Diagnostics Parameter Table Reference

Description of Parameters

From pg 5 of Fanuc Connection Manual 30i

1. Each of the parameters of the bit, bit machine group, bit path, bit axis, and bit spindle types consists of 8 bits for one data number (parameters with eight different meanings).
2. For machine group types, parameters corresponding to the maximum number of machine groups are present, so that independent data can be set for each machine group.
3. For path types, parameters corresponding to the maximum number of paths are present, so that independent data can be set for each path.
4. For axis types, parameters corresponding to the maximum number of control axes are present, so that independent data can be set for each control axis.
5. For spindle types, parameters corresponding to the maximum number of spindles are present, so that independent data can be set for each spindle axis.
6. The valid data range for each data type indicates a general range. The range varies according to the parameters. For the valid data range of a specific parameter, see the explanation of the parameter.

Data Type	Valid Data Range	Remarks
Bit	0 or 1	
Bit Machine Group		
Bit Path		
Bit Spindle		
Byte	-128 to 127 0 to 255	Some parameters handle these types of data as unsigned data
Byte Machine Group		
Byte Path		
Byte Axis		
Byte Spindle		
Word	-32768 to 32767 0 to 65535	Some parameters handle these types of data as unsigned data
Word Machine Group		
Word Path		
Word Axis		
Word Spindle		
2-Word	-999999999 to 999999999	Some parameters handle these types of data as unsigned data *This table defines 2-word valid range as 9 digits, but you may notice there are 2-word diag params in the below table with only 8 digits. I don't know if this is intentional but this is how it is defined in the manual.*
2-Word Machine Group		
2-Word Path		
2-Word Axis		
2-Word Spindle		
Real	*See the Standard Parameter Setting Tables*	
Real Machine Group		
Real Path		
Real Axis		
Real Spindle		

For any diagnostics that have a native type of Bit, each embedded bit within the byte can contain a bit value with distinct meaning. The meaning of each bit is represented in the table below within the **Note** column and numbered #0 - #7. Each bit may also contain a string identifier code defined by the diagnostic and displayed on the HMI but it is not used programmatically.

The relative access location of each numbered bit within the byte diagrammed:

#7	#6	#5	#4	#3	#2	#1	#0

Diagnostic Keynames

The diagnostic key names are generated using one of the below schemes depending on whether it is representing a standard value, or an individual bit for an axis or a spindle. Path numbers are omitted from the key if the value is for path 1.

- Diag<*diagno*>_<*name*><*path#*>
  - Diag403_S1
    - *name=S1*
    - *path=1 so path # is omitted from key*
  - Diag403_S12
    - *name=S1*
    - *path=2 so path# is included in key*
  - Diag403_S2
  - Diag403_S3
- Diag<*diagno*>Bit<*bit#*>_<*name*><*path#*>
  - Diag408Bit1_S1
  - Diag310Bit3_X
  - Diag310Bit3_X2

Fanuc 30i

#	Description	Native Type	Native Units	Valid Range	App Type /Subtype	Note
0	**Causes when the machine does not travel in spite of giving a command** CNC Internal State 1	Bit	N/A	0 to 1		*Manual is not clear how this is encoded, I'm extrapolating bit locations from screenshots of diagnosis screen and other examples from better defined bit diagnostics.* • #0 INPOSITION CHECK - In-position check is being done • #1 FEEDRATE OVERRIDE - 0% Feedrate override is 0% • #2 JOG FEED OVERRIDE 0% - Jog feedrate override is 0% • #3 INTER/START LOCK ON - Interlock/start lock is on • #4 SPEED ARRIVAL ON - The system is waiting for the speed arrival signal to turn on • #5 WAIT REVOLUTION - The system is waiting for the spindle one-rotation signal in threading • #6 STOP POSITION OCDER - The system is waiting for the rotation of the position coder in spindle feed per revolution • #7 FEED STOP - A feed stop was made
2	**Causes when the machine does not travel in spite of giving a command** Dwell Execution State	Bit	N/A	0 to 1		*Manual is not clear how this is encoded, I'm extrapolating bit locations from screenshots of diagnosis screen and other examples from better defined bit diagnostics.* • #0 DWELL - When a dwell is being executed "1" is displayed
8	**Causes when the machine does not travel in spite of giving a command** CNC Internal State 2	Bit	N/A	0 to 1		*Manual is not clear how this is encoded, I'm extrapolating bit locations from screenshots of diagnosis screen and other examples from better defined bit diagnostics.* • #0 FOREGROUND READING - Data is being input in the foreground • #1 BACKGROUND READING - Data is being input in the background
10	**Reader/Puncher Interface Output State**	Bit	N/A	0 to 1		*Manual is not clear how this is encoded, I'm extrapolating bit locations from screenshots of diagnosis screen and other examples from better defined bit diagnostics.* • #0 - When data is being output through the reader /puncher interface "1" is indicated

