DRAWINGS

Applicable Model

MH-630 MH-630/U

Before starting operation, maintenance, or programming, carefully read the manuals supplied by Mori Seiki, the NC unit manufacturer, and equipment manufacturers so that you fully understand the information they contain.
Keep the manuals carefully so that they will not be lost.

MORI SEIKI

MD-CEMH630-A0E

- The contents of this manual are subject to change without notice due to improvements to the machine or in order to improve the manual. Consequently, please bear in mind that there may be slight discrepancies between the contents of the manual and the actual machine. Changes to the instruction manual are made in revised editions which are distinguished from each other by updating the instruction manual number.
- Should you discover any discrepancies between the contents of the manual and the actual machine, or if any part of the manual is unclear, please contact Mori Seiki and clarify these points before using the machine. Mori Seiki will not be liable for any damages occurring as a direct or indirect consequence of using the machine without clarifying these points.
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The product shipped to you (the machine and accessory equipment) has been manufactured in accordance with the laws and standards that prevail in the relevant country or region. Consequently it cannot be exported, sold, or relocated, to a destination in a country with different laws or standards.
The exportation of this product may be subject to an authorization from the government of the exporting country.
Check with the government agency for authorization.

Machine Information

Description of machine : Machining center
Model name :
Machine serial No. :
Manufacturing date :

Representative :
Business hours : 8 : 30 – 17 : 30

PREFACE

This document gives the machine specifications and drawings which are necessary for the customer to carry out inspection and maintenance work. Please select the drawings that match your machine's specification to carry out inspection and maintenance.

If the drawings necessary for your inspection and maintenance are not included in this document, please contact Mori Seiki.

Drawings necessary for installation or moving of the machine including the general view, installation drawing, and foundation diagram, drawings of peripheral equipment such as hydraulic and pneumatic equipment and lubrication pump which are necessary for inspection and maintenance of them.

The tool limitation drawings and machine axis travel diagrams are also included. They are necessary for programming and determining tool layout.

WARNING



When changing parts, be sure to use genuine parts specified by Mori Seiki. Mori Seiki cannot accept responsibility for any trouble arising from the use of parts not specified by Mori Seiki. Using parts that are not specified will not only impair the performance of the machine; it will also make the machine unsafe and could cause accidents involving serious injuries or damage to the machine.



This manual uses SI unit system and metric system.
If inch system is required, please convert the values to inch system by referring to APPENDIX CONVERSION TABLE OF UNITS at the back of this manual.

SIGNAL WORD DEFINITION

A variety of symbols are used to indicate different types of warning information and advice.

Learn the meanings of these symbols and carefully read the explanation to ensure safe operation while using this chapter of the manual.

<Symbols related with warning>

The warning information is classified into three categories, DANGER, WARNING, and CAUTION.

The following symbols are used to indicate the level of danger.



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

The information described in the DANGER frame must be strictly observed.



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

The information described in the WARNING frame must be strictly observed.



Indicates a potentially hazardous situation which, if not avoided, may result in minor or moderate injury damages to the machine.

The information described following the caution symbol must be strictly observed.

<Other symbols>



Indicates the items that must be taken into consideration.



Indicates useful guidance relating to operations.



Indicates the page number or manual to be referred to.
The number in ( ) indicates the section number.

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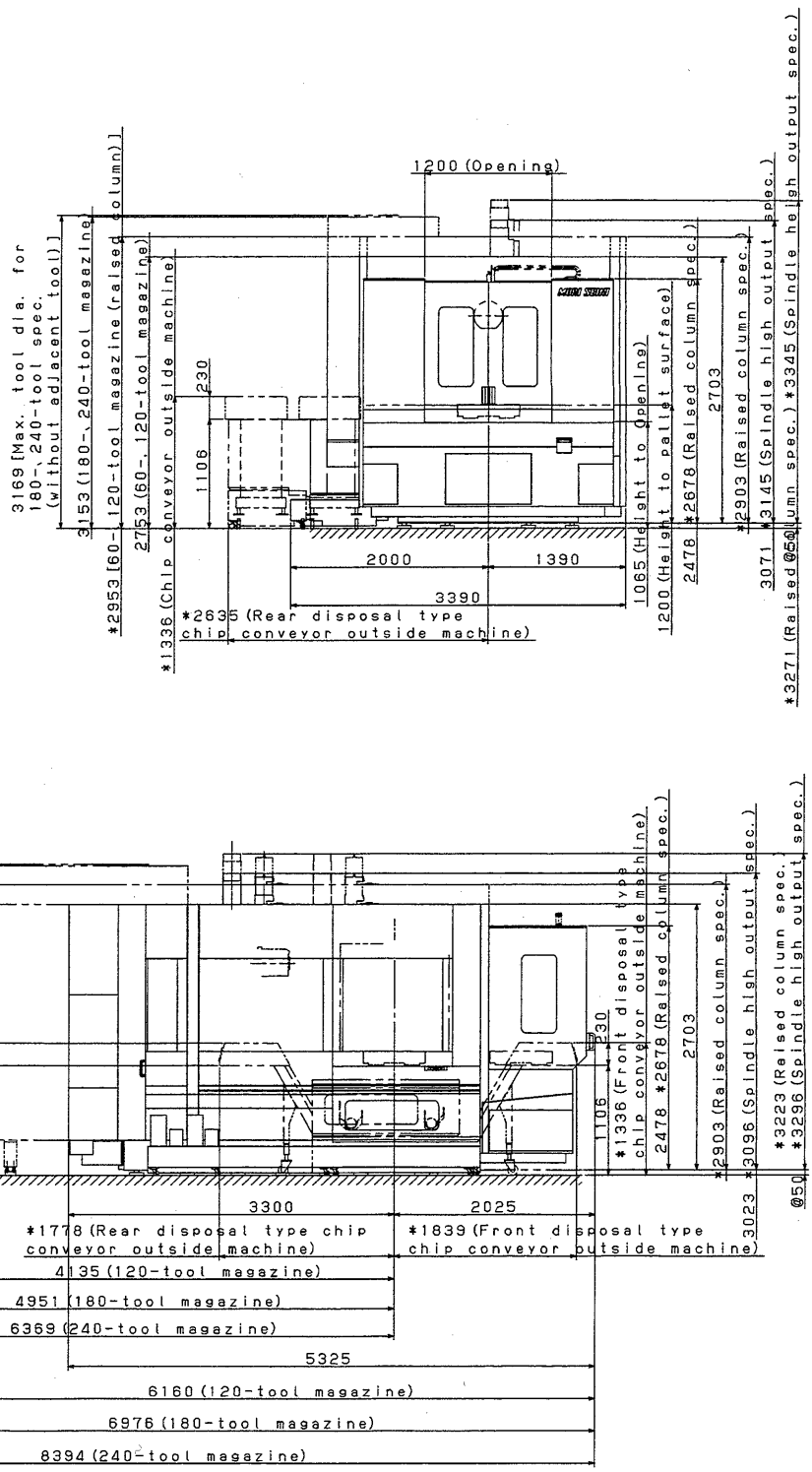
1. GENERAL VIEW

CAUTION

This illustration shows external machine dimensions.

Make sure that the machine can be carried to the installation site without interference and that there is sufficient space around the machine for maintenance.

Unit:mm



NOTE

① Dimensions marked with " * " indicate option.

② Dimensions marked with " @ " indicate the distance between floor and bottom.

(Q51408 B01)

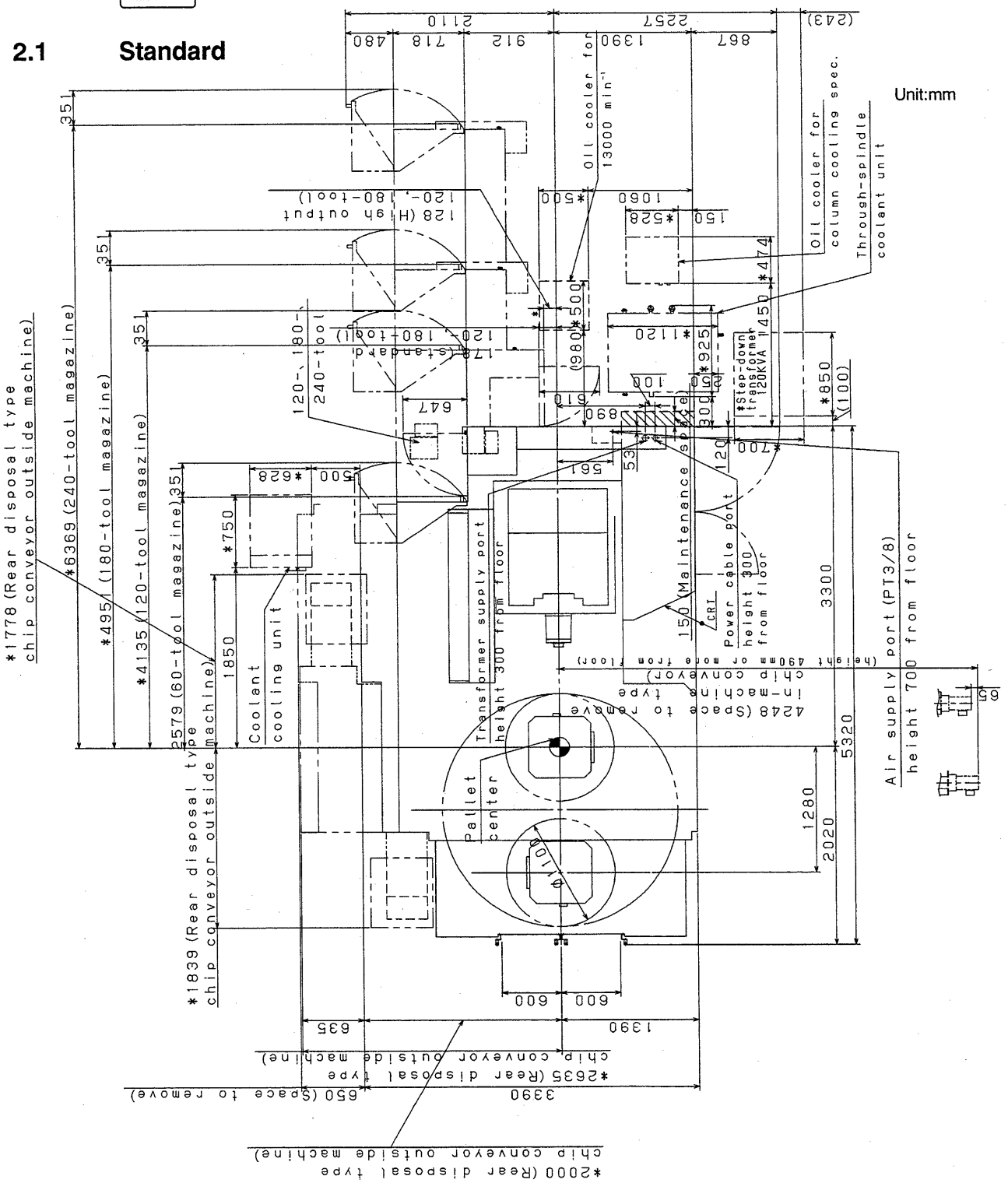
2. INSTALLATION DRAWINGS

CAUTION

Make sure there is sufficient maintenance area for opening the CNC and electrical cabinet doors, for pulling out the coolant tank and chip conveyor, etc.

2.1 Standard

Unit:mm



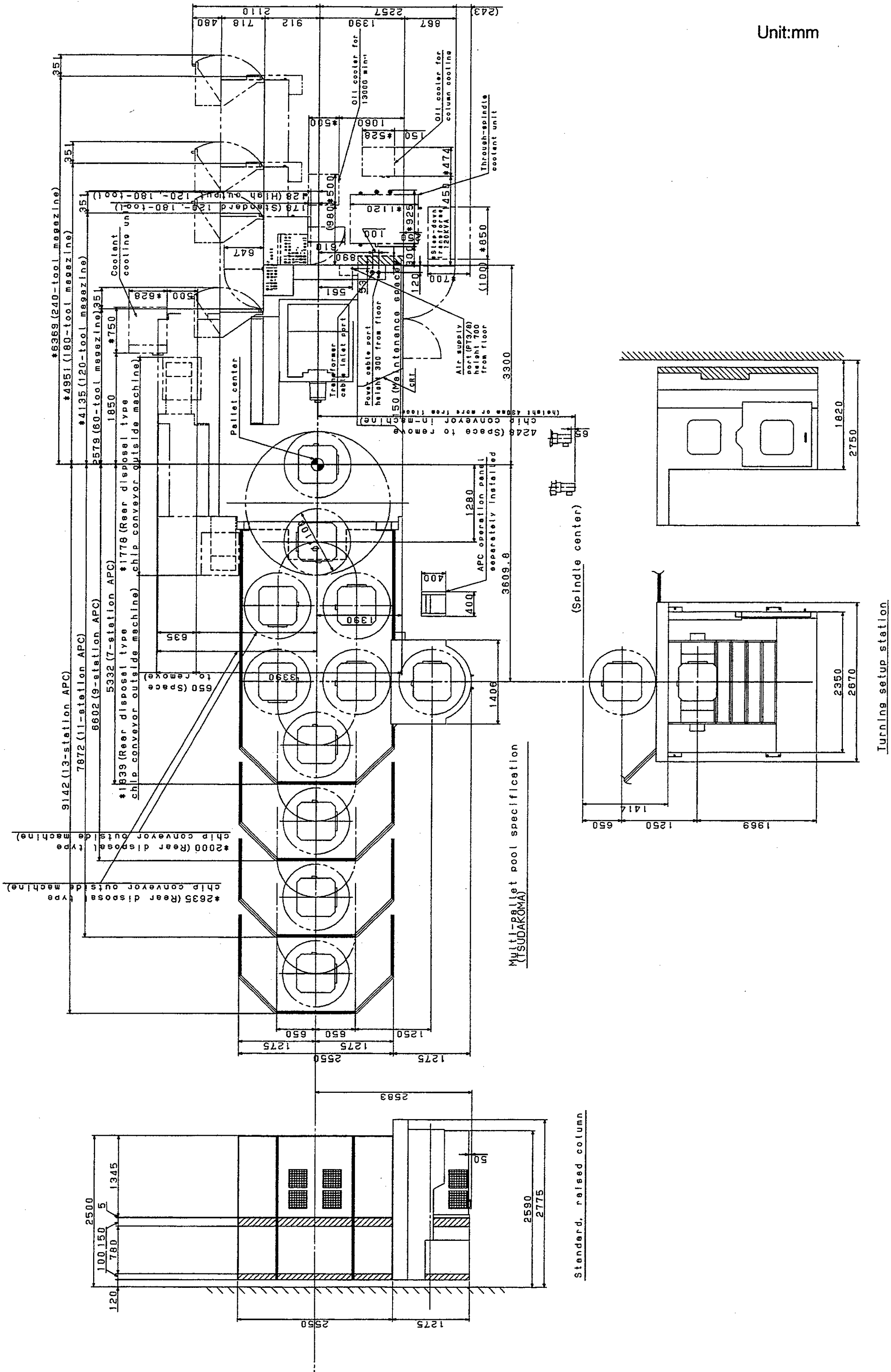
(Q51409 C05 1/2)

NOTE

Dimensions marked with * indicate option.

2.2 Pallet Pool (Tsudakoma) Specification

Unit:mm



Dimensions marked with ∗ indicate option.

3. FOUNDATION DIAGRAMS

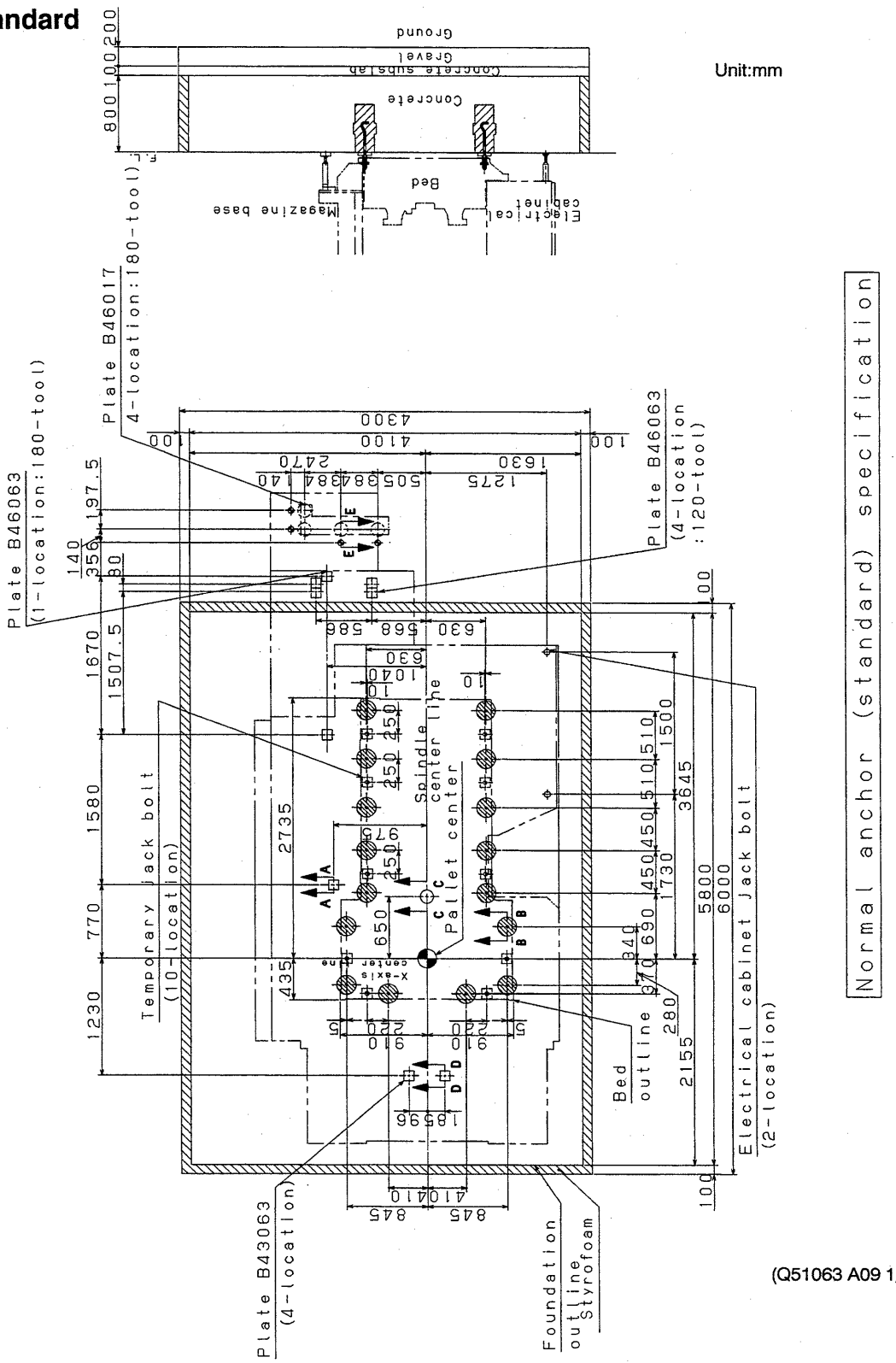
CAUTION

① Select a place that can support the weight of the machine.

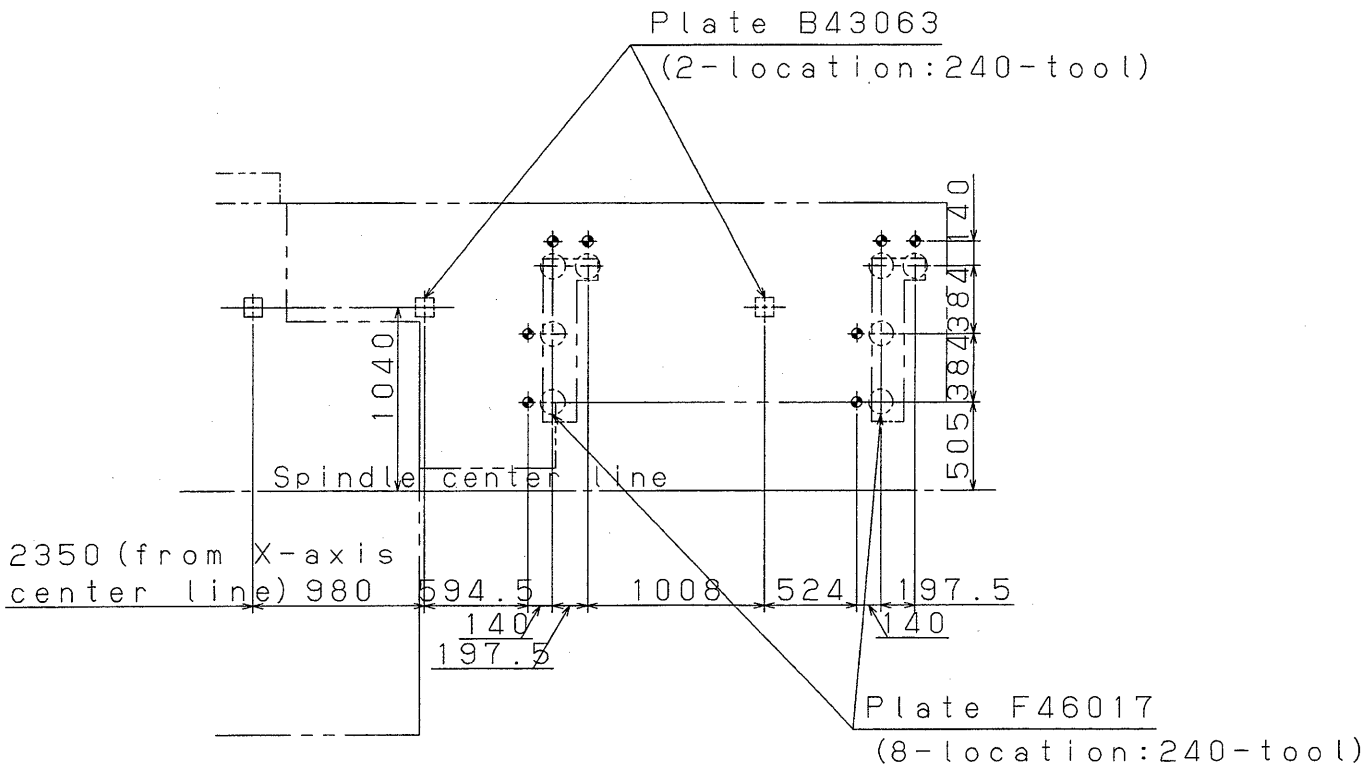
② To obtain and maintain the intended levels of accuracy and performance from the machine over a prolonged period of time, perform foundation work carefully and pay attention to machine installation. Unless foundation work is performed according to the foundation diagram, it will adversely affect the accuracy (static and dynamic) and the life of the machine.

3.1 Standard

Unit:mm



(Q51063 A09 1/4)



Magazine (240-tool spec.)

NOTE

① This drawing shows the standard foundation. Modity the concrete thickness according to ground conditions.

② Width of styrofoam: 100 mm (3.94 in.)

③ For easy supply of secondary concrete, chamfer the machine's contact point with ouside at 100 mm (3.94 in.), with concrete half-dried.

④ Applicable concrete subslab is specified as δ_{28} (strength of 28 days after application) = 20.6 MPa (2986.2 psi.)

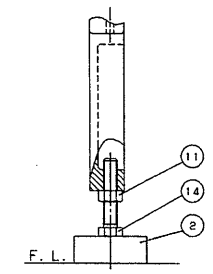
⑤ Applicable concrete is specified as δ_{28} = 20.6 MPa (2986.2 psi.)

⑥ Dig the ground at 100 mm (3.94 in.) in the outer direction of foundation outline (to fitting styrofoam of the ground.)

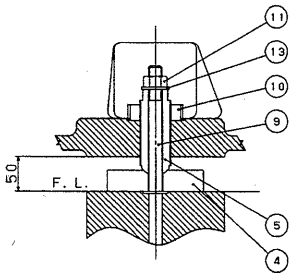
⑦ Drill the prepared hole for the anchor and place the anchor before installing the machine. Drilling after installation cannot be made.

⑧ Drill prepared hole at twelve locations marked with ⊕ . Drilling should be made referring to the detailed view and checking the drill diameter and prepared hole depth.

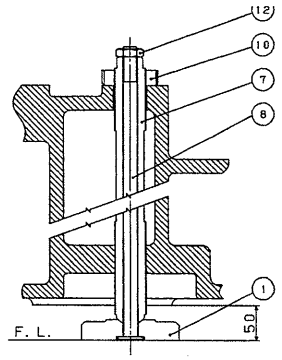
⑨ After drilling, the anchor should be placed up to the same level or slightly below the concrete upper surface.



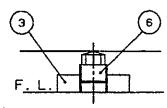
Sectional view of A-A



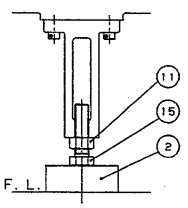
Sectional view of B-B



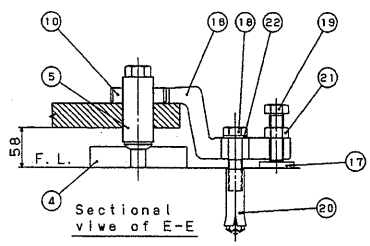
Sectional view of C-C



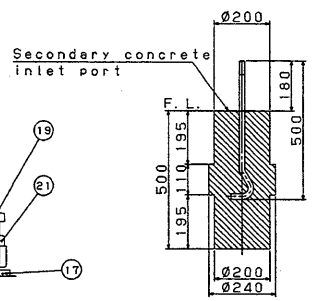
Detailed view of foundation bolt



Sectional view of D-D



Sectional viwe of E-E



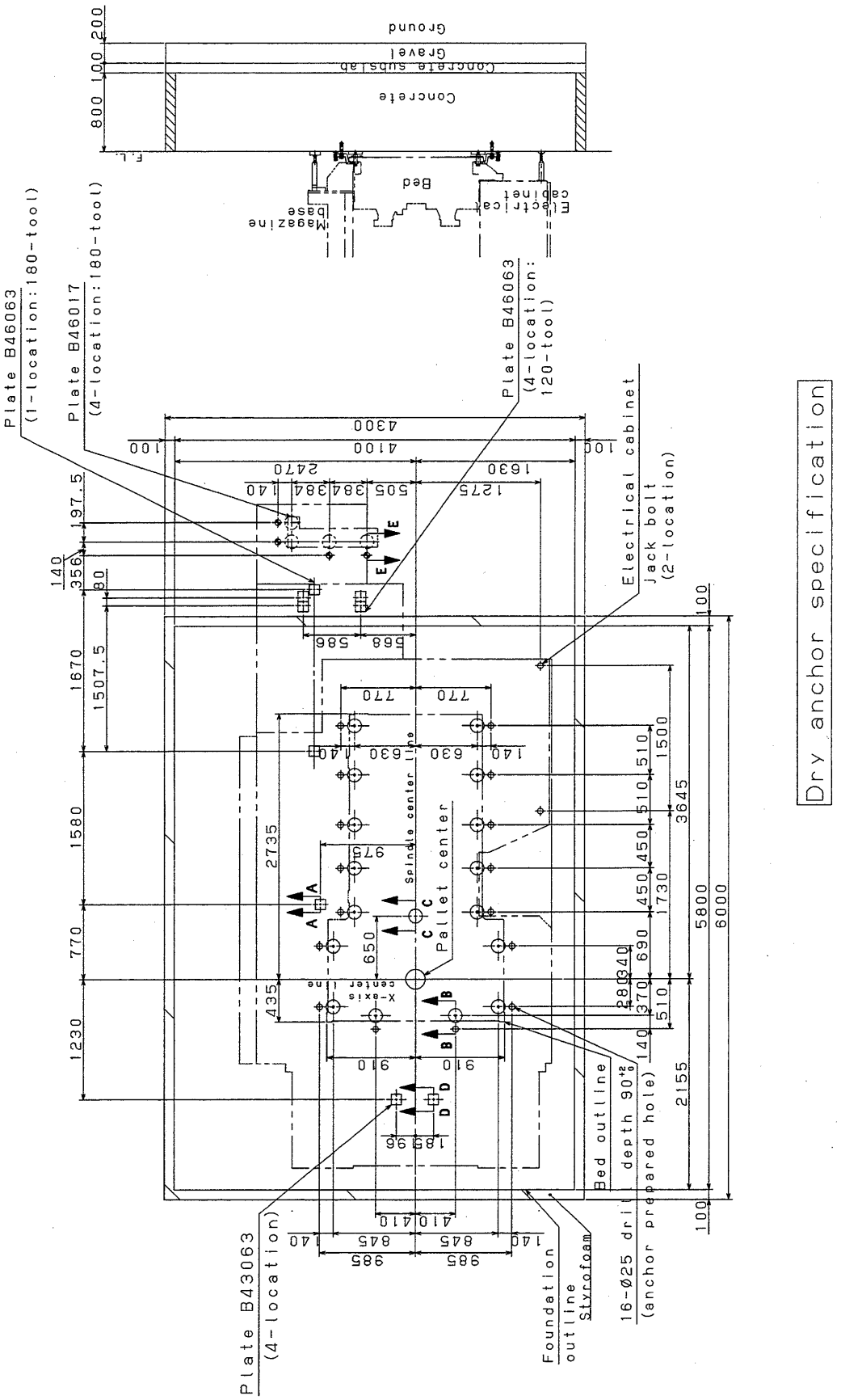
Detailed view of foundation bolt

Estimate mass and bearing				
	60-tool spec.	120-tool spec.	180-tool spec.	240-tool spec.
Machine mass	19000 kg	20900 kg	22800 kg	24700 kg
Max. workpiece mass	1500 kg	1500 kg	1500 kg	1500 kg
Foundation concrete mass	50000 kg	50000 kg	50000 kg	50000 kg
Average bearing of foundation concrete lower face	29.04 kPa {2960 kgf/m^2}	29.82 kPa {3040 kgf/m^2}	30.61 kPa {3120 kgf/m^2}	31.39 kPa {3200 kgf/m^2}
Required safety bearing power of soil	43.65 kPa {4450 kgf/m^2}	44.83 kPa {4570 kgf/m^2}	46.01 kPa {4690 kgf/m^2}	47.19 kPa {4810 kgf/m^2}

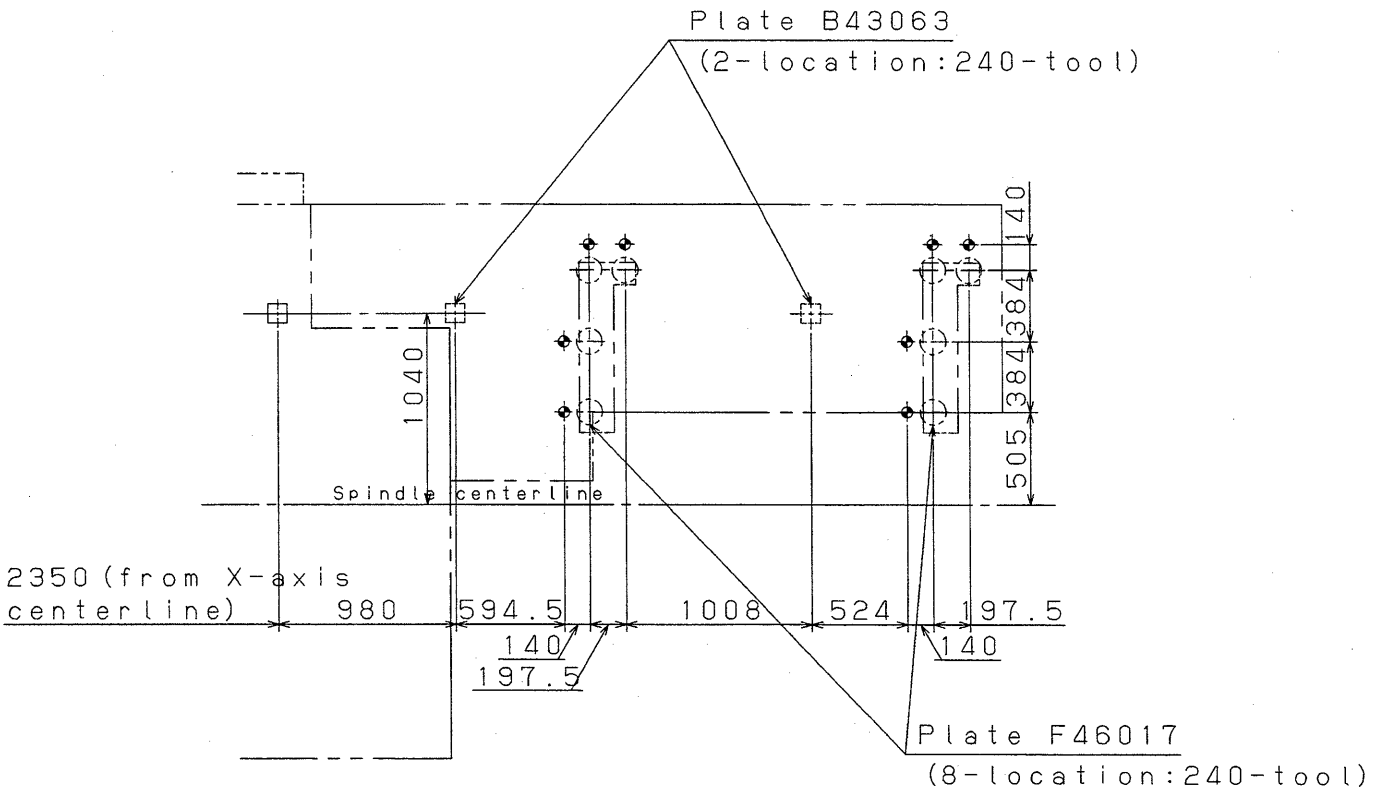
No.	Design No.	Part Name	Material	Q'ty	Q'ty	Q'ty	Q'ty	Remarks
				60-tool	120-tool	180-tool	240-tool	
1	A28018	Jack bolt plate	S45C	1	1	1	1	Standard
2	B43063	Plate	SS41	4	8	5	6	Standard
3	B45064	Temporary jack bolt plate	SS41	10	10	10	10	Standard
4	F46017	Jack bolt plate	S45C	16	16	20	24	Standard
5	N22011	Jack bolt	SCM435	16	16	20	24	Standard
6	N22015	Temporary jack bolt	SCM435	10	10	10	10	Standard
7	N22019	Jack bolt	SCM435	1	1	1	1	Standard
8	N32028	Plate mounting bar	SS41	1	1	1	1	Standard
9	N39000	Foundation bolt		16	16	16	16	Standard
10	N71021	Lock nut	S45C	17	17	21	25	Standard
11	Y60120	Nut, M20 (1 type)		20	24	21	22	Standard
12	Y60320	Nut, M20 (3 types)		1	1	1	1	Standard
13	Y70020	Washer M20		16	16	16	16	Standard
14	Y17650	Cap bolt, M20 × 105 (continuous thread)		2	6	3	4	Standard
15	Y17580	Cap bolt, M20 × 80 (continuous thread)		2	2	2	2	Standard
16	A39057	M/C fastening panel				4	8	Standard
17	B30257	Plate				4	8	Standard
18	Y17075	Cap bolt, M20 × 75				4	8	Standard
19	Y17570	Cap bolt, M20 × 70 (continuous thread)				4	8	Standard
20	Y49402	Fork cut anchor #20CA	(Construction fastener)			4	8	Standard
21	Y60120	Washer M20 (1 type)				4	8	Standard
22	Y70020	Washer M20				4	8	Standard

3.2 Dry Anchor Specification

Unit:mm



(Q51063 A09 2/4)



Magazine (240-tool)

NOTE

① This drawing shows the standard foundation. Modity the concrete thickness according to ground conditions.

② To determine the installation portion, refer to installation diagram.

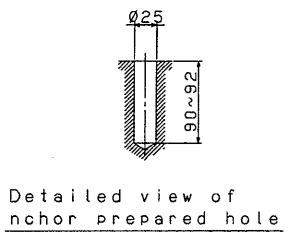
③ Drill the prepared hole for the anchor and place the anchor before installing the machine. Drilling after installation cannot be made.

④ Drill prepared hole at fourteen locations marked with ⊕ . Drilling should be made referring to the detailed view and checking the drill diameter and prepared hole depth.

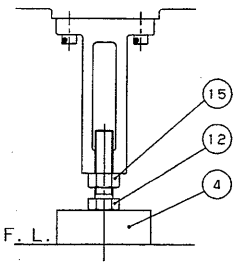
⑤ After drilling, the anchor should be placed up to the same level or slightly below the concrete upper surface.

⑥ Refer to alternative foundation diagram for the pallet pool specifications.

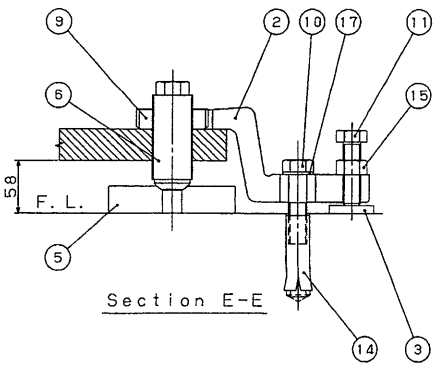
⑦ Applicable concrete specified is specified as δ_{28} (strength of 28days after application)= 20.6 MPa (2986.2 psi.)



