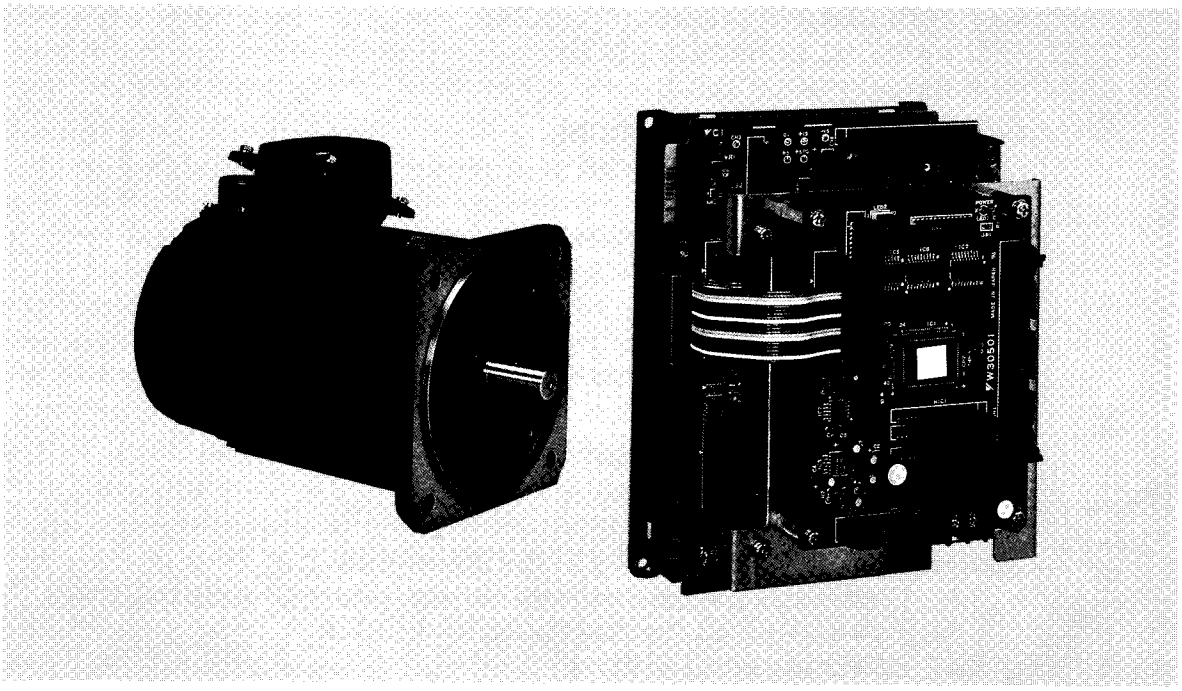
Juspoint Ⅲ

VECTOR CONTROL INVERTER POSITIONING SYSTEM

SPECIFICATIONS/FUNCTIONS



YASKAWA

TÜV PRODUCT SERVICE Bauart geprüft

Certificate No. B 95 03 22945 001

DTSE-S606-9.1

CONTENTS

1. INTRODUCTION

Juspoint Ⅲ is the newest member of our inverter drive family, developed exclusively for station indexing and positioning control. It is an economical-cost, easy to set, reliable positioning system designed to drive actuators for Numerical Control machine tools.

The system consists of a motor and a controller. The controller includes YASKAWA's vector-control inverter "X3000 series" with "Point module" (Positioning control board). The "X3000 series" features high-torque and precise speed control over a full speed ranged from 0 to 1800r/min. "Point module" can configure up to 120 different parameters for application flexibility.

The motor is a highly efficient, three-phase AC induction motor, exclusively designed for high performance vector-control applications. Juspoint Ⅲ positions accurately and rapidly in the same way as a servo drive and it is ideal for servo driven tool changer applications for machine tools.

In addition, compared with the cost of conventional AC servo drives, Juspoint Ⅲ is an economical alternative for tool resting, magazine attachments, Automatic Tool Changers (ATC), and Automatic Pallet Changers (APC).

FEATURES

- Juspoint Ⅲ can position up to 511 station numbers.
- Juspoint Ⅲ can operate rotary and linear axes.
  - Rotary axes
    - Juspoint Ⅲ can position up to 511 stations equidistantly.
    - Juspoint Ⅲ can automatically compensate positioning when the number of pulse between stations is a fraction.
  - Linear axes
    - Juspoint Ⅲ can position up to 511 station equidistatly.
    - Juspoint Ⅲ can arbitrarily position up to 45 stations.
- Juspoint Ⅲ can perform Absolute (ABS) positioning.

  Using the motor with a special brake, Juspoint Ⅲ can perform ABS positioning and no zero-point return operation is required even without a mechanical clamp when the power is ON.
- Juspoint Ⅲ can arrange parameters in up to 4 operation patterns.
- Juspoint Ⅲ has 6 operation modes:

  Automatic, manual, set-up, zero-point return, automatic zero offset, and JOG.
- 120 parameters available for configuring Juspoint Ⅲ to your specific requirements.

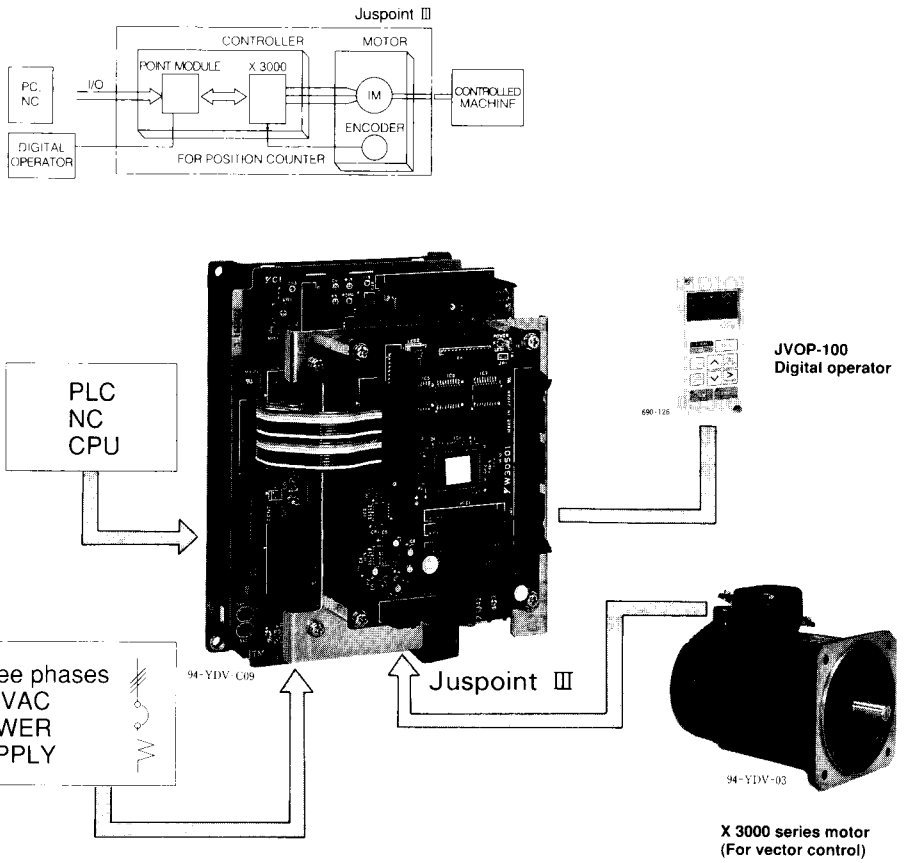


Fig. 1.1 Juspoint Ⅲ System Configuration

DANGER

- Do not touch circuit components until CHARGE lamp on X3000 series PC board extinguishes after turning off AC main circuit power.
  The capacitors are still charged and can be quite dangerous. Wait approximately five minutes after AC main circuit power is OFF.
- Do not connect or disconnect wires and connectors while AC power is applied.
- Do not check signals during operation.

IMPORTANT

- Be sure to ground Juspoint Ⅲ using mounting bolts.
- Do not provide capacitor or magnetic contactor between Juspoint Ⅲ and motor.
- Do not perform the following tests in the field :
  - Withstand voltage test on any part of the Juspoint Ⅲ. It is an electronic device using semiconductors and vulnerable to high-voltage.
  - Insulation resistance test with a megger. This test has been made at the factory and need not be conducted at test run. Exception: If megger-testing is required for inspection and maintenance purposes, it should be applied only to main circuit and the ground and never to the control circuit.
  - Conduction test on control circuits.

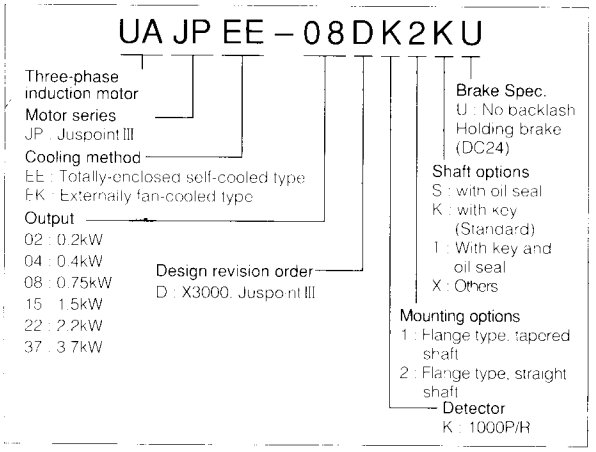
2. SPECIFICATIONS

Table 1.1 Specifications

	Model CIMR-	02JP3	04JP3	08JP3	15JP3	22JP3	37JP3
Drive	Output kW (HP)	0.2 (1/4)	0.4 (3/4)	0.75 (1)	1.5 (2)	2.2 (3)	3.7 (5)
	Current (A)	2.0	3.0	4.5	7.5	11.0	17.5
	Power Supply	Three phases 180 to 242V 50Hz			Three phases 180 to 253V, 60Hz		
	Input Current A	1.6	3.0	4.8	8.5	11.2	15.9
	Control Method	PWM vector cotrol					
	Power Element	IGBT					
	Braking Method	Resistive discharge (Resister built-in)					
	Speed Control Range	9-1800r/min					
	Speed Resolution	1800/6000 (0.3r/min)					
	Ambient Temperature	10 to +55°C (+14 to +131°F)					
	Power Supply	24VDC (±4V) 250mA					
Positioning Control	Control Axis	Rotary axis : Equidistant station (Single station pulse is an integer) Rotary axis : Equidistant station (Single station pulse is a fraction) Linear axis : Equidistant station Linear axis : Arbitrary station distance					
	Basic Operation	Zero-point return (2-mode) Set-up JOG Manual Automatic Automatic zero offset					
	Positioning Command	9 bit binary code (Max. 511 stations)					
	Current Position Output	9 bit binary code					
	Input Signal	Positioning command, Direction command, Start command, Operating mode, Zero - point LS Emergent stop, Reset, Numerical pattern, Servo on, ABS position start					
	Output signal	Position completion, Positioning near width, Zero speed, Alarm, Current station ABS position completion					
	Backlash Compensation	0 to 7200° (20-rotation at motor axis)					
	Accel Time	10 to 5000 msec (0 to 1800r/min)					
	Soft Start	Provided (0 to 100msec)					
	Soft Stopping	Provided					
	ABS Positioning	Provided (Using motor with brake)					
	Positioning Accuracy	0.5° or below (At motor axis)					
	Operation Constant	Total 120 parameters (Digital operator : JVOP-100 or setting by personal computer is also possible.)					
Motor	Model UAJPEE- DK2K	0.2kW	0.4kW	0.75kW	1.5kW	2.2kW	3.7kW
	Output kW (HP)	0.2 (1/4)	0.4 (3/4)	0.75 (1)	1.5 (2)	2.2 (3)	3.7 (5)
	Rated Current A	1.08	2.9	4.1	7.4	11.0	16.0
	Rated Torque N·m	1.06	2.12	3.98	7.95	11.66	19.62
	Maximum Torque N·m	200% rated Torque					
	Moment Inertia of J ($GD^2/4$) kg·cm²	6.0	14.5	30.75	70.25	96.75	200.5
	Insulation Class	Class B					
	Time Rated	40% ED (30min.)					30% (20min.)
	Rated Speed	1800r/min (4 poles)					
	Enclosure	IP44					
	Encoder	Optical 1000 puls/r (A, B, Z, phases)					
	Ambient Temperature, Humidity	-10 to +40°C (+14 to +104°F) 90% RH or below					

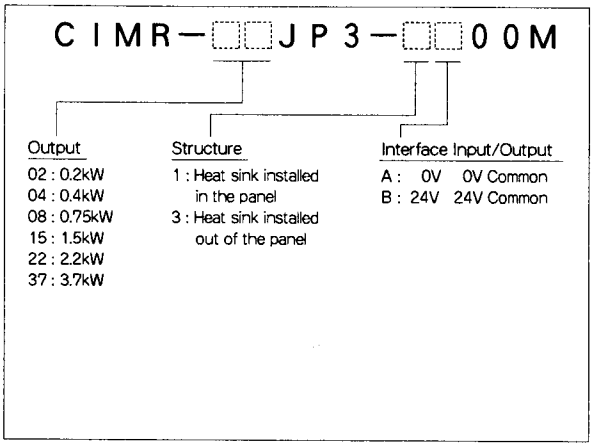
■ Motor (exclusive motor for X3000 series)

Instruct the motor by model numbers as shown in the example below. Specify output and whether with / without brake.
(With ABS positioning, order the motor with brake.)



■ Controller (X3000 series + point module)

Instruct Juspoint III by model numbers as shown in the example below. The model number differs according to control I/O interfaces. Specify output, cooling method, and interface specifications.



3. SYSTEM CONFIGURATION

3.1 INTERCONNECTION DIAGRAM

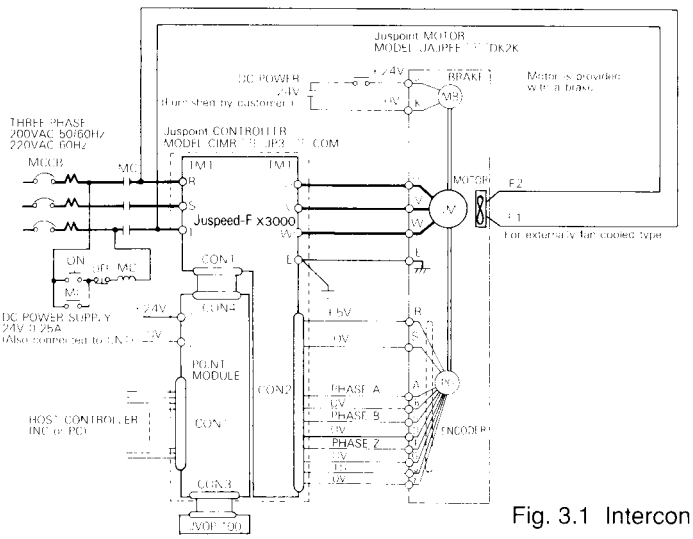


Fig. 3.1 Interconnection Diagram

(1) Specifications of peripheral equipment and cables for main circuit terminals

Table 3.1 Peripheral equipment and cables specifications for main circuit terminals

Model CIMR-	02 JP 3	04 JP 3	08 JP 3	15 JP 3	22 JP 3	37 JP 3
Magnetic Contactor Model	HI-7E			HI-10-2E		HI-20E
Main circuit terminal cables specification	Cable Size 2mm²		Screw dia. M4	Cable Size 3.5mm²		Screw dia. M4

Table 3.2 Recommended Molded-case circuit breakers (MCCB) that have been certified by European safety standard EN

Model CIMR-	02 JP 3	04 JP 3	08 JP 3	15 JP 3	22 JP 3	37 JP 3
MCCB made by Fuji Electric	EA 33 SA 33B (415 VAC, 5A)		EA 33 SA 33B (415 VAC, 10A)	EA 33 SA 33B (415 VAC, 20A)		EA 33 SA 33B (415 VAC, 30A)
MCCB made by Mitsubishi Electric	NF 30-CS NF 30-SS (415 VAC, 5A)		NF 30-CS NF 30-SS (415 VAC, 10A)	NF 30-CS NF 30-SS (415 VAC, 20A)		NF 30-CS NF 30-SS (415 VAC, 30A)

Note Designate "TÜV" as a special product. (Safety standard EN60947-3 certified)

(2) Specifications of cable and receptacle for encoder (PG) terminal and CON2 connection specifications

Table 3.3 Cable and receptacle specifications for encoder (PG) terminal

Name		Model	Remarks
Plug	Straight	MS 3106 B20-29S-ZN	Made by JAE
	Angular	MS 3108 B20-29S-ZN	Made by JAE
Cable Clamp		MS 3057-12A	Made by JAE
Connecting cable		Twisted pair shielded cable (AWG22×5P minimum) Length: 100m Maximum (For 10m or shorter lengths, use AWG28 or larger cable; for lengths up to 50m, AWG24 or larger cable; and for lengths up to 100m, AWG22 or larger cable.)	The lines for the A, B, Z phases and TS signal lines are each to be twisted to 0V line.

Note The MS3102 A 20-29P receptacle made by JAE is used.

Table 3.4 CON2 connection example

Name	Model	Remarks
Socket housing	PS-D 4C 10	Made by JAE
Contact	03-51307-001	Made by JAE

Notes 1. The CON2 on the X3000 printed board uses a 10-pole pin header with a lock. PS-10PE-D4T1-M1A, made by JAE.
2. One incorrect-insetion-proof key is provided.

(3) CON1 connection specifications

Table 3.5 CON1 connection example (maker: JAE)

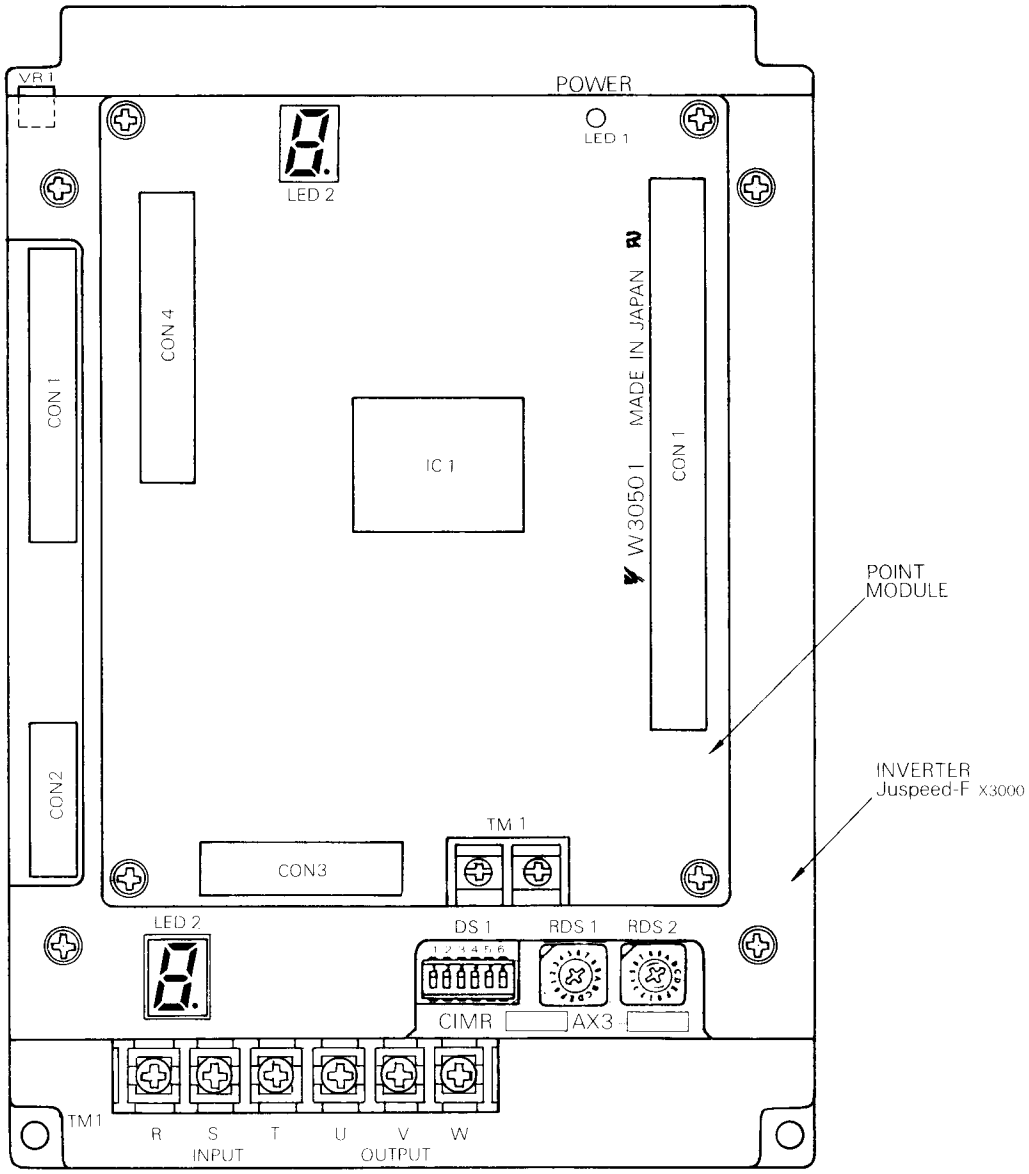
Name		Type	Specifications
Crimp type	Housing	PS-D4 C50	50-pole, With Incorrect-insertion-proof key
	Socket contact	030-51304-001	#24 to #28
	Manual crimping tool	CT 150-1-PSSF	
Press Welding type	Connector	PS-50 SM-D4P1-1CA	50-pole, With Incorrect-insertion-proof key
	Strain relief	PS-SR 50M	
	Press welding stranding machine	MT-PSSE 0-1B	

Notes 1. The CON1 on the point module board uses a 50-pole pin header with a lock. PS-50PE-D4T1-M1A, mode by JAE.
2. Two incorrect-insertion-proof keys are provided.

(4) Component Layout of Juspoint Ⅲ

Table 3.6 Lead Specifications of Control Power Supply Input Terminals

Specifications	Lead size	2mm²
	Terminal screw diameter	M4



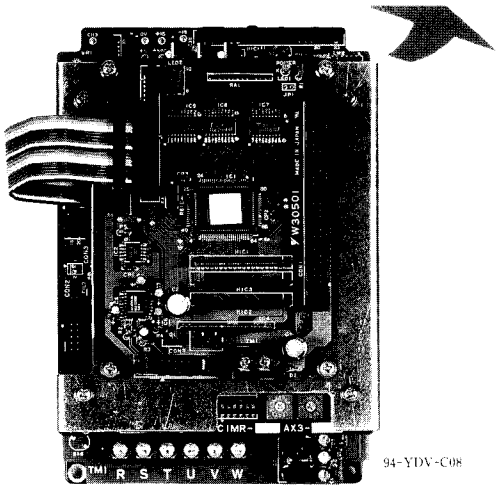


Fig. 3.2 Component Layout of Juspoint Ⅲ

3.2 MAIN CIRCUIT TERMINALS TM1

Table 3.7 Names and outline of main circuit terminals

Symbol	Name	Outline
R S T	Main circuit power input terminals	Three-phase 200/220 VAC (±10%) 50/60Hz (±5%)
U V W	Motor connection terminals	U and motor's U terminal, V and motor's V terminal, W and motor's W terminal

3.3 CONTROL POWER INPUT TERMINALS TM1

Table 3.8 Names and outline of control power input terminals

Symbol	Name	Outline
1	Power terminal	24VDC power
2	Power terminal	0V power

Notes 1. All 24V/0V power terminals are internally connected to the same power source.
2. Supply the 24VDC power either from the terminal (TM1) or connector (CON1)

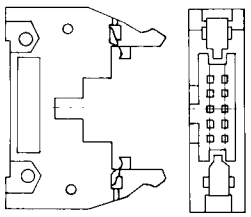
3.4 ENCODER (PG) CONNECTOR (CON2)

Names and outline of encoder (PG) connectors

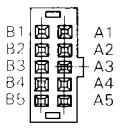
Table 3.9 Names and outline of encorder (PG) connectors (CON2)

Number	Name	Outline
A1	Power terminal	5VDC
B1	Power terminal	GND (0V)
A2	Signal terminal	Phase A input
B2		Phase A 0V
A3		Phase B input
B3		Phase B 0V
A4		Phase Z input
B4		Phase Z 0V
A5		Thermister input
B5		Thermister 0V

Pin arrangement of CON2



Pin header



Housing

3.5 I/O SIGNAL CONNECTOR CON1

(1) Terminal arrangement of I/O signal connector terminals

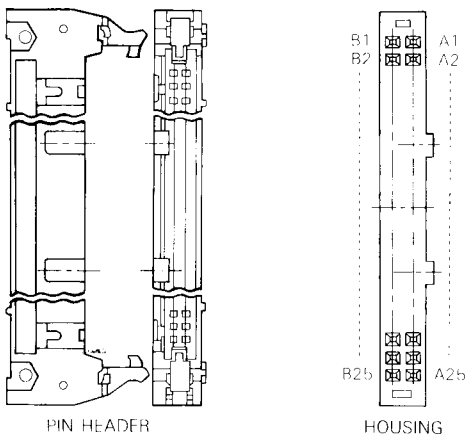
Table 3.10 Terminal arrangement of I/O signal connecter terminals

Number	Symbol	Description
A1	+24V	+24V power source
A2	0V	0V power source
A3	STA. NO 0	Command input of station number
A4	STA. NO 2	Command input of station number
A5	STA.NO 4	Command input of station number
A6	STA. NO 6	Command input of station number
A7	STA. NO 8	Command input of station number
A8	F/R	Direction command input
A9	MODE 1	Command input of operation mode
A10	ZRET-LS	Zero-point LS signal input
A11	SVON	Servo ON signal input
A12	MULT. 0	Multiple-pattern selection input
A13	COIN	Operation completion signal output
A14	NEAR	Positioning vicinity signal output
A15	ALARM	Alarm signal output
A16	POS. NO 1	Current station number output
A17	POS. NO 3	Current station number output
A18	POS. NO 5	Current station number output
A19	POS. NO 7	Current station number output
A20	ABS. READY	Memory storage in ABS mode completed output
A21	+24V	+24V power source
A22	0V	0V power source
A23	ABS. ST	Memory storage in ABS mode completed input
A24	NC	
A25	NC	

Number	Symbol	Description
B1	+24V	+24V power source
B2	0V	0V power source
B3	STA. NO 1	Command input of station number
B4	STA. NO 3	Command input of station number
B5	STA.NO 5	Command input of station number
B6	STA. NO 7	Command input of station number
B7	START	Command input of operation
B8	MODE 0	Command input of operation mode
B9	MODE 2	Command input of operation mode
B10	EMG	Emergency stop signal input
B11	RESET	Fault reset input
B12	MULT. 1	Multiple-pattern selection input
B13	COIN-A	Automatic positioning completion signal output
B14	Z SPD	Zero speed signal output
B15	POS. NO 0	Current station number output
B16	POS. NO 2	Current station number output
B17	POS. NO 4	Current station number output
B18	POS. NO 6	Current station number output
B19	POS. NO 8	Current station number output
B20	OPT. OUT 0	Spare output
B21	+24V	+24V power source
B22	0V	0V power source
B23	OPT. IN 0	Spare input
B24	NC	
B25	NC	

Notes : 1. When DC power is supplied from the TM1, there is no need to supply power from pins (A1, B1)(A21, or B21).
2. Pins B20 and B23 are for optional input and output. Do not connect them normally.

CON1 pin arrangement



(2) CON1 I/O signals

Here are descriptions of I/O signals.

