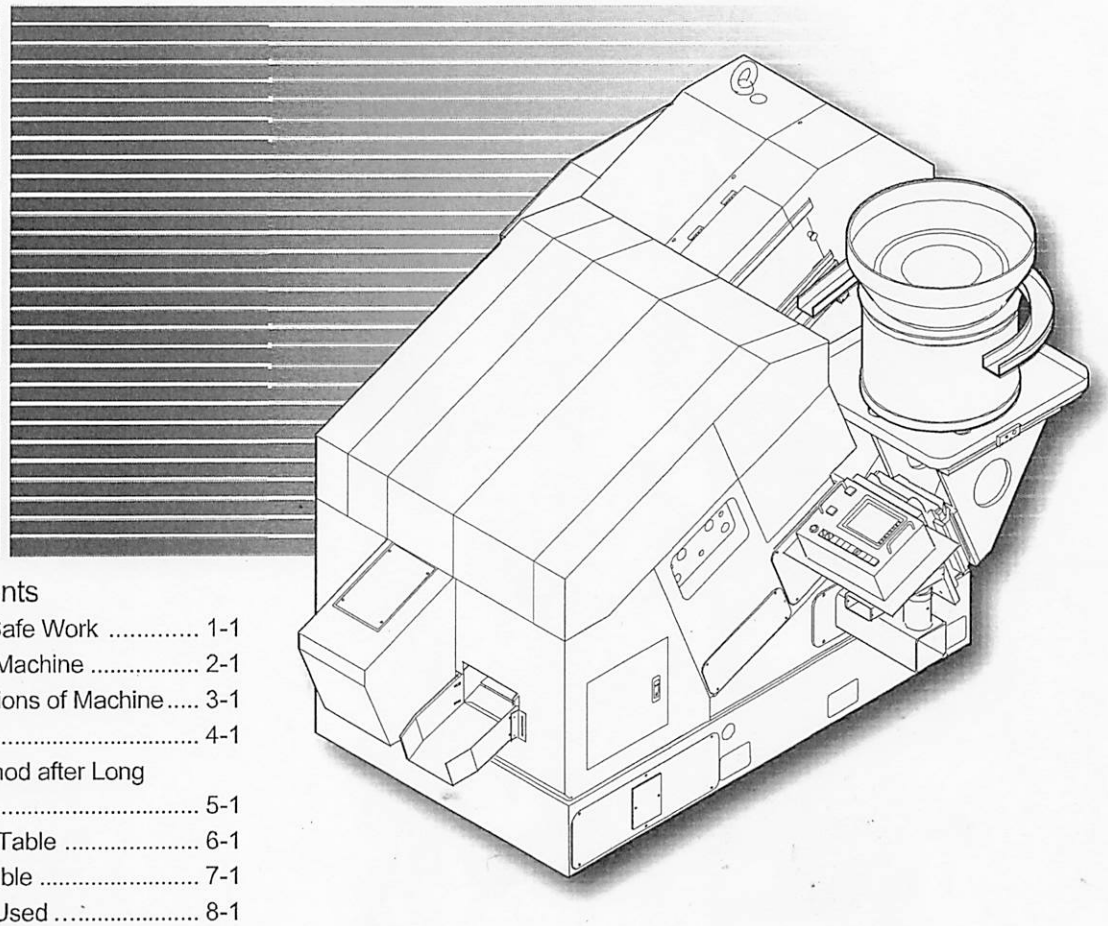
Sanmei

# THREAD ROLLING MACHINE
# THI-12R EVOLUTION
# INSTRUCTION MANUAL



Contents




SANMEI WORKS CO., LTD.

# 1. Cautionary Items for Safe Work

**Meanings and dangerous ranks of alarm marks**

The alarm marks used in this manual are classified in three stages according to the dangerous rank, and trouble seriousness and possibility.
The alarm marks and their meanings are listed below. Completely understand the meanings of the alarm marks, and be sure to observe the instructions.

| Alarm mark | Warning notice | Meaning and dangerous rank of alarm |
|---|---|---|
| ⚠ DANGER | DANGER | The occurring danger is extremely serious. If any instruction or procedure is not obeyed, it may lead to a death or serious injury. |
| ⚠ WARNING | WARNING | The occurring danger is serious. If any instruction or procedure is not obeyed, it may lead to a serious or slight injury. |
| ⚠ CAUTION | CAUTION | The occurring danger may lead to a middle or slight injury or damage a machine component. |

| ⚠ DANGER | |
|---|---|
| Inhibitation | **Never remove the covers (flywheel cover, pitman wheel cover and others) of the rotating part.**<br>If any part of your body touches the running part, you may be caught in, thus causing a serious wound or death accident.<br>If any cover is inevitably removed for maintenance or other purposes, previously turn the primary power source. |
| | **Never open the control panel.**<br>Otherwise it may result in an electric shock.<br>The person qualified for electricity must do the breaker check and others. |
| | **Do not run the machine keeping the safety cover and protective cover removed.**<br>Otherwise, the arm or hair may be wound in by the rotating part, etc., possibly resulting in a serious human accident. |
| | **During operation of the machine, do not come near any operating section (starter, ram, etc).**<br>Otherwise, the hand or arm may be pinched, thus causing a serious human accident. |
| | **Do not operate the machine keeping the interlock of each safety device or safety cover removed.**<br>Otherwise, any pinching operation of the rotating or moving part, an electric shock, etc. may occur, possibly resulting in a serious human accident. |
| | **Plural operators do not operate the machine at the same time.**<br>If any operator still touches the machine when another operator operates the machine by mistake, the machine, possibly suffering from a serious human accident may wind in the latter. |
| Contact inhibitation | **Never be near the high-speed rotating area of the machine.**<br>Otherwise, the hand or arm may be pinched, possibly resulting in a serious human accident.<br>Do not be near any operating part while the machine is running. |

## DANGER

| | |
|---|---|
|  Obey the instruction | **A qualified electrical service person only must maintain or repair the electrical system.**<br>If it is done by any unqualified worker, it may lead to an electric shock or serious human accident. |
| | **When removing the flywheel, use the crane or other which sufficiently bear the weight, taking care during the work.**<br>If the flywheel drops, it will cause a serious accident. |
| | **When using the crane, press or similar, the qualified worker must do the work. Moreover, take care since the work handles a heavy object.**<br>Otherwise, it may cause a serious human accident. |
| | **The battery used in the PLC must be store at the place which cannot be reached by the hand of a child.**<br>If it is drunk by mistake, it may lead to a death. |

## WARNING

| | |
|---|---|
|  Inhibitation | **Never rewrite the content of the PLC program.**<br>Otherwise, the machine will unexpectedly operate to possibly lead to a machine trouble.<br>If it is inevitably necessary to rewrite the program, gain the permission of SANMEI or responsible person.<br>Moreover, be sure to store the content of the written program at each concerned section.<br>If this is skipped, the machine will sometimes become disable to maintain and modify. |
| | **Do not replace any battery used in the PLC with one different in the model, polarity or other.**<br>There may be a danger of explosion.<br>For replacement, use the battery of the model recommended by the maker or equivalent.<br>Dispose of the used battery according to the instruction of the manufacturer. |
|  Ground check | **Be sure to ground the machine.**<br>If it is not grounded, the leak breaker will not be activated when electricity leaks.<br>Do not connect any ground cable to the gas pipe. Otherwise, it may be exploded.<br>Unless it is grounded, it may cause an electric shock.<br>Apply the ground work of Special Class 3 to keep the ground resistance under 100Ω.<br>Assure the cross-sectional area of 14mm$^2$ or more for the ground cable. |
|  Obey the instruction | **When loosening the bolt or removing part, keep the stable posture for the work.**<br>If it is worked in any unstable posture, the body balance will be broken to possibly cause an unexpected injury. |
| | **Assure the maintenance area.**<br>Assure the maintenance area (workable space for machine maintenance). Moreover, install it at the place where any interference is not present when the door of the control panel is opened and closed. |

