

GRO151

950

5-3206

# INSTRUCTION MANUAL

for

**Precision Cylindrical Grinding Machine  
(With 3-Step Function)**

**Model OGM-8 & 12 Series**

Model:

OGM 12-60U

Serial No.:

32004

Installation Date:

11-27-01

**Okamoto Machine Tool Works, Ltd.**

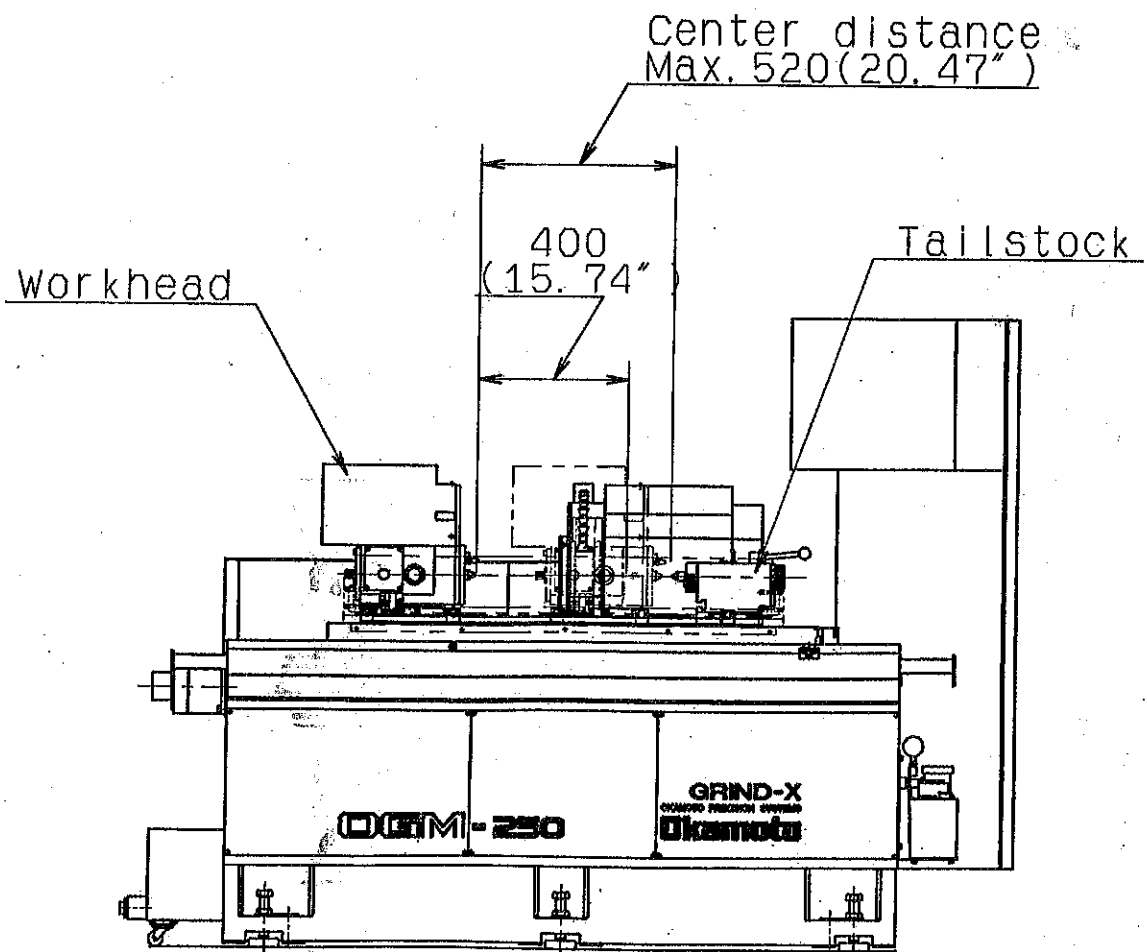
Yokohama, Japan

June, 1999

FOR OGM-250(8·20) JA

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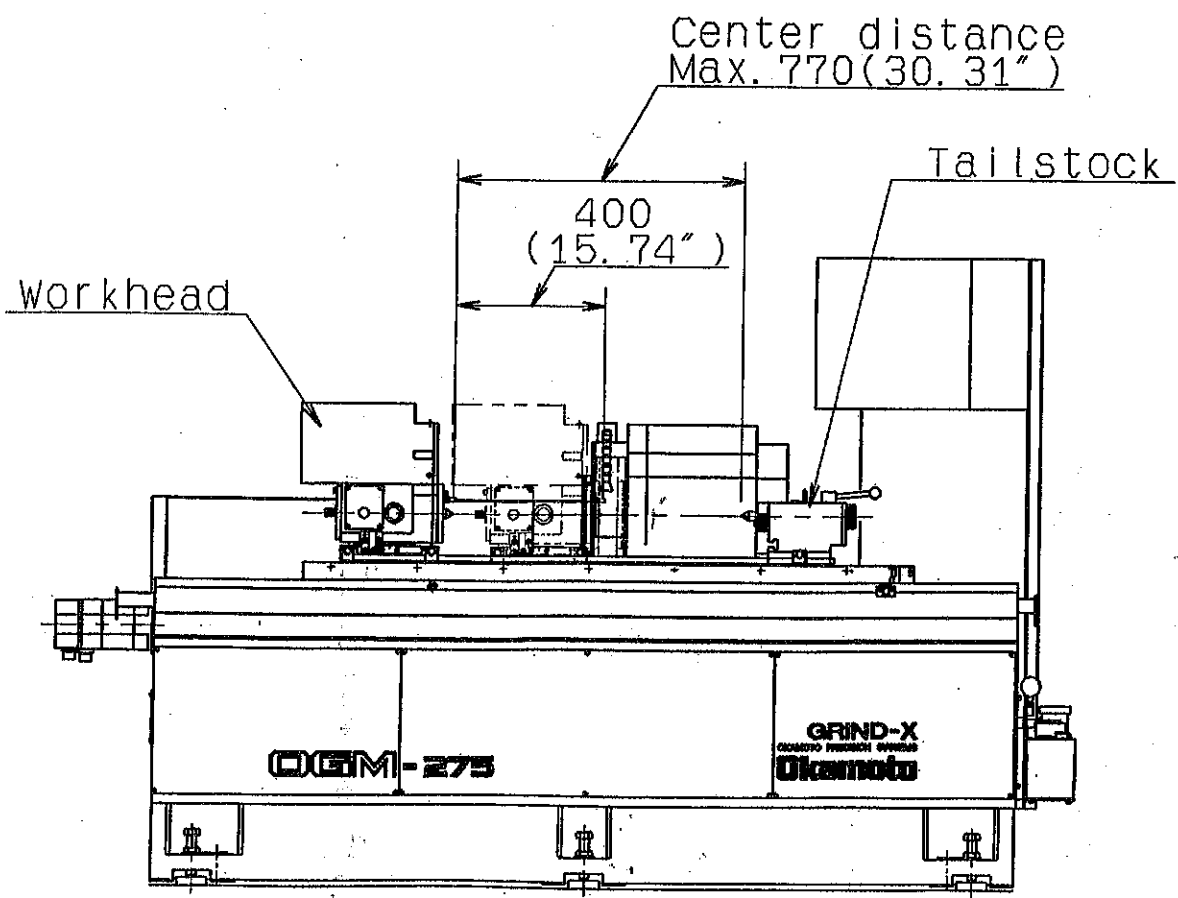
Don't move the work head more than 400mm(15.74") to right side. When grind the short workpiece Please move the work head accordingly.



FOR OGM-275(8.30) NA

<CAUTION>

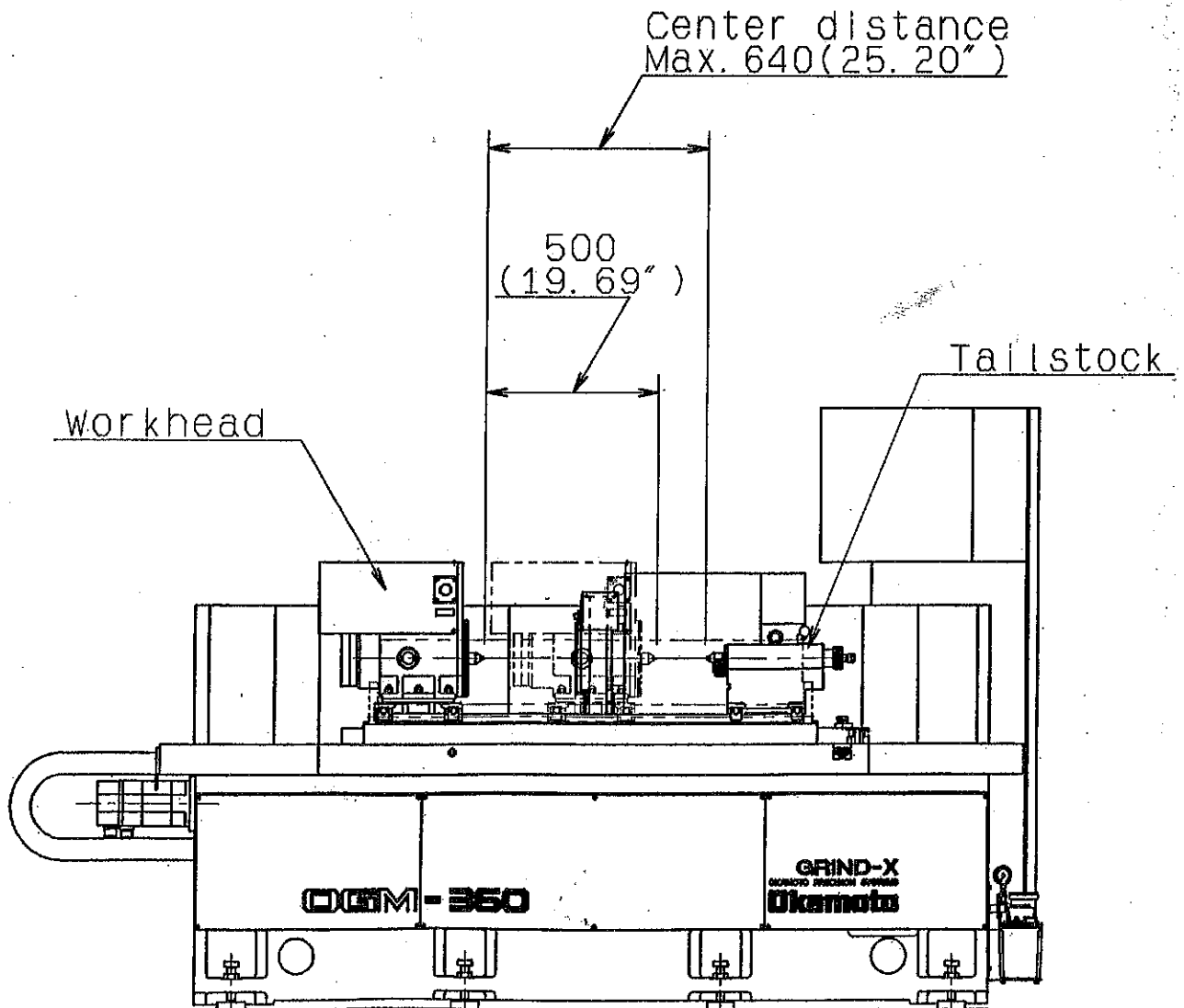
Don't move the work head more than 400mm(15.74") to right side. When grind the short workpiece Please move the work head accordingly.



FOR OGM-360(12.24) NA

<CAUTION>

Don't move the work head more than 500mm(19.69") to right side. When grind the short workpiece Please move the work head accordingly.

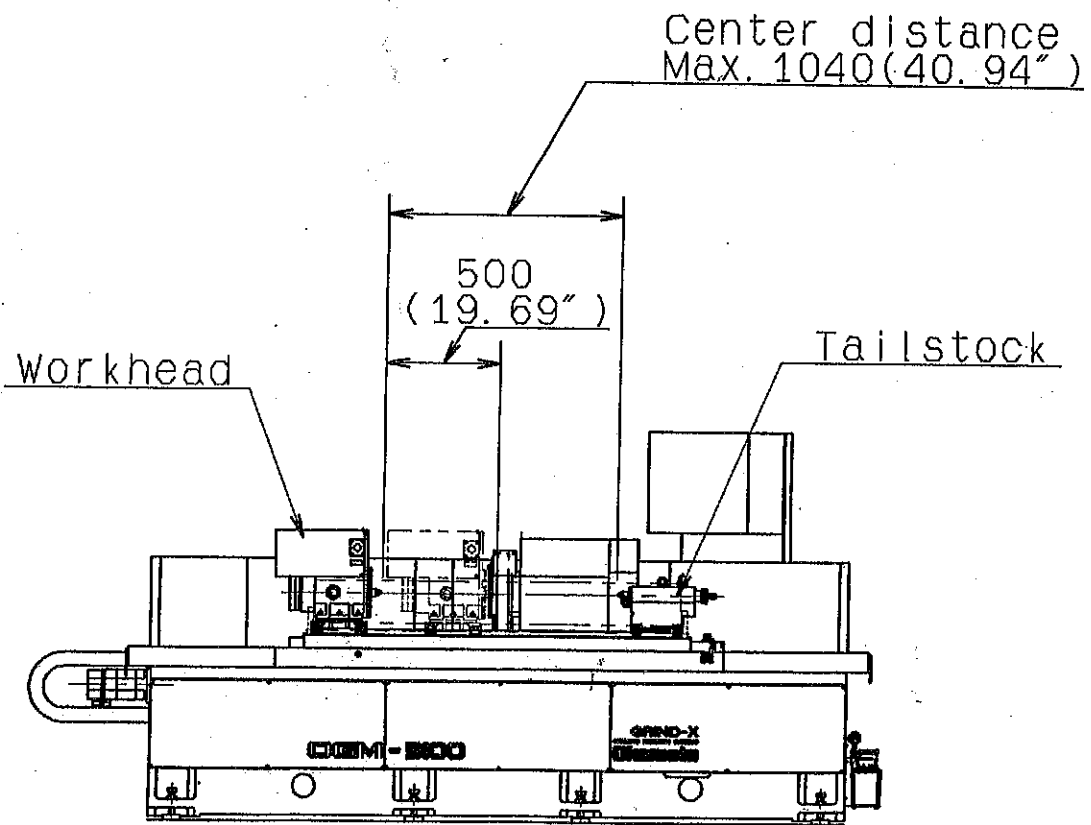


△ 追加 01.07.06

FOR OGM-3100(12.40) NA

<CAUTION>

Don't move the work head more than 500mm(19.69") to right side, when grind the short workpiece  
Please move the work head accordingly.



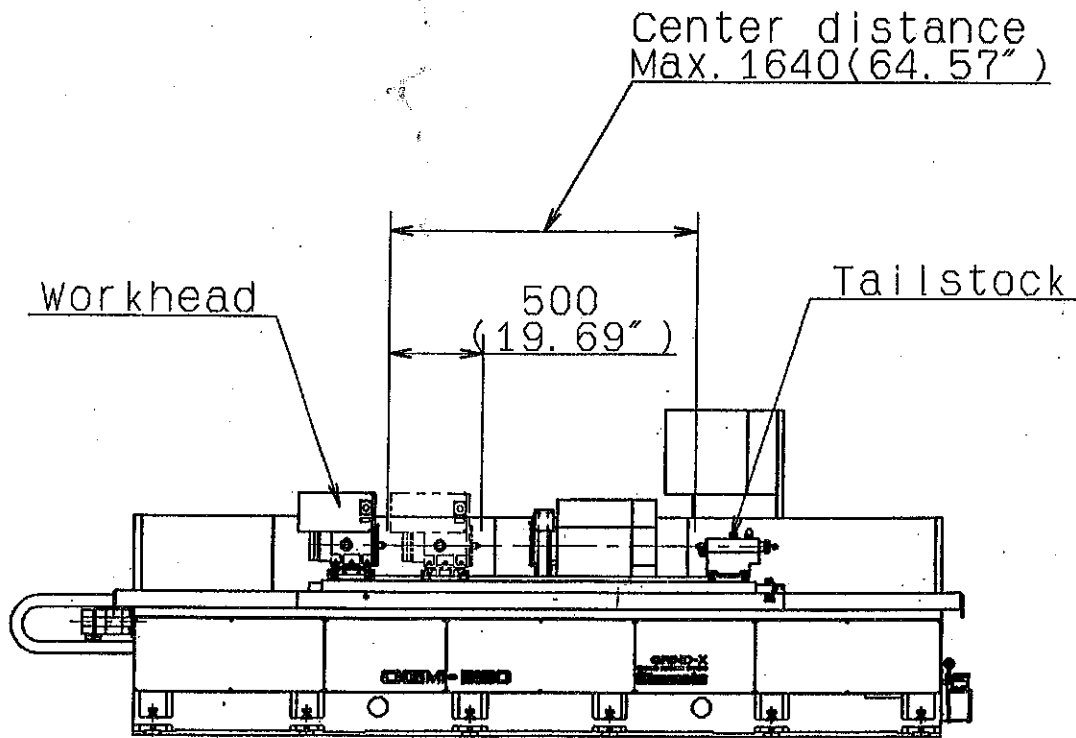
追加 01.07.06

FOR OGM-3160(12.60)

ours

<CAUTION>

Don't move the work head more than 500mm(19.69") to right side. When grind the short workpiece Please move the work head accordingly.



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FOREWORD

1. This machine is a Precision External Cylindrical Grinding Machine operated by NC. We hope that you will make full use of it, by becoming familiar with general notes on operating precision machines and its special functions.
2. The performance, safety and life span of this machine are dependent on how you are operating and maintaining it.
3. This Instruction Manual covers from a new installation to actual grinding operation step by step. When setting up the machine, proceed with the work in accordance with these instructions.
4. Do not operate this machine without reading and understanding this Instruction Manual.
5. If you find something that is not clear in your operation procedure, or for information such as a periodical checkup, maintenance and service, consult our head or sales office. In this case, inform us of your machine No., etc.
6. As we are continuously improving our machines, your machine may not agree in all details with this Instruction Manual. If you find something, please do not hesitate to contact us.



## 2. SPECIFICATIONS

### 2-1-1 Specifications for Machine

200-series (8-series)

(unit : mm)

Item	Unit	Plain type OGM-P			Universal type OGM-U			
		225P	250P	275P	225U	250U	275U	
Capacity	Swing over table	mm	220					
	Distance between centers	mm	250	500	750	250	500	750
	Max. Dia. to be ground	mm	200					
	Max. weight between centers	Kgf	20 (Center work)					
Grinding wheel	Size (O.D. x Width x I.D.)	mm	φ 355 x 38 x φ 127			φ 305 x 25 x φ 127		
	Speed (belt pulley)	rpm	1600/1780/1980			1880/2010/2210		
	Max. peripheral speed	m/sec	30					
Wheel-head	X-axis travel	mm	200					
	Swivel angle	deg.	Non-Swivel			± 30		
	Least travel increment	mm(φ)	0.0001					
	Continuous feed rate	mm/min	0.001~4000					
	Rapid feed rate	mm/min	4000					
Table	Z-axis travel	mm	400	650	900	400	650	900
	Swivel angle	deg.	5~ -11	4~ -9	4~ -7	5~ -11	4~ -9	3~ -7
	Least travel increment	mm(φ)	0.0001					
	Continuous feed rate	mm/min	0.001~4000					
	Rapid feed rate	mm/min	4000					
Work-head	Spindle type	-	For dead-live center combined use					
	Center taper	MT	MT No. 3					
	Spindle through hole Dia.	mm	φ 17.5					
	Spindle speed	rpm	15~500					
	Swivel angle	deg.	30 ~ -90					
Tail-stock	Spindle stroke	mm	20					
	Center taper	MT	MT No. 3					
Motors	Grinding wheel spindle	KW	3.7					
	Workhead spindle	KW	0.4 (AC servo motor)					
	Table feed	KW	0.9 (AC servo motor)					
	Wheelhead feed	KW	0.9 (AC servo motor)					
	Lubrication pump	KW	0.003					
	Coolant pump	KW	0.1					
	Magnetic separator (Option)	KW	0.025					
Required electro power consumption		KVA	15					
Tank capacity	Lubrication oil	liters	3					
	Coolant tank	liters	80					
Height from floor to work center		mm	1000					
Machine space	Width	mm	1700	2700	3500	1700	2700	3500
	Depth x Height	mm	1600 x 1500					
Weight	Net weight	Kgf	2200	2500	2700	2200	2500	2700

## 2. SPECIFICATIONS

### 2-1-1 Specifications for Machine

8-series (200-series)

(unit : inch)

Item	Unit	Plain type OGM-P			Universal type OGM-U			
		8-10P	8-20P	8-30P	8-10U	8-20U	8-30U	
Capacity	Swing over table	inch	8.66					
	Distance between centers	inch	9.84	19.68	29.52	9.84	19.68	29.52
	Max. Dia. to be ground	inch	7.87					
	Max. weight between centers	lbs	44 (Center work)					
Grinding wheel	Size (O.D. x Width x I.D.)	inch	φ 14 x 1.5 x φ 5			φ 12 x 1 x φ 5		
	Speed (belt pully)	rpm	1600/1780/1980			1880/2010/2210		
	Max. peripheral speed	ft/sec	98.42					
Wheel-head	X-axis travel	inch	7.87					
	Swivel angle	deg.	Non-Swivel			± 30		
	Least travel increment	in(φ)	0.00001					
	Continuous feed rate	in/min	0.0001 ~ 157.48					
	Rapid feed rate	in/min	157.48					
Table	Z-axis travel	inch	15.74	25.59	35.43	15.74	25.59	35.43
	Swivel angle	deg.	5 ~ -11	4 ~ -9	4 ~ -7	5 ~ -11	4 ~ -9	3 ~ -7
	Least travel increment	in(φ)	0.00001					
	Continuous feed rate	in/min	0.0001 ~ 157.48					
	Rapid feed rate	in/min	157.48					
Work-head	Spindle type	-	For dead-live center combined use.					
	Center taper	MT	MT No. 3					
	Spindle through hole Dia.	inch	φ 0.68					
	Spindle speed	rpm	15 ~ 500					
	Swivel angle	deg.	30 ~ -90					
Tail-stock	Spindle stroke	inch	0.78					
	Center taper	MT	MT No. 3					
Motors	Grinding wheel spindle	HP	5					
	Workhead spindle	HP	0.53 (AC servo motor)					
	Table feed	HP	1.2 (AC servo motor)					
	Wheelhead feed	HP	1.2 (AC servo motor)					
	Lubrication pump	HP	0.004					
	Coolant pump	HP	0.13					
	Magnetic separator (Option)	HP	0.03					
Required electro power consumption		KVA	15					
Tank capacity	Lubrication oil	galons	0.79					
	Coolant tank	galons	21.13					
Height from floor to work center		inch	39.37					
Machine space	Width	inch	66.92	106.29	137.79	66.92	106.29	137.79
	Depth x Hight	inch	62.99 x 59.05					
Weight	Net weight	lbs	4,848	5,510	5,950	4,848	5,510	5,950

## 2. SPECIFICATIONS

### 2-1-2 Specifications for Machine

300-series (12-series)

(unit : mm)

Item		Unit	Plain type OGM-P				Universal type OGM-U			
			340P	360P	3100P	3160P	340U	360U	3100U	3160U
Capacity	Swing over table	mm	320							
	Distance between centers	mm	400	600	1000	1600	400	600	1000	1600
	Max. Dia. to be ground	mm	300							
	Max. weight between centers	Kgf	150 (Center work) <i>14 x 1.5 x 5"</i>							
Grinding wheel	Size (O.D. x Width x I.D.)	mm	φ 405 x 50 x φ 127				φ 355 x 38 x φ 127			
	Speed (belt pulley)	rpm	1570/1742				1767/1996			
	Max. peripheral speed	m/sec	30							
Wheel-head	X-axis travel	mm	300							
	Swivel angle	deg.	Non-Swivel				± 30			
	Least travel increment	mm(φ)	0.0001							
	Continuous feed rate	mm/min	0.001~4000							
	Rapid feed rate	mm/min	4000							
Table	Z-axis travel	mm	550	750	1150	1750	550	750	1150	1750
	Swivel angle	deg.	5~-12	3~-10	3~-8.5	1~-5	5~-12	3~-10	3~-8.5	1~-5
	Least travel increment	mm(φ)	0.0001							
	Continuous feed rate	mm/min	0.001~10000							
	Rapid feed rate	mm/min	10000							
Work-head	Spindle type	-	For dead-live center combined use							
	Center taper	MT	MT No. 4							
	Spindle through hole Dia.	mm	φ 18							
	Spindle speed	rpm	10~500							
	Swivel angle	deg.	Non-Swivel				30 ~ -90			
Tail-stock	Spindle stroke	mm	30							
	Center taper	MT	MT No. 4							
Motors	Grinding wheel spindle	KW	5.5							
	Workhead spindle	KW	0.75 (AC servo motor)							
	Table feed	KW	0.9 (AC servo motor)							
	Wheelhead feed	KW	0.9 (AC servo motor)							
	Lubrication pump	KW	0.003							
	Coolant pump	KW	0.25							
	Magnetic separator (Option)	KW	0.025							
Required electro power consumption		KVA	20							
Tank capacity	Lubrication oil	liters	3							
	Coolant tank	liters	120							
Height from floor to work center		mm	1000							
Machine space	Width	mm	2860	3450	4400	6200	2860	3460	4400	6200
	Depth x Height	mm	1860 x 1676							
Weight	Net weight	Kgf	3000	3500	4000	5000	3000	3500	4000	5000

2. SPECIFICATIONS

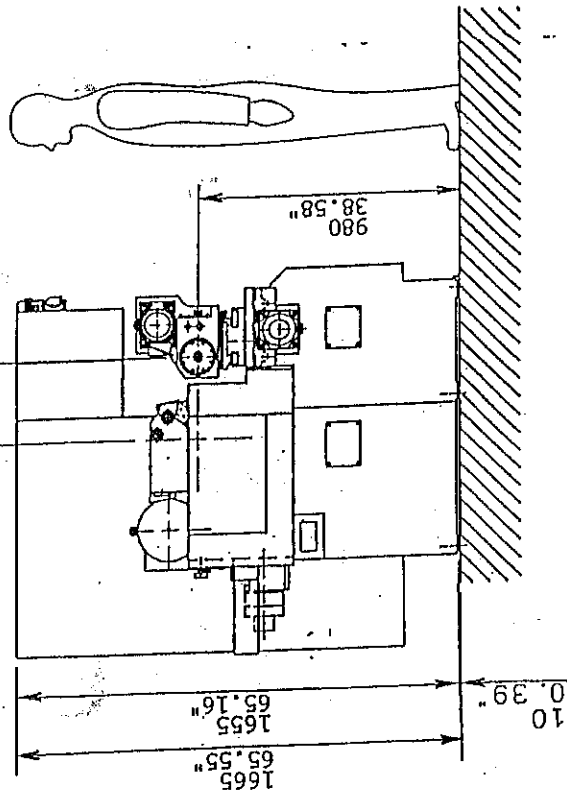
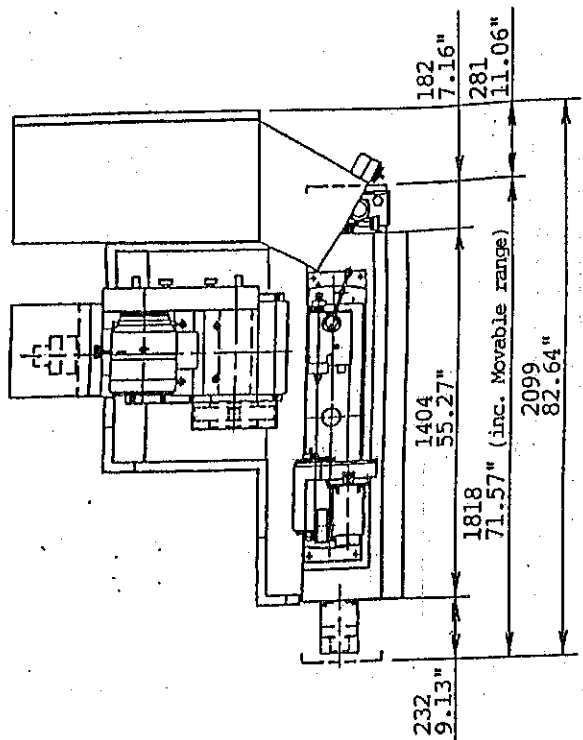
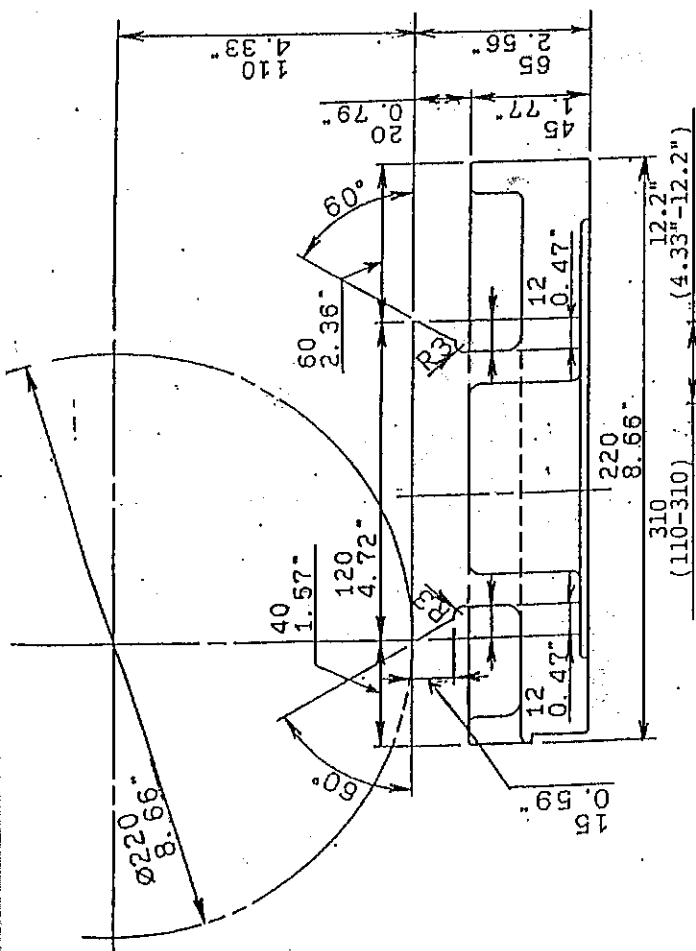
2-1-2 Specifications for Machine

12-series (300-series)

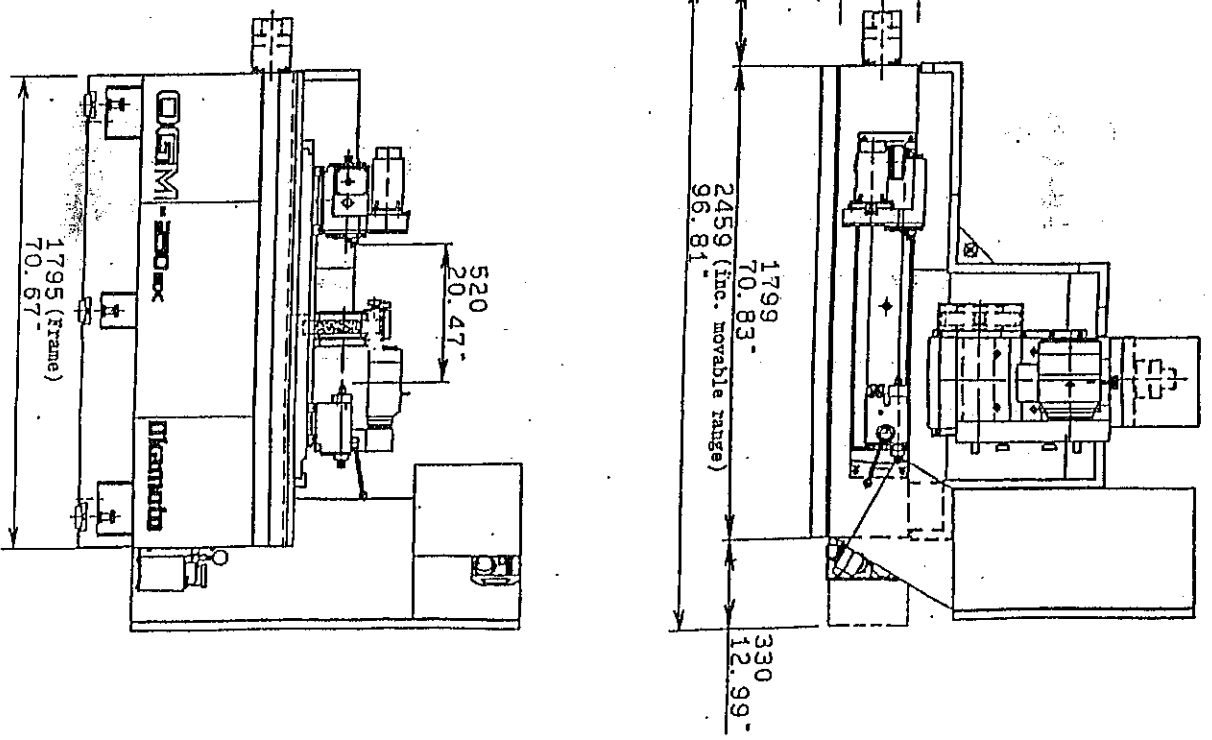
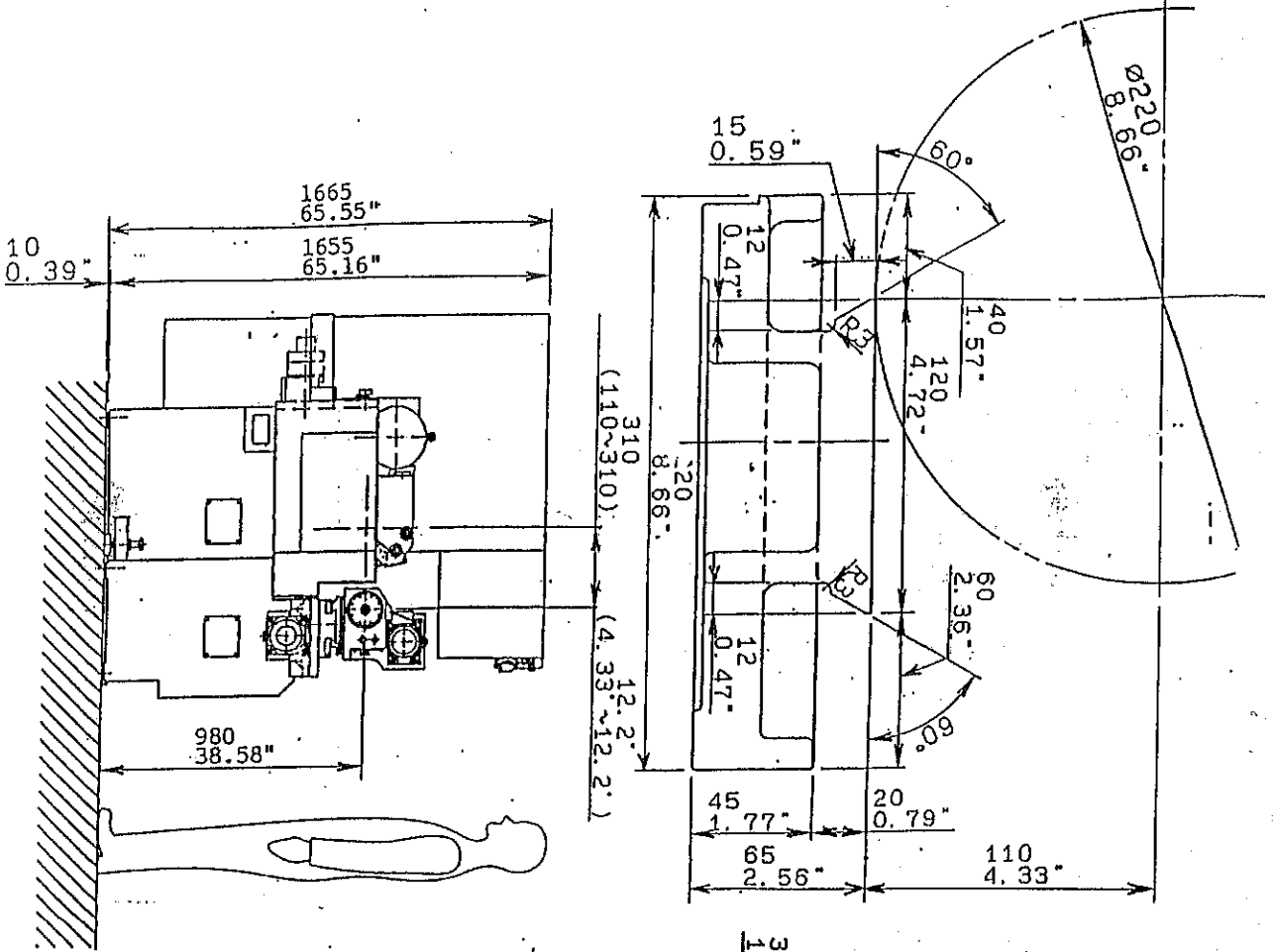
(unit : inch)

