Doosan Infracore
Machine Tools

NC Boring Maintenance Manual (Alarm)

(DBC 130/F30i Series)

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1. Emergency Alarm

1.1 2001 Emg. Button or Axes Emergency

1) Description

The Emergency Stop push-button switch on the operation panel is pressed down, or at least one Emergency Stop limit switch for the axes is tripped.

2) Cause of problem

① The Emergency Stop push-button switch on any of the main OP, the tool magazine OP, or the chip conveyor is pressed down.

② The Limit switch for an emergency stop located for each axis (X, Y, Z, W) is pressed down.

③ An error in the Emergency Stop switch on the OP, or the Emergency Stop limit switch for each axis, or other related parts

④ Disconnection of the wiring

3) Action

① Check if the red mushroom push-button switch on the main OP, the tool magazine OP, or the chip conveyor is pressed down, and if so, turn the switch counter clockwise to release it.

② If the Limit switch for any axis (X, Y, Z, or W) is tripped, press both the Machine Ready switch and the Emergency Release switch simultaneously to enter the Machine Ready state. (If you want to return to the emergency stop state, simply release the switch.) Then, move the problem-making axis in jog or handle mode so as to remove it from the emergency stop limit switch.

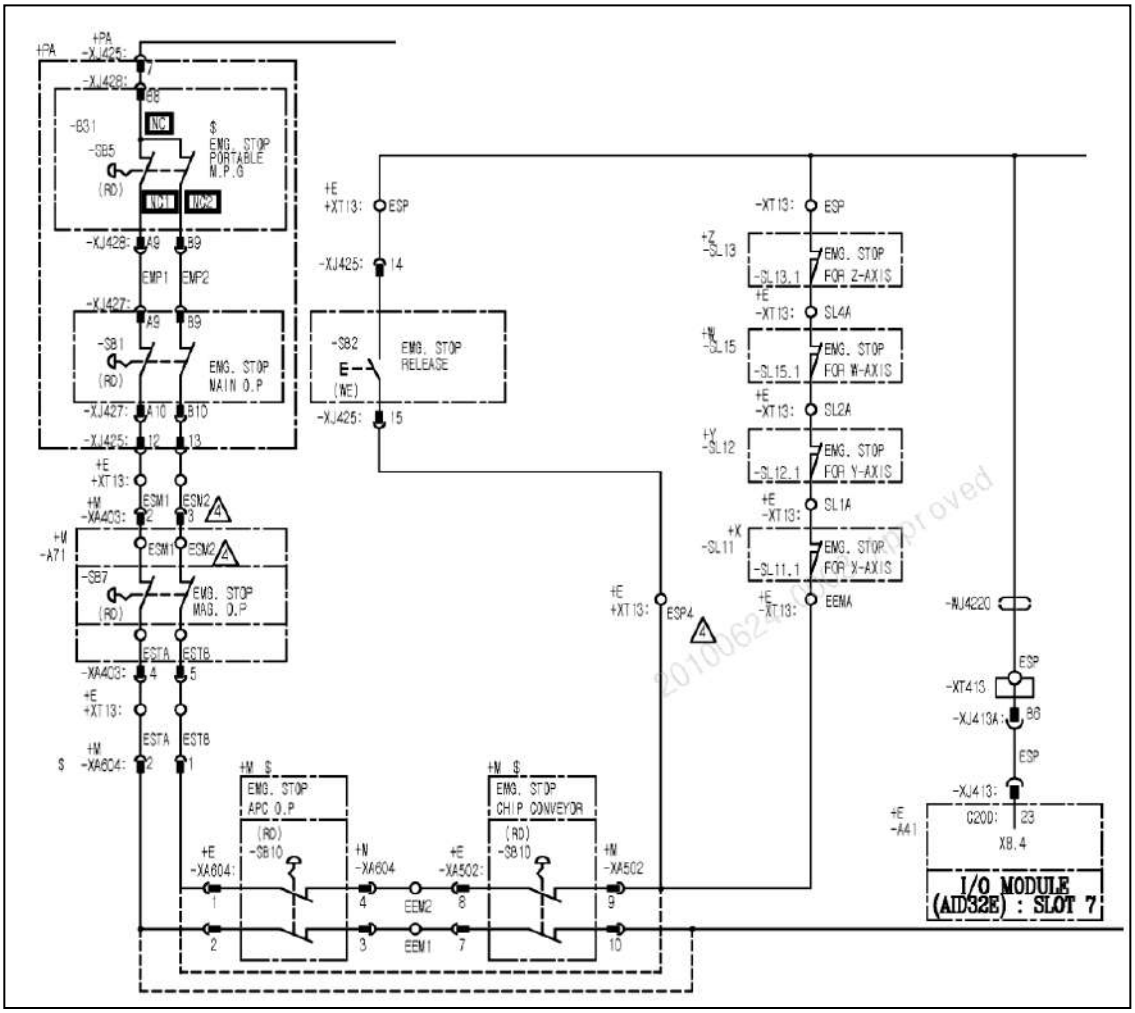
③ Check the Emergency Stop push-button switch on the main OP, the Emergency Stop limit switch on the axis, and other related parts for any problem. Repair or replace the defective part if necessary.

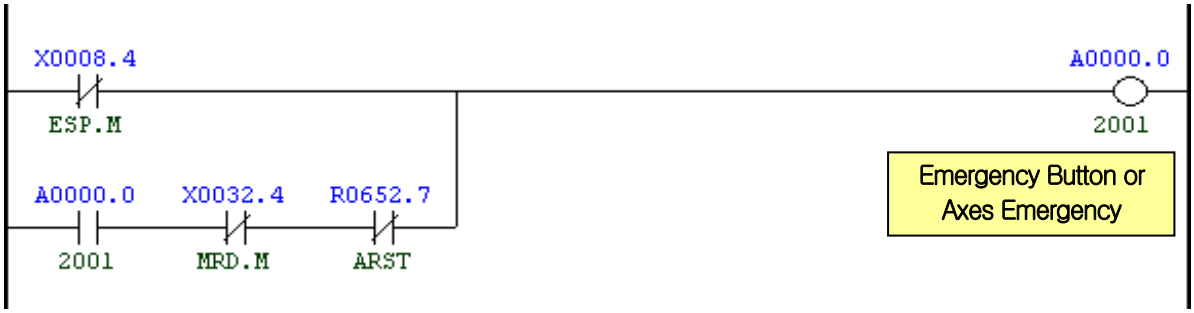
④ Disconnection of the wiring

Refer to the circuit diagram and use the electric tester to check each terminal block. If you find an error, repair or replace the defective part.

Part Name	Part No.	Symbol	Spec.	Maker
Switch, Emergency P/B	ESWPB0439	SB1,7,9,61	B30-81L2B	KACON
Switch, Limit	ESWLM0111	SL11.1,12.1,13.1,15.1	D4C-4332	OMRON

Signal	Address	Device Symbol	I/O	Connector (Pin)	Numbering
Emergency Stop	**X8.4** ESP.M	-SB1,7,9,10	I/O Module Slot 7	XJ413 (23)	ESP





Adress	Symbol	Coil Comment
X8.4	ESP.M	Emergency Stop
A0.0	2001	Emg. Button or Axes Emergency
X32.4	MRD.M	Machine Ready
R652.7	ARST	Alarm Reset

1.2 2002 Spindle Alarm is Detected

1) Description

There occurred an alarm from the main spindle drive unit.

2) Cause of problem

① An error found in the main spindle drive unit

② An error found in the spindle motor, power cable or signal cables

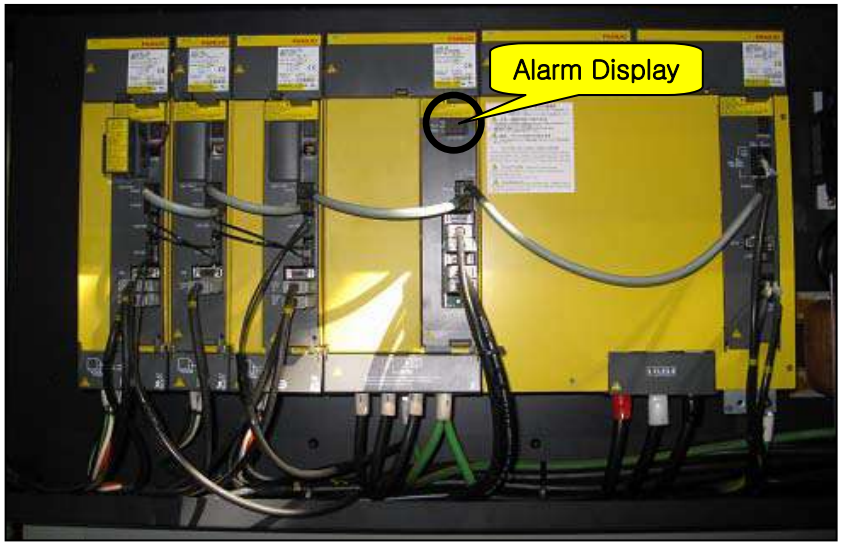
3) Action

① Check the alarm number that is displayed on the main spindle drive unit of the electric cabinet. Take a necessary measure according to the alarm number.

☞ Refer to "Troubleshooting by the spindle amplifier alarm" in the appendix.

② Check the spindle motor for the 3-phase power source and the feedback cable if there is a problem.

Address	Symbol	Coil Comment
F45.0	ALMA	Spindle Alarm
R820.1	2002	Spindle Alarm is Detected
R652.7	ARST	Alarm Reset



1.3 2003 Power Circuit Overcurrent Detected

1) Description

The circuit protector that is installed in the electric cabinet is tripped.

2) Cause of problem

① The circuit protector is triggered. (Abnormal signal is detected)

② An error in power control

③ The circuit protector has an error itself.

3) Action

① Find out the cause that the circuit protector is tripped.

☞ (ex) If QF22 is tripped, check the secondary circuit (L+) of QF22 if it's short-circuited, and take a necessary measure before turning the circuit protector back on.

② If the alarm occurs but no circuit protector is tripped, measure the resistance of each contact point, and find out the defective circuit protector, and replace it with a new one.

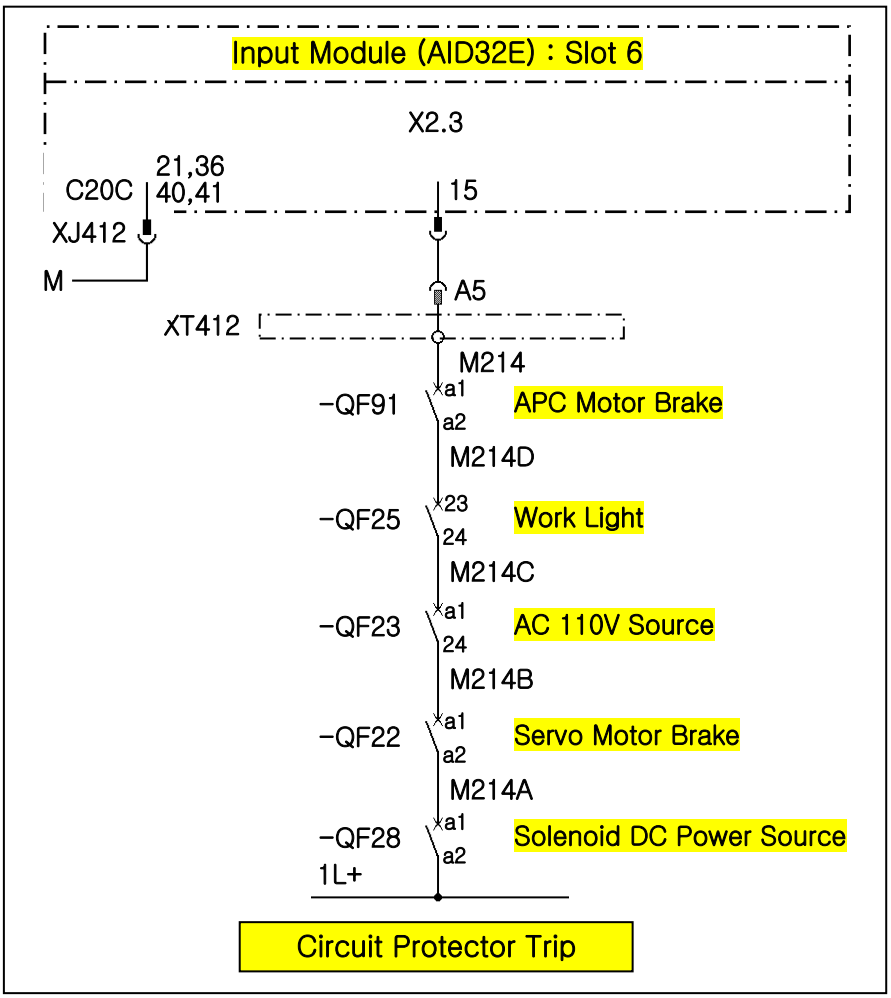
☞ If you measure the resistance on the contact point of the circuit protector that is turned on, you will get "0" ohm if it's normal.

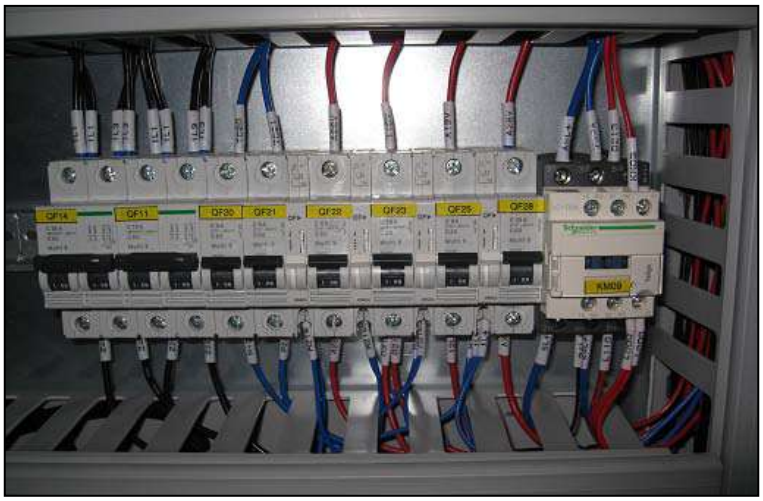
③ If you have found nothing wrong in steps ① and ② above, that is thought to be caused by the I/O circuit board. Check the I/O board and repair or replace it if necessary.

Part Name	Part No.	Symbol	Spec.	Maker
Breaker, Auxiliary	ENFBX0290K	QF22,23,25,28,91	C60,26924,of Contact	Schneider
Protector, Circuit	ENFBX0268K	QF22, 28	C60. 24430. 6A. 1P	Schneider
Protector, Circuit	ENFBX0272K	QF23	C60. 24433. 13A. 1P	Schneider
Protector, Circuit	ENFBX0551K	QF28	C60. 24436. 25A. 1P	Schneider
Protector, Circuit	ENFBX0266K	QF91	C60. 24427. 3A. 1P	Schneider

Signal	Address	Device Symbol	I/O	Connector (Pin)	Numbering
Circuit Protector Trip	**X2.3** TRIP.M	-XT412	Input Module : Slot 06	XJ412 (15)	M214

Address	Symbol	Coil Comment
X2.3	TRIP.M	Circuit Protector Trip Detection
R652.7	ARST	Alarm Reset
A0.2	2003	Circuit Protector Trip
X2.3	TRIP.M	Circuit Protector Trip Check





1.4 2004 Hyd. Pump Motor Overload

1) Description

Hyd. An excessive electric current is detected in the hydraulic pump motor or the lubricant pump motor of the spindle head.

2) Cause of problem

① The hydraulic pump motor, the lubricant pump motor of the spindle head, or the power cable is burnt out.

② The circuit breaker that detects the excessive current is overloaded or defective itself.

3) Action

① Check the hydraulic pump motor, the lubricant pump motor of the spindle head, or the power cable if there is a problem. Repair or replace the defective part if necessary.

② Check the circuit breaker for the load settings and make correction if necessary. If the circuit breaker itself has an error, replace it with a new one.
(You can detect a defective circuit breaker by checking the resistance on either circuit of M212 or 1L+)

▪ Overload settings

QM31 : 5.5 Kw : 24 A

QM33 : 3.7 Kw : 16.1 A

QM34 : 0.1 Kw : 0.7 A

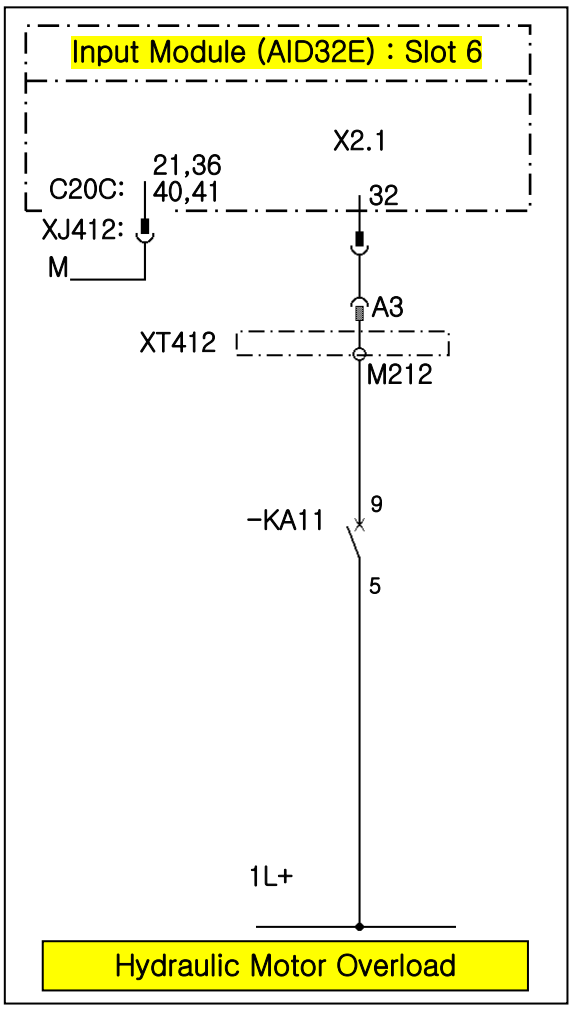
QM73 : 1.5 Kw : 7 A

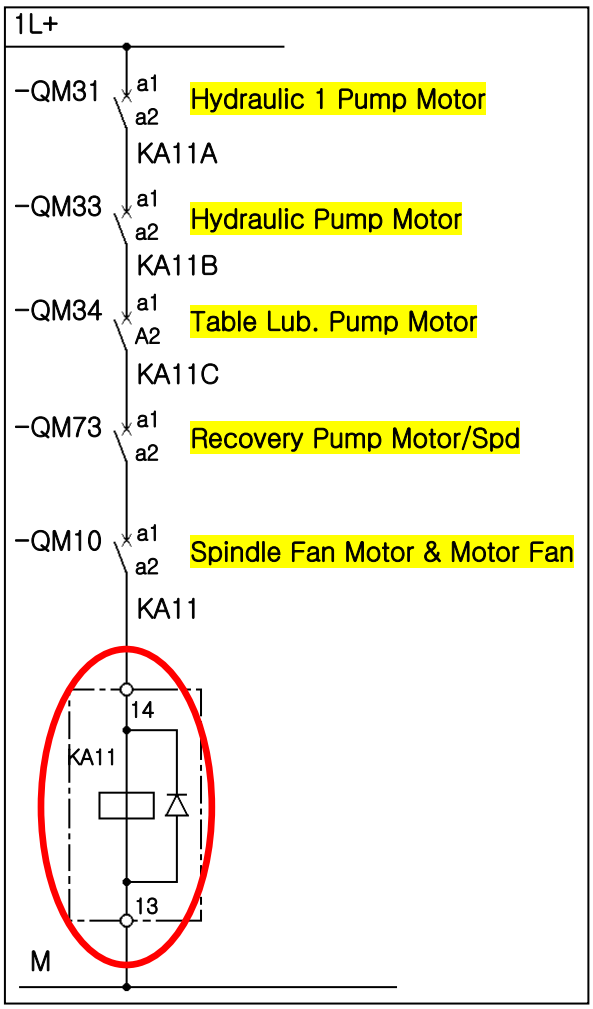
QM10 : 1.5 A

Part Name	Part No.	Symbol	Spec.	Maker
Breaker, Auxiliary	ENFBX0290M	QM33,34,73	TESYS. GVAE20. 2A	Schneider
Breaker, Motor Circuit	ENFBX0269M	QM31	TESYS. GV3P32. 23-32A	Schneider
Breaker, Motor Circuit	ENFBX0261M	QM33	TESYS. GV2ME21. 17-23A	Schneider
Breaker, Motor Circuit	ENFBX0254M	QM34	TESYS. GV2ME05. 0.63-1A	Schneider
Breaker, Motor Circuit	ENFBX0259M	QM73	TESYS. GV2ME14. 6-10A	Schneider

Signal	Address	Device Symbol	I/O	Connector (Pin)	Numbering
Hydraulic Motor Overload	**X2.1** HOVL.M	-KA11	Input Module Slot 06	XJ412 (32)	M212

Address	Symbol	Coil Comment
X2.1	HOVL.M	Hydraulic Pump Motor Overload
A0.3	2004	Hydraulic Pump Motor Overload
R652.7	ARST	Alarm Reset





1.5 2005 Hyd. Pressure Down Alarm

1) Description

The pressure of the hydraulic power unit falls below the setting value of the hydraulic pressure switch, causing the hydraulic pressure switch to be tripped.

2) Cause of problem

① The hydraulic power unit has an error or its pressure falls below 20kg/㎠.

② The hydraulic pressure switch or any of its parts is defective.

3) Action

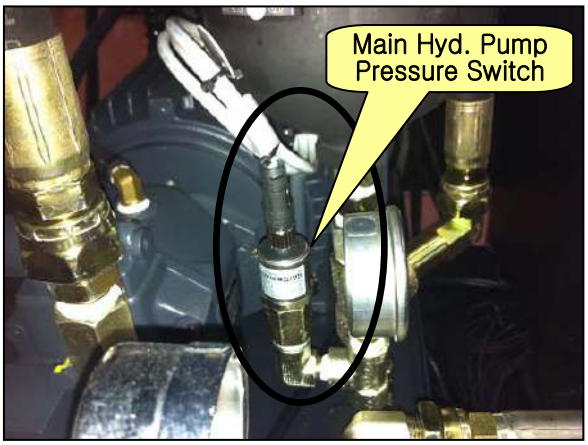
① Turn the pressure value of the hydraulic power unit clockwise to adjust the pressure to 50kg/㎠.

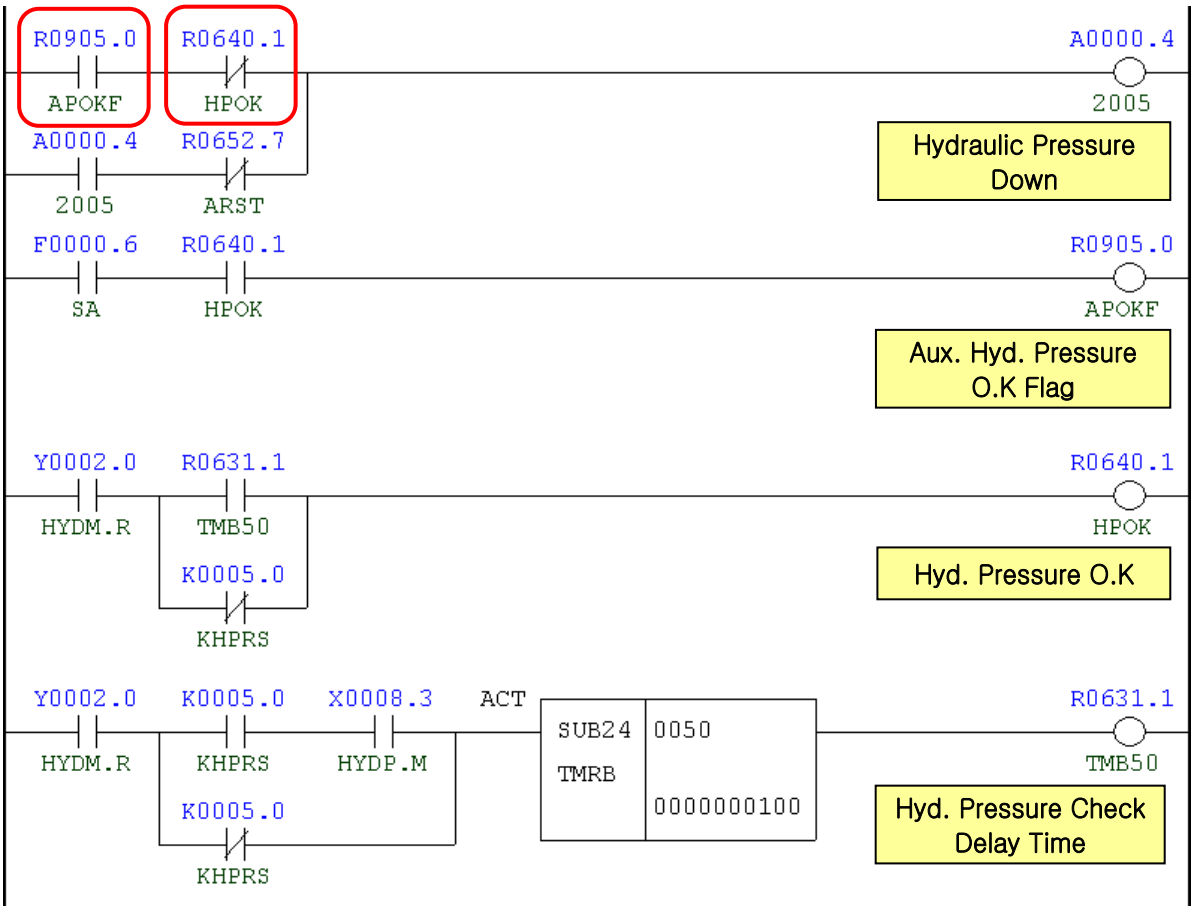
② The pressure switch of the hydraulic power unit has an error, or the wiring or related component parts are defective.

Check the hydraulic power unit, the pressure switch, and the wiring from the switch to the electric cabinet as well as the I/O board, and make repair or replacement if you find a problem.

Part Name	Part No.	Symbol	Spec.	Maker
Cable, Pressure Switch	ECBLS0167F	-WK11	BKS B19-1-05	BALUFF
Switch Pressure	R37983	-SP01	EDS810-060-0-024	HYDACS

Signal	Address	Device Symbol	I/O	Connector (Pin)	Numbering
Hyd. Pressure Check	**X8.3** HDPS.M	-SP31	Input Module Slot 7	XJ413(6)	SP31
Hydraulic Motor Run	**Y2.0** HYDM.R	-KA31A	Output Module Slot 2	(02)	KA31A





Address	Symbol	Coil Comment
R905.0	APOKF	Aux. Hyd. Pressure OK Flag
R640.1	HPOK	Hyd. Pressure OK
A0.4	2005	Hyd. Pressure Down Alarm
R652.7	ARST	Alarm Reset
F0.6	SA	Servo Ready
Y2.0	HYDM.R	Hyd. Pump Motor Run
R631.1	TMB50	Hyd. Pressure Check Delay Time
K5.0	KHPRS	Hyd. Pressure SW Used
X8.3	HYDP.M	Hyd. Pressure Check

1.6 2006 Spindle Gear Shift Check Switch Alarm

1) Description

3 or more of 4 check switches (Low, Middle, High, etc) on the spindle head gear range were tripped, or none of them was tripped.

2) Cause of problem

The check switch for the main spindle gear range has short-circuited or any of its component parts is defective.

3) Action

Check the gear box switch of the main spindle if it works properly on the DGN screen, and take a necessary measure.

Note 1) Spindle Gear Shifting I/O Settings

Signal	Address	Device Symbol	I/O	Connector (Pin)	Numbering
Gear 1 Check	X3.0 (SGA.M)	-SL11	Input Module Slot 06	XJ412 (12)	SL11
Gear 2 Check	X3.2 (SGB.M)	-SL13	Input Module Slot 06	XJ412 (44)	SL13
Gear 3 Check	X3.3 (SGC.M)	-SL14	Input Module Slot 06	XJ412 (11)	SL14
Gear 4 Check	X3.4 (SGD.M)	-SL15	Input Module Slot 06	XJ412 (27)	SL15
Spindle Gear 1	Y4.0 (GR1.V)	-KAR40	Output Module Slot 3	XJ400 (16)	YV14
Spindle Gear 2	Y4.1 (GR2.V)	-KAR41	Output Module Slot 3	XJ400 (32)	YV15
Spindle Gear 3	Y4.2 (GR3.V)	-KAR42	Output Module Slot 3	XJ400 (48)	YV18
Spindle Gear 4	Y4.3 (GR4.V)	-KAR43	Output Module Slot 3	XJ400 (15)	YV19

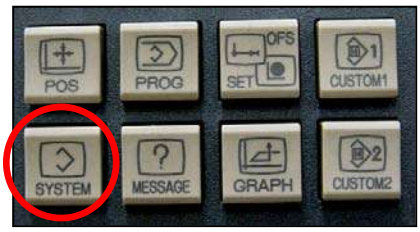
Note 2) Spindle Gear Range Shifting RPM (D460~D462)

Data of the data table---0002/0011(gear shift rpm)

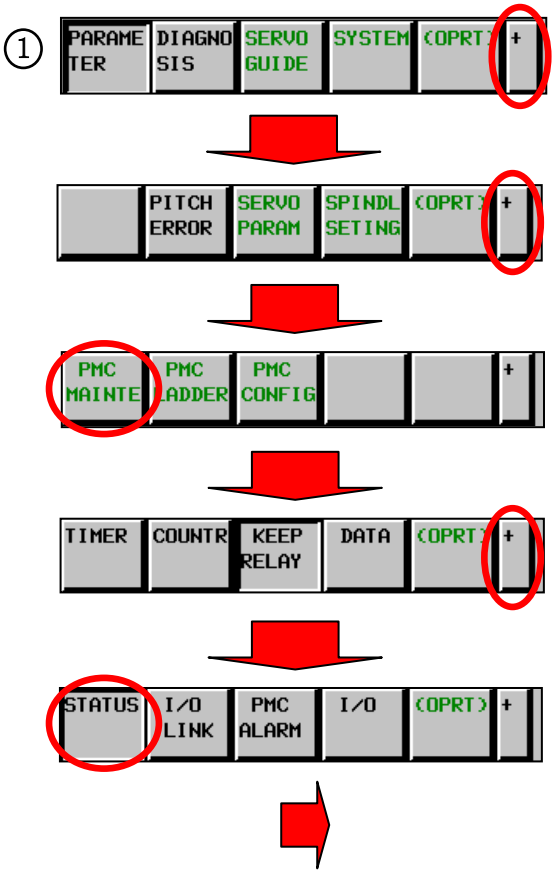
ADDRESS	NO.	DATA	MEANING
D0460 #	0000	25	Gear shift rpm in gear1 range
D0461 #	0001	25	Gear shift rpm in gear2 range
D0462 #	0002	25	Gear shift rpm in gear3 range

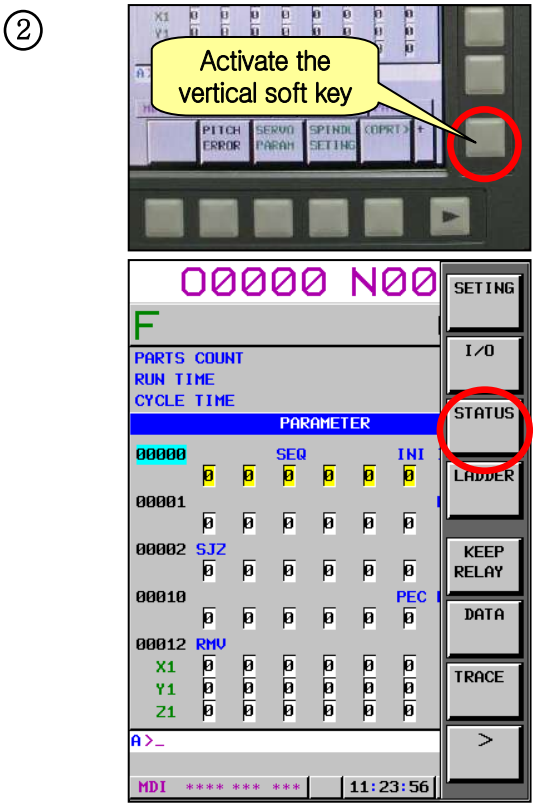
Note 3) How to move to DGN (Diagnostic)

(1) Press the “SYSTEM” button in the right side of the main OP monitor.
The following soft key bar will be displayed at the bottom.

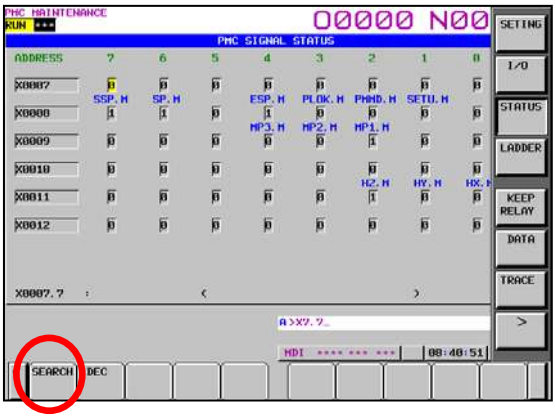


(2) Move to the DGN screen.
① Press the soft keys one after another to move to the DGN screen.
② Press any soft key in the right corner to activate the vertical soft key bar, and press the [STATUS] key.





(3) Enter a desired DGN address and press [SEARCH] to display the DGN screen of your choice.



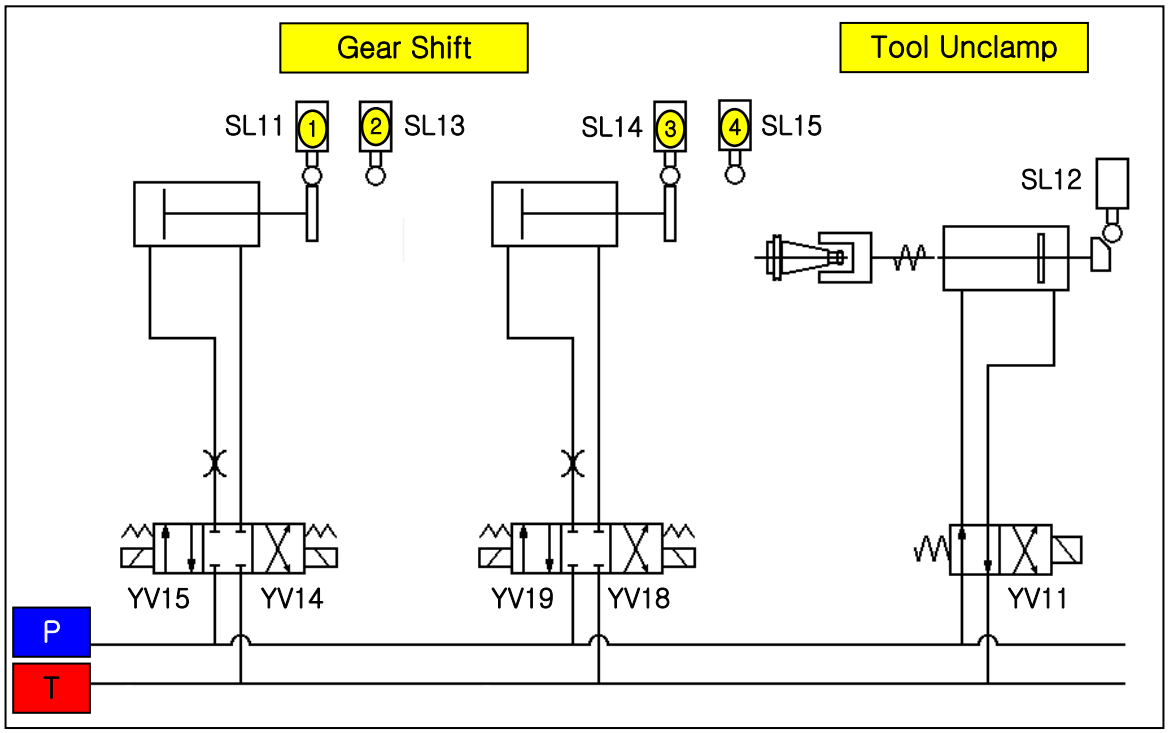
Note 4) How to read DGN (Diagnostic)

Ex) X 0007 0 0 1 1 0 0 1 0

Bit 1, 4 and 5 in Address X7 turn ON while Bit 0, 2, 3, 6 and 7 turn OFF.

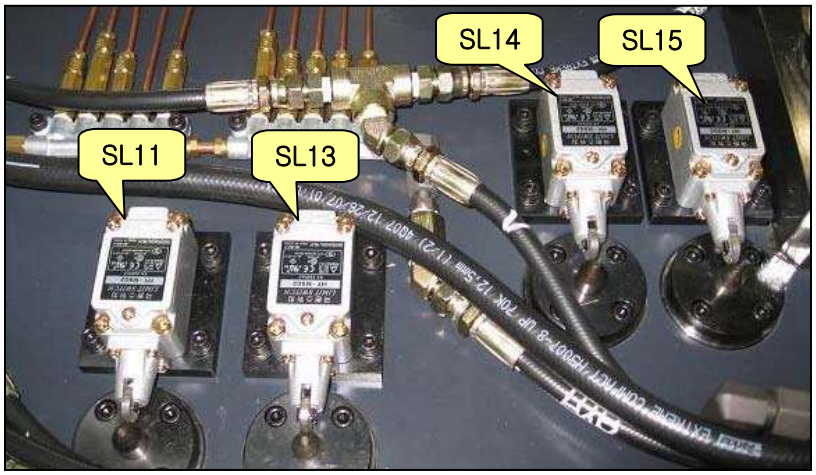
Symbol	0	0	1	1	0	0	1	0
Bit No	Bit 7	Bit 6	Bit 5	Bit 4	Bit 3	Bit 2	Bit 1	Bit 0

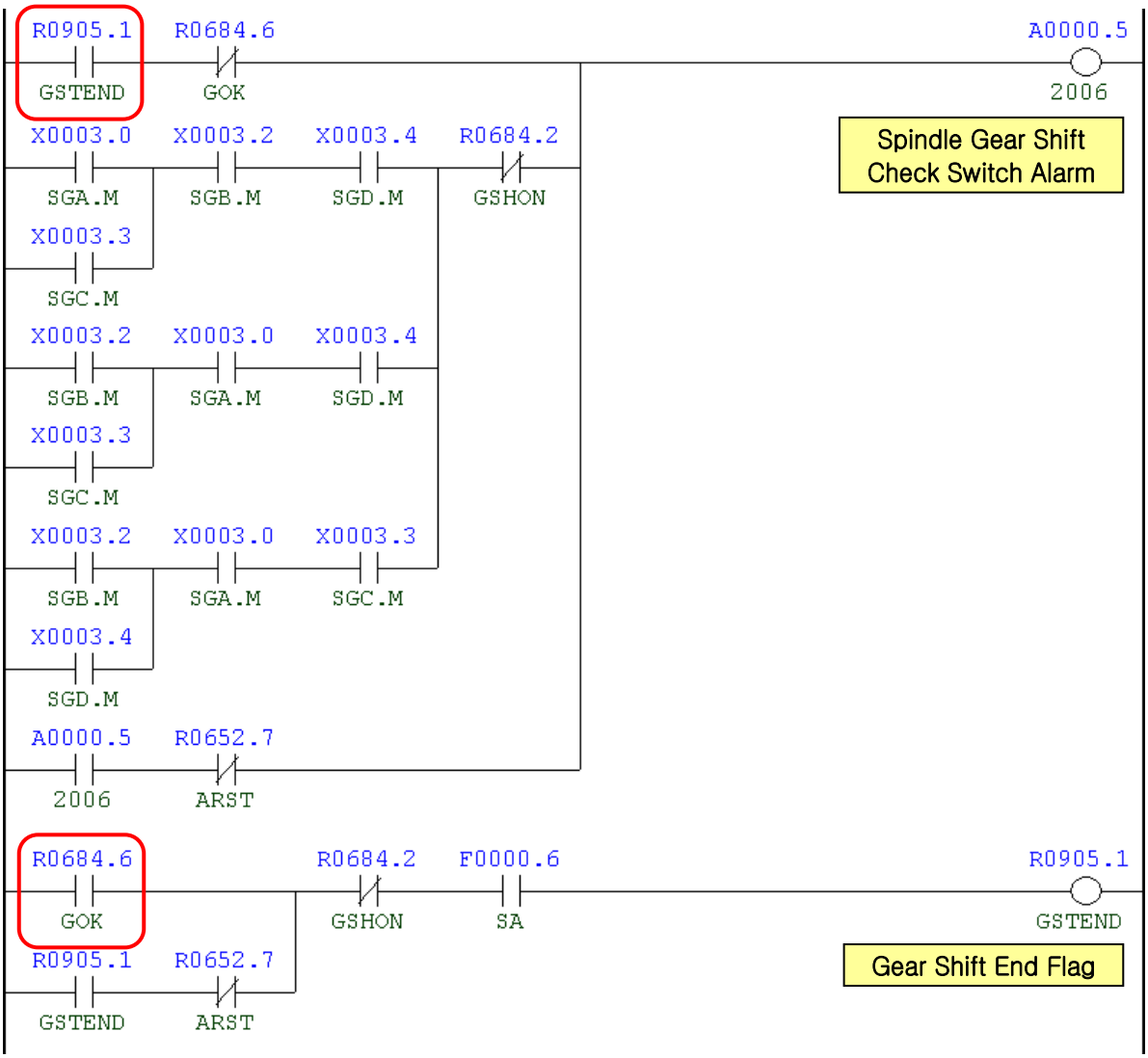
Note 5) Hydraulic circuit diagram of the spindle head

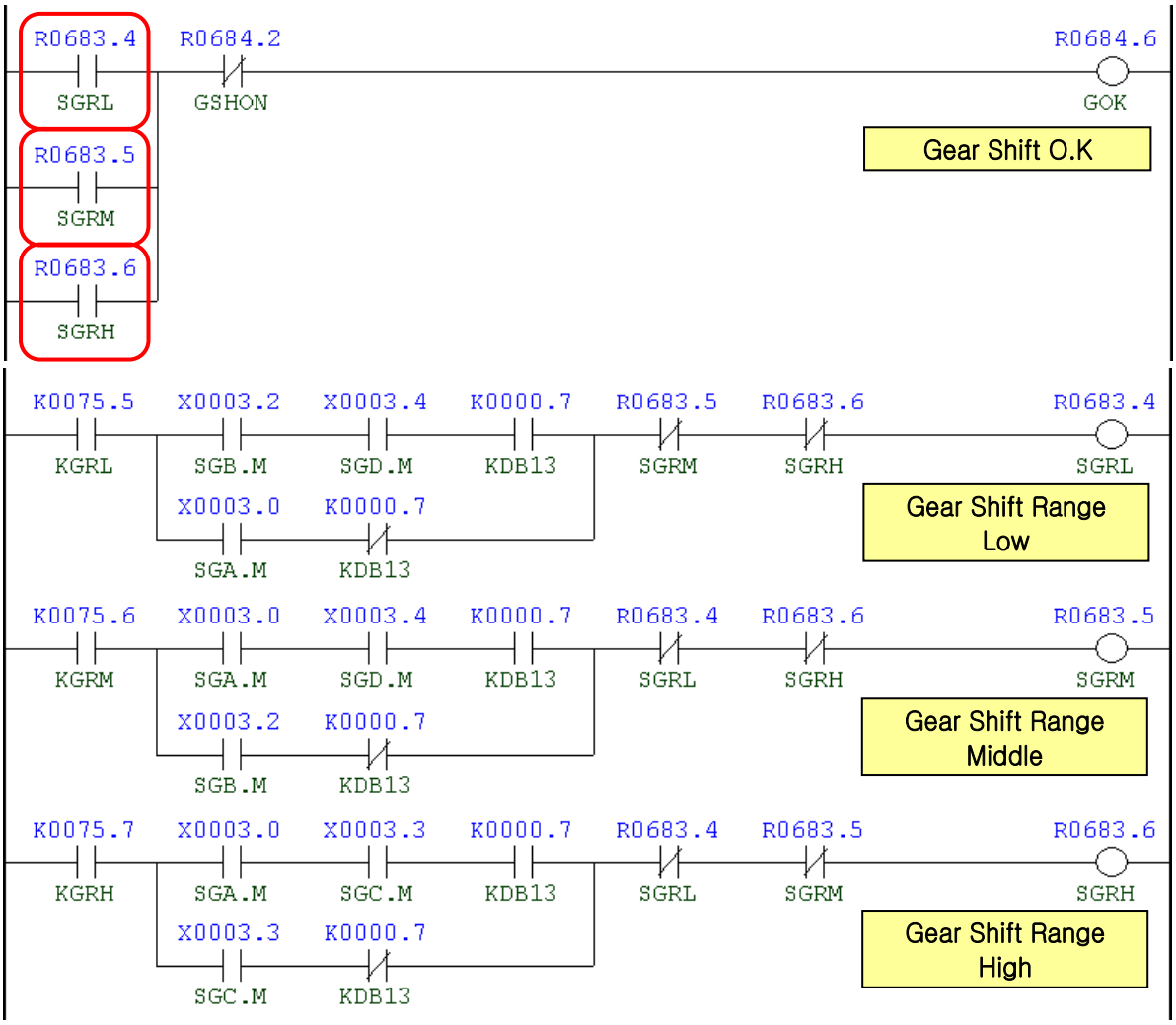


Note 6) Spindle Gear Selection Table

Gear State	Keep Relay	S-Code	Input Signal				Output Signal			
			X3.0 SL11	X3.2 SL13	X3.3 SL14	X3.4 SL15	Y4.3 YV19	Y4.2 YV18	Y4.1 YV15	Y4.0 YV14
High	K75.5	S0~S246	1	0	1	0	0	1	0	1
Middle	K75.6	S247~S806	1	0	0	1	1	0	0	1
Low	K75.7	S807~S2500	0	1	0	1	1	0	1	0


SL14
SL15
SL11
SL13


R0905.1
GSTEND
R0684.6
GOK
A0000.5
2006
Spindle Gear Shift Check Switch Alarm
X0003.0
SGA.M
X0003.2
SGB.M
X0003.4
SGD.M
R0684.2
GSHON
X0003.3
SGC.M
X0003.2
SGB.M
X0003.0
SGA.M
X0003.4
SGD.M
X0003.3
SGC.M
X0003.2
SGB.M
X0003.0
SGA.M
X0003.3
SGC.M
X0003.4
SGD.M
A0000.5
2006
R0652.7
ARST
R0684.6
GOK
R0684.2
GSHON
F0000.6
SA
R0905.1
GSTEND
Gear Shift End Flag
R0905.1
GSTEND
R0652.7
ARST



Address	Symbol	Coil Comment
R905.1	GSTEND	Gear Shift End Flag
R684.6	GOK	Gear Shift O.K
X3.0	SGA.M	Spindle Gear A/S-Unclamp Built
X3.2	SGB.M	Spindle Gear Shift Status B
X3.3	SGC.M	Spindle Gear Shift Status C
X3.4	SGD.M	Spindle Gear Shift Status D
R684.2	GSHON	Gear Shift On
A0.5	2006	Gear Shift Check Switch Alarm
R652.7	ARST	Alarm Reset
R905.1	GSTEND	Gear Shift End Flag
R683.4	SGRL	Spindle Gear Shift Low
R683.5	SGRM	Spindle Gear Range Middle
R683.6	SGRH	Spindle Gear Range High

1.7 2008 PSM Contact Check Error

1) Description

There occurred an error while KM10 magnetic contactor was operating.

2) Cause of problem

The operation of KM10 did not comply with the intended signal.

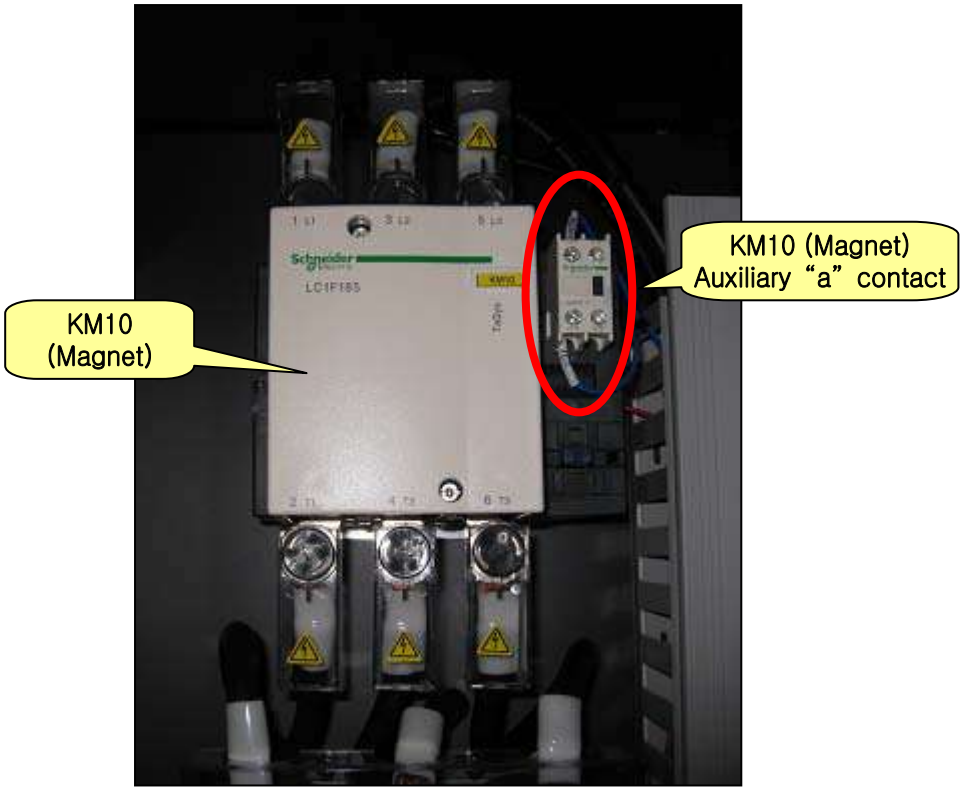
3) Action

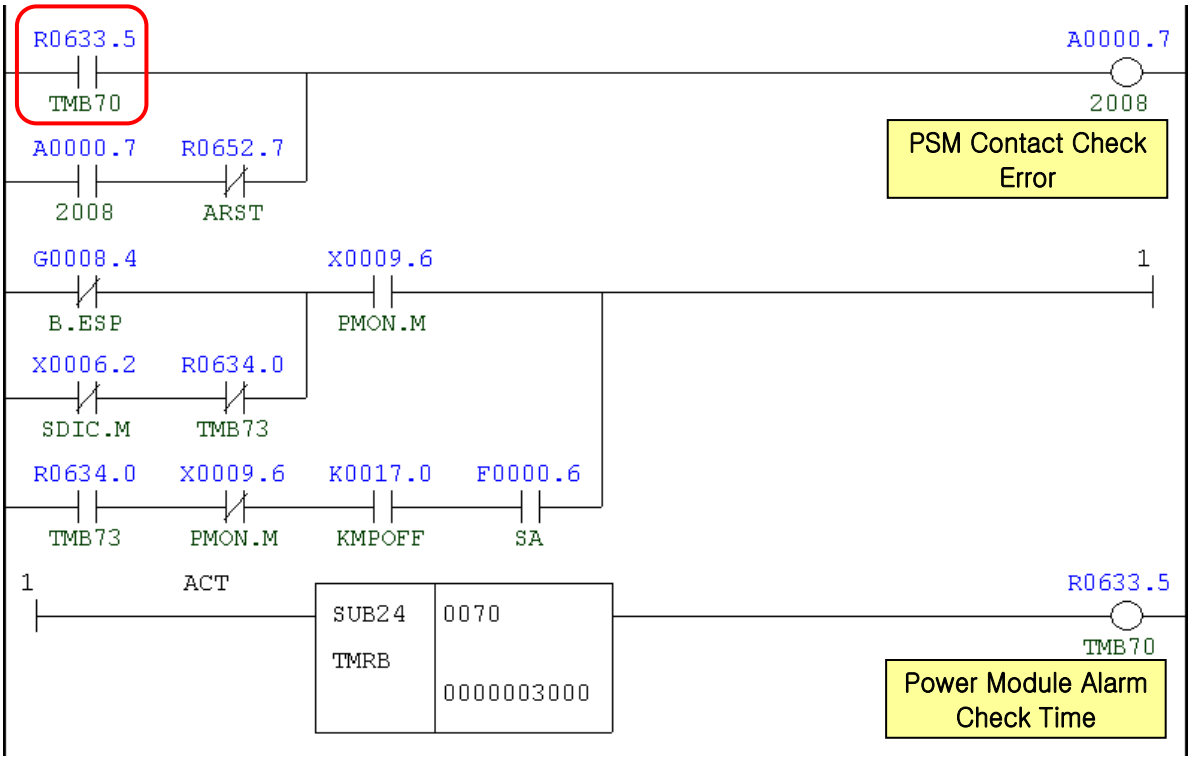
① The check signal (X9.6) of the magnetic contactor should turn on only while KM10 is operating.

② Set "Keep Relay K17.0" to 1 if you want to enable the option of Motor Power On/Off.

☞ If you set "K17.0=(1)" to enable the option of Motor Power ON/OFF, KM10 magnetic contactor turns off if the door is open, and turns on if the door is close.

Signal	Address	Device Symbol	I/O	Connector (Pin)	Numbering
Power Supply Contact On State	**X9.6** PMON.M	-KM10	Input Module Slot 07	XJ413 (01)	PMON
Splash Guard Door Interlock	**X6.2** SDIC.M	-S61	Input Module Slot 07	XJ413(48)	SS61B





Address	Symbol	Coil Comment
R633.5	TMB70	Power Module Alarm Check Time
A0.7	2008	PSM Contact Check Error
R652.7	ARST	Alarm Reset
G8.4	B.ESP	Emergency Stop
X6.2	SDIC.M	Splash Guard Door Interlock
R634.0	TMB73	Connect Delay Time Again
X9.6	PMON.M	Power Supply Magnet On State
K17.0	KMPOFF	Module Elec. Off D-Open
F0.6	SA	Servo Ready
X17.7	MENB.M	Machine Enable Switch On

2. Cycle Alarm

2.1 2031 Return to Ref. Point in Manual

1) Description

A message prompting you to manually return the axis to the reference point

2) Cause of problem

① The machine was instructed to operate before all axes had returned to their respective reference point.

② In the Machine Lock state, AUTO mode (EDIT, MEMORY, TAPE, MDI) was selected. (X, Y, Z, W)

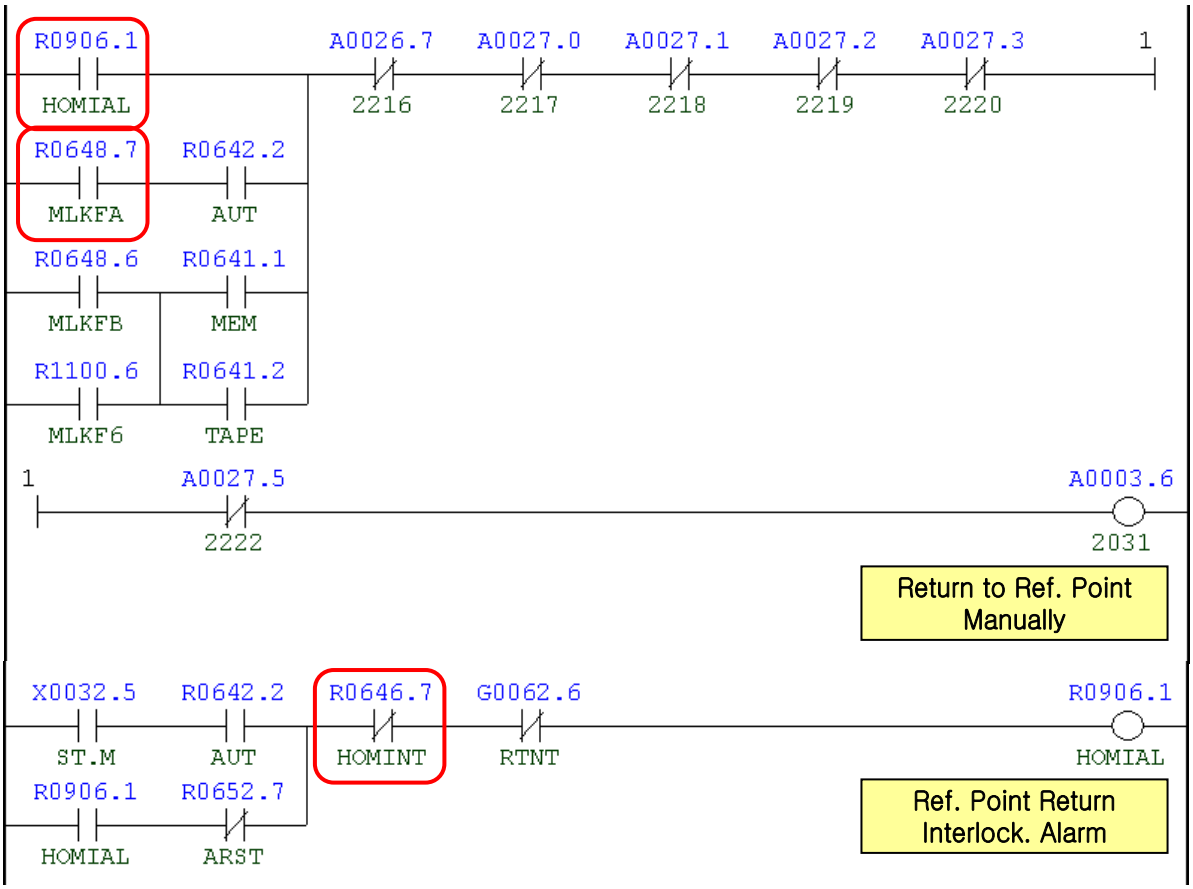
③ In the Machine Lock state, EDIT or MEMORY mode was selected. (B, 6 axes)

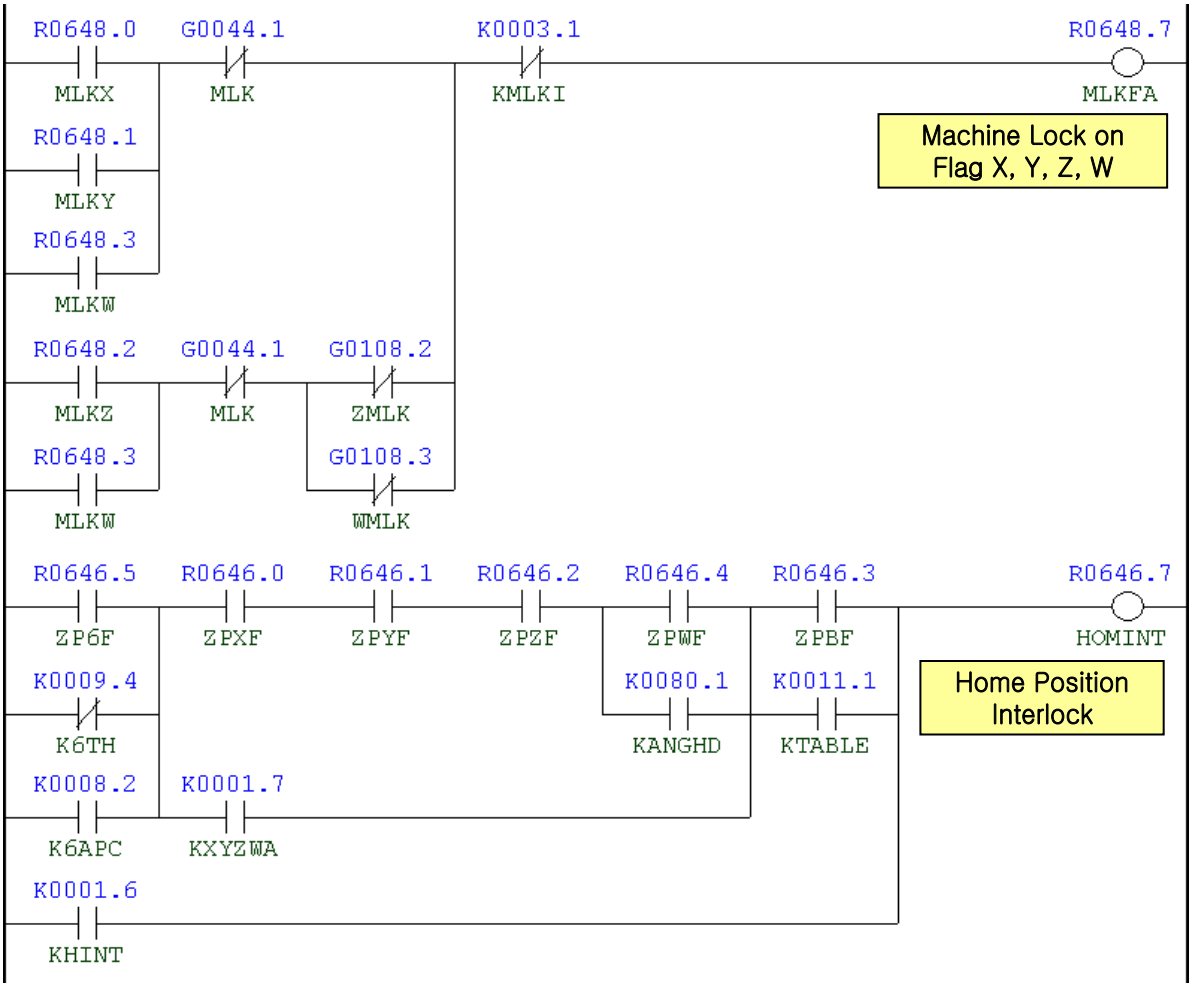
3) Action

① Return to the reference point manually

② If you want to operate the machine regardless of whether the axes return to their reference point, set "Keep Relay K1.6" to 1.

③ In the Machine Lock state, the machine can be instructed to operate in AUTO mode only after the axes have returned to their respective reference point.





Address	Symbol	Coil Comment
R906.1	**HOMIAL**	**Ref. Point Return Interlock Alarm**
R648.7	**MLKFA**	**Machine Lock On Flag X, Y, Z, W**
R642.2	AUT	Auto Mode
R648.6	MLKFB	Machine Lock On Flag B-Axis
R1100.6	MLKF6	Machine Lock On Flag 6-Axis
R641.1	MEM	Memory Mode
R641.2	TAPE	Tape Mode
A26.7	2216	Must Be Return to Ref. Point X
A27.0	2217	Must Be Return to Ref. Point Y
A27.1	2218	Must Be Return to Ref. Point Z
A27.2	2219	Must Be Return to Ref. Point W
A27.3	2220	Must Be Return to Ref. Point B
A27.5	2222	6th Axis Clamp/Unclamp Alarm

Address	Symbol	Coil Comment
A3.6	2031	Return to Ref. Point in Manual
X32.5	ST.M	Cycle Start
R652.7	ARST	Alarm Reset
R646.7	**HOMINT**	**Home Position Interlock**
G62.6	RTNT	Rigid Tapping Retraction Start
R648.0	MLKX	Machine Lock X-Axis
R648.1	MLKY	Machine Lock Y-Axis
R648.3	MLKW	Machine Lock W-Axis
G44.1	MLK	Machine Lock
R648.2	MLKZ	Machine Lock Z-Axis
G108.2	ZMLK	Z-Axis Machine Lock
G108.3	WMLK	W-Axis Machine Lock
K3.1	KMLKI	Machine Lock Ref. Point Invalid

2.2 2032 Feed Hold Push Button is Pressed

1) Description

An error in the signal of the feed hold switch while the program is running (in AUTO mode)

2) Cause of problem

① The feed hold switch on the main OP is tripped.

☞ The feed hold switch enables you to stop running the program instantly without instructing the emergency stop.

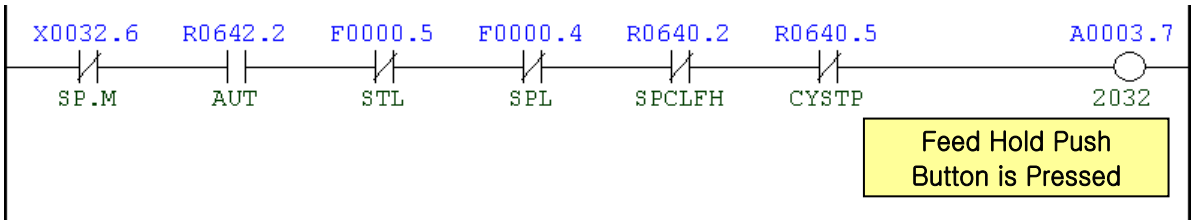
② A short-circuit or defective part in the feed hold switch

3) Action

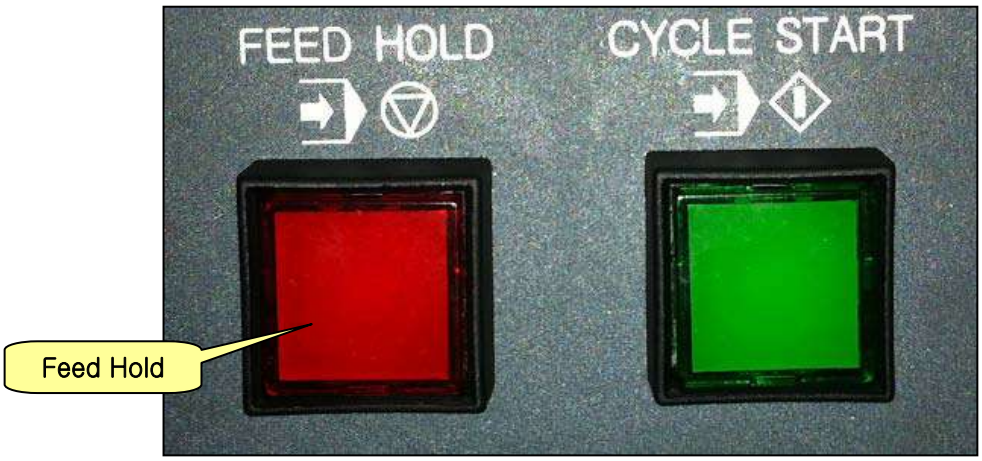
① If you have pressed the feed hold switch by necessity, release the switch to set off the alarm. Then, you can press the Cycle Start switch to resume running the program.

② Turn the feed hold switch manually to check the input signal on the DGN screen of PMC. Take necessary measures (reconnect the wiring, etc) to restore normal conditions.

Signal	Address	Device Symbol	I/O	Connector (Pin)	Numbering
Feed Hold	**X32.6** SP.M	-SB17	Distribute I/O Module(A)	XCE56A(A05)	SB17



Address	Symbol	Coil Comment
X32.6	SP.M	Cycle Stop
R642.2	AUT	Auto Mode
F0.5	STL	Cycle Start
F0.4	SPL	Feed Hold
R640.2	SPCLFH	Spindle & Coolant At Feed Hold
R640.5	CYSTP	Cycle Stop
A3.7	2032	Feed Hold Push Button is Pressed


FEED HOLD
CYCLE START
Feed Hold

2.3 2033 Air Pressure down Alarm

1) Description

The air pressure switch is tripped because the air pressure falls below the specified value.

2) Cause of problem

① The factory-supplied air pressure falls below the standard (4kg).

② The air pressure switch or any of its parts is defective.