## CAUTION

| | |
|---|---|
|  Inhibitation | **Do not climb the machine or place any material on the machine.**<br>If it drops or falls down, it will cause an injury. |
| | **Do not disassemble, repair, relocate or discard the machine.**<br>If any defective part is present, it may cause a fire, electric shock or part drop, thus causing a wound. |
| | **Do not use any new and old belts together.**<br>Since the length and driving elongation are different between them, it may cause the transmission loss of the power and shorten the life of the belt. |

| ⚠ CAUTION | |
|---|---|
|  Inhibition | **Any person who is disordered in the acuity, auditory or mental sense must not operate the machine.**<br>Otherwise, any machine abnormality or similar will not be sensed, possibly resulting in a serious human accident. |
| | **Do not place any flammable dangerous material around the machine.**<br>If it is placed near the machine, it will catch fire to cause an explosion or fire hazard. |
| | **Do not do any welding work or handle fire around the machine.**<br>Otherwise, the oil used in the machine may catch fire to cause a fire hazard. |
| | **Do not put on any ring, necklace, watch, etc.**<br>Otherwise, it may cause an electric shock or winding-in accident. |
| | **Do not operate the machine, drinking alcohol, chemical, etc.**<br>Otherwise, it may cause a wrong judgment, possibly resulting in a serious human accident. |
| | **Do not remove any warning notice sticker.**<br>Otherwise, it may cause an accident.<br>If it is removed, contact our company. |
|  Wet hand inhibited | **Do not operate or maintain the machine with wet hand.**<br>Otherwise, an electric shock may cause a serious human accident. |
|  Ground check | **Be sure to separately ground the machine.**<br>If it is not separately grounded, it is very dangerous since the ground fault current flows into this machine from another machine if the ground terminal, etc. comes into contact failure.<br>When using the frame, etc. of the factory building as the ground pole, be sure to separate it from the ground of an electric welder, electric discharge machine or other noise generating machine.<br>Otherwise, the noise may malfunction the machine. |
|  Contact inhibitation | **During setup, do not touch any continuous operation button.**<br>If the ram is brought into continuous operation, it may cause such a human accident as the hand or similar is caught in. |
|  Obey the instruction | **When removing the part, take care to prevent the finger or similar from being pinched.**<br>Otherwise, it may cause a wound. |
| | **In emergency (malodor, irregular sound, large vibration, etc), stop the operation and turn off the power switch.**<br>If the operation is continued in any irregular state, it may cause an electric shock or fire. |
| | **Before replacing the belt, turn off the power source of the machine and clearly notify "Under maintenance".**<br>If the machine is carelessly operated during belt replacement, you may be pinched by the flywheel, thus resulting in a serious human accident. |
| | **Carefully set up the set of the dies to precisely adjust the pitch.**<br>If this process is skipped, it may cause not only a defectively threaded product but also an accident of the machine breakage due to the pull-back, etc. |
| | **Keep the air pressure on the primary side at 0.4 to 0.6Mpa.**<br>If the air pressure drops, it will cause the improper operation of the equipment. |

## ⚠ CAUTION

Obey the instruction

**Carefully adjust the flow rate of lubricant.**

If the flow rate is choked more than necessary, it will cause the slide surface to be seized.

**On the oil in use, periodically inspect its properties. If the oil quality varies or any impurity is mixed, immediately remove it and renew the oil.**

The deteriorated lubricant causes the friction on the slide surface, thus reducing the precision of the machine.

**When operating the machine, be sure to put the earplugs.**

Otherwise, the noise may impair the auditory organs.

**Make the floor as horizontal as possible, and install it at the place where the ground is sufficiently strong.**

**Do not install it at any place of the extremely high or low temperature. Do not install it at any place where chips, cutting oil, cooling water, etc. is splashed from another machine. (Ambient temperature: 0° to 45° Ambient humidity: 90% (Note that the temperature must vary without dewing.))**

It may cause a wound or accident.

**Input the power source, separating it from that of the electric welder, electric discharge machine or similar machine which generates noise.**

Otherwise, the noise may cause the machine to malfunction. If the capacity of the power source is insufficient, the voltage may drop to malfunction the machine.
Be sure to lead the power cables directly and separately from the sufficient power source.
Power source voltage : Nominal power source voltage within a fluctuation of –15% to +10%
Power source frequency : Nominal power source frequency within a fluctuation of ±2Hz

**When using the machine, operate it within the load capacity specified in the specifications and operation manual.**

If any excessive load is applied, the machine may be seriously damaged.

**In the rolling process, be sure to use the processing oil.**

If it runs at the high speed without use of the processing oil, the accumulated processing heat or other may thermally seize the friction surface or cause another trouble.

**Only a person who masters the operation, learns the safety education and is qualified as the operator by the company must operate the machine.**

If any unskilled person operates the machine, it may cause a human accident or machine trouble.

**Only a person who knows the method to stop the machine in emergency or at the normal time must operate the machine.**

If the method of emergency stop in emergency is not known, it may cause a human accident, and if it is not stopped in the proper procedure, it will trouble the machine.

**When operating the machine, put on the safety clothing.**

Otherwise, it may cause a wound.
Be sure to put on the safety shoes and gloves, and helmet or working cap.

**A person with long hair settles the hair with the working cap, and operates the machine.**

If any hair is wound in by the machine, it will result in a human accident.

■ **Safety rules for operation (Item to keep)**

Make sure that any working tool or die is not placed on the machine or cover.
Make sure that all adjustment areas are securely fastened.
Clean the working area off waste material and obstacles.
Wipe the floor surface of the working area off oil and similar against the slip.
If any defect, danger or abnormality is present, immediately contact the foreman.

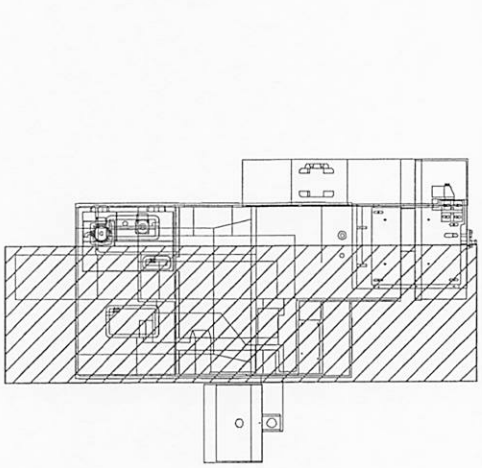
■ **Safety rules for setup (Items to inhibit)**

Do not use any mismatched tool, spanner, wrench or other tool.
Do not use any pliers instead of the spanner and wrench.
Do not use any wider-mouthed spanner or round-cornered wrench.
Do not use any screwdriver instead of the wedge and chisel.
Do not hit any spanner or wrench with the steel-made hammer.
(If it is necessary to hit it, use copper hammer.)
Do not tighten any screw, bolt, nut or similar using the pipe which breaks the thread.
Do not forcibly turn any bolt or nut which may be thermally seized.

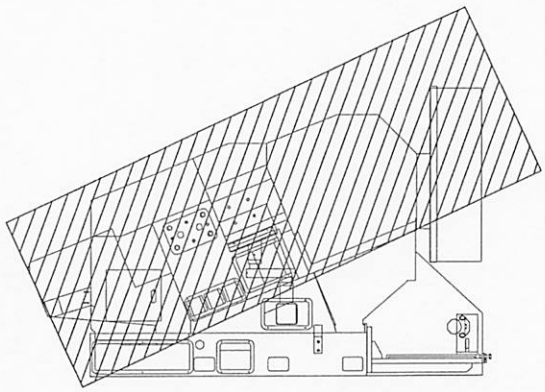
## a. Dangerous area

Though care is taken for safety during design and manufacture of the equipment, the dangerous areas are inevitably remained. During the work, take sufficient care for the access to the drive ram area, starter area and discharge rail damper area, and their operation and contact.

The dangerous areas of this machine are hatched in the following drawing.



Top view



Left side view

| | |
|---|---|
| ⚠ | **DANGER** |

**Do not touch any operating area.**

The machine rotates at a high speed. If any part of the human body touches the operating area, the body will be wound in, possibly resulting in a serious injury or death.
During continuous operation, never be near any operating area (hatched in the drawing).

| | |
|---|---|
| ⚠ | **DANGER** |

**Never remove any cover of the rotating part.**

If any cover is inevitably removed for the maintenance or other purpose, be sure to turn off the power source on the primary side.

# 2. Before Operating the Machine

Thank you very much for purchasing our machine.
Special care is taken for the safety in the design and manufacture stages of the machine.
However, to safely operate and maintain the machine, it is necessary for the operators and maintenance service person to observe the safe rules.

■ **For proper operation, refer to the Instruction Manual.**

Even if the machine is designed and manufactured with sufficient care, the component may be broken or troubled due to the carelessness or mistake of the operator or service person, possibly leading to a human accident in the worst case.
Accordingly, the operators and service person must read through this Instruction Manual and observe the instructions.

■ **After understanding, operate the machine.**

When reading the Instruction Manual to the last, read the cautionary items once again and completely understand the content. Then operate the machine.
Store this Instruction Manual without dirtiness, and at the accessible place in order to refer to it at all times.

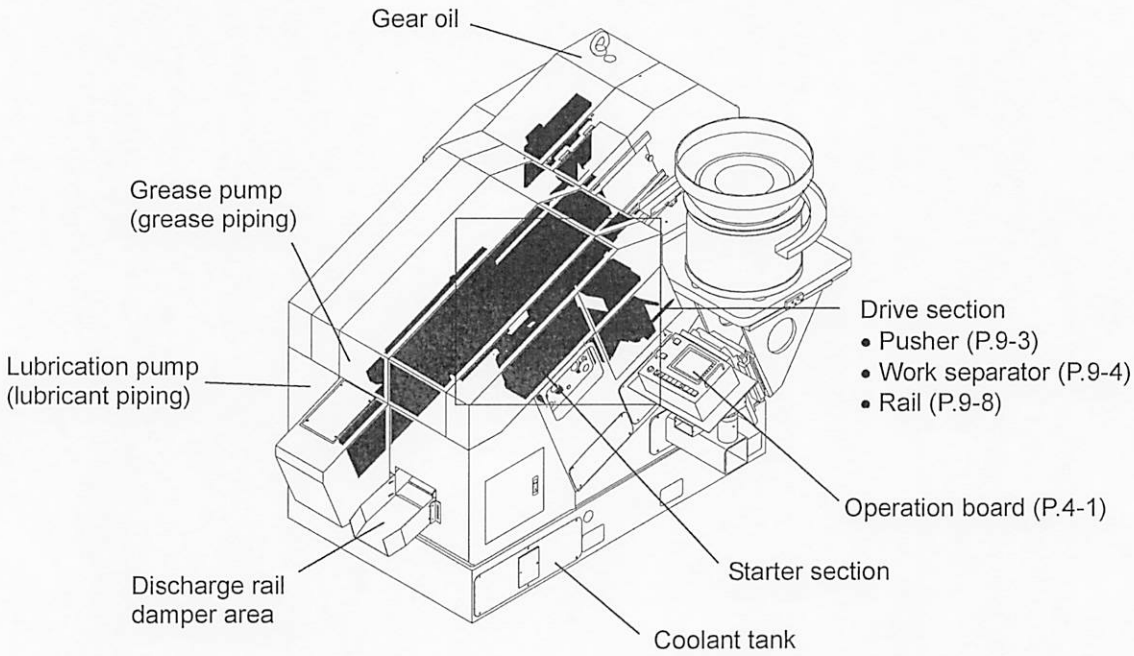
■ **Take the daily care, and keep the rules.**

Copy "6. Work-start Inspection Table" and "7. Periodic Inspection Table", and use it for the daily maintenance.
It is also requested to observe the safe rules which are specified by the safety laws and your company.

