2) TROUBLESHOOTING

2.1 Alarm Types Description

The machine alarms are split up into two different types of alarms. Fanuc designs one set of alarms in the controller, these are referred to as software alarms and the other set are in the PLC and these are designed by Victor. The PLC alarms are referred to as hardware alarms.

The alarms on the FANUC controller are classified as follows

Alarm No. area	description	Where we could find info. ?
No. 000 to 255	P/S alarms (program errors)	Fanuc maintenance manual
No. 300 to 349	Absolute pulse coder alarms	Fanuc maintenance manual
No. 350 and 399	Serial pulse coder alarms	Fanuc maintenance manual
No. 400 to 499	Servo alarms	Fanuc maintenance manual
No. 500 to 599	Overtravel alarms	Fanuc maintenance manual
No 700 to 749	Overheat alarms	Fanuc maintenance manual
No 750 to 799	Spindle Alarms	Fanuc maintenance manual
No 900 to 999	System Alarms	Fanuc maintenance manual
No. 5000 to	P/S Alarms	Fanuc maintenance manual

If the Fanuc alarms that belong to Fanuc POWER SUPPLY MODULE , SERVO AMPLIFIER and SPINDLE AMPLIFIER the alarm code also would be showed on the LED of the related device. Before you contact Fanuc service,please refer to section 2.2 and 2,3 of this chapter for it.

Alarm 1000~1999 are Victor PLC alarm, please refer to
Alarm 2000~2999 are Victor PLC warning message.
Please refer to Section 2.4 for them

2.2 Alarm number & description for Power supply, servo and spindle motor

2.2.1 Servo Alarm

Alarm No.	SVM	PSM	Description	Remarks
361			Pulsecoder phase error (built-in)	**2.3.3.7 (1)**
364			Soft phase alarm (built-in)	**2.3.3.7 (1)**
365			LED error (built-in)	**2.3.3.7 (1)**
366			Pulse error (built-in)	**2.3.3.7 (1)**
367			Count error (built-in)	**2.3.3.7 (1)**
368			Serial data error (built-in)	**2.3.3.7 (3)**
369			Data transfer error (built-in)	**2.3.3.7 (3)**
380			LED error (separate)	**2.3.3.7 (2)**
381			Pulsecoder phase error (separate)	**2.3.3.7 (2)**
382			Count error (separate)	**2.3.3.7 (2)**
383			Pulse error (separate)	**2.3.3.7 (2)**
384			Soft phase alarm (separate)	**2.3.3.7 (2)**
385			Serial data error (separate)	**2.3.3.7 (3)**
386			Data transfer error (separate)	**2.3.3.7 (3)**
387			Sensor error (separate)	**2.3.3.7 (2)**
417			Invalid parameter	**2.3.3.6**
421			Excessive semi-full error	**2.3.3.8**
430			Servomotor overheat	**2.3.3.5**
431		3	Converter: main circuit overload	**2.3.1.3**
432		6	Converter: control undervoltage	**2.3.1.6**
433		4	Converter: DC link undervoltage	**2.3.1.4**
434	2		Inverter: control power supply undervoltage	**2.3.2**
435	5		Inverter: DC link undervoltage	**2.3.2**
436			Soft thermal (OVC)	**2.3.3.3**
437		1	Converter: input circuit overcurrent	**2.3.1.1**
438	b		Inverter: motor current alarm (L axis)	**2.3.2**
438	c		Inverter: motor current alarm (M axis)	**2.3.2**
438	d		Inverter: motor current alarm (N axis)	**2.3.2**
439		7	Converter: DC link overvoltage	**2.3.1.7**
440		H	Converter: excessive deceleration power	**2.2.1.11**
441			Current offset error	**2.3.3.8**
442		5	Converter: DC link precharge failure	**2.3.1.5**
443		2	Converter: cooling fan stopped	**2.3.1.2**
444	1		Inverter: internal cooling fan stopped	**2.3.2**
445			Soft disconnection alarm	**2.3.3.4**
446			Hard disconnection alarm	**Not issued**
447			Hard disconnection alarm (separate)	**2.3.3.4**
448			Feedback mismatch alarm	**2.3.3.8**
449	8.		Inverter: IPM alarm (L axis)	**2.3.2**
449	9.		Inverter: IPM alarm (M axis)	**2.3.2**
449	A.		Inverter: IPM alarm (N axis)	**2.3.2**
453			Soft disconnection alarm (α Pulsecoder)	**2.3.3.4**
600	8.		Inverter: DC link current alarm (L axis)	**2.3.2**
600	9.		Inverter: DC link current alarm (M axis)	**2.3.2**
600	A.		Inverter: DC link current alarm (N axis)	**2.3.2**
601	F		Inverter: cooling fan stopped of the radiator	**2.3.2**

Alarm No.	SVM	PSM	Description	Remarks
602	6		Inverter: overheat	**2.3.2**
603	8.		Inverter: IPM alarm (OH) (L axis)	**2.3.2**
603	9.		Inverter: IPM alarm (OH) (M axis)	**2.3.2**
603	A.		Inverter: IPM alarm (OH) (N axis)	**2.3.2**
604	P		Communication error between amplifier and module	**2.3.2**
605		8	Converter: excessive regenerative power	**2.3.1.8**
606		A	Converter: cooling fan stopped of the radiator	**2.3.1.9**
607		E	Open phase in the converter main power supply	**2.3.1.10**

2.2.2 Spindle Alarm

Alarm No.		SPM	PSM	Description	Remarks
9001	7n01	01		Motor overheat	**2.3.4.1**
9002	7n02	02		Excessive speed deviation	**2.3.4.2**
9003	7n03	03		DC link fuse blown	**2.3.4.3**
9004	7n04	04	E	Open phase in the converter main power supply	**2.3.1.10**
9006	7n06	06		Temperature sensor disconnected	**2.3.4.4**
9007	7n07	07		Excessive speed	**2.3.4.5**
9009	7n09	09		Main circuit overload/IPM overheat	**2.3.4.6**
9011	7n11	11	7	Converter: DC link overvoltage	**2.3.1.7**
9012	7n12	12		DC link overcurrent/IPM alarm	**2.3.4.7** **2.3.5.1**
9015	7n15	15		Output switching/spindle switching alarm	**2.3.4.8**
750		18		Program sum check error	**2.3.4.9**
750		19		Excessive offset of the phase U current detection circuit	**2.3.4.10**
750		20		Excessive offset of the phase V current detection circuit	**2.3.4.10**
9021		21		Position sensor polarity setting incorrect	**2.3.4.11**
749		24		Serial transfer data error	**2.3.4.12**
9027	7n27	27		Position coder disconnected	**2.3.4.13**
9029	7n29	29		Short-period overload	**2.3.4.14**
9030	7n30	30	1	Overcurrent in the converter input circuit	**2.3.1.1**
9031	7n31	31		Motor lock alarm	**2.3.4.15**
9032	7n32	32		Serial communication LSI RAM error	**2.3.4.16**
9033	7n33	33	5	Converter: DC link precharge failure	**2.3.1.5**
9034	7n34	34		Parameter data out of the specifiable range	**2.3.4.17**
9035	7n35	35		Gear ratio parameter error	**2.3.5.2**
9036	7n36	36		Error counter overflow	**2.3.4.18**
9037	7n37	37		Speed detector parameter error	**2.3.4.19**
9041	7n41	41		Position coder one-rotation signal detection error	**2.3.4.20**
9042	7n42	42		Position coder one-rotation signal not detected	**2.3.4.21**
9046	7n46	46		Position sensor one-rotation signal detection error during thread cutting	**2.3.4.22**
9047	7n47	47		Position coder signal error	**2.3.4.23**
9050	7n50	50		Excessive speed command calculation value during spindle synchronization	**2.3.4.24**
9051	7n51	51	4	Converter: DC link undervoltage	**2.3.1.4**
9052	7n52	52		ITP signal error I	**2.3.4.25**
9053	7n53	53		ITP signal error II	**2.3.4.25**
9054	7n54	54		Current overload alarm	**2.3.4.26**
9055	7n55	55		Abnormal switching status of power leads	**2.3.4.27**
9056	7n56	56		Internal cooling fan stopped	**2.3.4.28**
9057	7n57	57	H	Converter: excessive deceleration power	**2.3.1.11**
9058	7n58	58	3	Converter: main circuit overload	**2.3.1.3**
9059	7n59	59	2	Converter: cooling fan stopped	**2.3.1.2**
9066	7n66	66		Communication alarm between spindle and amplifier	**2.3.4.29**
9069	7n69	69		Safety speed exceeded	**2.3.4.30**
9070	7n70	70		Abnormal axis data	**2.3.4.31**
9071	7n71	71		Abnormal safety parameter	**2.3.4.32**
9072	7n72	72		Motor speed mismatch	**2.3.4.33**
9073	7n73	73		Motor sensor disconnected	**2.3.4.34**
9074	7n74	74		CPU test alarm	**2.3.4.35**

| Alarm No.		SPM	PSM	Description	Remarks
9075	7n75	75		CRC test alarm	**2.3.4.36**
9076	7n76	76		Safety function not executed	**2.3.4.37**
9077	7n77	77		Axis number mismatch	**2.3.4.38**
9078	7n78	78		Safety parameter mismatch	**2.3.4.39**
9079	7n79	79		Abnormal initial test operation	**2.3.4.40**
9081	7n81	81		Motor sensor one-rotation signal detection error	**2.3.4.41**
9082	7n82	82		Motor sensor one-rotation signal not detected	**2.3.4.42**
9083	7n83	83		Motor sensor signal error	**2.3.4.43**
9084	7n84	84		Spindle sensor disconnected	**2.3.4.44**
9085	7n85	85		Spindle sensor one-rotation signal detection error	**2.3.4.45**
9086	7n86	86		Spindle sensor one-rotation signal not detected	**2.3.4.46**
9087	7n87	87		Spindle sensor signal error	**2.3.4.47**
9088	7n88	88		Cooling fan stopped of the radiator	**2.3.4.48**
	7n97			Other spindle amplifier alarm	**2.3.4.52**
	7n98			Other converter alarm	**2.3.4.52**
749		A		Program ROM error	**2.3.4.49**
749		A1		Program ROM error	**2.3.4.49**
749		A2		Program ROM error	**2.3.4.49**
9110	7n98	b0		Communication error between amplifier and module	**2.3.4.50**
9111	7n98	b1	6	Converter: control power supply low voltage	**2.3.1.6**
9112	7n98	b2	8	Converter:　　excessive regenerative power	**2.3.1.8**
9113	7n98	b3	A	Converter: cooling fan stopped of the radiator	**2.3.1.9**
9120		C0		Communication data alarm	**2.3.4.51**
9121		C1		Communication data alarm	**2.3.4.51**
9122		C2		Communication data alarm	**2.3.4.51**
9123		C3		Spindle switching circuit error	**2.3.4.52**
756,766				Abnormal axis data	**2.3.4.51**

n represents a spindle number.

2.3 Troubleshooting & Action for Fanuc motor hardware

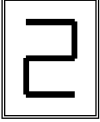(This section refer to Fanuc manual B-65285EN/03)

2.3.1 POWER SUPPLY MODULE

If an alarm occurs, in the STATUS display, the ALM LED lights red, and the one-digit 7-segment display indicates an alarm code or warning code.

The meaning of each warning code is the same as that of the corresponding alarm code. If a warning code is displayed, an alarm condition will occur in a certain period of time. The PSM or PSMR remains operable while the warning code stays displayed.

