1.3.1 Displaying Diagnosis Screen

(1) Press function key 

.

(2) Press soft key [DGNOS], then a diagnosis screen is displayed.

1.3.2 Contents Displayed

Causes when the machine does not travel in spite of giving a command

Diagnosis	0	CNC internal state 1

[Data type] Bit

NAME	Internal state when "1" is displayed
INPOSITION CHECK	In-position check is being done.
FEEDRATE OVERRIDE 0%	Feedrate override is 0%.
JOG FEED OVERRIDE 0%	Jog feedrate override is 0%.
INTER/START LOCK ON	Interlock/start lock is on.
SPEED ARRIVAL ON	The system is waiting for the speed arrival signal to turn on.

WAIT REVOLUTION	The system is waiting for the spindle one-rotation signal in threading.
STOP POSITION OCDER	The system is waiting for the rotation of the position coder in spindle feed per revolution.
FEED STOP	A feed stop was made.

Diagnosis 2 **Dwell execution state**

When a dwell is being executed, "1" is displayed.

Diagnosis 8 **CNC internal state 2**

[Data type] Bit

NAME	Internal state when "1" is displayed
FOREGROUND READING	Data is being input in the foreground.
BACKGROUND READING	Data is being input in the background.

Reader/puncher interface output state

Diagnosis 10 **Reader/puncher interface output state**

When data is being output through the reader/puncher interface, "1" is indicated.

State of TH alarm

Diagnosis 30 **TH alarm character count (foreground edit)**

[Data type] 2-word axis

The position where the TH alarm occurred in foreground input is indicated by the number of characters from the beginning of the block.

Diagnosis 31 **TH alarm character code (foreground edit)**

[Data type] 2-word axis

The character code of the character at which the TH alarm occurred in foreground input is indicated.

Diagnosis 32 **TH alarm character count (background edit)**

[Data type] 2-word axis

The position where the TH alarm occurred in background input is indicated by the number of characters from the beginning of the block.

Diagnosis 33 **TH alarm character code (background edit)**

[Data type] 2-word axis

The character code of the character at which the TH alarm occurred in background input is indicated.

Display language of the CNC screen

Diagnosis 43 **Number of the current display language of the CNC screen**

[Data type] Byte

The number of the current display language of the CNC screen is indicated.
The correspondence between languages and numbers is show below.

0	:	English
1	:	Japanese
2	:	German
3	:	French
4	:	Chinese (traditional characters)
5	:	Italian
6	:	Korean
7	:	Spanish
8	:	Dutch

9 : Danish
10 : Portuguese
11 : Polish
12 : Hungarian
13 : Swedish
14 : Czech
15 : Chinese (simplified characters)
16 : Russian
17 : Turkish

Details of serial Pulsecoder

		#7	#6	#5	#4	#3	#2	#1	#0
Diagnosis	200	OVL	LV	OVC	HCA	HVA	DCA	FBA	OFA

#0 OFA Overflow alarm
#1 FBA Disconnection alarm
#2 DCA Discharge alarm
#3 HVA Overvoltage alarm
#4 HCA Abnormal current alarm
#5 OVC Over current alarm
#6 LV Insufficient voltage alarm
#7 OVL Overload alarm

		#7	#6	#5	#4	#3	#2	#1	#0
Diagnosis	201	ALD	PCR		EXP				

#4 EXP
#7 ALD

	ALD	EXP	Description
Overload alarm	0	-	Motor overheat
	1	-	Amplifier overheat
Disconnection alarm	1	0	Built-in Pulsecoder (hard)
	1	1	Disconnection of separated type Pulsecoder (hard)
	0	0	Disconnection of Pulsecoder (software)

#6 PCR The one-rotation signal of the position detector was caught before a manual reference position return is performed. Since the manual reference position return grid was established, a manual reference position return is enabled.

> **NOTE**
> This bit is valid only when the operation of the manual reference position return mode is started.

		#7	#6	#5	#4	#3	#2	#1	#0
Diagnosis	202		CSA	BLA	PHA	RCA	BZA	CKA	SPH

#0 SPH Serial Pulsecoder or feedback cable is faulty.
Counting of feedback cable is erroneous.
#1 CKA Serial Pulsecoder is faulty.
Internal block stopped.
#2 BZA Battery voltage became 0.
Replace the battery and set the reference position.
#3 RCA Serial Pulsecoder is faulty.
The speed was incorrectly counted.
#4 PHA Serial Pulsecoder or feedback cable is erroneous.
Counting of feedback cable is erroneous.
#5 BLA Battery voltage is low (warning)
#6 CSA Hardware of serial Pulsecoder is abnormal

		#7	#6	#5	#4	#3	#2	#1	#0
Diagnosis	203	DTE	CRC	STB	PRM				

#4 PRM A parameter failure was detected on the digital servo side. See the cause and measure described in diagnosis No. 352.
#5 STB Communication failure of serial Pulsecoder.
Transferred data is erroneous.
#6 CRC Communication failure of serial Pulsecoder.
Transferred data is erroneous.
#7 DTE Communication failure of serial Pulsecoder.
There is no response for communication.

		#7	#6	#5	#4	#3	#2	#1	#0
Diagnosis	204		OFS	MCC	LDA	PMS			

#3 PMS Feedback is not correct due to faulty serial Pulsecoder C or feedback cable.
#4 LDA Serial Pulsecoder LED is abnormal
#5 MCC Contacts of MCC of servo amplifier is melted.
#6 OFS Abnormal current value result of A/D conversion of digital servo

Details of separate serial Pulsecoder alarms

		#7	#6	#5	#4	#3	#2	#1	#0
Diagnosis	205	OHA	LDA	BLA	PHA	CMA	BZA	PMA	SPH

#0 SPH A soft phase data error occurred in the separate Pulsecoder.
#1 PMA A pulse error occurred in the separate Pulsecoder.
#2 BZA The battery voltage for the separate Pulsecoder is zero.
#3 CMA A count error occurred in the separate Pulsecoder.
#4 PHA A phase data error occurred in the separate linear scale.
#5 BLA A low battery voltage occurred in the separate Pulsecoder.
#6 LDA An LED error occurred in the separate Pulsecoder.
#7 OHA Overheat occurred in the separate Pulsecoder.

		#7	#6	#5	#4	#3	#2	#1	#0
Diagnosis	206	DTE	CRC	STB					

#5 STB A stop bit error occurred in the separate Pulsecoder.
#6 CRC A CRC error occurred in the separate Pulsecoder.
#7 DTE A data error occurred in the separate Pulsecoder.

Details of invalid servo parameter alarms (on the CNC side)

When servo alarm No. 417 is issued, and diagnosis No. 203#4 = 0, its cause is indicated.
When diagnosis No. 203#4 = 1, see diagnosis No. 352.

		#7	#6	#5	#4	#3	#2	#1	#0
Diagnosis	280				DIR	PLS	PLC		MOT

#0 MOT The motor type specified in parameter No. 2020 falls outside the predetermined range.
#2 PLC The number of velocity feedback pulses per motor revolution, specified in parameter No. 2023, is zero or less. The value is invalid.
#3 PLS The number of position feedback pulses per motor revolution, specified in parameter No. 2024, is zero or less. The value is invalid.
#4 DIR The wrong direction of rotation for the motor is specified in parameter No. 2022 (the value is other than 111 or -111).

		#7	#6	#5	#4	#3	#2	#1	#0
Diagnosis	281								TDM

#0 TDM Four-winding motor drive (bit 7 of parameter No. 2211) or two-winding motor drive (bit 6 of parameter No. 2211) is enabled when no option for tandem control is present.

Position error amount

Diagnosis	300	Position error of an axis in detection unit

$$\text{Position error} = \frac{\text{Feed rate [mm/min]} \times 100}{60 \times \text{servo loop gain [1/sec]}} \times \frac{1}{\text{Detection unit}}$$

Machine position

Diagnosis	301	Distance from reference position of an axis in detection unit

Distance from the end of the deceleration dog to the first grid point

Diagnosis	302	Distance from the end of the deceleration dog to the first grid point

[Data type] Real axis
[Unit of data] Machine unit
[Valid data range] 0 to ±99999999

NOTE
For the reference position setting without a dog, the distance from the beginning of the reference position setting without a dog to the first grid point is assumed.

Reference counter

Diagnosis	304	Reference counter amount in each axis

[Data type] 2-word axis
[Unit of data] Detection unit
[Valid data range] –99999999 to 99999999

Motor temperature information

Diagnosis	308	Servo motor temperature (°C)

[Data type] Byte axis
[Unit of data] °C
[Valid data range] 0 to 255
The temperature of the coil of the servo motor is indicated. When the temperature reaches 140°C, a motor overheat alarm is issued.

Diagnosis	309	Pulsecoder temperature (°C)

[Data type] Byte axis
[Unit of data] °C
[Valid data range] 0 to 255
The temperature of the printed circuit board in the Pulsecoder is indicated. When the temperature reaches 100°C (approximately 85°C for the temperature of atmosphere in the Pulsecoder), a motor overheat alarm is issued.

