TOE-C843-7 25
INSTRUCTIONS

CNC SYSTEM FOR TURNING APPLICATIONS

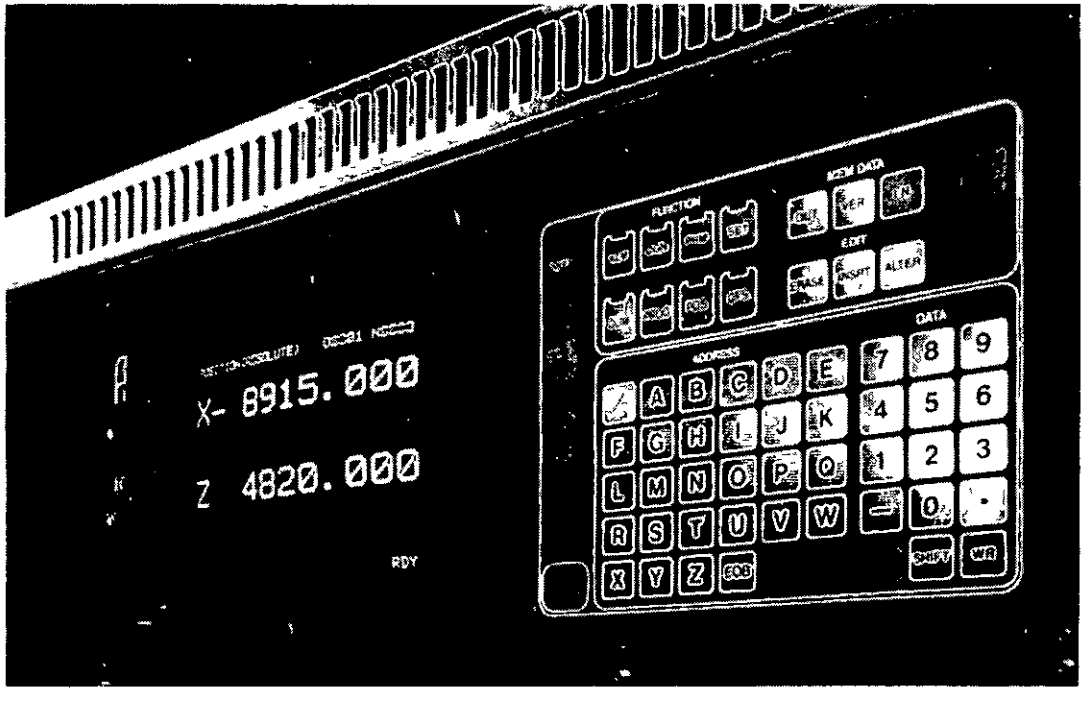
YASNAC® LX1

MAINTENANCE MANUAL

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

This manual is primarily intended to give operators maintenance instructions for YASNAC LX1.

The information contained in this manual does not provide all details to be met concerning maintenance and troubleshooting. If uncertainties be encountered for particular maintenance operation, contact your nearest YASNAC service office.



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YASNAC LX1 OPERATOR'S STATION

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1. OUTLINE

The YASNAC LX1 is a high-performance CNC for simultaneously controlling 2 axes of a lathe, 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 LX1 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 RS232C, 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

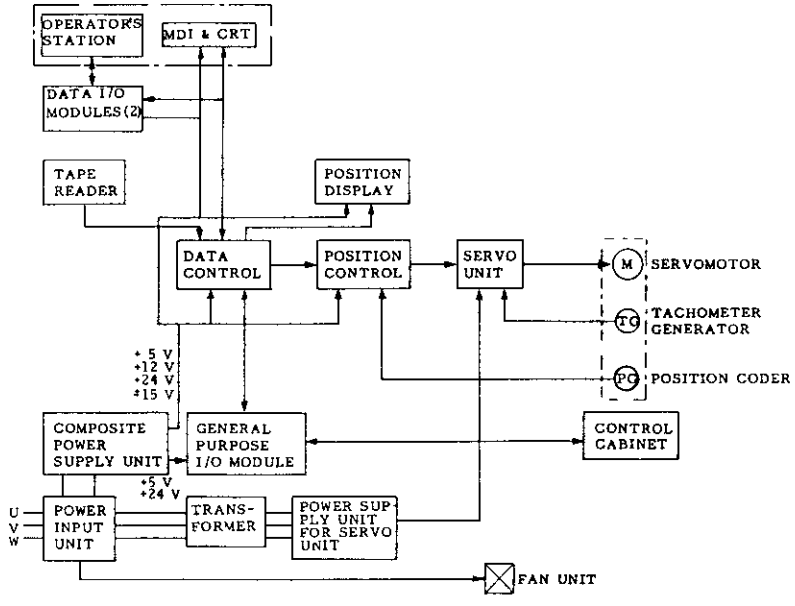


Fig. 1 1.1 Component Arrangement of YASNAC Control System

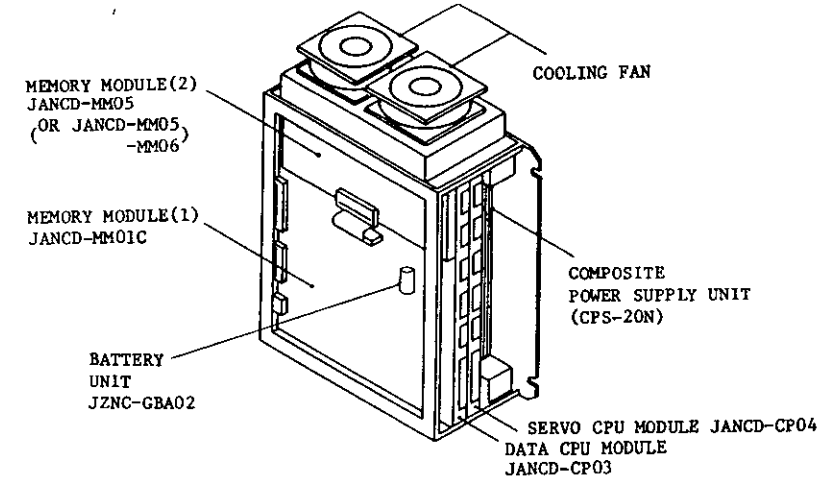


Fig. 1.1.2 CPU Rack

1 1 COMPONENT ARRANGEMENT OF YASNAC CONTROL SYSTEM (CONT'D)

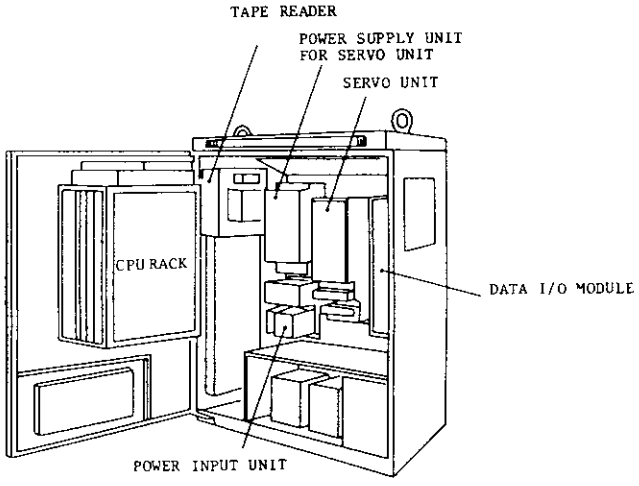


Fig 1 1 3 Built-in Type 2, with Door Open

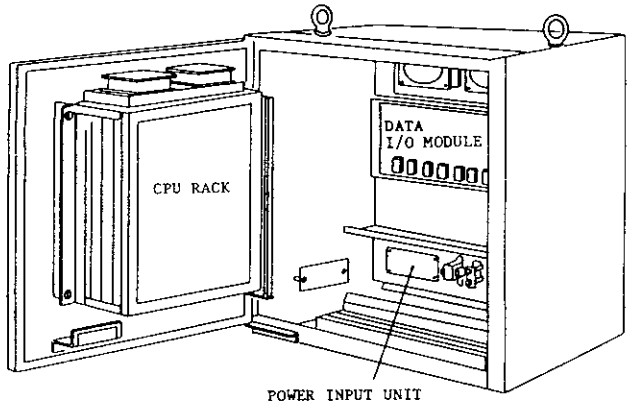


Fig 1 1.4 Unbundled Type

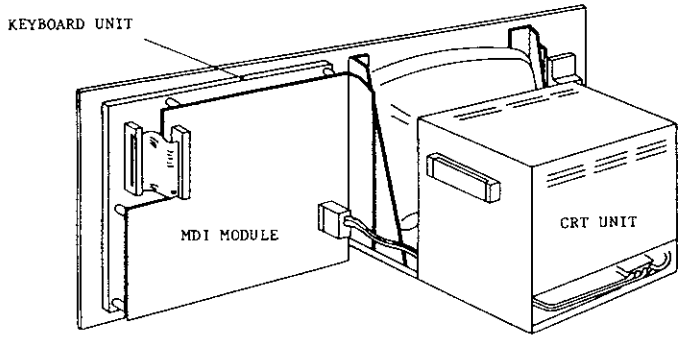


Fig 1 1 5 Operator's Station Unit

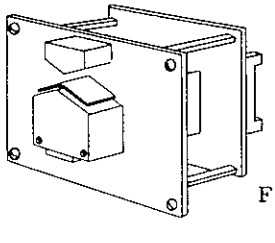


Fig 1 1 6 Tape Reader Unit

Component Name	Type	Component Code	Remarks
Power input unit	JZNC-TU11	DUN4420	Built-in type 2
	JZNC-TU12	DUN	Unbundled type
Power input control module	JANCD-TU02	DTN3690	Included in the power input unit
Composite power supply unit	CPS-20N	AVR815	
Tape reader	MODEL 2401-1	RED16	
Tape reel	MODEL 1500	RED14	6 inches
	MODEL 1402-1	RED13	8 inches
Data CPU module	JANCD-CP03	DTN3700	
Servo CPU module	JANCD-CP04	DTN3670	
Memory module (1)	JANCD-MM01B	DTN3590	
	JANCD-MM01C-01	DTN3720	40 meters 80 meters
	JANCD-MM01C-02	DTN3730	150 meters
Memory module (2)			
	JANCD-MM05-44	DTN3710	40 meters 80 meters
	JANCD-MM05	DTN3620	150 meters
	JANCD-MM05	DTN3620	320 meters
	JANCD-MM06	DTN3630	
Battery unit	JZNC-BGA02	DUN650	
Operator's station unit	JZNC-OP20	DUN	
CRT display unit	TR-9DD1B	CRT4	Included in the operator's station unit.
Keyboard unit	HMK-3993-04	SW655	
MDI module	JANCD-SP01	DTN3560	
Data I/O module	JANCD-IO02	DTN3680	
	JANCD-IO01B	DTN3580	

1 2 BLOCK DIAGRAM OF YASNAC CONTROL SYSTEM

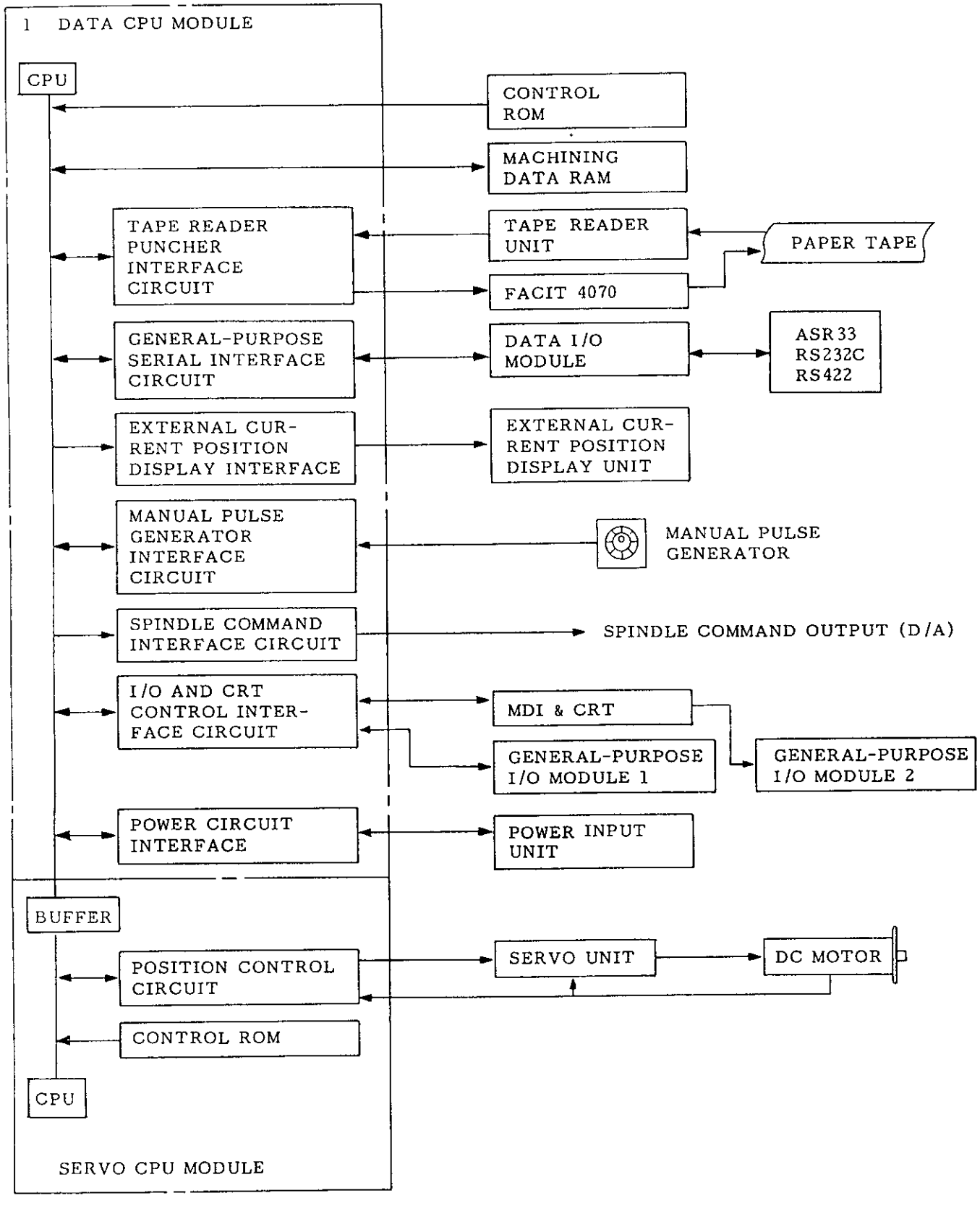


Fig 1 2 Block Diagram of YASNAC Control System

1.3 MAINTENANCE INSTRUMENTS

(1) Measuring instruments

Name	Specifications	Purpose
AC voltmeter	Capable of measuring AC power voltage Tolerance ±2% or less	To measure AC power voltages
DC voltmeter	Maximum range 10 V, 30 V Tolerance ±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 ±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 requirements to be observed for maintenance time in order to keep the equipment in optimum condition for an extended period

Table 1 4 1 Inspection Schedule

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

Except for those checks which can be made with the NC in the energized state, such as checks for external cleanliness, vibration, and noise, be sure to turn off the power supply to the NC before starting to undertake routine maintenance service.

For this, turning off the power supply by pushing the POWER OFF button on the NC operator's station is not sufficient, because after this button is pushed, still several areas in the housing are energized, and are potentially dangerous.

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.

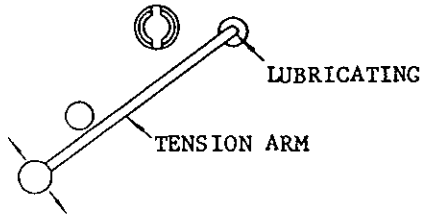
(2) Cleaning of tape tumble box (Weekly)

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)

Fig. 1.4.1

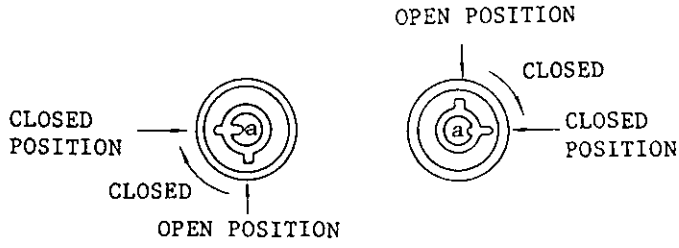
NOTE When trouble occurs in feeding or winding tape with 8 inch diameter reels, open the front door and brush away dust around the photo-coupler by using a blower brush

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



With the door lock on right side of the door (Left-hand Hinged Door)

With the door lock on left side of the door (Right-hand Hinged Door)

Fig 1 4.2

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

1.4.3 SERVOMOTOR AND DC MOTOR FOR SPINDLE (CONT'D)

(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

Cup motor: 6 mm or below

DC motor for spindle: 17 mm or below

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

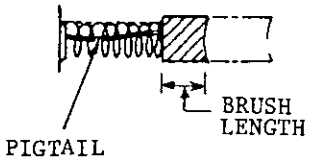


Fig 1 4.3

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, brushholders and brushes be cleaned with a dry compressed air (air pressure 2-4 kg/cm^2, 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 crimpled?
- 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?

2.1.2 OPERATIONS AND PROGRAMMING CHECKS (CONT'D)

- 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 occured 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)

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?

(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 TROUBLE SHOOTING 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

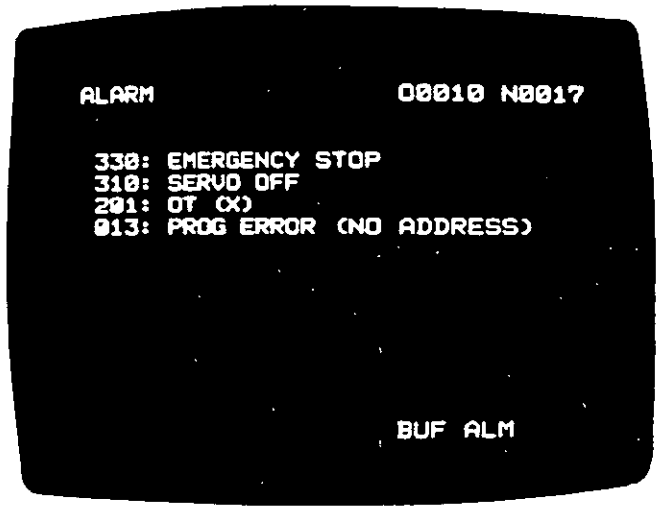


Fig 2 2 Alarm Codes and Messages

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 2.2

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

Code	Causes	Code	Causes
001	ZR UNREADY (X) REFERENCE POINT RETURN NOT COMPLETED X	024	PROG ERROR (G, G41 - 44) UNUSABLE G CODE COMMANDED DURING NOSE RADIUS COMPENSATION
002	ZR UNREADY (Z) REFERENCE POINT RETURN NOT COMPLETED Z	026	PROG ERROR (G41 - 44) RISE ERROR IN NOSE RADIUS COMPENSATION
005	RESET UNREADY (AFTER EDITING) CYCLE START WITHOUT DEPRESSING RESET BUTTON AFTER EDITING	027	PROG ERROR (G41 - 44) ERROR DURING NOSE RADIUS COMPENSATION (ERROR IN CIRCULAR INTERPOLATION MODE)
010	TH ERROR TAPE HORIZONTAL PARITY ERROR.	030	PROG ERROR (F/E) NO F OR E COMMAND IN FEED COMMAND
011	TV ERROR TAPE VERTICAL PARITY ERROR	031	PROG ERROR (R = 0) CIRCLE WITH RADIUS 0 COMMANDED IN CIRCULAR ARC COMMAND
012	OVERFLOW (128CH) BUFFER CAPACITY OVERFLOW IN A BLOCK (128 CHARACTERS)	034	PROG ERROR (G02/03) CIRCULAR ARC R DESIGNATION ERROR
013	PROG ERROR (NO ADDRESS) ADDRESS PLUS NO DATA AND NEXT ADDRESS COMMAND, OR NO ADDRESS PLUS DATA	035	PROG ERROR (T OFS) TOO LARGE NO OF T OFS CODE FOR TOOL POSITION OFFSET
014	PROG ERROR ("-," " ") SIGN "-," AND " " NOT CORRECTLY USED	036	PROG ERROR (P-G10) TOO LARGE P (NUMBER DESIGNATION) WHEN OFFSET IS PROGRAM-INPUT OR NO P DESIGNATION
015	PROG ERROR (UNUSABLE CH) UNUSABLE CHARACTER PROGRAMMED IN INSIGNIFICANT DATA AREA	037	PROG ERROR (G10) TOO LARGE R WHEN WORK COORDINATE SYSTEM IS PROGRAM-INPUT OR FORMAT ERROR IN A BLOCK
017	PROG ERROR (8 DIGITS) INPUT DATA OVERFLOW (MORE THAN 8 CHARACTERS)	040	PROG ERROR (M98, G65/66) P NOT PROGRAMMED IN G65/G66 BLOCK P OR Q NOT PROGRAMMED IN M98 BLOCK
020	PROG ERROR (G) UNUSABLE G CODE OR G CODE NOT INCLUDED IN OPTIONS PROGRAMMED	041	NO PROG PROGRAM NO (SEQUENCE NO) NOT FOUND WHEN PROGRAM IS CALLED BY M98, M99, G65, G66, G, M, AND T
021	PROG ERROR (G) G CODES IN MODAL AND * GROUPS PROGRAMMED SIMULTANEOUSLY IN A BLOCK.	042	PROG ERROR (M98, G65/66 NEST) SUBPROGRAM (M98) OR MACRO CALL (G65/G66) FIVE-NESTED

2.2.1 LIST OF ALARM CODES (CONT'D)

Code	Causes	Code	Causes
045	CAL ERROR (G41 - 44) CIRCULAR ARC DESIGNATED CIRCLE RADIUS r + 5 ≤ TOOL RADIUS d COMMANDED IN INSIDE COMPENSATION OF CIRCULAR COMMAND	062	PROG ERROR (G32/G33) THREAD CUTTING COMMANDED IN G98 MODE.
048	PROG ERROR (G41 - 44) INTERSECTION POINT NOT OBTAINED BY INTERSECTION COMPUTATION	063	PROG ERROR (G92/G78/G21) RAPID THREAD PULL-UP VALUE IN X-AXIS DIRECTION IN THREAD CUTTING WITH BEVELING SMALLER THAN BEVELING VALUE SET BY PARAMETER
049	PROG ERROR (G41 - 44) REVERSE OR ALMOST REVERSE COMMANDED IN M97 MODE	064	PROG ERROR (G92/G78/G21) RAPID THREAD PULL-UP VALUE IN Z-AXIS DIRECTION IN THREAD CUTTING WITH BEVELING VALUE SET BY PARAMETER
050	PROG ERROR (G11/12) I, K, R NOT CORRECTLY COMMANDED FOR BEVELING AND ROUNDING VALUES OF I, K, R TOO LARGE	067	POWER OFF WHILE EDITING POWER TURNED OFF DURING WRITING MEMORY
051	PROG ERROR (G11/12) TAPERING COMMAND IN BLOCKS FOR BEVELING AND ROUNDING	068	EDITING INHIBIT AREA EDITING BEING EXECUTED IN THE EDIT INHIBIT AREA
052	PROG ERROR (G01) ANGLE PROGRAMMING NOT CORRECT DURING ANGLE PROGRAMMING LINEAR INTERPOLATION BY G01	070	PROG ERROR (M02/M30/M99) MEMORY OPERATION COMPLETION COMMAND NOT GIVEN
053	PROG ERROR (G50T/G92T) VALUES OF TOOL COORDINATE MEMORY OUT OF THE RANGE BETWEEN 51 TO 80 IN WORK COORDINATE SYSTEM SETTING BY G50T	075	RS232C ERROR (BAUD RATE) DISAGREEMENT OF NO OF BITS AND NO OF BAUD RATES FOR RS232C INTERFACE
055	PROG ERROR (M, S, T) M, S, T COMMANDS IN THE BLOCK IN WHICH M, S, T CODE CANNOT BE COMMANDED	076	RS232C ERROR (SIGNAL LEVEL) DATA TRANSMISSION FAILURE THROUGH RS232C INTERFACE
056	PROG ERROR (AXIS) AXIS COMMAND IN G20, G21 BLOCKS. AXIS NOT CORRECTLY COMMANDED IN G04, G36-G38.	077	RS232C ERROR (OVER-RUN) 10 CHARACTERS OR MORE HAVE BEEN READ IN AFTER STOP CODE HAS BEEN TRANSMITTED THROUGH RS232C INTERFACE
059	ZR UNREADY G28 NOT COMPLETED ON THE AXIS WHICH HAS G29 COMMAND OR REFERENCE POINT RETURN NOT COMPLETED ON THE AXIS WHICH HAS G30 COMMAND	080	TOOL SET CMP ERROR T CODE NOT COMMANDED BEFORE G35 BLOCK G98 NOT COMMANDED IN OR BEFORE G35 BLOCK
060	PROG ERROR (G34) LEAD INCREASE/DECREASE VALUE EXCEEDING MAXIMUM PROGRAMMABLE VALUE DURING VARIABLE LEAD THREAD CUTTING. MINUS VALUE OF LEAD COMMANDED	081	TOOL SET CMP ERROR ERROR OF PARAMETER SETTING FOR TOOL SET ERROR COMPENSATION (X)
061	PROG ERROR (G11/G12 IN THREAD) ROUNDING, BEVELING COMMAND IN THREAD CUTTING BLOCK	082	TOOL SET CMP ERROR ERROR OF PARAMETER SETTING FOR TOOL SET ERROR COMPENSATION (Z).

