



TOE-C843-7-35D
INSTRUCTIONS

CNC SYSTEM FOR MACHINING CENTERS

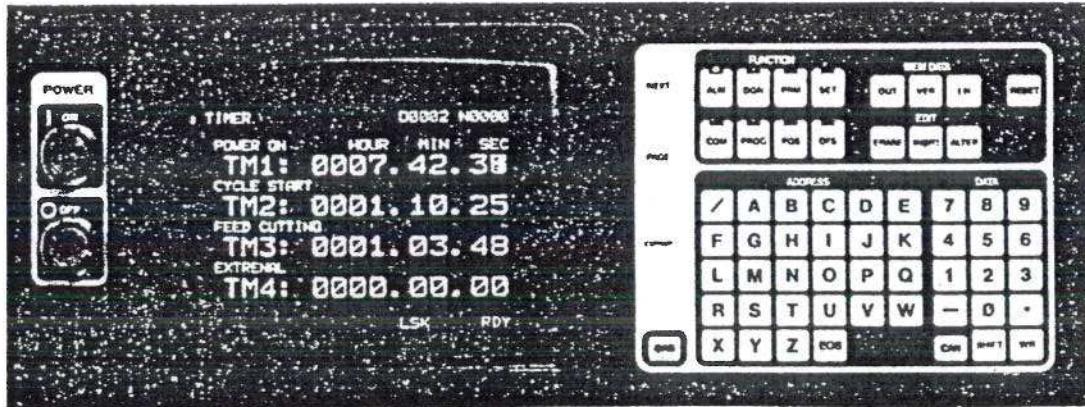
YASNAC® MX1

MAINTENANCE MANUAL

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

This manual is primarily intended to give operators instructions for YASNAC MX1 programming, operation and maintenance.

This manual applies to the basic and optional features of YASNAC MX1. The optional features are marked with a dagger. For the specifications of your YASNAC MX1, refer to the machine tool builder's manual.



YASNAC MX1 OPERATOR'S STATION

TABLE OF CONTENTS

1. GENERAL 3	2.4.2 DC Power Supply Voltage Check 45
1.1 COMPONENT ARRANGEMENT OF YASNAC CONTROL SYSTEM 3	2.5 STATUS DISPLAY BY ON-LINE DIAGNOSTICS FUNCTION (DCN) 46
1.2 BLOCK DIAGRAM OF YASNAC CONTROL SYSTEM 6	2.5.1 Outline Displays 46
1.3 MAINTENANCE INSTRUMENTS 7	2.5.2 Operating Procedure to Display Input/Output Signals 46
1.4 ROUTINE INSPECTION SCHEDULE 7	2.5.3 List of Standard Input/Output Signals 47
1.4.1 Tape Reader 8	
1.4.2 Control Panel 8	
1.4.3 Servomotor and DC Motor for Spindle 8	
1.4.4 Battery 9	
2. TROUBLESHOOTING 10	3. ADJUSTMENTS UPON INSTALLATION 55
2.1 TROUBLE ISOLATION 10	3.1 ADJUSTMENT PROCEDURES 55
2.1.1 Nature and Circumstances of Trouble 10	3.2 POWER TRANSFORMER CONNECTIONS 57
2.1.2 Operations and Programming Checks 10	3.2.1 Tape Changing on Control Transformer(1T) 57
2.1.3 NC Unit Check 12	3.3 DISPLAYING AND WRITING PARAMETERS 58
2.2 TROUBLESHOOTING BY ALARM CODES 12	3.3.1 Parameter Types 58
2.2.1 List of Alarm Codes 13	3.3.2 Parameter Data Display 58
2.2.2 Counteracting Alarms 24	3.3.3 Parameter Data Writing 58
2.3 TROUBLESHOOTING WITHOUT ALARM CODES 42	3.3.4 Tape Input of Setting Data and Parameter Data 59
2.4 SUPPLY VOLTAGE CHECK 44	3.3.5 Punching-Out of Setting Data and Parameter Data 59
2.4.1 Input Power Supply Voltage Check 44	3.3.6 Parameter Numbers and Their Contents 60
	APPENDIX STORED LEADSCREW ERROR COMPENSATION 76

INDEX

Subject

A Adjustment Procedures 55	O Operations and Programming Checks 10
ADJUSTMENTS UPON INSTALLATION 55	Outline of Displays 46
Alarm Codes, List of 13	
APPENDIX STORED LEADSCREW ERROR COMPENSATION 76	
B Battery 9	P Parameter Data Display 58
Block Diagram of Yasnac Control System 6	Parameter Data Writing 58
C Component Arrangement of Yasnac Control System 3	Parameter Numbers and Their Contents 60
Control Panel 8	Parameter Types 58
Counteracting, Alarms 24	PARAMETERS, DISPLAYING AND WRITING 58
D DC Power Supply Voltage Check 45	Power Transformer Connections 57
G GENERAL 3	R Routine Inspection Schedule 7
I Input Power Supply Voltage Check 44	S Servomotor and DC Motor for Spindle 8
M Maintenance Instruments 7	Setting Data and Parameter Data, Punching-Out of 59
N Nature and Circumstances of Trouble	Setting Data and Parameter Data, Tape Input of 59
NC Unit Check 10	Standard Input/Output Signals, List of 47
O Operating Procedure to Display Input/Output Signals 46	Status Display by On-Line Diagnostics Function (DCN) 46
	Supply Voltage Check 44
	T Tap Changing on Control Transformer (1T) 57
	Tape Reader 8
	Trouble Isolation 10
	TROUBLESHOOTING
	troubleshooting by alarm code 10
	Troubleshooting without Alarm Codes 42

1. GENERAL

The YASNAC MX1 is a high-performance CNC for simultaneously controlling 3 or 4 axes of a machining center, with emphasis placed on high-speed machining, unattended automatic operation, or feedback gauging control.

With the NC logic incorporating 16-bit microprocessors and various LSIs, the YASNAC MX1 incorporates a compact design with a wide range of capabilities. The memory comprises permanent, semi-permanent and programmable software storage used in combination to utilize each one to maximum advantage.

The data input-output interface has been expanded in concept, and, in addition to conventional interfaces such as FACIT4070 and RS 232C, RS422 is able to accommodate requirements for new modes of operations such as high-speed, long-distance data transmission.

The YASNAC can incorporate a programmable machine interface, and the logic diagram can be edited easily from the NC operator's station.

1.1 COMPONENT ARRANGEMENT OF YASNAC CONTROL SYSTEM

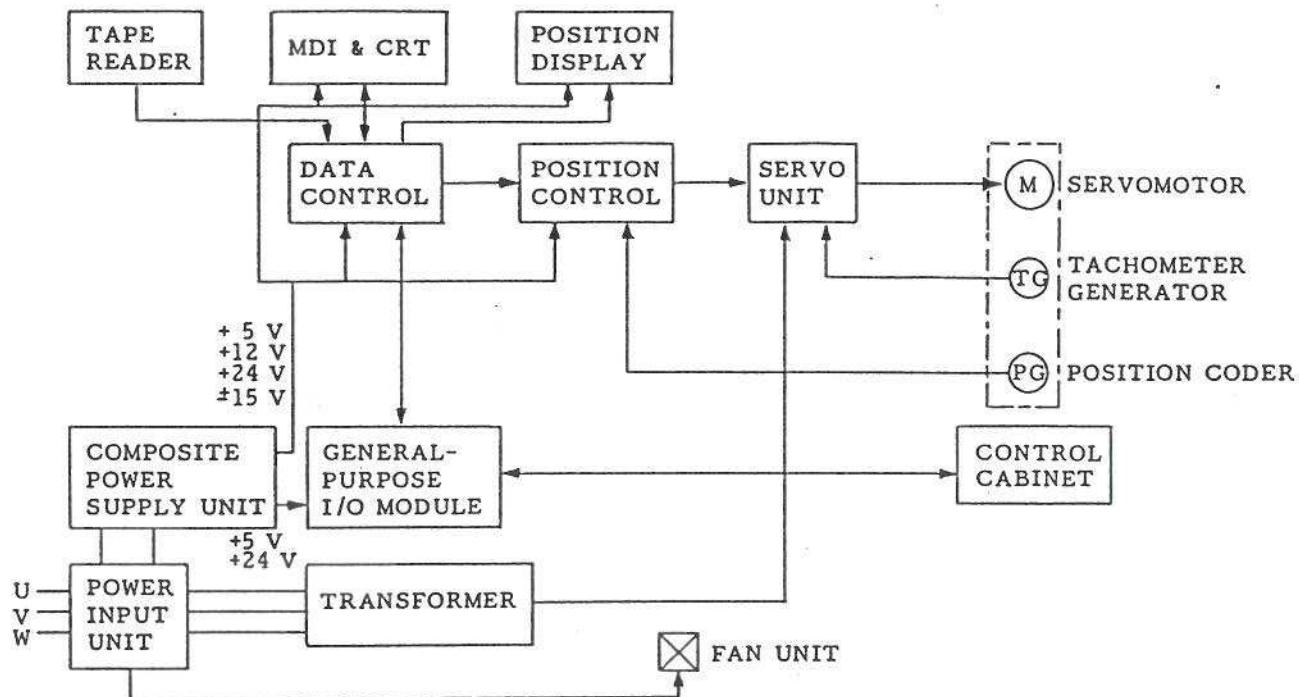


Fig. 1.1 Component Arrangement of YASNAC Control System

1.1 COMPONENT ARRANGEMENT OF YASNAC CONTROL SYSTEM (Cont'd)

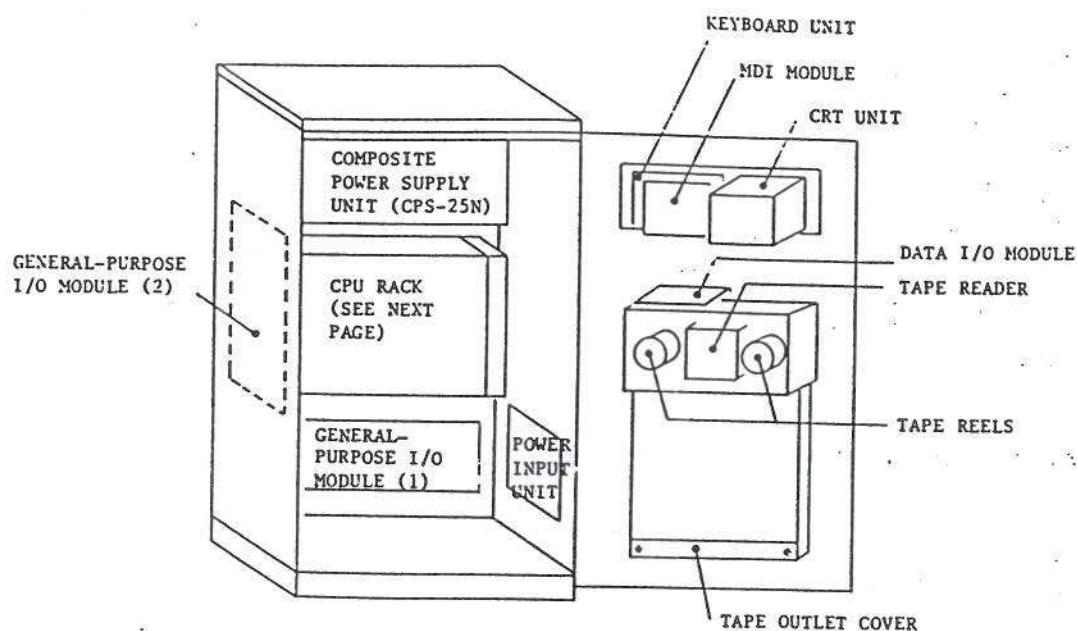


Fig. 1.2 Built-in Type 1, with Door Open

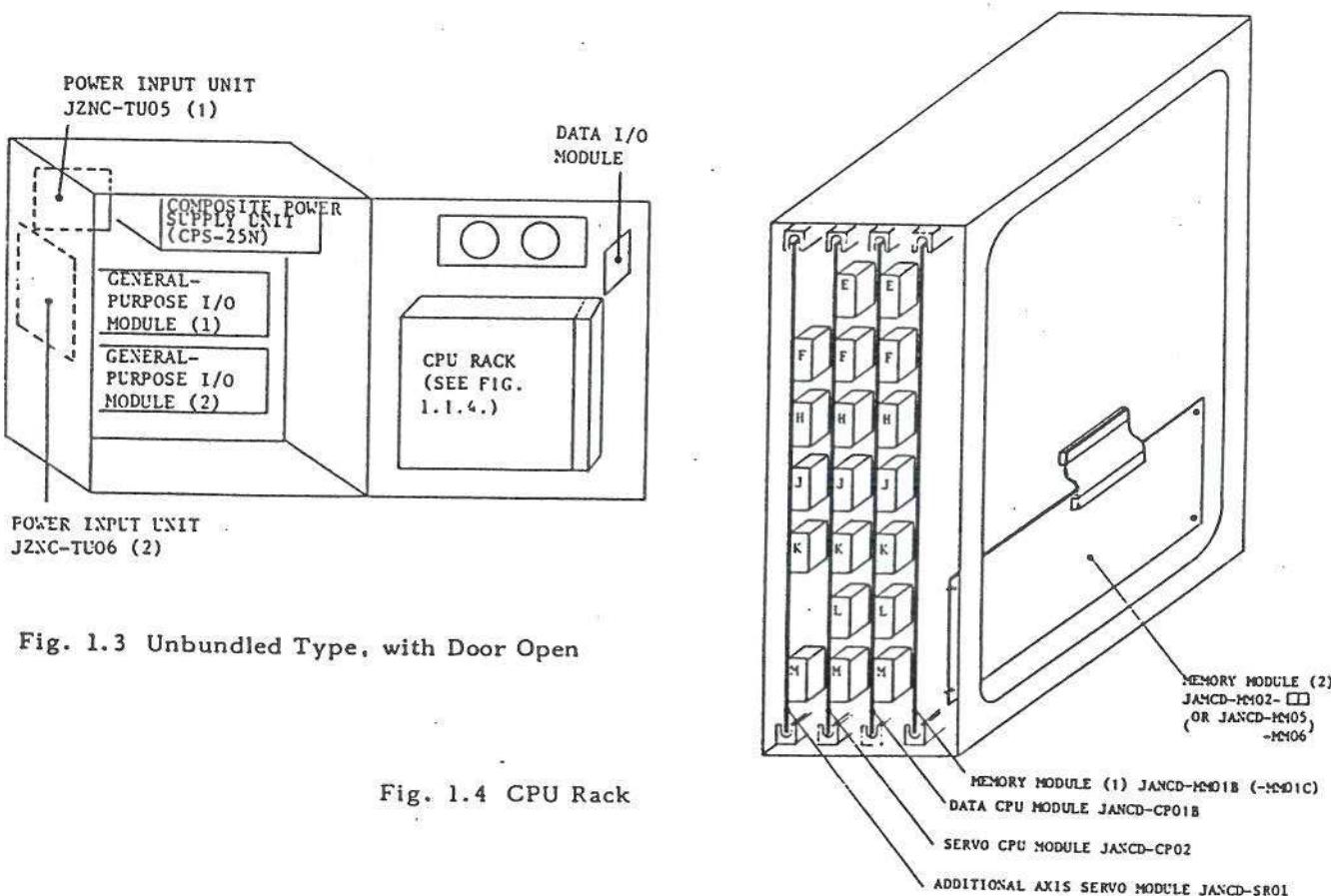


Fig. 1.4 CPU Rack

Table 1.1 List of Major Component Units

Component Name	Type Name	Component Code	Remarks
Power input unit	JZNC-TU04		Built-in type 1
	JZNC-TU05/06		Unbundle type
	JZNC-TU17		Free-standing type
Power control module	JANCD-TU01	DTN 3570	Included in the power input unit
Composite power supply unit	CPS-25N	AVR 808	
Tape reader	MODEL 2401-1	RED 16	
Tape reels	MODEL 1500	RED 14	6 inches
	MODEL 1402-1	RED 13	8 inches
Data CPU module	JANCD-CP03	DTN 3700	
	JANCD-CP01B	DTN 3650	
Servo CPU module	JANCD-CP02	DTN 3510	
Memory module (1)	JANCD-MM01B	DTN 3590	
	JANCD-MM01C-02	DTN 3730	150M Max
	JANCD-MM02-42	DTN 3540	20M
	JANCD-MM02-44	DTN 3550	40M
	JANCD-MM05	DTN 3620	70M
	JANCD-MM05	DTN 3620	
	JANCD-MM06	DTN 3630	320M
Battery unit	JZNC-GBA02	DUN 650	
Additional axis control module	JANCD-SR01	DTN 3600	
Control panel unit	JZNC-OP01	DUN 4210	
CRT display unit	TR-9DD1B	CRT 4	Included in the control panel unit
Keyboard unit	HMK-3993-02	SW 651	
MDI module	JANCD-SP01	DTN 3560	
Data I/O module	JANCD-GIF02	DTN 2340	
General-purpose I/O module	JANCD-IO01B	DTN 3580	

1.2 BLOCK DIAGRAM OF YASNAC CONTROL SYSTEM

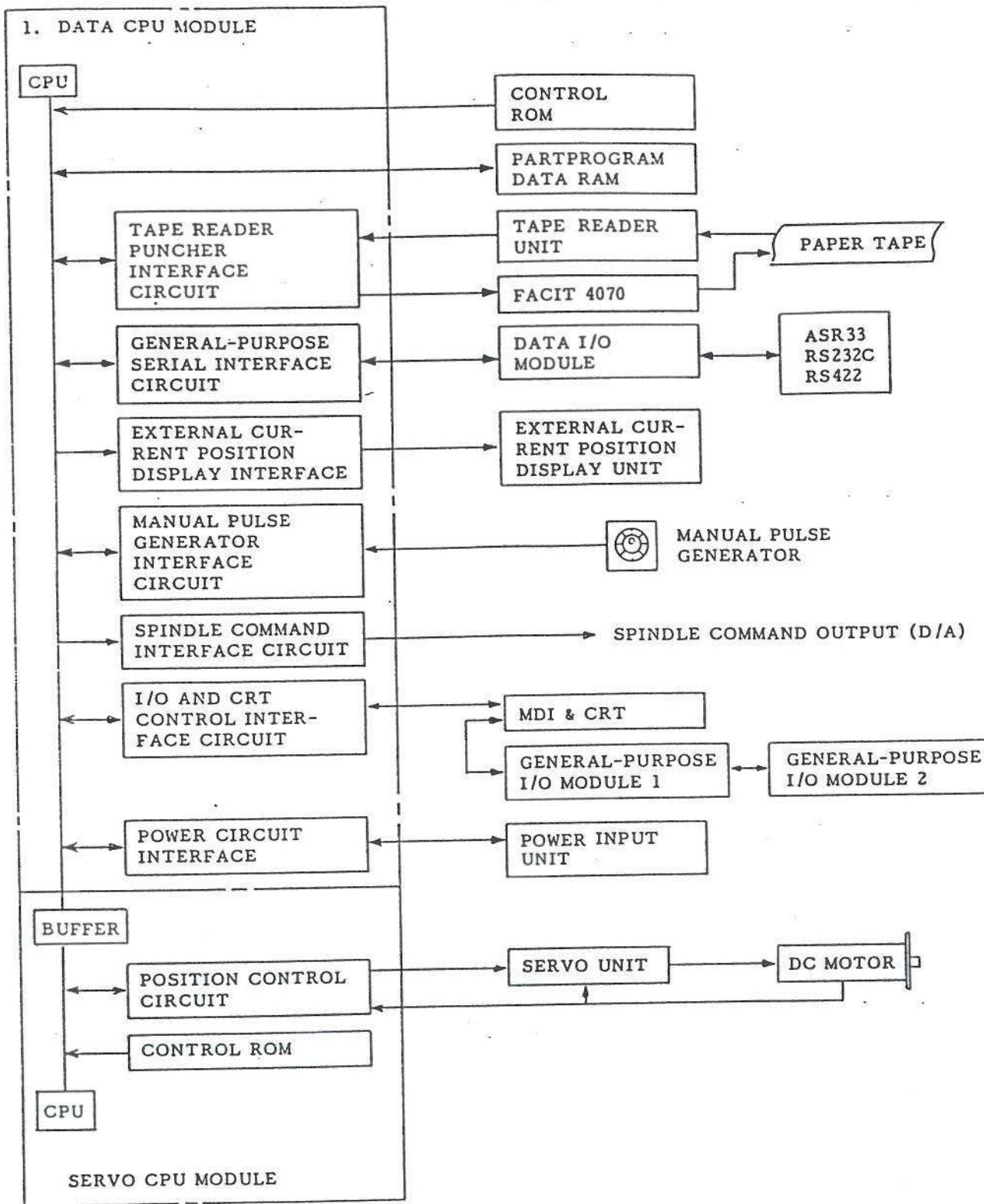


Fig. 1.5 Block Diagram of YASNAC Control System

1.3 MAINTENANCE INSTRUMENTS

(1) Measuring instruments

Name	Specifications	Purpose
AC voltmeter	Capable of measuring AC power voltage Tolerance: $\pm 2\%$ or less	To measure AC power voltages
DC voltmeter	Maximum range: 10 V, 30 V Tolerance: $\pm 2\%$ or less (A digital voltmeter may be required.)	To measure DC power voltages
Oscilloscope	2-channel type, with a frequency range of 5 MHz or higher	To measure tape reader output waveforms, etc.
DC ammeter	Maximum range: 10 A, 30 A, 50 A Tolerance: $\pm 2\%$ or less	To measure currents flowing through DC motors

(2) Tools

- Phillips screwdriver: large, medium and small
- Standard screwdrivers: medium and small

(3) Chemicals

- Cleaning agent for tape reader (absolute alcohol)

1.4 ROUTINE INSPECTION SCHEDULE

The following table shows the minimum require-

ments to be observed for maintenance time in order to keep the equipment in optimum condition for an extended period.

Table 1.2 Inspection Schedule

	Items	Frequency	With the system-off	With the system-on	Remarks
Tape reader	Cleaning of reading head	Daily	<input type="checkbox"/>		Including light source part.
	Cleaning of tape tumble box	Weekly	<input type="checkbox"/>		
	Lubricating of tension arm shaft end	As required	<input type="checkbox"/>		
Control panel	Tight closing of doors	Daily	<input type="checkbox"/>		
	Checking for loose fit and gaps of side plates and worn door gaskets	Monthly	<input type="checkbox"/>		
Servomotor and DC motor for spindle	Vibration and noise	Daily		<input type="checkbox"/>	Feel by hand, and do the audible inspection.
	Motor contamination and breakage	Daily or as required	<input type="checkbox"/>	<input type="checkbox"/>	Inspect visually.
	Clearance of ventilation openings		<input type="checkbox"/>	<input type="checkbox"/>	Inspect mainly spindle DC motor.
	Burned spots, cracks, wear, and pressure of brushes	Every three months	<input type="checkbox"/>		Check the length of brushes.
	Roughened commutator surface		<input type="checkbox"/>		Check dark bar, threading and grooving of commutator.
	Dirt in interior of motor		<input type="checkbox"/>		Clean with compressed air.
Battery		Daily	<input type="checkbox"/>	<input type="checkbox"/>	See if alarm for BATTERY is displayed on CRT screen.

1.4.1 TAPE READER

(1) Cleaning the tape reader head (Daily)

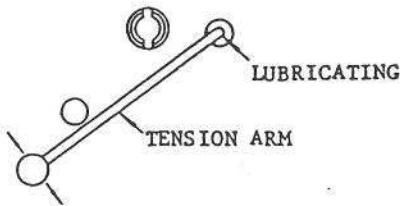
- A. Remove tape rubbish and dust from the glass with a blower brush. If the glass is stained with oil or oily dust, wipe it using a gauze or soft cloth with absolute alcohol. Also clean the tape guide and the tape retainer.
- B. Remove the dust, if any, on LED (light source) on top with a blower brush.

(2) Cleaning of tape tumble box (Weekly)

- A. Clean the braided nylon leading tape with a clean, soft cloth.
- B. Remove the tape outlet cover (See Fig. 1.1.2) by loosening two mounting screws and clean the bottom of the tape tumble box with cloth or brush.

(3) Lubricating of tension arm shaft[†]

For the control with 6 inch or 8 inch diameter reels, lubricate the shaft end of tension arm, when the tension arm does not move smoothly.



(In the case of 8-inch diameter reel)

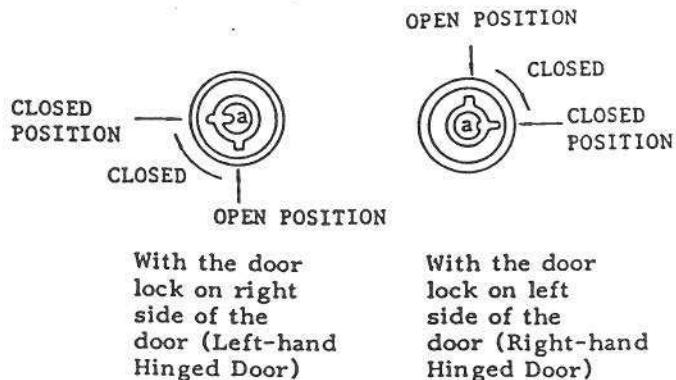
NOTE: When trouble occurs in feeding or winding tape with 8 inch diameter reels, open the front door and brush away dust around the photo-coupler by using a blower brush.

1.4.2 CONTROL PANEL

(1) Checks on doors for tight closing (Daily)

- A. The control panel is constructed as a dust-proof, sheet-steel enclosure with gasketed doors so as to keep off dust and oil mists. Keep each door tightly closed at all times.

- B. After inspecting the control with door open, close the door and fasten door locks (2 per door) securely using the key provided (No. YE001). When opening or closing, insert the key all the way into the keyhole and turn until it clicks (approximately a quarter-turn). The key can be removed from an open or closed position.



NOTE: If the optional door interlocking switch is provided, opening the door shuts off the main power supply and stops all operations.

- C. Check gaskets on the rims of front and rear doors.
- D. See if the inside of enclosure is dusty. Clean it, if necessary.
- E. Check for any opening in the door base with the doors shut tightly.

1.4.3 SERVOMOTOR AND DC MOTOR FOR SPINDLE

(1) Vibration and noise (Daily)

Vibration can be checked by resting the hand on the motors, and for noise, using a listening stick is recommended. If any abnormality is found, contact maintenance personnel immediately.

(2) Motor contamination and impairment (Daily)

Check the motor exterior visually. If dirt or damage should be observed, inspect the motor by removing the machine cover. Refer to the machine tool builder's manual.

[†] Tension arm shaft available as an option.

(3) Clearance of ventilation window blockage
(Daily)

Check the ventilation window of DC (or AC) spindle motor. If it is clogged with dust or dirt, inspect the spindle motor removing the machine cover. Refer to the machine tool builder's manual.