NOTE
1 Temperature information has the following error:
- 50°C to 160°C ±5°C
- 160°C to 180°C ±10°C

2 The temperature at which an overheat alarm is issued has an error of up to 5°C.

Cause that sets bit 4 (APZ) of parameter No. 1815 to 0

You can find the cause that sets bit 4 (APZ) of parameter No. 1815 to 0 by checking diagnosis Nos. 310 and 311.

Once diagnosis No. 310 or 311 is set to 1, this setting is kept unchanged until the zero point of the absolute position detector of the corresponding axis is set again. Possible causes that set APZ to 0 are as follows:

		#7	#6	#5	#4	#3	#2	#1	#0
Diagnosis	310		DTH	ALP		BZ2	BZ1	PR2	PR1

#0 PR1 One of the following parameters was changed:
No.1815#0, No.1815#1, No.1815#6, No.1817#3, No.1820, No.1821, No.1822, No.1823, No.1850, No.1868, No.1869, No.1874, No.1875, No.1876, No.1883, No.1884, No.2022, No.2084, No.2085, No.2179

#1 PR2 Bit 1 (ATS) of parameter No. 8303 was changed. Alternatively, when bit 7 (SMA) of parameter No. 8302 was set to 1, APZ of the axis to be synchronized together was set to 0.

#2 BZ1 A battery voltage of 0 V was detected. (Inductosyn)

#3 BZ2 A battery voltage of 0 V was detected. (Separate position detector)

#5 ALP The zero point was set by MDI when the α pulse coder had not rotate one or more turns. Alternatively, the CNC could not obtain a correct value from the absolute pulse coder.

#6 DTH An axis detach operation was performed by the controlled-axis detach signal DTCH <G124> or by setting bit 7 (RMV) of parameter No. 0012.

		#7	#6	#5	#4	#3	#2	#1	#0
Diagnosis	311		DUA	XBZ	GSG	AL4	AL3	AL2	AL1

#0 AL1 An SV alarm (SV301 to SV305) was issued.

#1 AL2 When bit 1 (CRF) of parameter No. 1819 was set to 1, alarm SV0445, "SOFT DISCONNECT ALARM", SV0447, "HARD DISCONNECT(EXT)", or SV0646, "ABNORMAL ANALOG SIGNAL(EXT)", was detected.

#2 AL3 A battery voltage of 0 V was detected. (Built-in serial Pulsecoder)

#3 AL4 Alarm SV0367, "COUNT MISS(INT)", was detected.

#4 GSG The status of broken-wire alarm ignore signal NDCAL (G202) changed from 1 to 0.

#5 XBZ A battery voltage of 0 V or alarm SV0382, "COUNT MISS(EXT)", was detected. (Separate serial position detector)

#6 DUA When bit 1 (CRF) of parameter No. 1819 was set to 1, alarm SV0421, "EXCESS ERROR(SEMI-FULL)", was detected.

Details of invalid servo parameter setting alarms (on the servo side)

Diagnosis	352	Detail number for invalid servo parameter setting alarm

Indicates information that can be used to identify the location (parameter) and cause of an invalid servo parameter setting alarm (servo alarm No. 417).

This diagnosis information is valid when the following conditions are satisfied.

- Servo alarm No. 417 has occurred.
- Bit 4 of diagnosis No. 203 (PRM) = 1

See the following table for the displayed detail numbers and the corresponding causes. For further detail information that could be used to take measures, refer to FANUC AC Servo Motor α*is*/α*i*/βis series Parameter Manual (B-65270EN).

- **Detailed descriptions about invalid servo parameter setting alarms**

Detail number	Parameter No.	Cause	Action
83	2019	Parameter settings related to learning control are illegal → See Supplementary.	Change the parameter settings so that they fall in the applicable range.

Detail number	Parameter No.	Cause	Action
0233	2023	When initialization bit 0 is set to 1, the number of velocity pulses exceeds 13100.	Correct the number of velocity pulses so that it is within 13100.
0234	2023	When a DD motor is used, a value smaller than 512 is set as the number of velocity pulses.	Set 512 or a greater number as the number of velocity pulses, or disable the DD motor. Bit 0 of parameter No. 2300=0
0243	2024	When initialization bit 0 is set to 1, the number of position pulses exceeds 13100.	Correct the number of position pulses so that it is within 13100. Use the position feedback pulse conversion coefficient (parameter No. 2185).
0434 0435	2043	The internal value of the velocity loop integral gain overflowed.	Decrease the value of the velocity loop integral gain parameter.
0443 0444 0445	2044	The internal value of the velocity loop proportional gain overflowed.	Use the function for changing the internal format of the velocity loop proportional gain (bit 6 of parameter No. 2200). Alternatively, decrease the parameter setting.
0474 0475	2047	The internal value of the observer parameter (POA1) overflowed.	Correct the setting to $(-1) \times$ (desired value)/10.
0534 0535	2053	The internal value of a parameter related to dead zone compensation overflowed.	Decrease the setting to the extent that the illegal servo parameter setting alarm is not caused.
0544 0545	2054	The internal value of a parameter related to dead zone compensation overflowed.	Decrease the setting to the extent that the illegal servo parameter setting alarm is not caused.
0694 0695 0696 0699	2069	The internal value of the velocity feed-forward coefficient overflowed.	Decrease the velocity feed-forward coefficient.
0754 0755	2075	The setting for this parameter has overflowed.	This parameter is not used at present. Set 0.
0764 0765	2076	The setting for this parameter has overflowed.	This parameter is not used at present. Set 0.
0843	2084	A positive value is not set as the flexible feed gear numerator. Alternatively, the following condition exists: Feed gear numerator > denominator $\times$ 16	Set a positive value as the flexible feed gear numerator. Alternatively, satisfy the following condition: Feed gear numerator $\leq$ denominator $\times$ 16 (except for phase A-/B-specific separate detector).
0853	2085	A positive value is not set as the flexible feed gear denominator.	Set a positive value as the flexible feed gear denominator.
0883	2088	For an axis with a serial type separate detector, a value exceeding 100 is set as the machine velocity feedback coefficient.	For an axis with a serial type separate detector, the upper limit of the machine velocity feedback coefficient is 100. Correct the coefficient so that it does not exceed 100.
0884 0885 0886	2088	The internal value of the machine velocity feedback coefficient overflowed.	Decrease the machine velocity feedback coefficient. Alternatively, use the vibration-damping control function that has an equivalent effect.

Detail number	Parameter No.	Cause	Action
0994 0995 0996	2099	The internal value for N pulse suppression overflowed.	Disable the N pulse suppression function. Alternatively, decrease the parameter setting so that no overflow will occur.
1033	2103	The retract distance related to an abnormal load differs between the L and M axes (if the same-axis retract function is in use).	Set the same value for both the L and M axes.
1123	2112	Although a linear motor is used, the AMR conversion coefficient parameter is not input.	Set the AMR conversion coefficient.
1182	2118 2078 2079	The dual position feedback conversion coefficient has not been specified.	Specify the dual position feedback conversion coefficient.
1284 1285	2128	When a small value is set as the number of velocity pulses, the internal value of a parameter related to current control overflows.	Decrease the value in this parameter to the extent that the alarm is not caused.
1294 1295	2129	When a large value is set as the number of velocity pulses, the internal value of a parameter related to current control overflows.	When the value set in this parameter is resolved to the form a $\times$ 256 + b, set a smaller value in a again.
1393	2139	The AMR offset setting value of a linear motor exceeds $\pm$45.	Enlarge the AMR offset setting range (bit 0 of parameter N. 2270=1) to input a value within a range of $\pm$60.
1454 1455 1456 1459	2145	Velocity feed-forward coefficient for cutting overflowed.	Decrease the velocity feed-forward coefficient.
1493	2149	A value greater than 6 is specified in this parameter.	Only 6 or less can be specified in this parameter. Change the setting to 6 or below 6.
1503	2150	A value equal to or greater than 10 is set.	Set a value less than 10.
1786	2178	Bit 6 of No. 2212 or bit 6 of No. 2213 is set to 1, and No. 2621=0 is set.	Set bit 6 of No. 2212 or bit 6 of No. 2213 to 0.
1793	2179	A negative value or a value greater than the setting of parameter No. 1821 is set.	Set a positive value less than the setting of parameter No. 1821.
1853	2185	A negative value or a value greater than the setting of parameter No. 2023 is set.	Set a positive value less than the setting of parameter No. 2023.
2203	2220#0	If pole detection is enabled (bit 7 of No. 2213=1) and a non-binary detector is enabled (bit 0 of No. 2220=1), an illegal servo parameter setting alarm is issued when any of the following is set: - AMR conversion coefficient 1 $\leq$ 0 - AMR conversion coefficient 2 $\leq$ 0 - AMR conversion coefficient 2 $>$ 512 (The settable range is 1 (2 poles) to 512 (1024 poles).)	Set the AMR conversion coefficients correctly.
2243	2224#5	This alarm is issued when a setting is made to neglect the invalid setting of the parameter for the feed-forward timing adjustment function (bit 5 of No. 2224=1) and a command for nano interpolation is issued.	Use either one.