2.2.1 LIST OF ALARM CODES (CONT'D)

Code	Causes	Code	Causes
083	TOOL WEAR CMP ERROR COMPENSATION NO EXCEPT 01 TO 19 DESIGNATED AT TOOL WEAR COMPENSATION	097	PROG ERROR (G70-76/G72-78) FOUR OR MORE PROCESSING INTERRUPTIONS BY FINISHED SHAPE PROGRAM IN STOCK REMOVAL CYCLE BY G71, OR G72 R1
084	TOOL WEAR CMP ERROR TOOL WEAR COMPENSATION INPUTS WOM, WOP GIVEN SIMULTANEOUSLY	098	PROG ERROR (G70-76/G72-78) DATA SPECIFIED BY G70, P, Q NOT REGISTERED IN INTERNAL KEEP MEMORY
085	EXTERNAL CMP ERROR MULTIPLICATION FACTOR SET BY PARAMETER EXCEEDING 11 FOR EXTERNAL TOOL COMPENSATION	100	CAL ERROR (FIXED POINT) MAGNITUDE OF FIXED POINT DATA EXCEEDING UPPER LIMIT
086	EXTERNAL CMP ERROR ERROR INPUT TURNED ON DURING EXTERNAL TOOL COMPENSATION	101	CAL ERROR (FLOATING) EXPONENT OF FLOATING POINT DATA EXCEEDING ALLOWABLE RANGE.
087	PROG ERROR (G31/G35) TOUCH SWITCH NOT ON WHEN MOTION REACHES END POINT BY SKIP OR TOOL SET ERROR COMPENSATION COMMANDS	102	CAL ERROR (DIVISION) CALCULATION DIVISOR ZERO OR OVERFLOW ERROR.
090	PROG ERROR (G70-76/G72-78) P, Q NOT COMMANDED IN G70, 71, 72, 73 BLOCKS	103	CAL ERROR (SQUARE ROOT) ROOT VALUE IS A NEGATIVE $\sqrt{(-)}$.
091	PROG ERROR (G70-76/G72-78) BLOCK OF SEQUENCE NO SPECIFIED BY P, Q IN G70 NOT FOUND PROG NO. INCLUDING IN G70 BLOCK	104	PROG ERROR (DOUBLE ADR) CHARACTER WHICH CANNOT BE REPEATED IN A BLOCK COMMAND IN REPETITION
092	PROG ERROR (G70-76/G72-78) NO OF BLOCKS INCLUDING FINISHED SHAPE PROGRAM SPECIFIED BY P, Q IN G70, G71, G72, AND G73, OVER 46	105	MACRO ERROR (CONSTANT) CONSTANTS EXCEEDING THE LIMIT
093	PROG ERROR (G70-76/G72-78) UNABLE G- AND M-CODE IN FINISHED SHAPE PROGRAM SPECIFIED BY P, Q IN G70, G71, G72, AND G73	106	MACRO ERROR TOO MANY CODES FOR CANCELLING G67
094	PROG ERROR (G70-76/G72-78) BEVELING AND ROUNDING COMMANDS AS LAST MOVE COMMAND FOR FINISHED SHAPE PROGRAM SPECIFIED BY P, Q IN G70, G71, G72, AND G73	107	MACRO ERROR (FORMAT) ERROR IN THE FORMAT EXCEPT FOR EQUATION
095	PROG ERROR (G70-76/G72-78) FAULTS IN FINISHED SHAPE PROGRAM SPECIFIED BY P, Q IN G71, G72	108	MACRO ERROR (UNDEFIN #NO) UNDEFINED VARIABLE NO DESIGNATED
096	PROG ERROR (G70-76/G72-78) D (CUTTING FREQUENCY) SPECIFIED BY G73 ZERO OR 128 OR MORE I, K (ROUGH CUTTING) SPECIFIED BY G73 BOTH ZERO D, K OF G76 EXCEEDING PROGRAMMABLE RANGE	109	MACRO ERROR (#NO NOT LEFT) PROHIBITED VARIABLE DESIGNATED AS SUBSTITUTION

2.2.1 LIST OF ALARM CODES (CONT'D)

Code	Causes	Code	Causes
110	MACRO ERROR ([ ]5 LIMIT) MULTIPLE LAYERS OF PARENTHESES EXCEEDING THE UPPER LIMITS	130	EXT DATA DATA ERROR IN A GROUP DATA.
111	MACRO ERROR (MOVE G66-M99) MOVE COMMAND IN M99 FINISHING COMMAND OF MACRO CALLED BY G66.	131	EXT MESSAGE NO ALARM NUMBER CORRESPONDING TO EXTERNAL ALARM MESSAGE TO BE CLEARED
112	MACRO ERROR MULTIPLE LEVELS OF MACRO CALL EXCEEDING THE UPPER LIMIT 4	132	EXT MESSAGE NO CORRESPONDING ALARM NO WHEN EXTERNAL ALARM MESSAGE IS CLEARED
114	MACRO ERROR (DO-FORMAT) DO-END NOT CORRESPONDING	133	EXT MESSAGE NO CORRESPONDING ALARM NO. WHEN EXTERNAL ALARM OR OPERATOR MESSAGE IS CLEARED
115	MACRO ERROR ([ ]UNMATCH) ERROR IN < EQUATION > FORMAT	134	NO PROG (EXT) NOT FOUND PROGRAM NO. SPECIFIED BY EXTERNAL NO SEARCH
116	MACRO ERROR (DO END NO) m NOT IN THE RANGE OF 1 ≤ m ≤ 3 IN DO m	135	EXT DATA ERROR IN DATA GIVEN BY EXTERNAL DATA INPUT
118	MACRO ERROR (GO TO N) n NOT IN THE RANGE OF 0 ≤ n ≤ 9999 IN GOTO n	140	PROG ERROR (G111/G112) ERROR IN ADDRESS WORD COMMANDING OF G111 BLOCK.
120	PRTN ERROR (NOT FOUND) SEQUENCE NO SEARCHED NOT FOUND IN PART PROGRAM	141	PROG ERROR (G111/G112) ANGLE FOR ANGLE PROGRAMMING A, B BY G111 OUT OF RANGE -360 ≤ A, B ≤ 360
121	PTRN ERROR (G50/G92) G31 COMMANDED DURING PROGRAM RESTART	142	PROG ERROR (G111/G112) 1ST BEVELING PORTION OUTSIDE RECTANGLE COMPOSED BY START AND END POINTS OR BETWEEN 45° STRAIGHT LINES OF START TO END POINTS AND END TO START POINTS
122	PRTN ERROR	143	PROG ERROR (G111/G112) ERROR IN G111 COMMAND BLOCK
123	PRTN ERROR (ORG)	144	PROG ERROR (G111/G112) M, S, T COMMANDED IN G111, G112 BLOCK
124	PRTN ERROR (MDI MOVE) AXIS OPERATED BY MDI AFTER PROGRAM RESTART PREPARATION	145	PROG ERROR (G111/G112) ERROR IN COMMANDING ADDRESS WORD FOR G112 BLOCK

2.2.1 LIST OF ALARM CODES (CONT'D)

Code	Causes	Code	Causes
146	PROG ERROR (G111/G112) ERROR IN COMMANDING PROGRAMMED SHAPE FORMED BY G112 BLOCK	222	S-OT2 (Z) STORED STROKE LIMIT SECOND AREA (OUTSIDE INHIBIT) X
170	MEM ERROR (OFS) TOOL OFFSET TOTAL CHECK ERROR	223	S-OT3 (INSIDE) STORED STROKE LIMIT THIRD AREA (OUTSIDE INHIBIT)
172	MEM ERROR (SET) SETTING AREA TOTAL CHECK ERROR	224	S-OT3 (X) STORED STROKE LIMIT THIRD AREA (OUTSIDE INHIBIT) X
173	MEM ERROR (PRM) PARAMETER AREA TOTAL CHECK ERROR	225	S-OT3 (Z) STORED STROKE LIMIT THIRD AREA (OUTSIDE INHIBIT) Z
179	OVER TEMP PANEL INSIDE TEMPERATURE TOO HIGH	231	ZR ERROR-AREA (X) REFERENCE POINT RETURN AREA ERROR X
180	SEQ ERROR SEQUENCE ERROR (1)	232	ZR ERROR-AREA (Z) REFERENCE POINT RETURN AREA ERROR Z
201	OT (X) OVERTRAVEL X	241	ZR ERROR-POS (X) REFERENCE POINT RETURN POSITION ERROR X.
202	OT (Z) OVERTRAVEL Z	242	ZR ERROR-POS (Z) REFERENCE POINT RETURN POSITION ERROR Z.
211	S-OT1 (X) STORED STROKE LIMIT FIRST AREA X	271	P-SET ERROR (X) P SET ERROR X
212	S-OT1 (Z) STORED STROKE LIMIT FIRST AREA Z	272	P-SET ERROR (Z) P SET ERROR Z
220	S-OT2 (INSIDE) STORED STROKE LIMIT SECOND AREA (INSIDE INHIBIT)	280	MACH UNREADY MACHINE READY OFF.
221	S-OT2 (X) STORED STROKE LIMIT SECOND AREA (OUTSIDE INHIBIT) X	310	SERVO OFF SERVO POWER NOT SUPPLIED

2.2.1 LIST OF ALARM CODES (CONT'D)

Code	Causes	Code	Causes
320	NU UNREADY NC UNREADY P SET UNREADY	372	FG ERROR (2) FG ERROR 2
330	EMERGENCY STOP EMERGENCY STOP	381	PRG ERROR PRG ERROR
331	FUSE (X) FUSE BLOWN X	391	TG ERROR (X) TG LEAD DISCONNECTION X
332	FUSE (Z) FUSE BLOWN Z	392	TG ERROR (Z) TG LEAD DISCONNECTION Z
341	SERVO ERROR (X) SERVO ERROR X	400	SEQ ERROR SEQUENCE ERROR (2)
342	SERVO ERROR (Z) SERVO ERROR Z	810	CPU ERROR CPU ERROR
351	OL (X) OVERLOAD (1) X	820	RAM CHECK ERROR, CP04 ERROR, MM01 ERROR RAM CHECK ERROR, CP04 ERROR, MM01 ERROR
352	OL (Z) OVERLOAD (1) Z	910	TAPE-MEM ERROR MEMORY VERIFYING ERROR (OFF-LINE)
357	OL (OTHERS) OVERLOAD (2)	920	TAPE ERROR TAPE READING-IN ERROR (OFF-LINE)
361	PG ERROR (X) PG ERROR X		
362	PG ERROR (Z) PG ERROR Z		
371	FG ERROR (1) FG ERROR 1		

2.2.1 LIST OF ALARM CODES (CONT'D)

ALARM "095"

X-coordinates differnt between G71 command cutting start point and last block for finished shape program

Z-coordinates different between G72 command cutting start point and last block for finished shape program

Z- coordinate for cutting start point by G71 command different from Z-coordinate for the first block of the finished shape program

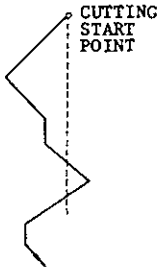
(EXCEPT FOR G71 --- R1 TYPE)

X-coordinate for cutting start point by G72 command difference from X-coordinate for the first block of the finished shape program.

(EXCEPT FOR G72 --- R1 TYPE)

X-coordinate for finishes shape program by G71 R1 Command exceeding cutting start point

Z-coordinate for finished shape program by G72 · R1 command exceeding cutting start point



ALARM "140"

- Commanding one or no address of addresses B, X(U), Z(W) specifying second straight line
- Commanding two addresses of addresses B, X(U), Z(W) specifying second straight line. In addition to this, one or no address commanded among addresses A,I, K,specifying first straight line.
- Address C specifying first beveling and address P specifying first rounding commanded.
- Address D specifying second beveling and address Q specifying second rounding commanded.

Commanding addresses X and Z specifying second straight line and Q and D specifying second beveling and rounding.

ALARM "143"

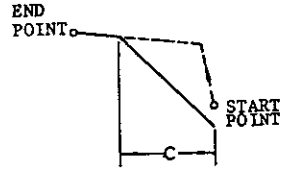
Command values for addresses A, I, K specifying first straight line are determined as follows, and programmed shape cannot be formed.

Command value for A	
-360 000, -180 000 0, 180 000, 360 000	Address I commanded for specifying first straight line
-270 000, -90 000 90 000, 270 000	Address K commanded for specifying first straight line

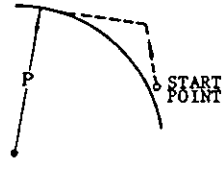
Command values for addresses B, X(U), Z(W) specifying second straight line are determined as follows, and programmed shape cannot be formed.

Command value for B	
-360 000, -180 000 0, 180 000, 360 000	Address X (U) commanded for specifying second straight line
-270 000, -90 000 90 000, 270 000	Address Z (W) commanded for specifying second straight line

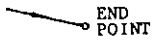
Command values for addresses C and D for beveling too large for the programmed shape Operation cannot be made according to the command.

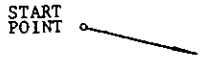


Command values for address P and Q specifying radius for rounding too large for the programmed shape. Operation cannot be made according to the command.



No intersecting point for first straight line and second straight line





First straight line and second straight line on the same line

ALARM "145"

X(U) or Z(W) not commanded

X(U) and Z(W) both commanded

R not commanded Or "0" commanded for R

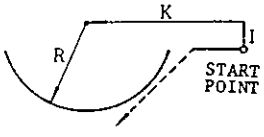
I and K not commanded
"0" commanded for I and K

P and C both commanded

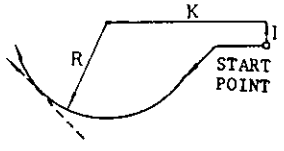
Q and D both commanded

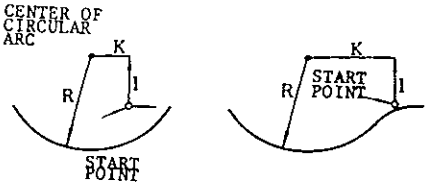
ALARM "146"

Beveling for command C cannot be made

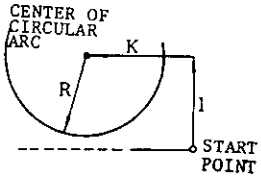


Beveling for command D cannot be made.

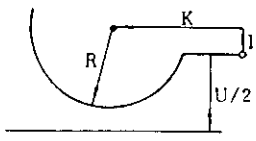


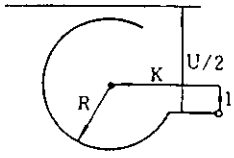


No intersecting point between circular arc and straight line



No intersecing point between circular arc and end point





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)

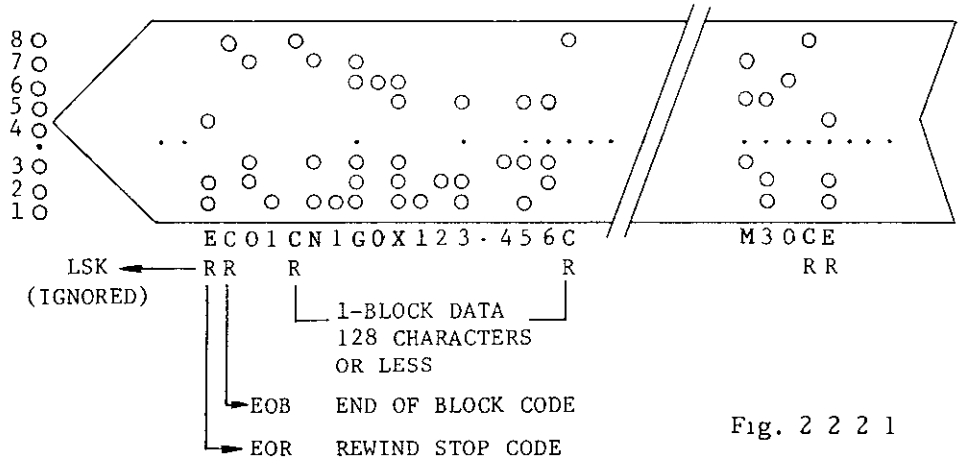
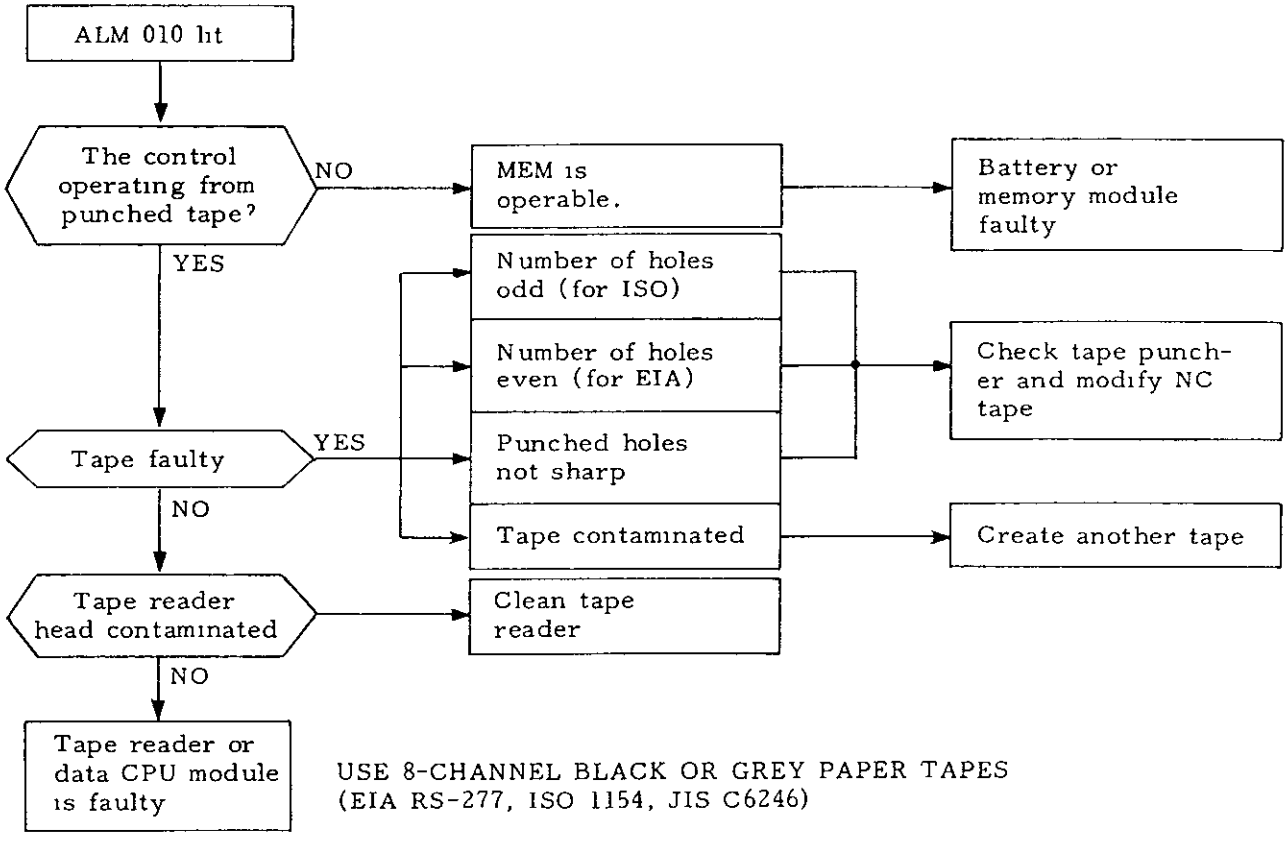


Fig. 2 2 2 1



USE 8-CHANNEL BLACK OR GREY PAPER TAPES
(EIA RS-277, ISO 1154, JIS C6246)

Fig 2 2 2 2

Tape Reader Connections

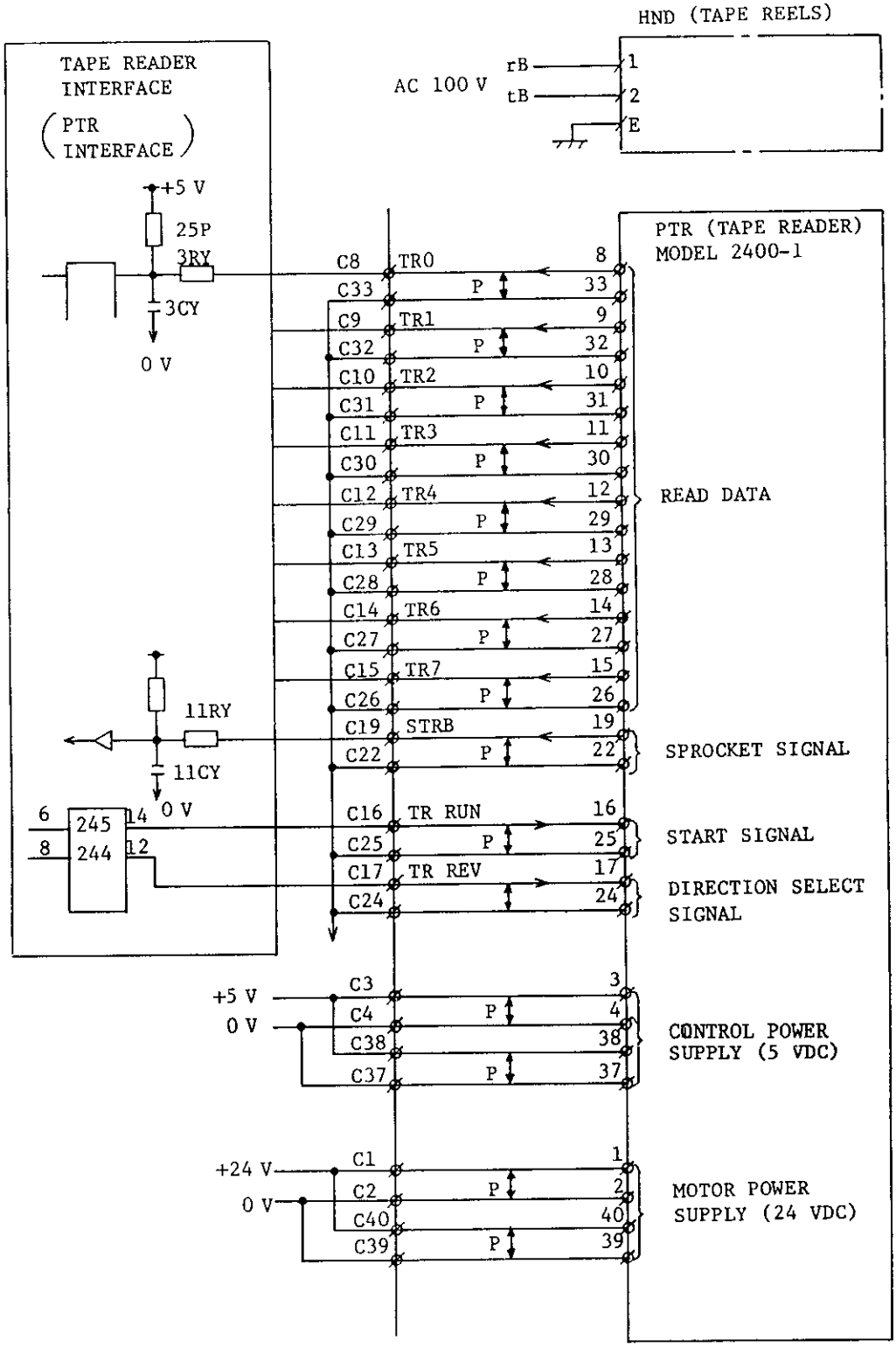


Fig 2 2 2 3 Tape Reader Connection Diagram

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

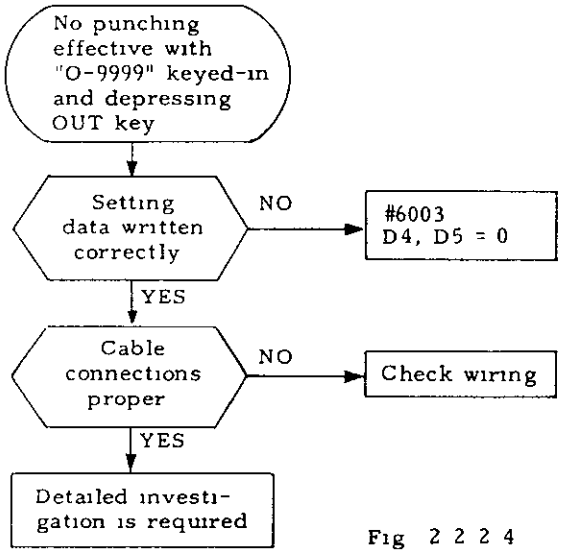


Fig 2 2 2 4

RS 232C

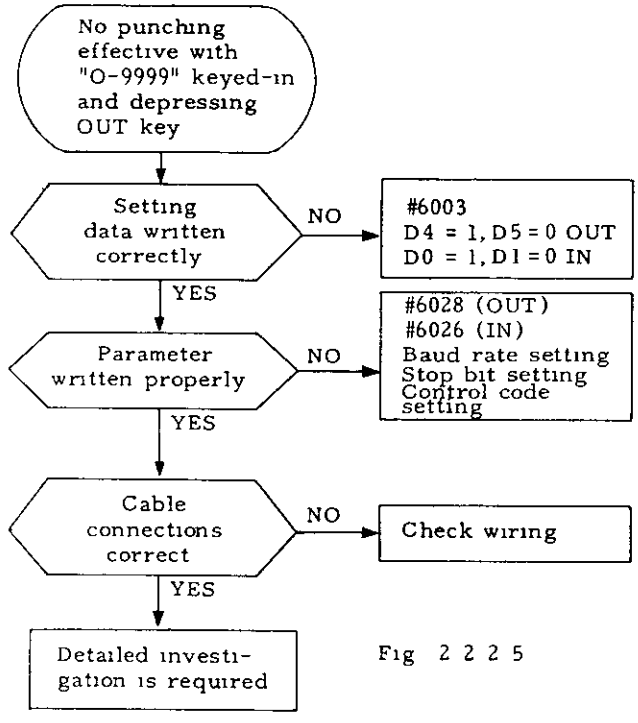


Fig 2 2 2 5

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	D0
PTR	FACIT	0	0	0	0	0	0	0	0
PTR	ASR 33	0	0	0	1	0	0	0	0
RS 232C	RS 232C	0	0	0	1	0	0	0	1

