YASKAWA ELECTRIC

TOE-S606-2

SMALL-CAPACITY DIGITAL TRANSISTOR INVERTER

Juspeed-F™

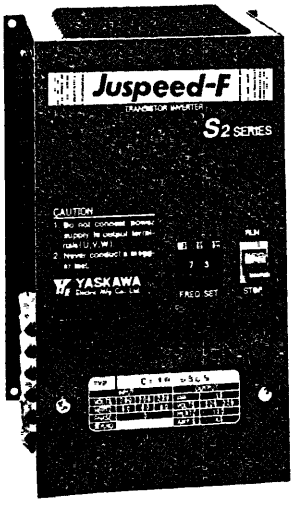
S_2 SERIES

MODEL CIMR-G08CS2 208/230V UP TO 1HP 1.5kVA
MODEL CIMR-08CS2 200/220V 0.2 TO 0.75kW 1.5kVA

INSTRUCTION MANUAL

Before initial operation read these instructions thoroughly and retain for future reference

When properly installed, operated and maintained, this equipment will provide a lifetime of optimum operation. It is mandatory that the person who operates, inspects, and maintains this equipment thoroughly read and understand this manual.



Juspeed-F
Model CIMR-08CS2

386 85

DANGER

- Do not touch circuit components until CHARGE lamp 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.
- If Juspeed-F inverter protective circuit activates, inverter output is stopped and, motor is coasting. Take positive action to protect personnel and machines from damage caused by motor coasting. If used with brake motor, be sure that motor power supply is separate from braking power supply.

IMPORTANT

- Be sure to ground Juspeed-F using the ground terminal Ⓔ on the casing of Juspeed-F.
- Do not provide magnetic contactor (MC) or capacitor between Juspeed-F and motor.
- All the potentiometers of Juspeed-F have been adjusted and paint-locked at the factory. Do not change their settings unnecessarily.
- Do not perform the following tests in the field.
  - Withstand voltage test on any part of the Juspeed-F unit. It is an electronic device using semi-conductors 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 maintenace purposes, it should be applied only to main circuit and the ground and never to the control circuit.
  - Conduction test on control circuits.

RECEIVING

This Juspeed-F has been put through stringent tests at the factory before shipped. After unpacking, however, check and see the following.

- Nameplate ratings meet your requirements.
- Leads and connectors are not disengaged.
- No damage while in transit.
- Bolts and screws are not loose.

If any part of Juspeed-F is damaged or lost, immediately notify us giving full details and nameplate data.

Juspeed-F MAJOR CONTROL COMPONENT LAYOUT

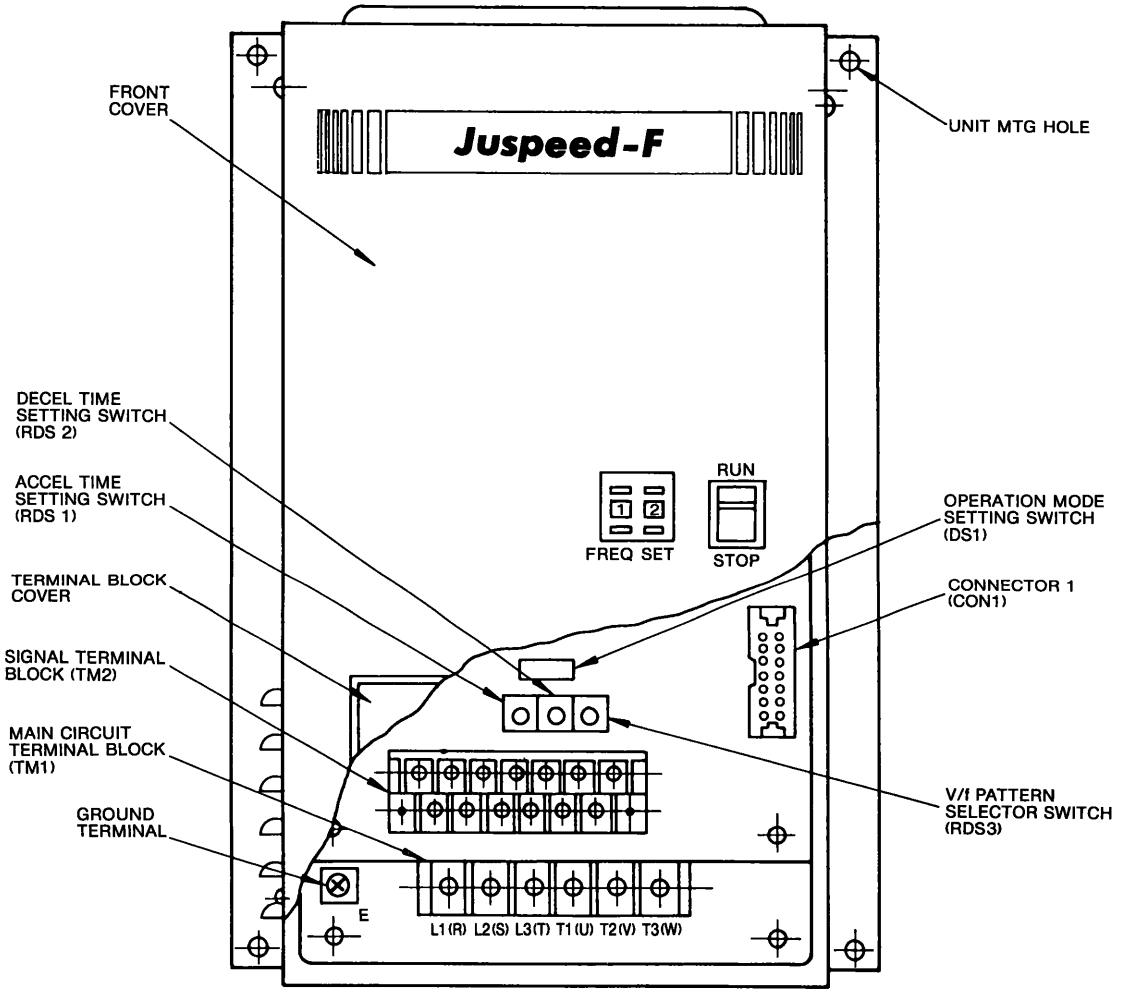


Fig 1 Major Control Component Layout of Juspeed-F Model CIMR-08CS2

INSTALLATION

LOCATION

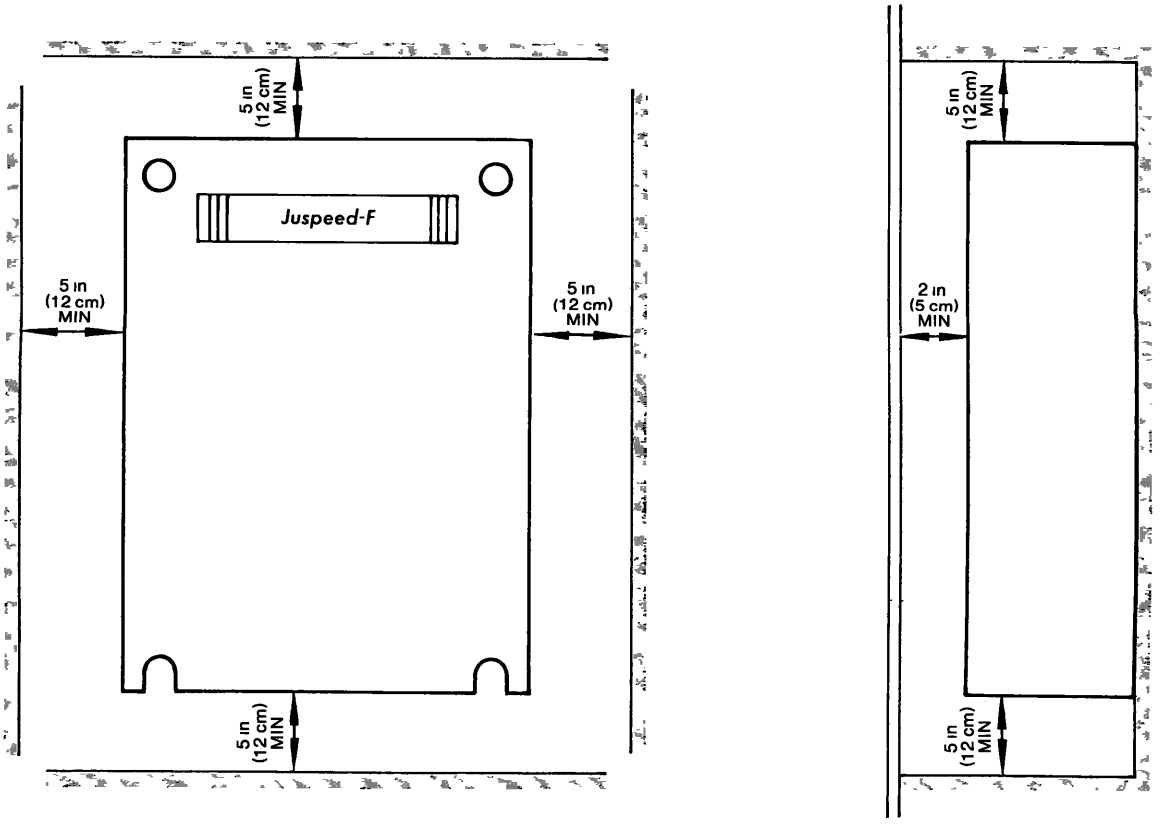
Location of the equipment is important to achieve proper performance and normal operating life. The units should be installed in areas where the following conditions exist.

