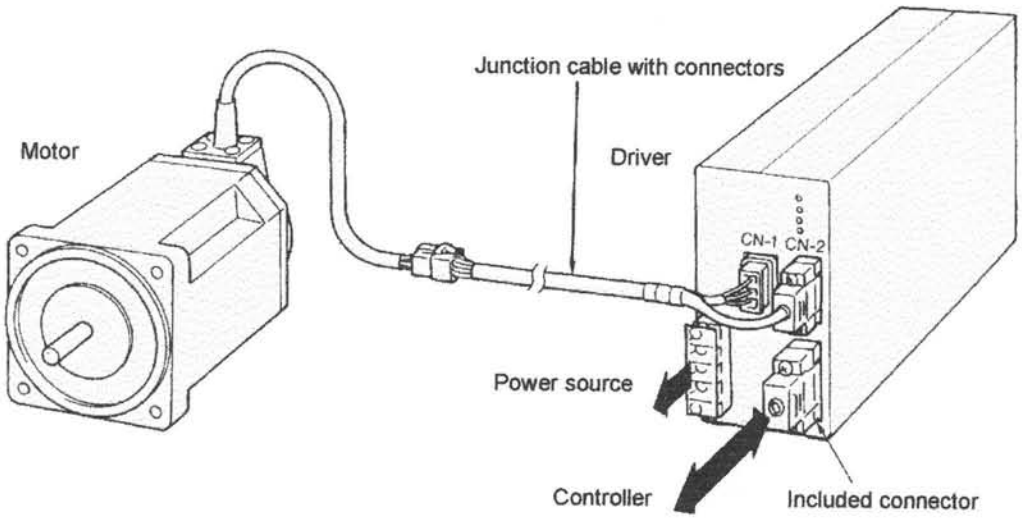
_____ Terminal block for power input

Pin #	Symbol	Signal name	Description
①	CW/PLS	Forward rotation pulse / pulse input	Receives a CW direction command pulse train or a pulse train (internally switched)
②	CCW/DRE	Reverse rotation pulse / rotating direction input	Receives a CCW direction command pulse train or a rotating direction command (internally switched)
③	HOF	Hold off input	Puts the motor in non-excitation (free) state. Because the deviation counter remains active, if the shaft is moved in motor-free state, it recovers to the previous position when HOF is cleared. (To clear this recovery function, enter CCR simultaneously with HOF.)
④	CCR	Counter clear input	Clears the deviation counter. While this signal is applied, any pulse input (including one sent from the encoder) is ignored.
⑤	ASG	Encoder A-phase pulse output	These signals are used for monitoring the encoder output or determining the home position. The number of pulses output per motor rotation is 200 for ASG and BSG, or 1 for ZSG.
⑥	BSG	Encoder B-phase pulse output	
⑦	ZSG	Encoder Z-phase pulse output	
⑧	RUN	Run output	This signal is sent when the motor is either properly running or is overloaded at a standstill. The "RUN" LED lights with this signal.
⑨	ALR	Alarm clear input	Clears alarm functions. Used to reset the overheat, overcurrent, or overflow protection function after it is activated.
⑩ ⑪	VCC	Common input	A 5-volt common for input signals.
⑫	ALM	Alarm output	This signal is sent when the protection circuit tripped. It lights the "ALARM" LED and frees the motor.
⑬ ⑭ ⑮	GND	Ground	Ground for output signal return.

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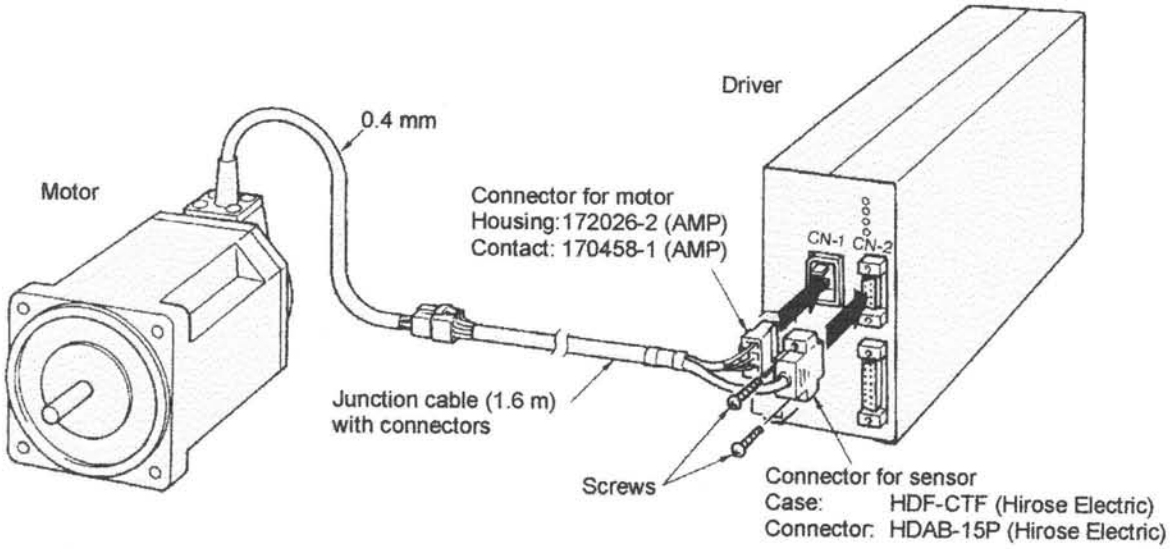
Connecting Procedure

To operate the motor, connect cables between the motor and the driver, between the driver and the power source, and then between the driver and the controller. The motor system includes a junction cable (1.6 m) having a CN-1 connector for motor and a CN-2 connector for sensor, as well as a CN-3 connector for control I/O signals. Two other cables, for power source and for control I/O signals, need to be prepared by the customer.



1. Connection between motor and driver

To connect the driver and the driver, use the included junction cable (1.6 m) having connectors.



Notes:

1. When connecting between the motor and the driver, make sure that power to the driver is turned off.
2. Remember to secure the connector for sensor on the driver using the two screws.

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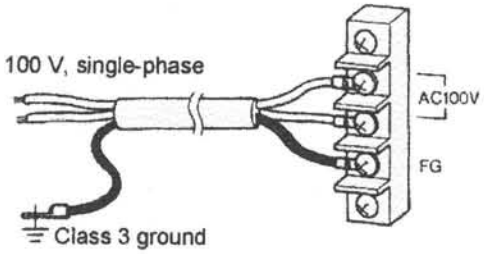
2. Connection between driver and power source

Use a 3-core cable (cross-sectional area of conductor ≥ 1.25 m^2) to connected with the power source.

The power supply voltage must be 100 V ±10%, single-phase, 50/60 Hz. However, the power supply input current depends on the motor output, as summarized in the table below.

Connect the frame ground (FG) terminal of the driver to class 3 ground (grounding resistance ≤ 100 Ω) or higher.