Baud rate setting Parameter #6026 (IN), #6028 (OUT)

Baud rate of I/O devices	–	–	RSCB	STP	Baud rate setting			
	D7	D6	D5	D4	D3	D2	D1	D0
110 bauds					0	0	1	0
300 bauds					0	1	0	1
600 bauds					0	1	1	0
1200 bauds					0	1	1	1
2400 bauds					1	0	0	0
4800 bauds					1	0	0	1
9600 bauds					1	0	1	0

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

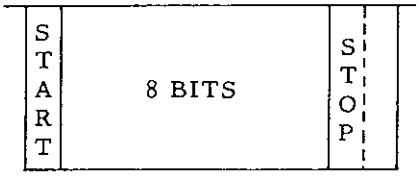
Teletypewriter setting (for ASR-33)

#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

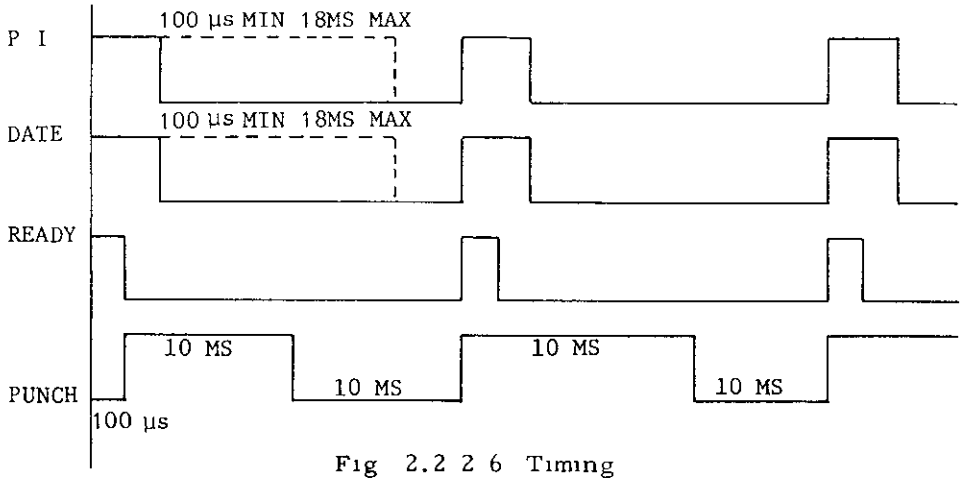


Fig 2.2 2 6 Timing

FACIT connection diagram

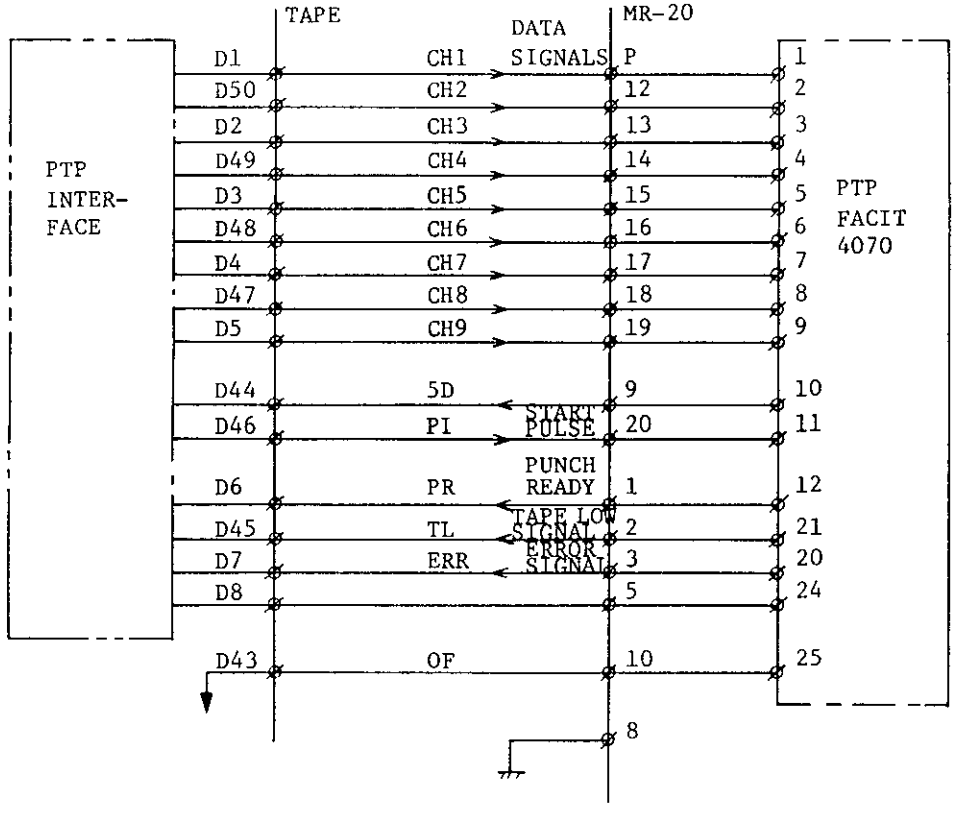


Fig 2 2 2 7 FACIT Connection Diagram

2.2.2 COUNTERACTING ALARMS (CONT'D)

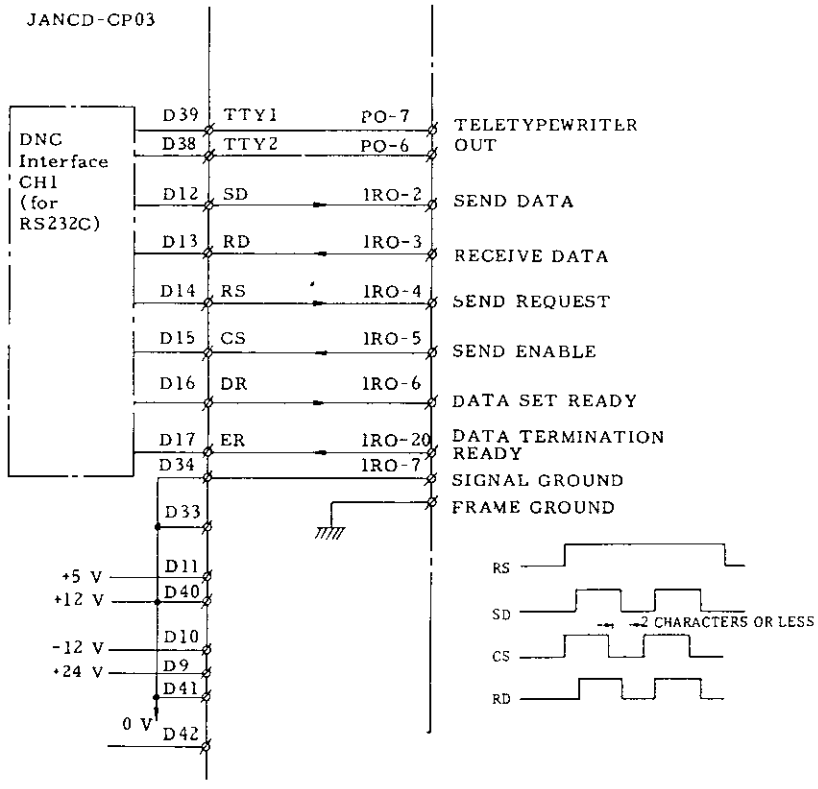


Fig 2 2 2 8 RS 232C Connection Diagram

(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

These alarms warn that tool offset amount, setting data, and parameter have been changed due to any of the following reasons

a. Battery unit failure (Battery alarm display)

b. Memory modules (2) not connected correctly

c. Failure of memory module (1) or (2).

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 18C, 18D	1C	3L
173	MEMORY ERROR (PRM)	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, either the ambient temperature is high, or the cooling fan inside the control panel or the external ventilation fan is stopped Check for both

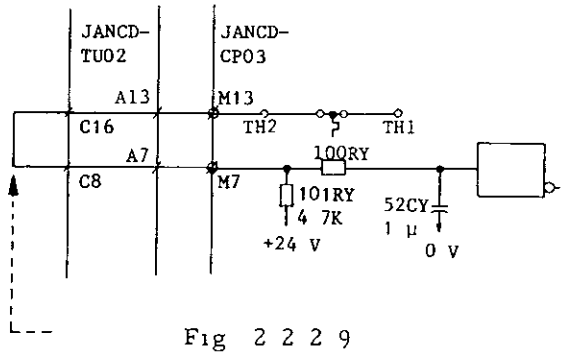


Fig 2 2 2 9

NOTE

The customer (OEM) can add another thermostat (contacts usually closed)

When the system is not in use, short-circuit pins C8 and C16 at TU02, as illustrated

(5) Alarms 231 (X), 232 (Z) (Zero Reutnr Area Error)

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

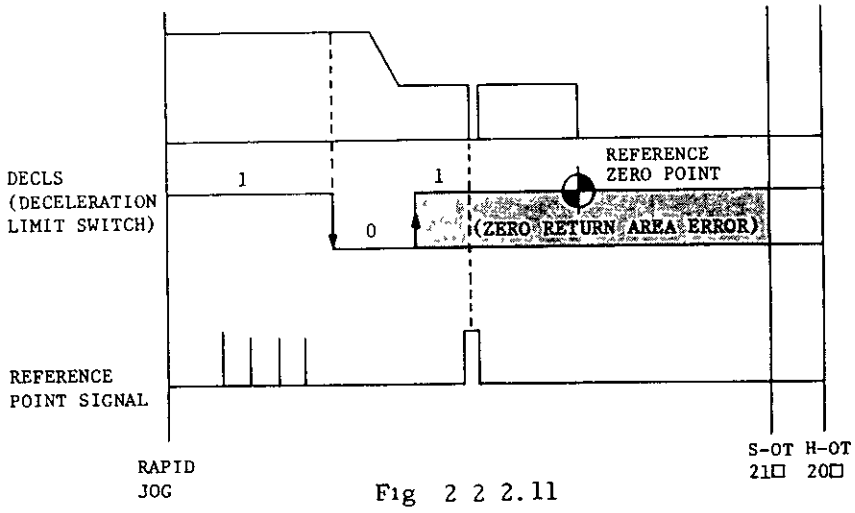


Fig 2 2 2.11

(6) Alarms 241 (X), 242 (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 "

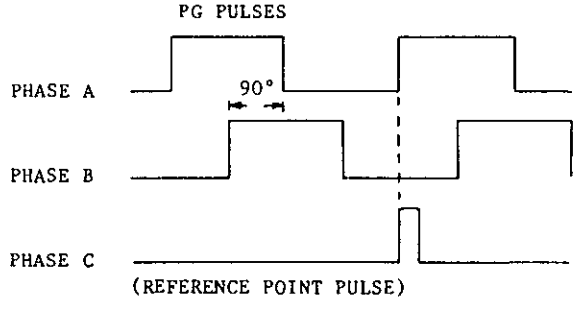


Fig. 2 2 2 11

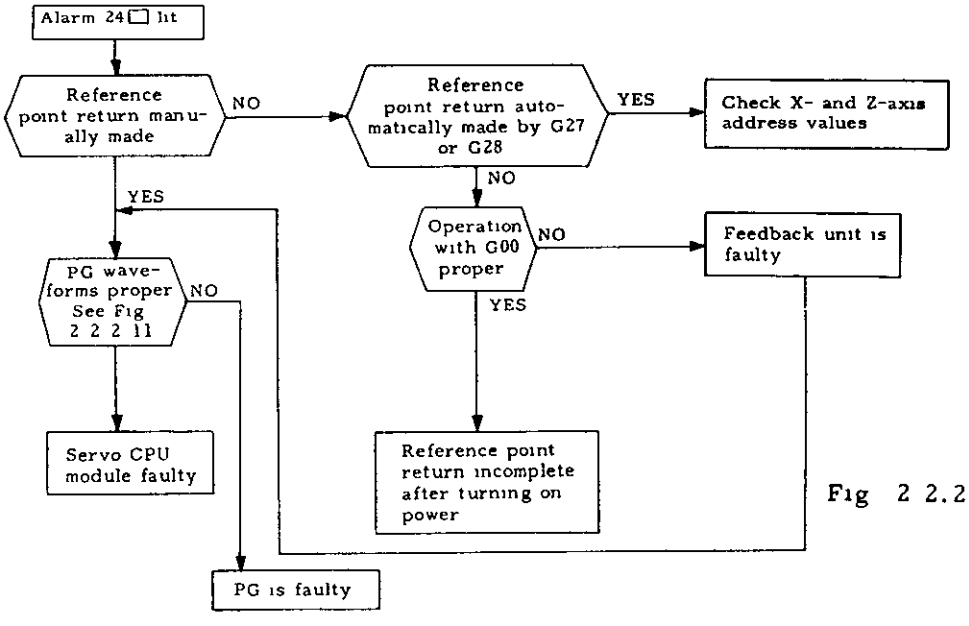


Fig 2 2.2 12

2.2.2 COUNTERACTING ALARM CODES (CONT'D)

(7) Alarms 271 (X), 272 (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

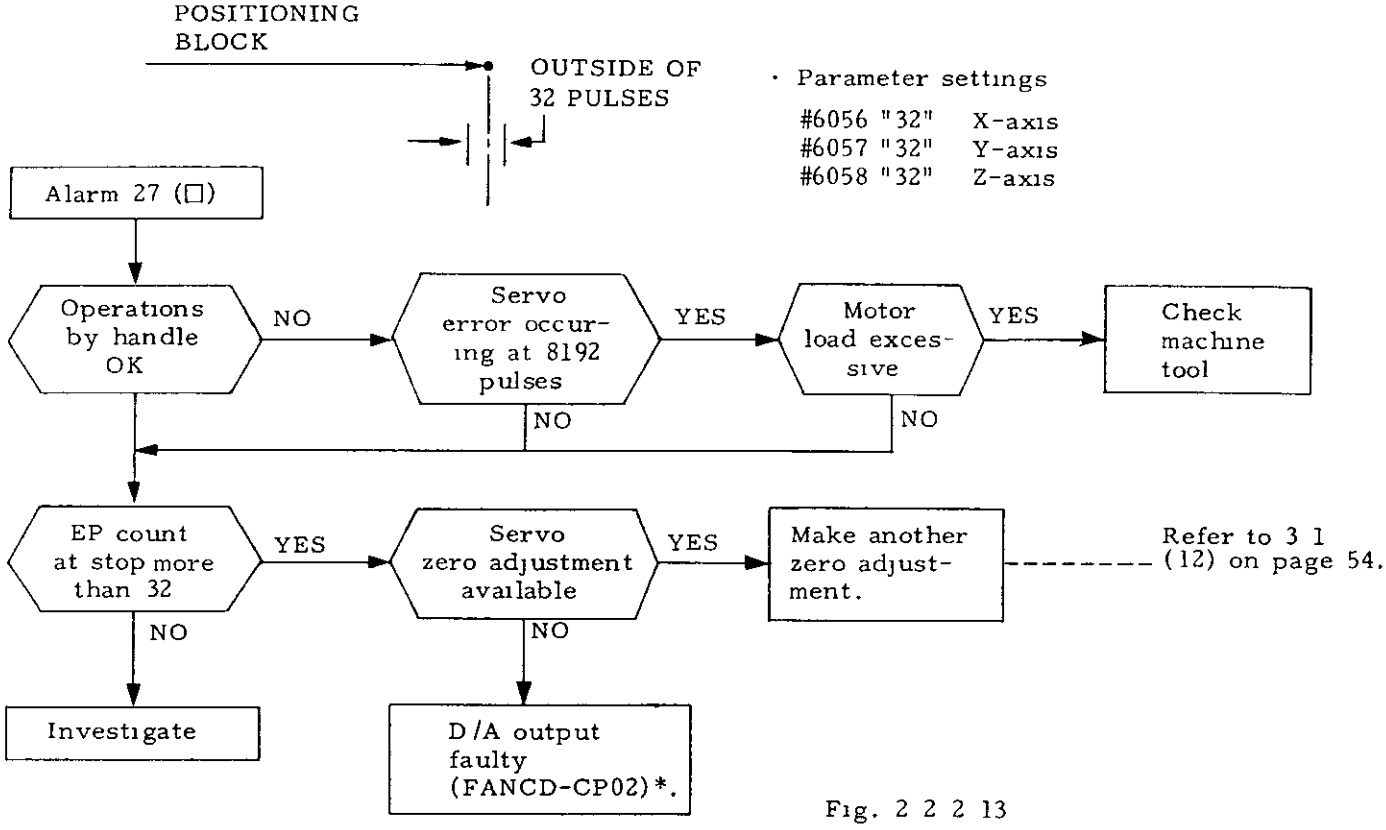


Fig. 2 2 2 13

* Measure the D/A voltage on an initial power application (1 pulse = 1.22 mV).

(8) Alarm 280 (Machine Unready)

This alarm results from the MRD (machine unready) signal being OFF after transmission of the NC Ready Signal Check to see if the MRD signal is normal.

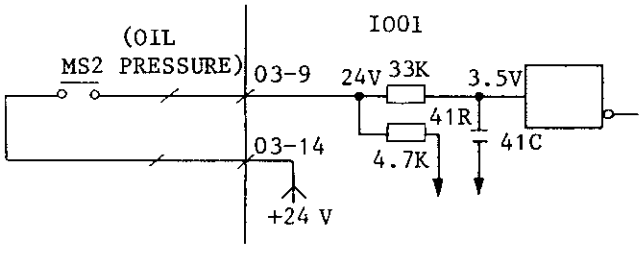


Fig 2 2 2 14 Connection Example

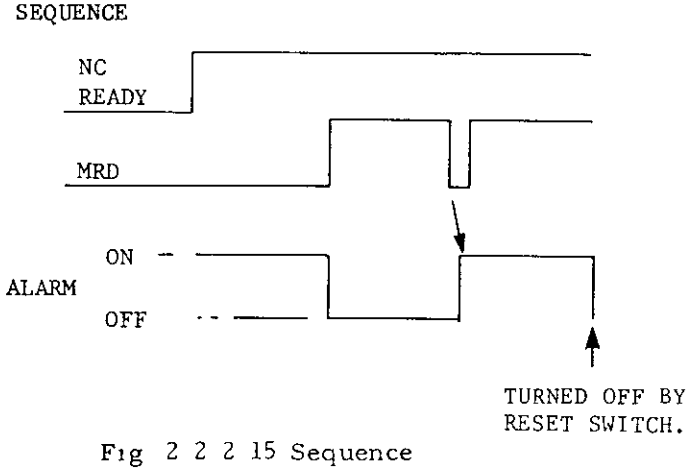


Fig 2 2 2 15 Sequence

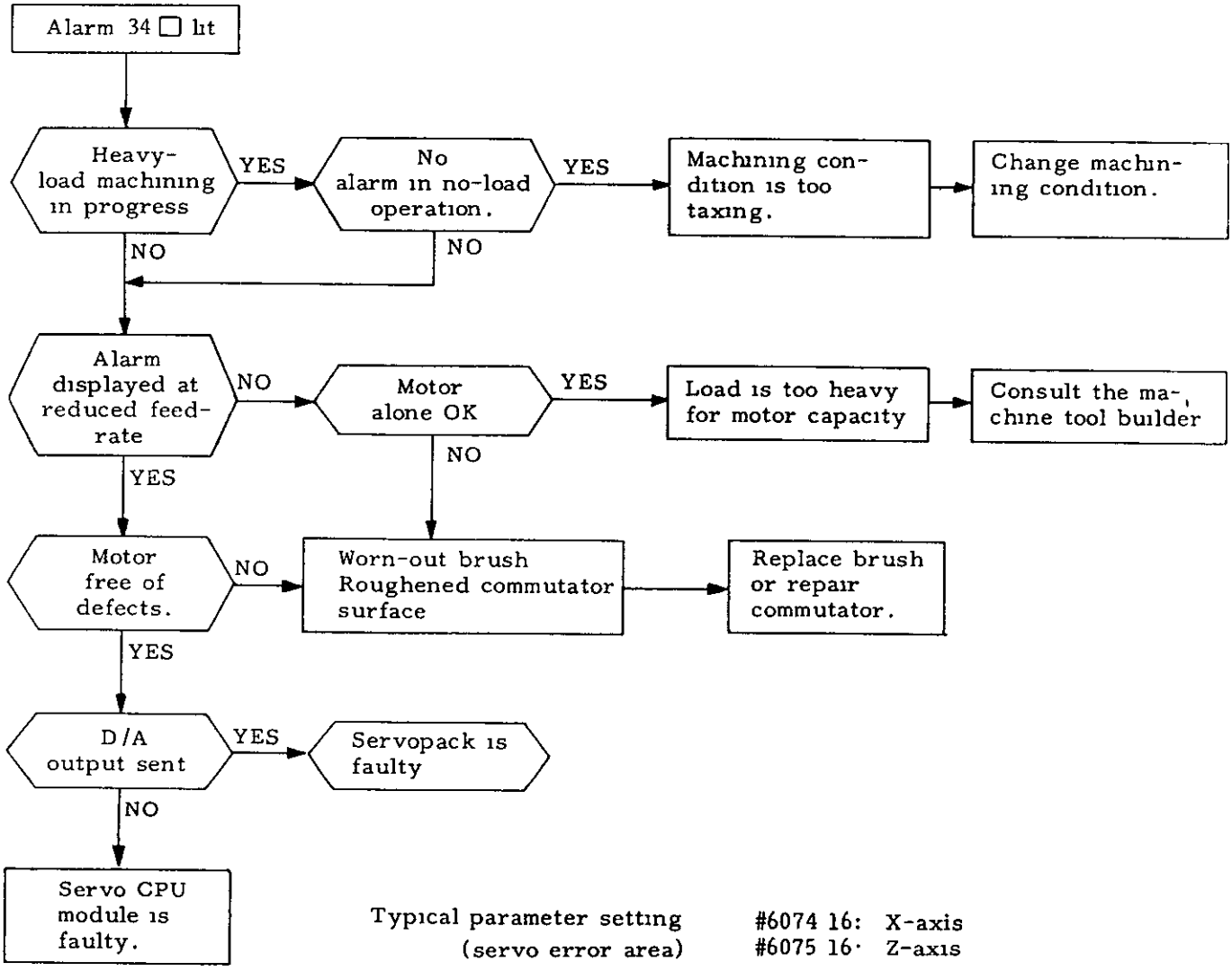
(9) Alarm 330 (Emergency Stop)

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), 322 (Z)
(Servo Fuse Blown)

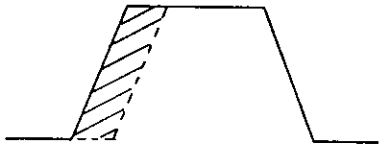
These errors are attributable to damaged transistor(s). Immediately contact the YASNAC service personell

(11) Alarms 341 (X), 342 (Z)
(Servo Error)



Typical parameter setting (servo error area)

#6074 16: X-axis
#6075 16: Z-axis



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

Fig. 2.2.2.16

2.2.2 COUNTERACTING ALARMS (CONT'D)

(12) Alarms 351 (X), 352 (Z) (Overload (1))

Electronic thermal relay trip

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

(13) Alarm 357 (Overload (2))

This alarm is initiated by too high regenerative resistance temperature. Main causes are high motor operation frequency (100% or more of the rating), failures of servo drive unit and servomotor

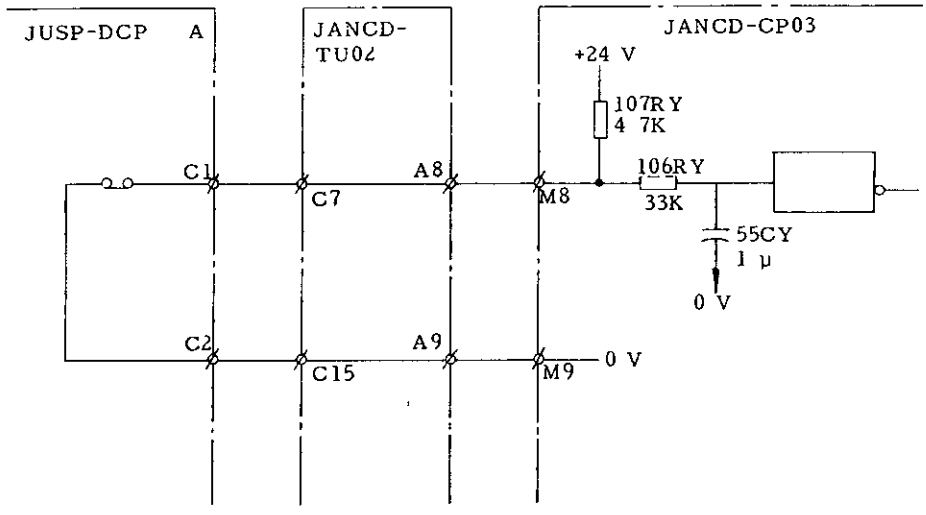


Fig. 2 2 2 18

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

The possible cause is that no PG input is given to the servo CPU module despite the Servopack $\overline{\text{TGON}}$ signal being turned on.

