Safety manual for those who install and set-up the tapping center

Tapping Center
TC-S2A

Please read this safety manual carefully before operating the tapping centre.

Brother Industries, Ltd. Machinery & Solution Company.

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Outline of the safety manual

Read this manual

All people who use the tapping centre, including those who install the tapping centre at the factory, who process materials by operating the tapping centre, who adjust and repair the tapping centre, are requested to read this safety manual.
In this safety manual, all people who use the tapping centre are expressed as the user.

Purpose

The tapping centre consists of high voltage electric circuits, tools which rotate at high speed, and tables and ATC magazines which move with powerful force. Therefore, various hazards are associated with the machine.
The purpose of this safety manual is to protect users from these hazards.
Therefore, the safety manual explains the following:
Warnings: types of hazards
Preventive measures: ways to prevent any hazards from occurring

Contents of Safety Manual and Relationship with Other Manuals

Each instruction manual, other than the programming manual, includes a safety manual.
Safety manuals are given to each respective personnel group.
Please read the main text of the instruction manual for machine functions and operation methods.

1.Operation manual for general operators
"Safety Manual for Operator"
"Safety manual for those who install ant set-up the tapping centre"
"Operation manual :
Operation of the machine necessary for basic operations"
English part code : 693075001

2.Operation manual for advanced personnel
"Safety Manual for Operator"
"Safety manual for those who install ant set-up the tapping centre"
"DOOR INTERLOCK FUNCTION"
"Operation manual:
Operation of the machine necessary for set-up and machining"

Conversational programming machine		NC language programming machine	
Japanese part code	: 690777001	Japanese part code	: 690779001
English part code	: 690783001	English part code	: 690785001

3.Installation manual "Safety manual for those who install and set-up the tapping centre"
"Installation manual:
Installation and assembly of the machine and its options"

Japanese part code : 690775001
English part code : 690781001

4.Programming manual "Programming manual: Creating machine programs"

Conversational programming machine		NC language programming machine	
Japanese part code	: 690692001	Japanese part code	: 690709001
English part code	: 690698001	English part code	: 690715001

5.Maintenance manual "Safety manual for those who qualified for tapping centre maintenance attached to the maintenance manual."
"Maintenance manual: Adjustment and repair of the machine"
The maintenance manual is not distributed to customers.

Relationship to safety labels

Items of particular importance that appear in this safety manual are also attached to the machine as safety labels.
An explanation of the safety labels is provided at the end of this safety manual. If any safety labels have peeled off the machine, obtain new safety labels and attach them correctly.

Language

Machines shipped domestically within Japan are provided with safety manuals and safety labels written in Japanese. Machines shipped abroad from Japan are provided with safety manuals and safety labels written in three languages: English, German, and French.
For manuals and labels in other languages, consult the dealer from which you purchased the machine.

Purchasing

When the safety manuals or safety labels have been lost, obtain these items from the dealer you have purchased the machine from.
If you do not know of a dealer, consult the offices specified below.

1-1-1 Kawagishi, Mizuho-ku, Nagoya 467-8562, JAPAN
BROTHER INDUSTRIES, LTD. Machinery & Solution Company,
phone +81-52-824-2232
fax +81-52-811-0469

Handling the safety manual

Be careful not to lose the safety manuals, and keep them handy at all times.
Also, when the machine changes hands, pass the manuals to the new owner together with the machine.

Degree of danger

The degree of danger is classified into three categories depending upon the level of damage that may occur when instructions are not observed.

1. DANGER

DANGER

Damage which may result in death or severe injury to persons.

2. WARNING

WARNING

Damage which may lead to a serious injury.

3. CAUTION

CAUTION

Damage less serious than that above.

Explanation order

The safety instructions are explained in the following order:

1. Signal words (DANGER, WARNING, CAUTION) and symbols indicating the degree of danger
2. Type of danger (Subject)
3. Type of predicted damages
4. Preventive measure

Meaning of symbols

Symbols are used on the safety labels and in the warnings in the safety manual to intuitively explain possible dangers.

1. Hazard

Slippery

Moving parts

Stumble

Caught

Electric shock

Electric shock

High temperature

High temperature

Hand pinched

Cut

Cut

Shart point

Burst

Falling object

Falling object

Fall

Rotating object

Splash

Splash

Fire

2. Preventive measures

Protect ears.

Protect hands.

Protect feet.

Remove power plug.

Connect grounding cable

Protect head.

Do not touch.

Do not disassemble.

Protect eyes.

TS2ASA01-1.ai

No.	各部の名称	Section names	Namen jedes Teils	Noms de sections	各部件名称
	日本語	English	Deutsch	Français	中文
1.	制御箱	control box	Steuerschrank	armoire de commande	控制箱
2.	ｽﾌﾟﾗｯｼｭｶﾞｰﾄﾞ	splash guard	Spitzblech	tôle pare-copeaux	火花防溅箱
3.	停止ｽｲｯﾁ	stop switch	stop Einschalter	bouton d'arrét	停止开关
4.	停止ﾗﾝﾌﾟ	stop lamp	stop Lampe	lampe d'arrêt	停止指示灯
5.	ﾄﾞｱｲﾝﾀﾛｯｸｽｲｯﾁ	door interlock switch	Verriegelungsschalter	interrupteur de la porte d'verrouillage	门互锁开关
6.	作業扉	work door	Arbeitstür	porte de travail	作业门
7.	ﾄﾞｱｲﾝﾀﾛｯｸｷｰ	door interlock key	Verriegelungsschlüssel	clef de la porte d'verrouillage	门互锁键
8.	ｽﾋﾟﾝﾄﾞﾙ	spindle	Spindel	broche	主轴
9.	ATC ﾏｶﾞｼﾞﾝ	ATC magazine	ATC Magazin	ATC magasin	ATC 刀库
10.	取手	handle	Griff	poignée	把手
11.	制御箱内部書類入れ	control box document	Dokumentenbehälter im Steuerschrank	boîte à papiers de l''armoire de commande	控制箱内书架
12.	ﾚﾍﾞﾘﾝｸﾞﾎﾞﾙﾄ	leveling bolt	Nivellierbolzen	boulon à régler le niveau de la machine	调平螺栓
13.	ｸｰﾗﾝﾄﾉｽﾞﾙ	coolant nozzle	Kühlmitteldüse	ajutage d'huile de coupe	冷却液喷嘴
14.	ｸﾞﾘｯﾌﾟｶﾊﾞｰ	grip cover	Griffschutz	couverture de jambe	夹钳套
15.	工具	tool	Werkzeug	outil	刀具
16.	工具ﾎﾙﾀﾞ	tool holder	Werkzeughalter	support à outil	刀具夹
17.	ｽﾋﾟﾝﾄﾞﾙﾍｯﾄﾞ	spindle head	Spindelkopf	tête de la broche	主轴头
18.	非常停止ｽｲｯﾁ	emergency stop switch	Notfall-stop-Schalter	bouton d'arrêt d'urgence	紧急停止开关
19.	ｹｰﾌﾞﾙｶﾊﾞｰ	cable cover	kabelschutz	couvre cable	揽绳套
20.	ﾃｰﾌﾞﾙ	table	Tisch	table	工作台
21.	主電源ﾌﾞﾚｰｶ	main power breaker	Hauptschalter	disjoncteur d’alimentation principale	主电源开关
22.	ｸｰﾗﾝﾄﾀﾝｸ	coolant tank	Kühlmitteltank	réservoir d'huile de coupe	冷却液罐
23.	ｽﾌﾟﾗｯｼｭｶﾞｰﾄﾞｻｲﾄﾞｶﾊﾞｰ	splash guard side cover	Spitzblechseitenschutz	couverture à côté du tôle pare-copeaux	火花防溅板一侧的护罩
24.	回生抵抗ｶﾊﾞｰ	regenerative resistor cover	Rückkopplungs- widerstandsschutz	couverture pour la résistance régénératrice	再生电阻罩
25.	操作ﾊﾟﾈﾙ	operation panel	Betriebstafel	panneau d'opéation	操作面板

Warnings and preventive measures

The numbers in ( ) such as 1, 2 correspond to the names of each part.

Danger **DANGER**

SD1 Various hazards are associated with the tapping center.
SD1-1 Read the safety manual before operating the machine to understand these hazards and preventive measures.
SD1-2 All users must know the position of the emergency stop switch (18) and its operation.

SD2 High voltage parts are present in the control box (1). Touching such parts by mistake may result in serious injury or death.
SD2-1 Only operators qualified for electrical work and familiar with the electric circuits of this machine are allowed to maintain and inspect the electrical components.
SD2-2 Turn off the main power breaker (21) before operation. Put up a signboard which says 'Under maintenance.'
SD2-3 When leaving the machine, close the control box door and bolt it.

SD3 You may be caught in the machine during machining, resulting in a serious injury.
SD3-1 Do not enter within the splash guard (2) during operation.
SD3-2 Press the stop switch (3) or the reset key. Visually check that the stop lamp (4) is lit and then you can put your hands, feet, and body into the machine.
SD3-3 Visually check that nobody is inside the splash guard before starting machine operation.
SD3-4 Keep your hands, feet, and body away from moving parts during operation.
SD3-5 When you have to enter the machine, turn off the main power breaker and padlock it so that the main power breaker (21) cannot be turned on.

SD4 When the door interlock switch (5) is invalid, the machine moves even when the work door (6) is open. You may cut yourself on a rotating tool (15) or be caught in the machine.
SD4-1 During machine maintainance, pay extreme attention to the machine motion so that you can stop the machine whenever required. After finishing maintenance and set-up, return the door interlock switch to valid. Pull out the door interlock key (7) for storage.
SD4-2 Do not leave the machine with the door interlock switch invalid.

SD5 When the door interlock switch (5) is invalid, the table (19) can move even when the work door (5) is open. You may be caught by the table, resulting in injury.
SD5-1 During machine set-up, pay extremely attention to the machine motion so that you can stop the machine whenever required. When you have finished machine set-up, set the door interlock switch to the ON position. Remove the door interlock key (7) that the supervisor must then always keep.

Warning **WARNING**

SW1 Touching rotating tools (15) results in injury.
SW1-1 Keep away from rotating tools.

SW2 You may be injured due to broken tools (15) or parts flung out.
SW2-1 Close the work door (6), and start machine operation.

SW3 You may be caught in the rotating part, resulting in an injury.
SW3-1 Keep away from rotating tools (15) , the spindle (8), and the ATC magazine (9).
SW3-2 Wear snug-fitting clothes. Put long hair up in cap. Do not wear gloves except for set-up operations carried out with the machine stopped. Do not wear any accessories. Do not hold the rotating part.

SW4 If the safety device is modified, its function may be altered, thus you may be caught in the machine, hit your body against the machine, or get an electric shock.
SW4-1 Do not modify safety devices. Do not alter the safety device in such a way that it does not function.

SW5 When chips scatter and get into the eyes, you may damage your eyeballs and lose your eyesight.
SW5-1 Wear safety goggles against the chips.
SW5-2 Do not blow the chips by air.

SW6 If you touch chips with bare hands, you may have your hand cut or burnt.
SW6-1 Do not touch chips with bare hands. Do not touch sharp edges of workpieces.
SW6-2 Wear gloves and use a brush to remove chips.
SW6-3 Clean cutting chips when machine is stopped.

SW7 If you grip the tool (15) blade, you may cut your hand.
SW7-1 Do not touch the edge of the tool. Always hold the shank of the tool holder (16).

SW8 Dropping a heavy object onto your foot may fracture your foot bones.
SW8-1 When lifting heavy objects, wear safety shoes.

SW9 Lifting heavy objects may cause a hernia of vertebral disk.
SW9-1 When lifting heavy objects, ask for help.
SW9-2 Lift object with the strength of your legs instead of your back.

SW10 Hearing ability is reduced when ears are exposed to excessive noise for a long period of time.
SW10-1 Use protection such as earplugs when working in a noisy environment.

SW11 You may hurt your eyes due to high pressure air bursts.
SW11-1 People other than those qualified for high pressure air handling and who understand the piping of this machine are not allowed to install or change the high pressure air piping.
SW11-2 To repair the high pressure air hose, disconnect the pressure source and release remaining pressure first. Put up a signboard which says “Under maintenance.”

SW12 You may hit your head when standing up.
SW12-1 Wear a helmet when working in and around the machine.

SW13 When the machine is operated while any tools are left in the machine, the tools may scatter and you may be injured.
SW13-1 Do not leave hand tools in the machine.

SW14 You may have your hand caught in the work door (6) if you are opening and closing while holding parts other than the handle (10).

SW14-1 Hold the handle when opening and closing the outer door.

SW15 High temperature parts are present in the control box(1). Therefore, if papers protrude from the control box document holder (11), these papers may catch fire.

SW15-1 Do not put papers larger than A4 or letter size in the control box document case.

SW16 If tools are placed on the control box (1) or the machine, these may fall down due to vibration.

SW16-1 Do not place any objects on the control box and the machine.

SW17 You may fall down and be injured when climbing on the machine or the coolant tank (22).

SW17-1 Do not climb on the machine or the coolant tank.

SW18 When putting your hand under the leveling bolts (12), you may have your hand caught, resulting in an injury.

SW18-1 Do not put your hands under the leveling bolt. Use tools to adjust the level.

SW19 When the cable is hanging down or is not covered, you may stumble or slip and fall.

SW19-1 Remove any slack in the cable. Cover the cable when placing the cable on the floor.

SW20 Remodeling the machine may affect the safety device, rendering all given warnings invalid.

SW20-1 Do not modify the machine. When modification is required, contact Brother Industries, Ltd. beforehand and ask for permission in writing.

SW21 You may have your eyes hurt if coolant splashes into your eyes.
SW21-1 When adjusting the coolant nozzle (13), wear safety goggles.
SW21-2 When coolant has splashed into your eyes, wash your eyes with clean water, and see a doctor.

SW22 If you put your finger in the clearance of the machine, you may have your finger caught, resulting in an injury.
SW22-1 Do not put fingers between grip cover (14).
SW22-2 Do not put the finger in the clearance between the tool (15) or the tool holder (16) and the ATC magazine.

SW23 When coolant, oil, or chips are scattered, you may slip and fall down, or hit yourself against something, resulting in an injury.
SW23-1 Turn off the power of the machine, clean inside and the surroundings of the machine, and then start operation.
SW23-2 Wear a helmet and safety shoes during machine installation.

SW24 When attaching and detaching tool holder (16), you may cut your hand on the edge of a tool (15) or hit your hand against the machine.
SW24-1 Do not hold the edge of the tool. Wear leather gloves. Hold the tool holder with both hands.

SW25 The machine may suddenly move or tools may fall down.
SW25-1 When the stop lamp (4) is not lit, do not put your hands, feet, and body under the spindle head (17).
SW25-2 Draw the pallet toward the operator to set-up the pallet changer.
SW25-3 Turn off the main power breaker (21), padlock the main power breaker so that it cannot be turned on, and apply grease.

SW26 When machining workpiece using an oil type coolant, the machined part may heat up and catch fire.
SW26-1 When using an oil type coolant, install a fire alarm and an automatic fire extinguisher.
SW26-2 When machining the workpiece, an operator must attend the machine.

SW27 If you lean on the machine, you may be caught or hit yourself against the machine when the machine moves, resulting in an injury.
SW27-1 Do not lean on the machine.

SW28 When objects are hung on the emergency stop switch (18), the emergency stop switch may not be pressed.
SW28-1 Do not hang any objects on the emergency stop switch.

SW30 Because the coolant tank (22) is heavy, you may suffer from a herniated vertebral disk or drop the tank on your feet when lifting the tank.
SW30-1 Do not lift the coolant tank even when removing chips.

SW31 When entering the machine, you may slip and fall down or be caught in the machine.
SW31-1 When entering the machine, be sure to cut the main power breaker (21), padlock the breaker so that the breaker is not turned on, and remove any coolant and chips. Also, wear safety shoes and a helmet. Put up a signboard which says “Under maintenance” near the machine.

SW32 If the splash guard (2) side cover (23) is not attached, you may be caught in the machine or injured due to broken tools.
SW32-1 Visually check that the side cover is attached before turning on the power.

SW33 Tools (15) or tool holder (16) whose weight and size exceed the specified limit may spring out while being used.
SW33-1 Use tools holder whose weight and size are within the specified limit.
SW33-2 For the limit of the tools, see the tool label attached on the machine or the operation manual.

SW34 If you touch the regenerative resistor, you may be burned because the regenerative resistor is heated during operation.
SW34-1 Do not remove the regenerative resistor cover (24).

SW35 If you touch the motor, you may be burned because the motor is heated during operation.
SW35-1 Do not touch the motor for 30 minutes after operation is finished.

SW36 If an incorrect fuse is set, a fire may break out because the protective device does not function.
SW36-1 Replace with the same rating fuse.

SW37 If the setting of thermal relay is changed, a fire may break out because the protective device does not function.
SW37-1 Do not change the setting of the thermal relay.

SW38 If the ATC magazine (9) rotates, tools (15) may hit machined workpieces, jigs, or the machine, and may be broken.
SW38-1 Set the tool length so that the tools do not contact machined workpieces, jigs, or the machine even if the ATC magazine rotates.

SW39 If the control box (1) or the operation panel (25) are wet, you may get an electric shock.
SW39-1 Do not sprinkle coolant, water, or chips on the control box and the operation panel.
SW39-2 Do not touch the control box with wet hands.

SW40 When the power PE line wired from outside is too short, the PE line may come off when the cable is pulled and you may get an electric shock.
SW40-1 Make the power PE line longer than other lines (L1, L2, L3) allowing some slack.

SW41 If the power is turned on or workpieces are machined in an explosive atmosphere, an explosion may occur due to a spark from the machine.
SW41-1 Do not carry out maintenance in an explosive atmosphere.
SW41-2 Do not turn on the power of the machine, or carry out machining or set-up in an explosive atmosphere.

SW42 If you forget to mount the splash guard side cover (23), you may get caught in the machine, resulting in injury.
SW42-1 Before turning on the power, visually check that the splash guard side cover is mounted.

SW44 Cutting chips may catch fire or explode depending on the workpiece material (e.x. Magnesium).
SW44-1 Remove any cutting chips immediately.
SW44-2 Install a fire extinguisher near the machine when machining a workpiece made of such material, and never perform unmanned operation.

SW45 The milliing inserts may come off the tool, resulting in serious injury.
SW45-1 Check that the milling inserts is secured before mounting the tool to the machine.

SW46 Fire may occur when a 3-wire sensor that includes an exclusive power line is used.
SW46-1 Use a 2-wire sensor, instead of a 3-wire sensor.
SW46-2 If it is not possible to avoid using 3-wire sensors, add a fuse (1 A or less) to the power line of each sensor.

SW47 If the terminal block screws are loose after wiring, heat may be generated due to faulty contact, causing a fire.
SW47-1 Make sure that there are no loose screws after wiring.

SW48 When the plant is poorly illuminated, inside the machine is dark and you may injure your hands on jigs or cutters.
SW48-1 Install a machine light when the illumination inside the machine is 500 lux or below.

Description of safety label

Particularly important descriptions in the safety manual are printed on a safety label, and the label is attached to the machine. Carefully read and understand the descriptions on the label before operating the machine.

The safety labels are attached to the positions shown in the illustration below. Check that the labels are not damaged. If damaged, obtain a new label for replacement.

Position of safety label

230S00C02.doc

S2A00401.ai

1. Safety label , front and side

(1) Language: English, Japanese, Chinese

Part Code : 690373001
Part Name : PS LABEL,TC FRONT JCE

(2) Language: English, German, French

This machine has hazards.
Read instruction manuals to understand hazards and avoid them before operation.

Diese Maschine birgt Gefahren.
Um Risiken zu erkennen und vermeiden, vor dem Einschalten die Betriebsanleitung lesen.

L'utilisation de cette machine comporte des risques.
Lisez les manuels d'instruction pour connaître les risques et les éviter avant d'utiliser cette machine.

DANGER	WARNING	WARNING
Machine in operation will suddenly move and crush you. Keep away from moving parts.	Broken tool or workpiece can hit and wound you. Shut door before starting machine.	Rotating parts can catch and injure you. Keep away from rotating tool, spindle, and magazine. Never hold moving parts. Do not wear gloves while operating machine.
GEFAHR	**WARNUNG**	**WARNUNG**
Maschine in Betrieb kann plötzlich laufen und Sie stoßen. Beim Betrieb der Maschine von allen bewegenden Teilen sich fernhalten, um Verletzungen zu vermeiden.	Gebrochene Werkzeuge oder Werkstücke könnten Sie treffen und verletzen. Vor dem Start der Maschine Tür schließen.	Umlaufende Teile könnten Sie fassen und verletzen. Von umlaufendem Werkzeug, Spindel und Magazin sich fernhalten. Rotierende Teile nicht berühren. Während des Bedienens keine Handschuhe tragen.
DANGER	**AVERTISSEMENT**	**AVERTISSEMENT**
En opération, cette machine bougera soudainement et provoquera des risques d'écrasement. Ne vous approchez jamais des parties mobiles.	Les outils cassés ou les pièces usinées peuvent être projetés et risquent de vous frapper et de vous blesser. Fermez la porte avant de faire démarrer la machine.	Les parties tournantes peuvent vous accrocher et vous blesser. Ne vous approchez jamais des outils tournant, de la broche et du magasin. Ne saisissez jamais les parties en mouvement. Ne portez pas de gants pendant l'utilisation.

691042001 / 0302 (2)

Part Code : 691042001
Part Name : PS LABEL,TC FRONT EGF

2. Tool label

工具、主軸回転数の制限を超えて使用すると、機械が破損する場合があります。操作前に、取扱説明書で詳細を確認して下さい。
If use beyond the limitation of the tool and spindle speed, machine may be broken.
Check the detailes by the operation manual before operation.

最高主軸回転速度	10000 min^{-1} / 16000 min^{-1}		Max Spindle Rotation Speed
主軸テーパ	7 / 24 No.30		Spindle Taper
ツールシャンク	MAS-BT30		Tool Shank
プルスタッド	MAS-P30T-2 (30°)		Retension Knob
マガジン全工具合計	M total 25 kg (14Tools) / 35 kg (21Tools)		Total in Magazine
工具の制限	D1 ≦ 40 mm L1 ≦ 200 mm D2 ≦ 80 mm L2 ≦ 160 mm D3 ≦ 46 mm L3 ≦ 30 mm M ≦ 3 kg MxH ≦ 180 kgmm	D1 ≦ 40 mm L1 ≦ 200 mm D2 ≦ 55 mm L2 ≦ 160 mm D3 ≦ 46 mm L3 ≦ 30 mm M ≦ 2 kg MxH ≦ 100 kgmm	Limitation of Tool
工具バランス制限	100 grmm	50 grmm	Limitation of Tool Balance
主軸回転数制限	10000 min^{-1}	16000 min^{-1}	Limitation Spindle Rotation Speed

653379001 / 0210 (2)

Part Code : 653379001
Part Name : Tool LABEL250

3. Safety label, rear and High pressure coolant equipment

(1) Language: English, Japanese, Chinese

Part Code : 690730001
Part Name : PSLABEL, TC REARJCE

(2) Language: English, German, French

Part Code : 691045001
Part Name : PSLABEL, TC REAR EGF

4. Label, regenerative resistor

(1) Language: English, Japanese, Chinese

Part Code: 690729001
Part Name: LABEL, TC REGENERATIVE JCE

(2) Language: English, German, French

Part Code: 691058001
Part Name: LABEL, TC REGENERATIVE EGF

5. Label, removing tool

(1) Language: English, Japanese, Chinese

Part Code : 653080001
Part Name : LABEL, Removing Tool JCE

(2) Language: English, German, French

Part Code : 69104001
Part Name : LABEL, Removing Tool EGF

6. Label, side cover

(1) Language: English, Japanese, Chinese

Part Code : 690731001
Part Name : LABEL, TC MAINTENANCE DOOR JCE

(2) Language: English, German, French

Part Code : 690732001
Part Name : LABEL, TC MAINTENANCE DOOR EGF

7. “Keep Off” label 40

Part code : 693178001

693178001 / 0607 (1)

693178001.ai

Safety Manual for Operator

Tapping Center
TC-S2A

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"DOOR INTERLOCK FUNCTION"
"Operation manual:
Operation of the machine necessary for set-up and machining"

Conversational programming machine		NC language programming machine	
Japanese part code	: 690777001	Japanese part code	: 690779001
English part code	: 690783001	English part code	: 690785001

3.Installation manual "Safety manual for those who install and set-up the tapping centre"
"Installation manual:
Installation and assembly of the machine and its options"

Japanese part code : 690775001
English part code : 690781001

4.Programming manual "Programming manual: Creating machine programs"

Conversational programming machine		NC language programming machine	
Japanese part code	: 690692001	Japanese part code	: 690709001
English part code	: 690698001	English part code	: 690715001

5.Maintenance manual "Safety manual for those who qualified for tapping centre maintenance attached to the maintenance manual."
"Maintenance manual: Adjustment and repair of the machine"
The maintenance manual is not distributed to customers.

Relationship to safety labels

Items of particular importance that appear in this safety manual are also attached to the machine as safety labels.
An explanation of the safety labels is provided at the end of this safety manual. If any safety labels have peeled off the machine, obtain new safety labels and attach them correctly.

Language

Machines shipped domestically within Japan are provided with safety manuals and safety labels written in Japanese. Machines shipped abroad from Japan are provided with safety manuals and safety labels written in three languages: English, German, and French.
For manuals and labels in other languages, consult the dealer from which you purchased the machine.

Purchasing

When the safety manuals or safety labels have been lost, obtain these items from the dealer you have purchased the machine from.
If you do not know of a dealer, consult the offices specified below.

1-1-1 Kawagishi, Mizuho-ku, Nagoya 467-8562, JAPAN
BROTHER INDUSTRIES, LTD. Machinery & Solution Company,
phone +81-52-824-2232
fax +81-52-811-0469

Handling the safety manual

Be careful not to lose the safety manuals, and keep them handy at all times.
Also, when the machine changes hands, pass the manuals to the new owner together with the machine.

Degree of danger

The degree of danger is classified into three categories depending upon the level of damage that may occur when instructions are not observed.

1. DANGER

DANGER

Damage which may result in death or severe injury to persons.

2. WARNING

WARNING

Damage which may lead to a serious injury.

3. CAUTION

CAUTION

Damage less serious than that above.

Explanation order

The safety instructions are explained in the following order:

1. Signal words (DANGER, WARNING, CAUTION) and symbols indicating the degree of danger
2. Type of danger (Subject)
3. Type of predicted damages
4. Preventive measure

Meaning of symbols

Symbols are used on the safety labels and in the warnings in the safety manual to intuitively explain possible dangers.

1. Hazard

Slippery

Moving parts

Stumble

Caught

Electric shock

Electric shock

High temperature

High temperature

Hand pinched

Cut

Cut

Shart point

Burst

Falling object

Falling object

Fall

Rotating object

Splash

Splash

Fire

2. Preventive measures

Protect ears.

Protect hands.

Protect feet.

Remove power plug.

Connect grounding cable

Protect head.

Do not touch.

Do not disassemble.

Protect eyes.

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No.	各部の名称	Section names	Namen jedes Teils	Noms de sections	各部件名称
	日本語	English	Deutsch	Français	中文
1.	制御箱	control box	Steuerschrank	armoire de commande	控制箱
2.	ｽﾌﾟﾗｯｼｭｶﾞｰﾄﾞ	splash guard	Spitzblech	tôle pare-copeaux	火花防溅箱
3.	停止ｽｲｯﾁ	stop switch	stop Einschalter	bouton d'arrét	停止开关
4.	停止ﾗﾝﾌﾟ	stop lamp	stop Lampe	lampe d'arrêt	停止指示灯
5.	ﾄﾞｱｲﾝﾀﾛｯｸｽｲｯﾁ	door interlock switch	Verriegelungsschalter	interrupteur de la porte d'verrouillage	门互锁开关
6.	作業扉	work door	Arbeitstür	porte de travail	作业门
7.	ﾄﾞｱｲﾝﾀﾛｯｸｷｰ	door interlock key	Verriegelungsschlüssel	clef de la porte d'verrouillage	门互锁键
8.	ｽﾋﾟﾝﾄﾞﾙ	spindle	Spindel	broche	主轴
9.	ATC ﾏｶﾞｼﾞﾝ	ATC magazine	ATC Magazin	ATC magasin	ATC 刀库
10.	取手	handle	Griff	poignée	把手
11.	制御箱内部書類入れ	control box document	Dokumentenbehälter im Steuerschrank	boîte à papiers de l''armoire de commande	控制箱内书架
12.	ﾚﾍﾞﾘﾝｸﾞﾎﾞﾙﾄ	leveling bolt	Nivellierbolzen	boulon à régler le niveau de la machine	调平螺栓
13.	ｸｰﾗﾝﾄﾉｽﾞﾙ	coolant nozzle	Kühlmitteldüse	ajutage d'huile de coupe	冷却液喷嘴
14.	ｸﾞﾘｯﾌﾟｶﾊﾞｰ	grip cover	Griffschutz	couverture de jambe	夹钳套
15.	工具	tool	Werkzeug	outil	刀具
16.	工具ﾎﾙﾀﾞ	tool holder	Werkzeughalter	support à outil	刀具夹
17.	ｽﾋﾟﾝﾄﾞﾙﾍｯﾄﾞ	spindle head	Spindelkopf	tête de la broche	主轴头
18.	非常停止ｽｲｯﾁ	emergency stop switch	Notfall-stop-Schalter	bouton d'arrêt d'urgence	紧急停止开关
19.	ｹｰﾌﾞﾙｶﾊﾞｰ	cable cover	kabelschutz	couvre cable	揽绳套
20.	ﾃｰﾌﾞﾙ	table	Tisch	table	工作台
21.	主電源ﾌﾞﾚｰｶ	main power breaker	Hauptschalter	disjoncteur d’alimentation principale	主电源开关
22.	ｸｰﾗﾝﾄﾀﾝｸ	coolant tank	Kühlmitteltank	réservoir d'huile de coupe	冷却液罐
23.	ｽﾌﾟﾗｯｼｭｶﾞｰﾄﾞｻｲﾄﾞｶﾊﾞｰ	splash guard side cover	Spitzblechseitenschutz	couverture à côté du tôle pare-copeaux	火花防溅板一侧的护罩
24.	回生抵抗ｶﾊﾞｰ	regenerative resistor cover	Rückkopplungs- widerstandsschutz	couverture pour la résistance régénératrice	再生电阻罩
25.	操作ﾊﾟﾈﾙ	operation panel	Betriebstafel	panneau d'opéation	操作面板

Warnings and preventive measures

The numbers in ( ) such as 1, 2 correspond to the names of each part.

Danger **DANGER**

OD1 Various hazards are associated with the tapping centre.
OD1-1 Read the safety manual before operating the machine to understand these hazards and preventive measures.
OD1-2 All users must know the position of the emergency stop switch (18) and its operation.

OD2 High voltage parts are present in the control box (1). Touching such parts by mistake may result in serious injury or death.
OD2-1 Only those qualified for electrical work, as well as having sufficient knowledge of the electric circuits of this machine, are allowed to maintain and inspect the electrical components. Operators must not open the control box.
OD2-2 If an alarm occurs, report it to the supervisor immediately. Operators are not allowed to repair the machine. Only qualified persons with sufficient knowledge of the machine are allowed carry out repair and installation.

OD3 You may be caught in the machine during machining, resulting in a serious injury.
OD3-1 Do not enter within the splash guard (2) during operation.
OD3-2 Visually check that nobody is inside the splash guard before starting machine operation
OD3-3 Keep your hands, feet, and body away from moving parts during operation.
OD3-4 If an alarm occurs, report it to the supervisor immediately. Do not put your hands, feet, and body in the machine.

OD4 When the door interlock switch (5) is invalid, the machine moves even when the work door (6) is open. You may cut yourself on a rotating tool (15) or be caught in the machine.
OD4-1 When the door interlock switch is invalid, do not put your hands, feet, and body in the machine. The operator must report it to the supervisor. The supervisor must set the door interlock switch to ON. The supervisor must always keep the key.
OD4-2 When the door interlock is invalid, the supervisor must not allow anybody to operate the machine.
OD4-3 Visually check by yourself that the door interlock switch is valid before starting machine operation.
OD4-4 If the door interlock key (7) is attached, report it to the supervisor.
OD4-5 The supervisor must always keep the door interlock key (7).

Warning **WARNING**

OW1 Touching rotating tools (15) results in injury.
OW1-1 Keep away from rotating tools.

OW2 You may be injured due to broken tools (15) or parts flung out.
OW2-1 Close the work door (6), and start machine operation.

OW3 You may be caught in the rotating part, resulting in an injury.
OW3-1 Keep away from rotating tools (15) , the spindle (8), and the ATC magazine (9).
OW3-2 Wear snug-fitting clothes. Put long hair up in cap. Do not wear gloves except for set-up operations carried out with the machine stopped. Do not wear any accessories. Do not hold the rotating part.

OW4 If the safety device is modified, its function may be altered, thus you may be caught in the machine, hit your body against the machine, or get an electric shock.
OW4-1 When the safety device is modified or fixed so that the device does not function, do not operate the machine.

OW5 When chips scatter and get into the eyes, you may damage your eyeballs and lose your eyesight.
OW5-1 Wear safety goggles against the chips.
OW5-2 Do not blow the chips by air.

OW6 If you touch chips with bare hands, you may have your hand cut or burnt.
OW6-1 Do not touch chips with bare hands. Do not touch sharp edges of workpieces.
OW6-2 Wear gloves and use a brush to remove chips.
OW6-3 Clean cutting chips when machine is stopped.

OW7 If you grip the tool (15) blade, you may cut your hand.
OW7-1 Do not touch the edge of the tool. Always hold the shank of the tool holder (16).

OW8 Dropping a heavy object onto your foot may fracture your foot bones.
OW8-1 When lifting heavy objects, wear safety shoes.

OW9 Lifting heavy objects may cause a hernia of vertebral disk.
OW9-1 When lifting heavy objects, ask for help.
OW9-2 Lift object with the strength of your legs feet instead of your back.

OW10 Hearing ability is reduced when ears are exposed to excessive noise for a long period of time.
OW10-1 Use protection such as earplugs when working in a noisy environment.

OW11 You may hurt your eyes due to high pressure air bursts.
OW11-1 People other than those qualified in high pressure air handling and who understand the piping of this machine are not allowed to install or change the high pressure air piping.

OW12 You may hit your head when standing up.
OW12-1 Wear a helmet when working in and around the machine.

OW13 When the machine is operated while any tools are left in the machine, the tools may scatter and you may be injured.
OW13-1 Do not operate the machine if tools are left in the machine. Report it to the supervisor.

OW14 You may have your hand caught in the work door (6) if you are opening and closing while holding parts other than the handle (10).
OW14-1 Hold the handle when opening and closing the outer door.

OW15 If tools are placed on the control box (1) or the machine, these may fall down due to vibration.
OW15-1 Do not place any objects on the control box and the machine.

OW16 You may fall down and be injured when climbing on the machine or the coolant tank (22).
OW16-1 Do not climb on the machine or the coolant tank.

OW17 When putting your hand under the leveling bolts (12), you may have your hand caught, resulting in an injury.
OW17-1 Do not adjust the leveling bolt. If the machine is not level, report it to the supervisor.
OW17-2 The supervisor must instruct the person in charge of installation to adjust the level.

OW18 When the cable is hanging down or is not covered, you may stumble or slip and fall.
OW18-1 When the cable is hanging down or is not covered, report it to the supervisor.
OW18-2 The supervisor must instruct the person in charge of installation to correct the cable wiring and cover the cable.

OW19 Remodeling the machine may affect the safety device, rendering all given warnings invalid.
OW19-1 If the machine has been modified, do not operate the machine. Report it to the supervisor.

OW20 You may have your eyes hurt if coolant splashes into your eyes.
OW20-1 When adjusting the coolant nozzle (13), wear safety goggles.
OW20-2 When coolant has splashed into your eyes, wash your eyes with clean water, and see a doctor.

OW21 If you put your finger in the clearance of the machine, you may have your finger caught, resulting in an injury.
OW21-1 Do not put fingers between grip cover (14).
OW21-2 Do not put the finger in the clearance between the tool (15) or the tool holder (16) and the ATC magazine.

OW22 If coolant, oil, or chips are scattered, you may slip, fall down, or collide somewhere, resulting in an injury.
OW22-1 Turn off the power of the machine, clean inside and the surroundings of the machine, and then start operation.

OW23 When attaching and detaching tool holder (16), you may cut your hand on the edge of a tool (15) or hit your hand against the machine.
OW23-1 Do not hold the edge of the tool. Wear leather gloves.

OW24 The machine may suddenly move or tools may fall down.
OW24-1 Do not put your hands, feet, and body under the spindle head (17).

OW25 When machining workpiece using an oil type coolant, the machined part may heat up and catch fire.
OW25-1 Do not use oil type coolant when a fire alarm and automatic fire extinguisher are not installed.
OW25-2 When machining the workpiece, an operator must attend the machine.

OW26 If you lean on the machine, you may be caught or hit yourself against the machine when the machine moves, resulting in an injury.
OW26-1 Do not lean on the machine.

OW27 When objects are hung on the emergency stop switch (18), the emergency stop switch may not be pressed.
OW27-1 Do not hang any objects on the emergency stop switch.

OW28 When the table (19) moves, the cable cover (20) at the rear of the machine springs out. You may collide with it, resulting in an injury.
OW28-1 Cut the main power breaker (21) and then remove chips.

OW29 Because the coolant tank (22) is heavy, you may suffer from a herniated vertebral disk or drop the tank on your feet when lifting the tank.

OW29-1 Do not lift the coolant tank even when removing chips.

OW30 When entering the machine, you may slip and hit your body against something.

OW30-1 Do not enter the machine. When it is necessary to enter the machine, report it to the supervisor.

OW31 If the splash guard (2) side cover (23) is not attached, you may be caught in the machine or injured due to broken tools.

OW31-1 Before turning on the power ,visually check that the cover is attached.
If the side cover is not attached, report it to the supervisor.

OW31-2 The supervisor must instruct the operator to attach the side cover.

OW32 Tools (15), tool holder (16) whose weight and size exceed the specified limit may spring out while being used.

OW32-1 Use tools holder whose weight and size are within the specified limit.

OW32-2 For the limit of the tools, see the tool label or the operation manual attached on the machine.

OW33 If you touch the regenerative resistor, you may be burned because the regenerative resistor is heated during operation.

OW33-1 Do not remove the regenerative resistor cover (24).

OW34 If you touch the motor, you may be burned because the motor is heated during operation.
OW34-1 Do not touch the motor for 30 minutes after operation is finished.

OW35 If the ATC magazine (9) rotates, tools (15) may hit machined workpieces, jigs, or the machine, and may be broken.
OW35-1 Set the tool length so that the tools do not contact machined workpieces, jigs, or the machine even if the ATC magazine rotates.

OW36 If the control box (1) or the operation panel (25) are wet, you may get an electric shock.
OW36-1 Do not sprinkle coolant, water, or chips on the control box and the operation panel.
OW36-2 Do not touch the control box with wet hands.

OW37 If the power is turn on or workpieces are machined in an explosive atmosphere, an explosion may occur due to a spark from the machine.
OW37-1 Do not turn on the power and carrrout machining in an explosive atmosphere.

OW-38 If you operate the machine without the workpiece secured, the workpiece may spring out, resulting in injury.
OW-38-1 Secure the workpiece.

OW39 If you forget to mount the splash guard side cover (23), you may get caught in the machine, resulting in injury.
OW39-1 Before turning on the power, visually check that the splash guard side cover is mounted. If not mounted, report it to the supervisor.
OW39-2 When removing the splash guard side cover, turn off the main power breaker and padlock it so that the main power breaker cannot be turned on.
OW39-3 The supervisor must instruct the operator to mount the maintenance cover.

OW40 Cutting chips may catch fire or explode depending on the workpiece material (e.x. Magnesium).
OW40-1 Remove any cutting chips immediately.
OW40-2 Install a fire extinguisher near the machine when machining a workpiece made of such material, and never perform unmanned operation.

OW41 The milliing inserts may come off the tool, resulting in serious injury.
OW41-1 Check that the miling inserts is secured before mounting the tool to the machine.

OW42 When the plant is poorly illuminated, inside the machine is dark and you may injure your hands on jigs or cutters.
OW42-1 Install a machine light when the illumination inside the machine is 500 lux or below.

Description of safety label

Particularly important descriptions in the safety manual are printed on a safety label, and the label is attached to the machine. Carefully read and understand the descriptions on the label before operating the machine.

The safety labels are attached to the positions shown in the illustration below. Check that the labels are not damaged. If damaged, obtain a new label for replacement.

Position of safety label

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1. Safety label , front and side

(1) Language: English, Japanese, Chinese

Part Code : 690373001
Part Name : PS LABEL,TC FRONT JCE

(2) Language: English, German, French

This machine has hazards.
Read instruction manuals to understand hazards and avoid them before operation.

Diese Maschine birgt Gefahren.
Um Risiken zu erkennen und vermeiden, vor dem Einschalten die Betriebsanleitung lesen.

L'utilisation de cette machine comporte des risques.
Lisez les manuels d'instruction pour connaître les risques et les éviter avant d'utiliser cette machine.

DANGER	WARNING	WARNING
Machine in operation will suddenly move and crush you. Keep away from moving parts.	Broken tool or workpiece can hit and wound you. Shut door before starting machine.	Rotating parts can catch and injure you. Keep away from rotating tool, spindle, and magazine. Never hold moving parts. Do not wear gloves while operating machine.
GEFAHR	**WARNUNG**	**WARNUNG**
Maschine in Betrieb kann plötzlich laufen und Sie stoßen. Beim Betrieb der Maschine von allen bewegenden Teilen sich fernhalten, um Verletzungen zu vermeiden.	Gebrochene Werkzeuge oder Werkstücke könnten Sie treffen und verletzen. Vor dem Start der Maschine Tür schließen.	Umlaufende Teile könnten Sie fassen und verletzen. Von umlaufendem Werkzeug, Spindel und Magazin sich fernhalten. Rotierende Teile nicht berühren. Während des Bedienens keine Handschuhe tragen.
DANGER	**AVERTISSEMENT**	**AVERTISSEMENT**
En opération, cette machine bougera soudainement et provoquera des risques d'écrasement. Ne vous approchez jamais des parties mobiles.	Les outils cassés ou les pièces usinées peuvent être projetés et risquent de vous frapper et de vous blesser. Fermez la porte avant de faire démarrer la machine.	Les parties tournantes peuvent vous accrocher et vous blesser. Ne vous approchez jamais des outils tournant, de la broche et du magasin. Ne saisissez jamais les parties en mouvement. Ne portez pas de gants pendant l'utilisation.

691042001 / 0302 (2)

Part Code : 691042001
Part Name : PS LABEL,TC FRONT EGF

2. Tool label

工具、主軸回転数の制限を超えて使用すると、機械が破損する場合があります。操作前に、取扱説明書で詳細を確認して下さい。
If use beyond the limitation of the tool and spindle speed, machine may be broken.
Check the detailes by the operation manual before operation.

最高主軸回転速度	10000 min^{-1} / 16000 min^{-1}		Max Spindle Rotation Speed
主軸テーパ	7 / 24 No.30		Spindle Taper
ツールシャンク	MAS-BT30		Tool Shank
プルスタッド	MAS-P30T-2 (30°)		Retension Knob
マガジン全工具合計	M total 25 kg (14Tools) / 35 kg (21Tools)		Total in Magazine
工具の制限	D1 ≦ 40 mm L1 ≦ 200 mm D2 ≦ 80 mm L2 ≦ 160 mm D3 ≦ 46 mm L3 ≦ 30 mm M ≦ 3 kg MxH ≦ 180 kgmm	D1 ≦ 40 mm L1 ≦ 200 mm D2 ≦ 55 mm L2 ≦ 160 mm D3 ≦ 46 mm L3 ≦ 30 mm M ≦ 2 kg MxH ≦ 100 kgmm	Limitation of Tool
工具バランス制限	100 grmm	50 grmm	Limitation of Tool Balance
主軸回転数制限	10000 min^{-1}	16000 min^{-1}	Limitation Spindle Rotation Speed

653379001 / 0210 (2)

Part Code : 653379001
Part Name : Tool LABEL250

3. Safety label, rear and High pressure coolant equipment

(1) Language: English, Japanese, Chinese

Part Code : 690730001
Part Name : PSLABEL, TC REARJCE

(2) Language: English, German, French

Part Code : 691045001
Part Name : PSLABEL, TC REAR EGF

4. Label, regenerative resistor

(1) Language: English, Japanese, Chinese

Part Code: 690729001
Part Name: LABEL, TC REGENERATIVE JCE

(2) Language: English, German, French

Part Code: 691058001
Part Name: LABEL, TC REGENERATIVE EGF

5. Label, removing tool

(1) Language: English, Japanese, Chinese

Part Code : 653080001
Part Name : LABEL, Removing Tool JCE

(2) Language: English, German, French

Part Code : 69104001
Part Name : LABEL, Removing Tool EGF

6. Label, side cover

(1) Language: English, Japanese, Chinese

Part Code : 690731001
Part Name : LABEL, TC MAINTENANCE DOOR JCE

(2) Language: English, German, French

Part Code : 690732001
Part Name : LABEL, TC MAINTENANCE DOOR EGF

7. “Keep Off” label 40

Part code : 693178001

693178001 / 0607 (1)

693178001.ai

Die Sicherheitsvorschrift für Personen, die die Maschine installieren und den Arbeitsprozeß aufstellen für Tapping Centre

Tapping Centre
TC-S2A

Lesen Sie bitte aufmerksam diese Sicherheitsvorschrift, bevor Sie die Tapping Centre benutzen.

Brother Industries, Ltd. Machinery & Solution Company.

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Was ist die Sicherheitsvorschrift?

Bitte lesen Sie!

Alle Leute, die die Tapping Centre benutzen, einschließlich der Leute, die die Tapping Centre in einer Fabrik installieren, die mit der Tapping Centre arbeiten, und die die Tapping Centre warten oder reparieren, sind aufgefordert, diese Sicherheitsvorschrift zu lesen.
In der Sicherheitsvorschrift werden alle Leute, die die Tapping Centre benutzen, als Benutzer bezeichnet.

Zweck

Die Tapping Centre ist eine Hochspannungsstrommaschine mit schnell umlaufenden Werkzeugen, und einem Tisch und einem ATC-Magazin, die sich mit starker Kraft bewegen. Deshalb bestehen verschiedene Gefahren bei der Benutzung dieser Maschine.
Der Zweck dieser Sicherheitsvorschrift ist es, vor Gefahren die Benutzer zu schützen.
In der Sicherheitsvorschrift wird Folgendes erklärt:
Warnung: Welche Gefahren bestehen?
Preventivmaßnahme: Wie kann man die Gefahren vermeiden?

Zusammenstellung der Sicherheitsvorschriften und der Zusammenhang mit anderen Manuals

Jedem Manual (außer der Programmierungsanleitung) ist eine Sicherheitsvorschrift für die betreffenden Benutzer beigelegt.
Für die verschiedenen Funktionen oder das Betriebsverfahren der Maschine lesen Sie bitte das entsprechende Manual.

1.Betriebsanleitung (Für alle Benutzer)
"Die Sicherheitsvorschrift für Operateure"
"Die Sicherheitsvorschrift für Personen, die Maschine installieren und den Arbeitsprozeß aufstellen für Tapping Centre"
"Betriebsanleitung"
Notwendige für grundlegenden Betriebsverfahren für alle Benutzer.
Deutsch Teil-Code: 693076001

2.Betriebsanleitung (Für Fachpersonal)
"Die Sicherheitsvorschrift für Operateure"
"Die Sicherheitsvorschrift für Personen, die Maschine installieren und den Arbeitsprozeß aufstellen für Tapping Centre"
"TÜRVERRIEGELUNGSFUNKTION"
"Betriebsanleitung:
Notwendige Betriebsmaßnahmen für die Aufstellung und die Bearbeitung."

Dialogorientierte Programmierung NC-Sprache	Japanischer Teil-Code:	690777001
	Englischer Teil-Code:	690783001
	Japanischer Teil-Code:	690779001
	Englischer Teil-Code:	690785001

3.Installierungsanweisung "Die Sicherheitsvorschrift für Personen, die die Maschine installieren und den Arbeitsprozeß aufstellen

	Japanischer Teil-Code:	690775001
	Englischer Teil-Code :	690781001

4.Programmierungsanleitung "Programmierungsanleitung:
Programmierung der Bearbeitung"

Dialogorientierte Programmierung NC-Sprache	Japanischer Teil-Code:	690692001
	Englischer Teil-Code:	690698001
	Japanischer Teil-Code:	690709001
	Englischer Teil-Code:	690715001

5.Wartungsvorschrift "Die Sicherheitsvorschrift für qualifiziertes Wartungspersonal; Tapping Centreist der Für Wartungsvorschrift beigelegt."
"Wartungsvorschrift:
Nachstellung und Reparatur der Maschine"
Die Wartungsvorschrift wird an die Kunden nicht verteilt.

Beziehung mit Sicherheitsschildern

Die wichtigsten Vorschriften der Sicherheitsvorschriften sind in Form von Sicherheitsschild an der Maschine angebracht.
Eine Erklärung für die Sicherheitsschilder gibt es am Ende der Sicherheitsvorschrift. Falls sich die Sicherheitsschilder von der Maschine lösen sollten, informieren Sie uns. Wir schicken Ihnen sofort Ersatzschilder zu.

Sprache

Die Maschinen für den japanischen Markt werden mit den Sicherheitsvorschriften und den Sicherheitsschildern auf japanisch ausgestaltet. Aus Japan exportierte Maschinen sind mit Sicherheitsanweisungen und -schildern auf vier Sprachen ausgestattet: Englisch, Deutsch, Französisch und Chinesisch.
Fordern Sie deshalb die für Sie entsprechenden Vorschriften und Schilder, einschließlich dieser in anderen Sprachen, bei Ihrem Hädler an.

Kundendienst

Sollten die Sicherheitsvorschriften oder die Sicherheitsschilder verloren gehen, bekommen Sie diese bei Ihrem Händler.

Wenn Sie Ihren Händler nicht kennen sollten, rufen Sie beim nachfolgenden Büro an.

1-1-1 Kawagishi, Mizuho-ku, Nagoya 467-8562, JAPAN
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Handhabung der Sicherheitsvorschrift

Geben Sie acht, daßSie die Sicherheitsvorschriften nicht verlieren, und bewahren Sie diese immer griffbereit auf.
Sollte die Maschine den Besitzer wechseln, dann müssen auch die Sicherheitsvorschriften an den neuen Besitzer zusammen mit der Maschine üergeben werden.

Gefahrenstufe

Die auftretenden Schäden bei Nichteinhaltung der Sicherheitsvorschriften werden in drei Stufen klassifiziert.
1. GEFAHR

⚠ GEFAHR

Lebensgefahr odeiche Körperverletzungsgefahr.

2. WARNUNG

⚠ WARNUNG

Schwere Verletzungsgefahr.

3. ACHTUNG

⚠ ACHTUNG

Leichte Verletzungsgefahr.

Reihenfolge der Erklärung

Hier wird Folgendes erklärt:
1. Stichwörter (GEFAHR, WARNUNG, ACHTUNG), die die Gefahren anzeigen, und Bildzeichen
2. Gefahrengruppe
3. Möglicher Verletzungsgrad
4. Preventivmßnahme

Bedeutung der Bildzeichen

Auf den Sicherheitsschildern und in den Sicherheitsvorschriften werden die Gefahren und deren Preventivmaßnahmen mit Bildzeichen anschaulich erklärt. Hier wird ihre Bedeutung erklät.

1. Gefahr

Rutschen

Stolpern

Stromschlag

Hand geklemmt

Heiß

Sich schneiden

Sich stechen

Fallender Gegenstand

Sturz

Spritzen

Laufender Teil

Stromschlag

Hineingezogen

Heiß

Sich schneiden

Explosion

Fallender Gegenstand

Umlaufender Gegenstand

Spritzen

Feuer

2. Preventivmaßnahmen

Ohren schützen

Hände schützen

Füße schützen

Netzstecker abziehen

Nicht berühren

Kopf schützen

Erden

Nicht zerlegen

Augen schützen

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No.	各部の名称	Section names	Namen jedes Teils	Noms de sections	各部件名称
	日本語	English	Deutsch	Français	中文
1.	制御箱	control box	Steuerschrank	armoire de commande	控制箱
2.	ｽﾌﾟﾗｯｼｭｶﾞｰﾄﾞ	splash guard	Spitzblech	tôle pare-copeaux	火花防溅箱
3.	停止ｽｲｯﾁ	stop switch	stop Einschalter	bouton d'arrét	停止开关
4.	停止ﾗﾝﾌﾟ	stop lamp	stop Lampe	lampe d'arrêt	停止指示灯
5.	ﾄﾞｱｲﾝﾀﾛｯｸｽｲｯﾁ	door interlock switch	Verriegelungsschalter	interrupteur de la porte d'verrouillage	门互锁开关
6.	作業扉	work door	Arbeitstür	porte de travail	作业门
7.	ﾄﾞｱｲﾝﾀﾛｯｸｷｰ	door interlock key	Verriegelungsschlüssel	clef de la porte d'verrouillage	门互锁键
8.	ｽﾋﾟﾝﾄﾞﾙ	spindle	Spindel	broche	主轴
9.	ATC ﾏｶﾞｼﾞﾝ	ATC magazine	ATC Magazin	ATC magasin	ATC 刀库
10.	取手	handle	Griff	poignée	把手
11.	制御箱内部書類入れ	control box document	Dokumentenbehälter im Steuerschrank	boîte à papiers de l''armoire de commande	控制箱内书架
12.	ﾚﾍﾞﾘﾝｸﾞﾎﾞﾙﾄ	leveling bolt	Nivellierbolzen	boulon à régler le niveau de la machine	调平螺栓
13.	ｸｰﾗﾝﾄﾉｽﾞﾙ	coolant nozzle	Kühlmitteldüse	ajutage d'huile de coupe	冷却液喷嘴
14.	ｸﾞﾘｯﾌﾟｶﾊﾞｰ	grip cover	Griffschutz	couverture de jambe	夹钳套
15.	工具	tool	Werkzeug	outil	刀具
16.	工具ﾎﾙﾀﾞ	tool holder	Werkzeughalter	support à outil	刀具夹
17.	ｽﾋﾟﾝﾄﾞﾙﾍｯﾄﾞ	spindle head	Spindelkopf	tête de la broche	主轴头
18.	非常停止ｽｲｯﾁ	emergency stop switch	Notfall-stop-Schalter	bouton d'arrêt d'urgence	紧急停止开关
19.	ｹｰﾌﾞﾙｶﾊﾞｰ	cable cover	kabelschutz	couvre cable	揽绳套
20.	ﾃｰﾌﾞﾙ	table	Tisch	table	工作台
21.	主電源ﾌﾞﾚｰｶ	main power breaker	Hauptschalter	disjoncteur d’alimentation principale	主电源开关
22.	ｸｰﾗﾝﾄﾀﾝｸ	coolant tank	Kühlmitteltank	réservoir d'huile de coupe	冷却液罐
23.	ｽﾌﾟﾗｯｼｭｶﾞｰﾄﾞｻｲﾄﾞｶﾊﾞｰ	splash guard side cover	Spitzblechseitenschutz	couverture à côté du tôle pare-copeaux	火花防溅板一侧的护罩
24.	回生抵抗ｶﾊﾞｰ	regenerative resistor cover	Rückkopplungs- widerstandsschutz	couverture pour la résistance régénératrice	再生电阻罩
25.	操作ﾊﾟﾈﾙ	operation panel	Betriebstafel	panneau d'opéation	操作面板

Warnungen und Preventivmaßnahmen

Jede Zahl in Klammern wie (1)(2) entspricht der Nummer der Namen jedes Teils.

Gefahr ⚠ **GEFAHR**

SD1 In der Tapping Centre bestehen verschiedene Gefahren.

SD1-1 Vor Inbetriebnahme der Maschine die Sicherheitsvorschrift lesen, um die Risiken zu erkennen und die Preventivmaßnahmen zu verstehen.

SD1-2 Alle Benutzer müsen wissen, wo der Notfall-stop-Schalter(19) ist, und wie er benutzt wird.

SD2 Im Steuerschrank (1) gibt es einen Hochspannungsteil. Bei versehntlicher Berührung besteht die Gefahr, sich schwer oder lebensgefährlich zu verletzen.

SD2-1 Nur hochqualifizierte Elektriker dürfen die elektrischen Teile dieser Maschine warten und reparieren.

SD2-2 Vor Wartung den Hauptschalter (21) ausschalten. Für Dritte kenntlich machen, daß es gearbeitet wird.

SD2-3 Beim Verlassen der Maschine die Tür des Steuerschranks zumachen und zuschrauben.

SD3 Es besteht die Gefahr, von laufenden Maschinenteilen geklemmt zu werden und sich dabei schwer zu verletzen.

SD3-1 Während die Maschine in Betrieb ist, darf kein Körperteil in die innere Seite des Spitzblechs (2) gelangen.

SD3-2 Bevor man in die Maschine greift oder sich in die Maschine begibt, den stop-Einschalter (3) oder die reset-Taste drücken und sich mit eigenen Augen vergewissern, daß die stop-Lampe (4) leuchtet.

SD3-3 Vor Anwerfen der Maschine sich mit eigenen Augen vergewissern, daß niemand innerhalb des Spitzblechs ist.

SD3-4 Während die Maschine in Betrieb ist, von laufenden Teilen Hände, Füße und sonstige Körperteile fernhalten.

SD3-5 Wenn man in die Maschine eintreten muß, mu3 der Hauptschalter (21) ausgeschaltet und verschlossen werden, damit ihn niemand mehr einschalten kann.

SD4 Wenn die Tüverriegelung (5) deaktiviert ist, bewegt sich die Maschine sogar, wenn die Arbeitstür (6) offen ist. Es besteht deshalb die Gefahr, von einem umlaufenden Werkzeug (15) geschnitten, oder von den Maschinenteilen geklemmt und verlezt zu werden.

SD4-1 Während der Einstellung der Maschine auf die Bewegung der Maschine achtgeben, damit die Maschine zu jeder Zeit angehalten werden kann.Nach einer Einstellung der Maschine oder einer Aufstellung den Verriegelungsschalter wieder in Kraft setzen, den Verriegelungsschlüssel (7) abziehen und aufbewahren.

SD4-2 Bei nicht aktivierter Verriegelung darf die Maschine nicht verlassen werden.

SD5 Wenn die Türverriegelung (5) nicht aktiviert ist, kann sich der Tisch (20) bewegen. Es besteht die Gefahr, vom Tisch eingeklemmt und verletzt zu werden.

SD5-1 Während der Einstellung der Maschine auf die Bewegung der Maschine achtgeben, damit die Maschine zu jeder Zeit angehalten werden kann. Nach Beendigung der Einstellung den Verriegelungsschalter wieder aktivieren. Der Verriegelungsschlüssel (7) wird abgezogen und muss vom Betriebsleiter aufbewahrt werden.

Warnung **WARNUNG**

SW1 Wenn man umlaufende Werkzeuge (15) beührt, wird man verletzt.

SW1-1 Von umlaufenden Werkzeugen sich fernhalten.

SW2 Es besteht Verletzungsgefahr durch abgebrochene Werkzeuge (15) oder herausspringende Werkstüke.

SW2-1 Arbeitstür (6) schließen.

SW3 In umlaufenden Teil können die Finger hineingezogen und verletzt werden.

SW3-1 Von umlaufendem Werkzeug (15), dem Spindel (8) und dem ATC-Magazin (9) sich fernhalten.

SW3-2 Küperanliegende Bekleidung tragen. Lange Haare müsen in einem Hut aufgesteckt werden. Beim Arbeiten an der laufenden Maschine keine Handschuhe tragen. Keinen Schmuck tragen. Umlaufende Teile nicht berüren.

SW4 Wenn die Sicherheitsvorrichtung abgeändert wird, funktioniert sie nicht mehr richtig. Es besteht die Gefahr, einen Stromschlag zu erhalten, von den Maschinenteilen geklemmt zu werden oder sich zu stoßen.

SW4-1 Die Sicherheitsvorrichtung nicht abändern. Die Sicherheitsvorrichtung nicht unbeweglich festmachen.

SW5 Wenn Stahlspäne in die Augen hineinspringen, werden die Augen verletzt.Es besteht die Gefahr, die Sehkraft zu verlieren.

SW5-1 Einen Augenschutz gegen Stahlspäne tragen.

SW5-2 Stahlspäne nicht mit einer Luftdruckpistole wegfegen.

SW6 Wenn man Stahlspäne mit bloßen Händen berürt, kann man sich schneiden oder verbrennen.
SW6-1 Stahlspäne nicht mit bloßen Händen berühren. Die Spitze der Werkstücke nicht mit bloßen Händen berühren.
SW6-2 Beim Reinigen der Schneidechips Handschuhe tragen und eine Bürste benutzen.
SW6-3 Schneidechips nur bei angehaltener maschine reinigen.

SW7 Wenn man die Schneide der Werkzeuge (15) berührt, wird die Hand geschnitten.
SW7-1 Die Schneide der Werkzeuge nicht berühren. Die Werkzeuge immer am Schaft des Werkzeughalters (16) halten.

SW8 Wenn schwere Gegenstände auf die Füße fallen, besteht die Gefahr, sich den Fußzu brechen.
SW8-1 Beim Heben schwerer Gegenstände Schutzschuhe tragen.

SW9 Beim Heben schwerer Gegenstände besteht die Gefahr, sich einen Bruch zu heben.
SW9-1 Beim Heben schwerer Gegenstände immer jemanden um Hilfe bitten.
SW9-2 Beim Heben schwerer Gegenstände nicht die Rückenkraft sondern die Beinkraft benutzen.

SW10 Lange Zeit dauernder oder großer Lärm ist für die Ohren schälich.
SW10-1 Bei der Arbeit unter Lärm einen Gehörschutz, z.B. Stöpsel, tragen.

SW11 Hochdruckluft kann explodieren und Augen oder Ohren verletzen.
SW11-1 Nur hochqualifizierte Fachkräfte dürfen an dieser Maschine Hochdruckluftrohrleitungen installieren oder verändern.
SW11-2 Vor der Arbeit an den Hochdruckluftrohrleitungen die Druckquelle abtrennen und den Restdruck ablassen. Bekannt machen, daß an der Druckleitung gearbeitet wird.

SW12 Beim Aufstehen besteht die Gefahr, sich den Kopf anzustoßen und dabei zu verletzen.
SW12-1 Beim Arbeiten in der Maschine oder in ihrem Bereich einen Schutzhelm tragen.

SW13 Wenn Werkzeuge in der Maschine liegenbleiben sollten und die Maschine in Betrieb genommen wird, besteht die Gefahr, daß diese Werkzeuge herumgeschleudert werden und jemanden verletzen.

SW13-1 In der Maschine keine Werkzeuge bleibenlassen.

SW14 Es besteht die Gefahr, sich die Finger zu klemmen, wenn die Arbeitstür (6) nicht mit der Klinke (10) auf- und zugemacht wird.

SW14-1 Türgriff (11) beim Öffnen und Schließen der vorderen und der Seitentür festhalten.

SW15 Im Steuerschrank (1) gibt es einen heißen Teil. Deshalb besteht die Gefahr, daß sich die im Dokumentenbehälter (11) im Steuerschrank nicht ordentlich aufbewahrten Papiere entzünden.

SW15-1 Im Dokumentenbehälter im Steuerschrank dürfen keine größere Papiere als A4 aufbewahrt werden.

SW16 Wenn man Werkzeuge auf dem Steuerschrank (1) oder auf der Maschine liegenläßt, besteht die Gefahr, daßdiese wegen der Vibration der Maschine herunterfallen.

SW16-1 Auf dem Steuerschrank und auf der Maschine nichts liegenlassen.

SW17 Wenn man auf die Maschine oder auf den Kühlmittelbehälter (22) steigt, besteht die Gefahr, zu stürzen und sich zu verletzen.

SW17-1 Nicht auf die Maschine und den Kühlmittelbehälter steigen.

SW18 Wenn man unter den Nivellierbolzen (12) greift, besteht die Gefahr, sich zu klemmen und zu verletzen.

SW18-1 Nicht unter den Nivellierbolzen greifen. Nur mit zweckmäßigem Werkzeug den Nivellierbolzen einstellen.

SW19 Wenn das Kabel hängt oder nicht ordentlich verlegt ist, besteht die Gefahr, darüber zu stolpern.

SW19-1 Das Kabel darf nicht locker sein. Das Kabel auf dem Fußboden muß mit einem Schutz bedeckt werden.

SW20 Wenn an der Maschine Modifikationen vorgenommen werden, dann tritt die Sicherheitsvorrichtung außer Kraft, und alle angegebenen Warnungen gelten nicht mehr.

SW20-1 Die Maschine nicht modifizieren. Wenn eine Modifikation notwendig sein sollte, muß man die BROTHER INDUSTRIES.,LTD. vorher informieren und ihr schriftliches Einverstädnis einholen.

SW21 Kühlmittel ist augenschädlich.

SW21-1 Bei der Einstellung der Kühlmitteldüse (14) einen Augenschutz tragen.

SW21-2 Wenn die Augen mit dem Kühlmittel in Berührung kommen, dann die Augen mit sauberem Wasser auswaschen und den Arzt konsultieren.

SW22 In jeder Spalte der Maschine besteht Klemm- und Verletzungsgefahr.

SW22-1 Nicht zwischen die zellen (27) fassen.

SW22-2 Nicht mit den Fingern zwischen das Werkzeug (16) oder den Werkzeughalter (17) und das ATC-Magazin kommen (10).

SW23 Wenn Kühlmittel, Schmierstoff oder Stahlspäne auf dem Fußboden ist, kann man rutschen und sich verletzen.

SW23-1 Vor Inbetriebnahme bei ausgeschalteter Maschine deren Innenseite und den Fußboden um die Maschine herum sauber machen.

SW23-2 Bei der Installierung einen Schutzhelm und Schutzschuhe tragen.

SW24 Beim Einsetzen und Herausnehmen des Werkzeughalters (16) besteht die Gefahr, sich zu schneiden oder sonstig zu verletzen.

SW24-1 Beim Austausch der Werkzeuge Lederhandschuhe tragen und die Schneide der Werkzeuge nicht berühren. Immer mit beiden Händen die Werkzeuge halten.

SW25 Die Maschine kann plötzlich zum Laufen anfangen, und die Werkzeuge können aus der Haltung herausfallen.

SW25-1 Wenn die stop-Lampe (4) nicht leuchtet, darf man mit keinem Körperteil unter den Spindelkopf (18) kommen.

SW25-2 Bei der Aufstellung des Arbeitsprozesses den Tisch nach vorne ziehen oder die Säule ins Innere drüken.

SW25-3 Den Hauptschalter (21) ausschalten und so verschließen, dass er nicht eingeschaltet werden kann und dann s chmieren.

SW26 Bei der Bearbeitung der Werkstücke mit ÖlKühlmittel besteht Brandgefahr.

SW26-1 Wenn Werkstücke mit Ölkühlmittel bearbeitet werden, müssen ein Feueralarm und eine automatische Feuerlöschanlage installier erden.

SW26-2 Bei der Bearbeitung muß der Operateur an der Maschine sein.

SW27 Wenn man sich an die Maschine anlehnt, besteht die Gefahr, daß man beim Lauf der Maschine gequetscht oder gestoßen und verletzt werden kann.

SW27-1 Sich nicht an die Maschine anlehnen.

SW28 Wenn man etwas an den Notfall-stop-Schalter (18) hängt, besteht die Gefahr, bei Notfall den Schalter nicht drücken zu können.

SW28-1 Nichts an den Notfall-stop-Schalter hängen.

SW30 Der Kühlmitteltank (22) ist sehr schwer. Wenn man versucht zu heben, besteht die Gefahr, sich einen Bruch zu heben oder sich an die Füße durch Fallen des Tanks zu verletzen.

SW30-1 Auch beim Aufräumen der Stahlspäne darf der Kühlmitteltank nicht aufgehoben werden.

SW31 Beim Eintreten in die Maschine besteht die Gefahr, zu rutschen order von den Maschinenteilen geklemmt zu werden.

SW31-1 Vor dem Eintreten in die Maschine muß der Hauptschalter ausgeschaltet und verschlossen werden, damit ihn niemand mehr einschalten kann. Külmittel und Stahlspäne aufräumen.Külmittel und Stahlspäne aus dem Boden räumen. Schutzschuhe und einen Schutzhelm tragen. An der Betriebstafel der Maschine anzeigen, daß in der Maschine gearbeitet wird.

SW32 Wenn man vergißt, die Seitenabdeckung (23) des Spritzschutzes (2) aufzusetzen, besteht die Gefahr, geklemmt oder von einem gebrochenen Werkzeug verletzt zu werden.

SW32-1 Vor Einschalten der Maschine sich mit eigenen Augen vergewissern, daß der Seitenschutz aufgesteckt ist.

SW33 Wenn Werkzeuge (15) oder Werkzeughalter (16), deren Gewicht oder Größe die vorgeschriebene Beschränkung überschreitet, benutzt werden, besteht die Gefahr, daß die Werkzeuge herausspringen.

SW33-1 Die vorgeschriebene Gewicht- und Größebeschränkung der Werkzeuge und Halter einhalten.

SW33-2 Das auf den Werkzeugsschildren angegebene Vorschriften für die Beschränkung der Werkzeuge lesen, Betriebsanleitung.

SW34 Das Rückkopplungswiderstandsgerät wird während des Betriebs sehr heiß Es besteht die Gefahr, daß man sich die Finger bei Berührung verbrennt.

SW34-1 Den Rückkopplungswiderstandsschutz (24) nicht abnehmen.

SW35 Der Motor wird während des Betriebs sehr heiß. Es besteht die Gefahr, daßman sich die Finger bei Berührung verbrennt.

SW35-1 Innerhalb von 30 Minuten nach dem Ausschalten der Maschine den Motor nicht berühren.

SW36 Bei Verwendung eines falschen Schmelzdrahts funktioniert die Schutzvorrichtung nicht. Es besteht Feuergefahr.

SW36-1 Einen zerrissenen Schmelzdraht mit einem Draht der selben Norm austauschen.

SW37 Wenn der Sollwert des Thermorelais geändert wird, funktioniert die Schutzvorrichtung nicht. Es besteht Feuergefahr.

SW37-1 Das Sollwert des Thermorelais nicht ändem.

SW38 Beim Umlauf des ATC-Magazins (10) besteht die Gefahr, daß diese Werkzeuge (16) an das Werkstück, die Vorrichtung oder die Innenwand der Maschine anstoßen und abbrechen.

SW38-1 Die Länge der Werkzeuge mußgenau eingestellt werden, damit die Werkzeuge beim Umlauf des ATC-Magazins an das Werkstück, die Vorrichtung oder die Innenwand der Maschine nicht anstoßen.

SW39 Wenn der Steuerschrank (1) oder die Betriebstafel (25) naßist, besteht die Gefahr, einen Stromschlag zu erhalten.

SW39-1 Den Steuerschrank und die Betriebstafel vor Flüssigkeit wie Kühlmittel, Wasser und Stahlspäne schützen.

SW39-2 Mit naßen Händen den Steuerschrank nicht berühren.

SW40 Wenn die von außen verdrahtete Kraft-PE-Linie zu kurz ist, kann sie durch einen Ruck des Kabels abreißen, und es besteht die Gefahr, einen Stromschlag zu erhalten.

SW40-1 Die Kraft-PE-Linie länger als die anderen Linien (L1,L2,L3) halten und locker verbinden.

SW41 Wenn man beim Bestehen der Explosionsgefahr den Schalter der Maschine einschaltet oder Werkstücke bearbeitet, besteht die Gefahr, daß ein überspringender Funke eine Explosion auslösen.

SW41-1 Beim Bestehen der Explosionsgefahr nicht die Maschine installieren.

SW41-2 Bei Explosionsgefahr in der Luft die Maschine nicht einschalten und die Bearbeitung sowie Vorbereitung nicht ausführen.

SW42 Wird der Spritzseitenschutz (23) nicht angebracht, besteht die Gefahr, in der Maschine eingeklemmt und verletzt zu werden.

SW42-1 Vor dem Einschalten des Schalters sich mit eigenen Augen vergewissern, daßder Spritzseitenschutz richtig aufgesetzt ist.

SW44 Je nach Material des Werkstücks kann der Schneidesplitter Feuer fangen oder explodieren (z.B. Magnesium).

SW44-1 Schneidesplitter sofort entfernen.

SW44-2 Wenn mit feuergefährlichen Werkstücken gearbeitet wird, Feuerlöscher griffbereit halten. Betrieb niemals unbeobachtet lassen.

SW-45 Sollten die Fräsapparate vom Werkzeug abgehen, könnten sie schwere Verletzungen verursachen.

SW45-1 Setzen Sie die Fräsapparate in die Werkzeuge fest ein.

SW45-2 Vergewissern Sie sich, daß dies Fräpparate befestigt sind, bevor Sie die Werkzeuge in die Maschine fassen.

SW46 Es besteht Feuergefahr, wenn ein 3-Draht-Sensor mit einer Starkstromleitung verwendet wird.

SW46-1 Keinen 3-Draht- sondern einen 2-Draht-Sensor benutzen.

SW46-2 Falls ein 3-Draht-Sensor trotzdem notgedrungen benutzt werden muss, muss zusäzlich eine Sicherung (1 A oder geringer) an der Starkstromleitung jedes Sensors angebracht werden.

SW47 Wenn die Schrauben der Anschlussklemmleiste nach der Verdrahtung lose sind, kann durch den fehlerhaften Anschluss Hitze erzeugt werden und es besteht Feuergefahr.

SW47-1 Bei der Verdrahtung darauf achten, dass alle Schrauben fest angezogen sind.

SW48 Wenn die Anlage unzureichend beleuchtet ist, ist der Innenraum der Maschine dunkel, und es besteht die Gefahr, sich die Hände an den Vorrichtungen oder Schneiden zu verletzen.

SW48-1 Eine Maschinenleuchte anbringen, wenn die innere Beleuchtungsstärke der Maschine 500 Lux oder darunter ist.

Prüfen der Sicherheitsschilder

Die Sicherheitsschilder sind an der im Bild gezeigten Stelle der Maschine angebracht. Prüfen Sie, ob sie da fest angeklebt sind. Wenn sie sich von der Maschine lösen sollten, bekommen Sie Ersatzschilder und kleben Sie sie an die Maschine an.

Plazierung der Sicherheitsschilder

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1. Sicherheitsschild, Vorderseite und Seite

(1) Sprache: Englisch, Japanisch, Chinesisch

Teilcode : 690373001
Teilname : PS LABEL,TC FRONT JCE

(1) Sprache: Englisch, Deutsch, Französisch

Teilcode : 691042001
Teilname : PS LABEL,TC FRONT EGF

2. Werkzeugschild

工具、主軸回転数の制限を超えて使用すると、機械が破損する場合があります。操作前に、取扱説明書で詳細を確認して下さい。
If use beyond the limitation of the tool and spindle speed, machine may be broken.
Check the detailes by the operation manual before operation.

最高主軸回転速度	10000 min^{-1} / 16000 min^{-1}		Max Spindle Rotation Speed
主軸テーパ	7 / 24 No.30		Spindle Taper
ツールシャンク	MAS-BT30		Tool Shank
プルスタッド	MAS-P30T-2 (30°)		Retension Knob
マガジン全工具合計	M total 25 kg (14Tools) / 35 kg (21Tools)		Total in Magazine
工具の制限	D1 ≦ 40 mm L1 ≦ 200 mm D2 ≦ 80 mm L2 ≦ 160 mm D3 ≦ 46 mm L3 ≧ 30 mm M ≦ 3 kg MxH ≦ 180 kgmm	D1 ≦ 40 mm L1 ≦ 200 mm D2 ≦ 55 mm L2 ≦ 160 mm D3 ≦ 46 mm L3 ≧ 30 mm M ≦ 2 kg MxH ≦ 100 kgmm	Limitation of Tool
工具バランス制限	100 grmm	50 grmm	Limitation of Tool Balance
主軸回転数制限	10000 min^{-1}	16000 min^{-1}	Limitation Spindle Rotation Speed

653379001 / 0210 (2)

Teilcode : 653379001
Teilname : Tool LABEL250

3. Sicherheitsschild, Rückseite und Hochdruckkühlmittelbehälter

(1) Sprache: Englisch, Japanisch, Chinesisch

Teilcode : 690730001
Teilname : PSLABEL, TC REARJCE

(2) Sprache: Englisch, Deutsch, Französisch

Teilcode : 691045001
Teilname : PSLABEL, TC REAR EGF

4. Schild, Regenerativwiderstand

(1) Sprache: Englisch, Japanisch, Chinesisch

Teilcode: 690729001
Teilname: LABEL, TC REGENERATIVE JCE

(2) Sprache: Englisch, Deutsch, Französisch

Teilcode: 691058001
Teilname: LABEL, TC REGENERATIVE EGF

5. Schild, Werkzeugausbau

(1) Sprache: Englisch, Japanisch, Chinesisch

Part Code : 653080001
Part Name : LABEL, Removing Tool JCE

(2) Sprache: Englisch, Deutsch, Französisch

Teilcode : 69104001
Teilname : LABEL, Removing Tool EGF

6. Schild, Seitenverkleidung

(1) Sprache: Englisch, Japanisch, Chinesisch

Teilcode : 690731001
Teilname : LABEL, TC MAINTENANCE DOOR JCE

(2) Sprache: Englisch, Deutsch, Französisch

Teilcode : 690732001
Teilname : LABEL, TC MAINTENANCE DOOR EGF

7. Betreten-verboten Schild

Teilcode : 693178001

693178001 / 0607 (1)

693178001.ai

Die Sicherheitsvorschrift für Operateure

Tapping Centre
TC-S2A

Lesen Sie bitte aufmerksam diese Sicherheitsvorschrift, bevor Sie die Tapping Centre benutzen.

Brother Industries, Ltd. Machinery & Solution Company.

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Was ist die Sicherheitsvorschrift?

Bitte lesen Sie!

Alle Leute, die die Tapping Centre benutzen, einschließlich der Leute, die die Tapping Centre in einer Fabrik installieren, die mit der Tapping Centre arbeiten, und die die Tapping Centre warten oder reparieren, sind aufgefordert, diese Sicherheitsvorschrift zu lesen.
In der Sicherheitsvorschrift werden alle Leute, die die Tapping Centre benutzen, als Benutzer bezeichnet.

Zweck

Die Tapping Centre ist eine Hochspannungsstrommaschine mit schnell umlaufenden Werkzeugen, und einem Tisch und einem ATC-Magazin, die sich mit starker Kraft bewegen. Deshalb bestehen verschiedene Gefahren bei der Benutzung dieser Maschine.
Der Zweck dieser Sicherheitsvorschrift ist es, vor Gefahren die Benutzer zu schützen.
In der Sicherheitsvorschrift wird Folgendes erklärt:
Warnung: Welche Gefahren bestehen?
Preventivmaßnahme: Wie kann man die Gefahren vermeiden?

Zusammenstellung der Sicherheitsvorschriften und der Zusammenhang mit anderen Manuals

Jedem Manual (außer der Programmierungsanleitung) ist eine Sicherheitsvorschrift für die betreffenden Benutzer beigelegt.
Für die verschiedenen Funktionen oder das Betriebsverfahren der Maschine lesen Sie bitte das entsprechende Manual.

1.Betriebsanleitung (Für alle Benutzer)
"Die Sicherheitsvorschrift für Operateure"
"Die Sicherheitsvorschrift für Personen, die Maschine installieren und den Arbeitsprozeß aufstellen für Tapping Centre"
"Betriebsanleitung"
Notwendige für grundlegenden Betriebsverfahren für alle Benutzer.
Deutsch Teil-Code: 693076001

2.Betriebsanleitung (Für Fachpersonal)
"Die Sicherheitsvorschrift für Operateure"
"Die Sicherheitsvorschrift für Personen, die Maschine installieren und den Arbeitsprozeß aufstellen für Tapping Centre"
"TÜRVERRIEGELUNGSFUNKTION"
"Betriebsanleitung:
Notwendige Betriebsmaßnahmen für die Aufstellung und die Bearbeitung."

Dialogorientierte Programmierung NC-Sprache	Japanischer Teil-Code:	690777001
	Englischer Teil-Code:	690783001
	Japanischer Teil-Code:	690779001
	Englischer Teil-Code:	690785001

3.Installierungsanweisung "Die Sicherheitsvorschrift für Personen, die die Maschine installieren und den Arbeitsprozeß aufstellen

	Japanischer Teil-Code:	690775001
	Englischer Teil-Code :	690781001

4.Programmierungsanleitung "Programmierungsanleitung:
Programmierung der Bearbeitung"

Dialogorientierte Programmierung NC-Sprache	Japanischer Teil-Code:	690692001
	Englischer Teil-Code:	690698001
	Japanischer Teil-Code:	690709001
	Englischer Teil-Code:	690715001

5.Wartungsvorschrift "Die Sicherheitsvorschrift für qualifiziertes Wartungspersonal; Tapping Centreist der Für Wartungsvorschrift beigelegt."
"Wartungsvorschrift:
Nachstellung und Reparatur der Maschine"
Die Wartungsvorschrift wird an die Kunden nicht verteilt.

Beziehung mit Sicherheitsschildern

Die wichtigsten Vorschriften der Sicherheitsvorschriften sind in Form von Sicherheitsschild an der Maschine angebracht.
Eine Erklärung für die Sicherheitsschilder gibt es am Ende der Sicherheitsvorschrift. Falls sich die Sicherheitsschilder von der Maschine lösen sollten, informieren Sie uns. Wir schicken Ihnen sofort Ersatzschilder zu.

Sprache

Die Maschinen für den japanischen Markt werden mit den Sicherheitsvorschriften und den Sicherheitsschildern auf japanisch ausgestaltet. Aus Japan exportierte Maschinen sind mit Sicherheitsanweisungen und -schildern auf vier Sprachen ausgestattet: Englisch, Deutsch, Französisch und Chinesisch.
Fordern Sie deshalb die für Sie entsprechenden Vorschriften und Schilder, einschließlich dieser in anderen Sprachen, bei Ihrem Hädler an.

Kundendienst

Sollten die Sicherheitsvorschriften oder die Sicherheitsschilder verloren gehen, bekommen Sie diese bei Ihrem Händler.

Wenn Sie Ihren Händler nicht kennen sollten, rufen Sie beim nachfolgenden Büro an.

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Handhabung der Sicherheitsvorschrift

Geben Sie acht, daßSie die Sicherheitsvorschriften nicht verlieren, und bewahren Sie diese immer griffbereit auf.
Sollte die Maschine den Besitzer wechseln, dann müssen auch die Sicherheitsvorschriften an den neuen Besitzer zusammen mit der Maschine üergeben werden.

Gefahrenstufe

Die auftretenden Schäden bei Nichteinhaltung der Sicherheitsvorschriften werden in drei Stufen klassifiziert.
1. GEFAHR

⚠ GEFAHR

Lebensgefahr odeiche Körperverletzungsgefahr.

2. WARNUNG

⚠ WARNUNG

Schwere Verletzungsgefahr.

3. ACHTUNG

⚠ ACHTUNG

Leichte Verletzungsgefahr.

Reihenfolge der Erklärung

Hier wird Folgendes erklärt:
1. Stichwörter (GEFAHR, WARNUNG, ACHTUNG), die die Gefahren anzeigen, und Bildzeichen
2. Gefahrengruppe
3. Möglicher Verletzungsgrad
4. Preventivmßnahme

Bedeutung der Bildzeichen

Auf den Sicherheitsschildern und in den Sicherheitsvorschriften werden die Gefahren und deren Preventivmaßnahmen mit Bildzeichen anschaulich erklärt. Hier wird ihre Bedeutung erklät.

1. Gefahr

Rutschen

Stolpern

Stromschlag

Hand geklemmt

Heiß

Sich schneiden

Sich stechen

Fallender Gegenstand

Sturz

Spritzen

Laufender Teil

Stromschlag

Hineingezogen

Heiß

Sich schneiden

Explosion

Fallender Gegenstand

Umlaufender Gegenstand

Spritzen

Feuer

2. Preventivmaßnahmen

Ohren schützen

Hände schützen

Füße schützen

Netzstecker abziehen

Nicht berühren

Kopf schützen

Erden

Nicht zerlegen

Augen schützen

TS2ASA01-1.ai

No.	各部の名称	Section names	Namen jedes Teils	Noms de sections	各部件名称
	日本語	English	Deutsch	Français	中文
1.	制御箱	control box	Steuerschrank	armoire de commande	控制箱
2.	ｽﾌﾟﾗｯｼｭｶﾞｰﾄﾞ	splash guard	Spitzblech	tôle pare-copeaux	火花防溅箱
3.	停止ｽｲｯﾁ	stop switch	stop Einschalter	bouton d'arrét	停止开关
4.	停止ﾗﾝﾌﾟ	stop lamp	stop Lampe	lampe d'arrêt	停止指示灯
5.	ﾄﾞｱｲﾝﾀﾛｯｸｽｲｯﾁ	door interlock switch	Verriegelungsschalter	interrupteur de la porte d'verrouillage	门互锁开关
6.	作業扉	work door	Arbeitstür	porte de travail	作业门
7.	ﾄﾞｱｲﾝﾀﾛｯｸｷｰ	door interlock key	Verriegelungsschlüssel	clef de la porte d'verrouillage	门互锁键
8.	ｽﾋﾟﾝﾄﾞﾙ	spindle	Spindel	broche	主轴
9.	ATC ﾏｶﾞｼﾞﾝ	ATC magazine	ATC Magazin	ATC magasin	ATC 刀库
10.	取手	handle	Griff	poignée	把手
11.	制御箱内部書類入れ	control box document	Dokumentenbehälter im Steuerschrank	boîte à papiers de l''armoire de commande	控制箱内书架
12.	ﾚﾍﾞﾘﾝｸﾞﾎﾞﾙﾄ	leveling bolt	Nivellierbolzen	boulon à régler le niveau de la machine	调平螺栓
13.	ｸｰﾗﾝﾄﾉｽﾞﾙ	coolant nozzle	Kühlmitteldüse	ajutage d'huile de coupe	冷却液喷嘴
14.	ｸﾞﾘｯﾌﾟｶﾊﾞｰ	grip cover	Griffschutz	couverture de jambe	夹钳套
15.	工具	tool	Werkzeug	outil	刀具
16.	工具ﾎﾙﾀﾞ	tool holder	Werkzeughalter	support à outil	刀具夹
17.	ｽﾋﾟﾝﾄﾞﾙﾍｯﾄﾞ	spindle head	Spindelkopf	tête de la broche	主轴头
18.	非常停止ｽｲｯﾁ	emergency stop switch	Notfall-stop-Schalter	bouton d'arrêt d'urgence	紧急停止开关
19.	ｹｰﾌﾞﾙｶﾊﾞｰ	cable cover	kabelschutz	couvre cable	揽绳套
20.	ﾃｰﾌﾞﾙ	table	Tisch	table	工作台
21.	主電源ﾌﾞﾚｰｶ	main power breaker	Hauptschalter	disjoncteur d’alimentation principale	主电源开关
22.	ｸｰﾗﾝﾄﾀﾝｸ	coolant tank	Kühlmitteltank	réservoir d'huile de coupe	冷却液罐
23.	ｽﾌﾟﾗｯｼｭｶﾞｰﾄﾞｻｲﾄﾞｶﾊﾞｰ	splash guard side cover	Spitzblechseitenschutz	couverture à côté du tôle pare-copeaux	火花防溅板一侧的护罩
24.	回生抵抗ｶﾊﾞｰ	regenerative resistor cover	Rückkopplungs- widerstandsschutz	couverture pour la résistance régénératrice	再生电阻罩
25.	操作ﾊﾟﾈﾙ	operation panel	Betriebstafel	panneau d'opéation	操作面板

Warnungen und Preventivmaßnahmen

Jede Zahl in Klammern wie (1)(2) entspricht der Nummer der Namen jedes Teils.

Gefahr

GEFAHR

OD1 In der Tapping Centre bestehen verschiedene Gefahren.

OD1-1 Vor Inbetriebnahme der Maschine die Sicherheitsvorschrift lesen, um die Risiken zu erkennen und die Preventivmaßnahmen zu verstehen.

OD1-2 Alle Benutzer müssen wissen, wo der Notfall-stop-Schalter ist, (18) und wie er benutzt wird.

OD2 Im Steuerschrank (1) gibt es einen Hochspannungsteil. Bei versehntlicher Berührung besteht die Gefahr, sich schwer oder lebensgefährlich zu verletzen.

OD2-1 Nur hochqualifizierte Elektriker dürfen die elektrischen Teile dieser Maschine warten und reparieren. Der Operateur darf den Steuerschrank nicht aufmachen.

OD2-2 Bei Alarm den Betriebsleiter sofort verständigen.Der Maschinenbediener darf die Maschine nicht reparieren. Nur qualifizierte Personen dürfen die Maschine installieren und reparieren.

OD3 Es besteht die Gefahr, von laufenden Maschinenteilen geklemmt zu werden und sich dabei schwer zu verletzen.

OD3-1 Während die Maschine in Betrieb ist, darf kein Körperteil in die innere Seite des Spitzblechs (2) gelangen.

OD3-2 Vor Anwerfen der Maschine sich mit eigenen Augen vergewissern, daß niemand innerhalb des Spitzblechs ist.

OD3-3 Während die Maschine in Betrieb ist, von laufenden Teilen Hände, Füße und sonstige Körperteile fernhalten.

OD3-4 Bei Alarm den Betriebsleiter sofort verständigen. Nicht in die Maschine greifen.

OD4 Wenn der Verriegelungsschalter (5) außer Kraft sein sollte, laft die Maschine trotzdem weiter, wenn die Arbeitstür (6) geöffnet wird. Es besteht deshalb die Gefahr, von den Maschinenteilen geklemmt und verletzt zu werden.

OD4-1 Wenn der Verriegelungsschalter außer Kraft ist, darf man mit keinem Körperteil in die Maschine kommen. Der Maschinenbediener muß den Betriebsleiter verständigen. Der Betriebsleiter muß den Verriegelungsschalter in Kraft setzen und den Schlüssel aufbewahren.

OD4-2 Bei außer Kraft gesetzter Verriegelung darf der Betriebsleiter niemanden die Maschine benutzen lassen.

OD4-3 Vor Inbetriebnahme der Maschine sich mit eigenen Augen vergewissern, daß die Verriegelung in Kraft ist.

OD4-4 Sollte der Verriegelungsschlüssel (7) im Schloß stecken, muß der Betriebsleiter darüber informiert werden.

OD4-5 Den Verriegelungsschlüssel (7) mußder Betriebsleiter aufbewahren.

Warnung **WARNUNG**

OW1 Wenn man umlaufende Werkzeuge (15) beührt, wird man verletzt.
OW1-1 Von umlaufenden Werkzeugen sich fernhalten.

OW2 Es besteht Verletzungsgefahr durch abgebrochene Werkzeuge (16) oder herausspringende Werkstüke.
OW2-1 Arbeitstür (6) schließen.

OW3 In umlaufenden Teil können die Finger hineingezogen und verletzt werden.
OW3-1 Von umlaufendem Werkzeug (15), dem Spindel (8) und dem ATC-Magazin (9) sich fernhalten.
OW3-2 Körperanliegende Bekleidung tragen. Lange Haare müsen in einem Hut aufgesteckt werden. Beim Arbeiten an der laufenden Maschine keine Handschuhe tragen. Keinen Schmuck tragen. Umlaufende Teile nicht berühren.

OW4 Wenn die Sicherheitsvorrichtung abgeändert wird, funktioniert sie nicht mehr richtig. Es besteht die Gefahr, einen Stromschlag zu erhalten, von den Maschinenteilen geklemmt zu werden oder sich zu stoßen.
OW4-1 Wenn die Sicherheitsvorrichtung abgeändert oder unbeweglich festgemacht wird, die Maschine nicht benutzen.

OW5 Wenn Stahlspäne in die Augen hineinspringen, werden die Augen verletzt.Es besteht die Gefahr, die Sehkraft zu verlieren.
OW5-1 Einen Augenschutz gegen Stahlspäne tragen.
OW5-2 Stahlspäne nicht mit einer Luftdruckpistole wegfegen.

OW6 Wenn man Stahlspäne mit bloßen Händen berürt, kann man sich schneiden oder verbrennen.
OW6-1 Stahlspäne nicht mit bloßen Händen berühren. Die Spitze der Werkstücke nicht mit bloßen Händen berühren.
OW6-2 Beim Reinigen der Schneidechips Handschuhe tragen und eine Bürste benutzen.
OW6-3 Schneidechips nur bei angehaltener maschine reinigen.

OW7 Wenn man die Schneide der Werkzeuge (15) berührt, wird die Hand geschnitten.
OW7-1 Die Schneide der Werkzeuge nicht berühren. Die Werkzeuge immer am Schaft des Werkzeughalters (16) halten.

OW8 Wenn schwere Gegenstände auf die Füße fallen, besteht die Gefahr, sich den Fuß zu brechen.
OW8-1 Beim Heben schwerer Gegenstände Schutzschuhe tragen.

OW9 Beim Heben schwerer Gegenstände besteht die Gefahr, sich einen Bruch zu heben.
OW9-1 Beim Heben schwerer Gegenstände immer jemanden um Hilfe bitten.
OW9-2 Beim Heben schwerer Gegenstände nicht die Rückenkraft sondern die Beinkraft benutzen.

OW10 Lange Zeit dauernder oder großer Lärm ist für die Ohren schädlich.
OW10-1 Bei der Arbeit unter Lärm einen Gehörschutz, z.B. Stöpsel, tragen.

OW11 Hochdruckluft kann explodieren und Augen oder Ohren verletzen.
OW11-1 Nur hochqualifizierte Fachkräfte dürfen an dieser Maschine Hochdruckluftrohrleitungen installieren oder verändern.

OW12 Beim Aufstehen besteht die Gefahr, sich den Kopf anzustoßen und dabei zu verletzen.
OW12-1 Beim Arbeiten in der Maschine oder in ihrem Bereich einen Schutzhelm tragen.

OW13 Wenn Werkzeuge in der Maschine liegenbleiben sollten und die Maschine in Betrieb genommen wird, besteht die Gefahr, daß diese Werkzeuge herumgeschleudert werden und jemanden verletzen.

OW13-1 Wenn Werkzeuge in der Maschine liegenbleiben, darf die Maschine nicht benutzt werden. Den Betriebsleiter verständigen.

OW14 Es besteht die Gefahr, sich die Finger zu klemmen, wenn die Arbeitstür (6) nicht mit der Klinke (10) auf- und zugemacht wird.

OW14-1 Türgriff (10) beim Öffnen und Schließen der Arbeitstür festhalten.

OW15 Wenn man Werkzeuge auf dem Steuerschrank (1) oder auf der Maschine liegenläßt, besteht die Gefahr, daß diese wegen der Vibration der Maschine herunterfallen.

OW15-1 Auf dem Steuerschrank und auf der Maschine nichts liegenlassen.

OW16 Wenn man auf die Maschine oder auf den Kühlmittelbehälter (22) steigt, besteht die Gefahr, zu stürzen und sich zu verletzen.

OW16-1 Nicht auf die Maschine und den Kühlmittelbehälter steigen.

OW17 Wenn man unter den Nivellierbolzen (12) greift, besteht die Gefahr, sich zu klemmen und zu verletzen.

OW17-1 Den Nivellierbolzen nicht einstellen. Wenn die Maschine nicht waagerecht ist, muß der Betriebsleiter verständigt werden.

OW17-2 Der Betriebsleiter muß den verantwortlichen Installateur mit der Einstellung des Nivellierbolzens beauftragen.

OW18 Wenn das Kabel hängt oder nicht ordentlich verlegt ist, besteht die Gefahr, darüber zu stolpern.
OW18-1 Wenn das Kabel hängt oder nicht ordentlich verlegt ist, muß man den Betriebsleiter verständigen.
OW18-2 Der Betriebsleiter muß den verantwortlichen Installateur damit beauftragen, das Kabel fachgerecht zu verlegen.

OW19 Wenn an der Maschine Modifikationen vorgenommen werden, dann tritt die Sicherheitsvorrichtung außer Kraft, und alle angegebenen Warnungen gelten nicht mehr.
OW19-1 Wenn die Maschine modifiziert wird, darf die Maschine nicht in Betrieb genommen werden, und muß man den Betriebsleiter verständigen.

OW20 Kühlmittel ist augenschädlich.
OW20-1 Bei der Einstellung der Kühlmitteldüse (14) einen Augenschutz tragen.
OW20-2 Wenn die Augen mit dem Kühlmittel in Berührung kommen, dann die Augen mit sauberem Wasser auswaschen und den Arzt konsultieren.

OW21 In jeder Spalte der Maschine besteht Klemm- und Verletzungsgefahr.
OW21-1 Nicht zwischen die ngriffschutz (14) fassen.
OW21-2 Nicht mit den Fingern zwischen das Werkzeug (15) oder den Werkzeughalter (16) und das ATC-Magazin kommen.

OW22 Wenn Kühlmittel, Schmierstoff oder Stahlspäne auf dem Fußboden ist, kann man rutschen und sich verletzen.
OW22-1 Vor Inbetriebnahme bei ausgeschalteter Maschine deren Innenseite und den Fußboden um die Maschine herum sauber machen

OW23 Beim Einsetzen und Herausnehmen des Werkzeughalters (16) besteht die Gefahr, sich zu schneiden oder sonstig zu verletzen.

OW23-1 Beim Austausch der Werkzeug Lederhandschuhe tragen und die Schneide der Werkzeuge nicht berühren.

OW24 Die Maschine kann plötzlich zum Laufen anfangen, und die Werkzeuge können aus der Haltung herausfallen.

OW24-1 Auf keinem Fall mit einem Körperteil unter den Spindelkopf (17) kommen.

OW25 Bei der Bearbeitung der Werkstücke mit ÖlKühlmittel besteht Brandgefahr.

OW25-1 Wenn kein Feueralarm und keine automatische Feuerlöschanlage installiert wird, nicht Ölkülmittel benutzen.

OW25-2 Bei der Bearbeitung mußder Operateur an der Maschine sein.

OW26 Wenn man sich an die Maschine anlehnt, besteht die Gefahr, daß man beim Lauf der Maschine gequetscht oder gestoßen und verletzt werden kann.

OW26-1 Sich nicht an die Maschine anlehnen.

OW27 Wenn man etwas an den Notfall-stop-Schalter (19) hängt, könnte er bei Notfall nicht gedrückt werden.

OW27-1 Nichts an den Notfall-stop-Schalter hängen.

OW28 Wenn der Tisch (19) sich bewegt, dann kann der Kabelschutz (20) auf der Rückseite der Maschine aus der Maschine herausspringen. Es besteht die Gefahr, gestoßen und verletzt zu werden.

OW28-1 Vor Aufräumen der Stahlspäne den Hauptschalter (21) ausschalten.

OW29 Der Kühlmitteltank (22) ist sehr schwer. Wenn man versucht zu heben, besteht die Gefahr, sich einen Bruch zu heben oder sich an die Füße durch Fallen des Tanks zu verletzen.

OW29-1 Auch beim Aufräumen der Stahlspäne darf der Kühlmitteltank nicht aufgehoben werden.

OW30 Beim Eintreten in die Maschine besteht die Gefahr, zu rutschen oder von den Maschinenteilen geklemmt zu werden.

OW30-1 Nicht unnötigerweise in die Maschine eintreten. Wenn man in die Maschine eintreten muß, den Betriebsleiter verständigen.

OW31 Wenn man vergißt, die Seitenabdeckung (23) des Spritzschutzes (2) aufzusetzen, besteht die Gefahr, geklemmt oder von einem gebrochenen Werkzeug verletzt zu werden.

OW31-1 Vor Einschalten der Maschine sich mit eigenen Augen vergewissern, daß der Seitenschutz aufgesteckt ist.Wenn er nicht aufgesteckt ist, den Betriebsleiter verständigen.

OW31-2 Der Betriebsleiter muß den Seitenschutz aufsetzen lassen.

OW32 Wenn Werkzeuge (16) oder Werkzeughalter (17), deren Gewicht oder Größe die vorgeschriebene Beschränkung überschreitet, benutzt werden, besteht die Gefahr, daß die Werkzeuge herausspringen.

OW32-1 Die vorgeschriebene Gewicht- und Größebeschränkung der Werkzeuge und Halter einhalten.

OW32-2 Das an der Maschine angebrachte Warnschild für die Beschr änkung der Werkzeuge beachten, Betriebsanleitung .

OW33 Das Rückkopplungs0widerstandsgerät wird während des Betriebs sehr heiß Es besteht die Gefahr, daß man sich die Finger bei Berührung verbrennt.

OW33-1 Den Rückkopplungs widerstandschutz (24) nicht abnehmen.

OW34 Der Motor wird während des Betriebs sehr heiß. Es besteht die Gefahr, daßman sich die Finger bei Berührung verbrennt.

OW34-1 Innerhalb von 30 Minuten nach dem Ausschalten der Maschine den Motor nicht berühren.

OW35 Beim Umlauf des ATC-Magazins (10) besteht die Gefahr, daß diese Werkzeuge (16) an das Werkstück, die Vorrichtung oder die Innenwand der Maschine anstoßen und abbrechen.

OW35-1 Die Länge der Werkzeuge mußgenau eingestellt werden, damit die Werkzeuge beim Umlauf des ATC-Magazins an das Werkstück, die Vorrichtung oder die Innenwand der Maschine nicht anstoßen.

OW36 Wenn der Steuerschrank (1) oder die Betriebstafel (25) naßist, besteht die Gefahr, einen Stromschlag zu erhalten.

OW36-1 Den Steuerschrank und die Betriebstafel vor Flüssigkeit wie Kühlmittel, Wasser und Stahlspäne schützen.

OW36-2 Mit naßen Händen den Steuerschrank nicht berühren.

OW37 Wenn man beim Bestehen der Explosionsgefahr den Schalter der Maschine einschaltet oder Werkstücke bearbeitet, besteht die Gefahr, daß ein überspringender Funke eine Explosion ausllösen.

OW37-1 Bei Explosionsgefahr in der Luft die Maschine nicht einschalten und die Bearbeitung sowie Vorbereitung nicht ausführen.

OW-38 Beim Bedienen mit nicht befestigtem Werkstüc kann das Werkstück abspringen, und deshalb besteht Verletzungsgefahr.

OW-38-1 Das Werkstück muß befestigt werden.

OW39 Wenn man vergißt, den Spritzseitenschutz (23) aufzusetzen, besteht Verletzungsgefahr.

OW39-1 Vor dem Einschalten des Schalters sich mit eigenen Augen vergewissern, daß der Spritzseitenschutz richtig aufgesetzt ist. Wenn kein Deckel aufgesetzt sein sollte, muß man den Betriebsleiter davon benachrichtigen.

OW39-2 Vor dem Entfernen des Spritzseitenschutz den Hauptschalter ausschalten und verschließen, damit ihn niemand mehr einschalten kann.

OW39-3 Der Spritzseitenschutz muß vom Betriebsleiter aufgesetzt werden.

OW40 Je nach Material des Werkstücks kann der Schneidesplitter Feuer fangen oder explodieren (z.B. Magnesium).

OW40-1 Schneidesplitter sofort entfernen.
OW40-2 Wenn mit feuergefährlichen Werkstücken gearbeitet wird, Feuerlöscher griffbereit halten. Betrieb niemals unbeobachtet lassen.

OW41 Sollten die Fräsapparate vom Werkzeug abgehen, könnten sie schwere Verletzungen verursachen.
OW41-1 Vergewissern Sie sich, daß dies Fräpparate befestigt sind, bevor Sie die Werkzeuge in die Maschine fassen.

