High Grade Linear Motor Machine

LX-160

High Precision Linear Motor Machine

LF-160

PC2

< Chain Magazine >

Matsuura L-Tech 30i

INSTALLATION



Matsuura Machinery Corporation Japan

WARNING: This machine is subject to export controls under NSG, Chemical / Biological Weapon Control, MTCR, Wassenaar Arrangement and other international treaties. When exporting this machine, the compliance with regulations set by each member country is necessary.

About the Composition of Instruction Manual

The instruction manual is in four volumes.

X This is a manual for <Installation>.

<Operation>

The following items required for operation are described.

- Section 1 Safety
- Section 2 Basic Operation and Automatic Operation
- Section 3 Set-up Operation
- Section 4 Daily Inspection
- Section 5 Alarms

<Programming>

The following items required for programming are described.

- Section 1 Specifications
- Section 2 Programming

< Maintenance and Troubleshooting >

The following items required for maintenance work and troubleshooting operation are described.

- Section 1 Maintenance
- Section 2 Troubleshooting
- Appendix

<Installation>

The items required for machine installation work are described.

Introduction

Matsuura Machinery Corporation designs and manufactures machines giving first priority to safety precautions, to allow customers to use the machines safely and effectively.

However, every machine tool has potential dangers. If operators misuse the machine or ignore safety instructions, it can result in personal injury or property damage, and in some cases, serious injury or death.

It is most essential that all operators and service personnel pay attention to the safety instructions when operating or servicing the machine.

The safety instructions in the manual are classified in the following three levels according to the seriousness of possible damage to persons or property.



DANGER

· Indicates an imminently hazardous situation which, if not avoided, will result in death or serious injury.



WARNING

Indicates a potentially hazardous situation which, if not avoided, could result in death or serious injury.



CAUTION

Indicates a potentially hazardous situation which, if not avoided, may result in minor or moderate injury or property damage.



- Indicates a situation which, if not avoided, may result in machine damage or shortened service life of the machine.
- Strictly follow all safety instructions to prevent accidents or machine damage.

Note on exportation to a third country

The machine is manufactured in compliance with laws and regulations that are effective in your country. Therefore, if you would like to resell or move the machine to a third country, it is mandatory to comply with laws and safety regulations of that country. Consult Matsuura if any modifications are necessary.

Note on transfer

If you transfer this machine, provide this manual and other attached documents to the next owner.

Disposal of oil and machine

If you dispose of the machine after the service life expires, follow instructions given by the applicable legal and governmental regulations. Also, disposal of hydraulic oil or coolant may be regulated. Please check and follow the manda-tory procedures.

Further inquiries

If you have any questions or doubts about information contained in this manual, please feel free to contact Matsuura or your distributor.

Composition of this manual and documents attached

The manual and attached documents are absolutely necessary for safe and proper operation of the machine. Keep them in a fixed place for an easy access anytime required.

Machine Remodeling Prohibited

Never remodel the machine.

If the remodeled machine should injure you or do damage to the remodeled machine itself, Matsuura will never bear any responsibility for such trouble at all.

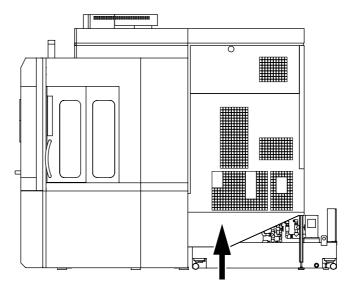


- This manual gives information the standard and optional machine features. Specially designed features are discussed in separate manuals.
- The design of the product is under constant review and whilst every effort is made to keep this manual up to date, the right is reserved to change specifications and equipment at any time without prior notice.

This manual provides information on the following model:

- Model : LX-160 / LF-160

- Manufacturer : Matsuura Machinery Corporation





Location of machine name plate

Matsuura Machinery Corporation Headquarters and factory 1-1, Urushihara-cho, Fukui, 910-8530 JAPAN

Distributor:

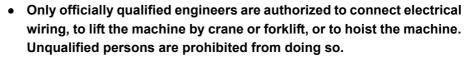
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1 Safety Instructions for Installation

(1) Safety Instructions for Installation





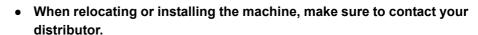






- Electric connection must be done by qualified electricians. Shut the power off before connecting the ground cable. Do not connect the machine to the primary switchboard before all electric connections are completed.
- Put a sign to notify other personnel that electric connection is being made.







 To avoid electric shock, connect the grounding cable to the "E" terminal in the electric control box, and establish a ground in compliance with nationally recognized safety standards on grounding. Do not share the grounding conductor (independent grounding only).