Table 3.11 I/O signals

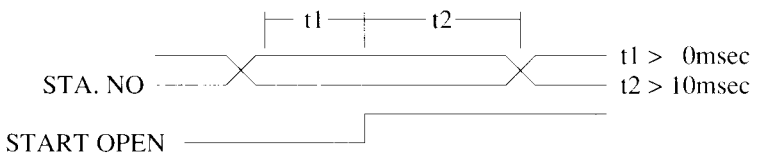
Symbol	Pin No.	Descriptions
+24V	CON1-A1 CON1-B1	I/O : Power source, or COM signal Name : +24V (power source) Function : This signal shows that power is being supplied (+24V) (Power may also be supplied from TM1-1.), or represents the COM signal in the case of +24V common type.
0V	CON1-A2 CON1-B2	I/O : Power source, or COM signal Name : 0V power source Function : This signal shows that power is being supplied (0V) (Power may also be supplied from TM1-2.), or represents the COM signal in the case of 0V common type.
STA. NO0	CON1-A3	I/O : Input Name : Command input of station number Function : Command a station number. The command input is received at the moment the START signal changes from OPEN to CLOSED during either automatic operation or setup operation. Hold the signal for over 10msec after the START signal has changed from OPEN to CLOSED in order for the signal to be read. Input a 9-bit binary (STA.NO0: LSB STA. NO8: MSB) code signal. 
STA. NO1	CON1-B3	
STA. NO2	CON1-A4	
STA. NO3	CON1-B4	
STA. NO4	CON1-A5	
STA. NO5	CON1-B5	
STA. NO6	CON1-A6	
STA. NO7	CON1-B6	
STA. NO8	CON1-A7	
START	CON1-B7	I/O : Input Name : Operation command input Function : Each operation begins with this signal CLOSED. ■ At Automatic Operation Station number is received at the moment the START signal changes from OPEN to CLOSED, and the positioning operation is started. Its speed is V1 (parameter). Hold CLOSED until the operation completion signal (COIN, COIN-A) is output. Changing to OPEN before the completion of indexing causes the machine to stop at the nearest available station in the running direction. And COIN signal is output, but COIN-A is not output. ■ At Manual Operation The operation is started in the direction commanded by the F/R signal at the moment the START signal changes from OPEN to CLOSED. Its speed is V2 (parameter). When the START signal is turned OPEN, the machine stops at the nearest available station in the running direction and COIN signal is output. (COIN-A is not output.)

Table 3.11 I/O signals (Cont'd)

<table>
<tr><th>Symbol</th><th>Pin No.</th><th>Descriptions</th></tr>
<tr><td>START</td><td>CON1-B7</td><td>■ Setup Operation
The current station number is received when the START signal changes from OPEN to CLOSED, and COIN signal, COIN-A signal, and the current station number received (POS. NO) are output.
■ At Zero-point Return Operation
The zero-point return operation is started when the START signal changes from OPEN to CLOSED. Hold the OFF signal until the operation completion signal (COIN) is output. Its speed is V3, V4 (parameter).
■ Zero-point Offset Automatic Setup Operation
The zero-point offset automatic setup operation is started in the direction set by the parameter setting when START signal changes from OPEN to CLOSED. Hold the CLOSED signal until the operation completion signal (COIN) is output. Its speed is V5 (parameter)
■ Jog Operation
The jog operation is started in the direction set by F/R signal when START signal changes from OPEN to CLOSED. Its speed is V6 (parameter). When START signal is turned to OPEN, it stops simultaneously. This stop position is not in the usual station position, and the COIN signal is not output, however, when the machine stops at a station position, the COIN signal and station NO.(POS.NO.) are output.</td></tr>
<tr><td>F/R</td><td>CON1-A8</td><td>I/O : Input
Name : Direction command input
Function : Carries out the direction command of an operation.
This is valid only in the following operations:
• Automatic operation (Only valid in the external direction command mode).
• Manual operation
• Jog operation
This input is received at the moment the START signal changes from OPEN to CLOSED. In order for the signal to be read, input F/R signal before or at the same time as the START signal, and hold for over 10msecs. It becomes CCW or CW when the signal is changed to OPEN, while CW or CCW when it is changed to CLOSED. Either may be switched by the parameter setting.</td></tr>
<tr><td>MODE0
MODE1
MODE2</td><td>CON1-B8
CON1-A9
CON1-B9</td><td>I/O : Input
Name : Operation mode command input
Function : Carries out the operation mode that you command.
<table>
<tr><th>MODE 2</th><th>MODE 1</th><th>MODE 0</th><th>Operation mode</th></tr>
<tr><td>OPEN</td><td>OPEN</td><td>OPEN</td><td>Jog operation</td></tr>
<tr><td>OPEN</td><td>OPEN</td><td>CLOSED</td><td>Setup operation</td></tr>
<tr><td>OPEN</td><td>CLOSED</td><td>OPEN</td><td>Zero-point return operation</td></tr>
<tr><td>OPEN</td><td>CLOSED</td><td>CLOSED</td><td>Zero-point offset automatic setup operation</td></tr>
<tr><td>CLOSED</td><td>OPEN</td><td>OPEN</td><td>Automatic operation</td></tr>
<tr><td>CLOSED</td><td>OPEN</td><td>CLOSED</td><td>Manual operation</td></tr>
<tr><td>CLOSED</td><td>CLOSED</td><td>OPEN</td><td>No mode</td></tr>
<tr><td>CLOSED</td><td>CLOSED</td><td>CLOSED</td><td>No mode</td></tr>
</table></td></tr>
</table>

Table 3.11 I/O signals (Cont'd)

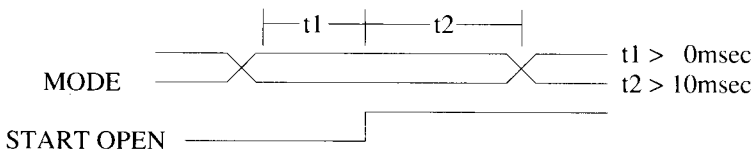
Symbol	Pin No.	Descriptions
MODE0 MODE1 MODE2	CON1-B8 CON1-A9 CON1-B9	All modes are received at the moment the START signal changes from OPEN to CLOSED. In order for the signal to be read, input mode signal before or at the same time as the START signal, and hold for over 10msec.  When the START signal changes to CLOSED, if the operation mode is set to no mode, a "mode set error" is displayed.
ZRET-LS	CON1-A10	I/O : Input Name : Zero-point LS signal Function : Zero-point LS signal at zero-point return operation ■ At zero-opoint return operation (C0-14=0). Detecting this signal changing from OPEN to CLOSED decelerates to V4 from V3. Then detecting the signal CLOSED to OPEN. Move and position by the zero-point offset from the first Z-phase pulse. This stopping position is zero-point. Fault occurs if point of the signal changing CLOSED to OPEN and Z-phase pulse is closer than ±120 PULSE. In this case, move zero-point LS. ■ At zero-point return operation (C0-14=1). Detecting this signal changing from OPEN to CLOSED decelerates to V4 from V3. Then detecting CLOSED to OPEN, move and position as zero-point offset preset. This stopping position is zero-point *: Enables zero-point return operation if the signal CLOSED time is over 10msec. But might go over zero-point (after go over return to zero-point). Because CLOSED time is too short.
EMG	CON1-B10	I/O : Input Name : Emergency stop signal Function : Emergency stop is carried out when this signal is input in each operation. The stop position is not the station position. After stopping, the COIN signal and COIN-A signal are not output. After an emergency stop, alarm status appears. To release this alarm status, use the reset signal. After resetting, if the machine stops at the station position, the COIN signal is output. If it does not stop at the station position, the COIN signal is not output. After resetting, the automatic/manual operation may be continued without carrying out the zero-point return operation/setup operation. Normally, input CLOSED signal for this signal. The system detects OPEN, and carries out an emergency stop. With teaching operation, EMG signal is valid. Perform the teaching with CLOSED signal input.

Table 3.11 I/O signals (Cont'd)

<table>
<tr><th>Symbol</th><th>Pin No.</th><th>Descriptions</th></tr>
<tr><td>SVON</td><td>CON1-A11</td><td>I/O : Input
Name : Servo ON signal
Function : Set this at CLOSED during operation. During CLOSED status, the motor drive is valid. When the signal is changed to OPEN, the inverter output is shut-off instantaneously and coasting status results.
After servo is turned ON, automatic/manual operation may be continued without carrying out zero-point return operation/setup operation. With teaching operation, SVON signal is valid.
JOG operation is executed by only CLOSED signal input.</td></tr>
<tr><td>RESET</td><td>CON1-B11</td><td>I/O : Input
Name : Fault reset
Function : When the driver (X3000) or the positioning controlling portion (point module) detects an error, alarm stop status is held.
Signal to return to operation status after removing the cause.
Resets by changing the signal for OPEN to CLOSED to OPEN.
However, reset the SVON signal by OPEN signal input only when the alarm occurs in the driver X3000. Reset cannot be executed if SVON signal is CLOSED.</td></tr>
<tr><td>MULT. 0
MULT. 1</td><td>CON1-A12
CON1-B12</td><td>I/O : Input
Name : Multiple-pattern selection
Function : More than one operation can be selected by combining two bits.
<table>
<tr><td>MULT. 0</td><td>OPEN</td><td>CLOSED</td><td>OPEN</td><td>CLOSED</td></tr>
<tr><td>MULT. 1</td><td>OPEN</td><td>OPEN</td><td>CLOSED</td><td>CLOSED</td></tr>
<tr><td>Automatic operation speed</td><td>V10</td><td>V11</td><td>V12</td><td>V13</td></tr>
<tr><td>Manual operation speed</td><td>V20</td><td>V21</td><td>V22</td><td>V23</td></tr>
<tr><td>High speed zero-point return</td><td>V30</td><td>V31</td><td>V32</td><td>V33</td></tr>
<tr><td>Low speed zero-point return</td><td>V40</td><td>V41</td><td>V42</td><td>V43</td></tr>
<tr><td>Zero-point offset automatic setup speed</td><td>V50</td><td>V51</td><td>V52</td><td>V53</td></tr>
<tr><td>Jog speed</td><td>V60</td><td>V61</td><td>V62</td><td>V63</td></tr>
<tr><td>Acceleration time</td><td>ACC0</td><td>ACC1</td><td>ACC2</td><td>ACC3</td></tr>
<tr><td>Positioning control constant</td><td>Kp0</td><td>Kp1</td><td>Kp2</td><td>Kp3</td></tr>
<tr><td>Software start time</td><td>ts0</td><td>ts1</td><td>ts2</td><td>ts3</td></tr>
<tr><td>Software start speed</td><td>Vs0</td><td>Vs1</td><td>Vs2</td><td>Vs3</td></tr>
<tr><td>Torque limit</td><td>TL0</td><td>TL1</td><td>TL2</td><td>TL3</td></tr>
<tr><td>Operation completion width</td><td>COIN0</td><td>COIN1</td><td>COIN2</td><td>COIN3</td></tr>
<tr><td>Positioning vicinity width</td><td>NEAR0</td><td>NEAR1</td><td>NEAR2</td><td>NEAR3</td></tr>
<tr><td>Soft stop speed</td><td>Vsp0</td><td>Vsp1</td><td>Vsp2</td><td>Vsp3</td></tr>
<tr><td>Soft stop Kp2</td><td>Kp20</td><td>Kp21</td><td>Kp22</td><td>Kp23</td></tr>
</table>
Parameter setting is E0-nn for all.</td></tr>
<tr><td>COIN</td><td>CON1-A13</td><td>I/O : Output
Name : Operation completion signal
Function : The system outputs the completion of each operation mode.</td></tr>
</table>

Table 3.11 I/O signals (Cont'd)

Symbol	Pin No.	Descriptions
COIN	CON1-A13	■ Automatic Operation Mode CLOSED is output at the completion of positioning to the commanded station. Action completion width is set by parameter. When the same station as the current station is specified, the output signal remains CLOSED, so confirm the action completions by checking for the COIN signal 10msec after the input of the START signal. Changing the START signal to OPEN during positioning causes the controlled machine to position itself at the nearest available station in the running direction. ■ Manual Operatoin Mode The system finishes manual operation, and outputs CLOSED when positioning and stopping the controlled machine at the nearest available station in the running direction. Action completion width is set by parameter. ■ Setup Operation Mode The system completes setup operation, and outputs CLOSED when receiving the current station No. During that time, OPEN is output (for 20msec), and then CLOSED is output, so determine completion by checking that the signal is changed from OPEN to CLOSED. In setup mode, COIN-A signal is output in the same manner as COIN signal. ■ Zero-point Return Mode The system outputs CLOSED at the completion of zero-point return. After that, carry out setup operation. Be aware, however, that in the case of (C0-15≠0), the setup operation will be automatically performed for the value of (C0-15). ■ Zero-point Offset Automatic Setup Operation Mode The system outputs CLOSED at the completion of zero-point offset automatic setup operation. ■ Jog Operation Mode The system outputs OPEN at the start of JOG operation mode. Outputs CLOSED when the controlled machine is stopped at the station. Outputs OPEN when the machine is not stopped at any station. *: After changing the START signal from OPEN to CLOSED, outputs OPEN COIN signal within 5msec, and starts positioning action. *: Immediately after turning the system ON, the OPEN COIN signal is output.
COIN-A	CON1-B13	I/O : Output Name : Automatic positioning completion signal Function : The system outputs this signal at the completion of positioning in automatic operation.

Table 3.11 I/O signals (Cont'd)

Symbol	Pin No.	Descriptions
COIN-A	CON1-B13	■ Automatic Operation Mode CLOSED is output at the completion of positioning at the commanded station. Completion width is set by parameter. When the same station as the current one is specified, the output signal remains CLOSED (the same way as COIN signal). Making START signal OPEN during positioning causes the machine to position itself at the nearest available station in the running direction, however, in this case, CLOSED is not output, and OPEN is held. ■ Setup Operation Mode The system carries out the same output sequence as the COIN signal. *: After changing START signal from OPEN to CLOSED, outputs OPEN COIN-A signal within 5msec, and starts positioning action. *: Always outputs OPEN in operation modes other than the above. *: Immediately after turning the system ON, OPEN COIN-A signal is output.
NEAR	CON1-A14	I/O : Output Name : Positioning vicinity signal Function : The system outputs CLOSED when the controlled machine approaches the aimed station. ■ Automatic/Manual Operation Mode The system outputs when the controlled machine comes close to the station to be positioned. The range of vicinity is set by parameter. Use this signal when mechanically clamping just before positioning. After changing the START signal from OPEN to CLOSED, OPEN NEAR signal is output within 5msec, and positioning action is started. ■ Setup Operation Mode The system carries out the same output sequence as for the COIN signal. *: After changing START signal from OPEN to CLOSED, outputs OPEN COIN-A signal within 5msec, and starts positioning action. *: Always outputs OPEN in operation modes other than the above. *: Immediately after turning the system ON, the OPEN NEAR signal is output.
ZSPD	CON1-B14	I/O : Output Name : Zero speed signal Function : The system outputs CLOSED when motor speed falls below zero speed (approximately 10r/min). This output signal is output independently regardless of operation status.

Table 3.11 I/O signals (Cont'd)

<table>
<tr><th>Symbol</th><th>Pin No.</th><th>Descriptions</th></tr>
<tr><td>ALARM</td><td>CON1-A15</td><td>
I/O : Output
Name : Error signal
Function : The system outputs CLOSED when an alarm is detected at the driver or the positioning controller. In this case, power is shut down and the motor goes into zero-speed status. However, only alarm signal in the driver X3000 is base-blocked. Alarm status is held, and is released by reset signal.
Alarm indication
<table>
<tr><th>Indication</th><th>Contents of alarm</th></tr>
<tr><td>0</td><td>Alarm detected at the driver (Contents are indicated at driver side.)</td></tr>
<tr><td>1</td><td>PG failure (including wiring failure)</td></tr>
<tr><td>2</td><td>Emergency stop</td></tr>
<tr><td>3</td><td>No setup operation after turning ON (Except in the ABS mode)</td></tr>
<tr><td>4</td><td>Zero-point LS not detected during zero-point offset automatic setup operation</td></tr>
<tr><td>5</td><td>Zero-point LS not detected during zero-point return</td></tr>
<tr><td>6</td><td>Undefined station number is specified.</td></tr>
<tr><td>7</td><td>Operation mode is not set properly.</td></tr>
<tr><td>8</td><td>Though zero-point offset setup mode is in the parameter setup mode, zero-point offset automatic setup operation is specified.</td></tr>
<tr><td>9</td><td>Position error or zero-point LS (too close to Z-phase pulse position)</td></tr>
<tr><td>A</td><td>Zero-point offset amount is out of the allowable range.
(Other than 120 to 12000)</td></tr>
<tr><td>b</td><td>When the backlash correction is not "0".
• Zero-point offset automatic setup operation is specified.
• Setup operation is specified without zero-point return.
The backlash correction is larger t han the unit station pulses.</td></tr>
<tr><td>C</td><td>Station is not positioned in order of station No.</td></tr>
<tr><td>d</td><td>Memory storage error in the ABS mode</td></tr>
<tr><td>Blank</td><td>CPU error (including status out of control)</td></tr>
</table>
*: Indication shows 7-segment numeric indicated on the point module board.
*: Blinking indication is alarm status.
*: Steady lighting indication is status indication.
</td></tr>
<tr><td>POS,NO0
POS,NO1
POS,NO2
POS,NO3
POS,NO4
POS,NO5
POS,NO6
POS,NO7
POS,NO8</td><td>CON1-B15
CON1-A16
CON1-B16
CON1-A17
CON1-B17
CON1-A18
CON1-B18
CON1-A19
CON1-B19</td><td>
I/O : Output
Name : Current station number
Function : The system outputs the current station number.
The system outputs the 9-bit binary code signal (POS.NO0: LSB, POS.NO8: MSB).
■ At Automatic Operation
The system outputs the station No. at which stopped when completing the positioning to the specified station. During operation, the station No. which can be stopped in operation direction is output. Also outputs the station number when the START signal is changed to OPEN during operation and the controlled machine is positioned and stopped at the nearest available station in the operation direction.
■ At Manual Operation
The system outputs the station No. at which stopped when completing the positioning to the arbitrary station. During positioning, station number at which can be stopped in operation direction is output.
</td></tr>
</table>

Table 3.11 I/O signals (Cont'd)

Symbol	Pin No.	Descriptions
POS.NO0 POS.NO1 POS.NO2 POS.NO3 POS.NO4 POS.NO5 POS.NO6 POS.NO7 POS.NO8	CON1-B15 CON1-A16 CON1-B16 CON1-A17 CON1-B17 CON1-A18 CON1-B18 CON1-A19 CON1-B19	■ At Setup Operation The system outputs the specified station number after completion of the setup operation. *: After confirming COIN signal changing OPEN→CLOSED, receives this signal. *: "0" is output after the system is turned ON, after zero-point return, and after the zero-point offset automatic setup operation. When automatic setup operation (CO-15), the system outputs the value set to (CO-15) after completing the zero-point return. *: "0" is output during JOG operation and after an emergency stop. When the controlled machine is stopped at a station after JOG operation and after resetting following an emergency stop, the station number is output.
ABS.READY	CON1-A20	I/O : Output Name : Memory storage in ABS mode completed Function : After turning ON the ABS.ST OPEN signal and stopping the motor at the same time in the ABS mode, the system stores the current position information into memory and outputs the completion signal (CLOSED). Maintain the 24VDC power source until this output turns to CLOSED. A special brake motor is required to use the ABS mode.
OPT.OUT0	CON1-B20	I/O : Output Name : Preliminary output Function :
24V	CON1-A21 CON1-B21	I/O : Power source, or COM signal Name : +24V(power source) Function : This signal shows that power (+24V) is being supplied (Power may also be supplied from TM1-1.), or represents the COM signal in the case of +24V common.
0V	CON1-A22 CON1-B22	I/O : Power source, or COM signal Name : 0V(power source) Function : This signal shows that power (0V) is being supplied (Power may also be supplied from TM1-2.), or represents the COM signal in the case of 0V common.
ABS.ST	CON1-A23	I/O : Input Name : Memory storage command in ABS mode Function : After detecting the change of this signal from CLOSED to OPEN in the ABS mode, the system stops the motor and stores the position information into memory when the motor is completely stopped. Then the system outputs the ABS. READY CLOSED signal. When the CLOSED input is detected for 0.5sec. or more after the power is supplied, the position information memory is read and the state before the power shutoff will be regained. The system then outputs the ABS. READY OPEN signal. This will function only in the ABS mode.

Table 3.11 I/O signals (Cont'd)

Symbol	Pin No.	Descriptions
OPT.IN0	CON1-B23	I/O : Input Name : Preliminary input Function :
NC	CON1-A24 to CON1-A25	I/O : For future use Name : Function :

3.6 WIRING PRECAUTIONS

(1) Use twisted pair shielded cables for PG feedback circuit.
Cable length may be up to 100m. For wiring, connect the cables in the shortest distance and cut off the surplus. (Refer to Table 3.2.)

(2) For grounding cables, use as large size as possible.
Class 3 grounding (100Ω or less) is recommended.
Grounding must be provided at one point. If motor is insulated between machines, use another grounding method to ground the motor.

(3) To prevent noise malfunction, take the following actions:
- Locate Juspoint Ⅲ or I/O reference setter precisely.
- Provide a surge absorbing circuit to relay coils, magnetic contactors, solenoids, etc.
- Separate main circuits (high-voltage circuits such as AC lines or motor power lines) and signal circuits more than 30cm. Do not run them in the same duct or bundle them together.
- Provide a noise filter to the power supply or input circuits when the power supply is shared with electrical welders or discharging machines, or when there is a high-frequency noise generating source near the unit.
- Use shielded cable for I/O signal wiring and the shielding treatment should be preformed at TM1-2 (0V) terminal of the point module.

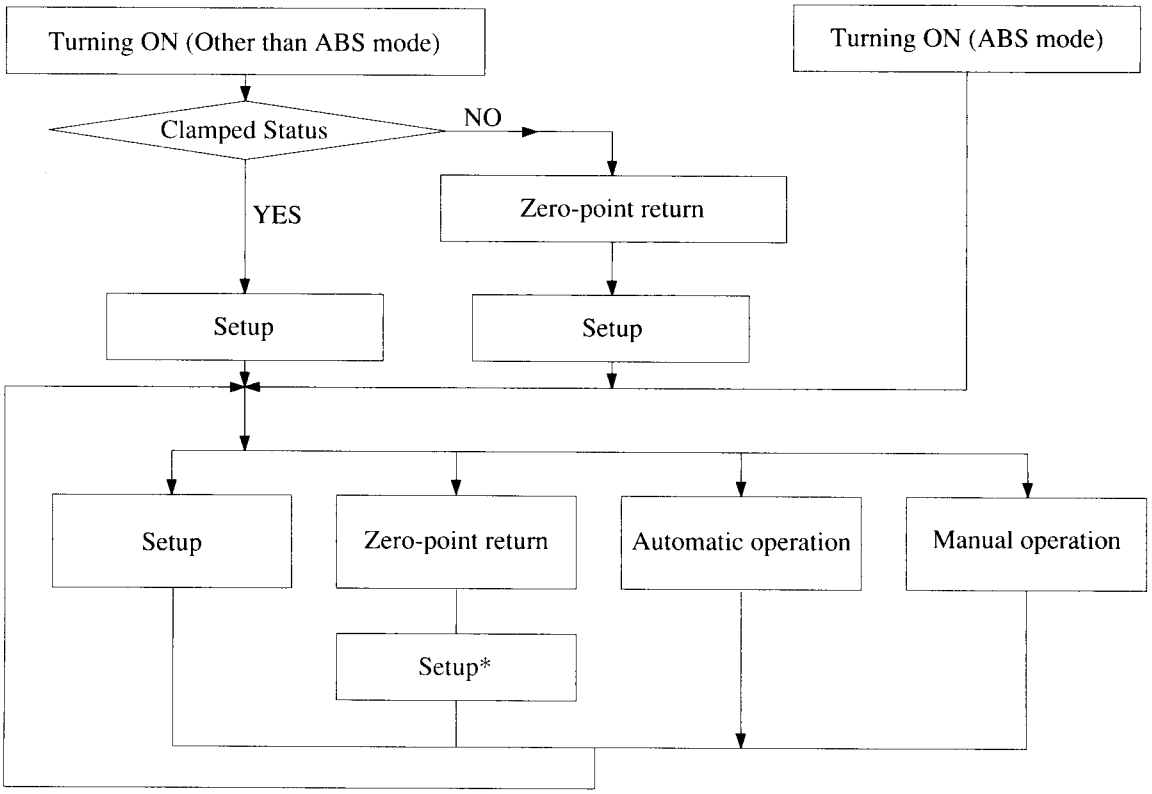
(4) Radio Frequency Interference Preventive Actions (R.F.I)
No preventive actions for radio frequency interference are provided to Juspoint Ⅲ since it is an industrial device. Therefore, if it is used in a residential area or radio frequency interference causes any problems, provide a line filter at the main circuit power supply input side.

(5) Since cable cores used for PG feedback circuit or signal circuits are very thin, do not apply bending force or tension force to the cables.

4. DESCRIPTION OF OPERATIONS

4.1 FUNDAMENTAL OPERATIONS

Fig. 4.1 shows the flowchart of fundamental operations.
After turning the system ON, select the desired operation mode.



When (C0-15=0), the setup operation is necessary after zero-point return.
In the case of (C0-15≠0), no setup operation is requested since the system executes the setup operation for (C0-15) atuomatically.

Fig. 4.1 Flowchart of Fundamental Operations

Table 4.1 Setting of Operation Mode

MODE2	MODE1	MODE0	START	Operation mode
OPEN	OPEN	OPEN	OPEN → CLOSED	JOG operation
OPEN	OPEN	CLOSED	OPEN → CLOSED	Setup operation
OPEN	CLOSED	OPEN	OPEN → CLOSED	Zero-point return
OPEN	CLOSED	CLOSED	OPEN → CLOSED	Zero-point offset amount automatic setup operation
CLOSED	OPEN	OPEN	OPEN → CLOSED	Automatic operation
CLOSED	OPEN	CLOSED	OPEN → CLOSED	Manual operation
Other than the above			————	No applicable modes

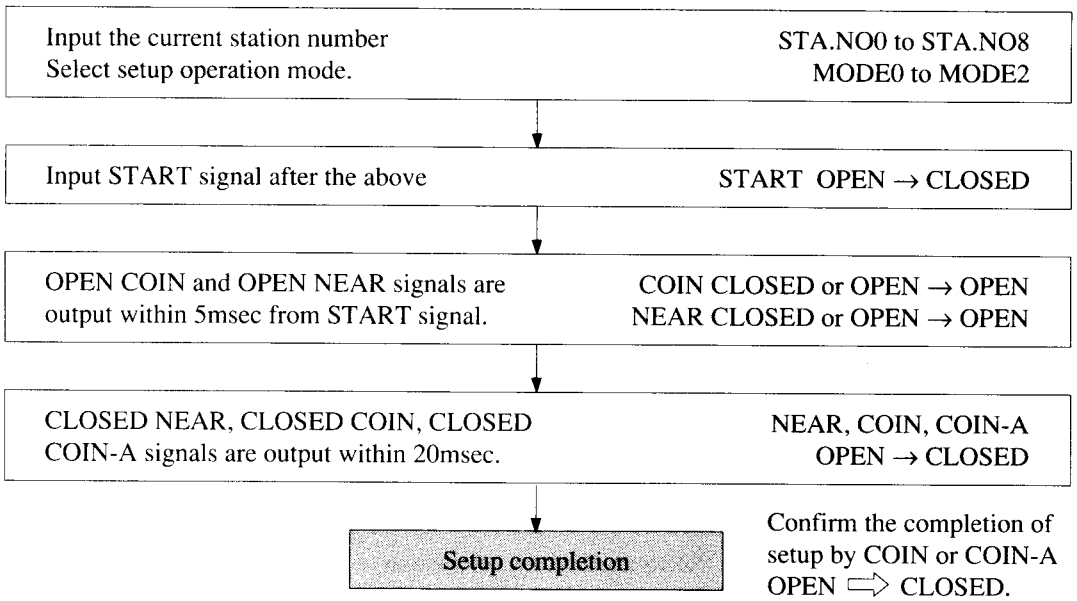
4.2 SETUP

■ Function

The system sets the station number of the controlled machine currently stopped.
To carry out setup operation, it is necessary that the machine be stopped at any one of the station positions and mechaninally clamped. Otherwise, carry out setup operation after zero-point return.
When (C0-15=0), the setup operation is necessary after zero-point return. In case of (C0-15≠0), no setup operation is requested.
Automatic/manual operation without setup operation after turning the system ON results in an alarm (exept in the ABS mode).
If the backlash correction is not "0", always carry out zero-point return before setup operation (except in the ABS mode).