OW42 Wenn die Anlage unzureichend beleuchtet ist, ist der Innenraum der Maschine dunkel, und es besteht die Gefahr, sich die Hände an den Vorrichtungen oder Schneiden zu verletzen.
OW42-1 Eine Maschinenleuchte anbringen, wenn die innere Beleuchtungsstärke der Maschine 500 Lux oder darunter ist.

Prüfen der Sicherheitsschilder

Die Sicherheitsschilder sind an der im Bild gezeigten Stelle der Maschine angebracht. Prüfen Sie, ob sie da fest angeklebt sind. Wenn sie sich von der Maschine lösen sollten, bekommen Sie Ersatzschilder und kleben Sie sie an die Maschine an.

Plazierung der Sicherheitsschilder

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1. Sicherheitsschild, Vorderseite und Seite

(1) Sprache: Englisch, Japanisch, Chinesisch

Teilcode : 690373001
Teilname : PS LABEL,TC FRONT JCE

(1) Sprache: Englisch, Deutsch, Französisch

Teilcode : 691042001
Teilname : PS LABEL,TC FRONT EGF

2. Werkzeugschild

工具、主軸回転数の制限を超えて使用すると、機械が破損する場合があります。操作前に、取扱説明書で詳細を確認して下さい。
If use beyond the limitation of the tool and spindle speed, machine may be broken.
Check the detailes by the operation manual before operation.

最高主軸回転速度	10000 min^{-1} / 16000 min^{-1}		Max Spindle Rotation Speed
主軸テーパ	7 / 24 No.30		Spindle Taper
ツールシャンク	MAS-BT30		Tool Shank
プルスタッド	MAS-P30T-2 (30°)		Retension Knob
マガジン全工具合計	M total 25 kg (14Tools) / 35 kg (21Tools)		Total in Magazine
工具の制限	D1 ≦ 40 mm L1 ≦ 200 mm D2 ≦ 80 mm L2 ≦ 160 mm D3 ≦ 46 mm L3 ≧ 30 mm M ≦ 3 kg MxH ≦ 180 kgmm	D1 ≦ 40 mm L1 ≦ 200 mm D2 ≦ 55 mm L2 ≦ 160 mm D3 ≦ 46 mm L3 ≧ 30 mm M ≦ 2 kg MxH ≦ 100 kgmm	Limitation of Tool
工具バランス制限	100 grmm	50 grmm	Limitation of Tool Balance
主軸回転数制限	10000 min^{-1}	16000 min^{-1}	Limitation Spindle Rotation Speed

653379001 / 0210 (2)

Teilcode : 653379001
Teilname : Tool LABEL250

3. Sicherheitsschild, Rückseite und Hochdruckkühlmittelbehälter

(1) Sprache: Englisch, Japanisch, Chinesisch

Teilcode : 690730001
Teilname : PSLABEL, TC REARJCE

(2) Sprache: Englisch, Deutsch, Französisch

Teilcode : 691045001
Teilname : PSLABEL, TC REAR EGF

4. Schild, Regenerativwiderstand

(1) Sprache: Englisch, Japanisch, Chinesisch

Teilcode: 690729001
Teilname: LABEL, TC REGENERATIVE JCE

(2) Sprache: Englisch, Deutsch, Französisch

Teilcode: 691058001
Teilname: LABEL, TC REGENERATIVE EGF

5. Schild, Werkzeugausbau

(1) Sprache: Englisch, Japanisch, Chinesisch

Part Code : 653080001
Part Name : LABEL, Removing Tool JCE

(2) Sprache: Englisch, Deutsch, Französisch

Teilcode : 69104001
Teilname : LABEL, Removing Tool EGF

6. Schild, Seitenverkleidung

(1) Sprache: Englisch, Japanisch, Chinesisch

Teilcode : 690731001
Teilname : LABEL, TC MAINTENANCE DOOR JCE

(2) Sprache: Englisch, Deutsch, Französisch

Teilcode : 690732001
Teilname : LABEL, TC MAINTENANCE DOOR EGF

7. Betreten-verboten Schild

Teilcode : 693178001

693178001 / 0607 (1)

693178001.ai

Manuel de sûretéour eux qui installent et arrangent le centreur tapant

Centreur tapant
TC-S2A

Lisez ce manuel de sûretésoigneusement avant l'opération de le centreur tapant, s'il vous plaît.

Brother Industries, Ltd. Machinery & Solution Company.

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Les grandes lignes du manuel de sûreté

Lisez ce manuel

Tout le monde qui utilize le centreur tapant, y compris eux qui installent le centreur tapant dans l'usine, qui manient le centreur tapant et façnnent des pièces en travail, qui ajustent et réparent le centreur tapant, est requis de lire ce manuel de sûret.

Dans ce manuel de sûreté tout le monde qui utilise le centreur tapant s'exprime comme utilisateur.

Intension
Le centreur tapant consiste en circuits électriques de voltage haut, outils qui tournent avec une grande vitesse, et tables et ATC magasins qui se meuvent avec une force puissante. Pour cela, des hasards divers s'associent à la machine.
L'intension de ce manuel de sûreté est de protéger les utilisateurs contre ces hasards.
Le manuel de sûreté explique ci-dessous:
Avertissments: des types de hasards
Mesures préventives : des manières d'empêcher les hasards de surgir

Le contenu de manuel de sûreté et la relation avec les autres manuels

Chaque manuel d'instruction, sauf le manuel de programmation, contient le manuel de sûreté
Les manuels de sûreté sont donnés à chaque groupe de personnel.
Lisez le texte du manuel d'instruction pour connaître des fonctions et des méthodes d'opération de la machine.

1.Manuel de fonctionnement (A l'usage des opérateurs non-spécialisés)
"Manuel de sûreté pour opérateurs"
"Manuel de sûeté pour eux qui installent et arrangent le centreur tapant"
"Manuel de opération:（fonctionnements élémentaires de la machine à l'intention des opérateurs non-spécialisés "）
Code de parties pour français : 693077001

2.Manuel de fonctionnement (A l'intention des opérateurs spécialisés)
"Manuel de sûreté pour opérateurs"
"Manuel de sûeté pour eux qui installent et arrangent le centreur tapant"
"Fonction De L'enclenchement Avec Verrouillage De La Porte"
"Manuel de opération":（opération de la machine necessaire pour arrangement et faconnement.）

La machine de programmation à conversation
Code de parties pour japonais : 690777001
Code de parties pour anglais : 690783001

NC langage
Code de parties pour japonais : 690779001
Code de parties pour anglais : 690785001

3 Manuel d'installation
"Manuel de sûreté pour eux qui installent et arrangent le centreur tapant"
"Manuel d'installation: Installation et assemblage de la machine et ces accessoires."
Code de parties pour japonais : 690775001
Code de parties pour anglais : 690781001

4. Manuel de programmation
"Manuel de programmation:
création de programme de façonnement"

La machine de programmation à conversation
Code de parties pour japonais: 690692001
Code de parties pour anglais : 690698001

NC langage
Code de parties pour japonais :690709001
Code de parties pour anglais : 690715001

5.Manuel de maintenance
"Manuel de sûeté pour eux qui sont qualifiés pour maintenance de centreur tapanmaintenance."
" Manuel de maintenance:
Ajustement et réparation de la machine."
Le manuel de maintenance n'est pas distribué aux clients.

Relation à des instructions de sûreté

Les articles d'importance particulier qui apparaissent dans ce manuel de sûreté s'attachent aussi à la machine comme instructions de sûreté.
Une explication des instructions de sûreté se prépare à la fin de ce manuel de sûeté. Si des instructions de sûreté se sont déachées de la machine, obtenez des nouvelles instructions de sûeté et les attachez correctement.

Langage

Des machine envoyées à l'intérieur du Japon sont pourvues de manuels de sûreté et d'instructions de sûeté rits en japoinais. Les machines exportées du Japon sont fournies avec les manuels et les étiquettes de sécurité en quatre langues : anglais, allemand, français et chinois. Obtenez les manuels et les instructions écrits en un langage que vous pouvez comprendre.
Sur manuels et instructions en autres langages, consultez le vendeur auquel vous avez acheté la machine.

Comment d'acheter

Quand les manuels de sûreté et les instructions de sûeté ont été perdus, obtenez-les du vendeur auquel vous avez acheté la machine.
Si vous ne savez pas le vendeur, consultez les bureaux spécifiés ci-dessous.

1-1-1 Kawagishi, Mizuho-ku, Nagoya 467-8562, JAPAN
BROTHER INDUSTRIES, LTD. Machinery & Solution Company.
phone +81-52-824-2232

Maniement du manuel de sûreté

Gardez-vous de perdre les manuels de sûreté et mettez-les sous la main toujours. Quand la machine change de main, passez les manuels de sûreté à la nouvelle propriétaire avec la machine.

Degré de danger

Les degré de danger se classent en trois catégories d'aprés le niveau de dommage qui peut surgir quand des instructions ne sont pas observées.

1.DANGER

⚠ DANGER

Dommage qui peut causer une mort ou une blessure sévère.

2. AVERTISSEMENT

⚠ AVERTISSEMENT

Dommage qui peut entraîner une blessure sérieuse.

3. ATTENTION

⚠ ATTENTION

Dommage moins sérieux que cela ci-dessus.

Ordre d'explication

Les instructions de sûreté s'expliquent dans l'ordre ci-dessous.

1. Mots de signal (DANGER, AVERTISSEMENT, ATTENTION) et symboles indiquant le degré de danger
2. Type de danger (Sujet)
3. Type de dommages prévus
4. Mesure préventive

Significations des symboles

Les symboles sont utilisés sur les instructions de sûreté et dans les avertissements du manuel de sûeté pour expliquer des dangers possibles et leurs mesures préventives.

1. Danger

Glissement

Parties se mouvant

Trébuchement

Commotionélectrique

Commotionélectrique

Pris

Main coincée

Température haute

Température haute

Coupe

Coupe

Eclatement

Pointe aigu

Objet tombant

Objet tombant

Objet tournant

Tomber

Jaillissement

Jaillissement

Feu

2. Mesures préventives

Protégez vos oreilles.

Protégez vos mains.

Protégez vos pieds.

Coupez la prise de courant.

Ne touchez pas.

Protégez votre tête.

Connectez le coupe-circuit.

Ne Désassemblez pas.

Protégez vos yeux.

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No.	各部の名称	Section names	Namen jedes Teils	Noms de sections	各部件名称
	日本語	English	Deutsch	Français	中文
1.	制御箱	control box	Steuerschrank	armoire de commande	控制箱
2.	ｽﾌﾟﾗｯｼｭｶﾞｰﾄﾞ	splash guard	Spitzblech	tôle pare-copeaux	火花防溅箱
3.	停止ｽｲｯﾁ	stop switch	stop Einschalter	bouton d'arrét	停止开关
4.	停止ﾗﾝﾌﾟ	stop lamp	stop Lampe	lampe d'arrêt	停止指示灯
5.	ﾄﾞｱｲﾝﾀﾛｯｸｽｲｯﾁ	door interlock switch	Verriegelungsschalter	interrupteur de la porte d'verrouillage	门互锁开关
6.	作業扉	work door	Arbeitstür	porte de travail	作业门
7.	ﾄﾞｱｲﾝﾀﾛｯｸｷｰ	door interlock key	Verriegelungsschlüssel	clef de la porte d'verrouillage	门互锁键
8.	ｽﾋﾟﾝﾄﾞﾙ	spindle	Spindel	broche	主轴
9.	ATC ﾏｶﾞｼﾞﾝ	ATC magazine	ATC Magazin	ATC magasin	ATC 刀库
10.	取手	handle	Griff	poignée	把手
11.	制御箱内部書類入れ	control box document	Dokumentenbehälter im Steuerschrank	boîte à papiers de l''armoire de commande	控制箱内书架
12.	ﾚﾍﾞﾘﾝｸﾞﾎﾞﾙﾄ	leveling bolt	Nivellierbolzen	boulon à régler le niveau de la machine	调平螺栓
13.	ｸｰﾗﾝﾄﾉｽﾞﾙ	coolant nozzle	Kühlmitteldüse	ajutage d'huile de coupe	冷却液喷嘴
14.	ｸﾞﾘｯﾌﾟｶﾊﾞｰ	grip cover	Griffschutz	couverture de jambe	夹钳套
15.	工具	tool	Werkzeug	outil	刀具
16.	工具ﾎﾙﾀﾞ	tool holder	Werkzeughalter	support à outil	刀具夹
17.	ｽﾋﾟﾝﾄﾞﾙﾍｯﾄﾞ	spindle head	Spindelkopf	tête de la broche	主轴头
18.	非常停止ｽｲｯﾁ	emergency stop switch	Notfall-stop-Schalter	bouton d'arrêt d'urgence	紧急停止开关
19.	ｹｰﾌﾞﾙｶﾊﾞｰ	cable cover	kabelschutz	couvre cable	揽绳套
20.	ﾃｰﾌﾞﾙ	table	Tisch	table	工作台
21.	主電源ﾌﾞﾚｰｶ	main power breaker	Hauptschalter	disjoncteur d’alimentation principale	主电源开关
22.	ｸｰﾗﾝﾄﾀﾝｸ	coolant tank	Kühlmitteltank	réservoir d'huile de coupe	冷却液罐
23.	ｽﾌﾟﾗｯｼｭｶﾞｰﾄﾞｻｲﾄﾞｶﾊﾞｰ	splash guard side cover	Spitzblechseitenschutz	couverture à côté du tôle pare-copeaux	火花防溅板一侧的护罩
24.	回生抵抗ｶﾊﾞｰ	regenerative resistor cover	Rückkopplungs- widerstandsschutz	couverture pour la résistance régénératrice	再生电阻罩
25.	操作ﾊﾟﾈﾙ	operation panel	Betriebstafel	panneau d'opéation	操作面板

Avertissements et mesures préventives

Les nombres dans ( ) tels que 1, 2 correspondent aux noms de chaque section.

Danger **DANGER**

SD1 Hasards divers s'associent au centreur tapant.
SD1-1 Lisez le manuel de sûetê avant l'opéation de la machine pour connaîre ces hasards et les mesures prêventives.
SD1-2 Tous les utilisateurs doivent connaître la position du bouton d'arrêt d'urgence(18) et l'opération.

SD2 Les sections de voltage haut sont presents dans l'armoire de commande(1). Si vous les touchez par erreur, vous pouvez se blesser sérieusement ou mourrir.
SD2-1 Personnes qui ont la connaissance suffisante sur les circuits électriques de cette machine et qualité d'elctromécanicien sont seulement admises à faire la maintenance et la révision des composants électriques.
SD2-2 Coupez le contacteur de l'alimentation principale (21) avant l'opération. Apposez une affiche spécifiant 'En train de maintenance.'
SD-2-3 Quand vous quittez la machine, fermez la porte de l'armoire de commande et fixez-la avec des vis.

SD3 Vous pouvez se prendre dans la machine en opération et se blesser sérieusement.
SD3-1 N'entrez pas dans le tôle-pare copeaux en opération.
SD-3-2 Appuyez sur la touche d'arrét (3) ou la touche de reproduction, assurez-vous visuellement que la lampe d'arrét allume, et mettez-vous les mains, les pieds, et le corps dans la machine.
SD3-3 Assurez-vous visuellement que personne n'ntre dans le tôle-pare copeaux avant de mettre la machine en marche.
SD3-3 Ne vous approchez pas les mains, les pieds, et le corps de sections se mouvant en opération.
SD3-4 Quand il est necéssaire d'entrer dans la machine, coupez le contacteur de l'alimentation principale et cadenassez-le pour que le contacteur de l'alimentation pricipale (21) ne soit pas mis en.

SD4 Quand le commutateur de la porte d'embrayage(5) est désactivé la machine marche quand même la porte de travail(6) ou la porte latérale (6)est ouverte. Vous pouvez se couper avec un outil tournant (15), ou se prendre dans la machine.
SD4-1 Pendant l'installation de la machine, faites extrêmement attention au mouvement de la machine de façon à pouvoir l'arrêter à tout moment. Lorsque l'installation de la machine est terminée, mettez l'interrupteur de verrouillage de la porte sur la position ON. Retirez la clé de verrouillage de la porte (7), que le superviseur devra ensuite toujours garder.
SD4-2 Ne quittez pas la machine oû l'interrupteur de la porte d'embrayage n'est pas valable.

SD5 La table (20) risque de se déplacer si l'interrupteur de verrouillage de la porte (5) est réglé sur la position OFF. Vous risquez de rester coincé dans la table et de vous blesser.

SD5-1 Pendant l'installation de la machine, faites extrêmement attention au mouvement de la machine de façon à pouvoir l'arrêter à tout moment. Lorsque l'installation de la machine est terminée, mettez l'interrupteur de verrouillage de la porte sur la position ON. Retirez la clé de verrouillage de la porte (8), que le superviseur devra ensuite toujours garder.

Avertissement AVERTISSEMENT

SW1 En touchant des outils tournant (15), vous vous blesserez.

SW1-1 Ne vous approchez pas d'utils tournant.

SW2 Des (15) outils cassés ou des pièces en travail frappant, vous pouvez se blesser.

SW2-1 Fermez la porte de travail (6) et mettez la machine en marche.

SW3 Vous pouvez être pris dans le section tournant et se blesser.

SW3-1 Ne vous approchez pas d'outiles tournant (15), de broche (8), et de ATC magasin (9).

SW3-2 Portez des vêtements tout justes. Mettez des cheveux longs dans un bonnet. Ne portez pas de gants sans que vous n'arrêtiez la machine et ni ne fassiez l'arrangement. Ne portez pas de bijoux. Ne tenez pas le section tonrnant.

SW4 Si le dispositif de sûreté est modifié il peut ne pas travailler préisement. Donc vous pouvez être happé par la machine, se heurter contre la machine, ou recevoir une commotion électrique.

SW4-1 Ne modifiez pas le dispositif de sûreté. Ne fixez pas le dispositif de sûreté pour que le dispositif de sûreté ne marche pas.

SW5 Quand des copeaux s'éarpillant vous sont mis dans les yeux, vous pouvez se blesser les globes oculaires et perdre la vue.
SW5-1 Portez des lunettes de protection.
SW5-2 Ne enlevez pas de copeaux en air.

SW6 Si vous touchez des copeaux de la main nue, vous pouvez se couper la main ou se brûler.
SW6-1 Ne touchez pas de copeaux de la main nue. Ne touchez pas de sections pointues de pièces en travail.
SW6-2 Quand vous enlevez des copeaux, utilisez une brosse.
SW6-3 Nettoyez copeaux de coupe quard machine est arrêtée.

SW7 Si vous tenez le tranchant d'outil (15), vous pouvez se couper la main.
SW7-1 Ne touchez pas le tranchant d'outil. Tenez le pied de la garde d'outil (16) toujours.

SW8 En laissant tomber un objet lourd sur vos pieds, vous pouvez se fracturer les pieds.
SW8-1 Quand vous levez des objets lourds, portez des chaussures de protection.

SW9 En levant des objets lourds, vous pouvez souffrir du lumbago.
SW9-1 Quand vous levez des objets lourds, demandez de l'aide.
SW9-2 Levez des objets avec la force de vos jambes au lieu de votre dos.

SW10 En travaillant dans un bruit infernal ou pendant de longues heures, vous pouvez avoir des légers troubles de l'audition.
SW10-1 Quand vous travaillez dans le bruit, portez des protections telles que les protège-oreilles.

SW11 Vous pouvez se blesser les yeux ou les oreilles dans un éclatement d'un air à haute pression.
SW11-1 Vous ne devez pas installer ou changer la tuyauteri d'un air àhaute pression, que vous ne soyez qualifiié pour manipuler l'air à haute pression et ne compreniez la tuyauterié de la machine.
SW11-2 Pour réparer la tuyauterié d'un air à haute pression, coupez la source de pression et enlevez la pression restant. Posez l'affiche qui dit d'en maintenance.

SW12 Vous pouvez se frapper la téte en levant.
SW12-1 Portez un casque de protection quand vous travaillez dans et autour de la machine.

SW13 Si vous faites fonctionner la machine en laissant des outils dans la machine, les outils peuvent jaillir et vous blesser.
SW13-1 Ne laissez pas des outils dans la machine.

SW14 Vous pouvez avoir la main pris dans la porte travail (6), si vous la ouvrez et fermez en tenant d'autres parties de la porte travail que la poignée (10).
SW14-1 Tenez la poignée de la porte travail , quand vous la ouvrez et fermez.

SW15 L'armoire de commande (1) a des sections de haute température. Pour cela, si des papiers d'epassez de la boîte â papiers (11) de l'armoire de commande, ils peuvent prendre feu.
SW15-1 Ne mettez pas de papiers excédant la grandeur de papiers de A4 ou de lettre.

SW16 Si des outils sont mis sur l'armoire de commande (1) ou la machine, ils peuvent tomber à cause de la vibration de la machine.
SW16-1 Ne mettez pas d'objets sur l'armoire de commande ou la machine.

SW17 Si vous montez sur la machine ou le tank d'huile de coupe (22), vous pouvez tomber et se blesser.
SW17-1 Ne montez pas sur la machine ou le tank d'huile de coupe.

SW18 Si vous vous mettez la main sous les boulons â régler le niveau de la machine (12), vous pouvez avoir la main pris et se blesser.

SW18-1 Ne mettez-vous pas la main sous le boulon à régler le niveau de la machine. Utilisez des outils pour ajuster le boulon à régler le niveau de la machine.

SW19 Si le câble pend ou n'est pas couvert, vous pouvez s'en prendre ou glisser et tomber.

SW19-1 Ne donnez pas de jeu au câble. Couvrez le câble, quand il est placé sur le plancher.

SW20 La modification de la machine peut affecter le dispositif de séurité et faire les expressions de tous les avertissements donnés inutiles.

SW20-1 Ne modifiez pas la machine.Si la modification est requise, contactez Brother Industries, Ltd. d'avance et demandez la permission par écrit.

SW21 Si de l'huile de coupe rejaillit dans vos yeux, vous pouvez se blesser les yeux.

SW21-1 Quand vous ajustez l'ajutage d'huile de coupe (13), portez les lunettes de protection.

SW21-2 Quand de l'huile de coupe rejaillit dans vos yeux, vous devez se laver les yeux à l'eau claire et consulter un médicin.

SW22 Si vous vous mettez les doigts dans un espace de la machine, vous pouvez avoir les doigts pris et se blesser.

SW22-1 Ne mettez pas les doigts entre couverture de jambe.

SW22-2 Ne vous mettez pas les doigts entre l'outil (15) ou le support à outil (16) et ATC magasin(9).

SW23 Si de l'huile de coupe, de l'huile, ou des copeaux sont dispersés, vous pouvez glisser, tomber, ou se heurter et se blesser.

SW23-1 Coupez le secteur de la machine, nettoyez dans et autour de la machine, et travaillez.

SW23-2 Portez un casque de protection et des chaussures de sûreté, pendant que vous installez la machine.

SW24 Quand vous attachez la garde d'outil (16) à la machine ou les en détachez, vous pouvez se couper à la main en un tranchant d'outil (15) ou se heurter la main contre la machine, se heurter la main coutre la machine.

SW24-1 Ne tenez pas le bout de l'outil. Portez des gants en cuir. Tenez l'outil et le support à outil des deux mains.

SW25 La machine peut marcher brusquement, ou des outils peuvent tomber.

SW25-1 Quand la lampe d'arrêt (4) n'allume pas, Ne vous mettez pas les mains, les pieds, et le corps sous la tête de la broche (17).

SW25-2 Quand vous arrangez la machine, tirez la table près de vous ou positionnez la colonneà l'écart de vous.

SW25-3 Tirez la cale près de vous, quand vous arrangez le changeur de cale.

SW25-4 Coupez le contacteur (21) de l'alimentation principale, cadenassez-le pour qu'il ne soit pas mis en, et appliquez graisse.

SW26 Quand vous façconnez des pièces en travail à la machine en utilisant de l'huile de coupe, la section façonnant peut chauffer et prendre feu.

SW26-1 En utilisant de l'huile de coupe, installez un avertisseur d'incendie et un extincteur automatique.

SW26-2 En façconnant des pièces en travail, il faut que un opérateur se tienne prêt de la machine.

SW27 En s'appuyant à la machine, vous pouvez se prendre dans la machine ou s'y heurter et se blesser.

SW27-1 Ne vous appuyez pas à la machine.

SW28 Si des objets s'accrochent au bouton d'arrêt d'urgence (18), vous pouvez ne pas appuyer le doigt sur le bouton d'arrrêt d'urgence.

SW28-1 Ne accrochez pas d'objet au bouton d'arrrêt d'urgence.

SW30 Comme le rêservoir d'huile de coupe (22) est lourd, en levant le réservoir d'huile de coupe vous pouvez souffrir du lumbago ou le laisser tomber sur les pieds.

SW30-1 Ne levez pas le réservoir d'huile de coupe, quand vous enlevez des copeaux même.

SW31 Quand vous entrez dans la machine, vous pouvez tomber en glissant et se happer dans la machine.

SW31-1 Avant d'entrer dans la machine, coupez le contacteur de l'alimentation principale, cadenassez-le pour qu'il ne soit pas mis en, et enlevez l'huile de coupe et les copeaux. Portez un casque de protection et des chaussures de sûreté Posez l'affiche qui dit d'en maintenance près de la panneau d'opération.

SW32 Si la couverture à càté (23) du tôle pare-copeaux (2) n'est pas attaché vous pouvez se prendre dans la machine ou se blesser en jaillissant des outils cassés.

SW32 Assurez-vous visuellement que le couvre côté du tôle pare-copeaux est attaché avant de mettre le contact.

SW33 Si des outils (15) ou la garde d'outil (16) dont le poids et la grandeur excédent la limite spéifiée sont utilisés, ils peuvent sauter.

SW33-1 Utilisez des outils et la garde d'outil dont le poids et la grandeur excédent la limite spécifid'e.

SW33-2 Pour connaître la limite d'outils, regardez l'instruction attachd'àl'outil manuel de operation.

SW34 Si vous touchez la résistance régénératrice, vous pouvez se brûler parce que la réistance chauffe en opétarion.

SW34-1 Ne enlevez pas la couverture pour a réistance ratrice (24).

SW35 Si vous touchez le moteur, vous pouvez se brûler parce que le moteur chauffe en opétarion.

SW35-1 Ne touchez pas le moteur dans 30 minutes après l'arrêt de la machine.

SW36 Si un plomb de séreté incorrect est disposé un feu peut éclater parce que le dispositif de protection ne marche pas.

SW36-1 Remplacez un plomb épuisé par le même plomb.

SW37 Si la disposition du relais thermique est incorrecte, un feu peut éclater parce que le dispositif de protection ne marche pas.

SW37-1 Ne changez pas la disposition du relais thermique.

SW38 Si le ATC magasin (10) tourne, des outils (16) peuvent heurter des piéces en travail, une gigue , ou la machine et casser.

SW38-1 Fixez la longueur des outils pour queles outils ne heurtent pas les piéces en travail, la gigue, ou la machine méme si le ATC magasin tourne.

SW39 Si l'armoire de commande (1) ou le panneau d'opération (25) sont mouillées, vous pouvez recevoir une commotion électrique.

SW39-1 Ne arrosez pas l'armoire de commande et le panneau d'opération d'huile de coupe, d'eau, et de copeaux.

SW39-2 Ne touchez pas l'armoire de commande de la main mouillée.

SW40 Si le fil de force motrice, fil de PE, installé à l'éxterieur est court, en cause du tirage du câble le fil de PE se décroche et vous pouvez recevoir une commotion électrique.

SW40-1 Utilisez le fil plus long que autres fils (L1, L2, L3) et connectez le fil en donnant le fil du jeu.

SW41 Si vous mettez le contact de la machine ou façonnez des pièces en travail dans une atmosphère explosible, une explosion peut survenir en cause d'une étincelle de la machine.

SW41-1 Ne installez pas dans une atmosphère explosible.

SW41-2 Ne mettez pas la machine sous tension, ne demarrez pas l'usinage ou ne reglez pas la machine dans une atmosphere explosive.

SW42 Si vous oubliez de monter le capot latéral de la tôle pare-copeaux (23), vous pouvez vous prendre dans la machine et vous blesser.

SW41-1 Avant une mise en alimentation, assurez-vous visuellement que le capot latéral de la tôle pare-copeaux est monté.

SW44 Copeaux de coupe peuvent prendre feu ou exploser selon matériel de piéce travaillée (cas. magnésium).

SW44-1 Enlevez touts copeaux de coupe immédiatement.

SW44-2 Installez extincteur auprés de la machine en usinant une pièce travaillée faite de tel matériel, et ne réalisez jamais opération inhabitée.

SW45 Si la appareil de fraisage n’est pas assurée à l’outil, elle peut se détacher de l’outil pendant rotation de broche, aboutissant à tort sérieux.

SW45-1 Contrôlez que la appareil de fraisage est assurée à l’outil et ensuite fixez l’outil.

SW46 Un feu risque de se déclencher si l'on utilise un capteur à 3 fils qui comprend une ligne d'alimentation exclusive.

SW46-1 Utiliser un capteur à 2 fils à la place d'un capteur à 3 fils.

SW46-2 Si l'on ne peut éviter d'utiliser des capteurs à 3 fils, ajouter un fusible (1A ou moins) à la ligne d'alimentation de chaque capteur.

SW47 Les mauvais contacts qui se produisent lorsque les bornes ne sont pas correctement serrées après la pose des fils électriques risquent de provoquer un incendie.

SW47-1 Après la pose des fils électriques, vérifier soigneusement le serrage des vis.

SW48 Attention de ne pas vous blesser avec les couteaux ou les dispositifs de serrage lorsque vous entrez dans la machine et que la pièce est mal éclairée.

SW48-1 Prévoir une lampe dans la machine lorsque l’éclairage ne dépasse pas 500 lux.

Vérification des instructions de sûreté

Les instructions de sûeté sont attacheés à la machine. Leurs positions sont indiquées dans le dession ci-dessous. Contrôlez que les instructions ne sont pas endommagées. Si elles sont endommagées, obtenez une nouvelle instruction pour remplacement.

Position des instructions de sûreté

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1. Etiquette de sûreté, Avant et latéral

(1) Langue : Anglais, Japonais, Chinois

Code de partie : 690373001
Nom de partie : PS LABEL,TC FRONT JCE

(2) Langue : Anglais, Allemand, Français

This machine has hazards.
Read instruction manuals to understand hazards and avoid them before operation.

Diese Maschine birgt Gefahren.
Um Risiken zu erkennen und vermeiden, vor dem Einschalten die Betriebsanleitung lesen.

L'utilisation de cette machine comporte des risques.
Lisez les manuels d'instruction pour connaître les risques et les éviter avant d'utiliser cette machine.

DANGER	WARNING	WARNING
Machine in operation will suddenly move and crush you. Keep away from moving parts.	Broken tool or workpiece can hit and wound you. Shut door before starting machine.	Rotating parts can catch and injure you. Keep away from rotating tool, spindle, and magazine. Never hold moving parts. Do not wear gloves while operating machine.
GEFAHR	**WARNUNG**	**WARNUNG**
Maschine in Betrieb kann plötzlich laufen und Sie stoßen. Beim Betrieb der Maschine von allen bewegenden Teilen sich fernhalten, um Verletzungen zu vermeiden.	Gebrochene Werkzeuge oder Werkstücke könnten Sie treffen und verletzen. Vor dem Start der Maschine Tür schließen.	Umlaufende Teile könnten Sie fassen und verletzen. Von umlaufendem Werkzeug, Spindel und Magazin sich fernhalten. Rotierende Teile nicht berühren. Während des Bedienens keine Handschuhe tragen.
DANGER	**AVERTISSEMENT**	**AVERTISSEMENT**
En opération, cette machine bougera soudainement et provoquera des risques d'écrasement. Ne vous approchez jamais des parties mobiles.	Les outils cassés ou les pièces usinées peuvent être projetés et risquent de vous frapper et de vous blesser. Fermez la porte avant de faire démarrer la machine.	Les parties tournantes peuvent vous accrocher et vous blesser. Ne vous approchez jamais des outils tournant, de la broche et du magasin. Ne saisissez jamais les parties en mouvement. Ne portez pas de gants pendant l'utilisation.

691042001 / 0302 (2)

Code de partie : 691042001
Nom de partie : PS LABEL,TC FRONT EGF

2. Etiquette d'outil

工具、主軸回転数の制限を超えて使用すると、機械が破損する場合があります。操作前に、取扱説明書で詳細を確認して下さい。
If use beyond the limitation of the tool and spindle speed, machine may be broken.
Check the detailes by the operation manual before operation.

最高主軸回転速度	10000 min^{-1} / 16000 min^{-1}		Max Spindle Rotation Speed
主軸テーパ	7 / 24 No.30		Spindle Taper
ツールシャンク	MAS-BT30		Tool Shank
プルスタッド	MAS-P30T-2 (30°)		Retension Knob
マガジン全工具合計	M total 25 kg (14Tools) / 35 kg (21Tools)		Total in Magazine
工具の制限	D1 ≦ 40 mm L1 ≦ 200 mm D2 ≦ 80 mm L2 ≦ 160 mm D3 ≦ 46 mm L3 ≦ 30 mm M ≦ 3 kg MxH ≦ 180 kgmm	D1 ≦ 40 mm L1 ≦ 200 mm D2 ≦ 55 mm L2 ≦ 160 mm D3 ≦ 46 mm L3 ≦ 30 mm M ≦ 2 kg MxH ≦ 100 kgmm	Limitation of Tool
工具バランス制限	100 grmm	50 grmm	Limitation of Tool Balance
主軸回転数制限	10000 min^{-1}	16000 min^{-1}	Limitation Spindle Rotation Speed

653379001 / 0210 (2)

Code de partie : 653379001
Nom de partie : Tool LABEL250

3. Etiquette de sûreté, Arrière équipement à haute pression de liquide réfrigérant

(1) Langue : Anglais, Japonais, Chinois

Code de partie : 690730001
Nom de partie : PSLABEL, TC REARJCE

(2) Langue : Anglais, Allemand, Français

Code de partie : 691045001
Nom de partie : PSLABEL, TC REAR EGF

4. Etiquette, résistance régénératrice

(1) Langue : Anglais, Japonais, Chinois

Code de partie: 690729001
Nom de partie: LABEL, TC REGENERATIVE JCE

(2) Langue : Anglais, Allemand, Français

Code de partie: 691058001
Nom de partie: LABEL, TC REGENERATIVE EGF

5. Etiquette, retrait d'outil

(1) Langue : Anglais, Japonais, Chinois

Code de partie : 653080001
Nom de partie : LABEL, Removing Tool JCE

(2) Langue : Anglais, Allemand, Français

Code de partie : 69104001
Nom de partie : LABEL, Removing Tool EGF

6. Etiquette, Couverture latérale

(1) Langue : Anglais, Japonais, Chinois

Code de partie	: 690731001
Nom de partie	: LABEL, TC MAINTENANCE DOOR JCE

(2) Langue : Anglais, Allemand, Français

Code de partie : 690732001
Nom de partie : LABEL, TC MAINTENANCE DOOR EGF

7. Etiquette défense de monter

Code de partie : 693178001

693178001 / 0607 (1)

693178001.ai

Manuel de sûreté pour opérateurs

Centreur tapant
TC-S2A

Lisez ce manuel de sûretésoigneusement avant l'opération de le centreur tapant, s'il vous plaît.

Brother Industries, Ltd. Machinery & Solution Company.

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Les grandes lignes du manuel de sûreté

Lisez ce manuel

Tout le monde qui utilize le centreur tapant, y compris eux qui installent le centreur tapant dans l'usine, qui manient le centreur tapant et façnnent des pièces en travail, qui ajustent et réparent le centreur tapant, est requis de lire ce manuel de sûret.

Dans ce manuel de sûreté tout le monde qui utilise le centreur tapant s'exprime comme utilisateur.

Intension
Le centreur tapant consiste en circuits électriques de voltage haut, outils qui tournent avec une grande vitesse, et tables et ATC magasins qui se meuvent avec une force puissante. Pour cela, des hasards divers s'associent à la machine.
L'intension de ce manuel de sûreté est de protéger les utilisateurs contre ces hasards.
Le manuel de sûreté explique ci-dessous:
Avertissments: des types de hasards
Mesures préventives : des manières d'empêcher les hasards de surgir

Le contenu de manuel de sûreté et la relation avec les autres manuels

Chaque manuel d'instruction, sauf le manuel de programmation, contient le manuel de sûreté
Les manuels de sûreté sont donnés à chaque groupe de personnel.
Lisez le texte du manuel d'instruction pour connaître des fonctions et des méthodes d'opération de la machine.

1.Manuel de fonctionnement (A l'usage des opérateurs non-spécialisés)
"Manuel de sûreté pour opérateurs"
"Manuel de sûeté pour eux qui installent et arrangent le centreur tapant"
"Manuel de opération:（fonctionnements élémentaires de la machine à l'intention des opérateurs non-spécialisés "）
Code de parties pour français : 693077001

2.Manuel de fonctionnement (A l'intention des opérateurs spécialisés)
"Manuel de sûreté pour opérateurs"
"Manuel de sûeté pour eux qui installent et arrangent le centreur tapant"
"Fonction De L'enclenchement Avec Verrouillage De La Porte"
"Manuel de opération":（opération de la machine necessaire pour arrangement et faconnement.）

La machine de programmation à conversation
Code de parties pour japonais : 690777001
Code de parties pour anglais : 690783001

NC langage
Code de parties pour japonais : 690779001
Code de parties pour anglais : 690785001

3 Manuel d'installation
"Manuel de sûreté pour eux qui installent et arrangent le centreur tapant"
"Manuel d'installation: Installation et assemblage de la machine et ces accessoires."
Code de parties pour japonais : 690775001
Code de parties pour anglais : 690781001

4. Manuel de programmation
"Manuel de programmation:
création de programme de façonnement"

La machine de programmation à conversation
Code de parties pour japonais: 690692001
Code de parties pour anglais : 690698001

NC langage
Code de parties pour japonais :690709001
Code de parties pour anglais : 690715001

5.Manuel de maintenance
"Manuel de sûeté pour eux qui sont qualifiés pour maintenance de centreur tapanmaintenance."
" Manuel de maintenance:
Ajustement et réparation de la machine."
Le manuel de maintenance n'est pas distribué aux clients.

Relation à des instructions de sûreté

Les articles d'importance particulier qui apparaissent dans ce manuel de sûreté s'attachent aussi à la machine comme instructions de sûreté.
Une explication des instructions de sûreté se prépare à la fin de ce manuel de sûeté. Si des instructions de sûreté se sont déachées de la machine, obtenez des nouvelles instructions de sûeté et les attachez correctement.

Langage

Des machine envoyées à l'intérieur du Japon sont pourvues de manuels de sûreté et d'instructions de sûeté rits en japoinais. Les machines exportées du Japon sont fournies avec les manuels et les étiquettes de sécurité en quatre langues : anglais, allemand, français et chinois. Obtenez les manuels et les instructions écrits en un langage que vous pouvez comprendre.
Sur manuels et instructions en autres langages, consultez le vendeur auquel vous avez acheté la machine.

Comment d'acheter

Quand les manuels de sûreté et les instructions de sûeté ont été perdus, obtenez-les du vendeur auquel vous avez acheté la machine.
Si vous ne savez pas le vendeur, consultez les bureaux spécifiés ci-dessous.

1-1-1 Kawagishi, Mizuho-ku, Nagoya 467-8562, JAPAN
BROTHER INDUSTRIES, LTD. Machinery & Solution Company.
phone +81-52-824-2232

Maniement du manuel de sûreté

Gardez-vous de perdre les manuels de sûreté et mettez-les sous la main toujours. Quand la machine change de main, passez les manuels de sûreté à la nouvelle propriétaire avec la machine.

Degré de danger

Les degré de danger se classent en trois catégories d'aprés le niveau de dommage qui peut surgir quand des instructions ne sont pas observées.

1.DANGER

⚠ DANGER

Dommage qui peut causer une mort ou une blessure sévère.

2. AVERTISSEMENT

⚠ AVERTISSEMENT

Dommage qui peut entraîner une blessure sérieuse.

3. ATTENTION

⚠ ATTENTION

Dommage moins sérieux que cela ci-dessus.

Ordre d'explication

Les instructions de sûreté s'expliquent dans l'ordre ci-dessous.

1. Mots de signal (DANGER, AVERTISSEMENT, ATTENTION) et symboles indiquant le degré de danger
2. Type de danger (Sujet)
3. Type de dommages prévus
4. Mesure préventive

Significations des symboles

Les symboles sont utilisés sur les instructions de sûreté et dans les avertissements du manuel de sûeté pour expliquer des dangers possibles et leurs mesures préventives.

1. Danger

Glissement

Parties se mouvant

Trébuchement

Commotionélectrique

Commotionélectrique

Pris

Main coincée

Température haute

Température haute

Coupe

Coupe

Eclatement

Pointe aigu

Objet tombant

Objet tombant

Objet tournant

Tomber

Jaillissement

Jaillissement

Feu

2. Mesures préventives

Protégez vos oreilles.

Protégez vos mains.

Protégez vos pieds.

Coupez la prise de courant.

Ne touchez pas.

Protégez votre tête.

Connectez le coupe-circuit.

Ne Désassemblez pas.

Protégez vos yeux.

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No.	各部の名称	Section names	Namen jedes Teils	Noms de sections	各部件名称
	日本語	English	Deutsch	Français	中文
1.	制御箱	control box	Steuerschrank	armoire de commande	控制箱
2.	ｽﾌﾟﾗｯｼｭｶﾞｰﾄﾞ	splash guard	Spitzblech	tôle pare-copeaux	火花防溅箱
3.	停止ｽｲｯﾁ	stop switch	stop Einschalter	bouton d'arrét	停止开关
4.	停止ﾗﾝﾌﾟ	stop lamp	stop Lampe	lampe d'arrêt	停止指示灯
5.	ﾄﾞｱｲﾝﾀﾛｯｸｽｲｯﾁ	door interlock switch	Verriegelungsschalter	interrupteur de la porte d'verrouillage	门互锁开关
6.	作業扉	work door	Arbeitstür	porte de travail	作业门
7.	ﾄﾞｱｲﾝﾀﾛｯｸｷｰ	door interlock key	Verriegelungsschlüssel	clef de la porte d'verrouillage	门互锁键
8.	ｽﾋﾟﾝﾄﾞﾙ	spindle	Spindel	broche	主轴
9.	ATC ﾏｶﾞｼﾞﾝ	ATC magazine	ATC Magazin	ATC magasin	ATC 刀库
10.	取手	handle	Griff	poignée	把手
11.	制御箱内部書類入れ	control box document	Dokumentenbehälter im Steuerschrank	boîte à papiers de l''armoire de commande	控制箱内书架
12.	ﾚﾍﾞﾘﾝｸﾞﾎﾞﾙﾄ	leveling bolt	Nivellierbolzen	boulon à régler le niveau de la machine	调平螺栓
13.	ｸｰﾗﾝﾄﾉｽﾞﾙ	coolant nozzle	Kühlmitteldüse	ajutage d'huile de coupe	冷却液喷嘴
14.	ｸﾞﾘｯﾌﾟｶﾊﾞｰ	grip cover	Griffschutz	couverture de jambe	夹钳套
15.	工具	tool	Werkzeug	outil	刀具
16.	工具ﾎﾙﾀﾞ	tool holder	Werkzeughalter	support à outil	刀具夹
17.	ｽﾋﾟﾝﾄﾞﾙﾍｯﾄﾞ	spindle head	Spindelkopf	tête de la broche	主轴头
18.	非常停止ｽｲｯﾁ	emergency stop switch	Notfall-stop-Schalter	bouton d'arrêt d'urgence	紧急停止开关
19.	ｹｰﾌﾞﾙｶﾊﾞｰ	cable cover	kabelschutz	couvre cable	揽绳套
20.	ﾃｰﾌﾞﾙ	table	Tisch	table	工作台
21.	主電源ﾌﾞﾚｰｶ	main power breaker	Hauptschalter	disjoncteur d’alimentation principale	主电源开关
22.	ｸｰﾗﾝﾄﾀﾝｸ	coolant tank	Kühlmitteltank	réservoir d'huile de coupe	冷却液罐
23.	ｽﾌﾟﾗｯｼｭｶﾞｰﾄﾞｻｲﾄﾞｶﾊﾞｰ	splash guard side cover	Spitzblechseitenschutz	couverture à côté du tôle pare-copeaux	火花防溅板一侧的护罩
24.	回生抵抗ｶﾊﾞｰ	regenerative resistor cover	Rückkopplungs- widerstandsschutz	couverture pour la résistance régénératrice	再生电阻罩
25.	操作ﾊﾟﾈﾙ	operation panel	Betriebstafel	panneau d'opéation	操作面板

Avertissements et mesures préventives

Les nombres dans ( ) tels que 1, 2 correspondent aux noms de chaque section.

Danger ⚠ DANGER

OD1 Hasards divers's associent au centreur tapant.
OD1-1 Lisez le manuel de sûreté avant l'opération de la machine pour connaître ces hasards et les mesures préventives.
OD1-2 Tous les utilisateurs doivent connaître la position du bouton (19) d'arrêt d'urgence et l'opération.

OD2 Les sections de voltage haut sont presents dans l'armoire de commande(1). Si vous les touchez par erreur, vous pouvez se blesser sérieusement ou mourrir.
OD2-1 Personnes qui ont la connaissance suffisante sur les circuits électriques de cette machine et qualité d'électromécanicien sont seulement admises à faire la maintenance et la révision des composants électriques.
OD2-2 Si une alarme est donnée, avertissez-en le superviseur immédiatement. Des opérateurs ne sont pas admis à réparer la machine. Des personnes qualifieés avec la connaissance suffisante sur la machine sont seulement admises à effectuer la réparation et l'installation.

OD3 Vous pouvez se prendre dans la machine en opération et se blesser sérieusement.
OD3-1 N'entrez pas dans le tôle-pare copeaux en opération.
OD3-2 Assurez-vous visuellement que personne n'entre dans le tôle-pare copeaux avant de mettre la machine en marche.
OD3-3 Ne vous approchez pas les mains, les pieds, et le corps de sections se mouvant en opération.
OD3-4 Si une alarme est donnée, avertissez-en le superviseur immédiatement.Ne vous mettez pas les mains, les pieds, et le corps dans la machine.

OD4 Quand l'interrupteur de l'enclenchement avec verrouillage de la porte(5) est invalable, la machine marche quand même la porte travail (6) ouvrirait. Vous pouvez se prendre dans la machine, aboutissant à tort.
OD4-1 Quand le commutateur de la porte d'embrayage est invalable, Ne vous mettez pas les mains, les pieds, et le corps dans la machine. L'opérateur doit en avertir le superviseur. Le superviseur doit mettre l'interrupteur de l'enclenchement avec verrouillage de la porte sur ON. Le superviseur doit toujours garder la clef.
OD4-2 Quand le commutateur de la porte d'embrayage est invalable,le superviseur ne doit pas admettre personne à travailler.
OD4-3 Assurez-vous visuellement que le commutateur de la porte d'embrayage est valable avant l'opération de la machine.
OD4-4 Si la clef de la porte d'embrayage (7) est attachée, avertissez-en le superviseur.
OD4-5 Le superviseur doit garder toujours la clef de la porte d'embrayage (7).

Avertissement **AVERTISSEMENT**

OW1 En touchant des outils tournant,vous (15) vous blesserez.
OW1-1 Ne vous approchez pas d'outils tournant.

OW2 Des outils cassés (15) ou des pièces en travail frappant, vous pouvez se blesser.
OW2-1 Fermez la porte de travail (6) et mettez la machine en marche.

OW3 Vous pouvez être pris dans le section tournant et se blesser.
OW3-1 Ne vous approchez pas d'outiles tournant (15), de broche (8), et de ATC magasin (9).
OW3-2 Portez des vêtements tout justes. Mettez des cheveux longs dans un bonnet. Ne portez pas de gants sans que vous n'arrêtiez la machine et ni ne fassiez l'arrangement. Ne portez pas de bijoux. Ne tenez pas le section tonrnant.

OW4 Si le dispositif de sûreté est modifié il peut ne pas travailler préisement. Donc vous pouvez être happé par la machine, se heurter contre la machine, ou recevoir une commotion électrique.
OW4-1 Si le dispositif de sûreté est modifié ou fixé pour ne pas marcher, ne mettez pas la machine en marche.

OW5 Quand des copeaux s'éarpillant vous sont mis dans les yeux, vous pouvez se blesser les globes oculaires et perdre la vue.
OW5-1 Portez des lunettes de protection.
OW5-2 Ne enlevez pas de copeaux en air.

OW6 Si vous touchez des copeaux de la main nue, vous pouvez se couper la main ou se brûler.
OW6-1 Ne touchez pas de copeaux de la main nue. Ne touchez pas de sections pointues de pièvces en travail.
OW6-2 Mettex des gants et utilisez une brosse quand vous nettoyez coupeaux de coupe.
OW6-3 Nettoyez copeaux de coupe quard machine est arrêtée.

OW7 Si vous tenez le tranchant d'outil (15), vous pouvez se couper la main.
OW7-1 Ne touchez pas le tranchant d'outil. Tenez le pied de la garde d'outil (16) toujours.

OW8 En laissant tomber un objet lourd sur vos pieds, vous pouvez se fracturer les pieds.
OW8-1 Quand vous levez des objets lourds, portez des chaussures de protection

OW9 En levant des objets lourds, vous pouvez souffrir du lumbago.
OW9-1 Quand vous levez des objets lourds, demandez de l'aide.
OW9-2 Levez des objets avec la force de vos jambes au lieu de votre dos.

OW10 En travaillant dans un bruit infernal ou pendant de longues heures, vous pouvez avoir des légers troubles de l'audition.
OW10-1 Quand vous travaillez dans le bruit, portez des protections telles que les protège-oreilles.

OW11 Vous pouvez se blesser les yeux ou les oreilles dans un éclatement d'un air à haute pression.
OW11-1 Vous ne devez pas installer ou changer la tuyauterié d'un air à haute pression, que vous ne soyez qualifié pour manipuler l'air à haute pression et ne compreniez la tuyauterié de la machine.

OW12 Vous pouvez se frapper la téte en levant.
OW12-1 Portez un casque de protection quand vous travaillez dans et autour de la machine.

OW13 Si vous faites fonctionner la machine en laissant des outils dans la machine, les outils peuvent jaillir et vous blesser.
OW13-1 Si vous découvrez des outils dans la machine, vous ne devez pas faire fonctionner la machine. avertissez-en le superviseur.

OW14 Vous pouvez avoir la main pris dans la porte travail (6), si vous la ouvrez et fermez en tenant d'autres parties de la porte travail que la poignée (10).
OW14-1 Tenez la poignée de la porte travail, quand vous la ouvrez et fermez.

OW15 Si des outils sont mis sur l'armoire de commande (1) ou la machine, ils peuvent tomber à cause de la vibration de la machine.
OW15-1 Ne mettez pas d'objets sur l'armoire de commande ou la machine.

OW16 Si vous montez sur la machine ou le tank d'huile de coupe (22), vous pouvez tomber et se blesser.
OW16-1 Ne montez pas sur la machine ou le tank d'huile de coupe.

OW17 Si vous vous mettez la main sous les boulons â régler le niveau de la machine (12), vous pouvez avoir la main pris et se blesser.
OW17-1 N'ajustez pas le boulon à régler le niveau de la machine. Si la machine n'est pas de niveau, avertissez le superviseur.
OW17-2 Le superviseur doit faire l'homme chargé de l'installation ajuster le niveau de la machine.

OW18 Si le câble pend ou n'est pas couvert, vous pouvez s'en prendre ou glisser et tomber.
OW18-1 Si le câble pend ou n'est pas couvert, avertissez-en le superviseur.
OW18-2 Le superviseur doit ordonner â l'homme qui a charge d'installer de corriger la pose du câble et couvrir le câble.

OW19 La modification de la machine peut affecter le dispositif de sécurité et faire les expressions de tous les avertissements donnés inutiles.
OW19-1 Si la machine a été modifiée, vous ne devez pas la faire marcher. avertissez-en le superviseur.

OW20 Si de l'huile de coupe gicle dans vos yeux, vous risquez de vous blesser les yeux.
OW20-1 Portez des lunettes de protection lorsque vous réglez l'ajutage d'huile de coupe (13).
OW20-2 Quand de l'huile de coupe rejaillit dans vos yeux, vous devez se laver les yeux à l'eau claire et consulter un médicin.

OW21 Si vous mettez les doigts dans un espace de la machine, vous pouvez avoir les doigts pris et se blesser.
OW21-1 Ne mettez pas les doigts entre couverture de jambe (14).
OW21-2 Ne vous mettez pas les doigts entre l'outil (15) ou le support à outil (16) et ATC magasin(9).

OW22 Si de l'huile de coupe, de l'huile, ou des copeaux sont dispersés, vous pouvez glisser, tomber, ou se heurter et se blesser.
OW22-1 Coupez le secteur de la machine, nettoyez dans et autour de la machine, et travaillez.

OW23 Quand vous attachez la garde d'outil (16) à la machine ou les en détachez, vous pouvez se couper à la main en un tranchant d'outil (15) ou se heurter la main contre la machine, se heurter la main coutre la machine.

OW23-1 Ne tenez pas le bout de l'outil. Portez des gants en cuir.

OW24 La machine peut marcher brusquement, ou des outils peuvent tomber.

OW24-1 Ne vous mettez pas les mains, les pieds, et le corps sous la tête de la broche (18).

OW25 Quand vous façconnez des pièces en travail à la machine en utilisant de l'huile de coupe, la section façonnant peut chauffer et prendre feu.

OW25-1 Ne utilisez pas d'huile de coupe quand un avertisseur d'incendie et un extincteur automatique ne sont pas installés.

OW25-2 En façconnant des pièces en travail, il faut que un opérateur se tienne prêt de la machine.

OW26 En s'appuyant à la machine, vous pouvez se prendre dans la machine ou s'y heurter et se blesser.

OW26-1 Ne vous appuyez pas à la machine.

OW27 Si des choses sont accrochées au bouton d'arrêt d'urgence(18),vous ne pouvez pas appuyer sur le bouton d'arrêt d'urgence.

OW27-1 Ne accrochez pas d'objet au bouton d'arrrêt d'urgence.

OW28 Le couvercle des câbles (20) à l'arrière de la machine ressort brusquement de la machine lorsque la table (19) avance. Le couvercle risque de vous heurter et de vous blesser.

OW28-1 Coupez le contacteur de la puissance principale (21) avant d'enlever les copeaux.

OW29 Comme le réservoir d'huile de coupe (22) est lourd, en levant le réservoir d'huile de coupe vous pouvez souffrir du lumbago ou le laisser tomber sur les pieds.

OW29-1 Ne levez pas le réservoir d'huile de coupe, quand vous enlevez des copeaux même.

OW30 Quand vous entrez dans la machine, vous pouvez tomber en glissant et se happer dans la machine.

OW30-1 Ne entrez pas dans la machine. Quand vous avez le besoin d'entrer dans la machine, avertissez-en le superviseur.

OW31 Si la couverture à côté (23) du tôle pare-copeaux (2) n'est pas attaché vous pouvez se prendre dans la machine ou se blesser en jaillissant des outils cassés.

OW31-1 Assurez-vous visuellement que le couvretureà côté du tôle pare-copeaux est attaché avant de mettre le contact. Si la couverture à côté du tôle pare-copeaux n'est pas attaché avertissez-en le superviseur.

OW31-2 Le superviseur doit faire l'opéreteur attacher la couverture à côté du tôle pare-copeaux.

OW32 Si des outils (15) ou la garde d'outil (16) dont le poids et la grandeur excédent la limite spéifiée sont utilisés, ils peuvent sauter.

OW32-1 Utilisez des outils et la garde d'outil dont le poids et la grandeur excédent la limite spécifid'ée.

OW32-2 Pour connaître la limite des outils, regardez les instructions des outils attachées à la machine, manuel de operation.

OW33 Si vous touchez la résistance régénératrice, vous pouvez se brûler parce que la réistance chauffe en opétarion.

OW33-1 Ne enlevez pas la couverture pour a résistance régénératrice (24).

OW34 Si vous touchez le moteur, vous pouvez se brûler parce que le moteur chauffe en opétarion.

OW34-1 Ne touchez pas le moteur dans 30 minutes après l'arrêt de la machine.

OW35 Si le ATC magasin (9) tourne, des outils (15) peuvent heurter des piéces en travail, une gigue, ou la machine et casser.

OW35-1 Fixez la longueur des outils pour queles outils ne heurtent pas les piéces en travail, la gigue, ou la machine même si le ATC magasin tourne.

OW36 Si l'armoire de commande (1) ou le panneau d'opération (25) sont mouillées, vous pouvez recevoir une commotion électrique.

OW36-1 Ne arrosez pas l'armoire de commande et le panneau d'opération d'huile de coupe, d'eau, et de copeaux.

OW36-2 Ne touchez pas l'armoire de commande de la main mouillée.

OW37 Si vous mettez le contact de la machine ou façonnez des pièces en travail dans une atmosphère explosible, une explosion peut survenir en cause d'une ètincelle de la machine.

OW37-1 Ne mettez le contact de la machine ou ni ne façonnez des pièces en travail dans une atmosphère explosible.

OW38 Si vous mettez en marche la machine sans fixer la pièce en travail, la pièce en travail peut faire ressort; par suite, vous pouvez vous blesser.

OW38-1 Fixez la pièce en travail.

OW39 Si vous oubliez de monter le capot latéral de la tôle pare-copeaux (23), vous pouvez vous prendre dans la machine et vous blesser.

OW39-1 Avant une mise en alimentation, assurez-vous visuellement que le capot latéral de la tôle pare-copeaux est monté. S'il n'est pas monté, avertissez-en le superviseur.

OW39-2 Quand vous enlevez le capot latéral de la tôle pare-copeaux, coupez le contacteur de l'alimentation principale et cadenassez-le pour que le contacteur de l'alimentation pricipale ne soit pas mis en.

OW39-3 Le superviseur doit instruire l'opérateur de monter le capot de maintenance.

OW40 Les copeaux de coupe risquent de prendre feu ou d'exploser, selon le matériau de la pièce que vous usinez (cas. magnésium).
OW40-1 Enlevez immédiatement tous les copeaux de coupe.
OW40-2 Installez extincteur auprès de la machine en usinant une pièce travaillée faite de tel matériel, et ne réalisez jamais opération inhabitée.

OW41 Si la appareil de fraisage n’est pas assurée à l’outil, elle peut se détacher de l’outil pendant rotation de broche, aboutissant à tort sérieux.
OW41-1 Contrôlez que la appareil de fraisage est assurée à l’outil et ensuite fixez l’outil.

OW42 Attention de ne pas vous blesser avec les couteaux ou les dispositifs de serrage lorsque vous entrez dans la machine et que la pièce est mal éclairée.
OW42-1 Prévoir une lampe dans la machine lorsque l’éclairage ne dépasse pas 500 lux.

Vérification des instructions de sûreté

Les instructions de sûeté sont attacheés à la machine. Leurs positions sont indiquées dans le dession ci-dessous. Contrôlez que les instructions ne sont pas endommagées. Si elles sont endommagées, obtenez une nouvelle instruction pour remplacement.

Position des instructions de sûreté

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1. Etiquette de sûreté, Avant et latéral

(1) Langue : Anglais, Japonais, Chinois

Code de partie : 690373001
Nom de partie : PS LABEL,TC FRONT JCE

(2) Langue : Anglais, Allemand, Français

This machine has hazards.
Read instruction manuals to understand hazards and avoid them before operation.

Diese Maschine birgt Gefahren.
Um Risiken zu erkennen und vermeiden, vor dem Einschalten die Betriebsanleitung lesen.

L'utilisation de cette machine comporte des risques.
Lisez les manuels d'instruction pour connaître les risques et les éviter avant d'utiliser cette machine.

DANGER	WARNING	WARNING
Machine in operation will suddenly move and crush you. Keep away from moving parts.	Broken tool or workpiece can hit and wound you. Shut door before starting machine.	Rotating parts can catch and injure you. Keep away from rotating tool, spindle, and magazine. Never hold moving parts. Do not wear gloves while operating machine.
GEFAHR	**WARNUNG**	**WARNUNG**
Maschine in Betrieb kann plötzlich laufen und Sie stoßen. Beim Betrieb der Maschine von allen bewegenden Teilen sich fernhalten, um Verletzungen zu vermeiden.	Gebrochene Werkzeuge oder Werkstücke könnten Sie treffen und verletzen. Vor dem Start der Maschine Tür schließen.	Umlaufende Teile könnten Sie fassen und verletzen. Von umlaufendem Werkzeug, Spindel und Magazin sich fernhalten. Rotierende Teile nicht berühren. Während des Bedienens keine Handschuhe tragen.
DANGER	**AVERTISSEMENT**	**AVERTISSEMENT**
En opération, cette machine bougera soudainement et provoquera des risques d'écrasement. Ne vous approchez jamais des parties mobiles.	Les outils cassés ou les pièces usinées peuvent être projetés et risquent de vous frapper et de vous blesser. Fermez la porte avant de faire démarrer la machine.	Les parties tournantes peuvent vous accrocher et vous blesser. Ne vous approchez jamais des outils tournant, de la broche et du magasin. Ne saisissez jamais les parties en mouvement. Ne portez pas de gants pendant l'utilisation.

691042001 / 0302 (2)

Code de partie : 691042001
Nom de partie : PS LABEL,TC FRONT EGF

2. Etiquette d'outil

工具、主軸回転数の制限を超えて使用すると、機械が破損する場合があります。操作前に、取扱説明書で詳細を確認して下さい。
If use beyond the limitation of the tool and spindle speed, machine may be broken.
Check the detailes by the operation manual before operation.

最高主軸回転速度	10000 min^{-1} / 16000 min^{-1}		Max Spindle Rotation Speed
主軸テーパ	7 / 24 No.30		Spindle Taper
ツールシャンク	MAS-BT30		Tool Shank
プルスタッド	MAS-P30T-2 (30°)		Retension Knob
マガジン全工具合計	M total 25 kg (14Tools) / 35 kg (21Tools)		Total in Magazine
工具の制限	D1 ≦ 40 mm L1 ≦ 200 mm D2 ≦ 80 mm L2 ≦ 160 mm D3 ≦ 46 mm L3 ≦ 30 mm M ≦ 3 kg MxH ≦ 180 kgmm	D1 ≦ 40 mm L1 ≦ 200 mm D2 ≦ 55 mm L2 ≦ 160 mm D3 ≦ 46 mm L3 ≦ 30 mm M ≦ 2 kg MxH ≦ 100 kgmm	Limitation of Tool
工具バランス制限	100 grmm	50 grmm	Limitation of Tool Balance
主軸回転数制限	10000 min^{-1}	16000 min^{-1}	Limitation Spindle Rotation Speed

653379001 / 0210 (2)

Code de partie : 653379001
Nom de partie : Tool LABEL250

3. Etiquette de sûreté, Arrière équipement à haute pression de liquide réfrigérant

(1) Langue : Anglais, Japonais, Chinois

Code de partie : 690730001
Nom de partie : PSLABEL, TC REARJCE

(2) Langue : Anglais, Allemand, Français

Code de partie : 691045001
Nom de partie : PSLABEL, TC REAR EGF

4. Etiquette, résistance régénératrice

(1) Langue : Anglais, Japonais, Chinois

Code de partie: 690729001
Nom de partie: LABEL, TC REGENERATIVE JCE

(2) Langue : Anglais, Allemand, Français

Code de partie: 691058001
Nom de partie: LABEL, TC REGENERATIVE EGF

5. Etiquette, retrait d'outil

(1) Langue : Anglais, Japonais, Chinois

Code de partie : 653080001
Nom de partie : LABEL, Removing Tool JCE

(2) Langue : Anglais, Allemand, Français

Code de partie : 69104001
Nom de partie : LABEL, Removing Tool EGF

6. Etiquette, Couverture latérale

(1) Langue : Anglais, Japonais, Chinois

Code de partie	: 690731001
Nom de partie	: LABEL, TC MAINTENANCE DOOR JCE

(2) Langue : Anglais, Allemand, Français

Code de partie : 690732001
Nom de partie : LABEL, TC MAINTENANCE DOOR EGF

7. Etiquette défense de monter

Code de partie : 693178001

693178001 / 0607 (1)

693178001.ai

安装作业人员以及准备作业人员的安全操作规程

攻丝中心
TC-S2A

请在接触攻丝中心前仔细阅读本安全操作规程。

兄弟工业公司
玛西纳丽和苏琉雄公司

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什么是安全操作规程

务必阅读本规程

凡接触攻丝中心的人员,诸如在工厂安装攻丝中心的人员、使用攻丝中心进行加工的人员和调整修理攻丝中心的人员,务必阅读本安全操作规程。
本规程把接触攻丝中心的所有人员称为「使用者」。

目的

攻丝中心由使用高电压的电器回路、高速旋转机具、大功率移动台和 ATC 送料装置组成。所以该机器带有许多危险因素。
制订本规章的目的是保护使用者免受攻丝中心所带危险因素的伤害。
为此本安全操作规程对下述问题进行说明。

警告: 有什么危险
回避方法:如何回避其危险

安全操作规程的内容以及和其他规程的关系

安全操作规程按使用对象进行分类,附在各说明书里(程序控制缝纫机除外)。您想知道机器的功能和操作方法,请阅读说明书本篇。

1 操作说明书(面向一般操作人员) 「操作人员安全操作规程」
「安装和做准备作业人员的安全操作规程」
「操作说明书」(基本作业所需要的机械操作方法)
中文零件编码 : 693271001

2 操作说明书(面向专门操作人员) 「操作人员安全操作规程」
「安装和做准备作业人员的安全操作规程」
「机门连动机能」
「操作说明书」(准备和加工所需要的机械操作方法)
(对话) 日文零件编码 : 690777001 英文零件编码 : 690783001
(NC 语言) 日文零件编码 : 690779001 英文零件编码 : 690785001

3 安装说明书 「安装作业人员和准备作业人员的安全操作规程」
「安装说明书」(机械和配件的安装及其组装方法)
日文零件编码 : 690775001 英文零件编码 : 690781001

4 编制程序说明书 「编制程序说明书」(加工程序的制作方法)
(对话) 日文零件编码 : 690692001
英文零件编码 : 690698001
(NC 语言) 日文零件编码 : 690709001
英文零件编码 : 690715001

5 维修说明书 「受过培训的维修作业人员安全操作规程」
「维修说明书」(机械的调整和修理方法)
对顾客不发维修说明书。

和安全签条的关系

安全操作规程中特别重要的部分被制作成安全标签，贴在机器上。
安全操作规程的最后部分是关于安全标签的说明。如果机器上的安全签条脱落，请设法索取签条后重新贴上。

语言

日本国内销售的机器，所贴的安全操作规程和安全签条均用日文。
销售到国外的机器，用的是英文、德文、法文和中文四国文字。
请设法取得所懂语言的安全操作规程和安全签条。
关于其他国家的安全操作规程和语言签条，请询问您所购买的机器销售店。

索取方法

如果安全操作规程或安全签条遗失，请到您所购买的机器销售店索取。
如销售店无法解决，请向下列单位咨询。

日本国外联系地址
1-1-1 Kawagishi, Mizuho-ku, Nagoya 467-8562, JAPAN
BROTHER INDUSTRIES, LTD.
phone +81-52-824-2232
fax +81-52-811-0469

安全操作规程的使用

安全操作规程应注意妥善保存,做到随时可以阅读。如机器更换所有人,请转交机器的新持有人。

危险程度

如无视警告,所引起的危险的程度按受害程度可分 3 种。

1. 危险

⚠ 危　险

招致死亡或不可复原的严重疾患的危险。

2. 警告

⚠ 警　告

招致重伤的危险。

3. 注意

⚠ 注　意

轻度危险

说明的顺序

按下列顺序进行说明。

1. 表示危险程度的文字标记(危险、警告、注意)和象图
2. 危险的种类
3. 伤害的预测
4. 回避方法

象形图的意思

安全签条和安全操作规程的警告语言使用象图,形象地说明其危险程度和回避方法。现将图像的意义说明如下。

1. 危险

当心滑倒

当心绊倒

当心触电

夹进手里

注意高温

谨防断裂

当心刺伤

有物落下

当心坠落

注意飞散

活动部件

注意触电

当心夹入

注意高温

谨防割断

注意破裂

有物落下

旋转物体

注意飞散

谨防火灾

2. 回避方法

保护耳朵

保护双手

保护双脚

拔掉电源

严禁触摸

保护头部

需接地线

不准分解

保护眼睛

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No.	各部の名称	Section names	Namen jedes Teils	Noms de sections	各部件名称
	日本語	English	Deutsch	Français	中文
1.	制御箱	control box	Steuerschrank	armoire de commande	控制箱
2.	ｽﾌﾟﾗｯｼｭｶﾞｰﾄﾞ	splash guard	Spitzblech	tôle pare-copeaux	火花防溅箱
3.	停止ｽｲｯﾁ	stop switch	stop Einschalter	bouton d'arrét	停止开关
4.	停止ﾗﾝﾌﾟ	stop lamp	stop Lampe	lampe d'arrêt	停止指示灯
5.	ﾄﾞｱｲﾝﾀﾛｯｸｽｲｯﾁ	door interlock switch	Verriegelungsschalter	interrupteur de la porte d'verrouillage	门互锁开关
6.	作業扉	work door	Arbeitstür	porte de travail	作业门
7.	ﾄﾞｱｲﾝﾀﾛｯｸｷｰ	door interlock key	Verriegelungsschlüssel	clef de la porte d'verrouillage	门互锁键
8.	ｽﾋﾟﾝﾄﾞﾙ	spindle	Spindel	broche	主轴
9.	ATC ﾏｶﾞｼﾞﾝ	ATC magazine	ATC Magazin	ATC magasin	ATC 刀库
10.	取手	handle	Griff	poignée	把手
11.	制御箱内部書類入れ	control box document	Dokumentenbehälter im Steuerschrank	boîte à papiers de l''armoire de commande	控制箱内书架
12.	ﾚﾍﾞﾘﾝｸﾞﾎﾞﾙﾄ	leveling bolt	Nivellierbolzen	boulon à régler le niveau de la machine	调平螺栓
13.	ｸｰﾗﾝﾄﾉｽﾞﾙ	coolant nozzle	Kühlmitteldüse	ajutage d'huile de coupe	冷却液喷嘴
14.	ｸﾞﾘｯﾌﾟｶﾊﾞｰ	grip cover	Griffschutz	couverture de jambe	夹钳套
15.	工具	tool	Werkzeug	outil	刀具
16.	工具ﾎﾙﾀﾞ	tool holder	Werkzeughalter	support à outil	刀具夹
17.	ｽﾋﾟﾝﾄﾞﾙﾍｯﾄﾞ	spindle head	Spindelkopf	tête de la broche	主轴头
18.	非常停止ｽｲｯﾁ	emergency stop switch	Notfall-stop-Schalter	bouton d'arrêt d'urgence	紧急停止开关
19.	ｹｰﾌﾞﾙｶﾊﾞｰ	cable cover	kabelschutz	couvre cable	揽绳套
20.	ﾃｰﾌﾞﾙ	table	Tisch	table	工作台
21.	主電源ﾌﾞﾚｰｶ	main power breaker	Hauptschalter	disjoncteur d’alimentation principale	主电源开关
22.	ｸｰﾗﾝﾄﾀﾝｸ	coolant tank	Kühlmitteltank	réservoir d'huile de coupe	冷却液罐
23.	ｽﾌﾟﾗｯｼｭｶﾞｰﾄﾞｻｲﾄﾞｶﾊﾞｰ	splash guard side cover	Spitzblechseitenschutz	couverture à côté du tôle pare-copeaux	火花防溅板一侧的护罩
24.	回生抵抗ｶﾊﾞｰ	regenerative resistor cover	Rückkopplungs- widerstandsschutz	couverture pour la résistance régénératrice	再生电阻罩
25.	操作ﾊﾟﾈﾙ	operation panel	Betriebstafel	panneau d'opéation	操作面板

警告和回避方法

(　)中的数字 1,2 与各部分的名称号码相对应。

危险　⚠ 危　险

SD1　在攻丝中心里隐藏着许多危险。
SD1-1　为了熟知危险的内容和回避方法,请在操作机器前阅读安全操作规程。
SD1-2　所有使用者均须知道紧急停止开关(19)的位置和操作方法。

SD2　控制箱(1)中有高电压装置,不慎触模该装置,会引起重大伤亡事故。
SD2-1　电气系统的维修检查作业,只允许具有本机械电气回路知识、持有电工执照的人员才能能操作。
SD2-2　应关掉主电源总开关(21)后进行作业,并设置「正在作业」的表示牌
SD2-3　运转中的机器,都有被其夹住而受重伤的危险。

SD3　运转中的机器,都有被其夹住而受重伤的危险。
SD3-1　机器在运转时,不能将身体伸入火花防溅箱(2)中去。
SD3-2　只有在按了停止开关(3)或按了回零按钮并确认停止指示灯(4)已经点亮后,才能将身体或手伸入火花防溅箱中。
SD3-3　亲眼确认火花防溅箱中确实无人后,才能开动机器。
SD3-4　在机器运转时,手足和身体不能靠近机器的转动部分。
SD3-5　在万不得已必须进入机器进行操作时,应切断主电源控制板(21)的电源,并加铁锁保护,以免电源接入。

SD4　门互锁开关(5)处于无效状态时，即使打开作业门(6)，机械也会运行。有被机械夹伤的危险。
SD4-1　在准备作业中,应留心机械的运转情况,做到能随时停机。准备作业结束以后,应将门互锁开关置于有效位置。并应拔去门互锁键(7),交由监督人员保管。
SD4-2　不应将门互锁开关置于无效位置的状态下离开机器。

SD5　门互锁开关(5)置于无效位置时，工作台 (20)会发生移动,作业人员有可能被平台夹伤。
SD5-1　在准备作业中,应留心机械的运转情况,做到能随时停机。准备作业结束以后,应将门互锁开关置于有效位置。并应拔去门互锁键(7),交由监督人员保管。

警告 **警 告**

SW1 触摸转动中的加工机具(15)会受伤。
SW1-1 不准靠近转动中的加工机具。

SW2 折断的加工机具(15)和工件弹出会造成伤害。
SW2-1 应关闭作业门(6)后再运行机械。

SW3 夹进转动部件而受伤。
SW3-1 勿靠近转动部件(15)、主轴(8)和 ATC 刀库(9)
SW3-2 应穿合身服装。长发应拢入工作帽内。除非停机作准备工作,不能戴手套。不能戴首饰。勿模弄转动部件。

SW4 改装安全装置,会带来安全装置失灵、触电、被夹和被打等危险。
SW4-1 勿改装安全装置。勿固定安全装置,以免安全装置失灵。

SW5 切削碎屑飞入眼内,会伤及眼球而失明。
SW5-1 应戴用铁屑防护眼镜。
SW5-2 勿用压缩空气清扫切削碎屑。

SW6 用手触摸切削碎屑,会造成外伤或烫伤。
SW6-1 勿用手触摸切削碎屑。勿用手触摸加工件的尖厉部分。
SW6-2 清理切削碎屑应戴手套,使用刷子。
SW6-3 应在停机后清理切削碎屑。

SW7 勿握模刀具(16)的刀刃,以免手被割破。
SW7-1 勿握模刀具的刀刃。拿取刀具时应拿住刀具夹(16)部分。

SW8 重物跌落脚上,会造成足部骨折。
SW8-1 抬拿重物时应穿安全鞋。

SW9 抬拿重物时,注意闪腰。
SW9-1 抬拿重物时,应请他人协助。
SW9-2 抬拿重物时,应双脚用力而非腰部用力。

SW10 长时间身处噪音之中或巨大的噪声之中,会造成双耳失聪。
SW10-1 在噪音中作业时,应戴耳塞等保护器具。

SW11 高气压设备有可能爆裂而伤及眼目。
SW11-1 没有接受过高气压设备使用方法培训、不懂该机器配管的人员,不能安装和改装高气压设备。
SW11-2 在进行高气压设备的配管作业时,应切断高压电源,放去残留高压空气后再进行作业。并设置「正在作业」的表示牌。

SW12 站起时注意碰伤头。
SW12-1 在机器内部或周围进行作业时应戴安全帽。

SW13 开机时,机器中有未取出的加工工具时, 加工工具有可能飞散而造成工伤。
SW13-1 勿将加工工具遗忘在机器中。

SW14 握取把手(10)以外的部分开关作业门(6)的话，有手被夹伤的危险。
SW14-1 开关作业门(6)时，应握取把手(10)。

SW15 控制箱(1)中有些机具处于高温状态,如控制箱内部的文件架(12)上的资料露出文件架,有起火燃烧的危险。
SW15-1 文件架上不能放置超过 A4 尺寸或信笺尺寸的资料。

SW16 在控制箱(1)和机器上放置工具时,工具会震落。
SW16-1 在控制箱和机器上勿放置物品。

SW17 攀登机器和冷却液罐(22),须注意坠落受伤。
SW17-1 勿攀登机器和冷却液罐。

SW18 把手伸进调平螺栓(12)的下面,须注意手被夹伤。
SW18-1 勿将手伸进调平螺栓的下面去。调节水平调节螺栓应使用工具。

SW19 缆绳下垂或不加缆绳护罩,会发生绊滑跌倒等工伤事故。
SW19-1 应收紧缆绳的松余部分,沿地板拖放时应加缆绳护罩。

SW20 擅自改装机器,会使安全装置失灵,安全操作规程和安全签条的警告事项将失去作用。
SW20-1 勿改装机器。需要改装时,应事先和兄弟工业公司联系,取得兄弟工业公司的书面允许。

SW21 冷却液进入眼睛,会损伤眼睛。
SW21-1 调整冷却液喷嘴 (13)时,应配戴防护眼镜。
SW21-2 冷却液进入眼睛后,应用清水洗眼,接受医生诊治。

SW22 手指伸入机器夹缝,应注意手被夹伤。
SW22-1 勿将手指伸入固定具的罩子中去。
SW22-2 勿将手指伸入刀具(15)或刀具夹(16)与 ATC 刀库(9)之间的空隙中去。

SW23 如冷却液、机油或切削碎屑被打翻,会因滑脚、跌倒、碰撞而受伤。
SW23-1 应切断电源,并清扫机器内部和机器周围以后,再进行作业。
SW23-2 安装作业应戴安全帽和穿安全鞋。

SW24 拆卸刀具夹(16)时,须注意手可能会被刀具(15)的刀刃所伤或手被机器打着。
SW24-1 不持拿刀具的刀刃部。持拿工具应使用皮制手套。应双手持拿刀具夹。

SW25 机器可能突然停机,刀具可能突然脱落。
SW25-1 停止指示灯(4)不亮时,不要将手脚、身体伸到主轴头(18)下面去。
SW25-2 应将工作台拉到身前再安排工作。
SW25-3 切断主电源开关(21),加锁以防止总开关打开,然后补充润滑液。

SW26 如使用油性冷却液加工,加工部位可能受热起火。
SW26-1 使用油性冷却液时,应设置火警预报器和自动灭火装置。
SW26-2 加工时,操作人员不得离开机器。

SW27 机器开动时,人傍靠在机器上,会有被夹、被打致伤的危险。
SW27-1 勿傍靠在机器上。

SW28 紧急停止开关(18)上挂有物品时,紧急停止开关会按不进去。
SW28-1 不得在紧急停止开关上钩挂物品。

SW29 工作台(19)移动,机器后背的Y轴后罩会跳弹出来,碰到人会造成工伤。
SW29-1 应切断主电源开关(21),再清扫切削碎屑。

SW30 冷却液罐(22)很重,抬拿时须注意闪腰或脚被砸伤。
SW30-1 清理切削铁屑时也不得抬拿冷却液罐。

SW31 进入机器时,须注意滑倒或被机器夹住。
SW31-1 进入机器前,应先切断主电源开关(21), 加锁以防止总开关被打开。清扫冷却液和铁屑时。应穿戴安全鞋和安全帽。并在操作盘附近置放「正在作业」的标牌。

SW32 别忘记安装火花防溅箱(2)的侧面护板(23),以免操作人员被夹或被断裂的刀具打伤。
SW32-1 在打开电源前应亲自确认是否装上了侧面护板。

SW33 如果使用超重超大的刀具(15),刀具夹(16),该刀具或该刀具的套柄有可能飞脱。
SW33-1 应使用重量和尺寸都在规定以内的刀具和套柄。
SW33-2 刀具的限制条件请见刀具签条和操作说明书。

SW34 机器在运转过程中,再生电阻会发热,须注意触摸再生器会被烫伤。
SW34-1 勿拆卸再生电阻罩(24)。

SW35 机器在运转过程中,马达会发热,须注意触摸马达可能会被烫伤。
SW35-1 在停止运转后的 30 分钟内不要触摸马达。

SW36 使用规定以外的保险丝,会使保护装置失灵,可能攘成火灾。
SW36-1 调换保险丝时,使用的保险丝规格应和刚用完的相同。

SW37 当改变热传导器的设定时,保护装置将失灵,有可能发生火灾。
SW37-1 勿改变热传导器的设定值。

SW38 当 ATC 刀库(9)转动时,须注意刀具(15)有可能碰到加工物件、夹具或机器而断裂。
SW38-1 应妥善设定裴恶的长度,以免在 ATC 刀库机转动时,刀具碰到加工物件、夹具或机器。

SW39 如控制箱(1)和操作盘(25)潮湿,须注意有可能触电。
SW39-1 不能将冷却液、水、切削铁屑撒到控制箱和操作盘上。
SW39-2 不能用潮湿的手触摸控制箱。

SW40 从外部引进的动力线的 PE 线过短的话,当拉动电缆线时,PE 线有可能松脱而触电。
SW40-1 接续 PE 线时,应留有余地,长于其他电线(L1、L2、L3)。

SW41 如果在有爆炸危险的环境下打开机器电源,或进行加工作业,有可能因机器的火花而引起爆炸。
SW41-1 不要将机器安装在有爆炸危险的环境下。
SW41-2 不应在有发生爆炸可能的环境中打开机器电源,进行加工或做准备作业。
SW41-3 不在有爆炸危险的环境下打开机器电源,或进行加工作业。

SW42 如忘加火花防溅板一侧的护板(23),将有可能被夹伤。

SW43 在打开电源前,应亲自确认维修罩是否已经装好。

SW44 有些被加工件的材料的切削碎屑有可能引火或爆炸。
SW44-1 切削碎屑应立即清除。
SW44-2 在加工上述材料时,机器附近应放置灭火设备或进行无人作业。

SW45 使用脱卸式固定斜楔的刀具时, 如固定斜楔安装不牢固,主轴旋转时,有可能飞脱砸人,造成工伤。
SW45-1 务必先确认固定斜楔是否安装牢固以后再安装刀具。

SW46 使用设有电源线专用的配线的 3 线式感应器的时候,有引火的危险。
SW46-1 请不要使用 3 线式感应器,应使用 2 线式感应器。
SW46-2 不得已使用 3 线式感应器的时候,应在电源线部处追加个别保险丝(1A 以下)。

SW47　配线时，端子台的螺丝锁得不紧的话，会导致由于接触不良引起发热、起火的危险。

SW47-1　配线时，螺丝应无松缓。

SW48　如果工厂内照明光线昏暗的话，有因机械内光线变暗而导致夹具及刀具弄伤手的危险。

SW48-1　机械内照明度低于 500 勒克斯以下的场合，应设置照明灯。

安全签条的说明

机器上贴有安全签条，安全签条是安全操作规程中特别重要的部分。
请在充分理解了安全签条的内容以后再进行机器的操作。
安全签条贴在机器的下述位置，请确认安全签条有否脱落。如有脱落，请索取后重贴。

230S00C02.doc

S2A00401.ai

[1] 前面安全签条

语言	零件编码
和中英文	690723001

This machine has hazards.
Read instruction manuals to understand hazards and avoid them before operation.

危険の内容と回避方法を理解するため、取扱説明書を読んでから、機械を操作してください。

由于有必要了解危险的内容和避免的方法，请仔细读完使用说明书后，再操作机器。

DANGER	WARNING	WARNING
Machine in operation will suddenly move and crush you. Keep away from moving parts.	Broken tool or workpiece can hit and wound you. Shut door before starting machine.	Rotating parts can catch and injure you. Keep away from rotating tool, spindle, and magazine. Never hold moving parts. Do not wear gloves while operating machine.
危 険	警 告	警 告
機械が、とつぜん、動き、はさまれて大けがをする。 動くところに、手足や、からだを近づけないこと。	おれた工具や工作物がとびだし、ぶつかって、けがをする。 とびらをしめてから運転すること。	回転部分にまきこまれて、けがをする。 回転している工具、スピンドル、マガジンに近づかないこと。 回転部分を、つかまないこと。 運転作業中は手ぶくろをしないこと。
危 险	警 告	警 告
被机器突然运行所夹住，会致人重伤。 在机器运转时，手足切勿靠近。	折损的刀具或工件飞出，会伤人。 请务必关上门之后，运行机器。	被回转部分夹住，会受伤。 不要靠近正在运行中的主轴，旋转头。 不要抓住回转部分。在操作时不许戴手套。

690723001 / 9411 (1)

[2] 前面面刀具标签

根据刀库的最大刀具收纳把数及主轴回转次数, 更改记载内容。

零件编码

653379001 **刀具标签** 250

工具、主軸回転数の制限を超えて使用すると、機械が破損する場合があります。操作前に、取扱説明書で詳細を確認して下さい。
If use beyond the limitation of the tool and spindle speed, machine may be broken.
Check the detailes by the operation manual before operation.

最高主軸回転速度	10000 min^{-1} / 16000 min^{-1}		Max Spindle Rotation Speed
主軸テーパ	7 / 24 No.30		Spindle Taper
ツールシャンク	MAS-BT30		Tool Shank
プルスタッド	MAS-P30T-2 (30°)		Retension Knob
マガジン全工具合計	M total 25 kg (14Tools) / 35 kg (21Tools)		Total in Magazine
工具の制限	D1 ≦ 40 mm L1 ≦ 200 mm D2 ≦ 80 mm L2 ≦ 160 mm D3 ≦ 46 mm L3 ≧ 30 mm M ≦ 3 kg MxH ≦ 180 kgmm	D1 ≦ 40 mm L1 ≦ 200 mm D2 ≦ 55 mm L2 ≦ 160 mm D3 ≦ 46 mm L3 ≧ 30 mm M ≦ 2 kg MxH ≦ 100 kgmm	Limitation of Tool
工具バランス制限	100 grmm	50 grmm	Limitation of Tool Balance
主軸回転数制限	10000 min^{-1}	16000 min^{-1}	Limitation Spindle Rotation Speed

653379001 / 0210 (2)

[3] 背面安全签条

语言	零件编码
和中英文	690730001

⚠ DANGER

Hazardous voltage
will cause severe injury or death.

Never attempt to adjust or repair electrical circuits unless you are familiar with circuits and qualified to work safely on electrical circuits.

Turn off main power before working.

Post notice you are working.

⚠ WARNING

Spilt coolant, lubricant, or chips are slippery and can cause injury.

Turn off main power and clean in and around machine before servicing.

Wear head protector and safety shoes while servicing.

⚠ 危　険

高 電 圧
感電死することがある。

電気の保守・点検作業は、この機械の電気回路の知識があり、電気安全の教育をうけた人間だけが、おこなうこと。

主電源を切ってから、作業すること。

作業中であることを表示すること。

⚠ 警　告

切削液、油、または切りくずのこぼれで、ころんだり、ぶつかって、けがをする。

機械の電源を切り、機械の中やまわりをそうじしてから、作業すること。

すえつけ作業のときは、ヘルメットと安全靴を使うこと。

⚠ 危　险

高 压 电
触电会致死。

电器的保养，检查的实施，仅限于了解该机器电路知识，受过电器安全教育的人员。

主电源切断之后，进行作业。

要做好正在作业的标志。

⚠ 警　告

切削液，机油，切削粉末溢出后，迭倒碰撞会受伤。

切断机器的电源，把机内和四周打扫干净之后，再工作。

安装作业时，要戴上安全帽，穿上防护鞋。

690730001 / 9709 (1)

[4]　再生阻抗器罩签条

语言	零件编码
和中英文	6907290001

[5]　刀具装脱签条

语言	零件编码
和中英文	65308001

[6] 侧面维修罩安全签条

语言	零件编码
和中英文	690731001

[7] 远离勿踏标签

零件编码
693178001

693178001 / 0607 (1)

693178001.ai

操作人员安全操作规程

攻丝中心
TC-S2A

请在接触攻丝中心前仔细阅读本安全操作规程。

兄弟工业公司
玛西纳丽和苏琉雄公司

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什么是安全操作规程

务必阅读本规程

凡接触攻丝中心的人员,诸如在工厂安装攻丝中心的人员、使用攻丝中心进行加工的人员和调整修理攻丝中心的人员,务必阅读本安全操作规程。
本规程把接触攻丝中心的所有人员称为「使用者」。

目的

攻丝中心由使用高电压的电器回路、高速旋转机具、大功率移动台和 ATC 送料装置组成。所以该机器带有许多危险因素。
制订本规章的目的是保护使用者免受攻丝中心所带危险因素的伤害。
为此本安全操作规程对下述问题进行说明。

警告: 有什么危险
回避方法:如何回避其危险

安全操作规程的内容以及和其他规程的关系

安全操作规程按使用对象进行分类,附在各说明书里(程序控制缝纫机除外)。您想知道机器的功能和操作方法,请阅读说明书本篇。

1 操作说明书(面向一般操作人员) 「操作人员安全操作规程」
「安装和做准备作业人员的安全操作规程」
「操作说明书」(基本作业所需要的机械操作方法)
中文零件编码 : 693271001

2 操作说明书(面向专门操作人员) 「操作人员安全操作规程」
「安装和做准备作业人员的安全操作规程」
「机门连动机能」
「操作说明书」(准备和加工所需要的机械操作方法)
(对话) 日文零件编码 : 690777001 英文零件编码 : 690783001
(NC 语言) 日文零件编码 : 690779001 英文零件编码 : 690785001

3 安装说明书 「安装作业人员和准备作业人员的安全操作规程」
「安装说明书」(机械和配件的安装及其组装方法)
日文零件编码 : 690775001 英文零件编码 : 690781001

4 编制程序说明书 「编制程序说明书」(加工程序的制作方法)
(对话) 日文零件编码 : 690692001
英文零件编码 : 690698001
(NC 语言) 日文零件编码 : 690709001
英文零件编码 : 690715001

5 维修说明书 「受过培训的维修作业人员安全操作规程」
「维修说明书」(机械的调整和修理方法)
对顾客不发维修说明书。

和安全签条的关系

安全操作规程中特别重要的部分被制作成安全标签，贴在机器上。
安全操作规程的最后部分是关于安全标签的说明。如果机器上的安全签条脱落，请设法索取签条后重新贴上。

语言

日本国内销售的机器，所贴的安全操作规程和安全签条均用日文。
销售到国外的机器，用的是英文、德文、法文和中文四国文字。
请设法取得所懂语言的安全操作规程和安全签条。
关于其他国家的安全操作规程和语言签条，请询问您所购买的机器销售店。

索取方法

如果安全操作规程或安全签条遗失，请到您所购买的机器销售店索取。
如销售店无法解决，请向下列单位咨询。

日本国外联系地址
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BROTHER INDUSTRIES, LTD.
phone +81-52-824-2232
fax +81-52-811-0469

安全操作规程的使用

安全操作规程应注意妥善保存,做到随时可以阅读。如机器更换所有人,请转交机器的新持有人。

危险程度

如无视警告,所引起的危险的程度按受害程度可分 3 种。

1. 危险

⚠ 危　险

招致死亡或不可复原的严重疾患的危险。

2. 警告

⚠ 警　告

招致重伤的危险。

3. 注意

⚠ 注　意

轻度危险

说明的顺序

按下列顺序进行说明。

1. 表示危险程度的文字标记(危险、警告、注意)和象图
2. 危险的种类
3. 伤害的预测
4. 回避方法

象形图的意思

安全签条和安全操作规程的警告语言使用象图,形象地说明其危险程度和回避方法。现将图像的意义说明如下。

1. 危险

当心滑倒

当心绊倒

当心触电

夹进手里

注意高温

谨防断裂

当心刺伤

有物落下

当心坠落

注意飞散

活动部件

注意触电

当心夹入

注意高温

谨防割断

注意破裂

有物落下

旋转物体

注意飞散

谨防火灾

2. 回避方法

保护耳朵

保护双手

保护双脚

拔掉电源

严禁触摸

保护头部

需接地线

不准分解

保护眼睛

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No.	各部の名称	Section names	Namen jedes Teils	Noms de sections	各部件名称
	日本語	English	Deutsch	Français	中文
1.	制御箱	control box	Steuerschrank	armoire de commande	控制箱
2.	ｽﾌﾟﾗｯｼｭｶﾞｰﾄﾞ	splash guard	Spitzblech	tôle pare-copeaux	火花防溅箱
3.	停止ｽｲｯﾁ	stop switch	stop Einschalter	bouton d'arrét	停止开关
4.	停止ﾗﾝﾌﾟ	stop lamp	stop Lampe	lampe d'arrêt	停止指示灯
5.	ﾄﾞｱｲﾝﾀﾛｯｸｽｲｯﾁ	door interlock switch	Verriegelungsschalter	interrupteur de la porte d'verrouillage	门互锁开关
6.	作業扉	work door	Arbeitstür	porte de travail	作业门
7.	ﾄﾞｱｲﾝﾀﾛｯｸｷｰ	door interlock key	Verriegelungsschlüssel	clef de la porte d'verrouillage	门互锁键
8.	ｽﾋﾟﾝﾄﾞﾙ	spindle	Spindel	broche	主轴
9.	ATC ﾏｶﾞｼﾞﾝ	ATC magazine	ATC Magazin	ATC magasin	ATC 刀库
10.	取手	handle	Griff	poignée	把手
11.	制御箱内部書類入れ	control box document	Dokumentenbehälter im Steuerschrank	boîte à papiers de l''armoire de commande	控制箱内书架
12.	ﾚﾍﾞﾘﾝｸﾞﾎﾞﾙﾄ	leveling bolt	Nivellierbolzen	boulon à régler le niveau de la machine	调平螺栓
13.	ｸｰﾗﾝﾄﾉｽﾞﾙ	coolant nozzle	Kühlmitteldüse	ajutage d'huile de coupe	冷却液喷嘴
14.	ｸﾞﾘｯﾌﾟｶﾊﾞｰ	grip cover	Griffschutz	couverture de jambe	夹钳套
15.	工具	tool	Werkzeug	outil	刀具
16.	工具ﾎﾙﾀﾞ	tool holder	Werkzeughalter	support à outil	刀具夹
17.	ｽﾋﾟﾝﾄﾞﾙﾍｯﾄﾞ	spindle head	Spindelkopf	tête de la broche	主轴头
18.	非常停止ｽｲｯﾁ	emergency stop switch	Notfall-stop-Schalter	bouton d'arrêt d'urgence	紧急停止开关
19.	ｹｰﾌﾞﾙｶﾊﾞｰ	cable cover	kabelschutz	couvre cable	揽绳套
20.	ﾃｰﾌﾞﾙ	table	Tisch	table	工作台
21.	主電源ﾌﾞﾚｰｶ	main power breaker	Hauptschalter	disjoncteur d’alimentation principale	主电源开关
22.	ｸｰﾗﾝﾄﾀﾝｸ	coolant tank	Kühlmitteltank	réservoir d'huile de coupe	冷却液罐
23.	ｽﾌﾟﾗｯｼｭｶﾞｰﾄﾞｻｲﾄﾞｶﾊﾞｰ	splash guard side cover	Spitzblechseitenschutz	couverture à côté du tôle pare-copeaux	火花防溅板一侧的护罩
24.	回生抵抗ｶﾊﾞｰ	regenerative resistor cover	Rückkopplungs- widerstandsschutz	couverture pour la résistance régénératrice	再生电阻罩
25.	操作ﾊﾟﾈﾙ	operation panel	Betriebstafel	panneau d'opéation	操作面板

警告和回避方法

(　)中的数字 1,2 与各部分的名称号码相对应。

危险　⚠ 危　险

OD1　在攻丝中心里隐藏着许多危险。
OD1-1　为了熟知危险的内容和回避方法,请在操作机器前阅读安全操作规程。
OD1-2　所有使用者均须知道紧急停止开关(18)的位置和操作方法。

OD2　控制箱(1)中有高电压装置,不慎触模该装置,会引起重大伤亡事故。
OD2-1　不具该机械的电气回路知识、没有电工执照的人员不准进行电气的维修和检查作业。操作人员不准打开控制箱。
OD2-2　如警报器报警,应立即向管理人员报告。操作人员不得擅自修理。
修理和安装应由具备专门知识的人员进行。

OD3　运转中的机器,都有被其夹住而受重伤的危险。
OD3-1　机器在运转时,不能将身体伸入火花防溅箱(2)中去。
OD3-2　亲眼确认火花防溅箱中确实无人后,才能开动机器。
OD3-3　在机器运转时,手足和身体不能靠近机器的转动部分。
OD3-4　如警报器报警,应立即向管理人员报告。不准将手脚和身体伸入机械。

OD4　门互锁开关(5)处于无效状态时，即使打开作业门(6)，机械也会运行。
有被旋转的刀具(15)切伤或被机械夹伤的危险。
OD4-1　门互锁开关(5)处于无效状态时,勿将手足和身体伸入机器内部。作业人员要向管理人员汇报。管理人员应将门互锁开关拨到有效位置。钥匙(8)由管理人员保管。
OD4-2　门互锁无效时,管理人员不得让操作人员进行作业。
OD4-3　操作人员应亲自确认门互锁开关(5)确已拨到有效位置后,才能开始作业。
OD4-4　如果门互锁上挂有钥匙,应向管理人员汇报。
OD4-5　门互锁的钥匙由管理人员保管。

警告 警告

OW1 触摸转动中的刀具(15)会受伤。
OW1-1 不准靠近转动中的刀具。

OW2 折断的刀具(15)和工件弹出会造成伤害。
OW2-1 应关闭作业门(6)后再运行机械。

OW3 夹进转动部件而受伤。
OW3-1 勿靠近转动部件(15)、 主轴(8)和 ATC 刀库(9)。
OW3-2 应穿合身服装。长发应拢入工作帽内。除非停机作准备工作,不能戴手套。不能戴首饰。勿模弄转动部件。

OW4 改装安全装置,会带来安全装置失灵、 触电、被夹和被打等危险。
OW4-1 勿改装安全装置。勿固定安全装置,以免安全装置失灵。

OW5 切削碎屑飞入眼内,会伤及眼球而失明。
OW5-1 应戴用铁屑防护眼镜。
OW5-2 勿用压缩空气清扫切削碎屑。

OW6 用手触摸切削碎屑,会造成外伤或烫伤。
OW6-1 勿用手触摸切削碎屑。勿用手触摸加工件的尖厉部分。
OW6-2 清理切削碎屑应戴手套,使用刷子。
OW6-3 应在停机后清理切削碎屑。

OW7 勿握模刀具(15)的刀刃,以免手被割破。
OW7-1 勿握模刀具的刀刃。拿取加工机具时应拿住刀具夹(17)部分。

OW8 重物跌落脚上,会造成足部骨折。
OW8-1 抬拿重物时应穿安全鞋。

OW9 抬拿重物时,注意闪腰。
OW9-1 抬拿重物时,应请他人协助。
OW9-2 应用脚力抬起而不是背上及腰间的力气。

OW10 长时间身处噪音之中或巨大的噪声之中,会造成双耳失聪。
OW10-1 在噪音中作业时,应戴耳塞等保护器具。

OW11 高气压设备有可能爆裂而伤及眼目。
OW11-1 没有接受过高气压设备使用方法培训、不懂该机器配管的人员,不能安装和改装高气压设备。

OW12 站起时注意碰伤头。
OW12-1 在机器内部或周围进行作业时应戴安全帽。

OW13 开机时,机器中有未取出的加工工具时，加工工具有可能飞散而造成工伤。
OW13-1 如有工具遗忘在机器中,不应继续操作机器,并向监督人员报告。

OW14 握取把手(10)以外的部分开关作业门(6)话，有手被夹伤的危险。
OW14-1 开关作业门(6)时，应握取把手(10)。

OW15 在控制箱(1)和机器上放置工具时,工具会震落。
OW15-1 在控制箱和机器上勿放置物品。

OW16 攀登机器和冷却液罐(22),须注意坠落受伤。
OW16-1 勿攀登机器和冷却液罐。

OW17 把手伸进调平螺栓(12)的下面,须注意手被夹伤。
OW17-1 不应将手伸入调平螺栓的下方。应使用工具调节调平螺栓。
OW17-2 管理人员应让安装人员调节水平调节螺栓。

OW18 缆绳下垂或不加缆绳护罩,会发生绊滑跌倒等工伤事故。
OW18-1 电缆线下垂或未加盖罩时,应向管理人员汇报。
OW18-2 管理人员应让安装人员拉线,在电缆线上加罩。

OW19 擅自改装机器,会使安全装置失灵,安全操作规程和安全签条的警告事项将失去作用。

OW19-1 不应改造机械。如有必要改造时，应事先与兄弟公司联系，获取书面上的许可。

OW20 冷却液进入眼睛会伤及眼睛。

OW20-1 调整冷却液喷嘴(13)时,应戴保护眼镜。

OW20-2 冷却液进入眼睛以后,应用清水冲洗眼睛,请医生检查。

OW21 手指伸入机器夹缝,应注意手被夹伤。

OW21-1 勿将手指伸入固定具的罩子(14)中去。

OW21-2 勿将手指伸入刀具(15)或刀具夹(16)与 ATC 刀库(9)之间的空隙中去。

OW22 如冷却液、机油或切削碎屑被打翻,会因滑脚、跌倒、碰撞而受伤。

OW22-1 应切断电源,并清扫机器内部和机器周围以后,再进行作业。

OW22-2 安装作业应戴安全帽和穿安全鞋。

OW23 拆卸刀具夹(16)时,须注意手可能会被刀具(15)的刀刃所伤或手被机器打着。

OW23-1 不得握模刀具夹的刀刃。拿刀具时应戴皮手套。应用双手持拿刀具。

OW24　机器可能突然停机，刀具可能突然脱落。
OW24-1　不要将手脚和身体伸进主轴头(17)下面。

OW25　如使用油性冷却液加工，加工部位可能受热起火。
OW25-1　使用油性润滑液时，应设置火警预报器和自动灭火装置。
OW25-2　加工时，操作人员不得离开机器。

OW26　机器开动时，人傍靠在机器上，会有被夹、被打致伤的危险。
OW26-1　勿傍靠在机器上。

OW27　紧急停止开关(18)上挂有物品时，紧急停止开关会按不进去。
OW27-1　不得在紧急开关上钩挂物品。

OW28　工作台(19)移动，会使机器背后的电缆护罩(20)飞脱，而砸伤作业人员。
OW28 -1　应先切断主电源闸(21)，再清扫切削碎屑。

OW 29　冷却液罐(22)很重，抬拿时须注意闪腰或脚被砸伤。
OW 29-1　清理切削铁屑时也不得抬拿冷却液罐。

OW30　进入机器时，须注意滑倒或被机器夹住。
OW30-1　不得进入机器。有必要进入机器时，应向管理人员报告。

OW31 别忘记安装火花防溅箱(2)的侧面护罩(23),以免操作人员被夹或被断裂的刀具打伤。

OW31-1 在打开电源前应亲自确认是否装上了侧面护板。侧面护板(23)尚未安装,应向管理人员报告。

OW31-2 管理人员应令其安装好侧面护罩。

OW32 如果使用超重超大的刀具(15),刀具夹(16),该机具或该机具的套柄有可能飞脱。

OW32-1 应使用重量和尺寸都在规定以内的刀具和套柄。

OW32-2 刀具的限制条件请见刀具条和操作说明书。

OW33 机器在运转过程中,再生电阻会发热,须注意触摸再生器会被烫伤。

OW33-1 勿拆卸再生电阻罩(24)。

OW34 机器在运转过程中,马达会发热,须注意触摸马达可能会被烫伤。

OW34-1 在停止运转后的 30 分钟内不要触摸马达。

OW 35 当 ATC 刀库(9)转动时,须注意刀具(15)有可能碰到加工物件、夹具或机器而断裂。

OW 35-1 应妥善设定刀具的长度,以免在 ATC 刀库转动时,刀具碰到加工物件、夹具或机器。

OW36 如控制箱(1)和操作盘(25)潮湿,须注意有可能触电。

OW36-1 不能将冷却液,水,切削铁屑撒到控制箱和操作盘上。

OW36-2 不能用潮湿的手触摸控制箱。

OW37 如在有爆炸危险的环境下打开机器电源开关或进行加工作业,有可能因机器的火花引起爆炸。

OW37-1 不得在有爆炸危险的环境下打开机器电源开关或进行加工作业。

OW38 不将加工物件妥善固定便进行加工时，有可能因加工物件飞脱而使操作人员致伤。
OW38-1 应将加工物件妥善固定。

OW39 忘记安装火花防溅侧面护罩(23)的话，有被夹伤的危险。
OW39-1 在开电源以前,应亲自确认是否已经安装了护罩。
OW39-2 应先切断主电源,加上铁锁防止开关跳入,然后拆卸护罩。
OW39-3 管理人员应自己安装护罩。

OW40 有些被加工件的材料的切削碎屑有可能引火或爆炸。
OW40-1 切削碎屑应立即清除。
OW40-2 在加工上述材料时,机器附近应放置灭火设备或进行无人作业。

OW41 带有可换固定斜楔的加工机具,如斜楔未妥善固定,在固定主轴的过程中,有可能卸脱而造成伤害。
OW41-1 务必先确认固定斜楔是否妥善固定,然后再安装刀具。

OW42 如果工厂内照明光线昏暗的话，有因机械内光线变暗而导致夹具及刀具弄伤手的危险。
OW42-1 机械内照明度低于 500 勒克斯以下的场合，应设置照明灯。

安全签条的说明

机器上贴有安全签条，安全签条是安全操作规程中特别重要的部分。
请在充分理解了安全签条的内容以后再进行机器的操作。
安全签条贴在机器的下述位置，请确认安全签条有否脱落。如有脱落，请索取后重贴。

230S00C02.doc

S2A00401.ai

[1] 前面安全签条

语言	零件编码
和中英文	690723001

This machine has hazards.
Read instruction manuals to understand hazards and avoid them before operation.

