Toshiba inverter tosvert 130-G1 instructions manual

INSTRUCTIONS MANUAL

INVERTER TOSVERT-130G1 OPERATION GUIDE

(380~460V 150~200kVA)

WALL MOUNT TYPE

TOSVERT-130g1 GENERAL PURPOSE INVERTER

HANDLING PRECAUTIONS

Before using these inverters, read their operation manuals carefully. Since mishandling them may cause them to break down or even be completely destroyed, carefully follow the suggestions listed below.

DANGER HIGH VOLTAGE

Do not touch any internal parts while main power is connected and the red CHARGE lamp is lit!

ENVIRONMENTAL FACTORS

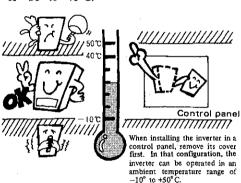
 Avoid installing the inverter where there is high temperature and/or humidity, or where there is dust or metallic powder. Be sure to install it in a well ventilated indoor space.



 Do not install the inverter where there is a high level of vibration.



• Keep the ambient temperature within a range of -10° to +40°C.

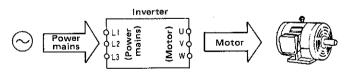


2 POWER INPUT

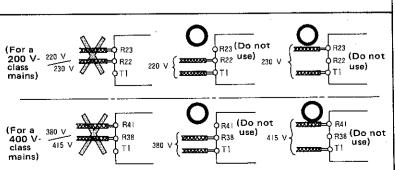
• Assure that the input power mains voltage is within ±10% of the voltage rating. If the voltage is above or below that range, a protective device may trip, or in the worst case, the inverter may be destroyed.

CONNECTION

• Connect input terminals L1, L2, and L3 to a power mains, and connect output terminals U, V, and W to a motor.



 Make the control power supply connections in accordance with the power mains voltage used.



RUNNING THE INVERTER

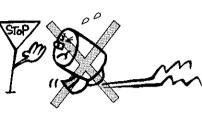
• Avoid overloads, sudden accelerations or decelerations, or other irregular operations of the inverter, since they will damage it.



Overload

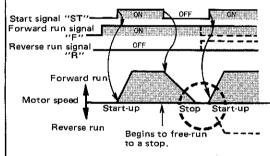


Sudden acceleration



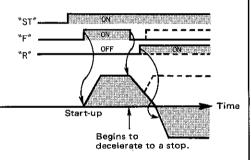
Sudden deceleration

• Inverter running pattern (For further details, see the operating instructions.)

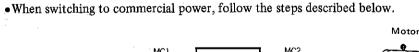


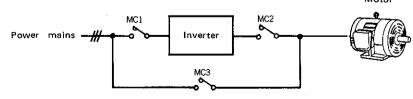
- o When the "ST" signal disappears, the motor will free-run to a stop.
- o Do not re-start the motor while it is still free-running to a stop.

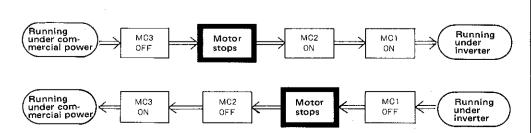
Only after the motor comes to a complete stop should it be re-started.



- o When the "ST" signal is on, and the "F" or "R" signal disappears, the motor will decelerate to a stop.
- o If the deceleration time is too short, the overvoltage protective circuit sometimes trips.
 In that case, either set a longer deceleration time, or use a regenerated power discharging resistor unit.







PREFACE

Thank you for purchasing the Toshiba general purpose inverter. This guide describes the operation and maintenance procedures.

It could be read carefully before using the inverter for the best use.

eperate Sec

This instructions could be attached with the inverter unit to final users.

- 2-Chiapath cavac Sugary
- 2.4 Operating Function
- The state of the s
 - van eli ZeA
- 97 Instrument Signal
- adiabato (Condition & Condition

그녀는 이렇게 그리는 그 나를 보다면

- restaO ni-White INS
- 3-0 ferioses Totan
- dell'arcia Option require aven energement at the travelle Usin

SECTION A PERSONAL OF LORGE TOTAL A STRONG

- ecipenco Coloradigionità di la
 - spoliability A. S-A.

MONTA SATEM B YOURSE

LARREY & MANUER

- La Star Oustan
- as mgaRi Lainnean at att RapumbaR RAD
- where religious is a substituted by the particular of the same profit is a substitution of the
- ciscosti galditi petrifi vis ne vessetturo munisett galerija un respect ja crimosi. Es

>^*ITENITO

Figure you for processing the Tochiba general execute imarker. This guide describes the

ssaubsour, congressiere bed helpsage

SECTION 1 INITIAL INSPECTION/STORAGE

- 1-1 Inspection Upon Purchase salt set schevel out gate, scolled vitalismo been of blipod fi
- 1-2 Storage

SECTION 2 STANDARD SPECIFICATION

- 2-1 Rated Type-Form
- 2-2 Input Power Supply
- 2-3 Control Specification
- 2-4 Operating Function
- 2-5 Protecting Function
- 2-6 Display
- 2-7 Instrument Signals
- 2-8 Ambient Condition

SECTION 3 OPTIONS

- 3-1 Built-In Option
- 3-2 External Option
- 3-3 External Option required some arrangement of the Inverter Unit

SECTION 4 PRINCIPLES OF OPERATION/APPLICATIONS

- 4-1 Principles of Operation
- 4-2 Applications

SECTION 5 INSTALLATION

SECTION 6 WIRING

- 6-1 Wiring Cautions
- 6-2 Standard Connection Diagram
- 6-3 Standard Wire Size and Main Circuit Equipments Selection Table
- 6-4 Location of Terminals, Adjusting Resistors and Display on the Printed Wiring Boards

SECTION 7 OPERATION AND CONNECTION EXAMPLES

- 7-1 Connection of Frequency Reference Signal
- 7-2 Connection of Frequency Meter and Ammeter
- 7-3 Connection of Operation Signal (Forward, Reverse)
- 7-4 Switching between Commercial Power Source and Inverter Output
- 7-5 Parallel Motor Operation
- 7-6 Using Brake with Motor
- 7-7 Additional Motor Operation
- 7-8 Switching Method between Motors, again the religious party of th

#####SECTION"8 #OPERATION AT DESERBATION AT DESERBATION OF PLANT PROPERTY OF THE HEART PROPERTY SHALL MEET ALL

- 8-1 Pre-operation Check Off
 - 8-2 Pre-operation Adjustments
 - 8-3 Operation Procedure of Aprel 2010 recognition per the Light Park of ACM to the street of the control of t
 - 8-4 Frequency and Fault Indicator assemble groups are assessed assembles asset

SECTION 9 ADJUSTMENTS

- 9-1 Variable Resistors
- 9-2 Jumper Connection

SECTION 10 MAINTENANCE

SECTION 11 FAULT DETECTION AND REPAIR

- 11-1 Fault Detection
- 11-2 Parts Replacement and Precautions
- 11-3 Troubleshooting
- 11-4 Spare Parts

SECTION 12 OUTLINE VIEW

research and considered by the character of feed consens are now.

SECTION 1

INITIAL INSPECTION/STORAGE

1-1 Inspection Upon Purchase

intermal development of the are any problems, please contact your dealer.

- (1) Check for damages during transportation.
- (2) Check for the rated kVA capacity inscribed on the name plate and ordered kVA.

1-2 Storage

Following remarks are required to storage the inverter unit for long term.

- (1) The inverter unit should be kept in clean dry location free from temperature extremes, humidity corrosive gas, dust and metal particles.
- (2) The test working once a half year should be recommended to reconfirm the inverter operation and maintain the filter capacitors quality, because the characteristic of electrolytic capacitors used as main circuit DC bus filter becomes worse without electricity for long term.
- (3) Some unit's PWB are protected from electrostatic stress by the conductive cover sheet.

 Please don't take it away in storaging. Please remove it at working only.
- *** Be sure charge light is out before touching any component.

SECTION 2

对数据基础的

grafiulas Landoperii

Pativad Howers

Pauli davo kas

STANDARD SPECIFICATION

The standard specifications are shown in Table.

If there are any special specifications with your order, they will be described separately.

for Might Olean asy i particularly appropriate the letterature

2-1 Rated Type-Form

Type-form	Rated Capacity	Rated output	Maximum Motor *	
	(kVA)	current (A)	kW	in the
VT130G1-4150KU2	150	206	110	150
VT130G1-4200KU2	200	275	150	200

0.6 Juli 60Mb I MM crucatorii

Note *1 Examples of applicable motors of max. capacity (4-pole)

2-2 Input Power Supply the second of the second sec

There are three types of rated voltages in 400 volt inverter series.

Please confirm the voltage rating or your inverter unit and then refer to this instructions.

Preferencia en al la priza bretto so nelo gerarere? 🖟

Subserve AS CAV CAS annual Julian Subserve

nerawah Barba Asamander Maresto Di Wali

2 * 4 - 300 - 300	and the second of the second o	The state of the s	ALL RESERVED TO STATE AND ADMINISTRAL TO A CONTROL OF A C
Item		Contents	SHEME THERE
Voltage	Type 1	Type 1 Type 2	
Frequency	3 <i>φ</i> -400V-50Hz 3 <i>φ</i> -400/440V-60Hz	3 <i>∲</i> -460V-60Hz	3 <i>φ</i> -380/415 V -50Hz
Allowable variation	Voltaς	ge ±10% Frequency	±2Hz

— 5 **—**

2-3 Control Specification

ltem	Contents
Control system	Sinusoidal wave PWM control
Output voltage	Output voltage is in proportion to input voltage
Output Frequency	0.5 to 80Hz (1 to 160Hz)
Frequency acturacy	±0.5% of maximum frequency (at 25°C ±10°C)
Voltage / Frequency ratio	0.5 to 60Hz: V/F constant 60 to 80Hz: V constant
Overload capacity	120% for 60 seconds 100% continuous
Speed Reference	DC 0 to 12V / 4 to 20mA (Changeable)
	· · · · · · · · · · · · · · · · · · ·

2-4 Operating Functions

Item	Contents	
Acceleration/Deceleration Time	1 to 20 seconds (acceleration and deceleration individually adjustable) SERECT "X6" by J13 6 to 120 seconds	
Braking		
Starting C	By dry contact (hold) with the profit of the desired many content to the ex-	
Forward , Reverse	Reversing can be added using limits are adjustable	
Upper and Lower speed limits	Upper and lower speed setting limits are adjustable	

2-5 Protecting Functions

3 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2	Bright and The Control of the Control of			
Item	and the second of the second o	Contents	800 4 <u>2</u> 4 10 7	1
Protedtion	Stall prevention, overcurred undervoltage protection, managed (about 15ms), and fuse pro-	omentary power fa	ailure protection	
Fault detection	Fault relay form-C contact The relay will engage who overvoltage, or undervoltage (Reset manually or remote	en overcurrent, ove ge is detected.	erheat,	

Note) When automatic restart option is provided, undervoltage doesn't work.