■ Sequence

Fig. 4.2 shows the sequence of setup.



Station number (POS.NO0 to POS.NO8) is output at completion.
Collate it with the set station number.

Fig. 4.2 Sequence of Setup Operation

■ Time chart

Fig. 4.3 shows the setup time chart.

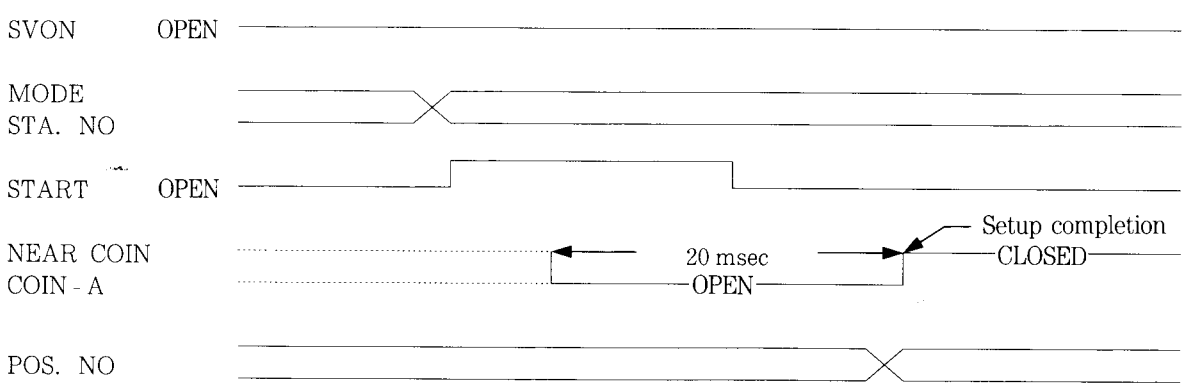


Fig. 4.3 Time Chart of Setup Operation

4.3 ZERO-POINT RETURN OPERATION

■ Function

The system carries out positioning of the machine and stops it at the zero-point.

Return to zero-point used zero-point LS signal.
Detecting start signal changing from OPEN to CLOSED.
Start zero-point return operation direction by C0-05 speed by V3.
Detecting zero-point LS signal changing from OPEN to CLOSED decelerate to V4.
Then detecting zero-point LS signal changes CLOSED to OPEN.

- At zero-point return operation 0 (C0-14=0)
  Move and position by the zero-point offset preset from the first Z-phase pulse of PG.
- At zero-point return operation 1 (C0-14=1)
  Move and position by the zero-point offset preset.
  Running speed V3, V4 is set by parameter (E0-20 to -23, E0-30 to -33).

■ Sequence

Fig. 4.4 shows the sequence of zero-point return operation.

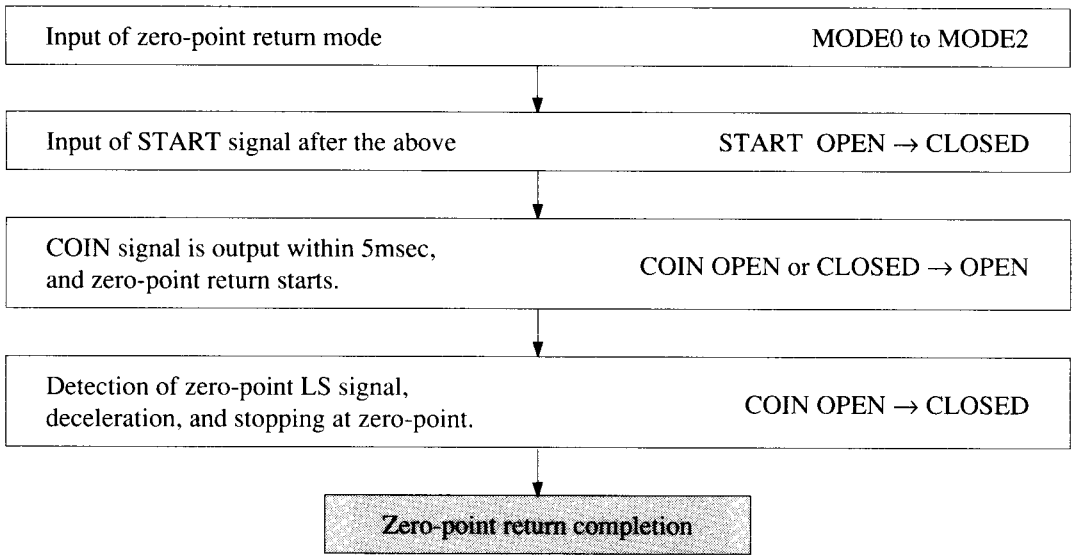


Fig. 4.4 Sequence of Zero-point Return Operation

■ Time chart

Fig. 4.5 shows the time chart of zero-point return operation.

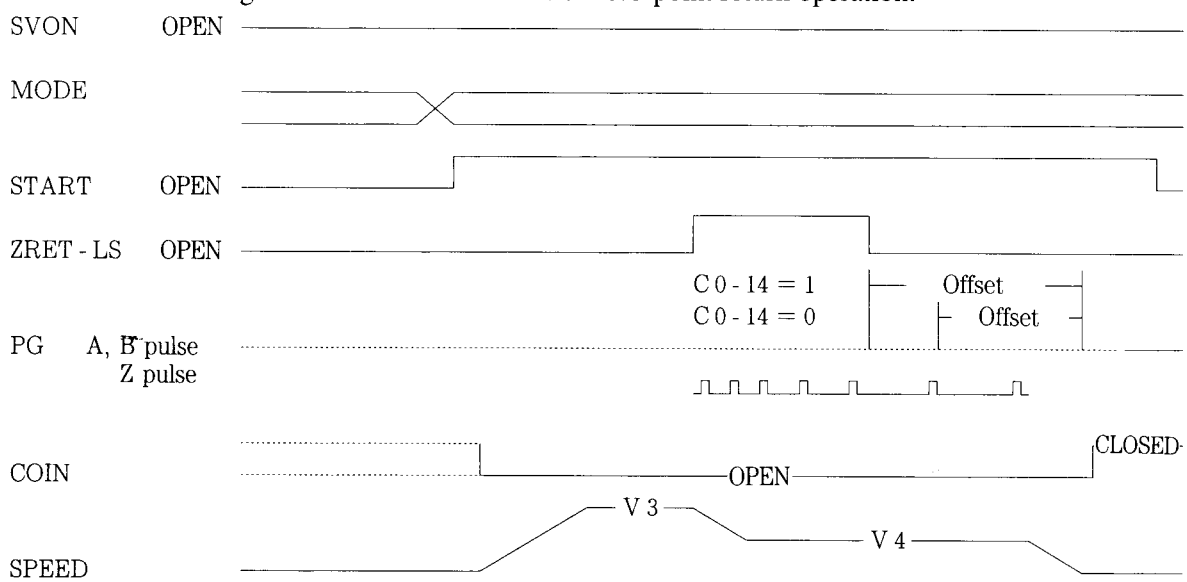


Fig. 4.5 Time Chart of Zero-point Return Operation

4.4 ZERO-POINT OFFSET AUTOMATIC SETUP OPERATION

■ Function

The system automatically sets zero-point offset.
When it is possible to turn ON the system with the machine stopped at zero-point (clamped status), this operation is possible. When it is not possible to carry out zero-point offset setup operation, set zero offset by parameter.
Adjust the zero-point LS position so that the offset becomes within the allowable range (range set by parameter C0-10).
Direction command is set by parameter. Set the parameter in the direction of zero-point LS (normally the opposite direction of zero-point return.) When the backlash correction is not "0", it is not possible to carry out zero-point offset setup operation.
Running speed V5 is set by parameter (E0-40 to -43).

■ Sequence

Fig. 4.6 shows the sequence of zero-point offset setup operation.

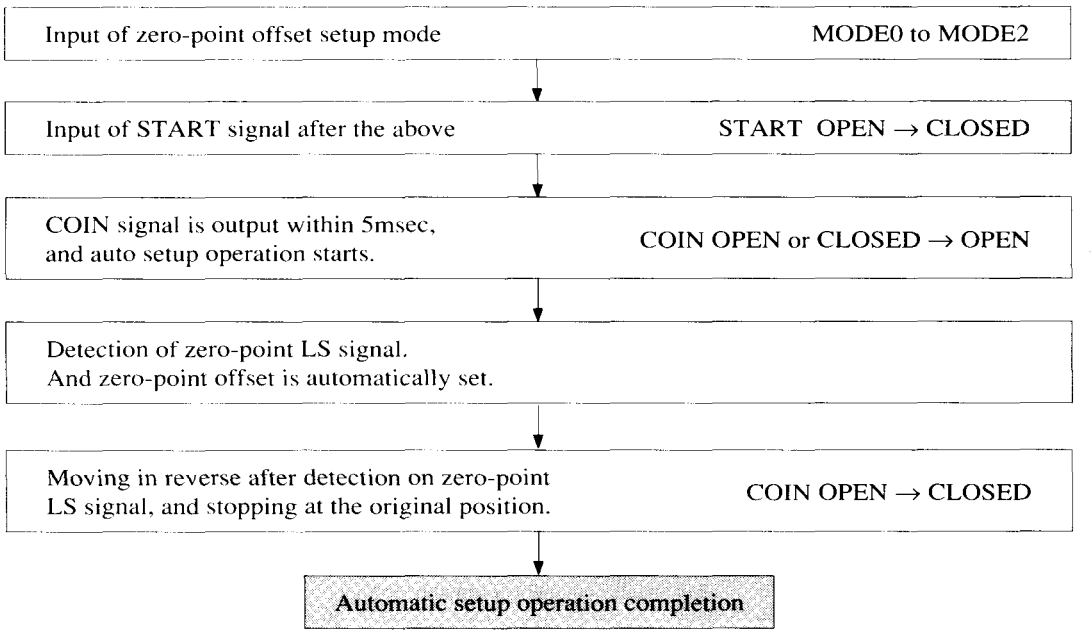


Fig. 4.6 Sequence of Zero-point Offset Automatic Setup Operation

■ Time Chart

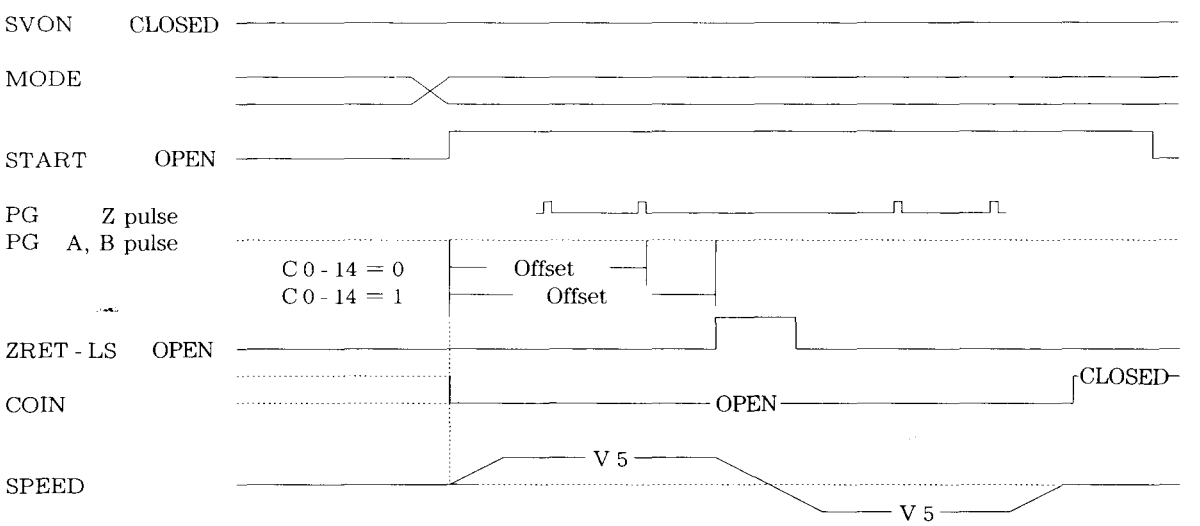


Fig. 4.7 Time Chart of Zero-point Offset Automatic Setup Operation

4.5 AUTOMATIC OPERATION

■ Function

The system moves the controlled machine to the station of the commanded number, positions it and stops it there.

In the case of a rotating axis, the shortest path control which determines the shorter distance direction is used.
The direction can be fixed or commanded externally.
When START signal is changed from CLOSED to OPEN during automatic operation, the machine is positioned and stopped temporarily at the nearest station in the running direction at that moment. Then COIN signal is output. (COIN-A signal is not output.) From this status, any operation mode is possible to use.
Running speed V1 is set by parameter (E0-00 to -03).

■ Sequence

Fig. 4.8 shows the sequence of automatic operation.

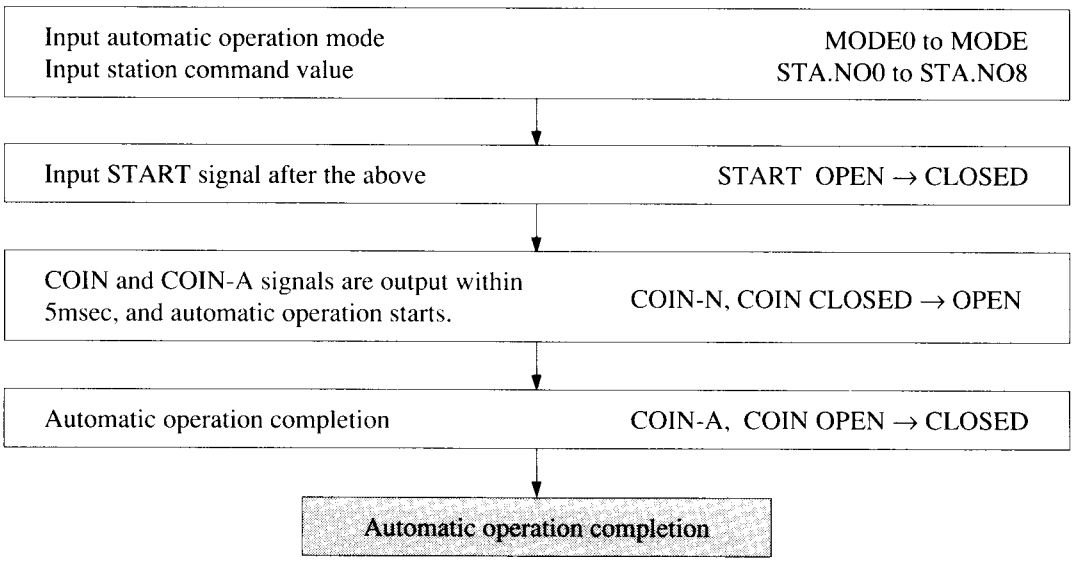


Fig. 4.8 Sequence of Automatic Operation

■ Time Chart

Fig. 4.9 shows the time chart of automatic operation.

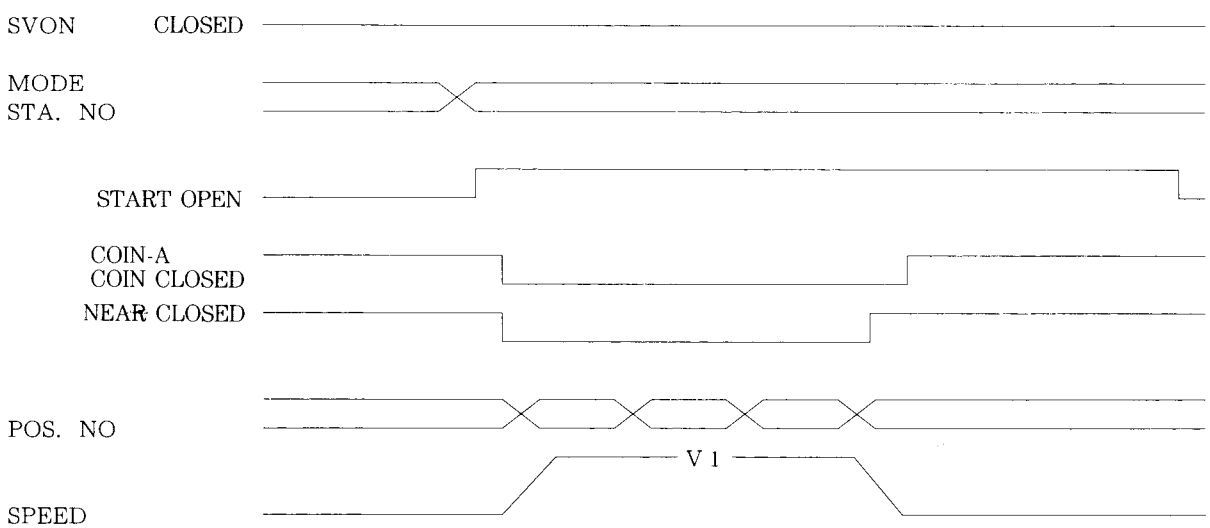
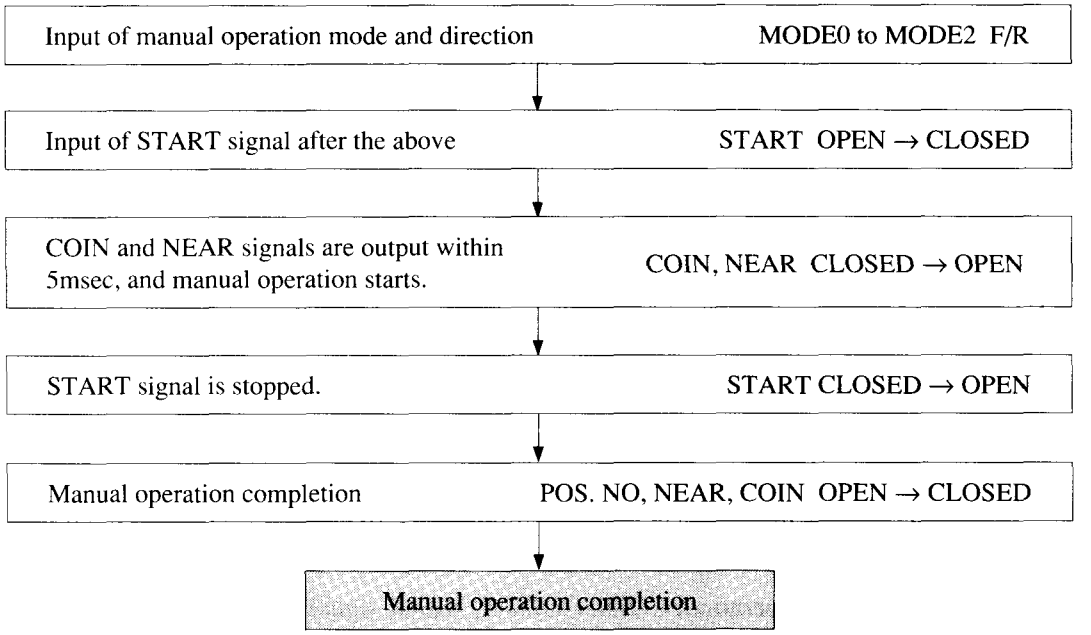


Fig. 4.9 Time Chart of Automatic Operation

4.6 MANUAL OPERATION

■ Function The system positions the machine and stops at each station by manual operation.
Select manual mode and direction and make START signal CLOSED, and operation will start. When making START signal OPEN, the machine will be positioned and stopped at the nearest available station in the operation direction.
Running speed V2 is set by parameter (E0-10 to -13).

■ Sequence Fig. 4.10 shows the sequence of manual operation.



Note: After start of operation, COIN-A signal is output OPEN, and continues to be output even after completion of operation.

Fig. 4.10 Sequence of Manual Operation

■ Time Chart Fig. 4.11 shows the time chart of manual operation.

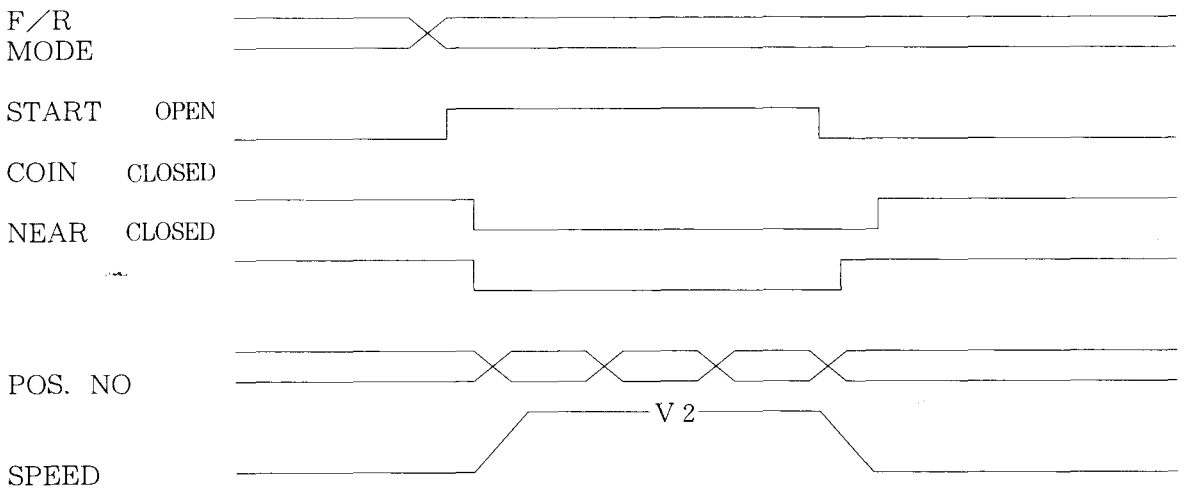


Fig. 4.11 Time Chart of Manual Operation

4.7 EMERGENCY STOP OPERATION

■ Function

When emergency stop signal (EMG) is OPENED during any operation, emergency stop is carried out. Normally, the stop position is not a station. (deceleration stop)

After an emergency stop, output is stopped, and alarm status appears. To release this, perform after reset.

After an emergency stop, COIN, COIN-A, and NEAR are output OPENED. When the machine is stopped at any station after resetting, COIN, NEAR signals are output CLOSE. COIN-A is output CLOSED.

After an emergency stop, the station position output indicates "0".
When the machine is stopped at any station after resetting an emergency stop, that station number is output.

When emergency stop operation is performed after a setup operation, there is no need for zero-point return operation/setup operation after reset.
Manual/automatic operation is possible without any preparation.

4.8 JOG OPERATION

■ Function

The system carries out a JOG operation.

After selecting JOG operation mode and F/R signal, changing the START signal from OPEN to CLOSED causes operation to start in the commanded direction.
And the machine stops at the same time the START signal is changed to OPEN.
Normally the stop position is not a station.

During JOG operation, COIN, COIN-A, NEAR signals are output OPENED at the same time as the start of operation, and OPEN signals are output even after completion.
However, in the case of stopping at a station, COIN and NEAR signals are output CLOSE. COIN-A is output OPEN.

During JOG operation, the station position output indicates "0" at the same time as the start of operation and even after stopping, indicates "0.".
When stopping at a station, the number of the station is output.

When carrying out a JOG operation after setup, there is no need for a zero-point return operation or setup operation.
Manual/automatic operation is possible without any preparation.
Running speed V6 is set by parameter (E0-50 to -53).

5. PARAMETER SETTING / MONITORING

5.1 PARAMETER SETTING

Parameters to be used for station indexing control are shown in the table below.
Perform parameter setting while the motor is stopped.

Table 5.1 List of Parameters

Cn-NO	Function Name	Lower Limit	Upper Limit	Unit	Initial Value
C0-00	Number of stations	2	511	—	8
C0-01	Rotational axis/linear axis	0	4	—	0
C0-02	Unit station pulses	40	960000	PULS	4000
C0-03	Rotation direction switching	0	1	—	0
C0-04	0-point offset automatic setup	0	1	—	0
C0-05	0-point return direction	0	1	—	0
C0-06	Direction for C0-04	0	1	—	1
C0-07	Gear ratio A	1	40000	—	1
C0-08	Gear ratio B	1	40000	—	1
C0-09	ABS mode	0	2	—	0
C0-10	0-point offset	120	40000	PULS	400
C0-11	Rotational axis direction	0	3	—	0
C0-12	Parameter setting permission	0	1	—	0
C0-13	Backlash correction	0	80000	PULS	0
C0-14	0-point return mode	0	1	—	0
C0-15	Number of automatic setup	0	511	—	0
C0-16	Unit PG pulses	0	1	—	0
C0-17	Kp gain during stop (Kp3)	10	1000	0.1/s	25
C0-18	Control width for C0-17	0	100	PULS	20
d0-02	Pulses between stations (1-2)	40	96000000	PULS	4000
d0-03	Pulses between stations (2-3) or (1-3)	40	96000000	PULS	4000
.....	Pulses between stations (X-X) or (1-X)	40	96000000	PULS	4000
d0-45	Pulses between stations (44-45) or (1-45)	40	96000000	PULS	4000
E0-00-03	Automatic operation speed (V10-V13)	10	1800	r/min	500
E0-10-13	Manual operation speed (V20-V23)	10	1800	r/min	500
E0-20-23	High speed 0-point return (V30-V33)	10	1800	r/min	500
E0-30-33	Low speed 0-point return (V40-V43)	10	1800	r/min	50
E0-40-43	Offset setting speed (V50-V53)	10	1800	r/min	50
E0-50-53	JOG speed (V60-V63)	10	1800	r/min	50
E0-60-63	Acceleration time (ACC0-ACC3)	10	5000	msec	100
E0-70-73	Position control gain (Kp0-Kp3)	10	1000	0.1/s	100
E0-80-83	Soft-start time (ts0-ts3)	0	99	msec	0
E0-90-93	Soft-start speed (Vs0-Vs3)	0	99	r/min	0
E0-A0-A3	Torque limit value (TL0-TL3)	30	300	%	200
E0-b0-b3	In-position width (COIN0-COIN3)	8	80000	PULS	20
E0-C0-C3	Near-position width (NEAR0-NEAR3)	8	80000	PULS	400
E0-d0-d3	Speed range for soft-stop (Vsp0-Vsp3)	0	1800	r/min	0
E0-E0-E3	Kp gain for soft-stop (Kp20-Kp23)	10	1000	0.1/s	100

Notes : 1. Attach or detach the digital operator (JVOP-100) while the power is turned OFF.
2. Any positioning operation is possible with the digital operator (JVOP-100) connected, however, parameters cannot be set during operation. (Parameters can be set only while Juspoint Ⅲ is not operating.)
3. Parameters out of the upper or the lower limit cannot be set. In this case, the upper or the lower limit will be set.
4. When 0 -point offset automatic setup is selected and the 0-point offset is out of the upper limit or the lower limit, an error occurs.