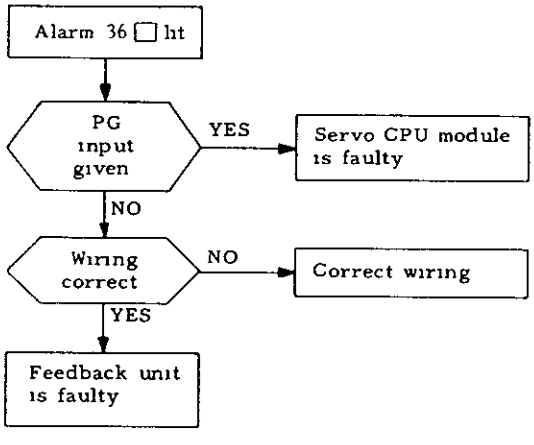


Fig 2.2.2.19

· PG Waveforms (type ZC7)

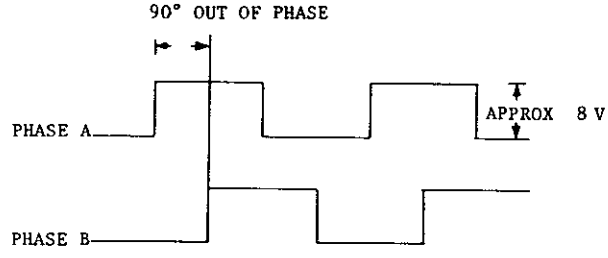


Fig 2 2 2.20

· PG Waveforms (type ZD7)

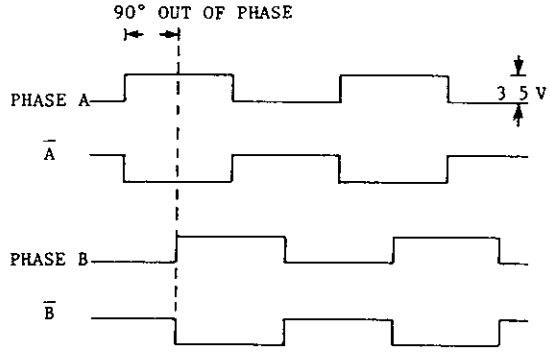
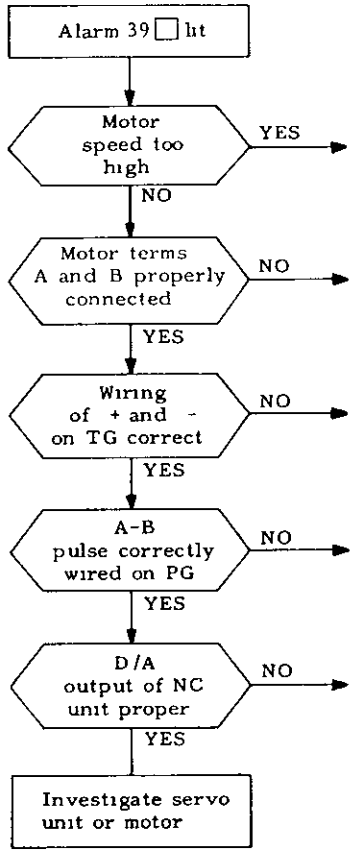


Fig. 2.2.2 21

(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.



Check the TG voltage

Does motor speed exceed the rating?

Is the TG wiring correct?

If the rotation is clockwise viewed from drive end, motor terms A and B should be connected to servo unit terms A and B, respectively

If the rotation is counterclockwise viewed from drive end, motor terms A and B should be connected to servo unit terms B and A, respectively

If the rotation is clockwise viewed from drive end, connect motor connecting pins L(G) and M(H) to TG pins J10 and J11, respectively

If the rotation is counterclockwise viewed from drive end, connect motor connecting pins L(G) and M(H) to TG pins J11 and J10, respectively

If the rotation is clockwise viewed from drive end, connect motor connecting pins A and B to PG pins J16 and J18, respectively

If the rotation is counterclockwise viewed from drive end, connect motor connecting pins A and B to PG pins J18 and J16, respectively

On a first power application, check the D/A output

On a second power application, use EP (error pulse) for verification to check the D/A output

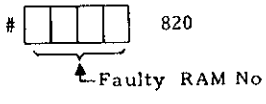
Fig. 2.2.2.22

(16) Alarm 810 (CPU error)

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

(17) Alarm 820

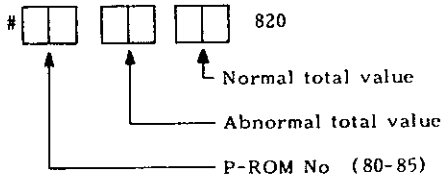
① RAM check error



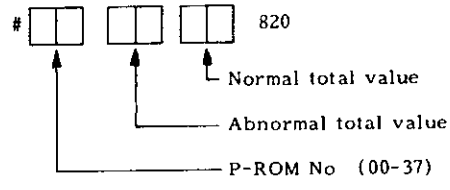
RAM No. and Location

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

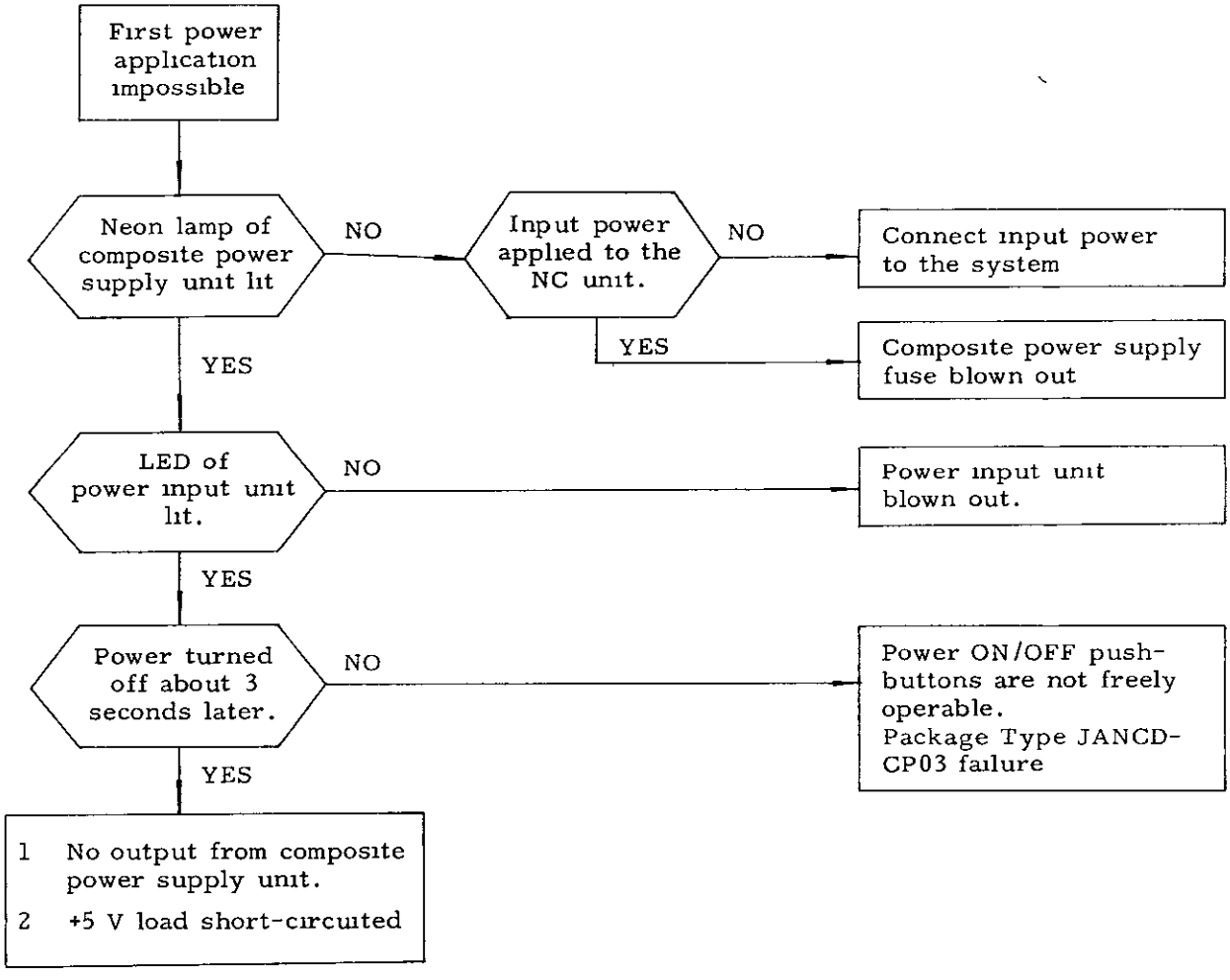
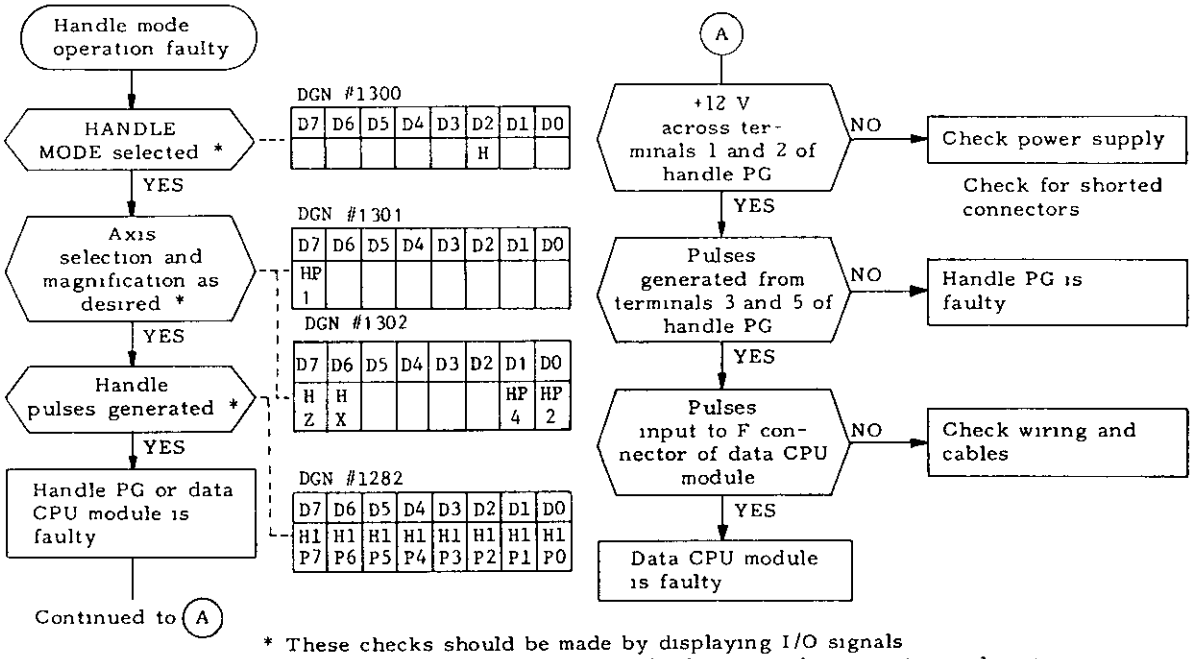


Fig 2 3.1

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 #6222 (maximum manual handle feedrate, 1 = 7 5 mm/min)

Fig. 2.3 2

Handle PG Connection Diagram

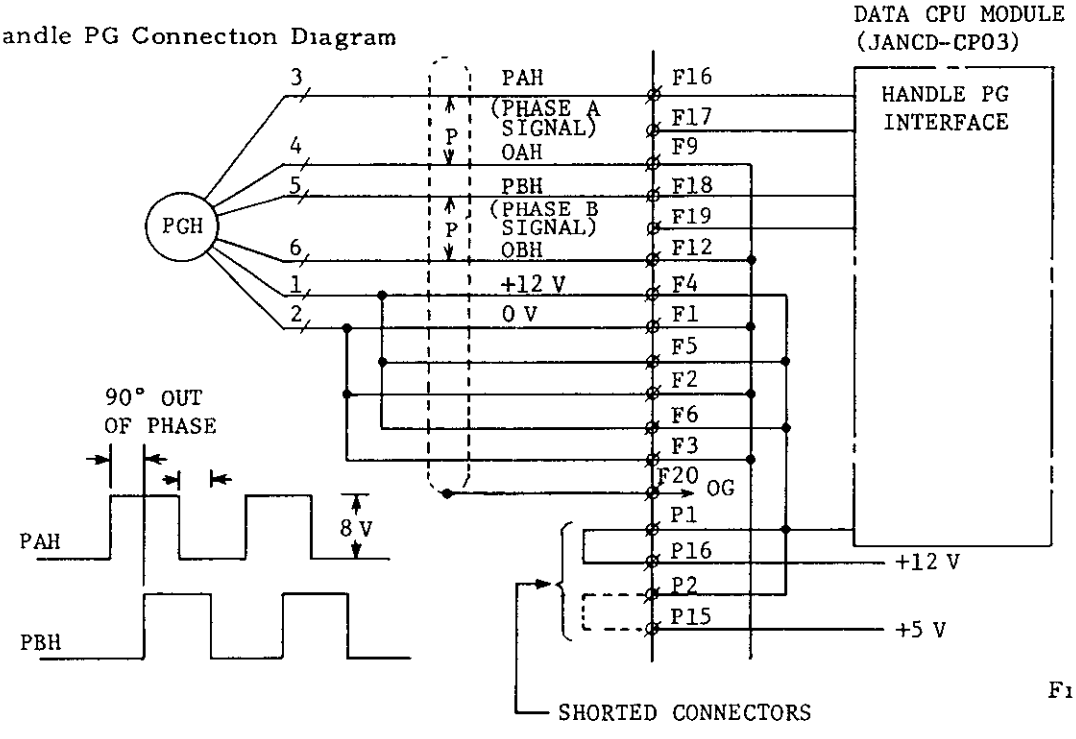


Fig 2 3.3

2.3 TROUBLESHOOTING WITHOUT ALARM CODES (CONT'D)

(3) Manual jog mode operation faulty

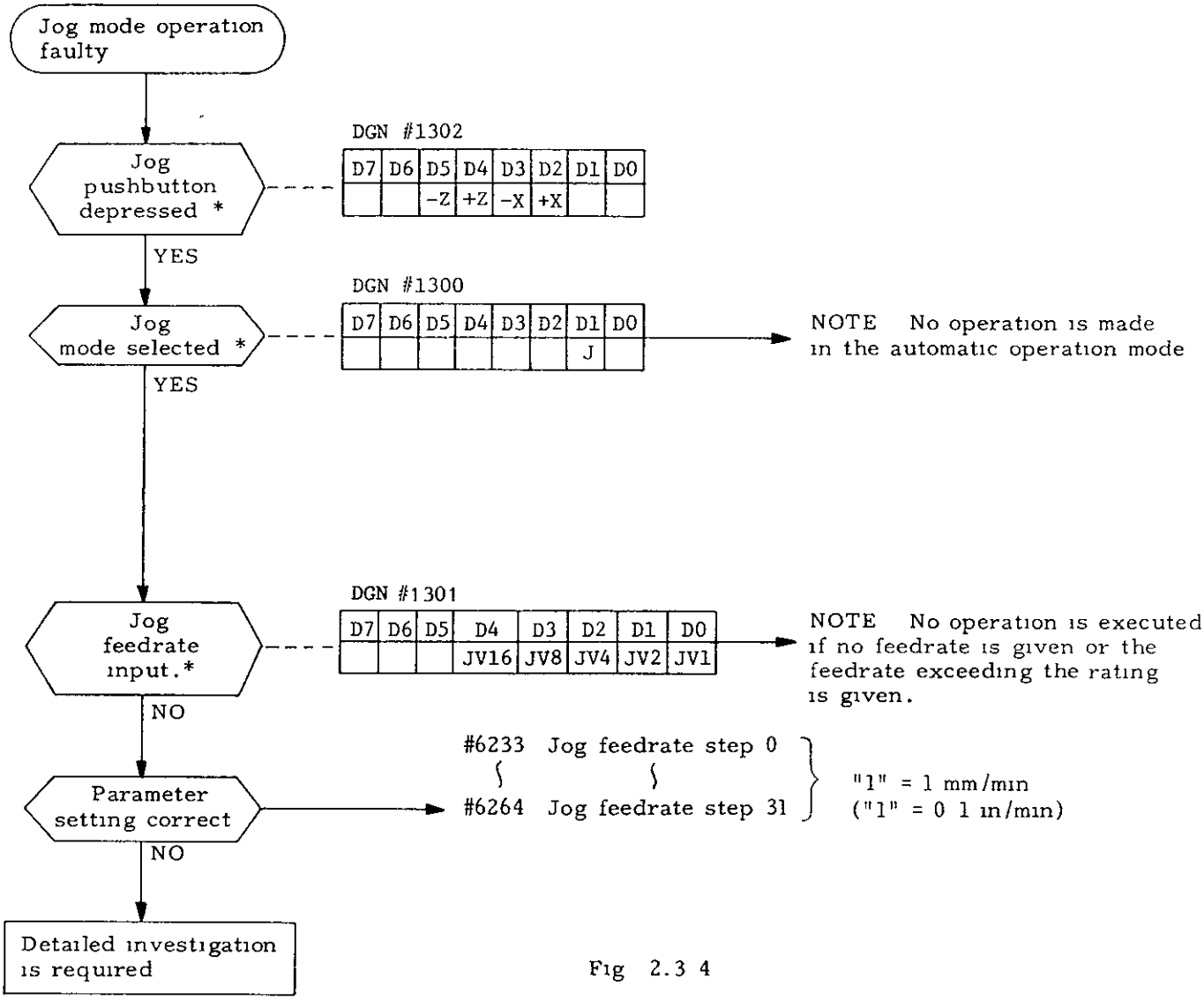


Fig 2.3 4

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

(4) Manual rapid mode operation faulty

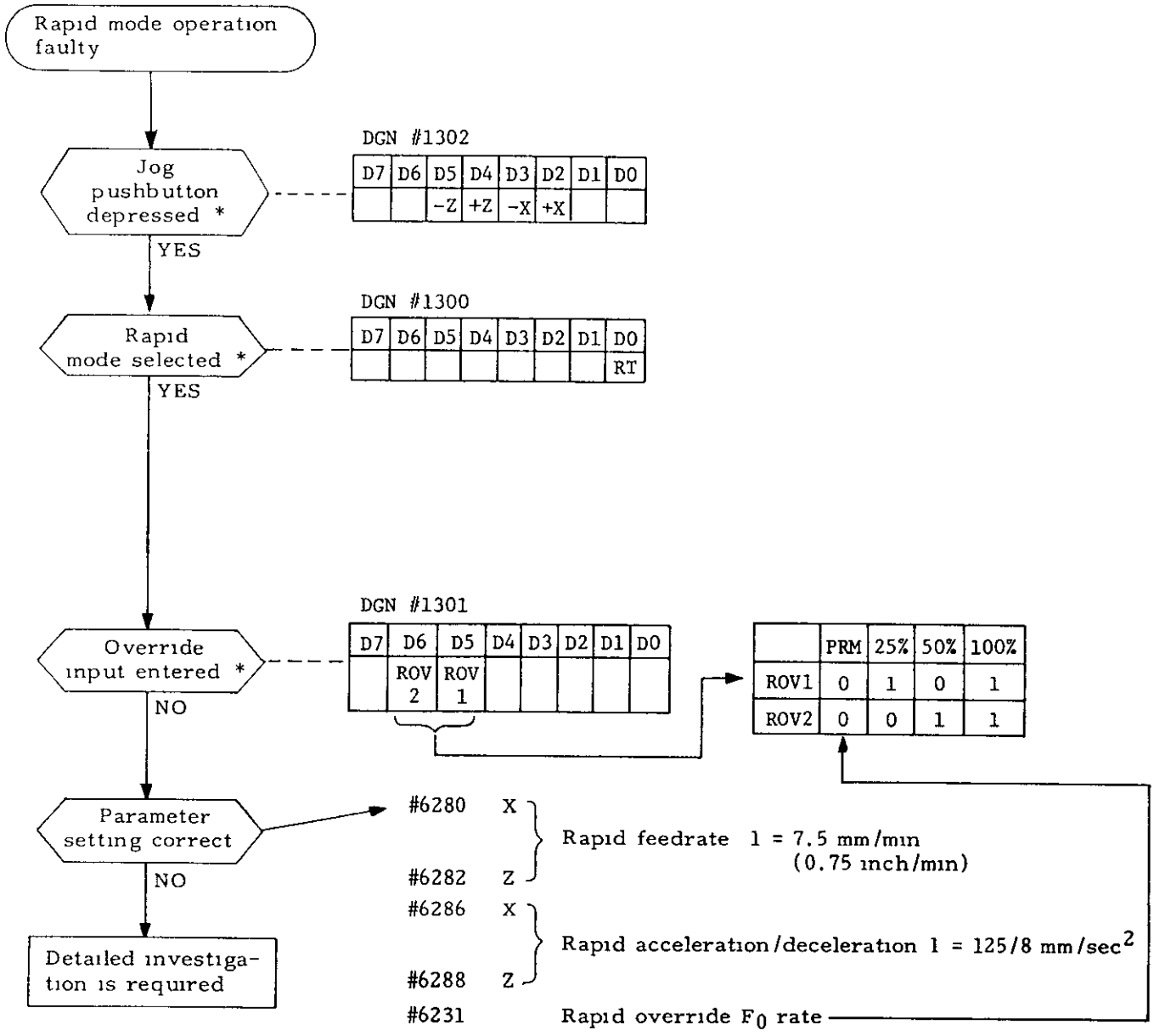


Fig. 2.3.5

* 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 (CONT'D)