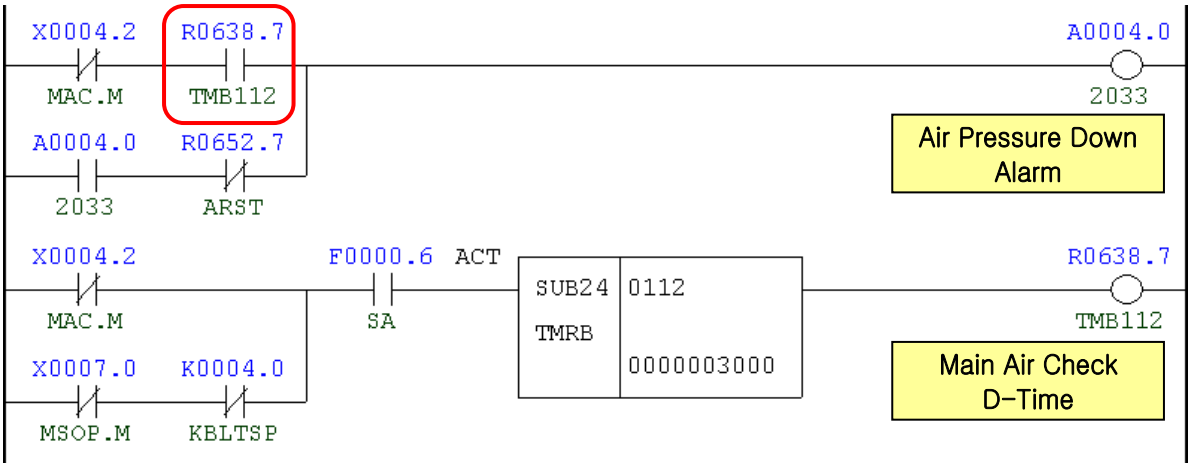
3) Action

① Increase the factory-supplied air pressure to more than 5kg/㎠.

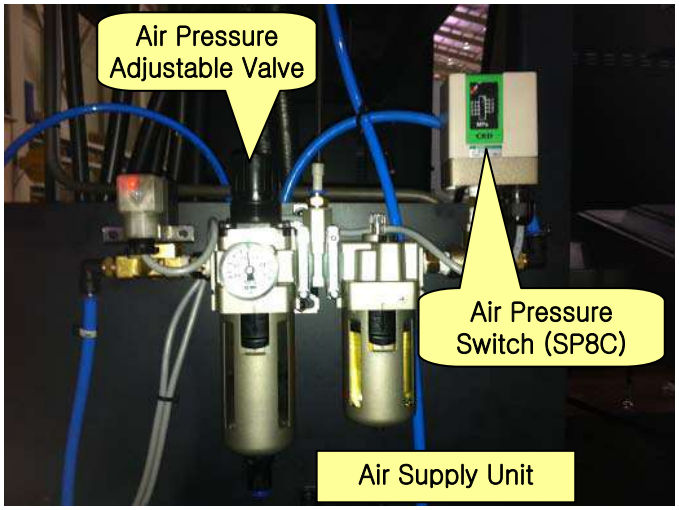
- Check the air pressure measurement displayed on the gauge of the air service unit, and if it's below 4kg/㎠, turn the air pressure handle to the right. If the gauge does not increase any further, this indicates the current air pressure is not appropriate.

② Check the air pressure switch, wiring and I/O module if there is no error. And make repair or replacement if necessary.

Signal	Address	Device Symbol	I/O	Connector (Pin)	Numbering
Main Air Pressure Check	**X4.2** MAC.M	-SP8C	Input Module : Slot 06	XJ412 (39)	SP8C



Address	Symbol	Coil Comment
X4.2	MAC.M	Main Air Pressure Check
R638.7	**TMB112**	**Main Air Check D-Time**
A4.0	2033	Air Pressure Down Alarm
R652.7	ARST	Alarm Reset
X7.0	MSOP.M	Mist Oil Operating Pressure
K4.0	KBLTSP	Built In Spindle Used
F0.6	SA	Servo Ready



2.4 2034 Coolant & Lub. Pump Overload

1) Description

An excessive electric current is detected in the coolant or lubricant pump motor.

2) Cause of problem

① The coolant or lubricant pump motor, or the power cable is burnt out.

② The circuit breaker that detects the excessive current is overloaded or defective itself.

3) Action

① Check the coolant or lubricant pump motor, or the power cable, and repair or replace a defective one if found.

② Check the circuit breaker for the load settings and make correction if necessary. If the circuit breaker itself has an error, replace it with a new one.

☞ Overload settings

QM41 (Flood Coolant Pump Motor) : 1.5 Kw : 7 A / 2.2 Kw : 11 A

QM42 (T-T-S Coolant Pump Motor) : 1.5 Kw : 7 A / 3.7 Kw : 17 A

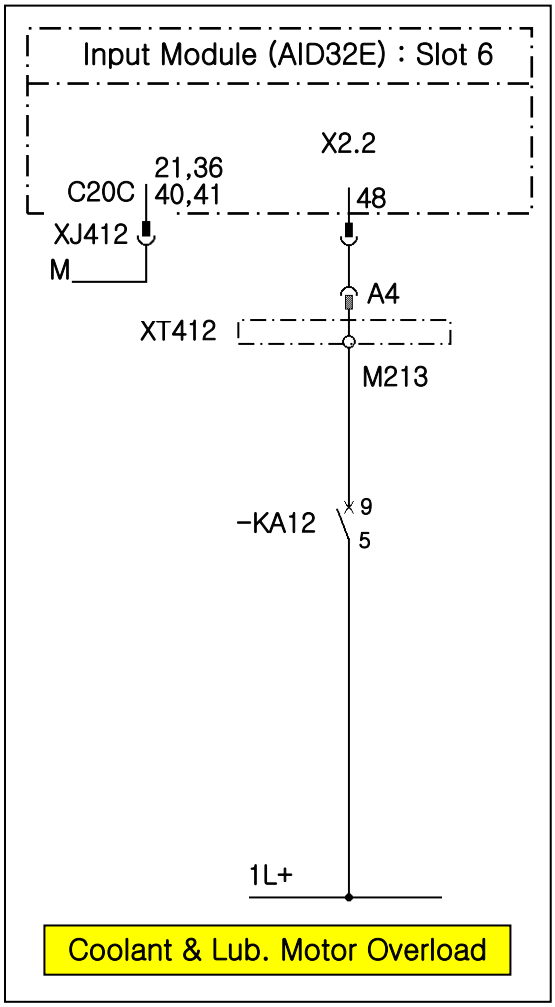
QM43 (Cool Jet T-S-C Unit) : 5.5 Kw : 23.9 A / 3.7Kw : 17A

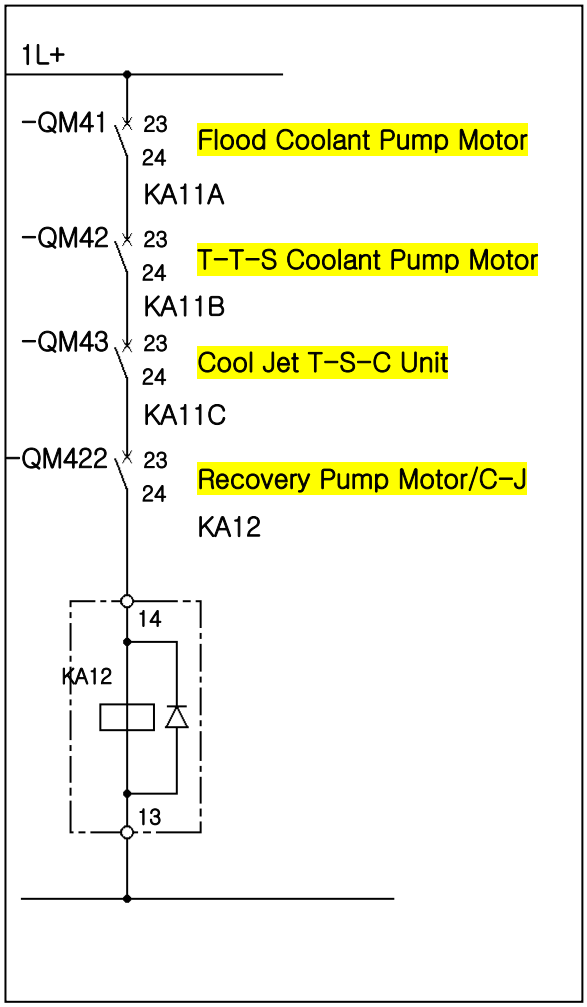
QM422 (Recovery Pump Motor/C-J) : 0.9 Kw : 5.2 A

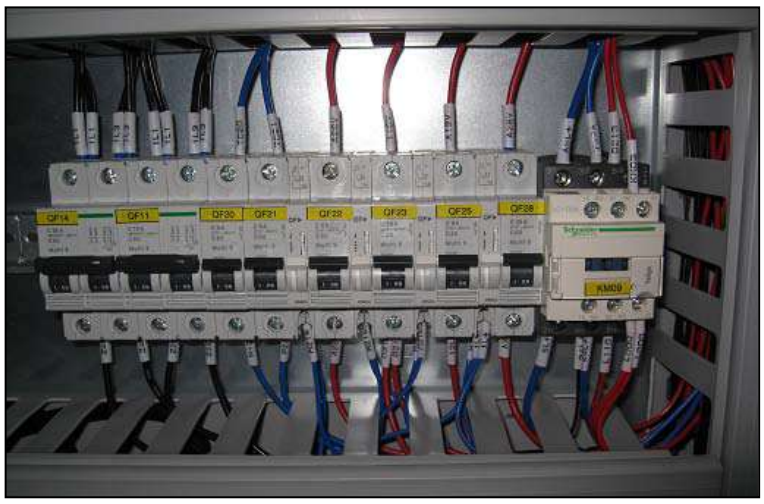
Part Name	Part No.	Symbol	Spec.	Maker
Breaker, Auxiliary	ENFBX0290M	QM41,42,43,422	TESYS. GV2ME22. 20-25A	Schneider
Breaker, Motor Circuit	ENFBX0259M	QM41,QM42	TESYS. GV2ME14. 6-10A	Schneider
Breaker, Motor Circuit	ENFBX0285M	QM41	TESYS. GV2ME16. 9-14A	Schneider
Breaker, Motor Circuit	ENFBX0261M	QM42, QM43	TESYS. GV2ME21. 17-23A	Schneider
Breaker, Motor Circuit	ENFBX0262M	QM43	TESYS. GV2ME22. 20-25A	Schneider
Breaker, Motor Circuit	ENFBX0258M	QM422	TESYS. GV2ME10. 4-6.3A	Schneider

Signal	Address	Device Symbol	I/O	Connector (Pin)	Numbering
Coolant & Lub. Motor Overload	**X2.2** MOVL.M	-M213	Input Module : Slot 06	XJ411 (48)	M213

Address	Symbol	Coil Comment
X2.2	MOVL.M	Lub. & Coolant Motor Overload
A4.1	2034	Coolant Motor Overload Alarm
R652.7	ARST	Alarm Reset







2.5 2035 Addition Coolant Unit Alarm

1) Description

An error occurred in an external coolant unit.

2) Cause of problem

① The coolant pressure of the TSC unit has decreased, or the filter of the TSC filter unit is clogged.

② The pressure switch has an error or the wiring has a problem.

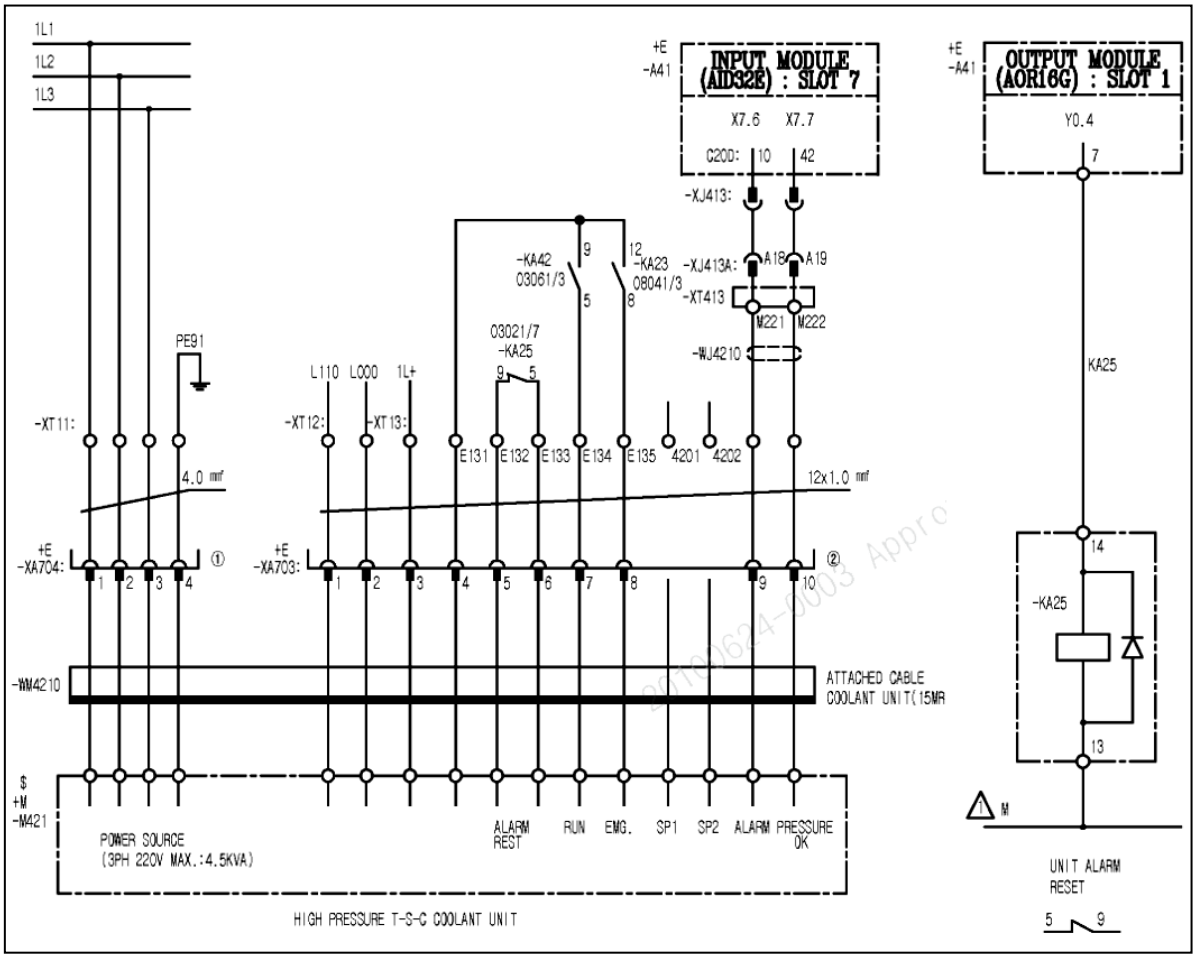
3) Action

① Take necessary measures to solve the problems of both the TSC unit and the filter.

② Check the pressure switch and the wiring, and repair or replace a defective one if necessary.

Signal	Address	Device Symbol	I/O	Connector (Pin)
T-S-C Unit Alarm	**X7.6** TSCA.M	-SP15	Input Module : Slot 07	XJ413 (10)

Address	Symbol	Coil Comment
X7.6	TSCA.M	T.S.C Unit Alarm
F0.6	SA	Servo Ready
A4.2	2035	Addition Coolant Unit Alarm
R652.7	ARST	Alarm Reset


1L1
1L2
1L3
PE91
-XT11:
4.0 ㎟
+E
-XA704:
①
-WM4210
$
+M
-WM421
POWER SOURCE
(3PH 220V MAX.:4.5KVA)
L110 L000 1L+
-XT12:
-XT13:
03021/7
-KA25
E131 E132 E133 E134 E135 4201 4202
12x1.0 ㎟
+E
-XA703:
②
ATTACHED CABLE
COOLANT UNIT(15MR
ALARM REST
RUN
EMG.
SP1
SP2
ALARM
PRESSURE OK
HIGH PRESSURE T-S-C COOLANT UNIT
+E
-A41
INPUT MODULE
(AID32E) : SLOT 7
X7.6 X7.7
C20D: 10 42
-XJ413:
-KA42
03061/3
-KA23
08041/3
-XJ413A:
A18
A19
-XT413
M221
M222
-WJ4210
+E
-A41
OUTPUT MODULE
(AOR16G) : SLOT 1
Y0.4
7
KA25
14
-KA25
13
M
UNIT ALARM
RESET
5
9

2.6 2037 Power Back Up Module Power Failure

1) Description

An error in the power backup module

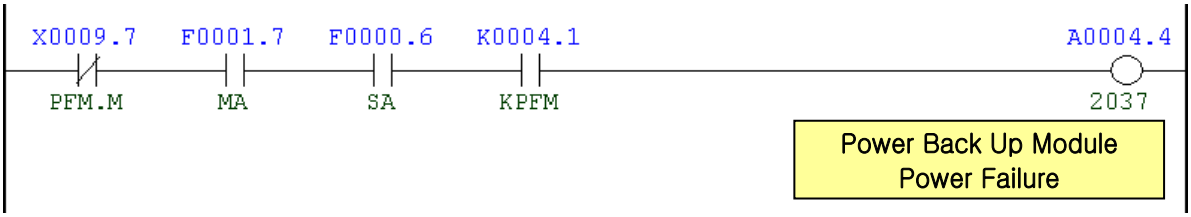
2) Cause of problem

In pre-operation stages, no power is applied to the power backup module. (An error in the power supply line to PFM.M)

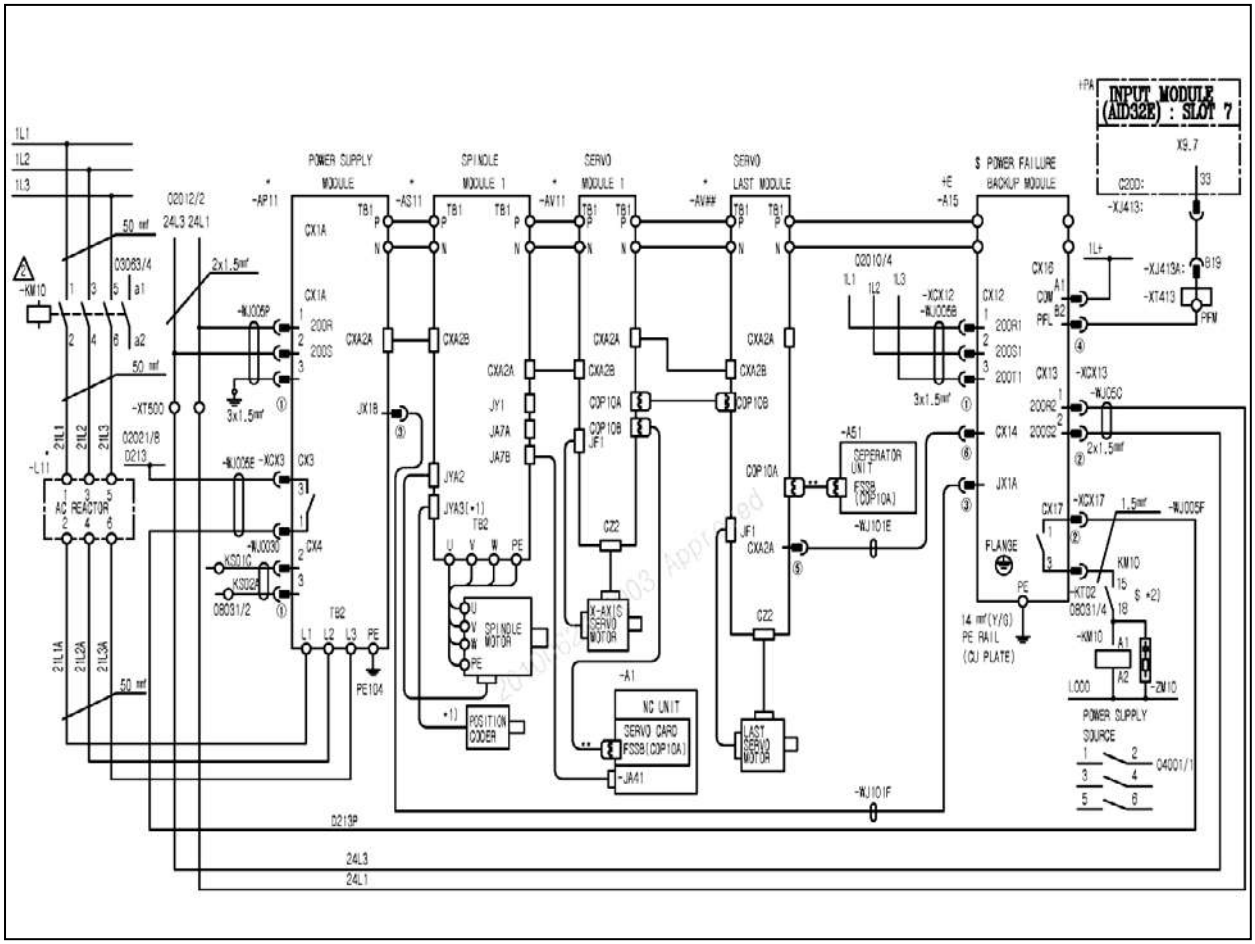
3) Action

Check the power supply line to PFM.M, and take a necessary measure if an error is found.

Signal	Address	Device Symbol	I/O	Connector (Pin)
Power Failure Detection	**X9.7** TSCA.M	PFL	Input Module : Slot 07	XJ413 (33)



Address	Symbol	Coil Comment
X9.7	PFM.M	Power Failure Detection
F1.7	MA	NC Ready
F0.6	SA	Servo Ready
K4.1	KPFM	Power Failure Detection Use
A4.4	2037	Power Back Up Module Power Failure


INPUT MODULE (AID32E) : SLOT 7
POWER SUPPLY MODULE
SPINDLE MODULE 1
SERVO MODULE 1
SERVO LAST MODULE
$ POWER FAILURE BACKUP MODULE
AC REACTOR
SPINDLE MOTOR
POSITION CODER
X-AXIS SERVO MOTOR
NC UNIT
SERVO CARD FSSB(02P10A)
LAST SERVO MOTOR
SEPERATOR UNIT FSSB (02P10A)
FLANGE
PE RAIL (CU PLATE)
POWER SUPPLY SOURCE

2.7 2049 Spindle Speed Arrival Signal Error

1) Description

The spindle failed to reach the instructed revolutions within 20 seconds after the rotation instruction (M03, M04).

2) Cause of problem

① An error found in parameter settings related to the spindle

② An error found in the signal from the main spindle drive unit

③ An error found in the signal from the position coder

3) Action

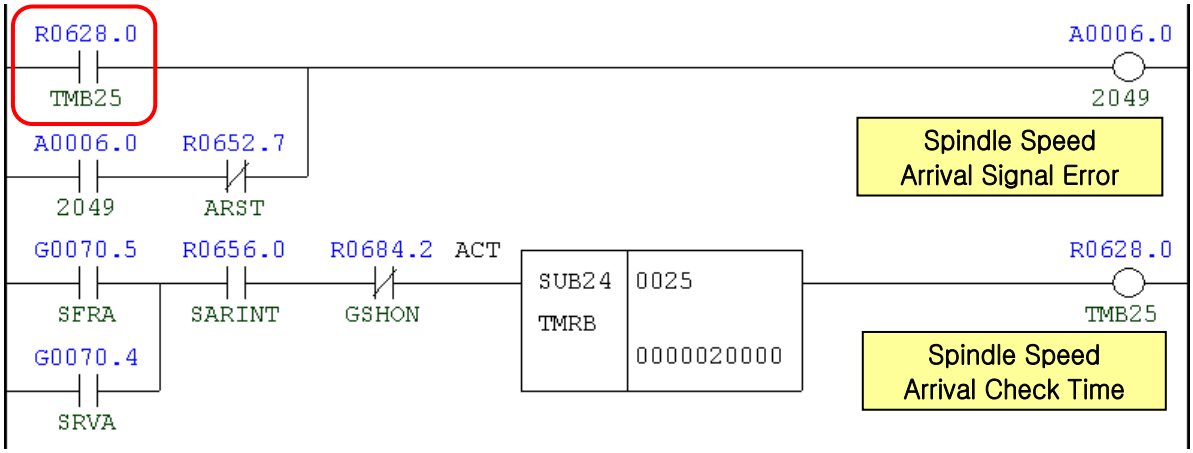
① Refer to the parameter sheet that comes with the product and check the spindle-related parameters (N3700~N4175). Take a necessary measure if an error is found.

② Check the alarm number that is displayed on the main spindle drive unit of the electric cabinet, and take a necessary measure according to the alarm number.

☞ Refer to "Troubleshooting by the spindle amplifier alarm" in the appendix.

③ Set the parameter to ignore the position coder settings, and rotate the spindle to check if the position coder is set properly. If not, take an appropriate action.

☞ For the parameter to ignore the position coder settings, change all bit numbers of N4001/N4002 to "0" and rotate the spindle after restarting the machine.



Address	Symbol	Coil Comment
R628.0	**TMB25**	**Spindle Speed Arrival Check Time**
A6.0	2049	Spindle Speed Arrival Signal Error
R652.7	ARST	Alarm Reset
G70.5	SFRA	Spindle Forward
G70.4	SRVA	Spindle Reverse
R656.0	SARINT	Spindle Speed Arrival Interlock
R684.2	SGHON	Gear Shift On

◈ Note) Spindle-related NC Parameter Table

DBC130 (1PATH)	NC PARAMETER (Common Parts)	NC UNIT	FS31iA

(TEC:TECNOMACH DIA:U.S.A)

NO.		DATA	REMARKS
• SPINDLE			
04000	S1	00000000	
04001	S1	00000000	#0 Whether to use the MRDY signal (machine ready signal)
04002	S1	00000010	#0~#3 Spindle sensor type setting
04003	S1	00000000	#4~#7 Gear teeth number setting of the spindle sensor
04004	S1	00000000	
04005	S1	00000000	
04006	S1	00000000	#1 Sets a gear ratio setting resolution(1 : 1/1000 unit)
04007	S1	00000000	ⓐ
04008	S1	00000000	ⓐ
04009	S1	00000000	ⓐ #0 Velocity loop gain increment system
04010	S1	00000000	ⓐ #0~#2 Setting of the number of motor sensor gear teeth
04011	S1	00011010	ⓐ
04012	S1	10000000	ⓐ
04013	S1	01010000	ⓐ
04014	S1	00000000	#2 Whether to check both spindle switch main and sub magnetic contactor contacts
04015	S1	00000101	#0 use the spindle orientation function.
04016	S1	00000000	#3 Sets the smoothing function in feed-forward control.
04017	S1	00000000	#7 Short-cut function when spindle orientation from stopped state is specified
04018	S1	00000000	#6 High-speed spindle orientation function (1)
04019	S1	00000100	ⓐ #7 automatically initializing spindle parameters
04020	S1	4919	ⓐ Maximum motor speed
04021	S1	100	Maximum speed on Cs contouring control mode
04022	S1	150	Speed arrival detection level
04023	S1	30	ⓐ Speed detection level
04024	S1	75	Zero speed detection level
04025	S1	50	Limited torque
04026	S1	83	Load detection level 1

NO.		DATA	REMARKS
04027	S1	95	Load detection level 2
04028	S1	0	Limited output pattern
04029	S1	100	Output limit
04030	S1	0	Soft start/stop time
04031	S1	0	Stop position of position coder method orientation
04032	S1	0	Acceleration on spindle synchronization
04033	S1	10	Spindle synchronization speed arrival level
04036	S1	0	Feed-forward coefficient
04040	S1	10	Velocity loop proportional gain on velocity control mode (High)
04041	S1	10	ⓐ Velocity loop proportional gain on velocity control mode (Low)
04042	S1	10	Velocity loop proportional gain on orientation (High)
04043	S1	10	Velocity loop proportional gain on orientation (Low)
04044	S1	10	Velocity loop proportional gain on servo mode (High)
04045	S1	10	Velocity loop proportional gain on servo mode (Low)
04046	S1	30	Velocity loop proportional gain on Cs contouring control (High)
04047	S1	30	Velocity loop proportional gain on Cs contouring control (Low)
04048	S1	10	Velocity loop integral gain on velocity control mode (High)
04049	S1	10	ⓐ Velocity loop integral gain on velocity control mode (Low)
04050	S1	10	Velocity loop integral gain on orientation (High)
04051	S1	10	Velocity loop integral gain on orientation (Low)
04052	S1	15	Velocity loop integral gain on servo mode/spindle synchronization control (High)
04053	S1	15	Velocity loop integral gain on servo mode/spindle synchronization control (Low)
04054	S1	50	Velocity loop integral gain on Cs contouring control (High)
04055	S1	50	Velocity loop integral gain on Cs contouring control (Low)
04056	S1	2000	Gear ratio (High)
04057	S1	610	Gear ratio (Medium High)
04058	S1	610	Gear ratio (Medium Low)

EDITION	DATE		PAGE
A04	09.11.12	04056 : 197-->2000	P17/19

DBC130 (1PATH)	NC PARAMETER (Common Parts)	NC UNIT	FS31iA

(TEC:TECNOMACH DIA:U.S.A)

NO.		DATA	REMARKS
04059	S1	197	Gear ratio (Low)
04060	S1	350	Position gain on orientation (High)
04061	S1	500	Position gain on orientation (Medium High)
04062	S1	500	Position gain on orientation (Medium Low)
04063	S1	500	Position gain on orientation (Low)
04064	S1	100	Ordinary orientation: Rate of change in position gain upon completion of orientation
04065	S1	2500	Position gain on servo mode/spindle synchronization control (High)
04066	S1	2500	Position gain on servo mode/spindle synchronization control (Medium High)
04067	S1	2500	Position gain on servo mode/spindle synchronization control (Medium Low)
04068	S1	2500	Position gain on servo mode/spindle synchronization control (Low)
04069	S1	3000	Position gain on Cs contouring control (High)
04070	S1	3000	Position gain on Cs contouring control (Medium High)
04071	S1	3000	Position gain on Cs contouring control (Medium Low)
04072	S1	3000	Position gain on Cs contouring control (Low)
04073	S1	0	Grid shift on servo mode
04074	S1	0	Reference position return speed on Cs contouring control/servo mode
04075	S1	10	Detection level for orientation completion signal
04076	S1	33	Ordinary orientation: Motor speed limit value on orientation
04077	S1	#	Orientation stop position shift
04080	S1	(15460)80	Ⓐ Regenerative power limit for high-speed zone/regenerative power limit
04081	S1	20	Delay time until motor power is cut off
04082	S1	10	Setting of acceleration/deceleration time
04083	S1	30	Ⓐ Motor voltage on velocity control mode
04084	S1	30	Motor voltage on orientation
04085	S1	30	Motor voltage on servo mode/spindle synchronization control mode
04086	S1	100	Motor voltage on Cs contouring control
04087	S1	115	Overspeed level

NO.		DATA	REMARKS
04088	S1	75	Level for detecting excess velocity deviation when motor is restrained
04089	S1	200	Level for detecting excess velocity deviation when motor rotates
04090	S1	90	Overload detection level
04091	S1	100	Rate of change in position gain during reference position return on servo mode
04092	S1	100	Rate of change in position gain during reference position return on Cs contouring control
04094	S1	0	Disturbance torque compensation constant (acceleration feedback gain)
04095	S1	0	Adjusted output voltage of speedometer
04096	S1	0	Adjusted output voltage of load meter
04099	S1	400	Delay time for motor excitation
04100	S1	1500	Ⓐ Base speed of motor output specifications
04101	S1	(80)100	Ⓐ Output limit for motor output specifications
04102	S1	(1756)1765	Ⓐ Excitation voltage saturation speed at no-load
04103	S1	(70)85	Ⓐ Base speed limit ratio
04104	S1	(4000)1500	Ⓐ Current loop proportional gain
04106	S1	(4000)5000	Ⓐ Current loop integral gain
04108	S1	0	Ⓐ Velocity at which the current loop integral gain is zero
04109	S1	250	Ⓐ Filter time constant for processing saturation related to the voltage command
04110	S1	(1231)924	Ⓐ Current conversion constant
04111	S1	(353)280	Ⓐ Secondary current coefficient
04112	S1	200	Ⓐ Criterion level for saturation related to the voltage command/PWM command clamp value
04113	S1	(290)250	Ⓐ Slip constant
04114	S1	0	Ⓐ Slip compensation coefficient for a high-speed zone/slip compensation coefficient at deceleration
04115	S1	100	Ⓐ PWM command clamp value at deceleration
04116	S1	5564	Ⓐ Motor leakage constant
04117	S1	(29530)28250	Ⓐ Regular-time voltage compensation coefficient for high-speed zone/regular-time motor voltage coefficient
04118	S1	(110)100	Ⓐ Acceleration-time voltage compensation coefficient for high-speed zone/acceleration-time motor voltage coefficient
04119	S1	(29)38	Ⓐ Deceleration-time excitation current change time constant/excitation current change time constant

EDITION	DATE		PAGE
A04	09.11.12	N04059 : 2000-->197, N04060 : 500-->350, N04063 : 350-->500	P18/19

DBC130 (1PATH)	NC PARAMETER (Common Parts)	NC UNIT	FS31iA

(TEC:TECHNOMACH DIA:U.S.A)

NO.		DATA	REMARKS
04120	S1	0	Ⓐ Dead-band rectangular wave component zero voltage/dead-band data
04121	S1	5	Time constant for changing the torque (TCMD filter time constant)
04122	S1	0	Time constant for velocity detecting filter
04123	S1	30	Short-time overload detection time
04127	S1	(164)142	Ⓐ Value displayed on load meter at maximum output
04128	S1	(0)108	Ⓐ Compensation coefficient between the specification and TRUE base/maximum torque curve compensation coefficient
04129	S1	0	Ⓐ Secondary current coefficient for rigid tapping
04130	S1	25700	Ⓐ Current loop proportional gain speed coefficient/current phase delay compensation coefficient
04131	S1	0	Time constant for velocity detecting filter (on Cs contouring control)
04133	S1	300	Motor model code
04134	S1	130	Ⓐ Motor overheat detect level (2-word)
04135	S1	0	Grid shift during Cs contouring control mode I (2-word)
04136	S1	0	Ⓐ Motor voltage setting on velocity control mode
04137	S1	0	Motor voltage
04138	S1	0	Ⓐ Base speed for motor output specification
04139	S1	0	Ⓐ Torque limitation value for motor output specification
04140	S1	0	Excitation voltage saturation speed at no-load
04141	S1	0	Base speed limit ratio
04142	S1	0	Current loop proportional gain
04143	S1	0	Current loop integral gain
04144	S1	0	Velocity at which the current loop integral gain is zero
04145	S1	0	Filter time constant for processing saturation related to the voltage command
04146	S1	0	Current conversion constant
04147	S1	0	Secondary current coefficient
04148	S1	0	Criterion level for saturation related to the voltage command / PWM command clamp value
04149	S1	0	Slip constant
04150	S1	0	Slip compensation coefficient for a high-speed zone / Slip compensation coefficient at deceleration

NO.		DATA	REMARKS
04151	S1	0	PWM command clamp value at deceleration
04152	S1	0	Motor leakage constant
04153	S1	0	Regular-time motor voltage coefficient
04154	S1	0	Acceleration-time motor voltage coefficient
04155	S1	0	
04156	S1	0	Slip compensation gainfficient
04157	S1	0	Torque command filter time constant
04158	S1	0	Maximum torque curve compensation coefficient
04159	S1	0	Secondary current coefficient for rigid tapping
04160	S1	0	Speed detection level hysteresis
04161	S1	0	Ⓐ
04191	S1	00000101	
04353	S1	01000000	

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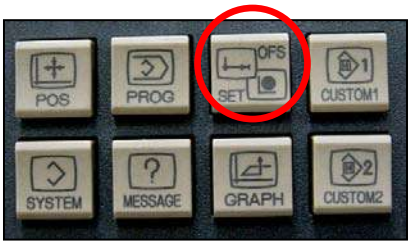
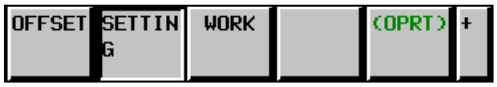
A03	09.04.02		P19/19

(Note) To change the parameter settings

(1) Set the mode switch in the main OP to "MDI".

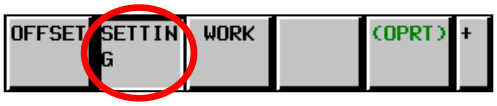
(2) Press the “OFS/SET” key in the right side of the main OP monitor.
The following soft key bar will be displayed at the bottom.

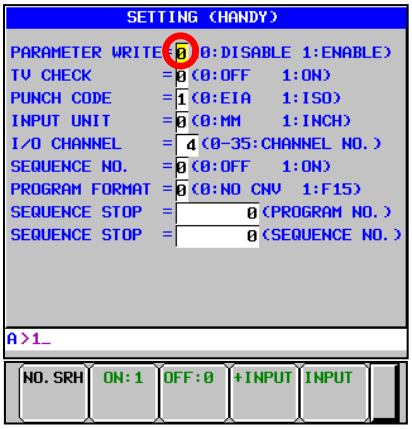




(3) Press the [SETTING] button.

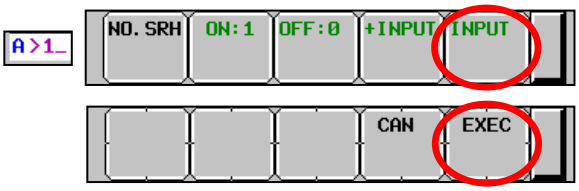
▪ The Setting screen appears where the cursor is positioned at the “PARAMETER WRITE” item on the top.

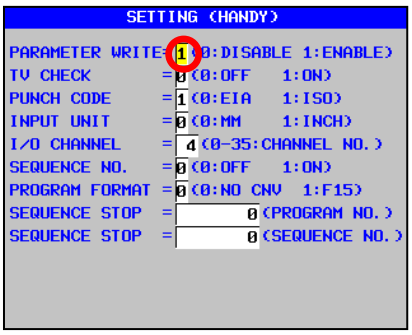




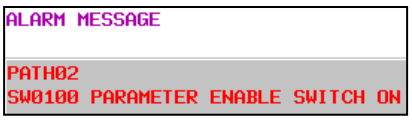
※ If the screen is not displayed as shown in the right picture, move to the first page of the Setting Parameter menu (“0” ➔ “NO.SRH”) and press the Page Up button three times. Then, you will see the right screen properly.

(4) Enter the number of 1, and keep pressing the INPUT and EXEC keys.



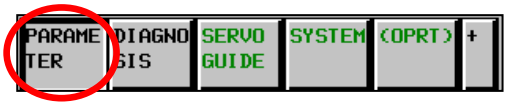


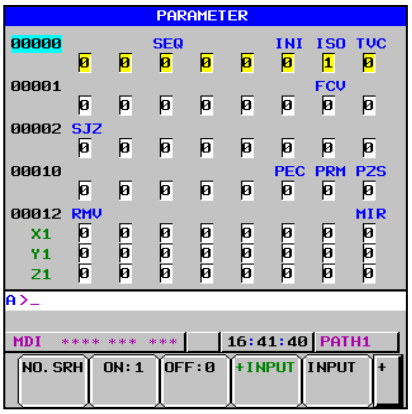
★ **The “SW0100 Parameter Enable Switch ON”** alarm will occur.



(5) Press the “SYSTEM” button in the right side of the main OP monitor.
The following soft key bar will be displayed at the bottom.

(6) Press the 〔**PARAMETER**〕 key in the soft key bar.





▪ You will see the Parameter setting screen.

☞ **About the soft key bar**

Find a desired parameter number.
Ex) If calling parameter no.4175: Enter the number of "4175" and press the [NO.SRH] soft key in the key bar to move to the Parameter N4175 screen with the cursor positioned at the number.

Used to turn ON (1) the BIT-format parameter.
Ex) Press this to turn ON (1) only the highlighted BIT-format parameters.

Used to turn OFF (0) the BIT-format parameter.
Ex) Press this to turn OFF (0) only the highlighted BIT-format parameters.

Used to increase or decrease a word-format parameter by adding or subtracting data.
Ex) If you want to add to or subtract from the existing data included in the parameter, enter a data value to add or subtract (In subtraction, add "-" in front of the data value.) and press this key to perform the operation (addition or subtraction).

Used to enter a parameter value in the word format.
Ex) Regardless of the existing data, enter a data value and press this button. The data value will be entered immediately and properly.

(7) Select a navigation button that is suitable to your needs, and use it to adjust the value as necessary.

(8) When done, move back to **“SETTING”** and turn off **“PARAMETER WRITE”**(“1” **‘0”). Then, press the** “RESET” key to release the alarm.

2.8 2051 Spindle Orientation Overtime

1) Description

Since the spindle orientation command was instructed in manual or auto mode, no completion signal is output within 15 seconds.

2) Cause of problem

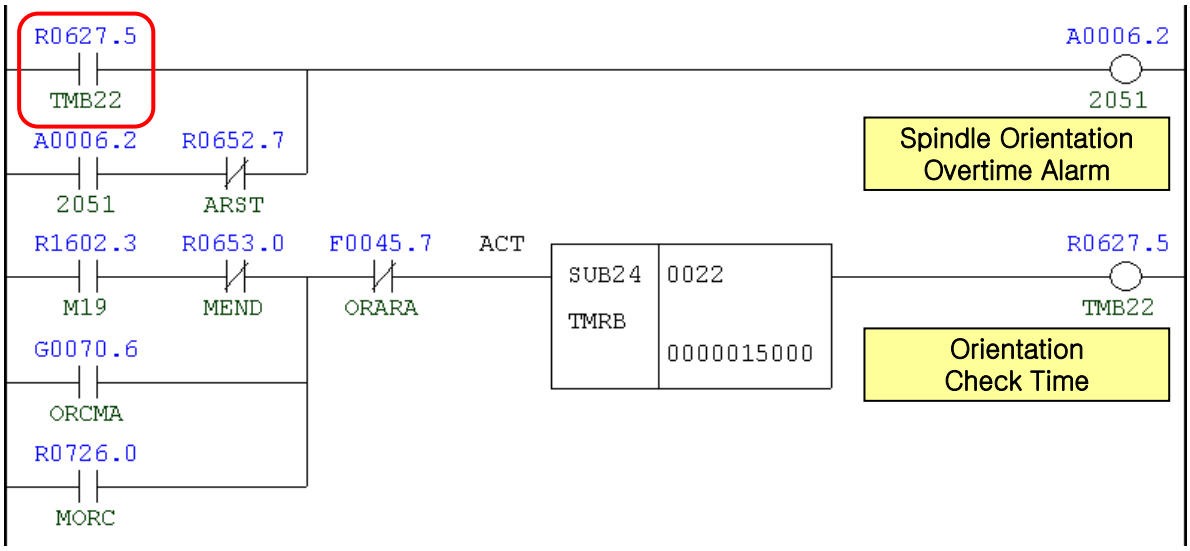
① An error in parameter settings related to the spindle orientation

② An error in the position coder or defect in feedback cable

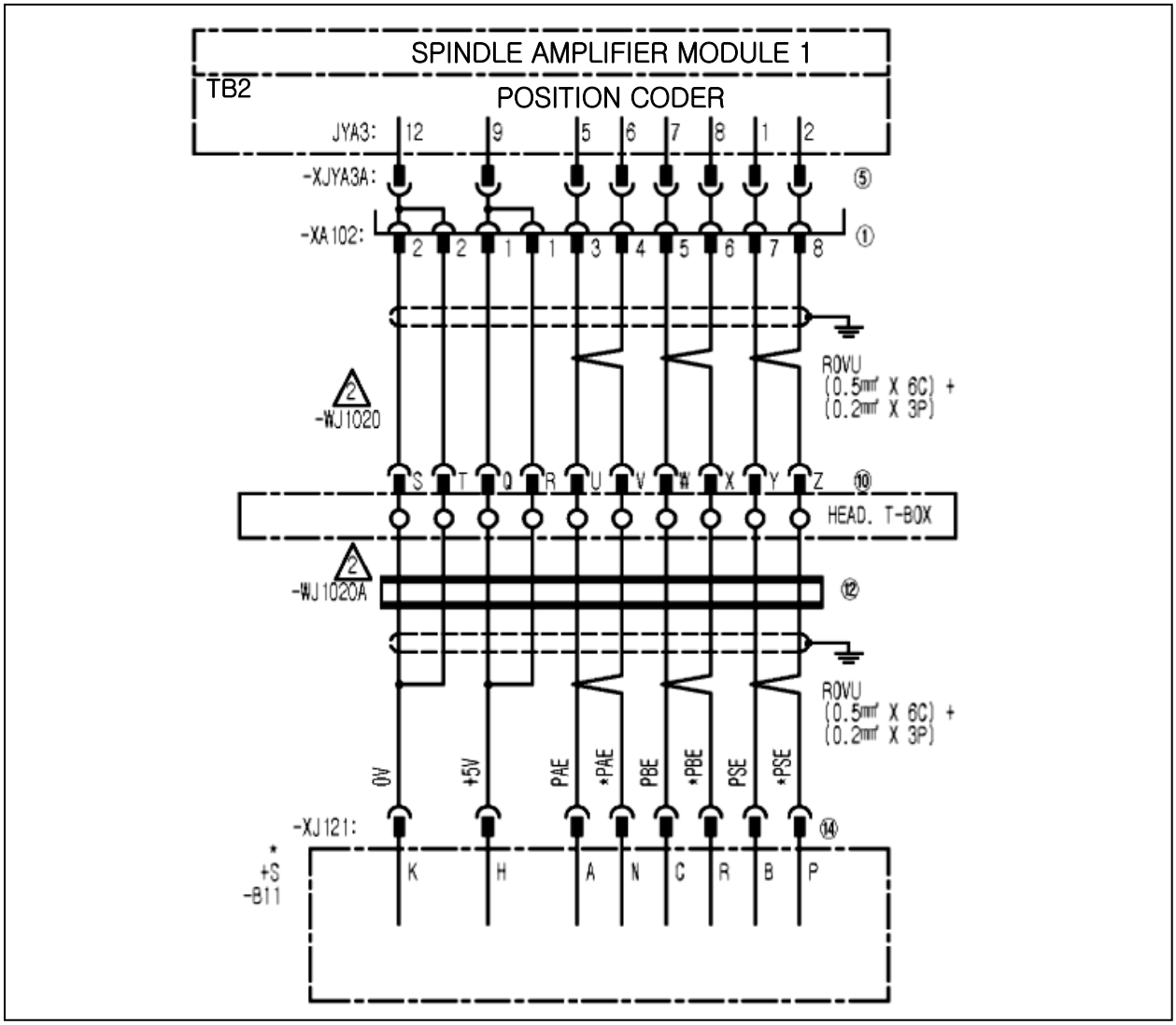
3) Action

① Check the parameters (N4042 ~ N4080) related to spindle orientation if they are set properly. If not, change the settings as appropriate.

② Check the feedback cable that is connected from the sensor to the spindle drive unit of the electric cabinet, and make repair or replacement if you encounter a problem.



Address	Symbol	Coil Comment
R627.5	**TMB22**	**Orientation Check Time**
A6.2	2051	Spindle Orientation Overtime Alarm
R652.7	ARST	Alarm Reset
R602.3	M19	Spindle Orientation
R653.0	MEND	M-Function End
G70.6	ORCMA	Orientation Command
R726.0	MORC	Man Orientation Command
F45.7	ORARA	Spindle Orientation Complete


SPINDLE AMPLIFIER MODULE 1
TB2
POSITION CODER
JYA3: 12 9 5 6 7 8 1 2
-XJYA3A:
⑤
-XA102: 2 2 1 1 3 4 5 6 7 8
①
ROVU
(0.5㎟ X 6C) +
(0.2㎟ X 3P)
2
-WJ1020
S T Q R U V W X Y Z
⑩
HEAD. T-BOX
2
-WJ1020A
⑫
ROVU
(0.5㎟ X 6C) +
(0.2㎟ X 3P)
0V
+5V
PAE
*PAE
PBE
*PBE
PSE
*PSE
-XJ121:
⑭
*
+S
-B11
K H A N C R B P

◈ Note) Spindle Orientation-Related NC Parameter Table (N4042~N4080)

DBC130 (1PATH)	NC PARAMETER (Common Parts)	NC UNIT	FS31iA

(TEC:TECNOMACH DIA:U.S.A)

NO.		DATA	REMARKS
• SPINDLE			
04000	S1	00000000	
04001	S1	00000000	#0 Whether to use the MRDY signal (machine ready signal)
04002	S1	00000010	#0~#3 Spindle sensor type setting
04003	S1	00000000	#4~#7 Gear teeth number setting of the spindle sensor
04004	S1	00000000	
04005	S1	00000000	
04006	S1	00000000	#1 Sets a gear ratio setting resolution(1 : 1/1000 unit)
04007	S1	00000000	ⓐ
04008	S1	00000000	ⓐ
04009	S1	00000000	ⓐ #0 Velocity loop gain increment system
04010	S1	00000000	ⓐ #0~#2 Setting of the number of motor sensor gear teeth
04011	S1	00011010	ⓐ
04012	S1	10000000	ⓐ
04013	S1	01010000	ⓐ
04014	S1	00000000	#2 Whether to check both spindle switch main and sub magnetic contactor contacts
04015	S1	00000101	#0 use the spindle orientation function.
04016	S1	00000000	#3 Sets the smoothing function in feed-forward control.
04017	S1	00000000	#7 Short-cut function when spindle orientation from stopped state is specified
04018	S1	00000000	#6 High-speed spindle orientation function (1)
04019	S1	00000100	ⓐ #7 automatically initializing spindle parameters
04020	S1	4919	ⓐ Maximum motor speed
04021	S1	100	Maximum speed on Cs contouring control mode
04022	S1	150	Speed arrival detection level
04023	S1	30	ⓐ Speed detection level
04024	S1	75	Zero speed detection level
04025	S1	50	Limited torque
04026	S1	83	Load detection level 1

NO.		DATA	REMARKS
04027	S1	95	Load detection level 2
04028	S1	0	Limited output pattern
04029	S1	100	Output limit
04030	S1	0	Soft start/stop time
04031	S1	0	Stop position of position coder method orientation
04032	S1	0	Acceleration on spindle synchronization
04033	S1	10	Spindle synchronization speed arrival level
04036	S1	0	Feed-forward coefficient
04040	S1	10	Velocity loop proportional gain on velocity control mode (High)
04041	S1	10	ⓐ Velocity loop proportional gain on velocity control mode (Low)
04042	S1	10	Velocity loop proportional gain on orientation (High)
04043	S1	10	Velocity loop proportional gain on orientation (Low)
04044	S1	10	Velocity loop proportional gain on servo mode (High)
04045	S1	10	Velocity loop proportional gain on servo mode (Low)
04046	S1	30	Velocity loop proportional gain on Cs contouring control (High)
04047	S1	30	Velocity loop proportional gain on Cs contouring control (Low)
04048	S1	10	Velocity loop integral gain on velocity control mode (High)
04049	S1	10	ⓐ Velocity loop integral gain on velocity control mode (Low)
04050	S1	10	Velocity loop integral gain on orientation (High)
04051	S1	10	Velocity loop integral gain on orientation (Low)
04052	S1	15	Velocity loop integral gain on servo mode/spindle synchronization control (High)
04053	S1	15	Velocity loop integral gain on servo mode/spindle synchronization control (Low)
04054	S1	50	Velocity loop integral gain on Cs contouring control (High)
04055	S1	50	Velocity loop integral gain on Cs contouring control (Low)
04056	S1	2000	Gear ratio (High)
04057	S1	610	Gear ratio (Medium High)
04058	S1	610	Gear ratio (Medium Low)

EDITION	DATE		PAGE
A04	09.11.12	04056 : 197-->2000	P17/19

DBC130 (1PATH)	NC PARAMETER (Common Parts)	NC UNIT	FS31iA

(TEC:TECHNOMACH DIA:U.S.A)

NO.		DATA	REMARKS
04059	S1	197	Gear ratio (Low)
04060	S1	350	Position gain on orientation (High)
04061	S1	500	Position gain on orientation (Medium High)
04062	S1	500	Position gain on orientation (Medium Low)
04063	S1	500	Position gain on orientation (Low)
04064	S1	100	Ordinary orientation: Rate of change in position gain upon completion of orientation
04065	S1	2500	Position gain on servo mode/spindle synchronization control (High)
04066	S1	2500	Position gain on servo mode/spindle synchronization control (Medium High)
04067	S1	2500	Position gain on servo mode/spindle synchronization control (Medium Low)
04068	S1	2500	Position gain on servo mode/spindle synchronization control (Low)
04069	S1	3000	Position gain on Cs contouring control (High)
04070	S1	3000	Position gain on Cs contouring control (Medium High)
04071	S1	3000	Position gain on Cs contouring control (Medium Low)
04072	S1	3000	Position gain on Cs contouring control (Low)
04073	S1	0	Grid shift on servo mode
04074	S1	0	Reference position return speed on Cs contouring control/servo mode
04075	S1	10	Detection level for orientation completion signal
04076	S1	33	Ordinary orientation: Motor speed limit value on orientation
04077	S1	#	Orientation stop position shift
04080	S1	(15460)80	ⓐ Regenerative power limit for high-speed zone/regenerative power limit
04081	S1	20	Delay time until motor power is cut off
04082	S1	10	Setting of acceleration/deceleration time
04083	S1	30	ⓐ Motor voltage on velocity control mode
04084	S1	30	Motor voltage on orientation
04085	S1	30	Motor voltage on servo mode/spindle synchronization control mode
04086	S1	100	Motor voltage on Cs contouring control
04087	S1	115	Overspeed level

NO.		DATA	REMARKS
04088	S1	75	Level for detecting excess velocity deviation when motor is restrained
04089	S1	200	Level for detecting excess velocity deviation when motor rotates
04090	S1	90	Overload detection level
04091	S1	100	Rate of change in position gain during reference position return on servo mode
04092	S1	100	Rate of change in position gain during reference position return on Cs contouring control
04094	S1	0	Disturbance torque compensation constant (acceleration feedback gain)
04095	S1	0	Adjusted output voltage of speedometer
04096	S1	0	Adjusted output voltage of load meter
04099	S1	400	Delay time for motor excitation
04100	S1	1500	ⓐ Base speed of motor output specifications
04101	S1	(80)100	ⓐ Output limit for motor output specifications
04102	S1	(1756)1765	ⓐ Excitation voltage saturation speed at no-load
04103	S1	(70)85	ⓐ Base speed limit ratio
04104	S1	(4000)1500	ⓐ Current loop proportional gain
04106	S1	(4000)5000	ⓐ Current loop integral gain
04108	S1	0	ⓐ Velocity at which the current loop integral gain is zero
04109	S1	250	ⓐ Filter time constant for processing saturation related to the voltage command
04110	S1	(1231)924	ⓐ Current conversion constant
04111	S1	(353)280	ⓐ Secondary current coefficient
04112	S1	200	ⓐ Criterion level for saturation related to the voltage command/PWM command clamp value
04113	S1	(290)250	ⓐ Slip constant
04114	S1	0	ⓐ Slip compensation coefficient for a high-speed zone/slip compensation coefficient at deceleration
04115	S1	100	ⓐ PWM command clamp value at deceleration
04116	S1	5564	ⓐ Motor leakage constant
04117	S1	(29530)28250	ⓐ Regular-time voltage compensation coefficient for high-speed zone/regular-time motor voltage coefficient
04118	S1	(110)100	ⓐ Acceleration-time voltage compensation coefficient for high-speed zone/acceleration-time motor voltage coefficient
04119	S1	(29)38	ⓐ Deceleration-time excitation current change time constant/excitation current change time constant

EDITION	DATE		PAGE
A04	09.11.12	N04059 : 2000-->197, N04060 : 500-->350, N04063 : 350-->500	P18/19

2.9 2052 Spindle Maximum rpm Setting Error

1) Description

A rotation command exceeding the max limit was instructed.

2) Cause of problem

① A rotation command exceeding the max limit (2,500 rpm) was instructed.

② No max rpm has ever been set for the angular head.

3) Action

① Check the current rpm value of the spindle and adjust it to below 2,500 rpm.

② Check the max rpm settings of the angular head (the max rpm setting value: D600)

Address	Symbol	Coil Comment
R2910.1	SPDMAX	Spindle Max rpm Check
F0.6	SA	Servo Ready
R688.2	ANSPMAX	Angular Head rpm Max.
K0.1	KANGU	Angular Head Used
A6.3	2052	Spindle Maximum rpm Setting Error
R652.7	ARST	Alarm Reset

2.10 2054 Illegal Condition in Spindle Rotation

1) Description

The spindle rotation command is instructed under the condition where the spindle is prohibited from rotating.

2) Cause of problem

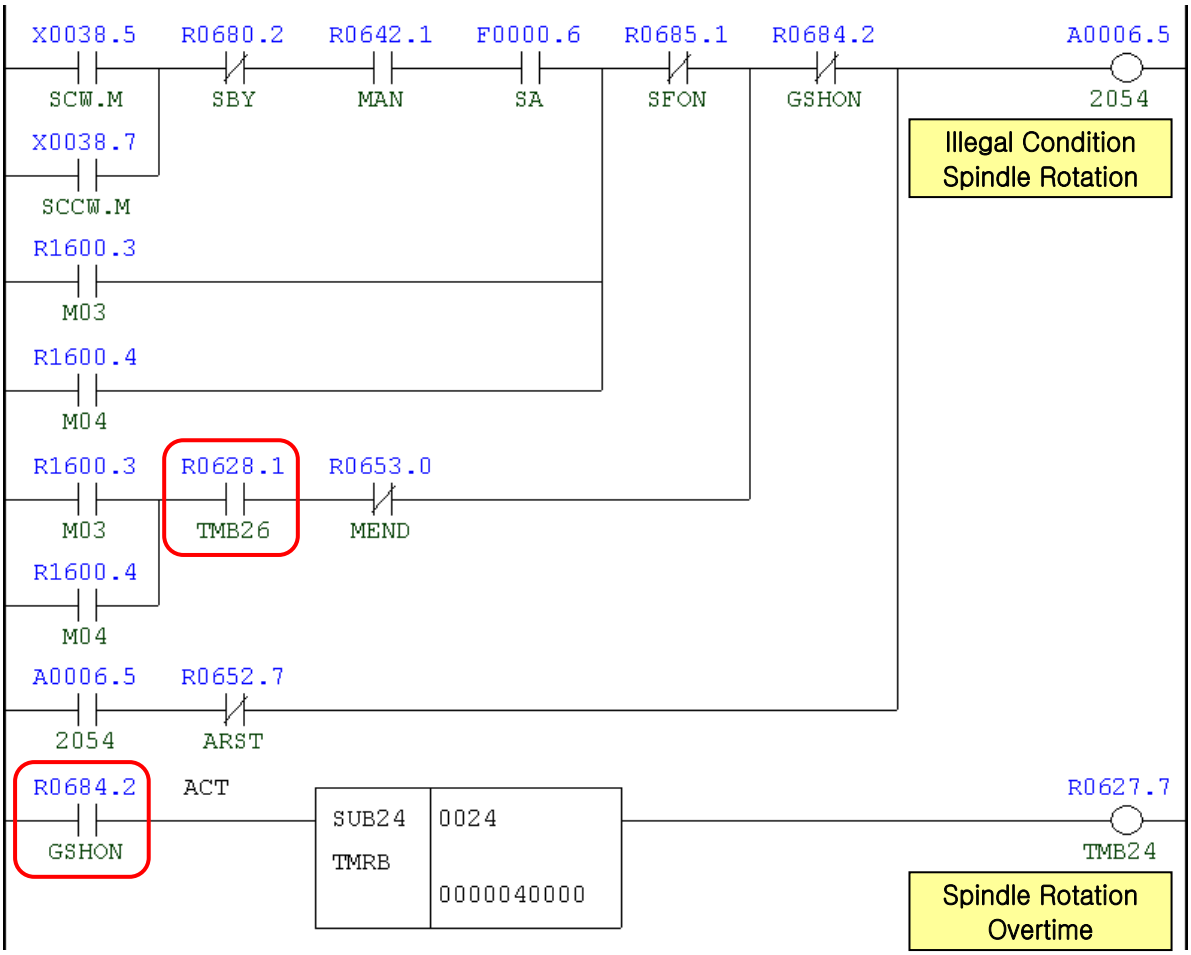
① After the machine starts initially, the rotation command is instructed with no revolution (S-code command) specified.

② The gear shifting is not complete within 40 seconds after the spindle rotation command (M03 or M04) was instructed.

3) Action

① Instruct the spindle rotation command after instructing S-Code.

② Check the status of gear shifting.



Address	Symbol	Coil Comment
X38.5	SCW.M	Spindle CW
X38.7	SCCW.M	Spindle CCW
R680.2	SBY	Spindle Stand-By
R642.1	MAN	Manual Mode
F0.6	SA	Servo Ready
R1600.3	M03	Spindle Forward (CW) Rotation
R1600.4	M04	Spindle Reverse (CCW) Rotation
R685.1	SFON	Initial S-Function On
R628.1	**TMB26**	**Spindle Rotation Overtime**
R653.0	MEND	M-Function End
R684.2	**GSHON**	**Gear Shift On**
A6.5	2054	Illegal Condition Spindle Rotation
R652.7	ARST	Alarm Reset
R683.0	SGL	Spindle Gear Change Low
R683.4	SGRL	Spindle Gear Change Low
R683.1	SGM	Spindle Gear Change Middle
R683.5	SGRM	Spindle Gear Change Middle
R683.2	SGH	Spindle Gear Change High
R683.6	SRRH	Spindle Gear Change High

2.11 2056 Gear Shift Overtime Alarm

1) Description

The gear shifting is not complete within 40 seconds after the command was instructed.

2) Cause of problem

① An error found in the solenoid valve for shifting the main spindle gear, or short-circuit of or error in the gear-shift switch

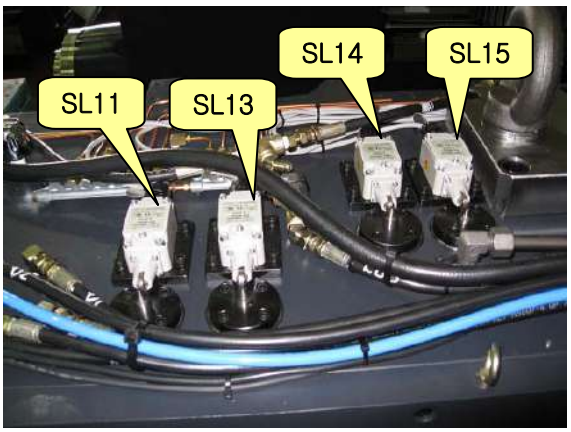
② An error found in the hydraulic cylinder for gear shifting, or defective in the shift gear itself

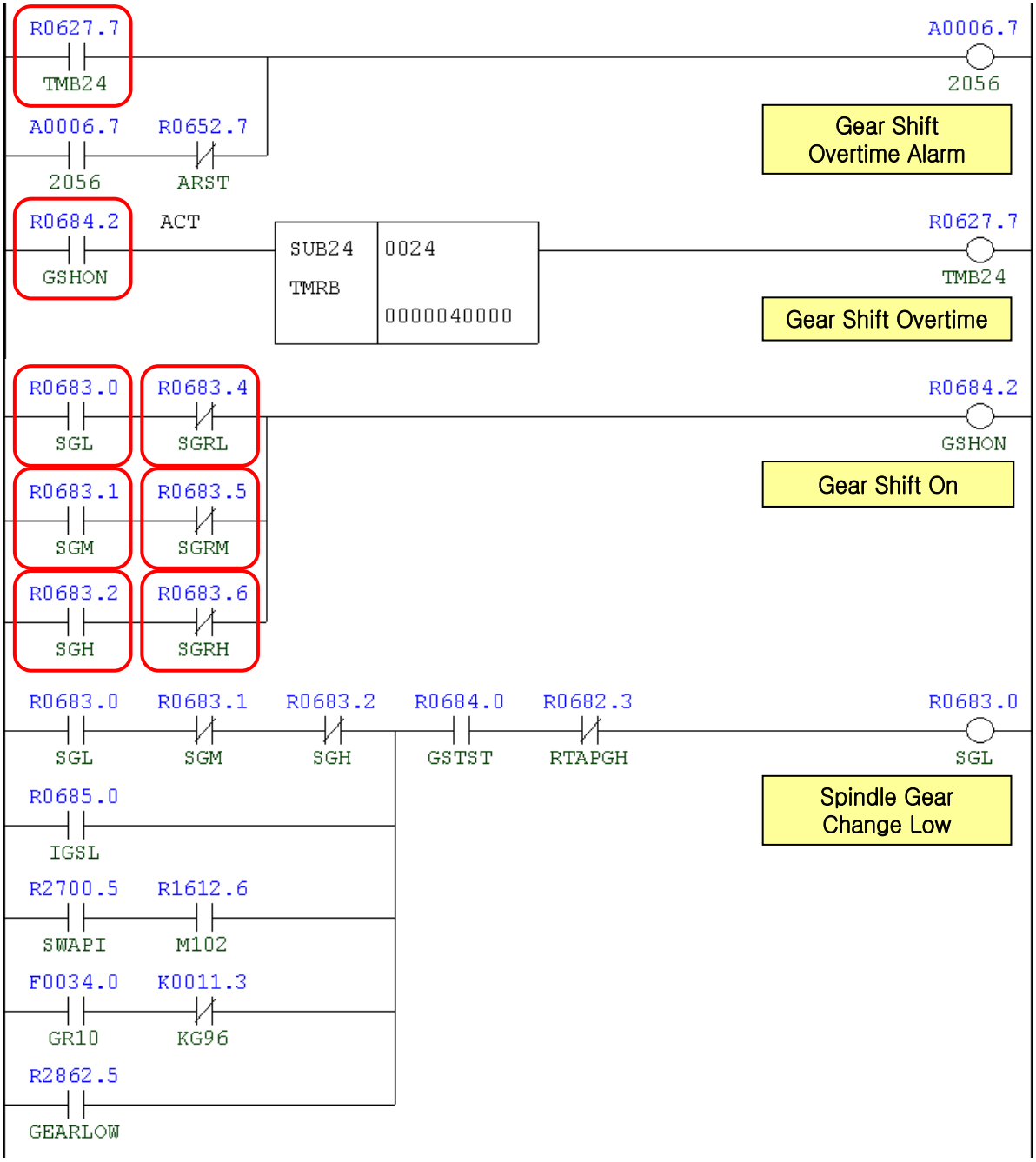
3) Action

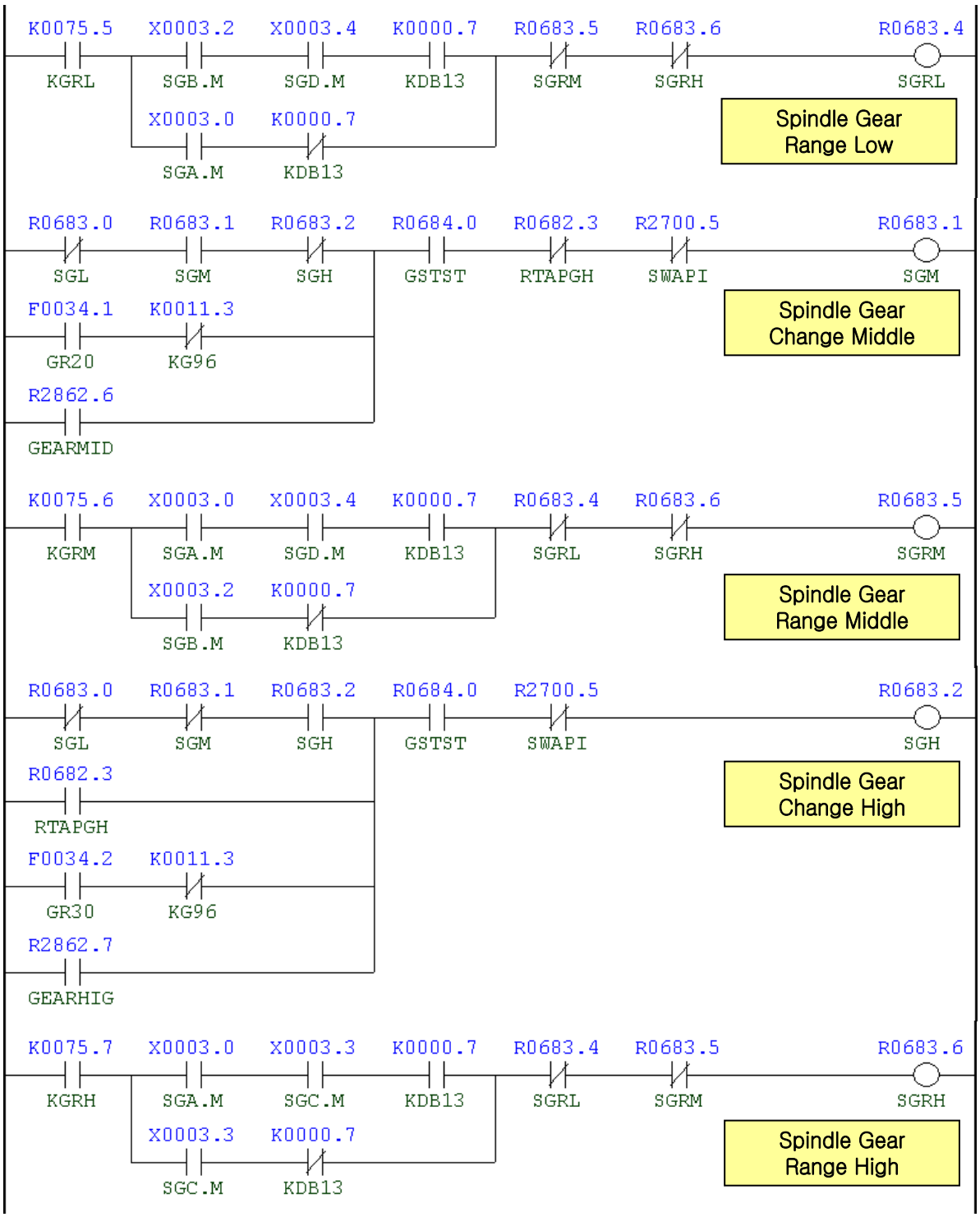
① Check the solenoid valve, limit switch, wiring cables and I/O module, and make repair or replacement if you encounter a problem.