Detail number	Parameter No.	Cause	Action
2632	2263	When the lifting function against gravity is enabled (bit 7 of No. 2298=1) or the post-servo-off travel distance monitor function is enabled (bit 5 of No. 2278=1), the function for enabling the CNC software to post the detection unit to the servo software is not supported and the setting of the detection unit (No. 2263) is disabled.	Take one of the following actions: 1) Set a value in parameter No. 2263. 2) Disable the lifting function against gravity and the post-servo-off travel distance monitor function. 3) Use CNC software that supports the function for enabling the detection unit to be posted to the servo software.
2780	2277#5,6,7 2278#0,2,4 24096	When the first SDU unit is not used (No.24096=0), a setting is made to connect a detector (acceleration sensor, temperature detection circuit, or analog check interface unit) to the first SDU unit.	Check the FSSB setting (No.24096) or the detector setting (bits 0, 2, and 4 of No. 2278).
2781	2277#5,6,7 2278#1,3,4 24097	When the second SDU unit is not used (No.24097=0), a setting is made to connect a detector (acceleration sensor, temperature detection circuit, or analog check interface unit) to the second SDU unit.	Check the FSSB setting (No.24097) or the detector setting (bits 1, 3, and 4 of No. 2278).
2782	2277#5,6,7 2278#0,4 24096	Any of the following settings is made: • For use with the first SDU unit, both of an acceleration sensor and temperature detection circuit are enabled. • Settings are made to use the first SDU unit (No.24096>0), disable an acceleration sensor (bits 5, 6, 7 of No. 2277=0,0,0), and read acceleration data from the second unit (bit 1 of No. 2278=1).	Check the settings of the acceleration sensor and temperature detection circuit.
2783	2277#5,6,7 2278#1,4 24097	Any of the following settings is made: • For use with the second SDU unit, both of an acceleration sensor and temperature detection circuit are enabled. • Settings are made to use the second SDU unit (No.24097>0), disable an acceleration sensor (bits 5, 6, 7 of No. 2277=0,0,0), and read acceleration data from the second unit (bit 1 of No. 2278=1).	Check the settings of the acceleration sensor and temperature detection circuit.
2784	1815#1 2277#5,6,7 2278#0,1,4	At the time of full-closed system setting, a detector other than a separate position detector is connected (with the first/second SDU unit).	Modify the setting of the detector.
2785	1815#1 2277#5,6,7 2278#0,4	At the time of full-closed system setting, a detector other than a separate position detector is connected (with the first SDU unit).	Modify the setting of the detector.
2786	1815#1 2277#5,6,7 2278#1,4	At the time of full-closed system setting, a detector other than a separate position detector is connected (with the second SDU unit).	Modify the setting of the detector.

Detail number	Parameter No.	Cause	Action
2787	2278#0,#1	A setting is made to connect two temperature detection circuits.	Only one temperature detection circuit can be connected. Modify the setting so that data is read from one of the first and second SDU units.
2788	1815#1 2277#5,6,7 2278#4 2278#0,1 24096 24097	A setting is made to connect two temperature detection circuits.	Only one temperature detection circuit can be connected. Modify the setting so that data is read from one of the first and second SDU units.
3002	2300#3,#7	The αiCZ detection circuit and linear motor position detection circuit do not support overheat signal connection.	Replace the αiCZ detection circuit and linear motor position detection circuit with those circuits that support overheat signal connection. Alternatively, modify the setting so that the overheat signal is read from a DI signal (bit 3 of parameter No. 2300=0).
3012	2301#2,#7	• When bit 2 of No. 2301=1 Hardware (PS, SV) that does not support DC link voltage information output is connected, but bit 2 of No. 2301 is set to 1. • When bit 7 of No. 2301=1 The CNC software does not support the torque control setting range extension function.	• When bit 2 of No. 2301=1 Set bit 2 of No. 2301 to 0. • When bit 7 of No. 2301=1 Use CNC software that supports the function.
3553 3603	2355	The value 4 or a smaller number is set.	Set the value 5 or a greater number.
3603	2113 2360 2363 2366	The value 95 or smaller number is set.	Set the value 96 or a greater number. Alternatively, if no resonance elimination filter is used, set all of the center frequency, band width, and dumping value to 0.
3603 3663	2366	The value 4 or a smaller number is set.	Set the value 5 or a greater number.
4553	2455	A negative value is set.	Set the value 0 or a greater number.
4563	2456	A value not within 0 to 12 is set.	Set a value within 0 to 12.
8213	1821	A positive value is not set in the reference counter capacity parameter.	Set a positive value in this parameter.
8254 8255 8256	1825	A position gain of 0 is set, or the internal position gain value has overflowed.	• Set a value other than 0 (when setting = 0). • Use the function for automatic format change for position gain setting range. (Set bit 6 of parameter No. 2209 to 1.)
9053	1815#1 24096 24097	At the time of full-closed system setting, no separate detector interface unit is set.	Set a separate detector interface unit.
10010 10016 10019	2200#0	The internal value of a parameter used to detect runaway has overflowed.	Do not use the runaway detection function (specify bit 0 = 1).
10033	2004	Illegal control cycle setting This error occurs if automatic modification is carried out for the control cycle.	Correct this parameter related to interrupt cycle setting.
10053	2018#0	When a linear motor is used, the scale reverse connection bit is set.	When the linear motor is used, the scale reverse connection bit cannot be used.

Detail number	Parameter No.	Cause	Action
10062	2209#4	The amplifier used does not support the HC alarm prevention function.	When you use the current amplifier continuously, set the function bit shown to the left to 0. When using the HC alarm prevention function, use an appropriate amplifier that supports the function.
10092 10093	2004 2013#0 2014#0	Different control cycles are set within one servo CPU.	Set the same control cycle for axes controlled by one servo CPU.
		When HRV4 is enabled, a detector that does not support HRV4 is used.	Replace the detector with a detector supporting HRV4. Alternatively, disable HRV4.
		When HRV4 is enabled, a servo amplifier that does not support HRV4 is connected.	Replace the servo amplifier with a servo amplifier supporting HRV4. Alternatively, disable HRV4.
10103	2004 2013#0	HRV1 is set.	The Series 30*i* does not allow HRV1 setting. Set HRV2, HRV3 or HRV4.
10113	2013#0	Current cycle mismatch alarm. This alarm is issued if the specified current cycle does not match the actual setting.	An axis for which HRV3 is specified exists on the same optical cable. Review the placement of the amplifier, or disable HRV3.
10123	2013#0	Alarm for indicating the disability of HRV3 setting. This alarm is issued when the axis supports HRV3 but the other axis of the pair does not support HRV3.	Eliminate the cause of the disability in setting the other axis. Alternatively, cancel the HRV3 setting.
10133	2013#0 2014#0	When HRV4 is set, this alarm is issued if any of the following conditions is met. • Servo software not supporting HRV4 is used. • The same FSSB system includes axes with HRV4 setting and axes with HRV2 or HRV3 setting. • The limitation in the number of axes is not observed. (In HRV4 control, one axis/DSP is set.)	Eliminate the causes listed on the left. Alternatively, cancel the HRV4 setting.
10133	2013#0 2014#0	This alarm is issued when HRV3 or HRV4 is set, but the amplifier does not support these control types.	HRV3 or HRV4 is unusable for the axis on which the alarm was issued.
10202	2277#5,6,7 2278#0,2,4	The ID of the detector connected to the first SDU unit differs from the parameter setting.	Check the detector-related parameter or the state of detector connection.
10212	2277#5,6,7 2278#1,3,4	The ID of the detector connected to the second SDU unit differs from the parameter setting.	Check the detector-related parameter or the state of detector connection.

Supplementary: Details of an illegal learning control parameter
Set parameter No. 2115 to 0, and parameter No. 2151 to 6265 to change the value of DGN No. 353 to a binary number. You can find a detailed cause from the bit position of the obtained binary number at which 1 is set.

Position	Cause
B3	The band-pass filter (No. 2512) is not in the range.

Position	Cause
B4	The profile number (No. 2511) is not in the range.
B5	The specified data period (No. 251, 2519, 2521, 2523, or 2525) is not in the range.
B6	The total number of profiles (No. 2510) is not in the range.
B7	This alarm is issued when G05 starts during a memory clear operation.
B8	This alarm is issued when the total number of profiles (No. 2510) is not 0, and the profile number (No. 2511) is 0.
B9	This alarm is issued when the automatically-set thinning shift value exceeds the range because the specified data period is too long.