Table 5.2 Parameter Functions

C0-00	Name : Number of stations Range : 2 to 511 (unit: 1, initial value: 8) Function : Set the number of stations to be indexed. Station position command (STA. NO 0 to 8) larger than the set number of stations will result in an error. Example 1 : In the case of 12-face indexing of rotational axis, set [12]. Example 2 : In the case of 2-point indexing of linear axis, set [2].
C0-01	Name : Rotational axis/linear axis Range : 0, 1, 2, 3 or 4 (unit: initial value: 0) Function : Set whether rotational axis or linear axis is to be indexed. 0 : Rotational axis (Uniform unit station pulses) 1 : Linear axis (Uniform unit station pulses) 2 : Rotational axis (Uniform unit and fractional unit station pulses) 3 : Linear axis (Arbitrary unit station pulses : incremental setting) 4 : Linear axis (Arbitrary unit station pulses : absolute coordinate setting) In case of [C0-01=4], pulse setting by teaching operation is possible.
C0-02	Name : Unit station pulses Range : 40 to 960,000 (unit: 1, initial value:4000) Function : Set the distance between respective stations in PG pulse units (multiples of 4). Station distance set up to 240 rotations motor axis/station. This parameter is valid only for [C0-01=0, 1]. Pulses between stations are as shown below. · C0-02 is valid when C0-01=0. · C0-02 is valid when C0-01=1. · C0-07 and C0-08 are valid when C0-01=2. · d0-02 to d0-45 are valid when C0-01=3. · d0-02 to d0-45 are valid when C0-01=4.
C0-03	Name : Motor rotational direction switching Range : 0 or 1 (unit: initial value: 0) Function : Set the rotational direction of the motor. Set the rotational direction in relation to the directional command signal (F/R) of the control sequence input. Also set the sequence of the station numbers. Example 1 : In the case of [0]: Motor rotates CCW (viewed from the load side) when F/R signal is OPEN. Or, the station number increases in the CCW direction. Example 2 : In the case of [1]:Motor rotates CW (viewed from the load side) when F/R signal is OPEN. Or, the station number increases in the CW direction.
C0-04	Name : Zero-point offset automatic setup mode Range : 0 or 1 (unit: initial value: 0) Function : Set using the parameter (C0-10) or zero-point offset automatic setup operation to set the zero-point offset. Example 1 : In the case of [0]: Setting by parameter is selected. Executing zero-point offset setup operation with this setting will result in an error. Example 2 : In the case of [1]: Setting by zero-point offset automatic setup operation is selected.

Table 5.2 Parameter Functions (Cont'd)

C0-05	Name : Zero-point return direction Range : 0 or 1 (unit: initial value: 0) Function : Set the direction of the zero-point return. Example 1 : In the case of [0]: Zero-point return will be carried out in the same direction as when the F/R signal is changed to OPEN. Example 2 : In the case of [1]: Zero-point return will be carried out in the same direction as when the F/R signal is changed to CLOSED.
C0-06	Name : Zero-point offset automatic setup operation direction Range : 0 or 1 (unit: initial value: 0) Function : Set the direction of the zero-point offset automatic setup. Normally, set in the opposite direction of the zero-point return. Example 1 : In the case of [0]: Zero-point offset automatic setup will be carried out in the same direction as when the F/R signal is changed to OPEN. Example 2 : In the case of [1]: Zero-point offset automatic setup will be carried out in the same direction as when the F/R signal is changed to CLOSED.
C0-07 C0-08	Name : Gear ratio B/A Range : 1 to 40000 (unit: 1, initial value: 1) Function : To be used when the unit station pulse is fractional. Set "A" or "B" of the gear ratio (B/A) C0-07: Gear ratio A C0-08: Gear ratio B Example 1 : When the gear ratio is "1/179" (decelerating), A=179 and B=1 Example 2 : When the gear ratio is "55/19" (accelerating), A=19 and B=55
C0-09	Name : ABS mode Range : 0, 1, 2 (unit: initial value: 0) Function : Set the ABS mode. 0 : The ABS mode is not used. 1 : ABS mode [1]. All the position information before turning OFF the power is stored in the nonvolatile memory. A specially designed brake motor is required. Control equivalent to an absolute value PG is possible. 2 : ABS mode [2]. Only the information of the stations stopped before turning OFF the power is stored in the nonvolatile memory. Since the amount the motor moves while the power is OFF will remain as an error, a mechanical clamp (e. g. clamp pin insertion) must be provided. A specially designed brake motor is not required. Set "0" for the backlash correction (C0-13).
C0-10	Name : Zero-point offset Range : 120 to 40000 (unit: 1, initial value:400) Function : This is used when setting the zero-point offset by parameter. Set in PG pulse units (multiples of 4). Additionally, in order to make the zero-point return operation stable, adjust the motor axis so that setting can be made within the upper limit and the lower limit. (In the case of zero-point offset automatic setup mode, exceeding the above rang will also result in an error.)

Table 5.2 Parameter Functions (Cont'd)

C0-11	Name : Rotational axis direction command mode Range : 0,1, 2, 3 (unit: initial value: 0) Function : Set the direction when executing automatic operation of rotational axis. 0 : Positioning is perfomed in the shorter distance direction. 1 : Positioning is performed in the same direction as that when the F/R signal turns OPEN. 2 : Positioning is performed in the same direction as that when the F/R signal turns CLOSED. 3 : Positioning is performed according to the external command (F/R signal).
C0-12	Name : Parameter setting permission Range : 0 or 1 (unit: initial value: 0) Function : This parameter allows or prohibits setting of parameters. JOG operation by teaching can be performed, but the position setting [write to (d0-**)] is not possible. 0 : All parameters can be set. 1 : Parameters cannot be set or initialized. To be used when prohibiting parameter setting. When this parameter is set to C0-12=1, parameter initialization cannot be performed.
C0-13	Name : Backlash correction Range : 0 to 80000 PULSES (unit: 1, initial value: 0) Function : Set the backlash correction in PG pulse units (multiples of 4). The direction of correction is opposite to the zero-point return. When the backlash correction is set to a value other than "0", be sure to carry out the zero-point return after turning the system ON. (except in the ABS mode 1) Commanding the setup operation without the zero-point return will result in an error. Also when the backlash correction is set to a value other than "0", it is not possible to carry out the zero-point automatic setup operation.
C0-14	Name : Zero-point return operation select. Range : 0 or 1 (unit: initial value: 0) Select operation mode 0 : Zero-point return (return mode 0) used with Z phase pulse. 1 : Zero-point return (return mode 1) without Z phase pulse.
C0-15	Name : Automatic setup number Range : 0-511 (unit:1, initial value:0) Function : The setup operation will be automatically performed at the end of the zero-point return operation for the number set in [C0-15]. In the case of [C0-15=0], the setup operation will not be performed automatically; the setup operation is required after the zero-point return. Also, the setup operation is required after the power supply (except in the ABS mode).
C0-16	Name : PG pulses Range : 0 or 1 (unit: 1, initial value: 0) Function : Set the PG pulses of the motor. 0 : 1000 pulses/rev. 1 : 1024 pulses/rev. Two types of PG pulses can be selected. Normally set "0". If this setting does not agree with the motor pulses, an alarm (alarm 1) will be output.

Table 5.2 Parameter Functions (Cont'd)

C0-17	Name : Kp gain during stop (Kp3) Range : 10-1000 (unit: 1, initial value: 25) Function : Set the value of position control proportional gain for the range set by [C0-18]. Normally, set a value smaller than Kp [E0-7n]. If the setting of Kp3 is larger than Kp, the value of Kp is assumed.
C0-18	Name : Control width for C0-17 Range : 0-100 (unit: 1, initial value: 20) Function : Set the range of pulses controlled by Kp3. In the set range of pulses, Kp [E0-7n] is switched to Kp3 for position control. Once the control is switched to Kp3, it will be held until the operation is started next (SATRT signal changing from OPEN to CLOSED). In the state "0", the position is controlled by the value of Kp3. In the case of [C0-18=0], the Kp3 control will not be executed. Position will always be controlled by Kp [C0-7n].
d0-02	Name : Section (1-2) Arbitrary station pulses Range : 40-96000000 (unit: 1, initial value: 4000) Function : Set the station pulses for the section (1-2) for the linear axis. In the case of [C0-01=3], set the pulses of section (1-2) in units of PG pulses (multiples of 4). In the case of [C0-01=4], set the pulses of section (1-2) in units of PG pulses (multiples of 4). In the case of [C0-01=4], this parameter can be set automatically by teaching. Furthermore, setting after teaching or teaching after setting are also possible.
d0-03	Name : Section (2-3) or (1-3) Arbitrary station pulses Range : 40-96000000 (unit: 1, initial value: 4000) Function : Set the station pulses for the section (2-3) or (1-3) for the linear axis. In the case of [C0-01=3], set the pulses of section (2-3) in units of PG pulses (multiples of 4). In the case of [C0-01=4], set the pulses of section (1-3) in units of PG pulses (multiples of 4). In the case of [C0-01=4], this parameter can be set automatically by teaching. Furthermore, setting after teaching or teaching after setting is also possible.
— — — — — — — — — — — —	
d0-45	Name : Section (44-45) or (1-45) Arbitrary station pulses Range : 40-96000000 (unit: 1, initial value: 4000) Function : Set the station pulses for the section (44-45) or (1-45) for the linear axis. In the case of [C0-01=3], set the pulses of section (44-45) in units of PG pulses (multiples of 4). In the case of [C0-01=4], set the pulses of section (1-45) in units of PG pulses (multiples of 4). In the case of [C0-01=4], this parameter can be set automatically by teaching. Furthermore, setting after teaching or teaching after setting is also possible.

Table 5.2 Parameter Functions (Cont'd)

E0-00 E0-01 E0-02 E0-03	Name : Automatic operation speed (V1 n) Range : 10 to 1800 r/min (unit: 1, initial value: 500) Function : Set the running speed (V1 n) for automatic operation. E0-00 : 1st automatic operation runnning speed (V1 0) E0-01 : 2nd automatic operation runnning speed (V1 1) E0-02 : 3rd automatic operation runnning speed (V1 2) E0-03 : 4th automatic operation runnning speed (V1 3)
E0-10 E0-11 E0-12 E0-13	Name : Manual operation speed (V2 n) Range : 10 to 1800 r/min (unit: 1, initial value: 500) Function : Set the running speed (V2 n) for manual operation. E0-10 : 1st manual operation running speed (V2 0) E0-11 : 2nd manual operation running speed (V2 1) E0-12 : 3rd manual operation running speed (V2 2) E0-13 : 4th manual operation running speed (V2 3)
E0-20 E0-21 E0-22 E0-23	Name : Zero-point return high speed (V3 n) Range : 10 to 1800 r/min (unit: 1, initial value: 500) Function : Set the high speed (V3 n) for zero-point return. E0-20 : 1st high speed zero-point return (V3 0) E0-21 : 2nd high speed zero-point return (V3 1) E0-22 : 3rd high speed zero-point return (V3 2) E0-23 : 4th high speed zero-point return (V3 3)
E0-30 E0-31 E0-32 E0-33	Name : Zero-point return low speed (V4 n) Range : 10 to 1800 r/min (unit: 1, initial value: 50) Function : Set the low speed (V4 n) for zero-point return. E0-20 : 1st low speed zero-point return (V4 0) E0-21 : 2nd low speed zero-point return (V4 1) E0-22 : 3rd low speed zero-point return (V4 2) E0-23 : 4th low speed zero-point return (V4 3)
E0-40 E0-41 E0-42 E0-43	Name : Zero-point offset automatic setup speed (V5 n) Range : 10 to 1800 r/min (unit: 1, initial value: 50) Function : Set the running speed (V5 n) of zero-point offset automatic setup. E0-40 : 1st low speed zero-point return (V5 0) E0-41 : 2nd low speed zero-point return (V5 1) E0-42 : 3rd low speed zero-point return (V5 2) E0-43 : 4th low speed zero-point return (V5 3)
E0-50 E0-51 E0-52 E0-53	Name : Jog speed (V6 n) Range : 10 to 1800 r/min (unit: 1, initial value: 50) Function : Set the running speed othe JOG operation (V6 n) E0-50 : 1st low speed zero-point return (V6 0) E0-51 : 2nd low speed zero-point return (V6 1) E0-52 : 3rd low speed zero-point return (V6 2) E0-53 : 4th low speed zero-point return (V6 3)
E0-60 E0-61 E0-62 E0-63	Name : Acceleration time (ACC n) Range : 10 to 5000 msec (unit: 1, initial value: 100) Function : Set the time required to accelerate from zero speed to maximum speed (1800 r/min) E0-60 : 1st acceleration time (ACC 0) E0-61 : 2nd acceleration time (ACC 1) E0-62 : 3rd acceleration time (ACC 2) E0-63 : 4th acceleration time (ACC 3)

Table 5.2 Parameter Functions (Cont'd)

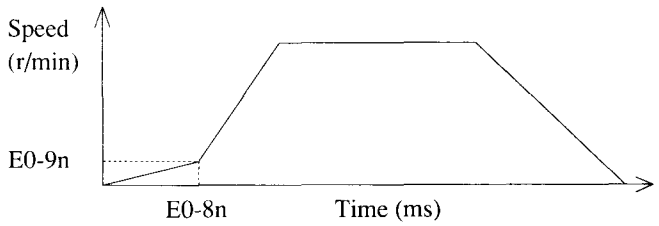
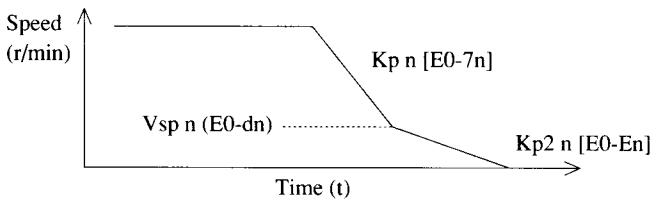
E0-70 E0-71 E0-72 E0-73	Name : Position control proportion gain (Kp n: unit 0.1/sec) Range : 1 to 1000 (unit: 1, initial value: 100) Function : Set the proportional gain of the position loop. E0-70 : 1st position control proportional gain (KP 0) E0-71 : 2nd position control proportional gain (KP 1) E0-72 : 3rd position control proportional gain (KP 2) E0-73 : 4th position control proportional gain (KP 3)
E0-80 E0-81 E0-82 E0-83	Name : Soft-start time at starting (ts n) Range : 0 to 99 msec (unit: 1, initial value: 0) Function : Set the time to soft-start at starting (ts n). E0-80 : 1st soft-start time upon starting (ts 0) E0-81 : 2nd soft-start time upon starting (ts 1) E0-82 : 3rd soft-start time upon starting (ts 2) E0-83 : 4th soft-start time upon starting (ts 3)
E0-90 E0-91 E0-92 E0-93	Name : Soft-start speed at starting (Vs n) Range : 0 to 99 r/min (unit: 1, initial value: 0) Function : The speed will reach the speed at the soft-start time (E0-8n) at the above start. See the chart below E0-90 : 1st soft-start speed upon starting (Vs 0) E0-91 : 2nd soft-start speed upon starting (Vs 1) E0-92 : 3rd soft-start speed upon starting (Vs 2) E0-93 : 4th soft-start speed upon starting (Vs 3) 
E0-A0 E0-A1 E0-A2 E0-A3	Name : Torque limit value (TL n) Range : 30 to 300% (unit: 1, initial value: 200) Function : Set the torque limit value (TL n) of the driver (X3000). E0-A0 : 1st torque limit value (TL 0) E0-A1 : 2nd torque limit value (TL 1) E0-A2 : 3rd torque limit value (TL 2) E0-A3 : 4th torque limit value (TL 3) 100 (%) is the motor's rated torque value. The deceleration time in JOG, emergency stop, zero-point return, zero-point offset automatic setup is determined by this torque value. Overrun may occur in manual/automatic operation owing to the Kp value (E0-7n) and torque limit value (E0-An). In that case, make the Kp a smaller value or make the torque limit a larger value.

Table 5.2 Parameter Functions (Cont'd)

E0-b0 E0-b1 E0-b2 E0-b3	Name : Operation completion width (COIN n, COIN-A n output width) Range : 8 to 80000 PULSES (unit: 1, initial value: 20) Function : Set the allowable position error range (error between the aimed position and the current position) for outputting COIN and COIN-A signals. Set in PG pulse units (multiples of 4). When the machine reaches the allowable range, the COIN/ COIN-A will be CLOSED and when the machine moves out of the allowable range, the COIN/COIN-A will be OPEN again. E0-b0 : 1st operation completion width (COIN 0, COIN-A 0) E0-b1 : 2nd operation completion width (COIN 1, COIN-A 1) E0-b2 : 3rd operation completion width (COIN 2, COIN-A 2) E0-b3 : 4th operation completion width (COIN 3, COIN-A 3)
E0-C0 E0-C1 E0-C2 E0-C3	Name : Positioning vicinity width (NEAR n output width) Range : 8 to 80000 PULSES (unit: 1, initial value: 400) Function : Set the allowable position error range (error between the aimed position and the current position) for outputting the NEAR signal. Set in PG pulses (multiples of 4). When the machine reaches the allowable range, the NEAR signal will be CLOSED and when the machine moves out of the allowable range, the NEAR signal will be OPEN again. E0-C0 : 1st near positioning width (NEAR 0) E0-C1 : 2nd near positioning width (NEAR 1) E0-C2 : 3rd near positioning width (NEAR 2) E0-C3 : 4th near positioning width (NEAR 3)
E0-d0 E0-d1 E0-d2 E0-d3	Name : Soft stop speed (Vspn) Range : 0 to 1800 r/min. (unit: 1, initial value: 0) Function : Set the speed at which the soft stop is to be started at the time of deceleration. When the speed is decelerated to the setting Vspn, the position control proportional gain Kpn [E0-7n] will be switched to Kp2n [E0-En]. E0-d0 : 1st soft stop speed (Vsp 0) E0-d1 : 2nd soft stop speed (Vsp 1) E0-d2 : 3rd soft stop speed (Vsp 2) E0-d3 : 4th soft stop speed (Vsp 3)
E0-E0 E0-E1 E0-E2 E0-E3	Name : Soft stop Kp2 Range : 10 to 1000 r/min. (unit: 1, initial value: 100) Function : Set the position control proportional gain for the soft stop. Be sure to set a value smaller than the position control proportional gain used before the soft stop (i.e. Kpn [E0-7n]). If a larger value is set, the same value as Kpn will be used. E0-E0 : 1st soft stop Kp2 (Kp2 0) E0-E1 : 2nd soft stop Kp2 (Kp2 1) E0-E2 : 3rd soft stop Kp2 (Kp2 2) E0-E3 : 4th soft stop Kp2 (Kp2 3)  Notes : 1 The soft stop function will make the deceleration time longer, thus making the positioning time (indexing time) longer. The smaller the value of Kp2n or the larger the value of Vspn, the longer the positioning time (indexing time) will be. 2 When a small value is set for Kp2n, the servo lock response for stopping will take a longer time. In case an external force applies at the time of stopping, restoration to the zero position will take longer.

5.2 OPERATION STATUS MONITOR

Table 5.3 shows the list of operation statuses to be monitored. Monitor the operation status while the system is at a standstill. Monitoring cannot be carried out during operation.

Table 5.3 List of Operation Statuses to be Monitored

Un-No	Name	Description
U0-00	Input signal block A	Sequence input signal status CON1-A3 to B9
U0-01	Input signal block B	Sequence input signal status CON1-A10 to B12 A 23 to B23
U0-02	Output signal block A	Sequence output signal status CON1-A13 to B19
U0-03	Output signal block B	Sequence output signal status CON1-A20 to B20
U0-04	Station number command value	Station number command value STA.NO 0 to 8 in decimal notation
U0-05	Current station number value	Current station number value POS.NO 0 to 8 in decimal notation.
U0-06	Zero-point offset	Zero-point offset in decimal notation
U0-07	Zero-point LS position	Zero-point LS position in decimal notation
U0-08	Current position (pulse)	Current position pulse in decimal notation
U0-09	Deviatoric pulse	Deviatoric pulse in decimal notation

Table 5.4 shows the operation status monitor functions.

Table 5.4 Monitor Function

U0-00

Name : Input signal block A

STA. NO 0 STA. NO 1 STA. NO 2 STA. NO 3 STA. NO 4

STA. NO 5 STA. NO 6 STA. NO 7 STA. NO 8 START

F/R MODE 0 MODE 1 MODE 2

When a signal is CLOSED, the corresponding indicator (———) is lit.

Code	Description	CON1-
STA. NO 0	Station command value : bit 0	A3
STA. NO 1	Station command value : bit 1	B3
STA. NO 2	Station command value : bit 2	A4
STA. NO 3	Station command value : bit 3	B4
STA. NO 4	Station command value : bit 4	A5
STA. NO 5	Station command value : bit 5	B5
STA. NO 6	Station command value : bit 6	A6
STA. NO 7	Station command value : bit 7	B6
STA. NO 8	Station command value : bit 8	A7
START	Operation command input	B7
F/R	Direction command input	A8
MODE 0	Operation mode command input : bit 0	B8
MODE 1	Operation mode command input : bit 1	A9
MODE 2	Operation mode command input : bit 2	B9

Table 5.4 Monitor Function (Cont'd)

U0-01

Name : Input signal block B

ZRET-LS EMG SVON RESET MULT. 0

MULT. 1 ABS.ST OPT. INO

When a signal is CLOSED, the corresponding indicator (———) is lit.

Code	Description	CON1-
ZRET. LS	Zero-point LS signal	A10
EMG	Emergency stop signal	B10
SVON	Servo ON signal	A11
RESET	Fault reset	B11
MULT. 0	Multiple-pattern signal 0	A12
MULT. 1	Multiple-pattern signal 1	B12
ABS. ST	Memory storage command signal	A23
OPT. IN0	Preliminary input	B23

U0-02

Name : Output signal block A

COIN COIN-A NEAR ZSPD ALARM

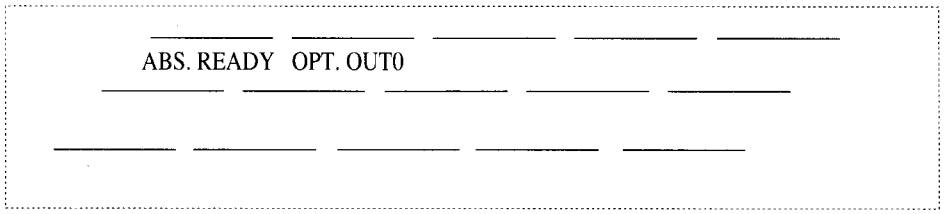
POS. NO 0 POS. NO 1 POS. NO 2 POS. NO 3 POS. NO 4

POS. NO 5 POS. NO 6 POS. NO 7 POS. NO 8

When a signal is CLOSED, the corresponding indicator (———) is lit.

Code	Description	CON1-
COIN	Operation completion signal	A13
COIN-A	Automatic operation positioning completion	B13
NEAR	Positioning vicinity signal	A14
ZSPD	Zero speed signal	B14
ALARM	Error signal	A15
POS. NO 0	Current station number value : bit 0	B15
POS. NO 1	Current station number value : bit 1	A16
POS. NO 2	Current station number value : bit 2	B16
POS. NO 3	Current station number value : bit 3	A17
POS. NO 4	Current station number value : bit 4	B17
POS. NO 5	Current station number value : bit 5	A18
POS. NO 6	Current station number value : bit 6	B18
POS. NO 7	Current station number value : bit 7	A19
POS. NO 8	Current station number value : bit 8	B19

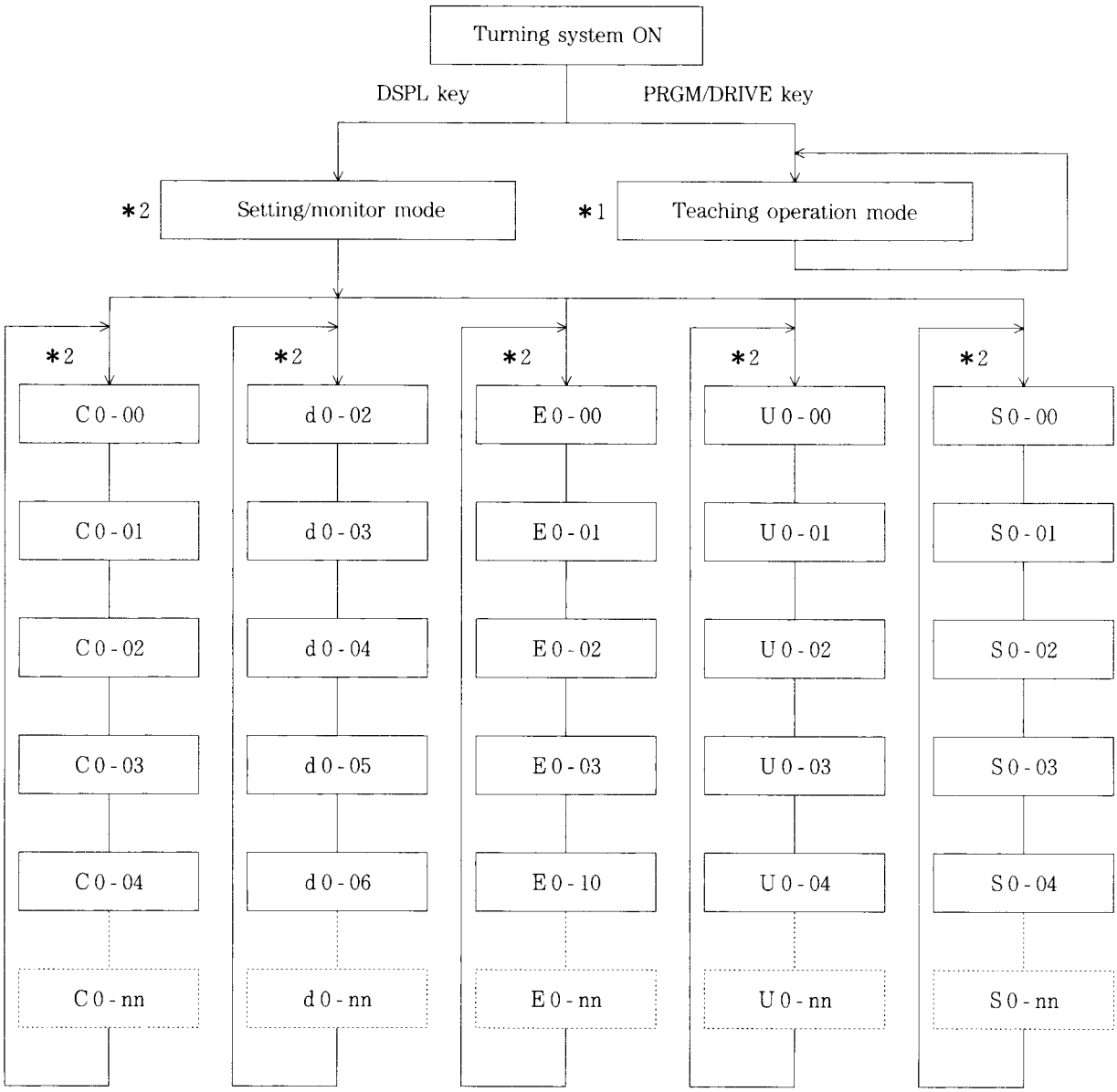
Table 5.4 Monitor Function (Cont'd)

<table>
<tr><td>U0-03</td><td>Name : Output signal block B
 
When a signal is CLOSED, the corresponding indicator (———) is lit.
<table><tr><th>Code</th><th>Description</th><th>CON1-</th></tr><tr><td>ABS. READY
OPT. OUT0</td><td>Memory storage completion
Preliminary output 1</td><td>A20
B20</td></tr></table></td></tr>
<tr><td>U0-04</td><td>Name : Station number command value display in decimal notation
Station number command value (STA. NO 0 to STA. NO 8) is displyaed in decimal notation.</td></tr>
<tr><td>U0-05</td><td>Name : Current station number value display in decimal notation
Current station number value (POS. NO 0 to POS. NO8) is displayed in decimal notation.</td></tr>
<tr><td>U0-06</td><td>Name : Zero-point offset (by automatic operation) display in decimal notation
Offset obtained as a result of zero-point offset automatic setup is displayed.
Adjust zero-point offset to be within 120 to 40000.
Otherwise, alarm A will be activated.
In the case of alarm A being activated, change either the zero-point LS position or Z-phase (PG) position.</td></tr>
<tr><td>U0-07</td><td>Name : Zero-point LS position in decimal notation
The distance (pulses) between the zero-point LS position and the Z-phase (PG) position is displayed in decimal notation.
A value out of the range of ± 120 will be occured alarm 9.
In the case of alarm 9 being activated change eigher the zero-point LS position or the Z-phase (PG) position.</td></tr>
<tr><td>U0-08</td><td>Name : Current position (pulses)in decimal notation
The current position pulses (internal setup down counter) in respect to the setup position being '0' are displayed in decimal notation. It is displayed in real time as signed 10-digit data. The data are to be monitored in two sections, upper and lower five digits. It starts counting from '0' in the case of overflowing.</td></tr>
<tr><td>U0-09</td><td>Name : Deviation pulses in decimal notation
The deviation pulses between the command position and current position are displayed in decimal notation. It is displayed in real time as signed 10-digit data. The data are to be monitored in two sections, upper and lower five digits. It starts counting form '0' in the case of overflowing.</td></tr>
</table>

5.3 HOW TO USE PARAMETER SETTER (Model JVOP-100)

5.3.1 Fundamental operation flow

(mode selection, parameter number selection)



*1 : Teaching mode is selected by depressing PRGM/DRIVE key. And depress the key again and the teaching mode is ended.

