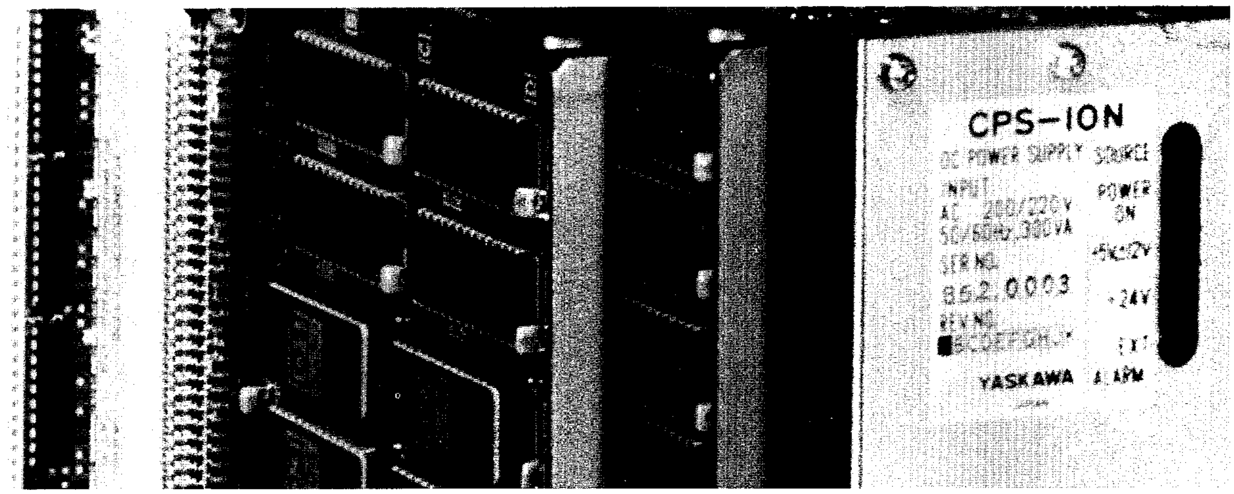
YASNAC LX3

CNC SYSTEM FOR TURNING APPLICATIONS

MAINTENANCE



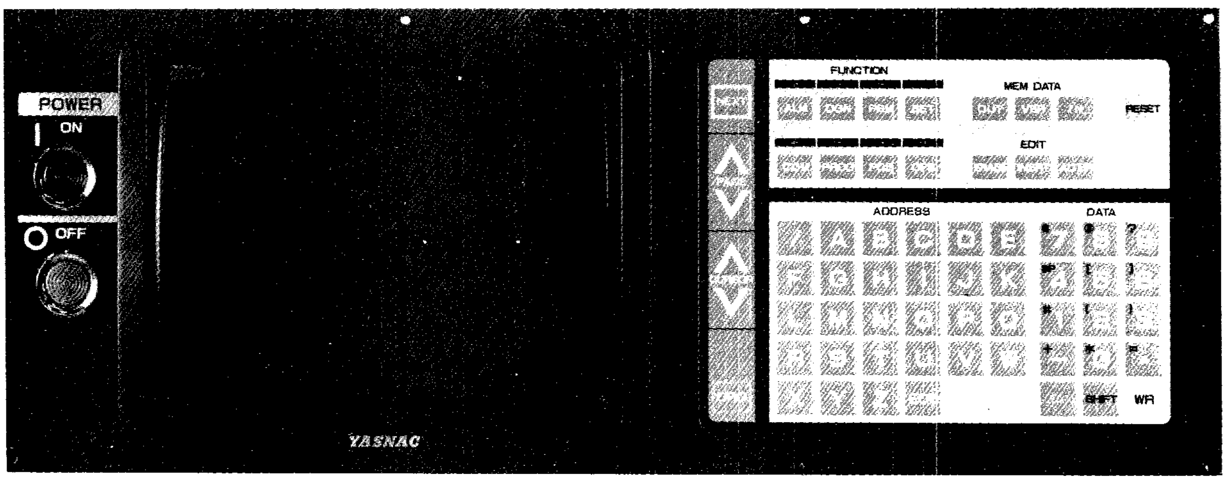
Before initial operation read these instructions thoroughly, and retain for future reference.

YASKAWA

This manual is primarily intended to give operator's maintenance instructions for YASNAC LX3.

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 LX3 documents for additional information:

- YASNAC LX3/MX3 PC SYSTEM (TOE-C843-9.1)
- YASNAC LX3 SPECIFICATIONS (SIE-C843-9.20)
- YASNAC LX3 OPERATOR'S MANUAL (TOE-C843-9.20)
- YASNAC LX3 CONNECTING MANUAL (TOE-C843-9.22)



YASNAC LX3 OPERATOR'S STATION

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1. OUTLINE

The YASNAC LX3 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 buit-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 parametevs such as accel/decel time constant and rapid speed.

1.1 COMPONENT ARRANGEMENT

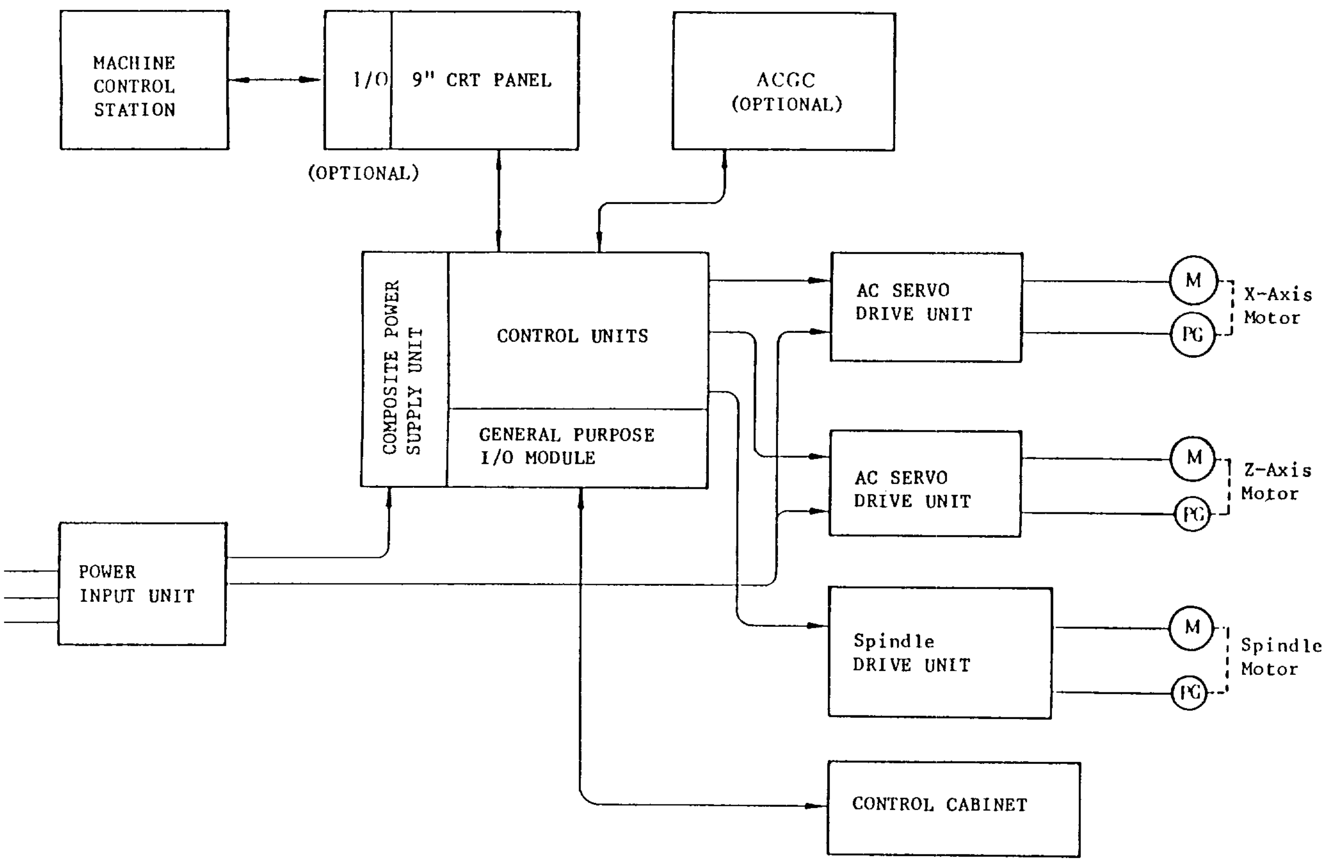
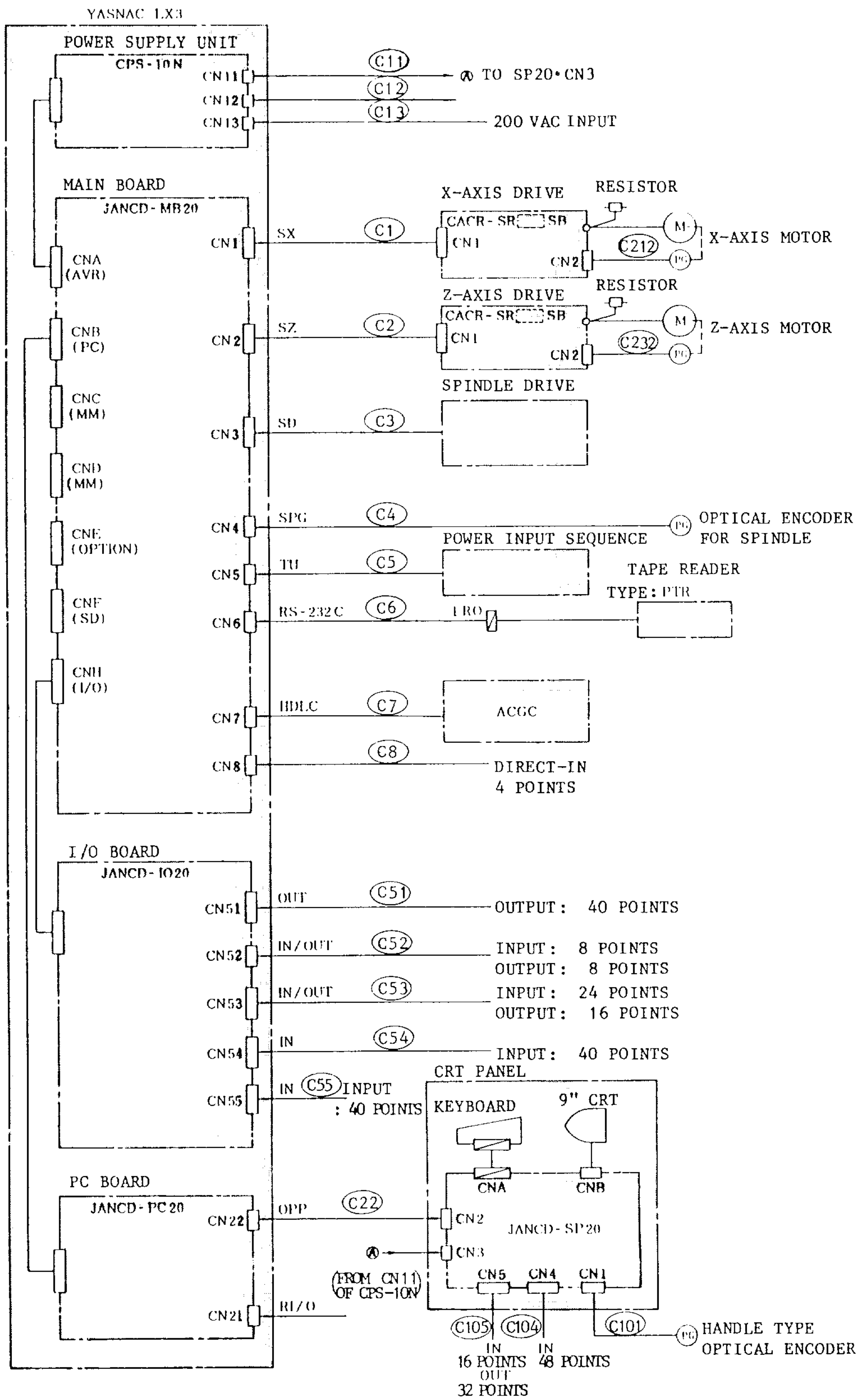


Fig. 1.1 Component Arrangement of YASNAC-LX3

1.1 COMPONENT ARRANGEMENT (Cont'd)

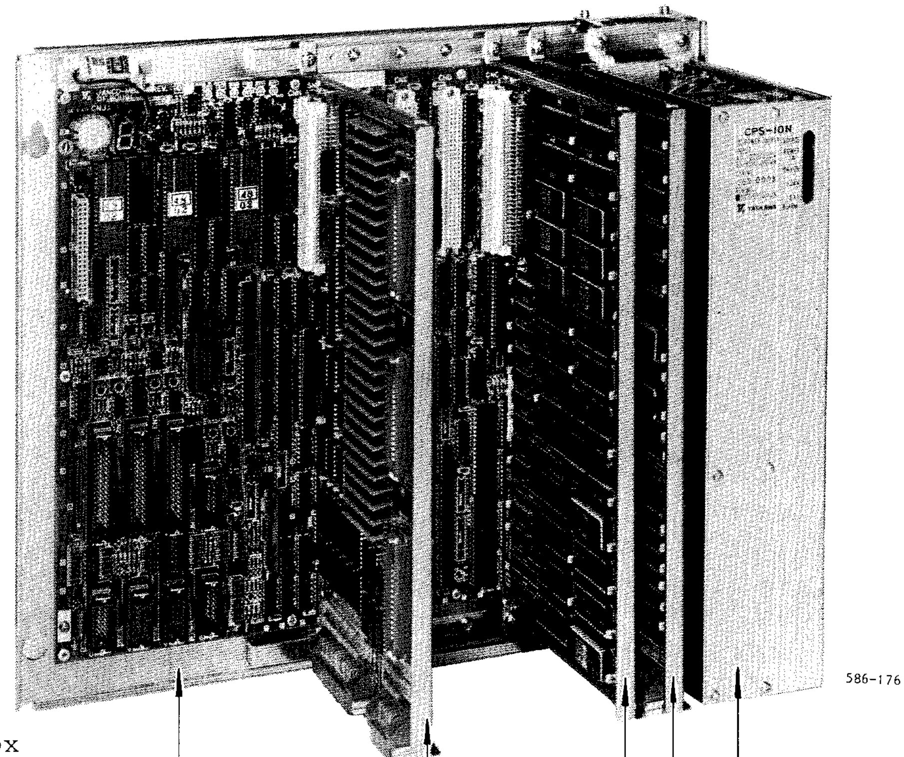


Note: Circled "C" values. Show cable No.

Fig. 1.2 Connection Diagram

1.2 CONSTRUCTION

(1)



Approx
Weight: 10 kg

Fig. 1.3 CPU Module

(2)

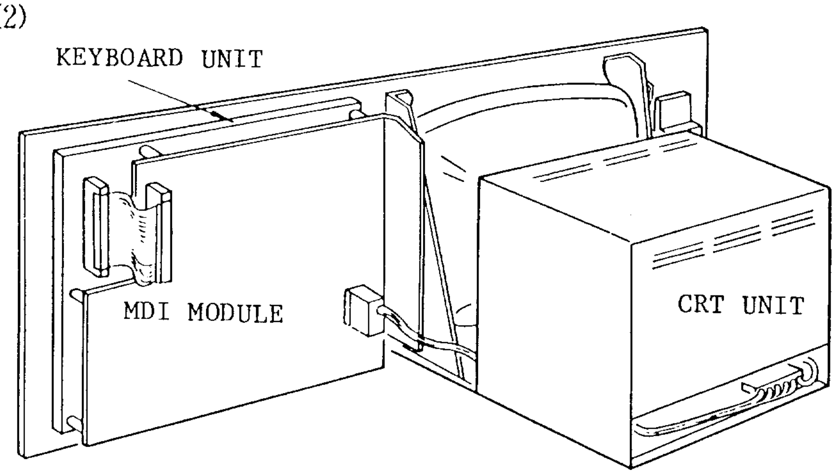


Fig. 1.4 9"CRT Unit (rear view)

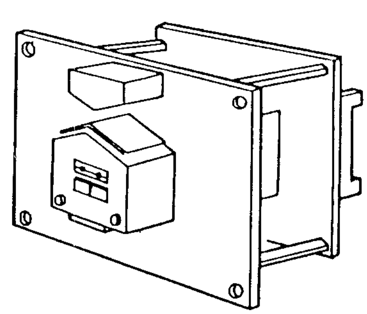


Fig. 1.5 Tape Reader Unit

1.2 CONSTRUCTION (Cont'd)

(3)

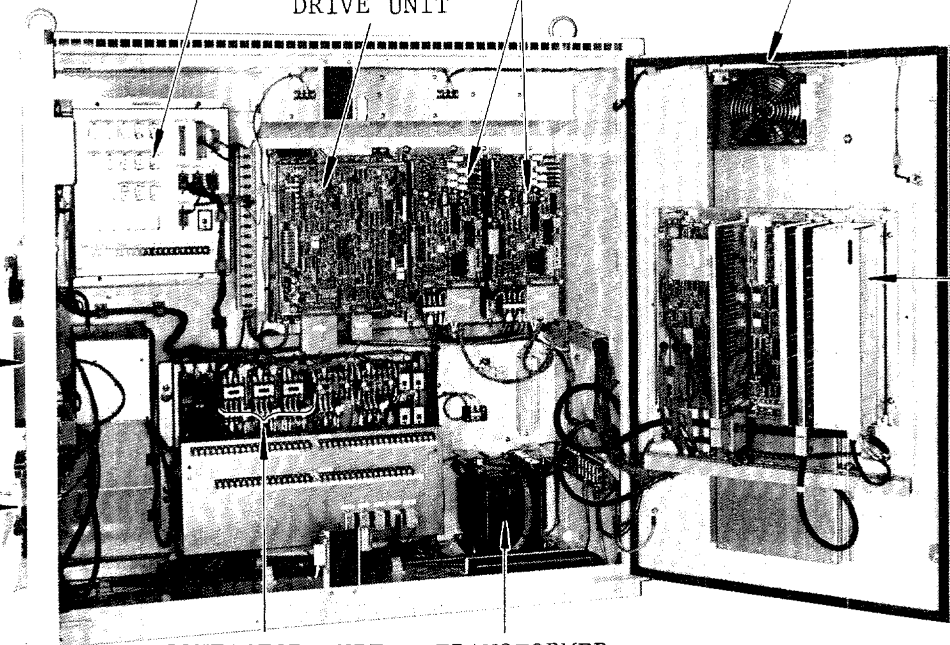


Fig. 1.6 Example of Unit Assembly with High Voltage Units

1.3 MAJOR COMPONENTS

(1) YASNAC MAJOR COMPONENTS

Table 1.1 YASNAC Major Components

Component Name	Type	Code	Remarks
Power Supply Unit	CPS-10N	AVR839	
Tape Reader	MODEL2801	RED18	Option
Tape Reel	MODEL1500	RED14	Option
	MODEL1402-1	RED13	Option
Main Board	JANCD-MB20C	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
	JANCD-MM21-3	DTN5180	Memory length: 320 m
	JANCD-MM21-4	DTN5190	Memory length: 640 m (option)
	JANCD-MM21-5	DTN5200	Memory length: 1280 m
	JANCD-MM21-6	DTN5210	Memory length: 2560 m
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	
General Purpose I/O Board	JANCD-1020-01	DTN4800	—
	JANCD-1020-02	DTN4810	—
	JANCD-1020-03	DTN4820	—
General Purpose I/O Module	JANCD-1021	DTN5250	Separated type

(2) ACGC Major Components

Table 1.2 ACGC Major Components

Name	Type	Code No.	Remarks
14" CRT Unit	C-5470YE	CRT6	Main Key
Keyboard Unit	HMK-9993-02	SW677	Main Key
Keyboard Unit	HMK-2293-03	SW678	Soft Key
Keyboard Unit	HMK-9993-20	SW679	
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

1.3 MAJOR COMPONENTS (Cont'd)

(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		Daily	○	○	See if alarm for BATTERY is displayed on CRT screen.

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

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

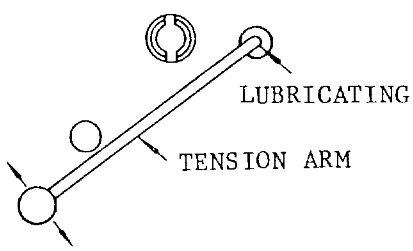
2.1 TAPE READER

(1) Cleaning the tape reader head (Daily)

(a) Remove tape rubbish and dust from the glass with a blower brush. If the glass is stained with oil or oily dust, wipe it using 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 (Weekly)
Clean the braided nylon leading tape with a clean, soft cloth.

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



(In the case of 8-inch diameter reel)

Fig. 2.1

NOTE

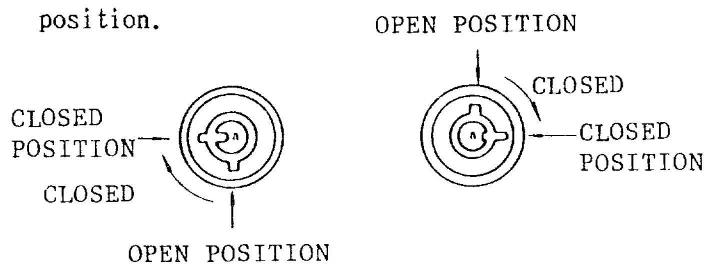
When trouble occurs in feeding or winding tape with 8-inch diameter reels, open thefront door and brush away dust around the photo-coupler by using a blower brush.

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.

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

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

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

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.

Replacing Procedure

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

(2) Open the front door of the control. The battery of the memory (printed circuit) board can be seen on the CPU module which is mounted on rear of the front door.

(3) Where the control is equipped with a door interlock switch, pull it out by hand. The power can be turned on, with the door open.

(4) Depress POWER ON pushbutton.

(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.

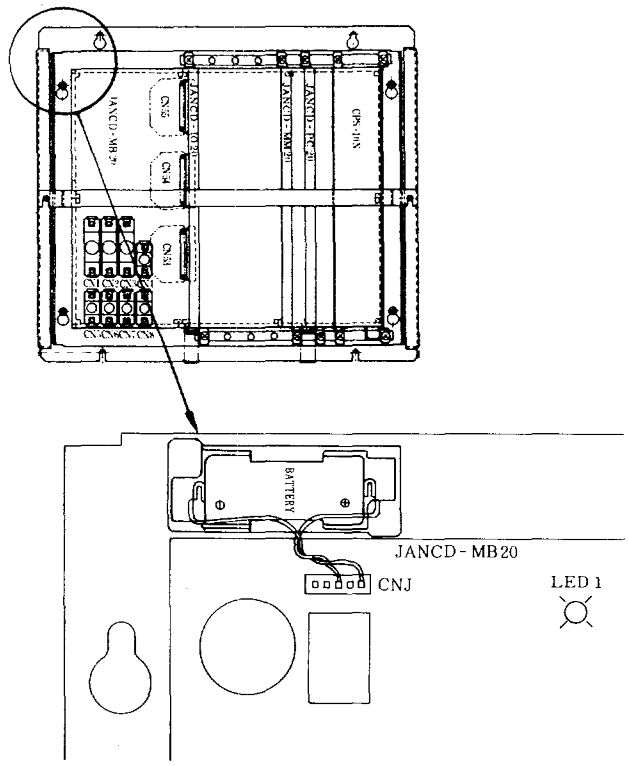


Fig. 2.3 Arrangement of LED and Battery

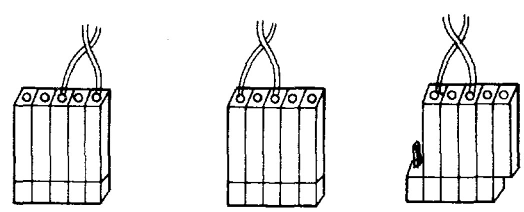


Fig. 2.4 Battery Connection

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

(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 the YASNAC service personnel 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-LX3 (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 at the time of power application. Then, the screen as shown in Fig. 4.1 appears on the CRT.

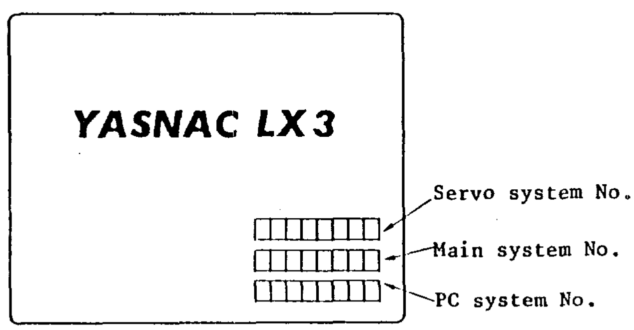


Fig. 4.1 NC Screen at Power Application

(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.