② Turn off the machine and loosen the tube connector that is connected to the cylinder. Move the cylinder piston up or down to check if it works normally. If you feel it's clamped somewhere, repair it as necessary.

Signal	Address	Device Symbol	I/O	Connector (Pin)	Numbering
Gear 1 Check	**X3.0** SGA.M	-SL11	Input Module : Slot 06	XJ412 (12)	SL11
Gear 2 Check	**X3.2** SGB.M	-SL13	Input Module : Slot 06	XJ412 (44)	SL13
Gear 3 Check	**X3.3** SGC.M	-SL14	Input Module : Slot 06	XJ412 (11)	SL14
Gear 4 Check	**X3.4** SGD.M	-SL15	Input Module : Slot 06	XJ412 (27)	SL15
Gear 1	**Y4.0** GR1.V	-KAR40	Output Module : Slot 03	XJ400 (16)	YV14
Gear 2	**Y4.1** GR2.V	-KAR41	Output Module : Slot 03	XJ400 (32)	YV15
Gear 3	**Y4.2** GR3.V	-KAR42	Output Module : Slot 03	XJ400 (48)	YV18
Gear 4	**Y4.3** GR4.V)	-KAR43	Output Module : Slot 03	XJ400 (15)	YV19


SL14
SL15
SL11
SL13


R0627.7
TMB24
A0006.7
2056
Gear Shift Overtime Alarm
A0006.7
2056
R0652.7
ARST
R0684.2
GSHON
ACT
SUB24
TMRB
0024
0000040000
R0627.7
TMB24
Gear Shift Overtime
R0683.0
SGL
R0683.4
SGRL
R0683.1
SGM
R0683.5
SGRM
R0683.2
SGH
R0683.6
SGRH
R0684.2
GSHON
Gear Shift On
R0683.0
SGL
R0683.1
SGM
R0683.2
SGH
R0684.0
GSTST
R0682.3
RTAPGH
R0683.0
SGL
Spindle Gear Change Low
R0685.0
IGSL
R2700.5
SWAPI
R1612.6
M102
F0034.0
GR10
K0011.3
KG96
R2862.5
GEARLOW



Address	Symbol	Coil Comment
R625.7	**TMB24**	**Gear Shift Overtime**
A6.7	2056	Gear Shift Overtime Alarm
R652.7	ARST	Alarm Reset
R684.2	**GSHON**	**Gear Shift On**

Address	Symbol	Coil Comment
R683.0	**SGL**	**Spindle Gear Low**
R683.4	**SGRL**	**Spindle Gear Range Low**
R683.1	**SGM**	**Spindle Gear Middle**
R683.5	**SGRM**	**Spindle Gear Range Middle**
R683.2	**SGH**	**Spindle Gear High**
R683.6	**SGRH**	**Spindle Gear Range High**
R685.0	IGSL	Initial Gear Shift Low
R2700.5	SWAPI	Wait for Spindle Warm Up
R1612	M102	Spindle Warm Up Start
F34.0	GR10	Spindle Gear Change Low
K11.3	KG96	G96 Function Used
R2862.5	GEARLOW	Gear Low Speed
R684.0	GSTST	Gear Shift Start
R682.3	RTAPGH	Rigid Tap Only Gear High
F34.1	GR20	Spindle Gear Change Middle
R2862.6	GEARMID	Gear Middle Speed
F34.2	GR30	Spindle Gear Change High
R2862.7	GEARHIG	Gear High Speed
K75.5	KGRL	Gear Shift Low Keep
X3.2	SGA.M	Spindle Gear Shift Status B
X3.4	SGD.M	Spindle Gear Shift Status D
K0.7	KDB13	DBC130 Type Machine
K75.6	KGRM	Gear Shift Middle Keep
K75.7	KGRH	Gear Shift High Keep

2.12 2057 Spindle Tool Clamp/Unclamp Change Alarm

1) Description

① The tool unclamp command was instructed while not in spindle orientation mode.

② It has passed 10 seconds since the position sensor switch of the spindle tool unclamp cylinder did not match with the applicable instruction.

2) Cause of problem

① An error in adjusting the position sensor switch

② An error in wiring or component parts

3) Action

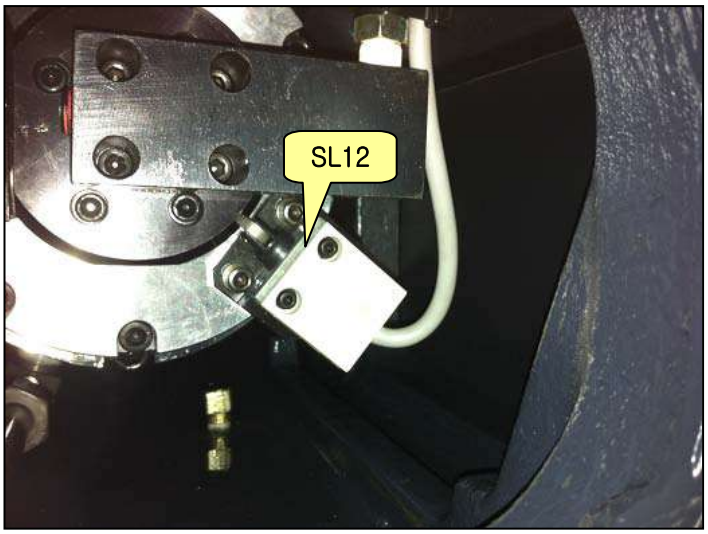
① An error in adjusting the position sensor switch

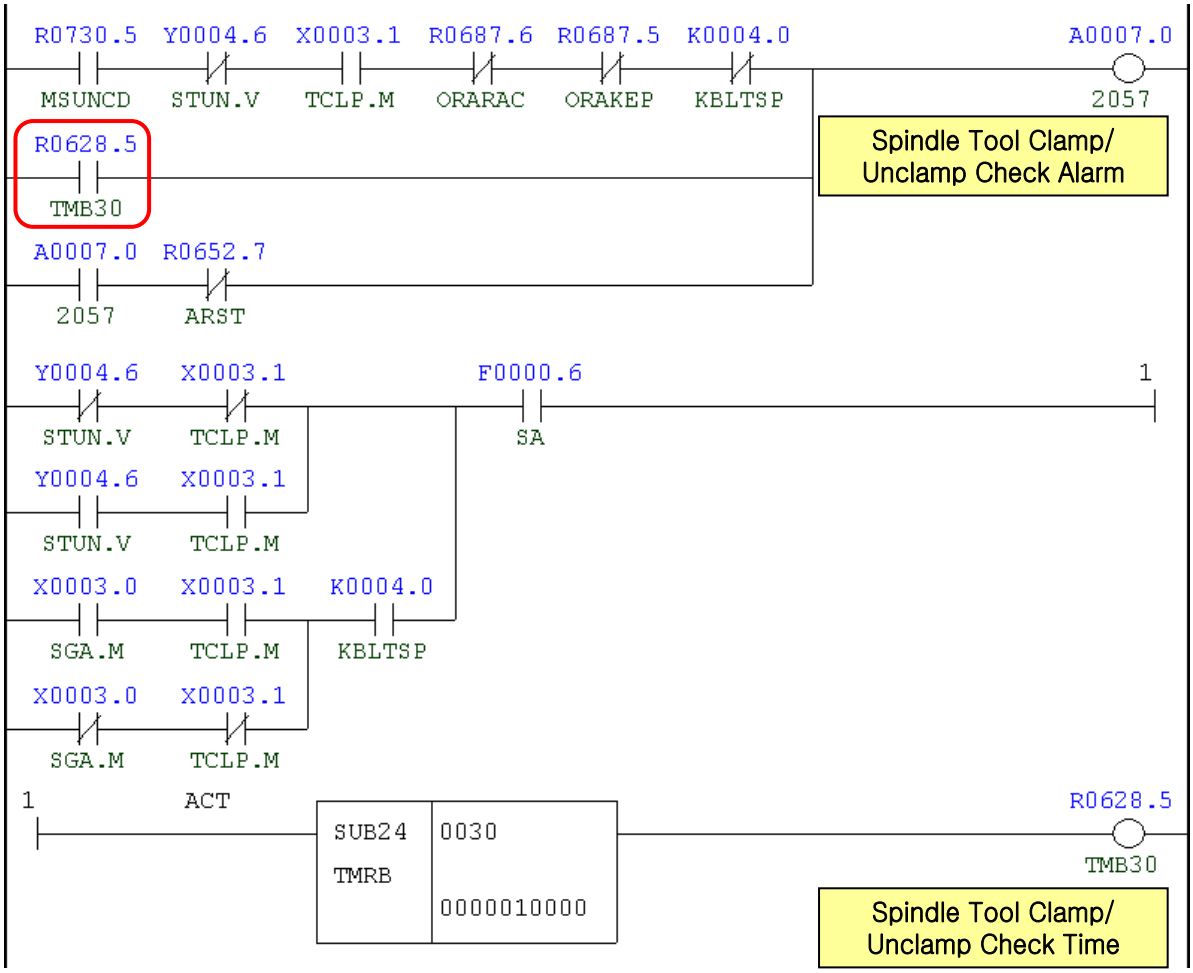
Check the sensor indicator displayed on the proximity switch (located in the rear of the spindle tool unclamping cylinder) and correct it according to the indicator.

② An error in wiring or component parts

Check the proximity switch, the wiring from the proximity switch to the electric cabinet as well as the I/O module if there is a problem. Repair or replace the defective part if necessary.

Signal	Address	Device Symbol	I/O	Connector (Pin)	Numbering
Spindle Tool Clamp	**X3.1** THLP.M	-SL12	Input Module : Slot 6	XJ412 (28)	SX12
Spindle Tool Unclamp	**Y4.6** STUN.V	-KAR46	Output Module : Slot 3	XA107 (10)	YV11





Address	Symbol	Coil Comment
R730.5	MSUNCD	Manual Spindle Unclamp Command
Y4.6	STUN.V	Spindle Tool Unclamp
X3.1	TCLP.M	Spindle Tool Clamp
R687.6	ORARAC	Spindle Orientation Complete Aux.
R687.5	ORAKEP	Orientation Keep Aux.
K4.0	KBLTSP	Built-In Spindle Used
R628.5	**TMB30**	**Spindle Clamp / Unclamp Check Time**
A7.0	2057	Spindle Tool CL / UNCL Check Alarm
R652.7	ARST	Alarm Reset
Y4.6	STUN.V	Spindle Tool Unclamp
X3.1	TCLP.M	Spindle Tool Clamp
X3.0	SGA.M	Spindle Gear A/S-Unclamp Built
K4.0	KBLTSP	Built-In Spindle Used
F0.6	SA	Servo Ready

2.13 2058 Tool No. Select Keep Relay Not Set

1) Description

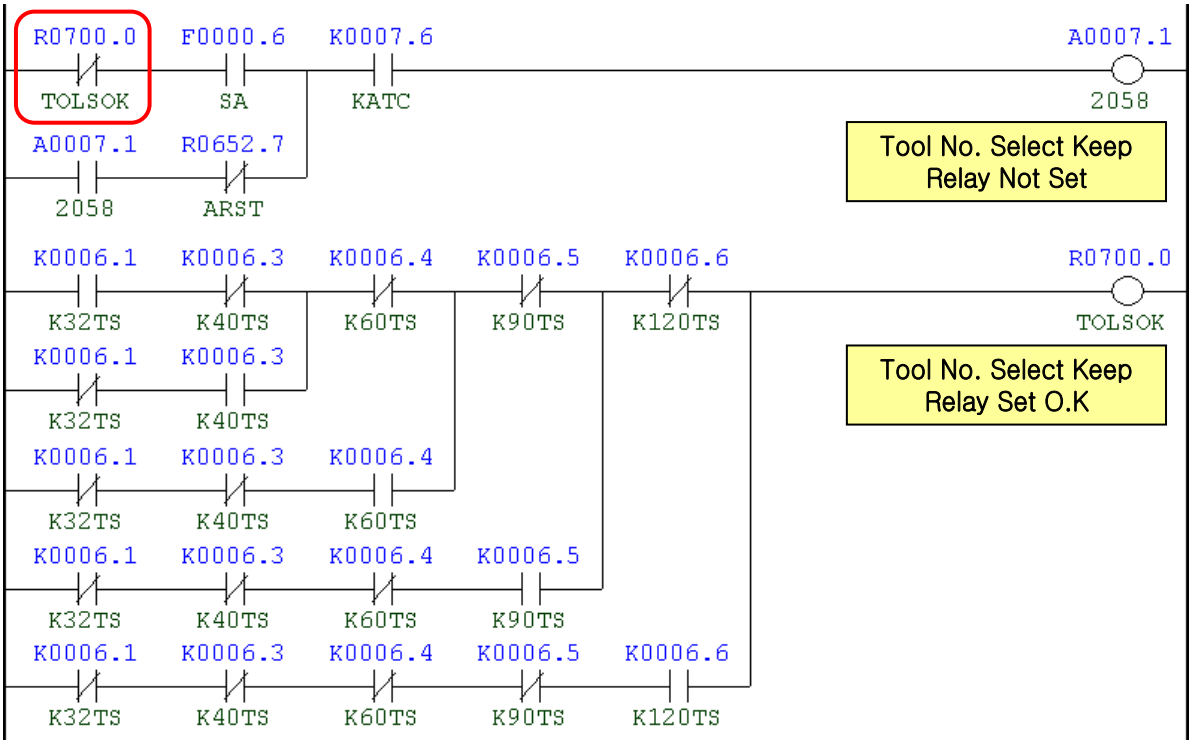
An error in the Keep Relay setting that specifies the maximum number of tool pots.

2) Cause of problem

The Keep Relay setting that enables you to select the maximum number of tool pots is not specified, or more than one setting is found.

3) Action

Check the Keep Relay settings and select a value appropriate to the machine.

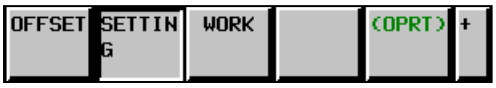


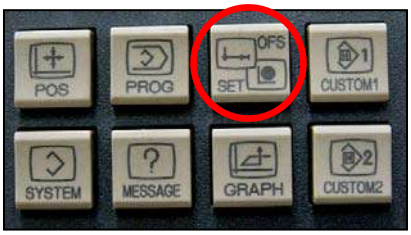
Address	Symbol	Coil Comment
R700.0	**TOLSOK**	**Tool No. Select Keep Relay Set O.K**
F0.6	SA	Servo Ready
A7.1	2058	Tool Magazine Selection Keep Relay Not Set
R652.7	ARST	Alarm Reset
K6.1	K32TS	Tool Magazine 32Tools Used
K6.3	K40TS	Tool Magazine 40Tools Used
K6.4	K60TS	Tool Magazine 60Tools Used
K6.5	K90TS	Tool Magazine 90Tools Used
K6.6	K120TS	Tool Magazine 120Tools Used

(Note) To change the Keep Relay settings

(1) Set the mode switch in the main OP to "MDI".

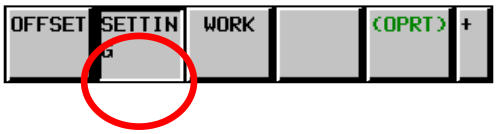
(2) Press the “OFS/SET” key in the right side of the main OP monitor.
The following soft key bar will be displayed at the bottom.

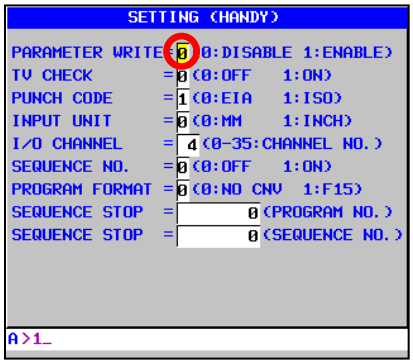




(3) Press the [SETTING] button.

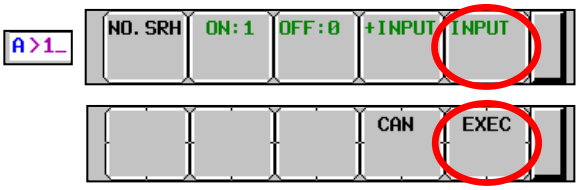
- The Setting screen appears where the cursor is positioned at the “PARAMETER WRITE” item on the top.

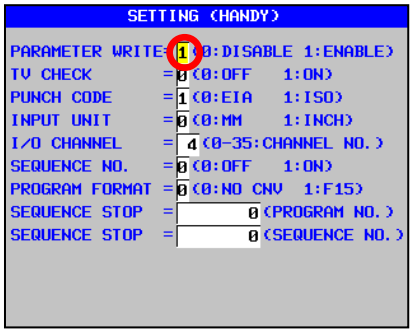




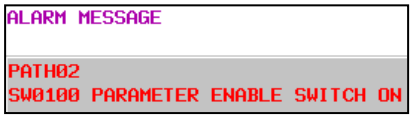
※ If the screen is not displayed as shown in the right picture, move to the first page of the Setting Parameter menu (“0” ➔ “NO.SRH”) and press the Page Up button three times. Then, you will see the right screen properly.

(4) Enter the number of 1, and keep pressing the INPUT and EXEC keys.





★ **The “SW0100 Parameter Enable Switch ON”** alarm will occur.



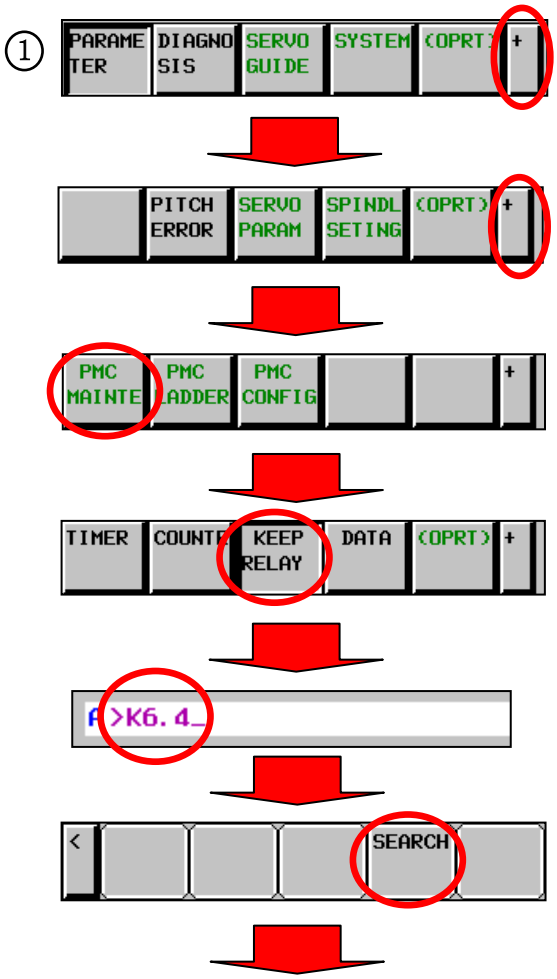
(5) Press the “SYSTEM” button in the right side of the main OP monitor.

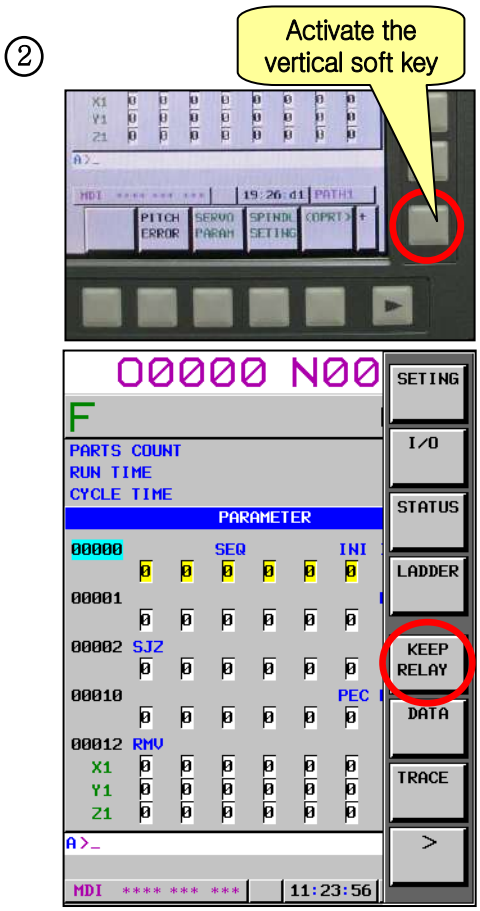
The following soft key bar will be displayed at the bottom.

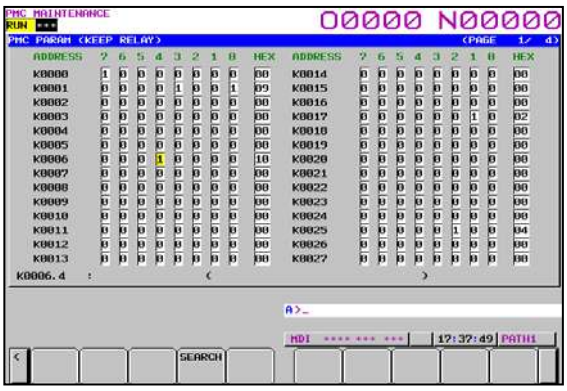
(6) Move to the Keep Relay screen.

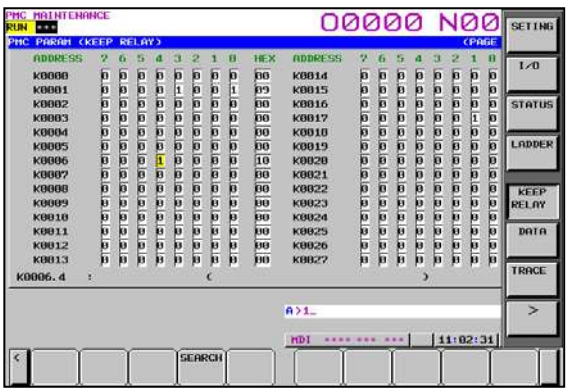
① Press the soft keys one after another to move to the Keep Relay screen.

② Press to activate the vertical soft key in the lower right corner and press the [KEEP RELAY] key.









(7) Enter a desired Keep Relay number and press [SEARCH], or move the cursor to the Keep Relay item and enter 1 or 0. Then, press the INPUT button.

(8) When done, move back to **"SETTING"** and turn off **"PARAMETER WRITE"**("1" **'0"). Then, press the** "RESET" key to release the alarm.

K-Relay	K6.6	K6.5	K6.4	K6.3	K6.2	K6.1	K6.0
Tool Count	120 Tool		60 Tool	40 Tool	90 Tool		Matrix

2.14 2059 T-Code Command Initial Condition

1) Description

When the tool magazine or ATC waiting pot had not been initialized, a tool was called (T_:).

2) Cause of problem

① A positioning error in switches that check the home position of ATC or tool magazine

② Defective component part in the switch

3) Action

① Check if the switch works properly on the DGN screen, and adjust the distance from the dog as appropriate.

② Check the Limit Switch, wiring cables and I/O module, and make repair or replacement if you encounter a problem.

Signal	Address	Device Symbol	I/O	Connector (Pin)
Tool Mag. Tool Out Interlock	**X12.7** MTIO.M	-SL75	Input Module : Slot 08	XJ414(37)
Tool Changer Arm 180° CW	**X13.0** T8CW.M	-SX78	Input Module : Slot 08	XJ414(3)
Tool Changer Arm 180° CCW	**X13.1** T8CC.M	-SX79	Input Module : Slot 08	XJ414(20)
Tool Changer Arm In	**X13.2** TCAI.M	-SX7A	Input Module : Slot 08	XJ414(35)
Tool Changer Arm Out	**X13.3** TCAO.M	-SX7B	Input Module : Slot 08	XJ414(2)
Tool Chg. Guide Rail Locate	**X13.4** TRLC.M	-SX7G	Input Module : Slot 08	XJ414(19)
Tool Chg. Guide Rail Unlocate	**X13.5** TRUC.M	-SX7H	Input Module : Slot 08	XJ414(34)

※ T-Code Initial Position

Address	X12.7	X13.0	X13.1	X13.2	X13.3	X13.4	X13.5
Status	1	1 or 0	0 or 1	1	0	0	1

(Note) How to move to DGN (Diagnostic)

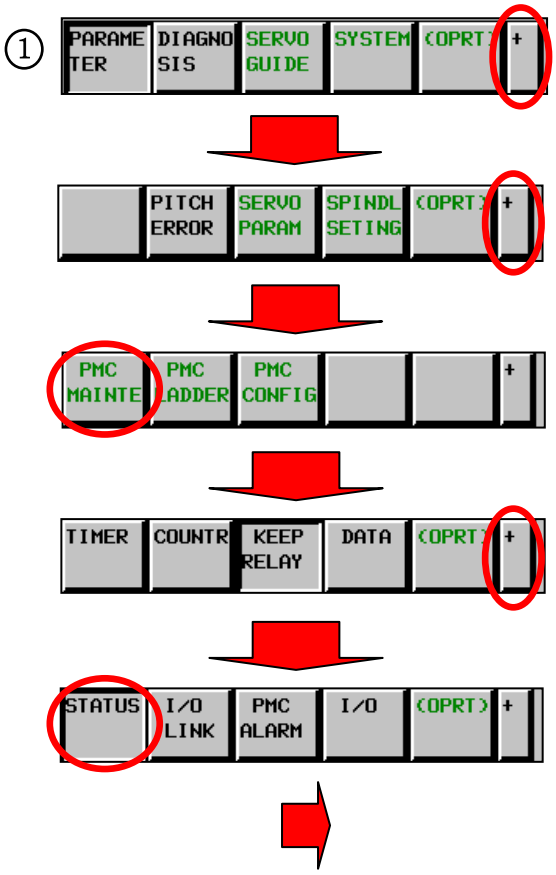
(1) Press the “SYSTEM” button in the right side of the main OP monitor.

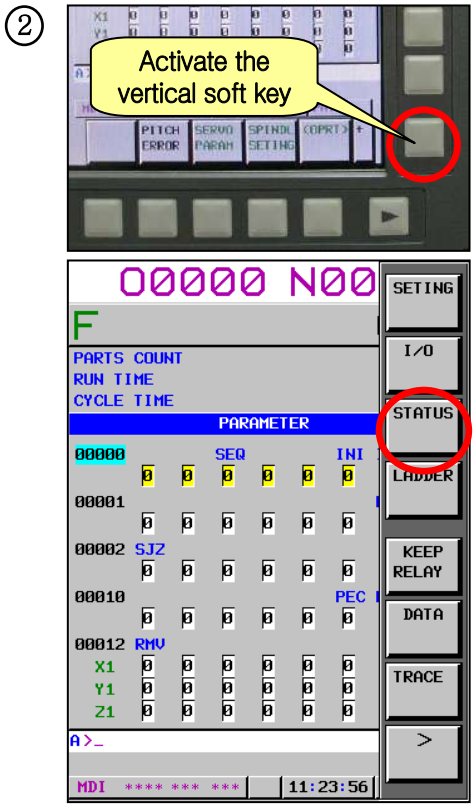
▪ The following soft key bar will be displayed at the bottom.

(2) Move to the DGN screen.

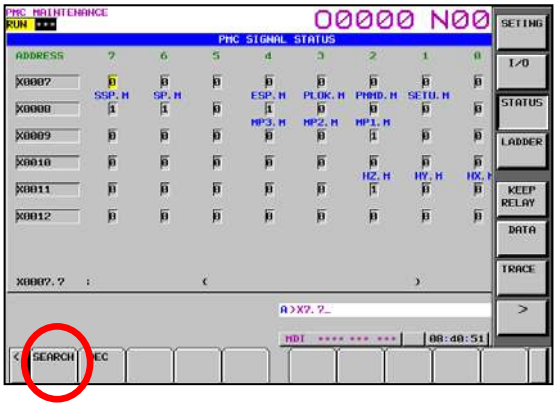
① Press the soft keys one after another to move to the DGN screen.

② Press any soft key in the right corner to activate the vertical soft key bar, and press the [STATUS] key.





(3) Enter a desired DGN address and press [SEARCH] to display the DGN screen of your choice.

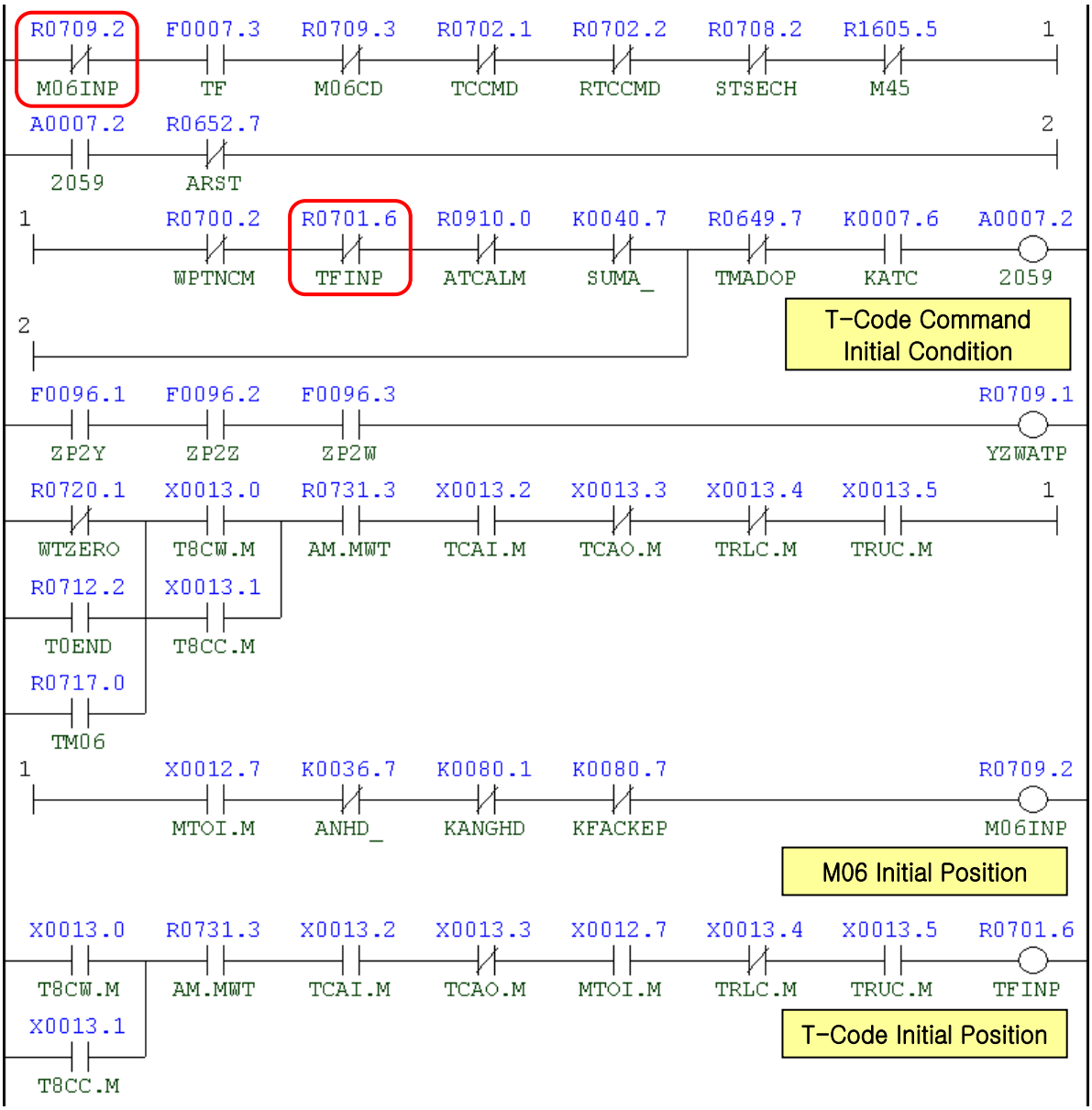


(Note) How to read DGN (Diagnostic)

Ex) X 0007 0 0 1 1 0 0 1 0

Bit 1, 4 and 5 in Address X7 turn ON while Bit 0, 2, 3, 6 and 7 turn OFF.

표시	0	0	1	1	0	0	1	0
Bit No	Bit 7	Bit 6	Bit 5	Bit 4	Bit 3	Bit 2	Bit 1	Bit 0



Address	Symbol	Coil Comment
R709.2	**M06INP**	**M06 Initial Position**
F7.3	TF	T Function Strobe

Address	Symbol	Coil Comment
R709.3	M06CD	M06 Command
R702.1	TCCMD	T-Code Command
R702.2	RTCCMD	Re-Charge T-Code Command
R708.2	STSECH	Spindle Tool Search
R1605.5	M45	Spindle Tool No. Set
R700.2	WPTNCM	Wait. Pot Tool No. Command
R701.6	**TFINP**	**T-Code Initial Position**
R910.0	ATCALM	ATC Alarm
K40.7	SUMA_	Sub. OP Manual Mode
A7.2	2059	T-Code Command Initial Condition
R652.7	ARST	Alarm Reset
R649.7	TMADOP	Tool Magazine Door Open Aux.
K7.6	KATC	ATC Use
R720.1	WTZERO	Waiting Pot Tool Number Zero
R712.2	T0END	T-Code Zero Command End
R717.0	TM06	Tool Zero M06 Command
X13.0	T8CW.M	Tool Changer Arm 180° CW
X13.1	T8CC.M	Tool Changer Arm 180° CCW
R731.3	AM.MWT	ATC Changer Mag. Wait Position
X13.2	TCAI.M	Tool Changer Arm In
X13.3	TCAO.M	Tool Changer Arm Out
X13.4	TRLC.M	Tool Changer Guide Rail Locate
X13.5	TRUC.M	Tool Changer Guide Rail Unlocate
X12.7	MTOI.M	Tool Mag. Tool Out Interlock
K36.7	ANHD_	Angle Head
K80.1	KANGHD	Angular Mismatch Alarm(M121)
K80.7	KFACKEP	

2.15 2060 M06 Command Illegal Position

1) Description

A tool change was instructed (by M06 or manually) in other than the home position.

2) Cause of problem

① The tool had not been called before the instruction.

② An error in the switch that detects the home position of tool magazine, waiting tool pot, or ATC.(The interval between switch and dog is set improperly, or the switch itself has a defective part.)

3) Action

① You should call a tool before instructing to change it.

T_ _ ; M06 ; or T_ _ M06 ;

② Check if the switch works properly on the DGN screen, and adjust the distance from the dog as appropriate. Check the Limit Switch, wiring cables and I/O module, and make repair or replacement if you encounter a problem.

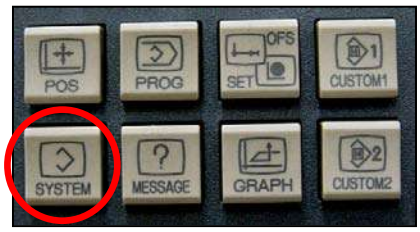
Signal	Address	Device Symbol	I/O	Connector (Pin)
Tool Mag. Tool Out Interlock	**X12.7** MTIO.M	-SL75	Input Module : Slot 08	XJ414(37)
Tool Changer Arm 180° CW	**X13.0** T8CW.M	-SX78	Input Module : Slot 08	XJ414(3)
Tool Changer Arm 180° CCW	**X13.1** T8CC.M	-SX79	Input Module : Slot 08	XJ414(20)
Tool Changer Arm In	**X13.2** TCAI.M	-SX7A	Input Module : Slot 08	XJ414(35)
Tool Changer Arm Out	**X13.3** TCAO.M	-SX7B	Input Module : Slot 08	XJ414(2)
Tool Chg. Guide Rail Locate	**X13.4** TRLC.M	-SX7G	Input Module : Slot 08	XJ414(19)
Tool Chg. Guide Rail Unlocate	**X13.5** TRUC.M	-SX7H	Input Module : Slot 08	XJ414(34)

※ T-Code Initial Position

Address	X12.7	X13.0	X13.1	X13.2	X13.3	X13.4	X13.5
Status	1	1 or 0	0 or 1	1	0	0	1

(Note) How to move to DGN (Diagnostic)

(1) Press the “SYSTEM” button in the right side of the main OP monitor.

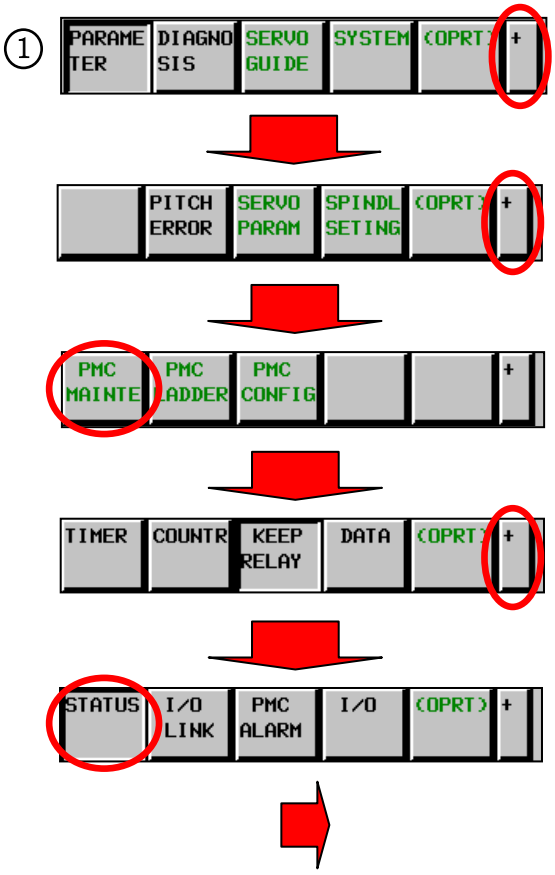


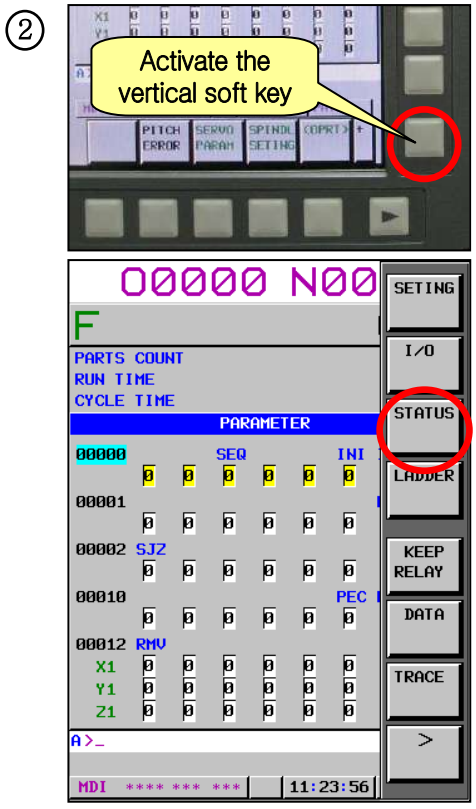
▪ The following soft key bar will be displayed at the bottom.

(2) Move to the DGN screen.

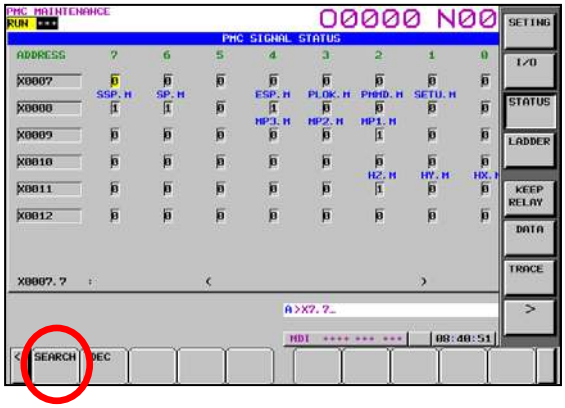
① Press the soft keys one after another to move to the DGN screen.

② Press any soft key in the right corner to activate the vertical soft key bar, and press the [STATUS] key.





(3) Enter a desired DGN address and press [SEARCH] to display the DGN screen of your choice.

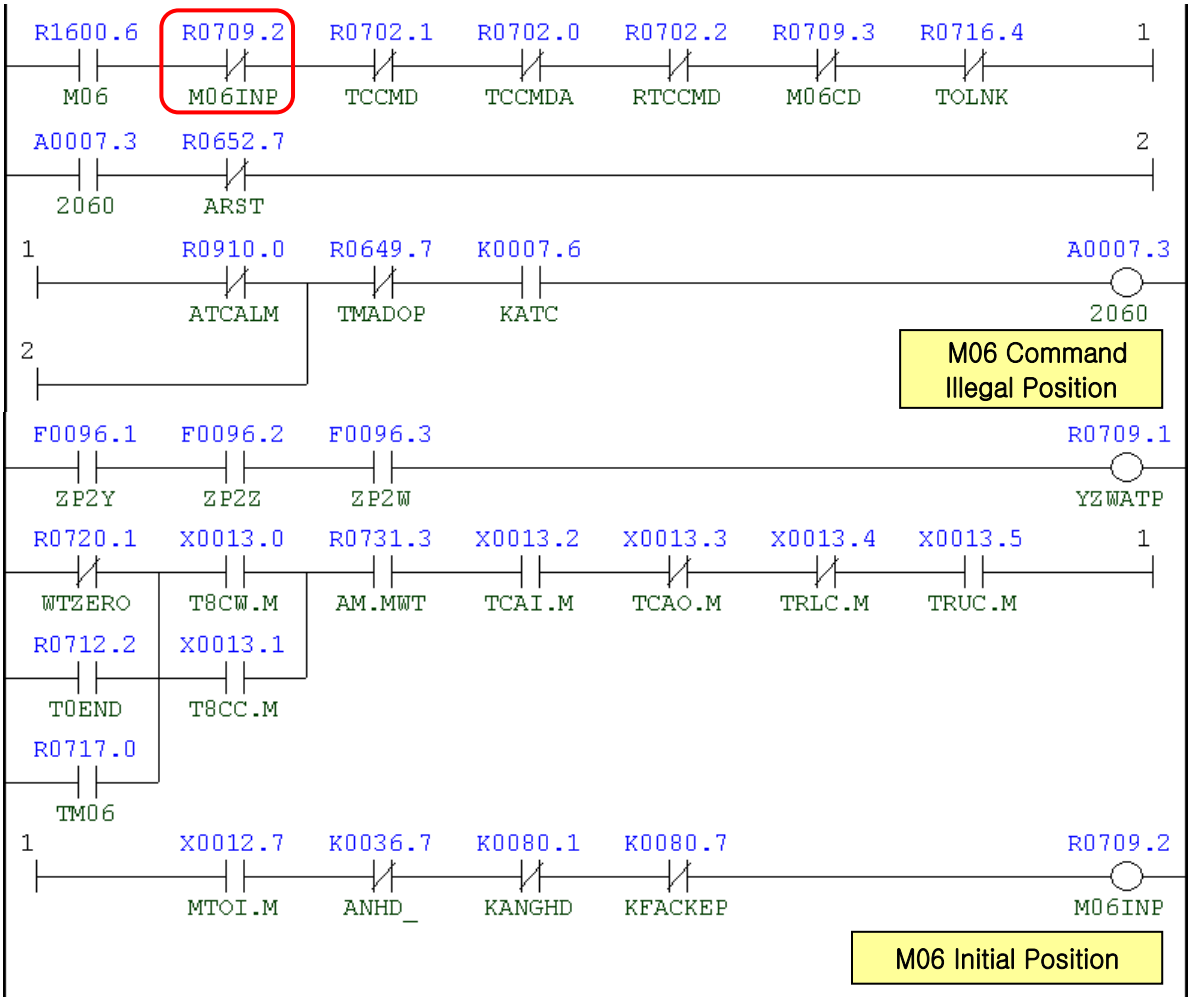


(Note) How to read DGN (Diagnostic)

Ex) X 0007 0 0 1 1 0 0 1 0

Bit 1, 4 and 5 in Address X7 turn ON while Bit 0, 2, 3, 6 and 7 turn OFF.

표시	0	0	1	1	0	0	1	0
Bit No	Bit 7	Bit 6	Bit 5	Bit 4	Bit 3	Bit 2	Bit 1	Bit 0



Address	Symbol	Coil Comment
R709.2	**M06INP**	**M06 Initial Position**
F7.3	TF	T Function Strobe
R709.3	M06CD	M06 Command
R702.1	TCCMD	T-Code Command
R702.2	RTCCMD	Re-Charge T-Code Command
R708.2	STSECH	Spindle Tool Search

Address	Symbol	Coil Comment
R1605.5	M45	Spindle Tool No. Set
R700.2	WPTNCM	Wait. Pot Tool No. Command
R701.6	**TFINP**	**T-Code Initial Position**
R910.0	ATCALM	ATC Alarm
K40.7	SUMA_	Sub. OP Manual Mode
A7.2	2059	T-Code Command Initial Condition
R652.7	ARST	Alarm Reset
R649.7	TMADOP	Tool Magazine Door Open Aux.
K7.6	KATC	ATC Use
R720.1	WTZERO	Waiting Pot Tool Number Zero
R712.2	T0END	T-Code Zero Command End
R717.0	TM06	Tool Zero M06 Command
X13.0	T8CW.M	Tool Changer Arm 180° CW
X13.1	T8CC.M	Tool Changer Arm 180° CCW
R731.3	AM.MWT	ATC Changer Mag. Wait Position
X13.2	TCAI.M	Tool Changer Arm In
X13.3	TCAO.M	Tool Changer Arm Out
X13.4	TRLC.M	Tool Changer Guide Rail Locate
X13.5	TRUC.M	Tool Changer Guide Rail Unlocate
X12.7	MTOI.M	Tool Mag. Tool Out Interlock
K36.7	ANHD_	Angle Head
K80.1	KANGHD	Angular Mismatch Alarm(M121)
K80.7	KFACKEP	

2.16 2061 T-Code Over Command Error

1) Description

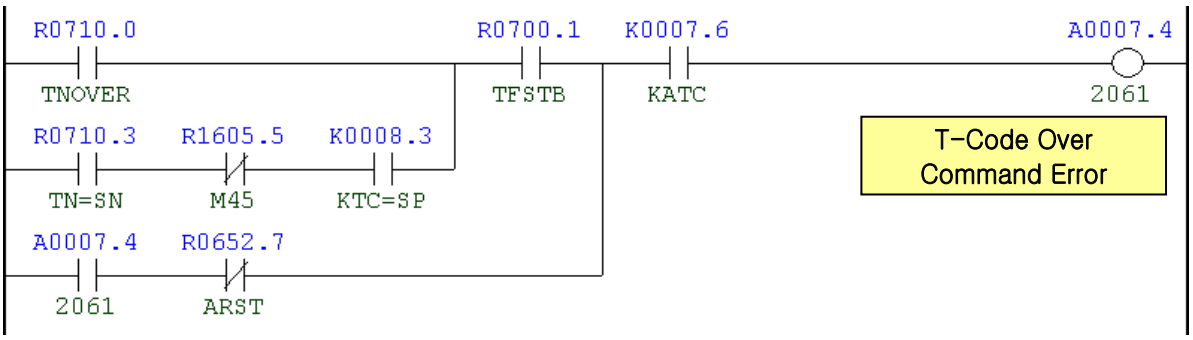
A T code that is not appropriate to the machine is instructed.

2) Cause of problem

A larger POT number than the pot count available in the machine is called.

3) Action

Check the number of the spindle tool data and waiting tool data in "PMC" > "D-Data" and correct it appropriately and try again.



Address	Symbol	Coil Comment
R710.0	TNOVER	Tool No. Over Command Error
R710.3	TN=SN	T-Code=Spindle Tool Command
R1605.5	M45	Spindle Tool No. Set
K8.3	KTC=SP	Spindle Tool Command Error Used
R700.1	TFSTB	TF Strobe
A7.4	2061	T-Code Command Error
R652.7	ARST	Alarm Reset
K7.6	KATC	ATC Not Use

2.17 2062 M06 Command Overtime Alarm

1) Description

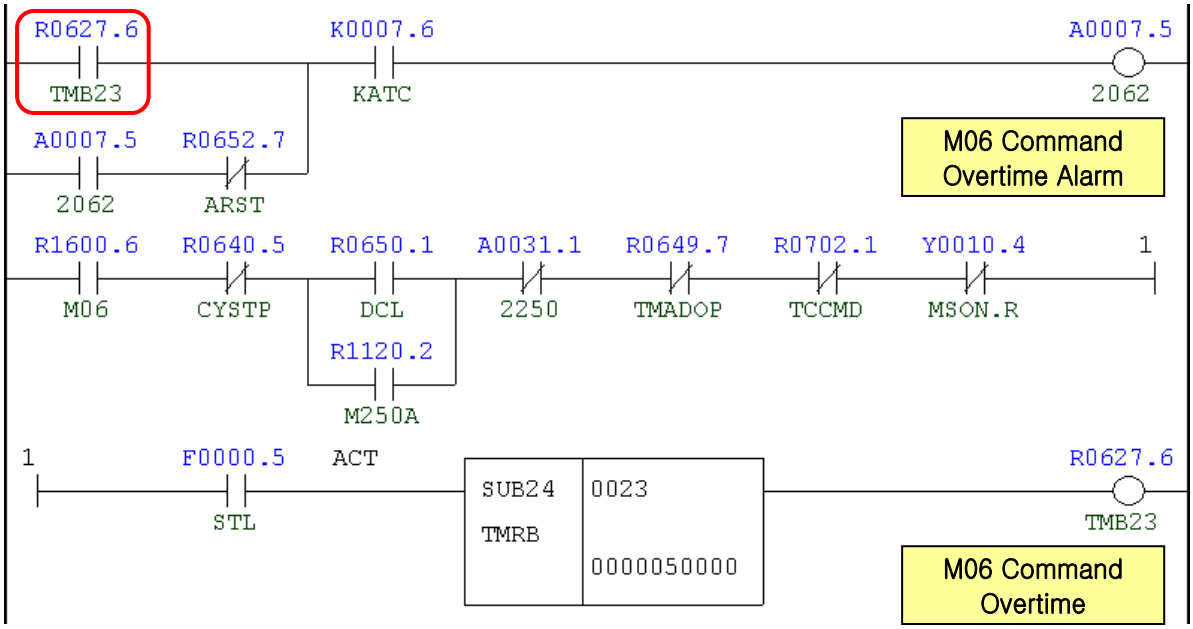
The mode switch of the ATC manual OP is set to Auto with the door being open. A tool change command (M06) was instructed but not complete within 6 seconds.

2) Cause of problem

In most cases, this happens if a tool is stuck in the changer arm while it is changed.

3) Action

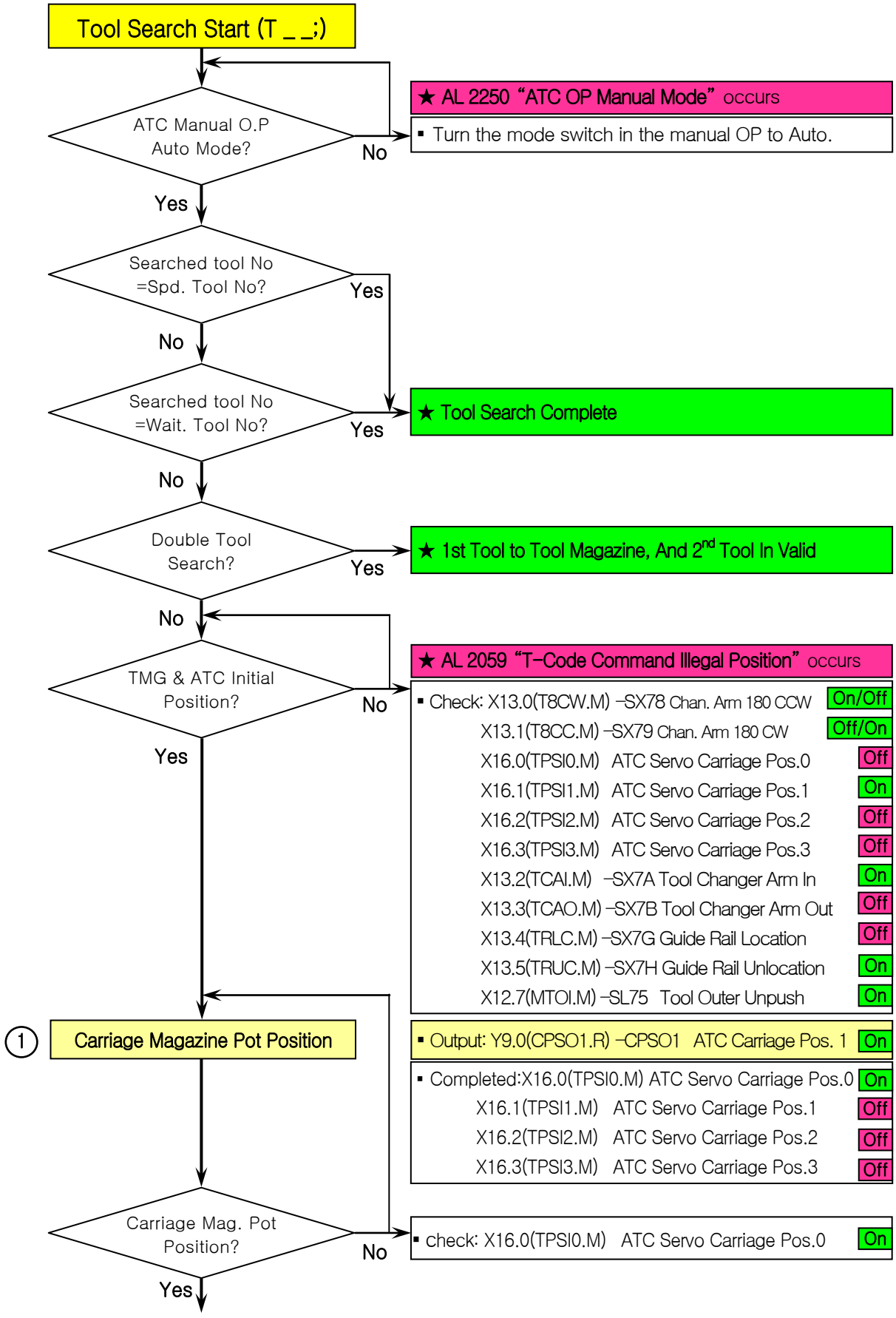
Move the changer arm to the home position manually and find and resolve the cause of trouble.

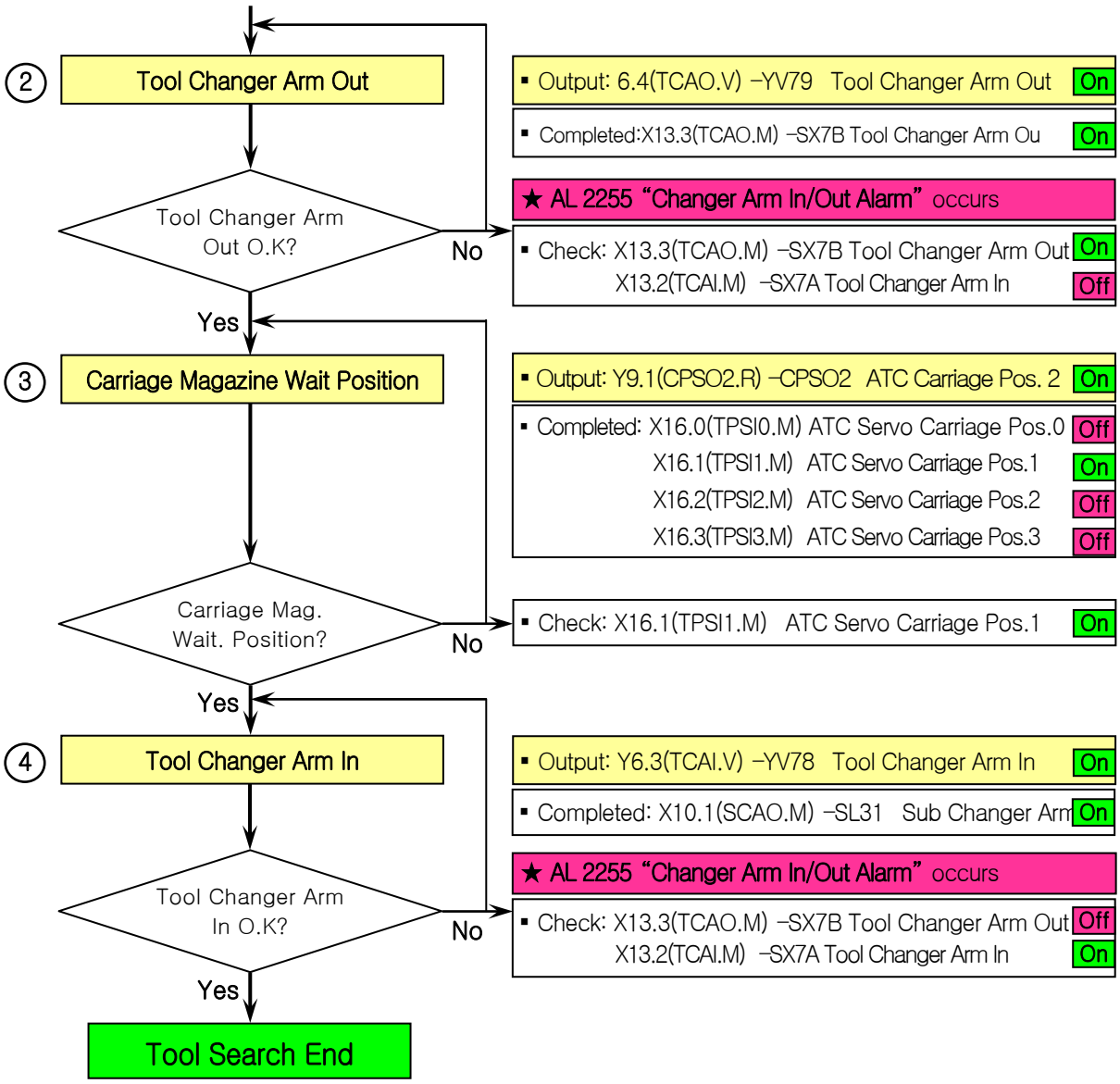


Address	Symbol	Coil Comment
R625.6	**TMB23**	**M06 Command Overtime**
A7.5	2062	M06 Command Overtime Alarm
R652.7	ARST	Alarm Reset
K7.6	KATC	ATC Not Use
R1600.6	M06	ATC Change Macro Call
R640.5	CYSTP	Cycle Stop
R650.1	DCL	Operator Door Close Confirm
R1120.2	M250A	Door Interlock Bypass On Aux.
A31.1	2250	Manual Mode Selected On ATC PA
R649.7	TMADOP	Tool Mag. Door Open Aux.