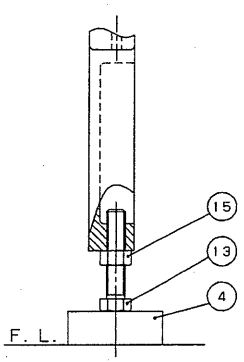
Detailed view of nchor prepared hole



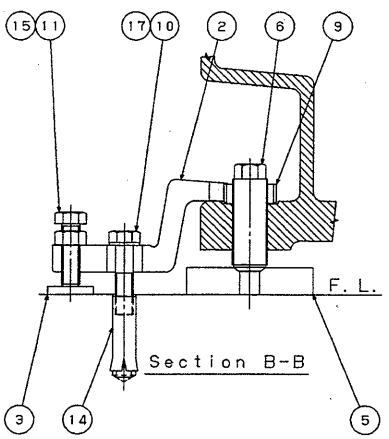
Section D-D



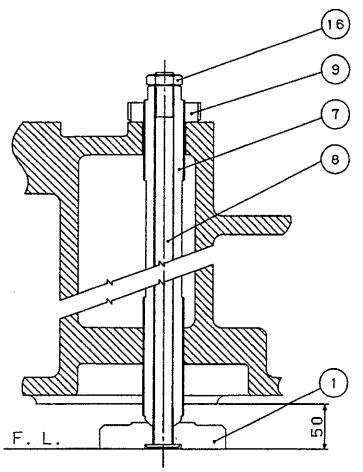
Section E-E



Section A-A



Section B-B



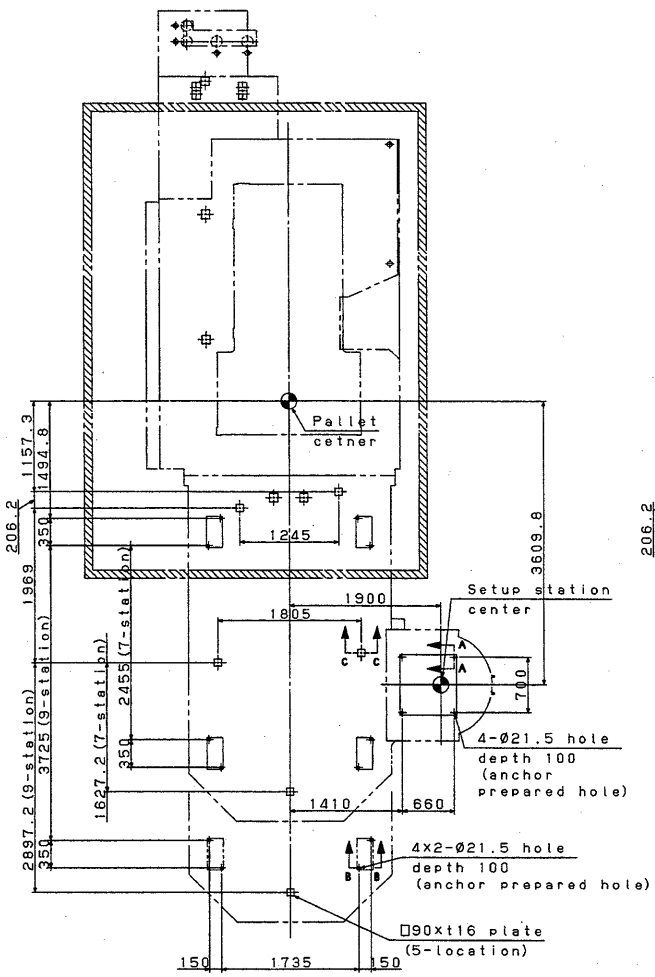
Section C-C

Estimate mass and bearing				
	60-tool spec.	120-tool spec.	180-tool spec.	240-tool spec.
Machine mass	19000 kg	20900 kg	22800 kg	24700 kg
Max. workpiece mass	1500 kg	1500 kg	1500 kg	1500 kg
Foundation concrete mass	50000 kg	50000 kg	50000 kg	50000 kg
Average bearing of foundation concrete lower face	29.04 kPa {2960 kgf/m^2}	29.82 kPa {3040 kgf/m^2}	30.61 kPa {3120 kgf/m^2}	31.39 kPa {3200 kgf/m^2}
Required safety bearing power of soil	43.65 kPa {4450 kgf/m^2}	44.83 kPa {4570 kgf/m^2}	46.01 kPa {4690 kgf/m^2}	47.19 kPa {4810 kgf/m^2}

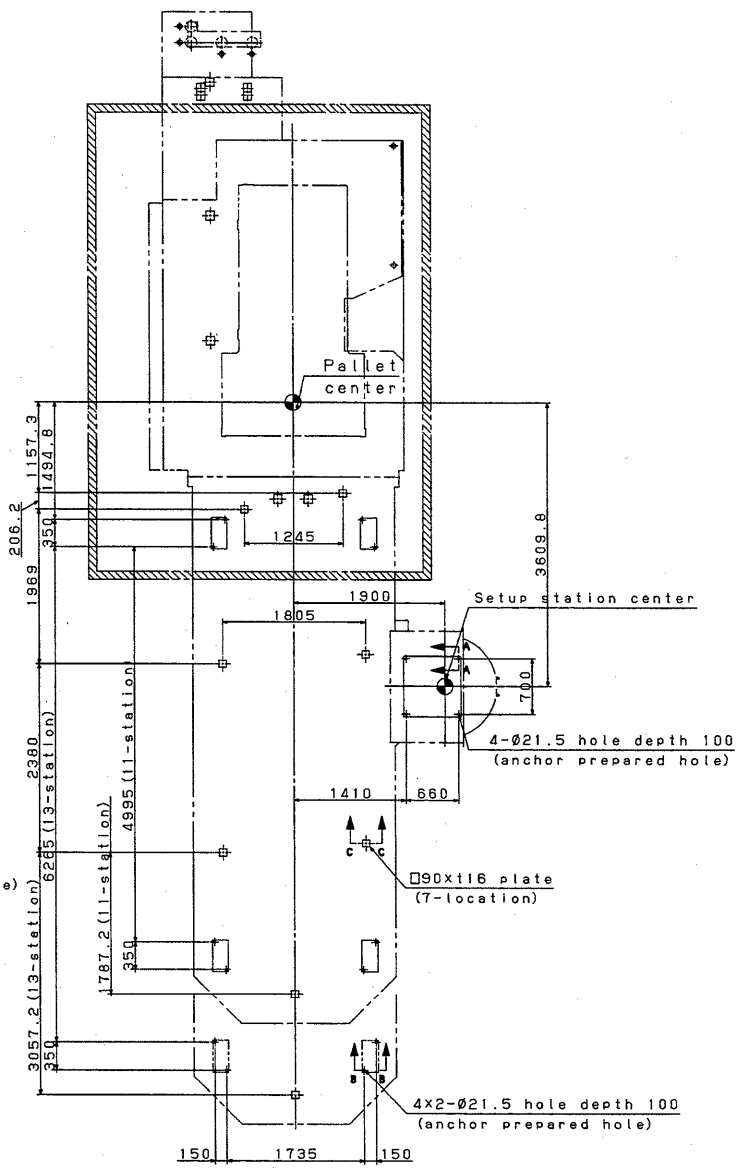
No.	Design No.	Part Name	Material	Q'ty 60-tool	Q'ty 120-tool	Q'ty 180-tool	Q'ty 240-tool	Remarks
1	A28018	Jack bolt plate	S45C	1	1	1	1	Standard
2	A39057	M/C fastening panel	FCD60	16	16	20	24	Standard
3	B30257	Plate	SS41	16	16	20	24	Standard
4	B43063	Plate	SS41	4	8	5	6	Standard
5	F46017	Jack bolt plate	S45C	16	16	20	24	Standard
6	N22011	Jack bolt	SCM435	16	16	20	24	Standard
7	N22019	Jack bolt	SCM435	1	1	1	1	Standard
8	N32028	Plate mounting bar	SS41	1	1	1	1	Standard
9	N71021	Lock nut	S45C	17	17	21	25	Standard
10	Y17075	Cap bolt, M20 × 75		16	16	20	24	Standard
11	Y17570	Cap bolt, M20 × 70 (continuous thread)		16	16	20	24	Standard
12	Y17580	Cap bolt, M20 × 80 (continuous thread)		2	2	2	2	Standard
13	Y17650	Cap bolt, M20 × 105 (continuous thread)		2	6	3	4	Standard
14	Y49402	Fork cut anchor #20CA	(Construction fastener)	16	16	20	24	Standard
15	Y60120	Nut, M20 (1 type)		20	24	25	30	Standard
16	Y60320	Nut, M20 (3 types)		1	1	1	1	Standard
17	Y70020	Washer M20		16	16	20	24	Standard

3.3 Pallet Pool (Tsudakoma) Specification

Unit:mm



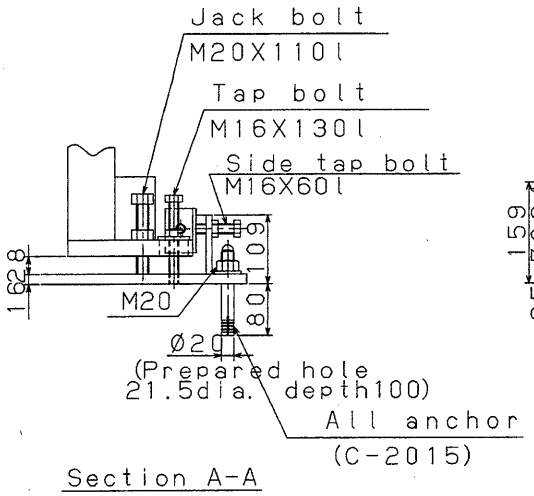
7/9-station pallet pool specification
(TSUDAKOMA)



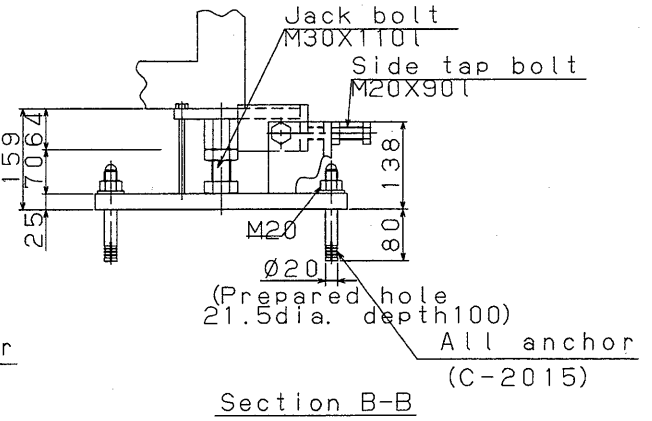
11/13-station pallet pool specification
(TSUDAKOMA)

(Q51063 A09 3/4)

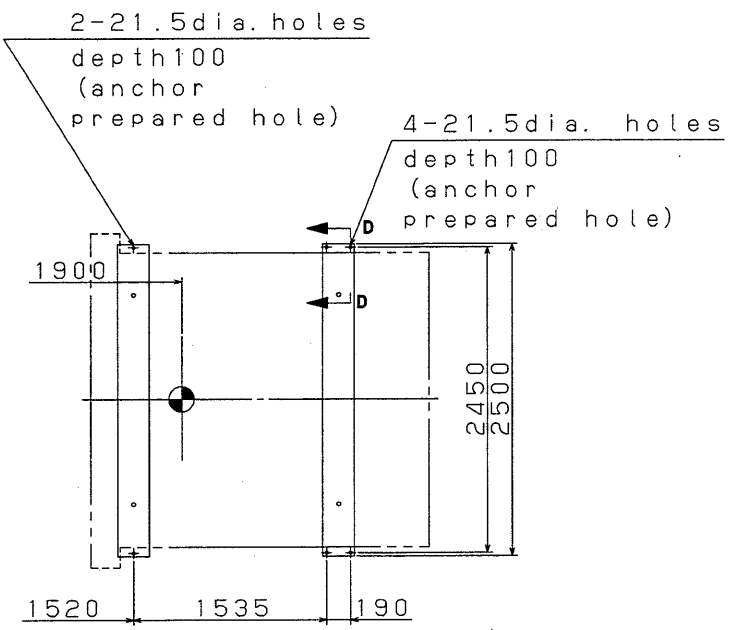
NOTE Use the dry anchor only in the pallet pool.



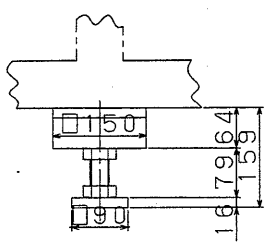
Section A-A



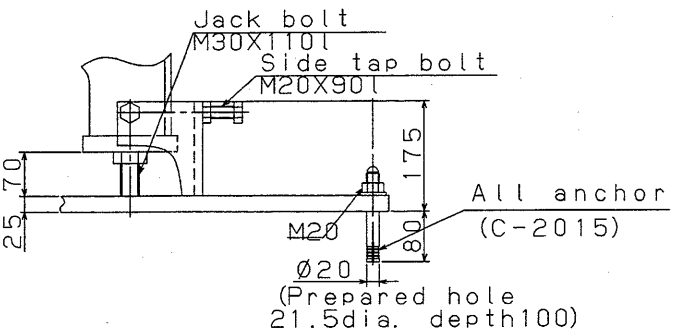
Section B-B



Tilting type



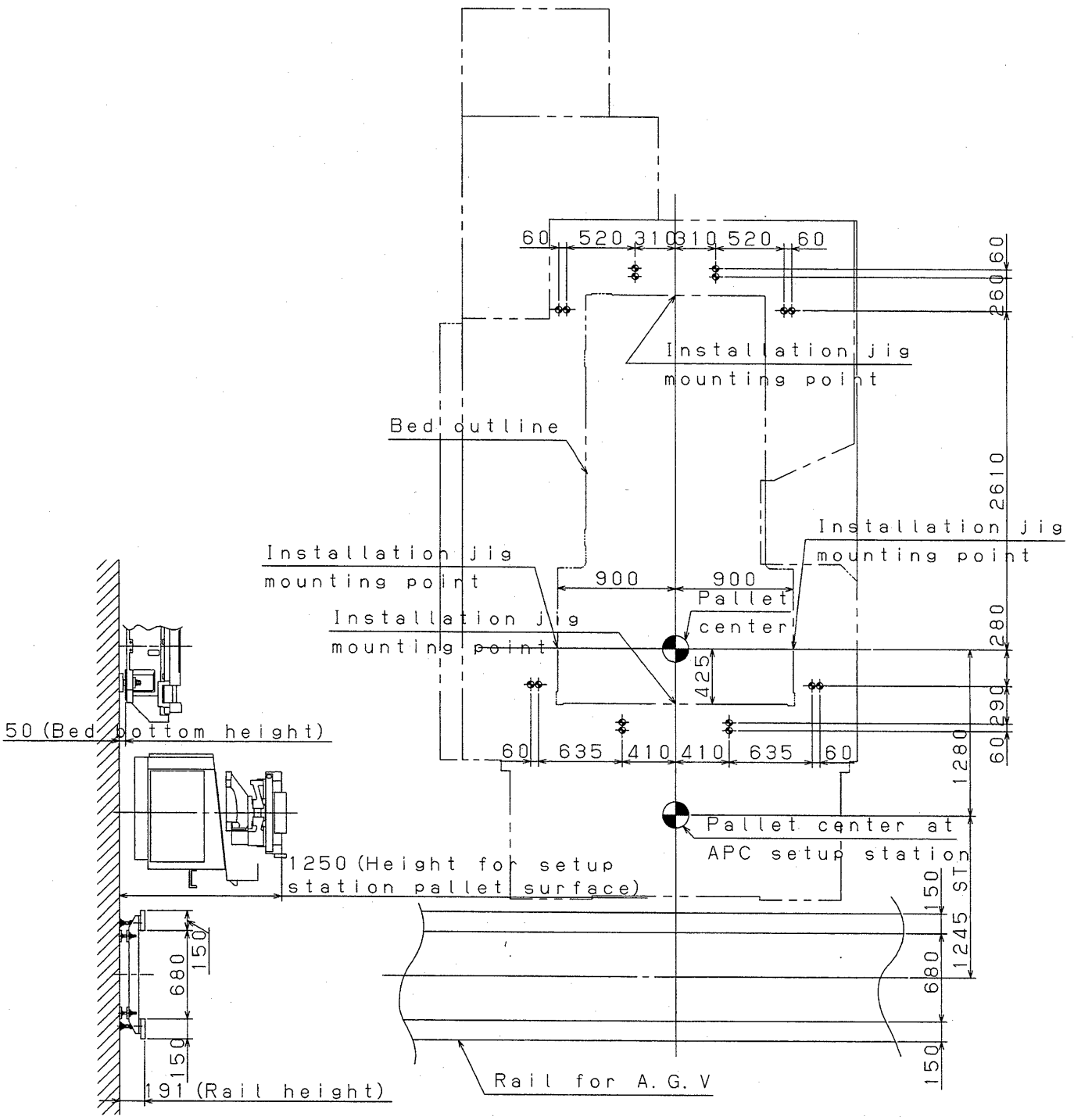
Seciton C-C



Section D-D

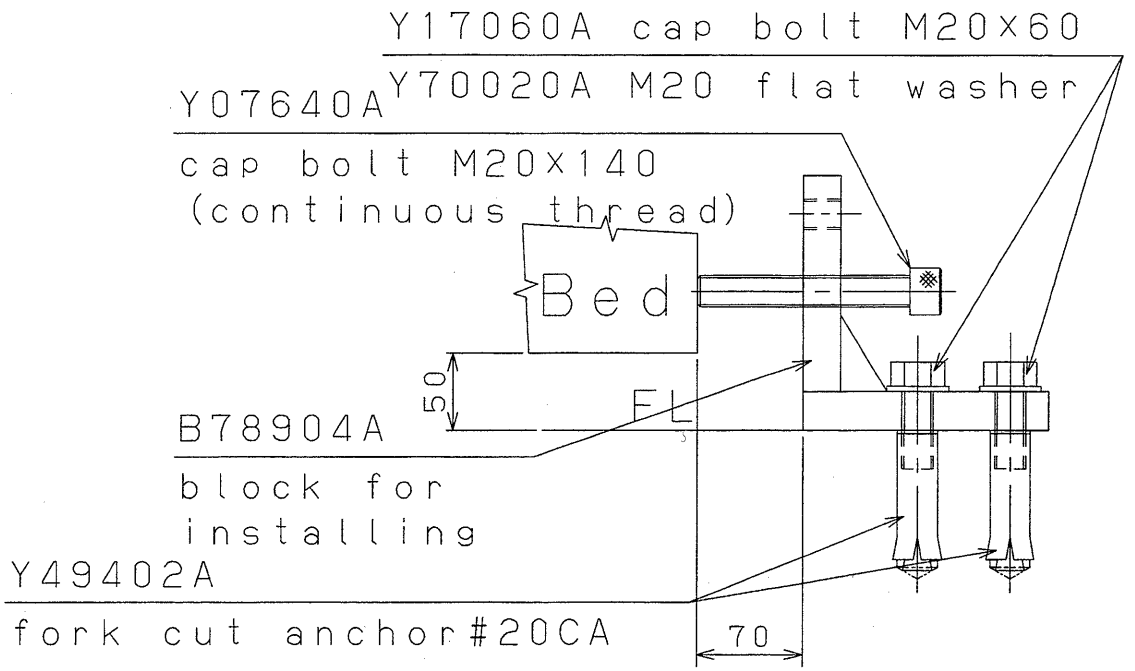
3.4 Linear Pallet Pool Specification

Unit:mm

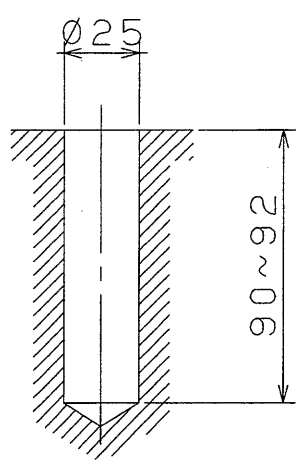


Linear pallet pool specification

(Q51063 A09 4/4)



Detail of installation jig



Detail of anchor prepared hole

NOTE

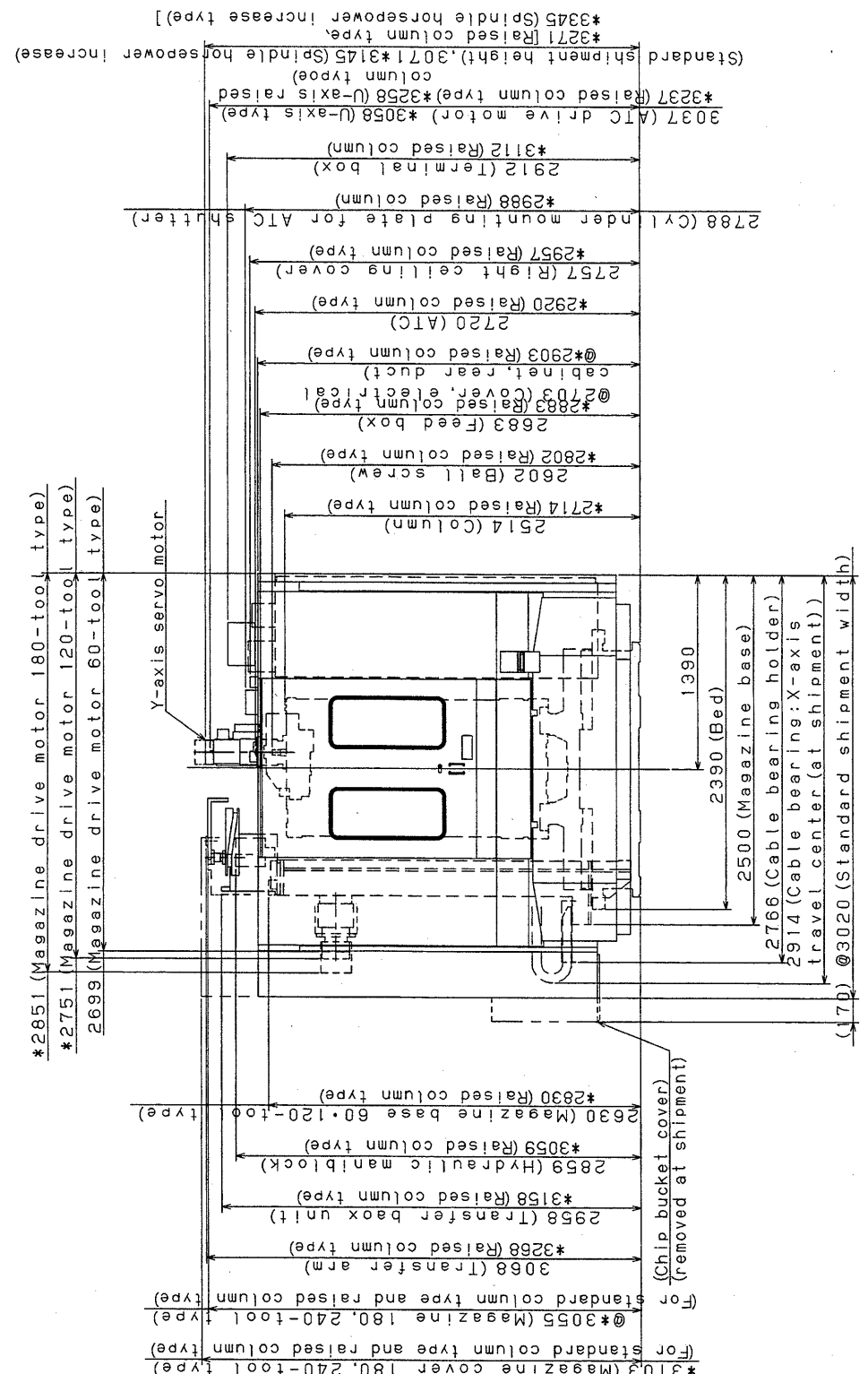
① Drill prepared hole for the anchor and place the anchor before installing the machine. Drilling after installation cannot be made.

② Drill prepared hole at sixteen locations marked with ⊕.
Drilling should be made referring to the detailed view and checking the drill diameter and prepared hole depth.

③ After drilling, the anchor should be placed up to the same level or slightly below the concrete upper surface.

4. DISASSEMBLY DIAGRAM

Unit:mm



NOTE

① Dimensions marked with " * " indicate option.

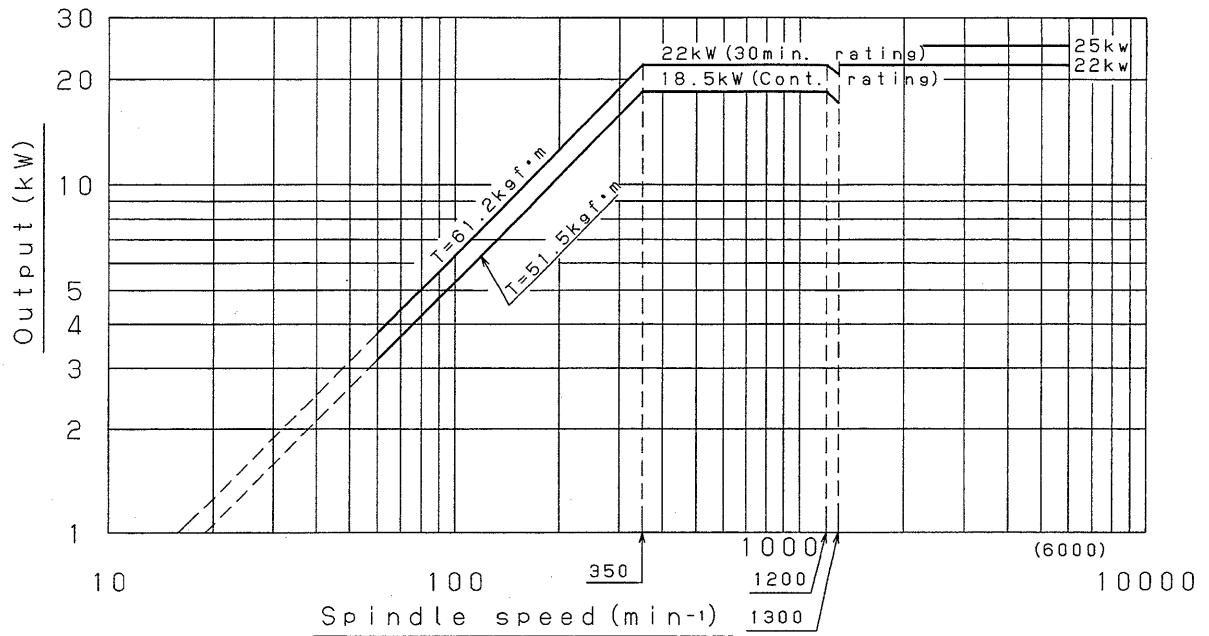
② Disassembling the machine into the units smaller than @ marked dimensions is impossible.

③ When removing transfer box and ATC, use taper pin or others to determine positions for reassembling.

(Q51863 A07)

5. SPINDLE SPEED OUTPUT DIAGRAMS

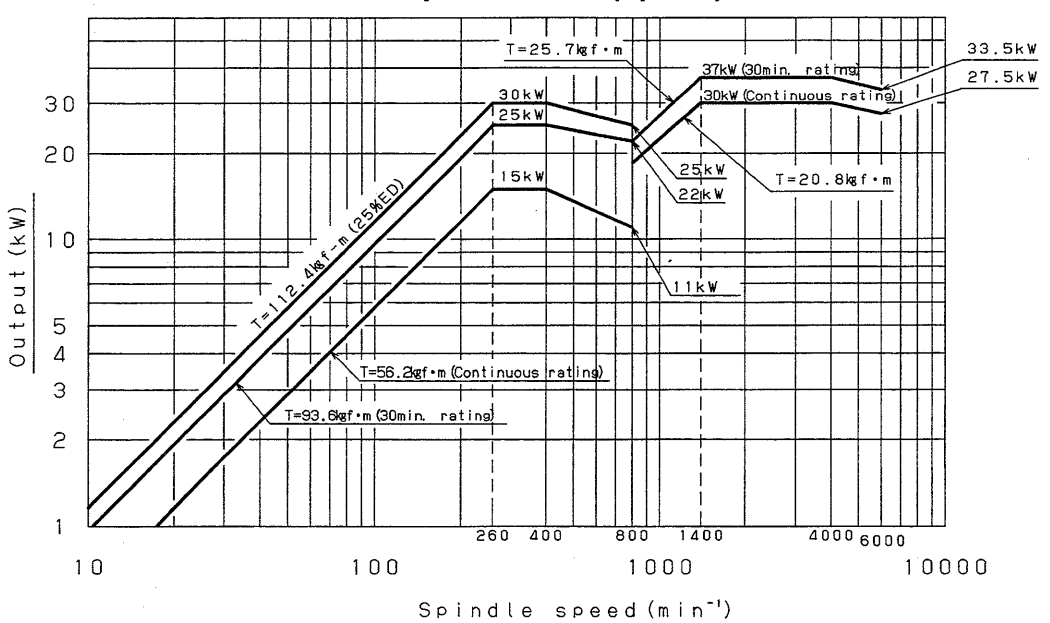
5.1 AC 25/22 kW 6000min^{-1} Specification (standard)



Motor specifications	
Output	25/22kW (33.5/30 HP)
Time rate	30 min/continuous
Spindle speed	max. 6000 min^{-1}
Manufacturer	FANUC

(Q43541 B01)

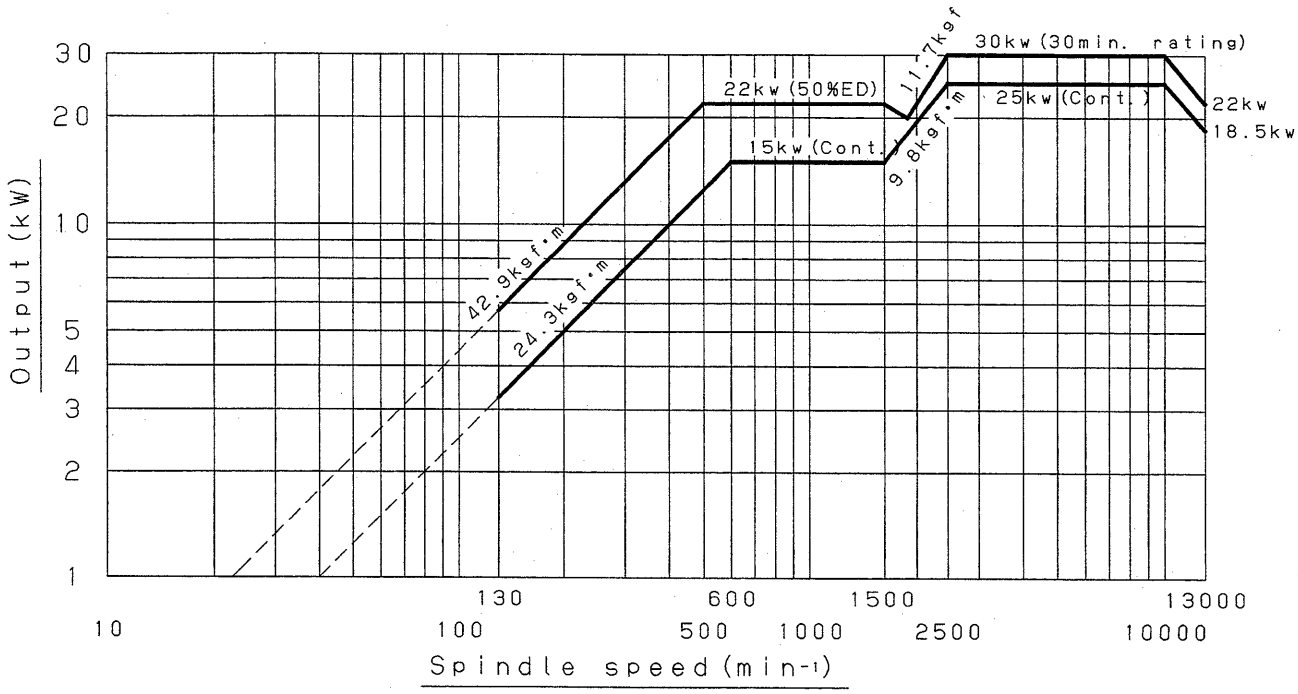
5.2 AC 37/30 kW 6000min^{-1} Specification (option)



Motor specifications	
Output	37/30 kW (50/40 HP)
Time rate	30 min/continuous
Spindle speed	max. 6000 min^{-1}
Manufacturer	FANUC

(Q43586 B02)

5.3 AC 30/25 kW 13000min^{-1} Specification (option)



Motor specifications	
Output	30/25 kW (40/33.5 HP)
Time rate	30 min/continuous
Spindle speed	max. 13000 min^{-1}
Manufacturer	FANUC

(Q43587 A04)

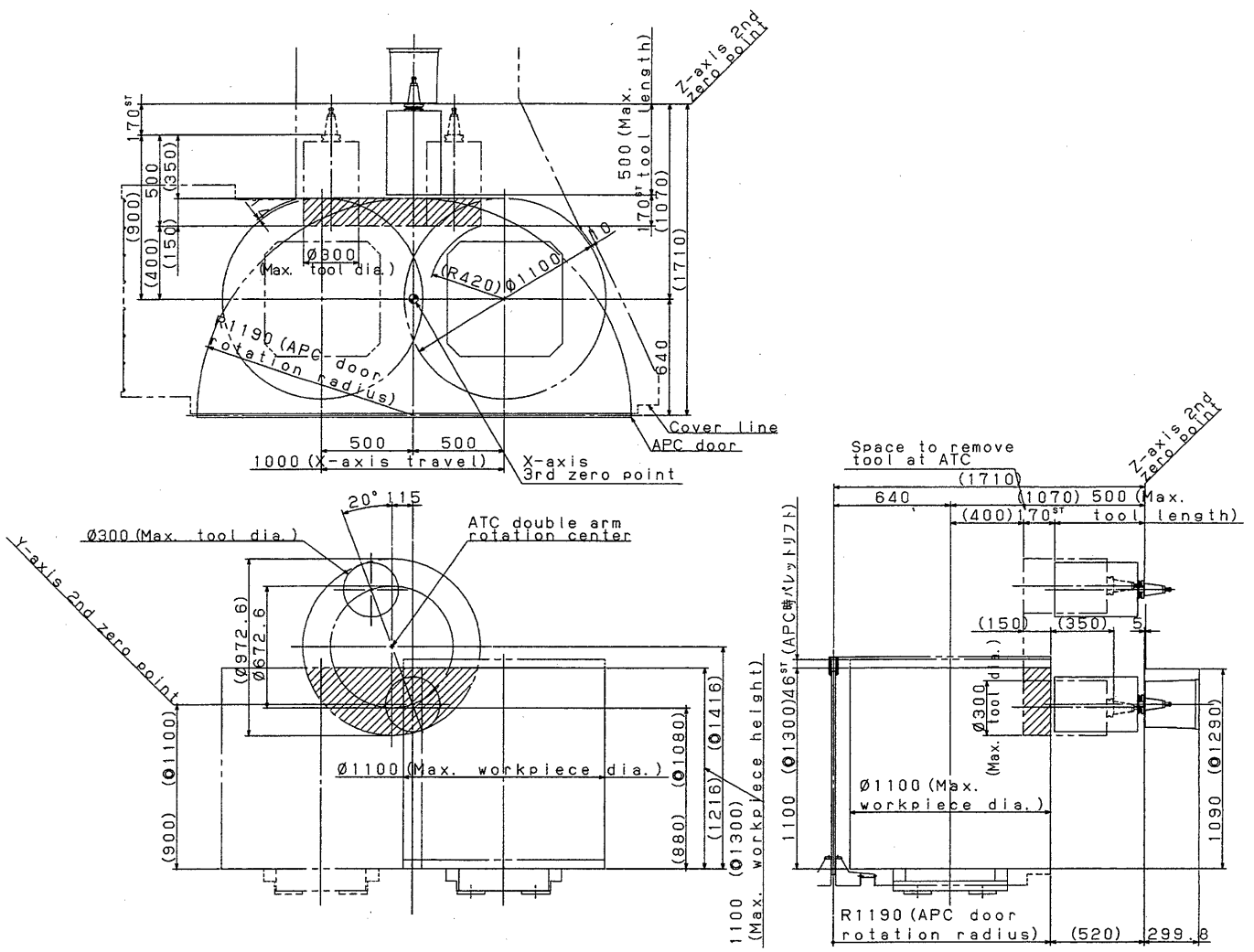
6. INTERFERENCE BETWEEN TOOL AND WORKPIECE

CAUTION

① When ATC is operating tools and workpieces may interfere even if they are within the dimension limits.
Interference range depends on X-axis coordinates.

② ATC and APC cannot operate simultaneously.

Unit:mm



NOTE

① Dimensions in brackets [ ] are only for reference.

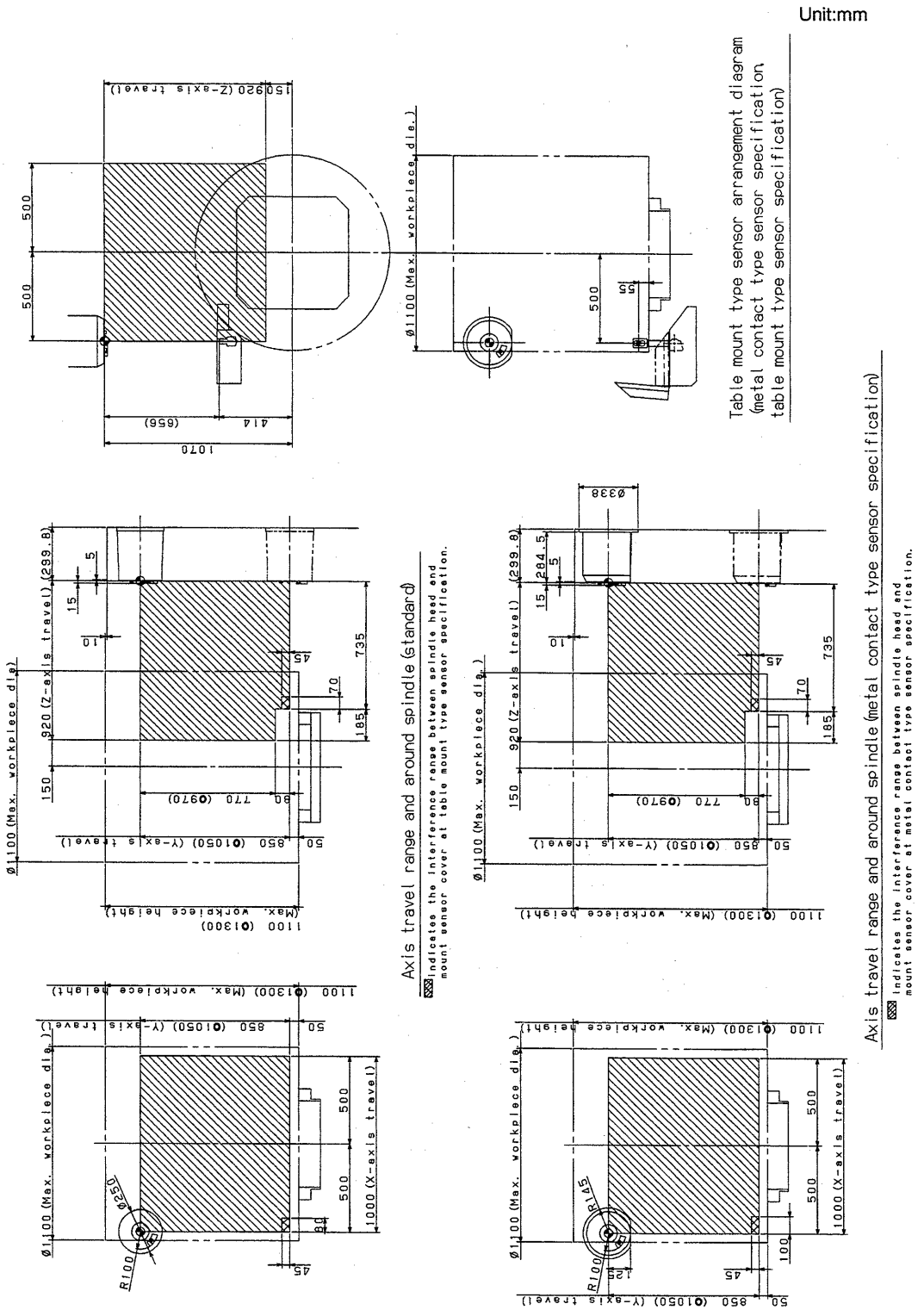
② The Z-axis 2nd zero point is APC and ATC operation position.
The Y-axis 2nd zero point is ATC operation position.
The X-axis 3rd zero point is APC operation position.

③ ◎ indicates the length of raised column specifications.

(Q53044 A02)

7. AXIS TRAVEL DIAGRAM

Unit:mm



NOTE

① Drawing indicates machine travel range. Takes into consideration spindle head and pallet interference at B-axis zero point. Interference with edge locator, etc. is not included.

② ◒ indicates machine zero point.

③ ◎ indicates the length for raised column specifications.

(Q52515 A05)

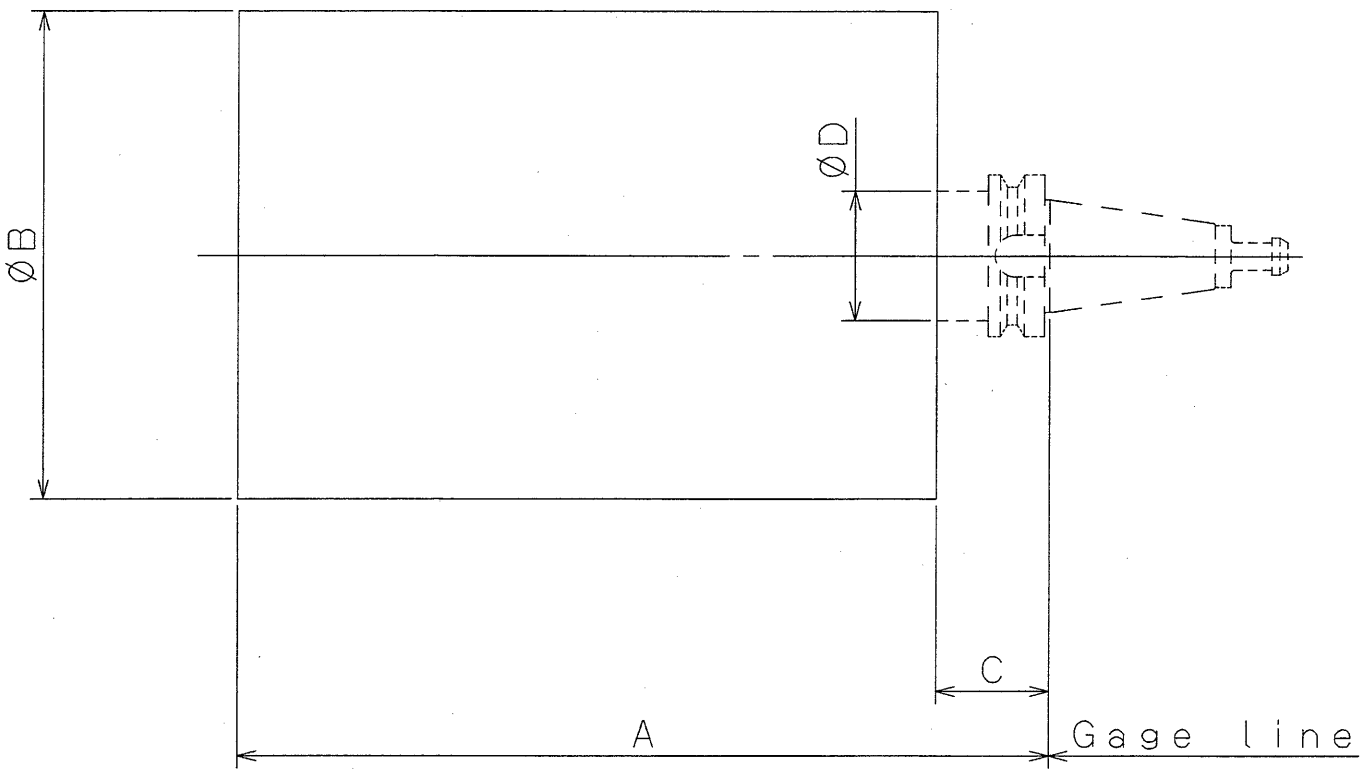
8. TOOL RESTRICTIONS

CAUTION

The dimension and mass of the tools used with the MH-63 are restricted by the tool magazine's capacity. Only use tools within the specified ranges.