* If any doubtful point is found in the instruction manual, consult the business man of SANMEI WORKS.

# 3. Outline and Specifications of Machine

**12R Evolution**



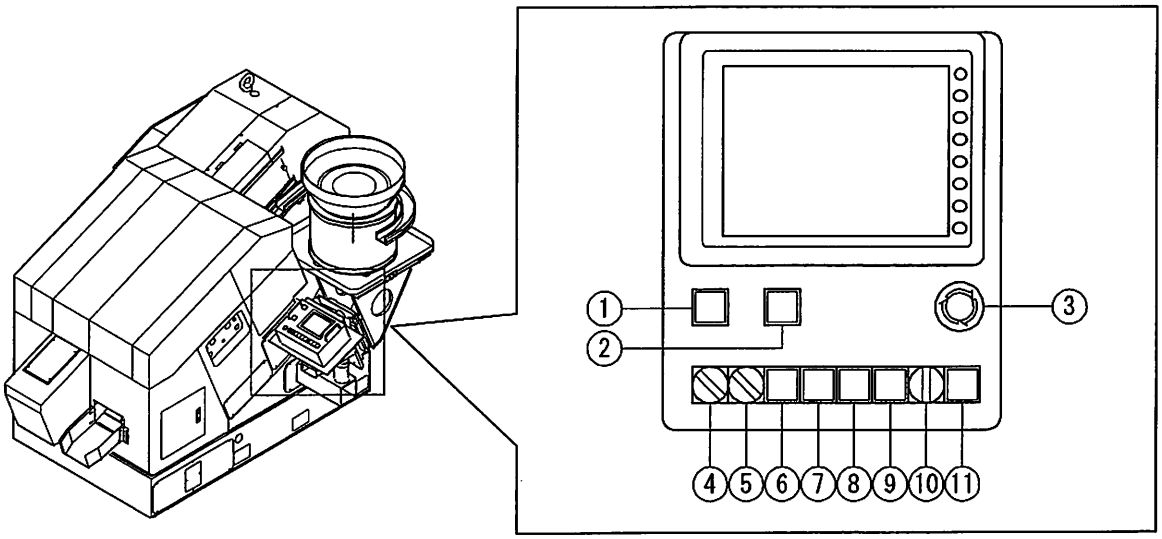

■ **Rolling machine THI-12R Evolution specifications**

| Item | Specifications | |
|---|---|---|
| Rollable maximum nominal diameter | M12 | |
| Rollable maximum thread length | 50mm | |
| Rollable maximum under head length | 150mm (Note, for half-thread) | |
| Rolling performance (per minute) | 50 to 150 pieces | |
| Transmission | Inverter | |
| Standard die dimensions | 200/220×38×40Hmm | |
| Die pocket dimensions | 201/256×35×135Hmm | |
| Ram stroke | 460mm | |
| Starter | Circular cam method | |
| Pitch alignment | Eccentric pin pitch alignment mechanism | |
| Rail up/down adjustment | One-touch clamp/ratchet lever type | |
| Brake | Yushin pneumatic disc brakes DBA-50 | |
| Sliding surface | Tungsten zebra slide | |
| Sliding surface lubricant | Circulating type continuous lubrication method (with flow check) | |
| Coolant | Coolant/lubricant separation method | |
| Supply device | ø500 vibratory feeder (According to specifications) | |
| Motor applied and others | Main motor | Fuji Electric Totally enclosed fan-cooled motor<br>200V 3 phases 4P 15kW |
| | Inverter | Fuji Electric Inverter FRN15E1S-2J<br>200V 3 phases Output 60A |
| | Lubrication pump | Showa Pump for continuous lubrication MLA015W<br>200V 3 phases 4P 25W |
| | Coolant pump | Teral Self-priming type oil pump VKN055A<br>200V 3 phases 2P 60W |
| | Grease pump | Showa Sinepump SHG121 |
| Machine dimensions | W1265×L2290×H1510mm | |

# 4. Operation

## 4-1. Description of operation board

For details, refer to the drawing in each board.




Operation board

■ **Operation switches (Indication color: G = Green, R = Red, W = White, Y = Yellow)**

| Indication lamp | Lamp color | Name | Operation description |
|---|---|---|---|
| 1 | W | Power source | Power turns ON when pressed in the stopped state. Power turns OFF when pressed again. |
| 2 | G | READY | READY state is activated when pressed. |
| 3 | R | Emergency stop | Emergency stop is applied when pressed. |
| 4 | | Oil pump (ON/OFF) | Press to turn oil pump ON/OFF. |
| 5 | | Continuous/Inching | Press for continuous operation or inching operation. |
| 6 | G | Ram (Start) | Press it, and the ram will start. |
| 7 | R | Ram (stop) | Press it, and the ram will stop. |
| 8 | | Ram jog | While it is pressed, the ram runs forward. |
| 9 | | Ram reverse jog | While it is pressed, the ram runs backward. |
| 10 | | Starter (open/automatic/close) | The starter controls starter operation. |
| 11 | Y | Reset | Press to reset operation state. |

# 4-2. Power turn-ON and shutdown

## a. Power turn-ON

Press up the handle of the breaker on the left upper area of the operation/control panel on the rear of the main body.
The power will be turned ON.
If the power is turned OFF since the breaker is activated due to the overcurrent, etc, remove the trouble which causes it. Then, fully lower the handle of the breaker to the extreme, and press it up.

Check whether the power lamp on the operation board is lit or not.
Unless it is lit, check the power source on the primary side.
Unless the power lamp is lit though the power is ON on the primary side, contact the maintenance service man, and check whether the non-fuse breaker in the control panel is activated or not.

## b. Power shutdown

After stopping all equipments with the buttons on the operation board, press down the handle of the breaker in the control panel to shut down the power source.

|  | **DANGER** |
|---|---|
| **A qualified electrical service person only must maintain or repair the electrical system.**<br>If it is done by any unqualified worker, it may lead to an electric shock or serious human accident. | |

# 5. Machine Starting Method after Long Holidays

12R Evolution

## a. Coolant

After the machine has stopped for holidays or other long terms, the rolling oil may run out in the coolant pump.
It the internal fluid runs out, the pump does not suck any oil even though the motor runs. In such a case, fill approx. 150cc of the priming oil from the discharge port of the coolant.

## b. Slide surface

After the machine is stopped for a long term, the lubrication may run out on the slide surface.
If the machine is brought into continuous operation, the slide surface may be damaged.
Refill the lubricant, press the lubrication pump "ON" and press the jog button of the lubrication pump. Then run the pump approx. 10 minutes under no load.

# 6. Work-start Inspection Table

## Work-start inspection table

| Inspection date year month | | | Machine No. | | | | | Person in charge | | | | | | Section/responsible person name | | | | | | | | | | | Judgment result Normal ○ Defective × | | | | | Approval | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| No. | Inspection item | Inspection method | Criterion | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 | 19 | 20 | 21 | 22 | 23 | 24 | 25 | 26 | 27 | 28 | 29 | 30 | 31 |
| 1 | Lubricant | Visual check | Specified amount | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 2 | Grease | Visual check | Specified amount | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 3 | Coolant | Visual check | Specified amount | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 4 | Air pressure | Pressure gauge Visual check | 0.4 to 0.6MPa | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 5 | Discharge rail damper | Visual check | Does it operate normally? | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 6 | Starter stop | Visual check | Does it operate normally? | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 7 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |

# 7. Periodic Inspection Table

The periodic maintenance and inspection are recommended to maintain the machine precision and safely operate the machine. Since the periodic inspection table is shown below, refer to it.