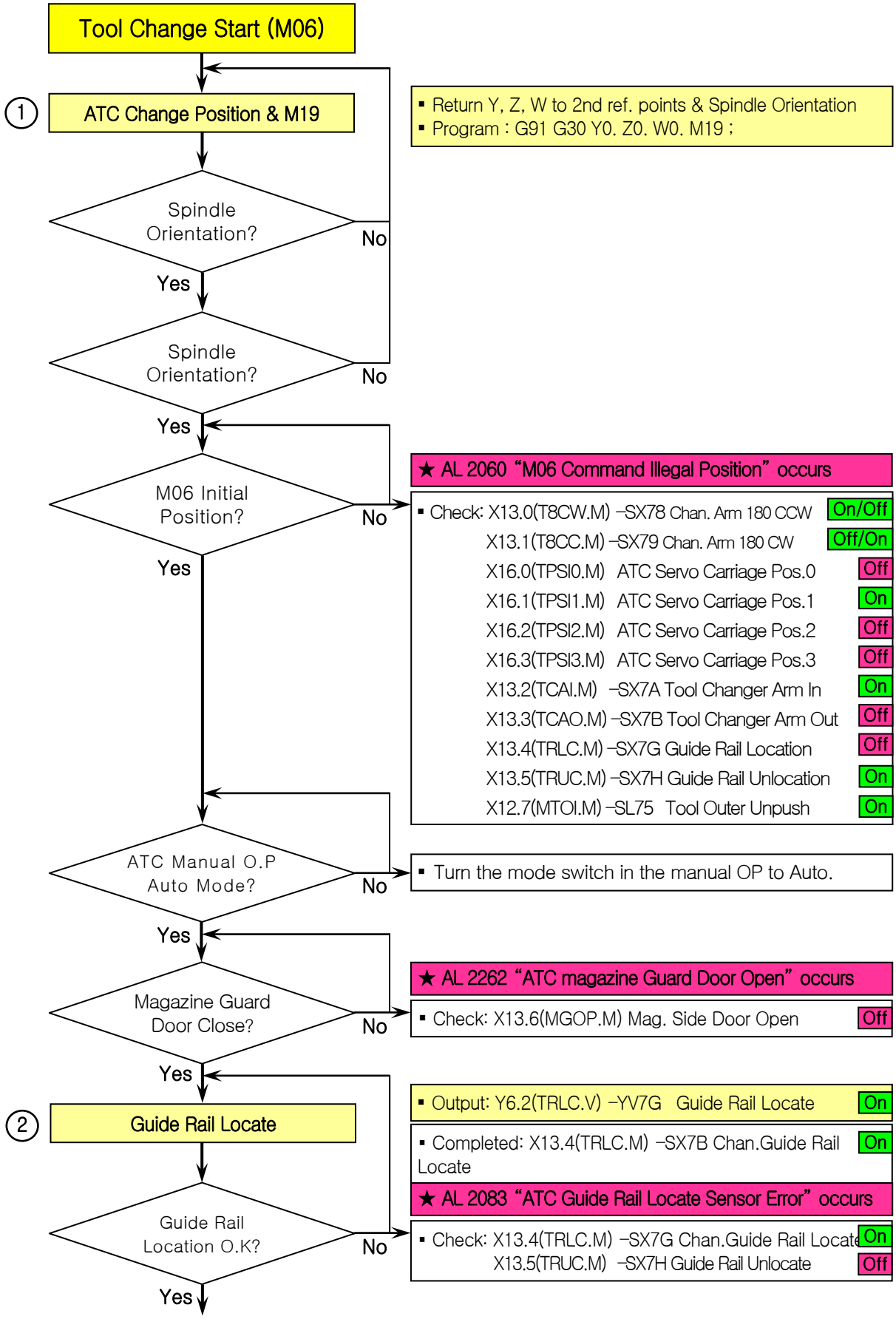
Address	Symbol	Coil Comment
R702.1	TCCMD	T-Code Command
Y10.4	MSON.R	TMG Servo On
F0.5	STL	Cycle Start

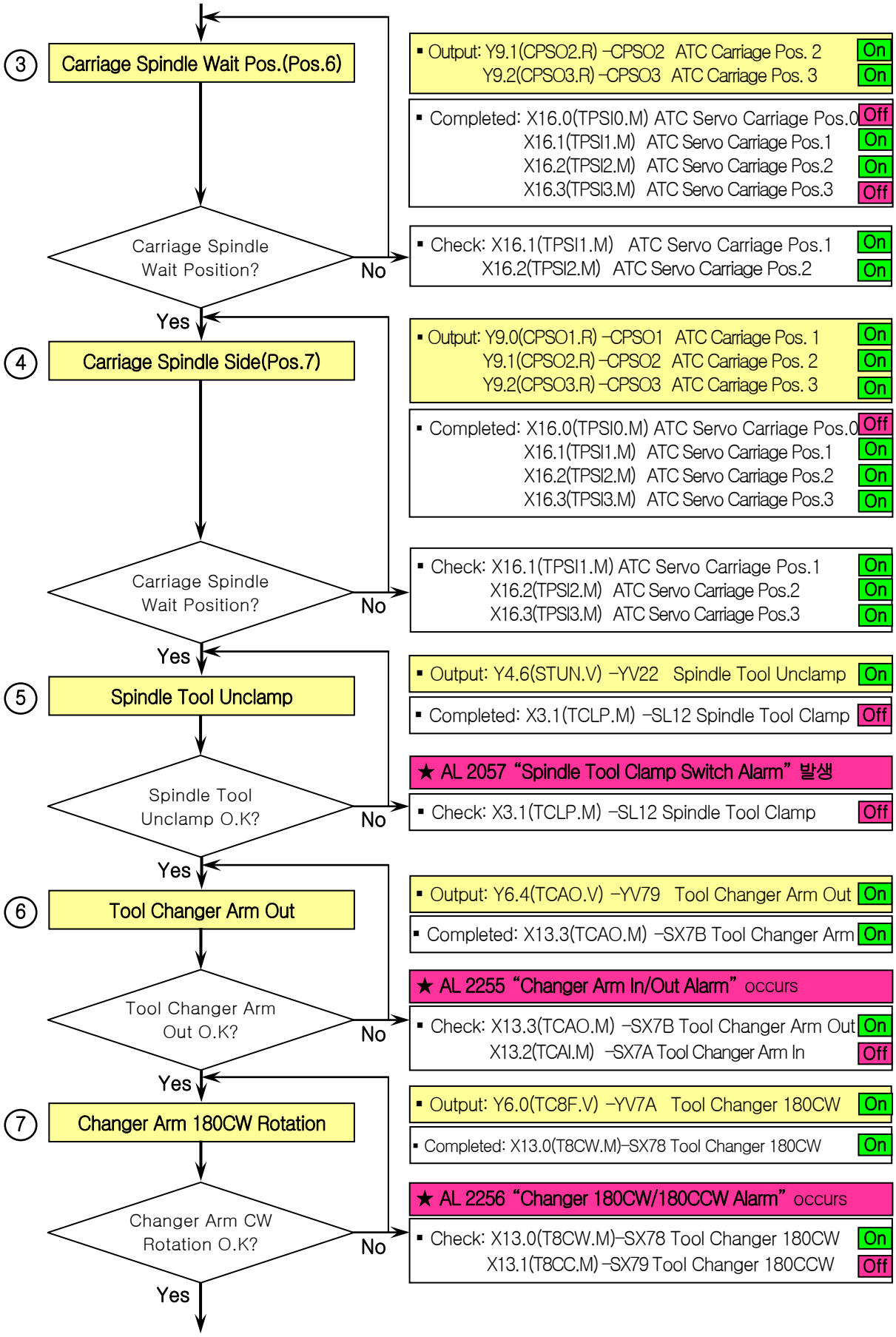
Note) Tool Search (T _ _ ;) Sequence Chart

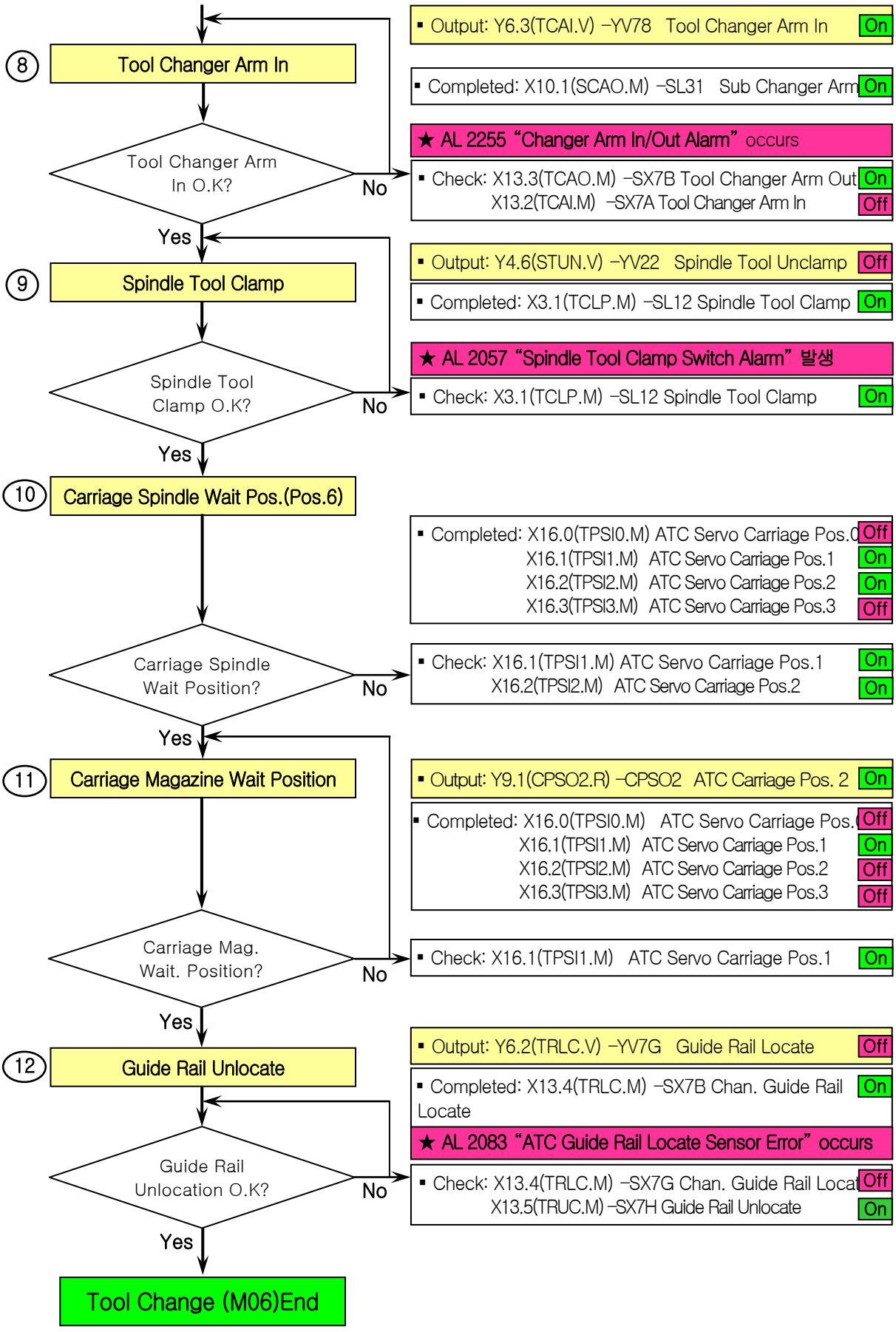



② Tool Changer Arm Out
▪ Output: 6.4(TCAO.V) –YV79 Tool Changer Arm Out On
▪ Completed:X13.3(TCAO.M) –SX7B Tool Changer Arm Ou On
Tool Changer Arm Out O.K?
No
★ AL 2255 "Changer Arm In/Out Alarm" occurs
▪ Check: X13.3(TCAO.M) –SX7B Tool Changer Arm Out On
X13.2(TCAI.M) –SX7A Tool Changer Arm In Off
Yes
③ Carriage Magazine Wait Position
▪ Output: Y9.1(CPSO2.R) –CPSO2 ATC Carriage Pos. 2 On
▪ Completed: X16.0(TPSI0.M) ATC Servo Carriage Pos.0 Off
X16.1(TPSI1.M) ATC Servo Carriage Pos.1 On
X16.2(TPSI2.M) ATC Servo Carriage Pos.2 Off
X16.3(TPSI3.M) ATC Servo Carriage Pos.3 Off
Carriage Mag. Wait. Position?
No
▪ Check: X16.1(TPSI1.M) ATC Servo Carriage Pos.1 On
Yes
④ Tool Changer Arm In
▪ Output: Y6.3(TCAI.V) –YV78 Tool Changer Arm In On
▪ Completed: X10.1(SCAO.M) –SL31 Sub Changer Arm On
Tool Changer Arm In O.K?
No
★ AL 2255 "Changer Arm In/Out Alarm" occurs
▪ Check: X13.3(TCAO.M) –SX7B Tool Changer Arm Out Off
X13.2(TCAI.M) –SX7A Tool Changer Arm In On
Yes
Tool Search End

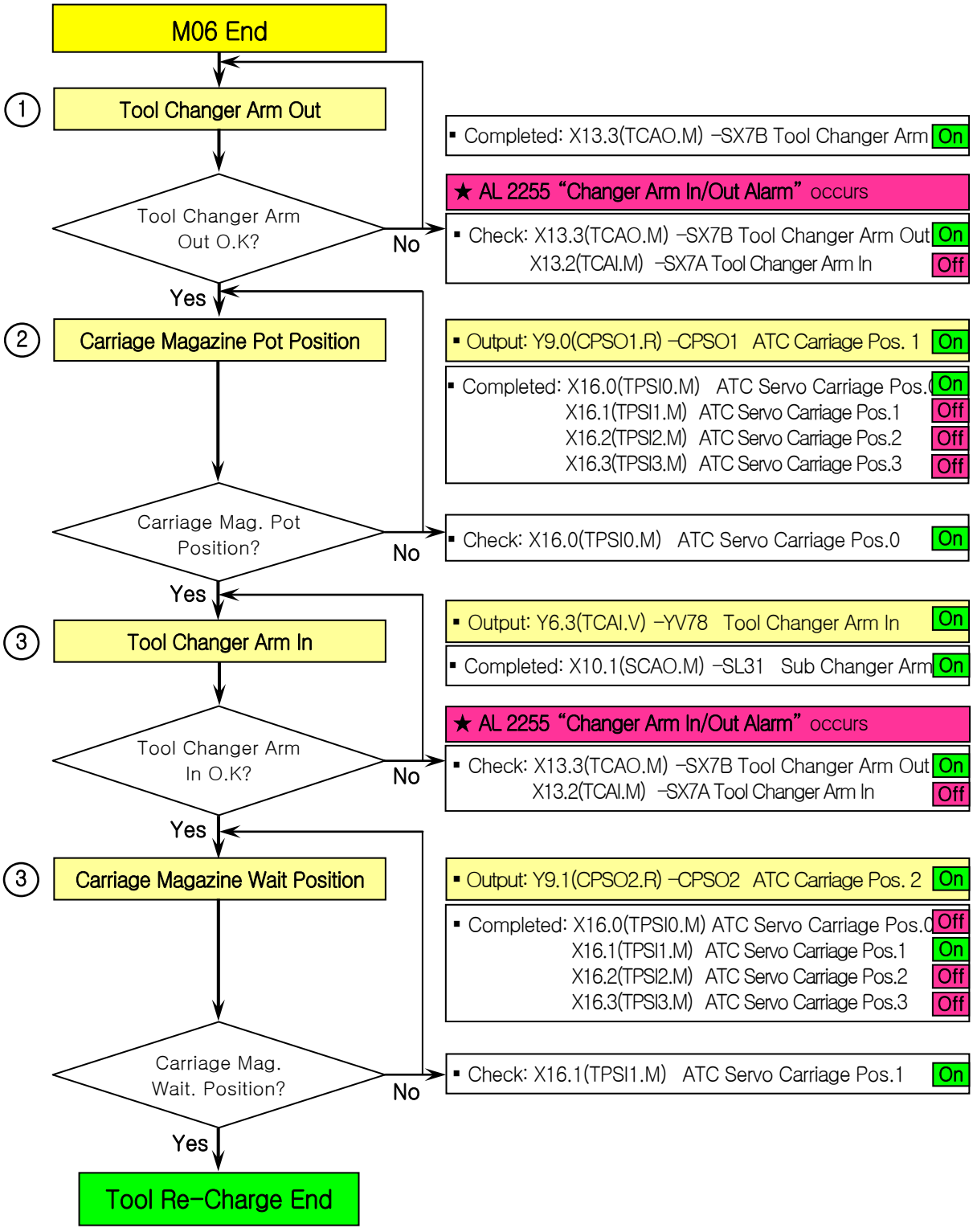
Note) Tool Changing (M06;) Sequence Chart




3
Carriage Spindle Wait Pos.(Pos.6)
▪ Output: Y9.1(CPSO2.R) –CPSO2 ATC Carriage Pos. 2 On
Y9.2(CPSO3.R) –CPSO3 ATC Carriage Pos. 3 On
▪ Completed: X16.0(TPSI0.M) ATC Servo Carriage Pos.0 Off
X16.1(TPSI1.M) ATC Servo Carriage Pos.1 On
X16.2(TPSI2.M) ATC Servo Carriage Pos.2 On
X16.3(TPSI3.M) ATC Servo Carriage Pos.3 Off
Carriage Spindle Wait Position?
No
▪ Check: X16.1(TPSI1.M) ATC Servo Carriage Pos.1 On
X16.2(TPSI2.M) ATC Servo Carriage Pos.2 On
Yes
4
Carriage Spindle Side(Pos.7)
▪ Output: Y9.0(CPSO1.R) –CPSO1 ATC Carriage Pos. 1 On
Y9.1(CPSO2.R) –CPSO2 ATC Carriage Pos. 2 On
Y9.2(CPSO3.R) –CPSO3 ATC Carriage Pos. 3 On
▪ Completed: X16.0(TPSI0.M) ATC Servo Carriage Pos.0 Off
X16.1(TPSI1.M) ATC Servo Carriage Pos.1 On
X16.2(TPSI2.M) ATC Servo Carriage Pos.2 On
X16.3(TPSI3.M) ATC Servo Carriage Pos.3 On
Carriage Spindle Wait Position?
No
▪ Check: X16.1(TPSI1.M) ATC Servo Carriage Pos.1 On
X16.2(TPSI2.M) ATC Servo Carriage Pos.2 On
X16.3(TPSI3.M) ATC Servo Carriage Pos.3 On
Yes
5
Spindle Tool Unclamp
▪ Output: Y4.6(STUN.V) –YV22 Spindle Tool Unclamp On
▪ Completed: X3.1(TCLP.M) –SL12 Spindle Tool Clamp Off
Spindle Tool Unclamp O.K?
No
★ AL 2057 “Spindle Tool Clamp Switch Alarm” 발생
▪ Check: X3.1(TCLP.M) –SL12 Spindle Tool Clamp Off
Yes
6
Tool Changer Arm Out
▪ Output: Y6.4(TCAO.V) –YV79 Tool Changer Arm Out On
▪ Completed: X13.3(TCAO.M) –SX7B Tool Changer Arm On
Tool Changer Arm Out O.K?
No
★ AL 2255 “Changer Arm In/Out Alarm” occurs
▪ Check: X13.3(TCAO.M) –SX7B Tool Changer Arm Out On
X13.2(TCAI.M) –SX7A Tool Changer Arm In Off
Yes
7
Changer Arm 180CW Rotation
▪ Output: Y6.0(TC8F.V) –YV7A Tool Changer 180CW On
▪ Completed: X13.0(T8CW.M)–SX78 Tool Changer 180CW On
Changer Arm CW Rotation O.K?
No
★ AL 2256 “Changer 180CW/180CCW Alarm” occurs
▪ Check: X13.0(T8CW.M)–SX78 Tool Changer 180CW On
X13.1(T8CC.M) –SX79 Tool Changer 180CCW Off
Yes


8
Tool Changer Arm In
Tool Changer Arm In O.K?
No
Yes
▪ Output: Y6.3(TCAI.V) –YV78 Tool Changer Arm In On
▪ Completed: X10.1(SCAO.M) –SL31 Sub Changer Arm On
★ AL 2255 "Changer Arm In/Out Alarm" occurs
▪ Check: X13.3(TCAO.M) –SX7B Tool Changer Arm Out On
X13.2(TCAI.M) –SX7A Tool Changer Arm In Off
9
Spindle Tool Clamp
Spindle Tool Clamp O.K?
No
Yes
▪ Output: Y4.6(STUN.V) –YV22 Spindle Tool Unclamp Off
▪ Completed: X3.1(TCLP.M) –SL12 Spindle Tool Clamp On
★ AL 2057 "Spindle Tool Clamp Switch Alarm" 발생
▪ Check: X3.1(TCLP.M) –SL12 Spindle Tool Clamp On
10
Carriage Spindle Wait Pos.(Pos.6)
Carriage Spindle Wait Position?
No
Yes
▪ Completed: X16.0(TPSI0.M) ATC Servo Carriage Pos.0 Off
X16.1(TPSI1.M) ATC Servo Carriage Pos.1 On
X16.2(TPSI2.M) ATC Servo Carriage Pos.2 On
X16.3(TPSI3.M) ATC Servo Carriage Pos.3 Off
▪ Check: X16.1(TPSI1.M) ATC Servo Carriage Pos.1 On
X16.2(TPSI2.M) ATC Servo Carriage Pos.2 On
11
Carriage Magazine Wait Position
Carriage Mag. Wait. Position?
No
Yes
▪ Output: Y9.1(CPSO2.R) –CPSO2 ATC Carriage Pos. 2 On
▪ Completed: X16.0(TPSI0.M) ATC Servo Carriage Pos.0 Off
X16.1(TPSI1.M) ATC Servo Carriage Pos.1 On
X16.2(TPSI2.M) ATC Servo Carriage Pos.2 Off
X16.3(TPSI3.M) ATC Servo Carriage Pos.3 Off
▪ Check: X16.1(TPSI1.M) ATC Servo Carriage Pos.1 On
12
Guide Rail Unlocate
Guide Rail Unlocation O.K?
No
Yes
▪ Output: Y6.2(TRLC.V) –YV7G Guide Rail Locate Off
▪ Completed: X13.4(TRLC.M) –SX7B Chan. Guide Rail Locate On
★ AL 2083 "ATC Guide Rail Locate Sensor Error" occurs
▪ Check: X13.4(TRLC.M) –SX7G Chan. Guide Rail Locate Off
X13.5(TRUC.M) –SX7H Guide Rail Unlocate On
Tool Change (M06)End

Note) Tool Re-Charging Sequence Chart



2.18 2080 Spindle Head Oil Overflow Alarm

1) Description

The oil level switch in the spindle head is tripped.

2) Cause of problem

① The lubricant level in the spindle head is excessive due to an error in the oil level switch.

② The oil level switch has an error or the wiring has a problem.

③ The recovery pump motor has an error.

3) Action

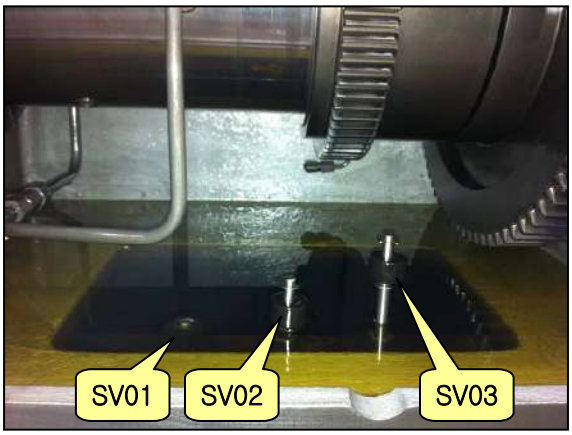
① Check the spindle oil drain pump. Check the drain line filter.

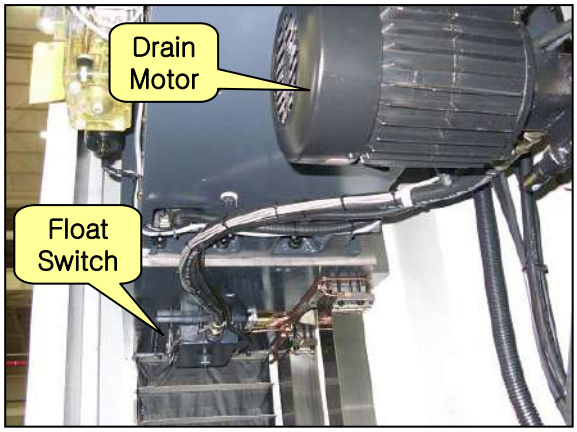
② Check the oil level switch, wiring cables and I/O module, and make repair or replacement if necessary.

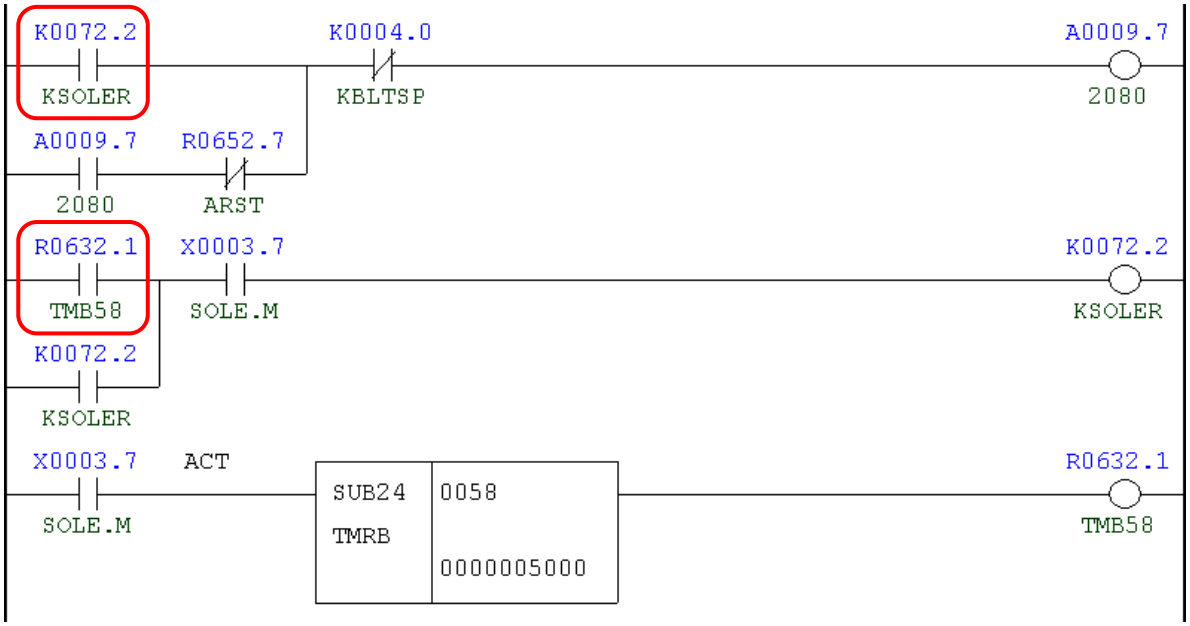
③ Check if the recovery pump motor synchronizes with Machine Ready properly.

Part Name	Part No.	Symbol	Spec.	Maker
Switch Float	R37112	-SV11	W-105-A(300MM)	A-Ryung

Signal	Address	Device Symbol	I/O	Connector (Pin)	Numbering
Spindle Head Oil Limit	**X3.7** SOLE.M	-SV18	Input Module : Slot 06	XJ412 (42)	SV18
Recovery Pump Motor	**Y2.7** REVM.R	-QM73	Output Module : Slot 2	(10)	KM73







Address	Symbol	Coil Comment
K72.2	**KSOLER**	**Keep Spindle Oil Level Limit**
A9.7	2080	Spindle Head Oil Overflow Alarm
R652.7	ARST	Alarm Reset
K4.0	KBLTSP	Built-In Spindle Used
R632.1	KBLTSP	Oil High Level Check Time
X3.7	SOLE.M	Spindle Head Oil Level Limit

2.19 2081 Y-Axis Clamp/Unclamp Alarm

1) Description

It has passed 5 seconds since the Y-axis clamp/unclamp pressure switch that was not conforming to the operation signal was tripped.

2) Cause of problem

① An error in the Y-axis clamp/unclamp pressure switch

② An error in wiring or component parts

3) Action

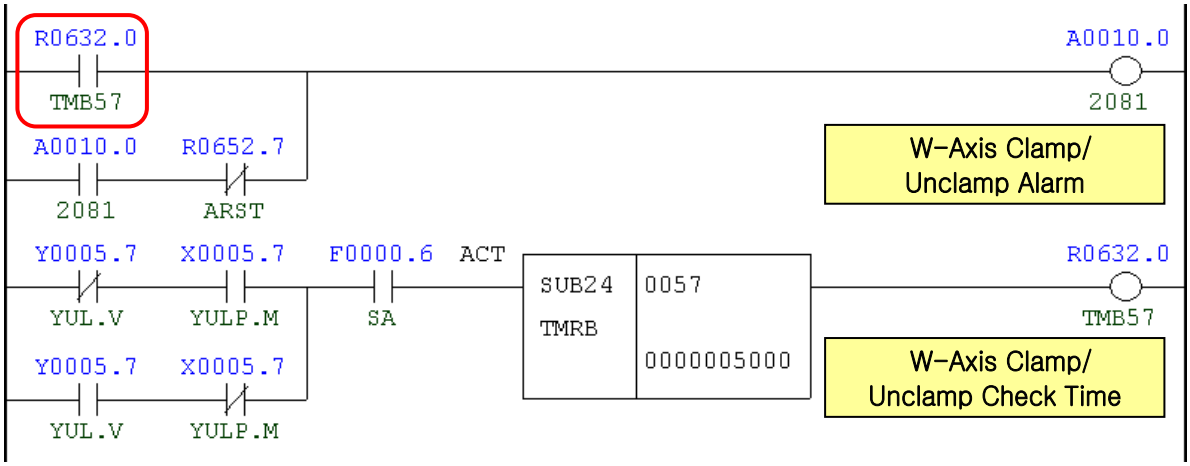
① An error in adjusting the pressure switch

Adjust the pressure switch settings to 45 Kg/㎠ for clamping the Y axis, and 1 kg/㎠ for unclamping it.

② An error in wiring or component parts

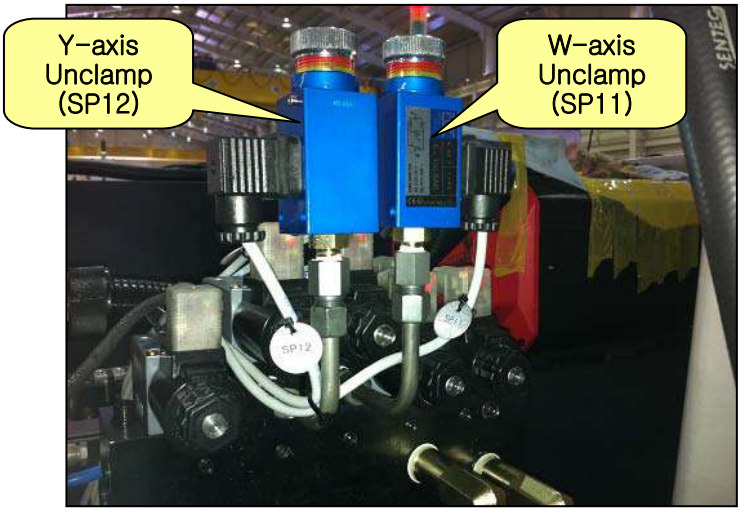
Check the pressure switch, the wiring from the pressure switch to the electric cabinet, and the input module. Make repair or replacement if necessary.

Signal	Address	Device Symbol	I/O	Connector (Pin)	Numbering
Y Axis Unclamp Pressure SW	**X5.7** YUL.M	-SP12	Input Module : Slot 6	XJ412 (33)	SP12
Y Axis Unclamp Sol.	**Y5.7** YUL.V	-KAR57	Output Module : Slot 3	XJ400(42)	YV17



Address	Symbol	Coil Comment
R632.0	**TMB57**	**Y Axis Clamp/Unclamp Check Time**
A10.0	2081	Y Axis Clamp/Unclamp Alarm
R652.7	ARST	Alarm Reset

Address	Symbol	Coil Comment
Y5.7	YUL.V	Y Axis Unclamp Sol.
X5.7	YULP.M	Y Axis Unclamp Pressure SW
F0.6	SA	Servo Ready



2.20 2082 Spindle Stop in Cutting Alarm

1) Description

With the spindle stopped, the feed axis is instructed to move. (not a machine failure.)

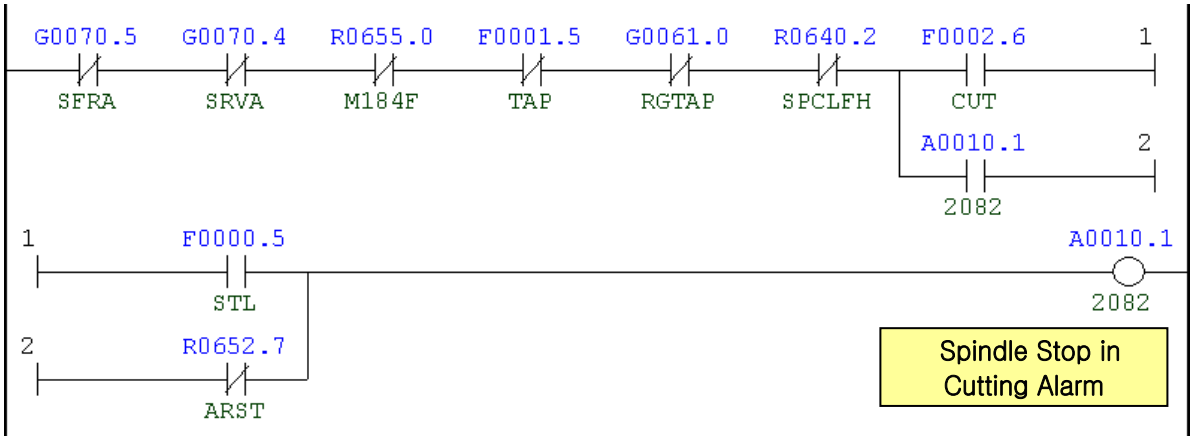
2) Cause of problem

With the spindle being stopped, the feed axis is instructed to move.

3) Action

The command to move the feed axis should be instructed after instructing to rotate the spindle. (S___ M03, or M04)

▪ If you want to move the feed axis with the spindle stopped, instruct M184 at first. (M185 will release the instruction of M184.)



Address	Symbol	Coil Comment
G70.5	SFRA	Spindle Forward
G70.4	SRVA	Spindle Reverse
R655.0	M184F	Cutting Mode Feed Moving(M184)
F1.5	TAP	Tapping Mode
G61.0	RGTAP	Rigid Tapping Mode
R640.2	SPCLFH	Spindle & Coolant at Feed Hold
F2.6	CUT	Cutting Feed Signal
F0.5	STL	Cycle Start
A10.1	2082	Spindle Stop in Cutting Alarm
R652.7	ARST	Alarm Reset

2.21 2083 ATC Guide Rail Locate Sensor Error

1) Description

It has passed 5 seconds since both position sensor switches of ATC Guide Rail Locate that were not conforming to the operation signal were tripped.

2) Cause of problem

① An error in adjusting the position sensor switch

② The position sensor switch failed due to the inaccurate position of the locating pin and the bush.

③ An error in wiring or component parts

3) Action

① An error in adjusting the position sensor switch

Adjust the ATC guide rail locate/unlocate switch while manipulating ATC guide rail locating pin manually.

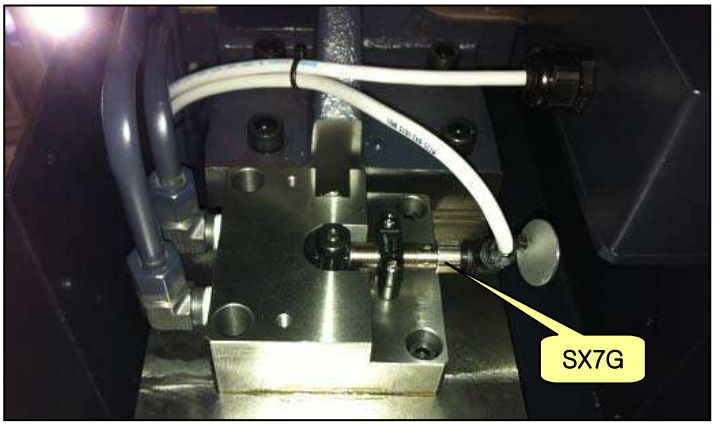
② Inaccurate position of the locating pin against the bush

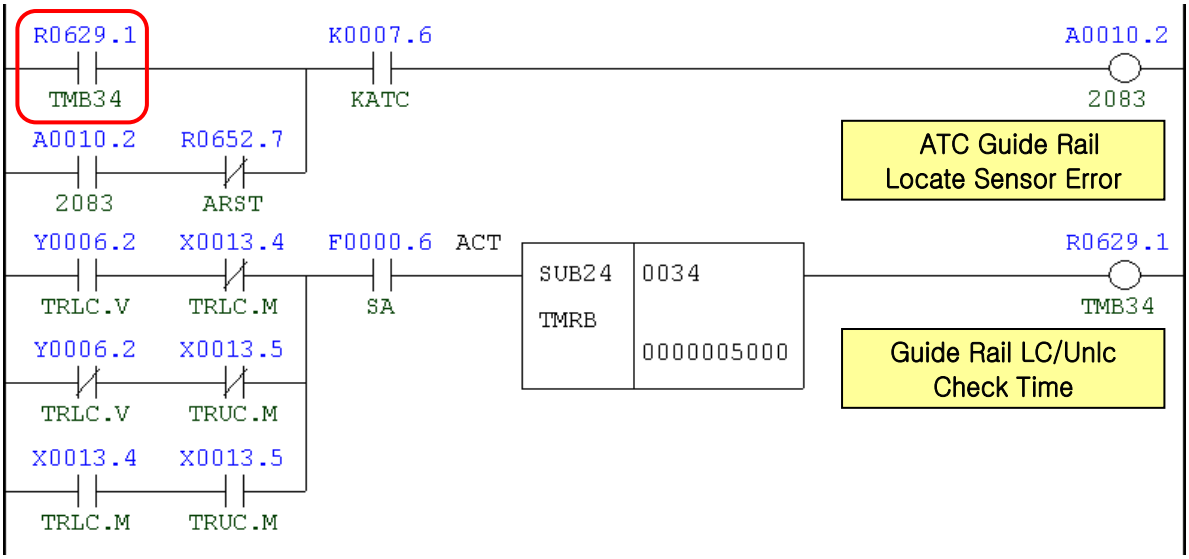
Manipulate the tool magazine to correct the position of the locating pin against the bush.

③ An error in wiring or component parts

Check the proximity switch, the wiring from the proximity switch to the electric cabinet as well as the I/O module if there is a problem. Repair or replace the defective part if necessary.

Signal	Address	Device Symbol	I/O	Connector (Pin)	Numbering
Guide Rail Location	**X13.4** TRLC.M	-SX7G	Input Module : Slot 8	XJ414 (19)	SX7G
Guide Rail Unlocation	**X13.5** TRUC.M	-SX7H	Input Module : Slot 8	XJ414 (34)	SX7H
Guide Rail Location	**Y6.2** TRLC.V	-KAR46	Output Module : Slot 3	XA107 (10)	YV11





Address	Symbol	Coil Comment
R629.1	**TMB34**	**Guide Rail LC/Unlc Check Time**
A10.2	2083	ATC Guide Rail Locate Sensor
R652.7	ARST	Alarm Reset
K7.6	KATC	ATC Used
Y6.2	TRLC.V	Guide Rail Locate
X13.4	TRLC.M	Tool Changer Guide Rail Locate
X13.5	TRUC.M	Tool Changer Guide Rail Unlocate
F0.6	SA	Servo Ready

2.22 2085 W-Axis Clamp/Unclamp Alarm

1) Description

It has passed 10 seconds since the W-axis clamp/unclamp pressure switch that was not conforming to the operation signal was tripped.

2) Cause of problem

① An error in the W-axis clamp/unclamp pressure switch

② An error in wiring or component parts

3) Action

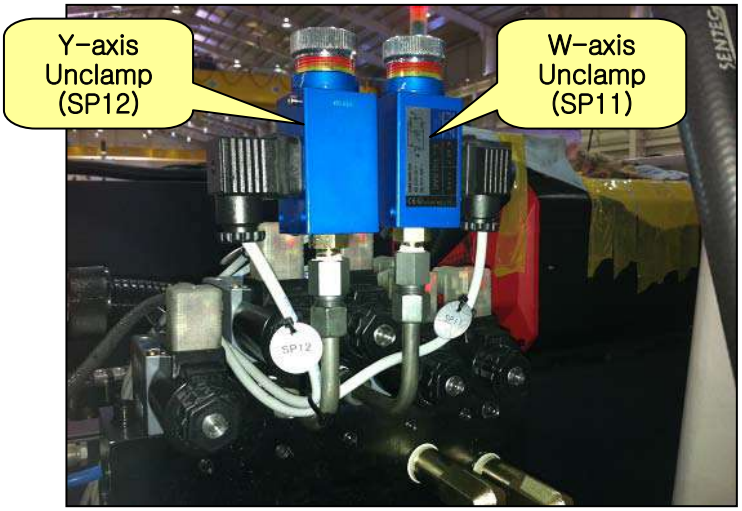
① An error in adjusting the pressure switch

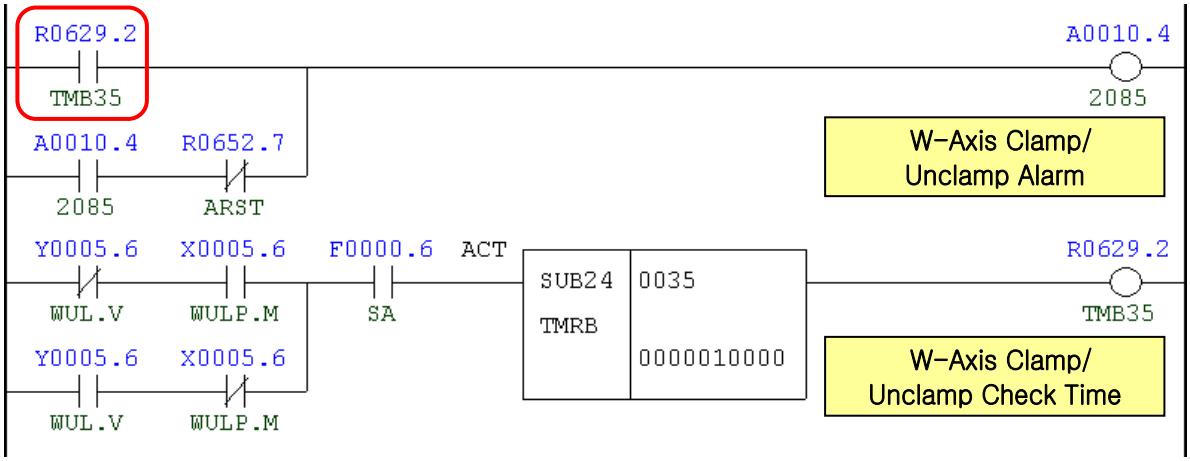
Adjust the pressure switch settings to 45 Kg/㎠ for clamping the W axis, and 1 kg/㎠ for unclamping it.

② An error in wiring or component parts

Check the pressure switch, the wiring from the pressure switch to the electric cabinet, and the input module. Make repair or replacement if necessary.

Signal	Address	Device Symbol	I/O	Connector (Pin)	Numbering
W Axis Unclamp Pressure SW	**X5.6** WULP.M	-SP11	Input Module : Slot 6	XJ412 (1)	SP11
W Axis Unclamp Sol.	**Y5.6** WUL.V	-KAR56	Output Module : Slot 3	XJ400 (10)	YV5D





Address	Symbol	Coil Comment
R629.2	**TMB35**	**W Axis Clamp/Unclamp Check Time**
A10.4	2085	W Axis Clamp/Unclamp Alarm
R652.7	ARST	Alarm Reset
Y5.6	WUL.V	W Axis Unclamp Sol.
X5.6	WULP.M	W Axis Unclamp Pressure SW
F0.6	SA	Servo Ready

2.23 2133 Guide Rail Locating State Alarm

1) Description

Any axis of Y, Z and W has moved when the ATC Guide Rail Locating pin had not been unlocated yet.

2) Cause of problem

① The ATC guide rail is located.

② An error in ATC guide rail locate/unlocate sensor switch

3) Action

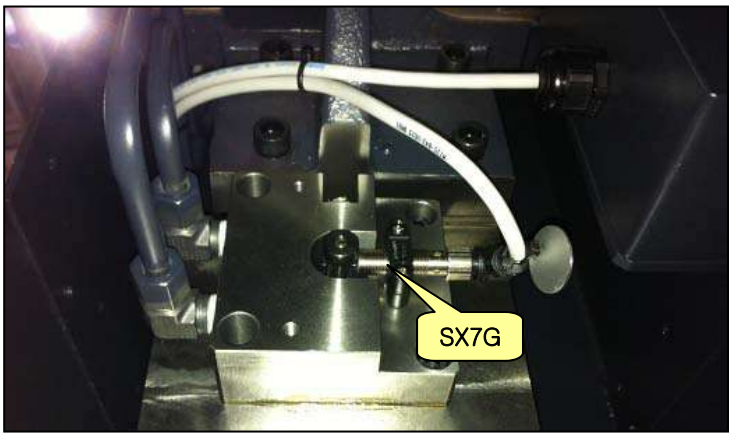
① An error in adjusting the position sensor switch

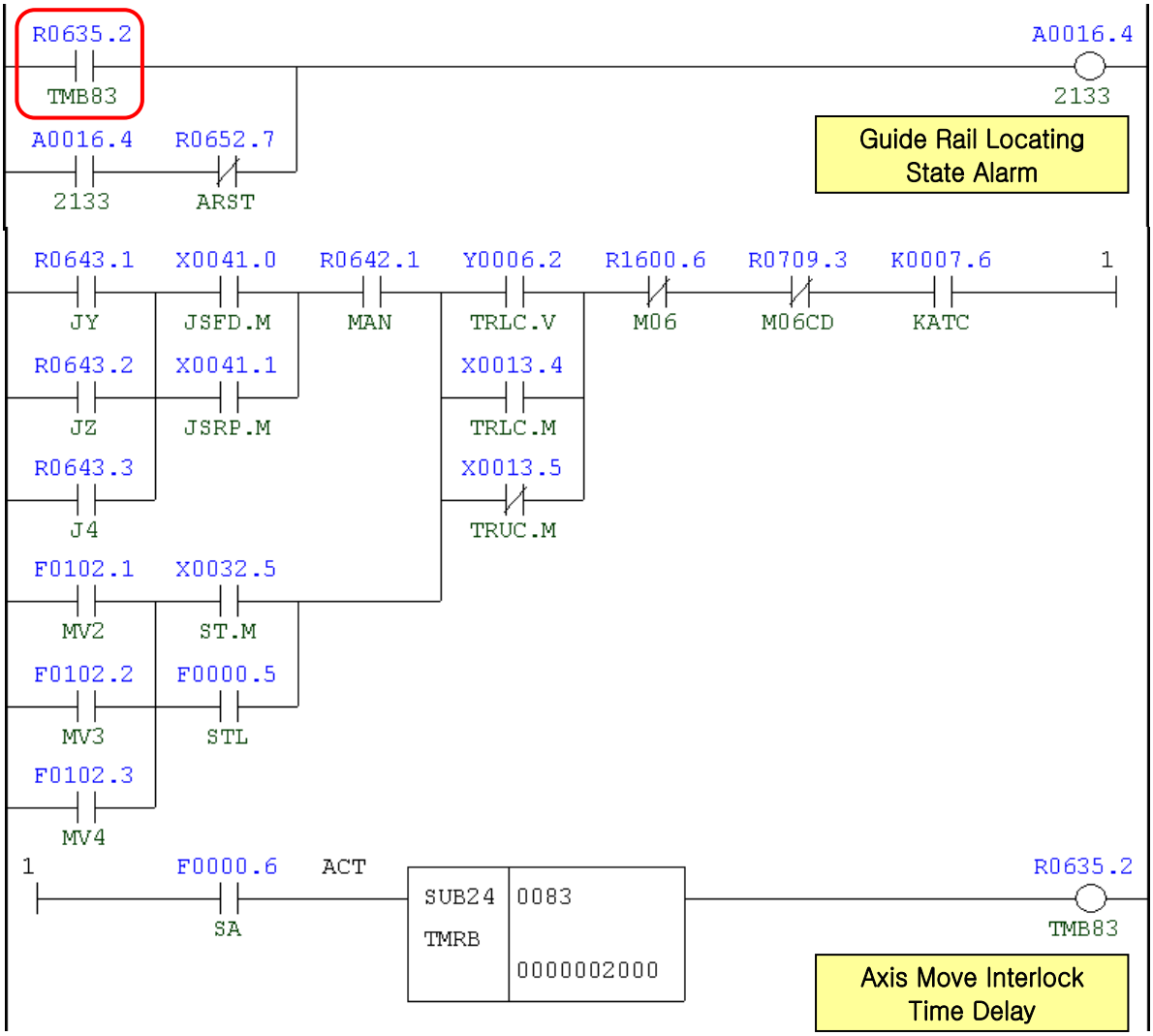
Check the sensor indicator displayed on the proximity switch (located in the rear of the spindle tool unclamping cylinder) and correct it according to the indicator.

② An error in wiring or component parts

Check the proximity switch, the wiring from the proximity switch to the electric cabinet as well as the I/O module if there is a problem. Repair or replace the defective part if necessary.

Signal	Address	Device Symbol	I/O	Connector (Pin)	Numbering
Joystick Feed	**X41.0** JSFD.M	-JS101A	Distributed I/O Module (B)	CXE57B(A02)	JS101A
Joystick Rapid	**X41.1** JSRD.M	-JS101B	Distributed I/O Module (B)	CXE57B(B02)	JS101B
Tool Changer Guide Rail Locate	**X13.4** TRLC.M	-SX7G	Input Module Slot : 8	XJ414 (19)	SX7G
Tool Changer Guide Rail Unlocate	**X13.5** TRUC.M	-SX7H	Input Module Slot : 8	XJ414 (34)	SX7H
Guide Rail Location	**Y6.2** TRLC.V	-KAR46	Output Module Slot : 3	XA107 (10)	YV11





Address	Symbol	Coil Comment
R635.2	**TMB83**	**Axis Move Interlock Time Delay**
A16.4	2133	Guide Rail Locating State Alarm
R652.7	ARST	Alarm Reset
R643.1	JY	Jog Y-Axis Select
R643.2	JZ	Jog Z-Axis Select
R643.3	J4	Jog 4th-Axis Select
X41.0	JSFD.M	Joystick Feed
X41.1	JSRP.M	Joystick Rapid
R642.1	MAN	Manual Mode
F102.1	MV2	Y-Axis Moving Signal
F102.2	MV3	Z-Axis Moving Signal
F102.3	MV4	4-Axis Moving Signal

Address	Symbol	Coil Comment
X32.5	ST.M	Cycle Start
F0.5	STL	Cycle Start
Y6.2	TRLC.V	Guide Rail Locate
X13.4	TRLC.M	Tool Changer Guide Rail Locate
X13.5	TRUC.M	Tool Changer Guide Rail Unlocate
R1600.6	M06	ATC Change Macro Call
R709.3	M06CD	M06 Command
K7.6	KATC	ATC Used
F0.6	SA	Servo Ready

2.24 2139 Spindle Run Signal Alarm

1) Description

The main spindle drive unit causes an error in the stop signal of the spindle.

2) Cause of problem

① An error found in the main spindle drive unit

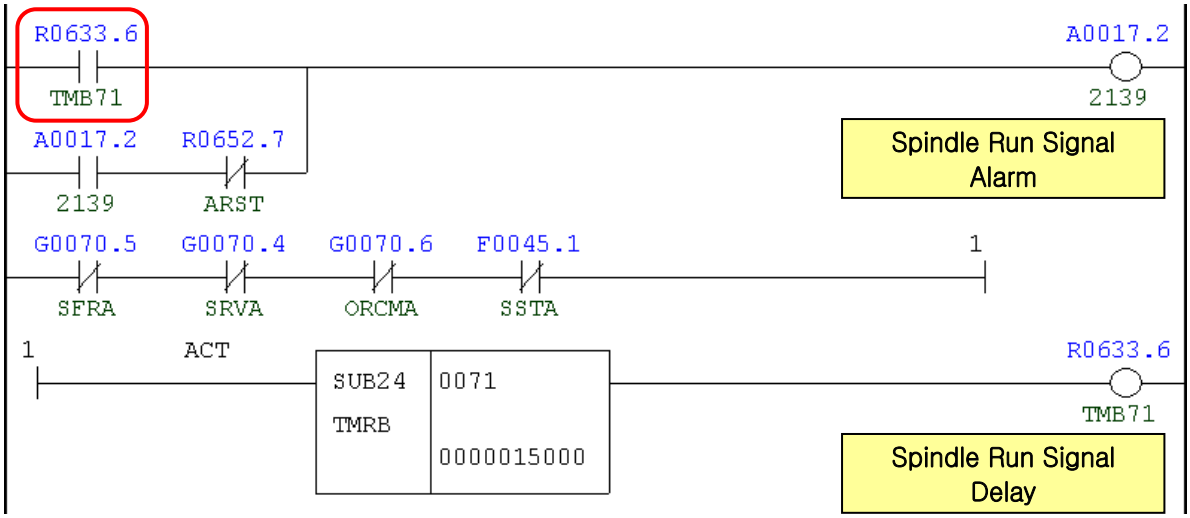
② An error found in the spindle motor, power cable or signal cables

3) Action

① Check the alarm number that is displayed on the main spindle drive unit of the electric cabinet. Take a necessary measure according to the alarm number.

☞ Refer to "Troubleshooting by the spindle amplifier alarm" in the appendix.

② Check the spindle motor for the 3-phase power source and the feedback cable if there is a problem.



Address	Symbol	Coil Comment
R633.6	**TMB71**	**Spindle Run Signal Delay**
A17.2	2139	Spindle Run Signal Alarm
R652.7	ARST	Alarm Reset
G70.5	SFRA	Spindle Forward
G70.4	SRVA	Spindle Reverse
G70.6	ORCMA	Orientation Command
F45.1	SSTA	Spindle Stop Confirm

3. Single Block Alarm

3.1 2160 Lubrication Oil Level Low X

1) Description

The lubricant tank that supplies lubricant to the X-axis guide way, the ball screws, and the bearings has run out of lubricant.

2) Cause of problem

① The lubricant tank has insufficient lubricant.

② An error in the lubricant tank or related parts, or problem with the wiring cables

3) Action

① Refill the lubricant tank in the rear of the machine with lubricant (way lubricant). (it is recommended to make a rule to refill the tank once every 3 or 4 days (based on 8 hours per day))

② Check the lubricant tank, connection line between tank and terminal block of the electric cabinet, and input module, and make repair or replacement if you encounter a problem.

Signal	Address	Device Symbol	I/O	Connector (Pin)	Numbering
Lub. Level Check	**X5.1** LUB.M	-SVJ1	Input Module : Slot 06	XJ412 (20)	SVL1

1) Position: Piping Frame

2) Type of Oil: G220 Oil

3) Fueling Capacity: 25L

Address	Symbol	Coil Comment
X5.1	LUB1.M	X-Axis Lub. Level Low

Address	Symbol	Coil Comment
A19.7	2160	Lubrication Oil Level Low X
R652.7	ARST	Alarm Reset

3.2 2161 Lubrication Oil Pressure Down

1) Description

After the lubricant motor of the lubricant tank that supplies lubricant to machine components such as guide way, ball screws and bearings started driving, the pressure does not increase to a specified level (15Kg/㎠), or it does not fall back to the specified level within 90 seconds ever since.

2) Cause of problem

① The lubricant supply line (lubricant hose, lubricant pipe, lubricant tube, etc) has leaked or gets loose somewhere in the line.

② An error in the distributor value

③ Error in the lubricant tank or related parts, or problem with the wiring cables

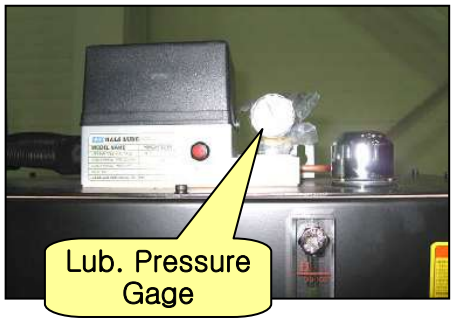
3) Action

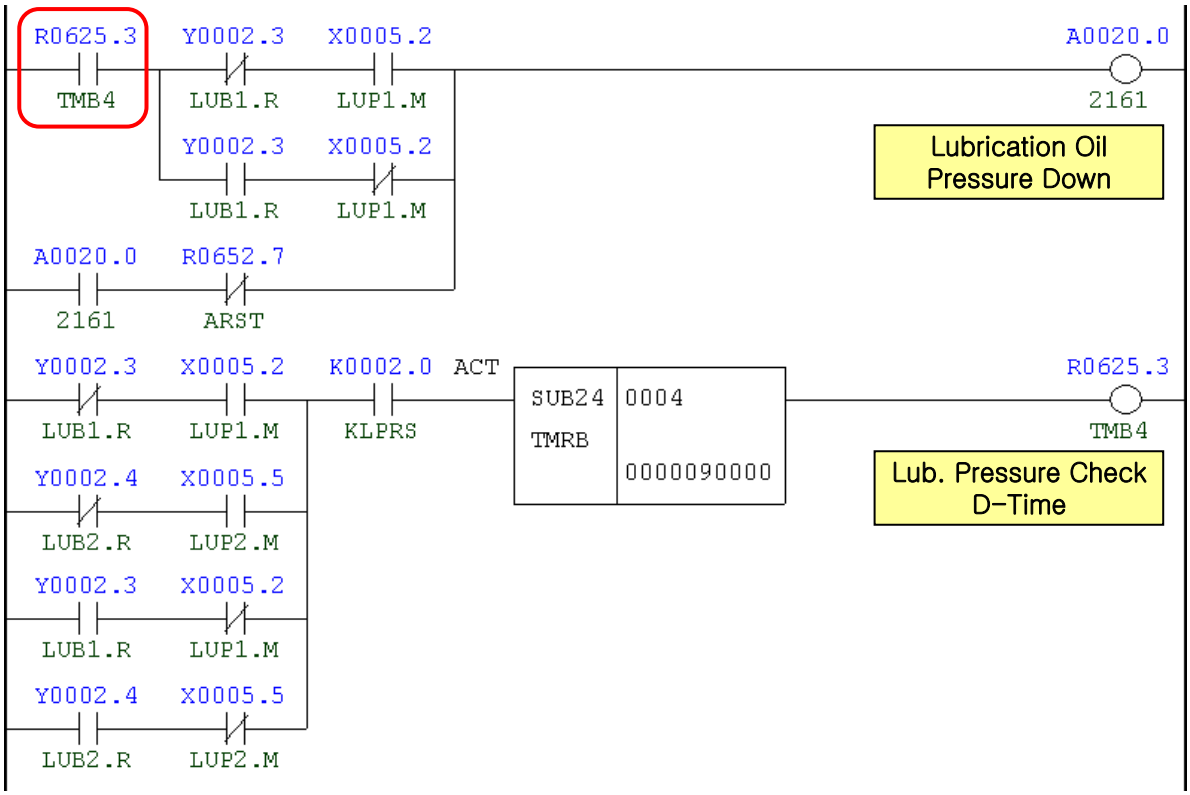
① Check the lubricant supply line (lubricant hose, lubricant pipe, lubricant tube, etc) and make repair or replacement if necessary.

② If there is no particular problem with the lubricant supply line but the lubricant is supplied intensively to a specific component, this is thought to be caused by a defective distributor valve. If this is the case, replace it with a new one.

③ Check the lubricant tank, connection line between tank and terminal block of the electric cabinet, and input module, and make repair or replacement if you encounter a problem.

Signal	Address	Device Symbol	I/O	Connector (Pin)	Numbering
X-Axis Lub. Pressure Check	**X5.2** LUP1.M	-SP51	Input Module : Slot 06	XJ412 (20)	SPL1
Y,W-Axis Lub. Pressure Check	**X5.5** LUP2.M	-SP51	Input Module : Slot 06	XJ412 (34)	SPL2
Lub. Pump Motor for X-Axis	**Y2.3** LUB1.R	-KA51	Output Module : Slot 2	(5)	KA51
Lub. Pump Motor for Y,W-Axis	**Y2.4** LUB2.R	-KA52	Output Module : Slot 2	(8)	KA52





Address	Symbol	Coil Comment
R625.3	**TMB4**	**Lub. Pressure Check D-Time**
Y2.3	LUB1.R	Lub. Pump Motor for X-Axis
X5.2	LUP1.M	X-Axis Lub. Pressure Check
A20.0	2161	Lubrication Oil Pressure Down
R652.7	ARST	Alarm Reset
Y2.4	LUB2.R	Lub. Pump Motor for Y,W-Axis
X5.5	LUP2.M	Y,W-Axis Lub. Pressure Check
K2.0	KLPRS	Lub. Unit Pressure Check Used

3.3 2162 Parts Count End Alarm

1) Description

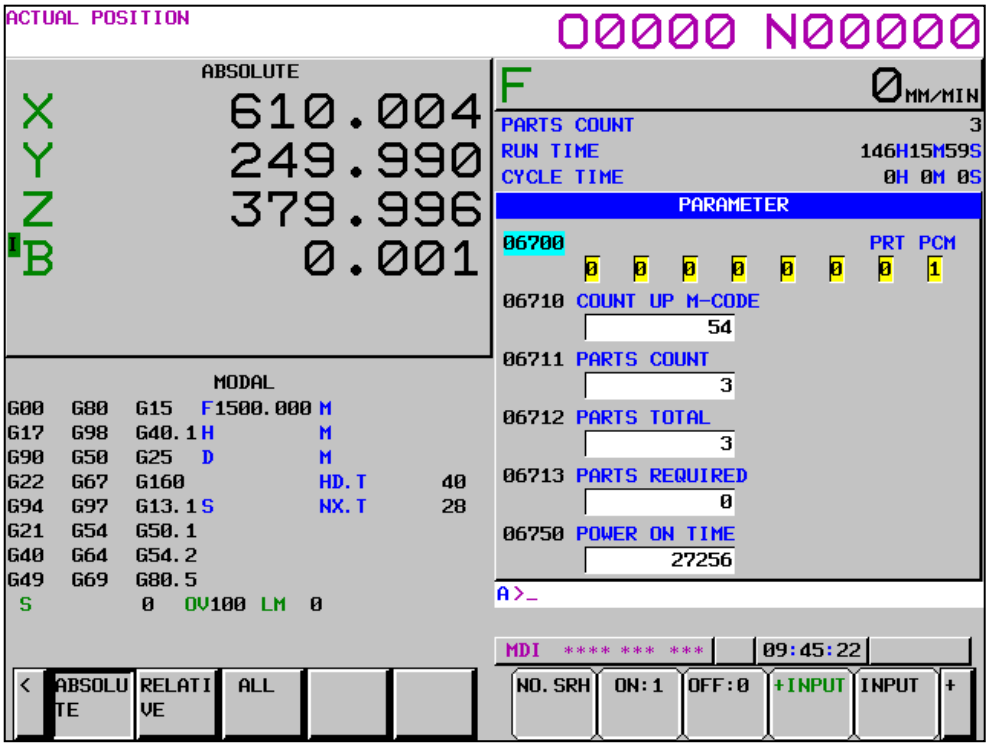
The parts count reaches the limit.

2) Cause of problem

The count of the machined parts reaches the maximum value.

3) Action

Adjust the parts count settings, or reset it.



Address	Symbol	Coil Comment
F62.7	PRTSF	Parts Count(NC) Max.
A20.1	2162	Parts Count End Alarm

3.4 2164 Oil Cooling Unit Alarm

1) Description

An error occurred in the oil cooling unit that cools down the main spindle.

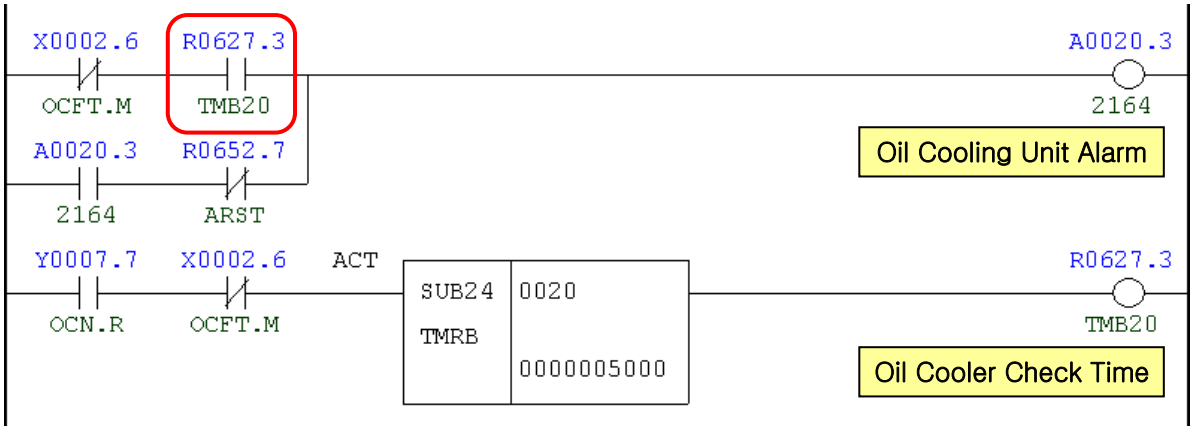
2) Cause of problem

An error in the oil cooling unit

3) Action

Refer to the oil cooling unit's manual, and check the alarm description and take a necessary action.

Signal	Address	Device Symbol	I/O	Connector (Pin)	Numbering
Oil Cooling Unit Fault	**X2.6** OCFT.M	-	Input Module : Slot 06	XJ412 (30)	94
Oil Cooling Unit Run	**Y7.7** OCN.R	-KAR77	Output Module : Slot 3	XJ400 (33)	KAR77



Address	Symbol	Coil Comment
X2.6	OCFT.M	Oil Cooling Unit Fault
R627.3	TMB20	Oil Cooler Check Time
A20.3	2164	Oil Cooling Unit Alarm
R652.7	ARST	Alarm Reset
Y7.7	OCN.R	Oil Cooling Unit Run

◈ Troubleshooting for oil cooler alarms (ILRIM)

RUN	No.	Cause	Action
●	AL 1	Overload of the oil motor pump	Refer to the user manual of the pump and check the oil circuit.
●	AL21	The circuit protector “F2” or “S40” is tripped.	Refer to the user manual and clean the air filter
●	AL 4	The temperature switch for protecting the heater is tripped. (only applied to the heater-equipped models)	
●	AL 61	Short-circuit of the master temperature sensor	▪Check the sensor if short-circuited ▪ Check the connector if contacted loose ▪ Replace with a new sensor
	AL 62	Short-circuit of the slave temperature sensor	
	AL 63	Short-circuit of the reference temperature sensor	
●	AL 71	An error in the CPU of the control board	Replace the control board
	AL 73	A communication error of the control board	Refer to the user manual and check DIP switch #1
The “H” and current temperature indicators blink		▪ The controlled temperature exceeds the specified upper limit. ▪ It exceeds the alarm limit.	
The “45” indicator blinks.		The controlled temperature exceeds 45℃.	
The “L” and current temperature indicators blink		▪ The controlled temperature exceeds the specified lower limit. ▪ It goes below the alarm limit.	
The “5” indicator blinks.		The controlled temperature goes below 5℃.	
The “FIL” indicator blinks		It's time to clean the filter.	Clean the filter and reset the machine

The “●” symbol above indicates that the indicator is turned off.

◈ **Troubleshooting for Oil Cooler alarms (Kaukan)**

Item	No.	Cause	Action
1	The machine turns on but no response is made.	1) The PCB is defective.	Replace the PCB
		2) Fuse A1 for power supply (SMCC-233) is defective.	Replace the fuse.
		3) The power supply module SMCC-233 is defective.	Replace SMCC-233
		4) The transformer is defective.	Replace the transformer
2	**E01**	1) Negative sequence wiring of the power supply unit	Reconnect any two phases of 3 power phases (see Ch4-4)
		2) Reconnect only two power phases of 3 phases	Check if three power phases are correctly wired.
		3) Out of AC220±15%	Check the AC power source.
3	**E02**	1) The pump motor overload breaker has triggered.	Reset the QFP switch to release the breaker. (Push button)
		2) Resetting the QFP switch does not work (push button not released)	This is because the overload breaker is damaged. Replace QFP.
		3) The pump motor is defective.	Replace the motor.
4	**E03**	1) The compressor motor overload breaker has triggered.	Reset the QFP switch to release the breaker. (Push button)
		2) Resetting the QFP switch does not work (push button not released)	This is because the overload breaker is defective. Replace QFP.
		3) The compressor motor is defective.	Replace the motor.
5	**E04**	1) The pressure switch of the refrigerant is defective.	Replace the switch.
		2) Out of effective range (-10℃~45℃)	Wait until the temperature falls in the effective range.
		3) The air filter is clogged.	Clean the air filter.
		4) The condenser is clogged.	Clean the condenser.
6	**E05**	1) The input pipe is not connected properly.	Tighten up the pipe.
		2) The input/output pipes are switched with each other.	Reconnect and tighten up the pipe.

Item	No.	Cause	Action
		3) The oil/water quantity is too low.	Find out the cause and make a refill.
		4) The woodruff key of the pump or the rotor shaft of motor is worn out.	Replace the pump or motor.
		5) Unable to adjust the pump pressure	Replace the pump.
		6) Defective oil/water pressure switch	Replace the switch.
		7) Hose, oil/water filter is clogged.	Clean the hose, replace the oil/water filter (optional).
		8) Excessive pump pressure	Adjust the pump pressure properly, or check and clean the oil/water filter if necessary.
7	**E06**	1) The oil/water is insufficient.	Refill the tank with the oil/water.
8	**E07**	1) The water in the pipe is not circulating.	The input/output pipe is clogged. Cleaning
		2) The float switch is burnt out.	Replace the switch.
9	**E08**	1) The oil/water temperature is below zero(0℃).	Turn off the power and wait until the temperature increases.
		2) The refrigerant switch is defective.	Replace the switch.
10	**E09**	The oil/water sensor is defective.	Replace the sensor.
11	**E10**	The room temperature sensor is defective.	Replace the sensor.
12	**E11**	Excessive oil/water temperature (adjust the effective range of STC45℃ by a technician)	Contact a technician to adjust the temperature range or improve the cooling capacity.
13	**E12**	1) Insufficient refrigerant	Refill the refrigerant.
		2) The current cooler has comparably insufficient cooling capacity.	Replace it with a larger-capacity cooler.

If you encounter that the oil/water cooler is overheated during its operation, refill the refrigerant regularly.

Use only the refrigerant that is specified in the nameplate, or consult with a professional.

◈ **Troubleshooting for oil cooler alarms (Daikin)**

1) If no alarm occurs but the cooler works abnormally

Item	No.	Cause	Action
1	Does not	① The main power is not supplied, or	Check the power supply line if
2	The pump does not	① The remote control items [10] and	Check if the remote control
		② The pump is locked on operation.	Release the lock at the control
3	The pump operates but no oil flows. Oil circulation is insufficient	① The intake pipe of the pump is	Tighten the packing of the
		② The intake strainer is clogged.	Unclog the intake strainer.
		③ The oil quantity level in the oil tank	Refill the tank with the oil
		④ The pressure loss of the oil	Replace the oil pipe with a
		⑤ The pressure loss of the oil intake	---
4	The pump is working but the compressor is not operating.	① The compressor is stopped under	Check if it resumes working
		② The anti-restart timer (30 seconds)	Check if it works properly when
		③ The low oil temperature protection	Check if it works properly when
		④ The low ambient temperature	Check if it works properly when
		⑤ The capacity is set to 10% in mode	Switch to a proper operation
5	Both pump and compressor are operating but no oil is cooling.	① There is an obstacle near the air	Remove the obstacle.
		② The air filter is clogged.	Clean the air filter,
		③ The room temperature is high and	Check the catalog for the temperature range available
		④ The heat load is great.	
		⑤ The temperature is set high.	Set the temperature to a
		⑥ If the temperature of the exhaust	Turn off the fail-safe switch
6	Operational settings are	① If "---" is displayed on the data	Connect the temperature
		② If "---" is displayed temporarily	Turn off the fail-safe switch
7	The alarm	① The signal connection of the alarm	The alarms [60] and [63] are

2) If an alarm occurs, (turn off the machine and restart it if you want to set off the alarm)

Alarm Code	Alarm Level	Description	Cause	Action
AA	2	Heater overloaded (S4B1:CN4) (applicable to heater-installed models only)	① For AKZ type, no oil is running.	Check if the hydraulic circuit is connected properly, and the pump is operating normally.
			① For AKZJ type, the tank has insufficient oil quantity.	Refill the oil.
A6	2	DC motor is not locked	① DC fan motor is defective.	Replace the DC fan motor.
			① There is a problem in communications between fan motor and control device.	Check the connector, check for any short circuit, and replace the control device.
E1	1	System error	① The internal parameter settings are invalid.	Replace the control board.
E3	2	High pressure (high-pressure switch (S3PH:CN6) is tripped)	① The oil or room temperature is beyond the working range.	Use the machine within the working temperature range.
			② There is an obstacle near the intake/exhaust opening.	Do not place any object within 500mm near the intake/exhaust port.
			③ The filter is clogged or the condenser is contaminated.	Refer to Item 8 above, and clean the air filter.
			④ Others	Contact us (Daikin) at the customer service team.
E5	2	The compressor is overheated. (Thermo TH6 on the emission pipe is tripped) (Compressor head thermo (S2B:CN) is tripped)	① The oil or room temperature is beyond the working range.	Use the machine within the working temperature range.
			② There is an obstacle near the intake/exhaust opening.	Do not place any object within 500mm near the intake/exhaust port.
			③ The filter is clogged or the condenser is contaminated.	Refer to Item 8 above, and clean up the air filter.
E6	2	The compressor (M2C) is locked.	① The compressor is defective (needs to be replaced).	Replace the compressor.
EH	1	Pump high-	① The pump is overloaded	Use only the operating fluid that

Alarm Code	Alarm Level	Description	Cause	Action
		currented Circuit Breaker (S1B:CN3) is tripped.	due to use of the high-viscosity oil.	has the viscosity range of 4 ~ 200 mm2/s within the working temperature range.
			② The pump motor is over-currented because the power voltage is lower than the effective range.	Check if the power voltage is lower than the effective range, or check if there occurs a sudden voltage drop for few seconds at the startup of peripheral equipment.
			③ Disconnected wiring of the pump motor	Replace the pump motor.
			④ The pump is clogged with debris or the motor is defective.	Replace the pump motor.
EJ	1/2	Optional protective device is activated (OP).	① Any optional protection device is activated. (For the unit, there are some devices connected by factory default)	Check the result of detection that is performed by the protective device.
H1	2	An error in the air temp sensor (TH5) (TH3: Ambient Temp Sensor)	①The air sensors used in the control system is short-circuited.	Check if there is any defective sensor on the monitor of the operation panel ("99.9" will be displayed for a defective sensor), and check also if the sensors are connected correctly.
FH	2	The temperature on the intake opening exceeds 60℃.	① The heat of the main body exceeds the cooling capacity of the oil corn. (choice of an inappropriate model)	If the compressor is operating at100% of its capacity in normal conditions (check this on the monitor), select a model one size bigger.
			② There is an obstacle near the inlet/outlet opening, which causes deteriorating the cooling capacity.	Do not place any object within 500mm near the intake/exhaust port.
			③ The unit is running under capacity suppressing control because it has exceeded the standard temperature (room temp:	If beyond the standard temperature, the cooling capacity is lowered than the nominal capacity by the load control system.