(5) Manual reference zero return operation faulty

(i)

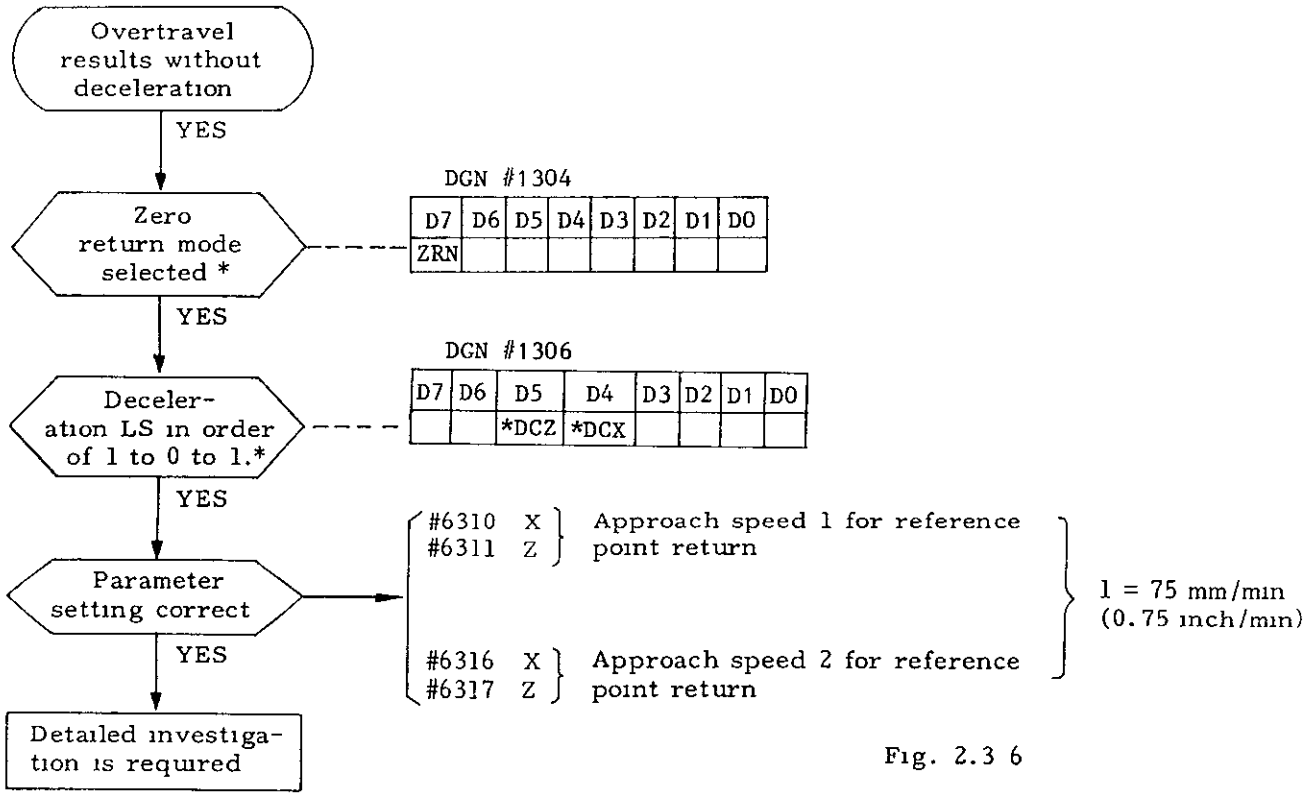


Fig. 2.3 6

(ii)

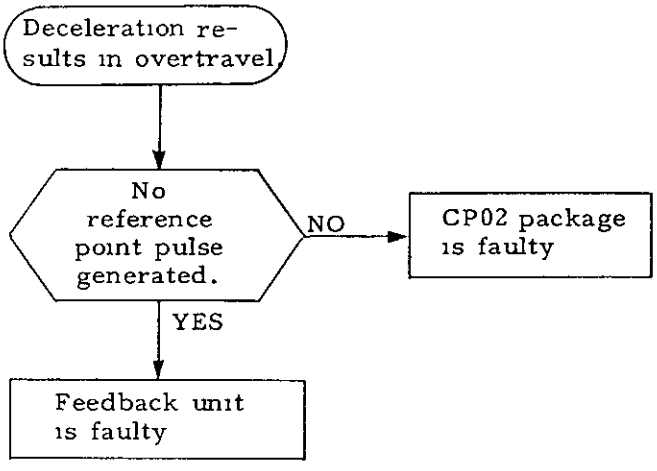


Fig 2 3.7

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

(6) Cycle start failure

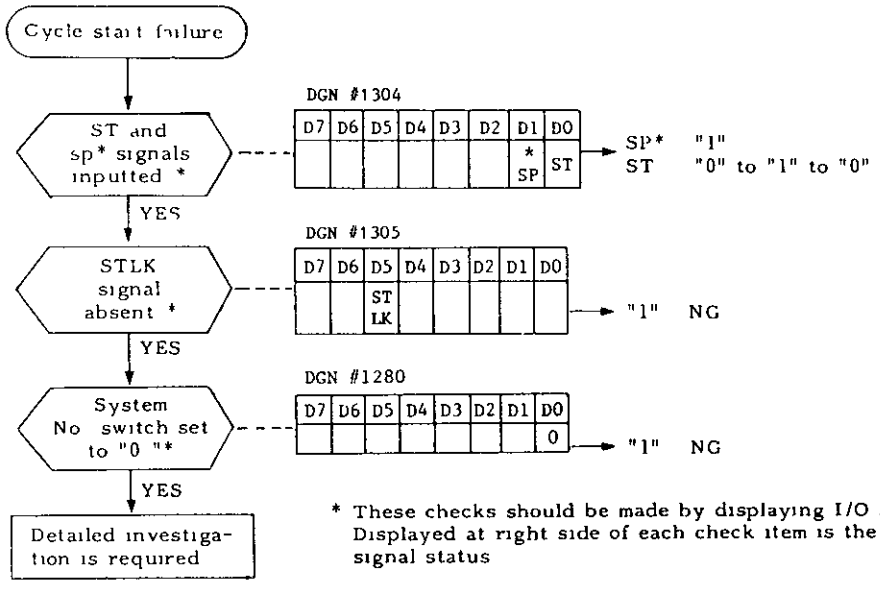


Fig 2 3 8

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

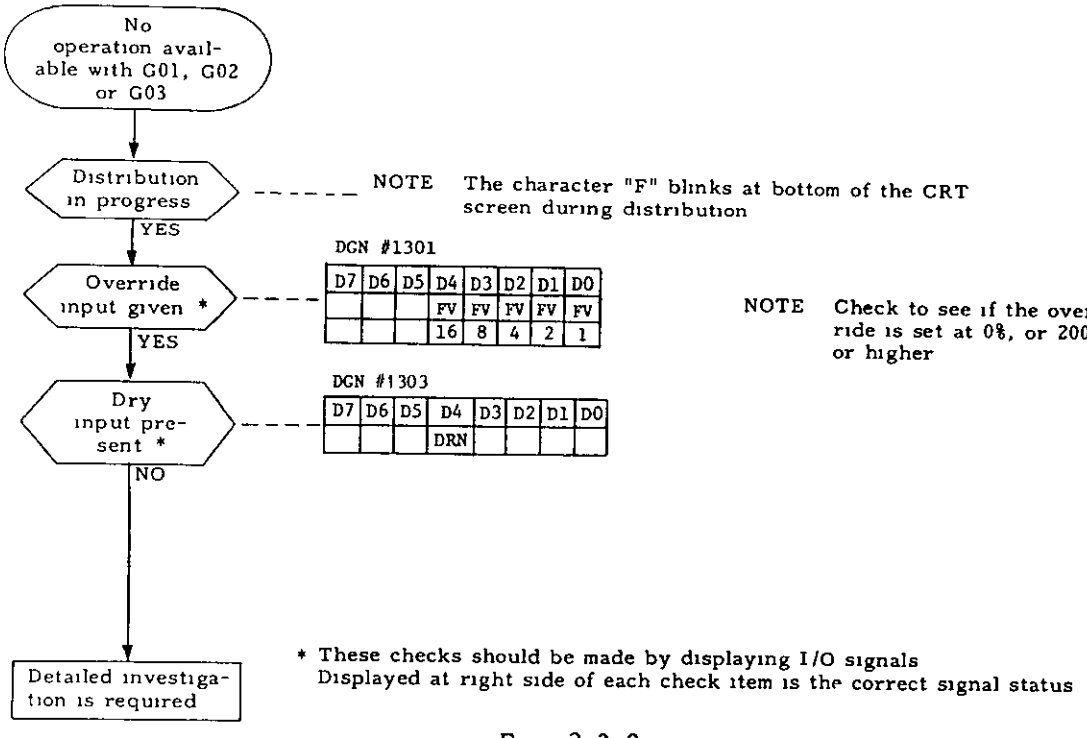


Fig. 2 3.9

2.3 TROUBLESHOOTING WITHOUT ALARM CODES (CONT'D)

(8) Spindle does not rotate

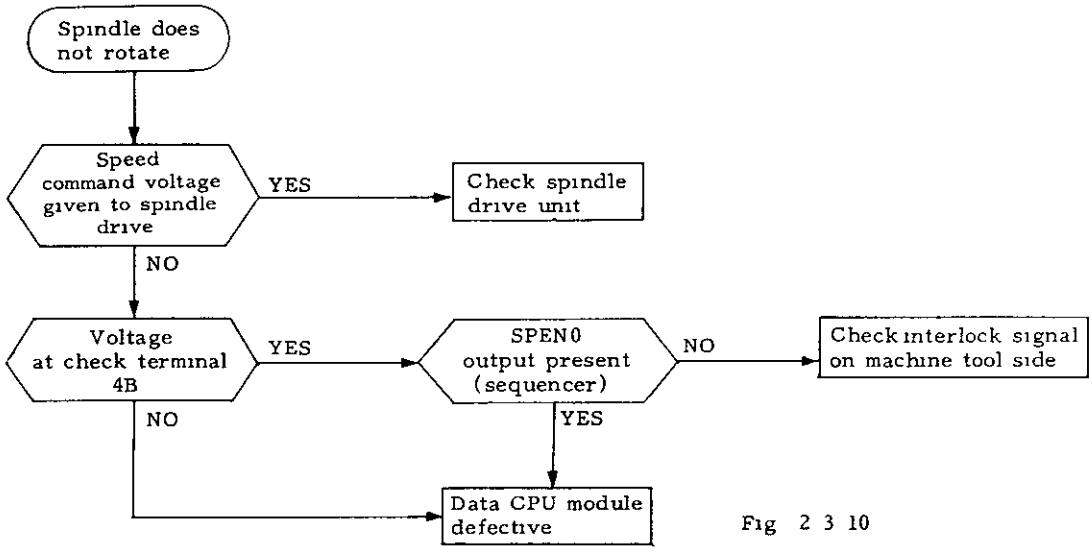


Fig 2 3 10

Connection Diagram for Spindle

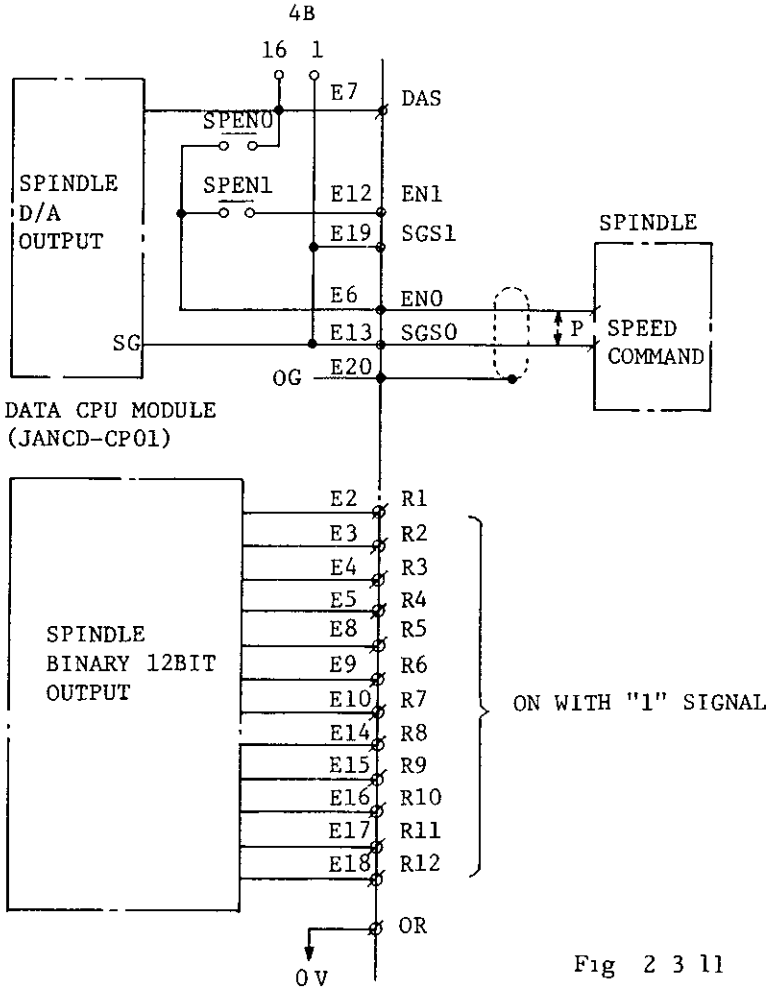


Fig 2 3 11

(9) CRT screen display faulty

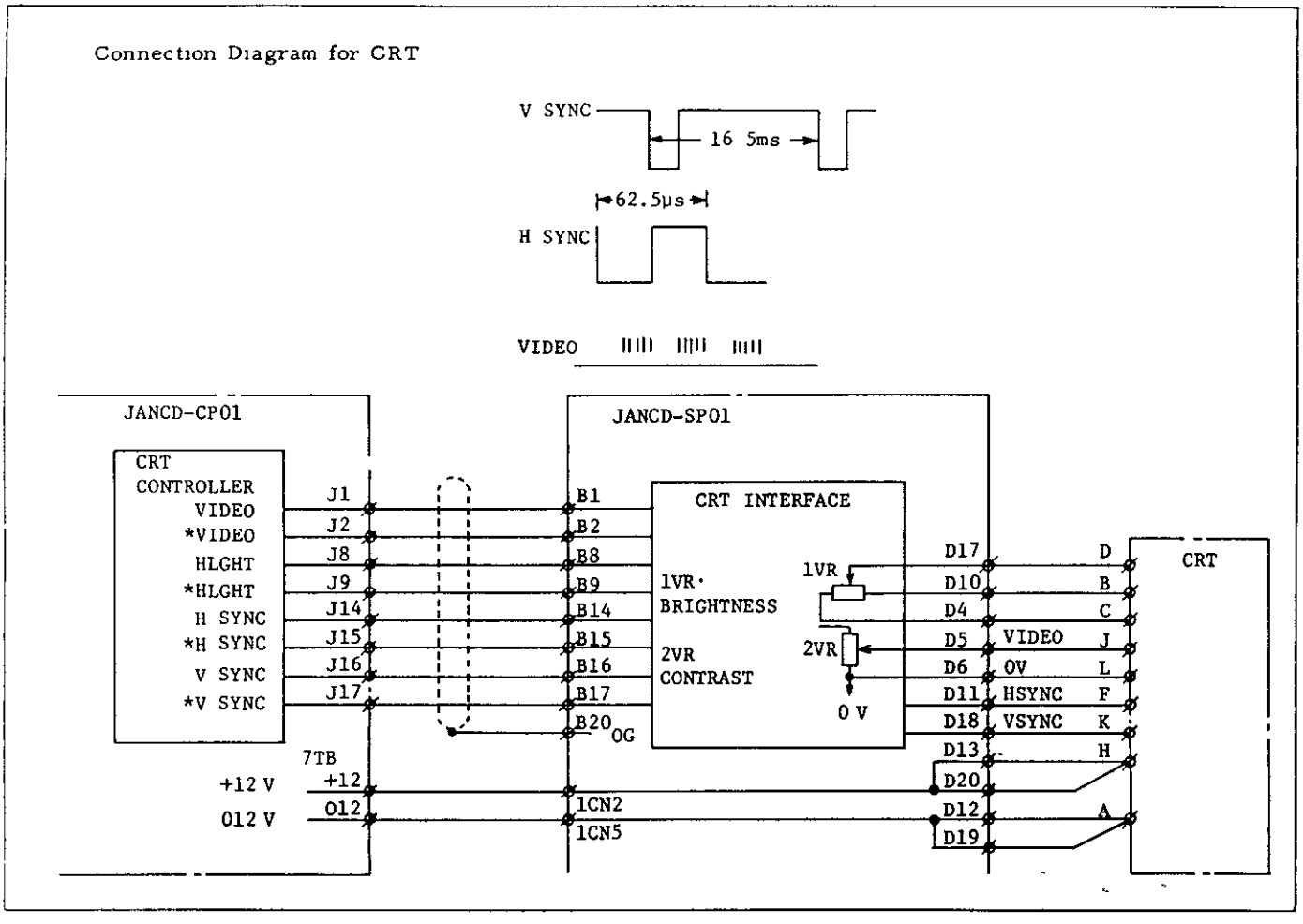


Fig. 2 3 12

2.3 TROUBLESHOOTING WITHOUT ALARM CODES (CONT'D)

(1) Description of CRT Signals

H SYNC and VIDEO signals

A. In normal state

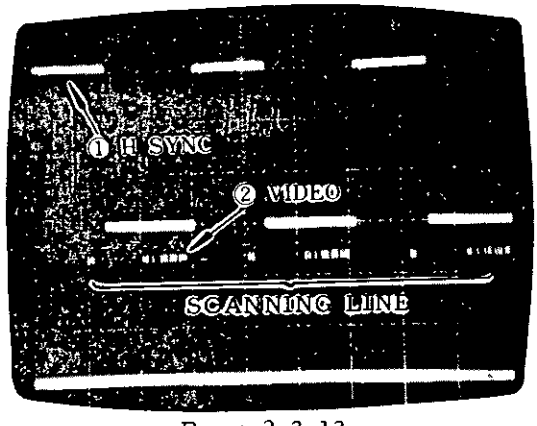


Fig. 2.3.13

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

B. With no VIDEO signal

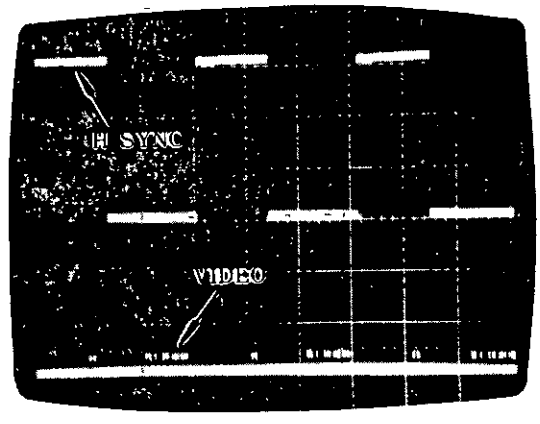


Fig. 2.3.14

The screen appears as shown left when no H SYNC signal comes in

- Either JANCD-CP03 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

C. With no H SYNC signal

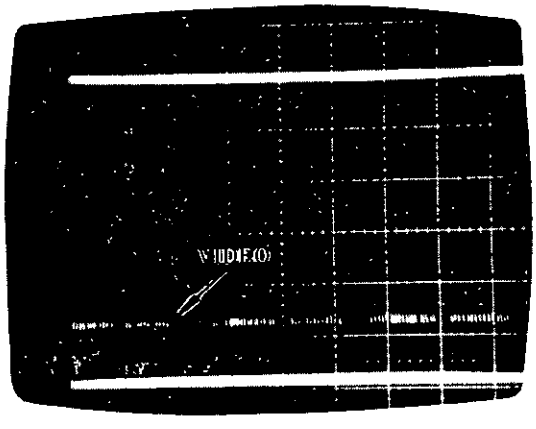


Fig. 2.3.15

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) V SYNC and VIDEO signals

A In normal state

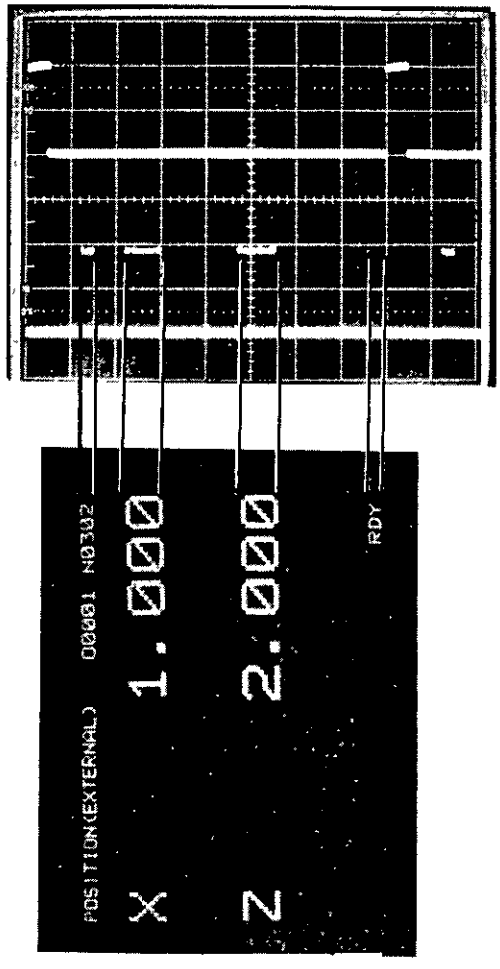


Fig. 2 3.16

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 sppear 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.

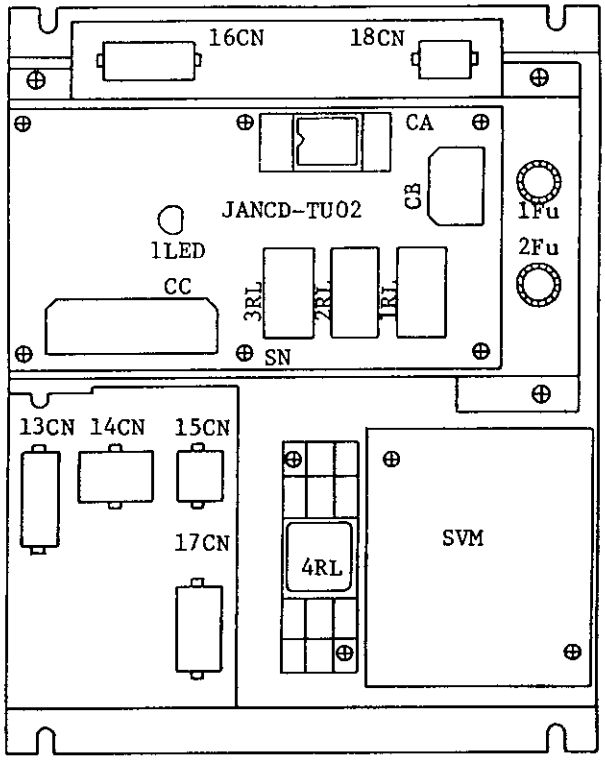
C With no V SYNC signal

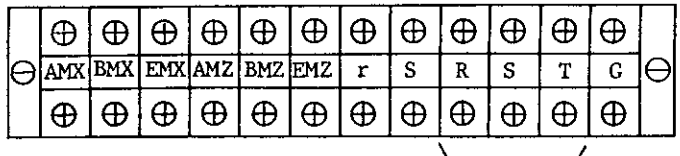
The characters on the screen shift vertically. The waveforms are the same as shown in Fig 2 3 5

- 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.