- Ambient temperature: -10 to +40°C; -10 to +50°C with cover removed
- Protected from rain or moisture.
- Protected from direct sunlight.
- Protected from corrosive gases or liquids.
- Free from airborne dust or metallic particles.
- Free from vibration.

POSITIONING

For cooling and maintenance purposes, make sure that there is sufficient clearance around the equipment whether it is enclosed in a cabinet or not, as shown in Fig. 2. Keep 5 in. (12 cm) clearance between wiring duct and Juspeed-F also.

To maintain effective cooling conditions, it must be installed vertically to the ground so that product name can be read correctly using the four mounting screws.



(a) Front View (b) Side View

Fig 2 Juspeed-F Clearance Requirements for Proper Cooling and Maintenance

WIRING

INTERCONNECTIONS

Fig.3 shows the connection diagram for Juspeed-F drive. Connections should be made correctly, referring to Fig.3. Before wiring, remove terminal block cover, run the leads through the lead entrance at the Juspeed-F bottom and connect them at the terminal block.

Wire size must be:

- 14 AWG(2 mm²) with M4 terminal screw for main circuit terminals Ⓛ1 (Ⓡ), Ⓛ2 (Ⓢ), Ⓛ3 (Ⓣ), Ⓣ1 (Ⓤ), Ⓣ2 (Ⓥ), Ⓣ3 (Ⓦ), and Ⓔ.
- 18 AWG(0.75 mm²) with M3 terminal screw for signal circuit terminals ① to ⑩

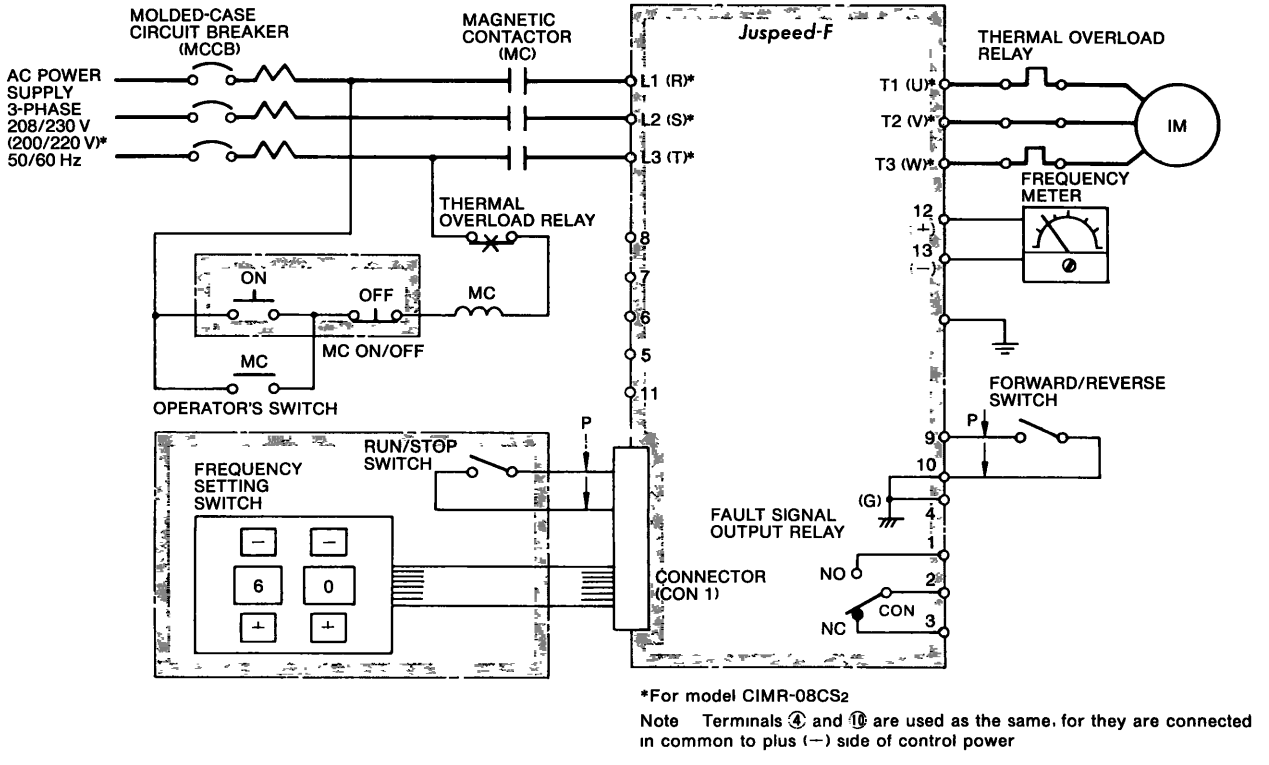


Fig 3 Example of Juspeed-F Interconnections

Main Circuit Connections

(1) MOLDED CASE CIRCUIT BREAKER (MCCB) AND MAGNETIC CONTACTOR (MC)

Be sure to connect MCCBs rated 30AF, 10A between power supply and Juspeed-F input terminals Ⓛ1 (Ⓡ), Ⓛ2 (Ⓢ), Ⓛ3 (Ⓣ) . To ensure safety, it is recommended that MC rated 250V, 10A or more containing a self-holding circuit be provided at power supply.

Do not connect MC between motor and Juspeed-F output terminals. Turning on or off the magnetic contactor flows full-voltage starting current into the controller and causes to Juspeed-F to stop. Frequent ON/OFF operations of MC may cause irreparable damage to Juspeed-F.

(2) Input terminals Ⓛ1 (Ⓡ), Ⓛ2 (Ⓢ), Ⓛ3 (Ⓣ), can be connected in any combination of power supply phase.

(3) Never connect AC power supply to output terminals T1 (U), T2 (V), T3 (W). Failure to do so may cause irreparable damage to the controller.

(4) DIRECTION OF MOTOR ROATION

When inverter output terminals T1 (U), T2 (V), and T3 (W) are connected to motor terminals T1 (U), T2 (V), T3 (W), respectively, upon forward operation command, motor rotates forward.

(5) POWER FACTOR CORRECTION CAPACITOR

Never connect power factor correction capacitor between inverter output terminals T1 (U), T2 (V), T3 (W), and motor.