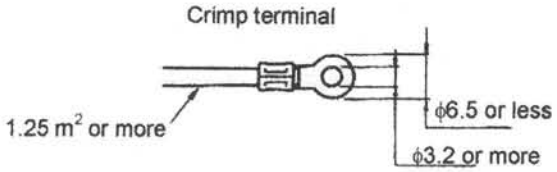
Connecting the power source



Power supply input current

System model name		Power supply input current
Round shaft type	Pinion shaft type	
KX230-ABZ	**KX230GD-ABZ**	2.5 A
KX460-ABZ	**KX460GD-ABZ**	3.5 A
KX5120-ABZ	**KX5120GD-ABZ**	6 A
KX6180-ABZ	**KX6180GD-ABZ**	9 A

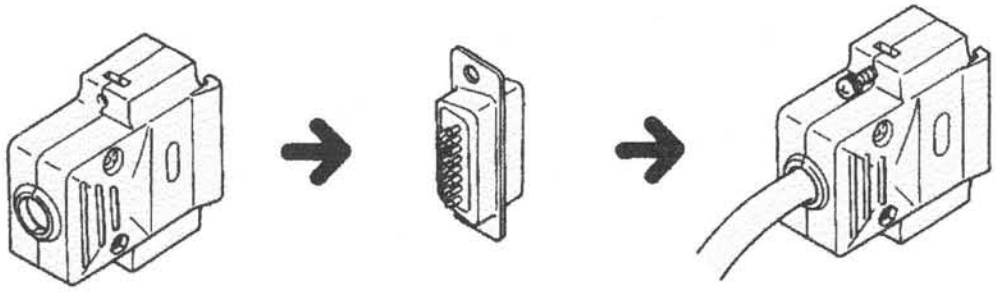
For connections on the terminal block, use the following (or equivalents):
Crimp terminals (V1.25-3 from J.S.T. Mfg.)
Crimping tool (YNT2216 from J.S.T. Mfg.)



3. Connection between control I/O section and controller

Use the included connector to connect the control I/O section to the controller.

For lead wires, use multi-core twisted-pair blanket shielding cable (consisting of at least 20 core wires, each 0.14 m^2 or more) to minimize the cable length and therefore the effects of noise.



Case: HDF-CTF
(Hirose Electric)

Connector: HDAB-15P
(Hirose Electric)

Solder the lead wires to the required pin numbers in accordance with the connection diagram.

After connection, secure the connector on the driver using the two screws.

For details of the control I/O section, see the next pages.

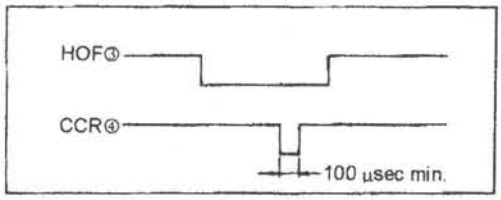
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How to Use the Control I/O

1. Description of control I/O signals

(1) Hold off input (③: HOF)

When a hold off signal is received, the motor enters the non-excitation (free) state. Use this state to rotate the motor's output shaft externally or to carry out manual positioning. However, once the hold off signal is cleared, the output shaft returns to where it was when the signal came, because the deviation counter in the driver remains active irrespective of the signal. If you are planning manual positioning to determine a home position, apply a counter clear (CCR) signal before clearing the hold off signal.

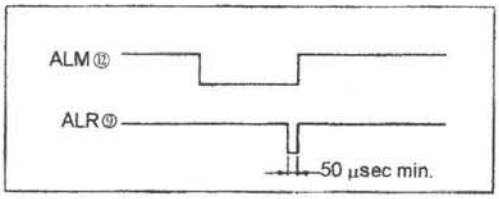


(2) Counter clear input (④: CCR)

This signals clears the deviation counter. Any pulses, or any feedback pulses from the encoder, that may come when this signal is On will be ignored. This signal can be used with the hold off signal for manual determination of home position.

(3) Alarm clear input (⑨: ALR)

Use this signal to reset the overheat, overcurrent, or overflow protection function after it is activated. The deviation counter is cleared at the same time. Ensure that the cause of the alarm has been removed before applying this signal.

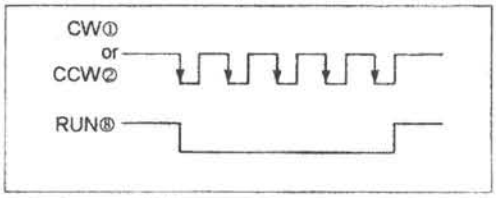


(4) Alarm output (⑫ : ALM)

This signal indicates that the protection circuit in the driver tripped. If an overload or overcurrent error is detected, the driver puts out an alarm signal, while lighting the "ALARM" LED and freeing the motor. If the motor is not following up the specified pulse rate, the driver puts out an alarm signal, while lighting the "OVER FLOW" LED and freeing the motor.

(5) Run output (⑧: RUN)

This signal is sent out when the motor is rotating properly with the input signal. It is also sent out when overload is applied when the motor is at a standstill. The "RUN" LED lights during output of a RUN signal.

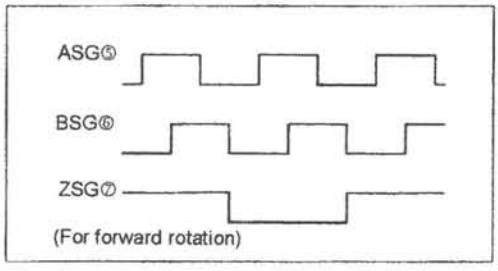


(6) Encoder output (⑤: ASG, ⑥: BSG, ⑦: ZSG)

These signals are used for monitoring the encoder output or determining a home position.

ASG, BSG } 200 pulses are sent out per motor rotation. The phase difference between ASG and BSG is 90 electric degrees.

ZSG One pulse is sent out per motor rotation.



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2. Pulse input modes

The AC servo motors of the KX series can use pulse signals to control the speed, angle, and direction of motor rotation. The motors provide two pulse input modes, which can be toggled to suit the pulse output mode of the controller. (The default is 2-pulse input mode.)

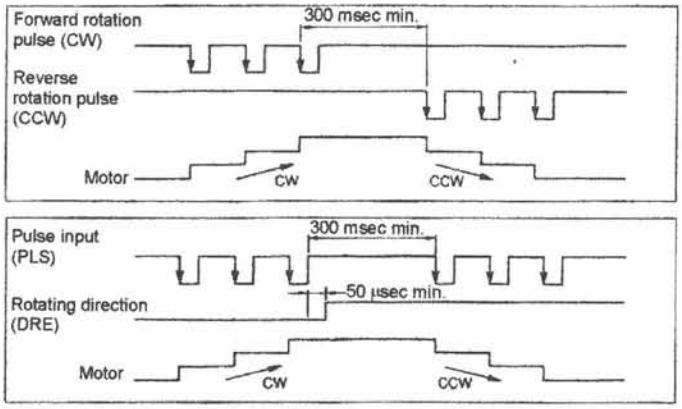
(1) 2-pulse input mode vs. 1-pulse input mode

- **2-pulse input mode**

This mode uses two types of pulse signals: forward rotation (CW) and reverse rotation (CCW). The motor rotates clockwise (as viewed from the end of the output shaft) with the input of a CW pulse, and counterclockwise with the input of a CCW pulse.

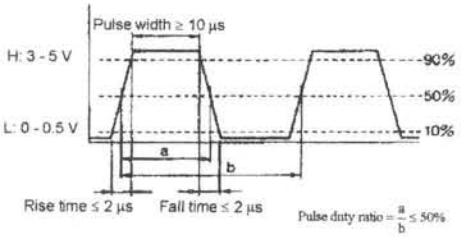
- **1-pulse input mode**

This mode uses a pulse (PLS) signal and a direction switching (DRE) signal.



(2) Pulse shape

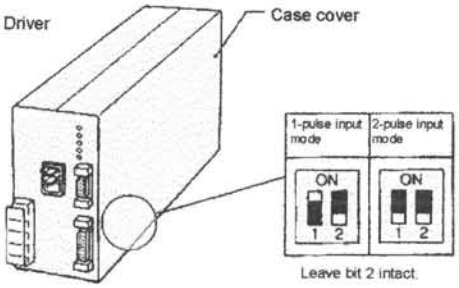
Use a pulse shape that has a width of 10 to 25 µsec and sharp rising/falling edges.