Position of the STATUS LEDs
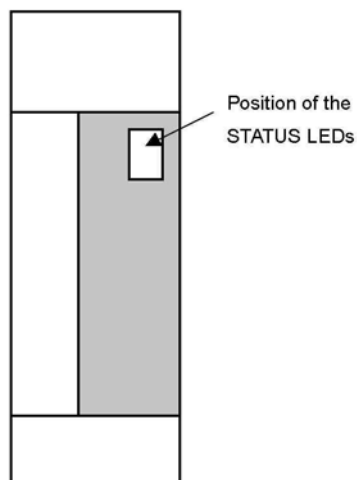
No.	STATUS LEDs	Description
1		The STATUS display LED is off. Control power has not been supplied. The control power circuit is defective. See Section 4.1.3.
2	—	Not ready The main circuit is not supplied with power (MCC OFF). Emergency stop state
3	▯	Ready The main circuit is supplied with power (MCC ON). The PSM is operable.
4	2.	Warning state (the dot at the bottom right lights.) A failure has occurred in the PSM. The PSM can keep operating. However it will enter an alarm state after a certain period of time. See Section 3.1 of Part II.

5		Alarm state The PSM is not operable.
	⎕2	

2.3.1.1   Alarm Code 1 (PSM)

For the PSM-5.5*i* to PSM-15 *i*
(1)   Meaning

     The main circuit power module (IPM) has detected an abnormal condition.

(2)   Cause and troubleshooting
     (a)   Control supply voltage decrease of the power module (IPM)
         → Replace the power unit.
     (b)   Input supply voltage imbalance
         → Check the input power supply specification.
     (c)   The specification of the AC reactor does not match the PSM in use.
         → Check the PSM and the specification of the AC reactor.
     (d)   IPM failure

         → Replace the IPM.

For the PSM-15*i* to PSM-37*i*

(1)   Meaning

     Overcurrent flowed into the input of the main circuit.

(2)   Cause and troubleshooting
     (a)   Input supply voltage imbalance
     → Check the input power supply specification
     (b)   The specification of the AC reactor does not match the PSM in use.
     → Check the PSM and the specification of the AC reactor.
     (c)   IGBT defective
     → Replace IGBT

2.3.1.2 Alarm Code 2 (PSM, PSMR)

(1) Meaning
    A cooling fan for the control circuit has stopped.

(2) Cause and troubleshooting
    (a)   Cooling fan broken ,Check whether the cooling fan rotates normally.

        → Replace it.

2.3.1.3 Alarm Code 3 (PSM)

(1) Meaning
    The temperature of the main circuit heat sink has risen abnormally.

(2) Cause and troubleshooting
    (a) Cooling fan for the main circuit broken. Check whether the cooling fan for the main circuit rotates
        normally.
        →   Replace it.
    (b) Dust accumulation
        → Clean the cooling system with a vacuum cleaner or the factory air blower.
    (c) Overload
        →   Examine the operating conditions.
    (d) Poor installation of the control printed-circuit board
        → Be sure to push the faceplate as far as it will go. (This alarm may be displayed if one of the
            connectors for connection between the control printed-circuit board and power printed-circuit
            board is detached.)

2.3.1.4 Alarm Code 4 (PSM, PSMR)

(1) Meaning
    In the main circuit, the DC voltage (DC link) has dropped.

(2) Cause and troubleshooting
    (a) A small power dip has occurred.
        →   Check the power supply.
    (b) Low input power supply voltage
        →   Check the power supply specification.
    (c) The main circuit power supply may have been switched off with an emergency stop state released.
        →   Check the sequence.

2.3.1.5 Alarm Code 5 (PSM, PSMR)

(1) Meaning
    The main circuit capacitor was not recharged within the specified time.

(2) Cause and troubleshooting
    (a)   Too many SVM and/or SPM units are connected.
        →   Check the specification of the PSM.
    (b)   The DC link is short-circuited.
        →   Check the connection.
    (c)   The recharge current limiting resistor is defective.
        →   Replace the distributing board.

2.3.1.6 **Alarm Code 6 (PSM, PSMR)**

(1) Meaning The control power supply voltage decrease.

(2) Cause and troubleshooting

   (a) Input voltage decrease
       →   Check the power supply.

2.3.1.7 **Alarm Code 7 (PSM, PSMR)**

(1) Meaning
     In the main circuit, the DC voltage at the DC link is abnormally high.

(2) Cause and troubleshooting
   (a) Excessive regenerated power The PSM does not have a sufficient capacity.
       →   Check the specification of the PSM.
   (b) The output impedance of the AC power source is too high.
       →   Check the power source output impedance.
        (Normal if the voltage variation at maximum output time is within 7%)
   (c) The main circuit power supply may have been switched off with an emergency stop state
        released.
       →   Check the sequence.

2.3.1.8 **Alarm Code 8 (PSMR)**

(1) Meaning
     There is excessive short-term regenerative power.

(2) Cause and troubleshooting
   (a) Insufficient regenerative resistance
       →   Review the specification of the regenerative resistance.
   (b) Regenerative circuit failure
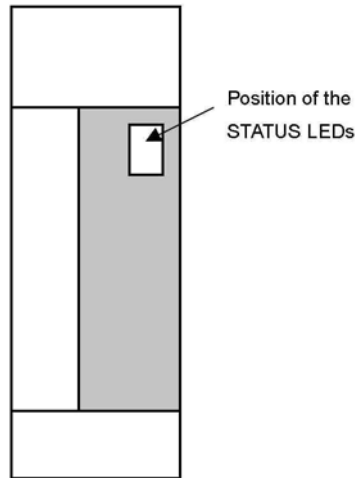   →   The regenerative circuit is abnormal. Replace the PSMR.

2.3.1.9 **Alarm Code A (PSM)**

(1) Meaning
     A cooling fan of external cooling fin has stopped.

(2) Cause and troubleshooting
   (a) Cooling fan of external cooling fin broken Check whether the cooling fan of external cooling
        fin rotates normally.
       →   Replace it.
   (b) Poor installation of the control printed-circuit board
       →   Be sure to install the control printed-circuit board.
(This alarm may be issued if one of the connectors for connection between the control printed-circuit board
and power printed-circuit board become loose.)

2.3.1.10 **Alarm Code E (PSM, PSMR)**

(1) Meaning

     The input power supply is abnormal (open phase).

(2) Cause and troubleshooting

    (a)   The input power supply has an open phase.

    (b)   Check the power supply voltage.
        →   If there is no problem with the power supply voltage, check the connections.

2.3.1.11   **Alarm Code H (PSMR)**

(1) Meaning
The temperature of the regenerative resistor has arisen abnormally.

(2) Cause and troubleshooting
    (a)   Regenerative resistance not detected
        →   Check the wiring for the regenerative resistance
    (b)   Insufficient regenerative resistance
        →   Review the specification for the regenerative resistance.
    (c)   Excessive regenerative power
        →   Reduce the frequency at which acceleration/ deceleration occurs.
    (d)   Regenerative resistor cooling fan stopped
        →   Check to see if the regenerative resistor cooling fan has stopped.
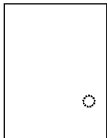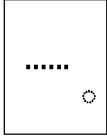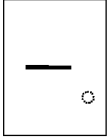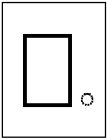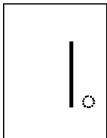
2.3.2 SERVO AMPLIFIER MODULE

The STATUS display (a 7-segment LED) on the front of the SVM indicates the operation status.

Position of the STATUS LEDs

STATUS display	Description
	• The STATUS display LED is not on. <1> Power is not turned on. <2> Poor cable connection → Check the cable. <3> The servo amplifier is defective. → Replace the fuse (F1) or servo amplifier.
Blinking	• The cable is shorted out. Check the cable.
	• The control power supply is waiting for a ready signal.
	• The servo amplifier is ready to operate. The servo motor is supplied with power.
	• Alarm state If an alarm is issued in the servo amplifier, a value other than "0" and "-" is indicated on the STATUS display LED. See Section 3.2 of Part II.

The following table lists alarms related to the servo amplifier. See this table while comparing the CNC alarm codes presented in Section 2.2 , "Alarm Numbers and Brief Description" with the LED displays of the SVM.

Alarm	LED display	Major cause	Reference
Inverter: internal cooling fan stopped	1	- Fan not running. - Fan motor connector or cable defective - SVM failure	**2.3.2.1**
Inverter: control power supply undervoltage	2	- The 24 V control power supply output from the PSM is low. - Connector/cable (CXA2A/B) defective - SVM failure	**2.3.2.2**
Inverter: DC link undervoltage	5	- Low input voltage - DC link short-bar poor connection - SVM failure	**2.3.2.3**
Inverter: overheat	6	- The motor is being used under a harsh condition. - The ambient temperature is high. - SVM failure	**2.3.2.4**
Inverter: cooling fan stopped of the radiator	F	- Fan not running. - Fan motor connector or cable defective - SVM failure	**2.3.2.5**
Communication error between amplifier and module	P	- Connector/cable (CXA2A/B) defective - SVM failure	**2.3.2.6**
Inverter: DC link current alarm (L axis)	8	- Short-circuit between power lead phases or ground fault in them - Short-circuit between motor winding phases or ground fault in them - SVM failure	**2.3.2.7**
Inverter: IPM alarm (L axis) Inverter: IPM alarm (M axis) Inverter: IPM alarm (N axis)	8. 9. A.	- Short-circuit between power lead phases or ground fault in them - Short-circuit between motor winding phases or ground fault in them - SVM failure	**2.3.2.8**
Inverter: IPM alarm (OH) (L axis) Inverter: IPM alarm (OH) (M axis) Inverter: IPM alarm (OH) (N axis)	8. 9. A.	- The motor is being used under a harsh condition. - The ambient temperature is high. - SVM failure	**2.3.2.9**
Inverter: DC link current alarm (L axis) Inverter: DC link current alarm (M axis) Inverter: DC link current alarm (N axis)	b c d	- Short-circuit between power lead phases or ground fault in them - Short-circuit between motor winding phases or ground fault in them - Incorrect motor ID setting - SVM failure - Motor failure	**2.3.2.10**
Inverter: abnormal control power supply	Blinking -	- Connector or cable (JF*) failure - Motor failure - SVM failure	**2.3.2.11**
Inverter: FSSB communication error (COP10B)	U	- Connector or cable (COP10B) failure - SVM failure - CNC failure	**2.3.2.12**
Inverter: FSSB communication error (COP10A)	L	- Connector or cable (COP10A) failure - SVM failure	

2.3.2.1 Alarm Code 1

(1) Meaning
  Inverter: internal cooling fan stopped
(2) Cause and troubleshooting
  (a) Check whether there is any foreign material in the fan.
  (b) Be sure to push the faceplate (control printed-circuit board) as far as it will go.
  (c) Check that the fan connector is attached correctly.
  (d) Replace the fan.
  (e) Replace the SVM.

2.3.2.2 Alarm Code 2

(1) Meaning
  Inverter: control power supply undervoltage
(2) Cause and troubleshooting
  (a) Check the three-phase input voltage of the amplifier (the voltage shall not be lower than 85% of the rated input voltage).
  (b) Check the 24 V power supply voltage output from the PSM (the voltage shall normally not lower than 22.8 V).
  (c) Check the connector and cable (CXA2A/B).
  (d) Replace the SVM.

2.3.2.3 Alarm Code 5

(1) Meaning
  Inverter: DC link undervoltage
(2) Cause and troubleshooting
  (a) Check that the screws for the DC link connection cable (bar) are tight.
  (b) If a DC link low voltage alarm condition occurs in more than one module, see Subsection 3.1.4, "Alarm code 4" for explanations about how to troubleshoot the power supply module.
  (c) If a DC link low voltage alarm condition occurs in one SVM only, be sure to push the faceplate (control printed-circuit board) of that SVM as far as it will go.
  (d) Replace the SVM in which this alarm has occurred.

