INSTRUCTION MANUAL

Single-Wire Saw

Model: WSD-K2

Registration No.: MA-MW-095- [2]

Takatori Corporation

Specification	Date of issue	Revision No.	Approved by	Prepared by	
				M	E
Standard Special	June 2 2011	2	Kita	Inoue	Matsuo Shimaoka

History of Revisions to This Instruction Manual

Rev. No.	Revision Date	Revision Section	Content of Revision	Page	Revised by
1	2011/5/30		Initially published		Inoue
2	2011/6/2	1-10	Power supply change	1-2	Inoue
		2-1	Standard accessories add	2-1	
		2-4	Option add	2-1	
		3-1	Power supply change	3-1～3-2	
		3-4	Pneumatic system change	3-7	

Precautions for Use

Read this instruction manual thoroughly in advance and use this single wire saw correctly.

Especially, please always follow the safety precautions provided in this instruction manual. Failure to follow may cause nipping of your hands by moving parts, injury of your hands and face by the wire, electric shocks, fire, and also result in machine defects or degraded accuracy.

In this manual, the safety precautions are classified into two levels as follow according to the degree of hazardousness (or the magnitude of the resultant accident):

Term	Meaning
DANGER	Indicates an imminently hazardous situation that, if the procedure or instruction is not followed, will result in death or serious injury or the occurrence of fire.
CAUTION	Indicates a potentially dangerous situation that, if the procedure or instruction is not followed, could result in medium or slight injury or damage to the machinery or equipment.

Table of Contents

1. Standard Specification

1−1. Cutting Capacity

- Maximum work piece

(Width * Height * Depth) 156 × 156 × 100(mm)[Caution 1]

(Dummy thickness should be 15mm or less than 15mm)

1−2. Work Rollers

- Material: Urethane(Using 1 wire is Standard Spec)[Caution 2]
- Outer diameter: Approx. ϕ120 mm × 2 axis
- Inter shaft distance: 310 mm
- Number of rotation: Max.1857rpm

1−3. Wire

- Number of supply wire: 1[Caution 3]
- Diameter of wire: ϕ0.12～ϕ0.18 mm(busbar)
- Reel capacity: 5km × 1coil(When winding diameter ϕ0.25 mm wire)
- Constant tension mechanism: Cylinder[Caution 4] (Maximum tension:40N)
- Reciprocation speed: Max.700m/min
- New wire supply rate: Max. 200m/min(able to set up parameter)[Caution 5]

1−4. Wire Rocking Motion

- Rocking angle: 0～±10 degree[Caution 6]
- Rocking speed: 1～999 degree/min

1−5. Work Table

- Elevation stroke: Max. 180 mm
- Slicing speed: 0.01～150 mm/min
- Rapid speed: Max.150 mm/min
- Horizontal swiveling: 0～±7.5 degree (roughly)

1−6. Cutting Coolant (Fixed abrasive spec)

- Abrasive solution material: Water-soluble, Water and surface acting agent etc.[Caution 7]
- Tank capacity: Max.12ℓ(Min.10 ℓ ,option)
- Pump discharge: Max.25ℓ/min (Viscosity: 1cSt or less,option)

1−7. Controller

- PC

1－8. Motors

• Wire supply/collect reel motor	1.3kW × 2 (AC servo motors)
• Rocking motor	100W + 1/100 decelerator (AC servo motor)
• Table elevation motor	100W + 1/100 decelerator (AC servo motor)
• Wire tension motor	50W × 2 (AC servo motors)
• Wire supply/collect traverser motor	Stepping motor × 2
• Cutting coolant pump (Option)	40W
• In-machine cooling fan motor	9.5w × 2

1－9. Machine Dimension and Exterior

• Outer dimension	Approx. 990 (w) x 1,750 (h) x 1,070 (d) (mm) (1,895 mm height including the dimension for signal tower light)
• Net weight	Approx. 500 kg
• Front cover/doors	Stainless steel
• Paint color	Munsell*2.5Y 9/1

1－10. Others

• Rated plant capacity	6.9kVA
• Power supply	3-phase, 200V/220V, 50/60Hz, 20A
• Air supply	0.5MPa x 150Nℓ/min (ϕ 10 air hose)

<Unit Usage Caution>

Caution1) The 100mm depth length work is able to be installed for each front and back of the wire position. Be careful the dummy thick and dummy cut amount when cutting the processing material regardless its shape.

Caution2) When using multi wires, wire sending amount margin error may be observed due to the work roller attrition. Avoid usage concerned the roller attrition. In case the roller attrition was found, replace the work roller to the replacement immediately. The margin error tends to increase with using a number of wires. Three wires usage is recommended as maximum.

Caution3) Do not leave the wire winding to the unit that may cause wire deterioration.

Caution4) The tension range is ±15 – 20%.

Caution5) Setting excessively small amount value when the wire reel size is small that may cause wire attrition due to contingence of wires, distortion of wires and/or breaking of wires. These causes may result some margin error of the wire provision because of the machinery's structure.

Caution6) Limitation occurs depending on the up and down movement or the dummy thickness.

Caution7) Be careful that the usage may possibly get rusty. (e.g., Processing with only water, Processing with processing agent may eat away the overlay, etc.)

* The specification and dimensions may be changed in order to modify the unit without notice.

2. Accessories

2－1. Standard Accessories

• 5km wire reel	3
• Cross socket head truss screw (M4 x 6)	10
• Cutting Coolant waterproof sheet	1 set
• Work attachment plate	2
• Work holder	1

2－2. Standard Maintenance Tool

• Tool box	1 set
• Hexagon wrenches (1.5～6.0mm)	1 set
• Compact size nipper (125mm)	1
• Torque wrench (QL25N)	1
• Hexagon socket (6mm, 5mm)	2
• Middle size cross slot screwdriver (#2, 100mm)	1

2－3. Special Tools (for Work Roller Replacement)

• Grapping spanner (ϕ25～ ϕ28)	1
• Plastic hammer (1/4 pound)	1

2－4. Option

- Cutting coolant circulating system
- Multi groove work roller unit
- Y/θ fine adjustable table with digital roudou (Not yet verified)

3. Names of Main Components and System Drawing

3-1. Specification, Dimension and Installation Area of Machine

Table 3-1. Specifications

Model			WSD-K2
Wire run method			Single wire run with reciprocation and rocking
Maximum work size (width, height, depth)		mm	156 x 156 x 100 (Thickness of Dummy should be less than 15mm)
Work Roller	Outer diameter	mm	Approx. ϕ 120 mm x 2 axis
	Inter shaft distance	mm	310
	Rocking angle	degree	0~±10
	Rocking speed	deg/min	1~999
Wire	Number of supply wire	#	1
	Diameter of wire(fixed abrasive)	mm	ϕ0.12~ ϕ0.18(busbar)
	Max. wire on reel capacity	km	5 (When winding diameter ϕ0.25 mm wire)
	Constant tension mechanism		Cylinder (maximum tension: 40N)
	Max. reciprocation speed	m/min	700
	Max. new wire supply rate	m/min	200 (able to set up parameter)
	Reciprocation mechanism		Wire servo motor normal and reverse rotation
	New wire feeding mechanism		Wire supply servo motor normal and reverse rotation
Work table	Max. elevation stroke	mm	180
	Slicing speed	mm/min	0.01~150
	Max. rapid speed	mm/min	150
	Horizontal swiveling	degree	0~±7.5 (roughly)
Cutting coolant	Abrasive solution material (fixed abrasive spec)		Water-soluble, Water and surface acting agent etc.
	Max. tank capacity (option)	liters	12 (Min.10 ℓ)
	Max. pump discharge rate (option)	liters/min	25 (Viscosity: 1cSt or less)
Motors	Wire supply/collect reel	kW	AC servo motor: 1.3 x 2
	Rocking	W	AC servo motor: 100 (deceleration rate: 1/200)
	Table elevation	W	AC servo motor: 100 (deceleration rate: 1/100)
	Wire tension	W	AC servo motor: 50 x 2
	Wire supply/collect reel traverser		Stepping motor x 2
	Cutting coolant pump (option)	W	40
	In-machine cooling fan	W	9.5 x 2
Others	Power supply	Ph-V	3-200/220
	Rated plant capacity	kVA	6.9
	Air supply	MPa-Nℓ/min	0.5-150(ϕ 10 air hose)
	Machine Outer dimension	mm	Approx. 990 (w) x 1,750 (h) x 1,070 (d)
	Net weight	Kg	Approx. 500

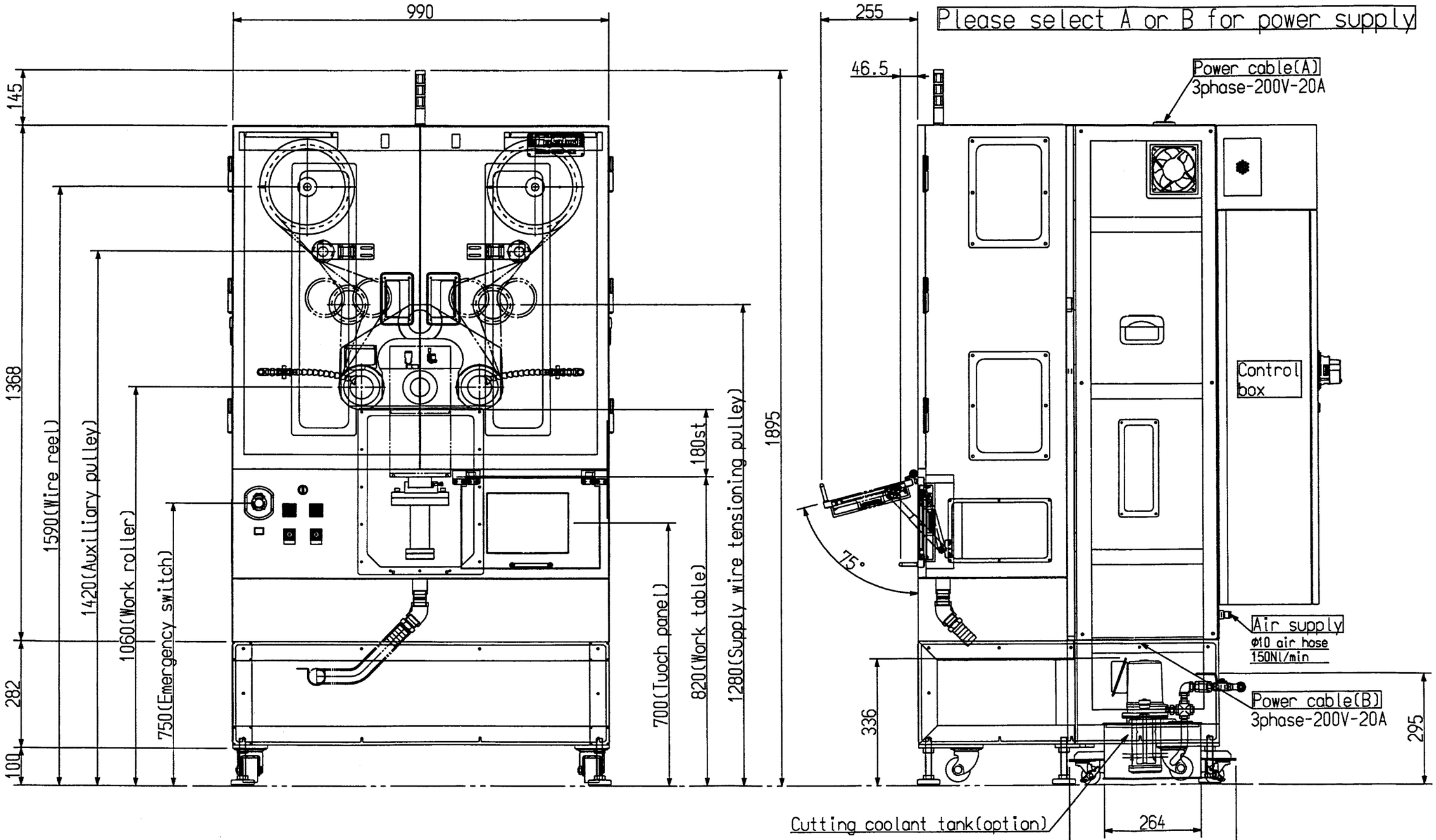


Fig.3-1 Overall View WSD-K2 MQ01WSD06Z030

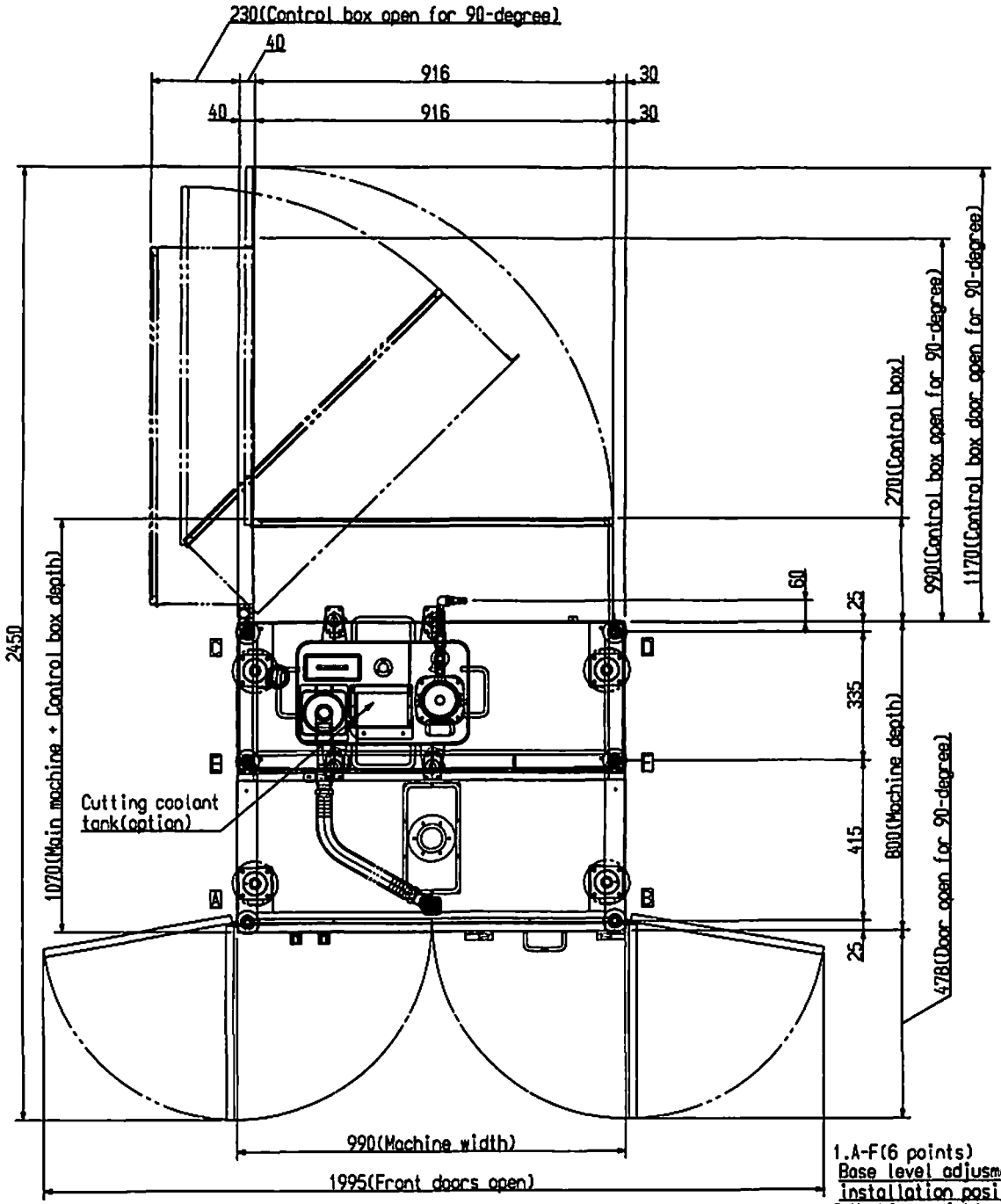


Fig.3-2 Machine installation area drawing WSD-K2 M001WSD06Z020

3-2. Wire Saw System

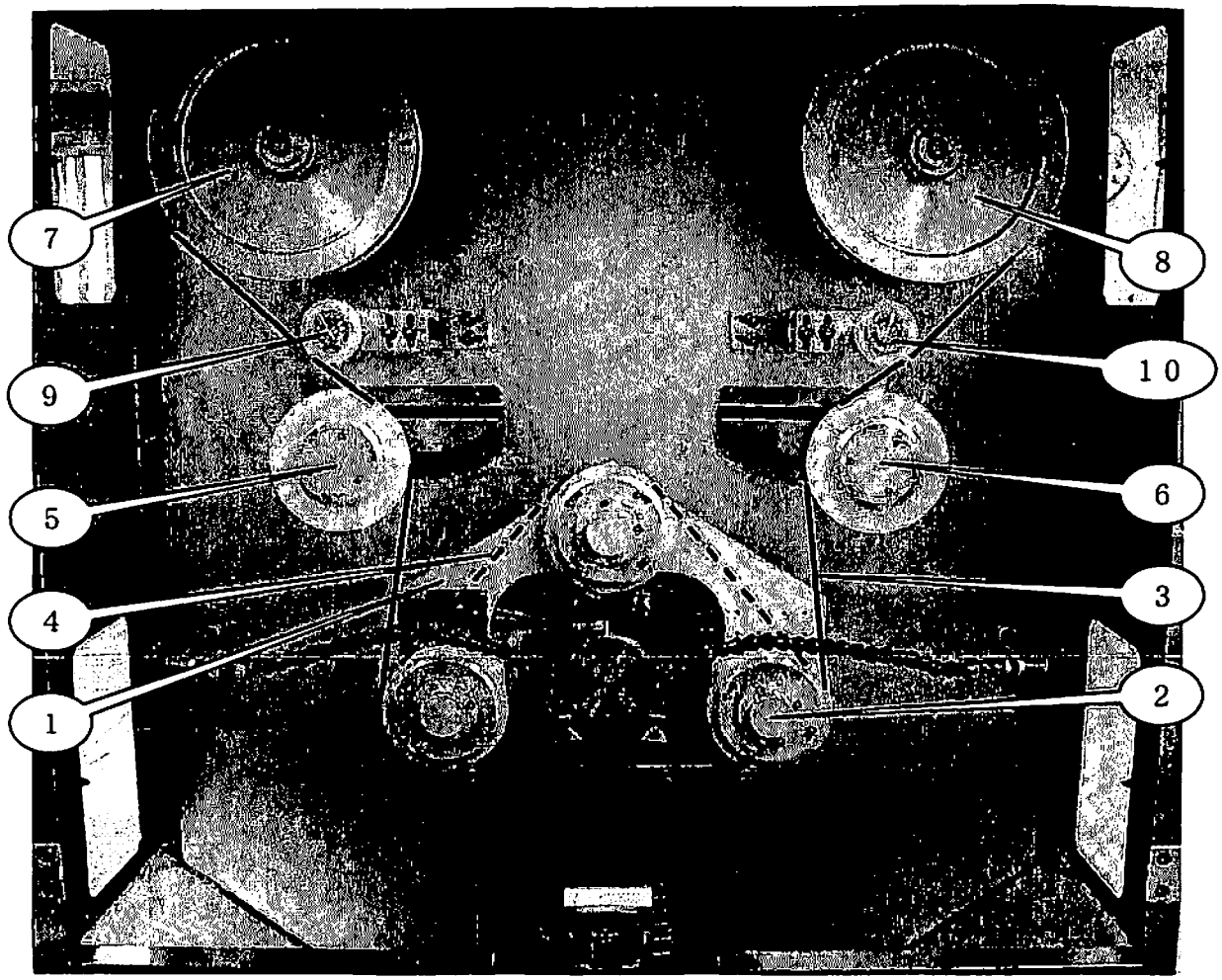


Fig. 3-3 Machine Front Part

1. Rocking plate
   (connected to the timing belt for rocking motor)
2. Work roller (Standard : 2 axis)
3. The way of wire when 1 wire is used
4. Way of wire when several wires are used multi wires
5. Supply wire tensioning pulley
   (connected to wire supply encoder)
6. Collect wire tensioning pulley
   (connected to wire collect encoder)
7. Supply wire reel
   (connected to wire supply motor and supply traverser motor)
8. Collect wire reel
   (connected to wire collect motor and collect traverser motor)
9. Supply sub pully
10. Collect sub pully

3-3. Cutting Coolant Circulating System

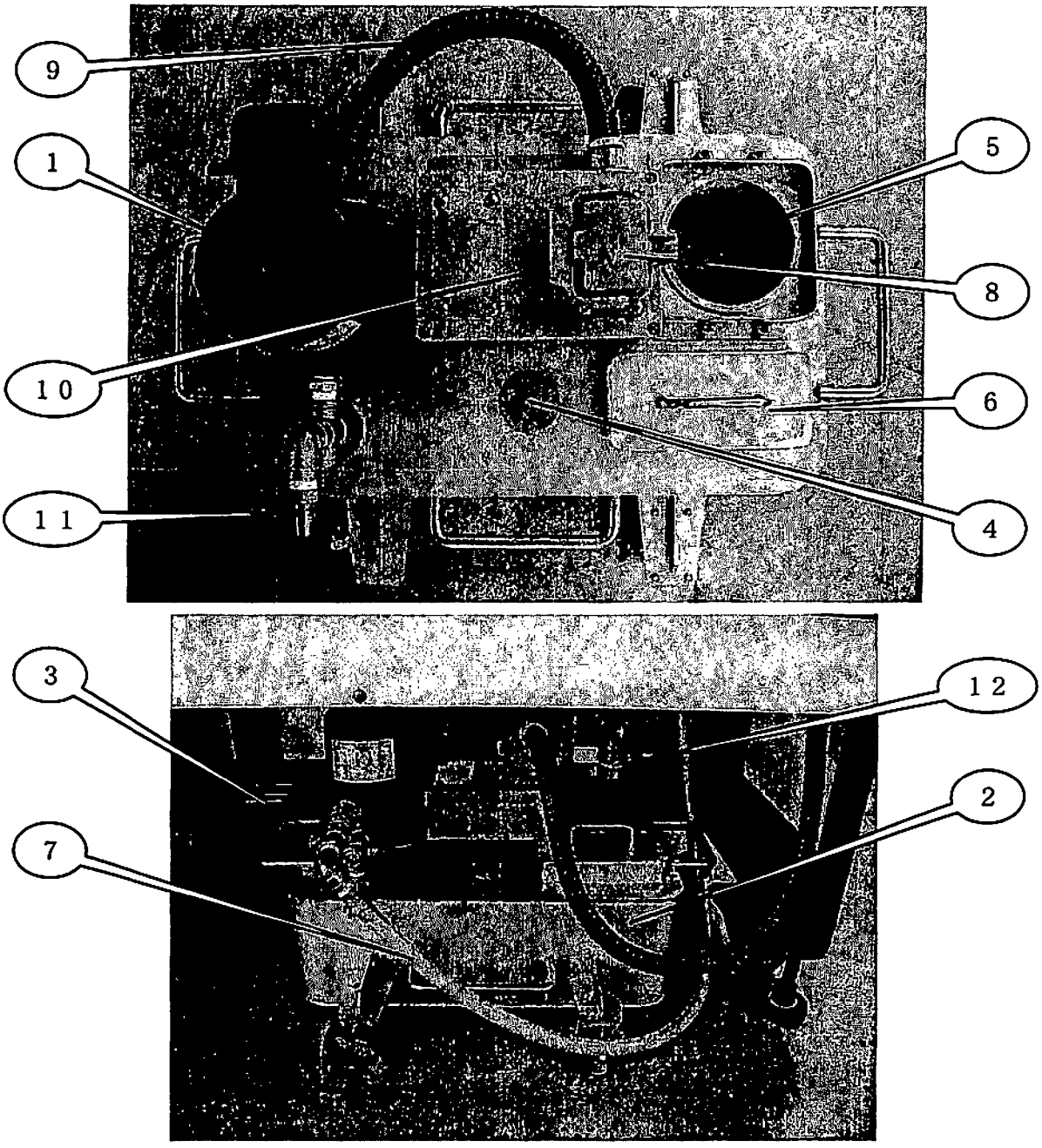


Fig. 3-4 Cutting Coolant Tank (Option)

1. Cutting coolant supply pump
2. Cutting coolant tank and lid
3. Cutting coolant tank main valve
4. Temperature detector port (option)
5. Cutting coolant colleting port (filter)
6. Cutting coolant supplement point
7. Cutting coolant supply hose (to machine internal part)
8. Tank connector
9. Pump cable
10. Relay box
11. Coupler
12. Duct for returning cutting coolant

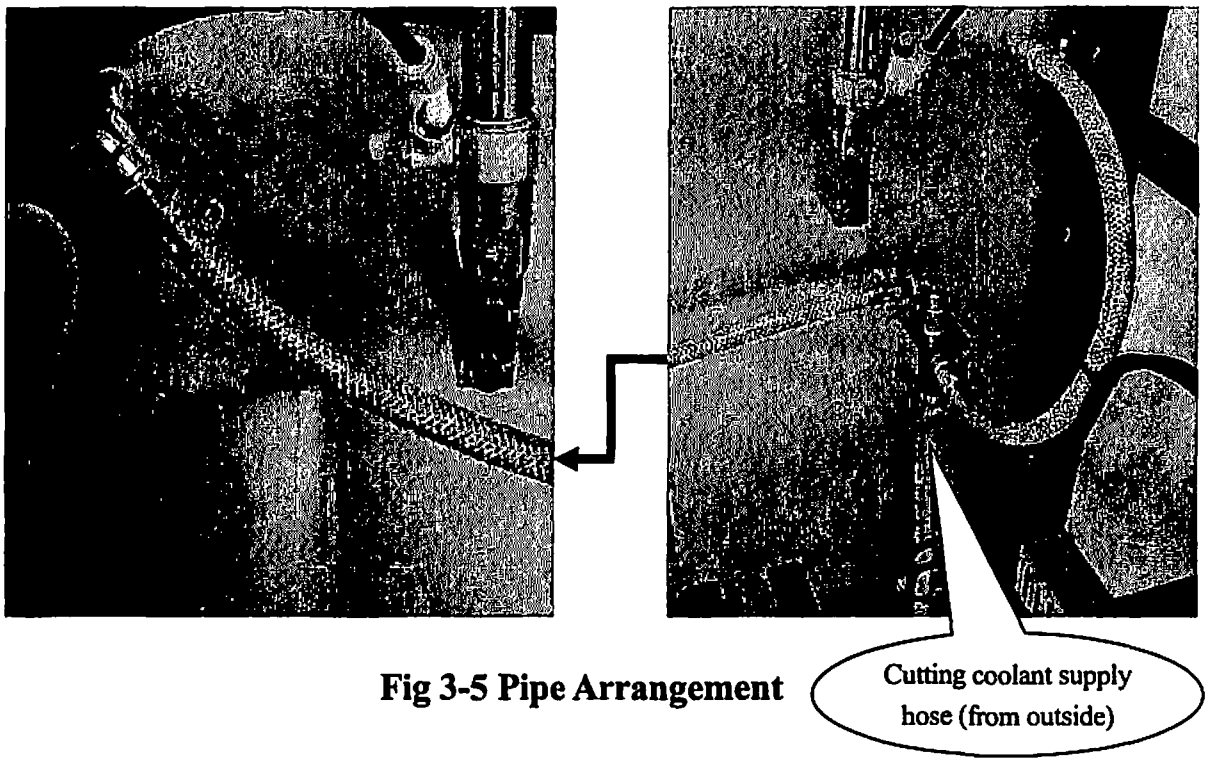


Fig 3-5 Pipe Arrangement

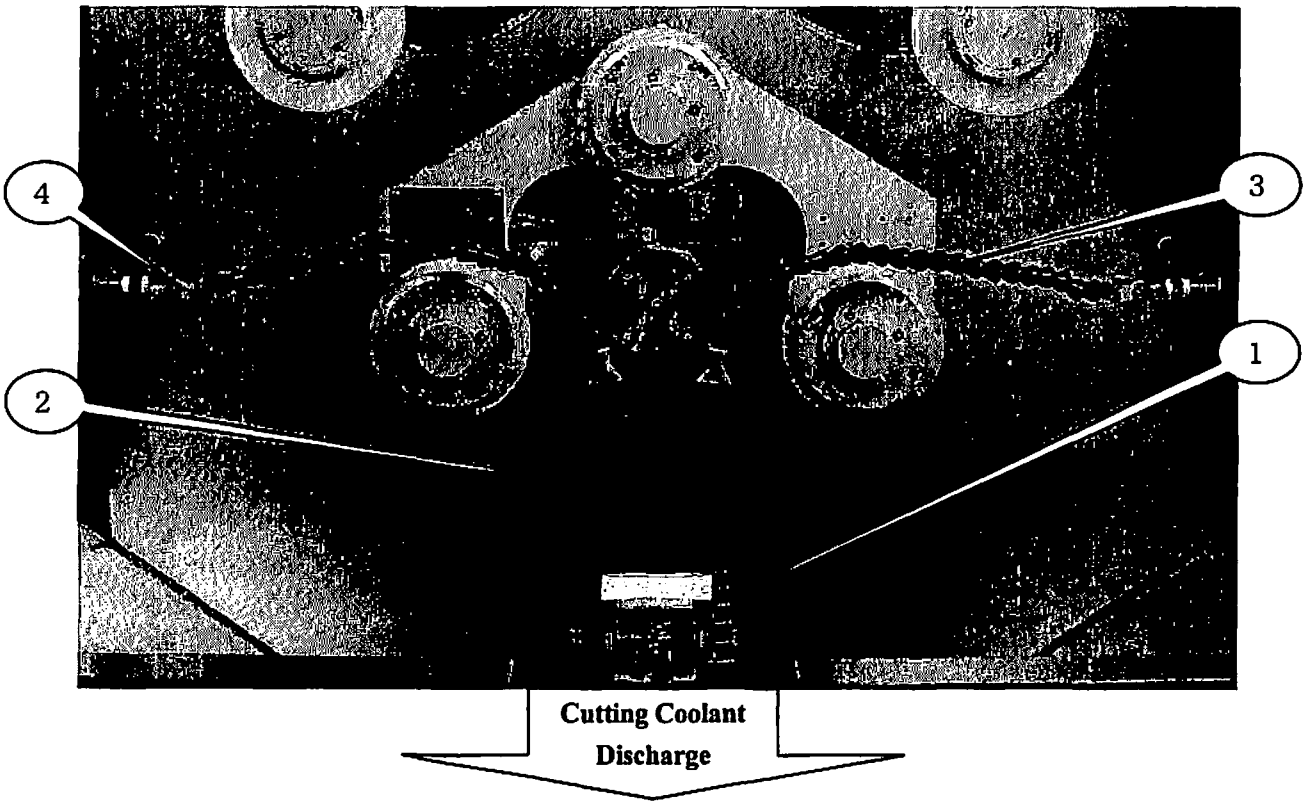
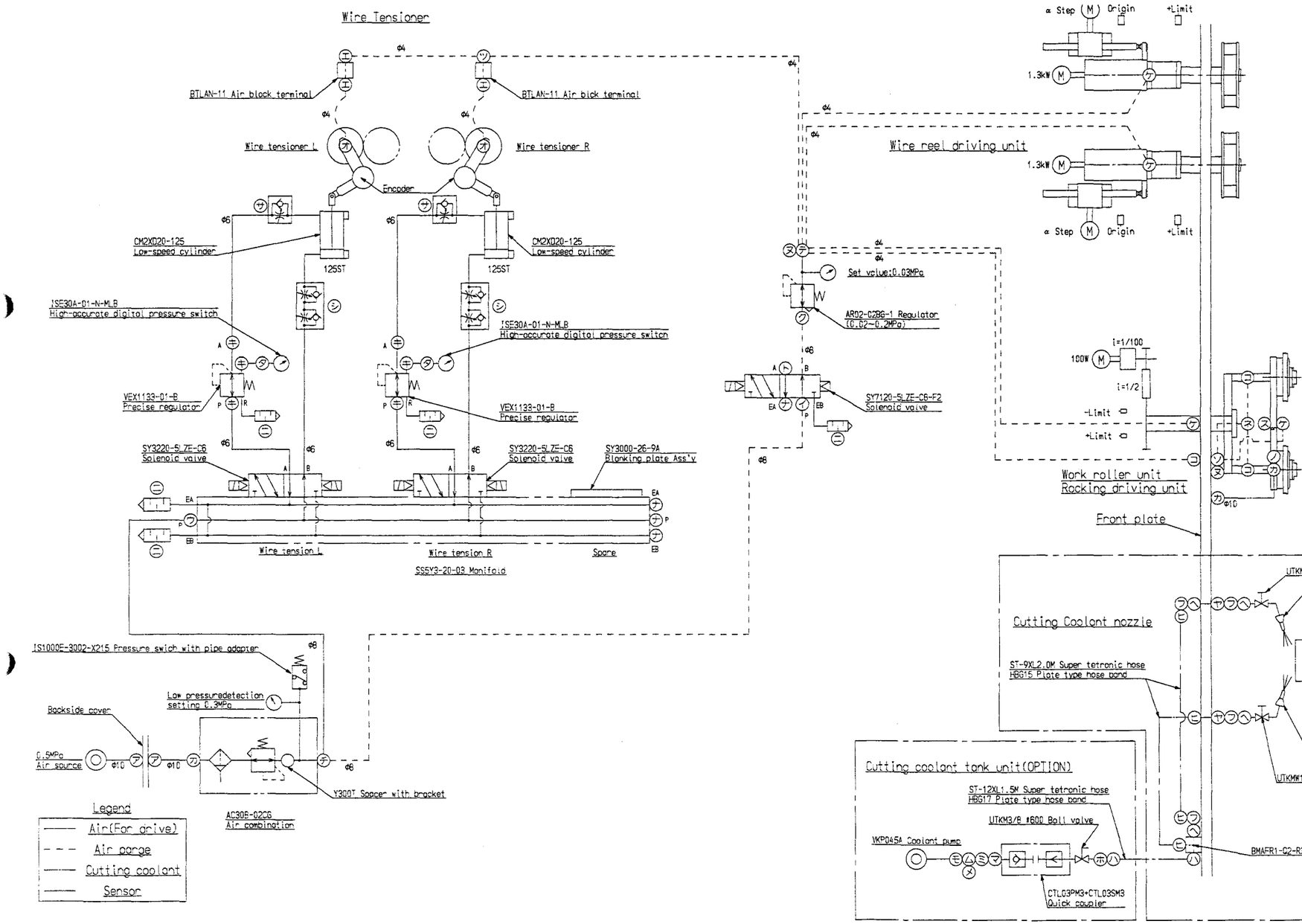


Fig. 3-6 Work table unit

1. Work attachment plate
2. Slicing material
3. Cutting coolant nozzle
4. Nozzle valve

3-4. Pneumatic System and Pipe Arrangement



symbol	Items	Model	Q'ty
ア	Half-union	KQ2H10-02S	2
イ	Half-union with hexagon hole	KQ2S08-02S	1
ウ		KQ2S08-01S	1
エ		KQ2S04-01S	3
オ		KQ2S04-M5	2
カ	Elbow union	KQ2L10-02S(Include MB03)	3
キ		KQ2L06-01S	6
ク		KQ2L08-02S	1
ケ		KQ2L04-M5(Include MB02)	4
コ		KQ2L04-01S	3
サ	Speed controller	AS2201F-01-06S	2
シ	Dual speed controller	ASD330F-01-06S	2
ス	Plug	M-5P(MB01パート)	1
ソ	Branch elbow union	KQ2LU04-01S	1
タ	Female union	KQ2F06-01	2
チ	Both-end tees union	KQ2T08-02S	1
ツ	Service tees union	KQ2Y04-01S	1
テ	Triple branch universal elbow	KQ2ZT04-02S	1
ト	Plug	KQ2P-08	1
ナ	Sunk plug	MSWTMK1	3
ニ	Silencer	AN103-01	5
ヌ	Plug	KQ2P-04(Include MB01)	2
ネ	Union Y	KQ2U04-00	1
ノ	Sunk plug	MSWTS2(Include MB03)	1
ハ	Hose nipple	VHN3/8x12.7SUS	2
ヒ		VHN1/4x10.5SUS	4
フ	Elbow	VL1/4SCS	4
ヘ	Hexagon nipple	V6N1/4SCS	4
ホ	Street elbow	VSL3/8SCS	1
マ	Elbow	VL3/8SCS	1
ミ	Nipple	VN3/8SUS	1
ム	Cross	VX3/8SCS	1
メ	Sunk Plug	MSWTS3	1
モ	Different end nipple	VRN3/8X1/4SCS	1
ヤ	Both-long nipple	VLN1/4X150SUS	2

※Wire single web・・・Use 1 pcs(ス) & 1 pcs(ヌ),Not use 1 pcs(ケ)

※Wire multi web・・・Use 1 pcs(ケ),Not use 1 pcs(ス) & 1 pcs(ヌ)

Fig.3-7 Pneumatic System and Pipe Arrangement WSD-K2 M301WSD06Z030

4. Machine Installation

4−1. Installation Location

Install the machine on a floor surface rigid enough to support the net machine weight (approx. 500kg) and free from direct sunlight and vibration. It is strongly recommended that you install the machine in a thermostatic chamber equipped with appropriate air conditioning facilities. CAUTION

It should be also noted that you should decide the installation area of the machine, by referring to 3-1, "Overall View" and "Machine Bottom Plan View" in consideration to slicing operation, cutting coolant supplement, machine maintenance, process and extension planning.

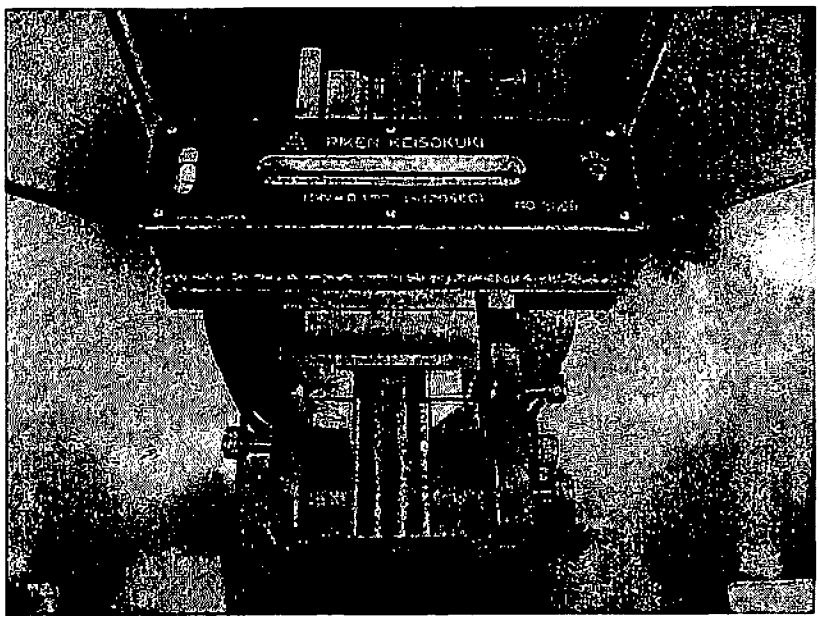
4−2. Machine Carry-in and Transfer

Transfer the machine by hooking the four eyebolts (M16) located on top of the machine with hoisting device. In this case, make sure that the machine is carefully hoisted in a good balance to prevent shocks. If hoisting is not available, move the machine carefully on the casters or a forklift track in a good balance. When moving the machine on a forklift, inserting metal fitting for moving in the back of the machine for increasing stability is recommended. (Do not get under the machine.) DANGER

4−3. Leveling

Put a water level on the work attachment plate placed on the work table located in the lower part inside the front door as shown in the Fig. 4-1. Check the levelness and turn the adjustor feet (M16) in the bottom of the machine by a spanner. Please check the levelness every year in the annual inspection. If raising the adjustor too high, the machine may fall and please keep the clearance under the machine as lower as 10mm. DANGER

Please refer to "3-1 Machine Bottom Plan View" for the location of adjustor feet, A, B, C, D, E and F.



4－4. Pneumatic Piping

There is a joint (R1/4) for air supply connection under the control box. Please connect ϕ10mm (inner diameter: 6.5mm or greater) hose to the joint and add a cock to the supply source. In this case, air pressure should be 0.5MPa and the consumption rate be 150Nl/min. If the pressure is lower than 0.3MPa, the pressure sensor detects it and the machine will stop. (Alarm message is shown, the buzzer sounds and the signal tower light turns on.) CAUTION

4－5. Electrical Wiring

The power connection terminal (R, S, and T) is located in the breaker in the left part of the control panel on the back of the machine. The power supply (3-phase, 200V, 50/60Hz, capacity: 30A) should be connected to the control box through either the hole of the bottom of the main machine frame or the top cover. To prevent malfunction of the machine, it is necessary to restrict the voltage fluctuation within ±10% of the rated voltage and supply earthing by earth bar. After connecting the power, read and understand this instruction manual thoroughly, close the door of the control box and turn on the main breaker. (Please beware of electric shocks.) DANGER

Check the supply air volume with the main regulator and confirm "WSD-K2 TAKATORI WIRE SAW" is shown in the touch panel screen, and then press the drive power switch under the emergency button in the front panel. Then, if touching the touch panel, the main menu screen will be displayed. Please press the reset button to reset the alarm shown in the touch panel if any in the procedure so far. (This step is necessary to go on to the next procedure.) CAUTION

5. Cutting Coolant

5－1. Selection of Cutting Coolant

Please apply water-soluble agent or water for cutting coolant and add surface acting agent where necessary. Determine the proportion of the surface acting agent according to the cutting requirement and condition. Be careful that the usage may possibly get rusty. (e.g., Processing with only water, Processing with processing agent may eat away the overlay, etc.)

The capacity of the tank unit (option) is 10 – 12 liters. (The filter for returned coolant is soaked in the liquid a little when 10 liters of it is poured.) For normal operation, connect the coupler and the connector, and then, push the tank under the machine paying attention to the return duct. (The casters have lock feature.) Check the remaining volume of cutting coolant regularly. CAUTION

In case this tank unit (option) is not installed, please connect customer supplying hose with the cutting coolant supply hose connecting part directly (see Fig. 3-5).

5－2. Agitation of Cutting Coolant

This tank unit (option) has automatic liquid agitation feature to prevent deposition. Pour cutting coolant into the tank, fit the pump and hose in the tank and then close the main valve of the pump discharging port. Then, press "Agitation" button on the main display of the touch panel to start agitation. To keep the uniformity of liquid's density, cutting coolant should be agitated well during the night when the machine is suspended. Also, be sure not to stop agitation for a long time such as during holidays, once the liquid is mixed. CAUTION

5－3. Supply of Cutting Coolant

After completing the cutting coolant agitation process above and the wire winding process explained later, set the liquid discharging nozzles on the sides of both left and right work rollers so as the liquid can pour the point where the material and the wire contact each other. In this point, please adjust the position of the nozzles not to interfere the area for the elevation of the work table. (The nozzle position can be changed after discharging starts.) CAUTION

Open the valve of the nozzle and attach the waterproof sheet, then press "Discharge" button in the main display in the touch panel screen. Next, if opening the main valve of the discharging port of the pump gradually, the cutting coolant is supplied to the nozzle through the hose. The cutting coolant thus supplied is not only used for slicing workpiece but also, as an important medium, removing the heat generated in the slicing part, minimizing the relative thermal deformation that occurs around the slicing unit

5－4. Cautions for Handling Cutting Coolant

In replacing cutting coolant, when removing the coolant pump outside of the tank, never lay down the coolant pump on its side nor turn it up side down. Because it may cause vibration and noise or the malfunction of the tank. if the cutting coolant in the bottom of the tank pours into the upper part of the tank, CAUTION

5－5. Maintenance of Cutting Coolant Pump

(1) Caution for burnout

When the viscosity of the cutting coolant is too high or foreign particle trapped in the pump bumpers the rotator, the motor will be overloaded and may set fire. DANGER

Also, when the air around the pump is not well-ventilated and the temperature is high, the motor may set fire too. DANGER

In case discharging stops suddenly or the volume of the liquid decreases, turn off the switch and check for any foreign particle inside the pump. CAUTION

(2) Daily Maintenance

During operation, always check whether the pump has vibration and noise and clean the exterior of the pump regularly. And, to avoid foreign particle catching inside the pump, clean the inside of the tank and replace cutting coolant regularly. CAUTION

(3) Others

Please read the operation manual of the cutting coolant pump. CAUTION

6. Work Roller

6—1. Work Roller Material

The work roller is an important part that affects the processing accuracy and resin (ultrahigh polymer) material has been used for the work rollers in our conventional line-ups because of its ease to cut, fitting well with wires, low cost, etc. However, for this machine, we adopt urethane rubber for the work roller material, which is known as wear resistance material. Urethane rubber is better in anti abrasiveness than resin and the lifetime of urethane is longer than that of resin. Thus, urethane is more advantageous in the running cost than the resin material in terms of labor saving in work roller replacement and the reduction in management.

6—2. V-groove Pitch Selection Criteria (Option)

The slicing stock is greatly influenced by the elements, such as "wire diameter" and "work piece material". Moreover, it will be somewhat affected by the set slicing conditions such as new wire supply rate, cutting speed, wire tension and rocking unit angle and speed, and wire weariness status. For the initial trial cutting, the selection of criteria for V-groove pitch is generally obtained as follows: (See Fig. 6-1)

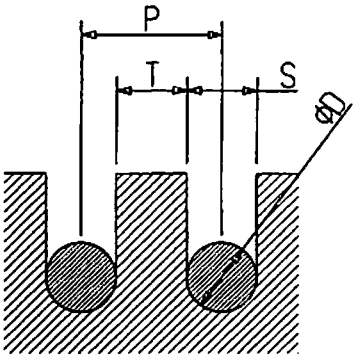


Fig.6-1 WSD-K2 MQ01WSD06Z020

(Slicing stock (S)= Piano wire diameter (ϕD)
V-groove pitch (P)= Target thickness of slicing (T) + Slicing stock (S))

To determine the V-groove pitch finally, try increasing or decreasing new wire supply rate and testing cutting a few times to seek for the most appropriate value.

6—3. Work Roller Replacement

When the machine is shipped from our factory, the work rollers are installed as in Fig. 6-2. Please replace the work rollers regularly before the V-groove is worn out. To replace the work rollers, loosen the four pieces of the bolt (1) and turn the aluminum holder plate to the hole and take off the plate, then, remove the work rollers (3)

The work rollers used in the machine can be used two times by reversing. When replacing the rollers, always clean the attached cutting coolant around the work rollers or wash them. If washing the work roller, to avoid the cleaning liquid soaking to the angular bearing unit, press "Air Purge" button in the touch panel preparation display. **CAUTION**

Please see the table 12-1 and we recommend you keep the spare parts in the list. When replacing "Work Roller Assembly Unit Parts", we recommend you purchase a set of the parts that are assembled in out factory.

6－4. Caution for Work Roller Storage

Precaution for temperature and humidity should be taken for storing work rollers to prevent the roller material from shrinking and expanding. CAUTION

Recommended storage conditions are as follows:

(1) Maintain the work rollers in the package as delivered.

(2) Maintain the work rollers under the environment at 30 degree C or less in temperature and 80 degree or less in humidity.

Fig. 6-2 Work Roller

7. Wire Tension

7－1. Wire Tension Selection Criteria

The wire tensioners, which give rigidity to wire, are installed both in the wire supply and collection units. Wire tension is determined in accordance with the wire diameter. CAUTION

The higher the wire tension is, the better the slicing performance (accuracy and productivity) is. However, extremely high wire tension causes wire breakage, short lifetime of work rollers and wire pulleys. (There is a fluctuation in the tensility value ±15-20%, and it doesn't lead to breaking directly, but swing to left and right of a tension pulley becomes big by a processing condition.)The wire tension on both right and left sides should be equal to balance the wire supply and collection. CAUTION

7－2. Wire Tension Setting

Setting and changing wire tension are described as below:

The mechanism of wire tensioning in this machine is air cylinder method and the tension is adjusted with the air regulator located in the under left part of the machine front face. (Please see Fig. 7-1) Those pressure values can be obtained through the touch panel by inputting wished wire tension. Please turn the tensioner regulator L and R checking the pressure indicators L and R so as to show the same pressure values obtained in the touch panel.

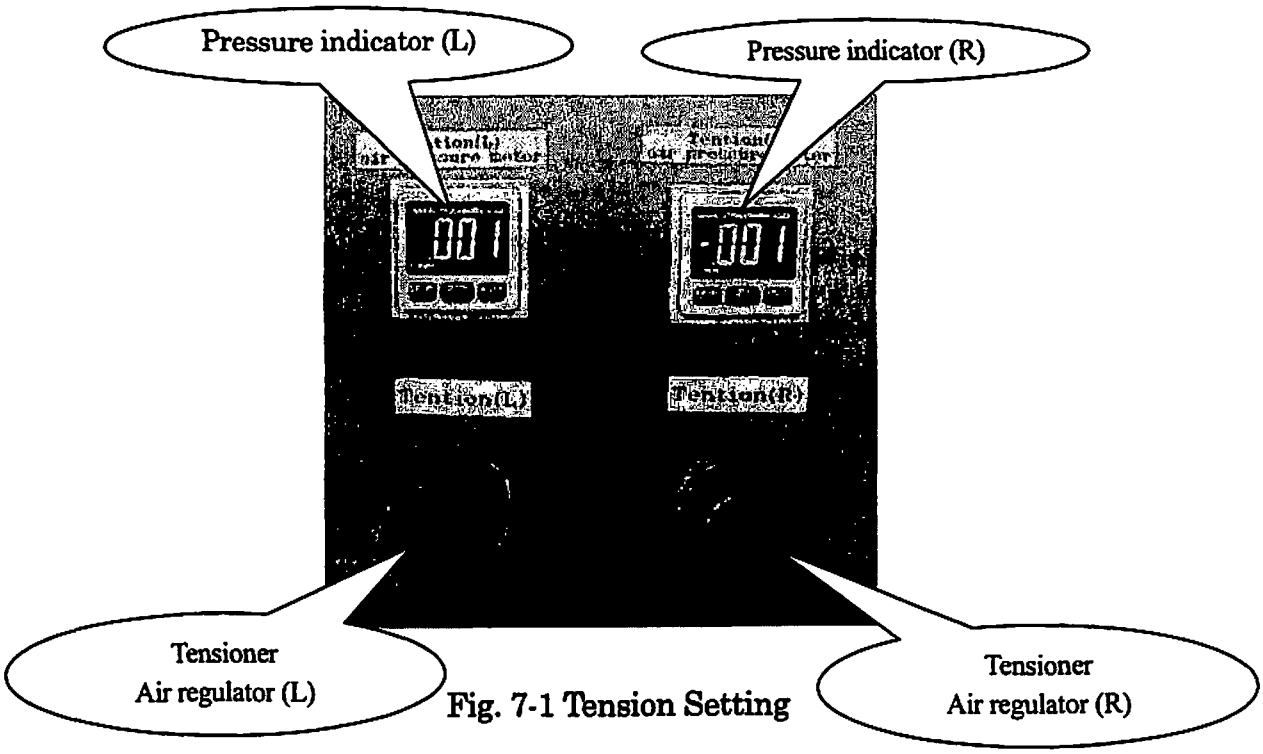


Fig. 7-1 Tension Setting

8. Wire Winding and Preparations

8—1. Wire Reel Installation

Attach the wire reel (Fig. 8-2) in the reel shaft part (Fig. 8-3) as shown in Fig. 8-3. In this point, insert the reel shaft positioning pin (2) into the wire reel positioning pin hole (1). There is one positioning pin on the reel shaft.

After attaching the wire reel, attach a washer, dish spring (round face to front side), and then, M8 x 20L (bolt with a hexagon socket) in order and fix the parts. The target value of bolt tightening torque is between 16.2 and 19.1 N.m (165-195kgf.cm). CAUTION

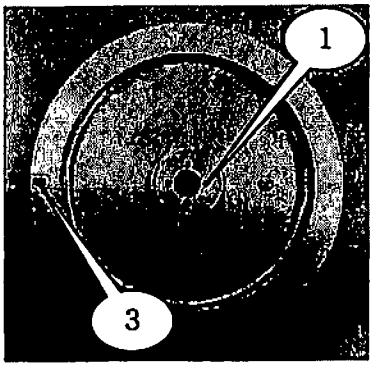


Fig. 8-1 Wire Reel

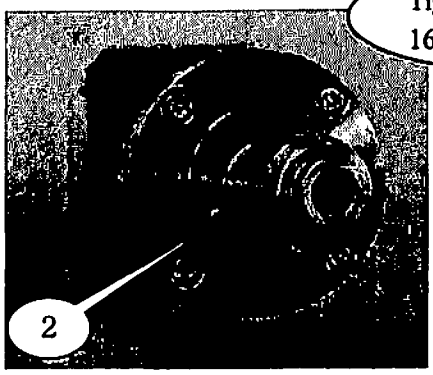


Fig. 8-2 Reel Shaft

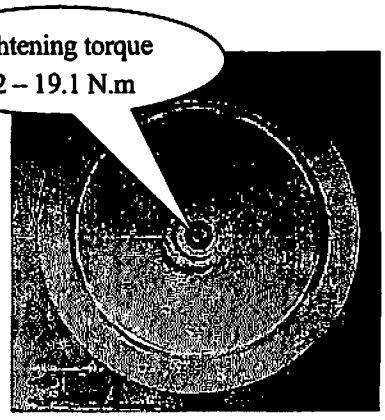


Fig. 8-3 Reel Installation

8—2. Storage of Remaining Wire

The total extension length of the wire wound in the wire supply reel can be calculated according to the length of new wire and the total length of wire running. (There is some gap arose during winding) When you replace wire reel, always input the length of the wire on the wire reel in the touch panel monitor. This value changes according to wire running and can be checked in the touch panel anytime. Please input the length of wire when replacing wire reel. CAUTION

Also, you can check the wire remaining volume through (3) inspection slit on the rim parts on both reels' sides. Moreover, if storing a wire reel temporarily, wrap the wire part with paper and put it in a plastic bag with a drying agent to avoid corrosion. CAUTION

8—3. Removal of Used Wire

After slicing, extreme fatigue and wear have been built on the wire on the collection reel. Therefore, in principle, the old wire is thrown away after single use. Please take off the wire reel when the wire is wounded on the reel on some level. (The volume of wire can be checked through (3) inspection slit.) In case the wire is broken and wire running is suspended, please be sure to take off the wire in the collection reel before restarting, because it may cause wire broken again. DANGER

8－4. Wire Winding

Wire winding work should start with the settings in "Standby Display" in the touch panel after completing the steps in "4-5. Electric Wiring". To start this work, you should open the machine front door and remove the waterproof sheet. Please note the alarm occurs if the door sensor is set as enable in the engineering data. (To start operation, close the front door and reset the alarm in the touch panel.) DANGER

(1) Preparation for Winding

First, adjust the air pressure of the tension cylinder. (Please see 7-2.) Turn on both tension L.R and adjust the regulator to set the pressure at 0.05MPa. Then, turn off both tension L and R.

Next, set "0mm (origin point)" for the present position of the collection (R) traverser in the manual traverser display. CAUTION

(2) Wire Winding

After completing preparation for winding, install supply/collection wire reel. (It is easier to install the reel while the servo motor is on.) Please turn off the servo motor then and turn the reel while feeding the wire little by little as shown in Fig. 3-3. In this point,

Hang the wire in the front groove on the work roller and then on the rim part of the collection wire reel for two times. The depth of the reel is 38mm. Please wind the wire on the front part of the depth. Then, put the end of the wire through (1) the hole and wind it around (2) truss head screw as shown in Fig 8-4. After fixing wire, please adjust the location of wire from a supply wire reel to a help pulley.(The length from wire reel to a front plate should be 150mm. CAUTION

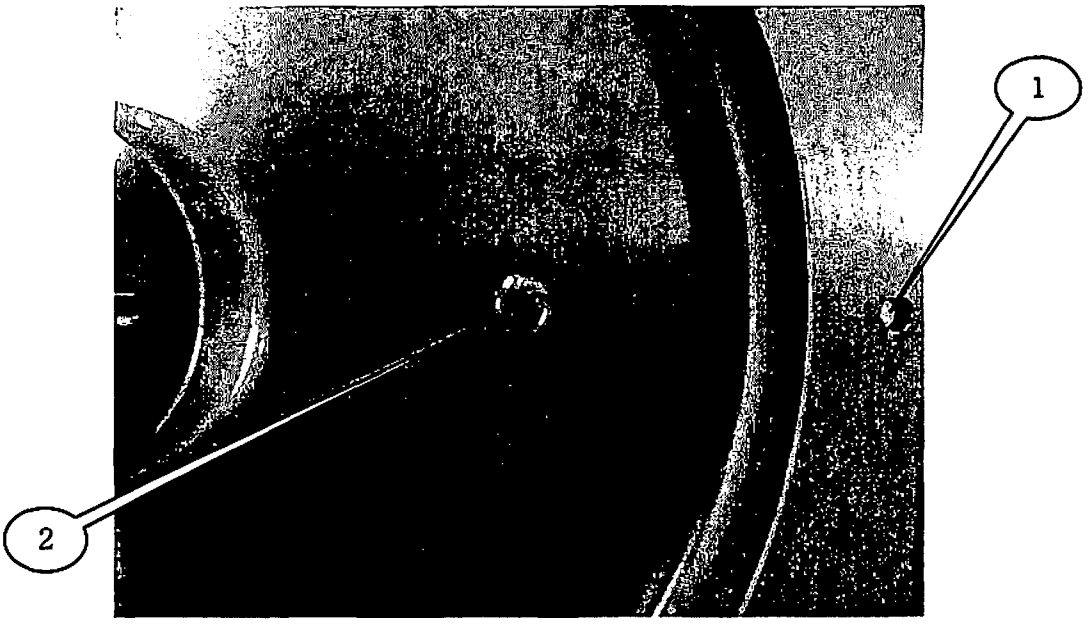


Fig 8-4 Wire Winding

(3) Tension Control

After completing wire winding, close the front door and turn servo-on the wire reel motor. Next, turn on tension L and R, and then, tension control in order and set the wire tension referring to the section 7-2. Please certainly measure the diameter of the wire on reel. (The measurement automatically finishes and becomes effective.) CAUTION

(4) Operation Start

After completing the wire on reel diameter and confirming the measured value is effective, once set the process condition arbitrary by setting positions such as elevation etc in the manual display before operation. Also, to make the operation stable, run the wire for 3 to 5 meters to the collection wire reel in the index operation. CAUTION

Then, set enable/disable of automatic removal, operation mode, speed of cutting coolant pump etc. and turn the mode to automatic, check all the settings are correct, and then start operation. CAUTION

But, the location of wire from a supply wire reel to a help pulley should be fixed vertically. (To prevent wire derailment and abrasion one side). Even when already adjusting it once, there is a fear that a location difference occurs again by accumulation by a mechanical error of the book state. It is recommended to calculate wire needed and change wire inside of the machine at automatic operation. CAUTION

8—5. Fine Adjustment of Traverse Unit

Operate the machine and check in which A or B way in Fig 8-5 the wire is wound, and try fine-adjusting the positions in the front and back traverser positions by inputting the value below into the common data of the touch panel and see if the winding improves.