Alarm Code	Alarm Level	Description	Cause	Action
			35℃, oil temp: 35℃), causing deteriorated cooling capacity.	Make sure that the capacity of the oil cooling unit exceeds the heat generation of the main unit in the entire operating temperature range.
			④ Temperature control is disabled as the machine is operating in mode 9 (capacity direct designation mode)	Switch to a proper operation mode. (In capacity direct designation mode, feedback control of temperature is not enabled.)
			⑤ The refrigerant gas is leaking.	If the temperature of the emission air is equal to the room temperature, there is a risk of leak of the refrigerant gas. If this is the case, contact us to the customer service team.
JH	2	Error in oil temp sensor (TH2: outlet oil temp sensor) (TH4: inlet oil temp sensor)	① Short circuit of the oil temp sensors used in the control system	Check if there is any defective sensor on the monitor of the operation panel ("99.9" will be displayed for a defective sensor), and check also if the sensors are connected correctly.
J3	2	An error in the temp thermistor on the emission pipe	① Short circuit or disconnection of the temperature thermistor of the condenser.	Check if the thermistor is connected correctly.
J5	2	Error in the EV valve outlet opening temp thermistor	① Short circuit or disconnection of the EV valve outlet opening temperature thermistor.	Check if the thermistor is connected correctly.
J6	2	An error in the temp thermistor of the condenser	① Short circuit or disconnection of the temperature thermistor of the condenser.	Check if the thermistor is connected correctly.
L0	2	Error in the compressor line of the inverter	① Defective compressor or inverter	Replace the control system or the compressor.
LC	2	Communication error between	① There occurred a communication error	Replace the control system, or improve the power supply

Alarm Code	Alarm Level	Description	Cause	Action
		inverter and temp control CPU.	between temperature control MICOM and inverter MICOM.	condition (such as noise reduction).
P3	2	Error in the temp thermistor on the cooling fin	① Short circuit or disconnection of the temperature thermistor of the control box.	Check if the thermistor is connected correctly.
P4	2	Error in the temp thermistor on the cooling fin	① Short circuit or disconnection of the temperature thermistor on the heat sink.	Check if the thermistor is connected correctly.
U0	2	Insufficient gas	① The refrigerant piping is damaged due to excessive vibration in its transportation, leading to a leak of the refrigerant gas.	Repair the damaged refrigerant piping, and refill the refrigerant gas.
U1	1	Power supply reverse-phase connection	① The power supply circuit is connected in reverse phase.	Switch the reverse phases with each other.
			② The L3 phase is open.	Make sure that the L3 phase is properly connected to the power supply terminal block.
U2	2	Sudden power failure • Insufficient power	① The power voltage is below about 70V.	Check if there occurs an instantaneous voltage drop at the startup of peripheral equipment.
U9	2	Communications error in other systems (communication error between slave and master)	① Communications error with a slave device.	Check if the communication line is properly established with the slave device. (this error occurs only if the slave device does not make response in master-slave communication.)
UH	2	System line failure (EEPROM error)	① The parameter settings that are saved in the control board are invalid.	Replace the control board.
UJ	1/2	OP2 activated	① Any optional protection device is activated. (For the unit, there are	Check the result of detection that is performed by the protection device.

Alarm Code	Alarm Level	Description	Cause	Action
			some devices connected by factory default)	
1E ~	-	Temperature range warning 1	① The temperature of the target to be monitored has exceeded the specified range. (not a fault of the oil cooling unit)	Check the warning message.
5E	-	Temperature range Warning 5		

3.5 2165 Oil Cooling Flow Alarm

1) Description

The filter of the high-pressure coolant unit (TSC) is clogged, which needs to be replaced.

2) Cause of problem

① The filter of the high-pressure coolant unit (TSC) is clogged.

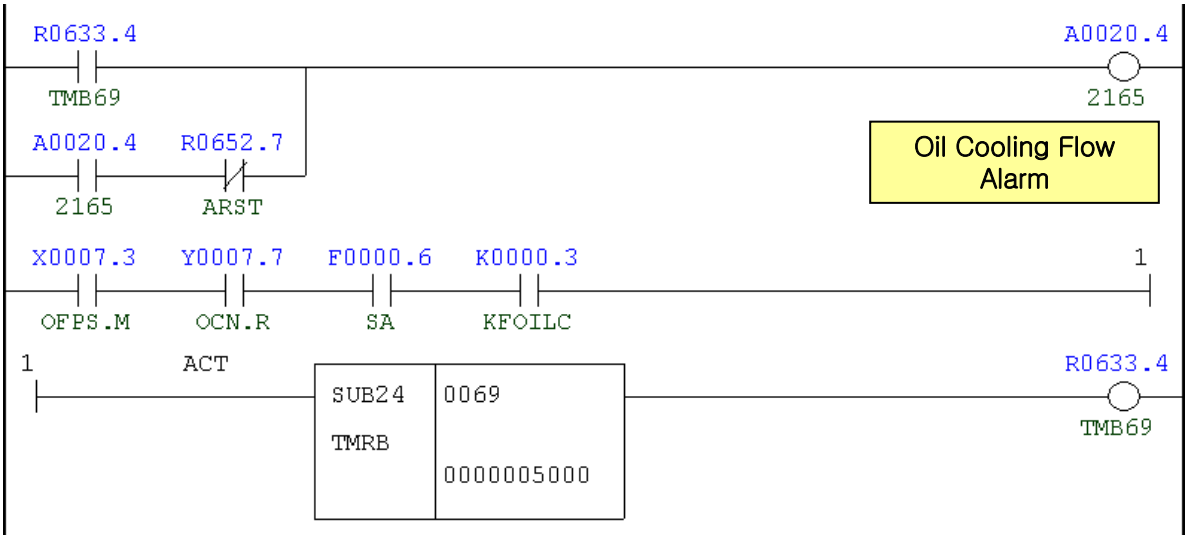
② Error in the filter sensor, possible disconnection of the wiring through to the terminal block of the electric cabinet, or defective component parts.

3) Action

① Replace the filter with a new one.

② Check the filter unit, and wiring between filter unit and terminal block of the electric cabinet as well as the input module, and make repair or replacement if you encounter a problem.

Signal	Address	Device Symbol	I/O	Connector (Pin)	Numbering
Oil Cooling Filter Pressure Check	**X7.3** OFPS.M	-SP30	Input Module : Slot 07	XJ413 (11)	SP30
Oil Cooling Unit Run	**Y7.7** OCN.R	-KAR77	Output Module : Slot 3	XJ400 (33)	KAR77



Address	Symbol	Coil Comment
R633.4	TMB69	Oil Cooling Check Time
F0.6	SA	Servo Ready
A20.4	2165	Oil Cooling Flow Alarm
R652.7	ARST	Alarm Reset

Address	Symbol	Coil Comment
X7.3	OFPS.M	Oil Cooling Pressure S/W
Y7.7	OCN.R	Oil Cooling Unit Run
F0.6	SA	Servo Ready
K0.3	KFOILC	Oil Cooling Filter Check Is Used

3.6 2166 Filter Changer of TSC. Alarm

1) Description

The filter of the high-pressure coolant unit (TSC) is clogged, which needs to be replaced.

2) Cause of problem

① The filter of the high-pressure coolant unit (TSC) is clogged.

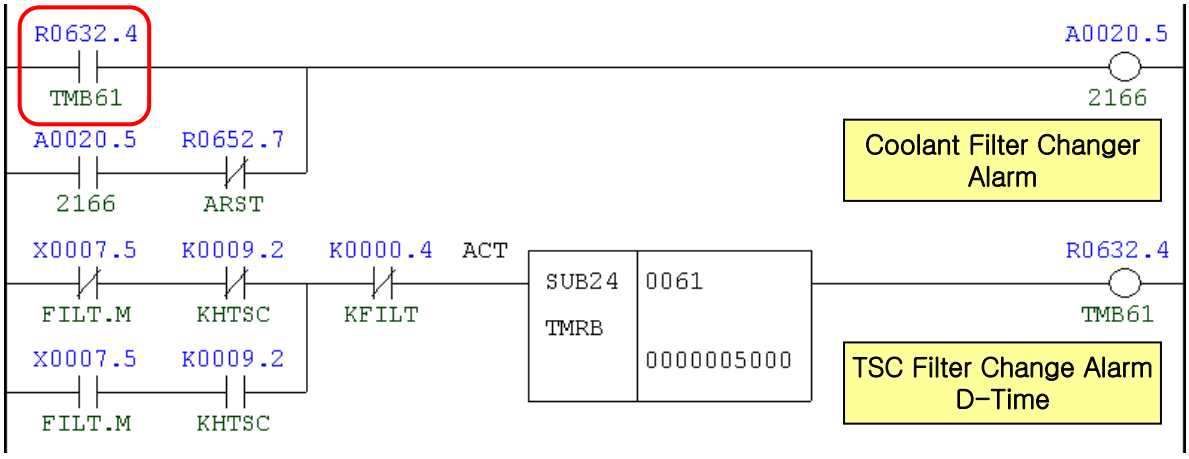
② Error in the filter sensor, possible disconnection of the wiring through to the terminal block of the electric cabinet, or defective component parts.

3) Action

① Replace the filter with a new one.

② Check the filter unit, and wiring between filter unit and terminal block of the electric cabinet as well as the input module, and make repair or replacement if you encounter a problem.

Signal	Address	Device Symbol	I/O	Connector (Pin)	Numbering
TSC Filter Check OK	**X7.5** FILT.M	-SP09	Input Module : Slot 07	XJ413 (43)	A17



Address	Symbol	Coil Comment
R632.4	TMB61	TSC Filter Change Alarm D-Time
A20.5	2166	Coolant Filter Change Alarm
R652.7	ARST	Alarm Reset
X7.5	FILT.M	TSC Filter Pressure Check
K9.2	KHTSC	High Pressure Coolant(TSC) Used
K0.4	KFILT	TSC Filter Check SW Is Not Used

3.7 2168 Coolant Pressure Down Alarm

1) Description

The coolant pressure alarm has tripped from the high-pressure TSC unit.

2) Cause of problem

① Insufficient coolant

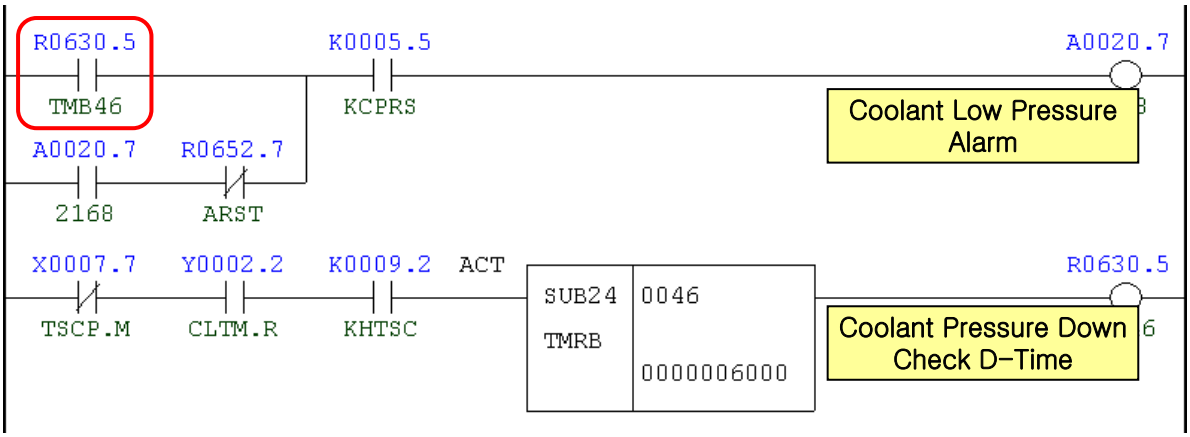
② Check the coolant pump and the motor of the high-pressure TSC unit, and the pressure sensor if they work properly. Check the wiring through to the electric cabinet and make repair or replacement if necessary.

3) Action

① Refill the tank with the coolant.

② Check the applicable pump motors and the pressure sensors, and the signal cable through to the electric cabinet as well as the input module if there is a problem. Repair or replace the defective part if necessary.

Signal	Address	Device Symbol	I/O	Connector (Pin)	Numbering
T-S-C Unit Pressure Check	**X7.7** TSCP.M	-M222	Input Module : Slot 07	XJ413 (42)	A19
Through The Tool/Spinde Coolant	**Y2.2** CLTM.R	-KA42	Output Module : Slot 2	(4)	KA42



Address	Symbol	Coil Comment
R630.5	TMB46	Coolant Pressure Down Ckeck D-Time
A20.7	2168	Coolant Low Pressure Alarm
R652.7	ARST	Alarm Reset
K5.5	KCPRS	Coolant Pressure Switch Used
X7.7	TSCP.M	T-S-C Unit Pressure Check

Address	Symbol	Coil Comment
Y2.2	CLTM.R	Through The Tool/Spinde Coolant
K9.2	KHTSC	High Pressre Coolant(TSC) Used

3.8 2170 Tool Life Count End Alarm

1) Description

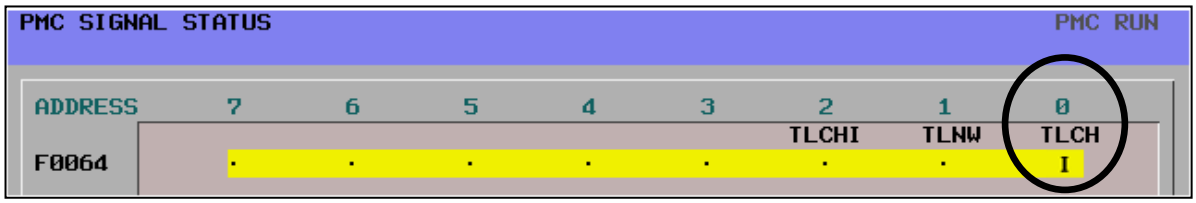
The tool change signal (of tool life cycle management) is detected.

2) Cause of problem

The tool has reached its life cycle specified in Tool Life Management, triggering the tool change request signal.

3) Action

Take an action according to the Tool Life Management instructions.



Address	Symbol	Coil Comment
F64.0	TLCHA	Tool Change Request
A21.1	2170	Tool Life Count End Alarm
R652.7	ARST	Alarm Reset

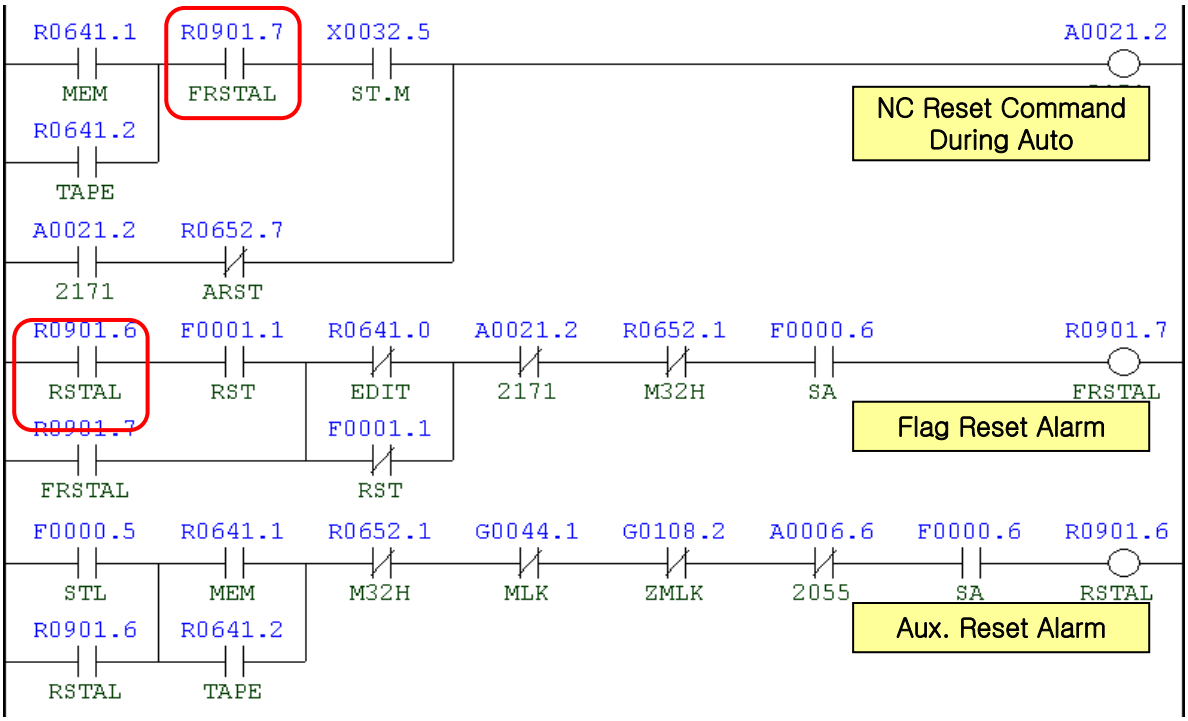
3.9 2171 RST Command Alarm On STL

1) Description

Immediately after NC Reset during the auto operation, the cycle start is performed in Auto mode.

2) Action

If NC reset is performed in auto operation, you must reset it again in Edit mode and then locate the program block before performing the cycle start in Auto mode.



Address	Symbol	Coil Comment
R641.1	MEM	Memory Mode
R641.2	TAPE	Tape Mode
R901.7	**FRSTAL**	**Flag Reset Alarm**
X32.5	ST.M	Cycle Start
A21.2	2171	NC Reset Command Aut
R652.7	ARST	Alarm Reset
R901.6	**RSTAL**	**Aux. Reset Alarm**
R641.0	EDIT	Edit Mode
F1.1	RST	Reset
A21.2	2171	NC Reset Commanded During Aut
R652.1	M32H	M02/M30 Hold
F0.6	SA	Servo Ready

3.10 2183 Table Lubrication Oil Flow Alarm

1) Description

The lubrication pressure of the table lubricant motor has not reached the value (1.0 kg/c㎡) set for the pressure switch within 10 seconds after it was activated.

2) Cause of problem

① Insufficient table lubrication oil

② A setting error in the table lubrication pressure switch

③ Check the coolant pump and the motor of the high-pressure TSC unit, and the pressure sensor if they work properly. Check the wiring through to the electric cabinet and make repair or replacement if necessary.

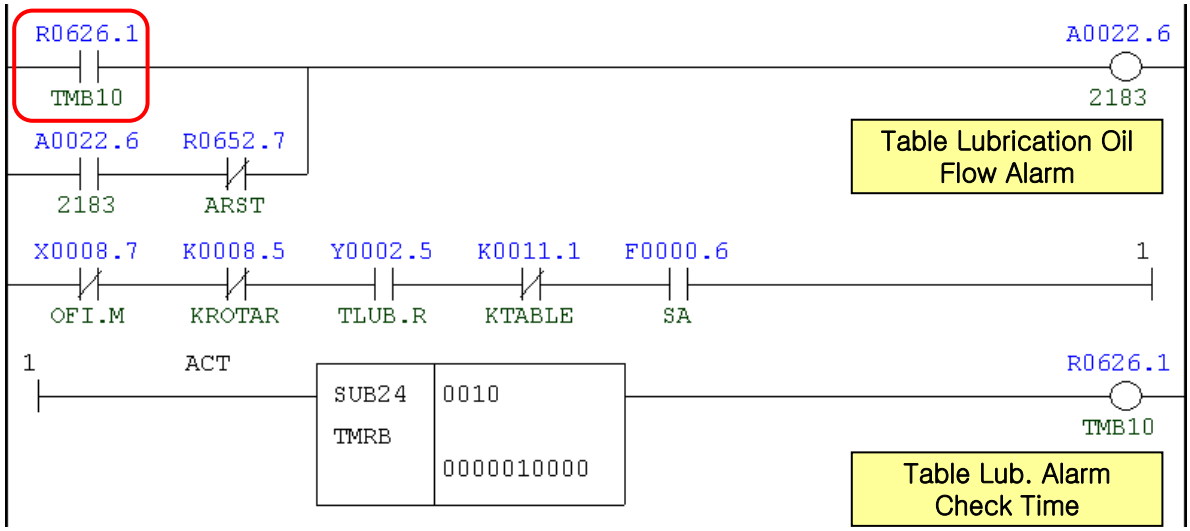
3) Action

① Locate the input line of the table lubrication oil and refill the tank.

② Set the pressure value of the table lubrication pressure switch to below 1.0Kg/㎠.

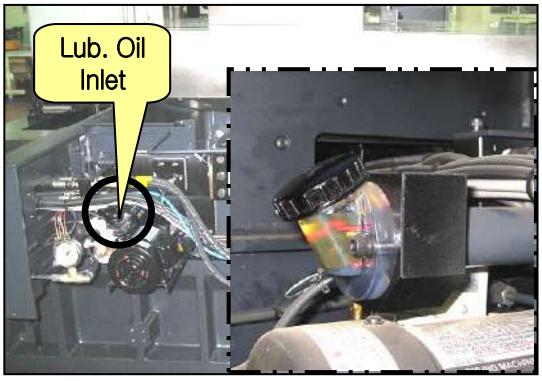
③ Check the applicable pump motors and the pressure switches, and the signal cable through to the electric cabinet as well as the input module if there is a problem. Repair or replace the defective part if necessary.

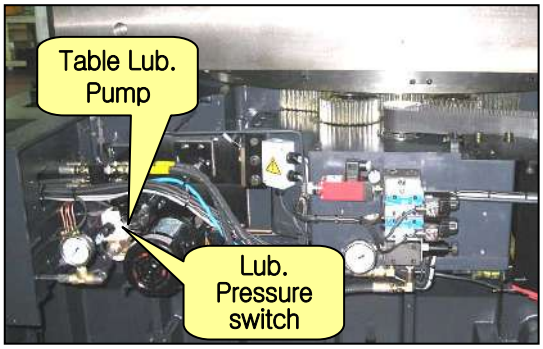
Signal	Address	Device Symbol	I/O	Connector (Pin)	Numbering
Oil Flow Indicator	**X8.7** OFI.M	-SP01	Input Module : Slot 07	XJ413 (37)	SP01
Table Lub. Motor On	**Y2.5** TLUB.R	-KM34	Output Module : Slot 2	(8)	KM34

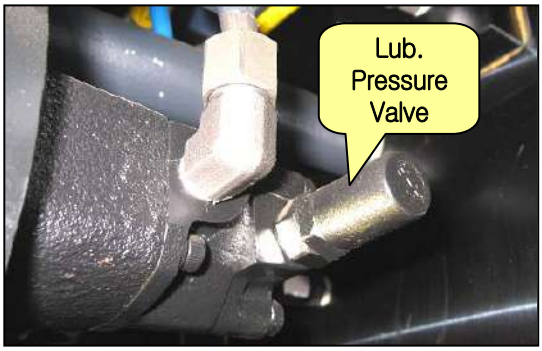


Address	Symbol	Coil Comment
R626.1	TMB10	Table Lub. Alarm Check Time
A22.6	2183	Table Lubrication Oil Flow Alarm
R652.7	ARST	Alarm Reset
X8.7	OFI.M	Oil Flow Indicator
K8.5	KROTAR	Ruckle Rotarry Table Used
Y2.5	TLUB.R	Table Lub. Motor On
K11.1	KTABLE	B-Axis Table Used
F0.6	SA	Servo Ready

1) Position: Rear of the table base
2) Type of Oil: GH68 Oil
3) Fueling Capacity: 40L
4) Pressure settings of table lubrication
: 1.0Kg/㎠







3.11 2185 Lubrication Oil Level Low Y, Z

1) Description

The lubricant tank that supplies lubricant to the X and Y-axis guide ways, the ball screws, and the bearings has run out of lubricant.

2) Cause of problem

① The lubricant tank has insufficient lubricant.

② An error in the lubricant tank or related parts, or problem with the wiring cables

3) Action

① Refill the lubricant tank in the rear of the machine with lubricant (way lubricant). (it is recommended to make a rule to refill the tank once every 3 or 4 days (based on 8 hours per day))

② Check the lubricant tank, connection line between tank and terminal block of the electric cabinet, and input module, and make repair or replacement if you encounter a problem.

Signal	Address	Device Symbol	I/O	Connector (Pin)	Numbering
Lub. Level Check	**X5.1** LUB.M	-SVJ1	Input Module : Slot 06	XJ412 (20)	SVL1

1) Position: Piping Frame

2) Type of Oil: G220 Oil

3) Fueling Capacity: 25L

Address	Symbol	Coil Comment
X5.4	LUB2.M	Y, Z-Axis Lub. Level Low
A23.0	2185	Lubrication Oil Level Low Y, Z
R652.7	ARST	Alarm Reset

3.12 2186 Lubrication Oil Pressure Down

1) Description

After the lubricant motor of the lubricant tank that supplies lubricant to machine components such as guide way, ball screws and bearings started driving, the pressure does not increase to a specified level (15Kg/㎠), or it does not fall back to the specified level within 90 seconds ever since.

2) Cause of problem

① The lubricant supply line (lubricant hose, lubricant pipe, lubricant tube, etc) has leaked or gets loose somewhere in the line.

② An error in the distributor value

③ Error in the lubricant tank or related parts, or problem with the wiring cables

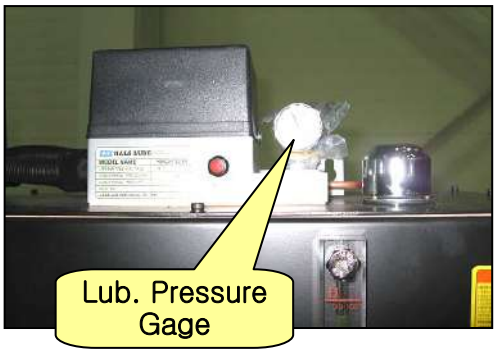
3) Action

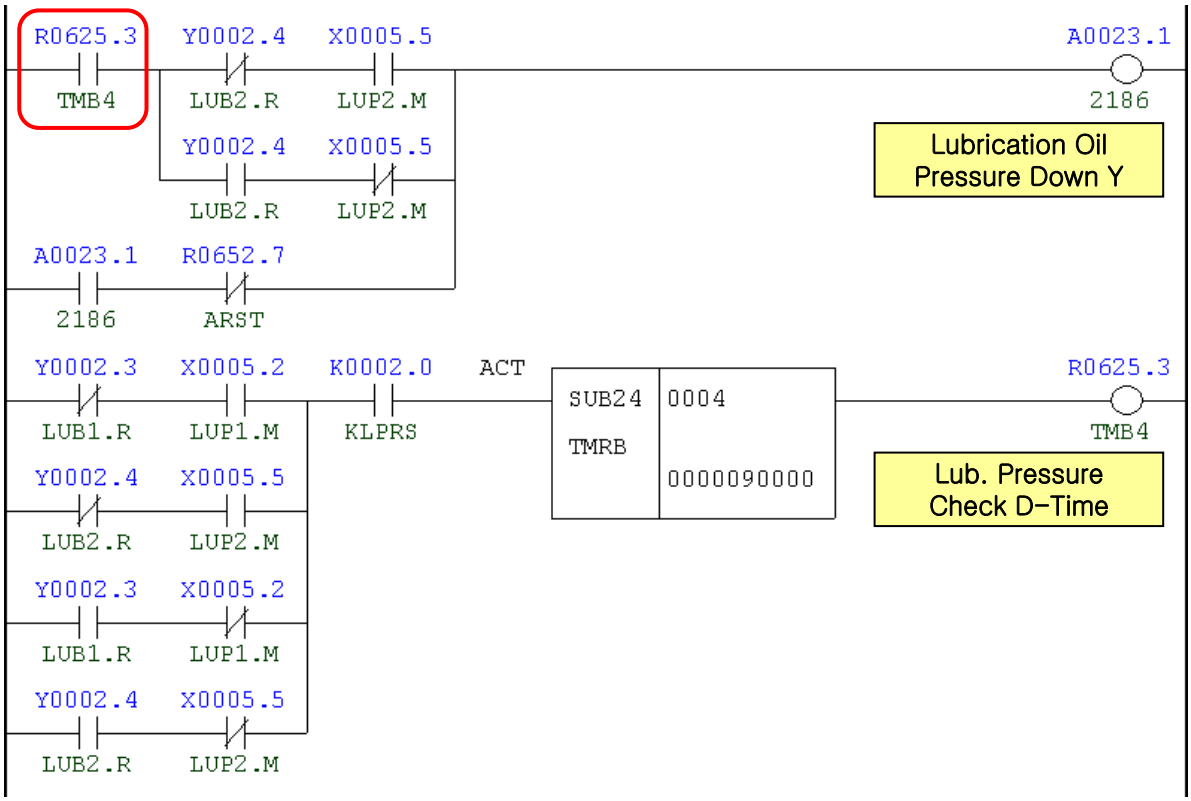
① Check the lubricant supply line (lubricant hose, lubricant pipe, lubricant tube, etc) and make repair or replacement if necessary.

② If there is no particular problem with the lubricant supply line but the lubricant is supplied intensively to a specific component, this is thought to be caused by a defective distributor valve. If this is the case, replace it with a new one.

③ Check the lubricant tank, connection line between tank and terminal block of the electric cabinet, and input module, and make repair or replacement if you encounter a problem.

Signal	Address	Device Symbol	I/O	Connector (Pin)	Numbering
X-Axis Lub. Pressure Check	**X5.2** LUP1.M	-SP51	Input Module : Slot 06	XJ412 (20)	SPL1
Y,W-Axis Lub. Pressure Check	**X5.5** LUP2.M	-SP51	Input Module : Slot 06	XJ412 (34)	SPL2
Lub. Pump Motor for X-Axis	**Y2.3** LUB1.R	-KA51	Output Module : Slot 2	(5)	KA51
Lub. Pump Motor for Y,W-Axis	**Y2.4** LUB2.R	-KA52	Output Module : Slot 2	(8)	KA52





Address	Symbol	Coil Comment
R625.3	**TMB4**	**Lub. Pressure Check D-Time**
Y2.3	LUB1.R	Lub. Pump Motor for X-Axis
X5.2	LUP1.M	X-Axis Lub. Pressure Check
A20.0	2161	Lubrication Oil Pressure Down
R652.7	ARST	Alarm Reset
Y2.4	LUB2.R	Lub. Pump Motor for Y,W-Axis
X5.5	LUP2.M	Y,W-Axis Lub. Pressure Check
K2.0	KLPRS	Lub. Unit Pressure Check Used

4. Massage Alarm

4.1 2193 Safety Switch Unlocked

1) Description

The release key of the splash guard's door-close check safety switch is opened.

2) Cause of problem

① The release key of the safety switch is tripped.

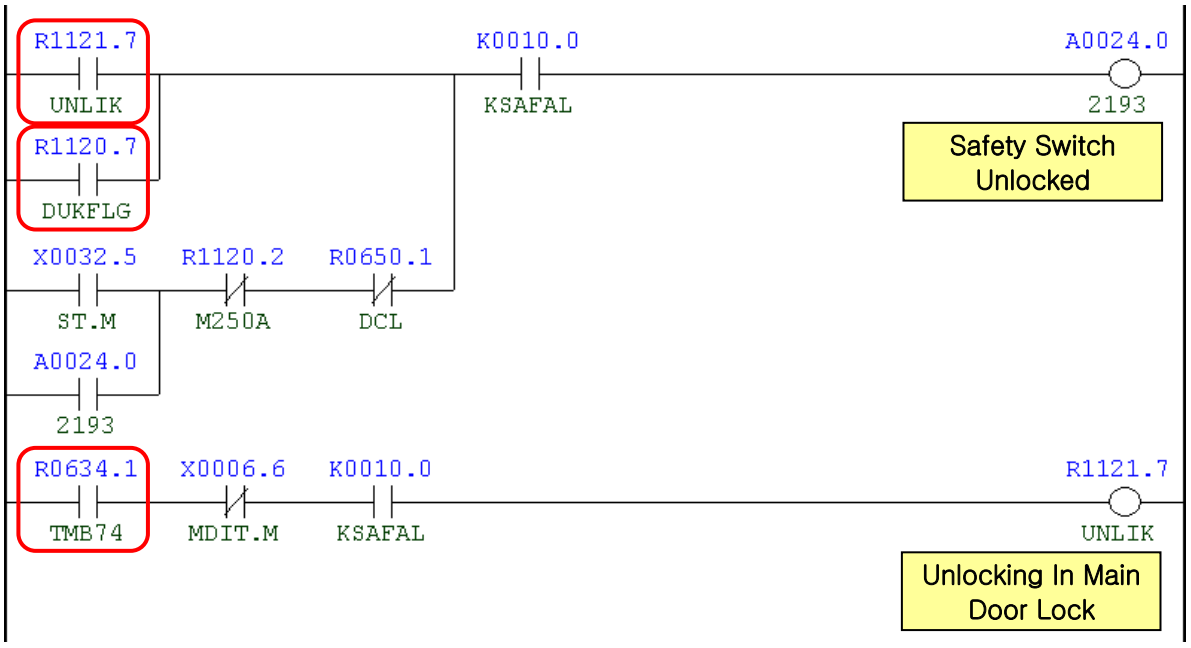
② The safety switch has an error or the wiring has a problem.

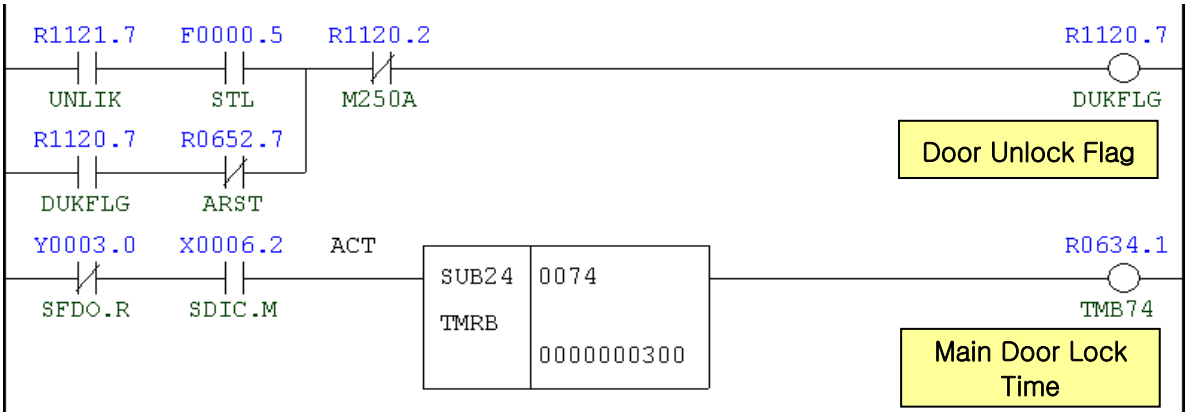
3) Action

① Turn the release key of the safety switch to set it off.

② Check the operator's side safety switch as well as the wiring, and repair or replace a defective one if necessary.

Signal	Address	Device Symbol	I/O	Connector (Pin)	Numbering
Splash Guard Door Interlock	**X6.2** SDIC.M	-SS61	Input Module : Slot 07	XJ413 (48)	SS61B
Main Unlock By Key Switch	**X6.6** MDIT.M	-SS61	Input Module : Slot 07	XJ413 (06)	SS61
Side Door Open Condition	**Y3.0** SFDO.M	-KA37	Output Module : Slot 7	(12)	KA37





Address	Symbol	Coil Comment
R1121.7	**UNLIK**	**Unlocking in Main Door Lock**
R1120.7	**DUKFLG**	**Door Unlock Flag**
X32.5	ST.M	Cycle Start
A24.0	2193	Safety Switch Unlocked
R1120.2	M250A	Door Interlock Bypass On Aux.
R650.1	DCL	Operator Door Close Confirm
K10.0	KSAFAL	Safety Switch Used At Main
R634.1	TMB74	Main Door Lock Timer
X6.6	MDIT.M	Main Unlock By Key Switch
F0.5	STL	Cycle Start
R652.7	ARST	Alarm Reset
Y3.0	SFDO.R	Side Door Open Condition
X6.2	SDIC.M	Splash Guard Door Interlock

4.2 2195 OP- Door Close, Must Be D-Open

1) Description

The spindle tool unclamp foot switch was pressed without opening the door in the operator side.

2) Cause of problem

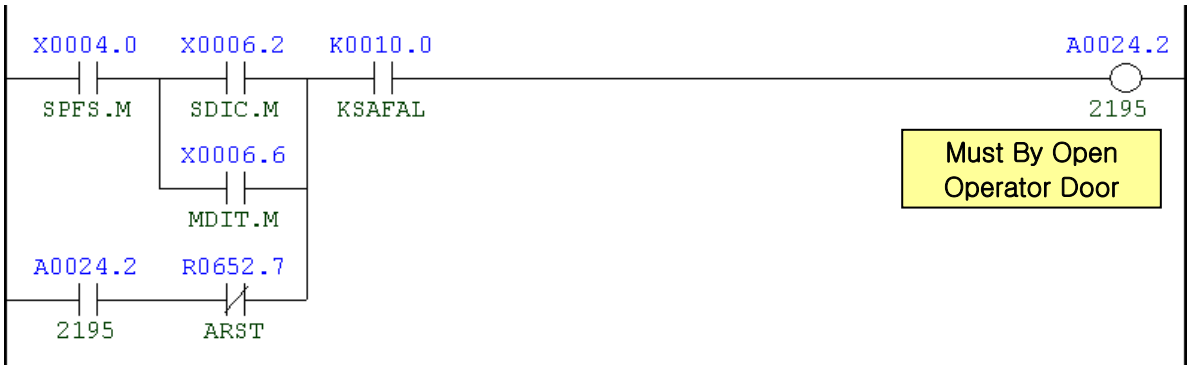
The door in the operator side had not been open before the spindle tool unclamp operation was performed.

3) Action

① Be sure to open the door in the operator side before using the tool unclamp foot switch.

② Check the operator's side safety switch as well as the wiring, and repair or replace a defective one if necessary.

Signal	Address	Device Symbol	I/O	Connector (Pin)	Numbering
Spindle Tool Cl/Uncl Foot SW	**X4.0** SPFS.M	-SF19	Input Module : Slot 06	XJ412 (7)	SF19
Splash Guard Door Interlock	**X6.2** SDIC.M	-SS61	Input Module : Slot 07	XJ413 (48)	SS61B
Main Unlock By Key Switch	**X6.6** MDIT.M	-SS61	Input Module : Slot 07	XJ413 (06)	SS61



Address	Symbol	Coil Comment
X4.0	SPFS.M	Spindle Tool Clamp/Unclamp Foot SW
X6.2	SDIC.M	Splash Guard Door Interlock
X6.6	MDIT.M	Main Unlock By Key Switch
R648.6	M250A	Door Interlock Bypass On Aux.

Address	Symbol	Coil Comment
A24.2	2195	Must Be Door Oprator Door
R652.7	ARST	Alarm Reset
K10.0	KSAFAL	Safety Switch Used At Main

4.3 2196 Coil Conveyor Overload Alarm

1) Description

An error occurred in the coil conveyor.

2) Cause of problem

An over-current in the coil conveyor motor (The chip is stuck in the chip conveyor)

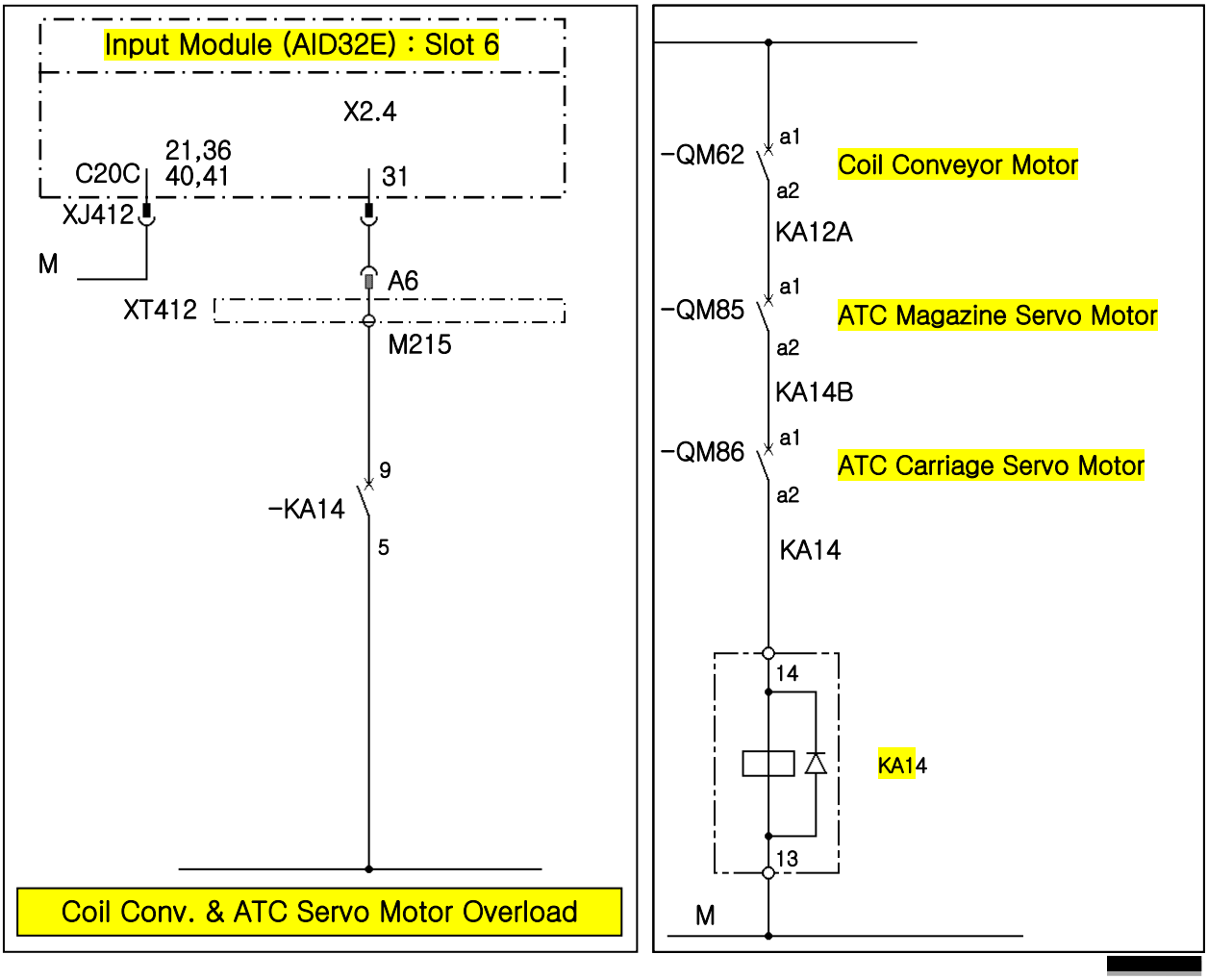
3) Action

Solve the mechanical problem and ensure that -QM62 or - QM85/86 is cut off. Check the 3-phase main wiring, the magnet (-KM62), and the insulation state of the motor, and make repair or replacement if necessary. (If –QM85/86 is cut off, check the ATC servo side.)

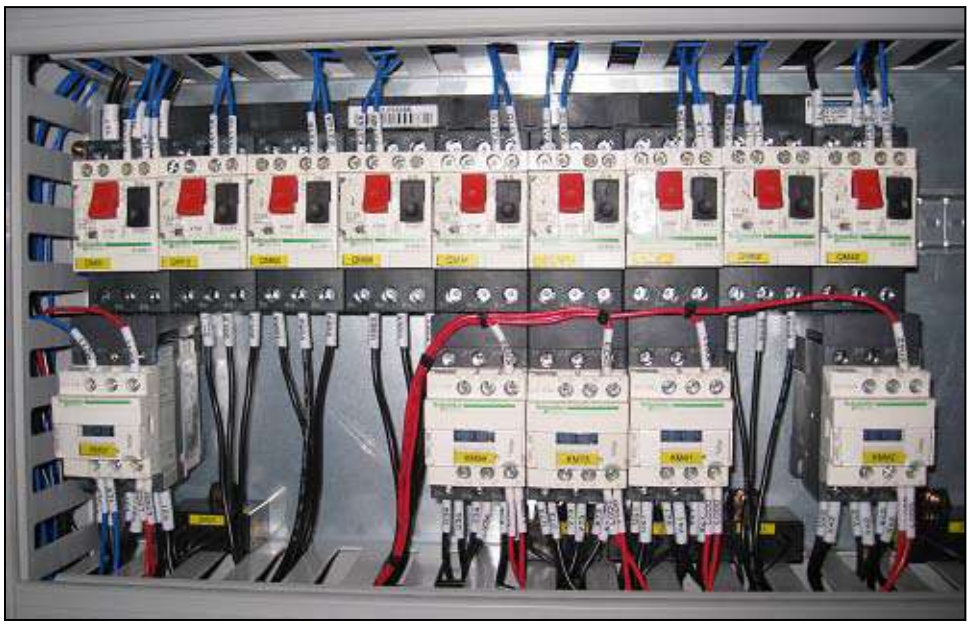
☞ Overload settings

QM62 : 2.8 A, QM85 : 10.1A, QM86 : 101A

Signal	Address	Device Symbol	I/O	Connector (Pin)	Numbering
Screw Conveyor Overload	**X2.4** CVOL.M	-KA14	Input Module : Slot 06	XJ412 (31)	M215



Address	Symbol	Coil Comment
X2.4	CVOL.M	Coil Conveyor Overload
K9.3	KCHIP	Coil Conveyor Used
A24.3	2196	Coil Conveyor Overload Alarm
R652.7	ARST	Alarm Reset



4.4 2197 Chip Conveyor Alarm

1) Description

An error occurred in the chip conveyor.

2) Cause of problem

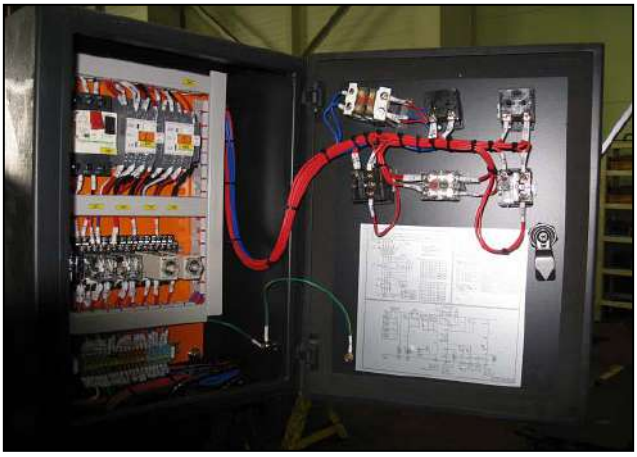
An alarm occurred due to an error in the chip conveyor

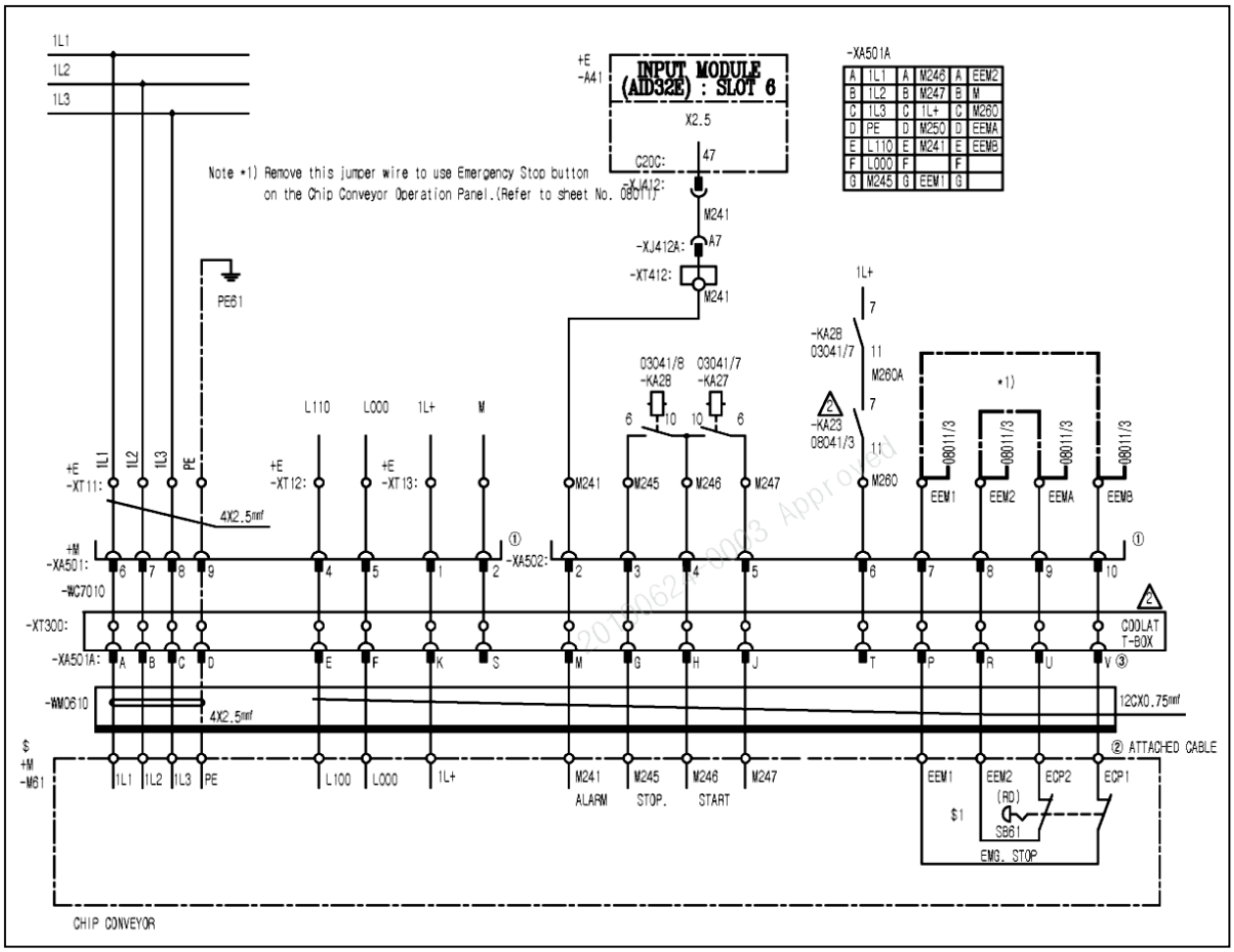
3) Action

Refer to the user manual of the chip conveyor and take a necessary measure.

Signal	Address	Device Symbol	I/O	Connector (Pin)	Numbering
Chip Conveyor Fault	**X2.5** CCFT.M	-M241	Input Module : Slot 06	XJ412 (47)	M241

Address	Symbol	Coil Comment
X2.5	CCFT.M	Chip Conveyor Fault
K9.1	KCHIP	Chip Conveyor Used
A24.4	2197	Chip Conveyor Alarm
R652.7	ARST	Alarm Reset




INPUT MODULE (AID32E) : SLOT 6
Note *1) Remove this jumper wire to use Emergency Stop button on the Chip Conveyor Operation Panel.(Refer to sheet No. 08011)
-XA501A
1L1
1L2
1L3
PE61
4X2.5㎟
12CX0.75㎟
COOLAT T-BOX
② ATTACHED CABLE
ECP1
ECP2
EEM1
EEM2
EEMA
EEMB
M241 ALARM
M245 STOP.
M246 START
M247
EMG. STOP
S861
CHIP CONVEYOR

4.5 2198 Auto Power Off Ready

1) Description

The switch for Auto Power Off is turned on.

2) Cause of problem

The switch for Auto Power Off in the main OP is turned on.

3) Action

To turn it off, press the Auto Power Off switch again.

☞ The Auto Power Off function will turn off NC 2 seconds after the switch is turned on and the function is set to "M30;". Then, the main NFB is tripped according to the TM1 timer settings. (Max: 5 seconds)

Signal	Address	Device Symbol	I/O	Connector (Pin)	Numbering
Auto Power Off Ready	**X40.3** APOF.M	-SB94	Distributed I/O Module (B)	XCE56B (B11)	HL94

Address	Symbol	Coil Comment
K36.3	APOFF	Auto Power Off
A24.5	2198	Auto Power Off Ready
X40.3	APOF.M	Auto Power Off
R13.3	APOF	Auto Power Off
Y38.6	APOF.L	Auto Power Off Lamp


AUXILIARY FUNCTION
COIL CONV. CW
WORK LIGHT
COIL CONV. CCW
Y-AXIS CLAMP
TABLE UNCLAMP
DOOR OPEN REQUEST
CHIP CONVEYOR
AUTO POWER OFF
AUTO POWER ON
W-AXIS UNCLAMP
TABLE UNLOCATE
ANGLE HEAD

4.6 2200 Warming Up Not Complete

1) Description

The spindle has not been used for more than 9 hours.

2) Cause of problem

The spindle has not been used for more than 9 hours.

3) Action

In MDI mode, instruct **"M102;"** (start spindle warming-up) to start warming up the spindle.

※ Spindle Warming Up

1) Relevant M code

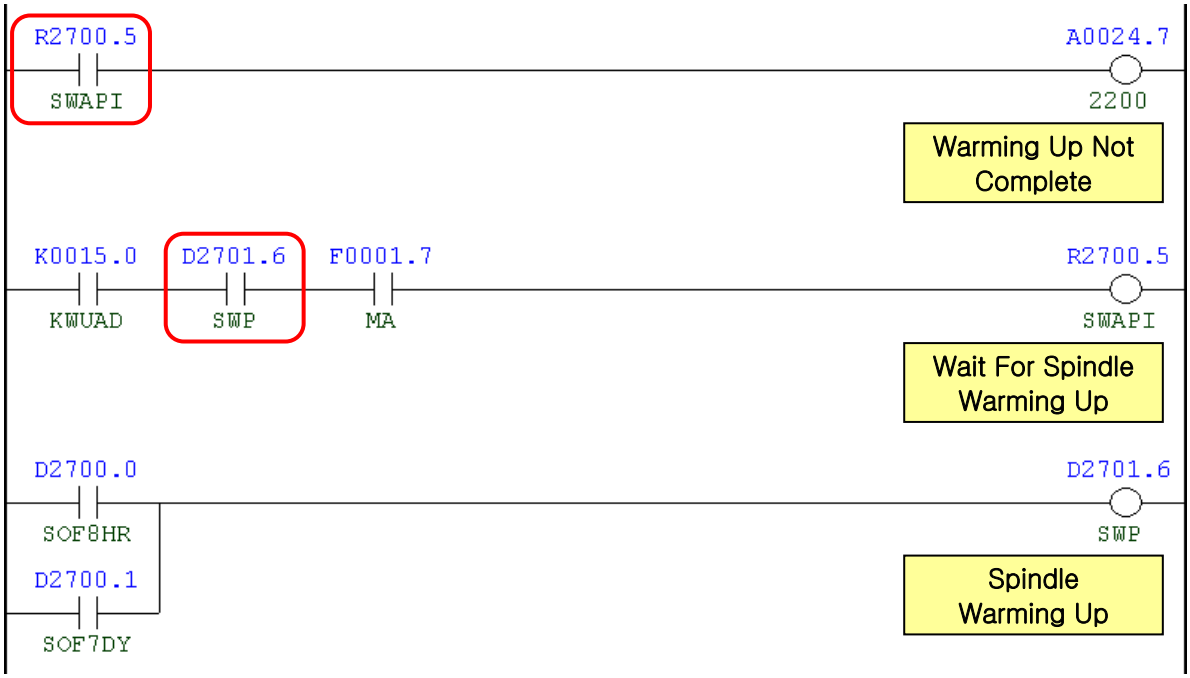
M102 : Start warming up

2) Steps of the spindle warming-up

① If the spindle has not been used for between more than 9 hours and less than 7 days:
Spindle Motor Max. rpm : 10% (4 min) ➔ 30% (3 min) ➔ 50% (3 min)

② If the spindle has not been used for more than 7 days:
Spindle Motor Max. rpm : 10% (10 min) ➔ 30% (10 min) ➔ 50% (10 min)

▪ The use of the spindle warming-up operation will be checked automatically, depending on the machine and spindle models.
(Regardless of the revolutions (rpm) of the machine, use of the warming-up unit will be determined according to the existence of the spindle of the oil-air lubrication unit.)



Address	Symbol	Coil Comment
R2000.5	**SWAPI**	**Wait for Spindle Warm Up**
A24.7	2200	Warming Up Not Complete
K15.0	KWUAD	Not Display WU Incompleted Alarm
D2701.6	SWP	Spindle Warm-Up
F1.7	MA	NC Ready
D2700.0	SOF8HR	Spindle Off 8 Hours
D2700.1	SOF7DY	Spindle Off 7 Days

4.7 2202 Machine Lock

1) Description

The Machine Lock Key switch in the main OP is turned on.

2) Cause of problem

① The Machine Lock switch in the main OP is set to All Axis or Z/W-Axis.

② An error in the Machine Lock switch, wiring cables or any of its component parts

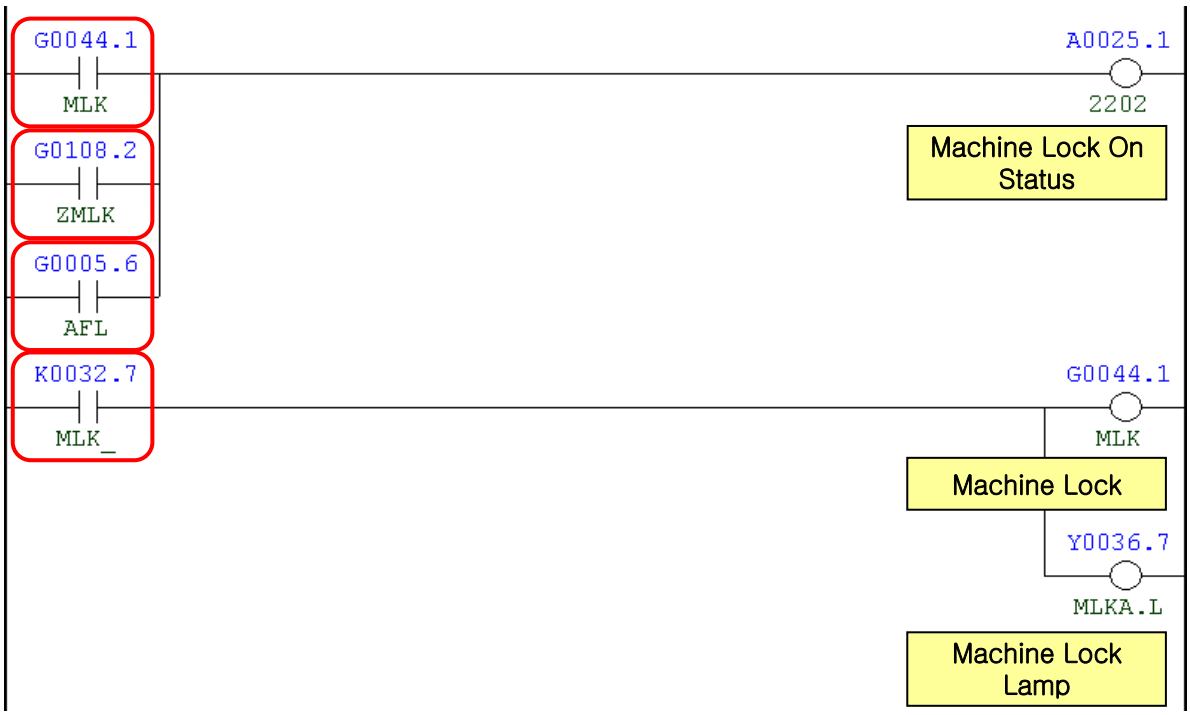
3) Action

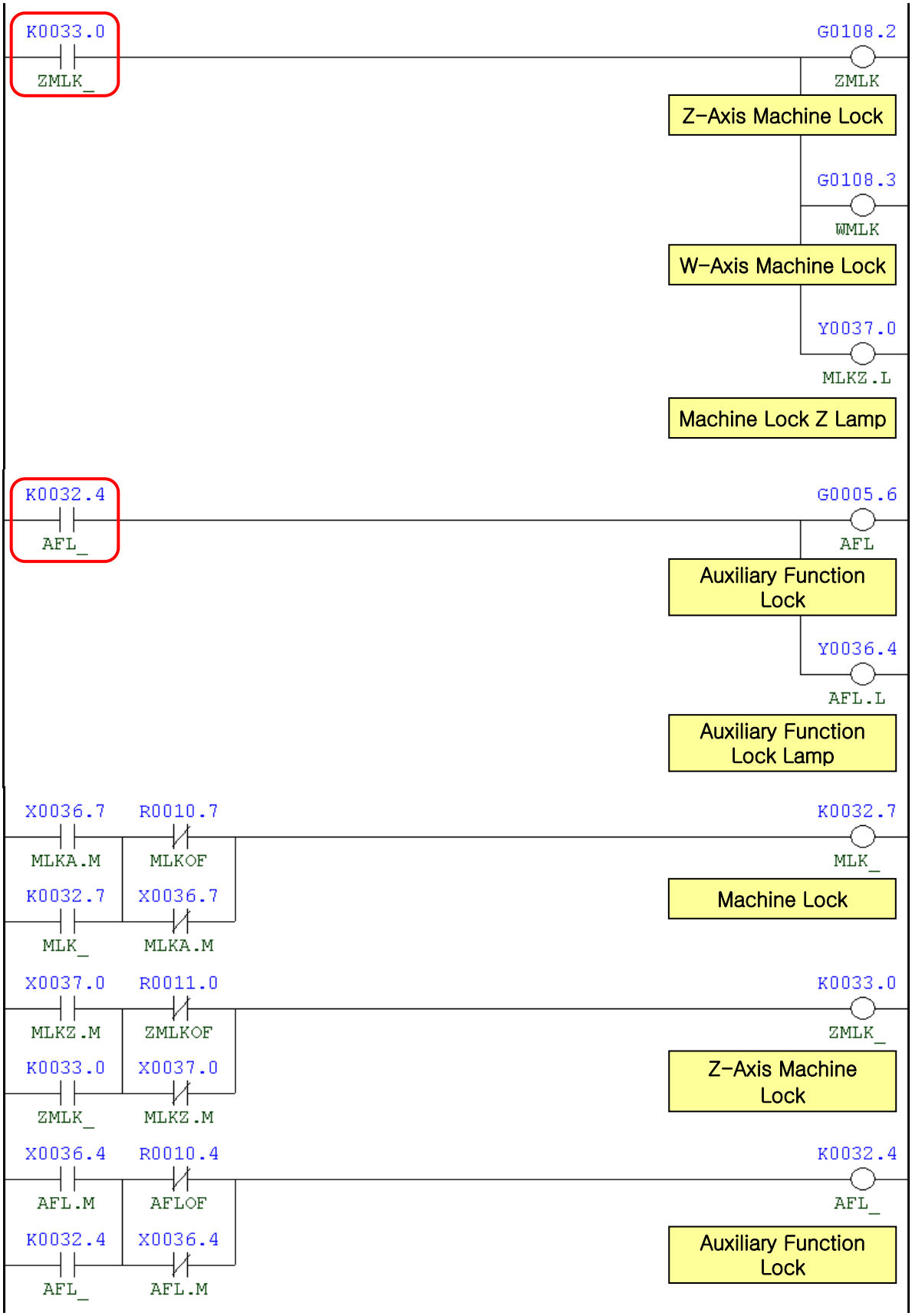
① Press the Machine Lock switch in the main OP to turn it off.

② Check the state of the followings: Machine Lock switch (-SB58), soldering inside the OP, connector (-XCE57A), and the state of pin fixation. And check also the wiring between OP and electric cabinet. Make repair or replacement if necessary.

☞ You must return all axes to their respective reference point after 2202 Machine Lock alarm is tripped.

Signal	Address	Device Symbol	I/O	Connector (Pin)	Numbering
Machine Lock	**X36.7** MLKA.M	-HL58	Distributed I/O Module (A)	XCE57A (B09)	SB58
Machine Lock Z, W-Axis	**X37.0** MLKZ.M	-HL61	Distributed I/O Module (A)	XCE57A (A10)	SB61
Auxiliary Function Lock	**X36.4** MLKZ.M	-HL55	Distributed I/O Module (A)	XCE57A (A08)	SB55




K0033.0
ZMLK_
G0108.2
ZMLK
Z-Axis Machine Lock
G0108.3
WMLK
W-Axis Machine Lock
Y0037.0
MLKZ.L
Machine Lock Z Lamp
K0032.4
AFL_
G0005.6
AFL
Auxiliary Function Lock
Y0036.4
AFL.L
Auxiliary Function Lock Lamp
X0036.7
MLKA.M
R0010.7
MLKOF
K0032.7
MLK_
X0036.7
MLKA.M
K0032.7
MLK_
Machine Lock
X0037.0
MLKZ.M
R0011.0
ZMLKOF
K0033.0
ZMLK_
X0037.0
MLKZ.M
K0033.0
ZMLK_
Z-Axis Machine Lock
X0036.4
AFL.M
R0010.4
AFLOF
K0032.4
AFL_
X0036.4
AFL.M
K0032.4
AFL_
Auxiliary Function Lock

Address	Symbol	Coil Comment
G44.1	MLK	Machine Lock
G108.2	ZMLK	Z-Axis Machine Lock
G5.6	AFL	Auxiliary Function Lock
A25.1	2202	Machine Lock On Satus
K32.7	MLK_	Machine Lock
Y36.7	MLKA.L	Machine Lock Lamp
K33.0	ZMLK_	Z-Axis Machine Lock
G108.3	WMLK	W-Axis Machine Lock
Y37.0	MLKZ.L	Machine Lock Z Lamp
K32.4	AFL_	Auxiliary Function Lock
Y36.4	AFL.L	Aux. Func. Lock Lamp
X36.7	MLKA.M	Machine Lock
R10.7	MLKOF	Machine Lock Off
X37.0	MLKZ.M	Machine Lock Z, W-Axis
R11.0	ZMLKOF	Z-Axis Machine Lock Off
X36.4	AFL.M	Auxiliary Function Lock
R10.4	AFLOF	Auxiliary Function Lock Off

4.8 2204 Feedrate Override 0%

1) Description

The Feedrate Override switch on the main OP is set to 0%.