30	**State of TH Alarm** [Foreground] TH Alarm Character Count When the alarm SR0001, “TH ERROR” occurred, the position in which it occurred is indicated by the number of characters counted from the beginning of the block.	2-Word Axis	Count			The position where the TH alarm occurred in foreground input is indicated by the number of characters from the beginning of the block **TH alarm occurs when a character with a parity error was entered in a significant data area.** (*I don’t yet know why these are stored in the Axis data structure, but they are*)
31	**State of TH Alarm** [Foreground] TH Data The character code of the character at which the TH alarm occurred in foreground input is indicated	2-Word Axis	Character Code			Readout code of the number of characters in which an alarm SR0001, “TH ERROR” occurred
32	**State of TH Alarm** [Background] Character Number Data When the alarm SR0001, “TH ERROR” occurred, the position in which it occurred is indicated by the number of characters counted from the beginning of the block.	2-Word Axis	Count			The position where the TH alarm occurred in background input is indicated by the number of characters from the beginning of the block
33	**State of TH Alarm** [Background] TH Data Readout code of the number of characters in which an alarm SR0001, “TH ERROR” occurred	2-Word Axis	Character Code			The character code of the character at which the TH alarm occurred in background input indicated
43	Current display language	Byte		0-17		Can’t imagine there’s any value in diagnostics like this one. Pg 14 of Maintenance manual for codes.
200	**Details of serial Pulsecoder**	Bit Axis				• #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
201	**Details of serial Pulsecoder**	Bit Axis				See pg 15 Maint manual Motor/Amp overheat One-rotation signal of pos detector
202	**Details of serial Pulsecoder**	Bit Axis				• #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 ref 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
203	**Details of serial Pulsecoder**	Bit Axis				• #4 PRM A parameter failure was detected on the digital servo side. See the cause and measure in Diag #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.
204	**Details of serial Pulsecoder**	Bit Axis				• #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

205	**Details of separate serial pulsecoder alarms**	Bit Axis				• #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.
206	**Details of separate serial pulsecoder alarms**	Bit Axis				• #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.
280	**Details of invalid servo parameter alarms (CNC side)**	Bit Axis				• #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).
281	**Details of invalid servo parameter alarms (CNC Side)**	Bit Axis				• #0 TDM Four-winding motor drive (bit 7 of p#2211) or two-winding motor drive (bit 6 of p#2211) is enabled when no option for tandem control is present
300	**Position Error Amount** Position deviation amount of each servo axis under Cs contour control Position error of an axis in detection unit	Real Axis	Machine Unit	-99999999 to 99999999		#418 shows information obtained from the serial spindle control unit *type/unit/range inferred from 302*
301	**Machine position** Distance from reference position of an axis in detection unit	Real Axis	Machine Unit	-99999999 to 99999999		*type/unit/range inferred from 302*
302	**Distance from the end of the deceleration dog to the first grid point**	Real Axis	Machine Unit	-99999999 to 99999999		Distance between the position at which the deceleration dog is turned off and the first grid point 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.
304	**Reference counter** Reference counter amount in each axis	2-word Axis	Detection Unit	-99999999 to 99999999		
306	Machine coordinates on the angular axis in the Cartesian coordinate system	Real Number	Machine Unit			Machine coordinates in the Cartesian coordinate system are displayed in arbitrary angular axis control. Bit 7 (ADG) of parameter No. 8201 can be used to change the display order.
307	Machine coordinates on the perpendicular axis in the Cartesian coordinate system	Real Number	Machine Unit			Machine coordinates in the Cartesian coordinate system are displayed in arbitrary angular axis control. Bit 7 (ADG) of parameter No. 8201 can be used to change the display order.
308	**Motor temperature information** Servo motor temperature (deg C)	Byte Axis	Deg Celsius	0 to 255	Sample /Temperature	The temperature of the coil of the servo motor is indicated. When the temperature reaches 140C, a motor overheat alarm is issued
309	**Motor temperature information** Pulsecoder Temperature (deg C)	Byte Axis	Deg Celsius	0 to 255	Sample /Temperature	The temperature of the PCB in the pulsecoder is indicated. When the temperature reaches 100C (~85C for temperature of atmosphere in the pulsecoder), a motor overheat alarm is issued. 1. Temperature information has the following error a. 50C to 160C +/- 5C b. 160C to 180C +/- 10C