Inspection of commutators and brushes is essential for maintaining the excellent performance of the control. Inspection work to be executed is described in the following three items.

Quarterly Inspection of Commutators and Brushes

The carbon dust from brushes, accumulated around the commutator, inside the motor, may cause motor troubles such as the layer short of armature and the flashover of commutator. In the worst case, it may lead to fatal damage. To avoid this, be sure to have an inspection on the commutators and brushes at least every three months.

Double check to be sure power is OFF by turning off both control power and servo power before inspecting brushes and servomotor inside. (Disconnecting the circuit breaker of the power supply unit for servo control unit cannot shut off power completely). Failure to do so may cause fatal or serious injury.

(4) Carbon brushes

A. Under normal operating conditions, brush wears by 2 to 4 mm per 1000 operating hours. If wear is excessive, check to see if oil has contaminated armature surface, or if abnormal overcurrent flows through motor circuit.

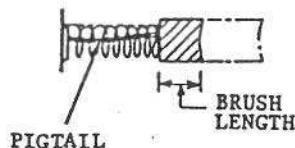
B. When brush length becomes shorter than those shown below, replace the brush with a new one.

Minertia motor junior series: 6 mm or below

DC motor for spindle: 17 mm or below

Minertia motor J series: 7 mm or below

C. If either the brush, or pigtails is broken, the brush assembly must be replaced as a whole unit.



NOTE: When replacing the brush assembly, consult the company.

(5) Commutator surface

A. Visually check surface roughness of the commutator through inspection window.

After 100 to 200 operating hours, the commutator should take on a polished light brown or chocolate color. The motor has developed an ideal commutator film and needs no attention other than to be kept clean.

B. See if a blackened bar, threading (or grooving) is on the commutator. If any of the above is observed, investigate the cause of trouble.

Threading or grooving on the commutator surface may be due to too small of a motor load. A blackened bar is the result of carbon dust in commutator slots, or accidentally produced sparkings. If the carbon dust is a cause of blackened bar, wipe the commutator with a clean dry cloth to smooth the surface. If sparking occurs, contact the maintenance representative.

(6) Motor inside (dirty)

A. Visually check the motor interior through inspection window.

The dried carbon dust will not affect motor running, but it is recommended that the inner parts such as commutator, brush-holders and brushes be cleaned with a dry compressed air (air pressure: 2-4 kg/cm², 28.5-56.5 ps)

B. If oily carbon dust exists inside the motor due to poor oil seal or defective enclosure, contact YASNAC service personnel.

(7) Servomotor with oil seal

As the life expectancy of oil seals and brushes is 5000 hours, the inspection and maintenance by the company should be done every 5000 hours. If possible, yearly inspection taking less than 8 hours is recommended.

1.4.4 BATTERY

Make sure that "BAT" or "A/B" on the right-low position of CRT screen is not displayed. If it is displayed, contact maintenance personnel. The battery must be replaced with a new one within a month.

2. TROUBLESHOOTING

2.1 TROUBLE ISOLATION

Try to fully analyze the circumstances in which the trouble occurred. This is necessary for isolating the trouble and/or for having the YASNAC serviceman called in to correct the trouble. Verifying the following points will minimize the down time of your system:

2.1.1 NATURE AND CIRCUMSTANCES OF TROUBLE

(1) Type of trouble

- In what mode did the trouble occur?
- In what mode(s) does the system normally operate?
- What was the display of MDI & CRT when the trouble occurred?
- Was the positioning incorrect (error axis, positioning error, displayed position values?)
- Was the tool path erroneous (by how much)?
- Was the feedrate correct?
- Was an auxiliary function used?
- What was the alarm number?
- In which program did the trouble occur? What was the sequence number?
- Does the trouble recur in a particular mode?
- Is the trouble related to tool changing?
- Is the trouble associated with feedrate?

(2) Frequency of trouble

- When did the trouble develop? (Did it occur when other machines were in operation?)
- How often did it occur?

(3) Recurrence of trouble

- Run the program tape that experienced the trouble several times. Check the values in the NC unit and compare them with those being programmed. Is the trouble attributable to external disturbances?
- Verify the offset values and remaining distributed values being stored.
- Increase or decrease the override value.
- Ask the operator to explain the circumstances under which the trouble occurred.

2.1.2 Operations and Programming Checks

(1) Operations

- Was the operator properly trained?
- Was there a recent change of operators?
- Was the operator well familiar with the program?
- Was the program interrupted before completion?
- Was the program placed under incremental or absolute command?
- Was the tool compensation properly set?
- Can other operating modes be selected?
- Was the optional block skip function properly used?
- Was the tape correctly set?
- Was the program properly coded?
- Were there any inadvertent or erroneous operations?

(2) Punched tape

- Was the tape contaminated?
- Was the tape bent or crimped?
- Were tapes properly spliced?
- Was the program successfully run prior to this operation?
- Was the tape correctly punched?
- Was the tape puncher operating normally?
- Was a black tape used?

(3) Programming

- Is the program new?
- Was the program formulated according to the instruction manual?
- Did the trouble occur in a particular block?
- Did the trouble occur in a subprogram?
- Was a check list made and used for tape verification?

(4) Settings

- Were there any corrections or adjustments made prior to starting the operation?
- Was a fuse blown?

- Was an emergency stop maintained?
- Was the machine tool ready to operate?
- Was an alarm state in effect?
- What was the alarm number?
- Was the alarm lamp lit on a module (on print board)?
- Was the MODE switch in normal position?
- Was the override set to "0"?
- Was the machine lock set?
- Was the feed hold set?

(5) External factors

- Was the machine tool recently repaired or adjusted?
- Was the control cabinet recently repaired or adjusted?
- Was the NC unit recently repaired or adjusted?
- Is there any noise source (e.g., crane, high frequency sewing machine, electrical discharge machine, welding machine) within interference range?
- Was there any new machine recently installed nearby?
- Is there any other NC unit that has developed similar failures in your factory?
- Has the user made an attempt at adjustments inside the NC unit?
- Has the same trouble occurred previously with this unit?

(6) Ambient conditions

- What was the temperature?
- Was there any abrupt change in temperature?
- Was the tape reader contaminated?
- Was there any oil or cutting fluid splashed, in the immediate area?
- Were there any vibrations?
- Was the system exposed to the direct sunlight?

2.1.3 NC UNIT CHECK

(1) Control unit exterior

- Was the MDI & CRT unit normal?
- Was the tape reader kept clean?
- Was the tape reader door closed?
- Was the unit operated with its door open?

- Did any machining chips enter the cabinet interior?

(2) Tape reader

- Was the tape reader contaminated?
- What were the characteristics of the waveforms from the tape reader?

(3) Control unit interior

- Was the control unit interior contaminated?
- Was the fan motor operating normally? (Was the air flow from the cooling air exhaust port normal?)
- Was the interior damaged by corrosive gas?

(4) Composite power supply unit

- Was the input voltage normal?
- Were the output voltages normal (+5 V, +12 V, +24 V, ±15 V)?
- Was each voltage within tolerance?
- Was a fuse blown?
- Was the circuit breaker tripped?
- Was the shield properly grounded?
- Was the wiring properly inside the control cabinet?
- How much did the input voltage fluctuate?
- Was there any significant drop in input voltage?
- Was the front or rear door open (with door interlock in effect)?
- Is there any machine that consumes a large amount of current in the factory (e.g., welding machine, electrical discharge machine)?

(5) Grounding

- Was grounding properly connected?
- Was the shield grounding proper?

(6) Cables

- Were cable connectors securely inserted?
- Was any internal cable damaged?
- Was any external cable damaged?
- Was any cable broken or contaminated?

2.1.3 NC UNIT CHECK (Cont'd)

- (7) Modules (on printed circuit board)
- Were all modules securely installed?
 - Were plug connectors properly secured?
 - What was the revision letter?
 - Were connections (on flat cable) between modules correct?

(8) MDI & CRT unit

- Were push buttons freely operable?
- Was the flat keyboard operable?
- Was the flat cable free of defects?

(9) Parameters

Did the actual parameters match those in the parameter table attached to the NC unit?

(10) Interface

- Were the power cable and NC cable separately installed?
- Was the cable positively shielded?
- Were the relay, solenoid, motor, etc. each equipped with a noise suppressor?
- Were the I/O signals normally generated by the DGN (diagnostic) function?

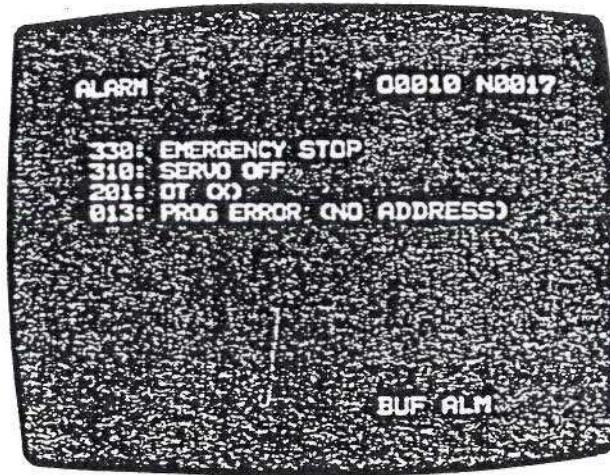
2.2 TROUBLESHOOTING BY ALARM CODE

If an alarm condition occurs, a display "ALM" or "A/B" (for battery alarm) blinks on the bottom line of the CRT screen regardless of the mode or function. In this case, detailed information of the alarm condition will be displayed by the following operations:

1. Depress the (ALM) key

This will cause up to 4 pairs of alarm codes and alarm messages to appear in order of importance, with the most serious one at the top.

NOTE: In an alarm state, the alarm screen appears taking priority over any other display. There is no need to operate the (PAGE) key.



Alarm Codes and Messages

Eliminate the cause of the alarm and depress the (RESET) key, and the alarm state and the alarm display will be reset. Notice that the alarm codes "800," "810," "820," "830" and "840" are displayed regardless of the selected function key.

2. The alarm codes are categorized as follows:

Table 2.1

Alarm No.	Spindle Operation	Type of Alarm
000 to 099	Stop at block end	Tape format error alarm
100 to 199	Stop at block end	Macro, operation, external input/output error, sequence error (1)
200 to 299	Immediate stop	Overtravel, reference point return, positioning, machine ready
300 to 399	Immediate stop	Servo, emergency stop, overload FG, RPG
400 to 499	Immediate stop	Sequence error (2)
500 to 599		
600 to 699		Sequencer message
700 to 799		
800 to 899	NC system stop	CPU error, RAM error, ROM error
900 to 999		Off-line error

2.2.1 LIST OF ALARM CODES

Table 2.2 List of Alarm Codes

Code	Causes	Code	Causes
000	POWER OFF SETTING THE PARAMETER REQUIRING TURNING OFF POWER.	014	PROG ERROR ("-", "0") SIGN "-", "0" NOT CORRECTLY USED.
001	ZR UNREADY (X) REFERENCE POINT RETURN NOT COMPLETED X.	015	PROG ERROR (UNUSABLE CH) UNUSABLE CHARACTER PROGRAMMED IN INSIGNIFICANT DATA AREA.
002	ZR UNREADY (Y) REFERENCE POINT RETURN NOT COMPLETED Y.	016	PROG ERROR (UNUSABLE AXIS) INPUT OF A, B, C, U, V, W NOT DEFINED AS ADDITIONAL AXIS OR B-FUNCTION.
003	ZR UNREADY (Z) REFERENCE POINT RETURN NOT COMPLETED Z.	017	PROG ERROR (8 DIGITS) INPUT DATA OVERFLOW (MORE THAN 8 CHARACTERS).
004	ZR UNREADY (4) REFERENCE POINT RETURN NOT COMPLETED 4.	020	PROG ERROR (G) UNUSABLE G CODE OR G CODE NOT INCLUDED IN OPTIONS PROGRAMMED.
005	ZR UNREADY (5) REFERENCE POINT RETURN NOT COMPLETED 5.	021	PROG ERROR (G) G CODE IN 1, 4, * GROUP PROGRAMMED SIMULTANEOUSLY IN A BLOCK.
010	TH ERROR TAPE HORIZONTAL PARITY ERROR.	022	PROG ERROR (G02/03, G43/44) G43, G44 COMMANDED IN CIRCULAR INTERPOLATION MODE (G02, G03).
011	TV ERROR TAPE VERTICAL PARITY ERROR.	023	PROG ERROR (G) UNUSABLE G CODE COMMANDED IN CANNED CYCLE.
012	OVERFLOW (128 CH) BUFFER CAPACITY OVERFLOW IN A BLOCK (128 CHARACTERS).	024	PROG ERROR (G, G41/42) UNUSABLE CODE COMMANDED DURING COMPENSATION MODE.
013	PROG ERROR (NO ADDRESS) ADDRESS PLUS NO DATA AND NEXT ADDRESS COMMANDED. OR NO ADDRESS PLUS DATA.	025	PROG ERROR (G70/71/72) G70 TO G72 COMMANDED EXCEPT IN CANNED CYCLES.
NOTES:			
1. No move command in three blocks in series at G41 (G42) command. 2. M00 commanded when rise. 3. Rise at circular interpolation block.			

2.2.1 LIST OF ALARM CODES (Cont'd)

Table 2.2 List of Alarm Codes (Cont'd)

Code	Causes	Code	Causes
026	PROG ERROR (G41/42) RISE ERROR AT COMPENSATION C (COMMAND WHICH CANNOT BE ACCOMODATED CORRECTLY IN COMPENSATION C MODE) SEE NOTES	038	PROG ERROR (P, G10) TOOL LARGE P WHEN WORK COORDINATE SYSTEM IS PROGRAM-INPUT
027	PROG ERROR (G41/42) ERROR AT COMPENSATION C (ERROR IN CIRCULAR INTERPOLATION MODE)	040	PROG ERROR (M98, G65/66) • P NOT PROGRAMMED IN M98, G65, G66, G25. • P DIFFERENT FROM Q IN NO. IN G25MODE. • G25 AND M98/M99 PROGRAMMED SIMULTANEOUSLY.
030	PROG ERROR (F) NO F-COMMAND IN FEED COMMAND	041	PROG ERROR (M08/09, G65/66) PROGRAM NO. (SEQUENCE NO.) NOT FOUND WHEN PROGRAM IS CALLED BY M98, M99, G65, G66, G25, G, M, T
031	PROG ERROR (R = 0) CIRCLE WITH RADIUS 0 COMMANDED IN CIRCULAR ARC COMMAND	042	PROG ERROR (M98, NEST) SUBPROGRAM (G25) OR MACRO CALL FIVE-NESTED.
032	PROG ERROR (G02/03) COMMANDS ON THREE AXES IN CIRCULAR ARC COMMAND WITHOUT HELICAL OPTION	043	PROG ERROR (G75) UNUSABLE ADDRESS COMMANDED IN G75.
033	PROG ERROR (G02/03) COMMANDS ON MORE THAN FOUR AXES IN CIRCULAR ARC PLANE WHOSE ARC CANNOT BE SELECTED FROM THE COMMAND	044	PROG ERROR (G12/13) IN CIRCLE CUTTING, PROGRAMMED RADIUS R IS SMALLER THAN COMPENSATION D.
034	PROG ERROR (G02/03) CIRCULAR ARC R DESIGNATION ERROR	045	CAL ERROR (G41/42)
035	PROG ERROR (D, H) TOO LARGE NO. OF H OR D CODE FOR TOOL RADIUS COMPENSATION AND TOOL LENGTH COMPENSATION	046	PROG ERROR (G41/42) IN COMPENSATION C MODE, CIRCULAR ARC OUTSIDE OF COMPENSATION PLANE PROGRAMMED.
036	PROG ERROR (P, G10) TOO LARGE P (NUMBER DESIGNATION) WHEN OFFSET IS PROGRAM-INPUT	047	PROG ERROR (G41/42) COMPENSATION PLANE CHANGED DURING COMPENSATION C MODE
037	PROG ERROR (P, G10) TOOL LARGE R WHEN WORK COORDINATE SYSTEM IS PROGRAM-INPUT	048	PROG ERROR (G41/42) INTERSECTION POINT NOT OBTAINED BY INTERSECTION COMPUTATION

Table 2.2 List of Alarm Codes (Cont'd)

Code	Causes	Code	Causes
049	PROG ERROR (G41/42) REVERSE OR ALMOST REVERSE COMMANDED IN M97 MODE.	070	PROG ERROR (M02/30/99) MEMORY OPERATION FINISH COMMAND NOT GIVEN.
050	SCALING ERROR UNUSABLE G CODE (G92, G28 TO G30, G36 TO G38, G70 TO G72) IN SCALING MODE.	075	RS232C RS232C INTERFACE DISAGREEMENT OF NO. OF BITS AND NO. OF BAUD RATES.
051	SCALING ERROR ERROR IN G51 AND G50 BLOCK FORMAT. SCALING FACTOR ZERO.	076	RS232C DATA TRANSMISSION FAILURE THROUGH RS232C INTERFACE.
055	PROG ERROR (M, S, T, B) M, S, T, B COMMANDS IN THE BLOCK IN WHICH M, S, T, B CODE CANNOT BE COMMANDED	077	RS232C MORE THAN 10 CHARACTERS HAVE BEEN READ IN AFTER STOP CODE HAS BEEN TRANSMITTED THROUGH RS232C INTERFACE.
056	PROG ERROR (AXIS) AXIS COMMAND IN G04, G20, AND G21 BLOCKS.	080	PROG ERROR (G10, G22/23) G10, G22, AND G23 COMMANDED WITH AXIS DATA.
058	MIRROR IMAGE (G28) G28 COMMANDED DURING MIRROR IMAGE.	084	MIRROR IMAGE (G36/37/38) MIRROR IMAGE IS ON WITH G36 TO G38.
059	ZR UNREADY G28 NOT COMPLETED ON THE AXIS WHICH HAS G29 COMMAND OR REFERENCE POINT RETURN NOT COMPLETED ON THE AXIS.	085	PROG ERROR (G36/37) COMMAND OF I (J) ON MORE THAN ONE AXIS AT G36 (G37).
066	RESET UNREADY (AFTER EDITING) —	086	PROG ERROR (G38) COMMAND OTHER THAN K AT G38.
067	— POWER TURNED OFF DURING WRITING MEMORY.	087	PROG ERROR (G31/36/37/38) TOUCH SWITCH NOT ON WHEN MOTION REACHES AT END POINT BY G31, G36 TO G38 COMMANDS.
068	— EDITING BEING EXECUTED IN THE EDIT INHIBIT AREA.	088	PROG ERROR (G36/37/38) TOUCH SWITCH CALCULATION ERROR AT G36 TO G38 COMMANDS.

2.2.1 LIST OF ALARM CODES (Cont'd)

Table 2.2 List of Alarm Codes (Cont'd)

Code	Causes	Code	Causes
100	CAL ERROR (FIXED POINT) MAGNITUDE OF FIXED POINT DATA EXCEEDING UPPER LIMIT.	111	MACRO ERROR (MOVE G66-M99) MOVE COMMAND IN M99 FINISHING COMMAND OF MACRO CALLED BY G66.
101	CAL ERROR (FLOATING) EXPONENT OF FLOATING POINT DATA EXCEEDING ALLOWABLE RANGE.	114	MACRO ERROR (DO-FORMAT) NO. OF DOs AND ENDs NOT THE SAME.
102	CAL ERROR (DIVISION) CALCULATION DIVISOR ZERO OR OVERFLOW ERROR.	115	MACRO ERROR ([] UNMACH) NO. OF LEFT BRACKETS AND RIGHT BRACKETS NOT THE SAME.
103	CAL ERROR (SQUARE ROOT) ROOT VALUE IS A NEGATIVE(-).	116	MACRO ERROR (DO-END NO.) CONDITION $1 \leq n \leq 3$ NOT ESTABLISHED IN DOn.
104	PROG ERROR (DOUBLE ADD) SAME ADDRESS REPEATED MORE THAN TWICE IN A BLOCK.	117	--
105	MACRO ERROR (CONSTANT) CONSTANTS USABLE IN USER MACRO EXCEEDING THE LIMIT.	118	MACRO ERROR (GOTO N) CONDITION $0 < n \leq 9999$ NOT ESTABLISHED OR NO SEQUENCE NO. IN GO TO n.
107	MACRO ERROR (FORMAT) ERROR IN THE FORMAT AND EQUATION.	120	PRTN ERROR (NOT FOUND) SEQUENCE NO. NOT FOUND IN PART PROGRAM.
108	MACRO ERROR (UNDEFIN # NO) UNDEFINED VARIABLE NO. DESIGNATED.	121	PRTN ERROR (G92) G92 COMMANDED THROUGH MDI OPERATION DURING PROGRAM RESTART.
109	MACRO ERROR (#NO NOT LEFT) COMMAND PROHIBITED VARIABLE AS SUBSTITUTION IN LEFT-HAND SIDE OF THE EQUATION.	122	PRTN ERROR (G54-G59) G54 TO G59 COMMANDED THROUGH MDI OPERATION DURING PROGRAM RESTART.
110	MACRO ERROR ([] 5 LIMIT) MULTIPLE LAYERS OF PARENTHESES EXCEEDING THE UPPER LIMIT (5).	123	PRTN ERROR (ORG) COORDINATE SYSTEM CHANGED BY DEPRESSING THE ORG BUTTON DURING PROGRAM RESTART.

Table 2.2 List of Alarm Codes (Cont'd)

Code	Causes	Code	Causes
124	PRTN ERROR (MDI MOVE) AXIS OPERATED BY MDI AFTER PROGRAM RESTART.	145	—
130	EXT DATA DATA ERROR IN A GROUP DATA.	146	PROG ERROR (G100) HIGH-SPEED CUTTING COMMAND G101 OR G102 NOT CANCELLED BY G100.
131	EXT MESSAGE NO ALARM NUMBER CORRESPONDING TO EXTERNAL ALARM MESSAGE TO BE CLEARED.	147	PROG ERROR (PARAMETER ON) PARAMETER #6008 (D7) SET TO 1 AT HIGH-SPEED CUTTING COMMAND.
132	EXT MESSAGE NO CORRESPONDING ALARM NO. WHEN EXTERNAL ALARM MESSAGE IS CLEARED.	170	MEM ERROR (OFS) TOOL OFFSET TOTAL CHECK ERROR.
133	EXT MESSAGE NO CORRESPONDING ALARM NO. WHEN EXTERNAL ALARM MESSAGE IS CLEARED.	172	MEM ERROR (SET) SETTING AREA TOTAL CHECK ERROR.
140	PROG ERROR (P NO.) NO AXIS COMMAND IN HIGH-SPEED CUTTING PROGRAM AT HIGH-SPEED CUTTING COMMAND.	173	MEM ERROR (PRM) PARAMETER AREA TOTAL CHECK ERROR.
141	PROG ERROR (FILE OVER) NO. OF BLOCKS IN REGISTERED PROGRAM EXCEEDING THE SPECIFIED VALUE IN HIGH-SPEED CUTTING.	179	OVER TEMP PANEL INSIDE TEMPERATURE TOO HIGH.
142	PROG ERROR (G00/G01/G02) G CODE OTHER THAN G00, G01, G02 AND G03 OR M, S, T CODE COMMANDED IN REGISTERED PROGRAM AT HIGH-SPEED CUTTING COMMAND.	180	SEQ ERROR SEQUENCE ERROR (1).
143	— —	181	SEQ ERROR SEQUENCE ERROR (1).
144	PROG ERROR (G101/G100) ADDRESS OTHER THAN P COMMANDED IN G100, G101, G102 BLOCK.	182	SEQ ERROR SEQUENCE ERROR (1).

2.2.1 LIST OF ALARM CODES (Cont'd)

Table 2.2 List of Alarm Codes (Cont'd)

Code	Causes	Code	Causes
183	SEQ ERROR SEQUENCE ERROR (1).	193	SEQ ERROR SEQUENCE ERROR (1).
184	SEQ ERROR SEQUENCE ERROR (1).	194	SEQ ERROR SEQUENCE ERROR (1).
185	SEQ ERROR SEQUENCE ERROR (1).	195	SEQ ERROR SEQUENCE ERROR (1).
186	SEQ ERROR SEQUENCE ERROR (1).	196	SEQ ERROR SEQUENCE ERROR (1).
187	SEQ ERROR SEQUENCE ERROR (1).	197	SEQ ERROR SEQUENCE ERROR (1).
188	SEQ ERROR SEQUENCE ERROR (1).	198	SEQ ERROR SEQUENCE ERROR (1).
189	SEQ ERROR SEQUENCE ERROR (1).	199	SEQ ERROR SEQUENCE ERROR (1).
190	SEQ ERROR SEQUENCE ERROR (1).	201	OT (X) OVERTRAVEL X.
191	SEQ ERROR SEQUENCE ERROR (1).	202	OT (Y) OVERTRAVEL Y.
192	SEQ ERROR SEQUENCE ERROR (1).	203	OT (Z) OVERTRAVEL Z.

Table 2.2 List of Alarm Codes (Cont'd)

Code	Causes	Code	Causes
204	OT (4) OVERTRAVEL 4.	223	S-OT2 (Z) STORED STROKE LIMIT SECOND AREA (OUTSIDE INHIBIT) Z.
205	OT (5) OVERTRAVEL 5.	224	S-OT2 (4) STORED STROKE LIMIT SECOND AREA (OUTSIDE INHIBIT) 4.
211	S-OT1 (X) STORED STROKE LIMIT FIRST AREA X.	230	TOOL BROKEN AT BROKEN TOOL DETECTION BY G32, G33, Z-AXIS MOVES TO THE SET POSITION BUT SENS (T) INPUT NOT TURNED ON.
212	S-OT1 (Y) STORED STROKE LIMIT FIRST AREA Y.	231	ZR ERROR-AREA (X) REFERENCE POINT RETURN AREA ERROR X.
213	S-OT1 (Z) STORED STROKE LIMIT FIRST AREA Z.	232	ZR ERROR-AREA (Y) REFERENCE POINT RETURN AREA ERROR Y.
214	S-OT1 (4) STORED STROKE LIMIT FIRST AREA 4.	233	ZR ERROR-AREA (Z) REFERENCE POINT RETURN AREA ERROR Z.
215	S-OT1 (5) STORED STROKE LIMIT 1ST AREA 5.	234	ZR ERROR-AREA (4) REFERENCE POINT RETURN AREA ERROR 4.
220	S-OT2 (INSIDE) STORED STROKE LIMIT SECOND AREA (INSIDE INHIBIT).	235	ZR ERROR-AREA (5) REFERENCE POINT RETURN ERROR 5.
221	S-OT2 (X) STORED STROKE LIMIT SECOND AREA (OUTSIDE INHIBIT) X.	241	ZR ERROR-POS (X) REFERENCE POINT RETURN AREA ERROR X.
222	S-OT2 (Y) STORED STROKE LIMIT SECOND AREA (OUTSIDE INHIBIT) Y.	242	ZR ERROR-POS (Y) REFERENCE POINT RETURN AREA ERROR Y.