- Check the following safety conditions of installation site.
 - The foundation bolts which are placed under the ground are clearly marked to prevent operators from tripping on them or to avoid damaging the machine and transportation units.
 - Cover up pits for waste oil, chips or piping to prevent accidents caused by falling or tripping.
 - Remove obstacles from the floor or passages, and wipe off any oil and water from the floor.
- Use a stable step or foothold when working at an elevated place which is out of your reach standing on the floor.
- When several operators should work in cooperation, determine a chief person whose instructions other members follow.
 - Make a sign to each other before operation.
 - Proceed with the operation one by one while checking the safety.
- Cover up wiring which is unavoidably placed on the floor, to protect it from chips or stepping.

N WARNING

- When lifting the machine, use undamaged wire ropes, shackles and hoist jigs of the specified size, so that they can sufficiently bear the machine weight.
- Power cable from the primary terminal to the main power switch must be of sufficient nominal cross sectional area to stably supply the power required for operation.

(CAUTION

- Completely wipe rust preventive oil away from the slideways using wash oil.
- Remove eye bolts and fixtures attached for transportation.
- Perfectly level the machine. (Adjust it within the value specified in the inspection data sheet attached.)
- After installation, check the following items before turning the power on:
 - Electric wiring and oiling are completed.
 - All the bolts and cannon connectors are securely tightened.
 - All hydraulic and air pipes are correctly connected and securely tightened.
 - Oil and grease are appropriately supplied in accordance with the lubrication control chart included in the instruction manual.
 - Water and dust are wiped away from the machine.
 - No oil leakage is found around the machine.

(2) Matters for caution relative to coolant

Use the coolant which satisfies the following items.

- 1. It does not have a bad influence on the human body.
- 2. It does not erode the machine parts (iron, copper, aluminum, etc.).
- 3. It does not have a bad influence on the painted surfaces.
- 4. It has good cooling capability.
- 5. It has good cutting capability.

A CAUTION

- Handle coolant with utmost care. If coolant gets into your eyes, as it
 is possible that inflammation is caused, be sure to wear safety
 glasses for handling coolant. If touching coolant with bare hands, as
 it is possible that inflammation and eczema are caused, be sure to
 wear safety gloves for handling coolant. Keep it in mind that soot and
 mist may cause trouble with your eyes or throat (in case of allergy in
 particular). It is desirable to install the mist collector on the machine
 and the correct ventilators in the factory.
- It is possible that some coolant discolors, rusts or erodes the machine and workpiece, or has painting come off. Be sure to select appropriate coolant finally after testing for a trial period.
- Never use ignitable coolant. It is possible that ignitable coolant catches fire by cutting heat during machining.
- In case of water-soluble coolant, it is possible that the same coolant capacity and performance as the catalog are not obtained because a chemical reaction is produced by the ingredients and property of water to mix coolant with. When desired capacity and performance cannot be obtained, it is assumed that the used water and coolant are ill-matched. Please contact the coolant-maker, and tell them a kind of the workpiece as well as the quality of the water for making a total judgment.
- Be sure to observe the mixture method, procedure and concentration specified by the coolant-maker. Periodically check the coolant concentration.
- Matsuura does not answer for a machine fault such as trouble, rust, etc. which result from coolant. You are kindly requested to choose and use appropriate coolant after properly examining it.

2 Installation Site

2-1 Installation Environment

Ambient temperature: 10°C ~ 35°C(20°C ± 2°C recommended)

Temperature change: 1°C/30 min. (1°C/h recommended)

Humidity: 75% or less (no visible moisture)



 Install the machine in a place free from partial temperature rise caused by direct sunlight or heat source. Thermal displacement caused by partial temperature rise may result in impairing machining accuracy.

Vibrations: 0.5G (4.9 m/s²) or less



 Install the machine in a place where vibrations from press machines or forging machines are not transmitted. Vibrations impair machining accuracy and may cause damage to the machine.

Dust: 0.3 mg/m³ or less (recommended)



- Install the machine in a place free from dust, dirt or mist.
- D Install the machine in a place free from chips, water or oil splashing from other machines.

2-2 Floor Space

Secure the floor space referring to the floor plan.



- Provide sufficient space for pulling out the coolant tank.
- Provide sufficient space for opening doors for maintenance purpose.
- Provide sufficient space for mounting or dismounting workpieces.
- The floor plan depends on the optional equipment provided to the machine. For machines with special attachments, request Matsuura to submit applicable floor plan.