Diagnosis	355	Communication alarm ignore counter (separate type)

Diagnosis	356	Link processing counter (built-in type)

Diagnosis	357	Link processing counter (separate type)

The number of times a communication error occurred during serial communication with the detector is indicated.
Data transmitted during communication is guaranteed unless another alarm occurs. However, if the counter value indicated in this diagnosis information increases in a short period, there is a high probability that serial communication is disturbed by noise. So, take sufficient measures to prevent noise.

* For details, refer to a relevant manual on FANUC SERVO MOTOR α*i* series.

Diagnosis	358	V ready-off information

This information is provided to analyze the cause of the V ready-off alarm (servo alarm SV0401).
Convert the indicated value to a binary representation, and check bits 5 to 14 of the binary representation.
When amplifier excitation is turned on, these bits are set to 1 sequentially from the lowest bit, which is bit 5. If the amplifier is activated normally, bits 5 to 14 are all set to 1.
Therefore, check the bits sequentially from the lowest bit to find the first bit that is set to 0. This bit indicates that the corresponding processing could not be completed and so the V ready-off alarm was caused.

#15	#14	#13	#12	#11	#10	#09	#08
	SRDY	DRDY	INTL		CRDY		

#07	#06	#05	#04	#03	#02	#01	#00
	*ESP						

 # 06 ***ESP** Converter emergency stop state released
 # 10 **CRDY** Converter ready
 # 12 **INTL** DB relay released
 # 13 **DRDY** Amplifier ready (amplifier)
 # 14 **SRDY** Amplifier ready (software)

* For details, refer to a relevant manual on FANUC SERVO MOTOR α*i* series.

Diagnosis	359	Communication alarm neglect counter (built-in type)

The diagnosis information is the same as that of diagnosis No. 355.
See the descriptions in diagnoses No.355 to 357.

Diagnosis	360	Cumulative value of specified pulses (NC)

[Data type] 2-word
[Unit of data] Detection unit
[Valid data range] -99999999 to 99999999
Cumulative value of move commands distributed from the CNC since power-on is indicated.

Diagnosis	361	Compensation pulses (NC)

[Data type] 2-word
[Unit of data] Detection unit
[Valid data range] -99999999 to 99999999
Cumulative value of compensation pulses (backlash compensation, pitch error compensation, and so on) distributed from the CNC since power-on is indicated.

Diagnosis	362	Cumulative value of specified pulses (SV)

[Data type] 2-word
[Unit of data] Detection unit
[Valid data range] -99999999 to 99999999
Cumulative value of move pulses and compensation pulses received by the servo system since power-on is indicated.

Diagnosis	363	Cumulative feedback (SV)

[Data type] 2-word
[Unit of data] Detection unit
[Valid data range] -99999999 to 99999999
Cumulative value of positional feedback pulses the servo system received from the pulse coder since power-on is indicated.

Diagnosis data related to the Inductosyn absolute position detector

Diagnosis	380	Difference between the absolute position of the motor and offset data

[Data type] 2-word axis
[Unit of data] Detection unit

$$\frac{\text{M (absolute position of the motor)-S (offset data)}}{\lambda \text{ (pitch interval)}}$$

The remainder resulting from the division is displayed.

Diagnosis	381	Offset data from the Inductosyn

[Data type] 2-word axis
[Unit of data] Detection unit
Off set data is displayed when CNC calculates the machine position.

Diagnosis data related to the serial spindles

Diagnosis	400	#7	#6	#5	#4	#3	#2	#1	#0
		LNK							

#7 LNK Communication with the spindle control side has been established.

Diagnosis	403	Temperature of spindle motor

[Data type] Byte spindle
[Unit of data] °C
[Valid data range] 0 to 255
The temperature of the winding of the spindle motor is indicated.
This information can be used to determine the overheat alarm of the spindle.
(The temperature that causes an overheat alarm varies from motor to motor.)

NOTE
1 Temperature information has the following error:
- 50°C to 160°C ±5°C
- 160°C to 180°C ±10°C

2 The indicated temperature and the temperature causing an overheat alarm have the following error:
- For lower than 160°C 5°C maximum
- For 160 to 180°C 10°C maximum

		#7	#6	#5	#4	#3	#2	#1	#0
Diagnosis	408	SSA		SCA	CME	CER	SNE	FRE	CRE

#0 CRE A CRC error occurred (warning).
#1 FRE A framing error occurred (warning).
#2 SNE The sender or receiver is not correct.
#3 CER An abnormality occurred during reception.
#4 CME No response was returned during automatic scanning.
#5 SCA A communication alarm was issued on the spindle amplifier side.
#7 SSA A system alarm was issued on the spindle amplifier side.
(The above conditions are major causes of alarm SP0749. These conditions are caused mainly by noise, a broken wire, a momentary failure of power, and so on.)

Diagnosis	410	Spindle load meter indication [%]

[Data type] Word spindle
[Unit of data] %

Diagnosis	411	Spindle load meter indication [min^{-1}]

[Data type] Word spindle
[Unit of data] min^{-1}

Diagnosis	417	Spindle position coder feedback information

[Data type] 2-word spindle
[Unit of data] Detection unit

Diagnosis	418	Positional deviation of spindle in position loop mode

[Data type] 2-word spindle
[Unit of data] Detection unit

Diagnosis	425	Spindle synchronization error

[Data type] 2-word spindle
[Unit of data] Detection unit
When the spindles are in synchronization mode, the absolute value of the synchronization error when each spindle is set as the slave axis is indicated.

Diagnosis	445	Spindle position data

[Data type] Word spindle
[Unit of data] Pulse
[Valid data range] 0 to 4095
For the serial spindle, position coder signal pulse data from the one-rotation signal is indicated as the position data of the spindle.
This data is valid when bit 1 of parameter No. 3117 is set to 1.
To display spindle position data, spindle orientation must be performed once.

Diagnosis data related to rigid tapping

Diagnosis	450	Spindle position error during rigid tapping

[Data type] 2-word spindle
[Unit of data] Detection unit

Diagnosis	451	Spindle distribution during rigid tapping

[Data type] 2-word spindle
[Unit of data] Detection unit

Diagnosis	452	Difference in error amount between spindle and tapping axis during rigid tapping (momentary value)

[Data type] 2-word spindle
[Unit of data] %

Diagnosis	453	Difference in error amount between spindle and tapping axis during rigid tapping (maximum value)

[Data type] 2-word spindle
[Unit of data] %

Diagnosis	454	Accumulated spindle distribution during rigid tapping (cumulative value)

[Data type] 2-word spindle
[Unit of data] Detection unit

Diagnosis	455	Difference in spindle-converted move command during rigid tapping (momentary value)

[Data type] 2-word spindle
[Unit of data] Detection unit

Diagnosis	456	Difference in spindle-converted positional deviation during rigid tapping (momentary value)

[Data type] 2-word spindle
[Unit of data] Detection unit

Diagnosis	457	Width of synchronization error during rigid tapping (maximum value)

[Data type] 2-word spindle
[Unit of data] Detection unit

Diagnosis	458	Tapping axis distribution amount during rigid tapping (cumulative value)

[Data type] 2-word spindle
[Unit of data] Detection unit

Diagnosis	459	Selected spindle number during rigid tapping

[Data type] 2-word path

Diagnosis	460	Difference in spindle-converted move command during rigid tapping (maximum value)

[Data type] 2-word spindle
[Unit of data] Detection unit

Diagnosis	461	Difference in spindle-converted machine position during rigid tapping (momentary value)

[Data type] 2-word spindle
[Unit of data] Detection unit

Diagnosis	462	Difference in spindle-converted machine position during rigid tapping (maximum value)

[Data type] 2-word spindle
[Unit of data] Detection unit

Diagnosis data related to polygon machining with two spindles

		#7	#6	#5	#4	#3	#2	#1	#0
Diagnosis	470	SC0	LGE		SCF	PSC	PEN	PSU	SPL

#0 SPL Polygon synchronization with two spindles under way

#1 PSU Polygon synchronization mode with two spindles being activated

NOTE
If only PSU becomes 1, but no change occurs, and the program stops in a block containing a G51.2 command, the speed of an spindle does not reach the targeted polygon synchronization speed, for example, because bit 7 (PST) of parameter No. 7603 = 0 keeps the spindle from being energized.

#2 PEN Polygon synchronization mode with two spindles released

#3 PSC Spindle speed being changed during polygon synchronization mode with two spindles

#4 SCF Spindle speed changed during polygon synchronization mode with two spindles

#6 LGE The loop gain is different between the spindles during polygon synchronization mode with two spindles.

NOTE
When the speed is changed during polygon synchronization mode, LGE is set to 1 if the spindle synchronization control loop gain used by the serial spindle control unit is different between the master spindle and polygon synchronization axis.
Diagnosis display indicates the loop gain because this function requires that both spindles be controlled with the same loop gain. However, no alarm is issued even if the loop gain is different between the spindles.
(For the serial spindle control unit, the parameters used are changed according to the state of the CTH1 and CTH2 signals.)