2.2.1 LIST OF ALARM CODES (Cont'd)

Table 2.2 List of Alarm Codes (Cont'd)

Code	Causes	Code	Causes
243	ZR ERROR-POS (Z) REFERENCE POINT RETURN AREA ERROR Z.	274	P-SET ERROR (4) P SET ERROR 4.
244	ZR ERROR-POS (4) REFERENCE POINT RETURN AREA ERROR 4.	275	P-SET ERROR (5) PROGRAM SET ERROR 5.
245	ZR ERROR-POS (5) REFERENCE POINT RETURN POSITION ERROR 5.	280	MACH UNREADY MACH RDY OFF.
250	S-OT3-5 (INSIDE) STORED STROKE LIMIT 3RD, 4TH, 5TH AREA INSIDE PROHIBITED.	310	SERVO POWER NOT SUPPLIED SERVO POWER NOT SUPPLIED.
251	S-OT3-5 (X) STORED STROKE LIMIT 3RD, 4TH, 5TH AREA OUTSIDE PROHIBITED X.	320	NC UNREADY NC UNREADY. SET UNREADY P SET UNREADY.
252	S-OT3-5 (Y) STORED STROKE LIMIT 3RD, 4TH, 5TH AREA OUTSIDE PROHIBITED Y.	330	EMERGENCY STOP EMERGENCY STOP.
253	S-OT3-5 (Z) STORED STROKE LIMIT 3RD, 4TH, 5TH AREA OUTSIDE PROHIBITED Z.	331	FUSE (X) FUSE BLOWN X.
271	P-SET ERROR (X) P SET ERROR X.	332	FUSE (Y) FUSE BLOWN Y.
272	P-SET ERROR (Y) P SET ERROR Y.	333	FUSE (Z) FUSE BLOWN Z.
273	P-SET ERROR (Z) P SET ERROR Z.	334	FUSE (4) FUSE BLOWN 4.

Table 2.2 List of Alarm Codes (Cont'd)

Code	Causes	Code	Causes
335	FUSE (5) FUSE BLOWN 5.	355	OL (5) OVERLOAD (1) 5.
341	SERVO ERROR (X) SERVO ERROR X.	357	OL (OTHERS) OVERLOAD (2).
342	SERVO ERROR (Y) SERVO ERROR Y.	361	PG ERROR (X) PG ERROR X.
343	SERVO ERROR (Z) SERVO ERROR Z.	362	PG ERROR (Y) PG ERROR Y.
344	SERVO ERROR (4) SERVO ERROR 4.	363	PG ERROR (Z) PG ERROR Z.
345	SERVO ERROR (5) SERVO ERROR 5.	364	PG ERROR (4) PG ERROR 4.
351	OL (X) OVERLOAD (1) X.	365	PG ERROR (5) PG ERROR 5.
352	OL (Y) OVERLOAD (1) Y.	371	FG ERROR (X) FG ERROR X.
353	OL (Z) OVERLOAD (1) Z.	372	FG ERROR (Y) FG ERROR Y.
354	OL (4) OVERLOAD (1) 4.	373	FG ERROR (Z) FG ERROR Z.

2.2.1 LIST OF ALARM CODES (Cont'd)

Table 2.2 List of Alarm Codes (Cont'd)

Code	Causes	Code	Causes
374	FG ERROR (4) FG ERROR 4.	394	TG ERROR (4) TG LEAD DISCONNECTION.
375	FG ERROR (5) FG ERROR 5.	395	TG ERROR (5) TG LEAD DISCONNECTION.
381	RPG ERROR (X) RPG ERROR 1.	400	SEQ ERROR SEQUENCE ERROR (2).
382	RPG ERROR (Y) RPG ERROR 2.	419	SEQ ERROR SEQUENCE ERROR (2).
383	RPG ERROR (Z) RPG ERROR 3.	500	SEQ ERROR SEQUENCE ERROR (3).
384	RPG ERROR (4) RPG ERROR 4.	519	SEQ ERROR SEQUENCE ERROR (3).
385	RPG ERROR 5 PROGRAM ERROR 5.	800	MEM ERROR BUBBLE FAILURE INPUT/OUTPUT FAILURE.
391	TG ERROR (X) TG LEAD DISCONNECTION.	801	MEM ERROR BUBBLE FAILURE INITIAL ERROR.
392	TG ERROR (Y) TG LEAD DISCONNECTION.	802	MEM ERROR BUBBLE FAILURE UNDEFINED COMMAND.
393	TG ERROR (Z) TG LEAD DISCONNECTION.	803	MEM ERROR BUBBLE FAILURE TRANSFER MISSING.

Table 2.2 List of Alarm Codes

Code	Causes	Code	Causes
804	MEM ERROR BUBBLE FAILURE. PARITY ERROR.		
805	MEM ERROR BUBBLE FAILURE. NO MARKER.		
806	MEM ERROR BUBBLE FAILURE. MANY DEFECT LOOPS.		
810	RAM ERROR RAM CHECK ERROR.		
820	ROM ERROR ROM CHECK ERROR.		
830	CPU ERROR CPU ERROR (1).		
840	CPU ERROR CPU ERROR (2).		
910	TAPE MEM ERROR MEMORY VERIFYING ERROR (OFF-LINE).		
920	TAPE ERROR TAPE READING-IN ERROR (OFF-LINE).		

2.2.2 COUNTERACTING ALARMS

(1) Alarm 010 (Tape Horizontal Parity Error)

The number of data holes for each character is checked on the NC tape. An alarm is issued when the number is:

Even: for EIA tape

Odd: for ISO tape

(The description that follows applies to the EIA code.)

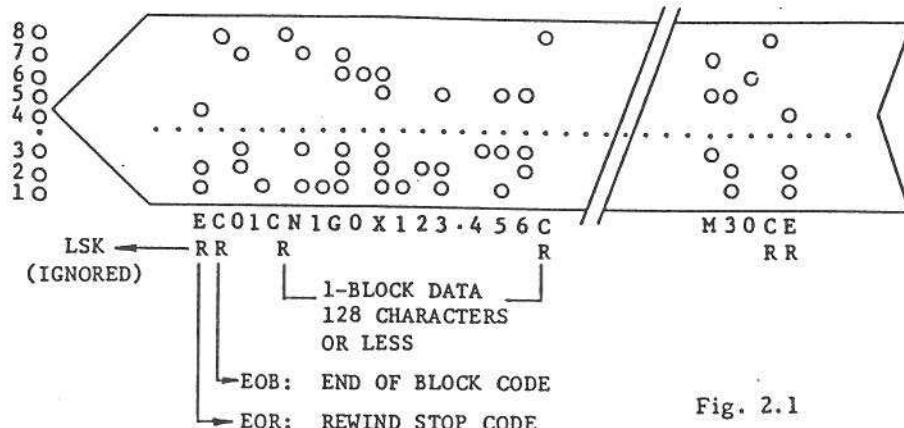


Fig. 2.1

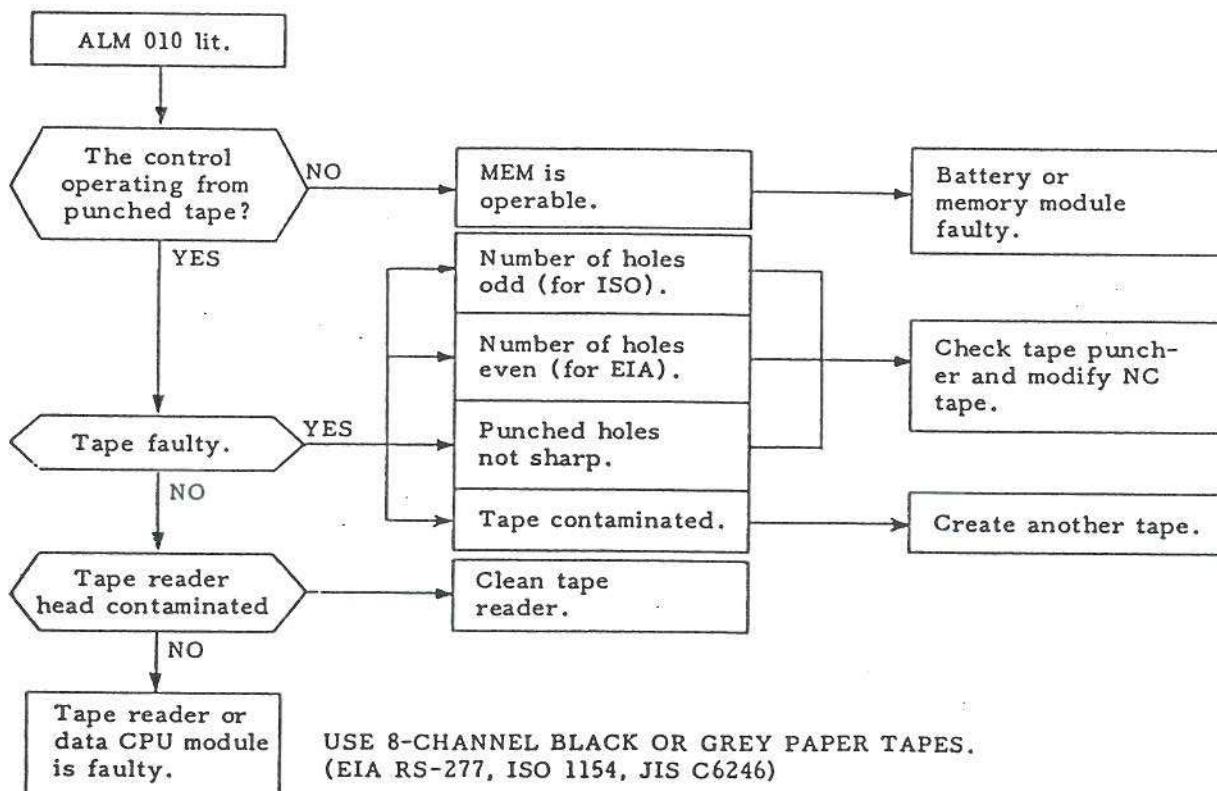


Fig. 2.2

Tape Reader Connections

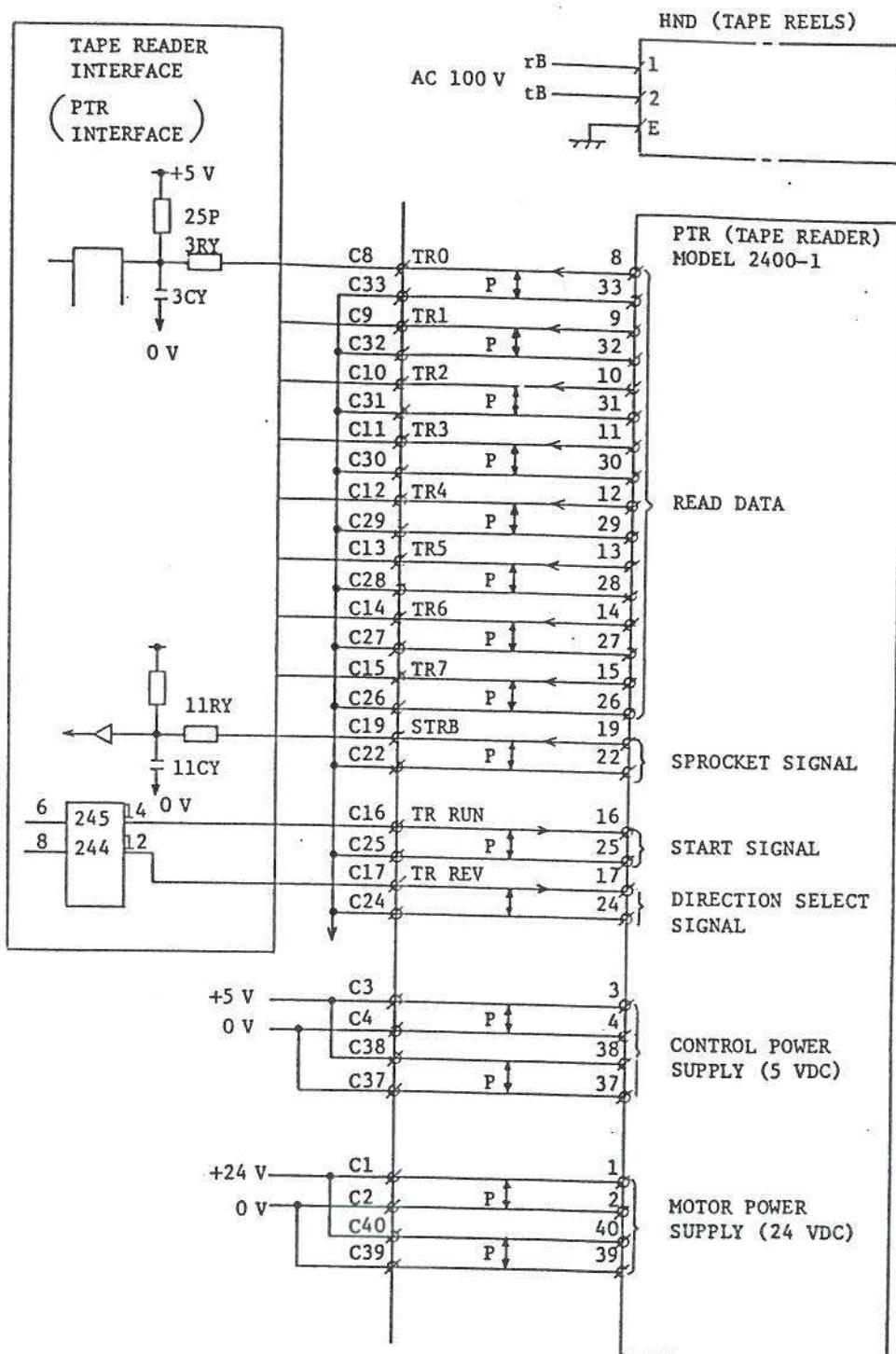


Fig. 2.3 Tape Reader Connection Diagram

2.2.2 COUNTERACTING ALARMS (Cont'd)

(2) Alarm 075, 076, 077 (RS 232C faulty)

- 075: RS 232C interface; disagreement between no. of bits and no. of baud rates
- 076: RS 232C interface; transmission failure
- 077: RS 232C interface; 10 characters or more were read in after stop code was issued.

FACIT 4070

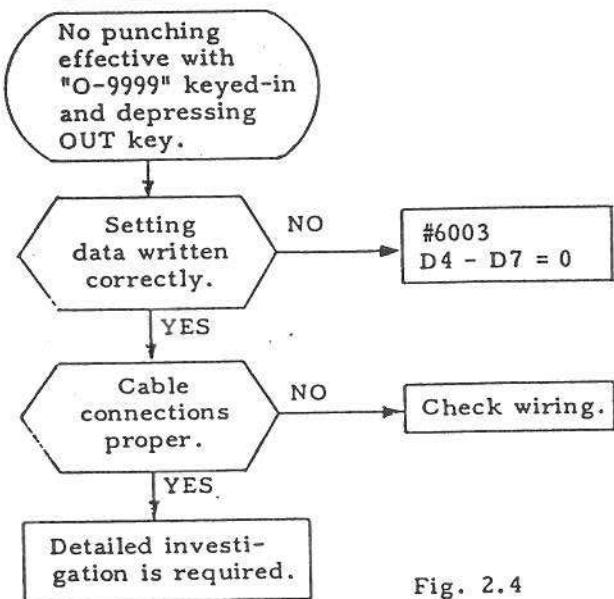


Fig. 2.4

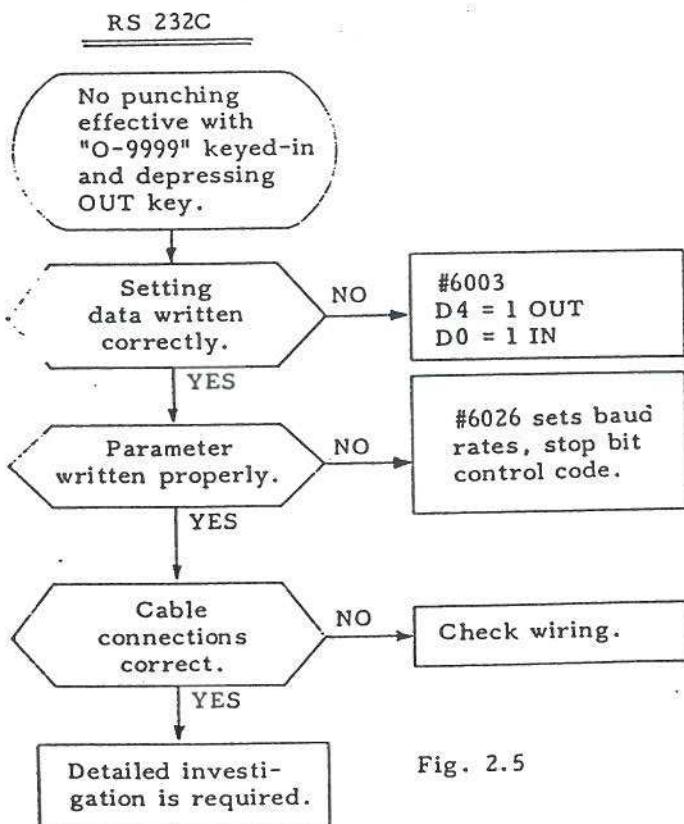


Fig. 2.5

Setting for Using FACIT, RS 232C and Teletypewriter (ASR-33)

Parameter (setting) setting

Interface establishing Setting #6003

IN	OUT	Output device				Input device		
		D7	D6	D5	D4	D3	D2	D1
PTR	FACIT	0	0	0	0	0	0	0
PTR	ASR 33	0	0	0	1	0	0	0
RS 232C	RS 232C	0	0	0	1	0	0	0

Baud rate setting Parameter #6026

Baud rate of I/O devices	-	-	RSCB	STP	Baud rate set			
	D7	D6	D5	D4	D3	D2	D1	
110 bauds								0 0 1
300 bauds								0 1 0
600 bauds								0 1 1
1200 bauds								0 1 1
2400 bauds								1 0 0
4800 bauds								1 0 0
9600 bauds								1 0 1

Stop BIT STP = D4 0: 1 BIT
1: 2 BIT

Control code RSCB = D5

0: Control code signal transmitted
1: No control code signal transmitted

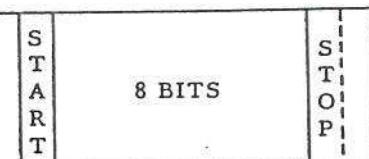
Teletypewriter setting (for ASR-33)

#6003

D7	D6	D5	D4	D3	D2	D1	D0
0	0	0	1	0	0	0	0

#6026

D7	D6	D5	D4	D3	D2	D1	D0
0	0	1	1	0	0	1	0



NOTE: Short-circuit IRO-4 (RS) and IRO-5 (CS) when using the teletypewriter (ASR-33).

Signals and Connection Diagram for FACIT 4070

Timing

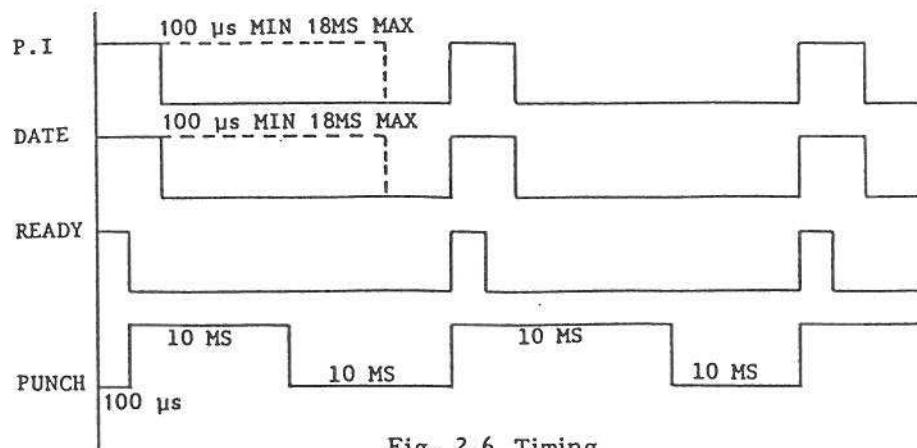


Fig. 2.6 Timing

FACIT connection diagram

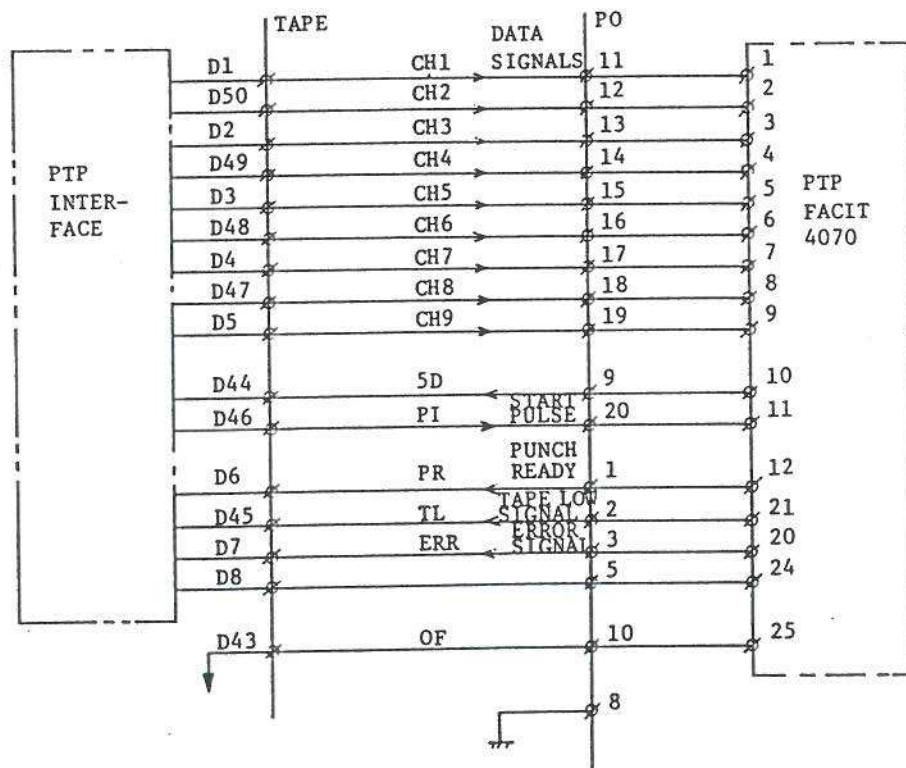


Fig. 2.7 FACIT Connection Diagram

2.2.2 COUNTERACTING ALARMS (Cont'd)

RS 232C Connection Diagram

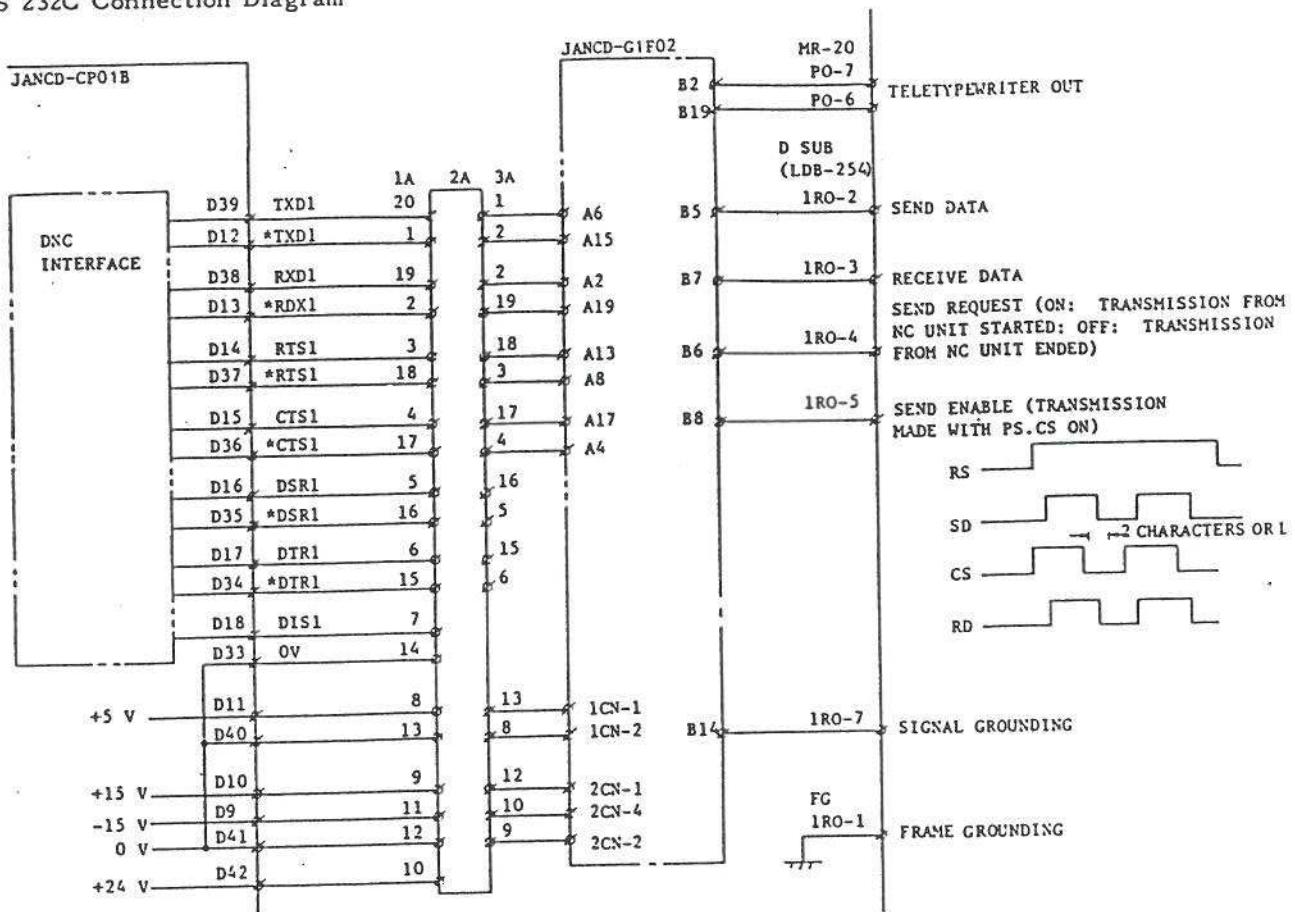


Fig. 2.8 RS 232C Connection Diagram

(3) Alarms 170, 172, 173 (MEM Error)

170: MEM error (OFS); tool offset total check error

172: MEM error (SET); setting area total check error

173: MEM error (PRM); parameter area total check error

Alarm No.	CRT Display	Location on Memory Module		
		MM02-XX	MM05	MM01C-XX
170	MEMORY ERROR (OFS)	20C, 20D	1D	3M
172	MEMORY ERROR (SET)	19C, 19D	1C	3L
173	MEMORY ERROR (PRM)	18C, 18D		
		17C, 17D		

(4) Alarm 179 (Panel Inside Temperature Tool High)

This alarm is activated when the panel inside temperature is 45°C or higher. There are two possible causes: the ambient temperature is high, or the cooling fan inside the control panel or the external ventilation fan is stopped. Check for both conditions.