Machine No. :
Inspection date :
Service person : Sign

| Inspection item | Inspection method | Inspection interval | Result | Remarks |
|---|---|---|---|---|
| Wear of main bearing | Abnormal noise during operation | Every day | | |
| Run-out of main shaft | Measure the run-out of Pitman | Every 3 months | | |
| Main V belt and pulley | Visual check | Every 3 months | | |
| Wear of cam | Visual check | Every 3 months | | |
| Wear of cam roller follower | Turn it with hand to check the backlash | Every 3 months | | |
| Wear of starter slide | Turn it with hand to check the backlash | Every month | | |
| Wear of pusher | Visual check | Every month | | |
| Wear of work stopper | Visual check | Every month | | |
| Scratch of die pocket | Check it with hand feeling | During setup | | |
| Wear at the tip area of rail | Visual check | Every 3 months | | |
| Wear of rail | Visual check | Every 3 months | | |
| Parallelism of ram die block | Measure with dial gauge | Every 3 months | | |
| Wear of slide surface | Move the ram for check | Every 3 months | | |
| Wear of ram pin | Move the ram with hand to check the backlash | Every 3 months | | |
| Wear of adjusting plate | Visual check | Every month | | |

# 8. Description of Terms Used



The terms used in this manual are described as follows.

■ **Machine and concerned**

| Term | Description |
|---|---|
| Adjusting plate | Guide plate to feed the product into the die. |
| Inner rail end plate | Part to support and guide the products when the parts are fed into the dies. |
| Rail | Guide to transfer the part from the supply device to the die. |
| Starter | Mechanism to feed the product into the die. |
| Starter circular cam | Cam to drive starter synchronously with the rotation of the machine. |
| Starter center lever | Lever to connect the cam and starter. |
| Die block | Block where the die is set up on the fixed side. |
| Pitman gear | Geared plate to convert the rotary movement into the linear movement. |
| Flywheel | Flywheel to transmit the power from the motor to the drive section. |
| Plunger | Plate to push and feed the product into the die. |
| Ram | Block where the die is set up on the movable side.<br>The product is rolled and formed with the reciprocation linear movement joined to Pitman gear. |
| Work separator | Block to separate one by one the products which are continuously flowed on the rail. |

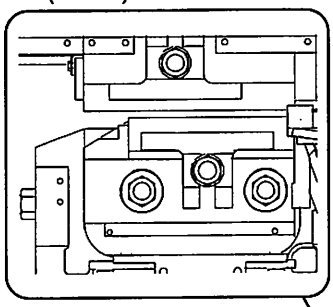
■ **Electricity and concerned**

| Term | Description |
|---|---|
| Electric circuit | It is a path where electricity flows. |
| Voltage | It is a pressure which drives the electricity to flow. (Unit: volt (V)) |
| Current | It is the pressure of the electric current when the electricity flows. (Unit: ampere (A)) |
| Alternate current (AC) | The strength of the voltage and current, and the current direction alternate at the constant intervals. |
| Direct current (DC) | The strength and direction of the current are continuously constant. |
| Electromagnetic switch (magnet) | When it is energized, the switch opens and closes the electric circuit with the force of the electric magnet. It is mainly used for the electricity of a large capacity. |
| Relay | When it is energized, the relay opens and closes the electric circuit with the force of the electric magnet. It is used to control the electricity such as signals. |
| Electromagnetic valve (solenoid valve) | When it is energized, the device opens and closes the valve with the force of the electric magnet. It is used to control the flow of the fluid such as an air and oil, etc. |
| Electromagnetic switch protective circuit (thermal relay) | The device protects the rotary component and others from the overcurrent, etc.<br>If any overcurrent is detected, the circuit will be shut down. |
| Transformer | The device converts the AC voltage. |

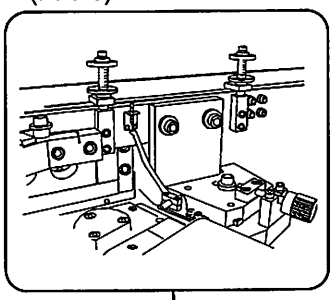
# 9. Adjusting Method of Each Component



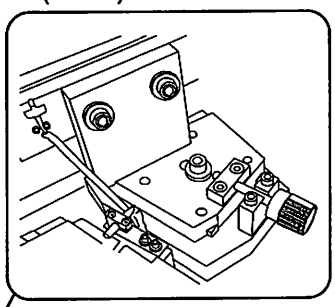
a. Replacing the flat die (P. 9-2)



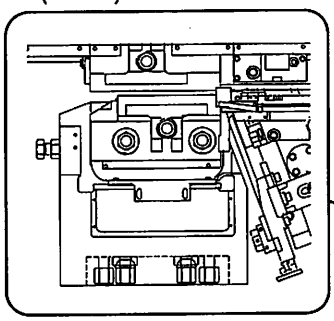
g. Adjusting the head retainer (P. 9-8)



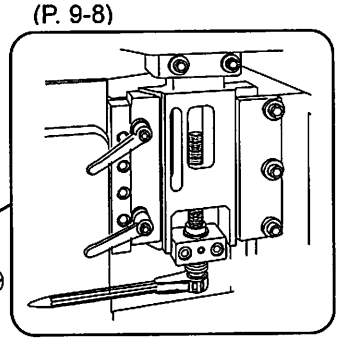
f. Adjusting the rail width (P. 9-8)

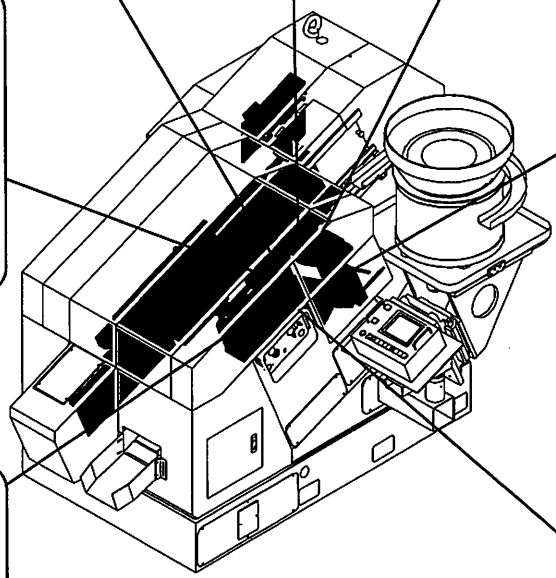


c. Adjusting the pitch (P. 9-5)

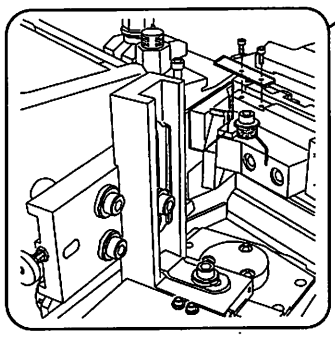


e. Adjusting the rail up/down movement (P. 9-8)

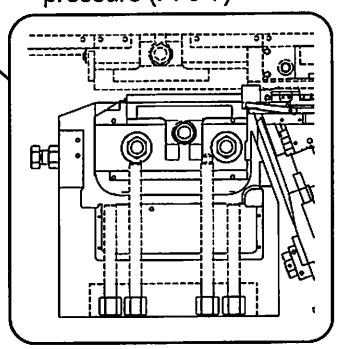




b. Adjusting and replacing the pusher and work separator (P. 9-3)

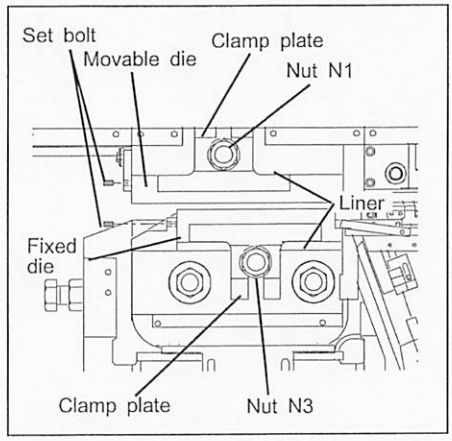


d. Adjusting the fixed die pressure (P. 9-7)

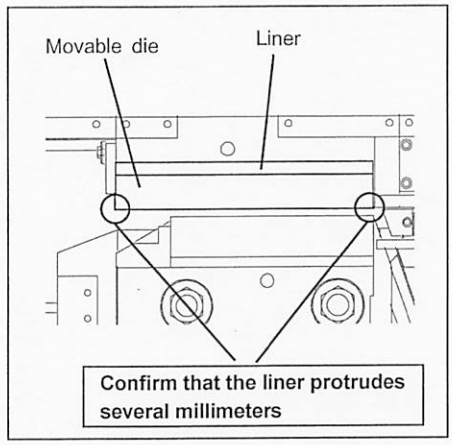


## a. Replacing the flat die

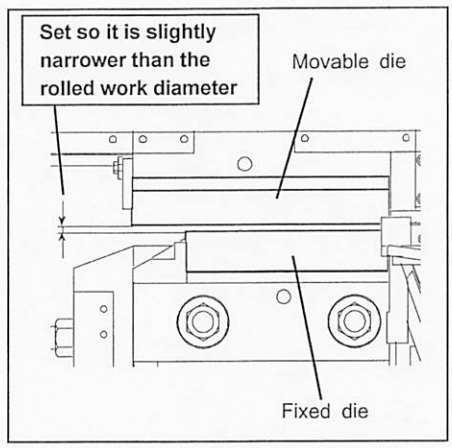
(1) Loosen the nut N1 and nut N3 which are fixing the clamp plate, and remove the clamp plate (both moving side and fixed side).
(2) Loosen the set both which is fixing the moving die and fixed die.
(3) Remove each die and liner.