(A):add +0.5mm to both front and back traverser position
(B):add -0.5mm to both front and back traverser position

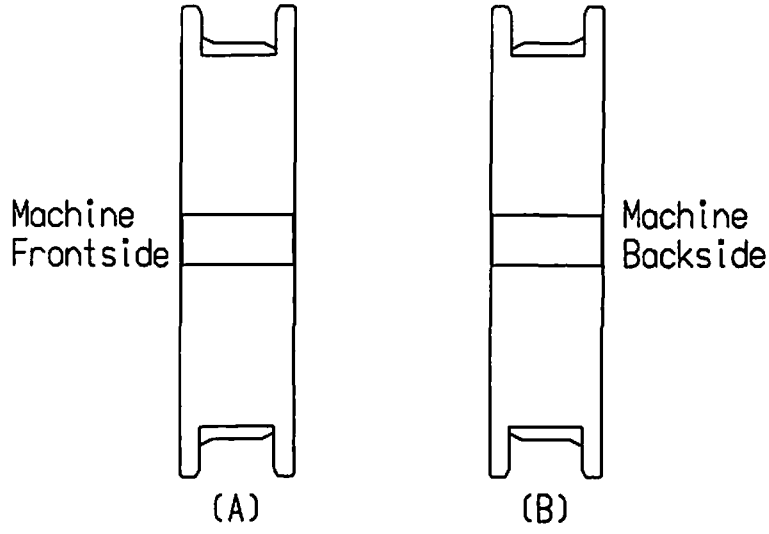


Fig.8-5 Fine Adjustment of Traverse Unit

WSD-K2 M001WSD06Z020

8—6. Wire Storage in Long Period Stoppage

Leaving the machine for a long period (such as new year holidays) with wire wound may cause deformation of the work rollers and rust on the wire, or lower accuracy. In this case, please cut the wire on the reel and store the wire reel. (See "8-2 Storage of Remaining Wire".) CAUTION

8－7. Multi Wire Web Specification (Option)

In this machine, single wire is hung under the work rollers. Wire arrangement as in Fig 3-3 is standard. In option specification, multiple wire can be wound on work rollers a few times just like our multi wire saws. This is called "multi wire web". To apply the multi wire web specification, some parts should be replaced and added (Using one more work roller), because the number of V-groove and wire winding pitch are limited in the standard structure. CAUTION (See "6-2 V-groove Pitch Selection Criteria".)

(1) Preparation for Winding

After completing the steps in "8-4 (1) Preparation for Winding", please add the parts for multi wire web. In this case, the work roller unit (including the urethane part) should be of multi wire web specification. Please note some components in this unit are different from single wire specification, such as using one more work roller.

Spacer(s) is to be added for multi wire web application. Those are used for changing the position of collection side tension and sub pulley unit to the front. In Fig 8-6, the 1-mm thick spacer is fitted and the position of the unit has been changed. (Please see Fig 11-1 for standard position relationship.) CAUTION

This part is necessary because the distance from the front plate in collection side to the wire changes due to multi wire web. The steps for fitting the part are as follow: CAUTION

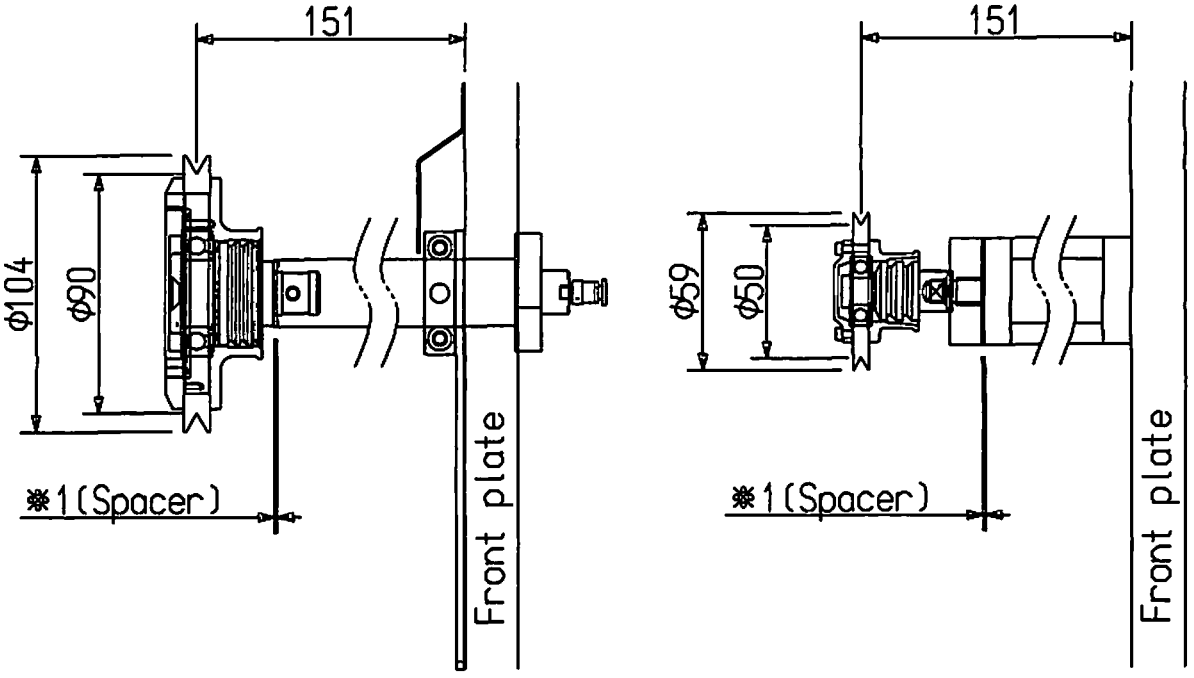


Fig.8-6 Multi Wire Web Additional Parts(Example)

WSD-K2 MQD1WSD06Z020

(2) Traverse Position Setting

After completing the preparation for wire winding as above, the front and back positions of the collection traverser should be changed. This is also because the distance from the front plate to the wire is to be changed in the multi wire web specification. The same reason of 8-7-(1).

The value for the spacer thickness {=V-groove pitch ×(No. of V-groove – 1)} should be input through the touch panel. (The value is a plus value based on the initial set value.) CAUTION

(3) Wire Winding

After completing the procedure above, install the wire referring to "8-4-(2) Wire Winding". However, see Fig 8-7 for winding wire on the work rollers, that is, hang the wire vertically against the work rollers under the rollers, whereas diagonally on the top of the rollers. (It is possible to use both side of third added work roller)

Wind the wire in the groove on the back in the supply side and lead the wire to the front and finally wind the wire in the groove on the front in the collection side.

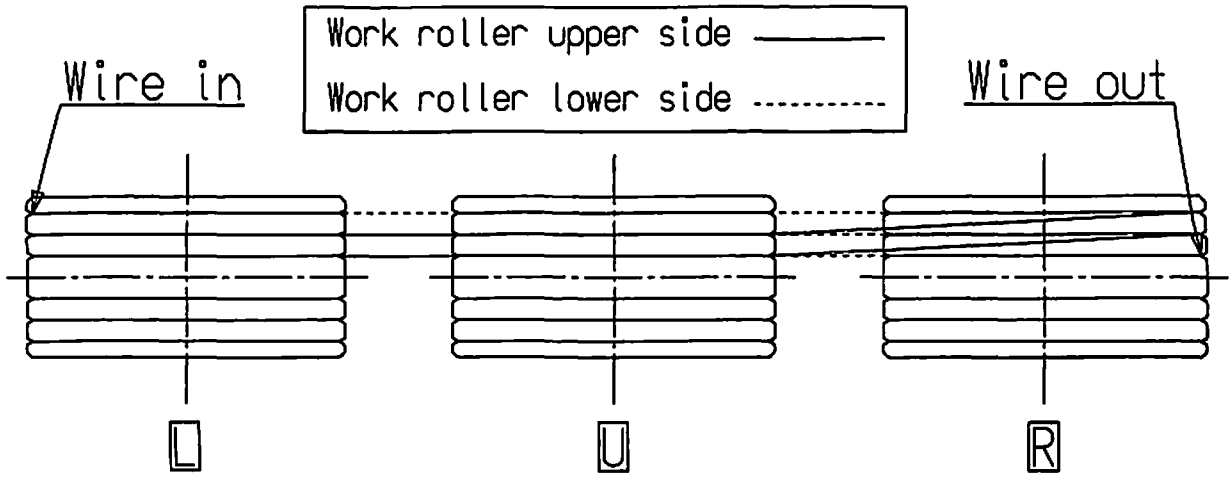


Fig.8-7 Work Roller Unit
Multi Wire Web Top View

WSD-K2 MQ01WSD06Z020

※An error of sending wire length is occurred by work roller worn out one way. Please avoid using a method caused abrasion of work roller and if you find abrasion of work roller, please change a work roller as soon as possible. It is recommended to use until 3 wires because abrasion gets serious when more than 3 wires are used.

9. Work Table

9－1. Work Table Mounting Space and Work Loading

The dimension of the work attachment space is 156 (w), 156 (H) and 100 (D) (mm) as shown in Fig 9-1. Please learn the locations of (1) work table, (2) attachment plate, (3) dummy plate and (4) material in the figure. (Fig 9-1)

(1) Work table is fixed on the (8) table base (Table base is fixed on the (7) clamp nut) with (5) swivel base and (6) positioning pin. (5) Swivel base is fixed on the (9) spacer higher place than slide quill which moves up and down by servo motor and ball screw. Clean the bottom and side faces of (2) attachment plate, which is attached with (3) dummy plate and (4) material, and the (2) attachment plate fitting face and both sides faces of the (1) work table, and (10) holder, and then, put the (2) attachment plate on the left side face of (1) work table, then fix it on the slicing position tightening (11) clamping bolt (6pcs, M6 x 20L, with round top). The tightening torque for the bolt is between 5.9 and 6.9 N.m (60 – 70kgf.cm). Please fix at least two or three pieces out of six. CAUTION

9－2. Work Table Orientation

At shipment of the machine, the attachment plate's mounting face of (1) work table is fitted in vertical relationship with the front plate. That is, the step 0 of (13) sub scale is aligned with the step 0 of (12) angle scale plate. In case the orientation needs to be adjusted because of crystalline layer alignment etc, the orientation can be changed up to ±7.5 degree.

To adjust the position, loosen the (14) work table fixing bolts (M8) on the right and left sides and, when needing to turn to the right viewing from the top, loosen (15) left adjust bolt in the front and tighten (16) right adjust bolt, press (6) positioning pin fixed on (8) table base. Then, adjust the orientation. And then, tighten (15) left adjust bolt lightly and (14) work table fixing bolts on both sides. When needing to turn the work table to the left, carry out the steps in opposite positions. (Work size may be limited depending on the table orientation.)

9－3. Y-axis Manual Position Adjustment

Please learn the wire position (150mm from the front plate) and work mounting related dimensions in Fig 9-1. To slice the material whose depth is 100mm or shorter in equal thickness, loosening (11) clamping bolt and adjusting (2) attachment plate attached with (4) material are necessary.

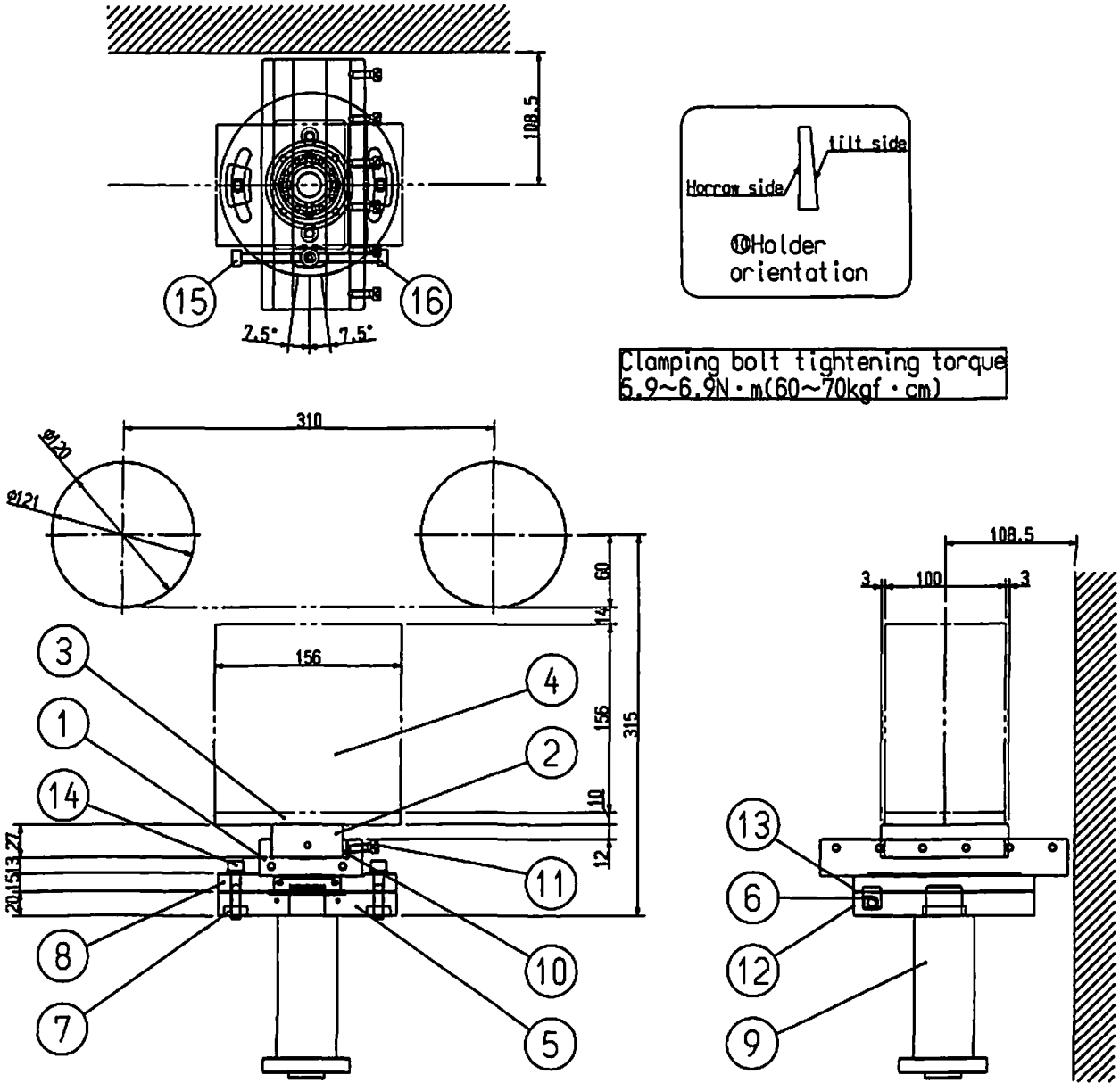


Fig.9-1 Work mounting related view WSD-K2 M001WSD06Z020

10. Maintenance, Inspection and Adjustment

10−1. Lubrication

(Lubrication for Ball screw, LM guide and Rocking shaft)

Apply grease (approx. 0.6cc) to the parts semi-annually. CAUTION

When the machine is not used for more than 6 months, apply grease as above and idle-run the machine at the half speed of standard speed for more than ten hours. CAUTION

10−2. Cleaning

When cleaning the machine in supplementing coolant and consumption parts or replacing wire reels, always press "Air Purge" button in the touch panel display to practice air purge to avoid the cleaning liquid flowing in the bearing part. CAUTION

Moreover, never apply cleaning liquid directly to the tension pulley unit, wire reel unit shaft, and rocking unit shaft because the cleaning liquid may flow inside of the machine through the units. (Electric components may be wet with the liquid.) DANGER

Do not leave the machine after washing by only water, and please use rust remover. CAUTION

10−3. Leveling

To maintain the accuracy, the machine must be kept being leveled.. Adjust the levelness of the machine referring to "4-3 Leveling" in annual inspection. CAUTION

11. Wire Pulley

11－1. Wire Pulley Structure

The wire pulleys of the machine (Tension Pulley, Sub Pulley) are designed to be located in 150mm position from the front plate as shown in Fig 11-1. So the position do not needs to be adjusted. However, always check the pulleys can turn smoothly. If the pulleys do not turn lightly, the life time of the pulleys as well as work rollers become shorter and what is worse, it may cause disconnection accident. CAUTION

Always check the pulleys are not worn and turn smoothly and stably without jamming and rattling before operation and remove the pulleys out of the machine to inspect for any abnormality regularly. CAUTION

Please see Fig 11-1 for the detailed structure.

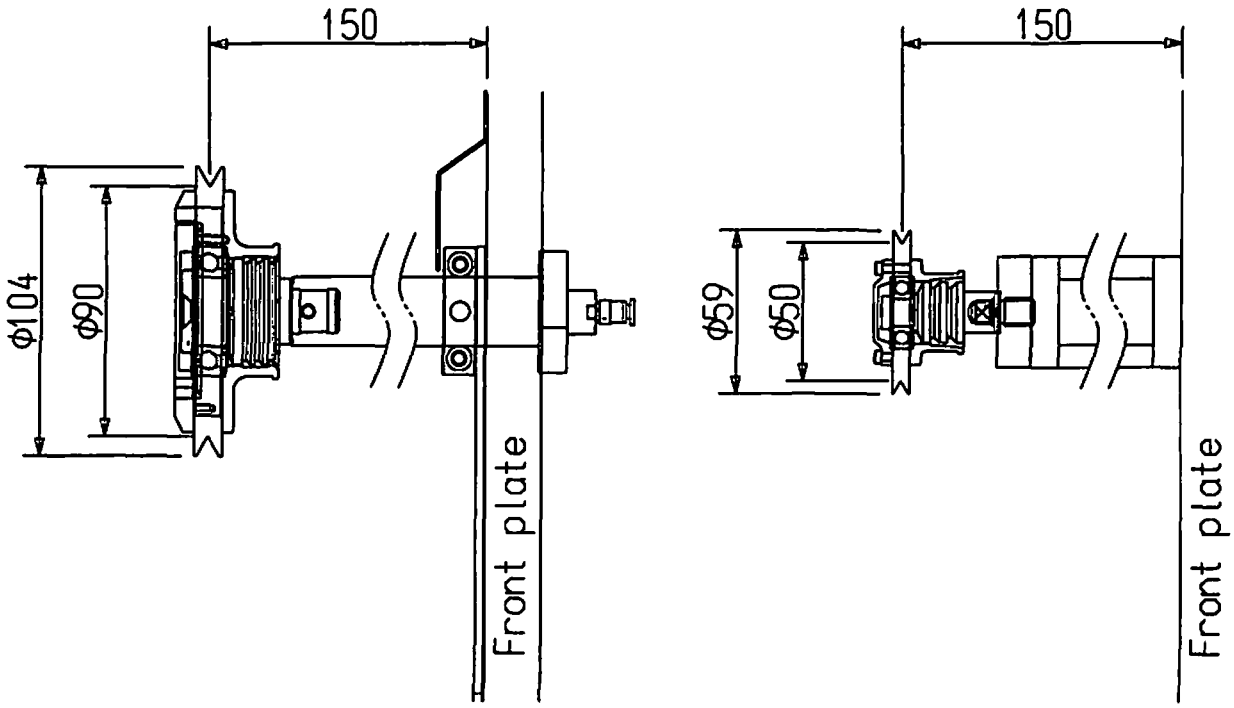


Fig.11-1 Wire Pullry Ttructural Drawing

WSD-K2 M001WSD06Z020

11－2. Wire Pulley Fitting Procedure

The wire pulley is fitted as shown in Fig 11-2 before shipment. Please replace it regularly before V-groove is worn out. Please clean off the cutting coolant around the unit or wash away. And also, in washing pulleys, please press "Air Purge" button in Stand-by Display to have air purge to avoid the cleaning liquid leaking in the bearing part. CAUTION

Wire pulleys should be stocked constantly as spare parts and we recommend, from a maintenance standpoint, that you regularly stock a set of pulley assembly unit for the purpose of "refresh replacement" or "Wear inspection" referring to Table 12-1

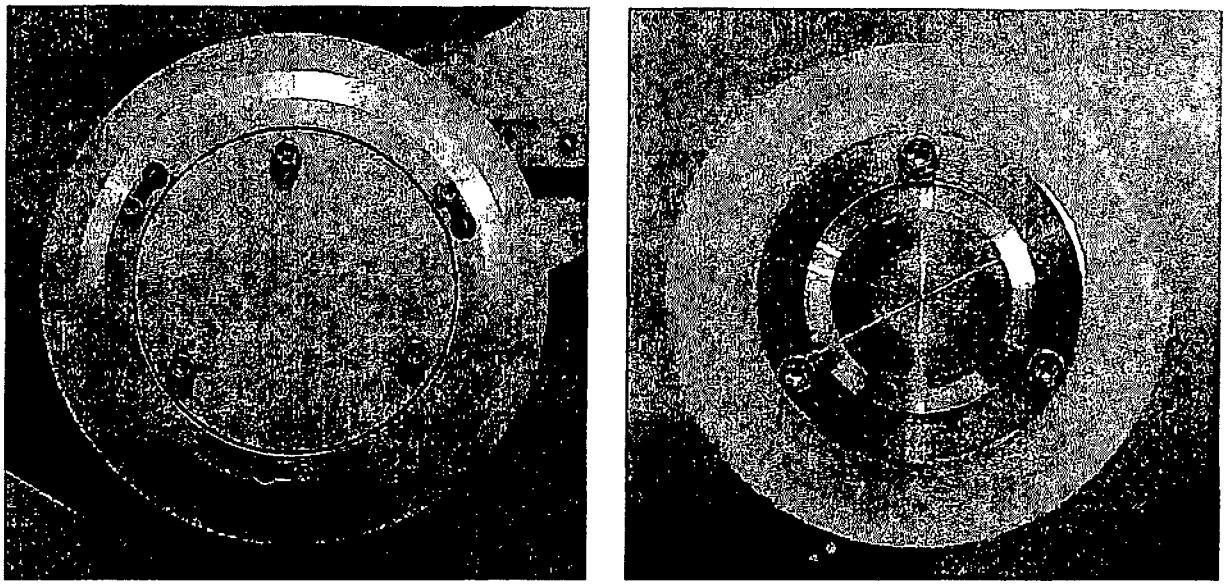


Fig 11-2 Wire Pulley

11－3. Caution for Wire Pulley Storage

The material of the wire pulleys may be shrunken or expanded depending on the storage method. Please keep the wire pulleys in the environment below. CAUTION

① Keep the parts in the package in delivery

② Temperature: 30 degree C or higher, humidity: 80% or less

1 2. Consumable Parts List

Table 12-1. Consumable Parts List(University of California Specification)

(See Fig 3-3, ▼:stock constantly)

	Items	P/N, Model	Material	Q'ty	Remarks
▼ Tension Pulley (2sets)	60 Degree groove pulley(K2)	MJ01WSD060020	SFT-1095T	1	ϕ104×ϕ90×10L
	Tension shaft (D cutting)	MJ01WSD060030	S45C	1	
	Bearing cover(1)	MJ02WSD020180	A2017	1	
	Bearing cover(2)	MJ02WSD020160	A2017	1	
	Pulley holder	MJ02WSD020170	A2017	1	
	Washer for bearing	QWE06030SUS	SUS	1	
	Bearing	6005VV	———	1	NSK
	O-ring	S60	———	1	NOK(apply grease)
	Hex socket head screw	M2.5×12	SUS	3	
	Hex socket head screw	M3×12	SUS	3	
	Cross socket head dish screw	M6×8	SUS	1	
▼ Work rollers (3sets)	Work roller (ϕ120×15L)	MB02WSD061110	SFT-1095T	1	(P:1.000, 3 groove)
	Bearing case	MB01WSD060071	A2017	1	For multi wire web
	Work roller shaft (1)	MB02WSD060010	S45C	1	For L work roller
	Work roller shaft (2)	MB02WSD060020	S45C	1	For R & U work roller
	Cap	MB01WSD020050	A2017	1	
	Pulley holder	MB01WSD060020	A2017	1	
	Angular bearing	7005CDB	———	1	NTN
	Helisert	M4-0.7X2DNS	———	4	
	Metal washer	WSSM30-8-5	———	1	Misumi
	Dish spring washer	GTS8	———	1	Misumi
	Socket head cap screw	MSWTMJ	———	1	Misumi
	O-ring	S44	———	1	NOK (apply grease)
	Hex socket head screw	M8×15	———	1	
	Hex socket head screw	M4×10	SUS	4	
	Hex socket head screw	M4×12	SUS	4	
	Hex socket head screw + spring washer	M3×5	SUS	30	For only L work roller

	Items	P/N, Model	Material	Q'ty	Remarks
Sub Pulley (2sets) ▼	ϕ50×6L deep groove wire pulley(U)	G1MWS08027	Urethane	1	ϕ50×ϕ59×6L
	Sub pulley shaft	MW04WSD060160	S45C-Q	1	
	Sub pulley cover (1)	MW04WSD060140	A2017	1	
	Sub pulley cover (2)	MW04WSD060150	A2017	1	
	Washer (A)	QWA04012Z4	SPCC	1	
	Bearing	6005VV	———	1	NSK
	Hex socket head screw	M2.5×15	SUS	3	
	Cross socket head dish screw	M4×8	SUS	1	
Wire reel	Wire reel (ϕ220)	MH01WSD050140	A2017	3	Empty weight:2kg(supply, collect) Include 1 for spare
Work attachment plate	Attachment plate	MD01WSD060010	SUS430	2	Include 1 for spare
	Top plate	MU16WSD060050	SUS430	2	Include 1 for spare (For work attachment jig)
Rocking belt	Timing belt	250S8M520	———	1	Mitsuboshi
Elevation belt	Timing belt	HTBN750S5M-250	———	1	Misumi
Lithium battery for motion controller	Battery	JZSP-BA01	———	1	Yasukawa

13. Attached Reference Materials

- Accuracy Inspection Results Sheet
- Servo Motor Operation/Maintenance Manual
- Cutting Coolant Pump Operation Manual (Option)
- Special Specification
- Others

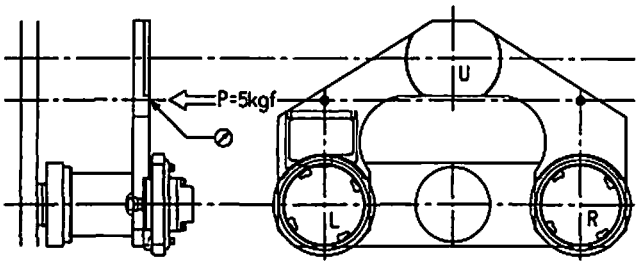
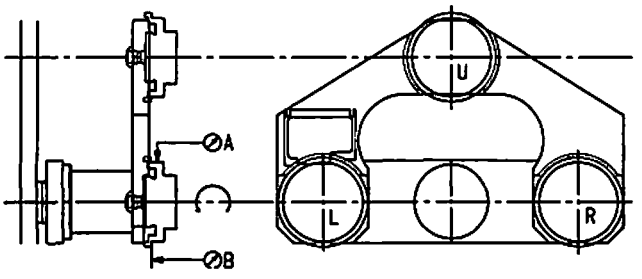
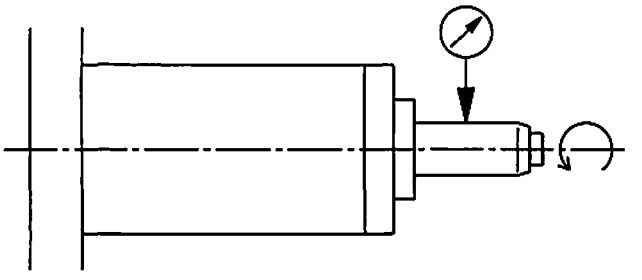
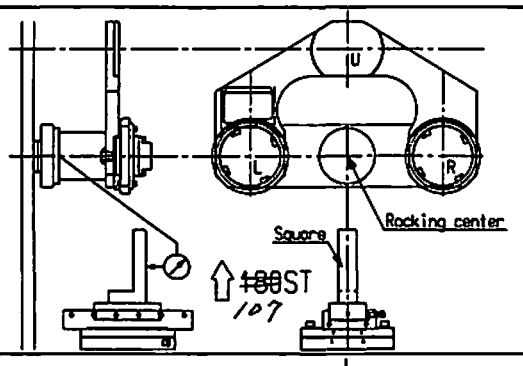
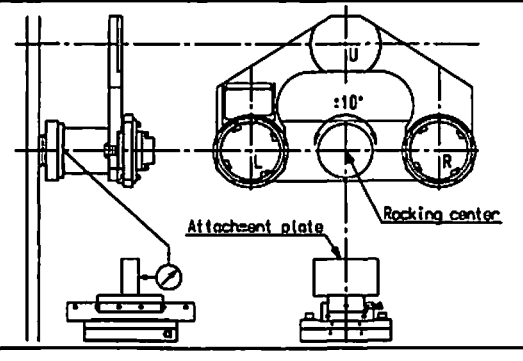
TM-D-070-K2-02 第0版

Check	Inspection
植松	吉村
MWS production	

Rigidity and Static Accuracy Inspection Record

Model : WSD−K2 Date : 202. 2. 28.

Production code : WM550913 SerialNo : 1021 1/2 MWS Design

Check point	Measuring method	[Unit: μm]
1. Rocking unit rigideity — Thrust direction		Tolerance: Under 100 L Value: 69 R Value: 57
2. Work roller axial runout — A Outer diameter B Wall surface		A tolerance: Dif. under 20 B tolerance: Dif. under 20 A Value: L 8, R 8, U 4 B Value: L 6, R 12, U 4
3. Reel axial runout		Tolerance: Dif. under 100 Supply side value: 40 Collect side value: 55
4. Elevation table verticalness toward rocking unit		Tolerance: Dif.under 20 Value: 3
5. Elevation table parallelism to rocking unit		Tolerance: Dif.under 20 Value: 5

(1) = Pick tester (2) Dif.: difference between maximum and minimum figure

TM-D-070-K2-02 第0版

Check	Inspection
植松	吉村
MWS production	

Rigidity and Static Accuracy Inspection Record

Model : WSD−K2 Date : 2012. 2. 28.

Production code : WM550913 SerialNo : 1021 2/2 MWS Design

Check point	Measuring method	[Unit: μm]	
		Tolerance	Value
8 Belt tension	Elevation unit belt	166.0～221.0N {16.9～22.6Kgf}	213
	Rocking unit belt	382.0～510.0N {39.0～52.0Kgf}	506

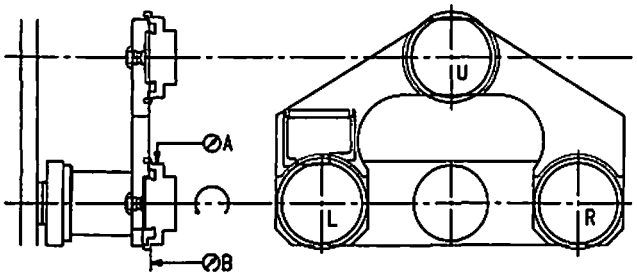
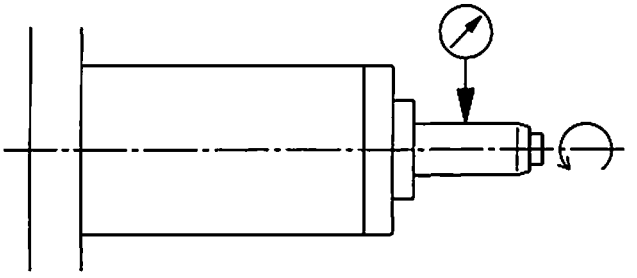
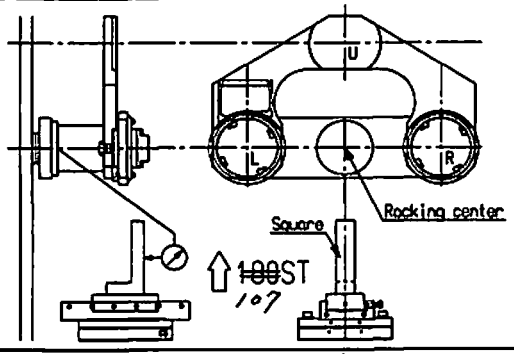
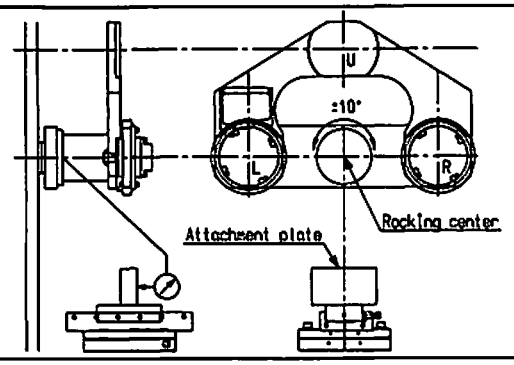
(1) ⓟ = Pick tester (2) Dif.: difference between maximum and minimum figure

Static-accuracy inspection report(Inspection STD)

Decision	Check	Inspection
合格	植松	吉村
M W S production		

Model : W S D－K 2　　Date : 2012. 2 . 28.

Production code : WM550913　　Serial No : 1021　　1/1　　M W S Design

Check Point	Measuring method	[Unit:μm]	Response to anomaly
1. Work roller axial runout A Outer diameter B Wall surface		A tolerance: Dif. under 20 B tolerance: Dif. under 20 A Value: L 8, R 9, U 4 B Value: L 6, R 12, U 4	axis exchange
2. Reel axial runout		Tolerance: Dif. under 100 Supply side value: 40 Collect side value: 55	axis exchange
3. Elevation table verticalness toward rocking unit		Tolerance: Dif.under 20 Value: 3	readjustment
4. Elevation table parallelism to rocking unit		Tolerance: Dif.under 20 Value: 5	readjustment

(1) ⓐ =Pick tester　　(2) Dif.: difference between maximum and minimum figure

TKI 剛性検査表(水平)

型式名　TKI-1113-1A

製造番号　1110121

検査日　2011.12.01

検査者:　湯沢

承　認:　早川

検査1. クランプなし

セットネジ方向　(単位:μm)

	a	b	c
A	5/1	3/1	4/1
B	3/1	2/0	2/1
C	4/1	2/1	6/1

負荷時の変位/除荷時の残留変位

走り方向　(単位:μm)

	a	b	c
A	6/1	2/0	5/1
B	2/1	1/0	3/1
C	4/1	2/1	6/1

負荷時の変位/除荷時の残留変位

検査2. クランプあり

セットネジ方向　(単位:μm)

	a	b	c
A	4/0	3/1	3/1
B	2/0	3/1	2/1
C	2/1	2/0	6/1

負荷時の変位/除荷時の残留変位

走り方向　(単位:μm)

	a	b	c
A	2/1	0/0	3/1
B	1/0	0/0	2/1
C	2/1	0/0	2/1

負荷時の変位/除荷時の残留変位

A, B, C:負荷点(荷重 20 kgf)
a, b, c:測定点

図1. セットネジ方向

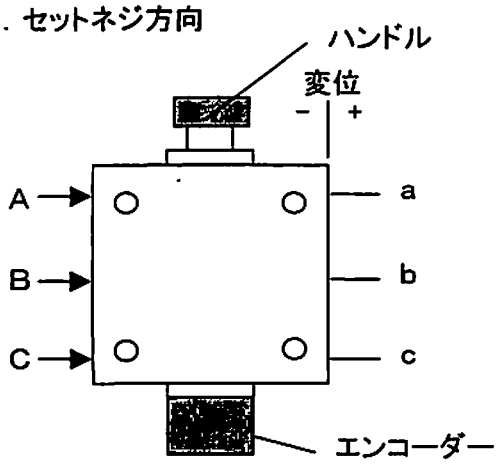
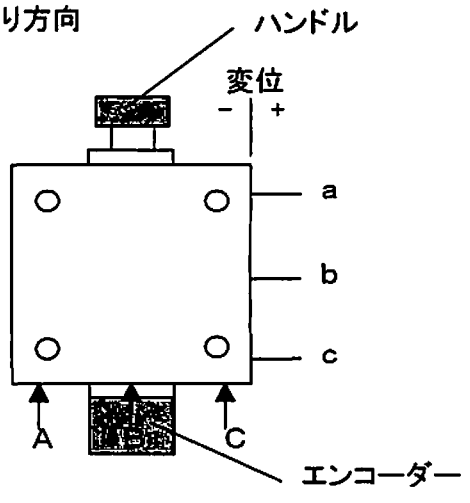


図2. 走り方向



TKI 剛性検査表(垂直)

型式名　TKI-1113-1A

製造番号　1110121

検査日　2011.12.01

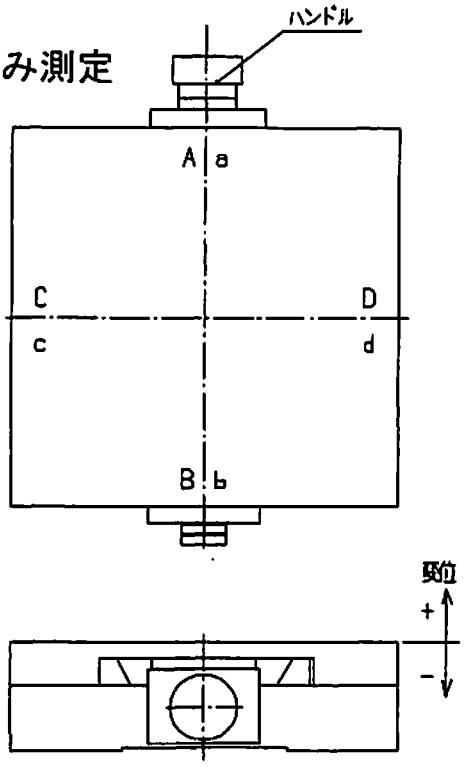
検査者:　湯沢

承　認:　早川

製造 11.12.01 湯沢

製造 11.12.01 早川

垂直方向たわみ測定



全てクランプ状態において
荷重 20 kgf
A, B, C, D:負荷点
a, b, c, d :測定点
とし、垂直方向の変位を測定

クランプ変位とは、
クランプのロック開放による変位である。

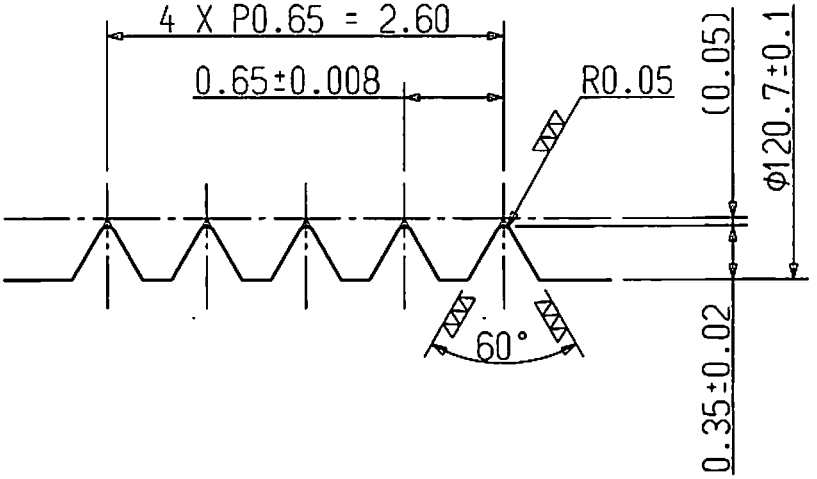
(単位:μm)

	a	b	c	d
A	1/0	0/0	0/0	0/0
B	0/0	0/0	0/0	1/0
C	0/0	1/0	1/0	1/0
D	1/0	2/1	1/0	3/1
クランプ変位	0	0	0	1

負荷時の変位/除荷時の残留変位

ユーザー名称	カリフォルニア大学/米国

MB02WSD061150-02



A部(V溝)詳細図(S=20/1)(2ヶ所)

V溝加工数10本

シムプレート取付要領(0.65mmピッチ,5溝X2)			
取付場所	使用溝数	組合セ厚ミ	数
テンショナー部	2溝使用時	0.60mm+0.05mm	各1
	3溝使用時	1.20mm+0.10mm	各1
	4溝使用時	1.50mm+0.40mm+0.05mm	各1
	5溝使用時	2.50mm+0.10mm	各1
補助プーリー部	2溝使用時	0.60mm+0.05mm	各1
	3溝使用時	1.20mm+0.10mm	各1
	4溝使用時	1.50mm+0.40mm+0.05mm	各1
	5溝使用時	2.50mm+0.10mm	各1

※使用溝数を変更する際は、必ずワークローラーを交換下さい。

※組合せ厚みは、計算上と最大で0.02mmの誤差があります。
(ワーク加工精度に影響はありません。)

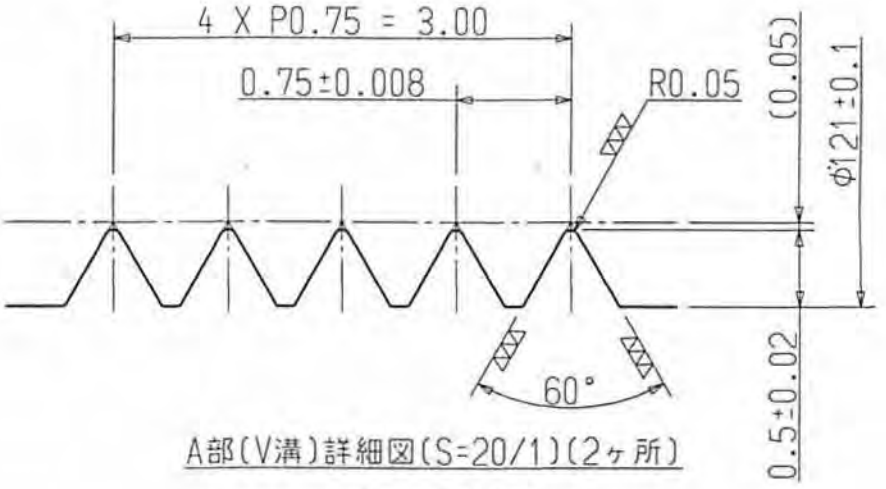
'12.3.07
行

第3角法 ISOネジ	機種名	WSD-K2	図番	MB02WSD061150	尺度	20/1
株式会社タカトリ	作成12年3月5日		品名	ウレタンワークローラー	承認	北
					検図	森
					製図	井上

15-39-50

ユーザー名称	カリフォルニア大学/米国

MB02WSD061160-02



A部(V溝)詳細図(S=20/1)(2ヶ所)

V溝加工数10本

シムプレート取付要領(0.75mmピッチ,5溝X2)			
取付場所	使用溝数	組合セ厚ミ	数
テンショナー部	2溝使用時	0.70mm+0.05mm	各1
	3溝使用時	1.50mm	各1
	4溝使用時	2.00mm+0.25mm	各1
	5溝使用時	3.00mm	各1
補助プーリー部	2溝使用時	0.70mm+0.05mm	各1
	3溝使用時	1.50mm	各1
	4溝使用時	2.00mm+0.25mm	各1
	5溝使用時	3.00mm	各1

※使用溝数を変更する際は、必ずワークローラーを交換下さい。

※組合せ厚みは、計算上と最大で0.02mmの誤差があります。
(ワーク加工精度に影響はありません。)

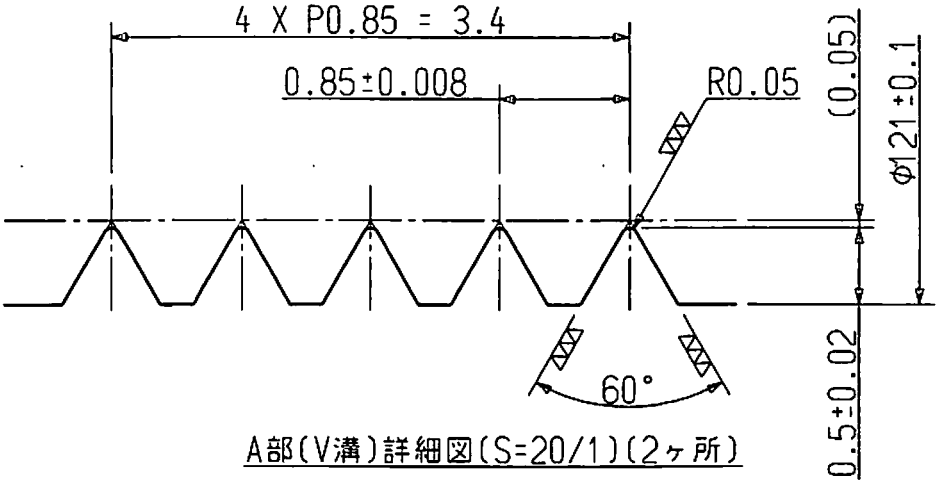
'12.3.07
行

第3角法 ISOネジ	機種名	WSD-K2	図番	MB02WSD061160	尺度	20/1
株式会社タカトリ	作成 12年3月5日		品名	ウレタンワークローラー	承認	北
					検図	森田
					製図	井上

16-26-07

ユーザー名称	カリフォルニア大学/米国

MB02WSD061170-02



A部(V溝)詳細図(S=20/1)(2ヶ所)

V溝加工数10本

シムプレート取付要領(0.85mmピッチ,5溝X2)			
取付場所	使用溝数	組合セ厚ミ	数
テンショナー部	2溝使用時	0.80mm+0.05mm	各1
	3溝使用時	1.50mm+0.20mm	各1
	4溝使用時	2.50mm+0.05mm	各1
	5溝使用時	3.00mm+0.40mm	各1
補助プーリー部	2溝使用時	0.80mm+0.05mm	各1
	3溝使用時	1.50mm+0.20mm	各1
	4溝使用時	2.50mm+0.05mm	各1
	5溝使用時	3.00mm+0.40mm	各1

※使用溝数を変更する際は、必ずワークローラーを交換下さい。

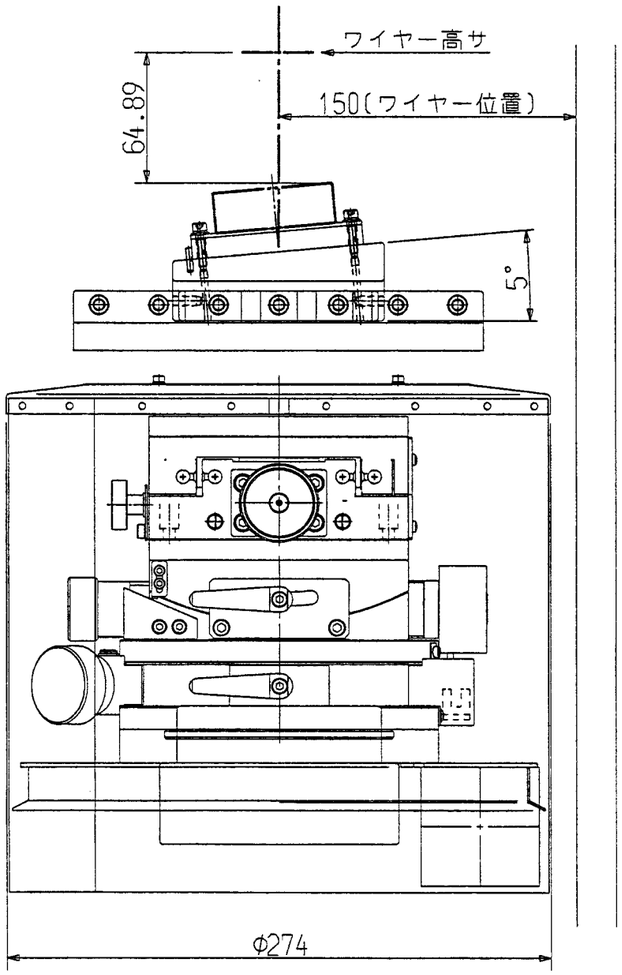
※組合せ厚みは、計算上と最大で0.02mmの誤差があります。
(ワーク加工精度に影響はありません。)

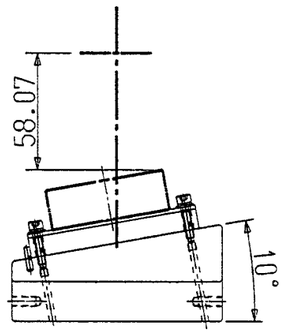
'12.3.07

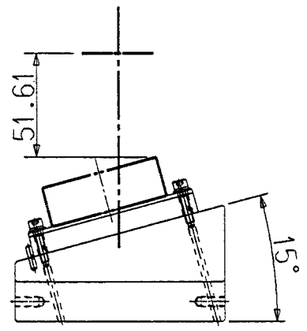
第3角法 ISOネジ	機種名	WSD-K2	図番	MB02WSD061170	尺度	20/1
株式会社タカトリ	作成12年3月5日		品名	ウレタンワークローラー	承認	検図 / 製図
					北	井上

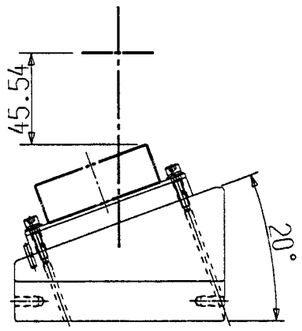
16-45-04

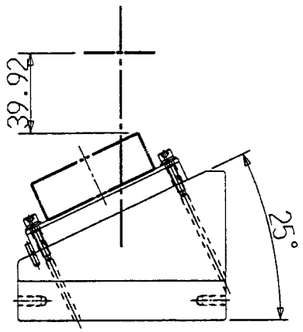
※傾斜ブロック使用時は、部品及びワイヤーの
干渉リスクが高くなるため十分御注意下さい。

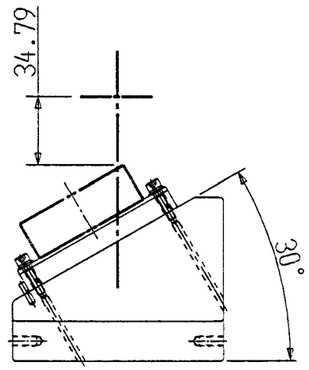


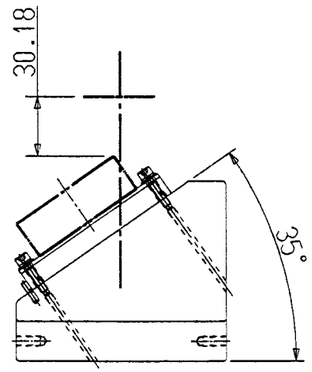


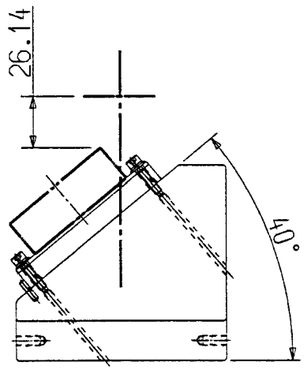


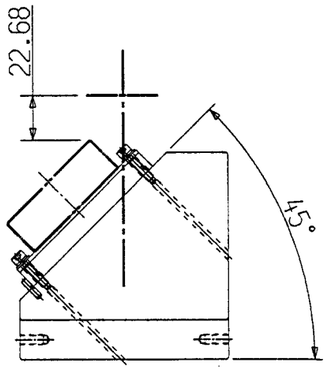












発行
2012. 3. 21
㈱タカトリ

カリフォルニア大学向傾斜固定ブロック概略図

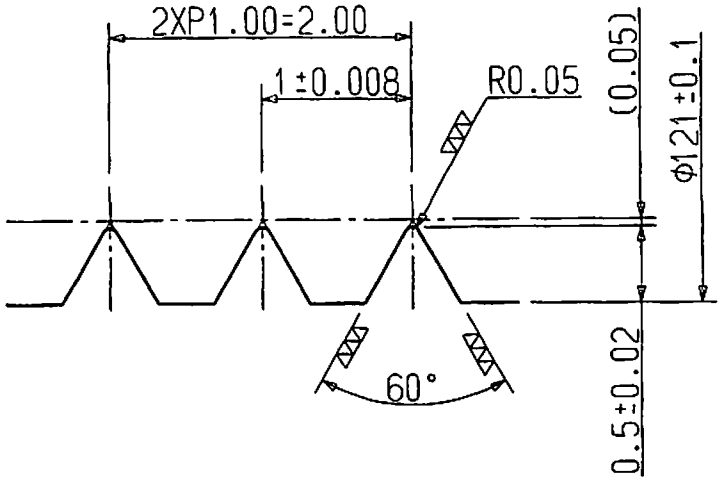
Confidential

第3角法 ISOネジ	機種名	WSD-K2	図番	MU16WSD06Z020	尺度	1/3
株式会社タカトリ			作成 12年3月19日		承認	検図	製図
			品名	カリフォルニア大学向 傾斜固定ブロック概略図	北	森	井上

15-31-37

ユーザー名称	カリフォルニア大学/米国

MB02WSD061110-02



A部(V溝)詳細図(S=20/1)(2ヶ所)

V溝加工数6本

シムプレート取付要領(1.00mmピッチ,3溝X2)			
取付場所	使用溝数	組合セ厚ミ	数
テンショナー部	2溝使用時	1.00mm	1
	3溝使用時	1.00mm	2
補助プーリー部	2溝使用時	1.00mm	1
	3溝使用時	1.00mm	2

※使用溝数を変更する際は、必ずワークローラーを交換下さい。

※組合せ厚みは、計算上と最大で0.02mmの誤差があります。
(ワーク加工精度に影響はありません。)

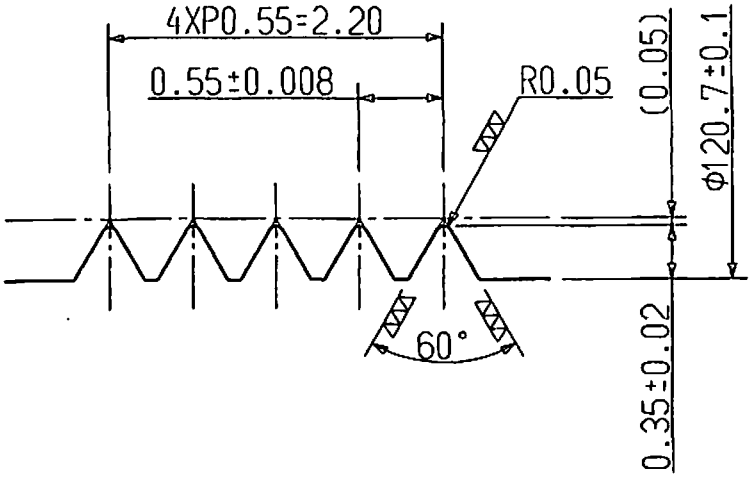
'12.1.17 行

第3角法 ISOネジ	機種名	WSD-K2	図番	MB02WSD061110	尺度	20/1
株式会社タカトリ			作成 12年1月17日		承認	検図	製図
			品名	ウレタンワークローラー	北	森田	井上

14-30-46

ユーザー名称	カリフォルニア大学/米国

MB02WSD061140-02



A部(V溝)詳細図(S=20/1)(2ヶ所)

V溝加工数10本

シムプレート取付要領(0.55mmピッチ,5溝X2)			
取付場所	使用溝数	組合セ厚ミ	数
テンショナー部	2溝使用時	0.50mm+0.05mm	各1
	3溝使用時	1.00mm+0.10mm	各1
	4溝使用時	1.50mm+0.15mm	各1
	5溝使用時	2.00mm+0.20mm	各1
補助プーリー部	2溝使用時	0.50mm+0.05mm	各1
	3溝使用時	1.00mm+0.10mm	各1
	4溝使用時	1.50mm+0.15mm	各1
	5溝使用時	2.00mm+0.20mm	各1