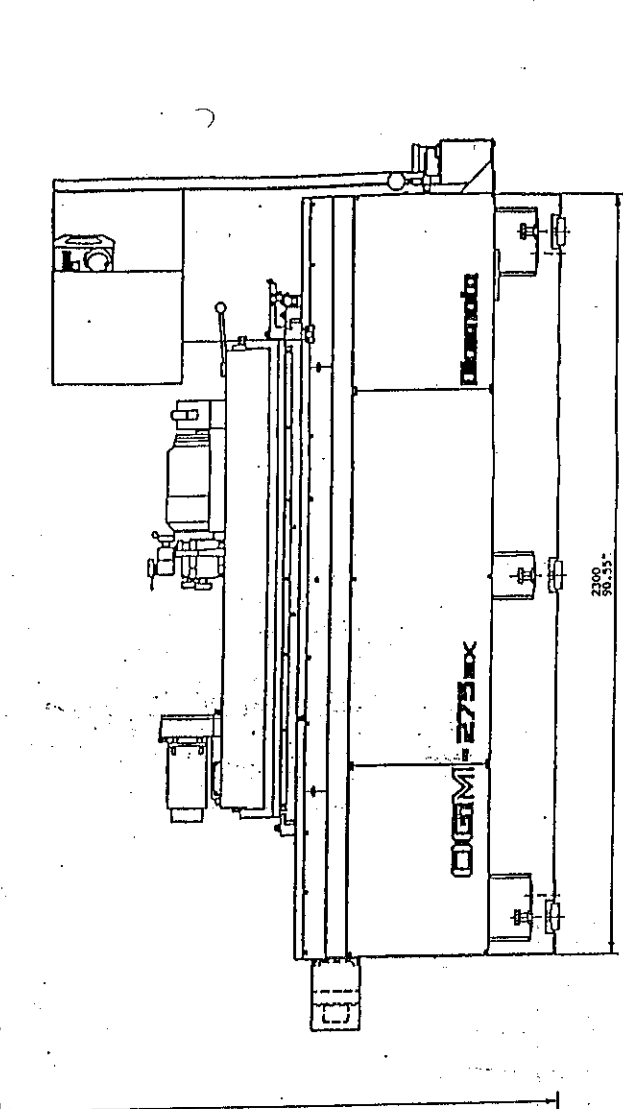
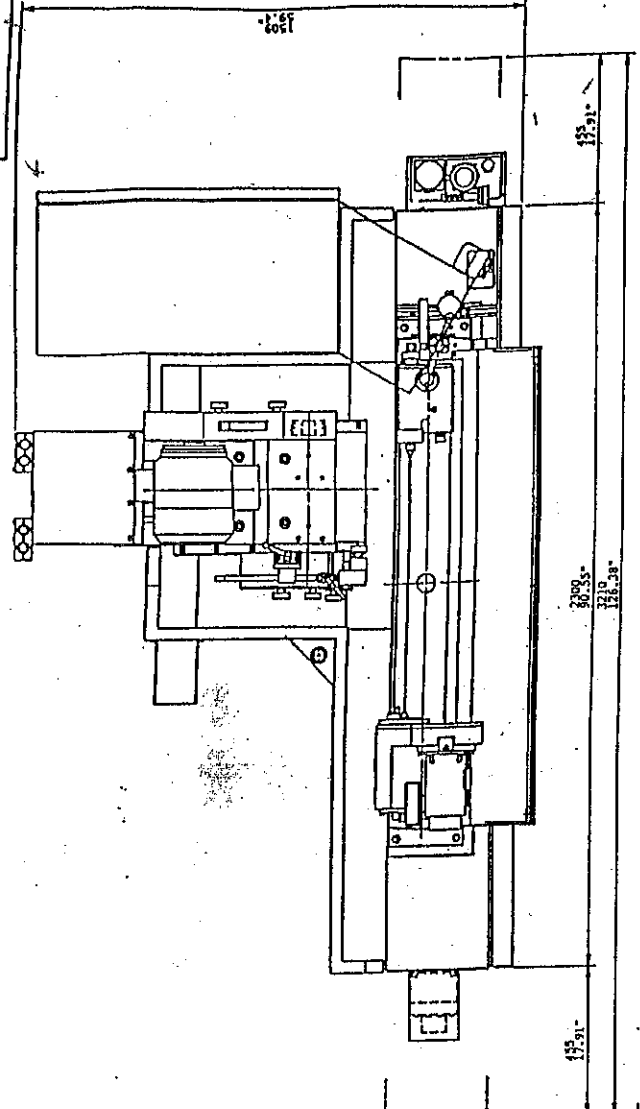
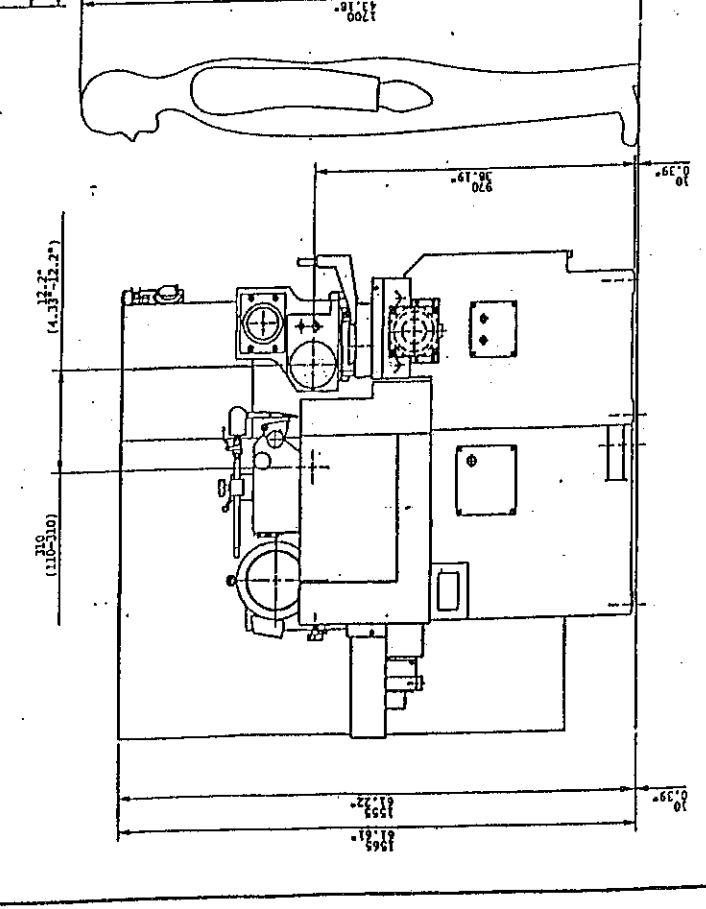
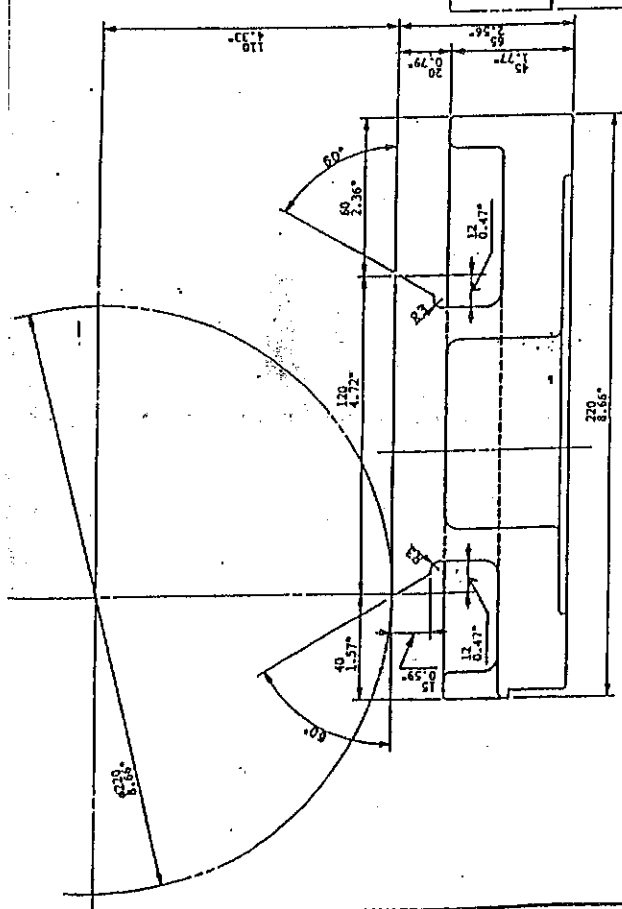
Item	Unit	Plain type OGM-P				Universal type OGM-U			
		12-16P	12-24P	12-40P	12-60P	12-16U	12-24U	12-40U	12-60U
Capacity	Swing over table	← 12-59 → 6.295							
	Distance between centers	15.74	23.62	39.37	62.99	15.74	23.62	39.37	62.99
	Max. Dia. to be ground	11.81							
	Max. weight between centers	330 (Center work)							
Grinding wheel	Size (O.D. x Width x I.D.)	φ16 x 2 x φ5				φ14 x 1.5 x φ5			
	Speed (belt pulley)	1570/1742				1767/1996			
	Max. peripheral speed	98.42							
Wheel-head	X-axis travel	11.81							
	Swivel angle	Non-Swivel				± 30			
	Least travel increment	0.00001							
	Continuous feed rate	0.0001 ~ 157.48							
	Rapid feed rate	157.48							
Table	Z-axis travel	21.65	29.52	45.27	68.89	21.65	29.52	45.27	68.89
	Swivel angle	5~-12	3~-10	3~-8.5	1~-5	5~-12	3~-10	3~-8.5	1~-5
	Least travel increment	0.00001							
	Continuous feed rate	0.0001 ~ 393.70							
	Rapid feed rate	393.70							
Work-head	Spindle type	For dead-live center combined use							
	Center taper	MT No. 4							
	Spindle through hole Dia.	φ 0.68							
	Spindle speed	10~500							
	Swivel angle	Non-Swivel				30 ~ -90			
Tail-stock	Spindle stroke	1.18							
	Center taper	MT No. 4							
Motors	Grinding wheel spindle	7.3							
	Workhead spindle	1.0 (AC servo motor)							
	Table feed	1.2 (AC servo motor)							
	Wheelhead feed	1.2 (AC servo motor)							
	Lubrication pump	0.004							
	Coolant pump	0.33							
	Magnetic separator (Option)	0.03							
Required electro power consumption		KVA 20							
Tank capacity	Lubrication oil	galons 0.79							
	Coolant tank	galons 31.70							
Height from floor to work center		Inch 39.37							
Machine space	Width	112.59	136.22	173.22	244.09	112.59	136.22	173.22	244.09
	Depth x Hight	inch 73.22 x 65.98							
Weight	Net weight	6.612	7.714	8.816	11.020	6.612	7.714	8.816	11.020

1	Description, Model		FANUC 21-GA	
2	No. of controlled axes		2-axes : Traverse (X) and Longitudinal (Z) (inc. PMC axis control)	
3	No. of simultaneously controlled axes		1-axis	
4	Least input increment		Traverse (X) : $\phi 0.0001\text{mm}/\phi 0.00001\text{ inch}$ Longitudinal (Z) : $0.0001\text{mm}/0.00001\text{ inch}$	
5	Interpolation		Positioning	
6	Max. programmable dimensions		$\pm 9999.9999$ (8 digits)	
7	Position detection		Pulse coder	
8	Display unit		9-inch monochrome CRT character display	
9	Data entry		Key-in system	
10	Programming system		Absolute/Incremental combined programming	
11	Tool dia. compensation memory		$\pm 6$ digits, 32 tools	
12	Preparatory functions		M. followed by 2 digit code	
13	Subprogram call		4 subprograms	
14	Manual feed	Manual pulse generator	Traverse (X) : $\phi 0.0001\text{mm}/0.00001\text{inch}$ per pulse	
			Longitudinal (Z) : $\phi 0.0001\text{mm}/0.00001\text{inch}$ per pulse	
			Magnifications : X1, X10 and X100	
			100 pulses per turn	
	Jog	OGM-200(8)	Traverse (X) : 1000 mm/min., 157.48 in/min.	
			Longitudinal (Z) : 0 ~ 4000 mm/min. 0.0001 ~ 157.48 in/min.	
		OGM-300(12)	Longitudinal (Z) : 0 ~ 10000 mm/min. 0.0001 ~ 393.70 in/min.	
			Traverse (X) : 4000 mm/min., 157.48 in/min	
		Rapid	OGM-200(8)	Longitudinal (Z) : 4000 mm/min., 157.48 in/min.
			OGM-300(12)	Longitudinal (Z) : 10000 mm/min., 393.70 in/min.
15	Other functions		<ul style="list-style-type: none"> <li>- Inch/Metric conversion</li> <li>- Interlock</li> <li>- Stored stroke check</li> <li>- PMC axis control</li> <li>- Reference point return (Manual, Auto.)</li> <li>- Dwell (second)</li> <li>- Skip function</li> <li>- Automatic acceleration and deceleration</li> <li>- Decimal point programming/calculator-type</li> <li>- Coordinate system setting</li> <li>- Macro executor</li> <li>- Memory card interface</li> <li>- Status display</li> <li>- Current position display</li> <li>- Display of parameter setting</li> <li>- Self-diagnostic function</li> <li>- Alarm display</li> <li>- Warning display</li> <li>- Servo adjustment screen</li> <li>- System configuration display, Hard- and Software</li> <li>- Language (English/Japanese)</li> <li>- Grinding data display</li> <li>- Extension of grinding data</li> </ul>	



CGM-225 (8.10)



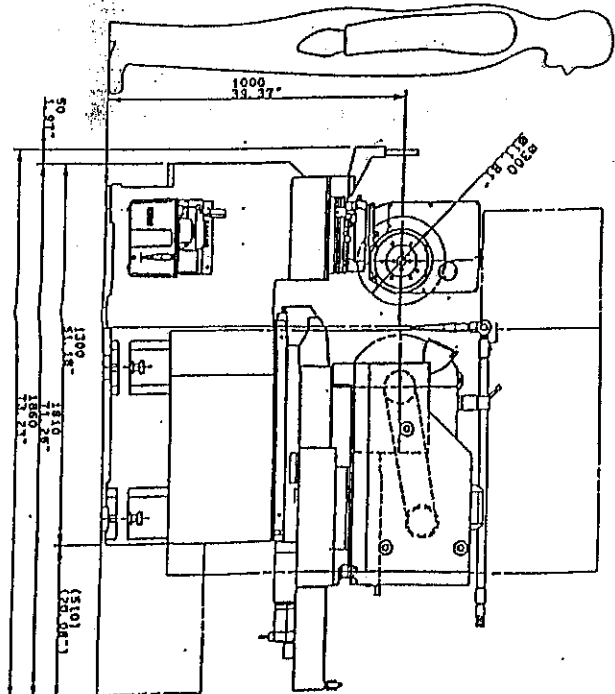
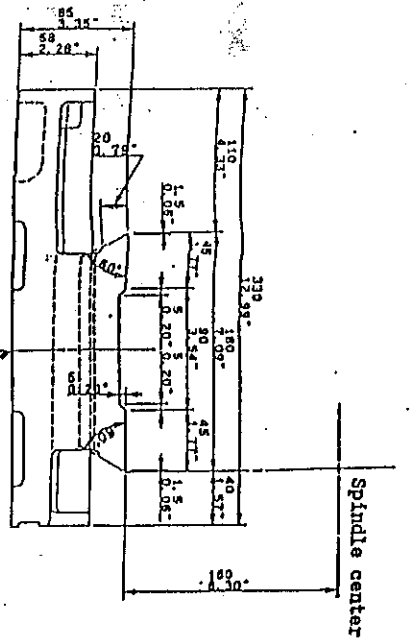
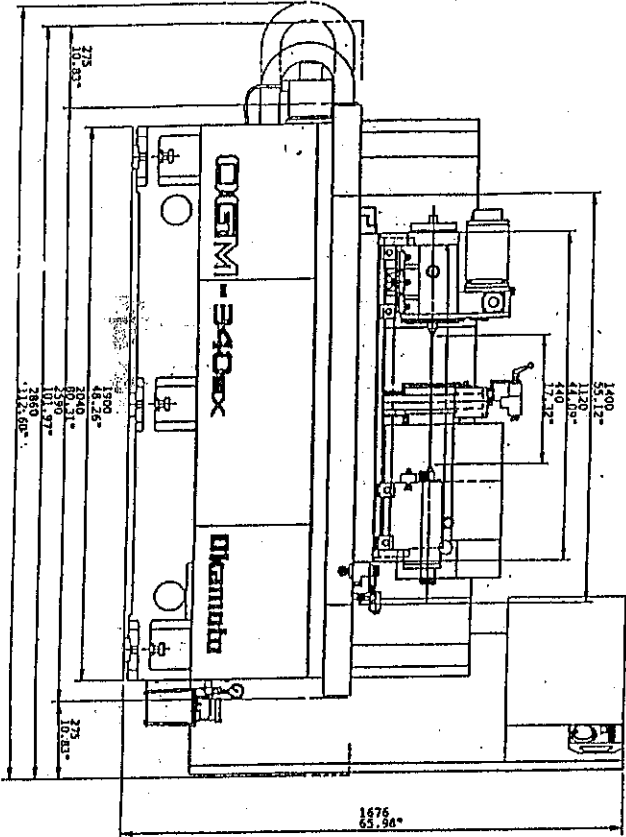
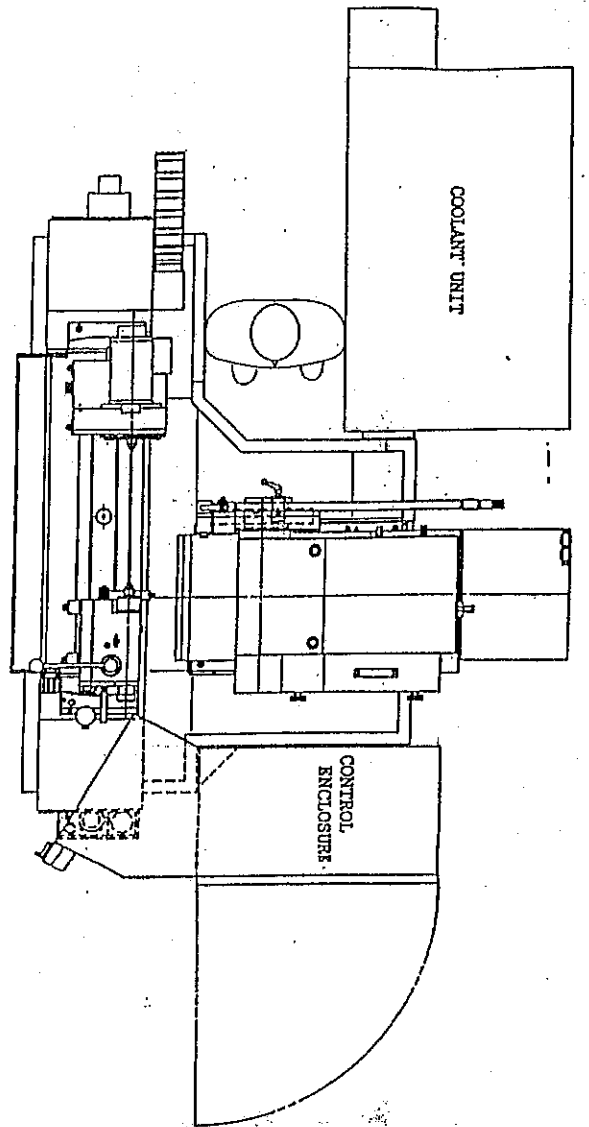


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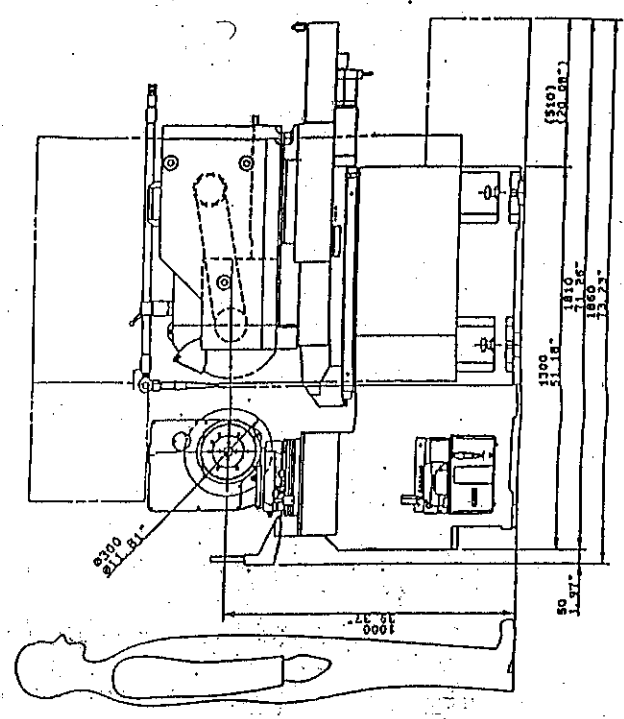
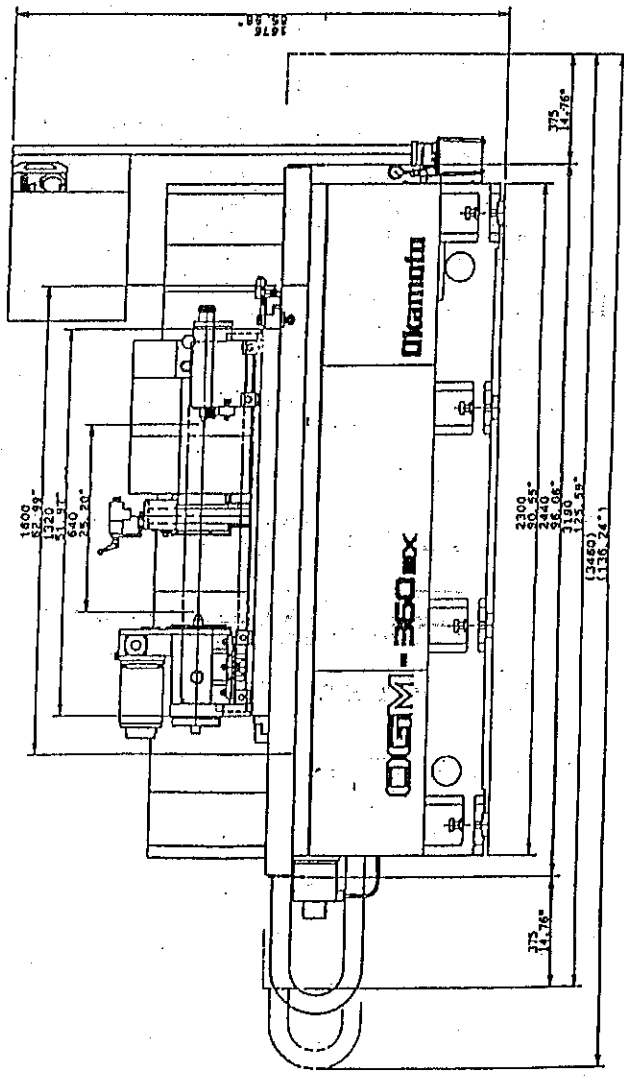
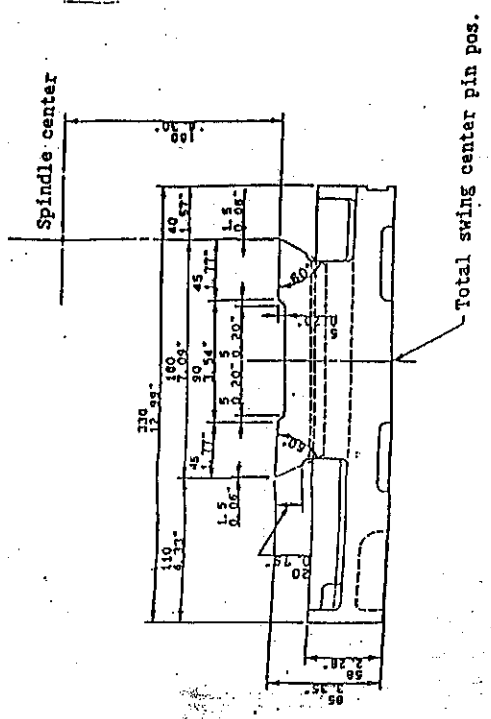
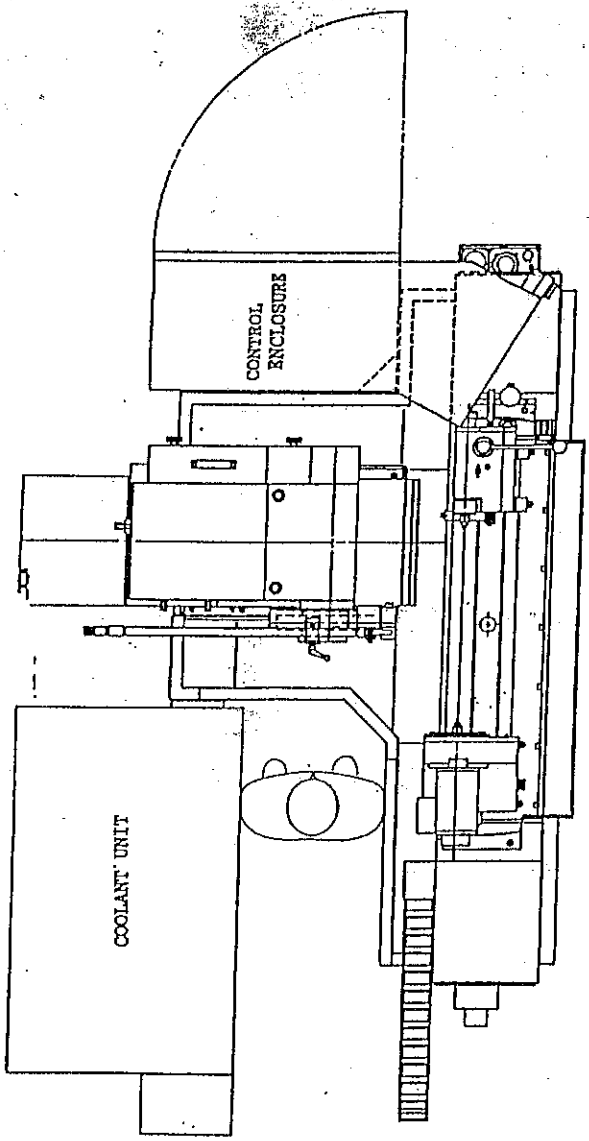
CGM-275

CGM-275

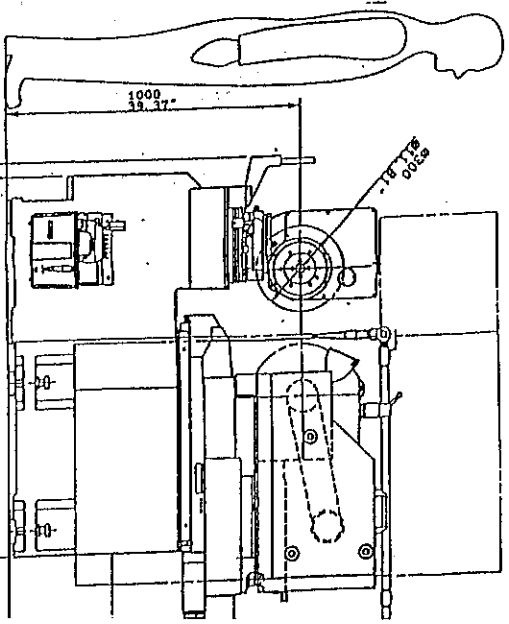
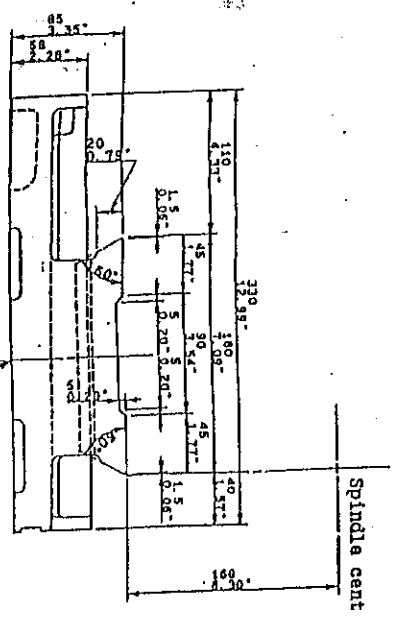
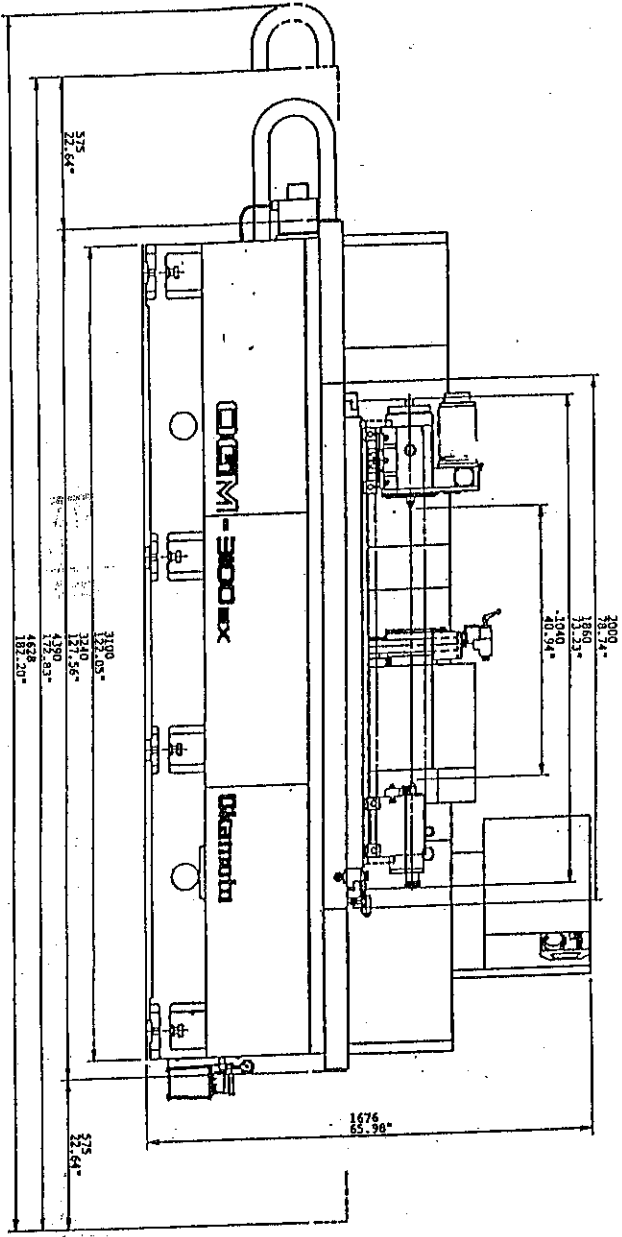
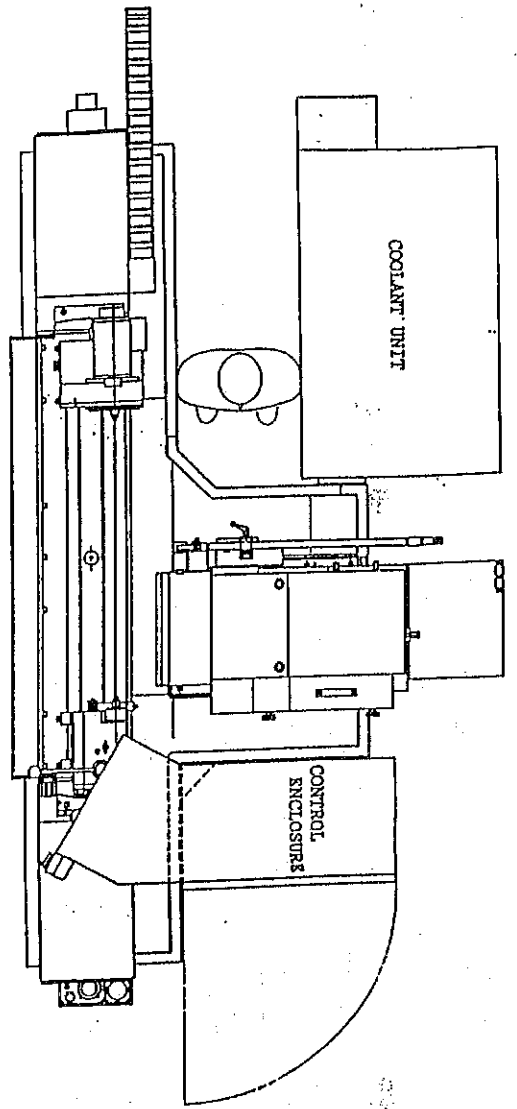




OCM-340



OKM-360(12.24)