Control Circuit Connections

(1) SIGNAL LEADS

Use the twisted lead for connections to signal terminals ④ to ⑬. The signal line must be separated from main circuit terminals T1 (U), T2 (V), T3 (W), L1 (R), L2 (S), and L3 (T) and large current electrical circuit (230V, 120V relay sequence circuit). See Fig. 4. Lead length should be 66 feet (20 meters) or less.

The operator's switch, consisting of RUN/STOP switch and frequency setting switch, can be separated from Juspeed-F unit if specified so. For separate mounting contact Yaskawa representive. Frequency setting switch is plugged-in by using JAE manual pressure tool CT150-1-PSSF. It employs JAE terminals 030-51304-001.

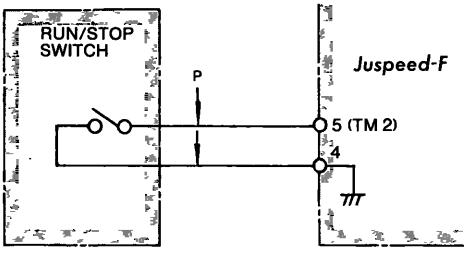


Fig 4 Connections of RUN/STOP Switch

(2) USE WITH BRAKE MOTORS

When used with brake motors, power supply of brake must be separated from that of motor. Make a sequence so that brake engages after Juspeed-F main circuit is shut off. This provides positive motor stop when inverter protective circuit is shut off.

Grounding

Make a positive grounding using ground terminal Ⓔ on the casing of Juspeed-F.

(1) Ground resistance should be 100Ω or less.

(2) Never ground Juspeed-F in common with welding machines, motors, and other large-current electrical equipment, or ground pole. Run the ground lead in a separate conduit from leads for large-current electrical equipment.

Molded-case Circuit Breaker (MCCB) and Power Supply Magnetic Contactor (MC)

Recommended MCCB and MC are listed below.

Juspeed-F Model CIMR-		08CS2
Molded-case Circuit Breaker (MCCB)		Type NF-30, 10A
Magnetic Contactor (MC)		Type HI-7E
Main Circuit Terminals L1 (R), L2 (S), L3 (T), T1 (U), T2 (V), T3 (W)	Lead Size	2mm²
	Terminal Screw	M4
Signal Terminals 1 to 13		Lead size 0.75 mm² or more, Terminal screw diameter M3

TEST RUN

CHECKS BEFORE TEST RUN

After completing mounting and connection of units, check for:

- Correct connections
- No short-circuit conditions
- No loose screws (Check especially for loose wire clippings)
- Proper load conditions
- Correct input power (No voltage drop or voltage imbalance, power supply capacity: 3kVA or more)

PRESETTING AND ADJUSTMENT

Operation Mode Setting Switch

Operation mode setting switch (DS1) consists of six ON/OFF slide switches printed on a base board. Select the operation modes from Table 1 according to the application. All the ON/OFF slide switches have been preset at factory to OFF as shown in Fig.5.

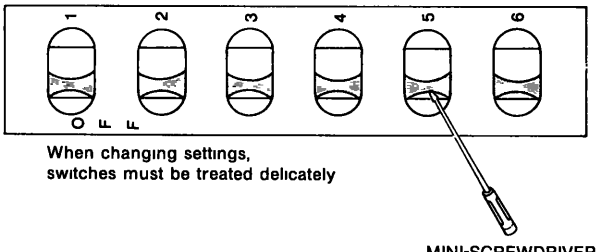


Fig 5 Operation Mode Setting Switch (DS1) (ON/OFF Slide Switches)

Table 1 Selection of Operation Modes

Slide Switch No	Setting	ON/OFF	Operation Mode
1	Stopping mode	ON	Motor coasts to a stop (Motor coasts to a stop by turning off the operation switch, or setting RUN/STOP switch to STOP)
		OFF	Motor brakes to a stop (Frequency braking → 3Hz → Dynamic braking → Motor stop)
2	Code selection†	ON	8-bit binary code—used for setting frequency
		OFF	2-digit BCD code—used for setting frequency
3 or 4*	High-speed frequency limit	3 ON 4 OFF	50Hz
		3 OFF 4 OFF	60Hz
		3 OFF 4 ON	90Hz
		3 ON 4 ON	120Hz
5	Running/ stopping	ON	Runs at frequency reference of 5 Hz or above Stops at frequency reference of less than 5 Hz
		OFF	Runs at 5 Hz with frequency reference of 0 to 5 Hz
6	Rapid stop	ON	Stops rapidly in approx 0.2s with stop command
		OFF	Brakes to a stop in the time set by RDS 2

*③ and ④ must be set in combination

†For the unit with operator's switch, set to OFF (BCD code)

Acceleration/Deceleration Time Setting Switch(RDS1)

Set the acceleration and deceleration times using accel/decel time setting switches (RDS1, RDS2) according to applications and load conditions. Table 2 shows the settings of RDS1 and RDS2 notches, acceleration and deceleration time and dynamic braking time at maximum frequency of 60 Hz (or 120 Hz). The switches have been preset at the factory to notch ③. High-speed frequency limit of 90 Hz or 120 Hz is selected, the time ranges in Table 2 are 0 to 120 Hz or 120 to 0 Hz.

Acceleration time and deceleration time RDS1 and RDS2. Acceleration and deceleration times represent the range of time of output frequency from 0 Hz to 60 Hz (or 120 Hz) and 60 Hz (or 120Hz) to dynamic braking, respectively. Calculate the corresponding time from the formula:

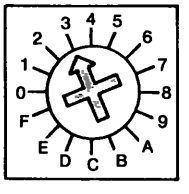
$$\text{Accel/decel time to be set} = \text{Time in Table 2} = \frac{\text{Max Frequency}}{60 \text{ (or } 120)}$$

Example

At maximum output frequency of 50Hz or 90Hz, the following calculation will apply.

$$\text{At 50 Hz, accel/decel time to be set} = \frac{\text{Accel/decel}}{\text{time in Table 2}} \times \frac{50}{60}$$

$$\text{At 90 Hz, accel/decel time to be set} = \frac{\text{Accel/decel}}{\text{time in Table 2}} \times \frac{90}{120}$$



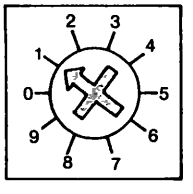
RDS1 Accel Time Setting Switch
RDS2 Decel Time Setting Switch

Table 2 Accel/Decel Times and Dynamic Braking Time at Switch Notches

Notch	⓪	①	②	③	④	⑤	⑥	⑦	⑧	⑨	Ⓐ	Ⓑ	Ⓒ	Ⓓ	Ⓔ	Ⓕ
Accel/Decel Time (s)	0 35	0 50	0 75	1 00	1 50	2 00	2 50	3 00	3 30	3 80	4 40	5 30	6 50	8 60	12 8	26 0
Dynamic Braking Time (s)	0 09	0 10	0 11	0 12	0 13	0 15	0 16	0 19	0 21	0 25	0 30	0 37	0 50	0 75	1 50	3 00