Item	Contents
	Frequency display 3 digit 7 Segment LED Fault display Same LED as frequency display
	Fault display Same LED as frequency display
]	Over current October 1 and the second of the second
LED display	Over voltage "OP" Unstable (under) voltage "UP"
De islondynatica	DBR over heat
Paris and The seems of	Main circuit condencer charge display

2-7 Instrument, Signals in Aug 2 m hards to be a leaded a several and interpretable at North America 18

Item	Contents	naka wita er dege
Frequency meter output	and the control of th	
	DC 1mA full scale	

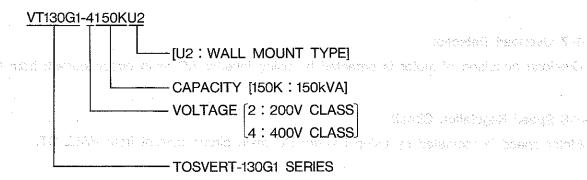
2-8 Ambient Conditions

ltem	Contents
Location	Indoor
Ambient Temperature	_10°C~50°C
Relative Humidity	Less than 90% non condensing
Vibration	Less than 0.5G
i per mineram di bada	karantan merego yan oras bidipenda yang berain balan ingan berain

Brails theography disposed that the

Condense Processo Tea D

2-9 Explained type-form



SECTION 3

market and expended to

OPTIONS

3-1 Built-in Option

3-1-1 Speed Feedback Control

For applications requiring extremely accurate speed regulation which take into account motor ship, motor speed is regulated by a speed feedback signal from a tachometer.

Tachometer is not furnished in this option and should be a single phase, 24P, 1800RPM, 25 Volt type.

3-1-2 SF Control

SF control circuit is designed to achieve torque correction. =Speed response is improved.

3-1-3 PI Control

For applications requiring flow rate control or head pressure control for pump, fan and blower, optimum control is done in accordance with process signal (1~5V DC or 4~20mA DC) from process value detector.

3-1-4 Automatic Restart Circuit

Automatic restart circuit is available for switching system between inverter and commercial power. Motor is restarted automatically.

3-1-5 Low Speed Detection and Accelerating Condition Output Signal

Output signal of low speed is obtained.

Output signal of accelerating condition and low speed condition is obtained.

3-1-6 Jogging/Inching Control

To meet the requirement for jogging/inching control, this circuit is available.

3-1-7 Overload Detection

Overload condition of motor is detected by using inverter AC main circuit current from CT.

3-1-8 Speed Regulation Circuit

Motor speed is regulated by using inverter DC main circuit current from HALL CT.

3-2 External Option

3-2-1 Remote Operation Box

Standard remote operation box contains an analog frequency meter, frequency setting variable resistor and run/stop switch. I be finally read event associated as the motion contains an analog frequency meter, frequency setting variable resistor and run/stop switch.

actorii crif fo brode eri, releav Lirib C.A. (PACMA) betalerrie e seekrola erisb sotora

the personal acommissions with resident physical engages in requirements.

A MOSTOSIS

To meet the requirement for power factor improvement, harmonics reduction and external surge reduction, this reactor is available.

action throughout the equation of the discount throughout will be well exist animal 3-2-3 Operation Parts

Analog frequency Analog frequency meter is available for monitoring the output

Frquency setting Frequency setting variable resistor is available for remote control of variable resistor output frequency

Knob for frequency For frequency setting variable resistor

setting variable resistor

3-3 External Options required some arrangement of the Inverter Unit.

3-3-1 Ground Fault Detection

Earth leakage current is detected by using ZCT.

3-3-2 Output Voltage Control

Output voltage control is available for output voltage correction. Motor terminal voltage is regulated by voltage reference and inverter output voltage.

CAMAC States Mildta Medicioned) investes circungs the incoming power or Delicard man make pulses

ad to actividad acreas a event to state? The endown to state are said and an end of the

SECTION 4

anlığı basını 6-8

amelent eldersk

TO SERVEY

PRINCIPLES OF OPERATION / APPLICATIONS

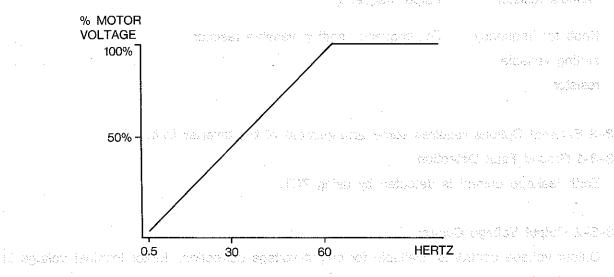
esc4-1 Principles of Operation in your expect goodes has a meteod and application as an expect.

Most A. C. induction motors in the past have been limited to fixed speeds. The Toshiba motor drive provides a simulated (P.W.M.) A.C. that varies the speed of the motor.

Toshiba's giant transistor (G-TR) is used with a microprocessor controlled regulator to accomplish agusa the conversion. Postora aprentavali jaga arcangali talush semba ku arcangalupan mit taba a f

Motor speed ratings usually show the motor base speed at 60Hz operation. Slower speeds (below base speed) are produced by reducing both the voltage and the frequency of the output. Paralog beginning netar it are thinks for each taken that our

Figure 4-1 shows the voltage varying with the frequency until base speed (60Hz) is reached. Above base speed, the voltage remains constant.



reunification **Fig. n.4-1**198 and form through and leading the first that

P.W.M. (Pulse Width Modulated) inverters change the incoming power to D.C. and then pulse the D.C. into the motor leads to simulate A.C. Figure 4-2 shows a representation of the Toshiba output voltage waveform.

An A.C. waveform is super-imposed on the pulse wave for illustration.

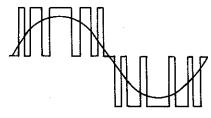
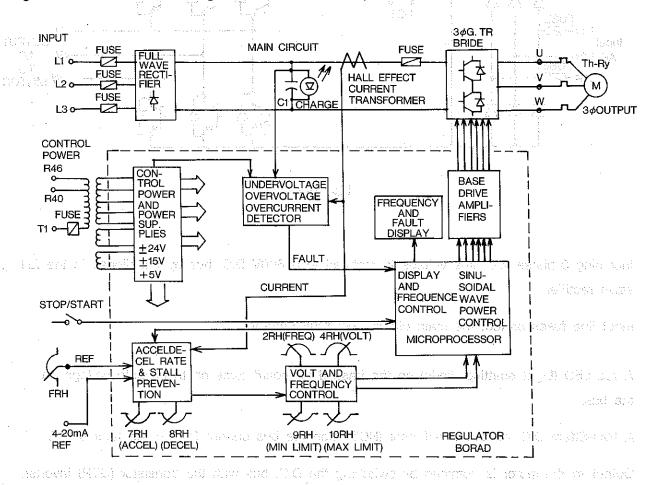


Fig. 4-2

Figure 4-3 is divided into two parts; the MAIN CIRCUIT which handles the input and output power, the REGULATOR BOARD which senses input information to direct the power transistor (GTR).

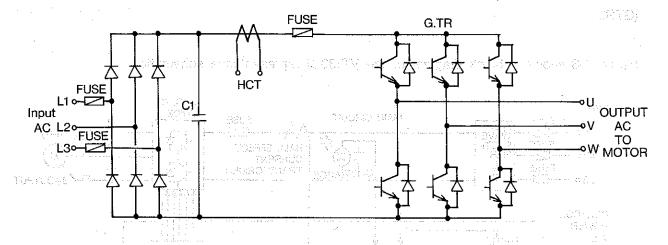
Figure 4-3 shows a block diagram of the VT130Gl representative schematic.



.chadagan Besa nd mpychil pri Fig. 4-3

Barros remalagas pro rel metranor di paprelesest edi la jellingaret

As Main Circuit pale seate as loose excluse the CASO vilvous as a composed that is a policy of the sea uffi-



nordanias tawog oris toralin di partici didili terdi asalas militar GRACE, POMADURAS esti jawag

Fig. 4-4

Incoming 3 phase A.C. line voltage is rectified to a 600V D.C. bus by the diodes in the full wave rectifier.

Input line fuses protect the main circuit from fault currents.

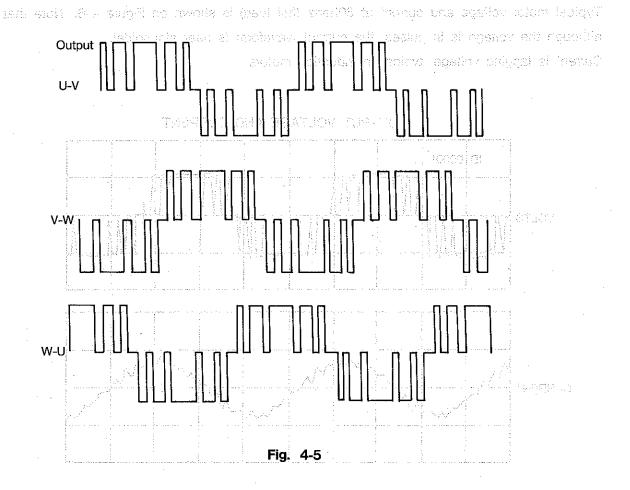
A red LED (Light emitting diode) on the base drive board turns on to indicate voltage on the bus.