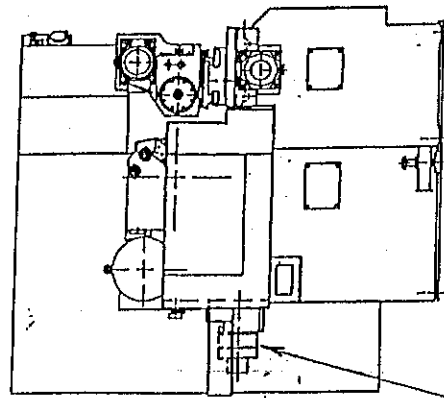
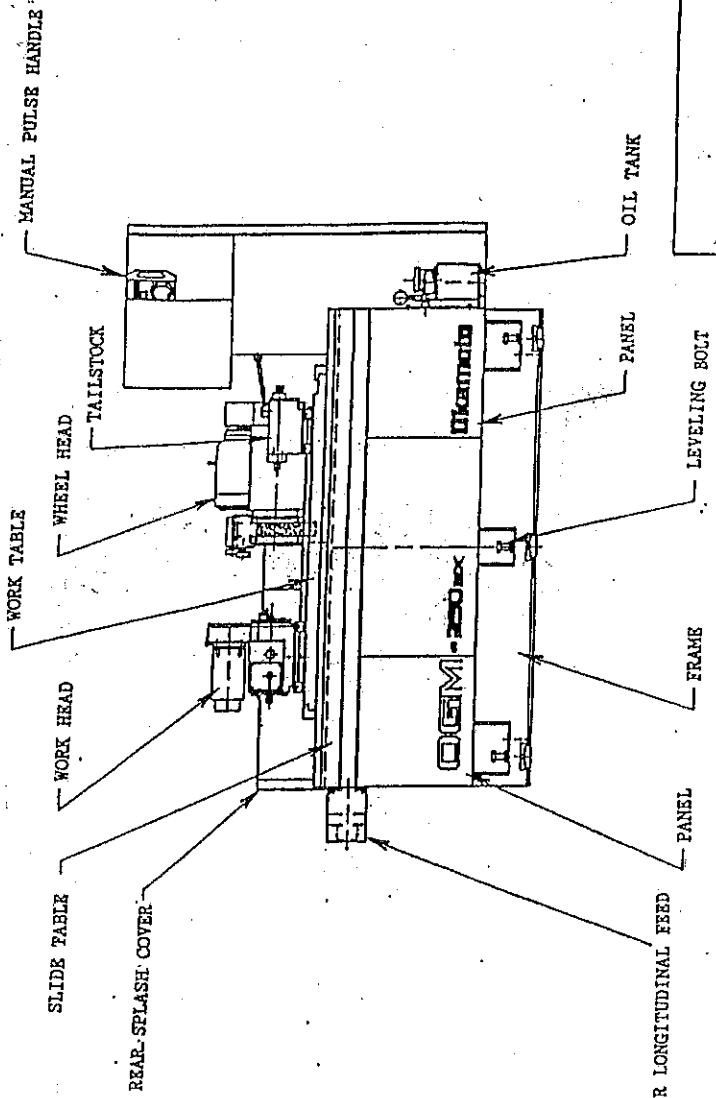
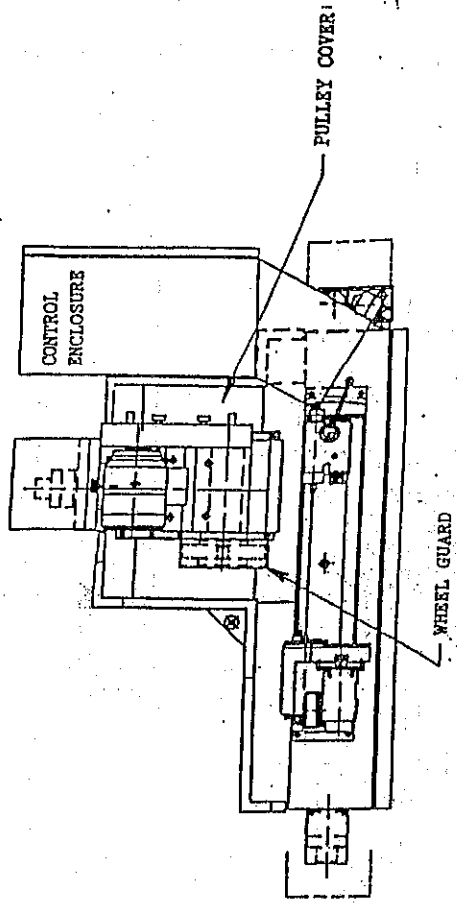
OGM-3100 (12.40)



## 2-4 Standard Accessories

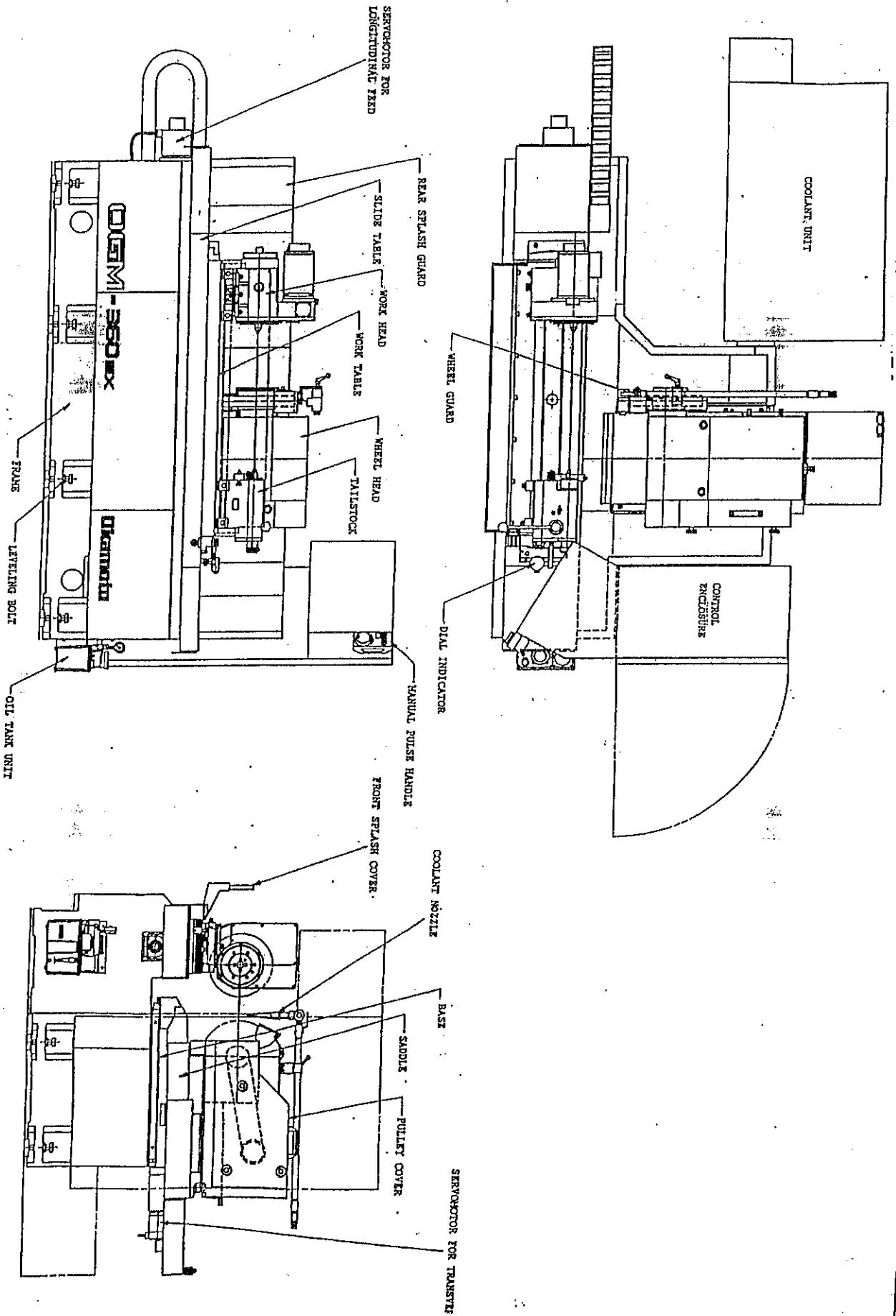
Model -( ): Inch

No.	Description	Q'ty
1.	OKAMOTO/FANUC (21-GA) MDI control	1 set
2.	Wheel adapter	1 set
3.	Carbide tip center	2 pcs
4.	Diamond tool (1 ct) & holder	1 set
5.	Grinding wheel Model OGM-200P, (8P) Series $\phi 355 \times 38 \times \phi 127 \text{mm}$ ( $\phi 14 \times 1.5 \times \phi 5''$ ) Model OGM-200U, (8U) Series $\phi 305 \times 25 \times \phi 127 \text{mm}$ ( $\phi 12 \times 1 \times \phi 5''$ ) Model OGM-300P, (12P) Series $\phi 405 \times 50 \times \phi 127 \text{mm}$ ( $\phi 16 \times 1 \times \phi 5''$ ) Model OGM-300U, (12U) Series $\phi 355 \times 38 \times \phi 127 \text{mm}$ ( $\phi 14 \times 1.5 \times \phi 5''$ )	1 pce
6.	Central Lubrication system	1 set
7.	Front splash cover	1 set
8.	Inifinitely variable workhead	1 set
9.	wheel guard with coolant nozzel	1 set
10.	Coolant tank Model OGM-200, (8) Series with 80 litters capacity Model OGM-300, (12) Series with 120 litters capacity	1 set 1 set
11.	Necessary tool with tool box	1 set
12.	Leveling plate & bolts	1 set
13.	Instruction Manual	1 set



SERVOMOTOR FOR TRANSVERSE FEED

SERVOMOTOR FOR LONGITUDINAL FEED



OGM-300 (12) Series

#### 4. TRANSPORTATION, INSTALLATION

##### 4-1 Transporting the Machine

1. Holes for lifting the machine are provided in its frame. To transport the machine, as shown in Fig. 4-1, insert steel round bars thereinto and properly and carefully sling the cables around them. Check balancing when using a crane. ▶ See Table 4-1.

NOTES - Use sufficient care to prevent shock to the machine when transporting.

- Movable parts are secured at the time of the shipment.

Table 4-1

Model	Machine weight	Dimensions of round bar
OGM-200 (8) Series	2200-2700Kgs (4850-5950 lbs)	φ 65x2000mm (φ 2.6x79") 2 pcs
OGM-300(12) Series	3000-5000Kgs (6610-11030lbs)	φ 85x1300mm (φ 3.4x52") 4 pcs

NOTES - The coolant tank is installed separately.

- If the cable may come in contact with the machine body, insert a pad and use sufficient care to prevent the paint from scratching and damage to the machine parts.

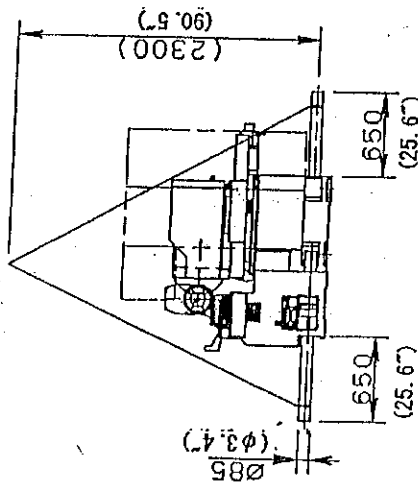
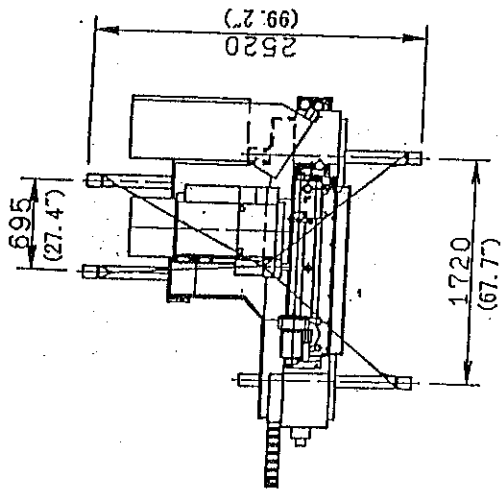
- Use sufficient care when inserting the round bar into the machine body, for wiring and piping are inside.

##### 4-2 Installing the Machine

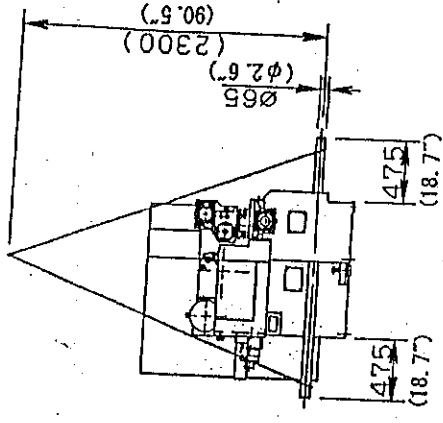
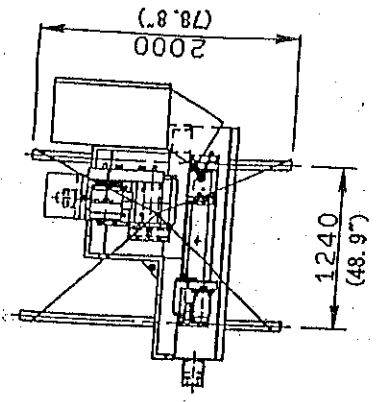
1. Avoid such locations where excessive vibrations and impacts, exposure to direct sunlight, and areas having excessive changes in temperature. Also if the environment is uneven, e.g. locations with a partial sunshine and heat source nearby, the machining accuracy will be affected.

2. The machine base will change at the site of a weak foundation, so be careful. ▶ See Figs. 4-2 and 4-3 for the foundation.



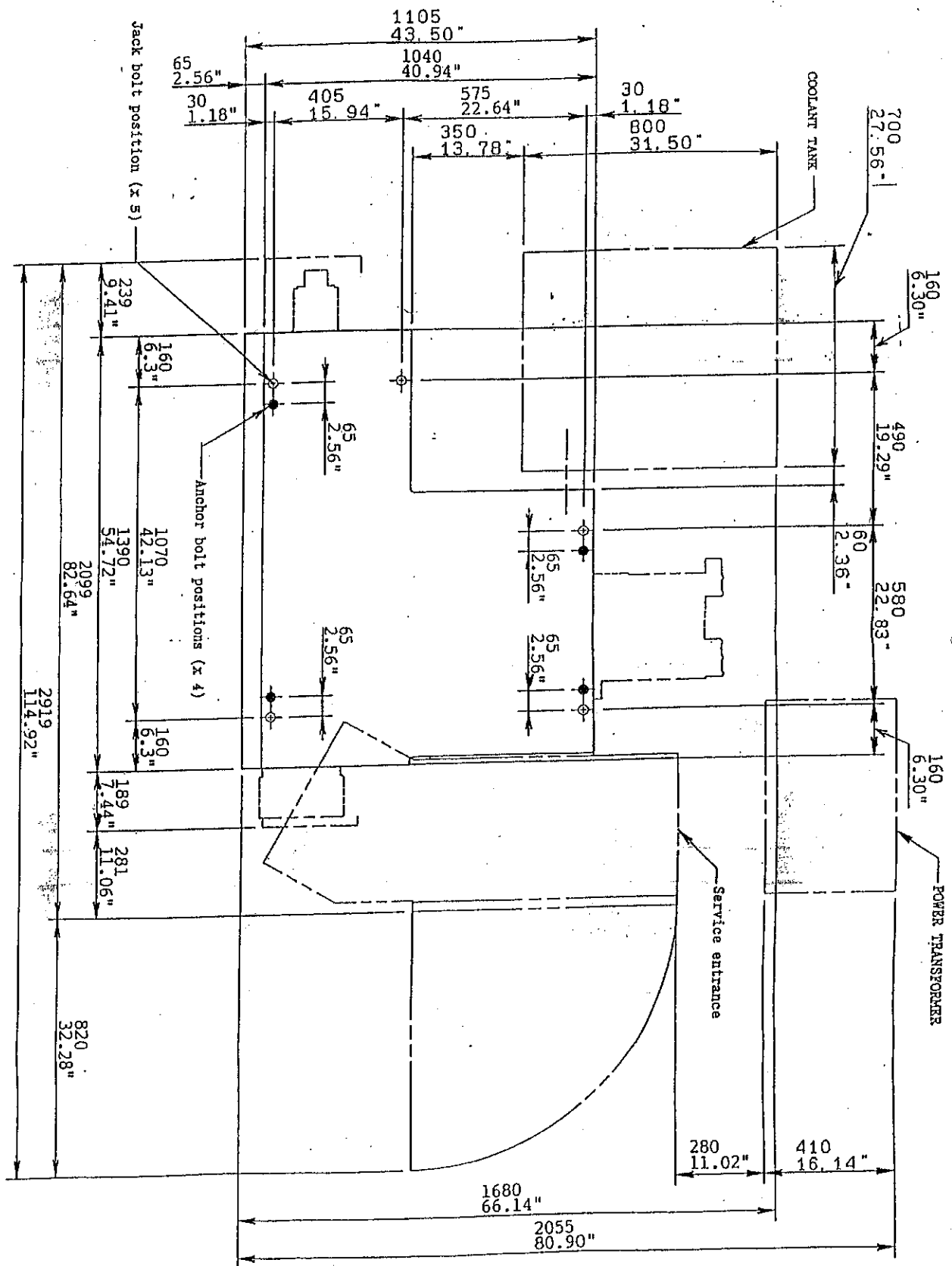


OGM-200 (8) Series

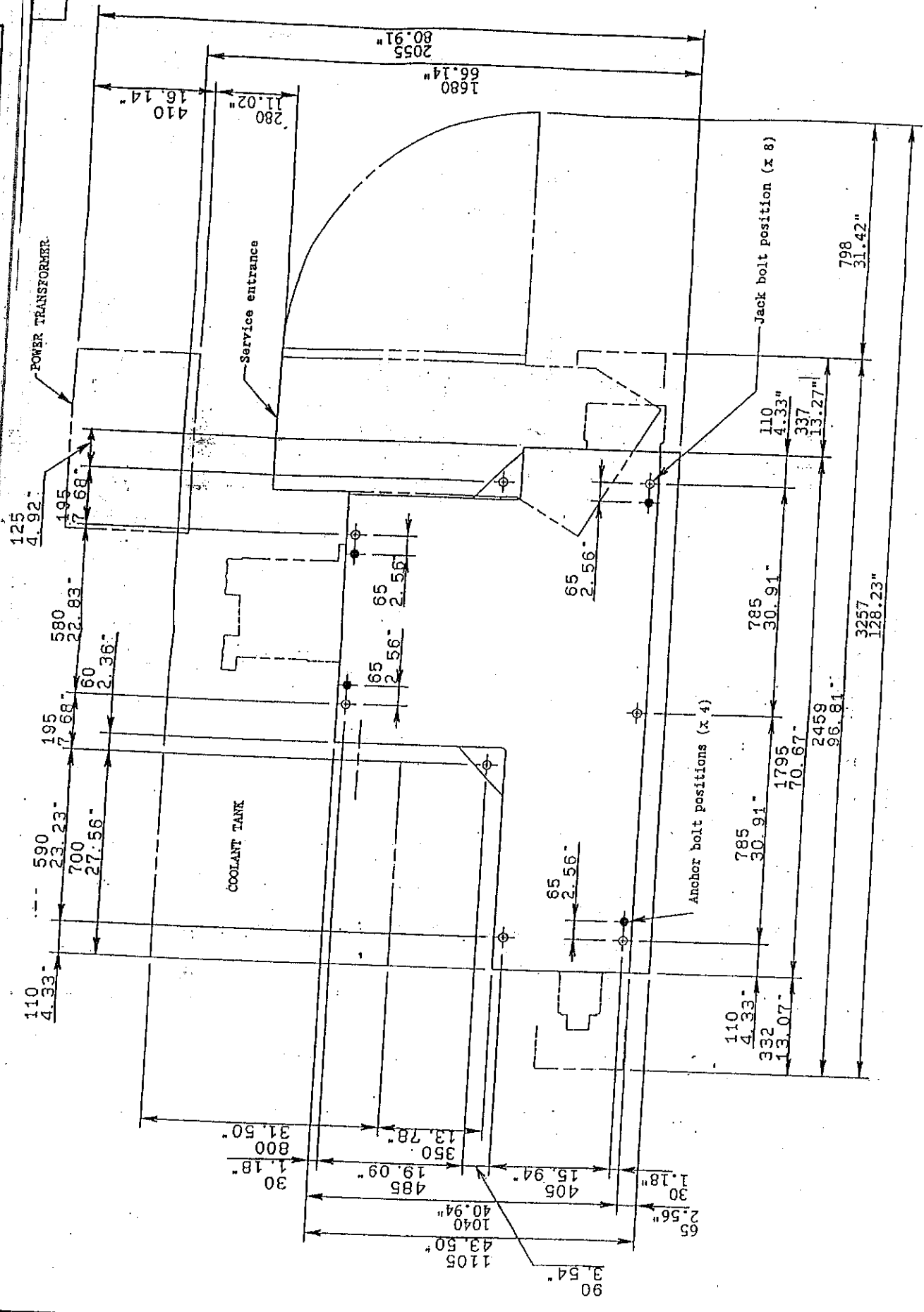


OGM-300 (12) Series

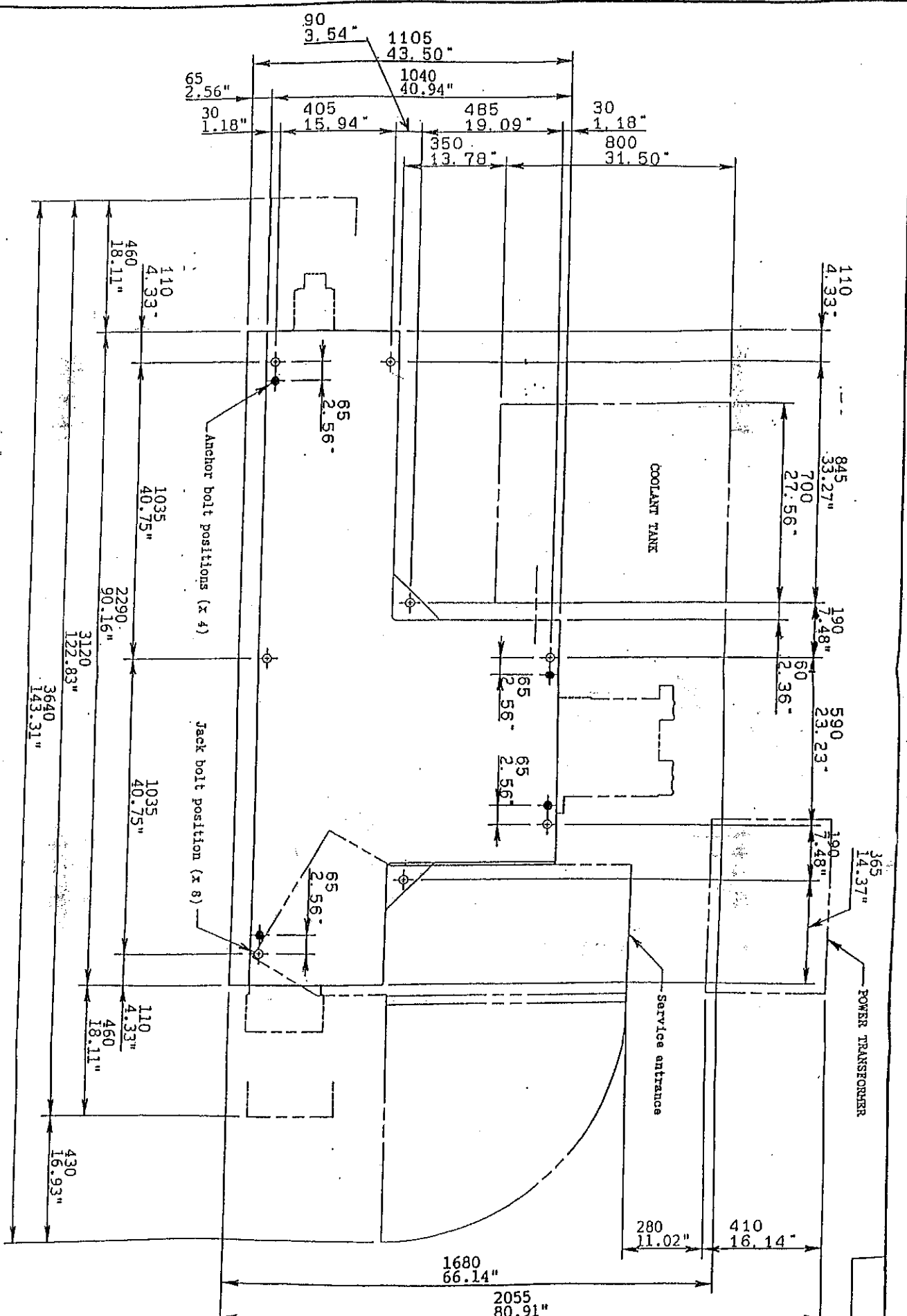
Fig. 4-1  
Lifting the Machine Body



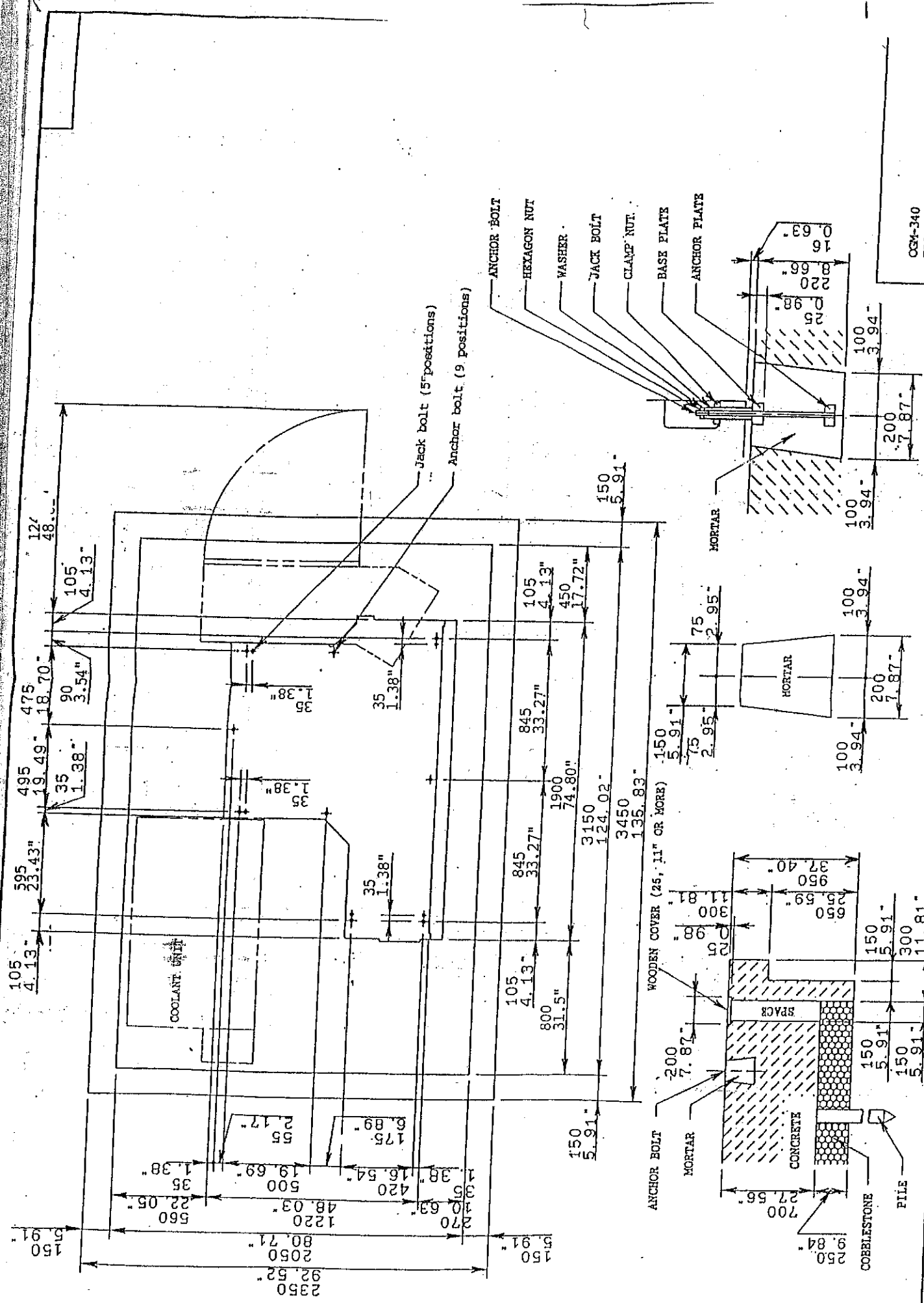
OSM-225 (8.10)  
FIG. 4-2 FOUNDATION



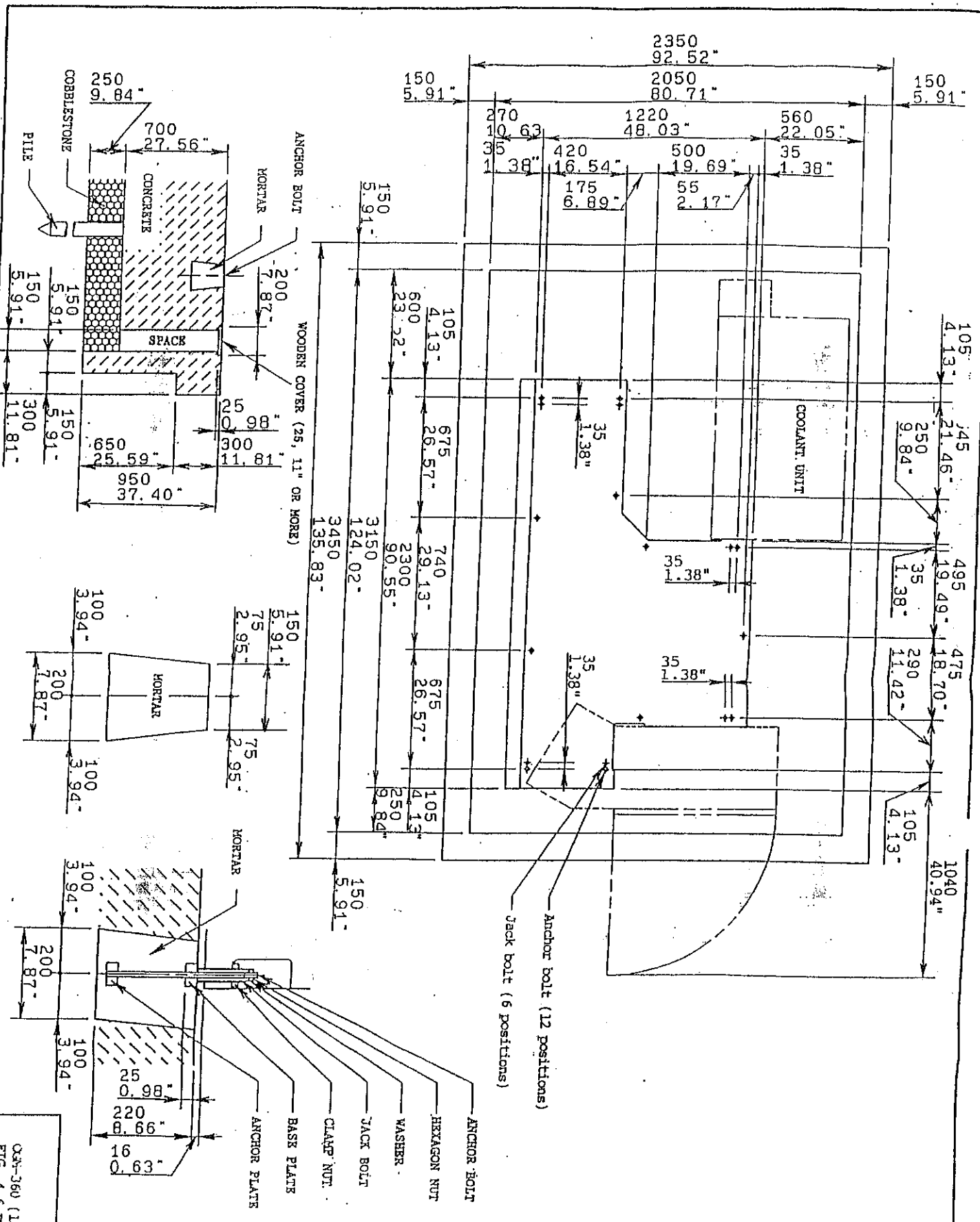
CGM-250 (8.20)  
 FIG. 4-3 FOUNDATION PLAN