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.

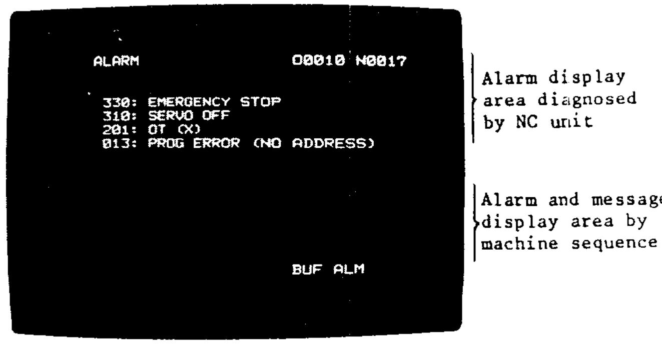


Fig. 4.2 Alarm Codes and Messages

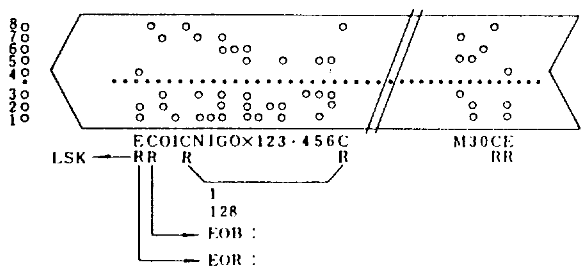
Eliminate the cause of the alarm and depress the $\boxed{\text{RESET}}$ key, and the alarm state and the alarm display will be reset. Notice that the alarm code "820" is displayed regardless of the selected function key.
The alarm codes are categorized as in Table 4.1.

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
200 to 299	Decelerated to stop	Overtravel, reference point return, positioning, machine ready
300 to 399	Decelerated to stop	Servo, emergency stop, overload FG,RPG
400 to 499	Decelerated to stop	Sequence error
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 YASNAC Service Personnel.
900 to 999	—	Off-line error (for our maintenance)

Note: Sequencer messages are the troubles concerned with machine sequence. Refer to the maintenance manual prepared by machine manufacturer for details.

4.2.1 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) 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 D6 = 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 Rioh noise level)	· Check the specification of RS232C equipment · Check parameters. Refer to par. 4.3.14. · Check cable grounding.

4.2.2 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.

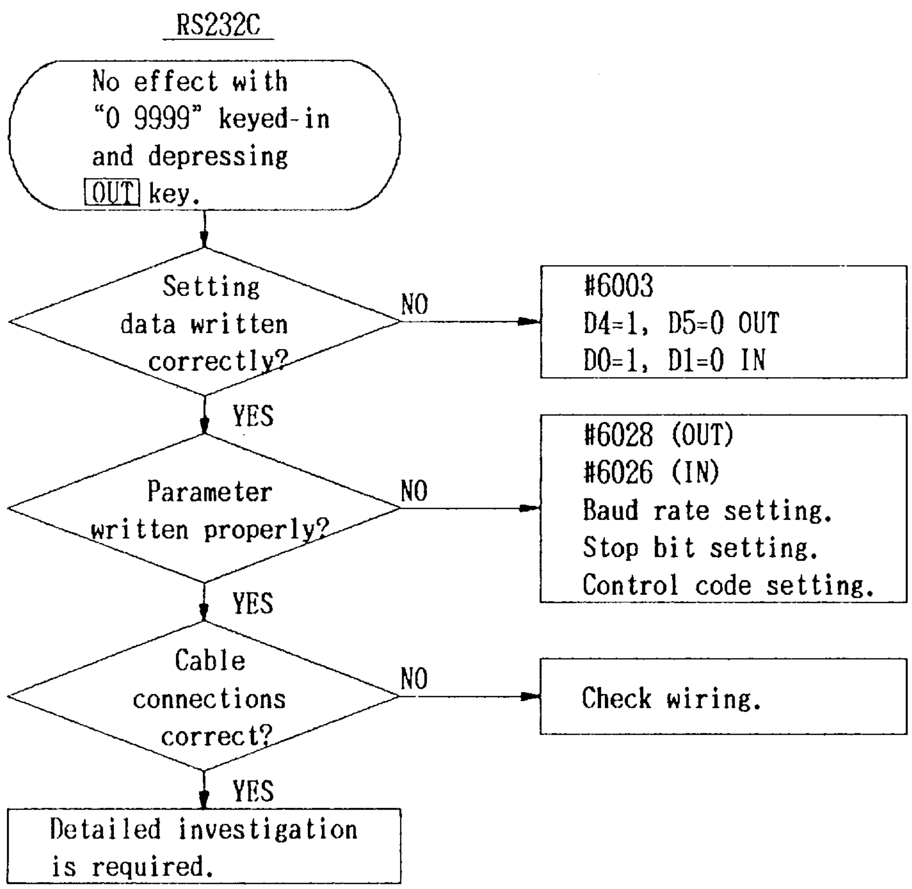


Fig. 4.3

· 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	#6003D0	#6003D4
2nd RS232C	#6003D1	#6003D5

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

Common	Input/Output	#6026 D3	#6026 D2	#6026 D1	#6026 D0
independent	Input	#6026 D3	#6026 D2	#6026 D1	#6026 D0
	Output	#6028 D3	#6028 D2	#6028 D1	#6028 D0
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

Common	Input/Output	#6026D4	=1: Two bits for stop bit
Independent	Input	#6026D4	=0: One bits for stop bit
	Output	#6028D4	

Setting of control code sending command

Common	Input/Output	#6026D5	=1: Does not send control code.
Independent	Input	#6026D5	=0: Sends control code.
	Output	#6028D5	

(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

Common	Input/Output	#6027 D3	#6027 D2	#6027 D1	#6027 D0
independent	Input	#6027 D3	#6027 D2	#6027 D1	#6027 D0
	Output	#6029 D3	#6029 D2	#6029 D1	#6029 D0
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

4.2.2 ALARM 075, 076, 077 (RS232C Faulty) (Cont'd)

Setting of stop bit length

Common	Input/ Output	#6027D4	=1: Two bits for stop bit
Independ-ent	Input	#6027D4	=0: One bits for stop bit
	Output	#6029D4	

Setting of control code sending command

Common	Input/ Output	#6027D5	=1: Does not send control code.
Independ-ent	Input	#6027D5	=0: Sends control code.
	Output	#6029D5	

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

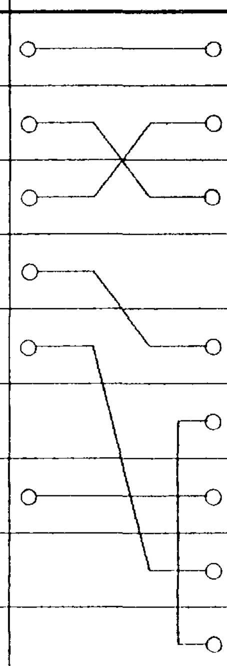
NC Side (DB-25P)			Connection	External Equipment Symbol
Symbol	Signal	Pin No.		
FG	Frame grounding	1		FG
SD	Send data	2		SD
RD	Receive data	3		RD
RS	Request send	4		RS
CS	Capable of send	5		CS
DR	Data set ready	6		DR
SG	Signal grounding	7		SG
ER	Equipment ready	20		IO BUSY
				ER

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

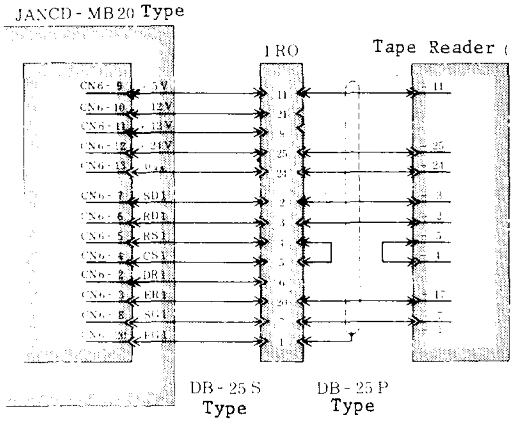


Fig. 4.4 Example of 1st RS232C Interface

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 YASREP in advance if it is necessary to exceed 3m.

4.2.3 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.

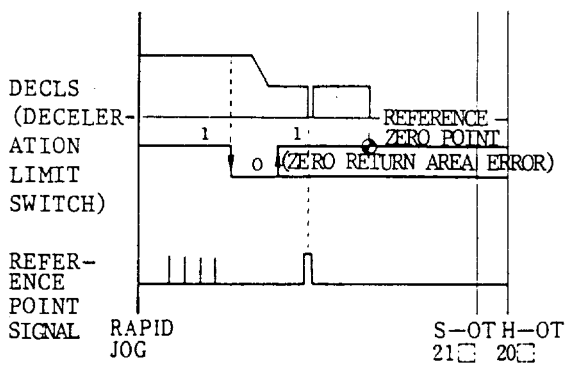
- Failure of battery unit (battery alarm display)
- JANCD-MB20 module, -MM20 module or -MM21 module (optional) is not correctly connected.
- Failure of above modules

Contact YASREP in any of above cases.

4.2.4 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 YASREP. · 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 YASREP.
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.

4.2.5 ALARMS 231 AND 232 (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 D4(X) #1306 D5(Z) As shown 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. 	Return it to the deceleration LS or try the zero point return again from a more distant point.
Final distance of zero point return is too short, or, approach speed is too fast.	Perform the zero point return by jog feed. Try to change parameter for final distance. Compare the parameter for approach speed with parameter list.	Make final distance (parameter) longer: • [PRM] #6304(X) #6305(Z) • Approach speed: #6310(X) #6311(Z) • If MB20, servopack and/or servo motor are replaced, ensure position loop gain (Kp).

4.2.6 ALARMS 241 AND 242 (Reference Point Return Area Error)

Cause of Trouble	Check Method	Solution
This type of alarm results when reference point return performed manually. It also occurs by reference point return at low speed due to DECLS chattering. Occurs at high speed by error of reference point pulse	Observe DECLS chattering: DGN #1306 D4 (X-axis) #1306 D5 (Z-axis) Observe reference point pulse: DGN #1288 D6 (X-axis) X1289 D6 (Z-axis)	Adjustment or replacement of LS · Failure of I020 or I021 PCB Replace AC servo. Replace MB20B. Replace AC motor. PG cable failure
The alarm occurs also at automatic reference point return.	In case of G28	Same as above
	In case of G27	Check the program.

4.2.7 ALARMS 271 AND 272 (P-SET Error)

P-Set Error results when difference between command position and machine position does not fall within parameters #6056 (X-axis) or X6057 (Z-axis) at the time of completing positioning with G00, G27, G28, G29 and G30.
Check is also required at the time of ERROR DETECT ON ($\boxed{\text{DGN}}$ #1304 D5=1) and G4 (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. 3.3.4.8 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 YASREP.

4.2.8 ALARM 310 (Servo Power Supply Not Applied)

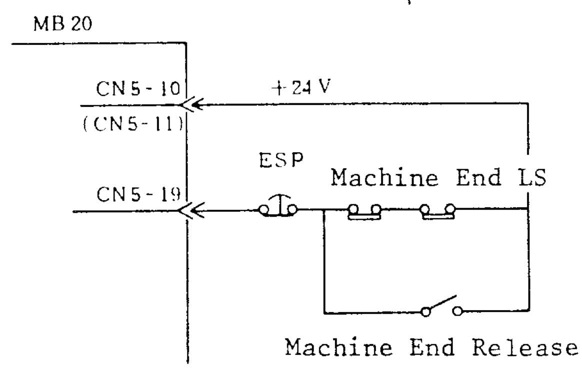
Cause of Trouble	Check Method	Solution
Secondary power supply is not applied.	This is a normal result when depressing NC RESET after initial power application, or resetting emergency stop alarm, etc.	Depress POWER ON button again.
In case of automatic servo power application I/O input specification is not activated by secondary power supply.	Ensure that it is set to DGN #1322 D7=1.	Check wiring and sequence.
Emergency stop input.	Check if ALM330 displays, or DGN #1281 D1=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.

4.2.9 ALARM 320 (Control Not Ready)

This type of alarm results when position lag does not fall within the range of RPM #6056 and #6057 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- and Z-axes.	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 YASREP.
MB20 failure.		Replace MB20. Contact YASREP.

4.2.10 ALARM 330 (Emergency Stop)

Cause of Trouble	Check Method	Solution
Emergency stop button depressed, or, machine end LS is out of place.	After ensuring $\boxed{\text{DGN}}$ #1281 D1=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 machine manufacturer.  Example of Emergency Stop Connection	Reset the emergency stop button. Release it from machine end LS according to instruction manual prepared by machine manufacturer.
Failure of MB20	This is MB20 failure if alarm 330 lights even at $\boxed{\text{DGN}}$ #1281=1.	Replace MB20. Contact YASREP.
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 YASREP.

4.2.11 ALARMS 331 AND 332 (Servo Fuse Blown)

Cause of Trouble	Check Method	Solution
Servopack fuse is blown or MCB tripped.	$\boxed{\text{DGN}}$ #1288 D1=1 X-axis alarm #1289 D1-1 Z-axis alarm Alarm 390 (servopack alarm) should also be displayed simultaneously. DGN #1281 D2=1	Turn off power supply to machine. Check if servopack fuse is blown or MCB tripped. Contact YASREP.
Erroneous wiring	Check if CN1-43 and/or CN2-43 drop to 0 V.	Correct wiring according to Connection Manual item 12. Servo Unit Feed Connection

4.2.12 ALARMS 341 AND 342 (Servo Error)

Servo error results when the lag of machine to command value exceeds parameter #6074 (X-axis) and #7075 (Z-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. 12. Connection of Feed Servo Unit.
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})	Adjust value by VR (LX3) of Servopack if the value is less than the value set as standard by machine manufacturer.

4.2.13 ALARMS 351 AND 352 (Motor Overload)

Trouble	Check Method	Solution
Cutting condition is too severe (Servopack alarm lights and alarm 390 activates.	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.	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 D2=0 causes alarm. #1289 D2=0 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 DGN #1288 D2=0 #1289 D2=0 without causing Servopack alarm.	Replace Servopack. Contact YASREP.

4.2.14 ALARMS 361, 362 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(Z-axis), CN3(spindle) and/or 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 YASREP.
No shorting plug connector even without spindle PG.	Shorting plug connector to CN4 at CPU module is required for such specifications without spindle PG.	Mount shorting plug connector.
Servopack failure	• Check if DGN #1288 D7=1 (X-axis TG ON) #1289 D7=1 (Z-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%.

4.2.15 ALARM 325 (Servo CPU Error)

Trouble	Check Method	Solution
Servo CPU failure	$\boxed{\text{PRM}}$ #6014 D6=1 causes error.	Replace MB20. Contact YASREP.

4.2.16 ALARM 329(Built-in type PC CPU error)

Cause of Trouble	Check Method	Solution
PC CPU failure	$\boxed{\text{PRM}}$ #6014 D7=1 causes error.	Replace PC20. Contact YASREP.

4.2.17 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 YASREP.

Trouble	Check Method	Solution
#00 to #05 ROM in failure	MM-20 ERROR #0N :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	PC␣RAM␣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.

Trouble	Check Method	Solution
#500 RAM error	RAM CHECK ERROR #0500 820 (#501)	Failure of RAM mounted to MB20 Replace MB20.
#40 error	PC␣ROM␣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	RAM CHECK ERROR #xxx :820	Replace MM20. Replace MB20. Replace PC20.
#302 RAM failure #510 to #511, #520, #521, #530 RAM failure	RAM CHECK ERROR #xxx :820	Replace PC20. Replace MB20.

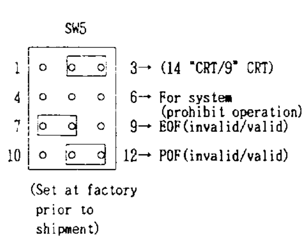
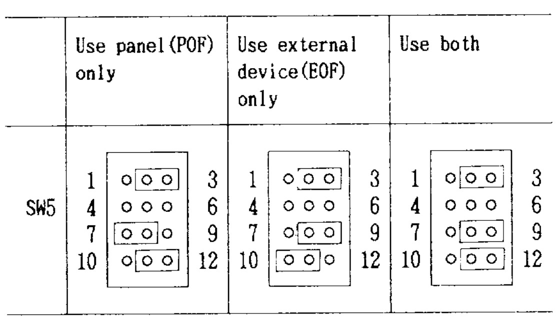
4.2.18 ALARM 323 (ACGC2 SYNC ERROR)

Trouble	Check Method	Solution
ACGC2 CPU failure	PRM #6014 D5=1 causes error.	Contact YASREP.

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 $\boxed{\text{DGN}}$, 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 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 ower 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="5">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 overvoltage 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 mey be in the power unit. Contact your YASKAWA representative(YASREP).</td></tr>
<tr><td>Power ON/OFF Switch is not set properly.

</td><td>SW5 Setting(for 9 "CRT)

</td><td>Set correctly shorting plug SW5 at left corner on MB20 PCB.</td></tr>
</table>

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 NC unit 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 our YASKAWA representative immediately if it is "CPU ERROR". If normal, start operation after ensuring correct parameters, settings, offsets and programs.

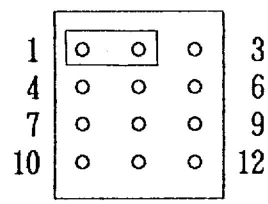
4.3.4 CRT SCREEN DOES NOT DISPLAY

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 YASREP, if the trouble can not be located even after the above procedure.

4.3.5 HANDLE MODE OPERATION FAULTY

<table>
<tr><th>Trouble</th><th>Check Procedure</th><th>Solution</th></tr>
<tr><td>Handle mode not selection.</td><td>$\boxed{\text{DGN}}$ #1300 D_2</td><td>Check wiring for Proper mode.</td></tr>
<tr><td>Axis not selection.</td><td>$\boxed{\text{DGN}}$ #1302 D_6 (X-axis)
$\boxed{\text{DGN}}$ #1302 D_7 (Z-axis)</td><td>Select the axis.
Check wiring.</td></tr>
<tr><td>Magnification not selection.</td><td>Handle Magnification Setup
<table>
<tr><th>#1302 D_1
MP3</th><th>#1302 D_0
MP2</th><th>#1302 D_7
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>0</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 is acceptable.</td><td>×100</td></tr>
</table></td><td>Check sequence.

Check wiring.</td></tr>
<tr><td>No power to handle PG.</td><td>Check that +5 V is supplied on terminal of handle PG.
Also check the signal wiring.</td><td>Correct wiring according to Connecting Manual(TOE-C843-9.22).</td></tr>
<tr><td>No pulse generated by turning handle.</td><td>Manual pulse monitor $\boxed{\text{DGN}}$ #1282 D0 to D7
Does this DGN change by turning handle?</td><td>Same as above</td></tr>
</table>

Trouble	Check Procedure	Solution
Parameter not set correctly.	PRM #6222 Max. speed at handling(Reference) PRM #6009 D4 1: Magnification to be set with PRM #6223 at handle×100 0: Magnification×100	Set parameter according to YASNAC LX3 Operator's Manual(TOE-C843-9.20)
SW1 of SP20 not set to ENB.	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	Specification for simultaneous 1 axis manual pulse generator. (Use this terface.)

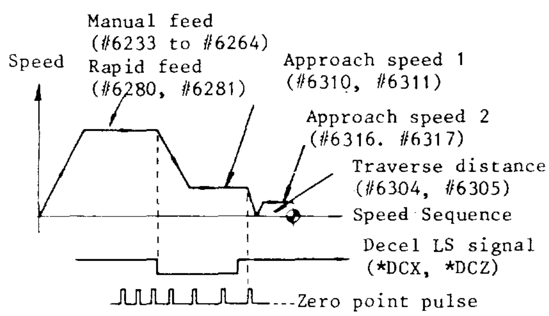
4.3.6 MANUAL JOG MODE OPERATION FAULTY

<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</td><td>Select the mode.
Check wiring.</td></tr>
<tr><td>Axial direction not specified.</td><td>+X [DGN] #1302 D_2
−X [DGN] #1302 D_3
+Z [DGN] #1302 D_4
−Z [DGN] #1302 D_5</td><td>Select axial direction.
Check wiring.</td></tr>
<tr><td>Jog override not entered</td><td>Feed override/Manual JOG feed rate Selection
<table>
<tr><th colspan="5">DGN #1301</th><th rowspan="2">Feed Override (Auto operation mode)</th><th rowspan="2">Manual JOG Feed Rate (Manual operation mode)</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>0</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>0</td><td>0</td><td>0</td><td>0</td><td>1</td><td>10 %</td><td>Parameter #6234 Setting speed</td></tr>
<tr><td>0</td><td>0</td><td>0</td><td>1</td><td>0</td><td>20 %</td><td>Parameter #6235 Setting speed</td></tr>
<tr><td>0</td><td>0</td><td>0</td><td>1</td><td>1</td><td>30 %</td><td>Parameter #6236 Setting speed</td></tr>
<tr><td>0</td><td>0</td><td>1</td><td>0</td><td>0</td><td>40 %</td><td>Parameter #6237 Setting speed</td></tr>
<tr><td>0</td><td>0</td><td>1</td><td>0</td><td>1</td><td>50 %</td><td>Parameter #6238 Setting speed</td></tr>
<tr><td>0</td><td>0</td><td>1</td><td>1</td><td>0</td><td>60 %</td><td>Parameter #6239 Setting speed</td></tr>
<tr><td>0</td><td>0</td><td>1</td><td>1</td><td>1</td><td>70 %</td><td>Parameter #6240 Setting speed</td></tr>
<tr><td>0</td><td>1</td><td>0</td><td>0</td><td>0</td><td>80 %</td><td>Parameter #6241 Setting speed</td></tr>
<tr><td>0</td><td>1</td><td>0</td><td>0</td><td>1</td><td>90 %</td><td>Parameter #6242 Setting speed</td></tr>
<tr><td>0</td><td>1</td><td>0</td><td>1</td><td>0</td><td>100 %</td><td>Parameter #6243 Setting speed</td></tr>
<tr><td>0</td><td>1</td><td>0</td><td>1</td><td>1</td><td>110 %</td><td>Parameter #6244 Setting speed</td></tr>
<tr><td>0</td><td>1</td><td>1</td><td>0</td><td>0</td><td>120 %</td><td>Parameter #6245 Setting speed</td></tr>
<tr><td>0</td><td>1</td><td>1</td><td>0</td><td>1</td><td>130 %</td><td>Parameter #6246 Setting speed</td></tr>
<tr><td>0</td><td>1</td><td>1</td><td>1</td><td>0</td><td>140 %</td><td>Parameter #6247 Setting speed</td></tr>
<tr><td>0</td><td>1</td><td>1</td><td>1</td><td>1</td><td>150 %</td><td>Parameter #6248 Setting speed</td></tr>
<tr><td>1</td><td>0</td><td>0</td><td>0</td><td>0</td><td>160 %</td><td>Parameter #6249 Setting speed</td></tr>
<tr><td>1</td><td>0</td><td>0</td><td>0</td><td>1</td><td>170 %</td><td>Parameter #6250 Setting speed</td></tr>
<tr><td>1</td><td>0</td><td>0</td><td>1</td><td>0</td><td>180 %</td><td>Parameter #6251 Setting speed</td></tr>
<tr><td>1</td><td>0</td><td>0</td><td>1</td><td>1</td><td>190 %</td><td>Parameter #6252 Setting speed</td></tr>
<tr><td>1</td><td>0</td><td>1</td><td>0</td><td>0</td><td>200 %</td><td>Parameter #6253 Setting speed</td></tr>
<tr><td>1</td><td>0</td><td>1</td><td>0</td><td>1</td><td rowspan="11">0 %</td><td>Parameter #6254 Setting speed</td></tr>
<tr><td>1</td><td>0</td><td>1</td><td>1</td><td>0</td><td>Parameter #6255 Setting speed</td></tr>
<tr><td>1</td><td>0</td><td>1</td><td>1</td><td>1</td><td>Parameter #6256 Setting speed</td></tr>
<tr><td>1</td><td>1</td><td>0</td><td>0</td><td>0</td><td>Parameter #6257 Setting speed</td></tr>
<tr><td>1</td><td>1</td><td>0</td><td>0</td><td>1</td><td>Parameter #6258 Setting speed</td></tr>
<tr><td>1</td><td>1</td><td>0</td><td>1</td><td>0</td><td>Parameter #6259 Setting speed</td></tr>
<tr><td>1</td><td>1</td><td>0</td><td>1</td><td>1</td><td>Parameter #6260 Setting speed</td></tr>
<tr><td>1</td><td>1</td><td>1</td><td>0</td><td>0</td><td>Parameter #6261 Setting speed</td></tr>
<tr><td>1</td><td>1</td><td>1</td><td>0</td><td>1</td><td>Parameter #6262 Setting speed</td></tr>
<tr><td>1</td><td>1</td><td>1</td><td>1</td><td>0</td><td>Parameter #6263 Setting speed</td></tr>
<tr><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: close 0: open</td><td>Set jog override to move value other than 0.
Check wire.</td></tr>
<tr><td>Parameter not set correctly.</td><td>Ensure that [PRM] #6233 to #6264 are set according to Table 4.9.</td><td>Set parameter</td></tr>
<tr><td>Not at machine lock.</td><td>[DGN] #1303 D_1</td><td>Check the switch to ensure that [PRM] #6000 D_1 is at 1.</td></tr>
</table>