2 4 SUPPLY VOLTAGE CHECK

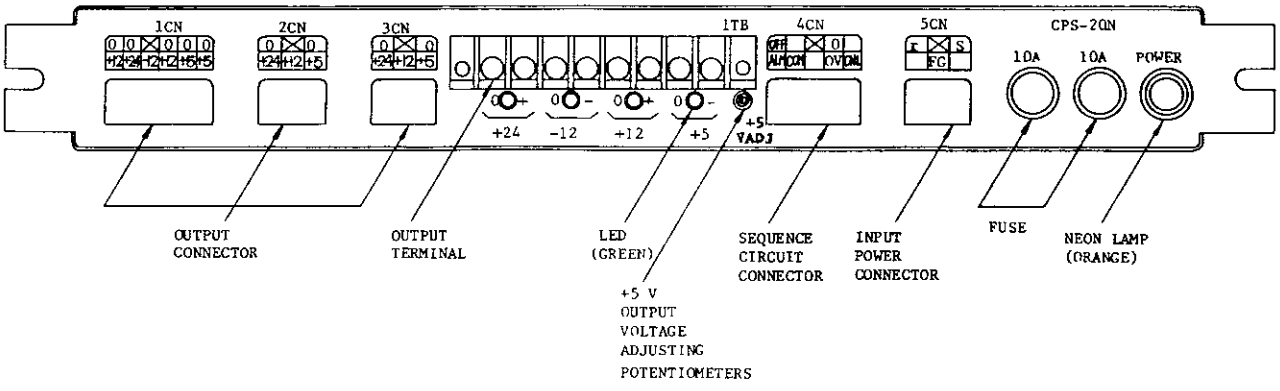
2.4.1 CHECK POWER SUPPLY VOLTAGE





200/220/230,
+10% to -15%
50/60 Hz

2.4.2 DC POWER SUPPLY VOLTAGE CHECK



NEON lamp is lit when the NC unit is powered It will be distinguished if any of the two glass tube fuses is blown out.

Input Power Supply Voltage (r and s of 5CN)

200/220 VAC ±15%, 50/60 Hz ±2 Hz

Specifications of Composite Power Supply Unit

Table 2.4.2

Rated Output	Rated Current	Applicable Voltage Range	Application
+5 V	22 A	5.0 - 5.25 V	Logic circuitry, Read relay
+24 V	3 A	22.08 - 26.4 V	CRT, tape reader, I/O signals
+12 V	2 5 A	11.4 - 12 6 V	CRT, memory, Position control circuitry
-12 V	0 5 A	-12.0 - -13 8 V	Position control circuitry

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

Table 2 5.1

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

1 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.

2 Key in the diagnostic number to be displayed, and depress the CURSOR ↑ or ↓ 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.

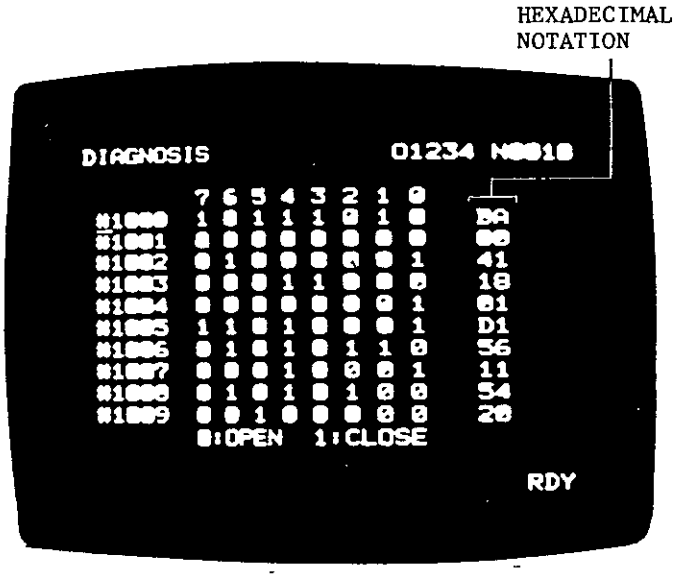


Fig. 2.5.2 Example of Input/Output Signal Display

3. Press the [CURSOR ↓] 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.

4. Press the [↑ CURSOR] 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.

5. Depress the [PAGE ↓] key.

The next page will be displayed.

6. Depress the [↑ PAGE] key.

The previous page will be displayed.

2.5.3 LIST OF STANDARD INPUT/OUTPUT SIGNALS

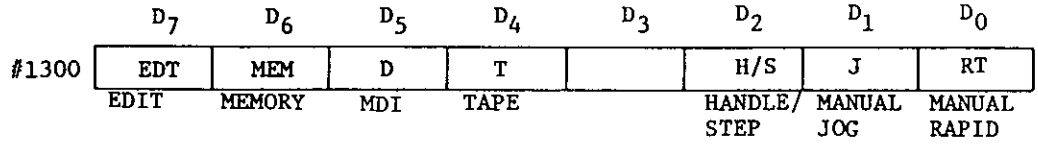
Refer to machine tool builder's manual.

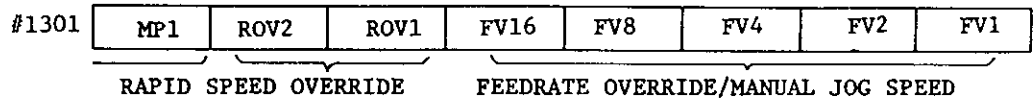
D_7	D_6	D_5	D_4	D_3	D_2	D_1	D_0
0	0	0	0	1	1	1	1

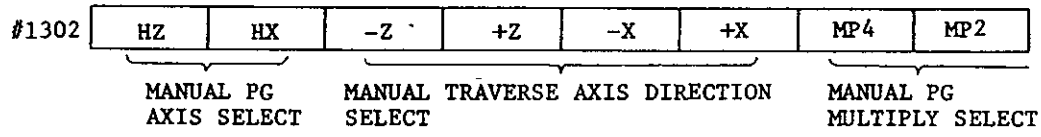
Contact opened — Contact closed

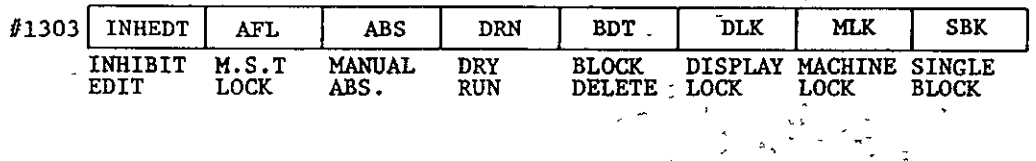
2.5.3 LIST OF STANDARD INPUT/OUTPUT SIGNALS (CONT'D)

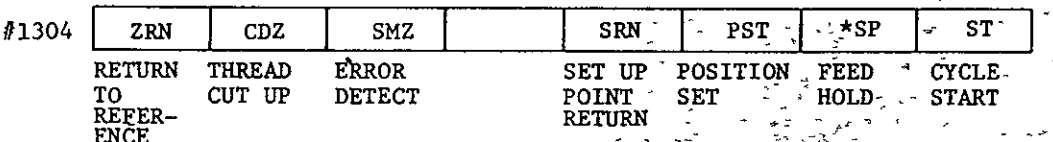
Input Signals

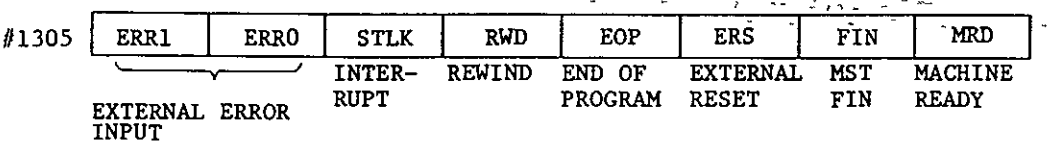


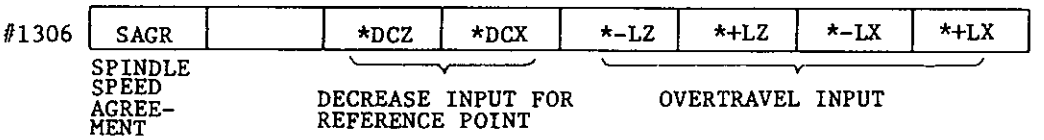


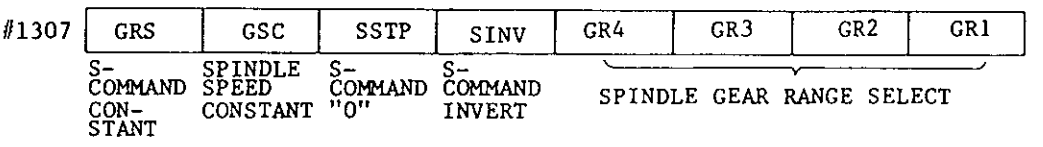




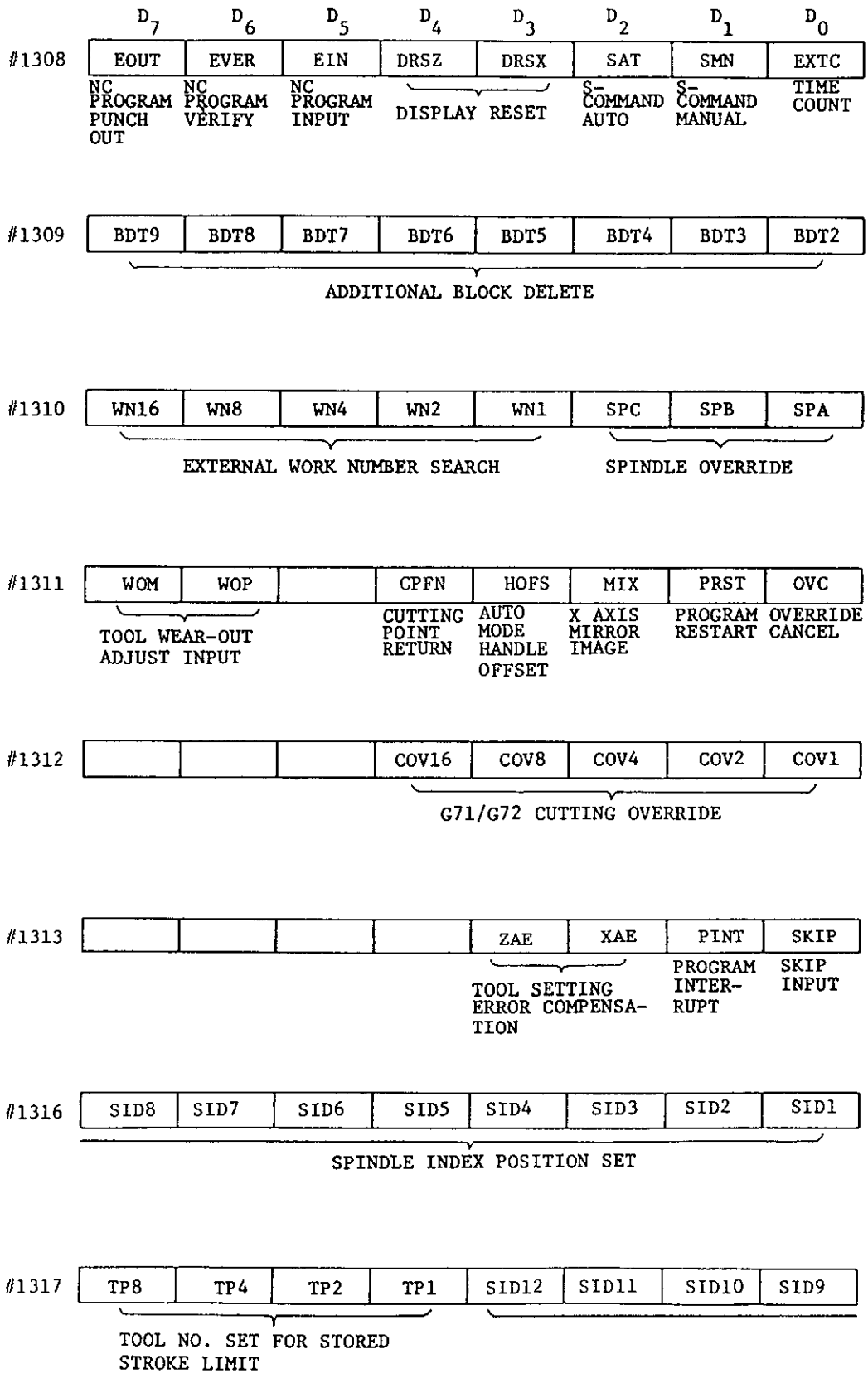






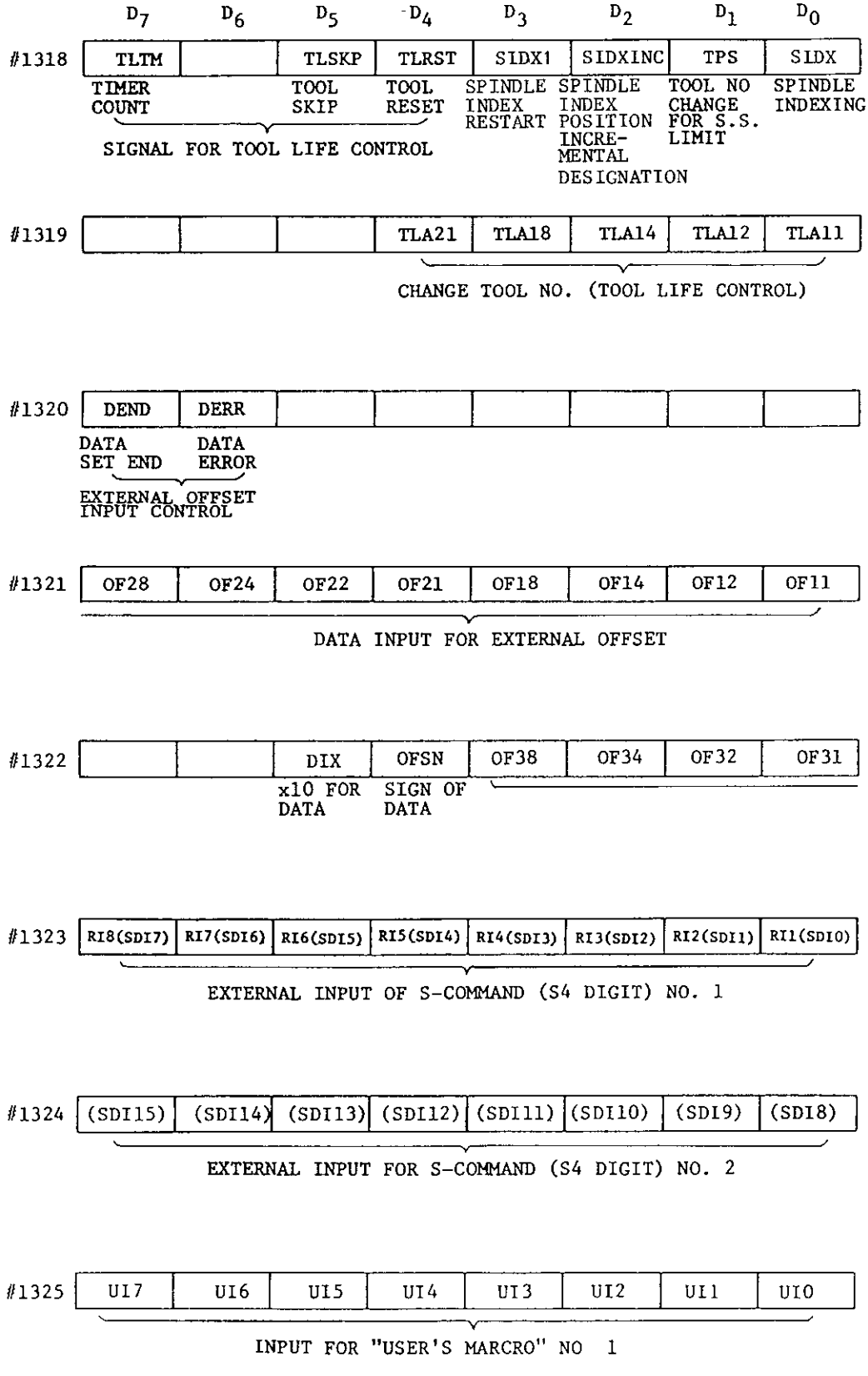


Input Signals

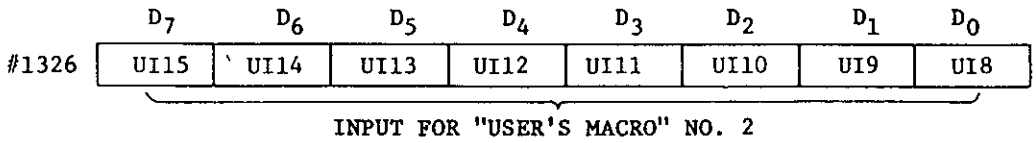


2.5.3 LIST OF STANDARD INPUT/OUTPUT SIGNALS (CONT'D)

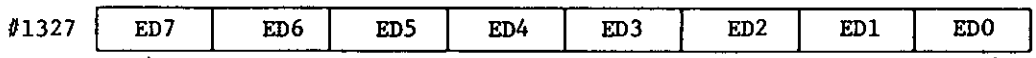
Input Signals



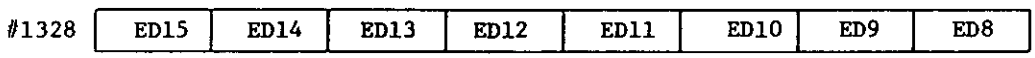
Input Signals



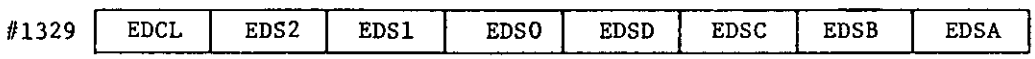
INPUT FOR "USER'S MACRO" NO. 2



EXTERNAL DATA INPUT NO. 1



EXTERNAL DATA INPUT NO. 2



CONTROL SIGNAL FOR EXTERNAL DATA INPUT

2.5.3 LIST OF STANDARD INPUT/OUTPUT SIGNALS (CONT'D)

Output Signals

	D_7	D_6	D_5	D_4	D_3	D_2	D_1	D_0
#1200	M28	M24	M22	M21	M18	M14	M12	M11

M FUNCTION BCD OUTPUT

#1201	M30R	M02R	M01R	M00R	M38	M34	M32	M31
	M30 DECODE OUTPUT	M02 DECODE OUTPUT	M01 DECODE OUTPUT	M00 DECODE OUTPUT				

#1202	TF	SF	MF	SINVA	LER	*ESPS	RST	ALM
	T-FUNCTION SAMPLING OUTPUT	S-FUNCTION SAMPLING OUTPUT	M-FUNCTION SAMPLING OUTPUT	S-4 DIGIT OUT INVERT STATUS	INPUT ERROR OUTPUT	EMERGENCY STOP OUTPUT	RESET OUTPUT	ALARM OUTPUT

#1203		EDTS	AUTO	MAN	THC	RWDS	OP	DEN
		EDIT OPERATING STATUS	AUTO MODE STATUS	MANUAL MODE STATUS	THREAD CUTTING STATUS	REWIND STATUS	FEEDING	POSITIONING END

#1204	S28	S24	S22	S21	S18	S14	S12	S11

S FUNCTION BCD OUTPUT

#1205	T28	T24	T22	T21	T18	T14	T12	T11

T FUNCTION BCD OUTPUT

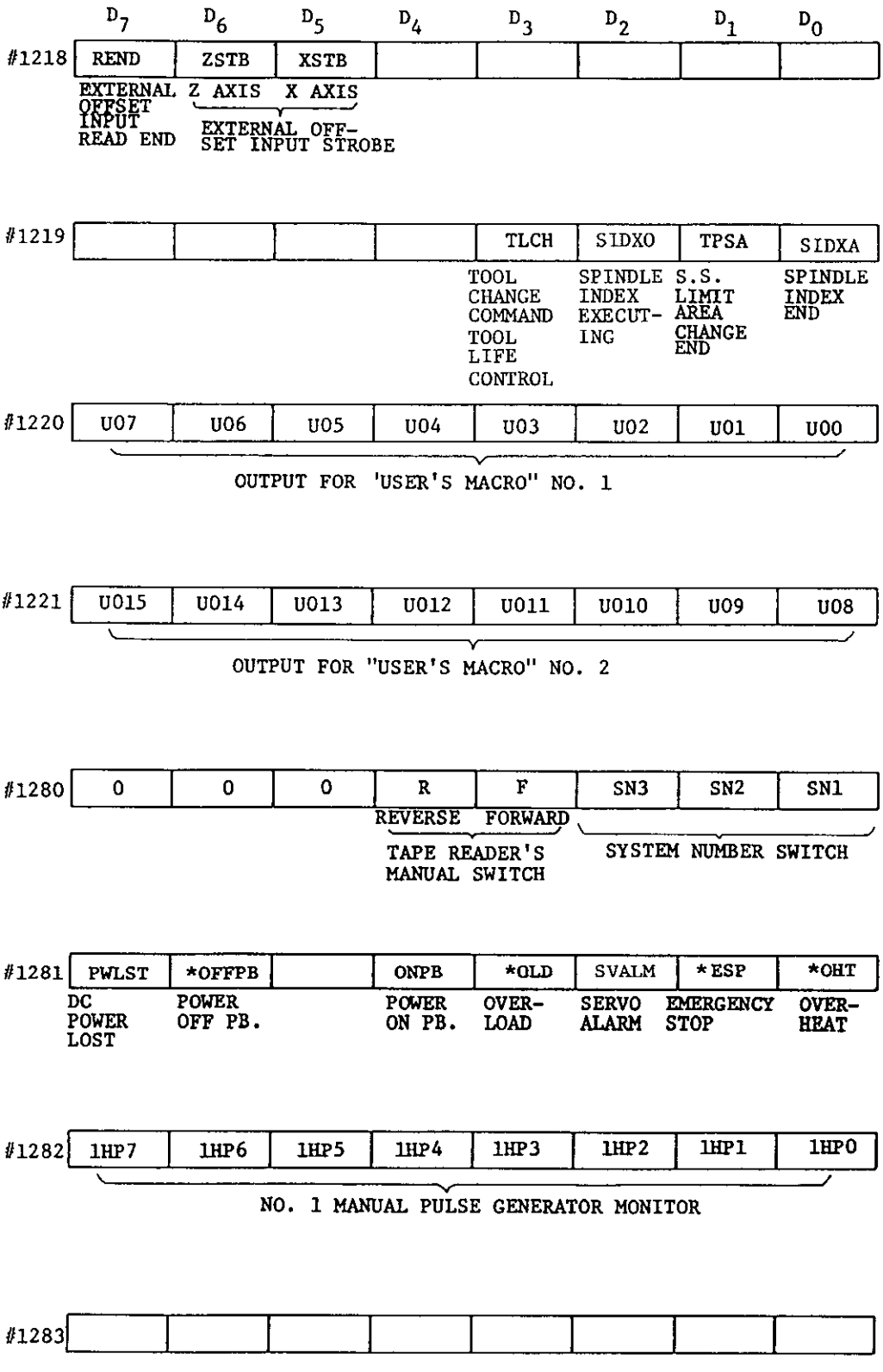
#1216	RO8(SDD7)	RO7(SDD6)	RO6(SDD5)	RO5(SDD4)	RO4(SDD3)	RO3(SDD2)	RO2(SDD1)	RO1(SDD0)

EXTERNAL OUTPUT FOR S-COMMAND (S4 DIGIT) NO. 1

#1217	(SDD15)	(SDD14)	(SDD13)	(SDD12)	RO12 (SDD11)	RO11 (SDD10)	RO10 (SDD9)	RO9 (SDD8)

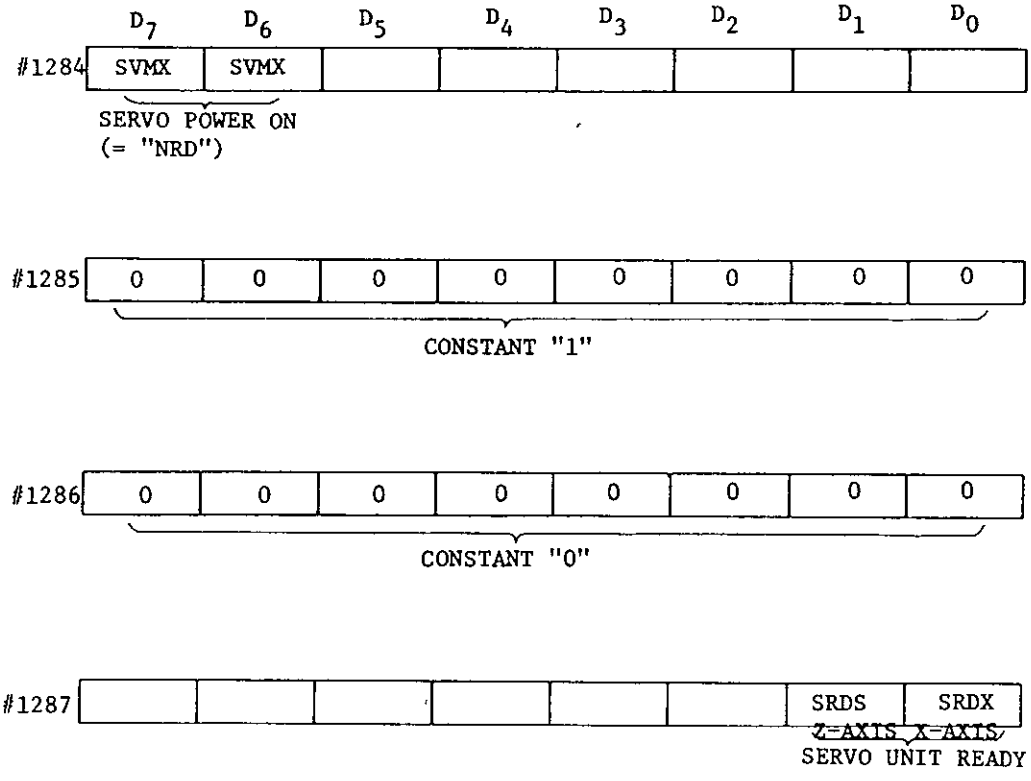
EXTERNAL OUTPUT FOR S-COMMAND (S4 DIGIT) NO. 2

Output Signals



2.5.3 LIST OF STANDARD INPUT/OUTPUT SIGNALS (CONT'D)

Output Signals



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

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
- +24 V and 0 V
- +12 V and 0 V
- -12 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.