						2. The temperature at which an overheat alarm is issued has an error of up to 5C
310	**Cause that sets bit 4 (APZ) of p#1815 to 0** APZ: Machine position and position on absolute position detector is used. 0 - Not corresponding 1 - Corresponding. When an abs position detector is used, after primary adjustment is performed or after the abs position detector is replaced, this parameter must be set to 0, power must be turned off and on, then manual reference position return must be performed. This completes the positional correspondence between the machine position and the position on the absolute position detector, and this sets this parameter to 1 automatically.	Bit Axis				• #0 - PR1 One of a set of param have changed. See Maintenance Manual for list of params • #1 - PR2 See Main Manual for changed params • #2 - BZ1 A battery voltage of 0v was detected (Inductosyn) • #3 - BZ2 A battery voltage of 0v was detected (Separate position detector) • #5 - ALP The zero point was set by MDI when the a pulce 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 p#0012
311	**Cause that sets bit 4 (APZ) of p#1815 to 0**	Bit Axis				See manual for desc • #0 AL1 • #1 AL2 • #2 AL3 • #3 AL4 • #4 GSG • #5 XBZ • #6 DUA
352	**Details of invalid servo parameter setting alarms (on the servo side)** Detail number for invalid servo parameter setting alarm	Type not specified Word Axis?				Valid when: • Servo alarm No. 417 has occurred • Bit 4 of diag#203 (PRM) = 1 See table in maintenance manual for further detailed information on the detail numbers indicated here
355	**Details of invalid servo parameter setting alarms (on the servo side)** Communication alarm ignore counter (separate type)	Type not specified Word Axis?				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. For more details, refer to relevant manual on Fanuc Servo Motor ai series
356	**Details of invalid servo parameter setting alarms (on the servo side)** Link processing counter (built-in type)	Type not specified Word Axis?				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. For more details, refer to relevant manual on Fanuc Servo Motor ai series
357	**Details of invalid servo parameter setting alarms (on the servo side)** Link processing counter (separate type)	Type not specified Word Axis?				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 diag 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. See FANUC servo motor manual for details
358	**Details of invalid servo parameter setting alarms (on the servo side)** V ready-off information	Type not specified 2-word Axis?				This info 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. *See maintenance manual for more detail on interpretation*

						2 bytes • #05 ??? - *Unstated* • #06 ESP • #07 ??? - *Unstated* • #08 ??? - *Unstated* • #09 ??? - *Unstated* • #10 CRDY • #11 ??? - *Unstated* • #12 INTL • #13 DRDY • #14 SRDY 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 squenctially 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 Vready-off alarm was caused.
359	**Details of invalid servo parameter setting alarms (on the servo side)** Communication alarm neglect counter (built-in type)	N/A	N/A	N/A		The diagnosis information is the same as that of diag #355. See descriptions of d#355 to d#357 in manuals
360	**Details of invalid servo parameter setting alarms (on the servo side)** Cumulative value of specified pulses (NC) Cumulative value of move commands distributed from the CNC since power-on is indicated.	2-word	Detection unit	-99999999 to 99999999		
361	**Details of invalid servo parameter setting alarms (on the servo side)** Compensation Pulses (NC) Cumulative value of compensation pulses (backlash compensation, pitch error compensation, and so on)	2-Word	Detection Unit	-99999999 to 99999999		
362	**Details of invalid servo parameter setting alarms (on the servo side)** Cumulative value of specified pulses (SV) Cumulative value of move pulses and compensation pulses received by the servo system since power-on is indicated	2-word	Detection Unit	-99999999 to 99999999		
363	**Details of invalid servo parameter setting alarms (on the servo side)** Cumulative feedback (SV) Cumulative value of positional feedback pulses the servo system received from the pulsecoder since power-on is indicated	2-word	Detection Unit	-99999999 to 99999999		
380	**Diagnosis data related to the Inductosyn absolute position detector** Difference between the abs position of the motor and offset data	2-word Axis	Detection Unit		Sample /Displacement	**(** M(abs of motor) - S(offset data) **)** / (pitch interval)
381	**Diagnosis data related to the Inductosyn absolute position detector** Offset data from the Inductosyn	2-word Axis	Detection Unit		Sample /Displacement	Offset data displayed when CNC calculates the machine position
		Bit Spindle				

400	**Diagnosis data related to the serial spindles** Information including spindle control information					#7 LNK Communication with the spindle control side has been established
403	**Diagnosis data related to the serial spindles** Temperature of Spindle Motor	Byte Spindle	Celsius	0 to 255	Sample /Temperature	Error: 50c to 160c +/- 5c 160c to 180c +/- 10c
408	**Diagnosis data related to the serial spindles** Serial spindle errors	Type not specified Bit Spindle				• #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.
410	**Diagnosis data related to the serial spindles** Load meter indication for the spindle [%]	Word Spindle	Percentage %	0 - 100		
411	**Diagnosis data related to the serial spindles** Speedometer indication for the spindle [min^{-1}] Spindle load meter indication	Word Spindle	min^-1			See manual for dependent parameters
417	**Diagnosis data related to the serial spindles** Spindle position coder feedback signal for the spindle [pulse]	2-word Spindle	Detection unit			
418	**Diagnosis data related to the serial spindles** Positional deviation of spindle in position loop mode	2-word Spindle	Detection Unit			This diagnostic display shows information obtained from the serial spindle control unit. This diagnosis displays position error of the spindle contour axis during spindle contour control. The position error can also be checked using a servo error display (DGN of No. 300) for an axis under Cs contour control. Position deviation amount of each spindle When spindles are involved in a position loop, the position deviation of each spindle is indicated. The unit of a detector used in each mode is used.
425	**Diagnosis data related to the serial spindles** Spindle synchronization error	2-word Spindle	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.
445	**Diagnosis data related to the serial spindles** Spindle position data Position coder signal pulse data from the spindle one-rotation signal of each spindle	Word Spindle	Pulse	0-4095		For the serial spindle, position coder signal pulse data from the one-rotation signal is indicted as the position data of the spindle. This data is valid when bit 1 of p#3117 is set to 1 To display spindle pos data, spindle orientation must be performed once.
450	**Diagnosis data related to rigid tapping** Spindle position error during rigid tapping Spindle Motion Error	2-Word Spindle	Detection Unit			Spindle position deviation during rigid tapping
451	**Diagnosis data related to rigid tapping** Spindle distribution during rigid tapping Spindle Motion Pulse	2-Word Spindle	Detection Unit (Pulse?)			Number of pulses distributed to the spindle during rigid tapping
452	**Diagnosis data related to rigid tapping**	2-word Spindle	Percentage %			Rigid error Momentary error difference between the spindle and drilling axis during rigid tapping (signed)