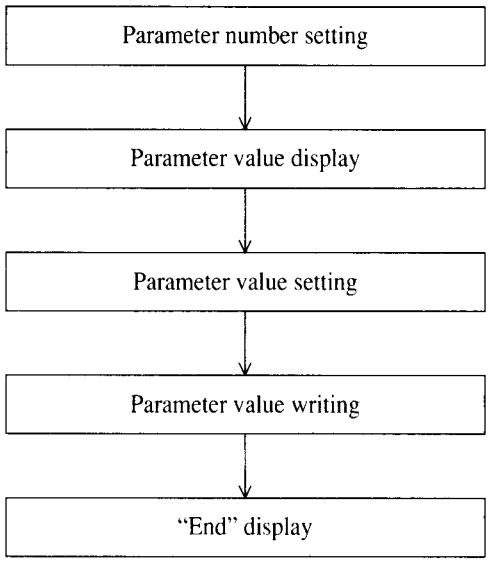
*2 : Mode changes one after another when "DSPL" key is depressed.

C0-00 ⇨ d0-02 ⇨ E0-00 ⇨ U0-00 ⇨ S0-00

Notes : 1. Set respective parameter numbers by depressing the "Δ" key and "∇" key.

2. The method to set parameter values of parameter number is shown on the next page

5.3.2 Parameter value setting flow (Co-nn, do-nn, Eo-nn)



Display the parameter number by depressing the "DSPL", "△" and "▽"keys.

Press the "ENTER" key to display parameter value. *1

Set (display) a parameter value by depressing the "△", "▽" and "▷" keys

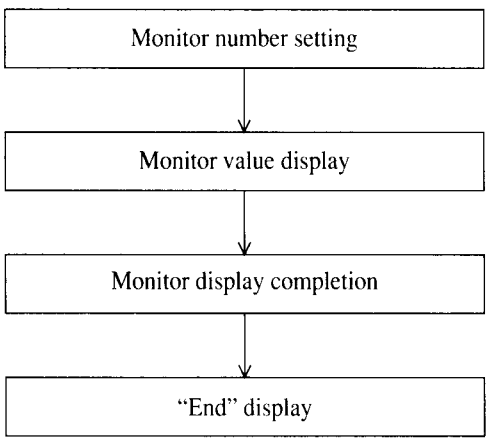
Press the "ENTER" key to input the parameter value.

Displays "End" for 0.5 second and completes setting. No display will appear after that. *2

*1 : Operation will not be possible unless "ENTER" is depressed to finish parameter setting. No operation commands are accepted.

*2 : To set more than 6-digit parameter , set the lower 4 digits first and then the upper 4 digits.

5.3.3 Monitor operation flow (Uo-nn)



Displays the monitor number by depressing the "DSPL", "△" and "▽" keys.

Depress the "ENTER" key to display monitor value. *1

Depress the "ENTER" key to finish the monitor value display.

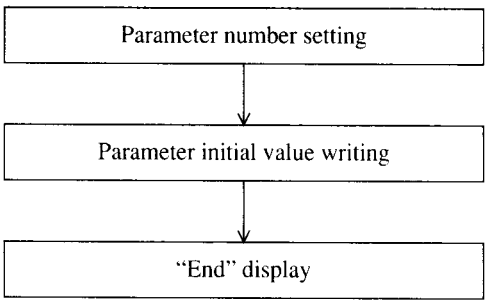
Displays "End" for 0.5second and completes monitor operation. No display will appear after that. *2

*1 : Monitoring data during operation shows the changes made every moment (real time).

*2 : Operation is possible even without depressing "ENTER" to finish monitor setting. However, you must finish monitor setting before carrying out other settings or monitor operation using the parameter setter.

*3 : 10-digit data are to be monitored in two sections, upper and lower 5 digits. The lower 5 digits are monitored first and the upper 5 digits.

5.3.4 Parameter initial value setting flow (So-nn)



Displays the parameter number by depressing the "DSPL", "△" and "▽" keys. (S0-00) is the initial value number.

Depress the "ENTER" key twice to enter the parameter initial value.

Displays "End" for 0.5second and completes setting. No display will appear after that. *2

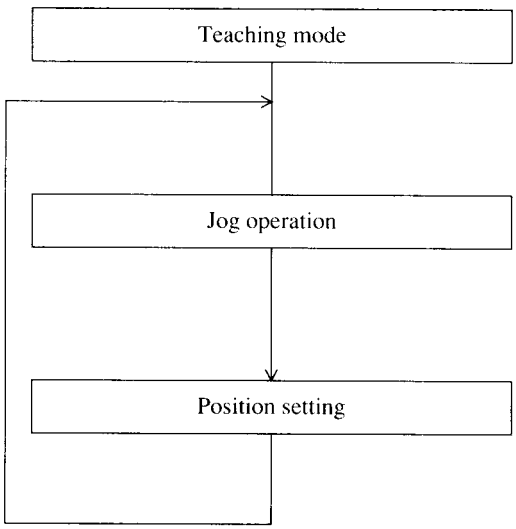
*1 : This setting is to be made only upon delivery from the factory. If this setting procedure is carried out, all parameters will be set back to the initial values used upon delivery.

*2 : Operation is not possible unless "ENTER" is depressed to finish the parameter setting operation.

*3 : When C0-12=1, parameters cannot be initialized. First set C0-12 to "0" then initialize the parameters.

*4 : Parameters other than S0-00 are for factory inspection use: do not use them.

5.3.5 Teaching Method



Depress the "PRGM/DRIVE" key to set the teaching mode. You can cancel the teaching mode by depressing this key again. The "DRIVE" lamp is lit when in the teaching mode.

Set the direction with the "FOW/REW" key first and then depress the "JOG" key to start the JOG operation. The "FOW" and "REV" lamps turn ON alternately every time the "FOW/REW" key is depressed. The dorection of the lit lamp is selected.

Advance to the station position using JOG operation and display the station number (no-**) by depressing the "△" or "▽" key and then depress the "ENTER" key. The pulse data of the station position will be written in parameter (d0-**).

*1 : The "DSPL" key is invalid in the teaching mode. Cancel the teaching mode before using the "DSPL" key.

*2 : The "FOW/REW" key is invalid during operation The JOG direction will not be changed even if the key is depressed during operation.

*3 : The teaching operation is to be performed in the case of [C0-12=0]. Note that the teaching operation can be performed in the case of [C0-12=1] as well, however, the position data of teaching will not be written in parameter [d0-**].

*4 : Monitoring data after carrying out the teaching operation allows you to monitor the data that have been set by the teaching operation. Setting parameters after that will allow you to correct or change the values that have been set by the teaching operation.

*5 : Furthermore, it is possible to correct the position error by carrying out teaching after setting the parameters

*6 : Executing the teaching operation before setup will result in teaching from station number 1. Teaching for station number 1 ends in the same state as when setup was performed (state indication 5). After that, teaching to the desired station number will be enabled.

*7 : After the setup operation, teaching to the desired station number is enabled.

*8 : Station numbers must be arranged in order. The direction of the order is set in parameter [C0-03: Motor rotational direction switching]. When the station numbers are not arranged in order at the start of setup, manual, or automatic operation, alarm "C" will be occured.

*9 : The distance between adjacent stations (pulses) can be "0". However, if this value is smaller than the setting for backlash, alarm "d" will be occured.

*10 : The JOG operation speed conforms to the setting of parameter [E0-50 to -53] and the input in MULT0 and 1. It also follows the input of the EMG/SVON signal.

*11 Teaching operation can be performed irrespective of the setting of parameter [C0-01: Rotational axis/linear axis]. The teaching data will be written in parameter [d0-**]. These data will be written as the absolute coordinate axis data. Therefore, to carry out positioning using the teaching data, parameter [C0-01=4: Absolute coordinate axis] must be set.

5.3.6 Supplementary description (for parameter setter)

■ Carry out the connection of the parameter setter with Juspoint Ⅲ (point module) turned OFF. We do not guarantee proper operation if the connection is made with Juspoint Ⅲ turned ON.

■ The following indications are not displayed : [SEQ] [REF]

■ The following keys do not function (even when depressed) : [RUN] [STOP]

■ Depress the "ENTER" key to finish parameter setting/monitor operation, and then depress the "DSPL" key to carry out parameter setting/monitor operation, and the next parameter number/monitor number will be displayed. (Example : C0-12 ⇒ C0-13)

■ Depress the "ENTER" key to finish parameter setting/monitor operation, and carry out operation, and then depress the "DSPL" key to carry out parameter setting/monitor operation, and the following parameter number/monitor number will be displayed.

■ The parameter setting operator is a not Juspoint Ⅲ accessory. It is identical to the parameter setter used in the inverter (VS series) made by Yaskawa Electric. (Type : JVOP-100 : made by Yaskawa Electric)

■ Holding down each key does not cause the key to repeatedly function. Release each key after depressing it for the next key operation.

■ For parameter set by personal computer, contact your YASKAWA representative.

6 I/O INTERFACE

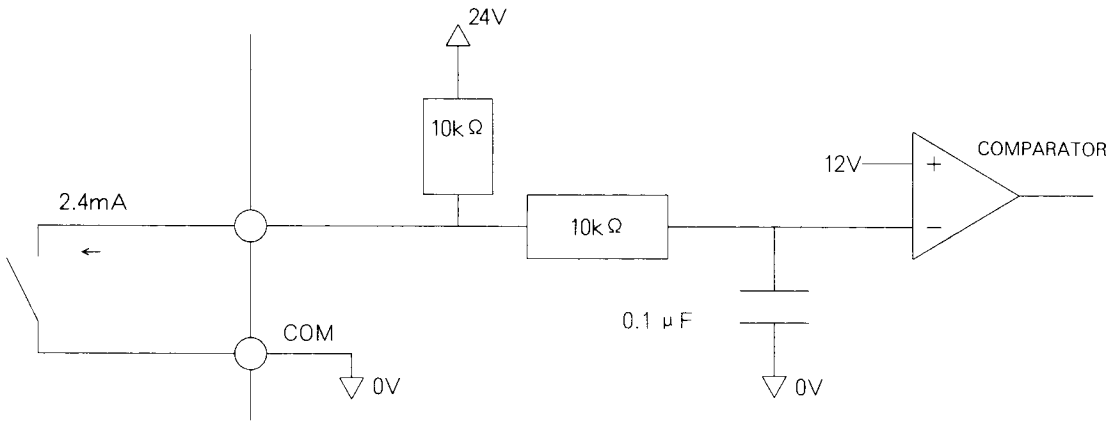
6.1 INPUT INTERFACE

Input interface is shown in Fig. 6.1.

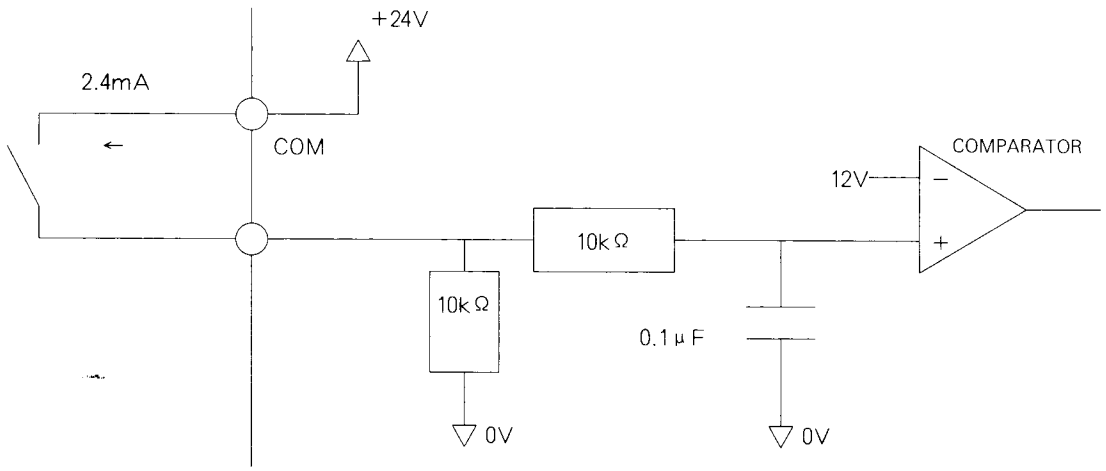
Two types of input interface : 0V common and +24V common, are provided.
These two types require different hardware, so specify which type you prefer when ordering (Refer to Table 6.1).

The input interface of the system does not use the photocoupler insulation method. (It is isolated from the main circuit.)

In the case of contact input, use a micro current contact.



(a) 0V Common Input Interface



(b) +24V Common Input Interface

Fig. 6.1 Input Interface Circuit

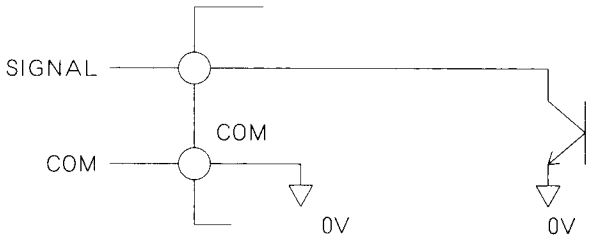
6.2 OUTPUT INTERFACE

The output interface is shown in fig. 6.2.

Two types of output interface, 0V common and +24V common, are provided. These two types require different hardware, so specify which type you prefer when ordering (Refer to Table 6.1).

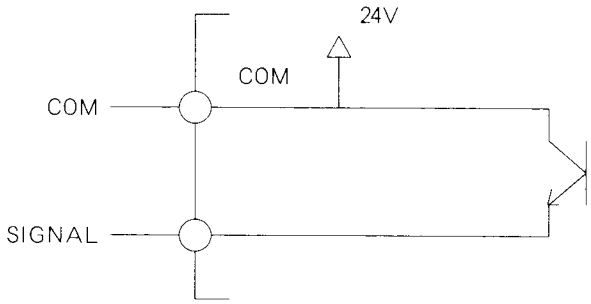
The output interface of the system is not of photo coupler insulation method. (It is isolated from the main circuit.)

For driving if a coil such as a relay, externally install a clamp diode.



Max. (service) voltage 35V
Max. (service) current 50mA

(a) 0V Common Output Interface



Max. (service) voltage 35V
Max. (service) current 50mA

(b) +24V Common Output Interface

Fig. 6.2 Output Interface Circuit

Specify the input/output interface in accordance with Table 6.1.

Table 6.1 I/O Interface Model Designation

C I M R – □ □ J P 3 – □ □ 0 0 M

Capacity
- 02: 0.2kW
- 04: 0.4kW
- 08: 0.75kW
- 15: 1.5kW
- 22: 2.2kW
- 37: 3.7kW

Construction
- 1: Heat radiating part (cooling fins) installed in the panel
- 3: Heat radiating part (cooling fins) separately installed

Interface(Input/Output)
- A: 0V/0V
- B: 24V/24V

6.3 SUPPLEMENT OF SEQUENCE CONTROL OUTPUT SIGNAL

■ Output Specifications of COIN, COIN-A, NEAR Signals

Table 6.3 Specifications of COIN, COIN-A, NEAR SIGNALS (Output specifications at the completion of operation)

Operation mode	COIN	COIN-A	NEAR
Automatic operation (Normal operation)	○	○	○
Automatic operation (Temporary stop)	○	×	○
Manual operation	○	×	○
Setup operation	○	○	○
Zero-point return operation	○	×	×
Zero-point offset automatic operation	○	×	×
Jog operation	△	×	△
Emergency stop operation	△	×	△

○ : Outputs OPEN at the start of the operation, and outputs CLOSED at the completion of the operation.
× : Outputs OPEN at the start of the operation, and outputs OPEN at the completion of the operation.
△ : Outputs OPEN at the start of the operation, and outputs CLOSED at the completion of the operation (after reset in the case of an emergency stop) if stopping at a station, otherwise, outputs OPEN.

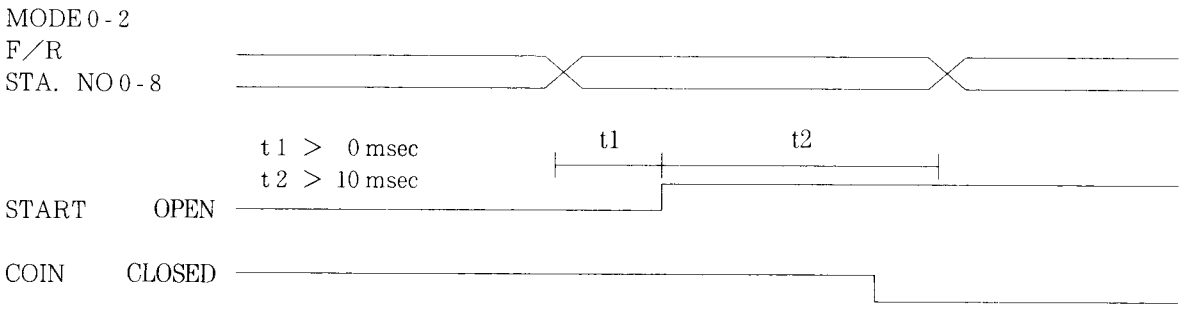
6.4 TIMING OF SEQUENCE CONTROL SIGNAL

■ At Operation Start

Establish the signals of operation mode (MODE0-2), station command value (STA.NO0-8), and direction command (F/R) at the same time with or before the change of the START signal output from OPEN to CLOSED.

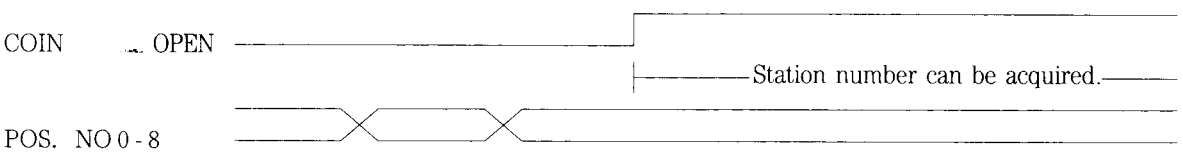
In order to secure signal, hold for over 10msec.

They may be held until completion of operation.



■ At Operation Completion

The operation completion signal (COIN) is output at the completion of operation, and simultaneously, current station number (PDS, No0-8) is displayed. Therefore, after detection of out (OPEN → CLOSED) of operation completion signal (COIN), acquire the current station number.



6.5 ABS MODE 1 AND 2

(1) Sequence before turning power OFF

- Usually input CLOSED for the memory storage command signal(ABS.ST). Then just before turning the power OFF input OPEN for ABS.ST.
- When ABS.ST is input as OPEN during operation, the motor will be stopped. At the same time, the motor brake will be turned ON. When the complete stop of the motor is detected, the current position information will be stored in E²ROM.
- After storing the required memory, output CLOSED for the memory storage completion signal ABS.READY to indicate that the power supply (24 VDC) can be turned OFF.

(2) Sequence after turning power ON

- After the power is turned ON, the ABS.READY signal is output as CLOSED. So input CLOSED for the ABS.ST signal. Operation mode will not be accepted while the ABS.READY signal is in the CLOSED STATE.
- When the ABS.ST signal becomes CLOSED (0.5 sec), all the contents of the position information memory (E²ROM) will be read and the ABS.READY signal will be output as OPEN.
  Then the condition before the power was turned OFF (condition "0" or "5") will be completely restored.
  In the case of condition "0", zero-point return or setup operation is required.
  In the case of condition "5", zero-point return or setup operation is not required.

*1 The time required for storing the memory while the motor is stopped is about 200 msec.

*2 When the ABS mode 1 [C0-09=1] is to be used, use it with the specially designed brake motor. The ABS mode 2 [C0-09=1] does not require a special motor.

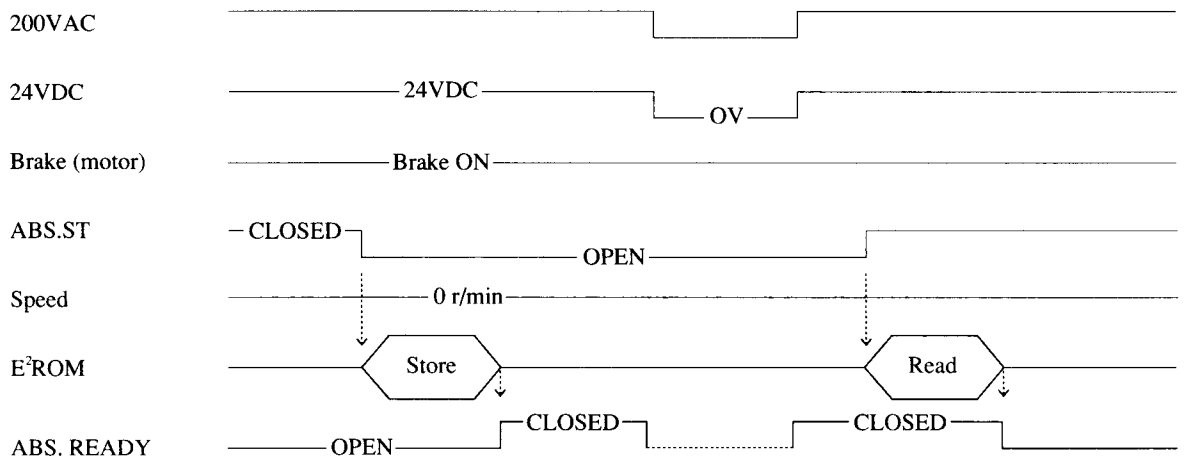
*3 In the case of ABS mode 1 [C0-09=1], all the position information is stored in E²ROM, thus enabling the control almost as precise as the absolute value PG, However, if the motor is rotated while the power is turned OFF positioning will have an error egual to that amount.
In the case of the ABS mode 2 [C0-09=2], only the station number is stored in E²ROM : use this mode only when you have the mechanical clamp mechanism (e.g. pin insertion). That way, even when the motor shaft rotates while the power is turned OFF due to play in the transmission mechanism, the positioning error will not exceed a certain value.

*4 To use the ABS mode for momentary power loss during operation, make sure the following conditions are satisfied.
1. The brake turned ON simultaneously with momentary power loss to stop the motor in a very short period of time. (Examine the brake operating life.)
2. The ABS.ST input becomes OPEN simultaneously (within about 100msec.) with the momentary power loss.
3. The power (24VDC) is retained until the ABS.READY output becomes CLOSED. (The ABS.READY output becomes CLOSED in about 200msec. after the motor is stopped.)

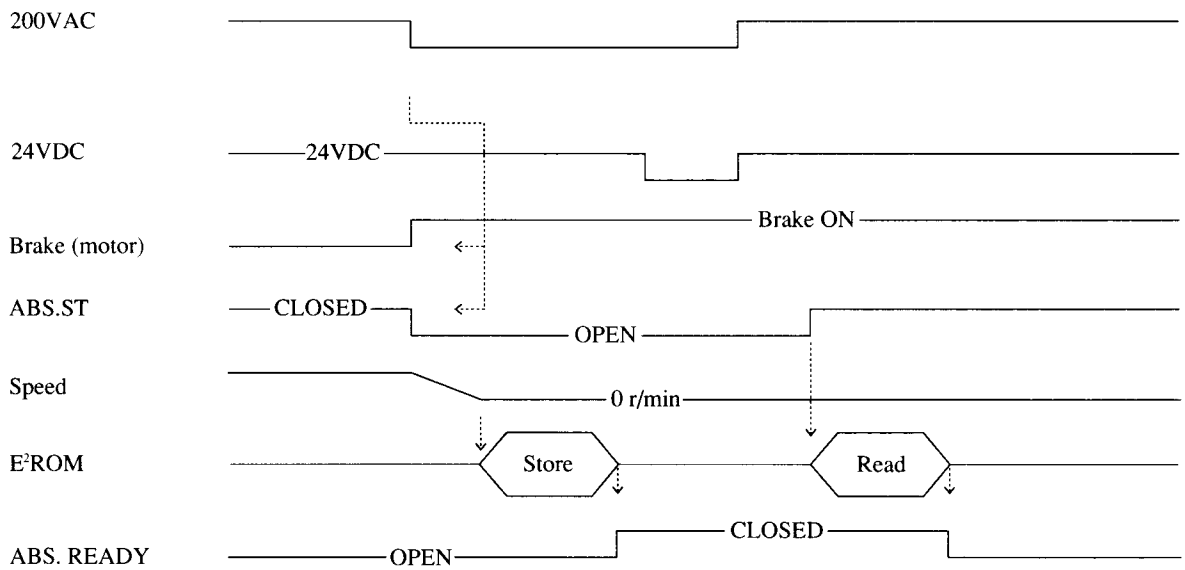
*5 When memory storage was not complete before the power was turned OFF, alarm D will be output as soon as the ABS.ST signal input becomes OPEN.
In this case, reset the fault and carry out the zero-point return and setup operation.

*6 In the case of the ABS mode 1 [C0-09=1], the above operations can be performed when the backlash compensation [C0-13=1], is set to other than "0" (zero-point return and setup operation after turning ON the power is not required).
In the case of the ABS mode 2 [C0-09=2], set "0" for the backlash compensation [C0-13].

■ Sequence diagram 1 (For normal power turning OFF : while the machine is stopped)



■ Sequence diagram 2 (Momentary power loss)



7. STATUS/ALARM INDICATION

7.1 STATUS INDICATION (on the point module)

Status indication is also possible on the 7-segment indication on the point module board.
Table 7.1 shows the contents of the status indication.
This indication is continuously lit. (A flickering indication is an alarm indication.)

Table 7.1 Status Indication

Continuous indication	Operation status
0	Just after turning ON (without setup operation) Non at ABS mode
1	During zero-point offset automatic setup operation
2	During jog operation
3	During zero-point return operation
4	During setup operation (confirmation seems impossible because of 15 msec)
5	During stopped (setup operation completion)
6	During automatic operation
7	During manual operation
8	
9	
A	
b	
C	
d	
E	
F	Memory storage in ABS mode completed. (ABS. READY CLOSED being output) Just after turning ON in ABS mode (ABS. READY CLOSED being output)

[Status indication of inverter (Juspeed-F X3000)]

Whether or not the inverter is in the normal operating state can be monitored with the LED (7 segments) on the printed circuit board in the inverter main body (the LED is continuously lit in the normal operating state).
Table 7.2 shows the indication of the normal operating state.

Table 7.2 State indication of Juspeed-F X3000

State	LED indication	Description
Stopped	—	Servo OFF condition, ready for operation. After the power is turned OFF, the inverter carries out self-diagnosis and displays "-" if no error is found.
Running	0	Servo ON condition and normal operation is continued.