Rated Output	Output Voltage Range
+5 V	4 75 - 5 25 V
+12 V	11 4 - 12 6 V
-12 V	-12.0 - -13.8 V
+24 V	22 8 - 25 2 V

+5 V output is adjusted so that +5 V can be obtained at voltage check terminal of memory module

(10) Check the I/O signals between the control unit and the machine tool
Check the I/O signals according to the list of I/O signals (see 2.5 Status Display by Self-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 Kp is obtained by the formula

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

where, F feedrate (mm/min)
E servo position deviation (0.001 mm)
Kp 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 ±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 (2T)

When a control transformer (2T) 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 3.2.1 Transformer Tap Connections according to Supply Voltage

Supply Voltage	Tap Connections Transformer Primary Side
200 V	R-3, 3-7, 7-24, 24-20 S-11, 11-15, 15-8, 8-4 T-19, 19-23, 23-16, 16-12
220/240 V	R-2, 2-6, 6-24, 24-20 S-10, 10-14, 14-8, 8-4 T-18, 18-22, 22-16, 16-12
380 V	R-3, 4-7, 8-11 S-11, 12-15, 16-19 T-19, 20-23, 24-3
420 V	R-3, 4-6, 8-11 S-11, 12-14, 16-19 T-19, 20-22, 24-3
460/480 V	R-2, 4-6, 8-10 S-10, 12-14, 16-8 T-18, 20-22, 24-2
550 V	R-1, 4-5, 8-9 S-9, 12-13, 16-17 T-17, 20-21, 24-1

3.2.2 TAP CHANGING ON CONTROL TRANSFORMER

When a control transformer 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.

Transformer Terminals

1	2	3	4	5	6	7	8
275	230	190	0	275	230	190	0

Table 3.2.1 Transformer Tap Connections according to Supply Voltage

Supply Voltage	Tap Connections Transformer Primary Side
200 V	R-3, 3-7, 4-8 T-8
220/240 V	R-2, 2-6, 4-8 T-8
380 V	R-3, 4-7 T-8
420 V	R-3, 4-6 T-8
460/480 V	R-2, 4-6 T-8
550 V	R-1, 4-5 T-8

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

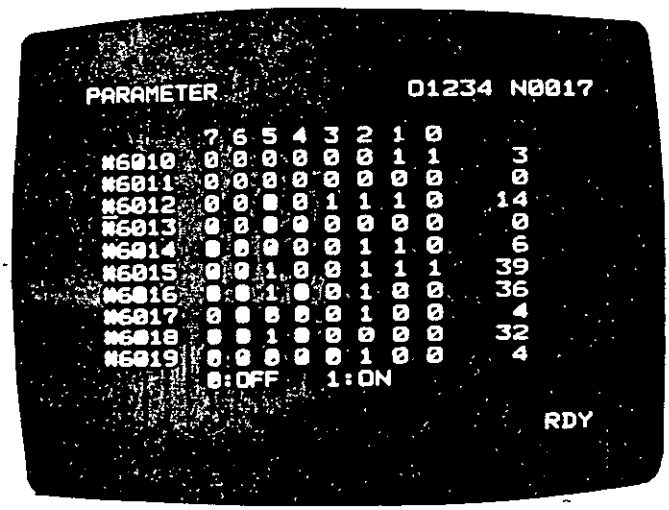


Fig 3 3 1 1 Typical Parameter Display (in binary digits)

Parameters #6005 to #6049 are displayed in binary digits

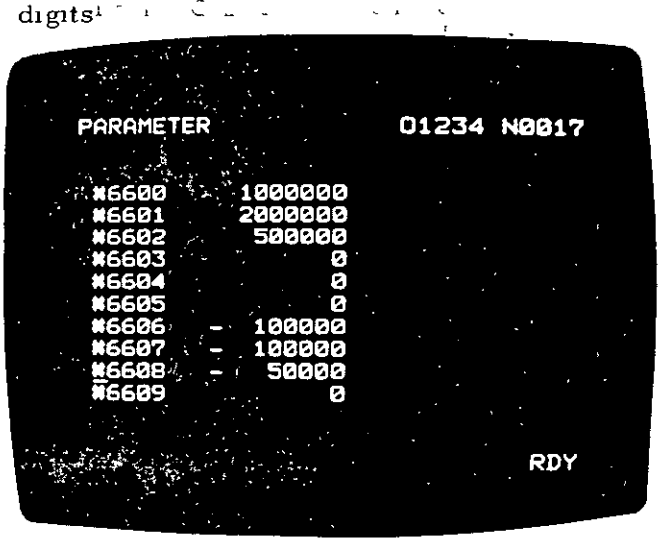


Fig 3.3.1 2 Typical Parameter Display (in decimal digits)

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 WRITING PARAMETER DATA

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 binary digit display, indicating the bit position of D7 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] [WR] →	0	0	0	0	0	0	0	0	0
[2] [5] [5] [WR] →	1	1	1	1	1	1	1	1	255

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 sytem 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  %  ,
N6000  X128  ,
N6001  X  5  ,
N6002  X  0  ;