A Hall-Effect D.C. current transformer (HCT) monitors bus current for the regulator board.

Output to the motor is obtained by switching the D.C. bus with the transistor (GTR) inverter. G-TR control comes from the regulator board through the base amplifiers.

Switching of the transistors is controlled by the regulator board.

Output waveforms are illustrated in Figure 4-5db about sugary searched mids passing table and mid-



9-3 514

Proper 120° phase shift between output leads stays constant over the entire frequency range. Typical motor voltage and current at 60hertz (full load) is shown on Figure 4-6. Note that although the voltage is in pulses, the current waveform is near sinusoidal. Current is lagging voltage, typical in induction motors.

基的 新启知 **"**"

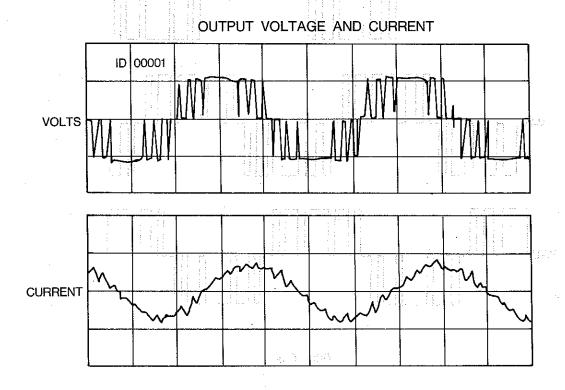


Fig. 4-6

The regulator board accepts operator information and outputs base signals to control the G-TR's. Refer to the wiring diagrams pages 20 for the following descriptions.

bremsvietë R-k

The operator speed pot. (frequency setting signal) is connected to CRF, REF, and OV, 0 to 12V DC at REF, controls full range output of the inverter patterns at a smile of the seventer.

A 4 to 20mA signal can be connected at IRF and OV. A contact opening the CRF wire of the speed pot. will automatically switch to this current reference.

ST (start), F (forward), and R (reverse) connected to COM controls the start/stop function and direction of inverter output.

Fault relay (contats at FLA, FLB, and FLC) latches on if a fault occurs. Pressing the reset button or remotely resetting will reset the relay. (Remote reset use term. RST to COM)

A low speed relay may be used to detect inverter speed below 0.5 Hz. (option)

Factory adjustment provides 0.5 to 80Hz operation. Moving jumper J3 from the 60Hz to the 50Hz position automatically changes maximum output to 67Hz. Frequency range is adjustable from 0.5Hz to 80Hz with 1F jumpere at J2.

Jumping 2F at J2 raises output frequency to 160Hz. Note that adjustments or changes in output frequency may require readjustment of remote frequency meter and V/Hz.

The current detector monitors bus current from the HCT.If bus current rises to 120%, stall prevention circuitry phases. 150% current shuts the G-TR base drive off until current decreases. 180% current turns base drive off and latches the fault relay and OC overcurrent display.

Bus voltage is monitored on the base drive board. Fast deceleration rates can cause the bus voltage to rise when absorbing energy from the motor. At 800V, the inverter shuts down to protect filter capacitors C1 and G-TRs from damage and latches fault relay and OV display.

The microprocessor (CPU) develops base signals which are isolated and amplified by the base driver circuit. Transformer T1 provides isolated low voltage A.C. which is rectified and filtered for the base driver amplifiers.

sui neu enem lage empe e vielen e reconsigna a mora por unita comunitation de la comunita

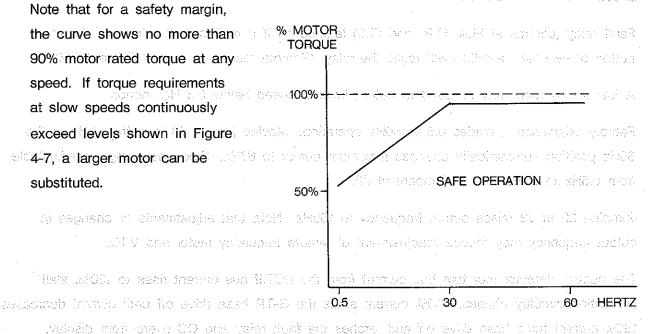
4-2 Applications

VT 130GI provides a high quality output voltage and current, but it is not a perfect sine wave. Therefore some increase in motor temperature, noise, and vibration may be noticed.

Special considerations must be taken when applying an inverter to an existing motor. At slower speeds, cooling is not effective due to reduced fan RPM. FULLLOAD torque at slow speeds may damage the motor due to overheating. In situations where the load requires high torque at slow speeds, the motor may require replacement with a large frame size for heat dissipation.

Figure 4-7 shows a curve plotting acceptable torque vs. speed.

Note that for a safety margin, 90% motor rated torque at any speed. If torque requirements at slow speeds continuously exceed levels shown in Figure polycles and stone allow 6/4-7, a larger motor can be substituted.



보고를 만든 생활성들은

Fixed speed machinery may not run properly at available speed ranges. Operation above 60 Hz may damage bearings or rotating parts. Slow speeds may provide insufficient lubrication on oil filled gear boxes or speed reducers. Manufacturer specifications may need to be consulted.

ead est eaunt aus arter notier-decad (coll traind avid need off an bernaum et eagtis, end

nawa na matana ikabusa matana mata

The above precautions should be looked at carefully to prevent any problems. It is most often the case, however, that the motor or motors on a variable speed application can be directly applied to the VT130GI.

SECTION: 5

프롭다 내 개기

INSTALLATION

The following instructions show the installation method. This inverter unitgrequires vertical: (a) installation is said said background to eggs? Interpreted addressed background of appears of eggs?

- 1. The ambient temperature must be between -10°C and 50°C (18 to 122 degrees Farenheit).

 If the inverter is installed inside a self-contained panel or a large control panel, there must be proper ventilation to keep the temperature between -10°C and 50°C. (-10°C and 40°C when equipped with cover) of the cover of the
- 2. It is necessary for proper inverter operation to avoid high temperatures, humidity, dust, or metal particles.
- 3. Corrosive gas and/or liquids must be avoided.

suchcermon lenkrist augler ent le

- - 5. On magnetic contactors, cooling fans and flourescent lamps turn off or turn on, large voltage surge occurs.

Then sometimes the electronic circuits are failed and the large voltage surge prevents normal operation for inverter. So please attach the surge suppressor at above equipment.

Recommended surge suppressor: MARCON ELECTRONICS CO., LTD.

Type-Form: DCR2-22A25

Rating: 200 Ω, 0.22uF

When the inverter is installed near the circuits which generate large electromagnetic noise such as the direct on line starting circuits, the failure of the electronic circuits on the printed circuit boards sometime prevents normal operation for inverter.

s feedily, colleges exercit marked of a startif

In this case please attach the surge suppressor at the motor driven by line power to reduce address. The part to the property of the part of the generated noise.

Recommended surge suppressor: OKAYA ELECTRIC IND. CO., LTD.

Type-Form: 3CRE-50500

along has believen and legi Rating : $50\,\Omega_{\star}$ 0.5uF subplocking by the relativistic and below the section

SECTION 6

WIRING

6-1). Wiring Cautions from the installation reliable the average of the secure of the content of

Refer to Page 20, Standard Connection Diagram, Page 21, Standard Wire Size and Main and Circuit Equipments Selection Table and use the following instructions.

- 1: Be careful not to apply commercial voltage to output terminals (U, V, or W). This will a common the unit. O 06 bas 0 11 perwind assembles and peak of notations regard on
 - 2. A surge suppressor must be connected across the excitation coil of the electromagnetic contactor (MC) when used. Recommended surge suppressor: MARCON Electronics DCR2-22A25 (or RC type, 0.22uf-250V, 220Ω-1/2W).
 - 3. Grounding wire size at terminal E must be 3.5mm² or greater (#10 AWG).
 - 4. Match the power supply voltage to the control power input terminals.
 - 5. Use shielded, twisted wires for external connections of speed reference signals (CRF, REF, IRF, OV) and also remote meter signals (FM, CM, OV).
 - 6. Use a DC 1 mA meter for frequency and current meter. A 20 k ohms variable resistorals become edd for the ammeter scale calibration and see adaptic carothesis will are adamous and a
 - 7. Connect either F(forward) or R(reverse) terminal to ST terminal through the START/STOP switch. If there are two input signals from both F and R, F (forward) command will override the reverse. The DRIVE-SW (START-STOP) on the operation panel is connected to F (forward), therefore to perform reverse operation without switching, two of the output terminal connections (U, V, and W) must be interchanged. If F (forward) or R (reverse) is to be controlled externally, switch the DRIVE-SW lead on the operation panel between F (forwarde) and R (reverse).

ani vi periti sotor eti is maa mene kokek eri jurite kakee kake

COROR EDITOR LINGUE GALT

8. The 4 to 20mA current input signal is not isolated in the inverter control circuit. Toshiba recommends that signal common not be grounded since noise problems may result.

Requirements

Unless supplied in a special optional enclosure, the VT-130G1 should be installed in an area where:

- 1. Cabinet mounting is upright leaving room for door clearance.
- 2. Ambient atmosphere is free of dust, corrosive gases, high moisture content and temperature extremes.

ariod ochva**v**avora

. Ce fig. STOPHA II, STAIN SA E. TIE FISHA

enegation of the contract of the con-

3. Vibration is kept to a minimum.

(4681 PS

4. Unit should be easily accessible for maintenance and troubleshooting.

Procedures

Each VT130G1 is shipped with wiring diagrams that show necessary inter-connections. page 21 shows diagram that would be received with the standard unit.

Terminal numbers in the standard units are shown clearly in wiring diagrams. Terminal strips are mounted at a convenient angle for easy access.