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 not selected.</td><td>$\boxed{\text{DGN}}$ #1300 D_0</td><td>Select the mode.
Check wiring.</td></tr>
<tr><td>Axial direction not specified.</td><td>+X $\boxed{\text{DGN}}$ #1302 D_2
−X $\boxed{\text{DGN}}$ #1302 D_3
+Z $\boxed{\text{DGN}}$ #1302 D_4
−Z $\boxed{\text{DGN}}$ #1302 D_5</td><td>Select axial direction.
Check wiring.</td></tr>
<tr><td>Rapid override not entered.</td><td>Input status and Rapid feedrate
<table>
<tr><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>Z axis</th></tr>
<tr><td>1</td><td>1</td><td>#6280
Setting speed</td><td>#6281
Setting speed</td></tr>
<tr><td>1</td><td>0</td><td>(#6280 Setting speed) $\times\frac{1}{2}$</td><td>(#6281 Setting speed) $\times\frac{1}{2}$</td></tr>
<tr><td>0</td><td>1</td><td>(#6280 Setting speed) $\times\frac{1}{4}$</td><td>(#6281 Setting speed) $\times\frac{1}{4}$</td></tr>
<tr><td>0</td><td>0</td><td colspan="2">F_0 (#6231 Setting speed)</td></tr>
</table>
Notes: 1) 1: close 0: open
2) The following table is applied for rapid override at 6 step specification.
(6 step specification: Parameter #6018 D_2=1)
<table>
<tr><th colspan="3">Input status</th><th colspan="2">Rapid feedrate</th></tr>
<tr><th>ROV4</th><th>ROV2</th><th>ROV1</th><th>X axis</th><th>Z axis</th></tr>
<tr><td>1</td><td>0</td><td>1</td><td>100%</td><td>100%</td></tr>
<tr><td>1</td><td>0</td><td>0</td><td>50%</td><td>50%</td></tr>
<tr><td>0</td><td>1</td><td>1</td><td>25%</td><td>25%</td></tr>
<tr><td>0</td><td>1</td><td>0</td><td>10%</td><td>10%</td></tr>
<tr><td>0</td><td>0</td><td>1</td><td>5%</td><td>5%</td></tr>
<tr><td>0</td><td>0</td><td>0</td><td colspan="2">F_0 (#6231 Setting speed)</td></tr>
</table>
1: close 0: open</td><td>Select rapid override and set the parameter.</td></tr>
<tr><td>Parameter not set correctly.</td><td>Check following parameters for correct setting as shown in the above table.
#6280 X-axis rapid feedrate
#6281 Z-axis rapid feedrate
#6231 Rate at F0 specification</td><td></td></tr>
<tr><td>Not at machine lock.</td><td>$\boxed{\text{DGN}}$ #1303 D_1</td><td>Check the switch.
$\boxed{\text{PRM}}$ #6000 D_1 not at 1.</td></tr>
</table>

4.3.8 MANUAL ZERO RETURN OPERATION FAULTY

Trouble	Check Procedure	Solution
Mode not set to zero return.	$\boxed{\text{DGN}}$ #1304 D_7	Select the mode. Check wiring.
Rapid or jog mode not selected.	RAPID $\boxed{\text{DGN}}$ #1300 D_0 JOG $\boxed{\text{DGN}}$ #1300 D_1	Select the rapid or jog mode at the time of zero return on sequence.
Axial direction not specified.	+X $\boxed{\text{DGN}}$ #1302 D_2 −X $\boxed{\text{DGN}}$ #1302 D_3 +Z $\boxed{\text{DGN}}$ #1302 D_4 −Z $\boxed{\text{DGN}}$ #1302 D_5	Select axial direction. Check wiring.
Deceleration LS not in order of 1 to 0 to 1?	X-axis $\boxed{\text{DGN}}$ #1306 D_4 Z-axis $\boxed{\text{DGN}}$ #1306 D_5	Check the limit switch. Check wiring.
Parameter not set correctly?	 Reference point return control I/O signals Approach speed 1 X-axis $\boxed{\text{PRM}}$ #6310 Z-axis $\boxed{\text{PRM}}$ #6311 Approach speed 2 X-axis $\boxed{\text{PRM}}$ #6316 Z-axis $\boxed{\text{PRM}}$ #6317 Final traverse distance X-axis $\boxed{\text{PRM}}$ #6034 Z-axis $\boxed{\text{PRM}}$ #6305	Set parameter correctly.

Trouble	Check Procedure	Solution
Motor run slips one turn.	Move from zero point to deceleration LS direcction, read the point where DGN #1306 D_4(X-axis) and D_5 (Z-axis) turn to 0 and ensure the positional relation between zero point pulse position and deceleration LS position.	Locate the point where deceleration LS turns to 1 from 0 to the medium of zero point pulses.
Position slips at random.	• Ensure that coupling and dog are not loose. • Check to ensure that the wire is shielded.	

4.3.9 CYCLE START FAILURE

Trouble	Check Procedure	Solution
No start signal.	Check if DGN #1304 D_0 becomes 1.	Release the interlock with reference to instruction manual of machine manufacturer. Check the sequence and also ensure to be correctly wired.
Feed hold signal is fed.	Check if DGN #1304 D_1 is set to 1 (normal if it is set to 1).	Check that feed hold button is not depressed and that wiring is not disconnected. If there is any fault, correct it.
Mode is erroneous.	Monitor on PROG screen if the mode is set to MEM, TAPE and MDI.	Check the mode switch. Refer to #1300 in DGN table.
Reset signal is fed.	Check if DGN #1202 D_1 is set to 1 (normal if it is set to 0).	Check that external reset input of #1305 D_2 is set to 0.
System number switch set erroneously.	Normal if SET #6219 is at 0 or 4. Normal is the system number switch on MB20 is set to 0 or 4.	Correct setting.

4.3.10 OPERATION IS NOT AVAILABLE WITH G01, G02 or 03.

Trouble	Check Procedure	Solution
Spindle stops at feed per revolution.	Check on COM screen if the mode is set to G99.	Turn the spindle. Make sure of revolution by POS spindle revolution display. (Spindle PG monitor DGN #1287 D_4, D_5)
Spindle revolution is checked by feed per minute.	Check if PRM #6006 D_4 is at 1 (spindle revolution is checked if it is at 1). SAGR #1306 D_7	Turn the spindle. If it is at dry run, make spindle revolution not be checked by setting #6006 D_4=0.
Cutting feed override is set to 0%.	Ensure if DGN #1301 D_0 to D_4 is set correctly.	Turn the override switch. Correct wiring if disconnected. Check parameter setting.
Manual jog feedrate is not set correctly at dry run status.		

Feed override/Manual JOG feed rate Selection

DGN #1301 FV 16	FV 8	FV 4	FV 2	FV 1	Feed Override (Auto operation mode)	Manual JOG Feed Rate (Manual operation mode)
0	0	0	0	0	0 %	Parameter #6233 Setting speed
0	0	0	0	1	10 %	Parameter #6234 Setting speed
0	0	0	1	0	20 %	Parameter #6235 Setting speed
0	0	0	1	1	30 %	Parameter #6236 Setting speed
0	0	1	0	0	40 %	Parameter #6237 Setting speed
0	0	1	0	1	50 %	Parameter #6238 Setting speed
0	0	1	1	0	60 %	Parameter #6239 Setting speed
0	0	1	1	1	70 %	Parameter #6240 Setting speed
0	1	0	0	0	80 %	Parameter #6241 Setting speed
0	1	0	0	1	90 %	Parameter #6242 Setting speed
0	1	0	1	0	100 %	Parameter #6243 Setting speed
0	1	0	1	1	110 %	Parameter #6244 Setting speed
0	1	1	0	0	120 %	Parameter #6245 Setting speed
0	1	1	0	1	130 %	Parameter #6246 Setting speed
0	1	1	1	0	140 %	Parameter #6247 Setting speed
0	1	1	1	1	150 %	Parameter #6248 Setting speed
1	0	0	0	0	160 %	Parameter #6249 Setting speed
1	0	0	0	1	170 %	Parameter #6250 Setting speed
1	0	0	1	0	180 %	Parameter #6251 Setting speed
1	0	0	1	1	190 %	Parameter #6252 Setting speed
1	0	1	0	0	200 %	Parameter #6253 Setting speed
1	0	1	0	1		Parameter #6254 Setting speed
1	0	1	1	0		Parameter #6255 Setting speed
1	0	1	1	1		Parameter #6256 Setting speed
1	1	0	0	0		Parameter #6257 Setting speed
1	1	0	0	1		Parameter #6258 Setting speed
1	1	0	1	0	0 %	Parameter #6259 Setting speed
1	1	0	1	1		Parameter #6260 Setting speed
1	1	1	0	0		Parameter #6261 Setting speed
1	1	1	0	1		Parameter #6262 Setting speed
1	1	1	1	0		Parameter #6263 Setting speed
1	1	1	1	1		Parameter #6264 Setting speed

Interlock signal is entered.	Check if DGN #1305 D_5 is at 1 (normal if it is 0).	Release interlock with reference to instruction.
Servo system is erroneously set.	Check if manual spindle feed is workable (check its function by manual mode).	Manual of machine manufacturer. Refer to the item for manual feed.

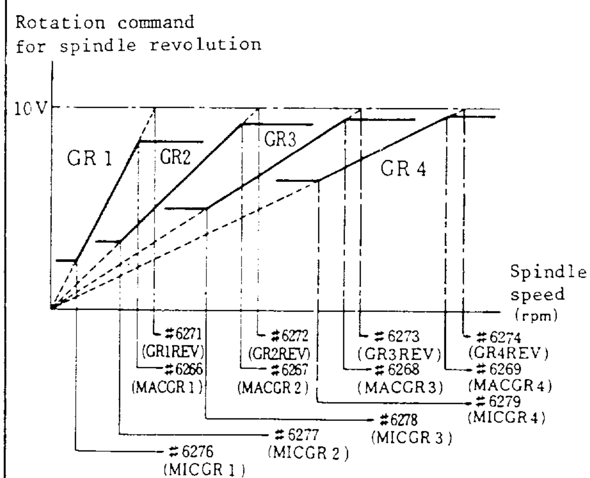
4.3.11 SPINDLE DOES NOT ROTATE

<table>
<tr><th>Trouble</th><th>Check Procedure</th><th>Solution</th></tr>
<tr><td>Program failure
· No S command.
· No start M code(e.g. M03, M04).</td><td>Check on PROG screen and COM screen.</td><td>Modify the program.</td></tr>
<tr><td>No start signal.</td><td>Check the output signal on DGN screen (numbers in #1100).</td><td>Release the interlock with reference to instruction manual of machine manufacturer.</td></tr>
<tr><td>Spindle speed command is not given.</td><td></td><td rowspan="3">Correct wiring and sequence properly to apply instruction voltage to the spindle unit.</td></tr>
<tr><td>S2 digit specification.
S4 digit specification A.</td><td>Check instruction voltage with spindle unit.</td></tr>
<tr><td>S4 digit specification B.</td><td>Check #1216, #1217, #1323 and #1324 on DGN screen.</td></tr>
<tr><td>Spindle drive is at alarm.</td><td>Check the alarm of spindle drive unit.</td><td>Remove the cause of alarm for spindle drive unit.</td></tr>
<tr><td>Combination of SSTP, GRS and GSC inputs is erroneous.
0 is enterd to parameters #6270 and #6275.</td><td>Ensure DGN #1307 by the following table.
SSTP, GRS & GSC Inputs And S4 Digit Command Analogue Voltage
<table>
<tr><th colspan="3">DGN #1307</th><th rowspan="2">Analog Voltage by S4 Digit Command</th></tr>
<tr><th>D5
SSTP Input</th><th>D7
GRS Input</th><th>D6
GSC Input</th></tr>
<tr><td>0</td><td>0</td><td>0</td><td rowspan="4">The voltage to meet with spindle speed to NC program</td></tr>
<tr><td>0</td><td>0</td><td>1</td></tr>
<tr><td>0</td><td>1</td><td>0</td></tr>
<tr><td>0</td><td>1</td><td>1</td></tr>
<tr><td>1</td><td>0</td><td>0</td><td>0 V</td></tr>
<tr><td>1</td><td>0</td><td>1</td><td>This combination causes command voltage at 0 V and the spindle does not run.</td></tr>
<tr><td>1</td><td>1</td><td>0</td><td>The spindle does not run if 0 is set.</td></tr>
<tr><td>1</td><td>1</td><td>1</td><td>0 V</td></tr>
</table>
Note: 0; contact open
1; contact close

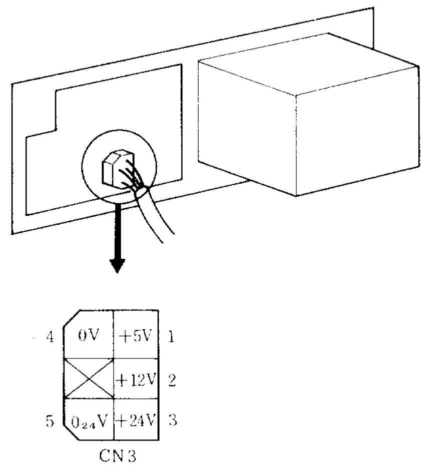
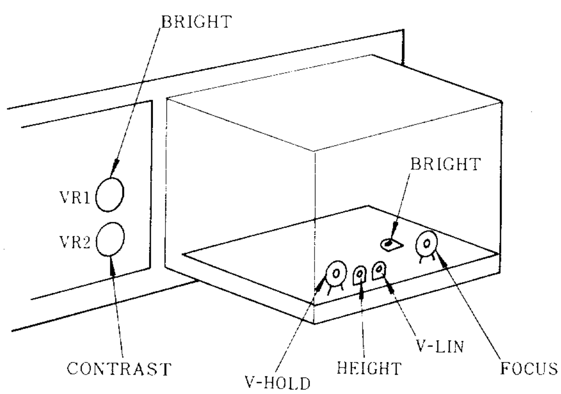
· Be careful for SSTP to cause reverse input if 1 is set to parameter SSTPAB (#6020 D4).</td><td>It may be caused by failure of limit switch or sequencer. Adjust input signal with reference to instruction manual of machine manufacturer.
Also refer to item 8.2 Spindle S command Input... in Connecting Manual(TOE-C843-9.22)

Set the correct value to parameters #6270 and #6275.</td></tr>
</table>

<table>
<tr><th>Cause of Trouble</th><th>Check Procedure</th><th>Solution</th></tr>
<tr>
<td>Parameters for spindle function are erroneous.

<table>
<tr><td>#1307 D_0</td><td>GR1</td></tr>
<tr><td>#1307 D_1</td><td>GR2</td></tr>
<tr><td>#1307 D_2</td><td>GR3</td></tr>
<tr><td>#1307 D_3</td><td>GR4</td></tr>
</table>
</td>
<td>
</td>
<td>Correct setting.</td>
</tr>
</table>

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. Call our service personnel if it is so.
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 proproperly adjusted.		(Do not perform setup change of CRT as a rule.) So, perform adjustment with VR1(BRIGHT) on SP20 board.
Hardware failure	(Trouble other than above)	Replace CRT unit or SP20 board. Call our YASREP.

4.3.13 EDIT DOES NOT FUNCTION

Trouble	Check Procedure	Solution
Failure of input signal Mode input(EDT) is not correct. Edit lock is input.	$\boxed{\text{DGN}}$ #1300 D_7 should be 1 and all #1300 D_0 to D_6 should be 0. #1303 D_7 should be 0 and SET #6000 D_7 should be 0.	Check mode input rotary switch, etc. Release edit lock input.
Parameter setting	Operator tries to edit number 0 that cannot edit data. 08000 to 08999 $\boxed{\text{PRM}}$ #6002 D_4: Edit interlock #6004 D_2: Edit, display and output interlock 09000 to 090000 $\boxed{\text{PRM}}$ #6002 D_5: Edit interlock #6021 D_7: Edit, display and output interlock	Release interlock for setting. Release interlock for setting and parameter.
Connection & material failure	Alarm 010 lights if operator tries to edit. The program characters registered turn to other characters. Key entry is not made correctly. Key entry turns to other characters.	Failure of CMOS memory Replace MB20. Replace MM21 in case of mass storage. Failure of keyboard Failure of SP20 Plug-in failure of SP20 flat cable
Other failures	The trouble caused by exceeding memory capacity or by exceeding number of registered programs. Check the number of characters left and number of registered programs by alarm directory screen.	Erase the program with OXXXX $\boxed{\text{ERS}}$.

4.3.14 RS232C DOES NOT FUNCTION WELL

<table>
<tr><th>Trouble</th><th>Check Procedure</th><th>Solution</th></tr>
<tr><td>Cable failure</td><td>Refer to connection examples of connecting Manual.
The cable is too long.</td><td>Readjust cable wiring.
Limit cable length to within 15m.</td></tr>
<tr><td>Parameters</td><td>Check if 1st and 2nd RS232Cs and I/O settings can make proper selection.
Ensure the value of SET #6003.
Check if baud rate, stop bit and control codes are properly set.
1st RS232C input #6026 D_0 to D_5
2nd RS232C input #6027 D_0 to D_5
1st RS232C output #6028 D_0 to D_5
2nd RS232C output #6029 D_0 to D_5</td><td>
<table>
<tr><th></th><th>D_1</th><th>D_0</th><th>Status</th></tr>
<tr><td>Input</td><td>0</td><td>0</td><td>It does not</td></tr>
<tr><td></td><td>0</td><td>0</td><td>operate</td></tr>
<tr><td></td><td>0</td><td>1</td><td>1st RS-232C</td></tr>
<tr><td></td><td>1</td><td>0</td><td>2nd RS-232C</td></tr>
<tr><td></td><td>1</td><td>1</td><td>Unsettable</td></tr>
<tr><th></th><th>D_5</th><th>D_4</th><th>Status</th></tr>
<tr><td>Output</td><td>0</td><td>0</td><td>It does not</td></tr>
<tr><td></td><td>0</td><td>0</td><td>operate</td></tr>
<tr><td></td><td>0</td><td>1</td><td>1st RS-232C</td></tr>
<tr><td></td><td>1</td><td>0</td><td>2nd RS-232C</td></tr>
<tr><td></td><td>1</td><td>1</td><td>Unsettable</td></tr>
</table>
</td></tr>
<tr><td></td><td>#6021 D_0</td><td>Regard M02, M30 and M99 as end of program.</td></tr>
<tr><td></td><td>#6021 D_1</td><td>Regard NXXXX as OXXXX.</td></tr>
<tr><td></td><td>#6021 D_4</td><td>Ensure DR(data set ready).</td></tr>
<tr><td></td><td>#6021 D_5</td><td>Turn ON/OFF RS signal(request for sending) by %.</td></tr>
<tr><td></td><td>#6022 D_2</td><td>Disregard or not disregard ISO parity at the time of IN operation.</td></tr>
<tr><td></td><td>#6022 D_3</td><td>Output or not output ISO parity at the time of OUT operation.</td></tr>
<tr><td>Noise</td><td>If TH error, framing error and/or overrun error occur, connecting equipment may require noise solution.</td><td>Install a line filter in AC input line of connecting equipment.</td></tr>
</table>

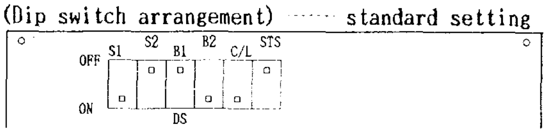
4.3.15 OPERATION IS NOT AVAILABLE WITH G32, G76 OR G92

Cause of Trouble	Check Method	Solution
Pulse of spindle encoder does not return.	Check POS S on POS screen(failure of A and/or B phase). Can be observed by DGN #1287 if at low speed revolution such as manual rota·tion. C phase is faulty if G01(mm/rev) is proper and G32 is faulty.	Failure of encoder, loosen cable, timing belt or connector, or PG interface Failure of MB20.
Unevenness of starting point pulse(C phase)	Occurs when thread is shifted.	Replace the spindle PG. Check wiring.
Slip of chuck or spindle	Occurs when thread pitch is shifted.	Check the function of machine.
Servo response	Ensure the servo response with TG-M.	Adjust KP(L-GAIN).
Staggering of spindle revolution	Check if POS S staggers on the POS screen.	Failure of spindle drive unit, spindle drive unit, spindle motor, DA output of MB20, or noise
Failure of thread cutting bias or acceleration/deceleration setting	PRM #6306 X-axis acceleration/deceleration at thread cutting #6307 Z-axis acceleration/deceleration at thread cutting #6308 X-axis bias at thread cutting X6309 Z-axis bias at thread cutting	Adjust parameters.
Spindle speed × F (pitch) exceeds maximum rating of machine.	Check the program.	Reduce the command for spindle speed.

4.3.16 SKIP FUNCTION(G31) OPERATION FAILURE

Trouble	Check Procedure	Solution
Input failure of skip signal	Check DGN #1280 D0. · Chattering must be eliminated. · Signal should exceed 5 m Sec.	· Replace LS and/or proximity switch. · Check noise level. Change wiring route.
Parameters	PRM #6232(G31F) value is not set. #6031 D_4 setting +24V 0V Case 0 Case 1 #6032 setting D_1 only should be at 1, but all D_0, D_2 and D_3 should be at 0.	Correct parameter settings.
Others	Optional	Contact machine manufacturer.

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="3">Read Speed (char/s)</th><th rowspan="3">Transmission Baud rate</th><th rowspan="3">AUTO Self-Checking</th><th rowspan="3">Input Control</th></tr>
<tr><th colspan="2">For PTR Speed</th><th colspan="2">For Transmission rate</th><th>Input Control Selection</th><th>For Self-Checking</th></tr>
<tr><th>S1</th><th>S2</th><th>B1</th><th>B2</th><th>C/L</th><th>STS</th></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>ATUO</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>ATUO</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>5600</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

Failure of tape reader

Others</td><td>· Check the wiring status of RS232C cable according to the Connecting Manual.
· Check for looseness of connector.
· Tape does not work even by depressing tape feed switch.
· Tape reader LED(red) does not light.
1 Power is not applied to the tape reader.
2 Failure of tape reader.
Check tape retainer again.</td><td>Correct connection.

Plug in firmly if loose.
Replace the tape reader.

Failure of MB20 or cable

Replace the tape reader.</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 manufacturer.

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 manufacturer 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 on.	Contact YASREP.
+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 +5 V, +12 V, and −12 V.

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

③ Depress a key and check for a beep.

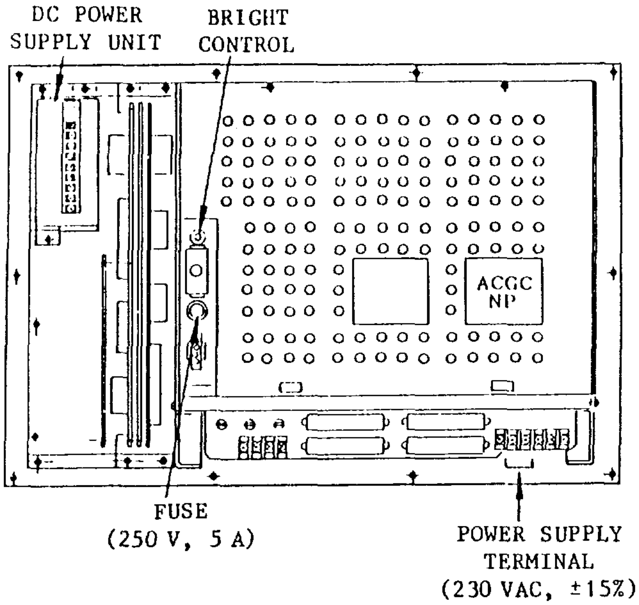


Fig. 4.5 Rear View of ACGC Unit

CAUTION

The brightness has been preset to the bestcondition at the factory. Adjustments 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 that circuit.