#7 SC0 Actual speed command is 0 during polygon synchronization mode with two spindles.

NOTE
Signal SC0 is not a value specified by the program. It is set to 1 under any of the following conditions:
1. When the S command value is adjusted according to the signals related to spindle control, SSTP<Gn029.6> and SOV0-SOV7<Gn030> and the signal related to multi-spindle control <Gn027>, the result is 0.
2. The S command value is smaller than the spindle control resolution (the result of multiplying the S command value by a value of 4095/(maximum spindle speed) is less than 1).
   The S command value is specified by SIND control <Gn032, Gn033>, and it is 0.

If SC0 = 1, the spindle speed becomes 0 and bit 0 of diagnosis display No. 471 becomes 1. In this case, the polygon synchronization rotation ratio is impractical, but alarm PS5018 does not occurs, because it is regarded as the result of the command.

If the following status is indicated during the polygon synchronization mode, there are no abnormalities.

		#7	#6	#5	#4	#3	#2	#1	#0
Diagnosis	470	0	0	0	1	-	0	0	1

		#7	#6	#5	#4	#3	#2	#1	#0
Diagnosis	471	NPQ	PQE	QMS	NSP	SUO	QCL		SCU

Polygon turning with two spindles
Indication of causes for alarms PS5018, PS0314, and PS0218

#0 to #3 Causes for alarm PS5018
Alarm PS5018 is cleared by a reset, but the indication of its causes remains until the causes are cleared or the polygon synchronization mode is released.

SCU The specified speed is too low during polygon synchronization mode with two spindles.
(The unit of speed calculated internally becomes 0.)

NOTE
SCU becomes 1 also when the specified spindle speed is 0 (diagnosis display No. 470#7 = 1). In this case, however, alarm PS5018 is not issued (because the command is 0). When diagnosis display No. 470#7 = 0 and diagnosis display No. 471#0 = 1, alarm PS5018 occurs. Normally this does not occur with speed at which the spindle can rotate.

QCL The polygon synchronization axis is clamped.

NOTE
QCL becomes 1, when the polygon synchronization axis receives a command with a polygon synchronization speed that is higher than the value specified in parameter No. 7621 and is clamped at that speed.

SUO The specified speed is too high during the polygon synchronization mode with two spindles.
(It is clamped to the upper limit calculated internally.)

NOTE
SUO occurs, if a result of (speed specified for the master spindle)/(value specified at P) is higher than 59998. In other words, the master spindle must rotate at a speed lower than 59998 min^{-1} assuming P = 1.

#4 Causes for alarm PS0314
When alarm PS0314 occurs, the polygon synchronization mode is released, but the indication of its causes remains until the alarm PS0314 is cleared by a reset.

NSP A spindle necessary for control is not connected.
(For example, there is not a serial spindle or the second spindle.)
The axis settings for polygon turning are not correct.

#5 to #7 Causes for alarm PS0218
When alarm PS0218 occurs, the polygon synchronization mode is released, but the indication of its causes remains until the alarm PS0218 is cleared by a reset.

QMS When bit 1 (QDR) of parameter No. 7603 = 1, a negative value is specified at Q.

PQE In a G51.2, either P or Q has a value out of the specifiable range.
Or, P and Q are not specified as a pair.

NPQ In a G51.2, R is specified when P and Q have not been specified at all, or none of P, Q, and R has been specified.

Indication of values specified during the polygon synchronization mode with two spindles

Diagnosis	474	Rotation ratio for the master axis during the polygon synchronization mode with two spindles (P command value)

This indication is the current rotation ratio (P command value) of the master axis during the polygon synchronization mode with two spindles.

Diagnosis	475	Rotation ratio for the polygon synchronization axis during the polygon synchronization mode with two spindles (Q command value)

This indication is the current rotation ratio (Q command value) of the polygon synchronization axis during the polygon synchronization mode with two spindles.

Diagnosis data related to the small-hole peck drilling cycle

Diagnosis	520	Total number of times a retraction operation has been performed during drilling since G83 was specified

Diagnosis	521	Total number of times a retraction operation has been performed in response to the reception of the overload torque detection signal during drilling since G83 was specified

The total numbers of times output in Nos.520 and 521 are cleared to zero by a G83 command issued after the small-hole peck drilling cycle mode is entered.

Diagnosis	522	Coordinate value of the drilling axis at which retraction operation starts (least input increment)

Diagnosis	523	Difference between the coordinate value of the drilling axis at which the previous retraction operation started and the coordinate value of the drilling axis at which the current retraction operation starts (least input increment: previous value minus current value)

Diagnosis data related to the dual position feedback function

Diagnosis	550	Closed loop error

[Data type] 2-word axis
[Unit of data] Detection unit
[Valid data range] -99999999 to +99999999

Diagnosis	551	Semi-closed loop error

[Data type] 2-word axis
[Unit of data] Detection unit
[Valid data range] -99999999 to +99999999

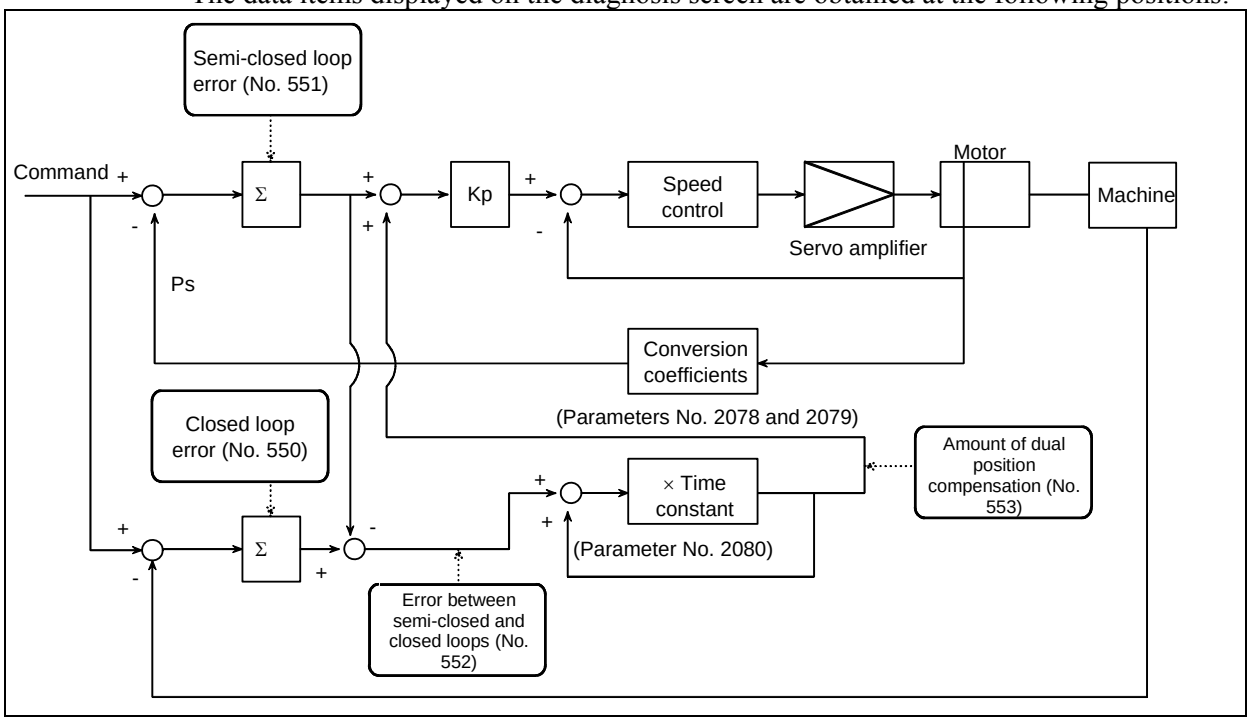
Diagnosis	552	Error between semi-closed and closed loops

[Data type] Word axis
[Unit of data] Detection unit
[Valid data range] -32768 to +32767

Diagnosis	553	Amount of dual position compensation

[Data type] 2-word axis
[Unit of data] Detection unit
[Valid data range] -99999999 to +99999999

The data items displayed on the diagnosis screen are obtained at the following positions:



Automatic alteration of tool position compensation

Diagnosis	0560	Manual tool compensation state number

[Data type] Byte
[Unit of data] None
[Valid data range] 0 to 255

When incomplete operation was performed in manual tool compensation, one of the following numbers is used for notification.

0 : Manual tool compensation was completed normally.
1 : The data of T code command falls outside the allowable range.
2 : The offset value falls outside the range.
3 : The offset number falls outside the range.
4 : Automatic operation or axis movement is being performed in the CNC.
5 : The CNC is in the tool-nose radius compensation mode.
6 : The CNC is in a mode other than the JOG mode, HNDL (INC) mode, and REF mode.
7 : A CNC parameter is illegal.
8 : The CNC is in the 3-dimensional cutter compensation mode or tool center point control mode.