V/f Pattern Selector Switch

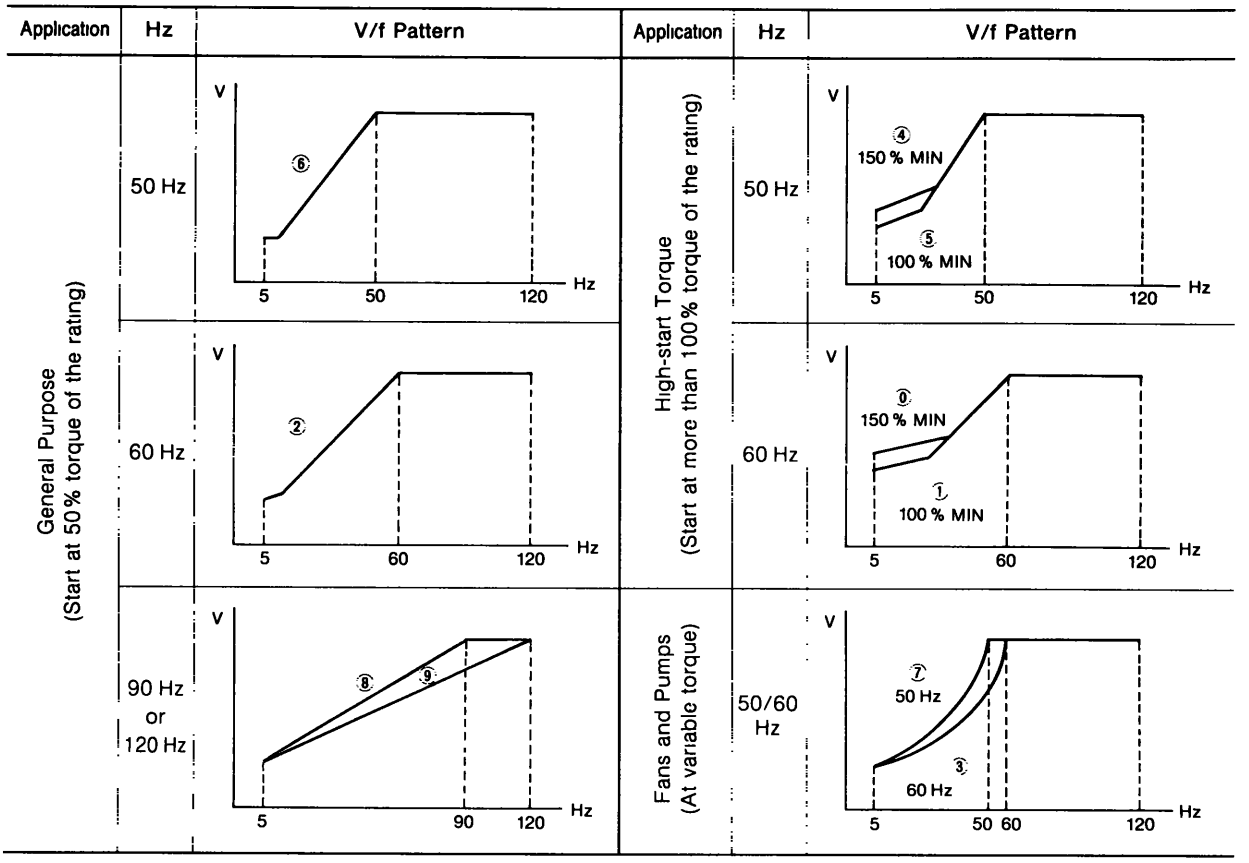
V/f pattern selector switch (RDS3) sets the voltage corresponding to the output frequency. For smooth motor running, select the optimum V/f pattern from 10 types listed in Table 3. The V/f pattern selector switch has been preset at the factory at notch ①. Setting excessively high voltage at low frequency may cause overcurrent and result in activating overcurrent protective function to shut off the transistor power.



V/f Pattern
Selector Switch (RDS3)

V/f Pattern Selector Switch (Cont'd)

Table 3 Nine Types of V/f Patterns



Note
1 Circled numbers in the table above indicate the notch to be set by the V/f pattern selector switch and their respective pattern curve
2 For notch ④ or Ⓒ, use with Juspeed-F motors

V/f Pattern Selection

Table 4 V/f Pattern Selection

Pattern Notch No.	Selection
0 (at 60 Hz) 4 (at 50 Hz)	For high starting torque of 150% rated torque. Apply to next lower motor capacity; combination with motor output for inverters may activate overvoltage protective circuit. Use a special motor. Continuous operation of standard motors at low frequency cannot be made.
1, 5	For starting torque of 100%. Optimum for constant torque such as conveyors. Continuous operation of standard motors at low frequency cannot be made. Use a special motor.
2, 6	For starting at 50% of the rated torque. For the application requiring 50% starting torque or less, noise and vibration at low frequency will be reduced as compared with 100% rated starting torque mode of pattern ① and ⑤.
3, 7	For variable torque loads specially for fans and pumps.
8, 9	For high-frequency motor at 90 Hz or 120 Hz.

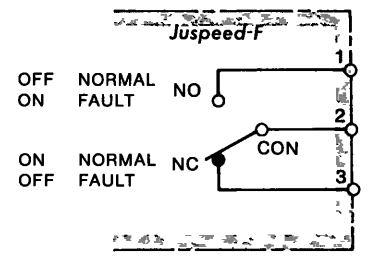
Note. Operation of standard motor at 60 Hz or more may cause motor vibration or cooling fan noise. Use of special motor is recommended.

Signal Connections

Signals can be connected through terminal block (TM2) or connector receptacle (CON1). Tables 4 and 5 list the functions of terminal block (TM2) and connector receptacle (CON1), respectively.

Table 5 Terminal Block TM2 Function

Terminal No.	Terminal Name	Terminal Function
1	Fault Signal	Contact signal output indicating that inverter protective circuit activates and operation stops.
2		
3		
4	I/O Common	Common terminals for I/O terminals 5 to 9 and output terminal 11. (Zero volt terminal of control circuit: GND)
10		
5	RUN/STOP	Input signals of RUN and STOP. ("L" — RUN, "H" — STOP)
6	Multispeed Operation Input	Input for multispeed operation. "L" for activation.
7		
8		
9	Forward/Reverse	Input for motor forward/reverse operation. ("L"—Reverse operation, "H"—Forward operation)
11	Frequency Synchronization Output	Open collector output terminal which indicates that output frequency reaches the set frequency. ("L"—at synchronized, "H"—during acceleration/deceleration and stopping.)
12	Frequency Meter Driving Terminal	Connected to frequency meter 1 mA DC at 60 or 120 Hz ("+" at terminal 12, "-" at terminal 13) Use moving coil type DC ammeter for frequency meter.
13		



Connections of Fault Signal Output Relay

Note: Input open collector signal with terminals 4 and 10 as common (GND common) for each input terminal. To input contact signal, input no-voltage contact signal between terminals 4 and 10. "Closed" means "L" of open collector.

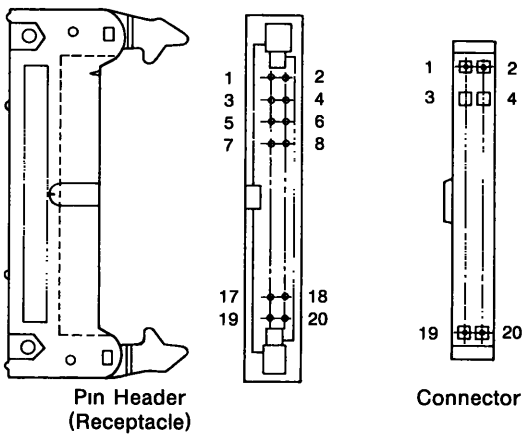
Table 6 CON1 Connector Function

Pin No.	Pin Name	Connector Function	
1	NC	Spare Pin	
2, 18	I/O Common	0 V of control circuit (GND)	
3	Fault Signal	Open collector signal output indicating that inverter protective circuit activates and operation stops. "L" at stop by fault, "H" in other cases. 50 mA, 35 V.	
4	Operation Input	Operates at "L," stops at "H."	
5	Multispeed Operation	Input for multispeed operation. Activates at "L."	
6			
7			
8	Forward/Reverse	Reverse operation at "L" Forward operation at "H"	
9	Frequency Reference	Higher 8 digits	2-digit BCD code or binary code. Activates at "L." Higher digits of BCD code 0 to F can be used. When binary code is used, pin No. 16-LSB and 9-MSB used. High speed limit at 50 Hz or 60 Hz, 1/4 of the set value is used as reference; at 90 Hz or 120 Hz, 1/2 of the set value is used.
10		Higher 4 digits	
11		Higher 2 digits	
12		Higher 1 digit	
13		Lower 8 digits	
14		Lower 4 digits	
15		Lower 2 digits	
16		Lower 1 digit	
17	Frequency Synchronization	Open collector output terminal which indicates that output frequency reaches the set frequency. "L" at synchronized, "H" during acceleration/deceleration and stopping.	
19	Frequency Meter	Connect a frequency meter, 1 mA DC at 60 or 120 Hz (pin 19 at "+" and pin 20 at "-"). Use a moving coil type DC ammeter as a frequency. (e.g. Model TRM-45G made by KUWANO Electric) meter.	
20			

Note Input open collector signal with input pins 2 and 18 as common (GND common) for each input pin. To input contact signal, input contact signal between pins 2 and 18. "Closed" means open collector "L."