8.1 Standard

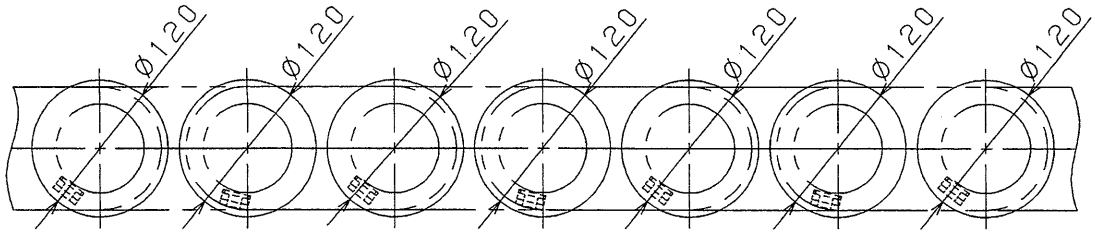
Unit:mm



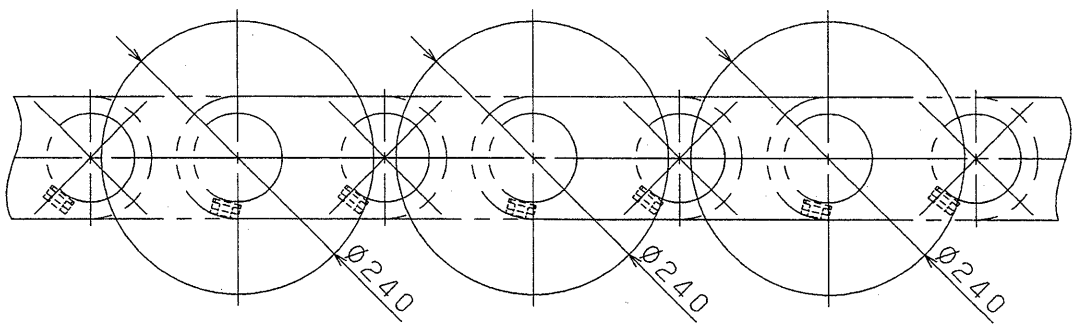
Tool restrictions				
		MAS	CAT	DIN
A: Max. tool length	mm (in.)	500 (19.68)		
B: Max. tool dia.	mm (in.)	300 (11.81)		
C: Tool restriction	mm (in.)	38 (1.49)	34.925 (1 3/8)	35 (1.37)
D: Tool restriction	mm (in.)	100 (3.93)	69.85 (2 3/4)	80 (3.14)
Max. tool mass	kg (lb.)	30 (66)		
Maximum moment (form gage line)	N·m (ft·lbf)	29.4 (21.70) {3000 kgf/mm}		

(Q53047 A08 1/6)

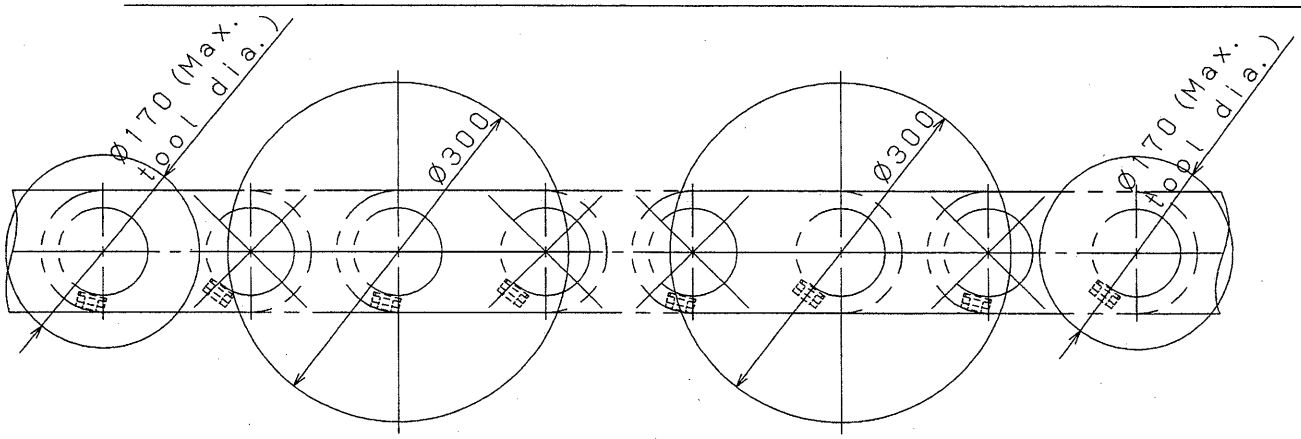
1. With adjacent tools (Max. tool dia. 120)



2. Without two adjacent tools (one tool on both sides) (Max. tool dia. 240 to 300.)



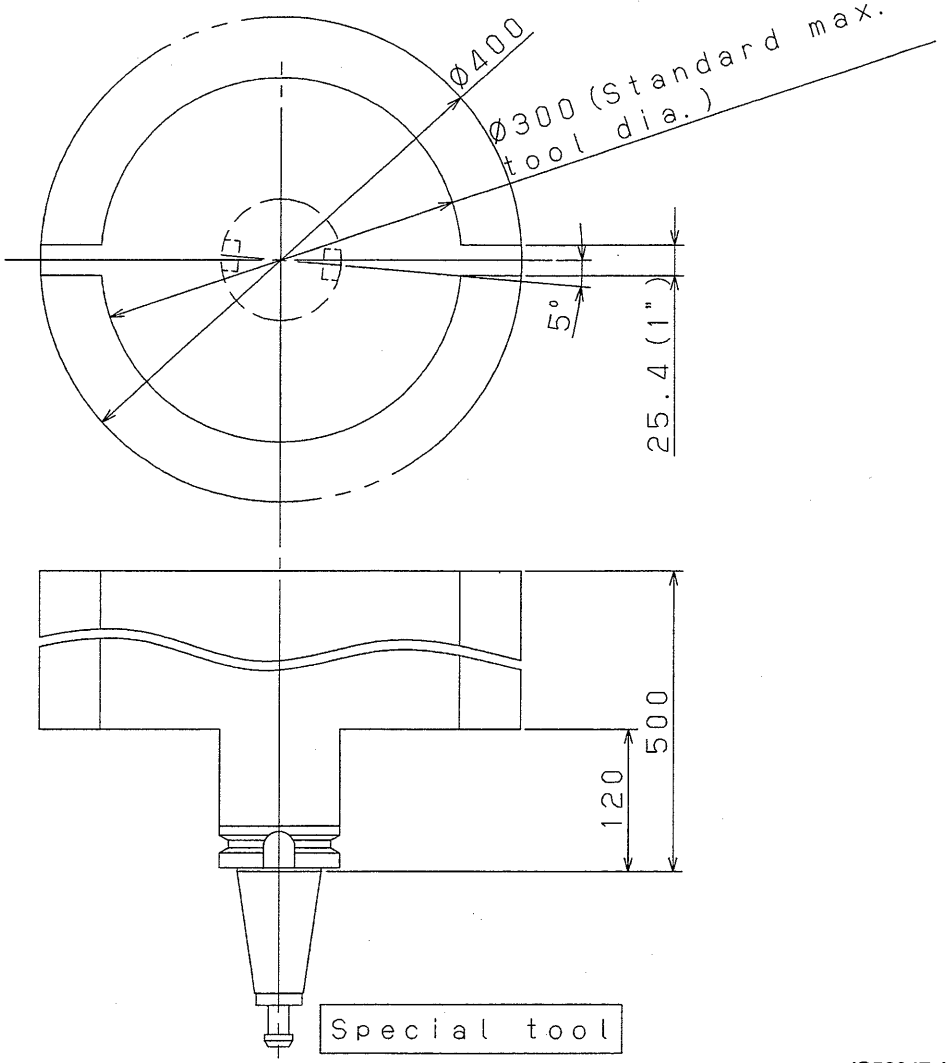
3. Without four adjacent tools (two tools on both sides) (Max. tool dia. 240 to 300)



NOTE Portions marked × can not be used because they interfere at the curve.

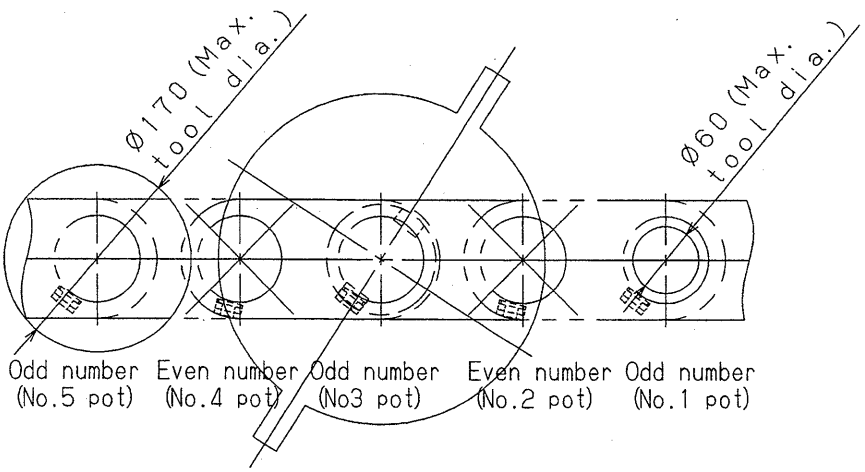
8.2 Special tool(60-tool type)

Unit:mm

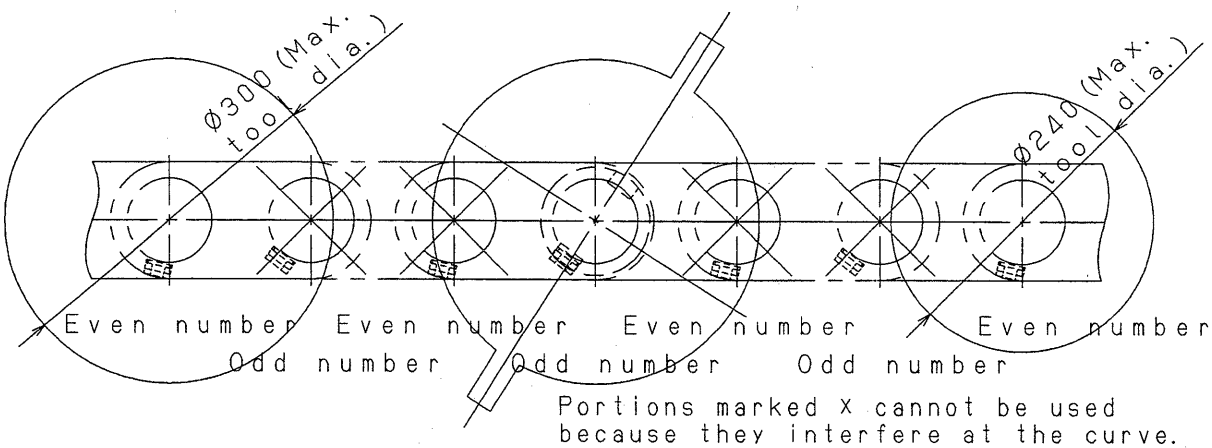


(Q53047 A08 2/6)

Without two adjacent tools (one tool on both sides) (max. tool dia. 60, 170)



Without four adjacent tools (two tools on both sides) (max. tool dia. 240)



CAUTION

When the special tools mentioned above are used, tools which can be mounted in the magazine are limited as follows:

① The special tools can be mounted only in odd-numbered pots (because it is good for the angle of the positioning key).

② When two or more special tools are mounted in the 60-tool magazine, at least 3 pots should be emptied between the special tools. The 16th pot from the special tool pot should be emptied. If a tool is mounted in the 16th pot, it may interfere.

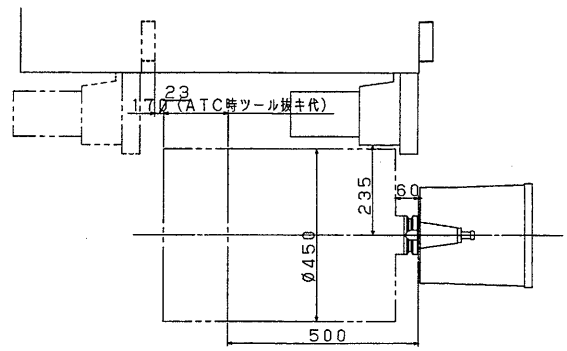
③ Special tools with standard maximum diameter of 300 mm (11.81 in.) can be mounted in the 60-tool magazine if 3 pots are empty.

④ Special tools (1) [single blade, radius 245 mm (9.64 in.)] cannot be mounted in the 120-tool magazine. (The magazine should be modified to the 56-tool type.)

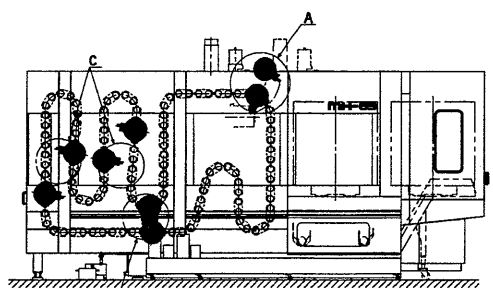
⑤ The maximum moment of the tool should be 29.4 N·m (21.70 ft·lbf) or less.

8.3 Special tool(120-tool type)

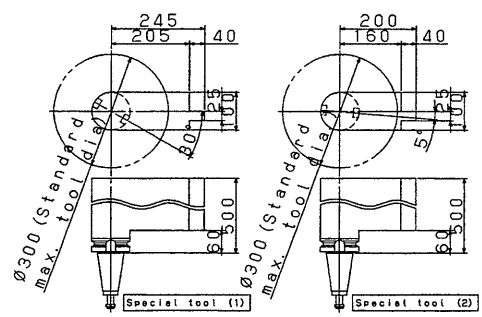
Unit:mm



Spindle right side view



Left side view of special tool mounting direction for 120-too type (standard column)



CAUTION

When the special tools mentioned above are used, tools which can be mounted in the magazine are limited as follows:

① The special tools can be mounted only in odd-numbered pots. (because it is good for the angle of the positioning key)

② The special tool (1) can be mounted in 3 pots or less of the 120-tool magazine, in 5 pots or less of the magazine for the raised column type machine. The tool limits are shown in table 1.

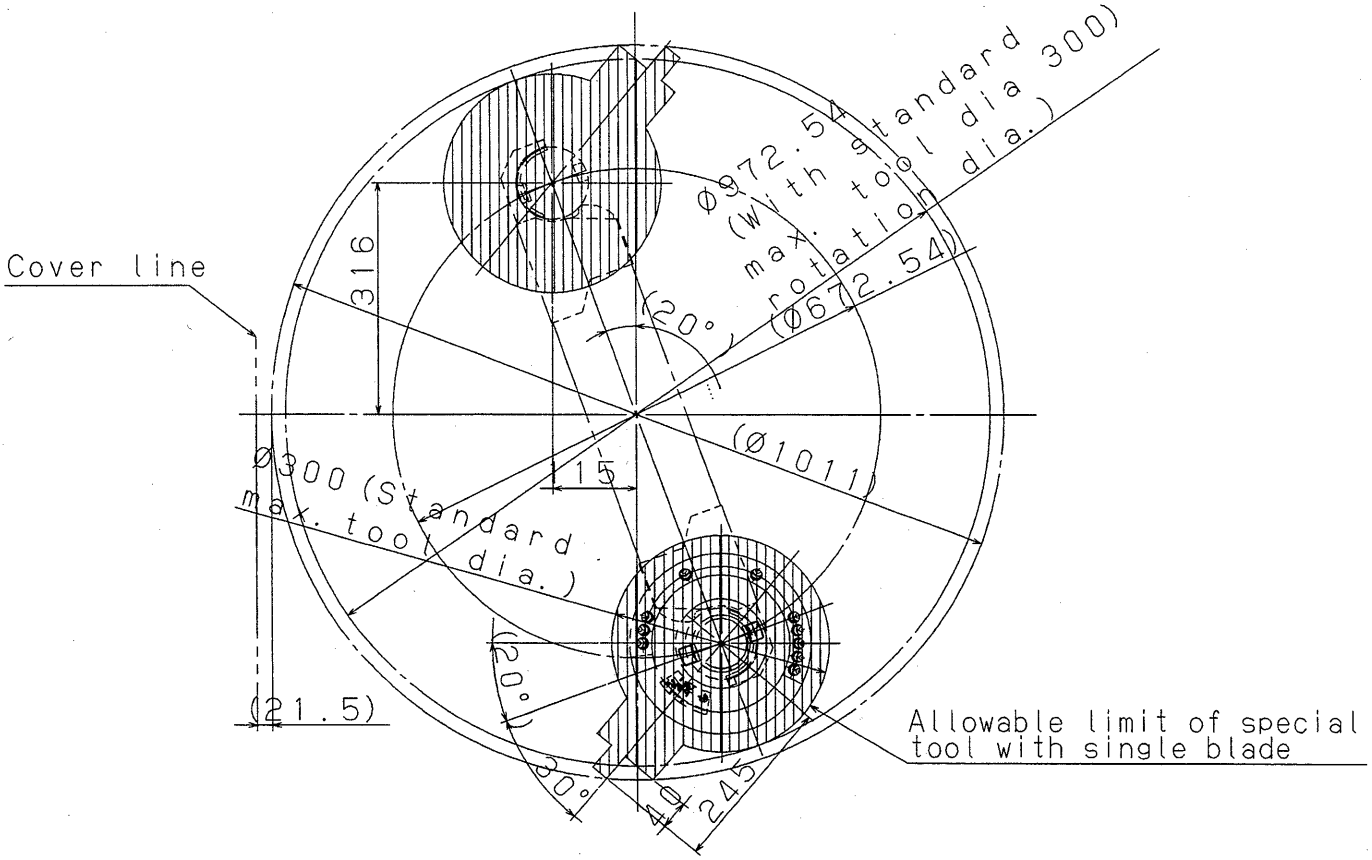
③ The special tool (2) can be mounted in 14 pots or less of the 120-tool magazine, in 30 pots or less of the magazine for the raised column type machine. The tool limits are shown in table 2.

④ When more than one special tool is used and the tool limits in the table overlap, select the one with the smaller limit.
ex.) When the special tool (1) is mounted in No.1 pot or the special tool (2) is mounted in No. 5 pot, select the 120 dia. or less tool in the pots from No. 61 to No. 64.

⑤ The maximum moment of the tool should be 29.4 N·m (21.70 ft·lbf) or less.

⑥ The tool cannot be mounted in the 60-tool magazine.

⑦ The tool cannot be used for machine No. 505 (CN92090417).



Spindle front view
(spindle orientation position)

CAUTION

If an irregularly shaped tool is used, the following restrictions apply to prevent interference with the ceiling shutter.

① When the Y-axis is at the zero point, the allowable max. tool turning diameter that does not cause tool interference with the ceiling shutter is 450 mm (17.72 in.)(see " spindle right side view " .) To use a tool exceeding this limit, move the Y-axis to a position where interference does not occur when the tool is rotated before starting the spindle.

② Before carrying out an ATC cycle, complete spindle orientation at a position where interference does not occur. Then, move the Y-axis to the zero point and carry out the ATC cycle.

NOTE Dimensions in brackets ( ) are only for reference.

Standard column magazine

[Table 1] Tool limits and pot numbers when special tools (1) are mounted in magazine

Special tool pot No. / Tool limits	1	39	77	Remarks
Tool not mounted	2, 120	38, 40	76, 78	Interference occurs when carrier arm swings with tool (A part).
Ø100 tool or larger not mounted	119	37	75	Interference occurs when carrier arm swings with tool (A part).
Ø120 tool or larger not mounted	55-68	93-106	11-24	Interference occurs at B part.
Ø200 tool or larger not mounted	11-24, 99-113, 118	17-31, 36, 49-62	55-69, 74, 87-100	Interference occurs at C part and when drum bends.

[Table 2] Tool limits and pot numbers when special tools (2) are mounted in magazine

Special tool pot No. / Tool limits	1	5	9	13	17	21	25	Remarks
Tool not mounted	2, 120	4, 6	8, 10	12, 14	16, 18	20, 22	24, 26	Interference occurs when carrier arm swings with tool (A part).
Ø140 tool or larger not mounted	3, 119	3, 7	7, 11	11, 15	15, 19	19, 23	23, 27	Interference occurs at A part and when drum bends.
Ø260 tool or larger not mounted	4, 57-60, 63-65	8, 61-64, 67-69	12, 65-68, 71-73	16, 69-72, 75-77	20, 73-76, 79-81	24, 77-80, 83-85	28, 81-84, 87-89	Interference occurs at B part and when drum bends.

Special tool pot No. / Tool limits	29	33	37	41	45	49	53	Remarks
Tool not mounted	28, 30	32, 34	36, 38	40, 42	44, 46	48, 50	52, 54	Interference occurs when carrier arm swings with tool (A part).
Ø140 tool or larger not mounted	27, 31	31, 35	35, 39	39, 43	43, 47	47, 51	51, 55	Interference occurs at A part and when drum bends.
Ø260 tool or larger not mounted	32, 85-88, 91-93	36, 89-92, 95-97	40, 83-96, 99-101	44, 87-100, 103-105	48, 91-104, 107-109	52, 95-108, 111-113	56, 99-112, 115-117	Interference occurs at B part and when drum bends.

Raised column magazine

[Table 1] Tool limits and pot numbers when special tools (1) are mounted in magazine

Special tool pot No. / Tool limits	1	25	49	Remarks
Tool not mounted	2, 120	24, 26	48, 50	Interference occurs when carrier arm swings with tool (A part).
Ø100 tool or larger not mounted	119	23	47	Interference occurs when carrier arm swings with tool (A part).
Ø200 tool or larger not mounted	10-22, 99-114, 118	3-18, 22, 34-46	27-42, 46, 58-70	Interference occurs at C part and when drum bends.

Special tool pot No. / Tool limits	75	99		Remarks
Tool not mounted	74, 76	98, 100		Interference occurs when carrier arm swings with tool (A part).
Ø100 tool or larger not mounted	73	97		Interference occurs when carrier arm swings with tool (A part).
Ø200 tool or larger not mounted	53-68, 72, 84-96	77-92, 96, 108-120		Interference occurs at C part and when drum bends.

[Table 2] Tool limits and pot numbers when special tools (2) are mounted in magazine

Special tool pot No. / Tool limits	1	5	9	13	17	21	25	Remarks
Tool not mounted	2, 120	4, 6	8, 10	12, 14	16, 18	20, 22	24, 26	Interference occurs when carrier arm swings with tool (A part).
Ø140 tool or larger not mounted	3, 119	3, 7	7, 11	11, 15	15, 19	19, 23	23, 27	Interference occurs at A part and when drum bends.
Ø260 tool or larger not mounted	4	8	12	16	20	24	28	When drum bends.

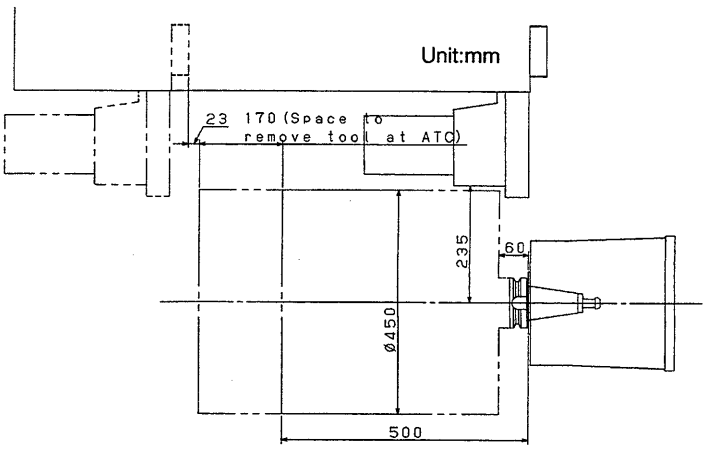
Special tool pot No. / Tool limits	29	33	37	41	45	49	53	Remarks
Tool not mounted	28, 30	32, 34	36, 38	40, 42	44, 46	48, 50	52, 54	Interference occurs when carrier arm swings with tool (A part).
Ø140 tool or larger not mounted	27, 31	31, 35	35, 39	39, 43	43, 47	47, 51	51, 55	Interference occurs at A part and when drum bends.
Ø260 tool or larger not mounted	32	36	40	44	48	52	56	When drum bends.

Special tool pot No. / Tool limits	57	61	65	69	73	77	81	Remarks
Tool not mounted	56, 58	60, 62	64, 66	68, 70	72, 74	76, 78	80, 82	Interference occurs when carrier arm swings with tool (A part).
Ø140 tool or larger not mounted	55, 59	59, 63	63, 67	67, 71	71, 75	75, 79	79, 83	Interference occurs at A part and when drum bends.
Ø260 tool or larger not mounted	60	64	68	72	76	80	84	When drum bends.

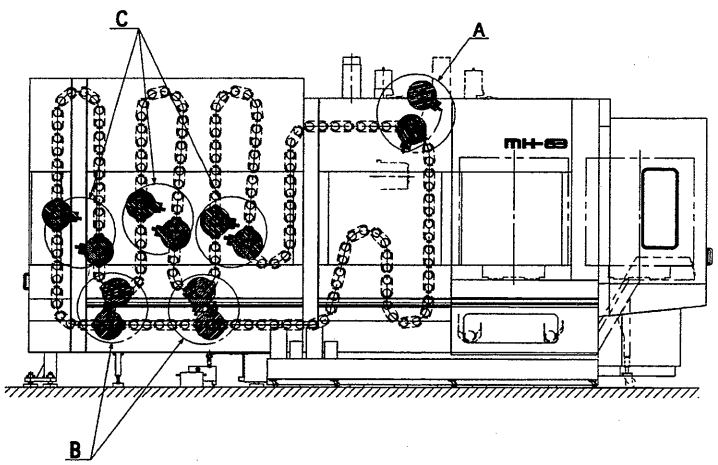
Special tool pot No. / Tool limits	85	89	93	97	101	105	109	Remarks
Tool not mounted	84, 86	88, 90	92, 94	96, 98	100, 102	104, 106	108, 110	Interference occurs when carrier arm swings with tool (A part).
Ø140 tool or larger not mounted	83, 87	87, 91	91, 95	95, 99	99, 103	103, 107	107, 111	Interference occurs at A part and when drum bends.
Ø260 tool or larger not mounted	88	92	96	100	104	108	112	When drum bends.

Special tool pot No. / Tool limits	113	117						Remarks
Tool not mounted	112, 114	116, 118						Interference occurs when carrier arm swings with tool (A part).
Ø140 tool or larger not mounted	111, 115	115, 119						Interference occurs at A part and when drum bends.
Ø260 tool or larger not mounted	116	120						When drum bends.

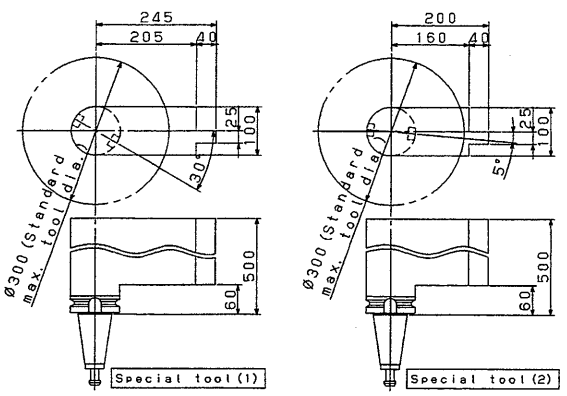
8.4 Special tool(180-tool type)



Spindle right side view



Left side view of special tool mounting direction for 180-tool type (raised column)



CAUTION

When the special tools mentioned above are used, tools which can be mounted in the magazine are limited as follows:

① The special tools can be mounted only in odd-numbered pots. (because it is good for the angle of the positioning key)

② The special tool (1) can be mounted in 5 pots or less of the 180-tool magazine, in 5 pots or less of the magazine for the raised column type machine. The tool limits are shown in table 1.

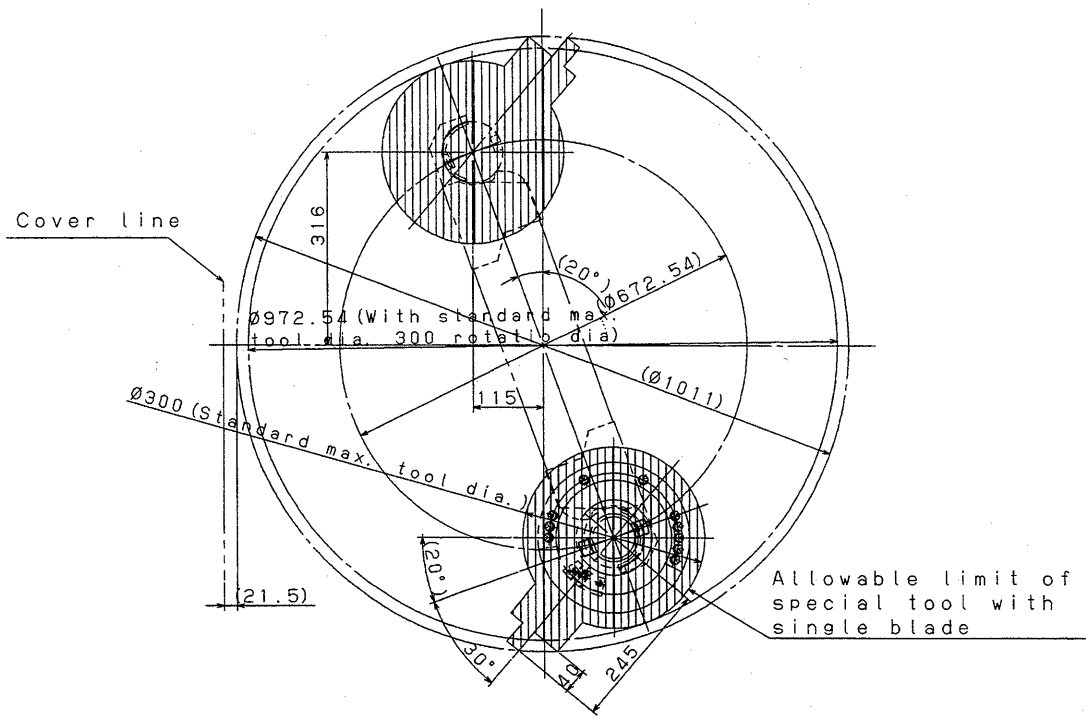
③ The special tool (2) can be mounted in 5 pots or less of the 120-tool magazine, in 15 pots or less of the magazine for the raised column type machine. The tool limits are shown in table 2.

④ When more than one special tool is used and the tool limits in the table overlap, select the one with the smaller limit.
ex.) When the special tool (1) is mounted in No.1 pot or the special tool (2) is mounted in No. 37 pot, select the 200 dia. or less tool in the pots from No. 9 to No. 16.

⑤ The maximum moment of the tool should be 29.4 N·m (21.70 ft·lbf) or less.

⑥ The tool cannot be mounted in the 60-tool magazine.

⑦ The tool cannot be used for machine No. 505 (CN92090417).



Spindle front view (spindle orientation position)

CAUTION

If an irregularly shaped tool is used, the following restrictions apply to prevent interference with the ceiling shutter.

① When the Y-axis is at the zero point, the allowable max. tool turning diameter that does not cause tool interference with the ceiling shutter is 450 mm (17.72 in.)(see " spindle right side view " .) To use a tool exceeding this limit, move the Y-axis to a position where interference does not occur when the tool is rotated before starting the spindle.

② Before carrying out an ATC cycle, complete spindle orientation at a position where interference does not occur. Then, move the Y-axis to the zero point and carry out the ATC cycle.

NOTE

Dimensions in brackets ( ) are only for reference.

Standard column magazine

[Table 1] Tool limits and pot numbers in magazine when special tools (1) are mounted in magazine

Special tool pot No. / Tool limits	1	37	73	Remarks
Tool not mounted	2, 180	36, 38	72, 74	Interference occurs when carrier arm swings with tool (A part).
Ø100 tool or larger not mounted	179	35	71	Interference occurs when carrier arm swings with tool (A part).
Ø120 tool or larger not mounted	20-33, 40-45, 55-60, 81-85, 96-102, 122-127, 137-143, 150-163	6-19, 56-69, 76-81, 91-96, 117-121, 132-138, 158-163, 173-179	14-19, 29-35, 42-55, 92-105, 112-117, 127-132, 153-157, 168-174	Interference occurs at B, C part.
Ø200 tool or larger not mounted	9-19, 164-173, 178	20-29, 34, 45-55	56-65, 70, 81-91	Interference occurs at B, C part and when drum bends.

Special tool pot No. / Tool limits	109	145		Remarks
Tool not mounted	108, 110	144, 146		Interference occurs when carrier arm swings with tool (A part).
Ø100 tool or larger not mounted	107	143		Interference occurs when carrier arm swings with tool (A part).
Ø120 tool or larger not mounted	9-13, 24-30, 50-55, 65-71, 78-91, 128-141, 148-153, 163-168	4-9, 19-24, 45-49, 60-66, 86-91, 101-107, 114-127, 164-177		Interference occurs at B, C part.
Ø200 tool or larger not mounted	92-101, 106, 117-127	128-137, 142, 153-163		Interference occurs at B, C part and when drum bends.

[Table 2] Tool limits and pot numbers in magazine when special tools (2) are mounted in magazine

Special tool pot No. / Tool limits	1	37	73	Remarks
Tool not mounted	2, 180	36, 38	72, 74	Interference occurs when carrier arm swings with tool (A part).
Ø140 tool or larger not mounted	3, 179	35, 39	71, 75	Interference occurs at A part and when drum bends.
Ø260 tool or larger not mounted	4, 21-33, 41-45, 56-60, 81-85, 97-101, 123-127, 138-142, 149-160	5-16, 40, 57-69, 77-81, 92-96, 117-121, 133-137, 159-163, 174-178	15-19, 30-34, 41-52, 76, 93-105, 113-117, 128-132, 153-157, 169-173	Interference occurs at B, C part part and when drum bends.

Special tool pot No. / Tool limits	109	145		Remarks
Tool not mounted	108, 110	144, 146		Interference occurs when carrier arm swings with tool (A part).
Ø140 tool or larger not mounted	107, 111	143, 147		Interference occurs at A part and when drum bends.
Ø260 tool or larger not mounted	9-13, 25-29, 51-55, 66-70, 77-88, 112, 129-141, 149-153, 164-168	5-9, 20-24, 45-49, 61-65, 87-91, 102-106, 113-124, 148, 165-177		Interference occurs at B, C part part and when drum bends.

Raised column magazine

[Table 1] Tool limits and pot numbers in magazine when special tools (1) are mounted in magazine

Special tool pot No. / Tool limits	1	37	73	Remarks
Tool not mounted	2, 180	36, 38	72, 74	Interference occurs when carrier arm swings with tool (A part).
Ø100 tool or larger not mounted	179	35	71	Interference occurs when carrier arm swings with tool (A part).
Ø120 tool or larger not mounted	22-32, 39-45, 81-86, 96-101, 138-142, 150-162	6-18, 58-68, 75-81, 117-122, 132-137, 174-178	30-34, 42-54, 94-104, 111-117, 153-158, 168-173	Interference occurs at B, C part.
Ø200 tool or larger not mounted	10-21, 33, 163-173, 178	19-29, 34, 46-57, 69	55-65, 70, 82-93, 105	Interference occurs at B, C part and when drum bends.

Special tool pot No. / Tool limits	109	145		Remarks
Tool not mounted	108, 110	144, 146		Interference occurs when carrier arm swings with tool (A part).
Ø100 tool or larger not mounted	107	143		Interference occurs when carrier arm swings with tool (A part).
Ø120 tool or larger not mounted	9-14, 24-29, 66-70, 78-90, 130-140, 147-153	3-9, 45-50, 60-65, 102-106, 114-126, 166-176		Interference occurs at B, C part.
Ø200 tool or larger not mounted	91-101, 106, 118-129, 141	127-137, 142, 154-165, 177		Interference occurs at B, C part and when drum bends.

[Table 2] Tool limits and pot numbers in magazine when special tools (2) are mounted in magazine

Special tool pot No. / Tool limits	1	5	9	Remarks
Tool not mounted	2, 180	4, 6	8, 10	Interference occurs when carrier arm swings with tool (A part).
Ø140 tool or larger not mounted	3, 179	3, 7	7, 11	Interference occurs at A part and when drum bends.
Ø260 tool or larger not mounted	4, 19-31, 41-45, 82-86, 97-101, 139-143, 151-158	8, 23-35, 45-49, 86-90, 101-105, 143-147, 155-162	12, 27-39, 49-53, 90-94, 105-109, 147-151, 159-166	Interference occurs at B, C part and when drum bends.

Special tool pot No. / Tool limits	13	17	61	Remarks
Tool not mounted	12, 14	16, 18	60, 62	Interference occurs when carrier arm swings with tool (A part).
Ø140 tool or larger not mounted	11, 15	15, 19	59, 63	Interference occurs at A part and when drum bends.
Ø260 tool or larger not mounted	16, 31-43, 53-57, 94-98, 109-113, 151-155, 163-170	20, 35-47, 57-61, 98-102, 113-117, 155-159, 167-174	19-23, 31-38, 64, 79-91, 101-105, 142-146, 157-161	Interference occurs at B, C part and when drum bends.

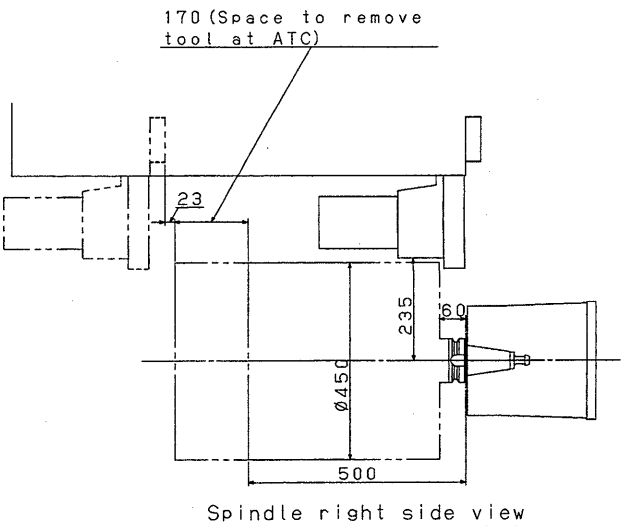
Special tool pot No. / Tool limits	65	69	73	Remarks
Tool not mounted	64, 66	68, 70	72, 74	Interference occurs when carrier arm swings with tool (A part).
Ø140 tool or larger not mounted	63, 67	67, 71	71, 75	Interference occurs at A part and when drum bends.
Ø260 tool or larger not mounted	23-27, 35-42, 68, 83-95, 105-109, 146-150, 161-170	27-31, 39-46, 72, 87-99, 109-113, 150-154, 165-169	31-35, 43-50, 77, 91-103, 113-117, 154-158, 169-173	Interference occurs at B, C part and when drum bends.

Special tool pot No. / Tool limits	77	121	125	Remarks
Tool not mounted	76, 78	120, 122	124, 126	Interference occurs when carrier arm swings with tool (A part).
Ø140 tool or larger not mounted	75, 79	119, 123	123, 127	Interference occurs at A part and when drum bends.
Ø260 tool or larger not mounted	35-39, 47-54, 81, 95-107, 117-121, 158-162, 173-177	22-26, 37-41, 79-83, 91-98, 124, 139-151, 161-165	26-30, 41-45, 83-87, 95-102, 128, 143-155, 165-169	Interference occurs at B, C part and when drum bends.