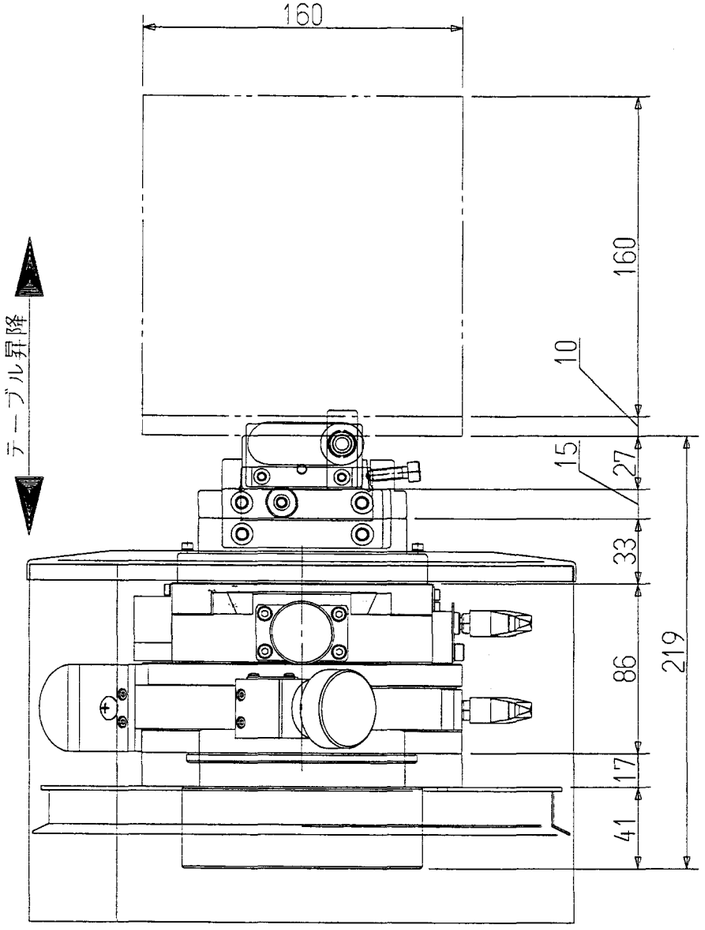
※使用溝数を変更する際は、必ずワークローラーを交換下さい。

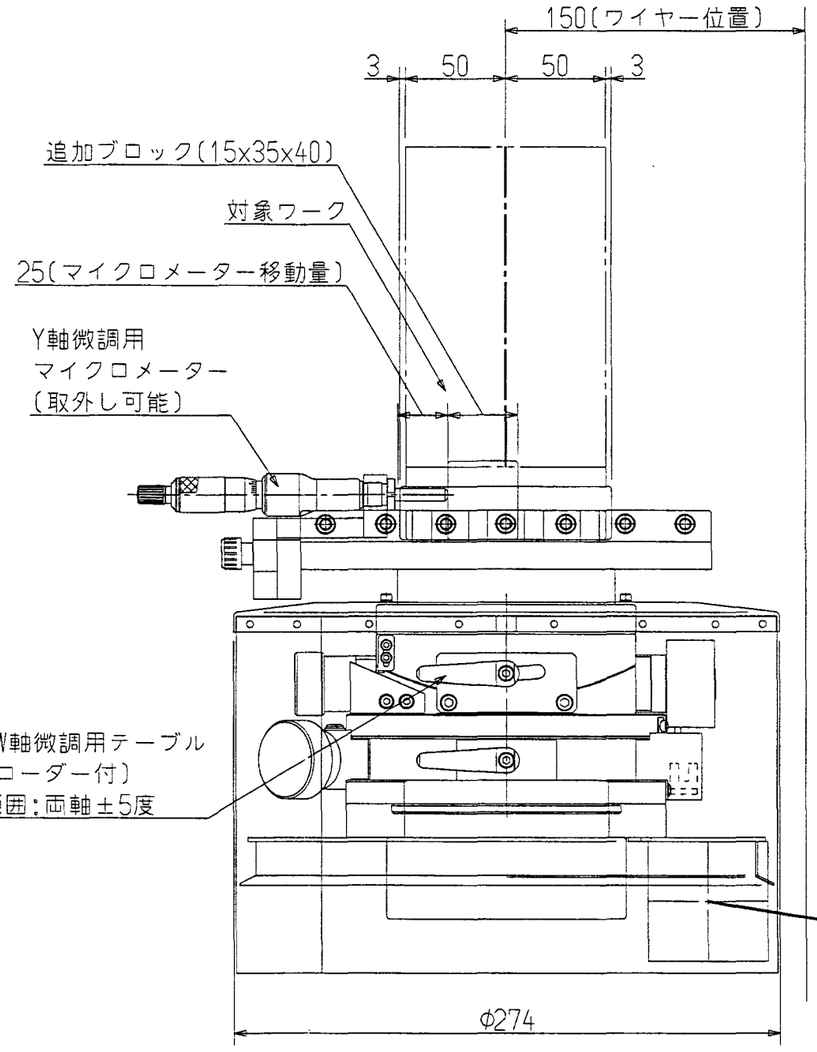
※組合せ厚みは、計算上と最大で0.02mmの誤差があります。
(ワーク加工精度に影響はありません。)

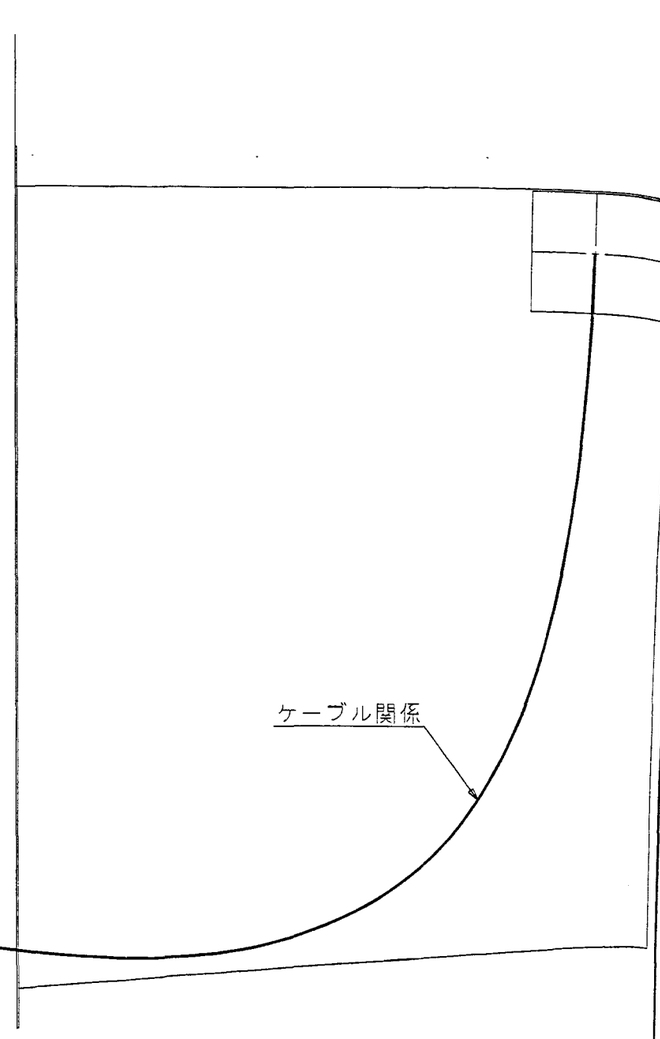
'12.3.01
行

第3角法 ISOネジ	機種名	WSD-K2	図番	MB02WSD061140	尺度	20/1
株式会社タカトリ	作成12年3月1日		品名	ウレタンワークローラー	承認 北	検図	製図 井上

16-25-23







表示器付Y・θ・SW手動微調テーブル概略図

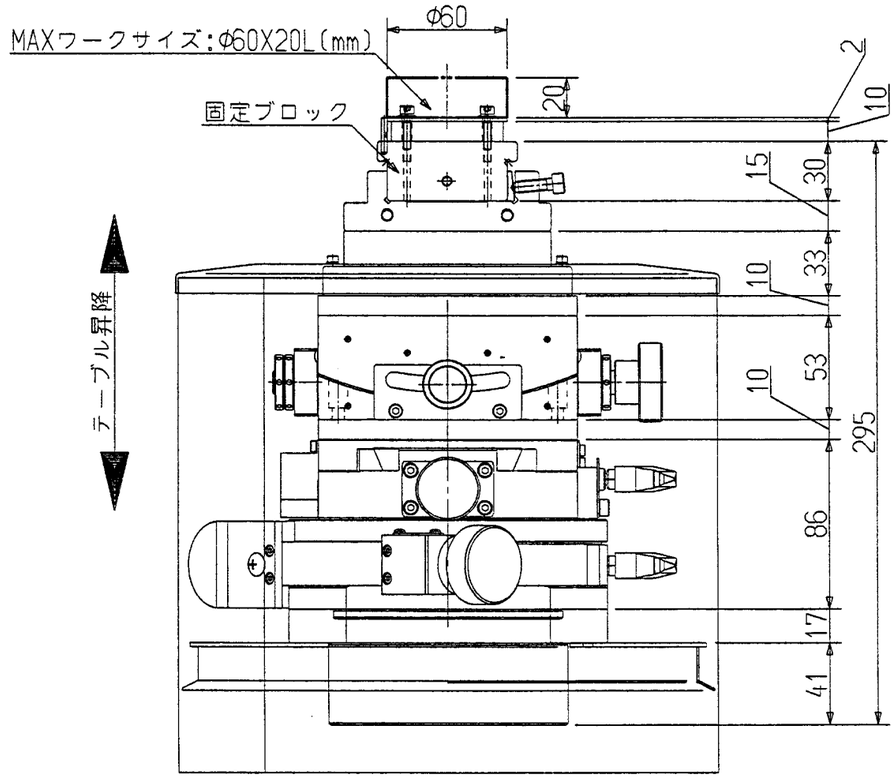
第3角法 ISOネジ	機種名	WSD-K2	図番	MX02WSD06Z010	尺度	1/3
株式会社タカトリ			作成 12年2月29日	承認	検図	製図
			品名	表示器付Y・θ・SW 手動微調テーブル概略図		井上

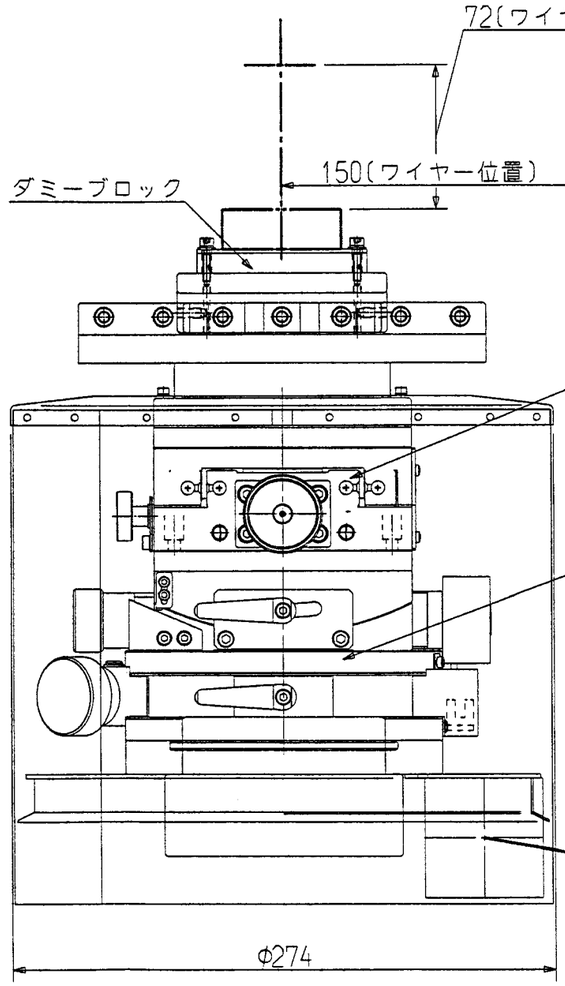
14-57-00

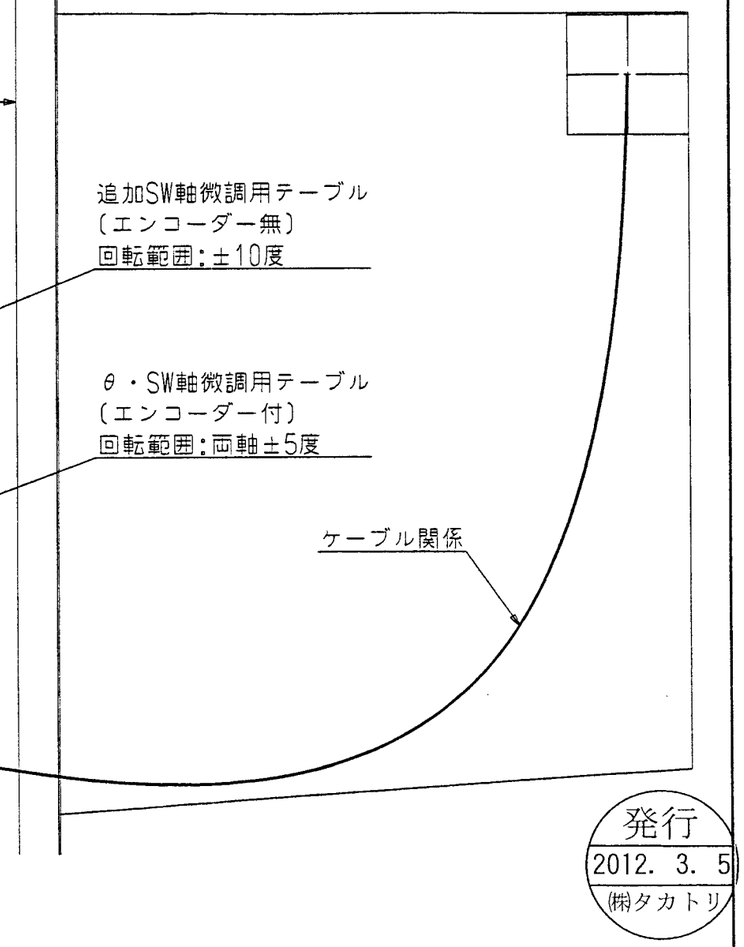
※測角器での調整角度とテーブル部での調整角度はイコールではありません。

※Z軸テーブルリミット:104mm(標準:180mm)⇒固定ブロック上面高さまでの距離

※揺動角度/ワーク調整角度によっては、部品干渉の恐れがありますので注意下さい。





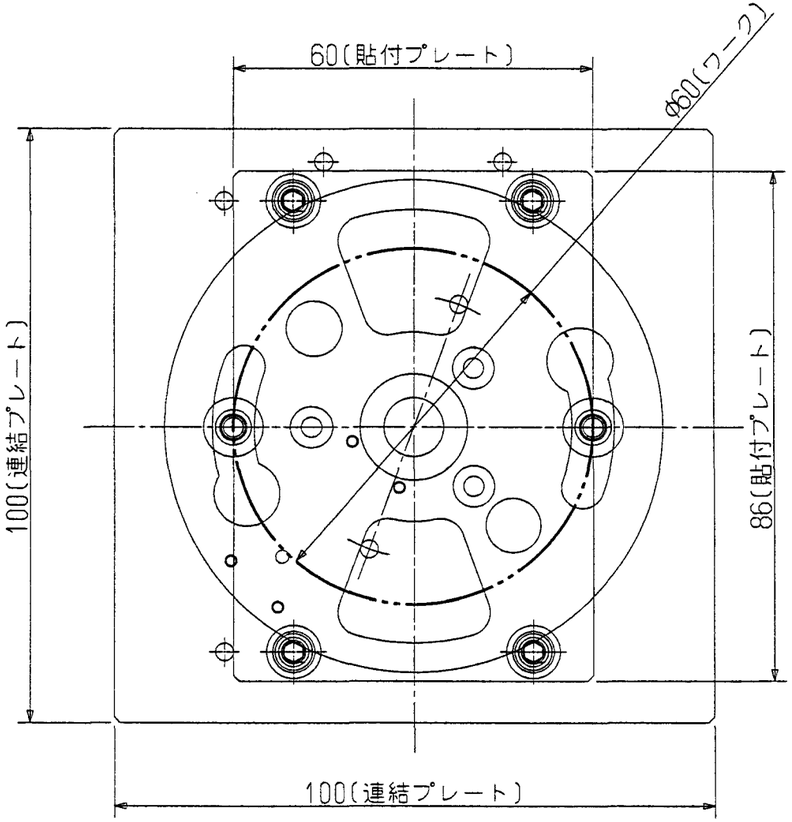


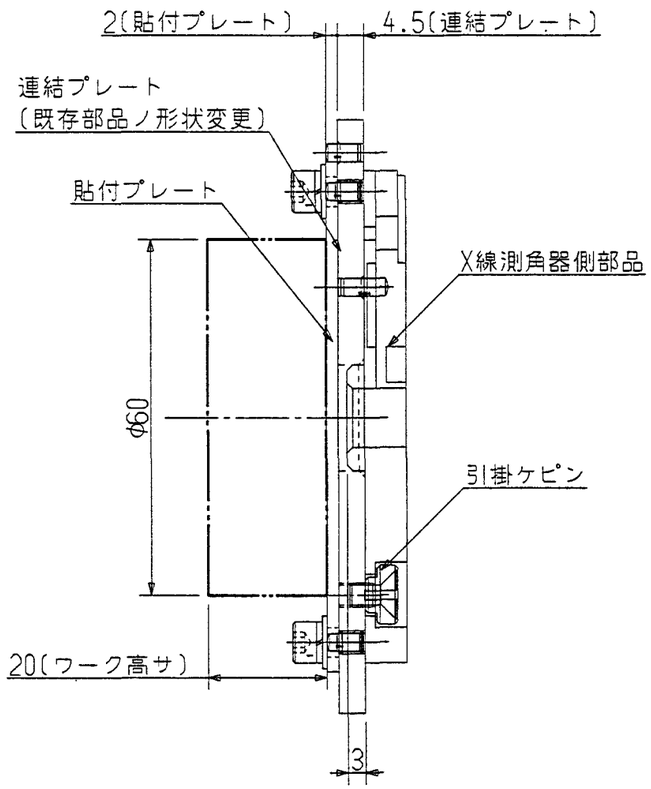
発行
2012. 3. 5
㈱タカトリ

カリフォルニア大学向特殊テーブル概略図

第3角法 ISOネジ	機種名	WSD-K2	図番	MU16WSD06Z020	尺度	1/3
株式会社タカトリ			作成 12年3月3日	承認	検図	製図
			品名 カリフォルニア大学向 特殊テーブル概略図	北		井上

17-16-44





カリフォルニア大学向ワーク貼付治具概略図

発行
2012. 3. 5
㈱タカトリ

第3角法 ISOネジ	機種名 WSD-K2	図番	MU16WSD06Z020	尺度	1/1
株式会社タカトリ		作成 12年3月3日		承認	検図	製図
		品名	カリフォルニア大学向 ワーク貼付治具概略図	北	森	井上

17-18-03

Create Date: 2011/01/27
Revised Date2011/06/24

Material Safty Data Sheets
(MSDS)

1. IDENTIFICATION

PRODUCT NAME	
MANUFACTURER'S NAME	PALACE CHEMICAL CO.,LTD.
DEPARTMENT	SALES DIVISION 2
MANUFACTURING DEPT	No.2 RESEARCH SECTION.,R&D DIVISION 2
ADDRESS	1-11-16 FUKUURA KANAZAWA-KU YOKOHAMA 236-0004 JAPAN
TELEPHONE	+81-45-784-7241
FAX	+81-45-788-1524
EMERGENCY PHONES	SALES DIVISION 2
PRODUCT USE/RESTRICITION	CUTTING/GRINDING OIL (WATER SOLUBLE)
PRODUCT REFERENCE NUMBER	01-3310740-04-00

2. HAZARDS IDENTIFICATION

GHS CLASSIFICATION

PHYSICOCHEMICAL HAZARDS	
FLAMMABLE GAS	Not objects to classify
OXIDIZING GAS	Not objects to classify
FLAMMABLE LIQUIDS	Not classified
HEALTH HAZARDS	
ACUTE TOXICITY (Oral)	Category5
ACUTE TOXICITY (Dermal)	Not classified
ACUTE TOXICITY (Gases)	Not objects to classify
ACUTE TOXICITY (Vapours)	Not classified
ACUTE TOXICITY (Dusts and Mists)	Not classified
SKIN CORROSION/IRRITATION	Category2
SERIOUS EYE DAMAGE/EYE IRRITATION	Category1
RESPIRATION SENSITIZATION	Classification not possible
SKIN SENSITIZATION	Category1
GERM CELL MUTAGENICITY	Classification not possible
CARCINOGENICITY	Classification not possible
REPRODUCTIVE TOXICITY	Category2
EFFECTS ON LACTATION	Classification not possible
SPECIFIC TARGET ORGAN TOXICITY SINGLE EXPOSURE	Category1(kidney, liver, nervous system, respiratory system)
SPECIFIC TARGET ORGAN TOXICITY REPEATED EXPOSURE	Category1(kidney, nervous system, respiratory system) Category2(liver, blood, testis, central nervous system)
ASPIRATION HAZARD	Classification not possible
ENVIRONMENT HAZARDS	
HAZARD TO THE AQUATIC ENVIRONMENT (ACUTE)	Category3
HAZARD TO THE AQUATIC ENVIRONMENT (CHRONIC)	Classification not possible

LABEL ELEMENTS

PICTOGRAMS

SIGNAL WORD Danger

HAZARD INFORMATION

May be harmful if swallowed (oral)

Causes skin irritation
Causes serious eye damage
May cause an allergic skin reaction
Suspected of damaging fertility or the unborn child
Causes damage to organs(kidney, liver, nervous system, respiratory system)
Causes damage to organs through prolonged or repeated exposure (kidney, nervous system, respiratory system)
May cause damage to organs through prolonged or repeated exposure(liver, blood, testis, central nervous system)
Harmful to aquatic life

PRECAUTIONARY STATEMENTS

SECURITY PRECAUTION

- Refer to MSDS before use.
- Do not handle until all safety precautions have been read and understood.
- Do not breathe dust, fume, gas, mist, vapor and spray.
- Avoid releasing to the environment-if this is not the intended use.
- Do not eat, drink or smoke when using this product.
- Contaminated work clothing should not be allowed out of the workplace.
- Wash thoroughly after handling.
- Wear eye protection and face protection specified by manufacturer, supplier or regulating authorities.
- Wear protective gloves specified by manufacturer, supplier or regulating authorities.

FIRST AID MEASURES

- IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing.
- IF ON SKIN: Wash with plenty of soap and water.
- If skin irritation or rash occurs, get medical advice and attention.
- Take off contaminated clothing. Wash it before reuse.
- If exposed or concerned: Get medical advice and attention.
- If you feel unwell get medical advice and attention.

STORAGE

- Lock up the store if possible.

DISPOSAL

- Dispose of contents and container in accordance with local, regional and national regulations (to be specified).

3. COMPOSITION/INFORMATION ON INGREDIENTS

SINGLE SUBSTANCE/MIXTURE	: Mixture	
COMMON NAME	:	
COMPOSITION AND CONTENT	: Water	55～65%
	Additives	35～45%
CHEMICAL PROPERTIES	: Unspecified	
(Chemical formula)		
GAZETTE NOTICE REFERENCE NUMBER	: Because trade secrets can not be described	
CAS No.	: Because trade secrets can not be described	

HAZARDOUS INGREDIENTS

Industrial Safety & Health Act(Deliver of Documents)

Substances	Cabinet Order No.	Content(%)	CAS No.
Diethanolamine	219	5～15	111-42-2

Industrial Safety & Health Act(Labeling)

Substances	Cabinet Order No.	Content(%)	CAS No.
—	—	—	—

Pollutant Release & Transfer Register

Substances	Cabinet Order No.	PRTR Application	Content(%)	CAS No.
boron compounds	—	Not applicable	<1	—

4. FIRST AID MEASURES

IF INHALED : Remove to fresh air. Cover the body with towels to keep warm, rest in silence, get medical treatment if necessary.
IF ON SKIN : Wash the attached parts with soap and water.
IF IN EYES : Immediately wash the eyes with clean water for 15 minutes or more, and get medical treatment from an ophthalmologist.
IF SWALLOWED : Don't make vomit by force. Get immediate medical advice and attention. Wash with plenty of water if contaminated within the mouth.
SIGN & SYMPTOM : There is currently no useful information.
PROTECTION : There is currently no useful information.
NOTES FOR DOCTORS : There is currently no useful information.

5. FIRE-FIGHTING MEASURES

EXTINGUISHING AGENT : fog-like liquid reinforcement, foam extinguishing agents, dry chemicals or carbon dioxide are effective.
Use powder, carbon dioxide fire extinguishing agent to control the initial fire.
On occasion of major fire, it is effective to use foam extinguishing agents to block the air.
BAN EXTINGUISHING AGENT : Do not use jet water. May expand the fire.
SPECIFIC WAY OF EXTINGUISHING A FIRE : Cut off the source of origin of the fire burning.
Spray with water to cool off the equipment.
Anyone irrelevant is prohibited from entering the fire area.
PROTECTION OF THE FIREMAN : In fire-extinguishing activity, should wear protective equipment and extinguish the fire from windward.
SPECIFIC HARMFUL & DANGEROUS : Non-flammable for containing water, but flammable if the water evaporated.
Avoid inhaling smoke when fighting fire for the burning gas contains toxic gases such as carbon monoxide, carbon dioxide, sulfur oxides, nitrogen compounds and others.

6. ACCIDENTAL RELEASE MEASURES

NOTICE TO THE HUMAN BODY : Operators should wear protective equipment.
NOTICE TO THE ENVIRONMENT : Take special care avoid discharging the concentrated solution into rivers.
Recover the product or cleaning water by absorbing with dry sand, earth or cloth.
In case of large quantity, prevent the leakage from flowing out by enclosing with a dike.
Take special care not to have it emitted into either rivers or sewer.
CLEANUP METHOD : Eliminate all ignition sources in the surrounding area
Recover with earth, sand and wess when in small amount, and wipe thoroughly with wess.
In case of large quantity, stretch a rope around the leaking area to prevent people from entering.
Prevent the liquid leakage from spreading with embankment to lead them to a safe place and collect it into an empty container as much as possible.
PREVENTION WAY OF THE AFTER-DAMAGE : Inform the relevant authorities immediately to prevent accident from happening or spreading when leakage occurs.
Removes all ignition sources in the surrounding area promptly and prepare an extinguishing agent.

7. HANDLING AND STORAGE

HANDLING :

SAFETY HANDLING	: Refer to MSDS before use.
PRECAUTIONS	: Handle at normal temperature, and avoid mixing with moisture, and dirt .
	: Be careful not to contact with halogens, strong acids, alkalis and oxidizing substances.
TECHNICAL	: Flammable!
MEASURES	: Handle in manufacturing facility, storage facility and handling facility that meets the law when handling in quantities more than specified.
	: Do not avoid contact with the flame, the spark or the high temperature body, and do not emanate steam recklessly.
	: Take ESD precautions, wear conductive working clothes and shoes.
	: Remove dangerous materials in a safe place when repairing or utilizing the machinery and equipment in which dangerous materials remain.
	: Use a pump when removing from container. Never use the small tube to suck by mouth. Do not drink.
	: Wear protection to avoid contacting with skin or eyes.
	: If mist generates, wear breathing apparatus to prevent inhaling.
	: Always keep the container tightly closed.
	: It is desirable to measure the working environment.
NOTES	: The ventilation should be kept in good condition and take care of fire , because steam generated from the product is likely to stay for it is heavier than air.
	: Non-flammable for containing water, but flammable if the water evaporated.

STORAGE :

SAFETY PACKAGING	: Do not apply pressure to empty container. May rupture if pressure is
MATERIALS	applied.
	: Don not weld, heat, drill or cut the container. The residue may ignite and explode.
NOTES	: Do not contact or store in the same place with halogens, strong acids, alkalis, oxidizing substances.
APPROPRIATE	: Flammable!
STORAGE	: Protect from sunlight. Store in a well-ventilated place.
CONDITION	: Keep the marking of dangerous materials when storing.
	: Avoid heat, sparks, flames and accumulation of static electricity.

8. EXPOSURE CONTROLS/PERSONAL PROTECTION

STANDARD CONTROL CONCENTRATI : NO SET
TOLERANCE CONCENTRATION : NO SET

EQUIPMENT MEASURE	: If mist generates, keep the generating source sealed, or install a local ventilation equipment. Near the workplace should be provided with eye washing and body washing equipment.
PROTECTIVE DEVICE	: Use the personal protective clothing and full face mask whenever necessary. Although unnecessary on general occasions, wear gas masks(organic gases) if necessary. Wear oil-resistant clothes when contacting for long time or many times . If splashing occur, wear a ordinary glass type goggle. Wear oil-resistant working clothes with long sleeves when handling in long time or getting wet.
APPROPRIATE SANITARY	: Take off wet clothes, and thoroughly clean before reuse.

REQUIREMENT

9. PHYSICAL AND CHEMICAL PROPERTIES

PHYSICAL-CHEMICAL PROPERTIES OF PRODUCT

PHYSICAL STATUS

APPEARANCE FORM	: liquid
COLOR	: Light Yellow
ODOUR	: No data
PH	: 9.4(×50)
SPECIFIC TEMPERATURE AT WHICH THE PHYSICAL STATE CHANGES	
MELTING POINT/FREEZING POINT(℃)	: No data
POUR POINT(℃)	: <0℃
BOILING POINT(℃)	: No data
FLASH POINT(℃)	: No flash point
IGNITION POINT	: No data
DENSITY	: 1.08
SOLUBILITY FOR SOLVENT	
WATER	: soluble
ORGANIC SOLVENT	: No data
TEMPERATURE OF DECOMPOSITION	: No data
DECOMPOSITION OF TEMPERATURE	: Lower Limit : No data
(EXPLOSION LIMIT)	Upper Limit : No data
OCTANOL/WATER PARTITION COEFFICIENT	: No data
SPONTANEOUS IGNITION TEMPERATURE	: No data
EVAPORATION RATE(VOLATILE)	: No data

10. STABILITY AND REACTIVITY

REACTION STABILITY	: Kept stably under room temperature and normal air pressure. Avoid the contact with strong oxidant.
AVOIDING CONDITION	: Be careful not to contact with halogens, strong acids, alkalis and oxidizing substances.
INCOMPATIBLE	: There is currently no useful information.
HAZARD	
HAZARDOUS	: Toxic gases like carbon monoxide, carbon dioxide, chlorine gas,
DECOMPOSITION	nitrogen compounds are likely to be generated when combusted.
PRODUCT	
OTHERS	: There is currently no useful information.

11. TOXICOLOGICAL INFORMATION

HAZARD OF PRODUCT

ACUTE TOXICITY (Oral)	: Category5 Including the following ingredients Diethanolamine : Category4
ACUTE TOXICITY (Dermal)	: Not classified
ACUTE TOXICITY (Gases)	: Not objects to classify
ACUTE TOXICITY (Vapours)	: Not classified
ACUTE TOXICITY (Dusts and Mists)	: Not classified
SKIN CORROSION/IRRITATION	: Category2 Including the following ingredients boron compounds : Category2 Diethanolamine : Category2
SERIOUS EYE DAMAGE/EYE IRRITATION	: Category1 Including the following ingredients boron compounds : Category2A Diethanolamine : Category1
RESPIRATION SENSITIZATION	: Classification not possible

SKIN SENSITIZATION	: Category1
GERM CELL MUTAGENICITY	: Classification not possible
CARCINOGENICITY	: Classification not possible
REPRODUCTIVE TOXICITY	: Category2 Including the following ingredients boron compounds : Category2
EFFECTS ON LACTATION	: Classification not possible
SPECIFIC TARGET ORGAN TOXICITY SINGLE EXPOSURE	: Category1(kidney, liver, nervous system, respiratory system) Including the following ingredients boron compounds : Category1(kidney, nervous system, respiratory system) Diethanolamine : Category1(liver) Category3(esthesia action)
SPECIFIC TARGET ORGAN TOXICITY REPEATED EXPOSURE	: Category1(kidney, nervous system, respiratory system) Category2(liver, blood, testis, central nervous system) Including the following ingredients boron compounds : Category1(kidney, nervous system, respiratory system) Category2(testis) Diethanolamine : Category2(liver, blood, central nervous system)
ASPIRATION HAZARD	: Classification not possible

12. ECOLOGICAL INFORMATION

HAZARD OF PRODUCT

TOXICITY	: No data
PERSISTENCE AND DEGRADABILITY	: No data
BIOACCUMULATIVE POTENTIAL	: No data
MOBILITY IN SOIL	: No data

13. DISPOSAL CONSIDERATION

RESIDUAL WASTE : Do not release used water for cleansing into ground or drain.
Burn in accordance with the industrial waste processing standards.
Companies should dispose of the industrial waste by itself, or subcontracting to industrial waste processing companies certified by state government, or local public body.
No dumping.
Dispose of by using incineration system, and ensure each parameter of the cinder is under the standards specified by "Enforcement of Waste Disposal and Public Cleaning Law".
Burn in a safe place with precautions that avoid harm or damage from burning or explosions, and assign watchmen at the same time.
Avoid inhaling smoke when fighting fire for the burning gas contains toxic gases such as carbon monoxide, carbon dioxide, sulfur oxides, nitrogen compounds and others.

14. TRANSPORT INFORMATION

INTERNATIONAL REGULATIONS	: Air Transport according to IATA regulations Maritime transport according to IMDG regulations
NATIONAL ACTS AND REGULATIONS	: It falls under the following restrictions on the transportation of domestic act, each container in accordance with the provisions

	of the Act, the manner of transport
LAND	: the Fire and Disaster Management Act Nonhazardous Material
MARINE	: Ship Safety Act Nonhazardous Material In a separate transport and bulk transport
AVIATION	: Civil Aeronautics Act Nonhazardous Material
UN classification	: Not fallen within any of UN classes
UN IDENTIFICATION NUMBER	: None
NOTES	: Ensure there is no leakage, collapse, falling or damage when embarking. Do not mix with 1st or 6th class of hazardous materials, or high pressure gases(some exceptions). Add MIC certified sign on the vehicle and install appropriate fire extinguisher when transporting the product in quantities more than specified. Ensure the container won't collide or sway significantly when transporting. Add a sign on the vehicle and install appropriate fire extinguisher when transporting the hazardous materials in quantities more than specified. Stack less than 3m from ground when transporting.
SPECIFIC SAFETY MEASURES AND CONDITIONS FOR TRANSPORT	: Before transporting, make sure the container has no damage, corrosion or leakage. Load with care so that there's no turning over, falling down or any damages, and make sure that there'll be no collapses. Package, display and transfer in accordance with applicable laws. Flammable!

15. REGULATORY INFORMATION

Industrial Safety and Health Act(Article 57-2) Deliver of Documents	: Corresponding
Industrial Safety and Health Act (Article 57) Labeling	: Not applicable
Poisonous and Deleterious Substances Control Law	: Not applicable
Ordinance on Prevention of Organic Solvent Poisoning	: Not applicable
Ordinance on Prevention of Hazards Due to Specified Chemical Substances	: Not applicable
Act on Confirmation, etc. of Release Amounts of Specific Chemical Substances in the Environment and Promotion of Improvements to the Management Thereof	: Not applicable
Act on the Evaluation of Chemical Substances and Regulation of Their Manufacture, etc.	: Not applicable
the Fire and Disaster Management Act	: Not applicable
Waste Management and Public Cleansing Law	: Industrial waste regulations(Spread, runoff ban)
Water Pollution Control Law	: Corresponding

16. OTHER INFORMATION

Reference

- MSDS of raw materials

RESPONSE SECTION FOR ABOVE INFORMATION

Please inquire of section of "1. Identification".

This product safety data sheet is based on the material information.
Therefore, it is sometimes revised by the new knowledge.
When you treat this product, consult this data sheet and try to do
according to the actual state under the responsibility for you.
This data sheet is not the guarantee of the safety and the quality.
This MSDS is made on the basis of the Japanese law.

- The end -

SAFETY DATA SHEET

1. CHEMICAL PRODUCT_COMPANY IDENTIFICATION

CHEMICAL PRODUCT NAME : **U-BOND WR-7HA Hardener**

NAME OF MANUFACTURER/SUPPLIER : NIKKA SEIKO CO., LTD.
ADDRESS : 2-2-1, Nozawa, Setagaya-ku, Tokyo 154-0003 Japan
TELEPHONE/FAX No. : 81-3-3424-1811 / 81-3-3424-2882
EMAIL ADDRESS : info-os@nikkaseiko.co.jp
EMERGENCY PHONE NUMBER : 81-3-3424-1811

SDS No. : C-805E

2. HAZARD IDENTIFICATION

GHS CLASSIFICATION :

PHYSICAL HAZARDS :	Self-heating substances and mixtures	Classification not possible
	Substances and mixtures corrosive to metals	Classification not possible
HEALTH HAZARDS :	Acute toxicity (Oral)	Category 5
	Acute toxicity (Dermal)	Classification not possible
	Acute toxicity (Inhalation: vapor)	Classification not possible
	Acute toxicity (Inhalation: dust/mist)	Classification not possible
	Skin corrosion/irritation	Category 3
	Severe eye damage/irritation	Category 1
	Respiratory sensitization	Classification not possible
	Skin sensitization	Category 1
	Germ cell mutagenicity	Classification not possible
	Carcinogenicity	Classification not possible
	Reproductive toxicity	Classification not possible
	Effects on or via lactation	Classification not possible
	Specific target organ toxicity (Single exposure)	Classification not possible
	Specific target organ toxicity (Repeated exposure)	Category 1 Lung: Inhalation
	Aspiration hazard	Classification not possible
ENVIRONMENTAL HAZARDS :	Hazardous to the aquatic environment (acute toxicity)	Classification not possible
	Hazardous to the aquatic environment (chronic toxicity)	Classification not possible

<Other hazards except the above-described hazards are not applicable or not possible for the GHS classification.>

GHS LABEL ELEMENTS
HAZARD PICTOGRAMS OR HAZARD SYMBOLS :

SIGNAL WORDS : Danger

Hazard statement codes : May be harmful if swallowed.
Causes mild skin irritation.
Causes serious eye damage.
May cause allergic skin reaction.
Causes damage to organs through prolonged or repeated exposure. Liver, Thyroid gland

Prevention precautions : Do not eat, drink or smoke when using this product.
Do not breathe dust/fume/mist/vapors/spray.
Use only outdoors or in a well-ventilated area.
Wear protective gloves/eye protection/face protection.
Contaminated work clothing should not be allowed out of the workplace.
Wash hands thoroughly after handling.

Response precautions : IF ON SKIN: Wash with plenty of soap and water.
If skin irritation or rash occurs: Take medical advice/treatment.
Take off contaminated clothing and wash before reuse.
IF INHALED: Remove victim to fresh air and keep at rest in a position comfortable for breathing.
IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses if present and easy to do. Continue rinsing.
If feeling unwell, take medical advice/treatment.

Storage precautions : Protect from sunlight and wetting. Store locked up.

Disposal precautions : Ask dispose of contents/container to industrial waste treatment agent which is permitted by regional government.

3. COMPOSITION / INFORMATION ON INGREDIENTS

SUBSTANCE/MIXTURE : Mixture
PRODUCT DESCRIPTION : Epoxy resin two-component liquid adhesive (Hardener)
INGREDIENTS AND COMPOSITION :

INGREDIENT	PROPORTION	C A S No.
Aliphatic polythiol		Registered
Amine compound		Registered
m-Xylylenediamine (MXDA)	<1%	1477-55-0
Phenol derivative		Registered

4. FIRST-AID MEASURES

INHALATION : If the vapor generated by the reaction with the resin is inhaled and there are any symptoms of itchiness, etc., immediately remove the victim from the contaminated to fresh air area. Take medical advice.

SKIN CONTACT : Immediately wipe out and wash with soap and warm water. Do not use solvent or thinner.If there are symptoms of itchness or skin inflammation, take medical advice immediately.

EYE CONTACT : Immediately rinse the eyes with plenty of water. If removing is diificult or any itchiness or inflammation is felt, take medical advice immediately.

INGESTION : Immediately rinse mouth with water well. Then give the person plenty of water or milk. If possible, induce vomiting but not necessary to induce vomiting by force. Take medical advice immediately. Do not give an unconscious person anything to drink.

5. FIRE-FIGHTING MEASURES

EXTINGUISHING MEDIA : Foam, Dry chemical powder, Carbon dioxide, Dry sand.

INAPPROPRIATE EXTINGUISHING MEDIA : Do not use solid water stream directly (May cause fire-spreading).

UNUSUAL FIRE AND EXPLOSION HAZARDS : Avoid inhalation of the smoke as it may generate toxic sulfur oxides and nitrogen oxides.

FIRE-FIGHTING MEASURES : Shut off fuel to fire. Use proper extinguishing media and fight fire from upwind position.

PROTECTION FOR FIRE-FIGHTERS : Wear proper protective equipment (respiratory equipment, heat-resistant clothes, etc.)

6 . ACCIDENTAL RELEASE MEASURES

PERSONAL PRECAUTIONS : In case of inside a building, ventilate area well until material pick up is complete.
Wear protecitve gloves of impervious material.

ENVIRONMENTAL PRECAUTION : Do not wash away into rivers or sewers.

REMOVAL METHOD : Absorb with cloth, absorbent mat or dry sand and then place in closed containers.

OTHERS : Nothing in paticular.

7 . HANDLING AND STORAGE

HANDLING :

NOTES FOR EXPOSURE CONTROL :
Do not handle this product with bare hands. Wear protective gloves of impervious material.
Avoid the product to adhere to working clothes as far as possible.
Wash hands and face well and rinse mouth after use.

NOTES FOR PREVENTION OF FIRE AND EXPLOSION :
This product is combustible. Please take care of fire in area.

OTHERS : Nothing in particular

VENTILATION : Use in area where local exhaust ventilation or general ventilation system is installed.

NOTES FOR SAFE HANDLING :
Reacts violently with strong acids, strong oxidizing agents or epoxy resins, and generates heat.

STORAGE :

STORAGE CONDITION :
Keep away from high temperatures, high humidity and sunlight. Keep container tightly closed and store in a cool, dark place in a building.

PACKAGING COMPATIBILITIES :
Generally, keep in a container made of polyethylene or polypropylene.

8 . EXPOSURE CONTROL / PERSONAL PROTECTION

ENGINEERING MEASURES : Install local exhaust ventilation systems in the working area.
Make available shower and eye wash in the work area.

CONTROL PARAMETER :

m-Xylylenediamine (MXDA)
ACGIH(2009) : (STEL) 0.1mg/m3 (Ceiling)

PERSONAL PROTECTION EQUIPMENT

RESPIRATORY PROTECTION : Chemical cartridge respirator with an organic vapor cartridge if necessary.

HAND PROTECTION : Protective gloves of oil-resistant gloves (impervious material).

EYE PROTECTION : Safety goggles

SKIN / BODY PROTECTION : Long-sleeved clothes, Protective apron

OTHERS : Nothing in particular

9. PHYSICAL AND CHEMICAL PROPERTIES

APPEARANCE, PHYSICAL STATE / FORM :	Paste
COLOR :	Light yellow - Light brown clear
ODOR :	Not evaluated
pH :	Not applicable
MELTING POINT :	No data
INITIAL BOILING POINT AND BOILING RANGE :	No data
FLASHING POINT :	> 122℃ (Cleveland Open Cup)
AUTOIGNITION TEMPERATURE :	No data
FLAMMABILITY (SOLID, GAS) :	Not applicable
EXPLOSION LIMIT :	No data
VAPOR PRESSURE :	No data
VAPOR DENSITY :	No data
EVAPORATION RATE :	No data
SPECIFIC GRAVITY(H2O=1) :	1.12(25℃)
SOLUBILITY :	Insoluble in water.
OCTANOL / WATER PARTITION COEFFICIENT :	m-Xylylenediamine : log Pow 0.18
DECOMPOSITION TEMPERATURE :	No data
OTHERS :	Nothing in particular

10. STABILITY AND REACTIVITY

STABILITY :	Stable.
REACTIVITY :	Reacts violently with strong acids, strong oxidizing agents or epoxy resins and may generate heat.
CONDITIONS TO AVOID :	Unknown
MATERIALS TO AVOID :	Avoid contact with strong acids, strong oxidizing agents, epoxy resins.
HAZARDOUS DECOMPOSITION PRODUCTS :	Mercaptans, Organic sulfieds, Hydrogen sulfide, Sulfur oxides, Nitrogen oxides, etc.
OTHERS :	Nothing in particular

11. TOXICOLOGICAL INFORMATION

Acute toxicity (Oral)

Category 5	May be harmful if swallowed.		
	Category 5	Phenol derivative	(rat) LD50 4000mg/kg
		Aliphatic polythiol	(rat) LD50 2600mg/L

Skin corrosion/irritation

Category 3	Causes mild skin irritation.		
	Category 2	Phenol derivative	from NITE

Severe eye damage/irritation

Category 1	Causes serious eye damage.		
	Category 1	Phenol derivative	from NITE

Skin sensitization

Category 1	May cause allergic skin reaction.	
	Category 1 Phenol derivative	from NITE

Specific target organ toxicity (Repeated exposure)

Category 1	Causes damage to organs through prolonged or repeated exposure.	
	Category 1 Phenol derivative	from NITE

12. ECOLOGICAL INFORMATION

GHS CLASSIFICATION
ENVIRONMENTAL HAZARDS : Classification is not possible, not applicable or exempted due to insufficient data.

OTHERS : Nothing in particular

13. DISPOSAL CONSIDERATION

Ask Industrial waste treatment agent for proper waste disposal. Follow all regulations in your country.

14. TRANSPORT INFORMATION

UN CLASS : Not applicable
UN No. : Not applicable
Proper Shipping Name : Not applicable
Packing Group : Not applicable
Marine Polutant : Not applicable

Handle with care. Keep away from heat or sunlight.
Follow all regulations in your country.

15. REGURATORY INFORMATION

Follow all regulations in your country.

16. OTHER INFORMATION

REFERENCES :

1) International Chemical Sefety Cards (ICSC)
2) GHS Classification result and Classification reason, National Institute of Technology and Evaluation in Japan (NITE), Ingredient Information
3) Epoxy Resin and Hardener Safe Handling Guide. (The Japan Society of Epoxy Resin Technology.)

The information herein is given in good faith,but no warranty,express or implied, is made.
Please consult NIKKA SEIKO CO.,LTD. for further information.

This MSDS is translated from Japanese into English, which information is in accordance with Japanese laws and regulations.

SAFETY DATA SHEET

1. CHEMICAL PRODUCT. COMPANY IDENTIFICATION

CHEMICAL PRODUCT NAME : **U-BOND WR-7RA Resin**

NAME OF MANUFACTURER/SUPPLIER : NIKKA SEIKO CO.,LTD.
ADDRESS : 2-2-1, Nozawa, Setagaya-ku, Tokyo 154-0003 Japan
TELEPHONE/FAX No. : 81-3-3424-1811 / 81-3-3424-2882
EMAIL ADDRESS : info-os@nikkaseiko.co.jp
EMERGENCY PHONE NUMBER : 81-3-3424-1811

SDS No. : C-804E

2. HAZARD IDENTIFICATION

GHS CLASSIFICATION :

PHYSICAL HAZARDS :	Flammable liquids	Classification not possible
	Self-reactive substances and mixtures	Classification not possible
	Pyrophoric liquids	Classification not possible
	Self-heating substances and mixtures	Classification not possible
	Substances and mixtures corrosive to metals	Classification not possible
HEALTH HAZARDS :	Acute toxicity (Oral)	Classification not possible
	Acute toxicity (Dermal)	Classification not possible
	Acute toxicity (Inhalation: vapor)	Classification not possible
	Acute toxicity (Inhalation: dust/mist)	Classification not possible
	Skin corrosion/irritation	Category 3
	Severe eye damage/irritation	Classification not possible
	Respiratory sensitization	Classification not possible
	Skin sensitization	Category 1
	Germ cell mutagenicity	Classification not possible
	Carcinogenicity	Classification not possible
	Reproductive toxicity	Classification not possible
	Effects on or via lactation	Classification not possible
	Specific target organ toxicity (Single exposure)	Classification not possible
	Specific target organ toxicity (Repeated exposure)	Classification not possible
	Aspiration hazard	Classification not possible
ENVIRONMENTAL HAZARDS :	Hazardous to the aquatic environment (acute toxicity)	Category 3
	Hazardous to the aquatic environment (chronic toxicity)	Category 3

<Other hazards except the above-described hazards are not applicable or not possible for the GHS classification.>

GHS LABEL ELEMENTS
HAZARD PICTOGRAMS OR HAZARD SYMBOLS :

SIGNAL WORDS : Warning

Hazard statement codes : Causes mild skin irritation.
May cause allergic skin reaction.
Harmful to aquatic life.

Harmful to aquatic life with long lasting effects.

Prevention precautions : Do not breathe dust/fume/mist/vapors/spray.
Wear protective gloves/eye protection/face protection.
Contaminated work clothing should not be allowed out of the workplace.
Wash hands thoroughly after handling.
Avoid release to the environment.

Response precautions : IF ON SKIN: Wash with plenty of soap and water.
If skin irritation or rash occurs: Take medical advice/treatment.
Take off contaminated clothing and wash before reuse.
IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses if present and easy to do. Continue rinsing.
If eye irritation persists: Take medical advice/treatment.

Storage precautions : Protect from sunlight and wetting. Store locked up.

Disposal precautions : Ask dispose of contents/container to industrial waste treatment agent which is permitted by regional government.

3 . COMPOSITION / INFORMATION ON INGREDIENTS

SUBSTANCE/MIXTURE : Mixture
PRODUCT DESCRIPTION : Epoxy resin two-component liquid adhesive (Resin)
INGREDIENTS AND COMPOSITION :

INGREDIENT	PROPORTION	C A S No.
Bisphenol A type-epoxy resin		25068-38-6
Other epoxy resin		Registered
Silica	10%～20%	7631-86-9
Filler		Registered
Coloring agent (Blue)		Registered

4 . FIRST-AID MEASURES

INHALATION : If the vapor generated by the reaction with the hardener is inhaled and there are symptoms of itchiness, etc., remove the victim to fresh air area immediately. Take medical advice immediately.

SKIN CONTACT : Immediately wipe out and wash with soap and warm water. Do not use solvent or thinner.If there are symptoms of itchness or skin inflammation, take medical advice immediately.

EYE CONTACT : Immediately rinse the eyes with clean water for at least 15 min. If any pain is felt, take medical advice immediately.

INGESTION : If possible, give the person plenty of water or milk to induce vomiting. But not necessary to induce by force. Take medical treatment immediately. Do not give unconscious person anything to drink.

5 . FIRE-FIGHTING MEASURES

EXTINGUISHING MEDIA : Foam, Dry chemical powder, Carbon dioxide, Dry sand.

INAPPROPRIATE EXTINGUISHING MEDIA : Do not use solid water stream directly (May cause fire-spreading).

UNUSUAL FIRE AND EXPLOSION HAZARDS : Wear proper respiratory protective equipment because toxic gas (carbon monoxide, etc.) may be generated on fire.

FIRE-FIGHTING MEASURES : Shut off fuel to fire. Use proper extinguishing media and fight fire from upwind position.

PROTECTION FOR FIRE-FIGHTERS : Wear proper protective equipment (respiratory equipment, heat-resistant clothes, etc.)

6. ACCIDENTAL RELEASE MEASURES

PERSONAL PRECAUTIONS : In case of inside a building, ventilate area well until material pick up is complete.
Wear protective gloves of impervious material.

ENVIRONMENTAL PRECAUTION : Do not wash away into rivers or sewers.

REMOVAL METHOD : Absorb with cloth, absorbent mat or dry sand and then place in closed containers.

OTHERS : Nothing in particular

7. HANDLING AND STORAGE

HANDLING :

NOTES FOR EXPOSURE CONTROL :
Do not handle this product with bare hands. Wear protective gloves of impervious material.
Avoid the product to adhere to working clothes as far as possible.
Wash hands and face well and rinse mouth after use.

NOTES FOR PREVENTION OF FIRE AND EXPLOSION :
This product is combustible. Please take care of fire in area.

OTHERS : Nothing in particular

VENTILATION : Use in area where local exhaust ventilation or general ventilation system is installed.

NOTES FOR SAFE HANDLING :
Do not mix with strong oxidizing agents, strong acids or strong bases.

STORAGE :

STORAGE CONDITION :
Keep away from sunlight. Store in a building.Keep container tightly closed. Store at room temperature. Do not store at temperatures below 10℃.

PACKAGING COMPATIBILITIES :
Generally, keep in a container made of polyethylene or polypropylene.

8. EXPOSURE CONTROL / PERSONAL PROTECTION

ENGINEERING MEASURES : Install local exhaust ventilation systems in the working area.
Make available shower and eye wash in the work area.

CONTROL PARAMETER :

ACGIH(2009) : Not established

PERSONAL PROTECTION EQUIPMENT

RESPIRATORY PROTECTION : Chemical cartridge respirator with an organic vapor cartridge if necessary.

HAND PROTECTION : Protective gloves of oil-resistant type (impervious material).

EYE PROTECTION : Safety goggles

SKIN / BODY PROTECTION : Long-sleeved clothes, Protective apron

OTHERS : Nothing in particular

9. PHYSICAL AND CHEMICAL PROPERTIES

APPEARANCE, PHYSICAL STATE / FORM :	Paste
COLOR :	Blue - Green
ODOR :	Slight ether odor
pH :	Not applicable
MELTING POINT :	No data
INITIAL BOILING POINT AND BOILING RANGE :	No data
FLASHING POINT :	No data (>220℃)
AUTOIGNITION TEMPERATURE :	No data
FLAMMABILITY (SOLID, GAS) :	Not applicable
EXPLOSION LIMIT :	No data
VAPOR PRESSURE :	No data
VAPOR DENSITY :	No data
EVAPORATION RATE :	No data
SPECIFIC GRAVITY(H2O=1) :	1.43(25℃)
SOLUBILITY :	Insoluble in water. Soluble well in organic solvents such as Toluene and Xylene.
OCTANOL / WATER PARTITION COEFFICIENT :	No data
DECOMPOSITION TEMPERATURE :	No data
OTHERS :	Nothing in particular

10. STABILITY AND REACTIVITY

STABILITY :	May be solidified (crystallized) if stored at low temperatures around 10℃ or below.
REACTIVITY :	If mixes with strong oxidizing agents, strong acids or strong bases, reacts violently and generates heat.
CONDITIONS TO AVOID :	Do not store at low temperatures (below 10℃).
MATERIALS TO AVOID :	Avoid contact with strong oxidizing agents, strong acids, strong bases.
HAZARDOUS DECOMPOSITION PRODUCTS :	Unknown
OTHERS :	Nothing in particular

11. TOXICOLOGICAL INFORMATION

Skin corrosion/irritation

Category 3	Causes mild skin irritation.		
	Category 2	Bisphenol A type-epoxy resin	from Ingredient information

Skin sensitization

Category 1	May cause allergic skin reaction.		
	Category 1	Bisphenol A type-epoxy resin	from Ingredient information

12. ECOLOGICAL INFORMATION

Hazardous to the aquatic environment (acute toxicity)

Category 3	Harmful to aquatic life.		
	Category 2	Bisphenol A type-epoxy resin	Crustacea (Daphnia Magna) EC50(48hr) 1.7mg/L

Hazardous to the aquatic environment (chronic toxicity)

Category 3	Harmful to aquatic life with long lasting effects.		
	Category 2	Bisphenol A type-epoxy resin	from Ingredient information

OTHERS : Nothing in particular

13. DISPOSAL CONSIDERATION

Ask Industrial waste treatment agent for proper waste disposal. Follow all regulations in your country.

14. TRANSPORT INFORMATION

UN CLASS : Not applicable
UN No. : Not applicable
Proper Shipping Name : Not applicable
Packing Group : Not applicable
Marine Pollutant : Not applicable

Handle with care. Keep away from heat or sunlight.
Follow all regulations in your country.

15. REGURATORY INFORMATION

Follow all regulations in your country.

16. OTHER INFORMATION

REFERENCES :

1) International Chemical Sefety Cards (ICSC)
2) GHS Classification result and Classification reason, National Institute of Technology and Evaluation in Japan (NITE), Ingredient Information
3) Epoxy Resin and Hardener Safe Handling Guide. (The Japan Society of Epoxy Resin Technology.)

The information herein is given in good faith,but no warranty,express or implied, is made.
Please consult NIKKA SEIKO CO.,LTD. for further information.

This MSDS is translated from Japanese into English, which information is in accordance with Japanese laws and regulations.

SAFETY DATA SHEET

1 . CHEMICAL PRODUCT. COMPANY IDENTIFICATION

CHEMICAL PRODUCT NAME : **SOLBLUE B**

NAME OF MANUFACTURER/SUPPLIER : NIKKA SEIKO CO.,LTD.
ADDRESS : 2-2-1, Nozawa, Setagaya-ku, Tokyo 154-0003 Japan
TELEPHONE/FAX No. : 81-3-3424-1811 / 81-3-3424-2882
EMAIL ADDRESS : info-os@nikkaseiko.co.jp
EMERGENCY PHONE NUMBER : 81-3-3424-1811
SDS No. : D-418E

2 . HAZARD IDENTIFICATION

GHS CLASSIFICATION :

PHYSICAL HAZARDS :	Self-heating substances and mixtures	Classification not possible
	Substances and mixtures corrosive to metals	Classification not possible
HEALTH HAZARDS :	Acute toxicity (Oral)	Category 5
	Acute toxicity (Dermal)	Classification not possible
	Acute toxicity (Inhalation: vapor)	Classification not possible
	Acute toxicity (Inhalation: dust/mist)	Classification not possible
	Skin corrosion/irritation	Category 2
	Severe eye damage/irritation	Category 2
	Respiratory sensitization	Classification not possible
	Skin sensitization	Classification not possible
	Germ cell mutagenicity	Classification not possible
	Carcinogenicity	Classification not possible
	Reproductive toxicity	Category 2
	Effects on or via lactation	Classification not possible
	Specific target organ toxicity (Single exposure)	Category 3 Respiratory tract irritation
	Specific target organ toxicity (Repeated exposure)	Category 1 Bone marrow, Spleen, Liver, Respiratory organ, Adrenal gland, Kidney
	Aspiration hazard	Classification not possible
ENVIRONMENTAL HAZARDS :	Hazardous to the aquatic environment (acute toxicity)	Classification not possible
	Hazardous to the aquatic environment (chronic toxicity)	Classification not possible

<Other hazards except the above-described hazards are not applicable or not possible for the GHS classification.>

GHS LABEL ELEMENTS
HAZARD PICTOGRAMS OR HAZARD SYMBOLS :

SIGNAL WORDS : Danger

Hazard statement codes : May be harmful if swallowed.
Causes skin irritation.
Causes serious eye irritation.