(1) Standard Specification

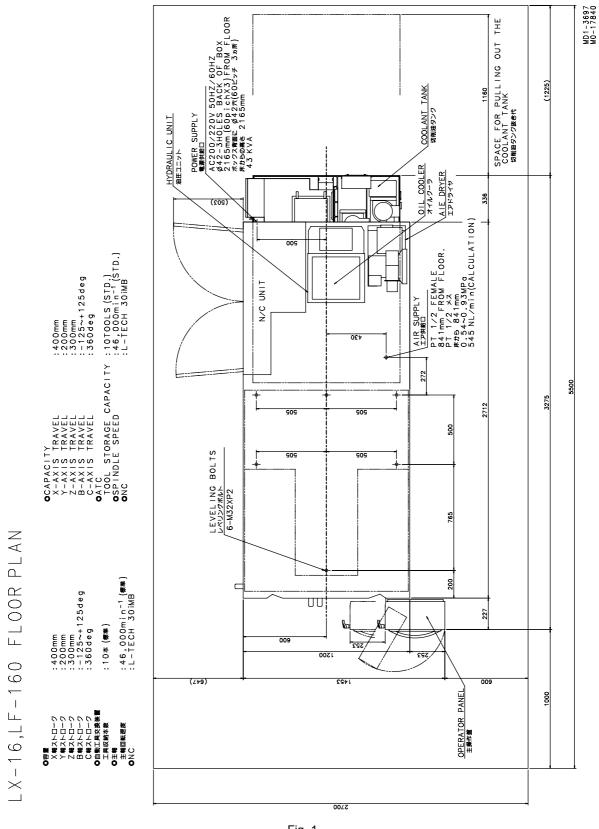


Fig. 1

(2) 2PC, 50-tool Specification

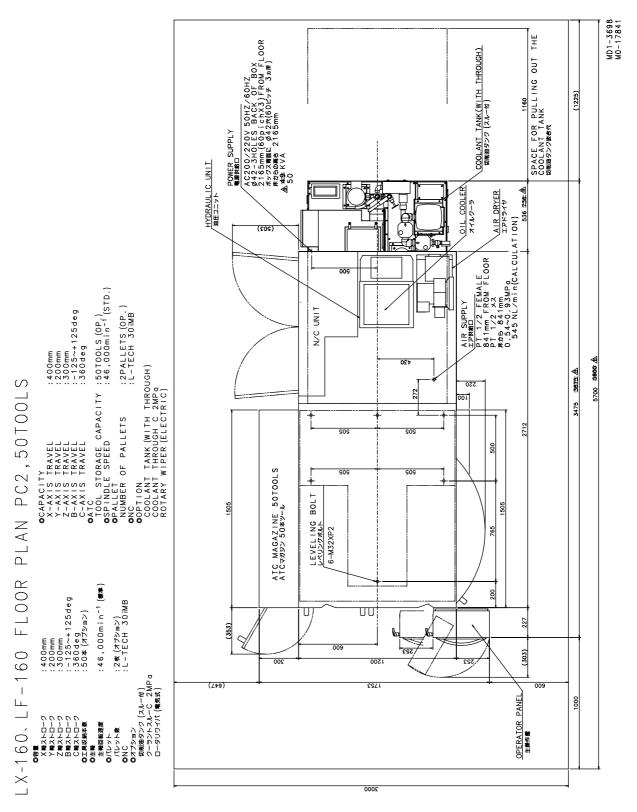


Fig. 2

2-3 Foundation

Construct the foundation as given by the foundation drawing. Refer foundation construction to experts.



• Check level of the foundation at regular intervals.



- The required foundation depends on the optional equipment provided to the machine. For machines with special attachments, request Matsuura to submit applicable foundation drawing.
- Flatness (level) of the foundation must be within 10 mm.
- Soil bearing capacity of 51 kN/m² is required. If less than this level, reinforce the foundation by inserting reinforcing bars.