2.3.2.4 Alarm Code 6

(1) Meaning
  Inverter: overheat
(2) Cause and troubleshooting
  (a) Check that the motor is being used at or below its continuous rating.
  (b) Check that the cooling capacity of the cabinet is sufficient (inspect the fans and filters).
  (c) Check that the ambient temperature is not too high.
  (d) Be sure to push the faceplate (control printed-circuit board) as far as it will go.
  (e) Replace the SVM.

2.3.2.5 Alarm Code F

(1) Meaning
  Innverter: cooling fan stopped of the radiator
(2) Cause and troubleshooting
  (a) Check whether there is any foreign material in the fan.
  (b) Be sure to push the faceplate (control printed-circuit board) as far as it will go.
  (c) Check that the fan connector is attached correctly.
  (d) Replace the fan.
  (e) Replace the SVM.

2.3.2.6 Alarm Code P

(1) Meaning
    Communication error between amplifier and module
(2) Cause and troubleshooting
    (a) Check the connector and cable (CXA2A/B).
    (b) Replace the control printed-circuit board.
    (c) Replace the SVM.

2.3.2.7 Alarm Code 8

(1) Meaning
    Inverter: DC link current alarm
(2) Cause and troubleshooting
    (a) Disconnect the motor power leads from the SVM, and
        release the SVM from an emergency stop condition.
        <1> If no abnormal DC link current alarm condition has occurred
            → Go to (b).
        <2> If an abnormal DC link current alarm condition has occurred
            → Replace the SVM.
    (b) Disconnect the motor power leads from the SVM, and check the insulation between PE and the
        motor power lead U, V, or W.
        <1> If the insulation is deteriorated
            → Go to (c).
        <2> If the insulation is normal
            → Replace the SVM.
    (c) Disconnect the motor from its power leads, and check whether the insulation of the motor or
        power leads is deteriorated.
        <1> If the insulation of the motor is deteriorated
            → Replace the motor.
        <2> If the insulation of any power lead is deteriorated
            → Replace the power lead.

2.3.2.8 Alarm Codes 8., 9., and A.

(1) Meaning
    Inverter: IPM alarm
(2) Cause and troubleshooting
    (a) Be sure to push the faceplate (control printed-circuit board) as far as it will go.
    (b) Disconnect the motor power leads from the SVM, and release the SVM from an emergency
        stop condition.
        <1> If no IPM alarm condition has occurred
            → Go to (b).
        <2> If an IPM alarm condition has occurred
            → Replace the SVM.
    (c) Disconnect the motor power leads from the SVM, and check the insulation between PE and the
        motor power lead U, V, or W.
        <1> If the insulation is deteriorated
            → Go to (c).
        <2> If the insulation is normal
            → Replace the SVM.
    (d) Disconnect the motor from its power leads, and check whether the insulation of the motor or
        power leads is deteriorated.
        <1> If the insulation of the motor is deteriorated
            → Replace the motor.

<2> If the insulation of any power lead is deteriorated
→ Replace the power lead.

2.3.2.9 Alarm Codes 8., 9., and A.

(1) Meaning
    Inverter: IPM alarm (OH)
(2) Cause and troubleshooting
   (a) Be sure to push the faceplate (control printed-circuit board) as far as it will go.
   (b) Check that the heat sink cooling fan is running.
   (c) Check that the motor is being used at or below its continuous rating.
   (d) Check that the cooling capacity of the cabinet is sufficient (inspect the fans and filters).
   (e) Check that the ambient temperature is not too high.
   (f) Replace the SVM.

2.3.2.10 Alarm Codes b, c, and d

(1) Meaning
    Inverter: DC link current alarm
(2) Cause and troubleshooting
   (a) Checking the servo parameters
        Referring to "FANUC AC SERVO MOTOR αis/αi series Parameter Manual
        (B-65270EN)," check whether the following parameters have default values.

Series 15i	No.1809	No.1852	No.1853
Series 16i, 18i, 20i, 21i, 0i Power Mate i	No.2004	No.2040	No.2041

        Alternatively, if an abnormal motor current alarm condition occurs only on rapid
        acceleration/deceleration, it is likely that the motor is being used under too harsh a
        condition. Increase the acceleration/deceleration time constant, and see what will occur.
   (b) Be sure to push the faceplate (control printed-circuit board) as far as it will go.
   (c) Disconnect the motor power leads from the SVM, and release the SVM from an emergency
        stop condition.
        <1> If no abnormal motor current occurs
             → Go to (c).
        <2> If an abnormal motor current occurs
             → Replace the SVM.
   (d) Disconnect the motor power leads from the SVM, and check the insulation between PE and the
        motor power lead U, V, or W.
        <1> If the insulation is deteriorated
             → Go to (d).
        <2> If the insulation is normal
             → Replace the SVM.
   (e) Disconnect the motor from its power leads, and check whether the insulation of the motor or
        power leads is deteriorated.
        <1> If the insulation of the motor is deteriorated
             → Replace the motor.
        <2> If the insulation of any power lead is deteriorated
             → Replace the power lead.

2.3.2.11   Alarm Code "-" Blinking

(1) Meaning
   Inverter: abnormal control power supply
(2) Cause and troubleshooting
   (a) Disconnect the feedback cable (JF*) from the SVM, and then switch on the power.
       <1> If blinking continues
           → Replace the SVM.
       <2> If blinking stops
           → Go to (b).
   (b) Disconnect the feedback cable (JF*) from the Pulsecoder, and then switch on the power. (Keep the cable on the SVM side connected.)
       <1> If blinking continues
           → Replace the cable.
       <2> If blinking stops
           → Replace the motor.

2.3.2.12   Alarm Code U

(1) Meaning
   Inverter: FSSB communication error (COP10B) (NOTE)
(2) Cause and troubleshooting
   (a) Replace the SVM optical cable (COP10B) that is nearest to the CNC on which "U" is displayed (in Fig. 3.2.12, the cable between UNIT2 and UNIT3).
   (b) Replace the SVM that is nearest to the CNC on which "U" is displayed (in Fig. 3.2.12, UNIT3).
   (c) Replace the COP10B-side SVM that is nearest to the CNC on which "U" is displayed (in Fig. 3.2.12, UNIT2).
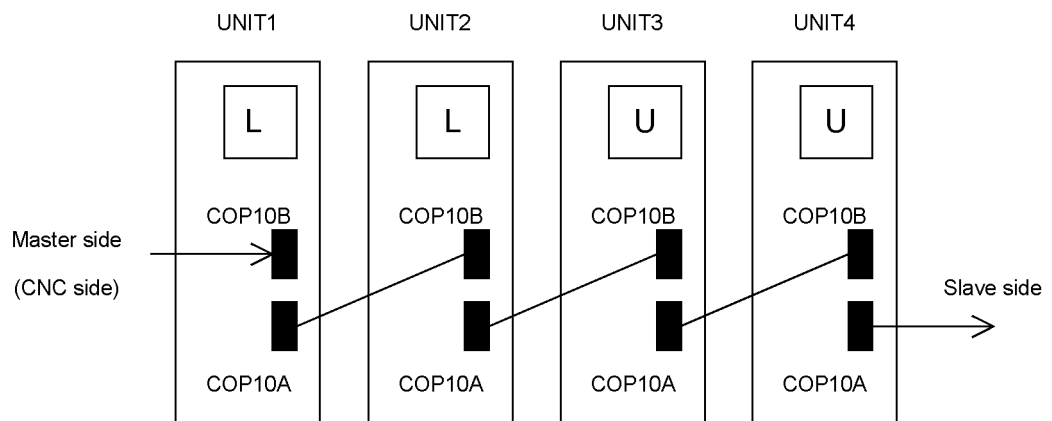   (d)   Replace the servo card in the CNC.

Fig. 3.2.12

NOTE
When the CNC power is turned on, "U" blinks momentarily, and then "-" steadily lights.
This is not a failure, though.

2.3.2.13   Alarm Code L

(1)   Meaning
        Inverter: FSSB communication error (COP10A)

(2)   Cause and troubleshooting
   (a) Replace the SVM optical cable (COP10A) that is farthest to the CNC on which "L" is displayed (in Fig. 3.2.13, the cable between UNIT2 and UNIT3).
   (b) Replace the SVM that is farthest to the CNC on which "L" is displayed (in Fig. 3.2.13, UNIT2).
   (c) Replace the COP10A-side SVM that is farthest to the CNC on which "L" is displayed (in Fig. 3.2.13, UNIT3).
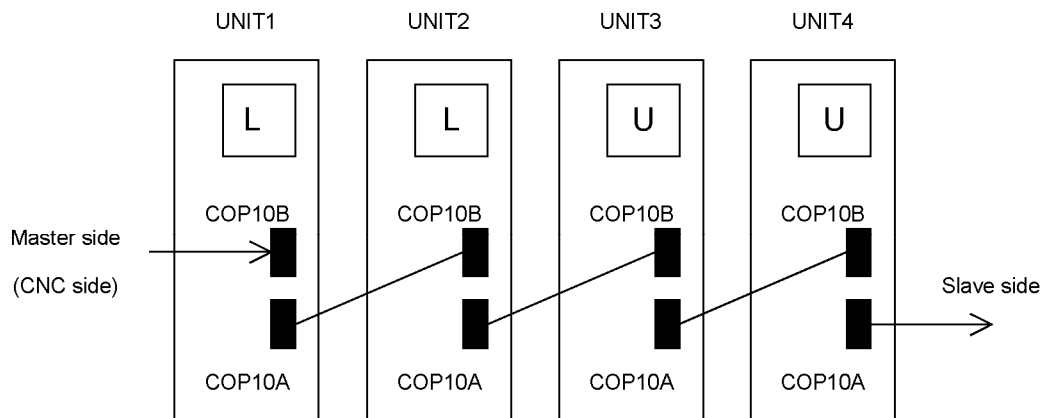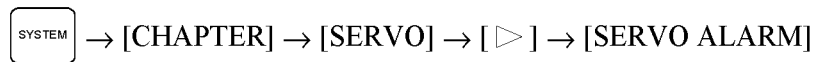
2.3.3   SERVO SOFTWARE

If a servo alarm is issued, an alarm message is output, and details of the alarm are also displayed on the servo adjustment screen or the diagnosis screen. Using the alarm identification table given in this section, determine the alarm, and take a proper action.
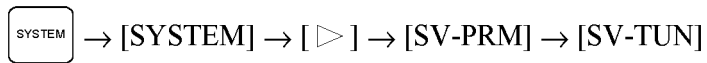
2.3.3.1   Servo Adjustment Screen

The following procedure can be used to display the servo adjustment screen.
 (The DPL/MDI of the Power Mate has no servo adjustment screen.)
✶**Series 15*i***

$$\boxed{\text{SYSTEM}} \rightarrow [\text{CHAPTER}] \rightarrow [\text{SERVO}] \rightarrow [\triangleright] \rightarrow [\text{SERVO ALARM}]$$

Series 16*i*, 18*i*, 20*i*, 21*i*, 0*i*

$$\boxed{\text{SYSTEM}} \rightarrow [\text{SYSTEM}] \rightarrow [\triangleright] \rightarrow [\text{SV-PRM}] \rightarrow [\text{SV-TUN}]$$

If the servo setting screen does not appear, specify the following parameter, then switch the CNC off and on again.