Location of CON1 Connector Pins

Pin header (receptacle) is mounted on the PC board. Mount terminals according to connector pin numbers. Plug the connector firmly into the pin header.

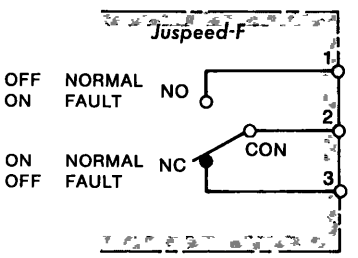


	Model (made by JAE)
Connector	PS-D4C20 (With key, 20-pole)
Terminals	030-51304-001
Manual Pressure Tool	CT150-1-IPSSF

Fig 6 CON 1 Connector Pins

Fault Signal Terminals ①, ②, ③

Give the contact output if the inverter is tripped.



CONTACT RATING
250 VAC, 1 A RESISTANCE LOAD
30 VDC, 1 A RESISTANCE LOAD

Fig 7 Connections of Fault Signal Output Relay

RUN/STOP Terminals(⑤ and ④ or ⑤ and⑩)

Terminals for motor run/stop switch are connected as shown in Fig.8.

For remote running or stopping of motor, use a toggle switch (30 VDC, 3A, contact resistance: 0.010Ω or less) and connect with twisted lead to prevent erroneous operation due to noise. Terminals ④ and ⑩ are connected within the circuit.

(a) Terminal Block TM2 Used (b) Connector CON1 Used

NOTE

When TM2 and CON1 are used at the same time, if signal of either one is low, the other one will not be activated by turning ON or OFF

Fig 8 Connections of RUN/STOP Switch

Foward/Reverse Terminals(⑨ and ④, or ⑨ and ⑩)

Terminals for motor forward/reverse operation switch. See Fig. 9. Motor runs forward by turning off terminals ⑨ and ④ and reverses by turning them on. Use a toggle switch (30 VAC, 3A, contact resistance: 0.010Ω or less) or equivalent.

Forward/reverse running can be changed during operation. For forward operation only, forward/reverse switch need not be connected.

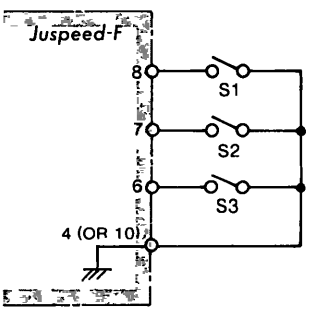
(a) Terminal Block TM2 Used (b) Connector CON1 Used

Fig 9 Connections of Forward/Reverse Switch

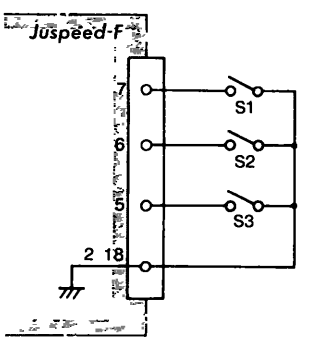
Multispeed/Low-speed Limit Terminals (⑥, ⑦, ⑧, ④ or ⑩)

Terminals for contact input for multispeed or low-speed limit operation. See Fig.10. Set the operation mode selector switch (DS1) ② to select multispeed or low-speed limit operation: ON for Low-limit, OFF for multispeed. Then, set the operation frequency by setting the external switches S1 to S3 ON or OFF referring to Table 4.

Use model MY relay made by OMRON, or equivalent for external switches S1 to S3.



(a) Terminal Block TM2 Used



(b) Connector CON1 Used

Table 7 Setting of External Switches

External ON/OFF Switch			Operation Mode: Multispeed (DS1 switch ② OFF)
S1	S2	S3	Output Frequency
OFF	OFF	OFF	Frequency set by frequency setting switch
OFF	OFF	ON	5Hz
OFF	ON	OFF	10Hz
OFF	ON	ON	20Hz
ON	OFF	OFF	30Hz
ON	OFF	ON	40Hz
ON	ON	OFF	50Hz
ON	ON	ON	60Hz

Fig 10 Connections of External ON/OFF Switches for Mutlispeed and Low-speed Limit Operation

Setting Frequency

Set the frequency using the frequency setting switch on the front of Juspeed-F. Digits can be set by pressing plus or minus levers of each digit. Frequency setting lever must be opened before they can be depressed.

Pressing the upper levers (-) decreases the counter by one; pressing the lower levers (+) increases the counter by one. Right-hand dial can be freely set from 0 to 9. Left-hand dial can be set from 0 to 12 or from 12 to 0, it locks at 0 or 12 position. After setting the required frequency, return the levers to the neutral positions (closed).

Set high-speed frequency limit according to Table 1. They take priority over the frequency set by the frequency setting switch.

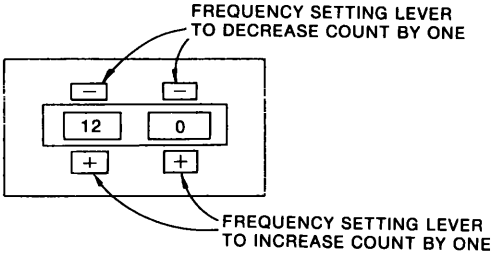


Fig 11 Frequency Setting Switch

TEST RUN

Uncouple the motor from the driven machine to insure safety. Start the operation following the procedures below.

1. Move RUN/STOP switch to STOP. Turn off the external sequence switches, if used.
2. Set the frequency setting switch to 5 Hz or below. When the frequency set by the switch is between 0 to 5 Hz, 5 Hz command is given and motor rotates at 5 Hz when the RUN/STOP switch is set to RUN. When operation mode setting switch (DS1) notch 5 is set to ON, frequency reference of less than 5 Hz is given as 0 speed reference and motor stops.
3. Turn on Juspeed-F AC main circuit (MCCB) and then the magnetic contactor (MC). Check to be sure that the POWER lamp (red) on the front of Juspeed-F lights. At this time, motor still does not start unless the operation circuit malfunctions. Check the motor for any noise or vibration (by hand) to make sure no malfunction has occured.
4. Change RUN/STOP switch to RUN. Make sure that the motor is running forward. If shaft rotation is incorrect, change FORWARD/REVERSE switch to REVERSE or reverse any two of motor leads Ⓣ1 (Ⓤ), Ⓣ2 (Ⓥ), Ⓣ3 (Ⓦ).
5. Juspeed-F output frequency increases or decreases according to the preset accel/decel time. Motor accelerates or decelerates according to the frequency as well. If the motor does not run smoothly during acceleration or deceleration, or Juspeed-F stops due to malfunction, the accel/decel time is assumed to have been set too short for the load level.
6. Accel/decel time and V/f pattern can be changed during motor operation. See pars. "Setting of Acceleration and Deceleration Times" and "Selection of V/f Pattern."

TEST RUN (Cont'd)

7. If any of the protective functions activates, Juspeed-F is stopped. Turn off the AC main circuit power by turning off the circuit breaker (MCCB) or magnetic contactor (MC) and turn on the power again.

   Trouble can be located by the blinking fault lamp (YELLOW) on the lower part of the printed board. If Juspeed-F stops, remove the terminal board cover and identify the trouble with the blinking lamp, referring to Table 8.

8. If load inertia (GD^2) is excessively large, rapid acceleration or deceleration frequently occurs, motor stops due to overvoltage (OV: overvoltage). In such cases or braking discharge resistor may be tripped. Should this happen, contact your Yaskawa represntative.

OPERATION

After the test run is over, start the operation keeping the following in mind.

