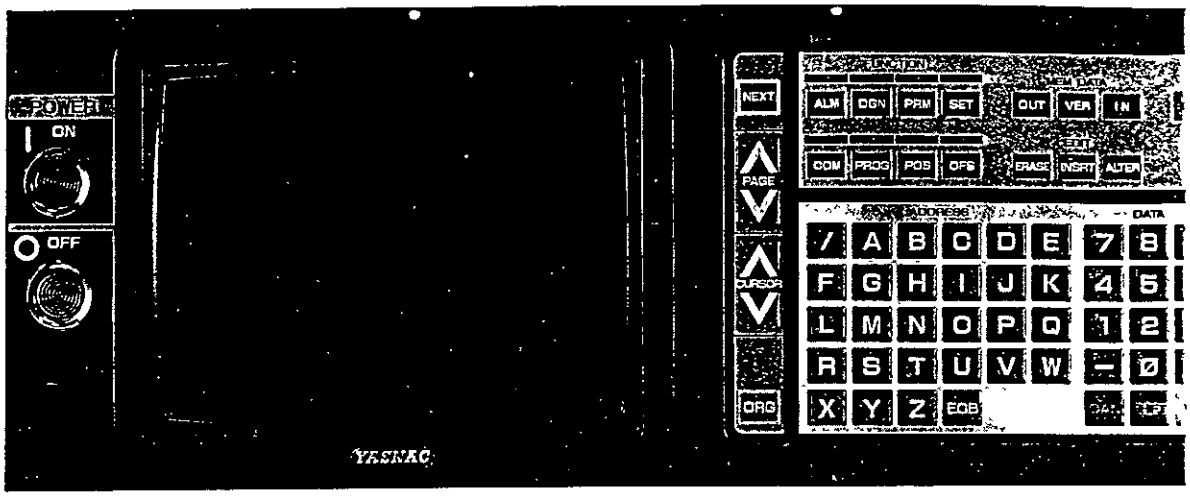
YASNAC MX3

CNC SYSTEM FOR MACHINING CENTERS



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

YASKAWA

CONTENTS

This manual is primarily intended to give operators maintenance instructions for YASNAC MX3.

The information contained in manual does not provide all details to be met concerning maintenance and troubleshooting. If uncertainties be encountered for particular maintenance operation, refer to the following YASNAC MX3 documents for additional information:

- YASNAC LX3/MX3 PC SYSTEM (TOE-C843-9.1)
- YASNAC MX3 SPECIFICATIONS (SIE-C843-9.30)
- YASNAC MX3 OPERATOR'S MANUAL (TOE-C843-9.30)
- YASNAC MX3 CONNECTING MANUAL (TOE-C843-9.32)

1. OUTLINE

The YASNAC MX3 provides you with an internal self-diagnosis function (DGN). System maintenance can easily be accomplished with DGN and other main functions as listed below;

(1) Microprocessor always monitors the machine operations internally and can display the status with function keys. If any failure occurs, NC immediately stops with the blinking of alarm displays. Also the same precedure can be executed on machine sequence for the application of built-in type programmable controller.

(2) ON/OFF SIGNAL of input to NC/Output from NC can be displayed with DGN.

(3) Setting value of various parameters such as accel/decel time constant and rapid speed.

1.1 COMPONENT ARRANGEMENT

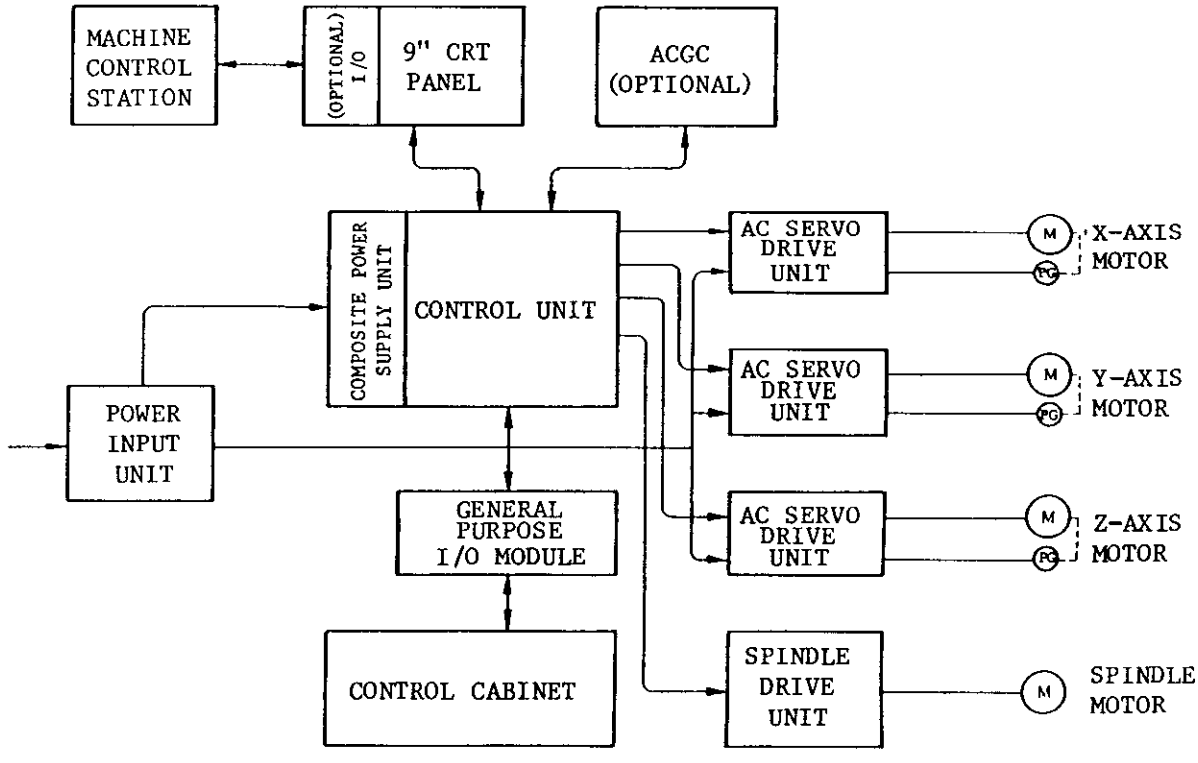
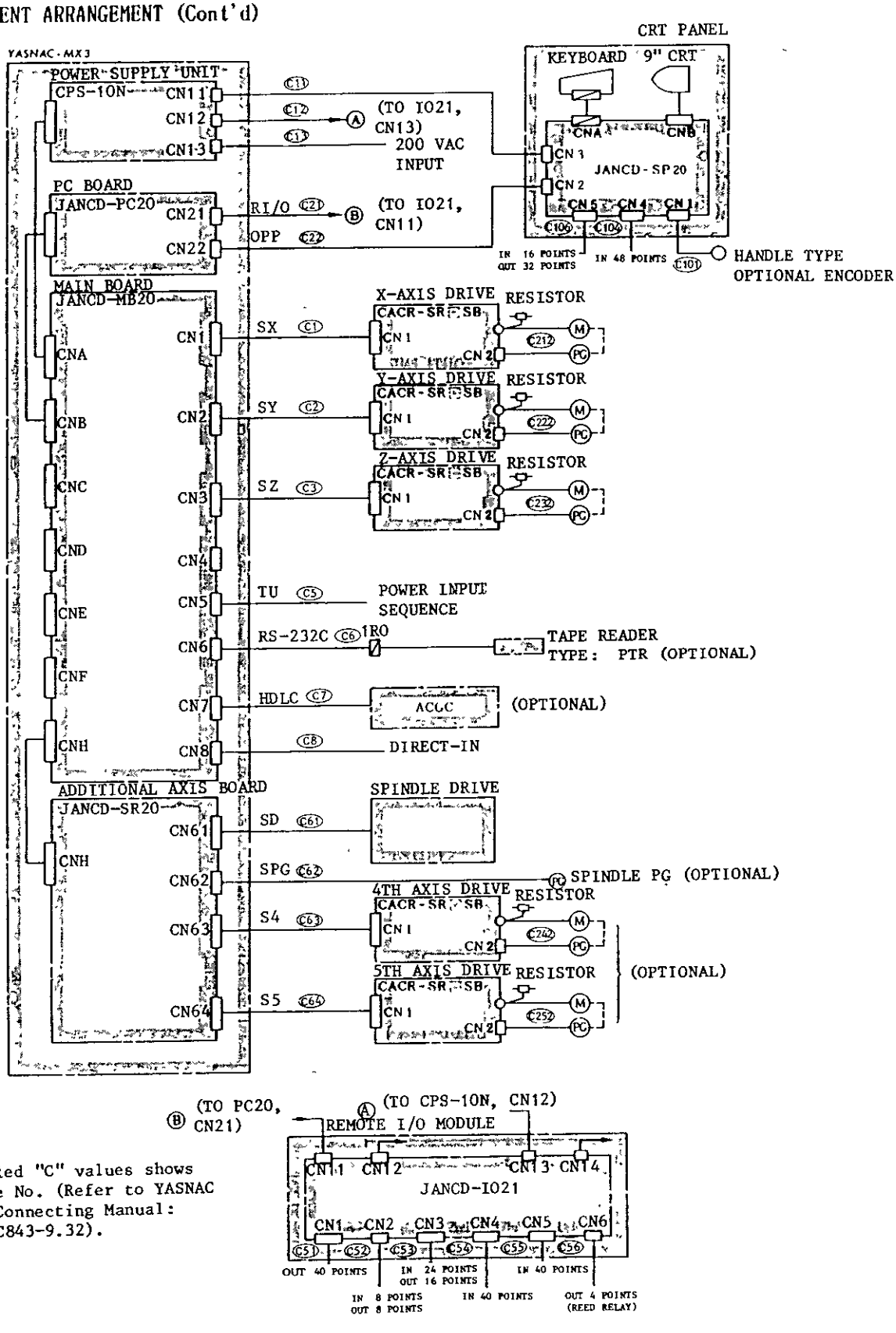


Fig. 1.1 Component Arrangement of YASNAC MX3

1.1 COMPONENT ARRANGEMENT (Cont'd)



NOTE: Circled "C" values shows cable No. (Refer to YASNAC MX3 Connecting Manual: TOE-C843-9.32).

Fig. 1.2 Connection Diagram

1.2 CONSTRUCTION

(1)

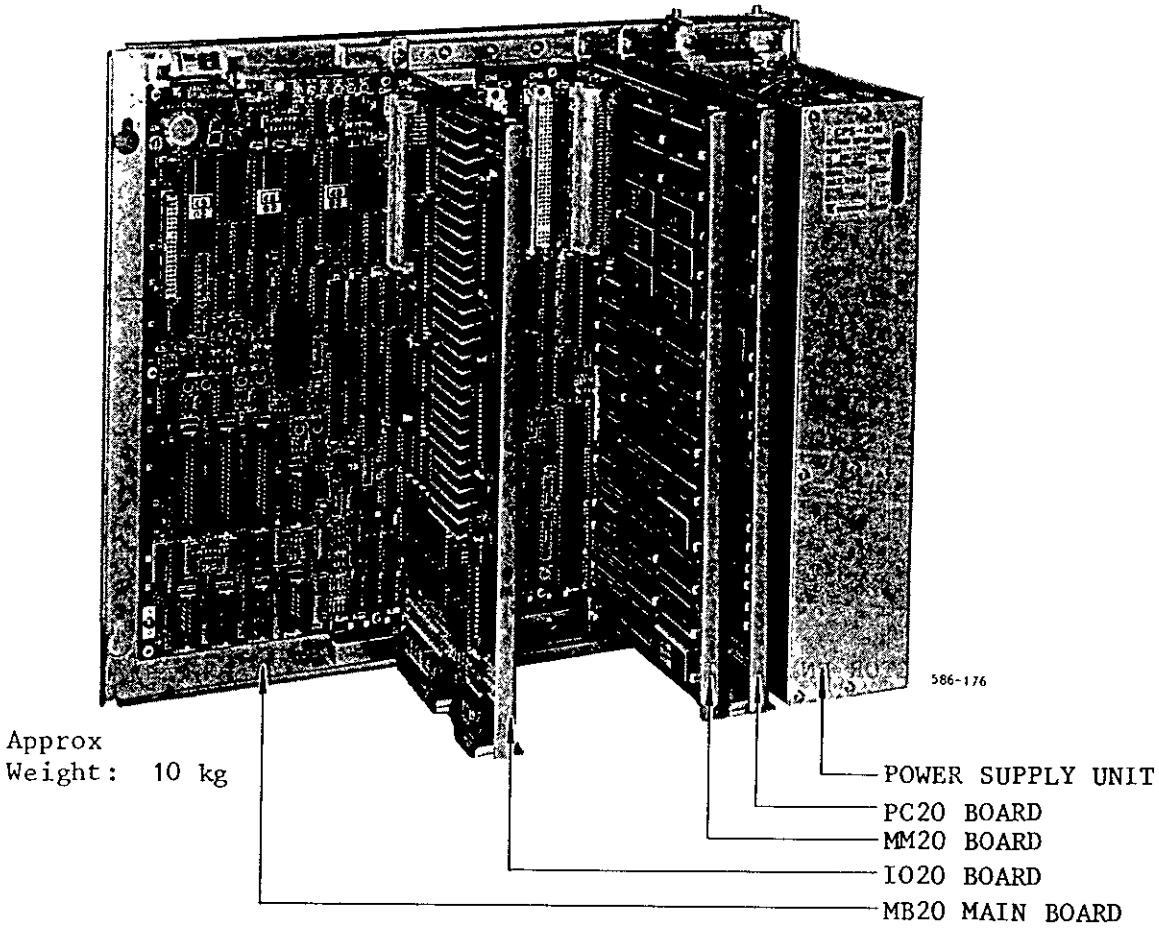


Fig. 1.3 CPU Module

(2)

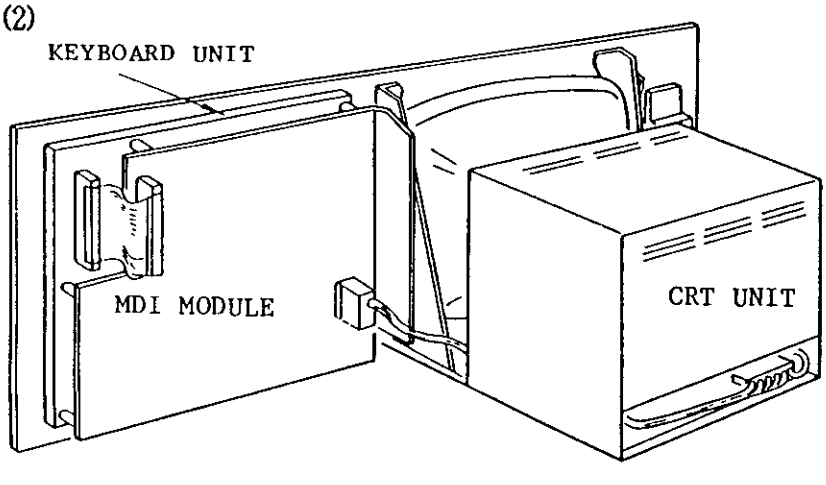


Fig. 1.4 9"CRT Unit
(rear view)

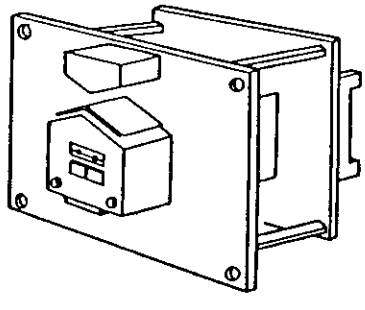


Fig. 1.5 Tape Reader Unit

(3)

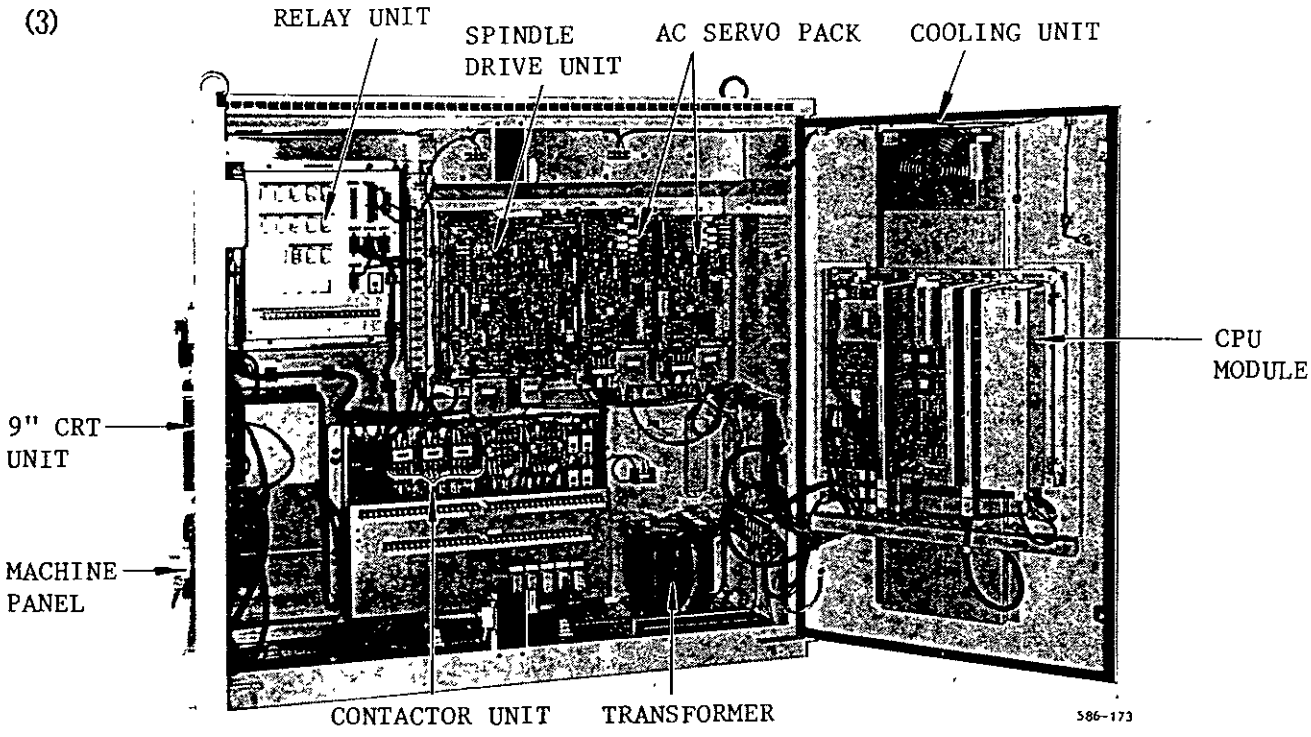


Fig. 1.6 Example of Unit Assembly with High Voltage Units

1.3 MAJOR COMPONENTS

(1) YASNAC MAJOR COMPONENTS

Table 1.1 YASNAC Major Components

Component Name	Type	Code	Remarks
Power Supply Unit	CPS-10NB	AVR839	
Tape Reader	MODEL2801	RED18	Option
Tape Reel	MODEL1500	RED14	Option
	MODEL1402-1	RED13	Option
Main Board	JANCD-MB20D	DTN5270	——
PC Board	JANCD-PC20	DTN4770	——
Memory Board	JANCD-MM20	DTN4790	——
Memory Board for Extension	JANCD-MM21-2	DTN5170	Memory length: 80 m,160 m (Option)
	JANCD-MM21-3	DTN5180	Memory length: 320 m (Option)
	JANCD-MM21-4	DTN5190	Memory length: 640 m (Option)
	JANCD-MM21-5	DTN5200	Memory length: 1280 m (Option)
	JANCD-MM21-6	DTN5210	Memory length: 2560 m (Option)
Control Station	JZNC-OP101-1	DUN13190	Without Panel I/O
	JZNC-OP101-2	DUN13200	With Panel I/O
CRT Display Unit	TR-9DDYB	CRT10	These units are included in the above control station.
Key Board Unit	HMK3993-12	SW773	
SP Board	JANCD-SP20B-01	DTN5460	
	JANCD-SP20B-02	DTN5470	
SR 20 Board	JANCD-SR20-01	DTN5330	Spindle
	JANCD-SR20-02	DTN5340	Spindle + 4 axis (Option)
	JANCD-SR20-03	DTN5350	Spindle + 4 axis, 5 axis (Option)
General Purpose I/O Module	JANCD-IO21	DTN5250	Separated type
Manual Pulse Generator (Simultaneous 3-axis Control) Module	JANCD-SP21	DTN5520	(Option)
Communication Module	JANCD-IF20	DTN5560	Communication interface (Option)

(2) ACGC Major Components

Table 1.2 ACGC Major Components

Name	Type	Code No.	Remarks
14" CRT Unit	C-5470YE	CRT6	
Keyboard Unit	HMK-9993-02	SW677	Main key (Horizontal)
Keyboard Unit	HMK-2293-03	SW678	Main key (Vertical)
Keyboard Unit	HMK-9993-20	SW679	Soft key
Power Supply Unit	VST-5-522/ST	AVR738	
CPU Module	JANCD-CG01D	DTN5390	
Graphic Module	JANCD-CG02	DTN4290	
Memory Module	JZNC-MU[ ][ ]-[ ]		
Memory Unit	JANCD-CG03	DTN5100	These units are incorporated into memory module.
	JANCD-CG04	DTN5110	
	JANCD-CG05	DTN5120	
	JANCD-CG06	DTN5130	
	JANCD-CG09	DTN5510	
Battery Unit	JZNC-BAT02	DUN13060	

(3) AC Servo Units

Table 1.3 AC Servo Units

Servopack Type	Code No.	Applied Motor	
		Motor Type	Optical Encoder p/rev
CACR-SR05SB1AF	DUA15920	USAFED-05FA1	6000
CACR-SR05SB1BF	DUA16020	USAFED-05FB1	5000
CACR-SR05SB1DF	DUA16120	USAFED-05FD1	4000
CACR-SR10SB1AF	DUA15940	USAFED-09FA1	6000
CACR-SR10SB1BF	DUA16040	USAFED-09FB1	5000
CACR-SR10SB1DF	DUA16140	USAFED-09FD1	4000
CACR-SR15SB1AF	DUA15950	USAFED-13FA1	6000
CACR-SR15SB1BF	DUA16050	USAFED-13FB1	5000
CACR-SR15SB1DF	DUA16150	USAFED-13FD1	4000
CACR-SR20SB1AF	DUA15960	USAFED-20FA1	6000
CACR-SR20SB1BF	DUA16060	USAFED-20FB1	5000
CACR-SR20SB1DF	DUA16160	USAFED-20FD1	4000
CACR-SR30SB1AF	DUA15970	USAFED-30FA1	6000
CACR-SR30SB1BF	DUA16070	USAFED-30FB1	5000
CACR-SR30SB1DF	DUA16170	USAFED-30FD1	4000
CACR-SR44SB1AF	DUA15980	USAFED-44FA1	6000
CACR-SR44SB1BF	DUA16080	USAFED-44FB1	5000
CACR-SR44SB1DF	DUA16180	USAFED-44FD1	4000

(4) Spindle Drive Units VS-626MTⅢ

Table 1.4 Spindle Drive Units

Drive Unit Type	Motor Type	Installation
CIMR-MTⅢ-3.7K	UAASKA-04CA1	Flange Mounted
	UAASKA-04CA3	Foot Mounted
CIMR-MTⅢ-5.5K	UAASKA-06CA1	Flange Mounted
	UAASKA-06CA3	Foot Mounted
CIMR-MTⅢ-7.5K	UAASKA-08CA1	Flange Mounted
	UAASKA-08CA3	Foot Mounted
CIMR-MTⅢ-11K	UAASKA-11CA1	Flange Mounted
	UAASKA-11CA3	Foot Mounted
CIMR-MTⅢ-15K	UAASKA-15CA1	Flange Mounted
	UAASKA-15CA3	Foot Mounted

2. 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 2.1 Inspection Schedule

Items		Frequency	With the system-off	With the system-on	Remarks
Tape Reader	Cleaning of reading head	As required	○		Including light source part.
	Cleaning of tape tumble box	As required	○		
	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	○		
AC Servo-motor	Vibration and noise	Daily		○	Feel by hand, and do the audible inspection.
	Motor contamination and breakage	Daily or as required	○	○	Inspect visually.
Battery		At POWER ON	○	○	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.

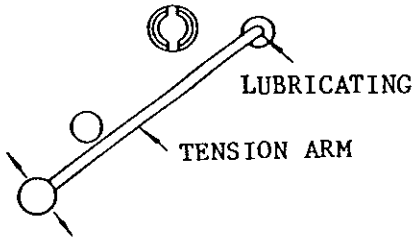
2.1 TAPE READER

(1) Cleaning the tape reader head (As required)

(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 agauze 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 (As required)
Clean the braided nylon leading tape with a clean, soft cloth.

(3) Lubricating of tension arm shaft(As required)
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. 2.1

NOTE

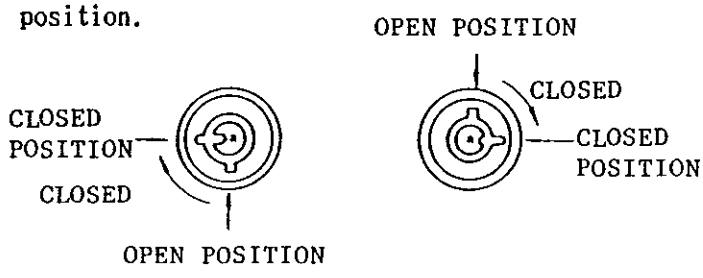
When trouble occurs in feeding or winding tape with 8-inch diameter reels, open the front door and brush away dust around the photo-coupler by using a blower brush.

2.2 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. Tension arm shaft available as an option.

(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. 2.2

NOTE

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

(2) Checks gaps or impairment of totally-enclosed structure.

(a) Check gaskets on the rims of front and rear doors.

(b) See if the inside of enclosure is dusty. Clean it, if necessary.

(c) Check for any opening in the door base with the doors shut tightly.

YASNAC control panel can be used stably for a longer period by executing the above procedures.

2.3 AC SERVOMOTOR

(1) Vibration and noise (Daily or as required)

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 or as required)

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.

2.4 BATTERY

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

When replacing, never remove the old battery with power OFF, otherwise the data stored in memory are cleared. Battery cannot be obtained in the market. Contact your YASKAWA representative.

Replacing Procedure

(1) Depress POWER OFF pushbutton to shut off the power supply to the operator's station.

(2) Turn OFF the door interlock switch key when a door interlock switch is provided. Then the power supply can be turned ON with the door opened.

(3) Open the door and remove the CPU module cover (type JANCD-MB20) so that the module can be seen.

(4) Depress POWER ON pushbutton (only for primary power supply).

(5) Check to see if 1LED on memory board is illuminated. Fig. 2.3 shows the arrangement of LED and the battery. If illuminated, replace the battery with new one.

Battery Type: JZNC-GBA01

(6) With the power on, remove the old battery.

(7) Put the new battery in the holder and set the connector. See Fig. 2.4. Battery connection.

(8) With the power on, make sure that blink display of CRT screen or LED1 goes off. IF they are still illuminated, it is due to the improper battery connection or defective battery.

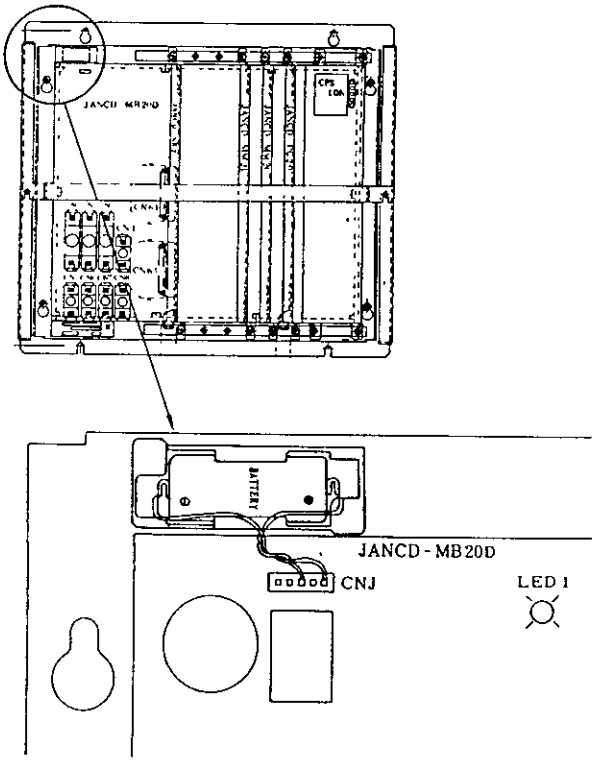


Fig. 2.3 Arrangement of LED and Battery

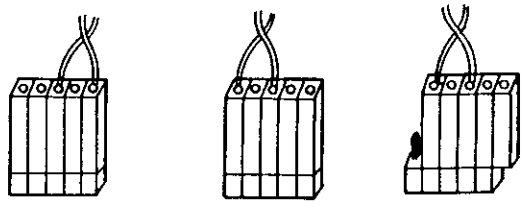


Fig. 2.4 Battery Connection

3. MAINTENANCE INSTRUMENTS

(1) Measuring instruments

Name	Allowable measuring range	Purpose
Tester or Multi-purpose digital meter	10 to 30 VAC (at 40 to 100 Hz) Tolerance : ±2% or less	To measure AC power voltages
	Several mV to 100 VDC Tolerance : ±2% or less	To measure DC power voltages
	Several Ω to approx. multiple of 10MΩ Tolerance : ±5% or less	To measure currents flowing through DC motors, etc.

(2) Tools

Phillips screwdrivers; large, medium and small
Standard screwdrivers; medium and small

(3) Chemicals

Cleaning agent for tape reader (absolute alcohol)

4.1 TROUBLE IDENTIFICATION

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

4.1.1 RECOGNITION OF TROUBLE STATUS

(1) What operation will cause the trouble? (Is other operation performed normally?)

(2) When does the trouble occur: every time or frequently?

(3) Was there no external disturbance such as power interruption or lightning when trouble occurred?

(4) Did it occur during or after operation of mode switches such as EDIT or memory, or function such as [PRM] (parameter) or [DGN] (diagnose) or key switch on CRT panel?

(5) Ensure the following points if the trouble occurred as related to feed and/or spindle operation:

- Check of LED on the drive unit
- ON/OFF check of fuse or MCCB
- Time of trouble occurrence such as
  at power application.
  at acceleration.
  at deceleration.
  at steady-state running.

(6) Does it depend on part program?
If so, record also part program, offset and coordinate system settings.

4.1.2 RECOGNITION OF NC SYSTEM

Ensure the following points so as to correctly recognize the status of machine and equipment regardless of the detail of trouble.
The NC unit is provided with an interlock switch. When the operator opens the door, the NC unit power supply is tripped by MCCB and the interlock switch is released.
Do not start the check operation until the interlock switch is released.

(1) Name of machine manufacturer

(2) Time of delivery

(3) Name and type of machine

(4) Name and type of NC unit and others
(Example)

NC unit	:	YASNAC MX3 (ENCM-LP332)
Servo drive	:	CACR-SR053SB
Servo motor	:	USAFED-05MA
Spindle drive	:	VS-626MT Ⅲ (CIMR-MTⅢ 7.5K)
Spindle motor	:	UAASKA-08CA3

(5) System No. of NC software
Check procedure
Keep depressing [ORG] button on operator's panel at the time of power application. Then, the screen as shown in Fig. 4.1 appears on the CRT.

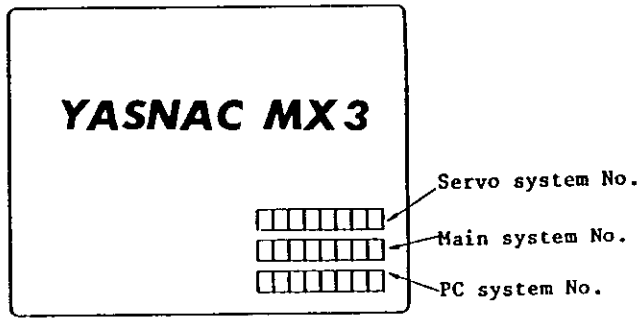


Fig. 4.1 NC Screen at Power Application

(6) Ensure that the parameters are the same as those specified in the list attached to the NC unit.

4.2 TROUBLESHOOTING BY ALARM CODES

This description covers the troubles displayed by alarm codes that were recognized by diagnostic function of NC unit during normal operation.
Refer to Appendix 1 "List of Alarm Codes."
Some additional explanations are given for especially difficult troubles.

4.2.1 DISPLAY METHOD

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:
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.

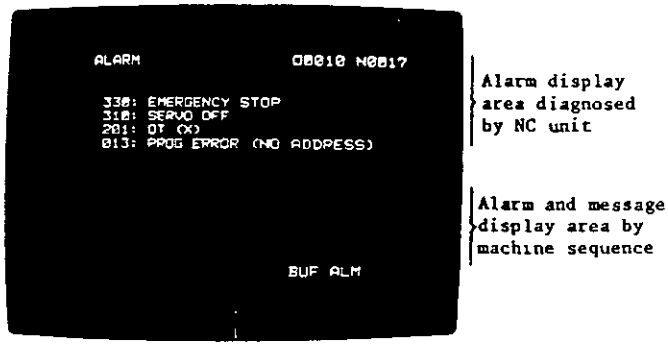


Fig. 4.2 Alarm Codes and Messages

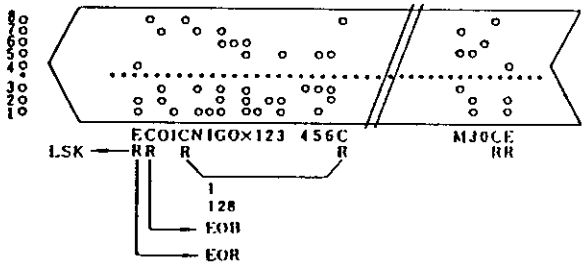
Eliminate the cause of the alarm and depress the RESET key, and the alarm state and the alarm display will be reset. Notice that the alarm code "820" is displayed regardless of the selected function key.
The alarm codes are categorized as in Table 4.1.

Table 4.1

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

NOTE: Alarm No. 180: sequence error (1), 400: sequence error (2) and 600 to 699: sequencer messages are the troubles concerned with machine sequence. Refer to the maintenance manual prepared by machine manufacturer for details.

4.2.2 ALARMS 010 AND 011 (Parity Error)

Cause of Trouble	Check Method	Solution
Alarm 010 (TH error)	1) In case of tape operation: 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.)	· Clean tape reader. Check tape itself if the feed hole is faulty and/or the nap is raised on the hole. · Failure of tape reader itself
		
	2) Failure of machining program area in case of memory operation or at time of EDIT. 3) RS232C communication error · Framing error · Overrun	· Failure of MB20 board or of expansion memory board (MM21 board) Refer to item 4.3.14.
Alarm 011 (TV error)	In case of tape operation: The tape should be capable of TV check. (Number of characters for one block should be even, including EOB.)	If the tape cannot perform TV check, use it by setting [SET] #6002 D_6 = 0 (TV check OFF) or make it so that it can perform TV check.
Others Alarm 010	1) Disagreement between numbers of RS232C baud rates and stop bits 2) Communication error of RS232C (e.a. too high noise level)	· Check the specification of RS232C equipment. · Check parameters. Refer to Par. 4.3.14. · Check cable grounding.

4.2.3 ALARM 075, 076, 077 (RS232C Faulty)

075: RS232C interface; disagreement between number of bits and number of baud rates

076: RS232C interface; transmission failure

077: RS232C interface; 10 characters or more were read after stop code was issued.