危険の内容と回避方法を理解するため、取扱説明書を読んでから、機械を操作してください。

由于有必要了解危险的内容和避免的方法，请仔细读完使用说明书后，再操作机器。

DANGER	WARNING	WARNING
Machine in operation will suddenly move and crush you. Keep away from moving parts.	Broken tool or workpiece can hit and wound you. Shut door before starting machine.	Rotating parts can catch and injure you. Keep away from rotating tool, spindle, and magazine. Never hold moving parts. Do not wear gloves while operating machine.
危 険	警 告	警 告
機械が、とつぜん、動き、はさまれて大けがをする。 動くところに、手足や、からだを近づけないこと。	おれた工具や工作物がとびだし、ぶつかって、けがをする。 とびらをしめてから運転すること。	回転部分にまきこまれて、けがをする。 回転している工具、スピンドル、マガジンに近づかないこと。 回転部分を、つかまないこと。 運転作業中は手ぶくろをしないこと。
危 险	警 告	警 告
被机器突然运行所夹住，会致人重伤。 在机器运转时，手足切勿靠近。	折损的刀具或工件飞出，会伤人。 请务必关上门之后，运行机器。	被回转部分夹住，会受伤。 不要靠近正在运行中的主轴，旋转头。 不要抓住回转部分。在操作时不许戴手套。

690723001 / 9411 (1)

[2] 前面面刀具标签

根据刀库的最大刀具收纳把数及主轴回转次数, 更改记载内容。

零件编码

653379001 **刀具标签** 250

工具、主軸回転数の制限を超えて使用すると、機械が破損する場合があります。操作前に、取扱説明書で詳細を確認して下さい。
If use beyond the limitation of the tool and spindle speed, machine may be broken.
Check the detailes by the operation manual before operation.

最高主軸回転速度	10000 min^{-1} / 16000 min^{-1}		Max Spindle Rotation Speed
主軸テーパ	7 / 24 No.30		Spindle Taper
ツールシャンク	MAS-BT30		Tool Shank
プルスタッド	MAS-P30T-2 (30°)		Retension Knob
マガジン全工具合計	M total 25 kg (14Tools) / 35 kg (21Tools)		Total in Magazine
工具の制限	D1 ≦ 40 mm L1 ≦ 200 mm D2 ≦ 80 mm L2 ≦ 160 mm D3 ≦ 46 mm L3 ≧ 30 mm M ≦ 3 kg MxH ≦ 180 kgmm	D1 ≦ 40 mm L1 ≦ 200 mm D2 ≦ 55 mm L2 ≦ 160 mm D3 ≦ 46 mm L3 ≧ 30 mm M ≦ 2 kg MxH ≦ 100 kgmm	Limitation of Tool
工具バランス制限	100 grmm	50 grmm	Limitation of Tool Balance
主軸回転数制限	10000 min^{-1}	16000 min^{-1}	Limitation Spindle Rotation Speed

653379001 / 0210 (2)

[3] 背面安全签条

语言	零件编码
和中英文	690730001

⚠ DANGER

Hazardous voltage
will cause severe injury or death.

Never attempt to adjust or repair electrical circuits unless you are familiar with circuits and qualified to work safely on electrical circuits.

Turn off main power before working.

Post notice you are working.

⚠ WARNING

Spilt coolant, lubricant, or chips are slippery and can cause injury.

Turn off main power and clean in and around machine before servicing.

Wear head protector and safety shoes while servicing.

⚠ 危　険

高 電 圧
感電死することがある。

電気の保守・点検作業は、この機械の電気回路の知識があり、電気安全の教育をうけた人間だけが、おこなうこと。

主電源を切ってから、作業すること。

作業中であることを表示すること。

⚠ 警　告

切削液、油、または切りくずのこぼれで、ころんだり、ぶつかって、けがをする。

機械の電源を切り、機械の中やまわりをそうじしてから、作業すること。

すえつけ作業のときは、ヘルメットと安全靴を使うこと。

⚠ 危　险

高 压 电
触电会致死。

电器的保养，检查的实施，仅限于了解该机器电路知识，受过电器安全教育的人员。

主电源切断之后，进行作业。

要做好正在作业的标志。

⚠ 警　告

切削液，机油，切削粉末溢出后，迭倒碰撞会受伤。

切断机器的电源，把机内和四周打扫干净之后，再工作。

安装作业时，要戴上安全帽，穿上防护鞋。

690730001 / 9709 (1)

[4]　再生阻抗器罩签条

语言	零件编码
和中英文	6907290001

[5]　刀具装脱签条

语言	零件编码
和中英文	65308001

[6] 侧面维修罩安全签条

语言	零件编码
和中英文	690731001

[7] 远离勿踏标签

零件编码
693178001

693178001 / 0607 (1)

693178001.ai

TC-S2A

MAINTENANCE MANUAL

Please read this manual carefully before starting operation.

brother®

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Chapter 1 Troubleshooting

1.1 Problem with the power ON

1.1.1 Power ON not available

## No	Problem	Cause	Measure	Replace-ment	Adjust-ment	Refer-ence
1	Power is not available even by the POWER on switch. (Neither the MAIN POWER lamp nor the LED of the POWER switch on the operation panel lights up.)	The main power breaker handle is not turned ON.	Turn the main power breaker handle ON.			
		The connector CNSVP or CNSW on the IO board is disconnected.	Connect the connector CNSW and CNSVP .			
		The connector CNSW in the operation box is disconnected.	Connect the connector CNSW .			
		By the overload or the short-circuited of the 200V for control power, -the breaker (Q2)is trip (Except EU). -the circuit protector (Q4) is trip (EU).	After making sure of no overloaded and short-circuited, -turn on the breaker Q2 (Except EU). -turn on the circuit protector (Q4) (EU).			
		The IO board is defective.	Rreplace the IO board.	3.1.5		
		DC power unit AVR2 is defective.	Rreplace the AVR2.	3.1.7		
	Power is not available even by the POWER on switch. (The MAIN POWER lamp on the operation panel lights up, but the LED of the POWER switch dosen't.)	External power OFF for the extended I/O terminal block XTIO on the IO board is used.	When the external power OFF is not used, short circuit No.3 and No.4 of the XTIO terminal.			
		The IO board is defective.	Rreplace the IO board.			
	Power is not available even by the POWER on switch. (The MAIN POWER lamp and the LED of the POWER switch on the operation panel lights up.)	The ralay KC1 is not ON.	Rreplace the ralay KC1.			
		The IO board is defective.	Rreplace the IO board.	3.1.5		
		The NC board's DC 5V is defective. (DC5V+/-0.15V at NC board.)	Check the AVR1, the connection and adjust AVR1. Rreplace the AVR1 at the time of inferiority.	3.1.6		
		The KEY board's DC powers are defective. (DC5V+/-10%, DC12V+/-10%)	Check the AVR3 and the connection. Rreplace the AVR3 at the time of inferiority.	3.2.2		
2	The POWER ALARM lamp lights up.(The MAIN POWER lamp is blinking.)	Power voltage is exceeding the specification range.	Adjust the power voltage within the specification range (+/-10%). Check the transformer tap. In case that input 400V to the 200V system specification machine, replace the varistor assy.	3.1.7		
		The IO board is defective.	Rreplace the IO board.	3.1.5		
	The POWER ALARM lamp lights up.(The MAIN POWER lamp isn't blinking.)	Power voltage exceeded the specification range.	Adjust the power voltage within the specification range (+/-10%).			
		The IO board is defective.	Rreplace the IO board.	3.1.5		
3	The POWER ALARM lamp light is blinking. (The MAIN POWER lamp is blinking, too.)	Power voltage between R/S/T and PE is exceeding the specification range.(The voltage between the pins of the connector CN200 at IO board and PE exceed AC230V +15%.)	Check the grounding method. Adjust the voltage between R/S/T and PE within the specification range (230V+10%).			
		The IO board is defective.	Rreplace the IO board.	3.1.5		
	The POWER ALARM lamp light is blinking. (The MAIN POWER lamp isn't blinking.)	Power voltage between R/S/T and PE exceeded the specification range.	Check the grounding method. Adjust the voltage between R/S/T and PE within the specification range (230V+10%).			
		The IO board is defective.	Rreplace the IO board.	3.1.5		
4	Even when the [POWER] switch is turned on, the [POWER] lamp blinks and power is not supplied immediately.	This is normal. When the [POWER] switch is turned on within 15 seconds after the [POWER] switch was turned on and then off, a suppression circuit is activated to prevent rush current from continuing.				

1.1.2 Earth leakage breaker trip

## No	Problem		Cause	Measure	Replace-ment	Adjust-ment	Refer-ence
1	The earth leakage breaker trips when only the main breaker is turned on.	When the error occurs even when fuse Q3 and breaker Q2 circuit is opened.	The varistor located below the breaker is defective.	Remove the varistor and check it.			
			When the peripheral equipment is defective. Chip-conveyor, high-pressure coolant unit, etc	Remove the peripheral equipment connected to the secondary side of the breaker and check it.			
		When the error no longer occurs when breaker Q2 circuit is opened.	When the error no longer occurs when CN1 of AVR2 is disconnected.	Replace the AVR2.	3.1.7		
			The T2 is defective.	Disconnect the primary wiring of transformer T2, and check it.			
		When the error no longer occurs when fuse Q3 circuit is opened.	When coolant power system circuit is defective.	Disconnect the connector CNCLM of the coolant unit, and check it.			
2	When power is turned on while the [EMERGENCY STOP] switch is pressed, the earth leakage breaker trips.	When the error no longer occurs when CNSFAN of connector is disconnected.	Insulation of the spindle motor-fan is defective.	Replace the spindle motor-fan.			
		When the error no longer occurs when “Y” and “COM” terminals of terminal block TB2 for the spindle driver are disconnected.	Insulation of the regenera-tive resistor is defective.	Check the external regenerative resistor connection. Replace the regenerative resistor.			
		When the error no longer occurs when “CP” and “CN” terminals of terminal block TB1 for the spindle driver are disconnected.	Insulation of the servo system for each axis is defective. Disconnect “CP” and CN” terminals from the terminal block in order for each axis to determine the defective driver axis.	Replace the driver for each axis.	3.1.9		
		When the error no longer occurs when “r” and “t” terminals of terminal block TB4 for the spindle driver are disconnected.	Insulation of the driver for spindle is defective.	Replace the driver for spindle.	3.1.9		
		When the error no longer occurs when CN1 of AVR1 is disconnected.	The AVR1 is defective.	Replace the AVR1.	3.1.6		
		When the error no longer occurs when CN1 of AVR3 is disconnected.	Insulation of the AVR3 power system is defective.	Check the external AVR3 connection.			
3	When the earth leakage breaker trips when the servomotor is turned on.	When the error no longer occurs when “Y” and “COM” terminals of terminal block TB2 for the spindle driver are disconnected.	Insulation of the regenerative resistor is defective.	Check the external regenera-tive resistor connection. Replace the regenerative resistor.			
		When the error no longer occurs when “MP” and “MN” terminals of terminal block TB1 for the spindle driver are disconnected.	Insulation of the servo system for each axis is defective. Disconnect “MP” and “MN” terminals from the terminal block in order for each axis to determine the defective driver axis.	When the error no longer occurs when the motor power cable is disconnected, check the wiring of motor power cable or replace the motor.	2.1.1 2.3.1 2.3.4 2.3.7		
				Replace the driver for each axis.	3.1.9		
		When the error no longer occurs when “R”, “S” and “T” terminals of terminal block TB2 for the spindle driver are disconnected.	Insulation of the driver for spindle is defective.	Replace the driver for spindle.	3.1.9		
		When the error no longer occurs when “U”, “V” and “W” terminals of ARM inverter are disconnected.	Insulation of the ATC motor power system circuit is defective.	Check the external ATC motor connection. Replace the ATC motor.	2.2..6		
		When the error no longer occurs when “R”, “S” and “T” terminals of ARM inverter are disconnected.	Insulation of the ARM inverter is defective.	Check the terminals of ARM inverter. Replace the ARM inverter.	3.1.10		
4	When the earth leakage breaker trips during operation.	When the error occurs when the axis starts moving or cutting conditions are too strict.	Breaker capacity is exceeded.	When any peripheral equipment is connected, check its capacity.			

1.2 Problem with axis travel

1.2.1 X,Y,Z,4,5,6 -axes servo error (1/5)

When the error occurs

0059.## X axis servo error (**)

is displayed on the alarm message screen, possible to choose alarms with ## and (**).

Alarm No. <Conv.>			Alarm No. <NC>		
0059	X-axis		5059	X-axis	
0060	Y-axis		5060	Y-axis	
0061	Z-axis		5061	Z-axis	
0062	4-axis	It will be changed by the axis name.	5062	4-axis	It will be changed by the axis name.
0063	5 axis		5063	5 axis	
0064	6 axis		5064	6 axis	

1.2.1 X,Y,Z,4,5,6-axes servo error (2/5)

## No	Problem		Cause	Measure	Replace-ment	Adjust-ment	Refer-ence
1	OC Over current	When the servo is turned off.	The digital I/F board is defective.	Replace the driver.	3.1.9		
		When the servo is turned on.	The motor insulation has deteriorated.	Replace the motor.	2.3.1 2.4.1 2.4.4 2.4.7 2.6.3		
			Motor's power cable wiring is incorrect or a short circuit has occurred.	Check the wiring.			
			The driver's power TR or current feedback circuit is defective.	Replace the driver.	3.1.9		
		When the motor is started or stopped.	The servo parameter is set incorrectly.	Check the parameter. (servo)			
3	EOH External regenerative resistor over heat	This error is peculiar to the spindle.					
4	OV Over voltage	Occurs when only control power is turned on.	The digital I/F board is defective.	Replace the driver.	3.1.9		
		The error occurs for multipe axes after the servomotor is turned on or during the operation.	Input power voltage is too high or wave form is deformed.	Check the power voltage and wave form.			
			The converter circuit or regenerative circuit inside the spindle driver is defective.	Check the connection and resistance value.			
			External regenerative resistance is incorrect.	Replace the driver for spindle .	3.1.9		
		The error occurs for only one axis after the servomotor is turned on or during the operation.	The alarm detection circuit inside the driver is defective.	Replace the driver.	3.1.9		
6	CPE Control power error	Occurs when only control power is turned on.	The input power has decreased or momentary interruption has occurred.	When this error frequentry occurs, check the power system.			
			Defective wiring to driver terminals CPand CN.	Check the wiring.			
			The driver is defective.	Replace the driver.	3.1.9		
		Occurs for multiple axes when only control power is turned on.	The converter circuit for the spindle driver is defective.	Replace the driver for spindle.	3.1.9		
			Defective wiring to driver terminals CPand CN.	Check the wiring.			
		The error occurs when an axis (paticularly thespindle) starts.	The input power has decreased.	Check the power source.			
7	DE 1 Detector error 1 of encorder line.		Wires between the encoder and driver are disconnected or connected incorrectly.	Check the encoder cable.			
				Check the encoder connection inside the motor terminal box.			
				Check the wiring of CN2 driver.			
		[0] is not set for [DIS-PLACEMENT PULSE] on the <I/O> screen or a pluse error simultaneously occurs.	The pulse circuit inside the encoder is defective.	Replace the motor.	2.3.1 2.3.4 2.3.7		
		The motor is extremely hot. (The error no longer occurs when the motor has cooled down.)	The temperature inside the encoder has risen excessively.	Eliminate the cause of excessive temperature rise of the motor.			
8	DE2 Detector error 2 of This error is peculiar to the M axis.	Serial communication is not possible between the absolute encoder and the driver.	Serial signal cord connected to pin #13 or 14 of CN2 is damaged.	Check the encoder cable.			
			The encoder serial communica-tion circuit is defective.	Replace the motor for M-axis .	2.3.1		
			The driver is defective.	Replace the driver for M-axis .	3.1.9		

*The indexer manufacturer shall provide measures for defective parts identified in the 5 axis and 6 axis.

1.2.1 X,Y,Z,4,5,6 -axes servo error (3/5)

## No	Problem		Cause	Measure	Replace-ment	Adjust-ment	Refer-ence
9	OL Over load	Occurs when only control power is turned on.	The servo parameter is set incorrectly.	Check the parameter (servo). Type of the morter.			
		Occurs during operation.	Too many program patterns are used. Cutting load is excessive.	Review the program patterns and cutting conditions.			
			Motor brake and mechanical clamp are not released.	Check the brake and clamp.			
			The dynamic brake is kept applied.	Replace the driver.	3.1.9		
			Mechanically overloaded. Bearings are burnt-out. Ball screews are abraded. Foreign matters are stuck to the ball screws.	Check the mechanical part.			
			Motor's power cable wiring is incorrect (incorrect wiring, defective connection and disconnection).	Check the wiring.			
			The servo parameter is set incorrrectly.	Check the parameter. (servo) Type of the morter.			
			When temperature is low. This error is peculiar to the C axis or additional axis.	Warm up the machine.			
10	OS Over speed The maxi-mum speed of 120% is exceeded.	When the motor is start, the overshoot is excessive.	Mechanically overloaded.	Check the mechanical part.			
			Excessive load is applied to the table.	Review the load.			
			The input power is decreaced.	Check the power source.			
			Too much acceleration.	Reduce the time constant.			
			The servo parameter is set incorrrectly.	Check the parameter (servo). Type of the morter, KVP and TVI etc.			
11	MPE Main power error.	Occurs when only control power is turned on.	The degital I/F board is defective.	Replace the driver.	3.1.9		
			Defective wiring to driver terminals MPand MN.	Check the wiring.			
		Occurs during operation.	The input power has decreased or mormentaly interruption has occurred.	Check the power source.			
12	FP Failure of phase.	The errror is peculiar to the spindle.					
13	RGE Regenerative registor over load.	The errror is peculiar to the spindle.					
14	DSPE DSP error		The degital I/F board is defective. Driver's 5 V power has decreased.	Replace the driver.	3.1.9		
15	ROME ROM error		The degital I/F board is defective. Driver's 5 V power has decreased.	Replace the driver.	3.1.9		
16	PARE Parameter error		The servo parameter is set incorrectly.	Check the parameter (servo). Type of the morter etc.			
			The type of driver is incorrect.	Install the correct amplifier.	3.1.9		
			The driver's select switch is set incorrectly.	Set the switch correctly.			

*The indexer manufacturer shall provide measures for defective parts identified in the 5 axis and 6 axis.

1.2.1 X,Y,Z,4,5,6 -axes servo error (4/5)

## No	Problem		Cause	Measure	Replace-ment	Refer-ence	Adjust-ment
18	CSE Commutation sensor error	Occures when only control power is turned on.	The servo parameter is set incorrectly.	Check the parameter (servo). Type of the encoder.			
			When between the encoder and driver are disconnected or connected incorrectly.	Check the encoder cable.			
				Check the connector connection inside the motor terminal box.			
				Check the wiring.			
19	MOC When turn off the servo power, feed back power current *for only PZ, PE driver.		The driver is defective.	Replace the driver.	3.1.9		
20	DTO Data time out		The command was not transmissible from the NC unit for 4ms.	Replace the driver.	3.1.9		
				Replace the SLAVE board.	3.1.4		
				Replace the amplifier cable.			
21	STO Slave time out		The response data was not transmissible from the driver for 4ms.	Check the driver's select switch.			3.1.9
				Check the connection CP,CN driver.			
				Replace the amplifier cable.			
				Replace the driver.	3.1.9		
22	SYS1 System error 1		The servo error was input but no corresponding status exists.	Replace the amplifier cable.			
				Replace the driver.	3.1.9		
				Replace the SLAVE board.	3.1.4		
				Check the external noise.			
23	SYS2 System error 2		The servo error status was turned on but no corresponding status exists.	Replace the driver.	3.1.9		
24	INI Initial error		Communication between the NC and amplifier was not successful.	Check the driver's select switch.			3.1.9
				Replace the amplifier cable.			
				Check the connection CP,CN driver.			
				Replace the driver.	3.1.9		

*The indexer manufacturer shall provide measures for defective parts identified in the 5 axis and 6 axis.

1.2.1 X,Y,Z,4,5,6 -axes servo error (5/5)

## No	Problem		Cause	Measure	Replacement	Reference	Adjustment
25	SS Slave send		Communication state was on when transferring the data to the amplifer was attempted.	Replace the amplifier cable.			
				Replace the driver.	3.1.9		
				Replace the SLAVE board.	3.1.4		
26	SR Slave receive		Receving state was on when transferring the data to the amplifer was attempted.	Replace the amplifier cable.			
				Replace the driver.	3.1.9		
				Replace the SLAVE board.	3.1.4		
27	CRCE CRC error		The contents of communication data were affected by noise.	Check the driver's select switch.			3.1.9
				Replace the amplifier cable.			
				Replace the driver.	3.1.9		
				Replace the SLAVE board.	3.1.4		
28	FRME Framing error		Communication framing error.	Check the driver's select switch.			3.1.9
				Replace the amplifier cable.			
				Replace the driver.	3.1.9		
				Replace the SLAVE board.	3.1.4		
29	VERE Verify error		Parameters that are not supported by the driver were sent.	Check the parameter (Servo).			
				The type of driver is incorrect.			3.1.9
30	ATO Amplifier time out error		Communication time elapsed.	Check the driver's select switch.			3.1.9
				Replace the amplifier cable.			
				Replace the driver.	3.1.9		
				Replace the SLAVE board.	3.1.4		
31	RSTM RST monitor error	This error is peculiar to the spindle.					
32	SCE Synchronous frame CRC error		Communication is defective.	Check the driver's select switch.			3.1.9
				Replace the amplifier cable.			
				Replace the driver.	3.1.9		
				Replace the SLAVE board.	3.1.4		
33	RECD Disable encoder signal reading error		Permission signal for encoder signal reading is not sent even after the specified time has elapsed.	Replace the motor.	2.3.1 2.3.4 2.3.7		
				Replace the driver.	3.1.9		
34	VERI The error occurs only in the PV type of driver.	The error occurs when replacing the PV type of driver.	Error may occur immediately after the PV type of driver.	This is normal. Turn on the power again.			
		The error occurs when the servo parameter is changed.	The servo parameter was changed. Type of moter and encorder.	This is normal. Turn on the power again.			
35	SRE	This error is peculiar to the spindle.					

*The indexer manufacturer shall provide measures for defective parts identified in the 5 axis and 6 axis.

1.2.2 X,Y,Z,4,5,6-axes deviation error

Alarm No.

<Conv.>

0512 X-axis deviation error 1
0513 Y-axis
0514 Z-axis
0515 4-axis
0516 5 axis
0517 6 axis

The axis name on the screen varies in accordance with axis selection.

<NC>

5512 X-axis deviation error 1
5513 Y-axis
5514 Z-axis
5515 4-axis
5516 5 axis
5517 6 axis

The axis name on the screen varies in accordance with axis selection.

No	Problem	Cause	Measure	Replacement	Reference	Adjustment
1	This error occurs soon after the servo motor is turned on or when the axis is not activated even if jog key operation is performed.	Position deviation limit value of the parameter is not properly set.	Modify the data properlty.			
		Even when the motor is rotated by hand, the deviation data displayed on the screen does not change. (The encoder feedback system is defective.)	Check the connecting part of the amplifier cable and the encoder cable.			
			The amplifier cable and the encoder cable is defective.			
			Reconect the connector on the slave PCB side to the other axis to check.	3.1.4		
			Replace the motor.	2.3.1 2.3.4 2.3.7		
		The motor drive is defective.	Check the cable and the connector.			
			Replace the motor.	2.3.1 2.3.4 2.3.7		
			Replace the driver.	3.1.9		
		Mechanical parts are locked.	Attempt to move the mechanical unit by hand.			
			Check that the brake and/or clamp are released.			
2	The error occurs during high-speed traveling or cutting.	Position deviation limit value of the parameter is not properly set.	Modify the data properly.			
		Load of the cutting condition is too large.	Modify the cutting condition.			
		Excessive load is applied to the table.	Review the load.			
		Mechanically overloaded. Foreign matters are stuck to the ball screws. Bearings are burnt-out.	Reduce the time constant.			
			Check that the current command monitor value is not larger than the normal level on the <IO>screen.			
			Attempt to move the mechanical unit by hand.			
		Malfunction of the break. The blake cannot be released unless the blake axis servomotor is turned on. The servomotor is turned on when the 6 th bit form the left for [STATUS] of [AMPLIFIER RESPONSE] on the <I/O>screen is set to [1].	Check that 24 VDC is applied to the brake terminal block inside the motor terminal box.			
			Check that 24 VDC is applied to both ends of the CNYB terminal on the IO board.			
			Replace the motor.	2.3.1 2.3.4 2.3.7		
		Power voltage decreases by 10% or more.	Check the capacity of the user power source and the cables.			

1.2.3 Pulse error

Alarm No.

<Conv.>	<NC>
0094 **PULSE ERROR (SPINDLE)	5094 **PULSE ERROR (SPINDLE)
0095 **PULSE ERROR (X-AXIS)	5095 **PULSE ERROR (X-AXIS)
0096 **PULSE ERROR (Y-AXIS)	5096 **PULSE ERROR (Y-AXIS)
0097 **PULSE ERROR (Z-AXIS)	5097 **PULSE ERROR (Z-AXIS)
0098 **PULSE ERROR (*-AXIS)	5098 **PULSE ERROR (*-AXIS)
0099 **PULSE ERROR (*-AXIS)	5099 **PULSE ERROR (*-AXIS)
0100 **PULSE ERROR (*-AXIS)	5100 **PULSE ERROR (*-AXIS)

## No	Problem	Cause	Measure	Replace-ment	Adjust-ment	Refer-ence
1	Pulse error occurs.	Parameter of motor pulse check allowance of machine parameter is set.	Check the feed back pulse from I/O screens.			
			Set new data.			
		Disconnection of the connector of amplifier.	Check contact of the connector.			
		Amplifier cord, encoder cord is defective.	Replace the cord.			
		The motor is defective.	Replace the motor.	2.1.1 2.3.1 2.3.4 2.3.7		
		The driver is defective.	Replace the driver.	3.1.9		
		The slave PCB is defective.	Replace the slave PCB.	3.1.4		

1.2.4 Other problems with X, Y, Z, 4, 5, 6 axes

No	Problem	Cause	Measure	Replace-ment	Adjust-ment	Refer-ence
1	When the origin point return, "OVERRUN" is displayed on the alarm message screen. <Conversational><NC> +X 0505 5505 -X 0506 5506 +Y 0507 5507 -Y 0508 5508 +Z 0509 5509 -Z 0510 5510 +5 0579 5579 -5 0580 5580 +6 0581 5581 -6 0582 5582	Grid shift of parameter is set incorrectly.	Set it correctly.			
		The [RELSE] and [Z.RTN] keys are not pressed after NC PCB replacement or NC critical error.	Move the axis to the stroke center and press the [RELSE] and [Z.RTN] keys.			
		The time constant is too large.	Check the time constant.			
		Origiin LS signal input is incorrect.	Check the LS.			
			Check the LS cord.			
			Replace the IO board.	3.1.5		
2	When power on , "OVERRUN" is displayed on the alarm message screen.	Connection of CNX, CNY and CNZ of IO board is incorrect.	Check the conector.			
3	"OVERRUN" (No axis name) <Conversational><NC> 0578 5578	When the error occurs when the axis is reaching the stroke end, the overrun limit switch turns on instantly.	Check that the overrun limit switch is not contacting the dog.			
		When the error occurs during machine movement, the overrun limit switch is defective.	Check the overrun limit switch terminal and the connector connection on the IO board side.			
			Replace the LS.	2.4.2 2.4.4 2.4.6		
		The IO board is defective.	Replace the IO board.	3.1.5		
4	When the origin point return, "ORIGIN POINT ERROR X (X,Y)" is displayed on the alarm message screen. <Conversational><NC> X axis 1163 6163 Y axis 1164 6164 Z axis 1165 6165 C axis 1167 6167 5 axis 1168 6168 6 axis 1169 6169 The axis could not deceleraate and stop while the origin limit switch was on.	The origin point LS is defective.	Check the origin point LS and the dog.			
			Replace the origin point LS.	2.4.1 2.4.3 2.4.5		
		Origin LS signal input is incorrect.	Check the LS cord.			
			Replace the IO board.	3.1.5		
		Origin return speedis too fast. The time constant is too large.	Check that the overrun limit switch is not contacting the dog.			
5	Traverse speed at the time of the origin point return is low.	The door has been open.	Close the door.			
		The LS is kept ON.	Check with the input/output screen.			
			Malfunction of the origin point LS due to chips or the like.			
			Check the LS cord.			
6	Axes don't move by the following keys but no alarm message is displayed.	Stop signal is input.	Check with the input/output screen.			
		No signal is input by the axis travel keys.	Check with the input/output screen. Replace the Key PCB when the signal is not input.			
		The rapid feed override switch is set to [1].	Check the switch. Check with the input/output screen.			
		The soft switch is set to [Motor not provided].	Check the soft switch.			

1.2.5 X, Y, and Z feed axis error

State when error occurred:
Feed axis stopped during operation.
Abnormal noise generated during operation.
Machining accuracy poor.

Error contents:
X, Y, and Z axes deviation errors 1 and 2
X, Y, and Z axes servo error

No	Problem	Cause	Measure	Replace-ment	Adjust-ment	Refer-ence
1	Feed axis does not move.	Feed axis does not move.	Replace motor.		2.3.1 2.3.4 2.3.7	
		Coupling is loose.	Tighten coupling.		4.3.1 4.3.2 4.3.3	
		Ball screw surface is “burnt” (lubrication is inadequate).	Replace ball screw.	2.3.3 2.3.6 2.3.9		
2	Abnormal noise or vibration is generated during operation.	Ball screw is defective.	Replace ball screw.	2.3.3 2.3.6 2.3.9		
		Foreign matter has entered (e.g. chips).	Remove foreign matter.			
		Snap ring has dropped, causing bearing to come off.	Attach bearing. Replace snap ring.	2.3.3 2.3.6 2.3.9		
		Coupling concentricity is incorrect	Replace coupling.	2.3.2 2.3.5 2.3.8		
		Motor is defective.	Replace motor.	2.3.1 2.3.4 2.3.7		
		Amplifier is defective.	Replace amplifier.			
3	Machining accuracy is inadequate.	Ball screw is abraded.	Replace ball screw.	2.3.3 2.3.6 2.3.9		
		LM guide is abraded.	Replace LM guide.			
4	Z-axis has dropped.	Brake is defective.	Replace Z-axis motor.	2.3.7		
5	Overtravel limit switch turns on although axis is within stroke.	Limit switch is not adjusted correctly.	Adjust limit switch.		4.3.5 4.3.6	
		Limit switch is defective.	Replace limit switch.	2.4.2 2.4.4 2.4.6		
6	Origin return operation is inconsistent.	Origin offset pulse is incorrect.	Change parameter.		4.3.1 4.3.3	

1.3 Spindle errer

1.3.1 Spindle servo errer (1/4)

When an alarm occurs, “0058.## Spindle Servo Error (**)” is displayed on the <Alarm> screen. You can determine the alarm type by “##” and (**).

Alarm No. <Conv.>	<NC>
0058	5058

## No	Problem		Cause	Measure	Replace-ment	Adjust-ment	Refer-ence
1	OC Over Current	When the servo is turned off.	The degital I/F board is defective.	Replace the driver.	3.1.9		
		When the servo is turned on.	The motor insulation has deteriorated.	Replace the motor.	2.1.1		
			The motor's power cable wiring is incorrect, or a short circuit has occured.	Check the wiring.			
			The driver's power TR or circuit feedback circuit is defective.	Replace the driver.	3.1.9		
		When the motor is started or stopped.	The servo parameter is set incorrectly.	Check parameter (servo).			
3	EOH External regenerative resistor over heat	Occurs when only control power is turned on.	The part between driver terminals H1 and H2 is open.	Check the wiring to the regenerative resistor.			
				Replace the regenerative resistor.			
		The regenerative resistor produces heat when only the servo is turned on.	The driver's regenerative transistor is defective.	Replace the driver.	3.1.9		
		Occurs during operation.	Too many program patterns are used.	Review the program patterns.			
			External fan wind volume has reduced.	Check the wind volume.			
			Power voltage is too high.	Check the voltage.			
4	OV Over voltage	Occurs when only control power is turned on.	The degital I/F board is defective.	Replace the driver.	3.1.9		
		The error ocurrs after the servomotor is turned during operation.	The input power voltage is too high or wave form is deformed.	Check the power voltage and wave form.			
			External regenerative resistance is incorrect.	Check the connection and resistance value.			
			The converter circuit or regenerative circuit inside the spindle driver is defective.	Replace the driver.	3.1.9		
			The alarm detection circuit inside the driver is defective.	Replace the driver.	3.1.9		
6	CPE Control power error	Occurs when only control power is turned on.	The input power has decreased or momentary interruption has occurred. (Tends to occur when the spindle is started.)	When this error frequently occurs, check the power system.			
			Defective wiring to the driver terminals "r" and "t".	Check the wiring.			
			The driver is defective.	Replace the driver.	3.1.9		
		Occurs for multiple axes when only control power is turned on.	The driver is defective.	Replace the driver.	3.1.9		
			Defective wiring to the driver terminals "CP" and "CN".	Check the wiring.			
		This error occurs when an axis (particularly the spindle) starts.	The input power has decteased.	Check the power source.			

1.3.1 Spindle servo errer (2/4)

## No	Problem		Cause	Measure	Replace-ment	Adjust-ment	Refer-ence
7	DE1 Detector error 1 of encorder line		Wires between the encooder and driver are disconnected or connected incorrectly.	Check the encoder cable.			
				Check the connector connection inside the motor terminal box.			
				Check the wiring.			
		[0] is not set for [DIS-PLACEMENT PULSE] on the <I/O> screen or a pluse error simultaneously occurs.	The pluse circuit inside the encoder is defective.	Replace the motor.	2.1.1		
		The motor is extremely hot. (The error no longer occurs when the motor has cooled down.)	The temperature inside the encoder has risen excessively.	Eliminate the cause of excessive temperature rise of the motor.			
8	DE2 Detector error 2	The error does not occur in the spindle.					
9	OL Over load	Occurs when only control power is turned on.	The servo parameter is set incorrectly.	Check the parameter.(Type of the motor.)			
		Occurs during operation.	Too many program patterns are used. Cutting load is excessive.	Review the program patterns and cutting conditions.			
			The dynamic brake is kept applied.	Replace the driver.	3.1.9		
			Mechanically overloaded. Bearings are burnt-out clamp system.	Check the mechanical part.			
			Motor's power cable wiring is incorrect (incorrect wiring, defective connection, and disconnection).	Check the wiring.			
			The servo parameter is set incorrectly.	Check the parameter.(Type of the motor.)			
10	OS Over speed The maximum speed of 120% is exceeded.	Occurs when the motor is started. (The over shoot is excessive.)	Mechanically overloaded.	Check the mechanical part.			
			Excessive load is applied to the table.	Review the load.			
			The input poweer has decreased.	Check the power source.			
			Acceleration is too great.	Reduce the time constant.			
			The servo parameter is set incorrectly.	Check the parameter.(Type of the motor,KVP and TVI.)			
		Occurs during operation.	The motor is demagnetized.	Replace the motor.	2.1.1		
11	MPE Main power error	Occurs when only control power is turned on.	The degital I/F board is defective.	Replace the driver.	3.1.9		
		Occurs after the servo is turned on.	Defective wiring to the driver terminals "MP" and "MN".	Check the wiring.			
		Occurs during operation.	The input power has decreased or momentary interruption has occurred. (Tends to occur when the spindle is started.)	Check the power source.			
12	FP Failure of phase	Occurs after the servo is turned on.	Power source lacks one phase.	Check the power line.			
		Occurs during operation.	The input power has decreased or momentary interruption has occurred. (Tends to occur when the spindle is started.)	Check the power source.			
13	RGE Regenerative register over load	Occurs after the servo is turned on.	The driver's regenerative transistor is defective.	Replace the driver.	3.1.9		
		Occurs during operation.	Too many program patterns are used. Cutting load is excessive.	Review the program patterns and cutting conditions.			
			Power voltage is too high.	Check the voltage.			
			The servo parameter is set incorrectly.	Check the parameter.(Type of the motor,KVP and TVI.)			

1.3.1 Spindle servo errer (3/4)

## No	Problem		Cause	Measure	Replace-ment	Adjust-ment	Refer-ence
14	DSPE DSP error		The degital I/F board is defective. Driver's 5V DC power has decreased.	Replace the driver.	3.1.9		
15	ROME ROM error		The degital I/F board is defective. Driver's 5V DC power has decreased.	Replace the driver.	3.1.9		
16	PARE Parameter error		The servo parameter is set incorrectly.	Check the parameter. (Type of the motor.)			
			Type of driver is incorrect.	Install the correct amplifer.			3.1.9
			The driver's select switch is set incorrectly.	Set the switch correctly.			3.1.9
17	Battery voltage drop	This error does not occur in the spindle.					
18	CSE Communication sensor error	Occurs when only control power is turned on.	The servo parameter is set incorrectly.	Check the parameter(servo). (Type of the encoder, etc.)			
			Wires between the encoder and driver are disconnected or connected incorrectly.	Check the encoder cable.			
				Check the connector connection inside the motor terminal box.			
				Check the wiring.			
19	MOC Current feedback error when the servo motor is off. (This error only occurs in the PZ type and PE type drivers.)		The driver is defective.	Replace the driver.	3.1.9		
20	DTO Data time out		The comand was not transmissible from the NC unit for 4 ms.	Replace the driver.	3.1.9		
				Replace the SLAVE board.	3.1.4		
				Replace the amplifier cable.			
21	STO Slave time out		The response data was not transmissible from the driver for 4 ms.	Check the driver's select switch.			3.1.9
				Replace the driver.	3.1.9		
				Replace the amplifier cable.			
22	SYS 1 System error 1		The servo error was input but no corresponding status exists.	Replace the amplifier cable.			
				Replace the driver.	3.1.9		
				Replace the SLAVE board.	3.1.4		
23	SYS 2 System error 2		The servo error status was turned on but no corresponding status exists.	Replace the driver.	3.1.9		
24	INI Initial error		Communication between the NC and driver was not successful.	Check the driver's select switch.			3.1.9
				Check the amplifier cable.			
				Check the wiring.			
				Replace the driver.	3.1.9		
25	SS Slave send		Communication state was on when transferring the data to the driver was attempted.	Check the amplifier cable.			
				Replace the driver.	3.1.9		
				Replace the SLAVE board.	3.1.4		
26	SR Slave receive		Receiving state was on when transferring data to the driver was attempted.	Check the amplifier cable.			
				Replace the driver.	3.1.9		
				Replace the SLAVE board.	3.1.4		
27	CRCE CRC error		The contents of communication data were affected by noise.	Check the driver's select switch.			3.1.9
				Check the amplifier cable.			
				Replace the driver.	3.1.9		
				Replace the SLAVE board.	3.1.4		

1.3.1 Spindle servo errer (4/4)

## No	Problem		Cause	Measure	Replace-ment	Adjust-ment	Refer-ence
28	FRME Framing error		Communication framing error.	Check the driver's select switch.			3.1.9
				Check the amplifier cable.			
				Replace the driver.	3.1.9		
				Replace the SLAVE board.	3.1.4		
29	VERE Verify error		Parameters that are not supported by the driver were sent.	Check the parameter(servo).			
				Type of the driver is incorrect.			3.1.9
30	ATO Amplifier time out error		Communication time elapsed.	Check the driver's select switch.			3.1.9
				Check the amplifier cable.			
				Replace the driver.	3.1.9		
				Replace the SLAVE board.	3.1.4		
31	RSTM RST monitor error		The driver's main circuit input has decreased while the servo is on.	Check the operation of servo relay KS1.			
				Check the power source.			
				Check the wiring of main power circuit.			
				For EU specifications, check the door limit switch input circuit.			
				Replace the IO board.	3.1.5		
				Replace the driver.	3.1.9		
32	SCE Synchronous frame CRC error.		Communication error.	Check the driver's select switch.			3.1.9
				Check the amplifier cable.			
				Replace the driver.	3.1.9		
				Replace the SLAVE board.	3.1.4		
33	RECD Disable encoder signal reading error.		Permission signal for encoder signal reading is not sent even after the specified time has elapsed.	Replace the motor.	2.1.1		
				Replace the driver.	3.1.9		
34	VERI	This error does not occur in the spindle.					

1.3.2 Spindle motor deviation error

Alarm No.

<Conv.>	<NC>
0511 Spindle motor deviation error 1	5511 Spindle motor deviation error 1

## No	Problem	Cause	Measure	Replace-ment	Adjust-ment	Refer-ence
1	This error occurs soon after the servo motor is turned on or when the spindle is not activated even if [S.CW] key operation is performed.	Position deviation limit value of the parameter is set incorrectly.	Modify the data properly.			
		Even when the motor is rotated by hand, the deviation data displayed on the screen does not change. (The encoder feedback system is defective.)	Check the connection of the amplifier cable and the encoder cable.			
			Amplifier cable and the encoder cable are defective.			
			Replace the SLAVE board.	3.1.4		
			Replace the motor.	2.1.1		
		The motor drive is defective.	Check the cable and the connecter.			
			Replace the driver.	3.1.9		
			Replace the motor.	2.1.1		
		Mechanical parts are locked.	Attemped to move the machanical unit by hand.			
2	The error occurs during high-speed traveling or cutting.	Position deviation limit value of the parameter is set incorrectly.	Modify the data properly.			
		Load of the cutting condition is too large.	Modify the cutting condition.			
		Tool inertia is too large.	Review the tool weight and outer diameter.			
		Mechanicaly over loaded. Bearings are burnt-out. Lubrication error.	Reduce the time constant.			
			Check that the current command monitor value is not larger than the normal level on the <I/O> screen.			
			Attemped to move the machanical unit by hand.			
		Power voltage decreases by 10% or more. (Low power) (This error occurs most often when the axis is starting.)	Check the power source.			
		Output torque of the motor was reduced.	Replace the motor.	2.1.1		
		The driver is defective.	Replace the driver.	3.1.9		

1.3.3 Thermal errer (spindle motor)

Alarm No.

<Conv.>		<NC>	
0048	Thermal errer (spindle motor)	5048	Thermal errer (spindle motor)

## No	Problem	Cause	Measure	Replace-ment	Adjust-ment	Refer-ence
1	During spindle stop, "THERMAL ERROR (SPINDLE MOTOR) " is displayed on the alarm message screen. (This error occurs although the spindle motor is not heated.)	Defect or disconnection of the spindle motor thermal relay.	Check the wiring of the motor thermal relay.			
			Replace the motor.	2.1.1		
		The IO board is defective.	Replace the IO board.	3.1.5		
2	During spindle rotation, "THERMAL ERROR (SPINDLE MOTOR) " is displayed on the alarm message screen. (The spindle motor is heated.)	Load of the cutting condition is too large.	Cool the motor and then ease the cutting conditions and operation pattern.			
		The spindle motor cooling is defective.	Check the spindle motor fan operation.			
			The spindle motor fan is clogged.			
		Mechanicaly over loaded.	Review the tool weight and outer diameter.			
			Attemped to move the machanical unit by hand.			
			Check that the current command monitor value is not larger than the normal level on the <I/O> screen.			
		The spindle motor heat generation increased.	Check the ACL type.			
			The spindle motor is demagnetized.	2.1.1		

1.3.4 Spindle error(1/2)

State when error occurred:
Spindle stops during operation.
Abnormal noise is generated during operation.
Machining accuracy is inadequate.
Tool drops.

Error contents:
Spindle servo error
Spindle deviation error

No.	Problem	Cause	Measure	Replace-ment	Adjust-ment	Refer-ence
1	Abnormal noise or vibration is generated during operation.	Bearing is “burnt”.	Replace bearing.	2.1.3		
		Spindle is not balanced.	Balance spindle.		4.1.4	
		Tool is not balanced.	Use well balanced tool.			
		Coupling is defective.	Replace coupling.	2.1.2		
		Motor is defective.	Replace motor.	2.1.1		
		Amplifier is defective (electromag-netic noise, etc.).	Replace amplifier.			
		Pull stud is loose.	Tighten pull stud.			
		Tool holder is defective.	Replace tool holder.			
		Piping for air purge and air blast is incorrect.	Correct piping.			
2	Spindle is “burnt” (heat is generated).	Bearing lubrication is inadequate.	Replace bearing.	2.1.3		
		Bearing pressure is excessive.	Correct pressure appropriately.	2.1.3		
		Head and bearing engagement is incorrect.	Replace bearing and adjust head and bearing engagement.	2.1.3		
		Foreign matter is entered.	Remove foreign matter.			
		Motor is defective (e.g. Fan stop).	Replace motor.	2.1.1 2.1.4		
3	Tool drops.	Steel ball does not move smoothly due to flaw, wear, etc. on oscilla-tion surface.	Replace draw-bar.	2.1.3		
		Draw-bar is defective.	Replace draw-bar.	2.1.3		
		Spring is damaged.	Replace draw-bar.	2.1.3		
		Slide spacer does not move smoothly.	Replace spindle.	2.1.3		
		Tapered section is defective (flaw, indentation).	Replace spindle.	2.1.3		
		Pull bolt is broken due to tool imbalance	Replace tool holder and use well-balanced tool.			

1.3.4 Spindle error(2/2)

No.	Problem	Cause	Measure	Replace-ment	Adjust-ment	Refer-ence
4.	Deflection accuracy is poor.	Tapered section is defective (flaw, indentation).	Replace spindle.	2.1.3		
		Foreign matter is adhered to tapered section.	Remove foreign matter.			
		Fitting of head and bearing is incorrect (excessive clearance).	Replace bearing and adjust fitting.	2.1.3		
		Backlash occurs in bearing due to wear.	Replace bearing.	2.1.3		
		Coupling concentricity is incorrect.	Replace coupling.	2.1.2		
		Motor attachment is inadequate.	Align motor with spindle center and attach motor.			
		Spindle accuracy is inadequate.	Replace spindle.	2.1.3		
5.	Spindle does not rotate.	Coupling slips because it is damaged.	Replace coupling.	2.1.2		
		Motor is defective.	Replace motor.	2.1.1		
		Encoder is defective.	Replace motor.	2.1.1		

1.4 Problem with ATC

1.4.1 ATC error

No	Problem	Cause	Measure	Replace-ment	Adjust-ment	Refer-ence
1	MAGAZINE NO. ERROR is displayed on the alarm message screen. <Conversation> Alarm No. 1194 <NC> Alarm No. 6154	All the encoder signals are “0”.	1. Replace the address sensor. 2. Repair disconnection of the cable. 3. Replace the ATCIO board.	2.2.4 3.1.3		
	After Z axis comes up into the magazine area, MAGAZINE POSITION ERROR” is displayed on the alarm message screen. <Conversation> Alarm No.1196 <NC> Alarm No. 6196 (ATC origin point LS is not on.)	The grid shift amount of the parameter No.2 in the data bank is not set properly.	Measure the grid shift amount and set it in the parameter No.2 of the data bank.		4.3.3	
		The ATC origin point LS is broken.	Replace the ATC origin point LS.	2.4.7	4.2.4 4.2.5	
		Z axis origin point comes out of the position by 10mm.	Adjust the location of the Z axis origin point LS.	4.3.4		
2	MAGAZINE INDEX ERROR is displayed on the alarm message screen. <CONVERSATION> Alarm No.1195 <NC> Alarm No.6195 (In case that the LED Of the barrel cam proximity switch is not off, axis movement can not be performed even after the alarm is reset.) I/O MAIN 1 INPUT 2 FE.....6.....0 .....X..... 0: normal	The magazine stops out the position.	Turn the magazine to the correct position.			
		Malfunction of the barrel cam proximity switch.	1. Adjust mounting position (clearance) of the switch. 2. Remove chips from the switch. 3. Check the cables of the switch. 4. Replace the relay board. 5. Replace the barrel cam proximity switch.	3.1.5	4.2.2 4.2.3	
		The sense input part of ATCIO board is defective.	Replace the ATCIO board.	3.1.3		
		The break controller of the ATC motor is defective.	Replace the relay board.	3.1.5		
		Fluctuation of power source at the user’s premises is high.	Change the power source.			

1.4.2 ATC abnormal (in magazine rotation) (1/2)

No	Problem	Cause	Measure	Replace-ment	Adjust-ment	Refer-ence
1	After the magazine rotation, "MAGAZINE NO. ERROR" is displayed on the alarm message screen. <Conversation> Alarm No.1194 <NC> Alarm No.6194 (Encoder signal is not input correctly.)	The address sensor is not mounted correctly.	Correctly mount the address sensor. Replace amplifier.		4.2.2	
		The slit board is mounted inside.	Correcly mount the slit board.	2.2.4		
		The address sensor is defective.	Replace the address sensor.	2.2.4		
		The ATC board is defective.	Replace the ATC board.	3.1.5		
		The IO board is defecitve.	Replace the IO board.	3.1.3		
		The encoder cable is defective.	Repair connection or replace the cable.			7.5
2	The magazine doesn't roate at all. "ATC TIME OVER ERROR" is diplayed on the alarm message screen. <Conversation> Alarm No.1199 <NC> Alarm No.6199 (1 pitch is indexed within 5sec.)	The cable to the connector on the ATC board is not properly connected.	Check the connection between following connectors and the cable. 1. ATC board CNA T200 2. ATC board CNAM			7.4.3
		Disconnection at the ATC terminal block.	Check and repair connection between the terminal block and the cables.			2.2.6
		ATC control part of the ATC board is defective.	Replace the realy board.	3.1.5		2.2.6
		The motor runs idle.	1. Repair the loosness of the coupling. 2. Replace the gears.			
		The cam follwer is broken.	Replace the cam follwer.			2.2.5
		The IO board is defective.	Replace the ATCIO board.	3.1.3		
		Circuit protector (CP2) is off.	Replace the fuses or replace the circuit protector.			
		Capacity of the capacitor (CAPI) has reduced or conncetion is faulty.	Replace the capacitor (CAP1) or check the connection.			

1.4.2 Magazine error (2/2)

No	Problem	Cause	Measure	Replace-ment	Adjust-ment	Refer-ence
3	During the magazine roation, "ATC TIME OVER ERROR" is displayed on the alarm messa.ge screen. <CONVERSATION> Alarm No.1199 <NC> Alarm No.6199	Chips stick to the barrel cam.	Remove chips and clean the cam.			2.2.5
		The slit board and the photelectric sensor touch with each other. (All the signals of the address sensor become "0")	Repalce the address sensor.	2.2.4		
		Weight of the mounted tools exceed the specified value.	Instruct the user on the proper setting.			
		Weights of the tools mounted on themagazine are out of the balance.	In order to balance the magazine, 1. Exchange positions of the tools or 2. Mount a balaner.			
		The barrel cam proximity switch doen't turn ON.	1. Adjust the location of the switch. (Clearance between the switch and the slit board) 2. Check the cable of the switch.		4.2.3	
		Decleration signal of the address senosr is kept to "0" or "1".	Check that the address sensor is properly mounted.		4.2.2	
4	The motor runs in the reverse rotation.	The motor cable is not correctly wired.	Repair the wiring.			
		Internal wiring of the motor is not correct.	Replace the motor.	2.2.6		
5	Motor rotating speed is slow.	Capacity of the capacitor (CAP1) has reduced.	Replace the condenser (CAP1).			

1.5 Problem with the NC board

1.5.1 Problem with the NC, MEM board (1/2)

## No	Problem	Cause	Measure	Replacement	Adjustment	Reference
1	ROM Error (MAIN) ROM Error (LOCAL) ROM Error (SLAVE)	The MEM board is defective.	Replace the MEM board.	3.1.3		
		The MEM board is connected incorrectly.	Check the MEM board.			
	ROM Error (****) Other than (MAIN- SLAVE)	The NC board is defective.	Replace the NC board.	3.1.2		
	ROM Error (MAIN- SLAVE)	The NC board is defective.	Replace the NC board.	3.1.2		
		The SLAVE board is defective.	Replace the SLAVE board.	3.1.4		
		The SLAVE board is connected incorrectly.	Check the SLAVE board.			
	The system does not start while [CNCA00] is displayed on the screen.	The NC board is defective.	Replace the NC board.	3.1.2		
	The screen stays dark and the system does not start.	The dip switch setting is incorrect.	Set the dip switches correctly.			
		The key cord is disconnected.				
		The NC board is defective.	Replace the NC board.	3.1.2		
	[MAIN INITIAL IMPSBLE] is displayed on the alarm message screen.	The NC board is defective.	Replace the NC board.	3.1.2		
	[SLV INITIAL IMPSBLE] is displayed on the alarm message screen.	The SLAVE board is defective.	Replace the SLAVE board.	3.1.4		
	WATCH DOG (***)	The NC board is defective.	Replace the NC board.	3.1.2		
		The MEM board is defective.	Replace the MEM board.	3.1.3		
		The SLAVE board is defective.	Replace the SLAVE board.	3.1.4		
	M EXCPT INTRPT, L EXCPT INTRPT,	The NC board is defective.	Replace the NC board.	3.1.2		
		The MEM board is defective.	Replace the MEM board.	3.1.3		
		The SLAVE board is defective.	Replace the SLAVE board.	3.1.4		
2	The screen display is defective. (Characters are converted incorrectly, the screen is flickering, etc.)	The dip switch setting is incorrect.	Set the language correctly.			
		The NC board is defective.	Replace the NC board.	3.1.2		
		The CNKEY cord is connected incorrectly.	Check that the cable connector is inserted until it is locked.			
		The CNKEY cord is broken.	Replace the CNKEY cord.	3.1.2		
		The KEY board is defective.	Replace the KEY board.	3.2.1		
3	NC or Conversation cannot be switched.	The cable of the NC/ Conversation select switch on the operation panel is disconnected.	Insert the cable correctly.			
		The CNIO cord is broken.	Replace the CNIO cord.			
		The IO board is defective.	Replace the IO board.			
		The NC board is defective.	Replace the NC board.	3.1.2		
	The memory writing [PROTECT OFF] or [PROTECT ON] cannot be switched.	The cable of the NC/ Conversation select switch on the operation panel is disconnected.	Insert the cable correctly.			
		The CNKEY cord is broken.	Replace the CNKEY cord.			
		The NC board is defective.	Replace the NC board.	3.1.2		

1.5.1 Probrem with the NC, MEM board (2/2)

## No	Problem	Cause	Measure	Replace-ment	Adjust-ment	Refer-ence
4	RS232C communication is impossible.	The setting for communication parameters is incorrect.	Set the parameter appropriately for the communication device.			Operation manual
		The RS232C connector cable on the operation panel is disconnected or broken.	Check the cable connection or replace the cable.			
		The KEY board is defective.	Replace the KEY board.	3.2.1		
		The CNKEY cord is broken.	Replace the CNKEY cord.			
		The NC board is defective.	Replace the NC board.	3.1.2		
5	[SERVO RELAY1 ERROR] is displayed on the alarm message screen.	The NC board is defective.	Replace the NC board.	3.1.2		
		The CNIO cord is broken.	Replace the CNIO cord.			
		The relay KS1 is defective.	Replace the relay KS1.			
		The IO board is defective.	Replace the IO board.	3.1.5		
	The Z-axis brake cannot be released.	The NC board is defective.	Replace the NC board.	3.1.2		
		The CNIO cord is broken.	Replace the CNIO cord.			
		The IO board is defective.	Replace the IO board.	3.1.5		
		The SLAVE board is defective.	Replace the SLAVE board.	3.1.4		
		The driver for Z axis is defective.	Replace the driver for Z axis.	3.1.9		
		The Z amplifier cord is broken.	Replace the Z amplifier cord.			
		The Z motor is defective.	Replace the Z motor .	2.3.7		
	The lock of the emergency stop switch is released, but the error cannot be cleared using the [RESET] key.	The NC board is defective.	Replace the NC board.	3.1.2		
		The CNIO cord is broken.	Replace the CNIO cord.			
		The IO board is defective.	Replace the IO board.	3.1.5		
	The EXIO board is mounted, but the data input and output is not recognized.	The NC board is defective.	Replace the NC board.	3.1.2		
		The CNIO cord is broken.	Replace the CNIO cord.			
		The CNEXIO cord is broken.	Replace the CNEXIO cord.			
		The IO board is defective.	Replace the IO board.	3.1.5		
	[I/O TIMEOVER *] is displayed on the alarm message screen.	The NC board is defective.	Replace the NC board.	3.1.2		
		The CNIO cord is broken. (*=3,4)	Replace the CNIO cord.			
		The CNEXIO cord is broken. (*=5)	Replace the CNEXIO cord.			
		The IO board is defective. (*=3,4)	Replace the IO board.	3.1.5		
		The EXIO board is defective. (*=5)	Replace the EXIO board.			
		The KEY board is defective. (*=1,2)	Replace the KEY board.	3.2.1		
		The CNKEY cord is broken. (*=1,2)	Replace the CNKEY cord.			
		The NC board is defective. (*=1,2,3,4,5)	Replace the NC board.	3.1.2		
	The pulse of the manual pulser cannot be input.	The NC board is defective.	Replace the NC board.	3.1.2		
		The CNKEY cord is broken.	Replace the CNKEY cord.			
		The operation panel is disconnected.	Insert the cable correctly.			
		The SLAVE board is defective.	Replace the SLAVE board.	3.1.4		
	The error LED of LINK I/O IC of NC PCB blinks.	Communication error due to noise has occurred.	Replace the NC board or CNIO,CNKEY cord.	3.1.2		

1.5.2 Problem with slave board

## No	Problem	Cause	Measure	Replace-ment	Adjust-ment	Refer-ence
1	**WATCH DOG (SLAVE) No.0001(Conv.)No.5001(NC) **ROM ERROR (SLAVE) No.0006(Conv.)No.5006(NC) **RAM ERROR (SLAVE) No.0005(Conv.)No.5005(NC) **RAM ERROR (MAIN-SLV) No.0011(Conv.)No.5011(NC) **TIMER ERROR (SLAVE) No.0012(Conv.)No.5012(NC) **CALC ERROR (SLAVE) No.0015(Conv.)No.5015(NC) **SLV INITIAL IMPOSBLE No.0018(Conv.)No.5018(NC) **COMMAND ERROR No.0052(Conv.)No.5052(NC) **SYSTEM ERROR (SLV) No.1150(Conv.)No.6150(NC) **COMMAND ERROR (SP) No.1172(Conv.)No.6172(NC)	DC5V is defective.	Check and adjust AVR1.		5.1.1	
		Disconnection of the CNSLV1, CNSLV2 of the slave board.	Check contact of the connector.			
		Disconnection of the CNROM1, CNROM2 of the MEM board.	Check contact of the connector.			
		Dip switchs are set incorrectly.	Check the setting.			
		The slave board is defective.	Replace the slave board.	3.1.4		
		The NC board is defective.	Replace the NC board.	3.1.2		
		The MEM board is defective.	Replace the MEM board.	3.1.3		

1.5.3 Ploblem with IO board (1/2)

## No	Problem	Cause	Measure	Replace-ment	Adjust-ment	Refer-ence
1	AC POWEER SUPPLY DROP is displayed on the alarm message screen. Alarm No.0019(Conv.)/5019(NC)	AC power supply voltage dropped by more than 10%.	Check the power supply voltage, change the tap the transformer or the power supply capacity.			
		The fuse (Q3, except EU) or the circuit protector (Q3,EU) blown out by overload or short-circuit of the coolant pump or the chipflow pump.	After making sure of no short-circuited external wiring, replace the fuse or turn the protector ON.	3.1.11		
		The connector CN200 of the IO board disconnected.	Connect the connector CN200.			
		The IO board is difective.	Replace the IO board.	3.1.5		
2	DC POWEER SUPPLY ERROR (24V) is displayed on the alarm message screen. Alarm No.0020(Conv.)/5020(NC) (In case that DC24V between No.1 and No.10 of XTIO terminal drops more than 10%.)	The DC power supply unit AVR2 is defective.	Replace the AVR2.	3.1.7		
		The IO board is difective.	Replace the IO board.	3.1.5		
	DC POWEER SUPPLY ERROR (24V) is displayed on the alarm message screen. Alarm No.0020(Conv.)/5020(NC) (In case that DC24V between No.1 and No.10 of XTIO terminal within 10%.)	Short-circuit between IO24 and IOG. Short-circuit of the relay or the valve.	Eliminate the cause of short circuit. (Disconnect the IO board connector while measuring the resistance between IO24 and IOG to determine the short-circuited location.)			
		Too many loads are connected to XTPW and XTO of the IO board terminal block. (Overload of 24 VDC power supply AVR2)	Reduce the number of loads. Increase the AVR2 capacity.			
		The DC power supply unit AVR2 is defective.	Replace the AVR2.	3.1.7		
		The IO board is difective.	Replace the IO board.	3.1.5		
3	100V POWEER SUPPLY ERROR is displayed on the alarm message screen. Alarm No.0027(Conv.)/5027(NC)	Interrupt of the cirduit protector Q4 (exept EU) or Q5 (EU) on the T2 by overload or short-circuit of AC 100V line.	After making sure of no short-circuited external wiring turn the protector ON.			
		The connector CN100 of IO board disconnected.	Connect the connector CN100 .			
		The IO board is difective.	Replace the IO board.	3.1.5		
4	SYSTEM ERROR (MAIN) is displayed on the alarm message screen at POWER switch ON. Alarm No.0501(Conv.)/5501(NC)	The IO cord connected to CNEXIO on the IO board.	Connect the IO cable to CNIO on the IO board.			
		The IO board is difective.	Replace the IO board.	3.1.5		
5	IO TIMEOVER 3 or 4 is displayed on the alarm message screen. Alarm No. 0035/0037(Conv.) 5035/5037(NC) (Other input/output timeover error does not occur.)	The IO cord between IO board and NC board is difective.	Check the connector CNIO . Replace the IO cord.			
		The IO board is difective.	Replace the IO board.	3.1.5		
6	The emergency stop does not release.	External emergency stop function is used. (External emergency contact is defective.)	When using this function, use a dry contact rated 3A. When not using this function, short between Nos. 23 and 24 of IO board terminal block XTIO.			
		The IO board is difective.	Replace the IO board.	3.1.5		

1.5.3 Ploblem with IO board (2/2)

## No	Problem	Cause	Measure	Replace-ment	Adjust-ment	Refer-ence
7	The emergency stop is not applied even when the [EMERGENCY STOP] switch is pressed.	The [EMERGENCY STOP] switch contact block in the operation box is disconnected.	Attach the contact block to the switch block.			
		The IO board is defective.	Replace the IO board.	3.1.5		
8	The system does not boot even when the [START] or [E. STA] button is pressed.	The [EXSTIN] (external start) or [EXOUSTIN] (external outer start) function is used. N-BUS I/F board is used.	When not using this function, short between 5 and 6 (external start), and 7 and 8 (external outer start) of terminal block XTIO. Check the ladder when using N-BUS.			

1.5.4 Problem with ATC board

## No	Problem	Cause	Measure	Replace-ment	Adjust-ment	Refer-ence
1	ATC BOAD ERR(POWER)	The power voltage exceeds 15% over the rated voltage.	Check the power voltage and the tap for transformer.			
		The ATC board is defective.	Replace the ATC board.	3.1.1		
		The IO board is defective.	Replace the IO board.	3.1.5		

1.6 Ploblem with operation box

1.6.1 Ploblem with operation panel

## No	Problem	Cause	Measure	Replace-ment	Adjust-ment	Refer-ence
1	The [IO timeover 1] or [IO timeover 2] error is displayed on the screen. Alarm No. 0031/0033(Conv.) 5031/5033(NC)	The Key board is defective.	Replace the Key board.	3.2.1		
		The CNKEY cord connecting the Key board and NC board is defective.	Check the CNKEY cord connection or replace the CNKEY cord.			
2	No response is made even when the key is pressed.	[MODE PROTECT ON] is selected.	Switch to [MODE PROTECT OFF].			
		"Mode changeover prohibited (MDLOCK)" or "Key operation prohibited (KYLOCK)" of the external input signal is input.	Check that such a signal is actually input.			
		The Key board is defective.	Replace the Key board.	3.2.1		
		The NC board is defective.	Replace the NC board.	3.1.2		
3	The LED does not light. (The alarm is not displayed on the screen.)	The Key board is defective.	Replace the Key board.	3.2.1		
		The NC board is defective.	Replace the NC board.	3.1.2		
4	"S OVRRD NO CONNECTED" is displayed on the screen. Alarm No.1300(Conv.)/6300(NC)	CNSPOV connector on the Key board is not connected.	Check the connection of the CNSPOV connector.			
5	FACIT power does not turn on.	The Key board fuse has blown.	Replace the fuse.	3.2.5		
		CNRS cable of the Key board is connected incorrectly.	Check the CNRS cable connection or replace the cable.			

1.6.2 Problem with screen

## No	Problem	Cause	Measure	Replace-ment	Adjust-ment	Refer-ence
1	The screen is completely dark. (Even the LCD fluorescent lamp is unlit.)	CNKEY cord connecting the NC board and the Keyboard is defective.	Check the CNKEY cord connection and replace the cord if necessary.			
		The AVR3 is defective.	Replace the AVR3.	3.2.2		
		CN5V cord connecting the Key board and the AVR3 is defective.	Check the CN5V connection and replace the cord if necessary.			
		The Key board is defective.	Replace the Key board.	3.2.1		
		The NC board is defective.	Replace the NC board.	3.1.2		
2	The screen is dark, but characters are displayed. (The LCD fluorescent lamp is unlit.)	The LCD inverter is defective.	Replace LCD inverter.	3.2.4		
		The fluorescent lamp inside the LCD is faulty (including the cable connecting the LCD and the inverter).	Replace the LCD fluorescent lamp.			
		CNBKLT cord connecting the Key board and the LCD inverter is defective.	Check the CNBKLT cord connection and replace the cord if necessary.			
		The NC board is defective.	Replace the NC board.	3.1.2		
3	The screen is bright, but characters are not displayed. (The LCD fluorescent lamp is lit.)	The Key board is defective.	Replace the Key board.	3.2.1		
		The NC board is defective.	Replace the NC board..	3.1.2		
		CNKEY cord connecting the Key board and the NC board is defective.	Check the CNKEY cord connection and replace the cord if necessary.			
		The LCD is defective.	Replace the LCD.	3.2.3		
		Contrast is not adjusted correctly (particularly when temperature is low).	Adjust the contrast according to the instruction manual.			
4	The screen becomes orange. Some white and black lines appear on the screen.	CNKEY cord connecting the NC board and the Key board is defective.	Check the CNKEY cord connection and replace the cord if necessary.			
5	Some white lines appear on the completely dark screen.	CNKEY cord connecting the NC board and the Key board is defective.	Check the CNKEY cord connection and replace the cord if necessary.			
6	Screen becomes completely white.	Contrast is not adjusted correctly (particularly when temperature is high).	Adjust the contrast according to the instruction manual.			
		The Key board is defective.	Replace the Key board.	3.2.1		
7	The cursor appears, but characters are not displayed.	ROM Character Generator on the NC board is defective.	Replace the NC board or the ROM Character Generator.	3.1.2		

1.7 Ploblem with peripheral equipment

1.7.1 Ploblem with coolant unit (1/2)

## No	Problem	Cause	Measure	Replace-ment	Adjust-ment	Refer-ence
1	THERMAL (COOLANT) is displayed on the alarm message screen. Alarm No. 0049(Conv.)/5049(NC)	Overload of the coolant pump.	Lower viscosity of coolant.			
		Improper setting of the thermal value.	Setting of the thermal value refer to installation manual.			
		Power voltage is high.	Set the power voltage to the rated value or set the thermal value appropriate for the voltage.			
		Phase fault of the pump motor.	1. In case that the fuse Q3 is brown out, replace it. 2. In case that the wiring to the motor is not performed sufficiently, repair it.	3.1.11		
2	The coolant motor doesn't rotate.	The [CLT.P] key on the key board is turned OFF. (The LED has put out lights)	Turn the [CLT.P] key ON. (The LED lights up.)			
		The EMERGENCY SW is pushed.	Release the EMERGENCY SW.			
		Disconnection of the connector CNKP1 or CNCLM of the coolant protection unit.	Check the CNKP1 connection and coolant protection unit connection (IO board connector CNBIO).			
		The fuse (Q3, except EU) or the circuit protector (Q3, EU)) blown out by overload or short-circuit of the coolant pump or the chipflow pump.	After making sure of no short-circuited external wiring, replace the fuse or turn the protector ON.	3.1.11		
		The relay KP1 in the coolant protection unit doesn't work.	Replace the coolant protection unit.			
		Improper setting of the dip SW1.	No.1 bit is OFF.			
		The IO board defective.	Replace the IO board.	3.1.5		

1.7.1 Ploblem with coolant unit (2/2)

## No	Problem	Cause	Measure	Replace-ment	Adjust-ment	Refer-ence
3	The solenoid valve of the coolant unit doesn't work.	Command M08 is not given.	Execute M08 by the key input operation or by the program.			
		The NC determines that the door is open. QT type (31A) 1.Both outer and inner doors are open. 2.The QT is at the non-indexing position with the outer door open. 3.The QT is not at the origin with the outer door open. Non QT type (22A) 1.The front and/or side door is open.	QT type (31A) 1.Close the outer door. 2.When the outer door is open, close the inner door to move the QT to the indexing position. Non QT type (22A) 1.Close both the front and side doors.			
		Disconnection of the connector CNYVC on the IO board.	Check the connector connection (Is the CNYVA connector connected mistakenly?). Also check the solenoid valve connection.			
		The IO board defective.(Although the above matter is correct, 24 VDC is not output to both ends of CNYVC.)	Replace the IO board.	3.1.5		
		The solenoid valve is defective.(Although the 24 VDC is output to CNYVC, the solenoid valve is not operated.)	Check connection to the solenoid valve. Replace the solenoid valve.			
4	The air assist valve does not work. (The solenoid valve works.)	Air piping is defective.	Check air piping.			
		The air assist valve is defective.	Replace the air assist valve.			
5	Flow of the coolant is not sufficient.	The mechanical valve of the coolant unit is closed.	Open the mechanical valve.			
		The coolant motor rotates in the reverse direction.	Exchange two of the three phases on the motor side.			
		The coolant nozzle is stopped up with chip.	Remove chips and clean the nozzle.			

1.7.2 Problem with chip shower unit

## No	Problem	Cause	Measure	Replace-ment	Adjust-ment	Refer-ence
1	THERMAL (CHIP SHOWER) is displayed on the alarm message screen. Alarm No.0046(Conv.)/5046 (NC)	Overload of the chip flow pump.	Lower viscosity of coolant.			
		Improper setting of the thermal value.	Setting of the thermal value refer to installation manual .			
		Power voltage is high.	Set the power voltage to the rated value or set the thermal value appropriate for the voltage.			
		Phase fault of the pump motor.	1. In case that the fuse Q3 is brown out, replace it. 2. In case that the wiring to the motor is not performed sufficiently, repair it.	3.1.11		
2	The coolant motor doesn't rotate.	The [CHIP.F] key on the key board is turned OFF. (The LED has put out lights)	Turn the [CHIP.F] key ON. (The LED lights up.)			
		Command M400 is not given.	Execute M400 by the key input operation or by the program.			
		The EMERGENCY SW is pushed.	Release the EMERGENCY SW.			
		Disconnection of the connecter CNKP2 or CNCLM of the coolant protection unit.	Check the CNKP2 connection. Also check the coolant protection unit wiring (IO board connector CNBIO).			
		The fuse (Q3, except EU) or the circuit protector (Q3, EU)) blown out by overload or short-circuit of the coolant pump or the chipflow pump.	After making sure of no short-circuited external wiring, replace the fuse or turn the protector ON.	3.1.11		
		The relay KP2 in the coolant protection unit doesn't work.	Replace the coolant protection unit.			
3	The motor starts only by pressing the chip shower key on the operation panel. (M400 is not activated.)	The IO board defective.	Replace the IO board.	3.1.5		
		Improper setting of the dip SW1.	No.2 bit is OFF.	3.1.5		
4	Flow of the chip flow is not sufficient.	The motor capacity is insufficient.	Use the next largest coolant unit.			
		The coolant viscosity is high.	Reduce the coolant viscosity.			
		The chip shower pipe is clogged with chips.	Remove chips and clean the nozzle.			
		The coolant motor rotates in the reverse direction.	Exchange two of the three phases on the motor side.			

1.7.3 Tool breakage error

State when error occurred:
Tool breakage detection device does not work.
Tool breakage detection device does not detect tool breakage.
Tool breakage detection device does not stop.

Error contents:
Tool breakage error
Tool breakage timeover
Tool breakage sensor error

## No	Problem	Cause	Measure	Replace-ment	Adjust-ment	Refer-ence
1	Tool breakage detection device does not work.	Air is not supplied.	Supply air.			
		Valve is defective.	Replace valve.			
		Cylinder is defective.	Replace cylinder.			
		Bearing is damaged.	Replace bearing.			
		Foreign matter has entered.	Remove foreign matter.			
		Speed controller is not adjusted correctly.	djust speed controller.			
2	Sensor does not detect tool breakage.	Sensor pin is damaged.	Replace sensor pin.			
		Sensor is damaged (wire is broken).	Replace sensor.			
3	Tool breakage detection device does not stop.	Stopper has come off.	Replace sensor.			

1.7.4 Automatic door error

State when error occurred:
Automatic door does not open or close.
Automatic door does not decelerate.
Automatic door does not open or close smoothly.

Error contents:
Door error

## No	Problem	Cause	Measure	Replace-ment	Adjust-ment	Refer-ence
1	Automatic door does not open or close.	Air is not supplied.	Supply air.			
		Speed controller is not adjusted correctly.	Adjust speed controller.			
		Valve is defective.	Replace valve.			
		Cylinder is defective.	Replace cylinder.			
		Air leaks from tube or coupler.	Connect tube and coupler correctly.			
2	Automatic door does not decelerate.	Micro-valve is defective.	Replace micro-valve (adjustment).			
		AD dog is defective (deformed or damaged).	Replace AD dog.			
		Speed controller is not adjusted correctly.	Adjust speed controller.			
3	Automatic door does not open or close smoothly.	Air pressure is low.	Adjust air pressure.			
		Air is not supplied.	Supply air.			
		Automatic door makes contact with obstacle.	Remove obstacle.			

1.7.5 Intermittent lubricator error

State when error occurred:
Pump does not operate.
Oil leaks.
Oil is not supplied

Error contents:
External error

## No	Problem	Cause	Measure	Replace-ment	Adjust-ment	Refer-ence
1	Pump does not operate.	Cord connection is incorrect (or wire is broken).	Connect cord correctly (or replace it).			
		Pump is defective (wire is broken).	Replace pump unit.			
		Oil has run out.	Replenish oil.			
	Oil leaks.	Tube is damaged.	Replace tube.			
		Gasket is damaged.	Replace gasket.			
		Manifold connection is incor-rect.	Connect hose correctly.			
	Oil is not supplied.	Foreign matter entered oil route, causing clogging.	Remove foreign matter (or replace tube).			
		Hose and tube are disconnected.	Connect hose and tube.			

Chapter 2 Replacement procedure (mechanical parts)

2.1 Spindle

2.1.1. The spindle motor replacement (1/3)

1. Turn on the <POWER> switch.

2. Set the **[PROTECT ON/OFF]** switch to **[OFF]**.

3. Press **[I/O]** , **[1]**, **[ENT]**, **[PAGE UP]** **[1]** **[ENT]**.

4. Set the **[GRID SHIFT VALUE SPINDLE]** < the machine parameter (system1) to '0'.
   Press **[DATA BANK]** Conversation:**[6]**
   NC:**[5]**
   Press **[ENT]**, **[1]**, **[ENT]**, **[PAGE DOWN]**,**[CURSOR DOWN]** keys.
   Move the cursor to the gird sift value spindle.
   Press **[0]** **[ENT]** **[F0]** **[F0]**.

5. Set the **[PROTECT ON/OFF]** switch to **[ON]**.

6. Turn off the <POWER> switch .

7. Turn on the <POWER> switch and then the keys **[MANU]** and **[ATC]** to perform the Z axis zero position return and the spindle orientation.

8. Press the **[-Z]** key to lower the spindle head until the cover of the hole on the spindle head side appears. Then, remove the cover. (Bolt, Socket 6×12, 4pcs.)

9. Loosen the M8 bolt on the coupling spindle side.

2.1.1 Replacement procedure of the spindle motor (2/3)

10. Press the **[ATC]** key to perform the z axis zero position return and the spindle orientation.
    (Note: In case that the spindle keys are not located on the front and the back sides of the spindle, adjust their locations manually.)

11. By pressing the **[ATC]** key, move the spindle head up to the upper limit of the Z axis.

12. Turn off the <POWER> switch and turn off the breaker for the control box.

13. Open the terminal box of the spindle motor.

14. Remove motor cords U, V, W, E , fan codes 1,2 and two connectors.

15. Remove the cable bear bracket at the top of the terminal box.

16. Remove the cord lock mounting plate on the side of the terminal box.

17. Remove the spindle motor from the spindle head.
    (Weight of the motor) 22 kg
    [NOTE]
    Pull up the motor vertically
    Pay utmost care not to put any excessive force on the coupling.

18. Remove the coupling.

19. Mount the coupling on a new spindle motor.
    (1) Insert the coupling into the motor shaft and keep the distance between the motor mounting surface and the coupling end surface as f follows:
    TC-S2A 10K.....13 mm
    (2) Tighten the coupling so that the fixing screw on the spindle side matches with the side hole of the spindle head.
    [Note]
    The torque to tighten M8 bolt is 29.4Nm (300kgf/cm).

20. Mount the spindle motor on the spindle head.
    Tentatively, tighten the spindle motor with screws.
    [Note]
    Insert the motor vertically while paying utmost care not to put any excessive force on the coupling.

21. Mount the cord lock mounting plate and the cable bear bracket.

22. Connect all cords and the connector and close the terminal box.

2.1.1 Replacement procedure of the spindle motor (3/3)

23. Turn on the breaker for the control box and turn on the <POWER> switch. While pressing the **[RELSE]** key, press the **[-Z]** key to lower the spindle head below the Z axis zero position.

24. By pressing the **[ATC]** key, perform the Z axis zero position return and the spindle orientation.

25. By pressing the **[-Z]** key, lower the spindle head until the side hole of the spindle head appears.

26. Tighten the M8 bolt on the spindle side (lower part) of the coupling thorugh the side hole of the spindle head.
(Tightening troque for the M8 bolt is 29.4Nm(300kg.cm))

27. Gradually, speed up a spindle from 100 to 1000min^{-1} by manual mode. Tighten screws for spindle motor when the spindle is aligned with the motor.

28. By pressing the **[ATC]** key, perform the Z axis zero position return and the spindle orientation.

29. Check if the the side of the key at the end of the spindle becomes parallel to the Y axis.
If not, loosen screws on the coupling to turn the spindle manually until the side of the key comes to the parallel position to the Y axis. Then, tighten screws on the coupling at that positon.
[NOTE]
Position the air blust hole on the back of the right side.

30. Perform the spindle orientation adjustment (See 4.1.1).

31. Adjust the spindle balance (See 4.1.4) for 16000min^{-1} type.
If the vibration is strong while rotating the spindle by 10000min^{-1} type, adjust the spindle balance. (See 4.1.4)

32. Attach the cover for the side hole of the spindle head.

Replacement parts		Tools to be
Name	Parts code	Small test 1/100 Hexagonal wrench set Phillips screw driver(+,-) 15cm straight edge M10 T wrentch (Longer than L400mm) M8 T wrentch
S MOTOR 250	653035001	

2.1.2. The spindle coupling replacement (1/3)

1. Turn on the <POWER> switch.

2. Set the **[PROTECT ON/OFF]** switch to **[OFF]**.

3. Press **[I/O]** , **[1]**, **[ENT]**, **[PAGE UP]** **[1]** **[ENT]**.

4. Set the **[GRID SHIFT VALUE SPINDLE]** < the machine parameter (system1) to '0'.
   Press **[DATA BANK]** Conversation:**[6]**
   NC:**[5]**
   Press **[ENT]**, **[1]**, **[ENT]**, **[PAGE DOWN]**,**[CURSOR DOWN]** keys.
   Move the cursor to the gird sift value spindle.
   Press **[0]** **[ENT]** **[F0]** **[F0]**.

5. Set the **[PROTECT ON/OFF]** switch to **[ON]**.

6. Turn off the <POWER> switch .

7. Turn on the <POWER> switch. Press the **[MANU]** and **[ATC]** keys to perform the Z axis zero position return and the spindle orientation.

8. Press the **[-Z]** key to lower the spindle head until the cover of the hole on the spindle head side appears. Then, remove the spindle head. (Bolt, Socket 6×12,4pcs.)

9. Loosen the M8 bolt on the coupling spindle side.

2.1.2. The spindle coupling replacement (2/3)

10. Press the **[ATC]** key to perform the Z axis zero position return and the spindle orientation.
    (Note: In case that the spindle keys are not located on the front and the back sides of the spindle, adjust their locations by manual.)

11. By pressing the **[ATC]** key, move the spindle head up to the upper limit of the Z axis.

12. Turn off the <POWER> switch and turn off the breaker for the control box.

13. Remove the cable bear bracket at the top of the column.
    Remove the cable tie and the saddle for the coolant hose which are mounted on the calbe bear.

14. Remove the spindle motor from the spindle head.
    (Weight of the motor) 22 kg

15. Put the spindle motor on the control box.

16. Remove the coupling.

17. Mount the new coupling on the spindle motor.
    (1) Insert the coupling into the motor shaft and keep the distance between the motor mounting surface and the coupling end surface as follows: TC-S2A 10K.....13 mm
    (2) Tighten the coupling so that the fixing screw on the spindle side matches with the side hole of the spindle head.
    [Note]
    The torque to tighten M8 bolt is 29.4Nm (300kgf/cm).

18. Mount the spindle motor on the spindle head.
    Tentatively, tighten the spindle motor with screws.
    [Note]
    Insert the motor vertically while paying utmost care not to put any excessive force on the coupling.

19. Mount the cable bear bracke at the top of the column.
    Mount the coolant hose on the cable bear with a cable tie, or a saddle.

20. Turn on the breaker for the control box and turn on the <POWER> switch . While pressing the **[RELSE]** key, press the **[-Z]** key to lower the spindle head below the Z axis zero position.

2.1.2. The spindle coupling replacement (3/3)

21. By pressing the **[ATC]** key, perform the Z axis zero position return and the spindle orientation.

22. By pressing the **[-Z]** key, lower the spindle head until the side hole of the spindle head appears.

23. Tighten the M8 bolt on the spindle side (lower part) of the coupling thorugh the side hole of the spindle head.
(Tightening troque for the M8 bolt is 29.4Nm(300kgf/cm))

24. Gradually, speed up a spindle from 100 to 1000min^{-1} by manual mode.
Tighten screws for spindle motor when the spindle is aligned with the motor.

25. By pressing the **[ATC]** key, perform the Z axis zero position return and the spindle orientation.

26. Check if the the side of the key at the end of the spindle becomes parallel to the Y axis.
If not, loosen screws on the coupling. Then, turn the spindle manually until the side of the key comes to the parallel position to the Y axis. Then, tighten the screw on the coupling at that positon.
[NOTE]
Position the air blust hole is on the back of the right side.

27. Perform the spindle orientation adjustment (See 4.1.1).

28. Adjust the spindle balance (See 4.1.4) for 16000min^{-1} type.
If the vibration is strong when rotating the spindle by 10000min^{-1} type, adjust the spindle balance. (See 4.1.4)

29. Attach the cover for the side hole of the spindle head.

Replacement parts		Tools to be
Name	Parts code	Small test 1/100 Hexagonal wrench set Phillips screw driver(+,-) 15cm straight edge M10 T wrentch (Longer than L400mm) M8 T wrentch
COUPLING 250	653036001	

2.1.3. The spindle replacement (1/2)

1. After mounting a tool on the spindle, measure the Z axis current position with a height pre-setter and take a note of the machine coordinate position on the screen.

2. Press the **[MANU]** key and the **[ATC]** key to perform the Z axis zero aposition return and the spindle orientation.

3. Press the **[-Z]** key to lower the spindle head until the cover of the hole on the spindle head side appears. (Bolt, Socket 6×12, 4pcs.)

4. Loosen the M8 bolt on the spindle side (the lower part)of the coupling.

5. Move the spindle head up to the position where the spindle can be pulled out from the spindle head. (The appropriate distance between the table or the jigu surface to the spindle edge is around 400mm.)

6. Turn off the <POWER> switch.

7. Turn off the air. Remove the air piping tube for the bearing stopper. (air blust and air purge)

8. Remove the bearing stopper. (Straight pin 8×26×M5 (2pcs.) Bolt, Soket 6 ×25 (6pcs.))

9. Pull out the spindle. Remove the collar on the bottom edge of the spindle bearing.
   Do not mix the removed collar witht the new one.
   [NOTE]
   Catch the spindle as it falls.

10. When the spindle is pulled out, the COLLAR D75T5 appears on the upper side of the spindle bearing or the back side of the spindle head.

11. Insert a new spindle from the bottom side.
    Place the COLLAR D75T5 which is removed at step10. on the upper side of the spindle bearing.
    [NOTE]
    Align the bearing .

2.1.3. The spindle replacement (2/2)

12. Put a collar attached to a new spindle on the spindle bearing.
    Attach the bearing stopper.
    [NOTE]
    Check the O ring is inserted into the bearing stopper.
    Position the bearing stopper with pins.
    Then, secure screws (6 pcs.) on the diagonal line in turn.

13. Return the air piping tube as it was.

14. Turn on the <POWER> switch.

15. Press the **[ATC]** key to perform the z axis zero position return and the spindle orientation.

16. Press the **[-Z]** key to lower the spindle head until the side hole of the spindle head appears.

17. Turn the spindle manually until the side of the key at the end of the spindle becomes parallel to the Y axis.

18. Tighten the screw on the coupling through the side hole of the spindle head.
    (Tightening torque for M8 screw is 29.4Nm (300 kg f.cm))

19. Perform the spindle orientation adjustment (See 4.1.1).

20. Adjust the spindle balance (See 4.1.4) for 16000min^{-1} type.
    If the vibration is strong when rotating the spindle by 10000min^{-1} type, adjust the spindle balance. (See 4.1.4)

21. Attach the cover for the side hole of the spindle head.

22. Attach a tool to the spindle and check with a height pre-setter that the Z axis currentposition is same as the one which was measured before the replacement.
    If they are not same, set the grid shift amount for Z axis (4.3.3).

Replacement parts		Tools to be used
Name	Parts code	Small test1/1000 Hexagonal wrench set Phillips screw driver (+,-) Height pre setter M8 T wrentch torque
SPINDLE ASSY 250	653175001	

2.1.4 Spindle motor fan (1/2)

1. Turn off the <POWER> switch and then the circuit breaker.

2. Remove the cover securing screw (1) and then the cover.

3. Loosen the terminal screw of the terminal box (2), and remove the fan motor lead wire from the terminal box (2).

4. Remove the silicon, and pull the lead wire out through the hole of the terminal box.

5. Remove the fan motor securing screw and then the fan motor.

6. Attach the packing (4), bracket (5), and fan motor, in this order.
   *Refer to the drawing for the position relationship of the lead wire.
   Pay attention to the attachment order.

7. Tighten the fan motor securing screw (3) to secure the fan motor. Apply adhesive agent (LOCKTITE #242 or equivalent) to the fan motor securing screw (3) and then tighten it. This is not necessary if the looseness preventive lock bolt is used.

8. Thread the lead wire through the terminal box hole. At this time, be careful not to damage the wires.
   *Do not pull the lead wire excessively or the lead wire may break.

9. Insert the lead wire into the terminal box (2), and tighten the terminal screw.

10. Fill the lead wire hole of the terminal box with silicon KE45.

11. Set the rubber packing (6) in place and tighten the cover securing screw (1) to secure the cover.

    Do not drop the fan motor or hit it with a hammer or the like.

Replacement parts		Tools to be used
Name	Parts code	
SMTORFAN31A	654435001	Hazagonal Allen key Cross head screwdriver

2.1.4 Spindle motor fan (2/2)

02P22.bmp

2.2 ATC

2.2.1 Magazine replacement (1/2)

1. Press the **[MANU]** key.

2. Press the **[ATC]** key twice and move the spindle head to the upper limit of Z axis.

3. Paste a magazine No. seal on each tool in the magazine and then take off all the tools.

4. Remove the grip cover.

5. Turn off the <POWER> switch and turn off the circuit breaker.

6. Remove the address name plates.

7. Remove the slit plate.

8. Remove the address sensor. (The connector should be put in the shaft.)

9. Loosen the hexagon socket head set screw for the M40 nut.

10. While holding the magazine with a hand, remove the M40 nut.

11. Remove the magazine and magazine spacer.
    (Don't remove the center shaft spacer 2.)

12. Mount a new magazine while setting the barrel cam in the cam follower.
    (Check if the magazine spacer is mounted.)

2.2.1 Magazine replacement (2/2)

13. Tighten the M40 nut (Tightening torque for M40 nut is 34.3 ~39.2N.m)

14. Tighten the hexagon socket head set screw of the M40 nut.

15. Attach the address sensor.

16. Attach the slit plate with the punched figure "2" outside.

17. Turn on the breaker and turn on the <POWER> switch.

18. Adjust the address sensor (4.2.2).

19. Adjust the magazine (4.2.1).

20. Press the **[M.Z.RT]** to perform the zero position return.

21. Select the magazine No. 2.
    <CONV.>
    1) By pressing the **[MDI]**, **[PRGRM]** and the **[CURSOR DOWN]** keys, move the cursor to the tool.
    2) Press the **[2]** and the **[ENTER]** and the **[START]** .
    <NC>
    1) Press the **[MDI], [M]** , **[0]**, **[6]**, **[T]** , **[1]**, **[0]**, **[2]** and the **[START]** key

22. Check that the punched figure "2" is on the top.

23. Attach the address name plate "2" downwards.

24. Mount the grip cover.

25. Mount tools in the magazine, matching the magazine No. on seals.

26. Press the **[MANU]** key.

27 While pressing the **[ATC]** key repeatedly, check that the tool change is performed properly.

Replacement parts		Tools to be used
Name	Parts code	Phillips screw driver(+,-) Hexagonal wrench set Tool alignment device set Hesagon spanner 13 M40 wrentch Small test 1/100
14ATC TOOL MAGAZINE 14ASSY (CENTER SHAFT SPACER2)	650062001 (640140001)	

2.2.2 Grip replacement (1/2)

1. Press the **[MANU]** key.
2. Press the **[ATC]** key twice and move the spindle head to the upper limit of Z axis.
3. Paste a magazine No. seal on each tool in the magazine and then take off all the tools.
4. Remove the grip cover.
5. Turn off the <POWER> switch and turn off the breaker circuit.
6. Remove the address name plates.
7. Remove the slit plate.
8. Remove the address sensor. (The connector should be put in the shaft.)
9. Loosen the hexagon socket head set screw of the M40 nut.
10. While holding the magazine with a hand, remove the M40 nut (SP).
11. Remove the magazine and magazine spacer.
    (Don't remove the center shaft spacer 2.)
12. Remove the broken grip.
13. Put the spring and the ball in a new grip and attach the grip to the magazine.
14. Mount the magazine and magazine spacer while setting the barrel cam in the cam follower.

2.2.2 Grip replacement (2/2)

15. Secure M40 nut (SP) with a tightening torque.
    (The torque should be between 34.3 ~ 39.2 N.m.)

16. Tighten the hexagon socket head set screw for the M40 nut.

17. Attach the address sensor.

18. Attach the slit plate with the punched figure "2" outside.

19. Turn on the <POWER> switch.

20. Adjust the address sensor (4.2.2).

21. Adjust the magazine (4.2.1).

22. Press the **[M.Z.RT]** to perform the zero position return.

23. Select the magazine No. 2.
    <CONV.>
    By pressing **[MDI]**, **[PRGRM]** and **[CURSOR DOWN]**,
    move the cursor to the tool column.
    Press **[2]** and **[ENT]** key and **[START]** button .
    <NC>
    1) Press the **[MDI]**, **[M]**, **[0]**, **[6]**, **[T],[1],[0],[2]** keys and the **[START]** button.

24. Check that the punched figure "2" is on the top.

25. Attach the address name plate "2" downwards.

26. Mount the grip cover.

27. Mount tools in the magazine, while matching the magazine No. on the seals.

28. Press the **[MANU]** key.

29. While pressing the **[ATC]** key repeatedly, check that the tool change is performed properly.

Replacement parts		Tools to be used
Name	Parts code	Phillips screw driver(+,-) Hexagon wrentch Tool alignment device set Hexagon spanner13 M40 Wrentch Small test 1/100 Jig assy for the magazine spacer selection
GRIP ASSY DP3	653065001	

2.2.3 Pin holder assy 2 replacement

1. Remove the snap ring C16 (①) in the following drawing).

2. Remove the roller (②) in the following drawing).

3. Remove the snap right C 16 (③) in the following drawing).

4. Pull out the pin holder assy 2 (④) in the following drawing) toward the inside of the magazine.

5. Install a new pin holder assy 2 in the reverse order from 4. to 1.
   (Use the removed roller and snap rings again.)
   (Never use snap rings inside out. Sags of a ring should face to the roller.)

   (Note)
   Dimension A in the illustration has to be 2 mm.
   (5 mm for the old type)

Z部詳細
Detailed drawing of part Z

Replacement parts		Tools to be
Name	Parts code	Tools for a C-shaped snap ring
PIN HOLDER ASSY 2 EXTERNAL SNAP RING SHAFT C16	646108001 048160142	

2.2.4 Address sensor replacement (1/2)

1. Turn the <POWER> switch OFF and turn off the breaker.
2. Remove the address plate.
3. Remove the slit plate.
4. Remove the address sensor.
5. Disconnect the connectors CN1 and CN2 from the address sensor.
6. Connect connectors CN1 and CN2 to a new address sensor.
7. Mount the new address sensor.
8. Attach the slit plate with the punched figure "2" outside.
9. Turn the <POWER> switch ON.
10. Adjust the address sensor. (4.2.2)
11. By pressing the **[M.Z.RT]** key, perform the zero position return.
12. Select the magazine No. 2.
    <CONV>.
    Press **[MDI], [PRGRM]** and the **[CURSOR DOWN]** keys,
    move the cursor to the tool column.
    Press **[2]** and **[ENT]**, **[START]**.
    <NC>
    Press the **[MDI]**, **[M]**, **[0]**, **[6]**, **[T], [1], [0], [2], [START]** .
13. Check that the punched figure "2" is on the top of the slit plate.
14. Attach the address plate with the figure "2" downwards.

2.2.4 Address sensor replacement (2/2)

Replacement parts		Tools to be used
Name	Parts code	Phillips screw driver(+,-)
ADDRESS SENSOR ASSY500	640528101	

2.2.5 Barrel cam replacement (1/3)

1. Press the **[MANU]** key.
2. Press the **[ATC]** key twice to move the spindle head up to the upper limit of Z axis.
3. After attaching tool number tags on the magazine, remove all tools.
4. Remove the grip cover.
5. Turn the POWER switch OFF. Then turn off the breaker.
6. Remove the address plate.
7. Remove the slit plate.
8. Remove the address sensor. (Put the connector in the shaft.)
9. Loosen the hexagon socket head set screw of the M40 nut.
10. While holding the magazine with a hand, remove the M40 nut (SP).
11. Remove the magazine and the magazine spacer.
12. Remove the saddle cover.
13. Remove the screw of cam flange 250, and then barrel cam assy 250.
14. Mount a new barrel cam assy 250.
15. Mount the saddle cover.

2.2.5 Barrel cam replacement (2/3)

16. Mount the magazine with the barrel cam in the cam follower.

17. Secure M40 nut (SP) with a tightening torque.
    (The torque should be between 34.3 ~ 39.2N.m.)

18. Tighten the hexagon socket head set screw for the M40 nut.

19. Mount the address sensor.

20. Mount the slit plate with the punched figure "2" outside.

21. Turn the <POWER> switch.

22. Adjust the magazine (4.2.1).

23. Adjust the address sensor (4.2.2).

2.2.5 Barrel cam replacement (3/3)

24. By pressing the **[M.Z.RT]** key, perform the zero position return.

25. Select the magazine No. 2.
    <CONV>
    1) By pressing the **[MDI]**, **[PRGRM]** and the **[CURSOR DOWN]** keys, move the cursor to the tool column.
    2) Press the **[2]** and the **[ENTER]** key and the **[START]** keys..
    <NC>
    1) Press **[MDI]**, **[M]** , **[0]**, **[6]**, **[T], [1],[0], [2]** keys and the **[START]** key.

26. Check that the punched figure "2" is on the top of the slit plate.

27. Attach the address plate with the figure "2" downwards.

28. Mount the grip cover.

29. Mount the tools, matching to the number tags on the magazine.

30. Press the **[MANU]** key.

31. By pressing the **[ATC]** key repeatedly, make sure the tool change motion has been taken place correctly.

Replacement parts		Tools to be used
Name	Parts code	Phillips screw driver(+,-) Small test 1/100 Hexagon wrentch Hexagon spanner 13 (2pcs.) Tool alignment jig set M40 Socket
BARREL CAM	653052001	

2.2.6 ATC motor (14 ATC) replacement (1/2)

1. Turn the <POWER> switch OFF. and turn off the breaker.

2. Remove the cover for the terminal box in the ATC motor.

3. Disconnect the cords from the terminal block and then release the cord locks.

4. Remove the ATC motor bolts.

5. Remove the ATC motor.

6. Remove spur gear M2Z25 from the ATC motor.
   (Hexagon socket set screw M5×5, 2pcs. × 2)

7. Mount spur gear M2Z25 to the new ATC motor and secure the motor with hexagon socket set screw .
   (Align the front end. Secure an each tap with screws (2 pcs.).)
   (Tightening torque is 4.9 N.m (50kgf.cm).)

8. Mount the ATC motor to the saddle.
   (Tightening torque is 11.6N.m (118kgf.cm).)

9. Attach a cord locks to the terminal box and connect the cords to the terminal block.

10. After tightening the cord locks, mount the lid on the terminal box.

11. Turn the <POWER> switch ON.

12. Press the **[MANU]** key.

13. By pressing the **[ATC]** key repeatedly, make sure that the magazine rotates smoothly.

2.2.6 ATC motor (14 ATC) replacement (2/2)

Terminalbox

Terminal NO.	Code Color	Mark Tube No.
⏚	Green/ Yellow	PE
V1	Black	V1
V2	White	V2
Z2	Red	Z2

Replacement parts		Tools to be
Name	Partscode	Phillips screw driver(+,-) Hexagon wrentch
SPUR GEAR M2AZ5 MOTOR 9290	653059001 650057001	

2.2.7 Middle gear (14 ATC) replacement

1. Attach the magazine number tags to the tools, and remove all tools.
2. Remove the gripper cover.
3. Remove the ATC proximity cover14.
4. Remove the middle gear flange (3 bolt, sockets).
5. Replace the middle gear assy.
6. Mount the middle gear flange.
7. Mount the ATC proximity cover 14.
8. Mount the gripper cover.
9. See the magazine number tag attached to the tool. Mount the tool to the grip while matching magazine number.

Replacement parts		Tools to be used
Name	Parts code	Phillips screw driver (+,-) (Large, Middle) Hex.wrentch set
MIDDLE GEAR ASSY	653060001	

2.3 Feed axis

2.3.1 X axis motor Replacement (1/3)

1. Set a small tester at the spindle and measure the base position
   (Use jigu etc.)
   Move the table in the X axis direction until the small tester indicates "0" at the base position.

2. Press the **[POS]** key.

3. Take notes of the current machine coordinate position from the screen.

4. Move the table from the X axis center position to the right.
   (In case that the table doesn't move, turn the <POWER>switch OFF, remove the X telescopic cover right and also BRG holder cover.
   Move the table by turning the ball screw.)

5. Turn the <POWER> switch OFF and turn off the breaker.

6. Remove the table front cover and the X telescopic cover left.

7. Remove the motor base cover.

8. Loosen the securing screw of the coupling on the motor side and remove the motor.

9. Take off the lid of the motor terminal box.

10. Disconnect the connectors and remove the cable boards out of the terminal box (2 pcs.each).

11. Connect the connectors (2 pcs) to a new motor.

12. Apply liquid gasket to the cable boards and to the fixing surface of the terminal box lid. Attach them to the terminal box.

13. Mount the new motor with the terminal box under the motor.
    (Note)
    Replace the coupling in the following conditions:
    a. When the element is deformed.
    b. When any of the bolts for securing the element to the coupling has a harmful defect such as wear.
    c. When the coupling has a harmful defect.
    d. When the coupling, which is mounted to the motor, deviates 0.3 mm or more with respect to the inside diameter as shown in the figure.

2.3.1 X axis motor Replacement (2/3)

14. Tighten the coupling screw on the motor side.

15. Turn the <POWER> switch ON.

16. Press the **[MANU]** key.

17. Press the **[-X]** or the **[+X]** key and check the motor noise.

18. Set the <PROTECT ON/OFF> switch to OFF.

2.3.1 X axis motor Replacement (3/3)

19. Select **[DATA BANK]** -> **[MACHINE PARAMETER]** -> **[SYSTEM 1]**, and take note of the value set for [GRID SHIFT VALUE X] and [X ORIGIN OFFSET VALUE] and reset the value to zero (0).