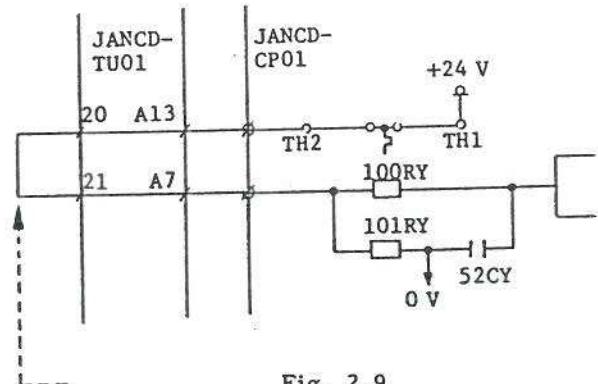


Fig. 2.9

NOTE:

- The customer (OEM) can add another the mostat (contacts usually closed).
- When the system is not in use, short-circ pins 20 and 21 at TU01 , as illustrated.

(5) Alarms 231 (X), 232 (Y), 233 (Z) (Zero Return Area Error)

As shown below, an alarm results when reference zero point return is made between DECLS and reference zero point. Note that these alarms cannot be issued on a first run after power is applied.

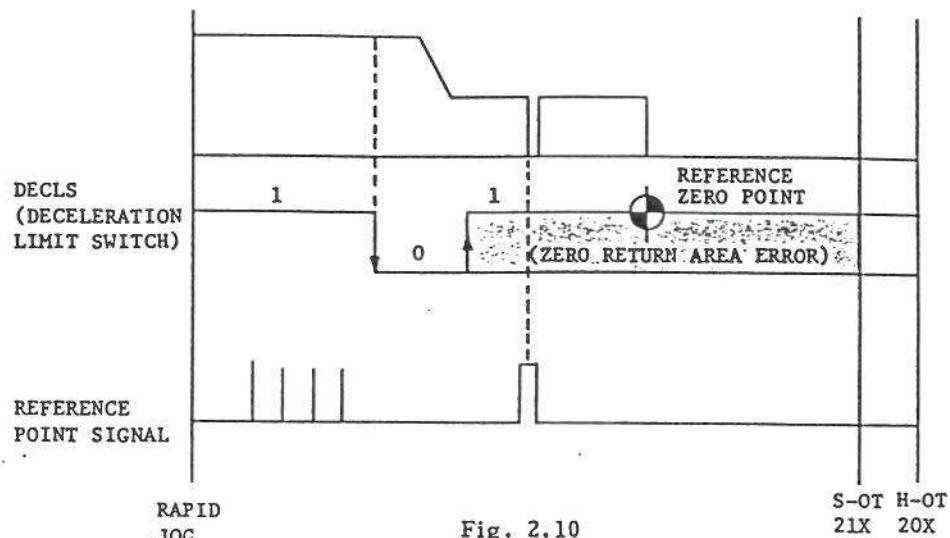


Fig. 2.10

(6) Alarms 241 (X), 242 (Y), 243 (Z) (Reference Point Return Area Errors)

This type of alarm results when the reference point return performed manually or automatically (G27 or G28) is different from the previous reference point.

NOTE: This check is made when the system No. switch is set to "0."

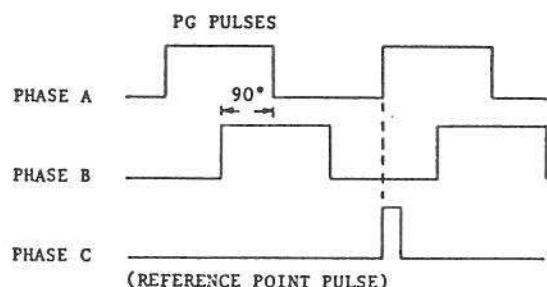


Fig. 2.11

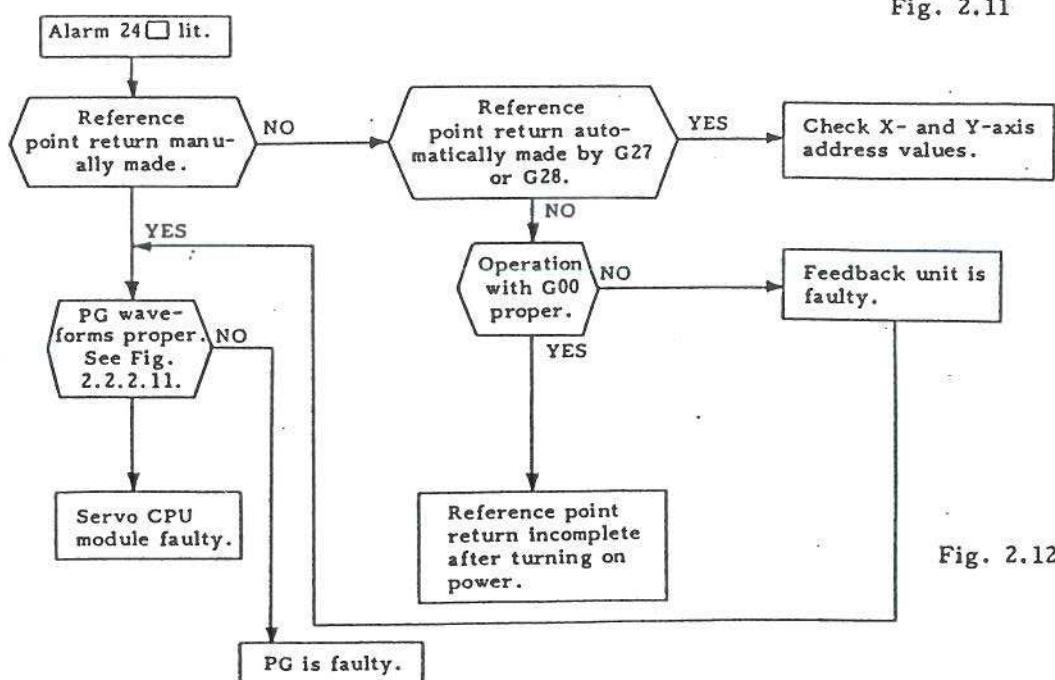
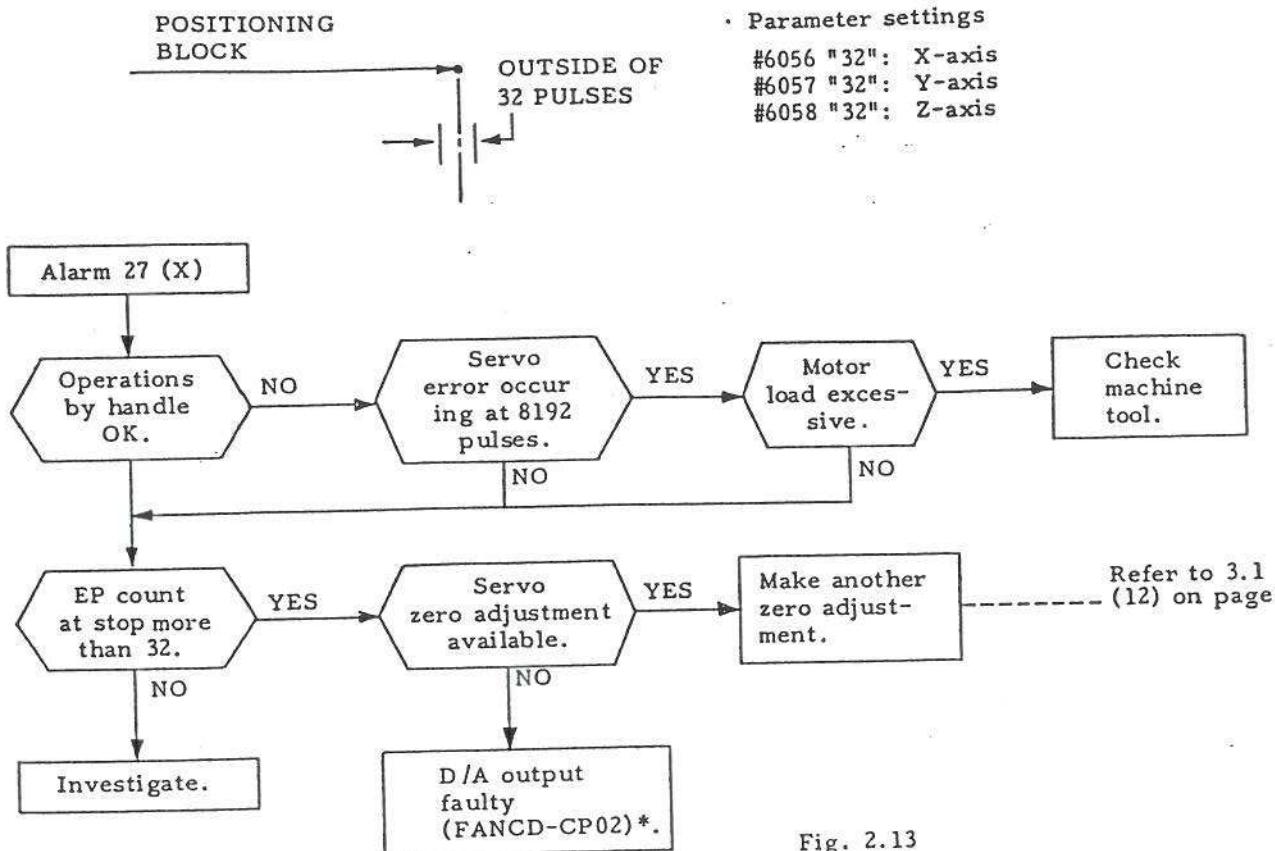


Fig. 2.12

2.2.2 COUNTERACTING ALARMS (Cont'd)

(7) Alarms 271 (X), 272 (Y), 273 (Z) (PSET Error)

This type of error results when a difference between current position value and command value is 32 pulses or below (set by parameter) after positioning according to command.



Display on the CRT is:

COMMAND X 100
POSITION X Less than 99.968
or
100.33 or more

This alarm results from the MER (machine unready) signal being off after transmission of the NC Ready Signal. Check to see if the MRD signal is normal. (See Fig. 2.14 and 2.15.)

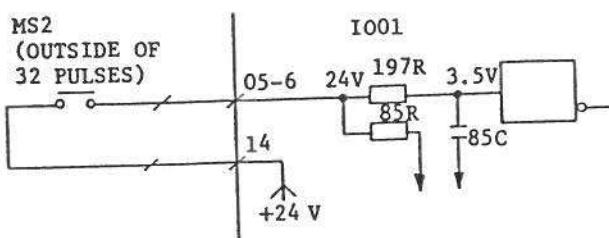


Fig. 2.14 Connection Example

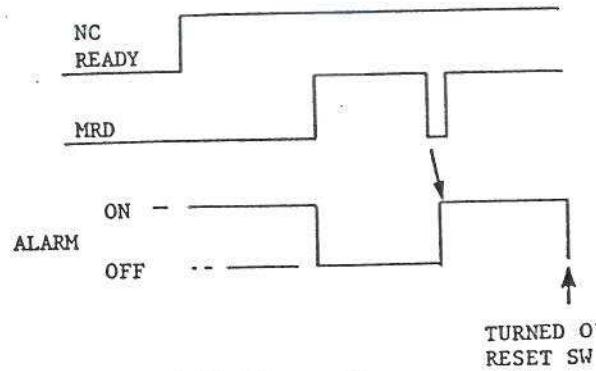


Fig. 2.15 Sequence

(9) Alarm 330 (Emergency Stop)

This alarm is displayed and the system comes to a stop when the emergency stop pushbutton is depressed or when the machine stroke end limit switch is turned on.

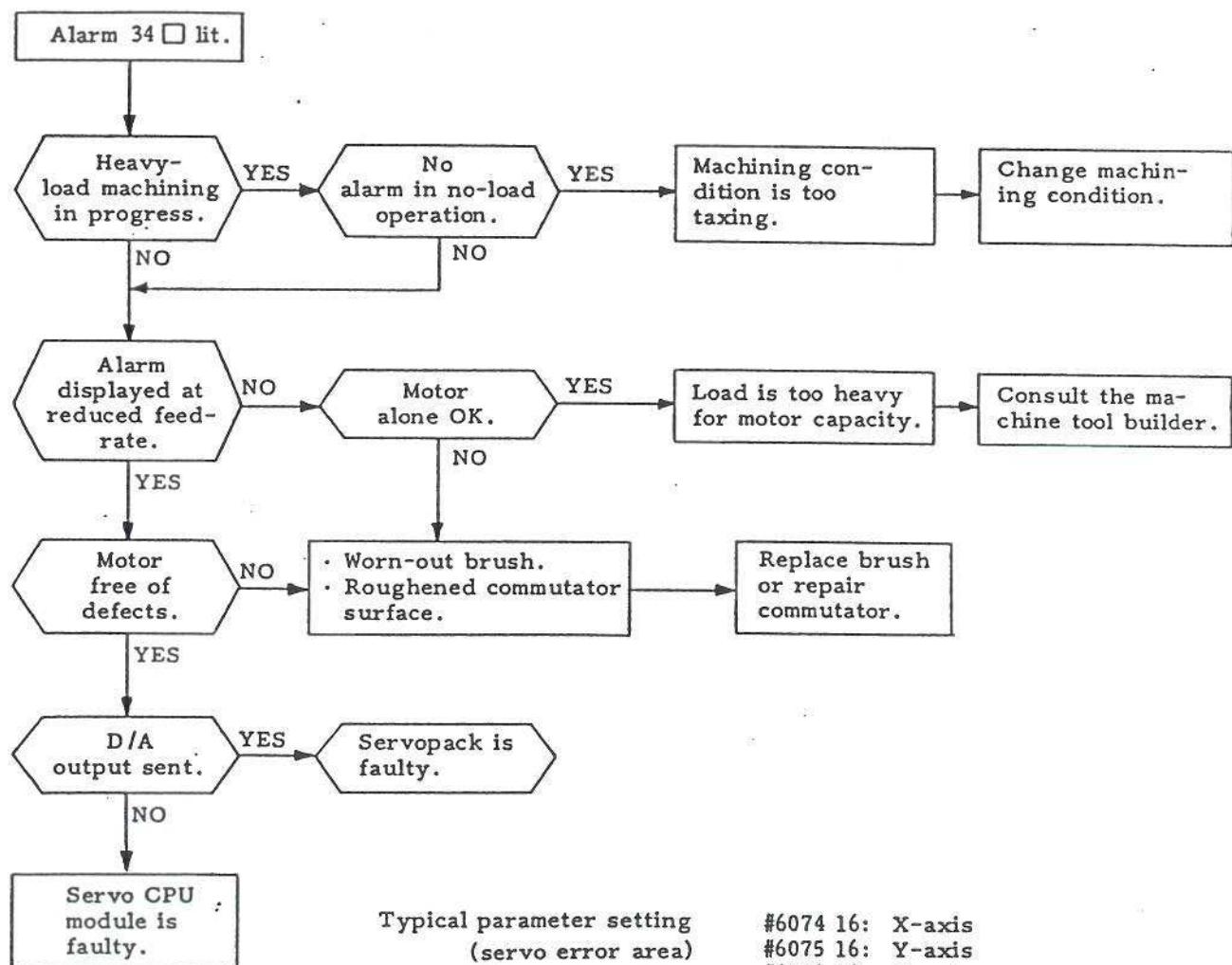
(10) Alarms 331 (X), 332 (Y), 333 (Z), 334 (4)
(Servo Fuse Blown)

(Errors)

MR-G: Servopack NFB off or tripped
MR-K: Servopack fuse blown

These errors caused by damaged transistor(s). Troubleshoot the error, take corrective action, and turn on the power again. Read the servo unit instruction manual for further details.

(11) Alarms 341 (X), 342 (Y), 343 (Z), 344 (4)
(Servo Error)



#6074 16: X-axis
#6075 16: Y-axis
#6076 16: Z-axis
#6077 16: 4th-axis



An alarm is issued when the shaded portion (follow-up deviation) in the left-hand figure exceeds 8192 pulses.

Fig. 2.16

2.2.2 COUNTERACTING ALARMS (Cont'd)

- (12) Alarms 351 (X), 352 (Y), 353 (Z)
(Overload (1))

MR-G: Servopack thermal relay trip
MR-K: Electronic thermal relay trip

These alarms indicate overload. Check the machining condition or machine tool load.

Table 2.3

Servomotor Type (With feedback unit)		Servopack Type	Thermal Relay Type ⁽¹⁾
Minertia Motor	UGMMEM-06AA1SF	CPCR-MR023G <input checked="" type="checkbox"/> Note	RH-35/6.2HV
	UGMMEM-13AA1SF	CPCR-MR053G <input checked="" type="checkbox"/>	RH-35/6.9HV
	UGMMEM-25AA1SF	CPCR-MR073G <input checked="" type="checkbox"/>	RH-35/12.5HV
	UGMMEM-50AA1SF	CPCR-MR153G <input checked="" type="checkbox"/>	RH-35/12.5HV
	UGMMEM-1AAA1SF	CPCR-MR553G <input checked="" type="checkbox"/>	RH-35/24.5HV
Minertia Motor J Series	UGJMED-40LA2OF	CPCR-MR054G <input checked="" type="checkbox"/>	RH-35/7.8HV
	UGJMED-60MA2OF	CPCR-MR084G <input checked="" type="checkbox"/>	RH-35/7T
	UGJMED-60LA2OF	CPCR-MR154G <input checked="" type="checkbox"/> 2	RH-35/15T1
	UGJMED-80MA2OF	CPCR-MR154G <input checked="" type="checkbox"/>	RH-35/15T2
	UGJMED-80LA2OF	CPCR-MR224G <input checked="" type="checkbox"/>	RH-35/26T
	UGJMED-80KA2OF	CPCR-MR374G <input checked="" type="checkbox"/>	RH-35/30T
Cup Motor A Series	UGC MED-04AA1SF	CPCR-MR052G <input checked="" type="checkbox"/>	RHK-35/8C
	UGC MED-08AA1SF	CPCR-MR082G <input checked="" type="checkbox"/>	RHK-36/6.4C
	UGC MED-15AA1SF	CPCR-MR152G <input checked="" type="checkbox"/>	RHK-35/11.2C
	UGC MED-22A1SF	CPCR-MR222G <input checked="" type="checkbox"/>	RHK-35/17C
	UGC MED-37AA1SF	CPCR-MR552G <input checked="" type="checkbox"/> 1	RH-35/27HV
Hi-Cup Motor G Series	UGH MED-03GG2OF	CPCR-MR055G <input checked="" type="checkbox"/>	RHK-35/8C
	UGH MED-06GG2OF	CPCR-MR085G <input checked="" type="checkbox"/> 2	RHK-35/6.4C
	UGH MED-12GG2OF	CPCR-MR155G <input checked="" type="checkbox"/> 2	RHK-35/10.5C
	UGH MED-20GG2OF	CPCR-MR225G <input checked="" type="checkbox"/> 2	RHK-35/16C
	UGH MED-30GG2OF	CPCR-MR555G <input checked="" type="checkbox"/> 2	RH-35/21HV

(1) Thermal relay is built-in the servomotor controller Servopack.

Note: is filled with a revision letter and changed with product modification.

(13) Alarm 357 (Overload (2))

Regenerative resistance: provided for Servopack Type MR08 or larger.
 Thermostat: provided for minertia motor junior series

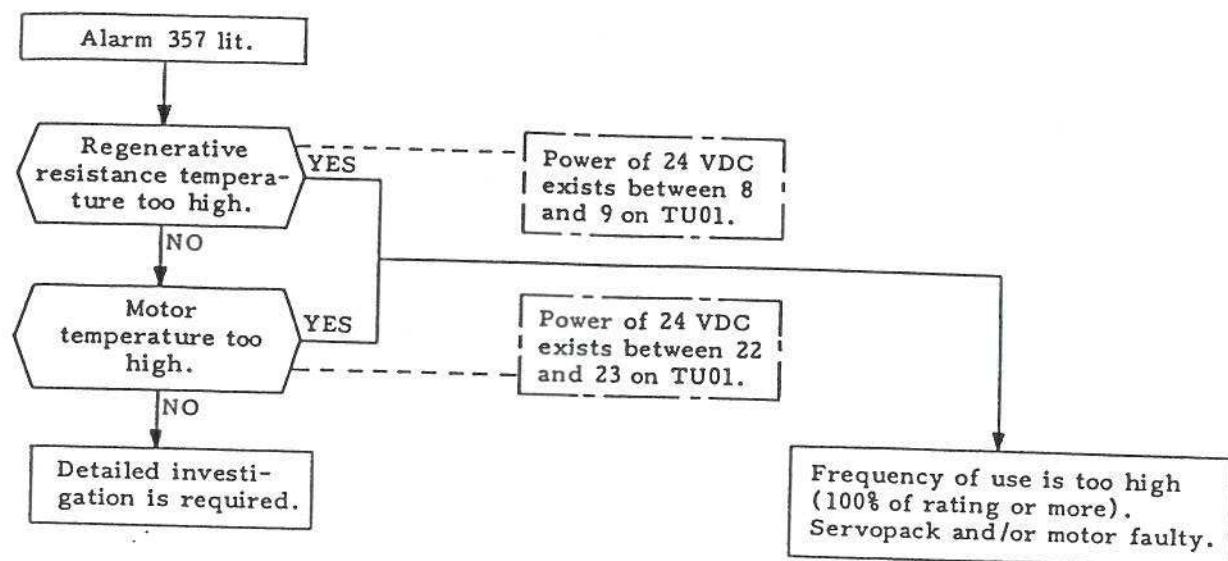


Fig. 2.17

Connection Diagram (for type MR-G)

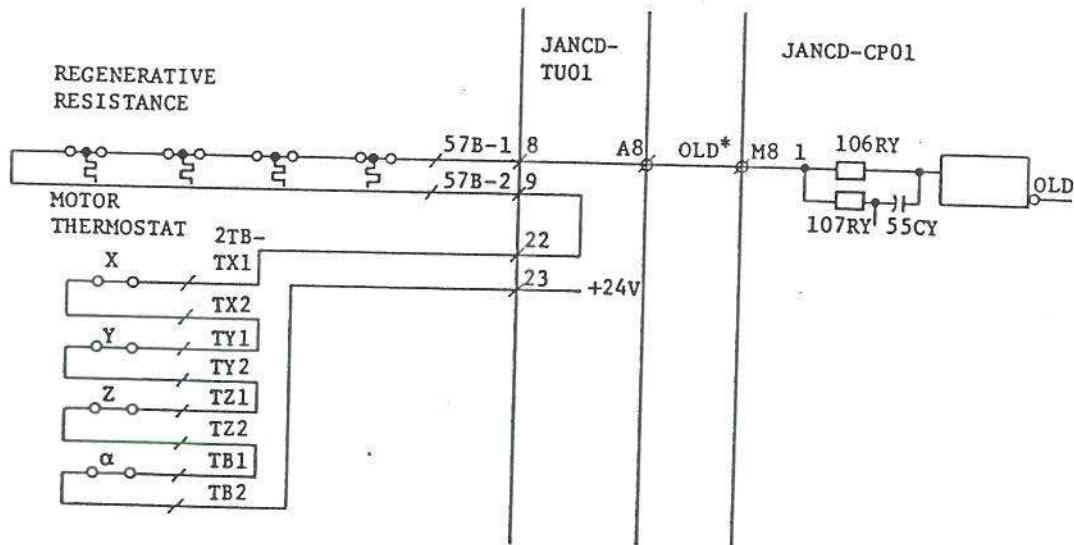


Fig. 2.18

2.2.2 COUNTERACTING ALARMS (Cont'd)

(14) Alarms 361 (X), 362 (Y), 363 (Z) (PG error)

The possible cause is that no PG input is given to the servo CPU module despite the Servopack TGON signal being turned on.

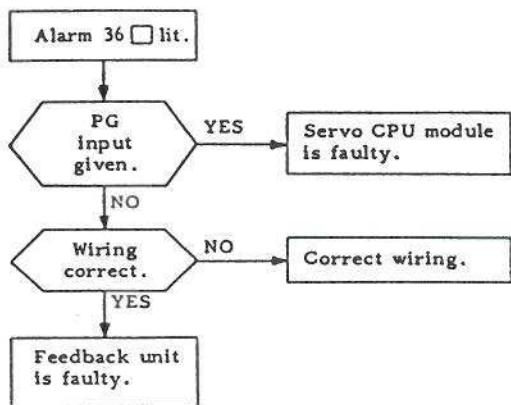


Fig. 2.19

PG Waveforms (type ZC7)

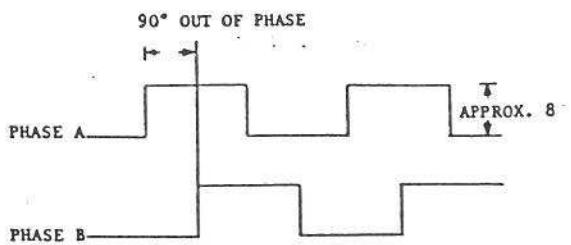


Fig. 2.20

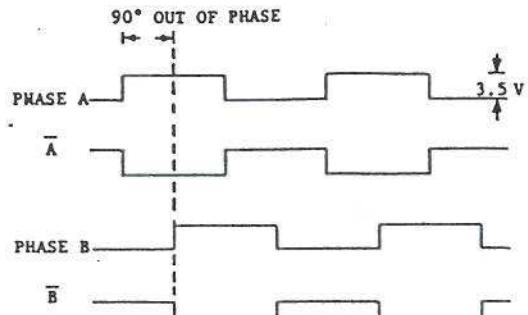


Fig. 2.21

(15) Alarms 391 (X), 392 (Y), 393 (Z) (TG error)

MR-K: The alarm is lit when PG and/or TG is wired in reverse or disconnected, or when A and B on the motor are wired in reverse.