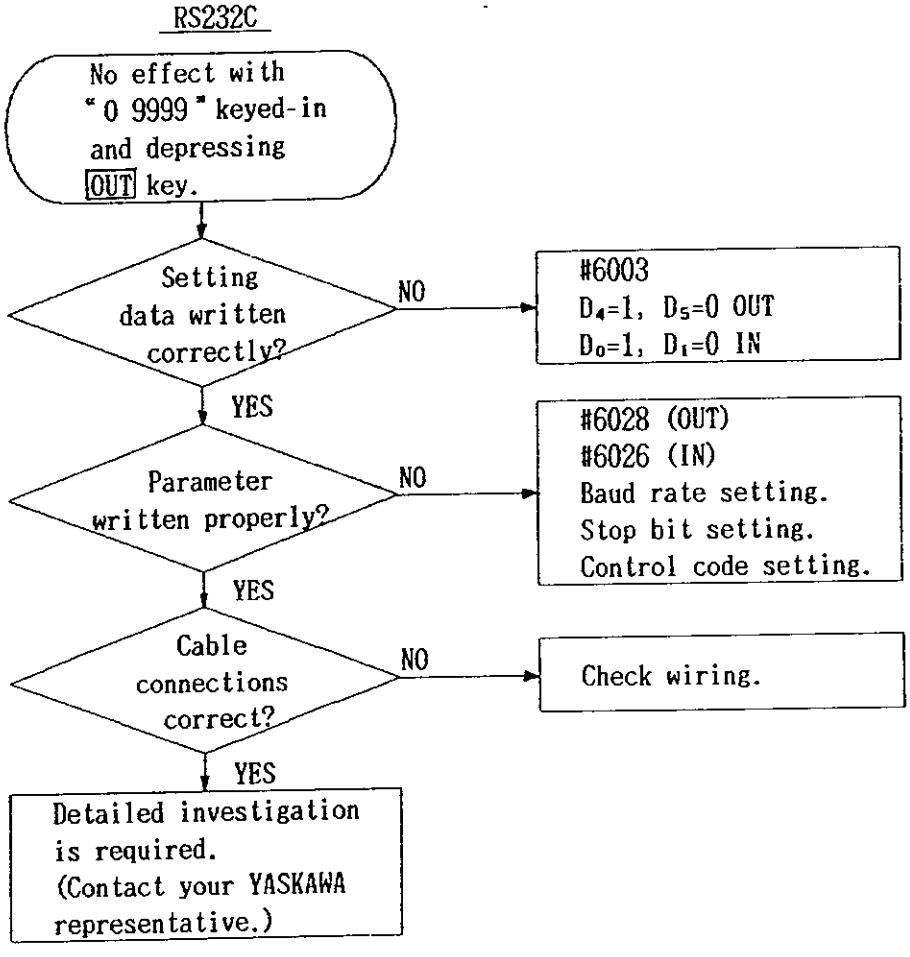


Fig. 4.3

· Setting of Applicable Interface

Set the data transmission baud rate, stop bit length and control code sending command specifications with parameters as shown in Tables 4.3 and 4.4.

(a) Selection of RS232C Interface Port

Select the port of RS232C interface by setting #6003.

1st RS232C and 2nd RS232C cannot be selected simultaneously.

Table 4.2 Selection of RS232C Interface Port

Interface	Input	Output
1st RS232C	#6003D_0	#6003D_4
2nd RS232C	#6003D_1	#6003D_5

Select above bits by parametter setting "1".

(b) 1st RS232C Interface

Baud rate value setting for 1st RS232C interface is shown in Table 4.3.

Table 4.3 Baud Rate Value Setting

	Input	#6026 D_3	#6026 D_2	#6026 D_1	#6026 D_0
	Output	#6028 D_3	#6028 D_2	#6028 D_1	#6028 D_0
Baud Rate Value	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

Setting of stop bit length

Input	#6026D_4	=1: Two bits for stop bit
Output	#6028D_4	=0: One bit for stop bit

Setting of control code sending command

Input	#6026D_5	=1: Does not send control code.
Output	#6028D_5	=0: Sends control code.

(c) 2nd RS232C Interface

Baud rate value setting for 2nd RS232C interface is shown in Table 4.4.

Table 4.4 Baud Rate value Setting

	Input	#6027 D_3	#6027 D_2	#6027 D_1	#6027 D_0
	Output	#6029 D_3	#6029 D_2	#6029 D_1	#6029 D_0
Baud Rate Value	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	0
	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

Setting of stop bit length

Input	#6027D_4	=1: Two bits for stop bit
Output	#6029D_4	=0: One bit for stop bit

Setting of control code sending command

Input	#6027D_5	=1: Does not send control code.
Output	#6029D_5	=0: Sends control code.

Table 4.5 RS232C Voltage Level

	VO<-3V	VO>+3V
Function	OFF	ON
Signal Status	Mark	Open
Logic	1	1

Table 4.6 Connection Cable(A) for Terminal Connection RS232C Interface

NC Side (DB-25P)			Connection	External Equipment Symbol
Symbol	Signal	Pin No.		
FG	Frame grounding	1		FG
SD	Send data	2		SD
RD	Receive data	3		RD
RS	Request send	4		RS
CS	Capable of send	5		CS
DR	Data set ready	6		DR
SG	Signal grounding	7		SG
ER	Equipment ready	20		IO BUSY
				ER

Fig. 4.4 shows connection example of standard RS232C tape reader.

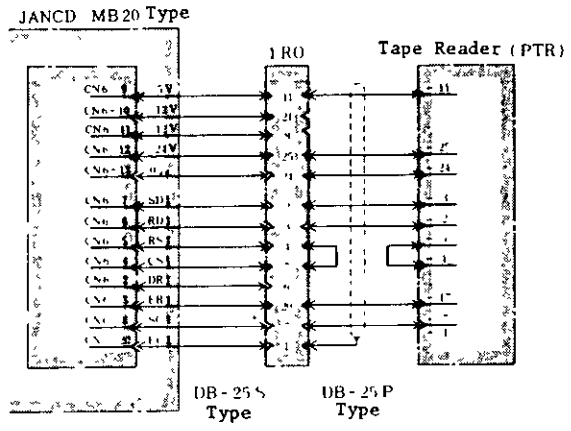


Fig. 4.4 Example of 1st RS232C Interface

Notes:
1. Use 1st RS232C interface when the built-in type tape reader (PTR) is used.
In this case, RS232C interface freely usable by customers is 2nd RS232C interface only.

2. Keep cable length from tape reader to main board (JANCD-MB20 Type) less than 3m. Contact your YASKAWA representative in advance if it is necessary to exceed 3m.

4.2.4 ALARM 170, 172, 173, 174 AND 175 (Memory Error)

170: MEM ERROR (OFS)
Tool offset value total check error
172: MEM ERROR (SET)
Setting area total check error
173: MEM ERROR (PRM)
Parameter area total check error
174: MEM ERROR (KEEP)
Keep memory total check error
175: MEM ERROR (MACR)
Macro total check error

These alarms indicate that tool offset value, setting data, parameters, keep memory data and/or macro data were rewritten for some reason.
The following points may be considered as their cause.

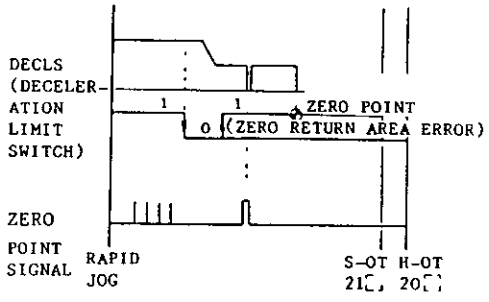
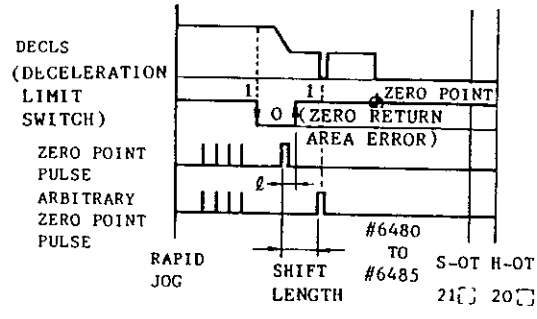
- Failure of battery unit (battery alarm display)
- JANCD-MB20 module, -MM20 module or -MM21 module (optional) is not correctly connected.
- Failure of above modules

Contact your YASKAWA representative in any of above cases.

4.2.5 ALARM 179 (Temperature Alarm inside the Panel)

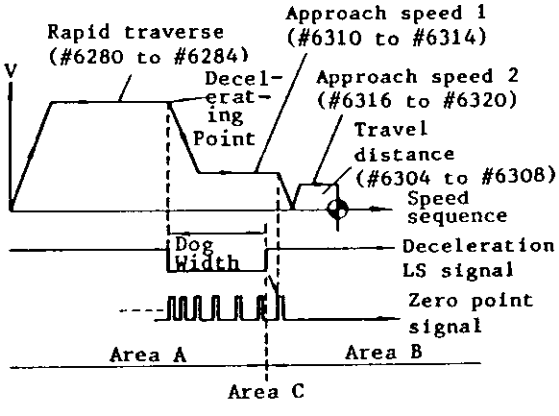
Cause of Trouble	Check Method	Solution
Ambient temperature of CPU module exceeded the specified value (70℃ ±3℃) by measuring at top of CPS-10N as a result of fan failure.	· Open NC panel door and ensure that the fan runs normally. · Ensure that air comes out of exhaust port at the cooling duct. · Ensure that air intake port of cooling duct is not blocked.	· Replace the fan if faulty. Call our service personnel your YASKAWA representative. · If cooling duct is clogged, remove the cause of clogging and restart the operation.
Failure of power supply unit(CPS-10N) (Temperature detector is built inside the power supply unit.)	· Turn OFF power supply, open the door of NC panel and cool it for about 30min. If the alarm still lights.	The power supply unit must be NC placed. Contact your YASKAWA representative.
Ambient temperature of NC panel is too high. (Applicable temperature range is 0℃ to 40℃.)	· Measure the ambient temperature. · The temperature may rise if NC panel is exposed to direct rays of the sun.	· Reduce the effects of temperature rise by shielding the NC unit, etc.

4.2.6 ALARMS 231, 232, 234 AND 235 (Zero Point Return Area Error)

Cause of Trouble	Check Method	Solution
Zero point return start position was at zero point side rather than at deceleration LS side.	Try zero point return again while observing the deceleration LS: DGN #1306 D_4(X) #1306 D_5(Z) As shown by below an alarm results when zero point return is made between DECLS and zero point. Note that this error check can be performed only after power supply is turned OFF and the manual return to zero point has been completed.  Comfirm the deceleration LS by DGN #1328 D_0 (X-axis) D_1 (Y-axis) D_2 (Z-axis) D_3 (4-axis) D_4 (5-axis)	Return it to the opposite direction of the zero point and try the zero point return again.
Generated in the specifications of arbirtary phase C zero point return. This is why an alarm is to occur in order to prevent the deceleration limit switch from being passed before establishment of arbitrary zero point when the position of the deceleration limit swich (0→1) is near the positon of zero point pulse detected at the first time of the first zero point return after power supply is turned ON.	Check the difference (ℓ) between positions of zero point pulse in the section "0" of the deceleration limit switch and "0" → "1". An alarm occurs when the former position is smaller (several millimeters).  	Adjust the deceleration limit switch dog.

4.2.7 ALARMS 241, 242, 243, 244 AND 245 (Zero Point Return Position)

At the completion of the second stop and after zero point return. Check if the stop position is the same as the previous one. If the position slips, an alarm will be issued.

Cause of Trouble	Check Method	Solution
Program error	The trouble occurred when G27 was used for zero point return during the machine operation.	Refer to Par. 2.9.14 "Reference point return check" of the YASNAC MX3 Handling Manual (TO-C843-9-30) to correct the program.
The dog of the deceleration limit switch is narrow in width.	Decelerating to approach speed 1 must be completed within the range of the dog width in the figure. Use an oscilloscope to measure each signal or use jog to return to the zero point. 	Replace the deceleration limit switch having a wider dog.
The deceleration limit switch exceeds 5 ms in the chattering range.	Use an oscilloscope to measure the signal waveform.	Replace the deceleration limit switch with a switch with less chattering.

Cause of Trouble	Check Method	Solution
The trailing edge (C-point) of the deceleration limit switch is too close to the zero point signal.	Measure [DGN] #1382 and #1288 - #1292 D_6, moving the C-point by the manual handle. The position slippage equivalent to one rotation of the motor corresponds to this.	Adjust the dog position for the deceleration limit switch, so that C-point in the figure may come to the center point between the zero point pulses. Point-C in the figure is illustrated in the How-to-confirm column when the deceleration limit switch dog is narrow.
The zero point pulse was in error.	Use [DGN] #1288 - #1292 D_6 or oscilloscope to measure the waveform.	Trouble has occurred on one of the following: · Motor (PG) · AC servo · MB20 servo Contact your YASKAWA representative.
The zero point return travel distance parameter is too small, or approach speed 2 valus is too high.	If the reference point return is operated without turning power OFF when [PRM] #6316 - #6320 is changed, (e.g. at the reference point return adjustment time,) an alarm will be issued. Make the [PRM] #6316 - #6320 value high or [PRM] #6304 - #6308 value low.	Set a parameter value which does not cause an alarm.

4.2.8 ALARMS 271, 272, 273, 274 AND 275 (P-SET Error)

P-Set Error results when difference between command position and machine position does not fall within parameters #6156 (X-axis), #6157 (Y-axis), #6158 (Z-axis), #6159 (4-axis), or #6160 (5-axis) at the time of completing positioning with G00, G27, G28, G29 and G30. Check is also required at the time of G04 (dowell).

Cause of Trouble	Check Method	Solution
Machine runs too heavy.	Measure the load current. Observe torque motor in case of AC servo.	Lighten machine load.
Servo error pulse exceeds setting range.	Check error pulse. Refer to Par. 4.3.4.5 Display Number of Servo Lag Pulses in Operator's Manual.	Adjust zero point of servo. If it cannot be adjusted, replace MB20 or Servo Pack. Contact your YASKAWA representative.

4.2.9 ALARM 310 (Servo Power Supply Not Applied)

Cause of Trouble	Check Method	Solution
Secondary power supply is not applied.	This is a normal result when depressing NC RESET after initial power application, or resetting emergency stop alarm, etc.	Depress POWER ON button again.
In case of automatic servo power application I/O input specification is not activated by secondary power supply.	Ensure that it is set to [DGN] #1322 D_7=1.	Check wiring and sequence.
Emergency stop input.	Check if ALM330 displays, or [DGN] #1281 D_1=1.	Reset emergency stop input
Secondary power supply was tripped by other alarm.	Check for other alarm display.	Take corrective action according to alarm code.

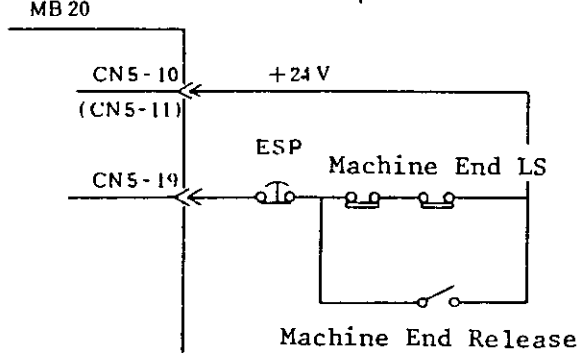
4.2.10 ALARM 320 (Control Not Ready)

This type of alarm results when position lag does not fall within the range of RPM #6156 (X-axis), #6157 (Y-axis), #6158 (Z-axis), #6159 (4-axis) and #6160 (5-axis) after power application and self-diagnosis.

Cause of Trouble	Check Method	Solution
Faulty zero point adjustment of servo.	Select [SET] #6219=4, then, ERROR PULSE display screen from [POS] display and read the values of X-, Y-, Z-, 4th- and 5th-axis.	Perform zero point adjustment of servo.
Machine is running.		This is a problem of the machine side rather than failure of NC unit. Contact machine manufacturer.
PG signal keeps feeding.		Replace PG or servo. Contact your YASKAWA representative.
MB20 failure.		Replace MB20. Contact your YASKAWA representative.

4.2.11 ALARM 330 (Emergency Stop)

Cause of Trouble	Check Method	Solution
Emergency stop button depressed, or, machine end LS is out of place.	After ensuring [DGN] #1281 D_1=0 (during emergency stop), check continuity of emergency stop button or machine end LS shown below. For correct connection, refer to connection diagram prepared by by machine manufacturer.	Reset the emergency stop button. Release it from machine end LS according to instruction manual prepared by machine manufacturer.
Wiring is not proper.		



Example of Emergency Stop Connection

4.2.11 ALARM 330 (Emergency Stop) (Cont'd)

Cause of Trouble	Check Method	Solution
Failure of MB20	This is MB20 failure if alarm 330 lights even at DGN #1281=1 when CN5-10 and CN5-19 short-circuit.	Replace MB20. Contact your YASKAWA representative.
Drop of +24V power	Check +24 VDC power. If the voltage is below +20 V, it indicates possible trouble.	Replace CPS-10N (power supply unit). Contact your YASKAWA representative.

4.2.12 ALARMS 331, 332, 333, 334 AND 335 (Servo Fuse Blown)

Cause of Trouble	Check Method	Solution
Servopack fuse is blown or MCB tripped.	DGN #1288 D_1=1 X-axis alarm #1289 D_1=1 Y-axis alarm #1290 D_1=1 Z-axis alarm #1291 D_1=1 4th-axis alarm #1292 D_1=1 5th-axis alarm Alarm 390 (Servopack alarm) should also be displayed simultaneously. DGN #1281 D_2=1	Turn off power supply to machine. Check if Servopack fuse is blown or MCB tripped. Contact your YASKAWA representative.
Erroneous wiring	Check if CN1-43 (X-axis) CN2-43 (Y-axis), CN3-43 (Z-axis), CN63-43 (4th-axis) and CN64-43 (5th-axis) drop to 0 V.	Correct wiring according to Connection Manual Par. 13. Servo Unit Feed Connection

4.2.13 ALARMS 341, 342, 343, 344, 345 AND 346 (Servo Error)

Servo error results when the lag of machine to command value exceeds parameter #6150 (X-axis), #6151 (Y-axis), #6152 (Z-axis), #6153 (4-axis) and #6154 (5-axis).

Trouble	Check Method	Solution
Motor load is too large and movement command is too small. E.g. · Excessive drilling load · Machine requires lubricant. · Program error causes tool/work contact.	· Observe motor current or torque monitor if alarm occurs during idle running ⊕/⊖ direction at jog or rapid mode after turning ON the power. · Check oil film on slide surface of machine and check oil level in tank.	If machine remove, trouble and restart operation.
Torque is not applied.	· Check torque limit signal. · Check torque monitor and motor current.	· Correct torque limitation. · Replace Servopack. · Replace the motor.
D/A circuit failure (output continues)	Measure check terminal (IN-M) of Servopack with servo power OFF. It is faulty if the voltage exceeds several 10 mV at this status.	Replace main board (MB20) of CPU unit.
Servopack failure (speed command continues.)	When servo power is on, the machine runs away, causes alarm and stops.	Replace Servopack.
Wiring failure		Refer to Connection Manual Par. 13. Connection of Feed Servo Unit.
The setting of PG magnigication is in error.	Feed at low speed such as in hurdle mode, etc. It will be mormal if the actual move distance equals the position display change distance.	Refer to the relation between the number of PG pulses, gear ratio, ball-type screw pitch, etc. to set the correct PG magnfication to parameters #6056 - #6060.

4.2.13 ALARMS 341, 342, 343, 344, 345 AND 346 (Servo Error) (Cont'd)

Trouble	Check Method	Solution
Kp(position loop gain) is not correctly adjusted and it causes excessive position lag.	Determine if Kp value from the POS(ER) display at the time of jog and rapid feed is correct. F=mm/min $Kp=16.7 \times \frac{F}{POS(ER)}$ (S^{-1})	When the value is lower than a value set as standard by the machine tool maker, enlarge parameters #6406 - #6410. For the KP adjustment technic, refer to Par. 3. 5 "Adjustment at installation time". For detailes, contact the machine tool maker.

4.2.14 ALARMS 351, 352, 353, 354 AND 355 (Motor Overload)

Trouble	Check Method	Solution
Cutting condition is too severe (Servopack alarm lights and alarm 390 activates simultaneously.)	Did it occur during drilling and/or threadcutting? Check if it recurs at idle running or dry run.	Wait until temperature of servo motor cools down. Then, restart operation by alleviating the condition after clearing alarm with alarm reset button of Servopack.
Machine runs heavily due to shortage of lubricant on the guide face of machine. (Servopack alarm lights and alarm 390 activates simultaneously.)	Check the oil film on the guide face.	Check oil tank and oil pipe according to instruction manual of machine.
Disconnection or contact failure of signal between NC unit and Servopack	· Ensure that alarm lamp of Servopack does not light. · DGN #1288 D_z=0(X) causes alarm. #1289 D_z=0(Y) causes alarm. #1290 D_z=0(Z) causes alarm. #1291 D_z=0(4) causes alarm. #1292 D_z=0(5) causes alarm.	Check wiring status between NC unit and Servopack according to Connection Manual.
Servopack failure	Servopack alarm activates instantly after power ON even if wiring is correct. It may cause an alarm by motor overload without causing Servopack alarm.	Replace Servopack. Contact your YASKAWA representative.

4.2.15 ALARMS 361, 362, 363, 364, 365 AND 366 (PG Disconnection Error)

They perform 2 types of checkup: Signal wire disconnection check of A, B and C phases from PG and check by PG input comparison at the time when TG ON signal from Servopack turns ON.

Trouble	Check Method	Solution
Disconnection or contact failure of signal wire between NC unit and Servopack	· Check for looseness and removal of MB20 board's connectors CN1 (X-axis), CN2(Y-axis), CN3(Z-axis), SR20 board's CN63(4th-axis), CN64(5th-axis), CN61(spindle), CN4(spindle PG). · Check looseness and removal of Servopack connectors. · Perform wiring check according to Connection Manual.	· Correct looseness and/or removal of connectors. · Correct wiring as necessary.
Failure of PG detector circuit connection	This type of alarm results when main power is applied though result of check for above item 1 is normal.	Replace MB20. Contact your YASKAWA representative.
No shorting plug connector even without spindle PG.	Shorting plug connector to CN62 at CPU module is required for such specifications without spindle PG.	Mount shorting plug connector.
Servopack failure	· Check if DGN #1288 D_7=1 (X-axis TG ON) #1289 D_7=1 (Y-axis TG ON) #1290 D_7=1 (Z-axis TG ON) #1291 D_7=1 (4th-axis TG ON) #1292 D_7=1 (5th-axis TG ON) occur at motor stop. · If alarm occurs above the speed to turn ON TGON signal, it may be PG output signal failure of Servopack.	Replace Servopack.
PG failure	· If alarm occurs above the speed to turn ON TGON signal, it may be failure of PG.	Replace PG.
Setting failure of TGON signal detect level for Servopack (Abnormal case)	This type of alarm results when position detector PPS is low. Motor may reach running speed at TGON signal detect level in case of a large speed change ratio with an external detector (such as Inductosyn, linear scale).	This is a rare case. But, change TGON signal detect level of Servopack to 12% from the standard 1%.

4.2.16 ALARM 325 (Servo CPU Error)

Trouble	Check Method	Solution
Servo CPU failure	PRM #6014 D_6=1 causes error.	Replace MB20. Contact your YASKAWA representative.

4.2.17 ALARM 329 (Built-in Type PC CPU Error)

Cause of Trouble	Check Method	Solution
PC CPU failure	PRM #6014 D_7=1 causes error.	Replace PC20. Contact your YASKAWA representative.

4.2.18 ALARM 820 (ROM/RAM Check Error)

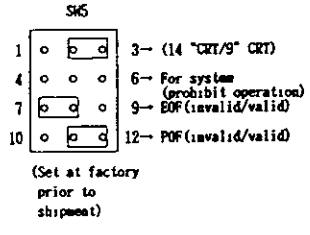
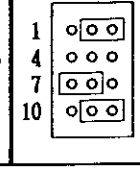
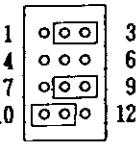
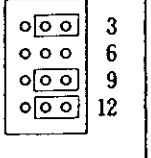
It performs check of ROM constantly and RAM at the time of power application with self-diagnostic function of NC unit. If there is any fault, it is displayed together with ROM/RAM number.
This is one of the major failures. After recording the alarm number, immediately contact your YASKAWA representative.

Trouble	Check Method	Solution
#00 to #05 ROM in failure	MM-20 ERROR #ON :820 (n=0 to 5)	Replace ROM #00 to #05 mounted to MM20.
#30, #33 ROM error	MM-20 ERROR #30 :820 (#33)	Replace ROM #30(#33) mounted to MM20.
#350 RAM error	RAM CHECK ERROR #350 820	Failure of RAM mounted to PC20 Replace PC20.
#36 ROM error	MM-20 ERROR #36 :820	Replace ROM #36 mounted to MM20.
#500 RAM error	RAM CHECK ERROR #0500 820 (#501)	Failure of RAM mounted to MB20 Replace MB20.
#40 error	PC-20 ERROR #40 :820	Replace ROM #40 mounted to PC20.
#44, 45 error	MB-20 ERROR #44 :820 (#45)	Replace ROM #44(#45) mounted to MB20.
#100 to #103 RAM failure #120 RAM failure #300 to #301 RAM failure #302 RAM failure #510 to #511, #520, #521, #530 RAM failure	RAM CHECK ERROR # [illegible] :820	Replace MM20. Replace MB20. Replace PC20. Replace PC20. Replace PC20.

4.3 TROUBLESHOOTING WITHOUT ALARM CODES

The following examples are instructions for locating and correcting the troubles not indicated by alarm codes.
For further details of signal meanings expressed by the address [DGN], refer to Section "Details of Signals" in Connection Manual.

4.3.1 POWER CANNOT BE SUPPLIED.

<table>
<tr><th>Trouble</th><th>Check Procedure</th><th>Solution</th></tr>
<tr><td>No input power supplid to NC unit.</td><td>Ensure that SOURCE LED(green) of DC power supply(CPS-10N) inside CPU module lights.</td><td>Check molded-case circuit breaker or NC panel and also connector CN13 of CPS-10N.</td></tr>
<tr><td>Alarm LED of CPS-10N lights.</td><td>CPS-10N LED Display
<table>
<tr><th></th><th>Signal Name</th><th>Display</th><th>LED Color</th><th>Function & Cause</th></tr>
<tr><td rowspan="2">Normal</td><td>Power supply status</td><td>SOURCE</td><td>Green</td><td>Lights when AC power is on, out when power is off.</td></tr>
<tr><td>Power on status</td><td>POWER ON</td><td>Green</td><td>Lights when SOURCE input above 170 VAC at NCMXCN.</td></tr>
<tr><td rowspan="4">Trouble Display</td><td>+5 V Trouble</td><td rowspan="3">+5 V, ±12 V</td><td rowspan="3">Red</td><td rowspan="3">Lights at +5 V over-voltage or overcurrent. Lights at +12 V over-voltage or −12 V under-voltage.</td></tr>
<tr><td>+12 V Trouble</td></tr>
<tr><td>−12 V Trouble</td></tr>
<tr><td>+24 V Trouble</td><td>+24 V</td><td>Red</td><td>Lights at +24 V over-voltage or overcurrent.</td></tr>
<tr><td>External trouble</td><td>EXT</td><td>Red</td><td>Lights with external EXALM signal.</td></tr>
</table>
Note: LED lights for external trouble (EXT) when CN13 connector between 4 and 7 short-circuits.</td><td>When trouble in Table on the left is displayed by LED, correct the trouble, then, turn on power again. If the trouble is not corrected by this procedure, trouble may be in the power unit. Contact your YASKAWA representative.</td></tr>
<tr><td>Power ON/OFF Switch is not set properly.
 
</td><td>SW5 Setting(for 9" CRT)
<table>
<tr><th></th><th>Use panel(POF) only</th><th>Use external device(EOF) only</th><th>Use both</th></tr>
<tr><td>SW5</td><td>  </td><td>  </td><td>  </td></tr>
</table>
</td><td>Set correctly shorting plug SW5 at left corner on MB20 PCB.</td></tr>
</table>

Code	Causes	Code	Causes
086	PROG ERROR (G38) OTHER THAN K ARE SPECIFIED BY G38.	091	TAP ERROR SLPC (SPINDLE LOOP COMMAND INPUT) IS NOT TURNED ON AT THE SOLID TAPPING EXECUTION TIME.
087	PROG ERROR (G31/G36/37/38) TOUCH SWITCH NOT ON WHEN MOTION REACHES END POINT BY G31, 36, G37, G38. CONFIRM COMMAND, THEN TOUCH SWITCH MOTION IF NO PROBLEMS.	092	
088	PROG ERROR (G36/37/38) THE TOUCH SWITCH CAUSES AN OPERATION ERROR BY G36 TO G38.	093	
089		094	
090	PROG ERROR (G93) A PROHIBITED CODE WAS SPECIFIED IN THE G93 BLOCK OR G93 MODE.	095	

Code	Causes
096	
097	
098	
099	
100	CAL ERROR (FIXED POINT) MAGNITUDE OF FIXED POINT DATA BY CALCULATION EXCEEDING UPPER LIMIT. RECHECK PROGRAM.
101	CAL ERROR (FLOATING) EXPONENT OF FLOATING POINT DATA BY CALCULATION EXCEEDING ALLOWABLE RANGE. RECHECK PROGRAM.
102	CAL ERROR (DIVISION) CALCULATION DIVISOR ZERO OR OVERFLOW ERROR. CORRECT PROGRAM.
103	CAL ERROR (SQUARE ROOT) ROOT VALUE IS A NEGATIVE $\sqrt{(-)}$. CORRECT PROGRAM.
104	PROG ERROR (DOUBLE ADD) THE SAME ADDRESS IS SPECIFIED TWO TIMES OR MORE WITHIN ONE BLOCK. CORRECT THE PROGRAM.
105	MACRO ERROR (CONSTANT) A RANGE OF CONSTANTS USABLE FOR THE MACRO PROGRAM IS EXCEEDED.
106	MACRO ERROR TOO MANY CODES FOR CANCELLING G67. CHECK NUMBERS OF G66 AND G67 AND CORRECT PROGRAM.
107	MACRO ERROR (FORMAT) AN EXPRESSION AND MACRO SENTENCE HAVE ERRONEOUS FORMAT.

4.3.2 INITIAL DAIAGNOSTIC ERROR DISPLAY AT POWER ON

Trouble	Check Procedure	Solution
Error identified by initial diagnostics at power ON.	Both diagnostic items passed and diagnostic item lead up to error are displayed and YASNAC stops.	Record the diagnostic item lead up to NC unit stop, turn on power again and contact your YASKAWA representative of its results.

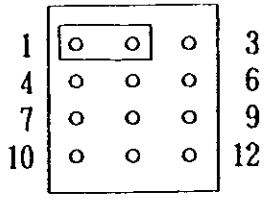
4.3.3 "CPU ERROR" DISPLAY(Without Alarm Codes)

Trouble	Check Procedure	Solution
"CPU ERROR" only is displayed on CRT screen.	CPU cannot function normally and this is major failure. The main system shuts off the servo power, but, depress the emergency stop and power OFF buttons to make check for proper AC input voltage and ensure power is OFF.	Remove any noise source near the NC unit. Turn on the main power under emergency stop condition. Contact your YASKAWA representative immediately if it is "CPU ERROR". If normal, start operation after ensuring correct parameters, settings, offsets and programs.

4.3.4 CRT SCREEN DOES NOT DISPLAY

CRT screen may not display any data as a result of trouble of CRT unit itself, display circuit and/or connection cable.
If there is no display on the screen even after the NC unit power is applied, check to ensure that the wire is properly connected to the NC operator's station, connectors are not loose, or fuse inside CRT unit is not blown(refer to Par. 4.3.12 9" CRT SCREEN IS DARK).
Contact your YASKAWA representative, if the trouble can not be located even after the above procedure.

4.3.5 HANDLE MODE OPERATION FAULTY

Trouble	Check Procedure	Solution
HANDLE mode signal not entered.	[DGN] #1300 D_2=1 Bit set to 0 ? All other bits (D_0, D_1, D_3 through D_7) must be set to 0.	Select HANDLE mode. Check mode switch wiring.
Axis selection signal not entered.	Confirm that one optional axis of the following axes is entered: [DGN] #1304 D_0 (X-axis) #1304 D_1 (Y-axis) #1304 D_2 (Z-axis) #1304 D_3 (4th-axis) #1315 D_4 (5th-axis)	Select an axis. Check the axis selection switch wiring.
Power is not supplied to HANDLE PG.	Check that +5 V is supplied on terminal of handle PG. Confirm that the HANDLE PG signal connector is not removed.	Refer to item 11 "Manual pulse generator" of the Connection Mamual to check the wiring, and wire correctly.
For 9-inch operation panel. SP20 board's SW1 is set to the HANDLE PG lock.	SW1 setup is shown below. 1 HPG power is fixed to +5 V. 2 SW1 on SP20 board is set as below by specification of manual pulse generator. (SW1)  Simultaneous 1 axis manual pulse generator (This interface used)	Set SW1 as illustrated in the figure on the left.

<table>
<tr><th>Trouble</th><th>Check Procedure</th><th>Solution</th></tr>
<tr><td>HANDLE PG trouble
SP20 board trouble</td><td>Confirm that [DGN] #1277 value monitored by counter changes when HANDLE PG is turned.</td><td>Replace HANDLE PG.
Replace the SP20 board.</td></tr>
<tr><td>Manual pulsing magnification input is selected.</td><td>Manual pulsing magnification input (DGN) #1304
<table><tr><th>D MP4</th><th>D MP2</th><th>D MP1</th><th>Magnification</th></tr><tr><td>0</td><td>0</td><td>0</td><td>× 1</td></tr><tr><td>0</td><td></td><td>1</td><td>× 10</td></tr><tr><td>0</td><td>1</td><td>0</td><td>× 100</td></tr><tr><td>0</td><td>1</td><td>1</td><td>× 100</td></tr><tr><td>1</td><td colspan="2">Either 0 or 1</td><td>× 100</td></tr></table></td><td>Check wiring of the magnification setting switch.</td></tr>
<tr><td>The number setting parameter of the HANDLE PG is set to 0.</td><td>The HANDLE mode does not work when [PRM] #6107 is set to 0.</td><td>Set the number of HANDLE PGs curretly used.</td></tr>
<tr><td>Others: Related parameters</td><td>The max speed in HANDLE mode
[PRM] #6222 (X-, Y-, Z-, U-, V- and W-axis)
[PRM] #6348 (rotation axes A, B and C)

Constant at decelerating in HANDLE mode
[PRM] #6350 - #6354

Optional magnification setting at magnification × 100 selection time
[PRM] #6383 (option)

Handle lag pulse clamp quantity
[PRM] #6677</td><td>Verify it with the parameter table attached at the factory prior to shipment.</td></tr>
</table>

4.3.6 MANUAL JOG MODE OPERATION FAULTY

<table>
<tr><th>Trouble</th><th>Check Procedure</th><th>Solution</th></tr>
<tr><td>Jog mode not selected.</td><td>DGN #1300 D_1=1
All other bits (D_0 ,D_1 ,D_3 through D_7) must be set to 0.</td><td>Select JOC mode.
Check mode wiring switch.</td></tr>
<tr><td>Jog axial direction not specified.</td><td>Comtirm the followings:
DGN #1302 D_0 (+X)
#1302 D_1 (−X)
#1302 D_2 (+Y)
#1302 D_3 (−Y)
#1302 D_4 (+Z)
#1302 D_5 (−Z)
#1302 D_6 (+4th-axis)
#1302 D_7 (−4th-axis)
#1315 D_0 (+5th-axis)
#1315 D_1 (−5th-axis)</td><td>Check the push button switch or selection switch wiring. In some cases, it is handled as a prohibited item for the sequence. Refer to the machine tool builder's reference manuals for details.</td></tr>
<tr><td>Jog speed signal not specified.
The setting of jog speed parameter is in error.</td><td>Feed overrride/Manual JOG feed rate Selection
<table>
<tr><th rowspan="3">Step</th><th colspan="5">DGN #1303</th><th rowspan="3">Manual JOG Feed Rate
(Manual operation mode)</th></tr>
<tr><th>D_4</th><th>D_3</th><th>D_2</th><th>D_1</th><th>D_0</th></tr>
<tr><th>FV
16</th><th>FV
8</th><th>FV
4</th><th>FV
2</th><th>FV
1</th></tr>
<tr><td>1</td><td>0</td><td>0</td><td>0</td><td>0</td><td>0</td><td>Parameter #6233 Setting speed</td></tr>
<tr><td>2</td><td>0</td><td>0</td><td>0</td><td>0</td><td>1</td><td>Parameter #6234 Setting speed</td></tr>
<tr><td>3</td><td>0</td><td>0</td><td>0</td><td>1</td><td>0</td><td>Parameter #6235 Setting speed</td></tr>
<tr><td>4</td><td>0</td><td>0</td><td>0</td><td>1</td><td>1</td><td>Parameter #6236 Setting speed</td></tr>
<tr><td>5</td><td>0</td><td>0</td><td>1</td><td>0</td><td>0</td><td>Parameter #6237 Setting speed</td></tr>
<tr><td>6</td><td>0</td><td>0</td><td>1</td><td>0</td><td>1</td><td>Parameter #6238 Setting speed</td></tr>
<tr><td>7</td><td>0</td><td>0</td><td>1</td><td>1</td><td>0</td><td>Parameter #6239 Setting speed</td></tr>
<tr><td>8</td><td>0</td><td>0</td><td>1</td><td>1</td><td>1</td><td>Parameter #6240 Setting speed</td></tr>
<tr><td>9</td><td>0</td><td>1</td><td>0</td><td>0</td><td>0</td><td>Parameter #6241 Setting speed</td></tr>
<tr><td>10</td><td>0</td><td>1</td><td>0</td><td>0</td><td>1</td><td>Parameter #6242 Setting speed</td></tr>
<tr><td>11</td><td>0</td><td>1</td><td>0</td><td>1</td><td>0</td><td>Parameter #6243 Setting speed</td></tr>
<tr><td>12</td><td>0</td><td>1</td><td>0</td><td>1</td><td>1</td><td>Parameter #6244 Setting speed</td></tr>
<tr><td>13</td><td>0</td><td>1</td><td>1</td><td>0</td><td>0</td><td>Parameter #6245 Setting speed</td></tr>
<tr><td>14</td><td>0</td><td>1</td><td>1</td><td>0</td><td>1</td><td>Parameter #6246 Setting speed</td></tr>
<tr><td>15</td><td>0</td><td>1</td><td>1</td><td>1</td><td>0</td><td>Parameter #6247 Setting speed</td></tr>
<tr><td>16</td><td>0</td><td>1</td><td>1</td><td>1</td><td>1</td><td>Parameter #6248 Setting speed</td></tr>
<tr><td>17</td><td>1</td><td>0</td><td>0</td><td>0</td><td>0</td><td>Parameter #6249 Setting speed</td></tr>
<tr><td>18</td><td>1</td><td>0</td><td>0</td><td>0</td><td>1</td><td>Parameter #6250 Setting speed</td></tr>
<tr><td>19</td><td>1</td><td>0</td><td>0</td><td>1</td><td>0</td><td>Parameter #6251 Setting speed</td></tr>
<tr><td>20</td><td>1</td><td>0</td><td>0</td><td>1</td><td>1</td><td>Parameter #6252 Setting speed</td></tr>
<tr><td>21</td><td>1</td><td>0</td><td>1</td><td>0</td><td>0</td><td>Parameter #6253 Setting speed</td></tr>
<tr><td>22</td><td>1</td><td>0</td><td>1</td><td>0</td><td>1</td><td>Parameter #6254 Setting speed</td></tr>
<tr><td>23</td><td>1</td><td>0</td><td>1</td><td>1</td><td>0</td><td>Parameter #6255 Setting speed</td></tr>
<tr><td>24</td><td>1</td><td>0</td><td>1</td><td>1</td><td>1</td><td>Parameter #6256 Setting speed</td></tr>
<tr><td>25</td><td>1</td><td>1</td><td>0</td><td>0</td><td>0</td><td>Parameter #6257 Setting speed</td></tr>
<tr><td>26</td><td>1</td><td>1</td><td>0</td><td>0</td><td>1</td><td>Parameter #6258 Setting speed</td></tr>
<tr><td>27</td><td>1</td><td>1</td><td>0</td><td>1</td><td>0</td><td>Parameter #6259 Setting speed</td></tr>
<tr><td>28</td><td>1</td><td>1</td><td>0</td><td>1</td><td>1</td><td>Parameter #6260 Setting speed</td></tr>
<tr><td>29</td><td>1</td><td>1</td><td>1</td><td>0</td><td>0</td><td>Parameter #6261 Setting speed</td></tr>
<tr><td>30</td><td>1</td><td>1</td><td>1</td><td>0</td><td>1</td><td>Parameter #6262 Setting speed</td></tr>
<tr><td>31</td><td>1</td><td>1</td><td>1</td><td>1</td><td>0</td><td>Parameter #6263 Setting speed</td></tr>
<tr><td>32</td><td>1</td><td>1</td><td>1</td><td>1</td><td>1</td><td>Parameter #6264 Setting speed</td></tr>
</table>
Note 1: closed 0. open
Does DGN #1303 change according to the list when the jog speed selection switch is changed?
Are parameters #6233 - #6264 set correctly?</td><td>Check wiring of the jog speed selection switch.
Set the command speed for the number of necessary steps in parameters #6233 - #6264.</td></tr>
</table>

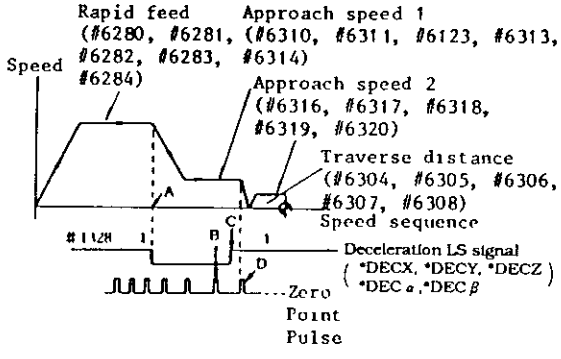
Trouble	Check Procedure	Solution
An axis interlock signal is entered.	Jog is correct when: [DGN] #1320 D_0=1 (X-axis) #1320 D_1=1 (Y-axis) #1320 D_2=1 (Z-axis) #1320 D_3=1 (4th-axis) #1320 D_4=1 (5th-axis) When 0, the axis does not work.	An axis interlocak signal is entered for some reason. Refer to the manual of the machine tool maker to release the axis interlock.
The machine is in LOCK mode.	The position display changes in MACHINE LOCK mode. Check the machine lock switch input. [DGN] #1305 D_5 Check the internal torque switch. [SET] #6002 D_5	Check wiring of the machine lock switch. Set [SET] #6002 D_5=0.