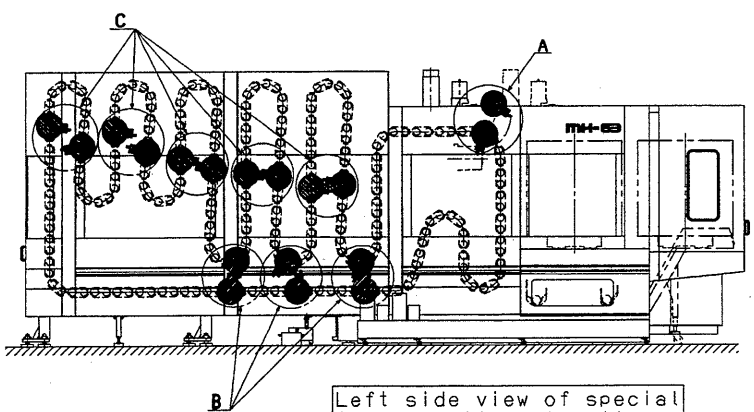
Special tool pot No. / Tool limits	129	133	137	Remarks
Tool not mounted	128, 130	132, 134	136, 138	Interference occurs when carrier arm swings with tool (A part).
Ø140 tool or larger not mounted	127, 131	131, 135	135, 139	Interference occurs at A part and when drum bends.
Ø260 tool or larger not mounted	30-34, 45-49, 87-91, 99-106, 132, 147-159, 169-173	34-38, 49-53, 91-95, 103-110, 136, 151-163, 173-177	38-42, 53-57, 95-99, 107-114, 140, 155-167, 177-1	Interference occurs at B, C part and when drum bends.

8.5 Special tool(240-tool type)

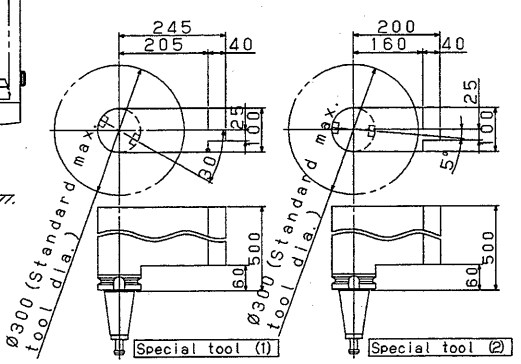
Unit:mm



Spindle right side view



Left side view of special tool mounting direction for 240-tool type (standard column)



CAUTION

When the special tools mentioned above are used, tools which can be mounted in the magazine are limited as follows:

① The special tools can be mounted only in odd-numbered pots. (because it is good for the angle of the positioning key)

② The special tool (1) can be mounted in 6 pots or less of the 240-tool magazine, in 6 pots or less of the magazine for the raised column type machine. The tool limits are shown in table 1.

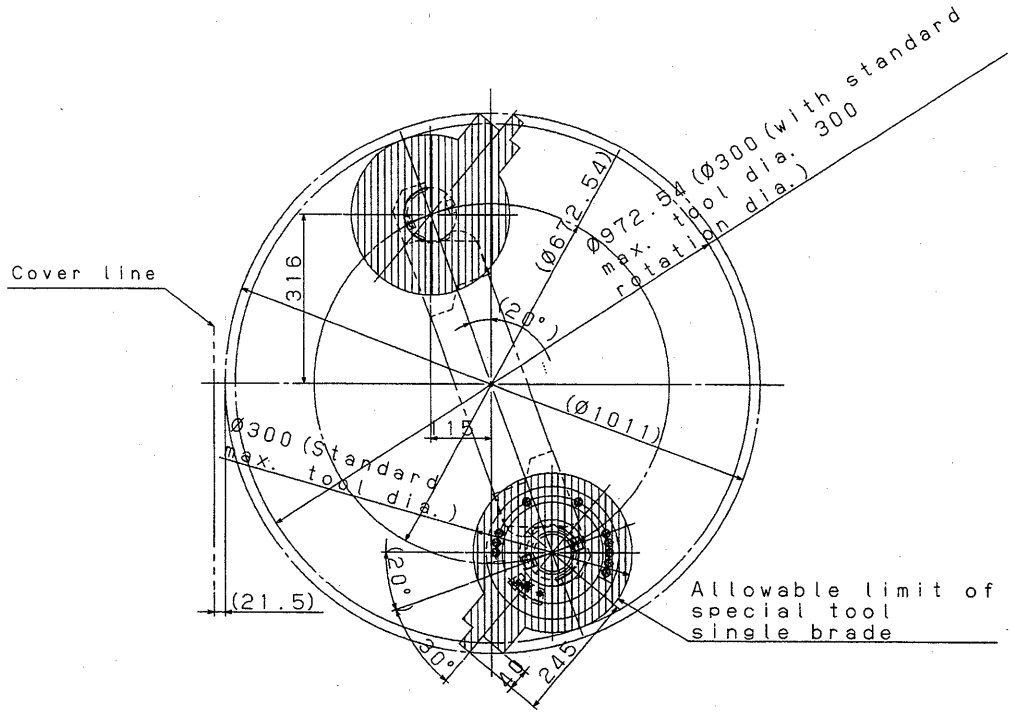
③ The special tool (2) can be mounted in 12 pots or less of the 120-tool magazine, in 16 pots or less of the magazine for the raised column type machine. The tool limits are shown in table 2.

④ When more than one special tool is used and the tool limits in the table overlap, select the one with the smaller limit.
ex.) When the special tool (1) is mounted in No.1 pot or the special tool (2) is mounted in No. 5 pot, select the 120 dia. or less tool in the pots from No. 20 to No. 33.

⑤ The maximum moment of the tool should be 29.4 N·m (21.70 ft·lbf) or less.

⑥ The tool cannot be mounted in the 60-tool magazine.

⑦ The tool cannot be used for machine No. 505 (CN92090417).



Spindle front view (spindle orientation position)

CAUTION

If an irregularly shaped tool is used, the following restrictions apply to prevent interference with the ceiling shutter.

① When the Y-axis is at the zero point, the allowable max. tool turning diameter that does not cause tool interference with the ceiling shutter is 450 mm (17.72 in.)(see " spindle right side view " .) To use a tool exceeding this limit, move the Y-axis to a position where interference does not occur when the tool is rotated before starting the spindle.

② Before carrying out an ATC cycle, complete spindle orientation at a position where interference does not occur. Then, move the Y-axis to the zero point and carry out the ATC cycle.

NOTE

Dimensions in brackets ( ) are only for reference.

Standard column magazine

[Table 1] Tool limits and pot numbers in magazine when special tools (1) are mounted in magazine

Special tool pot No. / Tool limits	1	41	81	Remarks
Tool not mounted	2, 240	40, 42	80, 82	Interference occurs when carrier arm swings with tool (A part).
Ø100 tool or larger not mounted	239	39	79	Interference occurs when carrier arm swings with tool (A part).
Ø120 tool or larger not mounted	16-33, 55-61, 96-105, 137-147, 182-188, 210-227	10-27, 56-73, 95-101, 136-145, 177-187, 222-228	22-28, 50-67, 96-113, 135-141, 176-185, 217-227	Interference occurs at B, C part.
Ø200 tool or larger not mounted	10-15, 228-233, 238	28-33, 38, 50-55	68-73, 78, 90-95	Interference occurs at B, C part and when drum bends.

Special tool pot No. / Tool limits	121	161	201	Remarks
Tool not mounted	120, 122	160, 162	200, 202	Interference occurs when carrier arm swings with tool (A part).
Ø100 tool or larger not mounted	119	159	199	Interference occurs when carrier arm swings with tool (A part).
Ø120 tool or larger not mounted	17-27, 62-68, 90-107, 136-153, 175-181, 216-225	16-25, 57-67, 102-108, 130-147, 176-193, 215-221	15-21, 56-65, 97-107, 142-148, 170-187, 216-233	Interference occurs at B, C part.
Ø200 tool or larger not mounted	108-113, 118, 130-135	148-153, 158, 170-175	188-193, 198, 210-215	Interference occurs at B, C part and when drum bends.

[Table 2] Tool limits and pot numbers in magazine when special tools (2) are mounted in magazine

Special tool pot No. / Tool limits	1	5	9	Remarks
Tool not mounted	2, 240	4, 6	8, 10	Interference occurs when carrier arm swings with tool (A part).
Ø140 tool or larger not mounted	3, 239	3, 7	7, 11	Interference occurs at A part and when drum bends.
Ø260 tool or larger not mounted	4, 16-33, 57-60, 98-105, 139-146, 183-187, 211-225	8, 20-37, 61-64, 102-109, 143-150, 187-191, 215-230	12, 24-41, 65-68, 106-113, 147-154, 191-195, 216-234	Interference occurs at B, C part and when drum bends.

Special tool pot No. / Tool limits	13	81	85	Remarks
Tool not mounted	12, 14	80, 82	84, 86	Interference occurs when carrier arm swings with tool (A part).
Ø140 tool or larger not mounted	11, 15	79, 83	83, 87	Interference occurs at A part and when drum bends.
Ø260 tool or larger not mounted	16, 28-45, 69-72, 110-117, 151-158, 195-199, 223-238	23-27, 51-66, 84, 96-113, 137-140, 178-185, 219-226	27-31, 55-70, 88, 100-117, 141-144, 182-189, 223-230	Interference occurs at B, C part and when drum bends.

Special tool pot No. / Tool limits	89	93	161	Remarks
Tool not mounted	88, 90	92, 94	160, 162	Interference occurs when carrier arm swings with tool (A part).
Ø140 tool or larger not mounted	87, 91	91, 95	159, 163	Interference occurs at A part and when drum bends.
Ø260 tool or larger not mounted	31-35, 59-74, 92, 104-121, 145-148, 186-193, 227-234	35-39, 63-78, 96, 108-125, 149-152, 190-197, 231-238	18-25, 59-66, 103-107, 131-146, 164, 176-193, 217-220	Interference occurs at B, C part and when drum bends.

Special tool pot No. / Tool limits	165	169	173	Remarks
Tool not mounted	164, 166	168, 170	172, 174	Interference occurs when carrier arm swings with tool (A part).
Ø140 tool or larger not mounted	163, 167	167, 171	171, 175	Interference occurs at A part and when drum bends.
Ø260 tool or larger not mounted	22-29, 63-70, 107-111, 135-150, 168, 180-197, 221-224	26-33, 67-74, 111-115, 138-154, 172, 184-201, 225-228	30-37, 71-78, 115-119, 143-158, 176, 188-205, 229-232	Interference occurs at B, C part and when drum bends.

Raised column magazine

[Table 1] Tool limits and pot numbers in magazine when special tools (1) are mounted in magazine

Special tool pot No. / Tool limits	1	41	81	Remarks
Tool not mounted	2, 240	40, 42	80, 82	Interference occurs when carrier arm swings with tool (A part).
Ø100 tool or larger not mounted	239	39	79	Interference occurs when carrier arm swings with tool (A part).
Ø120 tool or larger not mounted	16-33, 97-105, 137-146, 210-227	10-27, 56-73, 137-145, 177-186	50-67, 96-113, 177-185, 217-226	Interference occurs at B, C part.
Ø200 tool or larger not mounted	10-15, 228-233, 238	28-33, 38, 50-55	68-73, 78, 90-95	Interference occurs at B, C part and when drum bends.

Special tool pot No. / Tool limits	121	161	201	Remarks
Tool not mounted	120, 122	160, 162	200, 202	Interference occurs when carrier arm swings with tool (A part).
Ø100 tool or larger not mounted	119	159	199	Interference occurs when carrier arm swings with tool (A part).
Ø120 tool or larger not mounted	17-26, 90-107, 136-153, 217-225	17-25, 57-66, 130-147, 176-193	57-65, 97-106, 170-187, 216-233	Interference occurs at B, C part.
Ø200 tool or larger not mounted	108-113, 118, 130-135	148-153, 158, 170-175	188-193, 198, 210-215	Interference occurs at B, C part and when drum bends.

[Table 2] Tool limits and pot numbers in magazine when special tools (2) are mounted in magazine

Special tool pot No. / Tool limits	1	5	9	Remarks
Tool not mounted	2, 240	4, 6	8, 10	Interference occurs when carrier arm swings with tool (A part).
Ø140 tool or larger not mounted	3, 239	3, 7	7, 11	Interference occurs at A part and when drum bends.
Ø260 tool or larger not mounted	4, 16-33, 98-105, 139-146, 211-225	8, 20-37, 102-109, 143-150, 215-230	12, 24-41, 106-113, 147-154, 216-234	Interference occurs at B, C part and when drum bends.

Special tool pot No. / Tool limits	13	61	65	Remarks
Tool not mounted	12, 14	60, 62	64, 66	Interference occurs when carrier arm swings with tool (A part).
Ø140 tool or larger not mounted	11, 15	59, 63	63, 67	Interference occurs at A part and when drum bends.
Ø260 tool or larger not mounted	16, 28-45, 110-117, 151-158, 223-238	31-46, 64, 76-93, 158-165, 199-206	35-50, 68, 80-97, 162-169, 203-210	Interference occurs at B, C part and when drum bends.

Special tool pot No. / Tool limits	69	73	121	Remarks
Tool not mounted	68, 70	72, 74	120, 122	Interference occurs when carrier arm swings with tool (A part).
Ø140 tool or larger not mounted	67, 71	71, 75	119, 123	Interference occurs at A part and when drum bends.
Ø260 tool or larger not mounted	39-54, 72, 84-101, 166-173, 207-214	43-58, 76, 88-105, 170-177, 211-218	19-26, 91-106, 124, 136-153, 218-225	Interference occurs at B, C part and when drum bends.

Special tool pot No. / Tool limits	125	129	133	Remarks
Tool not mounted	124, 126	128, 130	132, 134	Interference occurs when carrier arm swings with tool (A part).
Ø140 tool or larger not mounted	123, 127	127, 131	131, 135	Interference occurs at A part and when drum bends.
Ø260 tool or larger not mounted	23-30, 95-110, 128, 140-157, 222-228	27-34, 99-114, 132, 114-161, 226-233	31-38, 103-118, 136, 148-165, 230-237	Interference occurs at B, C part and when drum bends.

Special tool pot No. / Tool limits	181	185	189	Remarks
Tool not mounted	180, 182	184, 186	188, 190	Interference occurs when carrier arm swings with tool (A part).
Ø140 tool or larger not mounted	179, 183	183, 187	187, 191	Interference occurs at A part and when drum bends.
Ø260 tool or larger not mounted	38-45, 79-86, 151-166, 184, 196-213	42-49, 83-90, 155-170, 188, 200-217	46-53, 87-94, 159-174, 192, 204-221	Interference occurs at B, C part and when drum bends.

Special tool pot No. / Tool limits	193			Remarks
Tool not mounted	192, 194			Interference occurs when carrier arm swings with tool (A part).
Ø140 tool or larger not mounted	191, 195			Interference occurs at A part and when drum bends.
Ø260 tool or larger not mounted	50-57, 91-98, 163-178, 196, 208-225			Interference occurs at B, C part and when drum bends.

9. TOOL MASS RESTRICTIONS

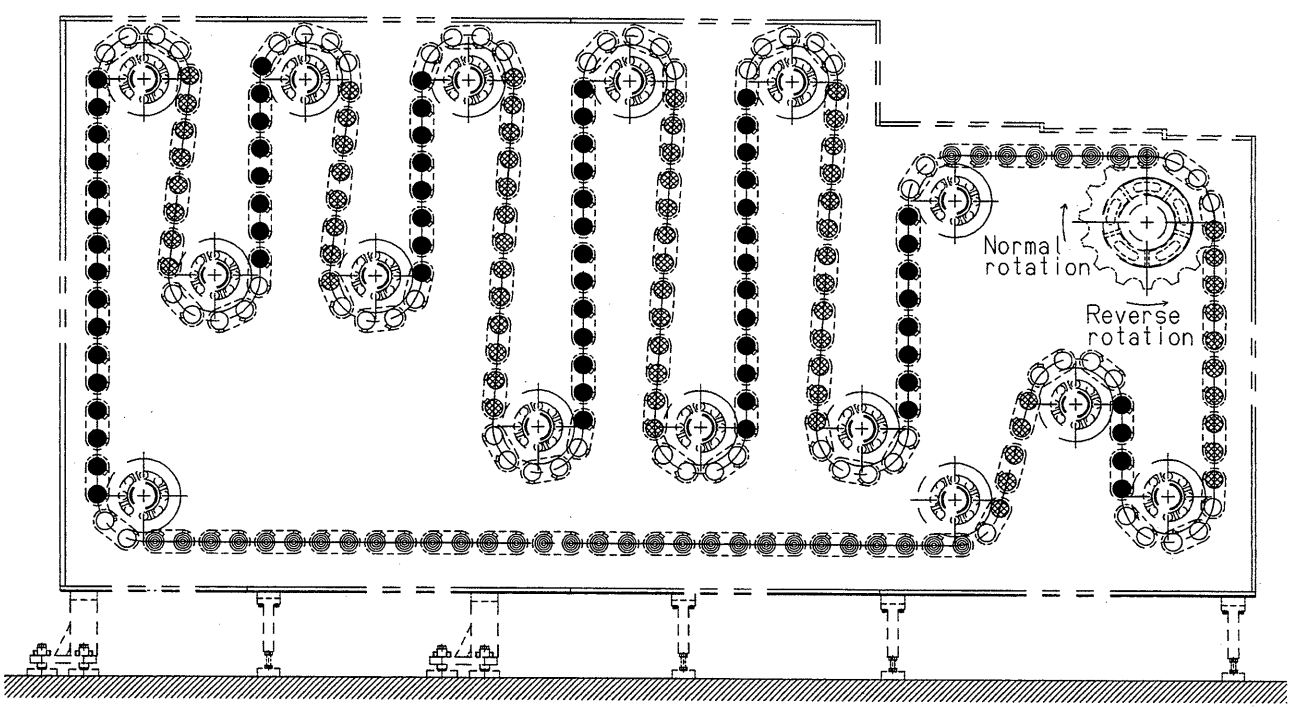
CAUTION

With the 180- or 240- tool capacity tool magazine, since the tool magazine will fail to move smoothly if heavy tools are mounted consecutively, set a tool layout that gives a good balance of tool mass in the magazine.
To ensure a balanced tool arrangement, keep values "A" and "B" less than 500 kgf(1100 lbf) at any pot position.

(a) A=(Total mass of tools at ●) - (Total mass of tools at ▨) +
(Total mass of tools at ◎×0.2) < 500 kgf (1100 lbf)

(b) B=(Total mass of tools at ▨) - (Total mass of tools at ●) +
(Total mass of tools at ◎×0.2) < 500 kgf (1100 lbf)

To meet the requirements indicated above, determine the tool layout so that the average mass of the tools mounted in five consecutive pots will be equal to the average mass of all tools mounted in the magazine.



240-tool type (standard column)

(Q53047 A08 6/6)

10. TOOL SHANK DIMENSIONS

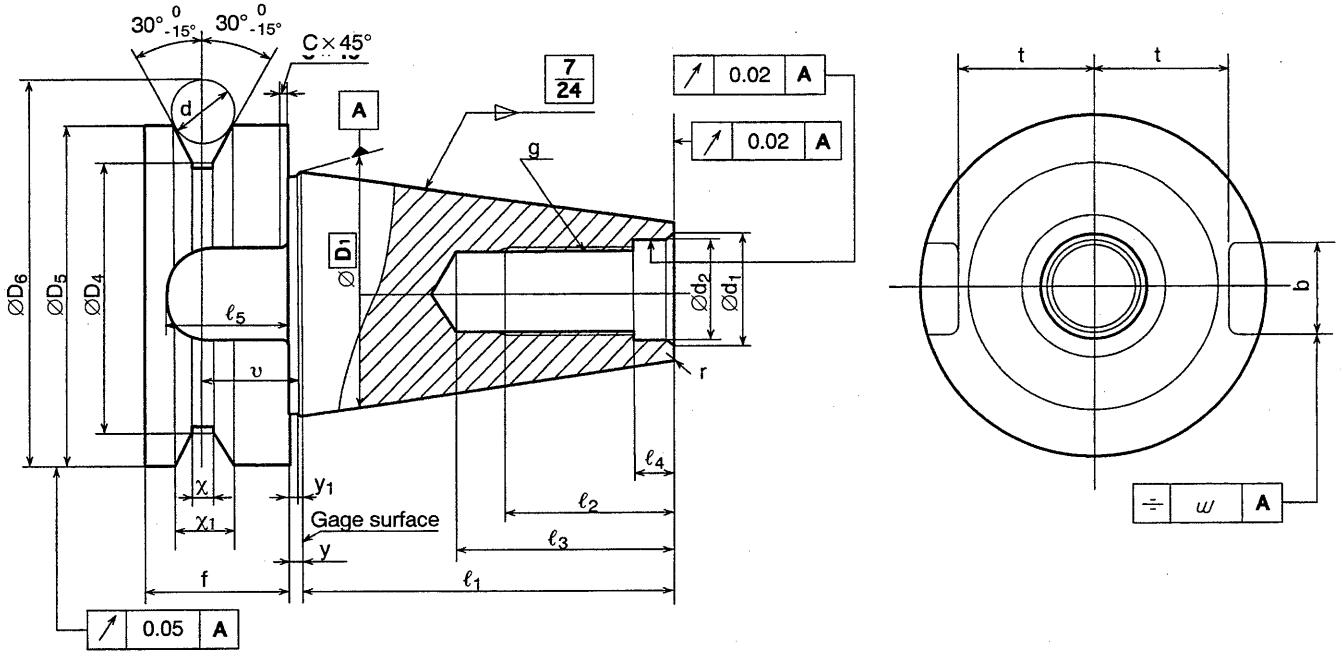
CAUTION

① The dimensions given below are only for reference purpose and the tool holders must not be manufactured by simply referring to the indicated dimensions. Mori Seiki is not responsible for any loss and problem arising from the user of tool holders manufactured in such a manner.

② For the machine with the through-spindle coolant system, use the tool holders corresponding to the coolant system (center-through type or side-through type) equipped with the machine.
If the tool holder not corresponding to the machine specifications is used, through-spindle coolant will not be discharged correctly, causing damage to the machine.

10.1 MAS

10.1.1 No. 50 taper



	Shunk			Screw						Tenon				
	D_1	ℓ_1 ±0.5	r (max.)	d_1	d_2 H8	g 6H	ℓ_2 (min.)	ℓ_3 (min.)	ℓ_4 +0.5 0	C (max.)	b H12	ℓ_5 (min.)	t 0 -0.2	ω
BT50	69.850	101.8	1	27	25	M24	45	62	13.0	1	25.7	31	35.4	0.2

	Flange								7/24 Taper angle tolerance *1 AT_D	References		
	D_4	D_5 h8	f	υ ±0.1	x	x_1 +0.1 0	y ±0.4	y_4 0 -0.4		Dia. at small end	d	D_6
BT50	85	100	35	23.2	7	15	3	3	+0.0051 0	40.158	15	119.019

NOTE *1: 7/24 Taper angle tolerance is $^{+AT4}_{0}$ (JIS B0614 taper angle tolerance class AT4).

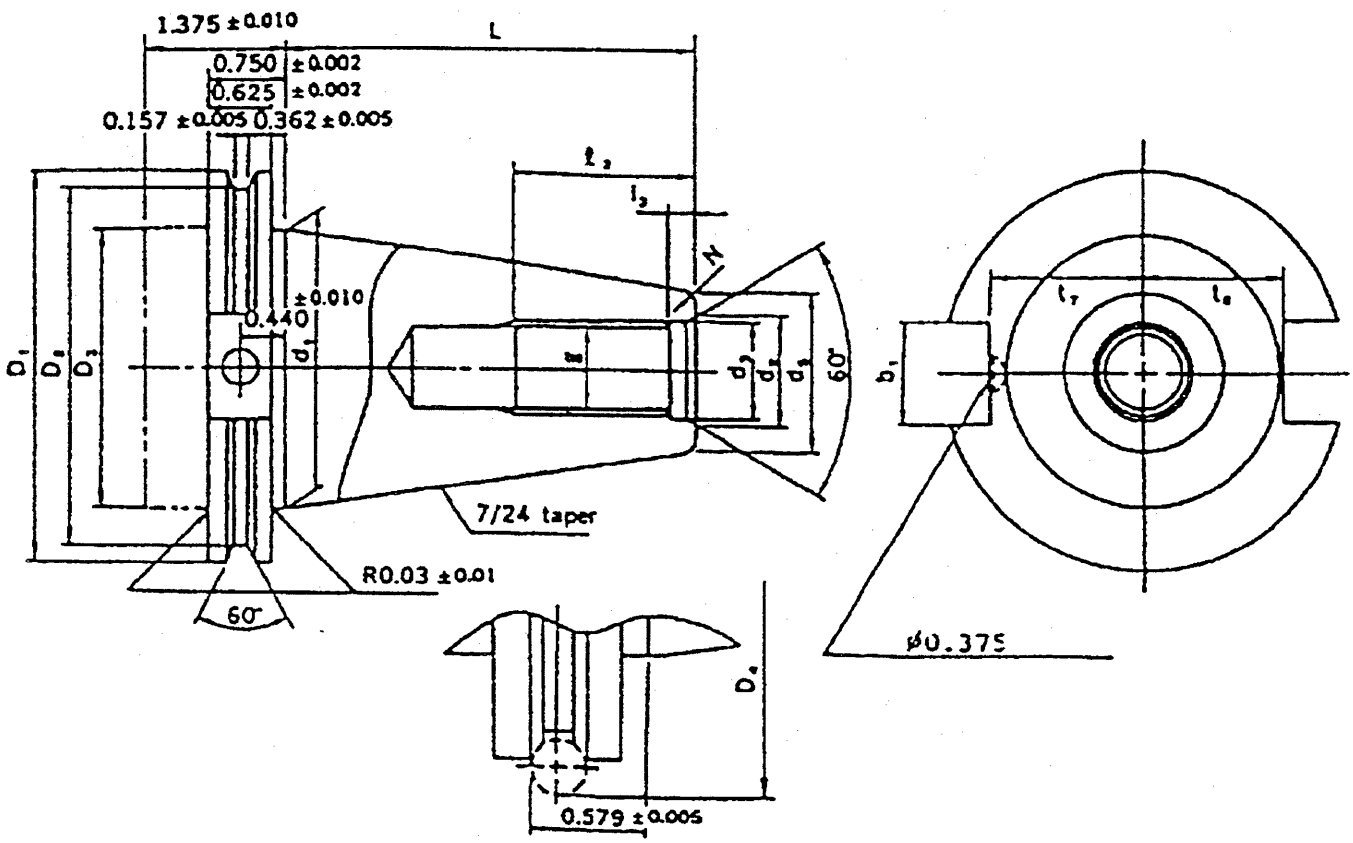
① Unless otherwise specified, the allowance should be middle class specified by JIS B0405.

② Relief for finish grinding may be provided on "d_2".

10.2 CAT

10.2.1 No. 50 taper

Dimensions Unit: in.



Shank	D_1		D_2		D_3		D_4		d_1 (Basic dimension)	
	Dimension	Tolerance	dimension	Tolerance	Dimension	Tolerance	Dimension	Tolerance	Dimension	Tolerance
CAT-50	3.875	0 -0.002	3.594	±0.010	2.750	±0.010	4.238	±0.002	2.750	±0.002

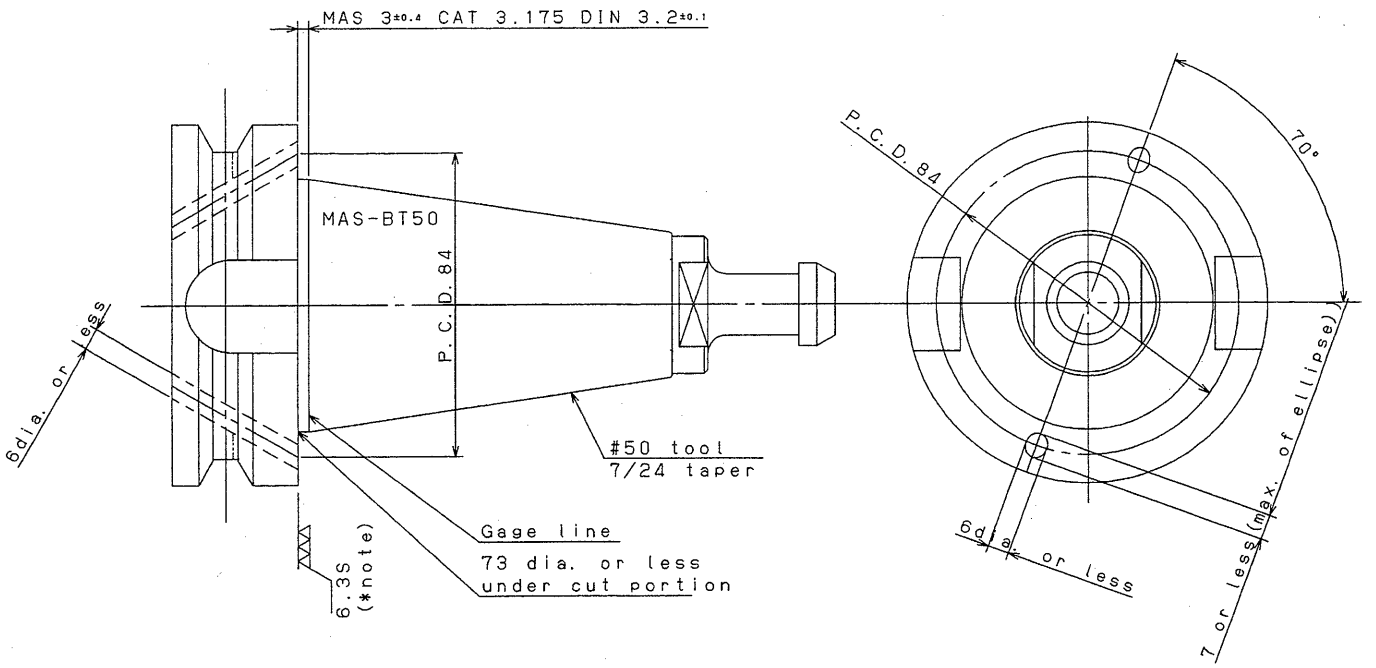
Shank	d_2		d_3		L		ℓ_2		g	N
	Dimension	Tolerance	Dimension	Tolerance	Dimension	Tolerance	Dimension	Tolerance		
CAT-50	1.125	±0.010	1.031	±0.015 0	4.000	±0.010 0	1.75	±0.040	1.000 -8	0.060 -0.120

Shank	ℓ_3		b_1		t_7		t_8		Reference
	Dimension	Tolerance	Dimension	Tolerance	Dimension	Tolerance	Dimension	Tolerance	d_5
CAT-50	0.250	±0.010	1.020	±0.010	1.485	0 -0.015	1.390	0 -0.015	1.38

10.3 Side Through-spindle Coolant Hole

10.3.1 No. 50 taper

Unit:mm



(Q81006 A02)

NOTE If surface finish accuracy is not adequate, coolant leak problem might occur.

11. RETENTION KNOB DIMENSIONS

11.1 Tables of Retention Knob

Check the retention knobs to be used referring to the tables below.

Six-digit codes are codes used for placing an order.

<No. 50 taper specification>

Type	Drawing No.	
	Standard	Center spindle-through coolant specification
MAS Mori 90°	N29011	N29031
CAT Mori 90°	N29012	N29032
DIN	As specified by the standard	N29033
MAS I	As specified by the standard	N29034
MAS II	As specified by the standard	N29035

NOTE

① For the side spindle-through coolant specification, use retention knobs of the standard specification.

② For the center spindle-through coolant specification of No. 40 taper, only DIN type retention knobs are available. Choose the one that meets the standard (MAS, CAT, or DIN).

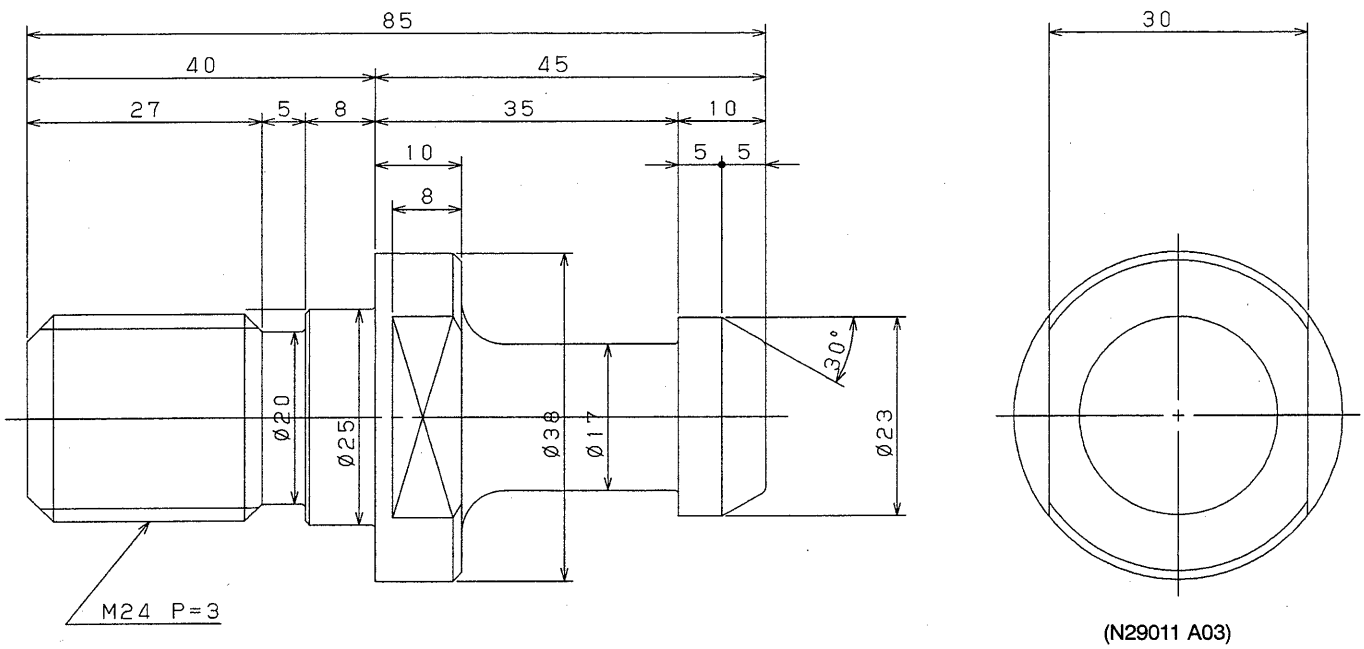
11.2 MAS Mori 90°

CAUTION

The dimensions given below are only for reference purpose and the tool holders must not be manufactured by simply referring to the indicated dimensions. Mori Seiki is not responsible for any loss and problem arising from the user of tool holders manufactured in such a manner.

11.2.1 No. 50 taper

Unit:mm

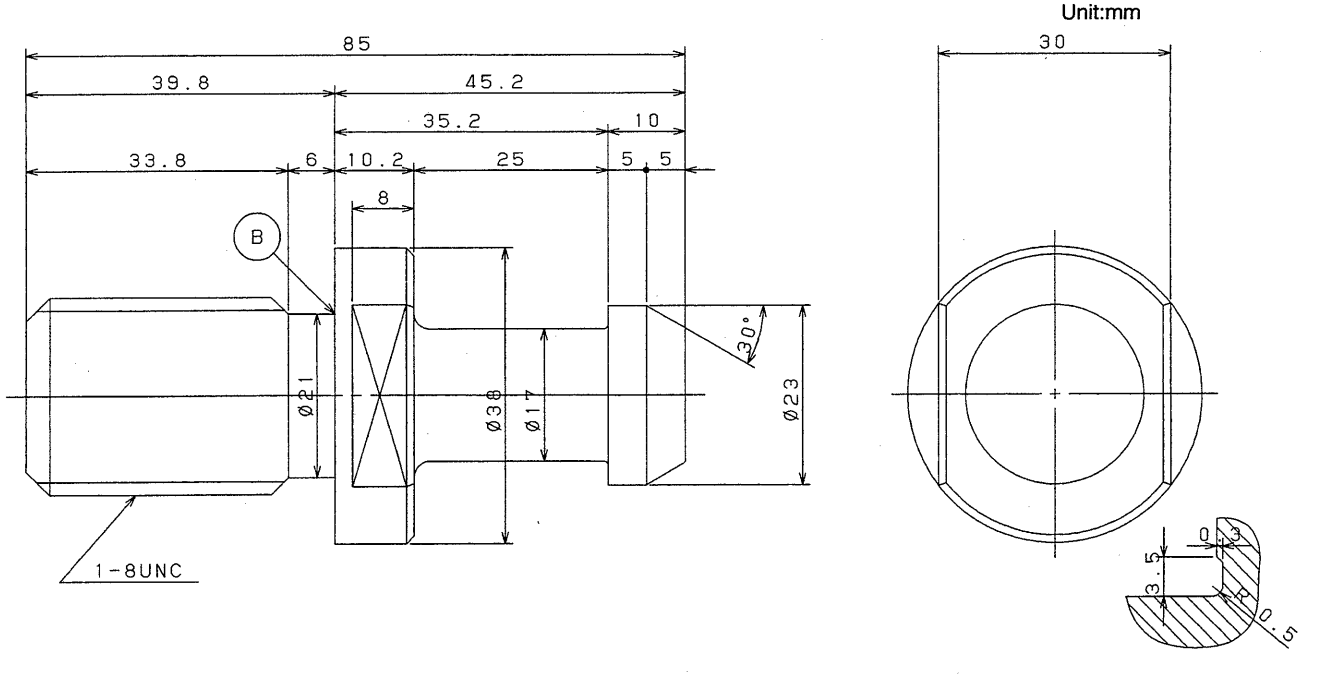


(N29011 A03)

11.3 CAT Mori 90°

11.3.1 No. 50 taper

Unit:mm



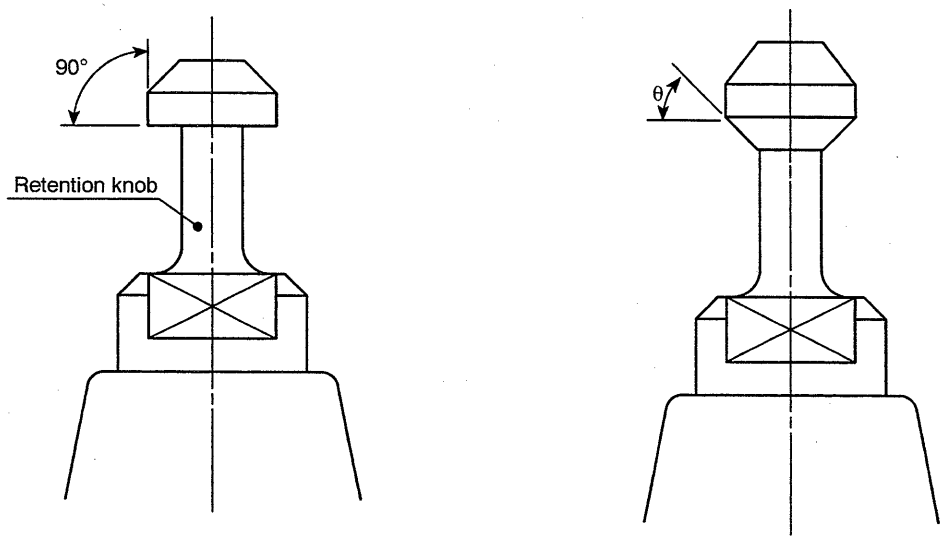
(N29012 A02)

11.4 Cautions on Using Retention Knob

CAUTION

① Use only the retention knob that meets the machine specifications. Since retention knobs of different specifications have different clamp mechanism, the one that does not meet the machine specification must not be used. If such retention knob is used, the collet will break and unexpected accidents will occur, causing damage to the machine.

The shapes of the retention knobs as following illustration vary depending on specifications.