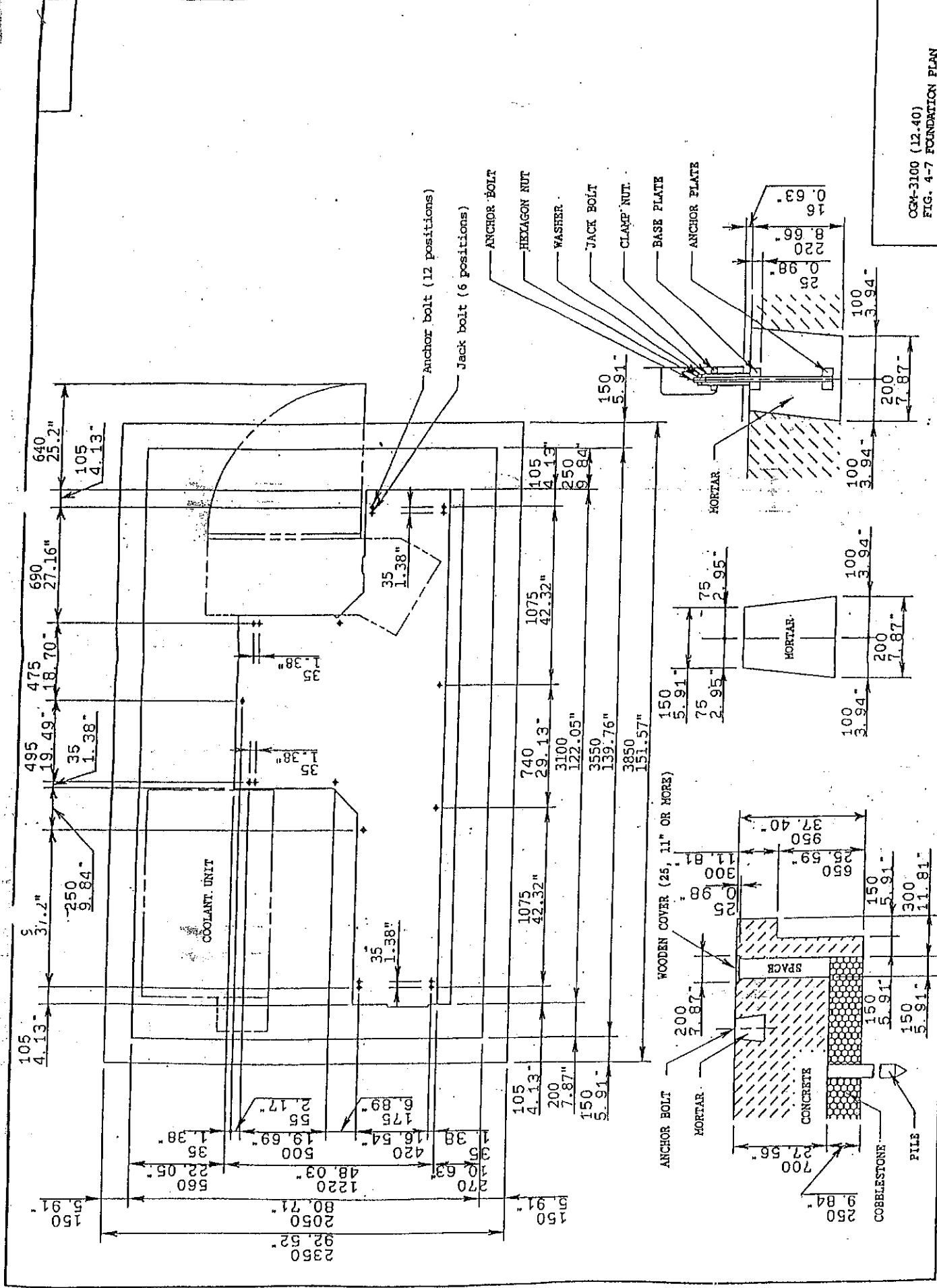
OCM-275  
 FIG. 4-4 FOUNDATION PLAN



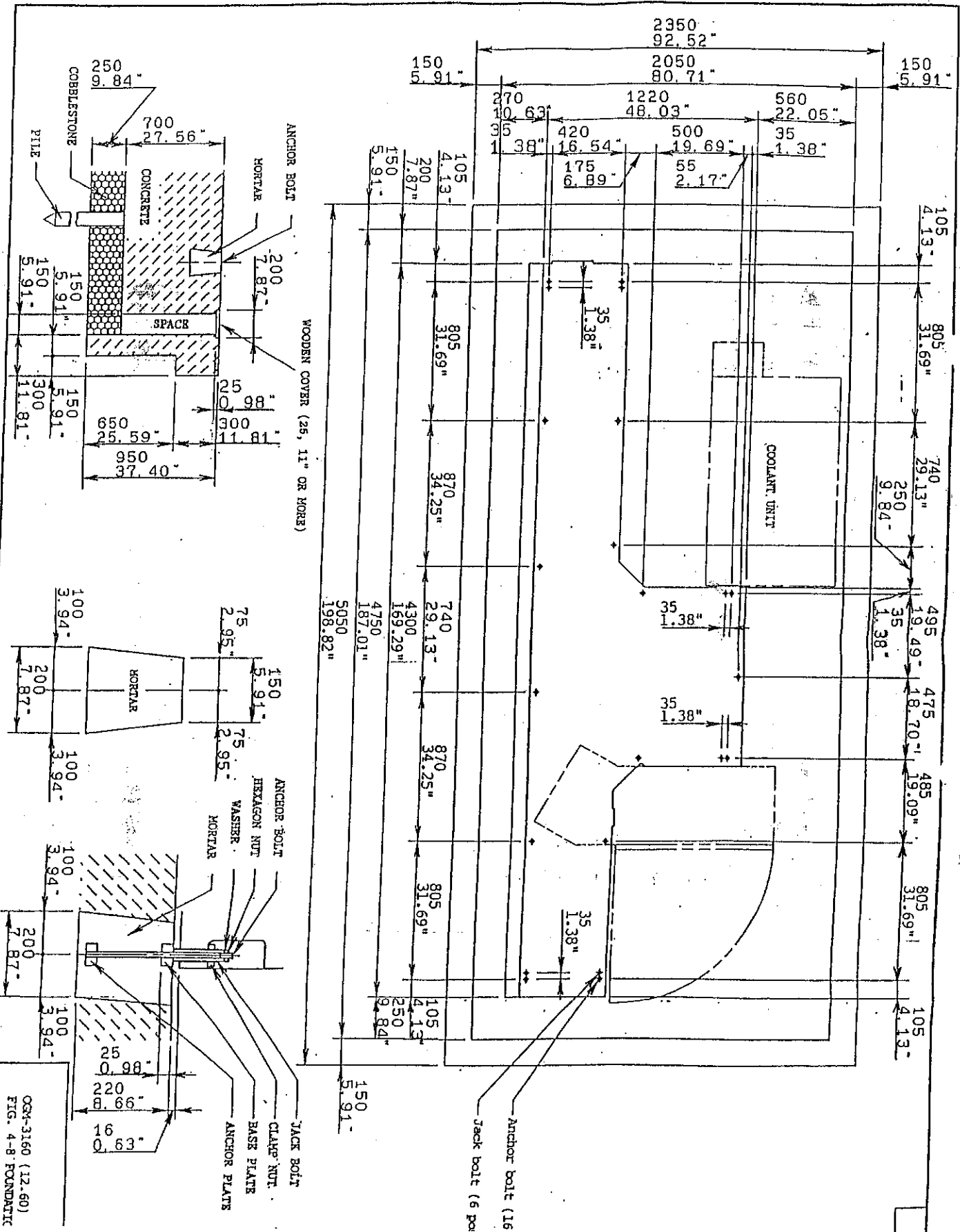
CGM-340  
FIG. 4-5 FOUNDATION PLAN



O&N-360 (12.24)  
 FIG. 4-6 FOUNDATION



CGM-3100 (12.40)  
FIG. 4-7 FOUNDATION PLAN



OGA-3160 (12-60)  
FIG. 4-8 FOUNDATION



### 4-3 Releasing Clamps

1. Clamping plates are attached to secure each movable part when transporting the machine.

#### OGM-200 (8) Series:

- |                                   |        |                 |
|-----------------------------------|--------|-----------------|
| (1) Frame & both table sides      | 2 pos. | ▶ See Fig. 4-4. |
| (2) Wheel head base & saddle side | 1      | ▶ See Fig. 4-5. |
| (3) Wheel head base & saddle rear | 2      | ▶ See Fig. 4-5. |

#### OGM-300 (12) Series:

- |                                   |        |                     |
|-----------------------------------|--------|---------------------|
| (1) Frame & table front and back  | 4 pos. | ▶ See Fig. 4-6.     |
| (2) Wheel head base & saddle side | 2      | ▶ See Fig. 4-7, 4-8 |

Check each clamp carefully.

NOTES: - Do not remove clamps until the machine has been located at the required site.

- Always keep all clamping plates. They will be necessary if the machine is moved or relocated.

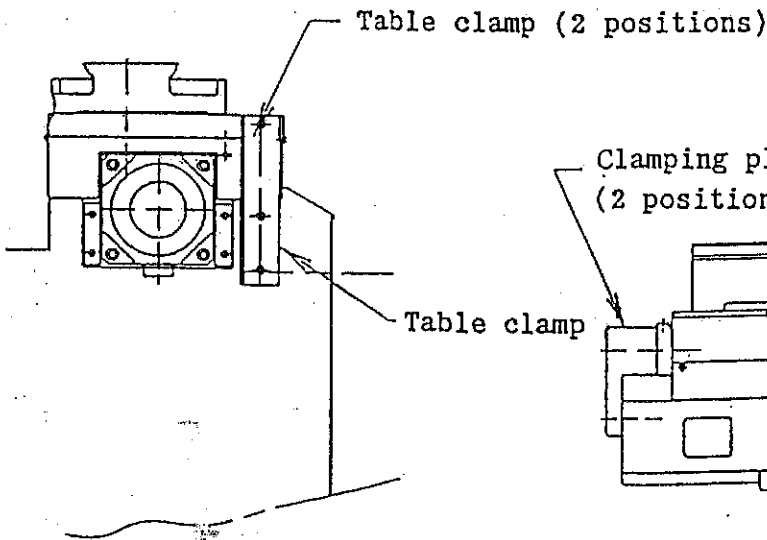


Fig. 4-4 Clamps for the Table

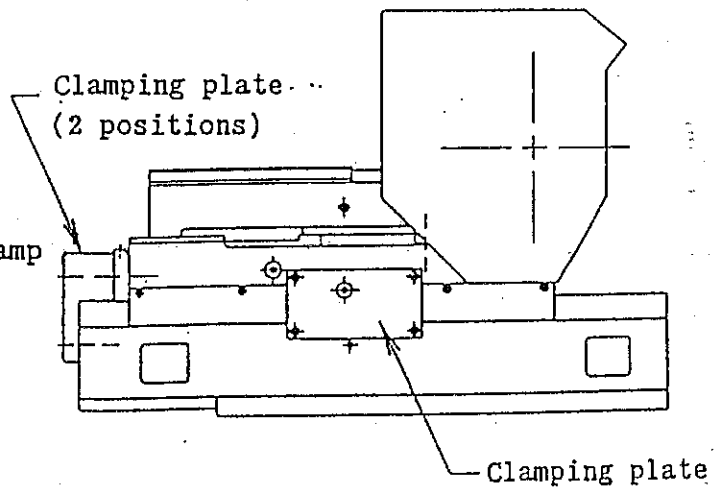


Fig. 4-5 Clamps for the Wheel Spindle Base & Saddle

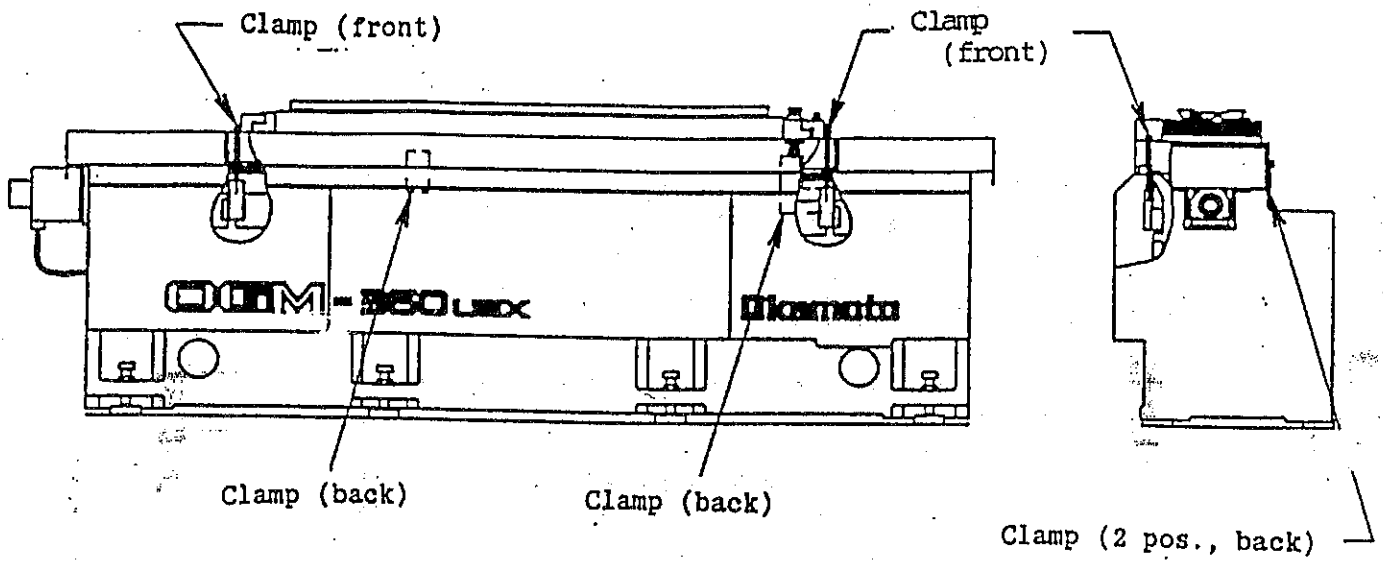


Fig. 4-6 Clamps for the Table

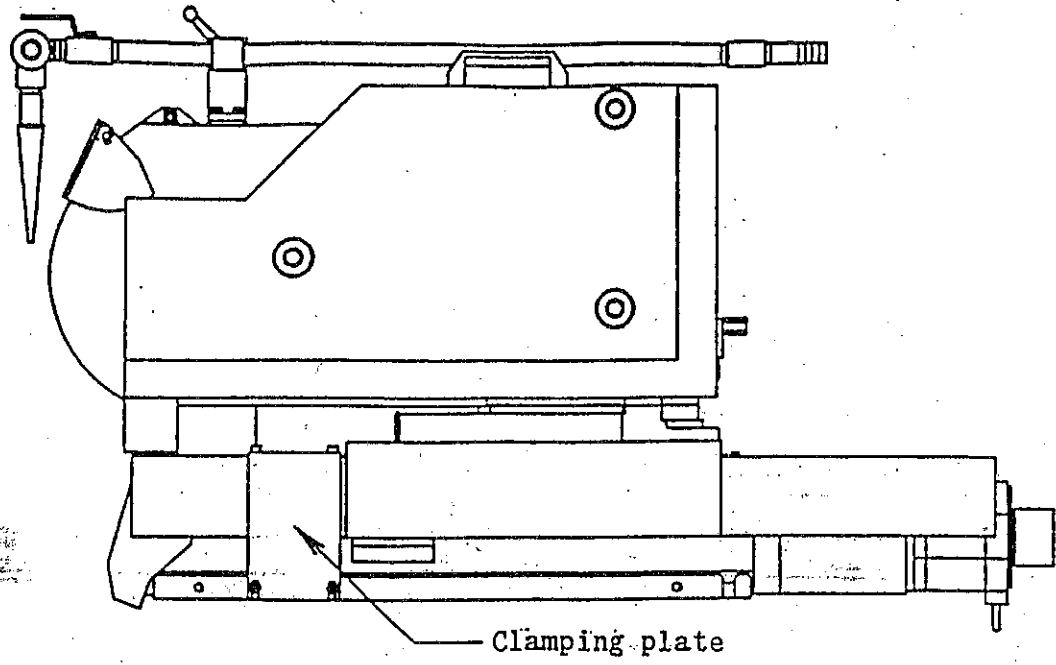


Fig. 4-7 Wheel Spindle Base and Saddle Side

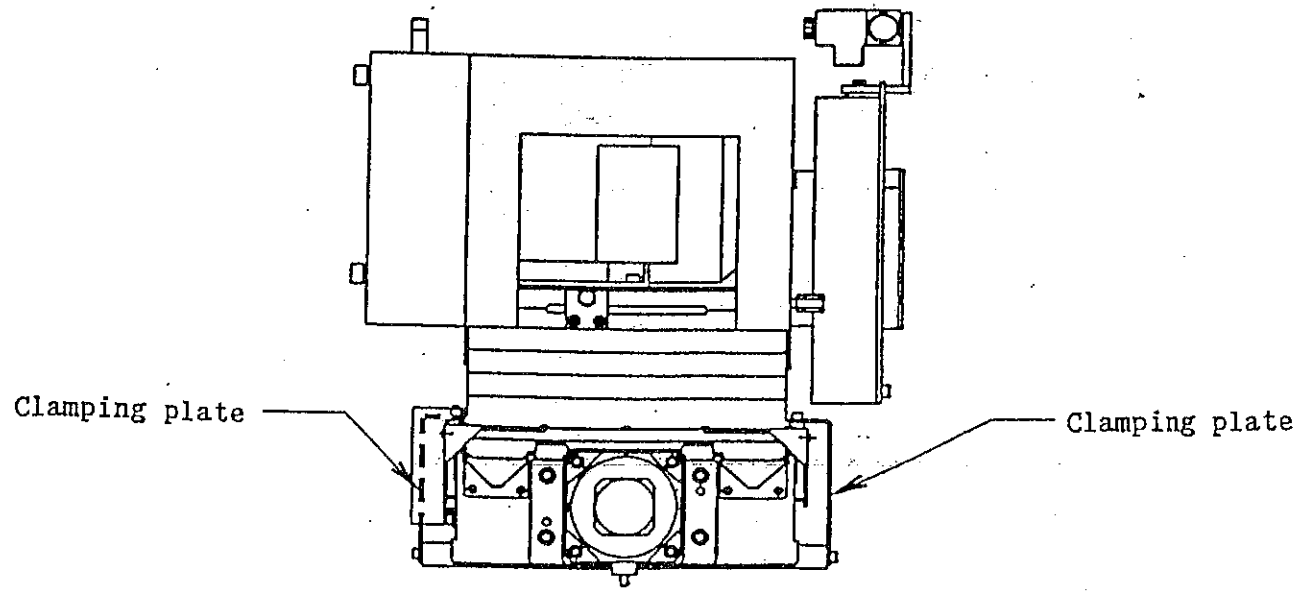


Fig. 4-8 Wheel Spindle Base and Saddle Rear

2. After installin the machine in the required position, attach the two panels (name plates) over the frame.

OGM-200 (8) Series : ▶ See Fig. 4-9  
OGM-300 (12) Series : ▶ See Fig. 4-10

3. The table front cover is packaged separately.  
Insert it from the top.

4. Install the coolant tank in the required position.  
See Fig. 4-2 and Fig. 4-3 FOUNDATION PLAN.

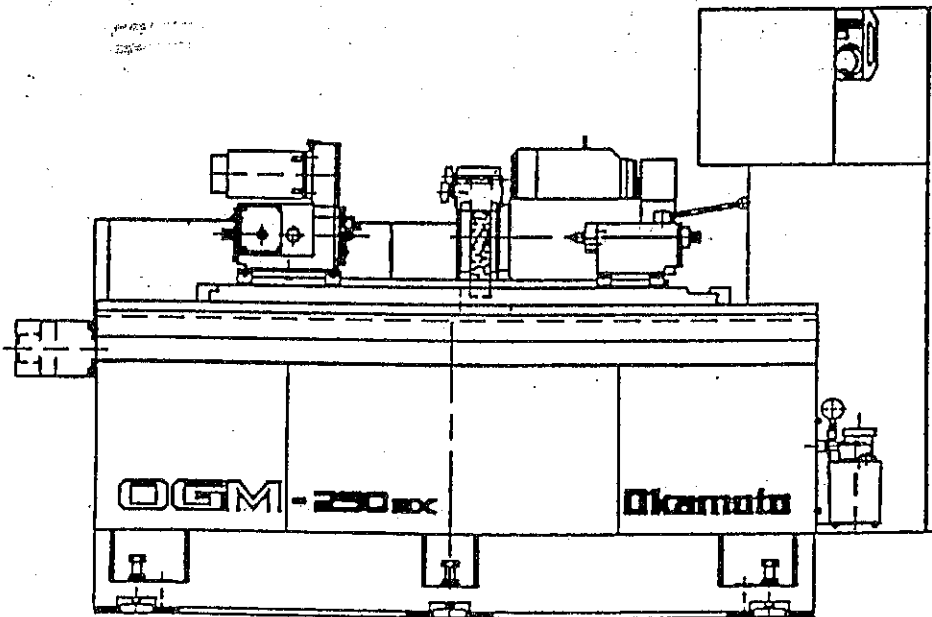


Fig. 4-9 Attaching the Panels

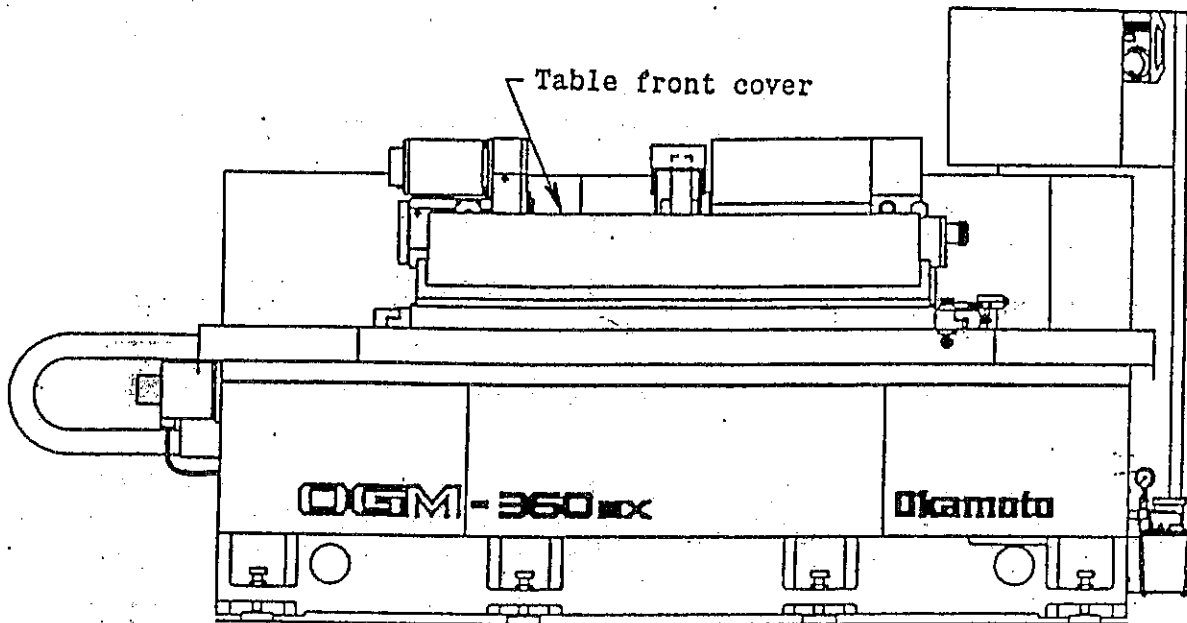


Fig. 4-10 Attaching the Panels

## 6-4 Leveling the Machine

1. To install the machine, support it in the beginning at 3 positions as shown in Fig. 4-11 and then adjust the jack bolts:
  - 1) Place a precision level at position 1 of the machine table, apply the jack bolt A to the base plate and carry out leveling with jack bolts B and C.
  - 2) Place the level at position 2 and carry out leveling with the jack bolt B.
  - 3) Equally screw the rest of the jack bolts so as not to change the level.
  - 4) After leveling, secure the jack bolts with the locking nut.
  - 5) Place the level at positions 1 and 2 and recheck the level.

NOTES - As to positions 1 and 2 of the level, place it on the top of the table.

- The loading applied to the base plates will slightly change with the passage of time, however, the machine will become stable gradually, so periodically recheck its level.

2. After applying power, check the level while moving the table to the right, center, and left. Adjust the jack bolts so that it has no twist or bend.

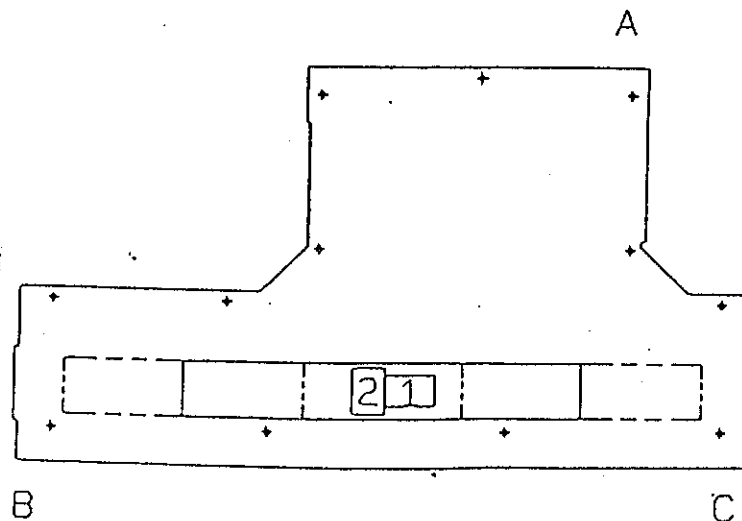


Fig. 4-11 Leveling

#### 4-5 Electrical Connections

1. Electrical equipment on this machine are centralized in the control enclosure located on the right side, as viewed from the front of the machine.
2. A service entrance is provided on the lower right side looking at the control enclosure from the front. Carry out wiring to the primary side (R, S, T, E) of the non-fused breaker (ground fault circuit interrupter).

NOTES - The grounding wire must be connected.

- Line voltage: 3-phase AC Primary power supply  
(e.g. 460/230, 415, 380)  
 $\pm 10\%$ ; 50/60Hz  $\pm 1$ Hz per phase

Consumption: 20kVA (OGM-200 (8) Series)  
15kVA (OGM-300 (12) Series)

- For the facilities other than the above, a transformer is required.

3. Check the 3-phase AC input line connections with a phase rotation indicator to properly carry out wiring.

NOTE: If having no phase rotation indicator, check them from the rotating direction of the wheel spindle.  
Depress the GRNDG. WHEEL ON button on the control panel and then depress the GRNDG. WHEEL OFF button immediately.  
Its rotating direction is clockwise. ▶ See Fig. 4-8.

SPECIAL NOTE: CHECK ROTATION WITH THE GRINDING WHEEL OFF OF THE MACHINE.

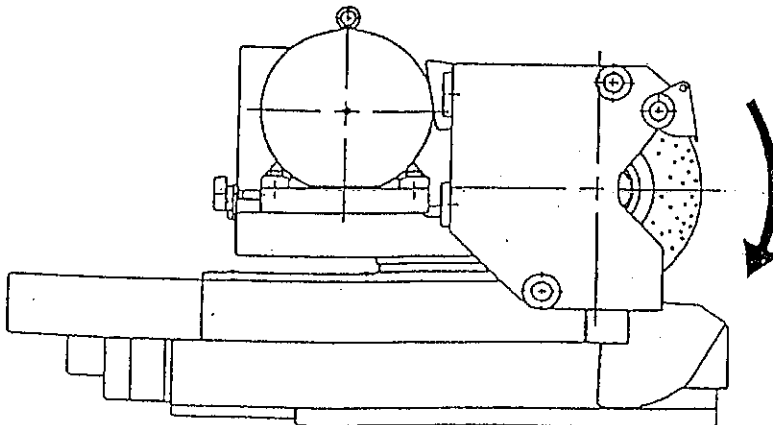


Fig. 4-12 Rotational Direction of the Wheel

NOTE: If the wheel runs in the wrong direction, interchange 2 wires (R and T) out of three connected to the primary side (R, S, T) of the mains breaker.

NOTE: Be sure to turn off power to the machine.

4. For connecting the coolant unit, a connecting passage is provided on the lower right side looking at the control enclosure from the front. Connect the wires from the coolant unit. To check its rotating direction, depress the COOLANT ON/OFF button to ON and then depress it to OFF immediately. The rotating direction is counterclockwise. ▶ See Fig. 4-13.

NOTE: Do not run the wheel spindle until the phase rotation has been checked. To run the coolant pump dry or in the wrong direction may cause damage, so never do so.

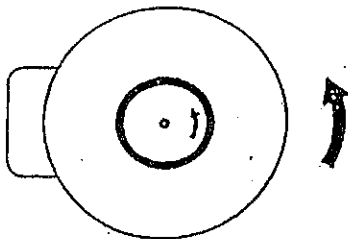


Fig. 4-13 Rotational Direction of the Coolant Pump



#### 4-6 Others

##### 1. Cleaning the Machine

When the machine has been placed in position, carefully remove the grease coated for transportation and rust prevention.

NOTE: To remove grease, use a soft cloth soaked with light oil.  
Do not use vaporizing solvents, e.g. thinner.

## 5. LUBRICATION

### 5.1 Recommended Oils

Use recommended lubricants:

	Recommended Lubricants	Manufacturer	Viscosity cSt at 40°C	Lubrication Point
HG32	VACUOLINE 1405	MOBIL	30.4	Slide ways
HM32	TONA T32	SHELL	32	
HG32	MAGNA GC32	CASTROL	32	Tailstock
EP-2 Lth	ALVERNIA NO.2	SHELL		Ball screw & nut

### 5.2 Lubrication Points and Quantity

#### 1. Servicing the slide ways with oil

Lubricate slide ways of the table and wheel head.  
Supply oil is sent through the centralized lubrication unit located on the right side of the machine. Its tank capacity is 3 liters.  
► See Fig. 5-1.

NOTES: - First time starting the machine, the oil level will drop slightly, so after finishing your work, e.g. the next day, check the oil level and add oil as necessary.

- Change the lubricating oil yearly. *OR 2,500 HRS RUN TIME*
- Clean the oil recovery filter in the unit periodically.
- The oil pressure has been set at 4kg/cm<sup>2</sup> (56.8 psi) at the time of shipment.

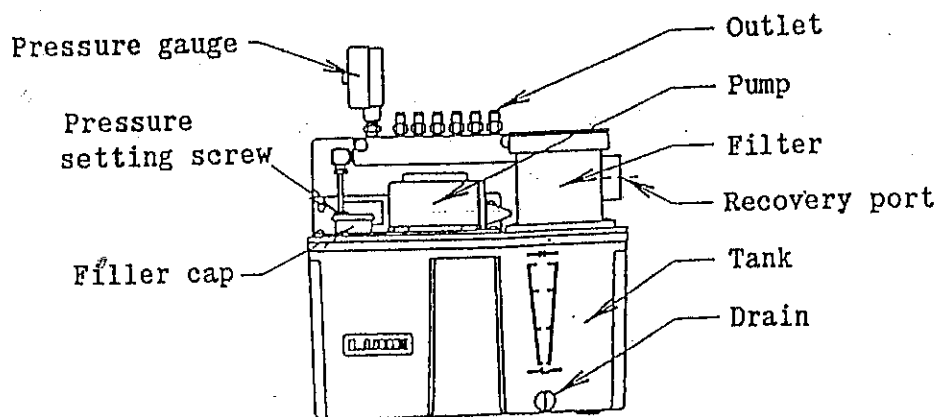


Fig. 5-1 Lube Tank

## 2. Servicing the ball screw nut with grease

Precision ball screws are used for the feed mechanisms of the table and wheel head. Grease the ball screw nuts periodically.

NOTE: Ends of the ball screw are supported with bearings and packed with grease.

(1) Table drive x 1 point  
▶ See Figs. 5-2 and 5-4.

(2) Wheel head drive x 1 point  
▶ See Figs. 5-3 and 5-5.

NOTES - Lubricating amount is about 5cc for each. Service every 6 months.

- Sufficiently clean the grease nipples to prevent entrance of contaminants.

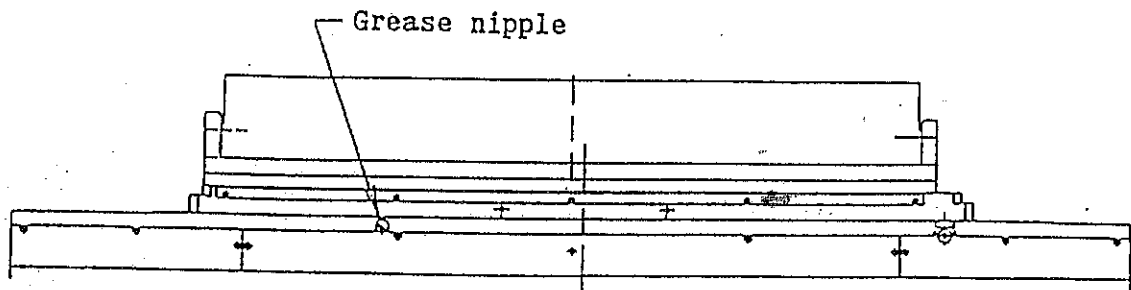


Fig. 5-2 Servicing the Table Nut

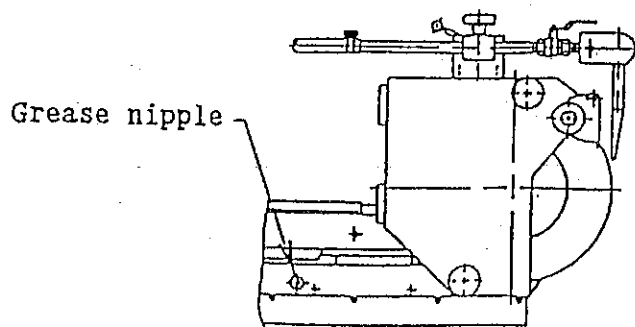


Fig. 5-3 Servicing the Wheel Spindle Nut

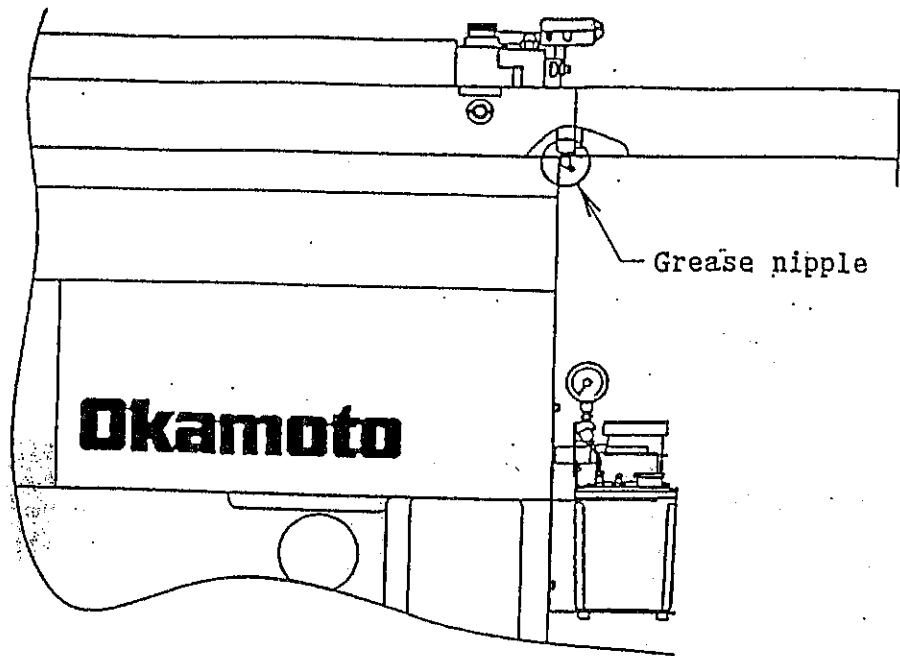


Fig. 5-4 Servicing the Table Nut

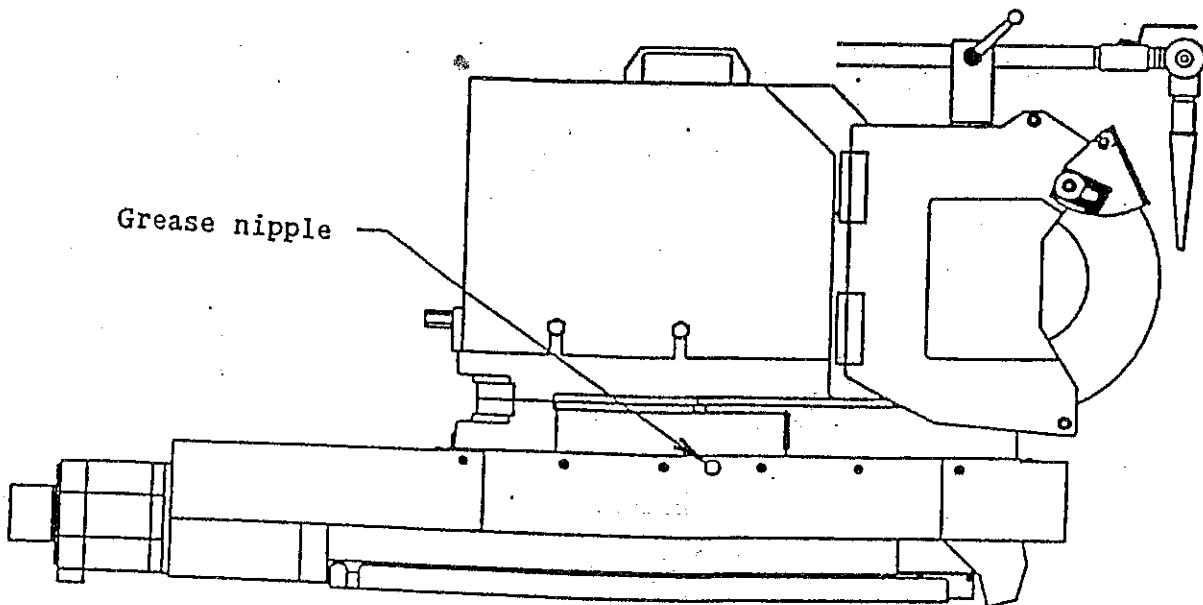


Fig. 5-5 servicing the Wheel Spindle Nut

### 3. Servicing the tailstock with oil

A hole to fill oil to lubricate the center sleeve is provided in the tailstock body and is plugged.