Suspected of damaging fertility or the unborn child.
(Respiratory tract irritation) May cause respiratory irritation.
Causes damage to organs through prolonged or repeated exposure. — Bone marrow, Spleen, Liver, Respiratory organ, Adrenal gland, Kidney

Prevention precautions : Obtain special instructions before use.
Do not handle until all safety precautions have been read and understood.
Do not eat, drink or smoke when using this product.
Do not breathe mist/vapors/spray.
Use only outdoors or in a well-ventilated area.
Wear protective gloves/eye protection/face protection.
Wash hands thoroughly after handling.

Response precautions : IF INHALED: Remove victim to fresh air and keep at rest in a position comfortable for breathing.
IF ON SKIN: Wash with plenty of soap and water.
If skin irritation occurs: Take medical advice/treatment.
Wash contaminated clothing before reuse.
IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses if present and easy to do. Continue rinsing.
If eye irritation persists: Take medical advice/treatment.
If exposed or concerned: Take medical advice/treatment.
IF SWALLOWED: Immediately take medical advice/treatment.
Do not induce vomiting.

Storage precautions : Store in a closed container, in a cool / well-ventilated place. Store locked up.

Disposal precautions : Ask dispose of contents/container to industrial waste treatment agent which is permitted by regional government.

3 . COMPOSITION / INFORMATION ON INGREDIENTS

SUBSTANCE/MIXTURE : Mixture
PRODUCT DESCRIPTION : Resin removing agent
INGREDIENTS AND COMPOSITION :

INGREDIENT	PROPORTION	C A S No.
Amide type solvent		Registered
Alcohol type solvent		Registered

4 . FIRST-AID MEASURES

INHALATION : Remove the person to fresh air area immediately. Cover the body with blanket to keep warm and quiet. If breathing has stopped or is weak, loosen the clothes and administer artifical respiration. Immediately take medical treatment.

SKIN CONTACT : Immediately rinse with plenty of water, then wash with soap well.

EYE CONTACT : Immediately rinse the eyes with clean water for at least 15 min. (If easily possible, remove contact lenses). Take medical advice.Rinse well by opening eyelids wide.

INGESTION : Rinse the mouth with water well. Do not induce vomiting as this may increase the risk of aspiration of the liquid into the lungs causing chemical pneumonitis. Take medical treatment immediately.

5 . FIRE-FIGHTING MEASURES

EXTINGUISHING MEDIA : Alcohol-resistant foam, Dry chemical powder, Carbon dioxide, Dry sand.

INAPPROPRIATE EXTINGUISHING MEDIA : Do not use solid water stream directly (May cause fire-spreading).

UNUSUAL FIRE AND EXPLOSION HAZARDS : Wear proper respiratory protective equipment because toxic gas (carbon monoxide, etc.) may be generated on fire.

FIRE-FIGHTING MEASURES : Shut off fuel to fire. Use proper extinguishing media and fight fire from upwind position.

PROTECTION FOR FIRE-FIGHTERS : Wear proper respiratory protective equipment.

6 . ACCIDENTAL RELEASE MEASURES

PERSONAL PRECAUTIONS : In case of inside a building, ventilate area well until material pick up is complete.
Wear protective gloves of impervious material and protective goggles.

ENVIRONMENTAL PRECAUTION : Do not wash away into rivers or sewers.

REMOVAL METHOD : In case of small spill, absorb with cloth, absorbent mat or dry sand and then place in closed containers.
In case of large spill, use inert material such as dry sand or earth to prevent the spill and lead it to safer area. Cover the surface with foam and place in closed containers.

OTHERS : Eliminate all sources of ignition in area. Use appropriate extinguishing media.
Use non-sparking handtools.

7 . HANDLING AND STORAGE

HANDLING :

NOTES FOR EXPOSURE CONTROL :
Wear proper protective equipment to avoid eye or skin contact.
Wash hands and face well and rinse mouth after use.

NOTES FOR PREVENTION OF FIRE AND EXPLOSION :
Shut off all sources of ignition in area.
Equipment should be grounded as static electricity counteraction.
Electrical equipment system should have explosion-proof system.
Use non-sparking handtools.

OTHERS : Nothing in particular

VENTILATION : Use in area where local exhaust ventilation or general ventilation system is installed.

NOTES FOR SAFE HANDLING :
Do not mix with strong oxidizing agents.

STORAGE :

STORAGE CONDITION :
Keep container tightly closed. Store in a well-ventilated, cool, dark place. Keep away from sunlight.Store away from strong oxidizing agents.

PACKAGING COMPATIBILITIES :
Generally, keep in a container made of high density polyethylene.

8 . EXPOSURE CONTROL / PERSONAL PROTECTION

ENGINEERING MEASURES : It is recommended to use a system which encloses vapor generated area. Or use local

exhaust ventilation systems or general ventilation systems.
Make available emergency shower and eye wash in the work area.

CONTROL PARAMETER :

Amide type solvent
ACGIH(2009) : Not established

PERSONAL PROTECTION EQUIPMENT

RESPIRATORY PROTECTION : Chemical cartridge respirator with an organic vapor cartridge if necessary.

HAND PROTECTION : Strong protective gloves of impervious material (Polyethylene, Polypropylene, Neoprene, Silicone rubber only).

EYE PROTECTION : Safety goggles.

SKIN / BODY PROTECTION : Long-sleeved clothes, Protective apron

OTHERS : Nothing in particular

9. PHYSICAL AND CHEMICAL PROPERTIES

APPEARANCE, PHYSICAL STATE / FORM : Liquid

COLOR : Colorless - Light yellow clear

ODOR : Slight amine odor

pH : Not applicable

MELTING POINT : No data

INITIAL BOILING POINT AND BOILING RANGE : 205℃(Balance reflux boiling point)

FLASHING POINT : 95℃ (Cleveland Open Cup)

AUTOIGNITION TEMPERATURE : No data

FLAMMABILITY (SOLID, GAS) : Not applicable

EXPLOSION LIMIT : No data

VAPOR PRESSURE : No data

VAPOR DENSITY : No data

EVAPORATION RATE : No data

SPECIFIC GRAVITY(H2O=1) : 1.04(25℃)

SOLUBILITY : Soluble in water well.

OCTANOL / WATER PARTITION COEFFICIENT : No data

DECOMPOSITION TEMPERATURE : No data

OTHERS : Nothing in particular

10. STABILITY AND REACTIVITY

STABILITY : Stable

REACTIVITY : Causes exothermal reaction by contacting with strong oxidizing agents, strong acids, strong alkali.

CONDITIONS TO AVOID : Do not store at high temperatures.

MATERIALS TO AVOID : Do not mix with strong oxidizing agents, strong bases, strong acids.

HAZARDOUS DECOMPOSITION PRODUCTS : When heated or burned, toxic fumes containing carbon monoxide, nitrogen oxide may be generated.

OTHERS : Nothing in particular

11. TOXICOLOGICAL INFORMATION

Acute toxicity (Oral)

Category 5	May be harmful if swallowed.		
	Category 4	Alcohol type solvent	(rat) LD50 1230mg/kg
	Category 5	Amide type solvent	(rat) LD50 4150mg/kg

Skin corrosion/irritation

Category 2	Causes skin irritation.		
	Category 2	Amide type solvent	from Ingredient information

Severe eye damage/irritation

Category 2	Causes serious eye irritation.		
	Category 2A	Amide type solvent	from Ingredient information

Reproductive toxicity

Category 2	Suspected of damaging fertility or the unborn child.		
	Category 2	Amide type solvent	from Ingredient information

Specific target organ toxicity (Single exposure)

Category 3	(Respiratory tract irritation) May cause respiratory irritation.		
	Category 3	Amide type solvent	from Ingredient information

Specific target organ toxicity (Repeated exposure)

Category 1	Causes damage to organs through prolonged or repeated exposure.		
	Category 1	Amide type solvent	from Ingredient information

12. ECOLOGICAL INFORMATION

GHS CLASSIFICATION
ENVIRONMENTAL HAZARDS : Classification is not possible, not applicable or exempted due to insufficient data.

OTHERS : Nothing in particular

13. DISPOSAL CONSIDERATION

Ask Industrial waste treatment agent for proper waste disposal. Follow all regulations in your country.

14. TRANSPORT INFORMATION

UN CLASS : Not applicable
UN No. : Not applicable
Proper Shipping Name : Not applicable
Packing Group : Not applicable
Marine Polutant : Not applicable

Handle with care. Keep away from heat or sunlight.
Follow all regulations in your country.

15. REGURATORY INFORMATION

Follow all regulations in your country.

16. OTHER INFORMATION

REFERENCES :

1) International Chemical Sefety Cards (ICSC)
2) GHS Classification result and Classification reason, National Institute of Technology and Evaluation in Japan (NITE), Ingredient Information

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Please consult NIKKA SEIKO CO.,LTD. for further information.

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14. Operation Manual Table of Contents

14-1. Outline

14-1-1. Operation Outline

On the machine front, there are a touch panel, DrivePower Switch and air regulators for operating this machine. On the back side of the machine, there is a breaker handle for turning off and on main power supply.

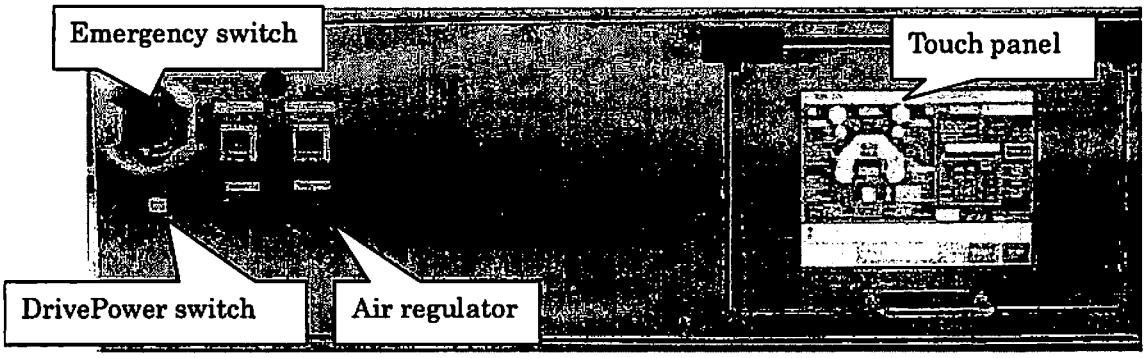


Fig. 14-1-1-1. Main Operation Panel on Machine Front

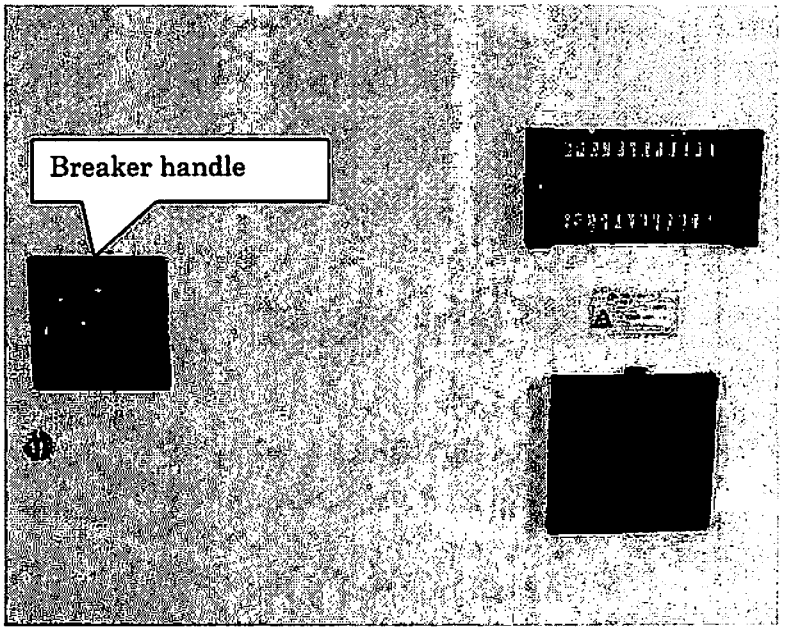


Fig 14-1-1-2. Door for Control Box on Machine Backside

14-2. Initial Operation

14-2-1. Operation Procedure

Operate the machine safely following the procedure as below.

(1) Always perform safety check before starting operation

(2) Check the safety inside and around the machine.

(3) Turn the breaker handle on the center of the left door of the control box to start main power supply.

(4) Press the servo-on switch on the main operation panel.

(5) See the monitor and check the system has finished the start operation.

(6) Continue operation.

14-3. Operation Panel

14-3-1. Main Operation Panel

There is the main operation panel on the machine front side.

1. Drive Power

This is a servo-on switch and always need to be pressed to start power supply to the servo motor drivers after turning the breaker handle for main power supply on the control box.

2. Air regulator

This switch is for adjusting the air pressure.

3. Touch panel

All operation is performed through this touch panel.

14-3-2. Touch Panel Initial Display

Touch panel display shows the picture as Fig 14-3-2-1 when it is powered on.

Fig 14-3-2-1 Initial Display

The Initial Display shown in Fig 14-3-2-1 appears while reading the system settings.

Leave the monitor until the display changes automatically.

Fig. 14-3-2-2 Initial Display

When this picture appears, touch the center of the display to move the next display.

If touching the center of the display, the display changes to Fig. 14-3-2-3 Menu Display.

Menu Display

This is a content page for the functions that are available in this system.

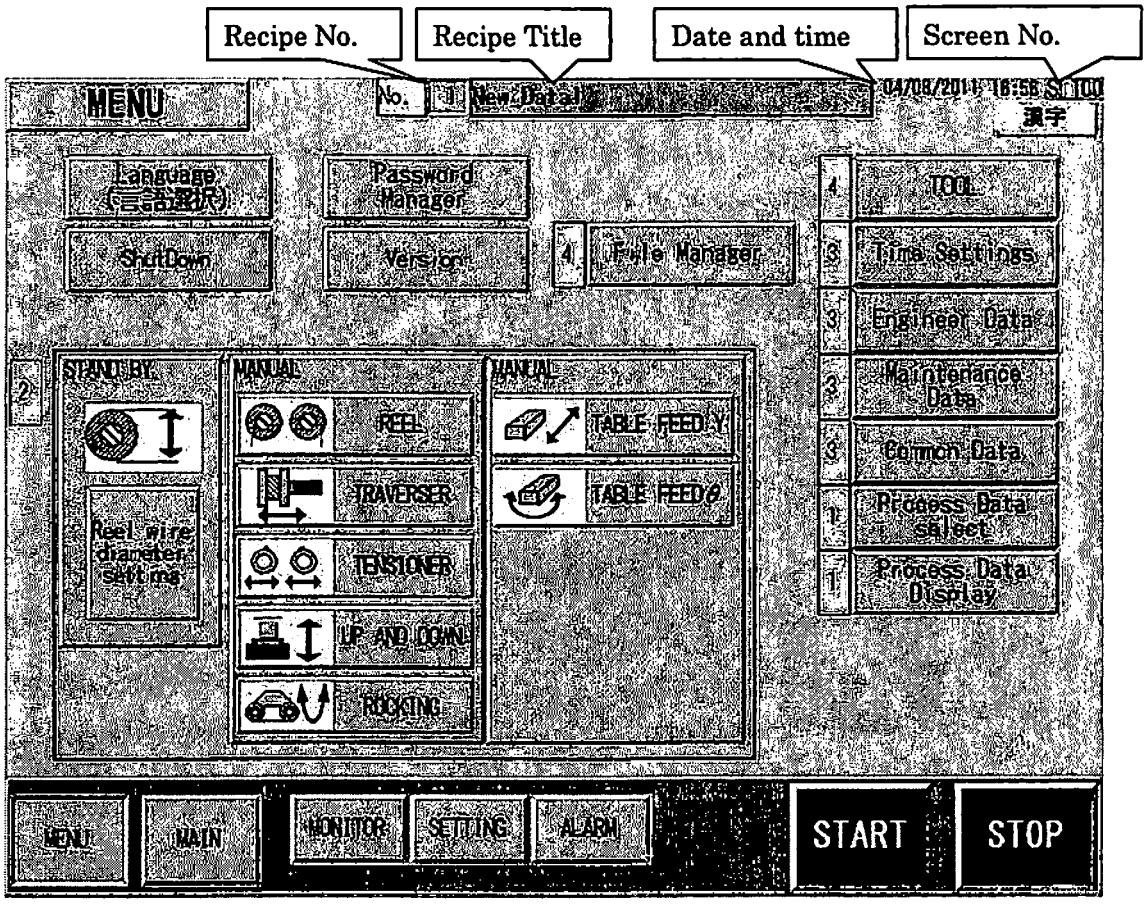


Fig. 14-3-2-3 Menu Display

Basic Description

This is basic information shown in each display

- Recipe No./Recipe Title

  Recipe No. and title read out from the data storage area are indicated.

- Date and time

  Date and time information that is set in the time setting page is displayed.

- Screen No.

  The page number of the current display is shown.

Basic Operation Switch

- Menu – move to the menu page
- Main – move to the main page.
- Monitor – move to the monitor page
- Setting – move to the setting page
- Alarm – move to the alarm page
- START – start auto operation, the title of the switch turns to "Running" while auto running and the light of the switch turns on.
- STOP – stop operation

Functional Switch

- Language Selection------- Touch the switch when selecting the language
- PowerOFF-------Touch the switch when turning OFF the Device
- Version-------Indicate the software version
- Password Manager-------Set the password security level

* The switches with numbers from [1] to [4] are available with password input.

- List Selection-------Show the setting value list indication
- Recipe Selection------Read and duplicate the registered recipe (processing condition)
- Common Data-------Set the basic settings of the device
- Maintenance Data-----Set the maintenance settings of the materials
- Engineering Data-------Set the important movement of the device
- Time-------Set the date and time
- Tool------Use for calibration of the device
- File Manager------Upgrade the software and save the recipe data
- Stand by------Prepare for the operation
- MANUAL------ Manual operation of the unit

14-4. Descriptions of Touch Panel Operation Display

14-4-1. Main Display

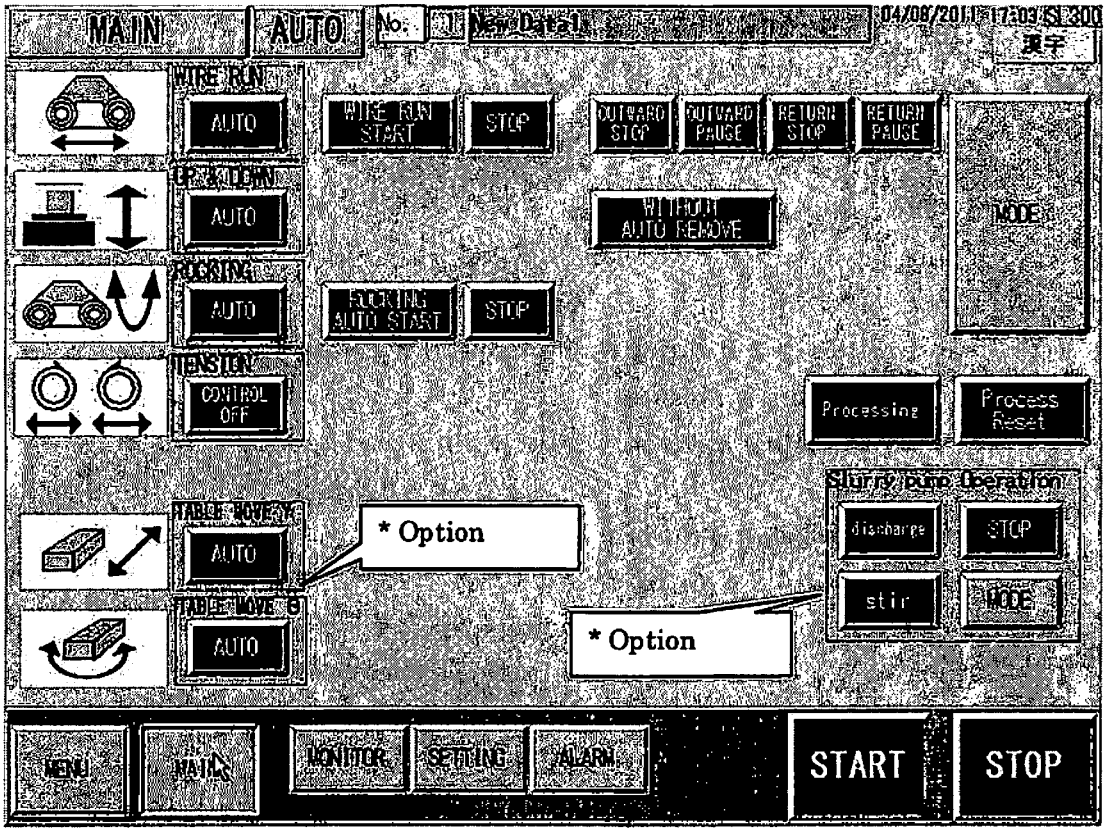


Fig 14-4-1-1.Main Display

This display is for starting/stopping auto operation.

・When the machine is operating,

AUTO・・・Auto running is selected.

・Each operation of the three modes as below will start according to the condition setting. If pressing STOP beside the start switch, each operation will stop. When "Processing" turns on, start operation is not available.

Wire Run Start

Rocking Auto Start

* Travers Start/Stop function operates simultaneously with the wire run.

- Outward Stop

  If pressing this switch during wire running, the operation stops when outward running finishes.

- Outward Pause

  If pressing this switch during wire running, the operation stops temporarily when outward running finishes.

  (When "Processing" turns on, this operation is not feasible.)

- Return Stop

  If pressing this switch during wire running, the operation stops when return running finishes.

- Return Pause

  If pressing this switch during wire running, the operation stops temporarily when return running finishes.

  (When "Processing" turns on, this operation is not feasible.)

- Without Auto Remove

  Set enable/disable wire removal after finishing slicing.

- Tension Control Off

  Shows on/off state of the tension control

  Setting on/off of the tension control is available in the preparation page.

- "Processing"

  "Processing" lamp turns on when the auto slicing starts and until the slicing movement finishes or stops.

- Process Reset

  This switch is used to suspend the slicing. If touching this switch, the confirmation window will pop up.

・Mode Switch

The window of Fig 14-4-1-2. appears if pressing the mode switch.

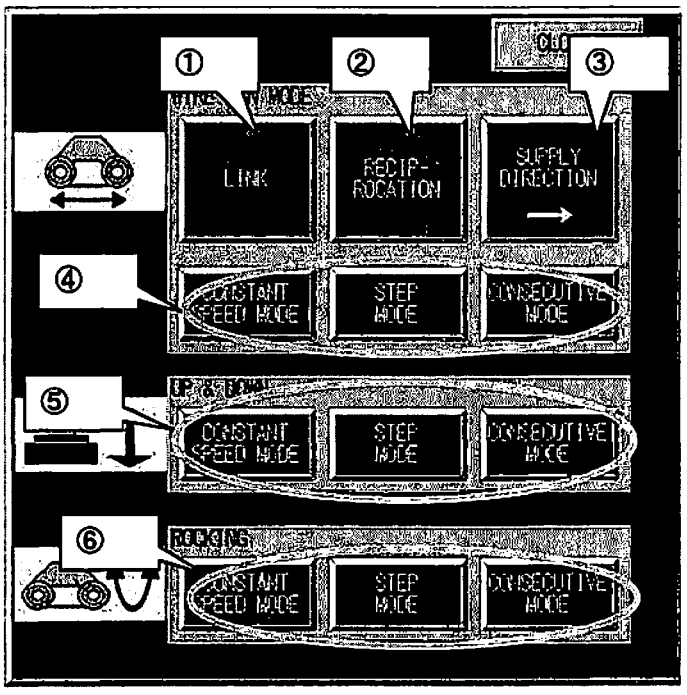


Fig 14-4-1-2. Operation Mode Pop Up Window

① ALONE/LINK・・・Select the reel movement. Set "LINK" under normal operation.

② Reciprocate・・・Reciprocate the wire running under the specified condition.

③ Supply Direction・・・「→」: Reel L→R
「←」: Reel R→L

④ Select the mode of wire running from constant speed mode, step mode and consecutive mode (*1)

⑤ Select the mode of the up and down movement from constant speed mode, step mode and consecutive mode (*1).

⑥ Select the mode of the rocking movement from constant speed mode, step mode and consecutive mode (*1).

・Please see the next page for the description for *1.

(*1) Constant Speed Mode, Step Mode and Consecutive Mode

- Constant Speed Mode: Slicing speed is constant from the slicing start position to the end position according to the speed set in the process condition page.
- STEPMODE : The elevating unit moves from slicing start position to the end position in the speeds set in the stage setting page. The moving speed changes step-likely according to the speed set in the each stage.
- CONSECUTIVE MODE : The elevating unit moves from slicing start position to the end position in the speeds set in the stage setting page. The moving speed changes linearly according to the speed set in the each stage.

・Slurry Pump Operation (Option)

・This setting consists of "Discharge", "Stir" and "Stop".

・The setting automatically turns to "Discharge" if starting operation by START switch.

・The setting becomes "Stir" when slicing finishes (or stops).

・If pressing "MODE" in the main display, the window of Fig 14-4-1-3 pops up and the amount of discharge and stir of the slurry pump can be changed.

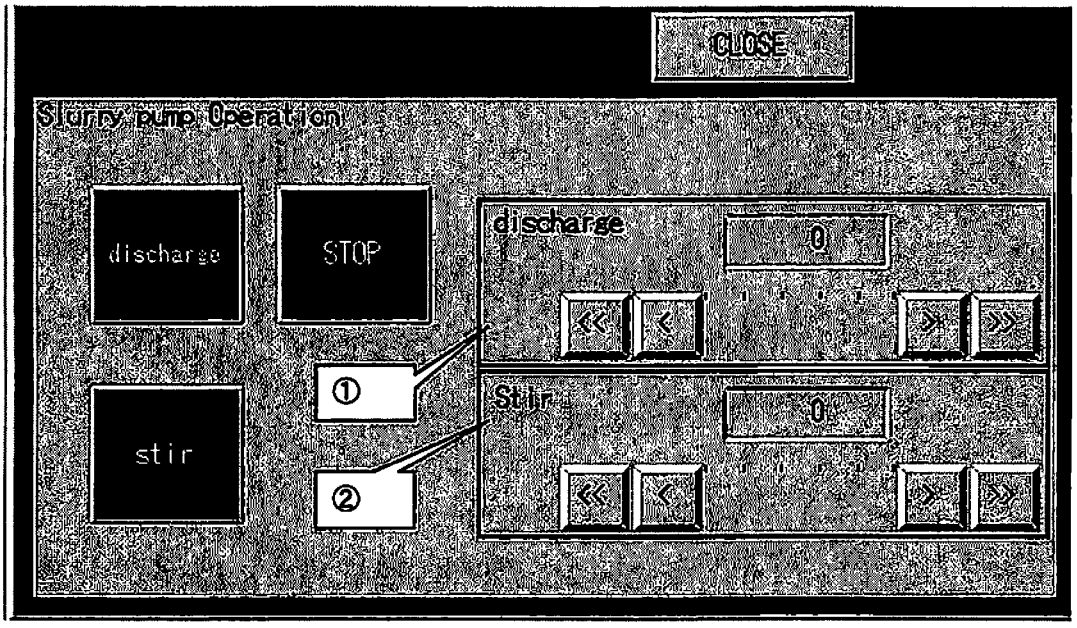


Fig. 14-4-1-3. Slurry Pump Operation Pop Up Window

① ・・・Adjusts the amount of discharge of slurry

② ・・・Adjusts the amount of stir of slurry

14-4-2. Monitor Display

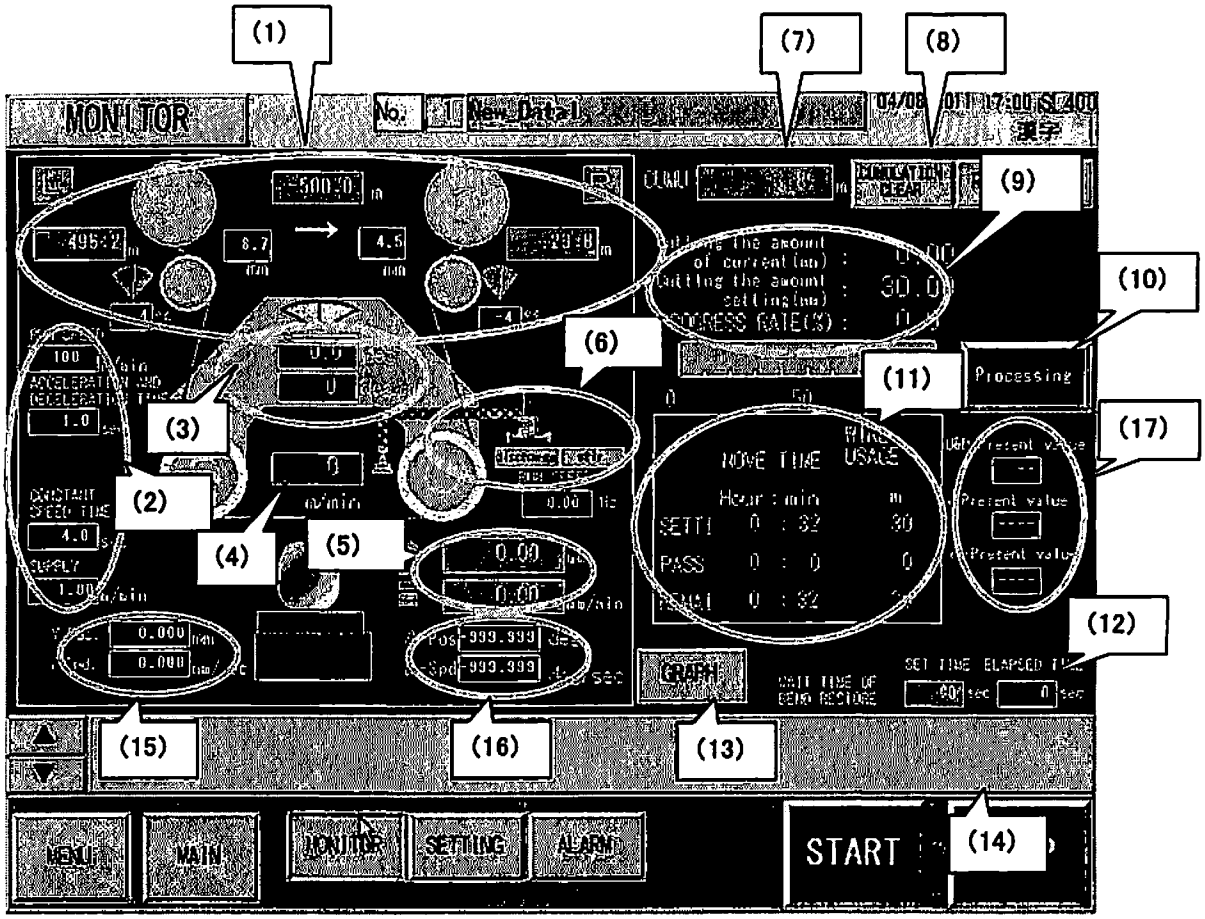


Fig. 14-4-2-11. Monitor

This page shows the current operation condition.

The items pointed by the numbers in the balloons are described as follow.

(1) Reel Part...Please see the enlarged view in the Fig 14-4-2-2

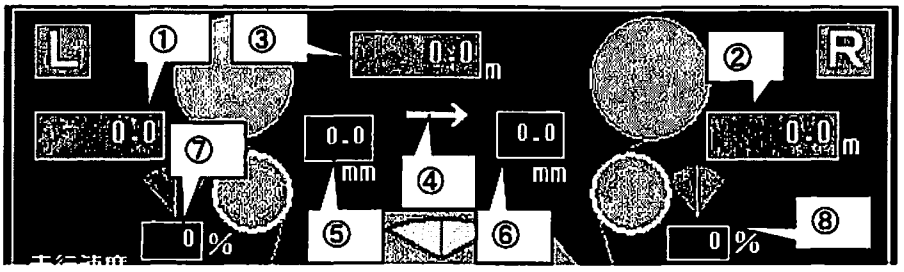


Fig. 14-4-2-2. Enlarged view of the monitor display (1) in Fig. 14-4-2-1

① • • • L reel, wire length
② • • • R reel, wire length
③ • • • Wire used length
④ • • • Wire supplying direction
⑤ • • • Traverse L position
⑥ • • • Traverse R position
⑦ • • • Tensioner L angle
⑧ • • • Tensioner R angle

(2) Wire running condition set values

Those values shows currently selected command values.

(3) Rocking unit

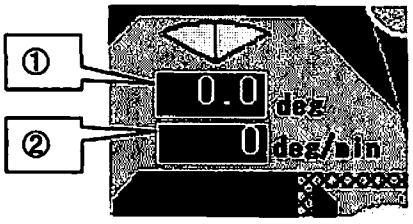


Fig 14-4-2-3 Enlarged view of the monitor display (3) in Fig. 14-4-2-1

① • • • Rocking angle monitor
② • • • Rocking speed monitor

(4) Wire running speed monitor

Monitor the wire running speed.

(5) Up and down unit · · · Refer to enlarged view shown in Fig 14-4-2-4.

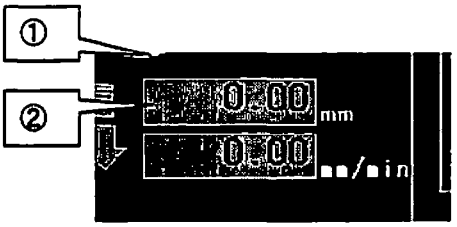


Fig. 14-4-2-4. Enlarged view of the monitor display (5) in Fig. 14-4-2-1

① · · · Up and down height monitor

② · · · Up and down speed monitor

(6) Pump unit (option) · · · Refer to enlarged view shown in Fig 14-4-2-5.

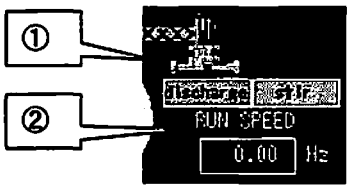


Fig. 14-4-2-5. Enlarged view of the monitor display (6) in Fig. 14-4-2-1

① · · · Discharge and slurry stirring indication lamp

② · · · Coolant pump speed monitor

(7) Wire usage total value

Display the wire usage total value.

(8) Wire usage total value clear switch

Press this switch longer when clearing the wire usage total value.

(9) Cutting monitor

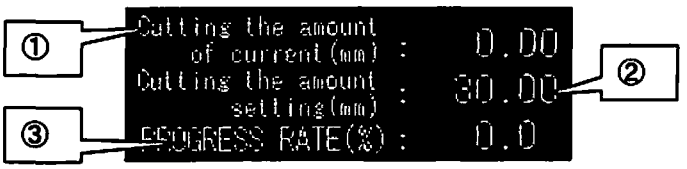


Fig. 14-4-2-6. Enlarged view of the monitor display (9) in Fig. 14-4-2-1

① · · · Cutting the amount of current (mm) monitor

② · · · Cutting the amount setting (mm)

③ · · · Progress rate (%) monitor

(10) Processing indication lamp

The processing indication lamp flashes during processing operation.

(11) Elapsed time

Display the elapsed time.

(12) Bow recovering wait time

Display the bow recovering wait time.

(13) Graph

If pressing "Graph", a graph pops up as in the fig 14-4-2-7.

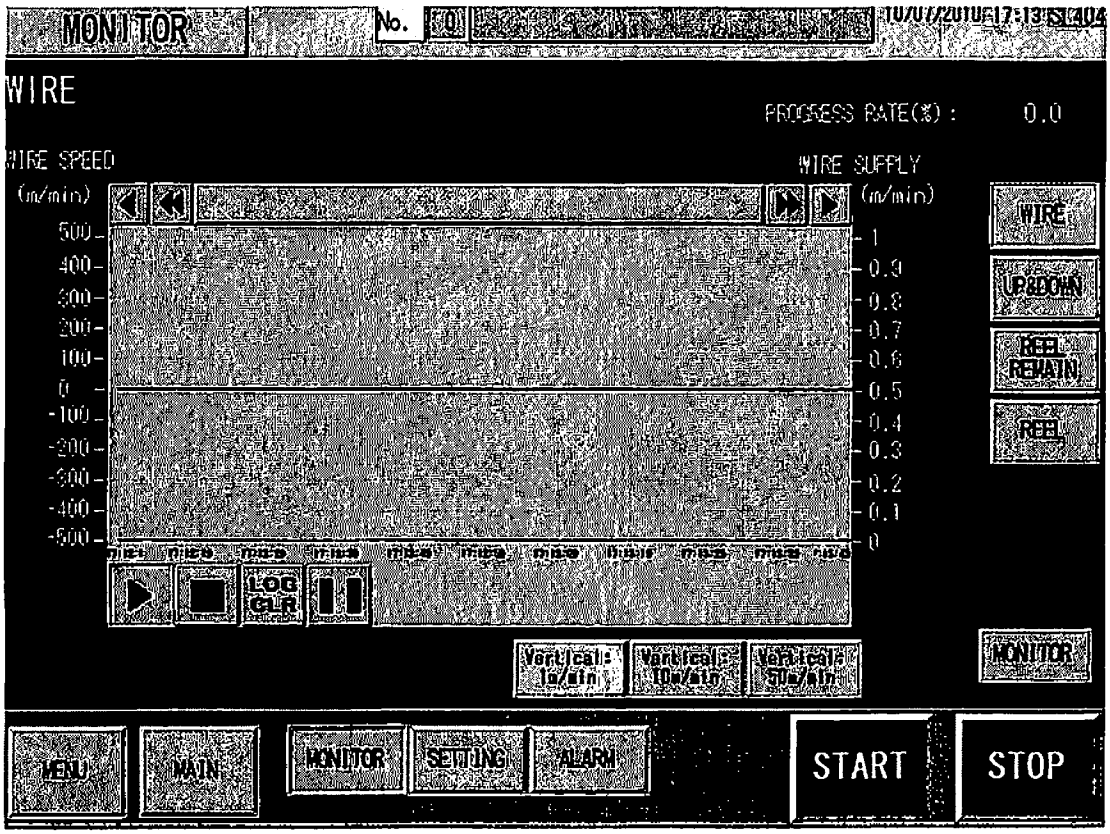


Fig. 14-4-2-7. Graph display in monitor display

(14) Alarm/message box

Display the alarm/message.

(15) Y unit monitor (option)

The monitor for the Y unit.

(16) θ unit monitor (option)

The monitor for the θ unit.

14-4-3. Setting Display

- In the setting display, different kinds of process condition can be set.

14-4-3-1. Common Switches for Setting Display

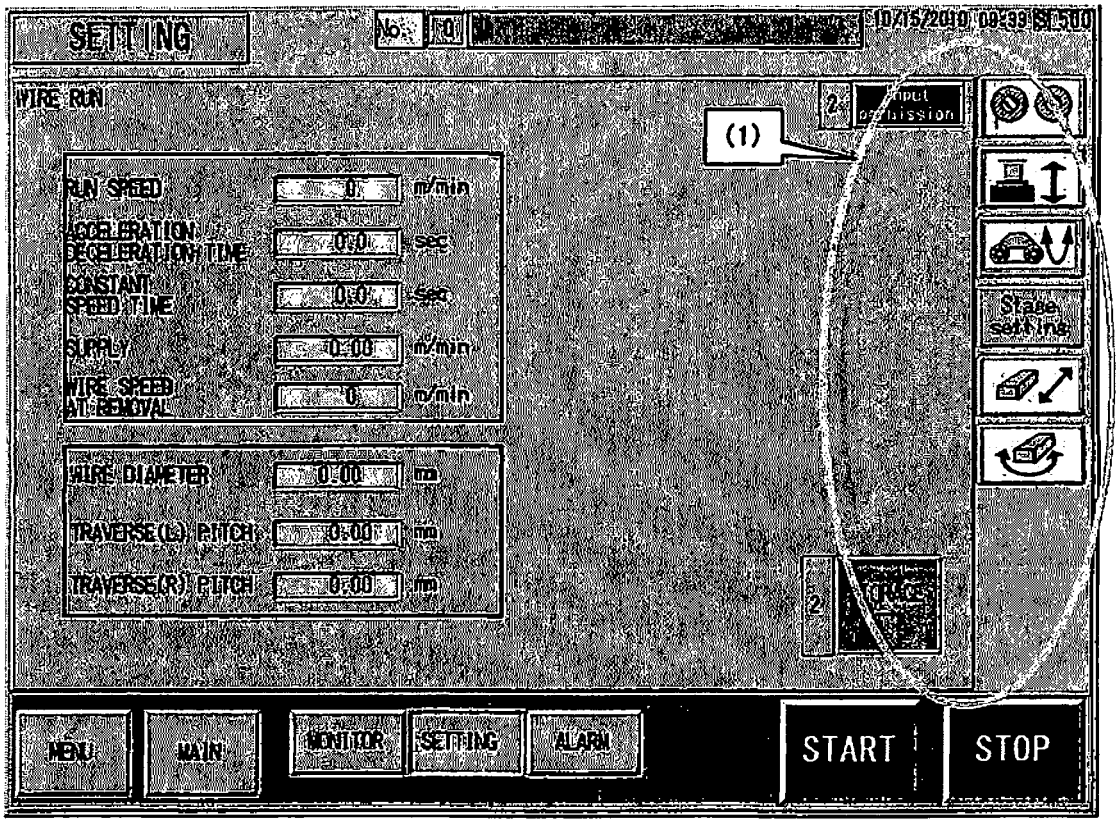


Fig. 14-4-3-1-1 Setting – Wire Run

(1) Input permit, recipe register and page switches

・Refer to enlarged view shown in Fig 14-4-3-1-2.

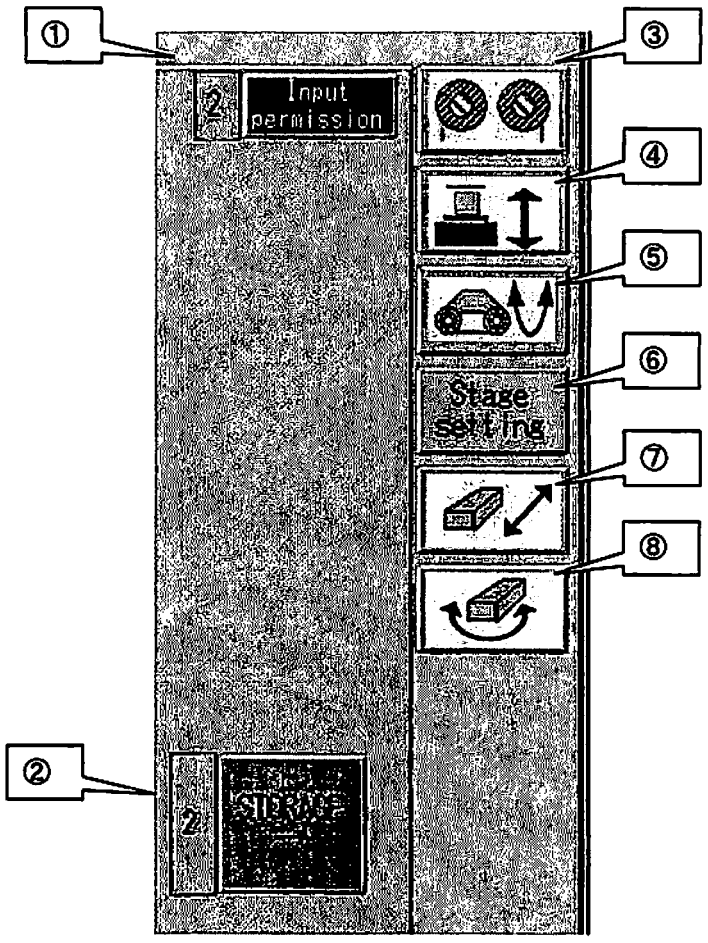


Fig 14-4-3-1-2.Common switches in the setting display

① ・・・Input permission switch: Parameter input in each page is available if pressing this switch when the password level is 2 or higher.

② ・・・Recipe storage switch: Display the confirmation dialogue window shown in Fig 14-4-3-1-3 if pressing this switch when the password level is 2 or higher. Display the processing screen window shown in Fig 14-4-3-1-4 if touch the OK screen button and then store the processing condition to the recipe currently selected. When the complete screen window shown in Fig 14-4-3-1-5 appears, press OK screen button. This operation is completed when the display disappears.

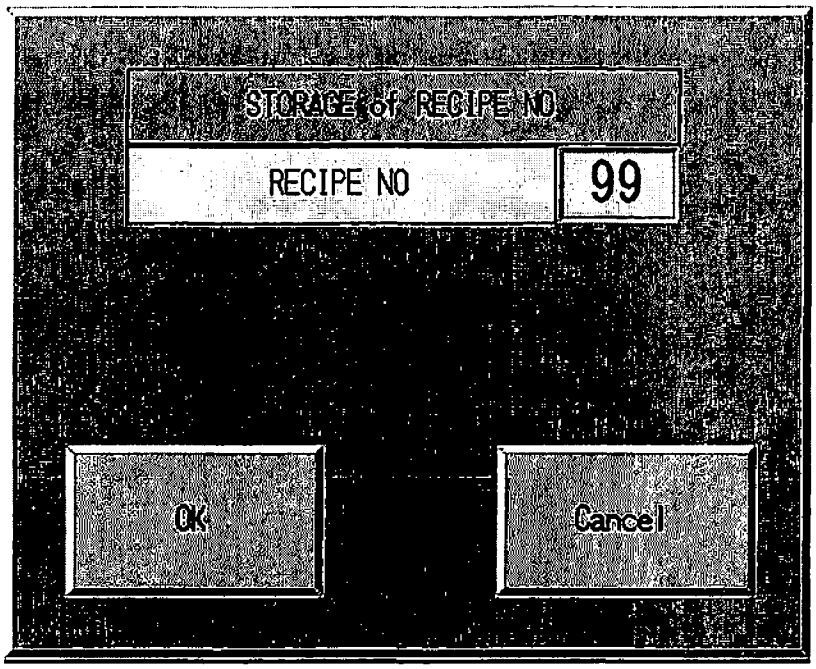


Fig. 14-4-3-1-3 Confirmation dialogue window

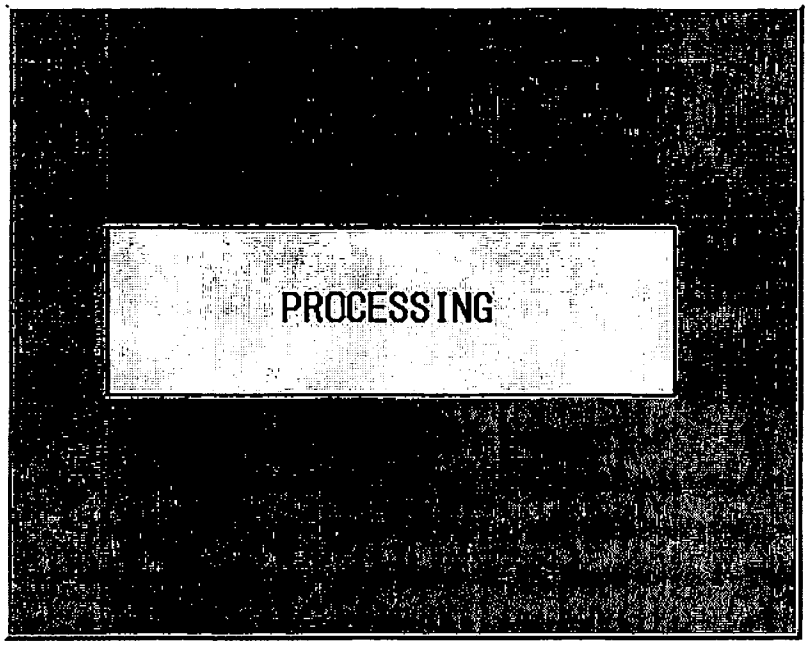


Fig. 14-4-3-1-4 processing screen

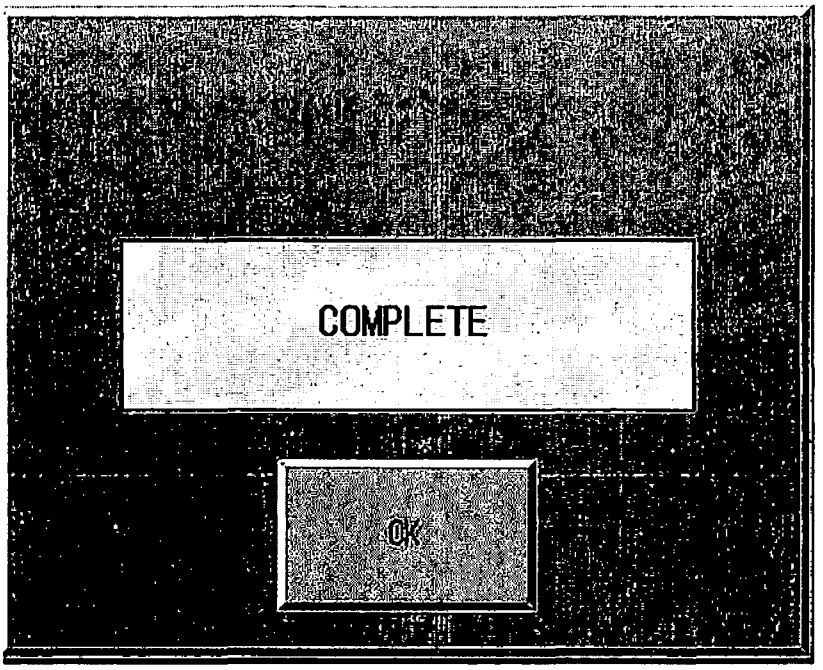


Fig. 14-4-3-1-5 Complete Screen

③ • • • go to Setting Display – Wire Run
④ • • • go to Setting Display – Up and down
⑤ • • • go to Setting Display – Rocking
⑥ • • • go to Setting Display – Stage Setting
⑦ • • • go to Setting Display – Y Setting(Option)
⑧ • • • go to Setting Display – θ Setting(Option)

14-4-3-2. Setting Display – Wire Run

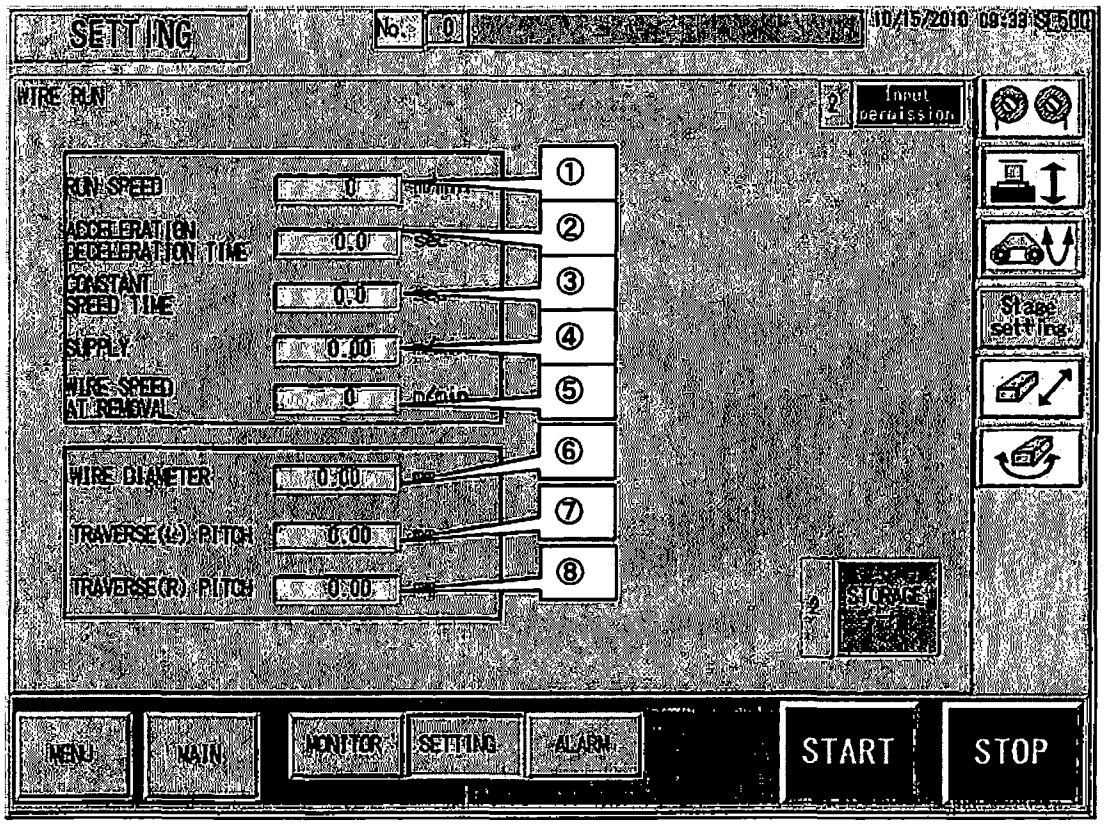


図 14-4-3-2. Setting Display – Wire Run

① ・・・Set the maximum speed of wire run in the auto mode

② ・・・Set the time for the speed shifting from 0 to the set running speed in wire reciprocation operation

③ ・・・Set the time from the acceleration ends until the deceleration starts

④ ・・・Set the amount of new wire supply during wire run

⑤ ・・・Set the wire run speed during wire automatic removal

⑥ ・・・Set the wire diameter

⑦ ・・・Set the moving amount of the reel traverse (L)

⑧ ・・・Set the moving amount of the reel traverse (R)

14-4-3-3. Setting Display – Up and Down

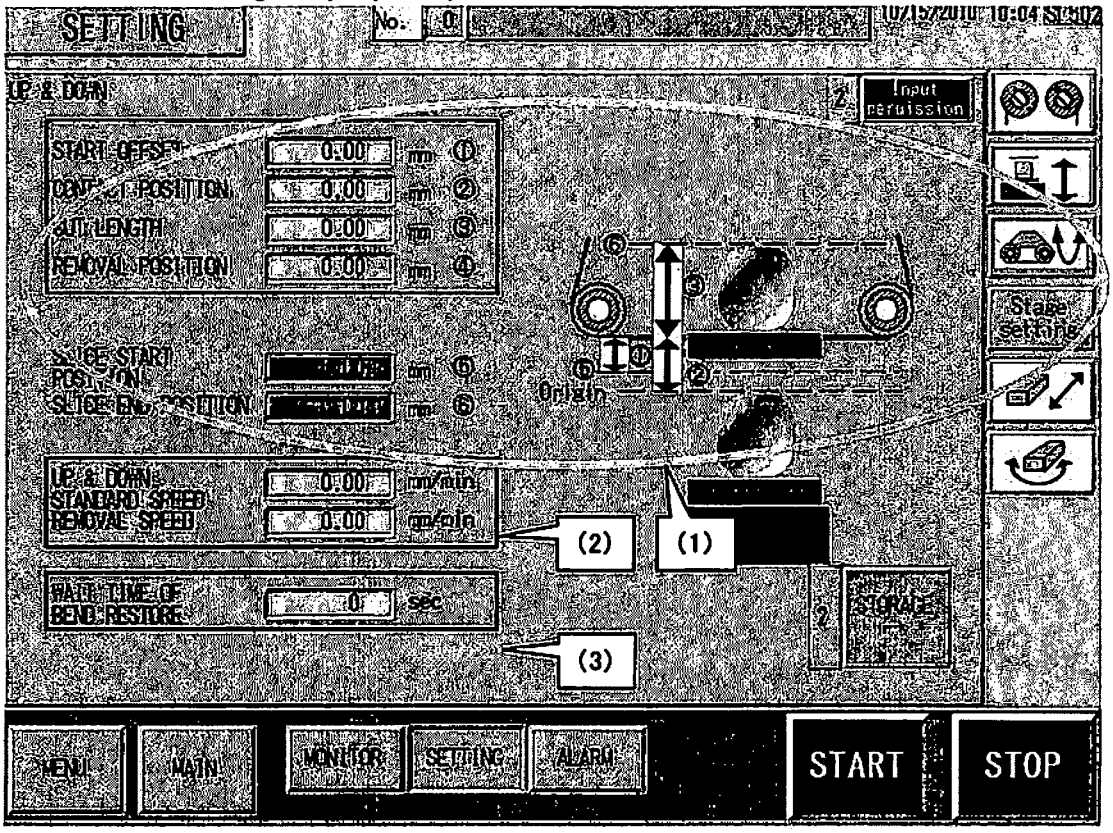


Fig. 14-4-3-3-1. Setting Display – Up and Down Display

(1) Up and down position setting function indicates in Fig 14-4-3-3-2.

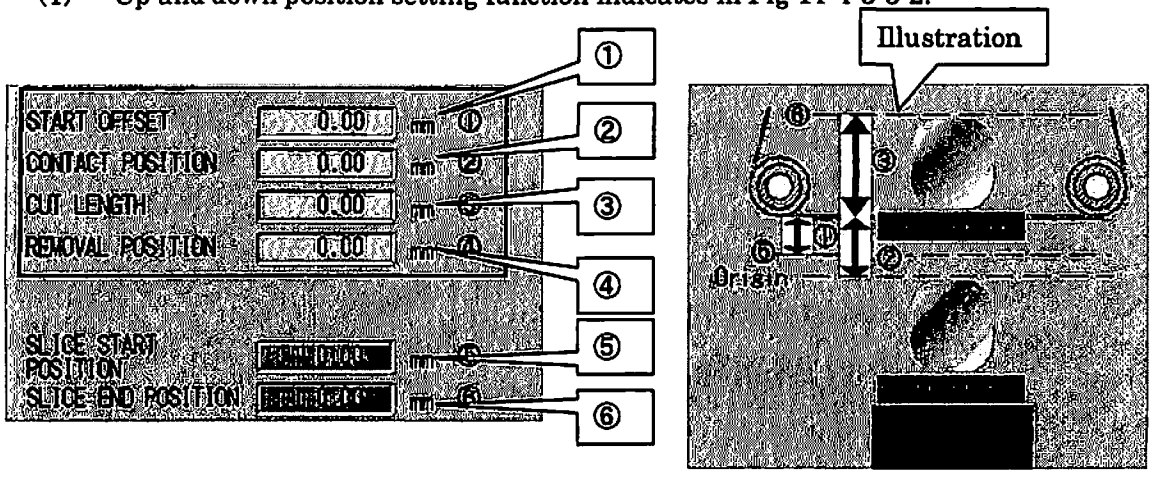


Fig. 14-4-3-3-2 Enlarged view of (1)

① ・・・Set the distance from the contact position as the height of the slicing start position

② ・・・Set the position where the wire and the material contact each other when the wire angle is horizontal. (the rocking angle is 0)

③ ・・・Set the amount of slicing, that is, the distance from the contact position.