(3) Switching the pulse input mode

To switch between the pulse input modes, use the DIP switch in the driver:

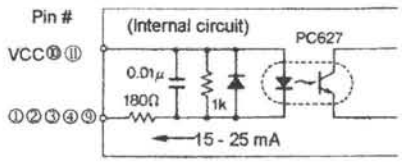
(1) Remove the right-hand case cover (as viewed from the driver front).
(2) Set bit 1 of the DIP switch to select the desired pulse input mode.
ON: 1-pulse input mode
OFF: 2-pulse input mode
(3) Close the case cover.



3. Control I/O circuit (I/O: CN-3)

(1) Input signal circuit

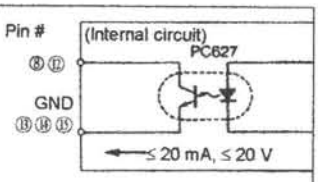
① Forward rotation pulse
② Reverse rotation pulse
③ Hold off input
④ Counter clear input
⑤ Alarm clear input



Note:
If input signal voltage exceeds 5 V, an external resistor is required to provide a current of 15 to 25 mA. Do not use an input signal that exceeds 18 V.
Example: 300 Ω for 12 V; no resistor required for 5 V

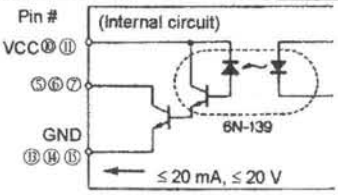
(2) Output signal circuit

⑧ Run output
⑫ Alarm output



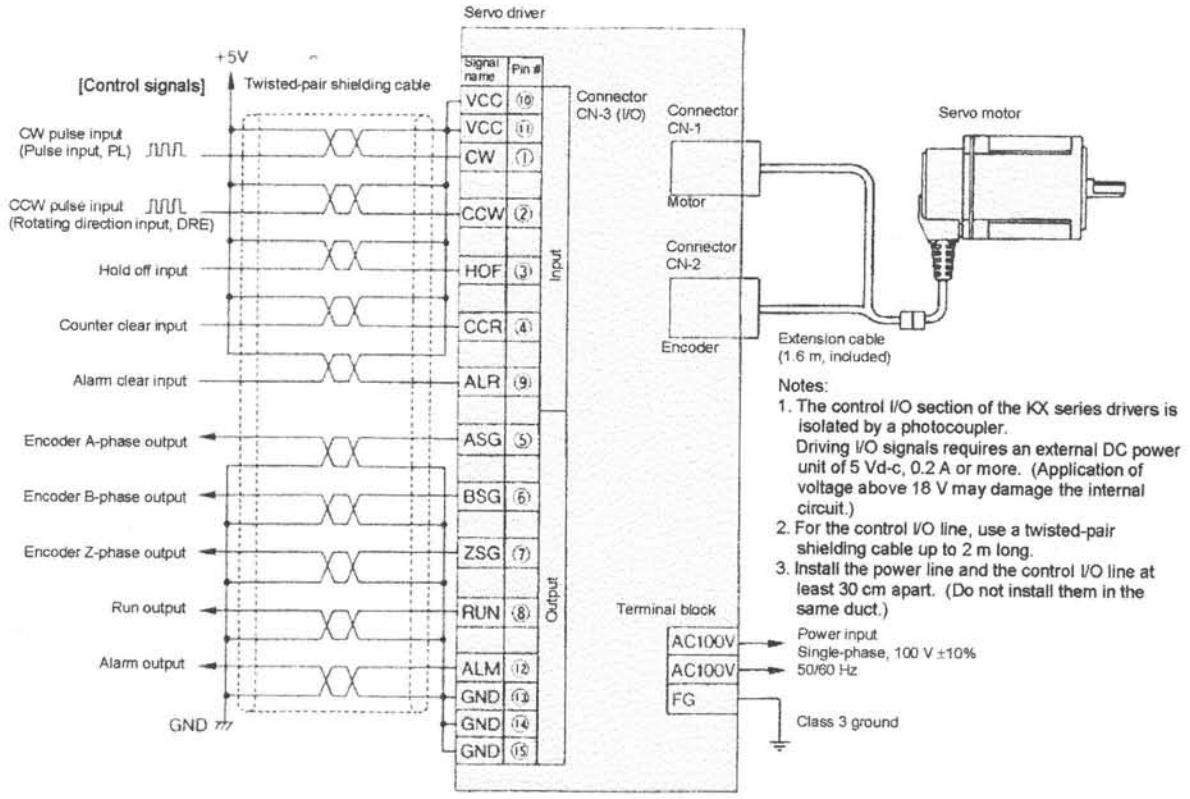
Note:
Use 10 mA or less to secure TTL level of output.

⑤ Encoder A-phase output
⑥ Encoder B-phase output
⑦ Encoder Z-phase output



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4. Connection diagram



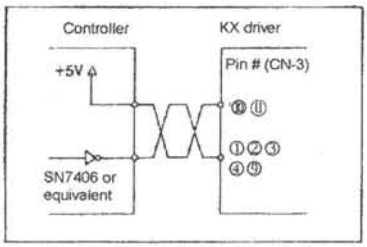
Notes:
1. The control I/O section of the KX series drivers is isolated by a photocoupler.
   Driving I/O signals requires an external DC power unit of 5 Vd-c, 0.2 A or more. (Application of voltage above 18 V may damage the internal circuit.)
2. For the control I/O line, use a twisted-pair shielding cable up to 2 m long.
3. Install the power line and the control I/O line at least 30 cm apart. (Do not install them in the same duct.)

5. Connection of control I/O signals to the controller

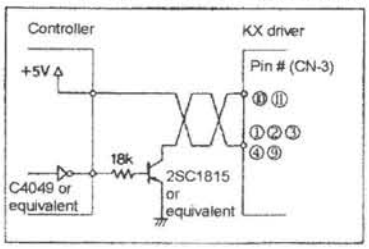
The connection of control I/O signals (CN-3) depends on the I/O mode of the controller. Connect them in a way that suits your controller as illustrated below.

(1) Controller's output configuration

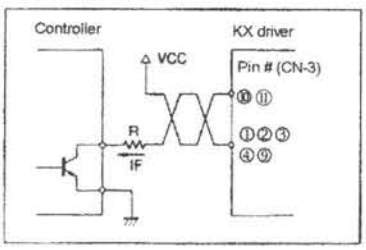
TTL (SN7406 or equivalent)



C-MOS (C4049 or equivalent)

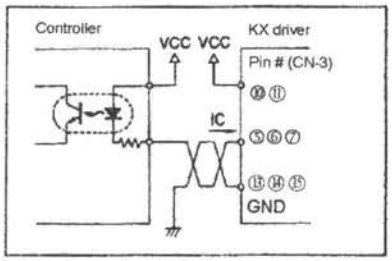


Open collector



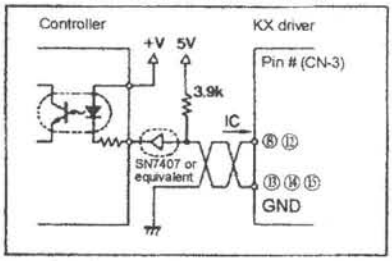
(2) Controller's input configuration (for photocoupler)

Encoder signals



Note: Ensure that VCC is above 5 V and below 18 V. If it is above 5 V, limit the IC current to 25 mA.