	Difference in error amount between spindle and tapping axis during rigid tapping (momentary value)					
453	**Diagnosis data related to rigid tapping** Difference in error amount between spindle and tapping axis during rigid tapping (maximum value)	2-word Spindle	Percentage %			Rigid Error (Max) Cumulative number of pulses distributed to the spindle during rigid tapping
454	**Diagnosis data related to rigid tapping** Accumulated spindle distribution during rigid tapping (cumulative value)	2-word Spindle	Detection Unit (Pulse)			Spindle Pulse (Sum) Cumulative number of pulses distributed to the spindle during rigid tapping
455	**Diagnosis data related to rigid tapping** Difference in spindle-converted move command during rigid tapping (momentary value)	2-word Spindle	Detection Unit (Pulse)			Sync. Pulse (Sum) Momentary spindle-converted move during command difference between the spindle and the drilling axis during rigid tapping
456	**Diagnosis data related to rigid tapping** Difference in spindle-converted positional deviation during rigid tapping (momentary value)	2-word Spindle	Detection Unit (Pulse)			Sync. Error Momentary spindle-converted position deviation difference between the spindle and the drilling axis during rigid tapping
457	**Diagnosis data related to rigid tapping** Width of synchronization error during rigid tapping (maximum value)	2-word Spindle	Detection Unit (Pulse)			Sync. Width Synchronization error range during rigid tapping (maximum value)
458	**Diagnosis data related to rigid tapping** Tapping axis distribution amount during rigid tapping (cumulative value)	2-word Spindle	Detection unit			
459	**Diagnosis data related to rigid tapping** Selected spindle number during rigid tapping	2-word Path				
460	**Diagnosis data related to rigid tapping** Sync. Pulse (Max) Maximum spindle-converted move during command difference between the spindle and the drilling axis during rigid tapping	2-word Spindle	Detection Unit (Pulse)			Difference in spindle-converted move command during rigid tapping (Maximum Value)
461	**Diagnosis data related to rigid tapping** Machine POS Error Spindle-converted machine position difference during rigid tapping (momentary value)	2-word Spindle	Detection Unit (Pulse)			Difference in spindle-converted machine position during rigid tapping (momentary value)
462	**Diagnosis data related to rigid tapping** Machine POS Error (Max) Spindle-converted machine position difference during rigid tapping (maximum value)	2-Word Spindle	Detection Unit (Pulse)			Difference in spindle-converted machine position during rigid tapping (maximum value)
470	**Diagnosis data related to polygon machining with two spindles** Polygon Turning w/ 2 spindles	Type not specified Bit Spindle? Bit Path?				• #0 SPL Polygon sync with 2 spindles underway • #1 PSU Polygon sync mode with 2 spindles being activated • #2 PEN Polygon sync mode with two spindles released

						• #3 PSC Spindle speed being changed during polygon sync mode with two spindles • #4 SCF Spindle speed changed during polygon sync mode with two spindles • #6 LGE The loop gain is different between the spindles during polygon sync mode with two spindles • #7 SC0 Actual speed command is 0 during polygon sync mode with two spindles See Maintenance Manual for details on bits #1, #6 and #7

471	**Diagnosis data related to polygon machining with two spindles**
	
	Polygon Turning w/ 2 spindles. Alarm cause indicator
		Type not specified
		
		Bit Spindle?
		
		Bit Path?
						• #0 SCU The specified speed is too low during polygon sync mode with two spindles (The unit of speed calculated internally becomes 0)
						• #2 QCL The polygon sync axis is clamped
						• #3 SUO The specified speed is too high during the polygon sync mode with two spindles. (It is clamped to the upper limit calculated internally)
						• #4 NSP A spindle necessary for control is not connected. Causes for alarm PS0314. When alarm PS0314 occurs, the polygon sync mode is released, but the indication of its causes remains until the alarm is cleared by a reset.
						• Causes for alarm PS0218.
						  • #5 QMS When bit 1 (QDR) of p#7603 = 1, a negative value is specified at Q
						  • #6 PQE In a G41.2 either P or Q has a value out of the specifiable range. Or, P and Q are not specified as a pair.
						  • #7 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.