Data for adjusting the compensation of the start position of thread cutting when the spindle speed is changed

Diagnosis	670	Delay in acceleration/deceleration after interpolation that is calculated in the NC

Diagnosis	671	Servo delay calculated in the NC

Diagnosis	672	Delay in one-rotation signal detection that is calculated in the NC

[Data type] 2-word path
[Unit of data] Metric input: 0.00001mm
Inch input : 0.000001inch
[Valid data range] 0 to 99,999,999
Compensation amounts calculated by the NC are indicated. Use them to set adjustment parameters Nos. 1446 to 1449.

State of high-speed HRV current control

		#7	#6	#5	#4	#3	#2	#1	#0
Diagnosis	700						DCLNK	HOK	HON

[Data type] Bit axis
The state of high-speed HRV current control is displayed.

#0 HON The motor is controlled in the high-speed HRV current control mode.

#1 HOK This bit is set to 1 when high-speed HRV current control is enabled.
High-speed HRV current control is enabled when the following conditions are satisfied:

- Bit 0 (HR3) of parameter No. 2013 is set to 1.
- Bit 0 (HR4) of parameter No. 2014 is set to 1.
- Servo software, servo modules, and servo amplifiers suitable for high-speed HRV current control are used.
- When a separate detector interface unit is used, the separate detector interface unit is suitable for high-speed HRV current control.

#2 DCLNK This bit is set to 1 when voltage information can be output to the diagnosis screen.

Thermal growth compensation along tool vector

Diagnosis	705	Thermal growth compensation amount for each axis

[Data type] Word axis
[Unit of data] Detection unit
[Valid data range] –32768 to +32767
The compensation amount for each axis in thermal growth compensation along the tool vector is indicated.

Spindle error and warning states

Diagnosis	710	Spindle error state

[Data type] Word spindle

Diagnosis	712	Spindle warning state

[Data type] Word spindle
When an error (yellow LED ON + error number indication) or a warning occurs in a Spindle Amplifier (SP), the number is indicated on the diagnosis screen.
If neither error nor warning occurs, 0 is indicated.

For spindle errors, refer to "FANUC SERVO MOTOR αi series Maintenance Manual" (B-65285EN).
For warnings, see Subsection 10.1.4, "Spindle Warning Interface" in this manual.

OVC level

Diagnosis	750	OVC level

[Data type] Word axis
[Unit of data] %
The proportion of soft thermal (OVC) in the alarm issuance level is indicated.

Linear inclination compensation function

Diagnosis	751	Each axis linear inclination compensation

[Data type] Word axis
[Unit of data] Detection unit
[Valid data range] -32768 to +32767
Compensation of linear inclination compensation for each axis is indicated.

DC link voltage information

Diagnosis	752	DC link voltage information

[Data type] Word axis
[Unit of data] Vrms
[Valid data range] 0 to 452 (200 Vrms input amplifier)
0 to 905 (400 Vrms input amplifier)
DC link voltage information is indicated.

Servo motor

Diagnosis	760	R phase current value

[Data type] Word axis
[Unit of data] Value 6554 is equivalent to the maximum amplifier current.
[Valid data range] -6554 to +6554
The actual R phase current value of the servo motor is indicated.

Diagnosis	761	Effective current value

[Data type] Word axis
[Unit of data] Value 8027 is equivalent to the maximum amplifier current.
[Valid data range] -8027 to +8027
The effective current value of the servo motor is indicated.

Diagnosis	762	Activating phase

[Data type] Word axis
[Unit of data] Value 256 is equivalent to 360 degrees.
[Valid data range] 0 to 255
The activating phase (electrical angle) of the servo motor is indicated.

Reason why a start cannot be performed

		#7	#6	#5	#4	#3	#2	#1	#0
Diagnosis	1006							ALM	*SP

[Data type] Bit
The reason why a start cannot be performed is displayed.
#0 *SP The feed hold signal (*SP) is 0.
#1 ALM An alarm occurs.

Automatic data backup

		#7	#6	#5	#4	#3	#2	#1	#0
Diagnosis	1016	ANG	ACM			DT3	DT2	DT1	AEX

[Data type] Bit
The execution state of backup is indicated.
#0 AEX Automatic data backup is being performed.

#1 DT1 Data 1 was updated in the previous backup.
#2 DT2 Data 2 was updated in the previous backup.
#3 DT3 Data 3 was updated in the previous backup.
#6 ACM Automatic data backup was performed.
#7 ANG An error occurred in automatic data backup.

Fan rotation speed

Diagnosis	1002	FAN1 rotation speed

Diagnosis	1003	FAN2 rotation speed

Diagnosis	1490	FAN3 rotation speed

Diagnosis	1491	FAN4 rotation speed

[Data type] 2-word
[Unit of data] 1/min

FAN1, FAN2
The rotation speed of the fans in the CNC controller are indicated.

FAN3, FAN4
The rotation speed of the fans in the stand-alone CNC with 15" LCD display are indicated.

If there is no applicable fan, 0 is indicated.

Custom macro / execution macro / auxiliary macro

Diagnosis	1493	Number of blocks in the macro statements executed by a custom macro/execution macro

[Data type] 2-word
[Unit of data] Block

Displays the number of blocks in the macro statements executed by a custom macro/execution macro per 1024 ms.
It provides an indication of the actual processing speed of macro statements.

Diagnosis	1494	Number of blocks in executed by an auxiliary macro

[Data type] 2-word
[Unit of data] Block

Displays the number of blocks executed by an auxiliary macro per 1024 ms.
It provides an indication of the actual processing speed of auxiliary macros.

Spindle revolution number history function

Diagnosis	1520	Spindle total revolution number 1

Diagnosis	1521	Spindle total revolution number 2

[Data type] 2-word spindle
[Unit of data] 1000 min^{-1}
[Valid data range] 0 to 999999999

The number of revolutions of the spindle is counted and the total number of revolutions is indicated.

Built-in 3D interference check

1900	Built-in 3D interference check processing time

[Data type] Word
[Unit of data] msec
[Description] Displays the current processing time required for 3D interference check.

1901	Additional width for Built-in 3D interference check

[Data type] Real
[Unit of data] mm, inch (machine unit)
[Description] Displays the current additional width to be considered for 3D interference check.
The display unit is the same as the unit set for the reference axis (parameter No. 1031).

Detector battery exhaustion

		#7	#6	#5	#4	#3	#2	#1	#0
Diagnosis	3019			EXP	INP	ABP			

[Data type] Bit axis
If a detector battery low alarm is issued, the cause can be checked.
#3 ABP The battery of the A/B phase is low.
#4 INP The battery of the serial pulse coder (built-in position detector) is low.
#5 EXP The battery of the separate detector of serial type is low.

Diagnosis data related to axis synchronous control

Diagnosis	3500	Synchronization error amount

[Data type] 2-word axis
[Unit of data] Detection unit
[Valid data range] –99999999 to +99999999
The difference in position (synchronization error amount) between the master axis and slave axis is indicated. This data is indicated for the slave axis.

Diagnosis	3501	Synchronization error compensation value

[Data type] 2-word axis
[Unit of data] Detection unit
[Valid data range] –99999999 to +99999999
Cumulative value of compensation pulses (synchronization error compensation value) output to the slave axis is indicated. This data is indicated for the slave axis.

Diagnosis data related to synchronous/composite control

Diagnosis	3502	Indication of synchronization error amount for each axis

[Data type] 2-word axis
[Unit of data] Detection unit
[Valid data range] –99999999 to +99999999
When synchronization deviation is detected (bit 1 (SERx) of parameter No. 8162 is set to 1), the positional deviation difference of the slave axis from the master axis is indicated.
The positional deviation difference is:
(Positional deviation of master axis) ± (positional deviation of slave axis)
↑
{+when mirror image is applied to synchronization command
–when mirror image is not applied to synchronization command

Details of invalid FSSB setting alarms

Diagnosis	3510	FSSB alarm number

[Data type] Word
Information is output for identifying the location (parameter) and cause of an FSSB-related alarm which has been issued. For the displayed detail numbers and corresponding causes and actions, see the table below. When multiple FSSB alarm numbers appear, address the alarms in ascending order of the FSSB alarm number.