(4) Clean the die mounting section of the die holder with a rag, etc.
(5) Select a liner so that the moving die's thread surface protrudes 3 millimeters from the die holder, and set the moving die.

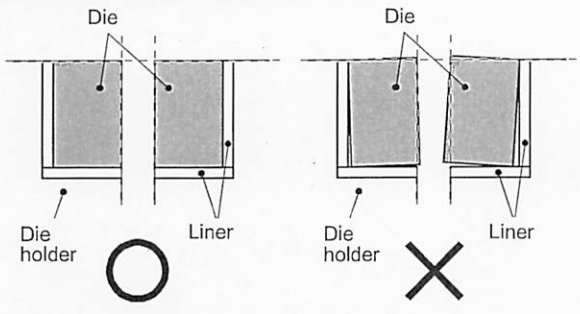



(6) Before setting the fixed die, confirm that it can be properly adjusted to the front and back.
(7) Select a liner so that the fixed die protrudes slightly from the end of the adjusting plate, and set the fixed die.

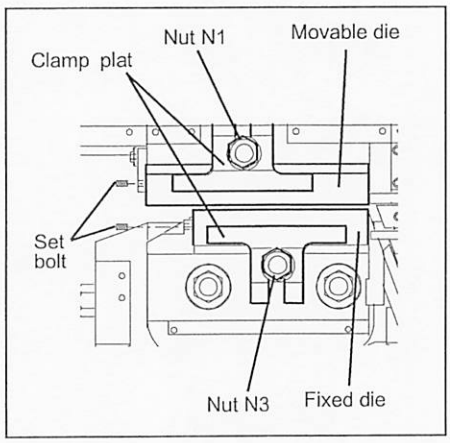



**CAUTION**

**Adjust the liner so that the die height is uniform or parallel on the top of the die holder.**



(8) Tighten the set bolt.
(9) Mount each clamp plate with nuts N1 and N2, and fix each die.



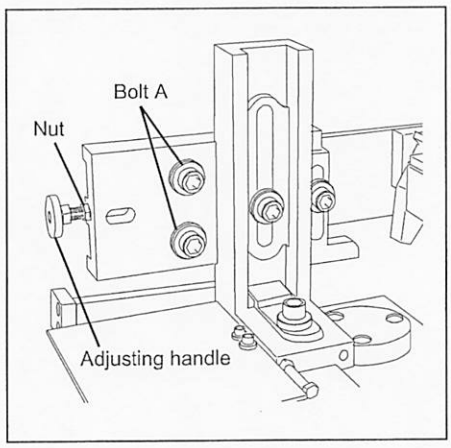

## Points for Mounting

- Select a die with the proper size for the machine.
- Use a liner having a good flatness accuracy and parallel accuracy, and seat it against the die.
- Properly mount the die into the die holder.

## b. Adjusting and replacing the pusher and work separator

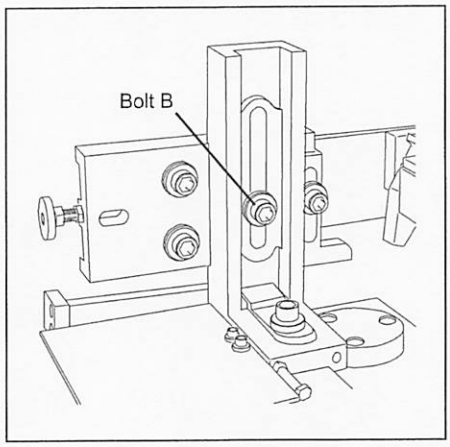
### ■ Replacement of pusher (Rolling of products of different nominal diameters)

(1) Jog the starter to return to the backward end.
(2) As shown in the right figure, loosen the nut, turn the adjusting handle leftward and return it.
(3) Loosen two bolts A, and pull them out. In this state, remove the pusher from the holder.
(4) After replacing the pusher with the new one, reverse the procedure of (1) thru (3) for reinstallation, and adjust the projection of the pusher with the adjusting handle.




### ■ Up/down adjustment of pusher

(1) Loosen the bolt B, and adjust it together with the pusher holder.
(2) After adjustment, tighten the bolt B to fasten the pusher holder.




## WARNING

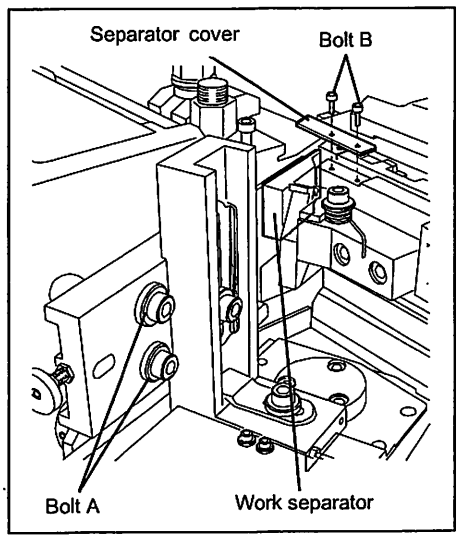
**Work in the stable posture.**
If you work in the unstable posture, you may loss the balance to cause an unexpected wound.

## ■ Replacement of work separator (Rolling of products of different nominal diameters)

(1) Remove two bolts B and the work separator cover.

(2) Remove the pusher in the procedure of "b. Replacement of pusher".
In this state, slide the work separator sideward, and it will be removed.
For removal, pull the separator lever toward you.

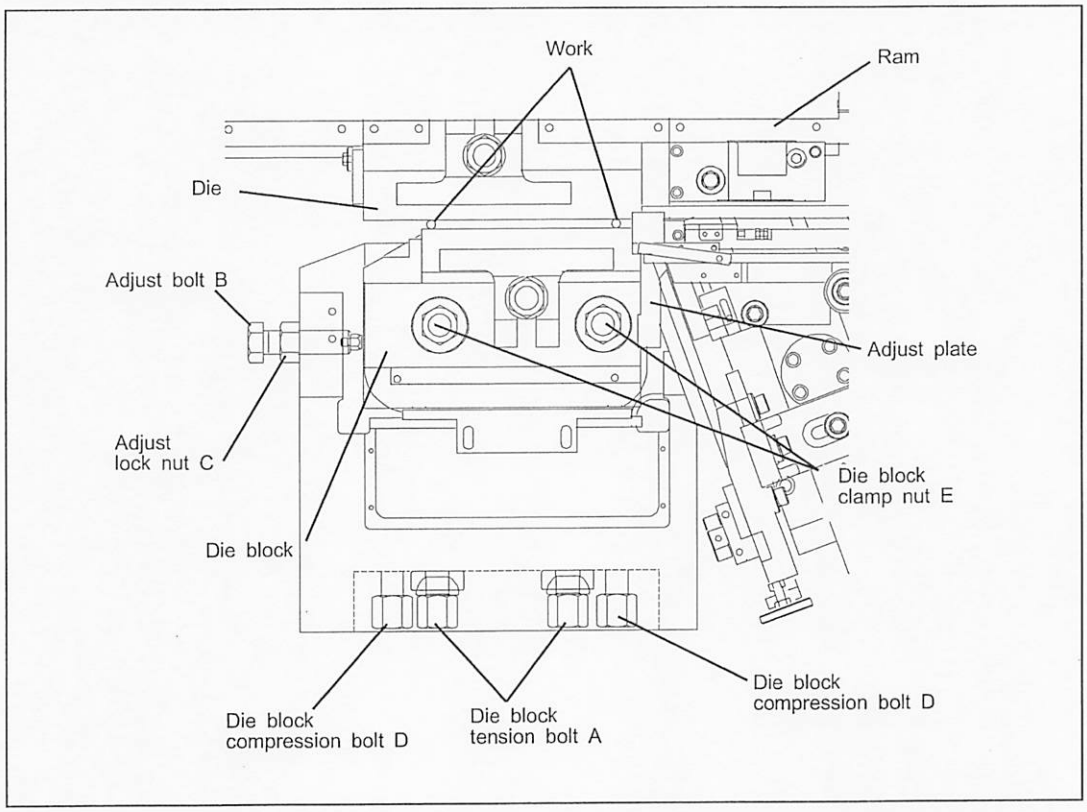
(3) After replacing the work separator with the new one, reverse the procedure of (1) through (2) to install the work separator cover and pusher.




| | CAUTION |
|---|---|
| The spring of the work separator is activated.<br>When removing the separator, take care to prevent the hand from being pinched with the lever. | |

## c. Adjusting the pitch

After replacing the die, adjust the pitch with the following method.




(1) As shown in the drawing, grip two workpieces at the entrance and exit of the die, and tighten the die block compression bolts D clockwise.
Tighten the bolts until the workpieces are gripped tightly by the die.