	#7	#6	#5	#4	#3	#2	#1	#0
3111								**SVS**

SVS (#0)=1 (to display the servo setting screen)

Alarm detail
information

```
SERVO MOTOR TUNING
 X AXIS
     (PARAMETER)          (MONITOR)
 FUNC. BIT   00001000  ALARM 1    00000000 <1>
 LOOP GAIN       3000  ALARM 2    00101011 <2>
 TUNING ST.         0  ALARM 3    10100000 <3>
 SET PERIOD         0  ALARM 4    00000000 <4>
 INT.GAIN          87  ALARM 5    00000000 <5>
 PROP.GAIN       -781  LOOP GAIN         0
 FILTER             0  POS ERROR         0
 VELOC.GAIN       200  CURRENT(%)        0
                       CURRENT(A)        0
                       SPEED(RPM)        0
```
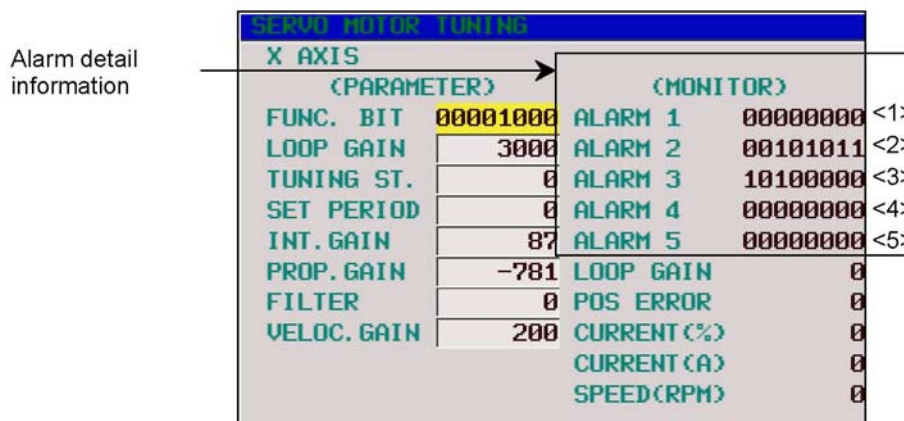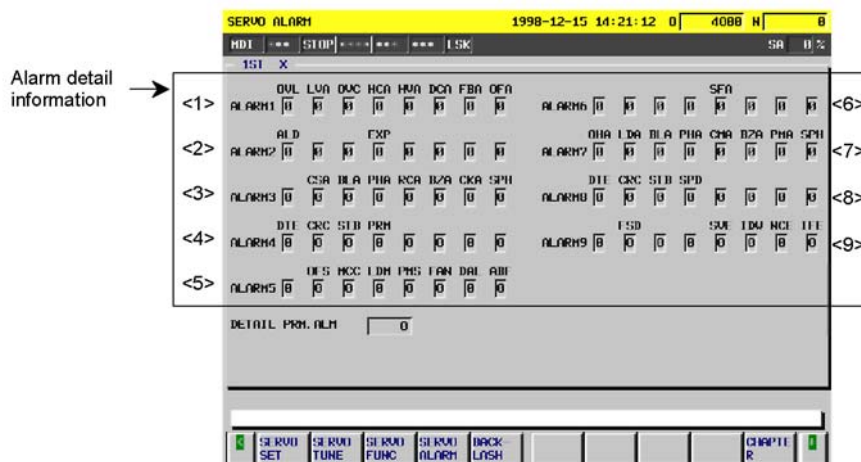
Fig. 3.3.1(a) Servo adjustment screen

Fig. 3.3.1(b) Series 15i servo alarm screen

The table below indicates the names of the alarm bits.

Table 3.3.1 List of alarm bit names

	#7	#6	#5	#4	#3	#2	#1	#0
<1> Alarm 1	OVL	LVA	OVC	HCA	HVA	DCA	FBA	OFA
<2> Alarm 2	ALD			EXP				
<3> Alarm 3		CSA	BLA	PHA	RCA	BZA	CKA	SPH
<4> Alarm 4	DTE	CRC	STB	PRM				
<5> Alarm 5		OFS	MCC	LDM	PMS	FAN	DAL	ABF
<6> Alarm 6					SFA			
<7> Alarm 7	OHA	LDA	BLA	PHA	CMA	BZA	PMA	SPH
<8> Alarm 8	DTE	CRC	STB	SPD				
<9> Alarm 9		FSD			SVE	IDW	NCE	IFE

NOTE
The empty fields do not represent alarm codes.

2.3.3.2   Diagnosis Screen _____

The alarm items of the servo adjustment screen correspond to the diagnosis screen numbers indicated in the table below.

Table 3.3.2   Correspondence between the servo adjustment screen and diagnosis screen

Alarm No.	Series 15i	Series 16i, 18i, 21i, 0i
<1> Alarm 1	No 3014 + 20(X-1)	No 200
<2> Alarm 2	3015 + 20(X-1)	201
<3> Alarm 3	3016 + 20(X-1)	202
<4> Alarm 4	3017 + 20(X-1)	203
<5> Alarm 5	---------	204
<6> Alarm 6	---------	---------
<7> Alarm 7	---------	205
<8> Alarm 8	---------	206
<9> Alarm 9	---------	---------

Fig. 3.3.2 Diagnosis screen

2.3.3.3   Overload Alarm (Soft Thermal, OVC) _____

(Alarm identification method)

	#7	#6	#5	#4	#3	#2	#1	#0
<1> Alarm 1	OVL	LVA	OVC	HCA	HVA	DCA	FBA	OFA

(1) Make sure that the motor is not vibrating.

    => If a motor vibrates, the current flowing in it becomes more than necessary, resulting in an alarm.

(2) Make sure that the power lead to the motor is connected correctly.

    => If the connection is incorrect, an abnormal current flows in the motor, resulting in an alarm.

(3) Make sure that the following parameters are set correctly.

    => An overload alarm is issued based on the result of calculation of these parameters. Be sure to set them to the standard values. For details of the standard values, refer to the FANUC AC SERVO MOTOR *αis/αi* series Parameter Manual (B-65270EN).

No. 1877 (FS15*i*)	**Overload protection coefficient (OVC1)**
No. 2062 (FS16*i*)	

No. 1878 (FS15*i*)	**Overload protection coefficient (OVC2)**
No. 2063 (FS16*i*)	

No. 1893 (FS15*i*)	**Overload protection coefficient (OVCLMT)**
No. 2065 (FS16*i*)	

No. 1785 (FS15*i*)	**Overload protection coefficient (OVC21)**
No. 2162 (FS16*i*)	

No. 1786 (FS15*i*)	**Overload protection coefficient (OVC22)**
No. 2163 (FS16*i*)	

No. 1787 (FS15*i*)	**Overload protection coefficient (OVCLMT2)**
No. 2165 (FS16*i*)	

(4) Attach the check board to connector JX5 to measure the waveform of the actual current (IR and IS) of the servo amplifier module. (This check pin board differs from that for the **a** series.) Run the motor and measure its actual currents (IR and IS). Then compare the

measurement results with the overload duty curve shown in "FANUC AC SERVO MOTOR *αis/αi* series Descriptions (B-65262EN)," and see whether the machine load is too heavy compared with the motor capacity. If the actual current is high on acceleration/deceleration, it is likely that the time constant is too small.

2.3.3.4 **Feedback Disconnected Alarm**

(Alarm identification method)

	#7	#6	#5	#4	#3	#2	#1	#0
<1> Alarm 1	OVL	LVA	OVC	HCA	HVA	DCA	FBA	OFA
<2> Alarm 2	ALD			EXP				
<6> Alarm 6					SFA			

FBA	ALD	EXP	SFA	Alarm description	Action
1	1	1	0	Hard disconnection (separate phase A/B)	1
1	0	0	0	Soft disconnection (closed loop)	2
1	0	0	1	Soft disconnection (α*i* Pulsecoder)	3

(Action)

Action 1: This alarm is issued when a separate phase A/B scale is used. Check if the phase A/B detector is connected correctly.

Action 2: This alarm is issued when the position feedback pulse variation is small relative to the velocity feedback pulse variation. This means that this alarm is not issued when a semi-full is used. Check if the separate detector outputs position feedback pulses correctly. If position feedback pulses are output correctly, it is considered that the motor alone is rotating in the reverse direction at the start of machine operation because of a large backlash between the motor position and scale position.

	#7	#6	#5	#4	#3	#2	#1	#0
No. 1808 (FS15*i*)							TGAL	
No. 2003 (FS16*i*)								

TGAL (#1)   1: Uses the parameter for the soft disconnection alarm detection level.

No. 1892 (FS15*i*)	Soft disconnection alarm level
No. 2064 (FS16*i*)	

Standard setting   4: Alarm issued for a 1/8 rotation of the motor. Increase this value.

Action 3: This alarm is issued when synchronization between the absolute position data sent from the built-in Pulsecoder and phase data is lost. Turn off the power to the CNC, then detach the Pulsecoder cable then attach it again. If this alarm is still issued, replace the Pulsecoder.

2.3.3.5 **Overheat Alarm**

(Alarm identification method)

	#7	#6	#5	#4	#3	#2	#1	#0
<1> Alarm 1	OVL	LVA	OVC	HCA	HVA	DCA	FBA	OFA
<2> Alarm 2	ALD			EXP				

OVL	ALD	EXP	Alarm description	Action
1	1	0	Motor overheat	1
1	0	0	Amplifier overheat	1

(Action)

Action 1: If this alarm is issued after a long-time of continuous operation, it is considered that the motor

and amplifier are overheated. Stop operation for a while, then make a check. If this alarm is still issued after the power is off for about 10 minutes then is turned on again, the thermostat is considered to be faulty. If this alarm is issued intermittently, increase the time constant or increase stop time in the program to suppress the rise in temperature.

2.3.3.6   Invalid Servo Parameter Setting Alarm

The invalid servo parameter setting alarm is issued when a setting out of the specifiable range is specified, or an overflow has occurred in an internal calculation. When an invalid parameter is detected on the servo side, alarm 4 #4 (PRM) = 1 results.

(Alarm identification method)

	#7	#6	#5	#4	#3	#2	#1	#0
<4> Alarm 4	DTE	CRC	STB	PRM				

For details and action required when the invalid servo parameter setting alarm is issued on the servo side, refer to the FANUC AC SERVO MOTOR αis/αi series Parameter Manual (B-65270EN).

(Reference information)
Method of checking details of an invalid parameter detected on the servo side

(For Series 15i)
A number is indicated in the item "Details of invalid parameter" on the servo alarm screen (Fig. 3.3.1(b)).

(For Series 16i, 18i, 21i, 0i, and Power Mate i)
A number is indicated in No. 352 of the diagnosis screen.

2.3.3.7   Alarms Related to Pulsecoder and Separate Serial Detector

	#7	#6	#5	#4	#3	#2	#1	#0
<1> Alarm 1	OVL	LVA	OVC	HCA	HVA	DCA	FBA	OFA
<2> Alarm 2	ALD			EXP				
<3> Alarm 3		CSA	BLA	PHA	RCA	BZA	CKA	SPH
<4> Alarm 4	DTE	CRC	STB	PRM				
<5> Alarm 5		OFS	MCC	LDM	PMS	FAN	DAL	ABF
<6> Alarm 6					SFA			
<7> Alarm 7	OHA	LDA	BLA	PHA	CMA	BZA	PMA	SPH
<8> Alarm 8	DTE	CRC	STB	SPD				
<9> Alarm 9		FSD			SVE	IDW	NCE	IFE

(Bits for alarm identification)

(1)   For a built-in Pulsecoder
An alarm is determined from the bits of alarms 1, 2, 3, and 5. The table below indicates the meaning of each bit.

Alarm 3							Alarm 5		1	Alarm 2		Alarm description	Action
CSA	BLA	PHA	RCA	BZA	CKA	SPH	LD	PMA	FBA	ALD	EXP		
						1						Soft phase alarm	2
				1								Zero battery voltage	1
			1						1	1	0	Count error alarm	2
		1										Phase alarm	2
	1											Battery voltage decrease (warning)	1
								1				Pulse error alarm	
							1					LED error alarm	

⚠ **CAUTION**	

An alarm for which no action number is given is considered to be caused by a Pulsecoder failure. Replace the Pulsecoder.

---

(2)   For a separate serial detector
An alarm is determined from the bits of alarm 7. The table below indicates the meaning of each bit.