An oil level sight glass is located on the side. Check it daily and service with the proper type and amount of oil.

► See Fig. 5-6.

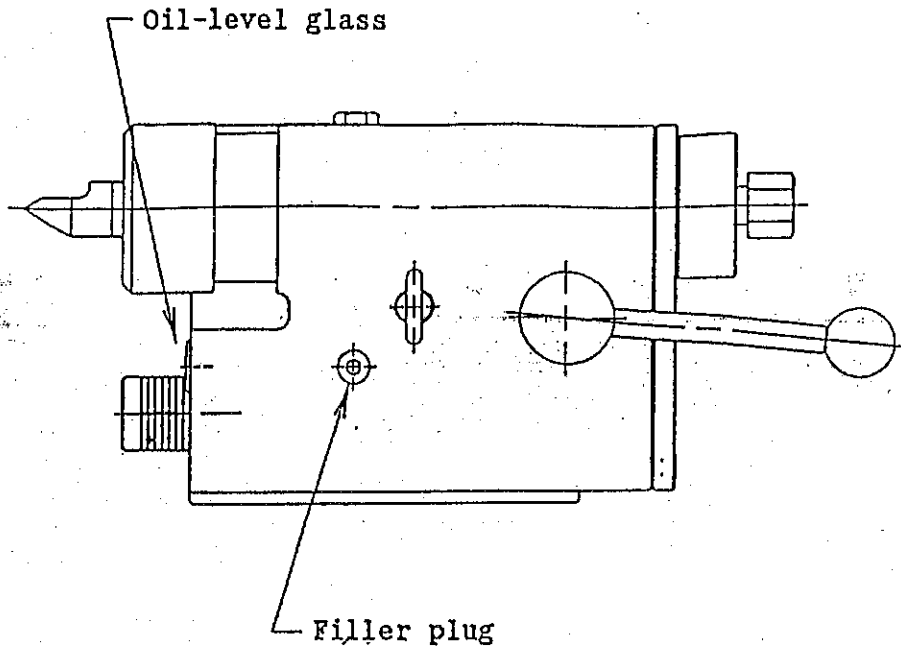


Fig. 5-6 Servicing the Tailstock with Oil

#### 4. Wheel and work spindles

No lubricant is required due to the prelubricated system with grease.

NOTE: The machine has sufficiently been run in at the time of the shipment, however, carry out the following running-in operation when running the machine for the first time.

- 1) Run continuously for 3 minutes, then stop for 3 minutes.
- 2) Run continuously for 5 minutes, then stop for 5 minutes.
- 3) Run continuously for 10 minutes, then stop for 10 minutes.
- 4) Run continuously for 30 minutes, then stop for 30 minutes.

In case of a temperature rise while running in, stop at once and wait until cooled down. Gradually extend the duration of operation.

Table 5-1 Lubrication Chart

Lubrication Point	Lub. System	Amount	Interval
Slide ways	Lube. oil	3 liters (0.86 gallon)	Replace yearly
Tailstock	Lube. oil	Properly	Check at times
Ball screw nut	Grease	5 cc (1/6 oz)	Every 6 months
Ball screw support	Prelubricated	---	No need
Wheel spindle	Prelubricated	---	No need
Work spindle	Prelubricated	---	No need

### 5-3 Lubrication Tank

Using a motor-driven gear pump unit the centralized lubrication system continuously supplies a small amount (3cc/min) of lube oil to each slide way.

Table 5-2 Specification of Lubrication pump unit

Pump	Motor-driven gear pump
Type	AMS - 3
Delivery rate	0 ~ 2.5 cc/min. (0 ~ 0.08 oz/min.): 50 Hz 0 ~ 3.0 cc/min. (0 ~ 0.10 oz/min.): 60 Hz
Delivery pressure	8 kgf/cm <sup>2</sup> (113.7 psi) - relief set pressure
Motor	Synchronous motor
Output	3 watts, single phase
Voltage	AC 200V
Current	25 mA (50 Hz) / 18 mA (60 Hz)
Speed	10 rpm (50 Hz) / 12 rpm (60 Hz)
Rotating direction	Clockwise
Tank capacity	3 liters (0.66 gallons)
Replacement part	Suction filter (Code No. 500324)
Manufacturer	RYUBE CO., LTD.

Distributed oils are recycled through the recovery filter from the drain line.

## 6. DESCRIPTION OF PARTS

### 6.1 Construction and Operation

#### 1. Table

##### ■ Construction

The table consists of a slide table which can travel longitudinally and a work table which can swivel.

To feed the slide table, a servomotor directly connected to a ball screw through a coupling is supplied. Its slide way is a V-V shaped sliding guide way.

##### ■ Swivel of work table

An adjusting screw, nut and plate which are fixed to the slide table are linked with the work table and swivel pin. ▶ See Fig. 6-1. Turning the adjusting screw clockwise swivels the work table clockwise (to operator's side), turning counterclockwise swivels in the direction of the wheel spindle.

The adjusting screw has a slight backlash, so after carrying out positioning, turn in the opposite direction to remove excessive pressure.

- NOTE - When swiveling the work table, loosen the pressure plate on its sides: Tighten them after swiveling.
- To swivel the work table in the extreme, pull up the swivel pin, and then turn the adjusting screw to move the plate in this condition.  
Down the swivel pin to set it to a groove in the plate, then adjust the work table.



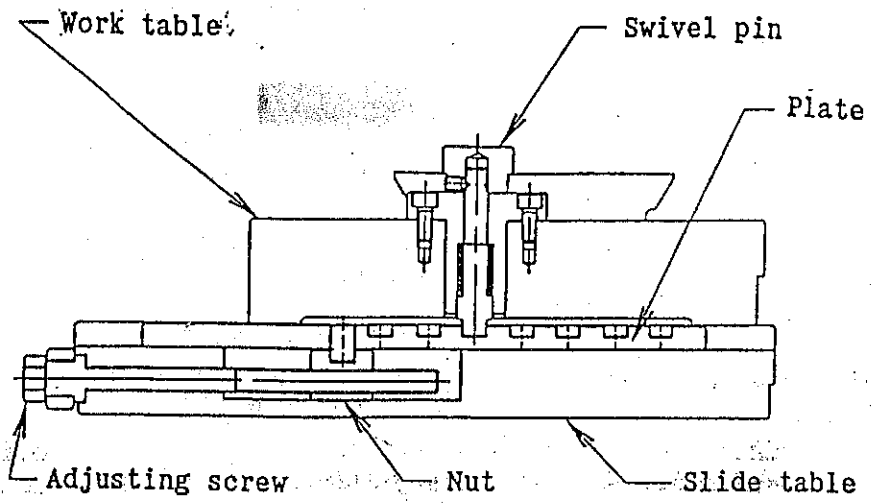


Fig. 6-1 Swivel of Work Table

## 2. Work head

### ■ Construction

The work head is a common type which is a dead center - which the center stops and the face plate runs - and allows chuck work as a live center by mounting a chuck onto the spindle.

Work heads are of two types: universal <sup>ones</sup> one which is located on the work table and can swivel through 90° to the wheel side and 30° to the operator's side and a plain one which does not swivel.

As to the work spindle bearings, proper preload has been given, using precision taper roller bearings, so that, high accuracy and rigidity can be obtained.

To rotate the face plate, the rotating force from the AC servomotor is transmitted to the face plate with a pulley supported by combined angular contact ball bearings through V-belt(s).

### ■ Shifting of dead center/live center

When using as a dead center, insert the shift knob is set to the DEAD position. The tip of the shift knob will go into a groove machined in the spindle to secure the spindle. Attach the carrier, onto the face plate portion. ▶ See Fig. 6-2.

NOTES - If it is difficult to insert the shift knob, turn the spindle by hand until it drops into place.

- The shift knob is fixed in these positions, DEAD or LIVE, by turning it while pulling.

When using the center as a live center, pull the shift knob to set it to the LIVE position, and free the spindle.

For chuck work, remove the cap on the face plate portion to mount the face plate for the chuck.

At this time, attach the driving dog beforehand. ▶ See Fig. 6-3.

NOTE: The chuck and face plate for chuck are options.

### ■ Mounting and dismounting the center

To put in the center, sufficiently clean the spindle taper and center and then insert it. To take out the center, screw in the extractor from the spindle back-side using a wrench.

NOTES - The spindle, as set as a dead center, does not move and therefore set the shift knob to the DEAD position.

- Hold the center to prevent it from dropping when removing it.

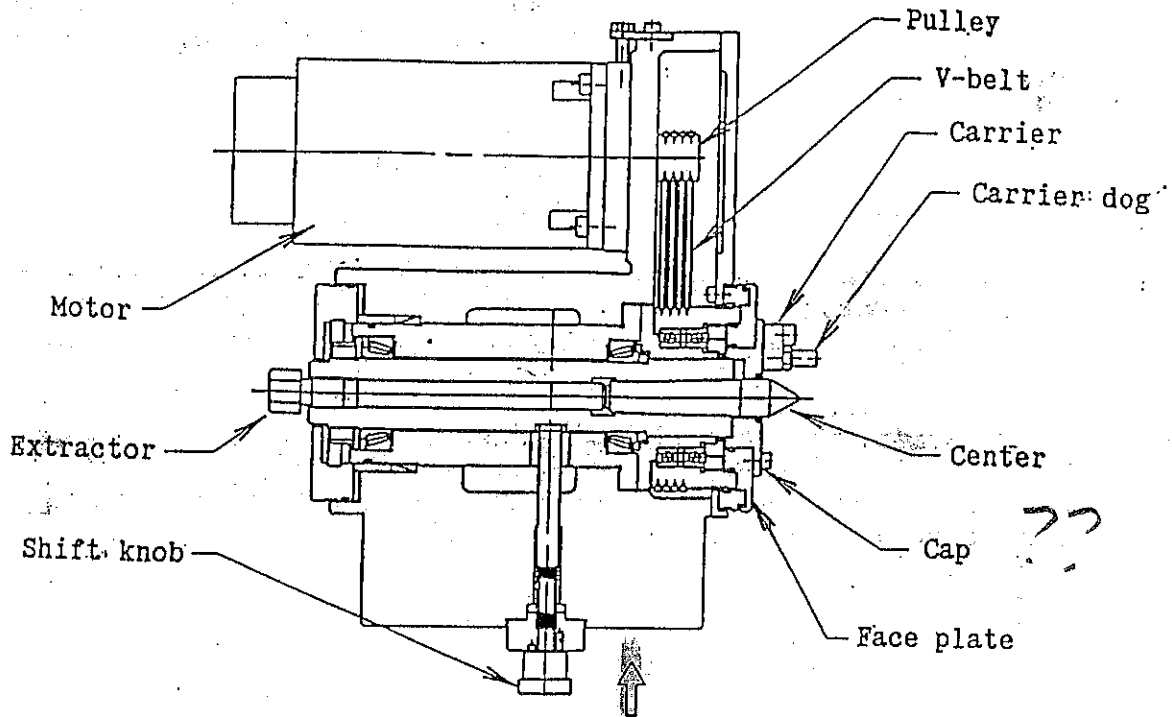


Fig. 6-2 Condition for Dead Center

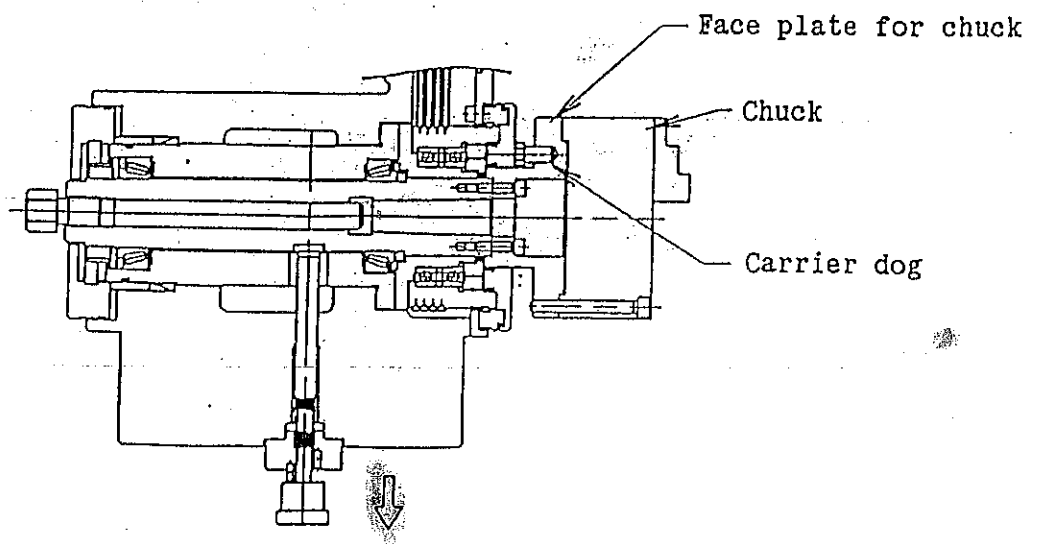


Fig. 6-3 Condition for Live Center

■ Grinding the center

OGM-200 (8) series:

Set the shift knob to the LIVE position by pulling it.  
Remove the cap on the face plate portion and drive a socket head screw (M6 x 15) into the spindle face.  
There is a groove on the back side of the cap, so that it will fit the screw head. Put the cap on face plate portion, then secure it with screws.  
▶ See Fig. 6-4.

NOTES - 4 tap holes (M6) are provided in the spindle face.  
Drive the screw into one of them.

- Except for grinding the center, leave the screw on the spindle face removed.

OGM-300 (12) Series:

Set the shift knob to the LIVE position while drawing.  
Attached a center grinding carrier to the face plate to link the spindle and face plate. ▶ See Fig. 6-5.

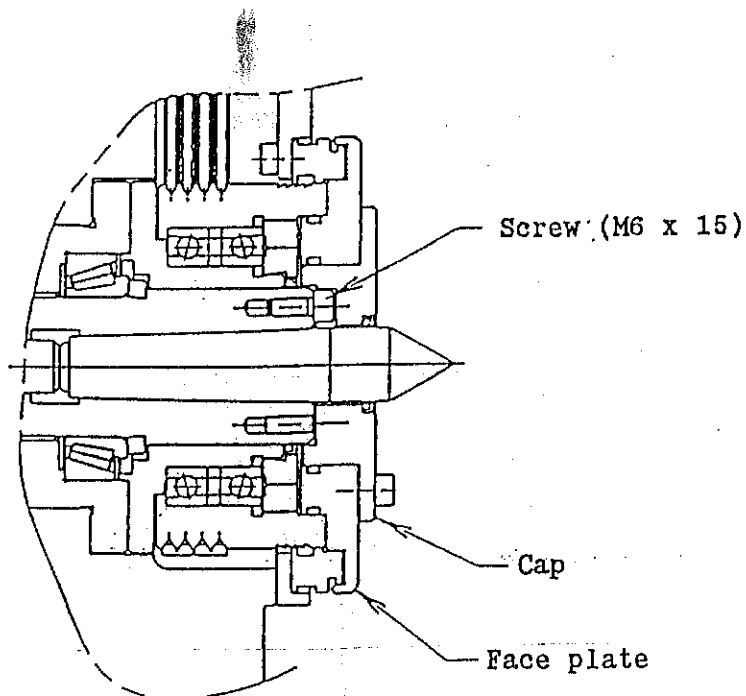


Fig. 6-4 Grinding the Center

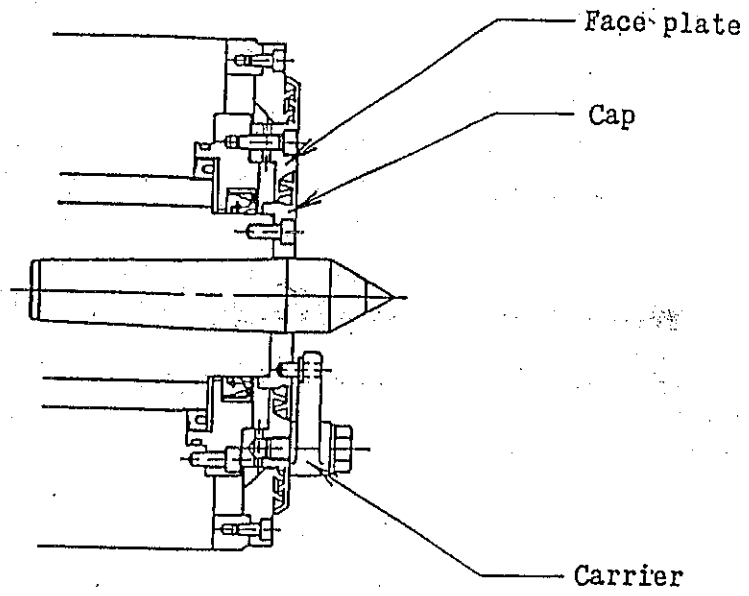


Fig. 6-5 Grinding the Center

■ Swiveling the work head

To swivel the work head body, loosen 3 work head fastening nuts, and then swivel it to the angle by hand. After swivelling, tighten all nuts again. > See Fig. 6-6.

■ Moving the work head

The work head is fixed on the work table through the saddle. When moving the work head, loosen the saddle fastening nuts (2 positions), and then carry out positioning according to the work size. > See Fig. 6-6.

When fixing the work head, secure it, by pressing the saddle against the gib of the work table, with the saddle fastening screws. Tighten the fastening screws.

NOTE: When moving the work head, clean up the work table and gib. If you found any nick or gouge, correct it with a fine grinding stone.

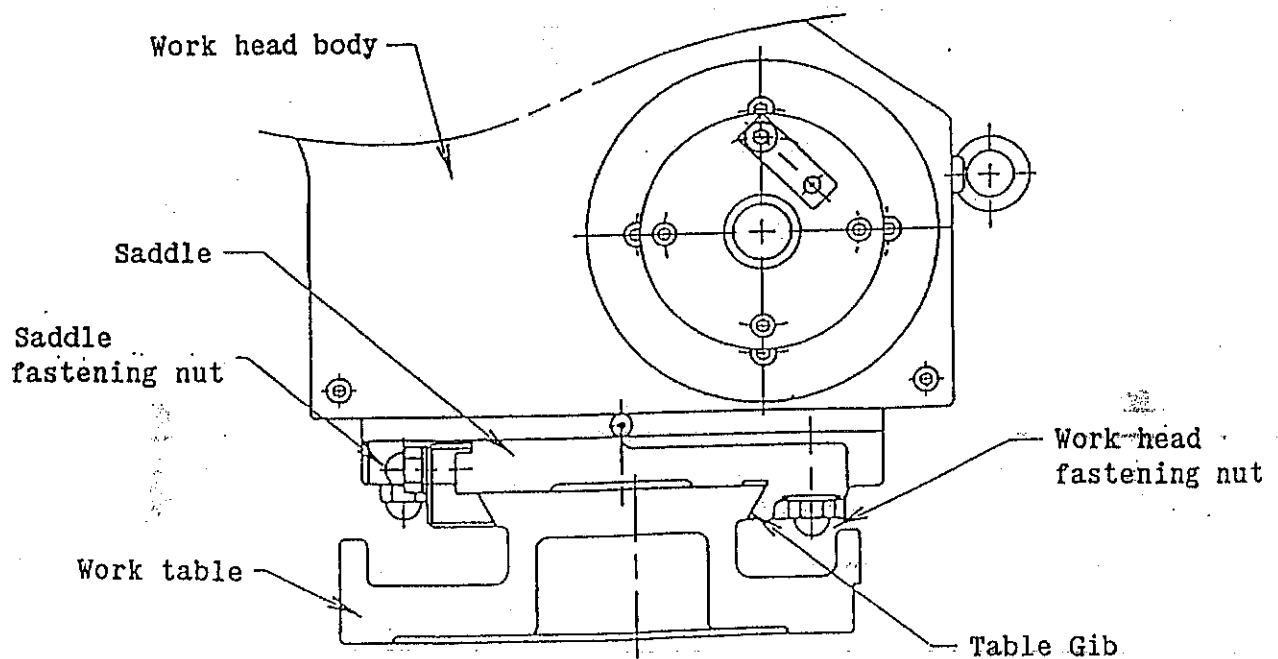


Fig. 6-6 Work Head Body

■ Belt adjustment and replacement

To rotate the spindle and face plate, the rotating force from the AC servomotor is transmitted through the V-belt(s). If any slipping or abnormal noise, carry out the belt adjustment or replacement.

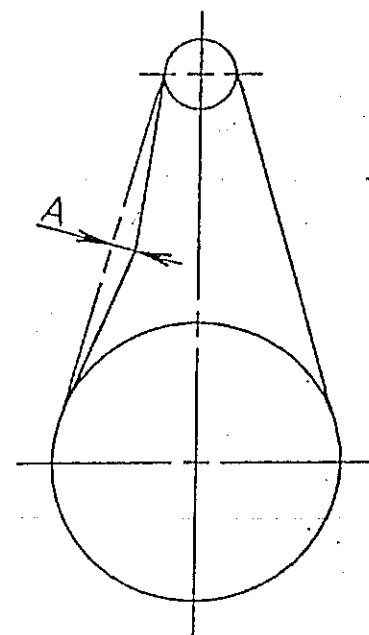
To adjust the belt, remove screw fastening the face plate and then remove the pulley cover. The pulley cover is screwed in place. Loosen screws on the motor base to adjust the belt tension with the tension bolt. ▶ See Fig. 6-7.

Note: If any abnormality of the belt, replace.

Table 6-1 Belt Size

Model	Belt Size	Qty.	Manufacturer
OGM-200 (8) Series	5-5MS-650	1	BANDO chemical
OGM-300 (12) Series	6-5MS-775	1	BANDO chemical

Model	A (Belt Adjustment)
OGM-200 (8) Series	3.1mm/1.2kg (2 scale)
	3.1mm/1.8kg (3 scale)
OGM-300 (12) Series	2.7mm/2.3kg (2 scale)
	2.7mm/3.5kg (3 scale)



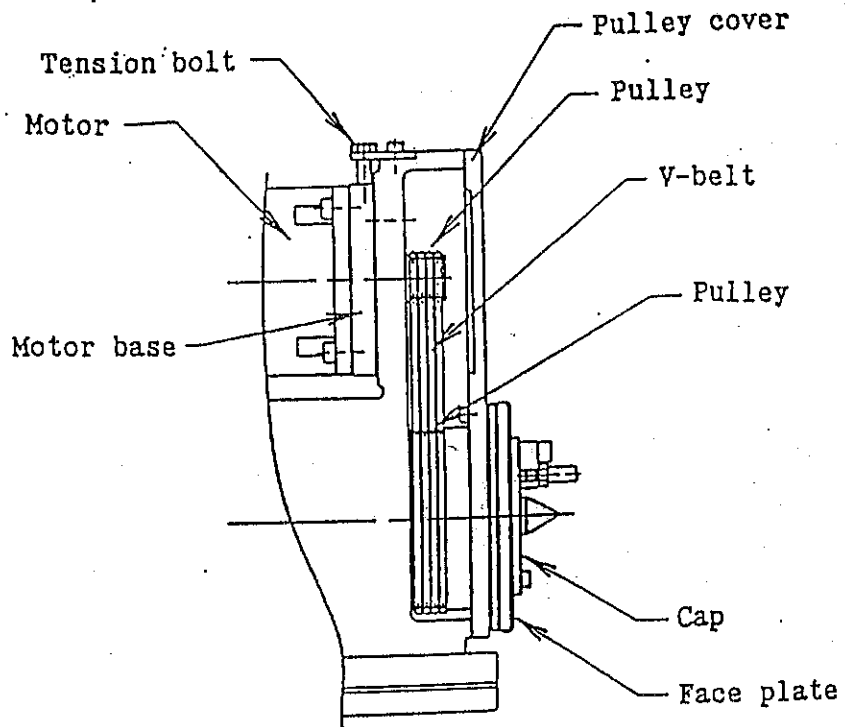


Fig. 6-7 Belt Adjustment



■ Inching the face plate and spindle

The work head body has an inching button.  
The work head will run as long as this button is depressed.  
To adjust the speed, use the WORKHEAD SPEED rpm control.  
▶ See Fig. 6-9.

■ Adjusting the carrier

As to the carrier to drive the work, adjust it as required,  
using the carrier adjusting screw. ▶ See Fig. 6-10.

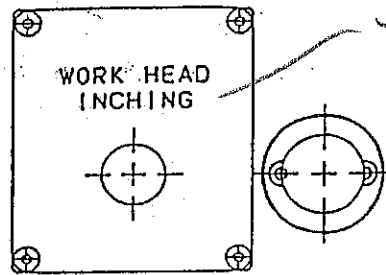


Fig. 6-9 Inching Button

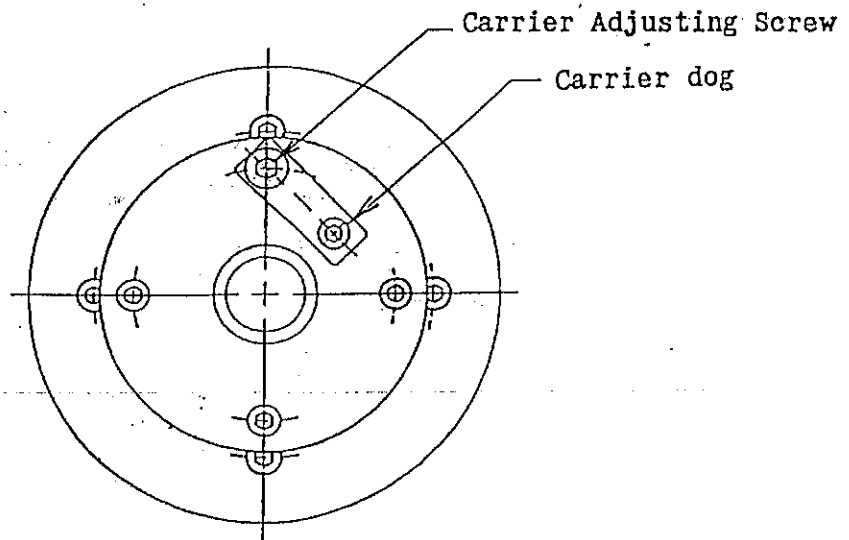


Fig. 6-10 Adjusting the Carrier Dog

### 3. Tailstock

#### ■ Construction

The tailstock spindle is sleeved, and to move the center forward and backward is done by a lever.

The pressure of the center is adjusted by a spring.

Stroke length: 20mm (0.8 inch) OGM-200 (8) Series  
30mm (1.2 inch) OGM-300 (12) Series

#### ■ Moving the tailstock

The tailstock is fixed onto the work table.

When moving the tailstock, loosen the tailstock fastening nuts and carry out positioning according to the work size.

▶ See Fig. 6-11.

When fixing the tailstock, secure it, by pressing the saddle against the gib of the work table. Tighten the tailstock fastening nuts.

NOTE: When moving the tailstock, clean up the work table and gib.  
If you find any nick or gouges, correct it with a fine lapping stone.

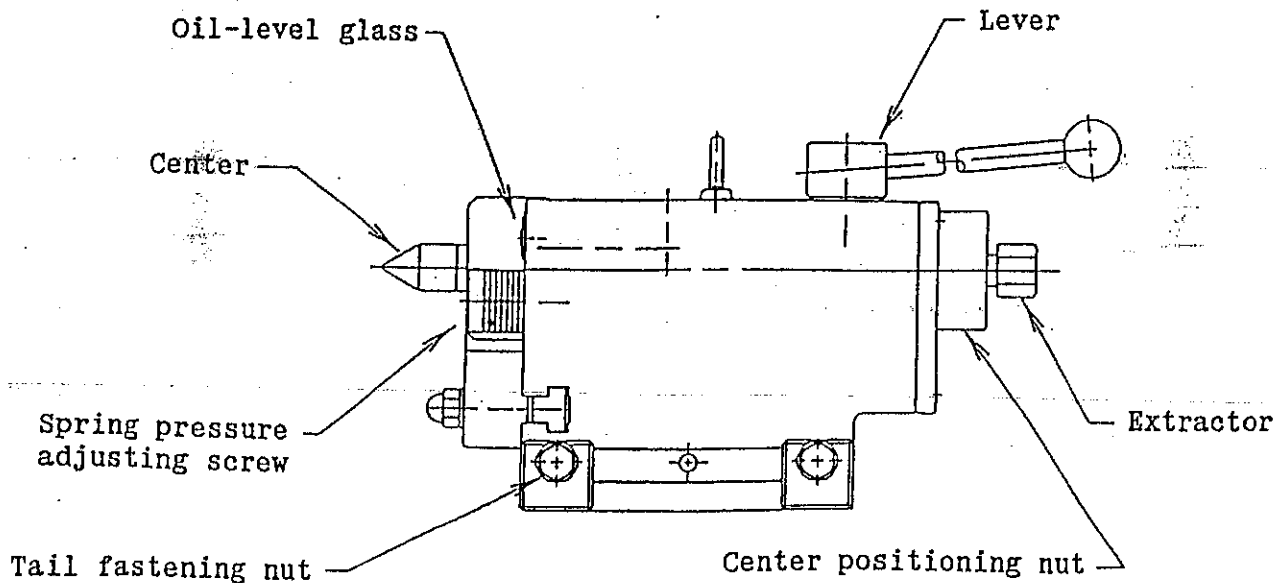


Fig. 6-11 Tailstock

### ■ Center pressure compensation

Compensate the pressure of the center according to the work shape and weight. To do this, carry out with the pressure setting screw.

► See Fig. 6-11.

Turning it clockwise increases the pressure. The relationship between the pressure and turn of pressure setting screw is shown in Figs. 6-12 and 6-13, and use them as the guidelines.

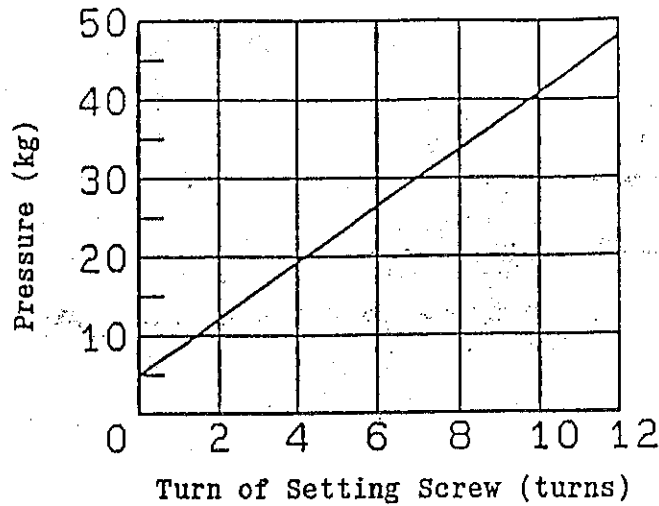


Fig. 6-12 Pressure (OGM-200 Series)

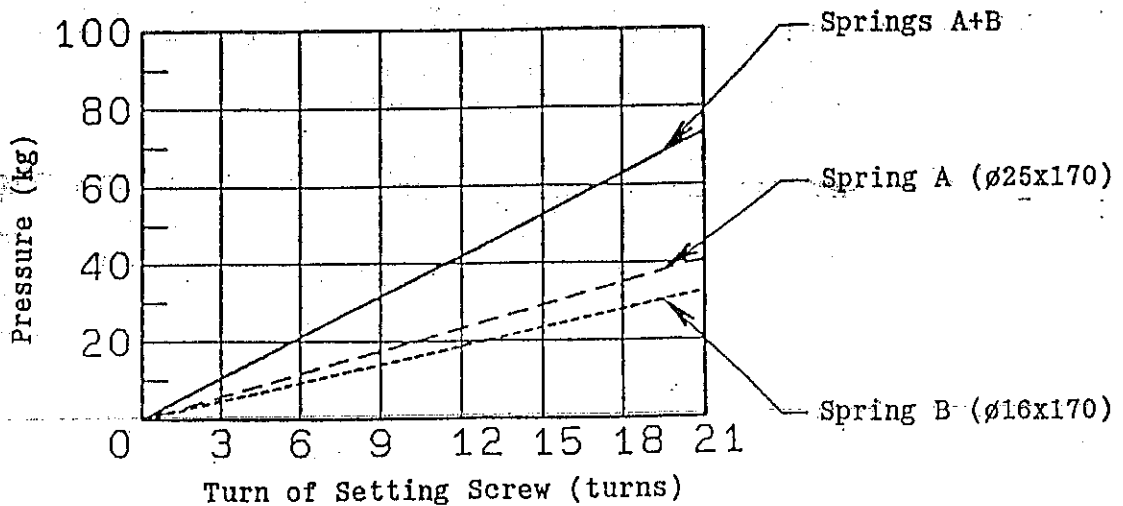


Fig. 6-13 Pressure (OGM-300 Series)

#### ■ Positioning the forward end of the center

The forward end position of the center is adjustable. A center positioning nut is located at the rear of the tailstock. Loosening the fastening bolt, turn the fastening bolt clockwise will move the center backward. After adjusting, tighten the fastening bolt.

► See Fig. 6-14.

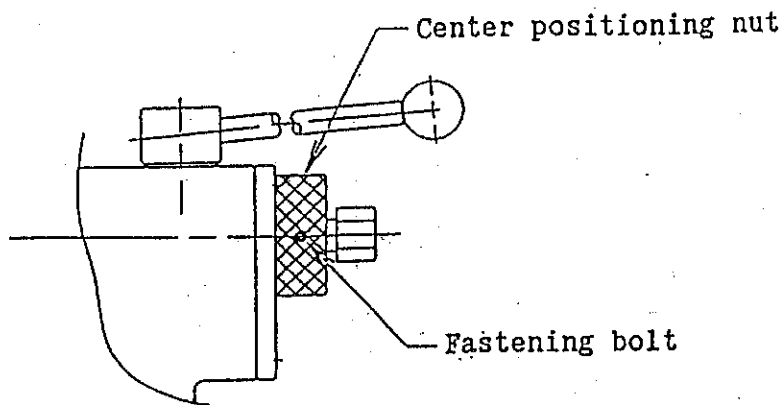


Fig. 6-14 Positioning the Forward End of the Center

#### ■ Mounting and dismounting the center

When mounting the center, sufficiently clean up the tapered portion of the tailstock spindle and center, and then push it in. To remove the center, screw in the extractor from the tailstock spindle backside using a spanner.

NOTE: Hold the center to prevent it from dropping when removing it.

#### 4. Wheel head

##### ■ Construction

The wheel head is so constructed that its body is fixed on the wheel head saddle and may travel transversely on the double-V slide way of the wheel head base. ▶ See Fig. 6-15.

##### Universal Type:

The wheel head can be swiveled horizontally to the right or left 30° on the wheel head saddle. When swiveling the wheel head, loosen the wheel head fastening nuts, and then swivel it to the required angle by hand. After swiveling, secure it with the wheel head fastening nuts.

NOTE: The wheel head fastening nuts are capped to protect them from dust. Never forget to put the caps back on.

▶ See Fig. 6-16.

OGM-200 (8) Series: 4 positions (A, A, B, B)

OGM-300 (13) Series: 2 positions (A, A)

##### Plain Type:

The wheel head body is fixed on the wheel head saddle and is unable to swivel.

##### ■ Feeding the wheel head

The wheel head saddle on the wheel head is moved by a motor connected to a ball screw through a coupling.