(1) For general purpose motors combined with Juspeed-F controller, motor temperature rises noise and vibration increase as compared with commercial power.

(2) Operate the motor at the temperature below the allowable temperature rise level, for motor cooling effects decrease at low speed operation.

(3) Motor ratings

- When two or more motors are controlled by a single Juspeed-F, check to be sure that the total motor current is not larger than the inverter rating.
- When multipole motors of more than 8 poles or special purpose motors are used, make sure that motor current is within the inverter rating.
- Even with small load, never use a motor whose current exceeds the inverter rating.

(4) Never connect a capacitor at the inverter output, for it may cause activation of overcurrent protective function.

(5) To start and stop the motor, use RUN/STOP switch on the front of Juspeed-F, not the magnetic contactor (MC) or circuit breaker (MCCB) which are used only for emergency stop.

(6) If supply voltage changes at momentary power failure, protective functions may operate and stop Juspeed-F, resulting in motor coasting to a stop. Turning on the AC power supply within one second after the activation of protective functions will not restart the motor. Power input after approximately 10 seconds will restart the motor. For the application requiring positive motor stop in an emergency, provide magnetic contactor (MC) including self-holding circuit at power input as shown in Fig. 3.

(7) Restart the motor after making sure that the motor has come to a full stop. If the operation is started during motor coasting, overcurrent protective function may be activated.

MAINTENANCE

Juspeed-F requires almost no routine checks. It will function efficiently and longer if it is kept clean, cool and dry, observing precautions listed under "Location." Especially check for tightness of electrical connections, discoloration or other signs of overheating. When servicing inspection, turn off AC main circuit power and wait ten minutes before removing the terminal cover. The capacitors are still charged and can be quite dangerous.

Insulation Resistance Test

- For megger-testing the external circuit, remove all the Juspeed-F terminals and do not apply the test voltage to the inverter.
- For megger-testing the inverter, measure the insulation resistance of the main circuit only with a 500 VDC megger.

Connect the AC main circuit terminals Ⓛ1 (Ⓡ), Ⓛ2 (Ⓢ), Ⓛ3 (Ⓣ), Ⓣ1 (Ⓒ), Ⓣ2 (Ⓥ), and Ⓣ3 (Ⓦ) by a common wire as shown in Fig. 12. After that, measure the insulation resistance between the common wire and ground with a megger. If reading is above 1MΩ, it is considered satisfactory. Never measure the insulation resistance of the control circuit.

- Never make a conduction test of the control circuit.

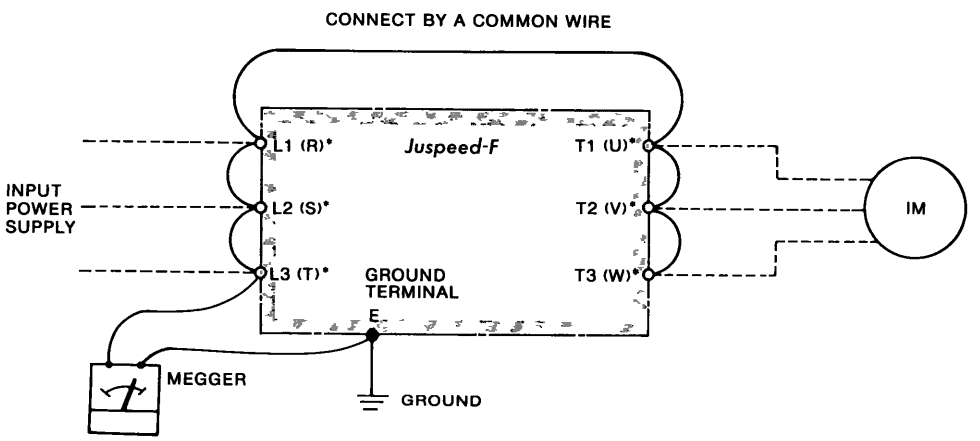
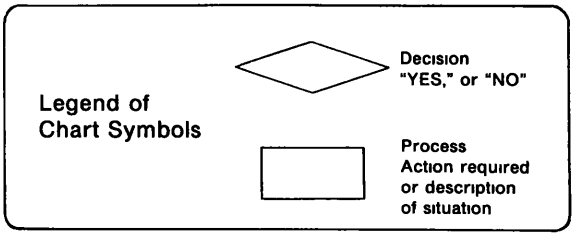


Fig 12 Connections for Megger-testing

TROUBLESHOOTING

If Juspeed-F malfunctions, find the cause and take the corrective actions by following the flowcharts given in Figs. 13 to Fig. 15.

If the causes cannot still be located by the flowcharts, the inverter or some parts are damaged, or any other problem occurs, contact Yaskawa representative.