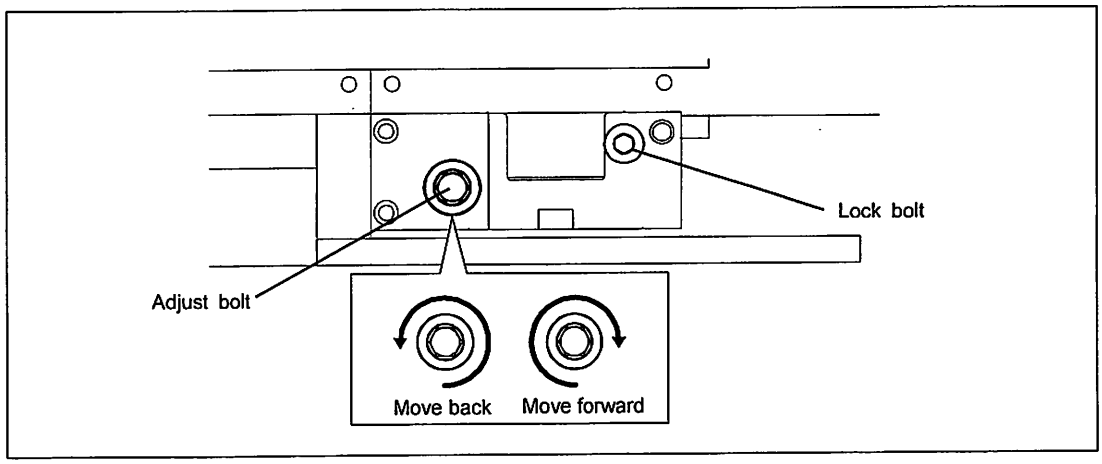
(2) Grip the workpiece between the adjusting plate and adjusting holder. Push the die block until the workpiece is lightly applied, and then tighten the adjusting bolt B.
When the die block position has been determined, fix the adjusting bolt B with adjusting lock nut C.

(3) Tighten the die block clamp nut E in this state.

(4) Tighten the die block tension bolt A clockwise.
The die block will lower by the amount that the die block tension bolt A was tightened. Tighten the die block compression bolt D again, so that the die securely grips the workpiece.

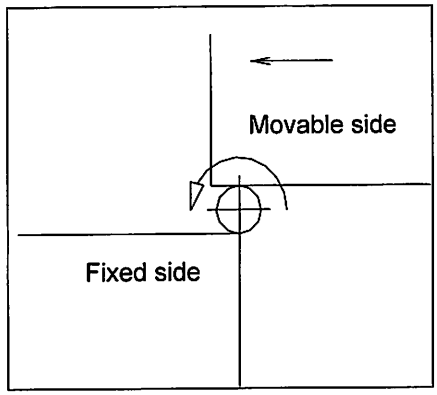
(5) Move the ram with inching and remove the gripped workpiece. Tighten the die block compression bolt D by about a half turn.

(6) Loosen the lock bolt, and move the ram by turning the adjusting bolt.
The adjusting bolt rotation direction and ram movement direction are shown below.

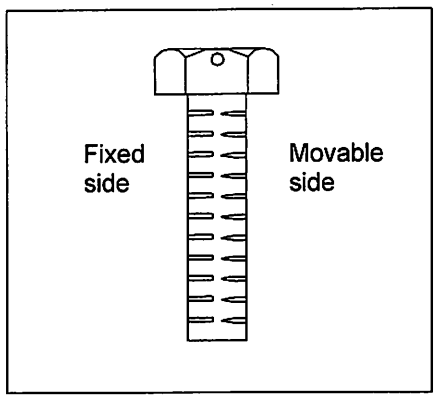



When the adjusting bolt is turned clockwise, the ram will move up to 9mm to the front. When turned counterclockwise, the ram will move up to 9mm to the back.

(7) Grip the work on the die, and jog it to turn half a turn.
At this time, mark the head of the work. It will make it easy to find which part bites the die on the fixed side.




(8) From the die mark on the work, judge which is higher, the movable die and fixed die, and move the ram with the turnbuckle to align the pitch.
The left side of the mark on the head indicates the mark of the fixed die, and the right side indicates the mark of the movable die. Since the movable die is lower in case of the right figure, turn the turnbuckle toward you to move the ram rightward. Since the lead of the die is lower rightward, turn the turnbuckle toward you, and the ram will move rightward to make the die mark of the movable side higher. Turn the turnbuckle far, and the ram will move leftward to make the die mark on the movable side lower.

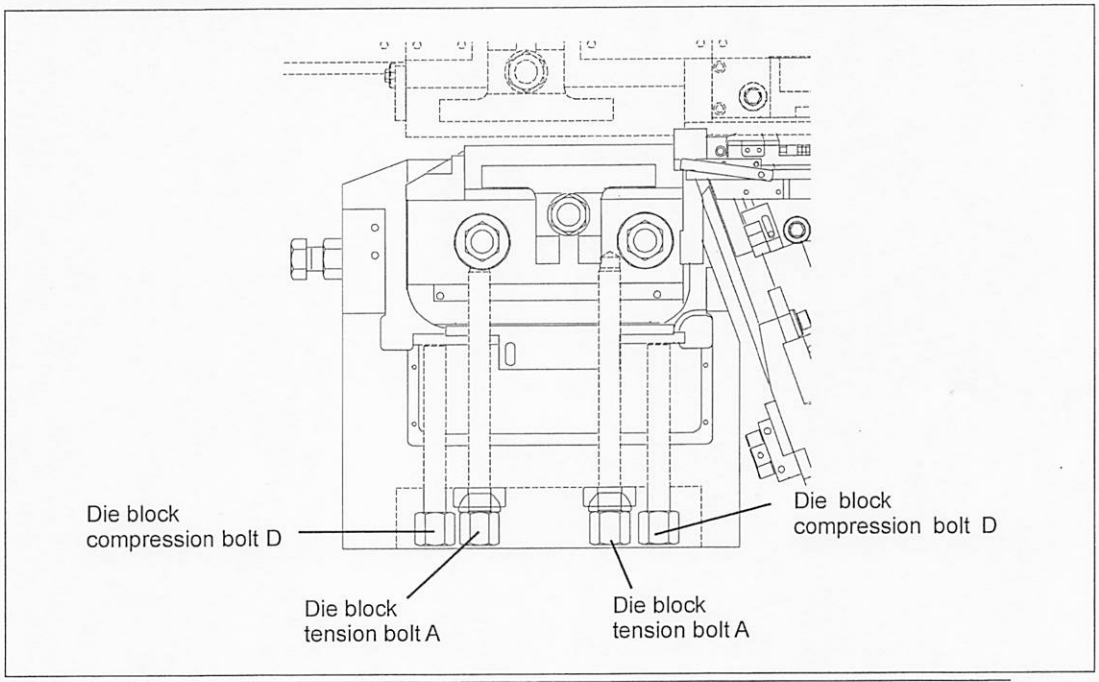


(9) After adjusting the pitch, tighten the lock nut and fix the ram.
Roll several workpieces with inching and check the pitch. If it is correct, adjustment of the pitch is finished.
When finished adjusting the pitch, check that each section is properly tightened (nuts N1 and N3, die block clamp nut E, etc.).

| | |
|---|---|
| ⚠ | **CAUTION** |
| **Carefully set up the dies, and accurately align the pitch.**<br>If it is skipped, it causes not only the occurrence of defective thread but also such an accident as the machine is troubled due to the pull-back. | |

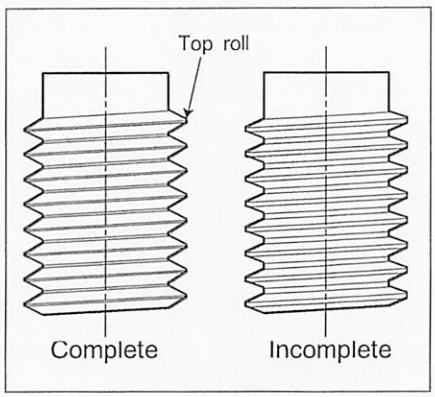
## d. Adjusting the fixed die pressure

(1) After adjusting the pitch, roll the workpiece to the end. While checking for faults in the thread padding, gradually turn with the die block tension bolt A and die block compression bolt D, and adjust so that the rolling pressure is evenly applied on the die.




(2) In the fixed die pressure state, the peak of the thread should lightly contact the base of the die, and a smooth R (top roll) should be formed at the peak section.

(3) After adjusting the fixed die pressure state, adjust the pitch again (step C).
When finished, check that each section is properly tightened (nuts N1 and N3, die block clamp nut E, etc.).



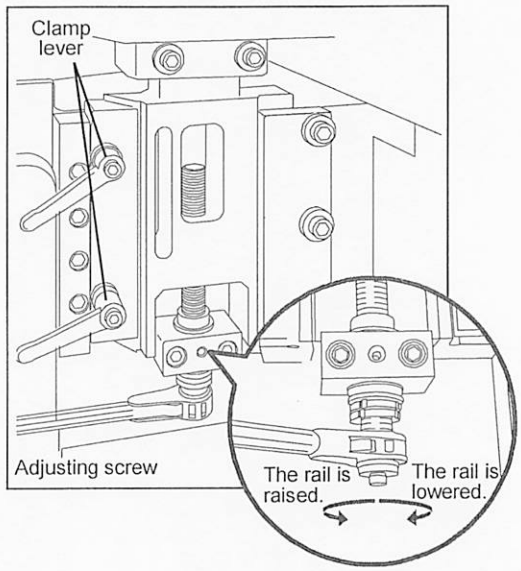
## e. Adjusting the rail up/down movement (Up/down adjustment of rail for semi-thread rolling)

(1) Loosen the clamp by raising the clamp lever which fastens the rail bracket base.