##### ■ Wheel spindle

Precision angular contact bearings are used for the wheel spindle. They ensure a high degree of rotational accuracy and rigidity. They are prelubricated and maintenance-free.

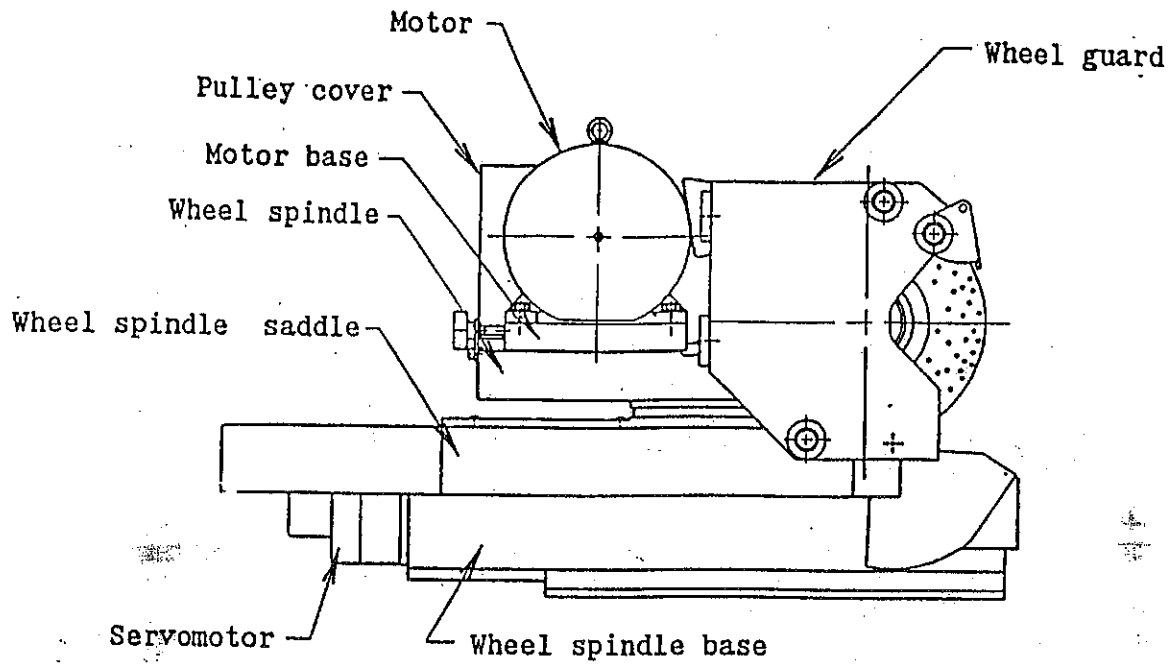


Fig. 6-15 Nomenclature of Wheel Head

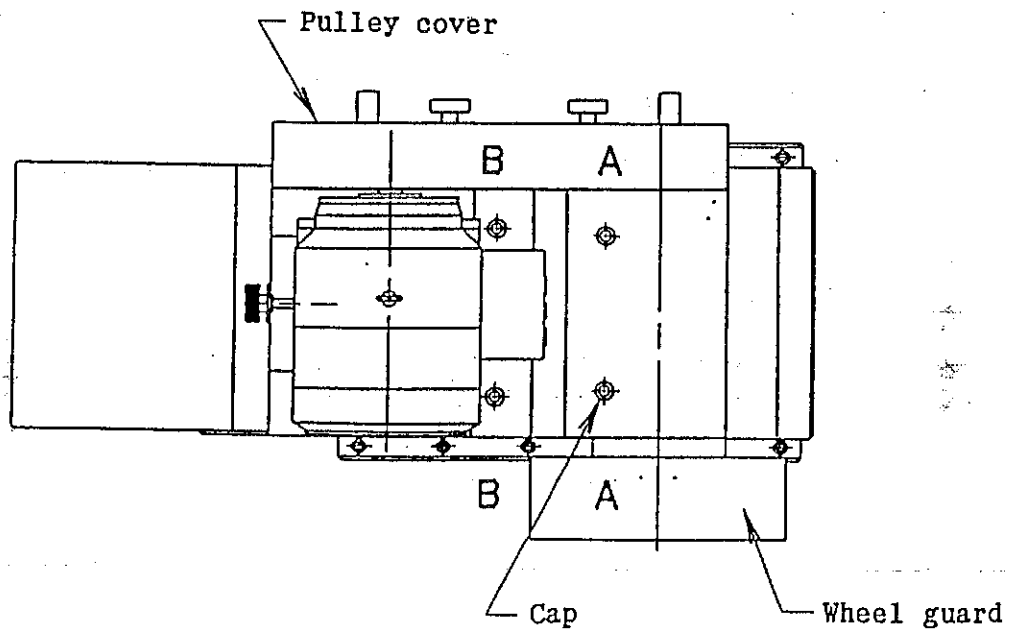


Fig. 6-15 Swiveling the Wheel Head

■ Adjustment of the wheel spindle drive belt

The wheel spindle is driven by transmitting the motor rotation via pulley and V-belt. The pulley and V-belt are protected by a cover.

NOTE: To adjust the V-belt, remove power first.

To change the wheel speed and V-belt, remove the pulley cover, and loosen the fastening screws on the motor base. Then, turn the tension setting screw to move the motor base. ▶ See Fig. 6-17.

After adjusting or changing the V-belt, tighten the fastening bolt for the motor base, properly tensioning by the tension setting bolt. ▶ See Fig. 6-18.

Attach the pulley cover after working.

NOTE: When replace the V-belt with a new one, it has an initial slack. So carry out running-in to readjust the tension.

■ Selecting the wheel spindle speeds

The grinding wheel wears and becomes smaller.  
Move the belt according to the chart on the pulley cover.  
▶ See Table 6-2.

NOTES - Particularly use care to the wheel surface speed check.  
Recheck the V-belt position so that the wheel will not exceed its specified surface speed.  
If this should occur, the wheel may break and therefore it is very hazardous.

- Maximum wheel surface speed: 2000m/min (5905 SFPM)

The maximum surface speed allowable for a wheel is shown on the wheel. In addition, a test certificate is attached to the wheels, so use them.

Specify the maximum wheel surface speed upon ordering wheels.

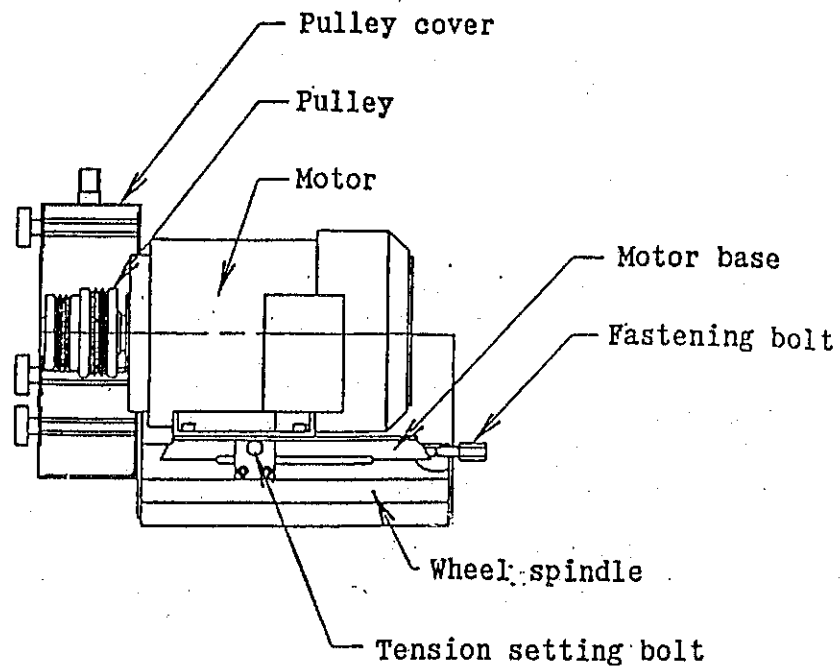
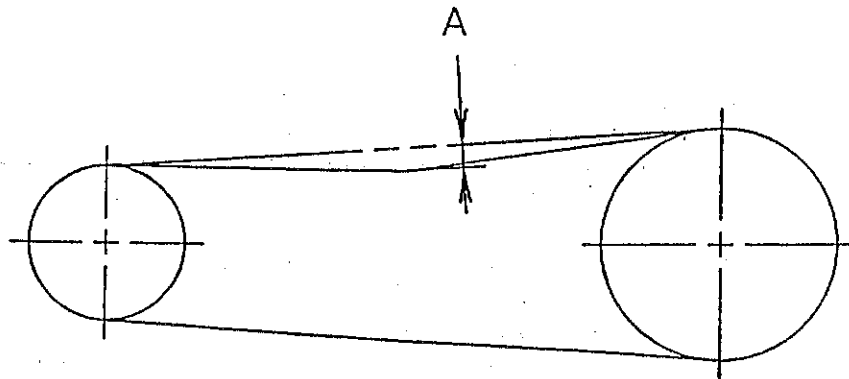


Fig. 6-17 Changing the Belt



Model	Belt Adjustment : Amount (A)
OGM-200 (8) Series	6 mm/2.2 Kg    0.23 inch/4.84 lb
OGM-300 (12) Series	7 mm/6.0 Kg    0.27 inch/13.2 lb

Fig. 6-18 Belt Tension



Table 6-2 Wheel Diameter - Belt Position

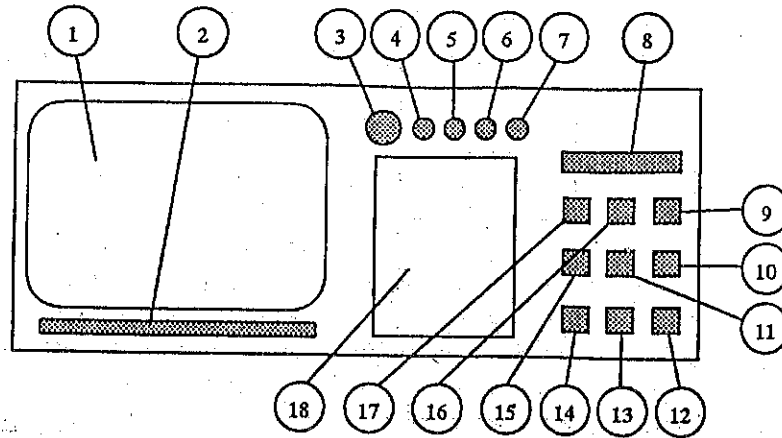
OGM-200 (8) Series :

Type	Pully	Wheel Diameter (mm/inch)
U-Type	A X B	$\phi$ 305 ~ $\phi$ 285 / $\phi$ 12 ~ $\phi$ 11.2
	C X D	$\phi$ 285 ~ $\phi$ 259 / $\phi$ 11.2 ~ $\phi$ 10.5
	E X F	$\phi$ 259 ~ less / $\phi$ 10.2 ~ less
P-Type	A X B	$\phi$ 355 ~ $\phi$ 322 / $\phi$ 14 ~ $\phi$ 12.6
	C X D	$\phi$ 322 ~ $\phi$ 289 / $\phi$ 12.7 ~ $\phi$ 11.4
	E X F	$\phi$ 289 ~ less / $\phi$ 11.4 ~ less

OGM-300 (12) Series :

Type	Pully	Wheel Diameter (mm/inch)
U-Type	A X B	$\phi$ 355 ~ $\phi$ 320 / $\phi$ 14 ~ $\phi$ 12.6
	A X C	$\phi$ 320 ~ less / $\phi$ 12.6 ~ less
P-Type	A X B	$\phi$ 405 ~ $\phi$ 365 / $\phi$ 16 ~ $\phi$ 14.4
	A X C	$\phi$ 265 ~ less / $\phi$ 14.4 ~ less

## 6-2 Control Panel



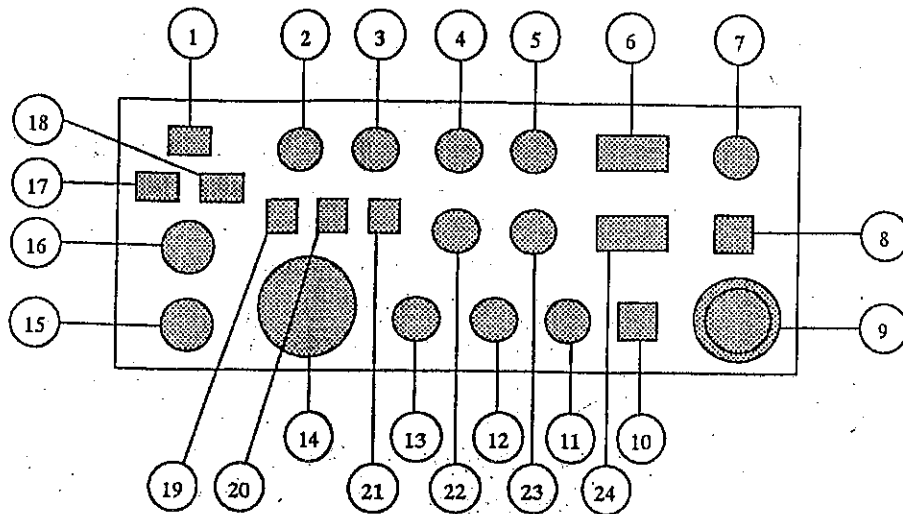
- |                          |                                   |                                    |
|--------------------------|-----------------------------------|------------------------------------|
| ① 9-inch CRT             | ⑧ WHEEL LOAD METER                | ⑭ COOLANT ON/OFF button            |
| ② Soft keys              | ⑨ GAUGE ADV. Button               | ⑮ INTERRUPT DRESS button           |
| ③ POWER lamp             | ⑩ WRK/CENT DATUM<br>select switch | ⑯ GAUGE RET. button                |
| ④ MACH. REF. X AXIS lamp | ⑪ DRESS CYCLE switch              | ⑰ GAUGE ON/OFF switch              |
| ⑤ MACH. REF. Z AXIS lamp | ⑫ GRND WHEEL ON button            | ⑱ Numeric address and data<br>keys |
| ⑥ CYCLE COMP. Lamp       | ⑬ GRND WHEEL OFF button           |                                    |
| ⑦ ALARM lamp             |                                   |                                    |

Nomenclature - 1 (Control panel upper section)

Description of each part -1 (Control panel upper section)

- ① 9-inch CRT
- ② Soft keys : for NC maintenance only, and normally not used.
- ③ POWER lamp : Comes on when turning on main breaker, operation power, and NC power.
- ④ MACH. REF. X AXIS lamp : Comes on when the wheel head is at reference point.
- ⑤ MACH. REF. Z AXIS lamp : Comes on when the table is at reference point.
- ⑥ CYCLE COMP. Lamp : Comes on when auto cycle completed. It goes off when the next cycle starts or NC mode changes over.
- ⑦ ALARM lamp : Comes on when an alarm occurred. It goes off when alarm is reset by pressing the RESET button.
- ⑧ WHEEL LOAD METER (OP) : If load exceeded the set value, all operations stop, then the wheel head returns to the reference point.
- ⑨ GAUGE ADV. button (OP) : Active when MACH. SET-UP button is ON and NC mode is manual. Use this for setting the gauge unit. The gauge unit advances when this button is pressed.
- ⑩ DATUM WRK/CENT Switch : Select which datum, workpiece or center, the grinding is based on.
- ⑪ DRESS CYCLE Switch : Select whether dressing is executed in auto cycle. If the SIDE is selected, the side face dress is done in manual dressing.
- ⑫ GRNDG. WHEEL ON button : Active when MACH. SET-UP is ON.
- ⑬ GRNDG. WHEEL OFF button : When ON, the wheel spindle rotates (CW), and when OFF, the wheel spindle stops. The ON button lamp comes on during rotation, and goes off when the spindle stops.
- ⑭ COOLANT ON/OFF button : Active when MACH. SET-UP is ON. Pressing this button turns on the coolant, and one more pressing turns off the coolant. The lamp comes on in ON status, and goes off in OFF status.
- ⑮ INTERRUPT DRESS ROUGH/FINE select switch : Select whether interrupt dress cycle is executed with rough dress data or fine dress data.  
INTERRUPT DRESS ON button: Active when MACH. SET-UP is ON and NC mode is manual, or during rough or fine auto grinding cycle. Pressing this button starts manual dressing when NC mode is manual, or executes interrupt dressing in auto cycle.

- ⑩ GAUGE RET. button (OP) : Active when MACH. SET-UP is ON and NC mode is manual. Use this for setting the gauge unit. Pressing this button retracts the gauge unit.
- ⑪ GAUGE ON/OFF switch (OP): Select whether gauging in auto cycle is controlled with the set data or directly from the gauge unit.
- ⑫ Numeric address and data keys: Numeric address keys set the data value and the data is updated when pressing the INPUT key. Pressing the "C" key clears the entered data before it is set. Pressing the data key causes the name and entered value of the pressed data are displayed on the screen.



- |                                  |                                 |
|----------------------------------|---------------------------------|
| ① RELEASE button                 | ⑬ Manual pulse generator handle |
| ② OD No. select switch           | ⑭ EMERGENCY RETRACT button      |
| ③ PAGE SELECT button             | ⑮ CYCLE START button            |
| ④ MODE SELECT switch             | ⑯ WHEELHEAD ADV. button         |
| ⑤ ROUGH infeed amount set switch | ⑰ WHEELHEAD RET. button         |
| ⑥ WORKHEAD ON/OFF button         | ⑱ AXIS X/Z select switch        |
| ⑦ TEACH menu select switch       | ⑲ TEACH INPUT button            |
| ⑧ EMERGENCY STOP button          | ⑳ MULTIPLIER select switch      |
| ⑨ MACH. SET-UP button            | ㉑ HANDLE INTERLOCK switch       |
| ⑩ WORKHEAD SPEED setting dial    | ㉒ FEEDRATE OVERRIDE switch      |
| ⑪ TABLE SPEED setting dial       | ㉓ FINE infeed amount set switch |
| ⑫ Jog feed lever switch          | ㉔ TABLE START/STOP button       |

Nomenclature - 2 (Control panel lower section)

Description of each part -2 (Control panel lower section)

- ① RELEASE button      The lamp blinks and this button becomes active when X or Z axis overtravelled, then the MACH. SET-UP turned off and all operations stopped.  
In this status, pressing this button causes the MACH. SET-UP to turn on, and the HANDLE to be active in NC manual mode. Thus, the overtravel status can be released.  
At this time, the manual pulse generator handle operates in the release direction only.  
In this case, the jog feed is inactive.
- ② O.D. No. select switch      Select O.D. No. when the O.D. data are to be displayed.  
Select check or grinding start O.D. No. for a grinding position check cycle or auto grinding cycle.
- ③ PAGE SELECT button      Select the screen to be displayed.
- ④ MODE SELECT switch      Select an NC mode.  
Selection of other than AUTO mode during a cycle causes the operation to be reset, resulting in a cycle stop.
- ⑤ ROUGH infeed amount set SW      set the infeed amount for a traverse rough grinding cycle.
- ⑥ WORKHEAD ON/OFF button      Active when MACH. SET-UP is ON.  
When ON, the work spindle rotates (CCW), and when OFF, the work spindle stops. The ON button lamp comes on during rotation, and goes off when the spindle stops.  
Set the speed with the WORKHEAD SPEED dial.
- ⑦ TEACH menu select switch      Active when NC mode is TEACH.  
When ⑧ TEACH INPUT button was pressed, the data selected with this switch is entered as teaching data.
- ⑧ EMERGENCY STOP button      Active in all NC modes.  
Pressing this button turns off the MACH. SET-UP, causing all operations to be stopped.
- ⑨ MACH. SET-UP button      *Hydraulics on*  
Pressing this button makes the NC ready, starts the lubrication pump, and turns on the lamp. Under this condition, each operation becomes available.
- ⑩ WORKHEAD SPEED set dial      Set the speed of work spindle.  
The speed can be changed even during spindle rotation.

- ⑪ **TABLE SPEED setting dial** Active in all NC modes.  
Use this to adjust table jog speed and reversing speed.  
The override of 0~100% is applied to the set value (TBL MAX SPD).
- ⑫ **Jog feed lever switch** Active when MACH. SET-UP is ON and NC mode is MAN., AUTO REF. RET., or TEACH. Moving the lever to +X or -X direction causes the wheel head to be fed, or to +Z or -Z direction causes the table to be fed in jog mode.  
The lever must be pulled when moving.
- ⑬ **Manual pulse generator handle** When the HANDLE INTERLOCK button is ON, rotating this handle clockwise moves the selected axis in "+" direction, or counter-clockwise moves the axis in "-" direction at the selected power.
- ⑭ **EMERGENCY RETRACT button** Active when MACH. SET-UP is ON in any NC mode. Pressing this button retracts the wheel head to the reference point. In auto cycle, the cycle stops after the wheel head retracted to the reference point.
- ⑮ **CYCLE START button** Active when MACH. SET-UP is ON and NC mode is AUTO only. Pressing this button starts the cycle selected with the GRIND. MODE switch. During a cycle, the lamp comes on, and it goes off when a cycle completed. Changing the mode to other than AUTO during a cycle causes the operation to be reset, resulting in a cycle stop.
- ⑯ **WHEELHEAD ADV. button** Active MACH. SET-UP is ON and the wheel head is in retract position only. The wheel head advances by the set amount.
- ⑰ **WHEELHEAD RET. button** Active MACH. SET-UP is ON and the wheel head is in advance position only. The wheel head retracts by constant amount. If the retraction of constant amount exceeds the reference point, the wheel head moves to the reference point and the macro alarm is displayed.
- ⑱ **AXIS X/Z select switch** Turning this switch to the left or right sets the axis controllable with the manual pulse generator handle for the wheel head (X) or table (Z) respectively.
- ⑲ **TEACH INPUT button** Used to input data in the Teach Mode.
- ⑳ **MULTIPLIER select switch** Set the feed amount per division of manual pulse generator handle.

- ②① HANDLE INTERLOCK switch Active when MACH. SET-UP is ON and NC mode is MAN. or TEACH.  
Pressing this button makes the manual pulse generator handle active and turns on the lamp. Pressing it one more makes the handle inactive and turns off the lamp.  
During lamp off, the axis feed with jog lever is possible.
- ②② FEEDRATE OVERRIDE switch The override of 0~200% can be set to the infeed rate (data value) in rough or fine grinding.
- ②③ FINE infeed amount set switch Set the infeed amount for a traverse fine grinding cycle. This value can be changed even during a cycle.
- ②④ TABLE START/STOP button Active when MACH. SET-UP is ON and both grind mode and NC mode are manual. Pressing this button starts the table reversing operation. The table speed is controlled with the set value (TBL MAX SPD) and ①② TABLE SPEED setting dial.





## 7. OPERATING INSTRUCTIONS

### ■ Introduction

This manual describes data setting procedure and operation procedure of cylindrical grinding machines OGM Series developed as universal NC machines with the emphasis put on the manual operation performance unlike conventional NC machines.

### ■ Composition

#### General Specification

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## General Specifications

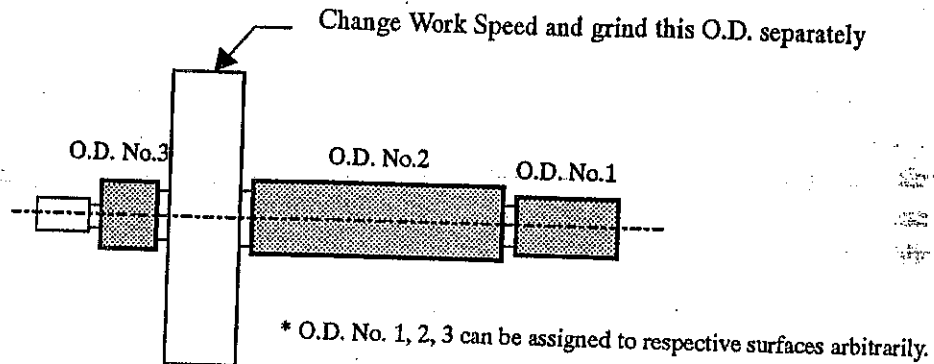
1. Three O.D. Continuous Grinding in Cycle
2. Work Datum and Center Datum Possible
3. Grinding Method
4. Grinding Conditions
5. Teaching Input
6. Dressing Cycle
7. Data Setting
8. Grinding Position Check
9. Auto Grinding
10. Cycle Skip

## 1. Three O.D. Continuous Grinding in Cycle



*Note!!*

However, the work head speed cannot be changed automatically during an auto cycle, and therefore a continuous grinding is disabled if the outside diameters of three surfaces are extremely different. If O.D. of three surfaces are extremely different, grind them one by one while changing the work head speed on the control panel.



## 2. Work Datum and Center Datum

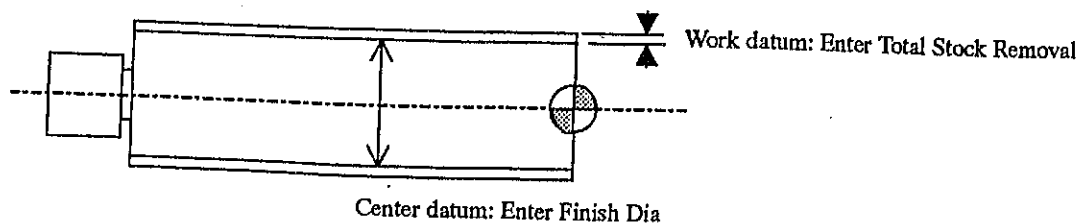
**Work datum** :Enter stock removal. Use this where only the surface skin is to be removed.

**Center datum** :Enter finish diameter. Use this where the work is to be finished to the specified diameter.



*Note !!*

However, the data on the screen are displayed in the center datum mode even if work datum is selected, because of multiple O.D. grinding system. Even in the work datum mode, the position display of the finish point is not zero.



### 3. Grinding Method

1) Plunge, traverse (right, left, both), or shift plunge

2) Select step or pass.

Step : In multiple-step grinding, grinding is executed every step (surface).

Pass : In multiple-step grinding, grinding is executed every pass (rough, fine).

3) Only rough (or fine) grinding cycle is possible.

### 4. Grinding Conditions

Plunge : Infeed rate. During grinding, the FEEDRATE OVERRIDE % on the control panel is active.

Traverse : Infeed amount. During grinding, the infeed amount can be changed with the ROUGH or FINE switch on the control panel.

Table speed. Set the table speed for rough grinding and fine grinding respectively. During grinding, the speed can be changed with the TABLE SPEED dial on the control panel.

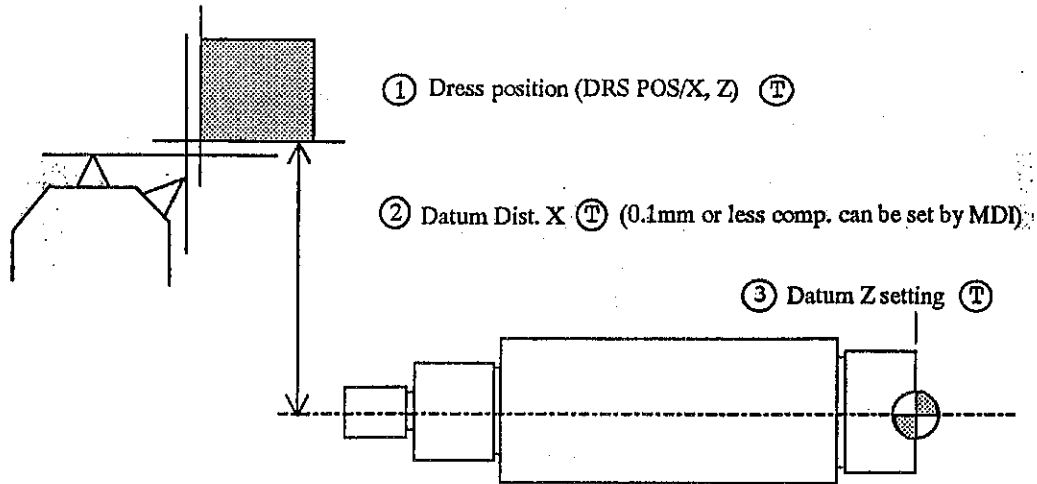
Shift plunge : Rough plunge + Fine traverse  
Set wheel shift amount.

DRS cond. : Dress infeed amount and dress speed for common dressing. Set dress interval for O.D. data.

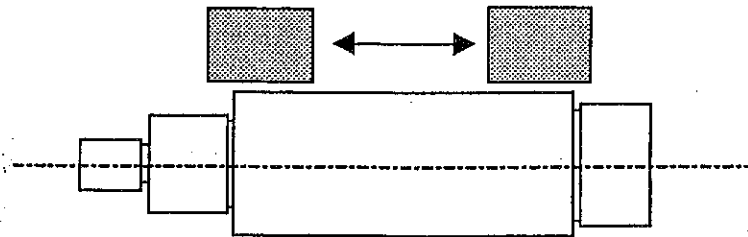
## 5. Teaching Input

The OGM-EX series allows the position data to be input through teaching by moving actually the grinding wheel to that position in the same manner as that of universal machines.

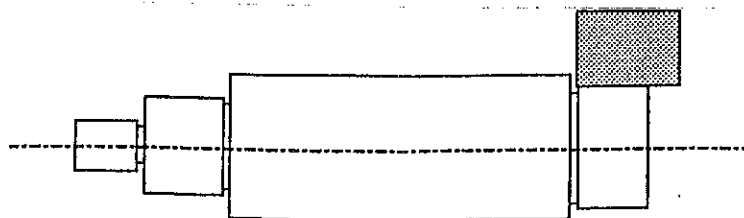
\* Data to be set by teaching (Data with  $\text{\textcircled{T}}$  marking can be input by teaching only, and not settable by other means)



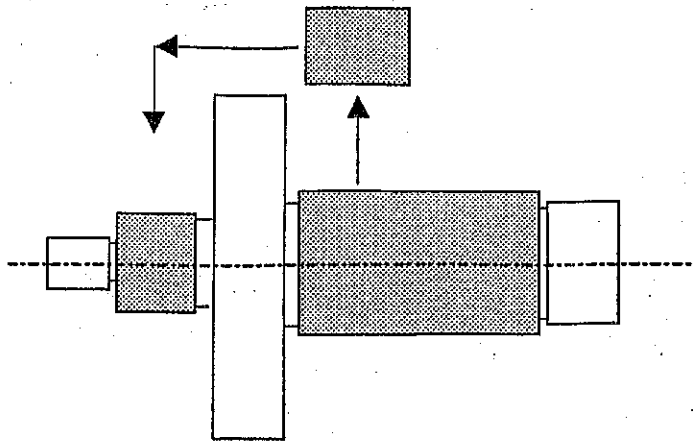
④ Reverse position/table start and end (set every O.D.)



⑤ Work datum size (set every O.D.)



⑥ Max. clear diameter



6. Dressing Cycle

① Manual dressing

Peripheral dressing, and side dressing

\*Manual dressing is enabled only when the wheel head is in retract position.

② Dressing during auto grinding cycle

Rough dressing, Finish dressing, Rough interval dressing

③ Interrupt dressing during auto grinding cycle

Pressing the INTERRUPT DRESS button during a grinding cycle interrupts the grinding and executes dressing, then restarts grinding after completion of dressing.

INTERRUPT  
DRESS



Side dressing

\*Side dressing is enabled in the manual dressing mode only.

\*Only peripheral dressing is executed during auto grinding.

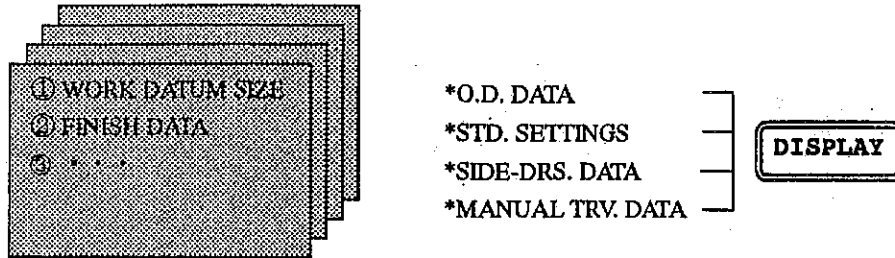
\*To execute the side dressing, set the DRESS CYCLE switch on the control panel to SIDE position.



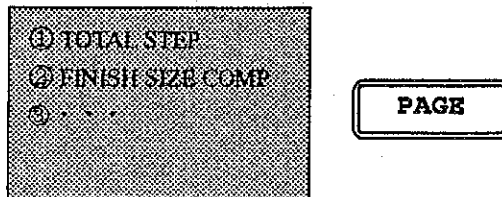
## 7. Data Setting

Select the screen to be displayed with the PAGE SELECT key on the control panel, select the MDI mode, and press the DISPLAY key on the sheet panel. That screen is then displayed.

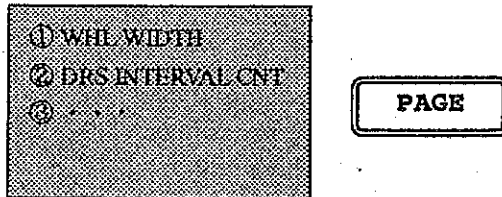
The screens for DATA LIST GRD DATA and DATA LIST DRS DATA are displayed at any time by pressing the PAGE key.



### \*DATA LIST GRD DATA



### \*DATA LIST DRS DATA

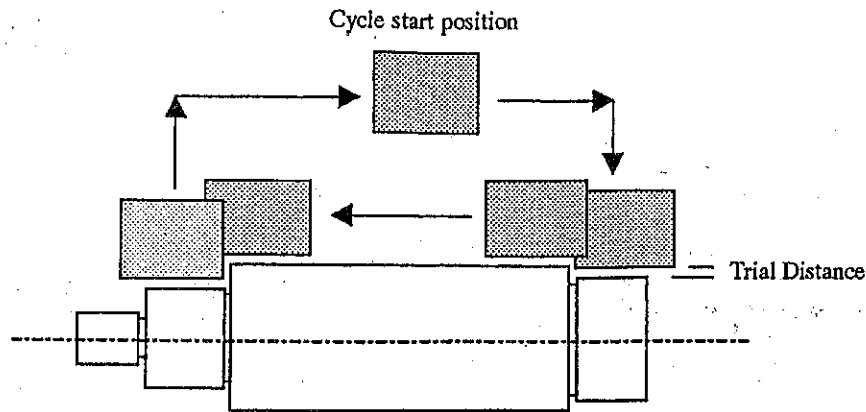


Pressing the DISPLAY switch changes over the screen, however if the EMERGENCY RETRACT button is pressed, this function has the top priority and it interrupts forcibly the screen change-over processing and returns the wheel head to the reference point. The data update processing is also interrupted, resulting in wrong position data. In this case, the alarm "3029 DATA CHECK" will be displayed at the CYCLE START. Check all data.

Also, the mode selecting function may fail after the reference point return operation by the EMERGENCY RETRACT. In this case, press the EMERGENCY STOP button and restart the operation.

### 8. Grinding Position Check

Check at each O.D. surface whether the wheel is retracted from the WORK DATUM SIZE by the amount of TRIAL DISTANCE set on the STD. SETTINGS screen.



### 9. Auto Grinding

After setting the data necessary for grinding, select the AUTO mode.

Set the O.D. No. switch to the No. position from which grinding starts, and press the CYCLE START button, and the auto grinding will start.