4.3.7 MANUAL RAPID MODE OPERATION FAULTY

<table>
<tr><th>Trouble</th><th>Check Procedure</th><th>Solution</th></tr>
<tr><td>Rapid mode signal not selected.</td><td>DGN #1300 D_0=1
All other bits (D_0, D_1, D_3 through D_7) must be set to 0.</td><td>Select the RAPID mode.
Check wiring of the mode switch.</td></tr>
<tr><td>Parameter not set correctly.</td><td>Input status and Rapid feedrate
<table><tr><th rowspan="2">Step</th><th colspan="2">DGN #1301
Input status</th><th colspan="2">Rapid feedrate</th></tr><tr><th>ROV2</th><th>ROV1</th><th>X axis</th><th>Y axis</th></tr><tr><td>100 %</td><td>1</td><td>1</td><td>#6280
Setting speed</td><td>#6281
Setting speed</td></tr><tr><td>50 %</td><td>1</td><td>0</td><td>(#6280 Setting speed) × 1/2</td><td>(#6281 Setting speed) × 1/2</td></tr><tr><td>25 %</td><td>0</td><td>1</td><td>(#6280 Setting speed) × 1/4</td><td>(#6281 Setting speed) × 1/4</td></tr><tr><td>Option</td><td>0</td><td>0</td><td colspan="2">#6231 Setting speed</td></tr></table><table><tr><th colspan="3">Rapid feedrate</th></tr><tr><th>Z axis</th><th>4 axis</th><th>5 axis</th></tr><tr><td>#6282
Setting speed</td><td>#6283
Setting speed</td><td>#6284
Setting speed</td></tr><tr><td>(#6282 Setting speed) × 1/2</td><td>(#6283 Setting speed) × 1/2</td><td>(#6284 Setting speed) × 1/2</td></tr><tr><td>(#6282 Setting speed) × 1/4</td><td>(#6283 Setting speed) × 1/4</td><td>(#6284 Setting speed) × 1/4</td></tr><tr><td colspan="3">#6231 Setting speed</td></tr></table>
The JOG mode does not work when values of high feed parameters #6280 - #6284 are set to 0.
When an optional step is selected, the speed changes to a speed set to parameter #6231.</td><td>Set a high feed speed of each axis to the parameter.
Set the correct speed to the parameter #6231 also.</td></tr>
<tr><td>Others</td><td>Refer to Par. 4.3.6 MANUAL JOG MODE OPERATION FAULTY.</td><td></td></tr>
</table>

4.3.8 MANUAL ZERO RETURN OPERATION FAULTY

In this paragraph, manual feeding (JOG) and manual rapid feeding (RAPID) should operate normally.

Trouble	Check Procedure	Solution
Mode not set to zero return.	The parameter must be DGN #1306 D_1=1. Characteristically, the signal runs to OT at the existing speed even when it has passed point A in the following figure.	Select the manual return-to--home mode or the relative switch. Check the wiring.
Rapid or jog mode not selected.	In parallel with DGN #1306 D_3=1, #1300 D_0 or D_1 must be 1. Unless this condition is satisfied, the operation cannot start.	Use a sequence change, etc. to enable the manual return-to-home signal and JOG or RAPID signal to be input simultaneously.
Deceleration LS not selected.	 Reference point return control I/O signals Confirm that DGN #1328 changes as above, transmitting signals at a low speed such as jog, etc.	Check the deceleration limit switch to check the wiring. If both the deceleration limit switch and wiring are normal, release the 1021 module.
Parameter not set correctly.	Referring to the above figure, verify the relative parameter with the attached parameter sheet.	If the parameter is different from the finally set value of the parameter sheet, reset it.

4.3.8 MANUAL ZERO RETURN OPERATION FAULTY (Cont'd)

Trouble	Check Procedure	Solution
A dog position for the deceleration limit switch is arranged adquately.	Occasionally dislocation occurs by one rotation of the motor.	Arrange the dog position to make the rising point (point C in the above figure) of the deceleration limit switch signal come to the center of points B through D of origin pulses (DGN #1288-#1292 D_6) of each axis, sending the signal in handle mode.
Others: -Coupling loose -Dog loose -Noise	This is a case in which the position is slipped at random. Shielded cable used for PG signal?	If loose, tighted. Check the shield processing and contact your YASKAWA representative.

4.3.9 CYCLE START FAILURE

Trouble	Check Procedure	Solution
The cycle start signal is not entered. The field hold is opened.	Is the parameter set to [DGN] #1306 D_0=1 when the cycle start switch is depressed? In this case, the field hold signal must be opened. Normal at [DGN] #1306 D_1=1.	Check the switch and wiring. If the machine interlock is working intermittently, refer to the manual of the machine tool builder.
The start interlock signal is entered.	Normal at [DGN] #1316 D_1=0.	If the machine interlock is working intermittently, refer to the manual of the machine tool builder.
The machine is under resetting.	Normal at [DGN] #1218 D_1=0. Confirm that the outside reset input DGN #1316 D_2 is also 0.	If the parameter is not set to 0 in several seconds, contact your YASKAWA representative.
The machine is in ALARM mode. The system No. switch or [SET] #6219 is set to other than 0.	An alarm message is displayed on the [ALM] screen.	After correcting the cause of the alarm, depress the RESET key on the operation panel to restart the operation.

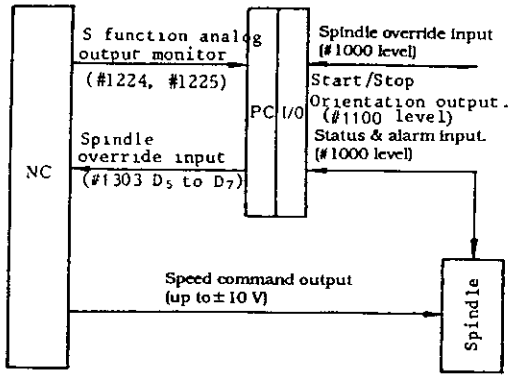
4.3.10 OPERATION IS NOT AVAILABLE WITH G01, G02 OR G03.

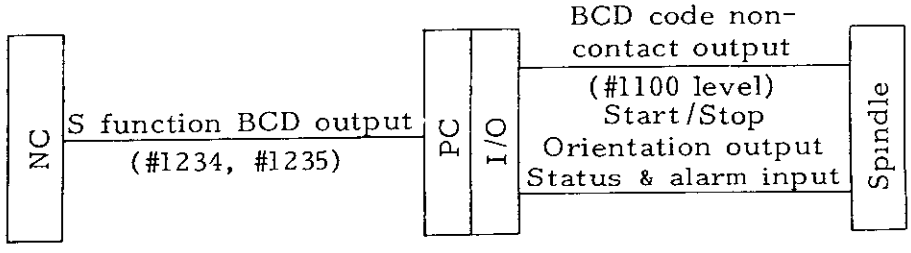
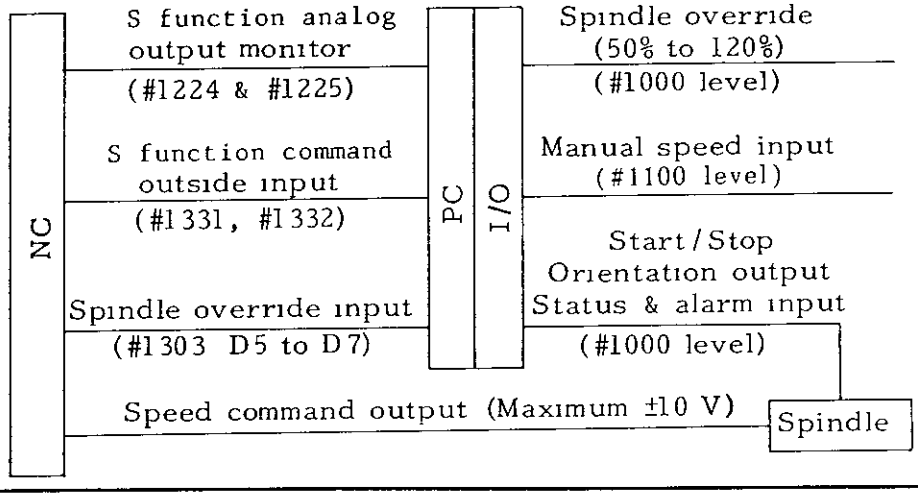
<table>
<tr><th>Trouble</th><th>Check Procedure</th><th>Solution</th></tr>
<tr><td>Feed override is set to 0%.</td><td>Feed override list
<table>
<tr><th colspan="5">DGN #1301</th><th rowspan="2">Feed Override (Auto operation mode)</th></tr>
<tr><th>D_4
OV 16</th><th>D_3
OV 8</th><th>D_2
OV 4</th><th>D_1
OV 2</th><th>D_0
OV 1</th></tr>
<tr><td>0</td><td>0</td><td>0</td><td>0</td><td>0</td><td>0 %</td></tr>
<tr><td>0</td><td>0</td><td>0</td><td>0</td><td>1</td><td>10 %</td></tr>
<tr><td>0</td><td>0</td><td>0</td><td>1</td><td>0</td><td>20 %</td></tr>
<tr><td>0</td><td>0</td><td>0</td><td>1</td><td>1</td><td>30 %</td></tr>
<tr><td>0</td><td>0</td><td>1</td><td>0</td><td>0</td><td>40 %</td></tr>
<tr><td>0</td><td>0</td><td>1</td><td>0</td><td>1</td><td>50 %</td></tr>
<tr><td>0</td><td>0</td><td>1</td><td>1</td><td>0</td><td>60 %</td></tr>
<tr><td>0</td><td>0</td><td>1</td><td>1</td><td>1</td><td>70 %</td></tr>
<tr><td>0</td><td>1</td><td>0</td><td>0</td><td>0</td><td>80 %</td></tr>
<tr><td>0</td><td>1</td><td>0</td><td>0</td><td>1</td><td>90 %</td></tr>
<tr><td>0</td><td>1</td><td>0</td><td>1</td><td>0</td><td>100 %</td></tr>
<tr><td>0</td><td>1</td><td>0</td><td>1</td><td>1</td><td>110 %</td></tr>
<tr><td>0</td><td>1</td><td>1</td><td>0</td><td>0</td><td>120 %</td></tr>
<tr><td>0</td><td>1</td><td>1</td><td>0</td><td>1</td><td>130 %</td></tr>
<tr><td>0</td><td>1</td><td>1</td><td>1</td><td>0</td><td>140 %</td></tr>
<tr><td>0</td><td>1</td><td>1</td><td>1</td><td>1</td><td>150 %</td></tr>
<tr><td>1</td><td>0</td><td>0</td><td>0</td><td>0</td><td>160 %</td></tr>
<tr><td>1</td><td>0</td><td>0</td><td>0</td><td>1</td><td>170 %</td></tr>
<tr><td>1</td><td>0</td><td>0</td><td>1</td><td>0</td><td>180 %</td></tr>
<tr><td>1</td><td>0</td><td>0</td><td>1</td><td>1</td><td>190 %</td></tr>
<tr><td>1</td><td>0</td><td>1</td><td>0</td><td>0</td><td>200 %</td></tr>
<tr><td>1</td><td>0</td><td>1</td><td>0</td><td>1</td><td>220 %</td></tr>
<tr><td>1</td><td>0</td><td>1</td><td>1</td><td>0</td><td>240 %</td></tr>
<tr><td>1</td><td>0</td><td>1</td><td>1</td><td>1</td><td>260 %</td></tr>
<tr><td>1</td><td>1</td><td>0</td><td>0</td><td>0</td><td>280 %</td></tr>
<tr><td>1</td><td>1</td><td>0</td><td>0</td><td>1</td><td>300 %</td></tr>
<tr><td>1</td><td>1</td><td>0</td><td>1</td><td>0</td><td>340 %</td></tr>
<tr><td>1</td><td>1</td><td>0</td><td>1</td><td>1</td><td>380 %</td></tr>
<tr><td>1</td><td>1</td><td>1</td><td>0</td><td>0</td><td>420 %</td></tr>
<tr><td>1</td><td>1</td><td>1</td><td>0</td><td>1</td><td>460 %</td></tr>
<tr><td>1</td><td>1</td><td>1</td><td>1</td><td>0</td><td>500 %</td></tr>
<tr><td>1</td><td>1</td><td>1</td><td>1</td><td>1</td><td>540 %</td></tr>
</table>
Note: 1) When the part program is executed in AUTO DRIVE mode, fix the transmission override to 100% against the thread cutting section.
2) The transmission override is effective for 220% through 540%, only when the F override option is present.</td><td>Select any value other than 0 to feed override switch.
Check the feed override switch and wiring.</td></tr>
<tr><td>Axis-interlock signal is entered.</td><td>Check if DGN #1320 D_0 to D_4 are at 1 (normal if they are 1).</td><td>Release axis-interlock with reference to instruction.</td></tr>
</table>

4.3.11 SPINDLE DOES NOT ROTATE

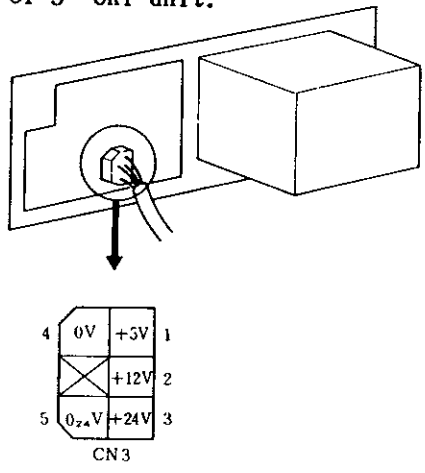
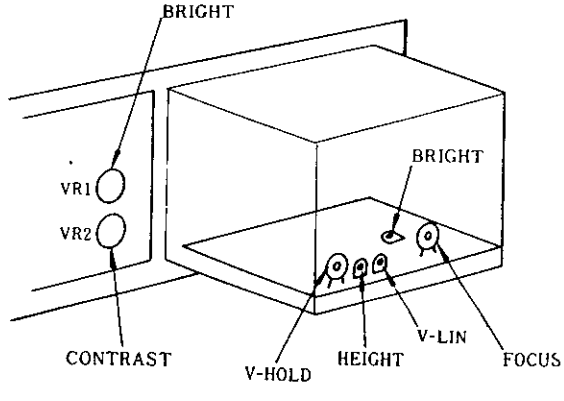
Sequence for the spindle control differs due to specifications of the machine tool builder. Read the machine tool builder's reference manuals carefully.

This section explains the basic I/O signals.

Trouble	Check Procedure	Solution
The speed command is not issued.	(1) Inside command input configuration  Confirm the program to see if the auxiliary function lock signal is DGN #1305 D_7=0 or the S code was assigned. Use DGN #1224 & #1225 to confirm the S 5-digit analog output monitor. Measure the speed command voltage on the spindle drive.	Turn the auxiliary function lock switch OFF. Change the program. Refer to Par.14 "Spindle drive unit connection" of the YASNAC MX3 Connection Manual (TO-C843-9.32) to check the wiring. If there is a possibility of trouble on the D/A circuit, replace the SR20 board.
The start signal is not issued.	The signal is output through I/O from PC (sequencer). Refer to the manual of the machine tool builder to confirm that DGN #1100 level output is turned ON.	The spindle start interlock condition differs from one machine to another. Contact the machine tool maker for information, advice, etc. When no trouble is found on wiring related to the spindle, there is a possibility of trouble in the I/O section. Replace the I021 module.
The setting of the is in error.	Refer to Par. 20.2.40 "S 5-digit command I/O" of the YASNAC MX3 Connection Manual (TO-C843-9.32).	Refer to the parameter sheet to set each paramter.

Trouble	Check Procedure	Solution
The operation stopped during gear selection.	Refer to Par. 20.2.41 "Gear selection I/O " of the YASNAC MX3 Connection Manual (TO-C843-9.32) and the manual of the machine tool builder to check the sighals.	Contact the machine tool builder for details.
There is trouble in the main axis drive.	Confirm alarm display of the spindle drive unit.	Contact your YASKAWA representative.
Other configurations	Use the same checking technics for all. (2) S function BCD output configuration.  (3) Outside command input configuration  	

4.3.12 9" CRT SCREEN IS DARK.

Cause of Trouble	Check Procedure	Solution
Power voltage is too low.	Check it with CN3 on SP20 board at rear side of 9" CRT unit. 	· If the voltage drops at power cable, replace the cable. · If CPS-10N output voltage is also low, it may be caused by failure of CPS-10N. Contact your YASKAWA representative.
Escutcheon is dirty.	Check visually if the surface of escutcheon and section between escutcheon and CRT are dirty.	Clean up CRT display and escutcheon.
Brightness is not properly adjusted.		(Do not perform setup change of CRT as a rule.) Perform adjustment with VR1(BRIGHT) on SP20 board.
Hardware failure	(Trouble other than above)	Replace CRT unit or SP20 board. Contact your YASKAWA representative.

4.3.13 EDIT DOES NOT FUNCTION

Trouble	Check Procedure	Solution
Erroneous input signal (a) The mode selection signal is not entered. (b) The edit lock signal is entered. (c) The setting edit lock signal is entered.	Is [DGN] #1300 set to D_7=1? All other bits (D_0 - D_6) must be set to 0. Lock at [DGN] #1306 D_0=1. Lock at [SET] #6001 D_3=1.	Select the EDIT mode. Select the edit lock release. Set [SET] #6001 D_2 to 0. For the procedure, refer to Par. 4.3.6 "Setting data display and write" of the YASNAC MX3 Handling Manual (TO-C843-9.30).
A parameter to lock a specially numbered program is turned ON.	[PRM] #6004 or [SET] #6004 D_4 1: Programs No.8000 - 8999 cannot be stored, erased or edited. 0: Programs No.8000 - 8999 can be stored, erased and edited as usual. D_3 1: Programs No.8000 - 8999 are not displayed. 0: Programs No.8000 - 8999 are displayed. [PRM] #6021 D_7 1: Programs No.9000 - 9999 cannot be stored, erased or edited. 0: Programs No.9000 - 9999 can be stored, erased and edited as usual. [PRM] #6022 D_6 1: Programs No.9000 - 9999 are not displayed. 0: Programs No.9000 - 9999 are displayed.	This is a setting to prevent programs from being destroyed by erroneous edit operation. For modification of [PRM], refer to Par. 4.3.7 "Parameter display and write" of the YASNAC MX3 Handling Manual (TO-C843-9.30).
Others: (a) Memory capacity exceeded (b) Stored program volume exceeded (c) Overlapped stored program numbers	MEMORY OVER! PROGRAM OVER! ALREADY IN! A warning alarm is issued for each.	Refer to Par. 4.5.4 "Stored program number display" of the YASNAC MX3 Handling Manual (TO-C843-9.30). Coutinue the edit operation after erasing unnecessary programs.

4.3.14 RS232C DOES NOT FUNCTIONAL WELL

<table>
<tr><th>Trouble</th><th>Check Procedure</th><th>Solution</th></tr>
<tr><td>Bad cable</td><td>Refer to Par.16 "RS-232C Interface connecting" of the YASNAC MX3 Connection Manual (TO-C843-9.30).</td><td>Correct the wiring as necessary.</td></tr>
<tr><td>The RS-232C interface port is not selected correctly.</td><td>Use [SET] #6003 for selection

<table><tr><th>Interface</th><th>Input</th><th>Output</th></tr><tr><td>1st RS-232C</td><td>#6003D_0</td><td>#6003D_4</td></tr><tr><td>2nd RS-232C</td><td>#6003D_1</td><td>#6003D_5</td></tr></table>
Use parameter setting No."1" to select the above bits. The first RS-232C and second RS-232C cannot be selected simultaneously.</td><td>Set as follows.
First RS-232C : D_0=1, D_4=1
D_1=0, D_5=0
Second RS-232C: D_0=0, D_4=0
D_1=1, D_5=1</td></tr>
<tr><td>The setting of the baud rate & stop bit control code transmission are in error.</td><td>Refer to Par. 16-2 "RS-232C interface" of the YASNAC MX3 Connection Manual (TO-C843-9.30).

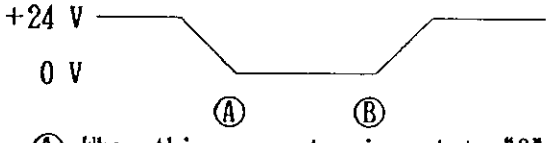
<table><tr><th>Interface</th><th>Input</th><th>Output</th></tr><tr><td>1st RS-232C</td><td>#6026</td><td>#6028</td></tr><tr><td>2nd RS-232C</td><td>#6027</td><td>#6029</td></tr></table></td><td>Reset the correct value.</td></tr>
<tr><td>Other parameters
- ISO code parity
- DR & DS signal handling</td><td>Refer to the attachment of Par.9 [PRM] #6021 and #6022 of the YASNAC MX3 Handling Manual (TO-C843-9.30).</td><td>Change the setting if needed.</td></tr>
</table>

4.3.15 "FIN" WAIT MODE BY SPINDLE RELATED INSTRUCTION

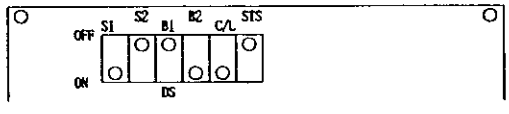
The sequential processing entered some signal wait mode and was then discontinued.

Cause of Trouble	Check Method	Solution
A signal identical with the spindle speed is not entered.	If this troule occurs at the time of command issuing such as "M03 S100", etc., confirm [DGN] #1317 D_4=1. Refer to the circuit diafram of the machine tool builder to confirm I/O input section [DGN] #1000 level.	If no trouble is found in the wiring, there is a possibility of a bad I021 module or bad spindle drive unit. Contact your YASKAWA representative.
The spindle zero speed signal is not entered.	If this trouble occurs at stop time "M05", refer to the circuit diagram of the machine tool builder to confirm the I/O input section [DGN] #1000 level.	If no trouble is found in the wiring, there is a possibility of a bad I021 module or spindle drive unit. Contact your YASKAWA representative.
Others	If this trouble occurs at the time of "M19 or M20", spindle orientation command, refer to the circuit diagram of the manchine tool builder to confirm the I/O, especially the orientation-related sections.	If no trouble is found in the wiring, there is a possobility of a bad I021 module or bad spindle drive unit. Contact your YASKAWA representative.

3.16 SKIP FUNCTION(G31) OPERATION FAILURE

Trouble	Check Procedure	Solution
Input failure of skip signal.	Use [DGN] #1280 D_4 to confirm the skip signal ON/OFF.	Confirm operation of the contactless switches, etc.
MB20 board is wrong.	Refer to Par.17 "Direct-in signal connection" of the YASNAC MX3 (TO-C843-9.23) to use [DGN] #1280 D_4 to confirm this trouble, entering a dummy signal.	Replace MB20 board. Contact your YASKAWA representative.
Parameter not set correctly	[PRM] #6019 D_4 D_4 1: Use a transmission speed shown at the skip function (G31) command time as a speed set to parameter #6232. 0: Use a transmission speed shown at the skip function (G31) command time as a speed assigned by the F code. For example, the machine does not work when the transmission speed is 0 at the [PRM] (#6232 G31 command) time. [PRM] #6062 D_4 Set a signal mode shown at the start time of the "SKIP" input for the D_4 skip function.  Ⓐ When this parameter is set to "0", start the operation at the time of change from 24 V to 0 V. Ⓑ When this parameter is set to "1", start the operation at the time of change from 0 V to 24 V. Note: When this parameter is changed, turn power ON and then OFF. [PRM] #6063 D_1 Determine ENABLE/DISABLE of an input control circuit of "SKIP" for the D_1 skip function. Note: When this skip function is used, set the bit to "1". Note: When this parameter is changed, turn power ON and then OFF.	Correct parameter setting.

4.3.17 TAPE MODE DOES NOT FUNCTION

<table>
<tr><th>Trouble</th><th>Check Procedure</th><th>Solution</th></tr>
<tr><td>Failure of input signal Mode input(T) is not correct.</td><td>DGN #1300 D_4 should be 1, but #1300 D_0 to D_3 and D_5 to D_7 should be 0.
TAPE should appear on PRG screen.</td><td></td></tr>
<tr><td>TAPE mode does not start.</td><td>Refer to Par. 4.3.9</td><td></td></tr>
<tr><td>Parameters failures such as baud rate, stop bit and control code</td><td>Refer to Par. 4.3.14, "RS232C Does Not Function Well".</td><td></td></tr>
<tr><td>Tape reader setting failure</td><td>Tape Reader Setting
<table>
<tr><th colspan="6">Dip Switch (DS)</th><th rowspan="2">Read Speed (char/s)</th><th rowspan="2">Transmission Baud rate</th><th rowspan="2">AUTO Self-Checking</th><th rowspan="2">Input Control</th></tr>
<tr><th>For PTR Speed</th><th colspan="2">For Transmission rate</th><th>Input Control Selection</th><th>For Self-Checking</th></tr>
<tr><td>S1</td><td>S2</td><td>B1</td><td>B2</td><td>C/L</td><td>STS</td><td></td><td></td><td></td><td></td></tr>
<tr><td>*ON</td><td>OFF</td><td>OFF</td><td>ON</td><td>ON</td><td>OFF</td><td>270</td><td>4300</td><td>AUTO</td><td></td></tr>
<tr><td>ON</td><td>ON</td><td></td><td></td><td></td><td>OFF</td><td>300</td><td></td><td>AUTO</td><td></td></tr>
<tr><td>OFF</td><td>OFF</td><td></td><td></td><td></td><td>OFF</td><td>200</td><td></td><td>AUTO</td><td></td></tr>
<tr><td></td><td></td><td>ON</td><td>ON</td><td></td><td>OFF</td><td></td><td>9600</td><td>AUTO</td><td></td></tr>
<tr><td></td><td></td><td>ON</td><td>OFF</td><td></td><td>OFF</td><td></td><td>2400</td><td>AUTO</td><td></td></tr>
<tr><td></td><td></td><td>OFF</td><td>OFF</td><td></td><td>OFF</td><td></td><td>1200</td><td>AUTO</td><td></td></tr>
<tr><td></td><td></td><td></td><td></td><td></td><td>ON</td><td></td><td></td><td>Self-Checking</td><td></td></tr>
<tr><td></td><td></td><td></td><td></td><td>ON</td><td></td><td></td><td></td><td></td><td>Code Control</td></tr>
<tr><td></td><td></td><td></td><td></td><td>OFF</td><td></td><td></td><td></td><td></td><td>Line Control</td></tr>
</table>
* standard setting
(Dip switch arrangement) - standard setting

</td><td>Check setting status of tape reader Model 2801B-2 according to the table at the left column and set it correctly again.</td></tr>
<tr><td>Connection failure</td><td>· Check the wiring status of RS232C cable according to the Connecting Manual.
· Check loosening and removal of connector.</td><td>Correct connection.</td></tr>
<tr><td>Failure of tape reader or RS232C cable</td><td>Confirm that the tape is fed by the manual feed switch of the tape reader. When other RS-232C devices are used, connect them to NC to confirm the normal operation.</td><td>Replace the tape reader.

Replace MB20 board.

Contact your YASKAWA representative.</td></tr>
</table>

4.4 MAINTENANCE OF ACGC

4.4.1 ACGC TROUBLESHOOTING

ACGC failure may be caused by any one of following conditions:
(1) Hardware failure
(2) System software failure
(3) Application program failure
For (1) or (2) above, contact your YASKAWA representative.
If the cause appears to be application program failure, contact the service agent of the machine tool builder.

4.4.2 ACGC ALARM INDICATION

(1) A YASNAC system equipped with ACGC may indicate what appears to be a machine-triggered alarm. Refer to the Instruction Manual of the machine builder for details of such alarm.

(2) If such machine-triggered alarm does not appear, the screen displays an alarm code with the same meaning as that for the 9" CRT NC Operator's Panel. Refer to Par. 4.2 TROUBLESHOOTING BY ALARM CODE for further details.

(3) ACGC performs self-diagnosis and data check, and any trouble in ACGC is indicated by an alarm. Table 4.7 describes alarm displays and their meanings.

Table 4.7 ACGC Alarms

Alarm Display/Meaning	Solution
SYSTEM PROM TOTAL ERROR: The PROM containing the system software is faulty. The faulty PROM No. appears in the framed section □.	Contact your YASKAWA representative.
+12 V/12 V POWER DOWN The power supply for RS232C interface is faulty.	

4.4.3 FAULTS NOT DISPLAYED BY ACGC ALARM INDICATION

(1) CRT screen remains blank.
If nothing appears on the CRT screen after power is turned on, check the following:

① AC power supply, e.g. one phase is open.

② CRT fuse blown.

③ Supply voltage at the ACGC rear panel terminal is 230 VAC ±15%.

④ DC supply in ACGC is normal. (Voltages are +5 V, +12 V, and −12 V.)

⑤ Wiring between the PCB and CRT is correct.

After checking these items, turn on power again. If the normal operation cannot be achieved, contact YASREP.

(2) No keyboard operation is accepted (hang up)
(a) Although message may appear on the CRT screen after power is turned on, no keyboard operation is accepted:

① Check keyboard wiring for loose or open connections.

② Check the terminals of the DC supply unit for +5V, +12V, and -12V. Check the voltage at the DC supply unit terminal side.

③ Depress the key and check for a "beep".
- When a beep is heard, the keys and related matters are normal.
- If a beep is not heard, some keys may be defective (together with other faults). Check the following points.

(b) Key operation is not accepted after the power supply is turned ON and some operation procedure is completed.

① Check that any alarm is displayed on the CRT screen. If it is displayed, take proper action for the alarm contents.

② After recording the operation procedure that has just been made, repeat the same procedure from when the power supply is turned ON and check for repeatability.

If it is not recovered normally, contact your YASKAWA representative.

4.4.3 FAULTS NOT DISPLAYED BY ACGC ALARM INDICATION (Cont'd)

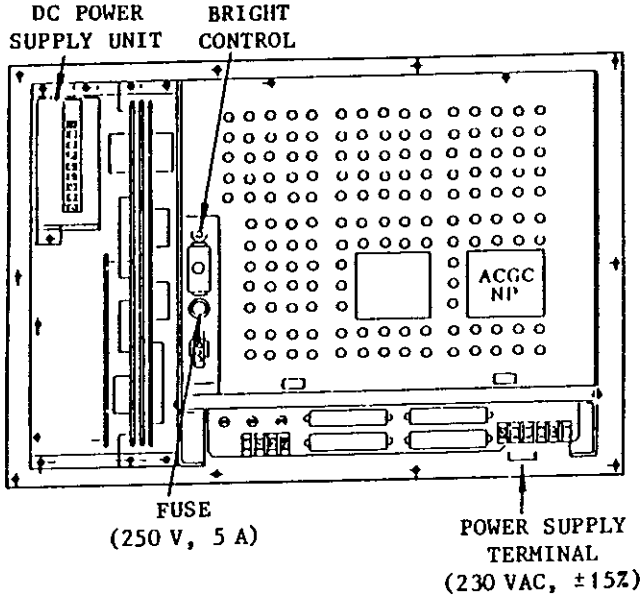


Fig. 4.5 Rear View of ACGC Unit

CAUTION

The brightness has been preset to the best condition at the factory. Adjustment may be made to compensate for local light conditions. If the bright control is maintained at a high setting, it may reduce the life of the CRT.

4.4.4 SOFTWARE VERSION INDICATION

If memory-related hardware such as the bubble memory fails, it is often desirable after repair to recover the stored software. For easy identification, software is managed with a version number, and can be determined by one of two methods:

(1) Indicated on "System No. Label" on the nameplate on the back of the CRT.