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.

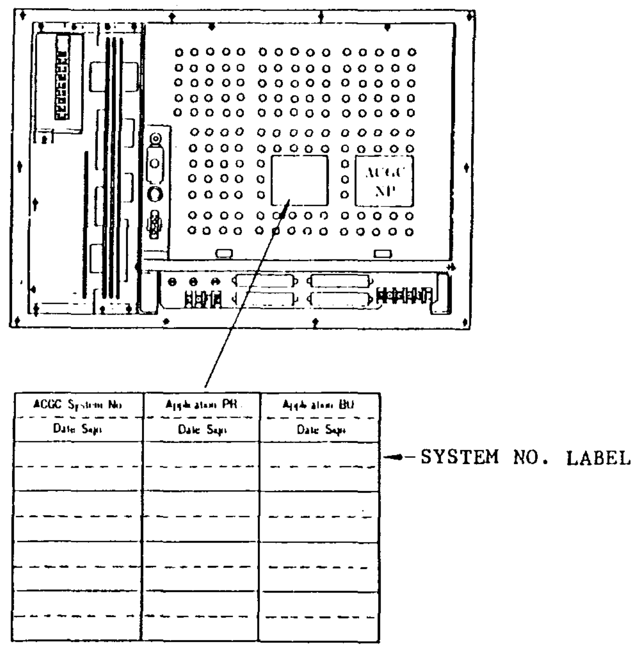


Fig. 4.6 Nameplate On Back of CRT

4.4.4 SOFTWARE VERSION INDICATION (Cont'd)

(2) Displayed on the CRT screen

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

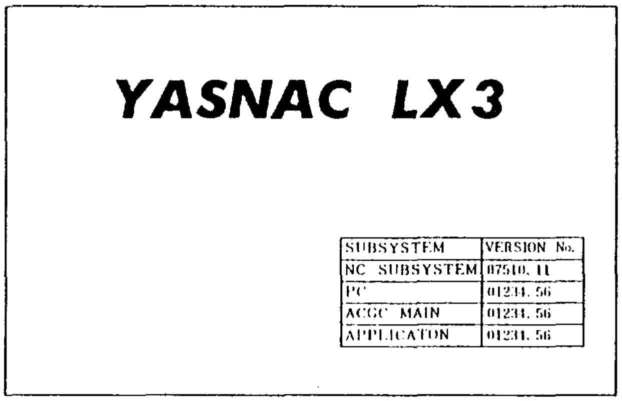


Fig. 4.7 Sample of Various, Software Version Nos. in NC Mode

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

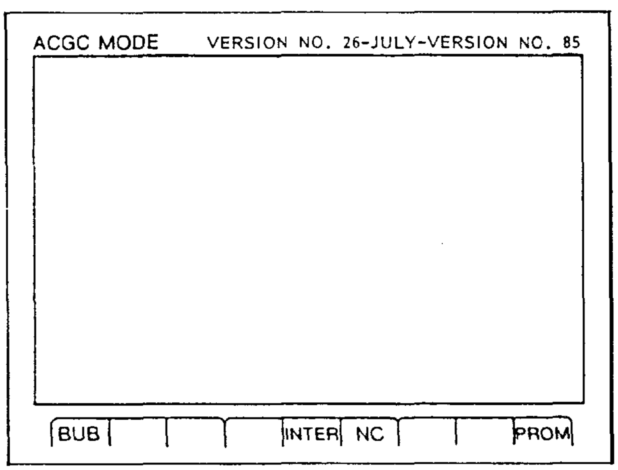


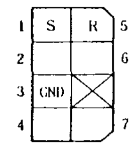
Fig. 4.8 Sample of ACGC Main Software Version Nos. in ACGC Mode

When memory-related hardware fails, notify the service agent of machine tool manufacturer or your YASNAC service office 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.



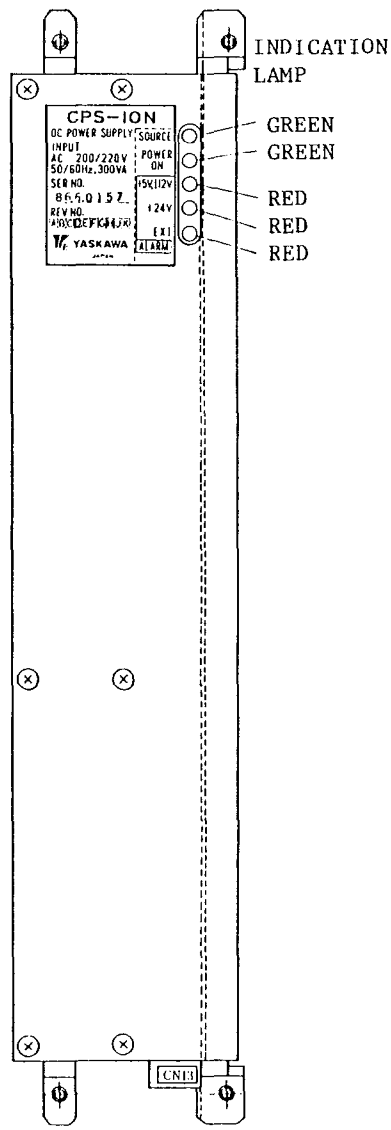


Fig. 4.9 External View of Power Supply Unit CPS-10N

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-C843-9.22.
#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 #1155 in meaning depending on each power sequence program. Read the machine tool builder's manual.

	D_7	D_6	D_5	D_4	D_3	D_2	D_1	D_0
Display	0	0	0	0	1	1	1	1
	Contact Opened				Contact colsed			

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.

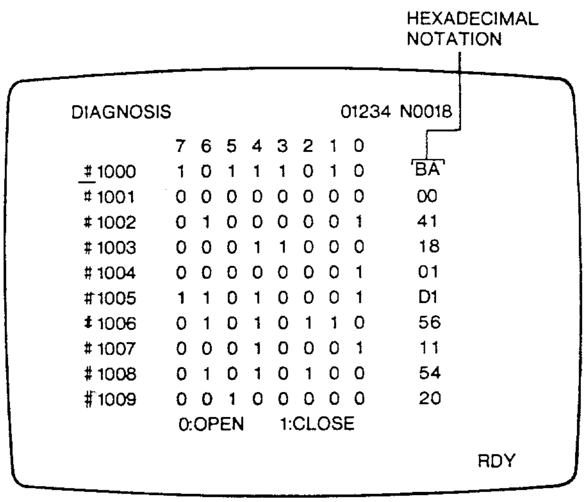


Fig. 4.10 Example of Input/Output Signal Display

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

5.1 ADJUSTMENT PROCEDURES

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	Check settings.	
7	Check the input power supply voltage and frequency.	
8	Check that the composite power supply unit outputs are not short-circuited.	
9	Check the output voltages after a first power application.	
10	Check the I/O signals between the NC unit and the machine tool.	
11	Check parameters and setting data.	
12	Perform a second power application.	
13	Check to be sure the emergency stop functions.	
14	Check movement on each axis by manual feed.	
15	Adjust the servo system.	
16	Check that all NC functions are successfully operable.	

(1) Check the interior and exterior of the control cabinet.
- Check the control panel exterior for contamination and damage.
- Check the module connections inside the cabinet for 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 (see Par. 3.2).

(7) Check input power supply voltage and frequency.

- Check that the power supply voltage and frequency meet ratings.
- Check that the input power supply capacity is high enough for power consumption of the control unit.

(8) Check that the composite power supply unit outputs are not short-circuited. Check for short-circuit between:

- +5 V and 0 V : +24 V and 0 V
- +12 V and 0 V: −12 V and 0 V

(9) Check the output voltages after a first power application.
Depress the POWER ON pushbutton for first power application.

- Check that the air flow from the cooling air exhaust port is normal.
- Verify the output voltages of the composite power supply unit.

Rated Output	Output Voltage Range
+ 5 V	4.75 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 9.6 standard I/O Diagnostic No.

(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 theMDI & CRT unit by following the steps given below:

1. Write "4" to SET #6219.
2. Depress the POS key.
3. Depress the $\boxed{\text{PAGE} \downarrow}$ of $\boxed{\uparrow \text{PAGE}}$ 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 ($sec.^{-1}$)

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

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

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

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 ACV, 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 · Spindle interface unit · 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.

6.1 CPU UNIT (Cont'd)

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.
I/O board JANCD-IO20	· Input 112 points · Output 64 points (polarized and contactless type)	· Mount after ensuring that I/O area no.(SW1) is correctly set.

6.2 OPERATOR'S PANEL

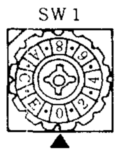
Component Name	Function	Cautions for Replacement
Panel Interface Board (JANCD-SP-20)	· 9" CRT interface unit · Keyboard interface unit · Single-axis handle PG interface unit · I/O unit for the panel (input: 64 points output: 32 points)	· Adjust brightness of CRT as required after completing replacement. (BRT: VR, 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-2801	· RS-232C Interface output · 200 char/s	Ensure that the dip switch (DS) is set as standard according to the Table 4.12.

7.1 MB20 BOARD

(1) SW1 (System No. Switch) Setting

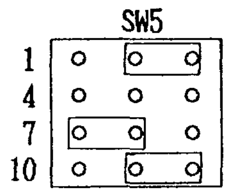


Set this switch to 0 for normal operation, since this switch is provided only for maintenance and creation of sequence ladder.

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.

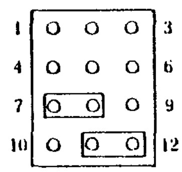
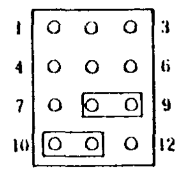
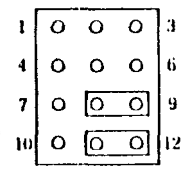
(2) SW5 Setting

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.



6→For system(operation prohibited)
9→EOF
12→POF
enable/disable

(Standard setting)

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

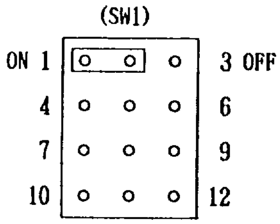
(3) Adjustment of VR1 to VR6

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

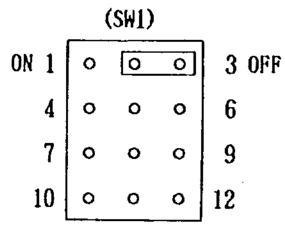
These are VRs for adjusting D/A of each axis and spindle. They have been already been adjusted at the factory prior to shipment. Readjustment is not required.

7.2 SP20 BOARD

(1) SW1 (HPG)



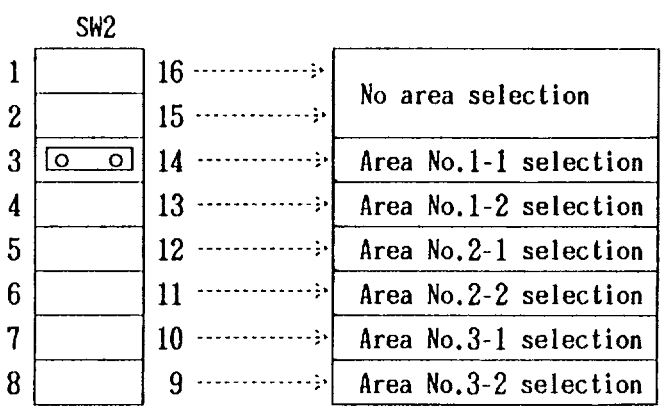
Simultaneous single axis manual pulse generator standard setting



Simultaneous 3-axis manual pulse generator optional setting

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).

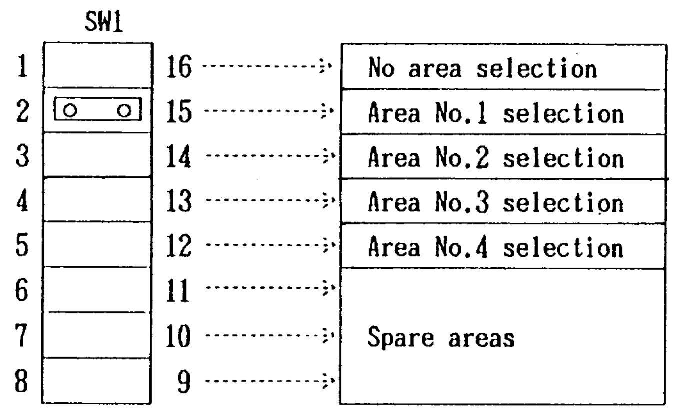
(2) SW2 (Remote I/O address)



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 IO20 BOARD

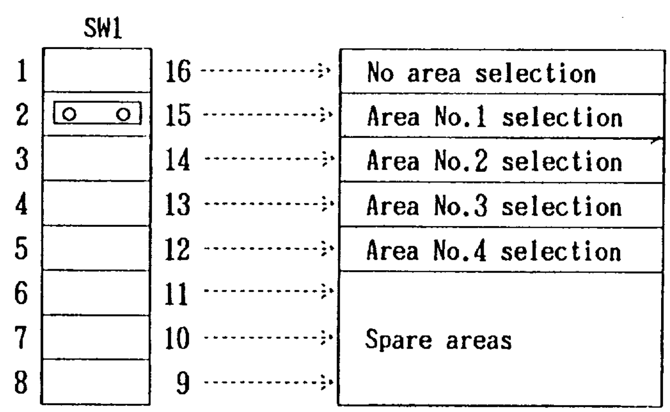
· SW1 (Remote I/O address)



The above diagram shows shorting plug(SW1) setting and I/O area no.
Note: Normal input cannot be made if the same I/O area no. is selected for selection of I/O area.

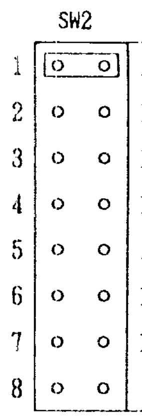
7.4 IO21

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



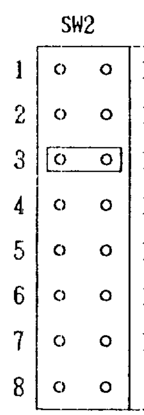
7.4 1021 (Cont'd)

(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.



Logic at contact closed	
0_{24} Common	+24 V Common
「0」	「1」

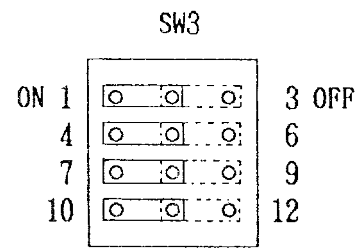
The above setting makes reverses logic in case of input contact closing similar to YASNAC X2 series.



Logic at contact closed	
0_{24} Common	+24 V Common
「1」	「1」

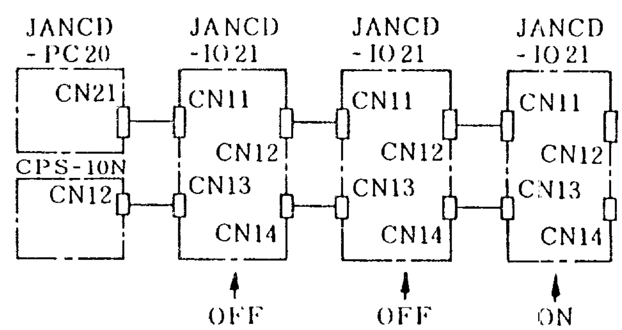
Left setting makes logic "1" in case of input contact closing.
Use 3 for standard setting, although the result is the same even if any one of SW2 to SW8 is short-circuited.

(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

<table>
<tr><th colspan="4">Input port</th><th colspan="4">Output port</th></tr>
<tr><th colspan="2">SP 20-02</th><th colspan="2">I020, I021</th><th colspan="2">SP20-02</th><th colspan="2">I020, I021</th></tr>
<tr><th>Area No.</th><th>Address port</th><th>Area No.</th><th>Address port</th><th>Area No.</th><th>Address port</th><th>Area No.</th><th>Address port</th></tr>
<tr><td>1 - 1</td><td>#1000 to #1007</td><td rowspan="2">1</td><td rowspan="2">#1000 to #1013</td><td>1 - 1</td><td>#1100 to #1103</td><td rowspan="2">1</td><td rowspan="2">#1100 to #1107 (#1108)</td></tr>
<tr><td>1 - 2</td><td>#1008 to #1015</td><td>1 - 2</td><td>#1108 to #1111</td></tr>
<tr><td>2 - 1</td><td>#1016 to #1023</td><td rowspan="2">2</td><td rowspan="2">#1016 to #1029</td><td>2 - 1</td><td>#1116 to #1119</td><td rowspan="2">2</td><td rowspan="2">#1116 to #1123 (#1124)</td></tr>
<tr><td>2 - 2</td><td>#1024 to #1031</td><td>2 - 2</td><td>#1124 to #1127</td></tr>
<tr><td>3 - 1</td><td>#1032 to #1039</td><td rowspan="2">3</td><td rowspan="2">#1032 to #1045</td><td>3 - 1</td><td>#1132 to #1135</td><td rowspan="2">3</td><td rowspan="2">#1132 to #1139 (#1140)</td></tr>
<tr><td>3 - 2</td><td>#1040 to #1047</td><td>3 - 2</td><td>#1140 to #1143</td></tr>
<tr><td></td><td></td><td>4</td><td>#1048 to #1061</td><td></td><td></td><td>4</td><td>#1148 to #1155 (#1156)</td></tr>
</table>

Precautions:
(1) In case of I021, more points output are added than for I020 value ( ) of output board.
(2) Normal input cannot be made if game 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."

```
ALARM               01234 N0003
 SYSTEM NO. SETTING (#6219): (1)

 MESSAGE


                 LSK
```

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. 9.4, "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.

```
PARAMETER                      01234 N0017

         7 6 5 4 3 2 1 0
#6010    0 0 0 0 0 0 1 1      3
#6011    0 0 0 0 0 0 0 0      0
#6012    0 0 0 0 1 1 1 0     14
#6013    0 0 0 0 0 0 0 0      0
#6014    0 0 0 0 0 1 1 0      6
#6015    0 0 1 0 0 1 1 1     39
#6016    0 0 1 0 0 1 0 0     36
#6017    0 0 0 0 0 1 0 0      4
#6018    0 0 1 0 0 0 0 0     32
#6019    0 0 0 0 0 1 0 0      4
         0:OFF     1:ON

                                   RDY
```

Fig. 8.2 Typical Parameter Display
(in binary digits)

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

```
PARAMETER                      01234 N0017

#6600      1000000
#6601      2000000
#6602       500000
#6603            0
#6604            0
#6605            0
#6606  —    100000
#6607  —    100000
#6608  —     50000
#6609            0

                                   RDY
```

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

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:

```
Lable %;
N6000 X128;
N6001 X  5;
N6002 X  0;
  .     .
  .     .
  .     .
%
```

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

<table>
<tr><th colspan="3">Operation</th><th>Edit Lock</th><th>Parameter #6219 Setting</th><th>Mode</th><th>Function</th><th>Procedure</th></tr>
<tr><td rowspan="3">Matching with tape</td><td rowspan="2">One part program</td><td>Tape with numbner 0</td><td></td><td></td><td rowspan="7">EDIT</td><td rowspan="10">PROG</td><td>[RESET] → [VER]</td></tr>
<tr><td>Tape without number 0 (Note 1)</td><td></td><td></td><td>[RESET] → [0] → Program number → [VER]</td></tr>
<tr><td colspan="2">All part programs on tape</td><td></td><td></td><td>[RESET] → [VER]</td></tr>
<tr><td rowspan="4">Edit</td><td colspan="2">Modification of address data (Note 2)</td><td>OFF</td><td></td><td>[CURSOR] (Set to address data to be modified) → Address data → [ALTER]</td></tr>
<tr><td colspan="2">Addition of address data (Note 2)</td><td>OFF</td><td></td><td>[CURSOR] (Set to address data just before addition)→ Address data → [INSRT]</td></tr>
<tr><td colspan="2">Deletion of one address data</td><td>OFF</td><td></td><td>[CURSOR] (Set to address data to be deleted) → [ERASE]</td></tr>
<tr><td colspan="2">Deletion of one block (Note 5)</td><td>OFF</td><td></td><td>[CURSOR] (Set to address data at head of block to be deleted) → [EOB] → [ERASE]</td></tr>
<tr><td colspan="3">Address search</td><td></td><td></td><td>TAPE MEM EDIT</td><td>Address data to be searched → [CURSOR]</td></tr>
<tr><td rowspan="2">Clear</td><td colspan="2">Designated part program</td><td>OFF</td><td></td><td rowspan="2">EDIT</td><td>[0] → program number to be searched → [ERASE]</td></tr>
<tr><td colspan="2">All part programs on tape</td><td>OFF</td><td></td><td>[0] → -9999 → [ERASE]</td></tr>
</table>

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 matched at 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.

APPENDIX 1 LIST OF ALARM CODE

APPENDIX 1 LIST OF ALARM CODES

Code	Causes	Code	Causes
000		006	
001	ZR UNREADY (X) CYCLE STARTED WITHOUT RETURNING REFERENCE POINT. RETURN TO REFERENCE POINT.	007	
002	ZR UNREADY (Z) CYCLE STARTED WITHOUT RETURNING REFERENCE POINT. RETURN TO REFERENCE POINT.	008	
003		009	
004		010	TH ERROR TAPE HORIZONTAL PARITY ERROR. SEE PAR. 4.2.2
005	RESET UNREADY (AFTER EDITING) CYCLE STARTED WITHOUT DEPRESSING RESET BUTTON AFTER EDITING.	011	TV ERROR TAPE VERTICAL PARITY ERROR. SEE PAR. 4.2.2

APPENDIX 1 LIST OF ALARM CODE (Cont'd)

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-C843-9.20) PAR. 2.1.1 AND CORRECT PROGRAM.	019	
014	PROG ERROR ("-,"".") SIGN "-," AND "." NOT CORRECTLY USED. SEE ORERATOR'S MANUAL (TOE-C843-9.20) 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-C843-9.20) PAR. 2.8.1 AND CORRECT PROGRAM.
015	PROG ERROR (UNUSABLE CH) UNUSABLE CHARACTER PROGRAMMED IN INSIGNIFICANT DATA AREA. SEE OPERATOR'S MANUAL (TOE-C843-9.20) 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-C843-9.20) PAR. 2.8.2 AND CORRECT PROGRAM.
016		022	
017	PROG ERROR (8 DIGITS) INPUT DATA OVERFLOW (MORE THAN 8 CHARACTERS). SEE ORERATOR'S MANUAL (TOE-C843-9.20) PAR. 2.1.1 AND CORRECT PROGRAM.	023	

Code	Causes	Code	Causes
024	PROG ERROR (G, G41-44) UNUSABLE G CODE COMMANDED DURING NOSE RADIUS COMPENSATION. SEE ORERATOR'S MANUAL (TOE-C843-9.20) PAR. 2.8.19 AND CORRECT PROGRAM.	030	PROG ERROR (F/E) NO F OR E COMMAND IN FEED COMMAND. E COMMANDED IN G98 MODE. SEE TOE-C843-9.20 PAR.2.4.2
025		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 (G41-44) RISE ERROR IN NOSE RADIUS COMPENSATION START. SEE ORERATOR'S MANUAL (TOE-C843-9.20) PAR. 2.8.19 AND CORRECT PROGRAM.	032	
027	PROG ERROR (G41-44) ERROR DURING NOSE RADIUS COMPENSATION CANCELLATION. (ERROR IN CIRCULAR INTERPOLATION MODE). SEE ORERATOR'S MANUAL (TOE-C843-9.20) PAR. 2.8.19 AND CORRECT PROGRAM.	033	
028		034	PROG ERROR (G02/03) CIRCULAR ARC R DESIGNATION ERROR. SEE TOE-C843-9.20 PAR.2.8.9 AND CORRECT PROGRAM
029		035	PROG ERROR (T OFS) TOO LARGE NO. OF T OFS CODE FOR TOOL RADIUS COMPENSATION AND TOOL LENGTH COMPENSATION. SEE TOE-C843-9.20 PAR.2.6.1

Code	Causes	Code	Causes
036	PROG ERROR (P-G 10) TOO LARGE P (NUMBER DESIGNATION) WHEN OFFSET IS PROGRAM-INPUT. OR P NOT PROGRAMMED. SEE TOE-C843-9.20 PAR. 2.62 AND 2.86 AND CORRECT PROGRAM.	042	PROG ERROR (M98, G65/66 NEST) SUBPROGRAM (M98) OR MACRO CALL (G65/G66) FIVE-NESTED. SEE TOE-C843-9.20 PAR. 2.7.5 NOTE 4 OR 2.8.23.10
037	PROG ERROR (G 10) TOO LARGE R WHEN WORK COORDINATE SYSTEM IS PROGRAM-INPUT. SEE TOE-C843-9.20 PAR. 2.62 AND 2.86 AND CORRECT PROGRAM.		
038		044	TOOL DATA ERROR (R AND C) NOSE R IS WRITTEN IN OFFSET NO. SPECIFIED BY □□ OF T**□□ COMMAND.
039		045	
040	PROG ERROR (M98, G65/66) P NOT PROGRAMMED IN G65/66 BLOCK. P OR Q NOT PROGRAMMED IN M 98 BLOCK. SEE TOE-C843-9.20 PAR. 2.75 OR 2.8.23.2	046	
041	NO PROG PROGRAM NO. (SEQUENCE NO.) NOT FOUND WHEN PROGRAM IS CALLED BY M98, M99, G65, G66, G M, AND T. SEE TOE-C843-9.20 PAR. 2.75 OR 2.8.23.2	047	PROG ERROR (G41-44) INTERFERENCE CHECK ERROR SEE TOE-C843-9.20 PAR.2.8.19 NOTES.