### 10. Cycle Skip

Only the surface selected with the O.D. No. switch is additionally ground for compensation under fine grinding condition.



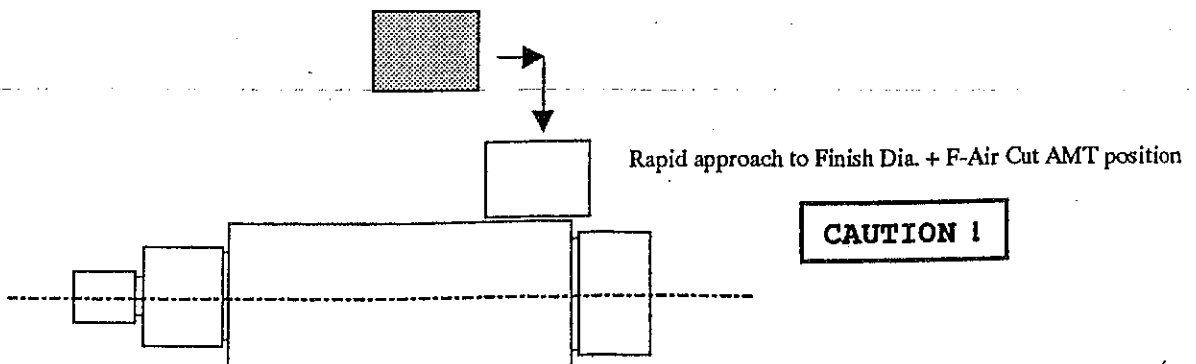
#### Caution !!

Set FINE SIZE COMP. on the DATA LIST GRD DATA screen.

If dress is not executed before compensation grinding, set the DRESS CYCLE switch to OFF.

\*Execute the Cycle Skip when additional grinding is necessary after measuring the finished dimension.

After cycle start, the wheel approaches rapidly to the FINISH DIA. + F-AIR CUT AMT position. The operation differs from normal auto grinding cycle, thus requiring extreme care.



## **Data Setting Items**

1. O.D. DATA Screen
2. STD. SETTINGS Screen
3. SIDE-DRS. DATA
4. MANUAL TRV. DATA
5. DATA LIST GRD DATA Screen
6. DATA LIST DRS DATA Screen

1. O.D. DATA Screen Title O.D. No. \_\_\_\_

Center datum

- ① WRK DATUM SIZE
- ② FINISH DIA.
- ③ OFFSET
- ④ TTL FINE FEED AMT
- ⑤ REVERSE POS/TB.START
- ⑥ REVERSE POS/TB.END
- ⑦ R-NO. OF DRS INTERVAL
- ⑧ R DRS (OFF=0 ON=1)
- ⑨ FIN DRS (OFF=0 ON=1)
- ⑩ R-INFEED SPD
- ⑪ F-INFEED SPD
- ⑫ INFEED POS R0 L1 B2

T

Offset value of finish Dia. Positive value for larger Dia.  
Negative value for smaller Dia.

T

T

\*\*\*

Set whether dress is executed before rough grinding.

Set whether dress is executed before fine grinding.

Rough infeed speed in plunge grinding

Fine infeed speed in plunge grinding

Infeed position in traverse grinding

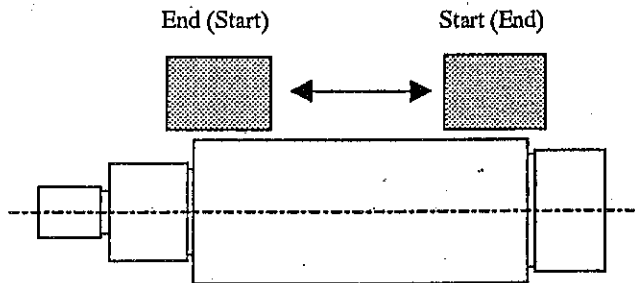
Work datum

- ① WRK DATUM SIZE
- ② TTL STK RMVL
- ③
- ④ TTL FINE FEED AMT
- ⑤ REVERSE POS/TB.START
- ⑥ REVERSE POS/TB.END
- ⑦ R-NO. OF DRS INTERVAL
- ⑧ R DRS (OFF=0 ON=1)
- ⑨ FIN DRS (OFF=0 ON=1)
- ⑩ R-INFEED SPD
- ⑪ F-INFEED SPD
- ⑫ INFEED POS R0 L1 B2

T

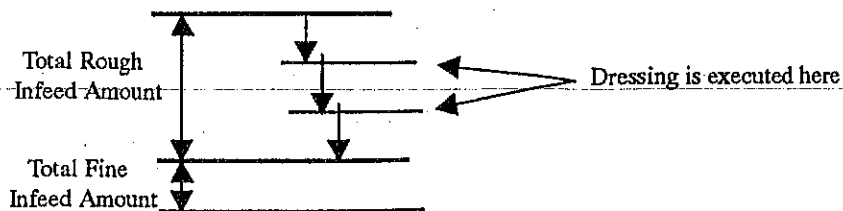
T

T



\*Start and End positions may be exchangeable. In plunge, teaching is done at same position.

\*\*\* If R-NO. OF DRS INTERVAL=2 is set, dressing is executed twice during rough grinding.



2. STD. SETTINGS Screen

- ① GRD (STEP=0 PASS=1)
- ② SHIFT-P (OFF=0 ON=1)
- ③ SHIFT-AMT.
- ④ TRIAL DISTANCE
- ⑤ RETRACT AMT
- ⑥ DIAMOND DISTANCE-X
- ⑦ DIAMOND DISTANCE-Z
- ⑧ \*\* DATUM DIST X \*\*
- ⑨ WORK O.D.
- ⑩ DATUM DIST X
- ⑪ \*\* GAUGE SET \*\*
- ⑫ ADD AMT

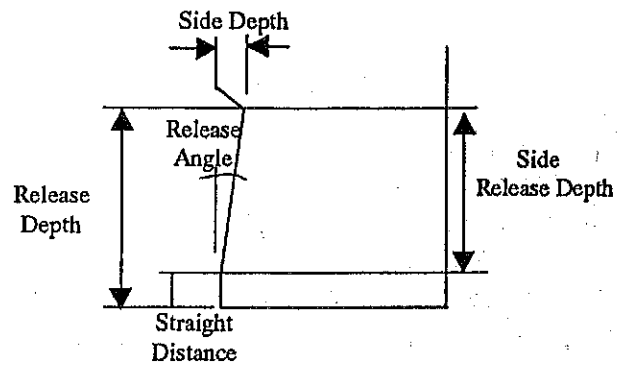
0: Grinding every step, 1: Grinding every pass  
 "ON" executes a shift plunge instead of traverse.  
 Wheel shift amount for a shift plunge grinding.  
 Wheel retract amount from work Dai. in G. position check.  
 Moving amount when pressing WH ADV/RET. button.

Work Dia. finished when setting DATUM DISTANCE X.  
 T Teaching input. It can be keyed in, if less than 0.1mm.

Additional amount from finish Dai. when using gauge unit.  
 (Wheel abrasion during grinding +  $\alpha$ )

3. SIDE-DRS. DATA

- ① DRS INFEEED AMT X
- ② DRS INFEEED AMT Z
- ③ DRS SPD
- ④ NO. OF DRS
- ⑤ NO. OF DEAD PASS
- ⑥ DIAMOND DISTANCE-X
- ⑦ RELEASE DEPTH
- ⑧ STRAIGHT DISTANCE
- ⑨ RELEASE ANGLE
- ⑩
- ⑪ DRS POS/X
- ⑫ DRS POS/Z



T Same values as data on DATA LIST DRS DATA screen.  
 T

<Reference data: Wheel Side Release Depth> Metric (mm)

Side Release Release Angle \ Depth	2	4	6	8	10	20	30
1 degree	0.035	0.07	0.1	0.14	0.17	0.35	0.52
2 degree	0.07	0.14	0.2	0.28	0.35	0.7	1.05
3 degree	0.1	0.21	0.31	0.42	0.52	1.05	1.57
4 degree	0.14	0.28	0.42	0.56	0.7	1.4	2.1
5 degree	0.17	0.35	0.52	0.7	0.87	1.75	2.26

#### 4. MANUAL TRV. DATA

①	TBL SPD	
②	TARRY TIME/R	
③	TARRY TIME/L	
④	REVERSE POS/TB. START	T
⑤	REVERSE POS/TB. END	T
⑥		
⑦	** TAPER COMP **	
⑧	TAPER COMP DIA/R	
⑨	TAPER COMP DIA/L	
⑩	TAPER COMP DISTANCE	
⑪	TAPER COMP AMT	
⑫	INDICATOR POS	

These values are also used for auto traverse grinding.

Compensation value is input when pressing TAPER ON/OFF key on the control panel.

#### 5. DATA LIST GRD DATA Screen

①	TOTAL STEP 1-3	
②	FINE SIZE COMP	
③	ROUGH TBL SPD	
④	FINE TBL SPD	
⑤	R-AIR CUT AMT (P)	
⑥	F-AIR CUT AMT (T)	
⑦	F-AIR CUT AMT	
⑧	SPK OUT TIME (P)	
⑨	NO. OF SPK OUT (T)	
⑩	MAX CLEAR DIA.	T
⑪	GAUGE FORWARD	
⑫	GAUGE SET O.D. NO.	

Set the number of steps to be ground.

Additional amount for compensation after end of auto cycle.

Rough table reversing speed in a traverse grinding.

Fine table reversing speed in a traverse grinding.

Gauge unit forward Dia. when using gauge unit directly.

**MAX CLEAR DIA.** : Be sure to set this value. If it is uncertain, set the max. work datum diameter +  $\alpha$ .

This data is used as an intermediate positioning point when performing the cycle start area check at the start of auto grinding cycle or wheel position check cycle, or when positioning the grinding wheel to a dressing point which is on a minus side from the work datum diameter.

## 6. DATA LIST DRS DATA Screen

- ① WHL WIDTH
- ② DRS INTERVAL CNT
- ③ DRS INTERVAL SERVE
- ④ R-DRS INFEED AMT
- ⑤ F-DRS INFEED AMT
- ⑥ R-DRS SPD
- ⑦ F-DRS SPD
- ⑧ R-NO. OF DRS
- ⑨ F-NO. OF DRS
- ⑩ F-NO. OF DEAD PASS
- ⑪ DRS POS/X
- ⑫ DRS POS/Z

Dress is executed under rough dress cond. at the set interval.  
Remaining count until rough dressing is displayed.

T Teaching input only. No data can be input in MDI mode.

**DRS INTERVAL CNT :** Set 0 (zero) if this function is not used.  
If data other than 0 is set, the dress before rough grinding, dress before fine grinding, and rough interval dress are not executed during auto grinding cycle.

**DRS INTERVAL SERVE:** Set same value if DRS INTERVAL CNT was set.  
During auto grinding cycle, the same value as that of DRS INTERVAL CNT is set automatically after a grinding completed when data is automatically subtracted and becomes 0.

## Operation Procedure

- 1 Auto Reference Point Return
- 2 Manual Dressing
  - 2 - 1 Measuring Distance between Diamonds
  - 2 - 2 Dress Point Teaching
  - 2 - 3 Manual Dressing Cycle
- 3 Manual Traversing
- 4 Taper Compensation
- 5 Measuring Datum Distance X
- 6 Preparing Auto Grinding
  - 6 - 1 Setting Conditions
  - 6 - 2 Datum Z Teaching
  - 6 - 3 Setting O.D. Data
  - 6 - 4 Setting Max. Clear Diameter
- 7 Grinding Position Check
- 8 Auto Grinding
- 9 Cycle Skip
- 10 Internal Grinding



# Home

## 1. Auto Reference Point Return

1. Turn on the main power on the side of control panel.
2. Reset the **EMERGENCY STOP** button.
3. Wait for 2 or 3 seconds, then turn on the **MACH. SET-UP** button.
4. Set the MODE SELECT switch to the **AUTO REF. RET.** position.
5. Turn on the **CYCLE START** button.
6. The wheel head retracts, and the table stops at the left end. Thus, the reference point return operation is over.



**Caution !!**

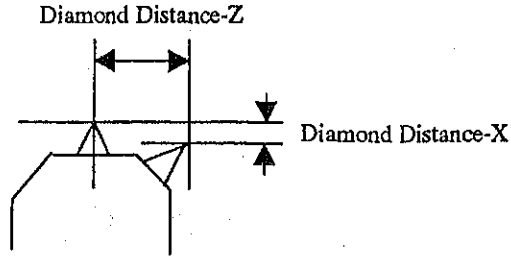
*Watch out "Z" goes like bat from hell  
check clearances for table*

The auto reference point return operation may stop with the display of alarm "500 OVER-TRAVEL" after cycle start. In such a case, retry the operation following the steps given below:

- ① Press the RESET button.
- ② Using the jog handle, advance the wheel head several ten millimeters.
- ③ Press the RESET button to reset the alarm.
- ④ Confirm that the MODE SELECT switch is in **AUTO REF. RET.** position.
- ⑤ Turn ON the **CYCLE START** button.

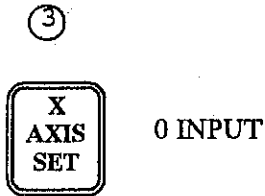
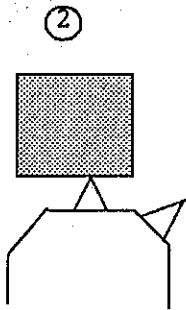
## 2. Manual Dressing

### 2-1. Measuring Distance between Diamonds (Enter absolute value)

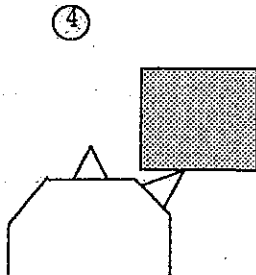


#### Diamond Distance

- ① Display the STD. SETTINGS screen.
- ② Manually move the wheel so that it lightly touches the vertex of diamond for O.D.
- ③ Reset the X Relative Position to 0.
- ④ Manually move the wheel so that it lightly touches the vertex of diamond for side.
- ⑤ Enter X Relative Position value to DIAMOND DISTANCE-X.



```
*MAIN FIG
X
Z
X RELATIVE POSITION 0.0000
```



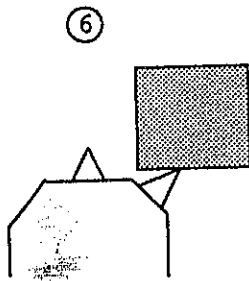
```
*MAIN FIG
X
Z
X RELATIVE POSITION -5.1230
```

⑤

Diamond Distance-X  
5.1230

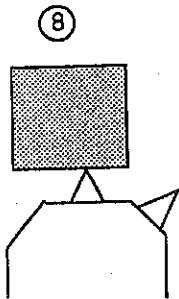
**Diamond Distance-Z**

- ⑥ Manually move the wheel so that it lightly touches the vertex of diamond for side.
- ⑦ Reset the Z Relative Position to 0.
- ⑧ Manually move the wheel so that it lightly touches the vertex of diamond for O.D.
- ⑨ Enter Z Relative Position value to **DIAMOND DISTANCE-Z**



0 INPUT

```
*MAIN FIG
X
Z
Z RELATIVE POSITION 0.0000
```



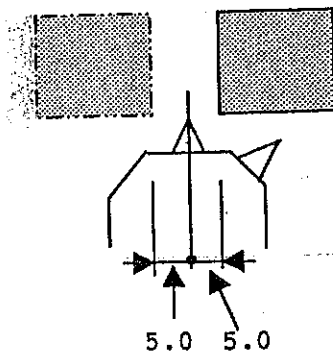
```
*MAIN FIG
X
Z
Z RELATIVE POSITION -10.3450
```

⑨

Diamond Distance-Z  
10.3450

Visual check is OK.

At a dressing, move Wheel Width + 10mm.

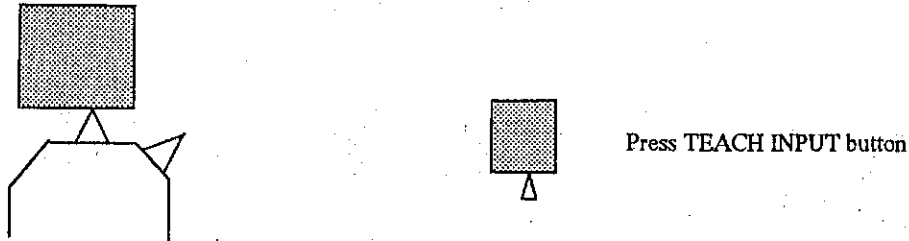


**Note !!**

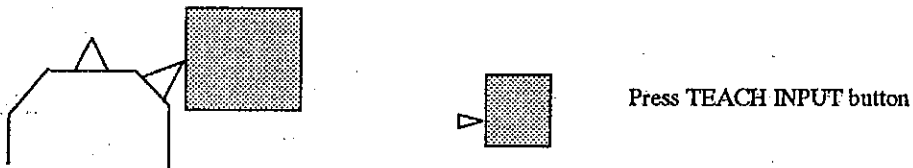
Execute again the measurement of diamond distance when diamonds were replaced.

## 2-2. Dress Point Teaching

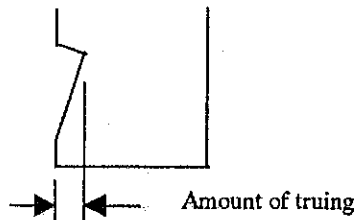
- ① Set the **MODE SELECT** switch to the **TEACH** position.
- ② Manually move the wheel so that it lightly touches the vertex of diamond for O.D.
- ③ Teach the **DRS POS/X**.



- ④ Set the **MODE SELECT** switch to the **TEACH** position.
- ⑤ Manually move the wheel so that it lightly touches the vertex of diamond for side.
- ⑥ \*(Retract the Z axis by the amount of truing with the Z relative position set to 0.)
- ⑦ Teach the **DRS POS/Z**.

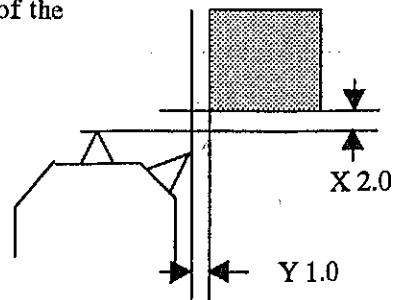


\* If executing the SIDE-DRS with a wheel not trued (or having different truing shape)



### Note !!

Teach again the Dress Position if the wheel was replaced.  
Executing the teaching stores the Machine Position of the points shown below as Dress Position.



### 2-3. Manual Dressing Cycle

#### O.D. dressing:

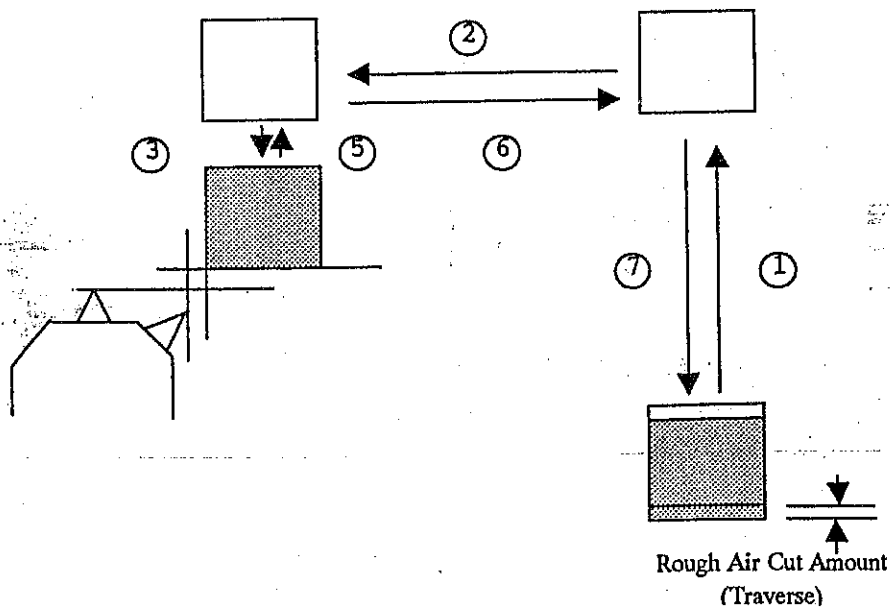
- ① On the DATA LIST DRS DATA screen, enter dressing conditions.
- ② Set the DRESS CYCLE switch to ON position.
- ③ Select ROUGH or FINE of INTERRUPT DRESS, and press INTERRUPT DRESS button.

#### Side dressing:

- ① On the SIDE-DRS DATA screen, enter dressing conditions.
- ② Set the DRESS CYCLE switch to SIDE position.
- ③ Press INTERRUPT DRESS button.

#### Operation of manual dressing cycle

- ① Move the wheel from current position (X0, Z0) to the X reference point.
- ② Move Z axis to the Dress Position Z.
- ③ Move X axis to the Dress Position X.
- ④ Execute dressing by the set number of dressing.
- ⑤ Move the wheel to the X reference point.
- ⑥ Move Z axis to the Z0 position.
- ⑦ Move X axis to the X0 + Rough Air Cut Amount (Traverse) position.



### 3. Manual Traversing

Teaching of reverse position, and start and stop of table:

- ① Set the **PAGE SELECT** switch to the MAN. TRV. position to open **\*MANUAL TRV. DATA** screen. MDJ
- ② Enter TABLE SPEED, TARRY TIMER/R, and TARRY TIMER/L.
- ③ Set the **MODE SELECT** switch to the MAN. TRV. position.
- ④ Press the **WHEELHEAD ADV.** button.
- ⑤ (Teach the Datum Z.)
- ⑥ Teach the **REVERSE POS/TB. START** and **REVERSE POS/TB. END**.
- ⑦ Make sure that the wheel is in a table reversing range, then press the **TABLE START** button.

Grinding with manual pulse generator handle, and measurement:

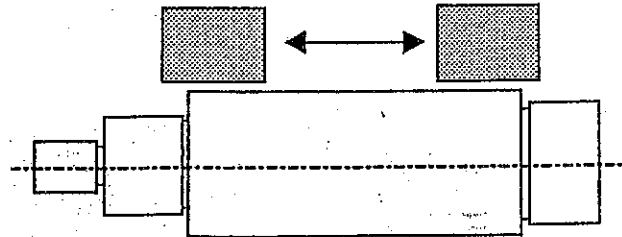
- ⑧ Turn on the **HANDLE INTERLOCK**, and feed in the wheel with the manual pulse generator handle.
- ⑨ Press the **WHEELHEAD RET.** button.
- ⑩ Measure the finished diameter.

If regrinding is necessary:

- ⑪ Retract the X axis a little with the manual pulse generator handle, then press the **WHEEL-HEAD ADV.** button.
- ⑫ Press the **TABLE START** button.
- ⑬ Repeat steps from ⑧.

\*MANUAL TRV. DATA screen

- |                         |
|-------------------------|
| ① TBL SPD               |
| ② TARRY TIME/R          |
| ③ TARRY TIME/L          |
| ④ REVERSE POS/TB. START |
| ⑤ REVERSE POS/TB. END   |
| ⑥ ***                   |



**CAUTION !**

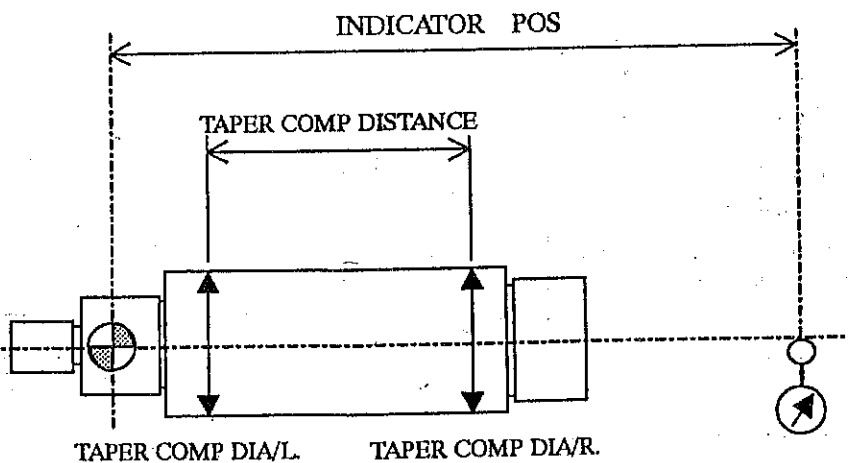
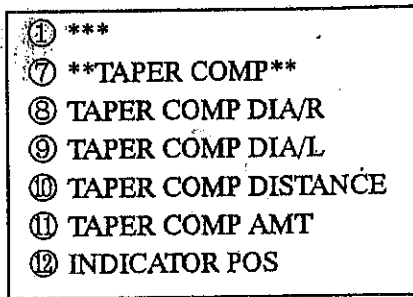
Teaching the Datum Z after teaching the Reverse Position/Table Start and Reverse Position/Table End allows the reverse position to be changed, causing a danger. The teaching of Datum Z must be performed before teaching the reverse position.

## 4. Taper Compensation

Though the table must be swiveled for compensation if the work is tapered, the use of the following method can obtain the taper compensation amount easily:

- (1) Display the MANUAL TRV. DATA screen.
- (2) Set the MODE SELECT switch to the MDI position, press the TAPER LEFT or TAPER RIGHT button on the control panel, and enter TAPER COMP DIA/R, TAPER COMP DIA/L, TAPER COMP DISTANCE, and INDICATOR POS.
- (3) Pressing the TAPER ON/OFF button on the control panel displays TAPER COMP AMT.
- (4) With the indicator touched the table, swivel the table by the amount of taper compensation.

\*MANUAL TRV. DATA screen



Center of table swiveling

## 5. Measuring Datum Distance X

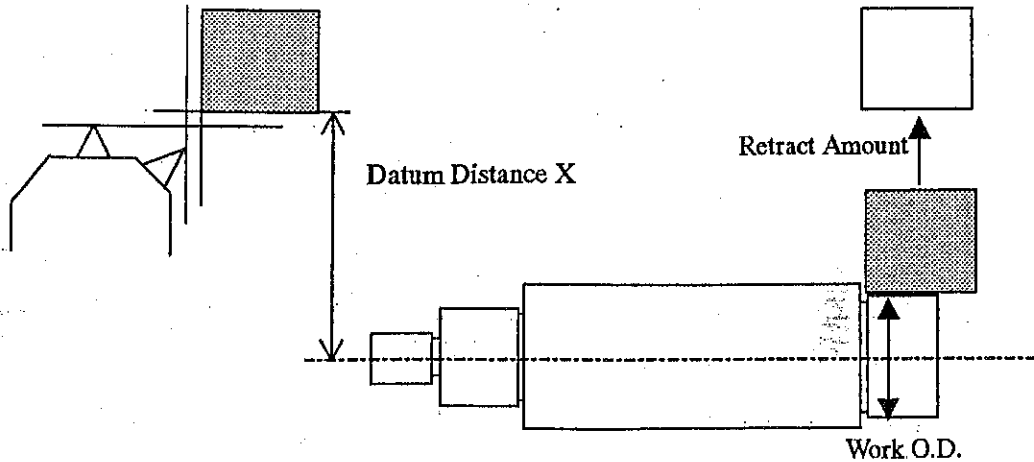
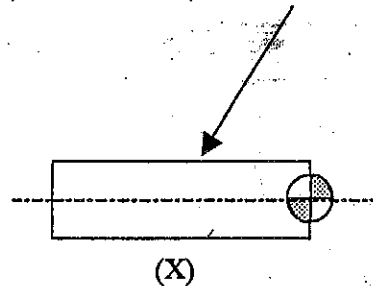
In a grinding with input of workpiece finish diameter based on the **CENTER DATUM**, the workpiece will not be finished to the specified diameter unless the distance from dress point to workpiece rotation center is correct.

Measure the Datum Distance X by the method given below.

- 1) Teach the dress point first, if not taught yet.
- 2) Perform manual dressing, as exact measurement of Datum Distance X fails if the wheel is deformed.
- 3) Display the **STD. SETTINGS** screen.
- 4) Press the **WHEELHEAD ADV.** button.
- 5) Grind a dummy workpiece in the manual mode (to the extent that the wheel is not deformed).
- 6) Press the **WHEELHEAD RET.** button.
- 7) Set the **MODE SELECT** switch to the **MDI** position, and enter the measured workpiece diameter.
- 8) Set the **MODE SELECT** switch to the **TEACH** position, and enter the **DATUM DIST X** by teaching.

\*STD. SETTINGS screen

①	***
⑧	** DATUM DIST X **
⑨	WORK O.D.
⑩	DATUM DIST X
⑪	***



**Note !!**

Though fundamentally the datum distance X is set by teaching, the compensation less than 0.1mm can be set in the MDI mode. If the finished workpiece diameter is on the minus side, compensate the datum distance X value by the amount of minus value.



## 6. Preparing Auto Grinding

### 6-1. Setting Conditions (Setting and confirming the conditions necessary for grinding)

The DATA LIST GRD DATA screen and DATA LIST DRS DATA screen are displayed at any time when the PAGE key is pressed.

Set the MODE SELECT switch to the MDI position, and enter the data.

#### \*DATA LIST GRD DATA screen

①	TOTAL STEP 1-3
②	FINE SIZE/CONT
③	ROUGH TBL SPD
④	FINE TBL SPD
⑤	R-AIR CUT AMT (P)
⑥	F-AIR CUT AMT (T)
⑦	F-AIR CUT AMT
⑧	SPK OUT TIME (P)
⑨	NO. OF SPK OUT (T)
⑩	MAX CLEAR DIA.
⑪	TRNGL FORWARD
⑫	GAUGE SET/D. NOT

Set the number of steps to be ground.

Rough table reversing speed in a traverse grinding.

Fine table reversing speed in a traverse grinding.

#### \*DATA LIST DRS DATA

①	WHL WIDTH
②	DRS INTERVAL CNT
③	DRS INTERVAL SERVE
④	R-DRS INFEEED AMT
⑤	F-DRS INFEEED AMT
⑥	R-DRS SPD
⑦	F-DRS SPD
⑧	R-NO. OF DRS
⑨	F-NO. OF DRS
⑩	F-NO. OF DEAD PASS
⑪	DRS POS/X
⑫	DRS POS/Z

Dress is executed under rough dress cond. at the set interval.

Remaining count until rough dressing is displayed.



#### Note !!

DRS INTERVAL CNT : Set 0 if this function is not used.

Select the desired screen with the PAGE SELECT switch on the control panel, set the MODE SELECT switch to the MDI position, and press the DISPLAY key on the sheet panel. The selected screen will appear.

\*STD. SETTINGS screen

- |   |                      |
|---|----------------------|
| ① | GRD (STEP=0 PASS=1)  |
| ② | SHIFT-P (OFF=0 ON=1) |
| ③ | SHIFT-AMT            |
| ④ | TRIAL DISTANCE       |
| ⑤ | RETRACT AMT          |
| ⑥ | DIAMOND DISTANCE-X   |
| ⑦ | DIAMOND DISTANCE-Z   |
| ⑧ | * DATUM DIST X *     |
| ⑨ | WORK O.D             |
| ⑩ | DATUM DIST X         |
| ⑪ | * GAUGE SET *        |
| ⑫ | ADD AMT              |

0: Grinding every step, 1: Grinding every pass  
 "ON" executes a shift plunge instead of traverse.  
 Wheel shift amount for a shift plunge grinding.  
 Wheel retract amount from work Dia. in-G. position check.  
 Moving amount when pressing WH ADV./RET. button.

\*MANUAL TRV. DATA screen

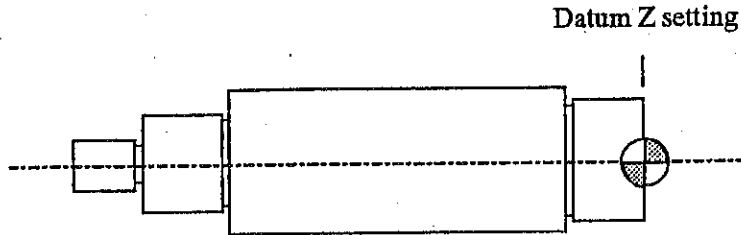
- |   |                      |
|---|----------------------|
| ① | TBL SPD              |
| ② | TARRY TIME/R         |
| ③ | TARRY TIME/L         |
| ④ | REVERSE POS/TB START |
| ⑤ | REVERSE POS/TR END   |
| ⑥ |                      |
| ⑦ | * TAPER COMP *       |
| ⑧ | TAPER COMP DIA/R     |
| ⑨ | TAPER COMP DIA/L     |
| ⑩ | TAPER COMP DISTANCE  |
| ⑪ | TAPER COMP AMT       |
| ⑫ | INDICATOR POS        |

These values are also used for auto traverse

## 6-2. Datum Z Teaching

**Danger!** Grinding can be executed without setting the datum Z, the table reverse position setting becomes easier if the Z coordinate of datum Z is set to 0 by the DATUM Z SET.  
Same as in the case of manual traverse grinding, take extreme care of the following:

**Teaching the Datum Z after teaching the Reverse Position/Table Start and Reverse Position / Table End allows the reverse position to be changed, causing a danger.  
The teaching of Datum Z must be performed before teaching the reverse position.**



### 6-3. Setting O.D. Data

- ① Select DATUM WRK. or CENT.  
Set the DATUM switch to the WRK. or CENT. position.  
The datum cannot be set for every O.D.
- ② Select O.D. No. 1~3
- ③ With the MODE SELECT switch set in MDI position, press the DISPLY key, and the O.D. DATA screen corresponding to the selected datum and O.D. No. will be displayed.
- ④ Enter the O.D. data by teaching or in the MDI mode.

\*O.D. DATA screen Title O.D. No. \_\_\_\_ (← Selected O.D. No. is displayed)

Center datum

- |                         |
|-------------------------|
| ① WRK DIAMETER          |
| ② FINISH DIA.           |
| ③ OFFSET                |
| ④ TTL FINE FEED AMT     |
| ⑤ REVERSE POS/TB. START |
| ⑥ REVERSE POS/TB. END   |
| ⑦ R-NO. OF DRS INTERVAL |
| ⑧ R DRS (OFF=0 ON=1)    |
| ⑨ FIN DRS (OFF=0 ON=1)  |
| ⑩ R-INFEED SPD          |
| ⑪ F-INFEED SPD          |
| ⑫ INFEED POS R0 L1 B2   |

Work datum

- |                         |
|-------------------------|
| ① WRK DIAMETER          |
| ② TTL STK RMVL          |
| ③ [REDACTED]            |
| ④ TTL FINE FEED AMT     |
| ⑤ REVERSE POS/TB. START |
| ⑥ REVERSE POS/TB. END   |
| ⑦ R-NO. OF DRS INTERVAL |
| ⑧ R DRS (OFF=0 ON=1)    |
| ⑨ FIN DRS (OFF=0 ON=1)  |
| ⑩ R-INFEED SPD          |
| ⑪ F-INFEED SPD          |
| ⑫ INFEED POS R0 L1 B2   |

- ⑤ In the case of multiple O.D. grinding, set each O.D. No. and repeat steps (3) and (4).

### 6-4. Setting Max. Clear Diameter

If the max. clear diameter is uncertain, set the max. work datum diameter +  $\alpha$ .  
This data is used as an intermediate positioning point, when performing the cycle start area check at the start of auto grinding cycle or wheel position check cycle, or when positioning the grinding wheel to a dressing point which is on a minus side from the work datum diameter.