2) Cause of problem

① The Feedrate Override switch on the main OP is set to 0%.

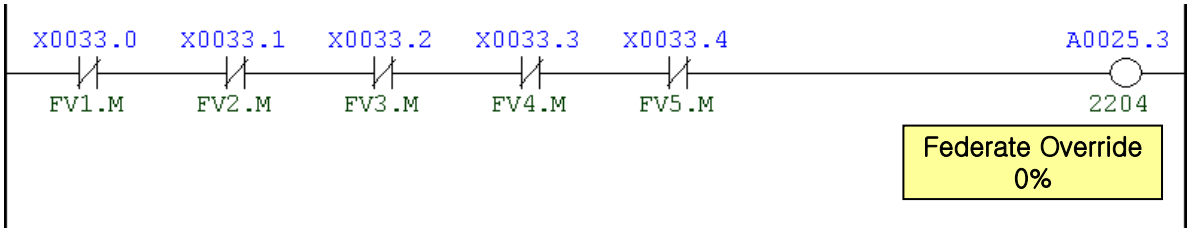
② An error in the Feedrate Override switch on the main OP, wiring cables or any of its component parts

3) Action

① Change the Feedrate Override switch on the main OP to other than 0%.

② Check the state of the followings: Feedrate Override switch (-SR21), soldering inside the OP and the connector (-XCE56A). Make repair or replacement if necessary.

Signal	Address	Device Symbol	I/O	Connector (Pin)	Numbering
Feedrate Override 1	**X33.0** FV1.M	-SR21	Distributed I/O Module (A)	XCE56A (A06)	SR21A
Feedrate Override 2	**X33.1** FV2.M	-SR21	Distributed I/O Module (A)	XCE56A (B06)	SR21F
Feedrate Override 3	**X33.2** FV3.M	-SR21	Distributed I/O Module (A)	XCE56A (A07)	SR21B
Feedrate Override 4	**X33.3** FV4.M	-SR21	Distributed I/O Module (A)	XCE56A (B07)	SR21E
Feedrate Override 5	**X33.4** FV5.M	-SR21	Distributed I/O Module (A)	XCE56A (A08)	SR21C



Address	Symbol	Coil Comment
X33.0	FV1.M	Feedrate Override 1
X33.1	FV2.M	Feedrate Override 2
X33.2	FV3.M	Feedrate Override 3
X33.3	FV4.M	Feedrate Override 4
X33.4	FV5.M	Feedrate Override 5
A25.3	2204	Feedrate Override 0%

4.9 2205 Measurement Device Battery Low

1) Description

The measurement battery of the touch sensor in the interface unit has run out.

2) Cause of problem

① The measurement battery of the touch sensor in the interface unit has run out.

② An error in the battery case, wiring cables or any of its component parts

3) Action

① Replace the battery of the measurement device with a new one.

② Check the battery case, wiring cables and connector (-XJ412) in this sequence. Make repair or replacement if necessary.

Signal	Address	Device Symbol	I/O	Connector (Pin)	Numbering
Low Battery Signal	**X4.6** LBAT.M	-BAT	Input I/O Module : Slot 6	XJ412 (22)	BAT

Address	Symbol	Coil Comment
X4.6	LBAT.M	Low Battery Signal
A25.4	2205	Measurement Device Battery Low
R652.7	ARST	Alarm Reset

4.10 2206 Measurement Device Alarm

1) Description

An error is detected from the interface unit of the measuring touch sensor.

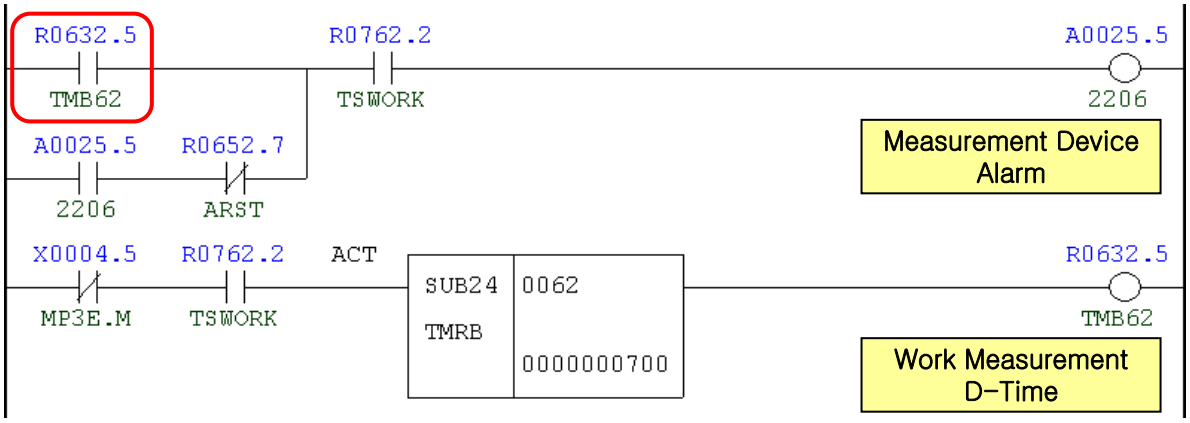
2) Cause of problem

An error in the measuring touch probe, interface unit, wiring cables or any of its component parts.

3) Action

Check the measuring touch probe, interface unit, wiring cables and connector (-XJ412) in this sequence. Make repair or replacement if necessary.

Signal	Address	Device Symbol	I/O	Connector (Pin)	Numbering
Work Probe Device Error	**X4.5** (MP3E.M)	-ERR	Input I/O Module : Slot 6	XJ412 (38)	ERR



Address	Symbol	Coil Comment
R632.5	**TMB62**	**Work Measurment D-Time**
A25.5	2206	Measurrement Device Alarm
R652.7	ARST	Alarm Reset
X4.5	MP3E.M	Work Probe Device Error
R762.2	TSWORK	Work Measure Sensor On

4.11 2207 Machine Interference Zone Error

1) Description

The machine has entered the machine interference zone. (To prevent possible conflicts between axes)

2) Cause of problem

① The machine has entered the machine interference zone.

② An error in the machine interference zone settings

3) Action

① Rotate the problem-making axis reversely in Handle or Jog mode to remove it.

② Check the values of D860～D868 in the PMC G data array, and correct them as appropriate.

4) Data of the data table---0003/0011(machine interference zone)

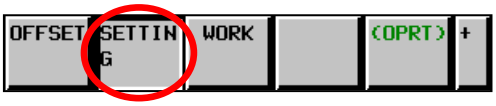
ADDRESS	NO	DATA				MEANING	REMARK
		DBC110	DBC130	DBC250			
D0860	0000					X axis interference zone	
D0864	0001	200000	220000	220000		Y axis interference zone	
			130000			Y axis interference zone	
D0868	0002	160000	170000	170000		Z axis interference zone(TABLE SIZE : 1600mm)	
		270000	270000	270000		Z axis interference zone(TABLE SIZE : 1800mm)	
		370000	370000	370000		Z axis interference zone(TABLE SIZE : 2000mm)	
			450000			Z axis interference zone(TABLE SIZE : 2300mm)	
D0872	0003					B axis interference zone	
D0876	0004					W axis interference zone	

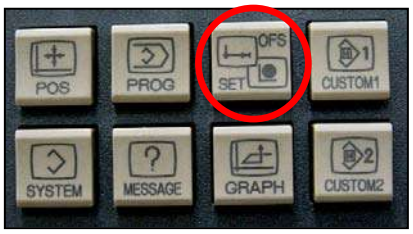
(Note) How to correct PMC data

(1) Set the mode switch in the main OP to "MDI".

(2) Press the “OFS/SET” key in the right side of the main OP monitor.

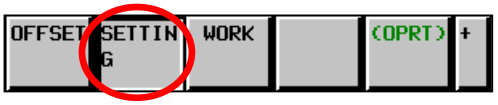
▪ The following soft key bar will be displayed at the bottom.

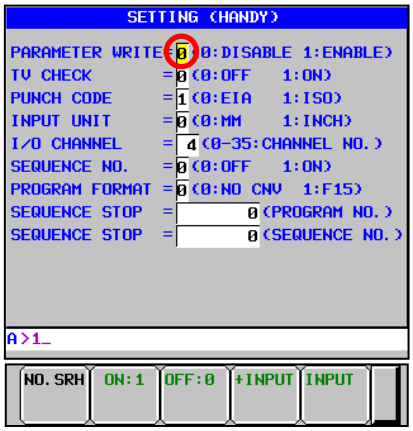




(3) Press the [SETTING] button.

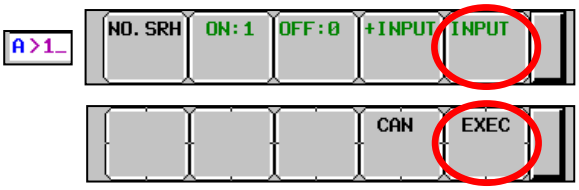
▪ The Setting screen appears where the cursor is positioned at the “PARAMETER WRITE” item on the top.

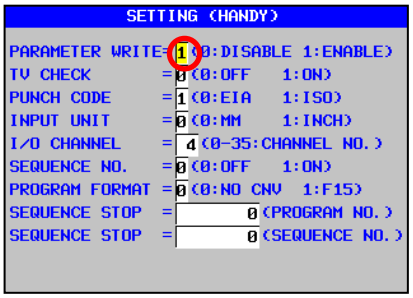




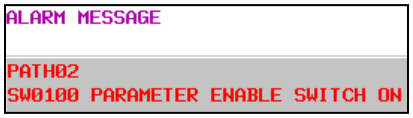
※ If the screen is not displayed as shown in the right picture, move to the first page of the Setting Parameter menu (“0” ➔ “NO.SRH”) and press the Page Up button three times. Then, you will see the right screen properly.

(4) Enter the number of 1, and keep pressing the INPUT and EXEC keys.

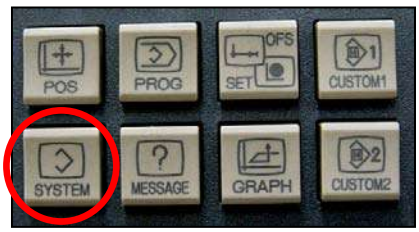




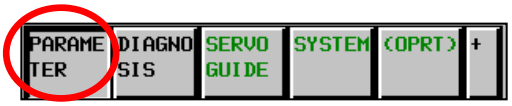
★ **The “SW0100 Parameter Enable Switch ON” alarm occurs.**



(5) Press the “SYSTEM” button in the right side of the main OP monitor.



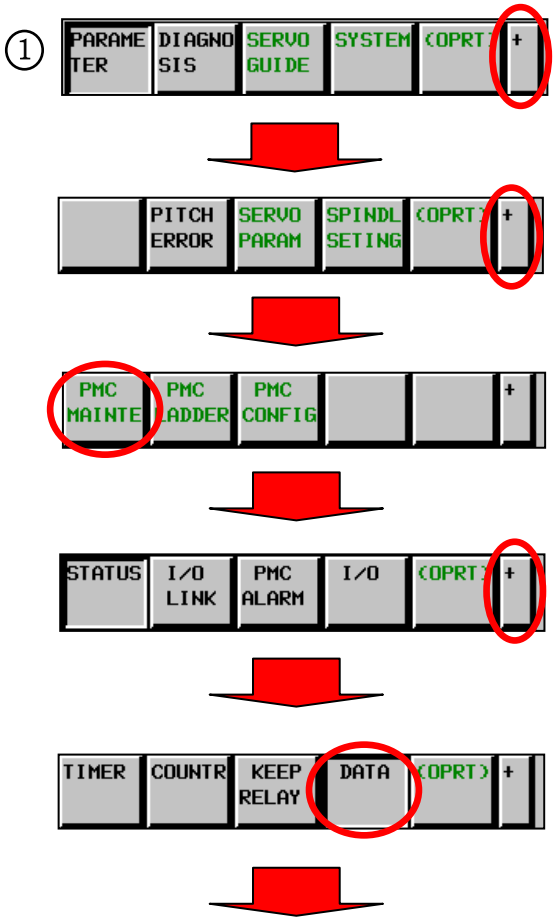
▪ The following soft key bar will be displayed at the bottom.

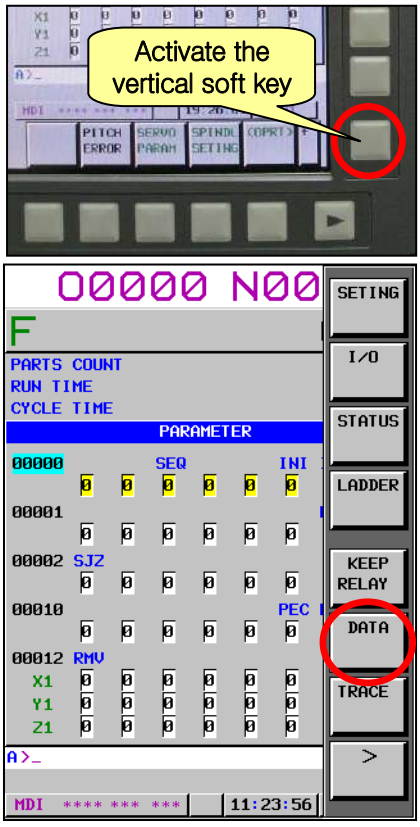


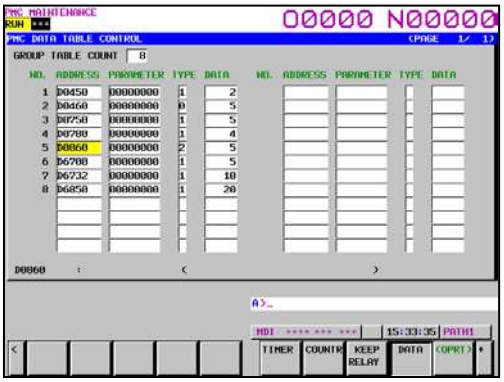
(6) Locate the Data screen.

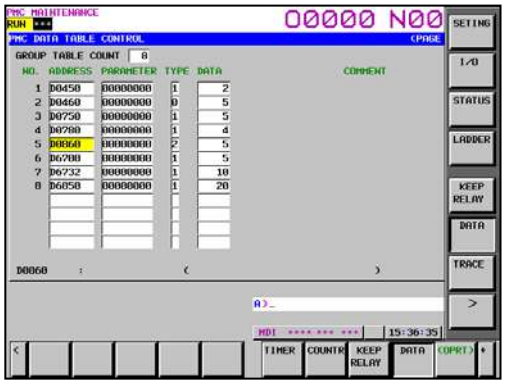
① Press the soft keys one after another to move to the Keep Relay screen.

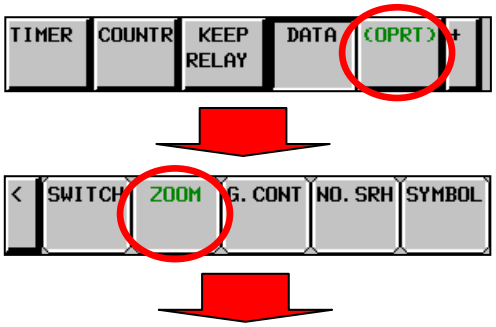
② Press to activate the vertical soft key in the lower right corner and press the [KEEP RELAY] key.

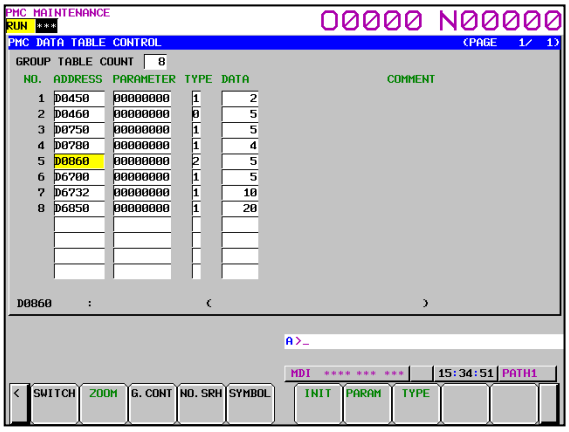


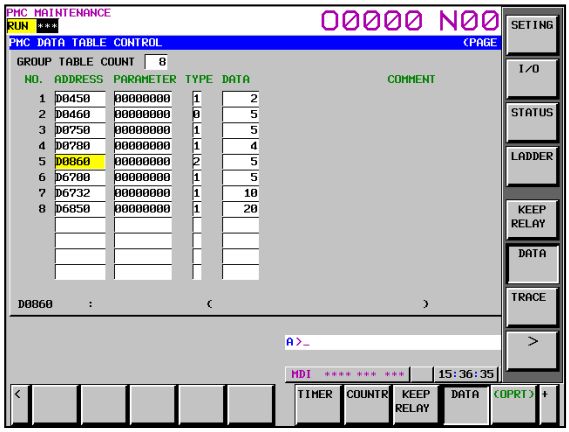




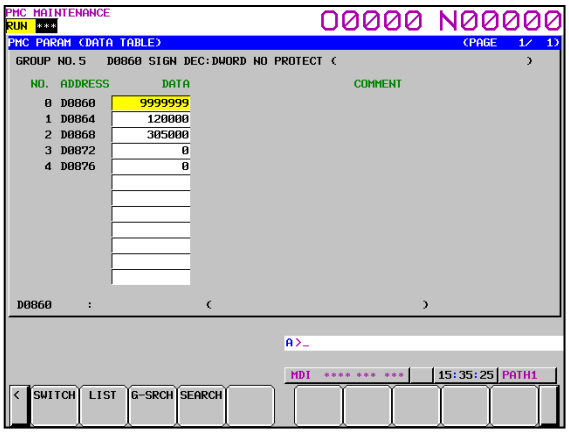




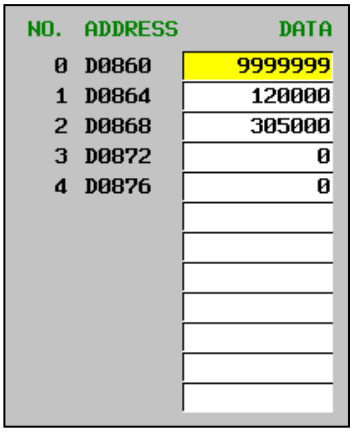




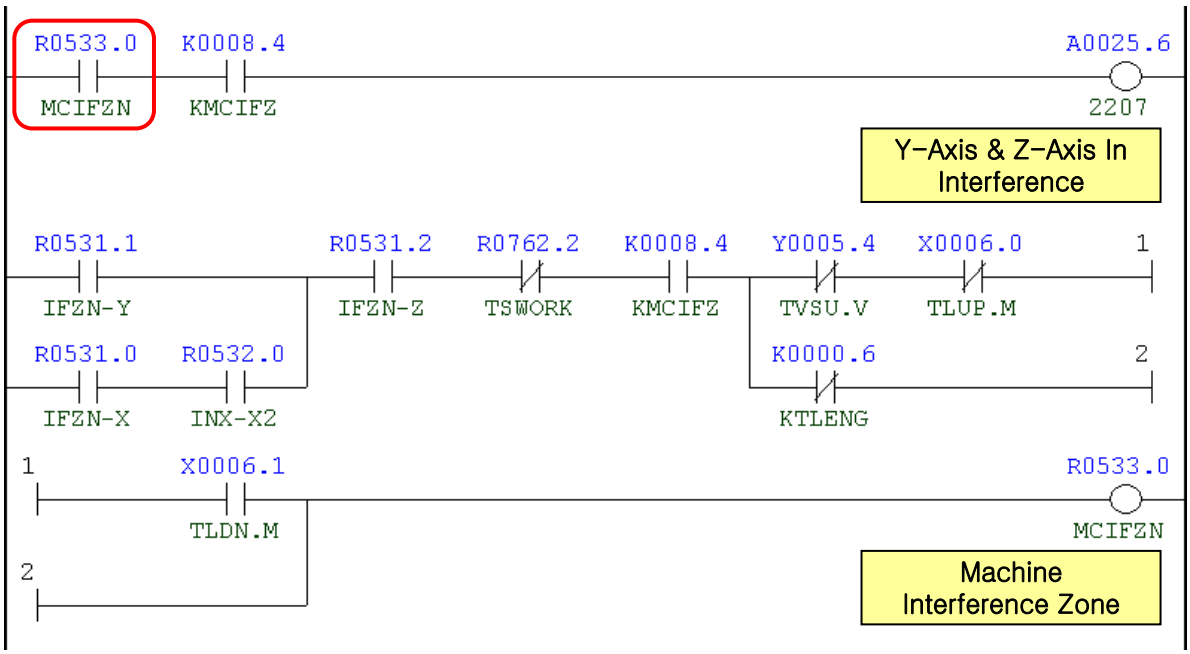
(7) Keep pressing the Page Down button until you see the Group No.5 (D860-D876) of the data table.



(8) Move the cursor to a desired item and enter a value. Then, press INPUT.



(9) When done, move back to **SETTING** and turn off **PARAMETER WRITE**(1 => 0). Then, press the **RESET** key to release the alarm.



Address	Symbol	Coil Comment
R533.0	MCIFZN	Machine In Interference Zone
K8.4	KMCIFZ	M/C Interference Zone Check Used
A25.6	2207	Y-Axis & Z-Axis In Interference
R531.1	IFZN-Y	Y-Axis Interebce Zone 1
R531.0	IFZN-X	X-Axis Interebce Zone 1
R532.0	INX-X2	X-Axis Interebce Zone 2
R531.2	IFZN-Z	Z-Axis Interebce Zone 1
R762.2	TSWORK	Work Messure Sensor On
K8.4	KMCIFZ	M/C Inter. Zone Check Used
Y5.4	TVSU.V	Tool Length Sensor Up
X6.0	TLUP.M	Tool Length Sensor Up
X6.1	TLDN.M	Tool Length Sensor Down
K0.6	KTLENG	Moving Type Tool Meas. Is Used

4.12 2208 Machine In Service Mode

1) Description

For the repairing purpose, the machine is in the state of Operator Door Interlock Bypass.

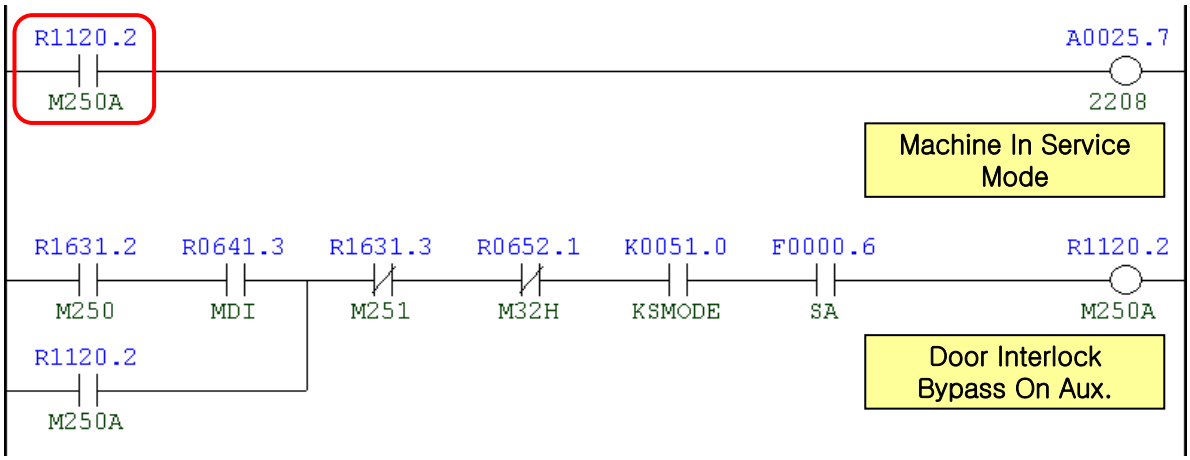
2) Cause of problem

To open the operator door for the repairing reason, the Door Interlock Bypass command (M250) is instructed in MDI mode.

3) Action

① In MDI mode, instruct M251.

② Press the NC Reset button on the main OP.



Address	Symbol	Coil Comment
R1120.2	**M250A**	**Door Interlock Bypass On Aux.**
A25.7	2208	Machine In Service Mode
R1631.2	M250	Machine Service Mode On
R641.3	MDI	MDI Mode
R1631.3	M251	Machine Service Mode Off
R652.1	M32H	M02/M30 Hold
K51.0	KSMODE	Keep Machine Service Mode
F0.6	SA	Servo Ready

4.13 2215 Tool Length Sensor Up/Down Alarm

1) Description

The operation of Tool Length Sensor Up or Down is not complete within 10 seconds after it was instructed, or both operations are turned on.

2) Cause of problem

① An error in adjusting the position sensor switch

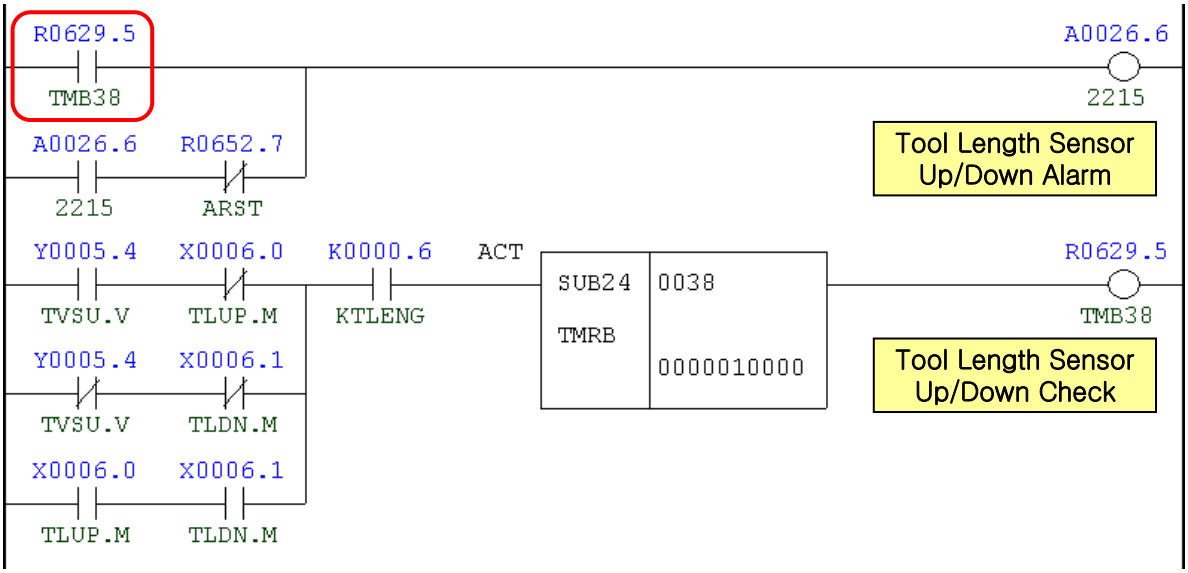
② An error in the Tool Length Sensor Up/Down switch, the wiring, or any of its component parts

3) Action

① Turn the Tool Length Sensor switch up or down while adjusting the position sensor switch.

② Check the Tool Length Sensor Up/Down switch, the connector (-XJ413) and the attachment of the pin, the wiring through to the electric cabinet, and the input module (AID32E). Make repair or replacement if necessary.

Signal	Address	Device Symbol	I/O	Connector (Pin)	Numbering
Tool Measure Sensor Up	**X6.0** TLUP.M	-SD61	Input Module : Slot 7	XJ413 (16)	SD61
Tool Measure Sensor Down	**X6.1** TLDN.M	-SD62	Input Module : Slot 7	XJ413 (32)	SD62
Tool Measure Sensor Up	**Y5.4** TVSU.V	-KAR54	Output Module : Slot3	XJ400 (27)	YV67



Address	Symbol	Coil Comment
R629.5	**TMB38**	**Tool Length Sensor Up/Down Check**
A26.6	2215	Tool Length Sensor Up/Down Alarm
R652.7	ARST	Alarm Reset
Y5.4	TVSU.V	Tool Measure Sensor Up
X6.0	TLUP.M	Tool Measure Sensor Up
X6.1	TLDN.M	Tool Measure Sensor Down
K0.6	KTLENG	Moving Type Tool Meas. is Used

4.14 2216 Must Be Return to Ref. Point X

1) Description

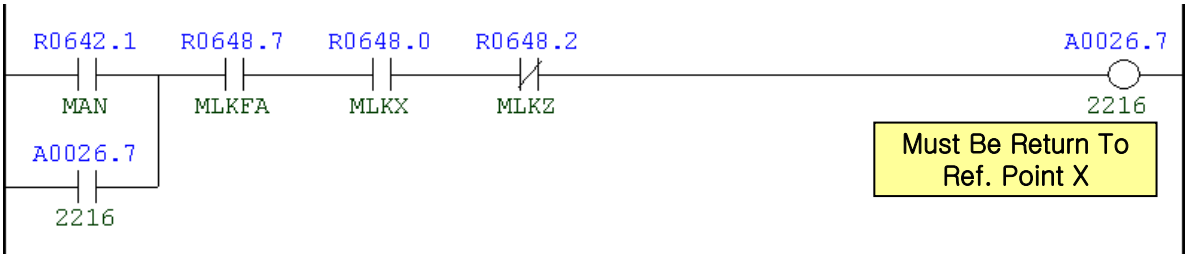
The X axis is moved in the state of Machine Lock. (not a product failure)

2) Cause of problem

The X axis is moved in the state of Machine Lock.

3) Action

Return the X axis to the reference point manually.



Address	Symbol	Coil Comment
R642.1	MAN	Manual Mode
A26.7	2216	Must Be Return To Ref. Point X
R648.7	MLKFA	Machine Lock On Flag X, Y, Z, W
R648.0	MLKX	Machine Lock X-Axis
R648.2	MLKZ	Machine Lock Z-Axis

4.15 2217 Must Be Return to Ref. Point Y

1) Description

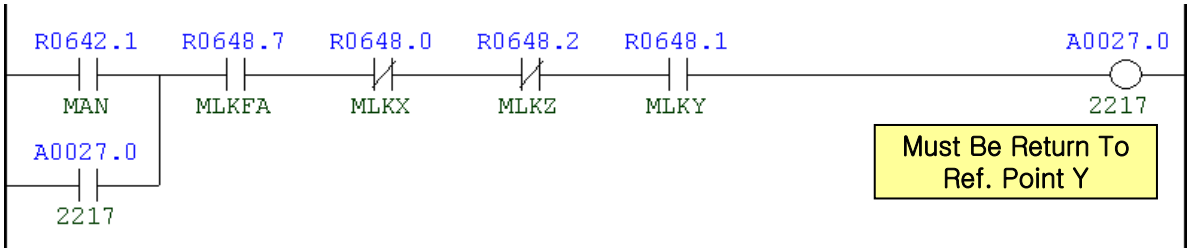
The Y axis is moved in the state of Machine Lock. (not a product failure)

2) Cause of problem

The Y axis is moved in the state of Machine Lock.

3) Action

Return the Y axis to the reference point manually.



Address	Symbol	Coil Comment
R642.1	MAN	Manual Mode
A27.0	2217	Must Be Return To Ref. Point Y
R648.7	MLKFA	Machine Lock On Flag X, Y, Z, W
R648.0	MLKX	Machine Lock X-Axis
R648.2	MLKZ	Machine Lock Z-Axis
R648.1	MLKY	Machine Lock Y-Axis

4.16 2218 Must Be Return to Ref. Point Z

1) Description

The Z axis is moved in the state of Machine Lock. (not a product failure)

2) Cause of problem

The Z axis is moved in the state of Machine Lock.

3) Action

Return the Z axis to the reference point manually.

Address	Symbol	Coil Comment
R642.1	MAN	Manual Mode
A27.1	2218	Must Be Return To Ref. Point Z
R648.7	MLKFA	Machine Lock On Flag X, Y, Z, W
R648.2	MLKZ	Machine Lock Z-Axis

4.17 2219 Must Be Return to Ref. Point W

1) Description

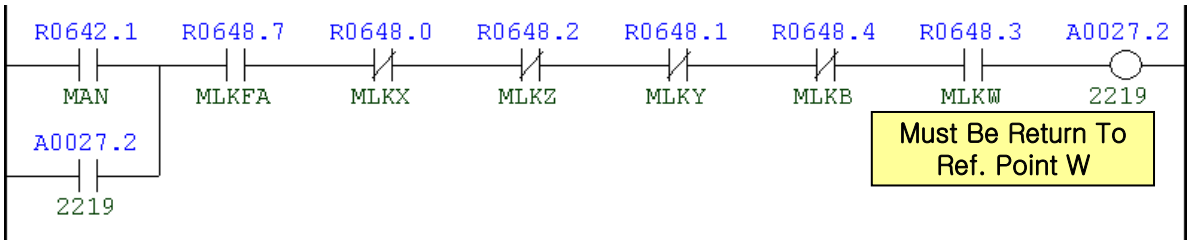
The W axis is moved in the state of Machine Lock. (not a product failure)

2) Cause of problem

The W axis is moved in the state of Machine Lock.

3) Action

Return the W axis to the reference point manually.



Address	Symbol	Coil Comment
R642.1	MAN	Manual Mode
A27.2	2219	Must Be Return To Ref. Point W
R648.7	MLKFA	Machine Lock On Flag X, Y, Z, W
R648.0	MLKX	Machine Lock X-Axis
R648.2	MLKZ	Machine Lock Z-Axis
R648.1	MLKY	Machine Lock Y-Axis
R648.4	MLKB	Machine Lock B-Axis
R648.3	MLKW	Machine Lock W-Axis

4.18 2220 Must Be Return to Ref. Point B

1) Description

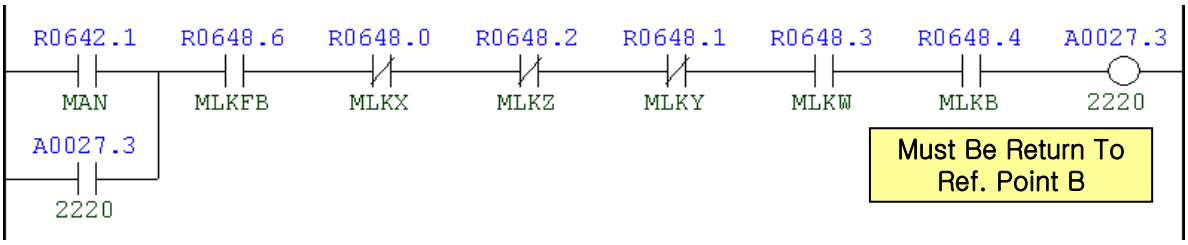
The B axis is moved in the state of Machine Lock. (not a product failure)

2) Cause of problem

The B axis is moved in the state of Machine Lock.

3) Action

Return the B axis to the reference point manually.



Address	Symbol	Coil Comment
R642.1	MAN	Manual Mode
A27.3	2220	Must Be Return To Ref. Point B
R648.6	MLKFB	Machine Lock On Flag B-Axis
R648.0	MLKX	Machine Lock X-Axis
R648.2	MLKZ	Machine Lock Z-Axis
R648.1	MLKY	Machine Lock Y-Axis
R648.4	MLKB	Machine Lock B-Axis
R648.3	MLKW	Machine Lock W-Axis

4.19 2221 Must Be Return to Ref. Point 6

1) Description

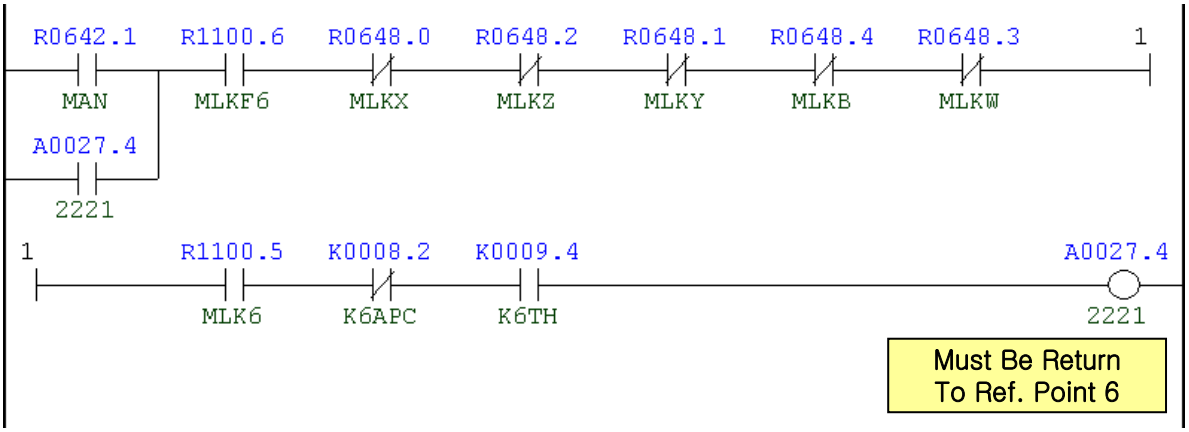
6 axes have moved in the state of Machine Lock. (not a product failure)

2) Cause of problem

6 axes have moved in the state of Machine Lock.

3) Action

Return 6 axes to their respective reference point manually.



Address	Symbol	Coil Comment
R642.1	MAN	Manual Mode
A27.4	2221	Must Be Return To Ref. Point 6
R1100.6	MLKF6	Machine Lock On Flag 6-Axis
R648.0	MLKX	Machine Lock X-Axis
R648.2	MLKZ	Machine Lock Z-Axis
R648.1	MLKY	Machine Lock Y-Axis
R648.4	MLKB	Machine Lock B-Axis
R648.3	MLKW	Machine Lock W-Axis
R1100.5	MLK6	Machine Lock 6-Axis
K8.2	K6APC	6-Axis Servo Motor ABS. Used
K9.4	K6TH	Keep 6th-axis Is Used

4.20 2223 Table (B-Axis) Locate/Unlocate

1) Description

① It has passed 20 seconds since the Table Locate/Unlocate position sensor switch was not conforming to the applicable instruction.

② One of the Table Locate 1(SL82) switch and the Table Locate 2(SL83) switch has turned off.

2) Cause of problem

① An error in adjusting the Table Locate/Unlocate position sensor switch

② An error in wiring or component parts

3) Action

① An error in adjusting the position sensor switch

In JOG mode, press the Table Locate/Unlocate push-button switch to check the status of YV82 solenoid and SL82/SL83 switch.

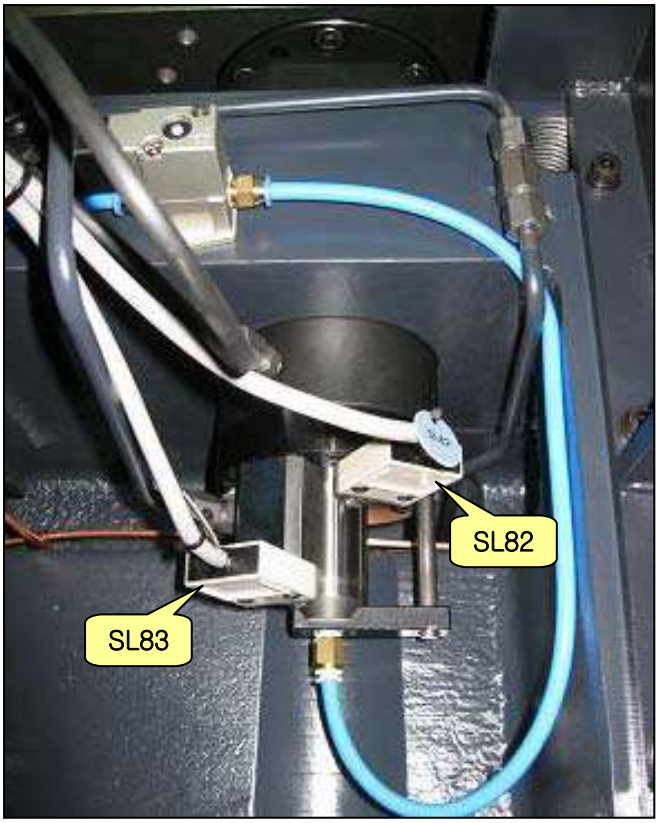
② An error in wiring or component parts

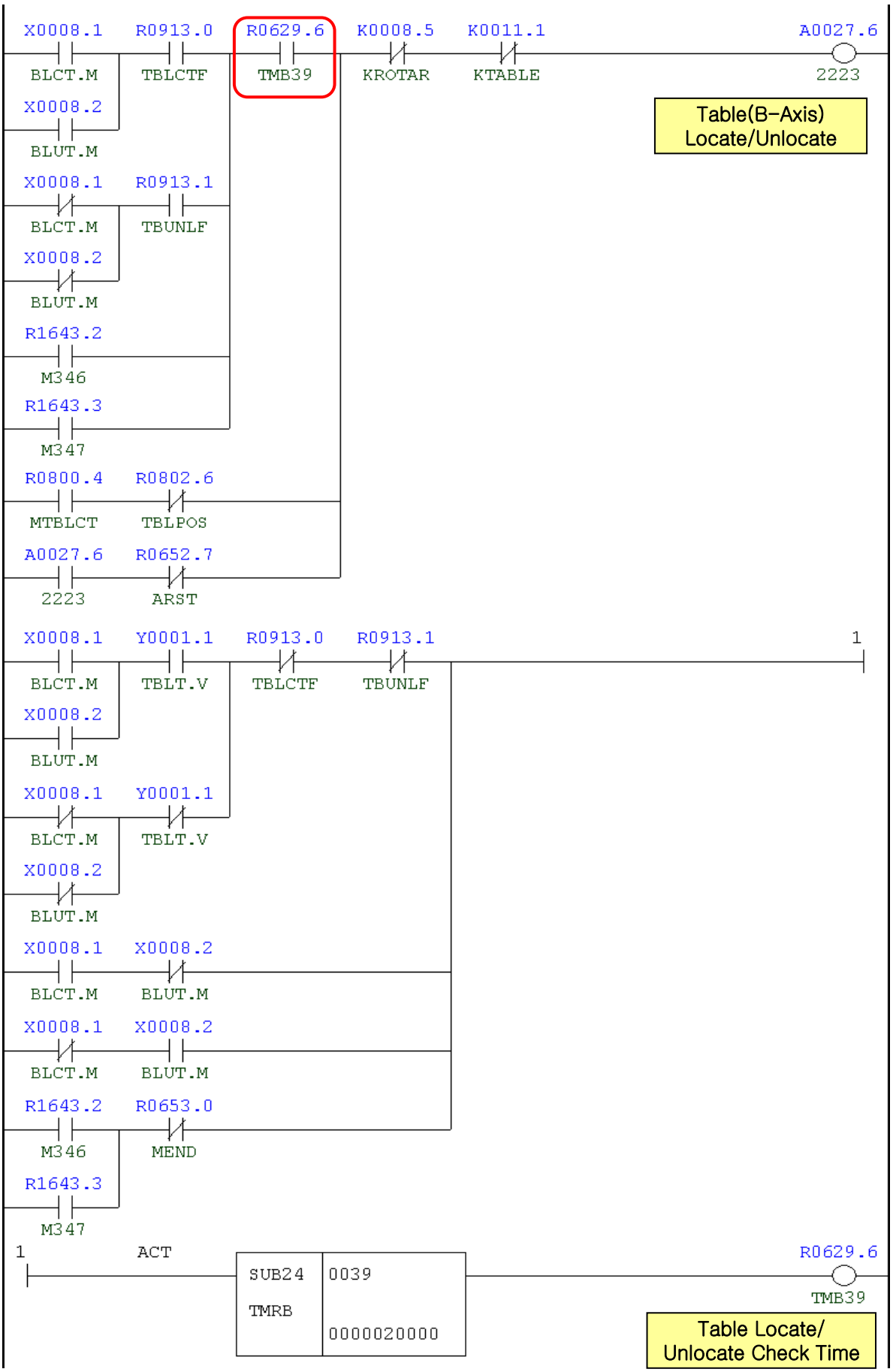
Check the proximity switch, the wiring from the proximity switch to the electric cabinet as well as the I/O module if there is a problem. Repair or replace the defective part if necessary.

Signal	Address	Device Symbol	I/O	Connector (Pin)	Numbering
Table Locate 1	**X8.1** BLCT.M	-SL82	Input Module : Slot 07	XJ413 (24)	SL82
Table Locate 1	**X8.2** BLUT.M	-SL83	Input Module : Slot 07	XJ413 (39)	SL83
Table Locate	**Y1.1** TBLT.M	-KA02	Output Module : Slot 1	(13)	YV82

Status	Locate (M50)	Unlocate (M51)
X8.1 (SL82)	0	1
X8.2 (SL83)	0	1
Y1.1 (YV81)	1	0


AUXILIARY FUNCTION
COIL CONV. CW
WORK LIGHT
COIL CONV. CCW
Y-AXIS CLAMP
TABLE UNCLAMP
DOOR OPEN REQUEST
CHIP CONVEYOR
AUTO POWER OFF
AUTO POWER ON
W-AXIS UNCLAMP
TABLE UNLOCATE
ANGLE HEAD


SL82
SL83


X0008.1
BLCT.M
R0913.0
TBLCTF
R0629.6
TMB39
K0008.5
KROTAR
K0011.1
KTABLE
A0027.6
2223
Table(B-Axis)
Locate/Unlocate
X0008.2
BLUT.M
X0008.1
BLCT.M
R0913.1
TBUNLF
X0008.2
BLUT.M
R1643.2
M346
R1643.3
M347
R0800.4
MTBLCT
R0802.6
TBLPOS
A0027.6
2223
R0652.7
ARST
X0008.1
BLCT.M
Y0001.1
TBLT.V
R0913.0
TBLCTF
R0913.1
TBUNLF
1
X0008.2
BLUT.M
X0008.1
BLCT.M
Y0001.1
TBLT.V
X0008.2
BLUT.M
X0008.1
BLCT.M
X0008.2
BLUT.M
X0008.1
BLCT.M
X0008.2
BLUT.M
R1643.2
M346
R0653.0
MEND
R1643.3
M347
1
ACT
SUB24
TMRB
0039
0000020000
R0629.6
TMB39
Table Locate/
Unlocate Check Time

Address	Symbol	Coil Comment
X8.1	BLCT.M	T-Locate(Index)/T-Clamp(45Ba)
X8.2	BLUT.M	T-Unlocate(Index)/T-Unclamp(1Ba)
R913.0	TBLCTF	Table Locate Flag
R913.1	TBUNLF	Table Unlocate Flag
R1643.2	M346	Table(B-Axis) Locate
R1643.3	M347	Table(B-Axis) Unlocate
R629.6	TMB39	Table Locate/Unlocate Check Time
R800.4	MTBLCT	Man Table(B-Axis) Locate
R802.6	TBLPOS	Table(B-Axis) Locate Position
A27.6	2223	Table(B-Axis) Locate/Unlocate
R652.7	ARST	Alarm Rest
K8.5	KROTAR	Ruckle Rotary Table Used
K11.1	KTABLE	B-Axis Table Used
Y1.1	TBLT.V	Table(B-Axis) Locate
R653.0	MEND	M-Function End

4.21 2228 Operator Door Open Alarm

1) Description

The door in the main OP side is open.

2) Cause of problem

① The door in the operator's side is open.

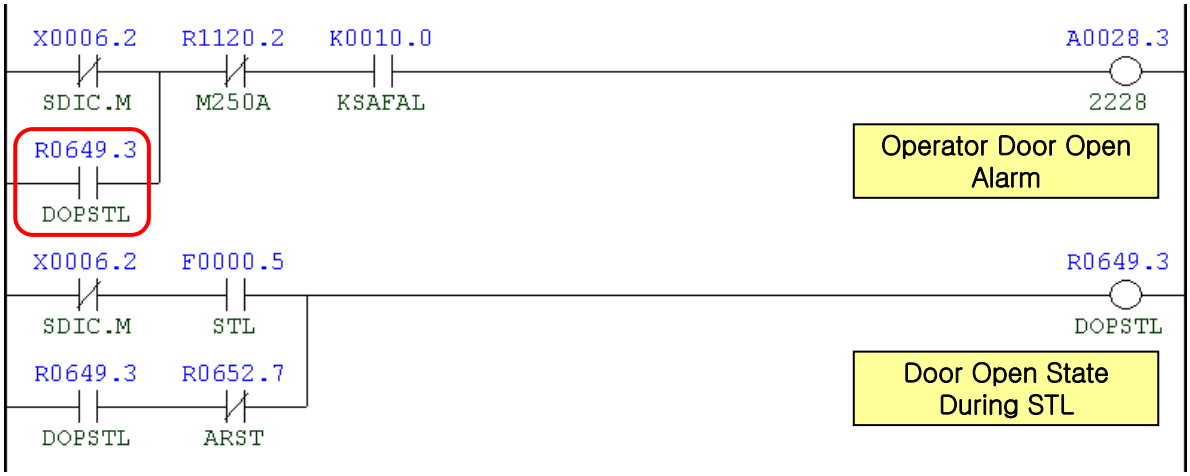
② The safety switch has an error or the wiring has a problem.

3) Action

① Close the door.

② Check the operator's side safety switch as well as the wiring, and repair or replace a defective one if necessary.

Signal	Address	Device Symbol	I/O	Connector (Pin)	Numbering
Splash Guard Door Interlock	**X6.2** SDIC.M	-SS61	Input Module : Slot 07	XJ413 (48)	SS61B



Address	Symbol	Coil Comment
X6.2	SDIC.M	Splash Guard Door Interlock
R649.3	**DOPSTL**	**Door Open State During STL**
R1120.2	M250A	Door Interlock Bypass On Aux.
K10.0	KSAFAL	Safety Switch Used At Main
F0.5	STL	Cycle Start
R652.7	ARST	Alarm Reset


Safety
Switch
Operator
Door

4.22 2234 Spindle Gear Detection Switch

1) Description

None of the High, Middle, and Low checking switches of the spindle head gear range is detected to trip.

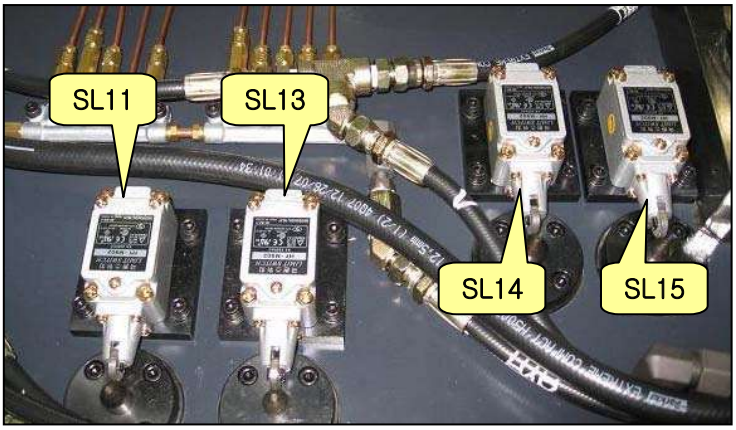
2) Cause of problem

The check switch for the main spindle gear range has short-circuited or any of its component parts is defective.

3) Action

Check the gear box switch of the main spindle if it works properly on the DGN screen, and take a necessary measure.

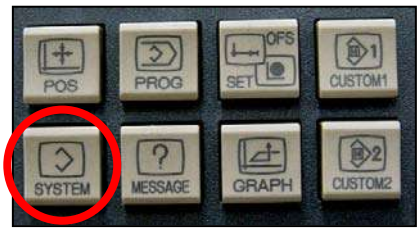
Signal	Address	Device Symbol	I/O	Connector (Pin)	Numbering
Spindle Gear 1 Check	**X3.0** SGA.M	-SL11	Input Module : Slot 06	XJ412 (12)	SL11
Spindle Gear 2 Check	**X3.2** SGB.M	-SL13	Input Module : Slot 06	XJ412 (44)	SL13
Spindle Gear 3 Check	**X3.3** SGC.M	-SL14	Input Module : Slot 06	XJ412 (11)	SL14
Spindle Gear 4 Check	**X3.4** SGD.M	-SL15	Input Module : Slot 06	XJ412 (27)	SL15



Note) How to move to DGN (Diagnostic)

(1) Press the “SYSTEM” button in the right side of the main OP monitor.

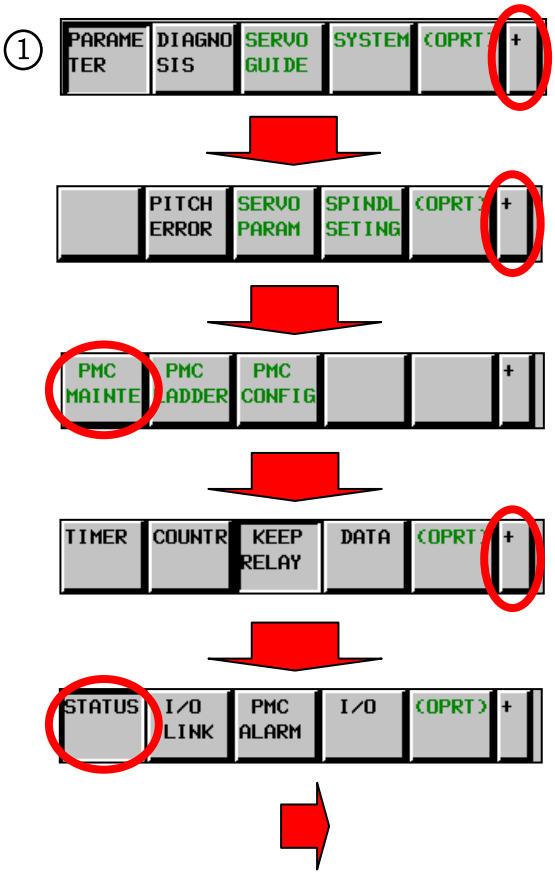
▪ The following soft key bar will be displayed at the bottom.



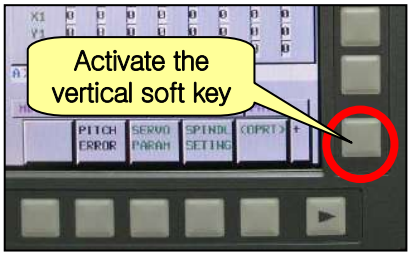
(2) Move to the DGN screen.

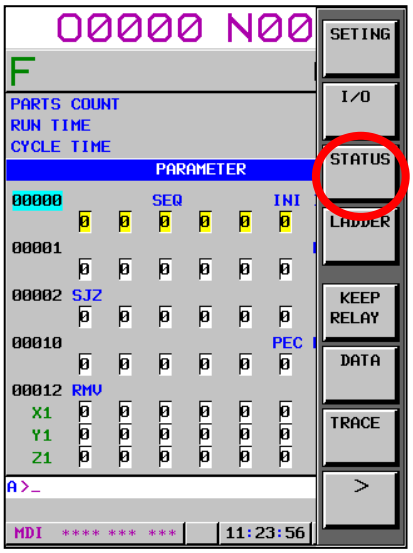
① Press the soft keys one after another to move to the DGN screen.

② Press any soft key in the right corner to activate the vertical soft key bar, and press the [STATUS] key.

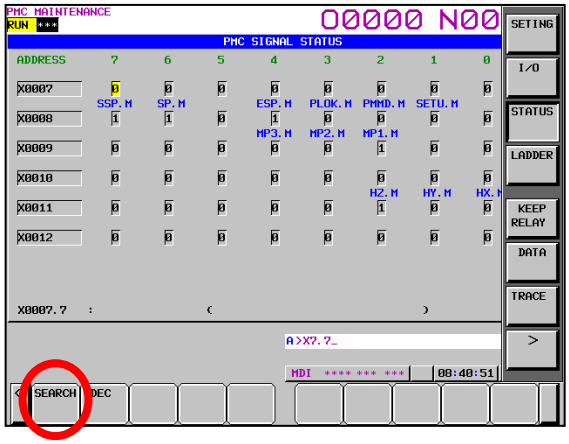


②





(3) Enter a desired DGN address and press [SEARCH] to display the DGN screen of your choice.

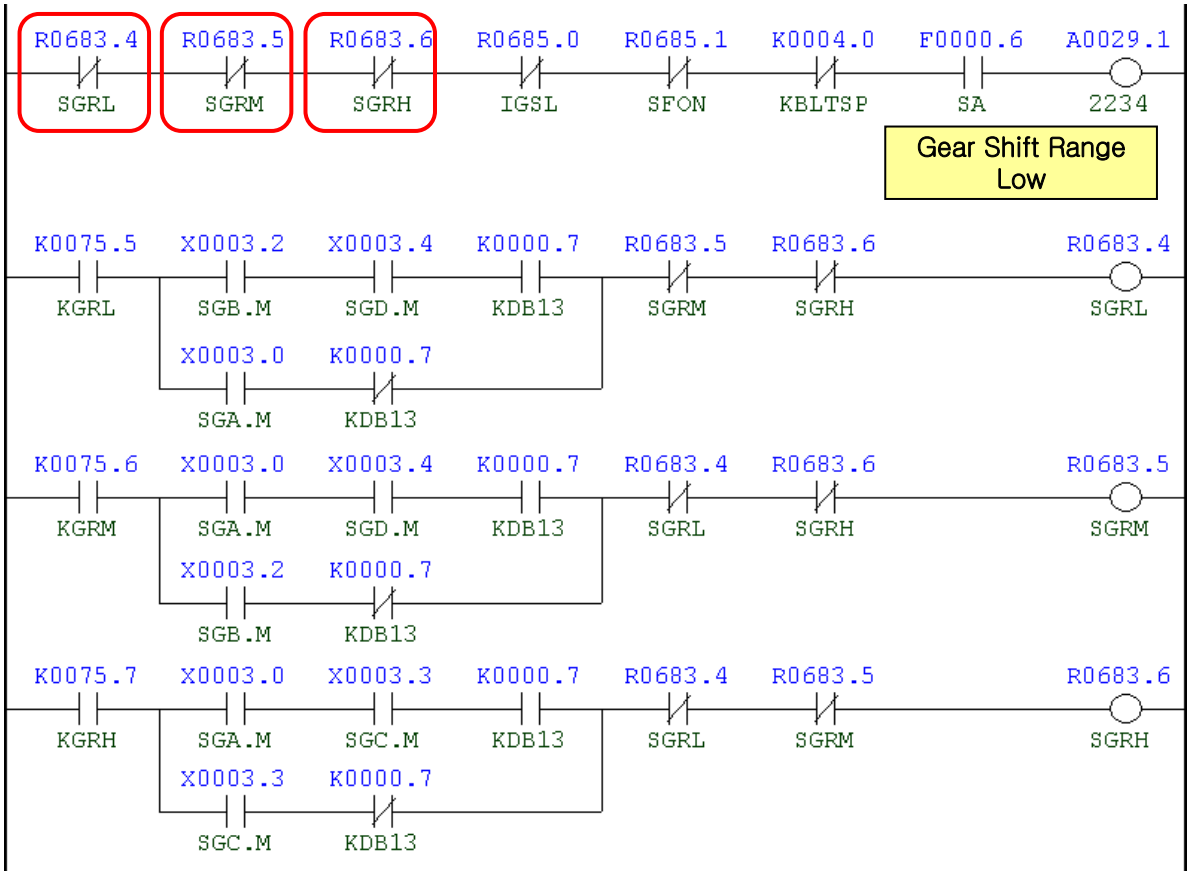


Note) How to read DGN (Diagnostic)

Ex) X 0007 0 0 1 1 0 0 1 0

☞ Bit 1, 4 and 5 in Address X7 turn ON while Bit 0, 2, 3, 6 and 7 turn OFF.

Symbol	0	0	1	1	0	0	1	0
Bit No	Bit 7	Bit 6	Bit 5	Bit 4	Bit 3	Bit 2	Bit 1	Bit 0



Address	Symbol	Coil Comment
R683.4	**SGRL**	**Spindle Gear Range Low**
R683.5	**SGRM**	**Spindle Gear Range Middle**
R683.6	**SHRH**	**Spindle Gear Range High**
R685.0	IGSL	Initial Gear Shift Low
R685.1	SFON	Initial S-Function On
K4.0	KBLTSP	Built-In Spindle Used
F0.6	SA	Servo Ready
A29.1	2234	Spindle Gear Detection Switch
K75.5	KGRL	Gear Shift Low Keep

Address	Symbol	Coil Comment
X3.2	SGB.M	Spindle Gear Shift Status B
X3.4	SGD.M	Spindle gear Shift Status D
X3.0	SGA.M	Spindle Gear A/S-Unclamp Built
K0.7	KDB13	DBC130 Type Machine
R683.5	SGRM	Spindle Gear Range Middle
R683.6	SGRH	Spindle Gear Range High
K75.6	KGRM	Gear Shift Middle Keep
R683.4	SGRL	Spindle Gear Range Low
K75.7	KGRH	Gear Shift High Keep
X3.3	SGC.M	Spindle Gear Shift Status C

4.23 2241 Wait. Pot or Spindle Tool data Zero

1) Description

The tool data of the waiting pot or the spindle is set to 0.

2) Cause of problem

① The command of "T00;" is instructed so that the waiting pot is empty.

② The command of "T00;" (M06) is instructed so that the spindle tool is empty.

③ The data value of D452 (Waiting Tool No.) or D450 (Spindle Tool No.) is erased.

3) Action

① Call another tool.

☞ Just in case, ensure that the waiting pot is empty.

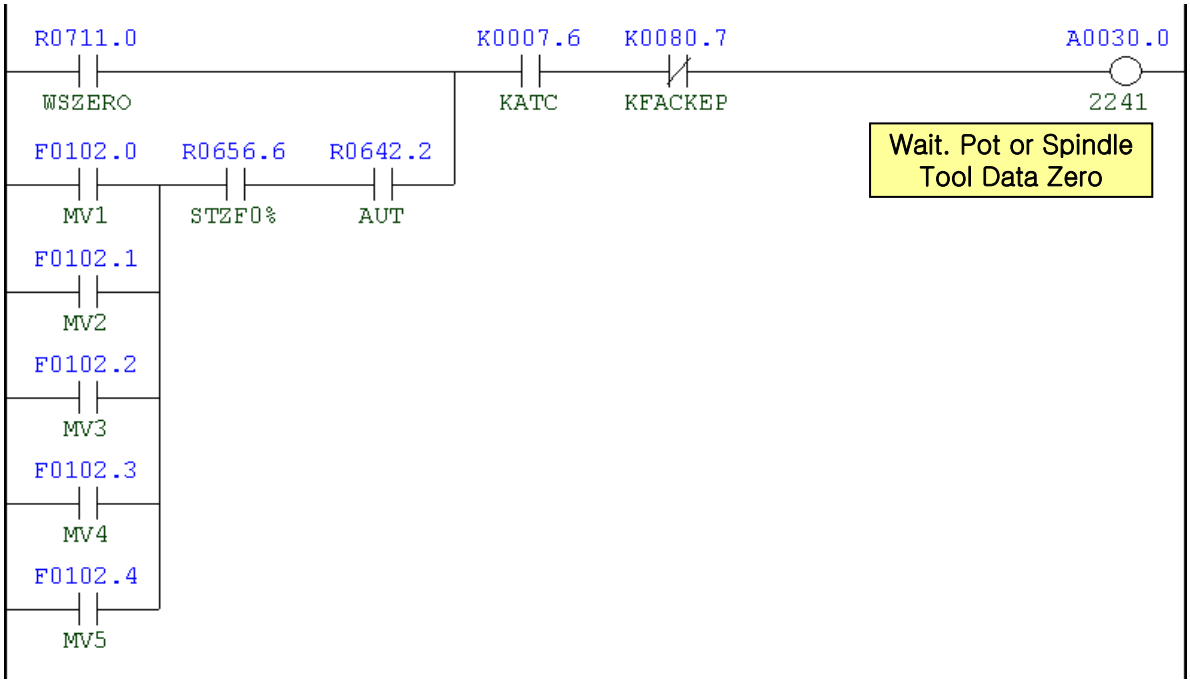
② Change to a different tool.

☞ Just in case, ensure that the spindle is empty.

③ Refer to the PMC DATA table to check the actual tool number of D452 (waiting tool no.) or D450 (spindle tool no.), and enter the right number.

2) DATA OF THE DATA TABLE---0001(TOOL NUMBER)

ADDRESS	NO.	DATA	REMARK
D0450	0000		SPINDLE TOOL NUMBER
D0452	0001		WAITING POT TOOL NUMBER



Address	Symbol	Coil Comment
R711.0	WSZERO	Wait. & Spindle Pot Tool Zero
F102.0	MV1	X-Axis Moving Signal
F102.1	MV2	Y-Axis Moving Signal
F102.2	MV3	Z-Axis Moving Signal
F102.3	MV4	W-Axis Moving Signal
F102.4	MV5	B-Axis Moving Signal
R656.6	STZF0%	Feedrate 0% At Spindle Tool Zero
R642.2	AUT	Auto Mode
K7.6	KATC	ATC Used
K80.7	KFACKEP	
A30.0	2241	Waiting Tool And Spindle Tool Data

4.24 2250 Manual Mode Selected On ATC Panel

1) Description

The manual OP of the ATC magazine is set to Manual.

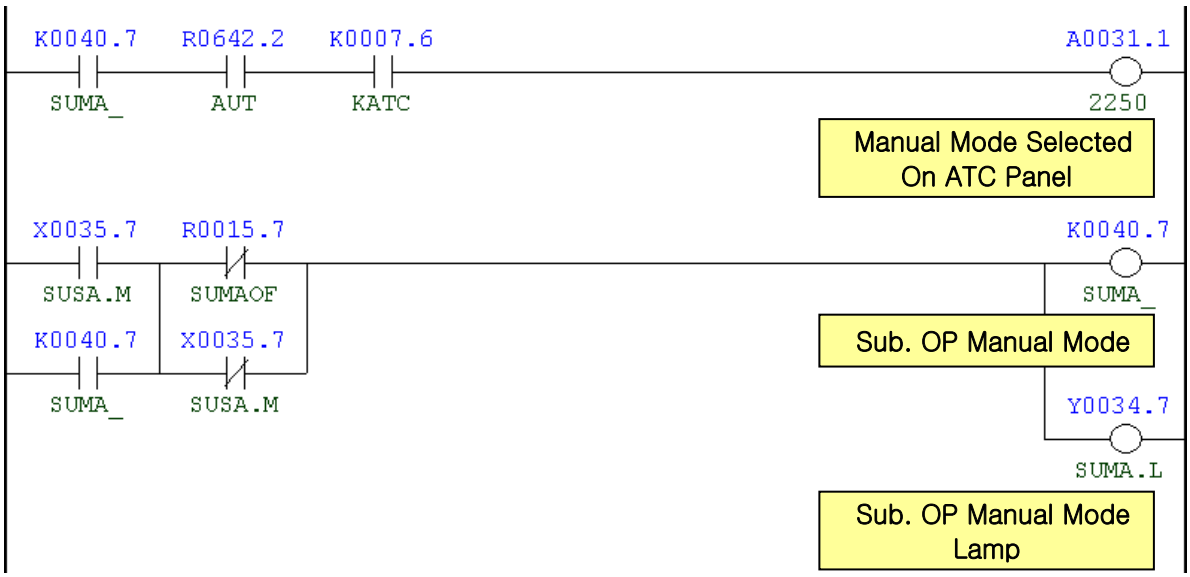
2) Cause of problem

With the manual OP being set to Manual, you set the mode selection switch of the main OP to AUTO (Edit, Memory, Tape or MDI).