474	**Diagnosis data related to polygon machining with two spindles** Rotation ratio for the master axis during the polygon sync mode w/ 2 spindles (P command value)	No type specified Word Spindle? Word Axis?				This indication is the current rotation ratio (P command value) of the master axis during the polygon sync mode with 2 spindles
475	**Diagnosis data related to polygon machining with two spindles** Rotation ratio for the master axis during the polygon sync mode w/ 2 spindles (Q command value)	No type specified Word Spindle? Word Axis?				This indication is the current rotation ratio (Q command value) of the polygon sync mode with two spindles.
476	**Diagnosis data related to polygon machining with two spindles** Phase difference between the two spindles under polygon sync control w/ 2 spindles (R command value)	No type specified Word Spindle? Real Spindle?				Conn manual left type unstated
477	**Diagnosis data related to polygon machining with two spindles** Actual master axis speed (min^-1) during the polygon sync mode w/ 2 spindles	No type specified Real Axis?				Conn manual left type unstated
478	**Diagnosis data related to polygon machining with two spindles** Actual polygon sync axis speed (min^-1) during the polygon sync mode w/ 2 spindles	No type specified Real Axis?				Conn manual left type unstated
520	**Diagnosis data related to the small-hole peck drilling cycle.** Total number of retract operations during cutting after G83 is specified	No type specified 2-word Path?	Count?			Total number of times a retraction operation has been performed during drilling since G83 was specified.
521	**Diagnosis data related to the small-hole peck drilling cycle.** Total number of retract operations based on	No type specified 2-word?	Count?			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.

	reception of the overload torque detection signal during cutting after G83 is specified					The total numbers of times output in Nos.520 & 521 are cleared to zero by a G83 command issued after the small-hole peck drilling cycle mode is entered.
522	**Diagnosis data related to the small-hole peck drilling cycle.** Coordinate on the drilling axis where a retract operation was started (least input increment)	No type specified				
523	**Diagnosis data related to the small-hole peck drilling cycle.** Difference between the coordinate on the drilling axis where the previous retract operation was started and the coordinate on the drilling axis where the current retract operation was started (least input increment: previous value - current value)	No type specified				
550	**Diagnosis data related to the dual position feedback function** Closed loop error	2-Word Axis	Detection Unit	-99999999 to 99999999		
551	**Diagnosis data related to the dual position feedback function** Semi-closed loop	2-Word Axis	Detection Unite	-99999999 to 99999999		
552	**Diagnosis data related to the dual position feedback function** Error between semi-closed and closed loops	Word Axis	Detection Unit	-32768 to 32767		
553	**Diagnosis data related to the dual position feedback function** Amount of dual position compensation	2-Word Axis	Detection Unit	-99999999 to 99999999		See Maintenance Manual for positions when displayed
560	**Automatic alteration of tool position compensation** Manual tool compensation status number	Byte	None	0-255		The following numbers are used to indicate whether compensation is completed or the reason for uncompleted compensation (if occur). • 0: Manual tool compensation is completed normally. • 1: The T code-specified data has exceeded the permissible range. • 2: The offset value is out of range. • 3: The offset number is out of range. • 4: The CNC is undergoing automatic operation or axis movement. • 5: The CNC is in the tool-nose radius compensation mode. • 6: The CNC is in a mode other than the JOG, HNDL (INC), or REF mode. • 7: A CNC parameter has specified an invalid number. • 8: The CNC is in the 3-dimensional tool cutter compensation mode or tool center point control mode.
670	**Data for adjusting the compensation of the start position of thread cutting when the spindle speed is changed.** Delay of acceleration /deceleration after interpolation calculated internally by the NC	2-word Path	• Input in metric : 0.00001 mm • Input in inch : 0.000001 inch	0 to 99,999,999		Compensation amounts calculated by the NC are displayed. They are used to set adjustment parameters Nos. 1446 to 1449.
671	**Data for adjusting the compensation of the start position of thread cutting when the spindle speed is changed.**	2-word Path	• Input in metric : 0.00001 mm • Input in inch :	0 to 99,999,999		Compensation amounts calculated by the NC are displayed. They are used to set adjustment parameters Nos. 1446 to 1449.