    Press the **[MANU]** key or the **[MDI]**key. Then, press **[I/O]**, **[1]**, **[ENT]**, **[PAGE UP]**, **[1]**, **[ENT]**, and **[F0]**.
    Then press **[DATA BANK]** and **[6]** for conversational type (**[5]** for NC type).
    Press **[ENT]**, **[1]**, **[ENT]**, **[PAGE DOWN]**, and **[CURSOR DOWN]** to move the cursor to **[GRID SHIFT VALUE X]** and take note of the value.
    Press **[0]** and **[ENT]**. In the same way, take note of the value set for [X ORIGIN OFFSET VALUE] and press **[0]**, **[ENT]**, and then **[F0]** twice.

20. Set the <PROTECT ON/OFF> switch to ON.

21. Turn the <POWER> switch off and then on again.

22. Adjust the X axis zero position LS (4.3.4).

23. Mount the covers in the reverse order from 6. to 7.
    [Note]
    When mounting the telescopic cover, move the table to the end so that the cover is contracted.

24. Set the X axis grid shift amount setting A (4.3.1) by using the X axis grid shift value noted in 19.

25. Set the grid shift amount to the value noted in 24 . according to the procedure as stated in 18. to 21.
    (The X axis grid shift amount was set to "0" in 19. Now, it is to be changed to the value noted in 22.)

26. Check the over run LS movement
    (Refer to the adjustment 4.3.5 X.Y axes Over run LS adjustment)

Replacement parts		Tools to be
Name	Parts code	Small test 1/100 Hexagonal wrench set Phillips screw driver(+,-) Liquid gasket
XY MOTOR-250	653023001	

2.3.2 X axis coupling replacement (1/3)

1. Set a small tester at the spindle and measure the base position (Use jigu etc.)
   Move the table in the X axis direction until the small tester indicates "0" at the base position.

2. Press the **[POS]** key.

3. Take notes of the current machine coordinate position from the screen.

4. Move the table from the X axis center position to the right.
   (In case that the table doesn't move, turn the <POWER> switch OFF, remove the X telescopic cover right side and BRG holder cover and move the table by turning the ball screw.)

5. Turn the <POWER> switch OFF and turn off the breaker.

6. Remove the table front cover and the X telescopic cover left.

7. Remove the motor base cover.

8. Loosen the securing screw of the coupling on the motor side and remove the motor.

9. Replace the coupling from the ball screw.

10. Fit a new coupling to the ball screw until a wiring fit is obtained and then tighten the fixing screw.

11. Mount the motor with the terminal box under the motor.
    [Note]
    Replace the coupling in the following conditions:
    a. When the element is deformed.
    b. When any of the bolts for securing the element to the coupling has a harmful defect such as wear.
    c. When the coupling has a harmful defect.
    d. When the coupling, which is mounted to the motor, deviates 0.3 mm or more with respect to the inside diameter as shown in the figure.

2.3.2 X axis coupling replacement (2/3)

12. Tighten the coupling fixing screw on the motor side.

13. Turn the <POWER> switch ON.

14. Press the **[MANU]** key.

2.3.2 X axis coupling replacement (3/3)

15. Press the **[-X]** or the **[+X]** key and check the noise of the motor.

16. Set the <PROTECT ON/OFF> switch to OFF.

17. Select **[DATA BANK]** -> **[MACHINE PARAMETER]** -> **[SYSTEM 1]**, and take note of the value set for [GRID SHIFT VALUE X] and [X ORIGIN OFFSET VALUE] and reset the value to zero (0).

    Press **[MANU]** or **[MDI]**. Then, press**[I/O]**, **[1]**, **[ENT]**, **[PAGE UP]**, **[1]**, **[ENT]**, and **[F0]**.
    Then press **[DATA BANK]** and **[6]** for conversational type (**[5]** for NC type).
    Press **[ENT]**, **[1]**, **[ENT]**, **[PAGE DOWN]**, and **[CURSOR DOWN]** to move the cursor to **[GRID SHIFT VALUE X]** and take note of the value.
    Press **[0]** and **[ENT]**. In the same way, take note of the value set for [X ORIGIN OFFSET VALUE] and press **[0]**, **[ENT]**, and then **[F0]** twice.

18. Set the <PROTECT ON/OFF> switch to ON.

19. Turn the <POWER> switch off and then on again.

20. Adjust the X axis zero position LS (4.3.4).

21. Mount covers in the reverse order from 6. to 7.
    [Note]
    When mounting the telescopic cover, move the table to the end so that the cover is contracted.

22. Perform the X axis grid shift amount setting A (4.3.1) by using the value noted in 17.

23. Set the grid shift amount to the value noted in 22 , using the procedure as stated in 16. to 19.
    (The X axis grid shift amount was set to "0" in 17. Now, it is to be changed to the value noted in 22.)

24. Check the over run LS movement
    (Refer to the adjustment 4.3.5 X.Y axes Over run LS adjustment)

Replacement parts		Tools to be used
Name	Parts code	Small test2/10000 Hexagonal wrench set Phillips screw driver (+)
COUPLING14-16XY	653026001	

2.3.3 X axis ball screw replacement (1/4)

1. Set a small tester at the spindle and measure the base position
   (Use jigu etc.)
   Move the table in the X axis direction until the small tester indicates "0" at the base position.

2. Press the [POS] key.

3. Take notes of the current machine coordinate position from the screen.

4. After moving the table to the left, remove the mounting screws (3pcs) for the X axis telescopic cover right and shift the X telescopic cover right to the right.

5. Remove the stopper 2.
   (After removing three stepped screws, turn and pull out the stopper.
   The stopper is equipped with a notch.)

6. Move the table from the X axis center position to the right. (In case that the table doesn't move, turn the POWER switch OFF, remove the X telescopic cover right, and the BRG holder cover, and move the table by turning the ball screw.)

7. Turn the POWER switch OFF and turn off the breaker.

8. Remove the table front cover, the table rear cover , the X telescopic cover left , the table cover and the motor base cover.

9. Loosen the coupling securing screw on the motor side. Remove the motor, Then, remove the coupling from the ball screw.

10. Remove the stopper 228-XY (2 stepped screws).

11. After removing the ball nut mounting screw, shift the nut position as shown on the next page, and remove the universal elbow from the table rear side by using the socket driver.
    [Caution]
    Be sure not to remove the tube from the universal elbow.
    Otherwise it may be extremely difficult to reassemble.

12. After removing the motor base positioning pin and the mounting screw, remove the ball screw with the motor base.

13. After mounting a new ball screw assy, attach the positioning pin and tighten the mounting screw.

2.3.3 X axis ball screw replacement (2/4)

14. Reattach the universal elbow in the reverse order of the removing, and then tighten the ball nut mounting screw. (At this time, bring the ball nut mounting screw as close to the motor base as much as possible.
    Temporarily tighten the universal elbow before hand, reassemble will be easier.)
15. Reattach the stopper 228-XY.

16. Attach the coupling to the ball screw and secure it with mounting screws.

2.3.3 X axis ball screw replacement (3/4)

17. Mount the motor with the terminal box under the motor and then tighten the coupling fixing screw.

    (Note)
    Replace the coupling in the following conditions:
    a. When the element is deformed.
    b. When any of the bolts for securing the element to the coupling has a harmful defect such as wear.
    c. When the coupling or hub has a harmful defect.
    d. When the coupling, which is mounted to the motor, deviates 0.3 mm or more with respect to the inside diameter as shown in the figure.

18. Attach the stopper 2.

19. After turning the< POWER >switch ON, press the **[MANU]** key.

20. Press the [-X] or the [+X] key and check the noise of the motor.

21. Set the <PROTECT ON/OFF> switch to OFF.

22. Select **[DATA BANK]** -> **[MACHINE PARAMETER]** -> **[SYSTEM 1]**, and take note of the value set for [GRID SHIFT VALUE X] and [X ORIGIN OFFSET VALUE] and reset the value to zero (0).

    Press **[MANU]** or **[MDI]**. Then, press **[I/O]**, **[1]**, **[ENT]**, **[PAGE UP]**, **[1]**, **[ENT]**, and **[F0]**.
    Then press **[DATA BANK]** and **[6]** for conversational type (**[5]** for NC type).
    Press **[ENT]**, **[1]**, **[ENT]**, **[PAGE DOWN]**, and **[CURSOR DOWN]** to move the cursor to **[GRID SHIFT VALUE X]** and take note of the value.
    Press **[0]** and **[ENT]**. In the same way, take note of the value set for [X ORIGIN OFFSET VALUE] and press **[0]**, **[ENT]**, and then **[F0]** twice.

23. Set the <PROTECT ON/OFF> switch to ON.

24. Turn the POWER switch OFF, and then ON again.

25. Supply grease through the grease nipple.

26. Adjust the X axis zero position LS (4.3.4).

2.3.3 X axis ball screw replacement (4/4)

27. Mount the cover which was removed in step 8.
When mounting the telescopic cover, move the table to the end so that the cover is contracted.

28. Perform the X axis grid shift amount setting A (4.3.1) by using the value noted in 22.

29. Set the grid shift amount to the value noted in 28. by the procedure as stated in 21. to 24.
(The X axis grid shift amount was set to "0" in 22. Now, it is to be changed to the value noted in 28.)

30. Check the over run LS movement.
(Refer to the adjustment 4.3.5 XY axes Over run LS adjustment)

Replacement parts		Tools to be
Name	Parts code	Small test2/1000 Hexagonal wrench set Phillips screw driver (+) Grease gun Hex. wrentch (1 set) Hex. wrentch.4 Socket driver (7mm)
BAllSCREW XASSY-228	622015001	

2.3.4 Y axis motor replacement (1/3)

1. Set a small tester at the spindle and measure the base position
   (Use jigu etc.)
   Move the table in theY axis direction until the small tester indicates "0" at the base position.

2. Press the **[POS]** key.

3. Take notes of the current machine coordinate position from the screen.

4. Move the table from the Y axis center position to the rear.
   (In case that the table doesn't move, turn the <POWER> switch OFF, remove the Y axis rear cover, the BRG holder cover and then move the table by turning the ball screw.)

5. Turn the POWER switch OFF and turn off the breaker.

6. Remove the table front cover and the Y axis telescopic cover.

7. Remove the motor base cover.

8. Loosen the coupling fixing screw on the motor side and then remove the motor.

9. Take off the lid for the motor terminal box.

10. Disconnect the connectors and remove the cable boards out of the terminal box (2 pcs.each).

11. Connect the connectors (2 pcs) to a new motor.

12. Apply liquid gasket to the cable boards and to the fixing surface of the terminal box lid. Attach them to the terminal box.

13. Mount the new motor with the terminal box on the right side of the motor.
    [Note]
    Replace the coupling in the following conditions:
    a. When the element is deformed.
    b. When any of the bolts for securing the element to the coupling has a harmful defect such as wear.
    c. When the coupling has a harmful defect.
    d. When the coupling, which is mounted to the motor, deviates 0.3 mm or more with respect to the inside diameter as shown in the figure.

2.3.4 Y axis motor replacement (2/3)

14. Tighten the coupling screw on the motor side.

15. Turn the <POWER> switch ON.

16. Press the **[MANU]** key.

17. Press the **[-Y]** or the **[+Y]** and check the noise of the motor.

18. Set the <PROTECT ON/OFF> switch to OFF.

2.3.4 Y axis motor replacement (3/3)

19. Select **[DATA BANK]** -> **[MACHINE PARAMETER]** -> **[SYSTEM 1]**, and take note of the value set for [GRID SHIFT VALUE X] and [X ORIGIN OFFSET VALUE] and reset the value to zero (0).

    Press **[MANU]** or **[MDI]**. Then, press **[I/O]**, **[1]**, **[ENT]**, **[PAGE UP]**, **[1]**, **[ENT]**, and **[F0]**. Then press **[DATA BANK]** and **[6]** for conversational type (**[5]** for NC type). Press **[ENT]**, **[1]**, **[ENT]**, **[PAGE DOWN]**, and **[CURSOR DOWN]** to move the cursor to **[GRID SHIFT VALUE Y]** and take note of the value.
    Press **[0]** and **[ENT]**. In the same way, take note of the value set for [YORIGIN OFFSET VALUE] and press **[0]**, **[ENT]**, and then **[F0]** twice.

20. Set the <PROTECT ON/OFF> switch to ON.

21. Turn the POWER switch OFF, and then ON again.

22. Adjust the Y axis zero position LS (4.3.4).

23. Mount motor covers in the reverse order from 6. to 7.
    (Note)
    When mounting the telescopic cover, move the table to the end so that the cover is contracted.

24. Perform the Y axis grid shift amount setting A (4.3.1) by using the value noted in 19.

25. Set the grid shift amount to the value noted in 24. by the procedure as stated in 18. to 21.
    (The Y axis grid shift amount was set to "0" in 19. Now, it is to be changed to the value noted in 24.)

26. Check the over run LS movement
    (Refer to the adjustment 4.3.5 X.Y axes Over run LS adjustment)

Replacement parts		Tools to be
Name	Parts code	Small test2/1000 Hexagonal wrench set Phillips screw driver (+,-) Liquid gasket
XYMOTOR250	653023001	

2.3.5 Y axis Coupling replacement (1/3)

1. Set a small tester at the spindle and measure the base position (Use jigu etc.)
   Move the table in the Y axis direction until the small tester indicates "0" at the base position.

2. Press the **[POS]** key.

3. Take notes of the current machine coordinate position from the screen.

4. Move the table from the Y axis center position to the column side.
   (In case that the table doesn't move, turn the <POWER> switch OFF, remove the Y axis rear cover and BRG holder cover.
   Then, move the table by turning the ball screw.)

5. Turn the <POWER> switch OFF.

6. Remove the table front cover and the Y axis telescopic cover .

7. Remove the motor base cover.

8. Loosen the coupling fixing screw on the motor side and then remove the motor.

9. Remove the coupling from the ball screw.

10. Fit a new coupling to the ball screw until a wiring fit is obtained and then tighten the fixing screw.
    [Note]
    Replace the coupling in the following conditions:
    a. When the element is deformed.
    b. When any of the bolts for securing the element to the coupling has a harmful defect such as wear.
    c. When the coupling has a harmful defect.
    d. When the coupling, which is mounted to the motor , deviates 0.3 mm or more with respect to the inside diameter as shown in the figure.

2.3.5 Y axis Coupling replacement (2/3)

11. Mount the motor with the terminal box on the right side of the motor.

12. Tighten the coupling fixing screw on the motor side.

13. Turn the <POWER> switch ON.

14. Press the **[MANU]** key.

15. Press the **[-Y]** or the **[+Y]** key and check the noise of the motor.

2.3.5 Y axis Coupling replacement (3/3)

16. Set the <PROTECT ON/OFF> switch to OFF.

17. Select **[DATA BANK]** -> **[MACHINE PARAMETER]** -> **[SYSTEM 1]**, and take note of the value set for [GRID SHIFT VALUE Y] and [Y ORIGIN OFFSET VALUE] and reset the value to zero (0).

    Press **[MANU]** or **[MDI]**. Press the **[I/O]**, **[1]**, **[ENT]**, **[PAGE UP]**, **[1]**, **[ENT]**, and **[F0]**.
    Then press **[DATA BANK]** and **[6]** for conversational type (**[5]** for NC type).
    Press **[ENT]**, **[1]**, **[ENT]**, **[PAGE DOWN]**, and **[CURSOR DOWN]** to move the cursor to **[GRID SHIFT VALUE Y]** and take note of the value.
    Press **[0]** and **[ENT]**. In the same way, take note of the value set for [Y ORIGIN OFFSET VALUE] and press **[0]**, **[ENT]**, and then **[F0]** twice.

18. Set the <PROTECT ON/OFF> switch to ON.

19. Turn the POWER switch OFF, and then ON again.

20. Adjust the Y axis zero position LS (4.3.4).

21. Mount covers in the reverse order from 6. to 7.
    [Note]
    When mounting the telescopic cover, move the table to the end so that the cover is contracted.

22. Perform the Y axis grid shift amount setting A (4.3.1) by using the value noted in 17.

23. Set the grid shift amount to the value noted in 22. by the procedure as stated in 18. to 19.
    (The Y axis grid shift amount was set to "0" in 17. Now, it is to be changed to the value noted in 22.)

24. Check the over run LS movement
    (Refer to the adjustment 4.3.5 X.Y axes Over run LS adjustment)

Replacement parts		Tools to be used
Name	Parts code	Small test2/1000 Phillips screw driver (+) Hex.wrentch set
COUPLING14-16XY	653026001	

2.3.6 Y axis ball screw replacement (1/4)

1. Set a small tester at the spindle and measure the base position (Use jigu etc.)
   Move the table in the Y axis direction until the small tester indicates "0" at the base position.

2. Press the **[POS]** key.

3. Take notes of the current machine coordinate position from the screen.

4. Remove the Y axis rear cover. (Remove the screws and then shift the cover.)

5. Remove the ball screw stopper 2.
   (Remove the stepped screw. Pull out the ball screw stopper2, twisting its cutting edge.)

6. Move the table from the Y axis center position to the column side.
   (In case that the table doesn't move, turn the <POWER> switch OFF, remove the Y axis rear cover and the BRG holder cover and then move the table by turning the ball screw.)

7. Turn the <POWER> switch OFF.

8. Remove the table front cover and the Y axis telescopic cover.

9. Remove the motor base cover.

10. Loosen the coupling fixing screw on the ball screw side and then remove the motor.
    (Note)
    Replace the coupling in the following conditions:
    a. When the element is deformed.
    b. When any of the bolts for securing the element to the coupling has a harmful defect such as wear.
    c. When the coupling has a harmful defect.
    d. When the coupling, which is mounted to the motor, deviates 0.3 mm or more with respect to the inside diameter as shown in the figure.

2.3.6 Y axis ball screw replacement (2/4)

11. Remove the grease tube from the Y axis ball nut.

12. Remove the stopper 228-XY and the ball nut mounting screw.

13. After removing the motor base positioning pin and mounting screw, remove the ball screw with the motor base.

14. Attach the positioning pin to the new ball screw assy and tighten the mounting screw.

15. Tighten the ball nut mounting screw. At this time, make the ball nut mounting screw as close to the motor base as possible.

2.3.6 Y axis ball screw replacement (3/4)

16. Reattach the stopper 228-XY.

17. Reattach the grease tube.

18. Fit the coupling to the ball screw until a wiring fit is obtained and then tighten the fixing screw.

19. Tighten the coupling fixing screw on the motor side.

20. Turn on the <POWER> switch.

21. Press the **[MANU]** key. Press the **[-Y]** or the **[+Y]** to check the motor noise.

22. Set the <PROTECT ON/OFF> switch to OFF.

23. Select **[DATA BANK]** -> **[MACHINE PARAMETER]** -> **[SYSTEM 1]**, and take note of the value set for [GRID SHIFT VALUE Y] and [Y ORIGIN OFFSET VALUE] and reset the value to zero (0).

    Press **[MANU]** or **[MDI]**. Press**[I/O]**, **[1]**, **[ENT]**, **[PAGE UP]**, **[1]**, **[ENT]**, and **[F0]**.
    Then press **[DATA BANK]** and **[6]** for conversational type (**[5]** for NC type).
    Press **[ENT]**, **[1]**, **[ENT]**, **[PAGE DOWN]**, and **[CURSOR DOWN]** to move the cursor to **[GRID SHIFT VALUE Y]** and take note of the value.
    Press **[0]** and **[ENT]**. In the same way, take note of the value set for [Y ORIGIN OFFSET VALUE] and press **[0]**, **[ENT]**, and then **[F0]** twice.

24. Set the <PROTECT ON/OFF> switch to ON.

25. Turn the <POWER> switch OFF, and then ON again.

26. Supply grease through the grease nipple.

27. Adjust the Y axis zero position LS (4.3.4).

28. Mount the cover in the reverse order of 8. to 9.
    (Note)
    When mounting the telescopic cover, move the table to the end so that the cover is contracted.

2.3.6 Y axis ball screw replacement (4/4)

29. Attach the ball screw stopper 2 and the Y axis rear cover.

30. Perform the Y axis grid shift value setting A (4.3.1) by using the Y axis grid shift value noted in 23.

31. Set the grid shift amount to the value noted in 30. by the procedure as stated in 22. to 25.
(The Y axis grid shift amount was set to "0" in 23. Now, it is to be changed to the value noted in 30.)

32. Check the over run LS movement.
(Refer to the adjustment 4.3.5 X.Y axes Over run LS adjustment)

Replacement parts		Tools to be
Name	Parts code	Small test2/1000 Phillips screw driver (+) Hex.wrentch 4assy Grease gun Hex.wrentch set
BALL SCREW Y ASSY -228	622016001	

2.3.7 Z axis motor replacement (1/3)

1. After mounting a tool on the spindle, move the spindle head in the Z axis direction until the height pre-setter indicates "0".
   (In case that the spindle head doesn't move, use a smal tester as a measuring device. Set the spindle edge 0.)

2. Press the **[POS]** key.

3. Take notes of the current machine coordinate position from the screen. When a small test is used to measure the coordinate, move the small test away from the spindle by pushing **[-X]** or **[+X]** keys.

4. Lower the spindle head to remove the motor base cover.

5. Bring the spindle head up and down to position the spindle where the coupling fixing bolt can be loosened through the motor base window.

6. Fix the spindle head with the fixture so that it won't fall down.

7. Turn the <POWER> switch OFF and turn off the breaker.

8. Remove the lid for the motor terminal box.
   Disconnect the connectors and remove the cable boards out of the terminal box.

9. Loosen the securing screw for the coupling on the motor side.

10. Remove the motor.

11. Mount the new motor to the back side of the terminal box.
    (Note)
    Replace the coupling in the following conditions:
    a. When the element is deformed.
    b. When any of the bolts for securing the element to the coupling has a harmful defect such as wear.
    c. When the coupling has a harmful defect.
    d. When the coupling, which is mounted to the motor, deviates 0.3 mm or more with respect to the inside diameter as shown in the figure.

12. Tighten the coupling fixing screw on the motor side.

13. Connect the connector on the motor side.
    Apply liquid gasket to the cable boards and to the fixing surface of the terminal box lid. Attach them to the terminal box.

2.3.7 Z axis motor replacement (2/3)

14. Remove the spindle head fixture.

15. Turn the <POWER >switch ON.

16. Press the **[MANU]** key. Press the **[-Z]** or the **[+Z]** key and check the motor noise.

17. Set the <PROTECT ON/OFF> switch to OFF.

18. Select **[DATA BANK]** -> **[MACHINE PARAMETER]** -> **[SYSTEM 1]**, and take note of the value set for [GRID SHIFT VALUE Z] and [Z ORIGIN OFF-SET VALUE] and reset the value to zero (0).

    Press **[MANU]** or **[MDI]**. Pess **[I/O]**, **[1]**, **[ENT]**, **[PAGE UP]**, **[1]**, **[ENT]**, and **[F0]**.
    Then press **[DATA BANK]** and **[6]** for conversational type (**[5]** for NC type). Press **[ENT]**, **[1]**, **[ENT]**, **[PAGE DOWN]**, and **[CURSOR DOWN]** to move the cursor to **[GRID SHIFT VALUE Z]** and take note of the value.
    Press **[0]** and **[ENT]**. In the same way, take note of the value set for [Z ORIGIN OFFSET VALUE] and press **[0]**, **[ENT]**, and then **[F0]** twice.

2.3.7 Z axis motor replacement (3/3)

19. Set the <PROTECT ON/OFF> switch to ON.

20. Turn the POWER switch OFF and then ON again.

21. Adjust the Z axis zero position LS (4.3.4).

22. Mount the motor base cover.

23. Perform the Z axis grid shift value setting A (4.3.3) by using the Z axis grid shift value noted in 18.

24. Set the grid shift amount to the value noted in 23. according to the procedure as stated in 17. to 20.
(The Z axis grid shift amount was set to "0" in 18. Now, it is to be changed to the value noted in 23.)

25. Check the over run LS movement.
(Refer to the adjustment 4.3.6 Z axis Over run LS adjustment)

Replacement parts		Tools to be used
Name	Parts code	Height pre-setter Phillips screw driver(+) Hex.wrentch set Spindle head fixture
Z AXIS BALL MOTOR 22A	652121001	

2.3.8 Z axis coupling replacement (1/3)

1. After mounting a tool on the spindle, move the spindle head in the Z axis direction until the height pre-setter indicates "0".
   (In case that the spindle head doesn't move, use a smal tester as a measuring device. Set the spindle edge 0.)

2. Press the **[POS]** key.

3. Take notes of the current machine coordinate position from the screen. When a small test is used to measure the coordinate, move the small test away from the spindle by pushing **[-X]** or **[+X]** keys.

4. Lower the spindle head to remove the motor base cover.

5. Bring the spindle head up and down to position the spindle where the coupling fixing bolt can be loosened through the motor base window.

6. Fix the spindle head with the fixture so that it won't fall down.

7. Turn the <POWER> switch OFF and turn off the breaker.

8. Loosen the coupling fixing screw on the ball screw side.

9. Remove the motor.

10. Remove the coupling.

11. Mount the new coupling on the motor with a clearance of 23 mm so that the hole in the coupling fixing bolt on the ball screw side is located on the motor terminal box side.

12. Mount the new motor to the back side of the terminal box.
    (Note)
    Replace the coupling in the following conditions:
    a. When the element is deformed.
    b. When any of the bolts for securing the element to the coupling has a harmful defect such as wear.
    c. When the coupling has a harmful defect.
    d. When the coupling, which is mounted to the motor, deviates 0.3 mm or more with respect to the inside diameter as shown in the figure.

13. Tighten the coupling fixing screw on the ball screw side.

2.3.8 Z axis coupling replacement (2/3)

14. Remove the spindle head fixture.

15. Turn the <POWER >switch ON.

16. Press the **[MANU]** key. Press the **[-Z]** or the **[+Z]** key and check the motor noise

17. Set the <PROTECT ON/OFF> switch to OFF.

2.3.8 Z axis coupling replacement (3/3)

18. Select **[DATA BANK]** -> **[MACHINE PARAMETER]** -> **[SYSTEM 1]**, and take note of the value set for [GRID SHIFT VALUE Z] and [Z ORIGIN OFFSET VALUE] and reset the value to zero (0).

    Press **[MANU]** or **[MDI]**. Press the **[I/O]**, **[1]**, **[ENT]**, **[PAGE UP]**, **[1]**, **[ENT]**, and **[F0]**.
    Then press **[DATA BANK]** and **[6]** for conversational type (**[5]** for NC type).
    Press **[ENT]**, **[1]**, **[ENT]**, **[PAGE DOWN]**, and **[CURSOR DOWN]** to move the cursor to **[GRID SHIFT VALUE Z]** and take note of the value.
    Press **[0]** and **[ENT]**. In the same way, take note of the value set for [Z ORIGIN OFFSET VALUE] and press **[0]**, **[ENT]**, and then **[F0]** twice.

19. Set the <PROTECT ON/OFF> switch to ON.

20. Turn the <POWER> switch OFF and then ON again.

21. Adjust the Z axis zero position LS (4.3.4).

22. Mount the motor base cover.

23. Perform the Z axis grid shift value setting A (4.3.3) by using the Z axis grid shift value noted in 18.

24. Set the grid shift amount to the value noted in 23. by the procedure as stated in 17. to 20.
    (The Z axis grid shift amount was set to "0" in 18. Now, it is to be changed to the value noted in 23.)

25. Check the over run LS movement
    (Refer to the adjustment 4.3.6 Z axis Over run LS adjustment)

Replacement parts		Tools to be used
Name	Parts code	Height pre-setter Phillips screw driver(+) Hex.wrentch set Spindle head fixture
COUPLING XY31A	650514001	

2.3.9 Z axis ball screw replacement (1/4)

1. After mounting a tool on the spindle, move the spindle head in the Z axis direction until the height pre-setter indicates "0".
   (In case that the spindle head doesn't move, use a smal tester as a measuring device. Set the spindle edge 0.)

2. Press the **[POS]** key.

3. Take notes of the current machine coordinate position from the screen.
   When a small test is used to measure the coordinate, move the small test away from the spindle by pushing **[-X]** or **[+X]** keys.

4. Remove the column side cover.

5. Move the spindle head near the Z axis orgin point.

6. Pull out the Z sheet and remove the stopper D72 attached to the bearing holder.
   (The shoulder screw has the cutting edge. Pull out shoulder screws by twisting its cutting edge.)

7. Lower the spindle head to remove the motor base cover.

8. Bring the spindle head up and down to position the spindle where the coupling fixing bolt can be loosened through the motor base window.

9. Fix the spindle head with the fixture so that it won't fall down.

10. Turn the <POWER> switch OFF and turn off the breaker.

11. Loosen the coupling fixing screw on the ball screw side.

12. Remove the motor.

13. Remove the Z axis ball nut mounting screw through the motor base hole.
    Remove the grease tube.

14. Remove the motor base mounting screw and the positioning pin.
    Remove the ball screw with the motor base.

15. Mount a new ball screw assy with the positioning pin.
    Tighten the motor base mounting screw.

2.3.9 Z axis ball screw replacement (2/4)

16. Mount the grease tube. Tighten the ball nut mounting screw through the motor base hole.

17. Mount the new motor with the terminal box is facing to the column side.

    (Note)

    Replace the coupling in the following conditions:

    a. When the element is deformed.

    b. When any of the bolts for securing the element to the coupling has a harmful defect such as wear.

    c. When the coupling has a harmful defect.

    d. When the coupling, which is mounted to the motor, deviates 0.3 mm or more with respect to the inside diameter as shown in the figure.

2.3.9 Z axis ball screw replacement (3/4)

18. Tighten the coupling fixing screw on the ball screw side.

19. Remove the spindle head fixture.

20. Set the <POWER> switch to ON.

21. Press the **[MANU]** key. Press the **[-Z]** or the **[+Z]** key and check the motor noise

22. Set the <PROTECT ON/OFF> switch to OFF.

23. Select **[DATA BANK]** -> **[MACHINE PARAMETER]** -> **[SYSTEM 1]**, and take note of the value set for [GRID SHIFT VALUE Z] and [Z ORIGIN OFFSET VALUE] and reset the value to zero (0).

    Press **[MANU]** or **[MDI]**. Press the **[I/O]**, **[1]**, **[ENT]**, **[PAGE UP]**, **[1]**, **[ENT]** and **[F0]**.
    Then press **[DATA BANK]** and **[6]** for conversational type (**[5]** for NC type).
    Press **[ENT]**, **[1]**, **[ENT]**, **[PAGE DOWN]**, and **[CURSOR DOWN]** to move the cursor to **[GRID SHIFT VALUE Z]** and take note of the value.
    Press **[0]** and **[ENT]**. In the same way, take note of the value set for [Z ORIGIN OFFSET VALUE] and press **[0]**, **[ENT]**, and then **[F0]** twice.

24. Set the <PROTECT ON/OFF> switch to ON.

25. Turn the POWER switch OFF, and then ON again.

26. Adjust the Z axis zero position LS (4.3.4).

27. Mount the stopper D72, the motor base cover and column side cover.

28. Perform the Z axis grid shift value setting A (4.3.3) by using the Z axis grid shift value noted in 18.

2.3.9 Z axis ball screw replacement (4/4)

29. Set the grid shift amount to the value noted in 23, by the procedure stated in 17. to 20.
(The Z axis grid shift amount was set to "0" in 18. Now, it is to be changed to the value noted in 23.)

30. Check the over run LS movement
(Refer to the adjustment 4.3.6 Z axis Over run LS adjustment)

Replacement parts		Tools to be used
Name	Parts code	Height pre-setter Phillips screw driver(+) Hex.wrentch set Hex. wrentch 4 Spindle head fixture
Z AXIS BALL SCREW	653045001	

2.4 Limit Switch

2.4.1 X axis zero position LS replacement

1. Set a small tester at the spindle and measure the base position
   (Use jigu etc.)
   Move the table in the X axis direction until the small tester indicates "0" at the base position.
2. Press the **[POS]** key.
3. Take notes of the X axis current machine coordinate position from the screen.
4. Turn the POWER switch OFF and turn off the breaker circuit.
5. Remove the table front cover.
6. Remove the zero position limit switch.
7. Remove the limit switch protection cover.
8. Disconnect the lead wire.
9. Connect the lead wire to a new limit switch.
10. Attach the protection cover and seal the lead wire exit with silicone.
11. Install the new limit switch.
12. Adjust the X axis zero position LS (4.3.4).
13. Perform the X axis grid shift amount setting A (4.3.1).
14. Mount the table front cover.

Switch SL1-P

Replacement parts		Tools to be used
Name	Parts code	Small test Hexagonal wrench set Silicone Phillips screw driver (+)
SWITCHSL1-P	620264000	

2.4.2 X axis overrun LS replacement

1. Turn the <POWER> switch OFF and turn off the breaker circuit.
2. Remove the table front cover.
3. Remove the overrun limit switch.
4. Remove the limit switch protection cover.
5. Disconnect the lead wire.
6. Connect the lead wire to a new limit switch.
7. Attach the protection cover and seal the lead wire exit with silicone.
8. Install the new limit switch.
9. Adjust the X axis overrun LS (4.3.5).
10. Mount the table front cover.

Switch SL1-P

Replacement parts		Tools to be used
Name	Parts code	Sillicone Hexagonal wrench set Phillips screw driver
SWITCHSL1-P	620264000	

2.4.3 Y axis zero position LS replacement

1. Set a small tester at the spindle and measure the base position (Use jigu etc.)
   Move the table in the Y axis direction until the small tester indicates "0" at the base position.
2. Press the **[POS]** key.
3. Take notes of the machine coordinate position from the screen.
4. Turn the <POWER> switch OFF and turn off the breaker circuit.
5. Remove the YLS cover.
6. Remove the zero position limit switch from the right side of the machine.
7. Remove the limit switch protection cover.
8. Disconnect the lead wire.
9. Connect the lead wire to a new limit switch.
10. Attach the protection cover.
11. Install the new limit switch.
12. Perform the Y axis zero position LS adjustment (4.3.4).
13. Perform the Y axis grid shift value setting A (4.3.1).
14. Mount the YLS cover.

Switch SL1-P

Replacement parts		Tools to be used
Name	Parts code	Small test Hexagonal wrench set Phillips screw driver (+)
SWITCHSL1-P	620264000	

2.4.4 Y axis overrun LS replacement

1. Turn the <POWER> switch OFF and turn off the breaker.
2. Remove the YLS cover.
3. Remove the overrun limit switch.
4. Remove the limit switch protection cover from the right side of the machine.
5. Disconnect the lead wire.
6. Connect the lead wire to a new limit switch.
7. Attach the protection cover.
8. Install the new limit switch.
9. Perform adjustment of the Y axis overrun LS (4.3.5).
10. Mount the YLS cover.

Switch SL1-P

Replacement parts		Tools to be used
Name	Parts code	Hexagonal wrench set Phillips screw driver (+)
SWITCHSL1-P	620264000	

2.4.5 Z axis zero position LS replacement

1. After mounting a tool on the spindle, move the spindle head to the position where a height pre-setter indicates 0.
2. Press the **[POS]** key.
3. Take notes of the machine coordinate position from the screen.
4. Turn the <POWER> switch OFF and turn off the breaker.
5. Remove the right side of the column side cover.
6. Remove the zero position limit switch.
7. Remove the limit switch protection cover.
8. Disconnect the lead wire.
9. Connect the lead wire to a new limit switch.
10. Attach the protection cover.
11. Install the new limit switch.
12. Perform adjustment of the Z axis zero position LS (4.3.4).
13. Perform the Z axis grid shift value setting (4.3.3).
14. Mount the column side cover.

Replacement parts		Tools to be used
Name	Parts code	Height Pre-Setter Hexagonal wrench set Phillips screw driver (+)
SWITCHSL1-P	620264000	

2.4.6 Z axis overrun LS replacement

1. Turn the <POWER>switch OFF and turn off the breaker.
2. Remove the right side column side cover.
3. Remove the overrun limit switch.
4. Remove the limit switch protection cover.
5. Disconnect the lead wire.
6. Connect the lead wire to a new limit switch.
7. Attach the protection cover.
8. Install the new limit switch.
9. Perform adjustment of the Z axis overrun LS (4.3.6).
10. Mount the column side cover.

Replacement parts		Tools to be used
Name	Parts code	Hexagonal wrench set Phillips screw driver (+)
SWITCHZ-15GW 22-B	626934000	

2.4.7 The Z axis ATC zero position LS replacement the ATC area LS replacement

1. Turn the< POWER> switch OFF and turn off the breaker.
2. Remove the left side column side cover.
3. Remove the limit switch.
4. Remove the limit switch protection cover.
5. Disconnect the lead wire.
6. Connect the lead wire to a new limit switch.
7. Attach the protection cover.
8. Install the new limit switch.
9. Perform an adjustment of the ATC zero position LS (4.2.4).
10. Perform an adjustment of the ATC area LS (4.2.5).
11. Mount the column side cover.

Replacement parts		Tools to be used
Name	Parts code	Hexagonal wrench set Phillips screw driver (+)
SWITCHSL1-P	620264000	

Chapter 3 Replacement Procedures (Electrical)

3.1 NC

3.1.1 Communication maintenance when replacing PCB (1/8)

1. Operationoutline

1. Format the floppy disk on the FACIT .
   (Refer to A. Format floppy disk on the FACIT)
   ↓
2. Output all data from the TC to the FACIT.
   (Refer to B. Outputting all data from the TC to the FACIT.)
   ↓
3. Take note of the data of **[POWER ON TIME]** and **[RUNNING TIME]**.
   (Refer to C. Take note of the power supply time and operation time.)
   ↓
4. Replace the PCB.
   ↓
5. Format the memory.
   (Refer to D. Formatting memory.)
   ↓
6. Set the date.
   (Refer to H. Setting the date.)
   ↓
7. Input all data from the FACIT to the TC.
   (Refer to F. Inputting all data from the FACIT to the TC.)
   ↓
8. Check operation
   (Refer to I. Special zero point return.)

3.1.1 Communication maintenance when replacing PCB (2/8)

2. Explanation of each operation

A. Format floppy disk on the FACIT.

1. Turn off the **[POWER]** switch of the machine.
2. Prepare the FACIT, and connect the communication cable to the RS-232C connector on the lower part of the operation panel.
3. Set the 3.5" floppy disk in the FACIT.
   Use a 2HD floppy disk.
   Set the write protect to OFF (close the notch).
4. Turn on the **[POWER]** switch of the machine.
5. Turn on the **[POWER]** switch of the FACIT.The following screen appears on the FACIT.

```
N1060   V.???
        Remote  Brother
        Press  Stop
???????         ??:??:??
```

Any data can be displayed in the ??? area.

6. Format the 3.5" floppy disk by the operation on the FACIT side.
   The following are the FACIT key operation:

   1) Press the **[STOP]** key.

```
N1060   V.???
Ready  off  Line
Remote  Brother
???????         ??:??:??
```

Any data can be displayed in the ??? area.

   2) Press the **[FORMAT]** key.

```
Format  Disk
2DD 2HD (1.4M)
2HD (1.2M)
Press    Step/ Sel.
```

   3) Press the **[CURSOR DOWN]** key twice to move the cursor to [2HD (1.2 M)].

```
Format  Disk
2DD 2HD (1.4M)
2HD (1.2M)      PG
Press    Step/ Sel.
```

   4) Press the **[ENTER]** key.

```
Insert New Disk
Press Format
```

3.1.1 Communication maintenance when replacing PCB (3/8)

5) Press the **[FORMAT]** key.

```
Formatting

                    . . . . . . .
```

It takes about one minute.

```
Formatting
  Complete

        Press   Stop
```

6) Press the **[STOP]** key.

```
N1060  V.???
Ready  off  Line
Remote  Brother
 ???????          ??:??:??
```

Any data can be displayed in the ??? area.

7) Press the **[ENTER]** key.

```
N1060  V.???
Remote  Brother
Press   Stop
 ???????          ??:??:??
```

Any data can be displayed in the ??? area.

(Note 1) Connecting the FACIT.

1. **Prepare a FACIT, and connect the communication cable to the RS232C connector on the lower part of the operation panel.**
2. **Check that the TC power is on, and then turn the FACIT power on.**
3. **Check that [Brother Remote] is displayed on the FACIT LCD.**
4. **Insert a formatted floppy disk to the FACIT floppy drive.**

(Note 2) Disconnecting the FACIT

1. **Remove the floppy disk from the FACIT.**
2. **Turn the FACIT power off.**
3. **Disconnect the communication cable from the operation panel.**

3.1.1 Communication maintenance when replacing PCB (4/8)

B. Outputting all data from the TC to the FACIT.

1. Set the **[NC LANG. /CONV]** switch to **[NC LANG.]**.
2. Connect the FACIT.
3. Turn power on.
4. Set the user parameter / communication. (Refer to G. Setting parameter/communication)
5. Press the **[EDIT]** key.
   Press the **[PRGRM]** key to display the <PROGRAM EDIT MENU> screen.
6. Press the **[3]** and **[EOB/ENT]** keys (NC type) or **[7]** and **[EOB/ENT]** keys (Conversation type), or move the cursor to [EXTERNAL PROGRAM I/O] and press the **[EOB/ENT]** key.
7. Press the **[4]** and **[EOB/ENT]** keys, or move the cursor to [MAINTENANCE] and press the **[EOB/ENT]** key.

8-1. When need to check the cause of defective board, press the **[4]** and **[EOB/ENT]** keys, or move the cursor to [OUTPUT CHECK DATA] and press the **[EOB/ENT]** key.

8-2. When not need to check the cause of defective board, press the **[1]** and **[EOB/ENT]** keys, or move the cursor to [OUTPUT ALL DATA] and press the **[EOB/**

9. **ENT]**key.
10. Press the **[E. STA]** key and all data is output.
    Upon completion of all data output, remove the floppy disk from the FACIT
11. and turn the FACIT power off.
12. Turn the TC power off.
13. Set the **[NC LANG. /CONV]** switch to **[CONV]**.
14. Repeat steps 2. to 10.
    Disconnect the FACIT.

*1.Operation can be started in either NC type or conversation type.

(NOTE)

Supplementary Explanation: Up to 192 files can be output to the FACIT.

When the number of files exceeds 193, more than two floppy disks are necessary.

Operation when using two floppy disks is as follows:

1. At step 9. above, press the **[3]** and **[EOB/ENT]** keys, or move the cursor to [OUTPUT ALL DATA BANK.] and press the **[EOB/ENT]** key.
2. Press the **[EDIT]** key and all data banks are output.
3. Upon completion of all data bank output, remove the current floppy disk from the FACIT and insert a new one.
4. Press the **[F0]** key to display the computer menu.
5. Press the **[2]** and **[EOB/ENT]** keys, or move the cursor to [OUTPUT TO PC] and press the **[EOB/ENT]** key.

3.1.1 Communication maintenance when replacing PCB (5/8)

6. Press the **[1]** and **[EOB/ENT]** keys, or move the cursor to the program items and press the **[ENT/EOB]** key.
7. When the **[1]**, **[/]** and **[E. STA]** keys are pressed on the <COMPUTER OUTPUT MENU> screen, files are output in order from machining program No. 1.

(NOTE)
When more than 193 machining program files exist, files are output in two stages.
Press the [1], [/], [1], [9], [2], and [E. STA] keys.
When the first output is completed, replace the floppy disk and press the [1], [9], [3], [/], and [E. STA] keys.

8. Return to step 11.above.

C. Take note of the power supply time and operation time.

1. Press the [key to display the <INPUT/OUTPUT MENU> screen. Select [1. INPUT/OUTPUT].
2. Press the **[PAGE DOWN]** or **[PAGE UP]** key to display the version screen.
3. Take notes of the power supply time and operation time.

*1.This can be done for either NC type or conversation type.

D. Formatting memory

1. Set the **[PROTECT]** switch to **[OFF]**.
2. Press the **[EDIT]** key.
3. Press the **[I/O]** key to display the <INPUT/OUTPUT MENU> screen. Select [1. INPUT/OUTPUT].
4. Press the **[PAGE DOWN]** or **[PAGE UP]** key to display the version screen.
5. Move the cursor to [PARAMETER CHANGE].
6. Press the **[1]** and **[EOB/ENT]** key.
7. Press the **[PRGRM]** key to display the <PROGRAM EDIT MENU> screen.
8. Press the **[2]** and **[EOB/ENT]** keys (NC type) or **[6]** and **[EOB/ENT]** keys (Conversation type), or move the cursor to [DIRECTORY OF MEMORY] and press the **[EOB/ENT]** key.
9. Press the **[F4]** key.
10. When instructed on the screen, press the **[DEL]** key.
11. Press the **[F0]** key on the memory format check screen.
12. After checking memory format, turn power off.
13. Set the **[NC LANG. /CONV]** switch to the desired setting.
14. Turn power on and the selected system boots. Repeat steps 1.to 12..

(NOTE)
When [PARAMETER CHANGE] is set to [1:YES], attempting to press the [RST] key or changing mode changes the setting to [0:NO].

3.1.1 Communication maintenance when replacing PCB (6/8)

E. abbreviation

F. Inputting all data from the FACIT to the TC.

1. Set the **[NC LANG. /CONV]** switch to **[NC LANG.]**.
2. Set the **[PROTECT]** switch to **[OFF]**.
3. Connect the FACIT.
4. Turn power on.
5. Set the user parameter / communication. (Refer to G.Use parameter / communucation)
6. Press the **[EDIT]** key.
7. Press the **[I/O]** key to display the <INPUT/OUTPUT MENU> screen. Select [1.INPUT/OUTPUT].
8. Press the **[PAGE DOWN]** or **[PAGE UP]** key to display the version screen.
9. Move the cursor to [PARAMETER CHANGE].
10. Press the **[1]** and **[EOB/ENT]** keys.
11. Press the **[PRGRM]** key to display the <PROGRAM EDIT MENU> screen.
12. Press the **[3]** and **[EOB/ENT]** keys (NC type) or **[7]** and **[EOB/ENT]** keys (Conversation type), or move the cursor to [EXTERNAL PROGRAM I/O] and press the **[EOB/ENT]** key.
13. Press the **[4]** and **[EOB/ENT]** keys, or move the cursor to [MAINTENANCE] and press the **[EOB/ENT]** key.
14. Press the **[2]** and **[EOB/ENT]** keys, or move the cursor to [INPUT ALL DATA] and press the **[EOB/ENT]** key.
15. Press the **[EDIT]** key and all data is input.
    (The [SAME DATA BANK EXISTS. MACHINE DATA INPUT OK?] message appears. Press the **[F3]** key ([INPUT HERE-AFTER]).
16. Upon completion of all data input, remove the floppy disk from the FACIT and turn the FACIT power off.
17. Turn the TC power off.
18. Set the **[NC LANG/CONV]** switch to **[CONV]**.
19. Repeat steps 2) to 15).
20. Disconnect the FACIT.

*1.Operation can be started in either NC type or conversation type.

(NOTE)

1) When [PARAMETER CHANGE] is set to [1:YES], attempting to press the [RST] key or changing mode changes the setting to [0:NO].

2) When using more than two floppy disks to output all data from the TC to the FACIT, replace the floppy disk when step 15) above is completed, and press the [E.STA] key.

3.1.1 Communication maintenance when replacing PCB (7/8)

G. Setting user parameter / communication

1. Press the **[DATA BANK]** key to display the <DATA BANK MENU> screen.
2. Press the **[4]** and **[EOB/ENT]** keys (NC type) or **[5]** and **[EOB/ENT]** keys (Conversation type), or move the cursor to the desired user parameter and press the **[EOB/ENT]** key.
3. Press the **[3]** and **[EOB/ENT]** keys, or move the cursor to [COMMUNICATION] and press the **[EOB/ENT]** key.
4. Set the following values:

[SELECT PORT]	0 (port A)
[CONNECTION OBJECT]	1 (computer)
[COMP COMMUNICATN PROTOCOL]	0 (format 1)
[BAUD RATE]	5(9600)
[PARITY]	0 (none)
[STOP BIT]	0 (1 bit)
[CHARACTER]	0 (7 bit)
[RESPONSE MONITORING TIME]	60
[COMMUNICATION TYPE]	0 (line)
[DR SIGNAL CHECK]	1(YES)
[TRANS DATA CODE]	0 (ISO)(Only for NC type)
[END OF BLOCK]	0 (CR, LF) (Only for NC type)
[RECOVERY TIME]	1

5. Press the **[F0]** key twice.

H. Setting the date

1. Press the **[DATA BANK]** key to display the <DATA BANK MENU> screen.
2. Press the **[4]** and **[EOB/ENT]** keys (NC type) or **[5]** and **[EOB/ENT]** keys (Conversation type), or move the cursor to the desired user parameter and press the **[EOB/ENT]** key.
3. Press the **[1]** and **[EOB/ENT]** keys, or move the cursor to switch 1 and press the **[EOB/ENT]** key.
4. Press the **[PAGE DOWN]** key several times to move the cursor to [CURRENT DATE] and [CURRENT TIME] and correct them if necessary.
5. Press the **[F0]** key twice.

*1.This setting can be made for either NC type or conversation type.

3.1.1 Communication maintenance when replacing PCB (8/8)

I. Special zero point return

1. Press **[MANU]** to enter the manual mode. Move the X, Y, and Z axes to their stroke centers using the jog keys.
2. Move the 4, 5, and 6 axes to the positions where the origin limit switch turns on.
   Whether the 4, 5, and 6 axes are provided or not can be confirmed on the <POS> screen. The 4, 5, and 6 axes are displayed in order after the Z axis. When a coordinate value is displayed, the corresponding axis is provided.

   Select the axis to be moved.
   Press **[F0]** (No. 4 axis), **[F1]** (No. 5 axis), or **[F2]** (No. 6 axis) on the <MANU COND> screen or the <POS> screen. The indication is highlighted when selected. Press **[+4]** or **[-4]** to move the axis to the position where the origin limit switch turns on and the axis does not get caught by any cables.

   [Origin limit switch check method]
   Display the <I/O> screen. Press **[1]**, **[EOB/ENT]**, and then **[NEXT PAGE]** twice. When the <ORIGIN LS STATE> screen appears, check the limit switch state. If it does not appear, press **[BEFORE PAGE]** twice to display the <MAIN1> screen and look at "Input 9" to check the limit switch state.

3. Press **[Z.RTN]** while **[RELSE]** is held down.

3.1.2 NC board replacement (1/2)

1. Send all data to the FACIT. (All data is stored in the NC PCB.)
   (Refer to the section on “Outputting all data from the TC to the FACIT”.
   When the machine is NC language and conversation specifications, boot the machine in respective mode to send the data.)
2. Turn off the [POWER] switch and then the main power breaker.
3. Disconnect all NC PCB and slave PCB connectors.
4. Loosen the screws at four corners of the NC PCB stay, and remove the PCB with the stay mounted.
5. Remove the slave PCB and MEM PCB from the NC PCB.
   Note: Take the utmost care to prevent your hands or conductive objects from contacting the PCB connector pins and pattern areas.
6. Replace the NC PCB.
7. Check the NC PCB dip switch settings. The settings should be the same as those before replacement
8. Mount the NC PCB to the control box in the reverse order of steps 3 to 5.
   Note: Firmly set the PCB so as not to allow any clearance. If unavoidable, slightly move the support as far as the hole allows.
9. Set the [PROTECT] switch to [OFF].
10. Press the [EMERGENCY STOP] switch, and turn on the main power breaker and then the [POWER] switch.
11. Send all data from the FACIT.
    (Refer to the section on “Inputting all data from the FACIT to the TC”.
    When the machine is NC language and conversation specifications, boot the machine in respective mode to send the data.)
12. Turn off the [POWER] switch.
13. Press the [EMERGENCY STOP] switch, and turn on the [POWER] switch.
    Check the key operation, display, and alarm indication.
14. Reset the [EMERGENCY STOP] switch and check operation.

3.1.2 NC board replacement (2/2)

DIP SW 1 to 4: Main
5 to 8: Local

Replacement parts		Tools to be used
Name	Parts code	Phillips screw driver
NC board assy A00# □	655836 - ***	

3.1.3 MEM board replacement

1. Send the program data to the FACIT in the case that the data may be damaged during replacement.
   (Refer to the section on “Outputting all data from the TC to the FACIT”. When the machine is NC language and conversation specifications, boot the machine in respective mode to send the data.)
2. Turn off the [POWER] switch and then the main power breaker.
3. Loosen the screws securing the MEM board stay to the NC board chassis, and remove the MEM board.
4. Mount a new MEM board.
   (Check that the board version is appropriate for the machine specifications.)
5. Mount the MEM board stay to the NC board chassis.
6. Press the [EMERGENCY STOP] switch, and turn on the main power breaker and then the [POWER] switch.
7. Check the key operation, display, and alarm indication.
   If the program data is damaged, send the data from the FACIT.
   (Refer to the section on “Inputting all data from the FACIT to the TC”.
   When the machine is NC language and conversation specifications, boot the machine in respective mode to send the data.)
8. Reset the [EMERGENCY STOP] switch and check operation.

Replacement parts		Tools to be used
Name	Parts code	
MEM unit NTassy A00J MEM unit NTassy A00E	TC-31A,22A J 654303-00* E 654303-10* G F	Phillips screw driver

3.1.4 SLAVE board replacement

* Perform back-up of all data as it may be lost or altered during replacement.

1. Turn off the [POWER] switch and then the main power breaker.
2. Remove all connectors from the SLAVE board.
3. Remove all screws securing the SLAVE board stay.
   Note: Be careful not to lose the screws.
4. Replace the SLAVE board.
   Check that the dip switch (SW1) setting is same as the setting of the board used befored replacement.
   Check that the jumper socket is not connected to JP3.
   Check that the connectors joining the NC board and the SLAVE board are fully interlocked.
5. Mount a new SLAVE board in the reverse order of steps 2 and 3.
6. Push the [Emergency stop] switch, turn on the main power breaker and then the [POWER] switch.
7. Check the key operation, display indication, and alarms.
8. Reset the [EMERGENCY STOP] switch , move the table to keep out of the tools. Operate the specific zero position return and check operation.

Replacement parts		Tools to be used
Name	Parts code	Phillips screw driver
SLAVE board assy A00	616468 - ***	

3.1.5 IO board replacement (1/2)

1. Turn off the [POWER] switch and the main power breaker.
2. After taking notes of each terminal block No., the cord mark tube No. and setting condition of dip switch, disconnect the cords.
3. Remove all the connectors and codes.
4. Remove nine fixing screws from the IO board and replace it.
5. Connect the connectors.
6. Connect cords to the terminal block.
7. Check dip switch SW1 of the board, (See next page.)
8. After [EMERGENCY STOP] switch on, turn the main power breaker and the [POWER] switch on .
9. Check motion (the key operation, display, and alarm indication).

TC31A manual:I/O signal:05L25

Replacement parts		Tools to be used
Name	Parts code	
IO board assy A00	654541-***	Phillips screw driver Phillips screw driver (small) (for the terminal block)

3.1.5 IO board replacement (2/2)

DIP SW Bit	Signal name	Contents	Setting when shipped
1	COL	Control of the coolant pump motor OFF :Only[CTL.P] key ON :[CTL.P] key & M08 command	OFF
2	CHP	Control of the chipflow pump motor OFF :Only[CHP.F] key ON :[CHP.F] key & M400 command	ON
3	OH1	Control(1) of the oil hole pump/ the high pressure coolant pump motor OFF :[CLT.P] key is effective (Only M-code command control) (When this is set to OFF, bits 4 and 6 cannot be set to OFF.) ON :[CLT.P] key is invalid	ON
4	OH2	Control(2) of the oil hole pump OFF :M408 command is invalid (3 bit=ON; Only[CLT.P]key is control) (When this is set to OFF, bit 3 cannot be set to OFF.) ON :M408 command is effective (3bit ON; [CLT.P]keey &M408 control)	ON
5	INT	Door interlock control of the coolant system OFF :Coolant system stops regardless of door interlock switch status. ON :Coolant system stops only when the door interlock switch is valid.	OFF
6	SPT	Control(2) of the high pressure coolant pump OFF :M-code command is invalid (3 bit=ON; Only[CLT.P]key is control) (When this is set to OFF, bit 3 cannot be set to OFF.) ON :M-code command is effective (3bit ON; [CLT.P]keey &M-code control)	ON
7	LT	Control of the machine light OFF :LIGHT] key control ON :Stays lit when the main power breaker is on (used only for maintenance)	OFF
8	PEV	Effectiveness or invalidity the grounding voltage checking. (Voltage between R/S/T and PE of main power.) OFF :Invalidity ON :Effectiveness	ON

3.1.6 AVR1 replacement (1/2)

1. Turn off the [POWER] switch and then the main power breaker.
2. Open the control box door.
3. Remove AVR1 connector and attachment screws.
4. Replace AVR1.
5. Secure the AVR1 attachment screws and attach the connector.
6. Press the [EMERGENCY STOP] switch, and turn on the main power breaker and then the [POWER] switch.
7. Check 5V of AVR1.

Power source	Measurement loccations	Voltage adjustment
+5V	Between the NC board CH17(5V) and CH15(LG)	4.85 to 5.15V

8. When the voltage is out of range, adjust AVR1.
9. Turn off the [POWER] switch and then the main power breaker.
10. Close the control box door.
11. Press the [EMERGENCY STOP] switch, and turn on the main power breaker and then the [POWER] switch.
12. Check that the LCD turns on and no error is displayed.

3.1.6 AVR1 replacement (2/2)

TC-S2A AVR1 arrangement

NC board check pin arrangement

Replacement parts		Tools to be used
Name	Parts code	
AVR LDA30F-5Y	638110-001	Phillips screwdriver(small) Digital tester

3.1.7 AVR2 replacement

1. Turn off the [POWER] switch and then the main power breaker.
2. Open the control box door.
3. Remove AVR2 connector and attachment screws.
4. Replace AVR2.
5. Secure the AVR2 attachment screws and attach the connector.
6. Press the [EMERGENCY STOP] switch, and turn on the main power breaker and then the [POWER] switch.
7. Check 24V of AVR2.

Power source	Measurement loccations	Voltage adjustment
+24V	Between the IO board XTPW-IO24 and XTPW-IOG	22.8to25.2V

8. AVR2 cannot be adjusted even when the voltage is out of range. Replace AVR2, and check the voltage again.
9. Turn off the [POWER] switch and then the main power breaker.
10. Close the control box door.
11. Press the [EMERGENCY STOP] switch, and turn on the main power breaker and then the [POWER] switch.
12. Check that the LCD turns on and no error is displayed.

TC-S2A AVR2 arrangement
(The left inside of the control box)

Replacement parts		Tools to be used
Name	Parts code	
AVR LDA100W-24	654261- 001	Phillips screw driver (small) Digital tester

3.1.8 Battery replacement (1/2)

1. When the battery low power mark is indicated on the lower right on the LCD
   1-1 When “M” is indicated
   Replace BAT1 (battery for NC PCB)

2. Turn the POWER switch and the MAIN POWER breaker OFF.

3. Holding the tongue of the battery holder, take off the lid.

4. Replace the battery immediately . Pay attention to the polarity (see the Note).

5. Attach the lid to the battery holder.

6. Turn the MAIN POWER breaker and the POWER switch ON.

7. Check that the mark indicating battery shortage doesn't display on the screen.

3.1.8 Battery replacement (2/2)

TC-S2A Battery arrangement

Replacement parts	Tools to be used
Dry battery UM-3 (Populer size AA alkali battery is sufficient for the purpose.)	

3.1.9 Servo driver replacement (X, Y, Z, S, 4, 5, 6, M-axes) (1/4)

1. Turn off the [POWER] switch and main power breaker.
2. Check that the spindle Charge LED is unlit.
3. Remove all connectors of the servo driver to be replaced.
4. Remove all cables (e.g. power cable, grounding cable, etc.) from the terminal block.
5. Remove four screws securing the servo driver and pull the driver toward you.
6. Replace the driver. (Refer to the section on “Servo driver type” to select the correct type.)
7. Tighten four screws.
8. Connect all cables.
9. Connect all connectors.
10. Check that the cables and connectors are connected correctly. Also check that the axis is correct.
11. Set the select switch. Refer to the section on “Select switch setting value”.
12. Turn on the main power breaker and then the [POWER] switch on.(Incorrect cable connection and/or select switch setting may cause runaway of the machine. Use the utmost care.)
13. Check operation in manual mode. No abnormal noise and vibration is allowed.

Caution:
If the power supply is cut for 30 minutes or longer with the M-axis cables disconnected, the absolute position data of the M-axis motor is lost.

3.1.9 Servo driver replacement (X, Y, Z, S, 4, 5, 6, M-axes) (2/4)

A. Set the select switch for each axis.

1. Select switch setting value

Driver	TC-S2A
X Axis	0
Y Axis	1
Z Axis	2
Spindle	3
C Axis	-
5 Axis	5
6 Axis	6
MAG Axis	8

TC S2A Control box

3.1.9 Servo driver replacement (X, Y, Z, S, 4, 5, 6, M-axes) (3/4)

Z and spindle driver

Note: H1 and H2 terminal blocks are provided only for the spindle servo driver.
Disconnect the short connector.

3.1.9 Servo driver replacement (X, Y, Z, S, 4, 5, 6, M-axes) (4/4)

Driver for XY axes

3.1.10 Q3 Fuse replacement (Models other than those for EU specifications)

1. Turn off the [POWER] switch on the operation panel.
2. Turn off the circuit breaker inside the control box, and remove two bolts to open the control box door.
3. Remove the Q3 fuse cover. Replace the blown fuse with a spare fuse, some being provided on the cover and secured with tape. Put the blown fuse in the plastic bag provided inside the control box.
   (Refer to section 7.3.7 of Chapter 7 for fuse capacities.)

TC22A Control box

3.1.11 ATC board replacement

1. Turn off the <POWER> switch and Turn off the breaker.
2. Remove all connectors.
3. Remove securing screws(5pcs.) and repalce the board.
4. Connect the connector.
5. Check the DIP switch (SWI) and jumper (JP1-3).
6. Turn on the breaker and turn on the <POWER> switch.
7. Check the movement.

Dip Switch Bit	Function	Setting for the Function at the shipment
1	ON: Digital filter is not available. OFF: Digital filter is available.	OFF
2	ON: Digital filter is not available. OFF: Digital filter is available.	OFF
3	0 Not Used.	OFF
4	Not used.	OFF

Replacement parts		Tools to be used
Name	Parts code	Phillips screw driver (+)
ATCBOAD ASSY A00	653271***	

3.2 Operation box

3.2.1 Keyboard replacement

1. Turn off the [POWER] switch and then the main power breaker.
2. Remove eleven M5 screws from the front operation panel. Open the panel.
3. Remove AVR3 connector.
4. Remove all keyboard connectors.
5. Remove the screws securing AVR3 stay. Remove AVR3 stay with AVR3 mounted.
6. Remove the nuts securing the keyboard.
7. Replace the keyboard.
8. Mount a new keyboard in the reverse order of steps 3 to 6.
9. Close the panel and tighten the screws.
10. Press the [EMERGENCY STOP] switch, and turn on the main power breaker and then the [POWER] switch.
11. Check the key operation.

The keyboard consists of the Key PCB and the key seat. Be sure to replace both together.

Operation panel rear

Replacement parts			Tools to be used
Name		Parts code	Phillips screw driver M3 Nut driver
Japan	Keyboard assy J	654132-001	
Overseas	Keyboard assy E	654132-101	

3.2.2 AVR3 replacement

1. Turn off the [POWER] switch and then main power breaker.
2. Remove eleven M5 screws from the front operation panel. Open the panel.
3. Remove AVR3 connector and securing screws.
4. Replace AVR3.
5. Secure AVR3 with screws and attach the connectors.
6. Press the [EMERGENCY STOP] switch, and turn on the main power breaker and then the [POWER] switch.
7. Check that the voltage is 5V and 12V, respectively.

Power supply	Measurement location	Voltage range
+5V	Between 0V and 5V on keyboard (check pin)	4.85 to 5.15V
+12V	Between 0V and 12V on keyboard (check pin)	11.6 to 12.4V

8. Turn off the [POWER] switch and then the main power breaker.
9. Close the panel and tighten the screws.
10. Press the [EMERGENCY STOP] switch, and turn on the main power breaker and then the [POWER] switch.
11. Check that the LCD turns on.

Operation panel rear

Replacement parts		Tools to be used
Name	Parts code	
Power supply LCD30F-1	638140-001	Phillips screw driver

3.2.3 LCD replacement

1. Turn on the [POWER] switch and then the main power breaker.
2. Remove eleven M5 screws from the front operation panel. Open the panel.
3. Remove the band connecting the CNLCDRV cord to the LCD protect stay. Loosen the M3 screws and remove the LCD protect stay.
4. Remove the screws (M3, 2 pcs.) securing the LCD inverter stay and detach the connector for the LCD inverter.
5. Remove the CNLCDRV connector from the keyboard, and remove three bands connecting the CNLCDRV cord.
6. Remove four spacers securing the LCD.
7. Replace the LCD with the CNLCDRV cord connected.
8. Secure the LCD in the reverse order of steps 2 to 5. At this time, secure the ferrite cord of the CNLCDRV cord with cable ties (3 locations).
9. Turn on the main power breaker and then the [POWER] switch. Check that the LCD turns on.

Note: Since the connector for the LCD and that for the cord CNLCDRV are very small, replace the LCD without disconnecting the cord CNLCDRV.

03.L2.3.ai

Replacement parts		Tools to be used
Name	Parts code	Phillips screw driver
LCD assy	654496-001	

3.2.4 LCD inverter replacement

1. Turn on the [POWER] switch and then the main power breaker.
2. Remove eleven M5 screws from the front operation panel. Open the panel.
3. Remove two M3 screws securing the LCD inverter stay, and disconnect the connector between the LCD inverter and the LCD.
4. Remove two M2 screws securing the LCD inverter.
5. Remove the CNBKLT connector from the keyboard, and remove two cable ties securing the CNBKLT cord.
6. Replace the LCD inverter with the CNBKLT cord connected.
7. Secure the LCD inverter in the reverse order of steps 2 to 4. At this time, secure the ferrite cord of the CNBKLT cord with cable ties (2 locations).
   Paint the agent for preventing screw loosening leaks and rust before mounting M2 screws which were removed in step 4.
8. Turn on the main power breaker and then the [POWER] switch. Check that the LCD turns on and displays the data correctly.

Note: Since the connector for the LCD inverter and that for the cord CNBKLT are very small, replace the LCD inverter without disconnecting the cord CNBKLT.

03L.2.4.ai

Replacement parts		Tools to be used
Name	Parts code	Phillips screw driver
LCD inverter assy	654497-001	

3.2.5 Keyboard fuse replacement

1. Turn off the [POWER] switch and then the main power breaker.
2. Remove eleven (M5,11pcs.) screws from the front operation panel.
   Open the panel.
3. Remove the fuse on the keyboardand replace the fuse.
4. Close the panel and tighten the screws.
5. Press the [EMERGENCY STOP] switch, and turn on the main power breaker and then the [POWER] switch.
6. Check the key operation.

Operation panel rear

Replacement parts		Tools to be used
Name	Parts code	
G fuse S 1A		Phillips screw driver M3 Nut driver

Chapter 4 Adjustment Procedure (Mechanical)

4.1 Spindle

4.1.1 Spindle orientation adjustment (1/3)

1. Press **[MANU].**

2. Perform the spindle orientation by pressing the **[ATC]** key.

3. Fix a small tester on the table and measure the upper part of a spindle end key.

4. Move the table in the Y axis direction and measure another key on the opposite side.

   In case that the parallelism between the keys doesn't fall in 0.1 mm, perform the following adjustment.

   A. Adjustment procedure by using the coupling

5A. By pressing the **[-Z]** key, lower the spindle head.

6A. Loosen the spindle coupling fixing screw through the hole on the left side of the spindle head.

7A. By pressing the [ATC] key, perform the spindle orientation.

8A. By pressing the [-Z] key, lower the spindle head.

9A. Turn the spindle manually to make the parallelism between the spindle keys within 0.02mm.

10A. Tighten the spindle coupling.

   * Tigthen the coupling after bringing the spindle air blast hole on the right side.

11A. By pressing the [ATC] key, perform the spindle orientation.

12A. Check that the spindle key parallelism falls within 0.1mm.

4.1.1 Spindle orientation adjustment (2/3)

B. Adjustment procedure by using the grid shift value spindle.

5B. Press **[MANU]**.

6B. Press **[+Z]** to raise the Z-axis 2 to 3 mm from the current position to move the small test indicator off the drive key.

7B. Set the [PROTECT ON/OFF] switch to [OFF].

8B. Press **[MANU]** or **[MDI]**. Press **[I/O]** ,**[1]** and **[ENTER], [PAGE UP]**, **[1]** and **[ENTER]**, **[F0]**.

Press **[DATA BANK]**
For conversational type, press **[6],** for NC type, press **[5], [ENTER]**, **[1]**, and **[ENTER].**

9B. Using the **[PAGE DOWN]** key and the cursor keys, move the cursor to [GRID SHIFT VALUE SPINDLE].

10B. Check the current grid shift value.

Calculate a new grid shift.

$$\text{New grid shift} = (\text{Current grid shift}) \times \frac{\pm \text{Key parallelism} \times 44}{2}$$

:Round off to the nearest whole number.

When the key is positioned as when viewed from above the spindle front, calculate using a positive value.

When the key is positioned as when viewed from above the spindle front, calculate using a negative value.

11B. Enter the new grid shift value and press **[ENTER]**.

12B. Press **[F0]** twice to complete editing.
(The [TURN OFF POWER] message appears on the screen.)

4.1.1 Spindle orientation adjustment (3/3)

13B. Turn the <POWER> switch off and on.

14B. By pressing the **[ATC]** key to operate the spindle orientation.

*Tigthen the coupling after bringing the spindle air blast hole on the right side.

15B. Check that the spindle key parallelism falls within 0.1mm.

16. Correct the inspection report.

Tools to be used
Small test indicator 1/100 Magnetic stand Hex.wrentch set

4.1.2 Static accuracy measurement

<Spindle hole deflection>

1. Install a test bar on the spindle.
2. Set a magnet stand on the table.
3. Place the small tester on the test bar at the mouth of the spindle and then at the place 200 mm away from the spindle mouth.
4. Rotate the spindle and measure the max.deflection.

	Root Position	200mm from root
Tolerance	0.01 or less	0.02 or less

(Unit: mm)

< Squareness of the spindle center line and the table surface>

1. Install a L-form tool on the spindle.
2. Make the small tester mounted on the L-form tool touched to the table surface.
   (Location of the small tester: 100 mm away from the spindle center line)
3. Rotate the spindle and measure the squareness.
   (Measurement position: 100 mm from spindlecenter)

	200mm from root
Tolerance	0.02orless

(Unit: mm)

(The table surface should not be inclined towards the operators side.)

Tools to be used
Test bar Small test indicator 1/100 Magnetic stand L-form tool

4.1.3 Motor attachment position

Adjust the motor mounting position only when the spindle motor is removed to replace the motor and the coupling.

1. Loosen the motor fixing screw for a half rotation.

2. Tighten the coupling screw on the spindle side. (It is not necessary to pay attention to the spindle orientation since this step is only for the adjustment.)

3. Rotate the spindle in manual mode at 100 rpm.

4. Rotate the spindle for 30 to 60 seconds. Then, tighten the motor securing screw without stopping the spindle.
   (The motor mounting position is adjusted automatically.)

5. Loosen the coupling screw on the spindle side.

6. Check that the spindle center is aligned with the coupling center.

fig.1

Manually rotate the coupling and the spindle in the reverse direction to check if those rotate lightly and smoothly. If they do not, try from step 1 again.

7. Adjust the orientation.
   (Refer to 4.1.1 Spindle Orientation Adjustment)

4.1.4 Spindle balancing (1/9)

Adjust the spindle balance for 16000min^{-1}type.
If the vibration is strong when rotating the spindle by 10000min^{-1} type, adjust the spindle balance.

1. Set the speed sensor and mark the target.

4.1.4 Spindle balancing (2/9)

04L06-1.ai

4.1.4 Spindle balancing (3/9)

2. Turn the power on.

3. Rotate the spindle clockwise at 10000 min^{-1} (10K), 16000 min^{-1} (16K).
4. Adjust the speed sensor position so that the balancer shows the same number of revolution as the machine.
5. Change the mode from single-face correction to double-face correction.

04L08.ai

Press [MODE] and [1 PL] flashes on the min^{-1} display.
Press [Move Digit] to select 1PL or 2PL.

04L09.ai

Check that the LED for No. 2 is lit.

04L10 .ai

The '---' and '0' are displayed on No. 2 side of Angle and Amount of unbalance displays.

When setting the mode, 1PL or 2PL is displayed in the rotation speed area.
When setting the number of divisions, 12P etc. is displayed in the rotation speed area.

4.1.4 Spindle balancing (4/9)

6. Check that the spindle is rotating at 10000 min^{-1} (10K), 16000 min^{-1} (16K), and press [START].
   (The INT LED lights.)

7. After a while, the TEST 1 LED lights, and the spindle stops. Mount the test weight to the coupling. (Mark where the weight is mounted for later reference.)

8. When the spindle rotation speed has reached 10000 min^{-1} (10K), 16000 min^{-1} (16K). Press [START].
   (The TEST 1 LED lights.)

9. After a while, the amount of unbalance display starts flashing. Stop the spindle, enter the weight of the test weight, and define it.
   Use the [Increment], [Decrement], and [Move Digit] keys to enter the value and press [ENTER] to define it. The TEST 2 LED lights. Refer to fig 13.

04L11.ai

10. Remove the test weight from the coupling.

11. Mount the test weight to the spindle. Mark where the weight is mounted for later reference.
    The start point of marking with black marker should be a reference point.

12. When the spindle rotation speed has reached 10000 min^{-1} (10K), 16000 min^{-1} (16K). press [START]. (The TEST 2 LED lights.)

13. After a while, the amount of unbalance display starts flashing. Stop the spindle, enter the weight of the test weight, and define it.
    Use the [Increment], [Decrement], and [Move Digit] keys to enter the value and press [ENTER] to define it. (When the test weight is the same as that of TEST 1, press [ENTER] only). Refer to fig 13.

04L12.ai

4.1.4 Spindle balancing (5/9)

The ADJ LED lights and the results are displayed.
Remove the test weight from the spindle.
(Ref. testing weight is 0.92g.)

Fig.13

04L13.ai

4.1.4 Spindle balancing (6/9)

14. Set the number of divisions.

04L14.ai

Numberof divisions is displayed on the min^{-1} display.
(Use [Increment] and [Decrement] keys to change the number of divisions.)

15. Display of results

04L15.ai

4.1.4 Spindle balancing (7/9)

Fig.16-1

04L16-1.ai

Value of the spindles amount of unbalance dispersed between the divided angle.

4.1.4 Spindle balancing (8/9)

In the angle display [A], the unbalance angle is displayed. For the angle displays [B] and [C], the position where the test weight is initially mounted is 1, followed by 2, 3, 4, ... in the direction of rotation.

04L17.ai

The illustration on the left is when viewed from the top.

16. According to the results, set the hexagonal screws for balancing to the indicated positions.

17. When the spindle rotation speed has reached 10000 min^{-1} (10K), 16000 min^{-1} (16K). press [START].
(The ADJ LED lights.)

18. The results are displayed again after a while. (Once the number of divisions is set, this is effective until power is turned off.)
Repeat steps 15) to 18) until the total amount of unbalance (for both No. 1 and No. 2) falls below 0.5 g. (0.5 g is not the divided value but the total value of No. 1 and No. 2 respectively. :Value of fig 16 -1[A])

19. Secure the screws set for balancing again and paste screw-lock paint.

4.1.4 Spindle balancing (9/9)

When balancing is unsuccessful

When the value of the weight required for the spindle exceeds the allowable weight.

Maximum Weight

M5 x 18 (1.88g)

Amount of unbalance = A
Balancin weight = B

B = A - 1.88
where 1.88 g is the weight of M5x18

e.g.
Angle(division number) = 3
Amount of unbalance = 2.5g

2.5 - 1.88 = 0.62

04L19.ai

4.2 Magazine

4.2.1 Magazine adjustment (1/2)

1. After putting magazine No. tags on the tools, remove all the tools.

2. Remove the grip cover.

3. Select the manual operation mode with the **[MANU]** key.

4. By pressing the **[ATC]** key, perform the spindle orientation. Make sure that the spindle orientation was completed.

5. By pressing the **[ATC]** key, raise the spindle head up to the ATC zero position.

6. Manually insert the tool align- ment jig into the spindle taper.

7. While pressing the **[RELSE]** key, press the **[-Z]** key to lower the spindle head. After mounting the tool alignment jig at the end of the spindle firmly, take off the unclamp cam out of the unclamp arm.

8. While pressing the **[RELSE]** key, press the **[+Z]** key to raise the spindle head. Then, make the grip held the tool collar.

9. While pressing the **[RELSE]** key, press the **[-Z]** key to lower the spindle head untill it comes 5mm away from the tool collar. Mount a small tester at the bottom of the tool alignment jig, which is mounted through the tool collar center hole.

10. Rotate the spindle manually and check that the indication of the tool tester at the rear side of the tool collar outer surface is within -0.3+/-0.1 mm when the front side is set to 0. In case that the deviation between the front and the rear sides doesn't fall within -0.3+/-0.1 mm, replace the center shaft spacer 2. 0.1 mm thicker spacer causes magazine position shifted by 0.08 mm towards the front (deviation changes by0.16 mm). As to the replacement procedure of the spacer, refer to2.2.1 "Replacement procedure of the ATC magazine".

    Thickness of the spacer:
    4.6, 4.7, 4.8, 4.9
    5.0, 5.1, 5.2

11. Rotate the spindle manually and check that the deviation between the right and the left sides of the tool collar outer surface is within 0.3 mm.
    [Note]
    Measure it while pushing the magnazine lightly to get rid of the space between the barrel cam and the cam follwer
    In case that the deviation is bigger than 0.3 mm, follow steps indicated below.

4.2.1 Magazine adjustment (2/2)

11.1 Loosen two screws (2 pcs. 2points)securing cam flange 250.
(It is not necessary to remove them.)

11.2 By turning the bearing case, adjust the deviation within 0.3 mm.
When the bearing case is turned to the right by 36°, the barrel cam moves by 0.1 mm. Center of the grip moves by 0.4 mm under this condition.

11.3 Loosen the hex.hole securing socket. (7.8 N.m)

12. Remove the small tester and the tool collar.

13. Mount the unclamp cam.

14. Remove the tool alignment jig.

15. Mount a tool on the grip under the spindle.

16. While pressing the **[RELSE]** key, press the **[-Z]** key to lower the spindle head.
Check that a tool is clamped and unclamped smoothly.

17. Attach the grip cover.

Replacement parts		Tools to be used
Name	Parts code	Phillips screw driver (+) Tool alignment jigu Hex. wrentch (1 set) Tool coller M40 wrentch (SP) Spanner 13 Small test 1/100 Wrench for cam Jig for magazine spacer selection
CENTER SHAFT SPACER 2	640140001	

4.2.2 Address sensor adjustment (1/3)

1. After putting magazine No. tags on the tools, remove all the tools.

2. Remove the grip cover.

3. Remove the proximity sensor cover located on the left side of the saddle.

4. Remove the address plate.

5. Check that the magazine indexes in the right position.
   (The magazine should not be moved when it is pushed by hands.)

6. By pressing the **[I/O]** key,display <the I/O menu >on the screen..
   Then, by pressing the keys **[1]** and **[ENTER]**, display the< I/O >screen.
   By pressing the **[PAGE DOWN]** key, display the <Main 2> screen indicated below.
   Check that the decimal digit indicated by bits (********) of the Input 2 (on the screen) is the same as the indexed magazine No.
   (Refer to the table below.)

```
Main2
Input   1   * * * * * * * * *********        ⬟Input    1   *****************
Input   2   FEDCBA9876543210                 ⬢Output   2   *****************
            * * * * * * * * *********
                                       *     ⬢Output   3   *****************
Input   3   *****************
Input   4   *****************
Input   5   *****************
```

* Correspondance between the bits (*) and the magazine No. is as follows.

Bit	F	E	D	7
Indication of Input1	Encoder Signal 8	Encoder Signal 4	Encoder Signal 2	Encoder Signal 1
Input display	0	1	0	1
Magazine No.	0+4+0+1=5			

4.2.2 Address sensor adjustment (2/3)

7. Turn the barrel cam right end to the right by using a spanner. Mark the position of an edge of the address sensor on the slit plate when a bit of Input 2 (indicating the magazine No.) changes from 1 to 0. Then, turn the barrel cam to the left and mark on the slit plate in the same way.

8. Turn the right end of the barrel cam until its left end notch becomes parallel to the proximity switch.
[Note]
In steps 7. to 8., make sure that the spindle head is at the top of the Z axis.

9. Loosen the address sensor mounting screw and move the address sensor so that its edge locates at the center of the marks on the slit plate.
Tighten the mounting screw.

10. By rotating the barrel cam, index the magazine at No. 1 to 10 (14) positions. Each time, rotate the magazine manually and check that the magazine No. is properly displayed.

11. Pressing the **[ATC]** key repeatedly, check that the indexed magazine No. is properly displayed.

12. Select the magazine No. 2.
<CONV>
By pressing the **[MDI]**, **[PRGRM]** and **[CURSOR DOWN]** key, set the cursor to the tool column.
Press the **[2]** and **[ENTER]** key and the **[START]** button.
<NC>.
Press the **[MDI]**, **[M]**, **[0]** , **[6]** , **[T]** ,**[1]**, **[0]**, **[2]** key and the **[START]** button.

13. Attach the address plate while putting the figure "2" at the bottom.

14. Mount the proximity sensor cover.

15. Attach the grip cover.

16. Mount tools on the grips according the magazine No. tags.

4.2.2 Address sensor adjustment (3/3)

Tools to be used
Phillips screw driver (+) Hex. wrentch (1 set) Spanner 13

4.2.3 Barrel cam proximity adjustment (1/2)

1. After putting magazine No. tags on the tools, remove all the tools.

2. Remove the grip cover.

3. By pressing the **[MANU]** key, select the manual operation mode.

4. By pressing the **[ATC]** key, move the spindle head to the Z axis zero position and perform the spindle orientation.

5. By pressing the **[ATC]** key, raise the spindle head up to the Z axis upper limit.

6. Grip the barrel cam right side end with a spanner and turn the barrel cam by 180°. (Caution: Magazine turns at the same time.)

7. Remove the proximity switch cover.

8. Loosen the proximity switch mounting nut.

9. Keeping the clearance between the barrel cam shaft outer surface and the proximity switch at 0.8 mm. Then, tighten the mounting nut.

10. Rotate the barrel cam and check that the proximity switch LED is OFF when the barrel cam comes to the zero position. Also, display the I/O screen by pressing the **[I/O]** key and check that the bit 6 of Input 2 on the< I/O (Main1)> screen is "0" under the above condition.

4.2.3 Barrel cam proximity adjustment (2/2)

11. Rotate the barrel cam and check if the proximity switch LED is ON when the barrel cam is out of the zero position. Display the <I/O >screen by pressing the **[I/O]** key. Check if the bit 6 of Input 2 on the < I/O (Main 1)> screen is "1" under this condition.

12. After making the barrel cam left side notch parallel to the proximity switch, press the **[RELSE]** key and the **[-Z]** key at the same time to lower the spindle head below the Z axis zero position.

13. Mount the proximity switch cover.

14. Attach the grip cover.

15. Mount tools on the grips by matching the magazine No. tags.

Tools to be used
Phillips screw driver (+) Spanner 13 Clearance gauge

4.2.4 ATC zero position LS adjustment

1. Select the manual operation mode by pressing the **[MANU]** key.

2. By pressing the **[CURSOR DOWN]** key, move the cursor to the step traveling amount.

3. By pressing the **[+]** key, set the step traveling amount to 0.1 mm/step.

4. By pressing the **[ATC]** key, move the spindle head to the z axis zero position and perform the spindle orientation.

5. By pressing the **[ATC]** key, raise the spindle head up to the z axis upper limit.

6. By pressing the **[I/O]** key, display the <I/O> screen (menu) on the screen. Then, press the keys **[1]**, **[ENTER]** to display the <I/O> screen (main1).

7. After pressing the **[JOG]** key, press the **[RELSE]** and the **[-Z]** keys at the same time to move the Z axis until bit E of Input 9 on the I/O screen (main 1) indicates "0".

8. After pressing the **[STEP]** key, press the **[RELSE]** and the **[+Z]** keys at the same time to move the Z axis in the step mode until bit E of Input 9 on the I/O screen (main 1) indicates "1".

9. Display the machine current coordinate screen by pressing the **[POS]** key and check the Z axis machine coordinate.
In case of the high column machine, add the thickness of the column spacer to the above values.

Standard value	567+/-1

10. When the Z axis machine coordinate is within the standard value, adjustment is completed. If not, proceed to the next step to adjust the limit switch position.

10.1 (Adjustment of the limit switch position)
Remove the column side cover on the left side of the column.

10.2 Loosen the LS mounting screw and shift the LS.

10.3 Check the Z axis machine coordinate by the procedure from step 6. to step 9.

10.4 Mount the column side cover.

Tools to be used
Phillips screw driver (+) Hex. wrentch (1 set)

4.2.5 ATC area LS adjustment

1. Select the manual operation mode with the **[MANU]** key.

2. By pressing the **[CURSOR DOWN]** key, move the cursor to the step traveling amount.

3. By pressing the **[+]** key, set thestep traveling amount to 0.1 mm/step.

4. By pressing the **[ATC]** key, move the spindle head to the Z axis zero position and perform the spindle orientation.

5. By pressing the **[I/O]** key, display the <I/O> screen (menu) on the screen. Then, press the keys **[1], [ENTER]** to display the <I/O> screen (main1).

6. After pressing the **[JOG]** key, press the **[RELSE]** and the **[+Z]** keys at the same time to move the Z axis until bit F of Input 9 on the <I/O> screen (main1) indicates "1".

7. After presisng the **[STEP]** key, press the**[RELSE]** and the **[-Z]** keys at the same time to move the Z axis in the step mode until bit F of Input 9 on the <I/O> screen (main 1) indicates "0".

8. Display the machine current position screen with the **[POS]** key.
   Check the Z axis machine coordinate.

Standard value	435+/-3

*In case of the high column machine, add the thickness of the column spacer to the above values.

9. When the Z axis machine coordinate is within the standard value, adjustment is completed.
   If not, proceed to the next step to adjust the limit switch position.

(Adjustment of the limit switch position)

9.1 Remove the column side cover on the left side of the column.

9.2 Loosen the LS mounting screw and shift the LS.

9.3 Check that the Z axis machine coordinate is within the standard value by repeating procedures from 5. to 8. above.

Tools to be used
Phillips screw driver (+) Hex. wrentch (1 set)

4.3 Feed Axis

4.3.1 Origin offset and X and Y axes grid shift value: Setting A (1/3)

1. Set a small test indicator on the spindle before parts replacement .
After performing the zero point return, measure the current position at the base point on the table when the small test indicates 0.
(Use a jigu to decide the base position.)

2. Press **[POS]** and the <PRESENT POS> screen appears.

3. Take note of the values set for [MACHINE POS (X, Y, Z)].

4. After the parts replacement, turn on the <POWER> switch, and press [Z. RTN] to perform the zero point return.

5. Press **[I/O]**, **[1]**, and **[ENT]**.

6. Press **[PAGE DOWN]** and the <SLAVE STATUS DISP1> screen appears.
Take note of the value set for [X (Y) ORIGIN OFFSET VALUE].
*Basically, the offset pulse value won't be changed drastically.
When the offset pulse value is not within 10000+/-2000, adjust the offset value by proceeding following steps.

7.1 Press the **[MANU]** key or the **[MDI]** key.
Press **[I/O]**,**[1]**, **[ENTER]**, **[PAGE UP]**, **[1]**, **[ENTER]**,**[F0]**

7.2 Press **[DATA BANK]** Conversation:**[6][ENTER]**
NC:**[5]**

Press **[1] [ENTER] [PAGE UP] [CURSOR DOWN]**. Move the cursor to [The Orgin Offset Value X (Y)]. Press **[0] [ENTER]** and then **[F0]** twice.

7.3 Turn the <POWER> switch OFF and On.
Press the [Z.R.T.N] key to operate the zero point return.

7.4 Operate steps from 5. to 6. to take a note of the offset pulse value.

7.5 When the value taken note of is within 12000 to 20000, add "-10000" to the said value and set it for [X (Y) ORIGIN OFFSET VALUE] of the machine parameter.
e.g. When offset pulse is 17215,
Origin offset value = 17215 + (-10000)
= 7215 pulse

4.3.1 Origin offset and X and Y axes grid shift value: Setting A (2/3)

Press **[PAGE DOWN]** and the <VERSION> screen appears.
Press **[1], [ENTER], [F0], [F0],** and **[MANU]** or **[MDI]**.
Press **[DATA BANK]** and **[6]** for conversational type (**[5]** for NC type).
Press **[ENTER]** and **[1].** Use **[PAGE DOWN]** and **[CURSOR DOWN]** to move the cursor to [X (Y) ORIGIN OFFSET VALUE] and enter the calculated value.
Press **[ENTER]**, and then **[F0]** twice.

7.6 When the value taken note of is within 0 to 8000, press **[I/O], [1],** and **[ENTER]** and the <MAIN 1> screen appears. Press **[JOG]** and **[-X]** to perform jog operation until bit 8 (9) of Input 9 indicates "1". Take note of the machine coordinate.
Loosen the screw on the coupling motor side of X or Y-axis. Calculate the value using the formula "5 mm - the value taken note of". Press **[STEP]** and **[+X]** or **[+Y]** to move the calculated distance. Tighten the coupling screw with a torque of 7N/m (70 kgf/cm).

7.7 Repeat steps 4. to 6. to check that the value set for [X (Y) ORIGIN OFFSET VALUE] is 10000 +/-2000. If not, repeat 1) and 6) of step 7.

8. Press **[MANU]** to select the manual operation mode.
Press **[JOG]** or **[STEP]**.

9. Move the cursor to **[JOG]** or [**STEP]** on the <MANUAL CONDITIONS> screen.
Press **[+]** to select the desired speed or step travel amount.

10. Press **[+X], [-X], [+Y], [-Y], [+Z],** or **[-Z]** to move the axis to the measuring position before parts replacement. And move the axis to the position where the small test indicates "0".

11. Press **[POS]** and compare the current machine coordinate with that obtained in step 3.

12. Calculate the grid shift value (round off to the nearest whole number).
New grid shift value = Current grid shift value +{(Machine coordinate after parts replacement - Machine coordinate before parts replacement) / 0.0005}

(e.x.)
Grid shift value = 1325 + {(-65.533) - (-66.000)}/ 0.0005 = 1325 + 934 = 2259

13. Set the [PROTECT ON/OFF] switch to [OFF].

4.3.1 Origin offset and X and Y axes grid shift value: Setting A (3/3)

14. Press the **[MANU]** or **[MDI]** . Press the **[I/O]**, **[1], [ENTER]**, **[PAGE UP], [1]**, **[ENTER]**, **[F0]**.
    Press **[DATA BANK]**: Conversation:**[6] [ENTER]**
    NC:**[5]**
15. Press **[1] [ENTER][PAGE UP] [CURSOR DOWN]** to move the cursor to the grid shift value X(Y) axis.

16. Use the numerical keys to enter the calculated value, and press **[ENT]**, and then **[F0]** twice.

17. Set the **[PROTECT ON/OFF]** switch to [ON].

18. Turn the <POWER> switch off and the on again.
    Repeat steps 8. to 11. to check the machine coordinate.

19. Correct the inspection report.

Tools to be used
smalltest2/1000

4.3.2 X (Y) axis grid shift value: Setting B (1/2)

1. Set the [PROTECT ON/OFF] switch to [OFF].

2. Select [DATA BANK] -> [MACHINE PARAMETER] -> [SYSTEM 1], and take note of the value set for [GRID SHIFT VALUE X(Y)] and [X(Y) ORIGIN OFF-SET VALUE] and reset the value to zero (0).

   Press **[MANU]** or **[MDI]**, **[I/O]**, **[1]**, **[ENTER]**, **[PAGE UP]**, **[1]**, **[ENTER]**, and **[F0]**.
   Press [DATA BANK] and **[6] [ENTER]** for conversational type .
   (**[5]** for NC type)
   Press **[PAGE DOWN]**, and **[CURSOR DOWN]** to move the cursor to [GRID SHIFT VALUE X(Y)] and take note of the value. Press **[0]** and **[ENTER]**.
   In the same way, take note of the value set for [X(Y) ORIGIN OFFSET VALUE] and press **[0]**, **[ENTER],** and then **[F0]** twice.

3. Turn the <POWER> switch off and then on again.

4. Press **[MANU]** to enter the manual operation mode, and press **[Z.RTN]**.
   Refer to 4.3.1 Origin offset and X and Y axes grid shift value: Setting A .
   Proceed steps from 4. to 6. to check the offset pulse value.
   If the value is not within the 10000+/-2000, adjust the value by proceeding steps from 7.1 to 7.7.

5. Set a small test indicator on the spindle.

6. Select the manual mode and move the table in the X or Y-axis direction so that the spindle is at the table center.
   (Check that the table key groove deflection to the right or left is 1/100 mm or less.)

7. Press **[POS]** to read the machine coordinate on the screen.

8. Calculate the grid shift value (round off to the nearest whole number).

9. Set the new grid shift value.
   Grid shift value = {Axis travel amount ×0.5 + Machine coordinate}/ 0.0005
   (e.g.)
   Grid shift value = {480 × 0.5 + (-235.623)} / 0.0005 = 8754

Axis Travel Amount	X-axis	Y-axis
TC-S2A	480	360
TC-S2A-0	700	360

4.3.2 X (Y) axis grid shift value: Setting B (2/2)

10. Move the cursor to [GRID SHIFT VALUE X (Y)] of parameter .
(This is the same procedure as step 2.)
Enter the calculated value, and press **[ENT]**, and then **[F0]** twice.

11. Set the <PROTECT ON/OFF> switch to [OFF].

12. Turn the <POWER> switch off and then on again.

13. Repeat steps 4 to 7 and check the machine coordinate to verify that the machine coordinate is within "axis travel amount x 0.5 +/-0.01".

Tool to be used
Small tests2/1000

4.3.3 Settings for origin offset and Z-axis grid shift value (1/2)

1. Before parts replacement.
   Set a tool to the spindle, perform the zero point return, and measure the tool tip current position with a height pre-setter.

2. Press **[POS]** and the <PRESENT POS> screen appears.

3. Take note of the values set for [MACHINE POS (X, Y, Z)].

4. After the replacement, turn the <POWER> switch off and then on.
   Press **[Z. RTN]** to operate the zero point return.

5. Press **[I/O], [1]** and **[ENTER].**

6. Press **[PAGE DOWN]** and the <SLAVE STATUS DISP1> screen appears.
   Take note of the value set for [Z ORIGIN OFFSET VALUE].
   Note: Basically, the offset pulse value does not change a great dial.
   If the value is not within the 20000+/-2000, follow the steps below to adjust the offset value:

7.1 Press**[MANU]**or**[MDI], [I/O], [1], [ENTER], [PAGE UP], [1],** and **[ENTER][F0].**

7.2 Press **[DATA BANK]** and **[6]** for conversational type (**[5]** for NC type).
   Press **[1]** and **[ENTER]**. Use **[PAGE UP]** and **[CURSOR UP]** to move the cursor to the [Z ORIGIN OFFSET VALUE(Z)] .
   Press **[0] [ENTER]** and then **[F0]** twice.

7.3 Turn the <POWER> switch off and then on .
   Press **[Z. RTN]** to operate the zero point return.

7.4 Take a note of the offset pusle value by operating steps from 5. to 6.

7.5 When the value taken note of is within 22000 to 40000, add "-20000" to the said value and set it for [Z ORIGIN OFFSET VALUE] of the machine parameter.
   e.g. When offset pulse is 27215,
   Origin offset value = 27215 + (-20000)
   = 7215 pulse
   Press **[PAGE DOWN]** and the <VERSION> screen appears. Press **[1]**, **[ENTER]**, **[F0], [F0]**, and **[MANU]** or **[MDI.]**
   Then press **[DATA BANK]** and **[6] [ENTER] [1]** for conversational type (**[5]** for NC type).
   Use **[PAGE DOWN]** and **[CURSOR DOWN]** to move the cursor to [(Z) ORIGIN OFFSET VALUE] and enter the calculated value.
   Press **[ENT]**, and then **[F0]** twice.

4.3.3 Settings for origin offset and Z-axis grid shift value (2/2)

7.6 When the value is within 0 to 18000, shift the Z axis origin LS .

7.7 Check if the value for [Z ORIGIN OFFSET VALUE] in steps from 4. to 6. is 20000 ±2000. If not, repeat 1) and 6) of step 7.

8 Perform machine origin return. Press **[MANU]** to enter the manual operation mode and press **[JOG]** or **[STEP]**.

9. Move the cursor to **[JOG]** or **[STEP]** on the screen. Press [+] to select the desired speed or travel amount per step.

10. Press **[+Z]** or **[-Z]** to move the spindle head to the measurement position before parts replacement.

11. Press **[POS]** and compare the current machine coordinate with that obtained in step 3.

12. Calculate a new grid shift value (round off to the nearest whole number).
New grid shift value = Current grid shift value + (Machine coordinate after parts replacement - Machine coordinate before parts replacement) / 0.0004
(e.g.)
Grid shift value = 4375 + (245.835 - 245.000) / 0.0004 = 4375 + 2088 = 6463

13. Set the **[PROTECT ON/OFF]** switch to [OFF].

14. Press the **[MANU]** or **[MDI]** . Press the **[I/O]**, **[1], [ENTER]**, **[PAGE UP], [1]**, **[ENTER]**, **[F0]**.

15. Press **[DATA BANK]**: Conversation:**[6] [ENTER]**
NC:**[5]**
Press **[1] [ENTER][PAGE UP] [CURSOR UP]** to move the cursor to the grid shift value Z axis. Input the calculated value and then press **[ENT]**, **[F0]** twice.

16. Set the [PROTECT ON/OFF] switch to [ON].

17. Turn the <POWER> switch off and then on.

18. After pressing the [ATC] key, repeat steps 8. to 11. to check the machine coordinate.

19. Correct the inspection report.

Tool to be used
height pre-setter

4.3.4 X, Y, Z axes origin limit switch (1/3)

1. Set the [PROTECT ON/OFF] switch to [OFF].

2. Select [DATA BANK] -> [MACHINE PARAMETER] -> [SYSTEM 1], and take note of the value set for [GRID SHIFT VALUE X(Y,Z)] and [X(Y,Z)]ORIGIN OFFSET VALUE] and reset the value to zero (0).

   Press **[MANU]** or **[MDI]**. Press **[I/O], [1]**, **[ENT]**, **[PAGE UP]**, **[1], [ENT],** and **[F0].**
   Then press **[DATA BANK]** and **[6]** for conversational type (**[5]** for NC type).
   Press **[ENTEER], [1], [ENTER], [PAGE DOWN]**, and **[CURSOR DOWN]** to move the cursor to [GRID SHIFT VALUE X(Y,Z)] and take note of the value.
   Press **[0]** and **[ENTER]**. In the same way, take note of the value set for [X(Y,Z)ORIGIN OFFSET VALUE] and press **[0], [ENTER]**, and then **[F0]** twice.

3. Set the [PROTECT ON/OFF] switch to [OFF].

4. Turn the <POWER> switch off and then on again.

5. Press **[MANU]** and **[Z. RTN].**

6. Select the manual mode to move the cursor to **[STEP]**.

7. Use **[+]** to set 0.1 mm for **[STEP]**.

8. Enter **[I/O], [1],** and **[ENTER].** The <INPUT/OUTPUT MENU (Main1)> screen appears.

9. Press **[JOG]**.

10. Press **[-X] ,[-Y]** or **[-Z]** to perform jog operation until bit 8 (9,A) of Input 9 indicates "1". Take note of the machine coordinate.

11. Press **[STEP]**.

12. Press **[-X], [-Y]**, or **[-Z]** to perform step operation until bit 8 (9,A) of Input 9 indicates "0". Take note of the machine coordinate, and check that the difference with that obtained in step 10 is 35 mm ±3 mm (XY axes), 54mm ± 3mm (Z axis) .
    If not, loosen the screw securing the limit switch and repeat the adjustment from step 10.

4.3.4 X, Y, Z axes origin limit switch (2/3)

13. Press **[POS]** to check the machine coordinate on the screen.

Axis	Reference value
X	-5 ± 1
Y	-5 ± 1
Z (S2A)	422± 1
Z (S2A-0)	402± 1

*In case of the high column machine, add the thickness of the column spacer to the value for Z axis..

14. When the machine coordinate is within the reference value in the table above, adjustment is completed. If beyond the value, take note of the machine coordinate currently displayed on the screen. When the value for XY axes is not within the reference value, shift the coupling. When the Z axis value is not within the reference value, shift the LS.
Origin offset value can be set only for the case described in step 16.1.

15.1 Press **[MANU]**. Use **[-X]** and **[-Y]** to move the axis to the stroke center.

15.2 Loosen the screw on the spindle motor side for the X-axis (Y-axis).

15.3 Press **[STEP]**.

15.4 Calculate the amount for shifting.
Amount for shifting = 5 mm - (Value taken note of in the step 13.)

15.5 Use **[+X]** and **[+Y]** to move the motor for the value calculated in 15.4.

4.3.4 X, Y, Z axes origin limit switch (3/3)

15.6 After shifting, secure the coupling securing screw with a torque 7N.m (70 kgf.cm).

15.7 Repeat steps from 4. to 14 to check the machine coordinate.

16.1 Press **[I/O], [1], [ENTER]**, and then **[PAGE DOWN]** four times. Origin offset function can be used only when the displayed offset pulse is in the range from 12000 to 20000 for XY axes and the range from 22000 to 40000 for Z axis.

(XY axes) Origin offset value = Displayed value - 10000
(Z axis) Origin offset value = Displayed value - 20000
Enter the calculated value for [ORIGIN OFFSET VALUE] < system1 < machine parameter.

16.2 Set the [PROTECT ON/OFF] switch to [OFF].

16.3 Enter the value for [X (Y,Z) ORIGIN OFFSET VALUE].
Press **[MANU]** or **[MDI]**, **[I/O]**, **[1]**, **[ENTER][PAGE UP]**, **[1]**, **[ENTER]**, **[F0]**.
Press **[DATA BANK]** then, press **[6]** for conversational type.
press **[5]** forNCtype.

[ENTER], [1], **[ENTER], [PAGE DOWN]**, and **[CURSOR DOWN]** to move the cursor to [X (Y, Z) ORIGIN OFFSET VALUE]. Enter the value using the numerical keys, and press **[ENTER]**, **[F0],** and **[F0]**.
Turn the <POWER> switch off and on.

16.4 Set the [PROTECT ON/OFF] switch to [ON].

16.5 Turn the <POWER> switch off and then on again.

16.6 Repeat steps 4 to 14 to check the machine coordinate.

Tool to be used
Phillips screw driver (+) Hex. wrentch

4.3.5 X, Y axes overrun LS adjustment (1/2)

1. Select the manual operation mode with the **[MANU]** key.

2. By pressing the **[CURSOR DOWN]** or the **[CURSOR UP]** key, move the cursor to the step traveling amount column.

3. By pressing the **[+]** key, set the step traveling amount to 1 mm/step.

4. Press the **[M.Z.RT]** key.

*A. Adjustment procedure of the X (Y) axis + (plus) overrun LS:

5A. By pressing the **[POS]** key, display the current machine position screen.

6A. Press the **[STEP]** key.

7A. While pressing the **[RELSE]** key, press the **[+X]** (**[+Y])** key to move the axis in the step mode until an overrun alarm is displayed on the screen. (within 7 mm)

*B. Adjustment procedure of the X (Y) axis - (minus) overrun LS:

5B. By pressing the **[-X]** (**[-Y]**) key, move the X(Y) axis stroke end.
Then, press the **[POS]**key.

6B. Check the machine position is the following value.

	X	Y
TC-S2A	-480.000	-360.000
TC-S2A-0	-700.000	-360.000

7B. Press the **[STEP]** key.