  %
```

NOTE:
"%" is used in the ISO code and "ER" in the EIA code.

Fig 3 3.4

(2) The input operation procedure is as follows
Set the system No. switch to "1."

A Select the EDIT mode

B. Depress the [PRM] key.

C. Set the setting/parameter data tape onto the tape reader.

D. Depress the [RESET] key

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
Set the system No. switch back to "0."

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 [PRM] key.

3. Depress the [RESET] key.

4. Depress the [OUT] key. The setting and parameter data will be continuously punched out.

5. To interrupt the punching operation, depress the [RESET] key.
Punching cannot be resumed. Restart operations from the beginning after interruption

3.3.6 LIST OF SETTING NUMBERS

#6000	D7	D6	D5	D4	D3	D2	D1	D0

INHEDTT D7

1 Turns on Edit Lock function.
0 Turns off Edit Lock function.

AFLT D6

1 Turns on Auxiliary Function Lock.
0 Turns off Auxiliary Function Lock.

ABST D5

1 Turns on Manual Absolute function.
0 Turns off Manual Absolute function.

DRNT D4

1 Turns on Dry Run function.
0 Turns off Dry Run function

BDTT D3

1 Turns on Block Delete function.
0 Turns off Block Delete function

DLKT D2

1 Turns on Display Lock function
0 Turns off Display Lock function.

MLKT D1

1 Turns on Machine Lock function
0 Turns off Machine Lock function.

SBKT D0

1 Turns on Single Block function.
0 Turns off Single Block function.

Notes

1. These settings are for setting internal toggle switches
2. When each switch is provided with machine control station, the logical sum of these settings and toggle switch setting determines function on/off state

Internal toggle switch	OFF	ON	OFF	ON
Toggle switch on machine	OFF	OFF	ON	ON
Resultant ON/OFF state	OFF	ON	ON	ON

#6001	D7					D2	D1	D0

BUZON D7

1 Turns on touch buzzer (key switch on operator's panel)
0 Turns off touch buzzer

SLT 3 D2

1 Effective on the third Stored Stroke Limit
0 Ineffective on the third Stored Stroke Limit

The value of limit automatically changes by G38 or G39 command in part program

SLT 2 D1

1 Effective on the second Stored Stroke Limit
0 Ineffective on the second Stored Stroke Limit

The value of limit automatically changes by G36 or G37 command in part program

INCHMM D0

1 Selects inch input increment
0 Selects metric input increment

#6002	D7	D6						

ISOEIA D7

1 Punches out tape code with ISO code
0 Punches out tape code with EIA code

TVCHK D6

1 Executes TV check
0 Does not execute TV check.

#6003			D5	D4			D1	D0

D5, D4
ODVCE 1 Selects the output device of data
ODVCE 0 I/O interface.
D1, D0
IDVCE 1 Selects the input device of data
IDVCE 0 I/O interface

Setting code		I/O device No	Input device	Output device	Parameter No requiring baud rate setting
0	0	0	Tape reader	FACIT PUNCHER	
0	1	1	RS232C	RS232C ASR33/43	#6026 #6028
1	0	2	RS422	RS422	#6027 #6029

#6004	D_7	D_6	D_5	D_4	D_3	D_2	D_1	D_0

COV16I(D7), COV8I(D6), COV4I(D5), COV2I(D4), COV1I(D3).

Sets the override of cut depth for Stock Removal in Turning (G71) and Stock Removal in Facing (G72) cycles

COV16I	COV8I	COV4I	COV2I	COV1I	Cut depth override
0	0	0	0	0	0%
0	0	0	0	1	10%
0	0	0	1	0	20%
0	0	0	1	1	30%
0	0	1	0	0	40%
0	0	1	0	1	50%
0	0	1	1	0	60%
0	0	1	1	1	70%
0	1	0	0	0	80%
0	1	0	0	1	90%
0	1	0	1	0	100%
0	1	0	1	1	110%
0	1	1	0	0	120%
0	1	1	0	1	130%
0	1	1	1	0	140%
0	1	1	1	1	150%
1	0	0	0	0	160%
1	0	0	0	1	170%
1	0	0	1	0	180%
1	0	0	1	1	190%
1	0	1	0	0	200%

Note These settings are effective when parameter #6023D_2 (COVP) is "0 "

UMO8000 D_2

1 Inhibits editing and punchout operations of the part program of program No 8000 to 8999.

0 Permits editing and punchout operations.

UMSBK D_1

1 Makes Single Block Stop effective for the programs in user macro when single block input is on.

0 Does not permit Single Block Stop for the user macro blocks commanding operation and control

SKIPIN D_0

1 Executes the next block when the skip signal is not given before completion of movement of block including Skip Function (G31)

0 Alarm "087" is displayed

#6161	TG1LF
#6162	TG2LF
#6163	TG3LF
#6164	TG4LF
#6165	TG5LF
#6166	TG6LF
#6167	TG7LF
#6168	TG8LF
#6169	TG9LF

TG1LF to TG9LF.

Individual life expectancy for tools in groups 1 to 9 is set by part program

Setting range 0 - 9999 (Tool life control)
Setting "1" = 1

#6170	TG10LF
#6171	TG11LF
#6172	TG12LF
#6173	TG13LF
#6174	TG14LF
#6175	TG15LF
#6176	TG16LF
#6177	TG17LF
#6178	TG18LF
#6179	TG19LF

TG10LF to TG19LF

Individual life expectancy for tools in groups 10 to 19 is set by part program.

Setting range 0 - 9999 (Tool life control)
Setting "1" = 1 minute

3.3.6 LIST OF SETTING NUMBERS (CONT'D)

#6181	TG1CNT
#6182	TG2CNT
⋮	⋮
#6198	TG18CNT
#6199	TG19CNT

TG1CNT to TG19CNT

No. of times used and operating times are indicated individually for tools in groups 1 to 19.

Note Writing is not permitted in this setting.

#6202	G71OFL

G71OFL

Sets retraction value after completion of each cutting cycle in Stock Removal in Turning (G71)

Setting range 0 - 65536
Setting Least input increment

#6203	G72OFL

G72OFL

Sets retraction value after completion of each cutting cycle in Stock Removal in Facing (G72).

Setting range 0 - 65536
Setting Least input increment

#6204	G74OFL

G74OFL

Sets retraction value (δ) in Peck Drilling in Z-axis (G74)

Setting range 0 - 65536
Setting Least input increment

#6205	G75OFL

G75OFL

Sets retraction value (δ) in Grooving in X-axis (G75)

Setting range 0 - 65536
Setting Least input increment

#6206	G76OFL

G76OFL

Sets cut depth (in X-axis) "a" in Automatic Threadcutting (G76)

Setting range 0 - 65536
Setting Least input increment

#6207	TINON

When the tape without program no is stored, program no is set for the tape

#6500	XSL2P
#6501	ZSL2P

XSL2P, ZSL2P

Sets the boundary area in positive direction of Stored Stroke Limit second prohibit area on X-axis and Z-axis, respectively

Setting range 0 to ±99999999
Setting Least output increment

#6502	XSL2M
#6503	ZSL2M

XSL2M, ZSL2M
Sets the boundary area in minus direction of Stored Stroke Limit second prohibit area on X-axis and Z-axis, respectively.

Setting range 0 to ±99999999
Setting Least output increment

#6504	XSL3P
#6505	ZSL3P

XSL3P, ZSL3P

Sets the boundary area in positive direction of Stored Stroke Limit third prohibit area on X-axis and Z-axis, respectively

Setting range 0 to ±99999999
Setting Least output increment

#6506	XSL3M
#6507	ZSL3M

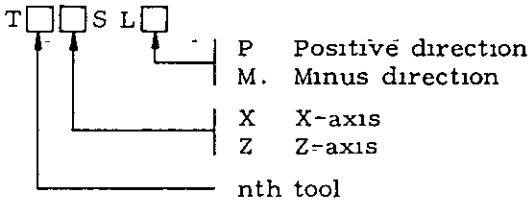
XSL3M, ZSL3M

Sets the boundary area in minus direction of Stroed Stroke Limit third prohibit area on X-axis and Z-axis, respectively

Setting range 0 to ±99999999
Setting Least output increment

#6508	T1XSLP
#6509	T1ZSLP
#6510	T1XSLM
#6511	T1ZSLM
#6512	T2XSLP
#6513	T2ZSLP
#6514	T2XSLM
#6515	T2ZSLM
#6516	T3XSLP
#6517	T3ZSLP
#6518	T3XSLM
#6519	T3ZSLM
#6520	T4XSLP
#6521	T4ZSLP
#6522	T4XSLM
#6523	T4SLM
#6524	T5XSLP
#6525	T5ZSLP
#6526	T5XSLM
#6527	T5ZSLM
#6528	T6XSLP
#6529	T6ZSLP
#6530	T6XSLM
#6531	T6ZSLM
#6532	T7XSLP
#6533	T7ZSLP
#6534	T7XSLM
#6535	T7ZSLM
#6536	T8XSLP
#6537	T8ZSLP
#6538	T8XSLM
#6539	T8ZSLM
#6540	T9XSLP
#6541	T9ZSLP
#6542	T9XSLM
#6543	T9ZSLM
#6544	T10XSLP
#6545	T10ZSLP
#6546	T10XSLM
#6547	T10ZSLM
#6548	T11XSLP
#6549	T11ZSLP
#6550	T11XSLM
#6551	T11ZSLM

#6552	T12XSLP
#6553	T12ZSLP
#6554	T12XSLM
#6555	T12ZSLM
#6556	T13XSLP
#6557	T13ZSLP
#6558	T13XSLM
#6559	T13ZSLM
#6560	T14XSLP
#6561	T14ZSLP
#6562	T14XSLM
#6563	T14ZSLM
#6564	T15XSLP
#6565	T15ZSLP
#6566	T15XSLM
#6567	T15ZSLM



Sets the distance of Stored Stroke Limit from reference point

Setting range 0 to ±99999999
Setting Least output increment

#6568	XSKIP

Indicates X-axis coordinate value when the skip signal is detected

#6569	ZSKIP

Indicates Z-axis coordinate value when the skip signal is detected

#8601	TGPN01
#8602	TGPN02
⟆	⟆
#8649	TGPN49
#8650	TGPN50

TGPN01 to TGPN50

Part program determines the number of groups including tools (number 01 to 50)

Setting range 0 to 20
(Tool life control)

#8651	TOFN01
#8652	TOGN02
⟆	⟆
#8669	TOFN49
#8670	TOFN50

TOFN01 to TOFN50

Part program sets tool number using offset value of offset memory numbers 01 to 50 orderly

Setting range 0 to 50
(Tool life control)

#8701	TOFO01
#8702	TOFO02
⟆	⟆
#8749	TOFO49
#8750	TOFO59

TOFO01 to TOFO05

Part program sets the order of using offset values in offset memories "01" to "50," sequentially

Setting range 0 to 5
(Tool life control)

3.3.7 LIST OF PARAMETER NUMBERS

#6005	D7	D6	D5			D2	D1	D0

GCDSP D7

1 Uses special G code I as G coce
0 Uses standard G code as G code

RSTG01 D6

1 Determines G code of 01 group as G01 when resetting
0 Determines G code of 01 group as G00 when resetting

POSEXT D5

1 Presets position external display by setting coordinate system
0. Does not preset position external display by setting coordinate system.

PONG01 D2

1 Sets the G code in the 01 group to G01 when power is applied
0 Sets the G code in the 01 group to G00 when power is applied.

PONG05 D1

1 Sets the G code in the 05 group to G99 when power is applied
0 Sets the G code in the 05 group to G98 when power is applied.

PONG03 D0

1 Sets the G code in the 03 group to G91 when power is applied.
0 Sets the G code in the 03 group to G90 when power is applied.

Note: Where the control is provided with special G code II option, determination of setting is changed as follows.

1 Uses special G code II.
0 Uses standard G code.

#6006	D7	D6	D5	D4	D3	D2	D1	D0

SDASGN2, SDASGN1. D7 , D6

Setting of S4-digit (analog output) output.

SDASGN2	SDASGN1	At M03 output	At M04 output
0	0	Plus	Plus
0	1	Minus	Minus
1	0	Plus	Minus
1	1	Minus	Plus

1OIN D5

1 Sets ten times the least input increment
0 Sets the least input increment

SAGRCH 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)

XRAD D3

1 Radius designation
0 Diameter designation

RPDDRN D2

1 Enables Dry Run in response to the rapid traverse command.
0 Disables Dry Run in response to the rapid traverse command

ZZRNILK D1

1 Causes an alarm ("002") upon Cycle Start when Reference Point Return on Z-axis is not made after power is applied
0 Causes no alarm.

XZRNILK D0

1 Causes an alarm ("001") upon Cycle Start when Reference Point Return on X-axis is not made after power is applied
0 Causes no alarm

NOTE Set "1" when Stored Lead Screw Error Compensation or Stored Stroke Limit is provided, set ZZRNILK at 1, XZRNILK at 1.

#6007	D7	D6		D4	D3	D2	D1	D0

EDTSTLK D7

1. Does not cause an alarm upon Cycle Start without reset operation after part program edit operation.
0 Causes an alarm 005.

STUD D6

1 Effective on Cycle Start when cycle start signal "1" changes to "0 "
0 Effective on Cycle Start when cycle start signal "0" changes to "1 "

3.3.7 LIST OF PARAMETER NUMBERS (CONT'D)

RWDOUT D_4

1 Provides Rewinding Activate Signal when NC program is rewound by RESET & REWIND signal
0 Provides no Rewinding Activate Signal when NC program is rewound by RESET & REWIND signal

OUTPUT D_3

1 Sets the least output increment at 0 0001 inch
0 Sets the least output increment at 0 001 mm

SCRSOV D_2

1 Makes the Spindle Override 100% during tapping
0 Does not make the Spindle Override 100% during tapping

SLT3IO D_1

1 Establishes the prohibited area of the Stored Stroke Limit 3 outside the boundary
0 Establishes the prohibited area of the Stored Stroke Limit 3 inside the boundary

SLT2IO D_0

1 Establishes the prohibited area of the Stored Stroke Limit 2 outside the boundary
0 Establishes the prohibited area of the Stored Stroke Limit 2 inside the boundary.

#6008								D_0

ZRNOFS D_0

1 Cancels the commanded block when the second reference point by G30 is commanded during Tool Position Offset or Tool Nose Radius Compensation
0 Cancels the blocks following the commanded block

#6009							D_1	D_0

BLZDR, BLXDR D_1, D_0

Specify the start direction of backlash compensation on Z-, and X-axis, respectively

1 Minus direction
0 Positive direction

#6010			D_5	D_4			D_1	D_0

AZRNHS D_5

1. Executes the first reference point return (deceleration limit switch) and the subsequent automatic reference point returns in the same way when power is applied.

0 Executes high-speed reference point return (position at reference point)

MZRNHS D_4

1 Executes the first reference point return and the subsequent automatic reference point returns in the same way when power is applied

0 Executes high-speed reference point return.

ZRNDRZ, ZRNDRX D_1, D_0

Specify the start direction of Backlash Compensation on Z-, and X-axis, respectively.

1 Minus direction
0. Plus direction

#6015							D_1	D_0

ATSUPZ, ATSUPX D_1, D_0

Specify whether or not the Automatic Coordinate System Setting is effective on the Z- and X-axis, respectively

1 Effective
0 Ineffective

NOTE The Automatic Coordinate System is established with the following parameters

Inch system #6631, #6630
Metric system #6637, #6636

#6017	D_7	D_6	D_5	D_4	D_3	D_2	D_1	D_0

EIA#B7-B0 D_7 - D_0

Specify whether or not a hole is to be made on channels 8-1, respectively, in a code corresponding to symbol "#" (used with user macro) in the EIA code.

1. Hole
0 No hole

Example EIA#B7-B0 = 01001001

The code with holes on channels 7, 4, and 1 is considered equivalent to symbol "#" in the EIA code No code for use by the unit can be set

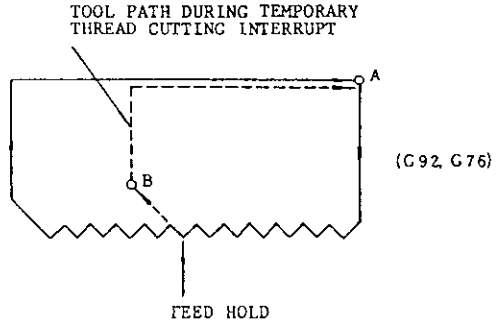
NOTE The specification of EIA#B7-B0 = 00000000 assumes that symbol "#" is not used in the EIA code

#6019	D7	D6	D5	D4				

G92FHP D7

Specifies the position of temporary stop of thread-cutting

1 Stops at the position B where Rapid threading pull-out is completed.
0 Returns to start point A and stops after Rapid threading pull-out is completed.



INTG D6

1 Sets the least input increment at 1 mm (or 1 inch)
0 Sets the least input increment using parameter #6006D_5 (10IN).

SCRDRN D5

1 Enables Dry Run at threadcutting
0 Disables Dry Run at threadcutting

SKPFED D4

1 Employs the feedrate set in parameter #6232 (G31F) for the Skip Function command (G31)
0 Employs the F code command as the feedrate for the Skip Function command (G31)

#6020	D7		D5	D4		D2	D1	D0

OFSDSP D7

1 Displays programmed position in current position display (POSITION ABSOLUTE).
0 Displays programmed position modified with tool position offset in current position display (POSITION ABSOLUTE)

FOVAB D5

1 Effective with feedrate override signal "0 "
0 Effective with feedrate override signal "1 "

SSTPAB D4

1: Analog output zero with spindle S command zero input signal SSTP "0."
0 Analog output zero with spindle S command zero input signal SSTP "1 "

PSTSGN D2

Shown in the calculation formula of storing data during MDI of measured work point into tool offset memories 00 to 50

1 (Data of tool coordinate memory) = (Current value temporarily stored in the register) - (Written measurement value)

0 (Data of tool coordinate memory) = (Written measurement value) - (Current value temporarily stored in the register)

OFSG96 D1

1 Specifies the surface speed calculated by the X-axis coordinate value modified by tool position offset value in Constant Surface Speed Control
0 Specifies the surface speed calculated by the programmed X-axis coordinate value in Constant Surface Speed Control

POSG96 D0

1 Surface Speed Control functions on the block including Rapid Traverse (G00)
0 Surface Speed Control functions on the block including Rapid Traverse (G00), if programmed before the Cutting Feed block

#6021	D7	D6	D5	D4	D3	D2	D1	D0

UMO9000 D7

1 Inhibts editing and punchout operations of the part program of program No 9000 to 9999
0 Permits editing and punchout operations

MERSIN D6

1. Replaces the stored program with a new one when part program is already stored.
0 Displays ALREADY ALARM

PSONOF D5

1 Sets on and off RS (RS232C signal) by "%" character.
0 Keeps RS signal on until reading-in is finished

3.3.7 LIST OF PARAMETER NUMBERS (CONT'D)

CHKDR D4

1 Recognizes DR
0 Does not recognize DR

O - 9999O D3

1 Punches O0 when tape is punched with O, -, 9, 9, 9, 9 keyed in and OUT key depressed
0 Does not punch O0 when tape is punched with O, -, 9, 9, 9, and 9 keyed in and OUT key depressed

PONON D2

1 Does not clear program No on power application
(Program number is stored at power supply shut off)
0 Clears program No on power application

PRGNO D1

1 Employs the value following address O or N as the program number (specifiable in one block)
0 Employs the value following address O as the program number

M02M99 D0

1 Considers M02, M30 and M99 as the program end when part program is stored into memory
0 Does not consider M02, M30 and M99 as the program end when part program is stored into memory.

#6022	D7						D1	D0

HOFSMV D7

1 Enables the movement of automatic mode handle offset during cutting feed by interpolation
0 Enables the movement of automatic mode handle offset except during execution of rapid traverse

HOFSZ, HOFSX D1, D0

Specifies whether automatic mode handle offset movement is effective or ineffective

1 Effective automatic mode handle offset movement
0 Ineffective automatic mode handle offset movement

#6023	D7			D4		D2		

PERIAB D7

1 Incremental setting of offset value for Stored Leadscrew Error Compensation.
0 Absolute setting of offset value for Stored Leadscrew Error Compensation

WOPMCT D4

1 Ignores the second input when tool wear compensation input WOP (or WOM) is inputted continuously two times
0 Adds or subtracts the offset value when tool wear compensation input WOP (or WOM) is inputted continuously two times

CONP D2

1 Sets cut depth value override with cut depth override input in Stroke Removal in Turning (G71) and Stock Removal in Facing (G72).
0 Sets cut depth value override with setting #6004

#6024		ORGZ	NZZ	CNZZ		ORGX	NZX	CNZX

Sets the method of reference point return on Z- and X-axis

Return to reference point system (X-axis / Z-axis)	ORGX / ORGZ	NZX / NZZ	CNZX / CNZZ
Grid system (Reference pulse)	1	0	0
Near zero system (Signal "1")	0	1	0
Near zero system (Signal "0")	0	1	1

Input for Current Loop and RS232C

#6026			D5	D4	D3	D2	D1	D0

SIF1CI D5

Determines whether the input control code for current loop and RS232C interface is given or not

1 Does not send control code
0 Sends control code

SIF1SI D4

Determines the input stop bit for current loop and RS232C interface as two bits or one bit

1 Determines stop bit as two bits
0 Determines stop bit as one bit

SIF1BID - SIF1BIA $D_3 - D_0$

Sets input baud rate for current loop and RS232C interface

Baud rate	SIF1BID	SIF1BIC	SIF1BIB	SIF1BIA
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

#6027

		D_5	D_4	D_3	D_2	D_1	D_0

SIF2CI D_5

Determines whether the input control code for RS422 interface is sent or not

1 Does not send control code
0 Sends control code

SIF2SI D_4

Determines the input stop bit for RS422 interface as two bits or one bit

1 Determines stop bit as two bits.
0 Determines stop bit as one bit.

SIF2BID-SIF2BIA $D_3 - D_0$

Sets input baud rate for RS422 interface

Baud rate	SIF2BID	SIF2BIC	SIF2BIB	SIF2BIA
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

Output for Current Loop and RS232C

#6028

		D_5	D_4	D_3	D_2	D_1	D_0

SIF1CO D_5

Determines whether output control code for current loop and RS232C interface is sent or not

1 Does not send control code
0 Sends control code

SIF1SO D_4

Determines output stop bit for current loop and RS232C interface as two bits or one bit

1 Determines stop bit as two bits
0 Determines stop bit as one bit

SIF1BOD-SIF1BOA $D_3 - D_0$

Sets output baud rate for current loop and RS232C interface

Baud rate	SIF1BOD	SIF1BOC	SIF1BOB	SIF1BOA
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

Output for RS422 Interface

#6029

		D_5	D_4	D_3	D_2	D_1	D_0

SIF2CO D_5

Determines whether output control code for RS422 interface is sent or not

1. Does not send control code
0. Sends control code.

SIF2SO D_4

Determines output stop bit for RS422 interface as two bits or one bit.

1 Determines stop bit as two bits.
0 Determines stop bit as one bit

3.3.7 LIST OF PARAMETER NUMBERS (CONT'D)

SIF2BOD-SIF2BOA D_3 - D_0

Sets output baud rate for RS422 interface

Baud rate	SIF2BOD	SIF2BOC	SIF2BOB	SIF2BOA
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

#6050	XBLP
#6051	ZBLP

XBLP, ZBLP

Sets backlash compensation value for X- and Z-axis

Setting range 0 - 255
Setting Least output increment

#6056	XPSET
#6057	ZPSET

XPSET, ZPSET

Sets position error range for X- and Z-axis.

Setting range 0 - 255
Setting Least output increment

#6068	XPERML
#6069	ZPERML

XPERML, ZPERML

Sets leadscrew error compensation multiplication factor for X- and Z-axis
Outputs the result of the preset compensation value multiplied by the multiplication factor as the error compensation value.

Setting range 0 - 3
(Setting 0 will not execute compensation.)

#6074	XSVER
#6075	ZSVER

XSVER, ZSVER

Sets servo error limit for X- and Z-axis
Position deviation exceeding the preset value causes an alarm "34 Δ "

Setting range 0 - 255
Standard setting 16
Setting 1/16 x (D/A saturation value)

#6080	CUPRD

Rapid threading pull-out width during thread-cutting

Setting range 0 - 255
Setting 0 1 lead

#6081	SIDRG

Spindle indexing completion output allowable range

Setting range 0 - 255
Setting 1 = 1 pulse (= 360/4096 deg)

#6083	SIDGAN 1

Sets spindle indexing command voltage gain No.1.

Setting range 0 - 255
Setting 1 = 0 31 mV/pulse

#6084	SIDGAN2

Sets spindle indexing command voltage gain No 2

Setting range 0 - 255
Setting 1 = 0.31 mV/pulse

#6085	SIDSER

Sets the percentage of the spindle speed for starting spindle indexing

Setting range 0 - 10
Setting 1 = (Spindle indexing rotation speed command) x $\frac{1}{100}$

#6092	CUTACC

CUTACC

Time constant at Exponential Acceleration/ Deceleration during feed

Setting range 0 - 255
Setting 120 mm/min (metric output)
120 in/min (inch output)

#6093	CUTBAS

CUTBAS

Sets bias speed at Exponential Acceleration/ Deceleration during feed

Setting range 0 - 255
Setting 120 mm/min (metric output)
120 in/min (inch output)

#6094	SCRACC

SCRACC

Time constant at Exponential Acceleration/ Deceleration during threadcutting.

Setting range 0 - 255
Setting (n + 1) x 2 msec

#6095	SCRBAS

SCRBAS

Sets bias speed at Exponential Acceleration/ Deceleration during threadcutting.

Setting range 0 - 255
Setting 2Kpps

#6096	WOIMUL

WOIMUL

Sets the multiplication factor of changed compensation value from external input during external tool compensation function (M94, M95). The final changed value is the result of the changed compensation value by external input multiplied by this multiplication factor.

Setting range 1 - 10
Setting 0 1

#6108	UMEIA[
#6109	UMEIA]

#6110	UMEIA*
#6111	UMEIA=
#6112	UMEIA(
#6113	UMEIA)

UMEIAs

Specify the punching pattern in EIA for special characters employed in user macro, [,] , *, =, (,), used in turn, beginning with #6108

Setting range 0 - 255
Setting Sets the punching pattern using the decimal value converted from the binary value which defines the pattern

Note When "0" is set for each chatacter, punching pattern will be

Special Character	8	7	6	5	4	○	3	2	1
[				○	○	○	○		
]		○			○	○	○		
*					○	○	○	○	
=			○	○	○	○		○	○
(				○	○	○		○	
)		○			○	○		○	

#6114	NBUFM1
#6115	NBUFM2
#6116	NBUFM3
#6117	NBUFM4
#6118	NBUFM5
#6119	NBUFM6

NBUFM1, 2, 3, 4, 5, 6

Sets up to 6 M codes for stopping advance reading function (buffering).

Setting range 0 - 255

3.3.7 LIST OF PARAMETER NUMBERS (CONT'D)

#6120	UMG1
#6121	UMG2
#6122	UMG3
#6123	UMG4
#6124	UMG5
#6125	UMG6
#6126	UMG7
#6127	UMG8
#6128	UMG9
#6129	UMG10

UMG1 - 10

Sets up to 10 G codes for calling user macro

Setting range 0 - 255

#6130	UMM1
#6131	UMM2
#6132	UMM3
#6133	UMM4

UMM1, UMM2, UMM3, UMM4·

Sets M codes for calling user macro of program No. O9001 to O9004.

Setting range 0 - 255

#6134	UMT

UMT

1 Regards T-code command as macro call command calling the macro of program No O9000
0 Regards T-code command as basic T-code.

Note This selection is effective only for the user macro option.

#6220	MSTF

MSTF

Sets the interval from the time M, S, and T codes are transmitted until the time MF, SF, and TF are transmitted

Setting range 0 - 65536 (msec

#6222	HPMAX

HPMAX

Specifies the maximum handle feedrate, which is common to the all axes

Setting "1" = 125 pulses/sec

#6224	SAGRT

SAGRT

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

Setting range 0 - 65536 msec

#6228	G98MAX

G98MAX

Specifies the maximum feedrate at G98 command (feed per minute) common to all axes

Setting range

Setting "1" = 1000 pulses/min

#6229	G35F

G35F

Specified the feedrate at Tool Set Error Compensation (G35)

Setting range

Setting "1" = 1000 pulses/min

When the parameter is set at "0," feedrate follows F command

#6230	NEGNR

NEGNR

When a circular path is drawn in Tool Radius Compensation outside a corner approaching 180°, the movement follows describing a very small circular arc This parameter is used to set the critical arc value, if this arc movement is considered to affect the workpiece surface machining

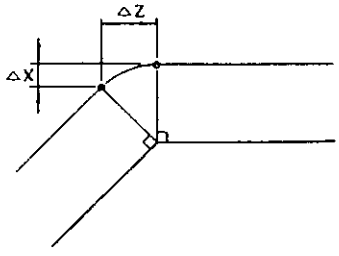
Setting range 0 - 65536
Setting Least input increment

The corner arc setting is ignored when

$\Delta X \leqq$ NEGNR

$\Delta Y \leqq$ NEGNR

Standard setting = 5



#6231	ROVFO

ROVFO

Specifies the FO speed for Rapid Traverse Override.

Setting range
Setting "1" = 125 pulses/sec

#6232	G31F

G31F

Specifies the feedrate in the skip function (G31)

Setting range: "1" = 1000 pulses/min

Setting: "1" = 1 mm/min

This setting is effective when parameter #6019D4 (SKPFED) = 1.

#6233	JOG0
⟨	⟨
#6264	JOG31

JOG0 ~JOG31

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

Setting range

Setting "1" = 0 5 mm/min (metric output)
"1" = 0 05 in/min (inch output)

Switch Position	Feedrate Override %	Parameter		Continuous Manual Feedrate
		Number	Setting	mm/min
0	0	#6233	0	0
1	10	#6234	1	1
2	20	#6235	2	2
3	30	#6236	4	4
4	40	#6237	6	6
5	50	#6238	8	8
6	60	#6239	10	10
7	70	#6240	12	12
8	80	#6241	15	15
9	90	#6242	20	20
10	100	#6243	25	25
11	110	#6244	30	30
12	120	#6245	40	40
13	130	#6246	50	50
14	140	#6247	60	60
15	150	#6248	80	80
16	160	#6249	100	100
17	170	#6250	120	120
18	180	#6251	150	150
19	190	#6252	200	200
20	200	#6253	250	250
21	0	#6254	300	300
22	0	#6255	400	400
23	0	#6256	500	500
24	0	#6257	600	600
25	0	#6258	800	800
26	0	#6259	1000	1000
27	0	#6260	1200	1200
28	0	#6261	1500	1500
29	0	#6262	2000	2000
30	0	#6263	2500	2500
31	0	#6264	3000	3000

#6266	MACGR1
#6267	MACGR2
#6268	MACGR3
#6269	MACGR4

MACGR1-MACGR4

Sets spindle speed upper limit for gear 1, 2, 3, and 4 orderly.

Setting range 0 - 6000 (rpm)

When the setting is at 0, the speed is not governed.

#6270	GRSREV

GRSREV

Sets the speed command output to spindle motor when gear shift input (GRS) is given

Setting value $\frac{\text{Gear shift spindle motor speed}}{\text{Spindle motor max speed (Command = 10 V)}}$ x 2047 --- 12-bit output

$\frac{\text{Gear shift spindle motor speed}}{\text{Spindle motor max speed (Command = 10 V)}}$ x 32512 --- Analog output

Setting range 0 - 6000

#6271	GR1REV
#6272	GR2REV
#6273	GR3REV
#6274	GR4REV

GR1REV-GR4REV

Specify the maximum speed of the spindle, respectively, for gears 1, 2, 3 and 4 each selected by an input signal Set the spindle speed applicable when the speed command voltage is 10 V.

Setting range 0 - 6000 (rpm)

#6275	GSCREV

GSCREV:

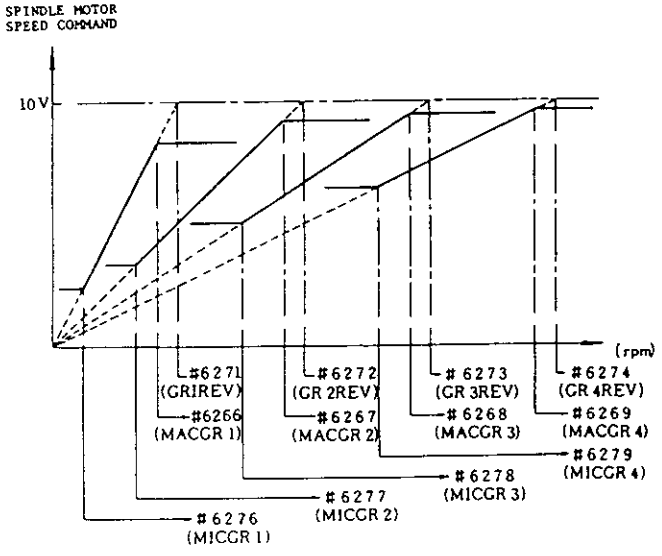
Specifies the spindle motor speed in effect when a spindle operation (GSC) input is entered

Setting range 0 - 6000 (rpm)

#6276	MICGR1
#6277	MICGR2
#6278	MICGR3
#6279	MICGR4

Specify the minimum speed of the spindle, respectively for gears 1, 2, 3 and 4 each selected by an input signal

Setting range 0 - 6000 (rpm)



#6280	RPDX
#6281	RPDZ

RPDX, RPDZ

Specify the rapid traverse rate for X- and Z-axis, respectively

Setting range. 0 - 3200
Setting· "1" = 125 pulses/sec

#6286	ACCX1
#6287	ACCZ1

ACCX1, ACCZ1

Set the time constant for Linear Accel/Decel for X- and Z-axis, respectively

Setting. "1" = 125/8 $\times 10^3$ pulses/sec^2

#6304	XREFP
#6305	ZREFP

XREFP, ZREFP

Sets the traverse distance for Reference Point Return, respectively, on the X- and Z-axes.

Setting range 0 - 65535

Setting "1" = 1 pulse

#6310	XREFV1
#6311	ZREFV1

XREFV1, ZREFV1

Specify the approach speed 1 for Reference Point Return, respectively, on the X- and Z-axes

Setting range: 0 - 200

Setting: "1" = 125 pulses/sec

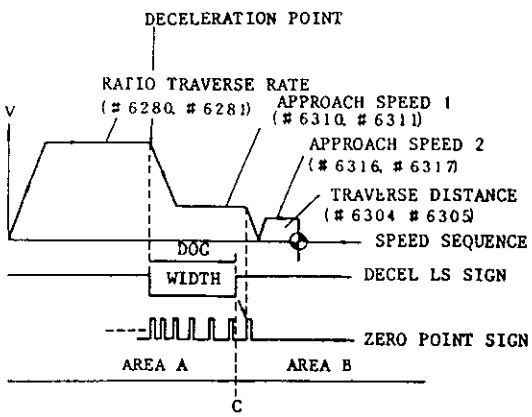
#6316	XREFV2
#6317	ZREFV2

XREFV2, ZREFV2

Specify the approach speed 2 for Reference Point Return, respectively, on the X- and Z-axes

Setting range: 0 - 200

Setting: "1" = 125 pulses/sec



Reference point return direction
#6010 (ZRNDRX, ZRNDRZ)

#6322	XPERED
#6323	ZPERED

XPERED, ZPERED:

Specify the number of the end point for Leadscrew Error Compnesation, respectively, on the X- and Z-axes

Setting range 0 - 255

#6328	XPERST
#6329	ZPERST

XPERST, ZPERST:

Specify the number of the start point for Leadscrew Error Compensation, respectively, on X- and Z-axes

Setting range 0 - 255

#6334	XPEROR
#6335	ZPEROR

XPEROR, ZPEROR:

Specify the reference point for Leadscrew Error compensation, respectively, on the X- and Z-axes.

Setting range: 0 - 255

#6342	SIDREF

SIDREF

Sets the reference point for spindle indexing

Setting range 0 - 4095

Setting "1" = 1 pulse (= 360/4096 deg)

#6343	SIDRV1

SIDRV1

Sets the spindle speed for spindle indexing.

Setting range· 0 - 32512

Setting 1 = 0.31 mV

#6344	SIDCRP

SIDCRP

Sets the spindle indexing creep speed

Setting range 0 - 31512

Setting "1" = 0 31 mV

#6345	SIDCRP

SIDCRP:

Sets the spindle indexing creep start position

Setting range 0 - 4095

Setting 1 = 1 pulse (= 360/4096 deg)

3.3.7 LIST OF PARAMETER NUMBERS (CONT'D)

#6346	SIDGEP

SIDGEP

Sets the spindle indexing command voltage gain No 2 start position

Setting range 0 - 4095

Setting 1 = 1 pulse (= 360/4096 deg)

#6600	XSL1P
#6601	ZSL1P

XSL1P, ZSL1P

Specify the plus direction boundary value for Stored Stroke Limit 1, respectively, on the X-, and Z-axes

Setting range 0 - 99999999

Setting· "1" = 1 pulse

#6606	XSL1M
#6607	ZSL1M

XSL1M, ZSL1M

Specify the minus direction boundary value for Stored Stroke Limit 1, respectively, on the X-, Z-axes

Setting range 0 - 99999999

Setting: "1" = 1 pulse

#6612	XZP2L
#6613	ZZP2L

XZP2L, ZZP2L

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

Setting range -99999999 - 99999999

Setting. "1" = 1 pulse

#6624	XBPTS
#6625	ZBPTS

XBPTS, ZBPTS

Specify the absolute coordinate value of X- and Z-axis, respectively where reference tool turns on touch switch during tool error compensation of X- and Z-axis.

#6630	XSETI
#6631	ZSETI

XSETI ZSETI.

Specify the value for Automatic Coordinate System Setting at the time of inch input, respectively, on the X-, and Z-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 range -99999999 - 99999999

Setting "1" = 0 0001 in

#6636	XSETM
#6637	ZSETM

XSETM, ZSETM.

Specify the value for Automatic Coordinate System Setting at the time of metric input, respectively, on the X-, and Z-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 range -99999999 - 99999999

Setting "1" = 0 001 mm

#6642	XPEINT
#6643	ZPEINT

XPEINT, ZPEINT

Specify the compensation inverval in Leadscrew Error Compensation, respectively, on the X- and Z-axes

Setting range -99999999 - 99999999

Setting· "1" = 1 pulse

#8000	PEMN0
⟆	⟆
#8255	PEMN255

PEMN0-PEMN255

Specify the respective values of Leadscrew Error Compensation

Setting range 0 - ±15 (Incremental designation)
0 - ±128 (Absolute designation)

Setting "1" = Output increment

Incremental/absolute designation is selected by parameter #6023D7 (PERIAB)

Axis for compensation is specified by parameters #6322, 6323, 6328, and 6329

APPENDIX STORED LEADSCREW ERROR COMPENSATION

This function automatically compensate for leadscrew 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, Z axes

No of correction points 256 Max.

Compensation base point Reference point

Compensation interval 6000 Pulses or more

Data setting system Absolute/incremental (Set by Parameter #6023D7 [PERIAB])

Compensation value

Minimum compensation unit 1 pulse (least output increment)

Compensation multiplication factor. 3X max.

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

Notes

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

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

3 No. of correction points on each axis can be arbitrary as far as the total compensation points are within 256

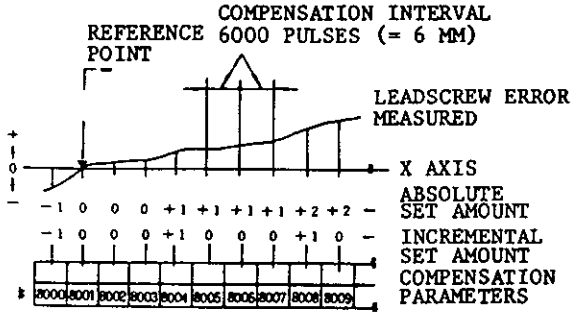
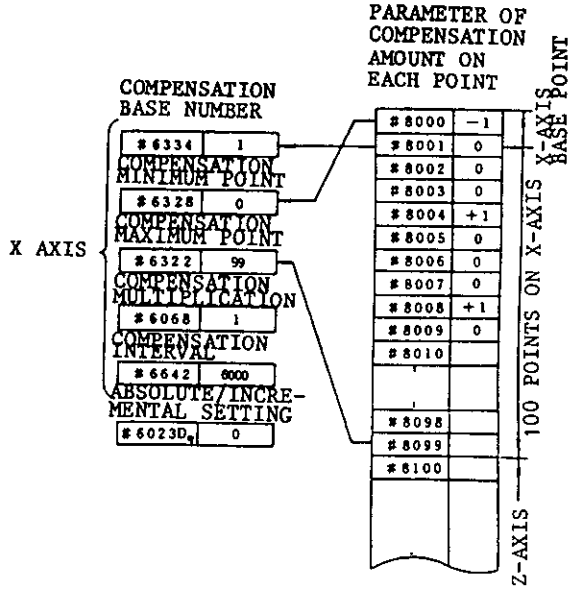


Table 3 1

	Axis	Parameter #	Functions
Compensation interval	X	#6642 (XPEINT)	6000 OR MORE "1" = 1 pulse
	Z	#6643 (ZPEINT)	
Absolute/incremental settig switchable		#6023D7 (PERIAB)	"0" = Incremental setting "1" = Absolute setting
Compensation reference no	X	#6334 (XPEROR)	Value of parameter # of compensation on each point minus 8000 will be written
	Z	#6335 (ZPEROR)	
Compensation max point	X	#6322 (XPERED)	
	Z	#6323 (ZPERED)	
Compensation min point	X	#6328 (XPERST)	
	Z	#6329 (ZPERST)	
Compensation value on each point	X	#8000 - #8255	0-±7 (Incremental setting) 0-± 127 (Absolute setting) "1" = 1 pulse
	Z		
Compensation multiplication factor	X	#6068 (XPERML)	0 to 3 "1" = 1X
	Z	#6069 (ZPERML)	



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