	Servo delay calculated internally by the NC		0.000001 inch			
672	**Data for adjusting the compensation of the start position of thread cutting when the spindle speed is changed.** One-rotation signal detection delay calculated internally by the NC	2-word Path	• Input in metric : 0.00001 mm • Input in inch : 0.000001 inch	0 to 99,999,999		Compensation amounts calculated by the NC are displayed. They are used to set adjustment parameters Nos. 1446 to 1449.
700	**State of high-speed HRV current control**	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 • See manual for pre-conditions of enablement • #2 DCLNK This bit is set to 1 when voltage information can be output to the diagnosis screen.
705	**Thermal growth compensation along tool vector** Thermal growth compensation amount for each axis	Word Axis	Detection Unit	-32768 to +32767		The amount of thermal growth compensation along tool vector is indicated for each axis.
710	**Spindle error and warning states** Spindle warning No. (Spindle error state) The warning number transferred from the spindle amplifier is indicated.	Word Spindle				
712	**Spindle error and warning states** Spindle Status error No. The status error number transferred from the spindle amplifier is indicated.	Word Spindle				When the spindle is disabled by an error such as a PMC signal input error (for example, when two operation modes are specified at the same time), a status error is recognized while the spindle is disabled. When the signal is input normally, the normal operation is resumed. For details of spindle error numbers, see the description of alarms (SP alarms) related to serial spindles in the alarm list. See Spindle manual.
750	**OVC Level** OVC Level	Word Axis	Percentage %			The proportion of soft thermal (OVC) in the alarm issuance level is indicated.
751	**Linear inclination compensation function** Each axis linear inclination compensation	Word Axis	Detection Unit (Vrms)	-32768 to 32767		Compensation of linear inclination compensation for each axis is indicated
752	**DC link voltage information** DC link voltage information	Word Axis	Vrms	0-452 (200 Vrms input amplifier) 0-905 (400 Vrms input amplifier)	Sample /Voltage	DC link voltage information is indicated
760	**Servo Motor** R phase current value	Word axis	Value 6554 is equivalent to teh max amplifier current	-6554 to 6554	Sample /Amperage	The actual R phase current value of the servo motor is indicated
761	**Servo Motor** Effective current value	Word axis	Value 8027 is equivalent to the maximum amplifier current	-8027 to 8027	Sample /Amperage	The effective current value of the servo motor is indicated
762	**Servo Motor** Activating phase	Word Axis	Value 256 is equivalent to 360 degrees	0-255		The activating phase (electrical angle) of the servo motor is indicated
1002	**Fan Rotation Speed** Fan1 Rotation Speed	2-Word	1/min			The rotation speed of the fans in the CNC controller is indicated If no applicable fan, 0 is indicated
1003	**Fan Rotation Speed** Fan 2 Rotation Speed	2-Word	1/min			The rotation speed of the fans in the CNC controller is indicated

						If no applicable fan, 0 is indicated
1006	**Reason why a start cannot be performed** Reason why a start cannot be performed	Bit				• #0 *SP The feed hold signal (*SP) is 0 • #1 ALM An alarm occurs
1016	**Automatic data backup** Execution state of a backup is indicated	Bit				• #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 backup
1490	**Fan Rotation Speed** Fan 3 Rotation Speed	2-Word	1/min			The rotation speed of the fans in the stand-alone CNC with 15” LCD display are indicated If no applicable fan, 0 is indicated
1491	**Fan Rotation Speed** Fan 4 Rotation Speed	2-Word	1/min			The rotation speed of the fans in the stand-alone CNC with 15” LCD display are indicated If no applicable fan, 0 is indicated
1493	**Custom macro / execution macro / aux macro** Number of macro statement blocks executed by custom and execution macros	2-word	Block			The number of macro statement blocks executed by custom and execution macros per 1024 ms is displayed. This data provides an indication of the actual macro statement processing speed.
1494	**Custom macro / execution macro / aux macro** Number of blocks in executed by an auxiliary macro	2-Word	Block			Displays the number of blocks executed by an auxiliary macro per 1024ms. It provides an indication of the actual processing speed of aux macros.
1520	**Spindle revolution number history function** Total spindle revolution number 1 The spindle revolution number is counted, and the total revolution number is displayed.	2-word Spindle	1000 min^-1	0 to 999999999		
1521	Total spindle revolution number 2 The spindle revolution number is counted, and the total revolution number is displayed.	2-word Spindle	1000 min^-1	0 to 999999999		
1544	Spindle positioning sequence status	Type not specified 2-Word Spindle?				Conn manual isn’t specific but coded values seem to use 4-byte hex status. Appears to set byte#3 to correspond to stage of the sequence: (See conn manual) 1. Sequence for switching to spindle positioning mode a. 00010003 b. … c. 0001000A 2. Spindle positioning sequence a. 00020004 b. 00020006 c. 00020007 d. Something about spindle B specifications has it’s own code i. 00040003 ii. … iii. 0004000A 3. Spindle positioning mode cancellation sequence a. 00030003 b. 00010004
1570	**Information about spindle control** The manual doesn’t label this field as clearly as others	Bit Spindle	N/A			CF2 - Bit#7 0: The spindle interface does not operate normally. 1: The spindle interface operates normally.
1900	**Built-in 3D interference check**	Word	msec			Displays the current processing time required for 3D interference check