8B. While pressing the **[RELSE]** key, press the **[-X]**(**[-Y]**) key to move the axis in the step mode until an overrun alarm is displayed on the screen. (within 7 mm)

9. Check that the machine coordinates are within the standard values in the table below.

10. When the machine coordinates are within the standard values, adjustment is completed.
Otherwise, adjust the limit switch position.

4.3.5 X, Y axes overrun LS adjustment (2/2)

* Adjustment of the LS position:

10.1 Take off the cover.

10.2 Loosen the limit switch mounting screw and shift the switch.

10.3 Check the machine coordinates again in the procedure stated as in 4. to 9.

10.4 Attach the cover.

Standard value

	X		Y	
	+OT	-OT	+OT	-OT
TC-S2A	3±1	-483±1	3±1	-363±1
TC-S2A-0	3±1	-703±1	3±1	-363±1

Tool to be used
Phillips screw driver (+) Hex. wrentch assy(1 set)

4.3.6 Zaxis overrun LS adjustment (1/2)

1. Select the manual operation mode with the **[MANU]** key.

2. By pressing the **[CURSOR DOWN]** or the **[CURSOR UP]** key, move the cursor to the step traveling amount.

3. By pressing the [+] key, set the step traveling amount to 1 mm/step.

4. Press the **[Z.RT]** key.

*A. Adjustment procedure of the Z axis + (plus) overrun LS:

5A. By pressing the **[ATC]** key, move the spindle head to the z axis zero position and perform the spindle orientation.

6A. By pressing the **[ATC]** key, move the spindle head to the Z axis upper limit.

7A. Press the **[POS]** key. Then, the <POS> screen appears.

8A. Press the **[STEP]** key.

9A. While pressing the **[RELSE]** key, press the **[+Z]** key to move the spindle head until an overrun alarm is displayed on the screen. (within 7 mm)

*B. Adjustment procedure of the Z axis - (minus) overrun LS:

5B. By pressing the **[-Z]** key, move the Z axis stroke end (-).

6B. By pressing the **[POS]** key, check the machine position is Z:160.

*In case of the high column machine, add the thickness of the column spacer to the value.

7B. Press the **[STEP]** key.

8B. While pressing the **[RELSE]** key, press the **[-Z]** key to move the spindle head in the step mode until an overrun alarm is displayed on the screen. (within 7 mm)

9. Check that the machine coordinates are within the standard values on the next page

10. When the machine coordinates are within the standard values, adjustment is completed.
Otherwise, adjust the limit switch position.

4.3.6 Z axis overrun LS adjustment (2/2)

*Adjustment of the LS position

10.1 Take off the column side cover on the right side of the column.

10.2 Loosen the limit switch mounting screw and shift the limit switch.

10.3 Check the machine coordinates again in the procedure stated as in 4. to 9.

10.4 Attach the column side cover.
*In case of the high column machine, add the thickness of the column spacer to the value.

Standard value

	Z	
	+OT	+OT
TC-S2A	572+/-1	158+/-1
TC-S2A-0	552+/-1	138+/-1

Tool to be used
Phillips screw driver (+) Hex. wrentch (1 set)

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Chapter5 Adjustment procedure (Electrical parts)

5.1 Adjustment procedure of the AVR

5.1.1 Adjustment procedure of the AVR 1 (1/2)

Adjust AVR when the voltage is out of range.

1. Turn the main power breaker on, then the power switch too.
2. AVR 1 adjustment.

Power source	Measurement locations	Voltage adjustment
+5V	Between the NC board CH17(5V) and CH15(LG)	4.85 to 5.15V Center 5.00V

Note: Please do not apply paint lock.

5.1.1 Adjustment procedure of the AVR 1 (2/2)

Chapter6 Check list

6.1 Check list for NC problem

1. When a number key is pressed, NC beeps sharply.
   Yes, _ No, _
2. When a mode key is pressed, LED of the mode moves.
   Yes, _ No, _
3. When the [JOG] key is pressed, the relative axis moves.
   Yes, _ No, _
4. When the [RESET] key is pressed, LED of the key lights up and then goes off.
   Yes, _ No, _
5. 5V power at the check pin on the NC board
   5V+4%, -0% (5.00to5.20V)
   Yes, _ No, _
6. ROM version.
   Yes, _ No, _

Main M_____
Slave S_____
Local M_____
SEQ VER_____

6.2 Check method of the ROM version

1. Turn the MAIN POWER breaker and the POWER switch ON.

2. By pressing the keys [I/O], [1], [ENTER] and [UP PAGE], display the I/O version screen.

3. Take notes of the versions.

<Example>

6.3 Check method of the servo ROM version

1. Turn the MAIN POWER breaker and the POWER switch ON.
2. Press the keys [I/O],[3] and [ENTER].
3. Take notes of numbers ROM TYPE, ROM VERSION.
4. Press [PAGE DOWN] key and take notes for each axis.

```
X AXIS                                          SERVO

•AMPLIFIER COMMAND
 CONTROL DATA                          **
 CONTROL COMMAND                ********
 SPEED COMMAND                  ********
 CURRENT COMMAND                   *****
 SPEED LOOP PROPTNAL GAIN          *****
 SPD LOOP INTGR TM CONST           *****
 CURRENT LIMIT                     *****
•AMPLIFER RESPONSE                     **
 CONTROL DATA           ****************
 STATUS                                 **
 ALARM CODE                        *****
 CRR COMD MONTR/CRR MONTR          *****
 ACTUAL SPEED MONITOR              *****
 ABSO POSITION DATA            **********
 FRAME ERR DETECT COUNTER          ***** /*****
•AMPLIFER INFORMATION
 ROM TYPE **/**     ROM VERSION     ** /**
 AMP MODEL **
•OTHER
 DISPLACEMENT PULSE                *****
NO.OF PULSE CHECK RETRY            *****

    I/O
    MENU
    F0      F1      F2      F3      F4
```

6.4 Method to open the control box door without turning off the power

Be extremely careful about the electrical shock.

1. Remove two screws on the rear side of control box door.

2. Put a screwdriver at the release screw of the main power breaker handle.
   While turning the screw driver in the left, draw the door.

(Note) Never touch the parts in the control box.

Tools to be used
Phillipes screw driver

6.5 Check method of the X,Y axes trouble (1/2)

How to check the cause of the trouble of either X or Y axis;
(When no replacement parts is available.)

(Note) Do not perform the zero position return during checking.

1. Inspection of the SLAVE board internal circuit.
   1.Method Exchange CNX and CNY.
   2.Judgement When operated in the JOG mode etc, trouble occurs;
   at the another axis (X, Y).
   SLAVE board trouble on the same axis.
   SLAVE board OK.

2. Inspection of the driver;
   1.Method Exchange the X and the Y drivers.
   2.Judgement When operated in the JOG mode etc, trouble occurs;
   at the another axis (X,Y).
   Driver trouble on the same axis.
   Driver OK.

6.5 Check method of the X,Y axes trouble (2/2)

3. Inspection of the MOTOR;
   1.Method Exchange the X and the Y motor cables.
   2.Judgement When operated in the JOG mode etc, trouble occurs;
   at the another axis (X,Y)
   Motor trouble on the same axis.
   Motor OK.

Tools to be used
Phillipes screw driver Phillipes screw driver (small)

6.6 Check method of the deviation

1. Turn the MAIN POWER breaker and the POWER switch ON.

2. By the pressing the keys [I/O],[1],[ENTER]and [PAGE DOWN], display the SLAVE STATUS DISPLAY1.

3. Take notes of numbers DEVIATION.

```
SLAVE STATUS DISP1                                INPUT/OUTPUT

 •DEVISION                  •OFFSET  PULSE

  SPINDLE     *******        X AXIS      *******

  X AXIS      *******        Y AXIS      *******

  Y AXIS      *******        Z AXIS      *******

  Z AXIS      *******        A AXIS      *******

  A AXIS      *******        B AXIS      *******

  B AXIS      *******        C AXIS      *******

  C AXIS      *******        MAGAZINE    *******

  MAGAZINE    *******

                             •MPG  COUNTER
                                         *******

     I/O
     MENU

     F0        F1        F2        F3        F4
```

6.7 Check method of the substrate version

Following No. and marks are registered on each substrate (board) except the key board;

1.	Brother board No.	(Ex.)	B52J067-3
2.	Board revision mark		A
3.	Production serial No.		9808001

1.Brother board No.

(Ex.)B52J67-1

- This figure incleases 1 to 2, 2 to 3....,when the board pattern is changed.
- No. saaigned to each board.

2.Production serial No.

(Ex.) 98 08 001

- Serial No. within the production month
- Production month
- Production year (last two places)

3.Board revision mark

(Ex.)A — This mark changes from no mark, A to B....,when the jumper of the board is modified.
Nomally, this mark is shown after the production serial No.

4.Items that you need to inform the manufacturer (or the representative) when asking something;

1.Model	(Ex.)TC-31A
2.Name of the board	(Ex.)NCboard
3.Brother board No.	(Ex.)B52J067-3
4.Production serial No.	(Ex.)9808001
5.Board revision mark	(Ex.)A

(Note)Never touch the parts in the control box.

6.8 LCD version check

Machine model, LCD type, and LCD serial number are all necessary when you inquire about or order spare parts. See the examples below for how to check each.

1.	Machine model	(Ex.)TC-31A
2.	LCD type	(Ex.)LM64P30
3.	LCD serial No.	(Ex.)97C00142N

Operation panel rear

6.9 LED check

1. LED indication when operation is normal.

   LD4, LD6, and LD7 are flashing constantly.
   LD1 to LD3 and LD8 to LD10 are lit or are flashing.
   This varies depending on the operation status.
   LD5 is not lit.

2. LED indication when operation is defective.

LD1 to LD4 stay lit:	CPU is defective.
LD7 to LD10 are not lit:	CPU is defective.
LD6 is not lit and LD5 is lit:	Communication LSI has stopped due to an error.

Chapter 7 Electrical system

7.1 Configuration

7.1.1 Board portability

The same main boards (NC board, Slave board, I/O board, EXIO board, KEY board) are used for the TC31A, TC22A and TCS2A. Thus, supply boards are common. The model and machine specifications can be changed between the TC31A, the TC22A and the TCS2A, using [Short connector MSEL** (6542450**)]. Refer to 8.2 I/O (main) - Attached circuit diagram (circuit 5).
Changing contents is as described below.

MSEL0 : No. of tools 0: 18
1: 26
(This is not used in TC-S2A.)

MSEL1 : ATC arm operation 0: Chuck format
1: Hook format
(This is not used in TC-S2A.)

MSEL2 / MSEL3: Model selection

MSEL2	MSEL3	Model
0	0	TC-22A
1	0	TC-31A
0	1	TC-S2A
1	1	Reserve

MSEL4 / MSEL5: Not used (fixed to "0")

The MEM board differs depending on whether the display language is Japanese or another language (English, German, or French).
Selection of English, German or French is done using the dip switch on the NC board. Refer to 3.1.2 NC board replacement. This applies to the TC-31A, TC-22A and TC-S2A.

7.2. Block Figure

7.2.1 Signal Block Figure

7.2.2 External cables

7.2.2.1 TCS2A (1/2)

7.2.2.1 TCS2A (2/2)

No.	PART CODE	QUANTITY	PART NAME	REMARK
1	653249001	1	SENCODER FLEXIBLE TUBE ASSY, 250	
2	653252001	1	S MOTOR FLEXIBLE TUBE ASSY, 250	
3	653253001	1	X FLEXIBLE TUBE ASSY, 250	
4	653260001	1	Y ENCODER CORD, 250	
5	653261001	1	Y MOTOR CORD, 250	
6	653262001	1	LSY CORD, 250	
7	652536001	1	Z ENCODER CORD, 250	
8	652525001	1	Z MOTOR CORD, 250	
9	653265001	1	LSZ CORD, 250	
10	653266001	1	LS CORD ATC ASSY, 250	
11		1		
12	653064001	1	ATC ENC CORD, ASSY, 250	
13	653065001	1	ATC MOTOR CORD, 250	
14	650245001	1	ATC CAM SWITCH ASSY, 229	
15	654093001	1	KEY CORD ASSY, 31A	
16	654187001	1	SW CORD ASSY, 31A	
17	654186001	1	K200 CORD ASSY, 31A	
18				
19		1	X MOTOR CORD 250	
20		1	X ENCODER CORD 250	
21		1	LSX CORD 250	
22		1	S MOTOR CORD 250	
23		1	S ENCODER CORD 250	
24		1	SFAN CORD 250	
25	654234001	1	DOOR LOCK LS ASSY	

7.3 Control device function

7.3.1 NC board (1/3)

NC board

7.3.1 NC board (2/3)

Connector on the NC board

Connector	Number	Remarks	Connection
CNIO	26	IO board control signal	IO board
CNPW	5	Power Input 5V	AVR1
CNRS	8	B port for RS-232C	None
CNKEY	36	LCD Display, Keyboard signal	Keyboard
CNROM1	96	For MEM board Interface	MEM board
CNROM2	96	For MEM board Interface	MEM board
CNSLV1	96	For SLAVE board Interface	SLAVE board
CNSLV2	48	For SLAVE board Interface	SLAVE board
CNSC	48	For NBUS board Interface	NBUS board

7.3.1 NC board (3/3)

Function of NC board

1.	LocalCPU	(Man-Machineinterface)

1.Editing
2.Keyboardinput(RS-232C)
3.Display

2.	Main CPU	(Operationcommand)

1.Operationcommand
2.Allocation calculation of tool
3.Calculation of tool diameter compensation
4.Calculation of intersection
5.Management of alarm
6.External I/O signal

7.3.2 SLAVE board

Slave board

Connector of the SLAVE board.

Connector	Number	Remarkes	Connection
CNSLV1	96	NC board interface	NC board
CNSLV2	48	NC board interface	NC board
CNX	20	Servo driver interface	X axis driver
CNY	20	Servo driver interface	Y axis driver
CNZ	20	Servo driver interface	Z axis driver
CNS	20	Servo driver interface	S axis driver
CNAX4	20	Servo driver interface	4th axis driver
CNAX5	20	Servo driver interface	5th axis driver
CNAX6	20	Servo driver interface	6th axis driver
CNMAG	20	Servo driver interface	MAG axis driver

Function of SLAVE board.

1. Axis control (8 axes).
2. Pluse count from pluse generator.

7.3.3 MEM board (1/2)

MEM board

7.3.3 MEM board (2/2)

Conector on the MEM board.

Conector	Number	Remarks	Conection
CNROM1	96	For NC board interface.	NC board
CNROM2	96	For NC board interface.	NC board

Function of the MEM board.

The MEM board is equipped with a Flash memory storing the system program for NC board and SLAVE board operations.

7.3.4 IO boad

B52J074-*
CNPAT1
CNPAT2
CNSW
CN100
CN200
CNTOOL
CNSPTHR
CNOPTN
CNEXZ4
CNIO
CNEXIO
CNSGA
CNSPA
CNSPCH
CNMCH
CNSGPCH
CNSGA2
CNVP
CNSGP
CNSGX
CNSGY
CNSGZ
CNARM
CNBIO
CNWRCE
CNYA
CNYB
CNYC
CNSVP
CNDR
CNSGD2
CNM2
CNM4
CNYD
CNYM
CNKCS
SW1
XTPW
XTIO
XTO
XTI
CN5
CN6
CNSUB
160
77±0.2
73±0.2
5±0.1
70±0.2
80±0.2
4±0.1
91±0.2
97±0.2
112±0.2
163±0.2
137±0.2
310
5
14-4

7.3.5 Key board

Key external view

7.3.6 Servo driver

7.3.6.1 Servo parameter (1/6)

These are parameters related to the servo driver of each axis.

1. Below are the parameter check methods.

<Conversation type>

(1) Press [DATA BANK], [6], and [ENT].

(2) Press [5] and [ENT]. (Machine parameter 5 (servo driver))

(3) Scroll the screen using [PAGE DOWN] or [PAGE UP].

<NC type>

(1) Press [DATA BANK], [5], and [ENT].

(2) Press [5] and [ENT]. (Machine parameter 5 (servo driver))

(3) Scroll the screen using [PAGE DOWN] or [PAGE UP].

7.3.6.1 Servo parameter (2/6)

Machine Parameter 5 (Servo)

NO.	Parameter name	Description	Default
001(X) 101(Y) 201(Z) 301(S) 401(4) 501(5) 601(6) 701(7) 801(M)	Velocity loop delay time.	Set the velocity loop delay time. Setting unit: 1micron second Effective range: 1 to 1023 micron second	
002(X) 102(Y) 202(Z) 302(S) 402(4) 502(5) 602(6) 702(7) 802(M)	Velocity loop proportional gain.	Set the default of the velocity loop proportional gain. Setting unit: 1Hz/LSB Effective range: 10 to 3000 Hz	
003(X) 103(Y) 203(Z) 303(S) 403(4) 503(5) 603(6) 703(7) 803(M)	Velocity loop integrated time constant.	Set the default of the velocity loop integrated time constant. Setting unit: 1 ms/LSB Effective range: 1 to 1000 ms	
004(X) 104(Y) 204(Z) 304(S) 404(4) 504(5) 604(6) 704(7) 804(M)	Currentlimiter.	Set the default of the current limiter. Setting unit: 1 %/LSB Effective range: 0 to 400 %	
005(X) 105(Y) 205(Z) 305(S) 405(4) 505(5) 605(6) 705(7) 805(M)	Time retaining Htvi after detection of velocity command “0”.	Set the time that retains Htvi after the velocity command “0” has been detected. Setting unit: 1 msec/LSB Effective range: 1 to 255 msec	

7.3.6.1 Servo parameter (3/6)

NO.	Parameter name	Description	Default
006(X) 106(Y) 206(Z) 306(S) 406(4) 506(5) 606(6) 706(7) 806(M)	Detection range of velocity command.	Set the detection range of the velocity command “0”. Setting unit: 1 .0 rpm/LSB Effective range: 0 to 127 rpm	
007(X) 107(Y) 207(Z) 307(S) 407(4) 507(5) 607(6) 707(7) 807(M)	Velocity loop integrated time constant used for changing quadrant.	Set the velocity loop integrated time constant used when changing quadrant. Setting unit: 1 ms Effective range: 1 to 255 ms	
008(X) 108(Y) 208(Z) 308(S) 408(4) 508(5) 608(6) 708(7) 808(M)	Velocity command LPF.	Set the cut off frequency of the primary low pass filter in respect to the velocity command. Setting unit: 1 Hz/LSB Effective range: 1 to 990 Hz	
009(X) 109(Y) 209(Z) 309(S) 409(4) 509(5) 609(6) 709(7) 809(M)	Current command LPF cut off frequency.	Set the cut off frequency of the current command low pass filter. Setting unit: 1 Hz / LSB Effective range: 1 to 990 Hz	
010(X) 110(Y) 210(Z) 310(S) 410(4) 510(5) 610(6) 710(7) 810(M)	Current command BEF center frequency.	Set the center frequency of the current command band pass filter. Setting unit: 10 Hz / LSB (e.g. Input value = 50 to 500Hz) Effective range: 20 to 99 (200 to 990 Hz)	

7.3.6.1 Servo parameter (4/6)

NO.	Parameter name	Description	Default
011(X) 111(Y) 211(Z) 311(S) 411(4) 511(5) 611(6) 711(7) 811(M)	Velocity command direction. Current command BEF. Velocity command LPF. CH1 polarity. CH2 polarity. Feed back phase order. Current monitor. +/- N7 N6 N5 N4 N3 N2 N1 N1 Velocity command direction. N2 Current command BEF. N3 Velocity command LPF. N4 CH1 polarity. N5 CH2 polarity. N6 Feed back phase order. N7 Current limiter. N8 Current monitor.	[Velocity command direction:N1] Set the velocity command direction. '0': + input to CCW Other than '0': + input to CW [Current command BEF:N2] Set whether or not to set the band pass filter to the current command. '0': OFF Other than '0': ON [Velocity command LPF:N3] Set ON or OFF of the speed command LPF. '0': OFF Other than '0': ON [CH1 polarity:N4] CH2 polarity:N5] Set the polarity of CH1 and CH2 monitors. '0': Increase CCW Other than '0': Increase CW [Feed back phase order:N6] Set the feedback phase order. '0': Phase A Other than '0': Phase B [Current limitor:N7] Set whether or not use a current limiter. '0': OFF Other than '0': ON [Current monitor:N8] Set the type of response to Control +Velocity command. '0': Current command (Icmd) Other than '0': Current monitor (Imo)	
012(X) 112(Y) 212(Z) 312(S) 412(4) 512(5) 612(6) 712(7) 812(M)	CH1 monitor CH2 monitor. +/- * * * * * * N2 N1 N1 CH1 monitor. N2 CH2 monitor.	[CH1 monitor:N1] [CH2 monitor:N2] Of the following four information types; current monitor, current command, velocity monitor, and velocity command, two can be analog-output. Use this parameter to select the information output to CH2 and CH2. 0: Current monitor (1V:IR) 1: Current command (1V:IR) 2: Velocity monitor (0.5V:1000rpm) 3: Velocity command (0.5V:1000rpm) 4: Velocity monitor (0.5V:4000rpm) Other than 0 to 4: Velocity command (0.5V:4000rpm)	

7.3.6.1 Servo parameter (5/6)

NO.	Parameter name	Description	Default
013(X) 113(Y) 213(Z) 313(S) 413(4) 513(5) 613(6) 713(7) 813(M)	Motor type.	Set the motor type. Note: The following are the setting values of the TC31A, thus these may be changed. 46 : 15A Driver times P50B07030D 71 : 30A Driver times P50B08050D 72 : 30A Driver times P50B08075H 105 : 50A Driver times P10B10120H 165 : 150A Driver times P64BM090W 193 : 300A Driver times 64BM100T 19 : 300A Driver times 64BM180L	
014(X) 114(Y) 214(Z) 314(S) 414(4) 514(5) 614(6) 714(7) 814(M)	Encoderresolution.	Set the encoder resolution. 0: 512 1:1000 2:1024 3:1500 4:2000 5:2048 6:2500 7:3000 8:4000 9:4096 10:5000 11:6000 12:8192 13:10000 255:10000 Other than the above, 255 applies.	
015(X) 115(Y) 215(Z) 315(S) 415(4) 515(5) 615(6) 715(7) 815(M)	Encoder type.	Set the type of encoder. 0: Reduced wire incremental encoder. 1: Absolute encoder.	
016(X) 116(Y) 216(Z) 316(S) 416(4) 516(5) 616(6) 716(7) 816(M)	Deadweight dropping prevention. +/- N8 * * * * * * N1 N1: Deadweight dropping prevention. N8: External regenerative resistor.	[Deadweight dropping prevention:N1] Set whenever or not to enable the deadweight dropping prevention control. '0': Enable. Other than '0': Disable [Externalregenerativeresistor:N8] Set the presence of an outside regenerative resistor. '0': Not equipped. Other than '0': Equipped.	
017(X) 117(Y) 217(Z) 317(S) 417(4) 517(5) 617(6) 717(7) 817(M)	Timing of deadweight dropping prevention.	Set the timing of preventing dropping due to deadweight when the servo driver is off. Setting unit : 8 ms / LSB (e.g. Input value = 50 to 400 ms) Effective range : 1 to 255 (8 to 2040 ms)	

7.3.6.1 Servo parameter (6/6)

NO.	Parameter name	Description	Default
018(X) 118(Y) 218(Z) 318(S) 418(4) 518(5) 618(6) 718(7) 818(M)	Current limiter with deadweight dropping prevention control enabled.	Set the current limiter when the deadweight dropping prevention control is enabled. Setting unit : 1% / LSB Effective range : 0 to 400 (0 to 400%)	
019(X) 119(Y) 219(Z) 319(S) 419(4) 519(5) 619(6) 719(7) 819(M)	Not using.		
020(X) 120(Y) 220(Z) 320(S) 420(4) 520(5) 620(6) 720(7) 820(M)	Not using.		

7.3.7 Current protection element

No.	Location	Name	Type/Capacity	Remarks		
1	On the T1.	Q1	Nothing.	Other than EU.	TC-31A(16K).	Spindle main circuit protection.
			Breaker (3P)15A.	EU.		
			Nothing.	Other than EU.	TC-31A(22K). TC-22A	
			Breaker (3P)20A.	EU.		
2	Control box center chassis.	Q2	G fuse (2pcs.)10A.	TC-31A (Other than EU.)	Transformer 2 primary side protection. Spindle motor fan.(Other than EU.)	
			Breaker (2P.)5A.	TC-31A(EU). TC-22A.		
3		Q3	G fuse (3pcs.) 8A.	Other than EU.	Coolant motor, chip flow motor, oil hole motor.	
			Breaker (3P)7.5A.	EU.		
4	On the T2.	Q4	Circuit protector (1P)4A.	Other than EU.	AC100V protecition for control.	
			Circuit protector (1P)3A.	EU.	AC200V protecition for spindle and feed axis control. Spindle motor fan (EU).	
5		Q5	(1P)3A.	EU.	AC100V protecition for control.	
6		Q6	(1P)3A.	EU.	AC24V protecition for light.	
7	Key board.	F1	G fuse S 1A.	For RS-232C.		
8	Side face inside the control box.	Spare fuse.	1) to 7) sets.			

7.3.8 Extended IO board ASSY.

Extend IO board assy.

Fig.1

7.3.9 N bus i/ f board (B52J041-*)

Nbus.jpg

7.3.10 FA- switch imterface board ASSY

Fig.1

7.3.11 ATC board

Chapter 8 Diagnosis by NC unit

8.1 I/O Display

8.1.1 Descliption of <IO> screen

Input signals to the NC unit and output signals from the NC unit can be displayed by pressing the [IO] key. Consequently, you can determine the machine and NC unit operation status when servicing.

An asterisk (*) after each signal indicates that the signal is negative logic (effective when bit is “0”).

“Default” indicates the state when the machine has started correctly.

“-“ indicates that the status varies depending on the settings.

8.2 I/O (Main) (1/20)

MAIN 1: INPUT 1

NO.	Symbol	Name	Default	Function
00			0	
01			0	
02			0	
03	*BATER	Battery error	1	"0" when battery error occurs
04			0	
05	MSEL	Machine selection	-	Not in use
06	*ROMSEL	ROM select	1	0: Flash writing mode
07			0	
			0	
			-	
08	DIPSW0	Dip Switch input 0	-	0:ON, 1:OFF
09	DIPSW1	Dip Switch input 1	-	0:ON, 1:OFF
0A	DIPSW2	Dip Switch input 2	-	0:ON, 1:OFF
0B	DIPSW3	Dip Switch input 3	-	
0C	*EXIO1	EX IO (5th station) provided	0	Extension I/O unit presence check signal When provided: 1
0D		Additional memory	0	0: No, 1: Exist
0E			0	
0F			0	

MAIN 1: INPUT 2

NO.	Symbol	Name	Default	Function
00	CPUERM	CPU error (main)	0	CPU internal error
01	CPUERS	CPUerror (slave)	0	CPU internal error
02	CPUERL	CPU error (local)	0	CPU internal error
03			0	
04	*ALMINT	Alarm interrupt	1	
05			0	
06	*ATCCAM	ATC cam zero point sensor	0	ATC cam sensor position signal 0: Zero point
07	*BYFSM	Flash busy	1	
08			0	
09			0	
0A			0	
0B			0	
0C			0	
0D			0	
0E			0	
0F			0	

Bit	Function	Description
DIPSW0	Change of safety level	0: Level 2 (strict) 1: Level 1 (less strict)
DIPSW1	Change of data/command cache	0: Enable 1: Disable
DIPSW2	Not used	0
DIPSW3	Flash writing	0: Normal 1: Writing

8.2 I/O (Main) (2/20)

MAIN 1: INPUT 3

NO.	Symbol	Name	Default	Function
00	OPNSW	Automatic door open SW.	0	“1” when the switch is pressed.
01	CLSSW	Automatic door close SW.	0	“1” when the switch is pressed.
02	MODE	Automatic door mode SW.	-	
03			0	
04			0	
05			0	
06			1	
07			1	
08	PI0	Key entry for FA0	0	Input signal via FA I/F board.
09	PI1	Key entry for FA1	0	
0A	PI2	Key entry for FA2	0	
0B	PI3	Key entry for FA3	0	
0C	PI4	Key entry for FA4	0	
0D	PI5	Key entry for FA5	0	
0E	PI6	Key entry for FA6	0	
0F	PI7	Key entry for FA7	0	

MAIN 1: INPUT 4

NO.	Symbol	Name	Default	Function
00	RELEASE	Release key.	0	“1” when [RELEASE] key is pressed .
01	RESET	Reset key.	0	“1” when [RESET] key is pressed.
02	SHIFT	Shift key.	0	“1” when [SHIFT] key is pressed.
03	MANU	Manu (manual).	0	“1” when [MANU] key is pressed.
04	MDI	MDI.	0	“1” when [MDI] key is pressed.
05	MEMOK	Memory operation.	0	“1” when [MEMOK] key is pressed.
06	EDIT	Edit.	0	“1” when [EDIT] key is pressed.
07			0	
08	JOG+X	Jog key +X	0	“1” when [JOG] key is pressed.
09	JOG-X	Jog key -X	0	“1” when [JOG] key is pressed.
0A	JOG+Y	Jog key +Y	0	“1” when [JOG] key is pressed.
0B	JOG-Y	Jog key -Y	0	“1” when [JOG] key is pressed.
0C	JOG+Z	Jog key +Z	0	“1” when [JOG] key is pressed.
0D	JOG-Z	Jog key -Z	0	“1” when [JOG] key is pressed.
0E	JOG+4	Jog key +4	0	“1” when [JOG] key is pressed.
0F	JOG-4	Jog key -4	0	“1” when [JOG] key is pressed.

8.2 I/O (Main) (3/20)

MAIN 1: INPUT 5

NO.	Symbol	Name	Default	Function
00	R0	Key matrix lead signal0	0	Key matrix lead signal.on the board.
01	R1	Key matrix lead signal1	0	
02	R2	Key matrix lead signal2	0	
03	R3	Key matrix lead signal3	0	
04	R4	Key matrix lead signal4	0	
05	R5	Key matrix lead signal5	0	
06	R6	Key matrix lead signal6	0	
07	R7	Key matrix lead signal7	0	
08	R8	Key matrix lead signal8	0	
09	R9	Key matrix lead signal9	0	
0A	R10	Key matrix lead signal10	0	
0B	R11	Key matrix lead signal11	0	
0C			0	
0D	AX1	Axis selection SW1	0	Refer to the other table
0E	AX2	Axis selection SW2	0	Refer to the other table
0F			0	

MAIN 1: INPUT 6

NO.	Symbol	Name	Default	Function
00	STA	Start SW.	0	“1” when [START SW] key is pressed.
01	STOP	Stop SW.	0	“1” when [STOP SW] key is pressed.
02	OSTA	Pallet start SW.	0	“1” when [PALLET START SW] key is pressed .
03	KEYPRT	Mode select SW.	0	Mode select can not be operated.
04	QT1	Pallet select1	-	Refer to the other table
05	QT2	Pallet select2	-	Refer to the other table
06	QT4	QT select signal.	-	When QT is provided:0
07			-	Refer to the other table
08	FOV1	Rapid override1	0	Refer to the other table
09	FOV2	Rapid override2	0	Refer to the other table
0A	FOVIN	Rapid override IN	0	Refer to the other table
0B	SPOV1	Spindle override 1	0	Refer to the other table
0C	SPOV2	Spindle override 2	0	Refer to the other table
0D	SPOV3	Spindle override 3	0	Refer to the other table
0E	SPOV4	Spindle override 4	0	Refer to the other table
0F	SPOVIN	Spindle override IN	0	Refer to the other table

8.2 I/O (Main) (4/20)

Input 6 11~15 bit

SPOVIN	SPOV4	SPOV3	SPOV2	SPOV1	Description
1	0	1	1	1	120%
1	1	0	0	0	110%
1	1	0	0	1	100%
1	1	0	1	0	90%
1	1	0	1	1	80%
1	1	1	0	0	70%
1	1	1	0	1	60%
1	1	1	1	0	50%
1	1	1	1	1	Alarm

Input 6 8~10 bit

FOVIN	FOV 2	FOV 1	Description
1	0	0	120%
1	0	1	Feed speed 3
1	1	0	Feed speed 2
1	1	1	0%

Input5 4~6 bit

QT 2	QT 1	Description
0	0	OFF
0	1	Pallet 1
1	1	Pallet 1 ⟺ 2
1	0	Pallet 2

Input6 13~14 bit

AX2	AX1	FOV 1	Description
1	0	0	Not connected
1	0	1	The 4th axis select
1	1	0	The 5th axis select
1	1	1	The 6th axis select

8.2 I/O (Main) (5/20)

MAIN 1: INPUT 7

NO.	Symbol	Name	Default	Function
00	MOV1	Cutting override 1	0	Refer to the table.
01	MOV2	Cutting override 2	0	Refer to the table.
02	MOV3	Cutting override 3	0	Refer to the table.
03	MOV4	Cutting override 4	0	Refer to the table.
04	MOV5	Cutting override 5	0	Refer to the table.
05	MOVIN	Cutting override IN	0	Refer to the table.
06	PULSC1	Manual Palse Generator Scale 1	0	Refer to the table.
07	PULSC2	Manual Palse Generator Scale 2	0	Refer to the table.
08	PULAX1	Manual Pallse Gnerator Axis Selection 1	0	Refer to the table.
09	PULAX2	Manual Pallse Gnerator Axis Selection 2	0	Refer to the table.
0A	PULAX3	Manual Pallse Gnerator Axis Selection 3	0	Refer to the table.
0B	PULAX4	Manual Pallse Gnerator Axis Selection 4	0	Refer to the table.
0C	OPT0	Input reserve 0	0	Input reserve 0
0D	OPT1	Input reserve 1	0	Input reserve 1
0E	OPT2	Input reserve 2	0	Input reserve 2
0F	OPT3	Input reserve 3	0	Input reserve 3

MAIN 1: INPUT 8

NO.	Symbol	Name	Default	Function
00	EXSTART	External start	0	“1” when SW is turned on.
01	EXOUTST	External out start	0	“1” when SW is turned on.
02	EXSTOP	External stop	0	“1” when SW is turned on.
03	EXRESET	External reset	0	“1” when SW is turned on.
04	DROPEN	Door open	0	“1” when automatic door is opened.
05	DRCLOSE	Door close	0	“1” when automatic door is closed.
06	DRCLS2	Door close 2 (QT inside door)	0	“1” when QT inside door is closed.
07	ATCOH	ATC overheat	0	“1” when ATC is overheat.
08	MSEL0	Machine select signal 0	-	No. of tools 0: 14 1: 21
09	MSEL1	Machine select signal 1	-	ATC arm 0: Chuck format 1: Hook format
0A	MSEL2	Machine select signal 2	-	
0B	MSEL3	Machine select signal 3	-	
0C	MSEL4	Machine select signal 4	0	Not used
0D	MSEL5	Machine select signal 5	0	Not used
0E	SECSW	Safety Device Switch	0	
0F	CE	CE Specification	0	“1” when door interlock switch is available for CE specification.

8.2 I/O (Main) (6/20)

Main 1: Input 8 0A, 0B, 0D bit

MSEL5	MSEL3	MSEL2	MODEL
1	0	0	TC-22A
0	0	1	TC-31A
0	1	0	TC-S2A
0	1	1	TC-32A
1	1	0	TC-R2A
1	1	1	TC-20A
0	0	0	TC-S2B

Input 7 6~7 bit

PULSC2	PULSC1	Function
0	0	X1
0	1	X10
1	0	X100
1	1	

Input 7 8~11 bit

PULAX4	PULAX3	PULAX2	PULAX1	Function
0	0	0	0	X axis
0	0	1	0	Y axis
0	0	0	1	Z axis
0	0	1	1	palser OFF
0	0	1	1	Additional sxis
0	1	1	1	Not connected

CONTRAST / SHIGNAL	Dark ← Contrast → Bright															
	0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
CONT1	0	1	0	1	0	1	0	1	0	1	0	1	0	1	0	1
CONT2	0	0	1	1	0	0	1	1	0	0	1	1	0	0	1	1
CONT4	0	0	0	0	1	1	1	1	0	0	0	0	1	1	1	1
CONT8	0	0	0	0	0	0	0	1	1	1	1	1	1	1	1	1

8.2 I/O (Main) (7/20)

Input 7 0~5 bit

MOVIN	MOV 5	MOV 4	MOV 3	MOV 2	MOV 1	Description
1	0	1	0	1	1	200%
1	0	1	1	0	0	190%
1	0	1	1	0	1	180%
1	0	1	1	1	0	170%
1	0	1	1	1	1	160%
1	1	0	0	0	0	150%
1	1	0	0	0	1	140%
1	1	0	0	1	0	130%
1	1	0	0	1	1	120%
1	1	0	1	0	0	110%
1	1	0	1	0	1	100%
1	1	0	1	1	0	90%
1	1	0	1	1	1	80%
1	1	1	0	0	0	70%
1	1	1	0	0	1	60%
1	1	1	0	1	0	50%
1	1	1	0	1	1	40%
1	1	1	1	0	0	30%
1	1	1	1	0	1	20%
1	1	1	1	1	0	10%
1	1	1	1	1	1	0%

8.2 I/O (Main) (8/20)

Control box transformer (T1) overheating detection signal.

MAIN 1: INPUT 9

NO.	Symbol	Name	Default	Function
00	100VER	100 V power supply error	0	100 V error detected inside the control box.
01	BOXOH	Control box overheat	0	Control box temperature rise detection signal.
02	*SPOH	*Spindle motor overheat	1	"0" when the spindle motor is overheat.
03	*TOH	*Trans overheat	1	"0" when the trans is overheat.
04	COOLOH	Coolant pump motor overheat	0	"1" when the coolant pump motor is over-heat.
05	CHPOH	Chip flow pump motor overheat	0	"1" when the chip flow pump motor is overheat.
06	OILHLOH	Oil hole pump motor overheat	0	"1" when the oil hole pump motor is overheat.
07		Input reserve 1	0	
08	XLS	Zero piont limit X	0	"1" when X zero point LS is turned on.
09	YLS	Zero piont limit Y	0	"1" when Y zero point LS is turned on
0A	ZLS	Zero piont limit Z	0	"1" when Z zero point LS is turned on
0B	4LS	Zero piont limit 4	0	"1" when 4 zero point LS is turned on
0C	5LS	Zero piont limit 5	0	"1" when 5 zero point LS is turned on
0D	6LS	Zero piont limit 6	0	"1" when 6 zero point LS is turned on
0E	ATCORG	ATC zero point limit	-	"1" when ATC zero position LS is turned on.
0F	ATCIN	ATC area limit	-	"1" when ATC area LS is turned on.

8.2 I/O (Main) (9/20)

MAIN 2: INPUT 1

NO.	Symbol	Name	Default	Function
00	+X	Over run +X	0	Overrun:1
01	-X	Over run -X	0	Overrun:1
02	+Y	Over run +Y	0	Overrun:1
03	-Y	Over run -Y	0	Overrun:1
04	+Z	Over run +Z	0	Overrun:1
05	-Z	Over run -Z	0	Overrun:1
06	OTLCH	All axes over latch	0	"1" when all axes are overlatch
07	SVPWOFF	Servo Power OFF	-	“1” always (For I O board, -3~)
08	ACDWN	AC power low	0	“1” when the defective is occured.
09	AIRDWN	Air power low	0	“1” when the defective is occured.
0A	PWOFF	Power switch off	0	“1” when the power switch is OFF.
0B	24VER	DC24V error	0	“1” when DC24V error is occured.
0C	EMS	Emergency stop	0	“1” when the emergency stop is ON.
0D	INVTER	ATC board error	0	The error detective signal for ATC board.
0E	RYCHK1	Servo relay contact check 1	1	“1” when KS1 is ON.
0F	RYCHK2	Servo relay contact check 2	0	Not in use.

MAIN 2: INPUT 2

NO.	Symbol	Name	Default	Function
00	P4C0	Input reserve 6	-	
01	AX4UNCLS	4th axis unclamp end input	-	“1” when C axis is clamped.
02	P4C2	Input reserve 7	-	
03	AX5UNCLS	5th axis unclamp end input	-	“1” when LS is closed.
04	P4C4	Input reserve 8	-	
05	AX6UNCLS	6th axis unclamp end input	-	“1” when LS is closed.
06	DEC	Deceleration signal	1	ATC magazine deceleration signal
07	T1	Magazine 1	-	Refer to the table.
08	+5	Over run+ additional axis 1+	0	“1” when LS is closed.
09	-5	Over run+ additional axis 1-	0	“1” when LS is closed.
0A	+6	Over run+ additional axis 2+	0	“1” when LS is closed.
0B	-6	Over run+ additional axis 2-	0	“1” when LS is closed.
0C	DROPN3	Side door open	0	“1” when side door is open.
0D	T2	Magazine 2	-	Refer to the table.
0E	T4	Magazine 4	-	Refer to the table.
0F	T8	Magazine 8	-	Refer to the table..

8.2 I/O (Main) (10/20)

Input 2 ,7 Bit D~F

Magazine No.	T8	T 4	T 2	T 1
1	0	0	0	1
2	0	0	1	0
3	0	0	1	1
4	0	1	0	0
5	0	1	0	1
6	0	1	1	0
7	0	1	1	1
8	1	0	0	0
9	1	0	0	1
10	1	0	1	0
11	1	0	1	1
12	1	1	0	0
13	1	1	0	1
14	1	1	1	0

8.2 I/O (Main) (11/20)

MAIN 2: INPUT 3

NO.	Symbol	Name	Default	Function
00	TOOLOK	Tool breakage detection sensor	0	“0” when the sensor is not provided . “1" when the sensor is provided (re-tracted) . “0” when the tool contacts.
01	TLS1	Tool breakage detection retr-*act end LS	0	“1” when tool breakage detection retracts.
02	TLS2	Tool breakage detection advance end LS	0	“1” when the Z axis measurement cover is opned . “0” when beam is obstructed .
03	ZCVOLS	Cover open signal	0	
04	*ARESN	Area sensor input	1	
05		Input reserve	0	I/O board, extend I/O point.
06		Input reserve	0	
07		Input reserve	0	
08	Pi53	Programable input (53)	0	
09	Pi54	Programable input (54)	0	
0A	Pi55	Programable input (55)	0	
0B	Pi56	Programable input (56)	0	
0C	Pi57	Programable input (57)	0	
0D	Pi58	Programable input (58)	0	
0E	Pi59	Programable input (59)	0	
0F	Pi60	Programable input (60)	0	

MAIN 2: INPUT 4

NO.	Symbol	Name	Default	Function
00	Pi203	Programable input (203)	0	Extend I/O board, point
01	Pi204	Programable input (204)	0	
02	Pi205	Programable input (205)	0	
03	Pi206	Programable input (206)	0	
04	Pi207	Programable input (207)	0	
05	Pi208	Programable input (208)	0	
06	Pi209	Programable input (209)	0	
07	Pi210	Programable input (210)	0	
08	Pi213	Programable input (213)	0	
09	Pi214	Programable input (214)	0	
0A	Pi215	Programable input (215)	0	
0B	Pi216	Programable input (216)	0	
0C	Pi217	Programable input (217)	0	
0D	Pi218	Programable input (218)	0	
0E	Pi219	Programable input (219)	0	
0F	Pi220	Programable input (220)	0	

8.2 I/O (Main) (12/20)

MAIN 1: OUTPUT 1

NO.	Symbol	Name	Default	Function
00	WATDOGM	Watchdog	0	NC internal self-check signal.
01	NMIGATEM	NMI gate	0	NMI interrupt permission signal.
02	*ALMCLR	Alarm clear	1	Alarm circuit reset.
03	SVRYON1	Servo relay on 1	0	Servo relay ON.
04	SVRYON2	Servo relay on 2	0	
05	*SFTPM	Soft protect	1	System memory protect signal.
06	ATCGATE	ATC origin sensor gate	0	Gate signal of ATC zero point signal .
07	INTOK	Interrupt enable	0	Interrupt permission signal.
08	LED0	LED output 0	0	
09	LED1	LED output 1	0	
0A	LED2	LED output 2	0	
0B	LED3	LED output 3	0	
0C	*WATCLR	Watch dog clear	1	
0D			0	
0E			0	
0F			0	

MAIN 1: OUTPUT 2

NO.	Symbol	Name	Default	Function
00	S0	Key LED matrix scan 0	0	Keyboard and LED output matrix drive signal.
01	S1	Key LED matrix scan 1	0	
02	S2	Key LED matrix scan 2	0	
03	SL0	LED scan output 0	0	
04	SL1	LED scan output 1	0	
05	OT0	LED matrix output 0	0	
06	OT1	LED matrix output 1	0	
07	OT2	LED matrix output 2	0	
08	OT3	LED matrix output 3	0	
09	OT4	LED matrix output 4	0	
0A	OT5	LED matrix output 5	0	
0B	OT6	LED matrix output 6	0	
0C	OT7	LED matrix output 7	0	
0D	OT8	LED matrix output 8	0	
0E	OT9	LED matrix output 9	0	
0F			0	

8.2 I/O (Main) (13/20)

MAIN 1: OUTPUT 3

NO.	Symbol	Name	Default	Function
00			0	
01			0	
02			0	
03			0	
04			0	
05			0	
06			0	
07			0	
08	PO0	Key output for FA 0	0	FA interface contact.
09	PO1	Key output for FA 1	0	
0A	PO2	Key output for FA 2	0	
0B	PO3	Key output for FA 3	0	
0C	PO4	Key output for FA 4	0	
0D	PO5	Key output for FA 5	0	
0E	PO6	Key output for FA 6	0	
0F	PO7	Key output for FA 7	0	

MAIN 1: OUTPUT 4

NO.	Symbol	Name	Default	Function
00	STALED	Start LED	0 0	"1" when Operation panel/start lamp is turned on.
01	STPLED	Stop LED	0 0	"1" when Operation panel/stop lamp is turned on.
02	OSTALED	Outside start LED	0 0	"1" when operation panel/external lamp is turend on.
03	BUZZ	Buzzeer	0	"1" when Operation panel/buzzer drive is turned on.
04			0	
05			0	
06			0	
07			0	
08	CONT1	LED contrast signal 1	0	Refer to the other table.
09	CONT2	LED contrast sginal 2	0	Refer to the other table.
0A	CONT4	LED contrast sginal 4	0	Refer to the other table.
0B	CONT8	LED contrast sginal 8	0	Refer to the other table.
0C			0	
0D				
0E				
0F				

8.2 I/O (Main) (14/20)

MAIN 1: OUTPUT 5

NO.	Symbol	Name	Default	Function
00			0	
01			0	
02	MAGST	Magazine start	0	"1"is set during magazine rotation.
03	MAGCCW	Magazine CCW	0	"1" when magazine direction is CCW.
04	SPOUT5	Output reserve 5	0	
05	SPOUT4	Output reserve 4	0	
06	DRLK	Door lock	0	"1"when the front door is locked.
07	OTRELS	OT release	0	"1" when the release key is turned on.
08	LIGHT	Machine light	0	"1" when the machine light key is on.
09	COLSW	Coolant SW	0	"1" when the coolant key is on.
0A	CHIPSW	Chip shower SW on	0	"1" when the chip shower is on.
0B	M08	Coolant valve on M18	0	"1" when the coolant(M08) is on.
0C	M400	Chip shower on M400	0	M400 signal output.
0D	M408	Oil hole on M408	0	M408 signal output.
0E	HPMON	Spindle through pump on	0	M494 signal output.
0F	AIRBLW	Air blasting	0	"1" when the spindle air valve drive is on.

MAIN 1: OUTPUT 6

NO.	Symbol	Name	Default	Function
00	AX4UNC	4 axis unclamp output.	0	4 axis unclamp output.("1" when C axis is unclamped.)
01	AX5UNC	5 axis unclamp output.	0	5 axis unclamp output. (Theory is paramter switch.)
02	AX6UNC	6 axis unclamp output.	0	6 axis unclamp output. (Theory is paramter switch.)
03	SPOUT1	Output reserve 1.	0	Output reserve 1.
04	SPOUT2	Output reserve 2.	0	Output reserve 2.
05	SPOUT3	Output reserve 3.	0	Output reserve 3.
06	DRVOPN	Automatic door valveopen.	0	"1" when the automatic door valve opens.
07	DRVCLS	Automatic door valve close.	0	"1" when the automatic door valve closes.
08	HPVON	3 way valve on.(SP through)	0	M494 signal output.
09	DRNVON	Drain air valve on. (SP through)	0	"1" when drain air valve is on. (SP through)
0A	*QTLOC	QT index. (constantly 1)	1	"0" when QT index.
0B				(always 1for the machine QT is not pro-
0C				vided with.)
0D	PA13	Output reserve 6	0	
0E	PA14	Output reserve 7	0	
0F	TMOFF	Power off	0	1: When the timer power is OFF.

8.2 I/O (Main) (15/20)

MAIN 1:OUTPUT 7

NO.	Symbol	Name	Default	Function
00	EXSTOUT	Start signal output	0	"1" when the start switch is pressed down.
01	EXOUTSTOUT	External start output	0	"1" when the external start switch is pressed down.
02	RED	Indication lamp red	0	Indication , out put.
03	YEL	Indication lamp yellow	0	
04	GRN	Indication lamp blue	0	"1" when the side door is locked..
05	DRLK2	Side door lock	0	M200 output signal, tool breakage operation signal.
06	M200	Tool breakage start (MCODE)	0	"1" when Z axis cover opens.
07	ZCVOP	Z axis cover open	0	IO board, IO output signal.
08	PO103	Programable output<103>	0	
09	PO104	Programable output<104>	0	
0A	PO105	Programable output<105>	0	
0B	PO106	Programable output<106>	0	
0C	PO107	Programable output<107>	0	
0D	PO108	Programable output<108>	0	
0E	PO109	Programable output<109>	0	
0F	PO110	Programable output<110>	0	

MAIN 1: OUTPUT 8

NO.	Symbol	Name	Default	Function
00	PO303	Programable output<303>	0	Extend IO board, IO output.
01	PO304	Programable output<304>	0	
02	PO305	Programable output<305>	0	
03	PO306	Programable output<306>	0	
04	PO307	Programable output<307>	0	
05	PO308	Programable output<308>	0	
06	PO309	Programable output<309>	0	
07	PO310	Programable output<310>	0	
08	PO313	Programable output<313>	0	
09	PO314	Programable output<314>	0	
0A	PO315	Programable output<315>	0	
0B	PO316	Programable output<316>	0	
0C	PO317	Programable output<317>	0	
0D	PO318	Programable output<318>	0	
0E	PO319	Programable output<319>	0	
0F	PO320	Programable output<320>	0	

8.2 I/O (Main) (16/20)

MAIN 1: OUTPUT 9

NO.	Symbol	Name	Default	Function
00	PO323	Programable output<323>	0	Extended IO board, IO output.
01	PO324	Programable output<324>	0	
02	PO325	Programable output<325>	0	
03	PO326	Programable output<326>	0	
04	PO327	Programable output<327>	0	
05	PO328	Programable output<328>	0	
06	PO329	Programable output<329>	0	
07	PO330	Programable output<330>	0	
08	PO333	Programable output<333>	0	
09	PO334	Programable output<334>	0	
0A	PO335	Programable output<335>	0	
0B	PO336	Programable output<336>	0	
0C	PO337	Programable output<337>	0	
0D	PO338	Programable output<338>	0	
0E	PO339	Programable output<339>	0	
0F	PO340	Programable output<340>	0	

8.2 I/O (Main) (17/20)

INPUT STATUS DISPLAY (MAIN 1)

Input \ Bit	F	E	D	C	B	A	9	8	7	6	5	4	3	2	1	0
1			ADDITIONAL MEMORY	*EXIO (5TH STATION) provided	DIP SWICH 3	DIP SWICH 2	DIP SWICH 1	DIP SWICH 0		*ROM SELECT	MACHINE SELECTION		*BATTERY ERROR			
2									*FLASH BUSY	*ATC CAM ZERO POINT SENSOR		*ALARM INTERRUPT		CPU ERROR (LOCAL)	CPU ERROR (SLAVE)	CPU ERROR (MASTER)
3	KEY ENTRY FOR FA 7	KEY ENTRY FOR FA 6	KEY ENTRY FOR FA 5	KEY ENTRY FOR FA 4	KEY ENTRY FOR FA 3	KEY ENTRY FOR FA 2	KEY ENTRY FOR FA 1	KEY ENTRY FOR FA 0						AUTOMATIC DOOR MODE SW	AUTOMATIC DOOR CLOSE SW	AUTOMATIC DOOR OPEN SW
4	JOG KEY -4	JOG KEY +4	JOG KEY -Z	JOG KEY +Z	JOG KEY -Y	JOG KEY +Y	JOG KEY -X	JOG KEY +X		EDIT	MEMO (MEMORY OPERATION)	MDI	MANU (MANUAL)	SHIFT KEY	RST KEY	RELSE KEY
5		AXIS SELECTION SW2	AXIS SELECTION SW1		KEY MATRIX READ SIGNAL 11	KEY MATRIX READ SIGNAL 10	KEY MATRIX READ SIGNAL 9	KEY MATRIX READ SIGNAL 8	KEY MATRIX LEAD SIGNAL 7	KEY MATRIX LEAD SIGNAL 6	KEY MATRIX LEAD SIGNAL 5	KEY MATRIX LEAD SIGNAL 4	KEY MATRIX LEAD SIGNAL 3	KEY MATRIX LEAD SIGNAL 2	KEY MATRIX LEAD SIGNAL 1	KEY MATRIX LEAD SIGNAL 0
6	POWER OFF	OUTPUT RESERVE 7	OUTPUT RESERVE 6	SPINDLE OVERRIDE 2	SPINDLE OVERRIDE 1	RAPID OVERRIDE IN	RAPID OVERRIDE 2	RAPID OVERRIDE 1		QT SELECT SIGNAL	PALLET SELECT 2	PALLET SELECT 1	MODE SELECT SW	PALLET START SW	STOP SW	START SW
7	INPUT RESERVE 3	INPUT RESERVE 2	INPUT RESERVE 1	INPUT RESERVE 0	MANUAL PULSE GENERATOR AXIS SELECTION 4	MANUAL PULSE GENERATOR AXIS SELECTION 3	MANUAL PULSE GENERATOR AXIS SELECTION 2	MANUAL PULSE GENERATOR AXIS SELECTION 1	MANUAL PULSE GENERATOR SCALE 2	MANUAL PULSE GENERATOR SCALE 1	CUTTING OVERRIDE IN	CUTTING OVERRIDE 5	CUTTING OVERRIDE 4	CUTTING OVERRIDE 3	CUTTING OVERRIDE 2	CUTTING OVERRIDE 1
8	CE SPECIFICATION	SAFETY DEVICE SW	MACHINE SELECT SIGNAL 5	MACHINE SELECT SIGNAL 4	MACHINE SELECT SIGNAL 3	MACHINE SELECT SIGNAL 2	MACHINE SELECT SIGNAL 1	MACHINE SELECT SIGNAL 0	ATC OVER HEAT	DOOR CLOSE2 (QT INNER DOOR)	DOOR CLOSE	DOOR OPEN	EXTERNAL RESET	EXTERNAL STOP	EXTERNAL OUT START	EXTERNAL START
9	ATC AREA LIMIT	ATC ZERO POINT LIMIT	ZERO POINT LIMIT 6	ZERO POINT LIMIT 5	ZERO POINT LIMIT 4	ZERO POINT LIMIT Z	ZERO POINT LIMIT Y	ZERO POINT LIMIT X	INPUT RESERVE 1	OIL HOLE PUMP MOTOR OVER HEAT	CHIP FLOW PUMP MOTER OVERHEAT	COOLANT PUMP MOTOR OVERHEAT	* TRANS OVERHEAT	* SPINDLE MOTER OVERHEAT	CONTROL BOX OVERHEAT	100V POWER SUPPLY ERROR

8.2 I/O (Main) (18/20)

OUTPUT STATUS DISPLAY(MAIN 1)

Output \ Bit	F	E	D	C	B	A	9	8	7	6	5	4	3	2	1	0
1				*WATCH DOG CLEAR	LED OUTPUT 3	LED OUTPUT 2	LED OUTPUT 1	LED OUTPUT 0	INTERRUPT ENABLE	ATC ORIGIN SENSOR GATE	*SOFT PROTECT	SERVO RELAY ON 2	SERVO RELAY ON 1	*ALARM CLEAR	NMI GATE	WATCH DOG
2		LED MATRIX OUTPUT 9	LED MATRIX OUTPUT 8	LED MATRIX OUTPUT 7	LED MATRIX OUTPUT 6	LED MATRIX OUTPUT 5	LED MATRIX OUTPUT 4	LED MATRIX OUTPUT 3	LED MATRIX OUTPUT 2	LED MATRIX OUTPUT 1	LED MATRIX OUTPUT 0	LED SCAN OUTPUT 1	LED SCAN OUTPUT 0	KEY LED MATRIX SCAN 2	KEYLED MATRIX SCAN 1	KEY MATRIX SCAN 0
3	KEY OUTPUT FOR FA 7	KEY OUTPUT FOR FA 6	KEY OUTPUT FOR FA 5	KEY OUTPUT FOR FA 4	KEY OUTPUT FOR FA 3	KEY OUTPUT FOR FA 2	KEY OUTPUT FOR FA 1	KEY OUTPUT FOR FA 0								
4					LED CONTRAST SIGNAL 8	LED CONTRAST SIGNAL 4	LED CONTRAST SIGNAL 2	LED CONTRAST SIGNAL 1					BUZZER	OUTSIDE START LED	STOP LED	START LED
5	AIR BLAST-ING	SPINDLE THROUGH PUMP ON	OIL HOLE ON M 408	CHIP SHOWER ON M 400	COOLANT VALVE ON M18	CHIP SHOWER SW ON	COOLANT SW ON	MACHINE LIGHT	OT RELEASE	DOOR LOCK	OUTPUT RESERVE 4	OUTPUT RESERVE 5	MAGAZINE CCW	MAGAZINE START		
6	POWER OFF	OUTPUT RESERVE 7	OUTPUT RESERVE 6	OPTION CLEAR	OPTION CLOCK	*QT INDEX (Constantly 1)	DRAIN AIR VALVE ON (SP THOUGH)	3-WAY VALVE ON (SP THOUGH)	AUTOMATIC DOOR VALVE CLOSE	AUTOMATIC DOOR VALVE OPEN	OUTPUT RESERVE 3	OUTPUT RESERVE 2	OUTPUT RESERVE 1	6TH AXIS UNCLAMP OUTPUT	5TH AXIS UNCLAMP OUTPUT	4TH AXIS UNCLAMP OUTPUT
7	PROGRAMABLE OUTPUT (110)	PROGRAMABLE OUTPUT (109)	PROGRAMABLE OUTPUT (108)	PROGRAMABLE OUTPUT (107)	PROGRAMABLE OUTPUT (106)	PROGRAMABLE OUTPUT (105)	PROGRAMABLE OUTPUT (104)	PROGRAMABLE OUTPUT (103)	Z AXIS COVER OPEN	TOOL BREAKAGE START (MCODE)	SIDE DOOR LOCK	INDICA-TION LAMP BLUE	INDICA-TION LAMP YELLOW	INDICATION LAMP RED	EXTERNAL START OUTPUT	START SIGNAL OUTPUT
8	PROGRAMABLE OUTPUT (320)	PROGRAMABLE OUTPUT (319)	PROGRAMABLE OUTPUT (318)	PROGRAMABLE OUTPUT (317)	PROGRAMABLE OUTPUT (316)	PROGRAMABLE OUTPUT (315)	PROGRAMABLE OUTPUT (314)	PROGRAMABLE OUTPUT (313)	PROGRAMABLE OUTPUT (310)	PROGRAMABLE OUTPUT (309)	PROGRAMABLE OUTPUT (308)	PROGRAMABLE OUTPUT (307)	PROGRAMABLE OUTPUT (306)	PROGRAMABLE OUTPUT (305)	PROGRAMABLE OUTPUT (304)	PROGRAMABLE OUTPUT (303)
9	PROGRAMABLE OUTPUT (340)	PROGRAMABLE OUTPUT (340)	PROGRAMABLE OUTPUT (338)	PROGRAMABLE OUTPUT (337)	PROGRAMABLE OUTPUT (336)	PROGRAMABLE OUTPUT (335)	PROGRAMABLE OUTPUT (334)	PROGRAMABLE OUTPUT (333)	PROGRAMABLE OUTPUT (330)	PROGRAMABLE OUTPUT (329)	PROGRAMABLE OUTPUT (328)	PROGRAMABLE OUTPUT (327)	PROGRAMABLE OUTPUT (326)	PROGRAMABLE OUTPUT (325)	PROGRAMABLE OUTPUT (324)	PROGRAMABLE OUTPUT (323)

1*:Low active

8.2 I/O (Main) (19/20)

INPUT STATUS DISPLAY(MAIN 2)

Input \ Bit	F	E	D	C	B	A	9	8	7	6	5	4	3	2	1	0
1	SERVO RELAY CONTACT CHECK 2	SERVO RELAY CONTACT CHECK 1	ATC BOARD ERROR	E M E R - GENCY STOP	DC 24V ERROR	POWER SW OFF	AIR POWER LOW	AC POWER OFF	*OPTION SIGNAL	ALL AXES OVER LATCH	OVER RUN -Z	OVER RUN +Z	OVER RUN -Y	OVER RUN +Y	OVER RUN -X	OVER RUN +X
2	MAGAZINE 8	MAGAZINE 4	MAGAZINE 2	SIDE DOOR OPEN	OVER RUN A D D I - TIONAL AXIS 2-	OVER RUN A D D I - TIONAL AXIS 2+	OVER RUN ADDITIONAL AXIS 1-	OVER RUN A D D I - TIONAL AXIS1+	MAGAZINE 1	DECLERATION SIGNAL	6TH AXIS UNCLAMP END INPUT	INPUT RESERVE 8	5TH AXIS UNCLAMP END INPUT	INPUT RESERVE 7	4TH AXIS UNCLAMP END INPUT	INPUT RESERVE 6
3	PROGRAMABLE INPUT (60)	PROGRAMABLE INPUT (59)	PROGRAMABLE INPUT (58)	PROGRAMABLE INPUT (57)	PROGRAMABLE INPUT (56)	PROGRAMABLE INPUT (55)	PROGRAMABLE INPUT (54)	PROGRAMABLE INPUT (53)	INPUT RESERVE	INPUT RESERVE	INPUT RESERVE	*AREA SENSOR INPUT	COVER OPEN SIGNAL	TOOL BREAKAGE DETECTION ADVANCE END LS	TOOL BREAKAGE DETECTION REACT END LS	TOOL BREAKAGE DETECTION SENSOR
4	PROGRAMABLE INPUT (220)	PROGRAMABLE INPUT (219)	PROGRAMABLE INPUT (218)	PROGRAMABLE INPUT (217)	PROGRAMABLE INPUT (216)	PROGRAMABLE INPUT (215)	PROGRAMABLE INPUT (214)	PROGRAMABLE INPUT (213)	PROGRAMABLE INPUT (210)	PROGRAMABLE INPUT (209)	PROGRAMABLE INPUT (208)	PROGRAMABLE INPUT (207)	PROGRAMABLE INPUT (206)	PROGRAMABLE INPUT (205)	PROGRAMABLE INPUT (204)	PROGRAMABLE INPUT (203)
5								NEW IO BOARD	OPTION 8	OPTION 7	OPTION 6	OPTION 5	OPTION 4	OPTION 3	OPTION 2	OPTION 1

1.*:Low active

8.2 I/O (Main) (20/20)

OUTPUT STATUS DISPLAY(MAIN 2)

Bit / Output	F	E	D	C	B	A	9	8	7	6	5	4	3	2	1	0
1	SLAVE 8 PCTTOER8	SLAVE 8 CRECER8	SLAVE 7 PCTTOER7	SLAVE 7 CRECER7	SLAVE 6 PCTTOER6	SLAVE 6 CRECER6	SLAVE 5 PCTTOER5	SLAVE 5 CRECER5	SLAVE 4 PCTTOER4	SLAVE 4 CRECER4	SLAVE 3 PCTTOER3	SLAVE 3 CRECER3	SLAVE 2 PCTTOER2	SLAVE 2 CRECER2	SLAVE 1 PCTTOER1	SLAVE 1 CRECER1
2	AUX PORT INPUT PC15	AUX PORT INPUT PC14	AUX PORT INPUT PC13	AUX PORT INPUT PC9					SLVON8	SLVON7	SLVON6	SLVON5	SLVON4	SLVON3	SLVON2	SLVON1
3	COMHOLT	IRQDEN														

1.*:Low active

8.3 Input output (slave) (1/3)

Slave Input 1

Bit	Symbol	Name	Discription	Nomal	Remark
0	DIPSW1	DIP switch 1	ON:0 OFF:1	0	
1	DIPSW2	DIP switch 2	ON:0 OFF:1	0	
2	DIPSW3	DIP switch 3	ON:0 OFF:1	0	
3	DIPSW4	DIP switch 4	ON:0 OFF:1	0	
4	BRKOK1	Brake permitted 1	Y/Z axis	0/1	
5	BRKOK2	Brake permitted 2	4/5/6/ARM/MAG axis	0	Not used
6	SVA1	Servo alarm 1	X,Y,Z,S,4,MAG axis	0	
7	SVA2	Servo alarm 2	5/6/ARM axis	0	
8	*RRDY1	*SIO1 receive ready	Receive ready:0	0/1	
9	*RRDY2	*SIO2 receive ready	Receive ready:0	0/1	
A	*BYFSS	*Flash memory busy		0	
B	SVAAX5	5th axis servo alarm		0	
C	SVAAX6	6th axis servo alarm		0	
D	SVAARM	ARM axis servo alarm		0	Not used
E	CPUERM	CPU error main		0	
F	-	Reserved		1	

Slave Input 2

Bit	Symbol	Name	Discription	Nomal	Remark
0-7	-	Reserved		1	
8-F	-	Not used		0	

Slave Input 3

Bit	Symbol	Name	Discription	Nomal	Remark
0	-	Not used		0	
1	XPZ	X axis C phase	C phase ON:1	0	
2	YPZ	Y axis C phase	C phase ON:1	0	
3	ZPZ	Z axis C phase	C phase ON:1	0	
4	SPZ	S axis C phase	C phase ON:1	0	
5	AX4PZ	4th axis C phase	C phase ON:1	0	
6	AX5PZ	5th axis C phase	C phase ON:1	0	
7	AX6PZ	6rh axis C phase	C phase ON:1	0	
8	ARMPZ	ARM axis C phase	C phase ON:1	0	Not used
9	MAGPZ	MAG axis C phase	C phase ON:1	0	
A-F	-	Not used		0	

Slave Input 4

Bit	Symbol	Name	Discription	Nomal	Remark
0	TOUCH	Touch sensor	ON:1	0	
1-F	-	Not used		0	

8.3 Input output (slave) (2/3)

Slave Output 1

Bit	Symbol	Name	Discription	Nomal	Remark
0	MY10	SIO1address 0		0/1	
1	MY11	SIO1address 1		0/1	
2	MY12	SIO1address 2		0/1	
3	MY13	SIO1address 3		0/1	
4	MY20	SIO2 address 0		0/1	
5	MY21	SIO2 address 1		0/1	
6	MY22	SIO2 address 2		0/1	
7	MY23	SIO2 address 3		0/1	
8	LED1S	Slave LED1	0:ON	0/1	
9	LED2S	Slave LED2	0:ON	0/1	
A	LED3S	Slave LED3	0:ON	0/1	
B	LED4S	Slave LED4	0:ON	0/1	
C	NMIGATES	NMI gate		1	
D	BRKSEL	Brake select		0	
E	PROTECTS	Soft protect		1	
F	-	Reserved		0	

Slave Output 2

Bit	Symbol	Name	Discription	Nomal	Remark
0	AX5SON	5th axis servo on		0/1	
1	AX6SON	6th axis servo on		0/1	
2	ARMSON	ARM axis servo on		0	Not used
3	AX5ON	5th axis enable	5th axis servo alarm enable	0/1	
4	AX6ON	6th axis enable	6th axis servo alarm enable	0/1	
5	ARMON	ARM axis enable	ARM axis servo alarm enable	0	Not used
6-F	-	k		0	

8.3 Input output (slave) (3/3)

INPUT STATUS DISPLAY (SLAVE)

Bit / Input	F	E	D	C	B	A	9	8	7	6	5	4	3	2	1	0
1	INPUT RESERVE	CPU ERROR MAIN	ARM AXIS SERVO ERROR	6TH SERVO ERROR	5TH SERVO ERROR	*FLASHMEM. BUSY SIG.	* SIO.2 RECEIVE READY	* SIO.1 RECEIVE READY	SERVO AlARM 2	SERVO AlARM 1	BREAKE PERMIT No 2	BREAKE PERMIT No1	DIPSW 4	DIPSW 3	DIPSW 2	DIPSW 1
2									INPUT RESERVE	INPUT RESERVE	INPUT RESERVE	INPUT RESERVE	INPUT RESERVE	INPUT RESERVE	INPUT RESERVE	INPUT RESERVE
3							C-PHASE STATUS MAG AXIS	C-PHASE STATUS ARM AXIS	C-PHASE STATUS 6-AXIS	C-PHASE STATUS 5-AXIS	C-PHASE STATUS 4-AXIS	C-PHASE STATUS MAIN AXIS	C-PHASE STATUS Z- AXIS	C-PHASE STATUS Y- AXIS	C-PHASE STATUS X- AXIS	
4																TOUCH SENSER SIGNAL

1*:Lowactive

OUTPUT STATUS DISPLAY (SLAVE)

Bit / Input	F	E	D	C	B	A	9	8	7	6	5	4	3	2	1	0
1	OUTPUT RESERVE	SOFT PROTECT	BRAKE SELECT SIGNAL	NMI GATE	SLAVE LED 4	SLAVE LED 3	SLAVE LED 2	SLAVE LED 1	SIO 2 ADDRESS 3	SIO 2 ADDRESS 2	SIO 2 ADDRESS 1	SIO 2 ADDRESS 0	SIO 1 ADDRESS 3	SIO 1 ADDRESS 2	SIO 1 ADDRESS 1	SIO 1 ADDRESS 0
2	OUTPUT RESERVE	OUTPUT RESERVE	OUTPUT RESERVE	OUTPUT RESERVE	OUTPUT RESERVE	OUTPUT RESERVE	OUTPUT RESERVE	OUTPUT RESERVE	OUTPUT RESERVE	OUTPUT RESERVE	ARM AXIS ENABLE	6TH AXIS ENABLE	5TH AXIS ENABLE	ARM AXIS SERVO ON	6TH AXIS SERVO ON	5TH AXIS SERVO ON

1*:Lowactive

8.4 I/O (Local) (1/2)

Local: INPUT 1

Bit	Signal	Name	Contents	Normal	Remarks
0	CPUERM	CPUerror(main).	"1" when error occurred in main CPU.	0	
1	CPUERS	CPU error(slave).	"1" when error occurred in slave CPU.	0	
2	LANGSEL	NC language.	Language selection signal. "1" for NC type; "0" for conversation type.	0/1	Not use for soft.
3		Memory capacity standard	0: 3 times, 1: standard	1	
4	*HARDP	*Hard protect.	Protect ON/OFF switching signal. "0" when protect ON is selected.	0/1	
5	*BYFSL	*Local flash busy signal.	Local flash memory busy signal.	1	
6	*DSRA	*Data set ready A.	RC-232C data set ready signal.	1	Host is ready.
7	*DSRB	*Data set ready B.	Spare communucation port data set ready signal	1	
8	DIPSWL0	DIPSW Input local 0.	1 bit of NC board SW1. "0" when dip switch is ON. (display language selection)	0/1	9 and 8 bit = 11/10/01/00 French/German/ English/Japanese
9	DIPSWL1	DIPSW Input local 1.	2bit of NC board SW1. "0" when dip switch is ON. (display language selection)	0/1	
		DIPSW Input local 2.			
		DIPSW Input local 3.		0	
A	DIPSWL2	Spare input local 1.	3 bit of NB board SW1. "0" when dip switch is ON.		
		Spare input local 2.		0	
B	DIPSWL3	Spare input local 3.	4 bit of NB board SW1. "0" when dip switch is ON.		
		Spare input local 4.			
C	SPIN1L			1	
D	SPIN2L			1	
E	SPIN3L			1	
F	SPIN4L			1	

Local: OUTPUT 1

Bit	Signal	Name	Contents	Normal	Remarks
0	INTOKL	Interrupt permission signal (local)	Local CPU interrupt permission signal.	1	
1	*SFTPWRL	*Soft protect on (local)	Local RAM soft protect signal.	0	
2	*ORSV0L	*Spare output local 0.		0	
3	LEDPWON	Liquid crystal power ON signal.	Liquid crystal power ON/OFF signal.	1	
4	*LED1L	*LED display local 1.	NC board LED1. Lights when corresponding port is "0".	1	
5	*LED2L	*LED display local 2.	NC board LED2. Lights when corresponding port is "0".	1	
6	*LED3L	*LED display local 3.	NC board LED3. Lights when corresponding port is "0".	1	
7	*LED4L	*LED display local 4.	NC board LED4. Lights when corresponding port is "0". Normal toggle.	0/1	
8	*SFTPL	*Soft protect on(share)	Common RAM soft protect signal.	0	
9	*NMIGATEL	*NMI gate.	Gate signal of NMI signal.	1	
A	*MASK	*Display mask signal.	Liquid crystal display indication ON/OFF signal.	1	
B	*DIMASK	* Display timing control signal.	Screen selection timing control signal.	0	
C	CPUERL	CPUerror(local).	Local CPU watch dog error.	0	
D	DTRA	Port terminal ready A.	RS-232C terminal ready A.	1	NC is ready.
E	DTRB	Port terminal ready B.	Spare communication port terminal ready B.	0	
F	SPO1L	Spare local 1.		0	

8.4 Input output (local) (2/2)

INPUT STATUS DISPLAY (LOCAL)

Bit / Input	F	E	D	C	B	A	9	8	7	6	5	4	3	2	1	0
1	INPUT RESERVE 4	INPUT RESERVE 3	INPUT RESERVE 2	INPUT RESERVE 1	DIPSW INPUT LOCAL 3	DIPSW INPUT LOCAL 2	DIPSW INPUT LOCAL 1	DIPSW INPUT LOCAL 0	*DATA SET READY B	*DATA SET READY A	*LOCAL FLASH BUSY SIGNAL	*HARD PROTECT ON	MEMORY CAPACITY STANDARD	NC LANGUAGE	CPU ERROR (SLAVE)	CPU ERROR (MAIN)
2																

1*:Lowactive

OUTPUT STATUS DISPLAY (LOCAL)

Bit / Input	F	E	D	C	B	A	9	8	7	6	5	4	3	2	1	0
1	SPARE LOCAL 1	*PORT TERMINAL READY B	*PORT TERMINAL READY A	CPU ERROR (LOCAL)	*DISPLAY TIMING CONTROL SIGNAL	*DIS-PLAY MASK	*NMI GATE	*SOFT PRPTECT ON (SHARE)	*LED DISPLAY LOCAL 4	*LED DISPLAY LOCAL 3	*LED DISPLAY LOCAL 2	*LED DISPLAY LOCAL 1	LIQUID CRYSTAL POWERON SIGNAL	*SPARE OUTPUT (LOCAL 0)	*SOFT PROTECT ON (LOCAL)	INTERRRUPT PERMISSION SIGNAL (LOCAL)

1*:Lowactive

8.5 Sequencer (1/6)

Sequence controller,Input contact

Bit / Contact	7	6	5	4	3	2	1	0
0								
1								
2								
3								
99								
48	M function end MFIN	Stop STOP	Start START	InSC external error8 SCERR	InSC manual motion SCMAN	InSC door close end SCCLS	InSC cycle SCCYCL	InSC automatic operationon goingSCSTL
49	InSC outside start OUTSTA		InSC outside startLED SCRLED		InSC external error9 ZERR		Reset EXRST	InSC external error9 EXALM
50			Door lock EXDRLCK	External 3rdzero pointreturn EXORG3	External 2ndzero pointreturn EXORG2	External zeropoint return EXORG	External 1stref pointreturn EXREF	
66	Mode changeover prohibited MDLOCK	Axis operation prohibited 6LOCK	Axis operation prohibited 5LOCK	Axis operation prohibited 4LOCK	Axis operation prohibited ZLOCK	Axis operation prohibited XYLOCK	Axis operation prohibited ATCLOCK	Spindle operational prohibited SP LOCK
67	External schedule program PR9900	External program selection PRO64	External program selection PRO32	External program selection PRO16	External program selection PRO8	External program selection PRO4	External program selection PRO2	External program selection PRO1
68	External error EXER17	External error EXER16	External error EXER15	External error EXER14	External error EXER13	External error EXER12	External error EXER11	External error EXER10
69	Key output forFA FAOUT8	Key output forFA FAOUT7	Key output forFA FAOUT6	Key output forFA FAOUT5	Key output forFA FAOUT4	Key output forFA FAOUT3	Key output forFA FAOUT2	Key output forFA FAOUT1
70	Key operation prohibited KYLOCK	Edit prohibited ED LOCK	Program edit prohibited PRLOCK	M468	M466	M464	M462	M460

8.5 Sequencer (2/6)

Sequence controller, Output contact

Contact \ Bit	7	6	5	4	3	2	1	0
4								
5								
6								
7								
51	Restart RSEST	Manual operation ongoing MANSTL	Reset RST		Edit operation EDIT	Memory operation MEMO	MDI operation MDI	Manual operation MANU
52	Extsignal 28 M28	Extsignal 24 M24	Extsignal 22 M22	Extsignal 21 M21	Extsignal 18 M18	Extsignal 14 M14	Extsignal 12 M12	Extsignal 11 M11
53	Start switch STA	Stop STP	InSC stop requirement SCSTOP	Door interlock SAFTY	Door lock DRLOCK	Counter end CNTUP	Program end M30(/1)	Program stop M00
54	Zeropoint return completion ORGFIN	Toolerror output TOOL	Alarm output ALM	NC operation NCOK	Memory operation enable MEMOK	Automatic operation ongoing STL	Automatic operation ongoing AUTO	M function MF
55	Dryrun DRY	Relese key RELS	Zero point output ZP5	Zero point output ZPSP	Zero point output ZPZ	Zero point output ZPY	Zero point output ZPX	Spindle rotation SPTURN
71	Single operation SINGL	StopLED STPLED	Door openend DROPEN	Counter endnotice CNTPRE	Safty type STYPE	3rdhome position returnfinish ORGFIN3	2ndhome position returnfinish ORGFIN2	Door close end DRCLS
72	Zeropoint output ZP6	Zeropoint output ZP4	Estinmate tool servicelife TOLPRE	Cuttingfeed override FDOR100	Spindle override SPOR100	Rapidfeed override RPOR100	Alarm level 2 ALMLV2	Alarm level 1 ALMLV1
73	Operation stoperror RUNSTP	M486	M484	M482	M480	M406	M404	M402

8.5 Sequencer (3/6)

Sequence controller, Output contact

Contact \ Bit	7	6	5	4	3	2	1	0
74	Tool broken error TLBRKE	Red lamp RED	Yellow lamp YEL	Green lamp GRN	M456	M455	M451	M450
75	Outside start LED RDYLED	Innerdoor close end INDRCL	Outside start output QTSTART	Pallet selection QT2	Pallet selection QT1	M30/2	Pallet index finish PFIN2	Pallet index finish PFIN1
76	Key entry for FA FAKEY8	Key entry for FA FAKEY7	Key entry for FA FAKEY6	Key entry for FA FAKEY5	Key entry for FA FAKEY4	Key entry for FA FAKEY3	Key entry for FA FAKEY2	Key entry for FA FAKEY1
77	Battery alarm BATALM	3rd ref point return finish RE6FN3	3rd ref point return finish RE5FN3	3rd ref point return finish RE4FN3	2nd ref point return finish RE6FN3	2nd ref point return finish RE5FN2	2nd ref point return finish RE4FN2	Side door close end SDDRCL
78	Manual pulse generator OFF PUL OFF	Oil Hole ON M408	Chipflow ON M400	Coolant ON M08	Ref point return finish RE6FN	Ref point return finish RE5FN	Ref point return finish RE4FN	Ref point return finish REFIN
79	6 posi signal output 6POSSW	5 posi signal output 5POSSW	4 posi signal output 4POSSW	Z posi signal output ZPOSSW	Y posi signal output YPOSSW	X posi signal output XPOSSW	Chipflow switch ON CHIPSW	Coolant switch ON COOLSW
80								
81								
82								
83								

8.5 Sequencer (4/6)

Sequence controller, Auxilliary contact1

Contact \ Bit	7	6	5	4	3	2	1	0
8	SEQ AUX CON M7	SEQ AUX CON M6	SEQ AUX CON M5	SEQ AUX CON M4	SEQ AUX CON M3	SEQ AUX CON M2	SEQ AUX CON M1	SEQ AUX CON M0
9	SEQ AUX CON MF	SEQ AUX CON ME	SEQ AUX CON MD	SEQ AUX CON MC	SEQ AUX CON MB	SEQ AUX CON MA	SEQ AUX CON M9	SEQ AUX CON M8
10	SEQ AUX CON M17	SEQ AUX CON M16	SEQ AUX CON M15	SEQ AUX CON M14	SEQ AUX CON M13	SEQ AUX CON M12	SEQ AUX CON M11	SEQ AUX CON M10
11	SEQ AUX CON M1F	SEQ AUX CON M1E	SEQ AUX CON M1D	SEQ AUX CON M1C	SEQ AUX CON M1B	SEQ AUX CON M1A	SEQ AUX CON M19	SEQ AUX CON M18
12	SEQ AUX CON M27	SEQ AUX CON M26	SEQ AUX CON M25	SEQ AUX CON M24	SEQ AUX CON M23	SEQ AUX CON M22	SEQ AUX CON M21	SEQ AUX CON M20
13	SEQ AUX CON M2F	SEQ AUX CON M2E	SEQ AUX CON M2D	SEQ AUX CON M2C	SEQ AUX CON M2B	SEQ AUX CON M2A	SEQ AUX CON M29	SEQ AUX CON M30
14	SEQ AUX CON M37	SEQ AUX CON M36	SEQ AUX CON M35	SEQ AUX CON M34	SEQ AUX CON M33	SEQ AUX CON M32	SEQ AUX CON M31	SEQ AUX CON M30
15	SEQ AUX CON M3F	SEQ AUX CON M3E	SEQ AUX CON M3D	SEQ AUX CON M3C	SEQ AUX CON M3B	SEQ AUX CON M3A	SEQ AUX CON M3D1	SEQ AUX CON M3D0
16	SEQ AUX CON M3D7	SEQ AUX CON M3D6	SEQ AUX CON M3D5	SEQ AUX CON M3D4	SEQ AUX CON M3D3	SEQ AUX CON M3D2	SEQ AUX CON M3D1	SEQ AUX CON M3D0
17	SEQ AUX CON M3DF	SEQ AUX CON M3DE	SEQ AUX CON M3DD	SEQ AUX CON M3DC	SEQ AUX CON M3DB	SEQ AUX CON M3DA	SEQ AUX CON M3D9	SEQ AUX CON M3D8
18	SEQ AUX CON M3E7	SEQ AUX CON M3E6	SEQ AUX CON M3E5	SEQ AUX CON M3E4	SEQ AUX CON M3E3	SEQ AUX CON M3E2	SEQ AUX CON M3E1	SEQ AUX CON M30
19	SEQ AUX CON M3EF	SEQ AUX CON M3EE	SEQ AUX CON M3ED	SEQ AUX CON M3EC	SEQ AUX CON M3EB	SEQ AUX CON M3EA	SEQ AUX CON M3E9	SEQ AUX CON M3E8
20	SEQ AUX CON M3F7	SEQ AUX CON M3F6	SEQ AUX CON M3F5	SEQ AUX CON M3F4	SEQ AUX CON M3F3	SEQ AUX CON M3F2	SEQ AUX CON M3F1	SEQ AUX CON MF0

8.5 Sequencer (5/6)

Sequence controller, Auxilliary contact 2

Contact	Discription	
21	SEQ AUX CON	M40 to M47
22	SEQ AUX CON	M48 to M4F
23	SEQ AUX CON	M50 to M57
24	SEQ AUX CON	M58 to M5F
25	SEQ AUX CON	M60 to M67
26	SEQ AUX CON	M68 to M6F
27	SEQ AUX CON	M70 to M77
28	SEQ AUX CON	M78 to M7F
29	SEQ AUX CON	M80 to M87
30	SEQ AUX CON	M88 to M8F
31	SEQ AUX CON	M90 to M9F
32	SEQ AUX CON	M98 to M9F
33	SEQ AUX CON	MA0 to MA7
34	SEQ AUX CON	MA8 to MAF
35	SEQ AUX CON	MB0 to MB7
36	SEQ AUX CON	MB8 to MBF
37	SEQ AUX CON	MC0 to MC7

8.5 Sequencer (6/6)

Sequence controller, Timer contact

Bit / Contact	7	6	5	4	3	2	1	0
56	Contact for TMR7	Contact for TMR6	Contact for TMR5	Contact for TMR4	Contact for TMR3	Contact for TMR2	Contact for TMR1	Contact for TMR0
57	Contact for TMR15	Contact for TMR14	Contact for TMR13	Contact for TMR12	Contact for TMR11	Contact for TMR10	Contact for TMR9	Contact for TMR8
58	Contact for TMR23	Contact for TMR22	Contact for TMR21	Contact for TMR20	Contact for TMR19	Contact for TMR18	Contact for TMR17	Contact for TMR16
59	Contact for TMR31	Contact for TMR30	Contact for TMR29	Contact for TMR28	Contact for TMR27	Contact for TMR26	Contact for TMR25	Contact for TMR24

Sequence controller, Counter contact

Bit / Contact	7	6	5	4	3	2	1	0
60	Contact for CTR7	Contact for CTR6	Contact for CTR5	Contact for CTR4	Contact for CTR3	Contact for CTR2	Contact for CTR1	Contact for CTR0
61	Contact for CTR15	Contact for CTR14	Contact for CTR13	Contact for CTR12	Contact for CTR11	Contact for CTR10	Contact for CTR9	Contact for CTR8
62	Contact for CTR23	Contact for CTR22	Contact for CTR21	Contact for CTR20	Contact for CTR19	Contact for CTR18	Contact for CTR17	Contact for CTR16
63	Contact for CTR31	Contact for CTR30	Contact for CTR29	Contact for CTR28	Contact for CTR27	Contact for CTR26	Contact for CTR25	Contact for CTR24

8.6 Servo display

Class	Items	Contents	
AMPLIFIER COMMAND	Control data	Bank set (transmission)	
	Control command	Bit 0	0:OFF 1:ON
		Bit 1	1:ABS encoder reset
	Bit 7 6 5 4 3 2 1 0	Bit 2	1:Alarm clear
	0 0 0 * * * * *	Bit 3	1:Quadrant projection control ON
		Bit 4	1:Current limiter ON
	Speed command	1/65536mm^{-1}/LSB	
	Current command	1%/LSB	
	Speed loop proportion gain	1Hz/LSB	
	Speed loop integrated time constant	1msec/LSB	
	Current limiter	1%/LSB	
AMPLIFIER RESPONSE	Control data	Bank set(reception)	
	Status	Status 0	
		Bit 0	1:Servo alarm
	Status ,O Status 1	Bit 1	1:Servo ready
	******** ********	Bit 2	1:Servo active
		Bit 3	1:RST monitor
	Status 0 Bit 8 7 6 5 4 3 2 1 0	Bit 4	1:Current limiter ON
	* * * * * * * * *	Bit 5	1:Encoder reset ON
		Bit 6	1:Htvi setting
	Status 1 Bit 8 7 6 5 4 3 2 1 0	Bit 7	1:Encoder enable
	0 0 0 0 0 0 0 0 *	Status 1	
		Bit,O	1:Battery warning
	Alarm code	00:Normal status 01:OC(Over Current) 03:EOH(External regenerative resistor Over Heat) 05:OV(Over Voltage) 07:CPE(Control Power Error) 08:DE1(Detector Error 1 of encoder) 09:DE2(Detector Error 2 of of Communication) 0A:OL(Over Load) 0B:OS(Over Speed) 10:MPE(Main Power Error) 11:FP(Failure of Phase) 12:RGE(Regenerative resistor over load Error) 13:DSP-E(DSP Error) 14:EEPROM-E(Memory Error) 15:PAR-E(Parameter Error) 16:ABS-E(Battery Error) 17:CS-E(Commutation Sensor Error) 18:MOC 19:Communication Error 1A:VERI-E(Verify Error)	
	Current command monitor/Current monitor	1%/LSB	
	Actual speed monitor	1mm^{-1}/LSB	
	Effective torque monitor	1%/LSB	
	Absolute position data	CW-increase	
	Frame error detect counter	Transmisson/Reception	
AMPLIFIER INFORMATION	ROM type	ROM1L/ROM2L	
	ROM version	ROM1H/ROM2H	
	Amplifier model	00:300A type 01:150A type 02:100A type 03:50A type 04:30A type 05:15A type	
OTHER	Displacement pulse	Result of C phase check	
	Number of pulse check retry	Result of C phase check	

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Chapter 9 Measures for Errors

9.1 System error

9.1.1

Conversation type	No.0000	**WATCH DOG (MAIN)
NC type	No.5000	**WATCH DOG (MAIN)
Conversation type	No.0001	**WATCH DOG (SLAVE)
NC type	No.5001	**WATCH DOG (SLAVE)
Conversation type	No.0002	**WATCH DOG (LOCAL)
NC type	No.5002	**WATCH DOG (LOCAL)

<Meaning>

1. The CPU indicated in brackets has a trouble. The watch dog timer has not been renewed for more than the specified time.

*Watch dog supervisory time

Main 20msec
Local 20msec
Slave 73msec

<Cause>

1. Faulty NC PCB, slave PCB, or MEM PCB

<Measures>

1. Replace NC PCB, slave PCB, or MEM PCB.

9.1.2

Conversation type	No.0003	**RAM ERROR (MAIN)
NC type	No.5003	**RAM ERROR (MAIN)
Conversation type	No.0005	**RAM ERROR (SLAVE)
NC type	No.5005	**RAM ERROR (SLAVE)
Conversation type	No.0007	**RAM ERROR (LOCAL)
NC type	No.5007	**RAM ERROR (LOCAL)
Conversation type	No.0009	**RAM ERROR (MAIN-LOC1)
NC type	No.5009	**RAM ERROR (MAIN-LOC1)
Conversation type	No.0010	**RAM ERROR (MAIN-LOC2)
NC type	No.5010	**RAM ERROR (MAIN-LOC2)
Conversation type	No.0011	**RAM ERROR (MAIN-SLV)
NC type	No.5011	**RAM ERROR (MAIN-SLV)
Conversation type	No.0055	**RAM ERROR (MAIN-LOC3)
NC type	No.5055	**RAM ERROR (MAIN-LOC3)
Conversation type	No.0106	**RAMERROR(MAIN-LOCAL4)
NC type	No.5106	**RAMERROR(MAIN-LOCAL4)
Conversation type	No.0107	**RAMERROR(MAIN-LOCAL5)
NC type	No.5107	**RAMERROR(MAIN-LOCAL5)

<Meaning>

1. When the power was turned on, the contents of the RAM indicated in brackets could not be read and written correctly.

*Main-Local RAM
MAIN-LOC1 : Common RAM other than Nos. 2 and 3
MAIN-LOC2 : Dual port RAM
MAIN-LOC3 : Software protect RAM
MAIN-LOC4 : Software protected RAM for X and Y axes thermal displacement
MAIN-LOC5 : Non protected RAM for X and Y axes thermal displacement

<Cause>

1. Faulty NC PCB or slave PCB

<Measures>

1. Replace the NC PCB or slave PCB.

9.1.3

Conversation type	No.0004	**ROM ERROR (MAIN)
NC type	No.5004	**ROM ERROR (MAIN)
Conversation type	No.0006	**ROM ERROR (SLAVE)
NC type	No.5006	**ROM ERROR (SLAVE)
Conversation type	No.0008	**ROM ERROR (LOCAL)
NC type	No.5008	**ROM ERROR (LOCAL)

<Meaning>

1. When the power was turned on, a problem was detected in the contents of the ROM indicated in brackets.

<Cause>

1. The MEM PCB is mounted incorrectly.

2. Faulty NC PCB, slave PCB, or MEM PCB

<Measures>

1. For cause 1, check that the MEM PCB is mounted correctly.
2. If the same error is still generated even in measure 1, cause 2 may be responsible. Replace the NC PCB, MEM PCB, or slave PCB.

9.1.4

Conversation type	No.0012	**TIMER ERROR(SLAVE)
NC type	No.5012	**TIMER ERROR(SLAVE)

<Meaning>

1. Interruption of the slave CPU free running timer does not occur even after the specified time has elapsed, and timer overrun occurs.

<Cause>

1. Faulty slave PCB

<Measures>

1. Replace the slave PCB.

9.1.5

Conversation type	No.0014	**CALC ERROR (MAIN)
NC type	No.5014	**CALC ERROR (MAIN)
Conversation type	No.0015	**CALC ERROR (SLAVE)
NC type	No.5015	**CALC ERROR (SLAVE)
Conversation type	No.0016	**CALC ERROR (LOCAL)
NC type	No.5016	**CALC ERROR (LOCAL)

<Meaning>

1. The CPU indicated in brackets has had an abnormal operation.

*Examples
Division by 0
Overflow by multiplication
The result of division has exceeded the range that can be expressed within 32 bits of code.

<Cause>

1. Faulty NC PCB or slave PCB

<Measures>

1. Replace the NC PCB or slave PCB.

9.1.6

Conversation type	No.0017	**MAIN INTIAL IMPSBLE
NC type	No.5017	**MAIN INTIAL IMPSBLE
Conversation type	No.0018	**SLV INTIAL IMPSBLE
NC type	No.5018	**SLV INTIAL IMPSBLE

<Meaning>

1. When the power was turned on, the CPU could not start properly.

<Cause>

1. The MEM PCB or slave PCB is mounted incorrectly.

2. Faulty NC PCB, slave PCB, or MEM PCB

<Measures>

1. For cause 1, check that the MEM PCB or slave PCB is mounted correctly.

2. If the same error is no longer generated in measure 1, cause 2 may be responsible. Replace theNC/MEM/ SLAVE/PCB.

9.1.7

Conversation type	No.0028	**POWER TURNED OFF
NC type	No.5028	**POWER TURNED OFF

<Meaning>

1. 3 seconds have passed since the PWOFF signal was turned on.

*This error is not generated by a normal power-off.

<Cause>

1. Defect of power circuit in the IO PCB

2. Defect of IO PCB or alarm processing circuit

<Measures>

1. In either case, replace the IO PCB with new one.

9.1.8

Conversation type	No.0029	**POS DETECT ERR
NC type	No.5029	**POS DETECT ERR

<Meaning>

1. The difference between the absolute position data inside the magazine amplifier and relative position data inside the NC unit has exceeded the allowable range (100 pulses plus those set for [Machine Parameter] to [System 3] to [IN-POSITION WIDTH MAGAZINE]).

<Cause>

1. Faulty magazine motor or amplifier.

2. Faulty ENC cord or amplifier cord

3. Faulty slave PCB

<Measures>

1. Replace the magazine motor or amplifier.

2. Replace the ENC cord or amplifier cord.

3. Replace the slave PCB.

9.1.9

Conversation type	No.0030	**I/O CRC ERROR 1
NC type	No.5030	**I/O CRC ERROR 1
Conversation type	No.0032	**I/O CRC ERROR 2
NC type	No.5032	**I/O CRC ERROR 2
Conversation type	No.0034	**I/O CRC ERROR 3
NC type	No.5034	**I/O CRC ERROR 3
Conversation type	No.0036	**I/O CRC ERROR 4
NC type	No.5036	**I/O CRC ERROR 4
Conversation type	No.0038	**I/O CRC ERROR 5
NC type	No.5038	**I/O CRC ERROR 5

<Meaning>

1. CRC error has occurred because the machine received incorrect data during communication between the keyboard and the NC unit.

<Cause>

1. External noise

2. Faulty keyboard or cable connection

<Measures>

1. CRC error 1 or 2 - check the keyboard and key cable connection. Replace the PCB or cable if necessary.

2. CRC error 3 or 4 - check the IO PCB and IO cable. Replace the PCB or cable if necessary.

3. CRC error 5 - check the EXIO PCB and EXIO cable connection. Replace the PCB or cable if necessary.

9.1.10

Conversation type	No.0031	**I/O TIMEOVER 1
NC type	No.5031	**I/O TIMEOVER 1
Conversation type	No.0033	**I/O TIMEOVER 2
NC type	No.5033	**I/O TIMEOVER 2
Conversation type	No.0035	**I/O TIMEOVER 3
NC type	No.5035	**I/O TIMEOVER 3
Conversation type	No.0037	**I/O TIMEOVER 4
NC type	No.5037	**I/O TIMEOVER 4
Conversation type	No.0039	**I/O TIMEOVER 5
NC type	No.5039	**I/O TIMEOVER 5

<Meaning>

1. Framing error occurred during communication between the keyboard and the NC unit, causing an unrecoverable.

<Cause>

1. External noise

2. Faulty keyboard or cable connection

<Measures>

1. I/O timeover error 1 or 2 - check the keyboard and key cable connection. Replace the PCB or cable if necessary.

2. I/O timeover error 3 or 4 - check the IO PCB and IO cable. Replace the PCB or cable if necessary.

3. I/O timeover error 5 - check the EXIO PCB and EXIO cable connection. Replace the PCB or cable if necessary.

Note : CRC error 1 may occur with an I/O timeover error. This occurs because the first station's data packet. At this time, reset the I/O timeover error and check whether the same error occurs again. If it does, the keyboard of the first or second station, or its cable, is faulty.

9.1.11

Conversation type	No.0051	**ABSOLUTE CLEAR ERR
NC type	No.5051	**ABSOLUTE CLEAR ERR

<Meaning>

1. Clearing start point data was attempted but the absolute data in the magazine amplifier was not cleared within five seconds.

<Cause>

1. Faulty magazine amplifier.

<Measures>

1. Replace the magazine amplifier.

9.1.12

Conversation type	No.0052	**COMMAND ERROR
NC type	No.5052	**COMMAND ERROR

<Meaning>

1. Main CPU is not synchronized with slave CPU.

<Cause>

1. Faulty NC PCB or slave PCB

<Measures>

1. Replace NC PCB or slave PCB.

9.1.13

Conversation type	No.0091	**M EXCPT INTRPT (*)
NC type	No.5091	**M EXCPT INTRPT (*)
Conversation type	No.0093	**L EXCPT INTRPT (*)
NC type	No.5093	**L EXCPT INTRPT (*)

<Meaning>

1. Main CPU or local CPU has detected incorrect interruption.

*The figure in brackets ( ) indicates interruption no.

<Cause>

1. Faulty NC PCB or MEM PCB

<Measures>

1. Replace NC PCB or MEM PCB.

9.1.14

Conversation type	No.0501	**SYSTEM ERROR (MAIN)
NC type	No.5501	**SYSTEM ERROR (MAIN)
Conversation type	No.1150	**SYSTEM ERROR (SLV)
NC type	No.6150	**SYSTEM ERROR (SLV)
Conversation type	No.1280	**SYSTEM ERROR (MC)
NC type	No.6280	**SYSTEM ERROR (MC)
Conversation type	No.1281	**SYSTEM ERROR (ATC)
NC type	No.6281	**SYSTEM ERROR (ATC)

<Meaning>

1. SYSTEM ERROR (MAIN) - NMI was detected, but there was no corresponding error.

2. Other SYSTEM ERRORS - an error was detected, but there was no corresponding error.

<Cause>

1.Faulty NC PCB or slave PCB

<Measures>

1. Replace NC PCB or slave PCB.

9.1.15

Conversation type	No.0567	*DOOR ERROR
NC type	No.5567	*DOOR ERROR
Conversation type	No.1278	*DOOR ERROR
NC type	No.6278	*DOOR ERROR

<Meaning>

1. When [AUTOMATIC DOOR] is set to [1:ON], the limit switch has turned on both at door opening and closing ends.

2. It took longer than the time set to [User Parameter] → [System 1] → [AUTOMATIC DOOR OPERATION TIME] for automatic door opening or closing.

<Cause>

1. Faulty limit switch

2. Faulty setting for [User Parameter]→ [System 1] → [AUTOMATIC DOOR OPERATION TIME].

<Measures>

1. For cause 1, check the limit switch input signal.

Input/output(main 1) Input 8

```
Bit        F E D C B A 9 8 7 6 5 4 3 2 1 0
Input 8    * * * * * * * * * * * * * * * *        0:OFF
                                                  1:ON
                                 |  |
                                 |  └──── DOOR OPEN
                                 └─────── DOOR CLOSE
```

Unless the following conditions are met, the limit switch may be faulty. Replace the switch.
- When the door is closed, the door opening end signal is 0 (off) and door closing end signal is 1 (on).
- When the door is open, the door opening end signal is 0 (off) or 1 (on) and the door closing end signal is 0 (off).

2. For cause 2, check the setting for [User Parameter] → [System 1]→ [AUTOMATIC DOOR OPERATION TIME].

9.1.16

Conversation type	No.1051	**START POINT DATA 1 ER
NC type	No.6051	**START POINT DATA 1 ER

<Meaning>

1. When the power was turned on, start point data 1 was not the correct value (a value between zero and the machine coordinate for one magazine rotation).

<Cause>

1. The data were damaged by an external factor, such as depletion of back-up batteries, replacement of PCB, etc.

<Measures>

1. For cause 1, check the battery alarm at the bottom right of the screen. If the alarm is displayed, the batteries have run out. Replace the batteries with new ones, and take procedure 2 as mentioned below. If not displayed, data are damaged by an external factor. Take procedure 2.

2. Adjust the magazine position in ATC maintenance mode.

1. Press [MANU] or [MDI],and then[I/O].
2. Press[1],[ENT]and[PAGEDOWN].
3. Press [CURSOR DOWN]until[ATC MAINT.MD]is highlighted and then press [1]and[ENT].
4. Turn the <Power> switch off and then ON again.
5. Press[1] for [CLEAR START P DATA].
6. Turn the <Power>switch off and then on agian if [CLEAR START P DATA]displays [0].
7. At this time, the pot No.of the ATC postion continues from [11] in case of No.1.
8. In the case except No.1, it press [MAGZ] pot of the ATC position turns over to the ATC position at the pot of No.1.
9. Press [1]for [CLEAR START P DATA].
10. Turn the <Power> switch off and then on again if [CLEAR START P DATA] displays [0].
11. Press [MANU]or [MDI], and then [I/0].
12. Press [1] [ENT]and [PAGE UP].
13. Press [CURSOR DOWN]until [ATC MAINT.MD]is highlighted, and then press [1]and [ENT].
14. Turn the <Power> switch off and then on again.

9.1.17

Conversation type	No.1172	*COMMAND ERROR (SP)
NC type	No.6172	*COMMAND ERROR (SP)

<Meaning>

1. Main CPU is not synchronized with slave CPU.

<Cause>

1. Faulty NC PCB or slave PCB

<Measures>

1. Replace NC PCB or slave PCB.

9.1.18

Conversation type	No.1197	*COMMAND ERROR (ATC)
NC type	No.6197	*COMMAND ERROR (ATC)

<Meaning>

1. A command to ATC is abnormal.

<Cause>

1. Faulty NC PCB

<Measures>

1. Replace NC PCB.

9.1.19

Conversation type	No.1293	*MAGAZN TOOL SET ERR
NC type	No.6293	*MAGAZN TOOL SET ERR

<Meaning>

1. When the power was turned on, the magazine data was damaged.

2. The magazine data was damaged when editing the data was attempted.

<Cause>

1. The data were damaged by an external factor, such as depletion of back-up batteries, replacement of PCB, etc.

<Measures>

1. For cause 1, check the battery alarm at the bottom right of the screen. If the alarm is displayed, the batteries have run out. Replace the batteries with new ones, and take procedure 2 as mentioned below. If not displayed, data are damaged by an external factor. Take procedure 2.