Detail alarm No.	Parameter number	Cause	Action
120 451 452	-	The FSSB internal status did not change to open.	Check the connection between the CNC and each amplifier. Alternatively, the servo card may be faulty.
140 450	24000 to 24095	The ATR value is inconsistent with the connected slave (servo, spindle, or separate detector).	Set the ATR value corresponding to the connected slave.
271	3717 24000 to 24095	The spindle amplifier number corresponding to the ATR value setting is not set.	Make the spindle amplifier number consistent with the ATR value setting.
272	24000 to 24031 24064 to 24095	The fifth to eighth separate detector is set for the first FSSB line (third FSSB line).	Do not set the fifth to eighth separate detectors for the first FSSB line (third FSSB line).
273	24032 to 24063	The first to fourth (ninth to twelfth) separate detector is set for the second FSSB line.	Do not set the first to fourth (ninth to twelfth) separate detectors for the second FSSB line.
276	24000 to 24095	The setting for a separate detector is made more than once.	Make the setting for each separate detector only once in the servo card.
290	24000 to 24095	The maximum number of slaves per FSSB line is exceeded for an FSSB line of servo HRV2 control.	Reduce the number of slaves to 32 (maximum number of slaves per FSSB line of servo HRV2 control) or less.
291	24000 to 24095	The maximum number of slaves per FSSB line is exceeded for an FSSB line of servo HRV3 control.	Reduce the number of slaves to 15 (maximum number of slaves per FSSB line of servo HRV3 control) or less.
293	24000 to 24095	The maximum number of slaves per FSSB line is exceeded for an FSSB line of servo HRV4 control.	Reduce the number of slaves to 7 (maximum number of slaves per FSSB line of servo HRV4 control) or less.
310	1023 24104 to 24199	The servo axis number corresponding to the ATR value setting of a separate detector is not set for parameter No. 1023.	Set the value corresponding to the ATR value setting for parameter No. 1023.
313	1023 14476#5 24104 to 24199	The servo axis number corresponding to the ATR value setting of a separate detector is not set for parameter No. 1023.	Set the value corresponding to the ATR value setting for parameter No. 1023.
314	1023 14476#5 24104 to 24199	The ATR value setting of a separate detector is invalid.	Correct the settings of parameters Nos. 24104 to 24199.
383	-	Manual setting 1 cannot be performed when a separate detector is used.	Disconnect the separate detector. Alternatively, perform manual setting or automatic setting.
453	-	Servo initialization has not completed successfully.	An optical cable may be faulty or the connection between the amplifier and another module may be incorrect.
454	-	Alarm No. 550 to 556 of diagnostic data No. 3511 occurred.	Check diagnostic data No. 3511.
460	24000 to 24095	The ATR value of a spindle or separate detector is set for a slave which is not connected.	Set the ATR value corresponding to the connected slave.
471	24000 to 24095	Although a separate detector is connected, the separate detector setting is not made.	Set the value for the separate detector in the corresponding parameter.
480	24000 to 24095	In ATR value setting, a servo axis number exceeds 80.	Make settings so that any servo axis number does not exceed 80.

Diagnosis	3511	FSSB alarm number

[Data type] Word axis

Information is output for identifying the location (parameter) and cause of an FSSB-related alarm which has been issued. For the displayed detail numbers and corresponding causes and actions, see the table below. When multiple FSSB alarm numbers appear, address the alarms in ascending order of the FSSB alarm number.

Detail alarm No.	Parameter number	Cause	Action
210	24096 to 24103	Although a separate detector is not set, a value is set in parameter No. 24096 to 24103.	Set parameter Nos. 24096 to 24103 to all 0.
220	1023	An unavailable servo axis number is set.	Change the servo axis number.
221	1023	A servo axis number is set more than once.	Change the servo axis number.
250	24096 to 24103	For a specific servo axis, two or more separate detectors are used and the paired separate detectors are two of the first, third, fifth, and seventh units or the second, fourth, sixth, and eighth units.	To use two separate detectors for a specific servo axis, one separate detector must have an odd number and the other must have an even number. Three or more separate detectors cannot be used.
270	1023 24000 to 24095	・ The servo axis number corresponding to the ATR value setting is not set for parameter No. 1023. ・ An unavailable servo axis number is set. ・ A servo axis number is set more than once.	Check the conditions on the left.
292	1023 2013#0	For an FSSB line of servo HRV3 control, only the following servo axis numbers can be used: (1 + 8n, 2 + 8n, 3 + 8n, 4 + 8n (n = 0, 1, ⋯, 9))	For the FSSB line of servo HRV3 control, set the servo axis numbers on the left.
294	1023 2014#0	For an FSSB line of servo HRV4 control, only the following servo axis numbers can be used: (1+8n(n=0,1,⋯,9))	For the FSSB line of servo HRV4 control, set the servo axis numbers on the left.
311	24096 to 24103	A connector number is invalid.	Specify a value between 0 and 8.
314	24096 to 24103	A connector number is set more than once.	Make setting so that each connector number is used only once for one separate detector.
350	2013#0 2014#0	Different current loops (HRV) are used for FSSB lines.	Set the same current loop (HRV) for the FSSB lines.
360	1023 2013#0 2014#0	Different current loops (HRV) are set for the first and second FSSB lines and parameter No. 1023 setting is invalid.	Set servo axis numbers so that each set of (1 to 6), (9 to 14), (17 to 22), (25 to 30), (33 to 38), and (41 to 46) is set for the same FSSB line.
370	1902#0 1902#1 2013#0 2014#0	When servo HRV3 or HRV4 control is set, manual setting 1 cannot be performed.	To set servo HRV3 or HRV4 control, perform manual setting or automatic setting.
380	1023	When a servo axis number is skipped, manual setting 1 cannot be performed.	Set servo axis numbers without skipping any number.

Detail alarm No.	Parameter number	Cause	Action
382	1023	An attempt was made to perform manual setting 1 though the maximum number of controlled axes per FSSB line is exceeded.	Reduce the number of connected servo axes to the maximum number of controlled axes or less.
470	24000 to 24095	An ATR value is set more than once.	Set each ATR value only once.
481	1023 24000 to 24095	A servo axis number is inconsistent with the ATR value setting or the servo motor having a servo axis number is not connected.	Check whether the value set in parameter No. 1023 is consistent with ATR value setting and whether the servo motor corresponding to each servo axis number is connected.
520	2165	At power-on, amplifier ID information could not be read.	Check the connection between the CNC and each amplifier. Alternatively, an amplifier may be faulty.
550	1023 24000 to 24095	The ATR value setting is inconsistent with the servo axis number setting.	Make the value set in parameter No. 1023 consistent with the ATR value setting.
551	24000 to 24095	The number of ATR value settings exceeds the number of slaves connected to the CNC.	Make as many settings as the number of slaves connected to the CNC.
552	1023	An unavailable servo axis number is set.	Change the servo axis number.
553	1023	A servo axis number is set more than once.	Change the servo axis number.
554	24096 to 24103	A value is set in parameter No. 24096 to 24103 though no separate detector is connected.	Set parameters Nos. 24096 to 24103 to all 0.
555 557 558	2165	The maximum current of an amplifier (parameter No. 2165) differs from that of a motor.	Set the maximum current of the amplifier (parameter No. 2165) to that of the motor.
1023	1023	An invalid servo axis number is set.	Set a correct servo axis number.

Diagnosis	3513	FSSB alarm number

[Data type] Word spindle

Information is output for identifying the location (parameter) and cause of an FSSB-related alarm which has been issued.

For the displayed detail numbers and corresponding causes and actions, see the table below. When multiple FSSB alarm numbers appear, address the alarms in ascending order of the FSSB alarm number.

Detail alarm No.	Parameter number	Cause	Action
271	3717 24000 to 24095	An ATR value is set more than once.	Make each spindle amplifier consistent with the ATR value setting.
381	3717	When a spindle amplifier number is skipped, manual setting 1 cannot be performed.	Set spindle amplifier numbers without skipping any number.

Diagnosis data related to linear scale with absolute address reference marks

Diagnosis	3545	Linear scale with absolute address reference marks: Measurement point 1

Diagnosis	3546	Linear scale with absolute address reference marks: Measurement point 2

Diagnosis	3547	Linear scale with absolute address reference marks: Measurement point 3

Diagnosis	3548	Linear scale with absolute address reference marks: Measurement point 4

[Data type] 2-word axis
[Unit of data] Detection unit
[Valid data range] -999999999 to 999999999

Diagnosis	3549	Linear scale with absolute address reference marks: Status display

Diagnosis	3550	Linear scale with absolute address reference marks: Scale value

[Data type] 2-word axis
[Unit of data] Detection unit
[Valid data range] -999999999 to 999999999

Diagnosis	3551	Linear scale with absolute address reference marks: Scale value (High)

[Data type] 2-word axis
[Unit of data] Detection unit
[Valid data range] -999 to 999
Linear scale with absolute address reference marks
Scale value = Diagnosis No.3551 × 1,000,000,000 + Diagnosis No.3550

Wrong operation prevention function

		#7	#6	#5	#4	#3	#2	#1	#0
Diagnosis	3570								MSC

[Data type] Bit path

#0 MSC Memory operation is stopped due to the reconfirming of midway block start.
In a multipath system, the bit is set to 1 on only the path on which the cursor is position in the middle of the program.

Diagnosis data related to flexible path axis assignment

Diagnosis	4000	Reason number of alarm in flexible path axis assignment

The cause of the alarm that may be issued in flexible path axis assignment is displayed.