VERNER HARLATE

Read the following precautions before installing the inverter:

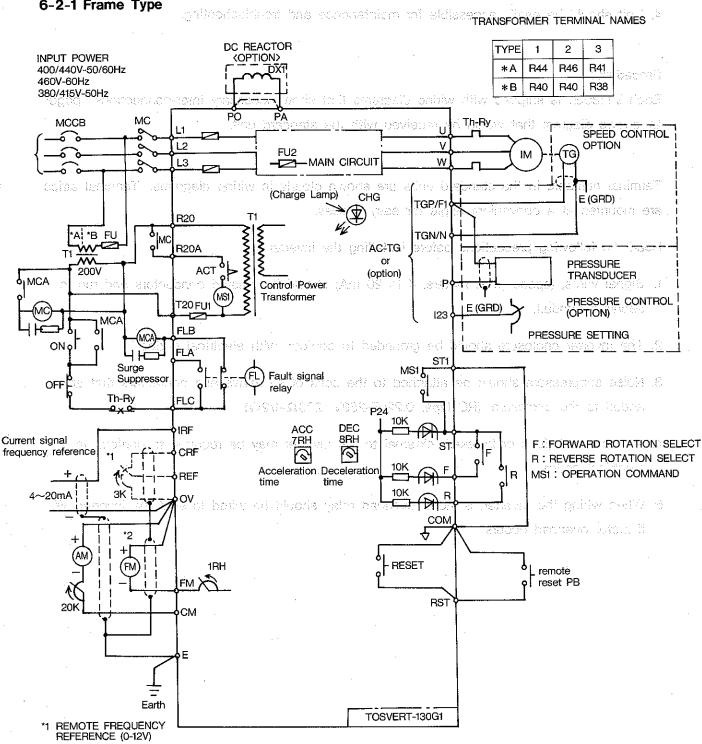
- 1. Signal wires, (speed pots, meters, 4 to 20 mA) should be twisted conductors and run in separate conduit.
- 2. The inverter enclosure should be grounded to conform with electrical codes.
- 3. Noise suppressors should be attached to the coils of all relays and contactors that are added to the enclosure. (RC type, 0.22uF-250V, $220\Omega-1/2W$)
- 4. A disconnect (fuse or breaker), external to the inverter may be required to conform to electrical codes.
 - 5. When wiring the inverter, a motor overload relay should be wired to shut the inverter off if motor overload occurs.

MARAND MODUSTON ON CHARTE 1998 TITEREST

prepare desemble and by consequent till till a control of 1900 8204 (control absorber

6-2 Standard Connection Diagram

6-2-1 Frame Type



*CONTACT CAPACITY OF FL RELAY IS AC250V-3A.

*2 REMOTE FREQUENCY

METER

Magnetic Contactor must be connected with MCA contact. If R20-R20A terminal shorten, the main circuit fuse might be blown at initial charge.

TOSVERT-130G1 STANDARD CONNECTION DIAGRAM

6-3 Standard Wire Size and Main Circuit Equipments Selection Table 1990 1990 1990 1990 1990

6-3-1 Standard Wire Size Unit (mm²)

Unit (mm²)

Type-Form	Type-Form Supply and Motor		Frequency Reference Frequency meter Ammeter	Other Signal Circuit	
VT130G1-4150KU2	80		Three core shielding		
VT130G1-4200KU2		Serio Residio medi Residio	wire (speed reference)	The second secon	
files O mist h particular registration	d di la di	2.0		0.75	
gerigeli (2004) Serelos actanos Corres El capa Serelos Serelos	Harris Sand Harris Sanda Sanda Harris Sanda Sanda Harris Sanda Sanda Sanda Sanda San	tector tector tentor tentor tentor tentor tentor tentor tentor tentor tentor tentor tentor tentor tentor tentor tentor	(meters) 0.3 mm2 or more		

6-3-2 Main Circuit Equipments Selection Table

\$ <u>.</u>	BES BEST	in hi	3 A A		
 Type-Form	Applicable Motor	Molded Circuit Breaker MCCB	Electro- magnetic Contactor MC1	Overload Relay Th-Ry	Auxiliary Relay RUN
	Output (kW)	Toshiba Model	Toshiba Model	Toshiba Model	Model
VT130G1-4150KU2	110 463 1640 1860	S400A-3P	C-250-300A	CT: 1A/300A +R-20-0.7A	FRL233N 200/4WE1
 VT130G1-4200KU2	150	S400A-3P 400A	G-250-300A	CT: 1A/400A +R-20-0.7A	(Fujitsu)

Formy Not asia only brookes 1-0-8

6-4 Location of Terminals, Adjusting Resister and Display on the Printed Wiring Boards See

(Aman) Frii			Property of the Sur Consults	and the second of the second o
Base drive	printed Wiring board	Here's newes fethed (Makk(nada) (Makk(nada)	Cleda Power Buoply end Mouer	· ·
	en de la companya de		200	
1	(secential busie) silv	(Base drive		CHARGE (本)
Main control prin	ted eavy problek in	⊃> ≯	⊃>̇́≷	(Main Circuit charge indicator)
	(Control voltage (Basic check frequer terminals) jumper	output (Output	ut frequency selection	J5 (Power discharge system selection jumper)
12RH	<u> </u>	: 60Hz 1f 2f 4f (Adj	usting istor) 2RH 3RH 4F	oll .
	1 1: 14: 45: (1): (6):11	X1 X6 (FM) (RO RO CO	GN) (AC-TG Feedback system selection
RESET		- 100 I		RH 9RH 10RH
	FLAP24V OH RST ST	9 8 (a) \$10 (10)	OV REF CRF IF	TGP TGN RF /FI /N P I23
TB (Land)	1000 80 100	1 70-4 00-4	7 (8	

6-4-2 Terminal Function

Terminal Symbol	Terminal Function
FLB	"Open" output is obtained between FLC during inverter fault.
FLA	"Close" output is obtained between FLC during inverter fault.
он	Overheat contact input. OH operation when connected to +24V. (Norinal "open" contact)
RST 555	Fault reset input. Fault reset when connected to COM. (Normal open contact.)
ST	Start preparation command input. Start preparation complete when ST is connected to COM, then start command complete when F or R is selected.
F	Forward operation signal input. Forward operation when connected to ST.
R	Reverse operation signal input. Reverse operation when connected to ST.
COM	Control circuit OV.
FM	Remote frequency meter terminal. Connect DC 1 mA meter between FM and OV.
СМ	Remote ammeter terminal. Connect DC 1 mA meter between CM and OV through the calibration resistor (20kΩ)
OV	Control circuit OV:
REF	Remote frequency reference (0-12V) input.
CRF	Power supply terminal to remote frequency setting device.
IRF	Current input (4 to 20mA) terminal. Connect 4 to 20mA signal between IRF and OV.
TGP/FI	
TGN/N	Terminal for optional signal input.
Р	reminarior optional signal input.
123	

T MONTORE

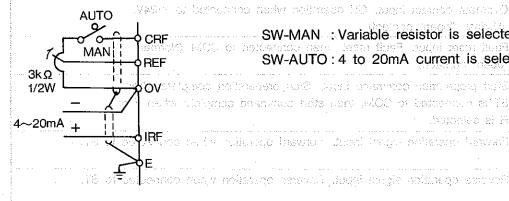
Call Colored as the vertable religion (that the Call Colored Section) setting decides

SECTION 7

OPERATION AND CONNECTION EXAMPLES

7-1 Connection of Frequency Reference Signal

7-1-1 Switching between Variable Resistor, and Current Input and a support to an in-



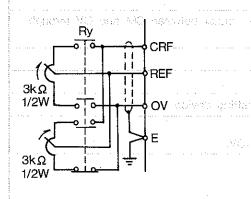
SW-MAN : Variable resistor is selected

nullius kad ilmavina ni depenti timbris invite targo-

SW-AUTO: 4 to 20mA current is selected

HOME, S

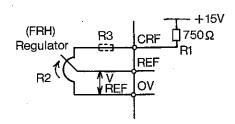
7-1-2 Switching between Two or More Variable Resistors



Two or more setting devices are adjusted to different frequencies and switched over.

Use small current rating relay for switching.

7-1-4 Selection of the variable resistor other than $3k\Omega$ for frequency setting device.



Quita Laborator C

KERNAY NOT STOLEN

SHIPS OF MAY B. G. Yonespett Light C

remean yet bedocker er mikitt derbyt () (skilk)

ski silavis ots

NAPA Crastilian at Sequence maker FM

A 750Ω affixed resistor is used as R1 in the inverter unit so that the REF value (VREF) is small between Q and 12V when regulator R2 is 3kΩ and the voltage (V_{REF}) is divided by R1 and R2. If the resistance value of the regulator is to be changed, a compensation resistor R3 is required. Obtain the compensation resistance R3 by substituting the value of the generator (R2) in the following equation.

$$V_{REF} = \frac{15V \times R2}{750\Omega + R2 + R3} = 12V$$

$$R_3 = \frac{3 \times R2 - 9000}{12} \left(\Omega\right)$$
 where $5 k\Omega > R2 > 3 k\Omega$

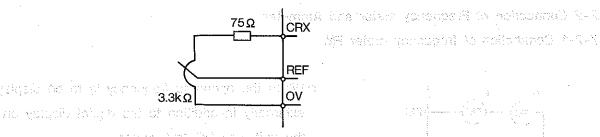
If a fixed resistor cannot be selected because R3 is not a round number, change R2 or use a variable resistor for R3.

Selection example

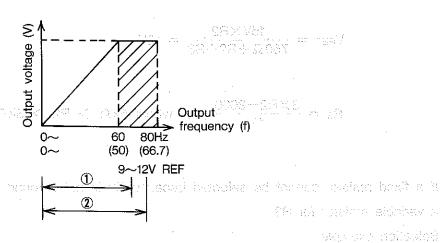
(f-1) When using a 5kΩ variable resistor

(f-2) When using a 3.3kΩ variable resistor

serval, 40 a critical services and are governously / o



Note: If the regulator is less than 3kΩ, REF voltage becomes less than 0 to 12V and the Assaurance maximum output frequency decreases. Therefore R3 must be greater/than 3kΩ. Assaurance However, if V/F characteristic between 9 and 12V (shaded area) is not required, as regulator between 1.2 and 3kΩ can be used.