Alarm 7								Alarm description	Action
OHA	LDA	BLA	PHA	CMA	BZA	PMA	SPH		
							1	Soft phase alarm	2
						1		Pulse error alarm	
					1			Zero battery voltage	1
				1				Count error alarm	2
			1					Phase alarm	2
		1						Battery voltage decrease (warning)	1
	1							LED error alarm	
1								Separate detector alarm	**3**

⚠ **CAUTION**

An alarm for which no action number is given is considered to be caused by a detector failure. Replace the detector.

(Action)

Action 1: Battery-related alarms

Check if a battery is connected. When the power is turned on for the first time after a battery is connected, the zero battery voltage alarm is issued. In such a case, turn off the power, then turn on the power again. If the alarm is still issued, check the battery voltage. If the battery voltage decrease alarm is issued, check the voltage, and replace the battery as required.

Action 2: Alarms that may be issued for noise

If an alarm is issued intermittently or after emergency stop cancellation, noise is probably the cause. So, provide noise protection. If the same alarm is still issued after noise protection is provided, replace the detector.

Action 3: Alarm condition detected by the separate detector

If the separate detector detects an alarm condition, contact the manufacturer of the detector for

information on troubleshooting.

(3)   Alarms related to serial communication. An alarm is determined from the bits of alarms 4 and 8.

Alarm 4			Alarm 8			Alarm description
DTE	CRC	STB	DTE	CRC	STB	
1						Serial Pulsecoder communication alarm
	1					
		1				
			1			Separate serial Pulsecoder communication alarm
				1		
					1	

Action: Serial communication is not performed correctly. Check if the cable is connected correctly and is not broken. If CRC or STB is issued, noise may be the cause. So, provide noise protection. If CRC or STB is always issued after the power is turned on, the Pulsecoder or amplifier control board or the pulse module may be faulty.

2.3.3.8 **Other Alarms**

(Alarm identification method)

	#7	#6	#5	#4	#3	#2	#1	#0
<5> Alarm 5		OFS	MCC	LDM	PMS	FAN	DAL	ABF

OFS	DAL	ABF	Alarm description	Action
		1	Feedback mismatch alarm	1
	1		Excessive semi-full error alarm	2
1			Current offset error alarm	3

 (Action)

Action 1: This alarm is issued when the move direction of the position detector is opposite to the move direction of the speed detector. Check the rotation direction of the separate detector. If the rotation direction of the separate detector is opposite to the rotation direction of the motor, take the following action: For a phase A/B detector: Reverse the connections of A and A.

For a serial detector: Reverse the setting of the signal direction of the separate detector.

In the Series 90B0/G(07) and subsequent editions, the following settings enable signal directions in the A/B phase detector to be inverted.

	#7	#6	#5	#4	#3	#2	#1	#0
No. 1960 (FS15*i*)								RVRSE
No. 2018 (FS16*i*)								

RVRSE (#0) Reverses the signal direction of the separate detector.

0: Does not reverse the signal direction of the separate detector.

1: Reverses the signal direction of the separate detector.

If a large distortion exists between the motor and separate detector, this alarm may be issued in the case of abrupt acceleration/deceleration. In such a case, modify the detection level.

	#7	#6	#5	#4	#3	#2	#1	#0
No. 1741 (FS15*i*)							RNLV	
No. 2201 (FS16*i*)								

RNLV (#1) Modifies the feedback mismatch alarm detection level.

1: Detected with 1000 min^{-1} or more

0: Detected with 600 min^{-1} or more

Action 2: This alarm is issued when the difference between the motor position and separate detector position exceeds the excessive semi-full error level. Check if the conversion efficient for dual position feedback is set correctly. If the conversion efficient is set correctly, increase the alarm level. If this alarm is still issued after the level is modified, check the connection direction of the scale.

No. 1971 (FS15*i*)	**Dual position feedback conversion coefficient (numerator)**
No. 2078 (FS16*i*)	

No. 1972 (FS15*i*)	**Dual position feedback conversion coefficient (denominator)**
No. 2079 (FS16*i*)	

$$\text{Conversion coefficient} = \frac{\left(\begin{array}{l} \text{Number of feedback pulses per motor} \\ \text{revolution (detection unit)} \end{array} \right)}{1,000,000}$$

No. 1729 (FS15*i*)	**Dual position feedback semi-full error level**
No. 2118 (FS16*i*)	

[Setting] Detection unit. When 0 is set, no detection is made.

Action 3: The current offset value of the current detector (equivalent to the current value in the emergency stop state) is abnormally high. If this alarm is still issued after the power is turned off then back on, the current detector is faulty. For the α*i* series, replace the amplifier.

2.3.4   SPINDLE AMPLIFIER MODULE

If an alarm occurs in the spindle amplifier module, the ALM LED lights red in the STATUS display, and the two-digit 7-segment LEDs indicate the alarm code.

The ALM LED → ☆ Ū I
lights red.

status   Alarm code 01, 02 or above is indicated.
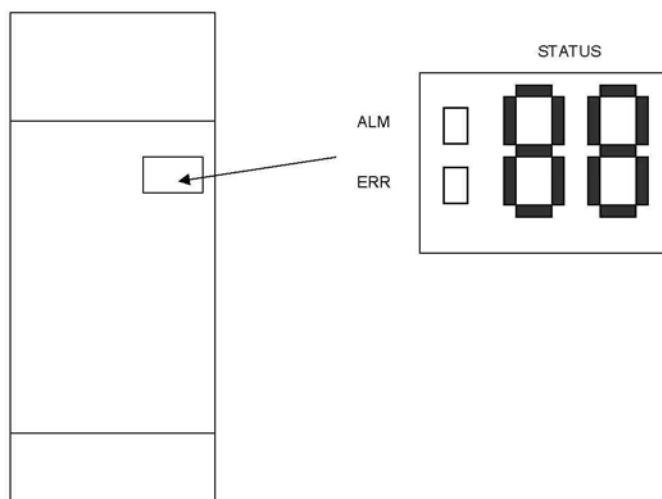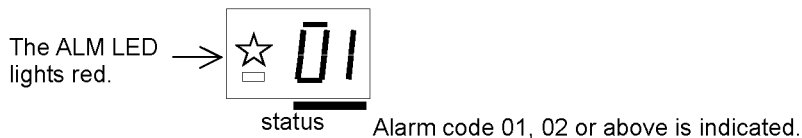
No.	ALM	ERR	STATUS	Description
1			No indication	The control power supply has not been switched on. The power supply circuit is defective. See Section 3.1.2.
2			50	For about 1.0 s after the control power supply is switched on, the lower two digits of the spindle software series No. are indicated. Example) 50: Software series No. 9D50
3			04	The spindle software edition number is displayed for about 1.0 s. 01, 02, 03, and so on correspond to A, B, C, and so on, respectively. Example) 04: software edition D
4			--Blinking	The CNC has not been switched on. The machine is waiting for serial communication and parameter loading to end.
5			--Lighting	Parameter loading has ended. The motor is not supplied with power.
6			00	The motor is supplied with power.
7	Lighting		01 or above is displayed.	Alarm state The SPM is not operable. See Chapter 1 of Part II.
8		Lighting	01 or above is displayed.	Error state Incorrect parameter setting or improper sequence.

2.3.4.1   **Alarm Code 01**

The inside temperature of the motor is higher than the specified temperature.

(1) If this alarm is issued during cutting (the motor temperature is high)
    (a) Check the cooling state of the motor.
        <1> If the cooling fan of the spindle motor is stopped, check the power supply of the cooling fan. If the cooling fan is still inoperative, replace it with a new one.
        <2> When a liquid-cooled motor is used, check the cooling system.
        <3> When the ambient temperature of the spindle motor is higher than the specified temperature, lower the ambient temperature to satisfy the specification.
    (b) Recheck the cutting conditions.

(2) If this alarm is issued under a light load (the motor temperature is high)
    (a) When the frequency of acceleration/deceleration is too high Set such a use condition that the average including output at acceleration/deceleration does not exceed the continuous rating.
    (b) The parameters specific to the motor are not correctly. Referring to "FANUC AC SPINDLE MOTOR α*i* series Parameter Manual (B-65280EN)," check the motor-specific parameters.

(3) If this alarm is issued when the motor temperature is low
    (a) The spindle motor feedback cable is faulty. Replace the cable.

    (c) The parameters specific to the motor are not set correctly. Referring to "FANUC AC SPINDLE MOTOR α*i* series Parameter Manual (B-65280EN)," check the motor-specific parameters.

FS15*i*	FS16*i*	For α series motor	For α*i* series motor
3134	4134	0	motor-specific parameter

    (c) The control printed circuit board is faulty. Replace the control printed circuit board or spindle amplifier.
    (d) The motor (internal thermostat) is faulty. Replace the motor.

2.3.4.2   **Alarm Code 02**

The actual motor speed is largely deviated from the commanded speed.

(1) If this alarm is issued during motor acceleration
    (a) The parameter setting of acceleration/deceleration time is incorrect.
        Set the following parameter with the actual acceleration/deceleration time for your machine plus some margin.

FS15*i*	FS16*i*	Description
3082	4082	Setting of acceleration/deceleration time

    (b) The parameter for the speed detector is not set correctly. Referring to "FANUC AC SPINDLE MOTOR α*i* series Parameter Manual (B-65280EN)," set a correct value.

(2) If this alarm is issued at a heavy cutting load
    (a) The cutting load has exceeded the motor output power. Check the load meter indication, and review the use condition.
    (b) The parameters for output restriction are not set correctly. Check that the settings of the following parameters satisfy the machine and motor specifications:

FS15*i*	FS16*i*	Description
3028	4028	Output restriction pattern setting

3029	4029	Output restriction value

    (c)   The parameters specific to the motor are not correctly.
Referring to "FANUC AC SPINDLE MOTOR α*i* series Parameter Manual (B-65280EN)," check the motor-specific parameters.

2.3.4.3   Alarm Code 03

The fuse of the DC link has blown. (The voltage at the DC link is insufficient.) This alarm is checked when emergency stop is cancelled.

(1)   If this alarm is issued during spindle operation (rotation)
The fuse of the DC link inside the SPM has probably blown. So, replace the SPM. This alarm may be caused by the following: <1> Power lead short-circuited to ground <2> Motor winding short-circuited to ground <3> IGBT or IPM module failure

(2)   If the PSM input magnetic contactor is once turned on and is turned off with this alarm when emergency stop is cancelled or the CNC is started (When two spindles are connected, the magnetic contactor may not be turned off.)
    (a)   The DC link wire is not connected. Check the DC link wiring for errors.
    (b)   The fuse of the DC link inside the SPM has blown. Replace the SPM.

2.3.4.4   Alarm Code 06

The temperature sensor is abnormal, or the temperature sensor cable is broken.

(1)   The parameters specific to the motor are not correctly. Referring to "FANUC AC SPINDLE MOTOR α*i* series Parameter Manual (B-65280EN)," check the motor-specific parameters.

(2)   Cable is faulty. Feedback cable is faulty. Replace the cable.

(3)   The control printed-circuit board is faulty.
Replace the control printed-circuit board or spindle amplifier.

(4)   A thermo sensor is faulty.Replace the motor (thermo sensor).

2.3.4.5   Alarm Code 07

The motor rotates at a speed exceeding 115% (standard setting) of the maximum allowable speed.

(1)   If this alarm is issued during spindle synchronization
If one of the motors operating in spindle synchronization is deactivated (SFR or SRV) and activated again, the spindle motor may accelerate to its maximum rotation speed in order to eliminate the position error accumulated while the motor is off, resulting in this alarm being issued.Modify the ladder in such a way that this sequence will not be used.

(2)   SPM is faulty.

Replace the SPM.

2.3.4.6   **Alarm Code 09**

The temperature of the heat sink of the SPM main circuit has risen abnormally. This alarm is issued for SPM-15i and later. With SPM-2.2i to SPM-11i, however, Alarm 12 is issued for the same cause.