(1) Motor will not run

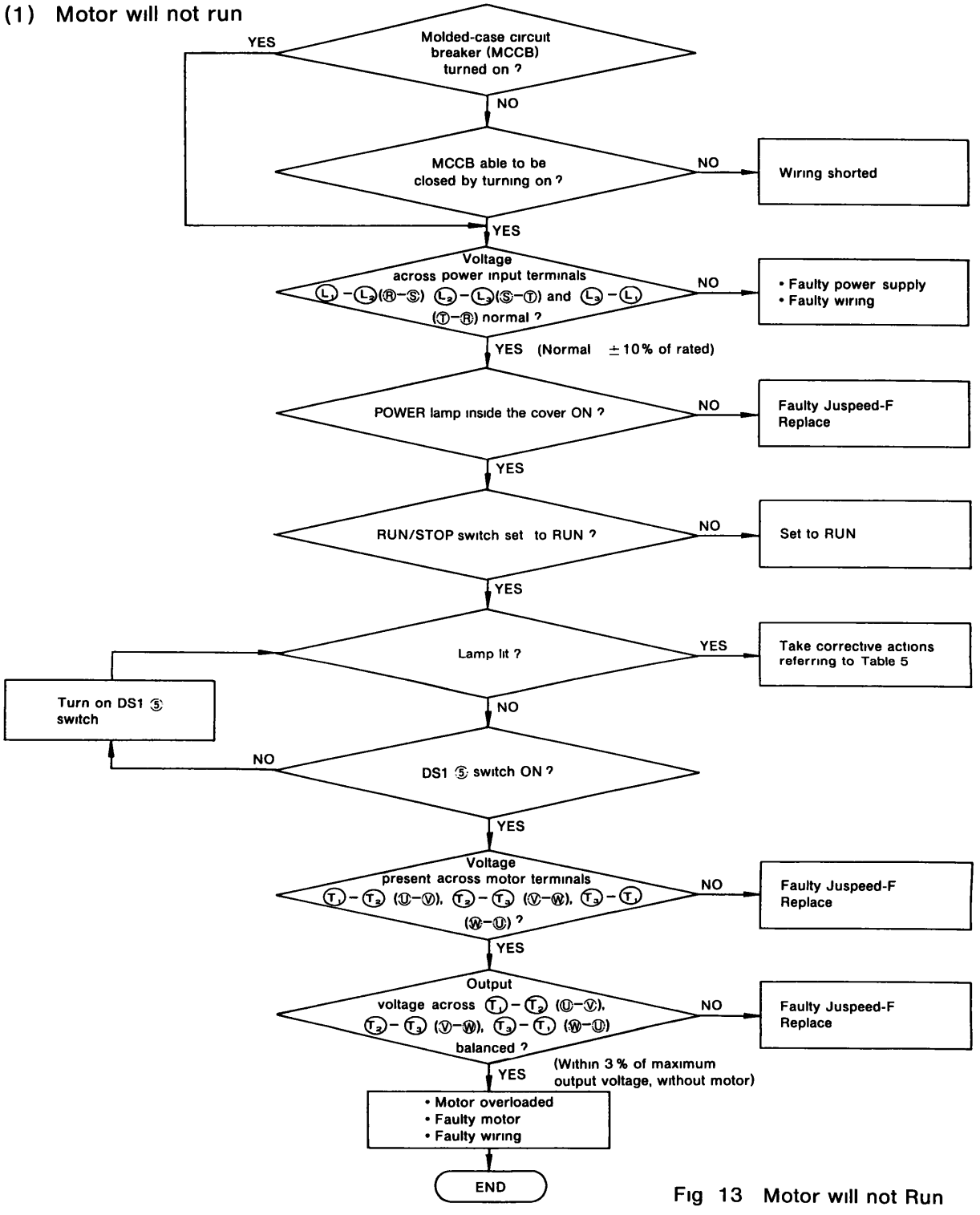


Fig 13 Motor will not Run

(2) Motor overheat

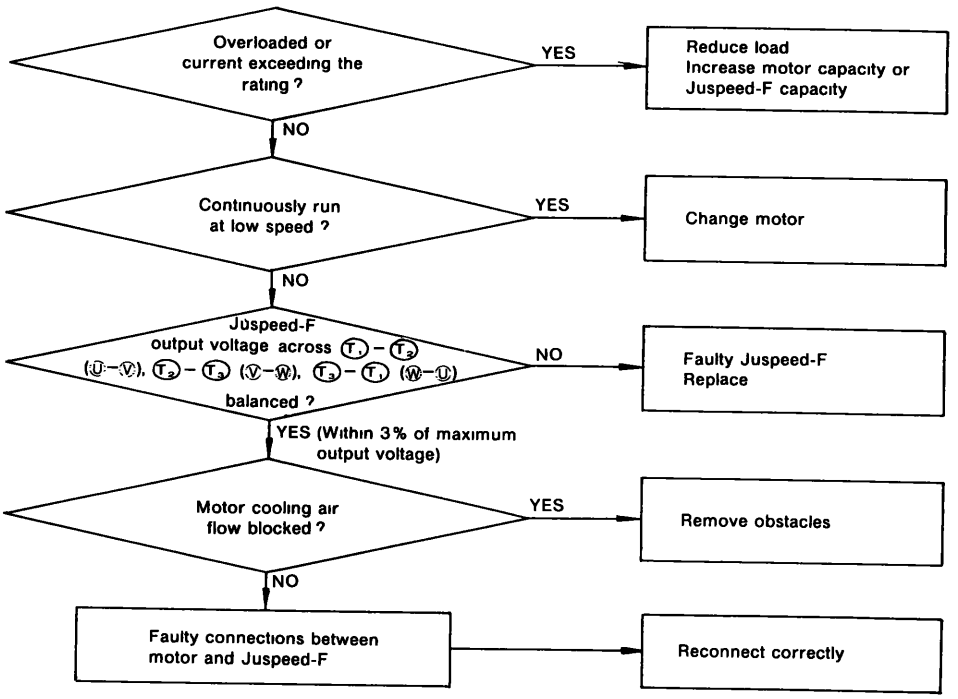


Fig 14 Motor Overheat

(3) Motor hunting

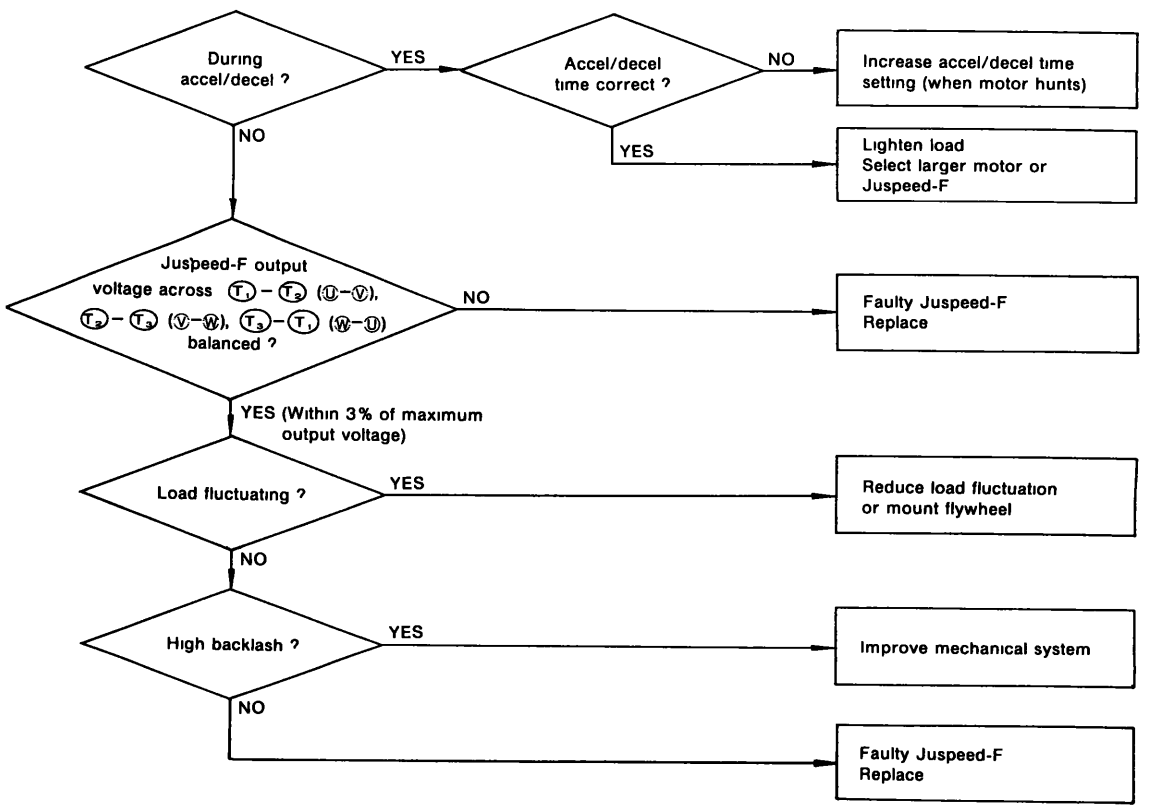
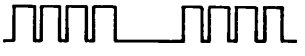


Fig 15 Motor Hunting

CAUSES FOR BUZZER AND FAULT LAMP ACTIVATION AND REMEDIAL ACTIONS

If Juspeed-F malfunctions, fault lamp (yellow) lights. Depending on the type of malfunction, the lamp will blink. When the lamp operates, check for continous or intermittent operation and whether the operation switch is ON or OFF.