1 The number of axes in the path is 0.
2 The number of axes in the path is larger than its allowable maximum value.
3 The removal command has no ID specification.
4 The removal command has a duplicate ID specification.
5 An axis specified with removal command P does not exist in the path or has been removed from the path.
6 An axis specified with removal command Q does not exist in the path or has been removed from the path.
7 An axis specified with removal command R does not exist in the path or has been removed from the path.
8 An axis specified with the removal command does not exist in the path or has been removed from the path.
9 The removal command has no axis specification or has an ID specification.
10 In flexible path axis assignment, the ID specification is incorrect.
11 The assignment command has no ID specification.
12 The assignment command has a duplicate ID specification.
13 The assignment command has a duplicate axis arrangement specification.
14 The path specified with the arrangement command has no target axis or the arrangement command has no ID specification.
15 The path specified with the arrangement command has an invalid axis assignment specification.

16 An axis whose removal a command is waiting for belongs to the path where the command was issued.
18 An axis whose removal an exchange command is waiting for belongs to the path paired with the path where the exchange command was issued.
19 An axis for which an assignment command was issued is yet to be removed. (Bit 1 of parameter No. 11561 is set to 1.)
20 An axis for which an assignment command is issued in a path belongs to another path where a removal command for it has been issued.
21 An axis for which an assignment command was issued is yet to be removed.
22 The assignment command has no axis specification or has an ID specification.
24 An axis at which an exchange command is targeted belongs to the path where the exchange command was issued.
25 The exchange command has no ID specification.
26 The exchange command has a duplicate ID specification.
27 In a system having 3 or more paths, an exchange command has no L specification.
28 An axis targeted by an exchange command was not found in the source path (path where this exchange command was issued).
29 An axis specified in the exchange command is being processed by another command or has already been removed.
30 An axis targeted by an exchange command was not found in the destination path (path paired with a path where another exchange command was issued for the axis).
32 The exchange command has no target axis.
33 The exchange command has a conflict.
34 The exchange command has no axis specification or has an ID specification.
35 A cycle other than flexible path axis assignment is under way.
36 An attempt was made to perform flexible path axis assignment during the SV rotation control mode.
37 An attempt was made to perform flexible path axis assignment during the polygon turning mode.
38 An attempt was made to perform flexible path axis assignment during PMC axis control.
39 An attempt was made to perform flexible path axis assignment during the chopping mode.
40 An attempt was made to perform flexible path axis assignment during mirror imaging.
41 An attempt was made to perform flexible path axis assignment during 3-dimensional coordinate conversion.
42 An attempt was made to perform flexible path axis assignment during coordinate system rotation.
43 An attempt was made to perform flexible path axis assignment during scaling.
44 An attempt was made to perform flexible path axis assignment during axis synchronization.
45 An attempt was made to perform flexible path axis assignment for an axis already removed.
46 An attempt was made to perform flexible path axis assignment for an axis under composite control.
47 An attempt was made to perform flexible path axis assignment for an axis under synchronous control.
48 An attempt was made to perform flexible path axis assignment for an axis under superimposed control.
55 An attempt was made to perform flexible path axis assignment simultaneously with an axis move command.
56 An attempt was made to perform flexible path axis assignment during tool compensation.

Diagnosis	4001	Belonging path of axis in flexible path axis assignment

A path (specified by parameter No. 981) to which an axis specified for flexible path axis assignment belongs is displayed.

0 : Source path
1 to 10 : Destination path (because of assignment or exchange)
-1 to -10 : Already removed

Pulse superimposed function

Diagnosis	4110	Number of accumulated pulses specified by the pulse superimposed function

[Data type] Floating point number axis
[Unit of data] Input unit

The number of accumulated pulses specified by pulse superimposition is indicated. The number multiplied by the travel distance magnification is indicated.

Diagnosis	4110	Number of accumulated pulses specified by the pulse superimposed function

[Data type] Floating point number axis
[Unit of data] Input unit

When the maximum cutting feedrate is to be exceeded by the specified pulse superimposition, the pulses exceeding the allowable number (set in parameter No. 7117) are discarded.
This diagnosis data indicates the number of accumulated pulses that are actually discarded in pulse superimposition.

| Number of pulses specified by pulse superimposition × travel distance magnification | > |maximum cutting feedrate + allowable number of pulses |
→ Number of discarded pulses
= Number of pulses specified by pulse superimposition × travel distance magnification - maximum cutting feedrate - allowable number of pulses

| Number of pulses specified by pulse superimposition × travel distance magnification | < |maximum cutting feedrate + allowable number of pulses |
→ Number of discarded pulses = 0

NOTE
When the pulse superimposed function is disabled (bit 0 (PSI) of parameter No. 10350 is set to 0), reset operation clears the indicated number of accumulated/discarded pulses.

Total of the current actual power consumption of all servo axes/spindles

Diagnosis	4900	Total of current actual power consumption of all axes

[Data type] 2-word
[Unit of data] W

NOTE
The actual power consumption is obtained by subtracting the regenerative power from the power consumption. If the regenerative power exceeds the power consumption, the actual power consumption becomes a negative value.

Current actual power consumption of each servo axis

Diagnosis	4901	Current actual power consumption of each servo axis

[Data type] 2-word axis

[Unit of data] W

NOTE
This power consumption becomes a negative value during regeneration of power such as reduction in servo axis speed.

Current actual power consumption of each spindle

Diagnosis	4902	Current actual power consumption of each spindle

[Data type] 2-word spindle
[Unit of data] W

NOTE
This power consumption becomes a negative value during regeneration of power such as reduction in spindle speed.

Accumulated value of the total power consumption of all servo axes/spindles

Diagnosis	4910	Accumulated value of the total actual power consumption of all axes
Diagnosis	4911	Accumulated value of the total power consumption of all axes
Diagnosis	4912	Accumulated value of the total regenerated power of all axes

[Data type] 2-word
[Unit of data] 0.001kWh

NOTE
These values are accumulated after power-on.

Accumulated value of power consumption of each servo axis

Diagnosis	4920	Accumulated value of the actual power consumption of each servo axis
Diagnosis	4921	Accumulated value of the power consumption of each servo axis
Diagnosis	4922	Accumulated value of the regenerated power of each servo axis

[Data type] 2-word axis
[Unit of data] 0.001kWh

NOTE
These values are accumulated after power-on.

Accumulated value of power consumption of each spindle

Diagnosis	4930	Accumulated value of the actual power consumption of each spindle
Diagnosis	4931	Accumulated value of the power consumption of each spindle
Diagnosis	4932	Accumulated value of the regenerated power of each spindle

[Data type] 2-word spindle
[Unit of data] W

NOTE
These values are accumulated after power-on.

Interpolation state

Diagnosis	5000	Smoothing mode

[Data type] Bit

NAME Interpolation state when "1" is indicated

Smooth IPL on When smooth interpolation G5.1 Q2 is specified and all conditions are satisfied, "1" is indicated. The G5.1 Q2 command turns on AI contour control at the same time. Therefore, the AI contour control mode signal AICC<Fn062.0> turns on and AICC1/AICC2 blinks in the state display at the lower right of the screen.

SMOOTHING ON When nano smoothing G5.1 Q3 is specified and all conditions are satisfied, "1" is indicated. The G5.1 Q3 command turns on AI contour control at the same time. Therefore, the AI contour control mode signal AICC<Fn062.0> turns on and AICC1/AICC2 blinks in the state display at the lower right of the screen.

3-dimensional machine position compensation

Diagnosis	5302	Compensation amount of 3-dimensional machine position compensation

[Data type] 2-word axis

[Unit of data] Detection unit

The compensation value of 3-dimensional machine position compensation is indicated.

Diagnosis data related to automatic phase synchronization for flexible synchronous control

Diagnosis	5600	Error of automatic phase synchronization (group A)
Diagnosis	5601	Error of automatic phase synchronization (group B)
Diagnosis	5602	Error of automatic phase synchronization (group C)
Diagnosis	5603	Error of automatic phase synchronization (group D)

[Data type] Real path

[Unit of data] mm, inch, deg (machine unit)

Error between master axis and slave axis after executing automatic phase Synchronization for flexible synchronous control is displayed.

This data is displayed in the path of slave axis in inter-path flexible synchronous control.

Diagnosis	5604	Maximum error of Automatic Phase Synchronization (group A)
Diagnosis	5605	Maximum error of Automatic Phase Synchronization (group B)
Diagnosis	5606	Maximum error of Automatic Phase Synchronization (group C)
Diagnosis	5607	Maximum error of Automatic Phase Synchronization (group D)

[Data type] Real path

[Unit of data] mm, inch, deg (machine unit)

Maximum error between master axis and slave axis after executing automatic phase synchronization for flexible synchronous control is displayed.

This data is displayed in the path of slave axis in inter-path flexible synchronous control.

This data is cleared when automatic operation is started in auto mode.

This data is cleared when flexible synchronous control is started in manual mode.