④ ・・・Set the position where the automatic wire discharge starts

⑤ ・・・Shows the difference between (1) and (2)

⑥ ・・・Shows the (2) and (3) combined length

The sketch illustrates the input values on the left.

・①~④・・・The data are to be input. (See the sketch)

・⑤,⑥・・・The data are automatically shown. (See the sketch)

(2) Slicing speed/Wire removal speed setting

・Slicing speed・・・Set slicing unit moving speed from slicing start position to slicing end position

・Wire discharge speed・・・Set automatic wire removing speed

(3) Bow recover waiting setting

・Wire bow recover waiting・・・Set the time for wire running after the slicing unit movesto the slicing end position

14-4-3-4. Setting – Rocking

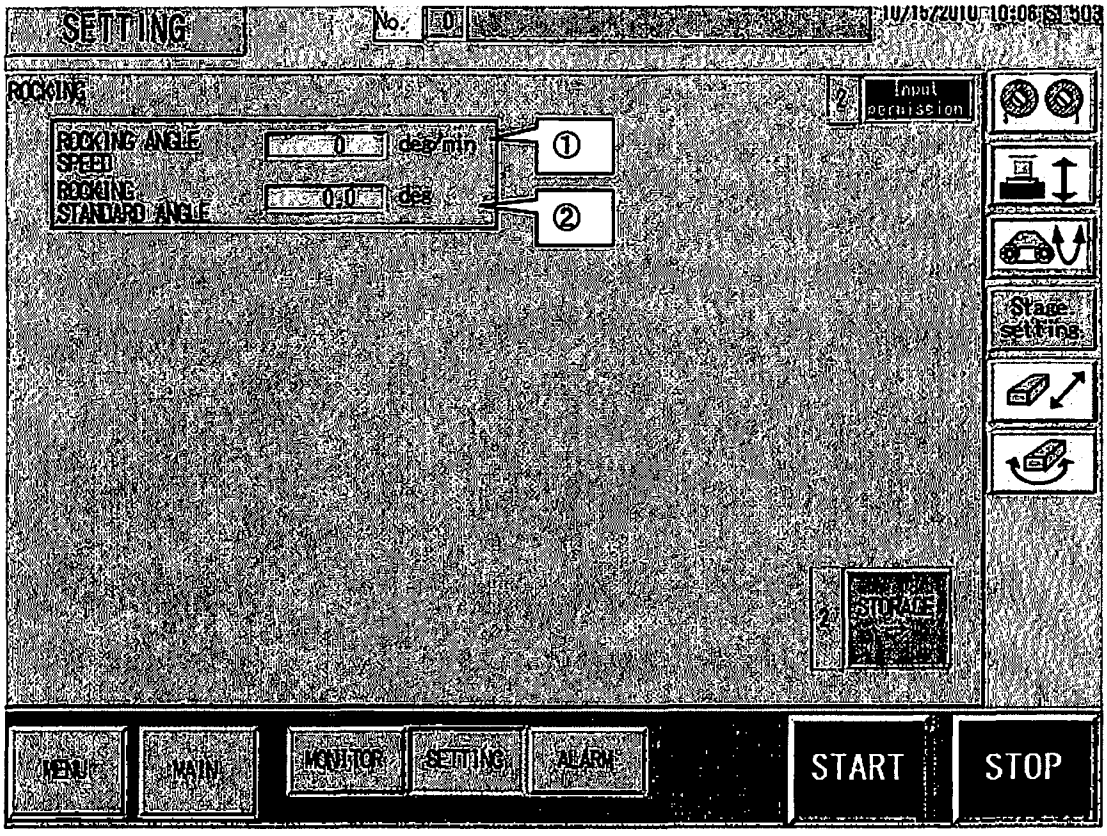


Fig. 14-4-3-4. Setting – Rocking

① ・・・Set the slicing unit rocking speed

② ・・・Set the slicing unit rocking angle with + or - value based on the origin point (horizontal).

14-4-3-5. Setting – Stage Setting Display

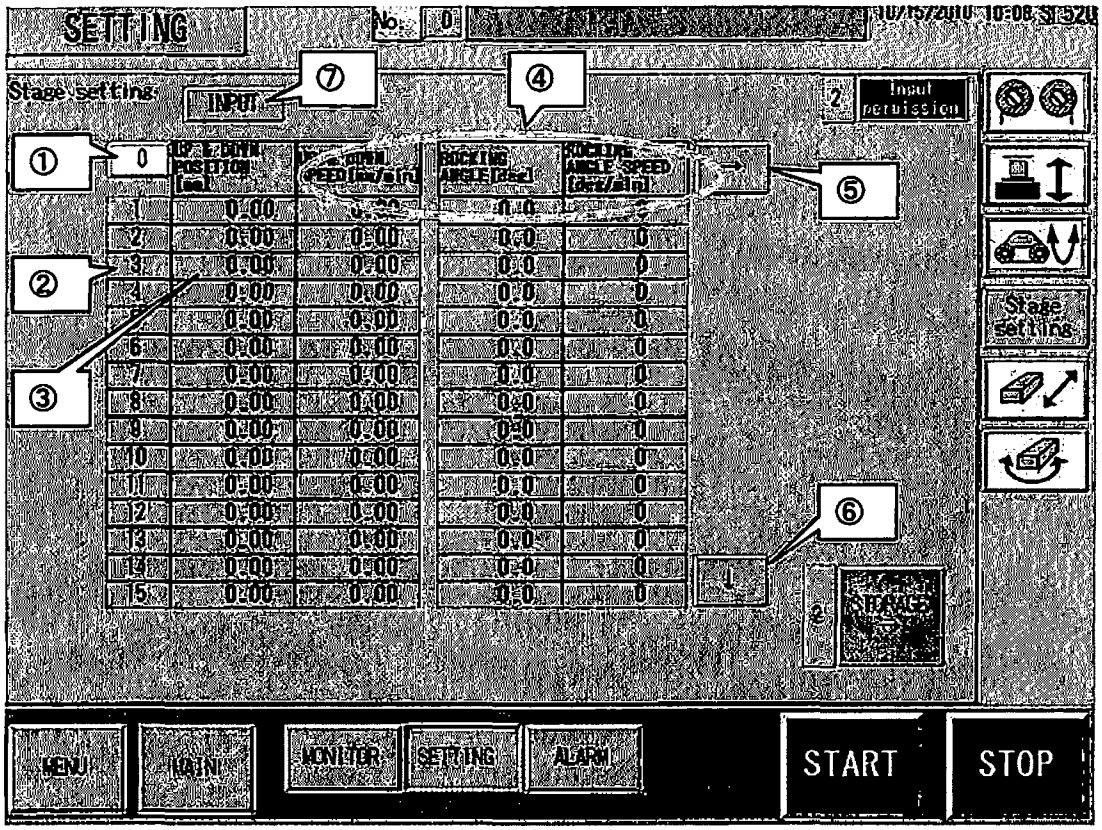


Fig 14-4-3-5-1. Setting – Stage Setting 1-1

① Stage Setting No. • • • Shows the number of stages (dividing the cut length into the number of stages)

② Stage setting switch/lamp • • • set the number of the stages from 1 to 25. The numbers that are touched are set as the number of stages (number of dividing)

③ Up and down position data • • • Set slicing position in each stage that is set in the stage setting switch

④ Process setting data • • • Set process data in each stage

⑤ Paging • • • Move to the other setting page (running speed, acceleration and deceleration, constant speed time, supplying amount) (Fig 14-4-3-5-2)

⑥ Paging • • • Move to the next page for the stage number 16 – 25.

⑦ Input Switch • • • Move to the stage position input page

(Fig 14-4-3-5-3)

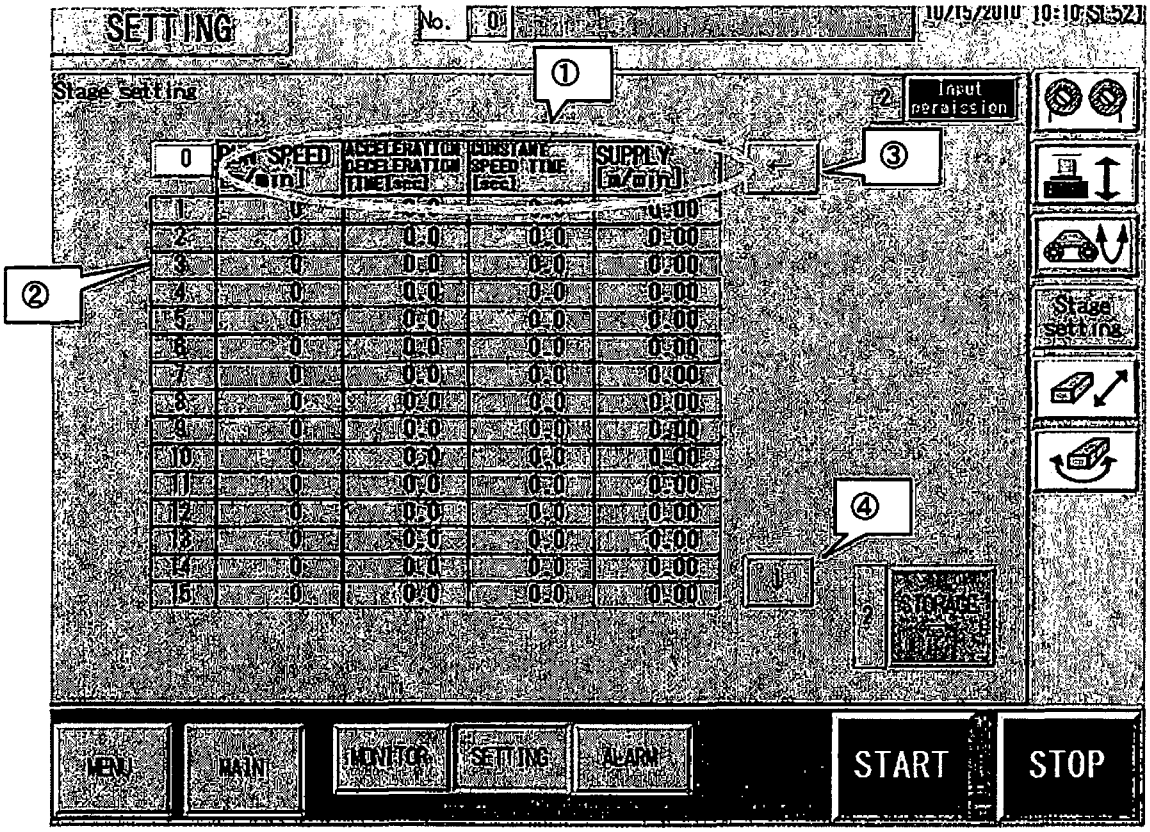


Fig. 14-4-3-5-2. Setting – Stage Setting 2-1

① Stage setting data・・・show process data for each stage

② Stage setting lamp・・・lamp for stages that are set in Fig 14-4-3-5-1

③ Paging・・・Move to the other setting page (elevating position, elevating speed, rocking angle, rocking speed) (Fig 14-4-3-5-1)

④ Paging・・・Move to the page indicates 16 – 25 of corresponding pages as Fig 14-4-3-5-1.

Up and Down Position Divide Input Function

This function is used when performing automatic input evenly until the stage position height stage based on the slice start/end position set on the processing condition "Up and Down" page.

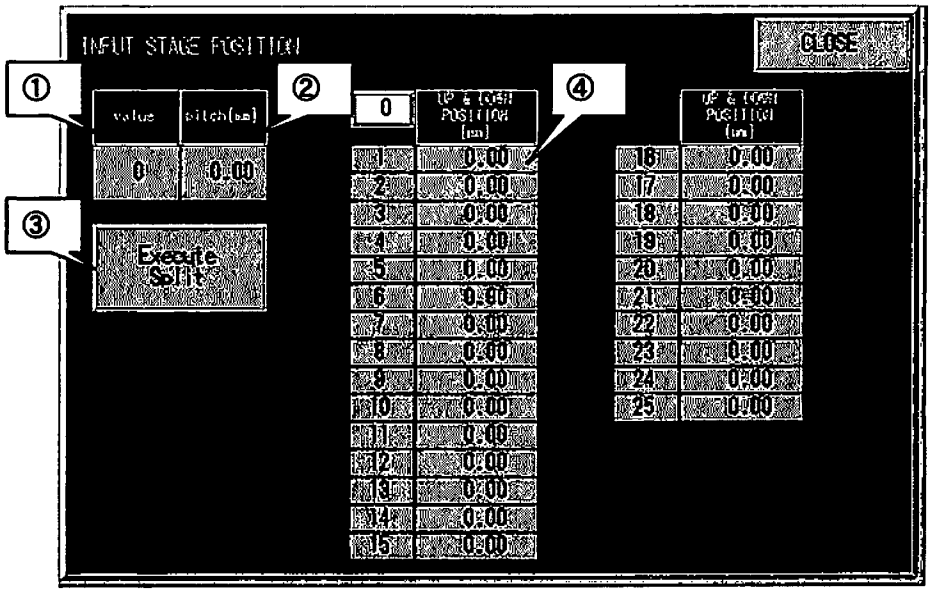


Fig 14-4-3-5-3. Processing Condition – Stage Setting Position Input

① Value • • • Indicate the divided counts between the slice start position and the slice end position.

The stage count number is "1" smaller than the stage set by the stage setting switch.

② Pitch • • • • Indicate the 1 stage height divided the height by partition numbers between the slice start position and the slice end position.

③ Execute Split

Perform from the 1 stage to the setting stage (by pressing longer than 1 second).

④ First Stage Position

When performing the execute split switch function, the slice start position set on the processing condition "Up and Down" page is indicated.

Even if this page is closed after performing input by this function, changing value of the up and down position is available on the stage setting page.

14-4-3-6. Setting – AXIS Y SETTING/EQUAL PITCH MODE(Option)

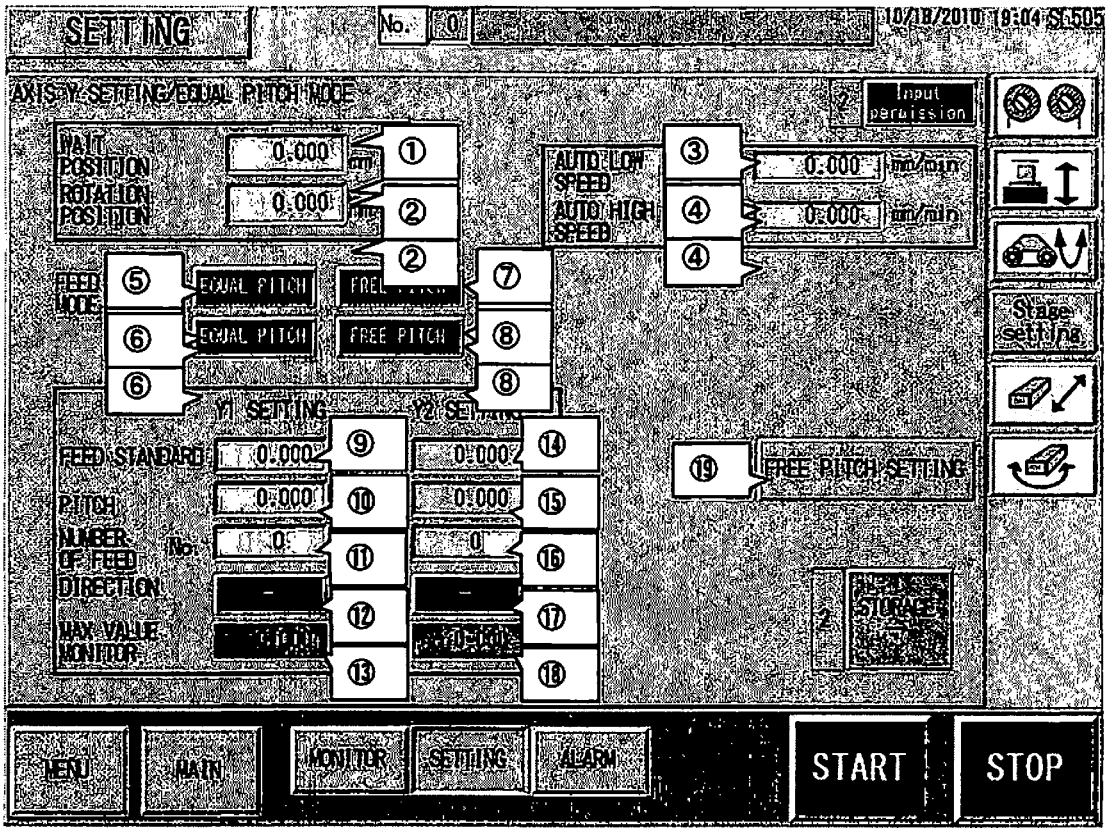


Fig. 14-4-3-6. Setting – AXIS Y SETTING/EQUAL PITCH MODE

① • • • Set the wait position of axis Y
② • • • Set the rotation position of axis Y
③ • • • Set the auto low speed of axis Y
④ • • • Set the auto high speed of axis Y
⑤ • • • Set Y1 to the equal pitch mode
⑥ • • • Set Y2 to the equal pitch mode
⑦ • • • Set Y1 to free pitch mode
⑧ • • • Set Y2 to free pitch mode
⑨ • • • Set the feeding standard position of Y1
⑩ • • • Set the pitch of Y1
⑪ • • • Set the number of feeding for Y1
⑫ • • • Set the moving direction for Y1
⑬ • • • Show the maximum moving length of Y1
⑭ • • • Set the feeding standard position of Y2
⑮ • • • Set the pitch of Y2

⑯ • • • Set the number of feeding for Y2

⑰ • • • Set the moving direction of Y2

⑱ • • • Show the maximum moving length of Y2

⑲ • • • Move to the free pitch display

14-4-3-7. Setting – AXIS Y SETTING/FREE PITCH(Option)

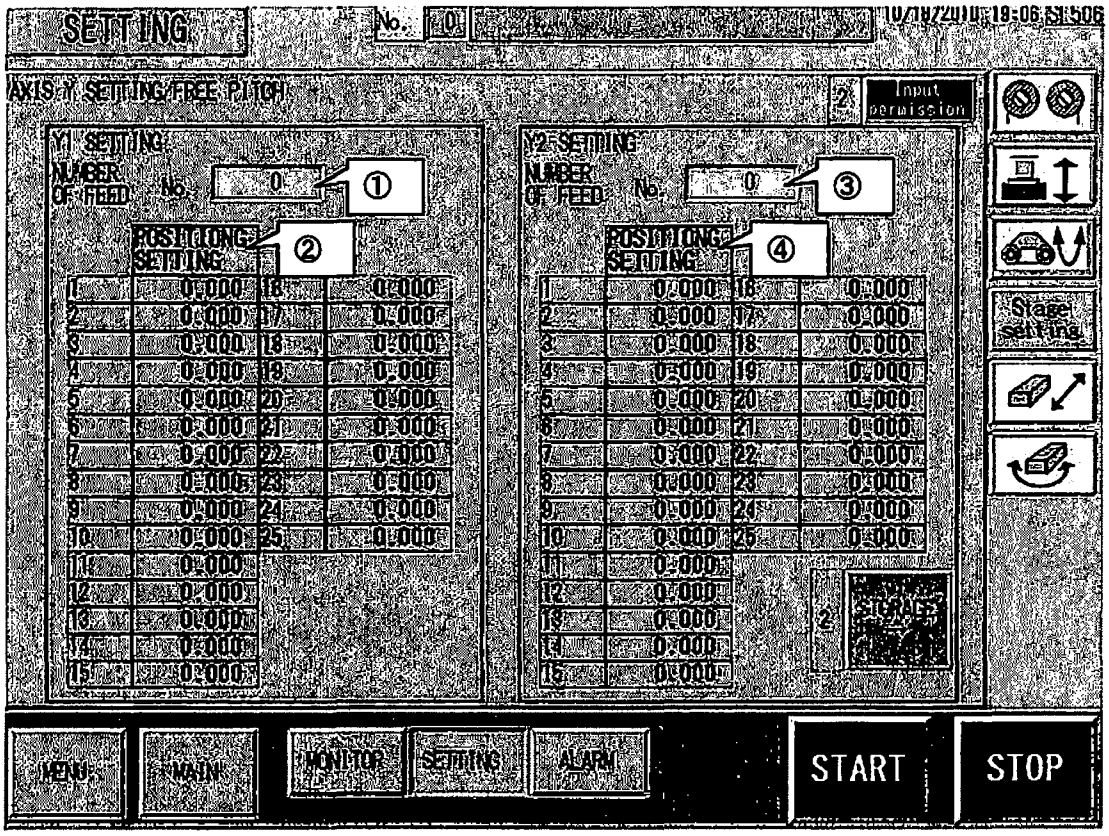


Fig. 14-4-3-7. Setting – AXIS Y SETTING/FREE PITCH

① • • • Set the number of Y1 free pitch feeding

② • • • Set the amount of Y1 free pitch feeding

③ • • • Set the number or Y2 free pitch feeding

④ • • • Set the amount of Y2 free pitch feeding

14-4-3-8. Setting – AXIS θ SETTING(Option)

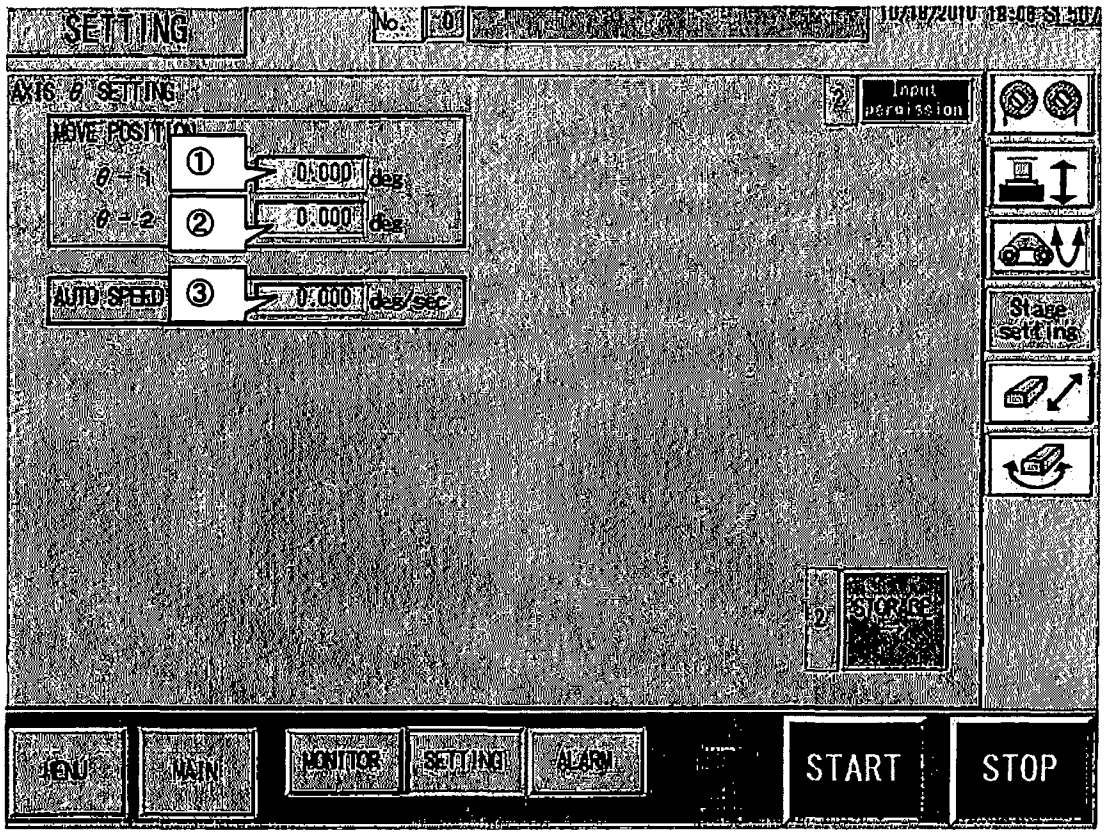


Fig. 14-4-3-8. Setting – AXIS θ SETTING

① • • • Set the θ1 angle of AXIS θ

② • • • Set the θ2 angle of AXIS θ

③ • • • Set the auto running speed of AXIS θ

14-4-4. Alarm Display

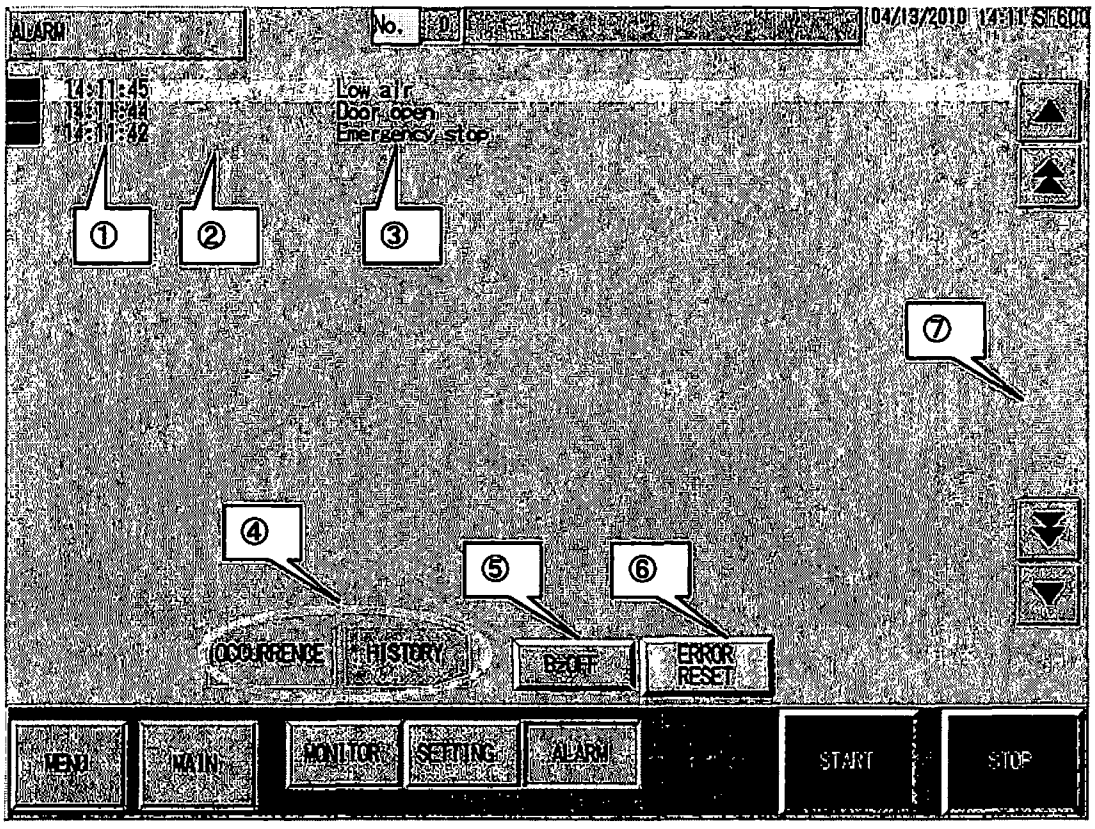


Fig. 14-4-4. Alarm Display

① ・・・Time of occurrence

② ・・・Time of reset (*shown only in the history page)

③ ・・・Error item

④ Occurrence/History tab ・・・Occurrence page and History page can be switched. Presently occurred alarm is shown in the occurrence page and the alarm occurred in the past is shown in the history page.

⑤ ・・・turn off the Buzzer

⑥ ・・・Reset the error status (alarm and warning etc)

⑦ ・・・Scroll the alarms

14-4-5. Reel Coiling Setting Display

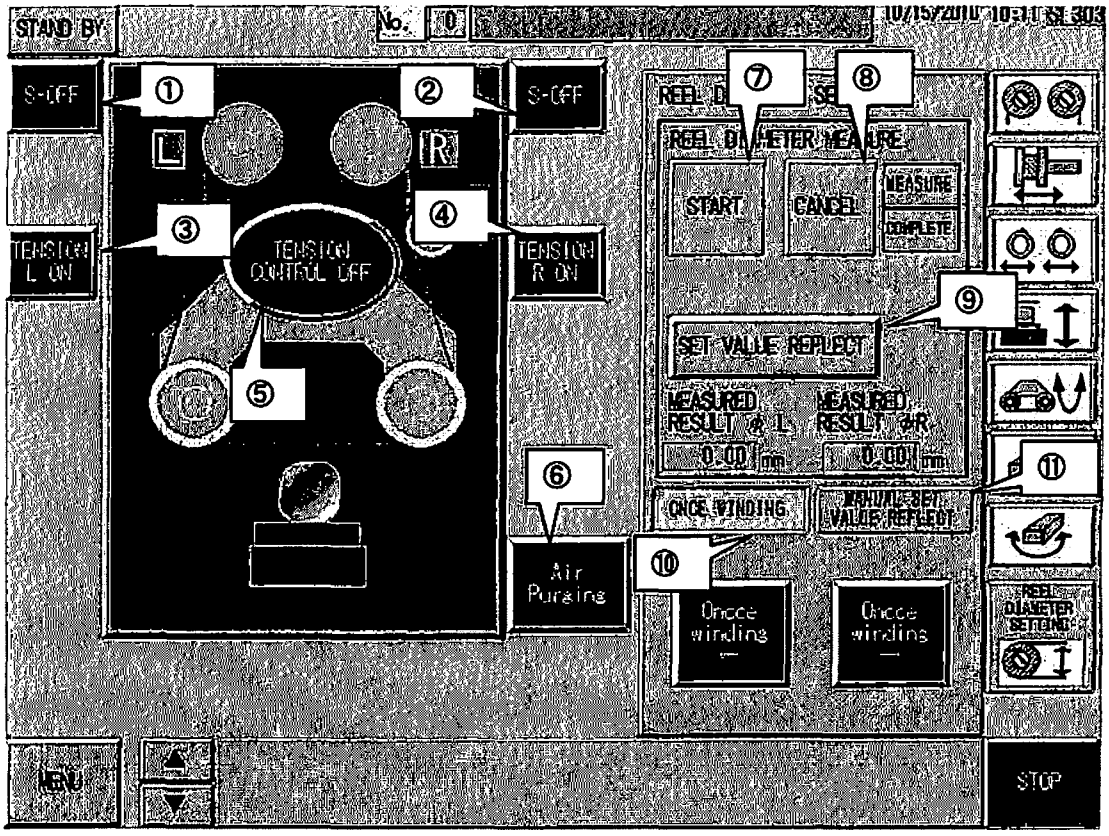


Fig. 14-4-5-1. Standby Reel Diameter Setting

① ・・・turns on/off the left reel servo lock

② ・・・turns on/off the right reel servo lock

③ ・・・turns on/off the cylinder of the left tension pulley

④ ・・・turns on/off the cylinder of the right tension pulley

⑤ ・・・turns on/off the tension control

⑥ ・・・turns on/off air purge of each part

⑦ ・・・starts to measure the reel coil diameter, turns on while the measurement is available.

⑧ ・・・press when stopping the measurement of the reel coil diameter

⑨ ・・・The measured values are automatically updated after each measurement and this lamp turns on during the updating.

(10) Reel once winding operation

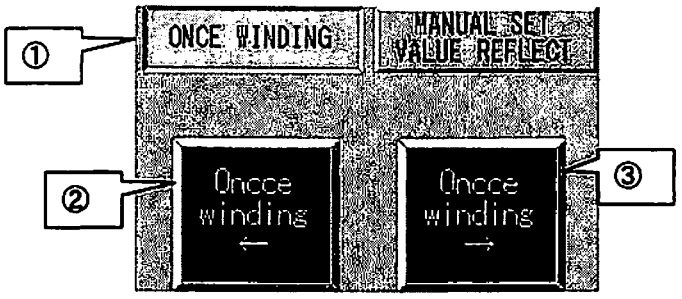


Fig. 14-4-5-2 Enlarged view of (10)

① ・・・Select the once winding operation.

② ・・・Wind the reel once in reverse rotation.

③ ・・・Wind the reel once in normal rotation.

※ Once winding operation is available when the "Manual" on the "Manual Function Reel" page is lit.

(11) Reel winding manual setting

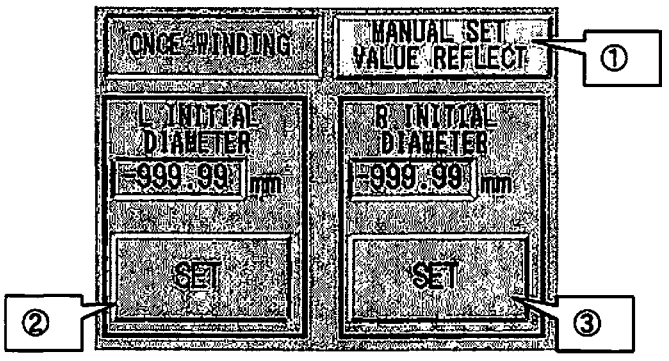


Fig. 14-4-5-3 Enlarged view of (11)

① ・・・Select the manual set value reflect.

② ・・・Set the L initial reel coil diameter Φ.

③ ・・・Set the R initial reel coil diameter Φ.

14-4-6. Manual Display

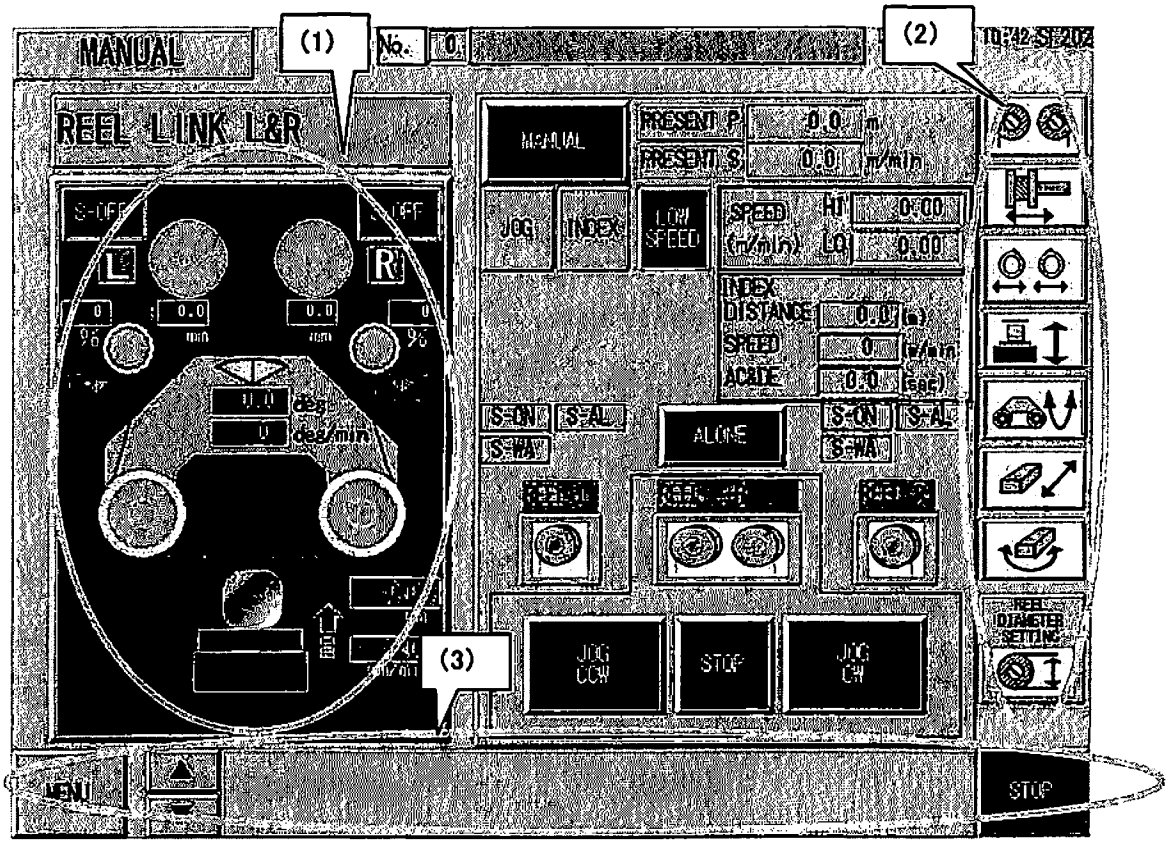


Fig 14-4-6(1). Reel Interlock L & R

- This portion explains the common operation on the manual screen.
- The manual mode is available to operate each function using JOG mode and INDEX mode.

JOG mode: Perform specified speed in specified time.

INDEX mode: Performs specified speed in specified distance.

- To understand the screen, the call-outs explained as follows.

(1) Monitor part・・・Refer to enlarged view shown in Fig 14-4-6(2).

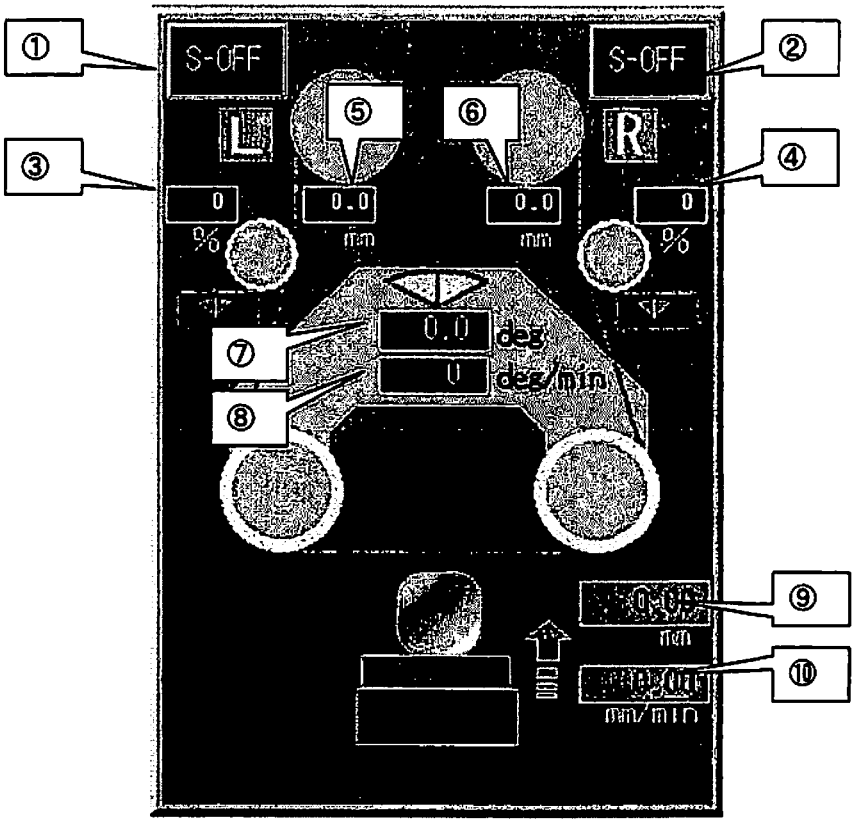


Fig 14-4-6(2) Manual screen common parts monitor part

① ・・・Reel L servo ON/OFF switch
② ・・・Reel R servo ON/OFF switch
③ ・・・Tensioner L present value
④ ・・・Tensioner R present value
⑤ ・・・Traverse L position
⑥ ・・・Traverse R position
⑦ ・・・Rocking angle monitor
⑧ ・・・Rocking speed monitor
⑨ ・・・Up and down level monitor
⑩ ・・・Up and down speed monitor

(2) Jumped page・・・Refer to enlarged view shown in Fig 14-4-6(3).

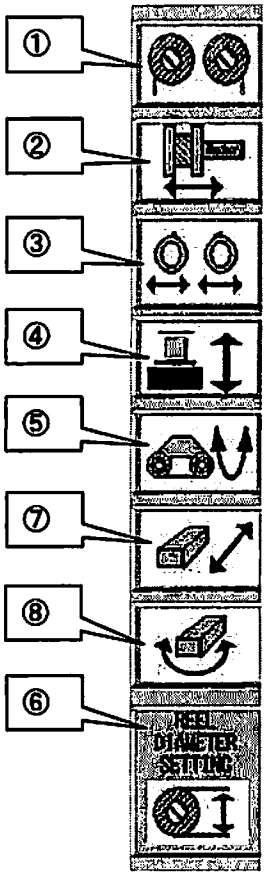


Fig. 14-4-6(3). Manual screen common parts jumped page

① ・・・jumps to the reel L and R unit
② ・・・jumps to the traverser unit
③ ・・・jumps to the tensioner unit
④ ・・・jumps to the up and down unit
⑤ ・・・jumps to the rocking unit
⑥ ・・・jumps to the reel diameter setting page
⑦ ・・・jumps to the Y setting page(Option)
⑧ ・・・jumps to the θ setting page(Option)

(3) Contents, alarm and stop • • • Refer to enlarged view shown in Fig 14-4-6(4)

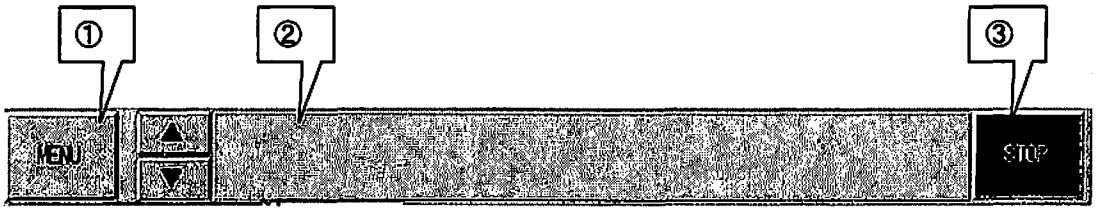


Fig. 14-4-6(4). Contents, alarm and stop

① • • • jumps to the content page.

② • • • shows presently occurred error. Up to three lines of the description can be shown at a time.

③ • • • All manual operation can be stopped with this switch.

14-4-6-1-1. Reel Display

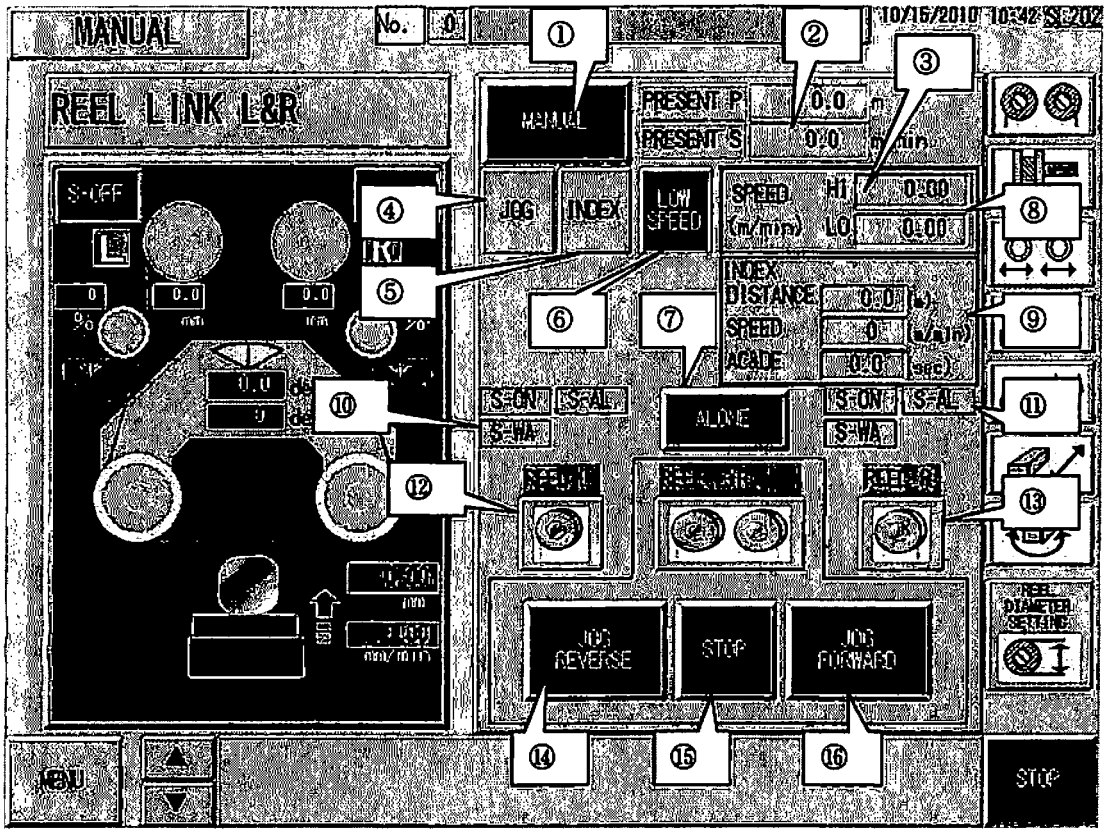


Fig.14-4-6-1-1. Reel Link L&R

Operation related to manual/reel is available

① • • • switch the reel operation mode to manual

② • • • show the wire length run in the manual mode

③ • • • show the present speed of the wire running

④ • • • switch the reel operation to the JOG mode

⑤ • • • switch the reel operation to the INDEX mode

⑥ • • • switch the speed between Hi and Lo

⑦ • • • switch the reel operation between alone and link

⑧ • • • set high/low speed of each unit in the manual mode

⑨ • • • set length, speed and acceleration and deceleration for INDEX mode.

⑩ • • • shows the status of the servo motor of the left reel. S-ON means the servo power is on, S-AL means servo alarm and S-WA means servo warning.

⑪ • • • show the status of the servo motor of the right reel. S-ON means the

servo power is on, S-AL means servo alarm and S-WA means servo warning.

⑫ • • • moves to the manual display for left reel manual operation. (Fig. 14-4-6-1-2)

⑬ • • • moves to the manual display for the right reel manual operation (Fig. 14-4-6-1-3)

⑭ • • • starts reel operation in either JOG mode or INDEX mode. This switch is for running wire from the right reel to the left reel.

⑮ • • • stops manual reel operation

⑯ • • • starts reel operation in either JOG mode or INDEX mode. This switch is for running wire from the left reel to the right reel.

• Reel L and R Alone Operation

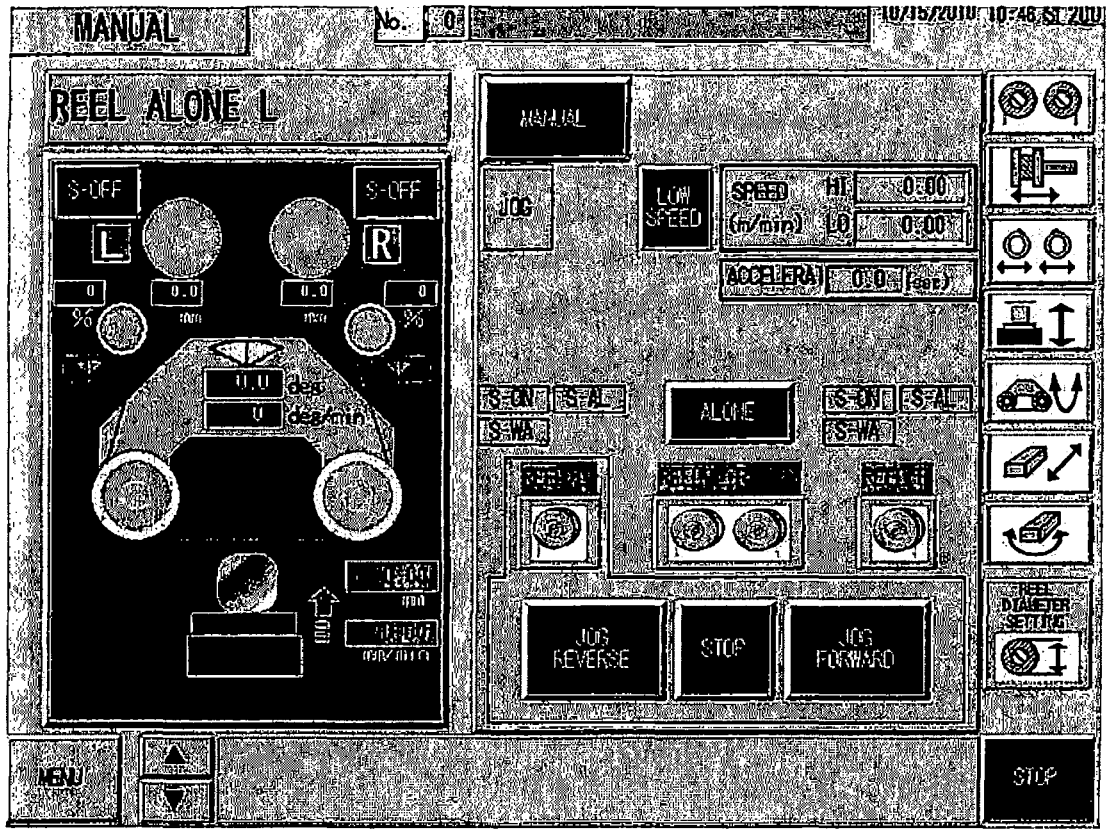


Fig 14-4-6-1-2. Reel L Alone Display

• In the reel L alone display, the left reel can be operated separately. Basicaly, the operation is the same as the reel link L&R operation.

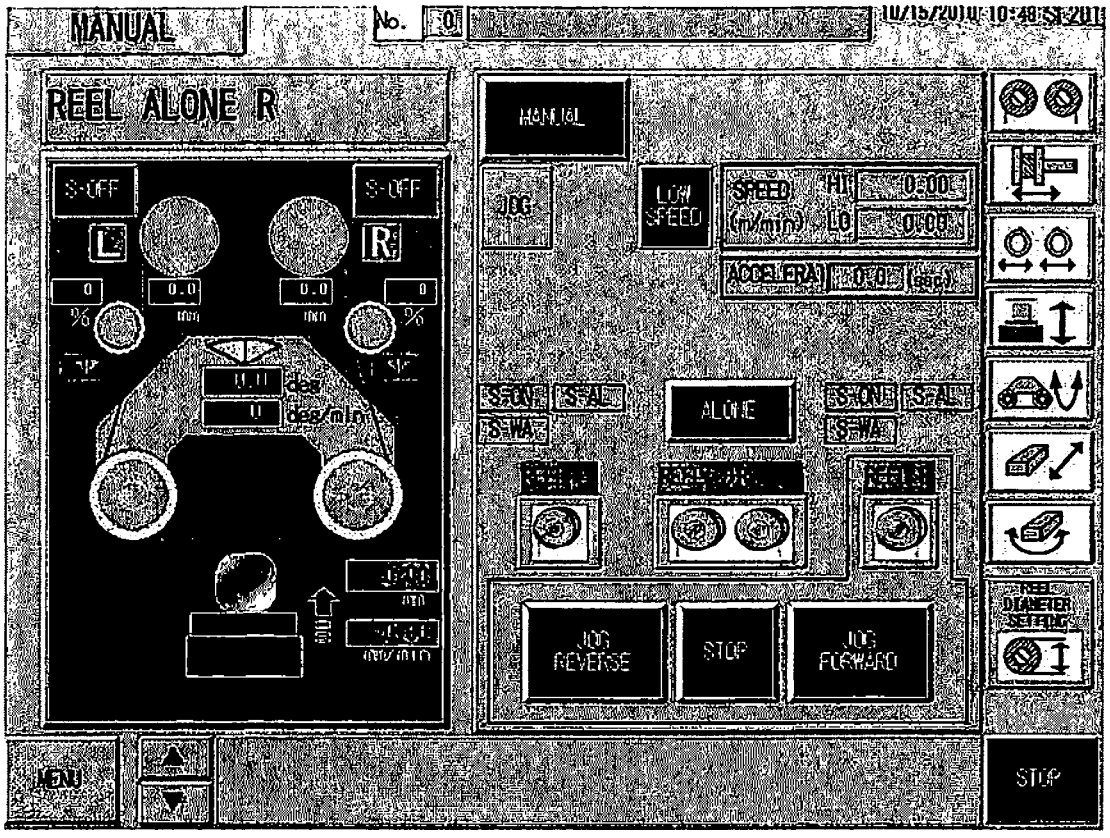


Fig. 14-4-6-1-3. Reel R Alone Display

• In the reel R alone display, the left reel can be operated separately. Basicaly, the operation is the same as the reel link L&R operation.

14-4-6-2. Traverser Display

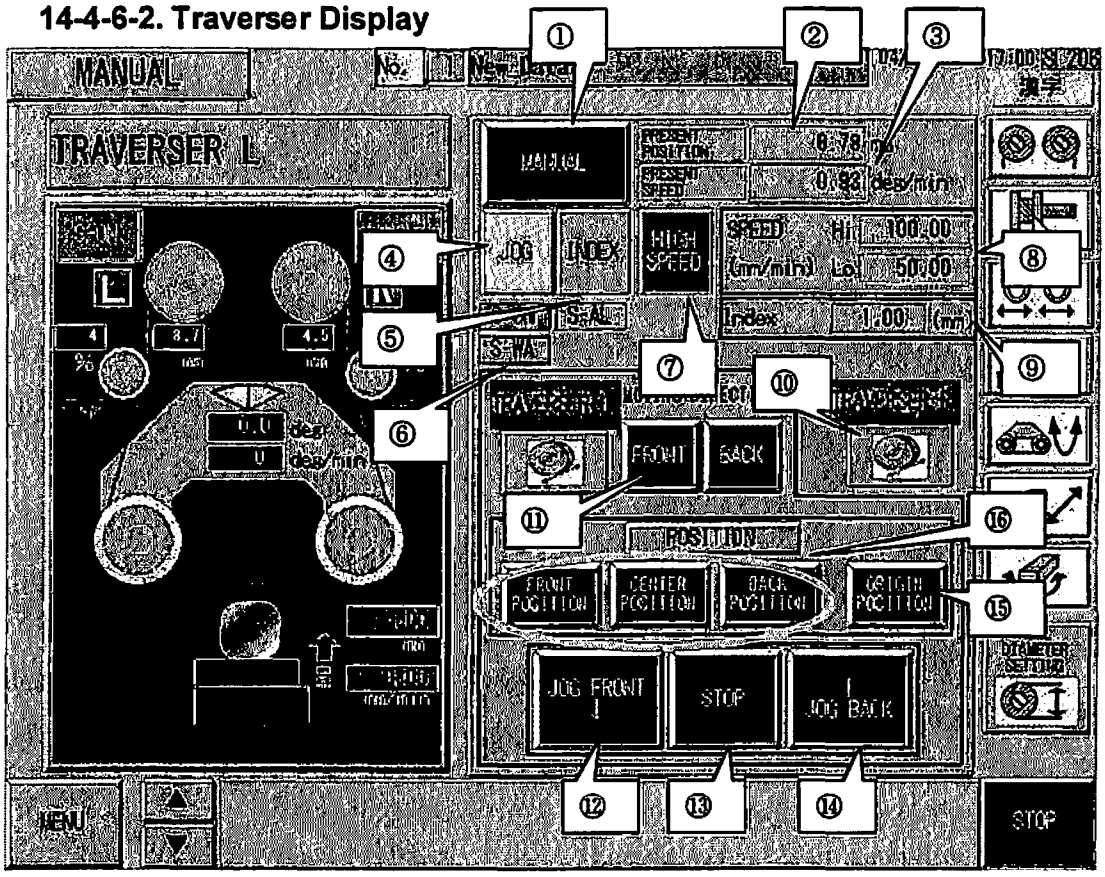


Fig. 14-4-6-2-1. Traverser L

・If pressing the traverser switch in the page jump part in the manual display, this display opens. To move to the traverser R page, this traverser L page should be opened first.

① ・・・switch traverser L operation to manual.

② ・・・show the present position of traverser L

③ ・・・show the present speed of traverser L

④ ・・・switch traverser L operation mode to JOG mode.

⑤ ・・・switch traverser L operation mode to INDEX mode

⑥ ・・・show the condition of the servo motor of traverser L, S-ON means the servo power is on, S-AL means servo alarm and S-WA means servo warning.

⑦ ・・・switch the speed between Hi and Lo

⑧ ・・・set high/low speed of the unit in the manual mode

⑨ ・・・set the moving length in INDEX mode

⑩ ・・・switch to traverser R page (Fig 14-4-6-2-2)

⑪ • • • Change forcibly traverser L moving direction

⑫ • • • Move traversar L in JOG mode or INDEX mode
Move the reel to the front side by this switch

⑬ • • • Stop traversar L manual movement

⑭ • • • Move traversar L in JOG mode or INDEX mode
Move the reel to rear side by this switch

⑮ • • • Move traversar L to origin position

⑯ • • • Move traversar L to each front, middle or rear side automatically

• Fig 14-4-6-2-2 is the traverser R page. The display is identical to the traverser L and only the page switch is different.