7.2 TROUBLESHOOTING

- Cause and remedy of alarms for Juspoint III

Table 7.3 is a list of alarms. The indications refer to those made on the 7-segment LED on the point module board.

These indications are blinking indications (continuously lit indication indicates normal operation).

Table 7.3 Cause and remedy of alarm

Blinking Indication	Alarm description	Cause and remedy
0	Driver alarm was detected (description is displayed on the driver).	Check the alarm on the driver. The alarm description is displayed on the amplifier board.
1	PG fault (including poor wiring)	PG fault, PG poor wiring, or motor locked may be the cause. Check them.
2	Emergency stop operation was occured.	Emergency stop operation was occured to stop the motor. Inputting OPEN for the EMG signal executes the emergency stop operation. After resetting the alarm, zero-point return or setup operation is not required.
3	Operation was commanded without setup operation after turning ON the power (except for ABS mode 1 and 2)	Automatic or manual operation was performed with state "0" (without setup). Perform the setup operation and then the automatic or manual operation.
4	Zero-point LS was not detected during zero-point offset automatic setup operation.	The zero-point LS was not detected after turning the motor for 40000 pulses (10 rotations)during the zero-point offset automatic setup operation. Check that the zero-point LS is correctly wired and that the signal is input to Juspoint Ⅲ. Or, mount the zero-point LS at a position within 40000 pulses (10 rotations) from the zero-point.
5	Zero-point LS was not detected during zero-point return operation.	The zero-point LS was not detected after turning the motor for all set stations during the zero-point return operation. Check that the zero-point LS is correctly wired or that the signal is input to Juspoint Ⅲ.
6	Undefined station number was commanded.	Command a station number within the range set by [C0-00: number of stations] (for setup or automatic operation).
7	Operation mode was not set correctly.	Undefined operation mode was input. Set the correct operation mode input (MODE0-MODE 2)
8	Zero-point offset automatic setup operation was commanded when the zero-point offset setup mode is set to parameter mode.	[C0-04=0] is set (zero-point offset setup is set to parameter mode). To perform the zero-point offset automatic setup operation, set [C0-04=1].
9	Zero-point LS position error (the zero-point LS position is too close to the Z-phase position, within ±120 pulses)	The Zero-point LS position and the Z-phase pulse position of PG is too close(±120 pulses). Change the LS position or Z-phase position.
A	Zero-point offset is out of allowable range (out of the range set by parameter [C0-10].)	The Zero-point offset detected during the zero-point offset automatic setup operation is out of the range of 120-40000. Change the zero-point LS position correctly.
b	The following occurred when the backlash compensation was other than "0". • Setup operation was commanded without zero-point return (except for ABS mode 1 and 2). • Zero-point offset automatic setup oprtation was commanded. The backlash compensation is larger than the unit station pulses. (Set a value smaller than the unit station pulses.)	A value larger than the minimum value of station interval pulses is set for the backlash compensation or zero-point return was not carried out before the setup operation. Check the two possibilities and correct the setting or sequence.
C	Station numbers are not arranged in order in the case of the absolute position setting [C0-01=4]. Arrange the station numbers in the order of station numbers.	Stations are not arranged in the order of station numbers in the case of the absolute coordinate axis [C0-01=4]. Set the parameters or carry out teaching so that the stations will be in the order of station numbers.
d	In the ABS mode, the memory storage was not completed. Reset and perform zero - point return.	In the case of the ABS mode [C0-09=1 or 2], the information required for the ABS operation was not stored in the nonvolatile memory before the power was turned OFF. To excute ABS operation, first change the ABS. ST signal from CLOSED to OPEN and make sure that the ABS.READY signal becomes CLOSED before turning OFF the power. This alarm is also issued when the motor shaft is forced to rotate by external force while the power is turned OFF. When the ABS mode 1 is to be used, the motor must have a brake.
Blank	MCU error	Malfunction of the microcomputer (out of control). It is possible that noise has entered from the control signal line or 24 VDC power line. Take measures to prevent noise from entering these lines; shield the cables or separate the lines from the power lines carrying large currents. It is also possible that the control unit is faulty. If the error does not disappear by eliminating the noise, replace the control unit and return it to the factory.

Reset the alarms using the reset signal (RESET). The alarms can also be reset by the power supply (24 VDC). Reset the power supply in the case of the MCU error.

[Cause and remedy of alarms for the inverter (Juspeed-F X3000)]

Error indication (Errors are indicated by blinking indication.)
Errors of the inverter can be monitored on the LED (7 segments) on the printed circuit board in the inverter main body.

Table 7.4 Cause and remedy of alarms for Juspeed-F X3000

State	LED indication	Contents	Cause and remedy
Overcurrent	1	Overcurrent or short-circuit current was detected and the inverter output was shut-off.	It is possible that the torque limit is too high or the output has a short-circuit. If no change can be seen after changing the torque limit to 200% or smaller, check for a short-circuit of the output.
Overvoltage	2	Regeneration overvoltage was detected and the the inverter output was shut-off. DC bus voltage: 450V	The torque limit may be too high or the regeneration resistor may be burned out. If no change can be seen after changing the torque limit to 200% or smaller, return the regeneration resistor to the factory for investigation.
Overspeed	3	The motor speed exceed 1.1 times max. speed (10 % increase) was detected and the inverter output was shut-off.	When the motor speed gets up to 1980 r/min, the motor is being forced to rotate by an external force. Check for the cause and eliminate it.
Under-voltage	4	A voltage drop was detected and the inverter output was shut-off. DC voltage: 213 V	The power supply voltage has dropped (180 VAC or lower) during operation or instantaneous power failure was detected. If the cause cannot be eliminated, add a sequence that will input the reset signal after the voltage drop or momentary power loss.
PG error	5	Encoder error was detected and the inverter output was shut-off . Note that not all the PG errors can be detected.	PG fault, PG wiring fault, or motor-lock can be considered. Check for the cause of these faults.
Exceeding temperature	6	The temperature inside the motor has risen above the regulated value and the inverter output was shut-off.	The temperature inside the motor has become high or the temperature detection line (inside the PG cable) is faulty. Check the motor temperature. If the temperature is normal, check the temperature detection line (PG cable).
CPU error I	7	CPU error was detected during the self-diagnosis carried out after power was supplied and the inverter output was shut-off.	Since the error was detected during self-diagnosis carried out after power was supplied, it is a hardware error. Replace and return it to the factory.
CPU error II	8	CPU error (WDT) was detected during operation and the inverter output was shut-off. This error is detected for external noise.	Malfunction of the microcomputer (out of control). It is possible that noise has entered from the control signal line or 24 VDC power line. Take measures to prevent noise from entering these lines; shield the cables or separate the lines from power lines carrying large currents. It is also possible that the control unit is faulty. If the error does not disappear after eliminating the noise, replace the control unit and return it to the factory.
CT error	9	CT (current detector) error was detected and the inverter output was shut-off.	Since the CT error for current detection was detected, it is a hardware error. Replace and return it to the factory.
Ground Fault	b	Ground fault was detected in the output at the start of operation and the inverter output was shut-off.	The ground fault was detected in output lines (U, V, W) upon servo ON. Check whether the output side is being grounded. If this alarm is not reset after the grounding state was reset, replace and return it to the factory.
Others	0	An error (alarm) other than those listed above was detected and the inverter output was shut-off.	An error other than those listed above was detected. It is possible that it is alarm 8 above. Take the corrective action listed in the column for alarm 8, and if no improvement is made, replace and return it to the factory.

Notes: 1 When more than one alarm is detected, they are indicated cyclically.
Example: When alarms 3,4 and 7 are detected, the LED will display 3 ➡ 4 ➡ 7 ➡ 3 ➡ 4 ➡ 7 ➡ 3 and so on.
2 The alarm state is retained unless the power supply is reset or th reset signal is used.
3 The indications blink.

8. PRECAUTIONS ON APPLICATION

(1) Minus Load

Continuous operation in which the motor is rotated by load and regenerative brake is applied cannot be performed. Juspoint Ⅲ regenerative braking capability is short-term rated specification about motor deceleration time.

(Example) • Motor drives for delevery

• Motor drives for lifting object (without counter weight)

(2) Load Inertia (Load GD^2)

Motor shaft conversion allowable load GD^2 must be within two times as large as applicable Juspoint Ⅲ motor GD^2. In applications in which this value is exceeded, overvoltage alarm may occur at deceleration.

In this case, take the following preventive actions:

- Lower the current limit.
- Increase accel/decel time.
- lower the maximum speed to be used.

(3) High Voltage

When power supply voltage is 400V class (400V, 440V, etc.), a power supply transformer is required to convert 3-phase 400/440V to 3-phase 200/220V.

(4) Machine or Control System Protection

When there is a limitation for machine traveling range, provide a limit switch to the machine system and build sequence to stop Juspoint Ⅲ (emergency stop, etc.) by the limit swith operation, in order to protect the machine or control system.

9. OPTION

9.1 PARAMETER SETTER

For setting the parameters, use the parameter setter manufactured by YASKAWA ELECTRIC. Specify the following type when ordering. It is common for all capacities.

JVOP-100

Precautions for using the parameter setter

- When connecting it to Juspoint Ⅲ, make sure that the 24VDC power supply is OFF.
- When disconnecting it from Juspoint Ⅲ, the 24VDC power supply can be ON.
- If you connect it while the 24VDC power supply is ON, the parameter setter will display the alarm mode of CPF00.
- Do not operate keys other than those designated.

9.2 PARAMETER SETTER CABLE

72616-W300□-01

Cable length
1: 1m
3: 3m

This is a cable used to connect the parameter setter (JVOP-100) and Juspoint Ⅲ. You must specify the length.

9.3 PG CABLE

This is a cable used to connect the motor PG (pulse encoder) and Juspoint Ⅲ. You must specify the cable length and the structure of the connector on the motor.

All cables are to be manufactured after receiving the order.

V4017□-□□□

Connector structure
7: Straight plug
8: Angular plug

Cable length
005: 0.5m
010: 1.0m
015: 1.5m
020: 2.0m
025: 2.5m
030: 3.0m
040: 4.0m
050: 5.0m
060: 6.0m
070: 7.0m
080: 8.0m
090: 9.0m
100:10.0m
ab0: (a×10+b)m

9.4 PARAMETER SETTING SOFTWARE (personal computer software)

Parameters can be set, edited, written, stored onto memory storage media, or verified using your personal computer. With the NEC PC98 version, the screen display is in Japanese and with the IBM version, the screen display is in English. The software will be delivered stored on a 3.5"2HD floppy disk. For details, refer to the appropriate document (PC98 version : YDVES-B2126, IBM version : YDVES-B2127).

P C J V O P – J P 3 – □

Personal computer
1: NEC PC98 computer (Japanese display)
2: IBM computer (English display)

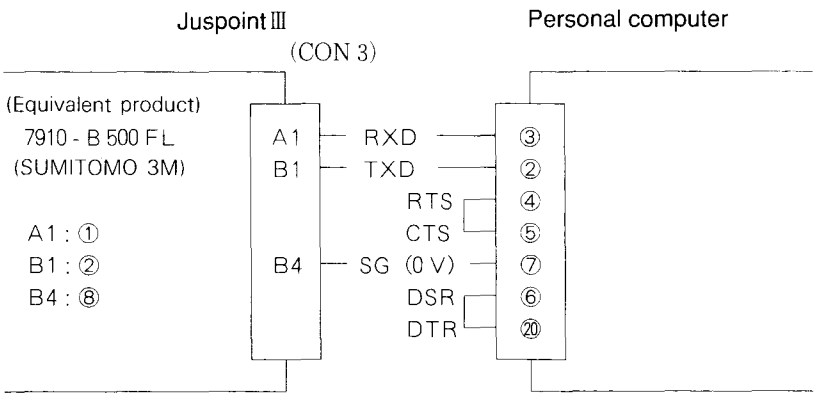
9.5 PERSONAL COMPUTER COMMUNICATION CABLE

To use the software for parameter setting, you must connect Juspoint Ⅲ to your personal computer with a communication (RS232C) cable. The cable specifications are listed in the document sheet. Specify the following type when ordering it from YASKAWA. This cable is manufactured after receiving the order. The lead length is 2m.

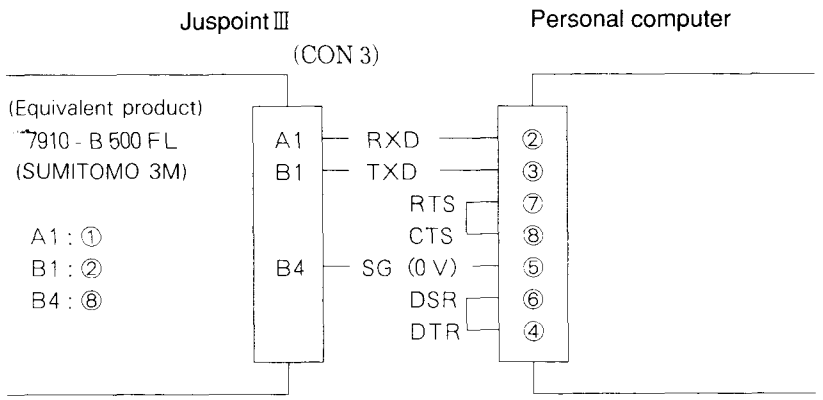
V 4 0 1 9 □

Applicable model (personal computer)
4: NEC PC98 (for 25 Pins)
5: IBM (for 9 Pins)

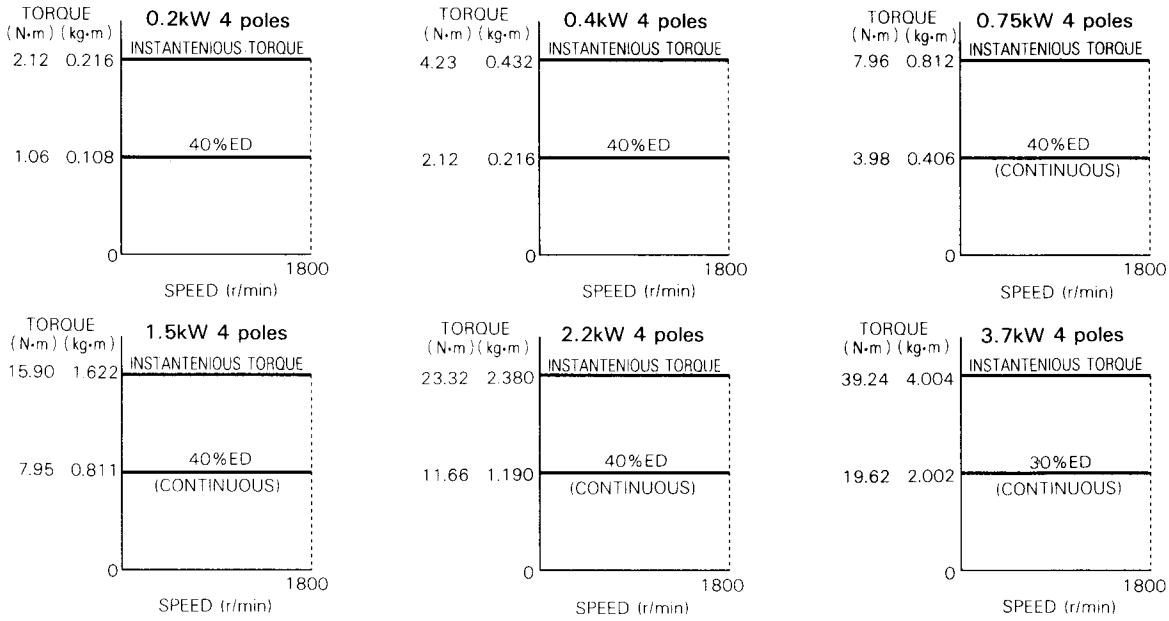
V 40194 (Applicable to NEC PC98)



V 40195 (Applicable to IBM)



10. CHARACTERISTICS (Speed-Torque Curve)

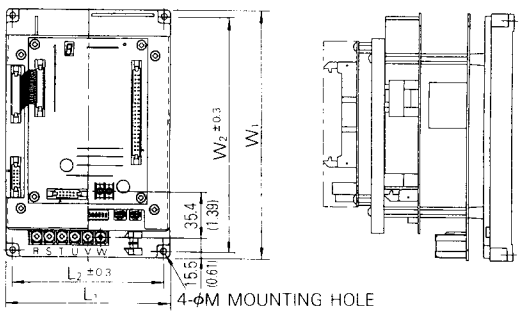


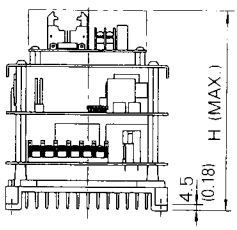
Note : (CONTINUOUS) is externally fan-cooled type.

11. DIMENSIONS in mm (inches)

11.1 CONTROLLER

(Heat sink installed in the panel)



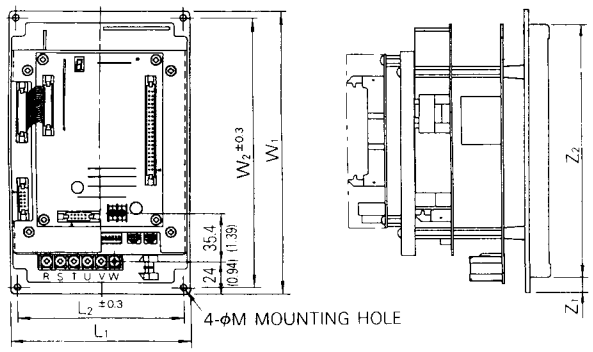


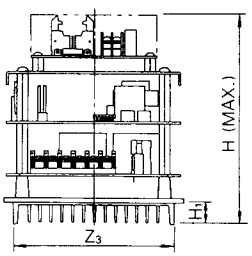
Notes : 1. The drawing shows CIMR-08 JP3-1.
2. Inside of ⬚ shows a live part. The insulation distance to a live part should be kept over 7mm.

Max. Applicable Motor Output	Model CIMR-	L1	L2	W1	W2	H	M
0.2kW(1/4HP)	02JP3-1	100 3.94	90 3.54	160 6.30	150 5.91	158 6.22	4.8 0.19
0.4kW(3/4HP)	04JP3-1	100 3.94	90 3.54	160 6.30	150 5.91	158 6.22	4.8 0.19
0.75kW(1HP)	08JP3-1	130 5.12	120 4.72	190 7.48	180 7.09	154 6.06	4.8 0.19
1.5kW(2HP)	15JP3-1	130 5.12	120 4.72	190 7.48	180 7.09	154 6.06	4.8 0.19
2.2kW(3HP)	22JP3-1	140 5.51	128 5.04	200 7.87	186 7.32	176 6.93	5.5 0.22
3.7kW(5HP)	37JP3-1	155 6.10	143 5.63	215 8.46	201 7.91	192 7.56	5.5 0.22

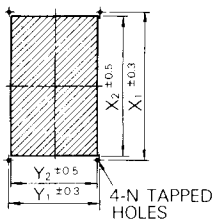
Note : Dimensions of the bottom parts in the columns are of inches.

(Heat sink installed out of the panel)





Panel Working Layout



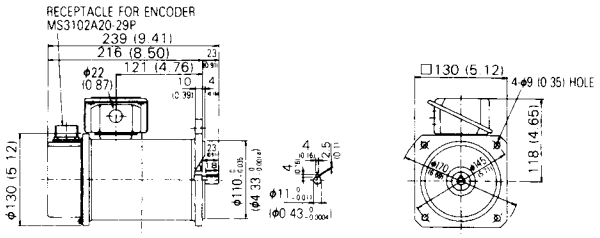
Notes : 1. The drawing shows CIMR-08 JP3-3.
2. Inside of ⬚ shows a live part. The insulation distance to a live part should be kept over 7mm.

Max. Applicable Motor Output	Model CIMR-	L1	L2	W1	W2	H	H1	M	N	X1	X2	Y1	Y2	Z1	Z2	Z3
0.2kW(1/4HP)	02JP3-3	112 4.41	102 4.02	177 6.97	167 6.57	157.4 6.20	19.4 0.76	4.8 0.19	M4	167 6.57	157 6.18	102 4.02	100 3.94	11 0.43	155 6.10	98 3.86
0.4kW(3/4HP)	04JP3-3	112 4.41	102 4.02	177 6.97	167 6.57	157.4 6.20	19.4 0.76	4.8 0.19	M4	167 6.57	157 6.18	102 4.02	100 3.94	11 0.43	155 6.10	98 3.86
0.75kW(1HP)	08JP3-3	134 5.28	124 4.88	207 8.15	197 7.76	153.5 6.04	15.5 0.61	4.8 0.19	M4	197 7.76	187 7.36	124 4.88	122 4.80	11 0.43	185 7.28	120 4.72
1.5kW(2HP)	15JP3-3	134 5.28	124 4.88	207 8.15	197 7.76	153.5 6.04	15.5 0.61	4.8 0.19	M4	197 7.76	187 7.36	124 4.88	122 4.80	11 0.43	185 7.28	120 4.72
2.2kW(3HP)	22JP3-3	160 6.30	150 5.91	230 9.06	215 8.46	176.5 6.95	38.5 1.52	5.5 0.22	M5	215 8.46	201 7.91	150 5.91	141 5.55	15 0.59	200 7.87	140 5.51
3.7kW5HP)	37JP3-3	175 6.89	165 6.50	245 9.65	230 9.06	192 7.56	47 1.85	5.5 0.22	M5	230 9.06	216 8.50	165 6.50	156 6.14	15 0.59	215 8.46	155 6.10

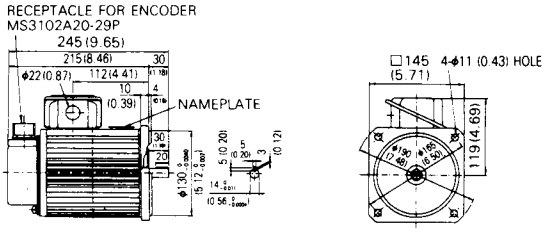
11.2 DIMENSIONS in mm (inches)

Motor without brake (Model UAJPEE-□□DK2K)

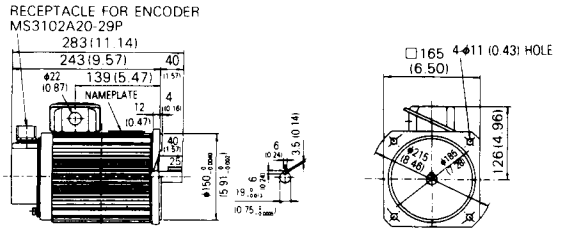
0.2kW
(1/4HP)



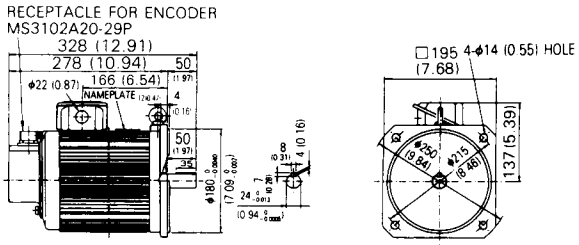
0.4kW
(3/4HP)



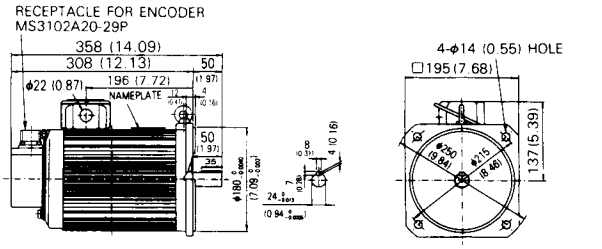
0.75kW
(1HP)



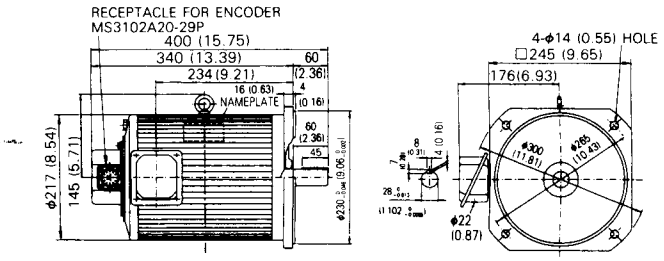
1.5kW
(2HP)



2.2kW
(3HP)



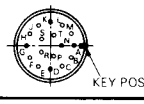
3.7kW
(5HP)



Encoder Connection

Pin Code	Signal
A	A phase
B	GND
C	B phase
D	GND
E	
F	Z phase
G	GND
H	
J	THERM+
K	THERM-
L	
M	
N	
P	
R	+5V
S	GND
T	

Receptacle



Encoder specifications

5VDC, 1000P/R
A, B, Z-phases, Open corrector type

Connector
MS3102 A20-29P (Receptacle)

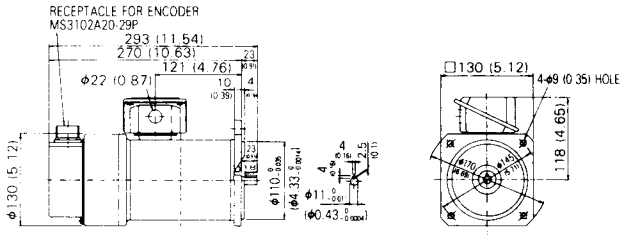
Connection component
MS3108 B20-29S (Angle plug)
MS3057-12A (Cable clamp)

Note : Connection component is not provided.

Notes : 1. Dimmensions of the shaft extension key and keyway are based on JISB 1301-1976.
2. The insulation class is B.
3. The drawings show 4-poles motors.