2. After data deletion, re-enter the data by programming or by inputting them from an external unit.

9.1.20

Conversation type	No.1300	*S OVRRD NO CONNECTED
NC type	No.6300	*S OVRRD NO CONNECTED

<Meaning>

1. When [User Parameter] → [Switch 1] → [OVERRIDE SWITCH] is set to [1: VALID], a non-connection signal was input from the I/O of the spindle override.

<Cause>

1. The spindle override connector is not connected.

<Measures>

1. Check that the following are connected to connector CNSPOV on the keyboard PCB.
   1) Short connector CNSPOV when spindle override is not applied.
   2) Spindle override connector CNSPOV when spindle override is applied.

9.1.21

Conversation type	No.2626	COMMUNICATION I/F ER
NC type	No.7626	COMMUNICATION I/F ER

<Meaning>

1. Incorrect command was given from the edit processing area to the communication processing area in the local CPU.

<Cause>

1. The data were damaged by an external factor, such as depletion of back-up batteries, replacement of PCB, etc.

2. Faulty NC PCB or MEM PCB

<Measures>

1. For cause 1, check the battery alarm at the bottom right of the screen. If the alarm is displayed, the batteries have run out. Replace the batteries with new ones, and take procedure 2 as mentioned below. If not displayed, data are damaged by an external factor. Take procedure 2.

2. Select [MAINTENANCE MENU] from [EXTERNAL PROGRAM I/O], output all data, format the memory, and re-enter all data. However, when faulty data or programs cannot be output, delete them.

3. Replace NC PCB or MEM PCB.

9.1.22

Conversation type	No.2996	**KERNEL ERROR (MAIN)
NC type	No.7996	**KERNEL ERROR (MAIN)
Conversation type	No.2998	**KERNEL ERROR (LOCAL)
NC type	No.7998	**KERNEL ERROR (LOCAL)

<Meaning>

1. An error has occurred in the main CPU or local CPU operation system.

<Cause>

1. Faulty NC PCB

<Measures>

1. Replace NC PCB.

9.1.23

Conversation type	No.2999	*NO ERROR NO.
NC type	No.7999	*NO ERROR NO.

<Meaning>

1. Machining data are converted to interpretive code during operation. Some interpretive code are invalid.

<Cause>

1. The data were damaged by an external factor, such as depletion of back-up batteries, replacement of PCB, etc.

<Measures>

1. For cause 1, check the battery alarm at the bottom right of the screen.
   If the alarm is displayed, the batteries have run out. Replace the batteries with new ones, and take procedure 2 as mentioned below.
   If not displayed, data are damaged by an external factor. Take procedure 2.

2. Delete the data which generated the error. After data deletion, re-enter the data by programming or by inputting them from an external unit.

9.1.24

Conversation type	No.1327	**NO MEM (XY THRM COMP)
NC type	No.6327	**NO MEM (XY THRM COMP)

<Meaning>

1. Although the optional X and Y axes thermal displacement correction function for the OPSEL board is provided, the RAM is not attached to the NC board.

<Cause>

1 The NC board is defective.

2 The version of the NC board is obsolete (before B52J067-3 or B52J090-2).

<Measures>

1. Replace the NC board.

9.1.25

Conversation type	No.2121	*PRESS. HIGH (AUTO OIL)
NC type	No.7121	*PRESS. HIGH (AUTO OIL)

<Meaning>
The pressure sensor was on when oiling was attempted. (Oil pressure has not reduced.)

<Cause>
1 Machine parameter 1 (SYSTEM1) is incorrectly set.
([AUTOMATIC OILING FUNCTION] is setting [YES] or [NO ENTORY], but the machine doesn't have this option.)
2 [PRSNSR]signal in user parameter 4 (EXTRL IN SIGNAL) is incorrectly set.
3 The cord connection of [PRSNSR] signal is incorrect.
4 The I/O board is defective.
5 The KLUB relay is defective.
6 The cord connection to the I/O board is incorrect.
7 The pressure sensor of the lubricating unit is defective.

<Measures>
1 Set machine parameter 1 (SYSTEM1) correctly.
(Set [NO] at [AUTOMATIC OILING FUNCTION])
2 Set [PRSNSR]signal in user parameter 4 (EXTRL IN SIGNAL) correctly.
3 Check the cord connection of [PRSNSR] signal.
4 Replace the I/O board.
5 Replace the KLUB relay.
6 Check the cord connection to the I/O board.
7 Replace the lubricating unit.

9.1.26

Conversation type	No.2122	*PRESS.LOW (AUTO OIL)
NC type	No.7122	*PRESS.LOW (AUTO OIL)

<Meaning>

1 The pressure sensor did not turn on (oil pressure did not rise) within the monitoring time (the time set for machine parameter 1) after the oil pump was activated.

<Cause>

1 [PRSNSR]signal in user parameter 4 (EXTRL IN SIGNAL) is incorrectly set.
2 The cord connection of [PRSNSR] signal is incorrect.
3 Machine parameter 1 (SYSTEM1) is incorrectly set.
([AUTOMATIC OILING FUNCTION] is setting [YES] or [NO ENTORY], but the machine doesn't have this option.)
4 The I/O board is defective.
5 The KLUB relay is defective.
6 The cord connection to the I/O board is incorrect.
7 The lubricating unit is not connected to the KLUB relay correctly.
8 The pressure sensor of the lubricating unit is defective.

<Measures>

1 Set [PRSNSR]signal in user parameter 4 (EXTRL IN SIGNAL) correctly.
2 Check the cord connection of [PRSNSR] signal.
3 Set machine parameter 1 (SYSTEM1) correctly.
(Set [NO] at [AUTOMATIC OILING FUNCTION])
4 Replace the I/O board.
5 Replace the KLUB relay.
6 Check the cord connection to the I/O board.
7 Check the connection of the lubricating unit and the KLUB relay.
8 Replace the lubricating unit.

9.2 Axial error

9.2.1 (1/2)

Conversation type	No.0094	**PULSEERROR(SPINDLE)
NC type	No.5094	**PULSEERROR(SPINDLE)
Conversation type	No.0095	**PULSE ERROR (X AXIS)
NC type	No.5095	**PULSE ERROR (X AXIS)
Conversation type	No.0096	**PULSE ERROR (Y AXIS)
NC type	No.5096	**PULSE ERROR (Y AXIS)
Conversation type	No.0097	**PULSE ERROR (Z AXIS)
NC type	No.5097	**PULSE ERROR (Z AXIS)
Conversation type	No.0098	**PULSE ERROR (4 AXIS)
NC type	No.5098	**PULSE ERROR (4 AXIS)
Conversation type	No.0099	**PULSE ERROR (5 AXIS)
NC type	No.5099	**PULSE ERROR (5 AXIS)
Conversation type	No.0100	**PULSE ERROR (6 AXIS)
NC type	No.5100	**PULSE ERROR (6 AXIS)
Conversation type	No.0102	**PULSE ERROR (M AXIS)
NC type	No.5102	**PULSE ERROR (M AXIS)

<Meaning>

1. Pulse signal sent from the axis indicated in brackets could not be read correctly.
   Note: The detected amount of shift can be checked by [DISPLACEMENT PULSE] on the <Input/output> screen.

<Cause>

1. Faulty setting for [Machine Parameter] to [System 1, 2, 3] to [?MTR PULSE CHCK ALLOWANCE]

2. Faulty motor or amplifier.

3. Faulty ENC cord or amplifier cord.

4. Faulty slave PCB.

9.2.1 (2/2)

<Measures>

1. For cause 1, check the setting for [Machine Parameter] to [System 1, 2, 3] to [?MTR PULSE CHCK ALLOWANCE].

2. Replace the motor or amplifier.

3. Replace the ENC cord or amplifier cord.

4. Replace the slave PCB.

9.2.2

Conversation type	No.0534	*SP IN-POS CHCK TMOUT
NC type	No.5534	*SP IN-POS CHCK TMOUT
Conversation type	No.0535	*X IN-POS CHCK TMOUT
NC type	No.5535	*X IN-POS CHCK TMOUT
Conversation type	No.0536	*Y IN-POS CHCK TMOUT
NC type	No.5536	*Y IN-POS CHCK TMOUT
Conversation type	No.0537	*Z IN-POS CHCK TMOUT
NC type	No.5537	*Z IN-POS CHCK TMOUT
Conversation type	No.0538	* 4 IN-POS CHCK TMOUT
NC type	No.5538	* 4 IN-POS CHCK TMOUT
Conversation type	No.0539	* 5 IN-POS CHCK TMOUT
NC type	No.5539	* 5 IN-POS CHCK TMOUT
Conversation type	No.0540	* 6 IN-POS CHCK TMOUT
NC type	No.5540	* 6 IN-POS CHCK TMOUT
Conversation type	No.0542	*M IN-POS CHCK TMOUT
NC type	No.5542	*M IN-POS CHCK TMOUT

<Meaning>

1. The amount of deviation of the axis in error did not become smaller than the value set for [Machine Parameter] to [System 1, 2, 3] to [IN-POSITION WIDTH?] even after the time set to [Machine Parameter] to [System 1, 2, 3] to [? IN-POSI CHECK TIMEOUT] has elapsed after completion of operation.

<Cause>

1. Faulty setting for [Machine Parameter] to[System 1, 2, 3] to [? IN-POSI CHECK TIMEOUT] or [IN-POSITION WIDTH?]

<Measures>

1. Check the time set to [Machine Parameter] to [System 1, 2, 3] to [? IN-POSI CHECK TIMEOUT] and [IN-POSITION WIDTH?] of the axis in error.

2. Check that there is no mechanical failure.

9.2.3

Conversation type	No.1163	*ORG POS ERROR X
NC type	No.6163	*ORG POS ERROR X
Conversation type	No.1164	*ORG POS ERROR Y
NC type	No.6164	*ORG POS ERROR Y
Conversation type	No.1165	*ORG POS ERROR Z
NC type	No.6165	*ORG POS ERROR Z
Conversation type	No.1166	*ORG POS ERROR SP
NC type	No.6166	*ORG POS ERROR SP
Conversation type	No.1167	*ORG POS ERROR 4
NC type	No.6167	*ORG POS ERROR 4
Conversation type	No.1168	*ORG POS ERROR 5
NC type	No.6168	*ORG POS ERROR 5
Conversation type	No.1169	*ORG POS ERROR 6
NC type	No.6169	*ORG POS ERROR 6

<Meaning>

1. When the zero position limit switch is turned on at the time of zero posion return (dog type), the rapid traverse is normally changed to a low speed feed. However, in this case, though the speed was decelerated at the specified time constant, the zero position limit switch was turned off by passing over the zero position dog after it was once turned on.

2. When the zero position limit switch is changed from ON to OFF, zero position signal of the motor is generally confirmed at the time of zero position return (dog type), but this was not confirmed.

<Cause>

1. Defect of the zero position limit switch

2. Zero dog length does not match the machine parameter.

3. Faulty motor or amplifier.

<Measures>

1. Check if the zero position limit switch is working properly, referring to Input on the input/output screen.
   In proper working condition of the zero position limit switch, the corresponding bits show "1" when the zero position limit switch is turned on, or "0" when turned off. If not, replace the zero position limit switch.

2. If the same error is no longer generated in measure 1, cause 2 may be responsible. Measure the length of the zero position limit switch through the input on the <Input/output> screen to determine whether the value matches the machine parameter using the formula below. If it does not match, set the correct value to [Machine Parameter] to [X DOG RETURN HIGH SPD TRAVEL] so that the formula below is satisfied.

   L: Length of the measured zero dog (mm)
   V: [Machine Parameter] to [X DOG RETURN HIGH SPD TRAVEL] (mm/min)
   T: [Machine Parameter] to [X RAPID FEED TIME CONSTANT 1] (msec)
   K: [Machine Parameter] to [X-AXIS POSITION LOOP GAIN] (sec-1)
   F: [Machine Parameter] to [X-AXIS RAPID FEED FORWARD RATIO] (%)

$$L < \frac{V}{60} \cdot \left(0.02 + \frac{1}{2} \cdot \frac{T}{1000} + \frac{1}{K} \cdot \frac{100-F}{100}\right)$$

3. If the same error is no longer generated after measure 2 is taken, cause 3 may be responsible. Replace the motor or amplifier.

9.2.4

Conversation type	No. 1323	*C ZERO RTRN POS ERR
NC type	No. 6323	*C ZERO RTRN POS ERR

<Meaning>
Dog type zero position return was attempted when the C-axis machine coordinate value was set to a value other than 0.000 or -180.000.

<Cause>

<Measures>
1. Set the C-axis machine coordinate value to 0.000 or -180.000 and then conduct dog type zero position return.

9.2.5

Conversation type	No.1324-1326:	*ORIGINLSOFF(4)-(6)
NC type	No.6324-6326:	*ORIGINLSOFF(4)-(6)

<Meaning>
The zero position limit switch was on when dog type zero position return was attempted for axes No. 4 ~ 6 by pressing the **[RELSE]** and **[Z.RTN]** keys.

<Cause>

<Measures>
1. Move the axes in JOG mode until the zero position limit switch turns on, and then conduct zero position return again.

Origin LS signal check on screen
1. **[I/O]** key on.
2. **[1] [EOB/ENT]** key on.
3. **[PAGE DOWN]** key on twice, and display following screen.

9.3 Data error

9.3.1

Conversation type	No.0025	**DATA ERR (M/C PARAM)
NC type	No.5025	**DATA ERR (M/C PARAM)
Conversation type	No.1057	**DATA ERR (USER PARAM)
NC type	No.6057	**DATA ERR (USER PARAM)
Conversation type	No.3204	*DATA ERR (TOOL)
Conversation type	No.3205	*DATA ERR (PTRN)
Conversation type	No.3206	*DATA ERR (HOLE)
Conversation type	No.3207	*DATA ERR (CUTC)
NC type	No.8206	*DATA ERR (WORK ZERO)
NC type	No.8207	*DATA ERR (TOOL DATA)
NC type	No.8208	*DATA ERR (MACRO VAR.)

<Meaning>

1. Structure of the data in brackets ( ) currently selected is damaged.

<Cause>

1. The data were damaged by an external factor, such as depletion of back-up batteries, replacement of PCB, etc.

<Measures>

1. For cause 1, check the battery alarm at the bottom right of the screen. If the alarm is displayed, the batteries have run out. Replace the batteries with new ones, and take procedure 2 as mentioned below. If not displayed, data are damaged by an external factor. Take procedure 2.

2. Delete the data which generated the error. After data deletion, re-enter the data by programming or by inputting them from an external unit.

9.3.2

Conversation type	No.2623	DATA ERR (DATA BANK)
NC type	No.7623	DATA ERR (DATA BANK)

<Meaning>

1. Structure of the data bank not currently selected is damaged.

<Cause>

1. The data were damaged by an external factor, such as depletion of back-up batteries, replacement of PCB, etc.

<Measures>

1. For cause 1, check the battery alarm at the bottom right of the screen.
   If the alarm is displayed, the batteries have run out. Replace the batteries with new ones, and take procedure 2 as mentioned below.
   If not displayed, data are damaged by an external factor. Take procedure 2.

2. Follow the steps below to recover the damaged data:
   1) Switch to program editing mode and select [DIRECTORY OF MEMORY].
   2) Select [DATA BANK].
   3) The <DIRECTORY OF MEMORY> screen for the data bank appears.
      Take measure 3 if no circle (○) is displayed, regardless of METRIC or INCH.
   4) Delete the data indicated with a circle (○).
   5) After deleting the data, re-enter the data by programming or by inputting it from an external unit.
   6) Repeat steps 4) to 5) for all data indicated with a circle (○).
   7) If the above error still occurs even when no circle (○) is indicated, proceed to measure 3.

   Note: Magazine data is lost when the unit system is changed.
   Save the magazine data before changing the unit system in step 6.

3. Format the memory.

9.3.3

Conversation type	No.1053	**M/C PARAM ERR (SYS2)
NC type	No.6053	**M/C PARAM ERR (SYS2)

<Meaning>

1. Setting of machine parameters 2 (system 2) is faulty.

<Cause>

1. Parameter for a different model was entered.

<Measures>

1. Check the following items for machine parameters 2 (system 2).
   - 4OPTION
   - 5-AXIS INSTALLATION POSITION
   - 6-AXIS INSTALLATION POSITION
   - 4-AXIS ADDRESS
   - 5-AXIS ADDRESS
   - 6-AXIS ADDRESS
   - 4-AXIS CLAMP MECHANISM

Note: The same address cannot be used for multiple axes.
(For the TC-31A, using the same address is allowed for the 5th and 6th axes.)

9.3.4

Conversation type	No.1871	*USER PAEA ER (Z MESR)
NC type	No.6871	*USER PAEA ER (Z MESR)

<Meaning>

1. Faulty setting of user parameter 6 (Z measurement) or [AUTO THRM DISP CMP]

<Cause>

1. [THERMAL MEASUREMENT FUNCTION] of user parameter 6 (Z measurement) is set to [1: VALID] and [AUTO THRM DISP CMP] is set to [1:VALID].

<Measures>

1. Check the settings for [THERMAL MEASUREMENT FUNCTION] of user parameter 6 (Z measurement) and [AUTO THRM DISP CMP], and change either setting to [0: INVALID].

9.3.5

Conversation type	No.1153	*EDIT ERROR 1
NC type	No.6153	*EDIT ERROR 1
Conversation type	No.1154	*EDIT ERROR 2
NC type	No.6154	*EDIT ERROR 2
Conversation type	No.1155	*EDIT ERROR 3
NC type	No.6155	*EDIT ERROR 3

<Meaning>

1. During editing, data is damaged.

2. Data cannot be edited.

<Cause>

1. Content of data area is damaged.

<Measures>

1. If the error still occurs,
   - Delete the file that may be the problem source.
   - Format the memory.

9.3.6 (1/2)

Conversation type	No.1158	*PARITY ER (USER PARA)
NC type	No.6158	*PARITY ER (USER PARA)
Conversation type	No.1159	*PARITY ER (M/C PARAM)
NC type	No.6159	*PARITY ER (M/C PARAM)
Conversation type	No.1160	*PARITY ERR (PRGRM)
NC type	No.6160	*PARITY ERR (PRGRM)
Conversation type	No.1299	*PARITY (SOFT SWITCH)
NC type	No.6299	*PARITY (SOFT SWITCH)
Conversation type	No.3200	*PARITY ERR (TOOL)
Conversation type	No.3201	*PARITY ERR (PTRN)
Conversation type	No.3202	*PARITY ERR (HOLE)
Conversation type	No.3203	*PARITY ERR (CUTC)
NC type	No.8203	*PARITY (WORK ZERO)
NC type	No.8204	*PARITY (TOOL DATA)
NC type	No.8205	*PARITY (MACRO VARIA.)

<Meaning>

1. When the power was turned on or when the NC was reset, data in brackets ( ) was found damaged.

2. Data in brackets ( ) was found damaged when editing, referencing, or operating.

3. For parity error (soft switch), soft switch data was found damaged when the power was turned on.

<Cause>

1. The data were damaged by an external factor, such as depletion of back-up batteries, replacement of PCB, etc.

9.3.6 (2/2)

<Measures>

1. For cause 1, check the battery alarm at the bottom right of the screen.
   If the alarm is displayed, the batteries have run out. Replace the batteries with new ones, and take procedure 2 as mentioned below.
   If not displayed, data are damaged by an external factor. Take procedure 2.

2. Delete the data which generated the error. After data deletion, re-enter the data by programming or by inputting them from an external unit.

*Tentative measure
Display the file which generated the error. Check the data, and correct them each time when an abnormal character is found.
(This measure does not always work to repair the data.)

9.3.7

Conversation type	No.1850	*MARK NOT FOUND
NC type	No.6850	*MARK NOT FOUND

<Meaning>

1. When starting editing or editing machining data or data bank data, data mark is lost.

2. When turning the power on or pressing the reset key, parameter mark is lost.

<Cause>

1. Tap preparatory hole data of other model are registered.

2. Parameters of other model are registered.

3. PROTECT switch is set to ON during edit processing, which results in setting an imperfect data.

4. The data were damaged by an external factor, such as depletion of back-up batteries, replacement of PCB, etc.

<Measures>

1. For causes 1 to 2, register correct data.

2. If the same error is still generated after the above, check the battery alarm at the bottom right of the screen. If the alarm is displayed, the batteries have run out. Replace the batteries with new ones, and take the procedure 3 as mentioned below. If not displayed, data are damaged by an external factor. Take the procesure 3.

3. Delete the data which generated the error. After data deletion, re-enter the data by programming or by inputting them from an external unit.

9.3.8

Conversation type No.3248 *NO REQUIRED DATA

<Meaning>

1. Data disappeared for some reason during processing.

<Cause>

1. The data were damaged by an external factor, such as depletion of back-up batteries, replacement of PCB, etc.

<Measures>

1. For cause 1, check the battery alarm at the bottom right of the screen.
   If the alarm is displayed, the batteries have run out.
   Replace the batteries with new ones, and take procedure 2 as mentioned below.
   If not displayed, data are damaged by an external factor. Take procedure 2.

2. Delete the data which generated the error. After data deletion, re-enter the data by programming or by inputting them from an external unit.

9.3.9

Conversation type	No.4566	OPENERROR(PROGRAM)
Conversation type	No.4567	OPEN ERROR(CUTCOND)

<Meaning>

1. During editing, data is damaged.

2. Data cannot be edited.

<Cause>

1.Content of data area is damaged.

<Measures>

1.If the error still occurs,
- Delete the file that may be the problem source.
- Format the memory.

9.3.10

Conversation type	No.0104	**FORMAT TYPE IS WRONG
NC type	No.5104	**FORMAT TYPE IS WRONG

<Meaning>

1. Memory format differs from the current format (conversation or NC language).

<Cause>

1. The version of the memory board is changed from WJ (E) -10 and lower to WJ (E)−11 and higher.
2. The data is damaged due to a dead backup battery or external causes, such as board replacement.
3. NC or conversation language is changed when memory capacity is three times of the standard.

<Measures>

1. Conduct special formatting. (See Hidden Operation 5.)
2. Conduct memory formatting.
3. Check the language changing switch.

9.3.11

Conversation type	No.0105	**FORMAT CAPA DIFFERS
NC type	No.5105	**FORMAT CAPA DIFFERS

<Meaning>

1. Memory format capacity differs from that set by the hardware (normal/triple).

<Cause>

1. The version of the memory board is changed from WJ (E) -10 and lower to WJ (E)−11 and higher.
2. The data is damaged due to a dead backup battery or external causes, such as board replacement.
3. The connector is not correctly connected to the NC board.

<Measures>

1. Conduct special formatting. (See Hidden Operation 5.)
2. Conduct memory formatting.
3. Check connection of the connector to the NC board.

Memory capacity check
Input/output (local) Input 1 Bit 3

Bit FEDCBA9876543210
Input 1 **********

Memory capacity
(0:three times of standerd
1:standerd)

9.3.12

Conversation type	No.0108	**NO MEMORY FORMAT
NC type	No.5108	**NO MEMORY FORMAT

<Meaning>

1. Completion of memory formatting is not identified in the memory format check area.

<Cause>

1. The data is damaged due to a dead backup battery or external causes, such as board replacement.

<Measures>

1. Conduct memory formatting.

9.3.13

Conversation type	No.1058	**USER PARAM ERR (SW2)
NC type	No.6058	**USER PARAM ERR (SW2)

<Meaning>

1. Setting of user parameters 2 (switch 2) is faulty.

<Cause>

1. Parameter for a different model was entered.

<Measures>

1. Check the following items for user parameters 2 (switch 2).
   STROKE 4
   STROKE 4 (-)
   STROKE 4 (+)
   SOFTWARE STROKE LIMIT1 4 (-)
   SOFTWARE STROKE LIMIT1 4 (+)

9.3.14

Conversation type	No.1059	**USER PARAM ERR (SW1)
NC type	No.6059	**USER PARAM ERR (SW1)

<Meaning>

1. Setting of user parameters 1 (switch 1) is faulty.

<Cause>

1. Parameter for a different model was entered.

<Measures>

1. Check the following items for user parameters 1 (switch 1).
   TOOL BREAKAGE DETECT OPTION

9.3.15

Conversation type No.0110 **MACHINESETTINGERR
NC type No.5110 **MACHINESETTINGERR

< Cause >

1. The machine model or type differs from the setting before shipping.

< Factor >

1. The model check signal (Main 1: Input 8-8 (MSEL0) ~ 8-d (MSEL5) is faulty.
2. Maintenance data for a different model or type was input.

< Solution >

1. Check that the model and type are correct.
   The model and type before shipping are assigned to settings “1” to “6” of soft switch 6.
   Setting “8” of soft switch 6 changes the parameter between [0: Invalid] and [1.Valid].
   Match the model check signal (Main 1: Input 8-8 (MSEL0) ~ 8-d (MSEL5) to settings “1” to “6” of soft switch 6.
   See **8.2 I/O (Main)** for details of the model check signal.

MEM PCB Ver26

Machine	Magazine	Soft switch 6							
		8	7	6	5	4	3	2	1
22A	18MG	1	0	1	0	0	0	1	0
	26MG	1	0	1	0	0	0	1	1
32A	18MG	1	0	0	0	1	1	1	0
	26MG	1	0	0	0	1	1	1	1
31A	18MG	1	0	0	0	0	1	0	0
	26MG	1	0	0	0	0	1	0	1
S2A	14MG	1	0	0	0	1	0	0	0
R2A	14MG	1	0	1	0	1	0	0	0
20A	15MG	1	0	1	0	1	1	0	0
S2B	14MG	1	0	0	0	0	0	0	0
	21MG	1	0	0	0	0	0	0	1

9.3.15-1.xel

9.4 ATC error

9.4.1

Conversation type	No.0103	ATC BOARD ERR(POWER)
NC type	No.5103	ATC BOARD ERR(POWER)

<Meaning>

1. [ATC BOARD ERR(POWER)] was input to the NC.

<Cause>

1. The power voltage in the machine exceeds 15% over the rated voltage.

3. Faulty ATC BOARD

<Measures>

1. Check if the power supply voltage is within the rated range.

2. Replace the ATC BOARD.

9.4.2 (1/2)

Conversation type	No.0504	*POSITION ERROR SP
NC type	No.5504	*POSITION ERROR SP

<Meaning>

1. Althogh the spindle does not position at the orient 0°, ATC limit switch was turned on.

2. Althogh the spindle does not position at the orient 0°, Z axis moves above the zero point.

3. Spindle command is ordered when Z axis was above the zero point.

<Cause>

1) Mistakes have been occurred during the operation.

2) Defect of ATC area limit switch

3) Defect of the board

<Measures>

1) For the cause 2, check if ATC area limit switch is working properly, referring to the input 5 or 6 (refer to fig.2) on the input/ output screen (slave).
If it is working properly, limit switch moves as shown in the figure 1.
If not working as shown in the fig.1, ATC area limit switch is damaged or dislocated, or the cable is disconnected.
Adjust the position or replace the part with new one as required.

9.4.2 (2/2)

Fig.1 Normal motion

(2) For the cause 3, check if the value of the bit F of input 9 (Refer to the fig.1) on the<I/O> screen.
If the bit is 0, the board is defective. Replace the part with the new one.

Fig.2 Input/ Output (main1) Input 9

9.4.3

Conversation type	No.1189	*POSITION ERROR SP
NC type	No.6189	*POSITION ERROR SP

<Meaning>

1) Spindle command is given while ATC area limit switch is being on.

2) With non-stop ATC, when Z axis positioning and spindle rotation are commanded after the Z axis was moved down to its zero position, the Z axis is located above the zero position, or ATC area limit switch is being on more than 3.0 sec.

<Cause>

1) Mistakes have been occurred during the operation.

2) Defect of ATC area limit switch

3) Defect of the board

<Measures>

1) For the cause 2, check if ATC area limit switch is working properly, referring to the input 5 or 6 (refer to fig.2) on the input/ output screen (slave).
If it is working properly, limit switch moves as shown in the figure 1.
If not working as shown in the fig.1, ATC area limit switch is damaged or dislocated, or the cable is disconnected.
Adjust the position or replace the part with new one as required.

9.4.3 (2/2)

Fig.1 Normal motion

2) For the cause 3, check if the value of the bit F of input 9 (Refer to the fig.1) on the<I/O> screen.
If the bit is 0, the board is defective. Replace the part with the new one.

Fig.2 Input/ Output (main1) Input 9

9.4.4 (1/2)

Conversation type	No.1194	*MAGAZINE No. ERROR
NC type	No.6194	*MAGAZINE No. ERROR

<Meaning>

(1 When the power is turned or the NC is reset, NO address sensor 1-14 is not turned on.
*Operation of the **[RELSE]** + **[RESET]** keys is excluded from the above.

(2) When the magazine starts rotating, no address sensor 1-14 is not turned on.

(3) When the magazine stops after rotation, the indexed magazine number is not the one commanded.

<Cause>

(1) Excessive tool weight

(2) Imbalance of tools on the magazine

(3) Improper location of address sensors

(4) Defect of ATC parts (address sensor, ATC address sensor cable)

(5) Defect of the board

<Measures>

(1 Press the **[RELSE]** key and the [RESET] key at the same time to clear the error message, and move the magazine to a regular position by pressing [RELSE] and [SINGL MAGAZ] keys.

*If the [RELSE] key is not pressed together, <MAGAZINE NO. ERROR> may be generated again.

(2) For the cause 1, check the each tool and the total weight on the magazine.

(3) For the cause 2, check the arrangment of tools on the magazine.
If it is imbalance, change the tools positions.

9.4.4

(4) After the measure 1, check the value for 7bits (D, E, F) of input 2 (Refer to the fig.1) on the input/ output screen (MAIN2) correspond to the magazine number which is currently indexed, as below. If not, move the magazine to the position corresponds. (Refer to the Maintenance Manual.) If the bits indicated above are not changed at all during magazine rotation , address sensor or ATC address sensor cable is damaged.
Replace the part with new one.

(5) Cause 5 may be occured when measures from 1 to 4 do not work.
Replace the board with the new one.

Fig.1 Input/ Output screen (Main 2) INPUT 2

Table.1 Correspondance of address sensor and number

Magazine No.	bitsF, E, D,7of input 2
1	0001
2	0010
3	0011
4	0100
5	0101
6	0110
7	0111
8	1000
9	1001
10	1010
11	1011
12	1100
13	1101
14	1110

9.4.5 (1/2)

Conversation type	No.1195	*MAGAZINE INDEX ERROR
NC type	No.6195	*MAGAZINE INDEX ERROR

<Meaning>

(1) When the power is turned on or when [RESET] key is turned off, the ATC cam sensor is being off.
*Operation of **[RELSE]** + **[RESET]** keys is excluded from the above.

(2) When **[MAGAZ]** or the **[ATC]** key is pressed in manual mode, ATC cam sensor is being off.

(3) When the Z axis is moved with the ATC area limit switch being on, ATC cam sensor is being off.

(4) After zero position return (dog type), when the Z axis is moved above the Z-axis machine zero position in manual mode (including tool changes in other mode), ATC cam sensor is being off.

(5) When the magazine stops after rotation, ATC cam sensor is being off.

<Cause>

(1) Excessive tool weight

(2) Imbalance of tools on the magazine

(3) Defect of ATC parts (ATC cam sensor, ATC cam sensor cable)

(4) Defect of the board

<MEASURES>

(1) Press [RELSE] and [RESET] keys at the same time to clear the error message, and move the magazine to a regular position by pressing [RELSE] and [SINGL MAGAZ] keys.

* If [RELSE] key is not pressed together, <MAGAZINE NO. ERROR> or <MAGAZINE INDEX ERROR> may be generated again.

(2) For the cause 1, check each tool weight and the total tool weight on the magazine.

9.4.5 (2/2)

(3) For the cause 2, check the arrangement of tools on the magazine.
If imbalanced, change the tool positions.

(4) For the cause 3, check if the value of the bit 6 of input 2 (Refer to the fig. 1.) on the <I/O> screen changes during the rotation..
If not, ATC cam sensor or ATC cam sensor cable is damaged. Replace the part with new one.

(5) If the same error is still generated even after checking all the above items, replace the board with new one.

```
Bit        F E D C B A 9 8 7 6 5 4 3 2 1 0
Input  2   * * * * * * * * * * * * * * *   0:ON  1: OFF
                         |
                         |_____________ ATC Cam sensor
```

Fig. 1 Input/output screen (MAIN 1) Input 2

9.4.6

Conversation type	No.1196	*MAGAZINE POSITION ERROR
NC type	No.6196	*MAGAZINE POSITION ERROR

<Meaning>

(1) When the magazine rotation is commanded in manual mode, ATC zero position limit switch is being off.

(2) During tool change in MDI or memory operation mode, ATC zero position limit switch is not turned on within 1.5 sec.after magazine rotation command.

<Cause>

(1) Magazine rotation command is given without moving up the Z axis to its ATC zero position.

(2) Grid shift amount Z or origin offset Z axis is not correct.

(3) Defect of ATC parts
(ATC zero position limit switch, ATC zero position limit switch cable)

(4) Defect of the board

<Measures>

(1) Check the grid shift amount Z and origin offset Z axis.

If not correct, set it properly. (Refer to the Maintenance Manual.)

(2) For the cause 3, check if ATC zero position limit switch is working properly, referring to the bit E of input 9 (Refer to the fig. 1.) on the <I/O> screen (MAIN 1). If not working as shown in the fig. 2, ATC zero position limit switch or cable is damaged. Replace the part with new one.

9.4.6

(3.) If the same error is generated even after checking all the above items, replace the board with new one.

```
Bit        FEDCBA9876543210
Input 1    ****************  0:OFF  1:ON
           |
           |
           └── ATC zero point limit
```

Fig.1 Input/Output screen (MAIN 1) Input 9

Fig. 2 Normal motion

9.4.7

Conversation type	No.1199	*MAGAZINE TIME OVER
NC type	No.6199	*MAGAZINE TIME OVER

<Meaning>

(1) Magazine rotation has not been finished within 5 sec.
* Magazine rotation Commended on the input output screen is excluded from the above.

<Cause>
(1) Excessive tool weight

(2) Imbalance of tools on the magazine

(3) Defect of ATC parts
(address sensor. ATC deceleration sensor. ATC cam sensor. motor)

(4) Defect of the board

<Measures>
l. Press **[RELSE]** and **[RESET]** keys at the same time to clear the error message, and move the magazine to a regular position by pressing **[RELSE]** and [SINGL MAGAZ] keys.
If **[RELSE]** key is not pressed together. <MAGAZINE NO. ERROR> or <MAGAZINE INDEX ERROR> may be generated.

2. For the cause 1, check each tool weight and the total weight on the magazine. If exceeding allowable weight remove the tool(s).

3. For the cause 2, check the arrangement of tools on the magazine. If imbalanced, change the tool positions.

4. For the cause 3, check if the value of the bit 6 of input 2 (refer to the fig. l) on the input output screen (ATC IO) changes during magazine rotation.
If not, ATC cam screen or ATC cam sensor cable is damaged.
Replace the part with new one.

```
Bit          F E D C B A 9 8 7 6 5 4 3 2 1 0
Input  2     * * * * * * * * * * * * * * * *   0:ON  1: OFF
                                 |
                                 |
                                 |____ ATC cam sensoer
```

Fig. 1 Input/output screen (MAIN 1) Input 2

9.4.7 (2/3)

Fig.2 Input/output screen (MAIN 2) Input 2

(5) After the measure 1, check that the values 7, D ,E, F bits ofinput 2 (Refer to the fig. 2.) on the <I/O> screen (MAIN2) correspond to the magazine number which is currently indexed, as below. If not. move the magazine for correspondence. (Refer to the Maintenance manual)
If the values 7, D ,E, F bits ofinput 2 are not changed at all during magazine rotation, address sensor or ATC address sensor cable is dameged.
Replace the part with new one.

Table 1 Correspondence of address sensor and number

Magazine No.	F, E, D,7 of input 2
1	0001
2	0010
3	0011
4	0100
5	0101
6	0110
7	0111
8	1000
9	1001
10	1010
11	1011
12	1100
13	1101
14	1110

9.4.7 (3/3)

(6) For the cause 3, check if the value of the bit 6 of input 2 (Refer to the fig. 2.) on the input output screen (MAIN 2) changes during megazine rotation.
If not ATC deceleration sensor or ATC delectation sensor cable is damaged.
Replace the part with new one.
If the same error is generated even after checking dl the above items, replace the board or the motor with new one.

(7) If the same error is generated even after checking all the above items, the cause 3 or the cause 4 may be occured.
Replace the motor or board.

9.5 Reference

9.5.1 Special power-ON

1. Special power-ON 1 (when the file is damaged)
   This is used when the system does not boot when power is turned on, because the desired program file (machine parameters, user parameters, etc.) is damaged. Not use for any other situation.
   1) Press the [POWER] switch while holding down the **[EMERGENCY]**, **[START]**, and **[HOLD]** keys.
   2) The system boots in manual mode with the [SPECIAL INITIAL (0001)] alarm message.
   3) Restore or delete the damaged file.
   4) Turn power off.

2. Special power-ON 2 (key check mode)
   This is used to check keys. Not use for any other situation.
   1) Press the [POWER] switch while holding down the **[EMERGENCY]**, **[HOLD]** and **[RELSE]** keys.
   2) The system boots in key check mode.
      All keys are invalid after the <Key Check> screen has appeared from the <INPUT/OUTPUT MENU> screen.
   3) Press the **[RST]** key to return to normal key operation.

3. Special power-ON 3 (axis detachment)
   This is used to disable a faulty axis and operate other axes when a servo error has occurred. Not use for any other situation.

   1) Remove the slave PCB side of the cable connecting the slave PCB of the axis with an error and the servo amplifier.
   2) Press the [POWER] switch while holding down the **[EMERGENCY]**, **[START]** and **[RELSE]** keys.
   3) The [**SERVO CHECK OFF] and [*EMERGENCY SW ON] alarms occur.
   4) Release the [EMERGENCY] switch and press the **[RST]** key. The servo turns on. (The [**SERVO CHECK OFF] alarm is not cleared.)

Notes

1) Do not allow the Z axis to drop when disabled.

2) Attempting to move the disabled axis using the jog keys may cause a deviation error or invalidate the jog keys.

3) The spindle cannot be disabled.

4. Special power-ON 4 (clearing all memory)
   This is used when the system does not boot even when special power-ON 1 (when the file is damaged) is attempted. Not use for any other situation.
   1) Set the [NC type/Conversation type] switch to [NC type].
   2) Set the [PROTECT] switch to [OFF].
   3) Press the [POWER] switch while holding down the **[EMERGENCY]**, **[RELSE]**, and **[SHIFT]** keys.
   4) Keep the **[+4]** key held down for at least three seconds when instructed on the screen, and all memory is cleared.
   5) After clearing all memory, turn power off.
   6) Set the [NC type/Conversation type switch to [Conversation type].
   7) Repeat steps 2) to 5).
   8) Set the [NC type/Conversation type] switch to [NC type].
   9) Turn power off.
   10) Format the memory.
   11) Turn power off.
   12) Set the [NC type/Conversation type] switch to [Conversation type].
   13) Format the memory.
   14) Turn power off.

Notes

1) Operation can be started in either NC type or conversation type.

2) When all memory is cleared, the adjusted value for the screen contrast is also cleared, thus the contrast needs to be adjusted when power is turned on next.
Press the [I/O] key to display the <INPUT/OUTPUT MENU> screen. Contrast can be adjusted using the [PAGE UP] or [PAGE DOWN] key.

3) The steps for formatting memory are as below.

1. Set the [PROTECT] switch to [OFF].
2. Press the **[EDIT]** key.
3. Press the **[I/O]** key to display the <INPUT/OUTPUT MENU> screen. Select [1. INPUT/OUTPUT].
4. Press the **[PAGE UP]** or **[PAGE DOWN]** key to display the version screen.
5. Move the cursor to [PARAMETER CHANGE].
6. Press the **[1]** and **[EOB/ENT]** keys.
7. Press the **[PRGRM]** key to display the <PROGRAM EDIT MENU> screen.
8. Press the **[2]** and **[EOB/ENT]** keys (NC type) or **[6]** and **[EOB/ENT]** keys (Conversation type), or move the cursor to [DIRECTORY OF MEMORY] and press the **[EOB/ENT]** key.
9. Press the **[F4]** key on the <DIRECTORY OF MEMORY MENU> screen.
10. When instructed on the screen, press the **[DEL]** key.
11. The memory format confirmation screen appears. To proceed, press the **[F0]** key.
12. Confirm that formatting memory has been completed and turn power off.

4) When [PARAMETER CHANGE] is set to [YES], attempting to press the [RST] key or change mode changes the setting to [NO].

9.5.2 Hidden Operation

1. Hidden Operation 1 (changing the soft switch)

1) Set the [PROTECT] switch to [OFF].
2) Press the **[I/O]** key to display the <INPUT/OUTPUT MENU> screen.
3) Press the **[-]**, **[9]**, **[9]**, **[9]**, **[8]**, and **[EOB/ENT]** keys.
4) Set the required items.
5) Press the **[EOB/ENT]** key.
6) Press the **[F0]** key.

```
SOFT SWITCH                                   INPUT/OUTPUT
 •SWITCH  1              00000000
 •SWITCH  2              00000000
 •SWITCH  3              00000000
 •SWITCH  4              00000000
 •SWITCH  5              00000000
 •SWITCH  6              00000000
 •SWITCH  7              00000000
 •SWITCH  8              00000000
 •SWITCH  9              00000000
 •SWITCH  10             00000000
 SWITCH  1    →  00000000
   I/O
   MENU
   F0      F1      F2      F3      F4
```

2. Hidden Operation 2 (changing the memory format information)

1) Set the [PROTECT] switch to [OFF].
2) Press the [EDIT] mode.
3) Press **[6]** (conversation type) or **[2]** (NC type) and **[EOB/ENT]** key.
4) Press **[-]**, **[9]**, **[9]**, **[9]**, **[9]**,and **[F4]** key.
(The following screen appears.)

5) Press the **[F0]** key.
6) Turn on the power again.

9.5.3 ATC Maintenance Mode (1/3)

This parameter cannot be set for the armless ATC.

This mode is used when setting the ATC arm or adjusting the magazine position.

1. Switch from normal mode to ATC maintenance mode
   1) Press the **[I/O]** key to display the <INPUT/OUTPUT MENU> screen. Select[1.INPUT/OUTPUT].
   2) Press the **[PAGE UP]** or **[PAGE DOWN]** key to display the version screen.
   3) Move the cursor to [ATC maintenance mode].
   4) Press the **[1]** and **[EOB/ENT]** key.
   5) The [**TURN OFF POWER] alarm occurs.
   6) Turn power off and then back on.
   7) The system boots in ATC maintenance mode.

2. Switch from ATC maintenance mode to normal mode
   1) Press the **[I/O]** key to display the <INPUT/OUTPUT MENU> screen. Select[1.INPUT/OUTPUT].
   2) Press the**[PAGE UP]** or **[PAGE DOWN]** key to display the version screen.
   3) Move the cursor to [ATC maintenance mode].
   4) Press the **[0]** and **[EOB/ENT]** key.
   5) The [**TURN OFF POWER] alarm occurs.
   6) Turn power off and then back on.
   7) The system boots in normal mode.

9.5.3 ATC Maintenance Mode (2/3)

```
VERSION                    TC-S2B                    INPUT/OUTPUT

•VERSION (**)                                        •KEY CODE LIST
MAIN          MA1-51-04                                000000000000
                                                       000000000000
SLAVE         SA1-11-03                                000000000000
                                                       000000000000
LOCAL         LA1-51-03                                000000000000
                                                       000000000000
SEQ(S)                                                 000000000000
                                                       000000000000
SEQ(U)

•PARAMETERCHANGE        0
 (0:NO          1:YES)
•ATC MAINT. MD          0                              POWERONTIME
                                                       00236:25:08
•DISPLAY TEST           0                              RUNNINGTIME
                                                       00103:10:53
•MAINT  INPUT        0

PARAMETER CHANGE→_

      I/O
      MENU
      F0        F1        F2        F3        F4
```

```
ATC MAINT. MD                                  MANUALCONDITIONS
 •MGZ COOD              0.000                  •Z-MC  C              45.000
 •MAGAZINE              NO.  01                •ATC  ARM  ORIGIN        0
 •POT  OPERATION  TIME                          0.000  sec
 •MAGAZINE  COVER  OPR  TIME                    0.000  sec
 •CLEAR  START P  DATA                              0
 •START  DT1                                    0.000
 •START  DT2                                        0
 •HIGH SPEED (MAGAZINE)                            10  %
        •RAPID FREEDRATE (XYZ)                      0  %
 •JOG SPEED (MAGAZINE)                            0.1  min-1
        •JOG  FREEDRATE (XYZ)                      50  mm/min-1
 •STEP AMOUNT (MAGAZINE)                        0.001  °
        •STEP  O  LENGTH (XYZ)                  0.001  mm
```

9.5.3 ATC Maintenance Mode (3/3)

3. ATC operation

Press the **[E. STA]** key and the LED lights.
When the LED is lit, each moving section of the ATC can be operated indepen dently. Key entry is disabled.
When the LED is unlit, key entry is enabled, but each moving section of the ATC cannot be operated independently.

[RELSE]+[X(U)]	Raise the pot.
[RELSE]+[D]	Lower the pot.
[RELSE]+[O(A)]	Swivel ATC arm in jog mode (at low speed).
[RELSE]+[T]	Swivel ATC arm in single block mode (at low speed)
[RELSE]+[S]	Perform spindle orientation.
[RELSE]+[P]	Magazine cover open.
[RELSE]+[Q]	Magazine cover close.

Operations of the **[ATC]** and **[MAGZ]** keys are the same as those in normal mode.

4. Magazine operation

1) The magazine axis JOG operation is enabled by pressing the **[+4]** and **[-4]** keys.
2) Press the **[MAGZ]** key and the magazine swivels one pitch in the direction that the magazine number increases.
3) Move the cursor to [CLEAR START P DATA] and press the **[1]** and **[EOB/ENT]** keys. The absolute value and start point data in the amplifier are initialized.

<Supplementary explanation of clearing start point data>
An absolute encoder is used for the magazine axis. Accordingly, when adjusting the magazine axis, the absolute value for the amplifier must be initialized, and then the machine coordinates must be matched to the absolute value again.
When clearing start point data is attempted, the absolute value for the amplifier is initialized, start point data 1 (base machine coordinates) is cleared to zero, and start point data 2 (base absolute value) is set to the initialized absolute value.

9.5.4 PCB Sticker

1. Memory PCB version sticker

A00- ? ? ??

- ?? : 00 - 99 : Indicates the version (last two digits of the part code)
- ? : J : Japanese specifications E: Overseas specifications
- ? : W: Both of NC and Conversation types

(e.g.) "A00-WJ01" indicates that the PCB is version 01 and available for both conversation and NC types, and conforms to Japanese specifications.

2. Software version

		Main	Local	Slave
NC	Japan	MA1-51-??	LA1-51-??	SA1-11-??
	Overseas		LA2-51-??	
Conversation	Japan	MA1-11-??	LA1-11-??	
	Overseas		LA2-11-??	

Note: The last two digits indicate the software version.

3. Example of memory PCB version sticker and software version No.

A00-WJ?? (Both, Japan)

A00-WJ01	MA1-11-01	LA1-11-01	SA1-11-01	MA1-51-01	LA1-51-01	SA1-11-01
A00-WJ02	MA1-11-02	LA1-11-02	SA1-11-02	MA1-51-02	LA1-51-02	SA1-11-02
A00-WJ03	MA1-11-03	LA1-11-02	SA1-11-02	MA1-51-03	LA1-51-02	SA1-11-02
A00-WJ04	MA1-11-04	LA1-11-03	SA1-11-03	MA1-51-04	LA1-51-03	SA1-11-03

A00-WE?? (Both, Overseas)

A00-WE01	MA1-11-01	LA2-11-01	SA1-11-01	MA1-51-01	LA2-51-01	SA1-11-01
A00-WE02	MA1-11-02	LA2-11-02	SA1-11-02	MA1-51-02	LA2-51-02	SA1-11-02
A00-WE03	MA1-11-03	LA2-11-02	SA1-11-02	MA1-51-03	LA2-51-02	SA1-11-02
A00-WE04	MA1-11-04	LA2-11-03	SA1-11-03	MA1-51-04	LA2-51-03	SA1-11-03

9.5.5 Dip Switch

Main/Local

M/L	Bit	Function	Contents
Local	5	Switch of language	Bit 7/ Bit 6 / bit 5 ON / ON / ON : Japanese ON / ON / OFF : English ON / OFF / ON :German ON / OFF / OFF : French OFF / ON / ON : Spainish (only for NC type) OFF / ON / OFF : Chinese
	6		
	7		
	8	Not available	ON

9.5.6 Software switch

Hidden Operation (changing the soft switch)

1) Set the [PROTECT] switch to [OFF].
2) Press the **[I/O]** key to display the <INPUT/OUTPUT MENU> screen.
3) Press the **[-]**, **[9]**, **[9]**, **[9]**, **[8]**, and **[EOB/ENT]** keys.
4) Set the required items.
5) Press the **[F0]** key.

```
SOFT SWITCH                                   INPUT/OUTPUT
 •SWITCH  1              00000000
 •SWITCH  2              00000000
 •SWITCH  3              00000000
 •SWITCH  4              00000000
 •SWITCH  5              00000000
 •SWITCH  6              00000000
 •SWITCH  7              00000000
 •SWITCH  8              00000000
 •SWITCH  9              00000000
 •SWITCH  10             00000000
 SWITCH  1    →  00000000
   I/O
   MENU
   F0      F1      F2      F3      F4
```

Switch 1

Bit	Function	Contents
1	Optional thread cutting function	0: Not provided 1: Provided
2	Optional Z axis measurement function	0: Not provided 1: Provided
3	Optional zero point measurement function	0: Not provided 1: Provided
4	Optional automatic thermal displacement compensation (Note1) For version A00-??04 machines and earlier, options can be changed using the bit settings above. For veasion A00-??05 machines and later, options are changed using the IO PCB. Refer to the data set for [Main] on the <I/O> screen to check whether or not any option is provided or the IO PCB is applicable for option changes.	0: Not provided 1: Provided
5	Not used	0
6	Not available	0
7	Not available	0
8	Not available	0

Switch 4

Bit	Function	Contents
1	Not available	0
2	Not available	0
3	QT axis acceleration and deceleration (only TC-31A, TC-32A, TC-R2A)	0: Normal S-curve 1: Refined S-curve
4	QT axis high gain time when clamping (only TC-31A, TC-32A, TC-R2A)	0:Until in-position check is completed. 1: Until clamping is completed.
5	Spindle position deviation offset	0: Invalid 1:Valid
6	Not used	0
7	Not used	0
8	Not used	0

Switch 5

Bit	Function	Contents
1	Switch of high/ middle pressure coolant	0: high pressure coolant 1: middle pressure coolant (CTS)
2	Automatic door lock	0: Lock 1: Unlock
3	Not used	0
4	Not used	0
5	Dog type zero return XYZ axes zero point LS check	0: Not check 1: Check
6	Not used	0
7	Not used	0
8	Not available	0

Switch 6

Bit	Function	Contents
1	MSEL0	Set the MSEL signal for machine type. When bit 8 is "1", this parameter compared to machine type.
2	MSEL1	
3	MSEL2	
4	MSEL3	
5	MSEL4	
6	MSEL5	
7	Not used	0
8	Invalidating software that machine change (MSEL signal) check.	0:Valid 1: invalid

Switch 7 to 9 are not used (0).

9.5.7 Display Inspection

This function is used to check missing dots on the screen.

1) Press the [I/O] key to display the <INPUT/OUTPUT MENU> screen.
   Select [1.INPUT/OUTPUT].
2) Press the **[PAGE UP]** or **[PAGE DOWN]** key to display the version screen.
3) Move the cursor to [DISPLAY TEST].
4) Press the **[1]** and **[EOB/ENT]** keys.
5) Testing the display is commenced.
6) Press any key to stop testing and the screen returns to the normal display.

Chapter 11 Alarm screen

11.1 Alarm message screen

This section describes the alarm message screen on which, in case of machine trouble or failure, the error number and its detail are displayed.

```
                                                    ALARM

NO.          MESSAGE

1050   **    TURN OFF POWER

0501   *     SYSTEM ERROR (MAIN)

ALARM
LOG
F0      F1      F2      F3      F4
```

(1) If 2 or more errors occur at the same time, the message of up to 10 most serious errors is displayed on the screen.

(2) If errors occur on a screen other than the alarm message screen, the message of only most serious one blinks together with its number.

(3) Checking the error code displayed on the screen, refer to the error code list and eliminate the error according to its remedy.

There are 3 degrees of importance.
Refer to the error code list (11.3).

11.2 <Alarm Log> screen

Among critical errors that have occurred, the information of up to the latest 50 errors is retained, and able to be referred to on this screen.

11.2.1 <Log List> screen

The error list is displayed on this screen.
Press [F0] on the <Alarm Message> screen, and the <Log List> screen will appear.

ALARM LOG ALARM

NO.		MESSAGE	DATE	TIME
•1294	*	ADDRESS SETTING ERR	07/06	09:01
•1050	**	TURN OFF POWER	07/06	09:02
•1294	*	ADDRESS SETTING ERR	07/06	09:10
•1050	**	TURN OFF POWER	07/06	09:11
•1294	*	ADDRESS SETTING ERR	07/06	09:20
•1294	*	ADDRESS SETTING ERR	07/06	09:21
•1294	*	ADDRESS SETTING ERR	07/06	09:25
•1050	**	TURN OFF POWER	07/06	09:26
•1209	*	STROKE OVER (+C)	07/06	10:02
•1209	*	STROKE OVER (+C)	07/06	10:13
•1851	*	PRESS RESET KEY	07/06	13:10
•1050	**	TURN OFF POWER	07/07	09:42
•0018	**	SLV INTIAL IMP SBLE	07/07	11:20
•1851	*	PRESS RESET KEY	07/06	12:50
•1851	*	PRESS RESET KEY	07/06	14:36

DETAIL DISP. : MOVE CURSOR AND PRESS SET.

ALARM
DISPLAY

F0 F1 F2 F3 F4

11.2.2 <Detailed Display> screen

The detailed error information can be referred to on this screen.
Use the arrow key to select the desired error on the <Log List> screen, and press the [ENT] key.

```
DETAILED DISPLAY                                          ALARM LOG
0500          *EMERGENCY SW  ON            07/06          17:45

•MODE        MEM                •DISPLAY     POS
•EDIT PRGRM        0015
•OPE PROGRM        3100
•MACHINING                      •MOTION
      JOB NO.      _ _ _ _ 01     FEED        Z      23.000
      TOOL NO.     _ _ _ _ 01                        47mm/min
      POS NO.      _ _ _ _ 001
      PIECE NO.    _ _ _ _ 01
      LINE NO.     _ _ _ _ 01
      INFEFD NO.   _ _ _ _ 01
•MACHINE POS
      X            -200.000
      Y            -200.000
      Z             223.616
      A               0.000
      B               0.000
      C               0.000
      MGZN          952.500

PREVIOUS PAGE      : I/O DSP (DEVIATION)
NEXT PAGE          : I/O DSP (MAIN 1)
   LIST
   DISP.
   F0        F1        F2        F3        F4
```

11.2.3 <I/O Display> screen (1/5)

The I/O status of the machine can be referred to for each alarm on this screen. This screen includes displays for Main 1, Main 2, Slave, Local, and Deviation. Press the previous and next page keys on the <Detailed Display> screen to alter the display.

MAIN1

```
I/O DSP (MAIN 1)                                   ALARM LOG
IN                                      OUT
    FEDCBA9876543210                        FEDCBA9876543210
1   0000000011100000                    1   0000101110000101
2   0010000000000000                    2   0000000000011011
3   0000000011000100                    3   0000000000000000
4   0000011000000000                    4   0000011000000001
5   0110000000000000                    5   0000001000000000
6   1010000000000000                    6   0000000000000000
7   0000001111110101                    7   0000000000010000
8   0000000001100000                    8   0000000000000000
9   0000000001100000                    9   0000000010010110
10  1011111100001100                        FEDCBA9876543210
    FEDCBA9876543210

PREVIOUS PAGE :   DETAILED DISPLAY
NEXT PAGE     :   I/O DSP (MAIN 2)

LIST
DISP.
F0        F1        F2        F3        F4
```

11.2.3 <I/O Display> screen (2/5)

MAIN2

```
I/O DSP (MAIN 2)                                   ALARM LOG
IN                                        OUT
    FEDCBA9876543210                          FEDCBA9876543210
1   0000000011100000                      1   0000101110000101
2   0010000000000000                      2   0000000000011011
3   0000000011000100                      3   0000000000000000
4   0000011000000000
5   1111111111111111

    FEDCBA9876543210                          FEDCBA9876543210

PREVIOUS PAGE  :   I/O DSP (MAIN 1)
NEXT PAGE      :   I/O DSP (SLAVE)

     LIST
     DISP.
     F0        F1        F2        F3        F4
```

11.2.3 <I/O Display> screen (3/5)

SLAVE

```
I/O DSP (SLAVE)                                          ALARM LOG
IN                                          OUT
    FEDCBA9876543210                            FEDCBA9876543210
1   0000000011100000                        1   0000101110000101

2   0010000000000000                        2   0000000000011011

3   0000000011000100

4   0000011000000000

    FEDCBA9876543210                            FEDCBA9876543210

PREVIOUS PAGE  :   I/O DSP (MAIN 2)
NEXT PAGE      :   I/O DSP (LOCAL)

      LIST
      DISP.
      F0        F1        F2        F3        F4
```

11.2.3 <I/O Display> screen (4/5)

LOCAL

```
I/O  DSP (LOCAL)                                   ALARM  LOG
IN                                        OUT
     F E D C B A 9 8 7 6 5 4 3 2 1 0           F E D C B A 9 8 7 6 5 4 3 2 1 0
1    0 0 0 0 0 0 0 0 1 1 1 0 0 0 0 0       1   0 0 0 0 1 0 1 1 1 1 0 0 0 0 1 0 1

2    0 0 1 0 0 0 0 0 0 0 0 0 0 0 0 0

     F E D C B A 9 8 7 6 5 4 3 2 1 0           F E D C B A 9 8 7 6 5 4 3 2 1 0

PREVIOUS PAGE  :    I/O  DSP  (SLAVE)
NEXT  PAGE     :    I/O  DSP (DEVIATION)

        LIST
        DISP.
        F0        F1        F2        F3        F4
```

11.2.3 <I/O Display> screen (5/5)

DEVIATION

```
I/O  DSP (DEVIATION)                                    ALARM LOG
DEVIATION
        SPINDLE              -1

        X AXIS                0

        Y AXIS               25

        Z AXIS             3010

        A AXIS             -210

        B AXIS                0

        C AXIS                0

        MAGAZINE             42



PREVIOUS PAGE  :    I/O  DSP  (LOCAL)
NEXT  PAGE     :    DETAILED DISPLAY

        LIST
        DISP.
        F0      F1      F2      F3      F4
```

11.3 Battery Fault alarm

In tapping center, the data in the memory is retained by batteries.
If the batteries are dead , the battery alarm mark as shown below appears on the right bottom of the screen. If this mark appears, replace the batteries.

Fig.11-1 Battery alarm

11.4 Display of alarm messages

Each message is displayed with * mark at the beginning according to the reset level.

(Ex.)

Reset level 3 = **

1000 **TURN OFF POWER

Reset level 2 = *

1040 *EMMERGENCY SW ON

Reset level 1 = No * mark

1280 MEMORY RUNNING

11.5 Alarm stop level and reset level

11.5.1 Alarm stop level

According to the stop level, the NC functions to stop as shown below.

(1) Stop level 5
The servo system stops.

(2) Stop level 4
The motion currently in execution stop instantaneously and no more motions are available afterwards.

(3) Stop level 3 (block stop)
The operation continues until the currently executed block is completed.
The blocks afterwards are not available. The START swich becoms ineffective and the NC program cannot be executed any longer.

(4) Stop level 2 (stop by M02 or M30)
The operation continues until the currently executed program is completed.
The START switch becomes ineffective and the NC program cannot be executed any longer.

When single block is ON, the stop level 3 and 2 become the same.

(5) Stop level 1
Only a warning is given but machine motions are not affected.

11.5.2 Alarm reset level

According to the reset level, reset each alarm as shown below:

(1) Reset level 3 (**)
Turn OFF the power. (An alarm cannot be reset otherwise.)

(2) Reset level 2 (*)
Press the [RST] key.

(3) Reset level 1 (No * mark)
Press any key.

The stop level and the reset level are independent from each other.
Therefore, they can be combined in different ways as shown below.

(Ex.) Stop level 5 and Reset level 2
Stop level 1 and Reset level 2

11.6 *Axis display

All about " * axis " description will be fixed, according to the machine parameter (system 2) setting in the manual , shown as below:

5-axis instslleation position (0: independent 1: table 1 2: table 2)
6-axis instslleation position (0: independent 1: table 1 2: table 2)
4-axisaddress (0: A 1: B 2: C)
5-axis address (0: A 1: B 2: C)
6-axis address (0: A 1: B 2: C)

		Installeation position		
		0: independent	1: table 1	2: table 2
Address	0: A	A	A 1	A 2
	1: B	B	B1	B2
	2: C	C	C1	C2

11.7 Alarm message

NO.	STOP LEVEL	RESET LEVEL	ERROR MESSAGE	CAUSE	SOLUTION
0000(conv) 5000(NC)	5	3	WATCH DOG (MAIN)	An error has occurred in main CPU.	Inform of circumstances when the trouble occurred.
0001(conv) 5001(NC)	5	3	WATCH DOG (SLAVE)	An error has occurred in slave CPU.	Inform of circumstances when the trouble occurred.
0002(conv) 5002(NC)	5	3	WATCH DOG (LOCAL)	An error has occurred in local CPU.	Inform of circumstances when the trouble occurred.
0003(conv) 5003(NC)	5	3	RAM ERROR (MAIN)	Reading and writing using main RAM is not possible.	Inform of circumstances when the trouble occurred.
0004(conv) 5004(NC)	5	3	ROM ERROR (MAIN)	The check sum of main ROM does not match.	Inform of circumstances when the trouble occurred.
0005(conv) 5005(NC)	5	3	RAM ERROR (SLAVE)	Reading and writing using slave RAM is not possible.	Inform of circumstances when the trouble occurred.
0006(conv) 5006(NC)	5	3	ROM ERROR (SLAVE)	The check sum of slave ROM does not match.	Inform of circumstances when the trouble occurred.
0007(conv)5007(NC)	5	3	RAM ERROR (LOCAL)	Reading and writing using local RAM is not possible.	Inform of circumstances when the trouble occurred.
0008(conv) 5008(NC)	5	3	ROM ERROR (LOCAL)	The check sum of local ROM does not match.	Inform of circumstances when the trouble occurred.
0009(conv) 5009(NC)	5	3	RAM ERROR (MAIN-LOC1)	Reading and writing using RAM common for main-loc1 is not possible.	Inform of circumstances when the trouble occurred.
0010(conv) 5010(NC)	5	3	RAM ERROR (MAIN-LOC2)	Reading and writing using RAM common for main-loc2 is not possible.	Inform of circumstances when the trouble occurred.
0011(conv) 5011(NC)	5	3	RAM ERROR (MAIN-SLV)	Reading and writing using RAM common for main-slv is not possible.	Inform of circumstances when the trouble occurred.
0012(conv) 5012(NC)	5	3	TIMER ERROR (SLAVE)	An error has occurred in slave CPU.	Inform of circumstances when the trouble occurred.
0014(conv) 5014(NC)	5	3	CALC ERROR (MAIN)	Improper calculation is executed.	Inform of circumstances when the trouble occurred.
0015(conv) 5015(NC)	5	3	CALC ERROR (SLAVE)	Improper calculation is executed.	Inform of circumstances when the trouble occurred.

NO.	STOP LEVEL	RESET LEVEL	ERROR MESSAGE	CAUSE	SOLUTION
0016(conv) 5016(NC)	5	3	CALC ERROR (LOCAL)	Improper calculation is executed.	Inform of circumstances when the trouble occurred.
0017(conv)5017(NC)	5	3	MAIN INITIAL IMPSBLE	Main CPU has not started.	Inform of circumstances when the trouble occurred.
0018(conv) 5018(NC)	5	3	SLV INITIAL IMPSBLE	Slave CPU has not started.	Inform of circumstances when the trouble occurred.
0019(conv) 5019(NC)	5	3	AC POWER SUPPLY DROP	AC power supply voltage dropped by more than 30%.	Check the power supply voltage, change the tap of the transformer or check power supply capacity.
0020(conv) 5020(NC)	5	3	DC POWER ERROR(24V)	24 vdc supply for control has dropped.	Check if a short circuit has occurred or the power supply is overload.
0021(conv)5021(NC)	5	3	SPECIAL INTIAL(*)	Power is turned on by special operations.	Perform required operations and turn power off and then on again.
0022(conv) 5022(NC)	5	3	THERMAL (TRANS)	The thermal relay of transformer 1 has tripped. 1)Transformer is over loaded. 2)Machining condition has exceeded capacity.	1)Check if a load more than acceptable is connected. 2)Check machining conditions and operation patterns. Eliminate the causes and turn off power for at lease 30 minutes before turning it on again.
0023(conv) 5023(NC)	5	3	THERMAL (CNTL BX)	The thermal relay at the center of the control panel has tripped. 1)Temperature is too high. 2)Machining condition has exceeded capacity.	1)Check that temperature is 40 degrees or more. 2)Review the machining conditions and operation patterns.
0024(conv) 5024(NC)	5	3	AIR PRESSURE LOW	Air pressure has dropped.	1)Check air piping and pressure. 2)Check that the pressure switch is set correctly.
0025(conv) 5025(NC)	5	3	DATA ERR (M/C PARAM)	Data structure of machine parameter is destroyed.	Press [RST] key, and delete the destroyed data by memory display in edit mode and create new data again.
0026(conv) 5026(NC)	5	3	NO M/C PARAM DATA	There is no machine parameter data.	Create the machine parameter and turn power off and then on again.

NO.	STOP LEVEL	RESET LEVEL	ERROR MESSAGE	CAUSE	SOLUTION
0027(conv) 5027(NC)	5	3	100V POWER SUPPLY ER	The circuit protector of the 100v power supply circuit has tripped. 1)overloaded 2)short-circuited.	Eliminate the cause and turn on the circuit protector of transformer 2.
0028(conv) 5028(NC)	5	3	POWER TURNED OFF	Power OFF activated or external power OFF signal activated.	The message, through displayed on turning off the power, is not an error. If this error occurs in a case other than the above, inform of circumstances when the trouble occurred. Refer to 9.1.7 .
0029(conv) 5029(NC)	5	3	POS DETECT ERR	The difference between the absolute position data inside the magazine amplifier and relative position data inside the NC unit has exceeded the allowable range.	Refer to 9.1.8 .
0030(conv) 5030(NC)	5	3	I/O CRC ERROR 1	CRC error has occurred during communication between the keyboard and NC unit. 1)External noise. 2)The faulty keyboard or cable connection.	Turn power off and then on again. If the error still occurs. 1)Eliminate the cause of external noise caused by the likes of welders. 2)The faulty keyboard or cable needs replacement. Refer to 9.1.9.
0031(conv) 5031(NC)	5	3	I/O TIMEOVER 1	Framing error has occurred during communication between the keyboard and NC unit. 1)External noise. 2)The faulty keyboard or cable connection.	Refer to 1.5.1 and 9.1.10 .

0032(conv) 5032(NC)	5	3	I/O CRC ERROR 2	CRC error has occurred during communication between the keyboard and NC unit. 1)External noise. 2)The faulty keyboard or cable connection.	Refer to 1.5.1 and 9.1.10 .
0033(conv)50 33(NC)	5	3	I/O TIMEOVER 2	Framing error has occurred during communication between the keyboard and NC unit. 1)External noise. 2)The faulty keyboard or cable connection.	Refer to 1.5.1 and 9.1.10 .
0034(conv) 5034 (NC)	5	3	I/O CRC ERROR 3	A CRC error has occurred during communication between I/O board and NC unit. 1)External noise 2)Faulty I/O board or cable.	Refer to 9.1.10 .
0035(conv) 5035(NC)	5	3	I/O TIMEOVER 3	Framing error has occurred during communication between the I/O board and NC unit. 1)External noise. 2)The faulty I/O board or cable connection.	Refer to 1.5.1 and 9.1.10 .
0036(conv) 5036(NC)	5	3	I/O CRC ERROR 4	A CRC error has occurred during communication between I/O board and NC unit. 1)External noise 2)Faulty I/O board or cable connection.	Refer to 9.1.10 .
0037(conv) 5037(NC)	5	3	I/O TIMEOVER 4	A CRC error has occurred during communication between I/O board and NC unit. 1)External noise 2)Faulty I/O board or cable.	Refer to 1.5.1 and 9.1.10 .

NO.	STOP LEVEL	RESET LEVEL	ERROR MESSAGE	CAUSE	SOLUTION
0038(conv) 5038(NC)	5	3	I/O CRC ERROR 5	A CRC error has occurred during communication between EXIO board and NC unit. 1)External noise. 2)Faulty EXIO board or cable.	Refer to 9.1.10 .
0039(conv) 5039(NC)	5	3	I/O TIMEOVER 5	A CRC error has occurred during communication between the EXIO board and NC unit. 1)External noise. 2)The faulty EXIO board or cable connection.	Refer to 1.5.1 and 9.1.10 .
0046(conv) 5046(NC)	5	3	THERMAL (CHIP SHOWER)	The thermal relay for the chip shower protection circuit has tripped. 1) Motor is overloaded. 2) Motor capacity is exceeded 3) Thermal relay setting value is incorrect. 4) There is an open motor phase	For 1), turn off power for 15 to 20 minutes and eliminate the cause. For causes other than simply eliminate the cause and turn power off and then on again Refer to 1.7.2 .
0047(conv) 5047(NC)	5	3	THERMAL (CHIP SHOWER)	The thermal relay for the chip shower protection circuit has tripped. 1) Motor is overloaded. 2)Motor capacity is exceeded 3)Thermal relay setting value is incorrect. 4)There is an open motor phase	For 1), turn off power for 15 to 20 minutes and eliminate the cause. For causes other than simply eliminate the cause and turn power off and then on again. Refer to 1.7.3 .
0048(conv) 5048(NC)	5	3	THERMAL (SP MOTOR)	1)The thermal relay inside the spindle motor has tripped. 2)Motor is overloaded or locked. Machining condition has exceeded motor's capacity.	1)Manually turn the spindle to check if the spindle load is great. 2)Review the machining conditions and operation patterns. Eliminate the causes and leave the motor with power on for 30 minutes before resuming operation Refer to 1.3.3 .

NO.	STOP LEVEL	RESET LEVEL	ERROR MESSAGE	CAUSE	SOLUTION
0049(conv)5049(NC)	5	3	THERMAL (COOLANT)	The thermal relay for coolant protection circuit has tripped. 1)Motor is overloaded. 2)Motor capacity is exceeded. 3)Thermal relay setting value is incorrect. 4)There is an open motor phase.	For 1), turn off power for 15 to 20 minutes and eliminate the cause. For causes other than simply eliminate the cause and turn power off and then on again. Refer to 1.7.1 .
0050(conv) 5050(NC)	5	3	THERMAL (SP THROUGH)	An alarm has occurred in the high pressure pump. 1)Pump is overloaded. 2)Filter is clogged.	1)Eliminate the cause and turn on power again. 2)Replace the filter. Refer to 1.7.3 .
0051(conv) 5051(NC)	5	3	ABSOLUTE CLEAR ERR	Clearing start point data was attempted but the data was not cleared within the specified time.	Refer to 9.1.11.
0052(conv) 5052(NC)	5	3	COMMAND ERROR	Main CPU is not synchronized with slave CPU.	Refer to 9.1.12.
0053(conv) 5053(NC)	5	3	THERMAL (ATC MOTOR)	The thermal switch inside the ATC motor has tripped 1) Motor is overloaded and locked. 2) ATC operation condition has exceeded motor's capacity.	Refer to 1.4.1.
0055(conv) 5055(NC)	5	3	RAM ERROR (MAIN-LOC3)	Reading and writing using RAM common for main-loc3 is not possible.	Refer to 1.5.1. and 9.1.2.
0056(conv) 5056(NC)	5	3	SERVO RELAY1 ERROR	The state of servo power supply relay 1 is as below. 1)The relay is already on. 2)The relay turned off midway.	Turn power off and then on again. if the error still occurs, please refer to 1.5.1.
0057(conv) 5057(NC)	5	3	SERVO RELAY2 ERROR	The state of servo power supply relay2 is as below. 1)The relay is already on. 2)The relay turned off midway.	Turn power off and then on again. if the error still occurs, please refer to 1.5.1.

NO.	STOP LEVEL	RESET LEVEL	ERROR MESSAGE	CAUSE	SOLUTION
0058(conv) 5058(NC)	5	3	SP SERVO (***)	A servo error has occurred for the spindle the cause differs depending on (***). Refer to the servo error list.	Refer to 1.3.1.
0059(conv) 5059(NC)	5	3	X SERVO (***)	A servo error has occurred for the X-axis. the cause differs depending on (***). Refer to the servo error list.	Refer to 1.2.1.
0060(conv) 5060(NC)	5	3	Y SERVO (***)	A servo error has occurred for the Y-axis. the cause differs depending on (***). Refer to the servo error list.	Refer to 1.2.1.
0061(conv) 5061(NC)	5	3	Z SERVO (***)	A servo error has occurred for the Z-axis. the cause differs depending on (***). Refer to the servo error list.	Refer to 1.2.1.
0062(conv) 5062(NC)	5	3	* SERVO (***)	A servo error has occurred for the 4 axis. the cause differs depending on (***). Refer to the servo error list.	Refer to 1.2.1.
0063(conv)50 63(NC)	5	3	* SERVO (***)	A servo error has occurred for the 5 axis. the cause differs depending on (***). Refer to the servo error list.	Refer to 1.2.1.
0064(conv) 5064(NC)	5	3	* SERVO (***)	A servo error has occurred for the 6 axis. The cause differs depending on (***). Refer to the servo error list.	Refer to 1.2.1.
0066(conv) 5066(NC)	5	3	M SERVO (***)	A servo error has occurred for the M axis. The cause differs depending on (***). Refer to the servo error list.	Refer to 1.2.1

NO.	STOP LEVEL	RESET LEVEL	ERROR MESSAGE	CAUSE	SOLUTION
0068(conv) 5068(NC)	5	3	ROM ERROR (SEQ)	An error has occurred in the SEQ unit connected to NC board connector seq.	Refer to the instruction manual of the connected SEQ unit eliminate the cause and turn on power again.
0069(conv) 5069(NC)	5	3	RAM ERROR (SEQ)	An error has occurred in the SEQ unit connected to NC board connector seq.	Refer to the instruction manual of the connected SEQ unit eliminate the cause and turn on power again.
0070(conv) 5070(NC)	5	3	SOFT TRAP(SEQ)	An error has occurred in the SEQ unit connected to NC board connector seq.	Refer to the instruction manual of the connected SEQ unit eliminate the cause and turn on power again.
0071(conv) 5071(NC)	5	3	WATCH DOG (SEQ)	An error has occurred in the SEQ unit connected to NC board connector seq.	Refer to the instruction manual of the connected SEQ unit eliminate the cause and turn on power again.
0072(conv) 5072(NC)	5	3	ADRS ERROR (SEQ)	An error has occurred in the SEQ unit connected to NC board connector seq.	Refer to the instruction manual of the connected SEQ unit eliminate the cause and turn on power again.
0073(conv) 5073(NC)	5	3	CALC ERROR (SEQ)	An error has occurred in the SEQ unit connected to NC board connector seq.	Refer to the instruction manual of the connected SEQ unit eliminate the cause and turn on power again.
0074(conv) 5074(NC)	5	3	SEQ INTIAL IMPSBLE	An error has occurred in the SEQ unit connected to NC board connector seq.	Refer to the instruction manual of the connected SEQ unit eliminate the cause and turn on power again.
0075(conv) 5075(NC)	5	3	SEQ RAM OPE ERROR	An error has occurred in the SEQ unit connected to NC board connector seq.	Refer to the instruction manual of the connected SEQ unit eliminate the cause and turn on power again.
0076(conv)50 76(NC)	5	3	COMPILE ERROR 1	An error has occurred in the SEQ unit connected to NC board connector seq.	Refer to the instruction manual of the connected SEQ unit eliminate the cause and turn on power again.
0077(conv) 5077(NC)	5	3	COMPILE ERROR 2	An error has occurred in the SEQ unit connected to NC board connector seq.	Refer to the instruction manual of the connected SEQ unit eliminate the cause and turn on power again.
0078(conv) 5078(NC)	5	3	CONVERT ERROR	An error has occurred in the SEQ unit connected to NC board connector seq.	Refer to the instruction manual of the connected SEQ unit eliminate the cause and turn on power again.

NO.	STOP LEVEL	RESET LEVEL	ERROR MESSAGE	CAUSE	SOLUTION
0079(conv) 5079(NC)	5	3	VERIFY ERROR	An error has occurred in the SEQ unit connected to NC board connector seq.	Refer to the instruction manual of the connected SEQ unit eliminate the cause and turn on power again.
0080(conv) 5080(NC)	5	3	STEP OVER ERROR	An error has occurred in the SEQ unit connected to NC board connector seq.	Refer to the instruction manual of the connected SEQ unit eliminate the cause and turn on power again.
0081(conv) 5081(NC)	5	3	MEMORY PROTECT ERROR	An error has occurred in the SEQ unit connected to NC board connector seq.	Refer to the instruction manual of the connected SEQ unit eliminate the cause and turn on power again.
0082(conv) 5082(NC)	5	3	DOUBLE COIL ERROR	An error has occurred in the SEQ unit connected to NC board connector seq.	Refer to the instruction manual of the connected SEQ unit eliminate the cause and turn on power again.
0083(conv) 5083(NC)	5	3	USER WDT-UP	An error has occurred in the SEQ unit connected to NC board connector seq.	Refer to the instruction manual of the connected SEQ unit eliminate the cause and turn on power again.
0084(conv)5084(NC)	5	3	USERRAM ERROR	An error has occurred in the SEQ unit connected to NC board connector seq.	Refer to the instruction manual of the connected SEQ unit eliminate the cause and turn on power again.
0085(conv) 5085(NC)	5	3	USER PROGRAM ERROR	An error has occurred in the SEQ unit connected to NC board connector seq.	Refer to the instruction manual of the connected SEQ unit eliminate the cause and turn on power again.
0086(conv) 5086(NC)	5	3	MEMORY CASSETTE ERR	An error has occurred in the SEQ unit connected to NC board connector seq.	Refer to the instruction manual of the connected SEQ unit eliminate the cause and turn on power again.
0087(conv) 5087(NC)	5	3	CALCULATION EXE ERR	An error has occurred in the SEQ unit connected to NC board connector seq.	Refer to the instruction manual of the connected SEQ unit eliminate the cause and turn on power again.
0088(conv) 5088(NC)	5	3	NO EXTENSION UNIT	An error has occurred in the SEQ unit connected to NC board connector seq.	Refer to the instruction manual of the connected SEQ unit eliminate the cause and turn on power again.

NO.	STOP LEVEL	RESET LEVEL	ERROR MESSAGE	CAUSE	SOLUTION
0089(conv) 5089(NC)	5	3	STATION NO.SET ERROR	An error has occurred in the SEQ unit connected to NC board connector seq.	Refer to the instruction manual of the connected SEQ unit eliminate the cause and turn on power again.
0090(conv) 5090(NC)	5	3	RETAINING DATA ERROR	An error has occurred in the SEQ unit connected to NC board connector seq.	Refer to the instruction manual of the connected SEQ unit eliminate the cause and turn on power again.
0091(conv) 5091(NC)	5	3	M EXCPT INTRPT(*)	Main CPU has detected incorrect interruption. The figure in brackets () indicates interruption no.	Refer to 1.5.1 and 9.1.13 .
0093(conv) 5093(NC)	5	3	L EXCPT INTRPT(*)	Local CPU has detected incorrect interruption. The figure in brackets () indicates interruption no.	Refer to 1.5.1 and 9.1.13 .
0094(conv) 5094(NC)	5	3	PULSE ERROR (SPINDLE)	Pulse signal sent from the spindle motor could not be read correctly.	Refer to 1.2.3 and 9.2.1 .
0095(conv) 5095(NC)	5	3	PULSE ERROR (X-AXIS)	Pulse signal sent from the X-axis motor could not be read correctly.	Refer to 1.2.3 and 9.2.1 .
0096(conv) 5096 (NC)	5	3	PULSE ERROR (Y-AXIS)	Pulse signal sent from the Y-axis motor could not be read correctly.	Refer to 1.2.3 and 9.2.1 .
0097(conv) 5097(NC)	5	3	PULSE ERROR (Z-AXIS)	Pulse signal sent from the Z-axis motor could not be read correctly.	Refer to 1.2.3 and 9.2.1 .
0098(conv) 5098(NC)	5	3	PULSE ERROR (* AXIS)	Pulse signal sent from the 4 axis motor could not be read correctly.	Refer to 1.2.3 and 9.2.1 .
0099(conv)55 099(NC)	5	3	PULSE ERROR (* AXIS)	Pulse signal sent from the 5 axis motor could not be read correctly.	Refer to 1.2.3 and 9.2.1 .
0100(conv) 5100(NC)	5	3	PULSE ERROR (* AXIS)	Pulse signal sent from the 6 axis motor could not be read correctly.	Refer to 1.2.3 and 9.2.1 .

NO.	STOP LEVEL	RESET LEVEL	ERROR MESSAGE	CAUSE	SOLUTION
0102(conv) 5102(NC)	5	3	PULSE ERROR (M AXIS)	Pulse signal sent from the M axis motor could not be read correctly.	Refer to 1.2.3 and 9.2.1.
0103(conv) 5103(NC)	5	3	ATC BOAD ERR (power)	AC power voltage increased more than 15%.	Check the power supply voltage and change the tap of the transformer. Refer to 9.4.1.
0104(conv) 5104(NC)	5	3	FORMAT TYPE IS WRONG	Memory has been formatted incorrectly for the conversation language.	Retry the formatting the memory correctly. Refer to 9.3.10.
0105(conv) 5105(NC)	5	3	FORMAT CAPA IS WRONG	The capacity of the formatted memory does not match the current machine state.	Retry the formatting the memory correctly. Refer to 9.3.11.
0106(conv) 5106(NC)	5	3	RAM ERROR (MAIN-LOC4)	Reading and writing of the RAM commonly used for main/local 4 was not possible.	Refer to 9.1.2.
0107(conv) 5107(NC)	5	3	RAM ERROR (MAIN-LOC5)	Reading and writing of the RAM commonly used for main/local 5 was not possible.	Refer to 9.1.2.
0108(conv) 5108(NC)	5	3	NO MEMORY FORMAT	The memory was not cleared at all, the data is damaged, or the memory has exceeded its capacity.	Output all data to the external device and format the memory. Refer to 9.3.12.
0500(conv) 5500(NC)	5	2	EMERGENCY 3 SW ON	EMERGENCY switch on signal was sent by the communication command. 1 Emergency switch is pushed. 2 External emergency stop contact is open.	Send emergency switch off signal by the communication command. 1 Remove the cause of trouble and press [RST] key. 2 Contact point of EXIO board terminal is to be closed again. Refer to 1.5.1.
0501(conv) 5501(NC)	5	2	SYSTEM ERROR (MAIN)	Error signal is detected but no relative error is found.	Press [RST] key and clear the alarm. Consult the Maker if the same trouble occurs repeatedly, refer to 1.5.1 and 9.1.14 .
0502(conv) 5502(NC)	5	2	NOT CLOSING DOOR	The door was opened while door interlock was valid.	Invalidate door interlock or close the door.

NO.	STOP LEVEL	RESET LEVEL	ERROR MESSAGE	CAUSE	SOLUTION
0503(conv) 5503(NC)	5	2	SERVO MOTOR STOPPED	The door was opened during operation while door interlock was valid.	Invalidate door interlock or close the door and press the [RST] key.
0504(conv) 5504(NC)	5	2	POSITION ERROR SP	Z axis was attempted to be lift above the Z axis zero point, while main axis servo had been turned on. (Except the main axis orient 0 degree.)	Press the [RST] key to reset the error. Refer to 9.4.2.
0505(conv) 5505(NC)	5	2	OVERRUN (+X)	The axis has overrun in the direction indicated by the alarm.	Switch to manual operation mode and press the [RST] key while holding down the [relse] key. Then move the axis in the opposite direction while holding down the [relse] key until the axis moves out of the overrun area. Refer to 1.2.4 .
0506(conv) 5506(NC)	5	2	OVERRUN (-X)	The axis has overrun in the direction indicated by the alarm.	Switch to manual operation mode and press the [RST] key while holding down the [relse] key. Then move the axis in the opposite direction while holding down the [relse] key until the axis moves out of the overrun area. Refer to 1.2.4 .
0507(conv) 5507(NC)	5	2	OVERRUN (+Y)	The axis has overrun in the direction indicated by the alarm.	Switch to manual operation mode and press the [RST] key while holding down the [relse] key. Then move the axis in the opposite direction while holding down the [relse] key until the axis moves out of the overrun area. Refer to 1.2.4 .

NO.	STOP LEVEL	RESET LEVEL	ERROR MESSAGE	CAUSE	SOLUTION
0508(conv) 5508(NC)	5	2	OVERRUN (-Y)	The axis has overrun in the direction indicated by the alarm.	Switch to manual operation mode and press the [RST] key while holding down the [relse] key. Then move the axis in the opposite direction while holding down the [relse] key until the axis moves out of the overrun area. Refer to 1.2.4 .
0509(conv) 5509(NC)	5	2	OVERRUN (+Z)	The axis has overrun in the direction indicated by the alarm.	Switch to manual operation mode and press the [RST] key while holding down the [relse] key. Then move the axis in the opposite direction while holding down the [relse] key until the axis moves out of the overrun area. Refer to 1.2.4 .
0510(conv) 5510(NC)	5	2	OVERRUN (-Z)	The axis has overrun in the direction indicated by the alarm.	Switch to manual operation mode and press the [RST] key while holding down the [relse] key. Then move the axis in the opposite direction while holding down the [relse] key until the axis moves out of the overrun area. Refer to 1.2.4 .
0511(conv) 5511(NC)	5	2	DEVIATION ERROR1 SP	The amount of spindle motor deviation has exceeded the value set to [maximum deviation spindle].	1)Check the value set to [maximum deviation spindle] of machine parameters system. 2)Check that machining condition is within motor's capacity press the [rls] key to reset the error. Refer to 1.3.2.
0512(conv) 5512(NC)	5	2	DEVIATION ERROR1 X	The amount of the X-axis motor deviation has exceeded the value set to [maximum deviation x].	1)Check the value set to [maximum deviation x] of machine parameters system. 2)Check that machining condition is within motor's capacity Press the [rls] key to reset the error. Refer to 1.2.2 .

NO.	STOP LEVEL	RESET LEVEL	ERROR MESSAGE	CAUSE	SOLUTION
0513(conv) 5513(NC)	5	2	DEVIATION ERROR1 Y	The amount of the Y-axis motor deviation has exceeded the value set to [maximum deviation y].	Check the value set to [maximum deviation y] of machine parameters system. 1)Check that machining condition is within motor's capacity . 2)Press the [rls] key to reset the error. Refer to 1.2.2 .
0514(conv) 5514(NC)	5	2	DEVIATION ERROR1 Z	The amount of the Z-axis motor deviation has exceeded the value set to [maximum deviation z].	1)Check the value set to [maximum deviation z] of machine parameters system. 2)Check that machining condition is within motor's capacity Press the [rls] key to reset the error. Refer to 1.2.2 .
0515(conv) 5515(NC)	5	2	DEVIATION ERROR1 *	The amount of the 4 axis motor deviation has exceeded the value set to [maximum deviation 4].	1)Check the value set to [maximum deviation 4] of machine parameters system. 2)Check that machining condition is within motor's capacity. Press the [rls] key to reset the error. Refer to 1.2.2 .
0516(conv) 5516(NC)	5	2	DEVIATION ERROR1 *	The amount of the 5 axis motor deviation has exceeded the value set to [maximum deviation 5].	1)Check the value set to [maximum deviation 5] of machine parameters system. 2)Check that machining condition is within motor's capacity. Press the [rls] key to reset the error. Refer to 1.2.2 .
0517(conv) 5517(NC)	5	2	DEVIATION ERROR1 *	The amount of the 6 axis motor deviation has exceeded the value set to [maximum deviation 6].	1) Check the value set to [maximum deviation 6] of machine parameters system. 2)Check that machining condition is within motor's capacity press the [rls] key to reset the error. Refer to 1.2.2 .

NO.	STOP LEVEL	RESET LEVEL	ERROR MESSAGE	CAUSE	SOLUTION
0519(conv) 5519(NC)	5	2	DEVIATION ERROR1 M	The amount of the M axis motor deviation has exceeded the value set to [maximum deviation magazine].	1)Check the value set to [maximum deviation m] of machine parameters system. 2)Check that machining condition is within motor's capacity press the [rls] key to reset the error. Refer to 1.2.2 and 1.4.1 .
0520(conv) 5520(NC)	5	2	INVERTER ERR(ATC)	1) Overloaded ATC motor. 2)Voltage error.	1)Check if tool weight is within the specified range. 2)Check if the power supply voltage is within the specified range. Refer to 1.4.1 .
0521(conv) 5521(NC)	5	2	DEVIATION ERROR2 SP	The amount of spindle motor deviation has exceeded the value set to [spindle posi deviation magnif] or the on set to [minimum sp position deviation] (motor is overloaded.)	1)Check the value set to [spindle posi deviation magnif] of machine parameters(system 1). 2)Check the value set to minimum sp position deviation of machine parameters system. 3)Check that machining condition is within motor's capacity. Press the [rls] key to reset the error. Refer to 1.3.2.
0522(conv) 5522(NC)	5	2	DEVIATION ERROR2 X	The amount of the X motor deviation has exceeded the value set to [X posi deviation magnif] or the on set to [minimum X position deviation] (motor is overloaded.)	1)Check the value set to [X posi deviationmagnif] of machine parameters(system 1). 2)Check the value set to minimum X position deviation of machine parameters system. 3)Check that machining condition is within motor's capacity. Press the [rls] key to reset the error. Refer to 1.2.2.

NO.	STOP LEVEL	RESET LEVEL	ERROR MESSAGE	CAUSE	SOLUTION
0523(conv) 5523(NC)	5	2	DEVIATION ERROR2 Y	The amount of the Y motor deviation has exceeded the value set to [Y posi deviation magnif] or the on set to [minimum Y position deviation] (motor is overloaded.)	1)Check the value set to [Y posi deviation magnif] of machine parameters(system 1). 2)Check the value set to minimum Y position deviation of machine parameters system. 3)Check that machining condition is within motor's capacity. Press the [rls] key to reset the error. Refer to 1.2.2.
0524(conv) 5524(NC)	5	2	DEVIATION ERROR2 Z	The amount of the Z motor deviation has exceeded the value set to [Z posi deviation magnif] or the on set to [minimum Z position deviation] (motor is overloaded.)	1)Check the value set to [Z posi deviation magnif] of machine parameters(system 1). 2)Check the value set to minimum Z position deviation of machine parameters system. 3)Check that machining condition is within motor's capacity. Press the [rls] key to reset the error. Refer to 1.2.2.
0525(conv) 5525(NC)	5	2	DEVIATION ERROR2 *	The amount of the 4 motor deviation has exceeded the value set to [4 posi deviation magnif] or the on set to [minimum 4 position deviation] (motor is overloaded.)	1)Check the value set to [4 posi deviation magnif] of machine parameters(system 2). 2)Check the value set to minimum 4 position deviation of machine parameters system. 3)Check that machining condition is within motor's capacity. Press the [rls] key to reset the error. Refer to 1.2.2.

NO.	STOP LEVEL	RESET LEVEL	ERROR MESSAGE	CAUSE	SOLUTION
0526(conv) 5526(NC)	5	2	DEVIATION ERROR2 *	The amount of the 5 motor deviation has exceeded the value set to [5 posi deviation magnif] or the on set to [minimum 5 position deviation] (motor is overloaded.)	1)Check the value set to [5 posi deviation magnif] of machine parameters(system 2). 2)Check the value set to minimum 5 position deviation of machine parameters system. 3)Check that machining condition is within motor's capacity. Press the [rls] key to reset the error. Refer to 1.2.2.
0527(conv) 5527(NC)	5	2	DEVIATION ERROR2 *	The amount of the 6 motor deviation has exceeded the value set to [6 posi deviation magnif] or the on set to [minimum 6 position deviation] (motor is overloaded.)	1)Check the value set to [6 posi deviation magnif] of machine parameters(system 2). 2)Check the value set to minimum 6 position deviation of machine parameters system. 3)Check that machining condition is within motor's capacity. Press the [rls] key to reset the error. Refer to 1.2.2.
0529(conv) 5529(NC)	5	2	DEVIATION ERROR2 M	The amount of the M motor deviation has exceeded the value set to [magazine posi deviation magnif] or the on set to [min magazine position deviation] (motor is overloaded.)	Check the value set to [magazine posi deviation magnif] of machine parameters(system 3). Check the value set to minimum magazine position deviation of machine parameters system. Check that machining condition is within motor's capacity. Press the [rls] key to reset the error. Refer to 1.2.2.

NO.	STOP LEVEL	RESET LEVEL	ERROR MESSAGE	CAUSE	SOLUTION
0531(conv) 5531(NC)	5	2	*-AXISPOS SHIFTED	The axis has shifted during clamping more than the value set to [LMT pulse for position alrm]. If the value set to [in-position width 4] is larger than the value set to [LMT pulse for position alrm], however this error occurs when the axis has shifted more than the value set to [in-position width 4]. (these parameters are set on the <machine parameter (system 2) >screen.)	Press the [RST] key. Check the axis position on the current position screen and move the axis to the correct position. Check that the value set to [LMT pulse for 4 position alrm] is not too small. When this error occurs during memory operation reduce the cutting depth.
0532(conv) 5532(NC)	5	2	*-AXISPOS SHIFTED	The axis has shifted during clamping more than the value set to [LMT pulse for position alrm]. If the value set to [in-position width 5] is larger than the value set to [LMT pulse for position alrm], however this error occurs when the axis has shifted more than the value set to [in-position width 5]. (these parameters are set on the <machine parameter (system 2) >screen.)	Press the [RST] key. Check the axis position on the current position screen and move the axis to the correct position. Check that the value set to [LMT pulse for 5 position alrm] is not too small. When this error occurs during memory operation reduce the cutting depth.

NO.	STOP LEVEL	RESET LEVEL	ERROR MESSAGE	CAUSE	SOLUTION
0533(conv) 5533(NC)	5	2	*-AXISPOS SHIFTED	The axis has shifted during clamping more than the value set to [LMT pulse for position alrm]. If the value set to [in-position width 6] is larger than the value set to [LMT pulse for position alrm], however this error occurs when the axis has shifted more than the value set to [in-position width 6]. (these parameters are set on the <machine parameter (system 2) >screen.)	1)Press the [RST] key. 2)Check the axis position on the current position screen and move the axis to the correct position. 3)Check that the value set to [LMT pulse for 6 position alrm] is not too small. When this error occurs during memory operation reduce the cutting depth.
0534(conv) 5534(NC)	5	2	SP IN-POS CHCK TMOUT	The amount of deviation did not become smaller than the value set to in-position width spindle even after the time set to [spindle inposi check timeout] had elapsed after completion of operation.	Check the values set to [in-position width spindle] and [spindle inposi check timeout] of machine parameters (system 1). Press the [RST] key to reset the error.
0535(conv) 5535NC)	5	2	X IN-POS CHECK TMOUT	The amount of deviation did not become smaller than the value set to in-position width x even after the time set to [X inposi check timeout] had elapsed after completion of operation.	Check the values set to [in-position width x] and [X inposi check timeout] of machine parameters (system 1). Press the [RST] key to reset the error.
0536(conv) 5536(NC)	5	2	Y IN-POS CHECK TMOUT	The amount of deviation did not become smaller than the value set to in-position width y even after the time set to [Y inposi check timeout] had elapsed after completion of operation.	Check the values set to [in-position width y] and [Y inposi check timeout] of machine parameters (system 1). Press the [RST] key to reset the error.

NO.	STOP LEVEL	RESET LEVEL	ERROR MESSAGE	CAUSE	SOLUTION
0537(conv) 5537(NC)	5	2	Z IN-POS CHECK TMOUT	The amount of deviation did not become smaller than the value set to in-position width z even after the time set to [Z inposi check timeout] had elapsed after completion of operation.	Check the values set to [in-position width z] and [Z inposi check timeout] of machine parameters (system 1). Press the [RST] key to reset the error.
0538(conv) 5538(NC)	5	2	* IN-POS CHCK TMOUT	The amount of deviation did not become smaller than the value set to in-position width 4 even after the time set to [4 inposi check timeout] had elapsed after completion of operation.	Check the values set to [in-position width 4] and [4 inposi check timeout] of machine parameters (system 2). Press the [RST] key to reset the error.
0539(conv) 5539(NC)	5	2	* IN-POS CHCK TMOUT	The amount of deviation did not become smaller than the value set to in-position width 5 even after the time set to [5 inposi check timeout] had elapsed after completion of operation.	Check the values set to [in-position width 5] and [5 inposi check timeout] of machine parameters (system 2). Press the [RST] key to reset the error.

NO.	STOP LEVEL	RESET LEVEL	ERROR MESSAGE	CAUSE	SOLUTION
0540(conv) 5540(NC)	5	2	* IN-POS CHCK TMOUT	The amount of deviation did not become smaller than the value set to in-position width 6 even after the time set to [6 inposi check timeout] had elapsed after completion of operation.	Check the values set to [in-position width 6] and [6 inposi check timeout] of machine parameters (system 2). Press the [RST] key to reset the error.
0542(conv) 5542(NC)	5	2	M IN-POS CHCK TMOUT	The amount of deviation did not become smaller than the value set to in-position width magazine even after the time set to [magazine inposi check timeout] had elapsed after completion of operation.	Check the values set to [in-position width magazine] and [magazine inposi check timeout] of machine parameters (system 3). Press the [RST] key to reset the error. Refer to 1.42.
0544(conv) 5544(NC)	5	2	EXTERNAL ERROR 1	Error signal was input from the external PLC.	Check the conditions that external PLC alarm occur eliminate the cause and press the [RST] key.
0545(conv) 5545(NC)	5	2	EXTERNAL ERROR 2	Error signal was input from the external PLC.	Check the conditions that external PLC alarm occurs eliminate the cause and press the [RST] key.
0546(conv) 5546(NC)	5	2	EXTERNAL ERROR 3	Error signal was input from the external PLC.	Check the conditions that external PLC alarm occur eliminate the cause and press the [RST] key.
0547(conv) 5547(NC)	5	2	EXTERNAL ERROR 4	Error signal was input from the external PLC.	Check the conditions that external PLC alarm occur eliminate the cause and press the [RST] key.
0548(conv) 5548(NC)	5	2	EXTERNAL ERROR 5	Error signal was input from the external PLC.	Check the conditions that external PLC alarm occur eliminate the cause and press the [RST] key.
0549(conv) 5549(NC)	5	2	EXTERNAL ERROR 6	Error signal was input from the external PLC.	Check the conditions that external PLC alarm occur eliminate the cause and press the [RST] key.

NO.	STOP LEVEL	RESET LEVEL	ERROR MESSAGE	CAUSE	SOLUTION
0550(conv) 5550(NC)	5	2	EXTERNAL ERROR 7	Error signal was input from the external PLC.	Check the conditions that external PLC alarm occur eliminate the cause and press the [RST] key.
0551(conv) 5551(NC)	5	2	EXTERNAL ERROR 10	EXER10 signal comes on.	Turn off the EXER10 and push [RST] key.
0552(conv) 5552(NC)	5	2	EXTERNAL ERROR 11	EXER11 signal comes on.	Turn off the EXER11 and push [RST] key.
0553(conv) 5553(NC)	5	2	EXTERNAL ERROR 12	EXER12 signal comes on.	Turn off the EXER12 and push [RST] key.
0554(conv) 5554(NC)	5	2	EXTERNAL ERROR 13	EXER13 signal comes on.	Turn off the EXER13 and push [RST] key.
0555(conv) 5555(NC)	5	2	EXTERNAL ERROR 14	EXER14 signal comes on.	Turn off the EXER14 and push [RST] key.
0556(conv) 5556(NC)	5	2	EXTERNAL ERROR 15	EXER15 signal comes on.	Turn off the EXER15 and push [RST] key.
0557(conv) 5557(NC)	5	2	EXTERNAL ERROR 16	EXER16 signal comes on.	Turn off the EXER16 and push [RST] key.
0558(conv) 5558(NC)	5	2	EXTERNAL ERROR 17	EXER17 signal comes on.	Turn off the EXER17 and push [RST] key.
0559(conv) 5559(NC)	5	2	EXTERNAL ERROR 18	EXER18 signal comes on.	Turn off the EXER18 and push [RST] key.
0560(conv) 5560(NC)	5	2	EXTERNAL ERROR 19	EXER19 signal comes on.	Turn off the EXER19 and push [RST] key.
0561(conv) 5561(NC)	5	2	EXTERNAL ERROR 20	EXER20 signal comes on.	Turn off the EXER20 and push [RST] key.
0562(conv) 5562(NC)	5	2	EXTERNAL ERROR 21	EXER21 signal comes on.	Turn off the EXER21 and push [RST] key.
0563(conv) 5563(NC)	5	2	EXTERNAL ERROR 22	EXER22 signal comes on.	Turn off the EXER22 and push [RST] key.
0564(conv) 5564(NC)	5	2	EXTERNAL ERROR 23	EXER23 signal comes on.	Turn off the EXER23 and push [RST] key.
0565(conv) 5565(NC)	5	2	EXTERNAL ERROR 24	EXER24 signal comes on.	Turn off the EXER24 and push [RST] key.

NO.	STOP LEVEL	RESET LEVEL	ERROR MESSAGE	CAUSE	SOLUTION
0566(conv) 5566(NC)	5	2	EXTERNAL ERROR 25	EXER25 signal comes on.	Turn off the EXER25 and push [RST] key.
0567(conv) 5567(NC)	5	2	DOOR ERROR	1) The automatic door limit switch has turned on both at door closing and opening ends. 2) It took x seconds (parameter value) for automatic door closing. 3) It took x seconds (parameter value) for automatic door opening.	Eliminate the error cause and press the [RST] key to reset the error.
0577(conv) 5577(NC)	5	2	MJR FAILURE RLY ON	An error has occurred in the SEQ unit connected to NC board connector SEQ.	Refer to the instruction manual of the connected SEQ unit eliminate the cause and turn on power again.
0578(conv) 5578(NC)	5	2	OVERRUN	Overrun error signal was received, but the error of the corresponding axis cannot be identified.	Eliminate the error cause and press the [RST] key to reset the error.
0579(conv) 5579(NC)	5	2	OVERRUN (+*)	The axis has overrun in the direction indicated by the alarm. (An asterisk (*) indicates axis 5)	Switch to manual operation mode and press the [RST] key while holding down the [relse] key. Then move the axis in the opposite direction while holding down the [relse] key until the axis moves out of the overrun area. Refer to 1.24 .
0580(conv) 5580(NC)	5	2	OVERRUN (-*)	The axis has overrun in the direction indicated by the alarm. (An asterisk (*) indicates axis 5)	Switch to manual operation mode and press the [RST] key while holding down the [relse] key. Then move the axis in the opposite direction while holding down the [relse] key until the axis moves out of the overrun area. Refer to 1.24 .