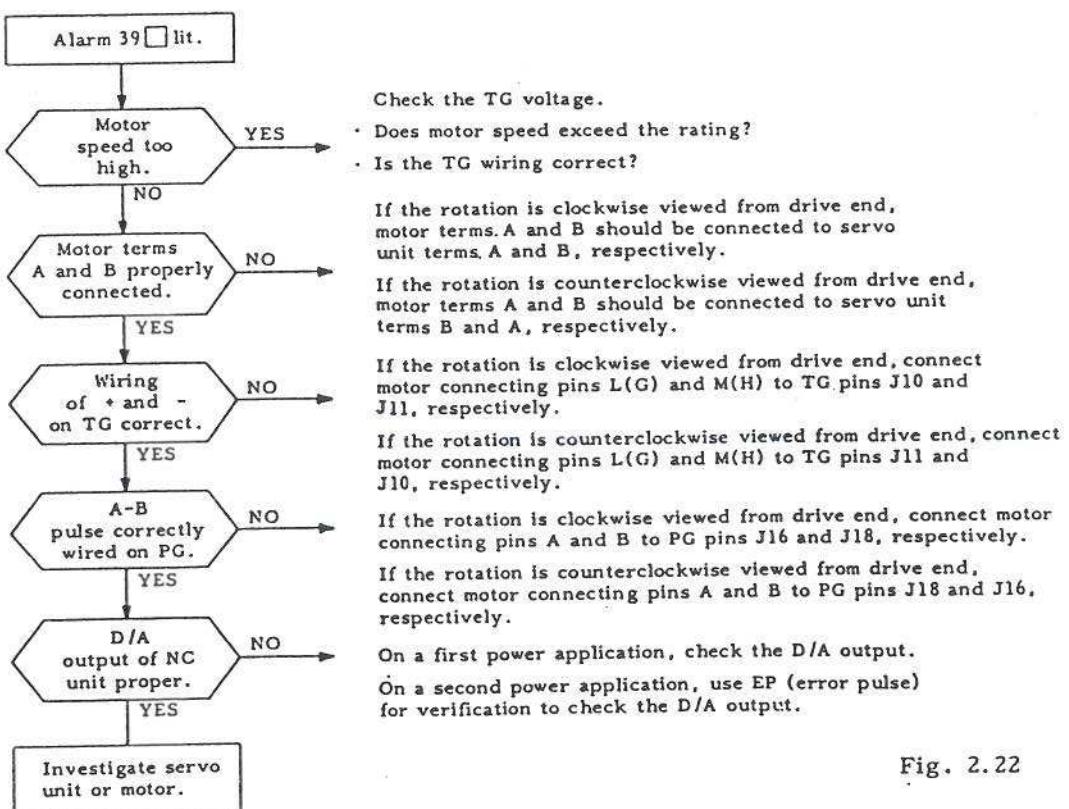


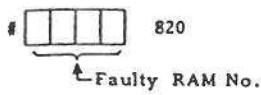
Fig. 2.22

(16) Alarm 810 (CPU error)

This alarm is displayed when a CPU malfunction prevents the operation.

(17) Alarm 820

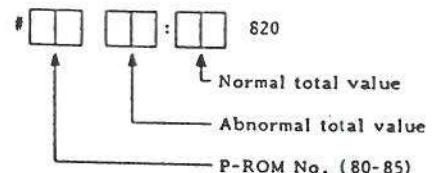
(1) RAM check error



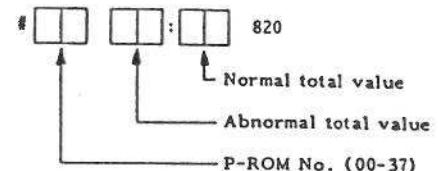
RAM No. and Location

RAM No.	Memory Module Type MM	Location on Module Board	RAM No.	Memory Module Type MM	Location on Module Board	RAM No.	Memory Module Type MM	Location on Module Board
#98	01C	2E	#105	01B	11C	#111	01B	8C
#99	01C	2C		01C	3D		01C	5C
#100	01B	13D	#106	01B	10D	#112	01B	7D
	01C	2F		01C	4E		01C	5F
#101	01B	13C	#107	01B	10C	#113	01B	7C
	01C	2D		01C	4C		01C	5D
#102	01B	12D	#108	01B	9D	#500	(CP02)	27C
	01C	3E		01C	4F	#501	(CP02)	27A
#103	01B	12C	#109	01B	9C			
	01C	3C		01C	4D			
#104	01B	11D	#110	01B	8D			
	01C	3F		01C	5E			

(2) CP02 error



(3) MM01 error



2.3 TROUBLESHOOTING WITHOUT ALARM CODES

The following flow charts are the instructions for correcting troubles not shown by alarm codes, in which basic operations are abnormal.

(1) Power cannot be applied.

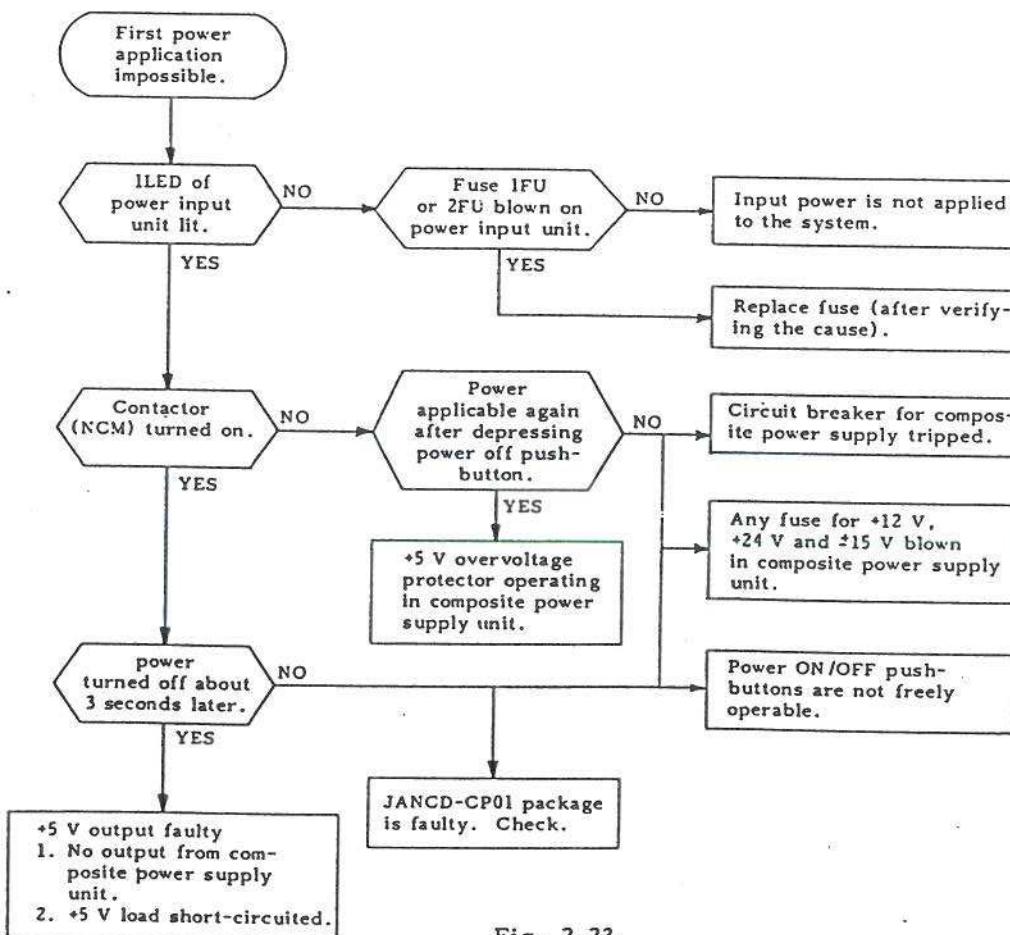
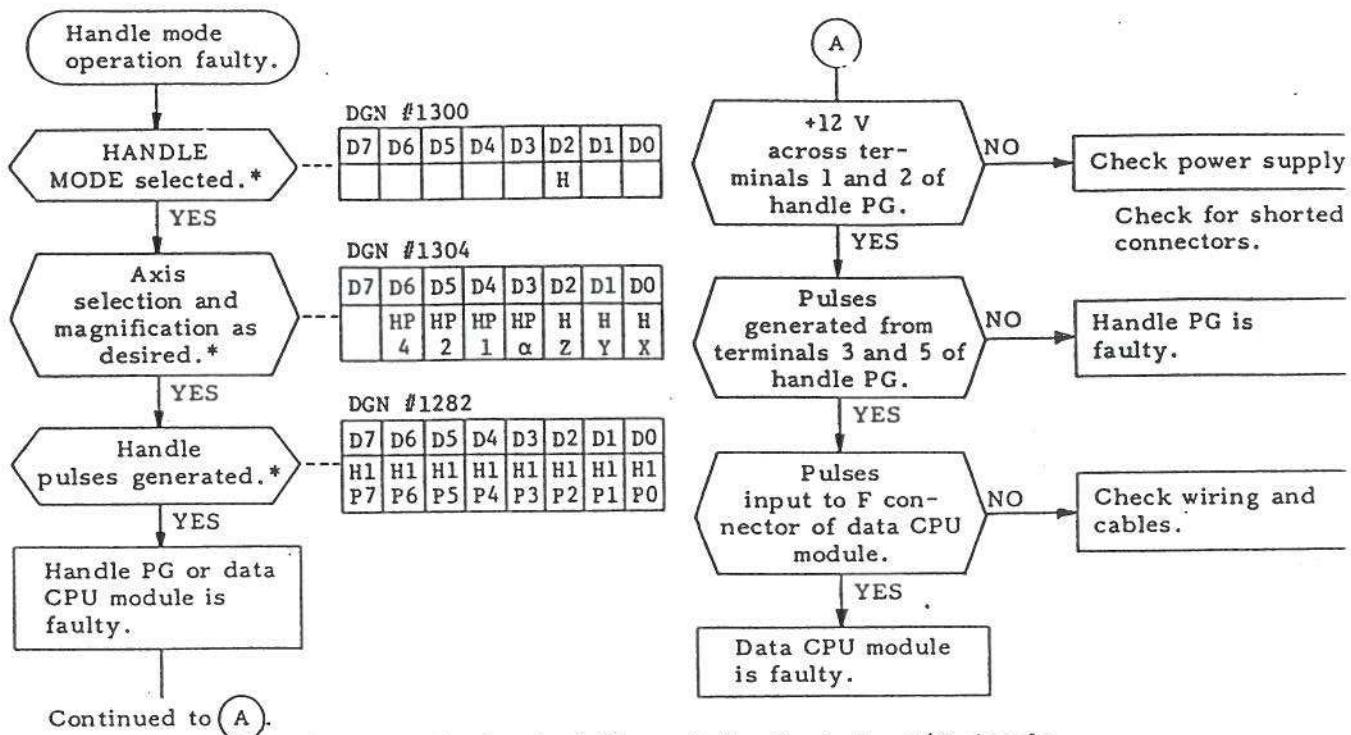


Fig. 2.23

2.3 TROUBLESHOOTING WITHOUT ALARM CODES (Cont'd)

(2) HANDLE MODE operation is faulty.



* These checks should be made by displaying I/O signals.
Displayed at right side of each check item is the correct signal states.

NOTE: Set correctly the parameter #6272 (maximum manual handle feedrate;
1 = 7.5 mm/min.)

Fig. 2.24

Handle PG Connection Diagram

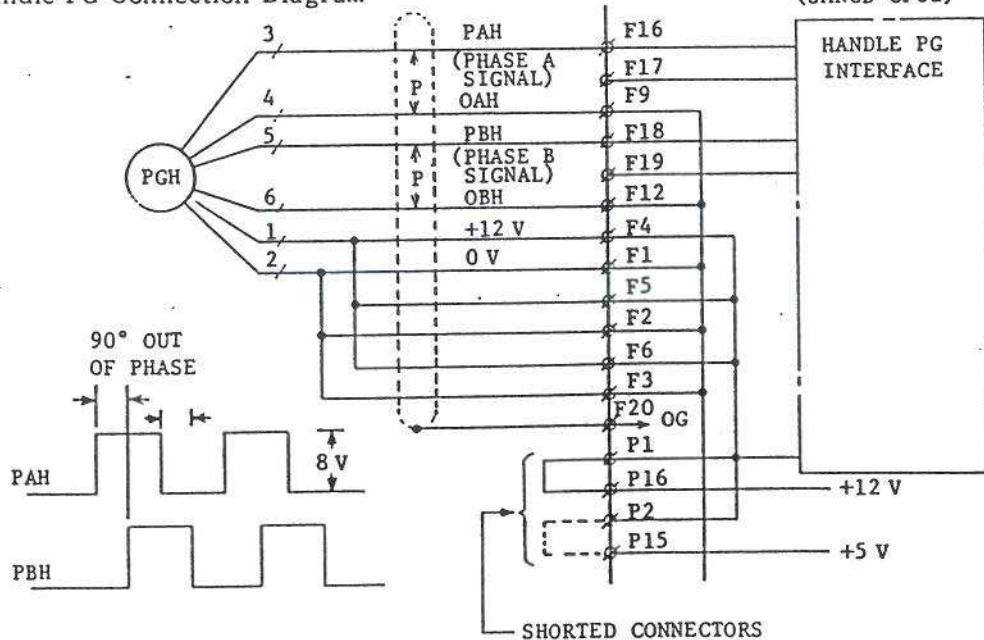


Fig. 2.25

(3) Manual jog mode operation faulty

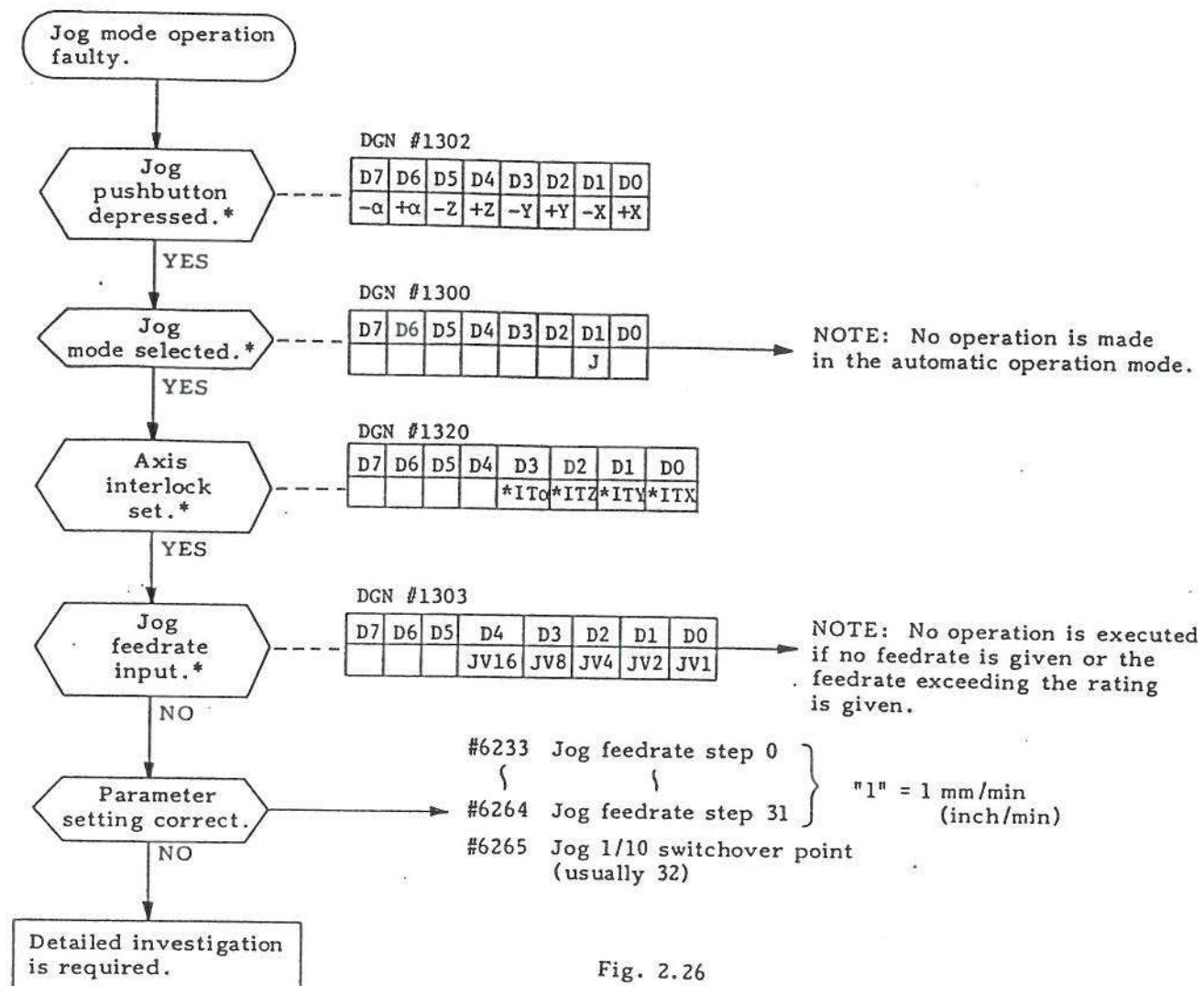


Fig. 2.26

* These checks should be made by displaying I/O signals.
 Displayed at right side of each check item is the correct signal states.

2.3 TROUBLESHOOTING WITHOUT ALARM CODES (Cont'd)

(4) Manual rapid mode operation faulty

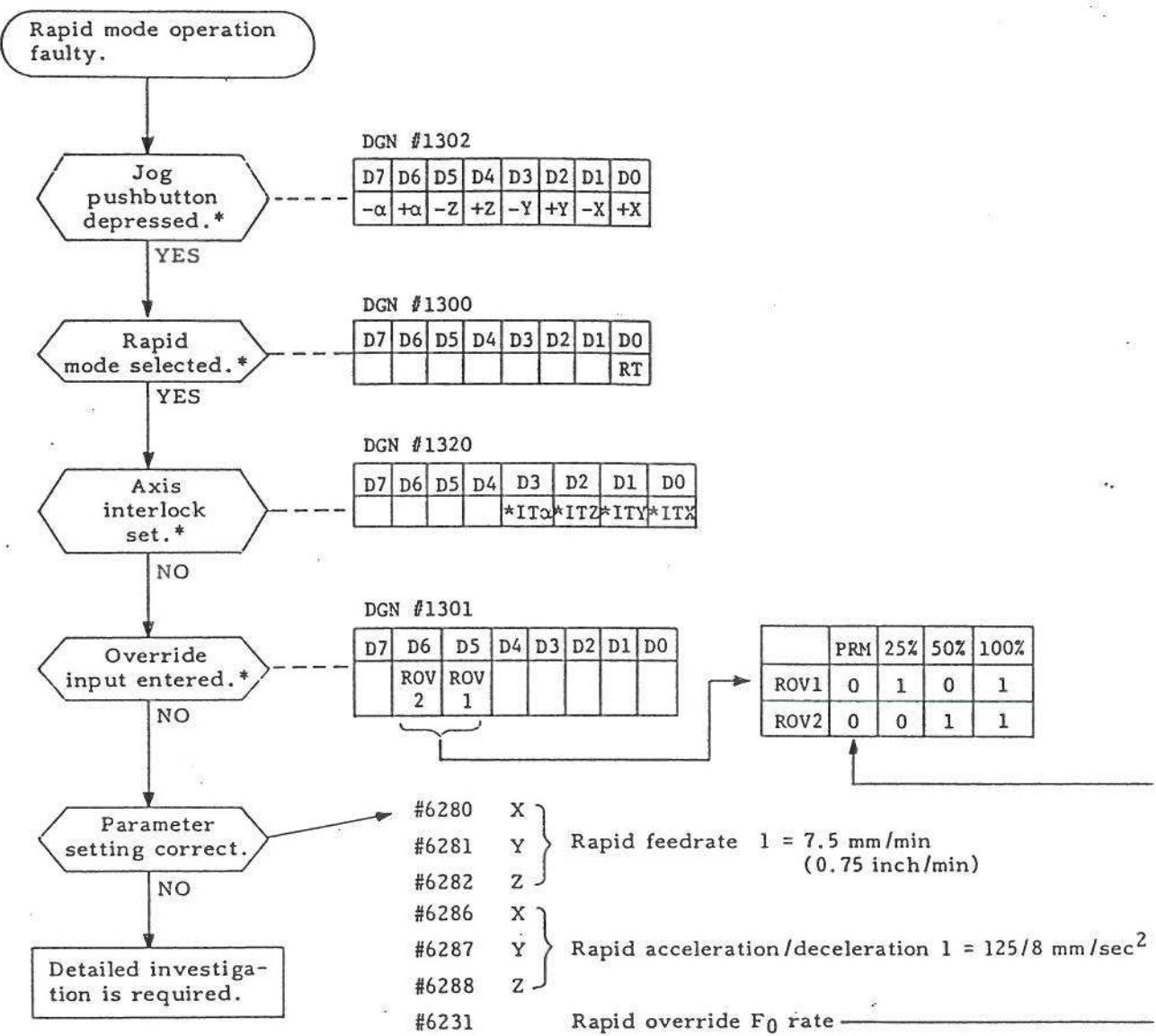


Fig. 2.27

* These checks should be made by displaying I/O signals.
 Displayed at right side of each check item is the correct signal status.

(5) Manual reference zero return operation faulty

(i)

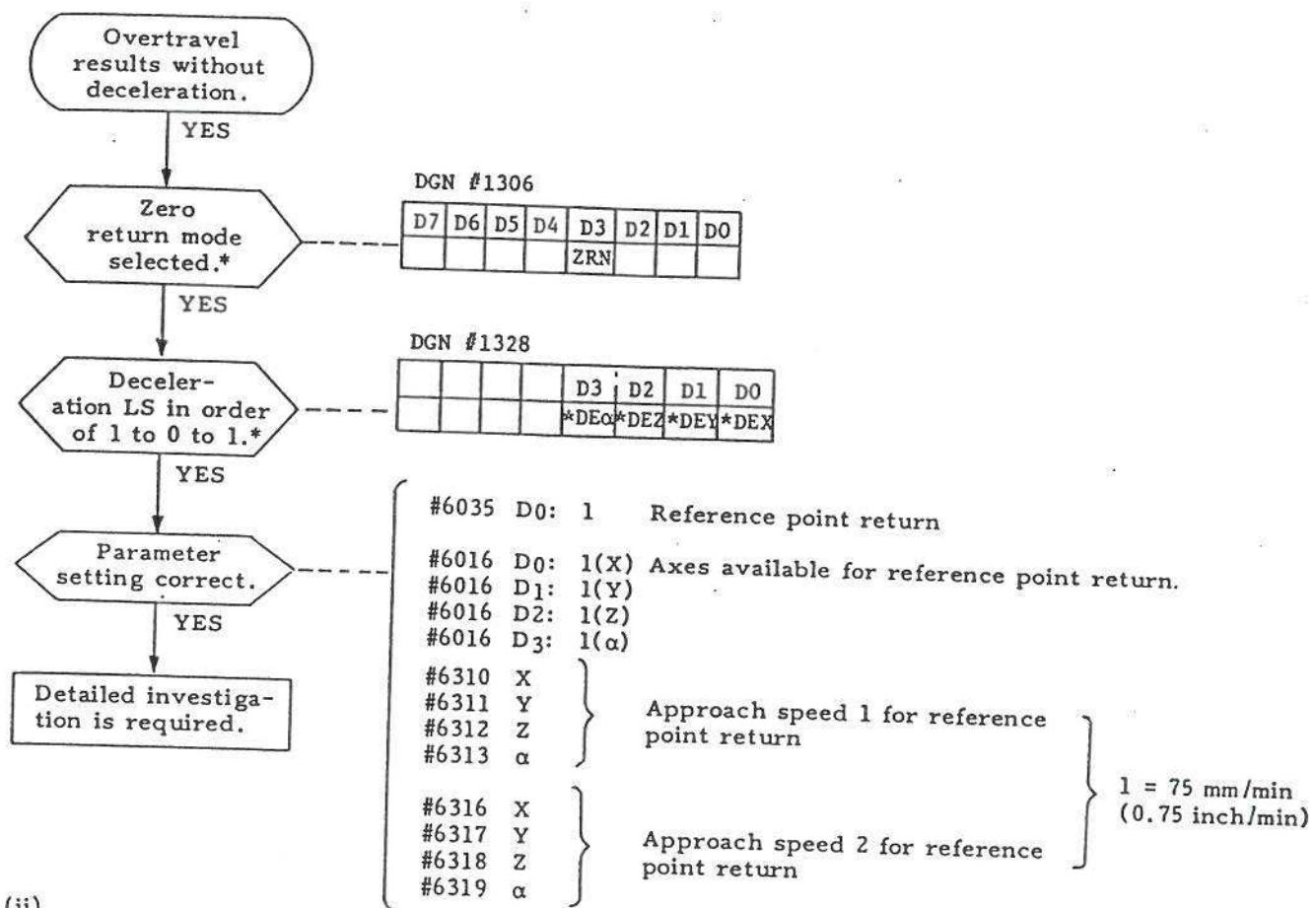


Fig. 2.28

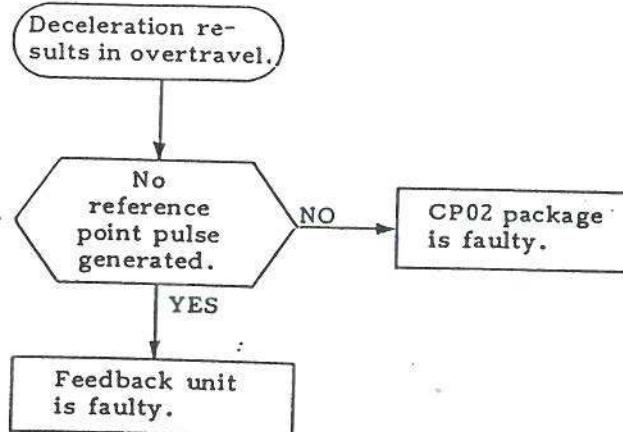


Fig. 2.29

* These checks should be made by displaying I/O signals.
Displayed at right side of each check item is the correct signal status.