Run signal and alarm signal

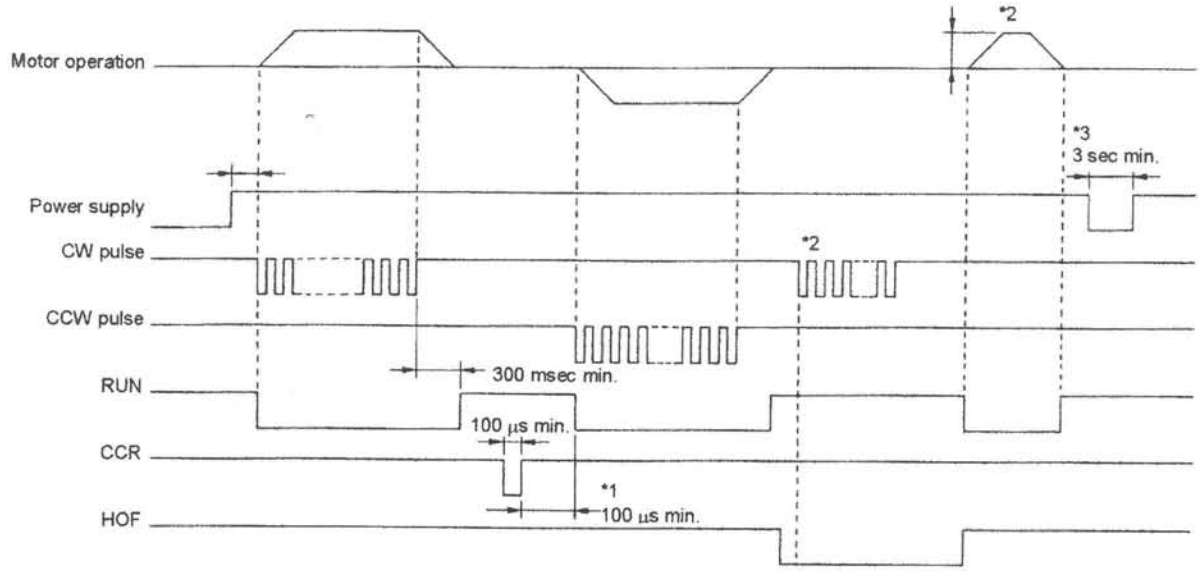


Note: The IC current is 10 mA or less. Therefore, if the photocoupler of the controller cannot be driven, amplify the current as shown above. However, VCC must be 5 V.

Note: If VCC is above 5 V and below 18 V, connect an external resistor R so that the IF current is 15 to 25 mA. If VCC is 5 V, the external resistor R is not required.

6. Operating Timing Chart

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*1 When applying a pulse signal following a CCR (counter clear) signal, provide a minimum interval of 100 μsec.

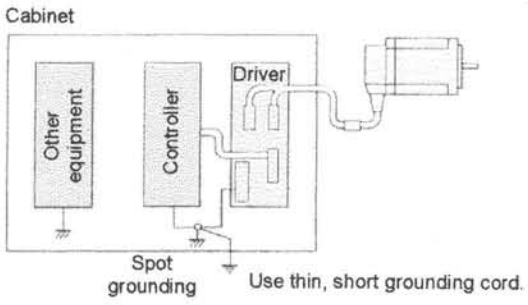
*2 While a HOF (hold off) signal is applied, the RUN signal output does not fall to the LOW level when pulses are input. However, because the deviation counter remains active, once the HOF is cleared, the motor rotates in either direction in accordance with the cumulative pulse. A RUN signal is sent out with this rotation.

*3 When turning power off and back on, provide a minimum interval of 3 sec.

7. Noise suppression

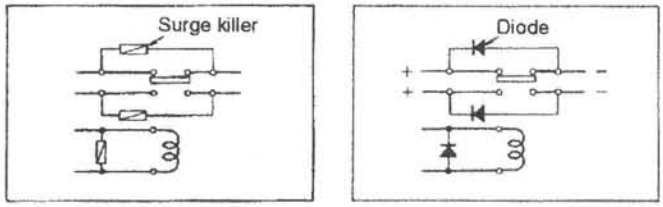
The AC servo drivers of the KX series withstand noise of 1000 V or more (for 1 μsec). However, the servo system may malfunction if exposed to excessive external noise. To prevent troubles due to noise, ground the system or apply noise suppression to the control relay contact, as shown below.

(1) Grounding example



(2) Noise suppression for relay coil and contact

AC circuit: Use surge killer. DC circuit: Use diode.



(3) Wiring

Follow the notes described in the connection diagram.

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Operation

Before operating your AC servo motor, make sure that:

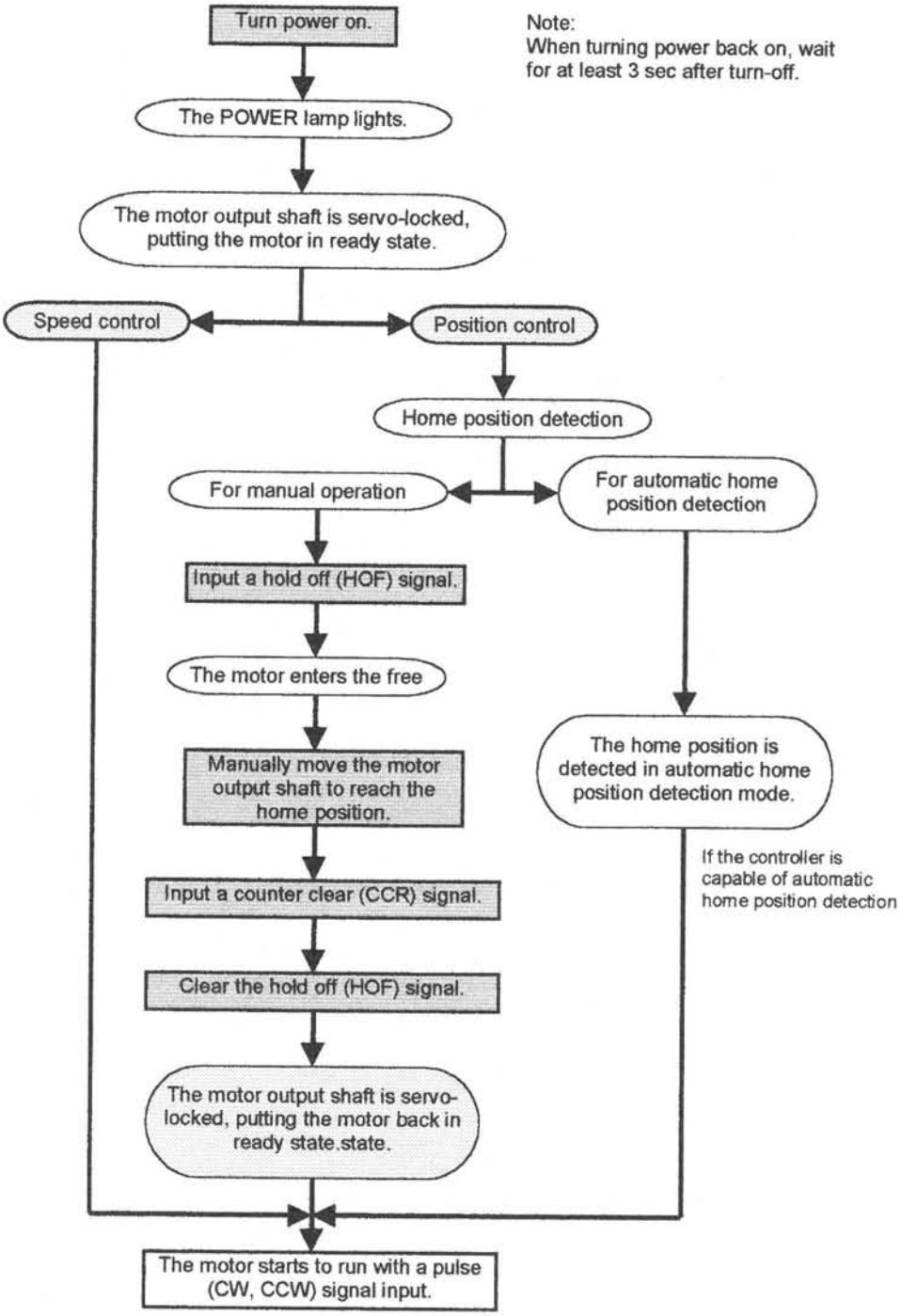
(1) The motor and driver are securely connected.