Example

1 When 1.5kΩ

esu no SA komedo Lodin

VREF: 0 to 10V variable

Output frequency: 0 to 66.7 (55.6) Hz

2 When 2.5kΩ

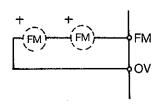
V_{REF}: 0 to 11.5 variable

Output frequency: 0 to 76.7(63.9) Hz

Note) (): When 50Hz is selected by jumper J3 for the basic output frequency, thes values are available

7-2 Connection of Frequency Meter and Ammeter

7-2-1 Connection of frequency meter FM



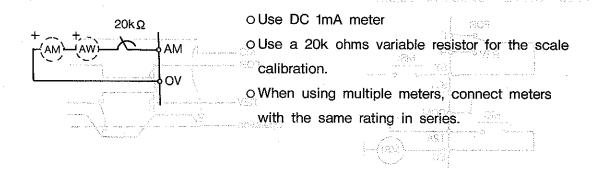
OWhen the operating frequency is to be displayed externally in addition to the digital display on the unit, use DC 1mA meter.

AMBHROTT

o When using multiple meters, connect meters with the same rating in series.

Reference operating to beits effections

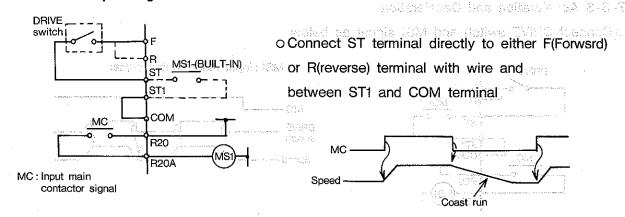
7-2-2 Connection of ammeter AM



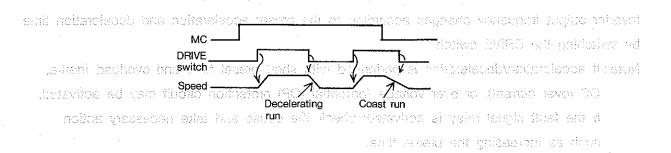
Moter if but I (Powerff and Rievarre) operating signals are connected at same time.

7-3 Connection of Operation Signals (Forward, Reverse) as all a basemage dissensive

7-3-1 When operating in one direction

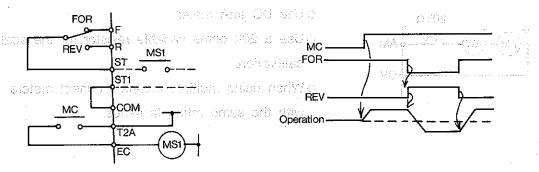


o Connect a DRIVE switch for stop operation in controlled deceleration.



7-3-2 When operating in both directions

o Use FOR-REV switch as below.



그로 보고 된 경험을 받는다.

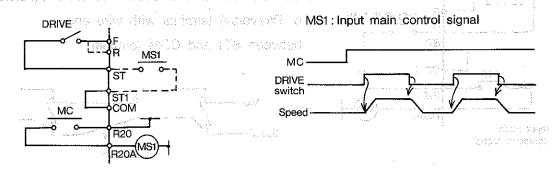
and the more to the property of San V

nethers's see of princeps purity (-9-1)

Note: If both F(forward) and R(reverse) operating signals are connected at same time, F(forward) command is in advantage. Second Second

7-3-3 Acceleration and Deceleration

o Connect DRIVE switch and MS1 signal as below



Inverter output frequency changes according to the preset acceleration and deceleration time by switching the DRIVE switch.

Note: If acceleration/deceleration is performed with short preset time and overload inertia, OC (over current), or over voltage /potential (OP) protection circuit may be activated. If the fault signal relay is activated, check the cause and take necessary action such as increasing the preset time.

7-5 Sarolle Major signification

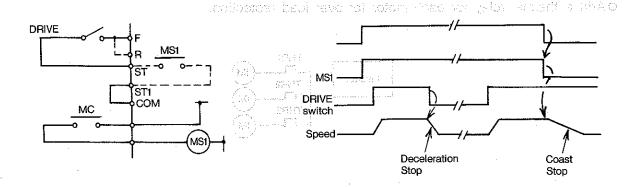
refold film when gains 5-7

sqli danni leb bani lodi rapir ravoq lovaso bosaso 3.0

Postevni arti lo scenero beden orli

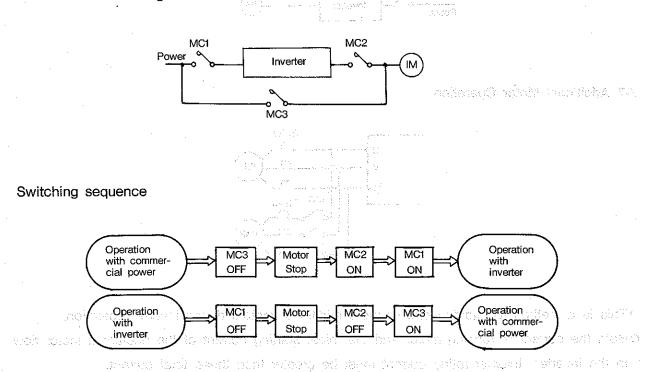
7-3-4 Motor coast stop and deceleration stop

baseCoast stop or deceleration stop is determined by the input signal to ST terminal.



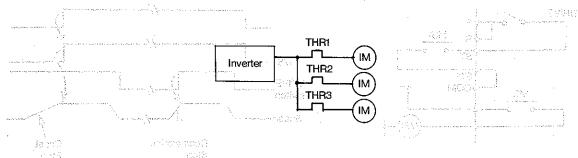
7-4 Switching between Commercial Power Source and Inverter Output and the extend policy

- o MC2 must be provided in order to prevent the transistors in the inverter unit from damages.
 - OMC2 and MC3 must be equipped with mechanical interlocking.
 - o Rrotection circuit may be activated when switching from commercial power to inverter while the motor is running.



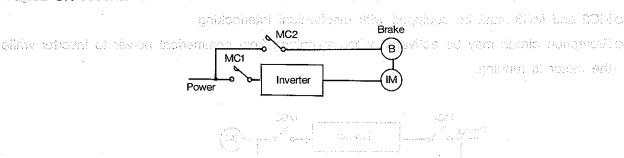
7-5 Parallel Motor Operation

- OThe total current of the motors (including transient current at start and stop) must not exceed the rated current of the inverter.
- OAdd a thermal relay for each motor for over load protection.

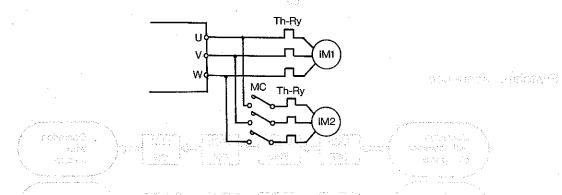


7-6 Using Brake with Motor

- OConnect brake power from the inverter input line.
- OUse brake with mechanical interlocking so that operation sequence is MC1 OFF first then
- ted**MC2:ON:second:** referrm ed) of workingst ed to one of rebo of belowed ed trans 50% o

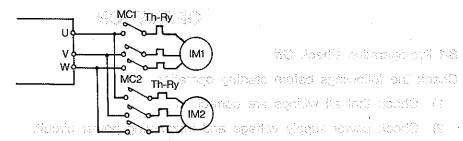


7-7 Additional Motor Operation



- OThis is a method for starting one or more additional motors during inverter operation.
- OBoth the current of running motor and the initial starting current of the additional motor flow in the inverter. Inverter rating current must be greater than these total current.
 - The over current protection circuit may be activated if the capacity of the inverter is not sufficient.
- OPlease contact your dealer when you want this operation.

7-8 Switching Method between Motors S MORES



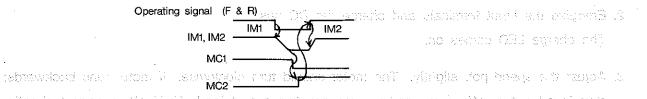
- Legador warren adi bi batuarren asa bisdiakat berarkerati uwang toanco sati doadD. G
 - 4) Cireck track there is no short-curallity

Artikoni ni ak barak ad biroje notradij

- diffet sis amusehon ons alvers terrimot telb AnodO (@
- OThis is the method for switching from an operating motor to a non-operating motor.

Switching procedure

Turn off the operating signal (F or R) and after the motor stops, turn off MC1, turn on MC2, and then turn on the operation signal.



Olf the switching is made before the motor stops, an overcurrent protection circuit may be activated.

municipa de galitres euscris politicas a capala acorda acorda de galitra de parte de la composición del composición de la composición de la composición de la composición del composición de la composición de la

Pala faventus oder beschoperation engine har her sett position in såko he engkap af høbuld**e krili**ght til Pala sentra flavende och eller i den besch

SECTION 8

法,就是基本法律管理

The September September Addition and the second

OPERATION

8-1 Pre-operation Check Off

Check the followings before starting operation.

- 1) Check that all wirings are correct.
- 2) Check power supply voltage and incomming power circuit.
- 3) Check that control power transformer terminals are connected to the correct voltages.

Office is the meanth' by evaciner, from as operating ability as sometimes that O

- 4) Check that there is no short-circuit.
- 5) Check that terminal screws and connectors are tight.