    (1)   If this alarm is issued during cutting (the heat sink temperature is high)

       (a)   If this alarm is issued when the load meter reads a value below the continuous rating of the amplifier, check the cooling state of the heat sink.

           <1> If the cooling fan is stopped, check the power supply (connector CX1A/B). If the cooling fan is still inoperative, replace the SPM with a new one.

           <2> When the ambient temperature is higher than the specified temperature, lower the ambient temperature to satisfy the specification.

       (b) When this alarm is issued because the load meter reads a value above the continuous rating of the amplifier, improve the use method.

       (c) When the heat sink on the back of the amplifier is too dirty, clean the heat sink, for example, by blowing air. Consider the use of a structure that prevents the heat sink from being directly exposed to coolant.

    (2)   If this alarm is issued under a light load (the heat sink temperature is high)

       (a) When the frequency of acceleration/deceleration is too high Set such a use condition that the average including output at acceleration/deceleration does not exceed the continuous rating.

       (b) The parameters specific to the motor are not set correctly. Referring to "FANUC AC SPINDLE MOTOR αi series Parameter Manual (B-65280EN)," check the motor-specific parameters.

    (3)   Poor installation of the control printed-circuit board
       Be sure to push the faceplate as far as it will go. (This alarm may be displayed if one of the connectors for connection between the control printed-circuit board and power printed-circuit board is detached.)

    (4)   If this alarm is issued when the heat sink temperature is low
       Replace the SPM.

2.3.4.7   **Alarm Code 12**

An excessively large current flowed into the DC link of the main circuit.

With SPM-2.2i to SPM-11i, this alarm indicates that the power module (IPM) of the main circuit detected an error such as an excessive load, overcurrent.

    (1)   If this alarm is issued on SPM-2.2i to SPM-11i Check alarm code 09 as well.

    (2)   Poor installation of the control printed-circuit board
       Be sure to push the faceplate as far as it will go. (This alarm may be displayed if one of the connectors for connection between the control printed-circuit board and power printed-circuit board is detached.)

    (3)   If this alarm is issued immediately after a spindle rotation command is specified

       (a) The motor power lead is faulty.
          Check for a short circuit between motor power leads and short-circuit to ground, and

replace the power lead as required.
(b) The motor winding has an insulation failure.
If the motor is short-circuited to ground, replace the motor.
(c) The parameters specific to the motor are not set correctly. Referring to "FANUC AC SPINDLE MOTOR α*i* series Parameter Manual (B-65280EN)," check the motor-specific parameters.
(d) The SPM is faulty.
A power element (IGBT, IPM) may be destroyed. Replace the SPM.

(4) If this alarm is issued during spindle rotation
(a) A power element is destroyed.
A power element (IGBT, IPM) may be destroyed. Replace the SPM.
If the amplifier setting condition is not satisfied, or cooling is insufficient because the heat sink is dirty, the power elements may be destroyed.
When the heat sink on the back of the amplifier is too dirty,clean the heat sink, for example, by blowing air. Consider the use of a structure that prevents the heat sink from being directly exposed to coolant.
For the installation condition, refer to "FANUC SERVO AMPLIFIER α*i* series Descriptions (B-65282EN)."
(b) The parameters specific to the motor are not set correctly.
Referring to "FANUC AC SPINDLE MOTOR α*i* series Parameter Manual (B-65280EN)," check the parameters specific to the motor.

(c) Speed sensor signal error
Check the spindle sensor signal waveform. If an error is found, make an adjustment or replace the sensor as required.

2.3.4.8 **Alarm Code 15**

In output switching control or spindle switching control, the switching operation sequence was not executed correctly. This alarm is issued if one second or more elapses from the transition of a switch request signal (SPSL or RSL) until a power lead state check signal (MCFN, MFNHG, RCH, or RCHHG) makes a transition.

(1) Troubleshooting when this alarm is issued
(a) The magnetic contactor (switch unit) for power lead switching is faulty.
If the contact is inoperative, check the power supply of the magnetic contactor. If the magnetic contactor is still inoperative, replace the magnetic contactor.
(b) The I/O unit or wiring for checking the contact of the magnetic contactor is faulty.
If a defect is found in the I/O unit or wiring, replace the I/O unit or wiring.
(c) The sequence (ladder) is incorrect.
Modify the sequence so that switching is completed within 1 second.

2.3.4.9 **Alarm Code 18**

A sum check is abnormal.

If this alarm is issued, replace the SPM or SPM control printed-circuit board.

2.3.4.10 **Alarm Codes 19 and 20**

The offset voltage of the phase U (alarm code 19) or phase V (alarm code 20) current detection circuit is excessively high. A check is made when the power is turned on.

If this alarm is issued, replace the SPM. If this alarm is issued immediately after the SPM control printed circuit board is replaced, check the plugging of the connectors between the power unit and SPM control printed circuit board.

2.3.4.11 Alarm Code 21

The specified polarity of the position sensor is incorrect.

Troubleshooting when this alarm is issued
- (a) Check the position sensor polarity parameter (bit 4 of parameter No. 4001).
- (b) Check the feedback cable of the position sensor.

2.3.4.12 Alarm Code 24

Serial communication data transferred between the CNC and spindle amplifier module contains an error.
(Note) Troubleshooting when this alarm is issued
- (a) Noise occurring between the CNC and spindle amplifier module (connected via an electric cable) caused an error in communication data.
  Check the condition for maximum wiring length. Referring to "Connection," in "FANUC SERVO AMPLIFIER α*i* series Descriptions (B-65282EN)," check the condition of electric cable connection.
- (b) Noise exercises an influence because a communication cable is bundled with the power lead.
  If a communication cable is bundled with the power lead for the motor, separate them from each other.
- (c) A cable is faulty.Replace the cable.
  If an optical I/O link adapter is used, the optical link adapter or optical cable may be faulty.
- (d) The SPM is faulty.
  Replace the SPM or SPM control printed circuit board.
- (e) The CNC is faulty.
  Replace the board or module related to the serial spindle.

NOTE
This alarm is issued also if the CNC power is off. This is not a failure, though.

2.3.4.13 Alarm Code 27

The signal of the α position coder is disconnected.

- (1) If this alarm is issued when the motor is deactivated
  - (a) The setting of a parameter is incorrect.
    Referring to "FANUC AC SPINDLE MOTOR α*i* series Parameter Manual (B-65280EN)," check the parameter for sensor setting.
  - (b) The cable is disconnected. If the connection of the feedback cable is correct, replace the cable.
  - (c) The SPM is faulty. Replace the SPM or SPM control printed circuit board.

- (2) If this alarm is issued when the cable is moved

    (a)   The connector has a bad contact, or the cable is disconnected.
           The conductor may be broken. Replace the cable. If coolant has penetrated into the connector, clean the connector.

(3) If this alarm is issued when the motor rotates
    (a)   The shielding of the cable between the sensor and the SPM is faulty.
           Referring to, "Connection," in "FANUC SERVO AMPLIFIER α*i* series Descriptions (B-65282EN)," check the shielding of the cable.
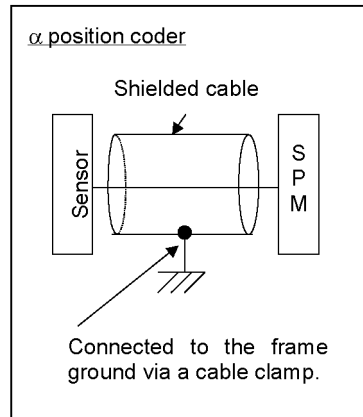
    (b)   The signal cable is bundled with the servo motor power lead. If the cable between the sensor and the SPM is bundled with the servo motor power lead, separate them from each other.

2.3.4.14   Alarm Code 29

An excessive load (standard setting: load meter reading of 9 V) has been applied continuously for a certain period (standard setting: 30 seconds).

(1) If this alarm is issued during cutting
    Check the load meter, and review the cutting condition.

(2) If this alarm is issued during a stop

    (a)   The spindle is locked.
           Check the sequence to see if the spindle is locked when a command for very slow movement is specified or orientation is specified for the spindle.

(3) If the spindle does not rotate as specified (the spindle rotates at a very low speed) and this alarm is issued
   (a) The setting of a parameter is incorrect.
       Referring to "FANUC AC SPINDLE MOTOR α*i* series Parameter Manual (B-65280EN)," check the parameter for sensor setting.
   (b) The phase sequence of the motor power lead is incorrect.
   (c) The feedback cable of the motor has a problem. Check if the phase A/B signals are connected correctly.
   (d) The feedback cable of the motor is faulty.
       Rotate the motor manually to see if a speed is indicated in the item of motor speed on the CNC diagnosis screen or on the spindle check board. If no speed indication is provided, replace the cable or spindle sensor (or motor).

(4) If the spindle does not rotate as specified (the spindle does not rotate at all) and this alarm is issued
   (a) The power lead is abnormal.
       Check if the motor power lead is connected normally. If spindle switching or output

switching is performed, check if the magnetic contactor is on.
(b)   The SPM is faulty.
Replace the SPM.

2.3.4.15 Alarm Code 31

The motor failed to rotate as specified, and has stopped or is rotating at a very low speed.

(1) If the motor rotates at a very low speed and this alarm is issued
(a)   The setting of a parameter is incorrect.
Referring to "FANUC AC SPINDLE MOTOR α*i* series Parameter Manual (B-65280EN)," check the parameter for sensor setting.
(b)   The motor phase sequence is incorrect. Check if the motor phase sequence is correct.
(c)   The feedback cable of the motor has a problem. Check if the phase A/B signals are connected correctly.
(d)   The feedback cable of the motor is faulty.
Rotate the motor manually to see if a speed is indicated in the item of motor speed on the CNC diagnosis screen or on the spindle check board. If no speed indication is provided, replace the cable or spindle sensor (or motor).

(2) If the motor does not rotate at all and this alarm is issued
(a)   The sequence for locking the spindle is incorrect. Check the sequence to see if the spindle is locked.
(b)   The power lead is faulty.
Check if the power lead is connected to the motor correctly. If spindle switching or winding switching is performed, check if the magnetic contactor is on.
(c)   The SPM is faulty.
Replace the SPM.

2.3.4.16 Alarm Code 32

LSI memory for serial communication is abnormal. A check is made when the power is turned on.

If this alarm is issued, replace the SPM or SPM control printed circuit board.

2.3.4.17 Alarm Code 34

Parameter data outside the specifiable range was set.

Troubleshooting when this alarm is issued Connect the spindle check board.
The spindle check board displays "AL-34" and "F-xxx" alternately. "F-xxx" indicates a parameter number outside the specifiable range. For the correspondence between the CNC parameter numbers and "F-xxx," refer to "FANUC AC SPINDLE MOTOR α*i* series Parameter Manual (B-65280EN)."

2.3.4.18   Alarm Code 36
The error counter overflowed.

(1)   The setting of a parameter is incorrect.
(a)   The gear ratio set in a parameter is incorrect. Check if an excessively large gear ratio is set.
(b)   The setting of a position gain is incorrect.
If the gear ratio data is correct, increase the position gain.

FS15*i*	FS16*i*	Description
3056 to 3059	4056 to 4059	Gear ratio between the spindle and motor
3060 to 3063	4060 to 4063	Position gain at orientation
3065 to 3068	4065 to 4068	Position gain in the servo mode/spindle synchronization
3069 to 3072	4069 to 4072	Position gain in Cs contour control

(2)   Sequence error
      (a) Check if the motor is deactivated (by turning off SFR/SRV) in a position control mode (rigid tapping, Cs contour control, or spindle synchronization).