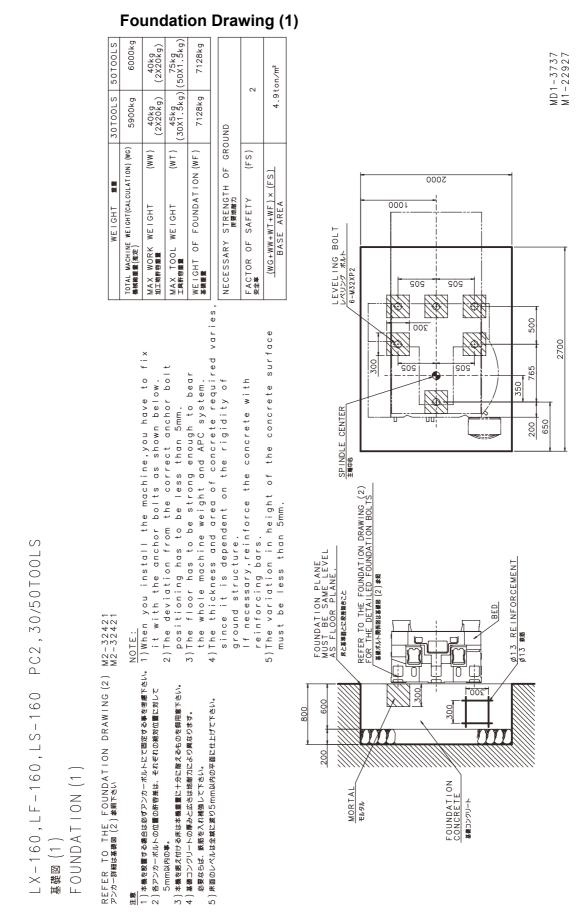


Fig. 3

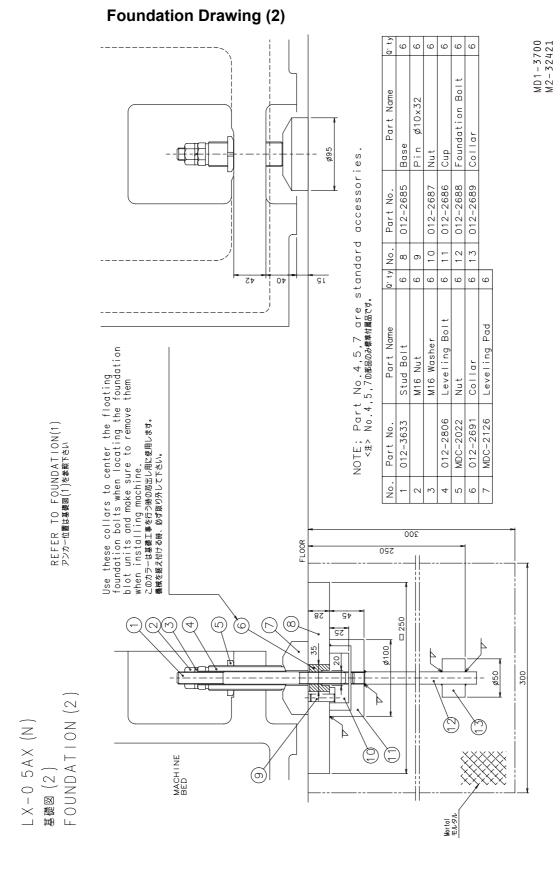


Fig. 4

3 Lifting Machine



- Only the officially qualified engineers are authorized to lift the machine by crane or forklift, or to hoist the machine. Unqualified persons are prohibited from conducting these works.
- Never reach or stand under the raised machine.



∕!\ WARNING

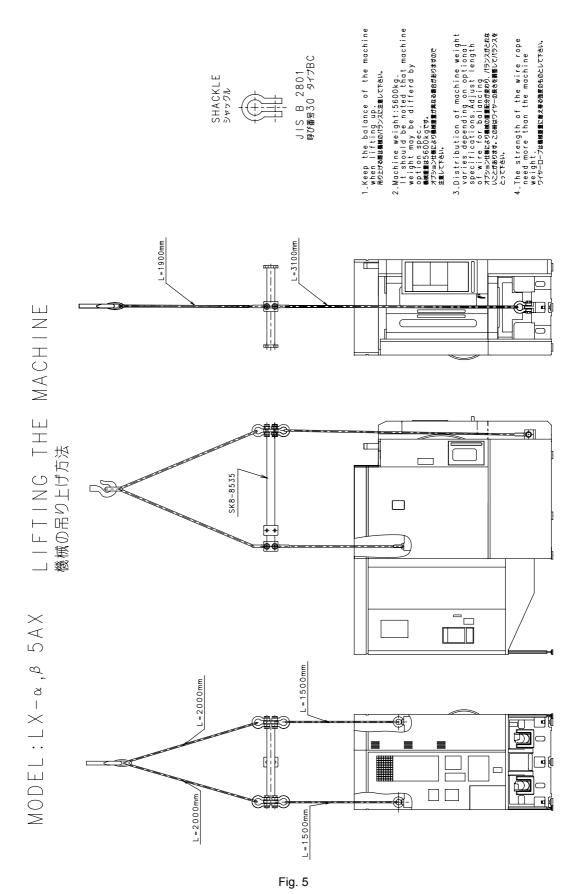
- When relocating or installing the machine, make sure to contact your distributor.
- Use a lifting jig that can sufficiently bear the machine weight.
- Cover the parts of the machine where the wire ropes are tied with pieces of woods or cloth.
- When several operators should work in cooperation, determine a chief person whose instructions other members follow.
 - Make a sign each other before operation.
 - Proceed operation one by one while checking the safety.
- . Check the following safety conditions of installation site.
 - The foundation bolts which are placed under the ground are clearly marked to prevent operators from tripping on them or to avoid damaging the machine and transportation units.
 - Cover up pits for waste oil, chips or piping to prevent accidents caused by falling or tripping.
 - Remove obstacles from the floor or passages, and wipe off any oil and water from the floor.