(2) The control I/O connector (CN-3) is properly connected and securely fixed.

(3) No pulse signal is applied.

1. Operation sequence

Being certain of the conditions (1), (2), and (3) above, operate the motor by following the procedure below.



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2. Operating conditions

To select or run a motor, ensure the following operating conditions. The operating conditions for motors depend on temperature, which increases with greater load or inertial load and with higher positioning (starting/stopping) frequency.

(1) Conditions for continuous operation

$T_L \leq T_R$ The load torque T_L (as converted to the value at the motor shaft) must be equal to or less than the rated torque T_R.

Round shaft type	KX230-ABZ	KX460-ABZ	KX5120-ABZ	KX6180-ABZ
Pinion shaft type	KX230GD-ABZ	KX460GD-ABZ	KX5120GD-ABZ	KX6180GD-ABZ
Rated torque, T_R	1 kgcm	2 kgcm	4 kgcm	6 kgcm

(2) Conditions for starting/stopping

$GD_L^2 \leq 6GD_M^2$ The inertial load GD_L^2 (as converted to the value at the motor shaft) must be equal to or less than five times the rotor inertia GD_M^2.

Round shaft type	KX230-ABZ	KX460-ABZ	KX5120-ABZ	KX6180-ABZ
Pinion shaft type	KX230GD-ABZ	KX460GD-ABZ	KX5120GD-ABZ	KX6180GD-ABZ
Allowable load inertia, 5 × GD_L^2	2.3 kgcm^2	11.5 kgcm^2	22.5 kgcm^2	35 kgcm^2

$T_a + T_L \leq Tm$ The sum of the acceleration/deceleration torque Ta (Td) required for accelerating/decelerating the inertia load GD_L^2, plus the load torque (T_L), must be equal to or less than the peak torque (Tm).

Round shaft type	KX230-ABZ	KX460-ABZ	KX5120-ABZ	KX6180-ABZ
Pinion shaft type	KX230GD-ABZ	KX460GD-ABZ	KX5120GD-ABZ	KX6180GD-ABZ
Peak torque, Tm	2 kgcm	4 kgcm	8 kgcm	12 kgcm

(3) Positioning frequency

$Trms \leq T_R$ Where position control is performed frequently, the effective load torque per cycle (the root mean square of required torque) Trms must be equal to or less than the rated torque T_R.

(4) How to determine torques

- Acceleration torque, Ta:

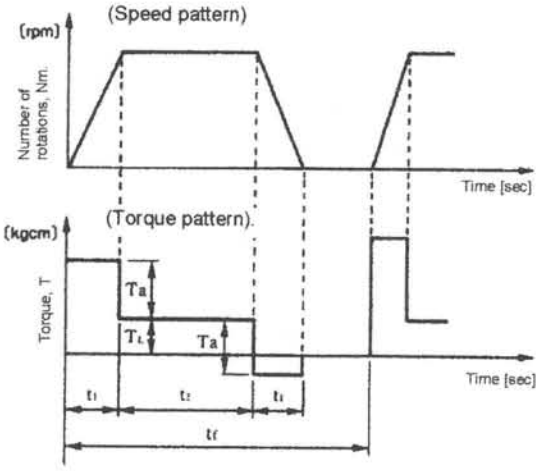
$$T_a = \frac{(GD_L^2 + GD_M^2)}{37500} \times \frac{N_M}{t_1} (kgcm)$$

- Effective load torque, Trms:

$$Trms = \sqrt{\frac{2(T_a + T_L)^2 \cdot t_1 + T_L^2 \cdot t_2}{t_f}} (kgcm)$$

GD_L^2: moment of load inertia (kgcm^2)
GD_M^2: rotor inertial moment (kgcm^2)
N_M: maximum number of rotations of motor (rpm)
Ta: acceleration torque (= deceleration torque) (kgcm)
T_L: load torque (kgcm)
t_1: acceleration/deceleration time (sec)
t_2: constant speed time (sec)
t_f: positioning cycle time (sec)

<Running pattern>



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3. Operating considerations

(1) Speed control

The number of rotations of motor, N_M (rpm), is proportional to pulse rate, S

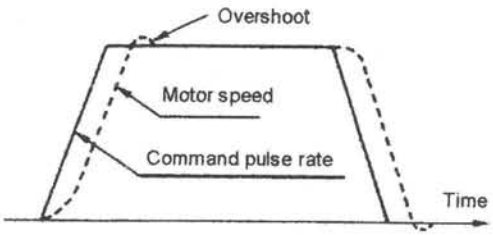
$$N_M = \frac{60 \cdot S}{400} = 0.15S(rpm)$$

This value is accurate to ±3 rpm relative to the set value. When the input pulse rate is 20 kpps, the motor rotates at 3,000 rpm. When the motor is coupled directly with a ball screw of 5-mm lead pitch, the feed rate of 250 mm/sec is obtained at 20 kpps of pulse rate.

Pulse rate, S [pps]	Number of motor rotations, NM [rpm]
200	30
1000	150
2000	300
10000	1500
20000	3000

(2) Acceleration/deceleration

Use acceleration/deceleration running to drive an inertial load. Acceleration/deceleration time can be adjusted to minimize overshoot or undershoot.



Speed pattern example for inertial load driving

System model number	Acceleration/deceleration rate [msec at 1000 pps]	Rise time [msec]
KX230-ABZ KX230GD-ABZ	30	600
KX460-ABZ KX460GD-ABZ	30	600
KX5120-ABZ KX5150GD-ABZ	30	600
KX6180-ABZ KX6180GD-ABZ	30	600

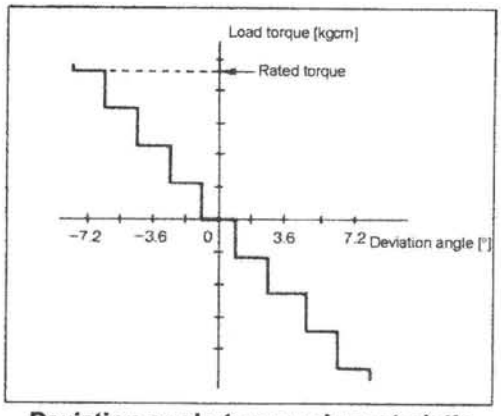
These are example values when the controller PC125 is used to accelerate an inertial load five times as much as the rotor inertia GD^ from 0 to 3,000 rpm.

(3) Positioning accuracy

Positioning accuracy is ±0.9° (±1 pulse) in no-load operation. In loaded operation, positioning accuracy changes with load torques as shown in the graph on the right. When the load torque changes to the rated torque, positioning accuracy is ±7.2° (±8 pulses).

Note:

In positioning application, stopping accuracy varies with load torque.



Deviation angle-torque characteristic

(4) Others

Avoid the following operations as they may damage the driver.

- Gravitational operation (i.e., lowering along the Z axis)
- Driving of a inertial load more than five times the rotor inertia.

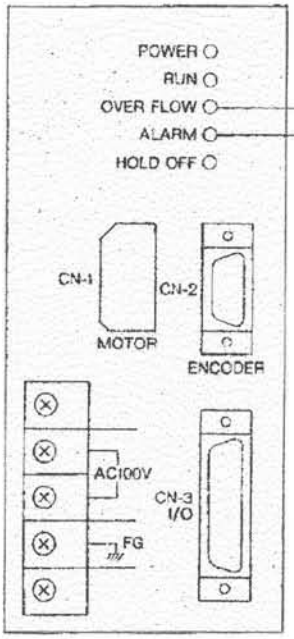
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4. Protection functions

The AC servo drivers of the KX series feature protection functions that detect abnormal operating conditions and servo system irregularities to maintain the servo system in safe conditions.