NO.	STOP LEVEL	RESET LEVEL	ERROR MESSAGE	CAUSE	SOLUTION
0581(conv) 5581(NC)	5	2	OVERRUN (+*)	The axis has overrun in the direction indicated by the alarm. (An asterisk (*) indicates axis 6)	Switch to manual operation mode and press the [RST] key while holding down the [relse] key. Then move the axis in the opposite direction while holding down the [relse] key until the axis moves out of the overrun area. Refer to 1.24 .
0582(conv) 5582(NC)	5	2	OVERRUN (-*)	The axis has overrun in the direction indicated by the alarm. (An asterisk (*) indicates axis 6)	Switch to manual operation mode and press the [RST] key while holding down the [relse] key. Then move the axis in the opposite direction while holding down the [relse] key until the axis moves out of the overrun area. Refer to 1.24 .
0586 conv) 5586(NC)	5	2	*SERVO MOTOR OFF	When door interlock is valid , the door was opened while the axis “*” (axis 4) was in motion.	Press the [RST] key.
0587 conv) 5587(NC)	5	2	*SERVO MOTOR OFF	When door interlock is valid , the door was opened while the axis “*” (axis 5) was in motion.	Press the [RST] key.
0588 conv) 5588(NC)	5	2	*SERVO MOTOR OFF	When door interlock is valid, the door was opened while the axis “*” (axis 6) was in motion.	Press the [RST] key.
1050(conv) 6050(NC)	4	3	TURN OFF POWER	Important parameter is modified.	Turn power OFF once and ON again.
1051(conv) 6051(NC)	4	3	START POINT DATA1 ER	When power was turned on, start point data 1 was smaller than zero or larger than machine coordinate value for one round of magazine.	Inform of circumstances when the trouble occurred.
1053(conv) 6053(NC)	4	3	M/C PAR.AM ERR (SYS2)	Setting of machine parameters 2 (system 2) is faulty.	Check the setting of machine parameters 2 (system 2). Refer to 9.3.3 .

NO.	STOP LEVEL	RESET LEVEL	ERROR MESSAGE	CAUSE	SOLUTION
1055(conv) 6055(NC)	4	3	ATC ARM POS ERR 2	ATC arm is not at home.	Turn off power and refer to 13.6. Resetting ATC.
1056(conv) 6056(NC)	4	3	ATC OFF POSITION ERR	The ATC arm is stopped midway, and cannot be reset by key operation.	
1057(conv) 6057(NC)	4	3	DATA ERR (USER PARAM)	Data structure of user parameter is destroyed.	Press [RST] key, and delete the destroyed data by memory screen in edit mode and create new data again. Refer to 9.3.1 .
1150(conv) 6150(NC)	4	2	SYSTEM ERROR(SLV)	Slave CPU error signal was received, but the corresponding error cannot be identified.	Press the [RST] key to reset the error. If the error still occurs, please contact us. Refer to 1.5.3 and 9.1.14 .
1151(conv) 6151(NC)	4	2	NO MEMORY FORMAT	Memory never cleared or data destroyed.	Refer to 9.5.1 . (Note that internal data is completely cleared when formatting of memory is attempted.)
1152(conv) 6152(NC)	4	2	EDITING	The same data are to be edited at the same time.	Check that communication mark has disappeared. Press the [RST] key to reset the error.
1153(conv) 6153(NC)	4	2	EDIT ERROR 1	During editing, data is destroyed.	Refer to 9.3.5 .
1154(conv) 6154(NC)	4	2	EDIT ERROR 2	During editing, data is destroyed.	Refer to 9.3.5 .
1155(conv) 6155(NC)	4	2	EDIT ERROR 3	During editing, data is destroyed.	Refer to 9.3.5 .
1156(conv) 6156(NC)	4	2	LONG RTRN DISTANCE	Recovery distance when turning on the servo is too long. (Door interlock is effective.)	Press the [RST] key.
1157(conv) 6157(NC)	4	2	NO USER PARAM DATA	There is no user parameter data.	Create the user parameter and turn power off and then on again.

NO.	STOP LEVEL	RESET LEVEL	ERROR MESSAGE	CAUSE	SOLUTION
1158(conv) 6158(NC)	4	2	PARITY ER (USER PARA)	Data structure of user parameter is destroyed.	Press [RST] key, and delete the destroyed data by memory screen in edit mode and create new data again. Refer to 9.3.6 .
1159(conv) 6159(NC)	4	2	PARITY ER (M/C PARAM)	Data structure of machine parameter is destroyed.	Press [RST] key, and delete the destroyed data by memory screen in edit mode and create new data again. Refer to 9.3.6 .
1160(conv) 6160(NC)	4	2	PARITY ERR (PRGRM)	Program is structure is destroyed.	Press [RST] key, and delete the destroyed data by memory screen in edit mode and create new data again. Refer to 9.3.6 .
1161(conv) 6161(NC)	4	2	CHECK THE MAGAZINE POS	When the power is on, the servo motor is on, or while the magazine is swiveling, the difference between START POINT DATA 2 and the absolute position data in the magazine amplifier has exceeded the value for one revolution of the magazine.	Check the pot number displayed on the present position screen and the pot number actually indexed. If these differ, switch to ATC maintenance mode and adjust the magazine position.
1163(conv) 6163(NC)	4	2	ORG POS ERROR X	Zero dog signal was not confirmed while dog zero return was being performed.	Refer to 1.2.4 and 9.2.3 .
1164(conv) 6164(NC)	4	2	ORG POS ERROR Y	Zero dog signal was not confirmed while dog zero return was being performed.	Refer to 1.2.4 and 9.2.3 .
1165(conv) 6165(NC)	4	2	ORG POS ERROR Z	Zero dog signal was not confirmed while dog zero return was being performed.	Refer to 1.2.4 and 9.2.3 .

NO.	STOP LEVEL	RESET LEVEL	ERROR MESSAGE	CAUSE	SOLUTION
1166(conv) 6166(NC)	4	2	ORG POS ERROR SP	When the first orientation is performed after power is turned on, PHASE C signal cannot be received even after spindle motor has rotated one turn.	Refer to 1.2.4 and 9.2.3 .
1167(conv) 6167(NC)	4	2	ORG POS ERROR *	Zero dog signal was not confirmed while dog zero return was being performed.(the asterisk (*) indicates axis 4.)	Refer to 1.2.4 and 9.2.3 .
1168(conv) 6168(NC)	4	2	ORG POS ERROR *	Zero dog signal was not confirmed while dog zero return was being performed.(the asterisk (*) indicates axis 5.)	Refer to 1.2.4 and 9.2.3 .
1169(conv) 6169(NC)	4	2	ORG POS ERROR *	Zero dog signal was not confirmed while dog zero return was being performed.(the asterisk (*) indicates axis 6.)	Refer to 1.2.4 and 9.2.3 .
1170(conv) 6170(NC)	4	2	ORG POS ERROR *	Zero dog signal was not confirmed while dog zero return was being performed.(the asterisk (*) indicates axis 7.)	Refer to 1.2.4 and 9.2.3 .
1171(conv) 6171(NC)	4	2	ORG POS ERROR *	Zero dog signal was not confirmed while dog zero return was being performed.(the asterisk (*) indicates axis 8.)	Refer to 1.2.4 and 9.2.3 .
1172(conv) 6172(NC)	4	2	COMMAND ERROR(SP)	Main CPU is not synchronized with slave CPU.	Refer to 9.1.7.
1173(conv) 6173(NC)	4	2	CAN NOT CLAMP *	Clamping axis was attempted but failed. (the asterisk (*) indicates axis 4.)	Press the [RST] key. Check if air pressure is appropriate. Check the machine parameter. Refer to 1.2.5 and 1.2.7.

NO.	STOP LEVEL	RESET LEVEL	ERROR MESSAGE	CAUSE	SOLUTION
1174(conv) 6174(NC)	4	2	CAN NOT UNCLAMP *	Unclamping axis was attempted but failed. (The asterisk (*) indicates axis 4.)	Press the [RST] key. Check if air pressure is appropriate. Check the machine parameter. Refer to 1.2.5 and 1.2.7.
1175(conv) 6175(NC)	4	2	* CLAMP	While * axis (4 axis) is rotating,* axis is clamped.	Inform of circumstances when the trouble occurred. Refer to 1.2.5 and 1.2.7.
1176(conv) 6176(NC)	4	2	* UNCLAMP	While * axis (4 axis) is holding,* axis is unclamped.	Inform of circumstances when the trouble occurred. Refer to 1.2.5 and 1.2.7.
1177(conv) 6177(NC)	4	2	*-AXISPOS SHIFTED	The axis has shifted during clamping more than the value set to [LMT PULSE FOR 4 POSITION ALRM]. If the value set to [IN-POSITION WIDTH 4] is larger than the value set to [LMT PULSE FOR POSITION ALRM], however this error occurs when the axis has shifted more than the value set to [IN-POSITION WIDTH 4]. (these parameters are set on the <machine parameter (system 2) >screen.)	Press the [RST] key. Check the axis position on the current position screen and move the axis to the correct position. Check that the value set to [LMT PULSE FOR 4 POSITION ALRM] is not too small. When this error occurs during memory operation reduce the cutting depth. Refer to 1.2.7.
1178(conv) 6178(NC)	4	2	CAN NOT CLAMP *	Clamping axis was attempted but failed. (the asterisk (*) indicates axis 5.)	Press the [RST] key. Check if air pressure is appropriate. Check the machine parameter.
1179(conv) 6179(NC)	4	2	CAN NOT UNCLAMP *	Unclamping axis was attempted but failed. (The asterisk (*) indicates axis 5.)	Press the [RST] key. Check if air pressure is appropriate. Check the machine parameter.
1180(conv) 6180(NC)	4	2	* CLAMP	While * axis (5 axis) is rotating,* axis is clamped.	Inform of circumstances when the trouble occurred.
1181(conv) 6181(NC)	4	2	* UNCLAMP	While * axis (5 axis) is holding,* axis is unclamped.	Inform of circumstances when the trouble occurred.

NO.	STOP LEVEL	RESET LEVEL	ERROR MESSAGE	CAUSE	SOLUTION
1182(conv) 6182(NC)	4	2	*-AXISPOS SHIFTED	The axis has shifted during clamping more than the value set to [LMT PULSE FOR 5 POSITION ALRM]. If the value set to [IN-POSITION WIDTH 5] is larger than the value set to [LMT PULSE FOR 5 POSITION ALRM], however this error occurs when the axis has shifted more than the value set to [IN-POSITION WIDTH 5]. (these parameters are set on the <machine parameter (system 2) >screen.)	Press the [RST] key. Check the axis position on the current position screen and move the axis to the correct position. Check that the value set to [LMT PULSE FOR 5 POSITION ALRM] is not too small. When this error occurs during memory operation reduce the cutting depth.
1183(conv) 6183(NC)	4	2	CAN NOT CLAMP *	Clamping axis was attempted but failed. (the asterisk (*) indicates axis 6.)	Press the [RST] key. Check if air pressure is appropriate. Check the machine parameter.
1184(conv) 6184(NC)	4	2	CAN NOT UNCLAMP *	Unclamping axis was attempted but failed. (The asterisk (*) indicates axis 6.)	Press the [RST] key. Check if air pressure is appropriate. Check the machine parameter.
1185(conv) 6185(NC)	4	2	* CLAMP	While * axis (6 axis) is rotating. * axis is clamped.	Inform of circumstances when the trouble occurred.
1186(conv) 6186(NC)	4	2	* UNCLAMP	While * axis (6 axis) is holding. * axis is unclamped.	Inform of circumstances when the trouble occurred.

NO.	STOP LEVEL	RESET LEVEL	ERROR MESSAGE	CAUSE	SOLUTION
1187(conv) 6187(NC)	4	2	*-AXISPOS SHIFTED	The axis has shifted during clamping more than the value set to [LMT PULSE FOR 6 POSITION ALRM]. If the value set to [IN-POSITION WIDTH 6] is larger than the value set to [LMT PULSE FOR 6 POSITION ALRM], however this error occurs when the axis has shifted more than the value set to [IN-POSITION WIDTH 6]. (these parameters are set on the <machine parameter (system 2) >screen.)	Press the [RST] key. Check the axis position on the current position screen and move the axis to the correct position. Check that the value set to [LMT PULSE FOR 6 POSITION ALRM] is not too small. When this error occurs during memory operation reduce the cutting depth.
1188(conv) 6188(NC)	4	2	POSITION ERROR Z	Z-axis was commanded above the Z axis zero point. (While ATC area servo has been turned on.)	Press the [RST] key. Move the Z-axis until it is below the Z-axis zero point while holding down the [RELSE]key.
1189(conv) 6189(NC)	4	2	POSITION ERROR SP	Spindle was commanded above the Z axis zero point. (While ATC area servo has been turned on.)	Press the [RST] key. Move the Z axis until it is below the Z axis zero point while holding down the [RELSE] key. Refer to 9.4.3.
1191(conv) 6191(NC)	4	2	COMMAND ERROR(SPEED)	The commanded speed is zero or larger than the maximum speed.	Inform of circumstances when the trouble occurred.
1192(conv) 6192(NC)	4	2	ARC SPEED ERROR	For arc cutting when the last point is not on the arc, the speed of the single axis is larger than the maximum speed.	Check start point and end point of program as well as circular are center point.
1193(conv) 6193(NC)	4	2	ATC TIMEOVER ERROR	ATC arm swivel is not completed with in the specified time.	Refer to 1.4.1, 1.4.3 and 9.4.4.

NO.	STOP LEVEL	RESET LEVEL	ERROR MESSAGE	CAUSE	SOLUTION
1194(conv) 6194(NC)	4	2	MAGAZINE NO.ERROR	The [emergency stop] key was pressed while the magazine was swiveling and the magazine stopped midway.	Press the [RST] key with the [RELSE] key held down in manual mode. After the alarm indication has disappeared, press the [MAGZ] key with the [RELSE] key held down. Refer to 9.4.4.
1195(conv) 6195(NC)	4	2	MAGAZINE INDEX ERROR	A tool was not indexed correctly, but magazine was attempted to be rotated. Or, Z axis was commanded.	Press the [RST] key with the [RELSE] key held down in manual mode. After the alarm indication has disappeared, press the [MAGZ] key with the [RELSE] key held down. Refer to 9.4.5
1196(conv) 6196(NC)	4	2	MAGAZINE POS. ERROR	Magazine was attempted to be rotated when the Z axis was not on the ATC zero point.	Press the [RST] key to cancel the alarm. Refer to 9.4.6
1197(conv) 6197(NC)	4	2	COMMAND ERROR(ATC)	A number exceeding the number of tools set in the magazine was required by ATC command.	Refer to 9.1.8.
1198(conv) 6198(NC)	4	2	POT POSITION ERROR	Pot position is incorrect.	Switch to manual operation mode press the [RST] key with the [RELSE] key held down. Then, press the[MAGZ] key with the [RELSE] key held down to move the magazine pot to the correct position.
1199(conv) 6199(NC)	4	2	MAGAZINE TIME OVER	Magazine has not been indexed within 5 sec per 1pitch.	Refer to 9.4.7.

NO.	STOP LEVEL	RESET LEVEL	ERROR MASSAGE	CAUSE	SOLUTION
1200(conv) 6200(NC)	4	2	POT TIME OVER	Raising and lowering of the pot was not completed within the specified time.	Turn off power and eliminate the cause.
1201(conv) 6201(NC)	4	2	POT SENSOR ERROR	Pot sensor is faulty.	
1202(conv) 6202(NC)	4	2	ATC ARM POS ERR 1	ATC arm is not at home.	Press the [RST] key with the [RELSE] key held down in manual mode. See 13.6 Resetting ATC.
1203(conv) 6203(NC)	4	2	STROKE OVER (+X)	The X-axis was attempted to be moved past its stroke limit in the positive direction.	Press the [RST] key and correct the program. (check the machine parameters (system 1).)
1204(conv) 6204(NC)	4	2	STROKE OVER (-X)	The X-axis was attempted to be moved past its stroke limit in the negative direction.	Press the [RST] key and correct the program. (check the machine parameters (system 1).)
1205(conv) 6205(NC)	4	2	STROKE OVER (+Y)	The Y-axis was attempted to be moved past its stroke limit in the positive direction.	Press the [RST] key and correct the program. (check the machine parameters (system 1).)
1206(conv) 6206(NC)	4	2	STROKE OVER (-Y)	The Y-axis was attempted to be moved past its stroke limit in the negative direction.	Press the [RST] key and correct the program. (check the machine parameters (system 1).)
1207(conv) 6207(NC)	4	2	STROKE OVER (+Z)	The Z-axis was attempted to be moved past its stroke limit in the positive direction.	Press the [RST] key and correct the program. (check the machine parameters (system 1).)
1208(conv) 6208(NC)	4	2	STROKE OVER (-Z)	The Z-axis was attempted to be moved past its stroke limit in the negative direction.	Press the [RST] key and correct the program. (check the machine parameters (system 1).)

NO.	STOP LEVEL	RESET LEVEL	ERROR MESSAGE	CAUSE	SOLUTION
1209(conv) 6209(NC)	4	2	STROKE OVER (+*)	The 4 axis was attempted to be moved past its stroke limit in the positive direction.	Press the [RST] key and correct the program. (check the machine parameters (switch 2).)
1210(conv) 6210(NC)	4	2	STROKE OVER (-*)	The 4 axis was attempted to be moved past its stroke limit in the negative direction.	Press the [RST] key and correct the program. (check the machine parameters (switch 2).)
1211(conv) 6211(NC)	4	2	STROKE OVER (+*)	The 5 axis was attempted to be moved past its stroke limit in the positive direction.	Press the [RST] key and correct the program. (check the machine parameters (switch 2).)
1212(conv) 6212(NC)	4	2	STROKE OVER (-*)	The 5 axis was attempted to be moved past its stroke limit in the negative direction.	Press the [RST] key and correct the program. (check the machine parameters (switch 2).)
1213(conv) 6213(NC)	4	2	STROKE OVER (+*)	The 6 axis was attempted to be moved past its stroke limit in the positive direction.	Press the [RST] key and correct the program. (check the machine parameters (switch 2).)
1214(conv) 6214(NC)	4	2	STROKE OVER (-*)	The 6 axis was attempted to be moved past its stroke limit in the negative direction.	Press the [RST] key and correct the program. (check the machine parameters (switch 2).)
1215(conv) 6215(NC)	4	2	LIMIT OVER (+X)	The X-axis was attempted to be moved past its stroke limit in the positive direction.	Press the [RST] key and correct the program. (check the machine parameters (switch 2).)
1216(conv) 6216(NC)	4	2	LIMIT OVER (-X)	The X-axis was attempted to be moved past its stroke limit in the negative direction.	Press the [RST] key and correct the program. (check the machine parameters (switch 2).)

NO.	STOP LEVEL	RESET LEVEL	ERROR MESSAGE	CAUSE	SOLUTION
1217(conv) 6217(NC)	4	2	LIMIT OVER (+Y)	The Y-axis was attempted to be moved past its stroke limit in the positive direction.	Press the [RST] key and correct the program. (check the machine parameters (switch 2).)
1218(conv) 6218(NC)	4	2	LIMIT OVER (-Y)	The Y-axis was attempted to be moved past its stroke limit in the negative direction.	Press the [RST] key and correct the program. (check the machine parameters (switch 2).)
1219(conv) 6219(NC)	4	2	LIMIT OVER (+Z)	The Z-axis was attempted to be moved past its stroke limit in the positive direction.	Press the [RST] key and correct the program. (check the machine parameters (switch 2).)
1220(conv) 6220(NC)	4	2	LIMIT OVER (-Z)	The Z-axis was attempted to be moved past its stroke limit in the negative direction.	Press the [RST] key and correct the program. (check the machine parameters (switch 2).)
1221(conv) 6221(NC)	4	2	LIMIT OVER (+*)	The 4 axis was attempted to be moved past its stroke limit in the positive direction.	Press the [RST] key and correct the program. (check the machine parameters (switch 2).)
1222(conv) 6222(NC)	4	2	LIMIT OVER (-*)	The 4 axis was attempted to be moved past its stroke limit in the negative direction.	Press the [RST] key and correct the program. (check the machine parameters (switch 2).)
1223(conv) 6223(NC)	4	2	LIMIT OVER (+*)	The 5 axis was attempted to be moved past its stroke limit in the positive direction.	Press the [RST] key and correct the program. (check the machine parameters (switch 2).)
1224(conv) 6224(NC)	4	2	LIMIT OVER (-*)	The 5 axis was attempted to be moved past its stroke limit in the negative direction.	Press the [RST] key and correct the program. (check the machine parameters (switch 2).)

NO.	STOP LEVEL	RESET LEVEL	ERROR MESSAGE	CAUSE	SOLUTION
1225(conv) 6225(NC)	4	2	LIMIT OVER (+*)	The 6 axis was attempted to be moved past its stroke limit in the positive direction.	Press the [RST] key and correct the program. (check the machine parameters (switch 2).)
1226(conv) 6226(NC)	4	2	LIMIT OVER (-*)	The 6 axis was attempted to be moved past its stroke limit in the negative direction.	Press the [RST] key and correct the program. (check the machine parameters (switch 2).)
1227(conv) 6227(NC)	4	2	STROKE OVER 2	The axis was attempted to be moved into the prohibited stroke zone.	Press the [RST] key and correct the program. (check the machine parameters (system 1).)
1228(conv) 6228(NC)	4	2	LIMIT OVER 2	The axis was attempted to be moved into the prohibited stroke limit zone.	Press the [RST] key and correct the program. (check the machine parameters (switch 2).)
1232(conv) 6232(NC)	4	2	COUNTER1 END	Each workpiece counter has attained the preset value.	
1233(conv) 6233(NC)	4	2	COUNTER2 END	Each workpiece counter has attained the preset value.	
1234(conv) 6234(NC)	4	2	COUNTER3 END	Each workpiece counter has attained the preset value.	
1235(conv) 6235(NC)	4	2	COUNTER4 END	Each workpiece counter has attained the preset value.	
1236(conv) 6236(NC)	4	2	SENSOR SIGNAL OFF	Detection signal was not turned on during measurement.	Press the [RST] key and check the measurement position.
1237(conv) 6237(NC)	4	2	SENSOR SIGNAL ON	Detection signal was not turned off during measurement.	Press the [RST] key and check the measurement position.
1238(conv) 6238(NC)	4	2	THRED CUT FEED ERR	The Z axis feedrate is not obtained from the X/Y axis feedrate during the thread cutting.	Press the [RST] key and check the end point, center point and feedrate in the thread cutting.
1239(conv) 6239(NC)	4	2	NO THREAD CUTTING	There is no optinal thread cutting function.	Purchase a thread cutting option.

NO.	STOP LEVEL	RESET LEVEL	ERROR MESSAGE	CAUSE	SOLUTION
1240(conv) 6240(NC)	4	2	SIGNAL TIME OVER	After external signal is given, completion signal can not be detected even when external signal reading limit time is over. M46* signals are not detected even after the time preset to MAXIMUM TIME OF EXIT SIGNAL has passed after motions of signal output functions 46* have been completed.	Press the [RST] key and set external reading completion signal within the limit time, or charge parameter value.
1241(conv) 6241(NC)	4	2	CALCULATION ERROR	The graphic calculation is not available any longer. 1.Feed rate of the additional axis could not be calculated. 2.Working path could not be determined. 3.Tool data for tool assignment could not be calculated. 1. Calculation was not performed even though coordinate calculation command was given.	Inform of circumstances when the trouble occurred. Press the [RST] key, and For 1 and 2, check the program and enter the correct value. For 3, check the tool list and enter the correct value. Press the [RST] key and check the program.
1242(conv) 6242(NC)	4	2	TOOL BROKEN ERROR	A signal was output from the tool detection sensor.	Check the service life of the broken tool on the <magazine tool> screen, and then press the [RST] key. If a suitable spare tool is registered, operation can be resumed. If no suitable spare tool is registered, replace the tool, set the tool length and tool life, and then resume operation. Note: when the [RST] key is pressed, the tool life indication value is automatically cleared. Note: if the tool is not broken, the tool breakage detection device needs adjustment. Refer to option - tool breakage detection device -> 4.adjustment.

NO.	STOP LEVEL	RESET LEVEL	ERROR MESSAGE	CAUSE	SOLUTION
1243(conv) 6243(NC)	4	2	TOOL LIFE END (*)	The tool life of the tool in use or the one to be used has reached zero. The figure in brackets ( ) indicates the tool number.	Replace tools and set tool life according after pressing [RST] key.
1244(conv) 6244(NC)	4	2	MEASURED VL ERROR L.	The result of zero point measurement has exceeded the tolerance set by the user parameter (zero point measurement).	Press the [RST] key and check the measurement position in the program.
1245(conv) 6245(NC)	4	2	NO MEASURING DATA	Positioning to the measuring point was attempted (G120) although measuring data does not exist.	Press the [RST] key and check the program.
1246(conv) 6246(NC)	4	2	TRM DISPMT AMT OVR	Displacement measured in Z-axis thermal displacement offset mode exceeded parameter Z-AXIS MACHINING ACCURACY.	See “parameter setting and change Z-axis thermal displacement offset witching motion to appropriate conditions.
1247(conv) 6247(NC)	4	2	THRM COMP POS ERR	Thermal displacement compensation was attempted for areas other than Z-axis machine zero position.	Do not move the axis in manual mode.
1248(conv) 6248(NC)	4	2	THRM COMP AMT OVER	Offset at stroke end exceeded THRM OFFSET AMT LIMIT VALUE in Z-axis thermal displacement offset mode.	Check if parameter measuring device installation position Z and tool length menu are correct. Check the measuring section of the tool length measuring device for chip adhesion.
1249(conv) 6249(NC)	4	2	COVER DOEST OPEN	When COVER OPEN CHCKING is executed, cover opening cannot be comfirmed within 10 seconds.	Check tool length measuring device cover.
1250(conv) 6250(NC)	4	2	NO Z-AX MEASUREMEN T	Tool breakage detection command or thermal measurement command was attempted to be executed for machines without optional Z-axis measurement system.	Change program.
1252(conv) 6252(NC)	4	2	PROGRAM PROTECT	An attempt is made to modify the data while the PROTECT SW is ON.	Set the PROTECT switch to OFF, and modify the data.
1253(conv) 6253(NC)	4	2	NO SEQ. CONTROLLER	A signal output 8XX is executed without sequence controller (option).	Change the signal output into a signal output XX.

NO.	STOP LEVEL	RESET LEVEL	ERROR MESSAGE	CAUSE	SOLUTION
1254(conv) 6254(NC)	4	2	NO EXT ERROR CODE	An error signal was received from the external PLC. At this time, no bit of internal auxiliary contact 20 signal (8-bit data) is on.	Check the conditions when the external PLC alarm occurs, eliminate the cause, and press the [RST] key.
1255(conv) 6255(NC)	4	2	EXTERNAL ERROR 1	Error signal was input from the external PLC.	Check the conditions that external PLC alarm occur eliminate the cause and press the [RST] key.
1256(conv) 6256(NC)	4	2	EXTERNAL ERROR 2	Error signal was input from the external PLC.	Check the conditions that external PLC alarm occurs eliminate the cause and press the [RST] key.
1257(conv) 6257(NC)	4	2	EXTERNAL ERROR 3	Error signal was input from the external PLC.	Check the conditions that external PLC alarm occurs eliminate the cause and press the [RST] key.
1258(conv) 6258(NC)	4	2	EXTERNAL ERROR 4	Error signal was input from the external PLC.	Check the conditions that external PLC alarm occurs eliminate the cause and press the [RST] key.
1259(conv) 6259(NC)	4	2	EXTERNAL ERROR 5	Error signal was input from the external PLC.	Check the conditions that external PLC alarm occurs eliminate the cause and press the [RST] key.
1260(conv) 6260(NC)	4	2	EXTERNAL ERROR 6	Error signal was input from the external PLC.	Check the conditions that external PLC alarm occurs eliminate the cause and press the [RST] key.
1261(conv) 6261(NC)	4	2	EXTERNAL ERROR 7	Error signal was input from the external PLC.	Check the conditions that external PLC alarm occurs eliminate the cause and press the [RST] key.
1262(conv) 6262(NC)	4	2	EXTERNAL ERROR 10	EXER10 signal comes on.	Turn off the EXER10 and push [RST] key.
1263(conv) 6263(NC)	4	2	EXTERNAL ERROR 11	EXER11 signal comes on.	Turn off the EXER11 and push [RST] key.
1264(conv) 6264(NC)	4	2	EXTERNAL ERROR 12	EXER12 signal comes on.	Turn off the EXER12 and push [RST] key.
1265(conv) 6265(NC)	4	2	EXTERNAL ERROR 13	EXER13 signal comes on.	Turn off the EXER13 and push [RST] key.

NO.	STOP LEVEL	RESET LEVEL	ERROR MESSAGE	CAUSE	SOLUTION
1266(conv) 6266(NC)	4	2	EXTERNAL ERROR 14	EXER14 signal comes on.	Turn off the EXER14 and push [RST] key.
1267(conv) 6267(NC)	4	2	EXTERNAL ERROR 15	EXER15 signal comes on.	Turn off the EXER15 and push [RST] key.
1268(conv) 6268(NC)	4	2	EXTERNAL ERROR 16	EXER16 signal comes on.	Turn off the EXER16 and push [RST] key.
1269(conv) 6269(NC)	4	2	EXTERNAL ERROR 17	EXER17 signal comes on.	Turn off the EXER17 and push [RST] key.
1270(conv) 6270(NC)	4	2	EXTERNAL ERROR 18	EXER18 signal comes on.	Turn off the EXER18 and push [RST] key.
1271(conv) 6271(NC)	4	2	EXTERNAL ERROR 19	EXER19 signal comes on.	Turn off the EXER19 and push [RST] key.
1272(conv) 6272(NC)	4	2	EXTERNAL ERROR 20	EXER20 signal comes on.	Turn off the EXER20 and push [RST] key.
1273(conv) 6273(NC)	4	2	EXTERNAL ERROR 21	EXER21 signal comes on.	Turn off the EXER21 and push [RST] key.
1274(conv) 6274(NC)	4	2	EXTERNAL ERROR 22	EXER22 signal comes on.	Turn off the EXER22 and push [RST] key.
1275(conv) 6275(NC)	4	2	EXTERNAL ERROR 23	EXER23 signal comes on.	Turn off the EXER23 and push [RST] key.
1276(conv) 6276(NC)	4	2	EXTERNAL ERROR 24	EXER24 signal comes on.	Turn off the EXER24 and push [RST] key.
1277(conv) 6277(NC)	4	2	EXTERNAL ERROR 25	EXER25 signal comes on.	Turn off the EXER25 and push [RST] key.
1278(conv) 6278(NC)	4	2	DOOR ERROR	1) The automatic door limit switch has turned on both at door closing and opening ends. 2) It took x seconds (parameter value) for automatic door closing. 3) It took x seconds (parameter value) for automatic door opening.	Eliminate the error cause and press the [RST] key to reset the error.
1279(conv) 6279(NC)	4	2	NO TOOL IN MAGAZINE	Tool required for operation is not set in the magazine.	Press the [RST] key, and set the tool on the <magazine tool> screen correctly.

NO.	STOP LEVEL	RESET LEVEL	ERROR MESSAGE	CAUSE	SOLUTION
1280(conv) 6280(NC)	4	2	SYSTEM ERROR (MC)	An error was received but the corresponding error cannot be identified.	Press the [RST] key and clear the alarm. Consult the Maker if the same trouble occurs repeatedly. Refer to 9.1.14.
1281(conv) 6281(NC)	4	2	SYSTEM ERROR (ATC)	An error was received but the corresponding error cannot be identified.	Press the [RST] key and clear the alarm. Consult the Maker if the same trouble occurs repeatedly.
1282(conv) 6282(NC)	4	2	PROHIBITED POT	The tool was attempted to be replaced with a prohibited pot.	
1283(conv)62 83(NC)	4	2	CAPPED	The tool was attempted to be replaced with a pot with the cap specified.	
1284(conv) 6284(NC)	4	2	NO OPTION (A)	An “a” axis program was attempted to be executed although an optional “a” axis is not provided.	Purchase an optional “a” axis. When already provided, set [a option] to [1. Yes].
1285(conv) 6285(NC)	4	2	NO OPTION (B)	A “b” axis program was attempted to be executed although an optional “b” axis is not provided.	Purchase an optional “b” axis. When already provided, set [b option] to [1. Yes].
1286(conv) 6286(NC)	4	2	NO OPTION (C)	A “c” axis program was attempted to be executed although an optional “c” axis is not provided.	Purchase an optional “c” axis. When already provided, set [c option] to [1. Yes].
1287(conv) 6287(NC)	4	2	SHORT POTMOTION TIM	Raising or lowering of the pot has been completed earlier than the specified time.	Turn off power and eliminate the cause.
1288(conv) 6288(NC)	4	2	NO EMPTY POT	No pot was available when changing from standard to large tool or vice versa.	Prepare an empty pot.
1289(conv) 6289(NC)	4	2	CAN'T SET TOOL LEN	The [protect] switch was turned on as soon as [tool length set] was executed in automatic tool length measurement mode or [tool length set] could not be executed for some reason.	Multiple errors have occurred concurrently. Check the causes on the <alarm> screen and eliminate them.
1291(conv) 6291(NC)	4	2	NO MEASURING DEVICE	The Z-axis measurement system was attempted to be operated using the pallet without a measurement device.	Operate the system using the pallet with a measurement device.

NO.	STOP LEVEL	RESET LEVEL	ERROR MESSAGE	CAUSE	SOLUTION
1292(conv) 6292(NC)	4	2	PALLET POS ERROR	The Z-axis measurement system was attempted to be operated although the pallet was not indexed.	Index the pallet and operate the system.
1293(conv) 6293(NC)	4	2	MAGAZN TOOL SET ERR	Tools are not set in the magazine correctly.	Set the tools in the magazine correctly.
1294(conv) 6294(NC)	4	2	ADDRESS SETTING ERR	The address of the additional axis is not set correctly.	Set the address correctly.
1295(conv) 6295(NC)	4	2	OUT PLT NOT COMMDED	The additional axis of the pallet opposite the pallet in operation was attempted to be moved.	Press the [RST] key and check the program.
1296(conv) 6296(NC)	4	2	NO ZERO MEASUREMEN T	Zero position measurement was attempted although zero position measurement option is not provided.	Purchase this option or change the program.
1297(conv) 6297(NC)	4	2	TOOL BRK SNSOR ERR	Tool breakage detecting sensor input is illegal.	When a tool breakage detection option is not provided, set [tool breakage detect option] to [0: no]. When provided, check to see if chips are stuck to the detection arm. if so, remove them. If the error still occurs, please contact us. Refer to 1.7.4.
1298(conv) 6298(NC)	4	2	TOOL BRK TIME OVER	Tool breakage detecting motion (extend or fold the detevting arm) time exceeds 5 sec.	Push [RST] key and check the air pressure (3-5kg/cm2). If the air is OK, inform us. Refer to 1.7.4.
1299(conv) 6299(NC)	4	2	PARITY (SOFT SWITCH)	Software switch data was damaged.	Refer to 9.3.6.
1300(conv) 6300(NC)	4	2	S OVRRD NO CONNECTED	The spindle override connector is not connected.	Refer to 1.6.1.

NO.	STOP LEVEL	RESET LEVEL	ERROR MESSAGE	CAUSE	SOLUTION
1304(conv) 6304(NC)	4	2	NO A/T THRM DISP COM	Although automatic thermal displacement compensation is not provided, automatic thermal displacement compensation was attempted.	Purchase this option.
1305(conv) 6305(NC)	4	2	* SERVO MOTOR OFF	When door interlock is valid for machines conforming to ce specifications, the door was opened while the axis "*" (axis 4) was in motion.	Press the [RST] key.
1306(conv) 6306(NC)	4	2	* SERVO MOTOR OFF	When door interlock is valid for machines conforming to ce specifications, the door was opened while the axis "*" (axis 5) was in motion.	Press the [RST] key.
1307(conv) 6307(NC)	4	2	* SERVO MOTOR OFF	When door interlock is valid for machines conforming to ce specifications, the door was opened while the axis "*" (axis 6) was in motion.	Press the [RST] key.
1308(conv) 6308(NC)	4	2	COOLANT BLOWING ON	The spindle was attempted to be rotated while the coolant blowing function was ON.	Turn the coolant blowing function OFF and then rotate the spindle.
1309(conv) 6309(NC)	4	2	SPINDLE ROTATING	The coolant blowing function was attempted to be turned ON while the spindle was rotating.	Stop the spindle and then turn the coolant blowing function ON.
1310(conv) 6310(NC)	4	2	NOT CLOSING DOOR	The door was open when swiveling the ATC arm was attempted.	Close the door and press the [RST] key.
1311(conv) 6311(NC)	4	2	H PRE COOLANT ERR 1	Either the high pressure or filter pump is overloaded.	Eliminate the cause of the overload.
1312(conv) 6312(NC)	4	2	H PRE COOLANT ERR 3	The line filter is clogged.	Check that the element in the line filter and pipe are not damaged, and clean the element.

NO.	STOP LEVEL	RESET LEVEL	ERROR MESSAGE	CAUSE	SOLUTION
1324(conv.) 6324(NC)	4	2	ORGIN LS OFF (*)	The zero point limit switch for axis No. 4 was not on when zero position return was attempted by pressing the [RELSE] and [Z.RTN] keys.	Press the [RST] key to reset the alarm. Move the axis No. 4 to the position where the zero position limit switch for the axis No. 4 turns on, and press the [RELSE] and [Z.RTN] keys. ➔ See the attached sheet. Refer to 9.2.4.
1325(conv.) 6325(NC)	4	2	ORGIN LS OFF (*)	The zero point limit switch for axis No. 5 was not on when zero position return was attempted by pressing the [RELSE] and [Z.RTN] keys.	Press the [RST] key to reset the alarm. Move the axis No. 5 to the position where the zero position limit switch for the axis No. 5 turns on, and press the [RELSE] and [Z.RTN] keys. ➔ See the attached sheet. Refer to 9.2.4.
1326(conv.) 6326(NC)	4	2	ORGIN LS OFF (*)	The zero point limit switch for axis No. 6 was not on when zero position return was attempted by pressing the [RELSE] and [Z.RTN] keys.	Press the [RST] key to reset the alarm. Move the axis No. 6 to the position where the zero position limit switch for the axis No. 6 turns on, and press the [RELSE] and [Z.RTN] keys. ➔ - See the attached sheet. Refer to 9.2.4.
1327(conv.) 6327(NC)	4	2	NO MEM (XY THRM COMP)	There is no memory area for automatic X and Y axes thermal diplacement compensation deta.	Refer to 9.1.24.
1328(conv.) 6328(NC)	4	2	NO AUTO THERM COMP (X)	Although X axis automatic thermal displacement compensation is not provided, X axis automatic thermal displacement compensation was attempted.	Edit the program.
1329(conv.) 6284(NC)	4	2	NO AUTO THERM COMP (Y)	Although Y axis automatic thermal displacement compensation is not provided, Y axis automatic thermal displacement compensation was attempted.	Edit the program.

When alarm No. 1324(6324) ~ 1326 (6326)"ORIGIN LS OFF (*)" occurs

This alarm occurs when the **[RELSE]** and **[Z.RTN]** keys are pressed when the zero position limit switch is not on. Thus, follow the steps below to move the axis using jog operation to the position where the zero position limit switch turns on.

1. Press the **[RST]** key to reset the alarm.
2. Select the desired additional axis on the <MANU COND> screen or the <POS> screen.
   axis No. 4: **[F0]** key
   axis No. 5: **[F1]** key
   axis No. 6: **[F2]** key
3. Press the **[I/O]** key and the <I/O> screen appears.
   Select **[1]** and press the **[ENT]** key.
4. Press the **[PAGE DOWN]** key to display the screen below.

```
MAIN3                                   INPUT/OUTPUT

●ORGIN LS STATE

    ■X    AXIS        OFF
    ■Y    AXIS        OFF
    ■Z    AXIS        OFF
    ■C    AXIS        OFF
    ■B1   AXIS        OFF
    ■B2   AXIS        OFF

    I/O
    MENU
    F0    F1    F2    F3    F4
```

5. While observing the screen, move the additional axis by pressing the **[+4]** or **[-4]** key to move in the direction that the cables connected to the additional axis are not entangled. When the manual pulse generator is provided, use it.
6. Release your finger from the key when the zero position limit switch of the additional axis being operated turns on.
   When the axis has stopped at its stroke end, you can move the axis to a position out beyond the stroke limit by pressing the **[+4]** or **[-4]** key while holding down the **[RELSE]**key.
7. Press the **[RELSE]** and **[Z.RTN]** keys.

NO.	STOP LEVEL	RESET LEVEL	ERROR MASSAGE	CAUSE	SOLUTION
1850(conv) 6850(NC)	3	2	MARK NOT FOUND	Delimiter of data in program is lost.	Delete the program and reedit it after pressing [RST] key.
1851(conv) 6851(NC)	3	2	PRESS RESET KEY	Important parameter is modified.	Press [RST] key.
1852(conv) 6852(NC)	3	2	EXTERNAL ERROR 10	Exer 10 signal comes on.	Turn off the exer 10 and push [RST] key.
1853(conv) 6853(NC)	3	2	EXTERNAL ERROR 11	Exer 11 signal comes on.	Turn off the exer 11 and push [RST] key.
1854(conv) 6854(NC)	3	2	EXTERNAL ERROR 12	Exer 12 signal comes on.	Turn off the exer 12 and push [RST] key.
1855(conv) 6855(NC)	3	2	EXTERNAL ERROR 13	Exer 13 signal comes on.	Turn off the exer 13 and push [RST] key.
1856(conv) 6856(NC)	3	2	EXTERNAL ERROR 14	Exer 14 signal comes on.	Turn off the exer 14 and push [RST] key.
1857(conv) 6857(NC)	3	2	EXTERNAL ERROR 15	Exer 15 signal comes on.	Turn off the exer 15 and push [RST] key.
1858(conv) 6858(NC)	3	2	EXTERNAL ERROR 16	Exer 16 signal comes on.	Turn off the exer 16 and push [RST] key.
1859(conv) 6859(NC)	3	2	EXTERNAL ERROR 17	Exer 17 signal comes on.	Turn off the exer 17 and push [RST] key.
1860(conv) 6860(NC)	3	2	EXTERNAL ERROR 18	Exer 18 signal comes on.	Turn off the exer 18 and push [RST] key.
1861(conv) 6861(NC)	3	2	EXTERNAL ERROR 19	Exer 19 signal comes on.	Turn off the exer 19 and push [RST] key.
1862(conv) 6862(NC)	3	2	EXTERNAL ERROR 20	Exer 20 signal comes on.	Turn off the exer 20 and push [RST] key.
1863(conv) 6863(NC)	3	2	EXTERNAL ERROR 21	Exer 21 signal comes on.	Turn off the exer 21 and push [RST] key.
1864(conv) 6864(NC)	3	2	EXTERNAL ERROR 22	Exer 22 signal comes on.	Turn off the exer 22 and push [RST] key.
1865(conv) 6865(NC)	3	2	EXTERNAL ERROR 23	Exer 23 signal comes on.	Turn off the exer 23 and push [RST] key.
1866(conv) 6866(NC)	3	2	EXTERNAL ERROR 24	Exer 24 signal comes on.	Turn off the exer 24 and push [RST] key.

NO.	STOP LEVEL	RESET LEVEL	ERROR MASSAGE	CAUSE	SOLUTION
1867(conv) 6867(NC)	3	2	EXTERNAL ERROR 25	Exer 25 signal comes on.	Turn off the exer 25 and push [RST] key.
1868(conv) 6868(NC)	3	2	CHG TOOL DG WK	Data on used tools are modified during operation.	Press [RST] key and restart operation.
1869(conv) 6869 (NC)	3	2	CHECK MAGAZINE TOOL.	Resetting ATC arm was attempted by pressing the [relse] and [ATC] keys.	Check the magazine tool and press the [RST] key.
1870(conv) 6870(NC)	3	2	SPINDLE RPM ERROR	The S command is not given during the spindle rotation, or the commanded value exceeds the allowable range.	Press the [RST] key and check the program.
1871(conv) 6871(NC)	3	2	USER PARA ER (Z MESR)	Setting of user parameters 6 (Z measurement) is faulty.	Check the setting of user parameters 6(Z measurement).
1872(conv) 6872(NC)	3	2	H PRE COOLANT ERR 2	Cause 1) The filter is clogged. 2) The coolant in the clean tank has fallen below the minimum required level.	1) Replace the filter. 2) Check the coolant level of the 200 L tank and replenish coolant if necessary.

NO.	STOP LEVEL	RESET LEVEL	ERROR MESSAGE	CAUSE	SOLUTION
2101(conv) 7101(NC)	2	2	RECV(*)	Received the program indicated in brackets ( ) from the external device.	Press the [RST] key.
2102(conv)7102(NC)	2	2	RECV(*)	Received the data indicated in brackets ( ) from the external device.	Press the [RST] key.
2104(conv) 7104(NC)	2	2	EXTERNAL ERROR 10	Exer 10 signal comes on.	Turn off the exer 10 and press the [RST] key.
2105(conv) 7105(NC)	2	2	EXTERNAL ERROR 11	Exer 11 signal comes on.	Turn off the exer 11 and press the [RST] key.
2106(conv) 7106(NC)	2	2	EXTERNAL ERROR 12	Exer 12 signal comes on.	Turn off the exer 12 and press the [RST] key.
2107(conv) 7107(NC)	2	2	EXTERNAL ERROR 13	Exer 13 signal comes on.	Turn off the exer 13 and press the [RST] key.
2108(conv) 7108(NC)	2	2	EXTERNAL ERROR 14	Exer 14 signal comes on.	Turn off the exer 14 and press the [RST] key.
2109(conv) 7109(NC)	2	2	EXTERNAL ERROR 15	Exer 15 signal comes on.	Turn off the exer 15 and press the [RST] key.
2110(conv) 7110(NC)	2	2	EXTERNAL ERROR 16	Exer 16 signal comes on.	Turn off the exer 16 and press the [RST] key.
2111(conv) 7111(NC)	2	2	EXTERNAL ERROR 17	Exer 17 signal comes on.	Turn off the exer 17 and press the [RST] key.
2112(conv) 7112(NC)	2	2	EXTERNAL ERROR 18	Exer 18 signal comes on.	Turn off the exer 18 and press the [RST] key.
2113(conv) 7113(NC)	2	2	EXTERNAL ERROR 19	Exer 19 signal comes on.	Turn off the exer 19 and press the [RST] key.
2114(conv) 7114(NC)	2	2	EXTERNAL ERROR 20	Exer 20 signal comes on.	Turn off the exer 20 and press the [RST] key.
2115(conv) 7115(NC)	2	2	EXTERNAL ERROR 21	Exer 21 signal comes on.	Turn off the exer 21 and press the [RST] key.
2116(conv) 7116(NC)	2	2	EXTERNAL ERROR 22	Exer 22 signal comes on.	Turn off the exer 22 and press the [RST] key.
2117(conv) 7117(NC)	2	2	EXTERNAL ERROR 23	Exer 23 signal comes on.	Turn off the exer 23 and press the [RST] key.

NO.	STOP LEVEL	RESET LEVEL	ERROR MASSAGE	CAUSE	SOLUTION
2118(conv) 7118(NC)	2	2	EXTERNAL ERROR 24	Exer 24 signal comes on.	Turn off the exer 24 and press the [RST] key.
2119(conv) 7119(NC)	2	2	EXTERNAL ERROR 25	Exer 25 signal comes on.	Turn off the exer 25 and press the [RST] key.
2120(conv) 7120(NC)	2	2	MNR FAILURE RLY ON	An error has occurred in the SEQ unit connected to NC board connector seq.	Refer to the instruction manual of the connected SEQ unit eliminate the cause and turn on power again.
2121(conv) 7121(NC)	2	2	PRESS. HIGH (AUTO OIL)	The pressure sensor was not off when oil supply was attmepted.	Press the [RST]key. Refer to 9.1.25.
2122(conv) 7122(NC)	2	2	PRESS. LOW (AUTO OIL)	The pressure sensor did not turn on witin the time set for [AUTOMATIC OILING MONITORING TIME] in the machine parameter (system1) after the oiling pump was turned on.	Press the [RST]key. Refer to 9.1.26.
2123(conv) 7123(NC)	2	2	LEVEL DROP (AUTO OIL)	Insufficient oil input signal was turned on.	Supply oil.
2400(conv) 7400(NC)	1	2	MEMORY OVERFLOW	Areas for directories and data are insufficient.	If you are editing, reduce the current program capacity before storing it or delete other programs to create greater free memory area and edit the program again.
2401(conv) 7401(NC)	1	2	M/C PARA NOT DELETED	When formatting or deleting all data banks, [PARAMETER CHANGE] was set to [NO].	When deleting machine parameters, set [PARAMETER CHANGE] to [YES] on the [I/O] screen.
2402(conv) 7402(NC)	1	2	* SERVO MOTOR OFF	The outer door was opened while the door interlock was valid for the CE specification machine. (*-axis (4 axis) servomotor power was turned off.)	Turn off power and refer to 13.6 . Resetting ATC.

NO.	STOP LEVEL	RESET LEVEL	ERROR MESSAGE	CAUSE	SOLUTION
2404(conv) 7404(NC)	1	2	* SERVO MOTOR OFF	The outer door was opened while the door interlock was valid for the CE specification machine. (*-axis (6 axis) servomotor power was turned off.)	Turn off power and refer to 13.6. Resetting ATC.
2500(conv) 7500(NC)	1	1	MEMORY RUNNING	An attempet is made to start the MDI operation during the halt of memory operation. The magazine tool data was attempted to be set during memory operation. Copying, detection, formatting, or changing data number was attemped on the <MEMORY> screen during memory operation. Editing data bank was attemped during memory operation.	Execute the MDI operation after the memory operation is finished. Complete memory operation and then set the data. Complete memory operation and then perform the desired operation.
2501(conv) 7501(NC)	1	1	IN MDI OPERATION	An attempt is made to start the memory operation during the halt of MDI operation. The magazine tool data was attempted to be set during MDI operation. Editing data bank was attempted during MDI operation.	Execute the memory operation after the MDI operation is finished. Complete MDI operation and then set the data. Complete MDI operation and then edit the data bank.
2502(conv) 7502(NC)	1	1	HANDLE MODE	Manual mode operation is performed during manual pulse generator mode.	Set to OFF axis selector switch of manual pulse generator.
2503(conv) 7503(NC)	1	1	COUNTER1 END NOTICE	The workpiece counter has attained the end notice number.	

NO.	STOP LEVEL	RESET LEVEL	ERROR MESSAGE	CAUSE	SOLUTION
2504(conv) 7504(NC)	1	1	COUNTER2 END NOTICE	The workpiece counter has attained the end notice number.	
2505(conv) 7505(NC)	1	1	COUNTER3 END NOTICE	The workpiece counter has attained the end notice number.	
2506(conv) 7506(NC)	1	1	COUNTER4 END NOTICE	The workpiece counter has attained the end notice number.	
2507(conv) 7507(NC)	1	1	NOT CLOSING DOOR	Attempt of runnung the machine while the door is open and the interlock unit is ON.	Close the door or set the interlock unit to OFF.
2508(conv) 7508(NC)	1	1	IN AUTO ALIGNMENT	The mode is changed during center aliginment.	Finish the center alignment operation.
2509(conv) 7509(NC)	1	1	RELEASE MACHINE LOCK	An attempt is made to execute the center alignment in the machine lock.	Turn OFF the respective lock status before executing the center alignment.
2510(conv) 7510(NC)	1	1	ZERO RTN COMMAND ERR	An attempt is made to return to M.Z. point during the machine lock.	Release the machine lock before executing the zero point return.
2511(conv) 7511(NC)	1	1	DR OPEN SPNDL STOP	The door was opened during spindle rotation (the door interlock is effective).	Close the door and restart the operation. The spindle starts rotating from the position when the operation was stopped.
2512(conv) 7512(NC)	1	1	TOO SMALL TM CONST	Tap time constant set by M code was smaller than the minimum tap time constant operable for tap rotation.	Set the time constant by M code appropriately for tap rotation.
2513(conv) 7513(NC)	1	1	PALLET POS ERROR	A memory operation is commanded while the pallet is not indexed.	Change to the manual mode and index pallet with [C INDEX] key.
2514(conv) 7514(NC)	1	1	INNER DOOR OPEN	The inner door is opened in the operation.	Close the inner door and push [CAN] key.
2515(conv) 7515(NC)	1	1	OUTER DOOR OPEN	The C axis is going to rotate while the safety switch is ON and the outer door is open. Or machine is going to be operated while the pallet is not indexed.	Close the outer door, or turn off the safety switch.

NO.	STOP LEVEL	RESET LEVEL	ERROR MESSAGE	CAUSE	SOLUTION
2516(conv) 7516(NC)	1	1	PRESSPALLET START	The inner pallet is going to carry out before take off the outer pallet work.	Take off the outer pallet work and press [PALLET START] key.
2517(conv) 7517(NC)	1	1	DIFFER FROM PLT PRG	The program different from the one set to user parameter (quick table) was selected in memory operation mode.	Check the pallet program number set to user parameter (quick table).
2518(conv) 7518(NC)	1	1	STROKE OVER (C)	When the pallet beyond its stroke, the [z. rtn] or [p. idx] key was pressed.	Press the [+c] or [-c] key to move the C-axis between -180.000 degrees and 0.000 degrees, and retry operation.
2519(conv) 7519(NC)	1	1	SPARE TOOL USING	Life of tool used in machining is over.	
2520(conv) 7520(NC)	1	1	MEASUREMENT ON	Switching the mode was attempted during zero position measurement.	Complete zero position measurement.
2521(conv) 7521(NC)	1	1	M406 IS ON	M406 signal was on when memory operation was executed.	Output m407 signal in MDI operation mode (block operation) to turn m406 signal off.
2522(conv) 7522(NC)	1	1	TL LF EXPIRING(*)	Tool life has reached the preset value. The figure in brackets ( ) indicates the tool number.	
2523(conv) 7523(NC)	1	1	INPUT DATA ERROR	Data beyond the specified range is set.	Set the data within the specified range.
2524(conv) 7524(NC)	1	1	ZERO RTN NOT DONE	An attempt is made to start operation or automatic setting without executing M.Z. return.	Execute the zero point return.
2525(conv) 7525(NC)	1	1	PROGRAM NO.ERROR	An attempt is made to set the program No. which is not allowed.	Set the program No. correctly.
2526(conv) 7526(NC)	1	1	NO COPY SOURCE DATA	The program or data bank to be copied does not exist.	Check the program no. or data bank no.
2527(conv) 7527(NC)	1	1	DST DATA ALRDY EXST	A program or data bank with an identical no. to those to be copied already exists.	Copy to a different no. or delete the existing program or the data bank.
2528(conv) 7528(NC)	1	1	PROGRAM PROTECT	An attempt is made to modify the data while the PROTECT SW is ON.	Set the PROTECT switch to OFF, and modify the data.

NO.	STOP LEVEL	RESET LEVEL	ERROR MESSAGE	CAUSE	SOLUTION
2529(conv) 7529(NC)	1	1	CHARACTER NO.OVER	Number of characters exceeds 128.	Reduce a number of characters.
2530(conv) 7530(NC)	1	1	PRGRM IN EXECUTION	An attempt is made to edit or delete the file concerning the program in operation.	Execute it after finishing the operation.
2531(conv) 7531(NC)	1	1	SELECT AXIS	The additional axis select switch was not set after power was turned on.	Set the switch correctly.
2532(conv) 7532(NC)	1	1	COMMUNICATING	When the program or data is to be modified, the same data is in communication.	Execute it after finishing the communication.
2533(conv)75 33(NC)	1	1	REQD DATA NOT FOUND	There is no specified program or data.	Check the program No. or data No.
2534(conv) 7534(NC)	1	1	OPERATING COMMU DATA	The data desired for communication is currently being used.	Stop operation and start communication.
2535(conv) 7535(NC)	1	1	EDITING COMMUNI DATA	The data desired for communication is currently being edited.	Complete editing and start communication.
2536(conv) 7536(NC)	1	1	COMMUNI PARAM ERROR	[7 bit] is set to [character] and era is set to [trans data code] for communication parameter.	Check the parameter.
2537(conv) 7537(NC)	1	1	DR SIGNAL OFF	DR signal was turned off during communication. (Only when DR SIGNAL CHECK in parameter 4 is effecive.)	Check the parameter.
2538(conv) 7538(NC)	1	1	CS SIGNAL OFF	CS signal was off during output of DC1 and DC3 codes.	Check the parameter.
2539(conv) 7539(NC)	1	1	RC BUFFER OVERFLOW	Receiving buffer has over flown (256 bytes).	Check the parameter.
2540(conv) 7540(NC)	1	1	PARITY ERROR(COM)	PARITY error has occurred during data entry.	Check the parameter.
2541(conv) 7541(NC)	1	1	OVERRUN ERROR(COM)	Overrun error (data skip) has occurred during data entry.	Check the parameter.

NO.	STOP LEVEL	RESET LEVEL	ERROR MESSAGE	CAUSE	SOLUTION
2542(conv) 7542(NC)	1	1	FRAMING ERROR(COM)	Framing error (stop bit was not detected) occurred during data entry.	Check the parameter.
2543(conv) 7543(NC)	1	1	TIMEOVER (COM)	Data could not be received or transmitted during the time preset to RESPONSE MONITORING TIME of the parameter.	Check the parameter and the data.
2544(conv) 7544(NC)	1	1	FORMAT ERROR(COM)	The header, data portion, or footer cannot be recognized.	Check the communication parameter or data.
2545(conv) 7545(NC)	1	1	LOAD HEADER ERROR	The format of the received header is not correct.	Check the format.
2546(conv) 7546(NC)	1	1	LOAD DATA NAME ERROR	The data name of the received header is not correct.	Check the data name.
2547(conv) 7547(NC)	1	1	RCV RSPONCE HEAD ERR	The received response header is not correct for the command requested through communication.	Check the response header.
2548(conv) 7548(NC)	1	1	LOAD RESPNCE ERR END	The response of error end was received for the command that has been sent.	Check any cause originating in the connected communication equipment.
2549(conv) 7549(NC)	1	1	CHECK ERROR	The contents of the machine data differ from those of input data.	
2550(conv) 7550(NC)	1	1	IGNORE LOAD (SYMBOL)	Invalid symbol was detected in the received data, thus the corresponding record was ignored.	Check the symbol in the data.
2551(conv) 7551(NC)	1	1	IGNORE LOAD (ASCEND)	The symbol in the received data is not in chronological order, thus the corresponding record was ignored.	Check the order of symbols in the data.
2552(conv) 7552(NC)	1	1	CONV.LOAD (ITEM QTY)	The number of items in one record of the received data is not correct. Excessive items are ignored. Nothing is set for missing items.	Check the record format.

NO.	STOP LEVEL	RESET LEVEL	ERROR MESSAGE	CAUSE	SOLUTION
2553(conv) 7553(NC)	1	1	CONV.LOAD (ITM RANGE)	The range of the item of the received data is not correct, thus changed. Nothing is set for the changed portion.	Check the value of each item.
2554(conv) 7554(NC)	1	1	COMMUNI DATA EDIT ER	Edit error has occurred during processing of communication data.	
2555(conv) 7555(NC)	1	1	SAVE DATA ERROR	The saved data format is not correct.	Edit the corresponding data again.
2556(conv) 7556(NC)	1	1	EXCESSIVE LOAD DIR.	The number of loaded directories has exceeded 256.	The number of directories to be loaded should be up to a maximum of 256.
2557(conv) 7557(NC)	1	1	COMMUNI TV CHECK ERR	The number of data in one block is incorrect.	Check the communication protocol.
2558(conv) 7558(NC)	1	1	RECEIVD DATA INVALID	The data that cannot be converted was received.	Check the communication protocol.
2560(conv) 7560(NC)	1	1	OVERWRITE PROTECT	Overwriting is prohibited for communication with slave station.	Check the communication parameter.
2561(conv) 7561(NC)	1	1	SEND(*)	The program indicated in brackets ( ) was sent to an external device.	
2562(conv) 7562(NC)	1	1	SEND(*)	The data indicated in brackets ( ) was sent to an external device.	
2564(conv) 7564(NC)	1	1	RECV(*)	The program indicated in brackets ( ) was received from an external device.	
2565(conv) 7565(NC)	1	1	RECV(*)	The data indicated in brackets ( ) was received from an external device.	
2566(conv) 7566(NC)	1	1	COMMUNI CHECKSUM ERR	The checksum of receiving response is not correct.	Set the checksum value correctly or set the checksum of user parameter (Communication) to[0:INVALID].

NO.	STOP LEVEL	RESET LEVEL	ERROR MESSAGE	CAUSE	SOLUTION
2567(conv) 7567(NC)	1	1	EXTERNAL ERROR 8	Error signal was input from the external PLC.	Check the conditions that external PLC alarm occur eliminate the cause.
2568(conv) 7568(NC)	1	1	EXTERNAL ERROR 9	Error signal was input from the external PLC.	Check the conditions that external PLC alarm occur eliminate the cause.
2569(conv) 7569(NC)	1	1	EXTERNAL ERROR 10	EXER10 signal comes on.	Turn off the exer 10 and push [RST] key.

NO.	STOP LEVEL	RESET LEVEL	ERROR MASSAGE	CAUSE	SOLUTION
2570(conv) 7570(NC)	1	1	EXTERNAL ERROR 11	EXER11 signal comes on.	Turn off the EXER11 and push [RST] key.
2571(conv) 7571(NC)	1	1	EXTERNAL ERROR 12	EXER12 signal comes on.	Turn off the EXER12 and push [RST] key.
2572(conv) 7572(NC)	1	1	EXTERNAL ERROR 13	EXER13 signal comes on.	Turn off the EXER13 and push [RST] key.
2573(conv) 7573(NC)	1	1	EXTERNAL ERROR 14	EXER14 signal comes on.	Turn off the EXER14 and push [RST] key.
2574(conv) 7574(NC)	1	1	EXTERNAL ERROR 15	EXER15 signal comes on.	Turn off the EXER15 and push [RST] key.
2575(conv) 7575(NC)	1	1	EXTERNAL ERROR 16	EXER16 signal comes on.	Turn off the EXER16 and push [RST] key.
2576(conv) 7576(NC)	1	1	EXTERNAL ERROR 17	EXER17 signal comes on.	Turn off the EXER17 and push [RST] key.
2577(conv) 7577(NC)	1	1	EXTERNAL ERROR 18	EXER18 signal comes on.	Turn off the EXER18 and push [RST] key.
2578(conv) 7578(NC)	1	1	EXTERNAL ERROR 19	EXER19 signal comes on.	Turn off the EXER19 and push [RST] key.
2579(conv) 7579(NC)	1	1	EXTERNAL ERROR 20	EXER20 signal comes on.	Turn off the EXER20 and push [RST] key.
2580(conv) 7580(NC)	1	1	EXTERNAL ERROR 21	EXER21 signal comes on.	Turn off the EXER21 and push [RST] key.
2581(conv) 7581(NC)	1	1	EXTERNAL ERROR 22	EXER22 signal comes on.	Turn off the EXER22 and push [RST] key.
2582(conv) 7582(NC)	1	1	EXTERNAL ERROR 23	EXER23 signal comes on.	Turn off the EXER23 and push [RST] key.
2583(conv) 7583(NC)	1	1	EXTERNAL ERROR 24	EXER24 signal comes on.	Turn off the EXER24 and push [RST] key.
2584(conv) 7584(NC)	1	1	EXTERNAL ERROR 25	EXER25 signal comes on.	Turn off the EXER25 and push [RST] key.

NO.	STOP LEVEL	RESET LEVEL	ERROR MESSAGE	CAUSE	SOLUTION
2586(conv)7586(NC)	1	1	EDITING AREA OVER	Editing contents have exceeded the editing capacity (64 Kbytes).	The memory area cannot be increased during editing, thus divide the program. When this error occurs when starting editing, this means the program is too large to edit.
2587(conv) 7587(NC)	1	1	SP LOCK SIGNAL ON	The spindle lock signal is on.	Turn it off.
2588(conv) 7588(NC)	1	1	ATC LOCK SIGNAL ON	The ATC lock signal is on.	Turn it off.
2589(conv) 7589(NC)	1	1	XY LOCK SIGNAL ON	The XY-axis lock signal is on.	Turn it off.
2590(conv) 7590(NC)	1	1	Z LOCK SIGNAL ON	The Z-axis lock signal is on.	Turn it off.
2591(conv) 7591(NC)	1	1	* LOCK SIGNAL ON	The axis 4 lock signal is on.	Turn it off.
2592(conv) 7592(NC)	1	1	* LOCK SIGNAL ON	The axis 5 lock signal is on.	Turn it off.
2593(conv) 7593(NC)	1	1	* LOCK SIGNAL ON	The axis 6 lock signal is on.	Turn it off.
2594(conv) 7594(NC)	1	1	SPINDLE OVERRIDE ON	The spindle override is set to the value other than 100%.	Set the spindle override to 100%.
2595(conv) 7595(NC)	1	1	CUT FEED OVERRIDE ON	Cutting feed override is set to a value other than 100%.	Set the cutting feed override to 100%.
2596(conv) 7596(NC)	1	1	RPD TRVS OVERRIDE ON	Rapid feed override is set to a value other than 100%.	Set the rapid feed override to 100%.
2597(conv) 7597(NC)	1	1	MODE CHANGE PROHIBIT	Mode changeover prohibition signal is on.	Turn the signal off.
2598(conv) 7598(NC)	1	1	DOOR LOCKED	The door OPEN/CLOSE switch was pressed while the door was locked.	
2599(conv) 7599(NC)	1	1	AREA SNSR OBSTRUCTED	The beam of the area sensor was obstructed while the door was opening or closing.	

NO.	STOP LEVEL	RESET LEVEL	ERROR MESSAGE	CAUSE	SOLUTION
2600(conv) 7600(NC)	1	1	TOOL ALRDY REGISTRD	The tool attempted to be set to [magazine tool] is already set for another pot.	Delete the current tool and set a new one.
2601(conv) 7601(NC)	1	1	NO TOOL IN MAGAZINE	The tool necessary for operation is not set in the magazine.	Set the correct tool on the <magazine tool> screen.
2602(conv) 7602(NC)	1	1	EDITING	Deleting and copying the data bank or changing the data bank number was attempted on the <directory of memory> screen during data bank editing.	Complete the data bank currently being edited.
2603(conv) 7603(NC)	1	1	INCORRECT TOOL TYPE	Replacement with a tool of incorrect type was attempted in manual operation mode.	
2604(conv) 7604(NC)	1	1	PROHIBITED POT	1) Setting other than “attachment of cap” was attempted for a prohibited pot on the <magazine tool> screen. 2) The tool was attempted to be changed with a prohibited pot.	1) Only “attachment of cap” can be set for a prohibited pot.
2605(conv) 7605(NC)	1	1	CAPPED	The tool was attempted to be replaced with a pot with the cap specified.	
2606(conv) 7606(NC)	1	1	EXCESSIVE TOOLS	Setting more than 30 tools per tool group was attempted.	
2607(conv) 7607(NC)	1	1	TOOL SET TONEXT POT	Although a tool is set in the adjacent pot, a large tool was attempted to be set.	Delete the tool set to the adjacent pot or set the large tool in another location.
2608(conv) 7608(NC)	1	1	DELETE POS ERROR	Deletion was attempted at an incorrect position.	Move the cursor to the correct position.
2609(conv) 7609(NC)	1	1	NO MEASURING DATA	Automatic Setting (parameter) was attempted although the measurement data does no exist.	Perform measurement using automatic centering function.

NO.	STOP LEVEL	RESET LEVEL	ERROR MESSAGE	CAUSE	SOLUTION
2611(conv) 7611(NC)	1	1	TOOL LEN SETTING ON	1) Changing mode was attempted during automatic tool length measurement. 2) The [m. lck] key was pressed.	Complete automatic tool length measurement.
2612(conv) 7612(NC)	1	1	OPERATING MANUALLY	Start data was attempted to be set during jog movement in ATC maintenance mode.	Stop jog movement and set the data.
2615(conv) 7615(NC)	1	1	NO OPTION (4)	Although an optional axis 4 is not provided, axis 4 operation was attempted to be performed.	Purchase an optional axis 4. When already provided, set [4 option] to [1: yes].
2616(conv) 7616(NC)	1	1	NO OPTION (5)	Although an optional axis 5 is not provided, axis 5 operation was attempted to be performed.	Purchase an optional axis 5. When already provided, set [5 option] to [1: yes].
2617(conv) 7617(NC)	1	1	NO OPTION (6)	Although an optional axis 6 is not provided, axis 6 operation was attempted to be performed.	Purchase an optional axis 6. When already provided, set [6 option] to [1: yes].
2618(conv) 7618(NC)	1	1	KEY OPE PROHIBITED	Key entry cannot be accepted because key operation prohibition signal is on.	Turn the signal off and then perform key entry.
2619(conv) 7619(NC)	1	1	PRGM EDIT PROHIBITED	Changing data was attempted while the program edit signal was on.	Turn the signal off and then change the data.
2620(conv) 7620(NC)	1	1	EDIT PROHIBITED	Changing data was attempted while the edit prohibition signal was on.	Turn the signal off and then change the data.
2621(conv) 7621(NC)	1	1	USER PARAM ERR (COM)	Setting of user parameter 3 (communication) is incorrect.	Check the setting.
2622(conv) 7622(NC)	1	1	SIDE DOOR OPEN	The machine was attempted to be operated while the side door was open.	Close the door and then operate the machine.
2623(conv) 7623(NC)	1	1	DATA ERR (DATA BANK)	Data structure of the non-selected data banks is damaged.	Delete the damaged data on the <directory of memory> screen in edit mode, and create new data.
2624(conv) 7624(NC)	1	1	SET POS ERROR	Setting data was attempted for a location where data cannot be set.	Set the data in other locations.

NO.	STOP LEVEL	RESET LEVEL	ERROR MASSAGE	CAUSE	SOLUTION
2625(conv) 7625(NC)	1	1	RCV COM ER END(***)	The command received communication with the TC slave resulted in an error.	Check the cause and send the command again.
2626(conv) 7626(NC)	1	1	COMMUNICATION I/F ER	An errror occured in the interface with communication device.	Refer to 9.1.21.
2627(conv) 7627(NC)	1	1	COMMUNI VER.CHECK ER	The version of the data attempted to be transmitted differs from that of system data version.	Edit the data again.
2628(conv) 7628(NC)	1	1	COMMU COMD END(***)	Coomunication command indicated in brackets()was ended.	
2629(conv) 7629(NC)	1	1	DELETE(***)	The data indicated in brackets ()was deleted during communication.	
2630(conv) 7630(NC)	1	1	DELETE(***)	The data indicated in brackets ()was deleted during communication.	
2634(conv) 7634(NC)	1	1	M PARAM CHNG DISABLE	Although input of machine parameter was attempted through communication, [parameter change] was set to [no].	When inputting the machining parameter, select [1. input/output] on the <I/O> screen, and set [parameter change] to [yes].
2635(conv) 7635(NC)	1	1	POT NOT FULLY RAISED	The pot is not at the upper end.	Press the [ATC] key to move the pot to the upper end.
2636(conv) 7636(NC)	1	1	DURING ATC	Changing to another mode was attempted during tool change.	The mode can not be changed during tool change.
2637(conv) 7637(NC)	1.	1	NO A/T THRM DISP COM	The compensation data screen was attempted to be opened although the automatic thermal displacement compensation function is not provided.	
2996(conv) 7996(NC)	5	3	KERNEL ERROR (MAIN)	An error has occurred in the main CPU operating system.	Refer to 9.1.22.
2998(conv) 7998(NC)	5	3	KERNEL ERROR(LOCAL)	An error has occurred in the slave CPU operating system.	Refer to 9.1.22.

NO.	STOP LEVEL	RESET LEVEL	ERROR MESSAGE	CAUSE	SOLUTION
3200(conv)	4	2	PARITY ERR(TOOL)	Each data structure is destroyed.	Press the [RST] key. Select [6. DIRECTORY OF MEMORY MENU] and then [3. DATA BANK] in the EDIT mode to delete the damaged data, and then create new data again.
3201(conv)	4	2	PARITY ERR(PTRN)		Press the [RST] key. Select [6. DIRECTORY OF MEMORY MENU] and then [3. DATA BANK] in the EDIT mode to delete the damaged data, and then create new data again.
3202(conv)	4	2	PARITY ERR(HOLE)		Press the [RST] key. Select [6. DIRECTORY OF MEMORY MENU] and then [3. DATA BANK] in the EDIT mode to delete the damaged data, and then create new data again.
3203(conv)	4	2	PARITY ERR(CUTC)		Press the [RST] key. Select [6. DIRECTORY OF MEMORY MENU] and then [3. DATA BANK] in the EDIT mode to delete the damaged data, and then create new data again.
3204(conv)	4	2	DATA ERR(TOOL)	Each data structure is destroyed.	Press the [RST] key. Select [6. DIRECTORY OF MEMORY MENU] and then [3. DATA BANK] in the EDIT mode to delete the damaged data, and then create new data again.

NO.	STOP LEVEL	RESET LEVEL	ERROR MESSAGE	CAUSE	SOLUTION
3205(conv)	4	2	DATA ERR(PTRN)		Press the [RST] key. Select [6. DIRECTORY OF MEMORY MENU] and then [3. DATA BANK] in the EDIT mode to delete the damaged data, and then create new data again.
3206(conv)	4	2	DATA ERR(HOLE)		Press the [RST] key. Select [6. DIRECTORY OF MEMORY MENU] and then [3. DATA BANK] in the EDIT mode to delete the damaged data, and then create new data again.
3207(conv)	4	2	DATA ERR(CUTC)		Press the [RST] key. Select [6. DIRECTORY OF MEMORY MENU] and then [3. DATA BANK] in the EDIT mode to delete the damaged data, and then create new data again.
3208(conv)	4	2	IMPROPER DATA TYPE	Program of different type is to be started.	Check the program.
3209(conv)	4	2	POS CALCUL IMPSBL	The command value exceeded +/-9999.999.	Check the program.
3210(conv)	4	2	NO TOOL IN SPINDLE	Tool break checking (signal output m120) was executed with no tool set on spindle.	Press the [RST] key. Insert the tool in the spindle and set the correct tool number on the <MAGAZ> screen.
3211(conv)	4	2	NO TOOL IN MENU	The tool to be used for machining is not included in the tool list.	Press the [RST] key and include the tool in the list.
3212(conv)	4	2	IMPROPER TOOL	The tool is not appropriate for machining or the tool list has been changed after the tool was assigned.	Press the [RST] key and assign the tool again.
3213(conv)	4	2	TOOL LNGTH NOT SET	Tool length is set to 0, or not set.	Set tool length after pressing the [RST] key.

NO.	STOP LEVEL	RESET LEVEL	ERROR MESSAGE	CAUSE	SOLUTION
3214(conv)	4	2	N.D. NOT SPECIFIED	Number of pattern divisions is specified as 0.	Set no. of divisions after pressing the [RST] key.
3215(conv)	4	2	N.M. NOT SPECIFIED	Machining number of patterns is specified as 0.	Set machining number after pressing the [RST] key.
3216(conv)	4	2	TOO MANY N.M.	Machining number of patterns is specified beyond the range (999).	Set machining number again after pressing the [RST] key.
3217(conv)	4	2	RPM NOT SPECIFIED	There is no peripheral speed set in cutting condition in memory operation, or it is set too small.	Set cutting conditions correctly after pressing the [RST] key.
3218(conv)	4	2	FDRATE NOT SPECFD	There is no feed rate set in cutting condition in memory operation, or it is set too small.	Set cutting conditions correctly after pressing the [RST] key.
3219(conv)	4	2	NO PECK DATA	Step data is set to 0 or no data in cutting condition in memory operation.	Set cutting conditions correctly after pressing the [RST] key.
3220(conv)	4	2	DRILL DIA NOT SET	Od of drill or small dia. of drill to be used is not set or set to 0.	After pressing the [RST] key, set od of drill in tool menu.
3221(conv)	4	2	NO PITCH DATA	Pitch data in tool menu is set to 0 or not set at all for tapping.	After pressing the [RST] key, set pitch data.
3222(conv)	4	2	TAP SIZE ERROR	Denominator of inch screw thread size is 0.	After pressing the [RST] key, set the nominal size of tap correctly.
3223(conv)	4	2	R OR L HAND ?	Data on torsion direction is not set in tool menu for tapping.	After pressing the [RST] key, set torsion direction.
3224(conv)	4	2	R.COMP ERROR	Motion of tool dia. offset start-up cancel is in circular arc command.	Set linear command for motion of start-up /cancel after pressing the [RST] key.
3225(conv)	4	2	TOO MANY LINES	Number of lines is set beyond the range (99). (cutting width is 0 or too small. or tool dia. is too small)	Press the[RST] key, and set cutting width and tool dia. correctly
3226(conv)	4	2	TOO MANY INFEEDS	Depth of cut is too small	Press the [RST] key and set depth of cut correctly.
3227(conv)	4	2	CORNER CALC IMPSBL	Calculation of corner r and c is not available in contouring or chamfering.	Modify corner r or c where error occurred after pressing the [RST] key.

NO.	STOP LEVEL	RESET LEVEL	ERROR MESSAGE	CAUSE	SOLUTION
3228(conv)	4	2	POCKET IMPOSSIBLE	Too dia. is larger in pocket machining as shown below: circle : dia. Square : shorter one of X or Y track : width or tool radius is larger than corner r of square pattern. (excl. corner r or 0)	Press the [RST] key and select a tool with dia. Smaller than pocket.
3229(conv)	4	2	CHAMFERING IMPSBL	Chamfer milling function comes first in pocketing.	Press the [RST] key and assign tools again so that chamfer milling function comes after milling function.
3230(conv)	4	2	ATC IMPOSSIBLE	Before/after cutting, there is a tool change code in auxiliary function or tool or auxiliary function of motion call process.	Press the [RST] key, and deleted tool change code.
3231(conv)	4	2	RPM OVER	Rotation commanded by MDI results in higher spindle speed than specified by machine parameter 1.	Press the [RST] key and set the correct data.
3232(conv)	4	2	FEEDRATE OVER	Cutting commanded by MDI results in higher feedrate than max. cutting speed or max. rapid feedrate specified by machine parameter 1.	Press the [RST] key and set the correct data.
3233(conv)	4	2	TOO LARGE R.COMP	During inner arc cutting in tool dia. Offset, programmed radius is smaller than dia. offset amount.	Press the[RST] key, and set programmed radius larger than tool dia. offset amount.
3234(conv)	4	2	NO ENTRY M.CODE	Unregistered m code is to be executed.	Press the[RST] key, and changed m code afterwards.
3235(conv)	4	2	ILLEGAL APPROACH	Cutter radius compensation is done on the center of line in rectangular or circular approach.	Press the[RST] key, and modify approaching method afterwards.
3236(conv)	4	2	ILLEGAL RELIEF	Cutter radius compensation is done on the center of line in rectangular or circular release.	Press the [RST] key, and modify release method afterwards.

NO.	STOP LEVEL	RESET LEVEL	ERROR MESSAGE	CAUSE	SOLUTION
3237(conv)	4	2	NO CUTTING LENGTH	Cutting length of the line of approach or release is not sufficient.	Press the[RST] key, and modify the program afterwards.
3238(conv)	4	2	AXIS NOT DESIGNTD	No axis is designated in the program.	Check the program.
3239(conv)	4	2	ILLEGAL AXIS	Axis is improperly designated in the program.	Check the program.
3240(conv)	4	2	R NOT DESIGNATED A	The A-axis radius is not specified in the program.	Check the program.
3241(conv)	4	2	R NOT DESIGNATED B	The B-axis radius is not specified in the program.	Check the program.
3242(conv)	4	2	A OUT OF COMMAND	During operation, A-axis operation has exceeded the range of 0 to 359.999.	Check the program.
3243(conv)	4	2	B OUT OF COMMAND	During operation, B-axis operation has exceeded the range of 0 to 359.999.	Check the program.
3244(conv)	4	2	NO NXT TOOL IN MGZ	Next tool is not set in the magazine.	Set next tool.
3245(conv)	4	2	NO ATC RTN HEIGHT	Return height for tool change is not set.	Set a return height.
3247(conv)	4	2	COORD. ROT. IMPOSS	X and Y positions cannot be calculated after coordinate rotation because the machining coordinate position of the X or Y-axis is not selected.	Correct the program and retry operation again. (set both the X and Y positions for XY movement within the first operation calling process.)
3248(conv)	4	2	NO REQUIRED DATA	Data disappeared for some reason during processing.	Refer to 9.3.8.
3253(conv)	4	2	CAN'T SET TOOL LEN	Protect switch was turned on as soon as tool length set was executed in automatic tool length measurement mode, or tool length set could not be executed for some reason.	More than one causative errors occur at the same time. Identify causes on alarm screen and remove.

NO.	STOP LEVEL	RESET LEVEL	ERROR MESSAGE	CAUSE	SOLUTION
3257(conv)	4	2	NO PROGRAM (A)	A-axis motion command is executed in a program without A-axis.	Change the program.
3258(conv)	4	2	NO PROGRAM (B)	B-axis motion command is executed in a program without B-axis.	Change the program.
3259(conv)	4	2	NOT MEASURED IN INC	Zero measurement was attempted in incremental mode.	Switch to absolute mode and perform zero measurement.
3260(conv)	4	2	NOT MEASURED IN COOD	Zero measurement was attempted in coordinate rotation mode.	Cancel coordinate rotation and perform zero measurement.
3261(conv)	4	2	NOT MEASURED IN COMP	Zero measurement was attempted in diameter offset mode.	Cancel diameter offset and perform zero measurement.
3262(conv)	4	2	EXTRNL PROGRM NO.ERR	The selected external program no. of the scheduled program is 5 digits or more.	Numbers that can be used for scheduled program are up to 4 digits.
3263(conv)	4	2	TL BRK DET POS ERR	The detecting motion is going to execute in the position lower than the return position.	Push [RST] key and check the user parameter1 'return position of tool breakage detection' or make lower the 'inprocess return ' or 'intercoordinate return ' value in the program.
3264(conv)	4	2	RELEASE MACHINE LOCK	Tool replacement with the pot number (M701 to 749)specified was attempted in memory operation with the machine locked.	Release machine lock.(The tool cannot be replaced with pot specified while machine is locked.)
3700(conv)	3	2	PROGRAM ERROR	Program directory is destroyed.	Delete the program and reedit it after pressing [RST] key.
4450(conv)	1	1	RPM NOT SPECIFED	RPM is not specified even after speed command is given in MDI operation.	Specify speed and give speed command.
4451(conv)	1	1	AXIS NOT DSGNTD	Axis data is not specified even after motion command is given in MDI operation.	specify-axis data and give motion command.

NO.	STOP LEVEL	RESET LEVEL	ERROR MESSAGE	CAUSE	SOLUTION
4452(conv)	1	1	ILLEGAL AXIS	Simultaneous cutting using 3 axes other than x, y, and z was attempted in MDI mode or simultaneous cutting using 4 axes or more was attempted.	Simultaneous cutting using 3 axes is impossible if any optional axis is included.
4453(conv)	1	1	XYAB DSGNTD IN TAP	Tapping command is given with X, Y,A or B axes data set in MDI operation.	X, Y,A or B axes data can not be specified in tapping command.
4454(conv)	1	1	Z NOT DSGN IN TAP	Tapping command is given with no z-axis data set in MDI operation.	Specify z-axis data.
4455(conv)	1	1	FDRATE NOT SPECFD	Cutting command is given with no feed rate set in MDI operation	Specify speed rate and give cutting command.
4456(conv)	1	1	FEED NOT SPECIFIED	Kind of feed is not specified in MDI operation.	Specify kind of feed.
4457(conv)	1	1	NO SCHEDULE PROGRAM	There is no schedule program available for operation.	Check schedule program number.
4458(conv)	1	1	NO SUBPROGRAM	Subprogram is not set in the program required for operation.	Set subprogram or deleted subprogram call process.
4459(conv)	1	1	NO.OF WKPCS ERROR	Workpiece number is not set.	Set workpiece number.
4460(conv)	1	1	TOOL ASGN NOT DONE	Tool assignment is not finished.	Assign tools.
4461(conv)	1	1	? CALC NOT DONE	Calculation of the unknown is not finished.	Check if line data is correctly set. assign tools afterwards.
4462(conv)	1	1	MACHINING ORD ERROR	Machining order other than 1-5 is set, or not set at all.	Set the machining order correctly.
4463(conv)	1	1	NO DIRECTION DATA	Operation is to be started without measuring direction set in automatic alignment.	Set measuring direction.
4464(conv)	1	1	DATA IMCOMPLETE	Data other than numerical values are set for the coordinate such as measuring start point, etc. when automatic aligning is started.	Set the data correctly again.

NO.	STOP LEVEL	RESET LEVEL	ERROR MESSAGE	CAUSE	SOLUTION
4465(conv)	1	1	ILLEGAL START SET	Operation is to be started by setting a start point in the coordinate setting process.	Check start point.
4466(conv)	1	1	NO TOOL IN SPINDLE	Spindle has no tool.	Set a proper tool in the spindle.
4467(conv)	1	1	R NOT DESIGNATED A	Radius is not designed in A-axis cutting.	Set radius.
4468(conv)	1	1	R NOT DESIGNATED B	Radius is not designed in B-axis cutting.	Set radius.
4469(conv)	1	1	A OUT OF COMMAND	A-axis angle is improperly specified.	Check the program.
4470(conv)	1	1	B OUT OF COMMAND	B-axis angle is improperly specified.	Check the program.
4472(conv)	1	1	NO PROGRAM	There is no program available for operation.	Check program number.
4473(conv)	1	1	TOO MANY DIGITS	Data of more than allow able digits are set.	Set the data within the range.
4474(conv)	1	1	MINUS SIGN ASSIGNED	Minus data is set while minus input is not allowed.	Set plus data.
4475(conv)	1	1	JOB IN POS ERROR	Copy is to be taken where it is not allowed.	Shift the cursor to the position where copy can be taken in. (position of process)
4476(conv)	1	1	PROG NO.NOT SPECFD	Program number is not specified.	Specify program number.
4477(conv)	1	1	NO SEARCH DATA	There is no data to be searched.	Check if there is the data to be searched.
4478(conv)	1	1	TOO MANY NO.OF JOBS	The one hundredth process is to be created.	Number of processes should not exceed 99.
4479(conv)	1	1	SUBPRG ALRDY DSGNTD	Attempt of preparing a subprogram already prepared.	Use another number or deleted the existing subprogram number.
4480(conv)	1	1	ALTER POSITION ERR	Data in unchangeable position is to be modified.	Shift the cursor to changeable position and modify the data.
4481(conv)	1	1	DELETE IMPOSSIBLE	Deletion is to be done during insertion.	Press [insert] key again and stop insertion, or deleted after insertion.

NO.	STOP LEVEL	RESET LEVEL	ERROR MESSAGE	CAUSE	SOLUTION
4482(conv)	1	1	INSRT POSITION ERR	Insertion is to be done where it is not possible.	Shift the cursor to the proper position for insertion.
4484(conv)	1	1	CURSOR MOVE IMPSBL	Cursor is to be shifted to order data than on insertion during insertion.	Shift the cursor to the proper position after insertion of all the data.
4485(conv)	1	1	JOB OUT POS ERROR	Copy is to be inserted where it is not possible.	Shift the cursor to the proper position for inserting copy.
4486(conv)	1	1	TOO MANY MOTIONS	The one hundredth motion is to be made in motion program editing.	Number of motions should be within 99.
4487(conv)	1	1	TOO MANY LINES	The one hundredth line is to be made in editing of contouring or chamfering process.	Number of lines should be within 99.
4488(conv)	1	1	WK ZERO SET POS ERR	Working zero position is to be set where it is not possible.	Move the cursor to x of working zero position and set zero position.
4490(conv)	1	1	SEARCH IMPOSSIBLE	Search is to be performed during insertion.	Press [insert] key again and stop insertion, or perform search after insertion.
4492(conv)	1	1	TOO MANY SCHDL PRG	Number of schedule programs is to be set beyond 99.	Number of programs should be within 99.
4493(conv)	1	1	JOB IN NOT DONE	Copy is to be taken in but it is not possible.	Take in the data to be copied.
4494(conv)	1	1	TOO MANY NO.OF WKPC	Number of workpieces to be inserted is over 99.	Number of workpieces should be within 99.
4495(conv)	1	1	NO TOOL IN MENU	Tool not registered in tool menu is set in the magazine.	Register the required tool in the magazine.
4496(conv)	1	1	TOO MANY NO.POINTS	Number of machining holes (point random system) to be inserted is over 12.	Number of machining holes should be within 12.
4497(conv)	1	1	ASSIGN TOOL	Data on assignment is modified upon completion of tool assignment.	Assign tools again.
4498(conv)	1	1	CALCULATION ?	Data on calculation is modified upon completion of items with? mark.	Assign tools again.

NO.	STOP LEVEL	RESET LEVEL	ERROR MESSAGE	CAUSE	SOLUTION
4499(conv)	1	1	ATC RT.DATA DELETED	Machining order or assigned tool is modified.	
4500(conv)	1	1	SET MACHINING ORDER	Data on return height for tool change is to be edited without setting machining order.	
4501(conv)	1	1	NO ATC RTN DATA	Unavailable data on return height for tool change is to be used.	
4502(conv)	1	1	DATA ERR(PRGRM)	Unmatched unit program is set in edit.	Set matching unit program.
4503(conv)	1	1	WRONG TOOL LENGTH	The tool length set by the [tool offset] key becomes 0 or less.	Check user parameter(switch1) 'tool length compensation amount'.
4504(conv)	1	1	NO TOOL MENU DATA	There is no data on tool menu.	Set tool menu.
4505(conv)	1	1	NO PATTERN DATA	There is no data on tool pattern.	Set tool pattern.
4506(conv)	1	1	NO HOLE DATA	There is no data on drill hole dia. for tapping.	Set drill hole dia. for tapping.
4507(conv)	1	1	NO CUT COND DATA	There is no data on cutting conditions.	Set cutting conditions.
4508(conv)	1	1	MATERIAL NOT DESIGN	Workpiece material is cutting conditions.	Set workpiece material.
4509(conv)	1	1	REQD TOOL NOT FOUND	There is no tool for required machining function in tool assignment.	Check contents, etc. of machining data, tool pattern, drill hole dia. for tapping, cutting tools, cutting conditions and tool menu, and modify as required.
4510(conv)	1	1	TOO MANY TOOLS ASGD	The number of assigned tools has exceeded the maximum storage capacity .	Assign the tools appropriately with the program.
4511(conv)	1	1	NO JOB	There is no process in program.	Check the machining data.
4512(conv)	1	1	NO DATA IN MENU	There is no data on specified tool in tool menu.	Set the data to the specified number in tool menu.
4513(conv)	1	1	INADEQUATE TOOL	Specified tools is not proper for machining.	Set proper tool for machining.
4514(conv)	1	1	TAP SIZE ERROR	Denominator of inch thread size is 0.	Set the correct tapping designation.

NO.	STOP LEVEL	RESET LEVEL	ERROR MESSAGE	CAUSE	SOLUTION
4515(conv)	1	1	JOB WITH OUT TOOL	There is a process for which no tool is set for the tool pattern.	Set a tool for the tool pattern.
4516(conv)	1	1	ILLEGAL TOOL PTRN	No machining tool required for the designated process is set for the tool pattern.	Check the tool pattern and modify as required.
4517(conv)	1	1	CALC OF ? IMPSBL	Calculation of the unknown is not available.	Modify the machining data.
4518(conv)	1	1	DEPTH SHALLOW	When the tool stops at the hole bottom during center hole drilling or chamfering, the tip touches the bottom.	Check the contents of machining data and tool menu, and modify as required.
4519(conv)	1	1	SHALLOW COUNTERBORE	Tool touches counterbore surface in chamfering.	Check the contents of machining data and tool menu, and modify as required.
4520(conv)	1	1	WORK HEIGHT IMPRPR	Max. depth of cut calculated from workpiece height comes below table surface.	Check the contents of machining data and tool menu, and modify as required.
4521(conv)	1	1	S.DIA TOO SMALL	Smaller dia. of tool is too small for machining data.	Check the contents of machining data and tool menu, and modify as required.
4522(conv)	1	1	TL LNGT NOT SPECFD	Tool length is set to 0 or not set at all.	Check the contents of machining data and tool menu, and modify as required. Check the data set for [MACHINING DATA], [TOOL MENU], [TOOL PATTERN], and [CUTTING CONDITION], and modify as required.
4523(conv)	1	1	TL LIFE NOT SPECFD	Tool life is set to 0 or not set at all.	Check the contents of machining data and tool menu, and modify as required.
4524(conv)	1	1	TOOL TOO LONG	Tool is too long.	
4525(conv)	1	1	S.DIA TOO LARGE	Smaller dia. is too large.	

NO.	STOP LEVEL	RESET LEVEL	ERROR MESSAGE	CAUSE	SOLUTION
4526(conv)	1	1	IMPROPER S.DIA L	Smaller dia. is not proper.	
4527(conv)	1	1	S.DIA L TOO LONG	Smaller dia portion is too long.	
4528(conv)	1	1	IMPROPER S.DIA L	Smaller dia portion is not proper.	
4529(conv)	1	1	S.DIA L TOO SHORT	Smaller dia portion is too small.	
4530(conv)	1	1	TOOL TOO SHORT	Tool does not reach the bottom of cut.	
4531(conv)	1	1	TOOL DIA TOO SMALL	Tool outer diameter is too small.	
4532(conv)	1	1	IMPROPER TOOL DIA	Tool outer diameter is not proper.	
4533(conv)	1	1	IMPROPER CENTER ANG	Center angle is not proper.	
4534(conv)	1	1	IMPROPER CHAMF ANG	Chamfer angle is not proper.	
4535(conv)	1	1	FLUTE TOO SHORT	Flute is too short.	
4536(conv)	1	1	TORSION IMPROPER	Torsion direction of tap is not proper.	
4537(conv)	1	1	THREAD IMPROPER	Kind of tap is not proper.	
4538(conv)	1	1	THREAD DIA IMPROPER	Dia. of thread is not proper.	
4539(conv)	1	1	PITCH IMPROPER	Pitch or number of threads of tap is not proper.	Check the data set for [MACHINING DATA], [TOOL MENU], [TOOL PATTERN], and [CUTTING CONDITION], and modify as required.
4540(conv)	1	1	PRIMARY DEPTH INSUF	Primary depth is not sufficient.	Check the contents of machining data and tool menu, and modify as required.
4541(conv)	1	1	NO TOOL NUMBER	Tool check is to be performed where tool number is not set.	Set tool number, or perform tool check where tool number is set.
4542(conv)	1	1	TOOL DIA TOO LARGE	Tool od is too large.	Check contents of machining data, tool menu, tool pattern, cutting conditions, etc. and modify as required.

NO.	STOP LEVEL	RESET LEVEL	ERROR MESSAGE	CAUSE	SOLUTION
4543(conv)	1	1	POCKET NOT DONE	Chamfering is to be done before pocketing. (chamfer milling function comes first.)	
4544(conv)	1	1	MIN.DISTANCE (SIDE)	There is interference at the side in chamfering.	
4545(conv)	1	1	MIN.DISTANCE (BTM)	There is interference at the bottom in chamfering.	
4546(conv)	1	1	B.H.NOT THROUGH	Tool which can not be used for blind hole is set.	Check the data set for [MACHINING DATA], [TOOL MENU], [TOOL PATTERN], and [CUTTING CONDITION], and modify as required.
4547(conv)	1	1	DIFRNT TL FROM CUTC	Tool not set in cutting conditions is to be used.	
4548(conv)	1	1	TOO LARGE CONER R	Corner r is longer than the half of X or Y whichever is shorter in a square pocket in the pocketing operation.	
4549(conv)	1	1	APPROACH RAD SMALL	Approach radius (in program) in chamfering process is smaller than tool radius.	Check the program.
4564(conv)	1	1	TOOL MENU EDITING	[start] key was pressed in automatic tool length measurement mode during tool menu editing.	Complete editing tool menu.
4565(conv)	1	1	LARGE OPE PROGRAM	Machining data size is larger than buffer capacity.	Divide the machining data. using the scheduled program function, divided machining data can be used for continuous operation.
4566(conv)	1	1	OPEN ERROR (PROGRAM)	The operation program cannot be analyzed.	Refer to 9.3.9.
4567(conv)	1	1	OPEN ERROR (CUT COND)	Cutting conditions cannot be referred to.	Refer to 9.3.9.

NO.	STOP LEVEL	RESET LEVEL	ERROR MESSAGE	CAUSE	SOLUTION
4568(conv)	1	1	WRONG M/C UNIT SYS	When selected memory operation mode, the dimention unit of set program is not same with the dimention unit of machine.	Reset the program to which having the same dimension unit with the machine.
4569(conv)	1	1	NO ZERO MEASUREMENT	Zero measurement was attempted although zero measurement option is not provided.	Please purchase the option.
4570(conv)	1	1	NO THREAD CUTTING	Helical screw cutting was attempted although screw cutting option is not provided.	Please purchase the option.

NO.	STOP LEVEL	RESET LEVEL	ERROR MESSAGE	CAUSE	SOLUTION
8200(NC)	4	2	NO WORK ZERO DATA	There is no data of working zero position.	Create the data on working zero position in the data setting mode or input it externally.
8201(NC)	4	2	NO TOOL DATA	There is no tool data.	Create the tool data in the data setting mode, or input it externally.
8202(NC)	4	2	NO MACRO VARIA.DATA	There is no macro parameter data.	Create a macro parameter data or input it externally.
8203(NC)	4	2	PARITY(WORK ZERO)	Working coordinate zero position data was damaged.	Press [RST] key, and data by memory screen new data again.
8204(NC)	4	2	PARITY(TOOL DATA)	Tool data was damaged.	Press [RST] key, and data by memory screen new data again.
8205(NC)	4	2	PARIT(MACRO VARIA)	Macro parameter data was damaged.	Press [RST] key, and data by memory screen new data again.
8206(NC)	4	2	DATA ERR(WORK ZERO)	The structure of the working coordinate zero position data was damaged.	Press [RST] key, and data by memory screen new data again.
8207(NC)	4	2	DATA ERR(TOOL DATA)	The structure of the tool data was damaged.	Press [RST] key, and data by memory screen new data again.
8208(NC)	4	2	DATA ERR(MACRO VAR.)	The structure of the macro parameter data was damaged.	Press [RST] key, and data by memory screen new data again.
8209(NC)	4	2	R.COMP ERROR	1) The tool dia offset start-up or cancel motions are by the circuler arc command. 2) X or Y axis and rotating axis (A, B, or C) simultaneous cutting feed command was given in tool offset mode.	Press the [RST] key and change this motions according to the linear command. Check the program.
8210(NC)	4	2	TOO LARGE R.COMP	The programmed radius is smaller than the dia offset amount during the inner circular arc cutting.	Press the [RST] key and change the program- med radious to be more
8211(NC)	4	2	NO R/Z COMMAND	The R or Z point is not commanded in the canned cycle.	Press the [RST] key and command the R and Z points.
8212(NC)	4	2	NO PITCH DATA	The tapping pitch is set to 0 or not set.	Press the [RST] key and set the pitch data.

NO.	STOP LEVEL	RESET LEVEL	ERROR MESSAGE	CAUSE	SOLUTION
8213(NC)	4	2	RESTART ERROR	The specified sequence No. is not found.	Press the [RST] key and check the specified sequence No.
8214(NC)	4	2	TOO MANY TOOLS ASGD	The number of tools used for the program is larger than the number of tool pots.	Press the [RST] key and check the program.
8215(NC)	4	2	FIXED CYCLE ADRS ERR	Necessary address is not found in canned cycle, or unnecessary address was specified.	Press the [RST] key and check the program.
8216(NC)	4	2	ZERO MESR ADRS ERR	Necessary address is not found in zero position measurement command or unnecessary address was specified.	Press the [RST] key and check the program.
8217(NC)	4	2	Z MESRMENT COMD ER	Thermal measurement command or tool breakage detection command format is incorrect.	Press the [RST] key and check the program.
8218(NC)	4	2	MACRO COMMAND ERROR	The format specified by the macro command is incorrect.	Press the [RST] key and check the program.
8219(NC)	4	2	THRM COMP IMPOSSIBLE"	Thermal compensation was attempted although thermal measurement was not performed.	Refer to the reference program for thermal measurement.
8700(NC)	3	2	COMMAND INVALID(G)	3-digit G code which is not available is specified.	Press the [RESET] key and check the program.
8701(NC)	3	2	INVALID COMMAND	The G and M codes are commanded in the same block, though it is not allowable.	Press the [RST] key and check the program.
8702(NC)	3	2	COMMAND INVALID(M)	3-digit M code which is not available is specified.	Press the [RST] key and check the program.
8703(NC)	3	2	INVALID CH COMMAND	Characters not accepted are commanded.	Press the [RST] key and check the program.
8704(NC)	3	2	SAME CODE INVALID	More than one M code is commanded in a block.	Press the [RST] key and check the program.
8705(NC)	3	2	INVALID VALUE DATA	The command format is not correct.	Press the [RST] key and check the program.

NO.	STOP LEVEL	RESET LEVEL	ERROR MESSAGE	CAUSE	SOLUTION
8706(NC)	3	2	DATA RANGE ERROR	Commanded value exceeds address range.	Press the [RST] key and check the program.
8707(NC)	3	2	CH/BLOCK OVER	No. of characters in one block exceeds 128.	Press the [RST] key and check the program.
8708(NC)	3	2	COMMAND INVALID G,M	The G and M codes which cannot be intervened mutually in the MDI mode are commanded in the memory operation.	Press the [RST] key and check the program.
8709(NC)	3	2	NO PROG END CODE	There is no M02 or M30 command.	Press the [RST] key and check the program.
8710(NC)	3	2	ARC COMMAND ERROR	Wrong command is given in the circular arc command.	Press the [RESET] key and check the program.
8711(NC)	3	2	SUB PROG CALL ERROR	The subprogram nesting exceeds 8 loops.	Press the [RST] key and check the program.
8712(NC)	3	2	SUB PROG NO.ERROR	The subprogram which can not be called is called.	Press the [RST] key and check the program.
8713(NC)	3	2	MODAL SUBPRG RTN ERR	G66 was commanded in mode other than macro modal call mode or tool dia offset was not canceled when returning from the sub program.	Press the [RST] key and check the program.
8714(NC)	3	2	FEEDRATE ERROR	The F command is not given during the cutting feed, or the commanded value exceeds the limit.	Press the [RST] key and check the program.
8716(NC)	3	2	NO INTERSECTION	The cross point is not obtained during the inner cutting of tool dia offset.	Press the [RST] key and check the program.
8717(NC)	3	2	WORK CAL ADDRESS ERR	Necessary address is not found when the coordinate calculation is commanded, or the value exceeding the allowable range is commanded.	Press the [RST] key and check the program.

NO.	STOP LEVEL	RESET LEVEL	ERROR MESSAGE	CAUSE	SOLUTION
8718(NC)	3	2	IN ARC MODE	The coordinate calculation is commanded in the circular arc mode.	Press the [RST] key and check the program.
8719(NC)	3	2	COMMENT ERROR	The control OUT/IN codes are not in the same block.	Press the [RESET] key and check the program.
8720(NC)	3	2	NO T-CODE COMMAND	The T command is not given while G100 or M06 is in execution.	Press the [RST] key and check the program.
8721(NC)	3	2	SUB PROGM RETURN ERR	The return number was specified by the program return command while the number of repeats was specified for sub program call.	Press the [RST] key and check the program.
8722(NC)	3	2	MACRO PROGM CALL ERR	The macro program call nesting exceeds 4 loops.	Press the [RST] key and check the program.
8723(NC)	3	2	NO APPLICABLE SEQ	The sequence No. spesified by the sub program return command or that specified by the macro command (GOTO) was not found.	Press the [RST] key and check the program.
9450(NC)	1	1	NO PROGRAM(*)	Specified program is not found. Figures in ( ) indicate the program No.	Check the program No.
9451(NC)	1	1	NO SUBPROGRAM(*)	Specified subprogram is not found. Figures in ( ) indicate the subprogram No.	Set the subprogram, or delete the subprogram call cycle.
9452(NC)	1	1	NO APPLICABLE SEQ	Specified sequence No. is not found.	Check the specified sequence No.
9453(NC)	1	1	SEQ NO.ERROR	The sequence No. in the program is not correct.	Check the sequence No. in the program.
9454(NC)	1	1	SUB PROG NO.ERROR	The subprogram No. in the program is not correct.	Check the subprogram No. in the program.
9455(NC)	1	1	NO DIRECTION DATA	Measuring direction is not set.	Set measuring direction.