(2) Turn the adjust screw to adjust up and down the rail.

(3) After adjustment, securely lower the lever to fasten the rail bracket base.

As the adjust screw is turned counterclockwise, the rail is lowered. As it is turned clockwise, the rail is raised.



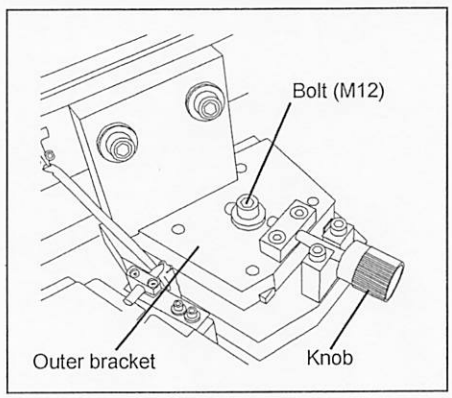

| | CAUTION |
|---|---|
| **Securely tighten the clamp lever.**<br>If it is loose, the rail which must be the process reference becomes unstable, possibly causing the defective thread. | |

## f. Adjusting the rail width

(1) Loosen the bolt (M12).

(2) Turn the knob, move the outer bracket, and adjust the rail width.
As reference, the rail should be wide enough to allow the workpieces to flow smoothly, but the workpieces should not drop in.

(3) After adjusting, securely tighten the bolt (M12), and fix the outer bracket.



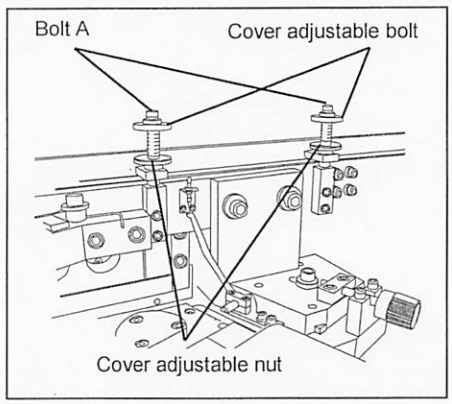

## g. Adjusting the head retainer

(1) Loosen two bolts A.

(2) Loosen two cover adjusting nuts.

(3) Turn two cover adjusting bolts, move the rivet cover up and down and adjust the head retainer gap so that the workpieces flow smoothly.

(4) After adjusting, reverse the procedure of (1) and (2), tighten two cover adjusting nuts and bolt A again.




| | WARNING |
|---|---|
| **Work in the stable posture.**<br>If you work in the unstable posture, you may loss the balance to cause an unexpected wound. | |

# Appendix 1. Recommended Lubricants and MSDS (Material Safety Data Sheet)

## Appendix 1-1. Lubricants

The oil used as the lubricant must satisfy the following conditions.
(1) It prevents rust and corrosion, and the lubrication capacity is high.
(2) It is scientifically stable, and the separation degree is high against water and others.
(3) It must not be deteriorated nor be mixed with foreign materials.

The recommended lubricants are listed as follows.

■ **Recommended lubricant list**

| Maker | Recommended brand |
|---|---|
| Idemitsu Kosan | DAPHNE MULTIWAY 68C |
| Esso General Oil | Febis K68 |
| Cosmo | Cosmo Mighty Super 68 |
| Showa Shell | Shell Tonna Oil T68 |
| ENEOS | UNIWAY 68 |
| Japan Energy | Slidus 68 |
| Kygnus | Way lubricant 80 |

If even any other brands except above comply with "Lubricant Viscosity Grade ISO VG68" specified by JIS and satisfy the conditions above as the slide surface lubricant, they are applicable.
At shipment from the factory, Idemitsu "DAPHNE MULTIWAY 68C" is used as the lubricant.
Hereafter, MSDS (Material Safety Data Sheet) of the product is added.

For lubricant replacement, refer to "Maintenance Manual for Rolling Machine" appended, or consult the business man of our company.

Conforms to 91/155/EEC - 2001/58/EC - Europe

# SAFETY DATA SHEET

**32290322 DAPHNE MULTIWAY 68C**

## 1. Identification of the substance/preparation and of the company/undertaking

| | | | |
|---|---|---|---|
| Product name | : 32290322 DAPHNE MULTIWAY 68C | Manufacturer | : IDEMITSUKOSAN CO., LTD.<br>3-1-1 MARUNOUCHI<br>CHIYODA-KU<br>TOKYO JAPAN<br>PHONE : +81-3-3213-3143 |
| Emergency telephone number | : +81-3-3213-3143 | Supplier | : ' |
| Material Uses | : Not available. | | |

## 2. Composition / information on ingredients

Substance/Preparation : Preparation

To present knowledge of the supplier, this product does not contain any hazardous ingredients in quantities requiring reporting in this section, in accordance to EU regulations or National regulations.

## 3. Hazards identification

The preparation is not classified as dangerous according to Directive 1999/45/EC and its amendments.

Skin Contact : Irritation of the product in case of skin contact: Not available.
Sensitization of the product: Not available.

Aggravating conditions : Repeated or prolonged exposure is not known to aggravate medical condition.

## 4. First-aid measures

First-Aid measures

Inhalation : If inhaled, remove to fresh air. If not breathing, give artificial respiration. If breathing is difficult, give oxygen. Get medical attention.

Ingestion : Do NOT induce vomiting unless directed to do so by medical personnel. Never give anything by mouth to an unconscious person. If large quantities of this material are swallowed, call a physician immediately. Loosen tight clothing such as a collar, tie, belt or waistband.

Skin Contact : Wash with soap and water. Get medical attention if irritation develops.

Eye Contact : Check for and remove any contact lenses. In case of contact, immediately flush eyes with plenty of water for at least 15 minutes. Get medical attention.

## 5. Fire-fighting measures

Extinguishing Media

Suitable : SMALL FIRE: Use DRY chemical powder.
LARGE FIRE: Use water spray, fog or foam. Do not use water jet.

Hazardous thermal (de)composition products : These products are carbon oxides (CO, CO2).

Special fire-fighting procedures : Fire fighters should wear positive pressure self-contained breathing apparatus (SCBA) and full turnout gear.

Protection of fire-fighters : Be sure to use an approved/certified respirator or equivalent.

## 6. Accidental release measures

Personal precautions : Splash goggles. Full suit. Boots. Gloves. Suggested protective clothing might not be sufficient; consult a specialist BEFORE handling this product.

Environmental Precautions and Clean-up Methods : Absorb with an inert material and put the spilled material in an appropriate waste disposal.

Note: See section 8 for personal protective equipment and section 13 for waste disposal.

*32290322 DAPHNE MULTIWAY 68C*

## 7. Handling and storage

Handling : Keep away from heat. Keep away from sources of ignition. Empty containers pose a fire risk, evaporate the residue under a fume hood. Ground all equipment containing material. Do not ingest. Do not breathe gas/fumes/ vapor/spray. Wear suitable protective clothing. If ingested, seek medical advice immediately and show the container or the label.

Storage : Keep container tightly closed. Keep container in a cool, well-ventilated area.

Packaging materials

Recommended use : Use original container.

## 8. Exposure controls/personal protection

Engineering measures : Provide exhaust ventilation or other engineering controls to keep the airborne concentrations of vapors below their respective occupational exposure limits. Ensure that eyewash stations and safety showers are proximal to the work-station location.

Hygiene measures : Wash hands, forearms, and face thoroughly after handling compounds and before eating, smoking, using lavatory, and at the end of day.

Occupational Exposure Limits : Not available.

Personal protective equipment

Respiratory system : Wear appropriate respirator when ventilation is inadequate.

Skin and body : Lab coat.

Eyes : Safety glasses.

## 9. Physical and chemical properties

Physical state : Liquid.

Color : Yellow. (Light.)

Odor : Characteristic.

pH : Not applicable.

Melting Point : -15°C (5°F)

Flash point : Open cup: 226 °C (438.8°F) (Cleveland.).

Explosive properties : Risks of explosion of the product in presence of mechanical impact: Not available.
Risks of explosion of the product in presence of static discharge: Not available.

Oxidizing Properties : Not available.

Density : 0.8695 g/cm$^3$ (15°C / 59°F)

Solubility : Insoluble in cold water.

Viscosity : Kinetic: 66.96 cSt (@40 ? )

## 10. Stability and reactivity

Stability : The product is stable.

Hazardous Decomposition Products : These products are carbon oxides (CO, CO2).

## 11. Toxicological information

Local effects

Chronic toxicity : Repeated or prolonged exposure is not known to aggravate medical condition.

## 12. Ecological information

*32290322 DAPHNE MULTIWAY 68C*

## 13. Disposal considerations

Methods of disposal ; Waste of residues ; Contaminated packaging : Waste must be disposed of in accordance with federal, state and local environmental control regulations.

Waste Classification : Not applicable.

European Waste Catalogue (EWC) : Not available.

Hazardous Waste : To present knowledge of the supplier, this product is not regarded as hazardous waste as defined by EU Directive 91/689/EC.