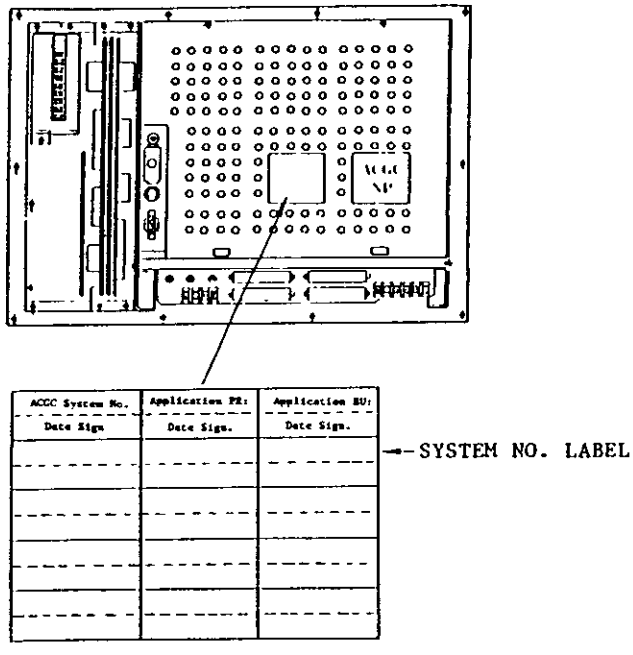


Fig. 4.6 Nameplate On Back of CRT

(2) Displayed on the CRT screen

(a) A sample indication in NC mode is shown below. This appears only when power is turned on.

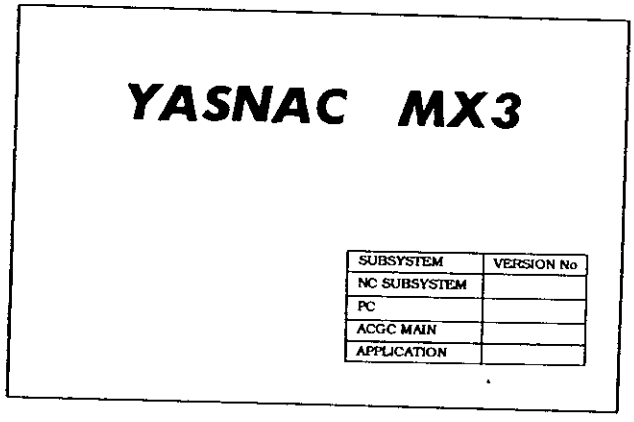


Fig. 4.7 Sample of Various, Software Version Nos. in NC Mode

(b) A sample indication in ACGC mode is shown below.

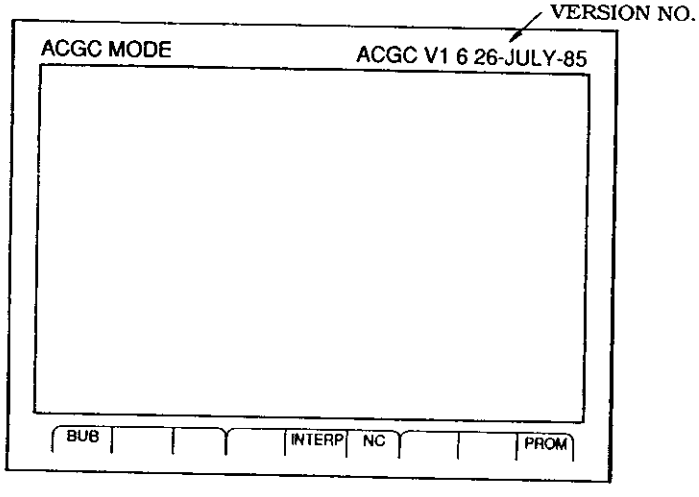


Fig. 4.8 Sample of ACGC Main Software Version Nos. in ACGC Mode

When memory-related hardware fails, notify the service agent of machine tool builder or your YASKAWA representative and report the latest version number of the related software.

4.5 SUPPLY VOLTAGE CHECK

4.5.1 CHECK AC POWER SUPPLY VOLTAGE

The voltage between terminals CN13-1 and CN13-5 in the power supply unit CPS-10N should be within 200/220 VAC ± 15% (170 to 253 VAC) at 50/60 Hz ± 2 Hz.

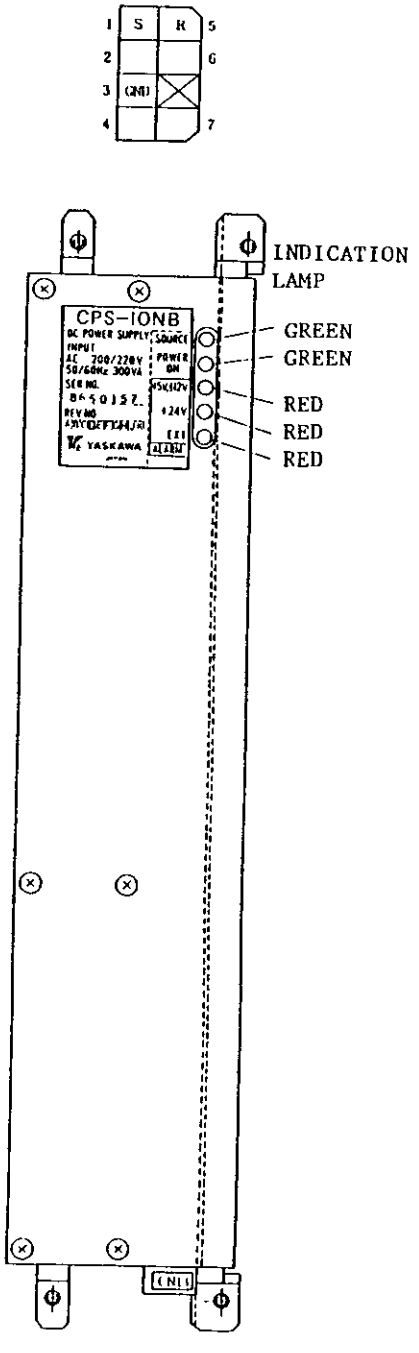


Fig. 4.9 External View of Power Supply Unit CPS-10N

4.5.2 INDICATION LAMP OF POWER SUPPLY UNIT

Table 4.8 Indication Lamp

INDICATION	Color	MEANING
SOURCE	Green	With this lamp on, AC input is executed or DC high voltage will still be applied even if AC input off.
POWER ON	Green	Power on with normal DC output
+5 V, ±12 V	Red	+5 V or ±12V abnormal output
+24 V	Red	+24 V abnormal output
EXT. ALARM	Red	Alarm input from external power supply etc. is on.

4.5.3 CHECK DC POWER SUPPLY VOLTAGE

Measure at check terminals on MB20 board.

4.6 STATUS DISPLAY BY ON-LINE DIAGNOSTICS FUNCTION (DGN)

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.

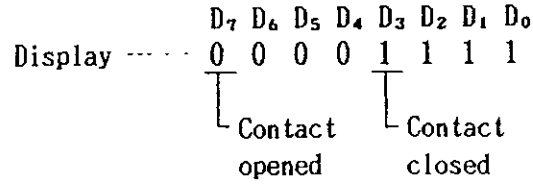
4.6.1 OUTLINE OF DISPLAYS

Table 4.9 Diagnostic Nos and Contents

Diagnostic No.	Display Contents	Remarks
#1000–#1061	Input signals for machine tool	Refer to machine tool builder's manual.
#1100–#1155	Output signals to machine tool	
#1200–#1295	Output signals to power sequence (PC)	Refer to Par. 9.6 or connecting manual TOE-C843-9.2
#1300–#1329	Input signals from power sequence (PC)	

Notes:

1. With a power sequence (PC) setup built-in, signals #1000 to #1061 and #1100 to #1156 in meaning depending on each power sequence program. Read the machine tool builder's manual.



2. For keep memory, refer to Par. 8 NC DATA PROCESSING

4.6.2 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 "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.
The data on each line is displayed in hexadecimal digits in the rightmost positions on the screen.

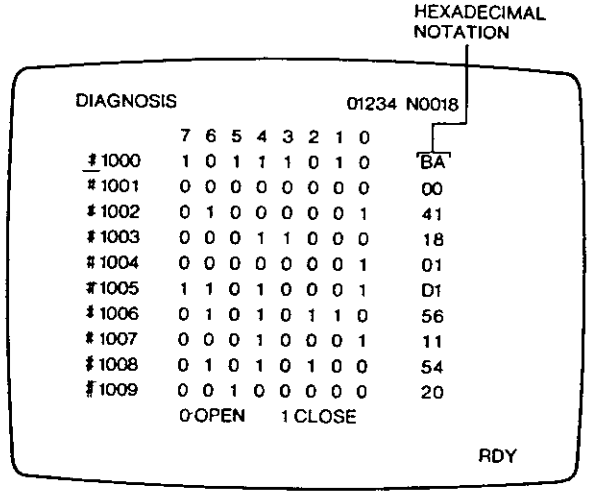


Fig. 4.10 Example of Input/Output Signal Display

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.

5. ADJUSTMENTS UPON INSTALLATION

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

Table 5.1 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	Set control power transformer.	
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 tighteness.
- 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 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.

(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.

(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.
- Vefify the output voltages of the composite power supply unit.

Rated Output	Output Voltage Range
+ 5 V	4.75 to 5.25 V
+12 V	11.4 to 12.6 V
−12 V	−12.0 to −13.8 V
+24 V	22.8 to 25.2 V

(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 4.6 "STATUS DISPLAY BY ON-LINE DIAGNOSTICS FUNCTION (DGN)") .

(11) Check parameters and setting data.

Conduct checkups according to the list of parameters (see 9.4 Parameter).

(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. Write "4" to SET #6219.
2. Depress the POS key.
3. Depress the [PAGE ↓] of [↑ PAGE] key to select the display (POSITION "ERROR") of a servo position deviation value.
4. Reset SET #6219 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)

The Kp value found by connecting a combination of the YASNAC MX3 and our AC servo divices according to Par.13 "Feed servo unit connection" of the YASNAC MX3 Connection Manual (TO-C843-9.32) is determined by setting the following parameters.

#6406	(X-axis)
#6407	(Y-axis)
#6408	(Z-axis)
#6409	(4th-axis)
#6410	(5th-axis)
#6411	(spindle)

Set a command unit position loop gain in the successive order of X-axis, Y-axis, Z-axis, 4th-axis, 5th-axis and spindle.

Setting: "1" = $0.01s^{-1}$
Standard setting = 4000
Use this parameter also for minor adjustments.

In this case, the following parameters must be set correctly.

- Move distance per motor rotation.
  #6444 - #6448
- Minimum move unit
  #6450 - #6454
- Servo input: standard setting = 250
  #6456 - #6460

(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.

6. MODULE/UNIT REPLACEMENT PROCEDURE

6.1 CPU UNIT

Component Name	Function	Cautions for Replacement
Power supply unit CPS-10N	Input voltage: 170 to 253 VAC, 300 VA Output voltage/current: + 5 V, 10 A · +12 V, 1.7 −12 V, 0.3 A · +24 V, 2.5 A	Replace it after checking input voltage and load short-circuit if faulty Refer to Par. 4.5 SUPPLY VOLTAGE CHECK.
Main Board JANCD-MB20	· Data controller · Function generator · Servo controller (X, Y, Z) · RS232C interface unit · HDLC interface unit · Direct-in interface unit · Power supply signal · Parameter memory · Machining tape memroy	When replacing MB208 · Parameters and machining tape data are required to enter again. · Check version no. of function generator (ROM #44, #45); servo controller (ROM #48); and that required ROM is mounted. · Set SW5 correctly for selecting CRT 14 "/9", power ON/OFF and internal/external device.
PC board JANCD-PC20	· Built-in type PC · CRT controller · Remote I/O controller	· Ensure version no. of PC manager (ROM #40); character generator (ROM #90); and that required ROM is mounted.
Memory board JANCD-MM20	· Data controller ROM, RAM · Servo controller ROM · PC ladder ROM	· Ensure version no. of data controller (ROM #00 to #); servo controller (ROM #36 to #37); PC ladder (ROM #30 to #33); and that each required number of ROMs is mounted.

Component Name	Function	Cautions for Replacement
Memory board JANCD-MM20	· Data controller ROM, RAM · Serro controller ROM · PC ladder ROM	· When changing ROMs from the old PCB to new PCB, be sure the ROMs are plugged securely into IC socket before mounting new PCB.
Spindle and additional axis control board (JANCD-SR-[ ])	· Servo control section (spindle, 4-axis and 5-axis) · Spindle PG interface	Replace with servo of the same type. · Confirm that the servo control section (ROM #48) version No. and each ROM are inserted.

6.2 OPERATOR'S PANEL

Component Name	Function	Cautions for Replacement
Panel Interface Board (JANCD-SP-20)	· 9" CRT interface unit · Keyboard interface unit · Single-axis handle PG interface unit · I/O unit for the panel (input: 64 points output: 32 points)	· Adjust brightness of CRT as required after completing replacement. (BRT: VR1, CONTRAST: VR) · Ensure that ENABLE/DISABLE (SW1) and I/O area No. (SW2) of single-axis handle PG are correctly set.
CRT Unit (TR-9DDYB)	9" CRT monochrome (yellow)	· Make replacement only after turning OFF the main power supply; CRT has high voltage generating section.
Keyboard Unit	· Function key and LED · Address key · Data key · Buzzer	

6.3 OPTIONAL MODULES

Componect Name	Function	Cautions for Replacement
Large capacity memory module Model: JANCD-MM21-□	Addition of machining tape area	· Requires reentry of the machining tape data.
External I/O module Model: JANCD-I021	· Input : 112 points · Output: 68 points (Polarized and contactless type: 64 points Contact type: 4 points)	Before replacement set according to Par. 7.3.
Tape reader unit Model-2801B-2	· RS-232C Interface output · 270 char/s	Ensure that the dip switch (DS) is set as standard according to the table of Par. 4.3.17.

7.1 MB20 BOARD

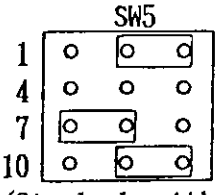
(1) SW1 (System No. Switch) Setting

Set this switch to 0 for normal operation, since this switch is provided only for maintenance and creation of sequence ladder.

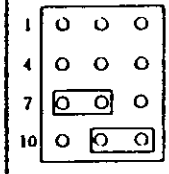
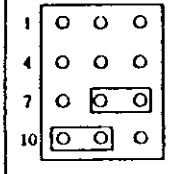
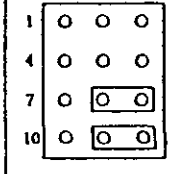
No.	Function
0	Performs normal operation and parameter changes. (Select #6219 = 1 or 4 at the time of parameter change.)
1	Changes parameters. (It cannot make cycle start, so do not use it for that purpose.)
2	Not used.
3	Not used.
4	Can enter into edit operation mode of sequence ladder from online mode. Do not use this setting since it is reserved for future developments and is used only by OEM and factory service personnel.
5	Not used.
6	Can enter into edit operation mode of sequence ladder at online immediately after power application. Do not use this setting since it is reserved for future developments and is used only by OEM and factory service personnel.
7	Can operate memory generation. Do not use this setting since it is for maintenance and is used only by our service personnel.

(2) SW5 Setting

This switch can select 14" CRT (with ACGC) or 9" CRT (standard) on operator's panel. It can also select if POWER OFF signal is entered on operator's panel (POS), from external device (EOF) or by both POF and EOF.



(Standard setting)

	Use panel (POF) only	Use external device (EOF) only	Use both
SW5			

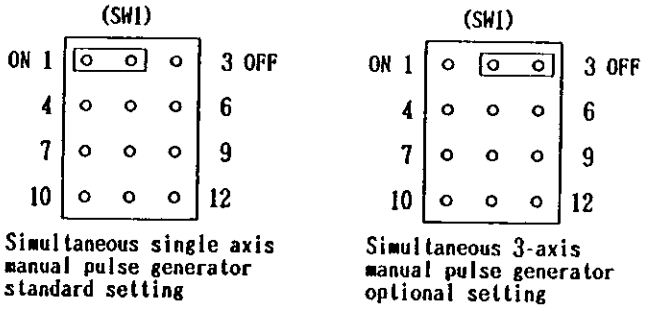
(3) Adjustment of VR1 to VR6

Function	X-axis	Z-axis	Spindle
Gain adjustment	VR1	VR3	VR5
Zero point adjustment	VR2	VR4	VR6

These are VRs for adjusting D/A of each axis and spindle. They have been already been adjusted at the factory prior to shipment. Readjustment is not required.

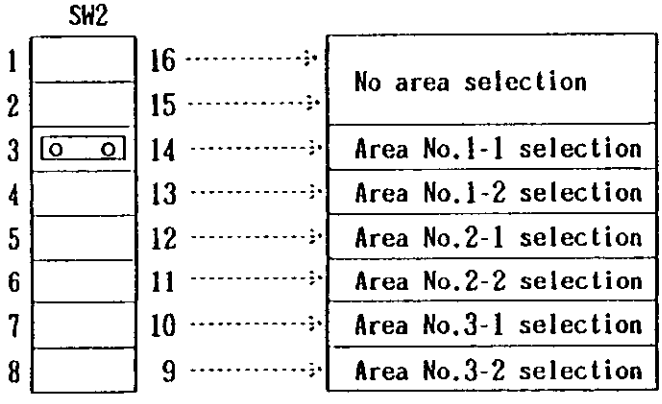
7.2 SP20 BOARD

(1) SW1 (HPG)



This switch selects use or prohibition of manual pulse generator interface.
Use it by standard setting for all except for simultaneous 3-axis manual pulse generator specification (optional).

(2) SW2 (Remote I/O address)



This switch selects I/O area for using SP20-2 (operator's panel with I/O).
The diagram at the left shows shorting plug (SW2) setting and I/O area no.

7.3 SR20 board SR20 - [ ]

1: Spindle control section only
2: Spindle control section + 4th axis control section
3: Spindle control section + 4th & 5th axis control sections

· Adjustment between VR1 and VR6

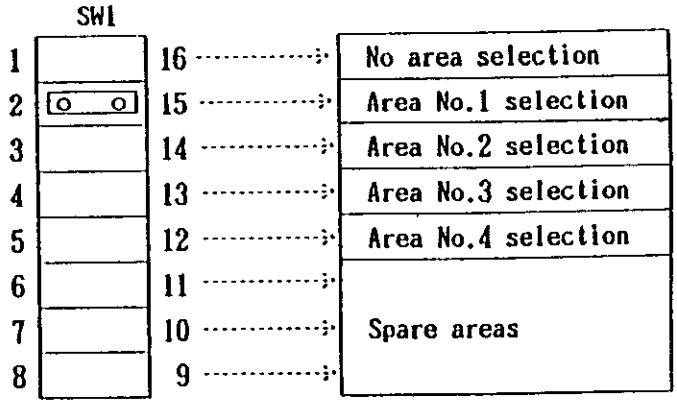
Function	Main axis	4th-axis	5th-axis
Gain adjustment	VR5	VR1	VR3
Zero adjustment	VR6	VR2	VR4

The above VRs are designed for D/A adjustment of each axis, and were already adjusted at the factory prior to shipping.
Readjustment is not required.

7.4 I021

(1) SW1 (Remote I/O address)

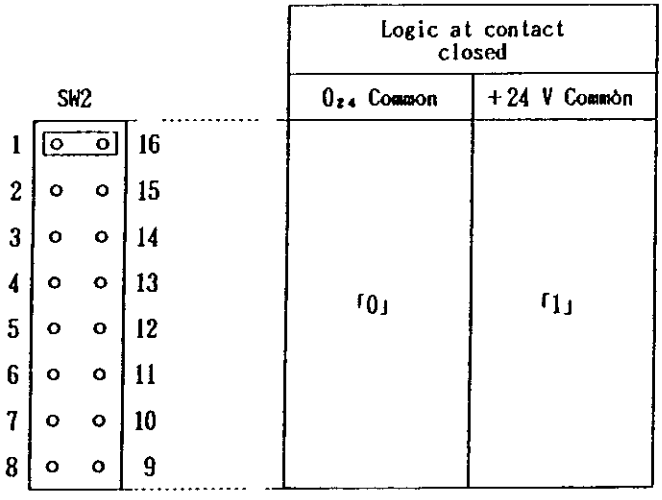
The above diagram shows shorting plug (SW1) setting and I/O area No.



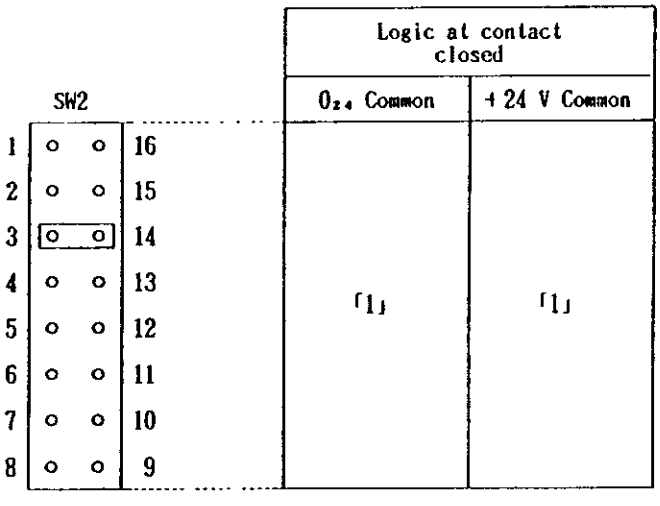
7.4 1021 (Cont'd)

(2) SW2 (Logic reverse)

This switch turns the function ON/OFF to make logic at the time of contact closing to logic "1", regardless of +24V common/0_{24} common.



The above setting makes reverses logic in case of input contact closing similar to YASNAC X2 series.

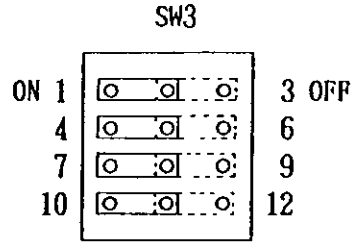


Left setting makes logic "1" in case of input contact closing.

Use 3 for standard setting, although the result is the same even if any one of SW2 to SW8 is short-circuited.

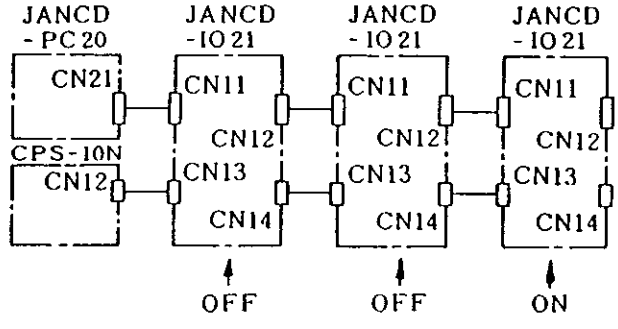
(3) SW3 (Terminator)

Terminator ON/OFF must be selected when one remote I/O board (JANCD-1021) is used, or if several boards are used, or if signal is transferred to an other remote I/O board.



Note: All four circuits should be set in a same side.

< Example >



7.5 AREA NO SETTING AND I/O ADDRESS PORT

Input port				Output port			
SP 20-02		I020, I021		SP20-02		I020, I021	
Area No.	Address port	Area No.	Address port	Area No.	Address port	Area No.	Address port
1 - 1	#1000 to #1007	1	#1000 to #1013	1 - 1	#1100 to #1103	1	#1100 to #1108
1 - 2	#1008 to #1015			1 - 2	#1108 to #1111		
2 - 1	#1016 to #1023	2	#1016 to #1029	2 - 1	#1116 to #1119	2	#1116 to #1124
2 - 2	#1024 to #1031			2 - 2	#1124 to #1127		
3 - 1	#1032 to #1039	3	#1032 to #1045	3 - 1	#1132 to #1135	3	#1132 to #1140
3 - 2	#1040 to #1047			3 - 2	#1140 to #1143		
		4	#1048 to #1061			4	#1148 to #1156

Precautions:

Normal input cannot be made if same area No. is erroneously set.

8.1 SYSTEM NO. SETTING (#6219)

Set system No. at "1" to write parameter number. System number can be set by setting the value of #6219 through the operator's panel.

(1) Setting of #6219

"0": SYSTEM

For normal operation. Writing parameters is prevented.

"1": PARAMETER

To write parameters. At this position, Cycle start is prevented.

"4": TEST (0) (Maintenance mode)

Normal operation is similar to the case of "0" SYSTEM, but available only for maintenance mode.

Note:

1. Setting values other than those described above will prevent correct operation.

2. Setting can be effective only when the system number switch provided on the control unit main module (MB20) is set at "0." Refer to Par. 7 "SETTING AND ADJUSTMENT FOR MODULE."

(2) Alarm Display of System No. Setting (#6219)
When setting #6219 is set at "1", Cycle Start is prohibited, causing unexpected errors. To prevent this, alarm status is displayed if #6219 is set at a value other than "0."

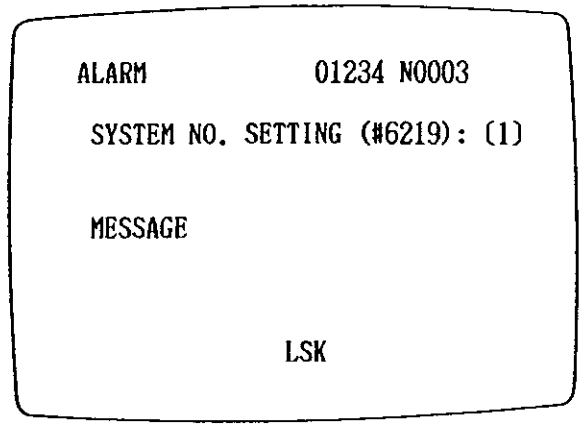


Fig. 8.1 Typical Alarm Display

System number #6219 should be set at "0" except for writing parameters.

8.2 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. For details, see Par. 9.3 LIST OF PARAMETER NUMBERS. For sequence parameters #7000 to #7099, see machine tool builder's manual.

8.2.1 PARAMETER TYPES

Parameters are displayed either in binary or in decimal digits.

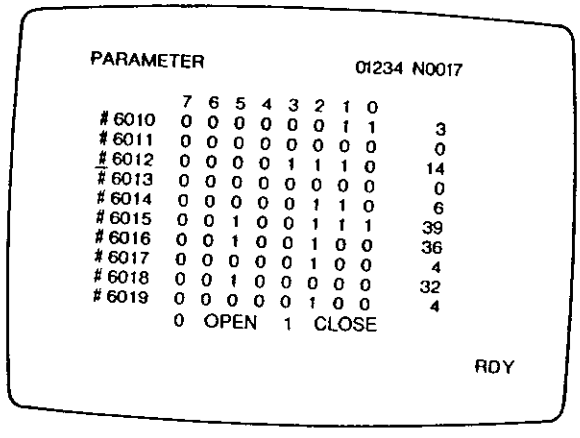


Fig. 8.2 Typical Parameter Display (in binary digits)

Parameters #6005 to #6049 are displayed in binary digits.

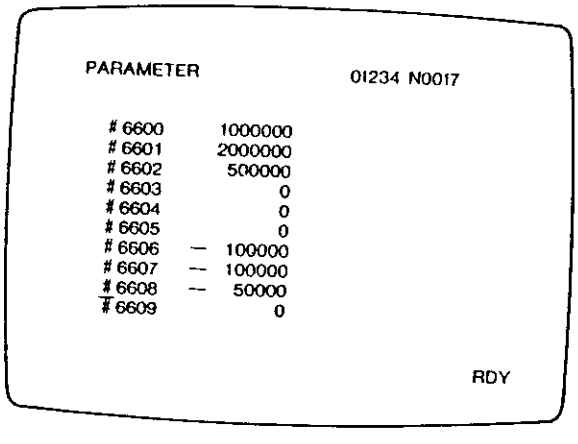


Fig. 8.3 Typical Parameter Display (in decimal digits)

Parameters #6050 and larger are displayed in decimal digits.

8.2.2 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.

8.2.3 WRITING PARAMETER DATA

Set the parameter #6219 to "1."

For display in binary disgits

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

8.2.3 WRITING PARAMETER DATA (Cont'd)

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 parameter #6219 back to "0."

8.3 DISPLAYING AND WRITING KEEP MEMORY

In keep memory to control machine sequence, vital important information are set and still stored even if power off.
The wrong setting results in machine failure, so display and write with care according to machine tool builder's manual.

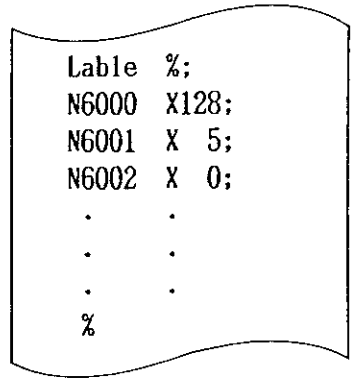
(1) Keep memory's area.
[DGN] function address #7100 to #7999

(2) Displaying and Writing keep memory
Refer to Par. 8.2 because of the same procedure.

8.4 TAPE INPUT OF SETTING DATA AND PARAMETER DATA

Although setting data and parameter data are generally input through MDI operation, they can also be entered by means of punched paper tape. The two types of data may be input from a single tape.
If something wrong with the data transfer by RS-232C, refer to Par. 4.2.3.

(1) The tape format is as follows:



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

Fig. 8.4

(2) The input operation procedure is as follows: Set the parameter #6219 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 parameter #6219 back to "0."

8.5 PUNCHING-OUT OF SETTING DATA AND PARAMETER DATA

If something wrong with the data transfer by RS-232C, refer to Par. 4.2.3.
The punching out procedure is as follows:

1. Select the [EDIT] mode.
2. Depress the [PRM] key.
3. Depress the [RESET] key.
4. Confirm puncher is ready.
5. Depress the [OUT] key. The setting and parameter data will be continuously punched out.
6. To interrupt the punching operation, depress the [RESET] key.
Punching cannot be resumed. Restart operations from the beginning after interruption.
Set the parameter #6219 back to "0."

8.6 SUMMARY OF STORING DATA AND EDITING OPERATIONS

	Operation			Edit Lock	Parameter #6219 Setting	Mode	Function	Procedure
Parameter	Storing from NC operator's panel keyboard				1		PRM	Parameter number → [CURSOR] Data → [WR]
	Storing from tape (Note 4) (Note 6)				1	EDIT		[RESET] → [IN]
	Punch out (Note 3)							[RESET] → [OUT]
	Matching with tape (Note 4)							[RESET] → [VER]
Setting	Storing from NC operator's panel keyboard						SET	Setting number → [CURSOR] Data → [WR]
	Storing from tape				1	EDIT		[RESET] → [IN]
	Punch out							[RESET] → [OUT]
	Verification with tape							[RESET] → [VER]
Offset	Storing from NC operator's panel keyboard						OFS	Offset number → [CURSOR] Data → [WR]
	Storing from tape					EDIT		[RESET] → [IN]
	Punch out							[RESET] → [OUT]
	Matching with tape							[RESET] → [VER]
	Clear of all offsets							[0] → −9999 → [ORG]
Part Program	Storing from NC operator's panel keyboard			OFF		EDIT	PROG	[0] → Program number → [WR] → Repeat of edit opeation "addition of address data"
	Storing from tape	One part program	Tape with number 0	OFF				[RESET] → [IN]
			Tape without number 0 (Note 1)	OFF				[RESET] → [0] → Program number → [IN]
		All part programs on tape		OFF				[RESET] → [0] → −999 → [IN]
		Addition to registered part program		OFF				[RESET] → NEXT → [IN]
	Punch Out	Designated part program						[RESET] → [0] → Program number → [OUT]
		Addition to registered part program						[RESET] → [0] → −9999 → [OUT]

8.6 SUMMARY OF STORING DATA AND EDITING OPERATIONS (Cont'd)

	Operation			Edit Lock	Parameter #6219 Setting	Mode	Function	Procedure
Part Program	Verification with tape	One part program	Tape with numbner 0			EDIT	PROG	[RESET] → [VER]
			Tape without number 0 (Note 1)					[RESET] → [0] → Program number → [VER]
		All part programs on tape						[RESET] → [VER]
	Edit	Modification of address data (Note 2)		OFF				[CURSOR] (Set to address data to be modified) → Address data → [ALTER]
		Addition of address data (Note 2)		OFF				[CURSOR] (Set to address data just before addition) → Address data → [INSRT]
		Deletion of one address data		OFF				[CURSOR] (Set to address data to be deleted) → [ERASE]
		Deletion of one block (Note 5)		OFF				[CURSOR] (Set to address data at head of block to be deleted) → [EOB] → [ERASE]
	Address search					MEM EDIT		Address data to be searched → [CURSOR]
	Clear	Designated part program		OFF		EDIT		[0] → program number to be searched → [ERASE]
		All part programs on tape		OFF				[0] → −9999 → [ERASE]

Notes:

1. Storing of a part program having a program number different from program number 0 on tape is performed by the same operation as for "tape without program number 0."
2. Within the limit of 32 characters, addition of multiple address data and the change to one address data are permitted.
3. Setting is punched out at the same time.
4. If the tape contains setting information, it is also stored and verified the same time.
5. When the cursor to the address data in the middle of a block and EOB and ERASE keys are depressed, the data following the cursor position is deleted.
6. When data has been stored from a parameter tape, turn the power on and off.

9 APPENDIX

9.1 ALARM NO. LIST

The alarm No. is classified as shown in table 9.1.

Table 9.1 Alarm classification

Alarm No.	During actuation	Classification
000 - 099	Stop by block end.	Tape format error alarm.
100 - 199	Stop by block end.	Macro, operation and external I/O error. Sequence error (1)(2)(3).
200 - 299	Decelerating and stop	Over-travel, return to reference point, positioning, MRDY and other errors.
300 - 399	Decelerating and stop	Servo, emergency stop, overload, FG, RPG and other errors.

Table 9.2 LIST OF ALARM CODES

Code	Causes	Code	Causes
000		006	
001	ZR UNREADY (X) REFERENCE POINT RETURN NOT COMPLETED X-AXIS CYCLE STARTED WITHOUT RETURNING TO REFERENCE POINT. RETURN TO REFERENCE POINT.	007	
002	ZR UNREADY (Y) REFERENCE POINT RETURN NOT COMPLETED Y-AXIS CYCLE STARTED WITHOUT RETURNING TO REFERENCE POINT. RETURN TO REFERENCE POINT.	008	
003	ZR UNREADY (Z) REFERENCE POINT RETURN NOT COMPLETED Z-AXIS CYCLE STARTED WITHOUT RETURNING TO REFERENCE POINT. RETURN TO REFERENCE POINT.	009	
004	ZR UNREADY (4) REFERENCE POINT RETURN NOT COMPLETED 4TH-AXIS CYCLE STARTED WITHOUT RETURNING TO REFERENCE POINT. RETURN TO REFERENCE POINT.	010	TH ERROR TAPE HORIZONTAL PARITY ERROR. SEE PAR. 4.2.2
005	RESET UNREADY (5) REFERENCE POINT RETURN NOT COMPLETED 5TH-AXIS CYCLE STARTED WITHOUT RETURNING TO REFERENCE POINT. RETURN TO REFERENCE POINT.	011	TV ERROR TAPE VERTICAL PARITY ERROR. SEE PAR. 4.2.2

Code	Causes	Code	Causes
012	OVERFLOW (128 CH) BUFFER CAPACITY OVERFLOW IN A BLOCK (128 CHARACTERS). CORRECT PROGRAM.	018	
013	PROG ERROR (NO ADDRESS) ADDRESS PLUS NO DATA AND NEXT ADDRESS COMMAND. OR NO ADDRESS PLUS DATA. SEE OPERATOR'S MANUAL (TOE-C843-9.30) PAR. 2.1.2 AND CORRECT PROGRAM.	019	
014	PROG ERROR ("-,"".") SIGN "-," AND "." NOT CORRECTLY USED. SEE ORERATOR'S MANUAL (TOE-C843-9.30) PAR. 2.1.1 AND CORRECT PROGRAM.	020	PROG ERROR (G) UNUSABLE G CODE OR G CODE NOT INCLUDED IN OPTIONS PROGRAMMED. SEE ORERATOR'S MANUAL (TOE-C843-9.30) PAR. 2.9.1 AND CORRECT PROGRAM.
015	PROG ERROR (UNUSABLE CH) UNUSABLE CHARACTER PROGRAMMED IN INSIGNIFICANT DATA AREA. SEE OPERATOR'S MANUAL (TOE-C843-9.30) PAR. 2.1.2 AND CORRECT PROGRAM.	021	PROG ERROR (G) G CODES IN 1, AND * GROUPS PROGRAMMED SIMULTANEOUSLY IN A BLOCK. SEE ORERATOR'S MANUAL (TOE-C843-9.30) PAR. 2.9.1 AND CORRECT PROGRAM.
016	PROG ERROR (UNUSABLE AXIS) INPUT OF A, B, C, U, V AND W IS NOT DEFINED AS AN ADDITIONAL AXIS NOR B FUNCTION.	022	PROG ERROR (G02/03, G43/44) G43 AND G44 ARE SPECIFIED IN THE CIRCULAR ARC (G02, 03) mode.
017	PROG ERROR (8 DIGITS) INPUT DATA OVERFLOW (MORE THAN 8 CHARACTERS). SEE ORERATOR'S MANUAL (TOE-C843-9.30) PAR. 2.1.1 AND CORRECT PROGRAM.	023	PROG ERROR (G) AN UNUSABLE G CODE IS SPECIFIED IN THE FIXED CYCLE MODE.