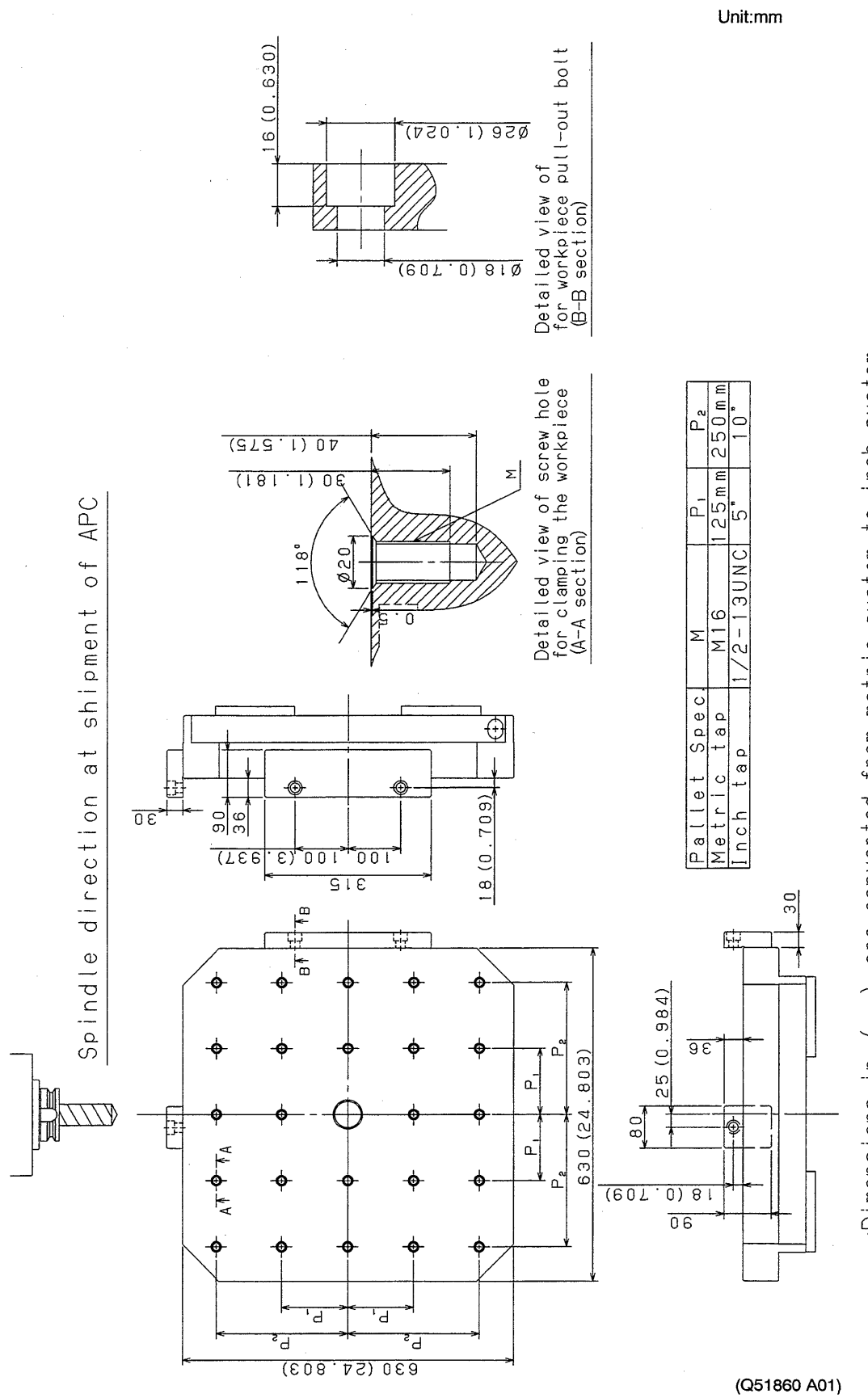


② To use a retention knob of center/side-through-spindle coolant specification, be sure to apply sealant to the threads of the retention knob. If the retention knob of center/side-through-spindle coolant specification is used without applying sealant or without an O-ring for the one that requires the use of an O-ring, coolant will leak through the threads of the retention knob and could cause damage to the machine.

12. PALLET DIMENSIONS

12.1 Tap Pallet

Unit:mm

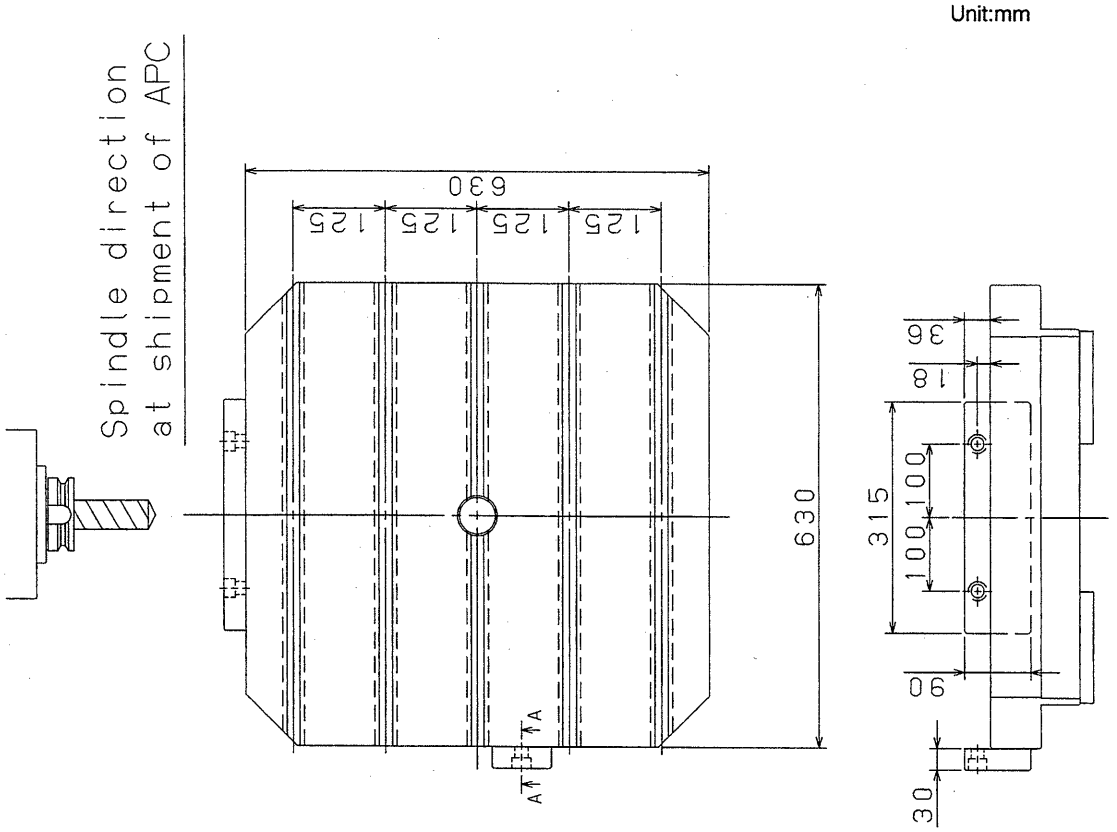


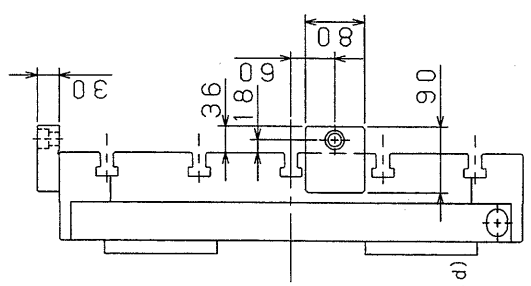
Pallet Spec.	M	P1	P2
Metric tap	M16	125mm	250mm
Inch tap	1/2-13UNC	5"	10"

(Q51860 A01)

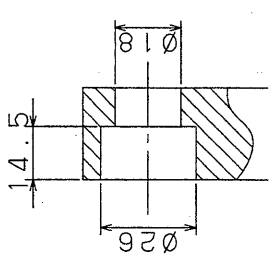
12.2 T-slot Pallet

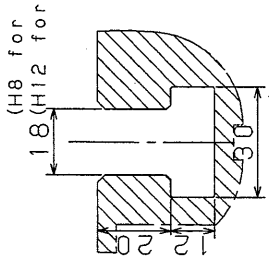
Unit:mm





Detailed view of hole for workpiece pull-out bolt (A-A section)





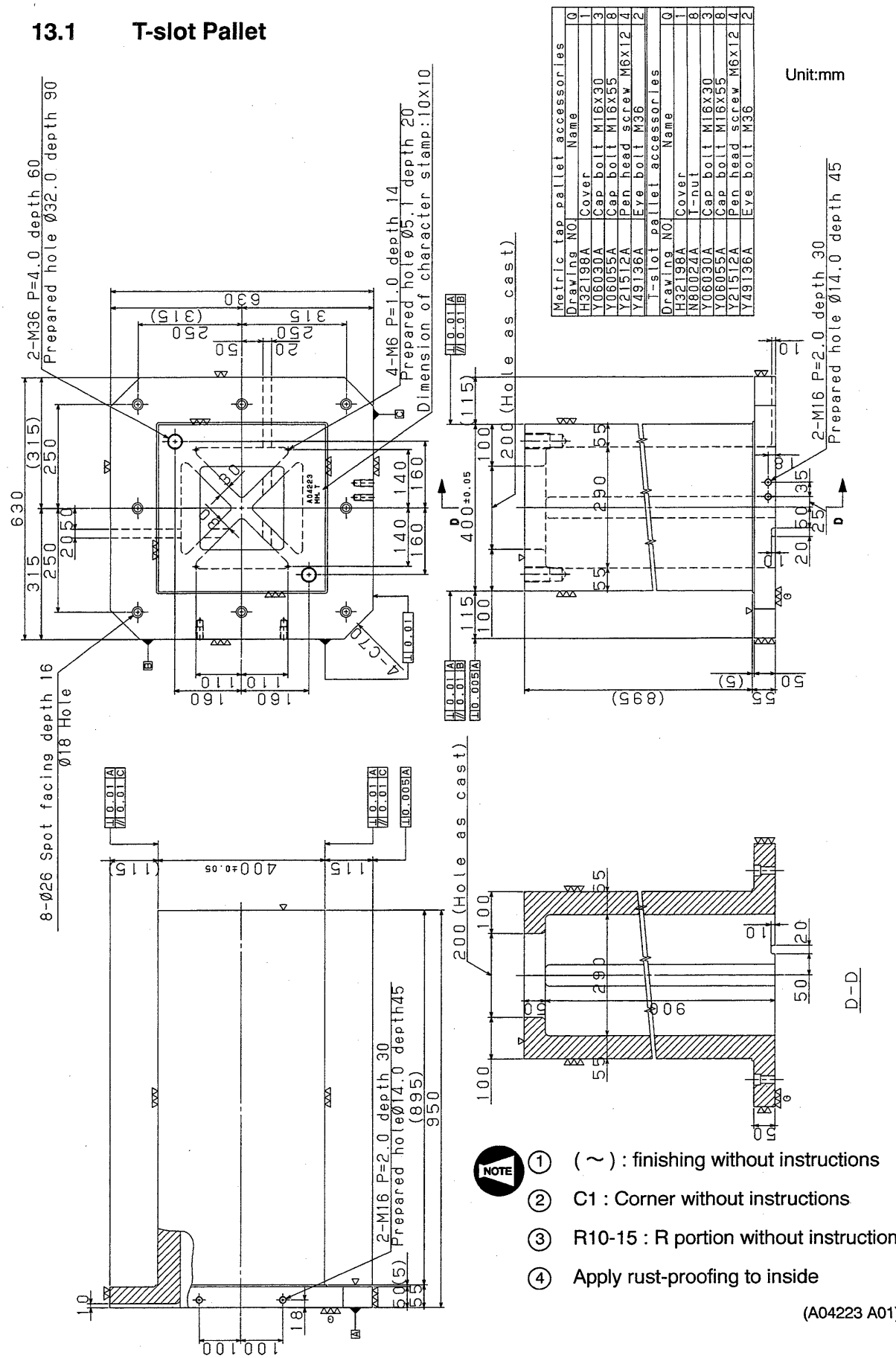
Detailed view of T-slot

(Q51861 A01)

13. FOUR-SIDE CLAMPING BLOCK DIMENSIONS

13.1 T-slot Pallet

Unit:mm



Metric tap pallet accessories

Drawing NO	Name	Q
H32198A	Cover	1
Y06030A	Cap bolt M16x30	3
Y06055A	Cap bolt M16x55	8
Y21512A	Pen head screw M6x12	4
Y49136A	Eye bolt M36	2

T-slot pallet accessories

Drawing NO	Name	Q
H32198A	Cover	1
N80024A	T-nut	8
Y06030A	Cap bolt M16x30	3
Y06055A	Cap bolt M16x55	8
Y21512A	Pen head screw M6x12	4
Y49136A	Eye bolt M36	2

NOTE

① (~) : finishing without instructions

② C1 : Corner without instructions

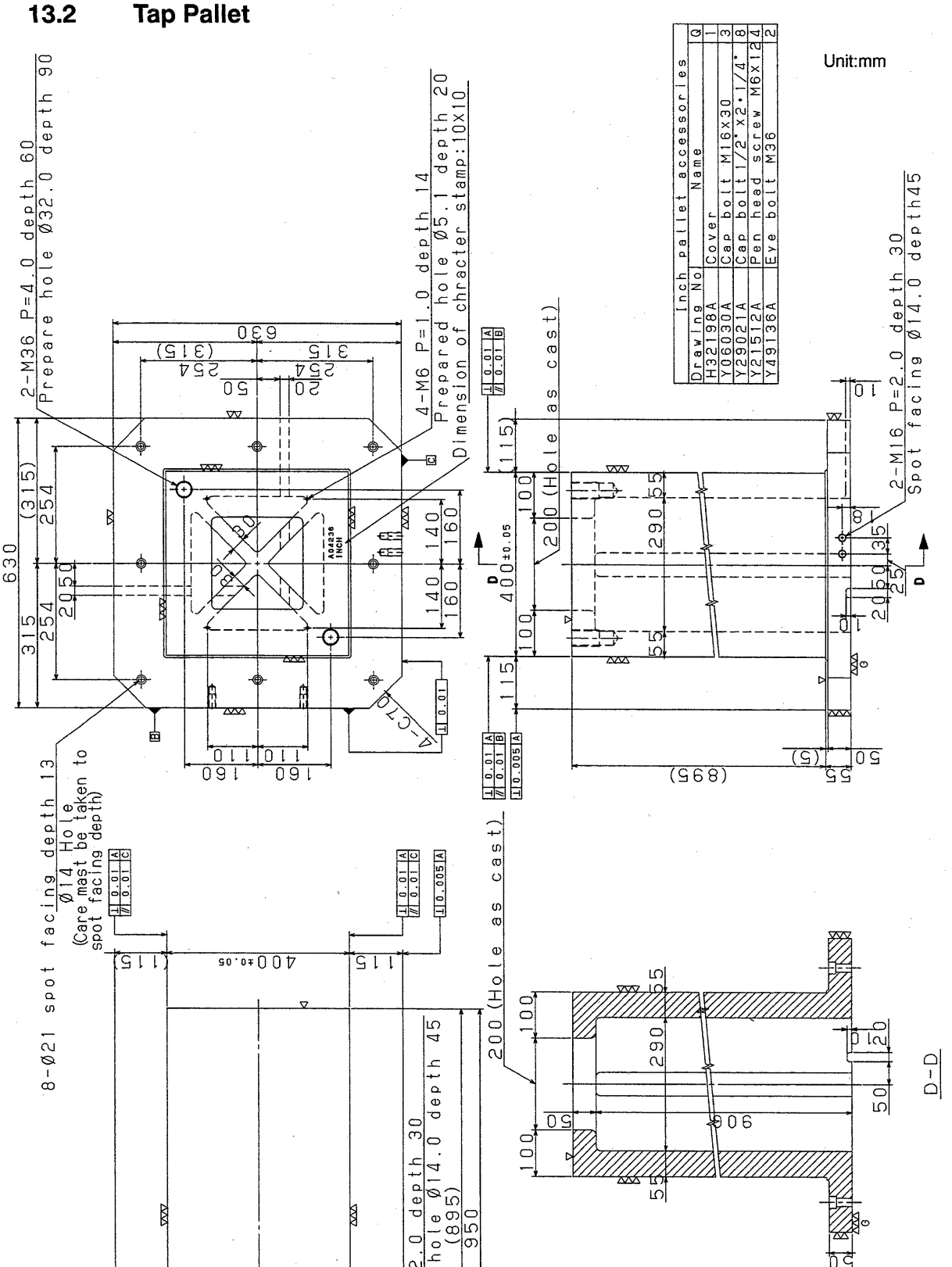
③ R10-15 : R portion without instructions

④ Apply rust-proofing to inside

(A04223 A01)

13.2 Tap Pallet

Unit:mm



NOTE

① (~) : finishing without instructions

② C1 : Corner without instructions

③ R10-15 : R portion without instructions

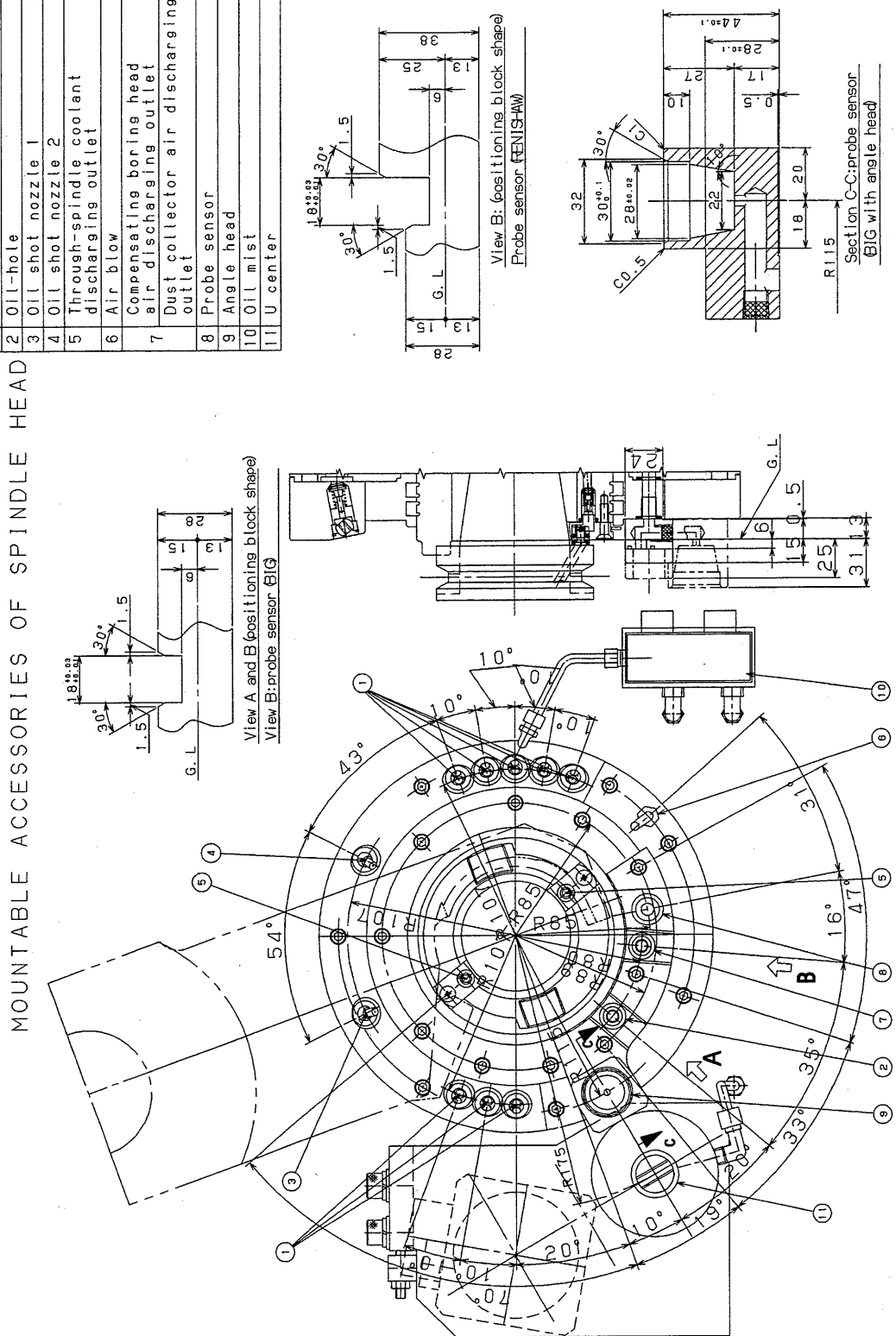
④ Apply rust-proofing to inside

(A04236 A01)

14. MOUNTABLE ACCESSORIES OF SPINDLE HEAD

	NAME	STD
1	Coolant nozzle	OPT
2	Oil-hole	OPT
3	Oil shot nozzle 1	OPT
4	Oil shot nozzle 2	OPT
5	Through-spindle coolant discharging outlet	OPT
6	Air blow	OPT
7	Compensating boring head air discharging outlet	OPT
	Dust collector air discharging outlet	OPT
8	Probe sensor	OPT
9	Angle head	OPT
10	Oil mist	OPT
11	U center	OPT

Unit:mm



NOTE

① U center can be mounted odd-numbered pot only. However, there is a limitation for surrounding tools. Refer to drawing no. Q53047

② Ring sensor and angle head cannot be mounted at U center type.

(Q51845 A08)

15. SLIDEWAY LUBRICATION PUMP DIAGRAM

<Specifications>

Pump specification

Type	MLB 03W
Discharge pressure	1.5 MPa {15 kg/cm^2}
Theoretical discharge capacity	0.21 mL
Discharge volume at 50Hz (1,400 min^{-1})	0.29 L/min
Discharge volume at 60Hz (1,600 min^{-1})	0.33 L/min
Tank capacity	12 L
Effective capacity	6.8 l

Motor specification

Type	3-phase induction motor		
Standard No.	JEC37		
Rating	Continuous		
Output (W)	25		
Frequency (Hz)	50	60	
Voltage (V)	200	200	220
Current (A)	0.29	0.25	0.27
Speed (min^{-1})	1250	1450	1550

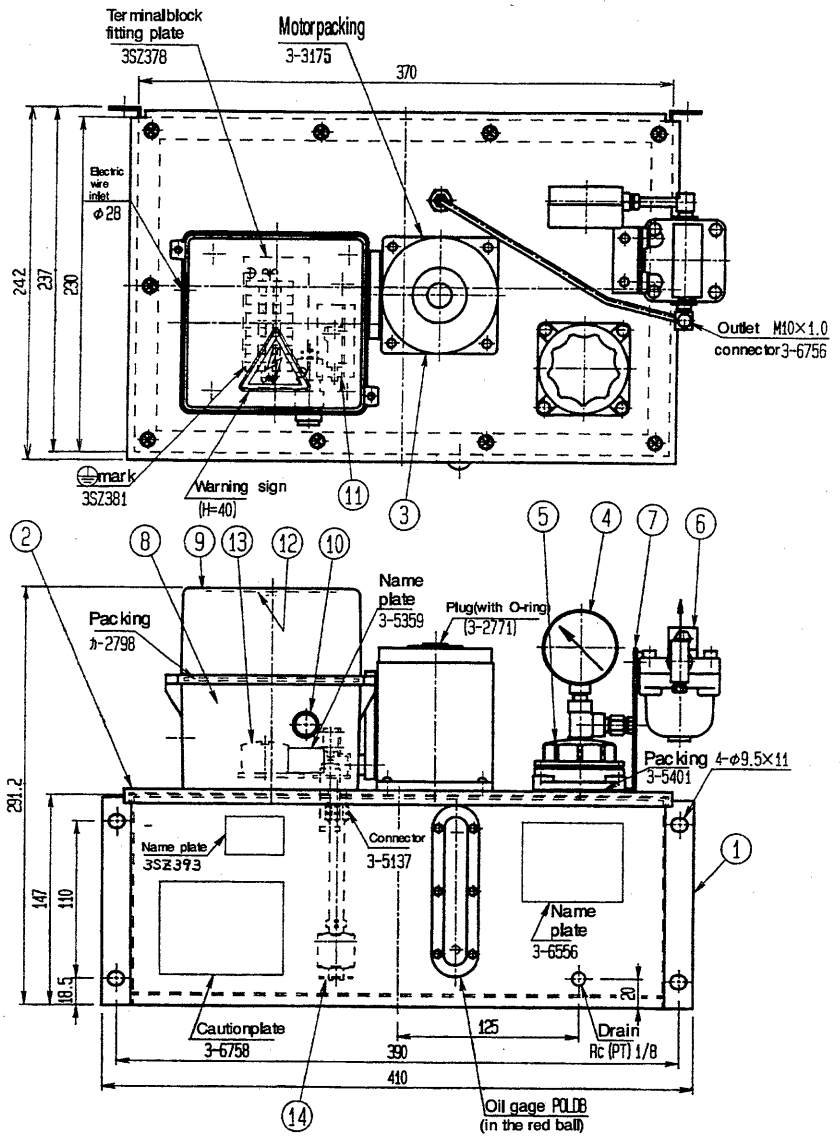
Float switch specification

Type	OLV01
Max. shut off capacity	30 VA AC
	50 W DC
Max. shut off current	0.33 A AC
	1.0 A DC
Max. shut off voltage	250 V AC
	200 V DC

Element specification

Filter accuracy	30 μm
Pressure resistance	1.5 MPa {15 kg/cm^2}
Test pressure	2.0 MPa {20 kg/cm^2}
Filter area	25 cm^2

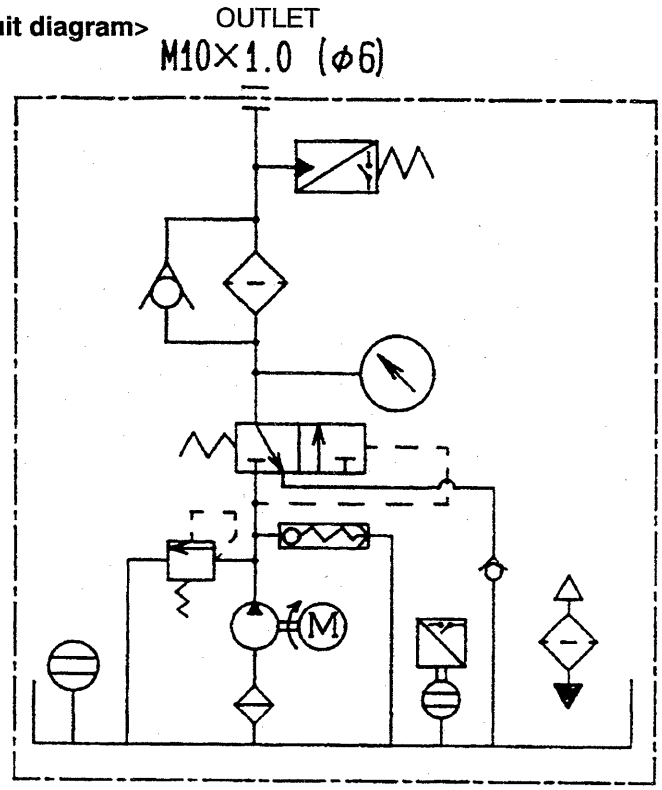
<General View>



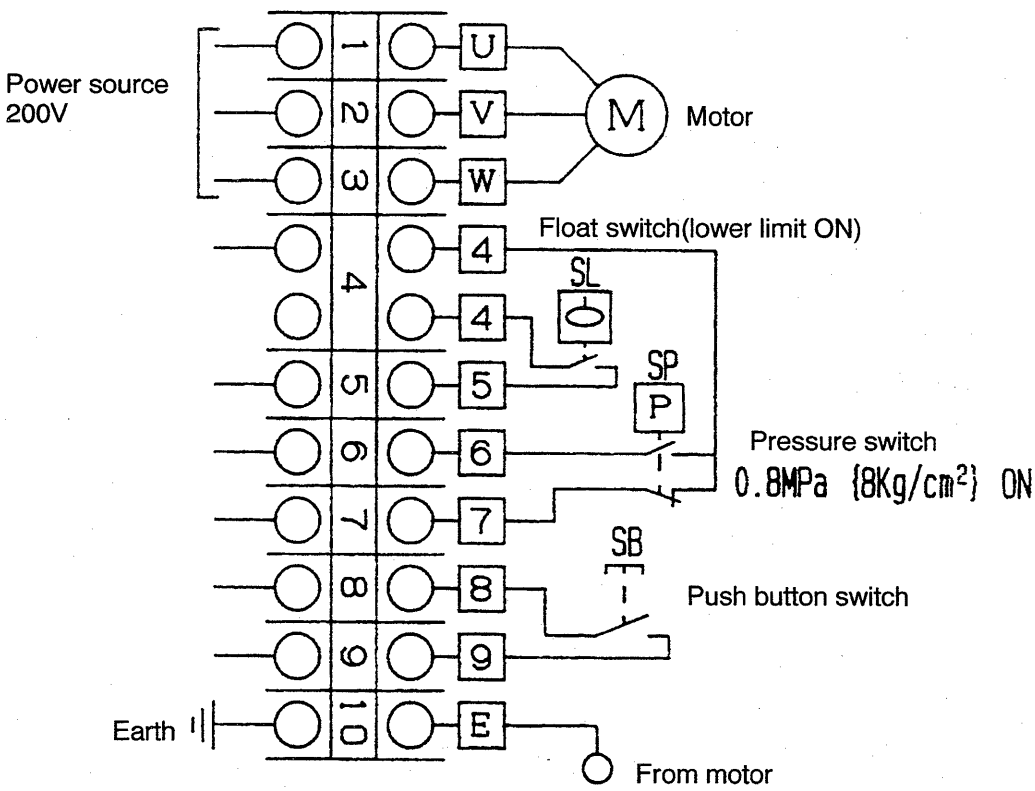
No.	Part Name	Part No.	Q'ty	Remarks
1	Tank	TY12	1	SHOWA
2	Tank frame	3SA412	1	SHOWA
3	Pump	MLB03W	1	SHOWA
4	Pressure gage	PGL35-2	1	SHOWA
5	Filler cap	SBC2	1	SHOWA
6	Line filter	LF0151E	1	SHOWA
7	Bracket	1362	1	SHOWA
8	Terminal box	3SD375	1	SHOWA
9	Terminal box cover	3-4908	1	SHOWA
10	Push button switch	AH165-EB11	1	FUJI
11	Pressure switch	GFB8	1	SHOWA
12	Connection diagram, name plate	3SZ380	1	SHOWA
13	Terminal block	10P	1	WAGO
14	Float switch	OLV01 (Lower limit ON)	1	SHOWA

(U27314 C02)

<Constructive circuit diagram>



<Wiring diagram>



16. SPINDLE BEARING LUBRICATION PUMP DIAGRAM

<Specifications>

Pump motor

Power × Poles	17 W × 2P Type E	
Frequency	50 Hz	60 Hz
Voltage	100 V	
Current	1.5 A	1.2 A
Discharge capacity	0.1 L/min	0.12 L/min
Discharge pressure	1.2 MPa {12 kgf/cm^2}	
Tank capacity	2.0 L (Effective capacity: 1.3L)	

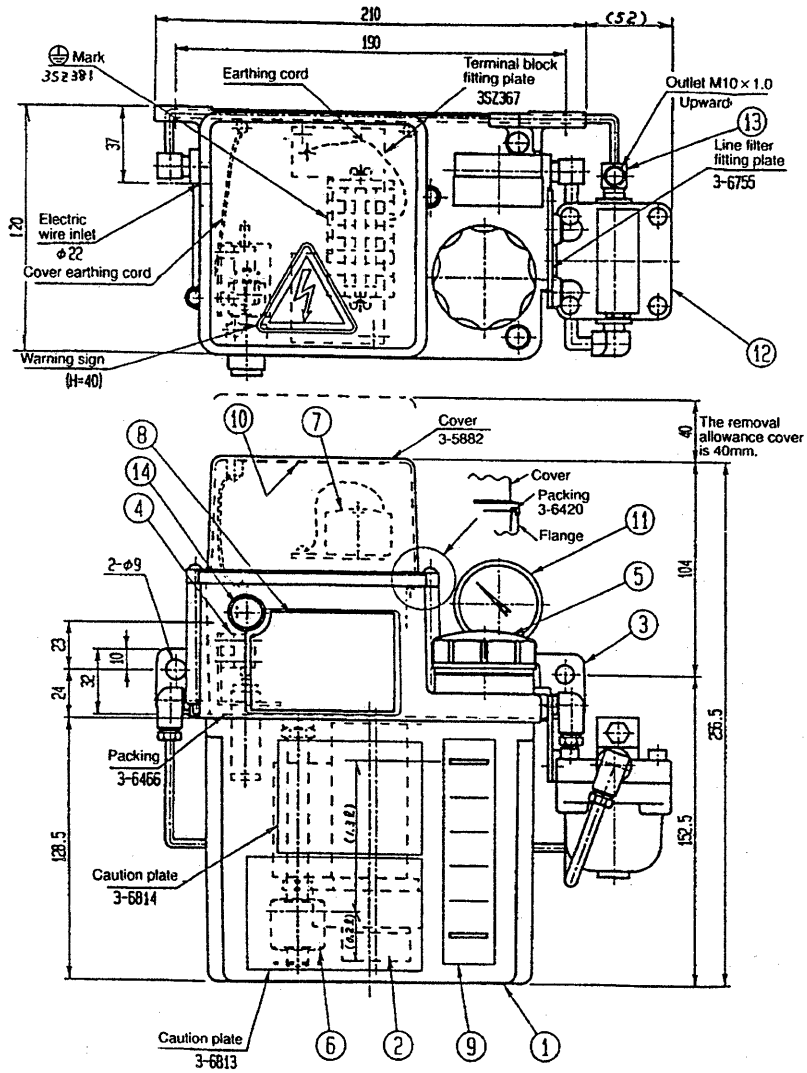
Float Switch

Maximum interrupting capacity	30 VAAC	50 WDC
Maximum interrupting current	0.33 AAC	1.0 ADC
Maximum interrupting voltage	250 VAC	200 VDC

PressureSwitch

Contact capacity	250 VAC 5 A, 30 VDC 5 A
Operating pressure	ON at 0.8 MPa {8 kgf/cm^2}

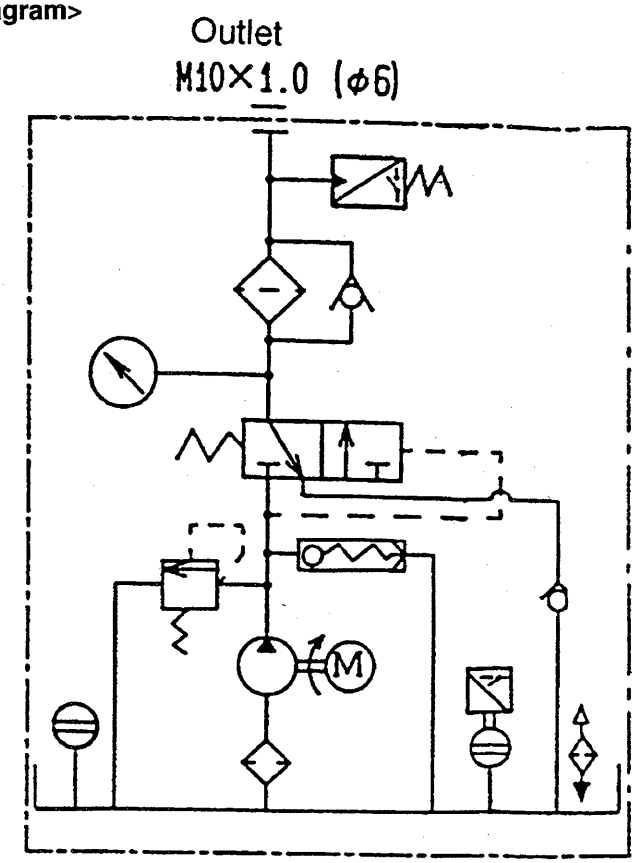
<General View>



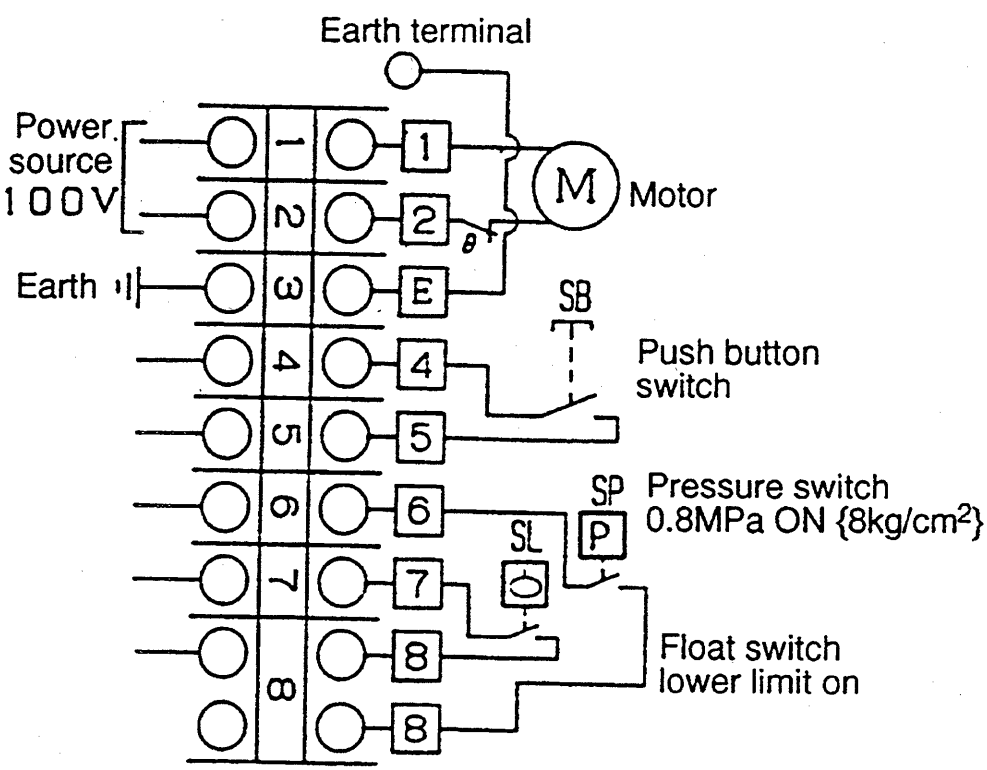
No.	Part Name	Part No.	Q'ty	Remarks
1	Tank	TP2A	1	SHOWA
2	Pump	MLB01W	1	SHOWA
3	Flange	ADC 3SA386	1	SHOWA
4	Pressure switch	GFB8	1	SHOWA
5	Filler cap	SBC2	1	SHOWA
6	Float switch	OLV01 (Lower limit ON)	1	SHOWA
7	Terminal block	8P	1	WAGO
8	Name plate	3SZ373	1	SHOWA
9	Level name plate	3-5236	1	SHOWA
10	Connection diagram, name plate	3SZ379	1	SHOWA
11	Pressure gage	PGLS35-3	1	SHOWA
12	Line filter	LF0101D	1	SHOWA
13	Connector	3-6756	1	SHOWA
14	Push button switch	AH165-EB11	1	FUJI

(U27323 B09)