Initial Operation

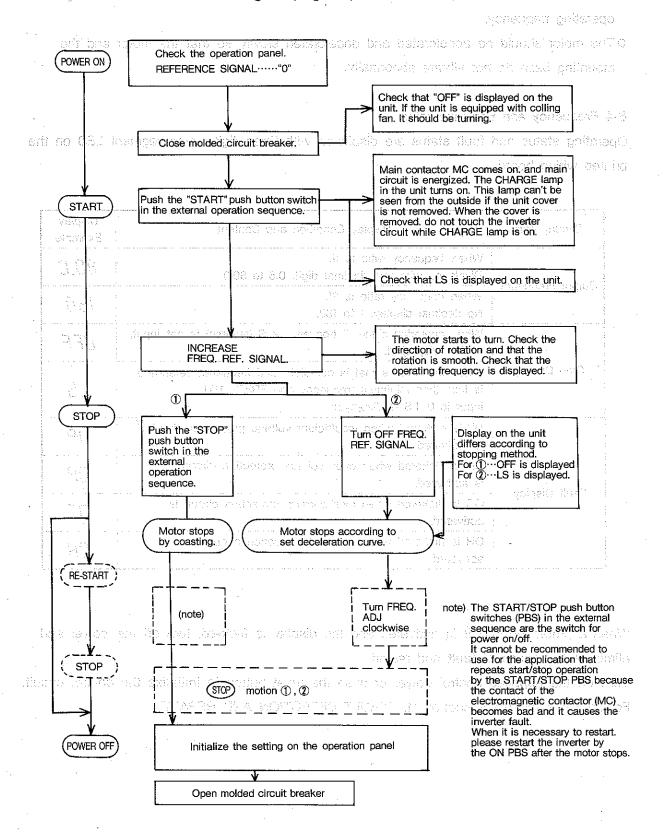
- 1. Initial conditions before power up:
 - a) Frequency pot. (speed adjustment) should be at minimum setting.
 - b) Forward/Reverse switch (if used) in forward position.
- Energize the input terminals and charge the DC bus.The charge LED comes on.
- 3. Adjust the speed pot. slightly. The motor should turn clockwise. If motor runs backwards: stop inverter, turn off power, and reverse any two output leads U, V, W to correct direction.
- 4. Forward/Reverse (if used) should be checked while motor is running. Forward command sw switchs to reverse, motor should stop, and turn to reverse direction. The final speed in reverse direction should be same as in forward.
- 5. Increase speed to maximum slowly, and check motor condition. Leave setting at maximum. Push the stop button. Motor should decelerate or coast without tripping inverter off. Push RUN button, motor should accelerate smoothly to maximum without tripping inverter. Motor current should be checked at several different speed.

8-2 Pre-operation Adjustments

This inverter can be adjusted according to usage and load. Refer to section 9 "ADJUSTMENTS" and make the proper adjustments.

8-3: Operation (Procedure) galicamos espasato (yennepsil decleo sebeval) yencepsil accuració o

Refer to the standard Connection Diagram (Page 20) and Perform the followings as a second connection of the standard Connection Diagram (Page 20) and Perform the followings as a second connection of the standard Connection Diagram (Page 20) and Perform the followings as a second connection of the standard Connection Diagram (Page 20) and Perform the followings as a second connection of the standard Connection Diagram (Page 20) and Perform the followings as a second connection of the standard Connection Diagram (Page 20) and Perform the followings as a second connection Diagram (Page 20) and Perform the followings as a second connection Diagram (Page 20) and Perform the followings as a second connection Diagram (Page 20) and Perform the followings as a second connection Diagram (Page 20) and Perform the followings as a second connection Diagram (Page 20) and Perform the followings as a second connection Diagram (Page 20) and Perform the followings are a second connection Diagram (Page 20) and Perform the followings are a second connection Diagram (Page 20) and Perform the followings are a second connection Diagram (Page 20) and Perform the followings are a second connection Diagram (Page 20) and Perform the Page 20) and Perform the followings are a second connection Diagram (Page 20) and Perform the Page 20) and Perform the Page 20) and Perform the Page 20 and Perform the Page



TOSHIBA

- Operating frequency (inverter output frequency) changes according to the preset acceleration time. The motor also accelerates and decelerates according to the operating frequency.
- OThe motor should be accelerated and decelerated slowly so that the motor and the mounting base do not vibrate abnormally.

8-4 Frequency and Fault Indicator

enteré para 50000 Selection de l'anco program de la 2005 personies

Operating status and fault status are displayed with three-digit seven-segment LED on the printed wiring board.

eu wijijigj <u>oodi</u> u. cast 808210 ed tast gast t	edi Bangebre di Leleti. Bili Januaria di Las Josefi	<u> </u>
. See a sector see	Condition and Content	Display Example
A. I. 18-21 18 11 200	When frequency ratio is 1f. Displayed with one decimal digit. 0.5 to 80.0	80.0
Output Frequency	When frequency ratio is 2f. No decimal display. 1 to 160.	150
estin sign (CD) der All entre hing	When operation signal F (forward) or R (reverse) is not input, OFF is displayed.	ÜFF
Stop Display	When operation signal is complete and frequency reference is less than minimum frequency and FREQ. ADJ. input is 0, LS is displayed.	<u>L</u> 5
gira est ess. En grasses es	UP is flickered when insufficient voltage protection circuit is activated.	UP
The second of th	OP is flickered when over voltage protection circuit is activated.	OP
Fault Display	OC is flickered when over current protection circuit is activated.	OC.
•	OH is flickered when overheat protection circuit is activated.	ОН

When a protection circuit is activated and the display is flickerd, turn off the power and eliminate the cause of fault and restart.

Turn off the supplied control power or push the reset button to initialize the control circuit. For details, refer to the section 11. "FAULT DETECTION AND REPAIR".

da adele geolecenta -- - 1955 albaid

nevod od no grima maled uznazujec ass nieli. 🖯

ADJUSTMENTS THIS TRIBET OF THE COURSE OF TH

9-1 Variable Resistors

censitie cora l'animation di l'anila socialità

The variable resistors are adjusted to specification at the factory and should not be touched unless necessary.

(Caution when adjusting)

- 1. Small-scale precision type variable resistors are used. Use a well insulated thin type minus screwdriver.
- 2. When the power is on, a high voltage is applied to the parts on the printed circuit board.

 Also after the power is turned off, the large capacitor is charged for about three (3) minutes.

 Do not touch any circuit while the CHARGE lamp is on.
- 3. A digital counter and an oscilloscope are necessary for readjustment. Do not ground the instruments when connecting and keep the input impedance of the instruments over 1M-ohm.
- 4. When monitoring the waveform with an oscilloscope, turn off the power before connecting (lesiwologic mail) and had an agailor require remaining the power of MSE esil it or disconnecting the probe.

 benisted at equivar tuchic magnissing lest on tables by the posterior of MSE esil is

Description of Variable Resistor (RH)

yonsi	RH No.	Symbol	Adjustment Function	When the RH is Turned Clockwise	Adjustment at Shipment	zmasi - Remarks a grafit
	1RH	FM	Remote frequency meter calibration	Sweep of the frequency meter increases	<u>्र</u> कृष्टिया —	r Riff) order griffre
	2RH	FRQ	Output frequency adjustment	Output frequency decreases	80Hz	
:	3RH	V-BS	Output voltage bias (Voltage boost)	Minimum output voltage increases	_	
	4RH	V-GN	Output voltage gain	V/F ratio decreases	100%	
	5RH	I-BS	Current input bias	Output V and F increase	0%	4mA input
	6RH	I-GN	Current input gain	Output gain decreases	100%	20mA input
sá i	7RH	ACC	Acceleration time adjustment	Acceleration time	about 120 sec (×6)	X1:1~about 20 sec X6:6~about 120 sec
	8RH	DEC	Deceleration time adjustment	Deceleration time decreases	about 120	X1:1~about 20 sec X6:6~about 120 sec
.//	9RH	UL	REF input upper limit	Limit value increases	80Hz	mwa pod Aurik o diti
	10RH	LL:	REF input lower limit	Limit value increases	OHz	Answer (1992)

Note: Do not touch variable resistors which are not described above



9-1-2-1 1RH ····· frequency meter Adjustment

If a remote frequency meter is used, it can be caribrated according to following procedure.

- 1) Make zero adjustment before turning on the power.
- 2) The meter will swing a little in the negative direction when the power is turned on.
- 3) Adjust the meter to the frequency shown on the digital display (Frequency/Fault) on the printed wiring board.



Zero adjustment

9-1-2 3RH, 4RH ····· V/F Ratio Adjustment

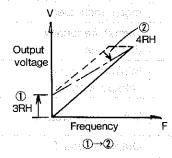
Envoid thruston oversion with no server, consistent (2) were Acrets and the color

Adjustment is required if there is insufficient torque to start the motor.

- 1) Use 3RH to increase the minimum output voltage at start time. (Turn clockwise.)
- 2) Use 4RH to change the V/F slope and adjust so that maximum output voltage is obtained at 50Hz or 60Hz. (Turn clockwise.)

The activation frequency (0.5Hz) of the motor is set between 35 mV and 75mV of frequency setting value (REF value).

no si qesi 888446 dë sën digave yar dikon be edi



9-1-2-3 5RH, 6RH ····· Adjustment of 4 to 20mA reference

Re-adjustment is necessary when the relation between 4-20mA and output frequency must be changed.

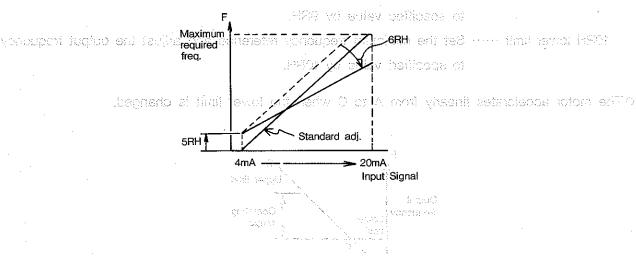
- 1) Switch off or disconnect the CRX terminal from the resistor for the frequency reference.

 Give 4mA between the terminal IRF-COM.
 - The frequency indication on the digital display is adjusted to required basic value by 5RH.
- 2) Give 20mA instead of 4mA. The frequency indication is adjusted to required top value by 6RH.

yonsujos tenbe sni isujok bas ecome

3) Above 4mA and 20mA adjustment should be done few times for accurate adjustment.