2.3 TROUBLESHOOTING WITHOUT ALARM CODES

(6) Cycle start failure

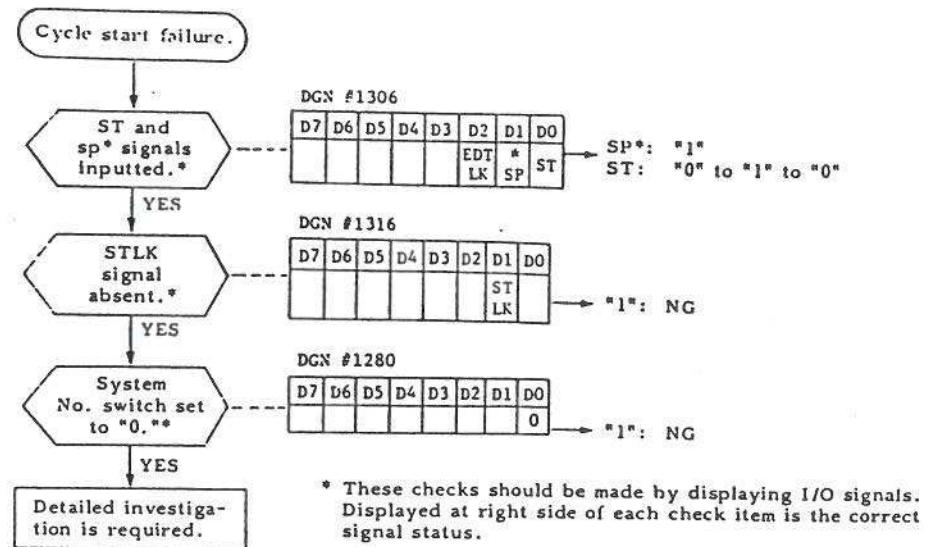


Fig. 2.30

(7) No operation available with G01, G02 or G03

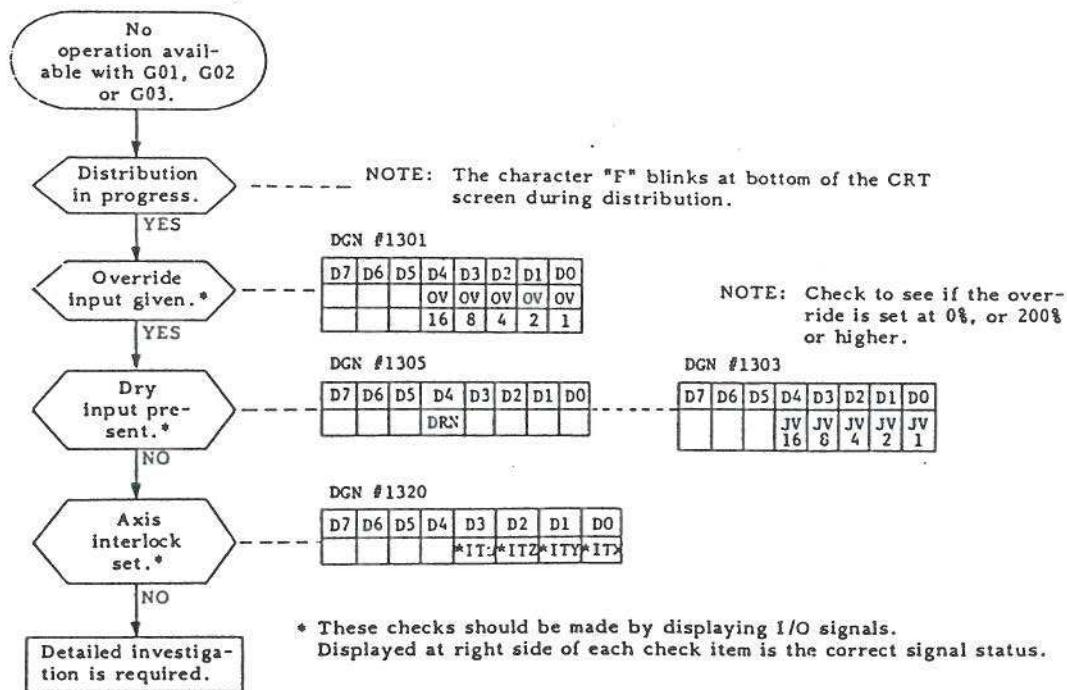


Fig. 2.31

(8) Spindle does not rotate.

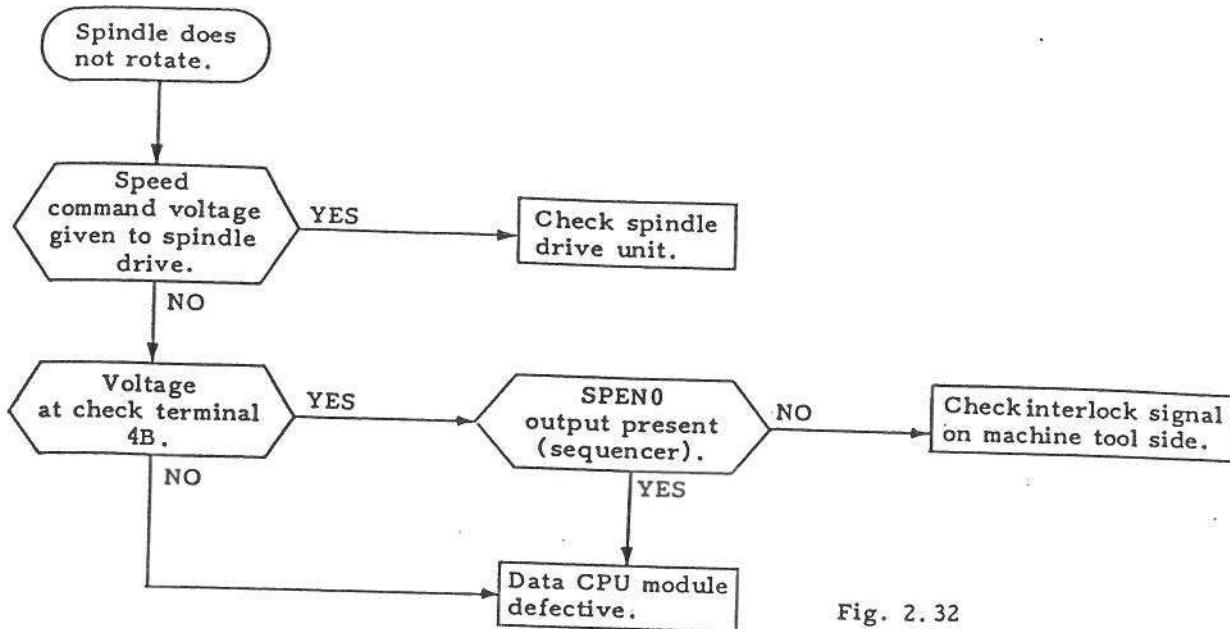


Fig. 2.32

• Connection Diagram for Spindle

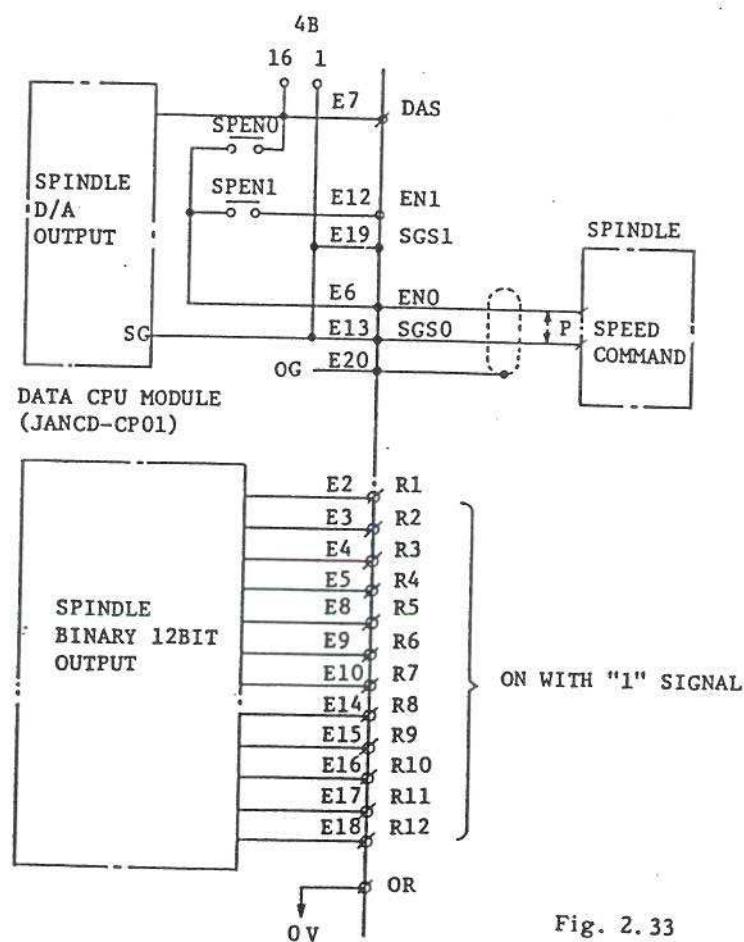


Fig. 2.33

2.3 TROUBLESHOOTING WITHOUT ALARM CODES (Cont'd)

(9) CRT screen display faulty

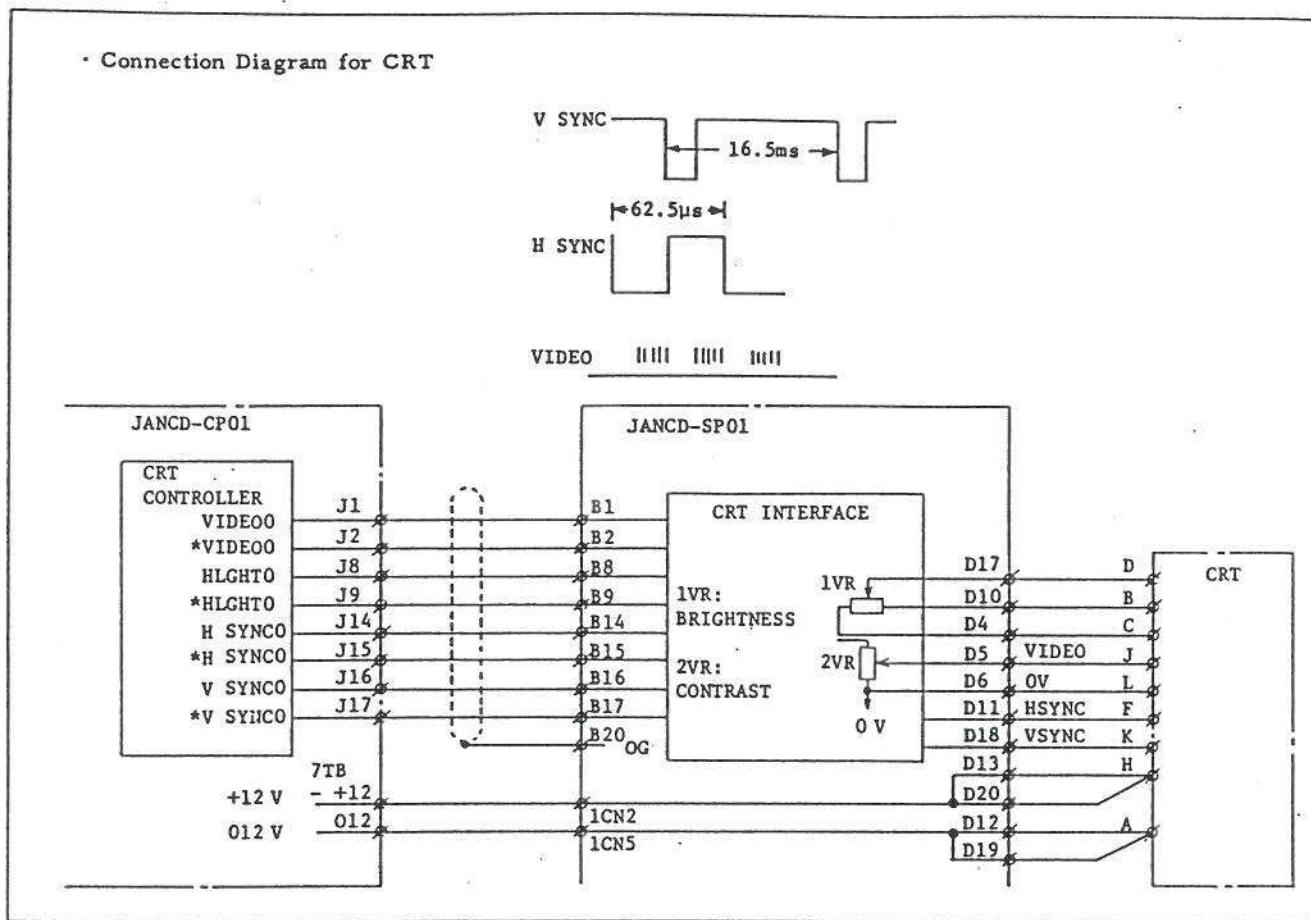


Fig. 2. 34

(1) Description of CRT Signals

H SYNC and VIDEO signals

A. In normal state

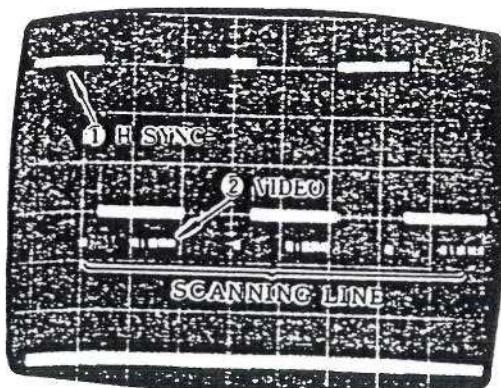


Fig. 2. 35

B. With no VIDEO signal

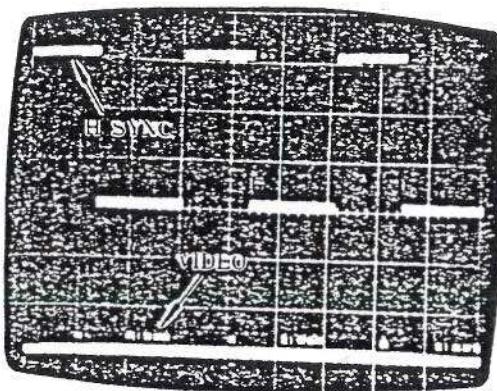


Fig. 2. 36

C. With no H SYNC signal

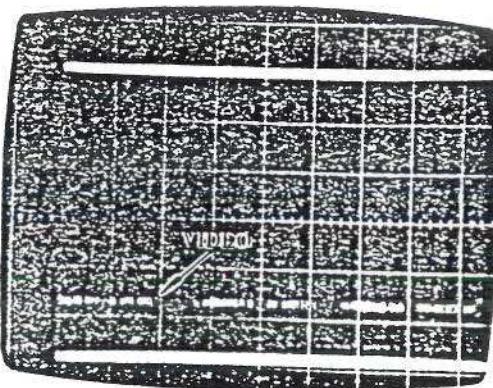


Fig. 2. 37

Use a 2-channel oscilloscope.

In the left-hand figure, 1 represents the H SYNC signal and 2 the VIDEO signal.

- With VIDEO signal 2, the screen brightness is in proportion to the number of characters. The screen is least bright in the alarm mode, and brightest in PRM and DGN modes.
- Check the signal 1 by measuring the voltage across CRT connectors L and F. Check the signal 2 by measuring L and J.

If synchronization is not obtained, have the H SYNC signal triggered.

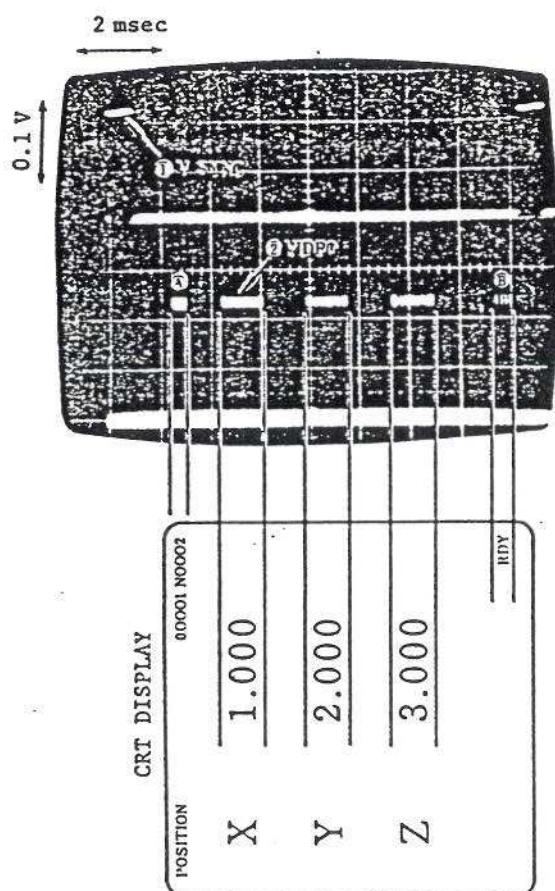
- The screen appears as shown left when no H SYNC signal comes in.
- Either JANCD-CP01 or JANCD-SP01 is defective. As shown in the left-hand figure, the VIDEO signal drops in level and remains unchanged even if the characters are changed on the screen.

- The screen appears as shown left when no H SYNC signal comes in.
- The screen disappears, and the mask is not visible even with the Bright Control turned on.

2.3 TROUBLESHOOTING WITHOUT ALARM CODES (Cont'd)

(2) V SYNC and VIDEO signals

A. In normal state



Use a 2-channel oscilloscope.

In the left-hand figure, 1 represents the V SYNC signal (across CRT connectors L and K) and 2 the VIDEO signal (across CRT connectors L and J).

- With the VIDEO signal, the CRT screen appears as bright as viewed crosswise. As shown left, the scanning lines are most dense in the POS mode with PRM and DGN. Only A and B appear in the ALM mode when corresponding alarm is not detected.

NOTE: With no synchronization, have the V SYNC signal triggered.

B. With no VIDEO signal

The above VIDEO waveforms disappear, the V SYNC alone remains, and the CRT screen disappears. But the mask is visible by operation of the Bright Control.

C. With no V SYNC signal

The characters on the screen shift vertically. The waveforms are the same as shown in Fig. 2.3.5.

- If the H SYNC, V SYNC and VIDEO signals are normal and the screen fails to appear, the CRT unit is defective.
- If the waveforms of the H SYNC, V SYNC and/or VIDEO signal are abnormal, check or replace JANCD-CP01 or NANCD-SP01.

Fig. 2.38

2.4 SUPPLY VOLTAGE CHECK

2.4.1 CHECK POWER SUPPLY VOLTAGE

ILED: Glows red while power is being applied to the NC unit.

1FU, 2FU:
Either of these glass-encased fuses turns off ILED when blown.

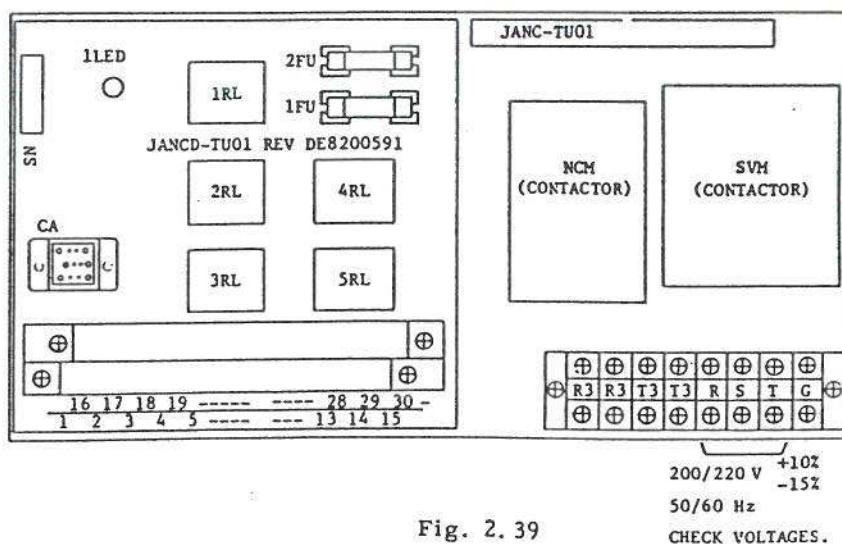


Fig. 2.39

2.4.2 DC POWER SUPPLY VOLTAGE CHECK

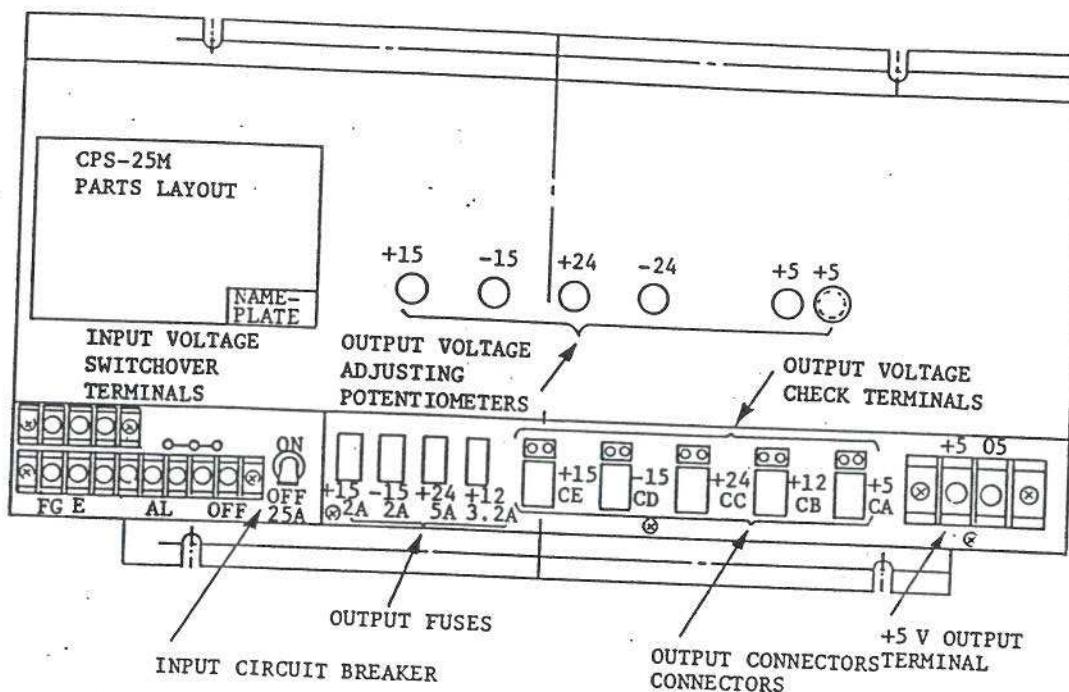


Fig. 2.40

(1) Switchover by input power supply voltage

Switch the input power supply voltage switch-over terminal common bars (see Fig. 2.4.2) according to the input power supply voltage.

(2) Specifications of composite power supply unit

Table 2.4

Rated output	Rated current	Allowable voltage range	Applications
+5 V	25 A	5.15 V	Logic circuitry, reed relay
+12 V	2 A	11.88 - 12.12 V	CRT, memory
+24 V	4.2 A	23.76 - 24.24 V	Tape reader, CRT I/O signals
+15 V	1.5 A	14.85 - 15.15 V	Position control circuitry
-15 V	1.5 A	-14.85 - -15.15 V	Position control circuitry

Each output voltage is factory-set and usually requires no further adjustment. But if any output voltages are not in allowable voltage range,

adjust to the normal value using voltage adjusting potentiometers.

2.5 STATUS DISPLAY BY ON-LINE DIAGNOSTICS FUNCTION (DCN)

When the I/O section of the NC unit is suspected of failure, diagnostic numbers can be keyed in on the NC control panel to display and check I/O signals for status.

2.5.1 OUTLINE OF DISPLAYS

Diagnostic No.	Display contents
#1000 - #1096	Input signals for machine tool
#1100 - #1157	Output signals to machine tool
#1200 - #1291	Output signals to power sequence (PC)
#1300 - #1350	Input signals from power sequence (PC)

NOTE: With a power sequence (PC) setup built in, signals #1000 to #1157 vary in meaning depending on each power sequence program. Read the machine tool builder's manual.

2.5.2 OPERATING PROCEDURE TO DISPLAY INPUT/OUTPUT SIGNALS

- Depress the (DGN) key.

A page containing the diagnostic number specified previously will appear on the CRT screen, with the status of I/O signals displayed in "1," "0" and hexadecimal digits.

- Key in the diagnostic number to be displayed, and depress the CURSOR \downarrow or \uparrow key. This will change the screen to the page containing keyed-in number.

"1": contact closed
"0": contact open

The data on each line is displayed in hexadecimal digits in the rightmost positions on the screen.

HEXADECIMAL NOTATION

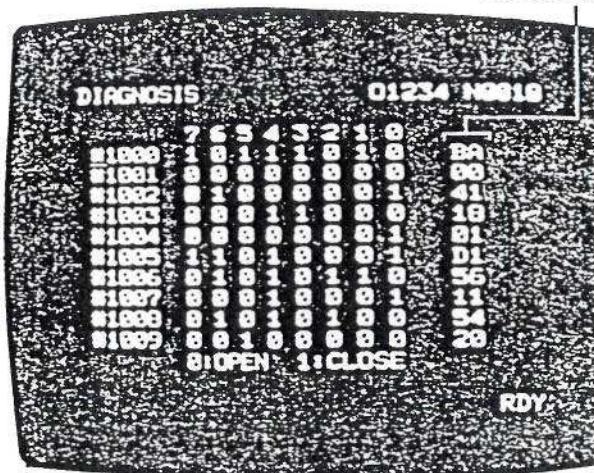


Fig. 2.41 Example of Input/Output Signal Display

- Press the CURSOR \downarrow key.

The cursor will move down by 1 line to the next diagnostic number. Keeping this key depressed continuously moves down the cursor. When the cursor reaches the last lower line, the screen switches to the next page.

- Press the CURSOR \uparrow key.

The cursor will move up by 1 line to the previous diagnostic number. Keeping this key depressed continuously moves up the cursor. When the cursor reaches top line, the screen switches to the previous page.

- Depress the PAGE \downarrow key.

The next page will be displayed.

- Depress the PAGE \uparrow key.

The previous page will be displayed.

2.5.3 LIST OF STANDARD INPUT/OUTPUT SIGNALS

Table 2.5.3 shows the list of I/O diagnostic numbers and their corresponding I/O signal names.