<Circuit diagram>



<Wiring diagram>



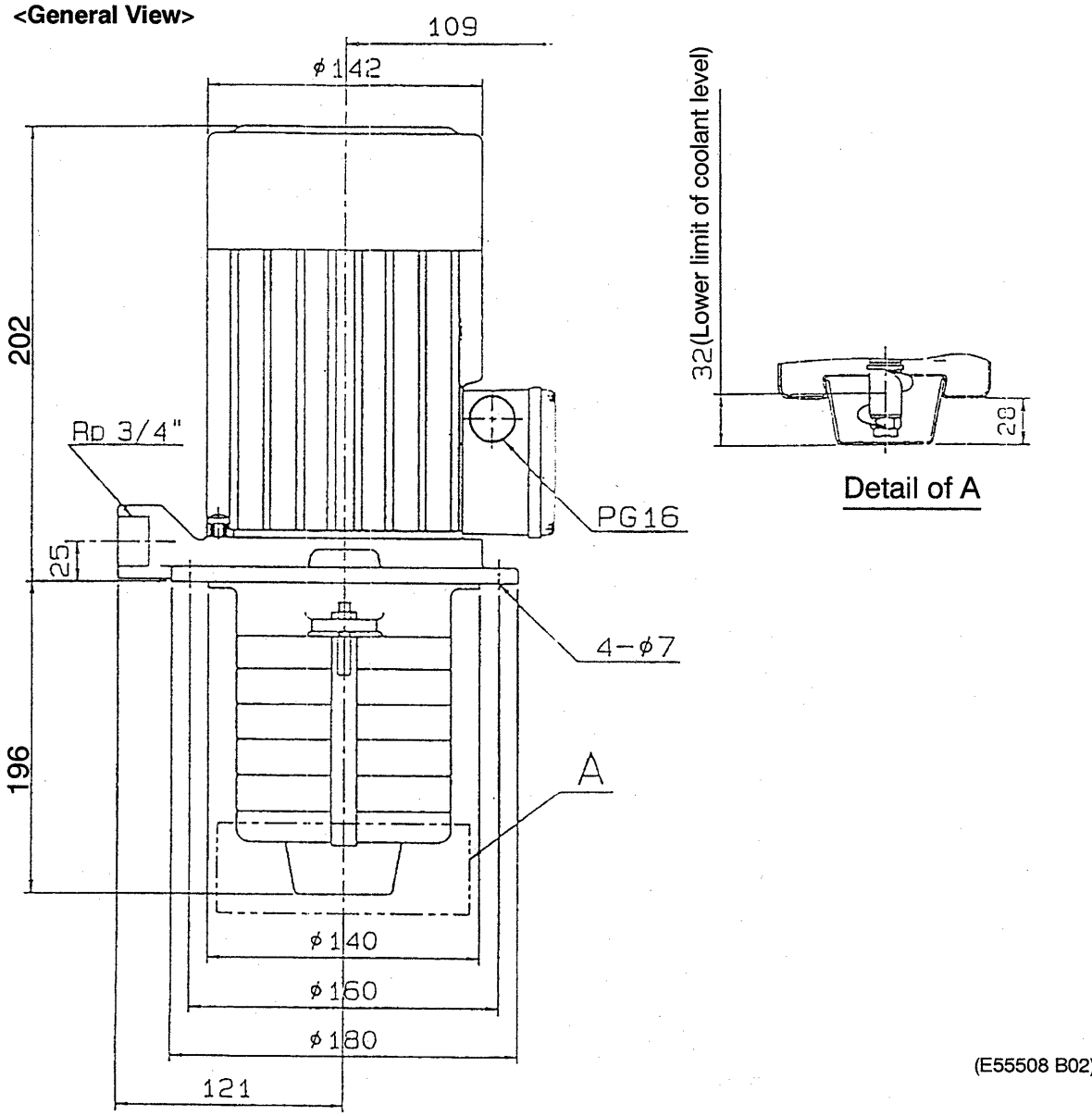
17. COOLANT PUMP DIAGRAMS

17.1 CHK2-60/3

<Specifications>

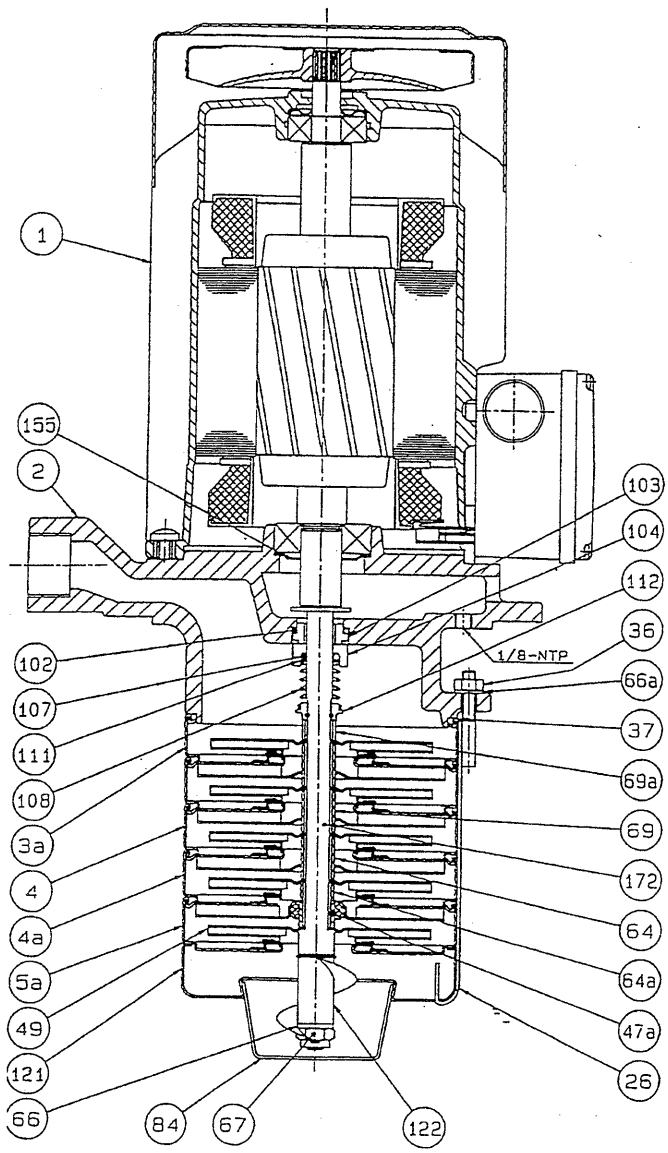
Type		Totally enclosed external fan type (indoor use) CHK2-60/3	
Output	(kW)	0.325	0.52
Frequency	(Hz)	50	60
Phases		3-phases	
Voltage	(V)	200	200 / 220
Current	(A)	2.7	2.4
Poles		2P	
Revolution	(min^{-1})	3,000	3,600
Insulation		F class	
Discharging outlet diameter	(mm)	20 (Rp 3/4)	

<General View>



(E55508 B02)

<Disassembly Diagram>



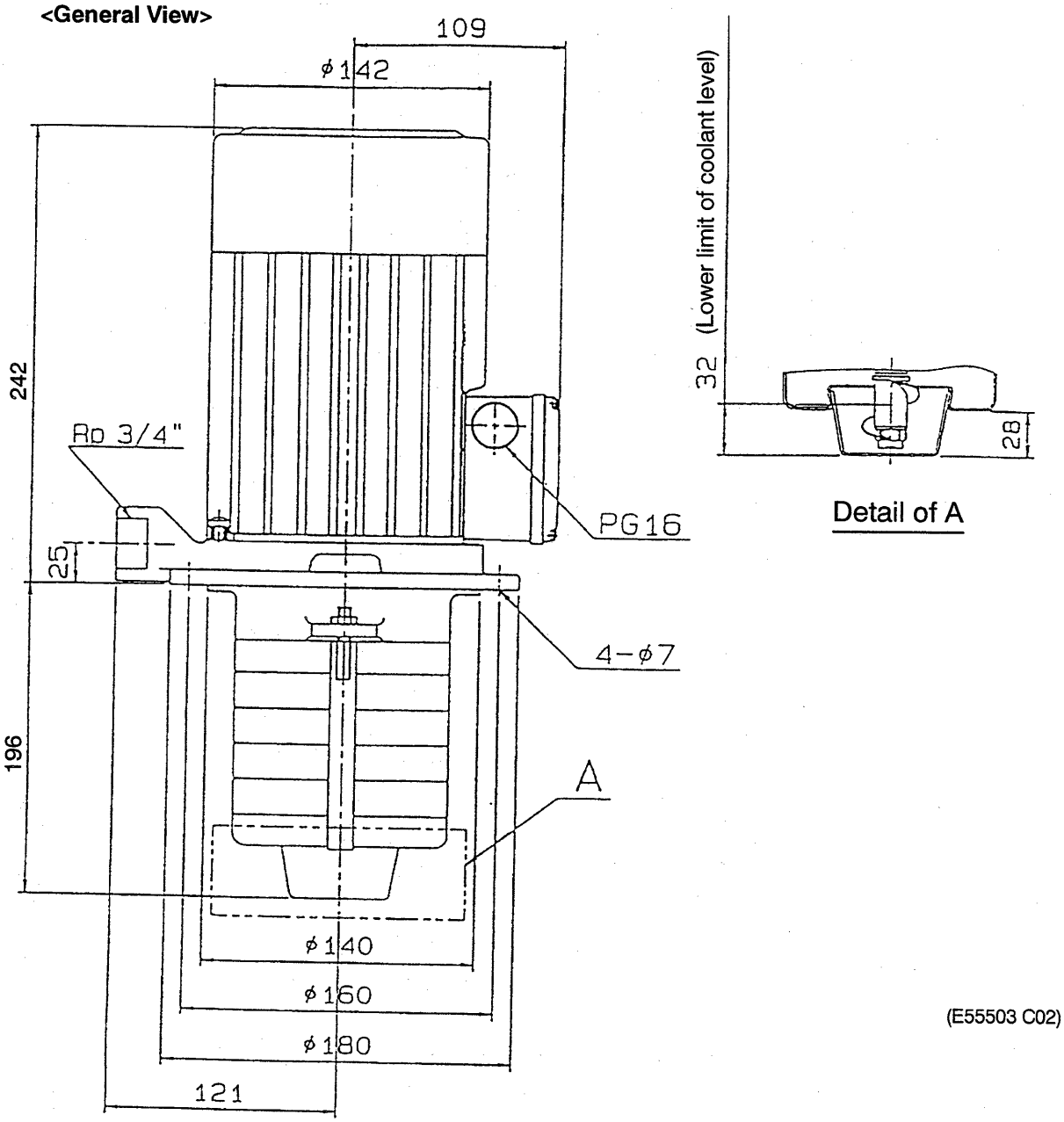
No.	Part Name	Q'ty	Material
1	Motor	1	-
2	Motor stool	1	FC200
3a	Intermediate chamber	2	SUS304
4	Intermediate chamber	2	SUS304
4a	Intermediate chamber (with bearing)	1	SUS304
5a	Bottom intermediate chamber	1	SUS316
26	Strap	3	SUS304
36	Nut	3	SUS316
37	Gasket	1	Oil paper
47a	Bearing ring	1	Tungsten cemented carbide
49	Impeller	3	SUS304
64	Spacer	1	SUS304
64a	Spacer	1	SUS304
66	Washer	1	SUS304
66a	Washer	3	SUS304
67	Lock nut	1	SUS304
69	Spacer	3	SUS304
69a	Spacer	1	SUS304
84	Strainer	1	SUS304
102	O-ring	1	Viton
103	Seal ring (fixed)	1	Carbon
104	Seal ring (rotation)	1	Ceramic
107	O-ring	1	Viton
108	Spring	1	SUS301
111	Disk	1	SUS304
112	Spacer	1	SUS304
121	Suction chamber	1	SUS304
122	Priming screw	1	SUS304
155	Bearing cover	1	SUS304
172	Pump shaft	1	SUS431

17.2 CHK2-60/6

<Specifications>

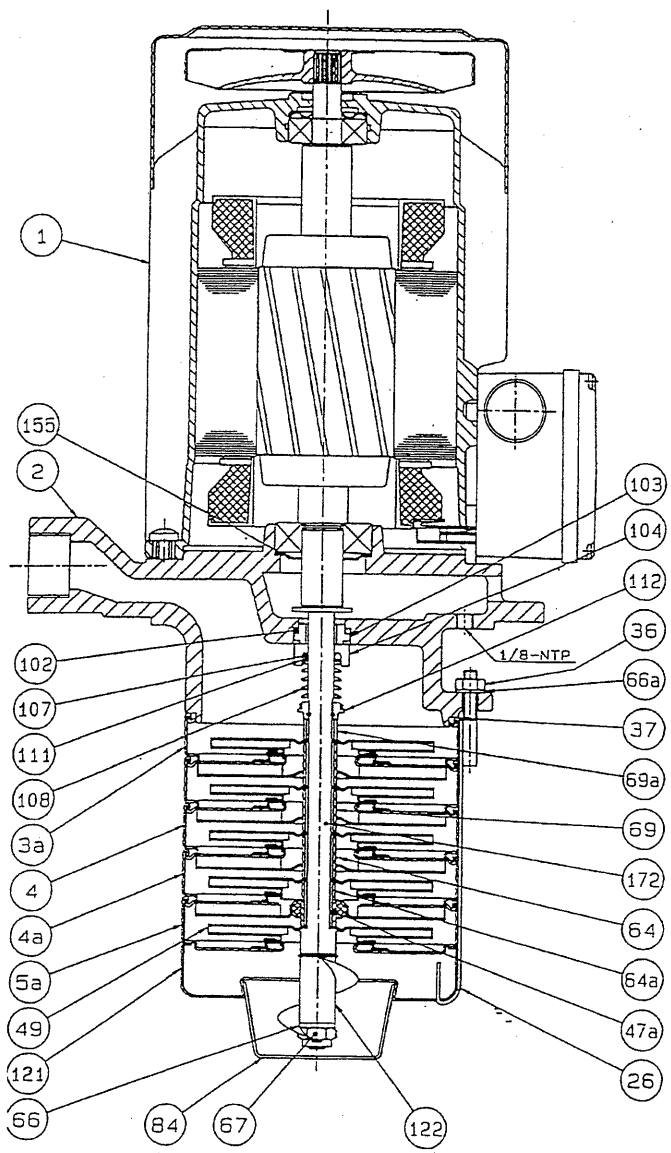
Type		Totally enclosed external fan type (indoor use) CHK2-60/6	
Output	(kW)	0.635	1.04
Frequency	(Hz)	50	60
Phases		3-phases	
Voltage	(V)	200	200/220
Current	(A)	4.2	4.4
Poles		2P	
Revolution	(min^{-1})	3,600	3,500
Insulation		F class	
Discharging outlet diameter	(mm)	20 (Rp 3/4)	

<General View>



(E55503 C02)

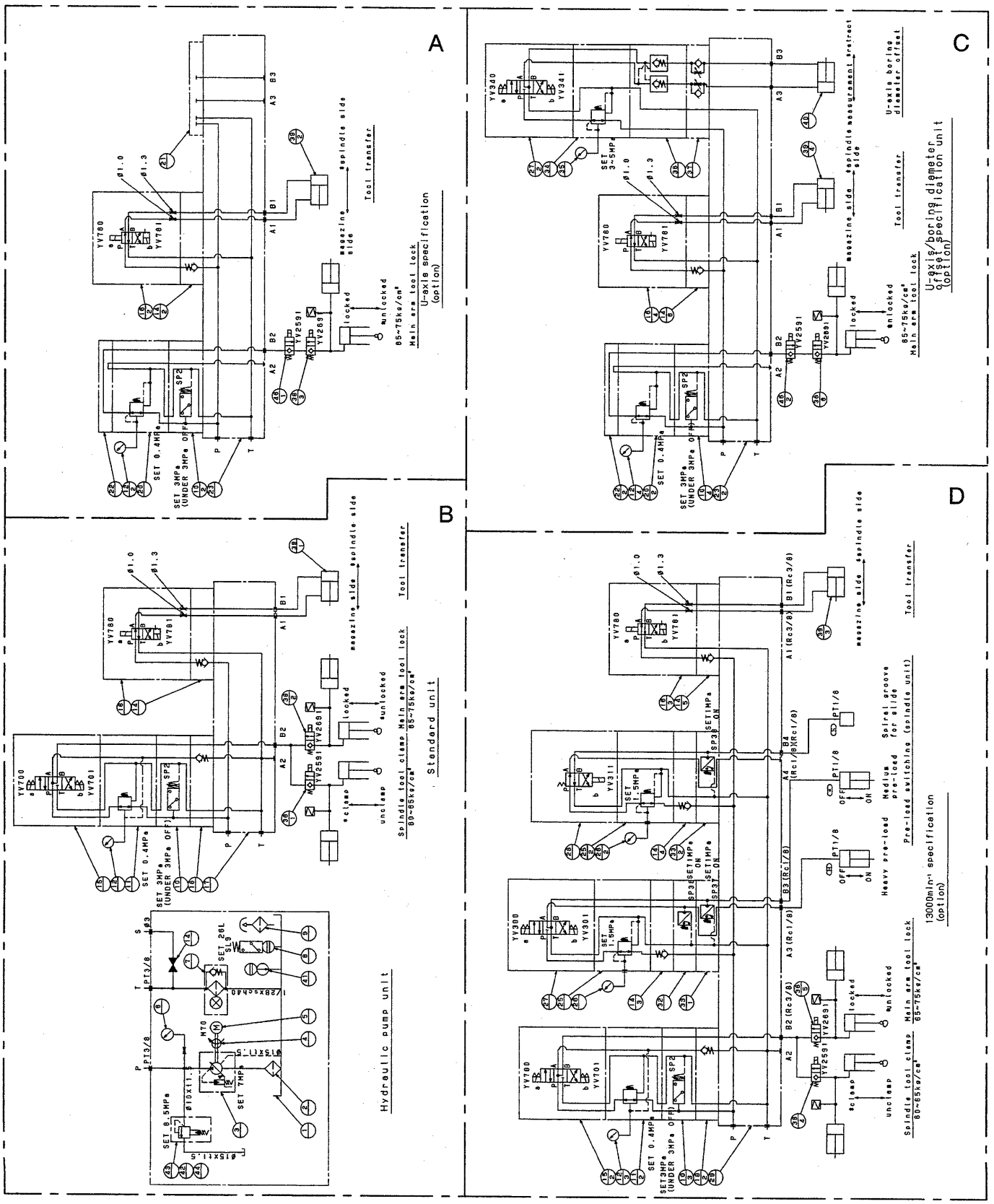
<Disassembly Diagram>



No.	Part Name	Q'ty	Material
1	Motor	1	-
2	Motor stool	1	FC200
4	Intermediate chamber	1	SUS304
4a	Intermediate chamber (with bearing)	4	SUS304
5a	Bottom intermediate chamber	1	SUS316
26	Strap	3	SUS304
36	Nut	3	SUS316
37	Gasket	1	Oil paper
47a	Bearing ring	1	Tungsten cemented carbide
49	Impeller	6	SUS304
64	Spacer	4	SUS304
64a	Spacer	1	SUS304
66	Washer	1	SUS304
66a	Washer	3	SUS304
67	Lock nut	1	SUS304
69a	Spacer	1	SUS304
84	Strainer	1	SUS304
102	O-ring	1	Viton
103	Seal ring (fixed)	1	Carbon
104	Seal ring (rotation)	1	Ceramic
107	O-ring	1	Viton
108	Spring	1	SUS301
111	Disk	1	SUS304
112	Spacer	1	SUS304
121	Suction chamber	1	SUS304
122	Priming screw	1	SUS304
155	Bearing cover	1	SUS304
172	Pump shaft	1	SUS431

18. HYDRAULIC UNIT DIAGRAMS

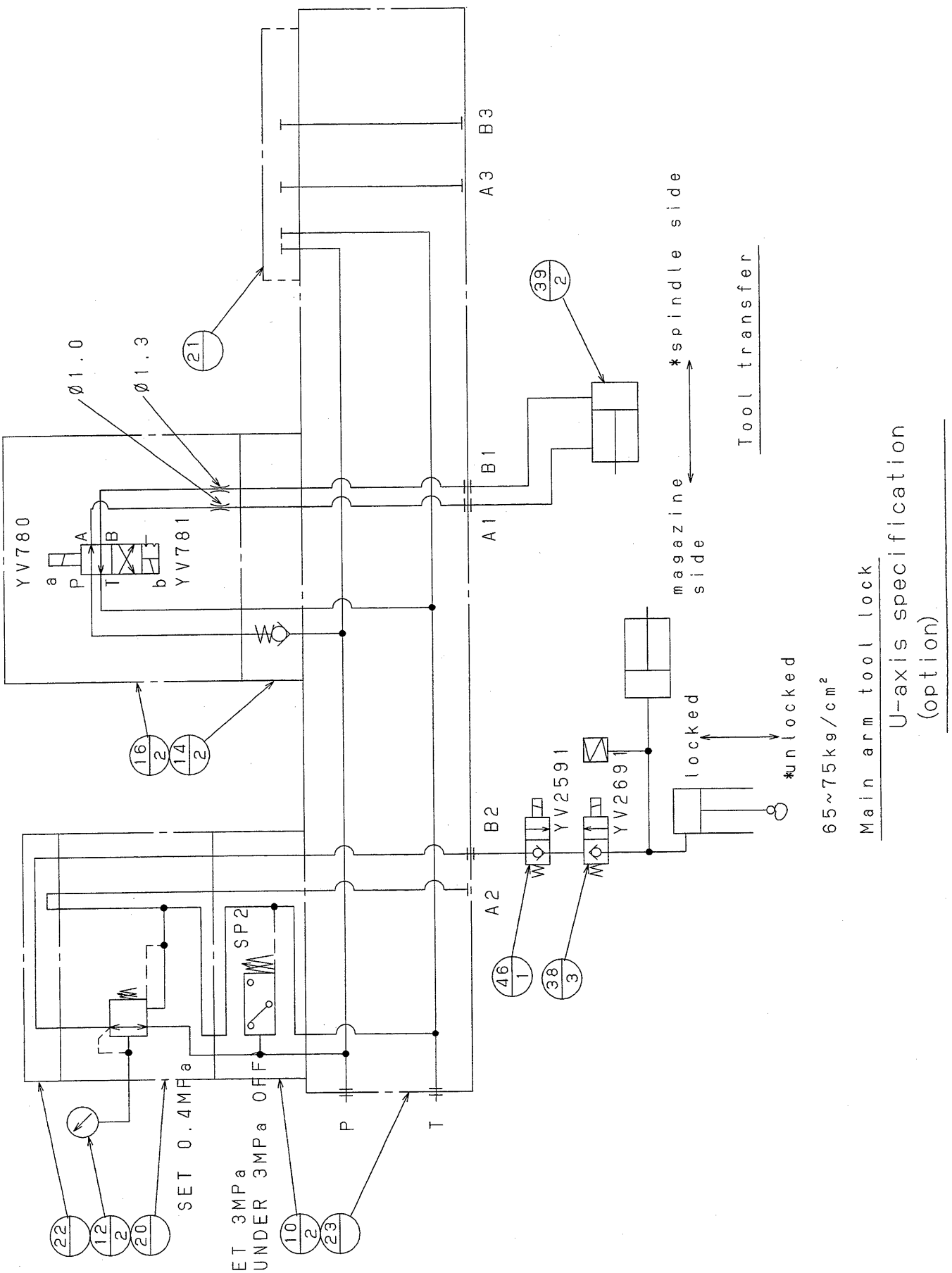
18.1 Hydraulic Circuit Diagram



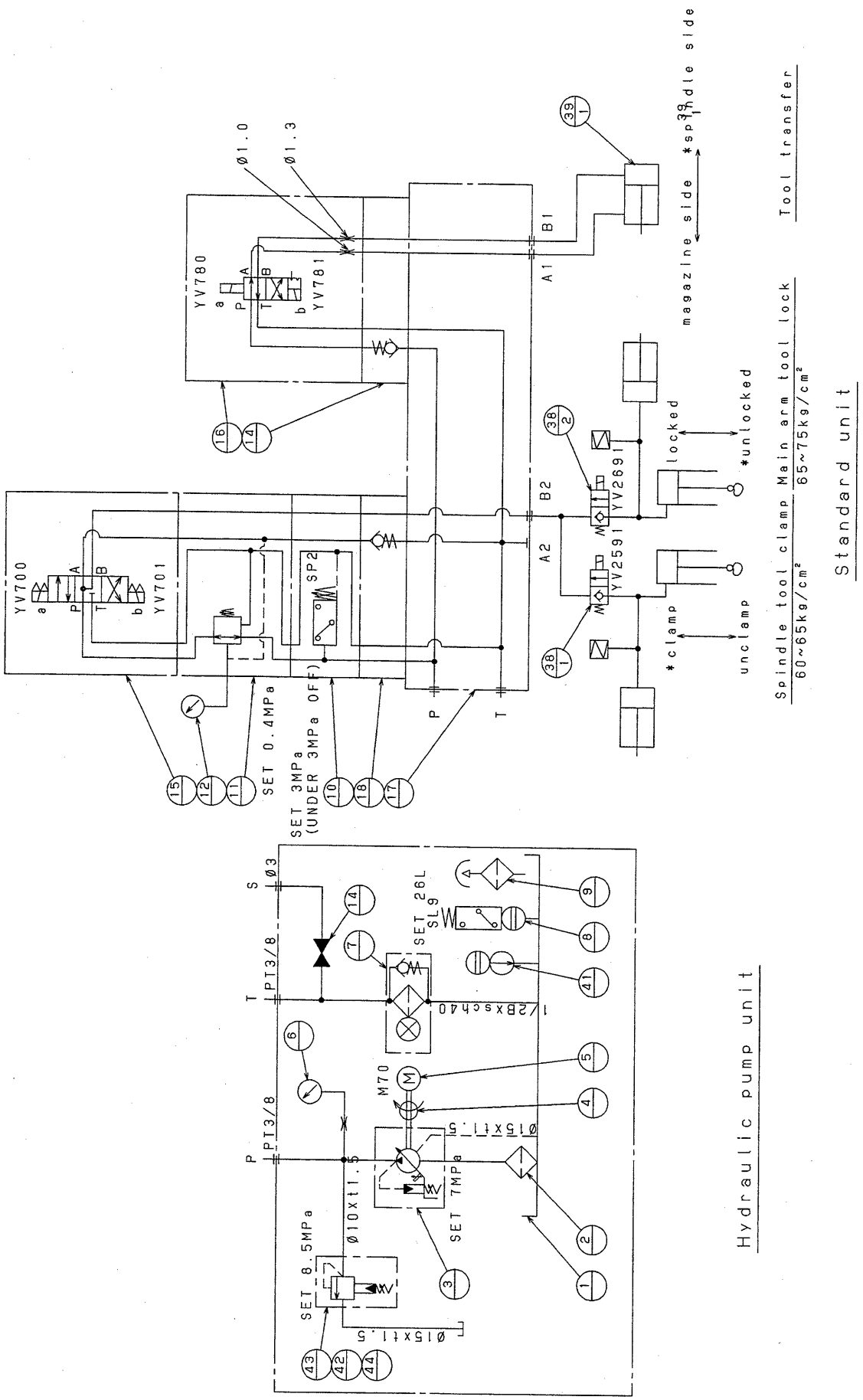
* indicates home position.

(Q46009001 1/2)

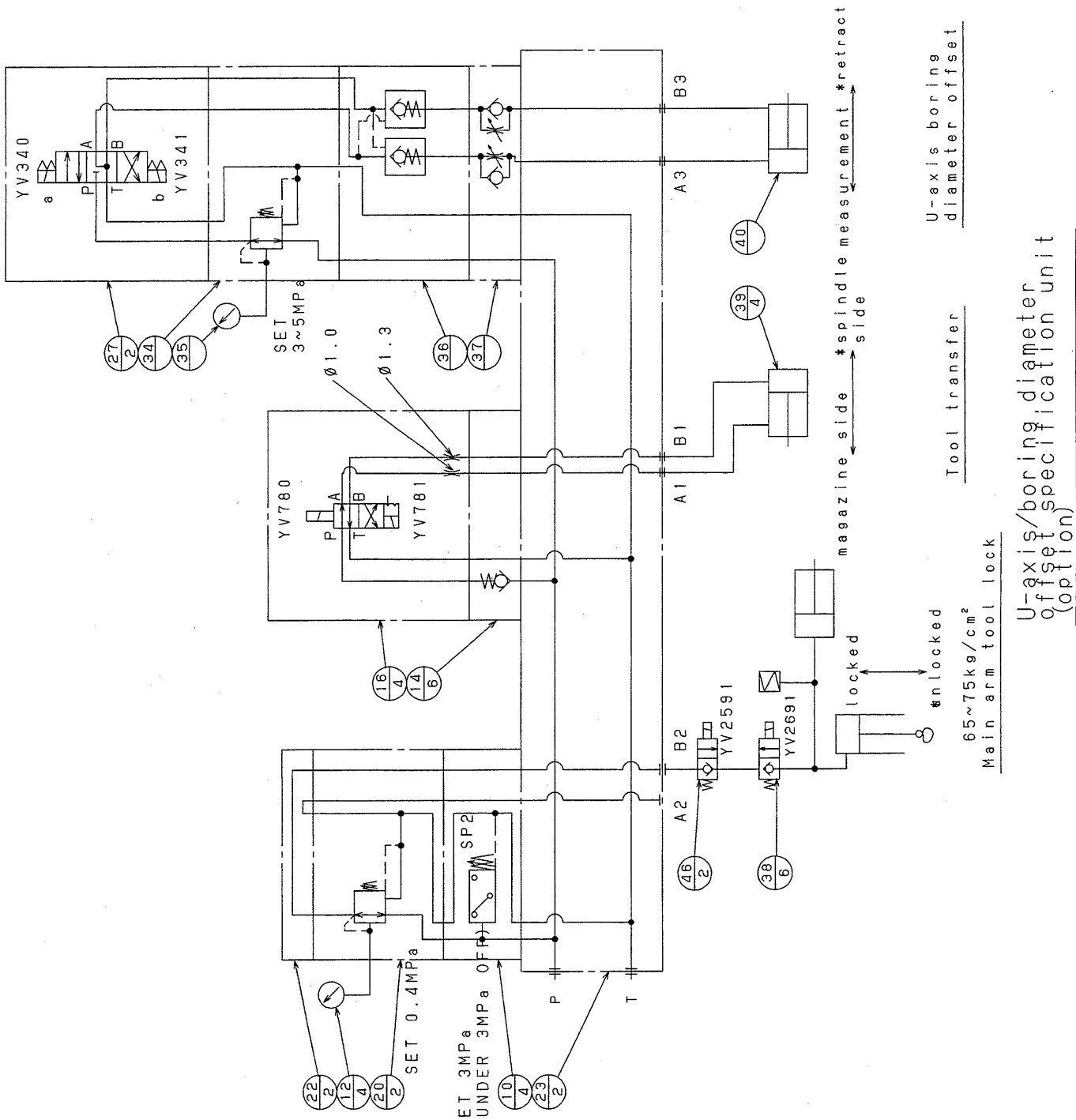
<Detail of A>


Main arm tool lock
U-axis specification
(option)
65~75kg/cm²
*unlocked
locked
magazine side
*spindle side
Tool transfer
YV780
YV781
YV2591
YV2691
SP2
SET 0.4MPa
SET 3MPa
(UNDER 3MPa OFF)
P
T
A1
A2
A3
B1
B2
B3
Ø1.0
Ø1.3

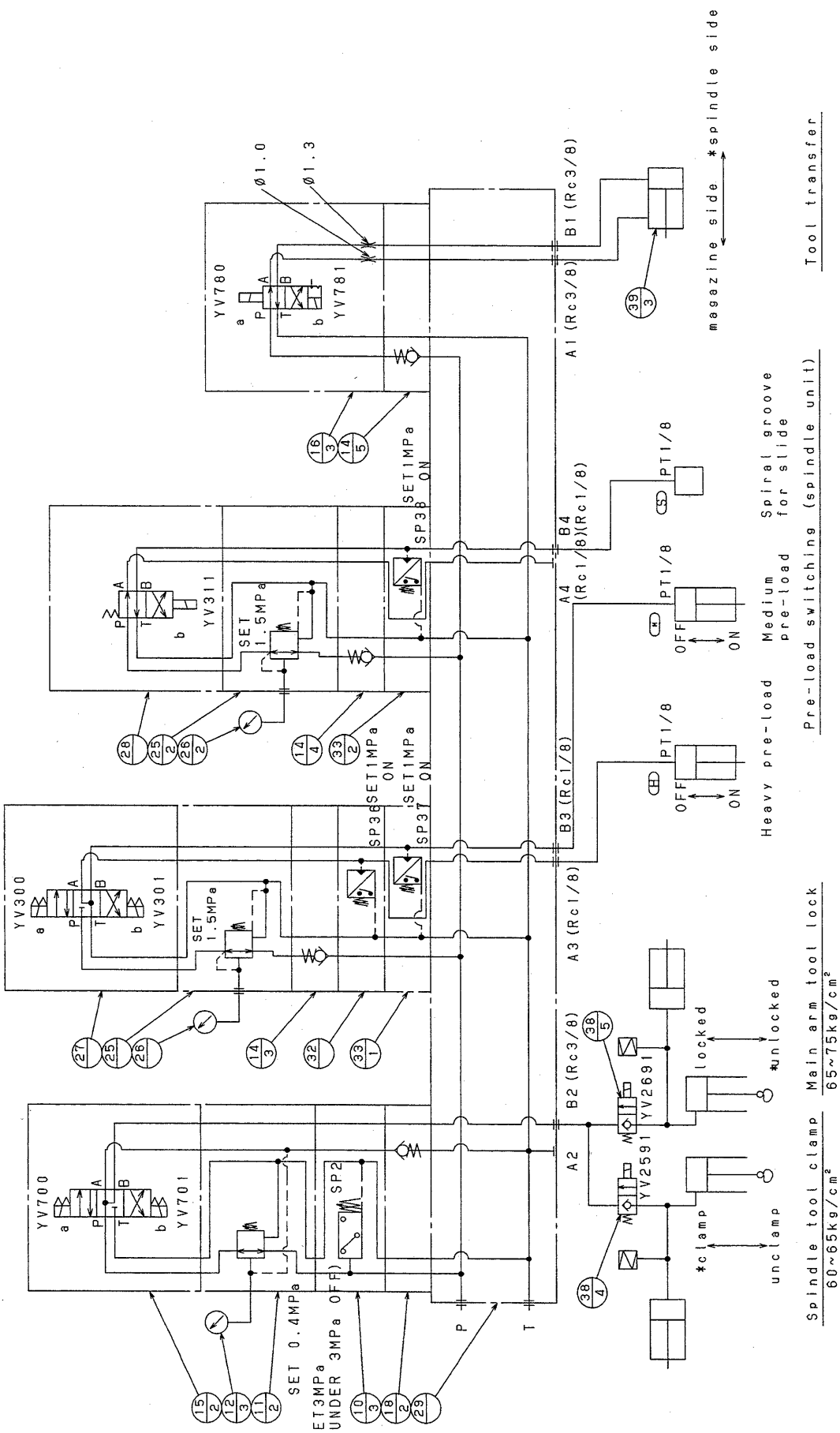
<Detail of B>


Hydraulic pump unit
Standard unit
Tool transfer
magazine side *spindle side
Spindle tool clamp Main arm tool lock
60~65kg/cm²
65~75kg/cm²
*clamp
unclamp
*unlocked
locked
YV700
YV701
YV780
YV781
YV2591
YV2691
SET 0.4MPa
SET 3MPa
(UNDER 3MPa OFF)
SET 8.5MPa
SET 7MPa
SET 26L
M70
SP2
SL9
Ø1.0
Ø1.3
A1
B1
A2
B2
P
T
S

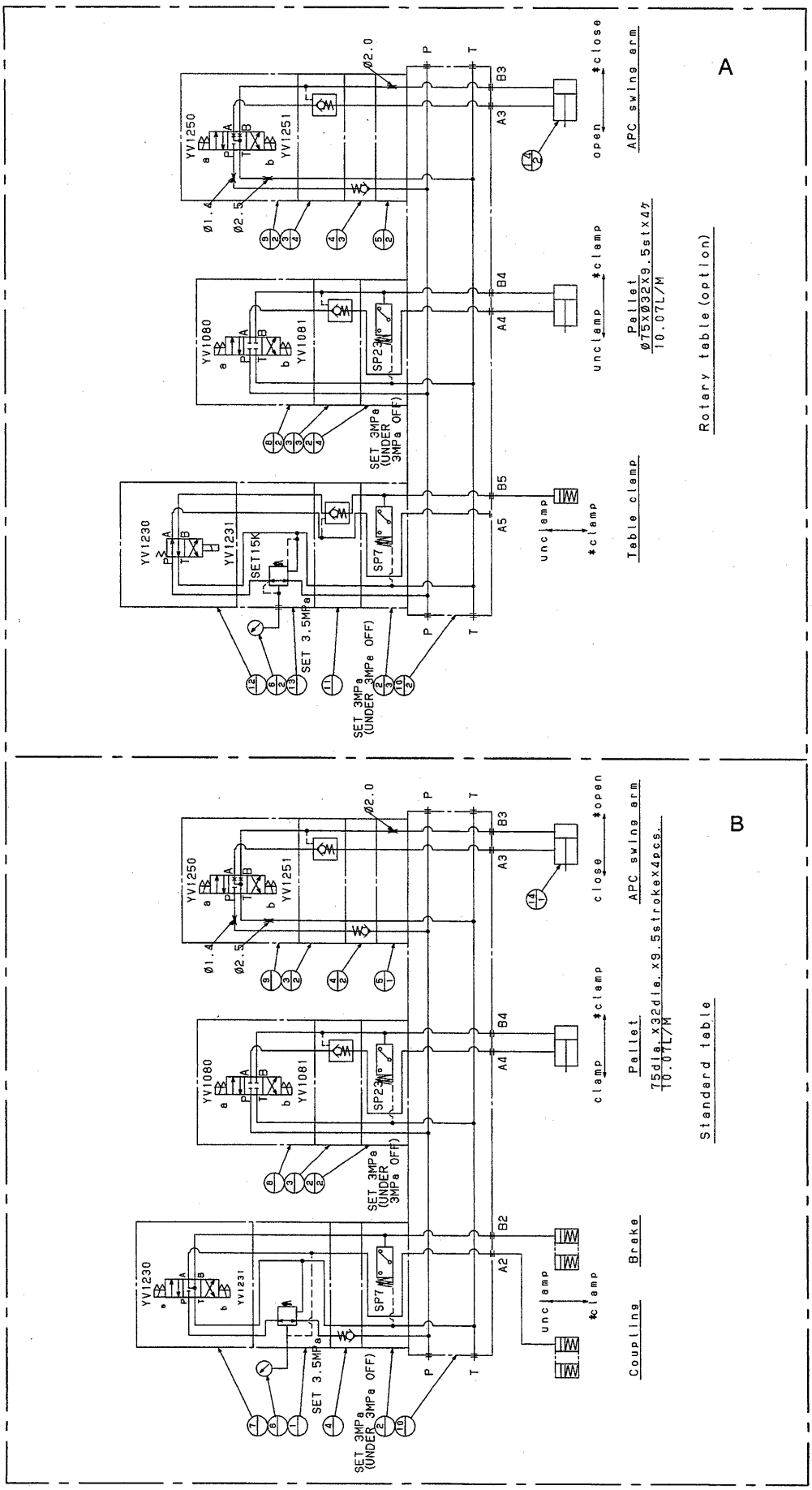
<Detail of C>


YV340
YV341
a
b
P
T
A
B
SET 3~5MPa
Ø1.0
Ø1.3
YV780
YV781
SET 0.4MPa
SET 3MPa (UNDER 3MPa OFF)
SP2
P
T
B3
A3
B1
A1
B2
A2
YV2591
YV2691
magazine side *spindle measurement *retract side
Tool transfer
locked
unlocked
65~75kg/cm²
Main arm tool lock
U-axis boring diameter offset
U-axis/boring diameter offset specification unit (option)