The resistor reference mode has no changing with above re-adjustment when CRF terminal larger extracted to reference resistor.



in yareyasi muniyar eli leb ---- lini seggu HAS

9-1-2-4 7RH, 8RH ····· Acceleration Time and Deceleration Time Adjustments

Adjust the time t1 to accelerate from 0 to maximum frequency by 7RH and time t2 to decelerate from maximum frequency to 0 by 8RH. Both can be adjusted from 1 to 20 seconds. O Readjustment of acceleration time (7RH)

If the load torque or load GD² is great and acceleration time is short, stall prevention accelerate the circuit dan be activated. The acceleration time is automatically increased to accelerate the motor without stalling. However, if the load condition is beyond the capacity of the stall prevention circuit, the motor may stall or the inverter may trip due to over current. In such case, the acceleration time must be increased. (Turn counter clock-wise.)

Readjustment of deceleration time (3RH)

If the deceleration time is short when the load torque or load GD² is large, the regenerative energy of the motor becomes large and capacitor voltage goes up. The over voltage protection circuit can be activated and the inverter may trip. In such case, increase the deceleration time. (Turn counter clockwise.)

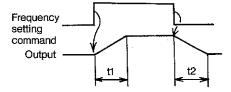
Olf the acceleration or deceleration time must be adjusted greater than 20 seconds, change J13 from one-time mode (×1) to six-times mode (×6).

The adjustable range is shown as below.

×1 ······ 1 to 20 seconds

×6 6 to 120 seconds

When you select either mode, ACC/DEC times are fixed to the selected mode.



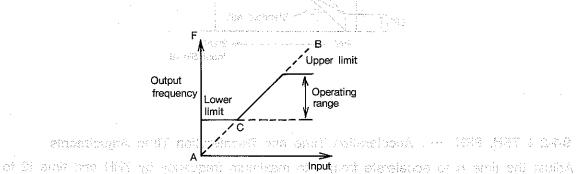
9-1-2-5 9RHp/10RHs/arco/Upper/and Lower/Limits Adjustments/au/bs/ Acids for Arch evoda (8

O Adjust with 9RH and 10RH when the upper and lower frequencies are to be limited sciented 180 and a manufacture of the external frequency reference signal.

9RH upper limit ······ Set the maximum frequency reference and adjust the output frequency to specified value by 9RH.

10RH lower limit Set the minimum frequency reference and adjust the output frequency to specified value by 10RH.

The motor accelerates linearly from A to C when the lower limit is changed.



Faceterals from medicular hequiling to 0 by 25%. Both our by orjudied from 1 to 20 accords. O Broadjustment of expeleration lient (484)

9-2 Jumper Connection sale and antisociacous have being at 1970 back to expect best additionally

Jumpers are connected to specification at factory shipment and should not be changed if not necessary. The locations of jumpers are shown on page 22. The function of each jumper is as following.

Capiar Audio principo una fiji Alexantrali sid bega leta i paderatorea sed issec

if the decalesation toward uncertainty and trappe of their little in more and community of the community and the energy of the mote, because have such community and the energy of the energialism of the energy of

ograsio allocados de está publica en el entre la la comisión de está de está de está de está la compositiva de está de

38

Carriera e de la companión de

N	lo.	Symbol on Circuit Board	Function	Connection at Shipment
J	J2	14 24	Ratio of output frequency can be changed. 2f ··· Output frequency is doubled.	galvalia _{ff} odl. Jedic
<u> </u>	waii	1 f. 2f 1989 - 1800 M. mytausa	spection he size to aper the lagar othersh	i gaimeding to o
		6 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0	Output frequency can be switch between 50Hz and 60Hz according to jumper selection.	o a cinulea arc by 1047 5H06 E kers becitos
J	113	© ° ° ° ° ° ° ° ° ° ° ° ° ° ° ° ° ° ° °	Acceleration/Deceleration time can be extended 200 and the standard is only approx. 1~ 20sec.	×6 v edi adi Xosifi

A, if the laws for rate are known from a form a form beauty from on the power or fresh purch arens

Note 1: Do not touch jumpers that are not described above.

Note 2: J2 and J3 jumpers

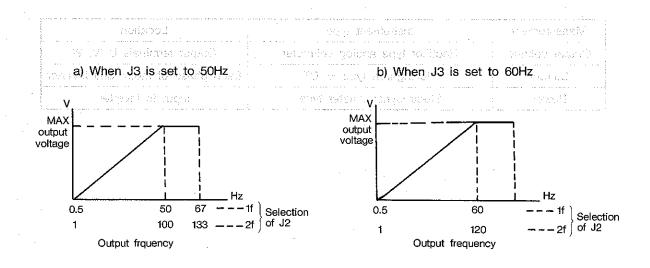
The V/F characteristic is as follows when J2 and J3 jumpers are switched.

Language VECC DG is title explicated house blow solinger and taggers mealing lypnession has

Levering with the secretary's orbital, that the Chekhode Listelians of this Last estimates and the listelians

easy tegto offs of the econocial elementation forces of work the grow elemental

Calcido (tara epatristi portir tipa est la necesión e discepte motificate tribility). El



SECTION 10

MAINTENANCE

Ratio of talent incomment that to oute

Check the following items monthly from at goals and facility in 18.

Before performing inspection, be sure to open the input circuit breaker (MCCB). Wait for at least 5 minutes, and check that the "CHARGE" lamp is "OFF" and then start inspection. The "CHARGE" lamp being "ON" indicates that the inverter unit is still energized by the main capacitor.

- 1. Check for loose wiring at terminals and damaged wires.
- 2. Check that the vents are not clogged by dust or debris.
- 3. Check that there is no dust on the printed wiring board and inside the unit.
- 4. If the inverter unit has been unused for a long period, turn on the power at least once every six months to check its operation. The protection against dust, corrosive gas, high temperature, and excessive humidity must be continued during any unused period. Periodic inspection is required.
- 5. Do not allow excessive vibration of the unit since damage may occur.
- 6. If necessary, perform megger test only for main circuit terminals with a DC 500V megger.

Note: Perform megger test with the terminals shorted. Do not test the terminals on the printed circuit board with a megger.

7. Measuring instruments

Instruments may not show the correct measurements because of the PWM output wave forms. Use the following instruments at the specified locations.

Measurement	Instrument type	Location
Output voltage	Rectifier type analog voltmeter	· Output terminals U, V, W
Current	Moving-iron type + CT	Each phase of motor and inverter
Power	Electrodynamometer type	Input to inverter

ONLY

FAULT DETECTION AND REPAIR Jodgenfreit des et ense Senand, begrand des et reflexions du traite.

11-1 Fault Detection of betweened of fault back gridly bylining will no leave to anomalize as

minus enil long s

The followings are the fault displays and corrective actions. Check the cause before taking corrective action. If the same fault occurs again after taking the corrective action, do not try to restart since inverter damage may result. Make sure the CHARGE damp is off when inspecting.

connected on the circuit board, remove the locking subject and then remove the writing

capitalsocy: beg frequencialist staff 2-3

Fault Display	Probable Cause	Action
nga son kojsenko	Inverter capacity does not match the motor rating	Increase inverter capacity Quarter distributions accommod
	Short-circuit or ground fault of motor circuit. Note 1	Remove the cause and repair
OC	Overload or sudden change in load	Decrease load
	Acceleration or deceleration time is too short	Readjust 7RH and 8RH
	Inverter fault	Repair
	Power supply voltage is too high	Remove the cause
OP	Deceleration time is too short	Readjust 8RH
Aggs Transcription Scatter on Engineering	V/F ratio incorrect	Readjust 3RH and 4RH
UP	Power supply voltage is too low	Remove the cause
	Regenerative discharge resistor overheat	Decrease load, readjust 8RH
OH .ss	Interior temperature of too high	Decrease ambient temperature
Main circuit	Fault in inverter. Main rectifier diode or	Repair so you eggl sys 250x3
fuse blown out	GTR may be damaged with seven seven and	nuarus land avadinum votobondou
Control circuit fuse blown out	Power supply fault in the inverter control circuit	Repair and arehova smort n

Note 1: In case of ground fault of the load, it may not be detected by the inverter and GTR may be damaged. "OC" is displayed upon retray.

Note 2: If the power supply voltage changes suddenly, the main circuit fuse may blow out. In this case, additional impedance can be added at the input power side to restrict the large charge current into the main circuit capacitor.

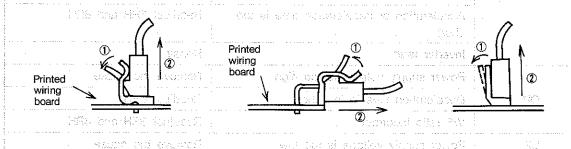
11-2 Parts Replacement and Precautions

- Before replacing parts, check that power is no supplied to the inverter and the main circuit capacitor is not charged (CHARGE lamp is not illuminated).
- 2. Replacement of parts on the printed wiring board must be performed by trained personnel.

 @Please contact your dealers and sension and training the performed by trained personnel.
- 3. Removing the printed wiring board of their strings in across field when their incides a disease.

connectors on the circuit board, remove the locking supports at four corners. Remove the board.

Removing connectors on the wiring circuit board
 Connectors are held with stoppers. Release the stopper and pull the connector out carefully.
 Do not pull on the wire.



To plug the connector back in, push it in place to lock with the stopper.

Excessive force may cause damage. Hold the print board and push gently. Also check the connector numbers and match the pins correctly.

romiza, enlositudo

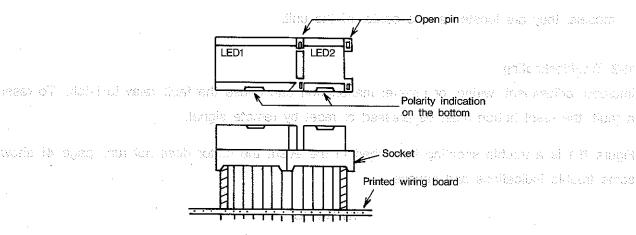
In some models the connector on the base drive circuit board is difficult to get at. In such case, remove the locking support and lift the circuit board so that the connector can be grasped easily before removing.

5. Replacing LED (7 segment indicator)

Philip to Robert Dear Servery 1

The LED indicator is plugged in a socket and can be easily replaced, but it should not be removed unless necessary.