When a protection function trips, the motor enters the non-excitation (free) state. At the same time, the driver sends an alarm signal to external equipment and lights the appropriate LED on its front pane. If an alarm signal is sent out, be sure to identify the abnormal condition and remove the cause. Then, clear the alarm by applying an alarm clear (ALR) signal or turning power off and back on.

Front panel of KX servo driver



Protection function	Typical cause
Speed error protection (Overflow)	• The motor is constrained by the load system. • The motor fails to rotate because of a broken wire, etc. • The cumulative pulses in the deviation counter are more than $2^{15} = 32,768$.
(1) Overcurrent protection	• The motor connection cable has a short circuit. • A motor of different specifications is connected.
(2) Overheat protection	• The driver heat sink exceeded 80°C. (If frequent position control was used, review the running cycle or adopt forced cooling.)
(3) Overload protection	• Severe loading. • A load greater than the rated load was applied continuously for 5 sec or more.

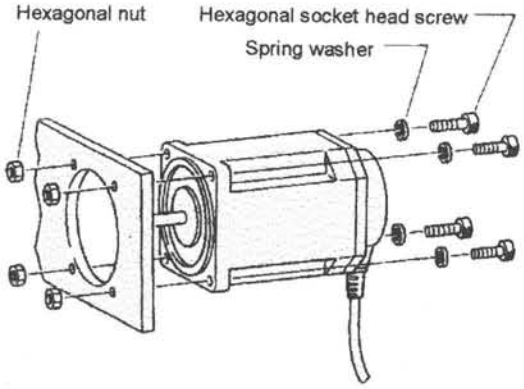
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Installation

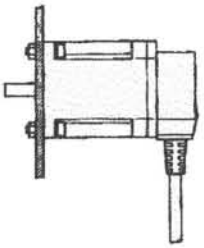
1. Motor installation

(1) Installing the driver

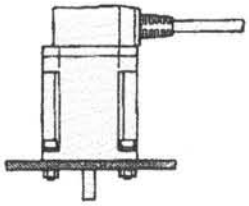
The motor can be installed in a horizontal or vertical position. For horizontal installation, facing the cable lead-out down serves better for dripproof purposes.



(Horizontal installation)



(Vertical installation)



(2) Coupling with the counterpart machine

The counterpart machine to be coupled with the motor needs alignment with the motor shaft. Inaccurate alignment causes vibration, which may shorten the bearing life seriously or invite fatigue failure of the motor shaft. A flexible coupling provides a good means for coupling between the counterpart machine and the motor.

Note: When attaching a coupling, timing pulley, or gear to the motor shaft, use care so that the motor shaft is not exposed to a shock. (A shock can damage the encoder in the motor.)

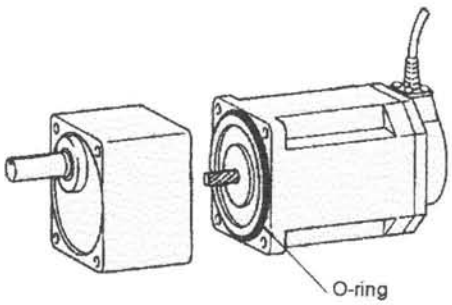
(3) Installation location

The motor should be used in the following environment.

- Indoors
- Ambient temperature: 0° to 40°C (non-freezing)
- Ambient humidity: ≤ 85% (non-condensing)
- Not exposed to corrosive gas or dust
- Not exposed to water or oil (if exposed, use a cover)
- Well ventilated for good heat dissipation

(4) Combining the motor and the gearhead

1) Before combining with the gear head, confirm that the included O-ring is seated on the motor socket of pinion shaft type.
2) Keep dust off the motor socket, O-ring, and gearhead socket.
3) Be cautious so that the O-ring is not galled when the motor and the gearhead are combined. (The low-viscosity grease used in the gearhead may leak if the O-ring is galled.)



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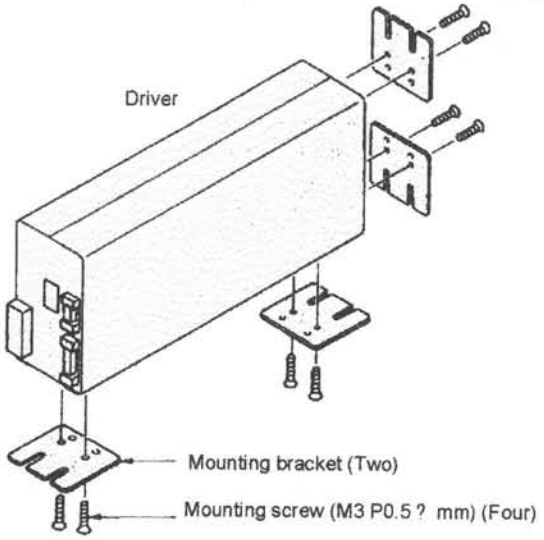
2. Driver installation

(1) Installing the driver

When installing the driver in a device, use the included mounting brackets and screws.

If installing the driver body directly without using the mounting brackets, be careful of the length of the screws to be used. (The screws should be as long as the thickness of the mounting plate plus 2 to 3 mm.)

(Installation on a vertical wall)



(2) Installation location

The driver should be used in the following environment.

- Indoors
- Ambient temperature: 0° to 40°C (non-freezing)
- Ambient humidity: ≤ 85% (non-condensing)
- Not exposed to corrosive gas, dust, or conductive particles (iron powder, etc.)
- Not exposed to water or oil

1) If you are installing the driver in a closed structure such as a control panel, or at a location near a heat generating object, be cautious of the temperature rise of the driver. Should the overheat function trip, cool the driver using a fan or attach a heat insulating cover.
2) If the driver is exposed to external vibration, use a shock absorber.
3) If the driver is near a noise generating object (such as a high-frequency welder or large electromagnetic switch), insert a noise filter, review the line cabling, or use a noise suppressor.
4) Ensure that conductive pieces (cuttings, pins, pieces of wiring) do not enter the driver.

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Specifications

The following specifications apply when each motor is combined with the dedicated servo driver.

■ Specifications of AC servo motors and servo drivers

System model number	Round shaft type	KX230-ABZ	KX460-ABZ	KX5120-ABZ	KX1680-ABZ
	Pinion shaft type	KX230GD-ABZ	KX460GD-ABZ	KX5120GD-ABZ	KX6180GD-ABZ
Rated output [W]		30	60	120	180
Rated torque [kgcm]		1	2	4	6
Rated speed [rpm]		3000			
Peak torque* [kgcm]		2	4	8	12
Rotor inertia GD^2 [$kgcm^2$]		0.45	2.3	4.5	7
Suitable load inertia		≤ 5 × rotor inertia			
Insulation class		Class E			
Power input	Voltage, frequency	100 V ±10%, single-phase, 50/60 Hz			
	Current [A]	2.5	3.5	6	9
Speed and position control input		Pulse train input			
Speed and position detection system		Optical encoder			
Maximum input pulse frequency		20 kpps (3000 rpm)			
Positioning pulses		400 pulses per rotation of motor shaft			
Protection functions		Overcurrent, overload, overheat			
Weight	Motor [kg]	1.0	2.1	3.0	4.4
	Driver [kg]	1.8			

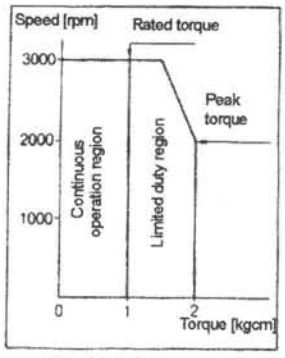
The maximum permissible time of peak torque shall be 5 sec at 2,000 rpm or below.