2.3.4.19   Alarm Code 37

After emergency stop signal input, the motor is accelerated without being decelerated. This alarm is issued also when the motor is not deactivated (the motor is not decelerated completely) when the acceleration/deceleration time (initial parameter setting: 10 seconds) has elapsed after emergency stop signal input.

Troubleshooting when this alarm is issued
      (a)   The parameter setting of the speed detector is incorrect. Referring to Chapter 1 in "FANUC AC SPINDLE MOTOR α*i* series Parameter Manual (B-65280EN)," set a correct time.
      (b)   The parameter setting of an acceleration/deceleration time is not proper.
          Check the parameter-set value and actual acceleration/ deceleration time, then set an actual acceleration/deceleration time plus some margin.

FS15*i*	FS16*i*	Description
3082	4082	Acceleration/deceleration time setting

2.3.4.20 Alarm Code 41

The position where the one-rotation signal of the α position coder is generated is incorrect.

Troubleshooting when this alarm is issued
      (a)   The setting of a parameter is incorrect. Referring to "FANUC AC SPINDLE MOTOR α*i* series Parameter Manual (B-65280EN)," check the parameter for sensor setting.
      (b)   The α position coder is faulty. Observe the Z signal of the position coder. If the signal is not generated per rotation, replace the position coder.
      (c)   The shielding of the cable between the sensor and SPM is faulty.
          Referring to "Connection," in "FANUC SERVO AMPLIFIER α*i* series Descriptions (B-65282EN)," check the shielding of the cable.
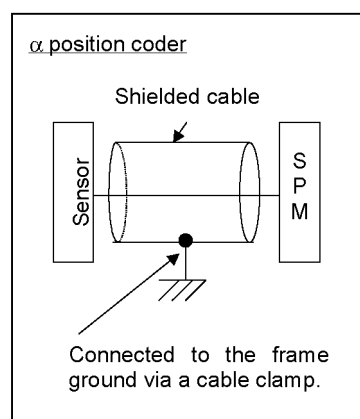
(d) The signal cable is bundled with the servo motor power lead.
If the cable between the sensor and SPM is bundled with the servo motor power lead, separate them from each other.
(e) The SPM is faulty.
Replace the SPM or SPM control printed circuit board.

2.3.4.21 Alarm Code 42

The one-rotation signal of the α position coder is not generated.

Troubleshooting when this alarm is issued

(a) The setting of a parameter is incorrect.
Referring to "FANUC AC SPINDLE MOTOR α*i* series Parameter Manual (B-65280EN)," check the parameter for sensor setting.
(b) The α position coder is faulty.
Check the check pin PSD on the spindle check board. If the signal is not generated per rotation, replace the connection cable and position coder.
(c) The SPM is faulty.
Replace the SPM or SPM control printed circuit board.

2.3.4.22 Alarm Code 46

The one-rotation signal of the position coder cannot be detected normally during thread cutting.

Troubleshoot as in the case of alarm code 41.

2.3.4.23 Alarm Code 47

The count value of α position coder signal pulses is abnormal.

Phases A and B for the position coder have a feedback pulse count of 4096 p/rev per spindle rotation. The SPM checks the pulse counts of phases A and B equivalent to the position coder each time a one-rotation signal is generated. The alarm is issued when a pulse count beyond the specified range is detected.

(1) If this alarm is issued when the cable is moved (as in the case where the spindle moves)
The conductor may be broken. Replace the cable. If coolant has penetrated into the connector, clean the connector.

(2) Troubleshooting in other cases
(a) The setting of a parameter is incorrect. Referring to "FANUC AC SPINDLE MOTOR α*i* series Parameter Manual (B-65280EN)," check the parameter for sensor setting.
(b) The shielding of the cable between the sensor and SPM is faulty.
Referring to "Connection," in "FANUC SERVO AMPLIFIER α*i* series Descriptions (B-65282EN)," check the shielding of the cable.

E-75
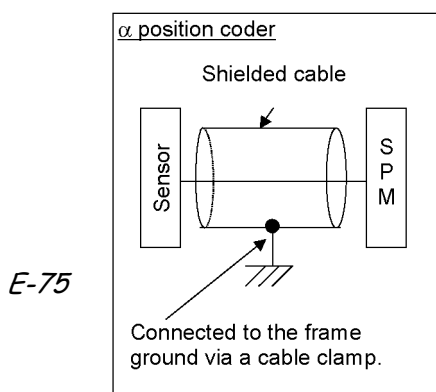
(c)   The signal cable is bundled with the servo motor power lead. If the cable between the sensor and SPM is bundled with the servo motor power lead, separate them from each other.

(d)   The SPM is faulty.
Replace the SPM or SPM control printed circuit board.

2.3.4.24   **Alarm Code 50**

A value obtained by internal calculation in spindle synchronization exceeded the allowable range.

Troubleshooting when this alarm is issued

(a)   The setting of parameters for gear ratio setting is incorrect. Check if an excessively large gear ratio is set.

(b)   Position gain setting limit If correct gear ratio data is set, increase the position gain value in spindle synchronization.

FS15*i*	**FS16***i*	**Description**
3056 to 3059	4056 to 4059	Gear ratio between the spindle and motor
3065 to 3068	4065 to 4068	Position gain in the servo mode/spindle synchronization

2.3.4.25 **Alarm Codes 52 and 53**

The synchronization signal (ITP) in communication data transferred to and from the CNC stopped.

Troubleshooting when this alarm is issued

(a)   The SPM is faulty.
Replace the SPM or SPM control printed circuit board.

(b)   The CNC is faulty.
Replace the board or module related to the serial spindle.

2.3.4.26 **Alarm Code 54**

A large current flowing in the motor for a long time was detected. Troubleshoot as in the case of alarm

code 29.

2.3.4.27 **Alarm Code 55**

In spindle switching control or output switching control, a mismatch between the switching request signal (SPSL or RSL) and the power lead state check signal (MCFN, MFNHG, RCH, or RCHHG) continues during motor activation.

Troubleshooting when this alarm is issued

(a)   The magnetic contactor (switch unit) for power lead switching is faulty.
If the contact is inoperative, check the power supply of the magnetic contactor. If the magnetic contactor is still inoperative, replace the magnetic contactor.

(b)   The I/O unit or wiring for checking the contact of the magnetic contactor is faulty.

If a defect is found in the I/O unit or wiring, replace the I/O unit or wiring.
(c)   The sequence (ladder) is incorrect.
Modify the sequence so that switching is not performed during activation. For details of the signals, refer to "FANUC SERVO AMPLIFIER α*i* series Descriptions (B-65282EN)."

2.3.4.28 **Alarm Code 56**

The cooling fan for the control circuit section has stopped.

(a)   Poor installation of the control printed-circuit board
Be sure to push the faceplate as far as it will go. (This alarm may be displayed if one of the connectors for connection between the control printed-circuit board and power printed-circuit board is detached.)
(b)   Replace the SPM or its internal cooling fan.

2.3.4.29 **Alarm Code 66**

An error occurred during communication (connector JX4) between spindle and amplifier.

Troubleshooting when this alarm is issued
(a)   Check the connection between the spindle and amplifier.
(b)   Replace the cable.

2.3.4.30 **Alarm Code 69**

This alarm can be issued only when Dual Check Safety is in use. The alarm occurs if, in safety signal mode C (a guard open request was entered to open the guard), the spindle motor rotation speed exceeds the safety speed.

Troubleshooting when this alarm is issued
(a)   If the guard is open, observe the safety speed.
(b)   Check the safety speed parameter.
(c)   Replace the SPM control printed-circuit board.

2.3.4.31 **Alarm Code 70**

This alarm can be issued only when Dual Check Safety is in use. The spindle amplifier connection status does not match the hardware setting.

Troubleshooting when this alarm is issued
(a)   Check the SPM connection and its setting.
(b)   Replace the CPU card or SPM control printed-circuit board.

2.3.4.32 **Alarm Code 71**

This alarm can be issued only when Dual Check Safety is in use. A safety parameter error occurred.

Troubleshooting when this alarm is issued
(a) Re-set the safety parameter.
(b) Replace the CPU card or SPM control printed-circuit board.

2.3.4.33 **Alarm Code 72**

This alarm can be issued only when Dual Check Safety is in use. The result of the spindle amplifier speed check does not match the result of the CNC speed check.

If the alarm occurs, replace the CPU card in the CNC or the SPM control printed-circuit board.
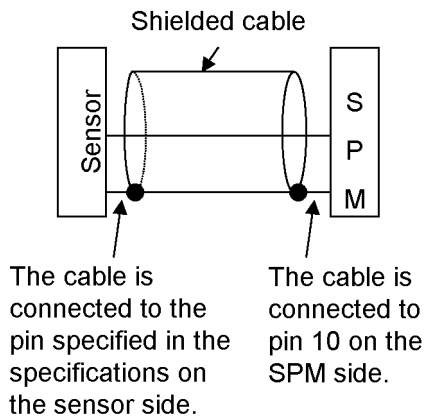
2.3.4.34 Alarm Code 73

The signal of the motor sensor is disconnected.

(1)   If this alarm is issued when the motor is deactivated
      (a)   The setting of a parameter is incorrect. Referring to "FANUC AC SPINDLE MOTOR αi series Parameter Manual (B-65280EN)," check the parameter for sensor setting.
      (b)   The cable is disconnected. Replace the cable.
      (c)   The sensor is not adjusted correctly. Adjust the sensor signal. If the sensor signal cannot be adjusted correctly, or the sensor signal is not observed, replace the connection cable and sensor.
      (d)   The SPM is faulty. Replace the SPM or SPM control printed circuit board.

(2)   If this alarm is issued when the cable is moved (as in the case where the spindle moves) The conductor may be broken. Replace the cable. If coolant has penetrated into the connector, clean the connector.

(3)   If this alarm is issued when the motor rotates
      (a)   The shielding of the cable between the sensor and the SPM is faulty. Referring to, "Connection," in "FANUC SERVO AMPLIFIER αi series Descriptions (B-65282EN)," check the shielding of the cable.

MZ*i* or BZ*i* sensor

The cable is connected to the pin specified in the specifications on the sensor side.

The cable is connected to pin 10 on the SPM side.

      (b)   The signal cable is bundled with the servo motor power lead. If the cable between the sensor and the SPM is bundled with the servo motor power lead, separate them from each other.

2.3.4.35 Alarm Code 74

This alarm can be issued only when Dual Check Safety is in use. The CPU test failed to end normally.

When this alarm is issued, Replace the SPM or SPM control printed circuit board.

2.3.4.36 Alarm Code 75

This alarm can be issued only when Dual Check Safety is in use. An error occurred in the CRC test.

When this alarm is issued, Replace the SPM or SPM control printed circuit board.

2.3.4.37 Alarm Code 76

This alarm can be issued only when Dual Check Safety is in use. The spindle safety function has not been executed.

If the alarm occurs, replace the SPM control printed-circuit board.

2.3.4.38 Alarm Code 77

This alarm can be issued only when Dual Check Safety is in use. The result of the spindle amplifier axis number check does not match the result of the CNC axis number check.

If the alarm occurs, replace the CPU card in the CNC or the SPM control printed-circuit board.

2.3.4.39 Alarm Code 78

This alarm can be issued only when Dual Check Safety is in use. The result of spindle amplifier safety parameter check does not match the result of the CNC safety parameter check.

If the alarm occurs, replace the CPU card in the CNC or the SPM control printed-circuit board.

2.3.4.40 Alarm Code 79

This alarm can be issued only when Dual Check Safety is in use. An abnormal operation was detected in the initial test.

When this alarm is issued, Replace the SPM or SPM control printed circuit board.

2.3.4.41   Alarm Code 81

The position where the one-rotation signal of the motor sensor is generated is incorrect.