DISPLAY

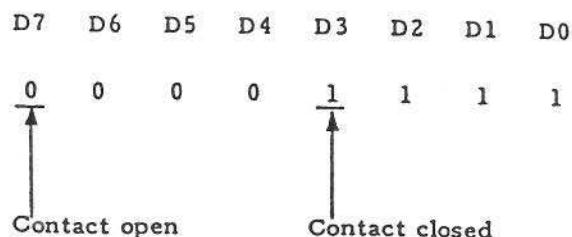


Table 2.5 List of Standard Input Signals

Table 2.5 List of Standard Input Signals (Cont'd)

	D7	D6	D5	D4	D3	D2	D1	D0
#1309			4NG					
				4TH AXIS NEGLECT				
#1310					2Ha	2HZ	2HY	2HX
					SECOND HANDLE AXIS SELECT			
#1311					3Ha	3HZ	3HY	3HX
					THIRD HANDLE AXIS SELECT			
#1312	PLYBK						EXC1	ESCO
PLAYBACK							EXT STROKE CHECK SELECTION	
#1315								
#1316	EFIN	FIN	RWD	EOP	ERS	EXTC	STLK	MRD
COMMAND CYCLE	MST COMPLE-	EXTERNAL REWIND	END PRO-	EXTERNAL RESET	EXTERNAL TIME	CYCLE START	FUNCTION PREP	
	TION		GRAM		COUNT		COMPLETED	
#1317	S-INV	S-FIN	*S-STP	SAGR	SOR	GRB	GRA	GST
SPINDLE REVERSE	S FIN		SPINDLE COINCIDENCE	SPINDLE INDEXING	GEAR GEAR		GEAR SHIFT	
					SELECTION			
#1318	ERR2	ERR1	ERRO			EXOUT	EXVER	EXIN
DEC TO STOP	IMMEDI- ATE	SINGLE BLOCK			EXTERNAL OUTPUT	EXTERNAL COLLATION	EXTERNAL INPUT	
	STOP		STOP					
#1319	*-L α	*+L α	*-LZ	*+LZ	*-LY	*+LY	*-LX	*+LX
					OVERTRAVEL			
#1320					*IT α	*ITZ	*ITY	*ITX
					AXIS INTERLOCK			
#1321	*-ED α	*+ED α	*-EDZ	*+EDZ	*-EDY	*+EDY	*-EDX	*+EDX
					EXTERNAL DECELERATION			
#1322					*SVOFa	*SVOFZ	*SVOFY	*SVOFX
					SERVO OFF			
#1323	UI7	UI6	UI5	UI4	UI3	UI2	UI1	UI0
					USER MACRO			

Table 2.5 List of Standard Input Signals (Cont'd)

Table 2.5 List of Standard Input Signals (Cont'd)

	D ₇	D ₆	D ₅	D ₄	D ₃	D ₂	D ₁	D ₀
#1180	SDAC8	SDAC7	SDAC6	SDAC5	SDAC4	SDAC3	SDAC2	SDAC1
S-FUNCTION D/A OUTPUT								
#1181	SDAC16	SDAC15	SDAC14	SDAC13	SDAC12	SDAC11	SDAC10	SDAC9
S-FUNCTION D/A OUTPUT								
#1182	SB08	SB07	SB06	SB05	SB04	SB03	SB02	SB01
S-FUNCTION NON-CONTACT OUTPUT								
#1183					SB012	SB011	SB010	SB09
S-FUNCTION NON-CONTACT OUTPUT								
#1184							SEN1	SENO
EXTER- INTERNAL NAL D/A D/A								

Table 2.6 List of Standard Output Signals

	D ₇	D ₆	D ₅	D ₄	D ₃	D ₂	D ₁	D ₀
#1200	M30	M02	M01	M00	DEN	OP	SPL	STL
					POSITION- ING COM- PLETED	FEED- ING	TEMPO- RARY	CYCLE START
#1201	2ZPa	2ZPZ	2ZPY	2ZPX	1ZPa	1ZPZ	1ZPY	1ZPX
	SECOND REFERENCE POINT LAMP				FIRST REFERENCE POINT LAMP			
#1202	4ZPa	4ZPZ	4ZPY	4ZPX	3ZPa	3ZPZ	3ZPY	3ZPX
	FOURTH REFERENCE POINT LAMP				THIRD REFERENCE POINT LAMP			
#1216	T8/T28	T7/T24	T6/T22	T5/T21	T4/T18	T3/T14	T2/T12	T1/T11
	FOR CANNED CYCLE				T FUNCTION BINARY/BCD OUTPUT			
#1217	T16/T48	T15/T44	T14/T42	T13/T41	T12/T38	T11/T34	T10/T32	T9/T31
	FOR CANNED CYCLE				T FUNCTION BINARY/BCD OUTPUT			
#1218	TAP	M04S	TLMO	G80S	EREND	ESEND	RST	AL
	TAPPING SPINDLE TOOL LENGTH MEASURE-	CHANNELED CYCLE MENT	EXTERNAL DATA INPUT COMPLET-	EXTERNAL DATA INPUT COMPLET-	RESET		ALARM	
	REVERSE STOP	OPERATION	B-FUNC-TION	T-FUNC-TION	S-FUNC-TION	M-FUNC-TION		
#1219	SRV	SSP	EMF	EF	BF	TF	SF	MF
	SPINDLE REVERSE	SPINDLE STOP	MF	EXTERNAL OPERA-	B-FUNC-TION	T-FUNC-TION	S-FUNC-TION	M-FUNC-TION
	FOR CANNED CYCLE			TION				
#1220	SB8	SB7	SB6	SB5	SB4	SB3	SB2	SB1
	FOR CANNED CYCLE				S-FUNCTION BINARY OUTPUT			
#1221					SB12	SB11	SB10	SB9
	FOR CANNED CYCLE				S-FUNCTION BINARY OUTPUT			
#1222	M8	M7	M6	M5	M4	M3	M2	M1
	FOR CANNED CYCLE				M-FUNCTION BINARY/BCD OUTPUT			
#1223	OS	EDTS	IER	4NGC	AUTO	MAN	RDY	RWD
	ORIENTATION	EDITING INPUT	ERROR	4TH AXIS	AUTO-MATIC	MANUAL NEGLECT	PREPARA-TION	REWIND COMPLETED

Table 2.6 List of Standard Output Signals (Cont'd)

Table 2.6 List of Standard Output Signals (Cont'd)

Table 2.6 List of Standard Output Signals (Cont'd)

3. ADJUSTMENTS UPON INSTALLATION

3.1 ADJUSTMENT PROCEDURES

Upon installation, make adjustments in reference to the adjustment procedures given in the table below.

Table 3.1 Adjustment Procedures

No.	Procedure	Remarks
1	Check the interior and exterior of the control cabinet.	
2	Check screw terminals for tightness.	
3	Connect external cables and check.	
4	Connect the power input cable.	
5	Check connector and module locations to be sure of positive connections.	
6	Check settings.	
7	Check the input power supply voltage and frequency.	
8	Check that the composite power supply unit outputs are not short-circuited.	
9	Check the output voltages after a first power application.	
10	Check the I/O signals between the NC unit and the machine tool.	
11	Check parameters and setting data.	
12	Perform a second power application.	
13	Check to be sure the emergency stop functions.	
14	Check movement on each axis by manual feed.	
15	Adjust the servo system.	
16	Check that all NC functions are successfully operable.	

(1) Check the interior and exterior of the control cabinet.

- Check the control panel exterior for contamination and damage.
- Check the module connections inside the cabinet for tightness.
- Check the cables and lead bunch inside the cabinet for damage.

(2) Check screw terminals for loose connections.

- Power input unit terminal block
- Composite power supply unit terminal block (+15 V, 0 V)
- CPU rack terminal block (+5 V, 0 V, +12 V, +24 V, ±15 V)
- Power on/off pushbutton switches on MDI and CRT unit
- Control power transformer terminal block
- Check each terminal block cover, if any, for dislocation.

(3) Connect external cables.

- Check that the cable shield is connected to the ground block through clamp.
- Check that the MDI and CRT unit is equipped with a serial transfer bus terminal connector (JZNC-TN01).
- Check that a protective ground wire is installed between the control unit and the machine tool.
- Check that the protective ground wire is of a one-point ground type.

(4) Connect the power input cable.

Before connecting the power input cable, verify that power input terminals R, S and T inside the control unit are not shorted.

3.1 ADJUSTMENT PROCEDURES (Cont'd)

- (5) Check connector and module locations and insertions.
- Check that the screws on the module clamps are tightened on the CPU rack.
 - Check that the clamp claws on Honda connectors are tightened and that clamp screws are securely in place.
 - Check that the clamp claws on power supply connectors are in place.
 - Check that the clamp claws on flat cables are in place.
- (6) Check settings.
- Verify the control power transformer setting in reference to the input power supply voltage (see 3.2).
- (7) Check input power supply voltage and frequency.
- Check that the power supply voltage and frequency meet ratings.
 - Check that the input power supply capacity is high enough for power consumption of the control unit.
- (8) Check that the composite power supply unit outputs are not short-circuited. Check for short-circuit between:
- +5 V and 0 V
 - +12 V and 0 V
 - +24 V and 0 V
 - +15 V and 0 V
 - -15 V and 0 V
- (9) Check the output voltages after a first power application.
Depress the POWER ON pushbutton for first power application.
- Check that the air flow from the cooling air exhaust port is normal.
 - Verify the output voltages of the composite power supply unit.
- | | |
|-------|-------------------|
| +5 V | 5.15 V |
| +12 V | 11.88 - 12.12 V |
| +24 V | 23.76 - 24.24 V |
| +15 V | 14.85 - 15.15 V |
| -15 V | -14.85 - -15.15 V |
- The +5 V output can be adjusted with an ADJ potentiometer in the composite power supply unit.
- (10) Check the I/O signals between the control unit and the machine tool.
Check the I/O signals according to the list I/O signals (see 2.5 Status Display by Sel Diagnostic Function).
- (11) Check parameters and setting data.
Conduct checkups according to the list of parameters (see 3.3 Displaying and Writing Parameters).
- (12) Perform a second power application.
Press the POWER-ON pushbutton again for second power application.
- An alarm, if displayed, should be dealt with according to the list of alarms.
 - Check that each axis can be placed under servo clamp.
 - Adjust the ZERO ADJ potentiometer on the servo drive unit so that the servo position deviation comes within 0 ±2 pulses in the servo clamp state.
- NOTE: Servo deviation pulses can be displayed on the MDI & CRT unit by following the steps given below:
1. Set the system No. switch to "4."
 2. Depress the POS key.
 3. Depress the **PAGE** or **↑ PAGE** key to select the display (POSITION "ERROR") of a servo position deviation value.
 4. After adjustment, set the system No. switch back to "0."
- (13) Verify the emergency stop.
With emergency stop activated (e.g., by emergency stop pushbutton, machine end LS), check that the second power supply (servo power supply) is turned off and that the alarm display "330: EMERGENCY STOP" appears.
- (14) Check movement on each axis by manual feed.
- Check that the machine tool properly follows up on the movement made by handle or step feed.
 - Operate the machine tool by manual jog feed. Activate its OT limit switch intentionally, and check to see that the machine is stopped by detection of an overtravel alarm.
 - Check that the machine tool follows in the entire feedrate range in manual jog and rapid feed.

(15) Adjust the servo system.

- Operate the machine tool by F4-digit feed or G00 feed in the MDI mode. Check the servo position deviation on the MDI & CRT unit. With the feedrate and servo position deviation, the position gain K_p is obtained by the formula:

$$K_p = 16.7 \times \frac{F}{E}$$

where, F: feedrate (mm/min)

E: servo position deviation (0.001 mm)

K_p: position gain (sec.⁻¹)

Turn the INPUT ADJ potentiometer for servo position deviation adjustment on the servo drive unit so that the position gain comes within $\pm 10\%$ of the target value. The difference between the axes should be 1% or less.

(16) Check that all NC functions are successfully operable.

- Check that reference point return is normally performed.
- Run the test tape on each machine for check.

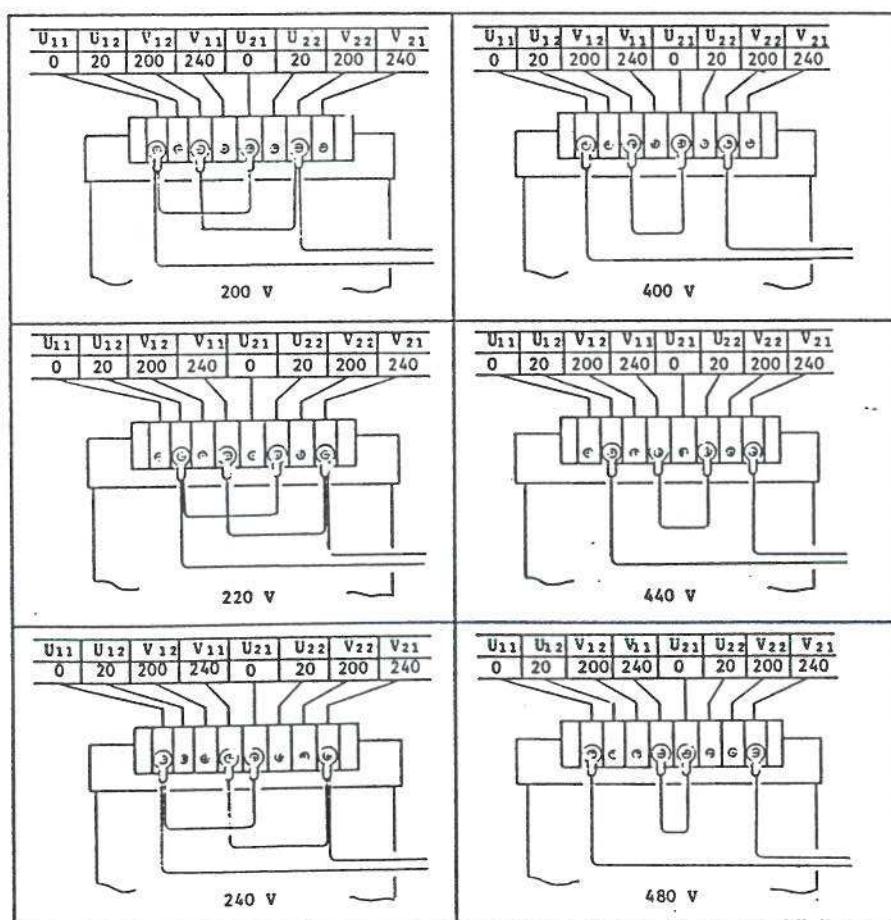
3.2 POWER TRANSFORMER CONNECTIONS

3.2.1 TAP CHANGING ON CONTROL TRANSFORMER (1T)

When a control transformer (1T) is incorporated, check the tap connections on the primary side of

the transformer. The supply voltage must be within $+10\%$ and -15% of the tap voltage. If this condition is not met, change the tap connection according to the following figures.

Table 3.2 Transformer Tap Connections
according to Supply Voltage



3.3 DISPLAYING AND WRITING PARAMETERS

This system has various parameters stored in memory. They determine operating conditions such as tape coding and feedrate. The parameters can always be displayed regardless of the mode even during automatic operation.

3.3.1 PARAMETER TYPES

Parameters are displayed either in binary or in decimal digits.

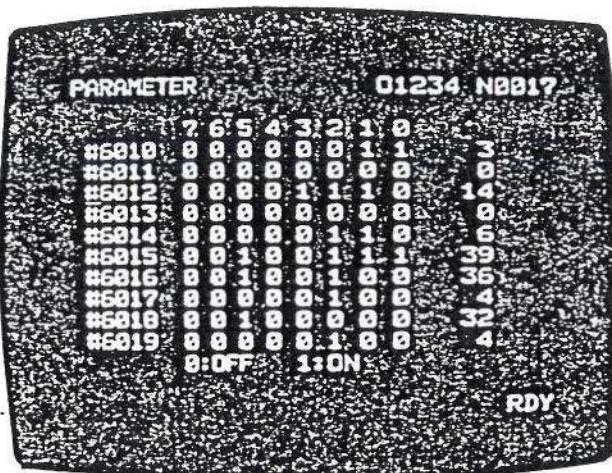


Fig. 3.3.1.1 Typical Parameter Display
(in binary digits)

Parameters #6005 to #6045 are displayed in binary digits.

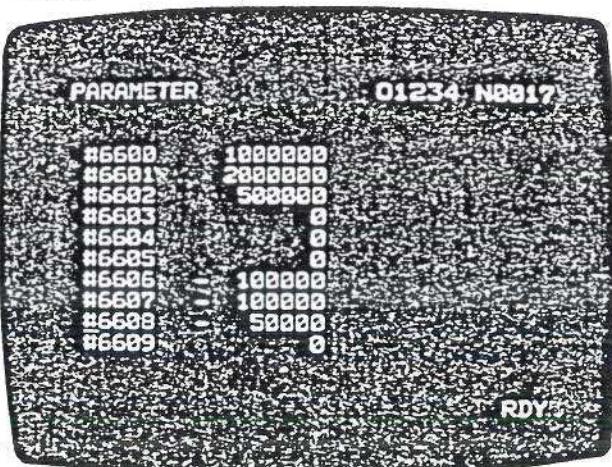


Fig. 3.3.1.2 Typical Parameter Display
(in decimal digits)

Parameters #6050 and larger are displayed in decimal digits.

3.3.2 PARAMETER DATA DISPLAY

1. Key in a parameter number and press the **CURSOR** **+** or **CURSOR** **↑** key. The symbol "#" need not be typed. Up to ten parameter numbers and their contents can be displayed.
2. The parameter number specification can be updated by operating the **CURSOR** **+** or **CURSOR** **↑** key. The screen can be updated by operating the **PAGE** **↓** or **PAGE** **↑** key.

3.3.3 PARAMETER DATA WRITING

Set the system No. switch to "1."

For display in binary digits

1. Specify a desired parameter number.
2. Depress the **INSRT** key. The cursor will move from the parameter number to the bin digit display, indicating the bit position of first.
3. Depress the **CURSOR** **↓** key. The cursor moves by 1 bit towards the bit position D0 every time this key is pressed. Keeping this key depressed can continuously move the cursor to the desired position.
4. Depress the **WR** key, and the designated bit data reverses (0 to 1 or 1 to 0). Pressing the key again will reverse the data. Generally, "1" represents the function being on and "0" being off.
5. Only when the cursor is set to the rightmost decimal position decimal data can be keyed in.

Key-in data	7	6	5	4	3	2	1	0
0	W	R	→	0	0	0	0	0
2	5	5	W	R	→	1	1	1

6. Repeat steps 2. to 5. to write desired parameter data.
Keeping the **CURSOR** **↓** or **CURSOR** **↑** key depressed moves the cursor continuously on the screen.

7. With the writing completed, depress the **INSRT** key in a "sandwitching" manner (INSRT, data, and INSRT in that order).

For display in decimal digits

1. Specify a desired parameter number.
2. Key in the data and depress the **WR** key. The data will be written to the parameter number indicated by the cursor.
3. The parameter number specification can be updated by operating the **CURSOR** ↓, **CURSOR** ↑ or **PAGE** ↑, **PAGE** ↓ key. Check that the writing has normally completed, and set the system No. switch back to "0."

3.3.4 TAPE INPUT OF SETTING DATA AND PARAMETER DATA

Although setting data and parameter data are generally inputted through MDI operation, they can also be entered by means of punched paper tape. The two types of data may be inputted from a single tape.

- (1) The tape format is as follows:

Label % ;
#6000 X128 ;
#6001 X 5 ;
#6002 X 0 ;
.
.
.
% .

Notes:
 1. "%" is used in the ISO code and "ER" in the EIA code.
 2. "N" is used in the EIA code instead of "#."

Fig. 3.3

(2) The input operation procedure is as follows:

- A. Select the EDIT mode.
- B. Depress the **RESET** key.
- C. Depress the **PRM** key.
- D. Set the setting /parameter data tape onto the tape reader.
- E. Depress the **IN** key. The tape reader will start reading the tape. "IN" blinks on the CRT screen while the data is being read.
- F. On completion of reading symbol % (or characters ER), the tape reader comes to a stop and causes the "IN" display to disappear from the CRT screen. This completes the data input.

3.3.5 PUNCHING-OUT OF SETTING DATA AND PARAMETER DATA

The punching out procedure is as follows:

1. Select the EDIT mode.
2. Depress the **RESET** key.
3. Depress the **PRM** key. The setting and parameter data will be continuously punched out.
4. To interrupt the punching operation, depress the **RESET** key.

3.3.6 PARAMETER NUMBERS AND THEIR CONTENTS

#6005	D ₇	D ₆	D ₅	D ₄	D ₃	D ₂	D ₁	
-------	----------------	----------------	----------------	----------------	----------------	----------------	----------------	--

- D₇ 1: Stores the H code for reset, G92 and G28.
0: Sets the H code to H00 for reset, G92 and G28.
- D₆ 1: Stores the G code in the 01 group for reset.
0: Sets the G code in the 01 group to G00 for reset.
- D₅ 1: Allows the current value display (universal) to be preset by the coordinate system setting command G92.

At this time, the [ORG] key is capable of Zero Setup.

0: Keeps the current value display (universal) from being preset by the coordinate system setting command G92.

At this time, the [ORG] key is incapable of Zero Setup.

D₄, D₃: Status of G codes at power on.

D ₄	D ₃	Initial status
1	0	Sets the G code in the 08 group to G44 on power application.
0	1	Sets the G code in the 08 group to G43 on power application.
0	0	Sets the G code in the 08 group to G49 on power application.

- D₂ 1: Sets the G code in the 01 group to G01 on power application.
0: Sets the G code in the 01 group to G00 on power application.
- D₁ 1: Sets the G code in the 05 group to G95 on power application.
0: Sets the G code in the 05 group to G94 on power application.
- D₀ 1: Sets the G code in the 05 group to G91 on power application.
0: Sets the G code in the 05 group to G90 on power application.

#6006	D ₇	D ₆	D ₅	D ₄	D ₃	D ₂		r
-------	----------------	----------------	----------------	----------------	----------------	----------------	--	---

D₇, D₆ Signs of S4-digit analog (SDA) output

D ₇	D ₆	Sign	
1	1	Minus	Plus
1	0	Plus	Minus
0	1	Minus	Minus
0	0	Plus	Plus
		SINV signal off	SINV signal on

- D₅ 1: Sets the least input increment to 0.01 (or 0.001 in., 0.01 deg.).
0: Sets the least input increment to 0.00 mm (or 0.0001 in., 0.001 deg.).
- D₄ 1: Checks to see if the spindle speed match signal (SAGR) is off upon transition from a rapid traverse block to a cutting feed block.
0: Provides no check on the spindle speed match signal (SAGR).
- D₃ 1: Enables the internal toggle switches.
0: Disables the internal toggle switches.
- D₂ 1: Enables dry run in response to the rapid traverse command.
0: Disables dry run in response to the rapid traverse command.
- D₁ 1: Causes an alarm ("001-004") upon cycle start when reference point return is not made after power application.
0: Causes no alarm.

NOTE: Set "1" when pitch error compensation or stored stroke limit is provided.

#6007

	D6		D4	D3	D2		D0
--	----	--	----	----	----	--	----

#6010

				D3	D2	D1	D0
--	--	--	--	----	----	----	----

- D6 1: Employs the newly entered tool compensation value in place of the old value.
 0: Adds the newly entered tool compensation value to the stored value to establish another offset.
- D4 1: Provides output during rewinding.
 0: Provides no output during rewinding.
- D3 1: Sets the least increment to 0.0001 in.
 0: Sets the least increment to 0.001 mm.
- D2 1: Makes the spindle override 100% during tapping.
 0: Does not make the spindle override 100% during tapping.
- D0 1: Establishes the 2nd prohibited area of the stored stroke limit outside the boundary.
 0: Establishes the 2nd prohibited area of the stored stroke limit inside the boundary.

#6008

					D1	
--	--	--	--	--	----	--

- D1 1: Does not clear the common variables of #100 through #149.
 0: Clears the common variables of #100 through #149.

Note: Some controls are not provided with the parameter #6008.

#6009

			D3	D2	D1	D0
--	--	--	----	----	----	----

D3, D2, D1, D0

Specify the direction of reference point return on the 4th-, Z-, Y- and X-axes, respectively.

- 1: Minus direction
 0: Plus direction

NOTE: The specification is effective for an axis with #6016 at "1."

#6012

				D3	D2	D1	D0
--	--	--	--	----	----	----	----

D3, D2, D1, D0

Specify whether or not the plus-direction external deceleration signal is effective on the 4th-, Z-, Y- and X-axes, respectively.

- 1: Makes the plus-direction external deceleration signal effective.
 0: Makes the plus-direction external deceleration signal ineffective.

#6013

				D3	D2	D1	D0
--	--	--	--	----	----	----	----

D3, D2, D1, D0

Specify whether or not the minus-direction external deceleration signal is effective on the 4th-, Z-, Y- and X-axes, respectively.

- 1: Makes the minus direction external deceleration signal effective.
 0: Makes the minus direction external deceleration signal ineffective.

#6014

				D3	D2	D1	D0
--	--	--	--	----	----	----	----

D3, D2, D1, D0

Specify the direction of the G60 unidirectional approach upper limit on the 4th-, Z-, Y- and X axes, respectively.

- 1: Minus direction
 0: Plus direction

NOTE: The approach upper limit is set with #6062 to #6065.

3.3.6 PARAMETER NUMBERS AND THEIR CONTENTS (Cont'd)

#6026		D5	D4	D3	D2	D1	D0
#6027		D5	D4	D3	D2	D1	D0

#6026, #6027:

- D5 1: Does not allow the control code (DC1 - DC4) to be used on the I/O device.
 0: Allows the control code (DC1 - DC4) to be used on the I/O device.
- D4 1: Employs 2 stop bits on the I/O device.
 0: Employs 1 stop bit on the I/O device.

D3 - D0

Baud rate setting

Baud rate	D3	D2	D1	D0
50	0	0	0	0
100	0	0	0	1
110	0	0	1	0
150	0	0	1	1
200	0	1	0	0
300	0	1	0	1
600	0	1	1	0
1200	0	1	1	1
2400	1	0	0	0
4800	1	0	0	1
9600	1	0	1	0

NOTE: #6026 provides the setting on I/O device 1 (SIO-1) and #6027 on I/O device 2 (SIO-2). For #6028, #6029, see YASNAC MX1 OPERATOR'S MANUAL ADDENDUM section 6.3.

#6030	D7	D6	D4			D0
-------	----	----	----	--	--	----

- D7 1: Provides an additional axis control module.
 0: Does not provide an additional axis control module.
- D6 1: Causes the system to filter the spindle PG reference point signal before reading it.
 0: Allows the system to read the spindle PG reference point signal as it is.

- D4 1: Enables the axis interlock function.
 0: Disables the axis interlock function.
- D0 1: Enables data output with DIAGNOSE.
 0: Disables data output with DIAGNOSE.

#6031					D2	D1	D0
-------	--	--	--	--	----	----	----

D2, D1, D0

Specify whether or not the direct-in signals IN2, IN1 and IN0 are effective, respectively.
 1: Effective with signal "0"
 0: Effective with signal "1"

#6032					D2	D1	D0
-------	--	--	--	--	----	----	----

D2, D1, D0

Specify whether or not the direct-in signals IN2, IN1 and IN0 are effective, respectively.
 1: Ineffective
 0: Effective

#6050		(X-axis)
-------	--	----------

#6051		(Y-axis)
-------	--	----------

#6052		(Z-axis)
-------	--	----------

#6053		(4th-axis)
-------	--	------------

#6050 to #6053:

Specify the backlash compensation, respectively, on the X-, Y-, Z- and 4th-axes (setting range: 0-255; "1" = least output increment).

#6056	(X-axis)	#6068	(X-axis)
#6057	(Y-axis)	#6069	(Y-axis)
#6058	(Z-axis)	#6070	(Z-axis)
#6059	(4th-axis)	#6071	(4th-axis)

#6056 to #6059:

Specify the position error offset, respectively, on the X-, Y-, Z- and 4th-axes setting range: 0 - 255; "1" = least output increment). The standard setting is 32.