<Detail of D>

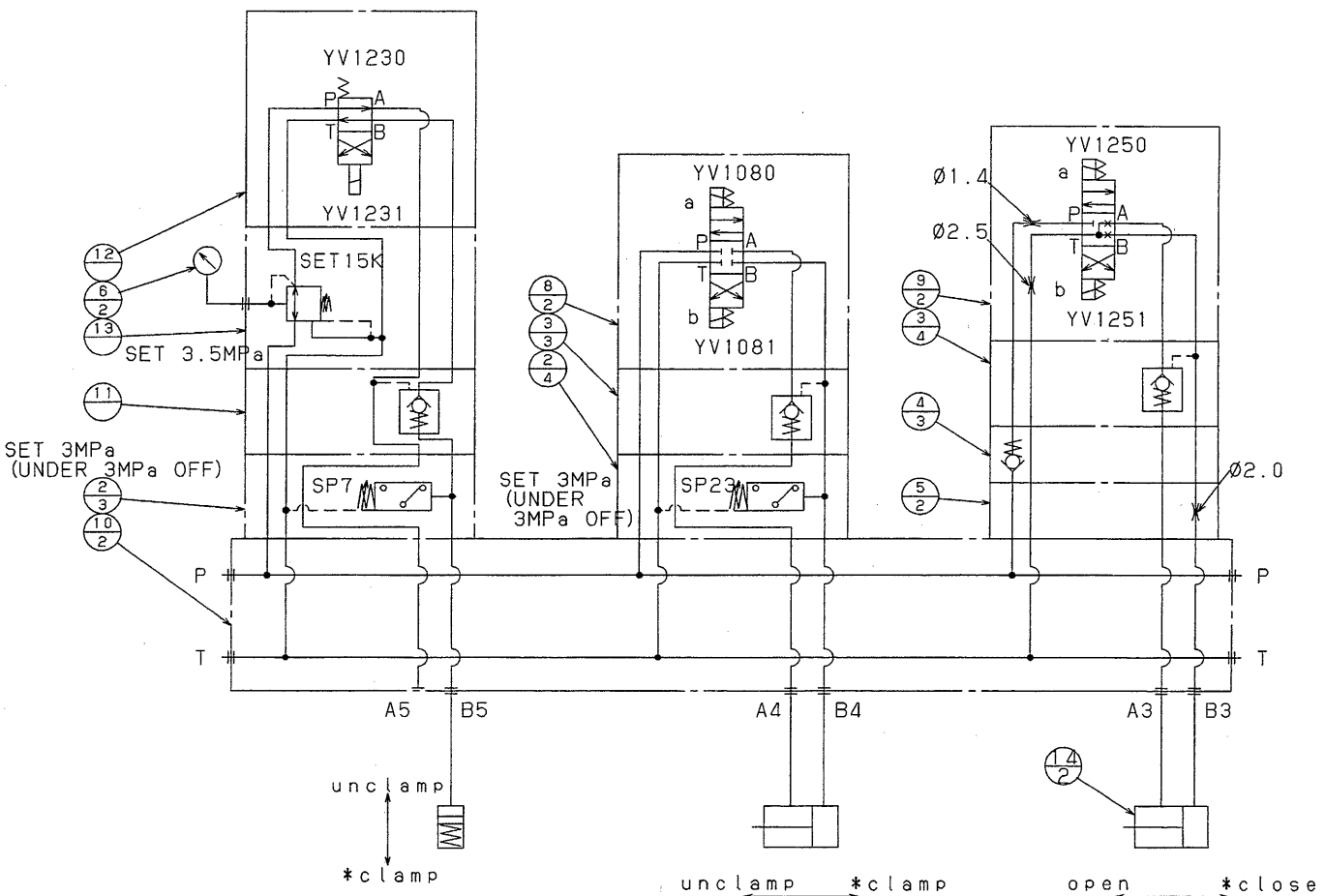

magazine side *spindle side
Tool transfer
Pre-load switching (spindle unit)
13000min-1 specification
(option)
Heavy pre-load
Medium pre-load
Spiral groove for slide
Spindle tool clamp
60~65kg/cm²
Main arm tool lock
65~75kg/cm²
*clamp
unclamp
*unlocked
locked
YV780
YV781
YV311
YV300
YV301
YV700
YV701
YV2691
YV2591
SET 1.5MPa
SET 0.4MPa
SET3MPa
(UNDER 3MPa OFF)
SET1MPa ON
PT1/8
OFF
ON
A1 (Rc3/8)
B1 (Rc3/8)
A2
B2 (Rc3/8)
A3 (Rc1/8)
B3 (Rc1/8)
A4 (Rc1/8)
B4 (Rc1/8)
SP2
SP36
SP37
SP38
P
T

NO.	PART NAME	MODEL	Q	REMARK
46	Lucifer valve	121K-04-2995/8118-100AC-DIN	2	TOKIMEC
45	Drain valve	MVD102	1	MAKIZAKI
44	Sub plate	DGMS-3-1E-10-T-JA-J	1	TOKIMEC
43	Connecting plate	DGMA-3-C1-10-JA	1	TOKIMEC
42	Relief valve	DGMC-3-PT-BW-41J	1	TOKIMEC
41	Level gage with thermometer	OLGT2-100	1	MARUWA
40	Hydraulic cylinder	MR70-1-CB25×50	1	HORIUCHI
39	Hydraulic cylinder	F7-SF-1TC32B70B170-ABD-N	4	HORIUCHI
38	Lucifer valve	121F-44-2722 100V DIN	6	TOKIMEC
37	Flow regulator	DGMFN-3-Y-A1W-B1W-41J	1	TOKIMEC
36	Pilot check valve	DGMPC-3-ABK-BAK-41J	1	TOKIMEC
35	Pressure gage	Ø40×1.5MPa (0.35~0.45KGREEN, THE OTHER RED)	1	TOKIMEC
34	Reducing valve	DGMX2-3-PP-BW-B-40J	1	TOKIMEC
33	Pressure switch	SG307-F-55-B, DGM-3-B-B-10	2	TOKIMEC
32	Pressure switch	SG307-F-55-B, DGM-3-A-B-10	1	TOKIMEC
29	Manifold block	DGMS-3-4E-10-T-JA-J	1	TOKIMEC
28	Solenoid valve	DG4V-3S-7C-M-U-T5-60	1	TOKIMEC
27	Solenoid valve	DG4V-3S-6C-M-U-T5-60	1	TOKIMEC
26	Pressure gage	Ø40×1.5MPa (0.35~0.45K GREEN, THE OTHER RED)	2	TAKASIMA
25	Reducing valve	DGMX2-3-PP-AW-B-40J	2	TOKIMEC
23	Manifold block	DGMS-3-3E-10-T-JA-J	2	TOKIMEC
22	Connecting plate	DGMA-3-C2-10-JA	2	TOKIMEC
21	Blanking plate	DGMA-3-B-10-JA	1	TOKIMEC
20	Reducing valve	DGMX2-3-PP-YW-B-40J	2	TOKIMEC
18	Check valve	DGMDC-3-Y-AN-41J	2	TOKIMEC
17	Manifold block	DGMS-3-2E-10-T-JA-J	1	TOKIMEC
16	Solenoid valve	DG4V-3S-2N-M-U-T5-60	4	TOKIMEC
15	Solenoid valve	DG4V-3S-7C-M-U-T5-60	2	TOKIMEC
14	Check valve	DGMDC-3-Y-PK-41J	6	TOKIMEC
12	Pressure gage	Ø40×1.5MPa (0.35~0.45K GREEN, THE OTHER RED)	4	TAKASIMA
11	Reducing valve	DGMX2-3-PA-YW-B-40J	2	TOKIMEC
10	Pressure switch	SG307-F-55-B, DGM-3-P-B-10	4	TOKIMEC
9	Filler & air breeder	FA-35	1	
8	Float switch	WS32-2 L=150	1	
7	Return filter	FRS04-10P-04T	1	
6	Pressure gage	G-D1/4PT×60×15MPa/PSI (6.75~7.25 GREEN, THE OTHER RED)	1	
5	Electric motor	1.5kw × 4P	1	
4	Coupling	CR4016-J	1	
3	Piston pump	P16V-RSG-CMC-10-S121-J	1	
2	Tank filter	OFS-06-JA-10-J	1	
1	Tank	40L	1	



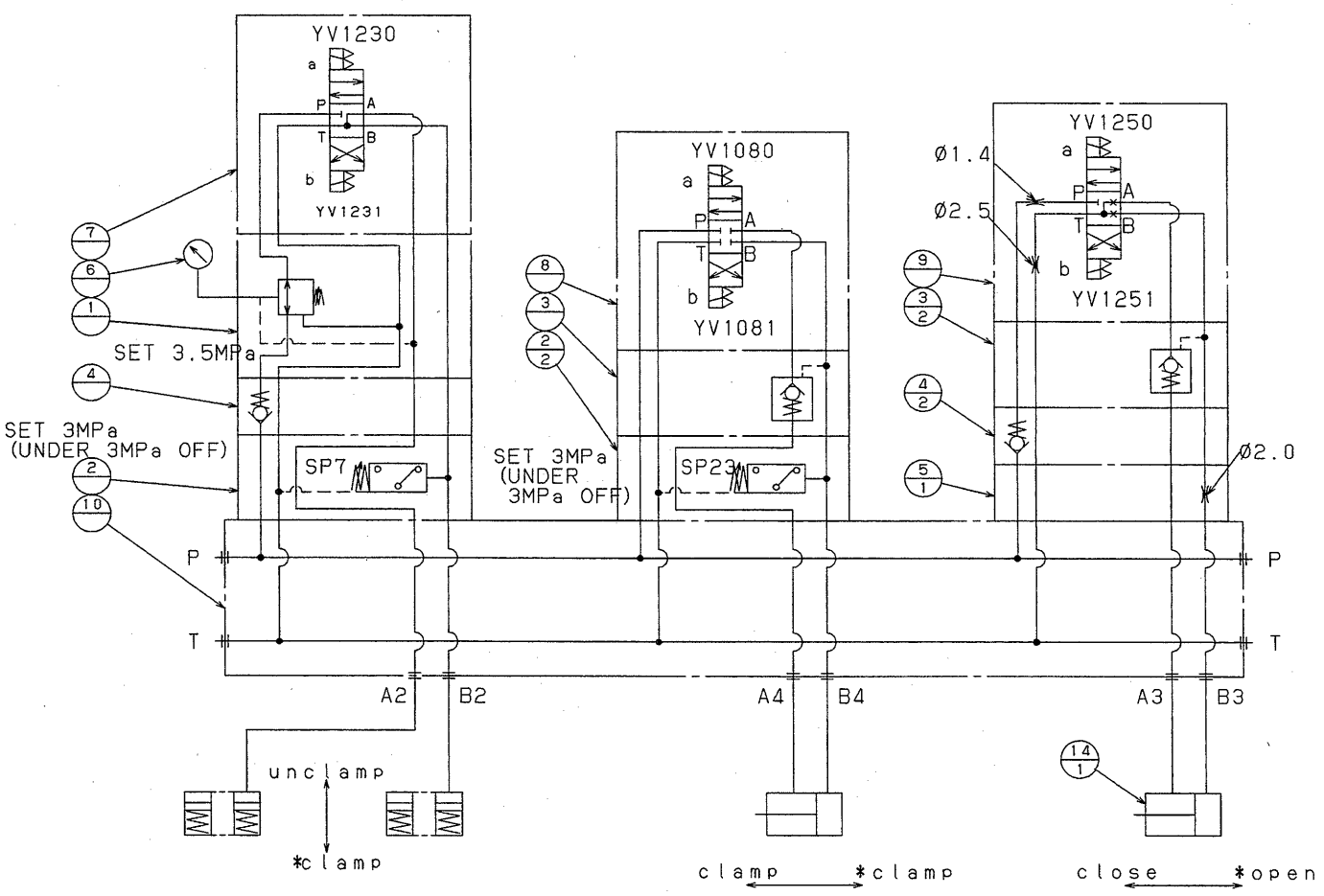
(Q46009001 2/2)

<Detail of A>



Rotary table (option)

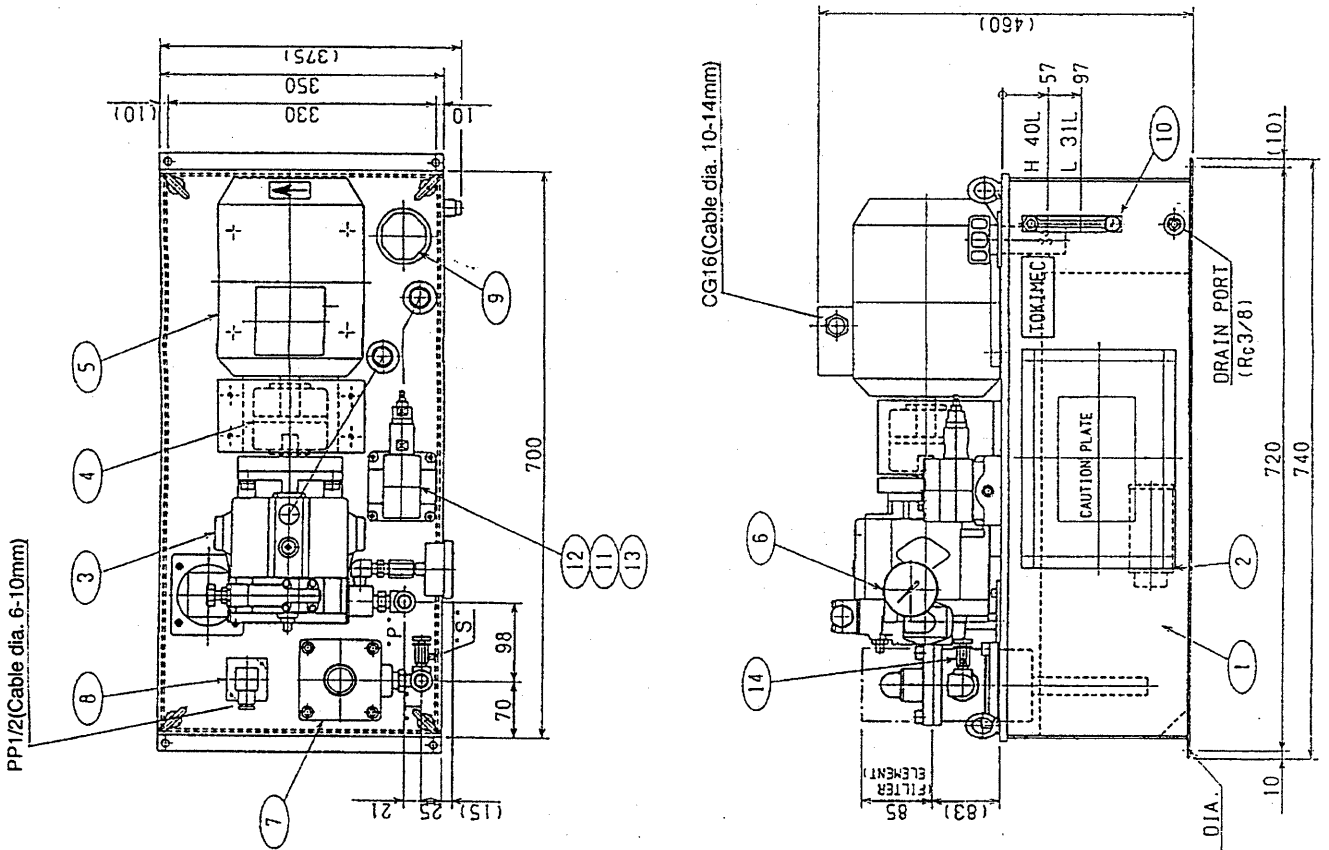
<Detail of B>



Standard table

NO.	NAME	MODEL	Q	REMARK
14	Hydraulic cylinder	F7-SF-1TC32B70B130-BCA-N	2	HORIUCHI
13	Reducing valve	DGMx2-3-PP-BW-B-40J	1	TOKIMEC
12	Solenoid valve	DG4V-3S-2A-M-U-T5-60	1	TOKIMEC
11	Pilot check valve	DGMPC-3-BAK-41J	1	TOKIMEC
10	Manifold block	DGMS-3-3EX-10-T-JA-J	2	TOKIMEC
9	Solenoid valve	DG4V-3S-33C-M-U-T5-60	2	TOKIMEC
8	Solenoid valve	DG4V-3S-2C-M-U-T5-60	2	TOKIMEC
7	Solenoid valve	DG4V-3S-6C-M-U-T5-60	1	TOKIMEC
6	Pressure gage (with glycerin)	Ø40x10MPa/PSI (3.25~ 3.75MPa GREEN, THE OTHER RED)	2	TAKASHIMA
5	Orifice plate	410212400	2	TOKIMEC
4	Check valve	DGMDC-3-Y-PK-41J	3	TOKIMEC
3	Pilot check valve	DGMPC-3-ABK-41J	4	TOKIMEC
2	Pressure switch	SG307-F-55-B, DGMP-B-B-10	4	TOKIMEC
1	Reducing valve	DGMx2-3-PA-BW-B-40J	1	TOKIMEC

18.2 General View and Specifications of Hydraulic Unit



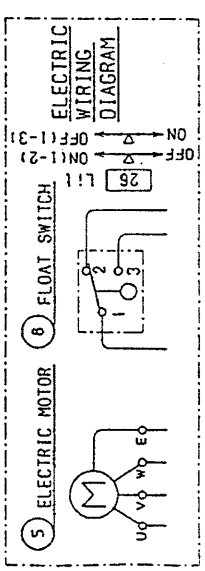
A SYSTEM SPECIFICATION

OPERATING PRESSURE(MAX.)	7MPa CUT OFF
DISPLACEMENT	15.6 L/min AT 50 Hz
OPERATING VISCOCITY RANGE	20-80 cSt
HYDRAURIC FLUID	ISO VG32
POWER SOURCE (POWER SYSTEM)	AC 3PHASE 200V 50Hz
STANDARD	or EN982, or EN809

STANDARD LIST FOR AC POWER SOURCE(ELECTRIC MOTOR)				
VOLTAGE (V)	200	200	220	
FREQUENCY (Hz)	50	60	60	
CURRENT (A)	6.9	6.7	6.1	
ELECTRIC POWER (KVA)	2.4	2.3	2.3	
OUTPUT (KW)	1.5KW 4P			
PHASE (ø)	3			

STANDARD LIST (FLOAT SWITCH)	
OPERATING VOLTAGE/CURRENT(MAX.)	220V/0.8A
OPERATING VOLTAGE/CURRENT(MIN.)	1V/2mA

NOISE LEVELS
7MPa CUT OFF
DISTANCE 1m HEIGHT 1m
5 ASPECT AVERAGE APPROX. 67/70db(A) 50/60Hz

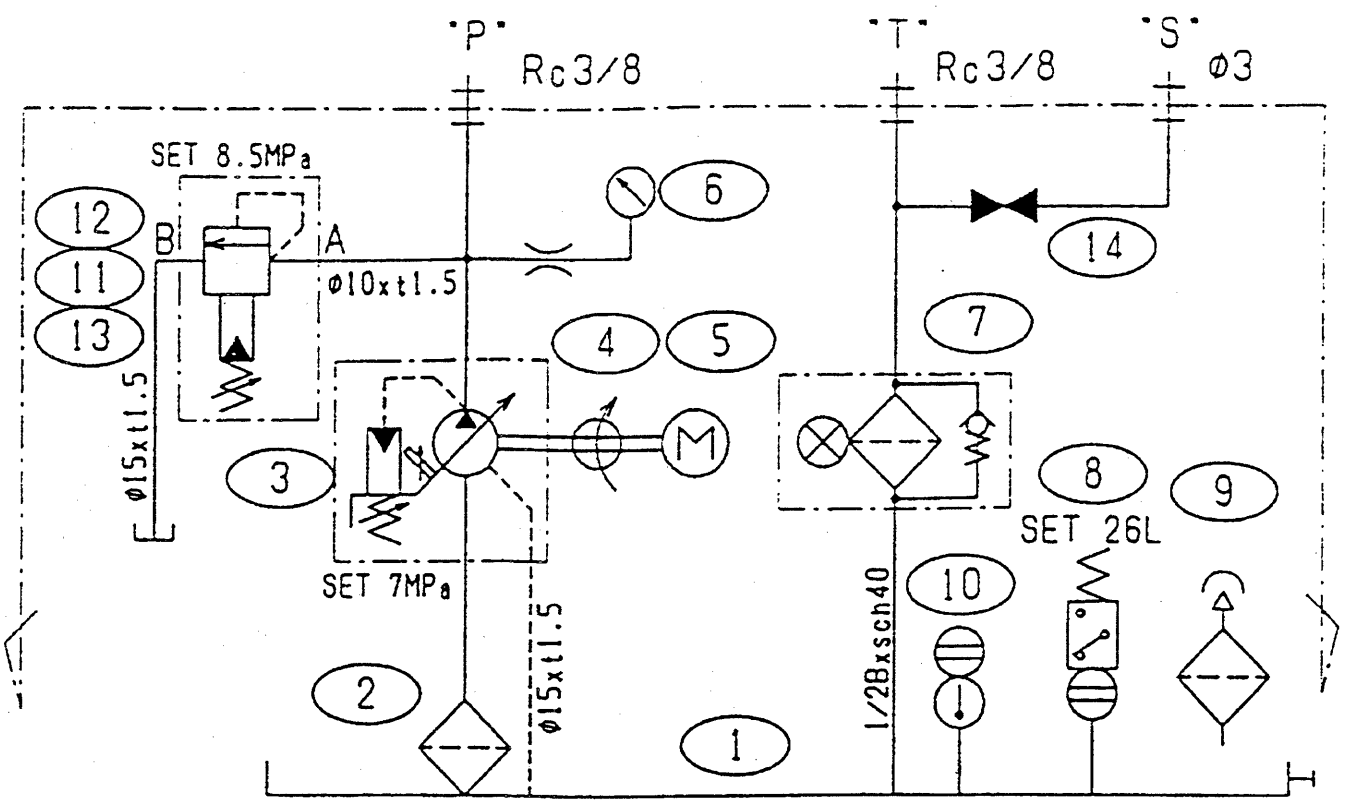


(U03006 B03)

<Names of major parts>

No.	Part Name	Part No.	Q'ty	Remarks
1	Tank	40L	1	TOKIMEC
2	Tank filter	OFS-06-JA-10-J	1	TOKIMEC
3	Piston pump	P16VMFR-10-CMC-20-J	1	TOKIMEC
4	Coupling	CR4016-J	1	TSUBAKIMOTO
5	Electric motor	1.5kW4P (LS90L/1.5kW/4P/B3)	1	LEROY SOMER
6	Pressure gage	G-D1/4PT×60×15MPa/PSI (6.75~7.25 GREEN, THE OTHER RED)	1	TAKASHIMA
7	Return filter	FRS04-10P-04T	1	MASUDA
8	Float switch	WS32-2 L=150	1	WILLY VOGEL
9	Filler & air breazer	FA-35	1	TAISEI
10	Level gage with thermometer	OLGT2-100	1	MARUWA
11	Relief valve	DGMC-3-PT-BW-41J	1	TOKIMEC
12	Connecting plate	DGMA-3-C1-10-JA	1	TOKIMEC
13	Sub plate	DGMS-3-1E-10-T-JA-J	1	TOKIMEC
14	Drain valve	MVD102	1	MAKIZAKI

<Circuit diagram>



18.3 General View and Specifications of Valve Unit For Spindle Tool Clamp / Unclamp and Tool Transfer

18.3.1 MH-630 Standard

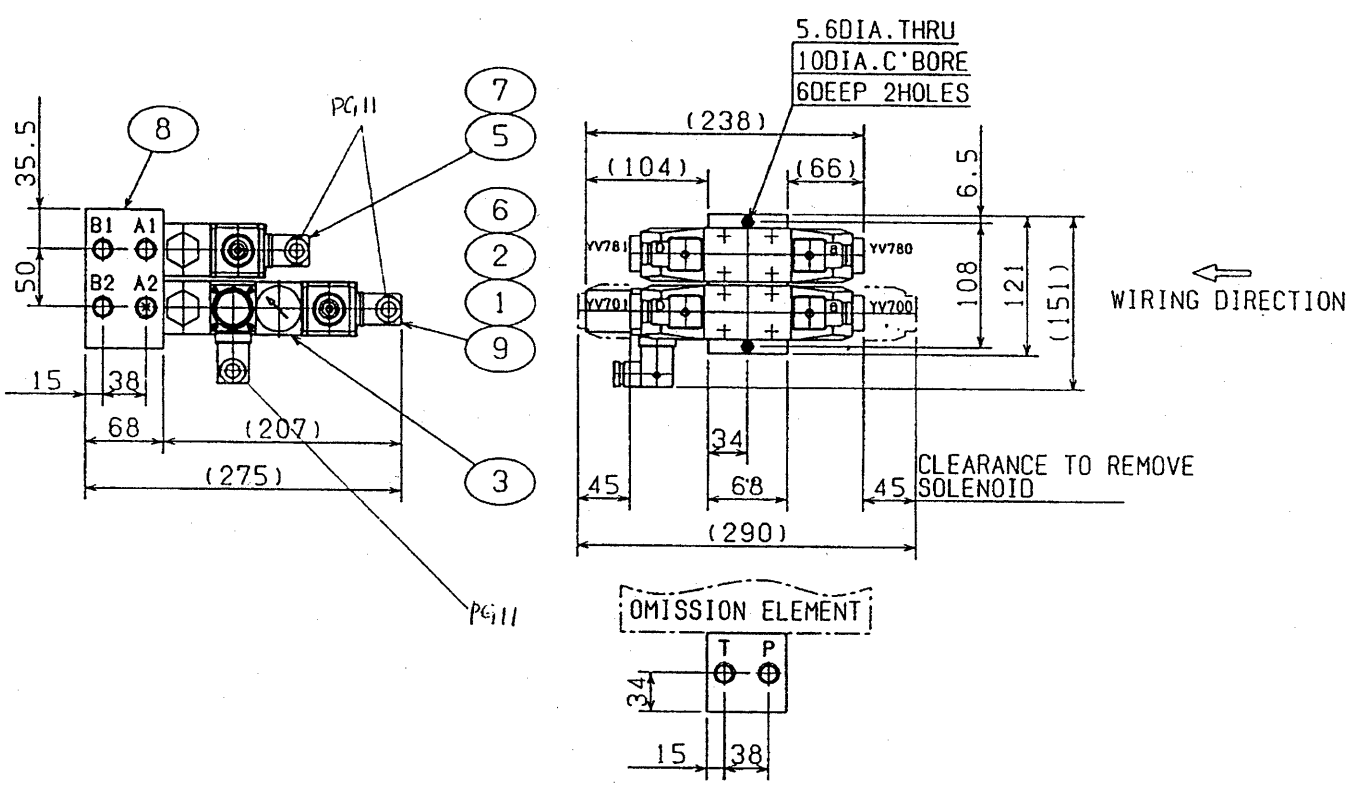
SOLENOID SPECIFICATIONS

COIL CODE	COIL RATING (V)	FREQU -ENCY (Hz)	INRUSH AMPS (A)	HOLDING AMPS (A)	HOLDING VA (RMS)	ALLOWABLE VOLTAGE TOLERANCE (%)
T	100	50	3.0	0.49	49	+10,-10
		60	3.1	0.61	61	+20,-10
	110	60		0.46	50.6	+10,-10

SWITCHING CAPACITY

POWER SOURCE	AC	DC				
VOLTAGE(V)	110to125.220to250	15to30	30to50	50to75	75to125	125to250
AMPS(A)	3	3	1.0	0.75	0.5	0.25

OPERATING VOLTAGE/AMPS(MIN.) 12V/1mA

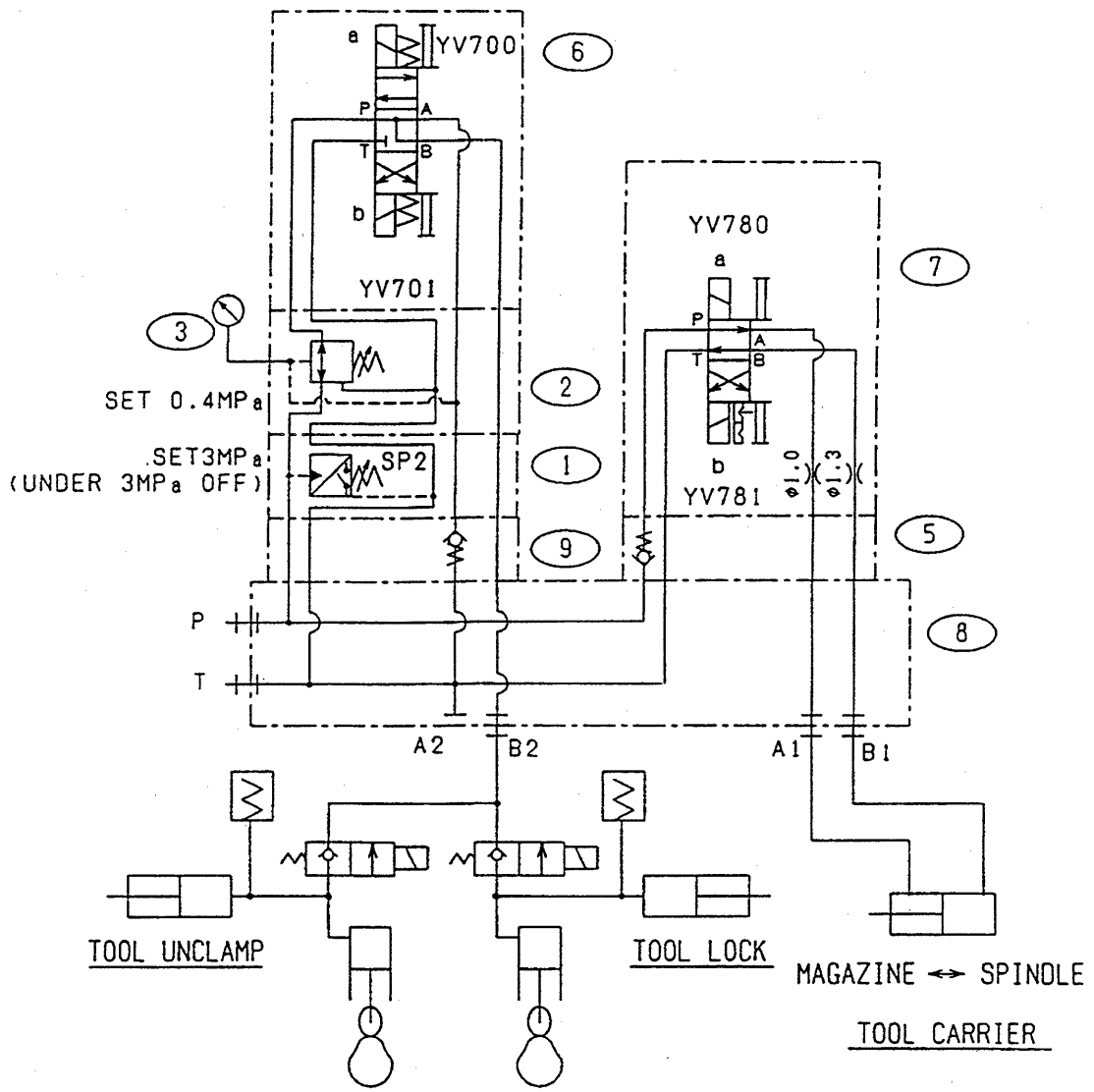


(U03007 B02)

<Names of major parts>

No.	Part Name	Part No.	Q'ty	Remarks
1	Pressure switch	SG307-F-55-B, DGMP-3-P-B-10	1	TOKIMEC
2	Reducing valve	DGMX2-3-PA-YW-B-40J	1	TOKIMEC
3	Pressure gage (with glycelin)	∅40 × 1.5MPa/PSI (0.35～0.45MPa, GREEN, THE OTHER RED)	1	TAKASHIMA
5	Check valve	DGMDC-3-Y-PK-41J	1	TOKIMEC
6	Solenoid valve	DG4V-3S-7C-M-U-T5-60	1	TOKIMEC
7	Silenoid valve	DG4V-3S-2N-M-U-T5-60	1	TOKIMEC
8	Manifold block	DGMS-3-2E-10-T-JA-J	1	TOKIMEC
9	Check valve	DGMDC-3-Y-AN-41J	1	TOKIMEC

<Circuit diagram>



18.3.2 MH-630 13000 min^{-1} Specification

SOLENOID SPECIFICATIONS

COIL CODE	COIL RATING (V)	FREQU-ENCY (Hz)	INRUSH AMPS (A)	HOLDING AMPS (A)	HOLDING VA (RMS)	ALLOWABLE VOLTAGE TOLERANCE (%)
T	100	50	3.0	0.49	49	+10,-10
		60	3.1	0.61	61	+20,-10
	110	60		0.46	50.6	+10,-10

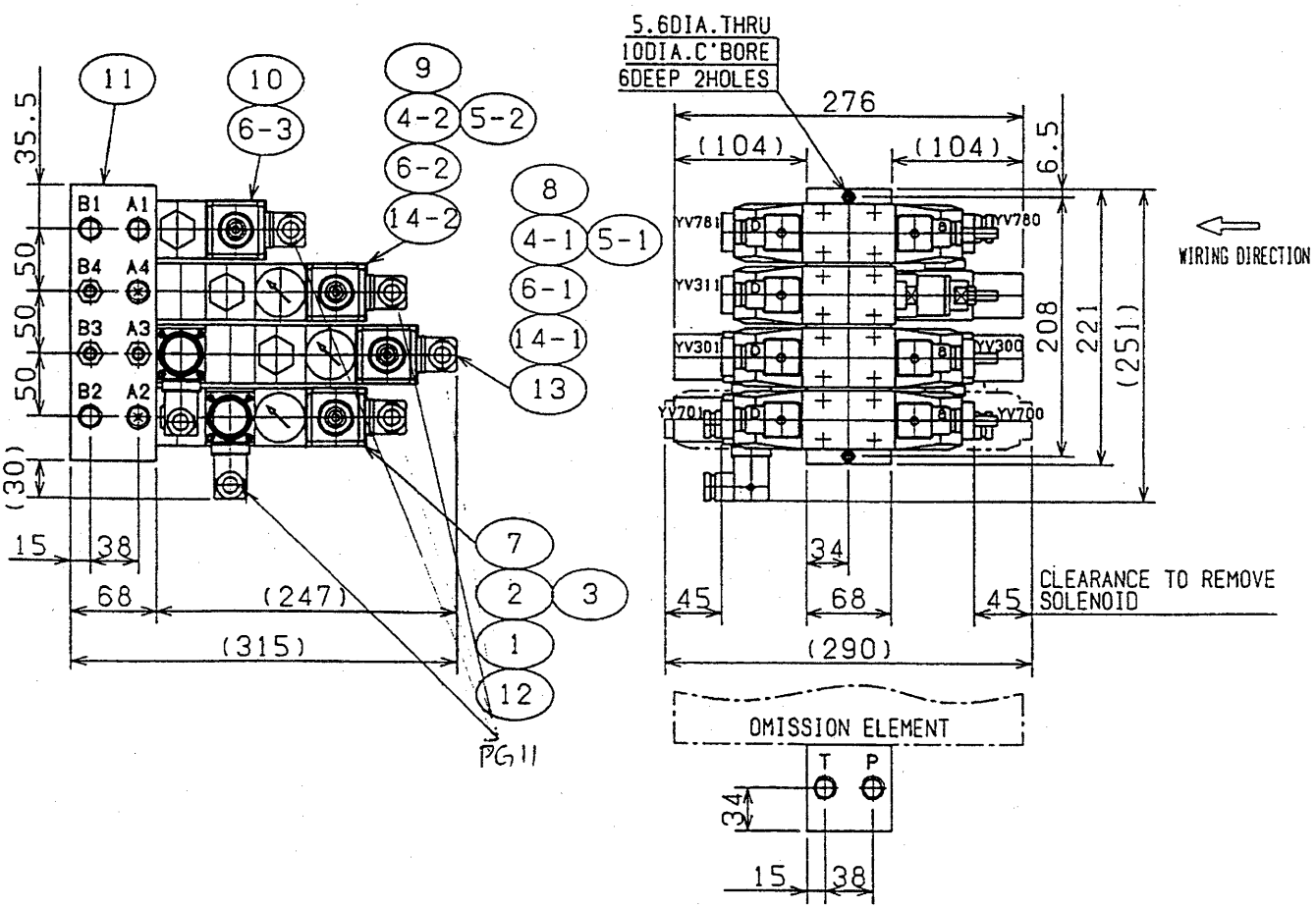
CHANGE FOR PRECHARGE PRESSURE ENERGIZING LIST

PRECHARGE PRESSURE \ ENERGIZING	Ⓐ	Ⓝ	Ⓑ	Ⓝ'	Ⓑ'
HEAVY	○				○
MIDDLE			○		○
LIGHT		○		○	

SWITCHING CAPACITY

POWER SOURCE	AC	DC				
VOLTAGE(V)	110to125.220to250	15to30	30to50	50to75	75to125	125to250
AMPS(A)	3	3	1.0	0.75	0.5	0.25

OPERATING VOLTAGE/AMPS(MIN.) 12V/1mA

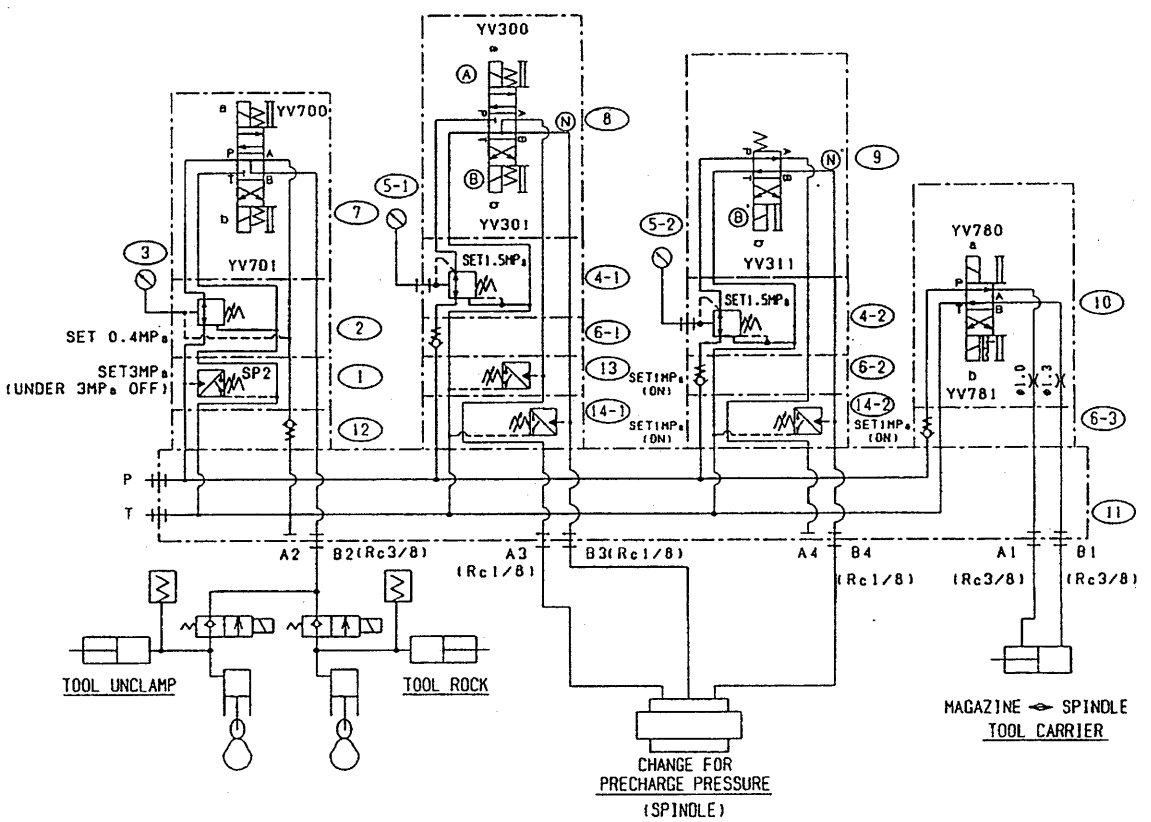


(U03008 B02)

<Names of major parts>

No.	Part Name	Part No.	Q'ty	Remarks
1	Pressure switch	SG307-F-55-B, DGMP-3-P-B-10	1	TOKIMEC
2	Reducing valve	DGMX2-3-PA-YW-B-40J	1	TOKIMEC
3	Pressure gage (with glycelin)	∅40 × 1.5MPa/PSI (0.35～0.45MPa, GREEN, THE OTHER RED)	1	TAKASHIMA
4	Reducing valve	DGMX2-3-PP-AW-B-40J	2	TOKIMEC
5	Pressure gage (with glycelin)	∅40 × 5MPa/PSI (1.2～1.8MPa, GREEN, THE OTHER RED)	2	TAKASHIMA
6	Check valve	DGMDC-3-Y-PK-41J	3	TOKIMEC
7	Solenoid valve	DG4V-3S-7C-M-U-T5-60	1	TOKIMEC
8	Solenoid valve	DG4V-3S-6C-M-U-T5-60	1	TOKIMEC
9	Solenoid valve	DG4V-3S-2A-M-U-T5-60	1	TOKIMEC
10	Solenoid valve	DG4V-3S-2N-M-U-T5-60	1	TOKIMEC
11	Manifold block	DGMS-3-4E-10-T-JA-J	1	TOKIMEC
12	Check valve	DGMDC-3-Y-AN-41J	1	TOKIMEC
13	Pressure switch	SG307-F-55-B, DGMP-3-A-B-10	1	TOKIMEC
14	Pressure switch	SG307-F-55-B, DGMP-3-B-B-10	2	TOKIMEC