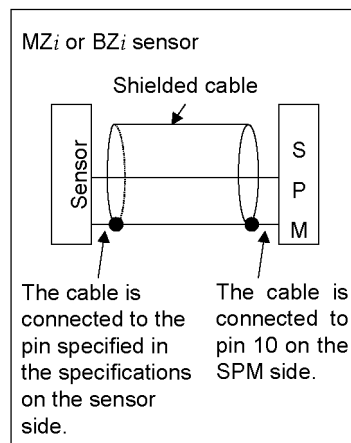(1) If the external one-rotation signal is used

(a)   The settings of parameters are incorrect.
Check that the gear ratio data matches the specification of the machine.

FS15*i*	FS16*i*	Description
3171 3173	4171 4173	Denominator of gear ratio between motor sensor and spindle
3172 3174	4172 4174	Numerator of gear ratio between motor sensor and spindle

(b)   Slippage between the spindle and motor
Check that there is no slippage between the spindle and motor. The external one-rotation signal is not applicable to V-belt connection.

(2)   Troubleshooting in other cases

(a)   The setting of a parameter is incorrect.
       Referring to "FANUC AC SPINDLE MOTOR α*i* series
       Parameter Manual (B-65280EN)," check the parameter for
       sensor setting.
(b)   A sensor (MZ*i* sensor or BZ*i* sensor) is not adjusted
       correctly.
       Adjust the sensor signal. If the sensor signal cannot be adjusted correctly, or the
       sensor signal is not observed, replace the connection cable and sensor.
(c)   The shielding of the cable between the sensor and SPM is
       faulty.
       Referring to "Connection," in "FANUC SERVO   AMPLIFIER α*i* series
       Descriptions (B-65282EN)," check the shielding of the cable.

(d)   The signal cable is bundled with the servo motor power lead. If the cable between
       the sensor and SPM is bundled with the servo motor power lead, separate them
       from each other.
(e)   The SPM is faulty. Replace the SPM or SPM control printed circuit board.

2.3.4.42 Alarm Code 82

The one-rotation signal of the motor sensor is not generated.

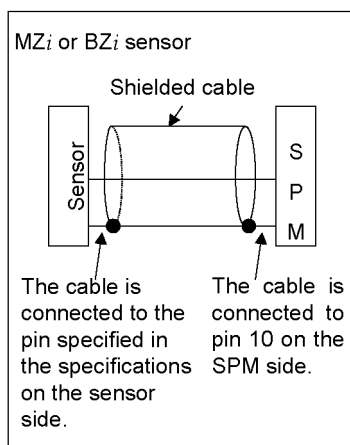Troubleshooting when this alarm is issued
(a)   The setting of a parameter is incorrect.
       Referring to "FANUC AC SPINDLE MOTOR α*i* series Parameter Manual
       (B-65280EN)," check the parameter for sensor setting.
(b)   The MZ*i* sensor or BZ*i* sensor is not adjusted correctly. Adjust the sensor. If the
       sensor cannot be adjusted or the signal is not observed, replace the connection cable
       and sensor.
(c)   The external one-rotation signal is faulty.
       Check the check pin EXTSC1 on the spindle check board. If the signal is not
       generated per rotation, replace the connection cable and position coder.
(d)   The SPM is faulty.
       Replace the SPM or SPM control printed circuit board.

2.3.4.43 Alarm Code 83

The SPM checks the pulse counts of phases A and B each time a one-rotation signal is generated. The

alarm is issued when a pulse count beyond the specified range is detected.

(1) If this alarm is issued when the cable is moved (as in the case where the spindle moves)
The conductor may be broken. Replace the cable. If coolant has penetrated into the connector, clean the connector.

(2) Troubleshooting in other cases
(a) The setting of a parameter is incorrect. Referring to "FANUC AC SPINDLE MOTOR α*i* series Parameter Manual (B-65280EN)," check the parameter for sensor setting.
(b) The MZ*i* sensor or BZ*i* sensor is not adjusted correctly. Adjust the sensor. If the sensor cannot be adjusted or the signal is not observed, replace the connection cable and sensor.
(c) The shielding of the cable between the sensor and SPM is faulty.
Referring to "Connection," in "FANUC SERVO AMPLIFIER α*i* series Descriptions (B-65282EN)," check the shielding of the cable.

(d) The signal cable is bundled with the servo motor power lead.
If the cable between the sensor and SPM is bundled with the servo motor power lead, separate them from each other.
(e)   The SPM is faulty.
Replace the SPM or SPM control printed circuit board.

2.3.4.44 Alarm Code 84

The spindle sensor signal was disconnected.

Refer to Alarm Code 73 for this alarm trouble shooting.

2.3.4.45 Alarm Code 85

The one-rotation signal of the spindle sensor occurred in an incorrect location.

Refer to Alarm Code 81 for this alarm trouble shooting.

2.3.4.46 Alarm Code 86

No spindle sensor one-rotation signal occurred.

Refer to Alarm Code 82 for this alarm trouble shooting.

2.3.4.47 Alarm Code 87

A spindle sensor signal is abnormal.

Refer to Alarm Code 83 for this alarm trouble shooting.

2.3.4.48 Alarm Code 88

The heat sink cooling fan is not running.

If this alarm is issued, replace the SPM heat sink cooling fan.

2.3.4.49 Alarm Codes A, A1, and A2

The control program is not running.
An error was detected when the control program was running.

(1) If this alarm is issued when the spindle amplifier power is switched on
   (a) Wrong software specification
   (b) Defective printed-circuit board
       Replace the SPM or SPM control printed-circuit board.

(2) If this alarm is issued when the motor is active.

   (a) Influence by noise
       Referring to "Installation" in "FANUC SERVO AMPLIFIER α*i* series Descriptions (B-65282EN)," check the grounding wire. If the spindle sensor signal wire is bundled together with any motor power wire, separate them.

2.3.4.50 Alarm Code b0

An error occurred in communication between amplifier modules (SPM, SVM, and PSM).

Troubleshooting when this alarm is issued
   (1) If this alarm is issued immediately after the power supply of CNC is turned on
       (a) Check the way the connectors are coupled. Normally, CXA2A and CXA2B must be coupled.
       (b) The cable is defective.
           Check the connection pin number. If there is any problem, correct it. Alternatively, replace the cable.
       (c) The SPM, SVM, or PSM is defective.
           Replace the SPM, SVM, or PSM. Alternatively, replace the SPM, SVM, or PSM control printed-circuit board.

2.3.4.51 Alarm Codes C0,C1, and C2

An error occurred in serial communication data between the CNC and spindle amplifier module.

Troubleshooting when this alarm is issued
     (a) The SPM is defective.
        Replace the SPM or SPM control printed-circuit board.
     (b) The CNC is defective.
   Replace the board or module related to the serial spindle.

2.3.4.52 Alarm Code C3

In spindle switching, a mismatch is found between the switching request signal (SPSL) and the internal status of the motor/spindle sensor signal switching circuit (submodule SW).

Troubleshooting when this alarm is issued The submodule SW (SSW) is defective. Replace the submodule SW (SSW).

2.3.4.53   Other Alarms

(1) If the SPM status display is 4, 11, 30, 33, 51, 57, 58, b1, b2, or b3 This status display means that an alarm condition occurred in the PSM. Check the status display of the PSM, and see Section 2.3.

(2) About CNC alarms 756 and 766 (abnormal axis number) These alarms can be issued only when the Dual Check Safety function is in use. If this alarm is issued, check that K76 shown below is attached to the JA7A connector of the second spindle. K76 is unnecessary if only the first spindle is used. If the wiring is normal, replace the SPM control printed-circuit board.
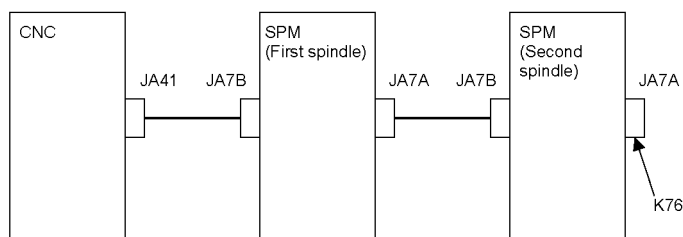
Details of K76
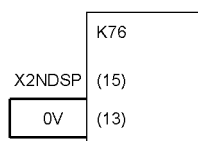
20-pin half-pitch connector

2.3.5   αC*i* SERIES SPINDLE AMPLIFIER MODULE

This section explains those alarm codes for the αC*i* series which require troubleshooting sequences that are different from those for the α*i* series even when the alarm numbers are the same. For explanations about the alarm codes not stated herein, see the descriptions about the corresponding number given in Section 2.4, "Spindle Amplifier Module."

2.3.5.1   Alarm Code 12

An excessive motor current was detected.

An excessively large current flowed into the DC link of the main circuit.

For SPMC-2.2*i* to 15*i*
An overload, overcurrent, or a low control power supply voltage was detected in the power module (IPM) of the main circuit.

   (1)   If this alarm is issued on SPM-2.2*i* to SPM-15*i* Check alarm code 09 as well.

   (2)   If this alarm is issued immediately after a spindle rotation command is specified
      (a)   The motor power lead is faulty.
            Check for a short circuit between motor power leads and short-circuit to ground, and replace the power lead as required.
      (b)   The insulation of the motor winding is defective.
            If the motor is short-circuited to ground, replace the motor.
      (c)   The parameters specific to the motor are not set correctly. Refer to "FANUC AC SPINDLE MOTOR α*i* series Parameter Manual (B-65280EN)."
      (d)   The SPMC is faulty.
            A power element (IGBT, IPM) may be destroyed. Replace the SPMC.

   (3) If this alarm is issued during spindle rotation
      (a)   Belt slippage
            It is likely that there may be belt slippage between the spindle and motor. Clean the pulleys and adjust the belt tension.
      (b)   The parameters specific to the motor are not set correctly.
            Referring to "FANUC AC SPINDLE MOTOR α*i* series Parameter Manual (B-65280EN)," check the parameters specific to the motor.
      (c)   The SPMC is faulty.
            A power element (IGBT, IPM) may be destroyed. Replacethe SPMC.
            If the amplifier setting condition is not satisfied, or cooling is insufficient because the heat sink is dirty, the power elements may be destroyed.
            When the heat sink on the back of the amplifier is too dirty, clean the heat sink, for example, by blowing air. Consider the use of a structure that prevents the heat sink from being directly exposed to coolant.
            For the installation condition, refer to "FANUC SERVO AMPLIFIER α*i* series Descriptions (B-65282EN)."

2.3.5.2   **Alarm Code 35**

There is a large difference between the motor speed calculated from the position coder and the motor

speed estimated with the spindle software.

   (1)   If an alarm is issued when a rotation command is entered

      (a)   Error in the position coder setting parameter
             Correctly specify the bits representing the relationships between the direction of position coder rotation and that of spindle rotation and between the direction of spindle rotation and that of motor rotation.

FS15*i*	FS16*i*	Description
3000#0	4000#0	Spindle and spindle motor rotation directions
3001#4	4001#4	Spindle sensor (position coder) mounting direction

(b)   Invalid gear ratio parameter setting
Check to see if an incorrect gear ratio has been specified. This value is used to convert the position coder speed to the motor speed. Be sure to specify the correct value.

FS15*i*	**FS16*i***	Description
3056 to 3059	4056 to 4059	Spindle-motor gear ratio data

(c)   Clutch/gear signal error
Make sure that the entered clutch/gear signals (CTH1A, CTH2A) are correct with respect to the actually selected gear.

	FS15*i*	FS16*i*	#7	#6	#5	#4	#3	#2	#1	#0
First spindle	G227	G070					CTH1A	CTH2A		
Second spindle	G235	G074					CTH1B	CTH2B		

(d)   Belt slippage between the spindle and spindle motor
Make adjustments so that no belt slippage will occur between the spindle and spindle motor.

(2)   If an alarm is issued during a cutting operation
An overload has occurred to decrease the motor speed. Review the cutting condition.