3) Action

In AUTO (Edit, Memory, Tape or MDI) mode, release the Manual mode.

Signal	Address	Device Symbol	I/O	Connector (Pin)	Numbering
ATC Manual On	**X35.7** SUSA.M	-SB112	Distributed I/O Module (A)	XCE56A (B05)	SB112



Address	Symbol	Coil Comment
K40.7	**SUMA_**	**Sub. OP Manual Mode**
R642.2	AUT	Auto Mode
K7.6	KATC	ATC Used
X35.7	SUSA.M	Sub OP Switch Mode
R15.7	SUMAOF	Sub. OP Manual Off
Y34.7	SUMA.L	Sub. OP Manual Mode Lamp

4.25 2254 ATC Carriage Overtime Alarm

1) Description

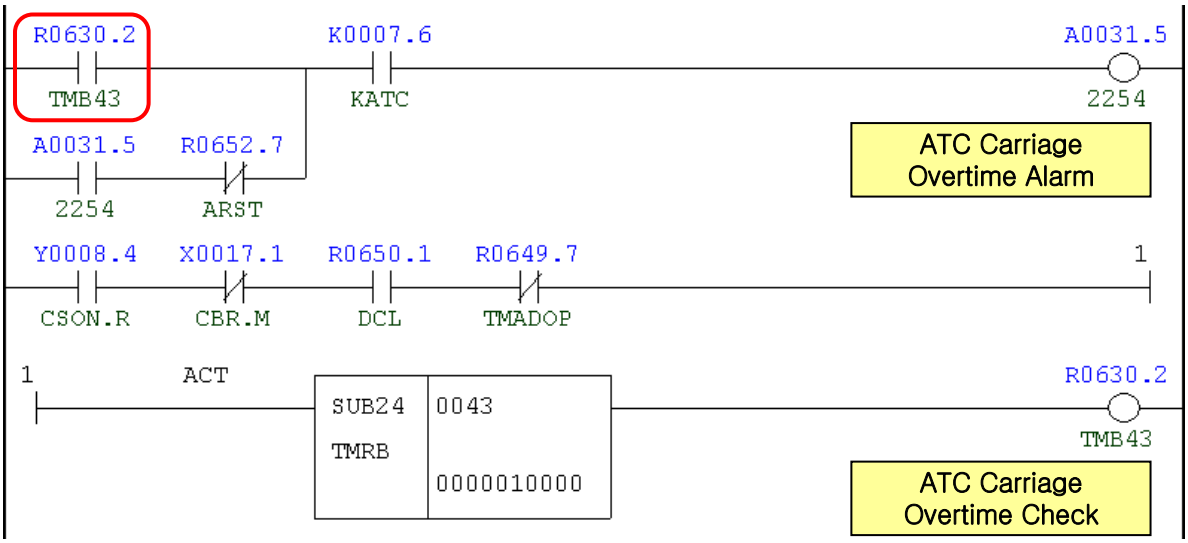
It has passed 10 seconds after the ATC Carriage Servo On command was instructed. However, the ATC Carriage Servo does not turn off when the ATC Carriage operation is complete.

2) Cause of problem

An error in the ATC Carriage operation or the servo itself

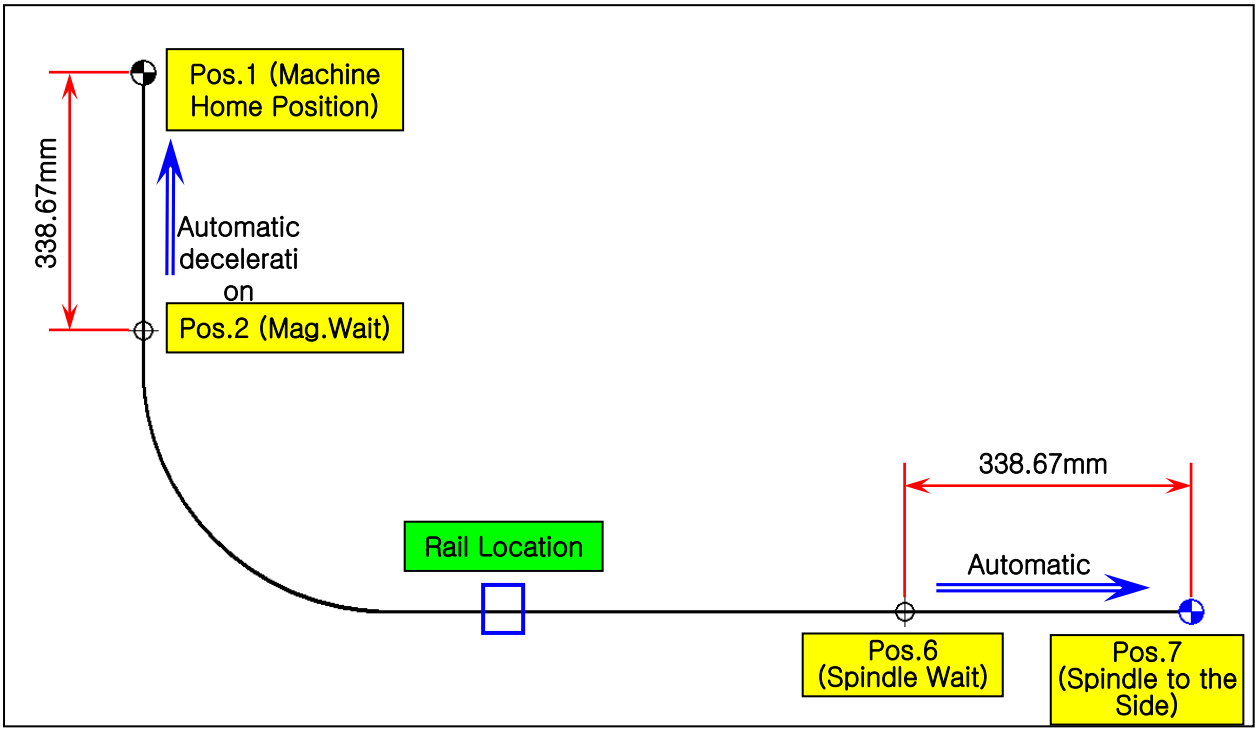
3) Action

Take an action as appropriate to the then circumstances.



Address	Symbol	Coil Comment
R630.2	**TMB43**	**ATC Carriage Overtime Check**
A31.5	2254	ATC Carriage Overtime Alarm
R652.7	ARST	Alarm Reset
K7.6	KATC	ATC Not Used
Y8.4	CSON.R	ATC Carriage Servo On
X17.1	CBR.M	ATC Carriage Brake Release
R650.1	DCL	Operator Door Close Confirm
R649.7	TMADOP	Tool Mag. Door Open Aux.

Note 1) Understanding of the carriage system



1) Position 1 (Machine Home Position) : Tool Changer Arm Magazine Pot Position

2) Position 2 (Magazine Wait) : Tool Changer Arm Magazine Waiting Position (Home Position)

3) Position 6 (Spindle Wait) : Tool Changer Arm Spindle Waiting Position

4) Position 7 (Spindle Side) : Tool Changer Arm Spindle Side Position

Note 1) Position Signal (input)

	Pos.	X16.0	X16.1	X16.2	X16.3
Magazine Side Position	1	1	0	0	0
Waiting Position	2	0	1	0	0
Spindle Waiting Position	6	0	1	1	0
Spindle Side Position	7	0	1	1	1

Note 2) Position Signal (output)

	Pos.	Y9.0	Y9.1	Y9.2
Magazine Side Position	1	1	0	0
Waiting Position	2	0	1	0
Spindle Waiting Position	6	0	1	1
Spindle Side Position	7	1	1	1

Note 3) ATC Carriage Servo Motor Parameter

NC BORING	CARRIAGE. MOTOR (DOOSAN SERVO)	NC UNIT	FS16/18iM-B

▣PARAMETERS FOR CARRIAGE SERVO

NO.	CARRIAGE. SERVO FUNCTION	RANGE	DEF.	TYPE	DB110CX/ DB130CX CARRIAGE
0	MOTOR POWER CAPA.	0	0	A	0
1	MOTOR ROTATION DIR.	0~1	1	A	1
2	RESERVED	0~2	0	A	0
3	JOG FUNCTION SEL.	0~1	0	A	1
4	RESERVED	0~1	0	A	2048
#5	MAX. POT NO.	2~127	12	A	15
6	GEAR RATIO 1(MOTOR)	1~9999	33	A	2053
7	GEAR RATIO 2(MACH.)	1~9999	12	A	100
8	HOME POT FOR SETTI.	1~127	1	A	1
9	RESERVED		0	A	0
10	POSITION LOOP P GAIN	0~2048	256	B	500
11	VELOCI. LOOP P GAIN	0~2048	250	B	600
12	VELOCI. LOOP I GAIN	0~2048	1	B	110
13	SERVO READY ON TIME	0~40	0	B	5
14	BRAKE OFF TIME	0~40	0	B	1
15	BRAKE ON TIME	0~40	0	B	20
16	VEL. OR TOR. MON. OF.	-12~12	0	B	0
17	VEL. OR TOR. MON. SE.	0~3	0	B	0
18	INPOSITION	1~9999	100	B	100
19	RESIDUAL PULSE ALLO.	1~6000	6000	B	6000
20	FEEDFORW. CONT. GAIN	0~100	0	B	0
21	FEEDFORW. TIME CONS.	0~500	0	B	0
22	TORQUE LIMIT POSIT.	0~300	250	B	280
23	TORQUE LIMIT NEGAT.	0~300	250	B	280
24	TORQUE LIMIT 2 POSIT.	0~300	50	B	280
25	TORQUE LIMIT 2 NEGA.	0~300	50	B	280
26	VELOCITY LIMIT	0~3000	1850	B	1250
27	JOG SPEED	0~1000	100	B	50
28	VELOCITY COMMAND	10~2000	1800	B	1200
29	ACC. TIME CONSTANT	0~340	50	B	340
30	DEC. TIME CONSTANT	0~340	80	B	340
31	MONIT. AT RATE VELO.	500~5000	3000	B	3000
32	MONIT. AT RATE TORQ.	500~5000	1500	B	1500
33	INITIAL STATUS DISP.	0~10	6	B	5
34	ABS O/F OFFSET(LSW)	-32768~32767			
35	ABS O/F OFFSET(MSW)	-32768~32767			
36	HOME O/S VAL.(LSW)	-32768~32767			
37	HOME O/S VAL.(MSW)	-32768~32767			
38	CURR. LOOP P GAIN	0~2048	750	B	750
39	CURR. LOOP I GAIN	0~2048	510	B	510
46	RESERVED		0	B	1
NO.	POSITION OFF SET				
1	MAGAZINE SIDE POS.			B	
2	WAITING POS.			B	
6	SPINDLE WAIT POS.			B	
7	SPINDLE SIDE POS.			B	2596

Method of setting parameter

※ Note. Adjusted parameter operated as follows.

A:Adjusted parameter is only valid when power is off→on

B:You can adjust the parameters under the servo is off.

Machine Home setting method

When assembling the motor for the first time, set the absolute encoder zero-point to the machine Home.

The setting method is as follows.

(These steps should be done when the external servo 'ON' signal is OFF.)

Turn the machine power supply ON.

Fit parameter 8 to the POST number of the current position.

❶ Press the MODE key and change operating display to parameter fixing mode. " 0.0.0000 "

❷ Press UP key and change display of the first two segments to 08.

" 0.8.0001 "

❸ Press SET key and the dot below the first two segments will disappear. " 0.8.0001 "

❹ Press UP or DOWN key to adjust the last 4 segments to the POST number of the current position.

(example ; if the current position number is 1, the initial POST will be set to 1.)

" 0.8.0001 "

■ Set the zero-point from the zero-point display of the servo ON/OFF display mode.

❶ Press the MODE key and change the display to servo ON/OFF mode.

" r d - oFF "

❷ Press the DOWN key and change the display to zero-point setting mode.

" O r 9.5-- "

❸ Press SET key for 5 seconds and the display will set the parameter automatically and the turn back the display to zero-point setting mode.

" O r 9.5-- "

■ Turn the power OFF and then ON again and the setting of the zero-point is now completed.

Carriage Position Setting Method

Press the MODE key and change operating display to parameter fixing mode. " n 0002 " => wating position

Mode key for 5 seconds pushed

fixing mode. " 0.10000 "

Press UP key for 3 seconds pushed

fixing mode. " 0.70000 "

Press SET pushed

fixing mode. " 0.72596 "

DATA input

Press SET pushed

1mm : 432.7 , 3mm :1298 , 5mm : 2163.7 , 7mm : 3029.2 ,

2mm : 865.5 , 4mm : 1731.0 , 6mm : 2596.5 , 8mm : 3462.2 ,

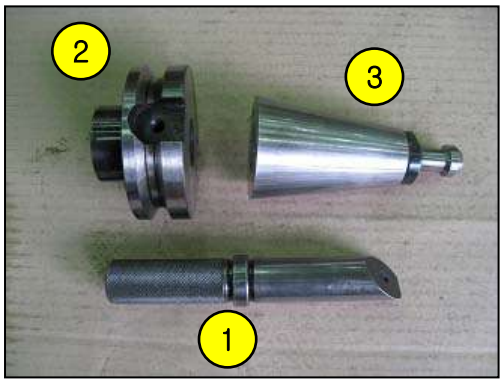
11mm : 4760.2 , 12mm : 5193.0 , 13mm : 5625.7 , 15mm : 6491.2 ,

9mm : 3894.7 , 10mm : 4327.5 , 16mm : 6924.0

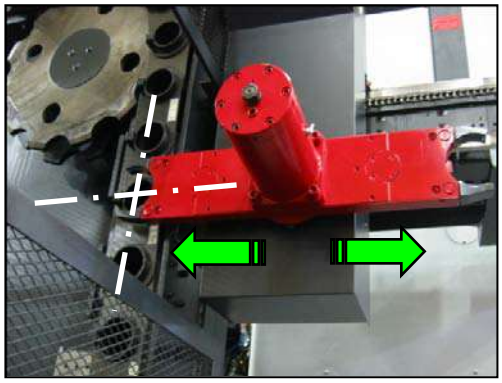
EDITION	DATE	REVISED CONTENT	PAGE
A0	2008. 01.30		M2

Note 4) Setting the reference point for the carriage magazine side position

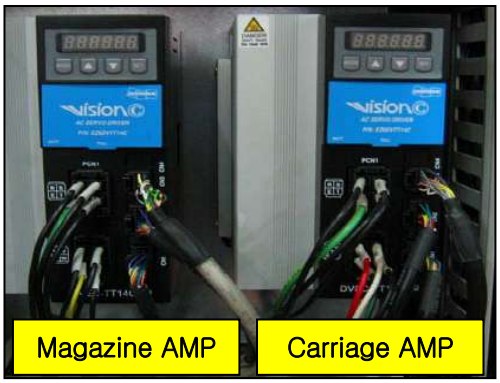
1) Insert the centering fixture between magazine pot (③) and changer gripper (②).



2) Move the changer to the magazine pot manually.



3) Open the door of the electric cabinet and find the carriage AMP that is located in the internal front side.



4.1) Check the center position using the centering fixture above, and if it fits correctly

① Press the MODE key in the start screen **[r 0000]** of the servo drive to switch to the diagnosis mode.

➔ **[rd-off]** : Diagnosis mode

② From the **[rd-off]** screen, set the down arrow key as a function key to set the reference point.

➔ **[Org.S - -]** : Switch to the ref-point setting mode

③ From the **[Org.S - -]** screen, press and hold the SET key for 10 seconds.
If you press and hold the SET key for 10 seconds in the **[Org.S - -]** screen, the screen will blink and switch to **[r0001]**.

➔ **[r 0001]** : Return to the start screen

④ Turn off the machine and turn it back on. This is the completion of resetting the reference point.

4.2) If you have to reset the reference point because the center of magazine pot does not match with that of the changer.

① Press the MODE key on the start screen **[r 0000]** of the servo drive.

➔ **[rd-off]** : Diagnosis mode

② From the **[rd-off]** screen, set the down arrow key as a function key to set the reference point.

➔ **[Jog.run]** : Switch to the jog run mode

③ From the **[Jog.run]** screen, press the SET button.

➔ **[Jr.0000]** : Jog run mode

④ From the **[Jr.0000]** screen, use the up/down arrow buttons to feed the changer in a desired direction. In such a way, adjust the changer position for the pot.

➔ Fine-tuning the changer

▪ If you want to fine-tune the magazine position, set parameter #27 to a lower value. Use the up/down arrow buttons on the **[Jr.0000]** screen, or press the rotation button on the manual operation panel. While holding the button, insert the center bar into the centering fixture until it is inserted smoothly.

※ Feeding the changer on the manual OP
Change "K17.6" from 0 to 1 before proceeding.
When you have completed resetting the reference point, change "K17.6" from 1 back to 0.

⑤ When the centering of the tool magazine's tool pot is completed, press the SET button.

➔ **[Jog.run]** : Return to the jog run mode }

⑥ In the **[Jog.run]** screen, press the MODE key.

➔ **[rd-off]** : Ready to operate the jog run

⑦ Back in the **[rd-off]** screen, press the up arrow key.

➔ **[Org.S - -]** : Origin mode

⑧ From the **[Org.S - -]** screen, press and hold the SET key for 10 seconds.
If you press and hold the SET key for 10 seconds in the **[Org.S - -]** screen, the screen will blink and switch to **[r0001]**.

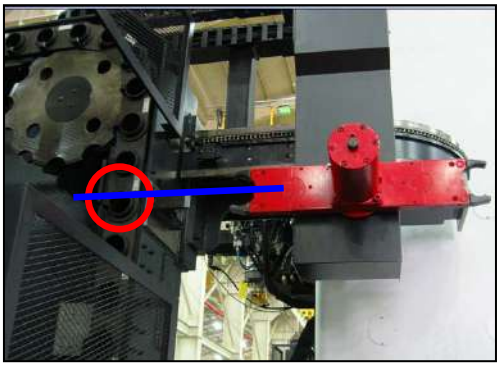
➔ **[r 0001]** : Return to the start screen

⑨ Turn off the machine and turn it back on. This is the completion of resetting the reference point.

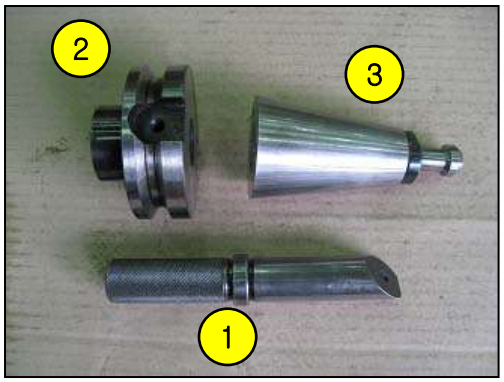
- When you have completed resetting the reference point, change "K17.6" from 1 back to 0.

Note 5) Setting the reference point for the tool magazine pot

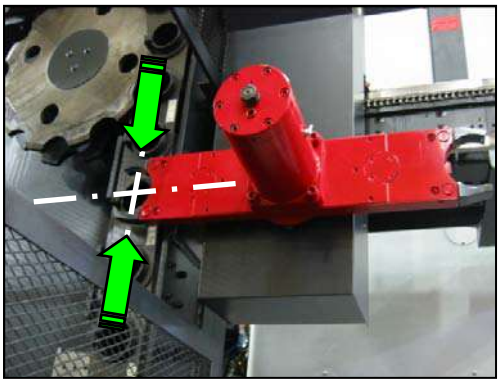
1) Enter the pot number (in the change position of the tool magazine) in parameter 8 on the servo AMP.



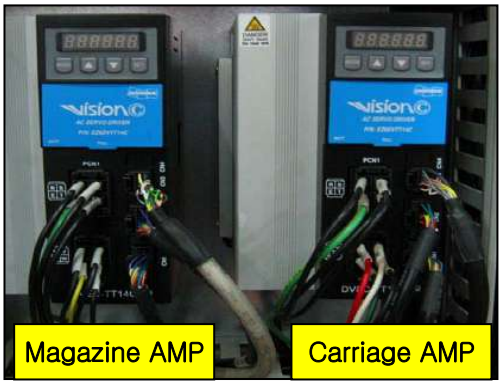
2) Insert the centering fixture in between magazine pot (③) and changer gripper (②).



3) Move the changer to the magazine pot manually (jog mode).



4) Open the door of the electric cabinet and find the magazine AMP that is located in the internal front side.



4.1) Check the center position using the centering fixture above, and if it fits correctly

① Press the MODE key in the start screen **[r 0000]** of the servo drive to switch to the diagnosis mode.

➔ **[rd-off]** : Diagnosis mode

② From the **[rd-off]** screen, set the down arrow key as a function key to set the reference point.

➔ **[Org.S - -]** : Switch to the ref-point setting mode

③ From the **[Org.S - -]** screen, press and hold the SET key for 10 seconds.
If you press and hold the SET key for 10 seconds in the **[Org.S - -]** screen, the screen will blink and switch to **[r0001]**.

➔ **[r 0001]** : Return to the start screen

④ Turn off the machine and turn it back on. This is the completion of resetting the reference point.

4.2) If you have to reset the reference point because the center of magazine pot does not match with that of the changer.

① Press the MODE key on the start screen **[r 0000]** of the servo drive.

➔ **[rd-off]** : Diagnosis mode

② From the **[rd-off]** screen, set the down arrow key as a function key to set the reference point.

➔ **[Jog.run]** : Switch to the jog run mode

③ From the **[Jog.run]** screen, press the SET button.

➔ **[Jr.0000]** : Jog run mode

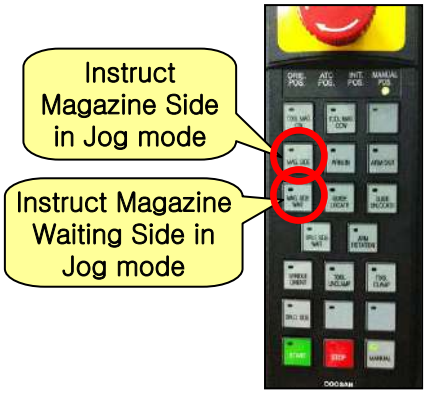
④ From the **[Jr.0000]** screen, use the up/down arrow buttons to feed the changer in a desired direction. In such a way, adjust the changer position for the pot.

➔ Fine-tuning the changer

▪ If you want to fine-tune the magazine position, set parameter #27 to a lower value. Use the up/down arrow buttons on the **[Jr.0000]** screen, or press the rotation button on the manual operation panel. While holding the button, insert the center bar into the centering fixture until it is inserted smoothly.

※Feeding the changer on the manual OP

Change "K17.6" from 0 to 1 before proceeding. When you have completed resetting the reference point, change "K17.6" from 1 back to 0.



⑤ When the centering of the tool magazine's tool pot is completed, press the SET button.

➔ **[Jog.run]** : Return to the jog run mode }

⑥ In the **[Jog.run]** screen, press the MODE key.

➔ **[rd-off]** : Ready to operate the jog run

⑦ Back in the **[rd-off]** screen, press the up arrow key.

➔ **[Org.S - -]** : Origin mode

⑧ From the **[Org.S - -]** screen, press and hold the SET key for 10 seconds.
If you press and hold the SET key for 10 seconds in the **[Org.S - -]** screen, the screen will blink and switch to **[r0001]**.

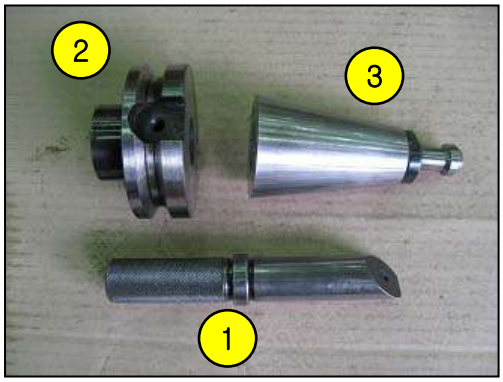
➔ **[r 0001]** : Return to the start screen

⑨ Turn off the machine and turn it back on. This is the completion of resetting the reference point.

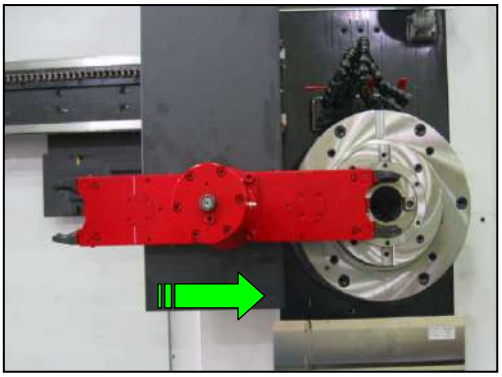
▪ When you have completed resetting the reference point, change "K17.6" from 1 back to 0.

Note 6) Fine-tuning the spindle side of the changer arm

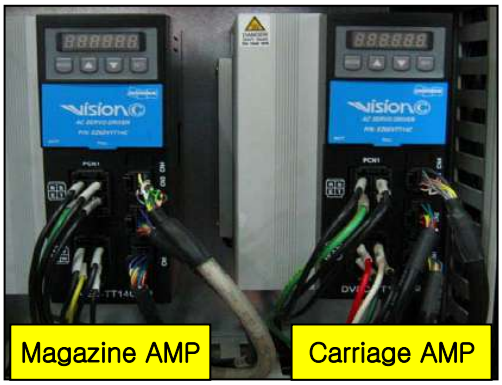
1) Remove the driving key from the spindle and insert the centering fixture(③) and changer gripper(②) as well.



2) In manual operation (jog), move the changer to the spindle side position.



3) Open the door of the electric cabinet and find the carriage AMP that is located in the internal front side.



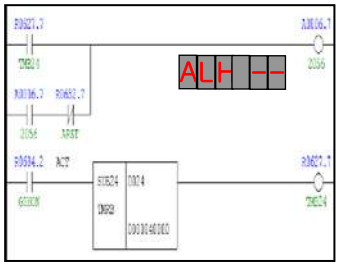
4) From the front operation panel, make necessary settings for the work.

① Press the MODE key on the start screen **[r 0000]** of the servo drive.

➔ **[rd-off]** : Diagnosis mode

② In the **[Jog.run]** screen, press the MODE button to display **[ALH - -]**.

➔ **[ALH - -]** : Alarm history display mode



③ In the **[ALH --]** screen, press the MODE button to display **[0.0.0000]**.

➔ **[0.0.0000]** : Parameter setting mode

④ In the **[0.0.0000]** screen, press the MODE button to display **[0.0.4095]**.

➔ **[0.0.4095]** : Parameter setting mode

(0.0. : Parameter #0, 4095 : setting value for Parameter #0)

⑤ From the **[0.0.4095]** screen, repeat pressing the Up arrow key six consecutive times to display **[0.7.0000]**.

➔ **[0.7.0000]** : Parameter #7 setting mode

⑥ If you press the SET key on the **[0.7.0000]** screen, the figure **0.7.** from **[0.7.0000]** will blink.

➔ **[0.7.0000]** : Mode where you can change the setting of Parameter #7

⑦ From the **[0.7.0000]** screen, use the Up or Down arrow key to enter a desired parameter.

➔ **[0.7.3462]** : Move by +8mm, **[0.7.3.4.6.2.]** : Move by -8mm

※ **Data Sheet : Setting Parameter #7 & Changer Movement**

Movement (mm)	Offset (pulse)	Movement (mm)	Offset (pulse)
1mm	432.7	10mm	4327.5
2mm	865.5	11mm	4760.2
3mm	1298.2	12mm	5193.0
4mm	1731.0	13mm	5625.7
5mm	2163.7	14mm	6058.5
6mm	2596.5	15mm	6491.2
7mm	3029.2	16mm	6924.0
8mm	3462.0	17mm	7359.2
9mm	3894.7	18mm	7789.4

Note 1) For a negative movement such as "-8mm", add a dot to the offset value like "3.4.6.2"
Note 2) If moving by 0.1mm: Enter "43" ; if moving by 0.01mm, enter "4.3".

⑧ When done, press the SET key to complete the parameter settings.

➔ **[0.7.3462]** : The value for parameter #7 is entered successfully.

4.26 2255 Changer Arm In/Out Alarm

1) Description

It has passed 15 seconds since the I/O position sensor switch of the changer arm was not conforming to the applicable instruction.

2) Cause of problem

① An error in adjusting the position sensor switch

② An error in wiring or component parts

3) Action

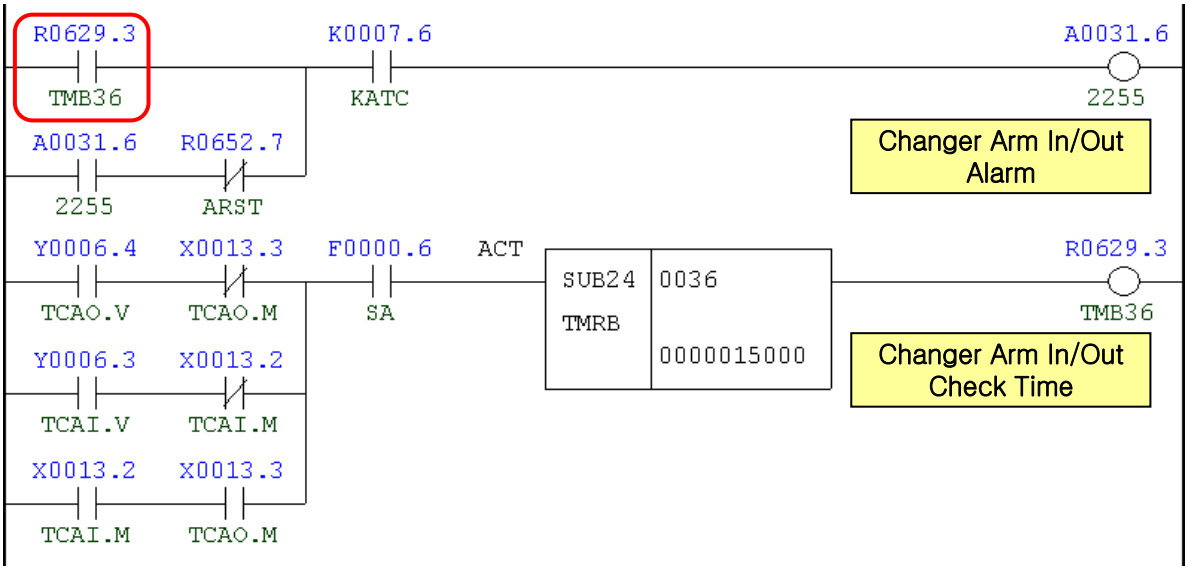
① An error in adjusting the position sensor switch

Manually turn the changer arm In/Out while adjusting the position sensor switch.

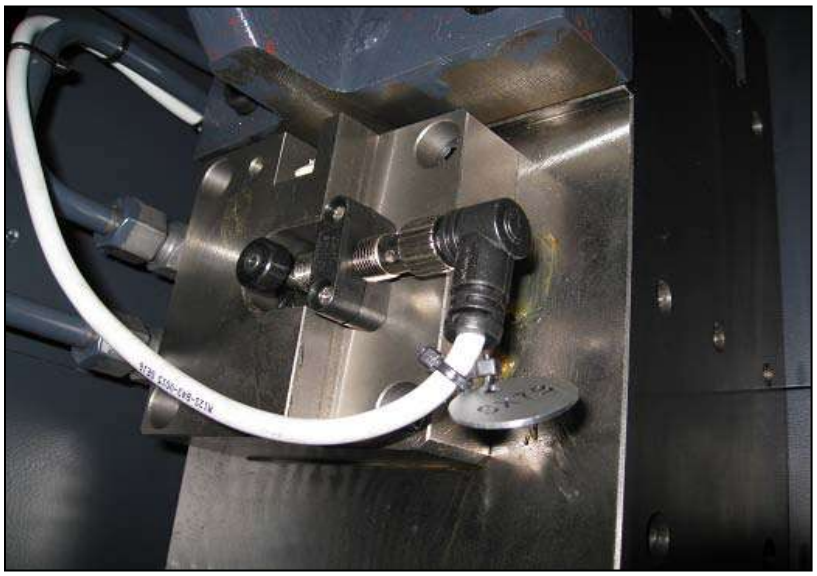
② An error in wiring or component parts

Check the proximity switch, the wiring from the proximity switch to the electric cabinet as well as the distributed I/O module if there is a problem. Repair or replace the defective part if necessary.

Signal	Address	Device Symbol	I/O	Connector (Pin)	Numbering
Tool Changer Arm In	**X13.2** TCAI.M	-SX7A	Input Module : Slot 08	XJ414 (35)	SX7A
Tool Changer Arm Out	**X13.3** TCAO.M	-SX7B	Input Module : Slot 08	XJ414 (2)	SX7B
Tool Changer Arm In	**Y6.3** TCAI.V	-KAR63	Output Module : Slot 3	XJ400 (6)	YV78
Tool Changer Arm Out	**Y6.4** TCAO.V	-KAR64	Output Module : Slot 3	XJ400 (23)	Y7V9



Address	Symbol	Coil Comment
R629.3	**TMB36**	**Changer Arm In/Out Check Time**
A31.6	2255	Changer Arm In/Out Alarm
R652.7	ARST	Alarm Reset
K7.6	KATC	ATC Not Used
Y6.4	TCAO.V	Tool Changer Arm Out
X13.3	TCAO.M	Tool Changer Arm Out
Y6.3	TCAI.V	Tool Changer Arm In
X13.2	TCAI.M	Tool Changer Arm In
F0.6	SA	Servo Ready



4.27 2260 ATC Magazine Rotation Overtime

1) Description

The tool magazine fails to complete the rotation within 60 seconds after instructed to do so by the operation signal (Y10.4)

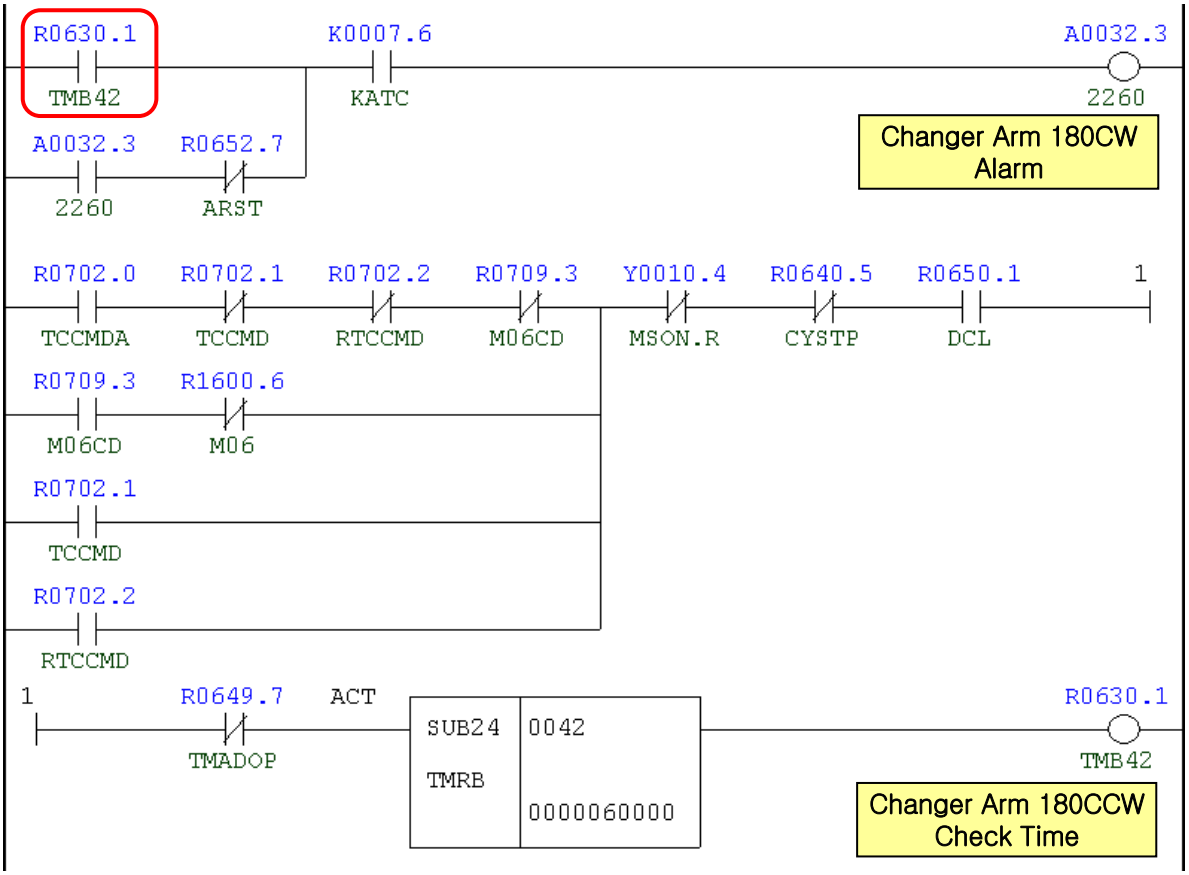
2) Cause of problem

An error in the servo motor that drives the tool magazine or the servo drive itself

3) Action

Refer to the service manual of the servo motor or the servo drive, and make repair or replacement if necessary.

☞ Refer to "Troubleshooting by the servo drive alarm".



Address	Symbol	Coil Comment
R630.1	**TMB42**	**ATC Mag. Rot. Overtime Check**
A32.3	2260	ATC Magazine Rotation Overtime
R652.7	ARST	Alarm Reset
K7.6	KATC	ATC Not Used

Address	Symbol	Coil Comment
R702.0	TCCMDA	T-Code Command Aux.
R702.1	TCCMD	T-Code Command
R709.3	M06CD	M06 Command
R1600.6	M06	ATC Change Macro Call
Y10.4	MSON.R	TMG Servo On
R640.5	CYSTP	Cycle Stop
R650.1	DCL	Operator Door Close Confirm
R649.7	TMADOP	Tool Mag. Door Open Aux.

4.28 2261 ATC Magazine Door Unlocking

1) Description

The magazine door was open while in auto run mode.

2) Cause of problem

① The magazine door was open while in auto run mode.

② An error in wiring or component parts

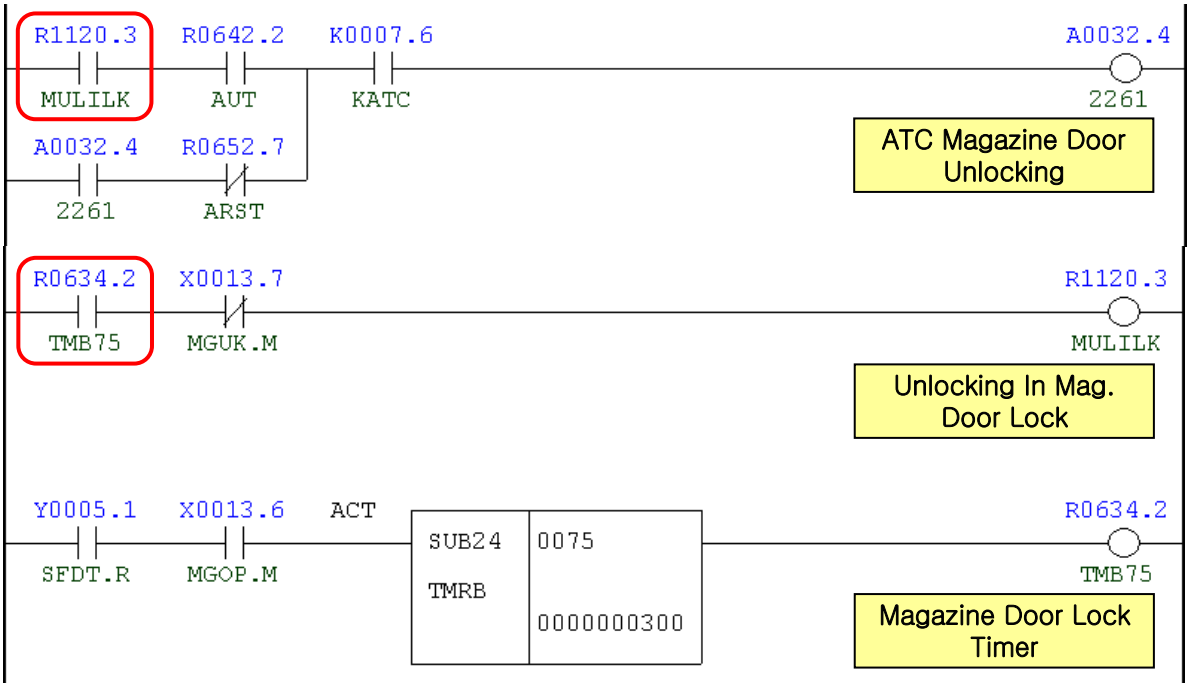
3) Action

① Close the magazine door.

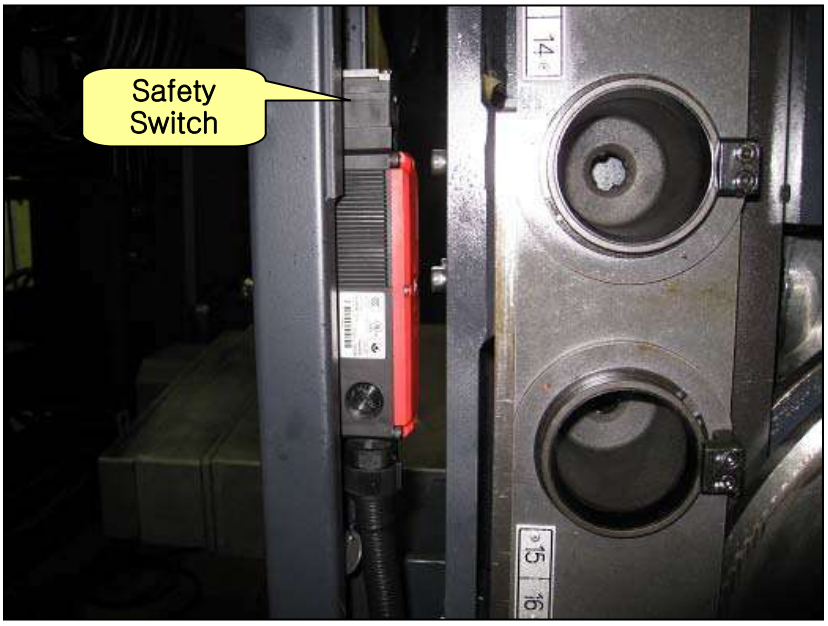
② An error in wiring or component parts

Check the safety switch, the wiring from the safety switch to the electric cabinet as well as the distributed I/O module if there is a problem. Repair or replace the defective part if necessary.

Signal	Address	Device Symbol	I/O	Connector (Pin)	Numbering
Mag. Side Door Open	**X13.6** MGOP.M	-SS62	Input Module : Slot 08	XJ414 (1)	SS62B
Mag. Unlock By Key Switch	**X13.7** MGUK.M	-SS62	Input Module : Slot 08	XJ414 (33)	SS62
Tool Magazine Door Close	**Y5.1** SFDT.R	-KAR51	Output Module : Slot 3	XJ400 (28)	KAR51



Address	Symbol	Coil Comment
R1120.3	**MULILK**	**Unlocking In Mag. Door Lock**
R642.2	AUT	Auto Mode
A32.4	2261	ATC Magazine Door Unlocking
R652.7	ARST	Alarm Reset
K7.6	KATC	ATC Not Used
R634.2	**TMB75**	**Mag. Door Lock Timer**
X13.7	MGUK.M	Mag. Unlock By Key Switch
Y5.1	SFDT.R	Tool Magazine Door Close
X13.6	MGOP.M	Mag. Side Door Open



4.29 2262 ATC Magazine Guard Door Open

1) Description

The ATC magazine guard door is open.

2) Cause of problem

① The ATC magazine guard door is open.

② An error in the ATC magazine guard door sensor switch, the wiring or any of its component parts

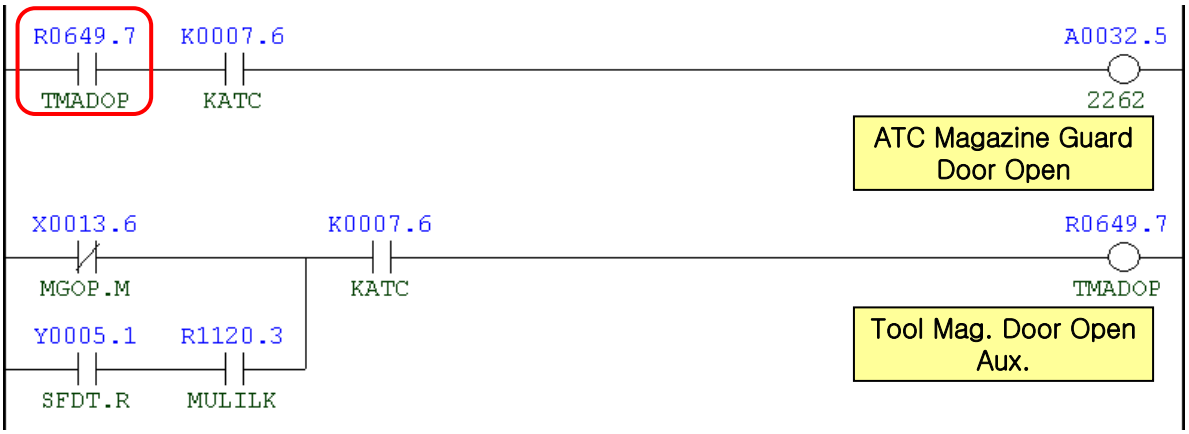
3) Action

① Close the ATC magazine guard door.

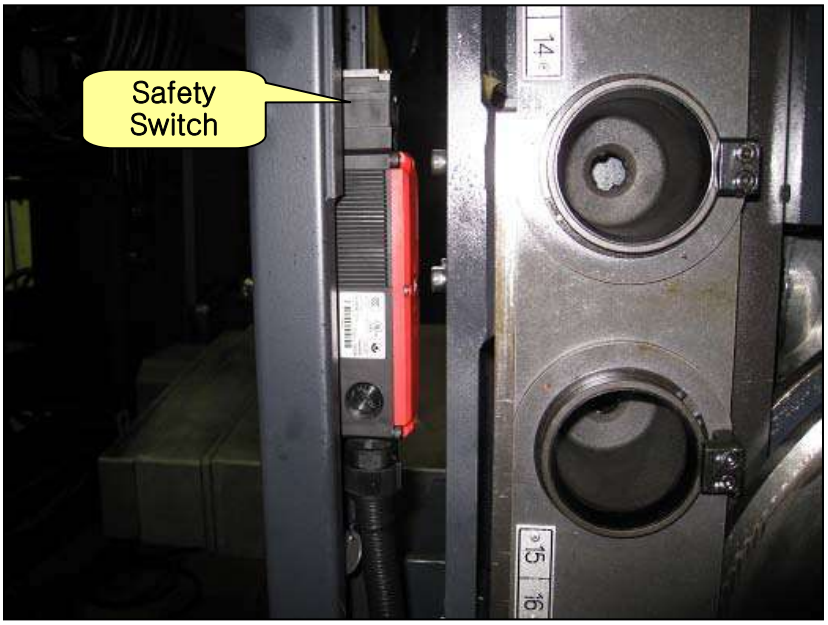
② An error in the safety switch, the wiring cables or any of its component parts

Check the safety switch, the wiring from the safety switch to the electric cabinet as well as the I/O module if there is a problem. Repair or replace the defective part if necessary.

Signal	Address	Device Symbol	I/O	Connector (Pin)	Numbering
Mag. Side Door Open	**X13.6** MGOP.M	-SS62	Input Module : Slot 08	XJ414 (1)	SS62B
Tool Magazine Door Close	**Y5.1** SFDT.R	-KAR51	Output Module : Slot 3	XJ400 (28)	KAR51



Address	Symbol	Coil Comment
R649.7	**TMADOP**	**Tool Mag. Door Open Aux.**
K7.6	KATC	ATC Not Used
A32.5	2262	ATC Magazine Guard Door Open
X13.6	MGOP.M	Mag. Side Door Open
Y5.1	SFDT.R	Tool Magazine Door Close
R1120.3	MULILK	Unlocking In Mag. Door Lock



4.30 2263 ATC Magazine Servo Unit Alarm

1) Description

An alarm occurred from the servo drive unit that drives the tool magazine.

2) Cause of problem

An error in the servo motor that drives the tool magazine or the servo drive itself

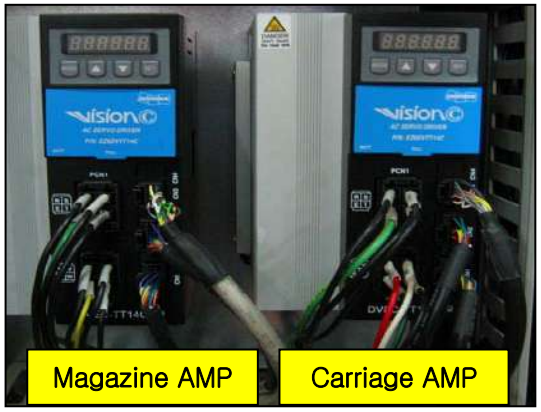
3) Action

Refer to the service manual of the servo motor or the servo drive, and make repair or replacement if necessary.

☞ Refer to "Troubleshooting by the servo drive alarm".

Signal	Address	Device Symbol	I/O	Connector (Pin)	Numbering
TMG Servo Alarm	**X15.2** TALM.M	-A85	Input Module : Slot 09	XJ415 (44)	MALM

Address	Symbol	Coil Comment
X15.2	TALM.M	TMG Servo Alarm
F0.6	SA	Servo Ready
A32.6	2263	Tool Magazine Servo Unit Alarm
R652.7	ARST	Alarm Reset
K7.6	KATC	ATC Not Used



4.31 2264 Tool Magazine Battery Alarm

1) Description

A battery alarm occurred from the servo drive unit that drives the tool magazine.

2) Cause of problem

① The battery of the servo drive unit that drives the tool magazine has been discharged.

② An error in the servo drive unit or the battery case, the wiring, or the connector

3) Action

① Replace the current battery with a new one.

② Refer to the service manual of the servo drive, and make repair or replacement if necessary.

☞ Refer to "Troubleshooting by the servo drive alarm".

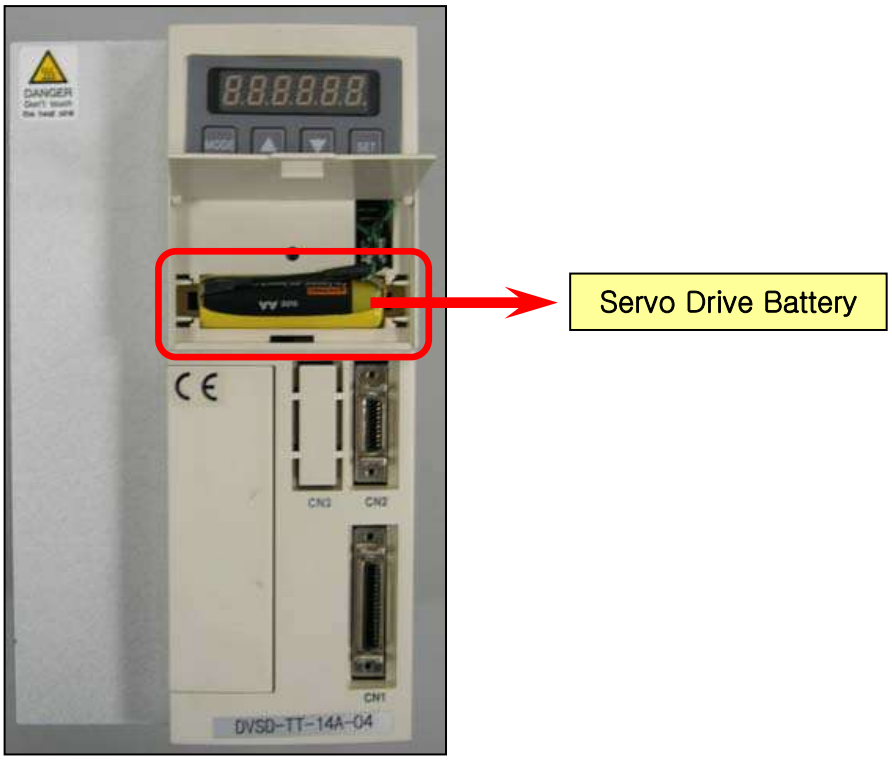
Signal	Address	Device Symbol	I/O	Connector (Pin)	Numbering
TMG Servo Alarm	**X15.3** TALM.M	-A85	Input Module : Slot 09	XJ415 (44)	MBAL

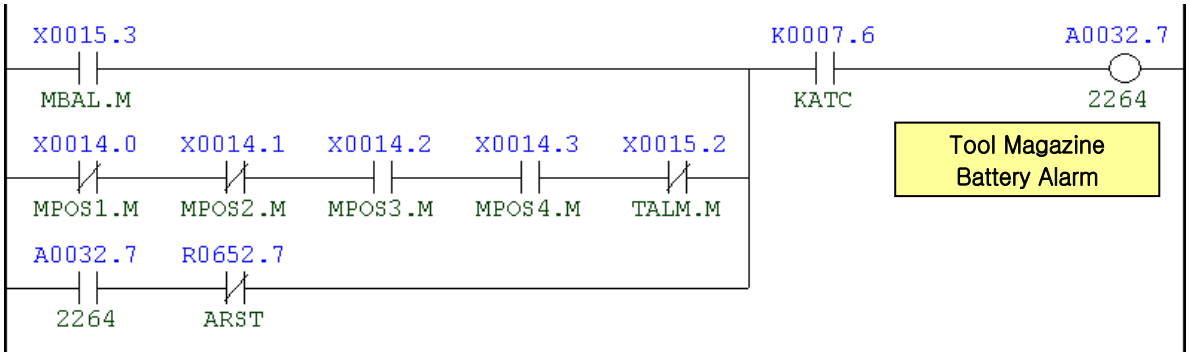
▪ The servo drive that is connected to the motor consumes the battery for driving itself if no main (external) power is applied.

▪ Battery life (Max current consumption: 150μA)

1.44 ~ 1.5 years at 25℃

0.89 ~ 0.96 year at 75℃





Address	Symbol	Coil Comment
X15.3	MBAL.M	ATC Magazine Alarm
X14.0	MPOS1.M	TMG Servo Pos. 1 Input
X14.1	MPOS2.M	TMG Servo Pos. 2 Input
X14.2	MPOS3.M	TMG Servo Pos. 3 Input
X14.3	MPOS4.M	TMG Servo Pos. 4 Input
X15.2	TALM.M	TMG Servo Alarm
A32.7	2264	Tool Magazine Battery Alarm
R652.7	ARST	Alarm Reset
K7.6	KATC	ATC Not Used

4.32 2265 Tool Magazine Servo Unit Off Signal Error

1) Description

The verification signal (that verifies the position of the servo) from the tool magazine servo drive unit has turned off.

2) Cause of problem

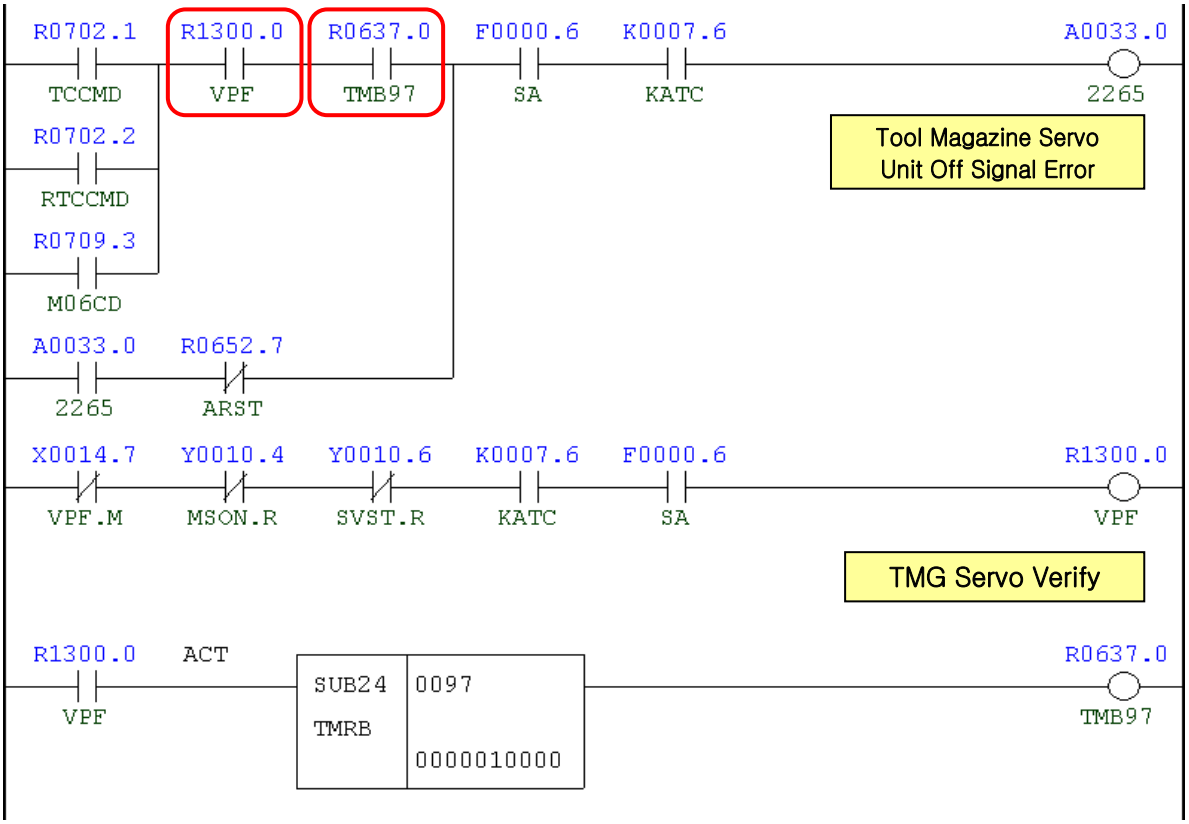
The verification signal that verifies the position of the tool magazine servo has turned off.

3) Action

① Manually operate the magazine to move it to the right position.

② Refer to the service manual of the servo drive, and make repair or replacement if necessary. ☞ Refer to "Troubleshooting by the servo drive alarm".

Signal	Address	Device Symbol	I/O	Connector (Pin)	Numbering
TMG Servo Verify	**X14.7** (VPF.M)	-A85	Input Module : Slot 09	XJ415 (46)	MVPF
TMG Servo On	**Y10.4** (MSON.R)	- A85	Output Module : Slot 4	XJ410 (23)	MSON
TMG Servo Start	**Y10.6** (SVST.R)	- A85	Output Module : Slot 4	XJ410 (22)	MST



Address	Symbol	Coil Comment
R702.1	TCCMD	T-Code Command
R702.2	RTCCMD	Re-Charge T-Code Command
R709.3	M06CD	M06 Command
R1300.0	**VPF**	**TMG Servo Verify**
R637.0	**TMB97**	
A33.0	2265	Tool Magazine Servo Unit VPF S
R652.7	ARST	Alarm Reset
F0.6	SA	Servo Ready
K7.6	KATC	ATC Not Used
X14.7	VPF.M	TMG Servo Verify
Y10.4	MSON.R	TMG Servo On
Y10.6	SVST.R	TMG Servo Start

4.33 2266 Servo Tool Magazine Number Mismatched

1) Description

The tool magazine was instructed to rotate but no position verification signal came out within 50 seconds since then.

2) Cause of problem

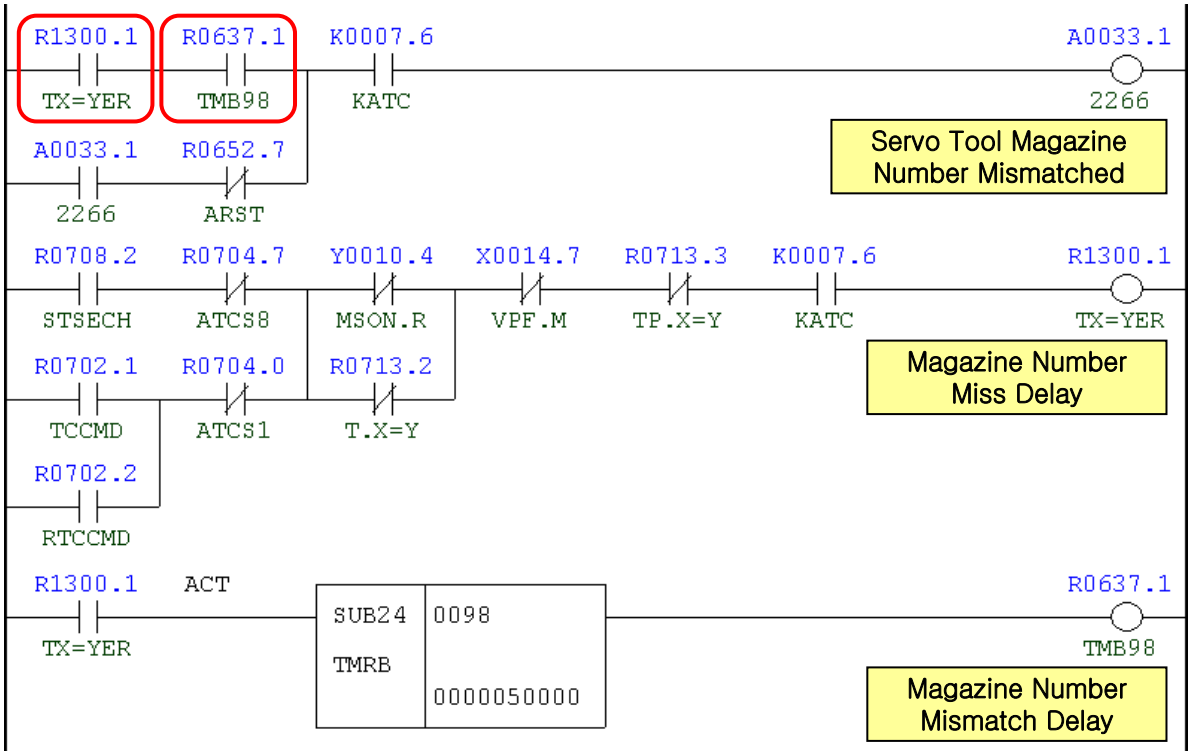
① The tool magazine servo motor has lost its reference point.

② An error in the servo drive unit, the wiring, or the connector

3) Action

① Reset the reference point for the tool magazine manually.

② Refer to the service manual of the servo drive, and make repair or replacement if necessary. ☞ Refer to "Troubleshooting by the servo drive alarm".



Address	Symbol	Coil Comment
R1300.1	**TX=YER**	
R637.1	**TMB98**	**Magazine Number Miss Delay**
A33.1	2266	Servo Tool Magazine Number Mismatch
R652.7	ARST	Alarm Reset
K7.6	KATC	ATC Not Used

Address	Symbol	Coil Comment
R708.2	STSECH	Spindle Tool Search
R704.7	ATCS8	Do.8 (Changer Spindle Side)
Y10.4	MSON.R	TMG Servo On
R702.1	TCCMD	T-Code Command
R702.2	RTCCMD	Re-Charge T-Code Command
R704.0	ATCS1	ATC Step1(Changer Magazine Side)
R713.2	T.X=Y	Command Tool Number X=Y
X14.7	VPF.M	TMG Servo Verify
R713.3	TP.X=Y	Tool Pot X=Y

4.34 2269 Tool Magazine Pot Detection Check Alarm

1) Description

The tool magazine has a tool inserted, which is supposed to be empty.

2) Cause of problem

① An incorrect spindle tool number was called.

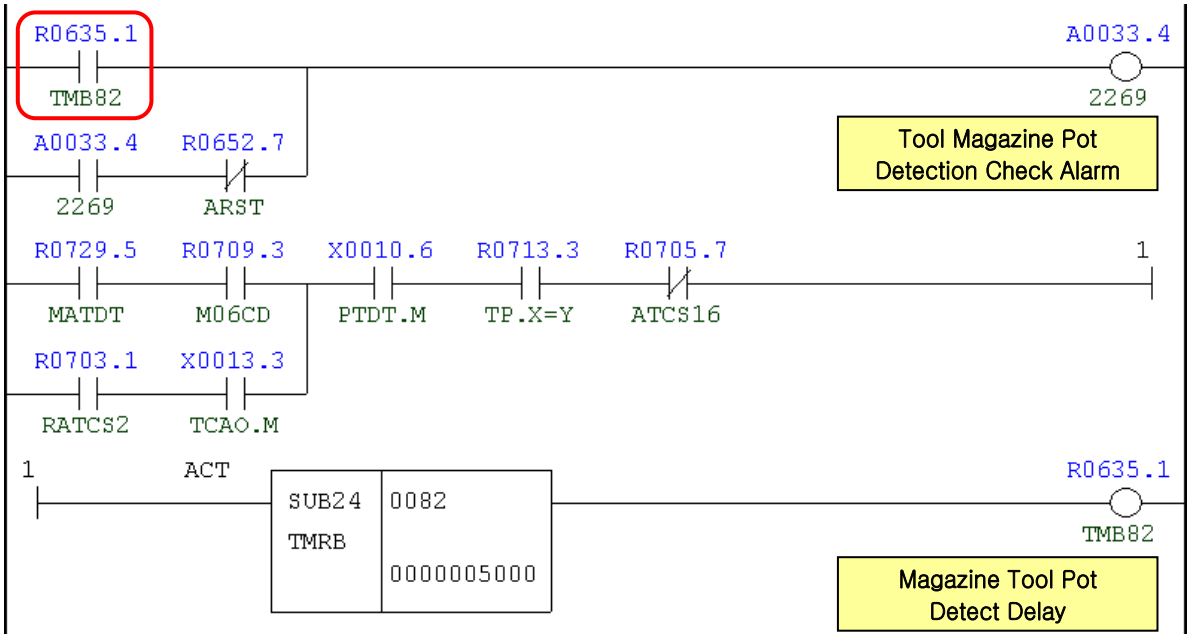
② An error in the tool pot sensor

3) Action

① Check the numbers of the spindle tool data and the waiting tool data in PMC > D-Data, correct them as appropriate, and try again.

② Check the proximity switch, the wiring from the proximity switch to the electric cabinet as well as the input module if there is a problem. Repair or replace the defective part if necessary.

Signal	Address	Device Symbol	I/O	Connector (Pin)	Numbering
Tool Mag. Pot Tool Detect	**X10.6** PTDT.M	-A85	Input Module : Slot 09	XJ415 (46)	MVPF



Address	Symbol	Coil Comment
R635.1	**TMB82**	**Magazine Tool Detect Delay**
A33.4	2269	Tool Magazine Pot Detection Check Alarm
R652.7	ARST	Alarm Reset

Address	Symbol	Coil Comment
R729.5	MATDT	Magazine Tool Detect Aux.
R709.3	M06CD	M06 Command
R703.1	RATCS2	DO.2(Changer Arm Out)
X13.3	TCAO.M	Tool Changer Arm Out
X10.6	PTDT.M	Tool Mag. Pot Tool Detect
R713.3	TP.X=Y	Tool Pot X=Y
R705.7	ATC16	DO.16(Changer Arm Out)

4.35 2270 Tool Pull Out Switch Alarm

1) Description

The position sensor on the air cylinder that performs the Tool Pull Out operation has turned off.