NO.	STOP LEVEL	RESET LEVEL	ERROR MESSAGE	CAUSE	SOLUTION
9456(NC)	1	1	DATA IMCOMPLETE	The data other than numerical values are set to [CENTER ALIGNMENT] or [AUTOMATIC TOOL LENGTH MEASUREMENT].	Set the data correctly.
9457(NC)	1	1	TOOL NO. IS NOT SET.	The group number was attempted to be set although the tool number was not set to [Magazine Tool].	Set the tool number and then group number.
9458(NC)	1	1	IN COORD.ROTTN.MODE	MDI operation was attempted to be executed during memory operation.	Cancel the coordinate rotation and execute MDI operation.
9459(NC)	1	1	PALLET SELECT SW OFF	Restart or sequence search was attempted while the pallet select switch is on.	Turn off the pallet select switch and retry.
9461(NC)	1	1	BLOCK NUMBER OVER	The number of blocks to be loaded or deleted is too large.	Delete the number of such blocks.
9462(NC)	1	1	NO DATA FOUND	The character string to be searched for or replaced was not found.	Change the character string to be searched for or replaced.
9463(NC)	1	1	IN OPERATION	Deleting or copying the data bank was attempted during memoryoperation.	Complete the memory operation first and then delete or copy the data bank.
9464(NC)	1	1	RESTARTING	Changing the data or executing MDI operation was attempted while restarting.	Execute it after finishing the restart motions.
9466(NC)	1	1	MEMORY OVERFLOW	If you are editing, reduce the current program capacity before storing it or delete other programs to create greater free memory area, and edit the program again.	Reduce the program capacity and store it during editing. Or delete other programs to make a free area and edit it again.
9467(NC)	1	1	NO REGISTERED TOOL	A tool is not set to the group that was attempted to be set to [Magazine Tool].	Check the tool group setting.

NO.	STOP LEVEL	RESET LEVEL	ERROR MESSAGE	CAUSE	SOLUTION
9476(NC)	1	1	T-CODE RANGE ERROR	The “T” command is out of the specified range.	Check the program.

11.8 Servo error message

DISPLAY	No	CAUSE	SOLUTION
OC	1	Overcurrent.	This error may occur due to machine failure and the like. Contact the nearest BROTHER approved service dealer.
EOH	3	The external regenerative.	Turn off the power supply. After 15 to 20 minutes, check the condition. If the error still occurs, it may be due to machine failure and the like. Contact the nearest BROTHER approved service dealer
OV	4	Overvoltage.	Check power supply voltage, capacity, momentary service interruption, and correct them as necessary. If the error still occurs, it may be due to machine failure and the like. Contact the nearest BROTHER approved service dealer
CPE	6	Controller power supply has decreased.	Check power supply voltage, capacity, momentary service interruption, and correct them as necessary. If the error still occurs, it may be due to machine failure and the like. Contact the nearest BROTHER approved service dealer
DE1	7	Encoder signal line is broken.	This error may occur due to machine failure and the like. Contact the nearest BROTHER approved service dealer.
DE2	8	Serial broken wire.	Main power supply voltage drop.
OL	9	Overloaded.	Turn off the power supply. After 15 to 20 minutes, check the condition. If the error still occurs, it may be due to machine failure and the like. Contact the nearest BROTHER approved service dealer

DISPLAY	No	CAUSE	SOLUTION
OS	10	Overspeed.	This error may occur due to machine failure and the like. Contact the nearest BROTHER approved service dealer.
MPE	11	Main power error.	Check power supply voltage, capacity, momentary service interruption, and correct them as necessary. If the error still occurs, it may be due to machine failure and the like. Contact the nearest BROTHER approved service dealer.
FP	12	Main circuit open phase.	Check power supply voltage, capacity, momentary service interruption, and correct them as necessary. If the error still occurs, it may be due to machine failure and the like. Contact the nearest BROTHER approved service dealer.
RGE	13	Regenerative register is overloaded.	Turn off the power supply. After 15 to 20 minutes, check the condition. If the error still occurs, it may be due to machine failure and the like. Contact the nearest BROTHER approved service dealer.
DSPE	14	DSP error	This error may occur due to machine failure and the like. Contact the nearest BROTHER approved service dealer.
ROME	15	Memory error	This error may occur due to machine failure and the like. Contact the nearest BROTHER approved service dealer.
PARE	16	Servo parameter error.	Check the following servo parameter settings. ・Motor type (*13) ・Limit of current while preventing drop due to dead load (*18)
BATT DROP	17	Battery voltage drop.	Replace alkaline battery for absolute encoder backup.

DISPLAY	No	CAUSE	SOLUTION
CSE	18	Encoder error in initial state.	This error may occur due to machine failure and the like. Contact the nearest BROTHER approved service dealer.
MOC	19	Motor overcurrent.	This error may occur due to machine failure and the like. Contact the nearest BROTHER approved service dealer.
DTO	20	Command monitor timer has expired. (No command has been recived from the amplifier within 4 msec)	This error may occur due to machine failure and the like. Contact the nearest BROTHER approved service dealer.
STO	21	Response monitor timer has expired. (No command has been recived from the amplifier within 4 msec)	This error may occur due to machine failure and the like. Contact the nearest BROTHER approved service dealer.
SYS1	22	Servo error signal was input but alarm number was not notified.	This error may occur due to machine failure and the like. Contact the nearest BROTHER approved service dealer.
SYS2	23	Servo error signal was input but undefined alarm number was issued.	This error may occur due to machine failure and the like. Contact the nearest BROTHER approved service dealer.
INI	24	Communication between the NC and amplifier was impossible when the power was turned on.	This error may occur due to machine failure and the like. Contact the nearest BROTHER approved service dealer.
SS	25	Already transmitting when the data was attempted to be transferred to the amplifier.	This error may occur due to machine failure and the like. Contact the nearest BROTHER approved service dealer.
SR	26	Already receiving when the data was attempted to be transferred to the amplifier.	This error may occur due to machine failure and the like. Contact the nearest BROTHER approved service dealer.
CRCE	27	CRC error.	This error may occur due to machine failure and the like. Contact the nearest BROTHER approved service dealer.

DISPLAY	No	CAUSE	SOLUTION
FRME	28	Framming error.	This error may occur due to machine failure and the like. Contact the nearest BROTHER approved service dealer.
VERE	29	Output deta to the amplifier was incorrect.	Check the servo parameter settings. If the error still occurs, it may be due to machine failure and the like. Contact the nearest BROTHER approved service dealer.
ATO	30	Amplifier tmeout error.	This error may occur due to machine failure and the like. Contact the nearest BROTHER approved service dealer.
RSTM	31	Amplifier RST input has decreased during servo on.	Check power supply voltage, capacity, momentary service interruption, and correct them as necessary. If the error still occurs, it may be due to machine failure and the like. Contact the nearest BROTHER approved service dealer.
SCE	32	CRC error for synchronized frame.	This error may occur due to machine failure and the like. Contact the nearest BROTHER approved service dealer.
RECD	33	Encorder signal reading impossible error.	This error may occur due to machine failure and the like. Contact the nearest BROTHER approved service dealer.
VERI	34	The motor type, encoder pulse, and encoder type previously set do not coincide with those set this time. This error will occur only to the PV amplifier..	Set the following servo parameters correctly, and turn the power off and then on again. Upon this operation, the [SERVO (VERI)] message will appear again. Just turn the power off and then on again. Motor type (*13) Encoder pulse (*14) Encoder type (*15)

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12.1 Memory advanced function option (1/15)

1.The optional explanation

As for the memory advanced function option, it is based to use either NC language type or conversation type.
Therefore, memory expansion cannot be done by two languages.
This option can be added after the shipment.
An option can be set up with TC-**A only.

When this option is installed, the parts are different by depending on the version of NC PCB and MEM PCB.
When installing the option after the shipment, check the version for NC PCB and MEM PCB attached to the machine.
Then make an order for the arrangement parts.

In case of NC PCB version is B52J067-1,2,3 or MEM PCB is A00-WJ01~A00-WJ10, PCB exchange is necessary for the simultaneity as well.

In case of NC PCB version is B52J090-2~ and MEM PCB version is A00-W*11~. PCB exchange is unnecessary.

Either is surely necessary for the following part.
(1) 655820001 Mem EXP OP supply ... Option parts for after the shipment.
(2) 655821001 Mem EXP OP ... Option parts for factory.

<Attention>

Be careful of the capacity about programming by this option because it is unchanged with the standard specifications though the memory capacity of the program is three times.

1.G code specification

Program memory capacity	about 250 meter → about 850 meter
Editable memory capacity	about 165 meter
Run memory capacity	about 330 meter
Input program	256
Data bank input	machine parameter is one only and other parameters are five.

2.Conversational specification

Program memory capacity	about 250 meter →about 850 meter
Editable memory capacity	about 165 meter
Run memory capacity	about 130 meter
Input program	256
Data bank input	machine parameter is one only and other parameters are five.

12.1 Memory advanced function option (2/15)

2.The option set up procedure

Procedure

Follow the procedure below to convert the version.

The operation before replacing PCB (the operation before setting this option)

1. Turn on the power.
   When the machine mounted the memory board (before version10), take a note of the tool number witch is registered with the magazine tool screen.
2. Check the communication parameter.
3. Save all data in FACIT.(Maintenance all data output)
4. Turn off the power.

The operation to replace PCB (only when a PCB exchange is necessary)

5. Replace the Mem PCB or NC PCB.
   Mount “the short connector EXP” for the memory advanced function on the “CNEXP” connector of NC PCB.
   Fix it on the bottom side of the cable duct with a band.

The operation to set this option

6. When step 5 is finished, remove the **[NC LANG/CONV]** switch from the switch panel under the control panel. Put a cap on the panel as a substitute.
   (When no PCB is exchanged, this step is done after step 4 is finished.)
   Put “Short connector LANG” on the cable after removing a switch for the conversation type.
   Nothing is put on it for NC language type.

The operation after setting this option

7. Turn on the power.
8. Check the version number.
9. Format the memory capacity.
10. Set the data for current date and time.
11. Delete the data for the ALARM LOG and OPERATION LOG.
12. Input the communication parameter.
13. Input all data from FACIT.(Maintenance all data input)
14. Turn off the power.
15. Turn on the power.
16. When the error “** DATA ERROR (MACHINE PARAMETER)” , “** DATA ERROR (USER PARAMETER)” or “ DATA ERROR ((USER PARAMETER)” occurred, set the value to the blank item.
17. When system of units are replaced in step 16, the magazine tool display is disappeared. Set the vale witch is took note before.

12.1 Memory advanced function option (3/15)

Detail Explanation

The operation before replacing PCB

1. Turn on the TC.
2. Check the communication parameter.

2-1. Set the **<PROTECT ON/OFF>** switch to off.

2-2. Press the **[DATA BANK]** key.

2-3. Select the "USER PARAMETER" from the DATA BANK MENU.

2-4. Select the "COMMUNICATION" from the USER PARAMETER MENU.

2-5. Set the parameter as indicated below.

User parameter 3 (communication) Not necessary to set the value in the blank.

No.	Item	Meter/inch
0	SELECT PORT	0
1	CONNECTION OBJECT	1
2	COMP COMMUNICATN PROTOCOL (MASTER)	0
3	BAUD RATE	5
4	PARITY	0
5	STOP BIT	0
6	CHARACTER	0
7	RESPONSE MONITORING TIME	60
8	COMMUNICATION TYPE	0
9	DC1 CODE	
10	DC2 CODE	
11	DC3 CODE	
12	DC4 CODE	
13	DR SIGNAL CHECK	1
14	ENDING DC3 CODE	
15	INVALD DATA	
16	TRANS DATA CODE	
17	END OF BLOCK	
18	TV CHECK	
19	HEADING OUTPUT	
20	RESET IN SLAVE COMMUNICATION	
21	RECOVERY TIME OF RESET	1
22	DATA OVERWRITE(SLAVE)	
23	REMOTE OPERATION	
24	CHECKSUM	
25	EIA CHARACTER CODE(#)	
26	EIA CHARACTER CODE(*)	
27	EIA CHARACTER CODE(=)	
28	EIA CHARACTER CODE([)	
29	EIA CHARACTER CODE(])	

2-6. When the setting is completed, press the **[F0:EDIT END MODE]** key and then press the **[F0:EDIT END]** key to display the < USER PARAMETER MENU > screen.

12.1 Memory advanced function option (4/15)

3. Transfer all data to FACIT from TC.

Preparation for FACIT

3-1. Connect the communication cable for FACIT.
3-2. Turn on the power for FACIT.
3-3. Wait for a while until FACIT is ready to start.
3-4. Insert the Floppy Disk.

Preparation for TC

3-4. Press the [EDIT] key to change the program edit mode.
3-5. Select the "EXTERNAL PROGRAM I/O" from the PROGRAM EDIT MENU.
3-6. Select the "MAINTENANCE" from the COMPUTER MENU.
3-7. Select the "OUTPUT ALL DATA" from the MAINTENANCE MENU.
3-8. Press the [E.STA] key to transfer the data.
3-9. Wait for a while until the transfer is completed. <Refer to Note>

Preparation for FACIT

3-10. Turn off the FACIT after the transfer is completed.

<NOTE>

Even when the display on TC side shows that the transfer had been completed, the transfer may have still been active on FACIT side.
Do not turn off the power for FACIT and do not pull out the cable until the screen on FACIT shows that the transfer had been completed.

4. Turn off the power in TC.
Also, Turn off the breaker on the back side of the machine.

12.1 Memory advanced function option (5/15)

The operation to replace PCB(only when a PCB exchange is necessary)

5. Replace the MEM PCB or NC PCB.
   Mount “the short connector EXP” for the memory advanced function on the “CNEXP” connector of NC PCB.
   Fix it on the bottom side of the cable duct with a band.

Short connector EXP

Fix the cable connector to the cable duct with band.

12.1 Memory advanced function option (6/15)

The operation to set this option

6. When step 5 is finished, remove the **[NC LANG/CONV]** switch from the switch panel under the control panel. Put a cap on the panel as a substitute.
   (When no PCB is exchanged, this step is done after step 4 is finished.)
   Put "Short connector LANG " on the cable after removing a switch for the conversation type.
   Nothing is put on it for NC language type.

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12.1 Memory advanced function option (7/15)

The operation after setting this option

7. Turn on the TC.

8. Check the version.
8-1. Press the **[I/O]** key.
8-2. Select the "INPUT/OUTPUT" from the INPUT/OUTPUT MENU.
8-3. Press the **[PAGE UP]** key to display the <VERSION> screen.
8-4. Check that the version numbers are as indicated below.

	NC	Conversational type	
MAIN	LA1-51-**	MA1-11-**	
SLAVE	SA1-51-**	SA1-11-**	
LOCAL	LA1-51-**	LA-1-11-**	: Japanese model
	(LA2-51-**)	(LA2-51-**)	: Export model

9. Format the memory capacity.
9-1. Set the <PROTECT ON/OFF> switch to off.
9-2. Press the **[EDIT]** key to change the program edit mode.
9-3. Select the "DIRECTORY OF MEMORY" from the PROGRAM EDIT MENU.
9-4. Press the **[F4:FORMAT]** key.
9-5. Press the **[DEL]** key.
9-6. Press the **[I/O]** key.
9-7. Select the "INPUT/OUTPUT" from the INPUT /OUTPUT MENU.
9-8. Press the **[PAGE UP]** key to display the <VERSION> screen.
9-9. Move the cursor to the "PARAMETER CHANGE", then set it to [1:YES].
9-10. Press the **[PRGRM]** key.
9-11. Press the **[F0:YES]** key.

10. Delete the data for ALARM LOG and OPERATION LOG.
10-1. Set the **<PROTECT ON/OFF>** switch to off.
10-2. Press the **[I/O]** key.
10-3. Input [-9999] on the <INPUT/OUTPUT MENU> screen and set the **[ENT]** key.
10-4. Move the cursor to "DELETE ALARM LOG" and set [1:YES].
10-5. Press the **[F0:YES]** key.
10-6. Move the cursor to "DELETE OPERATION LOG" and set [1:YES].
10-7. Press the **[F0:YES]** key.
10-8. Press the **[F0:I/O MENU]** key to display the <INPUT/OUTPUT MENU> screen.

12.1 Memory advanced function option (8/15)

11. Set the data for current date and time.
11-1. Set the **<PROTECT ON/OFF>** switch to off.
11-2. Press the **[DATA BANK]** key.
11-3. Select the "USER PARAMETER" from the DATA BANK MENU.
11-4. Select the "SWITCH 1" from the USER PARAMETER MENU.
11-5. Move the cursor to the "CURRENT DATE" to set the current date.
11-6. Move the cursor to the "CURRENT TIME" to set the current time.
11-7. When the setting is completed, press the **[F0:EDIT END MODE]** key and then press the **[F0:EDIT END]** key to display the < USER PARAMETER MENU > screen.

12. Input the communication parameter.
Repeat the step 2.

13. Input all data from FACIT.

Preparation for FACIT

13-1. Connect the communication cable for FACIT.
13-2. Turn on the Power for FACIT.
13-3. Wait for a while until FACIT is ready to start.

Preparation for TC

13-4. Set the **<PROTECT ON/OFF>** switch to off.
13-5. Press the **[EDIT]** key to change the program edit mode.
13-6. Press the **[I/O]** key.
13-7. Select the "INPUT/OUTPUT" from the INPUT/OUTPUT MENU.
13-8. Press the **[PAGE UP]** key to display the <VERSION> screen.
13-9. Move the cursor to the "PARAMETER CHANGE", then set it to **[1:YES]**.
13-10. Press the **[PRGRM]** key.
13-11. Select the "EXERNAL PROGRAM I/O" from the PROGRAM EDIT MENU.
13-12. Select the "MAINTENANCE" from the COMPUTER MENU.
13-13. Select the "INPUT ALL DATA" from the MAINTENANCE MENU.
13-14. Press the **[E.STA]** key to transfer the data.
13-15. When the screen to confirm the substitute data is displayed, then press **[F3 : INPUT HERE AFTER]** key.

12.1 Memory advanced function option (9/15)

```
INPUT  ALL  DATA.                                  MAINTENANCE


            SAME  DATA  BANK  EXISTS.
            M / C  DATA 1
            INPUT  OK ?



      YES          NO                      INPUT
                                           HERE
                                           AFTER
   F0          F1          F2          F3          F4
```

PreparationforFACIT

13-16. Turn off the FACIT after the transfer is completed.

14. Turn off the power of TC.

15. Turn on the power of TC.

16. When the error "** DATA ERROR (MACHINE PARAMETER) ", "** DATA ERROR (USER PARAMETER)"or " DATA ERROR ((USER PARAMETER)" occurred, set the value to the blank item.
(Refer to the parameter changing record.)
When the communication parameter changed in step 2, please return the setting value of the USER PARAMETER.

17. When system of units are replaced in step 16, the magazine tool display is disappeared. Set the vale witch is took note before.

12.1 Memory advanced function option (10/15)

Changes for the user parameter and machine parameter when upgrading the version for TC(A00).

Check that the version seal on the back side of MEMORY PCB is appropriate both before and after the replacement.
When there are parameter changes in a new version, initial values for parameters has not been set.
Set the initial value.

Machine parameter: Correct parameters either in conversation or in NC.
(The data is common between Conversation and NC.)
User parameter: Correct parameters both in conversation and in NC.
(The data is not common between conversation and NC.)
* Set parameters both in meter and in inch.

A00-WJ(E)01	New version.....only for TC-31A
A00-WJ(E)02	No changes.
A00-WJ(E)03	No changes
A00-WJ(E)04	There are changes in the user and machine parameters. TC-22A is added.

12.1 Memory advanced function option (11/15)

User parameter (Switch 1)
This parameter needs changes both in conversation and NC. (Meter/inch)

Items	Initial value			
	31A	22A	S2A	32A
M 490 COOLANT BLOWING TIME	0.0			
M 491 COOLANT BLOWING TIME	2.0			
M 492 COOLANT BLOWING TIME	4.0			
M 493 COOLANT BLOWING TIME	6.0			
M 494 COOLANT BLOWING TIME	8.0			

User parameter8 (AUTO THRM DISP CMP)
This parameter needs changes both in conversation and NC.

Items	Initial value			
	31A	22A	S2A	32A
Z AXIS COMPENSATION	100			
SPINDLE COMP ADJUSTMENT(Z)	100			

Machine parameter3 (System3)
This parameter needs changes either in conversation or NC.

Items	Initial value			
	31A	22A	S2A	32A
MAGAZINE ALLOWANCE	400			

Machine parameter6 (AUTO THRM DISP CMP)
This parameter needs changes either in conversation or NC.

Items	Initial value			
	31A	22A	S2A	32A
MAX. Z DISPLACEMENT CONSTANT1	0.0050			
MAX. Z DISPLACEMENT CONSTANT2	0.0			
Z ELONGATION DISPLACE CONSTANT3	2.60			
Z CONTRACTION DISPLACE CONSTANT3	2.60			
MAX SP DISPLACE CONSTANT 1(Z)	0.0043			
MAX SP DISPLACE CONSTANT 2(Z)	0.0			
SP ELONGATION DISP CONST 3(Z)	1.10			
SP CONTRACTION DISP CONST 3(Z)	1.10			

A00-WJ (E)05 NO changes.

A00-WJ (E)06 NO changes.

A00-WJ (E)07 There are changes in the machine parameter. TC-S2A is added.

12.1 Memory advanced function option (12/15)

Machine parameter (System 1)
This parameter needs changes either in conversation or NC.

Items	Initial value			
	31A	22A	S2A	32A
Z MAXIMUM RAPID SPEED (ATC)	50000	56000		

A00-WJ(E)08 NO changes.

A00-WJ(E)09 NO changes.

A00-WJ(E)10 NO changes.

A00-WJ(E)11 There are some changes both in user and machine parameter.
TC-32A is added.

Machine parameter (System 1)
This parameter needs changes either in conversation or NC.

Items	Initial value			
	31A	22A	S2A	32A
X AXIS ATC POSITION	0.000	0.000	0.000	
Y AXIS ATC POSITION	0.000	0.000	0.000	
X RAPID FEED TIME CONSTANT3	0	0	0	
Y RAPID FEED TIME CONSTANT3	0	0	0	
Z RAPID FEED TIME CONSTANT3	0	0	0	
X BALL SCREW ATTACHMENT POS	0.000	0.000	0.000	
Y BALL SCREW ATTACHMENT POS	0.000	0.000	0.000	
AUTOMATIC OILING FUNCTION	0	0	0	
AUTOMATIC OILING PAUSE	16	16	16	
AUTOMATIC OILING TIME REQUIRED	15	15	15	
AUTOMATIC OILING MONITORING TIME	60	60	60	

Machine parameter (System 3)
This parameter needs changes either in conversation or NC.

Items	Initial value			
	31A	22A	S2A	32A
SPD LOOP PROPTNAL GAIN (STOPPED)	200	200	200	
SPD LOOP INTGR TM CONST (STOPPED)	15	15	15	

12.1 Memory advanced function option (13/15)

Machine parameter (AUTO THRM DISP CMP)
This parameter needs changes either in conversation or NC.

Items	Initial value			
	31A	22A	S2A	32A
MAX. X DISPLACEMENT CONSTANT1	0.0000	0.0000	0.0000	
MAX. X DISPLACEMENT CONSTANT2	0.0	0.0	0.0	
X ELONGATION DISPLCE CONSTANT3	0.01	0.01	0.01	
X CONTRACTION DISPLCE CONSTANT3	0.01	0.01	0.01	
MAX. SP DISPLCE CONSTANT1(X)	0.0000	0.0000	0.0000	
MAX. SP DISPLCE CONSTANT2(X)	0.0	0.0	0.0	
SP ELONGATION DISP CONST3(X)	0.01	0.01	0.01	
SP CONTRACTION DISP CONST3(X)	0.01	0.01	0.01	
MAX. Y DISPLACEMENT CONSTANT1	0.0000	0.0000	0.0000	
MAX. Y DISPLACEMENT CONSTANT2	0.0	0.0	0.0	
Y ELONGATION DISPLCE CONSTANT3	0.01	0.01	0.01	
Y CONTRACTION DISPLCE CONSTANT3	0.01	0.01	0.01	
MAX. SP DISPLCE CONSTANT1(Y)	0.0000	0.0000	0.0000	
MAX. SP DISPLCE CONSTANT2(Y)	0.0	0.0	0.0	
SP ELONGATION DISP CONST3(Y)	0.01	0.01	0.01	
SP CONTRACTION DISP CONST3(Y)	0.01	0.01	0.01	

USER PARAMETER1 (SWITCH1)
Conversation (meter)

Items	Initial value			
	31A	22A	S2A	32A
TOOL BRK DETECTION POS X	0.000	0.000	0.000	
TOOL BRK DETECTION POS Y	0.000	0.000	0.000	
TL BRK DET EXE CYCLE (NO.OF OPR)	1	1	1	

12.1 Memory advanced function option (14/15)

USER PARAMETER1 (SWITCH 1)
Conversation (inch)

Items	Initial value			
	31A	22A	S2A	32A
TOOL BRK DETECTION POS X	0.0000	0.0000	0.0000	
TOOL BRK DETECTION POS Y	0.0000	0.0000	0.0000	
TL BRK DET EXE CYCLE (NO.OF OPR)	1	1	1	

USER PARAMETER1 (SWITCH 1)
NC (meter)

Items	Initial value			
	31A	22A	S2A	32A
TOOL BRK DETECTION POS X	0.000	0.000	0.000	
TOOL BRK DETECTION POS Y	0.000	0.000	0.000	

USER PARAMETER1 (SWITCH 1)
NC (inch)

Items	Initial value			
	31A	22A	S2A	32A
TOOL BRK DETECTION POS X	0.0000	0.0000	0.0000	
TOOL BRK DETECTION POS Y	0.0000	0.0000	0.0000	

USER PARAMETER8 (AUTO THRM DISP CMP)
This parameter needs changes both in conversation and in NC.
(both in meter and inch)

Items	Initial value			
	31A	22A	S2A	32A
X-AXIS COMPENSATION ADJUSTMENT	100	100	100	
SPINDLE COMP ADJUSTMENT (X)	100	100	100	
Y-AXIS COMPENSATION ADJUSTMENT	100	100	100	
SPINDLE COMP ADJUSTMENT (Y)	100	100	100	

A00-WJ (E)12 NO changes.

A00-WJ (E)13 There are changes in machine parameter.

12.1 Memory advanced function option (15/15)

MACHINE PARAMETER1 (SYSTEM 1)
This parameter needs changes either in conversation or NC.

Items	Initial value			
	31A	22A	S2A	32A
RETURN DISTANCE WITH SERVO ON	0.300	0.300	0.300	0.300

MACHINE PARAMETER2 (SYSTEM 2)
This parameter needs changes either in conversation or NC.

Items	Initial value			
	31A	22A	S2A	32A
RETURN ANGLE WITH SERVO ON	0.300	0.300	0.300	0.300

The magazine tool data is cleared by changing the unit from meter to inch or vice versa, when setting the user parameter.
Input the data for **[PROD DATA1]** to set the magazine tool data.
Use **[F0]** keys on the <ALL DATA INPUT1> screen in the maintenance to input the data for [PROD DATA 1].
Skip other items by using the **[F1]** key.
After inputting the data for [PROD DATA1], press the **[RESET]** key to cancel inputting other items follows to [PROD DATA1].

Please pay attention to the data for the power on time, program No. and operation point besides the magazine tool data. When inputting [PROD DATA1], all data for those above are also automatically set.

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CNC TAPPING CENTER

TC－S2A

パーツリスト
PARTS LIST

ブラザー工業株式会社
マシナリー・アンド・ソリューション カンパニー

BROTHER INDUSTRIES, LTD.
MACHINERY&SOLUTIONCOMPANY

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1. スピンドルヘッド関係
SPINDLE HEAD

1.ｽﾋﾟﾝﾄﾞﾙﾍｯﾄﾞ関係

参照No Ref.No	部品ｺｰﾄﾞ Part Code	個数 Q'ty	品名 Part Name		備考 Remark
1	653670001	1	SPﾓｰﾀｰ 10K-2	SP MOTOR 10K-2	10000min^{-1}
	653671001	1	SPﾓｰﾀｰ 16K-2	SP MOTOR 16K-2	16000min^{-1}
2	653036001	1	ｶｯﾌﾟﾘﾝｸﾞ 250	COUPLING 250	
3	653041001	1	ｼﾌﾄｶﾑDP 250	SHIFT CAM DP 250	
4	641405000	1	ｺｲﾙﾊﾞﾈSWH10-25	COIL SPRING, SWH10-25	
5	640137000	1	ｺｲﾙﾊﾞﾈSWM10X25	COIL SPRING, SWM10X25	
6	653042001	1	ｵｻｴｲﾀDP 250	DP PLATE	
7	018501231	2	ｱﾅﾎﾞﾙﾄ5X12	BOLT, SOCKET M5X12	
8	653043001	2	DPｶﾑ2 250	DPCAM2 250	
9	653037001	1	ｱﾝｸﾗﾝﾌﾟｱｰﾑｸﾐ250	UNCLAMP ARM ASSY 250	
10	645124001	2	ｱﾝｸﾗﾝﾌﾟｱｰﾑｽﾄｯﾊﾟ	UNCLAMP ARM STOPPER	
11	622085001	1	ｱﾝｸﾗﾝﾌﾟｶﾑ 228	UNCLAMP ARM CAM 228	
12	018084031	2	ｱﾅﾎﾞﾙﾄ 8X40	BOLT, SOCKET M8X40	
13	620067002	1	ｽﾄﾚｰﾄﾋﾟﾝ8X26XM5	PIN, STRAIGHT 8X26XM5	
14	620136001	1	ﾋﾟﾝLC-BX-6X30	PIN, LC-BX-6X30	
15	626177001	1	ﾎﾞﾙﾄ 10X100ﾄｸ	BOLT, 10X100	
16	021100102	1	ﾅｯﾄ 1ｼｭ 10	NUT, 1 M10	
17	622071001	1	ｱﾝｸﾗﾝﾌﾟﾊﾞﾈ228	UNCLAMP ARM SPRING, 228	
18	653175001	1	ｽﾋﾟﾝﾄﾞﾙｸﾐ 250	SPINDLE ASSY 250	10000min^{-1}
	653378001	1	ｽﾋﾟﾝﾄﾞﾙｸﾐ250-16	SPINDLE ASSY 250-16	16000min^{-1}
19	653039001	1	ﾍﾞｱﾘﾝｸﾞｵｻｴ 250	BEARING RETAINER 250	
20	626175000	1	ｼﾞｸ 25X216	SHAFT, 25X216	
21	155914001	1	ｼﾞｸ6X31.8	STUD 6X31.8	

2. ATCサドル 14関係
ATC SADDLE 14 PIECES

2.ATCｻﾄﾞﾙ関係

参照No Ref.No	部品ｺｰﾄﾞ Part Code	個数 Q'ty	品名 Part Name		備考 Remark
1	650028001	1	ATCｻﾄﾞﾙ14	ATC SADDLE 14	
2	650057001	1	ﾓｰﾀ 9290	MOTOR, 9290	
3	653052001	1	ﾊﾞﾚﾙｶﾑｸﾐ 250	BARREL CAM ASSY 250	
3-1	650058001	1	ﾀﾏｼﾞｸｳｹ7203BDB	BALL BEARING, RADIAL 7203BDB	
3-2	653054001	1	ﾍﾞｱﾘﾝｸﾞｹｰｽｸﾐ250	BEARING CASE ASSY 250	
3-3	622018001	1	ｼﾞｸｳｹﾅｯﾄHLB-17	BEARING NUT HLB-17	
3-4	653057001	1	ｵｻｴｲﾀ 250	RETAINER 250	
3-5	076003809	1	ﾀﾏｼﾞｸｳｹ6003ZZ	BALL BEARING, 6003ZZ	
3-6	048170142	1	ﾄﾒﾜｼﾞｸﾖｳC17	RETAINING RING, C17	
4	653059001	1	ﾋﾗﾊｸﾞﾙﾏ M2Z25	SPUR GEAR, M2Z25	
5	653060001	1	ﾁｭｳｶﾝﾊｸﾞﾙﾏｸﾐ	GEAR ASSY	
6	650245001	1	ATCCAMｽｲｯﾁｸﾐ229	ATC CAM SWITCH ASSY	
7	076200800	2	ﾀﾏｼﾞｸｳｹ6200ZZ	BALL BEARING, 6200ZZ	

3. ATCマガジン（1／2）
ATC MAGAZINE

3.ATCﾏｶﾞｼﾞﾝ(1of2)

参照No Ref.No	部品ｺｰﾄﾞ Part Code	個数 Q'ty	品名 Part Name		備考 Remark
1	650062001	1	ﾂｰﾙﾏｶﾞｼﾞﾝ14ｸﾐ	MAGAZINE ASSY, TOOL 14	
1-1	650065001	14	ｸﾞﾘｯﾌﾟｸﾐDP3	GRIP ASSY, DP3	
1-2	018063031	28	ｱﾅﾎﾞﾙﾄ 6X30	BOLT, SOCKET M6X30	
1-3	650064001	1	ﾌﾗﾝｼﾞｵｻｴ14ｸﾐ	FLANGE RETAINER 14 ASSY	
1-4	650053001	14	ｸﾞﾘｯﾌﾟｶﾊﾞｰ14	GRIP COVER, 14	
1-5	002400802	28	+ﾅﾍﾞｺ4X8	SCREW, PAN M4X8	
1-6	608783001	4	ｱﾅﾎﾞﾙﾄ8X20ﾄｸ	BOLT, SOCKET M8X20(SP)	
1-7	628343001	14	ｶﾑﾌｫﾛｱ17-2	CAM FOLLOWER, 17-2	

3. ATCマガジン（2／2）
ATC MAGAZINE

3.ATCﾏｶﾞｼﾞﾝ(2of2)

参照No Ref.No	部品ｺｰﾄﾞ Part Code	個数 Q'ty	品名 Part Name		備考 Remark
1	650065001	14	ｸﾞﾘｯﾌﾟｸﾐDP3	GRIP ASSY, DP3	
1-1	071127050	14	ｺｳｷｭｳ 1/2	STEEL BALL 1/2	
1-2	628133001	14	ｺｲﾙﾊﾞﾈ 12X50.5	COIL SPRING, 12X50.5	
1-3	646108001	28	ﾋﾟﾝﾎﾙﾀﾞｸﾐ 2	PIN HOLDER ASSY 2	
1-4	650097001	28	ﾛｰﾗ27.2-2	ROLLER 27.2-2	
1-5	048160142	56	ﾄﾒﾜｼﾞｸﾖｳC16	RETAINING RING,C16	
1-6	640150601	14	ｷｰDP2	KEY DP2	
1-7	002401605	14	+ﾅﾍﾞｺ4X16	SCREW, PAN M4X16	

4. アドレスセンサ ADDRESS SENSOR

4.ｱﾄﾞﾚｽｾﾝｻ

参照No Ref.No	部品ｺｰﾄﾞ Part Code	個数 Q'ty	品名 Part Name		備考 Remark
1	618577001	1	ｱﾄﾞﾚｽﾒｲﾊﾞﾝ250-2	ADDRESS NAMEPLATE, 250-2	
2	6A7694001	1	O ﾘﾝｸﾞ G130 4D	O RING G130 4D	
3	018400831	14	ｱﾅﾎﾞﾙﾄ4X8	BOLT, SOCKET M4X8	
4	640528101	1	ｱﾄﾞﾚｽｾﾝｻ ｸﾐ500	ADDRESS SENSOR ASSY, 500	
5	002402005	2	+ﾅﾍﾞｺ4X20	SCREW, PAN M4X20	
6	653064001	1	ATCENCｺｰﾄﾞｸﾐ250	ATCENC CABLE 250	
7	638173001	1	ｺｰﾄﾞﾌﾞｯｼｭ229	CORD BUSH, 229	
8	650056001	1	ｽﾘｯﾄｲﾀ14	SLIT PLATE, 14	
9	602372001	3	+ﾅﾍﾞﾈｼﾞ4X8Wﾂｷ	SCREW, PAN (P WASHER) M4X8	
10	640139000	1	ｾﾝﾀｰｼﾞｸ2	CENTER SHAFT 2	
11	018082531	4	ｱﾅﾎﾞﾙﾄ8X25	BOLT, SOCKET M8X25	

5．X軸関係

X AXIS

5.X軸関係

参照No Ref.No	部品ｺｰﾄﾞ Part Code	個数 Q'ty		品名 Part Name	備考 Remark
1	653023001	1	XYﾓｰﾀ 250	XY MOTOR 250	
2	018062031	4	ｱﾅﾎﾞﾙﾄ6X20	BOLT, SOCKET M6X20	
3	622015001	1	ﾎﾞｰﾙﾈｼﾞXｸﾐ-228	BALL SCREW ASSY, X-AXIS 228	STD
	653344001	1	ﾎﾞｰﾙﾈｼﾞXｸﾐ-250-L	BALL SCREW ASSY, X-AXIS 250L	LONG STROKE
4	018083031	4	ｱﾅﾎﾞﾙﾄ 8X30	BOLT, SOCKET M8X30	
5	620067002	2	ｽﾄﾚｰﾄﾋﾟﾝ8X26XM5	PIN, STRAIGHT 8X26XM5	
6	002400605	6	+ﾅﾍﾞｺ4X6	SCREW, PAN M4X6	
7	653026001	1	ｶｯﾌﾟﾘﾝｸﾞ14-16XY	COUPLING 14-16XY	
8	018082531	2	ｱﾅﾎﾞﾙﾄ8X25	BOLT, SOCKET M8X25	
9	620067002	2	ｽﾄﾚｰﾄﾋﾟﾝ8X26XM5	PIN, STRAIGHT 8X26XM5	
10	622186001	1	BRGﾎﾙﾀﾞｶﾊﾞｰ	BRG HOLDER COVER	
11	018400631	2	ｱﾅﾎﾞﾙﾄ4X6	BOLT, SOCKET M4X6	
12	641347000	1	ﾕﾆﾊﾞｻﾙｴﾙﾎﾞUEF4N	UNIVERSAL ELBOW, UEF4N	
13	641337000	1	ﾚｲﾛﾝﾁｭｰﾌﾞ300	TUBE, LYLON 300	
14	641338000	1	ﾚｲﾛﾝﾁｭｰﾌﾞ360	TUBE, LYLON 360	
15	641346000	4	ｽﾄﾚｰﾄ BF4N	STRAIGHT, BF4N	
16	641340000	1	ﾚｲﾛﾝﾁｭｰﾌﾞ470	TUBE, LYLON 470	
17	653001001	1	ｶﾞｲﾄﾞ Xｸﾐ 250	GUIDE ASSY, X 250	STD
	653332001	1	ｶﾞｲﾄﾞXｸﾐ 250L	GUIDE ASSY X 250L	LONG STROKE
18	018062531	34	ｱﾅﾎﾞﾙﾄ6X25	BOLT, SOCKET M6X25	
19	626125000	1	ﾎﾞｰﾙﾈｼﾞｽﾄｯﾊﾟXY2	BALL SCREW STOPPER, XY2	
20	533676001	3	ﾀﾞﾝﾈｼﾞ	SHOULDER SCREW	
21	622023001	1	ｽﾄｯﾊﾟ228-XY	STOPPER 228-XY	
22	533676001	3	ﾀﾞﾝﾈｼﾞ	SHOULDER SCREW	

6．Y軸関係

Y AXIS

6.Y軸関係

参照No Ref.No	部品ｺｰﾄﾞ Part Code	個数 Q'ty	品名 Part Name		備考 Remark
1	653023001	1	XYﾓｰﾀ 250	XY MOTOR 250	
2	018062031	4	ｱﾅﾎﾞﾙﾄ6X20	BOLT, SOCKET M6X20	
3	622016001	1	ﾎﾞｰﾙﾈｼﾞYｸﾐ-228	BALL SCREW ASSY, Y-AXIS 228	
4	002400605	6	+ﾅﾍﾞｺ4X6	SCREW, PAN M4X6	
5	653026001	1	ｶｯﾌﾟﾘﾝｸﾞ14-16XY	COUPLING 14-16XY	
6	626125000	1	ﾎﾞｰﾙﾈｼﾞｽﾄｯﾊﾟXY2	BALL SCREW STOPPER, XY2	
7	533676001	3	ﾀﾞﾝﾈｼﾞ	SHOULDER SCREW	
8	641347000	1	ﾕﾆﾊﾞｻﾙｴﾙﾎﾞUEF4N	UNIVERSAL ELBOW, UEF4N	
9	641342000	1	ﾚｲﾛﾝﾁｭｰﾌﾞ550	TUBE, LYLON 550	
10	653002001	1	ｶﾞｲﾄﾞ Yｸﾐ 250	GUIDE ASSY, Y 250	
11	641346000	8	ｽﾄﾚｰﾄ BF4N	STRAIGHT, BF4N	
12	641336000	2	ﾚｲﾛﾝﾁｭｰﾌﾞ240	TUBE, LYLON 240	
13	641337000	2	ﾚｲﾛﾝﾁｭｰﾌﾞ300	TUBE, LYLON 300	
14	622031001	1	YLSｶﾊﾞｰ-228	YLS COVER, 228	
15	622023001	1	ｽﾄｯﾊﾟ228-XY	STOPPER 228-XY	
16	533676001	2	ﾀﾞﾝﾈｼﾞ	SHOULDER SCREW	

7. Z軸関係
Z AXIS

7.Z軸関係

参照No Ref.No	部品ｺｰﾄﾞ Part Code	個数 Q'ty	品名 Part Name		備考 Remark
1	652121001	1	Zﾓｰﾀ22A	Z MOTOR, 22A	
2	018082531	4	ｱﾅﾎﾞﾙﾄ8X25	BOLT, SOCKET M8X25	
3	653045001	1	ﾎﾞｰﾙﾈｼﾞ Zｸﾐ 250	BALL SCREW ASSY Z 250	
4	650514001	1	ｶﾂﾌﾟﾘﾝｸﾞXY 31A	COUPLING, XY31A	
5	653029001	1	ｶﾞｲﾄﾞZｸﾐ 250	GUIDE ASSY Z 250	
6	018082531	20	ｱﾅﾎﾞﾙﾄ8X25	BOLT, SOCKET M8X25	
7	018082531	16	ｱﾅﾎﾞﾙﾄ8X25	BOLT, SOCKET M8X25	
8	641347000	1	ﾕﾆﾊﾞｻﾙｴﾙﾎﾞUEF4N	UNIVERSAL ELBOW, UEF4N	
9	641339000	1	ﾚｲﾛﾝﾁｭｰﾌﾞ400	TUBE, LYLON 400	
10	641347000	4	ﾕﾆﾊﾞｻﾙｴﾙﾎﾞUEF4N	UNIVERSAL ELBOW, UEF4N	
11	641341000	2	ﾚｲﾛﾝﾁｭｰﾌﾞ500	TUBE, LYLON 500	
12	641337000	2	ﾚｲﾛﾝﾁｭｰﾌﾞ300	TUBE, LYLON 300	
13	646237000	2	ｽﾄｯﾊﾟZ 311	STOPPER Z 311	
14	533676001	2	ﾀﾞﾝﾈｼﾞ	SHOULDER SCREW	
15	645161001	1	ｼﾞｸ 17X57	SHAFT, 17X57	
16	645162000	1	ﾛｰﾗ NART17UUR	ROLLER, NART17UUR	
17	608782001	1	ｱﾅﾄﾒﾈｼﾞ6 ｸﾎﾞﾐﾄｸ	SET SCREW, SOCKET M6 SP	
18	637550001	1	ｽﾄｯﾊﾟD72	STOPPER D72	
19	533676001	2	ﾀﾞﾝﾈｼﾞ	SHOULDER SCREW	

8．X軸リミットスイッチ関係
X-AXIS LIMIT SWITCH

8.X軸ﾘﾐｯﾄｽｲｯﾁ関係

参照No Ref.No	部品ｺｰﾄﾞ Part Code	個数 Q'ty	品名 Part Name		備考 Remark
1	650184001	1	ｹﾞﾝﾃﾝﾄﾞｸﾞX229N	ORIGINAL POINT DOG, X229N	
2	650185001	1	ﾄﾞｸﾞX+OT229N	DOG, X+OT229N	
3	650186001	1	ﾄﾞｸﾞX-OT229N	DOG, X-OT229N	
4	018061231	6	ｱﾅﾎﾞﾙﾄ6X12	BOLT, SOCKET M6X12	
5	622032001	1	ｽﾍﾟｰｻﾊﾟｲﾌﾟ36	SPACER PIPE, 36	
6	018065031	2	ｱﾅﾎﾞﾙﾄ 6X50	BOLT, SOCKET M6X50	
7	653253001	1	Xﾌﾚｷｸﾐ250	X FLEXIBLE TUBE ASSY 250	
7-1	620264000	3	ｽｲｯﾁ SL1-P	SWITCH SLP-1	
7-2	622028001	1	X-LSﾌﾟﾚｰﾄ228	X-LS PLATE, 228	
7-3	052402505	6	ﾅﾍﾞｺﾊﾞﾈﾋﾗ4X25	SCREW, PAN (S/P WASHER) M4X25	

9. Y軸リミットスイッチ関係
Y-AXIS LIMIT SWITCH

9.Y軸リミットスイッチ関係

参照No Ref.No	部品コード Part Code	個数 Q'ty	品名 Part Name		備考 Remark
1	650187001	1	ドグY 229N	DOG, Y 229N	
2	653262001	1	LSYコード 250	LSY CABLE 250	
2-1	620264000	3	スイッチ SL1-P	SWITCH SLP-1	
2-2	650188001	1	LSプレートY-229N	YLS PLATE, 229N	
2-3	0A5402505	6	+ナベザクミ4X25DB	SCREW, PAN (S/P WASHER) M4X25	

10. Z軸リミットスイッチ関係
Z-AXIS LIMIT SWITCH

10.Z軸ﾘﾐｯﾄｽｲｯﾁ関係

参照No Ref.No	部品ｺｰﾄﾞ Part Code	個数 Q'ty	品名 Part Name		備考 Remark
1	622033001	1	ﾄﾞｸﾞZ-228	DOG, Z 228	
2	018061231	2	ｱﾅﾎﾞﾙﾄ6X12	BOLT, SOCKET M6X12	
3	653265001	1	LSZｺｰﾄﾞ 250	LSZ CABLE 250	
3-1	620264000	1	ｽｲｯﾁ SL1-P	SWITCH SLP-1	
3-2	626934000	2	ｽｲｯﾁZ-15GW22-B	SWITCH Z-15GW22-B	
3-3	626936000	2	ｽｲｯﾁｶﾊﾞｰAP-B	SWITCH COVER, AP-B	
3-4	653272001	1	LSﾄﾘｯｹｲﾀZ 250	LS PLATE Z,250	
3-5	626145002	1	LSﾄﾘｯｹｲﾀ S	LS PLATE, S	
3-6	650163001	1	Z-OTLSｲﾀ324N	Z-OTLS PLATE, 324N	
3-7	0A5402505	6	+ﾅﾍﾞｻﾞｸﾐ4X25DB	SCREW, PAN (S/P WASHER) M4X25	

11. ATCリミットスイッチ関係
ATC LIMIT SWITCH

11.ATCﾘﾐｯﾄｽｲｯﾁ関係

参照No Ref.No	部品ｺｰﾄﾞ Part Code	個数 Q'ty		品名 Part Name	備考 Remark
1	622034001	1	ATCﾄﾞｸﾞ228	DOG, ATC 228	
2	018061231	2	ｱﾅﾎﾞﾙﾄ6X12	BOLT, SOCKET M6X12	
3	653266001	1	LSｺｰﾄﾞATCｸﾐ250	ATC LS CABLE ASSY,250	
3-1	620264000	2	ｽｲｯﾁ SL1-P	SWITCH SLP-1	
3-2	645115001	2	ATCｹﾞﾝﾃﾝLSﾌﾟﾚｰﾄ	ATC ORIGNAL POINT LS PLATE	
3-3	0A5402505	4	+ﾅﾍﾞｻﾞｸﾐ4X25DB	SCREW, PAN (S/P WASHER) M4X25	

12. Zシートカバー関係（1／2）
Z SHEET COVER

12.Zシートカバー関係

参照No Ref.No	部品コード Part Code	個数 Q'ty	品名	Part Name	備考 Remark
1	653034001	1	シートカバークミ 250	SHEET COVER ASSY, 250	
1-1	645083001	1	シートカナグ クミ227	SHEET FIXTURE ASSY, 227	
1-2	610678001	2	Zシートローラクミホキュウ	Z SHEET ROLLER ASSY SUPPLY	
1-3	622093001	1	ローラササエ228	ROLLER SUPPORT, 228	
1-4	653032001	1	シートヨウウエイト 250	SHEET WEIGHT,250	
1-5	115639004	2	センターネジ クミ	CENTER SCREW ASSY	
2	018061231	4	アナボルト6X12	BOLT, SOCKET M6X12	
3	018061231	4	アナボルト6X12	BOLT, SOCKET M6X12	
4	018061231	3	アナボルト6X12	BOLT, SOCKET M6X12	
5	016102031	2	アナトガリ 10X20	SET SCREW, SOCKET (CN) M10X20	
6	012101031	2	アナヒラ 10X10	SET SCREW, SOCKET (FT) M10X10	
7	622097003	1	シートカバー 228	SHEET COVER,228	
8	018061231	2	アナボルト6X12	BOLT, SOCKET M6X12	
9	622717001	1	YウシロワイパL-2クミ	Y AXIS REAR WIPER, L-2 ASSY	
10	622719001	1	YウシロワイパR-2クミ	Y AXIS REAR WIPER, R-2 ASSY	
11	018060831	4	アナボルト6X8	BOLT, SOCKET M6X8	
12	018062531	2	アナボルト6X25	BOLT, SOCKET M6X25	
13	622038001	1	テーブルウシロカバー228	TABLE REAR COVER, 228	
14	018061231	4	アナボルト6X12	BOLT, SOCKET M6X12	
15	622086001	1	YジクアトカバーZ28	Y AXIS REAR COVER 228	
16	018061231	5	アナボルト6X12	BOLT, SOCKET M6X12	
17	622094001	4	スペーサ 30	SPACER, 30	
18	018061231	4	アナボルト6X12	BOLT, SOCKET M6X12	
19	693178001	1	アシノセキンシラベル40	CAUTION LABEL 40	

12. Zシートカバー関係（2／2）
Z SHEET COVER

12.Zシートカバー関係

参照No Ref.No	部品コード Part Code	個数 Q'ty	品名	Part Name	備考 Remark
1	653034001	1	シートカバークミ 250	SHEET COVER ASSY, 250	
1-1	645083001	1	シートカナグ クミ227	SHEET FIXTURE ASSY, 227	
1-2	610678001	2	Zシートローラクミホキュウ	Z SHEET ROLLER ASSY SUPPLY	
1-3	622093001	1	ローラササエ228	ROLLER SUPPORT, 228	
1-4	653032001	1	シートヨウウエイト 250	SHEET WEIGHT,250	
1-5	115639004	2	センターネジ クミ	CENTER SCREW ASSY	
2	018061231	4	アナボルト6X12	BOLT, SOCKET M6X12	
3	018061231	4	アナボルト6X12	BOLT, SOCKET M6X12	
4	018061231	3	アナボルト6X12	BOLT, SOCKET M6X12	
5	016102031	2	アナトガリ 10X20	SET SCREW, SOCKET (CN) M10X20	
6	012101031	2	アナヒラ 10X10	SET SCREW, SOCKET (FT) M10X10	
7	622097003	1	シートカバー 228	SHEET COVER,228	
8	018061231	2	アナボルト6X12	BOLT, SOCKET M6X12	
9	622717001	1	YウシロワイパL-2クミ	Y AXIS REAR WIPER, L-2 ASSY	
10	622719001	1	YウシロワイパR-2クミ	Y AXIS REAR WIPER, R-2 ASSY	
11	018060831	4	アナボルト6X8	BOLT, SOCKET M6X8	
12	018062531	2	アナボルト6X25	BOLT, SOCKET M6X25	
13	622038001	1	テーブルウシロカバー228	TABLE REAR COVER, 228	
14	018061231	4	アナボルト6X12	BOLT, SOCKET M6X12	
15	622086001	1	YジクアトカバーZ28	Y AXIS REAR COVER 228	
16	018061231	5	アナボルト6X12	BOLT, SOCKET M6X12	
17	622094001	4	スペーサ 30	SPACER, 30	
18	018061231	4	アナボルト6X12	BOLT, SOCKET M6X12	
19	693178001	1	アシノセキンシラベル40	CAUTION LABEL 40	

13. X テレスコカバー関係（標準仕様）
Telescopic cover X (Standard)

13.Xﾃﾚｽｺｶﾊﾞｰ関係（標準仕様）

参照No Ref.No	部品ｺｰﾄﾞ Part Code	個数 Q'ty	品名 Part Name		備考 Remark
1	653003001	2	ﾃﾚｽｺｶﾊﾞｰXｸﾐ 250	X TELESCOPIC COVER ASSY 250	
1-1	645051000	2	ﾜｲﾊﾟｰX-269	WIPER, X-269	
1-2	645044000	2	ﾜｲﾊﾟｰX-259	WIPER, X-259	
1-3	645053000	2	ﾜｲﾊﾟｰY-68R	WIPER, Y-68R	
1-4	645046000	2	ﾜｲﾊﾟｰY-61R	WIPER, Y-61R	
1-5	645054000	2	ﾜｲﾊﾟｰY-68L	WIPER, Y-68L	
1-6	645047000	2	ﾜｲﾊﾟｰY-61L	WIPER, Y-61L	
1-7	622189001	8	ｸｯｼｮﾝｺﾞﾑ228ｸﾐ	CUSHION RUBBER ASSY, 228	
1-8	622274001	8	ｸｯｼｮﾝｽﾎﾟﾝｼﾞｸﾐ	CUSHION SPONGE ASSY	
1-9	693178001	2	ｱｼﾉｾｷﾝｼﾗﾍﾞﾙ40	CAUTION LABEL 40	
2	653011001	2	ﾃﾚｽｺｻﾎﾟｰﾄX-R	TELESCOPIC SUPPORT X-R	
3	653010001	2	ﾃﾚｽｺｻﾎﾟｰﾄX-L	TELESCOPIC SUPPORT X-L	
4	622959001	8	ｱﾅﾎﾞﾙﾄﾊﾞﾈﾋﾗ6X16	BOLT, SOCKET (S/P WASHER) M6X12	
5	018061231	8	ｱﾅﾎﾞﾙﾄ6X12	BOLT, SOCKET M6X12	
6	638786001	6	ｱﾅﾎﾞﾙﾄﾊﾞﾈﾋﾗ6X12	BOLT, SOCKET (S/P WASHER) M6X12	

13. X テレスコカバー関係（ロングストローク仕様）
Telescopic cover X
(Long Stroke Specification)

13.Xﾃﾚｽｺｶﾊﾞｰ関係（ﾛﾝｸﾞｽﾄﾛｰｸ仕様）

参照No Ref.No	部品ｺｰﾄﾞ Part Code	個数 Q'ty	品名 Part Name		備考 Remark
1	653333001	2	ﾃﾚｽｺｶﾊﾞｰXｸﾐ SL	X TELESCOPIC COVER ASSY SL	
1-1	628873000	2	ﾜｲﾊﾟｰX1-225L	WIPER, X1- 225L	
1-2	645051000	2	ﾜｲﾊﾟｰX-269	WIPER, X-269	
1-3	645044000	2	ﾜｲﾊﾟｰX-259	WIPER, X-259	
1-4	644177001	2	ﾜｲﾊﾟｰSR-1 323	WIPER, SR-1 323	
1-5	645053000	2	ﾜｲﾊﾟｰY-68R	WIPER, Y-68R	
1-6	645046000	2	ﾜｲﾊﾟｰY-61R	WIPER, Y-61R	
1-7	644178001	2	ﾜｲﾊﾟｰSL-1 323	WIPER, SL-1 323	
1-8	645054000	2	ﾜｲﾊﾟｰY-68L	WIPER, Y-68L	
1-9	645047000	2	ﾜｲﾊﾟｰY-61L	WIPER, Y-61L	
1-10	622189001	12	ｸｯｼｮﾝｺﾞﾑ228ｸﾐ	CUSHION RUBBER ASSY, 228	
1-11	622274001	12	ｸｯｼｮﾝｽﾎﾟﾝｼﾞｸﾐ	CUSHION SPONGE ASSY	
1-12	693178001	2	ｱｼﾉｾｷﾝｼﾗﾍﾞﾙ40	CAUTION LABEL 40	
2	653343001	2	ﾃﾚｽｺｻﾎﾟｰﾄX-R SL	TELESCOPIC SUPPORT X-R SL	
3	653342001	2	ﾃﾚｽｺｻﾎﾟｰﾄX-L SL	TELESCOPIC SUPPORT X-L SL	
4	622959001	8	ｱﾅﾎﾞﾙﾄﾊﾞﾈﾋﾗ6X16	BOLT, SOCKET (S/P WASHER) M6X12	
5	018061231	8	ｱﾅﾎﾞﾙﾄ6X12	BOLT, SOCKET M6X12	
6	638786001	6	ｱﾅﾎﾞﾙﾄﾊﾞﾈﾋﾗ6X12	BOLT, SOCKET (S/P WASHER) M6X12	

14. Y テレスコカバー関係
Telescopic cover Y

14.Yﾃﾚｽｺｶﾊﾞｰ関係

参照No Ref.No	部品ｺｰﾄﾞ Part Code	個数 Q'ty	品名 Part Name		備考 Remark
1	653012001	1	ﾃﾚｽｺｶﾊﾞｰYｸﾐ 250	Y TELESCOPIC COVER ASSY 250	
1-1	645074000	1	ﾜｲﾊﾟｰY-476	WIPER, Y-476L	
1-2	645070000	1	ﾜｲﾊﾟｰY-466	WIPER, Y-466	
1-3	645063000	1	ﾜｲﾊﾟｰY-456	WIPER, Y-456	
1-4	645053000	1	ﾜｲﾊﾟｰY-68R	WIPER, Y-68R	
1-5	645046000	1	ﾜｲﾊﾟｰY-61R	WIPER, Y-61R	
1-6	645065000	1	ﾜｲﾊﾟｰY-54R	WIPER, Y-54R	
1-7	645054000	1	ﾜｲﾊﾟｰY-68L	WIPER, Y-68L	
1-8	645047000	1	ﾜｲﾊﾟｰY-61L	WIPER, Y-61L	
1-9	645066000	1	ﾜｲﾊﾟｰY-54L	WIPER, Y-54L	
1-10	622189001	6	ｸｯｼｮﾝｺﾞﾑ228ｸﾐ	CUSHION RUBBER ASSY, 228	
1-11	622274001	6	ｸｯｼｮﾝｽﾎﾟﾝｼﾞｸﾐ	CUSHION SPONGE ASSY	
1-12	693178001	1	ｱｼﾉｾｷﾝｼﾗﾍﾞﾙ40	CAUTION LABEL 40	
2	653022001	1	ﾃﾚｽｺｻﾎﾟｰﾄY-R	TELESCOPIC SUPPORT Y-R	
3	653021001	1	ﾃﾚｽｺｻﾎﾟｰﾄY-L	TELESCOPIC SUPPORT Y-L	
4	622959001	4	ｱﾅﾎﾞﾙﾄﾊﾞﾈﾋﾗ6X16	BOLT, SOCKET (S/P WASHER) M6X12	
5	018061231	4	ｱﾅﾎﾞﾙﾄ6X12	BOLT, SOCKET M6X12	
6	638786001	3	ｱﾅﾎﾞﾙﾄﾊﾞﾈﾋﾗ6X12	BOLT, SOCKET (S/P WASHER) M6X12	

15. 扉関係（1／2）
DOOR

A- A

15.扉関係

参照No Ref.No	部品ｺｰﾄﾞ Part Code	個数 Q'ty	品名 Part Name		備考 Remark
1	652231001	4	ﾄﾞｱﾚｰﾙ	DOOR RAIL	STD
	653351001	4	ﾄﾞｱﾚｰﾙ 250L	DOOR RAIL 250L	LONG STROKE
2-1	628179000	8	ﾛｰﾗ 215	ROLLER, 215	
2-2	628194001	8	ﾛｰﾗｼﾞｸ 30	ROLLER SHAFT, 30	
2-3	025080232	24	ﾋﾗｻﾞｶﾞﾈﾁｭｳ8	WASHER, PLAIN M 8	
2-4	021080102	8	ﾅｯﾄ1ｼｭ8	NUT, 1 M8	
3	639423001	2	ﾄﾋﾞﾗﾏﾄﾞU29	DOOR WINDOW U29	
4	639421001	4	ﾄﾋﾞﾗﾊﾟｯｷﾝﾀﾃ	DOOR PACKING 1	
5	639422001	4	ﾄﾋﾞﾗﾊﾟｯｷﾝﾖｺ	DOOR PACKING 2	
6	646237000	6	ｽﾄｯﾊﾟZ 311	STOPPER Z 311	STD
	651022001	8	ｸｯｼｮﾝｽﾎﾟﾝｼﾞｸﾐ	CUSHION SPONGE10,ASSY	LONG STROKE
7	533676001	6	ﾀﾞﾝﾈｼﾞ	SHOULDER SCREW	STD
	002300405	4	+ﾅﾍﾞｺ 3×4	SCREW,PAN M3×4	LONG STROKE
8	645117001	3	ｽﾍﾟｰｻ 36	SPACER, 36	
9	645027000	4	ｼﾞｸｳｹDR19B1-14	BEARING, DR19B1-14	

15. 扉関係（2/2）
DOOR

15.扉関係

参照No Ref. No	部品ｺｰﾄﾞ Part Code	個数 Q'ty	品名 Part Name		備考 Remark
1	652231001	4	ﾄﾞｱﾚｰﾙ	DOOR RAIL	STD
	653351001	4	ﾄﾞｱﾚｰﾙ 250L	DOOR RAIL 250L	LONG STROKE
2-1	628179000	8	ﾛｰﾗ 215	ROLLER, 215	
2-2	628194001	8	ﾛｰﾗｼﾞｸ 30	ROLLER SHAFT, 30	
2-3	025080232	24	ﾋﾗｻﾞｶﾞﾈﾁｭｳ8	WASHER, PLAIN M 8	
2-4	021080102	8	ﾅｯﾄ1ｼｭ8	NUT, 1 M8	
3	639423001	2	ﾄﾋﾞﾗﾏﾄﾞU29	DOOR WINDOW U29	
4	639421001	4	ﾄﾋﾞﾗﾊﾟｯｷﾝﾀﾃ	DOOR PACKING 1	
5	639422001	4	ﾄﾋﾞﾗﾊﾟｯｷﾝﾖｺ	DOOR PACKING 2	
6	646237000	6	ｽﾄｯﾊﾟZ 311	STOPPER Z 311	STD
	651022001	8	ｸｯｼｮﾝｽﾎﾟﾝｼﾞｸﾐ	CUSHION SPONGE10, ASSY	LONG STROKE
7	533676001	6	ﾀﾞﾝﾈｼﾞ	SHOULDER SCREW	STD
	002300405	4	+ﾅﾍﾞｺ 3×4	SCREW, PAN M3×4	LONG STROKE
8	645117001	3	ｽﾍﾟｰｻ 36	SPACER, 36	
9	645027000	4	ｼﾞｸｳｹDR19B1-14	BEARING, DR19B1-14	

16. カバー関係（1／2）
COVER

16.ｶﾊﾞｰ関係

参照No Ref. No	部品ｺｰﾄﾞ Part Code	個数 Q' ty	品名 Part Name		備考 Remark
1	653087001	1	ｽﾌﾟﾗｯｼｭL 250	SPLASH GUARD L 250	STD
	653350001	1	ｽﾌﾟﾗｯｼｭL 250L	SPLASH GUARD L 250L	LONG STROKE
2	653086001	1	ｽﾌﾟﾗｯｼｭR 250	SPLASH GUARD R 250	STD
	653349001	1	ｽﾌﾟﾗｯｼｭR 250L	SPLASH GUARD R 250L	LONG STROKE
3	653214001	1	ｶｲｾｲRｶﾊﾞｰ	REGENERATIVE RESISTANCE COVER	
4	622086001	1	Yｼﾞｸｱﾄｶﾊﾞｰ228	Y AXIS REAR COVER 228	
5	653154001	1	ﾃﾝｼﾞｮｳｶﾊﾞｰｸﾐ250	CEILING COVER ASSY, 250	STD
	653372001	1	ﾃﾝｼﾞｮｳｶﾊﾞｰｸﾐ SL	CEILING COVER ASSY, SL	LONG STROKE
6	653098001	1	ﾃﾝｼﾞｮｳｶﾊﾞｰﾏｴ	FRONT CEILING COVER	STD
	653359001	1	ﾃﾝｼﾞｮｳｶﾊﾞｰﾏｴ L	FRONT CEILING COVER L	LONG STROKE
7	653158001	1	ﾃﾝｼﾞｮｳｶﾊﾞｰﾏｴ1	FRONT CEILING COVER 1	STD
	653366001	1	ﾃﾝｼﾞｮｳｶﾊﾞｰﾏｴ HL	FRONT CEILING COVER HL	LONG STROKE
8	650990001	2	ｻｲﾄﾞｶﾊﾞｰｸﾐ31A	SIDE COVER ASSY, 31A	
9	650050003	1	ﾏｶﾞｼﾞﾝｶﾊﾞｰ14L	MAGAZINE COVER 14L	
10	650052003	1	ﾏｶﾞｼﾞﾝｶﾊﾞｰ14R	MAGAZINE COVER 14R	
11	653091001	1	ﾄﾞｱLｸﾐ 250	L DOOR ASSY, 250	STD
	653354001	1	ﾄﾞｱLｸﾐ 250L	L DOOR ASSY, 250L	LONG STROKE
12	653089001	1	ﾄﾞｱRｸﾐ 250	R DOOR ASSY, 250	STD
	653352001	1	ﾄﾞｱRｸﾐ 250L	R DOOR ASSY, 250L	LONG STROKE

16. カバー関係（2／2）
COVER

16.ｶﾊﾞｰ関係

参照No Ref. No	部品ｺｰﾄﾞ Part Code	個数 Q'ty	品名 Part Name		備考 Remark
1	653087001	1	ｽﾌﾟﾗｯｼｭL 250	SPLASH GUARD L 250	STD
	653350001	1	ｽﾌﾟﾗｯｼｭL 250L	SPLASH GUARD L 250L	LONG STROKE
2	653086001	1	ｽﾌﾟﾗｯｼｭR 250	SPLASH GUARD R 250	STD
	653349001	1	ｽﾌﾟﾗｯｼｭR 250L	SPLASH GUARD R 250L	LONG STROKE
3	653214001	1	ｶｲｾｲRｶﾊﾞｰ	REGENERATIVE RESISTANCE COVER	
4	622086001	1	Yｼﾞｸｱﾄｶﾊﾞｰ228	Y AXIS REAR COVER 228	
5	653154001	1	ﾃﾝｼﾞｮｳｶﾊﾞｰｸﾐ250	CEILING COVER ASSY, 250	STD
	653372001	1	ﾃﾝｼﾞｮｳｶﾊﾞｰｸﾐ SL	CEILING COVER ASSY, SL	LONG STROKE
6	653098001	1	ﾃﾝｼﾞｮｳｶﾊﾞｰﾏｴ	FRONT CEILING COVER	STD
	653359001	1	ﾃﾝｼﾞｮｳｶﾊﾞｰﾏｴ L	FRONT CEILING COVER L	LONG STROKE
7	653158001	1	ﾃﾝｼﾞｮｳｶﾊﾞｰﾏｴ1	FRONT CEILING COVER 1	STD
	653366001	1	ﾃﾝｼﾞｮｳｶﾊﾞｰﾏｴ HL	FRONT CEILING COVER HL	LONG STROKE
8	650990001	2	ｻｲﾄﾞｶﾊﾞｰｸﾐ31A	SIDE COVER ASSY, 31A	
9	650050003	1	ﾏｶﾞｼﾞﾝｶﾊﾞｰ14L	MAGAZINE COVER 14L	
10	650052003	1	ﾏｶﾞｼﾞﾝｶﾊﾞｰ14R	MAGAZINE COVER 14R	
11	653091001	1	ﾄﾞｱLｸﾐ 250	L DOOR ASSY, 250	STD
	653354001	1	ﾄﾞｱLｸﾐ 250L	L DOOR ASSY, 250L	LONG STROKE
12	653089001	1	ﾄﾞｱRｸﾐ 250	R DOOR ASSY, 250	STD
	653352001	1	ﾄﾞｱRｸﾐ 250L	R DOOR ASSY, 250L	LONG STROKE

17. ドアインターロック
DOOR INTERLOCK

17.ﾄﾞｱｲﾝﾀｰﾛｯｸ

参照No Ref.No	部品ｺｰﾄﾞ Part Code	個数 Q'ty	品名 Part Name		備考 Remark
1	650827001	1	ﾄﾞｱﾛｯｸLS D4DL	DOOR LOCK LS D4DL	
2	018401631	3	ｱﾅﾎﾞﾙﾄ 4X16	BOLT, SOCKET M4X16	
3	650826001	1	ﾄﾞｱﾛｯｸｷｰD4DS-K1	DOOR LOCK KEY, D4DS-K1	
4	653126001	1	ﾄﾞｱｱｸﾁｭｴｰﾀｲﾀ 250	DOOR ACTUATOR PLATE	
5	0A5401205	4	+ﾅﾍﾞｻﾞｸﾐ4X12DB	SCREW, PAN (S/P WASHER) M4X12	

18. エアーブラスト関係
AIR BLAST

18ｴｱﾌﾞﾗｽﾄ関係

参照No Ref.No	部品ｺｰﾄﾞ Part Code	個数 Q'ty	品名 Part Name		備考 Remark
1	645208000	1	ﾁｭｰﾌﾞ 8X3500	TUBE, 8X3500	
2	628213000	1	ｽﾋﾟｺﾝSC3G-6-8I	SPEED CONTROLLER, SC3G-6-8I	
3	652318001	1	ｴｱﾌﾞﾗｽﾄ22Aｸﾐ	AIR BLAST ASSY 22A	

19. エアユニット関係 AIR UNIT

19.エアユニット関係

参照No Ref.No	部品コード Part Code	個数 Q'ty	品名 Part Name		備考 Remark
1	653067001	1	エアユニットクミ 250	AIR UNIT ASSY, 250	
1-1	653068001	1	エアプレート 250	AIR PLATE, 250	
1-2	628205000	1	フイルタ レギュレータ	FILTER REGURATOR	
1-3	018060831	2	アナボルト6X8	BOLT, SOCKET M6X8	
1-4	653106001	1	クーラントバルブクミ250	COOLANT VALVE ASSY, 250	
1-5	622808001	2	FRロックカナグ	FR LOCK PLATE	
1-6	018060831	4	アナボルト6X8	BOLT, SOCKET M6X8	
1-7	637678001	1	レギュレータR151-02	REGURATOR, R151-02	
1-8	018060831	2	アナボルト6X8	BOLT, SOCKET M6X8	
1-9	652318001	1	エアブラスト22Aクミ	AIR BLAST ASSY 22A	
1-10	650576001	1	バルブ243-4E2クミ	VALVE ASSY, 243-4E2	
1-11	0A5305005	2	+ナベザクミ3X50DB	SCREW, PAN M3X50 DB	
1-12	628627000	1	ルブリケータL300-02	LUBRICATOR, L300-02	
1-13	018060831	2	アナボルト6X8	BOLT, SOCKET M6X8	

20. クーラント配管
COOLANT PIPING

20.ｸｰﾗﾝﾄ配管

参照No Ref. No	部品ｺｰﾄﾞ Part Code	個数 Q'ty	品名 Part Name		備考 Remark
1	652268001	1	ﾊﾞﾙﾌﾞVNC201Bｸﾐ	VALVE ASSY, VNC201B	
2	653147001	2	ﾉｽﾞﾙ1/2-ｴﾙﾎﾞ	ELBOW AND NOZLE 1/2	
3	653106001	1	ｸｰﾗﾝﾄﾊﾞﾙﾌﾞｸﾐ250	COOLANT VALVE ASSY, 250	

21. クーラントタンク　50L関係
COOLANT TANK 50L

21.ｸｰﾗﾝﾄﾀﾝｸ50L

参照No Ref.No	部品ｺｰﾄﾞ Part Code	個数 Q'ty	品名 Part Name		備考 Remark
1	645431002	1	ｸｰﾗﾝﾄﾀﾝｸ50-2ｸﾐ2	COOLANT TANK ASSY2,50-2	
1-1	651042001	1	ｸｰﾗﾝﾄﾎﾟﾝﾌﾟ180W	COOLANT PUMP,180W	

22. クーラントタンク100L関係
COOLANT TANK 100L

22.ｸｰﾗﾝﾄﾀﾝｸ100L

参照No Ref.No	部品ｺｰﾄﾞ Part Code	個数 Q'ty	品名 Part Name		備考 Remark
1	645460002	1	Cﾀﾝｸ100-2ｸﾐ#2	COOLANT TANK ASSY2, 100-2	
1-1	651043001	2	ｸｰﾗﾝﾄﾎﾟﾝﾌﾟ250W	COOLANT PUMP, 250W	

23. クーラントタンク150L関係
COOLANT TANK 150L

23.ｸｰﾗﾝﾄﾀﾝｸ150L関係

参照No Ref.No	部品ｺｰﾄﾞ Part Code	個数 Q'ty	品名 Part Name		備考 Remark
1	622105002	1	Cﾀﾝｸ150L228 ｸﾐ1	COOLANT TANK ASSY1, 150-228	
1-1	651044001	1	ｸｰﾗﾝﾄﾎﾟﾝﾌﾟ400W	COOLANT PUMP, 400W	
1-2	651043001	1	ｸｰﾗﾝﾄﾎﾟﾝﾌﾟ250W	COOLANT PUMP, 250W	

24. クーラントタンク150L（オイルホールポンプ付）
COOLANT TANK 150L(OIL HOLE PUMP)

24.クーラントタンク150L(オイルホールポンプ付)

参照No Ref.No	部品コード Part Code	個数 Q'ty	品名 Part Name		備考 Remark
1	622103002	1	Cタンク150L228 クミ2	C TANK ASSY, 150L 228-2	
1-1	651044001	1	クーラントポンプ400W	COOLANT PUMP, 400W	
1-2	651043001	1	クーラントポンプ250W	COOLANT PUMP, 250W	
1-3	622711001	1	ポンプ750 ホキュウ	PUMP, 750 SUPPLY	
1-4	622130001	1	ポンプ 750	PUMP, 750	
1-5	622157001	1	レバーロックカプラ P	LEVER LOCK COUPLING, P	
1-6	622158001	1	レバーロックカプラ S	LEVER LOCK COUPLING, S	
1-7	622135001	1	アツリヨクケイ0-25	PRESSURE GAUGE, 0-25	
1-8	622133001	1	サクシヨンフイルターSFNO6	SUCTION FILTER, SFNO6	

25. 工具折損検出装置（1／2）
TOOL BREAKAGE DETECTION UNIT（1／2）

25.工具折損検出装置(1of2)

参照No Ref.No	部品ｺｰﾄﾞ Part Code	個数 Q'ty	品名 Part Name		備考 Remark
1	622256001	1	ｵﾚｹﾝﾎﾝﾀｲ	BODY, TOOL DETECTOR	
2	652270001	1	ｵﾚｹﾝﾊﾞﾙﾌﾞｸﾐ	TOOL DETECTOR VALVE ASSY	
3	0A5400605	2	+ﾅﾍﾞｻﾞｸﾐ4X6	SCREW, PAN (S/P WASHER) M4X6	
4	647490000	1	ﾅｲﾛﾝﾁｭｰﾌﾞ4X280	NYLON TUBE 4X280	
5	622923001	1	ﾅｲﾛﾝﾁｭｰﾌﾞ4X240	NYRON TUBE 4X240	
6	650323001	1	ｶｲﾃﾝｼﾞｸｸﾐNEW	ROTATINOL SHAFT, TOOL NEW	
7	650321001	4	ｱﾅﾎﾞﾙﾄ5X8ﾄｸ	BOLT, SOCKET M5X8(SP)	
8	650322001	1	ｵﾚｹﾝｽﾄｯﾊﾟNEW	NEW TOOL DETECTOR STOPPER	
9	018400831	2	ｱﾅﾎﾞﾙﾄ4X8	BOLT, SOCKET M4X8	
10	028040242	2	ﾊﾞﾈｻﾞｶﾞﾈ2.4	WASHER, SPRING 2-4	
11	025040232	2	ﾋﾗｻﾞｶﾞﾈﾁｭｳ4	WASHER, PLAIN M 4	
12	639646001	2	ｽﾄｯﾊﾟ732	STOPPER 732	
13	639647001	2	ｽﾍﾟｰｻ4X2	SPACER, 4X2	
14	000400605	2	+ﾊﾞｲﾝﾄﾞ 4X6	SCREW, BIND M4X6	
15	652646001	1	ｼﾘﾝﾀﾞ10X60ｸﾐ22A	CYLINDER ASSY, 10X60 22A	
16	622263001	1	ｵﾚｹﾝｺﾞﾑｵｻｴ1	RUBBER HOLDER 1, TOOL DETECTOR	
17	650321001	2	ｱﾅﾎﾞﾙﾄ5X8ﾄｸ	BOLT, SOCKET M5X8(SP)	
18	622269001	1	ｵﾚｹﾝｺﾞﾑｵｻｴ2	RUBBER HOLDER 2, TOOL DETECTOR	
19	018401031	1	ｱﾅﾎﾞﾙﾄ4X10	BOLT, SOCKET M4X10	
20	025040232	1	ﾋﾗｻﾞｶﾞﾈﾁｭｳ4	WASHER, PLAIN M 4	

25. 工具折損検出装置（2／2）
TOOL BREAKAGE DETECTION UNIT（2／2）

25.工具折損検出装置(2of2)

参照No Ref.No	部品ｺｰﾄﾞ Part Code	個数 Q'ty	品名 Part Name		備考 Remark
21	622268001	1	ｵﾚｹﾝｺﾞﾑ2	RUBBER 2, TOOL DETECTOR	
22	018300631	2	ｱﾅﾎﾞﾙﾄ3X6	BOLT, SOCKET M3X6	
23	026030235	2	ﾋﾗｻﾞｶﾞﾈﾐｶﾞｷ3	WASHER, PLAIN M 3	
24	622257001	1	ｵﾚｹﾝﾌﾀ	COVER, TOOL DETECTOR	
25	018400831	4	ｱﾅﾎﾞﾙﾄ4X8	BOLT, SOCKET M4X8	
26	026040235	4	ﾋﾗｻﾞｶﾞﾈﾐｶﾞｷ 4	WASHER, PLAIN M4	
27	638494001	1	ｵﾚｹﾝｱｰﾑNEW	TOOL DETECTOR ARM, NEW	
28	638493001	1	ｵﾚｹﾝｾﾝｻｽﾃｲNEW	TOOL DETECTOR SENSOR STAY, NEW	
29	018500831	2	ｱﾅﾎﾞﾙﾄ5X8	BOLT, SOCKET M5X8	
30	638495001	1	ｵﾚｹﾝｾﾝｻｶﾊﾞｰNEW	SENSOR COVER, TOOL DETECTOR NEW	
31	018500831	2	ｱﾅﾎﾞﾙﾄ5X8	BOLT, SOCKET M5X8	
32	652643001	1	ｵﾚｹﾝｾﾝｻｸﾐ22A	SENSOR, TOOL DETECTOR 22A	
33	652585001	1	TOOLｺｰﾄﾞ22A	TOOL CABLE 22A	

26. 自動扉
AUTOMATIC DOOR

26.自動扉

参照No Ref.No	部品ｺｰﾄﾞ Part Code	個数 Q'ty	品名 Part Name		備考 Remark
1	628627000	1	ﾙﾌﾞﾘｹｰﾀL300-02	LUBRICATOR, L300-02	
2	650576001	1	ﾊﾞﾙﾌﾞ243-4E2ｸﾐ	VALVE ASSY, 243-4E2	
3	653165001	1	ｽﾌﾟﾘﾝｸﾞｼｬﾌﾄ	SPRING SHAFT	
4	653164001	1	ｽﾌﾟﾘﾝｸﾞｳｹ	SPRING STAY	
5	638787001	2	ｱﾅﾎﾞﾙﾄﾊﾞﾈﾋﾗ5X12	BOLT, SOCKET (S/P WASHER) M5X12	
6	653163001	1	ｼﾘﾝﾀﾞｰﾌｯｸ 250	CYLINDER HOOK, 250	
7	639023001	1	ｼﾘﾝﾀﾞｶﾅｸﾞ204	CYLINDER BRACKET, 204	
8	651075001	1	ｽﾌﾟﾘﾝｸﾞ2.3X32	SPRING , 2. 3X32	
9	622959001	1	ｱﾅﾎﾞﾙﾄﾊﾞﾈﾋﾗ6X16	BOLT, SOCKET (S/P WASHER) M6X12	
10	637955001	2	ﾕﾆｵﾝﾃｲUT6	UNION TEE, UT6	
11	638907001	1	ｽﾋﾟｺﾝSSU6	SPEED CONTROLLER, SSU6	
12	638906001	1	ADｽﾋﾟｺﾝﾌﾞﾗｹｯﾄ	AD SPEED CONTROLLER BRACKET	
13	638787001	2	ｱﾅﾎﾞﾙﾄﾊﾞﾈﾋﾗ5X12	BOLT, SOCKET (S/P WASHER) M5X12	
14	650976002	1	ﾄﾋﾞﾗｼﾘﾝﾀﾞ31A	DOOR CYLINDER, 31A	
15	638787001	4	ｱﾅﾎﾞﾙﾄﾊﾞﾈﾋﾗ5X12	BOLT, SOCKET (S/P WASHER) M5X12	
16	638905001	1	ﾏｲｸﾛﾊﾞﾙﾌﾞKMC	MICRO VALVE KMC	

40. 制御箱関係

CONTROL BOX

A VIEW　　B VIEW

C VIEW

40. 制御箱関係
CONTROL BOX

参照No	部品ｺｰﾄﾞ	個数	品名		ﾊﾟｰﾂｼﾝﾎﾞﾙ	備考	
Ref.No	Part Code	Q'ty	Part Name		Part Symbol	Remark	
1	616365***	1	NCｷﾊﾞﾝｸﾐ A10#□C	NC PCB ASSY A10#□C	NC PCB	B52J090-4以降(□=4以降) CG PCB付	AfterB52J090-4(□=4 or higher) on CG PCB
2	616468***	1	ｽﾚｰﾌﾞｷﾊﾞﾝｸﾐA00	SLAVE P.C.B. ASSY A00	SLAVE PCB		
3	654846***	1	MEMﾕﾆｯﾄNTｸﾐA00J	MEM UNIT NT ASSY A00J	MEM PCB	日本語	JAPANESE
3	654848***	1	MEMﾕﾆｯﾄNTｸﾐA00E	MEM UNIT NT ASSY A00E	MEM PCB	日本以外	EXCEPT JP
4	654683***	1	IOｷﾊﾞﾝｸﾐ A00ﾎｷｭｳ	IO BOARD ASSY A00 SUPPLY	IO PCB		
5	654529***	1	EXIOｷﾊﾞﾝｸﾐ A00	EXIO BOARD ASSY A00	EXIO PCB		
6	653271***	1	ATCｷﾊﾞﾝｸﾐ A00	ATC P.C.B. ASSY A00	ATC PCB		
11	622581001	1	ﾌﾞﾚｰｶEG33B/30 E	BREAKER EG33B/30E	ELB	200V	200V
11	638321001	1	ﾌﾞﾚｰｶEG33B/20 E	BREAKER EG33B/20E	ELB	400V	400V
11	638135001	1	ﾌﾞﾚｰｶSA33B/15 T	BREAKER SA33B/15T	NFB	EU	EU
12	655629001	1	ﾊﾞﾘｽﾀ 200V ｸﾐ	VARISTOR 200V ASSY	VRSTR	200V	200V
12	655630001	1	ﾊﾞﾘｽﾀ 400V ｸﾐ	VARISTOR 400V ASSY	VRSTR	400V	400V
12	655631001	1	ﾊﾞﾘｽﾀ 400V ｸﾐEP	VARISTOR 400V ASSY EP	VRSTR	EU	EU
13	622464001	1	ｻｰﾓｾﾝｻOP-62 75	THERMAL SENSOR OP-62 75	BOH		
14	654267001	1	ﾄﾗﾝｽ1 5.7K 400V	TRANSFORMER 1 5.7K 400V	T1	400V	400V
14	654268001	1	ﾄﾗﾝｽ1 5. 7K EU	TRANSFORMER 1 5.7K EU	T1	EU	EU
15	6A3891001	1	ﾄﾗﾝｽ2 0. 6K 200V	TRANSFORMER 2 0.6K 200V	T2		
15	654273001	1	ﾄﾗﾝｽ2 1. 0K EU	TRANSFORMER 2 1.0K EU	T2	EU	EU
16	654557001	1	ﾃﾞﾝｹﾞﾝLDA30F-5X	AVR LDA30F-5X	AVR1		
17	654261101	1	AVR LDA100W-24 X	AVR LDA100W-24 X	AVR2		
18	654276001	1	ﾘﾚｰSD-N35 DC24V	RELAY SD-N35 DC24V	KS1		
18-1	653244001	1	ｻｲﾄﾞｵﾝUN-AX11CX	SIDE ON UN-AX11CX	KS1		
19	635998001	1	ﾘﾚｰSD-Q11	RELAY SD-Q11	KC1		
20	622484001	5	ﾌｧﾝ4715PS10TB30	FAN 4715PS10TB30-B00	FAN1、2、3、4、5		
21	618674001	1	ﾌﾞﾚｰｶEA32	BREAKER EA32	Q2		
22	616075001	3	Gﾋｭｰｽﾞ 8A	G FUSE 8A	Q3		
22	638294075	1	ﾌﾞﾚｰｶBAB3175211	BREAKER BAB3175211	Q3	EU	EU
25	653283001	1	ﾌｨﾙﾀNF3020C-RQ2	FILTER NF3020C-RQ2	Z1	EU	EU
30	638376001	1	ﾊﾝﾄﾞﾙBZ-V20C	HANDLE, BZ-V20C			
30	626986001	1	ﾅﾝｷﾝｼﾞｮｳ1000－30	PADLOCK 1000-30			
31	654082001	1	ﾃﾞﾝﾁﾎﾙﾀﾞｸﾐ31A	BATTERY HOLDER ASSY 31A	BAT1、2		
32	652550080	2	ﾄﾘﾑｼｰﾙ22A	TRIMSEAL 22A	L800		
33	652550100	2	ﾄﾘﾑｼｰﾙ22A	TRIMSEAL 22A	L1000		
34	610142001	1	ﾌｶｼﾞｸPLﾊﾟｯｷﾝ22A	OP-AXIS PL PACKING 22A			
51	618517***	1	ｱﾝﾌﾟPY9A150	AMP PY9A150	SP AMP	10k・16k	10k・16k
52	654671***	1	ｱﾝﾌﾟPY2C030	AMPLIFIER PY2C030	X AMP		
53	654671***	1	ｱﾝﾌﾟPY2C030	AMPLIFIER PY2C030	Y AMP		
54	654678***	1	ｱﾝﾌﾟPY9A050	AMPLIFIER PY9A050	Z AMP		
57, 58	616199001	1	ﾃｲｺｳ500W14ﾎｷｭｳｸﾐ	RESISTER 500W14B	RSP1, RSP2	ｻｰﾏﾙ付	with Thermal
59	638082001	1	ﾘｱｸﾄﾙTR-1704B	REACTLE TR-1704B	ACL1	10k	10k
59	638348001		ﾘｱｸﾄﾙTR-2518	ACL TR-2518	ACL1	16k	16k
60	654078001	1	ｺｳｶﾝﾖｳﾌｨﾙﾀｰ	Fan Filter			
61	610308001	1	ﾖﾋﾞﾋｭｰｽﾞ SFAN	SPARE FUSE SET SFAN			

41. 操作箱関係
OPERATION BOX

41. 操作箱 関係
OPERATION BOX

参照No Ref.No	部品ｺｰﾄﾞ Part Code	個数 Q'ty		品名 Part Name	ﾊﾟｰﾂｼﾝﾎﾞﾙ Part Symbol	備考 Remark
1	643690000	1	LED DB00−68B G	LED DB00−68B G	LED ST	
2	643691000	1	LED DB00−68B G	LED DB00−68B G	LED STP	
3	654102001	1	SW AR22FOR-10G	SW AR22 FOR-10G	SW ST	
4	654104001	1	SW AR22FOR-10R	SW AR22 FOR-10R	SW STP	
5	654444001	1	SWAR22JCR3B174A	SW AR22 JCR 3B 174A	SW PRT	
6	654317001	1	ｽｲｯﾁSECｸﾐ31A	SW SEC ASSY, 31A	SW SEC	
8	654313001	1	ｽｲｯﾁFOVｸﾐ	SW FOV ASSY	RSFOV	
	636844001	1	ﾂﾏﾐ B30	NOB B30		
9	654491001	1	SW AH165 TGL5Gﾄｸ	SW AH165TGL5G SPECIAL	SW PW	
10	654109001	1	SW AR22VOR-01R	SW AR22 VOR-01R	SW EM	
11	654314001	1	ｽｲｯﾁMOVｸﾐ	SW MOV ASSY	RSMOV	
	636844001	1	ﾂﾏﾐ B30	NOB B30		
12	654476001	1	ｿｳｻﾊｺﾊﾟﾈﾙ22A J	OPERATION BOX PANEL, 22A J		日本語 JAPANESE
12	654476101	1	ｿｳｻﾊｺﾊﾟﾈﾙ22A E	OPERATION BOX PANEL, 22A E		英語 ENGLISH
13	654497001	1	LCDｲﾝﾊﾞｰﾀｸﾐ	LCD INVERTER ASSY		
14	654496001	1	LCDｸﾐ	LCD ASSY	LCD	
15	654121001	1	LCDﾌｨﾙﾀ	LCD FILTER		
16	6541320**	1	ｷｰﾎﾞｰﾄﾞｸﾐJ	KEYBOARD ASSY, J	KEY PCB	日本語 JAPANESE
	6541321**	1	ｷｰﾎﾞｰﾄﾞｸﾐE	KEYBOARD ASSY, E	KEY PCB	英語 ENGLISH
17	638140001	1	ﾃﾞﾝｹﾞﾝ LDC30F-1	AVR LDC30F-1	AVR3	
18	654116001	1	ｹｰﾌﾞﾙCNRS 31A	CABLE CNRS, 31A		
19	654125001	2	ﾊﾟｯｷﾝ3X12X305	PACKING, 3X12X305		
20	654477001	2	ﾊﾟｯｷﾝ3X12X614	PACKING, 3X12X614		

42. ケーブル関係
CABLE

42. ケーブル関係
CABLE

参照No Ref.No	部品ｺｰﾄﾞ Part Code	個数 Q'ty		品名 Part Name		備考 Remark
1	653249001	1	SENCｺｰﾄﾞ ｸﾐ250	SENCODER CORD ASSY, 250		
2	653252001	1	Sﾓｰﾀｺｰﾄﾞｸﾐ 250	S MOTOR CORD ASSY, 250		
3	653253001	1	Xﾌﾚｷｸﾐ250	X FLEXIBLE TUBE ASSY, 250		
4	653260001	1	YENCｺｰﾄﾞ250	Y ENCODER CORD, 250		
5	653261001	1	Yﾓｰﾀｺｰﾄﾞ250	Y MOTOR CORD, 250		
6	653262001	1	LSYｺｰﾄﾞ250	LSY CORD, 250		
7	652536001	1	ZENCｺｰﾄﾞ22A	Z ENCODER CORD, 22A		
8	652525001	1	Zﾓｰﾀｺｰﾄﾞ22A	Z MOTOR CORD, 22A		
9	653265001	1	LSZｺｰﾄﾞ250	LSZ CORD, 250		
10	653266001	1	LSｺｰﾄﾞATCｸﾐ250	LS CORD ATC ASSY 250		
11	653065001	1	ATCﾓｰﾀｺｰﾄﾞ 250	ATC MOTOR CORD 250		
12	653064001	1	ATCENCｺｰﾄﾞｸﾐ 250	ATC ENCODER CORD ASSY 250		
13	650245001	1	ATCCAMｽｲｯﾁｸﾐ229	ATC CAM SWITCH ASSY 229		
14	654093001	1	KEYｺｰﾄﾞｸﾐ31A	KEY CORD ASSY, 31A		
15	654187001	1	SWｺｰﾄﾞｸﾐ31A	SW CORD ASSY, 31A		
16	654186001	1	K200ｺｰﾄﾞｸﾐ31A	K200 CORD ASSY, 31A		

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使用電線一覧表 Table of used selectric wires	
22mm²(AWG4)	適用電流 65Amax(UL1283相当)
14mm²(AWG6)	適用電流 46Amax(UL1283相当)
8.0mm²(AWG8)	適用電流 34Amax(UL1283相当)
5.5mm²(AWG10)	適用電流 24Amax(UL1015相当)
3.5mm²(AWG12)	適用電流 18Amax(UL1015相当)
2.0mm²(AWG14)	適用電流 12Amax(UL1015相当)
1.25mm²(AWG16)	適用電流 9Amax(UL1015相当)
0.75mm²(AWG18)	適用電流 6Amax(UL1015相当)
0.5 mm²(AWG20)	適用電流 4Amax(UL1015相当)

トランスタップ設定 (T2) Transformer Tap setting		T2 出荷時接続先 at delivery
日本	Japan	200
		210
韓国, 台湾, ノルウェ	Korea, Taiwan, Norway	220
アメリカ	USA	230

TC-S2A カイロズ 1A
TC-S2A CIRCUIT 1A

使用電線一覧表
Table of used selectric wires

22mm²(AWG4)	適用電流 65Amax(UL1283相当)
14mm²(AWG6)	適用電流 46Amax(UL1283相当)
8.0mm²(AWG8)	適用電流 34Amax(UL1283相当)
5.5mm²(AWG10)	適用電流 24Amax(UL1015相当)
3.5mm²(AWG12)	適用電流 18Amax(UL1015相当)
2.0mm²(AWG14)	適用電流 12Amax(UL1015相当)
1.25mm²(AWG16)	適用電流 9Amax(UL1015相当)
0.75mm²(AWG18)	適用電流 6Amax(UL1015相当)
0.5 mm²(AWG20)	適用電流 4Amax(UL1015相当)

トランスタップ設定 (T1)
Transformer Tap setting

		T1 出荷時接続先 at delivery
ホンコン	Hong Kong	346
南アフリカ	South Africa	380
		400
豪州, インド, シンガポール	Australia, India, Sinagpore	415
		440

TC-S2A カイロズ 1B
TC-S2A CIRCUIT 1B

使用電線一覧表
Table of used selectric wires

22mm² (AWG4)	適用電流 65Amax (UL1283相当)
14mm² (AWG6)	適用電流 46Amax (UL1283相当)
8.0mm² (AWG8)	適用電流 34Amax (UL1283相当)
5.5mm² (AWG10)	適用電流 24Amax (UL1015相当)
3.5mm² (AWG12)	適用電流 18Amax (UL1015相当)
2.0mm² (AWG14)	適用電流 12Amax (UL1015相当)
1.25mm² (AWG16)	適用電流 9Amax (UL1015相当)
0.75mm² (AWG18)	適用電流 6Amax (UL1015相当)
0.5 mm² (AWG20)	適用電流 4Amax (UL1015相当)

トランスタップ設定 (T1, T2)
Transformer Tap setting

		出荷時接続先 at delivery
英国以外の欧州	Except England	380
		400
英国	England	415
		440

TC-S2A カイロズ IC
TC-S2A CIRCUIT IC

TCS2Aｶｲﾛｽﾞ 2
TC-S2A CIRCUIT 2
676662-001

RECORD 7

送り軸回路（ヨーロッパ° 以外）

FEED AXIS CIRCUIT (EXCEPT EU)

TC-S2A カイロズ° 3A
TC-S2A CIRCUIT 3A

送り軸回路（ヨーロッパ）

FEED AXIS CIRCUIT (EU)

TC-S2A カイロズ 3B
TC-S2A CIRCUIT 3B

IO PCB 1

TC-S2A カイロス 4
TC-S2A CIRCUIT 4

IO PCB 2
IO PCB
CNSVP
5557-22R
AVR2
DC24
DC24
IOG
IOG
SVP CORD
KC1
SD-011
BU 1.25mm²
ATC PCB
(8)
KS1
SD-N35
IO24ON
IO24
SPOH
CNSPOH
VHR-2N
主軸モータサーマル
IO24
SPINDLE MOTOR
SPOH
THERMAL SW
(2-1B)
CNSPA
VHR-2N
AIRDWN
SHORT CONNECTOR CNSPA
PWON
SVRYON
RYCHK1
CNATCOH
VHR-2N
ATCOH
SHORT CONNECTOR ATCOH
DR3OPN
EMGOUT
CNSQX
5557-06R
SQXP
SQXO
SQXM
SL1-P X3
LSX CORD
COLPW
COLPW2on
COLPW2
DC5
CE
(EU)
(Except EU)
CNSQY
5557-06R
SQYP
SQYO
SQYM
SL1-P X3
LSY CORD
FRONT DOOR LS
SQDR
(At door close)
CNDR
MDF6-6DS-3.5
DRCLS
DRLOCK
FRONT DOOR LOCK SOL.
CNSQZ
5557-06R
SQZP
SQZO
SQZM
SL1-P X3
LSZ CORD
CNSQD2
5557-04R
DRCLS2
BRK
CNYB
NVR-02
CNYB
Z-AXIS
BRAKE
(3-4A)
CNYL2
51067-0200
DRLOCK2
5559-02P
5557-02R
YB CORD
IOG
IO PCB
AXW1301421A
CNBIO
DC5
CNMSEL
5559-14P
5557-14R
machine type
select signal
MSEL0
MSEL1
MSEL2
MSEL3
MSEL4
MSEL5
機種選択信号0
1:26ATC
0:18ATC
機種選択信号1
1:ATC
0:ATC
機種選択信号2
1:TC31Aタイプ
0:TC22Aタイプ
機種選択信号3
1:TCS2Aタイプ
0:
機種選択信号4
機種選択信号5
IO24
CNBOH
5559-02P
5557-02R
BOH
切粉BOXサーマル
CONTROL BOX
THERMAL SW
OP-62 75±5°C
CNTOH
5559-02P
5557-02R
TOH1
TOH2
トランス1サーマル
T1 THERMAL
SW
BOXIO CORD
Short (T1-Less & EU)
COLPW2
MO8
CNYVC
XLP-02V
FG
YVC
(OPTION)
COOLANT VALVE
COLPW
AIRBLW
CNYVA
XLP-02V
FG
YVA
SPINDLE TAPER
AIR BLAST VALVE
COLPW2ON= (DRCLS2&_OTLOC+DRCLS1) &DROPN3&COLPW
TCS2Aカイロズ 5
TC-S2A CIRCUIT 5
676665-001
RECORD 7

TC-S2A カイロズ 6
TC-S2A CIRCUIT 6

TCS2A カイロズ 7
TCS2A CIRCUIT 7
676667-001

RECORD 7

マガジン回路
MAGAZINE CIRCUIT

TCS2A カイロズ 8
TC-S2A CIRCUIT 8
676668-001

RECORD 7

C保護ユニット
COOLANT PROTECTION UNIT

IOPCB DIPSW1 SETTING

BIT1 (COL)	COOLANT PUMP CONTROL
• OFF	COOLANT SW ONLY
ON	COOLANT SW & M08

BIT2 (CHP)	CHIP FLOW PUMP CNTROL
OFF	CHIP FLOW SW ONLY
• ON	CHIP FLOW SW & M400

BIT3 (OH1) / BIT4 (OH2)	OIL HOLE PUMP CONTROL
OFF / OFF	INHIBIT
ON / OFF	COOLANT SW ONLY
OFF / ON	M408 ONLY
• ON / ON	COOLANT SW & M408

BIT5 (INT)	DOOR INTERLOCKING OF COOLANT
• OFF	ALWAYS CHECHKING
ON	ONLY DOOR INTERLOCK SW IS ON

サーマルリレー KP1, KP2 設定値
THERMAL RELAY KP1, KP2 SET VALUES

		with T1	without T1		
			200V INPUT	220V INPUT	230V INPUT
MOTOR	FREQUENCY	SETTING	SETTING	SETTING	SETTING
180W	50Hz	0.9A	0.85A	0.9A	0.9A
KP1	60Hz	1.0A	1.0A	1.0A	1.0A
250W	50Hz	1.2A	1.2A	1.2A	1.3A
KP1, 2	60Hz	1.5A	1.5A	1.5A	1.6A
400W	50Hz	2.6A	2.4A	2.6A	使用不可
KP2	60Hz	2.4A	2.5A	2.4A	2.4A

仕向地の入力電圧に合わせて，サーマルを設定すること．
adjust the thermal value

TC-S2A カイロズ 9
TC-S2A CIRCUIT 9

オイルホール過負荷保護ユニット
OIL HOLE PROTECTION UNIT

過電流保護Q8 仕向け対応表
OVER CURRENT PROTECTION CP8

200V INPUT	FUSE 3pcs. 250V 10A
400V INPUT (Except EU)	FUSE 3pcs. 460V 10A

サーマルリレー KP3 設定値
THERMAL RELAY KP3 SET VALUES

		with T1	without T1		
			200V INPUT	220V INPUT	230V INPUT
MOTOR	FREQUENCY	SETTING	SETTING	SETTING	SETTING
750W KP3	50Hz	3.7A	3.7A	使用不可	使用不可
	60Hz	3.3A	3.3A	使用不可	使用不可

仕向地の入力電圧に合わせて，サーマルを設定すること．
adjust the thermal value

TC-S2A カイロズ 10
TC-S2A CIRCUIT 10

基板間接続ブロック図

BLOCK DIAGRAM OF CONNECTION BETWEEN PCB

TC-S2A カイロズ 11
TC-S2A CIRCUIT 11

サーボ信号線
SERVO SIGNAL CIRCUIT

TC-S2A ｶｲﾛｽﾞ 12
TC-S2A CIRCUIT 12

IO PCB 5

TC-S2A ｶｲﾛｽﾞ 13

TC-S2A CIRCUIT 13

TC-S2A カイロズ 14

TC-S2A CIRCUIT 14

TC-S2A カイロズ 15

TC-S2A CIRCUIT 15

手動パルス発生器
MANUAL PULSE GENERATOR

TC-S2A カイロズ 16
TC-S2A CIRCUIT 16

EXIO PCB (OPTION)

TC-S2A カイロズ 17
TC-S2A CIRCUIT 17

自動給油装置コントローラ　(オプション)
LUBRICATOR CONTROLLER (OPTION)

給油装置コントローラ
LUBRICATOR CONTROLLER

型式
TYPE
MKU2-BW3~12003U

定格電流
RATED CURRENT
50HZ 1.11A
60HZ 1.42A

定格回転数
RATED ROTATION SPEED
50HZ 2600rpm
60HZ 3100rpm

吐出量
DISPENSION CAPACITY
0.2l/min

TC-S2A ｶｲﾛｽﾞ 18
TC-S2A CIRCUIT 18