If it must be replaced, refer to the following figure. The location and direction must be a concluded to the concluded the second and additional and the second and the sec

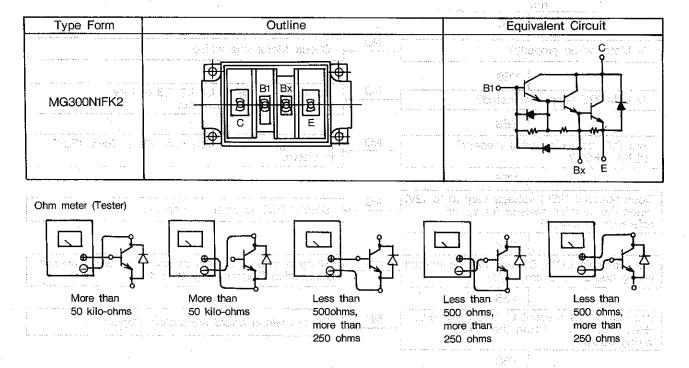


Training the control of the second of the second of the second of the period of the period of the second of the se

The connecting wires are not numbered. Therefore, when replacing, numbering the wires is suggested to prevent mis-connection.

Apply a silicone compound on the contact surface of G-TR cooling fins.

Typical types of silicone compound are as follows. Alcan by Alcan, Jointal S-200 by Nikkei Kako. The method of GTR checkout is shown below.



Note: Check the polarity of the meter internal battery at the chmmeter terminals, with polarity as shown. It is necessary to apply a thin coat of a heat-conductive silicone compound to the surface of the heat sink before attaching new G-TR.

7. Replacing fuserate bear notabled self. Is again estimated entired as an arrangement as an arrangement as a

Refer to section 12-OUTLINE VIEW and check the location of fuses FU1 and FU2. In some models, they are located at the center of the unit.

11-3 Troubleshooting

Improper adjustment, wiring, or inverter malfunction can cause the fault relay to latch. To reset a fault, the reset button must be pressed or reset by remote signal.

Figure 11-1 is a trouble shooting flow chart in the event the motor does not run. page 41 shows some trouble indications and causes.

WARNING

When troubleshooting with power on, care must be taken to avoid electric shock. Grounded test equipment may damage inverter. D. C. BUS voltage remains charged for several minutes after power is removed.

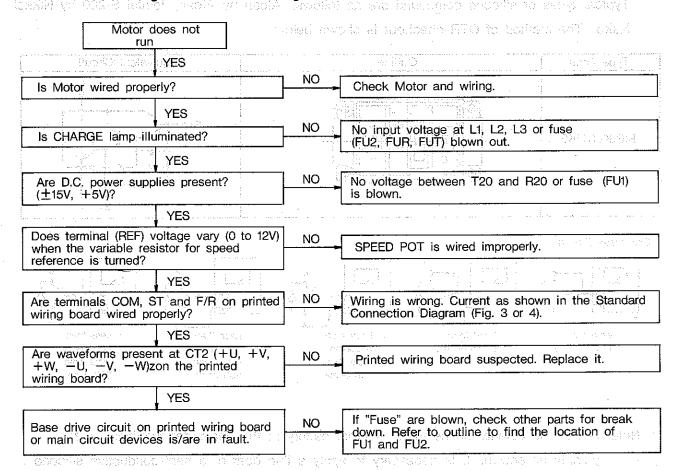


Fig. 11-1 Troubleshooting Flow Chart When Motor Does Not Run

	Programme and the company of the com	en the product revenue	
Test point Symbol	Function	Standard value or waveform	
CT1-N15	Control voltage -15V	d. c15 V	
CT1-P15	Control voltage +15V	d. c. +15V	
CT1-P5	Control voltage + 5V	d. c. + 5V	
CT1-0V	Control voltage 0V	OV COMMON	
CT2 +U +V		PWM signal for sinusoidal wave +5V	
+W	Base drive circuit		
_U V	input signals	0] [] [] [] [] [] [] [] [] []	
_w		$\pi \qquad \qquad 2\pi$	
***** REF ************************************	The output signal of accele- ration/deceleration circuit (Actual frequency reference)	The signal voltage varies from 0 to -12V when SPEED setting resistor is turned from 0 to maximum.	
V	The output signal of voltage control circuit	The signal voltage reaches +5V when the freq./volt. referenct (REF) goes up to the equivalent value of maximum motor voltage.	

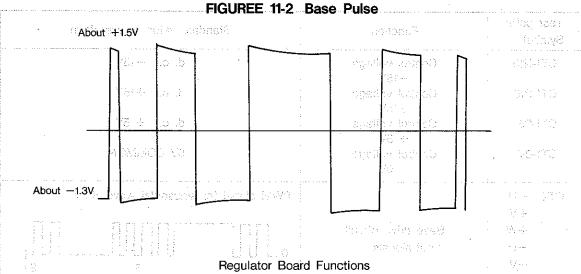
Checking the base amplifiers after G-TR replacement is a good practice:

100 yesia barasas abshirida

- 1. Remove voltage at L1, L2, L3 but keep control voltage.
- 2. Run the inverter and check base pulses with an oscilloscope. The ground lead of the scope should be connected to the emitter and the probe on the base. Connectors (CN41-4 to -6, CN61-1 to -2, CN21-6 to -8, CN11-1 to -2, CN31-1 to -2, CN51-1 to -2) on the driver Board provide access for measurement. Check all six base amplifier voltages. Figure 11-2 shows normal levels for proper operation.

cossiter further

...



AND LEVE STOR

		lator board i drictions
Test point symbol	e de la companya del companya de la companya del companya de la co	Waveform example
CT2 +U +V +W -U -V -W	i ilibut siuliai	PWM signal of sinusoidal wave distribution +5V +U~-W
		Waveform repeated every 60°
CM to COM	Current feedback rate	Approx. 5V (under 100% load)
76. 3 Sept. 1. 1. 1. 1. 1. 1. 1. 1. 1. 1. 1. 1. 1.	Voltage / frequency converter circuit output pulse	Pulse having a frequency 1152 times the inverter output frequency 5V 0
V	Voltage control circuit amplifier output voltage	Varies from 0 to 5V with speed setting resistor varied from 0 to maximum
CT1 P15	Control voltage +15V	d. c. voltage of +15V
CT1 N15	Control voltage —15V	d. c. voltage of -15V
CT1 P5	Control voltage +5V	d. c. voltage of +5V
CT1 0V	Control voltage 0V	0V Common

					AND
801.:	No.	BC Board Symbol	a set at Eunction et at at	Factory Connection	Remarks
	J2	Idea, le 16 des 17 19 26 1f 0 2f 0	1f: Output frequency 1f: Output frequency 1 2f: Output frequency 2		des6 collibrationes desector activitatio Note 1
	J3	50 60	60Hz: Maximum output frequency 80Hz 50Hz: Maximum output frequency 67Hz	60Hz (1) 60AZ (1) 60AC (1) 60AR 60AC (1) 60AR	Voltage increases up to maximum at 60Hz constant voltage from 60 to 80Hz
	J5	J5	BUS discharge control ON DECEL	Connected	Cut when Dynamic Brake Option used
		Name (Julius de la companya del companya del companya de la companya de	4880 (1885) 484 ()	

Note: Other Jumper connections are for factory use. Removing or changing may cause improper operation.

Note 1: If extended frequency ranges are required: A jumper at 2F will raise the maximum to 160Hz (or double the original frequency).

11-4 Spare Parts

It is recommended that the following parts be ordered with the inverter unit in order to reduce system downtime. Rank A signifies parts of relatively high necessity. Rank B signifies parts of relatively low necessity.

A Rank

HE KOREGOTE SORE	y Fu	Ses jagas mandas	al-Adal (G-TR
Inverter Type Form	Type Form	Used Q'ty	Type Form	Used Q'ty
VT130G1-4150KU2	URB31TTC400 URB31TTC500 PC1-5A	contract describes	MG300N1FK2	12
୍ତିଆ ଅଧିକଥିଲି । VT130G1-4200KU2	URB31TTC500 URB31TTC630 PC1-5A	2 1 1	GONG MG300N1FK2	18

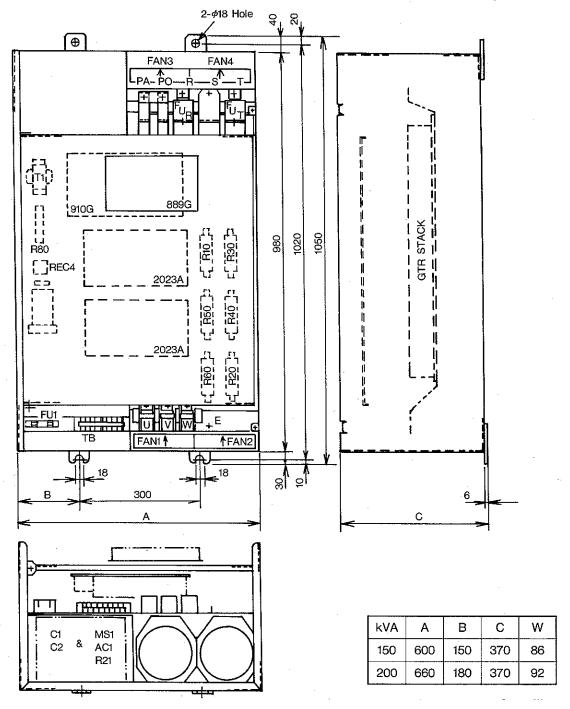
More i Joha III. Ja jest admiticitiona dia incimuly cak. Hameday or charging may ceuse language

	Condenser (M	Condenser (Main Circuit)		ring Board
Inverter Type Form	Ratings	Used Q'ty	Type Form	Used Q'ty
VT130G1-4150KU2		18	ARNI-889G	1
	400V-2700μF		- ARNI-910G	1

SECTION 12

UNIT OUTLINE

12-1 150kVA, 200kVA INVERTER UNIT (WALL-MOUNT TYPE)



APPROX, WEIGHT; W kg COLOR; MUNSELL 5Y 7/1

efes otomasyon toshiba