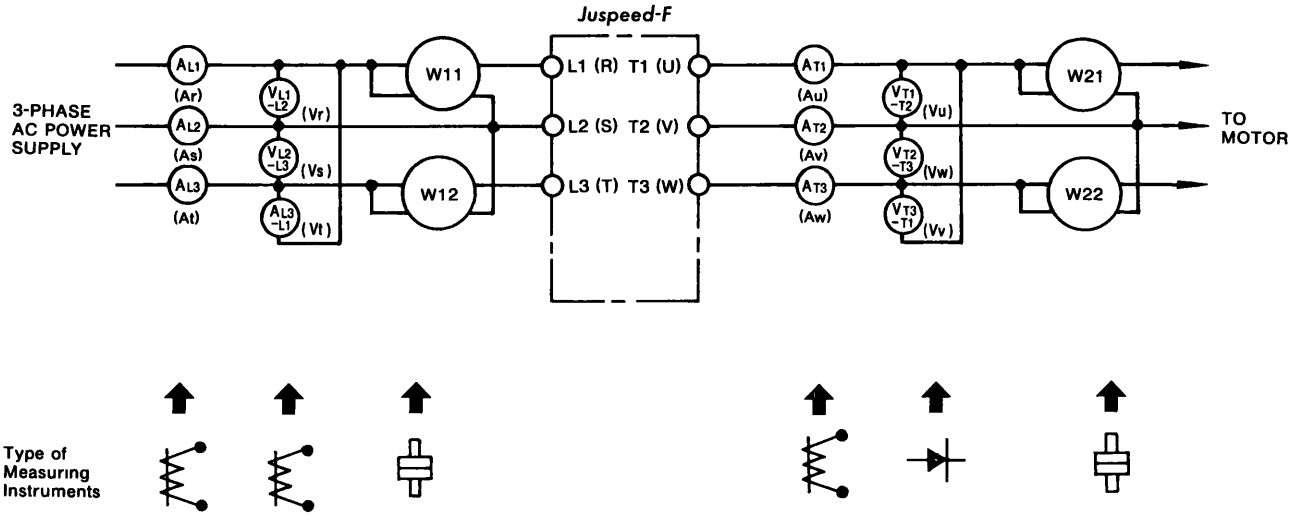
Table 8 Failure Indication of Juspeed-F

Operation of Fault Lamp	Cause	How to Check	What to Do
	Instantaneous overcurrent protection		
n = 2 times 	• Juspeed-F output circuit shorted or ground fault	• Remove Juspeed-F output terminals and measure the resistance across motor leads or motor leads and ground Use an ohmmeter across motor leads, and a megger across any one of motor lead and ground	If less than IMΩ, correct the short-circuit conditions
	• Accel/decel time set too short	• Extend the accel/decel time and operate the motor	• Extend the accel/decel time until overrcurrent protective function stops
	• Load too heavy	• Run motor without load • Check load conditions	• Change V/f pattern • Reduce load
	• Power factor correction capacitor connected to Juspeed-F output	—	Remove
	• Incorrect V/f pattern selection	• Run motor with frequency set at 5Hz, and V/f pattern selector switch at notch ③ or ⑦	• Select the optimum V/f pattern
n = 3 times 	**Overvoltage protection** • Decel time set too short	• Extend the decel time and operate the motor	• Extend the decel time until overvoltage protective function stops
n = 4 times 	**Undervoltage protection** • Supply voltage too low • Momentary power failure (15 ms or more)	Measure supply voltage with voltmeter	Restart the motor when the measued voltage is correct • Eliminate the cause of voltage drop
n = 5 times 	• Ground fault • Transistor module damaged	Remove all Juspeed-F terminals and check continuity across any one of motor leads and ground with a 500 V megger	If less than 1MΩ, eliminate the cause of ground fault
n = 6 times 	• Microcomputer malfunction due to noise	Check to see if noise source exists at inverter Input/Output	Prevent noise generation Insert a noise filter at inverter primary or secondary side

Note
1 If fault lamp lights, set RUN/STOP switch to STOP, find the cause, and turn off MCCB and MC
2 If the cause cannot be found, disconnect leads from Juspeed-F and motor
3 For any problem which cannot be corrected locally, contact your Yaskawa representative

Measuring Points and Instruments

The measuring points and measuring instruments, when measured at commercial frequency, are shown below. Measured data may differ depending on the listruments and circuit, for Juspeed-F primary and secondary voltage and current include higher harmonic.



Measuring Points and Instruments

Item	Points	Instrument	Note
Supply Voltage V_1	Across L1-L2 (R-S), L2-L3 (S-T), L3-L1 (T-R), V_{L1-L2}, V_{L2-L3}, V_{L3-L1} (Ⓥ$_R$ Ⓥ$_S$, Ⓥ$_T$)	Moving-iron type	Commercial power supply 187 to 253 V at 50 Hz/60 Hz
Power Supply Current I_1	Line current L1, L2, L3 (R, S, T) A_{L1}, A_{L2}, A_{L3} (Ⓐ$_R$, Ⓐ$_S$, Ⓐ$_T$)	Moving-iron type	—
Power Supply Power* P_1	L1, L2, L3 (R, S, T) and across L1-L2 (R-S), L2-L3 (S-T), L3-L1 (T-R), W_{L1}, W_{L2}, W_{L3} (Ⓦ$_R$, Ⓦ$_S$, Ⓦ$_T$)	Electrodynamometer	$P_1 = W_{11} + W_{12}$
Power Supply Power Factor Pf_1	Calculate from measured supply voltage, supply current, and supply power $Pf_1 = \frac{P_2}{\sqrt{3}V_1 I_1} \times 100\ (\%)$		
Output Voltage V_2	Across T1-T2 (U-V), T2-T3 (V-W), T3-T1 (W-U), V_{T1-T2}, V_{T2-T3}, V_{T3-T1} (Ⓥ$_U$, Ⓥ$_V$, Ⓥ$_W$)	Rectifier type (YOKOGAWA 2017 or equivalent) Moving-iron type cannot be used	Difference between each line and max output voltage 3 % or below
Output Current I_2	Line current at T1, T2, T3 (U, V, W), A_{T1}, A_{T2}, A_{T3} (Ⓐ$_U$, Ⓐ$_V$, Ⓐ$_W$)	Moving-iron type	Rated current of Juspeed-F or below (±10% or below at each line)
Output Current P_2	T1, T2, T3 (U, V, W) and across T1-T2 (U-V), T2-T3 (V-W), T3-T1 (W-U), W_{T1}, W_{T2}, W_{T3} (Ⓦ$_U$, Ⓦ$_V$, Ⓦ$_W$)	Electrodynamometer type, Three identical rating single-phase meters are used	$P_2 = W_{12} + W_{12}$
Output Power Factor Pf_2	Calculated same as power factor on supply side $Pf_2 = \frac{P_2}{\sqrt{3}V_2 I_2} \times 100\ (\%)$		

Juspeed-F Ratings and Specifications

Item \ Model CIMR-		G08CS2	08CS2
Max Motor Output		Fractional to 1HP (0 2 to 0 75kW)	
Rated Capacity		1 5kVA	
Rated Current*		4 5A(2 2A)	
Input Power Supply		208/230V ±10%	200/220V ±10%
		3-phase, at 50/60Hz ±5%	
Max Output Voltage†		208/230V ±10%	200/220V ±10%
		3-phase	
Control Method		Sinusoidal sine wave PWM	
Output Frequency Range‡		5 to 120 Hz (Frequency setting available every 1Hz)	
Frequency Reference (External signal)		1 Hz for 2-digit BCD or 0 5 Hz for 8-bit binary	
Frequency Resolution		0 25 Hz (5 to 60 Hz), ±0 5 Hz (5 to 120 Hz)	
Frequency Accuracy		±0 5 % (−10 to +40°C)	
Allowable Overload Capacity		150 % for two minutes	
Accel/Decel Time		0 35 to 26 sec (16 selections available independently of accel/decel)	
Braking Torque		100 % rating	
Input Signal	Run and Stop	Running reference from 1NO contact (holding)	
	Forward/Reverse Running	Reverse running reference from 1NO contact (holding)	
	Frequency Setting	3-digit digital switch	
	Multi-speed	7 steps (5, 10, 20, 30, 40, 50 and 60 Hz) by contact signal	
Protective Functions	Instantaneous Power Failure	Protective circuit functions if power failure is detected	
	Undervoltage	Stopped at 170 V or less	
	Overcurrent	Stopped by overcurrent caused by short circuit and/or ground fault	
	Overvoltage	Stopped by overvoltage when regeneration	
Environmental Condition	Location	Indoor (free from corrosive gases and dust)	
	Ambient Temperature	+50 to +104°F (−10 to +40°C)	
	Humidity	95 % max relative (non-condensing)	
	Elevation	3300 feet max (1000 meters)	
	Vibration	0 5 G max	

* Parenthesized values are for single-phase power input
† Inverter input voltage and output voltage equalize
208 V output at 208 V inpqt and 230 V output al 230 V input
‡ Maximum frequency can be set at 50, 60, 90, or 120 Hz
Frequency setting, in increments of 0 25 Hz at 0 to 60 Hz, in increments of 0 5 Hz at 0 to 90 Hz, 120 Hz

Note 1 Operator's switch can be installed separate from inverter proper For separation, contact Yaskawa representative
2 Noise filter to eliminate radio wave interference is available on request
3 For excessively high load inertia or repeated rapid deceleration, built-in braking resistor capacity may not be sufficient For this application, contact your Yaskawa representative

MEMO

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