■ General specifications

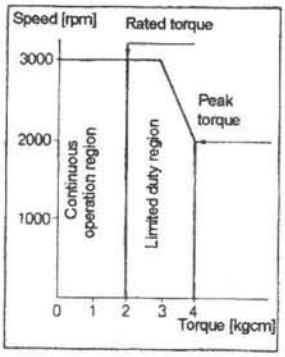
Unit		Servo motor	Servo driver
Insulation resistance		≥ 100 MΩ between the case and the coil as measured by a 500 Vdc megger.	≥ 100 MΩ between the case and the power input as measured by a 500 Vdc megger.
Dielectric strength		Sufficient to withstand 1.5 kVac applied for one minute between the case and the coil.	Sufficient to withstand 1 kVac applied for one minute between the case and the power input.
Environment (when operating)	Ambient temp.	0° to 40°C (non-freezing)	
	Humidity	≤ 85% (non-condensing)	
	Atmosphere	Free of corrosive gas and dust	

■ Torque-speed characteristic

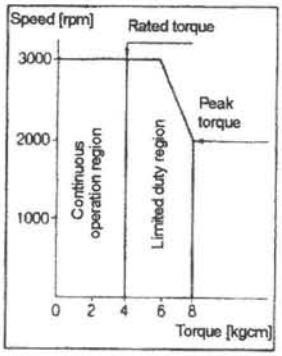
KX230-ABZ



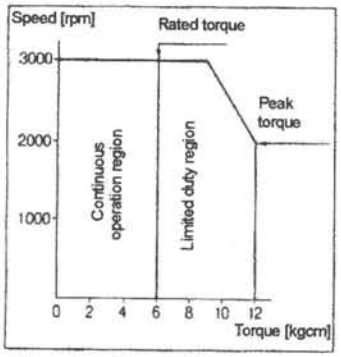
KX460-ABZ



KX5120-ABZ



KX1680-ABZ



Limited duty region: This operating region is typically used for acceleration/deceleration. If a torque about 1.5 times the rated torque is applied for more than 5 seconds, the overload protection function trips and lights the alarm LED on the driver.

Performance, specifications, and appearance of products are subject to change without prior notice.

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■ Permissible torque for motors coupled directly with gearheads [kgcm]

Gear ratio	5	10	15	20	30	50	100	200
Speed range / Motor/ gearhead type	4 – 600	2 – 300	1.3 – 200	1 – 150	0.67 – 100	0.4 – 60	0.2 – 30	0.1 – 15
KX230GD-ABZ / 2GD□K	4	8.1	12	16	21	30	40	40
	81%				73%		66%	
KX460GD-ABZ / 4GD□K	8.1	16	24	29	43	72	100	100
	81%			73%			66%	
KX5120GD-ABZ / 5GD□K	16	32	48	58	87	145	200	200
	81%			73%			66%	
KX6180GD-ABZ 6GD□K	24	48	73	87	131	218	300	300
	81%			73%			66%	

- The box (□) in the gearhead model number represents a gear ratio. (Only the gear ratios shown in the table are available as standard.)
- The rotating direction is the same as the motor for the torques shown in the thin-shade region□, and the opposite for the white region.
- The percent (%) values in the table indicate the transfer efficiency of gearheads.
- The bearings in gearheads consist entirely of ball bearings.

■ Permissible thrust load and overhang load of gearhead output shaft [kg]

Gearhead type / Gear ratio		5	10	15	20	30	50	100	200
2GD□K	Permissible thrust load	5							
	Permissible overhang load	10					15		
4GD□K	Permissible thrust load	10							
	Permissible overhang load	25				30			
5GD□K	Permissible thrust load	15							
	Permissible overhang load	30				40			
6GD□K	Permissible thrust load	15							
	Permissible overhang load	30				40			

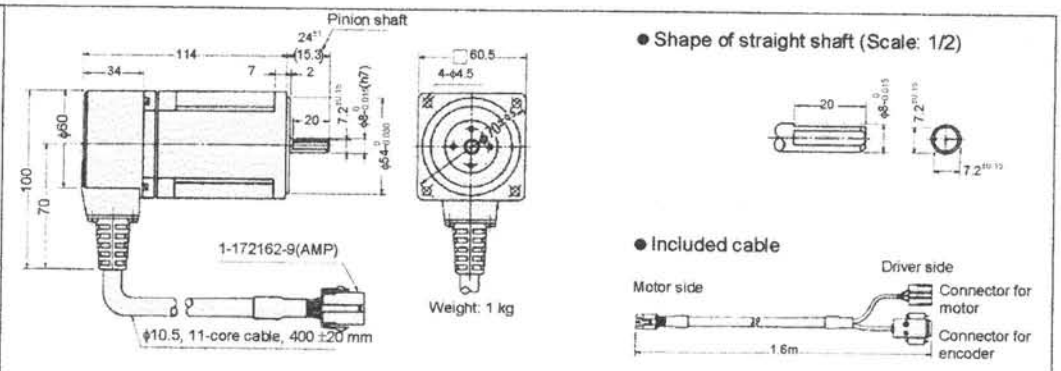
- The permissible overhang load is measured at 10 mm from the shaft end.

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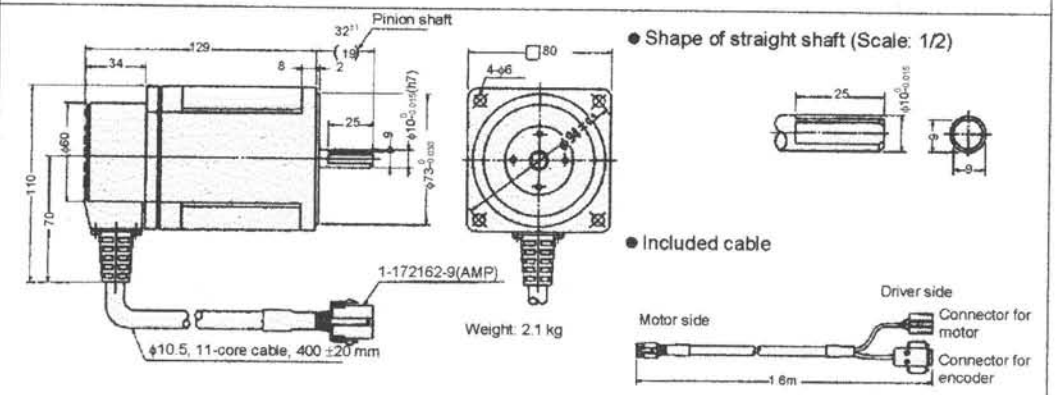
Dimensions

■ Motor (Scale: 1/4; Unit: mm)