Code	Causes	Code	Causes
048	PROG ERROR (G41-44) INTERSECTION POINT NOT OBTAINED BY INTER-SECTION COMPUTATION SEE TOE-C843-9.20 PAR.2.8.19.	054	
049	PROG ERROR (G41-44) REVERSE OR ALMOST REVERSE COMMANDED IN M97 MODE. SEE TOE-C843-9.20 PAR.2.8.19.	055	PROG ERROR (M, S, T) M, S, T COMMANDS IN THE BLOCK IN WHICH M, S, T CODE CANNOT BE COMMANDED. NOT AVAILABLE FOR M, T COMMANDS OF G70 TO G76, G90 TO G94, AND G111 TO G112. CORRECT PROGRAM.
050	PROG ERROR (G11/12) I, K, R NOT CORRECTLY COMMANDED FOR BEVEL-ING AND ROUNDING. VALUES OF I, K, R TOO LARGE. SEE TOE-C843-9.20 PAR.2.8.7.	056	PROG ERROR (AXIS) AXIS COMMAND IN G20, G21 BLOCKS. AXIS NOT CORRECTLY COMMANDED IN G04, G36-G38. SEE TOE-C843-9.20 PAR.2.8.8.(2)
051	PROG ERROR (G11/12) TAPERING COMMAND IN BLOCKS FOR BEVELING AND ROUNDING. SEE TOE-C843-9.20 PAR.2.8.7.	057	
052	PROG ERROR (G01) ANGLE PROGRAMMING NOT CORRECT DURING ANGLE PROGRAMMING LINEAR INTERPOLATION BY G01. SEE TOE-C843-9.20 PAR.2.8.3(3)	058	
053	PROG ERROR (G50T/G92T) VALUES OF TOOL COORDINATE MEMORY OUT OF THE RANGE BETWEEN 51 TO 80 IN WORK COORDINATE SYSTEM SETTING BY G50T. SEE TOE-C843-9.20 PAR.2.8.22.	059	ZR UNREADY G28 NOT COMPLETED ON THE AXIS WHICH HAS G2 COMMAND OR REFERENCE POINT RETURN NOT COM-PLETED ON THE AXIS WHICH HAS G30 COMMAND. SEE TOE-C843-9.20 PAR.2.8.12.

APPENDIX 1 LIST OF ALARM CODE (Cont'd)

Code	Causes	Code	Causes
060	PROG ERROR (G34) LEAD INCREASE/DECREASE VALUE EXCEEDING MAXIMUM PROGRAMMABLE VALUE DURING VARIABLE LEAD THREAD CUTTING. MINUS VALUE OF LEAD COMMANDED. SEE TOE-C843-9.20 PAR.2.8.17.	066	CANNOT CONTINUOUS THREAD TOO SHORT TIME FOR 1 BLOCK OF CONTINUOUS THREADCUTTING. CHANGE SPINDLE SPEED COMMAND NOT TO OCCUR THIS ERROR.
061	PROG ERROR (G11/G12IN THREAD) ROUNDING, BEVELING COMMANDED IN THREAD CUTTING BLOCK. THESE COMMANDS PROHIBITED.	067	
062	PROG ERROR (G32/33) THREAD CUTTING COMMANDED IN G98 MODE. MULTI-START THREAD CUTTING COMMAND B OUT OF SPECIFIED RANGE. SEE TOE-C843-9.20 PAR.2.8.15 AND 2.8.16.	068	
063	PROG ERROR (G92/G78/G21) RAPID THREAD PULL-UP VALUE IN X-AXIS DIRECTION IN THREAD CUTTING WITH BEVELING SMALLER THAN BEVELING VALUE SET BY PARAMETER. SEE TOE-C843-9.20 PAR.2.8.26.2.	069	
064	PROG ERROR (G92/G78/G21) RAPID THREAD PULL-UP VALUE IN Z-AXIS DIRECTION IN THREAD CUTTING WITH BEVELING VALUE SET BY PARAMETER. SEE TOE-C843-9.20 PAR.2.8.26.2.	070	PROG ERROR (M02/M30/M99) MEMORY OPERATION COMPLETION COMMAND NOT GIVEN. PROGRAM MODES M02/M30/M99.
065		071	

Code	Causes	Code	Causes
072	PROG ERROR (G50T/G50XZ) SET COORDINATE WITH T CODES. G50T OR G50XZ COMMANDED.	079	
073		080	
074		081	
075		082	
076		083	
077	RS 232C ERROR (OVER-RUN) 10 CHARACTERS MORE HAVE BEEN READ IN AFTER STOP CODE HAS BEEN TRANSMITTED THROUGH RS 232C INTERFACE. CONFIRM TRANSMITTER'S STOP CODE PROCESSING CAPABILITY.	084	
078		085	

Code	Causes	Code	Causes
086		091	PROG ERROR (70-76/G72-78) BLOCK OF SEQUENCE NO. SPECIFIED BY P, Q IN G70 NOT FOUND PROG NO. INCLUDING IN G70 BLOCK. SEE TOE-C843-9.20 PAR.2.8.25.2
087	PROG ERROR (G31/G35) TOUCH SWITCH NOT ON WHEN MOTION REACHES END POINT BY SKIP. CONFIRM COMMAND, THEN TOUCH SWITCH MOTION IF NO PROBLEMS. CHECK IF DGN #1280 D_0 BECOMES 1 TO 0 BY TOUCH SWITCH ON/OFF.	092	PROG ERROR (G70-76/G72-78) NO. OF BLOCKS INCLUDING FINISHED SHAPE PROGRAM SPECIFIED BY P, Q IN G70, G71, G72 AND G73, OVER 46. SEE TOE-C843-9.20 PAR.2.8.25.1
088		093	PROG ERROR (G70-76/G72-78) UNABLE G- AND M-CODE IN FINISHED SHAPE PROGRAM SPECIFIED BY P, Q IN G70, G71, G72, AND G73. CORRECT PROGRAM.
089	PROG ERROR (G90/G92/G94) UNUSABLE ADDRESSES SPECIFIED IN G90, G92, AND G94 BLOCKS. R, B, C, P, Q, L NOT AVAILABLE.	094	PROG ERROR (G70-76/G72-78) BEVELING AND ROUNDING COMMANDS AS LAST MOVE COMMAND FOR FINISHED SHAPE PROGRAM SPECIFIED BY P, Q IN G70, G71, G72 AND G73. CORRECT PROGRAM.
090	PROG ERROR (G70-76/G72-78) P, Q NOT COMMANDED IN G70, 71, 72, 73 BLOCK SEE TOE-C843-9.20 PAR.2.8.25.2,3,4. CORRECT PROGRAM AFTER CHECKING SEQUENCE NO.	095	PROG ERROR (G70-76/G72-78) FAULTS IN FINISHED SHAPE PROGRAM SPECIFIED BY P, Q IN G71, G72. G29 COMMANDED IN FINISHING SHAPE PROGRAM SPECIFIED BY P AND Q IN G70, G71, G72, AND G73. CORRECT PROGRAM.

Code	Causes	Code	Causes
096	PROG ERROR (G70-76/G72-78) D (CUTTING FREQUENCY) SPECIFIED BY G73 ZER OR 128 OR MORE. I, K (ROUGH CUTTING) SPEC FIED BY G73 BOTH ZERO. D, K OF G76 EXCEED ING PROGRAMMABLE RANGE. SEE TOE-C843-9.20 PAR.2.8.25.4, PAR.2.8.25.8.	102	CAL ERROR (DIVISION) CALCULATION DIVISOR ZERO OR OVERFLOW ERROR. CORRECT PROGRAM.
097	PROG ERROR (G70-76/G72-78) FOUR OR MORE PROCESSING INTERRUPTIONS BY FINISHED SHAPE PROGRAM IN STOCK REMOVAL CYCLE BY G71, OR G72 R1. SEE TOE-C843-9.20 PAR.2.8.25.2(2)	103	CAL ERROR (SQUARE ROOT) ROOT VALUE IS A NEGATIVE $\sqrt{(-)}$ CORRECT PROGRAM.
098	PROG ERROR (G70-76/G72-78) DATA SPECIFIED BY G70 P, Q NOT REGISTERED IN INTERNAL KEEP MEMORY. SEE TOE-C843-9.20 PAR.2.8.25.5(3)	104	PROG ERROR (DOUBLE ADR) CHARACTER WHICH CANNOT BE REPEATED IN A BLOCK COMMAND IN REPETITION. CORRECT PROGRAM.
099	PROG ERROR (G70-76/G72-78) UNUSABLE ADDRESSES SPECIFIED IN G70 TO G76 BLOCKS. ADDRESS REQUIRED IN THE BLOCK NOT SPECIFIED. CHECK FORMAT AND CORRECT PROGRAM.	105	MACRO ERROR (CONSTANT) CONSTANTS EXCEEDING THE LIMIT. SEE TOE-C843-9.20 PAR.2.8.23.10 (1) b,c, AND CORRECT PROGRAM.
100	CAL ERROR (FIXED POINT) MAGNITUDE OF FIXED POINT DATA BY CALCULATION EXCEEDING UPPER LIMIT. RECHECK PROGRAM.	106	MACRO ERROR TOO MANY CODES FOR CANCELLING G67. CHECK NUMBERS OF G66 AND G67 AND CORRECT PROGRAM.
101	CAL ERROR (FLOATING) EXPONENT OF FLOATING POINT DATA BY CALCULATION EXCEEDING ALLOWABLE RANGE. RECHECK PROGRAM.	107	MACRO ERROR (FORMAT) ERROR IN THE FORMAT EXCEPT FOR EQUATION. SEE TOE-C843-9.20 PAR.2.8.23 AND CORRECT PROGRAM.

Code	Causes	Code	Causes
108	MACRO ERROR (UNDEFIN #NO.) UNDEFINED VARIABLE NO. DESIGNATED. SEE TOE-C843-9.20 PAR.2.8.23.5 TABLE 1.66. CARRECT PROGRAM.	114	MACRO ERROR (DO-FORMAT) "DO" NOT CORRESPONDING TO "END." SEE TOE-C843-9.20 PAR.2.8.23.7 AND CORRECT PROGRAM.
109	MACRO ERROR (# NO NOT LEFT) PROHIBITED VARIABLE DESIGNATED AS SUBSTITUTION. SEE TOE-C843-9.20 PAR.2.8.23.5 (3), (4) AND CORRECT PROGRAM.	115	MACRO ERROR ([ ] UNMATCH) FORMAT ERROR IN <EQUATION>. 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-C843-9.20 PAR.2.8.23.6 (6) CORRECT PROGRAM.	116	MACRO ERROR (DO END NO.) "m" IN DO m OUT OF RANGE $1 \leqq m \leqq 3$. SEE TOE-C843-9.20 PAR.2.8.23.7 AND CORRECT PROGRAM.
111	MACRO ERROR (MOVE G66-M99) MOVE COMMAND IN M99 FINISHING COMMAND OF MACRO CALLED BY G66. NO MOVE IN M99 BLOCK.	117	
112	MACRO ERROR MULTIPLE LEVELS OF MACRO CALL EXCEEDING THE UPPER LIMIT 4. SEE TOE-C843-9.20 PAR.2.8.23.10 (2), c, d, AND CORRECT PROGRAM.	118	MACRO ERROR (GO TO N) "n" in GOTO n OUT OF RANGE $0 \leqq n \leqq 9999$. OR APPROPRIATE SEQUENCE NO. NOT FOUND.
113		119	AS AFTER READ SUBPROG/MACRO ADDRESS SEARCHED DURING EXECUTION OF SUBPROGRAM OR MACRO PPOGRAM. THIS OPERATION PROHIBITED.

Code	Causes	Code	Causes
120	PRTN ERROR (NOT FOUND) SEQUENCE NO. SEARCHED NOT FOUND IN PART PROGRAM. CHECK SEQUENCE NO.	128	
121	PRTN ERROR (G50/G92) G31 COMMANDED DURING PROGRAM RESTART. THIS COMMAND PROHIBITED.	129	
122		130	EXT DATA DATA ERROR IN A GROUP DATA. NEED MACHINE SEQUENCE'S OR HARDWARE'S CHECK CONTACT MACHINE TOOL BUILDER OR OUR YASREP
123		131	
124	PRTN ERROR (MDI MOVE) AXIS OPERATED BY MDI AFTER PROGRAM RESTART PREPARATION. THIS OPERATION PROHIBITED.	132	
125		133	
126		134	

Code	Causes	Code	Causes
135	EXT DATA ERROR IN DATA GIVEN BY EXTERNAL DATA INPUT. NEED MACHINE SEQUENCE'S OR HARDWARE'S CHECK CONTACT MACHINE TOOL BUILDER OR OUR YASREP.	141	PROG ERROR (G111/G112) ANGLE FOR ANGLE PROGRAMMING A, B BY G111 OUT OF RANGE $-360 \leq$ A, B ≤ 360. SEE TOE-C843-9.20 PAR.2.8.30. CORRECT PROGRAM.
136		142	PROG ERROR (G111/G112) IST BEVELING PORTION OUTSIDE RECTANGLE COM- POSED BY START AND END POINTS OR BETWEEN 45° STRAIGHT LINES OF START TO END POINTS AND END TO START POINTS. SEE TOE-C843-9.20 PAR.2.8.30. CORRECT PROGRAM.
137		143	PROG ERROR (G111/G112) ERROR IN G111 COMMAND BLOCK. CORRECT PROGRAM.
138		144	PROG ERROR (G111/G112) M, S, T COMMAND IN G111, G112 BLOCK. SEE TOE-C843-9.20 PAR.2.8.30.1, 2. CORRECT PROGRAM.
139		145	PROG ERROR (G111/G112) ERROR IN COMMANDING ADDRESS WORD FOR G112 BLOCK. CORRECT PROGRAM.
140	PROG ERROR (G111/G112) ERROR IN ADDRESS WORD COMMANDING OF G111 BLOCK. SEE TOE-C843-9.20 PAR.2.8.30. CORRECT PROGRAM.	146	PROG ERROR (G111/G112) ERROR IN COMMANDING PROGRAMMED SHAPE FORMED BY G112 BLOCK. CORRECT PROGRAM.

Code	Causes	Code	Causes
147		152	A VALUE OTHER THAN 1≦ TOOL NUMBER ≦ 50 IS DESIGNATED FOR THE TOOL NUMBER. A VALUE OTHER THAN 1≦ COMPENSATION MEMORY NUMBER≦ 50 IS DESIGNATED FOR THE COMPENSATION MEMORY NUMBER. ZERO OR A VALUE GREATER THAN 20 IS DESIGNATED IN (GROUP NUMBER) OF T 90 THROUGH T 95, OR T 99.
148		153	THE TOOL INFORMATION OF THE SAME GROUP NUMBER IS REGISTERED TWICE.
149		154	IT WAS ATTEMPTED TO REGISTER MORE THAN 16 PAIRS OF "TOOL NUMBER + COMPENSATION MEMORY NUMBER" IN A SINGLE GROUP NUMBER.
150	G122 OR G123 COMMAND IS NOT SPECIFIED ON A SINGLE BLOCK BASIS. AN ADDRESS OTHER THAN P, L, AND T IS DESIGNATED IN THE TOOL INFORMATION REGISTRATION PROGRAM.	155	THE TOOL OF THE SPECIFIED GROUP NUMBER IS NOT REGISTERED. T□□92, T□□93, T□□94, OR T□□95 IS SPECIFIED BUT THE CORRESPONDING COMPENSATION MEMORY NUMBER IS NOT REGISTERED.
151	THE DESIGNATION OF GROUP NUMBER P IS NOT PROVIDED. OR A VALUE OTHER THAN 1 ≦ P ≦ 19 IS DESIGNATED. THE DESIGNATION OF LIFE PER TOOL L IS NOT PROVIDED. OR A VALUE OTHER THAN 1 ≦ L ≦ 9999 IS DESIGNATED.	156	TOOL LIFE CONTROL IS DESIGNATED IN THE CONTROL HAVING NO "T 4-DIGIT DESIGNATION AND" OFFSET MEMORY ADDITION" OPTIONS.

Code	Causes	Code	Causes
157	THE TOOL REPLACEMENT REQUEST OUTPUT IS ON.	174	MEM ERROR (KEEP) KEEP MEMORY TOTAL CHECK ERROR. SEE THIS PAR.4.2.3
158	SOME REGISTERED TOOL IN THE TOOL GROUP DESIGNATED IN□□ OF WORK COORDINATE SYSTEM SETTING (G50 T□□ 90) HAS A TOOL NUMBER GREATER THAN "31".	175	MEM ERROR (MACR) USER MACRO TOTAL CHECK ERROR IN VARIABLE AREA. SEE THIS PAR.4.2.3
159	MORE THAN 6 PAIRS OF COMPENSATION MEMORY NUMBERS ARE REGISTERED FOR A SINGLE TOOL.	176	
170	MEM ERROR (OFS) TOOL OFFSET TOTAL CHECK ERROR. SEE THIS MANUAL PAR.4.2.3.	177	
171		178	TOOL NO SET ERROR 51 AND ABOVE FROM TOOL NO INPUT SIGNAL #1317 (D4 TO D7) #1342 (D4 TO D6)
172	MEM ERROR (SET) SETTING AREA TOTAL CHECK ERROR. SEE THIS PAR.4.2.3	179	OVER TEMP PANEL INSIDE TEMPERATURE TOO HIGH IN CASE OF "1" FOR DGN #1281 D_0. SEE THIS MANUAL PAR.4.2.4.
173	MEM ERROR (PRM) PARAMETER AREA TOTAL CHECK ERROR. SEE THIS PAR.4.2.3	180	SEQ ERROR SEQUENCE ERROR (1) IN CASE OF "1" DGN #1305 D6. CONTACT MACHINE TOOL BUILDER OR SEE THAT BUILDER'S MANUAL.

Code	Causes	Code	Causes
190	HDLC SYSTEM SOFT ERROR TRANSMISSION SYSTEM SOFTWARE ERROR CONTACT OUR YASREP.	197	HDLC NC REQUEST ERROR WRONG REQUEST COMMAND ACGC TO NC. CONTACT YASREP.
191	HDLC SOFT COMMAND ERROR NC RECEIVED DATA EXCEPT TRANSMISSION PROTO-COL BETWEEN ACGC AND NC. CONTACT OUR YASREP.	198	HDLC OPERATION ERROR DATA SENDING TIME ACGC TO NC OVER ONE MINU-TE. CONTACT YASREP.
192	HDLC 8530 SEND ERROR TRANSMISSION NC SENDING HARDWARE ERROR. CONTACT OUR YASREP.	201	OT (X) OVERTRAVEL X FOR "0" OF DGN #1306 D0, D1. SEE MACHINE TOOL BUILDER'S MANUAL.
193	HDLC 8530 RECEIVE ERROR TRANSMISSION NC RECEIVING HARDWARE ERROR. CONTACT OUR YASREP.	202	OT (Z) OVERTRAVEL Z FOR "0" OF DGN #1306 D2, D3. SEE MACHINE TOOL BUILDER'S MANUAL.
194	HDLC NAR ERROR (10 TIMES) SENT SAME DATA 10 TIMES NC TO ACGC ONLY TO FAIL. CONTACT OUR YASREP.	203	
195	HDLC CMOS FILE ERROR READING AND WRITING CMOS FILE FROM ACGC TO NC NOT EXCECUTED. CONTACT OUR YASREP.	204	
196	HDLC I/O DATA ERROR READING SYSTEM VARIABLE FROM ACGC TO NC NOT EXCECUTED. CONTACT YASREP.	205	

APPENDIX 1 LIST OF ALARM CODE (Cont'd)

Code	Causes	Code	Causes
206		213	
207		214	
208		215	
209		216	
210		217	
211	S-OT1 (X) STORED STROKE LIMIT FIRST AREA X. SEE TOE-C843-9.20 PAR.2.8.18.	218	
212	S-OT1 (Z) STORED STROKE LIMIT FIRST AREA Z. SEE TOE-C843-9.20 PAR.2.8.18.	219	

Code	Causes	Code	Causes
220	S-OT2 (INSIDE) STORED STROKE LIMIT SECOND AREA (INSIDE INHIBIT). SEE TOE-C843-9.20 PAR.2.8.18.	227	
221	S-OT2 (X) STORED STROKE LIMIT SECOND AREA (OUTSIDE INHIBIT) X. SEE TOE-C843-9.20 PAR.2.8.18.	228	
222	S-OT2 (Z) STORED STROKE LIMIT SECOND AREA (OUTSIDE INHIBIT) Z. SEE TOE-C843-9.20 PAR.2.8.18.	229	
223	S-OT3 (INSIDE) STORED STROKE LIMIT THIRD AREA (OUTSIDE INHIBIT). SEE TOE-C843-9.20 PAR.2.8.18.	230	
224	S-OT3 (X) STORED STROKE LIMIT THIRD AREA (OUTSIDE INHIBIT) X. SEE TOE-C843-9.20 PAR.2.8.18.	231	ZR ERROR-AREA (X) REFERENCE POINT RETURN AREA ERROR X. SEE TOE-C843-9.20 PAR.4.2.6.
225	S-OT3 (Z) STORED STROKE LIMIT THIRD AREA (OUTSIDE INHIBIT) Z. SEE TOE-C843-9.20 PAR.2.8.18.	232	ZR ERROR-AREA (Z) REFERENCE POINT RETURN AREA ERROR Z. SEE TOE-C843-9.20 PAR.4.2.6.
226		233	

Code	Causes	Code	Causes
234		241	ZR ERROR-POS (X) REFERENCE POINT RETURN POSITION ERROR X. SEE THIS MANUAL PAR.4.2.6.
235		242	ZR ERROR-POS (Z) REFERENCE POINT RETURN POSITION ERROR Z. SEE THIS MANUAL PAR.4.2.6.
236		243	
237		244	
238		245	
239		246	
240		247	

Code	Causes	Code	Causes
248		275	
249		276	
270		277	
271	P-SET ERROR (X) P SET ERROR X. SEE THIS PAR.4.2.7.	278	
272	P-SET ERROR (Z) P SET ERROR Z. SEE THIS PAR.4.2.7.	279	
273		280	MACH UNREADY MACH RDY OFF FOR "0" OF DGN #1305 DO. CONTACT MACHINE TOOL BUILDER.
274		281	

APPENDIX 1 LIST OF ALARM CODE (Cont'd)

Code	Causes	Code	Causes
282		288	
283		289	
284		310	SERVO OFF SERVO POWER NOT SUPPLIED. SEE THIS MANUAL PAR.4.2.8.
285		311	
286		312	
287		313	

Code	Causes	Code	Causes
314		321	
315		322	
316		323	ACGC2 SYNC ERROR SYNCHRONOUS CPU ERROR BETWEEN ACGC 120 AND NC CONTACT OUR YASKAWA REP.
317		324	AMGC SYNC ERROR SYNCHRONOUS CPU ERROR BETWEEN AMGC AND NC CONTACT OUR YASKAWA REP.
318		325	ACGC2/AMGC SERVO OFF REQ. SERVO OFF DUE TO ACGC2 OR AMGC MAJOR ERROR CONTACT OUR YASKAWA REP.
319		326	
320	NC UNREADY NC UNREADY P SET UNREADY. SEE THIS MANUAL PAR.4.2.9.	327	UNFINISHED PROG GEN GENERATION IN ALL PROGRAMS NOT FINISHED SEE TOE-C843-9.20 PAR.4.6.5 (4), AND DELETE ALL PROGRAM NUMBERS.