- Lift the machine slowly while checking the balance.
- Never give vibrations or physical shocks to the machine.

Lifting the machine



4 Power Connection

4-1 Input Power Voltage

Use power cables that can sufficiently carry the electric capacity required for the machine.



 Power cable from the primary terminal to the main power switch must have a nominal cross sectional area that can stably carry the electric capacity required for the machine.

Power voltage : AC 200/220 Vac \pm 10%

: 50/60 Hz \pm 1 Hz

Electric capacity: 44 kVA



• Total electric capacity required for the machine depends on the optional attachments provided.

4-2 Cable Connection



- Electric connection must be conducted by qualified electricians. Any other personnel are prohibited from doing so.
- オ
- Shut the power off before connecting the power cable and the ground cable. Do not connect the machine to the primary switchboard before all electric connections are completed.
- Put a sign saying "DO NOT TURN POWER ON" to notify other personnel that electric connection is being made.
- Never touch damaged electric wires or cables. Electric leakage or shock may result. Thoroughly check electric wires and cables for damage before turning the power on.

NARNING

- Cover up wiring which is unavoidably placed on the floor, to protect them from chips or stepping.
- * Transformer is not included in the package; please prepare one on your own. (It should provide 200/220 Vac \pm 10% at the output side.)
- * Required electric capacity depends on the optional features provided to the machine.

- Power supply voltage (primary): 380/400/440/480 Vac \pm 10%, 50/60 Hz \pm 1Hz

- Power supply voltage (machine): 200/220 Vac \pm 10%, 50/60 Hz \pm 1Hz

Required electric capacity: 44kVA

Power cable connection (Refer to the figures on the next page.)

- 1. An additional box is attached to the rear of the power supply box. Connect the primary power cable (1) to the no-fuse breaker (QF0) in the box.
- 2. Connect from (2) of the no-fuse breaker (QF0) to (3) the transformer (TM1).
- 3. Connect from (4) of the transformer (TM1) to (5) of the no-fuse breaker (QF1) in the electric control box.



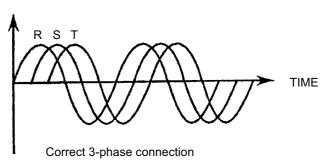


Fig. 6

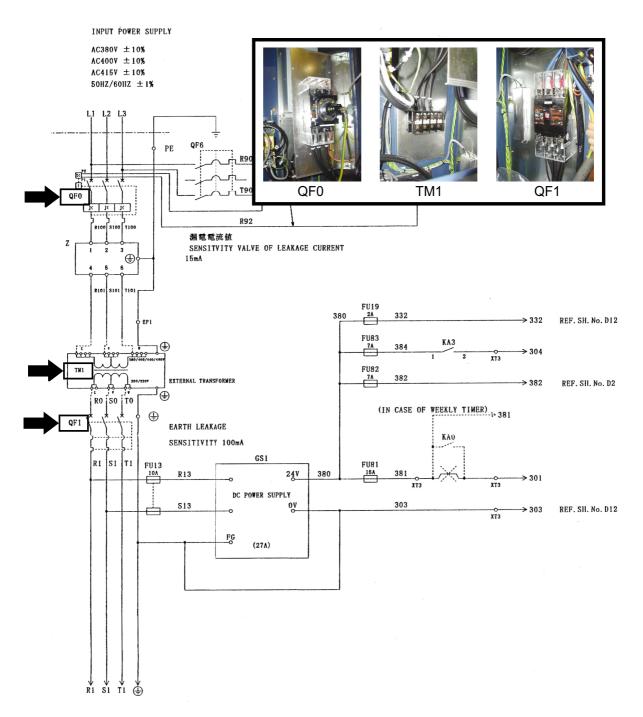


Fig. 7

5 Grounding

Establish grounding in compliance with nationally recognized electrical safety standards on grounding.