① • • • move to the traverser L page (Fig. 14-4-6-2-1)

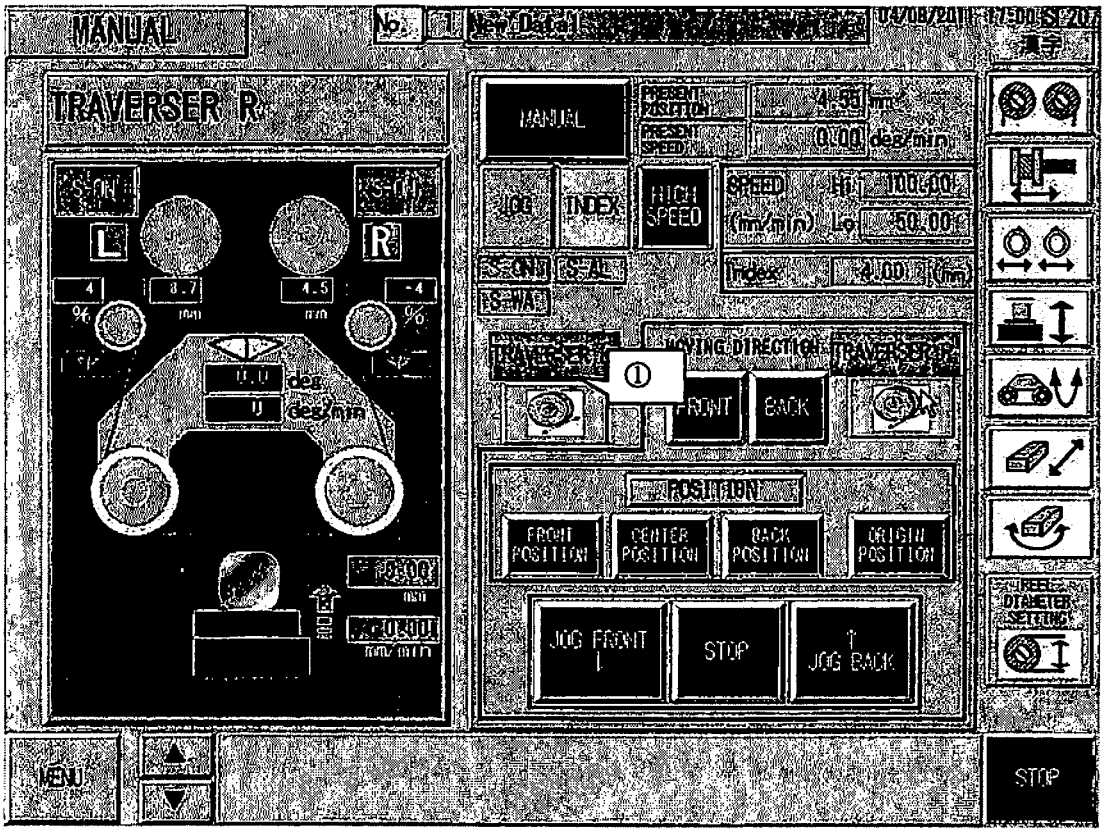


Fig 14-4-6-2-1. Traverser R

14-4-6-3. Tensioner Display

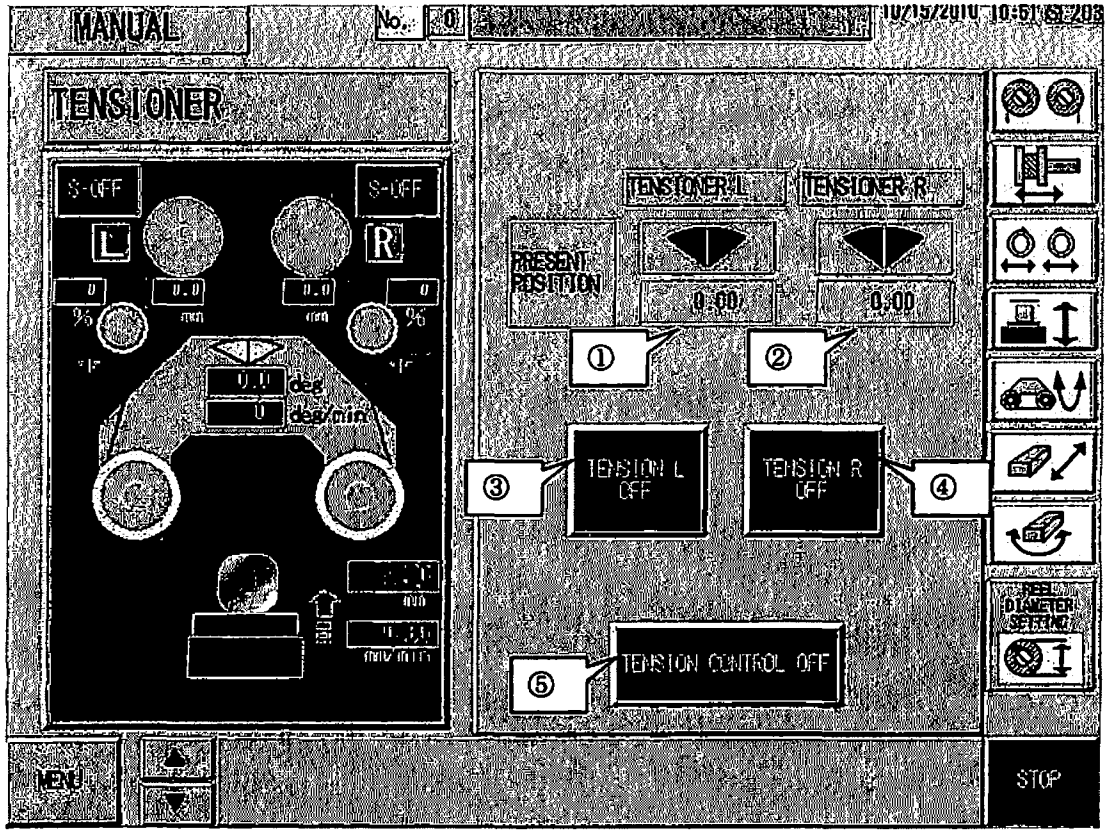


Fig. 14-4-6-3. Tensioner

In Tensioner Display, manual tensioner operation is available.

① • • • show present angle of tensioner L. The angle is 0 when it is vertical. Tensioner tilts up to 50 degree to inside and up to -50 to outside.

② • • • show present angle of tensioner R. The angle is 0 when it is vertical. Tensioner tilts up to 50 degree to inside and up to -50 to outside.

③ • • • supply air pressure on tensioner L

④ • • • supply air pressure on tensioner R

⑤ • • • turn on/off tension control when air pressure is supplied to tensioner L and tensioner R

14-4-6-4. Up and Down Display

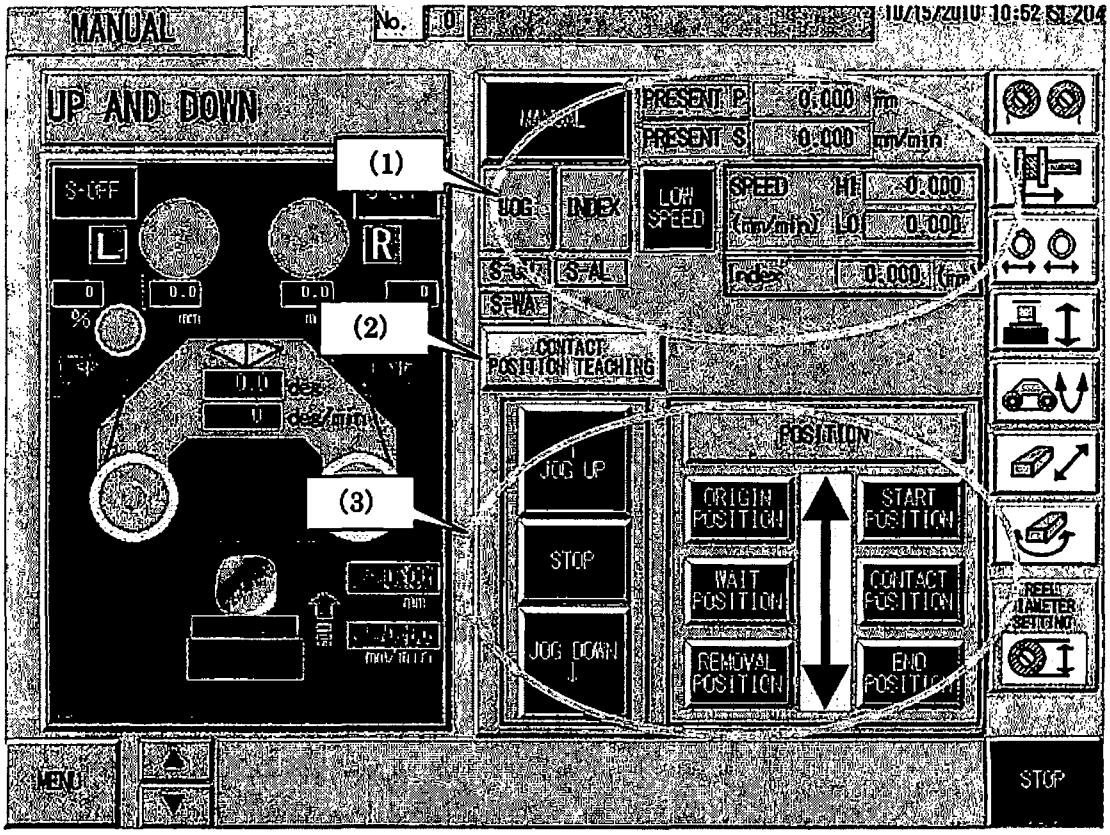


Fig 14-4-6-4-1. Up and Down Display

In the up and down display, the Unit can be moved up and down manually, and teaching the work contact position is available.

・Detail description of the display is as follows.

(1) Mode Change and Data Setting

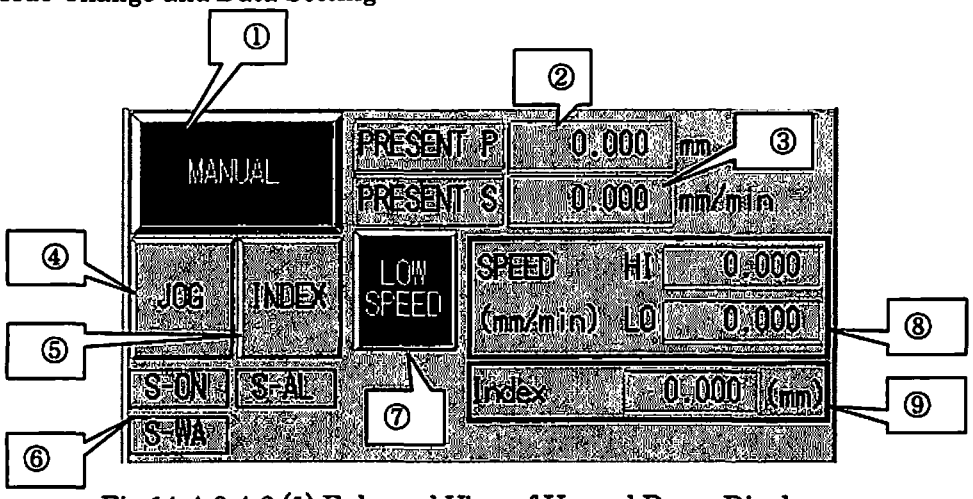


Fig 14-4-6-4-2 (1) Enlarged View of Up and Down Display

① • • • switch the up and down operation to manual

② • • • show the current position of up and down unit

③ • • • show the current speed of up and down unit

④ • • • switch the up and down operation to JOG mode

⑤ • • • switch the up and down operation to INDEX mode

⑥ • • • show the status of the servo motor of the up and down unit. S-ON means the servo power is on, S-AL means servo alarm and S-WA means servo warning.

⑦ • • • switch the speed between high and low

⑧ • • • set the high/low speeds

⑨ • • • set the moving length in INDEX mode

(2) Contact Position Teaching Switch

・If touching this button, the following display opens.

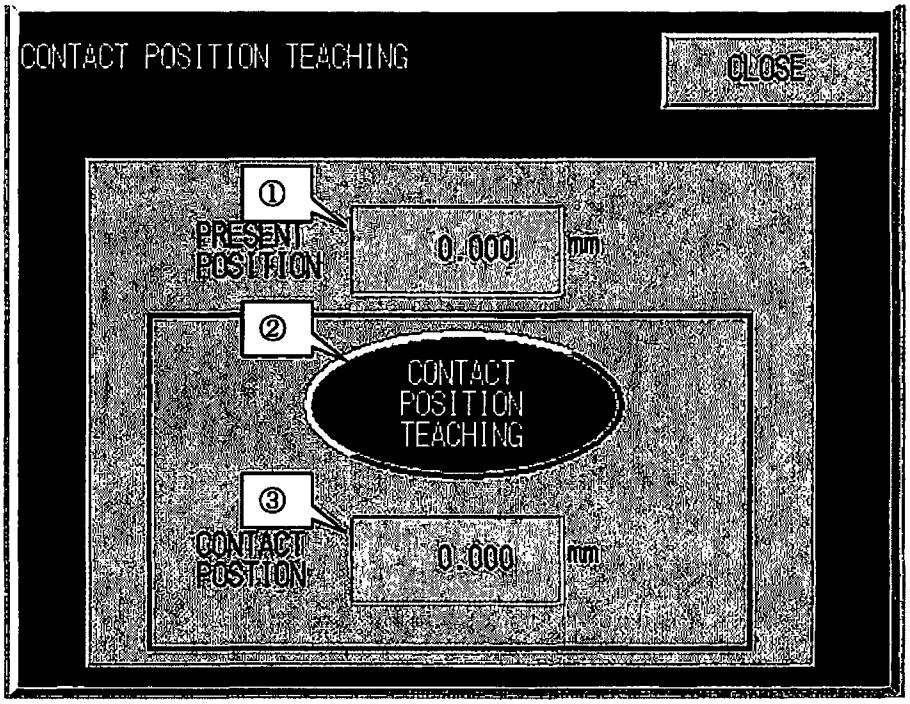


Fig 14-4-6-4-3 Contact Position Teaching Pop up Display

① ・・・show the present position of the up and down unit

② ・・・setting of contact position is available by touching this button

③ ・・・show presently set contact position of the up and down unit

(3) Manual Operation Switch

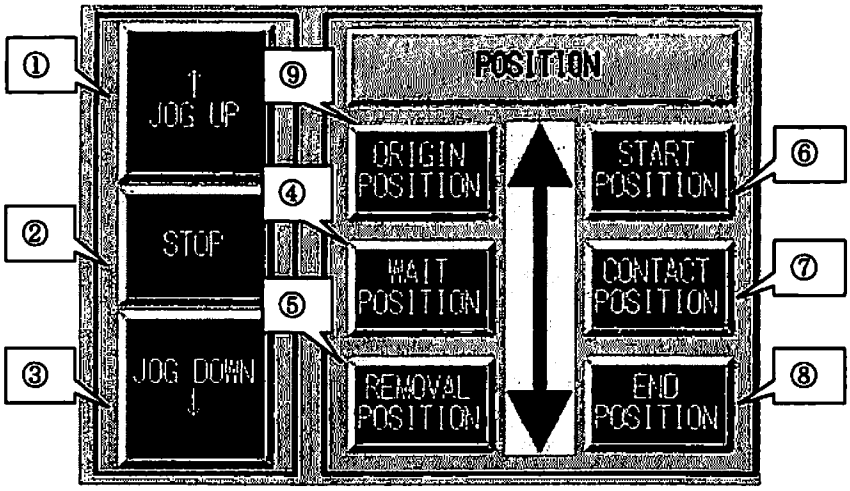


Fig 14-4-6-4-4. Enlarged View (3) of Up and Down Display

① ・・・Perform JOG or INDEX operation in manual mode
Move the up and down unit upward by this switch

② ・・・Stop the up and down unit manual movement

③ ・・・Perform JOG or INDEX operation in manual mode
Move the up and down unit downward by this switch

④ ・・・Move the up and down unit to the waiting position
Set by the processing condition – up and down

⑤ ・・・Move the up and down unit to removal position
Set by the processing condition – up and down

⑥ ・・・Move the up and down unit the start position
Set by the processing condition – up and down

⑦ ・・・Move the up and down unit to the contact position
Set by the processing condition – up and down

⑧ ・・・Move the up and down unit to the end position
Set by the processing condition – up and down

⑨ ・・・Move the up and down unit to the origin position

14-4-6-5. Rocking Display

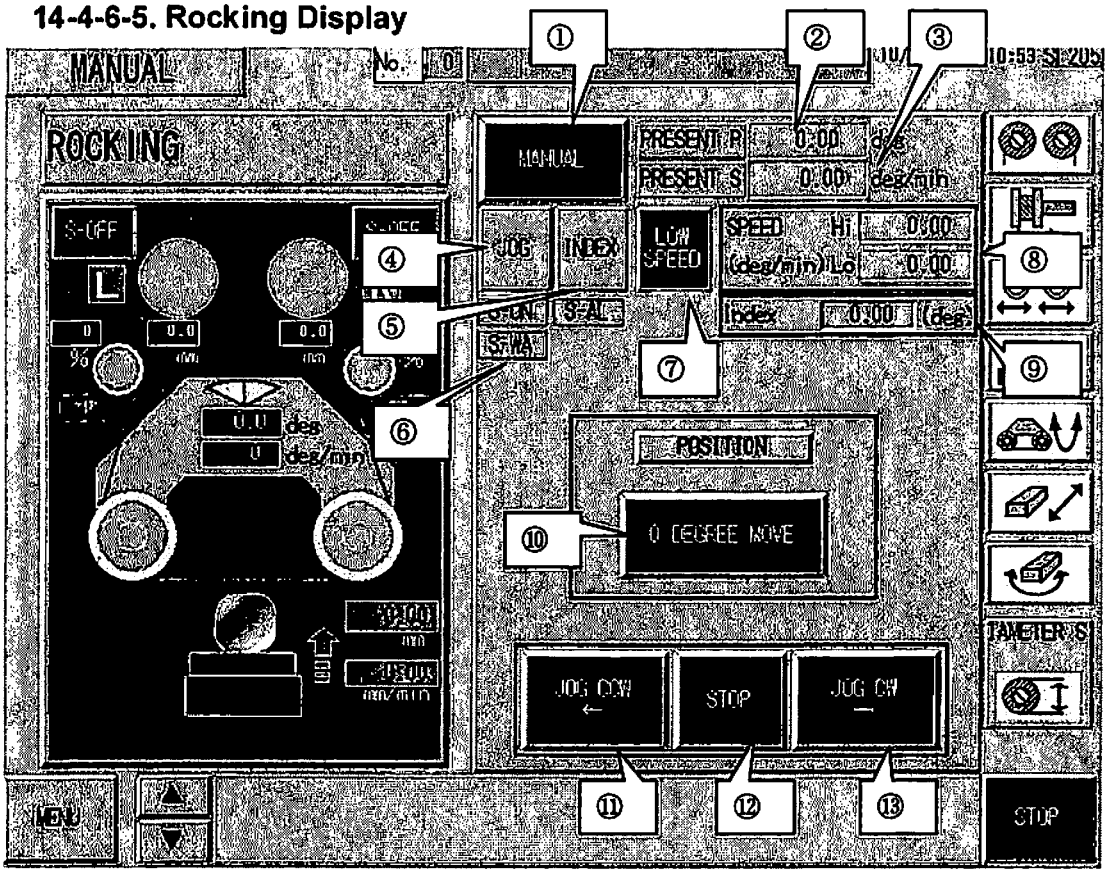


Fig 14-4-6-5. Rocking Display

In Rocking Display, the rocking angle of the work rollers can be changed in the manual mode.

① • • • switch the rocking unit operation mode to manual
② • • • show the present position of the rocking unit
③ • • • show the present speed of the rocking unit
④ • • • switch the rocking unit operation to JOG mode
⑤ • • • switch the rocking unit operation to INDEX mode
⑥ • • • show the status of the servo motor of the rocking unit. S-ON means the servo power is on, S-AL means servo alarm and S-WA means servo warning.
⑦ • • • switch the speed between high and low
⑧ • • • set the high/low speeds
⑨ • • • set the moving length in INDEX mode
⑩ • • • set the rocking angle as 0

⑪ ・・・start rocking unit operation either in JOG mode or INDEX mode. This switch is for turning the rocking unit counter clockwise.

⑫ ・・・stop the manual operation of the rocking unit

⑬ ・・・start rocking unit operation either in JOG mode or INDEX mode. This switch is for turning the rocking unit clockwise.

14-4-6-6. AXIS Y Display(Option)

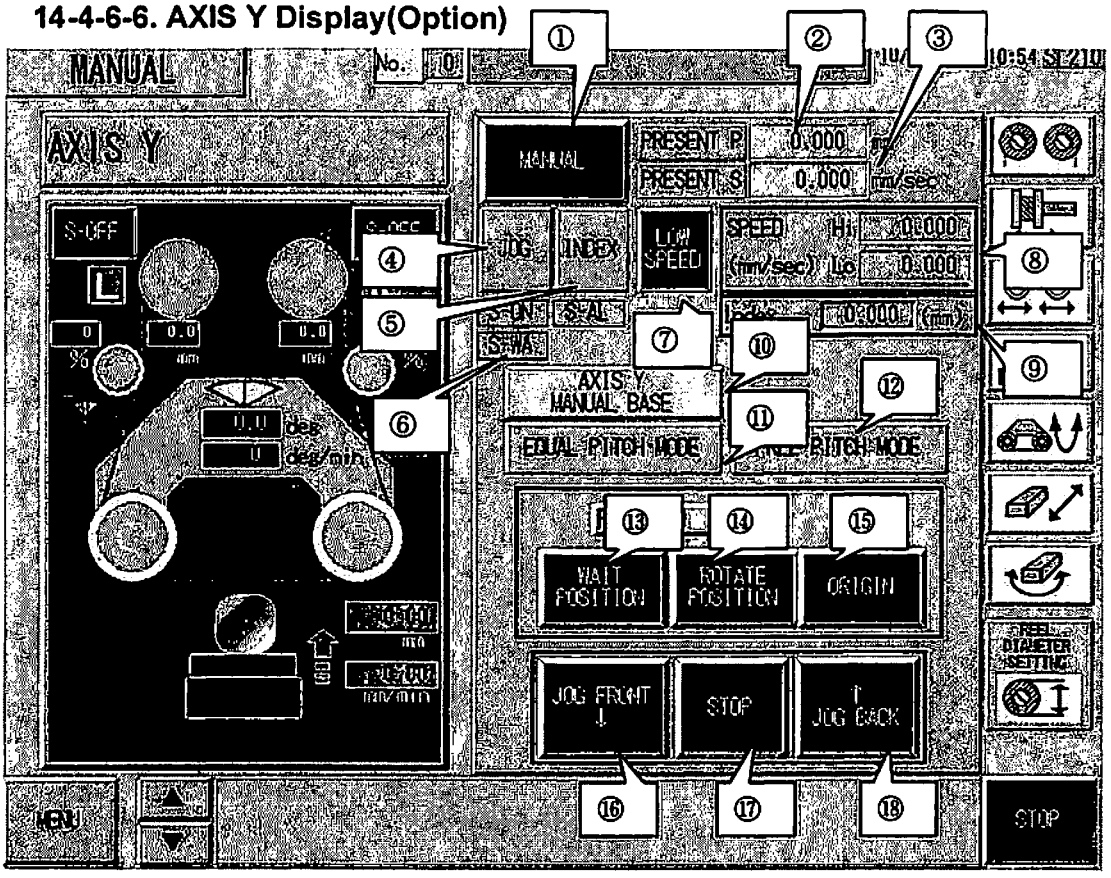


Fig 14-4-6-6. AXIS Y Display

① • • • switch the AXIS Y unit operation mode to manual

② • • • show the present position of the AXIS Y unit

③ • • • show the present speed of the AXIS Y unit

④ • • • switch the AXIS Y unit operation to JOG mode

⑤ • • • switch the AXIS Y unit operation to INDEX mode

⑥ • • • show the status of the servo motor of the AXIS Y unit. S-ON means the servo power is on, S-AL means servo alarm and S-WA means servo warning.

⑦ • • • switch the speed between high and low

⑧ • • • set the high/low speeds

⑨ • • • set the moving length in INDEX mode

⑩ • • • switch to AXIS Y MANUAL BASE page (Fig 14-4-6-6)

⑪ • • • switch to EQUAL PITCH MODE page (Fig 14-4-6-7)

⑫ • • • switch to FREE PITCH MODE page (Fig 14-4-6-8)

⑬ • • • move the AXIS Y unit to the wait position. Setting of the wait position is available in Setting – AXIS Y Display.

⑭ • • • move the AXIS Y unit to the Rotate position. Setting of the Rotate

position is available in Setting – AXIS Y Display.

⑮ • • • move the AXIS Y unit to the origin position.

⑯ • • • start AXIS Y unit operation either in JOG mode or INDEX mode. This switch is for moving the AXIS Y to the front side.

⑰ • • • stop the manual operation of the AXIS Y unit

⑱ • • • start AXIS Y unit operation either in JOG mode or INDEX mode. This switch is for moving the AXIS Y to the back side.

14-4-6-7. AXIS Y EQUAL PITCH Display(Option)

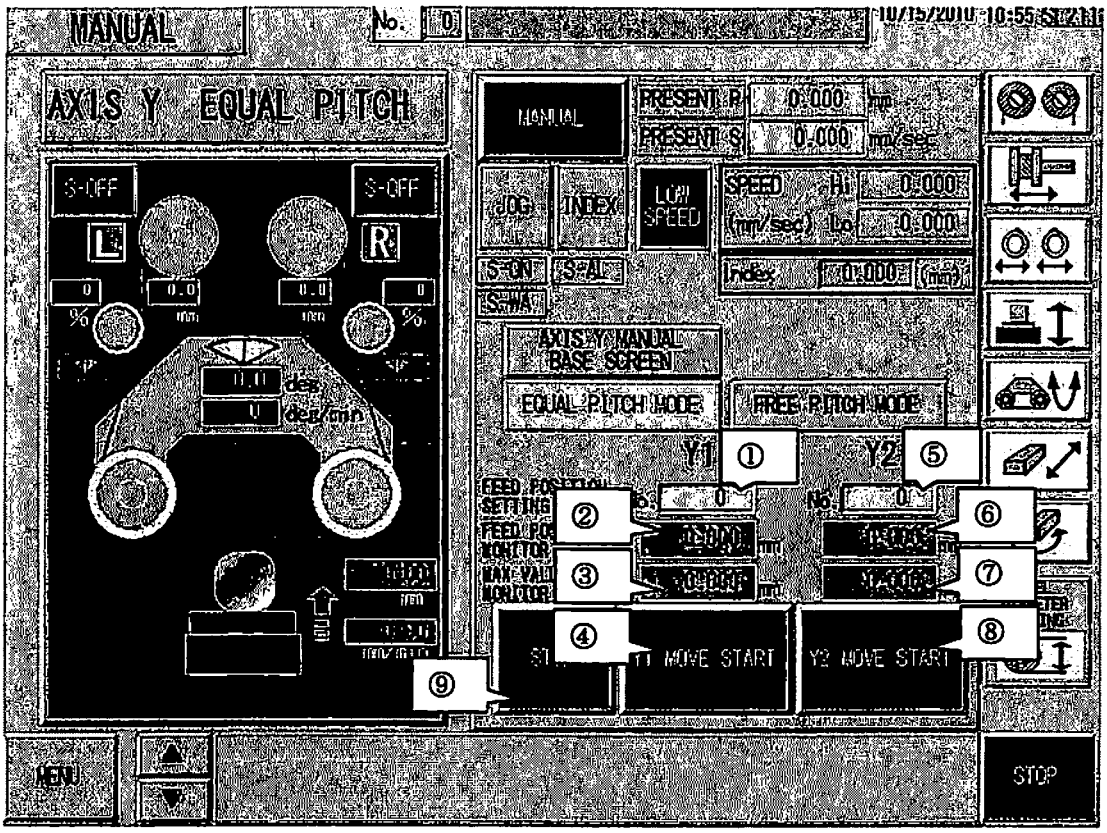


Fig 14-4-6-7. AXIS Y EQUAL PITCH Display

① ・・・Y1 feed position setting number
② ・・・Y1 feed position monitor
③ ・・・Y1 maximum value monitor
④ ・・・Move to ①Y1 position
⑤ ・・・Y2 feed position setting number
⑥ ・・・Y2 feed position monitor
⑦ ・・・Y2 maximum value monitor
⑧ ・・・Moves to ⑥Y2 position
⑨ ・・・Stop Y axis movement

14-4-6-8. AXIS Y FREE PITCH Display(Option)

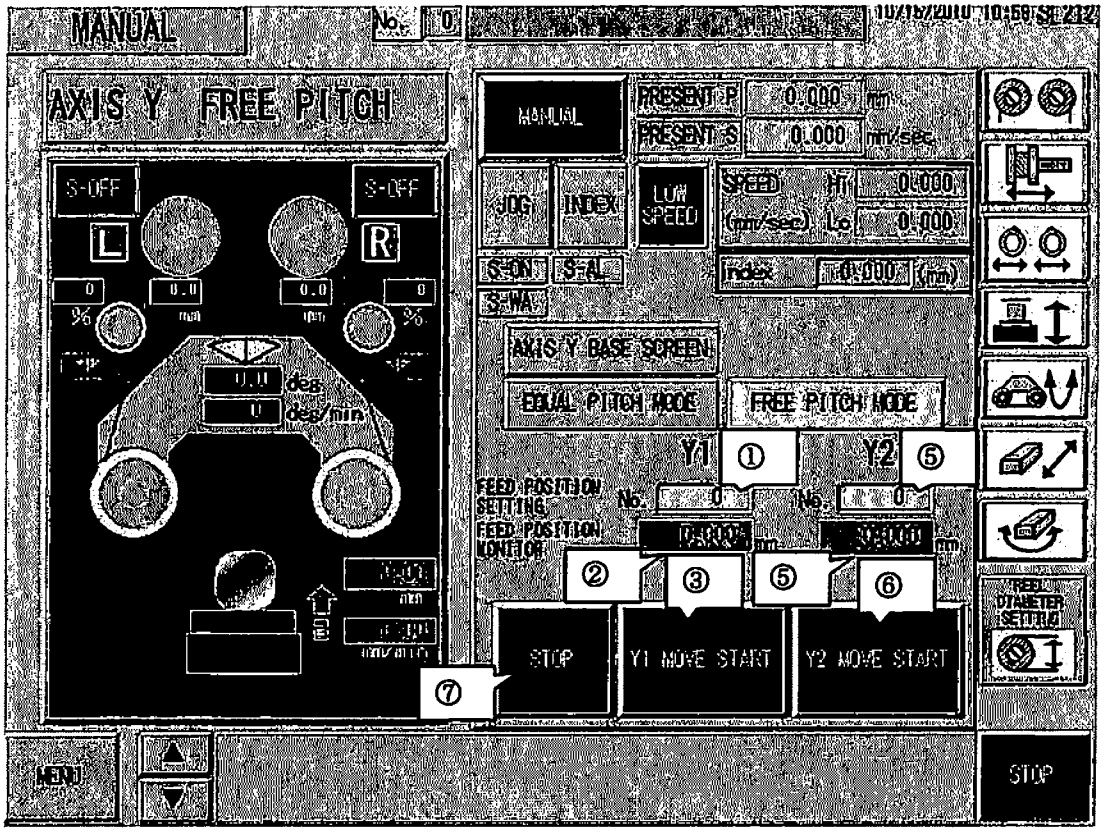


Fig 14-4-6-8. AXIS Y FREE PITCH Display

① ・・・Y1 feed position setting number
② ・・・Y1 feed position monitor
③ ・・・Move to ①Y1 feed position number
④ ・・・Y2 feed position setting number
⑤ ・・・Y2 feed position monitor
⑥ ・・・Move to ⑤Y2 feed position number
⑦ ・・・Stop Y axis movement

14-4-6-9. AXIS θ Display(Option)

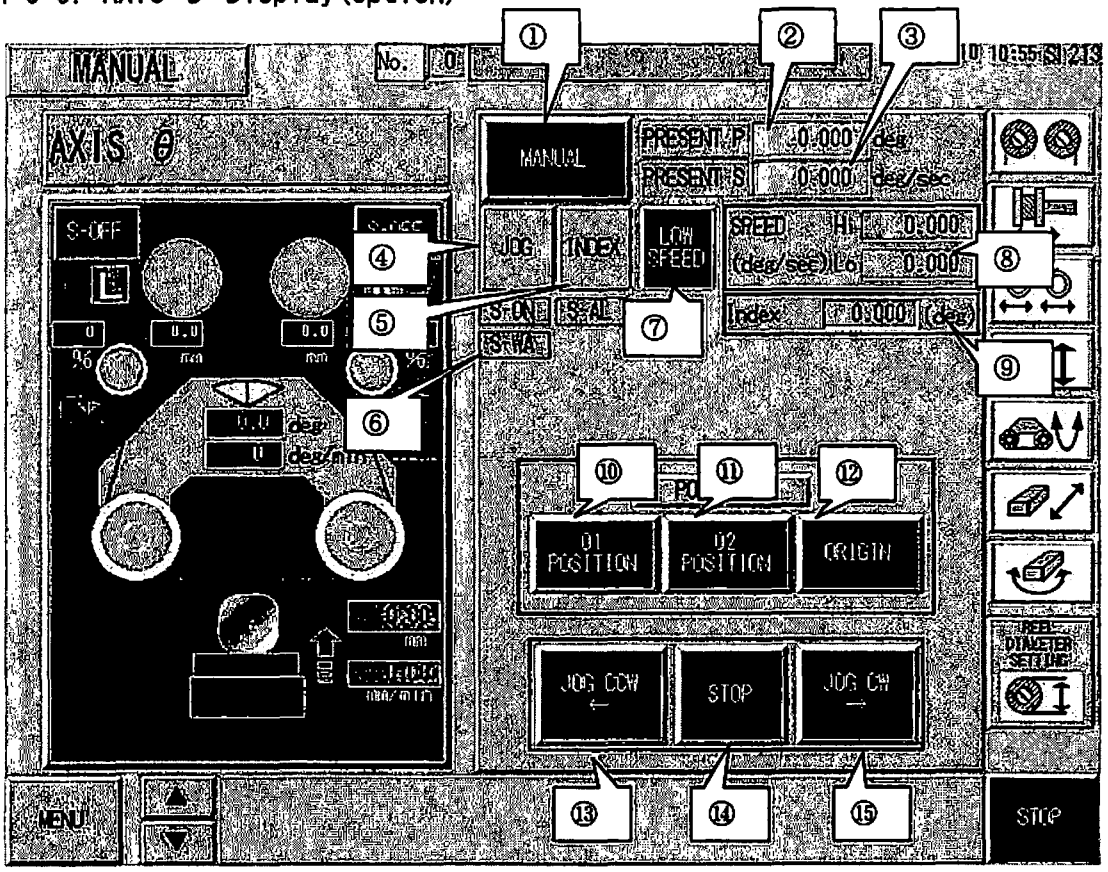


Fig 14-4-6-9. AXIS θ Display

① ・・・switch the AXIS θ unit operation mode to manual

② ・・・show the present position of the AXIS θ unit

③ ・・・show the present speed of the AXIS θ unit

④ ・・・switch the AXIS θ unit operation to JOG mode

⑤ ・・・switch the AXIS θ unit operation to INDEX mode

⑥ ・・・show the status of the servo motor of the AXIS θ unit. S-ON means the servo power is on, S-AL means servo alarm and S-WA means servo warning.

⑦ ・・・switch the speed between high and low

⑧ ・・・set the high/low speeds

⑨ ・・・set the rotation angle

⑩ ・・・move the AXIS θ unit to the 01POSITION. Setting of the 01POSITION is available in Setting – AXIS θ Display.

⑪ ・・・move the AXIS θ unit to the 02POSITION. Setting of the 02POSITION position is available in Setting – AXIS θ Display.

⑫ • • • AXIS θ unit returns to origin

⑬ • • • start AXIS θ unit operation either in JOG mode or INDEX mode. If pressing this switch, AXIS θ rotates CCW.

⑭ • • • stop the manual operation of the AXIS θ unit

⑮ • • • start AXIS θ unit operation either in JOG mode or INDEX mode. If pressing this switch, AXIS θ rotates CW.

14-4-7. Process Data Select Display

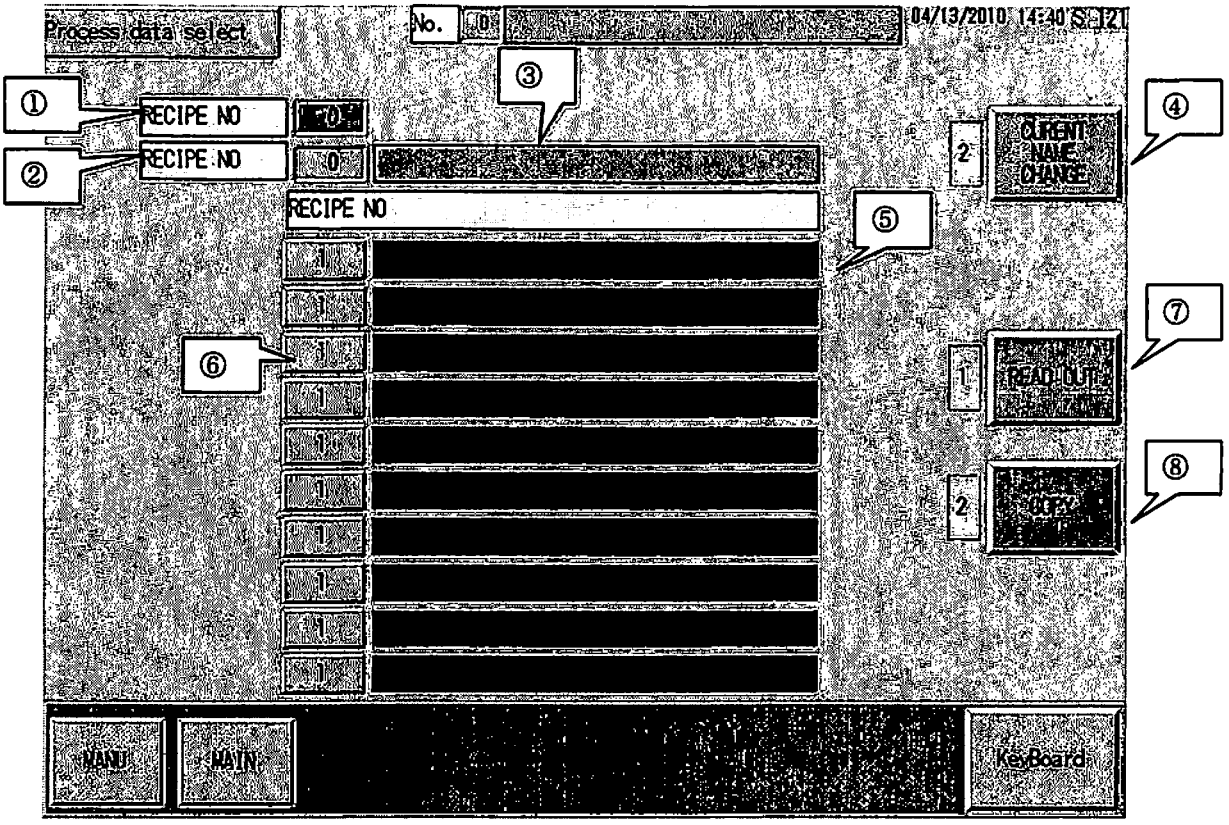


Fig 14-4-7 Process Data Select Display

In Process Data Select Display, recipe change, title change, read-out and copy are available.

① Folder No. • • • show the folder number of the read-out recipe

② Recipe No. • • • show the recipe number read out from the data group of the registered process conditions

③ Recipe Title • • • show the recipe title of the selected recipe number

④ Current Name Change • • • change the recipe title. If touching this button to change the selected recipe title, title change page opens.

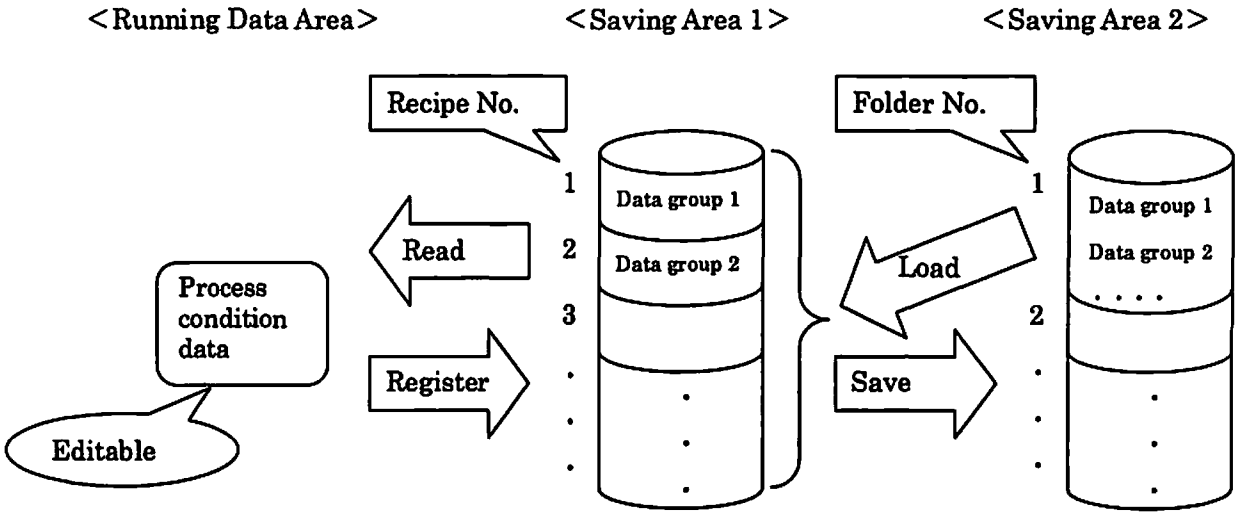
⑤ Recipe list • • • show the registered recipe titles

⑥ Read-out selection switch • • • specifies a recipe number to read out

⑦ Read-out switch • • • read the data of the recipe number that is selected by the read-out switch. If touching the button, the confirmation/execution page appears.

⑧ Copy switch • • • save currently selected recipe with new recipe number. If touching this button, confirmation/execution button appears.

・Save Data Schematic



14-4-8. Common Data

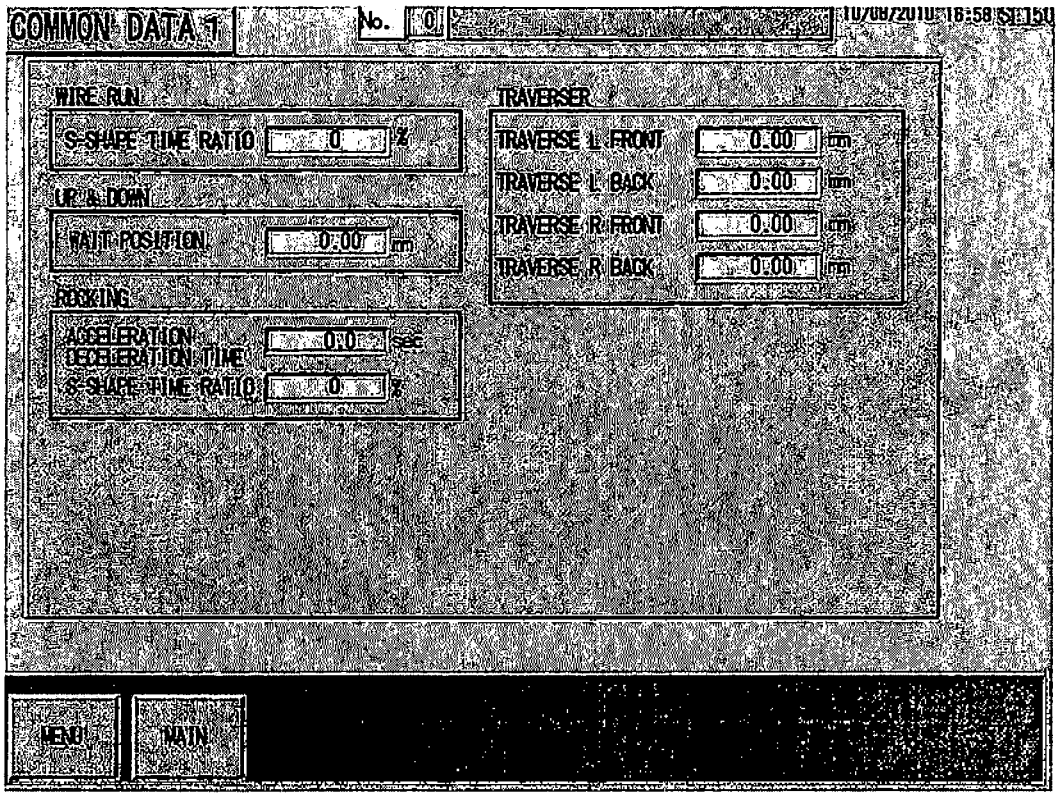


Fig 14-4-8. Common Data Display

In Common Data Display, the basic setting of wire run, up and down, rocking and traverser is available.

- Wire Running

  S-Shape time ratio: set the S-shape time ratio in the acceleration and deceleration time

- Up and Down

  Wait position: set the wait position of the up and down unit

- Rocking

  Acceleration Deceleration time: set the acceleration and deceleration time of the rocking spindle

  S shape time ratio: set the S-shape time ratio of the rocking spindle

- Traverser

  Traverse L Front position: set the front position of traverser L

  Traverse L Back position: set the back position of traverser L

  Traverse R Front position: set the front position of traverser R

  Traverse R Back position: set the back position of traverser R

14-4-9. Maintenance Data Display

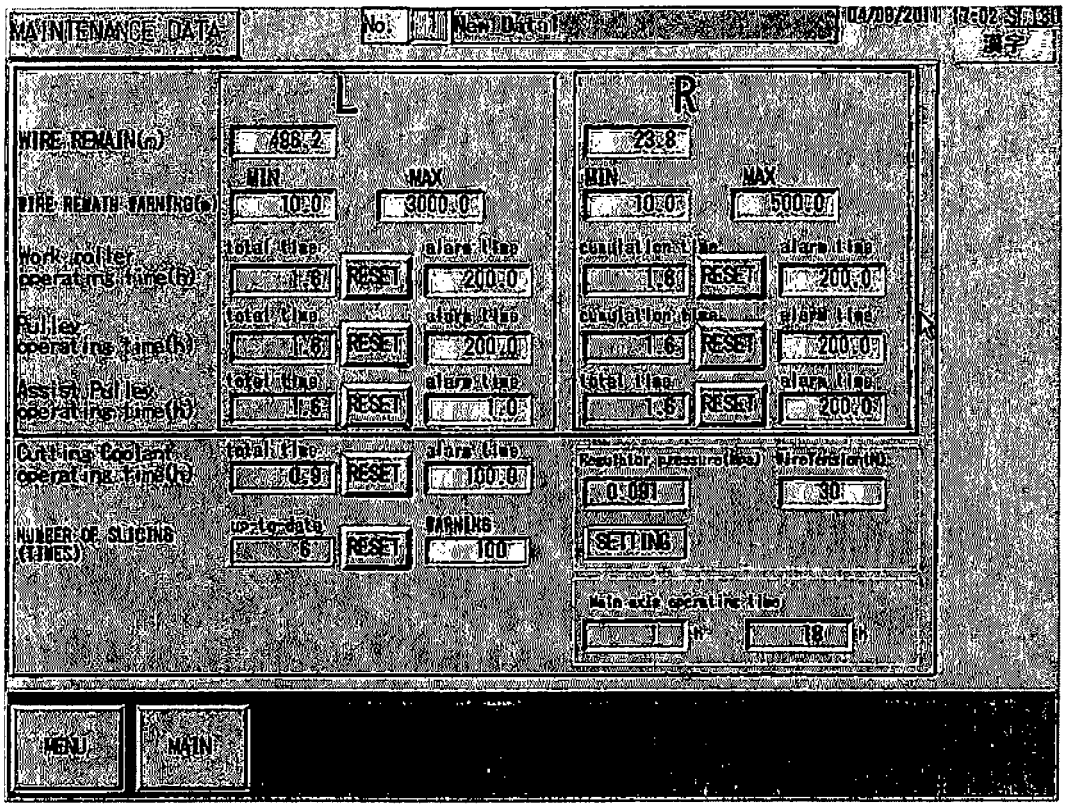


Fig 14-4-9. Maintenance Data Display

- Wire Remain

  set the wire length loaded on the reel

  the value increases and decreases according to the machine operation

  Always input wire length when replacing wire.

- Wire Remain Warning

  Set the wire remaining length for alarm

  Alarm occurs when the wire remaining length is more than the MAX length and less than the MIN length

- Work Roller Operating Time and Pulley Operating Time and Assist Pulley Operating Time

  Total time・・・records the time during wire running, if pressing "RESET" button, the value is reset.

  Alarm time・・・Alarm occurs when the total operating time reaches the alarm time.

- Cutting Coolant Operating Time

  Total time・・・records the time while slurry is discharging, if pressing "RESET"

button, the value is reset.

Alarm time・・・Alarm occurs when the cumulation time reaches the alarm time.

・Number of slicing (times)

Number of slicing・・・show the number of slicing time, if pressing "RESET" button, the value is reset.

Warning・・・alarm occurs when the number of slicing reaches the number in this box.

・Wire tension

set target tension

・Regulator pressure

show the value calculated from the target wire tension (N)

*Regulator should be adjusted according to this value.

・SETTING The display switches to Pressure Setting.(1second)

Please set X1,X2,Y1 and Y2. after touching an input permission switch.

Wire tension measurements : X1, X2 (X1 <X2)

Pressure Regulator adjustment : Y1, Y2 (Y1 <Y2)

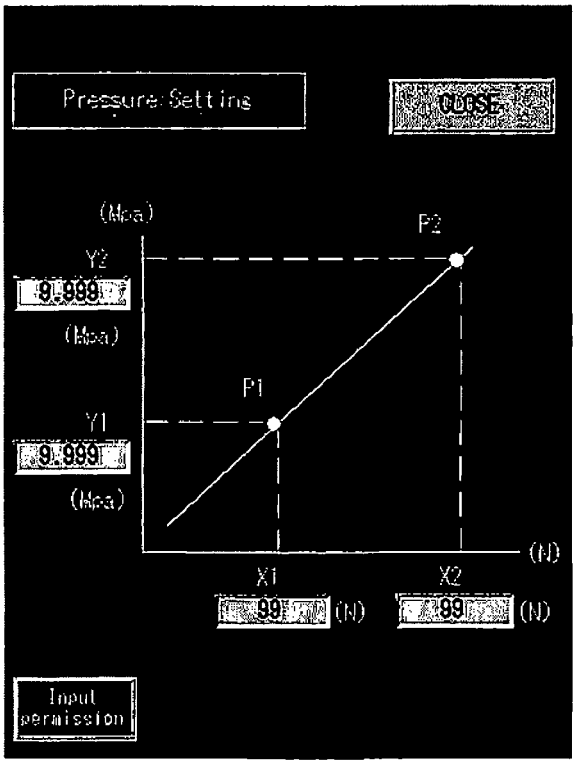


Fig 14-4-9-2.Pressure Setting Display

・Main axis operating time

record while wire is running

14-4-10. Engineer Data Display

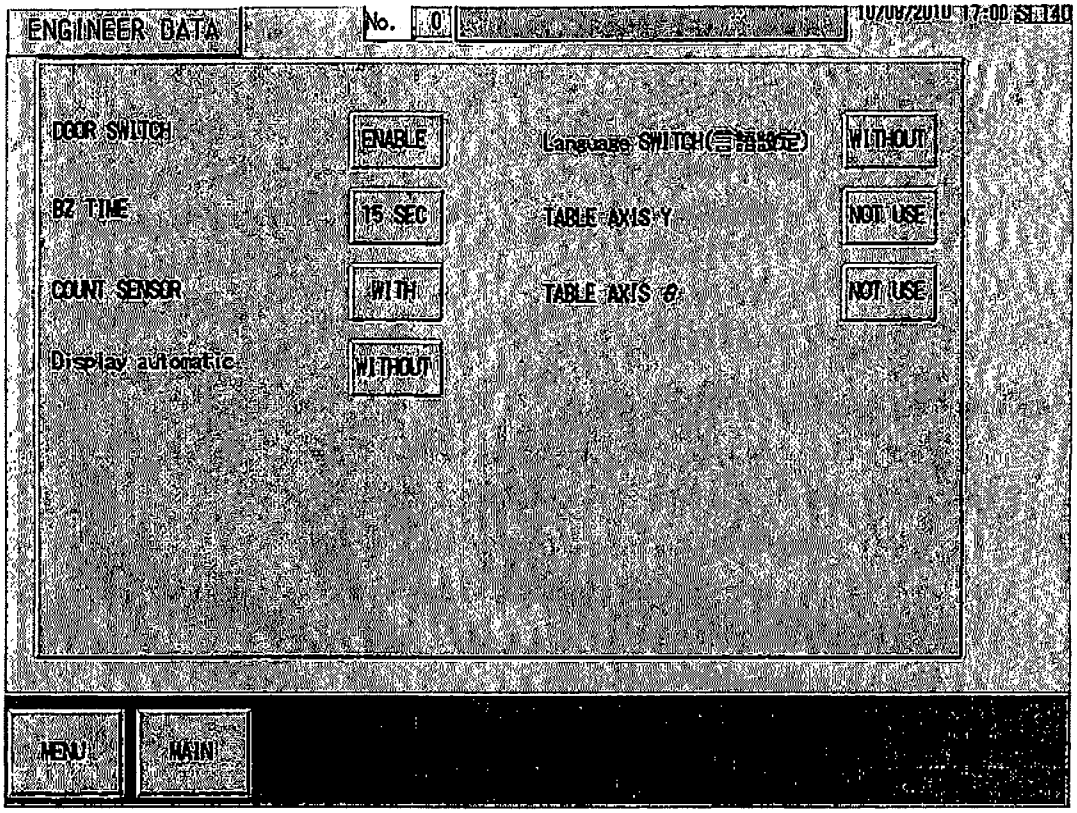


Fig 14-4-10-1. Engineer Data

- Door switch

  switch enable/disable of the door switch, if setting enable, alarm occurs when the door opens.

- BZ time

  change the time of buzzing sound (15 sec or constant)

- Count sensor

  "WITH" is set in normal operation

- Display automatic

  set "WITH" to automatically move to the alarm page when alarm occurs

- Language switch

  set "WITH" to display the language switch in each page

- Traverse middle point movement

  Press "WITH" when using the traverse middle point movement

- TABLE AXIS Y(Option)

  To use axis Y, set "USE".

- TABLE AXIS θ(Option)

  To use axis θ, set "USE".

14-4-11. Time Setting Display

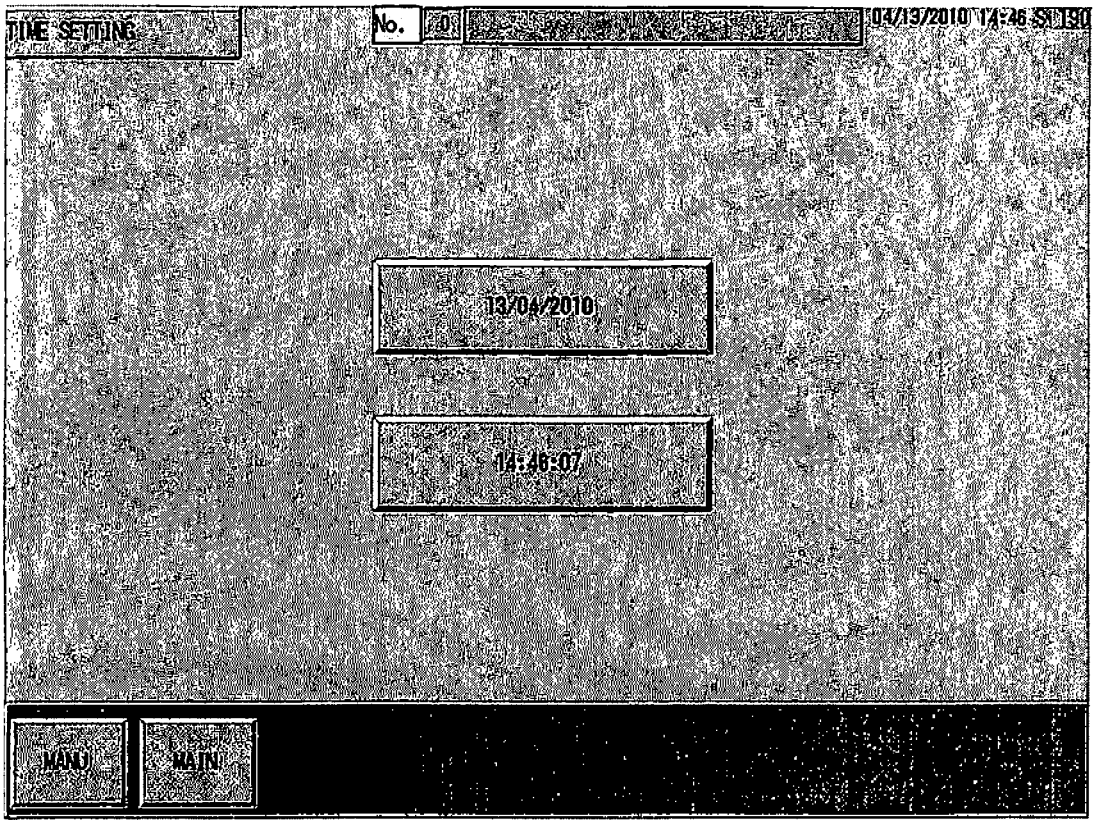


Fig 14-4-11. Time Setting Display

In Time Setting Display, the setting of date and time is available.