Code	Causes	Code	Causes
024	PROG ERROR (G, G41/42) AN UNUSABLE G CODE IS SPECIFIED IN THE COMPENSATION MODE.	030	PROG ERROR (F) NO F COMMAND IN FEED COMMAND. SEE TOE-C843-9.30 PAR.2.4.2
025	PROG ERROR (G70/71/72) G70 TO G72 ARE USED FOR OTHER THAN THE FIXED CYCLE.	031	PROG ERROR (R = 0) CIRCLE WITH RADIUS 0 COMMANDED IN CIRCULAR ARC COMMAND, RADIUS 0 CIRCULAR ARC COMMAND IMPOSSIBLE, CORRECT PROGRAM
026	PROG ERROR (G41/42) RISING ERROR AT TOOL RADIUS COMPENSATION C TIME.* NOTE) A COMMAND TO PREVENT FROM ENTERING THE CORRECTION C MODE IS ISSUED.	032	PROG ERROR (G02/03) MORE THAN THREE AXES ARE INCLUDED IN THE CIRCULAR ARC SPECIFICATION WITHOUT A HELICAL INTERPOLATION OPTION.
027	PROG ERROR (G41/42) RISING ERROR AT TOOL RADIUS COMPENSATION (THE FALLING TOOK PLACE IN CIRCULAR ARC MODE.)	033	PROG ERROR (G02/03) THE CIRCULAR ARC SURFACE CANNOT BE DECIDED FROM THE SPECIFICATION. MORE THAN FOUR AXES ARE INCLUDED IN THE CIRCULAR ARC SPECIFICATION.
028	PROG ERROR (G77-R) R-POINT RETURN IS SPECIFIED BY EXCUTING G77.	034	PROG ERROR (G02/03) CIRCULAR ARC R DESIGNATION ERROR. SEE TOE-C843-9.30 PAR.2.9.4(4) AND CORRECT PROGRAM
029		035	PROG ERROR (D, H) D AND H CODE NUMBERS OF THE TOOL DIAMETER AND LENGTH CORRECTION ARE TOO HIGH.

* (1) No move command provided in 3 blocks with G41 (G42)
(2) M00 provided at start up.
(3) Started up in circular arc block.

Code	Causes	Code	Causes
036	PROG ERROR (P-G 10) TOO LARGE P (NUMBER DESIGNATION) WHEN OFFSET IS PROGRAM-INPUT.	042	PROG ERROR (M98, G65/66 NEST) SUBPROGRAM OR MACRO CALL FIVE-NESTED. SEE TOE-C843-9.30 PAR. 2.8.7(6) AND PAR. 2.11.9.2(2)(ii).
037	PROG ERROR (G10) TOO LARGE R WHEN WORK COORDINATE SYSTEM IS PROGRAM-INPUT.	043	PROG ERROR (G52, Q2) THE WORK COORDINATE SYSTEM IS NOT SET. THE LOCAL COORDINATE SYSTEM WAS SPECIFIED IN THIS MODE.
038	PROG ERROR (G10, Q2) P IS TOO LARGE FOR INPUT OF THE WORK COORDINATE SYSTEM PROGRAM.	044	PROG ERROR (G12/13) RADIUS R < COMPENSATION D WAS SPECIFIED IN THE CIRCLE CUTTING.
039		045	CAL ERROR (G41/42) OPERATION WAS DISABLED IN THE TOOL RADIUS COMPENSATION.
040	PROG ERROR (M98, G65/66) P IS NOT ASSIGNED TO BLOCKS M91, M98, G65/G66 AND G25. THERE IS A DIFFERENCE BETWEEN P ONO. AND Q ONO. ON G25; G25 AND M98/M99 ARE ASSIGNED SIMULTANEOUSLY.	046	PROG ERROR (G41/42) CIRCULAR ARCS OTHER THAN THE COMPENSATED SURFACE ARE SPECIFIED IN THE TOOL RADIUS COMPENSATION.
041	PROG ERROR (NO PROG) PROGRAM NO. (SEQUENCE NO.) NOT FOUND AT CALL BY M98, M99, G65, G66, G25, G, M AND T.	047	PROG ERROR (G41/42) THE CORRECTED SURFACE ARE REPLACED IN THE TOOL RADIUS COMPENSATION.

Code	Causes	Code	Causes
048	PROG ERROR (G41/42) INTERSECTION POINT NOT OBTAINED BY INTER-SECTION COMPUTATION	054	
049	PROG ERROR (G41/42) REVERSE OR ALMOST REVERSE COMMANDED IN M97 MODE.	055	PROG ERROR (M, S, T, B) M, S, T, B COMMANDS IN THE BLOCK IN WHICH M, S, T,B CODE CANNOT BE COMMANDED.
050	SCALING ERROR UNUSABLE G CODES ARE SPECIFIED IN THE SCALING MODE. (G92, G28 - G30, G36 - G38, G70 - G72)	056	PROG ERROR (AXIS) AXIS COMMAND IN G04, G20, G21 BLOCKS.
051	SCALING ERROR A BLOCK SPECIFIED BY G51 AND G50 IS ERRONEOUSLY FORMATTED. THE SCALING MAGNIFICATION SHOWS 0.	057	PROG ERROR (S COM) S COMMAND EXCEEDS THE RANGE OF #6274. DISREGARDED WHEN #6274 IS SET TO "0".
052		058	MIRROR IMAGE (G28) G28 IS SPECIFIED IN THE MIRROR IMAGE.
053		059	ZR UNREADY REFERENCE POINT RETURN NOT COMPLETED ON THE AXIS WHICH HAS G29 COMMAND OR REFERENCE POINT RETURN NOT COMPLETED ON THE AXIS WHICH HAS G30 COMMAND.

Code	Causes	Code	Causes
060		066	RESET UNREADY (AFTER EDITING) CYCLE START BEGAN WITHOUT RESETTING AFTER EDIT OPERATION.
061		067	
062		068	
063		069	
064		070	PROG ERROR (M02/M30/M99) MEMORY OPERATION COMPLETION COMMAND NOT GIVEN. PROGRAM MODES M02/M30/M99.
065		071	

Code	Causes	Code	Causes
072		079	
073		080	PROG ERROR (G10, G22/23) G10, G22, G23 AND AXIS DATA ARE SPECIFIED SIMULTANEOUSLY.
074		081	
075	RS-232C ERROR (BAUD RATE) RS-232C INTERFACE THE NUMBER OF BITS AND BAUD RATE CONFLICT. REFER TO PAR. 4.2.3.	082	
076	RS-232C ERROR (SIGNAL LEVEL) RS-232C INTERFACE TRANSMISSION TROUBLE REFER TO PAR. 4.2.3	083	
077	RS 232C ERROR (OVERRUN) 10 CHARACTERS MORE HAVE BEEN READ IN AFTER STOP CODE HAS BEEN TRANSMITTED THROUGH RS 232C INTERFACE. CONFIRM TRANSMITTER'S STOP CODE PROCESSING CAPABILITY. REFER TO PAR. 4.2.2.	084	MIRROR IMAGE (G36/37/38) THE MIRROR IMAGE IS TURNED ON BY G36 TO G38.
078		085	PROG ERROR (G36/37) OTHER THAN ONE AXIS i, (j) ARE SPECIFIED BY G36, (37).

Code	Causes	Code	Causes
108	MACRO ERROR (UNDEFIN #NO.) UNDEFINED VARIABLE NO. DESIGNATED.	114	MACRO ERROR (DO-FORMAT) "DO" NOT CORRESPONDING TO "END." SEE TOE-C843-9.30 PAR.2.11.7.2 AND CORRECT PROGRAM.
109	MACRO ERROR (# NO. NOT LEFT) A VARIABLE PROHIBITED TO BE SUBSTITUTED FOR THE LEFT SIDE IS ASSIGNED.	115	MACRO ERROR ([ ] UNMATCH) NUMBER ERROR IN [ ]. CHECK NUMBER OF MARK [ ] TO MEET AND CORRECT PROGRAM.
110	MACRO ERROR ([ ] 5 LIMIT) MULTIPLE LAYERS OF PARENTHESES EXCEEDING THE UPPER LIMITS (5). SEE TOE-C843-9.30 PAR.2.11.6.6 CORRECT PROGRAM.	116	MACRO ERROR (DO END NO.) "m" IN DO m OUT OF RANGE $1 \leqq m \leqq 3$. SEE TOE-C843-9.30 PAR.2.11.7.2 AND CORRECT PROGRAM.
111	MACRO ERROR (MOVE G66-M99) MODAL ACCESS. AN AXIS MOVE COMMAND IS ISSUED AT M89 RETURN TIME OF G66. DO NOT MOVE BLOCK M99.	117	MACRO ERROR (10)
112	MACRO ERROR (5) MULTIPLE LEVELS OF MACRO CALL EXCEEDING THE UPPER LIMIT 4. SEE TOE-C843-9.30 PAR.2.11.9.2 (2) (ii) AND CORRECT PROGRAM.	118	MACRO ERROR (GO TO N) "n" in GOTO n OUT OF RANGE $0 \leqq n \leqq 9999$. CHECK SEQUENCE NO. AND CORRECT PROGRAM.
113	MACRO ERROR (6)	119	MACRO ERROR (12)

Code	Causes	Code	Causes
120	PRTN ERROR (NOT FOUND) SEQUENCE NO. NOT FOUND AT PROGRAM RESTART. CHECK SEQUENCE NO.	127	LIFE CTRL ERROR (T5 & T9999) T5 DIGITS WERE SPECIFIED WITHOUT STORING THE GROUP, OR THERE IS AN ERROR IN T9999L △△△ SPECIFICATION.
121	PRTN ERROR (G92) G92 WAS SPECIFIED VIA MDI AT THE TIME THE PROGRAM WAS RESUMED.	128	LIFE CTRL ERROR (T5 & T9999) ALL THE GROUP CONTENTS CONSIST OF SKP, BUT T5 DIGITS WERE SPECIFIED, OR, H(D)999 OF THE TOOL NOS. WAS SPECIFIED WITHOUT STORING H-NO. AND D-NO.
122	PRTN ERROR (G54 - G59) G54 TO G59 WERE SPECIFIED VIA MDI AT THE TIME THE PROGRAM WAS RESUMED.	129	PROG ERROR (G54 - 59J) J WAS SPECIFIED TOO LARGE IN THE WORK COORDINATE SYSTEM SPECIFICATION. BESIDES, THE MODE IS OTHER THAN G00/G01.
123	PRTN ERROR (ORG) THE COORDINATE SYSTEM WAS CHANGED BY DEPRESSING THE ORG KEY ON OPERATOR'S PANEL AT THE TIME THE PROGRAM WAS RESUMED.	130	
124	PRTN ERROR (MDI MOVE) THE AXIS MOVE WAS SPECIFIED VIA MDI AT THE TIME THE PROGRAM WAS RESUMED. THIS IS PROHIBITED.	131	
125	PROG ERROR (G122/123/124) P, I ,T, L, H AND D ARE SPECIFIED ERRONEOUSLY IN THE G122/123 SPECIFICATION.	132	
126	PROG ERROR (G122 DATA OVR) THE TOOL LIFE CONTROL DATA EXCEEDING THE CAPACITY WAS SPECIFIED.	133	

Code	Causes	Code	Causes
134		142	
135		143	
136		144	
137		145	
138		146	
139		147	
140		148	AS AFTER READ SUB PROG/MACRO AN UNUSABLE G CODE WAS SPECIFIED IN THE G68 MODE. G68 WAS SPECIFIED IN THE CORRECTION C CODE.
141		149	

Code	Causes	Code	Causes
150	ROTATE ERROR (G CODE) G CODE THAT CANNOT BE USED IN G68 MODE HAS BEEN COMMANDED. G68 HAS BEEN COMMANDED DURING TOOL RADIUS COMPENSATION C.	158	
151	ROTATE ERROR (FORMAT) THERE IS AN ERROR IN THE FORMAT OF THE BLOCK SPECIFIED BY G68 AND G69.	159	
152		160	DNC MODULE TIME OUT DNC TIME OUT ERROR.
153		161	DNC MODULE DR-LINE ERROR DR LINE ERROR.
154		162	DNC MODULE PACKET LENGTH ERROR PACKET LENGTH ERROR.
155		163	DNC MODULE 51 ERROR 8251 ERROR.
156		164	DNC MODULE CHECK SUM ERROR CHECK SUM ERROR.
157		165	DNC MODULE COMMAND ERROR COMMAND ERROR.

Code	Causes	Code	Causes
166		173	MEM ERROR (PRM) PARAMETER AREA TOTAL CHECK ERROR. SEE THIS MANUAL PAR.4.2.3.
167	DNC MODULE ROM CHECK ERROR COMMUNICATION MODULE ROM CHECK ERROR.	174	MEM ERROR (KEEP) KEEP MEMORY TOTAL CHECK ERROR. SEE THIS MANUAL PAR.4.2.3.
168	DNC HISPEED MODE ERROR HIGH SPEED CUTTING MODE ERROR.	175	MEM ERROR (MACR) MACRO TOTAL CHECK ERROR. SEE THIS MANUAL PAR.4.2.3.
169	DNC I/F SYNC ERROR DNC CPU ERROR.	176	
170	MEM ERROR (OFS) TOOL OFFSET TOTAL CHECK ERROR. SEE THIS MANUAL PAR.4.2.4.	177	
171		178	
172	MEM ERROR (SET) SETTING AREA TOTAL CHECK ERROR. SEE THIS MANUAL PAR.4.2.3.	179	OVER TEMP PANEL INSIDE TEMPERATURE TOO HIGH. SEE THIS MANUAL PAR.4.2.4.

Code	Causes	Code	Causes
180	SEQ ERROR 1 SEQUENCER ERROR (1) BLOCK STOP IS OUTPUT AT DGN #1318 D_5=1. REFER TO THE MACHINE MANUAL OR CONTACT THE MACHINE TOOL BUILDER FOR INFORMATION.	185	
181	SEQ ERROR 3 SEQUENCER ERROR (2) IMMEDIATE STOP IS OUTPUT AT DGN #1318 D_6=1 REFER TO THE MACHINE MANUAL OR CONTACT THE MACHINE TOOL BUILDER FOR INFORMATION.	186	
182	SEQ ERROR 2 DECELERATING STOP IS OUTPUT AT DGN #1318 D_7=1. REFER TO THE MACHINE MANUAL OR CONTACT THE MACHINE TOOL BUILDER FOR INFORMATION.	187	
183		188	
184		189	
183		190	HDLC SYSTEM SOFT ERROR A SYSTEM ERROR OCCURRED AT THE TIME OF ACGC CONNECTION. CONTACT YOUR YASKAWA REPRESENTATIVE.
184		191	HDLC SOFT COMMAND ERROR A SYSTEM ERROR OCCURRED AT THE TIME OF ACGC CONNECTION. CONTACT YOUR YASKAWA REPRESENTATIVE.

Code	Causes
192	HDLC 8530 SEND ERROR A SYSTEM ERROR OCCURRED AT THE TIME OF ACGC CONNECTION. CONTACT YOUR YASKAWA REPRESENTATIVE.
193	HDLC 8530 RECEIVE ERROR A SYSTEM ERROR OCCURRED AT THE TIME OF ACGC CONNECTION. CONTACT YOUR YASKAWA REPRESENTATIVE.
194	HDLC NAK ERROR (10 TIMES) A SYSTEM ERROR OCCURRED AT THE TIME OF ACGC CONNECTION. CONTACT YOUR YASKAWA REPRESENTATIVE.
195	HDLC CMOS FILE ERROR A SYSTEM ERROR OCCURRED AT THE TIME OF ACGC CONNECTION. CONTACT YOUR YASKAWA REPRESENTATIVE.
196	HDLC I/O DATA ERROR A SYSTEM ERROR OCCURRED AT THE TIME OF ACGC CONNECTION. CONTACT YOUR YASKAWA REPRESENTATIVE.
197	HDLC NC REQUEST ERROR A SYSTEM ERROR OCCURRED AT THE TIME OF ACGC CONNECTION. CONTACT YOUR YASKAWA REPRESENTATIVE.
198	HDLC OPERATION ERROR A SYSTEM ERROR OCCURRED AT THE TIME OF ACGC CONNECTION. CONTACT YOUR YASKAWA REPRESENTATIVE.

Code	Causes
201	OT (X) OVERTRAVEL X FOR "0" OF DGN #1319 D_0, D_1. SEE MACHINE TOOL BUILDER'S MANUAL.
202	OT (Y) OVERTRAVEL Y FOR "0" OF DGN #1319 D_2, D_3. SEE MACHINE TOOL BUILDER'S MANUAL.
203	OT (Z) OVERTRAVEL Z FOR "0" OF DGN #1319 D_4, D_5. SEE MACHINE TOOL BUILDER'S MANUAL.
204	OT (4) OVERTRAVEL 4 FOR "0" OF DGN #1319 D_6, D_7. SEE MACHINE TOOL BUILDER'S MANUAL.
205	OT (5) OVERTRAVEL 5 FOR "0" OF DGN #1313 D_0, D_1. SEE MACHINE TOOL BUILDER'S MANUAL.
206	
207	

Code	Causes	Code	Causes
208		215	S-0T1 (5) STORED STROKE LIMIT FIRST AREA 5. SEE TOE-C843-9.30 PAR.2.9.12.
209		216	
210		217	
211	S-0T1 (X) STORED STROKE LIMIT FIRST AREA X. SEE TOE-C843-9.30 PAR.2.9.12.	218	
212	S-0T1 (Y) STORED STROKE LIMIT FIRST AREA Y. SEE TOE-C843-9.30 PAR.2.9.12.	219	
213	S-0T1 (Z) STORED STROKE LIMIT FIRST AREA Z. SEE TOE-C843-9.30 PAR.2.9.12.	220	S-0T2 (INSIDE) STORED STROKE LIMIT SECOND AREA (INSIDE INHIBIT). SEE TOE-C843-9.30 PAR.2.9.12.
214	S-0T1 (4) STORED STROKE LIMIT FIRST AREA 4. SEE TOE-C843-9.30 PAR.2.9.12.	221	S-0T2 (X) STORED STROKE LIMIT SECOND AREA (OUTSIDE INHIBIT) X. SEE TOE-C843-9.30 PAR.2.9.12.

Code	Causes	Code	Causes
222	S-0T2 (Y) STORED STROKE LIMIT SECOND AREA (OUTSIDE INHIBIT) Y. SEE TOE-C843-9.30 PAR.2.9.12.	229	
223	S-0T2 (Z) STORED STROKE LIMIT SECOND AREA (OUTSIDE INHIBIT) Z. SEE TOE-C843-9.30 PAR.2.9.12.	230	TODL BROKEN WHEN THE TOOL BREAKAGE DETECTION (G32, G33) WAS EXECUTED, THE Z-AXIS MOVED TO THE SET POSITION. HOWEVER, SENTS (T) INPUT WAS NOT TURNED ON. (SPECIAL SPECIFICATION)
224	S-0T2 (4) STORED STROKE LIMIT SECOND AREA (OUTSIDE INHIBIT) 4. SEE TOE-C843-9.30 PAR.2.9.12.	231	ZR ERROR-AREA (X) ZERO POINT RETURN AREA ERROR X. VIRTUAL C PHASE TYPE LATCH UNFINISHED. SEE TOE-C843-9.30 PAR.4.2.6.
225		232	ZR ERROR-AREA (Y) ZERO POINT RETURN AREA ERROR Y. SEE TOE-C843-9.30 PAR.4.2.6.
226		233	ZR ERROR-AREA (Z) ZERO POINT RETURN AREA ERROR Z. SEE TOE-C843-9.30 PAR.4.2.6.
227		234	ZR ERROR-AREA (4) ZERO POINT RETURN AREA ERROR 4. SEE TOE-C843-9.30 PAR.4.2.6.
228		235	ZR ERROR-AREA (5) ZERO POINT RETURN AREA ERROR 5. SEE TOE-C843-9.30 PAR.4.2.6.

Code	Causes	Code	Causes
236		243	ZR ERROR-POS (Z) ZERO POINT RETURN POSITION ERROR Z. SEE THIS MANUAL PAR.4.2.7.
237		244	ZR ERROR-POS (4) ZERO POINT RETURN POSITION ERROR 4. SEE THIS MANUAL PAR.4.2.7.
238		245	ZR ERROR-POS (5) ZERO POINT RETURN POSITION ERROR 5. SEE THIS MANUAL PAR.4.2.7.
239		246	
240		247	
241	ZR ERROR-POS (X) ZERO POINT RETURN POSITION ERROR X. SEE THIS MANUAL PAR.4.2.7.	248	
242	ZR ERROR-POS (Y) ZERO POINT RETURN POSITION ERROR Y. SEE THIS MANUAL PAR.4.2.7.	249	

Code	Causes	Code	Causes
250	S-0T3-5 (INSIDE) STORED STROKE LIMIT 3rd, 4th AND 5th AREAS (INSIDE INHIBIT).	257	ZR DECLS ERROR (Z) DECELERATION LS ERROR Z-AXIS. DECLS OF Z-AXIS STARTS CHATTERING ON THE DOG.
251	S-0T3-5 (X) STORED STROKE LIMIT 3rd, 4th AND 5th AREAS (OUTSIDE INHIBIT) X.	258	ZR DECLS ERROR (4) DECELERATION LS ERROR 4TH-AXIS. DECLS OF 4TH-AXIS STARTS CHATTERING ON THE DOG.
252	S-0T3-5 (Y) STORED STROKE LIMIT 3rd, 4th AND 5th AREAS (OUTSIDE INHIBIT) Y.	259	ZR DECLS ERROR (5) DECELERATION LS ERROR 5TH-AXIS. DECLS OF 5TH-AXIS STARTS CHATTERING ON THE DOG.
253	S-0T3-5 (Z) STORED STROKE LIMIT 3rd, 4th AND 5th AREAS (OUTSIDE INHIBIT) Z.	260	
254		261	ZR ERROR PRM (X) RETRACTION BY ZERO POINT (ER PULSE AT C PHASE LATCH > #6304). CONTACT YOUR YASKAWA REPRESENTATIVE.
255	ZR DECLS ERROR (X) DECELERATION LS ERROR X-AXIS. DECLS OF X-AXIS STARTS CHATTERING ON THE DOG.	262	ZR ERROR PRM (Y) RETRACTION BY ZERO POINT (ER PULSE AT C PHASE LATCH > #6305). CONTACT YOUR YASKAWA REPRESENTATIVE.
256	ZR DECLS ERROR (Y) DECELERATION LS ERROR Y-AXIS. DECLS OF Y-AXIS STARTS CHATTERING ON THE DOG.	263	ZR ERROR PRM (Z) RETRACTION BY ZERO POINT (ER PULSE AT C PHASE LATCH > #6306). CONTACT YOUR YASKAWA REPRESENTATIVE.

Code	Causes	Code	Causes
264	ZR ERROR PRM (4) RETRACTION BY ZERO POINT (ER PULSE AT C PHASE LATCH > #6307). CONTACT YOUR YASKAWA REPRESENTATIVE.	269	
265	ZR ERROR (5) RETRACTION BY ZERO POINT (ER PULSE AT C PHASE LATCH > #6308). CONTACT YOUR YASKAWA REPRESENTATIVE.	270	
266		271	P-SET ERROR (X) P SET ERROR X. THE X-AXIS POSITIONING IS NOT COMPLETED. SEE THIS PAR.4.2.8. IF AN ERROR OCCURS IN THE BLOCK WHERE G01 IS CHANGED TO G00, OPERATION STOPS AFTER COMPLETION OF G00 BLOCK.
267		272	P-SET ERROR (Y) P SET ERROR Y. THE Y-AXIS POSITIONING IS NOT COMPLETED. SEE THIS PAR.4.2.8. IF AN ERROR OCCURS IN THE BLOCK WHERE G01 IS CHANGED TO G00, OPERATION STOPS AFTER COMPLETION OF G00 BLOCK.
268		273	P-SET ERROR (Z) P SET ERROR Z. THE Z-AXIS POSITIONING IS NOT COMPLETED. SEE THIS PAR.4.2.8. IF AN ERROR OCCURS IN THE BLOCK WHERE G01 IS CHANGED TO G00, OPERATION STOPS AFTER COMPLETION OF G00 BLOCK.

Code	Causes	Code	Causes
274	P-SET ERROR (4) P SET ERROR 4. THE 4-AXIS POSITIONING IS NOT COMPLETED. SEE THIS PAR.4.2.8. IF AN ERROR OCCURS IN THE BLOCK WHERE G01 IS CHANGED TO G00, OPERATION STOPS AFTER COMPLETION OF G00 BLOCK.	279	
275	P-SET ERROR (5) P SET ERROR 5. THE 5-AXIS POSITIONING IS NOT COMPLETED. SEE THIS PAR.4.2.8. IF AN ERROR OCCURS IN THE BLOCK WHERE G01 IS CHANGED TO G00, OPERATION STOPS AFTER COMPLETION OF G00 BLOCK.	280	MACH UNREADY MACH RDY OFF FOR "0" OF DGN #1316 D_0. CONTACT MACHINE TOOL BUILDER.
276		281	
277		282	
278		283	

Code	Causes	Code	Causes
284		310	SERVO OFF SERVO POWER NOT SUPPLIED. SEE THIS MANUAL PAR.4.2.9.
285		311	
286		312	
287		313	
288		314	
289		315	

Code	Causes
316	
317	
318	
319	
320	NC UNREADY NC NOTREADY P SET NOTREADY. SEE THIS MANUAL PAR.4.2.10.
321	
322	

Code	Causes
323	AMGC SYNC ERROR SYNCHRONOUS ERROR OF AMGC SIDE CPU AND NC SIDE CPU. CONTACT YOUR YASKAWA REPRESENTATIVE.
324	AMGC SYNC ERROR SYNCHRONOUS ERROR OF AMGC120 SIDE CPU AND NC SIDE CPU. CONTACT YOUR YASKAWA REPRESENTATIVE.
325	SERVO CPU ERROR SERVO CPU IS TROUBLE. CONTACT YOUR YASKAWA REPRESENTATIVE. SEE THIS MANUAL PAR.4.2.16
326	SKIP MACRO (G, M, T) ACCESS TO THE MAIN PROGRAMS G, M AND MACRO WAS SKIPPED. (CHECK MODE)
327	UNFINISHED PROG GEN GENERATION IN ALL PROGRAMS NOT FINISHED SEE TOE-C843-9.30 PAR.4.6.2 AND DELETE ALL PROGRAM NUMBERS.
328	UNFINISHED MM21 THE MEMORY LENGTH AND MEMORY BASE CONFLICT. CONTACT YOUR YASKAWA REPRESENTATIVE.
329	PC CPU ERROR PC AND CPU ERROR. CPU FAILURE FOR SEQUENCE CONTROL OR KEEP MEMORY CONTENTS DELETED. SEE THIS MANUAL PAR.4.2.17.

Code	Causes	Code	Causes
330	EMERGENCY STOP EMERGENCY STOP INPUTTED FOR "0" OF DGN #1281 D1. SEE THIS MANUAL PAR.4.2.11.	336	
331	FUSE (X) FUSE BLOWN X. WHEN DGN #1288 D1 IS "1", FUSE BLOWN OR MCCB TRIPPED IN X-AXIS SERVOPACK. SEE THIS MANUAL PAR.4.2.12.	337	
332	FUSE (Y) FUSE BLOWN Y. WHEN DGN #1289 D1 IS "1", FUSE BLOWN OR MCCB TRIPPED IN Y-AXIS SERVOPACK. SEE THIS MANUAL PAR.4.2.12.	338	
333	FUSE (Z) FUSE BLOWN Z. WHEN DGN #1290 D1 IS "1", FUSE BLOWN OR MCCB TRIPPED IN Z-AXIS SERVOPACK. SEE THIS MANUAL PAR.4.2.12.	339	
334	FUSE (4) FUSE BLOWN 4. WHEN DGN #1291 D1 IS "1", FUSE BLOWN OR MCCB TRIPPED IN 4TH-AXIS SERVOPACK. SEE THIS MANUAL PAR.4.2.12.	340	
335	FUSE (5) FUSE BLOWN 5. WHEN DGN #1291 D1 IS "1", FUSE BLOWN OR MCCB TRIPPED IN 5TH-AXIS SERVOPACK. SEE THIS MANUAL PAR.4.2.12.	341	SERVO ERROR (X) SERVO ERROR X. EXCESSIVE DEVIATION IN X-AXIS SERVO SYSTEM. SEE THIS MANUAL PAR.4.2.13.

Code	Causes	Code	Causes
342	SERVO ERROR (Y) SERVO ERROR Y. EXCESSIVE DEVIATION IN Y-AXIS SERVO SYSTEM. SEE THIS MANUAL PAR.4.2.13.	348	
343	SERVO ERROR (Z) SERVO ERROR Z. EXCESSIVE DEVIATION IN Z-AXIS SERVO SYSTEM. SEE THIS MANUAL PAR.4.2.13.	349	
344	SERVO ERROR (4) SERVO ERROR 4. EXCESSIVE DEVIATION IN 4TH-AXIS SERVO SYSTEM. SEE THIS MANUAL PAR.4.2.13.	350	
345	SERVO ERROR (5) SERVO ERROR 5. EXCESSIVE DEVIATION IN 5TH-AXIS SERVO SYSTEM. SEE THIS MANUAL PAR.4.2.13.	351	OL (X) OVERLOAD X. OVERLOAD IN X-AXIS SERVOPACK WHEN DGN #1288 D2 "0". SEE THIS MANUAL PAR.4.2.14.
346	SERVO ERROR (S) SERVO ERROR (SPINDLE). SEE THIS MANUAL PAR.4.2.13.	352	OL (Y) OVERLOAD Y. OVERLOAD IN Y-AXIS SERVOPACK WHEN DGN #1289 D2 "0". SEE THIS MANUAL PAR.4.2.14.
347		353	OL (Z) OVERLOAD Z. OVERLOAD IN Z-AXIS SERVOPACK WHEN DGN #1290 D2 "0". SEE THIS MANUAL PAR.4.2.14.

Code	Causes	Code	Causes
354	OL (4) OVERLOAD 4. OVERLOAD IN 4TH-AXIS SERVOPACK WHEN DGN #1291 D2 "0". SEE THIS MANUAL PAR.4.2.14.	360	
355	OL (5) OVERLOAD 5. OVERLOAD IN 5TH-AXIS SERVOPACK WHEN DGN #1292 D2 "0". SEE THIS MANUAL PAR.4.2.14.	361	PG ERROR (X) PG ERROR X. DISCONNECTION IN X-AXIS PG DETECTED. SEE THIS MANUAL PAR.4.2.15.
356		362	PG ERROR (Y) PG ERROR Y. DISCONNECTION IN Y-AXIS PG DETECTED. SEE THIS MANUAL PAR.4.2.15.
357	OL (OTHER) OVERLOAD (2). OVERLOAD FOR MULTI PURPOSE WHEN DGN #1281 D3 "0". CONTACT MACHINE TOOL BUILDER.	363	PG ERROR (Z) PG ERROR Z. DISCONNECTION IN Z-AXIS PG DETECTED. SEE THIS MANUAL PAR.4.2.15.
358		364	PG ERROR (4) PG ERROR 4. DISCONNECTION IN 4TH-AXIS PG DETECTED. SEE THIS MANUAL PAR.4.2.15.
359		365	PG ERROR (5) PG ERROR 5. DISCONNECTION IN 5TH-AXIS PG DETECTED. SEE THIS MANUAL PAR.4.2.15.

Code	Causes	Code	Causes
366	PG ERROR (S) PG ERROR S. DISCONNECTION IN SPINDLE PG DETECTED. SEE THIS MANUAL PAR.4.2.15.	373	SR-20 UNSUITABLE THE OPTIONAL AXIS SETTING AND SR-20 FORMAT CONFLICT. CONTACT YOUR YASKAWA REPRESENTATIVE.
367		374	
368		375	
369		376	
370		377	
371	SV-FG SYNC ERROR FG ERROR 1. CONTACT YOUR YASKAWA REPRESENTATIVE FOR CHECKING MB 20 BOARD.	378	
372	FG NOT READY FG CONTACT YOUR YASKAWA REPRESENTATIVE FOR CHECKING MB 20 BOARD.	379	

Code	Causes	Code	Causes
380		386	
381	AXIS ERROR (X) AXIS CPU ERROR. CONTACT YOUR YASKAWA REPRESENTATIVE FOR CHECKING MB 20 BOARD.	387	
382	AXIS ERROR (Y) AXIS CPU ERROR. CONTACT YOUR YASKAWA REPRESENTATIVE FOR CHECKING MB 20 BOARD.	388	
383	AXIS ERROR (Z) AXIS CPU ERROR. CONTACT YOUR YASKAWA REPRESENTATIVE FOR CHECKING MB 20 BOARD.	389	
384	AXIS ERROR (4) AXIS CPU ERROR. CONTACT YOUR YASKAWA REPRESENTATIVE FOR CHECKING MB 20 BOARD.	390	SERVOPACK ALARM (SERVO PACK) SR20 · SERVOPACK ALARM (SPINDLE DRIVE) · PG DISCONNECTION OF 4/5 AXIS · SR FAILURE CONTACT YOUR YASKAWA REPRESENTATIVE.
385	AXIS ERROR (5) AXIS CPU ERROR. CONTACT YOUR YASKAWA REPRESENTATIVE FOR CHECKING MB 20 BOARD.	391	SERVO ALARM (X) X-AXIS SERVOPACK ALARM. CONTACT YOUR YASKAWA REPRESENTATIVE.

Code	Causes	Code	Causes
392	SERVO ALARM (Y) Y-AXIS SERVOPACK ALARM. CONTACT YOUR YASKAWA REPRESENTATIVE.	399	
393	SERVO ALARM (Z) Z-AXIS SERVOPACK ALARM. CONTACT YOUR YASKAWA REPRESENTATIVE.	400	
394	SERVO ALARM (4) 4TH-AXIS SERVOPACK ALARM. CONTACT YOUR YASKAWA REPRESENTATIVE.	401	
395	SERVO ALARM (5) 5TH-AXIS SERVOPACK ALARM. CONTACT YOUR YASKAWA REPRESENTATIVE.	402	
396		403	
397		404	
398		405	

Code	Causes	Code	Causes
406		813	
407		814	
408		815	
409		816	
810	RAM ERROR	817	
811		818	
812		819	

Code	Causes	Code	Causes
820	ROM ERROR, RAM ERROR ROM OR RAM ERROR.0 OR HARDWARE CHECK REQUIRED. SEE THIS MANUAL PAR. 4.2.20.	826	
821		827	
822		828	
823		829	
824		830	CPU ERROR
825			

9.2 LIST OF SETTING NUMBERS

Setting numbers are classified in the following three groups:

Table 9.3

Setting Number	Group
#6000 to 6004	Setting by bit
#6200 to 6219	Setting by word
#6500 to 6599	Setting by double words
#6700 to 6771	Setting by double words
#6772 to 6899	Setting by double words

Appendix table 1-2 lists setting numbers and their functions

SETTING NUMBERS AND THEIR CONTENTS

#6000	D7		D5	D4	D3	D2	D1	D0

D7 1: Sets punch-out code to ISO

0: Sets punch-out code to EIA

D5 1: Sets playback ON

0: Sets playback ON/OFF with an external switch

D4, D3, D2, D1, D0

Selects whether to make the mirror image of the 5th-axis, 4th-axis, Z-axis, Y-axis and X-axis effective in successive order or to make them external switches

1 Mirror image effective

0 External switch

#6001	D7			D4	D3	D2	D1	D0

D7 1: Emits operating panel buzzer sound

0: Does not emit operating panel buzzer sound

D4 Z axis cancelling switch

1: ON

0: OFF

D3 Manual absolute switch
1: ON
0: OFF

D2 Editing lock switch
1: ON
0: OFF

D1 1: Checks the 2nd prohibited area of stored stroke limit

0: Does not check the 2nd prohibited area of stored stroke limit

D0 1: Changes input units to inch inputs

0: Changes input units to mm inputs

#6002	D7	D6	D5	D4	D3	D2	D1	D0

D7 Auxiliary function lock switch
1: ON
0: OFF

D6 Machine lock switch
1: ON
0: OFF

D5 Optional stop switch
1: ON
0: OFF

D4 Dry run switch
1: ON
0: OFF

D3 Optional block skipping switch
1: ON
0: OFF

D2 Display lock switch
1: ON
0: OFF

D1 Start lock switch
1: ON
0: OFF

D0 Single block switch
1: ON
0: OFF

#6003			D5	D4			D1	D0

D5, D4: Selects the output device of the data input interface

D1, D0: Selects the input device of the data input interface

Setting Code	Input Device	Output Device	Parameter for Setting Baud Rate
0 1	RS232C No.1	RS232C No.1	#6026 (#6028) D3 to D0
1 1	RS232C No.2	RS232C No 2	#6027 (#6029) D3 to D0

#6004		D6		D4	D3		D_1	D_0

D6 1: Cancels life data when executing command G122

0: Does not cancel life data when executing command G122

D4 1: Programs of program numbers 8000 through 8999 cannot be registered, erased or edited.