- Only officially qualified electricians are authorized to establish grounding.
- One grounding cable (14 mm² or above) must be connected independently to one conductor. Connection as shown below may result in accidents.
- Never share the grounding conductor with a machine which may generate electrical noise, such as arc welding machines, induction hardening machines, etc.

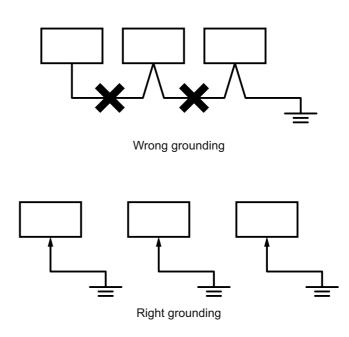


Fig. 8

6 Air Connection

! CAUTION

- Use clean, dry air for the compressor. (Maintain the compressor in the good condition.)
- When sharing the air source with another equipment, check to see that pressure drop does not occur. When the pressure drops, the machine may not work properly.
- Use a socket of PT3/8" for connection. Sockets of smaller port may hinder the machine from proper operation.

Source air pressure: 0.54 ~ 0.93 MPa

Hose joint: PT3/8 female (to be prepared by the customer)

Hose: Withstand pressure at 1.5 MPa or above, inner diameter ϕ 9.5 mm or above (to be prepared by the customer)



Air connection port

Fig. 9

7 Oiling



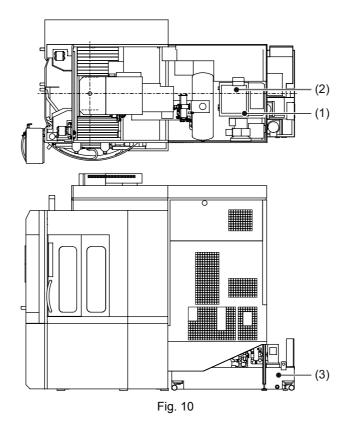
- Do not use highly combustible coolant. Heat generated during machining may ignite the coolant.
- Always use new oil (except coolant) of the types and manufacturers as specified in this manual.
- Do not use coolant of high viscosity (10 cSt or above). Otherwise, the required amount of coolant may not be discharged.

7-1 Oil Table

No.	Oil Type	Oiling Position	Oil Amount (L)
1	Α	Hydraulic unit	25
2	С	Oil cooler	9.5 tank
3	-	Coolant tank	320



The "Oil Type" column corresponds to those listed in "7-2 Recommended Oil List" (page 1-19)



7-2 Recommended Oil List

Oil Type	Idemitsu	Nippon Oil	Cosmo
Α	Daphne Hydraulic Fluid 32	FBK Oil RO32	Cosmo Hydro RO32
В	Daphne Multiway 68C	Uniway SF68	Cosmo Dynaway 68
С	Daphne Super Multi Oil 10	Super mulpus 10	Cosmo Mighty Super 10
D	Daphne Mechanic Oil 68	FBK Oil RO68	Cosmo Hydro RO68
Е	Daphne Mechanic Oil 120	FBK Oil RO100	Cosmo Hydro RO100
F	Coronex Grease 2	Multinoc Grease 2	Cosmo Grease Dynamax No. 2
G	Daphne Turbin Oil 32	FBK Turbin 32	Cosmo Turbin Super 32
Н	Daphne CE Compound 68S	Bonnoc M68	Cosmo Gear SE68
I	Daphne Hi-Thermo Grease	Pilonoc Grease 2	Cosmo Urea Grease No. 2
J	Daphne Coronex Grease EP No. 2	Epinox Grease AP2	Cosmo Grease Dynamax EP No. 2
K	Daphne Super Multi Oil 2	Super mulpus 2	Cosmo Mighty Super 2
L	For oil-air lubrication unit: DTE Oil Light (Mobil)		
М	Daphne Super Multi Oil 5	Super mulpus 5	Cosmo Mighty Super 5
N	Daphne Super Gear Oil 150	Bonnoc M150	Cosmo Gear SE150