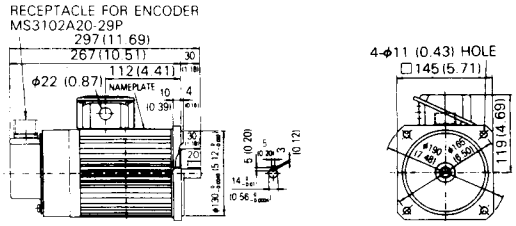
Motor without brake (Model UAJPEE-□□DK2KU)

0.2kW
(1/4HP)



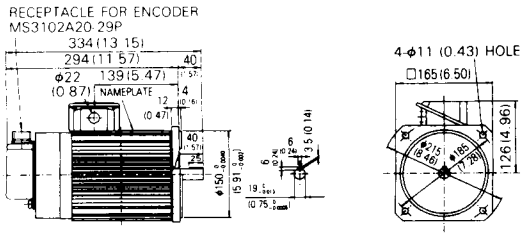
• Holding magnetic brake is built in.
(24VDC, braking torque: 3N-m)

0.4kW
(3/4 HP)



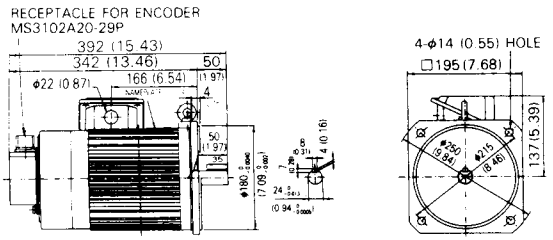
• Holding magnetic brake is built in.
(24VDC, braking torque: 5N-m)

0.75kW
(1HP)



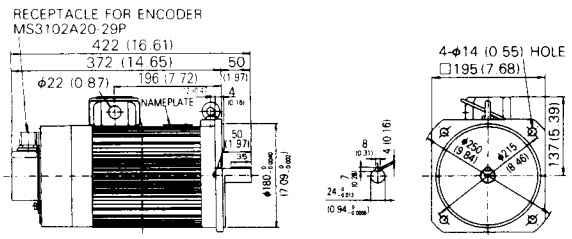
• Holding magnetic brake is built in.
(24VDC, braking torque: 5N-m)

1.5kW
(2HP)



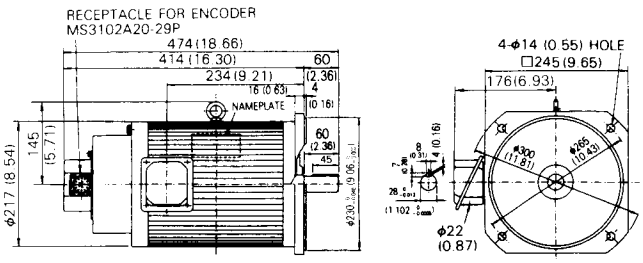
• Holding magnetic brake is built in.
(24VDC, braking torque: 14N-m)

2.2kW
(3HP)



• Holding magnetic brake is built in.
(24VDC, braking torque: 14N-m)

3.7kW
(5HP)



• Holding magnetic brake is built in.
(24VDC, braking torque: 24N-m)

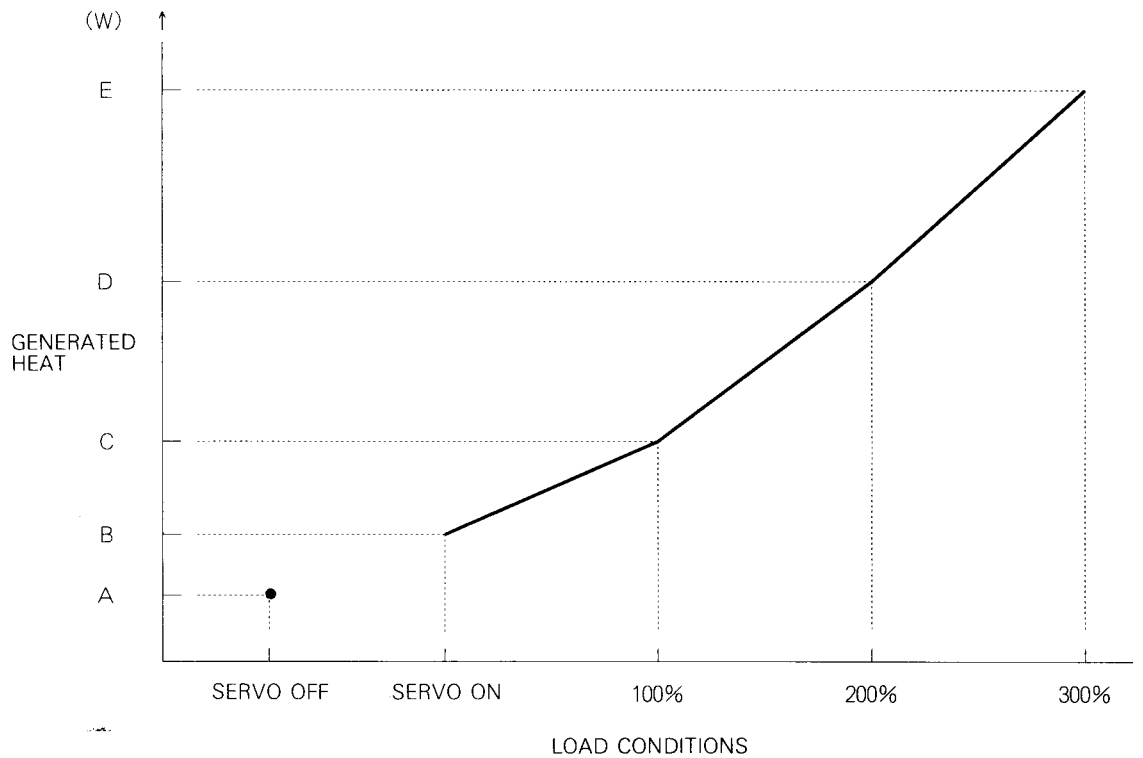
APPENDIX

A 1 HEAT LOSS DATA (Juspeed-F X3000/Juspoint III)

Total generated heat: Generated heat from power section+control section (Unit:W)

Capacity kW	0.2kW	0.4kW	0.75kW	1.5kW	2.2kW	3.7kW	5.5kW	7.5kW
A Servo OFF	50 (0.0)	6.0 (0.0)	7.0 (0.0)	9.0 (0.0)	9.0 (0.0)	10.0 (0.0)	12.0 (0.0)	14.0 (0.0)
B Servo ON	8.0 (1.5)	10.5 (2.0)	13.5 (4.0)	26.0 (10.5)	33.0 (15.0)	35.0 (16.0)	42.0 (19.0)	47.0 (21.0)
C100%	10.0 (3.0)	13.5 (4.5)	22.5 (9.5)	41.5 (20.0)	60 (32.5)	106 (62.5)	142 (83.5)	215 (130.0)
D200%	14.0 (5.5)	24.5 (11.5)	35.0 (18.0)	75.0 (42.5)	116 (69.0)	234 (146.0)	327 (205.0)	495 (320.0)
E300%	20 (9.5)	36.5 (13.0)	50.0 (27.5)	99 (58.0)	176 (108.0)	369 (233.0)	514 (325.0)	782 (498.0)

1: Values in ( )indicate the heat dissipated to the outside (rear) from the heat sink.
2: Data for servo ON is that under no load.
3: The speed is the base speed, 1800 r/min.

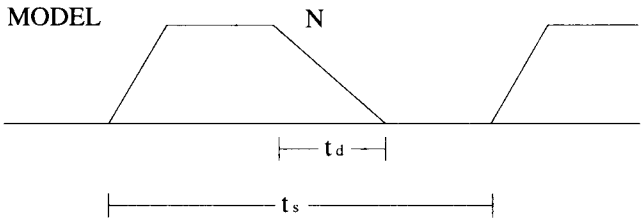


A 2 BUILT-IN DISCHARGING RESISTOR CAPACITY
(Juspeed-F X3000/Juspoint III)

The data listed here are for you to refer to and decide whether or not the built-in discharging resistor can be used.

1 Loads

Td= Deceleration torque kgm
N = Speed r/min
t_d = Deceleration time sec
t_s = Operation cycle sec



2 Heat generated from the resistor

Calculate the heat generated (W) from the discharging resistor using the following equation.

$W=T_d \times N \times 0.5 \times T_d \div t_s$ (W)

3 Applicable range for built-in braking resistor

When the heat (W) generated from the discharging resistor calculated from the equation above times 4 is smaller that the value in the following table, the built-in discharging resistor can be used.

$4 \times W \leq W_{MAX}$: Usable

$4 \times W > W_{MAX}$: Unusable

Model	0.2kW	0.4kW	0.75kW	1.5kW	2.2kW	3.7kW	5.5kW	7.5kW
W max	7.5W	7.5W	15.0W	25.0W	80.0W	80.0W	120W	120W

4 In the case when the internal resistor cannot be used

If the result of the above calculation shows that the built-in resistor cannot be used, you must use an external resistor. The following describes how to select the capacity of an external resistor "W_{EXT}".

$W_{EXT} = W \times 4$ (Select a resistor that has a capacity 4 times the generated heat.)

* To use an external resistor, a lead wire is required for connecting to X3000. The lead wire will be manufactured in our factory after receiving the order. A FASTON(250) receptacle is attached at the end of the 300 mm lead.
* Use a resistance designated for each capacity. An external resistor is available from YASKAWA (60 to 1000 W, parallel connection for more).

Model	0.2kW	0.4kW	0.75kW	1.5kW	2.2kW	3.7kW	5.5kW	7.5kW
W max →	200Ω	200Ω	150Ω	100Ω	47Ω	39Ω	24Ω	24Ω

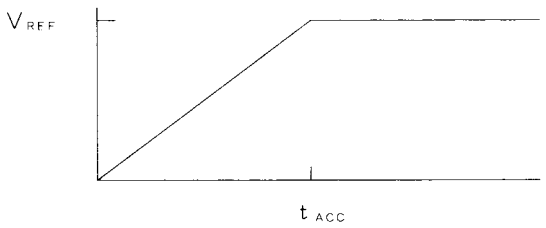
A 3 ACCELERATION AND DECELERATION TIME SETTING

The following describes how to set the acceleration and deceleration time.

1 ACCELERATION TIME

1.1 Not using soft start

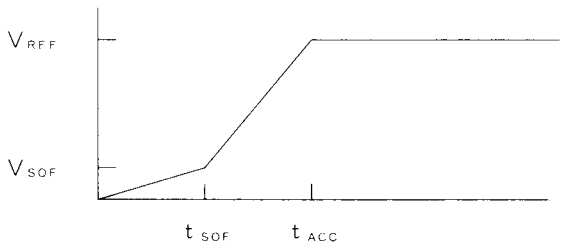
The acceleration time set by the parameter is the time required for accelerating from 0 to 1800 r/min. Therefore,calculate the acceleration time (t_{ACC}) to V_{REF} (r/min) using the following formula.



t_{ACC} = Acceleration time parameter setting × V_{REF} ÷ 1800 (msec)

1.2 Using soft start

When the soft start time (t_{SOF})is set in the parameter, the acceleration time is the sum of the soft start time and the acceleration time after that.
Therefore, calculate the acceleration time (t_{ACC}) to V_{REF} (r/min) using the following formula.



t_{ACC} = t_{SOF} + Acceleration time parameter setting × (V_{REF} – V_{SOF}) ÷ 1800 (msec)

2 DECELERATION TIME

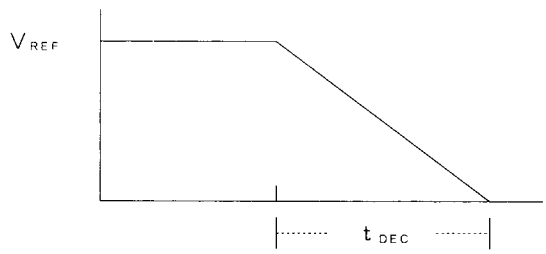
There is no parameter that sets the deceleration time. The deceleration time is determined by the position control constant (KP).

2.1 Not using soft stop

The relationship between the deceleration time (t_{DEC}) and position control constant (KP) can be expressed by the following equation.

t_{DEC} = 3×V_{REF} ÷ KP^2 (sec) KP: Parameter setting

The deceleration time is not in reverse proportion to KP but is in reverse proportion to KP^2.



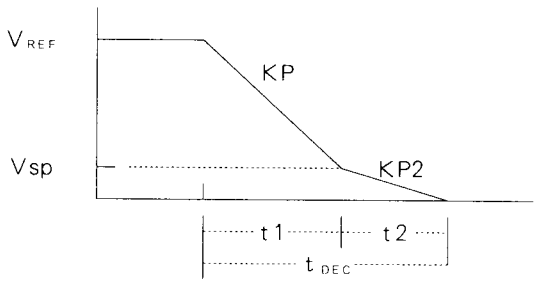
2.2 Using soft stop

The deceleration time (t_{DEC}) can be expressed by position control constant (KP)/soft stop speed (VSP)/soft stop KP2.

KP: Parameter setting

$t_{DEC} = t1 + t2$

$=3 \times (V_{REF}\text{-}Vsp) \div KP^2 + 3 \times Vsp \div KP2^2$ (sec)



Supplementary explanation

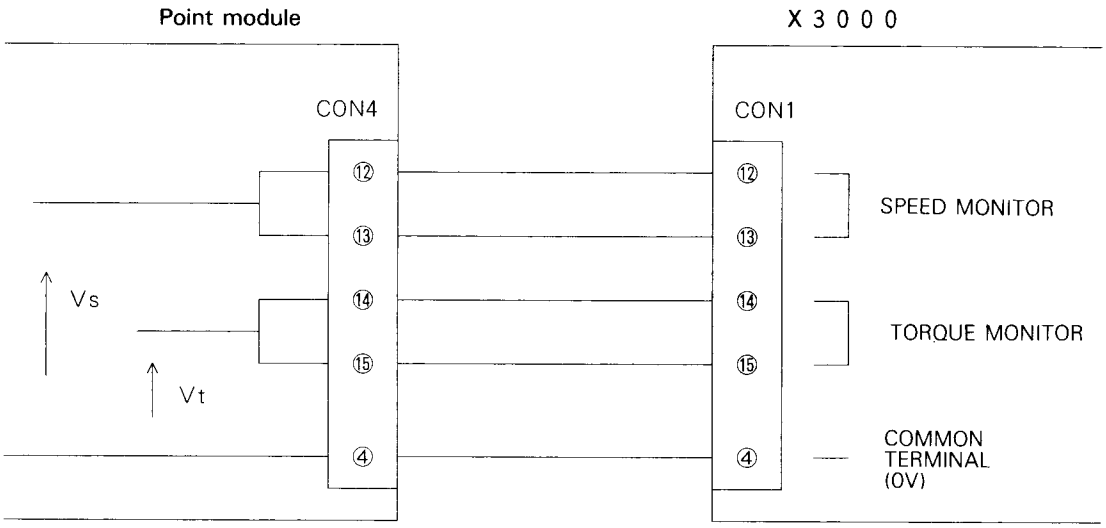
1. Note that the acceleration time/deceleration time is made longer by using the soft start/soft stop function.
2. When the setting is KP<KP2, the control will assume KP=KP2.
3. When the setting is V_{REF}<Vsp, the control will use KP2 from the start of deceleration.
4. When the setting is Vsp=0, the soft stop will not be used regardless of the value in KP2.

A 4 SPEED/TORQUE MONITOR

This section describes how to monitor the speed and torque of Juspoint Ⅲ.

The speed/torque monitor output of X3000 (amplifier) is output from the connector (CON1) which is connected to the point module connector (CON4) with a cable.

Therefore, to monitor the speed and torque, use the signal line from the point module board.



Short terminals ⑫ - ⑬ and ⑭ - ⑮ and measure the voltage between the common terminal ④ (0V).

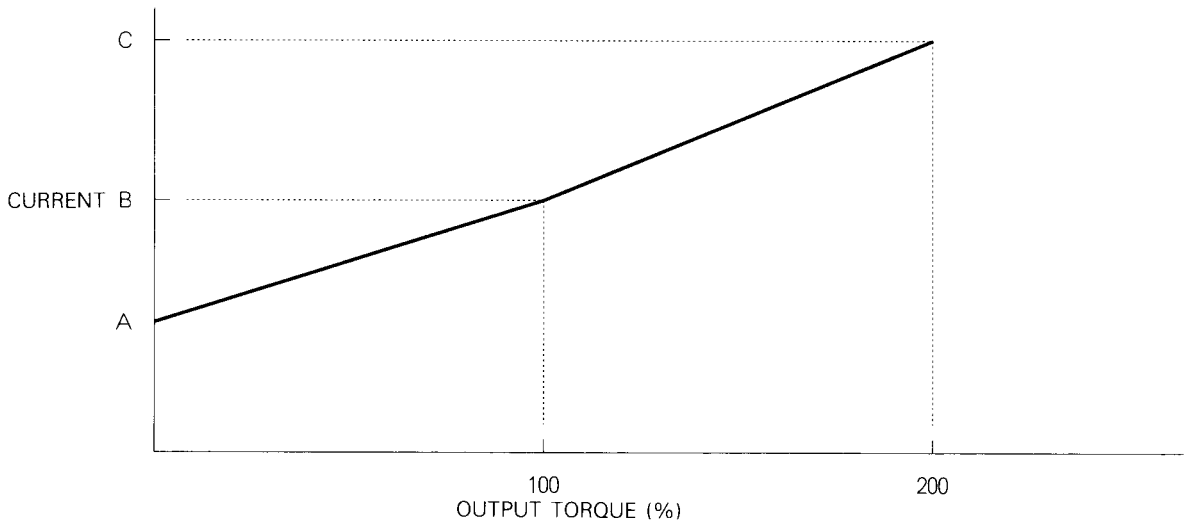
Monitor output voltage

Speed monitor (Vs)	0-10V (0-1800 r/min)
Torque monitor (Vt)	0-10V (0-300%)

A 5 RELATIONSHIP BETWEEN CURRENT AND TORQUE

Capacity	Output Current (A: rms)		
	A (0% torque)	B (100% torque)	C (200% torque)
0.2kW	0.6	1.08	2.10
0.4kW	2.23	2.85	4.20
0.75kW	2.71	4.14	6.70
1.5kW	4.09	7.35	13.30
2.2kW	6.51	11.06	20.17
3.7kW	7.40	16.00	29.70
5.5kW			
7.5kW			

Notes: 1. The values in the table are the root-mean-square values (rms) and will be 1.5 times that at the peak; 1.5 times was obtained considering the current wave from distortion of the PWM control.
2. The current value at the time of 0 to 100% and 100 to 200% torque output can be obtained from linear approximation.



A 6. OPERATION UPON ALARM OCCURRENCE

This section describes what action is taken when an alarm is occured.

The system operates as shown below when an alarm is occured.

Alarm #	Description	SVON signal OPEN	SVON signal CLOSED	Reset conditions
0	Error on amplifier	Base block	Base block	SVON: OPEN
1	PG error		Servo Clamp	None
2 to F	Control error			

Notes: 1 When the PG error (alarm #1) is detected, the servo clamp may not occur because the correct feed back of the PG signal cannot be obtained.

2 When the alarm is detected during high-speed operation, deceleration will be started as soon as the alarm is detected until the zero speed is obtained (zero speed or extremely low speed in the case of the PG error). After the deceleration is completed, zero speed (ZSPD) will be output closed.

3 When the zero speed output as detected after the alarm output, try to input OPEN for the SVON signal as promptly as possible.

4 When the amplifier side error (alarm#0) was detected, the alarm cannot be reset unless the SVON signal is input OPEN.

5 When the alarm was output (alarm#2) as a result of the EMG (emergency stop) operation, input CLOSED for the EMG signal before resetting the alarm. Alarm (#2) will be output again if the alarm is reset while the EMG signal is input OPEN.

6 To reset the alarm, input OPEN, CLOSED, then OPEN again for the reset signal. When the reset signal changes from CLOSED to OPEN, the alarm will be reset.

7 In the case of the amplifier side alarm (#0), the alarm is indicated on the amplifier (1-digit display) as well. Refer to Table 9.4 for the correspondence of alarm contents and the indication.

A 7. TORQUE LIMIT SETTING

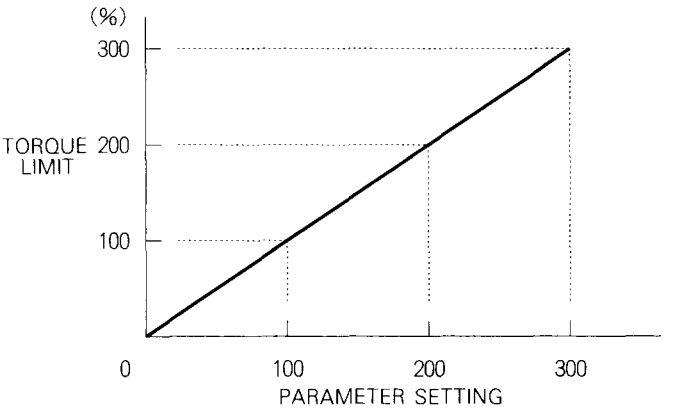
This section describes torque limit value setting (command).

1 TORQUE LIMIT VALUE SETTING (command)

Set the torque limit value by setting the parameter of Juspoint Ⅲ. The value of the parameter will be the torque limit value (%).

The analog signal that corresponds to the torque limit value set in the parameter is output from the point module to X3000.

The relationship between the parameter setting and torque limit value (%) is shown in the graph on the right.



2 SUPPLEMENTARY EXPLANATION CONCERNING THE TORQUE LIMIT VALUE

- Torque larger than the torque limit value will not be output even during acceleration, deceleration, constant speed, or servo lock.
- The torque limit value is the same for forward and reverse directions.
- Normally set the torque limit value to 200% or smaller. Setting the torque limit value higher may cause overcurrent or overvoltage as well as rapidly increasing the motor loss.
- Consider protection of the transmission mechanism such as the maximum allowable gear torque when selecting the torque limit value.
- On the other hand, setting a smaller value than the load torque will not allow the motor to rotate, resulting in the PG (encoder) alarm.

■ By setting an acceleration time longer than that obtained from equation (1) below, the set acceleration time will be used.
On the other hand, when a shorter time is set, the desired result will not be obtained. Acceleration will be performed in the time (ta) obtained from equation (1).
(The parameter setting for the acceleration time sets the time required to accelerate from 0 to 1800 r/min.)

■ By setting a deceleration time longer than that obtained from equation (2) below, the set time will be used.
Conversely, when a shorter time is set, the desired result will not be obtained.
Deceleration will be performed in the time (td) obtained from equation (2).
(The deceleration time cannot be set directly. Set the position control constant [KP]. Refer to A3. ACCELERATION AND DECELERATION TIME SETTING for the relationship between the deceleration time and KP.

$$t_a = (GD^2_M + GD^2_L) \times V \div 375\ (T_{LIM} - T_L) \quad (1)$$
$$t_d = (GD^2_M + GD^2_L) \times V \div 375\ (T_{LIM} + T_L) \quad (2)$$

GD^2_M : Motor inertia ($kg \cdot m^2$)
GD^2_L : Load inertia ($kg \cdot m^2$)
V : Speed (r/min)
T_{LIM} : Torque limit value (kgm)
T_L : Load torque (kgm)

A 8. EVALUATION CONDITIONS FOR TEMPERATURE-RISE TEST FOR MOTORS

Thermal evaluation of the motor can be made by calculating from operating conditions (e.g. operation cycle). This section, however, describes how to perform evaluations through actually operating the motor. When the motor is to be operated with a protective cover, this method is effective since precise calculation will be difficult.

1 Measure the temperature of the motor at two locations to determine whether or not the motor can be used from the thermal point of view.

■ Frame surface temperature (At center of frame and avoid the bolt sections.)

■ Internal air temperature inside the encoder enclosure.

2 Criteria

If the temperature-rise values at both points are equal to or smaller than the values listed in the table below, the motor can be used.

Capacity	Temperature-rise value (°C)	
	Frame center	Encoder enclosure
0.2kW	50	48
0.4kW	50	48
0.75kW	57	51
1.5kW	62	51
2.2kW	58	49
3.7kW	59	51
5.5kW		
7.5kW		

The maximum operating ambient temperature is 40°C.

Example : Motor capacity: 1.5kW
Ambient temperature: 28.5°C
Actually measured temperaturer: 75°C/65°C (Inside frame/encoder enclosure)
Temperature rise value: Frame : 75-28.5=46.5 < 62
Encoder enclosure : 65-28.5=36.5<51

The motor in this example can be used from the thermal point of view.

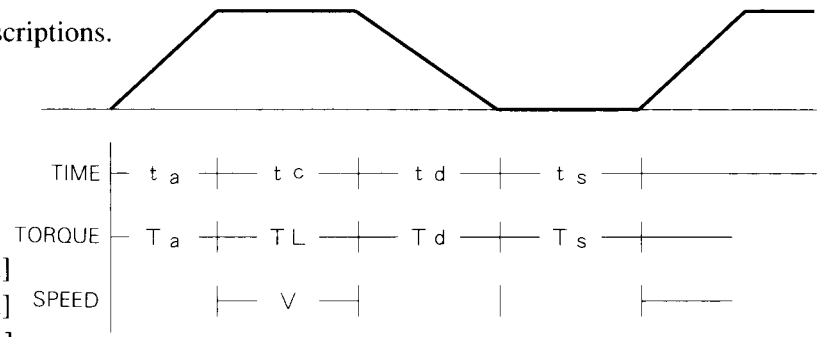
A9 SELECTION OF MOTOR CAPACITY

This section describes the basic on how to select your motor capacity.
Note that the control unit of the same capacity as the motor must be used. otherwise, the motor cannot be controlled.

1 Model

The following models are used in descriptions.

GD^2_M : Motor inertia [kg·m^2]
GD^2_L : Load inertia [kg·m^2]
V : Speed [r/min]
T_M : Motor rated torque [kgm]
T_L : Load torque [kgm]
T_a : Acceleration torque [kgm]
T_d : Deceleration torque [kgm]
T_s : Locked rotor torque [kgm]



■ Acceleration torque (T_a) is obtained from the following equation.

$$T_a = (GD^2_M + GD^2_L) \times V \div 375 \div ta + T_L$$

■ Deceleration torque (T_d) is obtained from the following equation.

$$T_d = (GD^2_M + GD^2_L) \times V \div 375 \div td - T_L$$

2 Select a motor capacity that satisfies the following conditions

■ 200% of the motor rated torque is larger than the acceleration torque (T_a).

$$2 \times T_M > T_a$$

■ 200% of the motor rated torque is larger than the deceleration torque (T_d).

$$2 \times T_M > T_d$$

■ 100% of the motor rated torque is larger than the load torque (T_L).

$$T_M > T_L$$

∗: Thermal evaluation is also required.

A10 GEAR RATIO SETTING

Depending on the gear ratio, the unit station interval pulses can be a fraction (not integer). A rotational axis can have a further error accumulation.
In such cases, control with no error accumulation is enabled by setting the gear ratio in parameter. The following describes how to set the gear ratio parameter.

1 Express the ratio of the number of motor shaft rotations to the machine output shaft rotations in a fraction and set the numerator/denominator in the parameter.

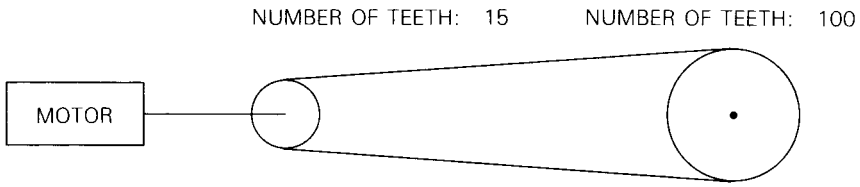
$$\frac{B}{A} = \frac{\text{Final machine output shaft speed}}{\text{Motor shaft speed}}$$

A: C0 - 07 ⇦ Motor shaft speed
B: C0 - 08 ⇦ Final machine output shaft speed

2 To control the unit station interval by the gear ratio, set the rotational axis/linear axis parameter [C0-01=2].

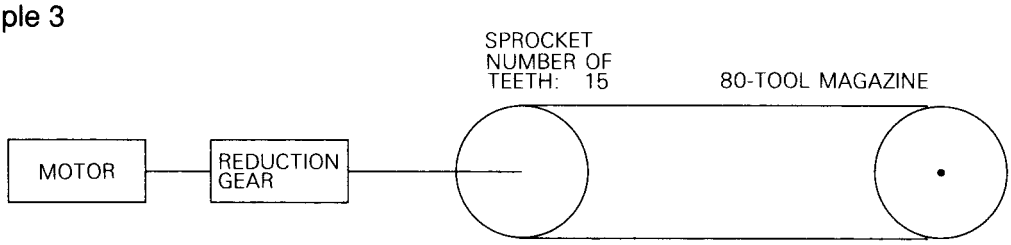
3 Example 1 Pulley ratio=Reducation ratio=B/A=1/150
A: C0-07=150
B: C0-08=1

Example 2



Reduction ratio=B/A=15/100.....Deceleration
A: C0-07=100
B: C0-08=15

Example 3



Reduction ratio=1/100/15/80=15/8000
A: C0-07=8000
B: C0-08=15

A11 HOW TO USE EMG SIGNAL

This section describes how to use the EMG (emergency stop) signal.

1 As soon as the EMG signal detects the OPEN input, it starts the emergency stop operation.
If the motor is running, it will be stopped at once; the deceleration torque for this is the torque limit value.
After the motor is stopped, the machine will be in the alarm condition [alarm 2].

2 The EMG signal always performs the emergency stop operation as soon as it detects the OPEN input except in state "F".

3 Therefore, when turning ON the power or setting the parameters, make sure that CLOSED is input for the EMG signal. If OPEN is input then, the emergency stop operation will be performed and alarm 2 will be output, disabling all machine operations and parameter settings.

4 Alarm 2 can be reset with the reset signal.

5 Position control is continued during the emergency stop operation. Thus, no zero return nor setup operation is required after the emergency stop. All operations are enabled.