#6068 to 6071:

Output in pitch error offset pulses the pitch error compensation times each magnification specification, respectively, for the X-, Y-, Z- and 4th axes. The setting range is 1 to 3, and "1" represents a magnification of 1.

#6062	(X-axis)	#6074	(X-axis)
#6063	(Y-axis)	#6075	(Y-axis)
#6064	(Z-axis)	#6076	(Z-axis)
#6065	(4th-axis)	#6077	(4th-axis)

#6062 to #6065:

Specify the overtravel, respectively, on the X-, Y-, Z- and 4th-axes in unidirectional approach (G60; setting range: 0 - 255; "1" = least input increment).

#6074 to #6077:

Causes an alarm "34*" when a position deviation exceeding the critical servo error value is detected respectively, on the X-, Y-, Z- and 4th axes.

3.3.6 PARAMETER NUMBERS AND THEIR CONTENTS (Cont'd)

Setting formula: $n = 16 \times \frac{c}{b}$

Standard setting: 16 ($b = c$)

b: D/A saturation value (pulse count)
set in #6080 - #6083

c: Critical servo error value
(pulse count)

#6086	(X-axis)
#6087	(Y-axis)
#6088	(Z-axis)
#6089	(4th-axis)

#6086 to #6089:

Specify the PG pulse magnification and D/A resolution, respectively, for the X-, Y-, Z- and 4th-axes.

Setting formula: $n1 + n2$

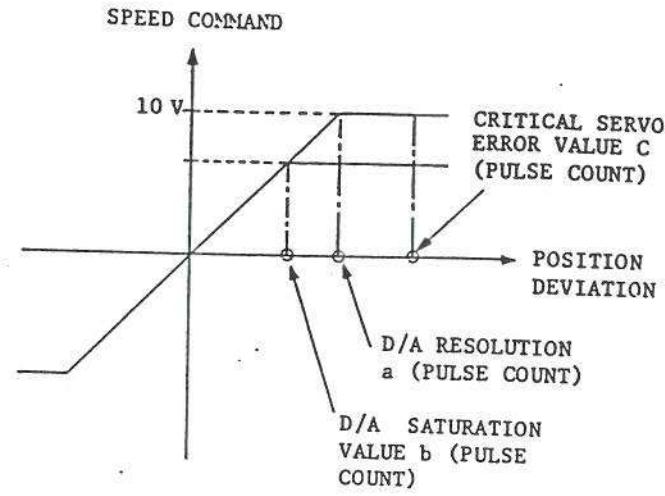


Fig. 3.3.6.1 .

#6080	(X-axis)
#6081	(Y-axis)
#6082	(Z-axis)
#6083	(4th-axis)

#6080 to #6083:

Specify the D/A saturation value, respectively, for the X-, Y-, Z- and 4th axes.

Setting formula: $2^{(7+n)} = b$

b: D/A saturation value (pulse count)

NOTE: "n" is set.

Standard setting: 6 ($b = 8192$ pulses)

NOTE: Make the setting so that $b = a$.

a: D/A resolution (pulse count)

(1) PG pulse magnification value $n1$

PG pulse magnification	$n1$
$\times 1$	64
$\times 2$	80
$\times 4$	112
$\times 8$	48

(2) D/A resolution value $n2$

D/A resolution a (pulse count)	$n2$
32768 pulses	14
16384 pulses	13
8192 pulses	12
4096 pulses	11

Standard value: $n2 = 12$

#6092

#6106

Specifies the exponential function acceleration/deceleration time constant for cutting feed (common to all axes).

The setting formula is: " n " = $\frac{t}{4} - 1$

where, t : time constant(ms), specifiable in units of 4 ms

#6093

Specifies the exponential function acceleration/deceleration speed bias for cutting feed (common to all axes).

Setting: " 1 " = 2 kpps.

#6094

(X-axis)

#6095

(Y-axis)

#6096

(Z-axis)

#6097

(4th-axis)

#6094 to #6097:

Specify the reference point return method, respectively, for the X-, Y-, Z- and 4th-axes.

"0" of NZ signal enabled	<input type="radio"/>	<input checked="" type="radio"/>	<input type="radio"/>
NZ signal employed		<input type="radio"/>	<input checked="" type="radio"/>
Reference point pulse used	<input checked="" type="radio"/>		
Parameter setting	64	48	32

Standard setting: 64

#6106

Specifies the "rapid traverse section" for a "returning semicircle" by the proportionate semicircle radius in circle cutting (G12, G13).

Setting range: 0 - 10 ($\times 10\%$)

Examples:

1. A setting of 0 creates a rapid traverse section automatically computed by the program command values.
2. A setting of 10 (= 100%) makes the entire "returning semicircle" into a "rapid traverse section."

#6107

Specifies the number of manual pulse generators.

Setting range: 1 - 3

#6120

G-1

#6121

G-2

#6122

G-3

#6123

G-4

#6124

G-5

#6125

G-6

#6126

G-7

#6127

G-8

#6128

G-9

#6129

G-10

#6120 to #6129:

Specify up to 10 G codes for calling user macros.

3.3.6 PARAMETER NUMBERS AND THEIR CONTENTS (Cont'd)

#6130	M-1
#6131	M-2
#6132	M-3
#6133	M-4

#6130 to #6133:

Specify up to 4 M codes for calling user macros.

Setting range: 03 - 29, 31 - 89

NOTE: M00, M01, M02, M30 and M90 - M99 cannot be called by user macros.

#6134	
-------	--

1: Allows the T code to call a user macro.

0: Does not allow the T code to call a user macro.

#6141	
#6142	
#6143	
#6144	
#6145	
#6146	
#6147	
#6148	
#6149	

#6141 to #6149:

Specify the feedrate change for one increment on a manual pulse generator, for F1 to F9, respectively, of F1-digit designation.

Setting: "1" = 0.1 mm/min.

#6220

Specifies the interval from the time, M, S, T and B codes are transmitted until the time MF, SF, TF and BF are transmitted.

Setting: "1" = 1 ms

#6221

Specifies the interval from gear output (GRH, GRL) unit SF transmission when an S5-digit designation is added.

Setting: "1" = 1 ms

#6222

Specify the maximum handle feedrate, which is common to the linear axes (X, Y, Z, U, V, W).

Setting: "1" = 7.5 mm/min.

NOTE: The settings for the rotary axes (A, B, C) are made with #6348.

#6223

Specifies the tool shift speed for canned cycles of G76 and G77.

Setting: "1" = 1 mm/min.

NOTE: This specification is effective when #6019D0 = 1.
If #6019D0 = 0, rapid traverse is effective regardless of this parameter specification.

#6224

Specifies the delay time for checking the spindle speed reaching signal (SAGR).

Setting: "1" = 1 ms

#6225

Setting: "1" = 0.001 mm (metric system)
"1" = 0.0001 in. (inch system)

Specifies the feedrate for the rapid traverse section in circle cutting (G12, G13).

Setting: "1" = 1 mm/min.

#6226

#6227

#6226, #6227

Specify the maximum feedrate for F1-digit designation.

Setting: "1" = 1 mm/min.

NOTE: The maximum feedrate for F1-F4 commands is set in #6226 and that for F5-F9 commands in #6227. Any feedrates increased on manual pulse generators are bunched into these settings.

#6228

Specifies the maximum cutting feedrate for the linear axes (X, Y, Z, U, V, W).

Setting: "1" = 1 mm/min.

#6229

Specifies the maximum cutting feedrate for the rotary axes (A, B, C).

Setting: "1" = 1 mm/min.

NOTE: Any cutting feedrates greater than those set in #6228 and #6229 are bunched into those settings.

#6230

When a circular path is drawn in tool radius compensation outside a corner approaching 180° , the movement follows on a very small circular arc. In this, arc movement is considered to affect the workpiece surface machining, this parameter is used to set the critical arc value.

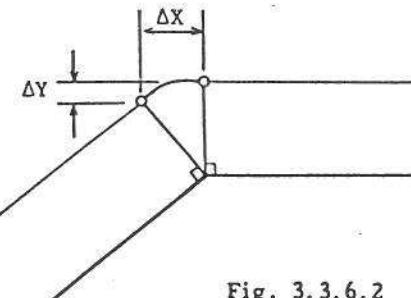


Fig. 3.3.6.2

The corner arc setting is ignored when:

$\Delta X \leq \#6230$

$\Delta Y \leq \#6230$

Standard setting = 5

#6231

Specifies the F_0 speed for rapid traverse override.

Setting: "1" = 7.5 mm/min.

#6232

Specifies the feedrate in the skip function (G31).

Setting: "1" = 1 mm/min.

NOTE: This setting is effective when parameter #6019D4 = 1.

#6233

l

l

#6264

#6233 to #6264

Specify the feedrate for the respective positions on the jog feedrate select switch.

Setting: "1" = 1 mm/min.

3.3.6 PARAMETER NUMBERS AND THEIR CONTENTS (Cont'd)

#6265

Typical settings

Switch position	Typical Settings		mm/min	
	Parameter Number	Setting	Continuous manual feedrate #6250 = 0	Continuous manual feedrate #6265 = 10
0	#6233	0	0	0
1	#6234	1	1	0.1
2	#6235	2	2	0.2
3	#6236	4	4	0.4
4	#6237	6	6	0.6
5	#6238	8	8	0.8
6	#6239	10	10	1.0
7	#6240	12	12	1.2
8	#6241	15	15	1.5
9	#6242	20	20	2.0
10	#6243	25	25	2.5
11	#6244	30	30	3.0
12	#6245	40	40	4.0
13	#6246	50	50	5.0
14	#6247	60	60	6.0
15	#6248	80	80	8.0
16	#6249	100	100	10.0
17	#6250	120	120	12.0
18	#6251	150	150	15.0
19	#6252	200	200	20.0
20	#6253	250	250	25.0
21	#6254	300	300	30.0
22	#6255	400	400	40.0
23	#6256	500	500	50.0
24	#6257	600	600	60.0
25	#6258	800	800	80.0
26	#6259	1000	1000	100.0
27	#6260	1200	1200	120.0
28	#6261	1500	1500	150.0
29	#6262	2000	2000	200.0
30	#6263	2500	2500	250.0
31	#6264	3000	3000	300.0

The manual feedrates set in parameters #6233 to #6264 can each be reduced to a tenth of the original setting. This applies to the settings on all switch positions lower than the value specified in this parameter #6265.

Setting: 0 - 31 (switch position)

#6266

#6267

#6268

#6269

#6266 to #6269:

Specify the spindle speed upper limit, respectively, for gears 1, 2, 3 and 4 (specifiable only in S5-digit designation).

Setting: 0 - 9999 (rpm)

#6270

Specifies the speed command output value to the spindle motor when a gear shift (GR0) input is entered (specifiable only in S5-digit designation). The setting formula is:

$$\frac{\text{Gear shift spindle motor speed}}{\text{Maximum speed of spindle motor}} \times 32767$$

(command = 10 V)

Setting range: 0 - 32767

#6271

#6272

#6273

#6274

#6276

#6277

#6278

#6279

#6271 to #6274:

Specify the maximum speed of the spindle, respectively, for gears 1, 2, 3 and 4 each selected by an input signal (specifiable in S5-digit designation). Set the spindle speed applicable when the speed command voltage is 10 V.

Setting range: 0 - 99999 (rpm)

#6276 to #6279:

Specify the minimum speed of the spindle, respectively, for gears 1, 2, 3 and 4 each selected by an input signal (specifiable in S5-digit designation).

Setting range: 0 - 99999 (rpm)

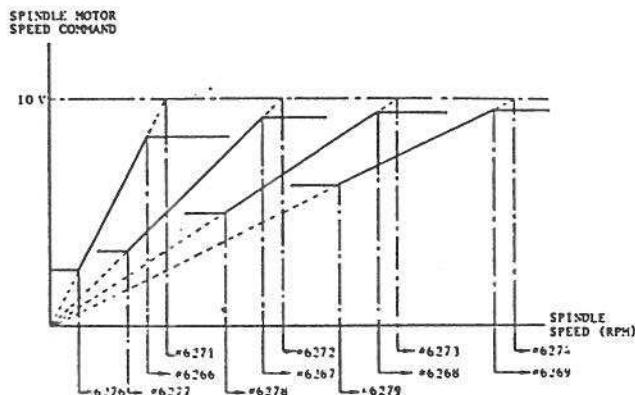


Fig. 3.3.6.3

#6280

(X-axis)

#6281

(Y-axis)

#6282

(Z-axis)

#6283

(4th-axis)

#6280 to #6283

Specify the rapid traverse rate, respectively, on the X-, Y-, Z- and 4th-axes.

Setting: "1" = 7.5 mm/min.

#6275

Specifies the spindle motor speed in effect when a spindle orientation (SOR) input is entered (specifiable in S5-digit designation).

Setting range: 0 - 99999 (rpm)

3.3.6 PARAMETER NUMBERS AND THEIR CONTENTS (Cont'd)

#6286	(X-axis)
#6287	(Y-axis)
#6288	(Z-axis)
#6289	(4th-axis)

#6286 to #6289:

Specify the first-stage time constant in linear acceleration/deceleration, respectively, on the X-, Y-, Z- and 4th-axes.

Setting: "1" = $125/8$ (mm/sec²)

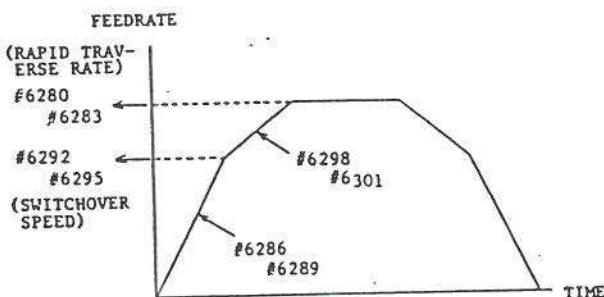


Fig. 3.3.6.4

#6292	(X-axis)
#6293	(Y-axis)
#6294	(Z-axis)
#6295	(4th-axis)

#6292 to #6295:

Specify the second-stage time constant switchover speed in linear acceleration/deceleration, respectively, on the X-, Y-, Z- and 4th-axes.

Setting: "1" = 7.5 mm/min.

#6298	(X-axis)
#6299	(Y-axis)
#6300	(Z-axis)
#6301	(4th-axis)

#6298 to #6301:

Specify the second-stage time constant in linear acceleration/deceleration, respectively, on the X-, Y-, Z- and 4th-axes.

Setting: "1" = $125/8$ (mm/sec²)

#6304	(X-axis)
#6305	(Y-axis)
#6306	(Z-axis)
#6307	(4th-axis)

#6304 to #6307:

Specify the traverse distance for reference point return, respectively, on the X-, Y-, Z- and 4th-axes.

Setting: "1" = 0.001 mm

#6310	(X-axis)
#6311	(Y-axis)
#6312	(Z-axis)
#6313	(4th-axis)

#6310 to #6313:

Specify the approach speed 1 for reference point return, respectively, on the X-, Y-, Z- and 4th-axes.

Setting: "1" = 7.5 mm/min.

#6316	(X-axis)	#6328	(X-axis)
#6317	(Y-axis)	#6329	(Y-axis)
#6318	(Z-axis)	#6330	(Z-axis)
#6319	(4th-axis)	#6331	(4th-axis)

#6316 to #6319:

Specify the approach speed 2 for reference point return, respectively, on the X-, Y-, Z- and 4th-axes.

Setting: "1" = 7.5 mm/min.

NOTE: The parameters associated with reference point return operations are as follows:

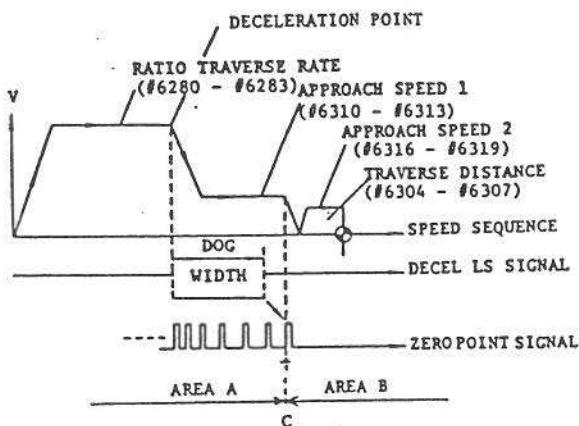


Fig. 3.3.6.5

- Reference point return direction:
#6010 D0 - D3
- Reference point return enabled/disabled:
#6016 D6 - D3

#6322	(X-axis)
#6323	(Y-axis)
#6324	(Z-axis)
#6325	(4th-axis)

#6322 to #6325:

Specify the number of the start point for pitch error compensation, respectively, on the X-, Y-, Z- and 4th-axes.

Setting: 0 - 511

#6328 to #6331:

Specify the number of the start point for pitch error compensation, respectively, on the X-, Y-, Z- and 4th-axes.

Setting: 0 - 511

#6334	
#6335	
#6336	
#6337	

#6334 to #6337:

Specify the reference point for pitch error compensation, respectively, on the X-, Y-, Z- and 4th-axes.

Setting: 0 - 511

#6340	
-------	--

Specifies the external deceleration speed for rapid traverse.

Setting: "1" = 7.5 mm/min. (common to all axes)

#6341	
-------	--

Specifies the external deceleration speed for cutting feed.

Setting: "1" = 1 mm/min. (common to all axes)

3.3.6 PARAMETER NUMBERS AND THEIR CONTENTS (Cont'd)

#6342	(X-axis)
#6343	(Y-axis)
#6344	(Z-axis)
#6345	(4th-axis)

#6342 to #6345:

Specify the offset in external workpiece coordinate system shift, respectively, on the X-, Y-, Z- and 4th-axes.

Setting: "1" = 0.001 mm

NOTE: Usually, these parameters are automatically set from the machine tool side through the external data input function.

#6348

Specifies the maximum speed for handle feed on the rotary axes (A, B, C).

Setting: "1" = 7.5 mm/min.

#6600	(X-axis)
#6601	(Y-axis)
#6602	(Z-axis)
#6603	(4th-axis)

#6600 to #6603:

Specify the plus direction boundary value for stored stroke limit 1, respectively, on the X-, Y-, Z- and 4th-axes.

Setting: "1" = 0.001 mm

#6606	(X-axis)
#6607	(Y-axis)
#6608	(Z-axis)
#6609	(4th-axis)

#6606 to #6609:

Specify the minus direction boundary value for stored stroke limit 1, respectively, on the X-, Y-, Z- and 4th-axes.

Setting: "1" = 0.001 mm

#6612	(X-axis)
#6613	(Y-axis)
#6614	(Z-axis)
#6615	(4th-axis)

#6612 to #6615:

Specify the distance between the first and the second reference point, respectively, on the X-, Y-, Z- and 4th-axes.

#6618	(X-axis)
#6619	(Y-axis)
#6620	(Z-axis)
#6621	(4th-axis)

#6618 to #6621:

Specify the distance between the first and the third reference point, respectively, on the X-, Y-, Z- and 4th-axes.

#6624	
#6625	
#6626	
#6627	

#6624 to #6627

Specify the distance between the first and the fourth reference point, respectively, on the X-, Y-, Z- and 4th-axes.

Setting: "1" = 0.001 mm

#6630		(X-axis)
#6631		(Y-axis)
#6632		(Z-axis)
#6633		(4th-axis)

#6630 to #6633

Specify the value for automatic coordinate system setting at the time of inch input, respectively, on the X-, Y-, Z-, and 4th-axes. A desired value should be set in inches for the distance between the first reference point and the reference point of the coordinate system to be established.

Setting: "1" = 0.0001 in.

#6636		(X-axis)
#6637		(Y-axis)
#6638		(Z-axis)
#6639		(4th-axis)

#6636 to #6639

Specify the value for automatic coordinate system setting at the time of metric input, respectively, on the X-, Y-, Z- and 4th-axes. A desired value should be set in millimeters for the distance between the first reference point and the reference point of the coordinate system to be established.

Setting: "1" = 0.001 mm

NOTE: Each setting is effective only for an axis with parameter #6015 at "1."

#6642		(X-axis)
#6643		(Y-axis)
#6644		(Z-axis)
#6645		(4th-axis)

#6642 to #6645

Specify the compensation interval in pitch error compensation, respectively, on the X-, Y-, Z- and 4th-axes.

Setting: "1" = 0.001 mm (metric output)

"1" = 0.0001 in. (inch output)

#8000		(number 0)
-------	--	------------

#8511		(number 511)
-------	--	--------------

#8000 to #8511

Specify the respective values of pitch error compensation.

Setting: 0 - ±15 (output increment)

NOTE: Parameters #6322 to #6339 determine specific combinations of settings and axes.

APPENDIX STORED LEADSCREW ERROR COMPENSATION

This function automatically compensates for lead-screw error on each axis according to the compensation data set by parameter and is effective after completion of reference point return. The compensation data are made on the distances between the reference point on each axis and specified points.

Compensation axes: X, Y, Z and 4th axes
(including rotary axis)

No. of correction points: 512 Max.

Compensation base point: Reference point

Compensation interval: 6000 Pulses or more

Data setting system: Absolute/incremental
(Set by Parameter #6039D2)

Compensation value:

Minimum compensation unit: 1 pulse (least output increment)

Compensation multiplication: X3 max.

One-time-compensation value: 15 pulses max.
(Compensation multiplication)

Note 1:

Regardless of absolute/incremental setting, the difference between neighboring compensation values should be (15 pulses x compensation multiplication) and below.

Note 2:

Maximum set value in case of absolute setting is ±127 pulses. Compensation multiplication is taken on this value.

Note 3:

No. of correction points on each axis can be arbitrary as far as the total compensation points are within 512.

Note 4:

Where the 4th axis is a rotary axis, operation is possible within ±200 revolutions maximum.

	Axis	Parameter #	Functions.
Compensation interval	X to α	#6642 to #6645	6000 OR MORE "1" = 1 pulse
Absolute/incremental setting switchable		#6039D2	"0" = Incremental setting "1" = Absolute setting
Compensation reference no.	X to α	#6334 to #6337	Value of parameter # of compensation on each point minus 8000 will be written
Compensation max point	X to α	#6322 to #6325	
Compensation min point	X to α	#6328 to #6331	
Compensation value on each point	X to α	#8000 to #8511	-15 to +15 (Incremental setting) "1" = 1 pulse
Compensation multiplication	X to α	#6068 to #6071	0 to 3 "1" = 1X

The figure below shows the example of writing the data for X axis.

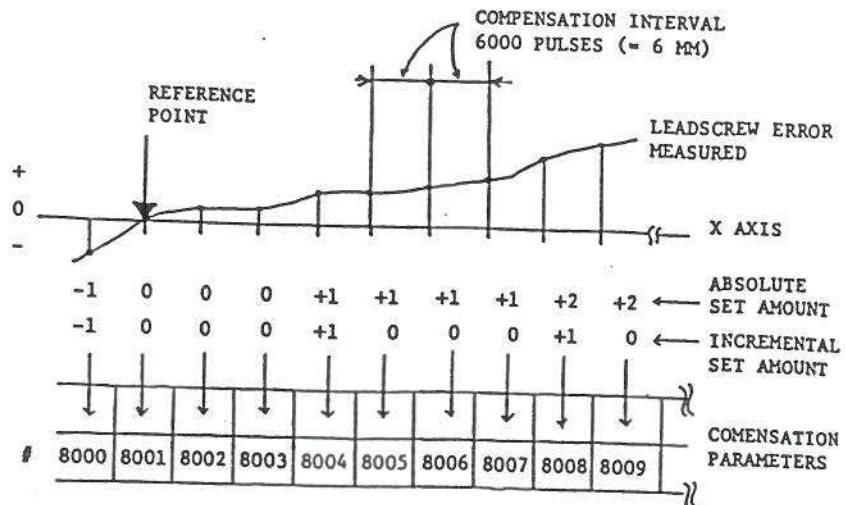


Fig. 1

In the above figure,

Compensation interval: 6000 pulses

Absolute/incremental: Incremental

Compensation multiplication: $\times 1$

Compensation point on X axis: 100 points

Each parameter is set as follows:

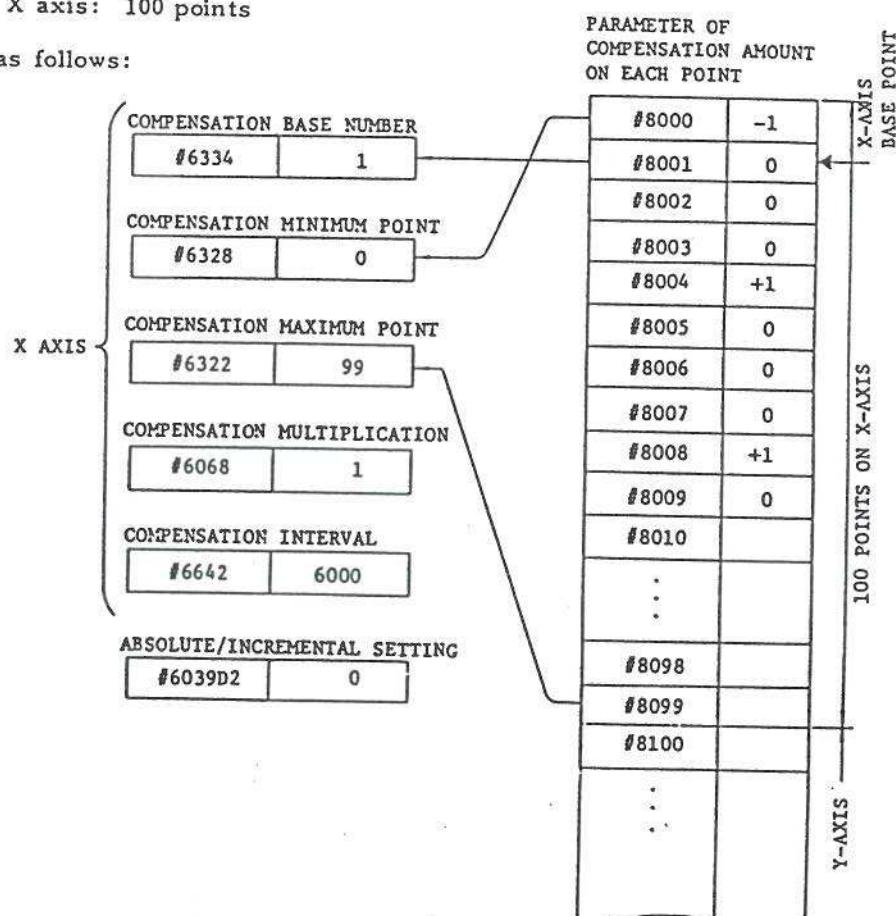


Fig. 2