Code	Causes	Code	Causes
328	UNFINISHED MM21 PROGRAM MEMORY REGION SETTING NOT ACCORD WITH PHISICAL CAPACITY OF MEMORY MODULE. CONTACT YASREP.	334	
329	PC CPU ERROR PC AND CPU ERROR. CPU FAILURE FOR SEQUENCE CONTROL OR KEEP MEMORY CONTENTS DELETED. SEE THIS MANUAL PAR.4.2.16.	335	
330	EMERGENCY STOP EMERGENCY STOP INPUTTED FOR "0" OF DGN #1281 D1. SEE THIS PAR.4.2.10.	336	
331	FUSE (X) FUSE BLOWN X: FUSE BLOWN OR MCCB TRIPPED IN X-AXIS WHEN DGN #1288 D1 IS "1", SERVOPACK. SEE THIS PAR.4.2.11.	337	
332	FUSE (Z) FUSE BLOWN Z. WHEN DGN #1289 D1 IS "1", FUSE BLOWN OR MCCB TRIPPED IN Z-AXIS SERVOPACK. SEE THIS PAR.4.2.11.	338	
333		339	

Code	Causes	Code	Causes
340		347	
341	SERVO ERROR (X) SERVO ERROR X. EXCESSIVE DEVIATION IN X-AXIS SERVO SYSTEM. SEE THIS PAR.4.2.12.	348	
342	SERVO ERROR (Z) SERVO ERROR Z. EXCESSIVE DEVIATION IN Z-AXIS SERVO SYSTEM. SEE THIS PAR.4.2.12.	349	
343		350	
344		351	OL (X) OVERLOAD (1) X. OVERLOAD IN X-AXIS SERVOPACK WHEN DGN #1288 D2 "0". SEE THIS PAR.4.2.13.
345		352	OL (Z) OVERLOAD (1) Z. OVERLOAD IN Z-AXIS SERVOPACK WHEN DGN #1289 D2 "0". SEE THIS PAR.4.2.13.
346		353	

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

Code	Causes	Code	Causes
366	PG ERROR (S) PG ERROR S. DISCONNECTION IN SPINDLE PG DETECTED. SEE THIS PAR.4.2.14.	373	
367		374	
368		375	
369		376	
370		377	
371	FG ERROR (1) FG ERROR 1. CONTACT OUR YASREP FOR CHECKING MB 20 MODULE.	378	
372	FG NOT READY FG CONTACT OUR YASREP FOR CHECKING MB 20 MODULE.	379	

Code	Causes	Code	Causes
380		387	
381	AXIS ERROR (1) AXIS ERROR (X-AXIS). CONTACT OUR YASREP FOR CHECKING MB 20 MODULE.	388	
382	AXIS ERROR (2) AXIS ERROR (Z-AXIS). CONTACT OUR YASREP FOR CHECKING MB 20 MODULE.	389	
383	AXIS ERROR (3) AXIS ERROR (SPINDLE). CONTACT OUR YASREP FOR CHECKING MB 20 MODULE.	390	SERVOPACK ALARM (S) CONTACT YASREP FOR CHECKING X-AXIS, Z-AXIS SERVOPACK, SPINDLE DRIVE, OR MB20 MODULE.
384		391	SERVOPACK ALARM (X) CONTACT YASREP FOR CHECKING X-AXIS SERVOPACK.
385		392	SERVOPACK ALARM (Z) CONTACT YASREP FOR CHECKING Z-AXIS SERVOPACK.
386		393	

Code	Causes	Code	Causes
394		400	SEQ ERROR SEQUENCE ERROR (2). WHEN DGN #1305 D7 "1". SEE MACHINE TOOL BUILDER'S MANUAL OR CONTACT THE MACHINE BUILDER.
305		401	
396		402	
397		403	
398		404	
399		405	

APPENDIX 1 LIST OF ALARM CODE (Cont'd)

Code	Causes	Code	Causes
406		814	
407		815	
408		816	
409		817	
810		818	
811		819	
812		820	ROM ERROR, RAM ERROR ROM OR RAM ERROR.0 OR HARDWARE CHECK REQUIRED. SEE THIS PAR. 4.2.17.
813			

SUPPLEMENTAL ALARM CODE

ALARM "095"

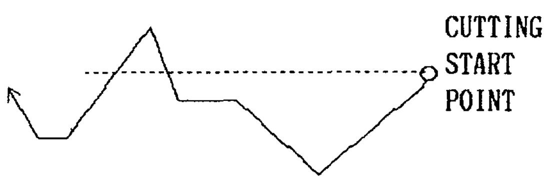
X-coordinates differnt between G71 command cutting start point and last block for finished shape program.

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

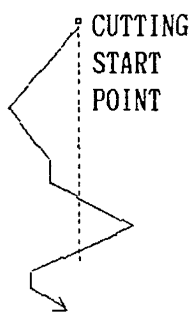
Z-coordinate for cutting start point by G71 command different from Z-coordinate for the first block of the finished shape program. (Command G71 ... R1 is excepted.)

X-coordinate for cutting start point by G72 command different from X-coordinate for the first block of the finished shape program. (Command G72 ... R1 is excepted.)

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



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



ALARM "140"

- Commanding one or no address of addresses B, X(U), Z(W) specifying second straight line.

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

- Address D specifying second beveling and address Q specifying second rounding commanded.

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

ALARM "143"

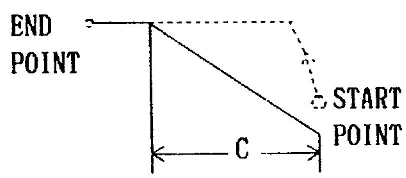
Command values for addresses A, I, K specifying first straight are determined as follows, and programmed shape cannot be formed.

Command Value for A	—
−360.000, −180.000, 0, 180.000, 360.000	Address I commanded for specifying first straight line.
−270.000, −90.000, 90.000, 270.000	Address K commanded for specifying first straight line.

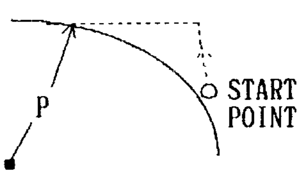
Command values for addresses B, X(U), Z(W) specifying second straight line are determined as follows, and programmed shape cannot be formed.

Command value for B	—
−360.000, −180.000 0, 180.000, 360.000	Address X(U) commanded for specifying second straight line.
−270.000, −90.000 90.000, 270.000	Address Z(W) commanded for specifying second straight line.

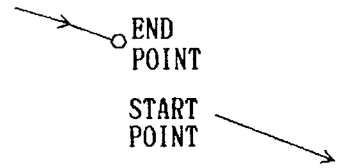
Command values for addresses C and D for beveling too large for the programmed shape. Operation cannot be made according to the command.



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



No intersecting point for first straight line and second straight line.



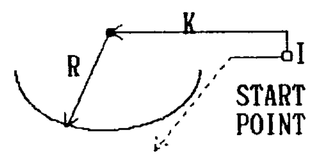
First straight line and second straight line on the same line.

ALARM "145"

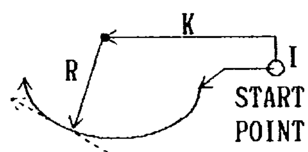
- X(U) or Z(W) not commanded.
- X(U) and Z(W) both commanded.
- R not commanded. Or "0" commanded for R.
- I and K not commanded.
  "0" commanded for I and K.
- P and C both commanded.
- Q and D both commanded.

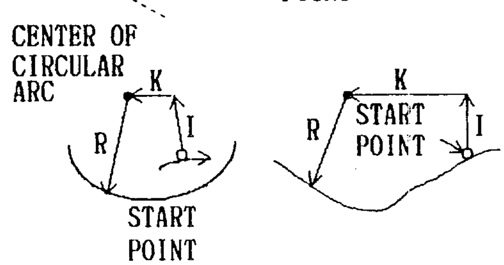
ALARM "146"

Beveling for command C cannot be made.

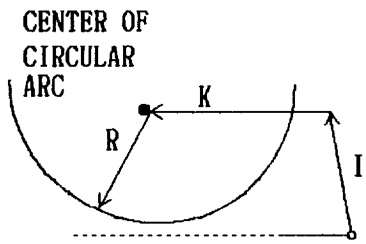


Beveling for command D cannot be made.

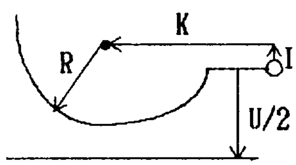




No intersecting point between circular arc and straight line.



No intersecing point between circular arc and end point.



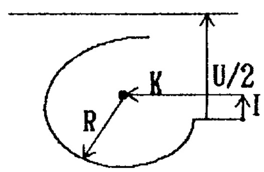


Table A.2.1 Address Characters

Address	Meaning	B: Basic O: Optional
A	Angle designation for G01 and G111, included angle for G76	O
B	Spindle shift angle O1 multiple thread, angle designation for multiple cornering	O
C	User macro character	O
D	Depth of cut and number of cutting cycles for G71 to G76	O
E	Specifications for precise feed and precise lead for cutting	B
F	Specifications for normal feed and normal lead for cutting	B
G	Preparatory function (G-function)	B
H	User macro character	O
I	X-component of arc center, canned cycle parameter, beveling value (radius value)	B, O
J	User macro character	O
K	Z-component of arc center, canned cycle parameter, beveling value	B, O
	Incremental value of variable lead thread	O
L	Number of subprogram repetition, G13 to G16 angle and coordinate	B, O
M	Miscellaneous function (M-function)	B
N	Sequence number	B
O	Program number	B
P	Dwell, canned cycle starting sequence number, program number, user macro number	B, O
Q	Subprogram starting sequence number, canned cycle ending sequence number	B, O
R	Radius of arc, rounding value, tool radius value	B, O
S	Spindle function (S-function), maximum spindle revolution	B

Address	Meaning	B: Basic O: Optional
T	Tool function (T-function), tool coordinate memory number	B, O
U	X-axis incremental command value, dwell, canned cycle parameter	B, O
V	User macro character	O
W	Z-axis incremental command value, canned cycle parameter	B, O
X	X-axis coordinate value	B
Y	User macro character	O
Z	Z-axis coordinate value	B

Table A.2.2 Function Characters

EIA Code	ISO Code	Function	Remarks
Blank	NuL	Error in significant data area in EIA Disregarded in ISO	
BS	BS	Disregarded	
Tab	TH	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 start)	
+	+	Disregarded, User macro operator	
−	−	Minus sign, User macro operator	
0 to 9	0 to 9	Numerals	
a to z	A to Z	Address characters	
0	:	User macro comment	
/	/	Optional block skip	
Del	DEL	Disregarded (Including All Mark)	
.	.	Decimal point	

EIA Code	ISO Code	Function	Remarks
Parameter starting	#	Sharp (Variable designation)	EIA: Special code
*	*	Asterisk (Multiplication operator)	
=	=	Equal mark	
[	[	Left bracket	
]	]	Right bracket	
$	$	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) is automatically recognized.

APPENDIX 2 LIST OF DATA (Cont'd)

Table A.2.3 Tape Code

EIA CODE									CHARACTERS		ISO CODE								
8	7	6	5	4	o	3	2	1			8	7	6	5	4	o	3	2	1
		○			o				0				○	○		o			
					o			○	1		○		○	○		o			○
					o		○		2		○		○	○		o		○	
			○		o		○	○	3				○	○		o		○	○
					o	○			4		○		○	○		o	○		
			○		o	○		○	5				○	○		o	○		○
			○		o	○	○		6				○	○		o	○	○	
					o	○	○	○	7		○		○	○		o	○	○	○
				○	o				8		○		○	○	○	o			
			○	○	o			○	9				○	○	○	o			○
	○	○			o			○	a	A		○				o			○
	○	○			o		○		b	B		○				o		○	
	○	○	○		o		○	○	c	C	○	○				o		○	○
	○	○			o	○			d	D		○				o	○		
	○	○	○		o	○		○	e	E	○	○				o	○		○
	○	○	○		o	○	○		f	F	○	○				o	○	○	
	○	○			o	○	○	○	g	G		○				o	○	○	○
	○	○		○	o				h	H		○			○	o			
	○	○	○	○	o			○	i	I	○	○			○	o			○

EIA CODE									CHARACTERS		ISO CODE								
8	7	6	5	4	o	3	2	1			8	7	6	5	4	o	3	2	1
	○		○		o			○	j	J	○	○			○	o		○	
	○		○		o		○		k	K		○			○	o		○	○
	○				o		○	○	l	L	○	○			○	o	○		
	○		○		o	○			m	M		○			○	o	○		○
	○				o	○		○	n	N		○			○	o	○	○	
	○				o	○	○		o	O	○	○			○	o	○	○	○
	○		○		o	○	○	○	p	P		○		○		o			
	○		○	○	o				q	Q	○	○		○		o			○
	○			○	o			○	r	R	○	○		○		o		○	
		○	○		o		○		s	S		○		○		o		○	○
		○			o		○	○	t	T	○	○		○		o	○		
		○	○		o	○			u	U		○		○		o	○		○
		○			o	○		○	v	V		○		○		o	○	○	
		○			o	○	○		w	W	○	○		○		o	○	○	○
		○	○		o	○	○	○	x	X	○	○		○	○	o			
		○	○	○	o				y	Y		○		○	○	o			○
		○		○	o			○	z	Z		○		○	○	o		○	
					o				Blank	NUL						o			
		○		○	o		○		BS		○				○	o			

APPENDIX 2 LIST OF DATA (Cont'd)

Table A.2.3 Tape Code (Cont'd)

	EIA CODE									CHARACTERS		ISO CODE								
	8	7	6	5	4	o	3	2	1			8	7	6	5	4	o	3	2	1
			○	○	○	o	○	○		Tab	HT					○	o			○
	○					o				CR	LF/NL					○	o		○	
										–	CR	○				○	o	○		○
				○		o				SP		○		○			o			
					○	o		○	○	ER	%	○		○			o	○		○
		○	○	○	○	o	○			UC	–									
		○	○	○	○	o		○		LC	–									
*										–	(			○		○	o			
*										–	)	○		○		○	o			○
*		○	○	○		o				+				○		○	o		○	○
		○				o				−				○		○	o	○		○
		○				o	○	○		o	:			○	○	○	o		○	
			○	○		o			○	/		○		○		○	o	○	○	○
		○	○	○	○	o	○	○	○	Del	DEL	○	○	○	○	○	o	○	○	○
	○	○	○	○	○	o	○	○	○	All Mark		○	○	○	○	○	o	○	○	○
	See Note 2.									#		○		○			o		○	○
*	○			○	○	o				*		○		○		○	o		○	
*	○				○	o	○			=		○		○	○	○	o	○		○
*	○		○	○		o				[		○	○		○	○	o		○	○

	EIA CODE									CHARACTERS	ISO CODE								
	8	7	6	5	4	o	3	2	1		8	7	6	5	4	o	3	2	1
*	○		○			o		○		]	○	○		○	○	o	○		○
	○			○		o	○			$			○			o	○		
	○				○	o	○	○	○	@	○	○				o			
	○			○	○	o	○	○		?			○	○	○	o	○	○	○
		○	○		○	o		○	○	.			○		○	o	○	○	

Notes:

1. For the hole pattern of EIA code of the characters with an asterisk, the pattern shown in the table is standard. However, other patterns may be specified by parameters.

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

APPENDIX 3 LIST OF SETTING NUMBERS

#6000	D_7	D_6	D_5	D_4	D_3	D_2	D_1	D_0

INHEDTT D_7
1: Turns on Edit Lock function.
0: Turns off Edit Lock function.

AFLT D_6
1: Turns on Auxiliary Function Lock.
0: Turns off Auxiliary Function Lock.

ABST D_5
1: Turns on Manual Absolute function.
0: Turns off Manual Absolute function.

DRNT D_4
1: Turns on Dry Run function.
0: Turns off Dry Run function.

BDTT D_3
1: Turns on Block Delete function.
0: Turns off Block Delete function.

DLKT D_2
1: Turns on Display Lock function.
0: Turns off Display Lock function.

MLKT D_1
1: Turns on Machine Lock function.
0: Turns off Machine Lock function.

SBKT D_0
1: Turns on Single Block function.
0: Turns off Single Block function.

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

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

#6001	D_7					D_2	D_1	D_0

BUZON D_7
1: Turns on touch buzzer (key switch on operator's panel).
0: Turns off touch buzzer.

SLT 3: D_2
1: Effective on the third Stored Stroke Limit.
0: Ineffective on the third Stored Stroke Limit.
The value of limit automatically changes by G38 or G39 command in part program.

SLT 2: D_1
1: Effective on the second Stored Stroke Limit.
0: Ineffective on the second Stored Stroke Limit.
The value of limit automatically changes by G36 or G37 command in part program.

INCHMM D_0
1: Selects inch input increment.
0: Selects metric input increment.

#6002	D_7	D_6	D_5	D_4				

ISOEIA D_7
1: Punches out tape code with ISO code.
0: Punches out tape code with EIA code.

TVCHK D_6
1: Executes TV check.
0: Does not execute TV check.

UM09000E D_5

1: Effective on the edit interlock in 09000's.

0: Ineffective on the edit interlock in 09000's.

UM08000E D_4

1: Effective on the edit interlock in 08000's.

0: Ineffective on the edit interlock in 08000's.

#6003			D_5	D_4			D_1	D_0

D_5, D_4

ODVCE 1 Selects RS232C interface for output port.

ODVCD 0 I/O interface.

D_1, D_0

IDVCE 1 : Selects RS232C interface for input
IDVCE 0 port.

Setting Code		Input/Output Port	Parameter No. requiring Baud Rate Setting
0	1	RS232C No.1	#6026 #6028
1	0	RS232C No.1	#6027 #6029

#6004	D_7	D_6	D_5	D_4	D_3	D_2	D_1	D_0

COV161(D_7), COV82(D_6), COV41(D_5), COV21(D_4), COV11(D_3):

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

COV161	COV81	COV41	COV21	COV11	Cut Depth Override
0	0	0	0	0	0%
0	0	0	0	1	10%
0	0	0	1	0	20%
0	0	0	1	1	30%
0	0	1	0	0	40%
0	0	1	0	1	50%
0	0	1	1	0	60%
0	0	1	1	1	70%
0	1	0	0	0	80%
0	1	0	0	1	90%
0	1	0	1	0	100%
0	1	0	1	1	110%
0	1	1	0	0	120%
0	1	1	0	1	130%
0	1	1	1	0	140%
0	1	1	1	1	150%
1	0	0	0	0	160%
1	0	0	0	1	170%
1	0	0	1	0	180%
1	0	0	1	1	190%
1	0	1	0	0	200%

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

UM08000 D_2

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

0: Permits editing and punchout operations.

UMSBK D_1

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

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

SKIPIN D_0

1: Executes the next block when the skip signal is not given before completion of movement of block including Skip Function (G31) or if the touch switch does not trip beyond the limit position in the direction of motion for tool set error compensation (G35).

0: Alarm "087" is displayed.

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

TG1LF to TG9LF:
Individual life expectancy for tools in groups 1 to 9 is set by part program.
Setting range: 0 - 9999 (Tool life control)
Setting: "1" = 1

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

TG10LF to TG19LF:
Individual life expectancy for tools in groups 10 to 19 is set by part program.
Setting range: 0 −9999 (Tool life control)
Setting: "1" = 1 minute

#6181	TG1CNT
#6182	TG2CNT
⸾	⸾
#6198	TG8CNT
#6199	TG19CNT

TG1CNT to TG19CNT:
No. of times used and operating times are indicated individually for tools in groups 1 to 19.
Note: Writing is not permitted in this setting.

#6202	G71OFL

G71OFL:
Sets retraction value after completion of each cutting cycle in Stock Removal in Turning (G71).
Setting range: 0 −65536
Setting: Least input increment

#6203	G72OFL

G72OFL:
Sets retraction value after completion of each cutting cycle in Stock Removal in Facing (G72).
Setting range: 0 −65536
Setting: Least input increment

#6204	G74OFL

G74OFL:
Sets retraction value (δ) in Peck Drilling in Z-axis (G74).
Setting range: 0 −65536
Setting: least input increment

#6205	G75OFL

G75OFL:
Sets retraction value (δ) in Grooving in X-axis (G75).
Setting range: 0 −65536
Setting: Least input increment

#6206	G76OFL

G76OFL:
Sets cut depth (in X-axis) "a" in Automatic Threadcutting (G76).
Setting range: 0 −65536
Setting: Least input increment

#6207	TINON

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

#6219	SNSW

Setting: 0, 1, or 4 of system No. switch

"0": SYSTEM
For usual operation. Writing parameters is prevented.

"1": PARAMETER
To write parameters. At this position, the Cycle Start is prevented.

"4": TEST (0)
The usual operation is similar to case of "0" SYSTEM. Self-diagnostics of the memory contents and checking of reference zero return point are omitted.

Note:

1. Setting the values other than described above cannot permit the correct operation.
2. Setting can be effective only when the system number switch provided on the upper part of the unit is set at "0."

#6500	XSL2P
#6501	ZSL2P

XSL2P, ZSL2P:
Sets the boundary area in positive direction of Stored Stroke Limit second prohibit area on X-axis and Z-axis, respectively.
Setting range: 0 to ±99999999
Setting: Least output increment

#6502	XSL2M
#6503	ZSL2M

XSL2M, ZSL2M:
Sets the boundary area in minus direction of Stored Stroke Limit second prohibit area on X-axis and Z-axis, respectively.
Setting range: 0 to ±99999999
Setting: Least output increment

#6504	ZSL3P
#6505	ZSL3P

XSL3P, ZSL3P:
Sets the boundary area in positive direction of Stored Stroke Limit third prohibit area on X-axis and Z-axis, respectively.
Setting range: 0 to ±99999999
Setting: Least output increment

#6506	XSL3M
#6507	ZSL3M

XSL3M, ZSL3M:
Sets the boundary area in minus direction of Stored Stroke Limit third prohibit area on X-axis and Z-axis, respectively.
Setting range: 0 to ±99999999
Setting: Least output increment

#6508	T1XSLP
#6509	T1ZSLP
#6510	T1XSLM
#6511	T1ZSLM
#6512	T2XSLP
#6513	T2ZSLP
#6514	T2XSLM
#6515	T2ZSLM
#6516	T3XSLP
#6517	T3ZSLP
#6518	T3XSLM
#6519	T3ZSLM
#6520	T4XSLP
#6521	T4ZSLP
#6522	T4XSLM
#6523	T4ZSLM
#6524	T5XSLP
#6525	T5ZSLP
#6526	T5XSLM
#6527	T5ZSLM
#6528	T6XSLP
#6529	T6ZSLP
#6530	T6XSLM
#6531	T6ZSLM
#6532	T7XSLP
#6533	T7ZSLP
#6534	T7XSLM
#6535	T7ZSLM
#6536	T8XSLP
#6537	T8ZSLP
#6538	T8XSLM
#6539	T8ZSLM

#6540	T9XSLP
#6541	T9ZSLP
#6542	T9XSLM
#6543	T9ZSLM
#6544	T10XSLP
#6545	T10ZSLP
#6546	T10XSLM
#6547	T10ZSLM
#6548	T11XSLP
#6549	T11ZSLP
#6550	T11XSLM
#6551	T11ZSLM
#6552	T12XSLP
#6553	T12ZSLP
#6554	T12XSLM
#6555	T12ZSLM
#6556	T13XSLP
#6557	T13ZSLP
#6558	T13XSLM
#6559	T13ZSLM
#6560	T14XSLP
#6561	T14ZSLP
#6562	T14XSLM
#6563	T14ZSLM
#6564	T15XSLP
#6565	T15ZSLP
#6566	T15XSLM
#6567	T15ZSLM

T□□SL□

P: Positive direction:
M: Minus direction
X: X-axis
Z: Z-axis
nth tool

Sets the distance of Stores Stroke Limit from reference point.
Setting range: 0 to ±99999999
Setting: Least output increment

#6568	XSKIP

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

#6569	ZSKIP

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

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

TGPN01 to TGPN50:
Part program determines the number of groups including tools (number 01 to 50).
Setting range: 0 to 20
(Tool life control)

#8651	TOFN01
#8652	TOGN02
~	~
#8699	TOFN49
#8700	TOFN50

TOFN01 to TOFN50:
Part program sets tool number using offset value of offset memory numbers 01 to 50 orderly.
Setting range: 0 to 50
(Tool life control)

#8701	TOF001
#8702	TOF002
~	~
#8749	TOF049
#8750	TOF050

TOF001 to TOF050:
Part program sets the order of using offset values in offset memories "01" to "50," sequentially.
Setting range: 0 to 5
(Tool life control)

APPENDIX 4 LIST OF PARAMETER NUMBERS

#6005	D_7	D_6	D_5	D_4			D_1	D_0

GCDSP D_7
1: Uses special G code I as G code.
0: Uses standard G code I as G code.