6 Immediately after alarm 2 is reset, the position at the time of the emergency stop will be retained. After the next operation command, the motor will start moving.

A12 HOW TO USE SVON SIGNAL

This section describes how to use the SVON signal.

1 The SVON signal is the servo command of the driver (X3000).
The CLOSED input is servo ON and OPEN input is servo OFF.
Except during the alarm state of the amplifier (X3000), the control follows the SVON signal.

2 The CLOSED input immediately after the power supply functions as the servo clamp at the current stopped position.

3 The OPEN input for the SVON signal during operation turns OFF servo and the motor will stop after coasting. The motor usually does not stop at a station position in this case. If, however, the motor stops at a station position and within the COIN/NEAR range, the COIN/NEAR signal will be output.

4 The CLOSED input for the SVON signal after that functions as servo clamp at the current stopped position. The motor will not rotate to a station position.

5 The motor will start moving according to the following operation command.
Positioning control is continued during the servo OFF state. Thus, no zero-point return nor setup operation is required after servo ON.

6 If the motor shaft is to be mechanically clamped, positional error may occur continuously. In such state, the overcurrent will flow or the motor will overheat in a short period of time.
Thus, if your system makes such mechanical clamp, input OPEN (servo OFF) for the SVON signal during the clamp.

7 Also, if you use a motor with a brake, input OPEN (servo OFF) for the SVON signal while the brake is on.

8 When an alarm of the amplifier (X3000) is detected, it cannot be reset unless the SVON signal is input OPEN.

A13 SETUP OPERATION

This section describes the setup operation.

1 The setup operation sets (commands) a station number to the currently stopped position in case it is a station position.

2 Any desired station number can be set after zero-point return.
In the case of [C0-15≠0], the station number will be automatically set to the setting of [C0-15] after zero-point return; thus the setup operation is not required.
In the case of [C0-15=0], the setup operation is required after zero-point return.

3 When the ABS mode is not used

■ With a mechanical clamp mechanism, the motor shaft will be mechanically clamped at a station position. After the power supply, command (setup) the number of that station position. Refer to the memory of the NC unit or the position information of the output shaft encoder.

■ When a mechanical clamp mechanism is not provided, performing the setup operation every time the power is supplied means that positional errors will be accumulated every time the power is supplied. Thus, if a mechanical clamp mechanism is not provided, be sure to perform zero-point return every time the power is supplied.

4 When the ABS mode is used

■ ABS mode 1
All positional information is stored in the nonvolatile memory before the power is turned OFF; thus, no zero-point return nor setup operation is required after power is supplied.

■ ABS mode 2
Only the station number is stored in the nonvolatile memory before the power is turned OFF; thus, no setup operation is required after power is supplied. However, errors will be accumulated every time the power is supplied when no mechanical clamp mechanism is provided. Thus, when no mechanical clamp mechanism is provided, perform the zero-point return every time the power is supplied.

5 The following table shows when and when not the zero-point return and setup operations are required.

(Zero return/setup operation)

	No ABS mode	ABS mode 1	ABS mode 2
With mechanical clamp	Not required/Required	Not required/Not required	Not required/Not required
Without mechanical clamp	Required/Required*	Not required/Not required	Required/Required*

* In the case of [C0-15≠0], automatic setup operation is executed; thus setup operation is not required.
* In the case of [C0-15=0], setup operation is required after zero-point return.

A14 TEACHING OPERATION

This section describes the teaching operations and precautions.

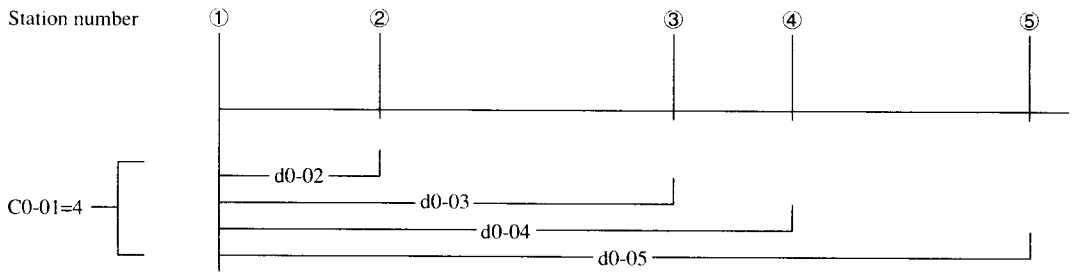
1 The teaching operation is performed using the parameter setter (JVOP-100). Note that the following control input signals are valid during the teaching operation.

EMG : OPEN input will start emergency stop and occured alarm 2.
SVON : OPEN input will turn OFF servo and the motor will coast to stop.
MULT 0, 1 : Selection of the JOG operation speed.

2 Teaching is enabled regardless of the value in parameter [C0-01].
After teaching, the pulse data of the station position will be written in parameter [d0-**].

3 Parameter [d0-**] can be monitored or changed using the parameter setter .
Parameter [d0-**] can be changed and monitored freely by teaching and parameter setting.

4 Parameter [d0-**] will be used as the data of the absolute coordinates axis.



5 Station numbers must be in order from no. 1. Othrwise, alarm C will be output.
The interval between stations must be larger than the backlash compensation.

6 Teaching operation is allowed after setup, however, teaching before setup is allowed only for station number 1. In that case, the machine will be in the state after the setup when the teaching is finished.

	Before setup	After setup
Teaching for station no. 1	Allowed. State after setup when the teaching is finished.	Allowed
Teaching for stations other than no. 1	Not Allowed. Only station no. 1 is displayed.	Allowed

A15 INTERNAL MEMORY INFORMATION MONITOR

The internal memory information of Juspoint Ⅲ can be monitored.
This section describes the internal memory information monitor.

1 Two internal memories can be monitored.

■ Current position: Parameter [U0-08]
The PG pulses count (multiples of 4), in relation to the setup position as being '0', can be monitored.

■ Deviation pulses: Parameter [U0-09]
The PG pulses count (multiples of 4), in relation to the command position as being '0', can be monitored.

2 Monitored data indication

■ Indicated digits
The monitored data are indicated as signed 9-digit data. When the count overflows, '0' is indicated and count is restarted.

0, 1, 2, 3, 4, ····· 999,999,999, 0, 1, 2, 3,·····

0, -1, -2, -3, -4, ····· -999,999,999, 0, -1, -2, -3,·····

7, 6, 5, 4, 3, 2, 1, 0, -1, -2, -3, -4, -5, -6, -7,·····

-7, -6, -5, -4, -3, -2, -1, 0, 1, 2, 3, 4, 5, 6, 7,·····

■ Data indication timing
The indicated value is the real-time value. When the position changes during monitoring, the indicated data will change accordingly. Thus, normally monitor data while the motor is stopped.

3 Others

■ Monitored data before the setup operation is not correct.

■ 5 digits are displayed at a time, lower 5 digits and upper 5digits. Pay attention for carry over digits when reading the monitor data.

A16 PG PULSE SELECTION

The PG pulses can be selected in parameter.
This selection describes how to select PG pulses.

1 There are two selections of PG pulses/rev.

- C0-16: 0, PG pulses=1000 pulses/rev.
- C0-16: 1, PG pulses=1024 pulses/rev.

2 Differences in control

- Since the internal control works in multiples of 4 of PG pulses, set the related parameters as 4000 or 4096/rev. according to the setting of C0-16.
- When the detected pulses differ from the PG pulses set in C0-16, it will be processed as the PG error.
  Therefore, when the motor PG pulses and the setting of C0-16 are different, an alarm will be output.

3 Others

- The different motor PG pulses require different control units.
  When the specifications of the amplifier do not match the motor PG pulses, the correct control cannot be guaranteed.
- The control unit is determined to be one type at the time of shipment and cannot be changed.
- The choice of 1024 pulses is available for special overseas motors. Therefore, normally choose the 1000 pulses, the standard specification.

A17 STATION NUMBER OUTPUT DURING OPERATION

The numbers of the passing stations can be output during operation.
this section describes the station number output during operation.

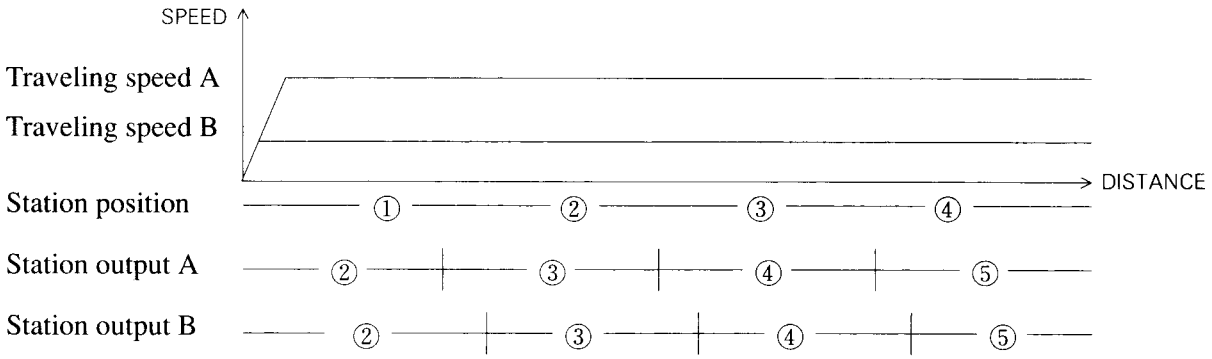
1 The numbers of passing stations during operation are output.

2 "During operation" refers to:

- JOG operation (after setup)
- Manual operation
- Automatic operation

3 The numbers of the currently stoppable stations if the stop command is to be input are output. Note, however, during JOG operation, the machine driven by the motor will stop before the output station number.

[Example]



A18 SPEED COMMAND OFFSET ADJUSTMENT

Speed command (0-10V) is output from the point module (JBFPM 3) to the vector control unit (X3000). Offset for this speed command has been adjusted before shipment and does not usually require any further adjustment.
However, if you have changed the offset by mistake or have replaced either (JBFPM 3) or X3000, offset must be adjusted.
This section describes how to adjust this offset.

1 Offset is adjusted using the VR1 on the control board of X3000.

2 Adjustment

- Turn ON the power and set the machine ready for operation.
- Input CLOSED for the SVON signal.
- Input OPEN for the EMG signal and turn ON alarm 2. (JBFPM3 side)
- Set the DIP switch "DS1-2" of X3000 to ON.
- Adjust VR1 of X3000 to the position where the motor does not turn.
- Set the DIP switch "DS1-2" of X3000 to OFF.
- Change the input of the SVON signal from CLOSED to OPEN to CLOSED.
- After the EMG signal is CLOSED, input OPEN, CLOSED and OPEN again for the RESET signal to reset alarm 2.

3 Precautions upon adjustment

- During adjustment, the motor will move though at a low speed. Before starting adjustment, make sure that rotation of the motor will cause no problems.
- After adjustment, be sure to set the DIP switch "DS1-2" of X3000 to OFF. Juspoint Ⅲ cannot operate correctly with the DIP switch set to ON.
- To adjust VR1, use a small screwdriver.
- If the offset is not adjusted correctly, the motor generates abnormal vibration or noise when stopped (SVON: CLOSED). Also, the motor may rotate at an extremely slow speed when an alarm is issued.
- The DIP switch "DS1-2" of X3000 is read by the microcomputer when the SVON signal changes from OPEN to CLOSED.

A19 SETTING OF OPERATION CONSTANTS OF AMPLIFIER

The operation constants of X3000 used as the driver (speed control unit) of Juspoint Ⅲ are set by several switches.
When it has been incorporated as the amplifier for Juspoint Ⅲ, the switches have been adjusted at the factory before shipment and usually require no further adjustment. However, if a switch setting has been changed by mistake, it must be adjusted or set again.

This section describes how to set the constants of the driver.

1. The switches used to set the constants are located on the board of the driver (X3000).

2. The following table shows the function and set values (★) for Juspoint Ⅲ.

<table>
<tr><th colspan="2">Switch symbol</th><th>Name</th><th colspan="2">Function</th></tr>
<tr><td rowspan="5">DSI</td><td rowspan="2">1</td><td rowspan="2">Speed range</td><td>★ OFF</td><td>9 to 1800 r/min</td></tr>
<tr><td>ON</td><td>9 to 3600 r/min</td></tr>
<tr><td rowspan="2">2</td><td rowspan="2">Speed command</td><td>★ OFF</td><td>Speed command 0 to +10V (Rotation command is the F/R signal.)</td></tr>
<tr><td>ON</td><td>-10 to +10V (Rotation command is the polarity.)</td></tr>
<tr><td>3
4
5</td><td>*
Capacity selection</td><td colspan="2"><table>
<tr><td>3</td><td>OFF</td><td>ON</td><td>OFF</td><td>ON</td><td>OFF</td><td>ON</td><td>OFF</td><td>ON</td></tr>
<tr><td>4</td><td>OFF</td><td>OFF</td><td>ON</td><td>ON</td><td>OFF</td><td>OFF</td><td>ON</td><td>ON</td></tr>
<tr><td>5</td><td>OFF</td><td>OFF</td><td>OFF</td><td>OFF</td><td>ON</td><td>ON</td><td>ON</td><td>ON</td></tr>
<tr><td>kW</td><td>0.2</td><td>0.4</td><td>0.75</td><td>1.5</td><td>2.2</td><td>3.7</td><td>5.5</td><td>7.5</td></tr>
</table></td></tr>
<tr><td colspan="2">RDS 1</td><td>P GAIN</td><td colspan="2"><table>
<tr><td>RDS 1</td><td>0</td><td>1</td><td>★ 2 ..... D</td><td>E</td><td>F</td></tr>
<tr><td>P GAIN</td><td colspan="5">1000 ..... 2000 ..... 9000</td></tr>
</table></td></tr>
<tr><td colspan="2">RDS 2</td><td>I GAIN</td><td colspan="2"><table>
<tr><td>RDS 2</td><td>0</td><td>1 ..... ★ B .....</td><td>E</td><td>F</td></tr>
<tr><td>I GAIN</td><td colspan="4">500 ..... 6000 ..... 8000</td></tr>
</table></td></tr>
</table>

* Select the capacity to be the same as that of the control unit.

A20 OPERATION CONSTANTS (PARAMETERS) LIST

Cn-No	Name	Lower Limit	Upper Limit	Initial Value	Set Value	Unit
C0-00	Number of stations	2	511	8		
C0-01	Rotational axis/linear axis	0	4	0		
C0-02	Unit station pulses	40	960000	4000		pulse
C0-03	Rotation direction switching	0	1	0		
C0-04	0-point offset automatic setup	0	1	0		
C0-05	0-point return direction	0	1	0		
C0-06	Direction for C0-04	0	1	1		
C0-07	Gear ratio A	1	40000	1		
C0-08	Gear ratio B	1	40000	1		
C0-09	ABS mode	0	1	0		
C0-10	0-point offset	120	40000	400		pulse
C0-11	Rotational axis direction	0	3	0		
C0-12	Parameter setting permission	0	1	0		
C0-13	Backlash correction	0	80000	0		pulse
C0-14	0-point return mode	0	1	0		
C0-15	Number of automatic setup	0	511	0		
C0-16	Unit PG pulses	0	1	0		
C0-17	Kp gain during stop (Kp3)	10	1000	25		0.1/Sec
C0-18	Control width for Kp3	0	100	20		pulse
d0-02	Pulses between stations (1-2)	40	96000000	4000		pulse
d0-03	Pulses between stations (2-3) or (1-3)	40	96000000	4000		pulse
d0-04	Pulses between stations (3-4 or (1-4)	40	96000000	4000		pulse
d0-05	Pulses between stations (4-5) or (1-5)	40	96000000	4000		pulse
d0-06	Pulses between stations (5-6) or (1-6)	40	96000000	4000		pulse
d0-07	Pulses between stations (6-7) or (1-7)	40	96000000	4000		pulse
d0-08	Pulses between stations (7-8) or (1-8)	40	96000000	4000		pulse
d0-09	Pulses between stations (8-9) or (1-9)	40	96000000	4000		pulse
d0-10	Pulses between stations (9-10) or (1-10)	40	96000000	4000		pulse
d0-11	Pulses between stations (10-11) or (1-11)	40	96000000	4000		pulse
d0-12	Pulses between stations (11-12) or (1-12)	40	96000000	4000		pulse
d0-13	Pulses between stations (12-13) or (1-13)	40	96000000	4000		pulse
d0-14	Pulses between stations (13-14) or (1-14)	40	96000000	4000		pulse
d0-15	Pulses between stations (14-15) or (1-15)	40	96000000	4000		pulse
d0-16	Pulses between stations (15-16) or (1-16)	40	96000000	4000		pulse
d0-17	Pulses between stations (16-17) or (1-17)	40	96000000	4000		pulse
d0-18	Pulses between stations (17-18) or (1-18)	40	96000000	4000		pulse
d0-19	Pulses between stations (18-19) or (1-19)	40	96000000	4000		pulse
d0-20	Pulses between stations (19-20) or (1-20)	40	96000000	4000		pulse
d0-21	Pulses between stations (20-21) or (1-21)	40	96000000	4000		pulse
d0-22	Pulses between stations (21-22) or (1-22)	40	96000000	4000		pulse
d0-23	Pulses between stations (22-23) or (1-23)	40	96000000	4000		pulse
d0-24	Pulses between stations (23-24) or (1-24)	40	96000000	4000		pulse
d0-25	Pulses between stations (24-25) or (1-25)	40	96000000	4000		pulse
d0-26	Pulses between stations (25-26) or (1-26)	40	96000000	4000		pulse
d0-27	Pulses between stations (26-27) or (1-27)	40	96000000	4000		pulse
d0-28	Pulses between stations (27-28) or (1-28)	40	96000000	4000		pulse
d0-29	Pulses between stations (28-29) or (1-29)	40	96000000	4000		pulse
d0-30	Pulses between stations (29-30) or (1-30)	40	96000000	4000		pulse
d0-31	Pulses between stations (30-31) or (1-31)	40	96000000	4000		pulse

(Cont'd)

Cn-No	Name	Lower Limit	Upper Limit	Initial Value	Set Value	Unit
d0-32	Pulses between stations (31-32) or (1-32)	40	96000000	4000		pulse
d0-33	Pulses between stations (32-33) or (1-33)	40	96000000	4000		pulse
d0-34	Pulses between stations (33-34) or (1-34)	40	96000000	4000		pulse
d0-35	Pulses between stations (34-35) or (1-35)	40	96000000	4000		pulse
d0-36	Pulses between stations (35-36) or (1-36)	40	96000000	4000		pulse
d0-37	Pulses between stations (36-37) or (1-37)	40	96000000	4000		pulse
d0-38	Pulses between stations (37-38) or (1-38)	40	96000000	4000		pulse
d0-39	Pulses between stations (38-39) or (1-39)	40	96000000	4000		pulse
d0-40	Pulses between stations (39-40) or (1-40)	40	96000000	4000		pulse
d0-41	Pulses between stations (40-41) or (1-41)	40	96000000	4000		pulse
d0-42	Pulses between stations (41-42) or (1-42)	40	96000000	4000		pulse
d0-43	Pulses between stations (42-43) or (1-43)	40	96000000	4000		pulse
d0-44	Pulses between stations (43-44) or (1-44)	40	96000000	4000		pulse
d0-45	Pulses between stations (44-45) or (1-45)	40	96000000	4000		pulse
E0-00	1st Automatic operation speed	10	1800	500		r/min
E0-01	2nd Automatic operation speed	10	1800	500		r/min
E0-02	3rd Automatic operation speed	10	1800	500		r/min
E0-03	4th Automatic operation speed	10	1800	500		r/min
E0-10	1st Manual operation speed	10	1800	500		r/min
E0-11	2nd Manual operation speed	10	1800	500		r/min
E0-12	3rd Manual operation speed	10	1800	500		r/min
E0-13	4th Manual operation speed	10	1800	500		r/min
E0-20	1st High-speed 0-point return	10	1800	500		r/min
E0-21	2nd High-speed 0-point return	10	1800	500		r/min
E0-22	3rd High-speed 0-point return	10	1800	500		r/min
E0-23	4th High-speed 0-point return	10	1800	500		r/min
E0-30	1st Low-speed 0-point return	10	1800	50		r/min
E0-31	2nd Low-speed 0-point return	10	1800	50		r/min
E0-32	3rd Low-speed 0-point return	10	1800	50		r/min
E0-33	4th Low-speed 0-point return	10	1800	50		r/min
E0-40	1st 0-point offset setting speed	10	1800	50		r/min
E0-41	2nd 0-point offset setting speed	10	1800	50		r/min
E0-42	3rd 0-point offset setting speed	10	1800	50		r/min
E0-43	4th 0-point offset setting speed	10	1800	50		r/min
E0-50	1st JOG speed	10	1800	50		r/min
E0-51	2nd JOG speed	10	1800	50		r/min
E0-52	3rd JOG speed	10	1800	50		r/min
E0-53	4th JOG speed	10	1800	50		r/min
E0-60	1st Accel time	10	5000	100		msec
E0-61	2nd Accel time	10	5000	100		msec
E0-62	3rd Accel time	10	5000	100		msec
E0-63	4th Accel time	10	5000	100		msec
E0-70	1st positioning control gain	10	1000	100		0.1/Sec
E0-71	2nd positioning control gain	10	1000	100		0.1/Sec
E0-72	3rd positioning control gain	10	1000	100		0.1/Sec
E0-73	4th positioning control gain	10	1000	100		0.1/Sec
E0-80	1st Soft-start time	0	99	0		msec
E0-81	2nd Soft-start time	0	99	0		msec
E0-82	3rd Soft-start time	0	99	0		msec
E0-83	4th Soft-start time	0	99	0		msec

(Cont'd)

Cn-No	Name	Lower Limit	Upper Limit	Initial Value	Set Value	Unit
E0-90	1st Soft-start speed	0	99	0		r/min
E0-91	2nd Soft-start speed	0	99	0		r/min
E0-92	3rd Soft-start speed	0	99	0		r/min
E0-93	4th Soft-start speed	0	99	0		r/min
E0-A0	1st torque limit value	30	300	200		%
E0-A1	2nd torque limit value	30	300	200		%
E0-A2	3rd torque limit value	30	300	200		%
E0-A3	4th torque limit value	30	300	200		%
E0-b0	1st in-position width	8	80000	20		pulse
E0-b1	2nd in-position width	8	80000	20		pulse
E0-b2	3rd in-position width	8	80000	20		pulse
E0-b3	4th in-position width	8	80000	20		pulse
E0-C0	1st near position width	8	80000	400		pulse
E0-C1	2nd near position width	8	80000	400		pulse
E0-C2	3rd near position width	8	80000	400		pulse
E0-C3	4th near position width	8	80000	400		pulse
E0-d0	1st soft-stop speed	0	1800	0		r/min
E0-d1	2nd soft-stop speed	0	1800	0		r/min
E0-d2	3rd soft-stop speed	0	1800	0		r/min
E0-d3	4th soft-stop speed	0	1800	0		r/min
E0-E0	1st soft-stop Kp^2	10	1000	100		0.1/Sec
E0-E1	2nd soft-stop Kp^2	10	1000	100		0.1/Sec
E0-E2	3rd soft-stop Kp^2	10	1000	100		0.1/Sec
E0-E3	4th soft-stop Kp^2	10	1000	100		0.1/Sec

NOTES

Juspoint Ⅲ

VECTOR CONTROL INVERTER POSITIONING SYSTEM

Distributer

YASKAWA ELECTRIC CORPORATION

YASKAWA

TOKYO OFFICE Ohtemachi Bldg. 1-6-1 Ohtemachi Chiyoda-ku, Tokyo 100 Japan
Phone (03) 3284 9111 Telex YASKAWA J33530 Fax (03) 3284-9034
YASKAWA ELECTRIC AMERICA, INC.
Chicago-Corporate Headquarters 2942 MacArthur Blvd. Northbrook IL 60062-2028 U.S.A.
Phone (708) 291-2340 Fax (708) 498 2430
Chicago-Technical Center 3160 MacArthur Blvd. Northbrook IL 60062-1917 U.S.A.
Phone (708) 291 0411 Fax (708) 291-1018
MOTOMAN INC.
805 Liberty Lane West Carrollton OH 45449 U.S.A.
Phone (513) 847 6200 Fax (513) 847-6277
YASKAWA ELÉTRICO DO BRASIL COMÉRCIO LTDA.
Rua Conde Do Pinhal 8-5 Andar Sala 51 CEP 01501-São Paulo-SP, Brasil
Phone (011) 35-1911 Fax (011) 37 7375
YASKAWA ELECTRIC EUROPE GmbH
Am Kronberger Hang 2, 65824 Schwalbach, Germany
Phone (49) 6196-569 300 Fax (49) 6196-888 301
Motoman Robotics AB
Box 130 S 38500 Torsas, Sweden
Phone 0486-10575 Fax 0486-11410
Motoman Robotec GmbH
Kammerfeldstraße 1, 85391 Allershausen, Germany
Phone 08166-900 Fax 08166 9039
YASKAWA ELECTRIC UK LTD.
3 Drum Mains Park Orchardton Woods Cumbernauld Scotland G68 9LD U.K.
Phone (1236)735000 Fax (1236)458182
YASKAWA ELECTRIC KOREA CORPORATION
Paik Nam Bldg. 901 188-3 1-Ga Euljiro Joong-Gu, Seoul, Korea
Phone (02)776-7844 Fax (02)753-2639
YASKAWA ELECTRIC (SINGAPORE) PTE. LTD.
Head Office 1 CPF Bldg. 79 Robinson Road #13-05, Singapore 0106 SINGAPORE
Phone 221-7530 Telex (87) 24890 YASKAWA RS Fax 224 5854
Service Center 221 Henderson Road #07-20 Henderson Building Singapore 0315, SINGAPORE
Phone 276-7407 Fax 276-7406
YATEC ENGINEERING CORPORATION
Shen Hsiang Tang Sung Chiang Building 10F 146 Sung Chiang Road, Taipei, Taiwan
Phone (02) 563-0010 Fax (02) 567-4677
SHANGHAI OFFICE Room No. 85 Wan Zhong Building 1303 Yan An Road (West), Shanghai 200050 CHINA
Phone (86) 212-1015 Fax (86) 212-1015
TAIPEI OFFICE Shen Hsiang Tang Sung Chiang Building 10F 146 Sung Chiang Road, Taipei, Taiwan
Phone (02) 563 0010 Fax (02) 567 4677

Manufacturer & Distributer

DRIVE

Y-E DRIVE CORPORATION
31 YOSHIKITA IIZUKA CITY
FUKUOKA PREF 820 JAPAN
PHONE (0948) 24-7601 FAX (0948) 24-7942

TOKYO SALES DIVISION C/O YASKAWA ELECTRIC CORPORATION Tokyo Office
Ohtemachi Bldg. 1-6-1 Ohtemachi, Chiyoda-ku, Tokyo, 100 Japan
Phone (03) 3284-9077 Fax (03) 3284-9383

OHSAKA SALES DIVISION C/O YASKAWA ELECTRIC CORPORATION Ohsaka Office
Osaka Daiichi Seimei Bldg., 1-8-17 Umeda, Kita-ku, Osaka, 530 Japan
Phone (06) 346-4560 Fax (06) 346-4565

NAGOYA SALES DIVISION C/O YASKAWA ELECTRIC CORPORATION Nagoya Office
Horiuchi Bldg. 3-25-9 Meieki, Nakamura-ku, Nagoya, 450 Japan
Phone (052) 581-2346 Fax (052) 581-2359

KYUSHU SALES DIVISION C/O YASKAWA ELECTRIC CORPORATION Kyushu Office
Chiyoda Seimei Fukuoka Bldg. 1-9-17 tenjin, Fukuoka, 810 Japan
Phone (092) 714-5075 Fax (092) 714-5799

DTSE-S606-9.1

Due to ongoing product modification, improvement, data subject to change without notice.