## 7. Grinding Position Check

The wheel is positioned to the point retracted from the Work Datum Size by the amount of Trial Distance set on the STD. SETTINGS screen on each step set to the Total Step on the DATA LIST GRD DATA screen.

Executing this cycle before starting the auto grinding can check the Work Datum Size and Reverse Position data. Also, this function checks the data range of all data, and therefore execute this cycle if the data setting was changed.

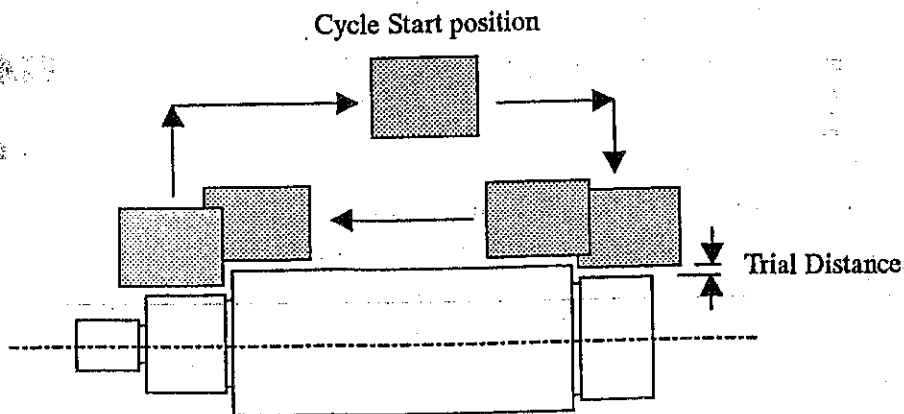
The O.D. NO. select switch on the control panel is used for the following two purposes:  
A Selecting O.D. No. for displaying the O.D. DATA screen  
B Checking the grinding position, or the data for auto grinding cycle, or selecting O.D. No. from which the grinding starts.

Accordingly, for example even though the TOTAL STEP is set to 3, if the O.D. NO. switch on the control panel is set to 2, checking and grinding of O.D. No. 2 and 3 are executed in the grinding position check cycle and auto grinding cycle.

- ① Set the **MODE SELECT** switch to the G. POS CHECK position.
- ② Set the **FEEDRATE OVERRIDE** dial to 0%.
- ③ Press the **CYCLE START** button.
- ④ Increase gradually the **FEEDRATE OVERRIDE %** and check the positioning operation.

\* At the reverse position, the wheel dwells for the time set to **SPK OUT TIME (Plunge)**.

\* The table speed in a traverse grinding is the **ROUGH TBL SPD**.



## 8. Auto Grinding

After setting the data necessary for grinding, set the MODE SELECT switch on the control panel to the AUTO position.

Set the O.D. NO. switch to the No. from which the grinding starts, then press the CYCLE START button to start the auto grinding cycle.

**Do not change the selection of DATUM switch.**

After setting the O.D. data, changing the DATUM switch selection before pressing the CYCLE START causes the data to be changed. Set the data again if the Datum is changed.

The alarm is displayed if the Datum for data setting is different from the Datum for auto grinding.

- ① Set the MODE SELECT switch to the AUTO position.
- ② Set the ROUGH infeed amount dial, FINE infeed amount dial, WORKHEAD SPEED setting dial, and DRESS CYCLE ON/OFF on the control panel.
- ③ Set the FEEDRATE OVERRIDE dial to 0% and the TABLE SPEED dial to 0.
- ④ Press the CYCLE START button.

Increase gradually the FEEDRATE OVERRIDE % and TABLE SPEED to check the operation. The ROUGH infeed amount dial, FINE infeed amount dial, and WORKHEAD SPEED setting dial can be changed during auto grinding cycle.



### Caution !!

Press the EMERGENCY RETRACT button on the control panel, if the operation is to be interrupted during auto cycle.

Pressing the EMERGENCY RETRACT button causes the wheel head to retract up to the reference point.

The WHEELHEAD RET. button does not function during auto cycle.

## 9. Cycle Skip

Only the surface selected with the -O.D. No. switch is additionally ground for compensation under fine grinding condition.

- ① Pressing the FINE SIZE COMP key on the sheet panel causes the cursor to be moved to the FINE SIZE COMP item on the DATA LIST GRD DATA screen. Or, press the PAGE key to display the DATA LIST GRD DATA screen, and move the cursor to the FINE SIZE COMP item.
- ② Enter the FINE SIZE COMP value.
- ③ Set the MODE SELECT switch to the FINE SIZE COMP position.
- ④ Set the FINE infeed amount dial, WORKHEAD SPEED setting dial, and DRESS CYCLE ON/OFF on the control panel.
- ⑤ Set the FEEDRATE OVERRIDE dial to 0% and the TABLE SPEED dial to 0.
- ⑥ Press the CYCLE START button.

Increase gradually the FEEDRATE OVERRIDE % and TABLE SPEED to check the operation.

The FINE infeed amount dial and WORKHEAD SPEED setting dial can be changed during compensation grinding.

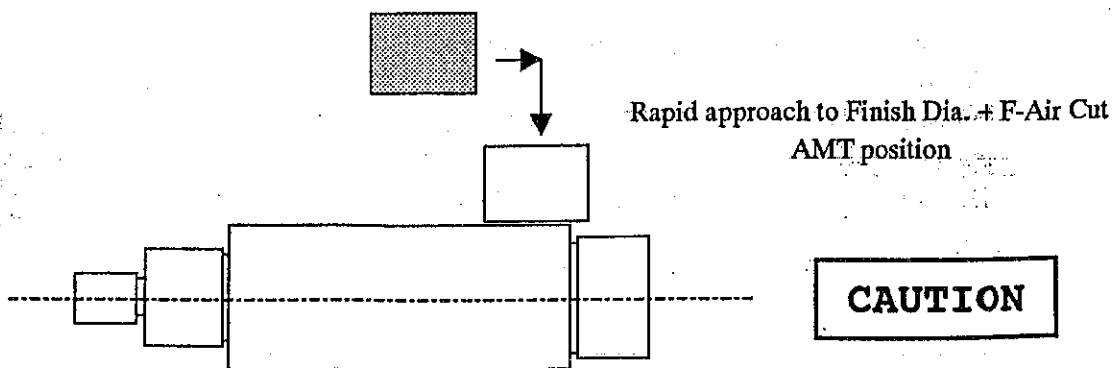
The fine size compensation value must be a positive value. Input of a negative value causes the alarm to be displayed immediately after cycle start.



### Caution !!

\*Execute the Cycle Skip when additional grinding is necessary after measuring the finished dimension.

After cycle start, the wheel approaches rapidly to the FINISH DIA. + F-AIR CUT AMT position. The operation differs from normal auto grinding cycle, thus requiring extreme care.



\*After the compensation grinding cycle completed, the entered Fine Size Comp value is reset to 0 automatically.

To execute the Cycle Skip again after the compensation grinding cycle completed, set the previous Fine Size Comp value plus additional value.

Example: To execute the Cycle Skip with the Fine Size Comp set to 0.01, and again execute compensation by 0.005, set the Fine Size Comp value to 0.015.

## 10. Internal Grinding

The machine with the internal grinding unit can perform internal grinding manually.



### Caution !!

The WHEELHEAD ADV. and RET. buttons and the EMERGENCY RETRACT button are disabled while the internal unit is in active position to ensure safety.

### Operation procedure

Teaching of reverse position, and start and stop of table:

- ① Set the PAGE SELECT switch to the MAN. TRV. position to open \*MANUAL TRV. DATA screen.
- ② Enter TABLE SPEED, TARRY TIMER/R, and TARRY TIMER/L.
- ③ Set the MODE SELECT switch to the \*MAN. TRV. position.
- ④ (Teach the Datum Z)
- ⑤ Teach the REVERSE POS/TB. START and REVERSE POS/TB. END.
- ⑥ Make sure that the wheel is in a table reversing range, then press the TABLE START button.

Grinding with manual pulse generator handle, and table reverse stop:

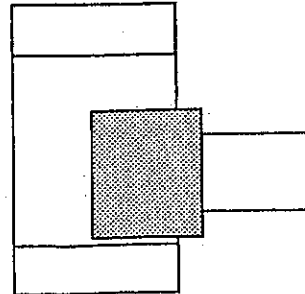
- ⑦ Turn on the HANDLE INTERLOCK, and feed in the wheel with the manual pulse generator handle.
- ⑧ Press the TABLE STOP button, and the table stops in +100mm position from the right reverse position.

If regrinding is necessary:

- ⑨ Make sure that the wheel is in a table reversing range, then press the TABLE START button.
- ⑩ Repeat steps from seven (7).

\*MANUAL TRV. DATA screen

- |                         |
|-------------------------|
| ⑦ TBL SPD               |
| ⑧ TARRY TIME/R          |
| ⑨ TARRY TIME/L          |
| ⑩ REVERSE POS/TB. START |
| ⑪ REVERSE POS/TB. END   |
| ⑫ ***                   |



Teaching the Datum Z after teaching the Reverse Position/Table Start and Reverse Position/Table End allows the reverse position to be changed, causing a danger. The teaching of Datum Z must be performed before teaching the reverse position.
---



8-1. Alarm

Macro Alarm List

Alarm No.	Description
3001	Internal unit is in active position.
3002	
3003	
3004	
3005	Out of cycle start area. Shift the wheel head to plus side from MAX CLEAR DIA. <i>Shift head way back 1/4" X</i>
3006	Datum selection error. Current datum is not the set datum.
3007	
3008	Wheel head is in advance position. DATUM DIST X cannot be set.
3009	
* 3010	Retracted value is less than set value because wheel head is close to the reference point.
3011	
3012	
3013	
3014	
3015	Current position is faulty for table reversing in the MAN. TRVS. mode.
3016	DRS POS/X cannot be entered in MDI mode. (Teach input only)
3017	DRS POS/Z cannot be entered in MDI mode. (Teach input only)
3018	DATUM DIST X cannot be entered in MDI mode. (Less than 0.2 comp. is possible)
3019	
3020	
3021	TEACH mode check error. (Confirm the mode selection)
3022	
3023	Machine has not returned to the reference point yet.
3024	
3025	

\* 3010 : Pay attention when the wheel head advances. (It will advance by the amount of advance.)

### Macro Alarm List

Alarm No.	Description
3026	
3027	
3028	
3029	
3030	O.D. NO. selection error
3031	PAGE SELECT error <i>"Gaman Set" Wrong Screen Choice</i>
3032	Table reversing amount in a traverse grinding is less than 1 mm or 0.04 inch.
3033	
3034	
3035	
3036	
3037	DRS POS has not been set yet.
3038	DATUM Z has not been set yet.
3039	DATUM DIST X has not been set yet.
3040	
3041	Gauge device can not use for Comp. Grinding
3042	Gauge forwarding diameter is smaller than size
3043	Size signal did not output for Gauge device
3044	Grinding method should be [STEP=0] when using Gauge device
3045	COMP AMT of DATUM DIST X is too big. Should be more than 0.2mm (0.01inch).
3046	
3047	
3048	
3049	
3050	No data check alarm. Check the data.

### Macro Alarm List

Alarm No.	Description
3051	WRK DATUM SIZE is out of data range.
3052	TTL FINE FEED AMT is out of data range.
3053	R-NO. OF DRS INTERVAL is out of data range.
3054	R DRS (OFF=0 ON=1) is out of data range.
3055	FIN DRS (OFF=0 ON=1) is out of data range.
3056	R-INFEED SPD is out of data range.
3057	F-INFEED SPD is out of data range.
3058	INFEED POS R0 L1 B2 is out of data range.
3059	TTL STK RMVL is out of data range.
3060	FINISH DIA. is out of data range.
3061	OFFSET is out of data range.
3062	GRD (STEP=0 PASS=1) is out of data range.
3063	SHIFT-P (OFF=0 ON=1) is out of data range.
3064	SHIFT AMT is out of data range.
3065	TRIAL DISTANCE is out of data range.
3066	RETRACT AMT is out of data range.
3067	DIAMOND DISTANCE-X is out of data range.
3068	DIAMOND DISTANCE-Z is out of data range.
3069	WORK O.D. is out of data range.
3070	DATUM DIST X is out of data range.
3071	ADD.AMT is out of data range.
3072	TOTAL STEP 1-3 is out of data range.
3073	FINE SIZE COMP is out of data range.
3074	ROUGH TBL SPD is out of data range.
3075	FINE TBL SPD is out of data range.

### Macro Alarm List

Alarm No.	Description
3076	R-AIR CUT AMT (P) is out of data range.
3077	R-AIR CUT AMT (T) is out of data range.
3078	F-AIR CUT AMT is out of data range.
3079	SPK OUT TIME (P) is out of data range.
3080	NO. OF SPK OUT (T) is out of data range.
3081	MAX CLEAR DIA. is out of data range.
3082	GAUGE FORWARD is out of data range.
3083	GAUGE SET O.D. NO. is out of data range.
3084	WHL WIDTH is out of data range.
3085	DRS INTERVAL CNT is out of data range.
3086	DRS INTERVAL SERVE is out of data range.
3087	R-DRS INFEED AMT is out of data range.
3088	F-DRS INFEED AMT is out of data range.
3089	R-DRS SPD is out of data range.
3090	F-DRS SPD is out of data range.
3091	R-NO. OF DRS is out of data range.
3092	F-NO. OF DRS is out of data range.
3093	F-NO. OF DEAD PASS is out of data range.
3094	DRS INFEED AMT X (SIDE) is out of data range.
3095	DRS INFEED AMT Z (SIDE) is out of data range.
3096	NO. OF DRS (SIDE) is out of data range.
3097	NO. OF DEAD PASS (SIDE) is out of data range.
3098	DRS SPD (SIDE) is out of data range.
3099	RELEASE DEPTH (SIDE) is out of data range.
3100	STRAIGHT DISTANCE (SIDE) is out of data range.

### Macro Alarm List

Alarm No.	Description
3101	RELEASE ANGLE is out of data range.
3102	TBL SPD is out of data range.
3103	TARRY TIME/R is out of data range.
3104	TARRY TIME/L is out of data range.
3105	TAPER COMP DIA/R is out of data range.
3106	TAPER COMP DIA/L is out of data range.
3107	TAPER COMP DISTANCE is out of data range.
3108	INDICATOR POS is out of data range.

### PMC Alarm List

Alarm No.	Description
1000	+X over travel (hardware)
1001	-X over travel (hardware)
1002	+Z over travel (hardware)
1003	-Z over travel (hardware)
1004	Motor overload
1005	Meter relay operated
2001	<p>Battery voltage low</p> <p>* Replace the battery once a year periodically. Also, even within one year, replace the battery as soon as possible (in 2 or 3 weeks) if alarm No.2001 is displayed or "BAL" blinks on the CRT.</p> <p>Low battery voltage causes the data including programs to be all cleared, and therefore the battery must be replaced with a new one.</p> <p>The battery used is exclusive lithium battery (A98L-0031-006).</p> <p>For the battery replacing method, refer to page 10-26.</p>
2002	<p>Gauge unit mode error</p> <p>(Cycle Start was attempted though the gauge unit is in manual mode.)</p>

Alarm Nos. 2000s: Warning indication

Alarm No.	Meaning
2001	<p>Battery system voltage drop                      This alarm arises when the voltage of the RAM backup battery in the NC drops. If you let this alarm as it stands, RAM contents (program) will be erased and change the battery in good time. At this time, you should carry out in the condition energized the NC. Then, reset this alarm with the RESET button.</p>
2002	<p>Sizing unit mode error (Option)                      This alarm arises when desired to start a sizing unit on cycle, although the sizing unit is in a MAN mode. The RESET button allows you to release this alarm.</p>
2003	<p>Door interlock alarm (Option)                      This alarm arise when the CYCLE START button is depressed, although the door is not closed in AUTO mode (SQ14/15 is off). The RESET button allows you to release this alarm. In addition, in the event the door opens during the cycle (SQ14/15 is off), for safety, the wheel head returns to its zero, and then the machine is in an emergency stop condition and this alarm is involved. The RESET button allows you to release it.</p>
2004	<p>Internal grinding interlock alarm (Option)                      In the event the internal grinding interlock limit switch (SQ9) is turned on during the automatic cycle, for safety, the cycle is terminated and this alarm is involved, stopping the work spindle and coolant and retracting the wheel head. The RESET button allows you to release it.</p>
2005	<p>Work spindle orientation stop error (Option)                      When a work spindle orientation stop occurred at the time of terminating the automatic cycle, this alarm arises after stopping the work spindle in the event the orientation proximity switch (SQ19) is not turned on and work spindle continues running despite of the passage of 10 sec after decelerating the work spindle. The RESET button allows you to release this alarm.</p>
2006	<p>Chuck interlock alarm (Option)                      This alarm arises when the CYCLE START button is pressed, although the chuck is not tuned on in AUTO mode. The RESET button allows you to release this alarm. In addition, in the even the chuck is turned off during the automatic cycle, an emergency stop occurs and this alarm is involved. The RESET button allows you to relapse it.</p>

8-2 Service Parts - Machine

1) OGM-200 (8) Series

Used for	Description	Type	Q'ty	Manufacturer	Remarks
Frame	Limit switch	D4MC-5020	3	OMRON	
Table	Bearing	25TAC62BDF10PN7A	1	NSK	
	Bearing	7206CTYDBC7P4	1	NSK	
	Bearing	HR30205J	1	NSK	
	DC coupling	DCCS06X, special	1	OSAKA SEISA	
Work Head	O-ring	G-85	1	NOK	
	O-ring	G-90	1	NOK	
	O-ring	G-65	1	NOK	
	O-ring	G-135	1	NOK	
	Oil seal	DS50584	1	IKO	
	Oil seal	DS24324	1	IKO	
	Bearing	7913CDB/GL	1	NTN	
	Bearing	ET-32009XP5	2	NTN	
	Bearing	6806ZZ	1	NTN	
	V-belt	4-5MS-650	1	BANDO	
	Carbide center	E2803H	1	BRUECKNER	MT No. 3
	AC servomotor	GPK1400K	1	FUJI ELECTRIC	
Tailstock	O-ring	G-35	1	NOK	
	Scraper	SER-45	2	SAKAGAMI	
	Bearing	TA1416Z	1	IKO	
	Bearing	TA1815Z	1	IKO	
	Carbide half-center	HE2813H	1	BRUECKNER	MT No. 3
	Diamond dresser	φ 12 x 20L x 120° x R10, 1ct.	1	YOKOHAMA DIA	
Wheel head	Bearing	7100CTYDBP2+KL18BC8	1	NSK	
	Bearing	7011CTYDBP2+KL27AC8	1	NSK	
	Bearing	30TAC62BDFC10PN7A	1	NSK	
	Bearing	7206CTYDBC7P4	1	NSK	
	DC coupling	DCCS06X, special	1	OSAKA SEISA	
	O-ring	P-26	4	NOK	
	Limit switch	D4MC-5020	3	OMRON	
	AC motor	SF-J3, 7KW4P 200V, Class-B, 7-3	1	MITSUBISHI	
V-belt	11M-1090	1	BANDO		
Lube Tank	Continuous type gear pump	AMS-3-30LP-4 200V	1	RYUBE	

8-2 Service Parts - Machine

2) OGM-300 (12) Series

Used for	Description	Type	Q'ty	Manufacturer	Remarks
Frame	Limit switch	D4MC-5020	3	OMRON	
Table	O-ring	P-35	1	NOK	
	Bearing	BST30X62-1DEP4	1	NTN	
	Bearing	7206CDBC7P4	1	NTN	
	Bearing	51103	1	NTN	
	DC coupling	DCCS06X, special	1	OSAKA SEISA	
Work Head	O-ring	G-130	1	NOK	
	O-ring	G-115	1	NOK	
	O-ring	G-125	1	NOK	
	Oil seal	AC3855E0	1	NOK	
	Oil seal	AC2359E0	1	NOK	
	Scraper	SDR-31.5	1	SAKAGAMI	
	V-ring	V-140L	1	NOK	
	Bearing	32017P5	1	NTN	
	Bearing	30215P5	1	NTN	
	Bearing	7818CDB/GNP5	1	NTN	
	Bearing	6806ZZ	1	NTN	
	V-belt	6-5MS-775	1	BANDO	
	Carbide center	E2804H	1	BRUECKNER	MT No. 4
	AC servomotor	GPK1750K	1	FUJI ELECTRIC	
Tailstock	O-ring	G-60	1	NOK	
	O-ring	G-35	1	NOK	
	Scraper	SER-50	2	SAKAGAMI	
	Quad-ring	No. 4325-366Y	1	Captan Ind.	
	Bearing	51101	1	IKO	
	Bearing	TA1416Z	1	IKO	
	Bearing	TA1816Z	1	IKO	
	Carbide half-center	HE2804H	1	BRUECKNER	MT No. 4
	Diamond dresser	φ 12 x 20L x 120" x R10, 1ct.	1	YOKOHAMA DIA	
Whell head	O-ring	G-35	2	NOK	
	O-ring	G-105	1	NOK	
	O-ring	G-125	1	NOK	
	O-ring	G-115	1	NOK	
	O-ring	G-100	1	NOK	
	Oil seal	AC2668A0	1	NOK	
	Bearing	7012CDBC8P4	2	NTN	
	Bearing	BST35X72-1DFP4	1	NTN	

cont.



2) OGM-300 (12) Series




Used for	Description	Type	Qty	Manufacturer	Remarks
Wheel Head	Bearing	7007CDBC7P4	1	NTN	
	DC coupling	DCCR08BS, special	1	OSAKA SEISA	
	V-belt	3-7MS-1250	1	BANDO	for 50Hz
	V-belt	3-7MS-1280	1	BANDO	for 60Hz
	Limit switch	D4C-4202	3	OMRON	
	AC motor	SF-J5. 5KW4P 200V, Class B, V-3	1	mitsubishi	
Lube Tank	Continuous type gear pump	AMS-3-30LP-6 200V	1	RYUBE	

### 8-3. Service Parts - Electric

#### 1. Setting items

Servo-amplifiers for the work spindle, X and Z axes have been set at the time of the shipments as follows:

Table 8-1 Set Values

WORKHEAD SERVO AMP. E5	DIP SW No. 4	ON
	GAIN	
	ACC 1	
	ACC 2	
	Parameter No. 60 *)	
X AXIS, Z AXIS SERVO AMP. E3, E4	Short pin position: S2	

\*) If the work spindle runs slowly when turned the WORKHEAD SPEED control (RI), as started it, to zero, set this parameter to such a value that the spindle rotation is stopped.

To do so, a special loader is required, so please contact us.

8-3 Service Parts - Electric

Refer attachment operation manual Fuji

# Fuji ES Motor

Controller DES-A

## Contents

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4.3 Torque control mode .....	12
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## 1. Mounting

The controller is of panel-mount type. Install the controller vertically to the ground so that the characters "DIGITAL ES" on the front face can be seen horizontal.

Rear or side mounting is allowed (Braking resistor is mountable at the rear or top so as to meet the installation of controller).

When installing multiple controllers side by side, provide a space of 30mm or wider in between.

## 2. Wiring

### 2.1 Wiring diagram

For connection of the main circuit (—), use of a solderless terminal with insulating sleeve is recommended.

Notes:\*

(1) 200V AC, single-phase input is allowed only for 0.2 and 0.4 kW. For a power capacity of 500kVA or more, an AC reactor for impedance matching is required.

(2) Valid (effective) in position control mode with loader.

Remark:

Torque command is issued in the torque control mode.

### Remarks:

(1) After unpacking, perform the following checks.

(a) Check for damage due to transit (concavity of case and damage, missing, etc. of part).

(b) Check the following accessories are packed together:

For CN1 connector	17JE-13250-02(D1)	} 1 each
Cover	17JE-25H-1A	
For CN2 connector	17JE-13090-02(D1)	} 1 each
Cover	17JE-09H-1A	

(c) Check if the delivered product exactly meets your order.

(2) Before checking the controller power terminals (R, S, T, U, V, W) and the main circuit, be sure to turn off the input power and wait for 3 minutes or longer.

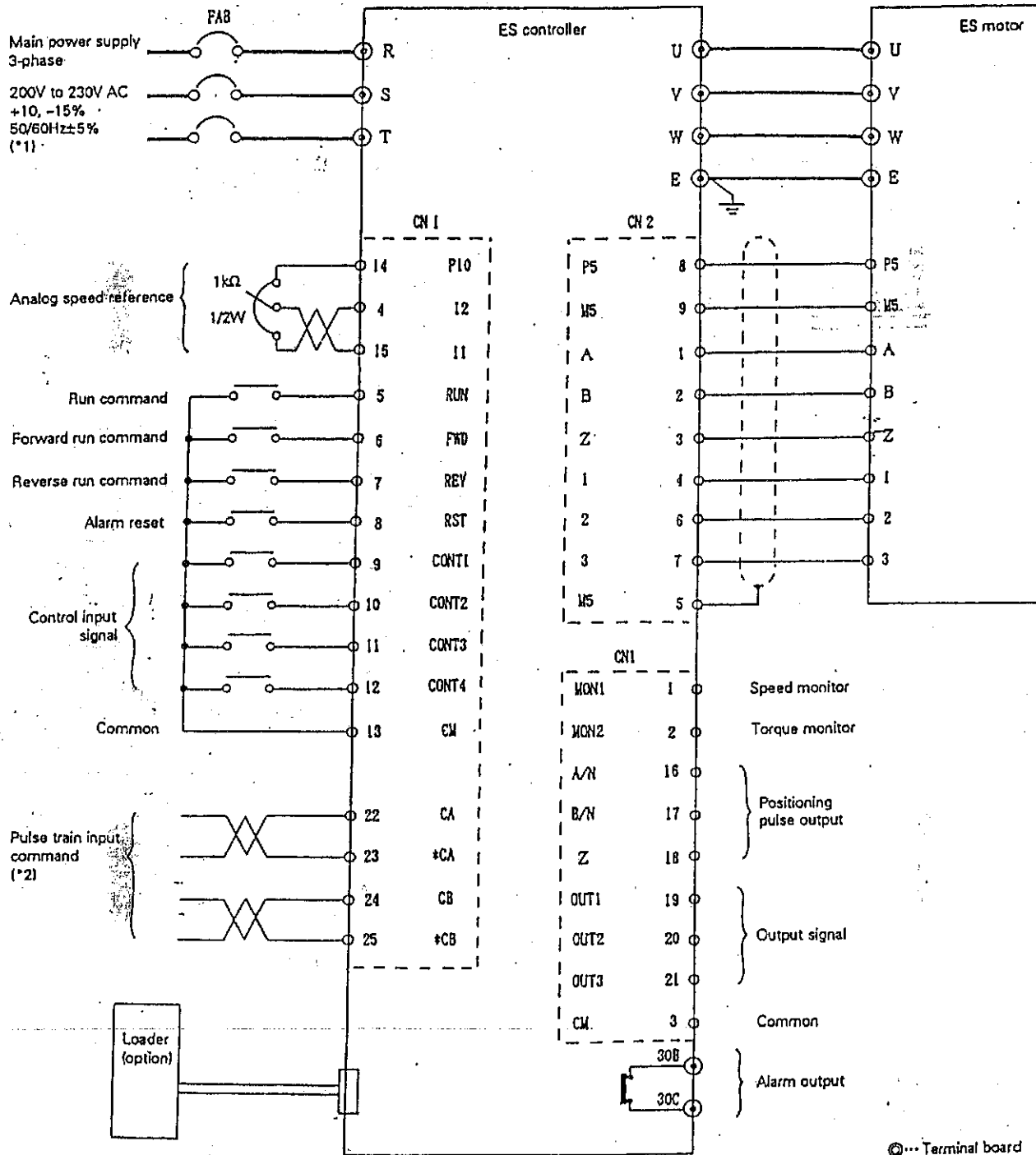
Otherwise, a residual voltage in the internal smoothing capacitor may cause a shock hazard.

(3) The ground terminals (E) of the controller and motor should be grounded as specified with your local standards.

(4) Before test-run after installation, reconfirm that wiring has been made correctly.

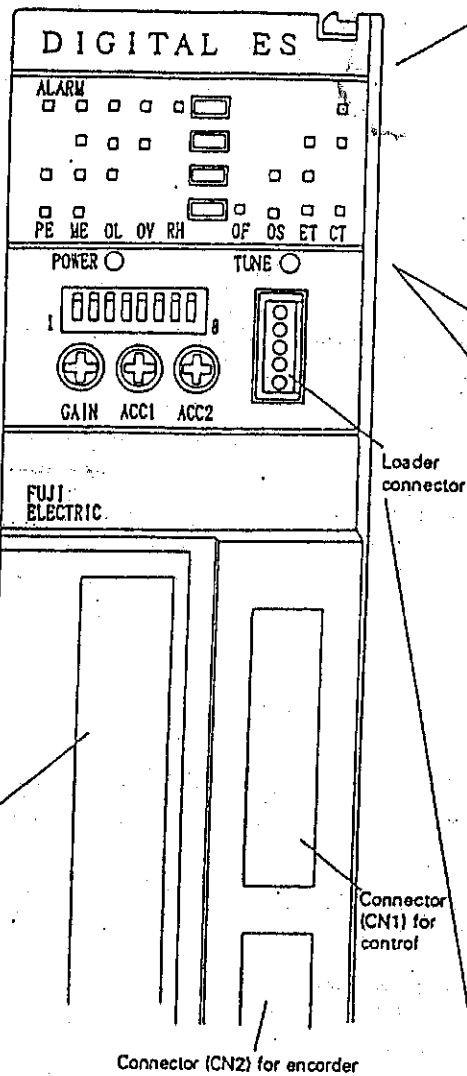
(5) To prevent the influence by an external surge, a noise filter should be connected. Also, a surge killer (surge absorber) should be connected to the magnet switch.

(6) After a change in load condition, SW-2 should be turned off, on and off for performing tuning again.



⊙... Terminal board

## 2.2 Setting

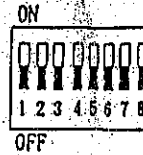


### Control indicating LED and alarm indication

Green	POWER	Power supply is turned on.
	TUNE	Tuning is completed.
Red	PE	Power error (trouble)
	ME	Memory error (trouble)
	OL	Overload
	OV	Overvoltage
	RH	Brake resistor overheat
	OF	Overflow of deviation
	OS	Overspeed
	ET	Encoder trouble
CT	Control circuit trouble	

Switch and variable resistor:  
Valid when loader is invalid

Switch



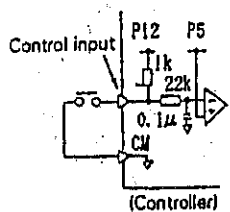
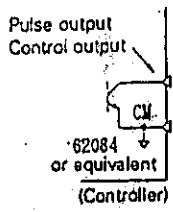
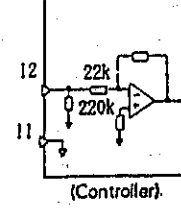
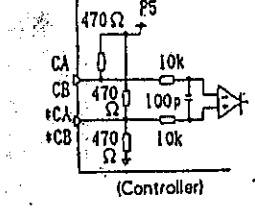
All switch selectors turned off at shipment

No.	Setting	ON	OFF
1	Loader validity	Valid	Invalid
2	Auto/manual tuning	Manual	Auto
3	ASR integral time	160ms	40ms
4	Accel./decel. time	10 times	1 time
5	Speed monitor	One-way	Both-way
6	—	—	—
Pulse output frequency dividing ratio			
		1/1	1/5
		1/10	1/20
7	OFF	ON	OFF
8	OFF	OFF	ON

### Variable resistor

GAIN	Adjusts motor response. (Factory-set at notch-5)
 Larger	
ACC 1	Adjusts accel./decel. time (Max. 1s/factory-set at min.) Adjustable to max. 10s by SW-4.
 Longer	
ACC 2	Adjusts accel./decel. time (Max. 3s/factory-set at min.) Valid with CONT3 signal ON. Adjustable to max. 30s by SW-4.
 Longer	

### 2.3 Interface

Signal name	Control input [CN1]	Pulse output Control output [CN1]	Analog input [CN1]	Pulse train input [CN1]
Data	DC + 12V 12mA/point	DC + 50V/30mA (Max.)	DC ± 10V Input impedance 20kΩ	DC +5V/10mA Max. Input 100kHz line driver
V/F circuit				
Connector pin No.	5 to 12	16 to 21	4, 15	22 to 25

## 3. Basic Operation (without loader)

Basic operation is selected with SW-1 turned off.

### 3.1 Electrical connection

#### (1) Terminal board

Signal name	Terminal symbol	Description
Power input terminal	R, S, T	Inputs 3-phase 200 to 230V AC, 50/60Hz (Single-phase input is allowed for 0.2 and 0.4 kW)
Output terminal to motor	U, V, W	Terminals for connection to motor. Connect the terminals of controller to those of motor by matching the same terminals symbols.
Ground (earth) terminals	E	Terminal for grounding the controller case. Be sure to ground the case.
Alarm output	308, 30C	Relay contact for external output of an error if occurs. (Contact turns off (opens) at error.)

#### (2) Control input (The ON status of input signal means that the relevant terminal is connected to CM)

Signal name	Terminal symbol	CN1 pin No.	Description
* +10V	P10	14	Outputs a unipolar power supply of +10V for command voltage (max. 30mA).
Speed reference input	12	4	Inputs a bipolar voltage of 0 to ±10V.
Common	11	15	Common side of signal appearing at terminals P10 and P12
Run command	RUN	5	While this terminal is ON, current flows through the motor to allow rotation.
Forward start	FWD	6	While [FWD] is ON, motor rotates forward for positive (+) speed reference voltage.
Reverse start	REV	7	While [REV] is ON, motor rotates reversely for positive (+) speed reference voltage.
Alarm reset	RST	8	Terminal for resetting the alarm status once turned ON. (Valid only at alarm. However, operation is prohibited with this signal turned ON.)
Control 1	CONT1	9	Speed selection 1
Control 2	CONT 2	10	Speed selection 2
Control 3	CONT 3	11	Accel./decel. time selection 1
Control 4	CONT 4	12	P-action
Common	CM	13	Common side of each control signal. Common side is internally shared.

Standard assignment

Note: \* Torque command input is selected in the torque control mode.



0401  
5  
0410  
15  
0420  
25  
0430  
35  
0440  
45  
0450  
55  
0460  
65  
0470  
F

R1 S1 T1 E  
R1 S1 T1 E

AC200/200~220V±10% 50/60HZ 3φ

FR4	
0.9A	0.6A
1216, 1224	810, 820
1240, 1260	830

M4	
180W 2P	100W 2P
1216, 1224	810, 820
1240, 1260	830

KM4 FR4

COOLANT UNIT (OPTION)

U4  
V4  
W4  
E

Z6 SK

M4

COOLANT

Z7 SK

M5

MAGNETIC SEPARATER  
25W 4P



XS.XP1

承認 APPROVED	検図 CHECKED	設計 DESIGNED	製図 DRAWN	原図番 PRIMARY DWG. No.	形式 MODEL	名付 NAME
		5942 KAMBE	5942 KAMBE	505EL0094D3	OGM-series	SCHEMATIC DIAGRAM
		930526	960905	岡本工作機械製作所 OKAMOTO MACHINE TOOL WORKS, LTD.	短号 CODE	図番 DRAWING No.
					3410	頁 PAGE
						04