RSTG01 D_6
1: Determines G code of 01 group as G01 when resetting.
0: Determines G code of 01 group as G00 when resetting.

POSEXT D_5
1: Presets position external display by setting coordinate system.
0: Does not preset position external display by setting coordinate system.

EXTSET D_4
1: Resets the value at POSITION EXTERNAL display to "0."
0: Does not reset the value at POSITION EXTERNAL display to "0."

PONG04 D_1
1: Sets the G code in the 05 group to G99 when power is applied.
0: Sets the G code in the 05 group to G98 when power is applied.

PONG03 D_0
1: Sets the G code in the 03 group to G91 when power is applied.
0: Sets the G code in the 03 group to G90 when power is applied.

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

#6006	D_7	D_6	D_5	D_4	D_3	D_2	D_1	D_0

SDASGN2, SDASGN1: D_7, D_6
Setting of S4-digit (analog output) output.

SDASGN 2	SDASGN 1	At M03 Output	At M03 Output
0	0	Plus	Plus
0	1	Monus	Monus
1	0	Plus	Minus
1	1	Minus	Plus

10IN D_5
1: Sets ten times the least input increment.
0: Sets the least input increment.

SAGRCH D_4
1: Checks to see if the spindle speed match signal (SAGR) is off upon transition from a rapid traverse block to a cutting feed block.
0: Provides no check on the spindle speed match signal (SAGR).

XRAD D_3
1: Radius designation.
0: Diameter designation.

RPDDRN D_2
1: Enables Dry Run in response to the rapid traverse command.
0: Disables dry Run in response to the rapid traverse command.

ZZRNILK D_1
1: Causes an alarm ("002") upon Cycle Start when Reference Point Return on Z-axis is not made manually after power is applied.
0: Causes no alarm.

XZRNILK D_0
1: Causes an alarm ("001") upon Cycle Start when Reference Point Return on X-axis is not made manually after power is applied.
0: Causes no alarm.

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

#6007	D_7	D_6		D_4	D_3	D_2	D_1	D_0

EDTSTLK D_7
1: Does not cause an alarm upon Cycle Start without reset operation after part program edit operation.
0: Causes an alarm 005.

STUD D_6
1: Effective on Cycle Start when cycle start signal "1" changes to "0."
0: Effective on Cycle Start when cycle start signal "0" changes to "1."

RWDOUT D_4
1: Provides Rewinding Activate Signal when NC program is rewound by RESET & REWIND signal.
0: Provides no Rewinding Activate Signal when when NC program is rewound by RESET & REWIND signal.

OUTPUT D_3
1: Sets the least output increment at 0.0001 inch.
1: Sets the least output increment at 0.001 mm.

SCRSOV D_2
1: Makes the Spindle Override 100% during tapping.
0: Does not make the Spindle Override 100% during tapping.

SLT3IO D_1
1: Establishes the prohibited area of the Stored Stroke Limit 3 outside the boundary.
0: Establishes the prohibited area of the Stored Stroke Limit 3 inside the boundary.

SLT2IO D_2
1: Establishes the prohibited area of the Stored Stroke Limit 2 outside the boundary.
0: Establishes the prohibited area of the Stored Stroke Limit 2 inside the boundary.

#6008			D_5				D_1	D_0

PONM97 D_5
1: M97 command (calculation of intersection) is selected at power-on.
0: M96 command (circular arc) is selected at power-on.

CVSAVE D_1
1: Does not clear user macro command variable #100 thru #149 by reset.
0: Clears user macro common variables #100 thru #140 by reset operation.

ZRNOFS D_0
1: Cancels the commanded block when the second reference point by G30 is commanded during Tool Position Offset or Tool Nose Radius Compensation.
0: Cancels the blocks following the commanded block.

#6009	D_7	D_6	D_5	D_4	D_3		D_1	D_0

ZMOVILK D_7
1: After turning on power, if move command except by G28 is executed without returning Z-axis to reference point manually or automatically, alarm "001" will be caused.
0: Does not cause alarm in the same condition shown above.

XMOVILD D_6
1: After turning on power, if move command except by G28 is executed without returning X-axis to reference point manually or automatically, alarm "001" will be caused.
0: Does not cause alarm.

OTALILK D_5
1: Does not cause an alarm at overtravel.
0: Causes an alarm at overtravel.

HPMUL D_4
1: Sets the value set by #6223 when MANUAL PULSE MULTIPLY switch is set at x100.
0: Regards multiplication factor as x100 when MANUAL PULSE MULTIPLY switch is set at x100.

ZRNRPD D_3
1: Provides JOG command instead of RAPID command until reference point return for each axis is completed after the power is turned on. In the reference point return mode, usual RAPID operation is executed in both negative and positive directions.
0: Provides usual RAPID TRAVERSE rate.

BLZDR, BLXDR D_1, D_0
Specify the start direction of backlash compensation on Z-, and X-axis, respectively.
1: Minus direction
0: Positive direction

#6010			D_5	D_4			D_1	D_0

AZRNHS D_5
1: Executes the first reference point return (deceleration limit switch) and the subsequent automatic reference point returns in the same way when power is applied.
0: Executes high-speed reference point return (position at reference point).

MZRNHS D_4
1: Executes the first reference point return and the subsequent automatic reference point returns in the same way when power is applied.
0: Executes high-speed reference point return.

ZRNDRZ, ZRNDRX D_1, D_0
Specify the start direction of Backlash Compensation on Z-, and X-axis, respectively.
1: Minus direction
0: Plus direction

#6014	D_7							

PCMEM D_7:
Stores PC unit malfunction. (Maintenance Parameter)

#6015							D_1	D_0

ATSUPZ, ATSUPX D_1, D_0
Specify whether or not the Automatic Coordinate System Setting is effective on the Z- and X-axis, respectively.
1: Effective
0: Ineffective

Note: The Automatic Coordinate System is established with the following parameters:
Inch system: #6631, #6630
Metric system: #6637, #6636

#6016						D_2	D_1	

NOSERR D_2
1: Effective on interference check.
0: Ineffective on interference check.

MRVDRN D_1

1: Dryrun shift during operation possible with mode MM/REV.

0: Dry run shift during operation impossible with mode MM/REV.

#6017	D_7	D_6	D_5	D_4	D_3	D_2	D_1	D_0

#EIA#B7-B0 D_7-D_0

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

1: Hole

0: No hole

Example: EIA#B7-B0=01001001

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

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

#6018	D_7	D_6	D_5	D_4	D_3	D_2	D_1	

G50WST D_7

1: Does not add workpiece shift value at G50 coordinate system setting or resetting by ORG key.

0: Adds workpiece shift value at G50 coordinate system setting or resetting by ORG key.

WSTSGN D_6

1: Reverses U and W input code for work coordinate system shift value.

0: Does not reverse U and W input code for work coordinate system shift value.

OFSCYC D_5

1: Displays cyclically by pressing offset function.

0: Does not display cyclically by pressing offset function.

G32ALM D_4

1: Activates alarm due to too short cutting time of 1 block for continuous threadcutting.

0: Executes without waiting for cycle start if cutting time is too short for continuous threadcutting.

MAXUM D_3

1: Warning if U or W input exceeds parameter #6626

0: Regards U or W input to offset data as usual input.

RPDOV D_2

1: Provides six steps of rapid override (F0, 25, 50, 100%)

0: Provides four steps of rapid override (F0, 25, 50, 100%)

SPDOV D_1

1: Sets spindle speed override range of 50 to 200% (10% increments)

0: Sets spindle speed override range of 10 to 120% (10% override increments)

#6019	D_7		D_5	D_4	D_3	D_2		

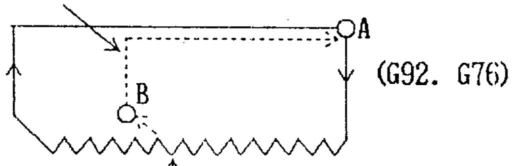
G92FHP D_7

Specifies the position of temporary stop of threadcutting.

1: Stops at the position B where Threading-up is completed.

0: Returns to start point A and stops after Threading-up is completed.

TOOL PATH DURING TEMPORARY THREAD CUTTING INTERRUPT



SCRDRN D_5
1: Enables Dry Run at thread cutting.
0: Disables Dry Run at thread cutting.

SKPFED D_4
1: Employs the feedrate set in parameter #6232 (G31F) for the Skip Function command (G31).
0: Employs the F code command as the feedrate for the Skip Function command (G31).

ESPRST D_3
1: Does not turn on RST output with ESP input ON.
0: Turns on RST output with ESP input ON.

G31SKP D_2
1: Inputs the specified value to macro system variables #5001, 5002 during G31 execution.
0: Inputs the current value to macro system variables #5001, 5002 during G31 execution.

#6020	D_7		D_5	D_4		D_2	D_1	D_0

OFSDSP D_7
1: Displays programmed position in current position display (POSITION ABSOLUTE).
0: Displays programmed position modified with tool position offset in current position display (POSITION ABSOLUTE).

FOVAB D_5
1: Effective with feedrate override signal "0."
0: Effective with feedrate override signal "1.'

SSTPAB D_4
1: Analog output zero with spindle S command zero input signal SSTP "0."
0: Analog output zero with spindle S command zero input signal SSTP "1."

PSTSGN D_2
Shown in the calculation formula of storing data during MDI of measured work point into tool offset memories 00 to 50.

1: (Data of tool coordinate momory) = (Current value temporarily stored in the register) − (Written measurement value)

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

OFSG96 D_1
1: Specifies the surface speed calculated by the X-axis coordinate value modified by tool position offset value in Constant Surface Speed Control.
0: Specifies the surface speed calculated by the programmed X-axis coordinate value in Constant Surface Speed Control.

POSG96 D_0
1: Surface Speed Control functions on the block including Rapid Traverse (G00).
0: Surface Speed Control functions on the block including Rapid Traverse (G00), if programmed before the Cutting Feed block.

#6021	D_7	D_6	D_5	D_4	D_3	D_2	D_1	D_0

UM09000 D_7

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

MERSIN D_6

1: Replaces the stored program with a new one when part program is already stored.

0: Displays ALREADY ALARM.

PSONOF D_5

1: Sets on and off RS (RS232C signal) by "%" character.

0: Keeps RS signal on until reading-in is finished.

CHKDR D_4

1: Recognizes DR.

0: Does not recognize DR.

0-99990 D_3

1: Punches 00 when tape is punched with 0, −, 9, 9, 9, 9 keyed in and $\boxed{\text{OUT}}$ key depressed.

0: Does not punch 00 when tape is punched with 0, −, 9, 9, 9, and 9 keyed in and $\boxed{\text{OUT}}$ key depressed.

PONON D_2

1: Does not clear program No. on power application.
(program number is stored at power supply shut off.)

0: Clears program No. on power application.

PRGNO D_1

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

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

M02M99 D_0

1: Considers M02, M30 and M99 as the program end when part program is stored into memory.

0: Does not consider M02, M03 and M99 as the program end when part program is stored into memory.

#6022	D_7	D_6	D_5	D_4	D_3	D_2	D_1	D_0

HOFSMV D_7

1: Enables the movement of automitic mode handle offset during cutting feed by interpolation.

0: Enables the movement of automatic mode handle offset except during execution of rapid traverse.

TLCC D_6

1: Effective on the next T code when offset amount is changed.

0: Effective on the next block when offset amount is changed.

TRDFH D_5

1: Executes the block next to the block specifying thread, and stops at single block operation or feedhold during thread cutting.

0: Stops on completion of the block specifying thread at single block operation or feedhold during thread cutting.

MABIN D_4

1: Ignores manual absolute function for incremental command by U and W.

0: Does not ignore manual absolute function for incremental command by U and W.

ISOPO D_3

1: Does not output parity bit (8th bit) when outputting ISO codes from NC by operating OUT key (in the EDIT mode).

0: Outputs parity bit.

ISOPI D_2

1: Ignores parity bit (8th bit) when outputting ISO codes by operating IN key (in the EDIT mode) and when reading-in ISO tape data in the TAPE mode.

0: Performs parity check.

HOFSZ HOFSX D_1, D_0

Specifies whether automatic made handle offset movement is effective or ineffective.

1: Effective automatic mode handle offset movement.

0: Ineffective automatic mode handle offset movement.

#6023	D_7	D_6	D_5		D_3	D_2	D_1	D_0

PERIAB D_7

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

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

PERST D_6

1: Regards "%" code as M30, if "%" is commanded before M02 or M30 in TAPE mode operaiton.

0: Ignores "%" code if commanded before M02 or M30 in TAPE or MEM mode operation.

MCHMST D_5

1: Lights feedhold lamp and stores M, S, and T commands when manual operation mode is selected during automatic operation.

0: Does not light feedhold lamp and M, S, and T commands are forced to reset when manual operation mode is selected during automatic operation.

ONOCHG D_3

1: Changes No. 0 by pressing 0, program number and ALT keys.

0: Does not change No. 0 by pressing 0, program number,and ALT keys.

COVP D_2

1: Sets cut depth value override with cut depth override input in Stroke Removal in Turning (G71) and stock removal in facing (G72).

0: Sets cut depth value override with setting #6004.

CLNO D_1

1: Outputs "0" by inputting ":" and outputs ":" by inputting "0," in ISO code.

0: Does not perfrom the conversion above.

HSRWD D_0

1: Automatically starts at high speed in high speed rewinding.

0: Does not start automatically at high speed in high-speed rewinding.

Input for RS232C No. 1

#6026			D_5	D_4	D_3	D_2	D_1	D_0

SIF1CI D_5

Determines whether the input control code for RS232C interface is given or not.

1: Does not send control code.

0: Sends control code.

SIF1SI D_4

Detrtmines the input stop bit for RS232C interface No. 1 as two bits or one bit.

1: Determines stop bit as two bits.

0: Determines stop bit as one bit.

SIF1BID - SIF1BIA D_3 - D_0

Sets input baud rate for RS232C interface No. 1

Baud Rate	SIF 1 BID	SIF 1 BIC	SIF 1 BIB	SIF 1 BIA
50	0	0	0	0
100	0	0	0	1
110	0	0	1	0
150	0	0	1	1
200	0	1	0	0
300	0	1	0	1
600	0	1	1	0
1200	0	1	1	1
2400	1	0	0	0
4800	1	0	0	1
9600	1	0	1	0

Output for RS232C No. 2

#6027			D_5	D_4	D_3	D_2	D_1	D_0

SIF2CI D_5

Determines whether output control code for RS232C No. 2 interface is sent or not.

1: Does not send control code.

0: Sends control code.

SIF1SO D_4

Determines output stop bit for RS232C interface No. 2 as two bits or one bit.

1: Determines stop bit as two bits.

0: Determines stop bit as one bit.

SIF2BID - SIF2BIA D_3 - D_0

Sets output band rate for RS232C interface No. 2.

Baud Rate	SIF 2 BID	SIF 2 BIC	SIF 2 BIB	SIF 2 BIA
50	0	0	0	0
100	0	0	0	1
110	0	0	1	0
150	0	0	1	1
200	0	1	0	0
300	0	1	0	1
600	0	1	1	0
1200	0	1	1	1
2400	1	0	0	0
4800	1	0	0	1
9600	1	0	1	0

Output for RS232C No. 1

#6028			D_5	D_4	D_3	D_2	D_1	D_0

SIF1CO D_5

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

1: Does not send control code.

0: Sends control code.

SIF1SO D_4

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

1: Determines stop bit as two bits.

0: Determines stop bit as one bit.

SIF1BOD - SIF1BOA D_3 - D_0
Sets output baud rate for current loop and RS232C interface.

Baud Rate	SIF 1 BOD	SIF 1 BOC	SIF 1 BOB	SIF 1 BOA
50	0	0	0	0
100	0	0	0	1
110	0	0	1	0
150	0	0	1	1
200	0	1	0	0
300	0	1	0	1
600	0	1	1	0
1200	0	1	1	1
2400	1	0	0	0
4800	1	0	0	1
9600	1	0	1	0

Output for RS232C No. 2

#6029			D_5	D_4	D_3	D_2	D_1	D_0

SIF2CO D_5
Determines whether output control code for RS232C interface No. 2 is sent or not.
1: Does not send control code.
0: Sends control code.

SIF2SO D_4
Determines output stop bit RS232C interface No. 2 as two bits or one bit.
1: Determines stop bit as two bits.
0: Determines stop bit as one bit.

SIF2BOD - SIF2BOA D_3 - D_0
Sets output baud rate for RS232C interface.

Baud Rate	SIF 2 BOD	SIF 2 BOC	SIF 2 BOB	SIF 2 BOA
50	0	0	0	0
100	0	0	0	1
110	0	0	1	0
150	0	0	1	1
200	0	1	0	0
300	0	1	0	1
600	0	1	1	0
1200	0	1	1	1
2400	1	0	0	0
4800	1	0	0	1
9600	1	0	1	0

#6050	XBLP

#6051	XBLP

XBLP, ZBLP:
Sets backlash compensation value for X-and Z-axis.
Setting range: 0 – 255
Setting: Least output increment

#6056	XPSET

#6057	ZPSET

#6058	SPSET

XPSET, ZPSET, SPSET:
Sets position error range for X-, Z-axis and spindle (at indexing).
Setting range: 0 – 255
Setting: Least output increment

#6062	BSX

#6063	BSZ

#6064	BSS

BSX, BSZ, BSS:
Sets D/A conversion bit for X-, Z-axis, and spindle (at indexing).

#6062 #6063 #6064	Bit	Max No. of Error Pulses
4	12bit	2047
5	13bit	4095
6	14bit	8191
7	15bit	16383
8	16bit	32765

$$\text{Max No. of Error Pulses} = \frac{\text{Max Feedrate (pulse/s)}}{\text{Position Loop Gain (1/s)}}$$

Setting range: 0 – 255
Setting: Least output increment

#6068	XPERML

#6069	ZPERML

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

Setting range: 0 – 255
(Setting 0 will not execute compensation.)

#6074	XSVER

#6075	ZSVER

#6076	SSVER

XSVER, ZSVER, SSVER:
Sets servo error limit for X-, Z-axis, and spindle. Position deviation exceeding the preset value activates an alarm "34Δ."
Setting range: 0 – 255
Standard setting: 16
Setting: 1/16 x (D/A saturation value)

#6080	CUPRD

Rapid threading pull-out width during thread-cutting.
Setting range: 0 – 255
Setting: 0.1 lead

#6108	UMEIA [

#6109	UMEIA]

#6110	UMEIA *

#6111	UMEIA =

#6112	UMEIA (

#6113	UMEIA)

UMEIAs:
Specify the punching pattern in EIA for special characters employed in user macro; [,] , * , =, (,), used in turn, beginning with #6108.
Setting range: 0 – 255
Setting: Sets the punching pattern using the decimal value converted from the binary value which defines the pattern.

Note: When "0" is set for each character, punching pattern will be as listed below.

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

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

NBUFM1, 2, 3, 4, 5, 6:
Sets up to 6 M codes for stopping advance reading function (buffering).
Setting range: 0 – 255

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

UMG1 – 10:
Sets G codes for calling user macro of program No. 09001 to 09004.
Setting range: 0 – 255

#6130	UMM1

#6131	UMM2

#6132	UMM3

#6133	UMM4

UMM1, UMM2, UMM3, UMM4:
Sets M codes for calling user macro of program No. 09001 to 09004.
Setting range: 0 – 255

#6134	UMT

UMT
1: Regards T-code command as macro call command calling the macro of program No. 09000.
0: Regards T-code command as basic T-code.

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

#6220	MSTF

MSTF:
Sets the interval from the time M, S, and T codes are transmitted until the time MF, SF, and TF are transmitted.
Setting range: 0 – 65536 msec

#6222	HPMAX

HPMAX:
Specifies the maximum handle feedrate, which is common to the all axes.
Setting: "1" = 125 pulses/sec

#6223	HPMUL

HPMUL:
Sets the value when MANUAL PULSE MULTIPLY switch is set at x100.
Setting: "1" = x 1 time

#6224	SAGRT

SAGTR:
Specifies the delay time for checking the spindle speed reaching signal (SAGR).
Setting range: 0 - 65536 msec

#6225	KPX

#6226	KPZ

#6227	KPS

KPX, KPZ, KPS:
Set position loop gain for the control units of X-, Z-axis, and spindle (at indexing).
Setting: 1024

#6228	G98MAX

G98MAX:
Specifies the maximum feedrate at G98 command (feed per minute) common to all axes.
Setting range:
Setting: "1" = 1000 pulses/min

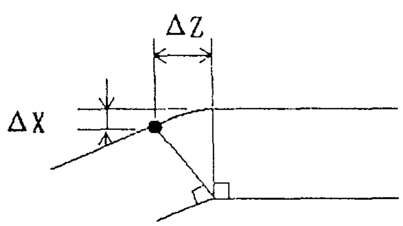
#6230	NEGNR

NEGNR:
When a circular path is drawn in Tool Radius Compensation outside a corner approaching 180° the movement follows describing a very small circular arc. This parameter is used to set the critical arc value, if this arc movement is considered to affect the workpiece surface machining.
Setting range: 0 −65536
Setting: Least input increment
The corner arc setting is ignored when:

$\Delta X \leqq$ NEGNR

$\Delta Y \leqq$ NEGNR

Standard setting = 5



#6231	ROVFO

ROVFO:
Specifies the F0 speed for Rapid Traverse Override.
Setting range:
Setting: "1" = 125 pulses/sec

#6232	G31F

G31F:
Specifies the feedrate in the skip function (G31).
Setting range:
Setting: "1" = 1000 pulses/min
This setting is effective when parameter #6019D_4 (SKPFED) = 1.

#6233	JOG0
~	~
#6264	JOG31

JOG0～JOG31:
Specify the feedrates for the respective positions on the jog feedrate select switch.
Setting range:
Setting: "1" = 0.5 mm/min (metric output)
"1" = 0.05 in/min (inch output)

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

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

MACGR1 - MACGR4:
Sets spindle speed upper limit for gear 1, 2, 3, and 4 orderly.
Setting range: 0 −6000 (rpm)
When the setting is at 0, the speed is not clamped.

#6270	GRSREV

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

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

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

Setting range: 0 − 6000

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

GR1REV − GR4REV:
Specify the maximum speed of the spindle, respectively, for gears 1, 2, 3 and 4 each selected by an input signal. Set the spindle speed applicable when the speed command voltage is 10 V.
Setting range: 0 − 6000 (rpm)

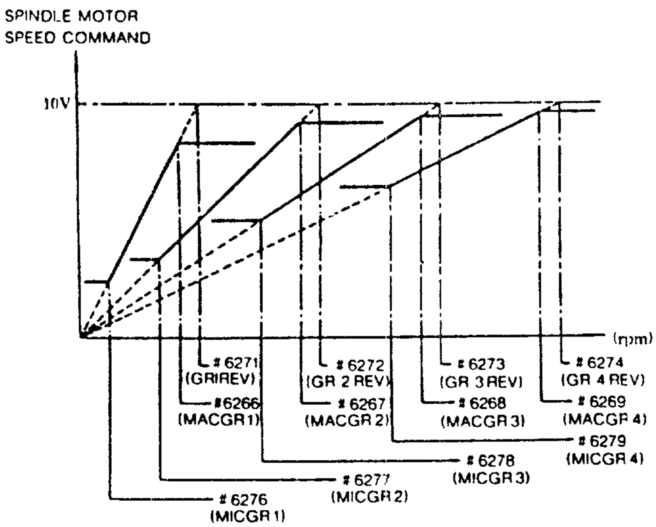
#6275	GSCREV

GSCREV:
Specifies the spindle motor speed in effect when a spindle operation (GSC) input is entered.
Setting range: 0 − 6000 (rpm)

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

Specify the minimum speed of the spindle, respectively for gears, 1, 2, 3 and 4 each selected by an input signal.
Setting range: 0 − 6000 (rpm)

APPENDIX 4 LIST OF PARAMETER NUMBERS (Cont'd)



#6280	RPDX
#6281	RPDZ

RPDX, RPDZ:
Specify the rapid traverse rate for X- and Z-axis, respectively.
Setting range: 0 – 3200
Setting: "1" = 125 pulses/sec

#6282	XBLP
#6283	XBLP

XBLP, ZBLP:
Sets amount of backlash for X-, and Z-axis.
Setting range: – 8192 to 8191 P
P: Least output increment

Note: When negative value is set, 65536+ "Setting value" is indicated.