14-4-12. Tool Display

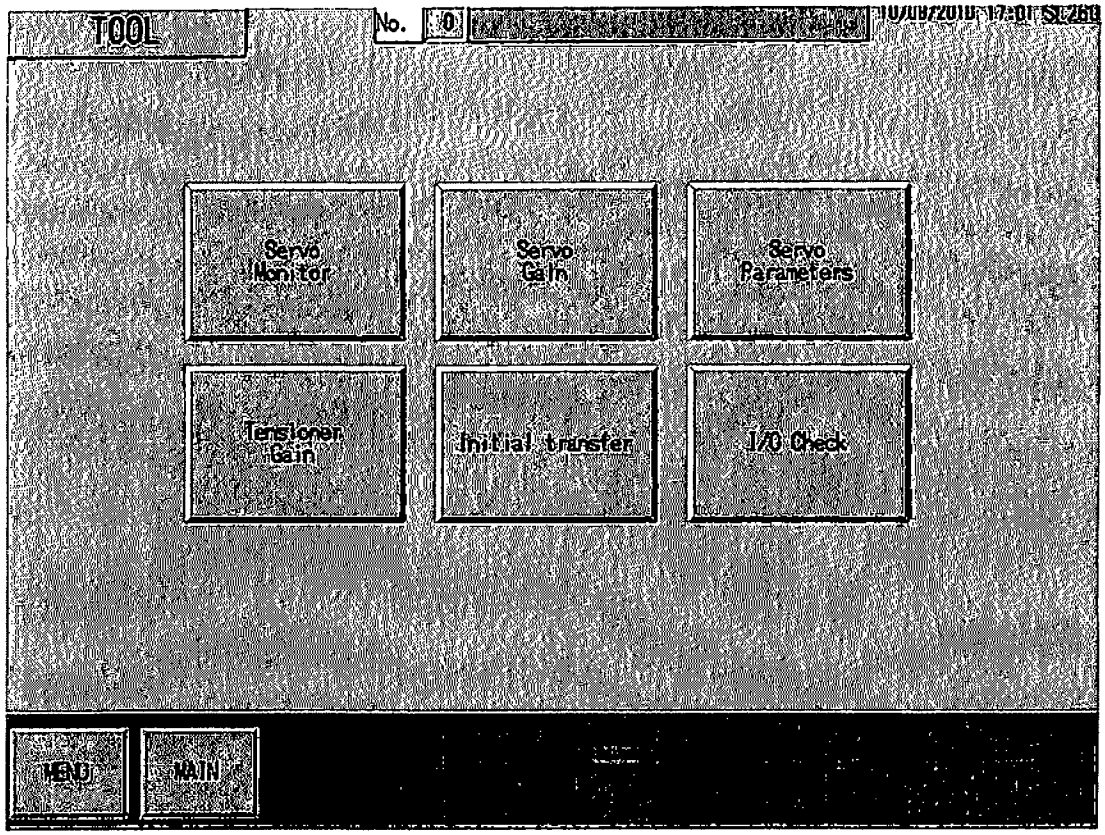


Fig 14-4-12-1. Tool Display

- Servo monitor

  Jump to the servo motor (stepping motor) information display/operation page (Fig14-4-12-2)

- Servo gain

  Jump to the servo motor gain adjustment page (Fig 14-4-12-5)

- Servo parameters

  Jump to the servo parameters page (Fig 14-4-12-9)

- Tensioner gain

  Jump to the tensioner gain adjustment page (Fig 14-4-12-13)

- Initial transfer

  Jump to the initial value transfer page (Fig 14-4-12-14)

- I/O Check

  Jump to the I/O check page (Fig 14-4-12-17)

  The forced output is available by pressing the forced output switch (Fig 14-4-12-18)

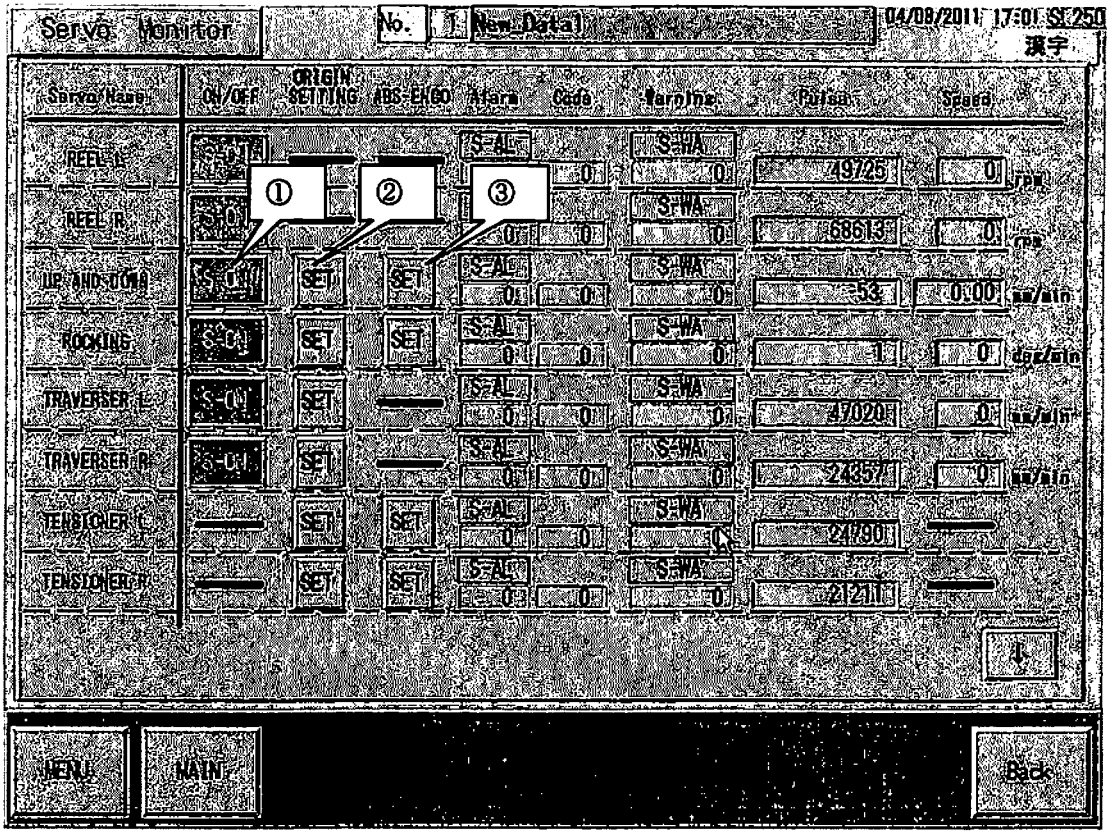


Fig 14-4-12-2. Servo Monitor Display

In Servo Monitor Display, turning ON/OFF of servo motors, setting origin position, checking alarms and warnings, checking present pulse amount and present speed are available.

① S-ON・・・Change ON and OFF each time when pressing the switch.
S-ON: Servo ON (Operation preparation is completed)
S-OFF: Servo OFF (Operation preparation is not completed)
The normal operation is available when S-ON indicates with flashing green lamp.
If the alarm occurs, the lamp may extinguish during S-ON is indicating.

② Origin set・・・The pop-up window shown in Fig 14-4-12-3 appears when pressing this switch. The origin set is available on the screen.

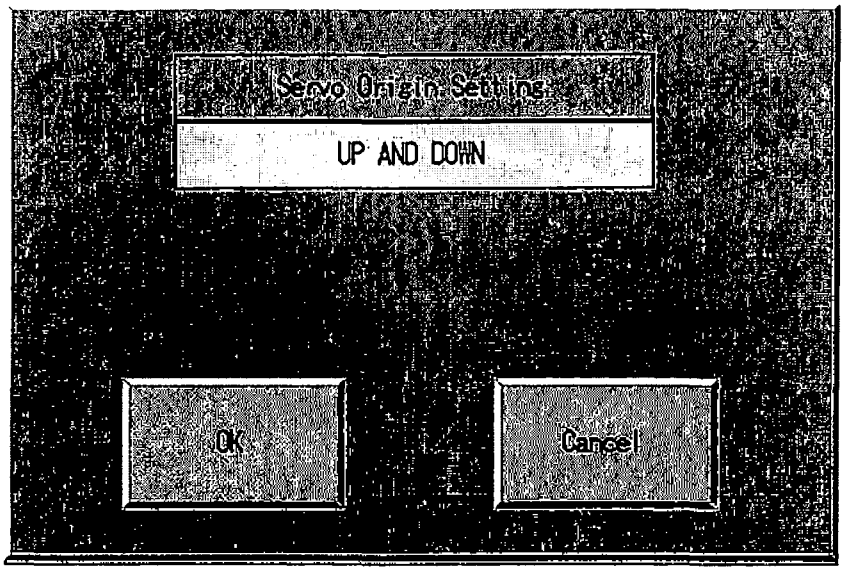


Fig 14-4-12-3. Servo Origin Set

OK • • • Decide current position of the up and down unit as original position.

Press OK switch, and then the complete screen shown in Fig 14-3-2-21-4 appears when the setting is completed.

Press OK, and the operation is finished when the screen disappears.

Cancel • • • Close this pop-up window.

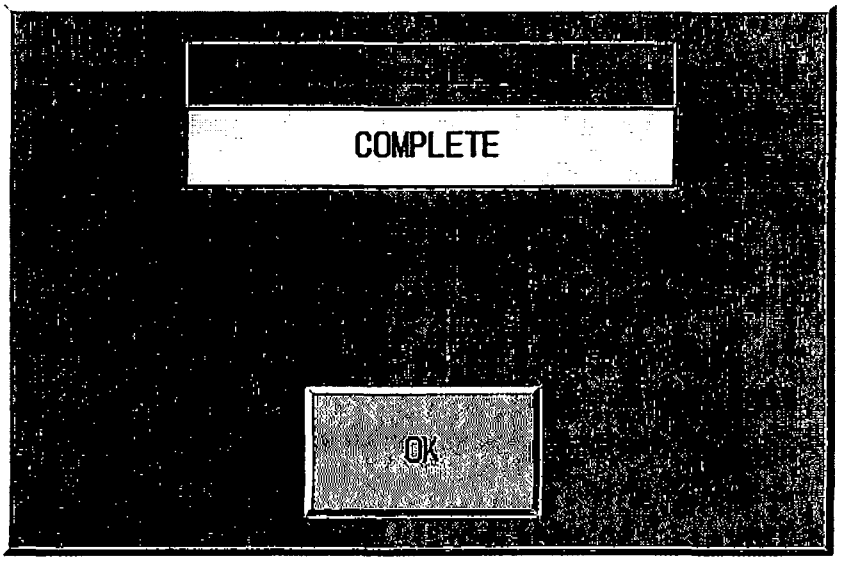


Fig. 14-4-12-4 Operation Completion

* The other units can be set the origin point to perform same procedures.

③RESET・・・The pop-up window shown in Fig 14-4-12-54 appears when pressing this switch. The ABS-ENCO reset can be performed on this screen.
(ABS-ANCO is abbreviation of the Absolute Encoder.)

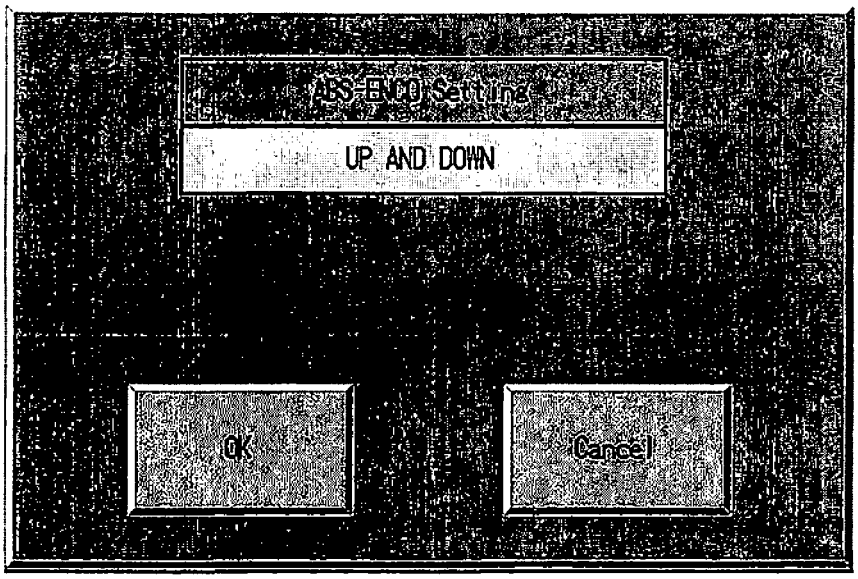


Fig. 14-4-12-5. ABS-ENCO reset

OK・・・Start the ABS-ENCO reset operation by pressing "OK" screen button longer.
Fig 14-4-12-6 appears during processing.
Fig 14-4-12-7 appears when the operation is completed. Press "OK" and the operation is completed when the screen disappears.

Cancel ・・・Close this pop-up screen.

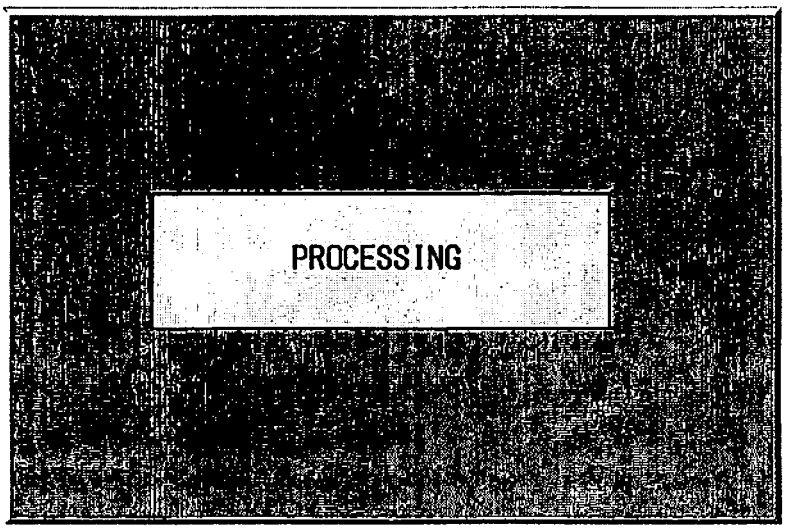


Fig. 14-4-12-6. Processing

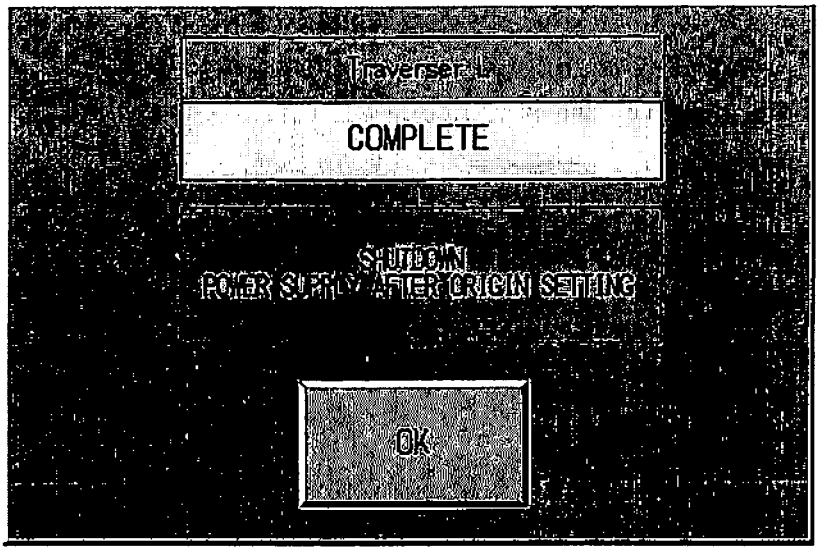


Fig. 14-4-12-7. Operation completion

* The other units can be reset the ABS-ENCO to perform same procedures.

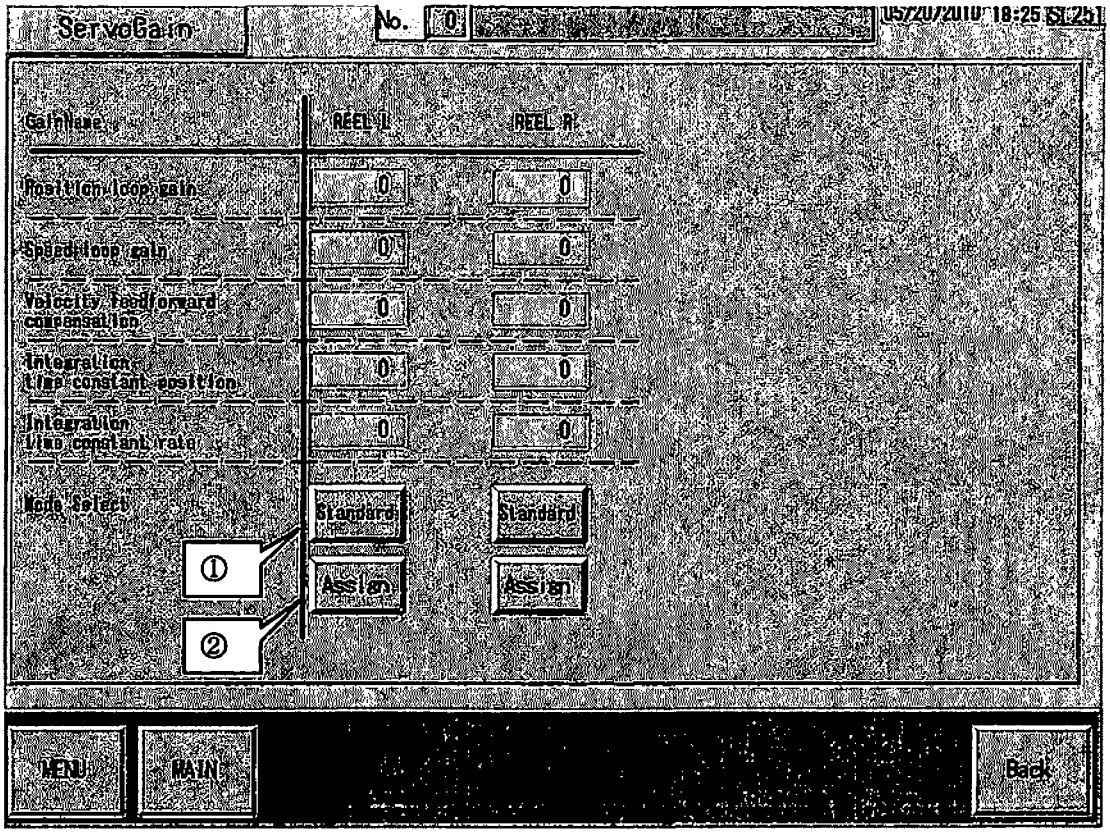


Fig. 14-4-12-8 Servo Gain Display

In Servo Gain Display, confirmation and adjustment of servo gain in each reel axis is available.

① ・・・If pressing this button, the gain value is set as standard value. In case this button is turned on, gain cannot be changed.

② ・・・If pressing this button, arbitral gain value can be set.

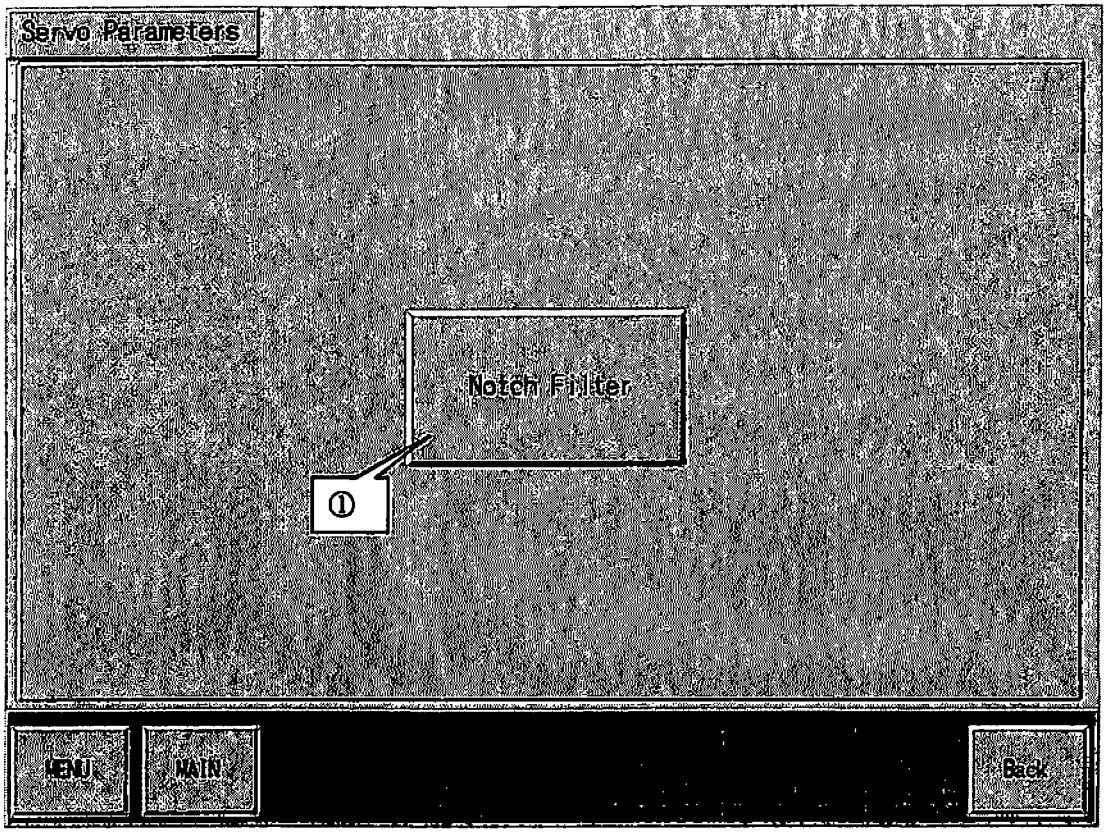


Fig 14-4-12-9 Servo Parameters Display

It is available to set and change the parameter of servo motor on the Servo Parameters.

① ・・・Press the Notch Filter. Notch Filter Screen appears.

It is available to confirm and change the set value on the Notch Filter.

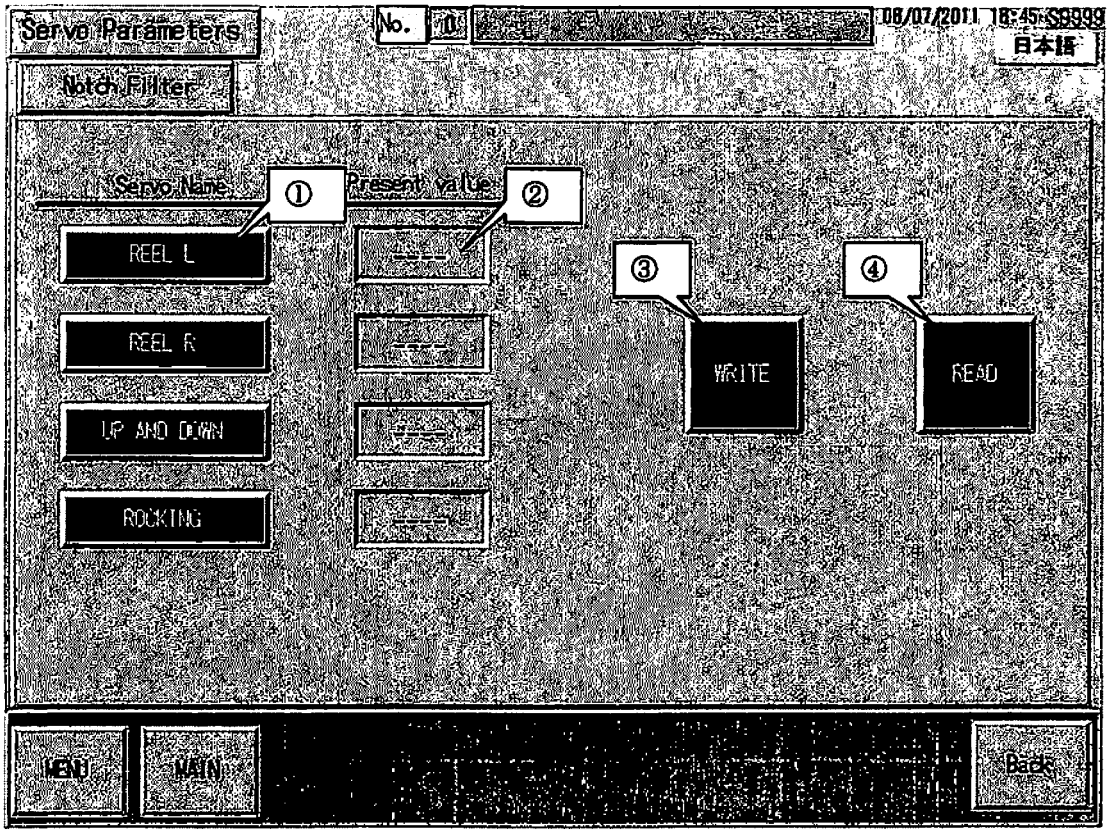


Fig.14-4-12-10.Notch Filter Screen

① Servo Name Switch

Select the unit for Read or Write.

If you push a switch, it will be light on。 If you push another switch, the previous switch will be light off and the switch you pushed will be light on.

It is only available to select one unit

②Present value

It shows the present value. It appears present value if Read operation process

③Write switch

Please push the Write switch when you change setting value.

It is only available to show other windows after Read operation is done.

(Fig.14-4-12-8)

④Read switch

If you push the Read switch, it will read the present setting value and shows the data at Present setting screen

Please push the switch after you select an unit.

Please process Read operation one more time after selecting another unit.

・Changing Setting value

The window as below appears when you push the Write execution switch.※読み It is only available after Read and Write operation.

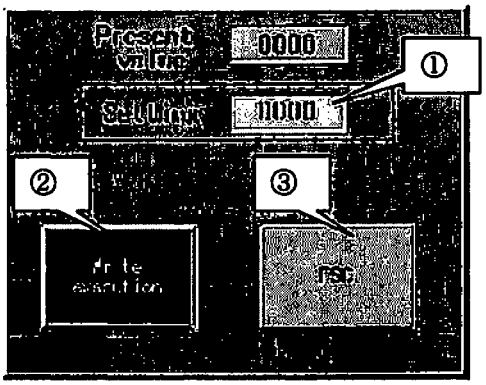


Fig. 14-4-12-11.Notch Filter Screen

① Setting

Putting data is available when you push the yellow part (Putting number window appears)

Please put the value you want to change.

②Write execution

Push the switch long when you change setting value. Setting value will be written in Servo.

③ ESC

Close the screen. Please push the switch to change setting value.

If Read and Write process, it shows the screen as below and notice operation is done. Operation is done after pushing OK switch.

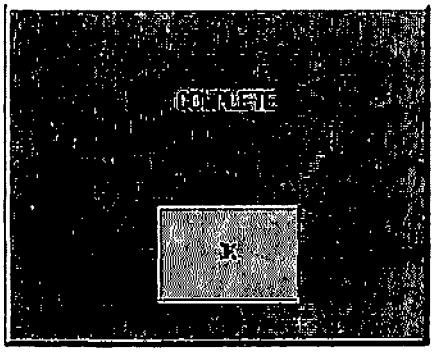


Fig. 14-4-12-12.Notch Filter Screen

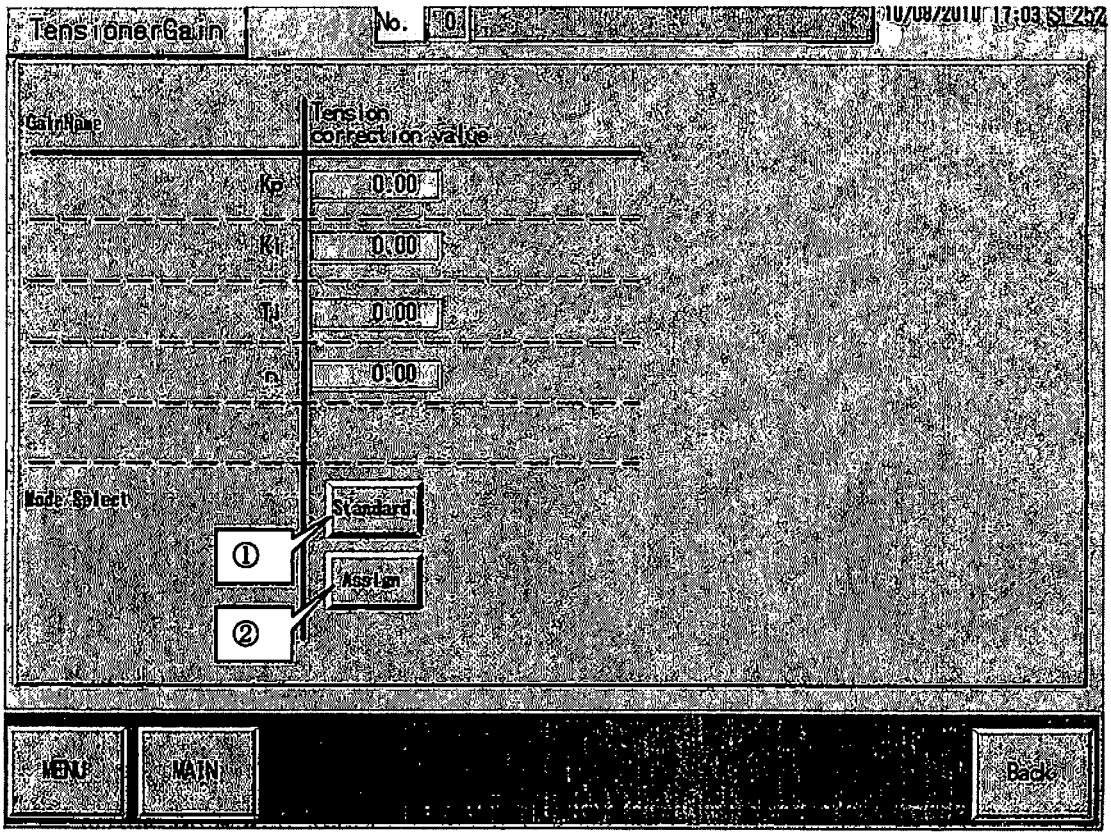


Fig. 14-4-12-13. Tensioner Gain Display

In Tensioner Gain Display, confirmation and adjustment of tensioner gain is available.

① ・・・If pressing this button, the gain value is set as standard value. In case this button is turned on, gain cannot be changed.

② ・・・If pressing this button, arbitral gain value can be set.

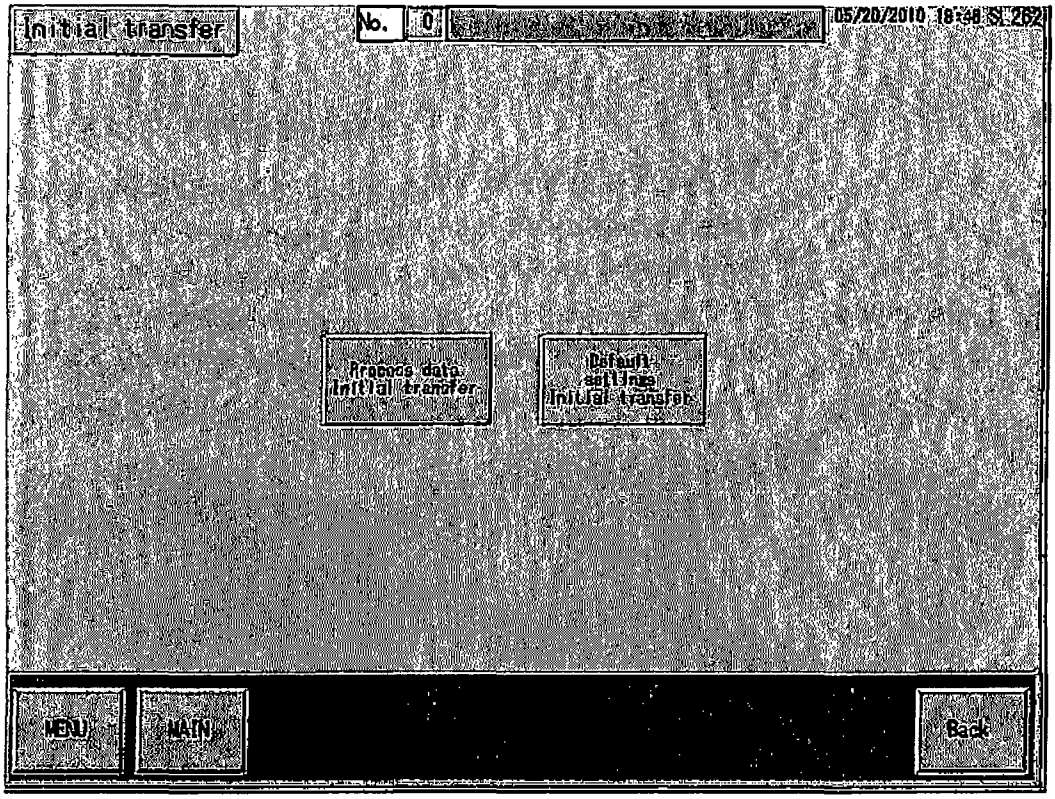


Fig. 14-4-12-14. Initial Transfer Display

In Initial Transfer Display, initial data transfer of the parameters is available.

- Process Data Initial Transfer...The process data initialtransferwindow (Fig.14-4-12-15) pops up.

- Default Setting Initial Transfer...The default setting initial transfer window (Fig.14-4-2-16) pops up.

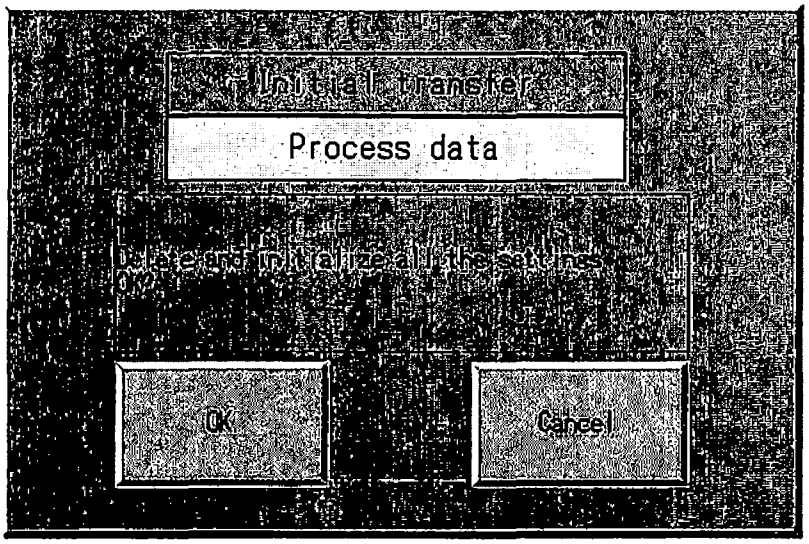


Fig. 14-12-15. Process Data Initial Transfer Display

- OK...If pressing this button for three seconds, the process data initial setting is transferred and the pop up window closes.
- Cancel...Press to close the window.

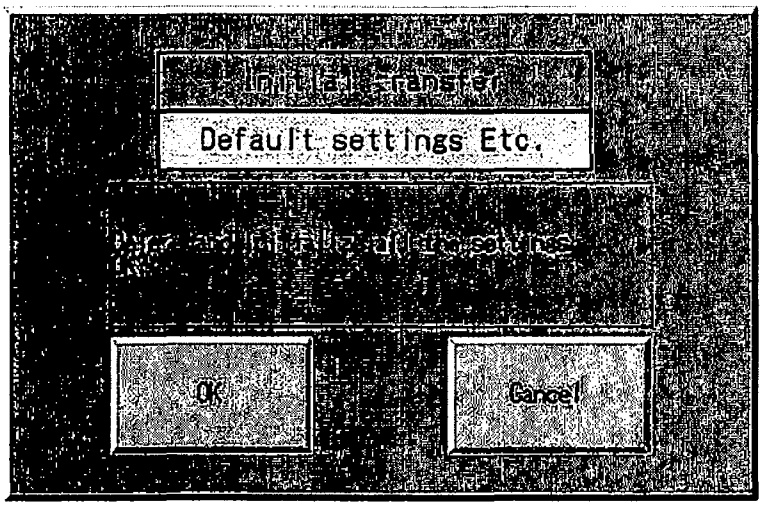


Fig. 14-4-12-16.Default Setting Initial Transfer

- OK...If pressing this button for three seconds, the default initial setting is transferred and the pop up window closes.
- Cancel...Press to close the window.

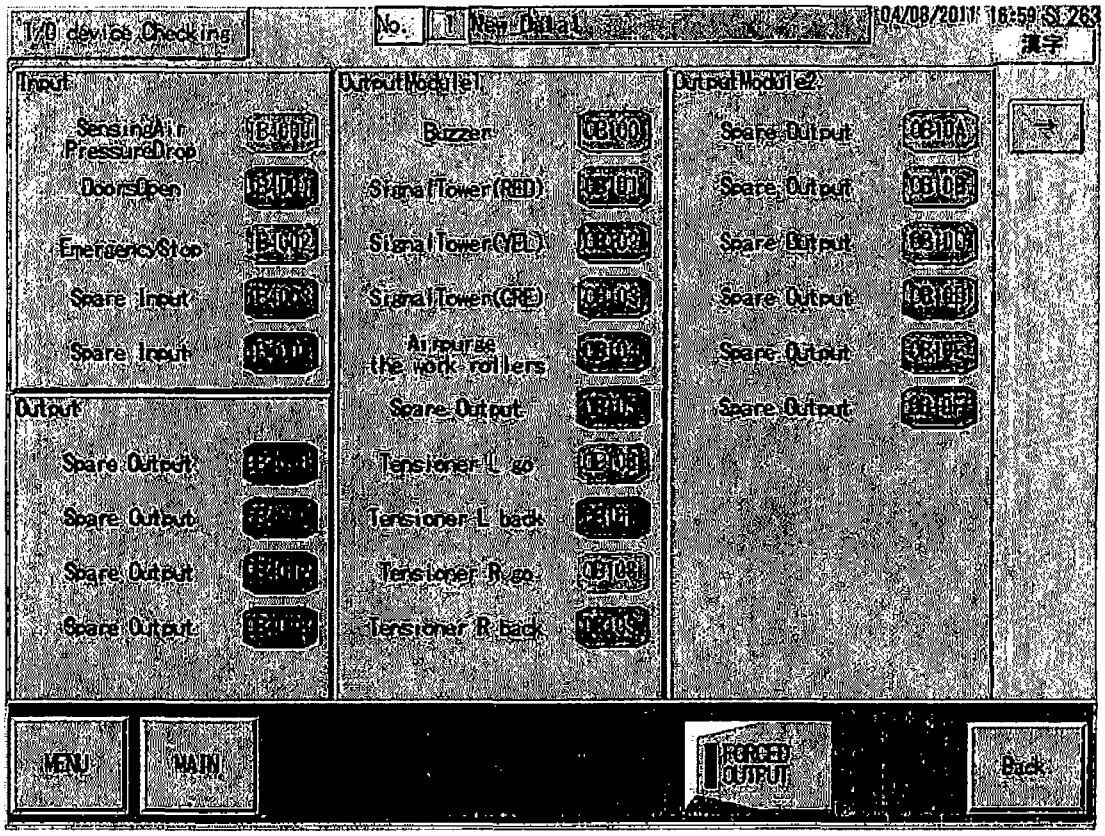


Fig. 14-4-12-17. I/O check screen

Each input and output condition can be confirmed on the I/O check screen.

The indicator turns to Green when ON condition.

Forced output • • • When pressing this switch, the forced output is available.

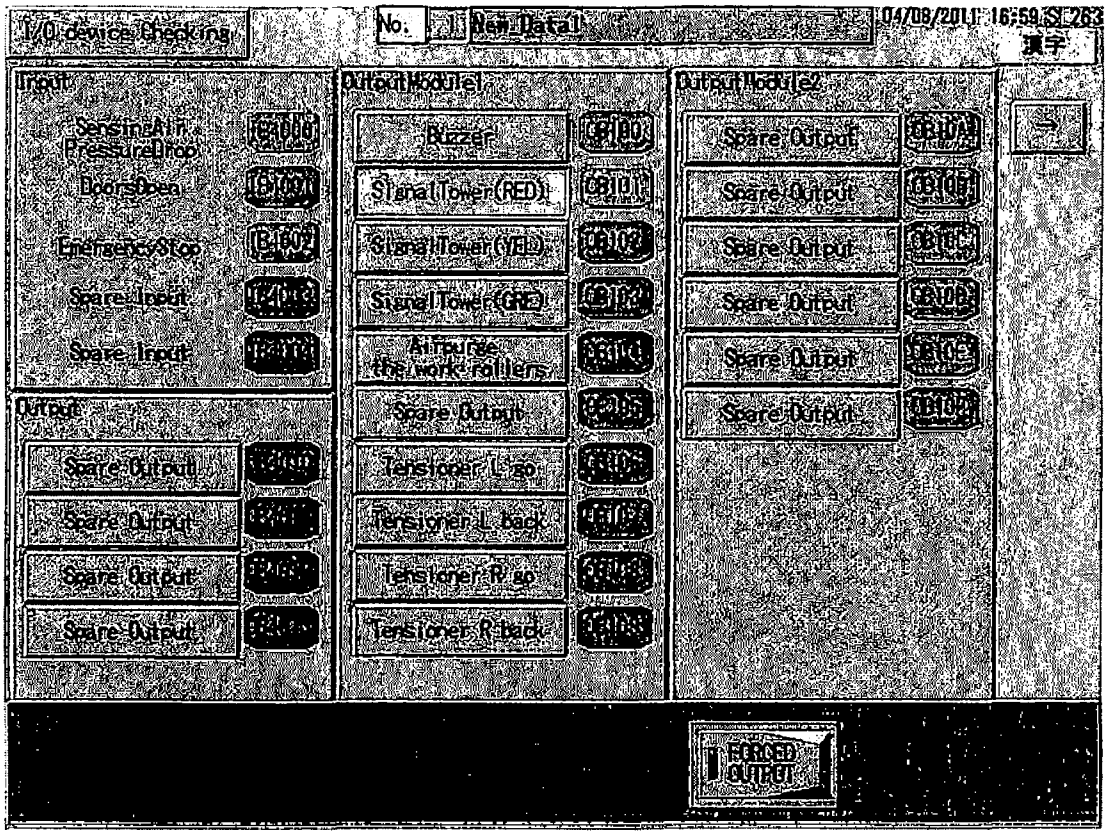


Fig. 14-4-12-18. I/O check forced output screen

Embossed switch • • • Output the address while pressing the switch.

14-4-13. File Manager

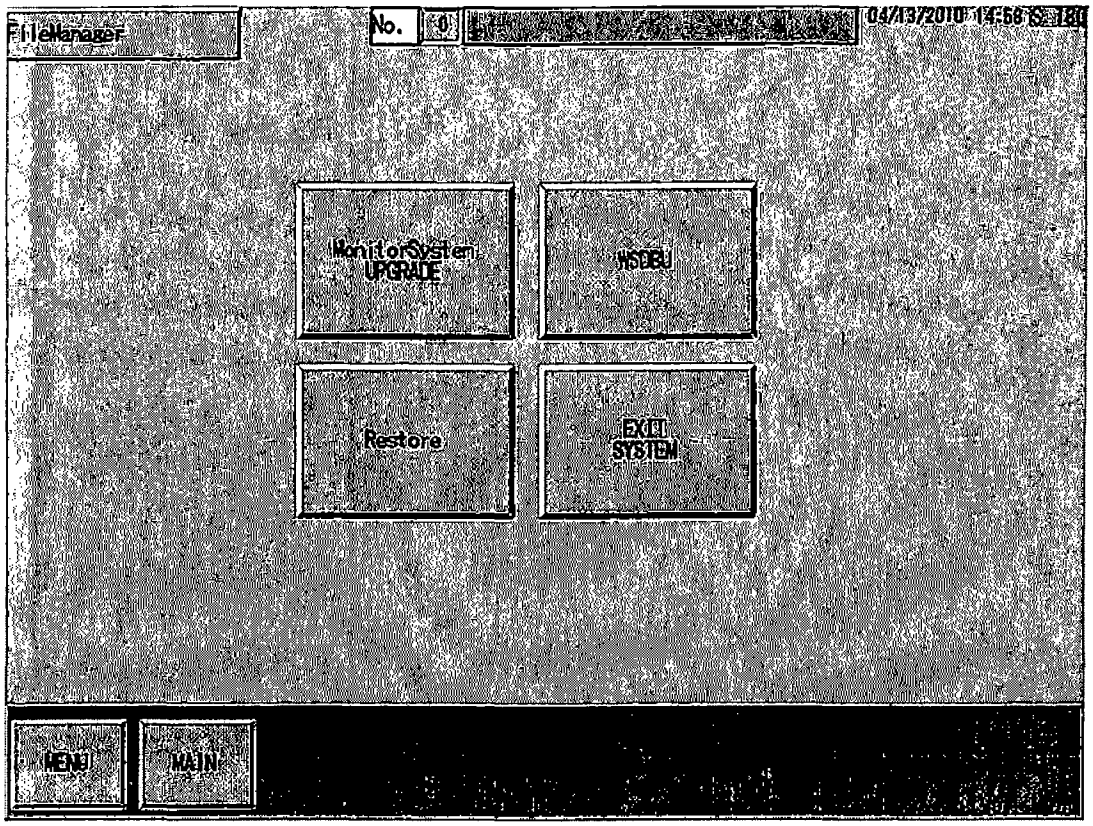


Fig 14-4-13. File Manager Display

In File Manager Display, upgrading motion system, saving process data and restoring MP are available.

- Monitor System Upgrade

  move to the page for changing the displayed data on the touch panel. (for version up etc.)

  Refer to exhibit

- Restore

  move to the page for changing machine movement program (version up etc)

  Refer to exhibit

- WSDBU

  move to the page for saving/loading the set data

  Refer to exhibit

- Exit System

  exit the touch panel display. (display Windows desk top display)

  Refer to exhibit

14-4-14. Password Manager Display

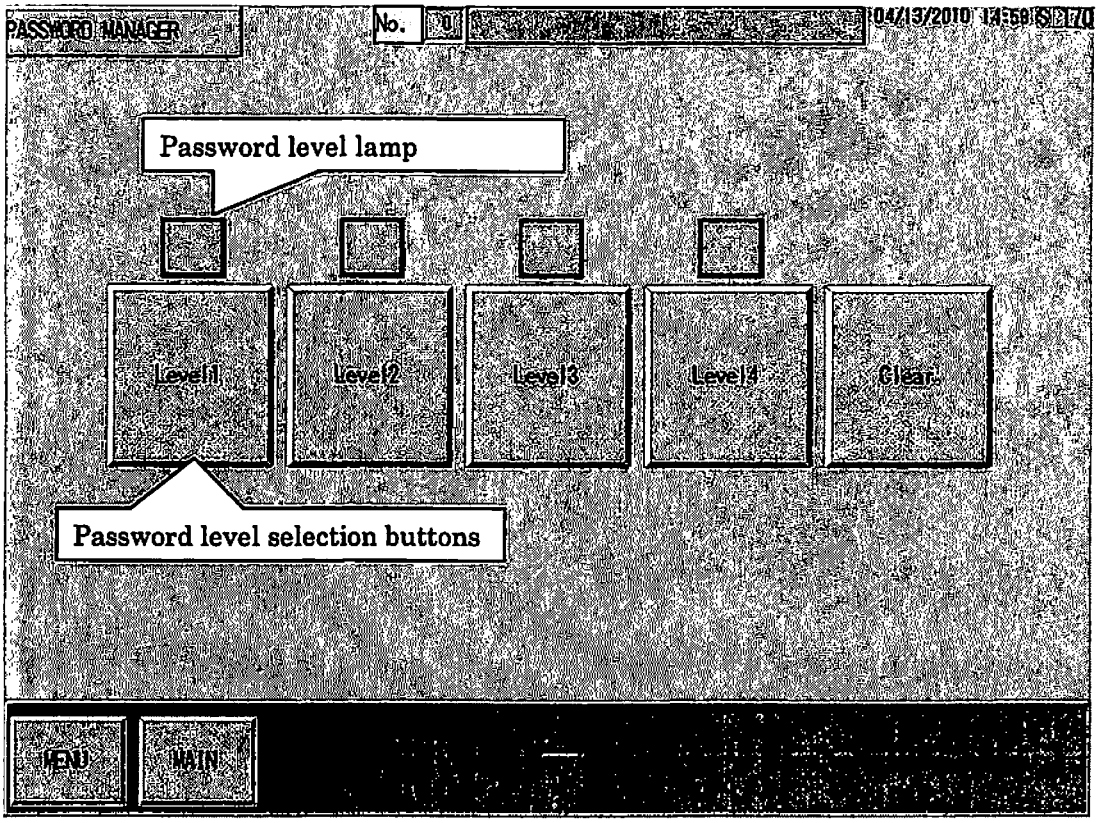


Fig 14-4-14-1. Password Manager Display

In Password Manager Display, authentication for password from level 1 to 4, password change and initialization are available.

- Password level lamp

  The lamp of current password level turns on.

- Password level selection buttons

  Set password level for operation authorization

  If touching any of the buttons, the display changes to password authentication page. (Fig. 14-4-14-2)

  There are 5 levels from 0 to 4 and each level is applied with different operation authorization.

  When passing the password authentication, the corresponding password level turns on.

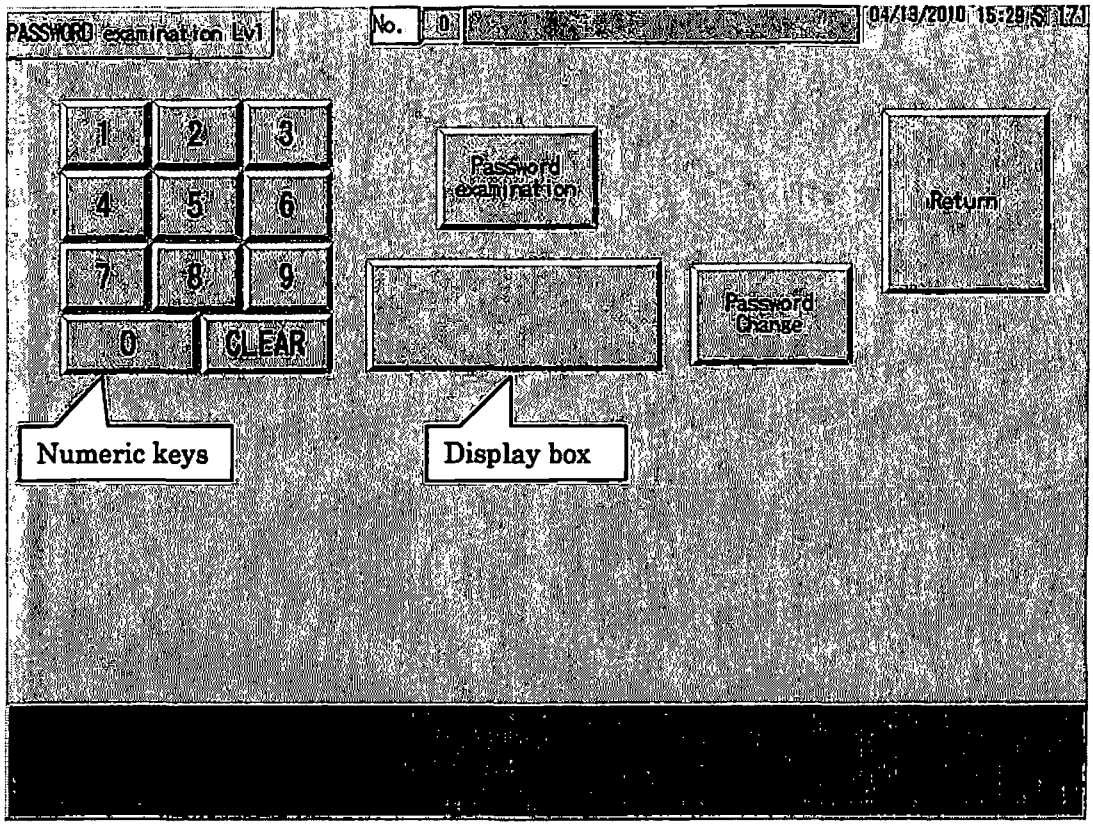


Fig 14-4-14-2. Password Authentication Display

Key in numbers to input a password

Each input number is shown as "*".

After authentication, press "Return" to go back to Password Manager Display.

- Password verification

  After inputting a password, press this button to starts verification

- Password change

  After inputting a password, press this button to move to the password change display. (Fig. 14-4-14-3)

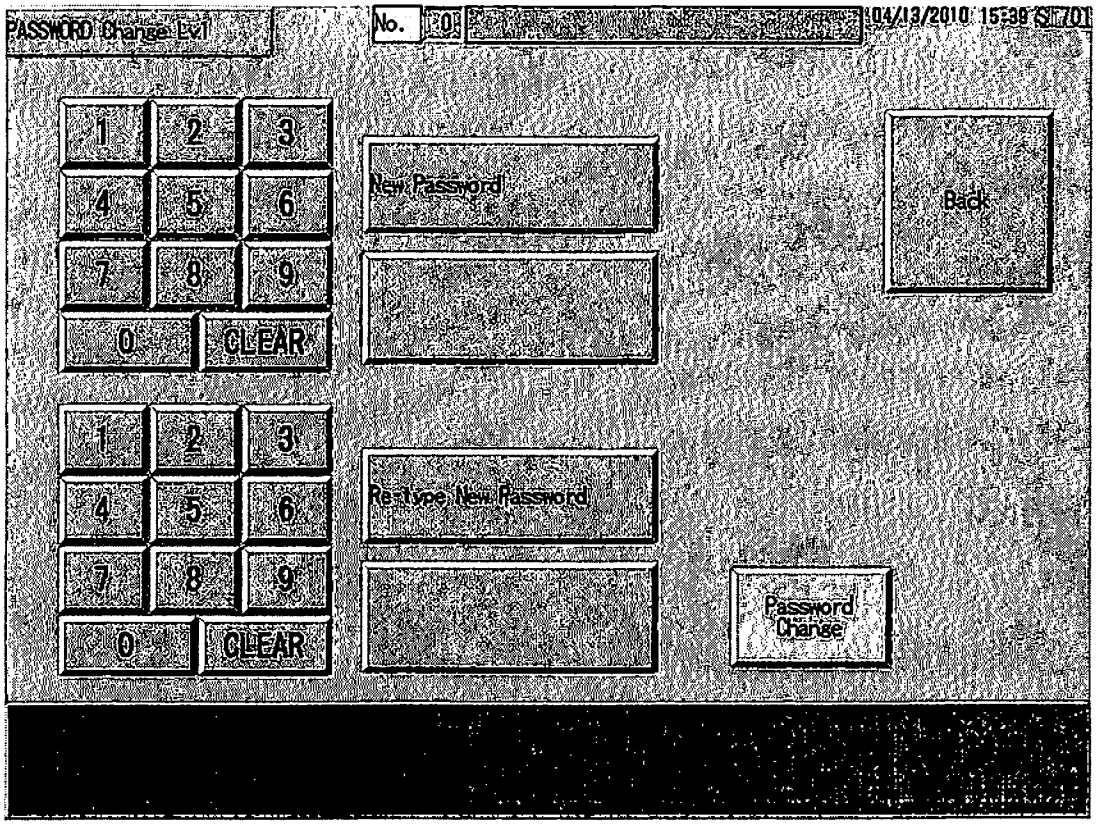


Fig 14-4-14-3. Password Change Display

Input a new password with the numeric key in the same way as password authentication

When identical passwords are input in the new password and re-type new password boxes, press "Password Change" button for the system confirming the new password.

14-4-15. Language Display

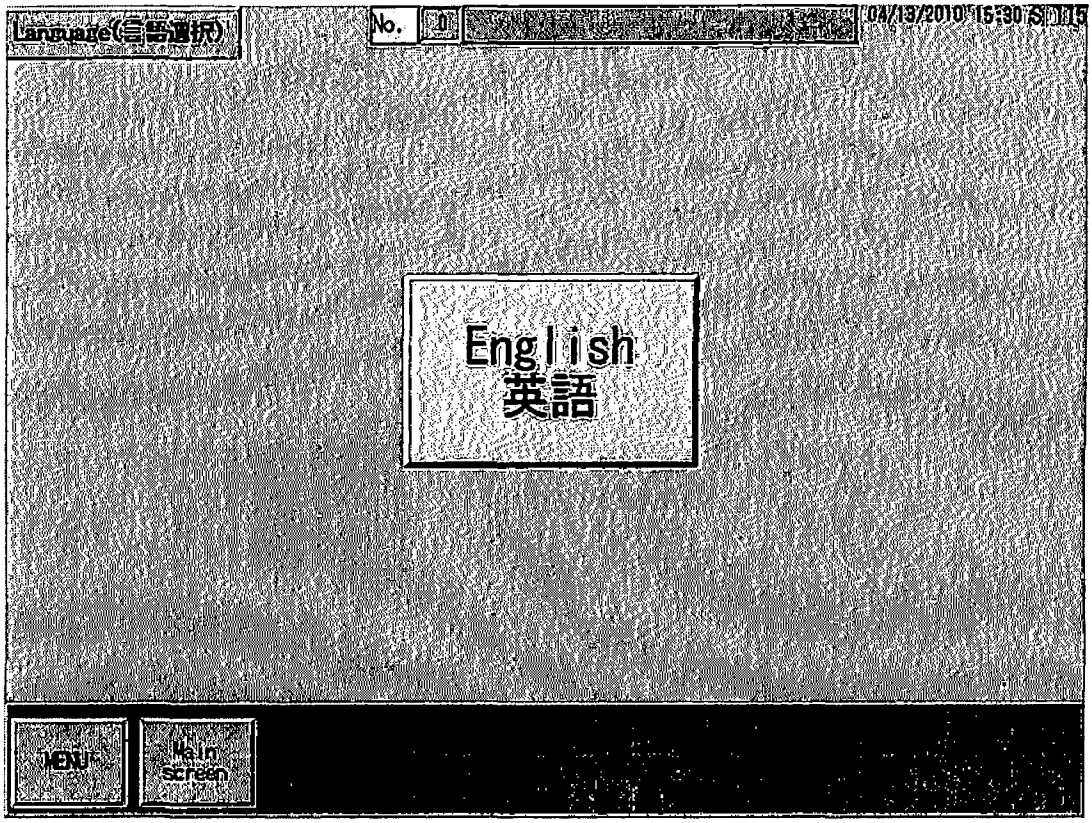


Fig 14-4-15. Language Setting Display

In Language Setting Display, switching the language between Japanese and English is available.