0: Normal registration, erasure and editing can be performed.

D3 1: Programs with program numbers 8000 through 8999 will not be displayed.

0: Programs with program numbers 8000 through 8999 will be displayed.

D1 1: Single blocks become effective in relation to an operation command from the user program.

0: Single blocks become ineffective in relation to operation commands or control commands from the user program.

D0 1: The next block will be executed if there is no skip signal input until shifting of the G31 block ends.

0: Causes alarm "087"

#6200	Break point -1
#6201	Break point -2

Sets break points sequence
Setting range 1 through 9999 Will not stop at 0

#6204	

Specifies group number during tool change and reset.
Setting range 1 through 256.

#6207	

Sets program number.
Specifies program number of tape when inputting tape without a program number.
Setting range 1 through 9999.

Note: When 0 is set and the number on CRT is not 0, input error.

#6210	

Sets dwell time when executing G76 and G77.
Setting "1" = 1 ms
Setting range: 0 - 32767

#6211	

Sets amount of δ when executing G73,
Setting "1" = 0.001 mm
"1" = 0.0001 inch
Setting range: 0 - 32767

#6213	

Sets shift amount "δ" when executing G83.
Setting: "1" = 0.001 mm
or "1" = 0.0001 inch
Setting range: 0 - 32767

#6219	

System No. switch setting
Setting range: 0, 1, 4

#6500	
#6501	

Sets scaling multiple. Multiple = #6500/#6501
Scale multiple = 1 when setting is "0."

#6506	

Sets angle during execution of commands G76 and G77.
Setting: "1" = 0.001 deg

#6507	

Sets tool length measuring bias.
Setting: "1" = Least input increment

#6508	

Sets tool length measuring bottom level.
Setting: "1" = Least input increment

#6510	X-axis
#6511	Y-axis
#6512	Z-axis

Sets stored stroke limit of the X, Y and Z axes and the boundary value in the positive direction of the 2nd prohibited area.
Setting range: 0 - ±99999999
Setting: "1" = 1 pulse

#6513	X-axis
#6514	Y-axis
#6515	Z-axis

SETTING NUMBERS AND THEIR CONTENTS (Cont'd)

Sets stored stroke limit of the X, Y and Z axis in successive order and also the negative direction boundary value of the 2nd prohibited area.
Setting range: 0 - ±99999999
Setting: "1" = 1 pulse

#6516	X-axis
#6517	Y-axis
#6518	Z-axis
#6519	4th-axis
#6520	5th-axis

Work coordinate system setting G54 (J1)
Setting range: 0 - ±99999999
Setting: "1" = Least input increment

#6522	X-axis
#6523	Y-axis
#6524	Z-axis
#6525	4th-axis
#6526	5th-axis

Work coordinate system setting G55 (J1)
Setting range: 0 - ±99999999
Setting: "1" = Least input increment

#6528	X-axis
#6529	Y-axis
#6530	Z-axis
#6531	4th-axis
#6532	5th-axis

Work coordinate system setting G56 (J1)
Setting range: 0 - ±99999999
Setting: "1" = Least input increment

#6534	X-axis
#6535	Y-axis
#6536	Z-axis
#6537	4th axis
#6538	5th axis

Work coordinate system setting G57 (J1)
Setting range: 0 - ±99999999
Setting: "1" = Least input increment

#6540	X-axis
#6541	Y-axis
#6542	Z-axis
#6543	4th-axis
#6544	5th-axis

Work coordinate system setting G58 (J1)
Setting range: 0 - ±99999999
Setting: "1" = Least input increment

#6546	X-axis
#6547	Y-axis
#6548	Z-axis
#6549	4th-axis
#6550	5th-axis

Work coordinate system setting G59 (J1)
Setting range: 0 - ±99999999
Setting: "1" = Least input increment

#6552	X-axis
#6553	Y-axis
#6554	Z-axis
#6555	4th-axis
#6556	5th axis

Coordinate value at skip signal ON
Setting range: 0 - ±99999999
Setting: "1" = Least input increment

#6561	F1
#6562	F2

#6563	F3
#6564	F4
#6565	F5
#6566	F6
#6567	F7
#6568	F8
#6569	F9

F1-digit speed setting
Setting range: 0 - 240000
"1" = 0 1 mm/min
or 0 01 in/mm
Setting· "1" = Least input increment

#6570	

Tool setter measurement longitudinal direction reference value
Setting "1" = Least input increment
Setting range ±99999999

#6572	

Tool setter measurement diameter direction reference value
Setting. "1" = Least input increment
Setting range: ±99999999

#6573	X-axis+
#6574	X-axis-
#6575	Y-axis+
#6576	Y-axis-
#6577	Z-axis-
#6578	

Workpiece setter measurable return amount
Setting "1" = Least input increment
Setting range 99999999

#6700	X-axis
#6701	Y-axis
#6702	Z-axis

Work coordinate system setting G54 (J2)
Setting range: 0 - ±99999999
Setting: "1" = Least input increment

#6703	X-axis
#6704	Y-axis
#6705	Z-axis

Work coordinate system setting G55 (J2)
Setting range: 0 - ±99999999
Setting: "1" = Least input increment

#6706	X-axis
#6707	Y-axis
#6708	Z-axis

Work coordinate system setting G56 (J2)
Setting range: 0 - ±99999999
Setting: "1" = Least input increment

#6709	X-axis
#6710	Y-axis
#6711	Z-axis

Work coordinate system setting G57 (J2)
Setting range: 0 - ±99999999
Setting: "1" = Least input increment

#6712	X-axis
#6713	Y-axis
#6714	Z-axis

Work coordinate system setting G58 (J2)
Setting range: 0 - ±99999999
Setting: "1" = Least input increment

#6715	X-axis
#6716	Y-axis
#6717	Z-axis

Work coordinate system setting G59 (J2)
Setting range: 0 - ±99999999
Setting: "1" = Least input increment

#6718	X-axis
#6719	Y-axis

SETTING NUMBERS AND THEIR CONTENTS (CONT'D)

#6720	Z-axis

Work coordinate system setting G54 (J3)
Setting range: 0 - ±99999999
Setting: "1" = Least input increment

#6721	X-axis
#6722	Y-axis
#6723	Z-axis

Work coordinate system setting G55 (J3)
Setting range: 0 - ±99999999
Setting: "1" = Least input increment

#6724	X-axis
#6725	Y-axis
#6726	Z-axis

Work coordinate system setting G56 (J3)
Setting range: 0 - ±99999999
Setting: "1" = Least input increment

#6727	X-axis
#6728	Y-axis
#6729	Z-axis

Work coordinate system setting G57 (J3)
Setting range: 0 - ±99999999
Setting: "1" = Least input increment

#6730	X-axis
#6731	Y-axis
#6732	Z-axis

Work coordinate system setting G58 (J3)
Setting range: 0 - ±99999999
Setting: "1" = Least input increment

#6733	X-axis
#6734	Y-axis
#6735	Z-axis

Work coordinate system setting G59 (J3)
Setting range: 0 - ±99999999
Setting: "1" = Least input increment

#6736	X-axis
#6737	Y-axis
#6738	Z-axis

Work coordinate system setting G54 (J4)
Setting range: 0 - ±99999999
Setting: "1" = Least input increment

#6739	X-axis
#6740	Y-axis
#6741	Z-axis

Work coordinate system setting G55 (J4)
Setting range: 0 - ±99999999
Setting: "1" = Least input increment

#6742	X-axis
#6743	Y-axis
#6744	Z-axis

Work coordinate system setting G56 (J4)
Setting range: 0 - ±99999999
Setting: "1" = Least input increment

#6745	X-axis
#6746	Y-axis
#6747	Z-axis

Work coordinate system setting G57 (J4)
Setting range: 0 - ±99999999
Setting: "1" = Least input increment

#6748	X-axis
#6749	Y-axis
#6750	Z-axis

Work coordinate system setting G58 (J4)
Setting range: 0 - ±99999999
Setting: "1" = Least input increment

#6751	X-axis
#6752	Y-axis
#6753	Z-axis

Work coordinate system setting G59 (J4)
Setting range: 0 - ±99999999
Setting: "1" = Least input increment

#6754	X-axis
#6755	Y-axis
#6756	Z-axis

Work coordinate system setting G54 (J5)
Setting range: 0 - ±99999999
Setting: "1" = Least input increment

#6757	X-axis
#6758	Y-axis
#6759	Z-axis

Work coordinate system setting G55 (J5)
Setting range: 0 - ±99999999
Setting: "1" = Least input increment

#6760	X-axis
#6761	Y-axis
#6762	Z-axis

Work coordinate system setting G56 (J5)
Setting range: 0 - ±99999999
Setting: "1" = Least input increment

#6763	X-axis
#6764	Y-axis
#6765	Z-axis

Work coordinate system setting G57 (J5)
Setting range: 0 - ±99999999
Setting: "1" = Least input increment

#6766	X-axis
#6767	Y-axis
#6768	Z-axis

Work coordinate system setting G58 (J5)
Setting range: 0 - ±99999999
Setting: "1" = Least input increment

#6769	X-axis
#6770	Y-axis
#6771	Z-axis

Work coordinate system setting G59 (J5)
Setting range: 0 - ±99999999
Setting: "1" = Least input increment

9.3 LIST OF PARAMETER NUMBERS

Parameter numbers are classified in the following five groups

Table 9.4

Parameter number	Group
#6005 to #6099	Setting by bit
#6100 to #6199	Setting by byte
#6220 to #6499	Setting by word
#6600 to #6699	Setting by double words
#7000 to #7099	Setting by byte for sequencer

Optimum data of parameters have been set according to machine performance and applications. For any modification of parameter data, consult the machine tool builder.

Data pertaining to parameters #6033 to #6049 must not be modified, for they have been incorporated as part of the system.

PARAMETER NUMBERS AND THEIR CONTENTS

#6005	D7	D6	D5	D4	D3	D2	D1	D0

D7 1 Stores the H code for reset and G28

0 Sets the H code to G00 for reset and G28

D6 1 Stores the G code in the 01 group for reset.

0. Sets the G code in the 01 group to G00 for reset.

D5 1: Allows the current value display (universal) to be preset by the coordinate system Setting command G92.

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

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

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

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

D4	D3	Initial status
1	0	Sets the G code in the 08 group to G44 on power application
0	1	Sets the G code in the 08 group to G43 on power application.
0	0	Sets the G code in the 08 group to G49 on power application.

D2 1 Sets the M95 mode (mirror image ON) on power application or reset.

0 · Sets the M94 mode (mirror image OFF) on power application or reset

D1 1 : Does not apply mirror image on the mid-point of G28 at M95 mode on power application or reset

0 : Applies mirror image on the mid-point of G28 at M95 mode on power application or reset

D0 1. Sets the G code in the 03 group to G91 on power application.

0 Sets the G code in the 03 group to G90 on power application

#6006	D7	D6	D5	D4	D3	D2	D1	D0

D7, D6 Signs of 55-digit analog (SDA) output

D7	D6	Sign		
1	1	Minus	Minus	(1)
1	0	Plus	Plus	(1)
0	1	Minus	Minus	(2)
0	0	Plus	Plus	(2)
		M03 output	M04 output	

Note: The function of (1) is same as (2).

D5 1 Sets the least input increment ×10

0 Does not set the least input increment to ×10

D4 1 Checks to see if the spindle speed match signal (SAGR) is off upon transition from a rapid traverse block to a cutting feed block.

0 Provides no check on the spindle speed match signal (SAGR).

D3 1 Enables the internal toggle switches

0 Disables the internal toggle switches.

See #6001, #6002

D2 1. Enables dry run in response to the rapid traverse command.

0· Disables dry run in response to the rapid traverse command.

D1 1 Causes an alarm ("001-004") upon cycle start when reference point return is not made after power application

0 Causes no alarm

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

When this parameter is set to "1," Cycle Start is not activated unless reference point return of all the axes have not be completed. Setting it to "0" determines whether reference point return is required or not for each axis.
Refer to parameters #6011 D0 to D4.

D0 1: Enables automatic coordinate system setting

2: Disables automatic coordinate system setting.

Refer to #6630 to #6640

#6007	D7	D6	D5	D4	D3	D2	D1	D0

D7 1: Disables start interlock after EDT.

0. Enables start interlock after EDT.

D6 1: Employs the newly entered tool compensation value in place of the old value.

0. Adds the newly entered tool compensation value to the soterd value to establish another offset

D5 1: Enables error detect ON mode at dwell.

0: Disables error detect On mode at dwell.

D4 1. Provides output during rewinding.

0· Provides no output during rewinding.

D3 1· Sets the least increment to 0.0001 in.

0. Sets the least increment to 0.001 mm.

D2 1: Makes the spindle override 100% during tapping by G84.

0: Does not make the spindle override 100% during tapping by G84.

D0 1· Establishes the prohibited area of the 3rd, 4th, and 5th stored stroke limit outside the boundary.

0· Establishes the prohibited area of the 3rd, 4th, and 5th stored stroke limit inside the boundary.

#6008	D7	D6	D5	D4	D3	D2	D1	D0

D7 1: Rewinds at M30 command in tape operation with Yasnac standard tape reader. (No.2 RS-232C)

0: Rewinds at M30 command in tape operation with Yasnac standard tape reader. (No.2 RS-232C)

D6 1: Rewinds at M30 command in tape operation with Yasnac standard tape reader. (No.1 RS-232C)

0: Does not rewind at M30 command in tape operation with Yasnac standard tape reader. (No.1 RS-232C)

D5 1: 0 is changeable with ALT operation.

0: 0 is not changeable with ALT operation.

D4 1: Feed hold block stop ineffective when tapping with G84

0: Feed hold block stop effective when tapping with G84

D3 1: Manual absolute effective in the G91 mode.

0: Manual absoulte ineffective in the G91 mode.

D2 1: Changes approach speed to jog speed when restarting program.

0: Changes approach speed to fast feed when restarting program.

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

0: Clears the common variables of #100 through #149.

D0 1: Requires Edit interlock for Manual Zero Setup.

0: Does not require Edit interlock for Manual Zero Setup

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

#6009		D6						

D6 1: Feed is provided when output from the NC.

0: Feed is not provided when output from the NC.

#6010	D7	D6	D5	D4	D3	D2	D1	D0

D7, D6, D5

Specify whether or not the automatic pulse is effective on the Z-, Y-, and X-axis, respectively.

1: Effective

0: Ineffective

(Automatic handle offset)

D4, D3, D2, D1, D0

Specify the direction of reference point return on th 4th-, 5th-, Z-, Y- and X-axes, respectively.

1 Minus direction

0· Plus direction

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

Backlash is applied first when the tool is moved in the reverse direction of that specified by D0 to D4 after turning on power.

#6011	D7	D6	D5	D4	D3	D2	D1	D0

D7 1: Convert the ":" into "O" upon tape in/out.

0: Do not convert the ":" into "O" upon tape in/out.

D6, D5

Specify whether or not the automatic pulse is effective on the 5th, and 4th axes, respectively.

1: Effective

0: Ineffective

D4, D3, D2, D1, D0

Command reference-point interlock for 5th, 4th, Z-, Y-, and X-axis respectively, before cycle start.

1: Interlock enable

0: Interlock disable

Note: The specification is effective when #6006 D1 is "0."

#6012				D4	D3	D2	D1	D0

D4, D3, D2, D1, D0

Specify whether or not the plus-direction external deceleration signal is effective on the 4th-,5th-,Z-,Y- and X-axes, respectively.

1· Makes the plus-direction external deceleration signal effective.

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

#6013				D4	D3	D2	D1	D0

D4, D3, D2, D1, D0

Specify whether or not the minus-direction external deceleration signal is effective on the 4th-, 5th-, Z-, Y- and X-axes, respectivel

1: Makes the minus direction external deceleration signal effective.

0: Makes the minus direction external deceleration signal ineffective.

#6014	D7	D6		D4	D3	D2	D1	D0

D7 1: PC CPU error is triggered.
0: PC CPU error is not triggered.

D6 1: SV CPU error is triggered.
0: SV CPU error is not triggered.

D5 1: ACGC2 SYNC ERROR or AMGC SYNC ERROR occurred.

0: ACGC2 SYNC ERROR or AMGC SYNC ERROR did not occur.

D4, D3, D2, D1, D0

Specify the direction of the G60 unidirectional approach upper limit on the 4th-,5th-, Z-, Y- and X-axes, respectively.

1: Minus direction

0: Plus direction

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

#6015				D4	D3	D2	D1	D0

D4, D3, D2, D1, D0

Specify whether or not the automatic coordinate system setting is effective on the 4th-, 5th-, Z-, Y- and X-axes, respectively.

1. Effective

0 Ineffective

NOTE. The automatic coordinate system is established with the following parameters:

Metric system, #6636 - #6639

Inch system· #6630 - #6633

#6016				D4	D3	D2	D1	D0

D4, D3, D2, D1, D0

Specify whether or not reference point return is effective on the 4th-, 5th-, Z-, Y- and X-ases, respectively.

1 Makes reference point return effective.

0: Makes reference point return ineffective.

#6017	D7	D6	D5	D4	D3	D2	D1	D0

D7 - D0

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:
D7 - D0 = 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 D7 - D0 =00000000 assumes that symbol "#" is not used in the EIA code

#6018	D7	D6	D5	D4	D3		D1	

D7 1: Provides dwell at hole bottom in the canned cycles of G76 and G77.

0. Does not provide dwell at hole bottom in the canned cycles of G76 and G77.

NOTE: The dwell time is set with #6210.

D6 1. Establishes M03 for G74 and M04 for G84 as the M code for output at hole bottom in the canned cycles of G74 and G84.

0: Reverses the M code in effect before the canned cycles for output at hole bottom in the canned cycle of G74 and G84.

Before canned cycle	Hole bottom
M03 →	M04
M04 →	M03

NOTE This specification is effective when D4 = 0 in #6018.

D5 1 Rotates the spindle forward and in reverse, outputting M05 at hole bottom in the canned cycles of G74 and G84

0 Rotates the spindle forward and in reverse, not outputting M05 at hole bottom in the canned cycles of G74 and G84.

NOTE This specification is effective when D_4 = 0 in #6018.

D4 1 Outputs a read-only signal (SSP, SRV, OSS) in the canned cycles.

0 Outputs the M code in the canned cycles

D3 1: Does not wait for IN POSITION at G00 and G01 to G00 commands.

0: Waits for IN POSITION at G00 and G01 to G00 commands.

D1 1 Outputs the FMF signal twice in a canned cycle

0 Outputs the FMF signal once in a canned cycle.

#6019	D7	D6		D4	D3	D2	D1	D0

D7 Stops the tape at the initial "%" during tape operation.

1: Effective

0: Ineffective

D6 1: When parameter outputs, only #7000-#7999 is output.

0: When parameter outputs, all range is output.

D4 1. Employs the feedrate set in parameter #6232 for the skip function command (G31).

0 Employs the F code command as the feedrate for the skip function command (G31).

D3 1: Reset OFF at Emergency Stop

0: Reset ON at Emergency Stop

D2, D1

Specify the tool shift direction in the canned cycles of G76 and G77 (effective when #6019 = 0).

D2	D1	Shift direction
1	1	-Y
1	0	+Y
0	1	-X
0	0	+X

PARAMETER NUMBERS AND THEIR CONTENTS (CONT'D)

D0 1. **Allows the tool shift direction in the canned cycles of G76 and G77 to be specified in setting #6506 (specifiable in the +X direction in increments of 0.001; the shift being cutting feed).**

0. Allows the tool shift direction in the canned cycles of G76 and G77 to be specified in D_2 and D_1 of parameter #6019 (specifiable only axially)

#6020	D7	D6	D5	D4	D3	D2	D1	D0

D7 1: Assigns selection of group specification numbers to an external signal when the tool change skip signal is ON during life control.

0: Assigns selection of group specification numbers to the currently specified group when the tool change skip signal is ON during life control.

D6 1: Assigns selection of the T command group to the T command immediately prior during the M06 command in life control.

0: Assigns selection of the T command to the latest T command during the M06 command in life control.

D5 1: Assigns group number specifiifcation to an external signal during tool change reset in life control.

0: Assigns group number specification to setting #6204 during tool change reset in life control.

D4 1: Counts with M02/M30 when count is the type of life control.

0: Counts with T9999L△△△ when count is the type of life control.

D3 1: Sets F14 (in/rev) for the feed per minute in the inch system.

0: Sets F13 (in/rev) for the feed per minute in the inch system.

D2 1: Sets F23 (mm/rev) for the feed per minute in the metric system.

0: Sets F22 (mm/rev) for the feed per minute in the metric system.

D1 1 Sets F32 (mm/min.) for the feed per minute in the metric system.

0. Sets F31 (mm/min.) for the feed per minute in the inch system.

D0 1 Sets F51 (mm/min.) for the feed per minute in the metric system.

0 Sets F50 (mm/min) for the feed per minute in the metric system

#6021	D7	D6	D5	D4	D3	D2	D1	D0

D7 1: Makes editing interlock O9000 through O9999 effective.

0: Makes editing interlock O9000 through O9999 ineffective.

D6 1: Erases and stores the previous O when loading a tape provided with an O.

0: ALREADY IN will be displayed if the same O number exists when a tape with an O is loaded.

D5 1: Executes ON/OFF control of RTS during RS 232C operation until loading ends.

0: Sets RTS to ON state during RS 232C operation until loading ends.

D4 1: Refers to DR (Data set ready) during RS 232C operation.

0: Does not refer to DR (Data set ready) during RS 232C operation.

D3 1: Outputs O0 with O through 9999 OUT.

0: Does not output O0 with 0 through 9999 OUT.

D2 1: Displays the 0 number when the power supply is turned on and off.

0: Displays 0 when power is turned on.

D1 1 Employs the value following address O or N as the program number (speciable in one block)

0 Employs the value following address O as the program number.

D0 1 Considers M02, M30 or M99 as the program end when machining data are stored into memory
EOB code is attached at the head of No 0 at punching-out (0-9999 OUT)

0. Does not consider M02, M30 or M99 as the program end when machining data are stored into memory
EOB code is not attached at the head of No 0 at punching out (0 9999 OUT)

#6022	D7	D6	D5	D4	D3	D2	D1	D0

D7 1: Sets input unit of parameter setting to 10 RPM when specifying the S5 digits.

0: Sets input unit of parameter setting to 1 RPM when specifying the S5 digits.

D6 1: Enables binary search of EDIT/MEM. Character search is also possible if the NEXT key is pressed.

0: Enables search of EDIT/MEM character only.

D5 1: Makes editing display of O90000 through O9000 Interlock effective.

0: Makes editing display O90000 through Interlock O9999 ineffective.

D4 1: Makes intermediate POT display effective.

0: Makes intermediate POT display ineffective.

D3 1: Makes tool POT word display effective.

0: Makes tool POT byte display effective.

D2 1: Enables writing word

0: Enables writing bytes in keep memory.

D1 1: No parity bit when punching out an ISO tape

0: Parity bit exists when punching out an ISO tape

D0 1: Enables read of ISO tape possible even without parity.

0: Disables read of ISO tape without parity.

#6023		D6		D4	D3	D2	D1	D0

D6 1: Enables the additional axis to ignore 4NG.

0: Disables the additional axis to ignore 4NG.

Note: When this parameter setting is changed, turn off the power. Setting the parameter except to "0," display shows additional axis is provided. However, this additional axis cannot be effective without changing hardware (SR20-**).

D4-D0

Set the address for pan-out and CRT display on the additional axis.

Address	D_4	D_3	D_2	D_1	D_0
A	0	0	0	0	1
B	0	0	0	1	0
C	0	0	0	1	1
U	1	0	1	0	1
V	1	0	1	1	0
W	1	0	1	1	1

#6024		D6		D4	D3	D2	D1	D0

D6 1: Enables 5NG to ignore the additional axis

0: Disables 5NG to ingnore the additional axis

Note: When this parameter setting is changed, turn off the power. Setting the parameter except to "0," display shows additional axis is provided. However, this additional axis cannot be effective without changing hardware (SR20-**).

D4-D0: Set address of pan-out and CRT display on the additional axis.

Address	D4	D3	D2	D1	D0
A	0	0	0	0	1
B	0	0	0	1	0
C	0	0	0	1	1
U	1	0	1	0	1
V	1	0	1	1	0
W	1	0	1	1	1

Note: These parameters cannot be written when parameter #6030-D7 is "0."

#6025								

Parameter #6025 cannot be written at any time.

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

#6026, #6027:

D5 1: Does not allow the control code (DC1 - DC4) to be used on the I/O device.

0 Allows the control code (DC1 - DC4) to be used on the I/O device.

D4 1: Employs 2 stop bits on the I/O device.

0: Employs 1 stop bit on the I/O device.

PARAMETER NUMBERS AND THEIR CONTENTS (CONT'D)

D3 to D0 Baud rate setting

Baud Rate Setting

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

NOTE: #6026 provides the setting on input device 1 (SIO-1) and #6027 on input device 2 (SIO-2).

#6028			D5	D4	D3	D2	D1	D0
#6029			D5	D4	D3	D2	D1	D0

D5 1. Does not use control codes (DC1-DC4).

0: Uses control codes (DC1-DC4)

D4 1: Sets stop bits as two bits in the output device.

0: Sets stop bits as one bit

D3 to D0 Baud rate setting

Baud Rate Setting

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

Notes 1 #6028 is for setting output device 1 (SIO-1)

2. #6029 is for setting output device 2 (SIO-2)

#6050	D7	D6	D5				D0
#6051	D7	D6	D5				D0
#6052	D7	D6	D5				D0
#6053	D7	D6	D5				D0
#6054	D7	D6	D5				D0
#6055	D7	D6	D5				D0

Shown in the order of X-axis Y-axis, Z-axis, 4th-axis, 5th-axis and spindle.

D7, D6

Be sure to set the assignment of servo control form.

CNTL 2: 0

CNTL 1: 0

Spindle only: 0, 1

D5 1: No servo control is performed.

0: Servo control is performed.

D0 1: Operation confirmation of each unit is not performed during system operation.

0: Operation confirmation of each unit is performed during system operation.

Notes: 1. Normal setting is "0."

2. When these parameters are changed, be sure to turn the power off and on.

#6056					D3	D2	D1	D0
#6057					D3	D2	D1	D0
#6058					D3	D2	D1	D0
#6059					D3	D2	D1	D0
#6060					D3	D2	D1	D0
#6061					D3	D2	D1	D0

Shown in the order of X-axis, Y-axis, Z-axis, 4th-axis, 5th-axis and spindle.

D3 to D0: They set the pulse scale factor of feedback pulses to be input into NC unit.

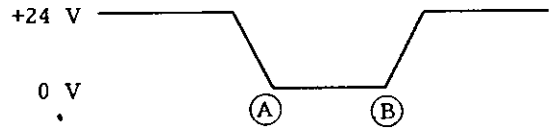
	D3	D2	D1	D0
×1	0	0	0	1
×2	0	0	1	0
×4	0	1	0	0
×8	1	0	0	0

Note: Be sure to turn the power on and off after changing the parameter.

#6062				D5	D4			

D4: This sets the signal state of processing start of "skip" input for skip function.

D5: This sets the signal state of processing start of "PINT" input for pint function.



Ⓐ: When this parameter is set to "0," the processing starts at the time when the change of 24V → 0V occurs.

Ⓑ: When this parameter is set to "1," the processing starts at the time when the change of 0V → 24V occurs.

Note: Be sure to turn the power on and off after changing the parameter.

Be sure to set "0" except for D4 and D5.

#6063					D3		D1	

D1: This determines the ENABLE/DISABLE of control circuit of "SKIP" input for skip function.

D3: This determined the ENABLE/DISABLE of control circuit of "PINT" input for pint function.

Notes: 1. Be sure to set "1" when using the skip and program interruption functions.
2. Be sure to turn the power on and off after changing the parameter to set "0" except for D1 and D3.

#6064				D4	D3	D2	D1	D0

D4, D3, D2, D1, D0

Shown in the order of 5th-axis, 4th-axis, Z-axis, Y-axis and X-axis.

1: Follow-up processing is performed during servo-off input.

0: Follow-up processing is not performed during servo-off input.

#6066	D7	D6						

D7 1: JOG speed of 4 and 5 axis is 1/10 of 3 axis.
0: JOG speed of 4 and 5 axis is not 1/10 of 3 axis.

D6 1: At power ON, M97.
0: At power ON, N96.

#6074			D5	D4	D3	D2	D1	D0

D5 1 Control code (DC1 to DC4) is not used in the input unit.
0. Control code (DC1 to DC4) is used in the input unit.

D4 1: Stop bit is to be 2 bits in the input unit.
0· Stop bit is to be 1 bit in the input unit.

D3 to D0 Baud rate setting

Baud Rate	D3	D2	D1	D0
Setting Disable	0	0	0	0
Setting Disable	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

#6075			D5	D4	D3	D2	D1	D0

D5 1 Control code (DC1 to DC4) is not used
0 Control code (DC1 to DC4) is used

D4 1 Stop bit is to be 2 bits in the output unit.
0. Stop bit is to be 1 bit in the output unit

D3 to D0 Baud rate setting

Baud Rate	D3	D2	D1	D0
Setting Disable	0	0	0	0
Setting Disable	0	0	0	1
110	0	0	1	0
150	0	0	1	1
200	0	1	0	0
300	0	1	0	1
600	0	1	1	0
1200	0	1	1	1
2400	1	0	0	0
4800	1	0	0	1
9600	1	0	1	0

Note. #6074 is for setting of input unit 3.
#6075 is for setting of output unit 3
#6074 and #6075 are used exclusively for AMGC

#6076					D3	D2	D1	D0

D3 1. TLM function is used for tool compensating measurement when both offset presetter function and TLM function are effective
0 Offset presetter function is used.

D2 1: Machine zero point on drawing can be set on the drawing condition setting screen.
0: Machine zero point on drawing cannot be set.

D1 1: Parity bit not provided at ISO tape punch-out.
0 Parity bit provided at ISO tape punch-out.

D0 1. No parity enabled at ISO tape read-in
0 No parity disabled at ISO tape read-in

Note. This parameter is used exclusively for AMGC

#6100	Reserved
#6101	Reserved
#6102	Reserved
#6103	Reserved
#6104	Reserved

Note: Be sure to turn the power on and off after changing the parameter.

#6107	

Specifies the number of manual pulse generators.
Setting: "1" = 1
Setting range: 0 - 3

#6110	([ )
#6111	( ])
#6112	(*)
#6113	(=)
#6114	(( )
#6115	( ))

#6110 to #6115:

Specify punches of the codes corresponding to the symbols of EIA codes used in the user macro body.

1: Punched

0: Not punched

Setting range: 0 - 255

#6116	
#6117	
#6118	
#6119	

Maximum 4 types of M codes to stop advance reading.

Setting range: 0 - 255

#6120	G-1
#6121	G-2
#6122	G-3
#6123	G-4
#6124	G-5
#6125	G-6
#6126	G-7
#6127	G-8

#6128	G-9
#6129	G-10

#6120 to #6129:
Specify up to 10 G codes for calling user macros
Setting range: 0 - 199 (Except for G codes specified by NC manufacturer)

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

#6130 to #6133:
Specify up to 4 M codes for calling user macros.

Setting range: 0 - 255

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

#6134	

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

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

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

#6141 to #6149:
Specify the feedrate change for one increment on a manual pulse generator, for F1 to F9, respectively, of F1-digit designation.

Setting: "1" = 0.1 mm/min.

Setting range: 0 - 255/pulse

#6150	
#6151	
#6152	
#6153	
#6154	

Specifies the magnification for the deviation pulse at the max. rapid traverse time of the X-axis, in the alarm zone in the successive order of X-axis, Y-axis, Z-axis, 4-axis and 5-axis.

Setting: "1" = 1%

Setting range: 1 - 200

#6156	
#6157	
#6158	
#6159	
#6160	

Error detect ON area in the order of X-axis, Y-axis, Z-axis, 4th-axis and 5th-axis

Setting "1" = 1 pulse

Setting range 0 to 255

Note: Always turn off the power once when change is made in parameters #6150 to #6160.

#6162	
#6163	
#6164	
#6165	
#6166	

#6167	

Expanded setting area of M codes to stop advance reading.

#6168	X-axis
#6169	Y-axis
#6170	Z-axis
#6171	4th axis
#6172	5th axis

Set pitch error compensation setting pulse multiplication factor for X-, Y-, Z-, 4th-, and 5th-axis, respectively.

Setting: "1" = 1 multiplication

Setting range: 0 - 3

#6210	

G76/G77 dwell timer
Setting: "1" = 1 ms
Setting range: 0 - 32767

#6211	

G73 δ amount
Setting: "1" = 0.001 mm or 0.0001 inch
Setting range: 0 - 32767

#6213	

G83 δ amount
Setting: "1" = 0.001 mm or 0.0001 inch
Setting range: 0 - 32767

#6220	

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

Setting. "1" = 1 ms

Setting range: 0 - 32767

#6221	

Specifies the interval from gear output (GRH, GRL) unit SF transmission when an S12-digit designation is added

Setting "1" = 1 ms

Setting range: 0 - 32767

#6222	

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

Setting: "1" = 1 mm/min. or 0.1 inch/min.

Setting range: 0 - 24000

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

#6223	

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

Setting: "1" = 1 mm/min.

Setting range: 0 - 24000

NOTE: This specification is effective when #6019D_0 = 1.
If #6019D_0 = 0, rapid traverse is is effective regardless of this parameter specification.

#6224	

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

Setting "1" = 1 ms

Setting range: 0 - 32767

#6225	

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

Setting: "1" = 1 mm/min. or 0.1 inch/min.

Setting range: 0 - 24000

#6226	
#6227	

#6226, #6227

Specify the maximum feedrate for F1-digit designation.

Setting "1" = 1 mm/min.

Setting range: 0 - 24000

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

#6228

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

Setting: "1" = 1 mm/min or 0.1 inch/min

Setting range. 0 - 24000

#6229

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

Setting. "1" = 1000 p/min.

Setting range. 0 - 24000

NOTE: any feedrate greater than those set in #6228 and #6229 are bunched into those settings.

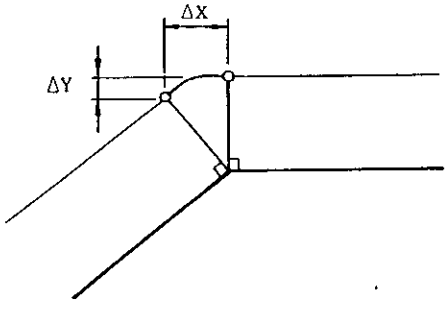
#6230

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

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

"1" = 0.001 in. (inch system)

Setting range: 0 - 32767



The corner arc setting is ignored when:

$\Delta X \leq$ #6230

$\Delta Y \leq$ #6230

Standard setting = 5

#6231

Specifies the F_0 speed for rapid traverse override.

Setting "1" = 1 mm/min. or 0.1 inch/min

Setting range: 0 - 24000

#6232

Specifies the feedrate in the skip function (G31).

Setting: "1" = 1 mm/min. or 0.1 inch/min

Setting range: 0 - 24000

NOTE: This setting is effective when parameter #6019D_4 = 1.

#6233 to #6264

#6233 to #6264

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

Setting: "1" = 1 mm/min. or 0.1 inch/min.

Setting range: 0 - 24000

Typical settings

Table 9 5 Typical Settings mm/min

Switch position	Parameter		Continuous manual feedrate	
	Number	Setting	#6250 = 0	#6265 = 10
0	#6233	0	0	0
1	#6234	1	1	0 1
2	#6235	2	2	0.2
3	#6236	4	4	0.4
4	#6237	6	6	0.6
5	#6238	8	8	0.8
6	#6239	10	10	1.0
7	#6240	12	12	1.2
8	#6241	15	15	1.5
9	#6242	20	20	2.0
10	#6243	25	25	25
11	#6244	30	30	30
12	#6245	40	40	40
13	#6246	50	50	50
14	#6247	60	60	60
15	#6248	80	80	80
16	#6249	100	100	100
17	#6250	120	120	120
18	#6251	150	150	150
19	#6252	200	200	200
20	#6253	250	250	250
21	#6254	300	300	300
22	#6255	400	400	400
23	#6256	500	500	500
24	#6257	600	600	600
25	#6258	800	800	800
26	#6259	1000	1000	1000
27	#6260	1200	1200	1200
28	#6261	1500	1500	1500
29	#6262	2000	2000	2000
30	#6263	2500	2500	2500
31	#6264	3000	3000	3000

#6265

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

Setting: 0 - 32 (switch position)

#6266

#6267

#6268

#6269

#6266 to #6269:

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

Setting: "1" = 1 rpm or "1" = 10 rpm
(Depends on #6022 D7)

Setting range: 0 - 32767

#6270

Specifies the speed command output value to the spindle motor when a gear shift (GR 0) input is entered (specifiable only in S5-digit designation).