## 14. Transport information

International transport regulations

| Regulatory Information | UN number | Proper shipping name | Class | Packing Group | Label | Additional information |
|---|---|---|---|---|---|---|
| ADR/RID Class | Not available. | Not available. | Not available. | | | - |
| ADN Class | Not available. | Not available. | Not available. | | | - |
| IMDG Class | Not available. | Not available. | Not available. | | | - |
| IATA-DGR Class | Not available. | Not available. | Not available. | | | - |

## 15. Regulatory information

EU Regulations

Risk Phrases : This product is not classified according to the EU regulations.

Product Use : Classification and labeling have been performed according to EU directives 67/548/EEC, 1999/45/EC including amendments and the intended use.
- Consumer applications.

Additional Warning Phrases : Safety Data Sheet available for professional user on request.

EC Statistical Classification (Tariff Code) : 32089091

## 16. Other information

Full text of R-Phrases with no. appearing in Section 2 - Europe :

Text of classifications appearing in Section 2 - Europe :

HISTORY

Date of printing : 2002/10/16.

Date of issue : 2002/10/16.

Date of Previous Issue : No Previous Validation.

Version : 1

Prepared by :

Notice to Reader

To the best of our knowledge, the information contained herein is accurate. However, neither the above named supplier nor any of its subsidiaries assumes any liability whatsoever for the accuracy or completeness of the information contained herein.
Final determination of suitability of any material is the sole responsibility of the user. All materials may present unknown hazards and should be used with caution. Although certain hazards are described herein, we cannot guarantee that these are the only hazards that exist.

## Appendix 1-2. Grease

Grease is a lubricant semi-solidified in the gel state with the thickening agent, being suitably applicable to the areas where the lubrication mechanism is difficult to be assembled in and the lubricant must be held.
Use the grease which complies with the grease Class 1 No. 1 (Thickening degree No. 1) of JIS for centralized lubrication.

The recommended greases equivalent to Class 1 No. 1 are listed below.

■ **Recommended grease list**

| Maker | Recommended brand |
|---|---|
| Idemitsu Kosan | DAPHNE EPONEX GREASE No. 1 |
| Esso General Oil | Listan 1 |
| Cosmo | Cosmo Centralized Grease No. 1 |
| Showa Shell | Shell Retinax Grease CL |
| ENEOS | EPINOX Grease AP1 |
| Japan Energy | Auto Grease 0 |
| Kygnus | MP Grease 1 |

At shipment from the factory, Idemitsu "DAPHNE EPONEX No.1" is used as the grease.
Hereafter, MSDS "Product Safety Data Sheet" of the product is appended.

For grease replacement, refer to "Maintenance Manual for Rolling Machine" appended, or consult the business man of our company.

IDEMITSU KOSAN CO.,LTD. 1/5

First issue : DEC ,12,2001
Revised : ----------
M SDS No . : 3810922 0

# Material Safety Data Sheet

## 1. CHEMICAL PRODUCT AND COMPANY IDENTIFICATION.

Product name : DAPHNE EPONEX GREASE No .1
P roduct code : 38109220
Company name : IDEMITSU KOSAN CO., ED
Address : No.1-1, 3-chome, Marunouchi, Chiyoda-ku, Tkyo, Japan
T elephone number : +81-3-3213-3143
Facsimile number : +81-3-3213-9415

## 2. COMPOSITION / INFORMATION ON INGREDIENTS.

Substance /Mixture : Mixture
Components
Lubricating Base Oil (Content: >85 Wt%) :
a nd
Lithium Soap(Content: < 10Wt %) nd Additives(Content: < 5Wt %)

C ompositioncomment
This product fit the ACGIH definition for mineral oil mist .
The ACGIH TLV is 5mg/m³ , the OSHAPEL is 5 mg/m³
This components areincluded in U.S TSCA Inventory

## 3. HAZARDS IDENTIFICATION.

E mergency overview :
Potential Health effects
E ye : Not expected to cause prolonged or significant eye irritation.
S kin: Contact the skin is not expected to cause prolonged or significant irritation.
Not expected to be harmful to internal organs if absorbed through the skin.
Ingestion: Not expected to be harmful if swallowed.
I nhalation: Contains a petroleum-based mineral oil . May cause respiratory ir ritation or other pulmonary effects following prolonged or repeated inhalation of oil mist at airborne levels the recommended mineral oil mist exposure limit.
( Recommendation ) Wear safety glasses and gloves while at work as a good

safety practice.

## 4. FIRST AID MEASURES.

Eye contact : Flush eyes freshwater for at least 15 minutes
then seek medical attention.
Skin contact : Wash contact areas thoroughly withsoap and water
Inhalation : Remove to fresh air. Cover the victim's body with blanket,
rest in keeping warm, and seek medical attention immediately.
Ingestion : If swallowed, donot inducevomiting. Seek medical attentionimmediately.
If contaminatedin mouth,flush thoroughlywith water

## 5. FIRE-FIGHTING MEASURES.

Flammable properties:
Flash point and Method: > 200 ℃ ( SETA ) for Base Oil
Flammable Limits : Lower 1vol% Upper 7vol% (estimate).
Extinguishing media : $CO_2$, Dry Chemical, Form and Water Fog.
Fire fighting instructions :
For fires involving thismaterial, do not enterany enclosed or confinedfire space without proper protective equipment, including self-containedbreathing apparatus.
Combustion products :
Normal combustionforms carbon dioxide andwater. Incomplete combustion can produce carbonmonoxide.

## 6. ACCIDENTAL RELEASE MEASURES.

Stop the source of the leak or release. Clean upreleases as soon as possible, observing precautionsin Exposure Controls/Personal Protection.
Contain greaseto preventfurther contaminationof soil, surface wateror groundwater. Clean up small spills using appropriate techniques such as sorbent materials or pumping.
Where feasible andappropriate, remove contaminated soil.
Follow prescribed procedures for reporting and responding to larger releases.

## 7. HANDLING AND STORAGE

Do not weld, heat or drill container Residue may ignite with explosive violence if heated sufficiently

CAUTION : Do not use pressure to empty drum or drum may rupture with explosive force.

## 8. EXPOSURE CONTROLS / PERSONAL PROTECTION.

Engineering Controls :

Use adequate ventilation to keep the airborne concentrations of this material below the recommended exposure standard.

Personal protective equipment :

Eye/ Face Protection :

No special eye protection is usually necessary. Where splashing is possible wear safety glasses with side shields as a good safety practice.

Skin protection :

No special protective clothing is normally required Avoid prolonged or frequently repeated skin contact with this material.

Skin contact can be minimized by wearing protective clothing.

Respiratory protection :

No respiratory protection is usually necessary. However if operating conditions create airborne concentrations which exceed the recommended exposure standards, the use of an approved respirator is required

## 9. PHYSICAL AND CHEMICAL PROPERTIES.

Physical description :

Light brown paste with characteristic order.

Solubility : Negligible in water

Density : 0.90~1.0 g/cm³ ( @15℃ )

Dropping Point : 194℃

## 10. STABILITY AND REACTIVITY.

Hazard ous decomposition products : No data available
Chemical stability : stable
Condition to avoid : No data available
Incompatibility with other materials. May react with strong oxidizing agent, s uch as chlorates, nitrates, peroxides, etc.
Hazardous polymerization: polymerization will not occur

## 11. TOXICOLOGICALINFORMATION.

E ye effects : No product toxicology data available.
S kin effects : No data available.
A cute oral effects : No data available.
Acute inhalation effects : No data available.
Additional toxicology information:
None of the oils requires a cancer warning under the OSHA Hazard Communicatio Standard (29 CFR 1910.1200). These oils have not been listed in the National Toxicology Program (NTP) Annual Report or have they been classified by the International Agency for Research on Cancer (IARC) as;
IARC group 3 (The agent is not classifiable as a possible Carcinogen to humans.)
EU 67/548/EEC (the classification as a carcinogen need not apply)

## 12. ECOLOGICALINFORMATION.

E cotoxicity : No data available.
Enviromental fate : This material is not expected to be readily biodegradable.

## 13. DISPORSALCONSIDERATIONS.

Place contaminated material in disposable containers and dispose of in a manner consistent with applicable regulations. Contact local environmental or health authorities for approved disposal of this materials.

14. TRANSPORT INFORMATION.

The descriptionshownmay not apply to all shipping situations. Consult 49CFR, or Dangerous Goods Regulations, for additional description requirements (e,g., technical name) and mode-specificor quantity-specific shipping requirements

UN No.: Not applicable

15. REGULATORY INFORMATION.

None of thelisted components of this material are found on the regulatory lists i ndicates.

16. OTHER INFORMATION.

NFPA RATINGS : Health 1; Flammability 1 ; Reactivity 0 ;
(0- Least, 1 - Slight, 2 - Mderate, 3 - High, 4 - Extreme)

These valuesare obtainedusing the guidelines or published evaluation prepared by the National Fire ProtectionAssociation (NFPA).

Notice to Reader :

The information contained herein is based on th e best of our knowledge. However, neither the above named supplier nor any of its subsidiaries assumes any liability whatsoeverfor the accuracyor completeness of the information contained herein Final determination of suitability of anymaterial is the sole responsibility of the user All materials may present unknown hazards and should be used withcaution.Although certain hazards are d escribed h erein, we cannot guarantee that th ese are the only hazards that exists.

# Appendix 2. Index

THI-12R Evolution Instruction Manual

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