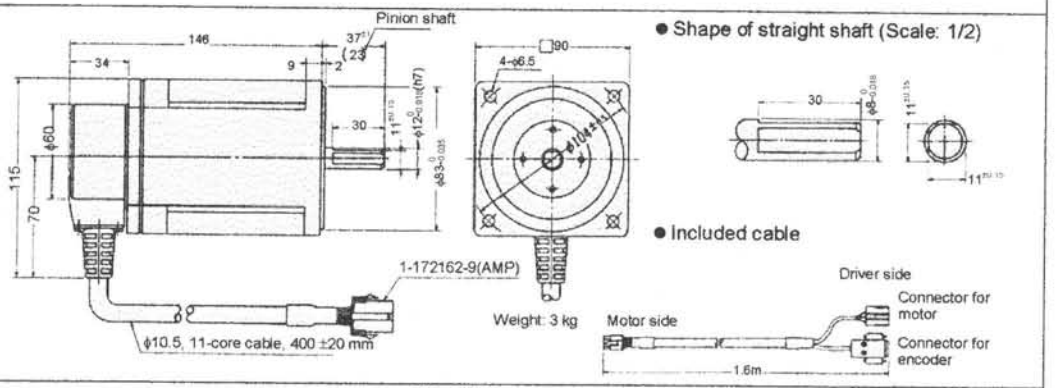
KXM230-AB



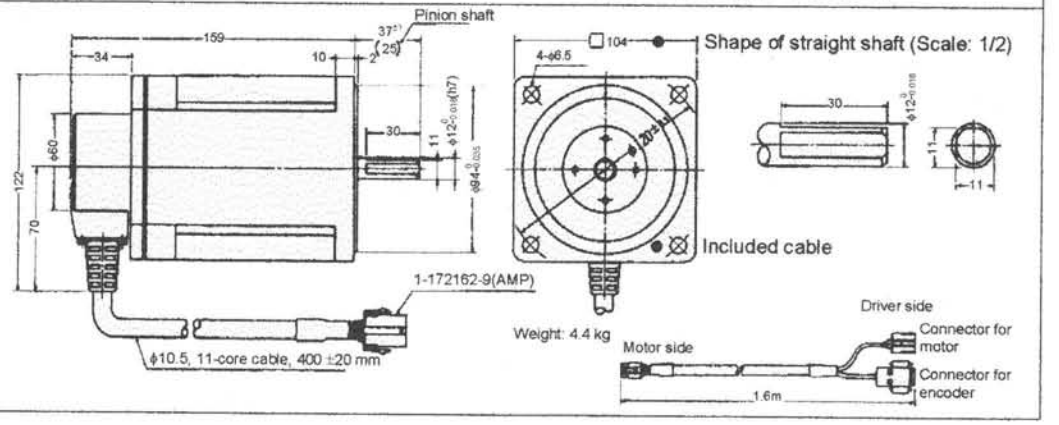
KXM460-AB



KXM5120-AB



KXM6180-AB

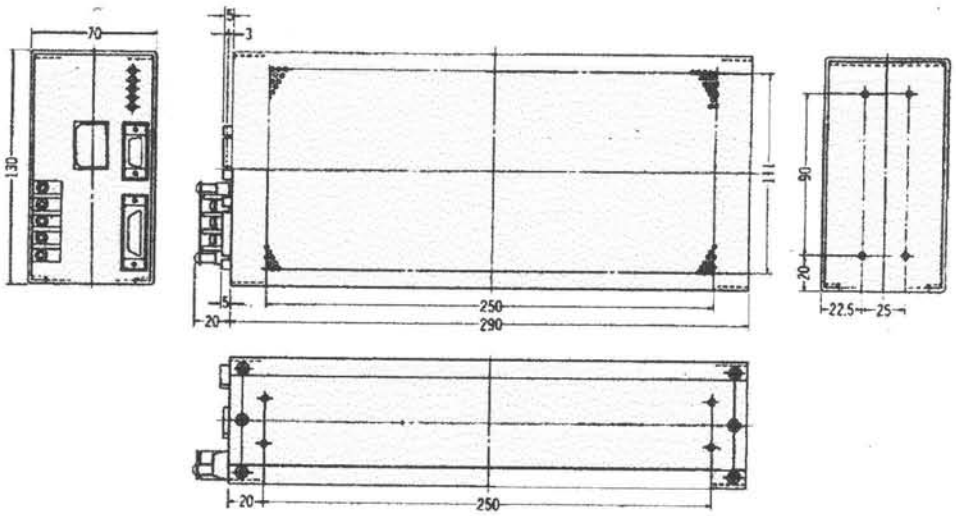


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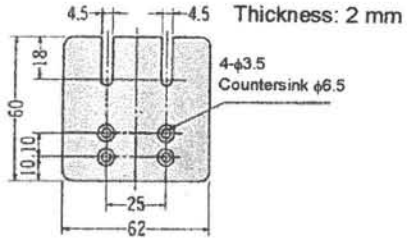
■ Driver (Scale: 1/4; Unit: mm)

Weight: 1.8 kg

KXD30-ABZ
KXD60-ABZ
KXD120-ABZ
KXD180-ABZ



Driver mounting bracket (Two brackets are included)



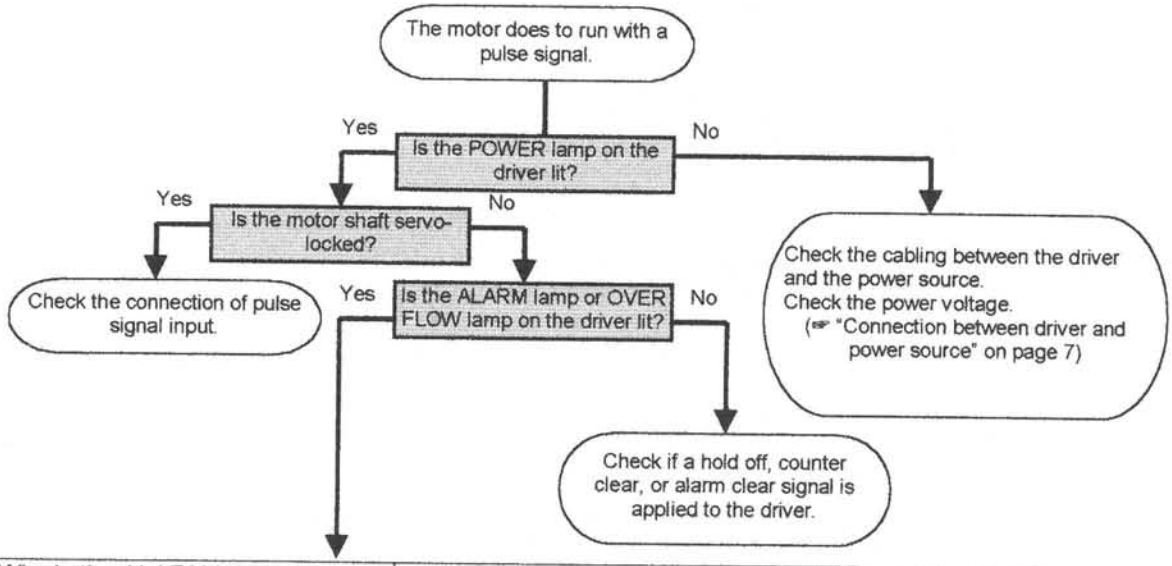
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Check on abnormal phenomenon

Please check before calling.

The following procedure should be used to check and deal with the phenomenon.

1. The motor does not run.



Why is the ALARM lamp lit?	Action
Overload	Review the load and the acceleration/deceleration time. (Load: ☞ (1) "Conditions for continuous operation" on page 13) (Acceleration/deceleration: ☞ (2) "Conditions for starting/stopping" on page 13)
Overcurrent	Check if motor lead wires are short-circuited.
Overheat	Decrease the ambient temperature of the driver to 40° C or lower.

Why is the OVER FLOW lamp lit?	Action
Excessive load inertia	Review the load inertia.
Motor wire break	Check for break in the cable and the connections.
Cumulative pulses overflowed.	Review the load inertia.

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2. The motor develops hunting during acceleration/deceleration.

(1) Is the load inertia less than five times the rotor inertia?

(☞ (2) "Conditions for starting/stopping" on page 13)

(2) Is acceleration/deceleration time appropriate?

(☞ (2) "Acceleration/deceleration")

For question, please contact the nearest sales office.

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