Specifies No. of bits occupied in 32767 (16 bits) or 4095 (12 bits) directly.

Setting value: $\frac{\text{Gear shift spindle motor speed}}{\text{Spindle motor max. speed (Command = 10 V)}} \times 4095$ --- 12-bit output

$\frac{\text{Gear shift spindle motor speed}}{\text{Spindle motor max speed (Command = 10 V)}} \times 32767$ --- Analog output

Setting range: 0 - 32767

#6271

#6272

#6273

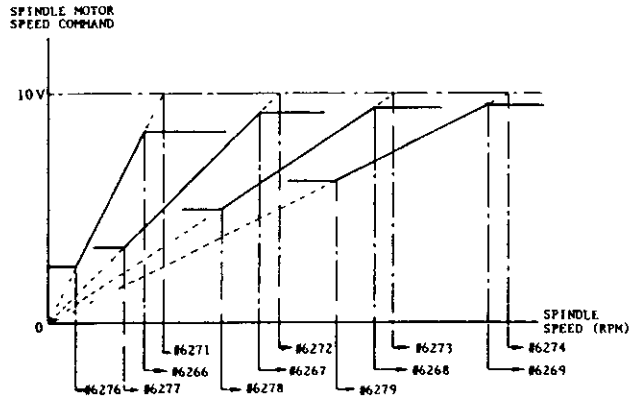
#6274

#6271 to #6274:

Specify the maximum speed of the spindle D/A (10 V/4095), respectively, for gears 1, 2, 3 and 4 each selected by an input signal (specifiable in S5-digit designation). Set the spindle speed applicable when the speed command voltage is 10 V.

Setting: "1" = 1 rpm or "1" = 10 rpm
(For parameter #6022 D7)

Setting range: 1 - 32767



#6275	

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

Setting: "1" = 1 rpm

Setting range: 0 - 32767

#6276	
#6277	
#6278	
#6279	

#6276 to #6279:

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

Setting: "1" = 1 rpm or "1" = 10 rpm

Setting range: 0 - 32767
(Depends on parameter #6022 D7.)

#6280	X-axis
#6281	Y-axis
#6282	Z-axis
#6283	4th axis
#6284	5th axis

#6280 to #6284:

Specify the rapid traverse rate, respectively, on the X-, Y-, Z-, 4th-, and 5th-axes.

Setting: "1" = 1 mm/min. or "1" = 0.1 inch/min.

Setting range: 0 - 24000

NOTE: Be sure to turn the power on and off after changing the parameter.

The following calculations are made between rapid traverse rate and acceleration and deceleration for re-computing the rapid traverse rate and second- stage time constant switching rate. The example of calculations shown below is made for the parameters related to X-axis, but the same can be applied also to Y-axis, Z-axis, 4th-axis or 5th-axis.

Rapid traverse rate: Va = #6280 → Rate V'a recreated by the calculations.

Acceleration & deceleration 1st-stage time constant.
ta = #6286 → Time constants t'a recreated by the calculations.

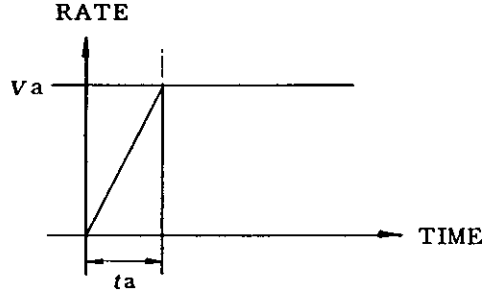
"2nd-stage time constant switching rate:
Vb = #6269 → Rate V'b recreated by the calculations.

Acceleration & deceleration 2nd-stage time constant:
tb = #6298 → Rate t'b recreated by the calculations

(a) Where 2nd-stage acceleration & deceleration are not used:
Condition: Vb = 0
tb = 0

$$t'a = \left(\frac{Va}{7.5} * \frac{100}{MP}\right) / \frac{ta}{8}$$

$$V'a = t'a * \frac{ta}{8} * 7.5$$



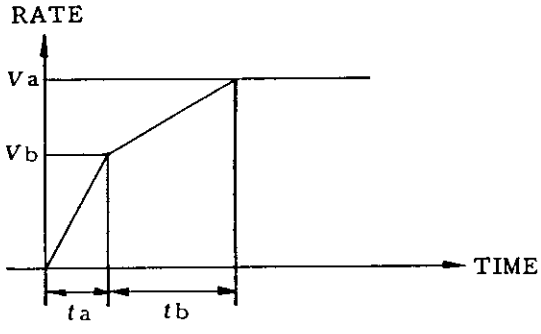
PARAMETER NUMBERS AND THEIR CONTENTS (CONT'D)

(b) Where 2nd-stage acceleration & deceleration are used:

$$t'a = \left(\frac{Vb}{75} * \frac{100}{MP}\right) / \frac{ta}{8}$$

$$t'b = V'b + \left(\frac{Va - Vb}{7.5} * \frac{100}{MP}\right) / \frac{tb}{8}$$

$$V'b = t'a * \frac{ta}{8} * 7.5 \qquad V'a = V'b + t'b * \frac{tb}{8} * 7.5$$



Notes

1 Setting of rapid traverse rate may be different from actual speed (The figures below the decimals are disregarded in the value of *t'a* or *t'b* As a result, errors occur between *V'a* and *V'b*)
2 "MP" indicates #6450, #6451, #6452, #6453 and #6454.

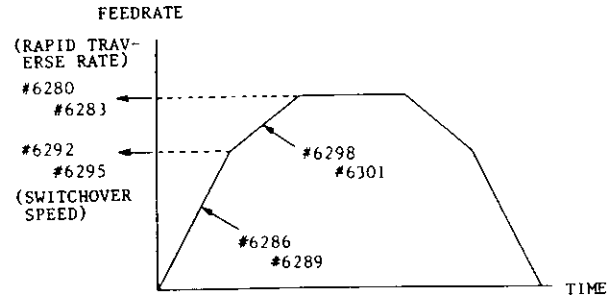
#6286	X-axis
#6287	Y-axis
#6288	Z-axis
#6289	4th axis
#6290	5th axis

#6286 to #6290:

Specify the first-stage time constant in linear acceleration/deceleration, respectively, on the X-, Y-, Z-, 4th-, and 5th-axes.

Setting: "1" = 1 ms.

Setting range: 8 - 32767



NOTE. Setting should be made in multiples (×8, ×16, ×24) When this parameter is changed,turn OFF and ON power

#6291	Spindle

Sets linear acceleration/deceleration speed constant

Setting: Setting: "1" = 1 ms

Setting range: 0-32767

#6292	X-axis
#6293	Y-axis
#6294	Z-axis
#6295	4th axis
#6296	5th axis

#6292 to #6296:

Specify the second-stage time constant switchover speed in linear acceleration/ deceleration, respectively, on the X-, Y-, Z-, 4th-, and 5th-axes.

Setting: "1" = 1 mm/min. or "1" = 0.1 inch/min

Setting range: 0 - 24000

NOTE: When this parameter is changed, turn off and on power.

#6298	X-axis
#6299	Y-axis
#6300	Z-axis
#6301	4th axis
#6302	5th axis

#6298 to #6302:

Specify the second-stage time constant in linear acceleration/deceleration, respectively, on the X-, Y-, Z-, 4th-, and 5th-axes.

Setting: "1" = 1 ms

Setting range: 8-32767

NOTE: Setting should be made by multiples (×8, ×16, ×24...)

#6304	X-axis
#6305	Y-axis
#6306	Z-axis
#6307	4th axis
#6308	5th axis

#6304 to #6308:

Specify the traverse distance for reference point return, respectively, on the X-, Y-, Z-, 4th-, and 5th-axes.

Setting: "1" = 0.001 mm or "1" = 0.0001 inch/min.

Setting range: 0 - 32767

#6310	X-axis
#6311	Y-axis
#6312	Z-axis
#6313	4th axis
#6314	5th axis

#6310 to #6314:

Specify the approach speed 1 for reference point return, respectively, on the X-, Y-, Z-, 4th-, and 5th-axes.

Setting: "1" = 1 mm/min. or "1" = 0.1 inch/min.

Setting range: 0 - 24000

#6316	X-axis
#6317	Y-axis
#6318	Z-axis
#6319	4th axis
#6320	5th axis

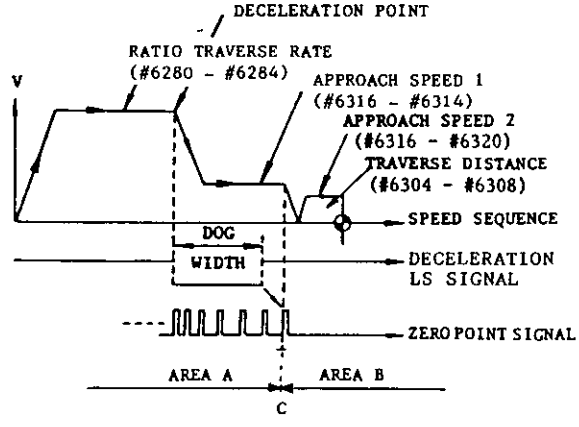
#6316 to #6320:

Specify the approach speed 2 for reference point return, respectively, on the X-, Y-, Z-, 4th-, and 5th-axes.

Setting: "1" = 1 mm/min. or "1" = 0.1 inch/min.

Setting range: 0 - 24000

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



- Reference point return direction: #6010 D_0 - D_3
- Reference point return enabled/disabled: #6016 D_0 - D_3

#6322	X-axis
#6323	Y-axis
#6324	Z-axis
#6325	4th axis
#6326	5th axis

#6322 to #6326:

Specify the number of the start point for pitch error compensation, respectively, on the X-, Y-, Z-, 4th-, and 5th-axes.

Setting 0 - 511

#6328	X-axis
#6329	Y-axis
#6330	Z-axis
#6331	4th axis
#6332	5th axis

#6328 to #6332:

Specify the number of the start point for pitch error compensation, respectively, on the X-, Y-, Z-, 4th-, and 5th-axes.

Setting: 0 - 511

#6334	X-axis
#6335	Y-axis
#6336	Z-axis
#6337	4th axis
#6338	5th axis

#6334 to #6338:

Specify the reference point for pitch error compensation, respectively, on the X-, Y-, Z-, 4th-, and 5th-axes.

Setting: 0 - 511

#6340	

Specifies the external deceleration speed for rapid traverse.

Setting: "1" = 1 mm/min. or "1" = 0.1 inch/min. (common to all axes)

Setting range: 0 - 24000

#6341	

Specifies the external deceleration speed for cutting feed.

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

Setting range: 0 - 24000

#6342	X-axis
#6343	Y-axis
#6344	Z-axis
#6345	4th axis
#6346	5th axis

#6342 to #6346:

Specify the offset in external workpiece coordinate system shift, respectively, on the X-, Y-, Z-, 4th-, and 5th-axes.

Setting: 1 = 0.001 mm

Setting range: 0 - ±32767

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

#6348	

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

Setting: "1" = 1 mm/min. or "1" = 0.1 inch/min.

Setting range: 0 - 24000

#6350	X-axis
#6351	Y-axis
#6352	Z-axis
#6353	4th axis
#6354	5th axis

#6350 to #6354:

Specify the rapid traverse accel/decel constants X-, Y-, Z-, and 4th-, and 5th-axis handle feed respectively.

Setting: "1" = 1 ms

Setting range: 8 - 32767

NOTE Setting should be made in multiples (×8, ×16, ×24.)

#6355	
#6356	

For tool pot indication

#6355: Sets tool pot indication start No.

#6356: Sets tool pot indication end No.

#6357	X-axis
#6358	Y-axis
#6359	Z-axis

#6357 to #6359:

Specify the time between ESP and SVOF for X-, Y-, and Z-axis, respectively.

Setting: "1" = 8 ms

Setting range: 0 - 32767

#6362	
#6363	
#6364	

#6362: Tool pot SP
#6363: Tool pot MG
#6364: Tool pot WT

#6383	

By the input of x100, the scale factor of handle becomes effective.

#6384	
≀	≀
#6391	

Title display code setting during power turn-on: 1st line

#6392	
≀	≀
#6399	

Title display code setting during power turn-on: 2nd line

#6400	X-axis
#6401	Y-axis
#6402	Z-axis
#6403	4th axis
#6404	5th axis
#6405	Spindle

Backlash compensation values shown in the order of X-axis, Y-axis, Z-axis, 4th-axis, 5th-axis and spindle.

Setting: "1" = 1 pulse

Setting range: 0 to ±8191

Note: Be sure to turn the power on and off after changing the parameter.

#6406	X-axis
#6407	Y-axis
#6408	Z-axis
#6409	4th axis
#6410	5th axis
#6411	Spindle

Command unit position loop gains are set in the order of X-axis, Y-axis, Z-axis, 4th-axis, 5th-axis and spindle.

Setting "1" = 0 01 1/s

Setting range 0 - 32767

Standard setting. 1024

#6412	X-axis
#6413	Y-axis
#6414	Z-axis
#6415	4th axis
#6416	5th axis

Acceleration and deceleration time constants for control unit during ordinary cutting are set in the order of X-axis, Y-axis, Z-axis, 4th-axis and 5th-axis

Setting: "1" = 1 ms

Setting range: 0 - 32767

#6418	X-axis

#6419	Y-axis
#6420	Z-axis
#6421	4th axis
#6422	5th axis

Acceleration and deceleration bias for control unit during ordinary cutting is set in the order of X-axis, Y-axis, Z-axis, 4th-axis and 5th-axis.

Setting "1" = 1 mm/min or "1" = 0 1 inch/min

Setting range: 0 - 32767

#6424	X-axis
#6425	Y-axis
#6426	Z-axis
#6427	4th axis
#6428	5th axis

Setting of acceleration and deceleration time constants for control unit during screw/tap cutting in the order of X-axis, Y-axis, Z-axis, 4th-axis and 5th-axis.

Setting: "1" = 1 ms

Setting range: 0 - 32767

#6430	X-axis
#6431	Y-axis
#6432	Z-axis
#6433	4th-axis
#6434	5th-axis

Setting of acceleration and deceleration bias for control unit tap cutting.

Setting "1" = 1 mm/min. or "1" = 0.1 inch/min

Setting range. 0 - 32767

#6436	X-axis
#6437	Y-axis
#6438	Z-axis
#6439	4th axis
#6440	5th axis

Overshoot during G60 in the order of X-axis, Y-axis, Z-axis, 4th-axis and 5th-axis.

Setting: "1" = 1 pulse

Setting range: 0 - 32767

#6444	X-axis
#6445	Y-axis
#6446	Z-axis
#6447	4th axis
#6448	5th axis

Distance traveled per 1 revolution of motor in the order of X-axis, Y-axis, Z-axis, 4th-axis and 5th-axis.

Setting "1" = 0 001 mm/rev or 1' = 0.0001 inch/rev

Setting range 1 - 65535

Notes: 1. Be sure to turn the power on and off after changing the parameter.
2. For input of 32768-65535, the number is shown by minus.

Example

Input	Indication
32768	-32768
32769	-32767
32769	-32676
to	to
65535	-1

#6449	

Feedback pulse number for 1 rotation of spindle PG.

Setting: "1" = 1 pulse/rev.
Setting range: 1 - 32768

#6450	X-axis
#6451	Y-axis

#6452	Z-axis
#6453	4th axis
#6454	5th axis

Minimum unit of travel in the order of X-axis Y-axis, Z-axis, 4th-axis, and 5th-axis.

Setting. "1" = 0 00001 mm or "1" = 0 000001 inch

Setting range: 100 is set.

NOTE: Be sure to turn the power on and off after changing the parameter.

#6456	X-axis
#6457	Y-axis
#6458	Z-axis
#6459	4th axis
#6460	5th axis

Servo input in the order of X-axis, Y-axis, Z-axis, 4th-axis, and 5th-axis.

Setting: "1" = 1 rpm/volt

Setting range: 250 is set.

#6462	

Spindle indexing creep rate.

Setting: "1" = 500 pps

Setting range: 0 - 32767

#6463	

Spindle indexing positioning rate.

Setting: "1" = 500 pps

Setting range: 0 - 32767

#6464	

Spindle indexing & spindle stop confirmation timer.

Setting: "1" = 8 ms

Setting range: 0 - 255

#6465	

Spindle indexing and origin position.

Setting: "1" = 1P

Setting range: 0 - 4095

#6466	(F1)
#6467	(F2)

Rapid traverse override of F1 and F2 in the order shown

Setting: "1" = 1 mm/min. or "1" = 0.1 inch/min.

Setting range: 0 to 24000

#6600	X-axis
#6601	Y-axis
#6602	Z-axis
#6603	4th axis
#6604	5th axis

#6600 to #6604:

Specify the plus direction boundary value for stored stroke limit 1, respectively, on the X-, Y-, Z-, 4th- and 5th-axes.

Setting: "1" = 1 pulse

Setting range: 0 - ±99999999

#6606	X-axis
#6607	Y-axis
#6608	Z-axis
#6609	4th axis
#6610	5th axis

#6606 to #6610:

Specify the plus direction boundary value for stored stroke limit 1, respectively, on the X-, Y-, Z-, 4th- and 5th-axes.

Setting: "1" = 1 pulse

Setting range: 0 - ±99999999

#6612	X-axis

#6613	Y-axis
#6614	Z-axis
#6615	4th axis
#6616	5th axis

#6612 to #6616:

Specify the distance between the first and the second reference point, respectively, on the X-, Y-, Z-, 4th-, and 5th-axes.

Setting: "1" = 1 pulse

Setting range: 0 - ±99999999

#6618	X-axis
#6619	Y-axis
#6620	Z-axis
#6621	4th axis
#6622	5th axis

#6618 to #6622:

Specify the distance between the first and the third reference point, respectively, on the X-, Y-, Z-, 4th-, and 5th-axes.

Setting: "1" = 1 pulse

Setting range: 0 - ±99999999

#6624	X-axis
#6625	Y-axis
#6626	Z-axis
#6627	4th axis
#6628	5th axis

#6624 to #6628.

Specify the distance between the first and the fourth reference point, respectively, on the X-, Y-, Z-, 4th-, and 5th-axes.

Setting: "1" = 1 pulse

Setting range: 0 - ±99999999

#6630	X-axis
#6631	Y-axis
#6632	Z-axis
#6633	4th axis
#6634	5th axis

#6630 to #6634

Specify the value for automatic coordinate system setting at the time of inch input, respectively, on the X-, Y-, Z-, and 4th, and 5th-axes. A desired value should be set in inches for the distance between the first reference point and the reference point of the coordinate system to be established.

Setting: "1" = 0.0001 in.

Setting range: 0 - ±99999999

#6636	X-axis
#6637	Y-axis
#6638	Z-axis
#6639	4th axis
#6640	5th axis

#6636 to #6640.

Specify the value for automatic coordinate system setting at the time of metric input, respectively, on the X-, Y-, Z-, 4th-, and 5th-axes. A desired value should be set in millimeters for the distance between the first reference point and the reference point of the coordinate system to be established.

Setting: "1" = 0.001 mm

Setting range: 0 - ±99999999

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

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

#6646	5th axis

#6642 to #6646.

Specify the compensation interval in pitch error compensation, respectively, on the X-, Y-, Z-, 4th-, and 5th-axes

Setting: "1" = 1 pulse

Setting range: 0 - ±99999999

#6650	X-axis
#6651	Y-axis
#6652	Z-axis

#6650 to #6652:

Specify stored stroke limit 3 for X-, Y-, and Z-axis, respectively (optional)

Plus (+) boundary setting: "1" = 1 pulse

Setting range: 0 - ±99999999

#6653	X-axis
#6654	Y-axis
#6655	Z-axis

#6653 to #6655:

Specify stored stroke limit 3 for X-, Y, and Z-axis, respectively.

Minus (-) boundary setting: "1" pulse

Setting range: 0 - ±99999999

#6656	X-axis
#6657	Y-axis
#6658	Z-axis

#6656 to #6658:

Specify stored stroke limit 4 for X-, Y-, and Z-axis, respectively.

Plus (+) boundary setting: "1" = 1 pulse

Setting range: 0 - ±99999999

#6659	X-axis
#6660	Y-axis

#6661	Z-axis

#6659 to #6661 (optional):

Specify stored stroke limit 4 for X-, Y-, and Z-axis, respectively.

Minus (-) boundary setting: "1" = 1 pulse

Setting range: 0 - ±99999999

#6662	X-axis
#6663	Y-axis
#6664	Z-axis

#6662 to #6664 (optional):

Specify stored stroke limit 5 for X-, Y-, and Z-axis, respectively.

Plus (+) boundary setting: "1" = 1 pulse

Setting range: 0 - ±99999999

#6665	X-axis
#6666	Y-axis
#6667	Z-axis

#6665 to #6667 (optional):

Specify stored stroke limit 5 for X-, Y-, and Z-axis, respectively.

Minus (-) boundary setting: "1" = 1 pulse

Setting range: 0 - ±99999999

#6674	

Sets the multiplication factor of characters of the display at power on.

#6675	

Sets the position of the display at power on
"1" = 1 notch (hadle pulse)

#6677	

Sets no. of remaining movement pulses to be clamped of handle.
"1" = 1 pulse

PARAMETER NUMBERS AND THEIR CONTENTS (CONT'D)

#8000	number 0
to	to
#8511	number 511

#8000 to #8511

Specify the respective values of pitch error compensation.

Setting 0 - ±15 (output increment)

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

9.4 STORED LEADSCREW ERROR COMPENSATION

This function automatically compensates 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, Y, Z, 4th-, and 5th-axes. (including rotary axis)

No. of correction points: 512 Max

Compensation base point: Reference point

Compensation interval. 10000 Pulses or more

Data setting system: Absolute/incremental (Set by Parameter #6039$_{D2}$)

Compensation value.

Minimum compensation unit	1 pulse (least output increment)
Compensation multiplication.	×3 max.
One-time-compensation value.	15 pulses max. × (Compensation multiplication)

Note 1:

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

Note 2:

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

Note 3:

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

Note 4:

Where the 4th and 5th axis is a rotary axis, operation is possible within ±200 revolution maximum.

Note 5:

For the axis requiring no leadscrew error compensation, set the parameter for compensation multiplication factor at "0."

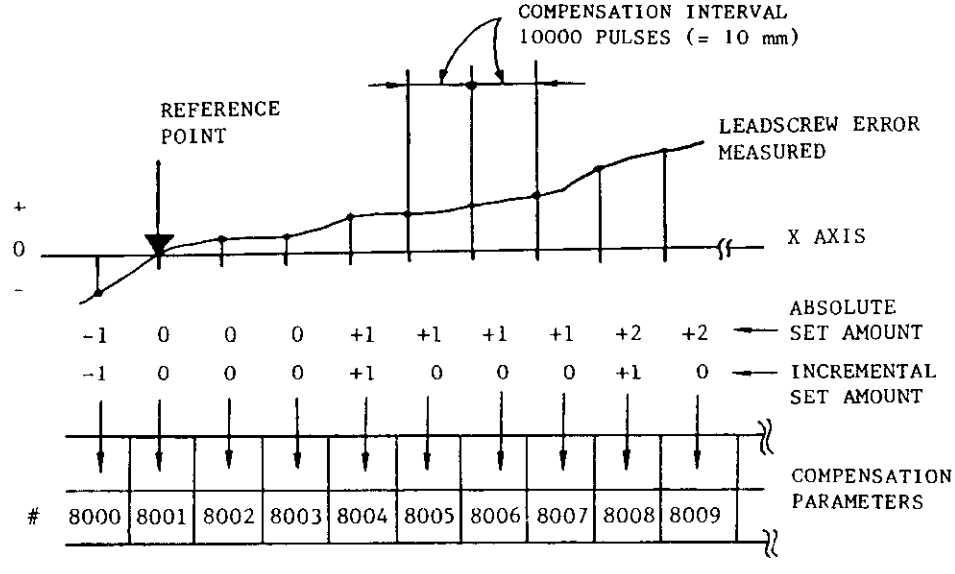
Note 6:

Setting at base point is to be made in such a manner that the pitch error compensation value will not occur. In the example shown below, the incremental set point of #8002 should be zero. Alos, set the absolute set point in such a manner that the difference between #8001 and #8002 becomes "0."

Table 9.6

	Axis	Parameter #	Functions
Compensation interval	X to β	#6642 to #6646	6000 OR MORE "1" = 1 pulse
Absolute/incremental setting switchable		#6039$_{D2}$	"0" = Incremental setting "1" = Absolute setting
Compensation reference no.	X to β	#6334 to #6338	Value of parameter # of compensation on each point minus 8000 will be written
Compensation max point	X to β	#6322 to #6326	
Compensation min point	X to β	#6328 to #6332	
Compensation value on each point	X to β	#8000 to #8511	-15 to +15 (Incremental setting) "1" = 1 pulse
Compensation multiplication	X to β	#6168 to #6172	-0 to 3 "1" = 1X

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



In Fig. 9.1,

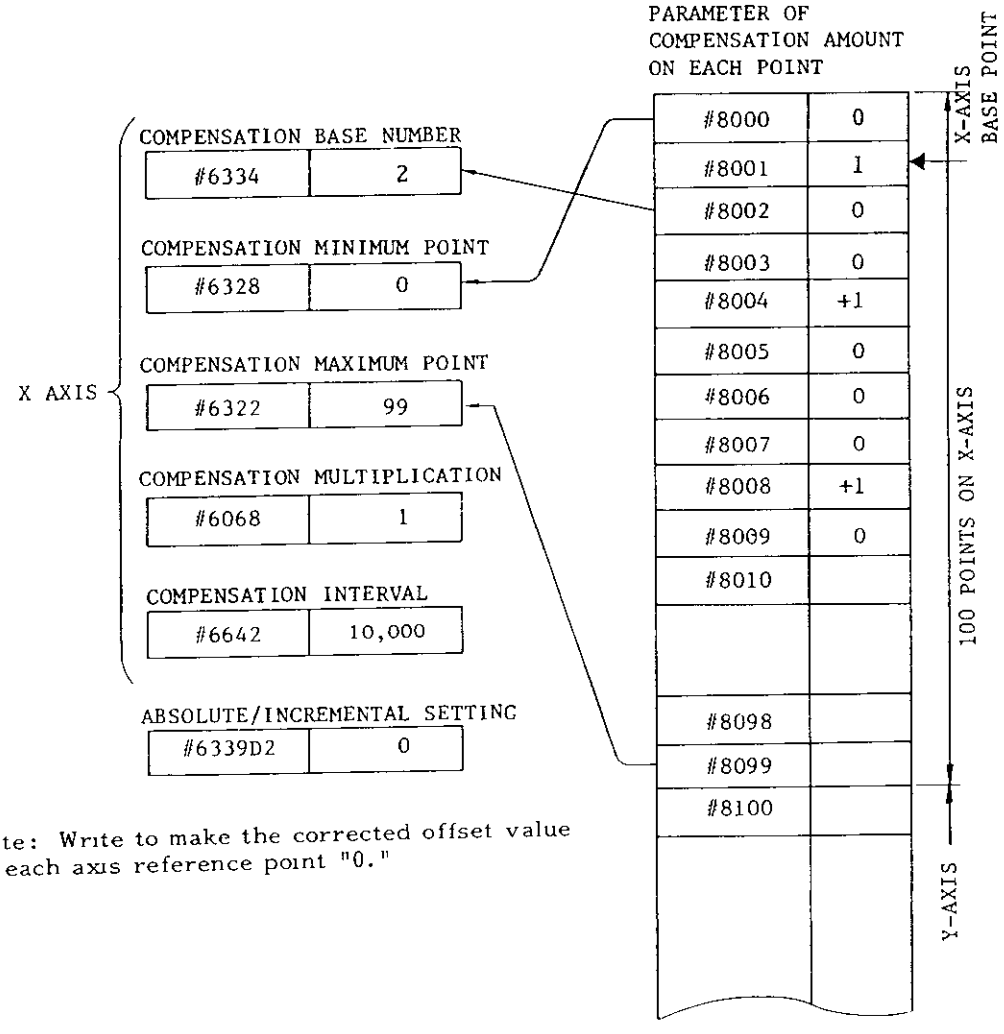
Compensation interval 10000 pulses

Absolute/incremental. Incremental

Compensation multiplication· x 1

Compensation point on X axis. 100 points

Each parameter is set as follows



Note: Write to make the corrected offset value of each axis reference point "0."

Fig. 9.2

To use the 4th and 5th axes as the rotary axis, follow the rules shown below in addition to the rules for setting X-, Y, and Z-axes.

(1) Compensation Interval

The compensation interval should be more than 10000 pulses and the quotient obtained by dividing 360000 by the compensation interval become a positive integer.

(2) Compensation Amount at Reference Point

The compensation amount to be set to the reference point should be as follows

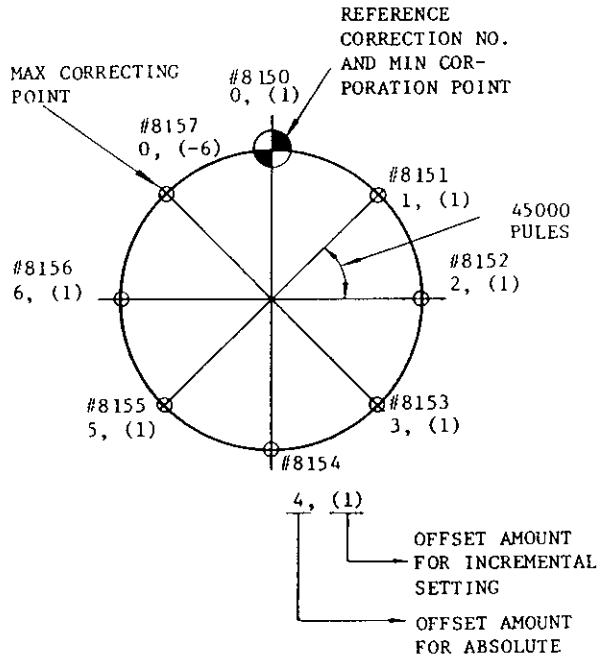
a. Absolute setting ··· "0"

b. Incremental setting ··· "0"

In the case of incremental setting, set such a value for the compensation amount at compensation maximum point that the sum of the compensation amount of each point becomes "0."

(3) Sample Writing

If the compensation interval is 45000 pulses (one rotation divided by 8) as shown below, set the parameters as follows.



4th axis of rotary axis

Offset reference No.

#6337	150

Offset min point

#6331	150

Offset max point

#6325	157

Offset multiplication factor

#6071	1

Offset point

#6645	45000

Offset parameter at each point

Parameter	Absolute setting	Incremental setting
#8150	0	0
#8151	1	1
#8152	2	1
#8153	3	1
#8154	4	1
#8155	5	1
#8156	6	1
#8157	0	-6
⋮	⋮	⋮

Fig. 9.3

9.5 LIST OF STANDARD INPUT/OUTPUT SIGNALS

Table 9.5 shows standard input/output signals. For custom-built signals depending on the system, refer to the list of I/O signals provided on the system.

DISPLAY

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

Contact open

Contact closed

Table 9.7 (a) List of Standard Input Signals

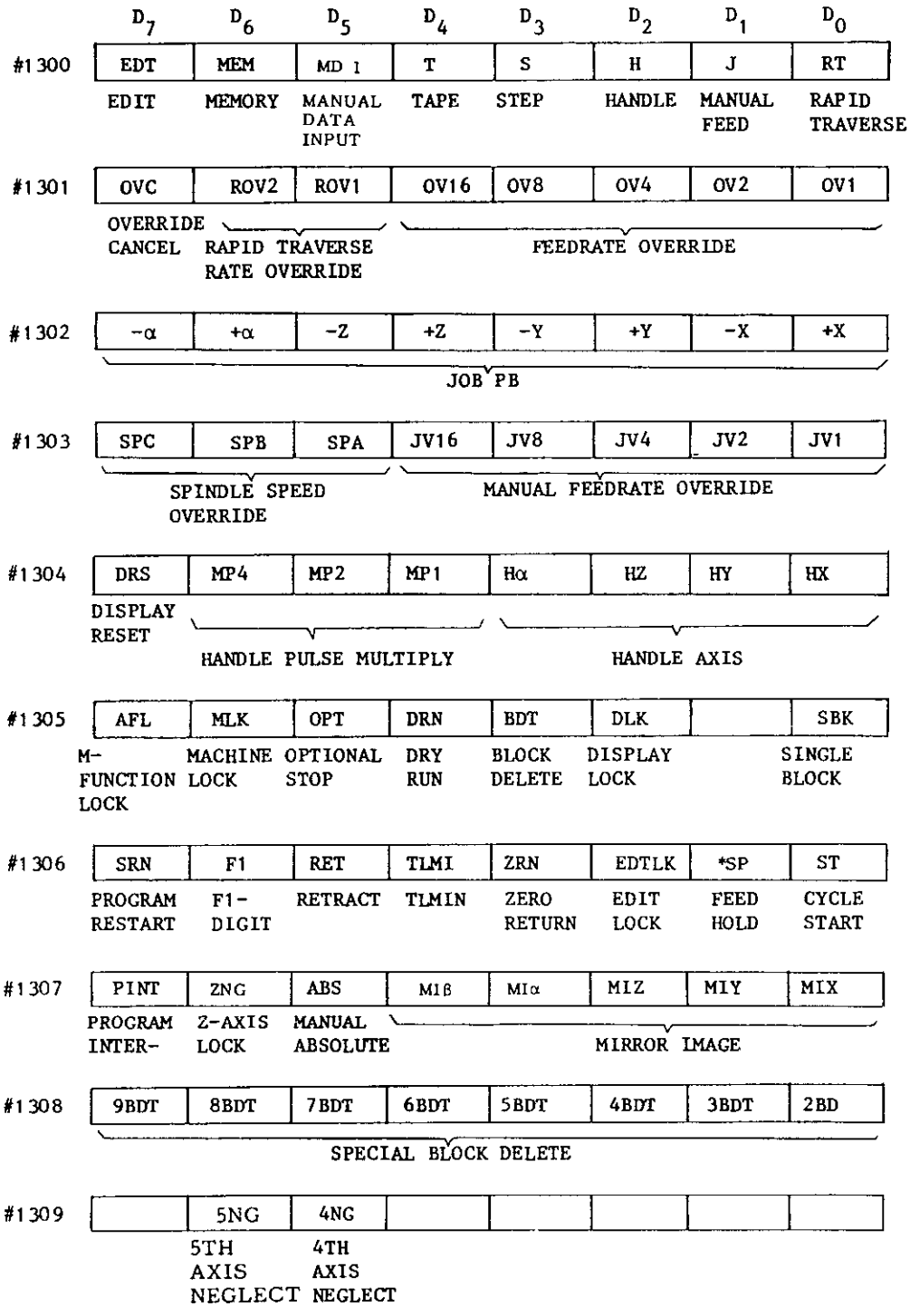


Table 9 7 (a) List of Standard Input Signals (Cont'd)

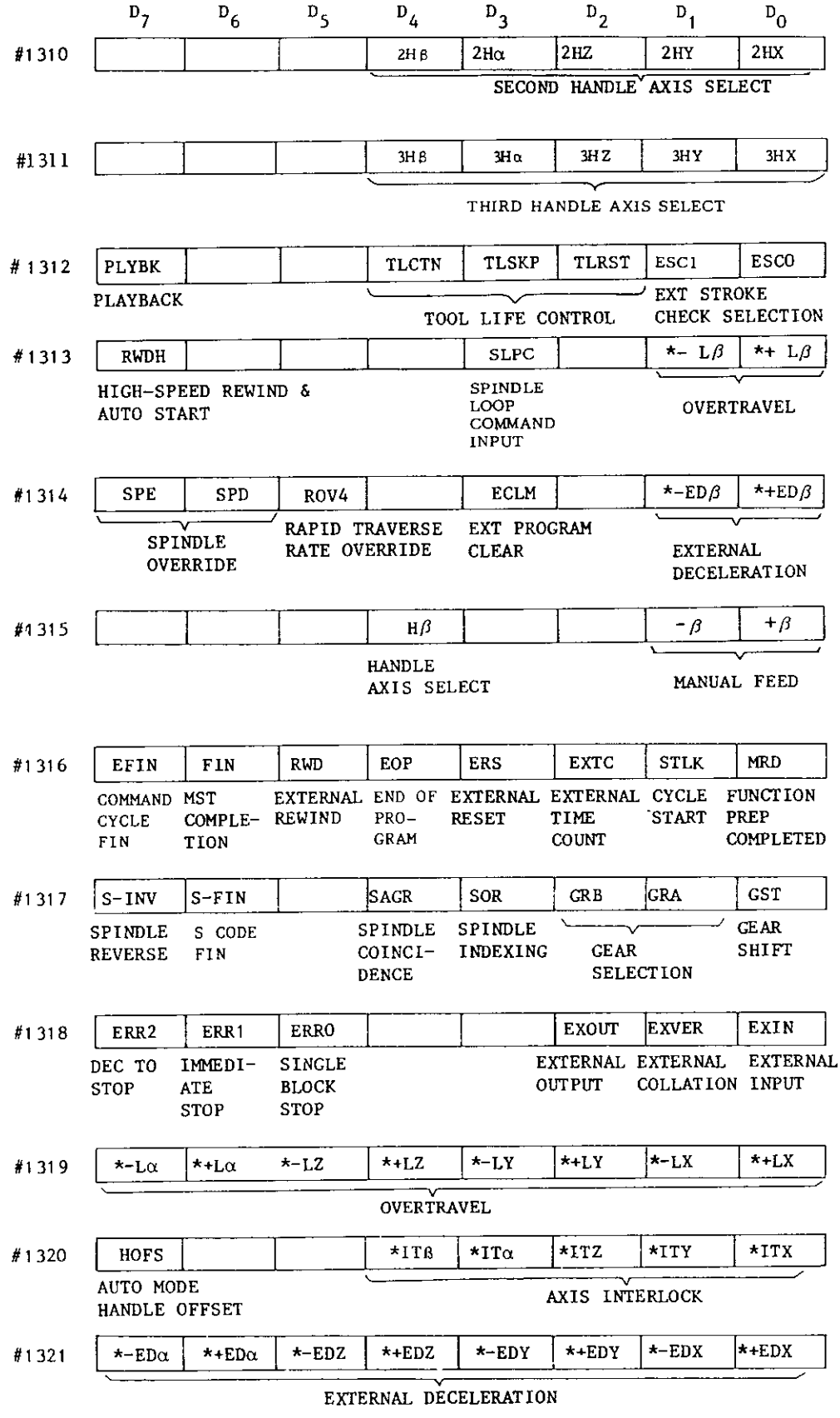


Table 9 7 (a) List of Standard Input Signals (Cont'd)