Oil Type	Esso	Shell	Mobil	Castrol
Α	Teresso 32	Tellus Oil 32	D.T.E. 24	Hyspin AWS32
В	Febis K68	Tonna Oil S68	Vactra Oil No.2S, No.2	
С	Spinesso 10	Tellus Oil C10	Velocity Oil No. 6	Hyspin AWS10
D	Teresso 68	Tellus Oil 68	D. T. E 26	Hyspin AWH68
Е	Teresso 100	Tellus Oil 100	Mobil Gear 627	Alpha ZN100
F	Andok B	Alvania Grease 2	Mobilax EP2	Spheerol AP2
G	Teresso 32	Turbo Oil T32	D.T.E. Oil Light	Hyspin AWS32
Н	Spartan EP68	Omala Oil 100	Mobil Gear 626	Alpha SP100
1	Temprex N2 & N3	Darina Grease EP2	Temp Grease 1	Spheerol BNS
J	Lithtan EP2	Alvania Grease EP2	Mobilax EP2	Spheerol AP2
K	Unipower MP2	Tetra Oil 2	Velocity Oil No. 3	Magna 2
L	For oil-air lubrication unit: DTE Oil Light (Mobil)			
М	Spinesso 5	Tellus Oil 5	*1	*1
N	Spartan EP150	Omala Oil 150	Mobil Gear 629	Alpha SP150

^{*1:} Use lubricating oil correspondent to ISO viscosity grade 5 (ISO VG5).

8 Operation Preparation

8-1 Removing the fixtures and fixing the cover



Keep the removed fixtures.

8-2 Cleaning

Rust preventive agent is applied to the slideways, the table and the spindle. Wipe it away completely using light oil and waste cloth.



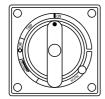
 After rust preventive agent is removed, apply lubrication oil. Axial movement before removing the rust prevent agent may damage the machine.

Power ON 8-3



∕!∖ CAUTION

- Check the following items before turning the power on:
 - Electric wiring and oiling are completed.
 - All the bolts and cannon connectors are securely tightened.
 - All hydraulic and air pipes are correctly connected and securely tightened.
 - Oil and grease are appropriately supplied in accordance with the lubrication control chart included in the instruction manual.
 - Water and dust are wiped away from the machine.
 - No oil leakage is found around the machine.



- 1. Turn the main power switch on at the electric control box.
 - The oil cooler starts.



Double-check that all the shipping brackets (except for the Z axis) are removed.



2. Press the POWER ON switch on the main operation panel. The NC controller is turned on, and the CRT screen lights up.



- 3. Press the POWER ON switch again.
 - The machine power is supplied, and gets ready for operation.
 - The hydraulic unit starts.



4. After slowly moving the Z-axis in the "+" (plus) direction using the manual pulse generator, remove the Z-axis-fixing wooden blocks and fixtures.



Refer to "Fig. 11" (page 1-20)



Never move the Z axis in the minus direction before the wooden block is removed.

9 Leveling

Machine level greatly affects machining accuracy as well as service life.



 If the machine is left unpacked for a long time or is placed in an inappropriate condition, machine level may not be stabilized by one adjustment. In such a case, adjust the level again in three or four weeks after the first leveling.



 Adjust the leveling bolts until the distance between the floor and the bed bottom becomes between 10mm and 20mm.

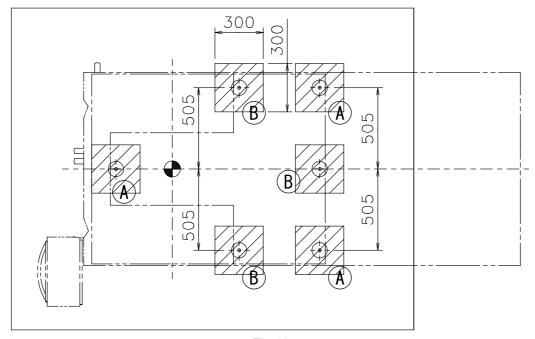


Fig. 11

- 1. Place a spirit level on the 4/5-axes table, adjust the level at three positions marked with (A).
- 2. After adjusting the squareness and the moving level, exert weight on the remaining bolt indicated as (B) in the above figure.



- Adjust all leveling bolts until the machine weight is exerted on them evenly.
- Machine level may be changed with time after installation. Check the level at regular intervals (three months for the first time, and afterwards every six months).