#6286	ACCX1
#6287	ACCZ1

ACCX1, ACCZ1:
Set the time constant for Linear Accel/Decel for X- and Z-axis, respectively.
Setting range:
Setting: "1" = $125/8 \times 10^3$ P/sec^2
(P: least output increment)

#6304	XREFP
#6305	ZREFP

XREFP, ZREFP:
Sets the traverse distance for Reference Point Return, respectively, on the X- and Z-axis.
Setting range: 0 – 32767
Setting: "1" = 1 pulse

#6306	SCRXACC
#6307	SCRZACC

SCRXACG, SCRZACC:
Sets accel/decel time constant at thread cutting on X-, and Z-axis.
Setting: 131,070/time constsnt (ms)
Always read the notes for #6314, #6315.

#6308	SCRXBAS
#6309	SCRZBAS

SCRXBAS, SCRZBAS:
Sets accel/decel bias at thread cutting on X-, and Z- axis.
Setting: 1 = 500 pulses/s
Always read the notes for #6314, #6315.

#6310	XREFV1
#6311	ZREFV1

XREFV1, ZREFV1:
Specify the approach speed 1 for Reference Point Return, respectively, on the X- and Z- axes.
Setting range: 0 – 200
Setting: "1" = 125 pulses/sec

#6312	CUTXACC
#6313	CUTZACC

CUTXACC, CUTZACC:
Sets accel/decel time constant at normal thread cutting on X-, and Z-axis.
Setting: 131,070/time constant ms
Always read the notes for #6314, #6315.

#6314	CUTXBAS
#6315	CUTZBAS

CUTXBAS, CUTZBAS:
Sets accel/decel bias at usual thread cutting on X-, and Z-axis.

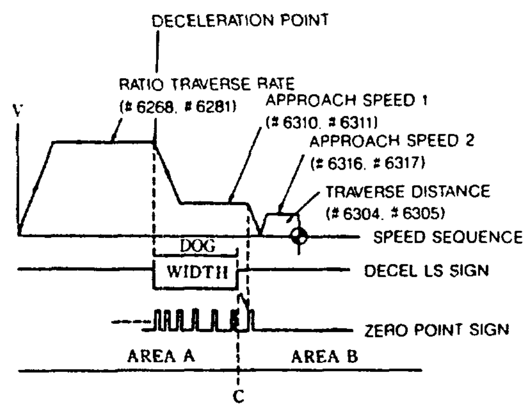
Setting: 1 = 500 p/s

Notes for Setting Accel/Decel Time Constant and Bias at Normal Thread cutting (#6306 -- #6309, #6312 – #6315)

1. Sets the same values for X- and Z-axix as a rule to ensure motion path accuracy.
2. When accel/decel time constant or bias is set under the different conditions between thread cutting and normal thread cutting, direct changing these two types cutting may influence speed factor at selected point. Be sure to program dwell or positioning code between these two types.

#6316	XREFV2
#6317	ZREFV2

XREFV2, ZREFV2:
Specify the approach speed 2 for Referefce Point Return, respectively, on the X- and Z- axes.
Setting range: 0 – 200
Setting: "1" = 125 pulses/sec



Reference point return direction:
#6010 (ZRNDRX, ZRNDRZ)

#6318	RPDX2
#6319	RPDZ2

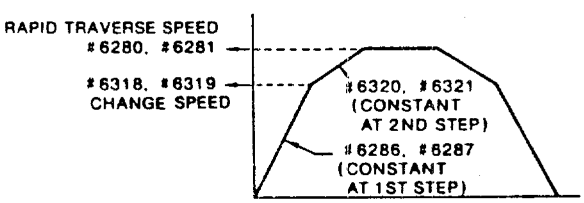
RPDX2, RPDZ2:
Set change speed for linear accel/decel of X- and Z-axis, respectively.
Setting: "1" = 125 pulses/s

#6320	ACCX2
#6321	ACCZ2

ACCX2, ACCZ2:
Set 2nd time constant for linear accel/decel of X- and Z-axis, respectively.

Note: Parameters #6318 to #6321 must be set under the following conditions:

$$\frac{\text{2nd Step Constant}}{\text{Change Speed}} = \frac{\text{Rapid Accel/Decel Constant}}{\text{Speed Constant}} \times n \ (1, 2, 3 \ldots n)$$



#6322	XPERED
#6323	ZPERED

XPERED, ZPERED:
Specify the number of the end point for lead-screw Error Compensation, respectively, on the X-and Z-axes.
Setting range: 0 – 255

#6328	XPERST
#6329	ZPERST

XPERED, ZPERED:
Specify the number of the start point for Leadscrew Error Compensation, respectively, on X-and Z-axes.
Setting range: 0 – 255

#6334	XPEROR
#6335	ZPEROR

XPEROR, ZPEROR:
Specify the reference point for Leadscrew Error compensation, respectively, on the X- and Z-axes.
Setting range: 0 – 255

#6342	SIFREF

SIDREF:
Sets the reference point for spindle indexing.
Setting range: 0 – 4095
Setting: "1" = 1 pulse (=360/4096 deg.)

#6343	SIDRV1

Sets the spindle speed for spindle indexing.
Setting range: 0 — 32512
Setting: 1 = 0.31 mV

#6344	SIDCRP

SIDCRP
Sets the spindle indexing creep speed.
Setting range: 0 — 32512
Setting: "1" = 0.31 mV

#6600	XSL1P
#6601	ZSL1P

XSL1P, ZSL1P:
Specify the plus direction boundary value for Stored Stroke Limit 1, respectively, on the X- and Z-axes.
Setting range: 0 — 99999999
Setting: "1" = 1 pulse

#6606	XSL1M
#6607	ZSL1M

XSL1M, ZSL1M:
Specify the minus direction boundary value for Stored Stroke Limit 1, respectively, on the X-, Z-axes.
Setting range: 0 — 99999999
Setting: "1" = 1 pulse

#6612	XZP2L
#6613	ZZP2L

XZP2L, ZZP2L:
Specify the distance between the first and the second reference point, respectively, on the X-, Z-axes.
Setting range: — 99999999 to 99999999
Setting: "1" = 1 pulse

#6626	MAXDUW

MAXDUM:
Sets upper limit of U and W for offset data. The input of the value exceeding the limit will cause an alarm.

Note: Paramter #6018 D_3 is set to "1," the parameter setting is effective.

#6630	XSET1
#6631	ZSET1

XESTI, ZSETI:
Specify the value for Automatic Coordinate System Setting at the time of inch input, respectively, on the X-, and Z-axes. A desired value should be set in inches for the distance between the first refersnce point and the reference point of the coordinate system to be established.
Setting range: — 99999999 to 99999999
Setting: "1" = 0.0001 in.

#6636	XSETM
#6637	ZSETM

APPENDIX 4 LIST OF PARAMETER NUMBERS (Cont'd)

XESTM, ZSETM:
Specify the value for Automatic Coordinate System Setting at the time of metric input, respectively, on the X-, and Z-axes. A desired value should be set in millimeters for the distance between the first reference point and the reference point of the coordinate system to be established.
Setting range: − 99999999 to 99999999
Setting: "1" = 0.001 mm

#6642	XPEINT

#6643	ZPEINT

XPEINT, ZPEINT:
Spedify the compensation interval in Leadscrew Error Compensation, respectively, on the X- and Z-axes.
Setting renge: − 99999999 to 99999999
Setting: "1" = 1 pulse

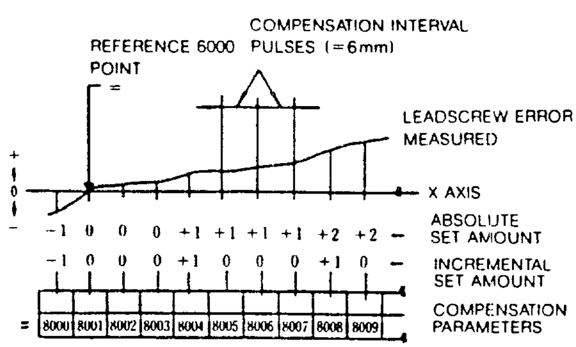
#8000	PEMNO
⁞	⁞
#8255	PEMN255

PEMNO − PEMN255:
Specify the respective values of Leadscrew Error Compensation.
Setting range: 0 to ± 15(Incremental designation)
0 to ±128(Absolute designation)
Setting: "1" = Output increment
Incremental/absolute designation is selected by parameter #6023D_7 (PERIAB).
Axis for compensation is specified by parameters #6322, 6323, 6328, and 6329.

APPENDIX 5 STORED LEADSCREW ERROR COMPENSATION

This function automatically compensate for leadscrew error on each axis according to the compensation data set by parameter and is effective after completion of reference point return. The compensation data are made on the distances between the reference point on each axis and specified points.
Compensation axes: X, Z axes
No. of corrsection points: 256 Max.
Compensation base point: Reference point
Compensation interval: 6000 Pulses or more
Data setting system: Absolute/incremental (Set by Parameter #6023D_7 PERIAB)
Compensation value:
Minimum compensation unit: 1 pulse (least output increment)
Compensation multiplication factor: 3X max.
One-time-compensation value: 15 pulses max. (Compensation multiplication)

Notes:
1. Regardless of absolute/incremental setting, the difference between neighboring compensation values should be (15 pulses x compensation multiplication) and below.
2. Maximum set value in case of absolute setting is ±127, pulses. Compensation multiplication is taken on this value.
3. No. of correction points on each axis can be arbitrary as far as the total compensation points are within 256.



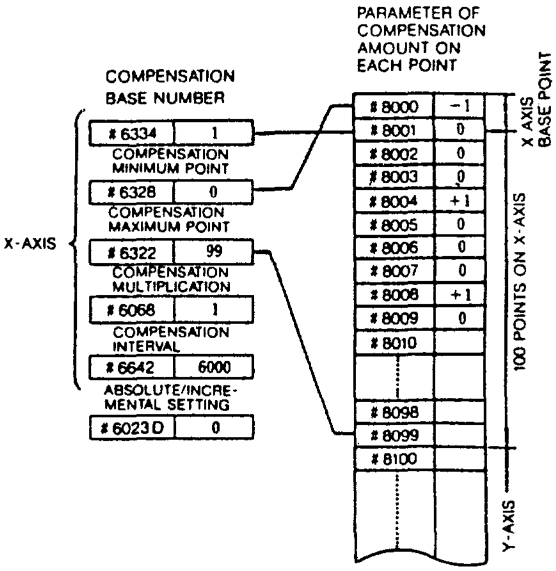


Table A.5

	Axis	Parameter #	Functions
Compensation Interval	X	#6642 (XPEINT)	6000 OR MORE "1" = 1 Pulse
	Z	#6642 (ZPEINT)	
Absolute/Incremantal Setting Switchable		#6023 D_7 (PERIAB)	"0" = Incremental setting "1" = Absolute setting
Compensation Reference No.	X	#6334 (XPEROR)	Value of parameter # of compensation on each point minus 8000 will be written.
	Z	#6335 (ZPEROR)	
Compensation Max. Point	X	#6322 (XPERED)	
	Z	#6323 (XPERED)	
Compensation Min. Point	X	#6328 (XPERST)	
	Z	#6329 (ZPERST)	
Compensation Value on Each Point	X	#8000 –	0 to ±7 (Incremental setting) 0 to ±127 (Absolute setting) "1" = 1 pulse
	Z	#8255	
Compensation Miltiplication Factor	X	#6068 (XPERML)	0 to 3 "1" = 1 X
	Z	#6069 (ZPERML)	

APPENDIX 6 LIST OF STANDARD INPUT/OUTPUT SIGNALS

Table A.6 shows the list of diagnostic numbers and signal names of standard input/output signals and monitor signals.

Table A.6

Diagnostic Number	Display
#1000 – #1096	Input signals from machine
#1100 – #1157	Output signals to machine
#1200 – #1223	Output signals to machine interface (PC)
#1300 – #1331	Input signals to machine interface (PC)
#1280 – #1295	Monitor signals

Notes:

1. Monitor signals are used to check the internal condition of the control.
2. The functions of signals #1000 – #1096, #1100 – #1157

Refer to machine tool builder's manual.

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

Contact closed

Contact opened

Fig.A.6 Status Display of Input/Output Signals

Table A.7 List of Standard Input/Output Signals

Input Signals

	D_7	D_6	D_5	D_4	D_3	D_2	D_1	D_0
#1300	EDT	MEM	D	T		H/S	J	RT
	EDIT	MEMORY	MDI	TAPE		HANDLE/ STEP	MANUAL JOG	MANUAL RAPID
#1301	MP1	ROV2	ROV1	FV16	FV8	FV4	FV2	FV1
		RAPID SPEED OVERRIDE		FEEDRATE OVERRIDE/MANUAL JOG SPEED				
#1302	HZ	HX	−Z	+Z	−X	+X	MP4	MP2
	MANUAL PG AXIS SELECT		MANUAL TRAVERSE AXIS DIRECTION SELECT				MANUAL PG MULTIPLY SELECT	
#1303	INHEDT	AFL	ABS	DRN	BDT	DLK	MLK	SBK
	INHIBIT EDIT	M.S.T LOCK	MANUAL ABS.	DRY RUN	BLOCK DELETE	DISPLAY LOCK	MACHINE LOCK	SINGLE BLOCK
#1304	ZRN	CDZ	SWZ	RWDH	SRN	PST	*SP	ST
	RETURN TO REFER-ENCE	THREAD CUT UP	ERROR DETECT	HIGH-SPEED REWIND	SET UP POINT RETURN	POSITION SET	FEED HOLD	CYCLE START

Input Signals

	D_7	D_6	D_5	D_4	D_3	D_2	D_1	D_0
#1305	ERR1	ERR0	STLK	RWD	EOP	ERS	FIN	MRD
	EXTERNAL ERROR INPUT		INTER-RUPT	REWIND	END OF PROGRAM	EXTERNAL RESET	MST FIN	MACHINE READY

#1306	SAGR		*DCZ	*DCX	*−LZ	*+LZ	*−LX	*+LX
	SPINDLE SPEED AGREE-MENT		DECREASE INPUT FOR REFERENCE POINT		OVERTRAVEL INPUT			

#1307	GRS	GSC	SSTP	SINV	GR4	GR3	GR2	GR1
	S-COMMAND CON-STANT	SPINDLE SPEED CONSTANT	S-COMMAND "0"	S-COMMAND INVERT	SPINDLE GEAR RANGE SELECT			

#1308	EOUT	EVER	EIN	DRSZ	DRSX			EXTC
	NC PROGRAM PUNCH OUT	NC PROGRAM VERIFY	NC PROGRAM INPUT	DISPLAY RESET				TIME COUNT

#1309	BDT9	BDT8	BDT7	BDT6	BDT5	BDT4	BDT3	BDT2
	ADDITIONAL BLOCK DELETE							

Table A.7 List of Standard Input/Output Signals (Cont'd)

Input Signals

	D_7	D_6	D_5	D_4	D_3	D_2	D_1	D_0
#1310	WN16	WN8	WN4	WN2	WN1	SPC	SPB	SPA
	EXTERNAL WORK NUMBER SEARCH					SPINDLE OVERRIDE		

#1311				CPRN	HOFS	MIX	PRST	OVC
				CUTTING INTERRUPT POINT RETURN	AUTO MODE HANDLE OFFSET	X AXIS MIRROR IMAGE	PROGRAM RESTART	OVERRIDE CANCEL

#1312				COV16	COV8	COV4	COV2	COV1
				G 71/G 72 CUTTING OVERRIDE				

#1313								

#1316	SID8	SID7	SID6	SID5	SID4	SID3	SID2	SID1
	SPINDLE INDEX POSITION SET							

Input Signals

	D_7	D_6	D_5	D_4	D_3	D_2	D_1	D_0
#1317	TP8	TP4	TP2	TP1	SID12	SID11	SID10	SID9
	TOOL NO. SET FOR STORED STROKE LIMIT							
#1318			TLSKP	TLRST	SIDXI	SIDXING	TPS	SIDX
			TOOL SKIP	TOOL RESET	SPINDLE INDEX RESTART	SPINDLE INDEX POSITION INCRE-MANTAL DESIGNA-TION	TOOL NO CHANGE FOR S.S. LIMIT	SPINDLE INDEXING
			SIGNAL FOR TOOL LIFE CONTROL					
#1319	ROV4	SPE	SPD	TLA21	TLA18	TLA14	TLA12	TLA11
	RAPID OVERRIDE	SPINDLE OVERRIDE		CHANGE TOOL NO. (TOOL LIFE CONTROL)				
#1320								
#1321								

Table A.7 List of Standard Input/Output Signals (Cont'd)

Input Signals

	D_7	D_6	D_5	D_4	D_3	D_2	D_1	D_0
#1322	SONPB							

SERVO ON

#1323	RI8(SDI7)	RI7(SDI6)	RI6(SDI5)	RI5(SDI4)	RI4(SDI3)	RI3(SDI2)	RI2(SDI1)	RI1(SDI0)

EXTERNAL INPUT OF S- COMMAND (S4 DIGIT) NO. 1

#1324	(SDI15)	(SDI14)	(SDI13)	(SDI12)	(SDI11)	(SDI10)	(SDI9)	(SDI8)

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

#1325	UI7	UI6	UI5	UI4	UI3	UI2	UI1	UI0

INPUT FOR "USER'S MACRO" NO. 1

#1326	UI15	UI14	UI13	UI12	UI11	UI10	UI9	UI8

INPUT FOR "USER'S MACRO" NO. 2

Input Signals

	D_7	D_6	D_5	D_4	D_3	D_2	D_1	D_0
#1327	ED7	ED6	ED5	ED4	ED3	ED2	ED1	ED0

EXTERNAL DATA INPUT NO. 1

#1328	ED15	ED14	ED13	ED12	ED11	ED10	ED9	ED8

EXTERNAL DATA INPUT NO. 2

#1329	EDCL	EDS2	EDS1	EDS0	EDSD	EDSC	EDSB	EDSA

CONTROL SIGNAL FOR EXTERNAL DATA INPUT

#1330								

#1331								

Table A.7 List of Standard Input/Output Signals (Cont'd)

Output Signals

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

	D_7	D_6	D_5	D_4	D_3	D_2	D_1	D_0
#1201	M30R	M02R	M01R	M00R	M38	M34	M32	M31
	M30 DECODE OUTPUT	M02 DECODE OUTPUT	M01 DECODE OUTPUT	M00 DECODE OUTPUT				

	D_7	D_6	D_5	D_4	D_3	D_2	D_1	D_0
#1202	TF	SF	MF	SINVA	IER	ESPS	RST	ALM
	T-FUNC-TION SAMPL-ING OUTPUT	S-FUNC-TION SAMPL-ING OUTPUT	M-FUNC-TION SAMPL-ING OUTPUT	S4 DIGIT OUT INVERT STATUS	INPUT ERROR OUTPUT	EMERGENCY STOP OUTPUT	RESET OUTPUT	ALARM OUTPUT

	D_7	D_6	D_5	D_4	D_3	D_2	D_1	D_0
#1203		EDTS	AUTO	MAN	THC	RWDS	OP	DEN
		EDIT OPERAT-ING STATUS	AUTO MODE STATUS	MANUAL MODE STATUS	THREAD CUTTING STATUS	REWIND STATUS	FEEDING	POSITION-ING END

	D_7	D_6	D_5	D_4	D_3	D_2	D_1	D_0
#1204	S28	S24	S22	S21	S18	S14	S12	S11
	S-FUNCTION BCD OUTPUT							

Output Signals

	D_7	D_6	D_5	D_4	D_3	D_2	D_1	D_0
#1205	T28	T24	T22	T21	T18	T14	T12	T11

T-FUNCTION BCD OUTPUT

#1206	2ZPZ	2ZPX	ZPZ	ZPX		G96S	SPL	STL
	Z AXIS	X AXIS	Z AXIS	X AXIS		CONSTANT SURFACE SPEED CONTROL	FEED HOLD LAMP	CYCLE START LAMP
	NO. 2 REFERENCE POSITION		REFERENCE POSITION					

#1207								

#1216	R08(SDD7)	R07(SDD6)	R06(SDD5)	R05(SDD4)	R04(SDD3)	R03(SDD2)	R02(SDD1)	R01(SDD0)

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

#1217	(SDD15)	(SDD14)	(SDD13)	(SDD12)	R012(SDD11)	R011(SDD10)	R010(SDD9)	R09(SDD8)

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

Table A.7 List of Standard Input/Output Signals (Cont'd)

Output Signals

	D_7	D_6	D_5	D_4	D_3	D_2	D_1	D_0
#1218							ASF	
							S4 DIGIT COMMAND ANALOG SF	
#1219	ESEND	EREND			TLCH	SIDXO	TPSA	SIDXA
	EXTERNAL DATA SEARCH COMPLE-TION	EXTERNAL DATA INPUT COMPLE-TION			TOOL CHANGE COMMAND (TOOL LIFE CONTROL)	SPINDLE INDEX EXECUT-ING	S.5. LIMIT AREA CHANGE END	SPINDLE INDEX END
#1220	U07	U06	U05	U04	U03	U02	U01	U00
#1221	U015	U014	U013	U012	U011	U010	U09	U08
#1222								

#1220: OUTPUT FOR "USER'S MACRO" NO. 1

#1221: OUTPUT FOR "USER'S MACRO" NO. 2

Output Signals

	D_7	D_6	D_5	D_4	D_3	D_2	D_1	D_0
#1223		RPDO	OPF					
		CUTTING SIGNAL	RAPID FEEDING SIGNAL					

#1280	SSW3	SSW2	SSW1	SSW0				SKIP
	SYSTEM NUMBER SWITCH							SKIP INPUT

#1281	0	*OFFPB		ONPB	*OLD	SVAM	*ESP	*OHT
		POWER OFF PB.		POWER ON PB.	OVERLOAD	SERVO ALARM	EMER-GENCY STOP	OVERHEAT

#1282	1HP7	1HP6	1HP5	1HP4	1HP3	1HP2	1HP1	1HP0
	NO. 1 MANUAL PULSE GENERATOR MONITOR							

#1283					SET3	SET2	SET1	SET0
					SETTING #6219 MONITOR			

Table A.7 List of Standard Input/Output Signals (Cont'd)

Output Signals

	D_7	D_6	D_5	D_4	D_3	D_2	D_1	D_0
#1284	SVMX	NRD						

SERVO POWER ON
(= "NRD")

#1285	○	○	○	○	○	○	○	○

CONSTANT "1"

#1286	○	○	○	○	○	○	○	○

CONSTANT "0"

#1287		PCS	PBS	PAS				
		PHASE-C	PHASE-B	PHASE-A				

SIGNAL FROM SPINDLE PG

#1288	TGONX	PCX	PBX	PAX	*ALX	*OLX	FUX	SRDX
	X-AXIS TGON	PHASE-C	PHASE-B	PHASE-A				

SIGNAL FROM X-AXIS PG

MONITOR FOR SERVO UNIT OF X AXIS

Output Signals

	D_7	D_6	D_5	D_4	D_3	D_2	D_1	D_0
#1289	TGONZ	PCZ	PBZ	PAZ	*ALZ	*OLZ	FUZ	SRDZ
	Z-AXIS TGON	PHASE-C	PHASE-B	PHASE-A	MONITOR FOR SERVO UNIT OF Z AXIS			

SIGNAL FROM Z-AXIS PG

#1290	SCOM28	SCOM24	SCOM22	SCOM21	SCOM18	SCOM14	SCOM12	SCOM11

S-COMMAND MONITOR

#1291	SCOM48	SCOM44	SCOM42	SCOM41	SCOM38	SCOM34	SCOM32	SCOM31

S-COMMAND MONITOR

#1292	SO28	SO24	SO22	SO21	SO18	SO14	SO12	SO11

S-OUTPUT MONITOR

#1293	SO48	SO44	SO42	SO41	SO38	SO34	SO32	SO31

S-OUTPUT MONITOR

Table A.7 List of Standard Input/Output Signals (Cont'd)

Output Signals

	D_7	D_6	D_5	D_4	D_3	D_2	D_1	D_0
#1294	ALM28	ALM24	ALM22	ALM21	ALM18	ALM14	ALM12	ALM11
	ALARM CODE MONITOR							
#1295					ALM38	ALM34	ALM32	ALM31
					ALARM CODE MONITOR			

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