2) Cause of problem

① An error in adjusting the Tool Magazine Tool Pull Out limit switch

② An error in the limit switch or any of its electric parts

3) Action

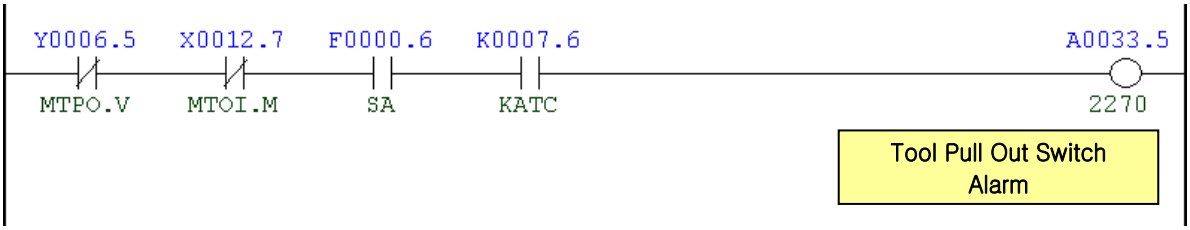
① An error in adjusting the position sensor switch

Adjust the read switch on the air cylinder that performs the Tool Magazine Pot Tool Out operation.

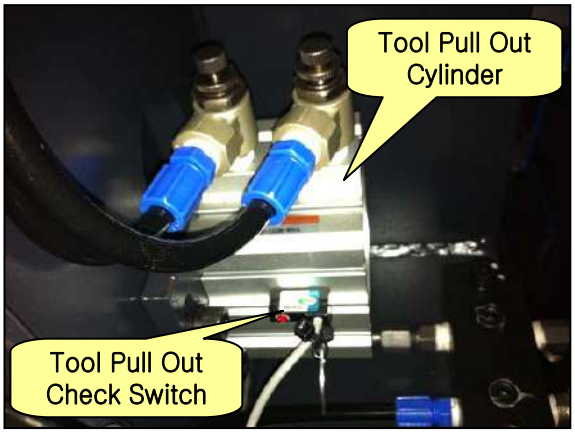
② An error in wiring or component parts

Check the read switch, the wiring from the read switch to the electric cabinet as well as the input module if there is a problem. Repair or replace the defective part if necessary.

Signal	Address	Device Symbol	I/O	Connector (Pin)	Numbering
Tool Mag. Tool Out Interlock	**X12.7** (MTOI.M)	-SL75	Input Module Slot : 08	XJ415 (46)	SL75
Manual Tool Push Out	**Y6.5** (MTPO.V)	-KAR65	Output Module Slot : 4	XJ410 (22)	YV74



Address	Symbol	Coil Comment
Y6.5	MTPO.V	Manual Tool Push Out
X12.7	MTOI.M	Tool Mag. Tool Out Interlock
F0.6	SA	Servo Ready
K7.6	KATC	Servo Ready
A33.5	2270	Tool Pull Out Switch Alarm


Tool Pull Out
Cylinder
Tool Pull Out
Check Switch


Tool Pull Out
Foot Switch

4.36 2282 Carriage Servo Unit Alarm

1) Description

An alarm occurred from the servo drive unit that drives the ATC carriage.

2) Cause of problem

An error in the servo motor that drives the ATC carriage or the servo drive itself

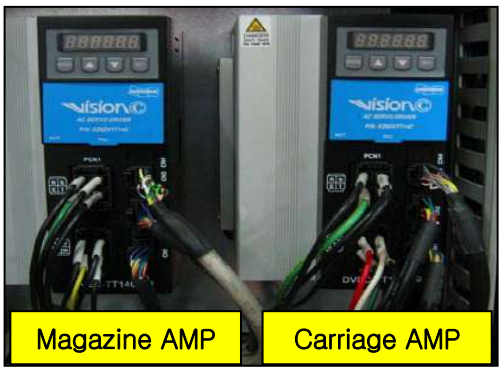
3) Action

Refer to the service manual of the servo motor or the servo drive, and make repair or replacement if necessary.

☞ Refer to "Troubleshooting by the servo drive alarm".

Signal	Address	Device Symbol	I/O	Connector (Pin)	Numbering
ATC Carriage Servo Alarm	**X17.2** CALM.M	-B14	Input Module : Slot 09	XJ415 (35)	CALM

Address	Symbol	Coil Comment
X17.2	CALM.M	ATC Carriage Servo Alarm
F0.6	SA	Servo Ready
A35.1	2282	Carriage Servo Unit Alarm
R652.7	ARST	Alarm Reset
K7.6	KATC	ATC Not Used



4.37 2283 Carriage Battery Alarm

1) Description

A battery alarm occurred from the servo drive unit that drives the ATC carriage.

2) Cause of problem

① The battery of the servo drive unit that drives the ATC carriage has been discharged.

② An error in the servo drive unit or the battery case, the wiring, or the connector

3) Action

① Replace the current battery with a new one.

② Refer to the service manual of the servo drive, and make repair or replacement if necessary.

☞ Refer to "Troubleshooting by the servo drive alarm".

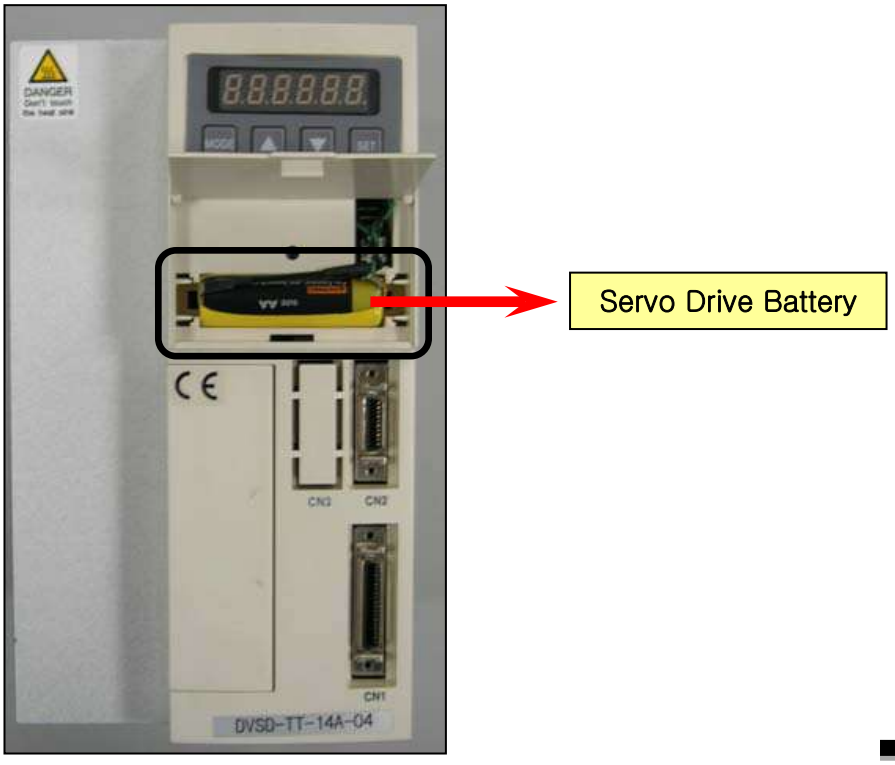
Signal	Address	Device Symbol	I/O	Connector (Pin)	Numbering
ATC Battery Alarm	**X17.3** (CBAL.M)	-A85	Input Module : Slot 09	XJ415 (44)	MBAL

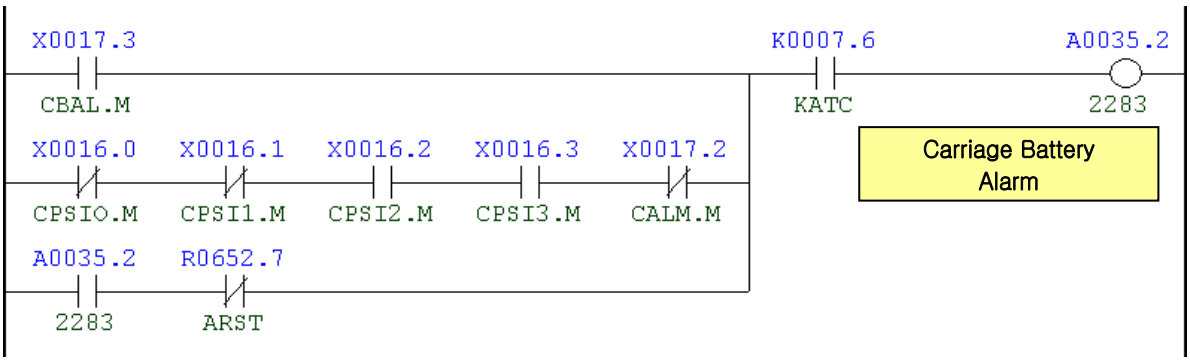
▪ The servo drive that is connected to the motor consumes the battery for driving itself if no main (external) power is applied.

▪ Battery life (Max current consumption: 150μA)

1.44 ~ 1.5 years at 25℃

0.89 ~ 0.96 year at 75℃





Address	Symbol	Coil Comment
X17.3	CBAL.M	ATC Battery Alarm
X16.0	CPSI0.M	ATC Servo Carriage Pos0
X16.1	CPSI1.M	ATC Servo Carriage Pos1
X16.2	CPSI2.M	ATC Servo Carriage Pos2
X16.3	CPSI3.M	ATC Servo Carriage Pos3
X17.2	CALM.M	ATC Carriage Servo Alarm
A35.2	2283	Carriage Battery Alarm
R652.7	ARST	Alarm Reset
K7.6	KATC	ATC Not Used

4.38 2284 Carriage Servo Unit Off Signal Error

1) Description

No position verification signal had come out within 30 seconds after the carriage was instructed to move.

2) Cause of problem

① The carriage servo motor has lost its reference point.

② An error in the servo drive unit, the wiring, or the connector

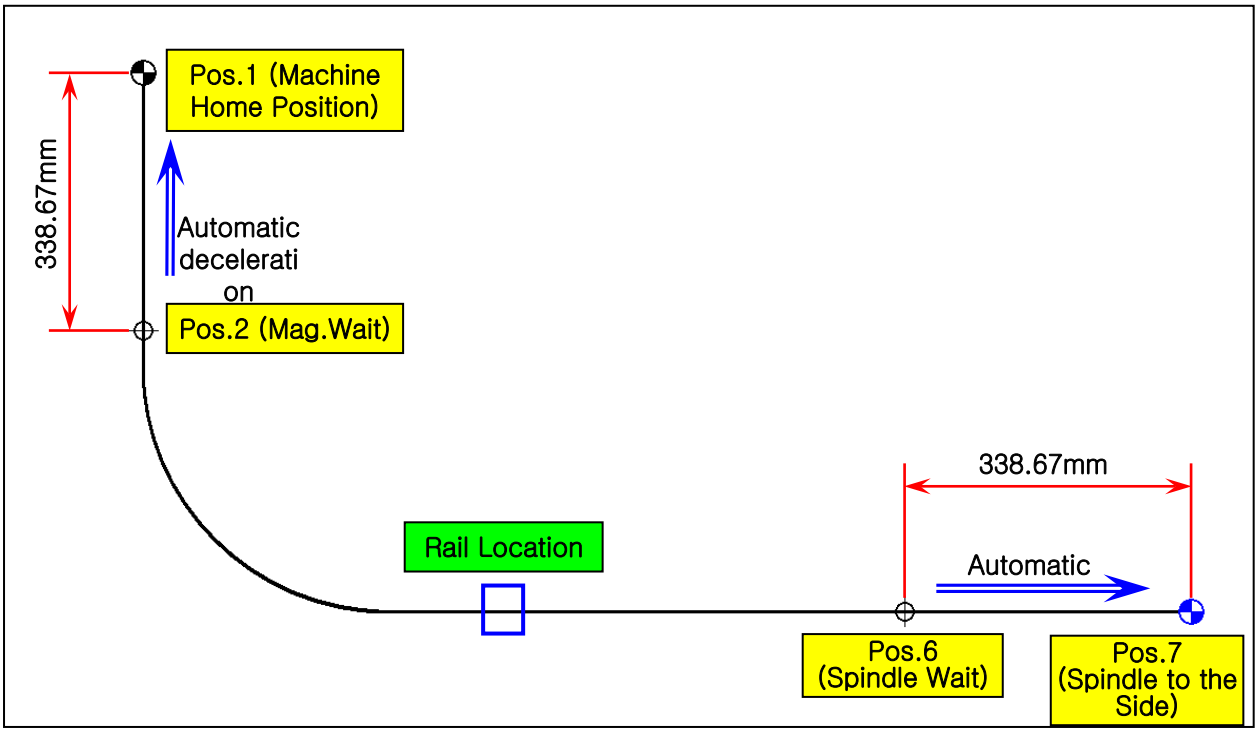
3) Action

① Reset the reference point for the carriage manually.

② Refer to the service manual of the servo drive, and make repair or replacement if necessary.

☞ Refer to "Troubleshooting by the servo drive alarm".

Note) Carriage Position

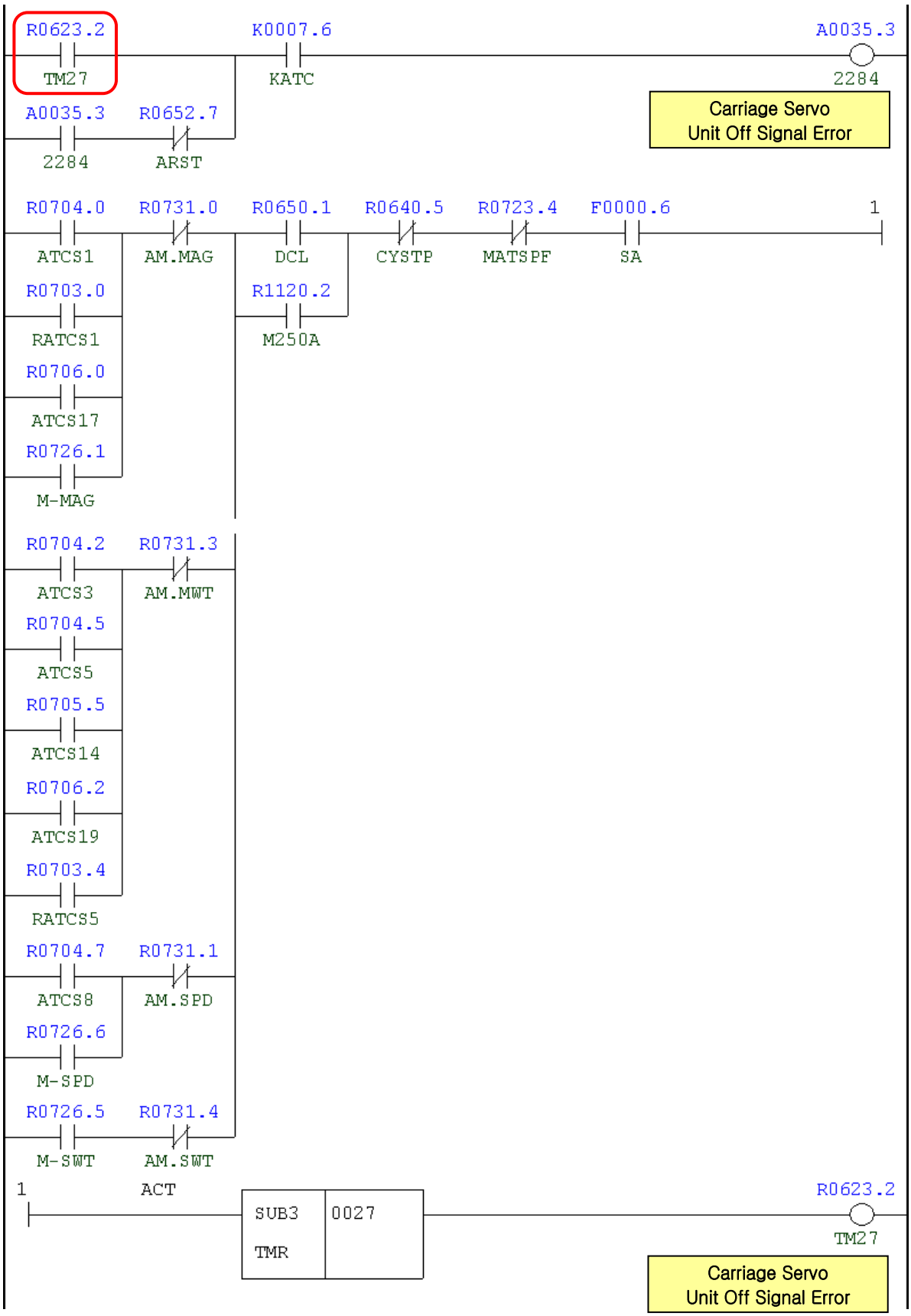


1) Position 1 (Machine Home Position): Tool Changer Arm Magazine Pot Position

2) Position 2 (Magazine Wait) : Tool Changer Arm Magazine Waiting Position (Home Position)

3) Position 6 (Spindle Wait) : Tool Changer Arm Spindle Waiting Position

4) Position 7 (Spindle Side : Tool Changer Arm Spindle Side Position


R0623.2
TM27
K0007.6
KATC
A0035.3
2284
Carriage Servo
Unit Off Signal Error
A0035.3
2284
R0652.7
ARST
R0704.0
ATCS1
R0731.0
AM.MAG
R0650.1
DCL
R0640.5
CYSTP
R0723.4
MATSPF
F0000.6
SA
1
R0703.0
RATCS1
R1120.2
M250A
R0706.0
ATCS17
R0726.1
M-MAG
R0704.2
ATCS3
R0731.3
AM.MWT
R0704.5
ATCS5
R0705.5
ATCS14
R0706.2
ATCS19
R0703.4
RATCS5
R0704.7
ATCS8
R0731.1
AM.SPD
R0726.6
M-SPD
R0726.5
M-SWT
R0731.4
AM.SWT
1
ACT
SUB3
TMR
0027
R0623.2
TM27
Carriage Servo
Unit Off Signal Error

Address	Symbol	Coil Comment
R623.2	**TM27**	**ATC Changer Pos. Error Check Time 1**
A35.3	2284	Carriage Servo Unit VPF Signal Error
R652.7	ARST	Alarm Reset
F0.6	SA	Servo Ready
K7.6	KATC	ATC Not Used
R704.0	ATCS1	ATC Step1 (Changer Magazine Side)
R703.0	RATCS1	Re-ATC Step1 (Changer Magazine Side)
R706.0	ATCS17	Do.17 (Changer Magazine Side)
R726.1	M-MAG	Man Changer Magazine Side
R731.0	AM.MAG	ATC Changer Magazine Side
R704.2	ATCS3	Do.3 (Changer Mag. Side Wait. Pos.)
R704.5	ATCS5	Do.6 (Changer Wait. Pos.)
R705.5	ATCS14	Do.14 (Changer Wait. Pos.)
R706.2	ATCS19	Do.19 (Changer Wait. Pos.)
R703.4	RATCS5	Do.5 (Changer Mag. Side Wait. Pos.)
R731.3	AM.MWT	ATC Changer Mag. Wait. Position
R704.7	ATCS8	Do.8 (Changer Spindle Side)
R726.6	M-SPD	Man Changer Spindle Side
R726.5	M-SWT	Man Changer Spindle Wait
R731.4	AM.SWT	ATC Changer Spindle Wait. Position
R650.1	DCL	Operator Door Close Confirm
R1120.2	M250A	Door Interlock Bypass On Aux.
R640.5	CYSTP	Cycle Stop
R723.4	MATSPF	Man ATC Stop Flag
F0.6	SA	Servo Ready

4.39 2323 B-Axis (Table) Clamp/Unclamp Alarm

1) Description

It has passed 5 seconds since the B-axis (table) clamp/unclamp pressure switch that was not conforming to the operation signal was tripped.

2) Cause of problem

① An error in the B-axis (table) clamp/unclamp pressure switch

② An error in the pressure switch, the wiring, or any of its component parts

3) Action

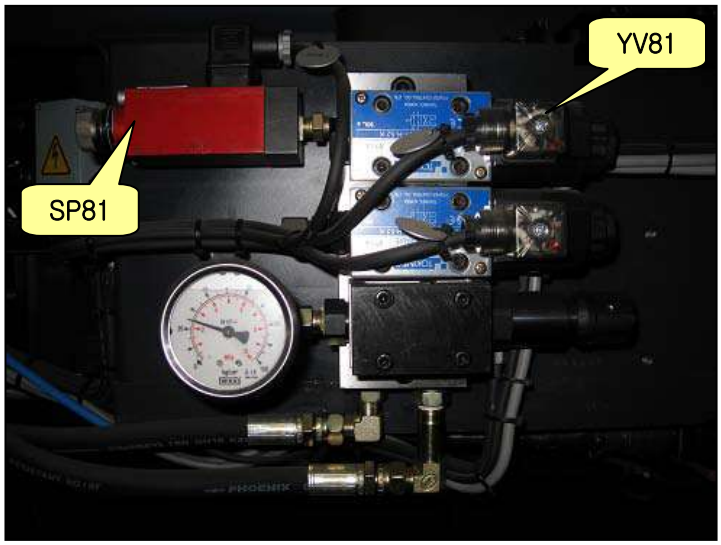
① An error in adjusting the pressure switch

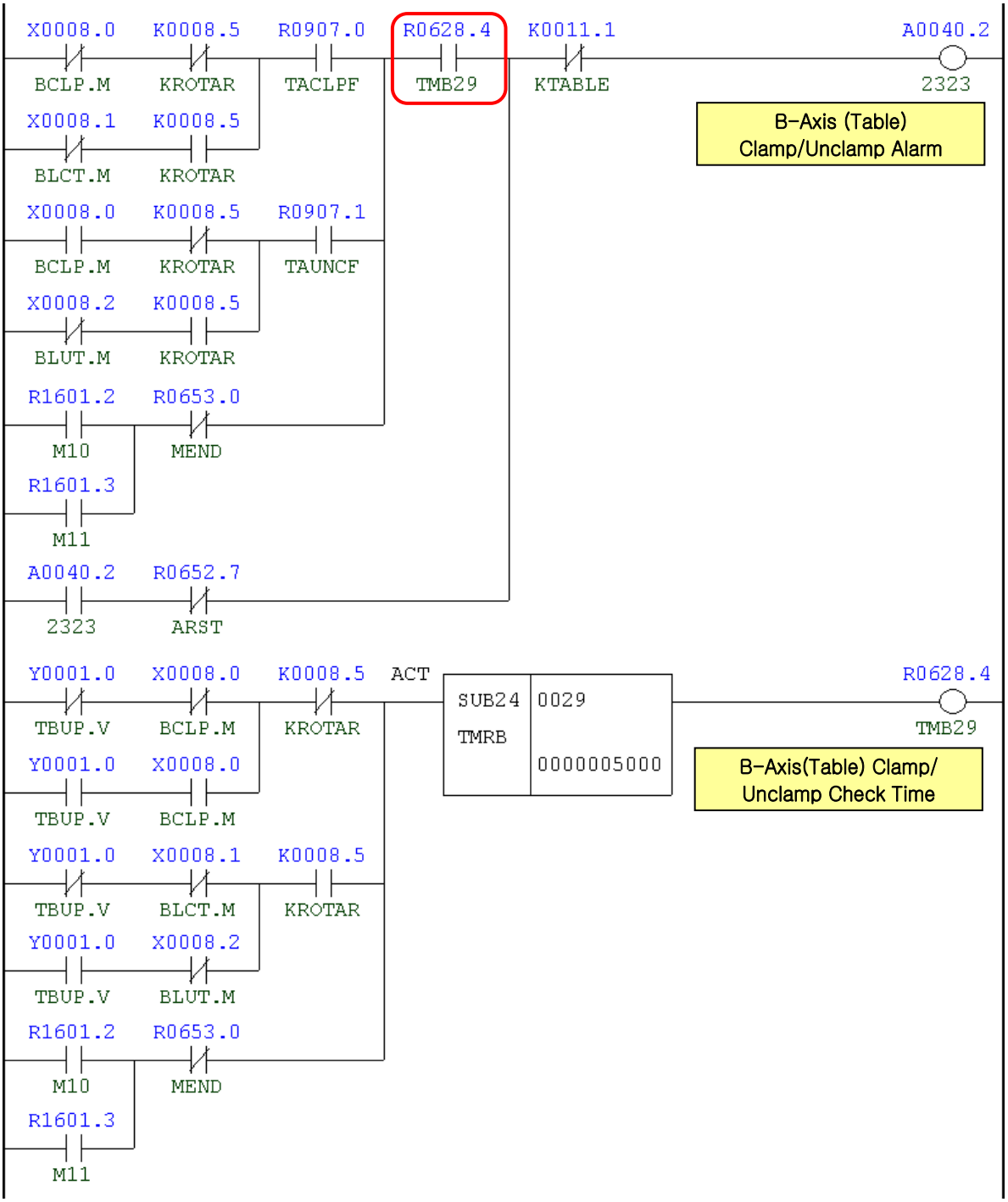
Adjust the pressure switch settings to 45 Kg/㎠ for clamping the Y axis, and 1 kg/㎠ for unclamping it.

② An error in wiring or component parts

Check the pressure switch, the wiring from the pressure switch to the electric cabinet, and the input module. Make repair or replacement if necessary.

Signal	Address	Device Symbol	I/O	Connector (Pin)	Numbering
Table Clamp	**X8.0** (BCLP.M)	-SP81	Input Module : Slot : 07	XJ413 (7)	SP81
Table(B-Axis) Unclamp Sol.	**Y1.0** (TBUP.V)	-KAR01	Output Module : Slot 1	(12)	YV81





Address	Symbol	Coil Comment
X8.0	BCLP.M	Table Clamp(Except Ruckle Table)
K8.5	KROTAR	Rucke Rotary Table Used
X8.1	BLCT.M	T-Locate(Index)/T-Clamp(45Bar)
R907.0	TACLPF	Table(B-Axis) Clamp Flag
X8.2	BLUT.M	T-Unlocate/T-Unclamp(1Bar)

Address	Symbol	Coil Comment
R907.1	TAUNCF	Table(B-Axis) Unclamp Flag
R1601.2	M10	B-Axis(Table) Clamp
R1601.3	M11	B-Axis(Table) Unclamp
R653.0	MEND	M-Function End
R628.4	**TMB29**	**B-Axis(Table) Cl/Uncl Check Time**
A40.2	2323	B-Axis(Table) Clamp/Unclamp Alarm
R652.7	ARST	Alarm Reset
K11.1	KTABLE	B-Axis Table Used
Y1.0	TBUP.V	Table(B-Axis) Unclamp Sol.

4.40 2341 ATC APC Interlock Alarm

1) Description

The ATC or the APC is not in its home position.

2) Cause of problem

① The tool magazine servo motor has lost its reference point.

② An error in the servo drive unit or the battery case, the wiring, or the connector

3) Action

① Reset the reference point for the tool magazine manually.

② Refer to the service manual of the servo drive, and make repair or replacement if necessary.

☞ Refer to "Troubleshooting by the servo drive alarm".

◈ **Note 1) ATC Interlock**

① Guide rail Unlocate : Y6.2(0), X13.4(0) or X13.5(1)

② ATC Changer Magazine Side : X16.0(1), X16.1(0), X16.2(0), X16.3(0), X10.3(1)

③ ATC Changer Mag. Wait Position : X16.0(0), X16.1(1), X16.2(0), X16.3(0)

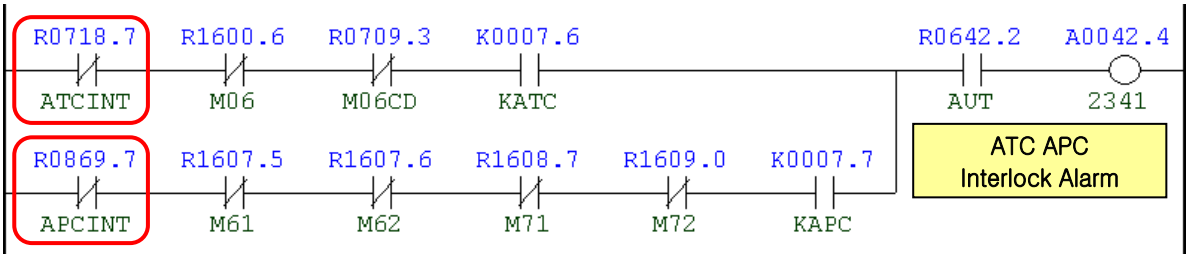
④ ATC Changer Spindle Wait Position : X16.0(0), X16.1(1), X16.2(1), X16.3(0)

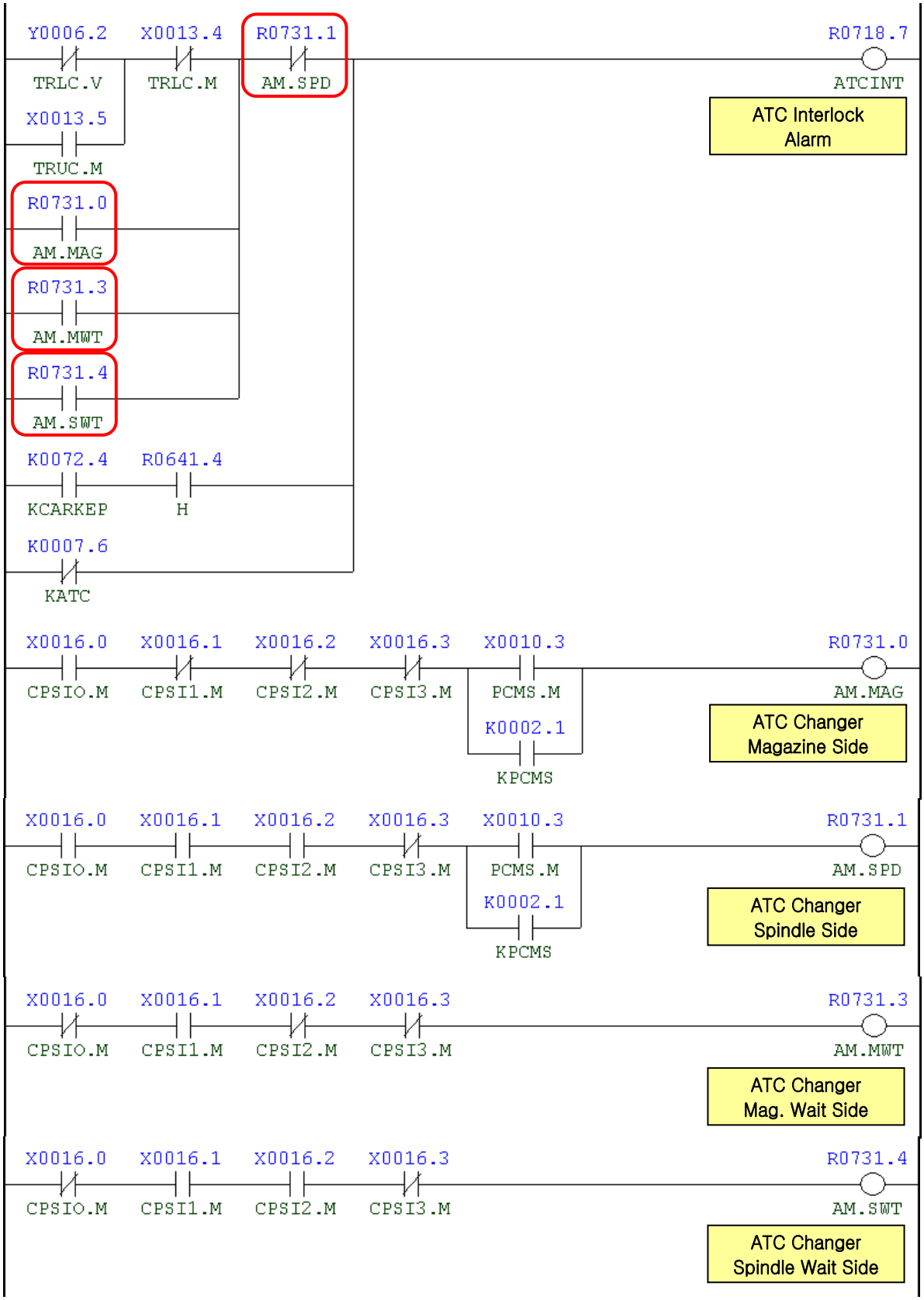
Signal	Address	Device Symbol	I/O	Connector (Pin)	Numbering
Guide Rail Locate	**Y6.2** TRLC.V	-KAR62	Output Module : Slot 03	XJ400 (39)	YV7G
Tool Changer Guide Rail Unlocate	**X13.5** TRUC.M	-SX7H	Input Module : Slot 08	XJ414 (34)	SX7H
Tool Changer Guide Rail Locate	**X13.4** TRLC.M	-SX7G	Input Module : Slot 08	XJ414 (19)	SX7G
ATC Servo Carriage Pos. 0	**X16.0** CPSI0.M	CPSI0	Input Module : Slot 09	XJ415 (7)	A1
ATC Servo Carriage Pos. 1	**X16.1** CPSI1.M	CPSI1	Input Module : Slot 09	XJ415 (24)	B2
ATC Servo Carriage Pos. 2	**X16.2** CPSI2.M	CPSI2	Input Module : Slot 09	XJ415 (39)	A2
ATC Servo Carriage Pos. 3	**X16.3** CPSI3.M	CPSI3	Input Module : Slot 09	XJ415 (6)	B3
Carriage Position Confirm	**X10.3** PCMS.M	-SX7P	Input Module : Slot 08	XJ414 (15)	SX7P

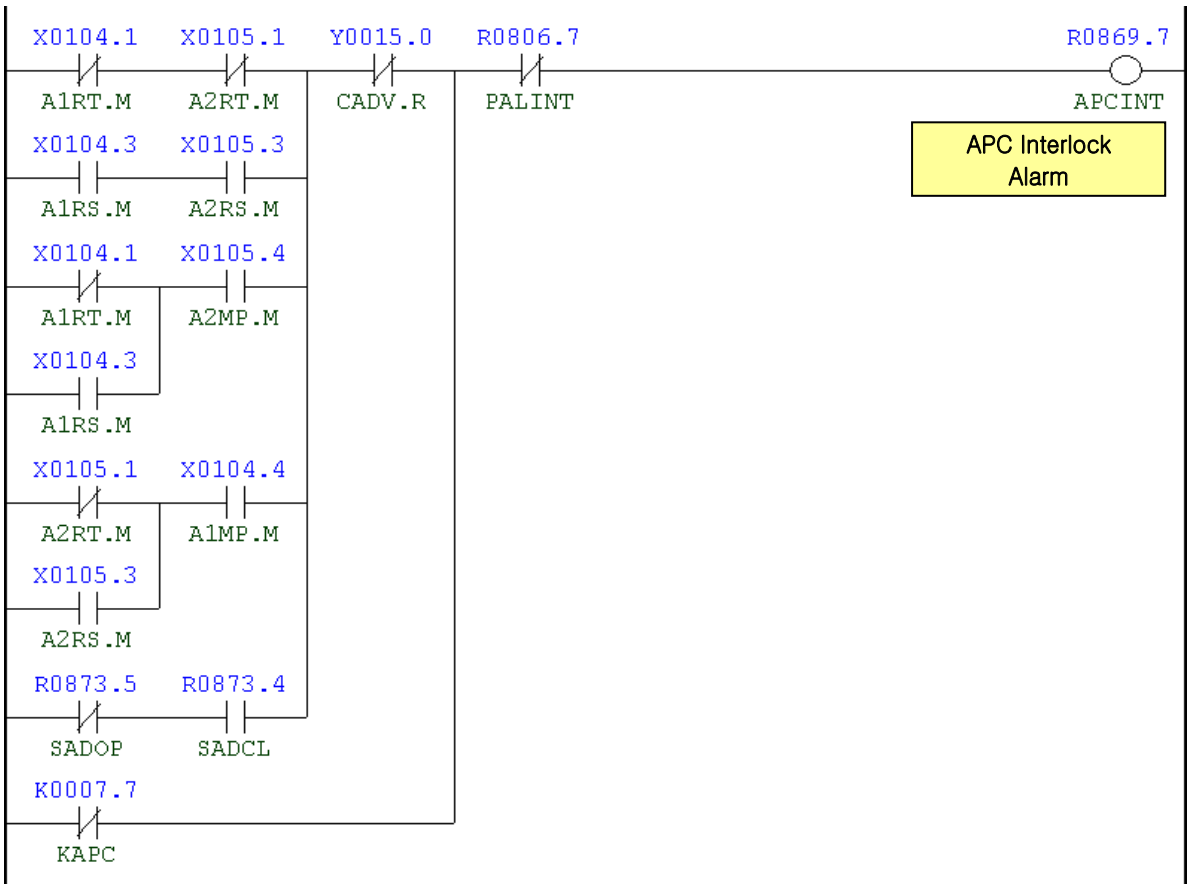
◈ Note 2) APC Interlock

① APC 1,2 Changer Arm Return : X104.1(0), X105.1(0)
② APC 1,2 Changer Arm Return Slow Down : X104.3(1), X105.3(1)
③ APC 1 Changer Middle Position : X104.1(0), X103.3(1), X105.4(1)
④ APC 2 Changer Middle Position : X105.1(0), X105.3(1), X104.4(1)
⑤ Splash Door Close : X12.0(1), X12.1(0), X12.2(1), X12.3(0)

Signal	Address	Device Symbol	I/O	Connector (Pin)	Numbering
APC1 Changer Arm Return	**X104.1** A1RT.M	-SL191	Distributed I/O Module (C)	XCE57C (B06)	SL191
APC2 Changer Arm Return	**X105.1** A2RT.M	-SL19A	Distributed I/O Module (C)	XCE57C (B10)	SL19A
APC1 Changer Arm Return Slow Down	**X104.3** A1RS.M	-SL194	Distributed I/O Module (C)	XCE57C (B07)	SL194
APC2 Changer Arm Return Slow Down	**X105.3** A2RS.M	-SL19D	Distributed I/O Module (C)	XCE57C (B11)	SL19D
APC1 Changer Middle Position	**X104.4** A1MP.M	-SL195	Distributed I/O Module (C)	XCE57C (A08)	SL195
APC2 Changer Middle Position	**X105.4** A2MP.M	-SL19E	Distributed I/O Module (C)	XCE57C (A12)	SL19E
Pallet Changer Arm Advance	**Y15.0** CADV.R	-KA91	Output Module : Slot 5	XC20B (3)	KA91
Auto Door 1 Close	**X12.0** ADC1.M	-SL110	Input Module : Slot 8	XJ414 (7)	SL110
Auto Door 1,2 Open	**X12.1** ADO12.M	-SL111	Input Module : Slot 8	XJ414 (24)	SL111
Auto Door 2 Close	**X12.2** ADC2.M	-SL112	Input Module : Slot 8	XJ414 (39)	SL112
Auto door 2 Open	**X12.3** ADO2.M	-SL113	Input Module : Slot 8	XJ414 (6)	SL113




Y0006.2
TRLC.V
X0013.4
TRLC.M
R0731.1
AM.SPD
X0013.5
TRUC.M
R0731.0
AM.MAG
R0731.3
AM.MWT
R0731.4
AM.SWT
K0072.4
KCARKEP
R0641.4
H
K0007.6
KATC
R0718.7
ATCINT
ATC Interlock Alarm
X0016.0
CPSIO.M
X0016.1
CPSI1.M
X0016.2
CPSI2.M
X0016.3
CPSI3.M
X0010.3
PCMS.M
K0002.1
KPCMS
R0731.0
AM.MAG
ATC Changer Magazine Side
R0731.1
AM.SPD
ATC Changer Spindle Side
R0731.3
AM.MWT
ATC Changer Mag. Wait Side
R0731.4
AM.SWT
ATC Changer Spindle Wait Side



Address	Symbol	Coil Comment
R718.7	**ATCINT**	**ATC Interlock**
R1600.6	M06	ATC Interlock
R709.3	M06CD	M06 Command
K7.6	KATC	ATC Used
R869.7	**APCINT**	**APC Interlock**
R1607.5	M61	APC Pallet 1 Load
R1607.6	M62	APC Pallet 2 Load
R1608.7	M71	APC Pallet 1 Unload
R1609.0	M72	APC Pallet 2 Unload
K7.7	KAPC	APC Used
R642.2	AUT	Auto Mode
A42.4	2341	ATC APC Interlock Alarm
Y6.2	TRLC.V	Guide Rail Locate
X13.5	TRUC.M	Tool Changer Guide Rail Unlocate
X13.4	TRLC.M	Tool Changer Guide Rail Locate

Address	Symbol	Coil Comment
R731.0	AM.MAG	ATC Changer Magazine Side
R731.3	AM.MWT	ATC Changer Magazine Wait Position
R731.4	AM.SWT	ATC Changer Spindle Wait Position
K72.4	KCARKEP	Carriage Not Position Keep
R641.4	H	Handle Mode
R731.1	AM.SPD	ATC Changer Spindle Side
X16.0	CPSI0.M	ATC Servo Carriage Pos.0
X16.1	CPSI1.M	ATC Servo Carriage Pos.1
X16.2	CPSI2.M	ATC Servo Carriage Pos.2
X16.3	CPSI3.M	ATC Servo Carriage Pos.3
X10.3	PCMS.M	Carriage Position Confirm
K2.1	KPCMS	Carriage Position Confirm Not Used
X104.1	A1RT.M	APC 1 Changer Arm Return
X105.1	A2RT.M	APC 2 Changer Arm Return
X104.3	A1RS.M	APC 1 Changer Arm Ret. Slow Down
X105.3	A2RS.M	APC 2 Changer Arm Ret. Slow Down
X105.4	A2MP.M	APC 2 Changer Arm Middle Position
X104.4	A1MP.M	APC 1 Changer Arm Middle Position
Y15.0	CADV.R	Pallet Changer Arm Advance
R806.7	PALINT	B-Axis or Pallet Unclamp Interlock

4.41 2389 Angular Mismatch Alarm (M121 Must Be Released)

1) Description

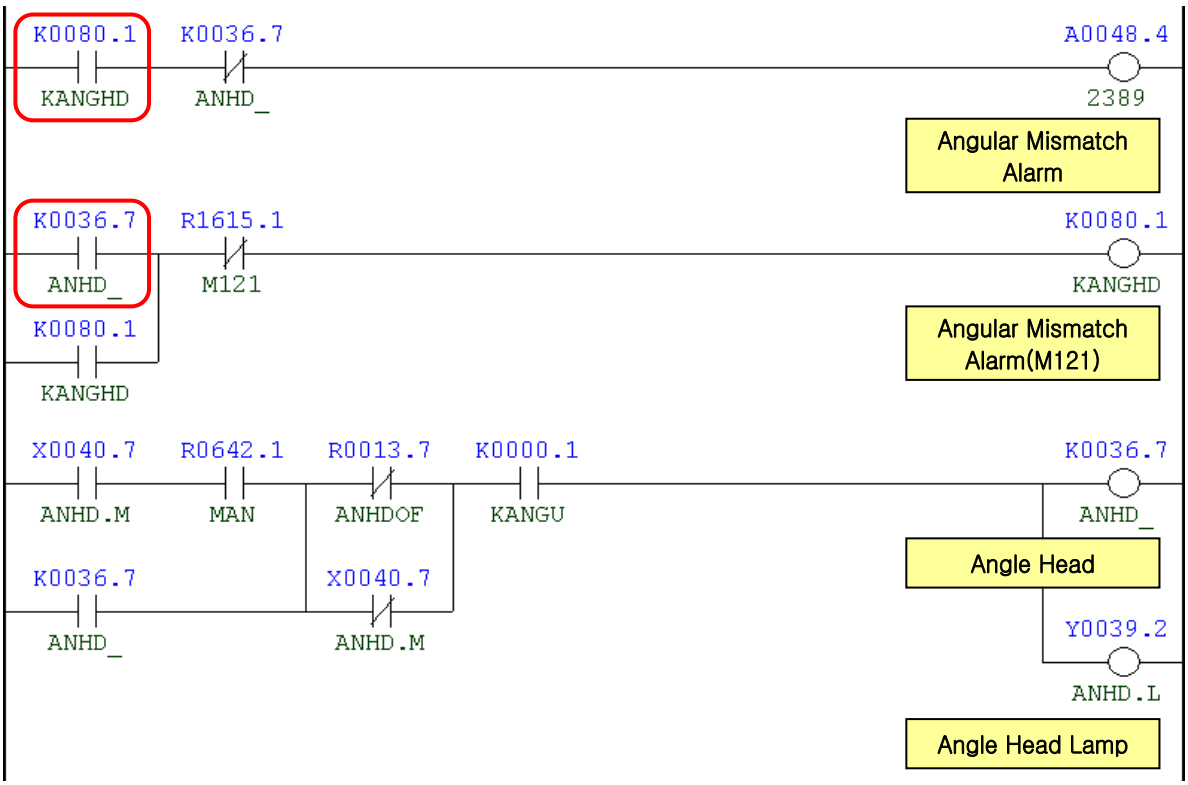
The angle head was used.

2) Cause of problem

The angle head has not been released in MDI mode since it was used.

3) Action

After you used the angle head, be sure to instruct M121 (Release the angle head) in MDI mode.



Address	Symbol	Coil Comment
K80.1	**KANGHD**	**Angular Mismatch Alarm**
K36.7	**ANHD_**	**Angle Head**
A48.4	2389	Angular Mismatch Alarm (M121 Must)
R1615.1	M121	Angle Head Release
X40.7	ANHD.M	Angle Head
R642.1	MAN	Manual Mode
R13.7	ANHDOF	Angle Head Off
K0.1	KANGU	Angular Head Used

Address	Symbol	Coil Comment
Y39.2	ANHD.L	Angle Head Lamp

4.42 2392 Facing Head Interlock

1) Description

A command of tool change was instructed while the facing head was being used.

3) Action

Remove the facing head and instruct M260 for changing tools.

Address	Symbol	Coil Comment
R1600.6	M06	ATC Change Macro Call
K80.7	KFACKEP	
K80.1	KANGHD	Angular Mismatch Alarm
A48.7	2392	Facing Head Interlock
R652.7	ARST	Alarm Reset

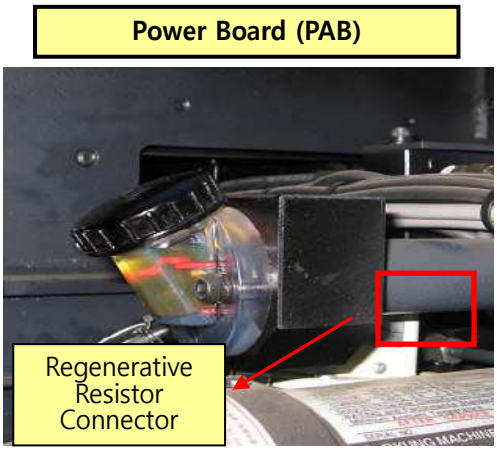
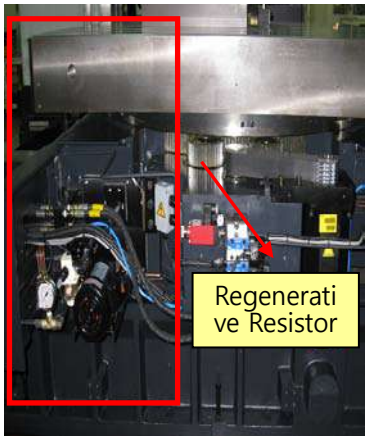
☞ Refer to "Troubleshooting by the servo drive alarm".

1) UV (Under Voltage) Alarm : This alarm warns that the main unit is running out of direct voltage.

Message	AL P-UV
Description	This alarm is tripped when the internal DC link voltage falls below the set value.
Troubleshooting	▪ Measure the input voltage on the drive terminal box to check if the tester reads between 200V and 220V. If not, take a necessary measure to adjust the voltage to between 200V and 220V.  ▪ Check if the motor has a short circuit. If so, replace the motor cables wherever applicable. ▪ Then, turn off the turret servo drive and turn it back on. See if there occurs the same alarm. If so, replace the drive because this alarm is tripped from the defective drive.

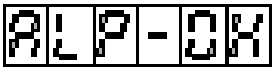
Note) The turret servo drive alarm is tripped to protect the servo drive, the motor, and the turret unit. You restart the drive and release the alarm doesn't mean either the drive or the motor has an error. You do not need to replace any of these two.

2) OV (Over Voltage) Alarm : This alarm warns that the direct voltage to the main unit is excessive.

Message	
Description	This alarm is tripped when the internal DC link voltage falls below the set value.
Troubleshooting	▪ Measure the input voltage on the drive terminal box to check if the tester reads between 200V and 220V. If not, take a necessary measure to adjust the voltage to between 200V and 220V.  ▪ Remove the drive and disconnect the regenerative resistor connector to check if the regenerative resistor (installed at a side of the drive) measures at 26Ω. If not, replace the resistor.   ▪ Check if the motor has a short circuit. If so, replace the motor cables wherever applicable. ▪ Then, turn off the turret servo drive and turn it back on. See if there occurs the same alarm. If so, replace the drive because this alarm is tripped from the defective drive.

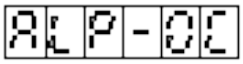
Note) The turret servo drive alarm is tripped to protect the servo drive, the motor, and the turret unit. You restart the drive and release the alarm doesn't mean either the drive or the motor has an error. You do not need to replace any of these two.

3) OH (Over Heat) Alarm : This is a overheat alarm.

Message	
Description	This alarm is tripped if the internal IPM device is overheat or has an error.
Troubleshooting	▪ Turn off the turret servo drive and wait until it cools down. Then, turn it back on and see if the same alarm occurs again. If the problem persists, replace the drive because the IPM module of the drive is defective.

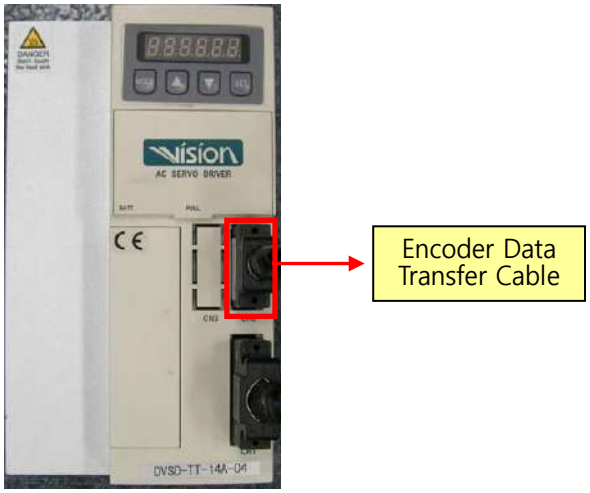
Note) The turret servo drive alarm is tripped to protect the servo drive, the motor, and the turret unit. You restart the drive and release the alarm doesn't mean either the drive or the motor has an error. You do not need to replace any of these two.

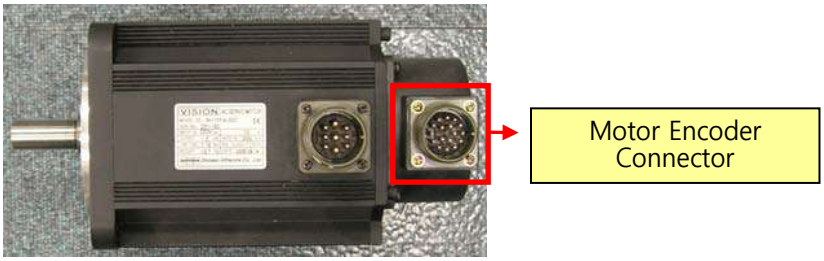
4) OC (Over Current) Alarm : This is an over-current alarm.

Message	
Description	This alarm is tripped when the motor is over-currented.
Troubleshooting	▪ Check if the acceleration parameter (No. 29) and the deceleration parameter (No. 30) are set to less than specified. ▪ Check the wiring of the motor power cable, and replace it if necessary.

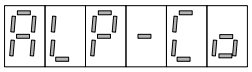
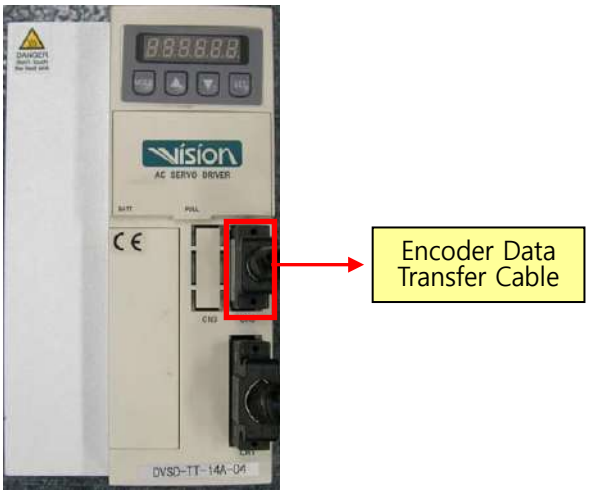
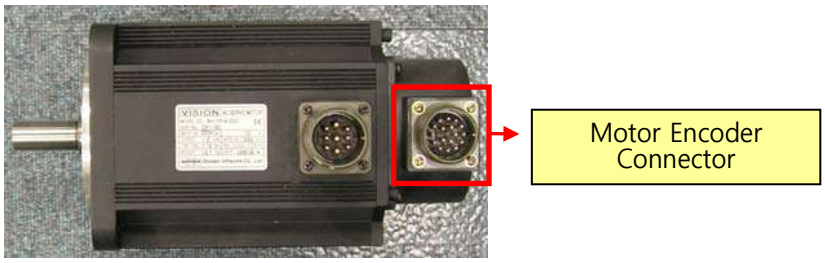
Note) The turret servo drive alarm is tripped to protect the servo drive, the motor, and the turret unit. You restart the drive and release the alarm doesn't mean either the drive or the motor has an error. You do not need to replace any of these two.

5) CA Alarm : This is an encoder-related alarm, against which the troubleshooting action differs according to the drive version (11 bit old drive, and 17 bit new drive).

<table>
<tr><td>Message</td><td colspan="2">AL P-CA</td></tr>
<tr><td rowspan="2">Description</td><td>11 Bit</td><td>▪ This alarm occurs if A, B, or Z of the encoder signals has an error.</td></tr>
<tr><td>17 Bit</td><td>▪ This alarm occurs when the turret servo drive is turned on before the encoder is reset.</td></tr>
<tr><td rowspan="2">Troubleshooting</td><td>11 bit</td><td>▪ Disconnect the encoder data transfer cable from the turret servo drive, and reconnect it as it may be connected improperly.
▪ Check the wiring of the encoder data transfer cable, and replace it if necessary.
 

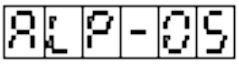
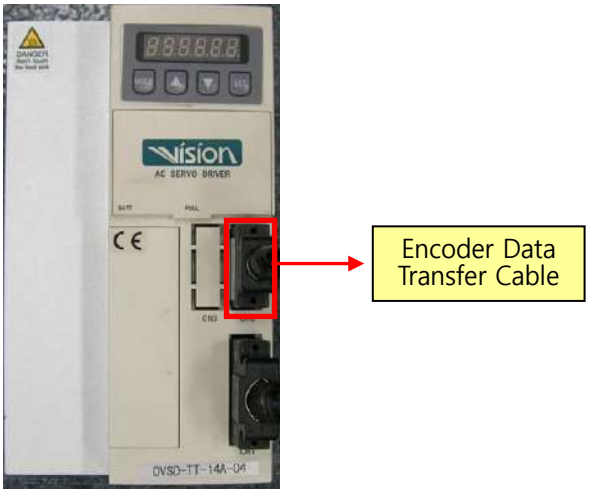
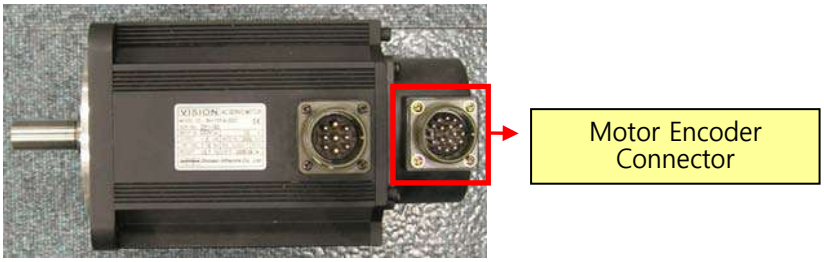
▪ Check if the motor encoder connector is short-circuited. If so, replace the motor.
 
</td></tr>
<tr><td>17 bit</td><td>▪ Turn off the turret servo drive to reset the motor encoder. 5 seconds after the encoder is reset, turn back on the turret servo drive. The alarm will be released.
▪ This action applies to turret servo drive versions of DVSD-TT-14A through DVSD-TT-14A-04. For later versions than DVSD-TT-14A-05, the CA alarm is deleted.</td></tr>
</table>

6) CO Alarm : This alarm applied to the 17-bit turret servo drive version of DVSD-TT-14A-05 or later, which is related to a signal error in the encoder.

Message	
Description	This alarm occurs if the signal from the encoder has an error.
Troubleshooting	▪ Disconnect the encoder data transfer cable from the turret servo drive, and reconnect it as it may be connected improperly. ▪ Check the wiring of the encoder data transfer cable, and replace it if necessary.  ▪ Check if the motor encoder connector is short-circuited. If so, replace the motor. 

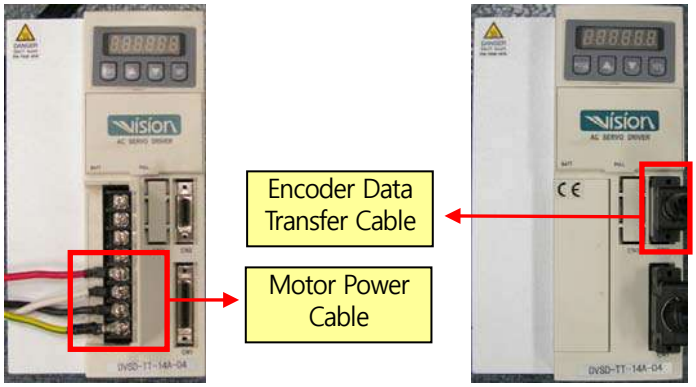
Note) The turret servo drive alarm is tripped to protect the servo drive, the motor, and the turret unit. You restart the drive and release the alarm doesn't mean either the drive or the motor has an error. You do not need to replace any of these two.

7) OS (Over Speed) Alarm : This is an over-speed alarm.

Message	
Description	This alarm occurs when the motor speed exceeds the limit.
Troubleshooting	▪ Disconnect the encoder data transfer cable from the turret servo drive, and reconnect it as it may be connected improperly.  ▪ Check the wiring of the encoder data transfer cable, and replace it if necessary. ▪ Check if the motor has a short circuit. If so, replace the motor cables wherever applicable. ▪ Check if the motor encoder connector is short-circuited. If so, replace the motor. 

Note) The turret servo drive alarm is tripped to protect the servo drive, the motor, and the turret unit. You restart the drive and release the alarm doesn't mean either the drive or the motor has an error. You do not need to replace any of these two.

8) OL (Over Load) Alarm : This is an overload alarm.

Message	AL P-OL
Description	▪ This alarm occurs if the overload state lasts for more than specified. ▪ Overload detection time 250% ~ : 1 second, 220% ~ : 24 seconds, 200% ~ : 48 seconds 180% ~ : 96 seconds, 160% ~ : 192 seconds, 150% ~ : 384 seconds 140% ~ : 769 seconds, 130% ~ : 1536 seconds
Troubleshooting	Use the Keep Relay settings to set the turret to be in the state of Unclamp. Turn the turret manually and see if it rotates smoothly. If not, increase parameter no. 10 and parameter no. 11 by 10 and check the turret again. If the problem persists, the turret itself has a problem. ▪ Check if the parameters are set properly. (Note) For the 11-bit AS turret servo drive of DASD-CT15SPXC-05 or later versions, and the 17-bit new turret servo drive of DVSD-TT-14A-04 or later versions, parameter no. 4 is set to 2048 by default. If you change the value, you will have the overload alarm. ▪ This alarm occurs if the turret has a tool overload or asymmetric load, or has a mechanical error. Turn the turret manually while increasing parameter no. 10 and parameter no. 11 by 10 until the turret rotates smoothly. ▪ If you are using a separate Clamp/Unclamp solenoid relay, the turret will be clamped and overload the turret motor if the relay has an error, causing the overload alarm to be tripped. If this is the case, check the relay and take a necessary measure. ▪ Disconnect the motor power cable and the encoder data transfer cable from the turret servo drive, and reconnect them as they may be connected improperly. 
	▪ Check the wiring of the motor power cable and the encoder data transfer cable, and replace them if necessary. ▪ Then, turn off the turret servo drive and turn it back on. See if there occurs the same alarm. If so, replace the drive because this alarm is tripped from the defective drive.

Note) The turret servo drive alarm is tripped to protect the servo drive, the motor, and the turret unit. You restart the drive and release the alarm doesn't mean either the drive or the motor has an error. You do not need to replace any of these two.

9) SE Alarm : This is a double interruption alarm.

Message	
Description	This alarm occurs if the CPU or the MCB of the turret servo drive has an error.
Troubleshooting	▪ Reset the parameters of the turret servo drive, and set them as appropriate again. ▪ Then, turn off the turret servo drive and turn it back on. See if there occurs the same alarm. If so, replace the drive because this alarm is tripped from the defective drive (a MCB error).

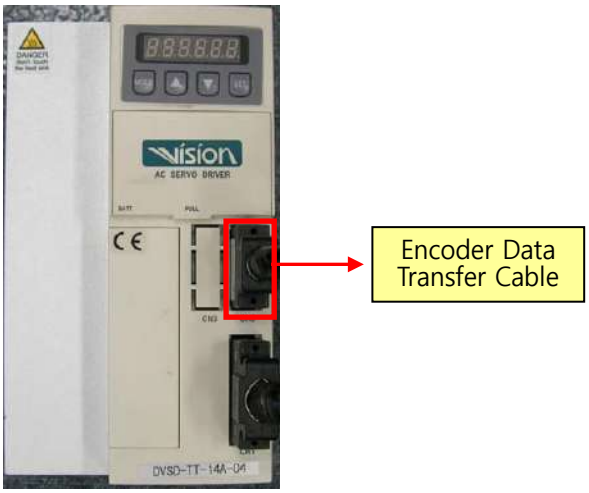
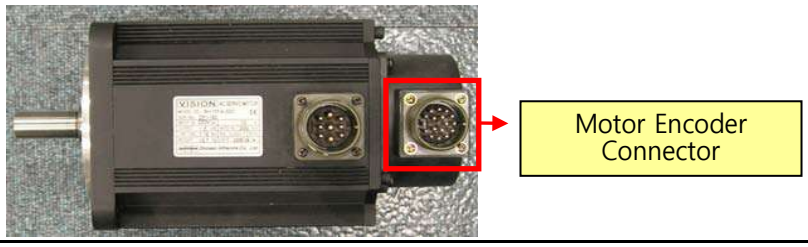
Note) The turret servo drive alarm is tripped to protect the servo drive, the motor, and the turret unit. You restart the drive and release the alarm doesn't mean either the drive or the motor has an error. You do not need to replace any of these two.

10) PE (Parameter Error) Alarm : This is a parameter error alarm.

Message	
Description	This alarm occurs if the parameters of the turret servo drive are out of the set range.
Troubleshooting	▪ Reset the parameters and the position correction values of the turret servo drive, and set the parameters again as appropriate and set the reference point again. ▪ Then, turn off the turret servo drive and turn it back on. See if there occurs the same alarm. If so, replace the drive because this alarm is tripped from the defective drive (a MCB error).

Note) The turret servo drive alarm is tripped to protect the servo drive, the motor, and the turret unit. You restart the drive and release the alarm doesn't mean either the drive or the motor has an error. You do not need to replace any of these two.

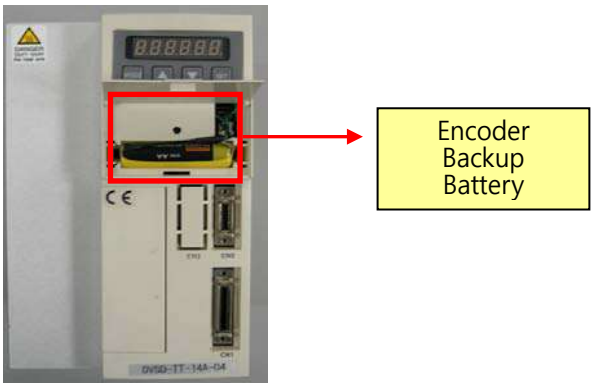
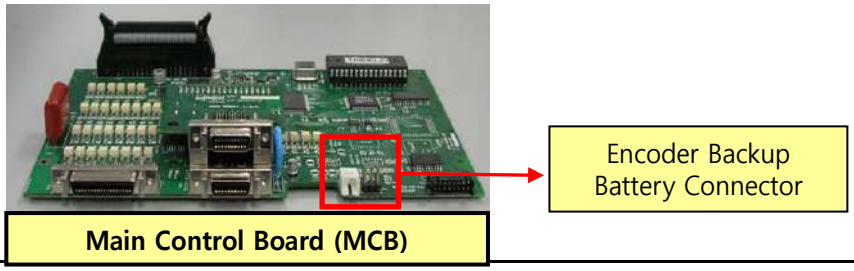
11) RP (Residue Pulse) Alarm(ALP-rP) : This alarm occurs due to an excessive position deviation.

Message	
Description	This alarm occurs if the residue pulse (RP) exceeds the limit specified for parameter no. 19 while the turret servo drive is controlling the position information.
Troubleshooting	▪ Check if parameter no. 19 of the residue pulse is set to less than specified. ▪ Disconnect the encoder data transfer cable from the turret servo drive, and reconnect it as it may be connected improperly.  ▪ Check if the motor has a short circuit. If so, replace the motor encoder cables wherever applicable. ▪ Check if the motor encoder connector is short-circuited. If so, replace the motor. 

Note) The turret servo drive alarm is tripped to protect the servo drive, the motor, and the turret unit. You restart the drive and release the alarm doesn't mean either the drive or the motor has an error. You do not need to replace any of these two.

12) EN (Battery) Alarm : This alarm occurs due to an encoder backup battery error.

- ▪ The servo drive that is connected to the motor consumes the battery for driving itself if no main (external) power is applied.
- ▪ Battery life (Max current consumption: 150μA)
  1.44 ~ 1.5 years at 25℃
  0.89 ~ 0.96 year at 75℃

Message	AL P-En
Description	This alarm is tripped when the encoder backup battery of the turret servo drive is discharged or loose.
Troubleshooting	▪ Replace the encoder backup battery of the turret servo drive.  ▪ Remove the turret servo drive and check the backup battery of the internal encoder if the battery connector is connected properly. If you find an error from the servo drive, replace the servo drive. 

Note) The turret servo drive alarm is tripped to protect the servo drive, the motor, and the turret unit. You restart the drive and release the alarm doesn't mean either the drive or the motor has an error. You do not need to replace any of these two.

Revision History
NC Boring Maintenance Manual DBC 130

Version	Year/Month	Revision history	Created by
01	2012. 10	Created a draft (DBC130ALE2A)	Jung, Sam Young
02			
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