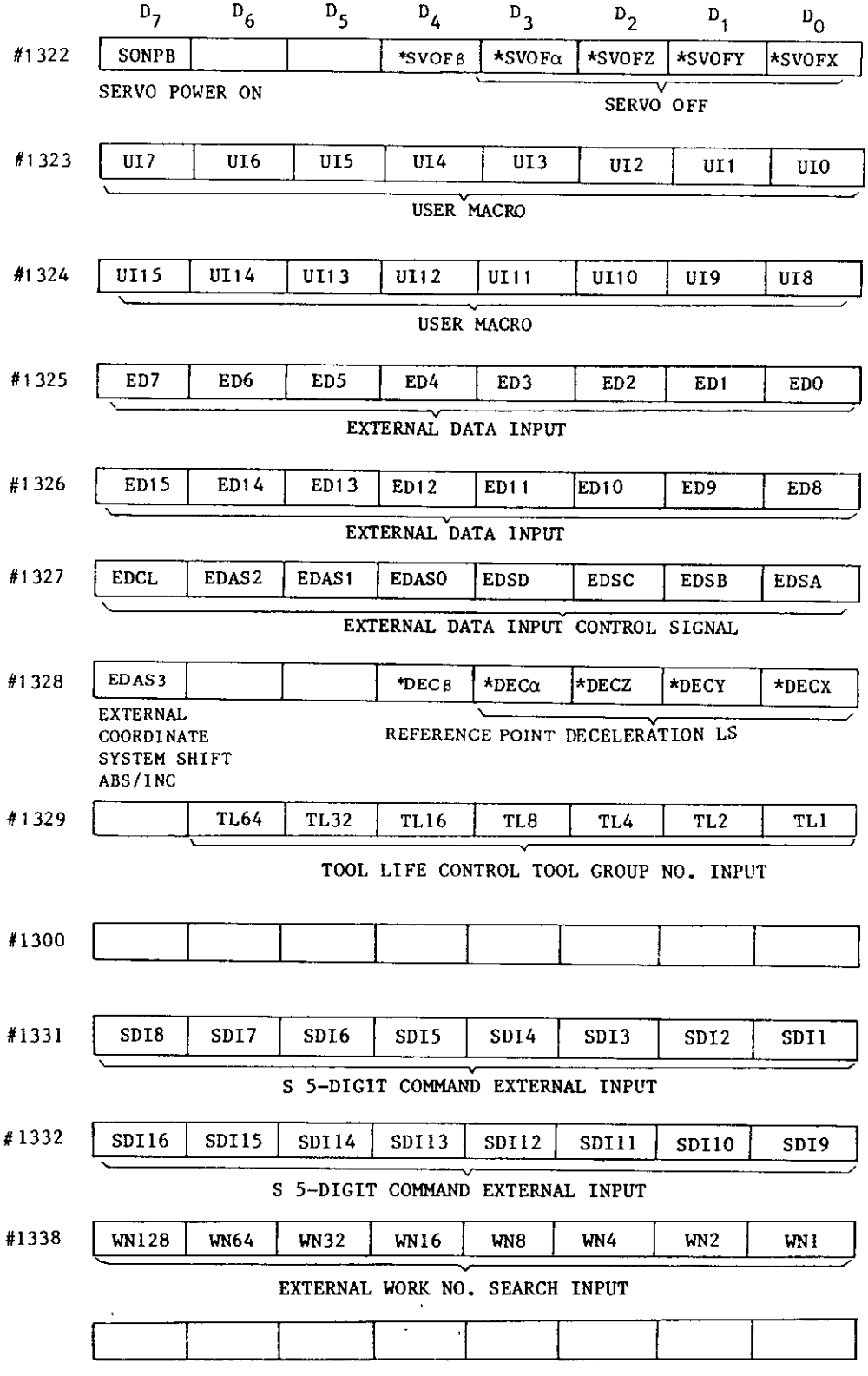


Table 9.7 (b) List of Standard Output Signals

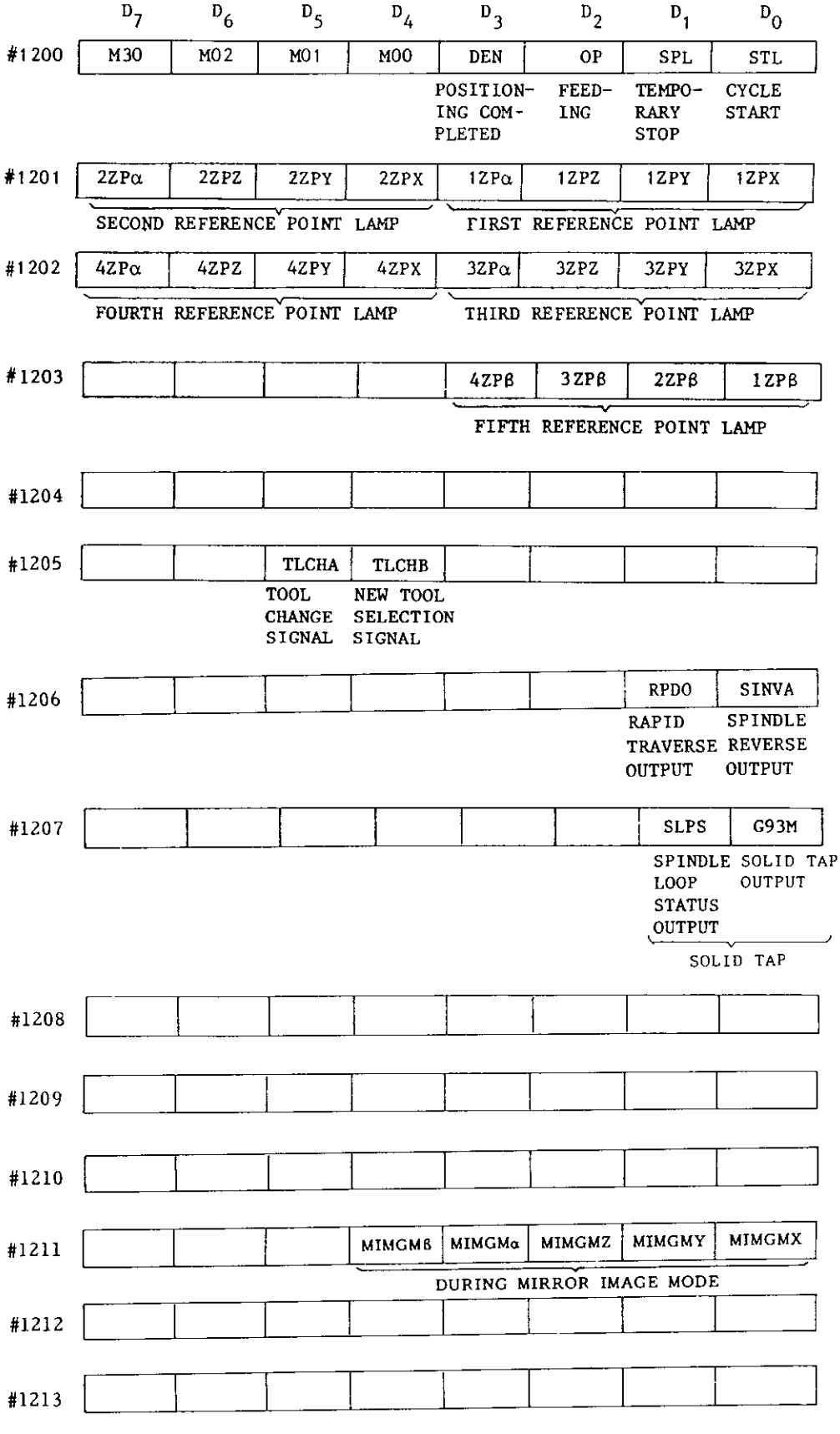


Table 9.7 (b) List of Standard Output Signals (Cont'd)

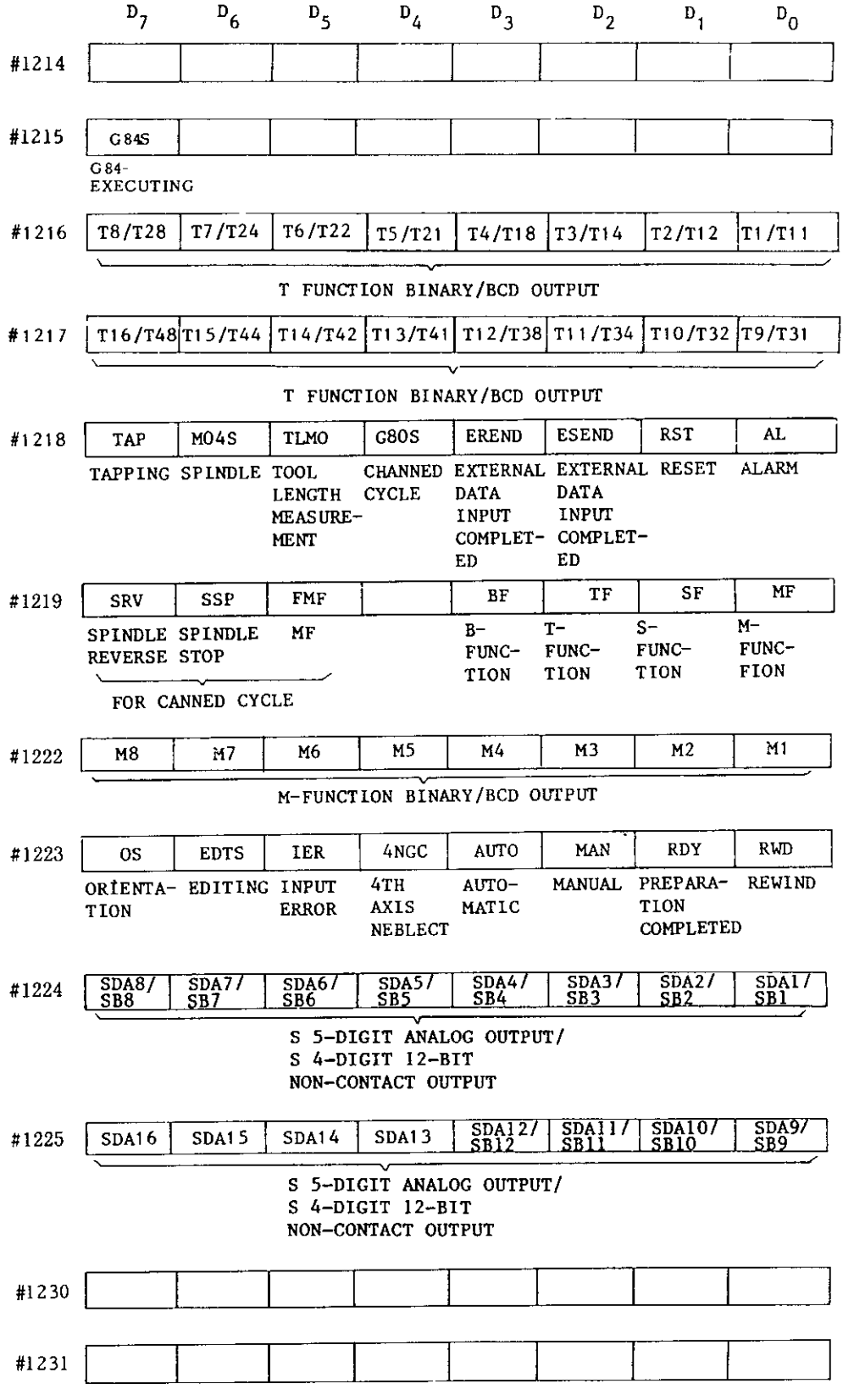


Table 9.7 (b) List of Standard Output Signals (Cont'd)

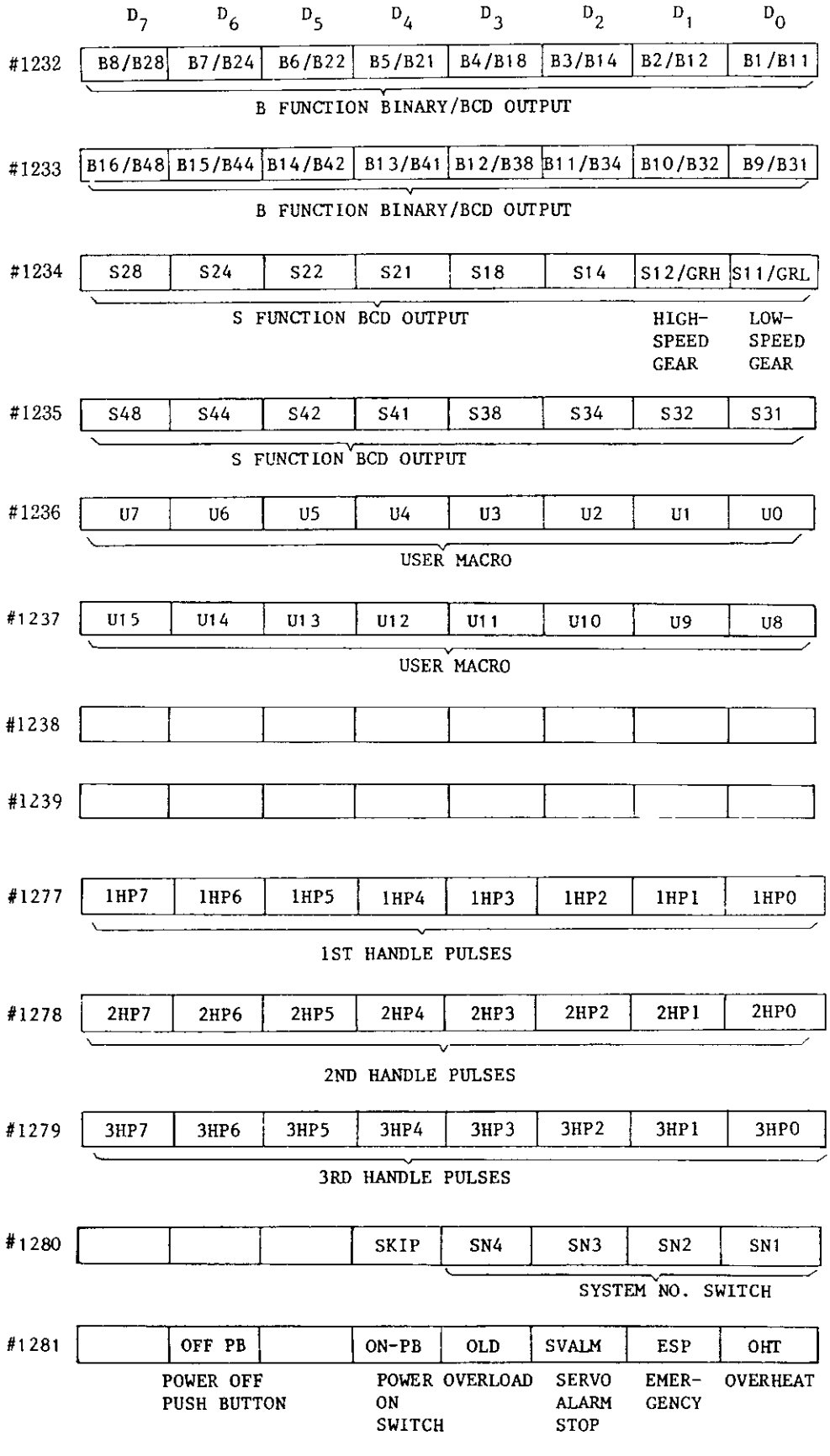


Table 9.7 (b) List of Standard Output Signals (Cont'd)

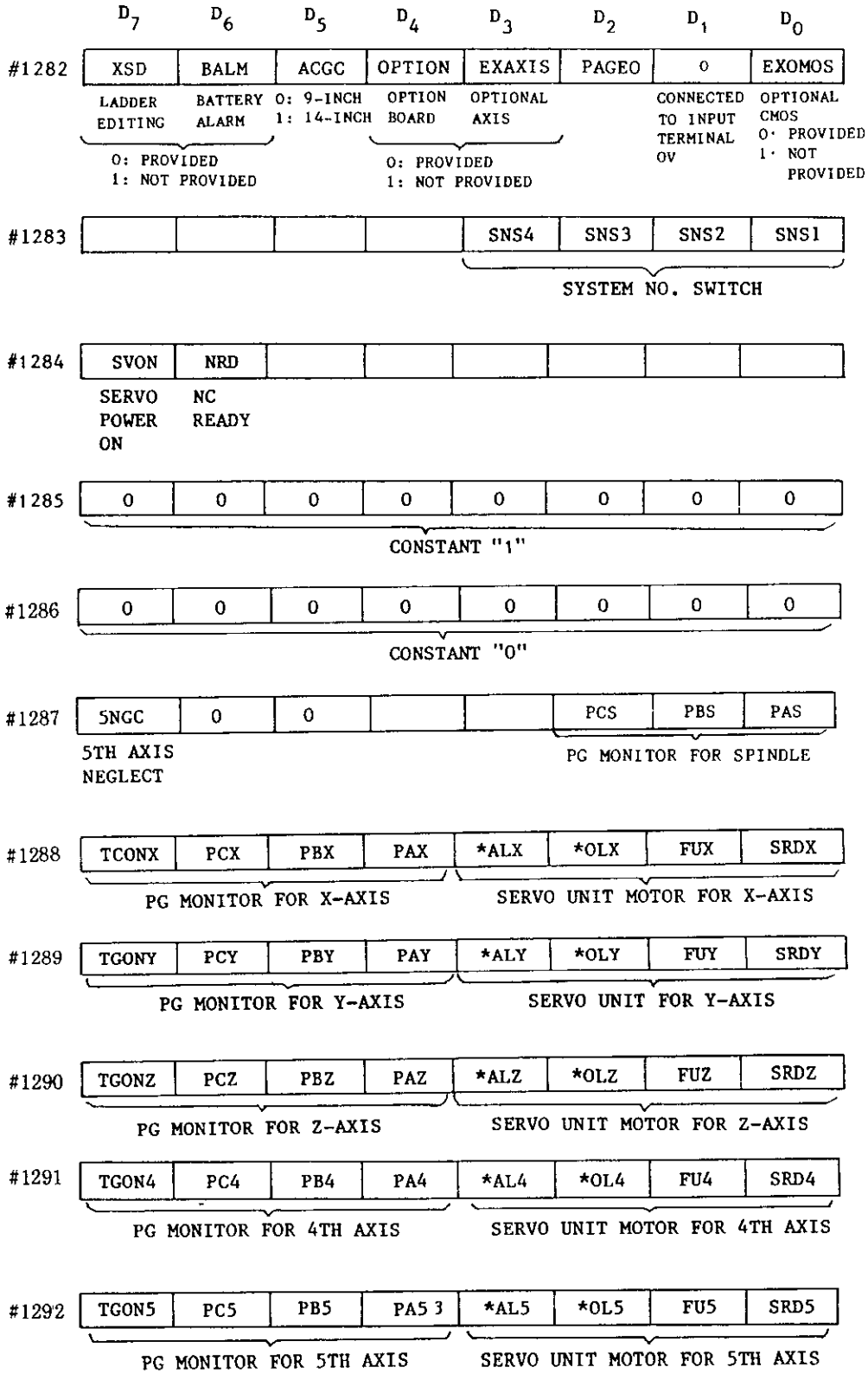
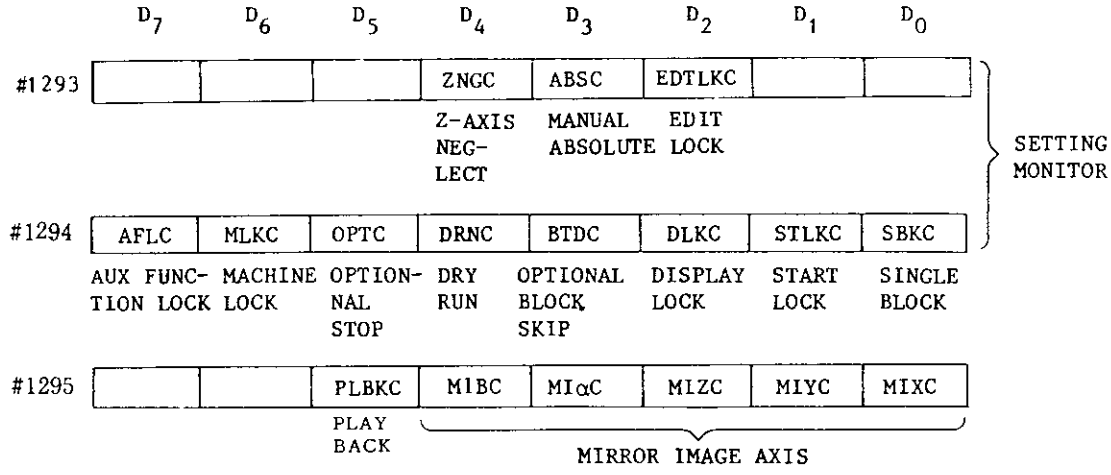


Table 9 7 (b) List of Standard Output Signals (Cont'd)



9.6 LIST OF ADDRESS CHARACTERS

Table 9 8 List of Address Characters

Address Characters	Meanings	B Basic O Optional
A	Rotary axis parallel to X-axis	O
B	Rotary axis parallel to Y-axis	O
C	Rotary axis parallel to Z-axis	O
D	Tool radius offset number	B, O
E	User macro character	O
F	Feedrate	B
G	Preparatory function	B, O
H	Tool length offset number	B
I	X-coordinate of arc center Radius for circle cutting	B O
J	Y-coordinate of arc center Cutting depth for circle cutting	B, O
K	Z-coordinate arc center	B
L	Number of repetitions	B, O
M	Miscellaneous functions	B
N	Sequence number	B
O	Program number	B
P	Dwell time, Program No and sequence No designation in subprogram	B O
Q	Depth of cut, shift of canned cycles	O
R	Point R for canned cycles Radius designation of a circular arc	O, B
S	Spindle-speed function	B
T	Tool function	B
U	Additional linear axis parallel to X-axis	O
V	Additional linear axis parallel to Y-axis	O
W	Additional linear axis parallel to Z-axis	O
X	X-coordinate	B
Y	Y-coordinate	B
Z	Z-coordinate	B

Table 9 9 Function Characters

EIA Code	ISO Code	Meanings	Remarks
Blank	Nul	Error in significant data area in EIA Disregarded in ISO	
BS	BS	Disregarded	
Tab	HT	Disregarded	
CR	LF/NL	End of Block (EOB)	
	CR	Disregarded	
SP	SP	Space	
ER	%	Rewind stop	
UC		Upper shift	
LC		Lower shift	
2-4-5 bits	(	Control out (Comment start)	EIA: Special code
2-4-7 bits	)	Control in (Comment end)	
+	+	Disregarded, User macro operator	
-	-	Minus sign, User macro operator	
0 to 9	0 to 9	Numerals	
a to z	A to Z	Address characters, User macro operator	
/	/	Optional block skip, User macro operator	
Del	DEL	Disregarded (Including All Mark)	
.	.	Decimal point	
Parameter setting	#	Sharp (Variable)	
*	*	Astrisk (Multiplication operator)	
=	=	Equal mark	
[	[	Left bracket	
]	]	Right bracket	
0	:	User macro operator	
$	$	User macro operator	
@	@	User macro operator	
?	?	User macro operator	

Notes·

1. Characters other than the above cause error in significant data area.
2. Information between Control Out and Control In is ignored as insignificant data.
3. Tape code (EIA or ISO) can be switched by setting

Table 9.10 Tape Code

EIA CODE									CHARACTERS		ISO CODE							
8	7	6	5	4	'	3	2	1			8	7	6	5	4	'	3	2	1
		○			○				0				○	○		○			
					'			○	1		○		○	○		○			○
					○		○		2		○		○	○		○		○	
			○		○		○	○	3				○	○		○		○	○
					○	○			4		○		○	○		○	○		
			○		○	○		○	5				○	○		○	○		○
			○		○	○	○		6				○	○		○	○	○	
					○	○	○	○	7		○		○	○		○	○	○	○
				○	○				8		○		○	○	○	○			
			○	○	○			○	9				○	○	○	○			○
	○	○			○			○	a	A		○				○			○
	○	○			○		○		b	B		○				'		○	
	○	○	○		○		○	○	c	C	○	○				○		○	○
	○	○			○	○			d	D		○				○	○		
	○	○	○		○	○		○	e	E	○	○				○	○		○
	○	○	○		○	○	○		f	F	○	○				○	○	○	
	○	○			○	○	○	○	g	G		○				○	○	○	○
	○	○		○	○				h	H		○			○	'			
	○	○	○	○	○			○	i	I	○	○			○	○			○
	○		○		○			○	j	J	○	○			○	○		○	
	○		○		○		○		k	K		○			○	○		○	○
	○				○		○	○	l	L	○	○			○	○	○		
	○		○		○	○			m	M		○			○	○	○		○
	○				○	○		○	n	N		○			○	○	○	○	
	○				○	○	○		o	O	○	○			○	○	○	○	○
	○		○		○	○	○	○	p	P		○		○		○			
	○		○	○	○				q	Q	○	○		○		○			○
	○			○	○			○	r	R	○	○		○		○		○	
		○	○		○		○		s	S		○		○		○		○	○
		○			○		○	○	t	T	○	○		○		○	○		
		○	○		○	○			u	U		○		○		○	○		○
		○			○	○		○	v	V		○		○		○	○	○	
		○			○	○	○		w	W	○	○		○		○	○	○	○
		○	○		○	○	○	○	x	X	○	○		○	○	○			
		○	○	○	○				y	Y		○		○	○	○			○
		○		○	○			○	z	Z		○		○	○	○		○	
					○				Blank	NUL						○			
		○		○	○		○		BS		○				○	○			
		○	○	○	○	○	○		Tab	HT					○	○			○
○					○				CR	LF/NL					○	○		○	
									—	CR	○				○	○	○		○
			○		○				SP		○		○			○			
				○	○		○	○	FR	%	○		○			○	○		○
	○	○	○	○	○	○			UC	—									
	○	○	○	○	○	○		○	LC	—									
									—	(			○		○	○			
									—	)	○		○		○	○			○
	○	○	○		○				+				○		○	○		○	○
	○				○				—				○		○	○	○		○
	○			▲	○	○	○		○	:			○	○	○	○		○	
		○	○		○			○	/		○		○		○	○	○	○	○
	○	○	○	○	○	○	○	○	Del	DEL	○	○	○	○	○	○	○	○	○
○	○	○	○	○	○	○	○	○	All Mark		○	○	○	○	○	○	○	○	○
See Note 2.									#		○		○			○		○	○
○			○	○	○				*		○		○		○	○		○	
○				○	○	○			=		○		○	○	○	○	○		○
○		○	○		○				[		○	○		○	○	○		○	○
○		○			○		○		]		○	○		○	○	○	○		○
○			○		○	○			$				○			○	○		
○				○	○	○	○	○	@		○	○				○			
○			○	○	○	○	○		?				○	○	○	○	○	○	○
	○	○		○	○		○	○	.				○		○	○	○	○	

Notes:

1. For characters from # to ?, EIA codes have not been agreed upon. In the present system, for the time being, the above provisional codes are used.

2. EIA code of character # can be designated by the parameter #6017.

Table 9.11 Tape Format

No.	Address		Metric output		Inch input		B: Basic O: Optional
			Metric input	Inch input	Metric input	Inch input	
1	Program No.		O4		O4		B
2	Sequence No.		N4		N4		B
3	G function		G3		G3		B
4	Cordinate Word	Linear axis	a + 43	a + 34	a + 53	a + 34	B
		Rotary axis	b + 43	b + 43	b + 43	b + 43	O
5	Feed/min		F40	F31	F50	F31	B
6	Feed/min 1/10		F41	F32	F51	F32	B
7	S-function		S2		S2		B
			S5		S5		O
8	T-function		T2		T2		B
			T4		T4		O
9	M-function		M3		M3		B
10	Tool Offset No.		H2 or D2		H2 or D2		B
11	B-function		B3		B3		O
12	Dwell		P53		P53		B
13	Program No. designation		P1		P4		B
14	Sequence No. designation		P4		P4		B
15	No. of repititions		L8		L8		B

Table 9 12 Range of Program Commands

No	Address		Metric Output		Inch Output	
			Metric Input	Inch Input	Metric Input	Inch Input
1	Program Number	O	1 to 9999	1 to 9999	1 to 9999	1 to 9999
2	Sequence Number	N	1 to 9999	1 to 9999	1 to 9999	1 to 9999
3	G-function	G	0 to 199	0 to 199	0 to 199	0 to 199
4	Coordinate address Linear axis Rotary axis Max cumulative value		±9999.999 mm ±9999.999 deg ±99999.999 mm	±3937.0078 in. ±9999.999 deg ±9999.99999 deg	±9999.999 mm ±9999.999 deg ±99999.999 mm	±9999.9999 in. ±9999.999 deg ±9999.99999 in.
5	Feed per minute	F	1 to 24000 mm/min	0.1 to 944.8 in./min	1 to 60960 mm/min	0.1 to 2400.0 in./min
6	Feed per minute 1/10	F	0.1 to 24000.0 mm/min	0.01 to 944.88 in./min	0.1 to 60960.0 mm/min	0.01 to 2400.00 in./min
7	S-function	S2	0 to 99	0 to 99	0 to 99	0 to 99
		S5	0 to 99999	0 to 99999	0 to 99999	0 to 99999
8	T-function	T2	0 to 99	0 to 99	0 to 99	0 to 99
		T4	0 to 9999	0 to 9999	0 to 9999	0 to 9999
9	M-function	M	0 to 199	0 to 199	0 to 199	0 to 199
10	Tool offset No.	H	0 to 99 (299)	0 to 99 (299)	0 to 99 (299)	0 to 99 (299)
		D	0 to 99 (299)	0 to 99 (299)	0 to 99 (299)	0 to 99 (299)
11	B-function	B	0 to 999	0 to 999	0 to 999	0 to 999
12	Dwell	P	0 to 99999.999 sec	0 to 99999.999 sec	0 to 99999.999 sec	0 to 99999.999 sec
13	Program No. designation	P	1 to 9999	1 to 9999	1 to 9999	1 to 9999
14	Sequence No. designation	P	1 to 9999	1 to 9999	1 to 9999	1 to 9999
15	No. of repetitions	L	99999999	99999999	99999999	99999999

Table 9 13 Range of Data Setting

Address		Metric Output		Inch Output	
		Metric Input	Inch Input	Metric Input	Inch Input
Least input increment		0.001 or 0.01 mm	0.0001 or 0.001 in.	0.001 or 0.01 mm	0.0001 or 0.001 in.
Max stroke (Distance from reference point)		± 99999.999 mm		±3937.0074 in.	± 9999.9999 in.
Tool offset amount & Tool radius value		0 to ± 999.999 mm	0 to ± 99.9999 in.	0 to ± 999.999 mm	0 to ± 99.9999 in.
Min. feed amount at STEP/HANDLE		0.001 mm	0.0001 in.	0.001 mm	0.0001 in.
Unit of area setting for stored stroke limit	Program designation	0.001 mm	0.0001 in.	0.001 mm	0.0001 in.
	Parameter & setting	0.001 mm		0.0001 in.	
Rapid traverse rate		(7.5 to) 1 to 24,000 mm/min		(0.75 to) 0.1 to 2400.0 in./min	
Manual jog speed					
Seed at Fo					
Max. feedrate		1 to 24,000 mm/min		0.1 to 2400.0 in./min	
Dry run speed					
Stored leadscrew compensation, stored stroke limit, and setting area for 2nd to 4th reference points		0 to ±9999.999 mm (0: REFERENCE POINT)		0 to ± 3937.0078 in.	0 to ± 9999.9999 in.
Backlash compensation		± 8191 pulses		± 8191 pulses	
Stored leadscrew Compensation	Incremental	0 to 15 pulses		0 to 15 pulses	
	Absolute	0 to 127 pulses		0 to 127 pulses	

Note: 1 pulse = least output increment

Table 9 14 List of G Codes

G Code	Group	Function	B Basic O Optional
G00	01	Positioning (rapid feed)	B
G01		Linear interpolation	B
G02		Circular interpolation CW, Helical interpolation CW	B O
G03		Circular interpolation CCW, Helical interpolation CCW	B O
G04	*	Dwell	B
G06		Positioning in error detect off mode	B
G09		Exact stop	B
G10		Tool offset value and work coordinate, Shift-value modification	B
G12		Circle cutting CW	O
G13		Circle cutting CCW	O
G17	02	XY plane designation	B
G18		ZX plane designation	B
G19		YZ plane designation	B
G20	06	Inch input designation	O
G21		Metric inpt designation	O
G22	04	Stored stroke limit ON	O
G23		Stored stroke limit OFF	O
G25	*	Program copy	O
G27	*	Reference point check	O
G28		Automatic return to reference point	O
G29		Return from reference point	O
G30		Return to 2nd, 3rd, 4th reference point	O
G31		Skip function	O
G40	07	Tool radius compensation cancel	O
G41		Tool radius compensation, left	O
G42		Tool radius compensation, right	O
G43	08	Tool length compensation plus direction	B
G44		Tool length compensation, minus derection	B
G49		Tool length compensation, cancel	B
G45	*	Tool position offset extension	B
G46		Tool position offset, retraction	B
G47		Tool position offset, double extesion	B
G48		Tool position offset, double retraction	B
G50	15	Scaling OFF	O
G51		Scaling ON	O
G52	12	Return to base coordinate system	O
G53	*	Temporary shift to machine coordinate	O

G Code	Group	Function		B Basic O Optional
G54	12	Shift to work coordinate system 1		O
G55		Shift to work coordinate system 2		O
G56		Shift to work coordinate system 3		O
G57		Shift to work coordinate system 4		O
G58		Shift to work coordinate system 5		O
G59		Shift to work coordinate system 6		O
G60	01	Unidirectional approach		O
G61	13	Exact stop mode		B
G64		Exact stop mode cancel		B
G65	*	Non-modal call of user macro		B
G66	14	Modal call of user macro		O
G67		Modal call of user macro cancel		O
G68	18	Rotation of coordinate ON		O
G69		Rotation of coordinate OFF		O
G70	*	Bolt hole circle		O
G71		Arc		O
G72		Line-at-angle		O
G73	09	Canned cycle 10		O
G74		Canned cycle 11		O
G76		Canned cycle 12		O
G77		Canned cycle 13		O
G80		Canned cycle cancel		O
G81		Canned cycle 1, Output for external motion		O
G82		Canned cycle 2		O
G83		Canned cycle 3		O
G84		Canned cycle 4		O
G85		Canned cycle 5		O
G86		Canned cycle 6		O
G87		Canned cycle 7		O
G88		Canned cycle 8		O
G89		Canned cycle 9		O
G90	03	Absolute command designation		B
G91		Incremental command designation		B
G92	*	Programming of absolute zero point		B
G93	05	Solid tap mode ON		O
G94		Solid tap mode OFF		O
G98	10	Return to initial point for canned cycles		O
G99		Return to point R for canned cycles		O
G122	17	Tool register start	Tool life control	O
G123		Tool register end		O
G124	*	Tool register cancel		O

Notes
1 The codes marked with ◥ are automatically selected at power ON or reset.
2 The codes marked with ◥ are automatically selected at power ON

YASNAC MX3

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