1-1-5 Spindle Torque & Power Diagram

(1) 46,000 min⁻¹

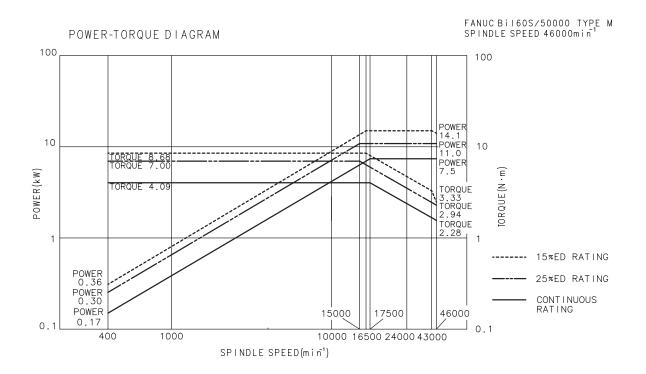


Fig. 1-5

1-1-6 Table Dimensions

(1) Non-PC Specification

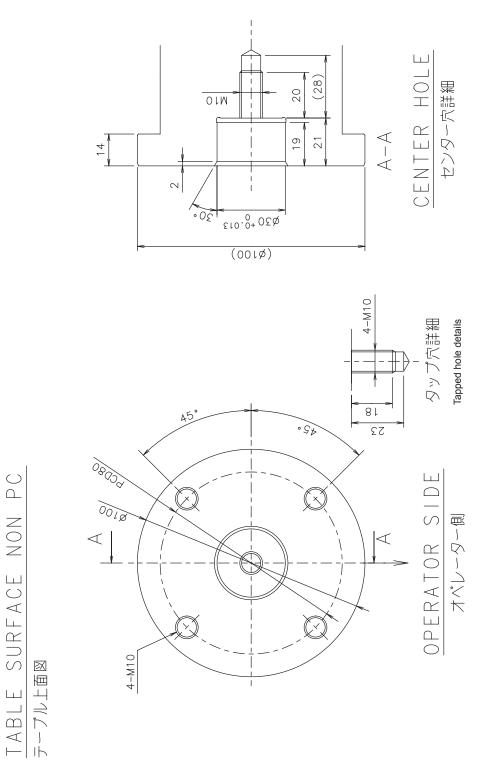
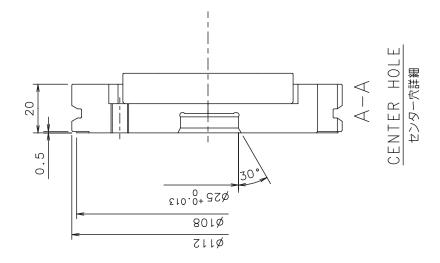


Fig. 1-6

(2) PC2 Specification



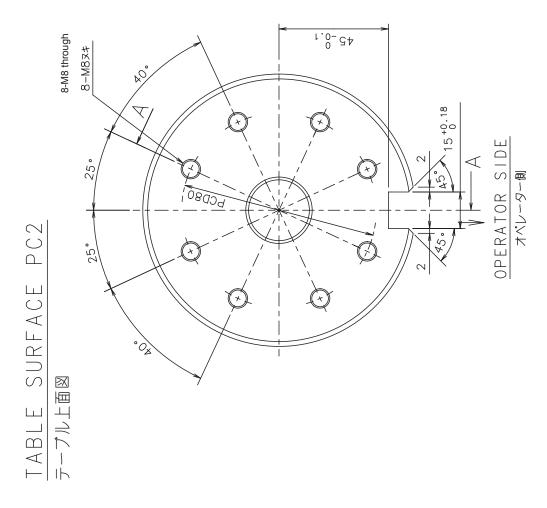


Fig. 1-7

1-1-7 Tool Shank & Retention Knob

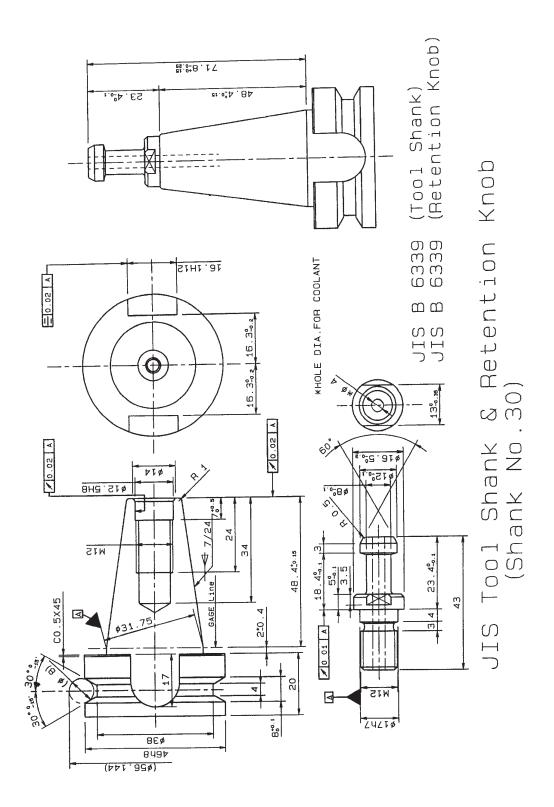


Fig. 1-8