	Built-in 3D interference check processing time					
1901	**Built-in 3D interference check** Additional width for Built-in 3D interference check	Real	mm, inch (machine unit)			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.
3019	**Detector Battery Exhaustion** Param to check cause of battery low alarm	Bit Axis				• #3 ABP - Battery low in the phase A/B • #4 INP - Battery low in the serial Pulsecoder (built-in position detector) • #5 EXP - Battery low in serial separate position detector
3500	**Diagnosis data related to axis synchronous control** Synchronization error for each axis	2-Word Axis	Detection Unit	-99999999 to 99999999		The difference in position (synchronization error amount) between the master axis and the slave axis is indicated. This data is indicated for the slave ax The difference between the positions of the master and slave axes (synchronization error) is displayed. It is displayed for the axis number of the slave axis.
3501	**Diagnosis data related to axis synchronous control** Synchronization error compensation for each axis The total number of compensation pulses output to the slave axis (synchronization error compensation) is displayed. This number is displayed for the axis number of the slave axis.	2-Word Axis	Detection Unit	-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.
3502	**Diagnosis data related to synchronous/composite control** Display of synchronous error for each axis	2-word Axis	Detection Unit	-99999999 to 99999999		Displays the difference between the master and slave axes in position deviation if synchronous deviation detection is performed (bit 1 (SERx) of parameter No. 8162 =1). The positional deviation difference is: (positional deviation of the master axis) ± (positional deviation of the slave axis) • + if a mirror image is applied to the synchronization command. • - if no mirror image is applied to the synchronization command.
3510	**Details of invalid FSSB setting alarms** FSSB Alarm Number	Word		see table		See manual for table of valid alarm numbers and their meanings
3511	**Details of invalid FSSB setting alarms** FSSB Alarm Number	Word axis		see table		See manual for table of alarm numbers and their meaning
3513	**Details of invalid FSSB setting alarms** FSSB Alarm Number	Word spindle		see table		See manual for table of alarm numbers and their meaning
3520	Information of setting the zero point for abs position detection	Byte Axis	None	0-3		• 0 - Not performed yet • 1 - Performed by manual ref position return • 2 - Performed by MDI operation • 3 - Performed by reading param file
3545	**Diagnosis data related to linear scale with absolute address reference marks** Measurement point 1 of the reference marks of distance coded linear scale	2-Word Axis	Detection Unit	-999999999 to 999999999		Linear Scale Absolute Address Reference Marks (LSAARM)
3546	**Diagnosis data related to linear scale with absolute address reference marks** Measurement point 2 of the reference marks of distance coded linear scale	2-Word Axis	Detection Unit	-999999999 to 999999999		Linear Scale Absolute Address Reference Marks (LSAARM)
3547	**Diagnosis data related to linear scale with absolute address reference marks**	2-Word Axis	Detection Unit	-999999999 to 999999999		Linear Scale Absolute Address Reference Marks (LSAARM)

	Measurement point 3 of the reference marks of distance coded linear scale					
3548	**Diagnosis data related to linear scale with absolute address reference marks** Measurement point 4 of the reference marks of distance coded linear scale	2-Word Axis	Detection Unit	-999999999 to 999999999		Linear Scale Absolute Address Reference Marks (LSAARM)
3549	**Diagnosis data related to linear scale with absolute address reference marks** Internal status of the reference marks of distance coded linear scale	2-Word Axis	Detection Unit	-999999999 to 999999999		
3550	**Diagnosis data related to linear scale with absolute address reference marks** Scale counter value of the reference marks of distance coded linear scale	2-Word Axis	Detection Unit	-999999999 to 999999999		
3551	**Diagnosis data related to linear scale with absolute address reference marks** Scale counter value of the reference marks of distance coded linear scale (high)	2-Word Axis	Detection Unit	-999 to 999		Scale counter value of the reference marks of distance coded linear scale = d#3551 * 1,000,000,000 + d#3550
3570	**Wrong operation prevention function** Memory operation stopped due to the reconfirming of midway block start.	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.
4000	**Diagnosis data related to flexible path axis assignment** Reason number of alarm in flexible path axis assignment	Type not specified Word Path?		1-56		See Pg 476 of Connection Manual for full list of code descriptions
4001	**Diagnosis data related to flexible path axis assignment** 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.	Type not specified Word Path?		-10-10		• 0 : Source path • 1 to 10 : Destination path (because of assignment or exchange) • -1 to -10 : Already removed
4110	**Pulse Superimposed Function** Cumulative amount of pulses specified in the pulse superimposed function Indicates the cumulative amount of pulses specified to be superimposed. The amount displayed is the amount multiplied by the movement magnification.	Floating point number (Real?) Axis	Input Unit			*Are these function diagnostics useful to track here?* See pg 2828 of Connection Manual for more description
4111	**Pulse Superimposed Function** Cumulative amount of pulses discarded with the pulse superimposed function If an amount of superimposed pulses that will exceed the maximum cutting feedrate is specified, the amount of pulses that exceeds the permissible flow amount (setting of parameter No. 7117) is discarded. This	Floating point number (Real?) Axis	Input Unit			*Are these function diagnostics useful to track here?* See pg 2828 of Connection Manual for more description