14-4-16. Power OFF Display

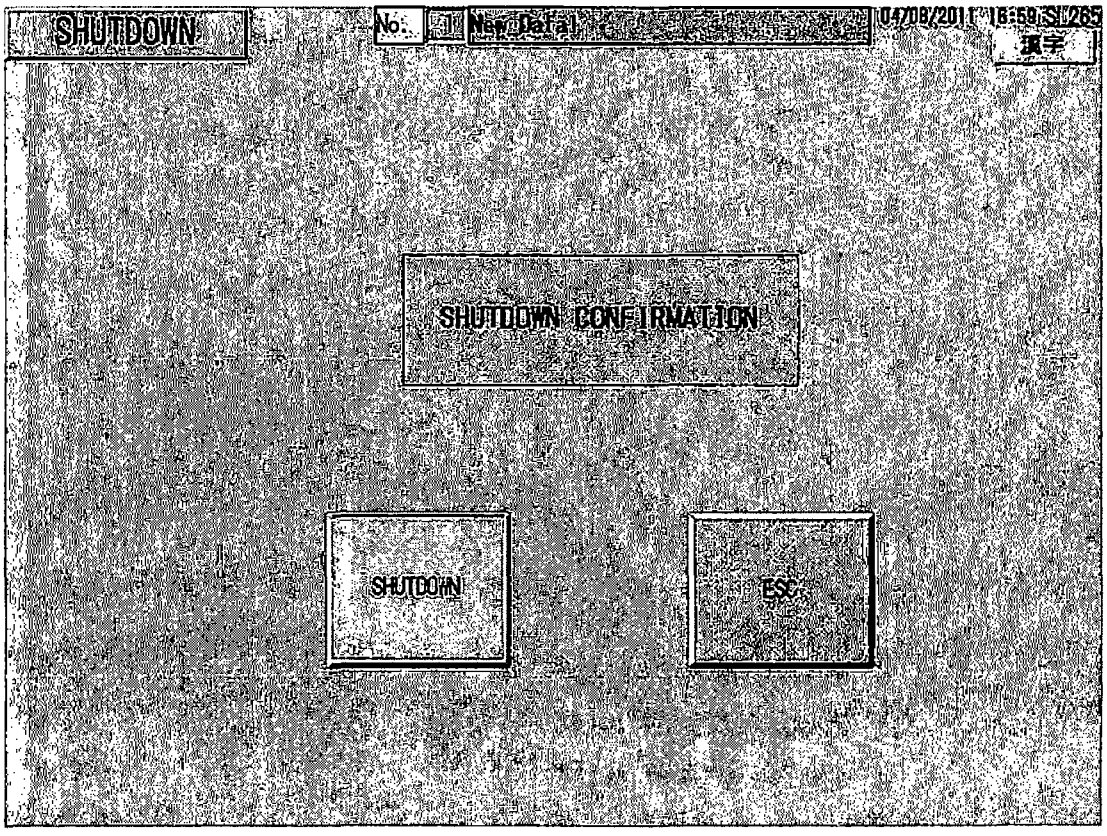


Fig. 14-4-16-1. Power shutdown confirmation screen

When pressing the "SHUTDOWN", the power shutdown confirmation screen appears. Press "SHUTDOWN" switch longer.

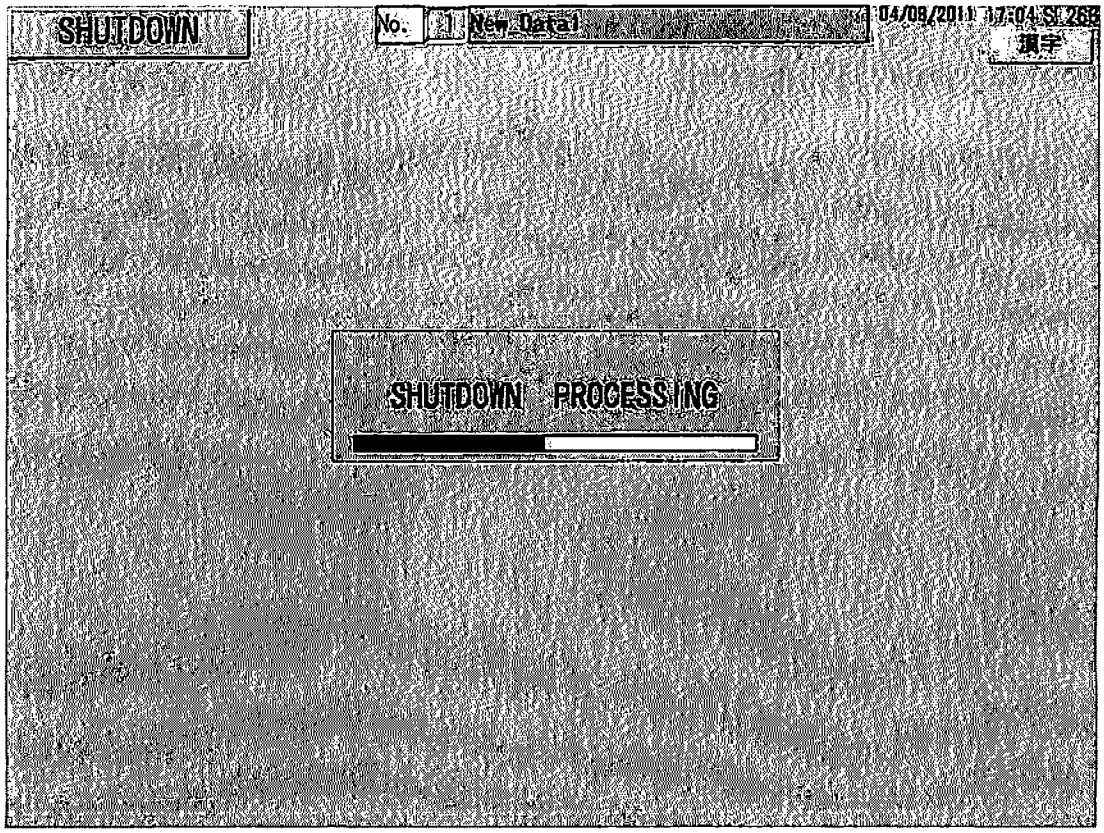


Fig. 14-4-16-2. Shutdown processing

Saving the setting data.

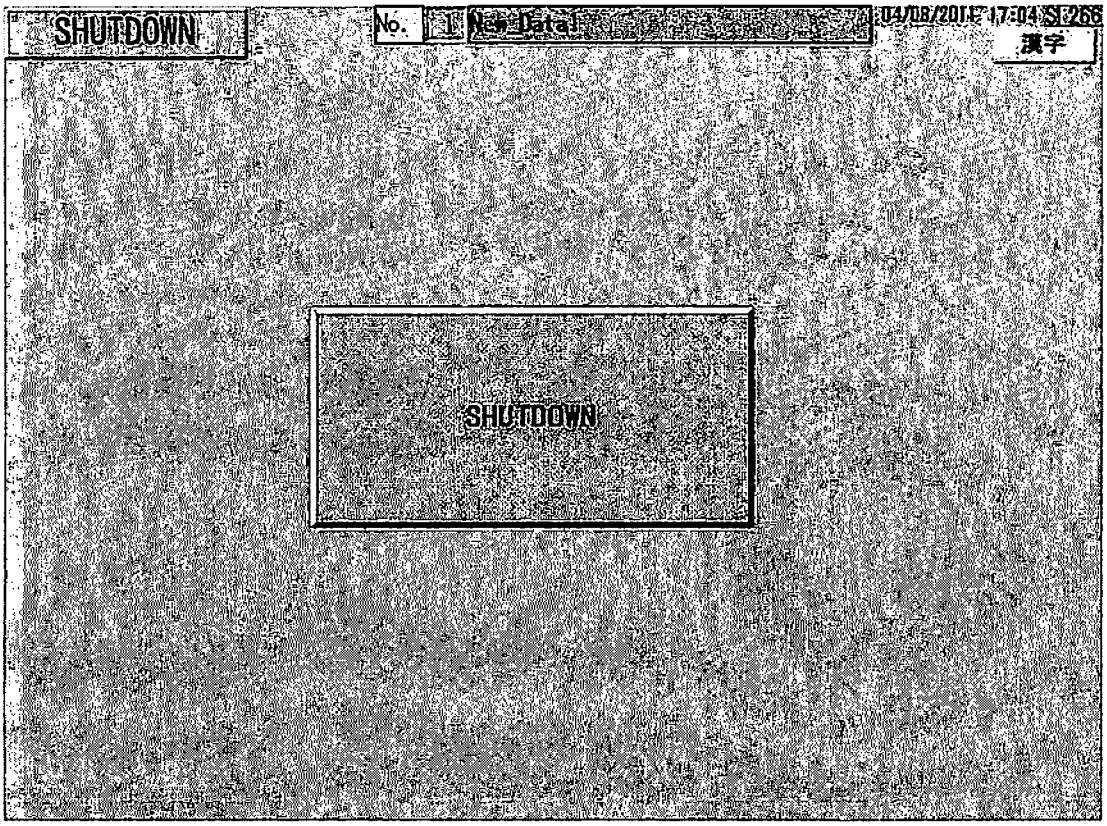


Fig. 14-4-16-3. Shutdown processing

The settings are correctly saved. Press "SHUTDOWN" and turn the machine power source OFF.

14-4-17. Setting List

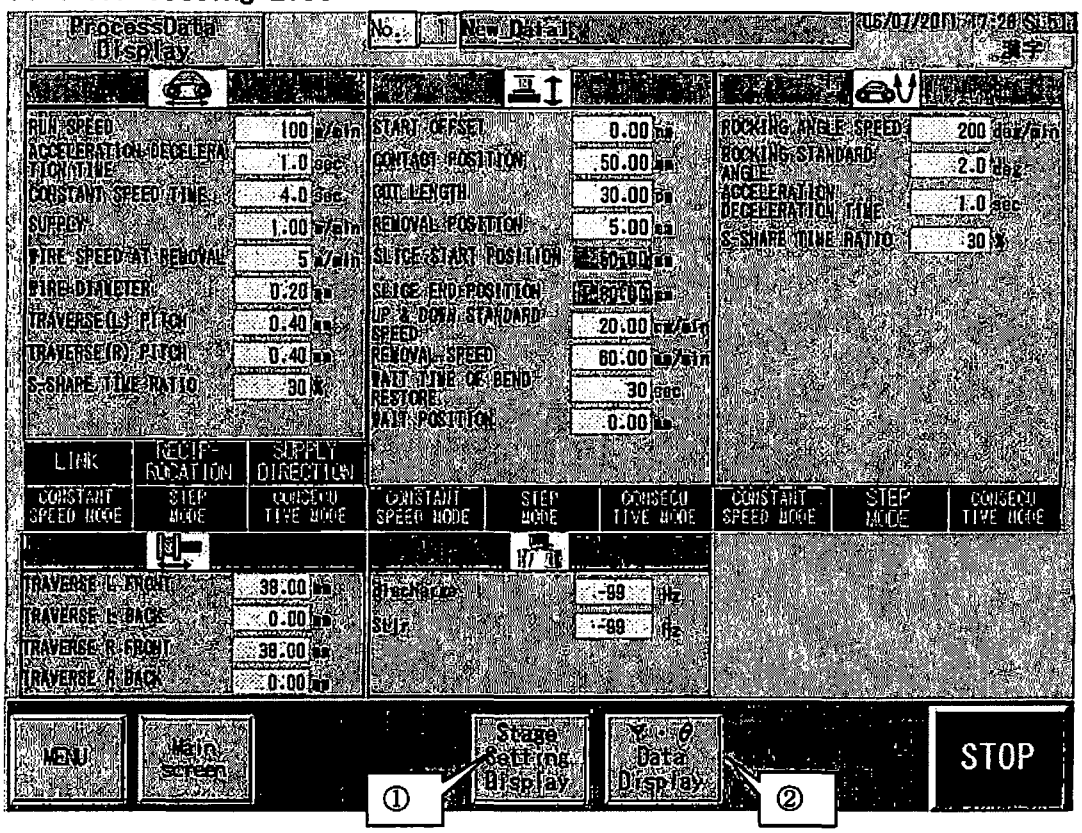


Fig. 14-4-17-1. Setting List

Enable to confirm the current settings, but not available to change settings.

① ・・・Press this switch to confirm the stage setting.

② ・・・Press this switch to confirm the Y・θ settings (Option).

Stage Setting Display

Confirm the parameter of Stage Setting.。

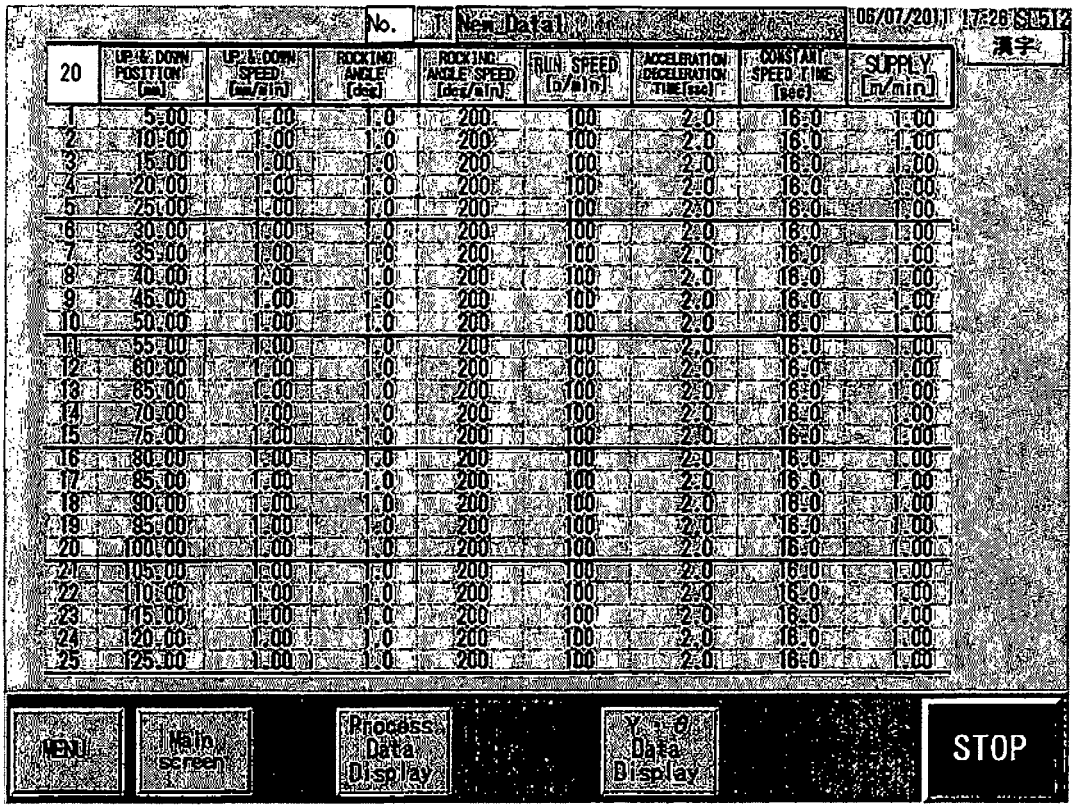


Fig. 14-4-17-2. Stage setting list

Option Setting Display

Enable to confirm the processing data for each stage, but not available to change the settings.

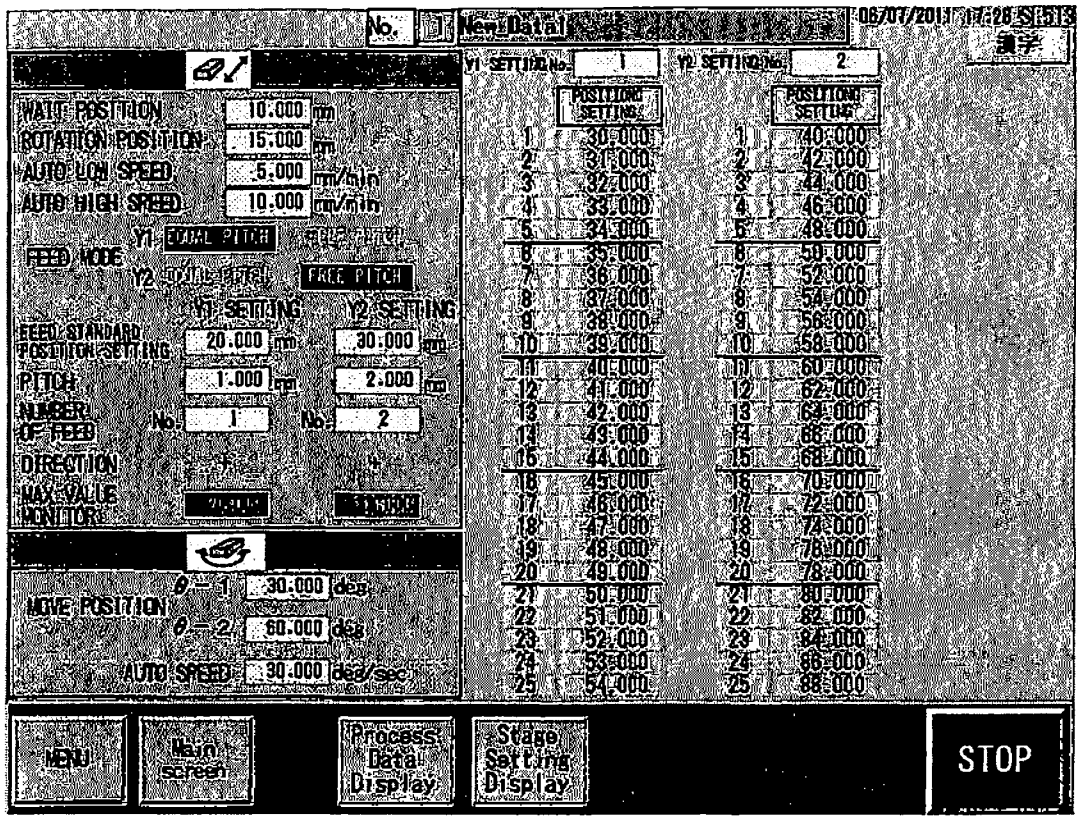


Fig. 14-4-17-3.Y・θ list

14-5.Error

14-5-1. ErrorMessage

ErrorMessage	Content	Action
Emergency stop	The emergency stop switch is being pressed.	1. Confirm the safety and turn the emergency stop switch to cancel the locking state. 2. Touch the reset switch to release. 3. Press the drive power switch for energization.
Door open	The front door was opened.	Check the door is open.
Low air	The pressure is below the setting value of the pressure switch.	Check and recover the air pressure.
Drive power OFF	Drive power is off.	1. Press the drive power switch for energization. 2. Check the fuse (F**) in the control box and replace if it is defective.
Pump inverter output current error	Current value for the pump is not rated value.	Confirm the connector connection for the pump. (This error is detected when the discharge and stir setting value is over 5hz)
Servo alarm reel L	Real L control error	1. See the manual for the servo pack alarm code and follow the instruction. (*1) 2. Check the load of the axis in case the error is a deviation error. 3. In case the error is not caused by cause above, hardware such as parameter, drivers, motors may be defective.

ErrorMessage	Content	Action
Servo alarm reel R	Real R control error	1. See the manual for the servo pack alarm code and follow the instruction. (*1) 2. Check the load of the axis in case the error is a deviation error. 3. In case the error is not caused by cause above, hardware such as parameter, drivers, motors may be defective.
Servo alarm up and down axis	Lifting axis control error	1. See the manual for the servo pack alarm code and follow the instruction. (*1) 2. Check the load of the axis in case the error is a deviation error. 3. In case the error is not caused by cause above, hardware such as parameter, drivers, motors may be defective.
Servo alarm rocking axis	Rocking axis control error	1. See the manual for the servo pack alarm code and follow the instruction. (*1) 2. Check the load of the axis in case the error is a deviation error. 3. In case the error is not caused by cause above, hardware such as parameter, drivers, motors may be defective.
Servo alarm traverser L	Traverser L control error	1. When the system detects an error in the driver, the red LED light of the driver blinks and alarm code appears. 2. Check the alarm code in the manual and follow the instruction. (*2) 3. In case the error is not caused by the cause above, hardware such as parameters, drivers and motors may be defective.

ErrorMessage	Content	Action
Servo alarm traverser R	Traverser R control error	1. When the system detects an error in the driver, the red LED light of the driver blinks and alarm code appears. 2. Check the alarm code in the manual and follow the instruction. (*2) 3. In case the error is not caused by the cause above, hardware such as parameters, drivers and motors may be defective.
Servo alarm tensioner L	Tensioner L control error	1. See the manual for the servo pack alarm code and follow the instruction. (*1) 2. Check the load of the axis in case the error is a deviation error. 3. In case the error is not caused by cause above, hardware such as parameter, drivers, motors may be defective.
Servo alarm tensioner R	Tensioner R control error	1. See the manual for the servo pack alarm code and follow the instruction. (*1) 2. Check the load of the axis in case the error is a deviation error. 3. In case the error is not caused by cause above, hardware such as parameter, drivers, motors may be defective.
Servo alarm Y-axis	Y-axis control error	1. When the system detects an error in the driver, the red LED light of the driver blinks and alarm code appears. 2. Check the alarm code in the manual and follow the instruction. (*2) 3. In case the error is not caused by the cause above, hardware such as parameters, drivers and motors may be defective.

ErrorMessage	Content	Action
Servo alarm θ-axis	θ-axis control error	1. When the system detects an error in the driver, the red LED light of the driver blinks and alarm code appears. 2. Check the alarm code in the manual and follow the instruction. (*2) 3. In case the error is not caused by the cause above, hardware such as parameters, drivers and motors may be defective.
Pump inverter error	Inverter was wrong with the working coolant pump.	When the error is detected, 1. the error message appears and ALM lamp is turned on for alerting the LED operator (LCD operator). 2. Check the alarm code in the manual and follow the instruction. (*3)
MP2500 error	Controller error occurred.	Controller is defective. Please contact Takatori and report the error occurrecne condition.
Up and down limit error	Up-down axis is outside the specified area.	Check the present position and whether the up-down position setting data is correct.
Rocking axis limit error	Rocking axis is outside the specified area.	Check the present position and whether the up-down position setting data is correct.
Traverse L limit error	Traverse L-axis is outside the specified area.	Check the present position and whether Travers L position setting data is correct.

ErrorMessage	Content	Action
Traverse R limit error	Traverse R-axis is outside the specified area.	Check the present position and whether Travers R position setting data is correct.
Y-axis limit error	Y-axis position is outside the specified area.	Check the present position and whether Y-axis position setting data is correct.
Wire tension control error	Tension controlling area exceeds the specified value.	1. Check if the wire is not disconnected and connect the wire if disconnected. 2. Measure the diameter of the reel and set the diameter correctly.
Count sensor error	Rotation sensor does not receive a signal.	Take off the cover and check if the sensor's cord is normal.
Tensioner L forward error	Tensioner L was to move, but it is was in the open end in 5 seconds.	1. Check if the pressure of the tensioner L is not too low. If it is too low, adjust the pressure with the regulator. 2. Check if the solenoid of tensioner L is acting correctly. 3. Check if the cylinder, air hose and driving part of the tensioner L are working correctly.
Tensioner L return error	Tensioner L was to open, but it could not move to the open end in five seconds.	1. Check if the pressure of the tensioner L is not too low. If it is too low, adjust the pressure with the regulator. 2. Check if the solenoid of tensioner L is acting correctly.3. Check if the cylinder, air hose and driving part of the tensioner L are working correctly.

ErrorMessage	Content	Action
Tensioner R forward error	Tensioner R was to move, but it was in the open end in 5 seconds.	1. Check if the pressure of the tensioner R is not too low. If it is too low, adjust the pressure with the regulator. 2. Check if the solenoid of tensioner R is acting correctly. 3. Check if the cylinder, air hose and driving part of the tensioner R are working correctly.
Tensioner R return error	Tensioner R was to open, but it could not move to the open end in five seconds.	1. Check if the pressure of the tensioner R is not too low. If it is too low, adjust the pressure with the regulator. 2. Check if the solenoid of tensioner R is acting correctly. 3. Check if the cylinder, air hose and driving part of the tensioner R are working correctly.
Slice end position setting limit over	The set value of the slice end position is over limitation of the up and down stroke.	Confirm the following value on the processing condition – up and down, and set the slice end position is less than 183mm. • Start Offset • Contact position • Cutting amount
Y1 Position setting LIMIT over	The set value of the Y1 is over limitation	Check if the set data is normal.
Y2 Position setting LIMIT over	The set value of the Y2 is over limitation	Check if the set data is normal.

ErrorMessage	Content	Action
Reel L full error	The set value of reel exceeds the specified range when wire runs	Check if the set data is normal. It occurs at 5500m or more than 5500m
Reel R full error	The set value of reel exceeds the specified range when wire runs	Check if the set data is normal. It occurs at 5500m or more than 5500m.
Reel L low error	The set value of reel exceeds the specified range when wire runs	Check if the set data is normal. It occurs at -500m or less than -500m.
Reel R low error	The set value of reel exceeds the specified range when wire runs	Check if the set data is normal. It occurs at -500m or less than -500m
Up and down axis Data range error	The set value of the up-down axis exceeds the specified range.	Check if the set data is normal.
Rocking axis data setting error	The set value of the rocking axis exceeds the specified range.	Check if the set data is normal.
Wire running data setting error	Wire running set value exceeds the specified range.	Check if the set data is normal.

ErrorMessage	Content	Action
Axis Y data setting error	Y-axis set value exceeds the specified range.	Check if the set data is normal.
Axis θ data setting error	θ-axis set value exceeds the specified range.	Check if the set data is normal.
Common data 1 setting error	Common data set value exceeds the specified range.	Check if the set data is normal.
Common data 2 setting error	Common data set value exceeds the specified range.	Check if the set data is normal.
Basic setting value error	Basic setting value exceeds the specified range.	Check if the set data is normal.
Manual speed setting error	Manual speed set value exceeds the specified range.	Check if the set data is normal.
Index setting value error	Manual index set value exceeds the specified range.	Check if the set data is normal.

ErrorMessage	Content	Action
Maintenance setting value error	Maintenance set value exceeds the specified range.	Check if the set data is normal.
Maintenance setting 2 value error	Maintenance set value exceeds the specified range.	Check if the set data is normal.
Stage data setting error	Stage data set value exceeds the specified range.	Check if the set data is normal.
Stage setting Height value line order error	Stage setting Height value is lower than previous data	Confirm the following value on the processing condition – set value of next stage is higher than previous data. (It occurs at only stage mode and consecutive mode.)

ErrorMessage	Content	Action
Servo warning reel L	Reel L servo control error	1. See the manual for the servo pack alarm code and follow the instruction. (*1) 2. Check the load of the axis in case the error is a deviation error. 3. In case the error is not caused by cause above, hardware such as parameter, drivers, motors may be defective
Servo warning reel R	Reel R servo control error	1. See the manual for the servo pack alarm code and follow the instruction. (*1) 2. Check the load of the axis in case the error is a deviation error. 3. In case the error is not caused by cause above, hardware such as parameter, drivers, motors may be defective
Servo warning up and down axis	Up-down axis servo control error	1. See the manual for the servo pack alarm code and follow the instruction. (*1) 2. Check the load of the axis in case the error is a deviation error. 3. In case the error is not caused by cause above, hardware such as parameter, drivers, motors may be defective
Servo warning rocking axis	Rocking axis servo control error	1. See the manual for the servo pack alarm code and follow the instruction. (*1) 2. Check the load of the axis in case the error is a deviation error. 3. In case the error is not caused by cause above, hardware such as parameter, drivers, motors may be defective

ErrorMessage	Content	Action
Servo warning traverser L	Traverser L servo control error	1. When the system detects an error in the driver, the red LED light of the driver blinks and alarm code appears. 2. Check the alarm code in the manual and follow the instruction. (*2) 3. In case the error is not caused by the cause above, hardware such as parameters, drivers and motors may be defective.
Servo warning traverser R	Traverser R servo control error	1. When the system detects an error in the driver, the red LED light of the driver blinks and alarm code appears. 2. Check the alarm code in the manual and follow the instruction. (*2) 3. In case the error is not caused by the cause above, hardware such as parameters, drivers and motors may be defective.
Servo warning tensioner L	Tensioner L servo control error	1. See the manual for the servo pack alarm code and follow the instruction. (*1) 2. Check the load of the axis in case the error is a deviation error. 3. In case the error is not caused by cause above, hardware such as parameter, drivers, motors may be defective
Servo warning tensioner R	Tensioner R servo control error	1. See the manual for the servo pack alarm code and follow the instruction. (*1) 2. Check the load of the axis in case the error is a deviation error. 3. In case the error is not caused by cause above, hardware such as parameter, drivers, motors may be defective

ErrorMessage	Content	Action
Servo warning Y-axis	Y-axis servo control error	1. When the system detects an error in the driver, the red LED light of the driver blinks and alarm code appears. 2. Check the alarm code in the manual and follow the instruction. (*2) 3. In case the error is not caused by the cause above, hardware such as parameters, drivers and motors may be defective.
Servo warning θ-axis	θ-axis servo control error	1. When the system detects an error in the driver, the red LED light of the driver blinks and alarm code appears. 2. Check the alarm code in the manual and follow the instruction. (*2) 3. In case the error is not caused by the cause above, hardware such as parameters, drivers and motors may be defective.
Pump inverter warning	Coolant pump inverter error	1. Check if the driving power is input. 2. When detecting minor failure or warning, error message will appear to notice operators. See and follow the manual to work out the problem. (*3)
MP2500 battery low	Backup battery for motion board of the controller (MP2500) is lower than the specified value.	1. Battery needs to be replaced. Turn off the power supply as long as possible until replacing the battery, because the set data may be lost. 2. Please contact Takatori for battery replacement.

ErrorMessage	Content	Action
Up and down axis to set origin request	Disappeared the servo motor encoder information.	Confirm that the encoder cable connection is correct and perform the origin point set with battery for encoder having remaining amount. And then turn the power OFF once and supply the power again.
Rocking axis to set origin request	Disappeared the servo motor encoder information.	Confirm that the encoder cable connection is correct and perform the origin point set with battery for encoder having remaining amount. And then turn the power OFF once and supply the power again.
Tensioner L to set origin request	Disappeared the servo motor encoder information.	Confirm that the encoder cable connection is correct and perform the origin point set with battery for encoder having remaining amount. And then turn the power OFF once and supply the power again.
Tensioner R to set origin request	Disappeared the servo motor encoder information.	Confirm that the encoder cable connection is correct and perform the origin point set with battery for encoder having remaining amount. And then turn the power OFF once and supply the power again.
Y-axis to set origin request	Disappeared the stepping motor encoder information.	Perform the origin point set.
θ-axis to set origin request	Disappeared the stepping motor encoder information.	Perform the origin point set.

ErrorMessage	Content	Action
Traverser L to set origin request	Disappeared the stepping motor encoder information.	Perform the origin point set.
Traverser R to set origin request	Disappeared the stepping motor encoder information.	Perform the origin point set.
Reel L coiling warning	Reel L wire amount exceeds the specified value.	Replace the reel, check the set values in the maintenance page and reset the counter as necessary.
Reel R coiling warning	Reel R wire amount exceeds the specified value.	Replace the reel, check the set values in the maintenance page and reset the counter as necessary.
Reel L feeding low warning	Reel L wire amount is lower than the specified value.	Replace the reel, check the set values in the maintenance page and reset the counter as necessary.
Reel R feeding low warning	Reel R wire amount is lower than the specified value.	Replace the reel, check the set values in the maintenance page and reset the counter as necessary.
Tensioner L pulley life warning	Tensioner L pulley life counter reached the set value.	Replace the pully of the tensioner L, check the set values in the maintenance page and reset the counter as necessary.

ErrorMessage	Content	Action
Tensioner R pulley life warning	Tensioner R pulley life counter reached the set value.	Replace the pully of the tensioner R, check the set values in the maintenance page and reset the counter as necessary.
WR-L life warning	Work roller L life counter reached the set value.	Replace the work roller L, check the set values in the maintenance page and reset the counter as necessary.
WR-R life warning	Work roller R life counter reached the set value.	Replace the work roller R, check the set values in the maintenance page and reset the counter as necessary.
Coolant life warning	Coolant life counter reached the set value.	Replace the coolant, check the set values in the maintenance page and reset the counter as necessary.
Total auto process warning	Number of auto slicing psocess reached the set value.	Check the set values in the maintenance page and reset the counter as necessary.
Assist pulley L life warning	Assist pulley L life count reached the set value.	Confirm the set value on the maintenance page and perform the counter reset. Replace the assist pulley L if necessary.

ErrorMessage	Content	Action
Assist pulley R life warning	Assist pulley R life count reached the set value.	Confirm the set value on the maintenance page and perform the counter reset. Replace the assist pulley R if necessary.
Slice End Position Data Setting warning	The set value of the slice end position is over limitation of the up and down stroke.	Confirm the following value on the processing condition – up and down, and set the slice end position is less than 180mm. ・Start Offset ・Contact position ・Cutting amount
Rocking S-ratio setting value over	Acceleration-and -deceleration time or S ratio setting is too large.	Please change a preset value so that the multiplication value of acceleration-and-deceleration time and S ratio becomes below 0.51 (sec). Example 1 acceleration-and-deceleration time (sec): 0.5 S-ratio (%):30 0.5 × 0.3 = 0.15 (sec) Example 2 acceleration-and-deceleration time (sec): 1.0 S-ratio (%):40 1.0 × 0.4 = 0.40 (sec)

・14-4-2. Footnote Explanation

*1: Yasukawa Electric ΣV Series Users Manual Design/Maintenance Edition
Chapter 9: Troubleshooting

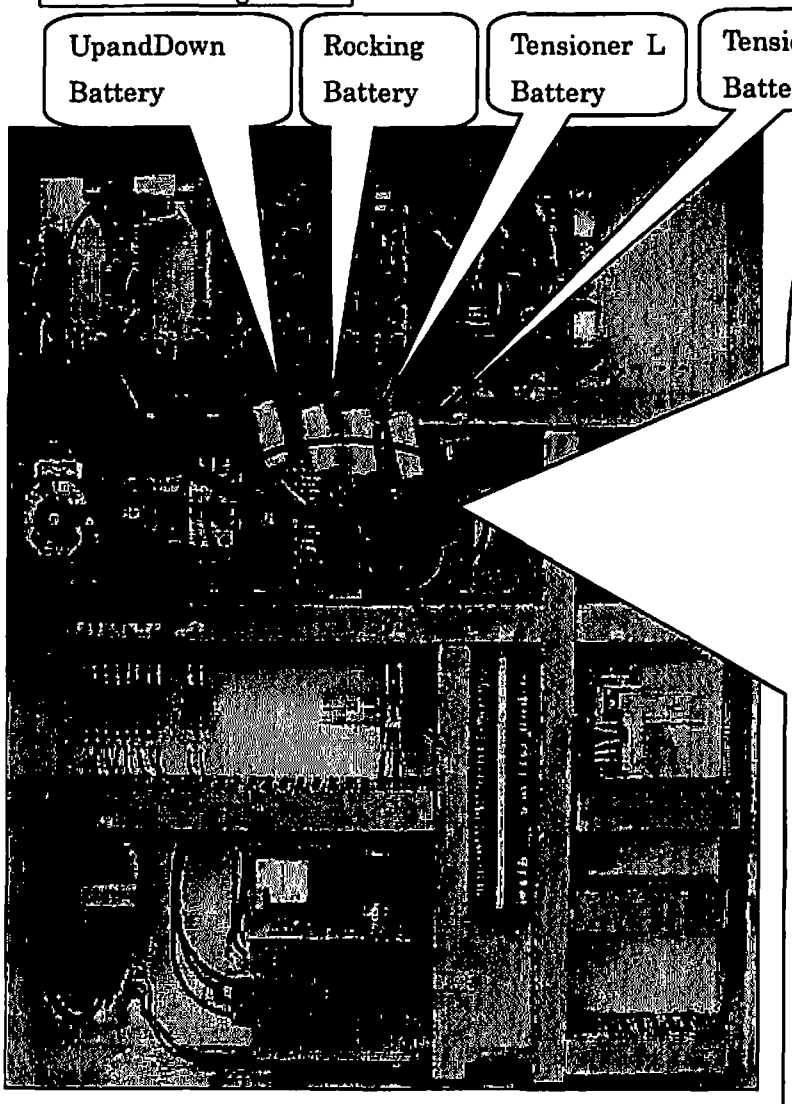
*2: Oriental Motor AS Series
MECHATROLINK-II Driver Users Manual
Troubleshooting

*3: Yasukawa Inverter V1000 Technical Manual
6.3 Inverter Alarm and Error Function
6.5 Minor Failure/Warning

14-6. Replacing battery

14-6-1. Replacing servo battery procedure

This operation needs to proceed with extreme caution due to applying current during work.



<Preparation>

Press the emergency stop switch located on the front side of the machine.

Supply the breaker while leaving the control board door.

When reboot the machine, press the reset switch on the alarm screen.

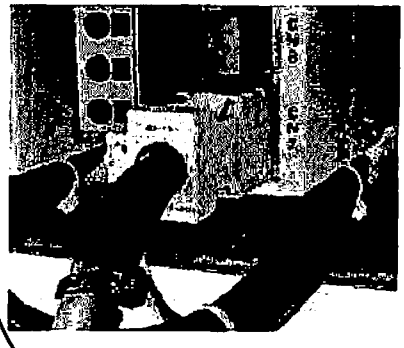
Confirm that the [Emergency Stop SW ON] indication is not cleared.

Unplug the connector (CN2) connecting to the servo battery cable indicated alarm.

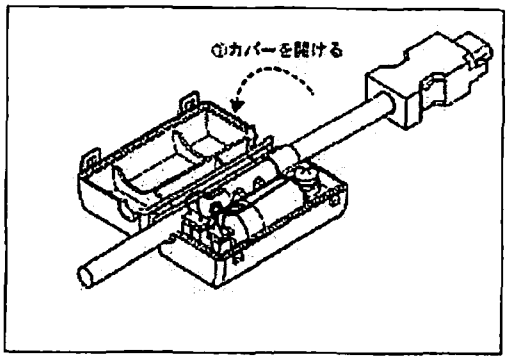
Release the lock mechanism by pinching upper and lower portion and withdraw the cable.

The servo back indication repeats A, 9, 1, 0, · alternately.

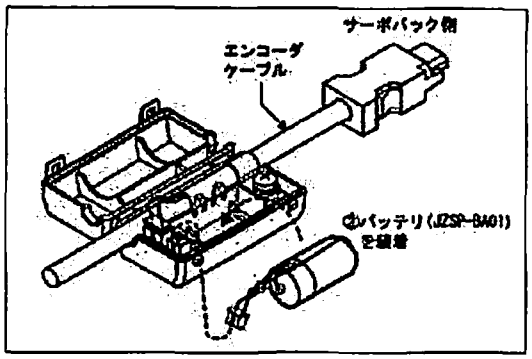
(CN2 Enlarged View)



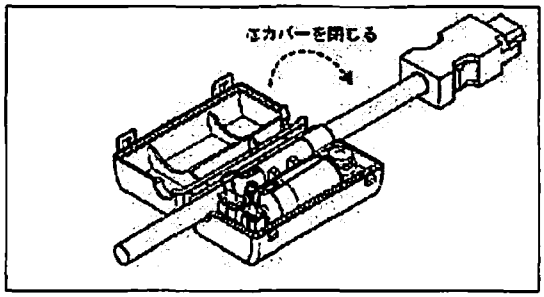
Open the battery unit cover.



Replace the old battery to the new battery (JZSP-BA01).



Close the battery unit cover.



After replacing the battery, plug the encoder cable connector to the servo back (CN2).

Turn the power off by using the touch panel. When the touch panel monitor indication is disappeared, turn the breaker OFF and turn the power OFF.

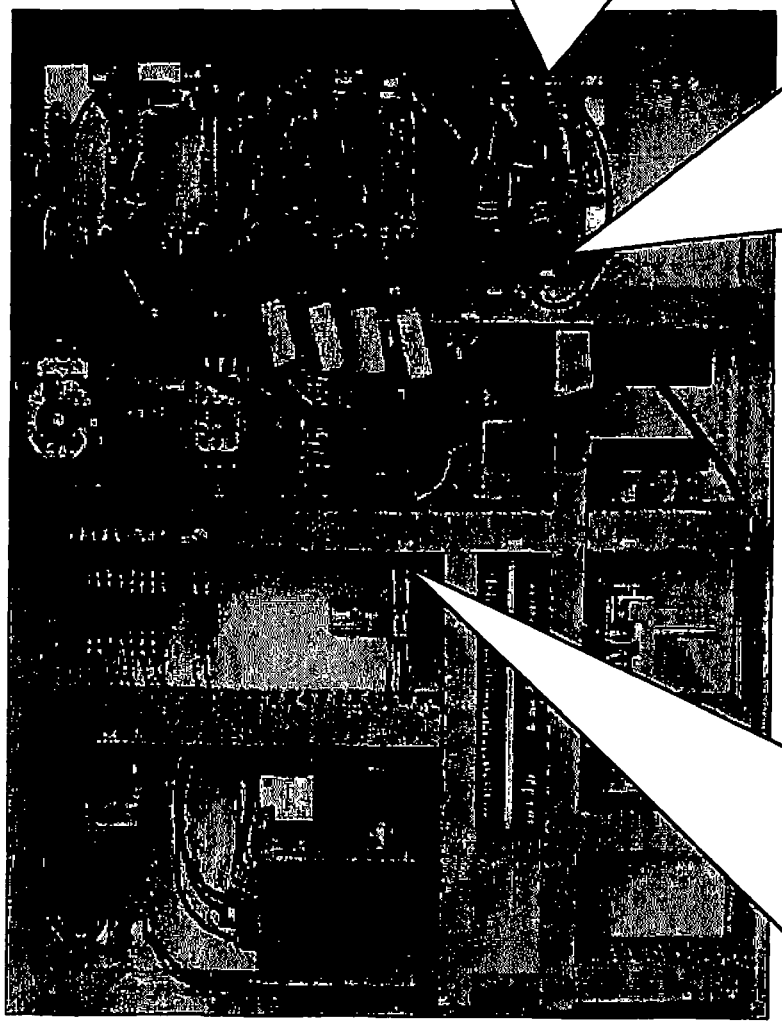
Clear the emergency stop SW.

Close the control board door, turn the breaker lever ON and supply the power to the machine.

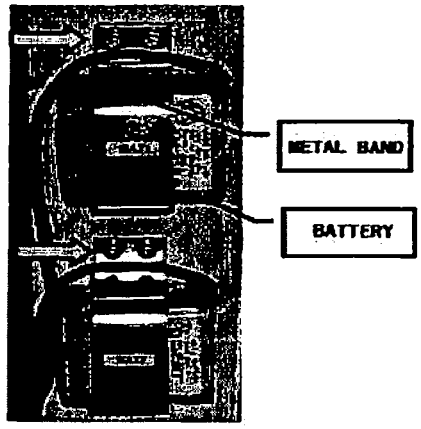
Confirm that the alarm was cleared on the alarm screen after booting.

14-6-2. Replacing the stepping battery

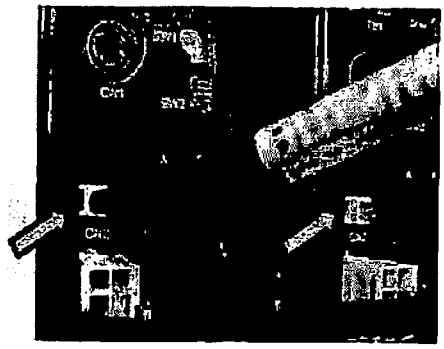
Be sure that this operation is proceed after turning the power OFF.



Release the screws retaining the metal band and replace the old battery to the new battery.



Connect the leading wire from the battery to the stepping driver [CN2].



[Reset]

Battery running out indication

When the battery is running out, the following indication appears. (This example is for tensitoner R.)

Origin set request

When this indication appears, the positioning information is lost and the unit is not able to move correctly.

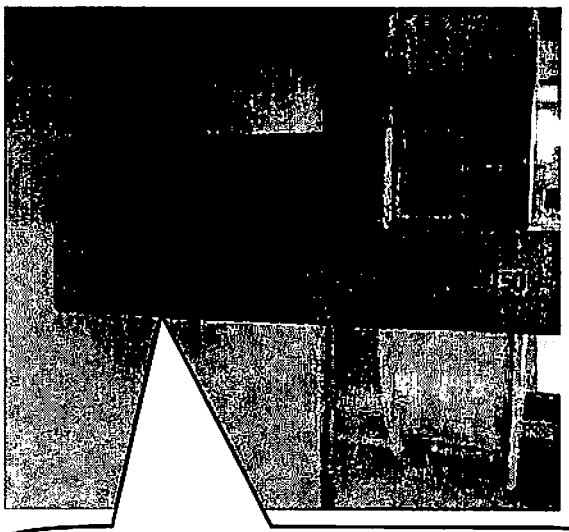
Perform the origin position setting.

If the alarm occurs, clear the alarm before the performance.

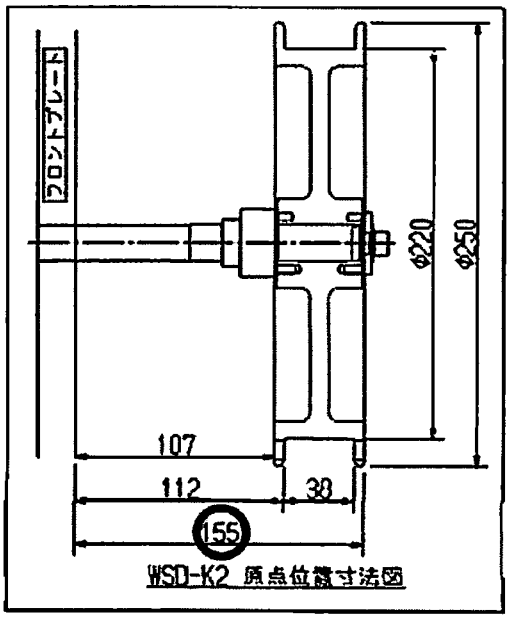
[Origin position setting procedure]

① Move the unit to the origin position.

Move the position indicated as the right illustration by JOG or INDEX in manual mode.



Scale the size from the front plate

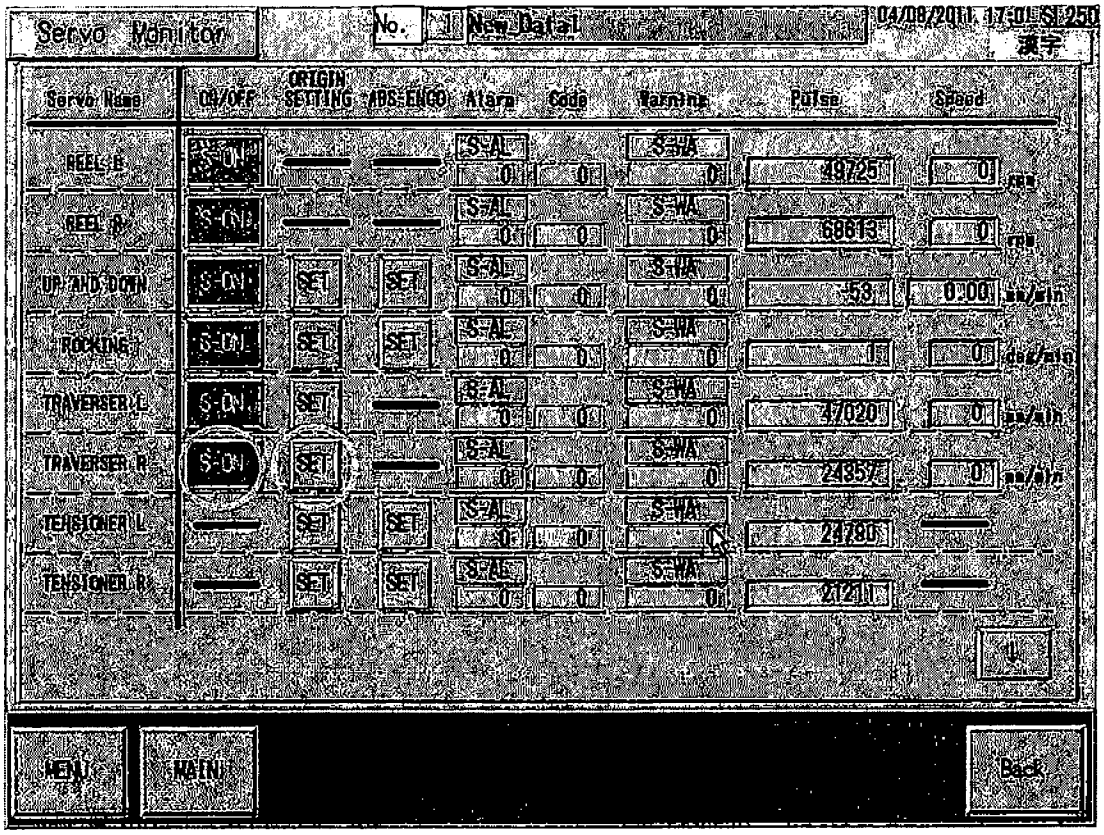


Once the position information is lost, the actual position does not match the encoder. For that reason, the limit position is detected during JOG/INDEX operation that may cause alarm. If the alarm occurs, clear the alarm by the reset switch on the alarm screen. After clear the alarm, proceed following ② to ③ procedure to save the origin position that makes operation available. Move the position indicates as the illustration by JOG operation.

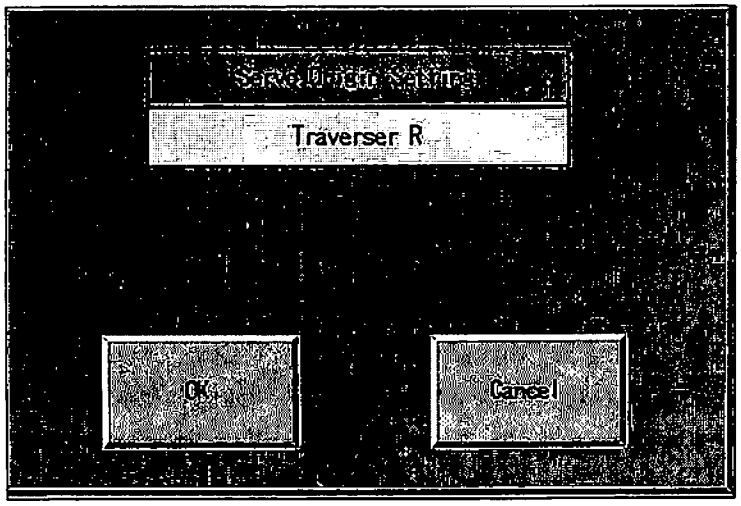
② MENU→Tool→Servo monitor screen and display the servo monitor screen.

Confirm the servo ON condition (S-ON switch).

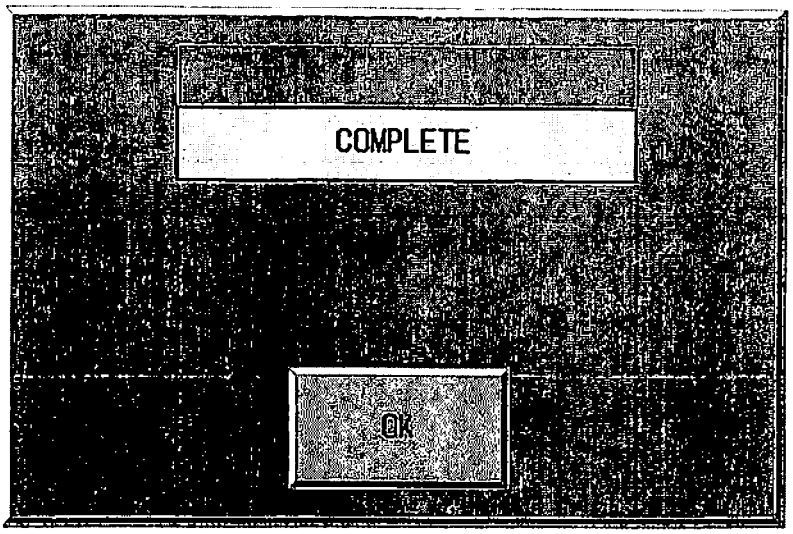
Press the "SET" switch of the origin setting.



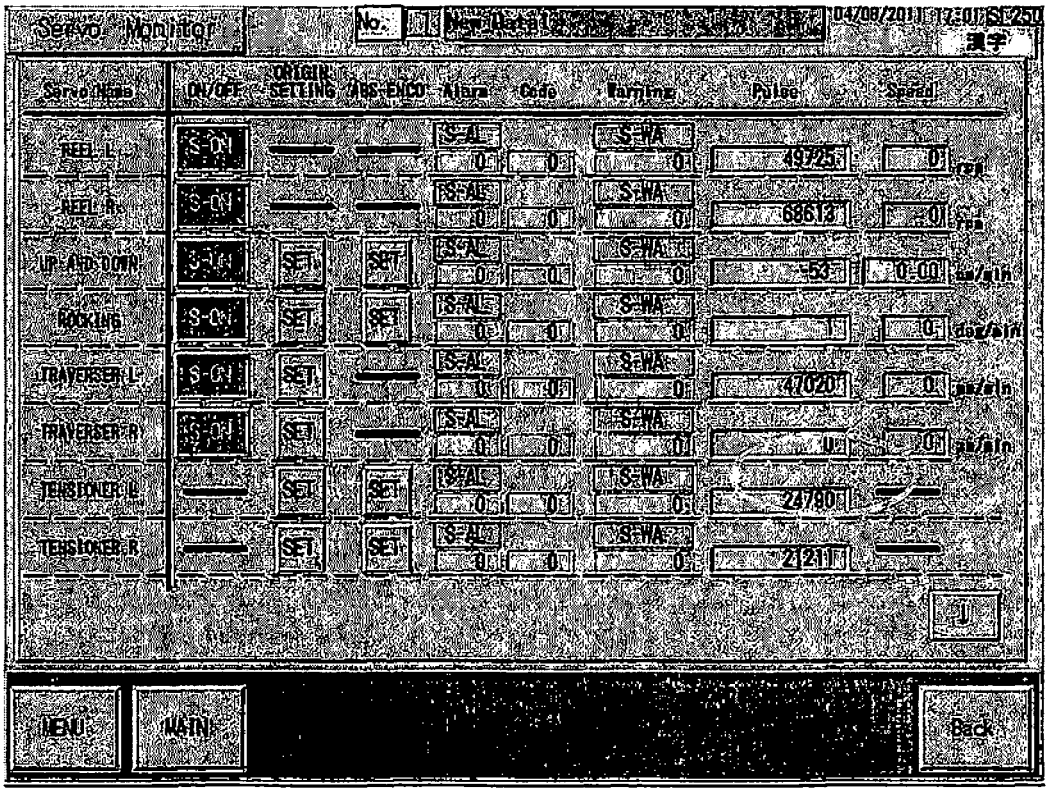
③ The Servo Origin Setting screen will appear, and then press "OK" switch.



④ Press "OK" when the complete screen appears.



⑤ Confirm the pulse value "0" and complete the operation. (± few pulse may occurs.)



Revision History

Rev. No.	-	Software version	MP	2.018
Date	2011/4/4		Screen	1.010
Chapter	Page	Contents		
-	-	Initial Document		

Rev. No.	1	Software version	MP	2.020
Date	2011/5/13		Screen	1.012
Chapter	Page	Contents		
14	All Chapters	Review all Chapters : Revise composition		
14-3-2	14-7	Add and Change description: Menu Display Figure		
14-4-3-5	14-26, 14-28	Add function : Stage setting		
14-4-5	14-35	Add description : Reel once winding		
14-4-9	14-64	Add description : Pressure setting		
14-5	14-90～	Add chapter : alarm		

Rev. No.	2	Software version	MP	2.021
Date	2011/6/6		Screen	1.013
Chapter	Page	Contents		
14-4-3-5	14-26	Revise Figure		
14-4-4	14-33	Revise description : Alarm Scroll		
14-4-6-1	14-41	Revise description : Figure number		
14-4-6-2	14-46	Revise description : Figure number		
14-4-6-5	14-51	Revise description、Figure : control switch		
14-4-6-6	14-51	Revise Figure : Control switch		
14-4-12	14-69	Add description : Servo Parameter		
14-5	14-93	Revise description		

Rev. No.	3	Software version	MP	2.025
Date	2011/6/6		Screen	1.020
Chapter	Page	Contents		
14-4-8	14-61	Revise Figure		
14-4-9	14-63	Revise description : Pressure Setting.(1second), touching an input permission switch.		

14-4-9	14-63	Revise Figure : Control switch
14-4-10	14-64	Revise Figure:Traversemiddle point movementswitch Default Setting switch
14-4-17	14-88	Revise Figure : Reel size switch deletion

Rev. No.	4	Software version	MP	2. 027
Date	2012/2/2		Screen	1. 022, 2. 022
Chapter	Page	Contents		
14-5	14-106	Add description : Alarm		

15. Warranty

The warranty period of this product is either one year or 2000 hours of use after the delivery inspection. After this warranty period, we shall provide inspection services according to the separate maintenance contract. Please note, however, that repair services provided for any defects arising from the following reasons shall be charged even in the warranty period:

①Any defects arising from the improper use of product by customers, including those caused by falling the machine, giving a impact to the machine, or other reasons.

②Any defects arising from the Act of God including a fire, earthquake, flood, as well as abnormal voltage applied to the machine.

③Any defects caused by defects of unauthorized equipment connected to this product.

④Any defects arising from failure to follow the operating procedure and instruction described in the manuals supplied with the product.