	diagnosis indicates the cumulative amount of pulses actually discarded under pulse superimposed control.					
4300	Position error of servo calculated by CNC	Type not specified ? Axis				TODO: Connection manual doesn't state types
4301	Position error of spindle calculated by CNC	Type not specified ? Spindle				TODO: Connection manual doesn't state types
4900	**Total of the current actual power consumption of all servo axes/spindles** Total of current actual power consumption of all axes	2-Word	W			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
4901	**Current actual power consumption of each servo axis** Current actual power consumption of each servo axis	2-Word Axis	W			
4902	**Current actual power consumption of each spindle** Current actual power consumption of each spindle	2-word Spindle	W			This power consumption becomes a negative value during regeneration of power such as reduction in spindle speed
4910	**Accumulated value of the total power consumption of all axes/spindles** Accumulated value of the total **actual** power consumption of all axes	2-Word	0.001kWh			These values are accumulated after power on
4911	**Accumulated value of the total power consumption of all axes/spindles** Accumulated value of the total power consumption of axes	2-Word	0.001kWh			These values are accumulated after power on
4912	**Accumulated value of the total power consumption of all axes/spindles** Accumulated value of the total regenerated power of all axes	2-Word	0.001kWh			These values are accumulated after power on
4920	**Accumulated value of power consumption of each servo axis** Accumulated value of the actual power consumption of each servo axis	2-Word Axis	0.001kWh			These values are accumulated after power on
4921	**Accumulated value of power consumption of each servo axis** Accumulated value of the power consumption of each servo axis	2-Word Axis	0.001kWh			These values are accumulated after power on
4922	**Accumulated value of power consumption of each servo axis** Accumulated value of the regenerated power of each servo axis	2-Word Axis	0.001kWh			These values are accumulated after power on
4930	**Accumulated value of power consumption of each spindle** Accumulated value of the actual power consumption of each spindle	2-Word Spindle	0.001kWh			These values are accumulated after power on
4931			0.001kWh			These values are accumulated after power on

	Accumulated value of power consumption of each spindle Accumulated value of the power consumption of each spindle	2-Word Spindle				
4932	**Accumulated value of power consumption of each spindle** Accumulated value of the regenerated power of each spindle	2-Word Spindle	0.001kWh			These values are accumulated after power on
5000	**Interpolation State** Smoothing mode	Bit				See manual for more description • NAME Interpolation State when “1” is indicated • Smooth IPL On • Smoothing On (Nano Smoothing)
5207	Clamp/unclamp sequence status	Type not specified 2-Word Axis?				Conn manual isn’t specific on types but coded values are 4-byte hex. See manual for deciphering codes
5302	**3-dimensional machine position compensation** Compensation amount of 3-dimensional machine position compensation	2-word Axis	Detection Unit			The compensation value of 3-dimensional machine position compensation
5600	**Diagnosis data related to automatic phase synchronization for flexible synchronous control** Error of automatic phase synchronization (group A)	Real Path	mm, inch, degree (machine unit)	9 digit of minimum unit of data (When the increment system is IS-B, -999999.999 to +999999.999)		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.
5601	**Diagnosis data related to automatic phase synchronization for flexible synchronous control** Error of automatic phase synchronization (group B)	Real Path	mm, inch, degree (machine unit)	9 digit of minimum unit of data (When the increment system is IS-B, -999999.999 to +999999.999)		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.
5602	**Diagnosis data related to automatic phase synchronization for flexible synchronous control** Error of automatic phase synchronization (group C)	Real Path	mm, inch, degree (machine unit)	9 digit of minimum unit of data (When the increment system is IS-B, -999999.999 to +999999.999)		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.
5603	**Diagnosis data related to automatic phase synchronization for flexible synchronous control** Error of automatic phase synchronization (group D)	Real Path	mm, inch, degree (machine unit)	9 digit of minimum unit of data (When the increment system is IS-B, -999999.999 to +999999.999)		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.
5604	**Diagnosis data related to automatic phase synchronization for flexible synchronous control** Maximum error of Automatic Phase Synchronization (group A)	Real Path	mm, inch, degree (machine unit)	9 digit of minimum unit of data (When the increment system is IS-B, -999999.999 to +999999.999)		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.
5605	**Diagnosis data related to automatic phase synchronization for flexible synchronous control**	Real Path	mm, inch, degree (machine unit)	9 digit of minimum unit of data (When the		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

	Maximum error of Automatic Phase Synchronization (group B)			increment system is IS-B, -999999.999 to +999999.999)		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.
5606	**Diagnosis data related to automatic phase synchronization for flexible synchronous control** Maximum error of Automatic Phase Synchronization (group C)	Real Path	mm, inch, degree (machine unit)	9 digit of minimum unit of data (When the increment system is IS-B, -999999.999 to +999999.999)		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.
5607	**Diagnosis data related to automatic phase synchronization for flexible synchronous control** Maximum error of Automatic Phase Synchronization (group D)	Real Path	mm, inch, degree (machine unit)	9 digit of minimum unit of data (When the increment system is IS-B, -999999.999 to +999999.999)		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.
6507	Active machine configuration set No.	Byte path		0 - 10		• 0 : Machine configuration set has not been selected yet. • 1 to 10 : Active machine configuration set No.