<Circuit diagram>



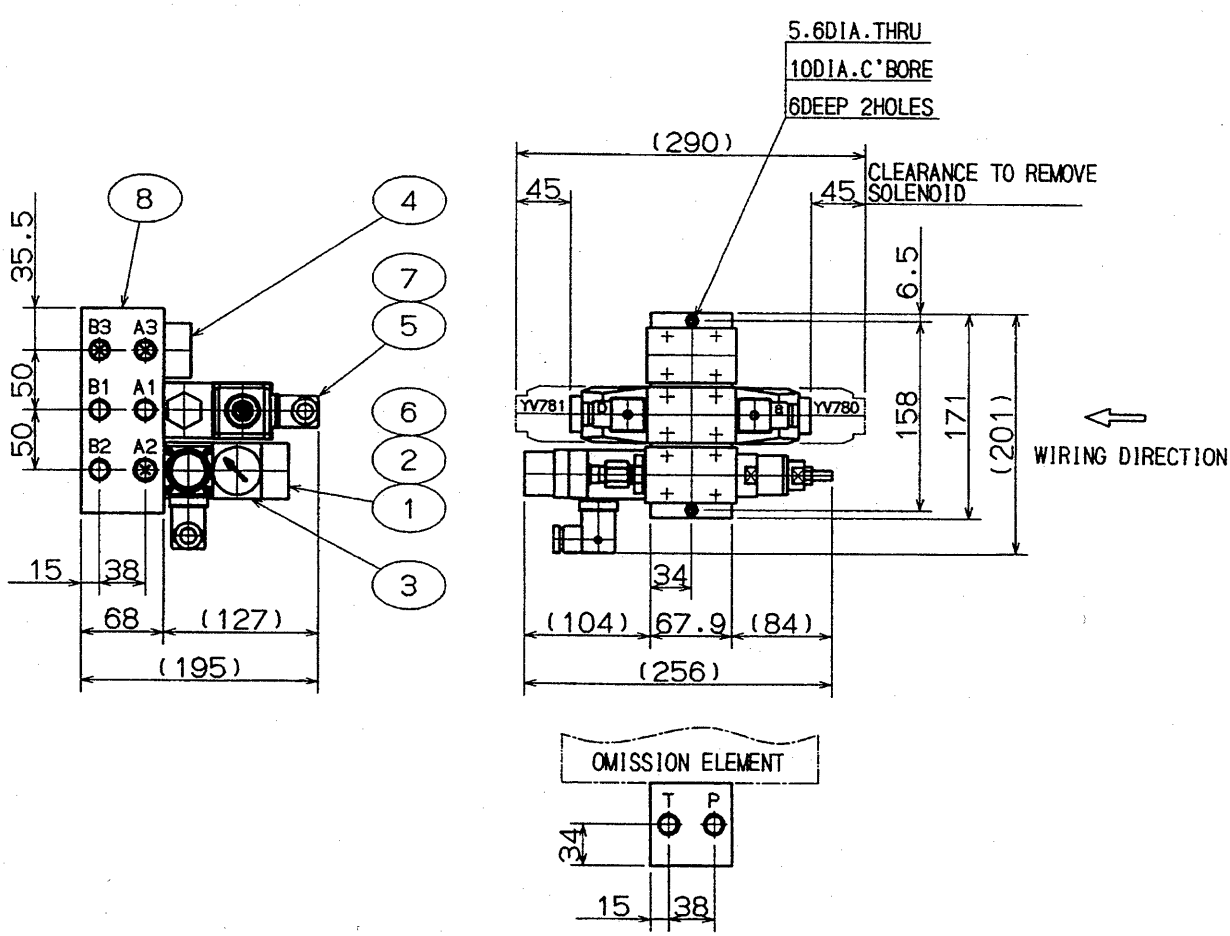
18.3.3 MH-630/U Standard

COIL CODE	COIL RATING (V)	FREQU -ENCY (Hz)	INRUSH AMPS (A)	HOLDING AMPS (A)	HOLDING VA (RMS)	ALLOWABLE VOLTAGE TOLERANCE (%)
T	100	50	3.0	0.49	49	+10,-10
		60	3.1	0.61	61	+20,-10
	110	60		0.46	50.6	+10,-10

SWITCHING CAPACITY

POWER SOURCE	AC	DC				
VOLTAGE(V)	110to125,220to250	15to30	30to50	50to75	75to125	125to250
AMPS(A)	3	3	1.0	0.75	0.5	0.25

OPERATING VOLTAGE/AMPS(MIN.) 12V/1mA

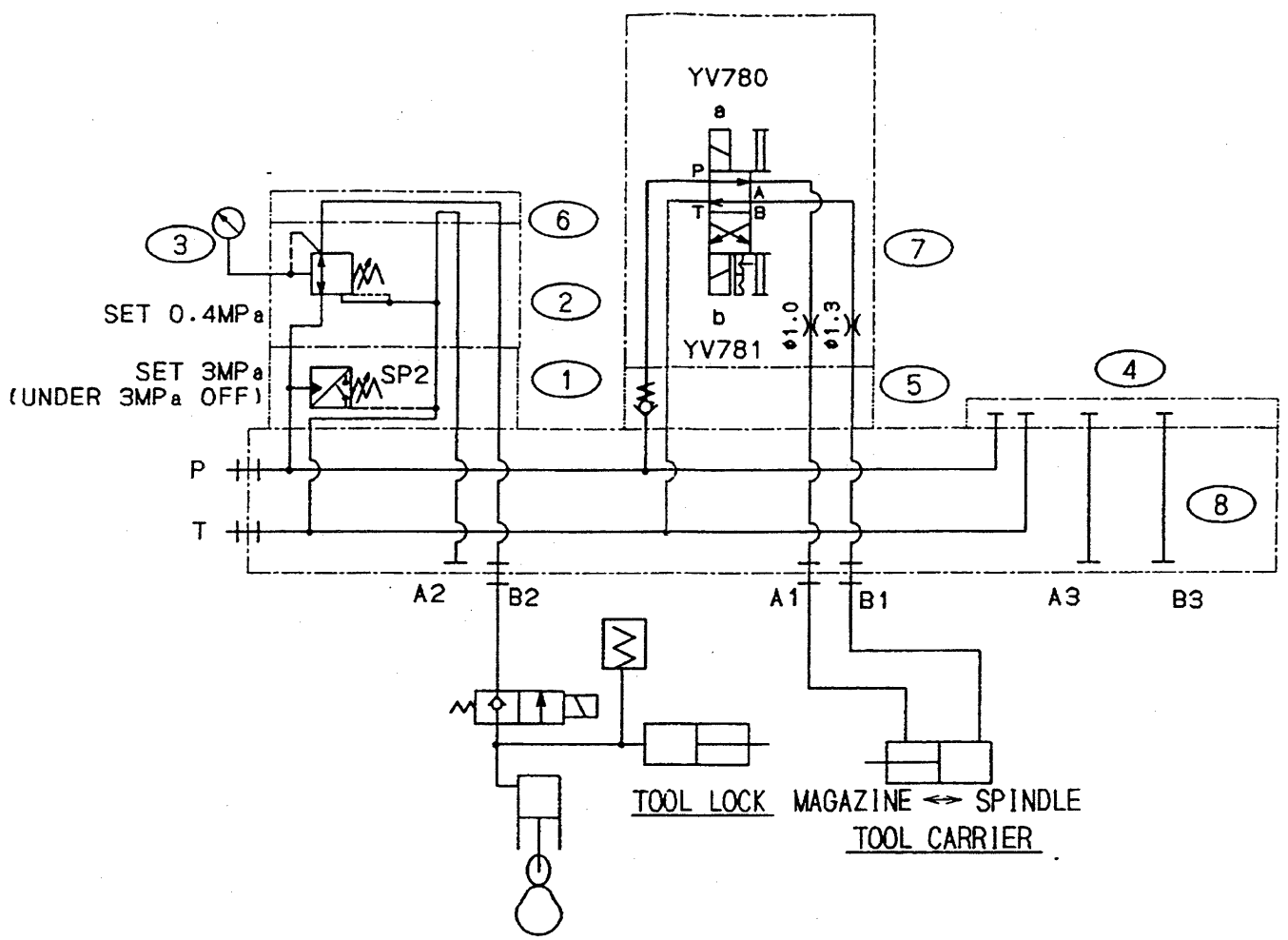


(U03014 B02)

<Names of major parts>

No.	Part Name	Part No.	Q'ty	Remarks
1	Pressure switch	SG307-F-55-B, DGMP-3-P-B-10	1	TOKIMEC
2	Reducing valve	DGMX2-3-PP-YW-B-40J-JA18	1	TOKIMEC
3	Pressure gage (with glycelin)	∅40 × 1.5MPa/PSI (0.35～0.45MPa, GREEN, THE OTHER RED)	1	TAKASHIMA
4	Blanking plate	DGMA-3-B-10-JA	1	TOKIMEC
5	Check valve	DGMDC-3-Y-PK-41J	1	TOKIMEC
6	Connecting plate	DGMA-3-C2-10-JA	1	TOKIMEC
7	Silenoid valve	DG4V-3S-2N-M-U-T5-60	1	TOKIMEC
8	Manifold block	DGMS-3-3E-10-T-JA-J	1	TOKIMEC

<Circuit diagram>



18.3.4 MH-630/U Boring Diameter Offset Specification

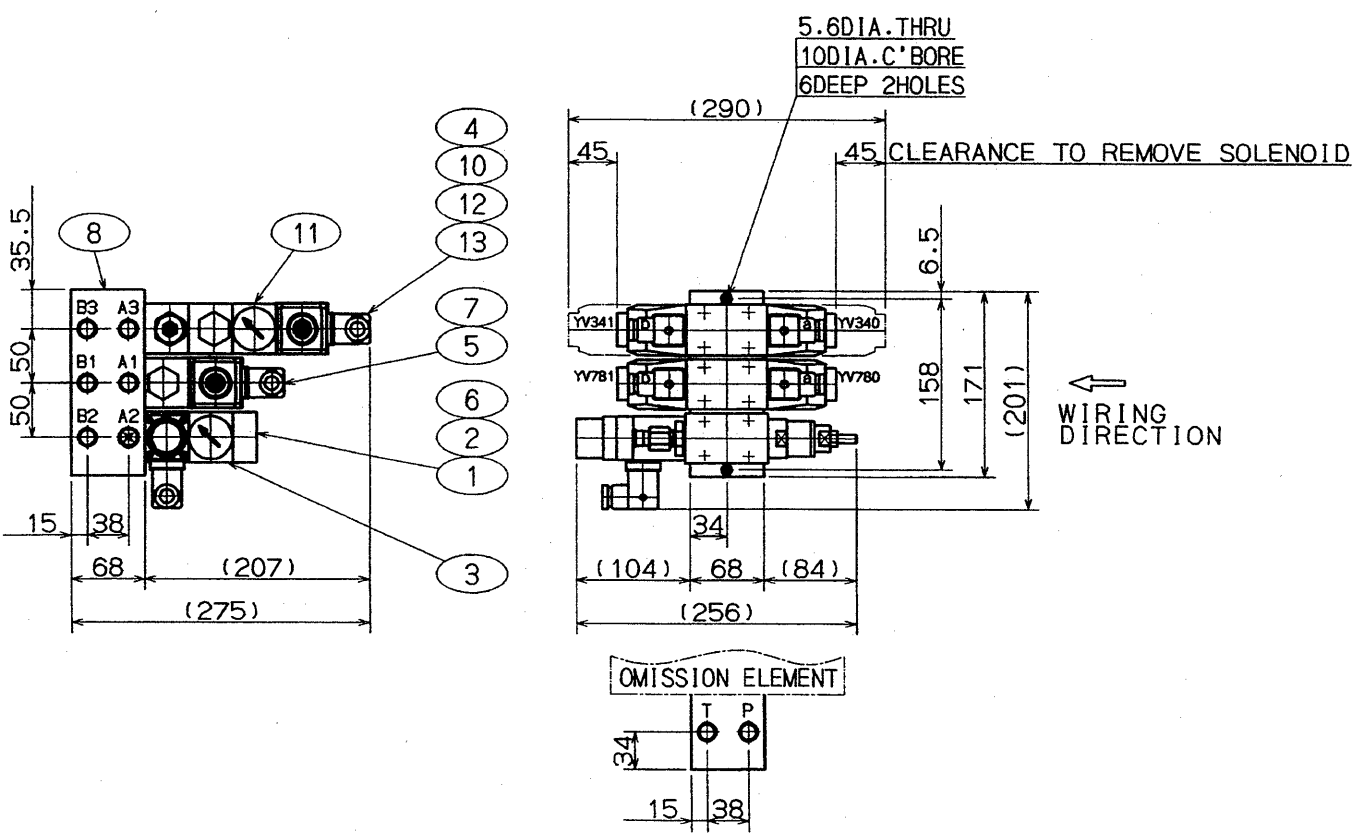
SOLENOID SPECIFICATIONS

COIL CODE	COIL RATING (V)	FREQU -ENCY (Hz)	INRUSH AMPS (A)	HOLDING AMPS (A)	HOLDING VA (RMS)	ALLOWABLE VOLTAGE TOLERANCE (%)
T	100	50	3.0	0.49	49	+10,-10
		60	3.1	0.61	61	+20,-10
	110	60		0.46	50.6	+10,-10

SWITCHING CAPACITY

POWER SOURCE	AC	DC				
VOLTAGE(V)	110to125.220to250	15to30	30to50	50to75	75to125	125to250
AMPS(A)	3	3	1.0	0.75	0.5	0.25

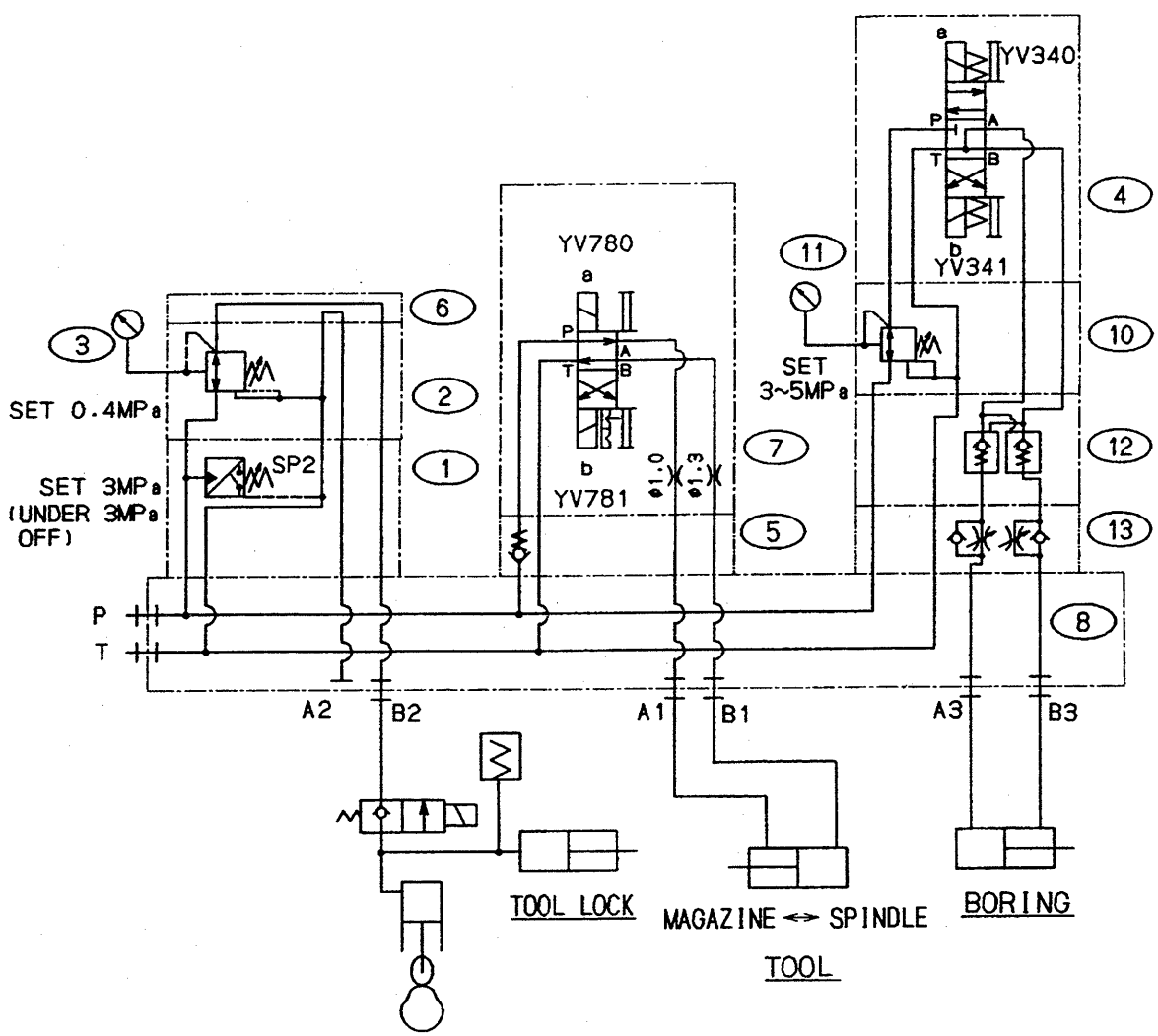
OPERATING VOLTAGE/AMPS(MIN.) 12V/1mA



<Names of major parts>

No.	Part Name	Part No.	Q'ty	Remarks
1	Pressure switch	SG307-F-55-B, DGMP-3-P-B-10	1	TOKIMEC
2	Reducing valve	DGMX2-3-PP-YW-B-40J-JA18	1	TOKIMEC
3	Pressure gage (with glycelin)	∅40 × 1.5MPa/PSI (0.35 ~ 0.45MPa, GREEN, THE OTHER RED)	1	TAKASHIMA
4	Solenoid valve	DG4V-3S-6C-M-U-T5-60	1	TOKIMEC
5	Check valve	DGMDC-3-Y-PK-41J	1	TOKIMEC
6	Connecting plate	DGMA-3-C2-10-JA	1	TOKIMEC
7	Solenoid valve	DG4V-3S-2N-M-U-T5-60	1	TOKIMEC
8	Manifold block	DGMS-3-3E-10-T-JA-J	1	TOKIMEC
10	Reducing valve	DGMX2-3-PP-BW-B-40J	1	TOKIMEC
11	Pressure gage (with glycelin)	∅40 × 15MPa/PSI (NO MARKING)	1	TOKIMEC
12	Pilot check valve	DGMPC-3-ABK-BAK-41J	1	TOKIMEC
13	Flow regurator	DGMFN-3-Y-A1W-B1W-41J	1	TOKIMEC

<Circuit diagram>



18.4 General View and Specifications of Valve Unit For APC and Table Clamp / Unclamp

18.4.1 Standard

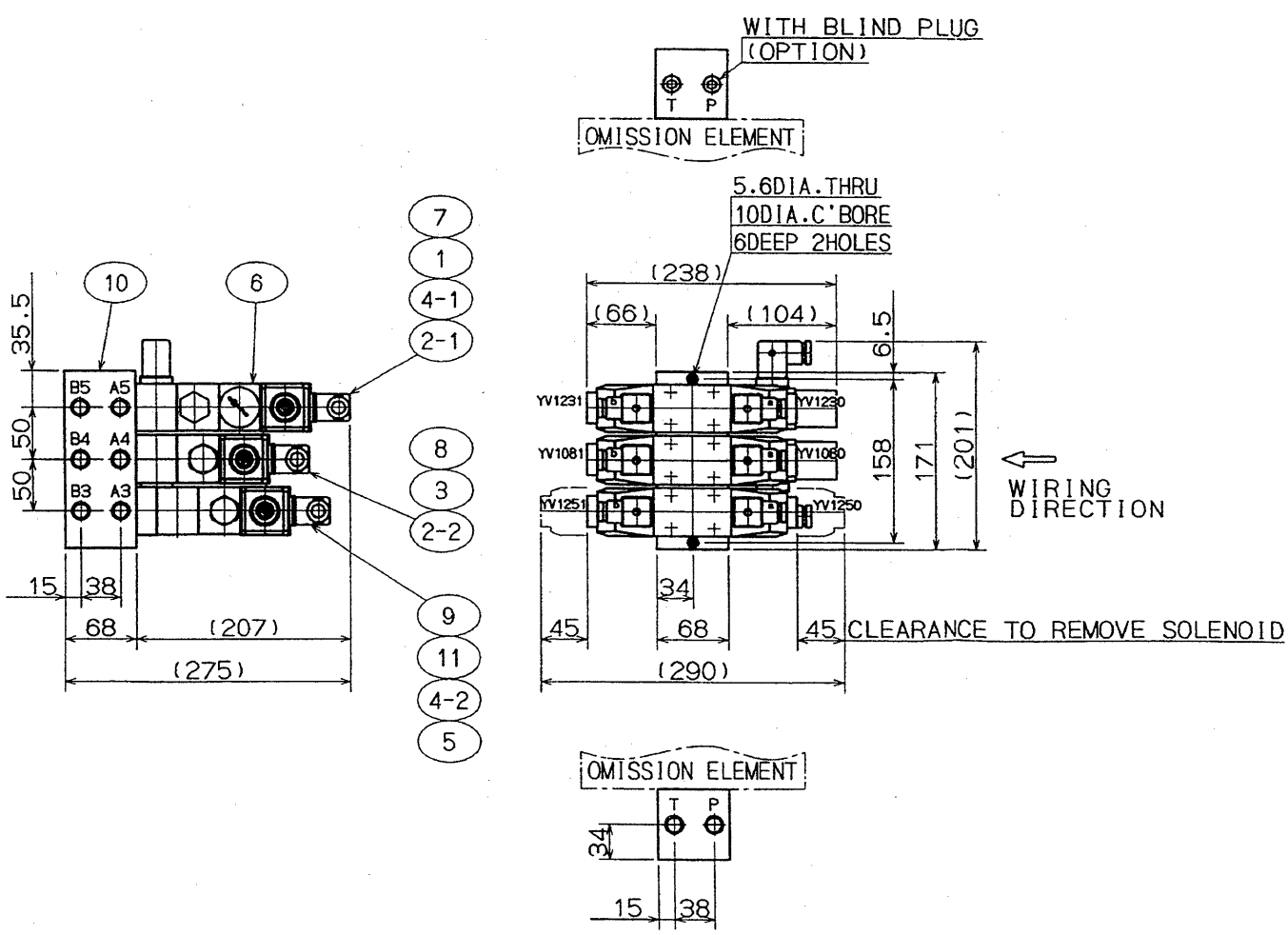
SWITCHING CAPACITY

POWER SOURCE	AC	DC				
VOLTAGE(V)	110to125.220to250	15to30	30to50	50to75	75to125	125to250
AMPS(A)	3	3	1.0	0.75	0.5	0.25

OPERATING VOLTAGE/AMPS(MIN.)12V/1mA

SOLENOID SPECIFICATIONS

COIL CODE	COIL RATING (V)	FREQU -ENCY (Hz)	INRUSH AMPS (A)	HOLDING AMPS (A)	HOLDING WATTS (W)	ALLOWABLE VOLTAGE TOLERANCE (%)
T	100	50	3.0	0.49	49	+10,-10
		60	3.1	0.61	61	+20,-10
	110	60		0.46	50.6	+10,-10

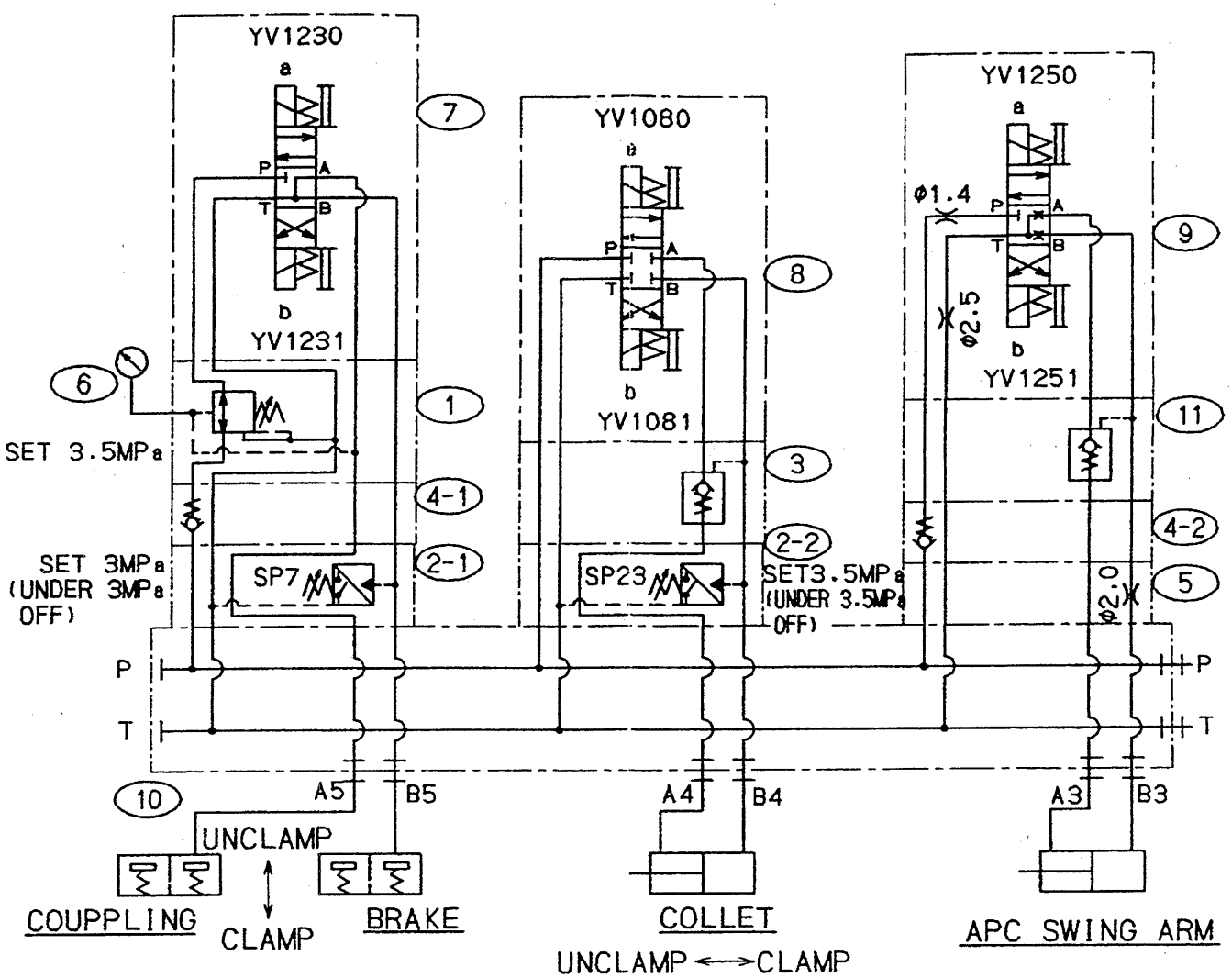


(U03009 B03)

<Names of major parts>

No.	Part Name	Part No.	Q'ty	Remarks
1	Reducing valve	DGMX2-3-PA-BW-B-40J	1	TOKIMEC
2	Pressure switch	SG307-F-55-B, DGMP-3-B-B-10	2	TOKIMEC
3	Pilot check valve	DGMPC-3-ABK-41J	1	TOKIMEC
4	Check valve	DGMDC-3-Y-PK-41J	2	TOKIMEC
5	Orifice plate	410212400	1	TOKIMEC
6	Pressure gage (with glycelin)	∅40 × 10MPa/PSI (3.25～3.75MPa, GREEN, THE OTHER RED)	1	TAKASHIMA
7	Solenoid valve	DG4V-3S-6C-M-U-T5-60	1	TOKIMEC
8	Solenoid valve	DG4V-3S-2C-M-U-T5-60	1	TOKIMEC
9	Solenoid valve	DG4V-3S-33C-M-U-T5-60	1	TOKIMEC
10	Manifold block	DGMS-3-3EX-10-T-JA-J	1	TOKIMEC
11	Pilot check valve	DGMPC-3-ABN-41J	1	TOKIMEC

<Circuit diagram>



18.4.2 Rotary Table Specification

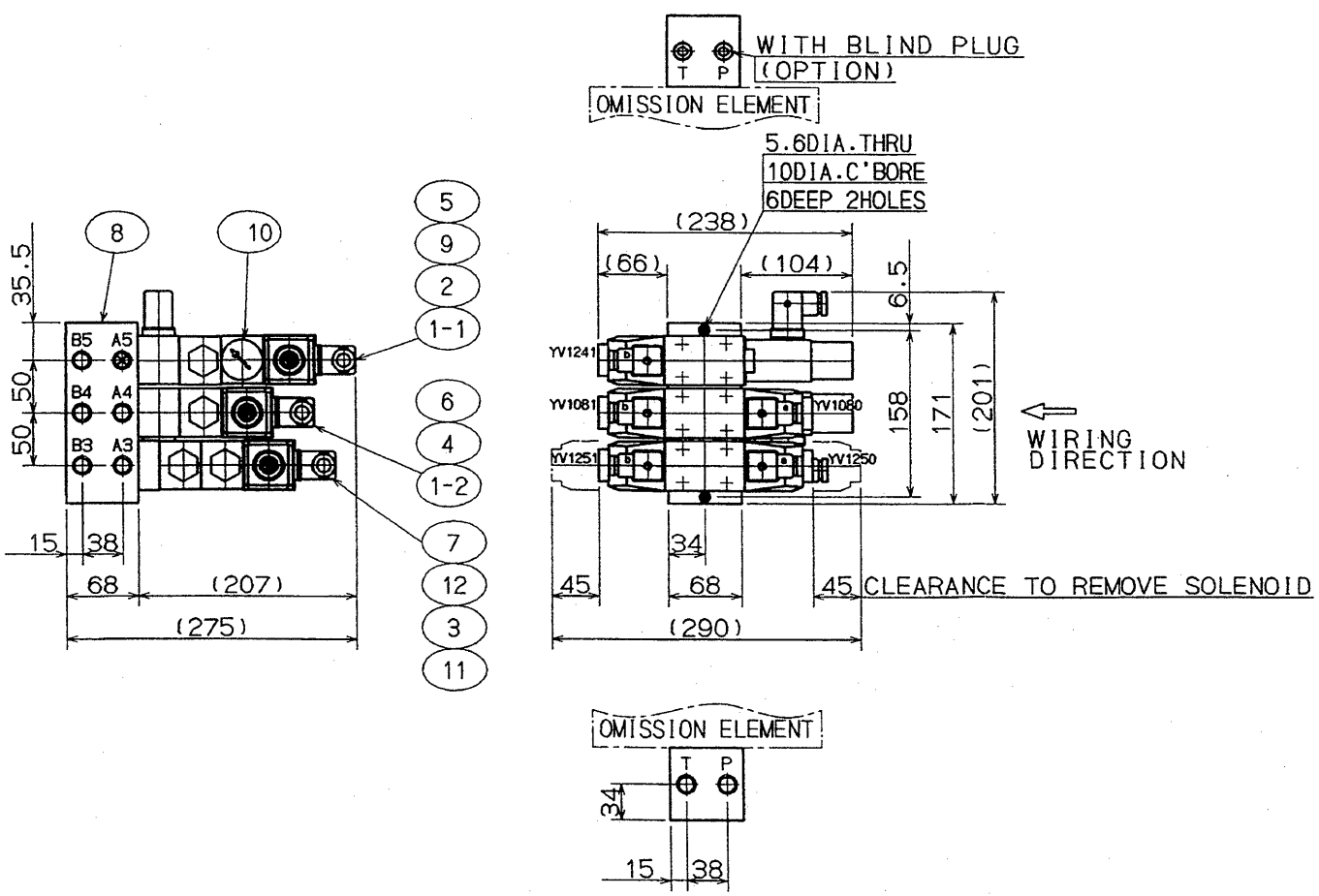
SOLENOID SPECIFICATIONS

COIL CODE	COIL RATING (V)	FREQU -ENCY (Hz)	INRUSH AMPS (A)	HOLDING AMPS (A)	HOLDING VA (RMS)	ALLOWABLE VOLTAGE TOLERANCE (%)
T	100	50	3.0	0.49	49	+10,-10
		60	3.1	0.61	61	+20,-10
	110	60		0.46	50.6	+10,-10

SWITCHING CAPACITY

POWER SOURCE	AC	DC				
VOLTAGE(V)	110to125,220to250	15to30	30to50	50to75	75to125	125to250
AMPS(A)	3	3	1.0	0.75	0.5	0.25

OPERATING VOLTAGE/AMPS(MIN.) 12V/1mA

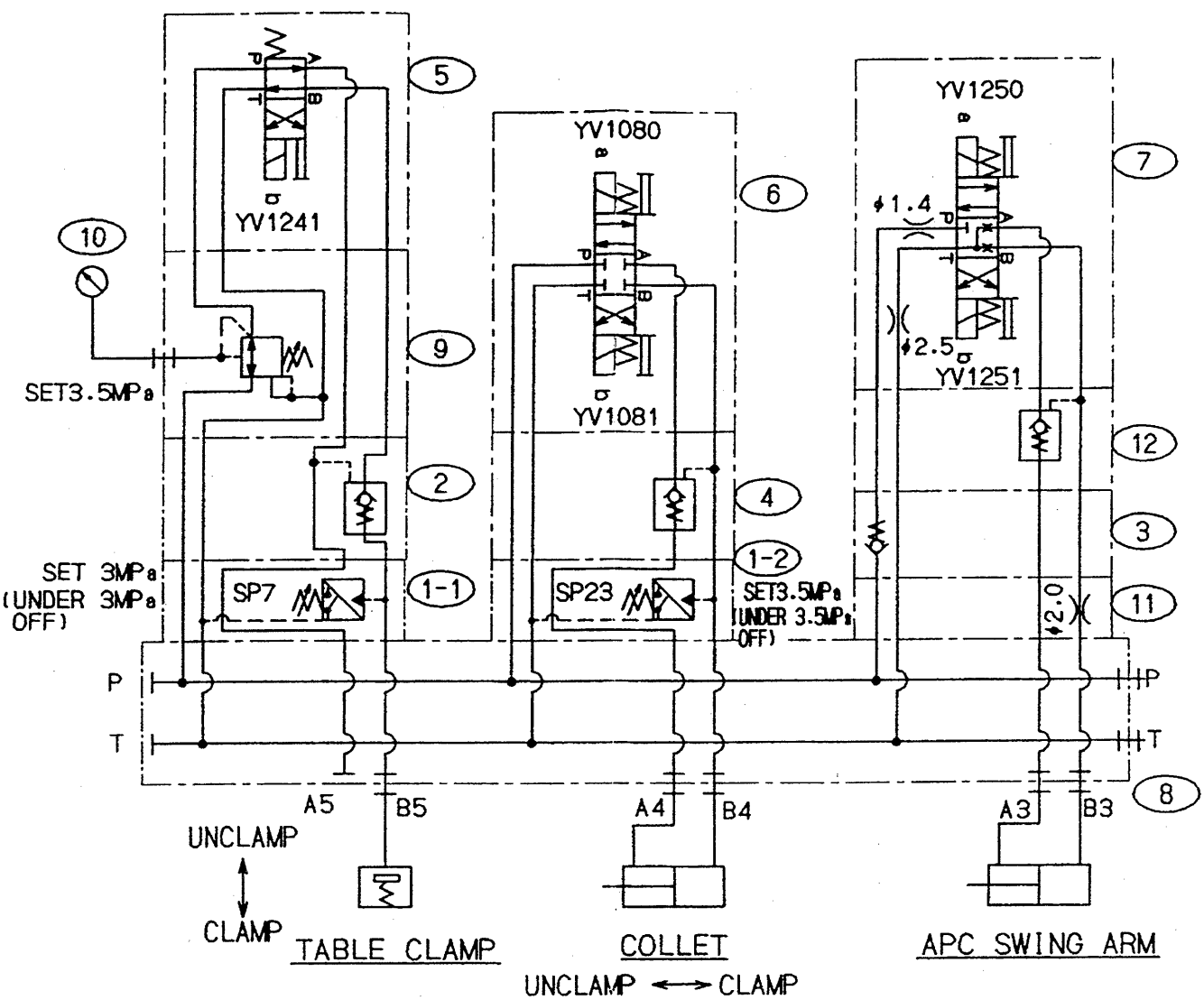


(U03010 B03)

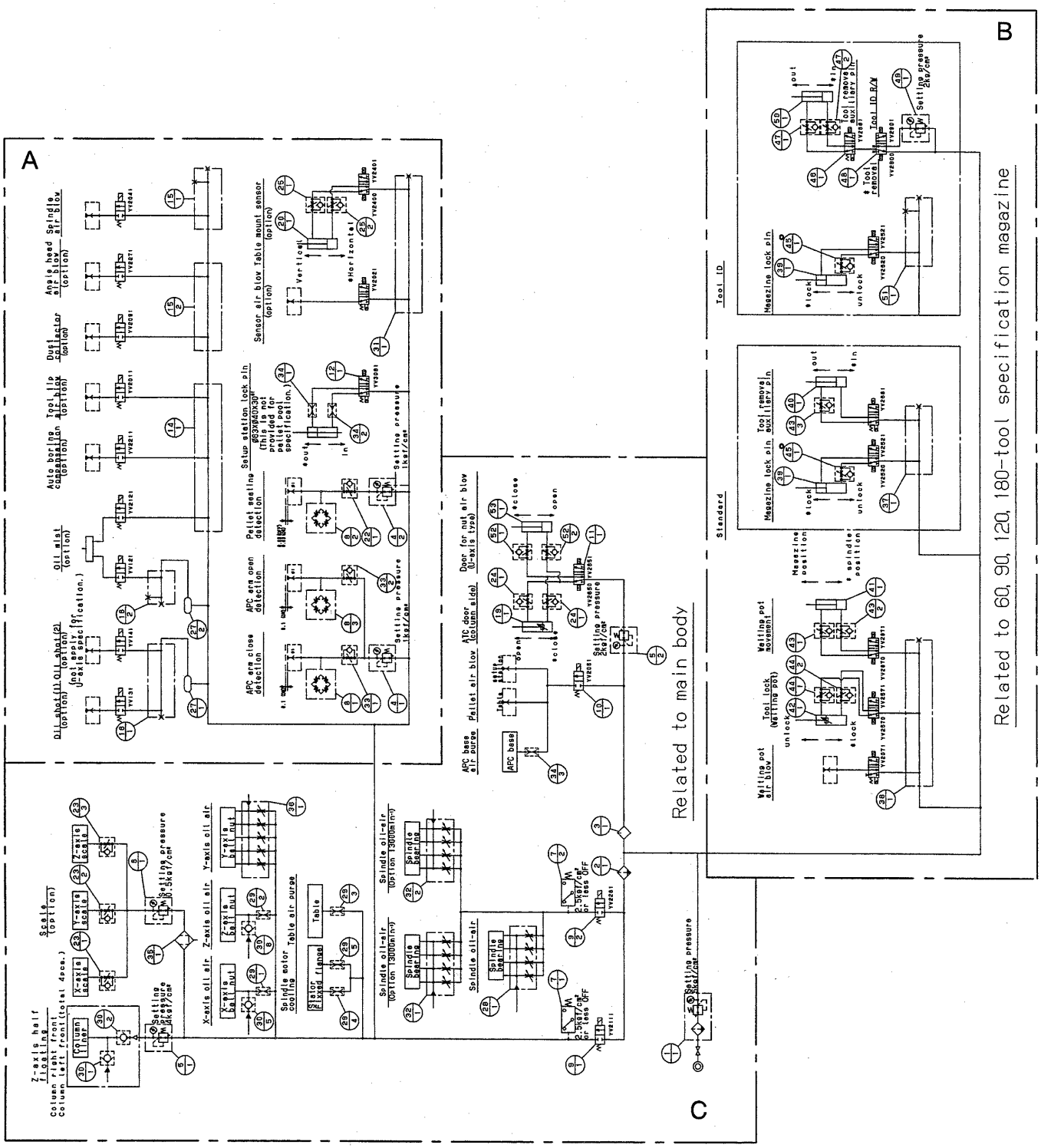
<Names of major parts>

No.	Part Name	Part No.	Q'ty	Remarks
1	Pressure switch	SG307-F-55-B, DGMP-3-B-B-10	2	TOKIMEC
2	Pilot check valve	DGMPC-3-BAK-41J	1	TOKIMEC
3	Check valve	DGMDC-3-Y-PK-41J	1	TOKIMEC
4	Pilot check vlave	DGMPC-3-ABK-41J	1	TOKIMEC
5	Solenoid valve	DG4V-3S-2A-M-U-T5-60	1	TOKIMEC
6	Solenoid valve	DG4V-3S-2C-M-U-T5-60	1	TOKIMEC
7	Solenoid valve	DG4V-3S-33C-M-U-T5-60	1	TOKIMEC
8	Manifold block	DGMS-3-3EX-10-T-JA-J	1	TOKIMEC
9	Reducing valve	DGMX2-3-PP-BW-B-40J	1	TOKIMEC
10	Pressure gage (with glycelin)	∅40 × 10MPa/PSI (3.25～3.75MPa, GREEN, THE OTHER RED)	1	TAKASHIMA
11	Orifice plate	410212400	1	TOKIMEC
12	Pilot check valve	DGMPC-3-ABN-41J	1	TOKIMEC

<Circuit diagram>



19. PNEUMATIC CIRCUIT DIAGRAM



NOTE

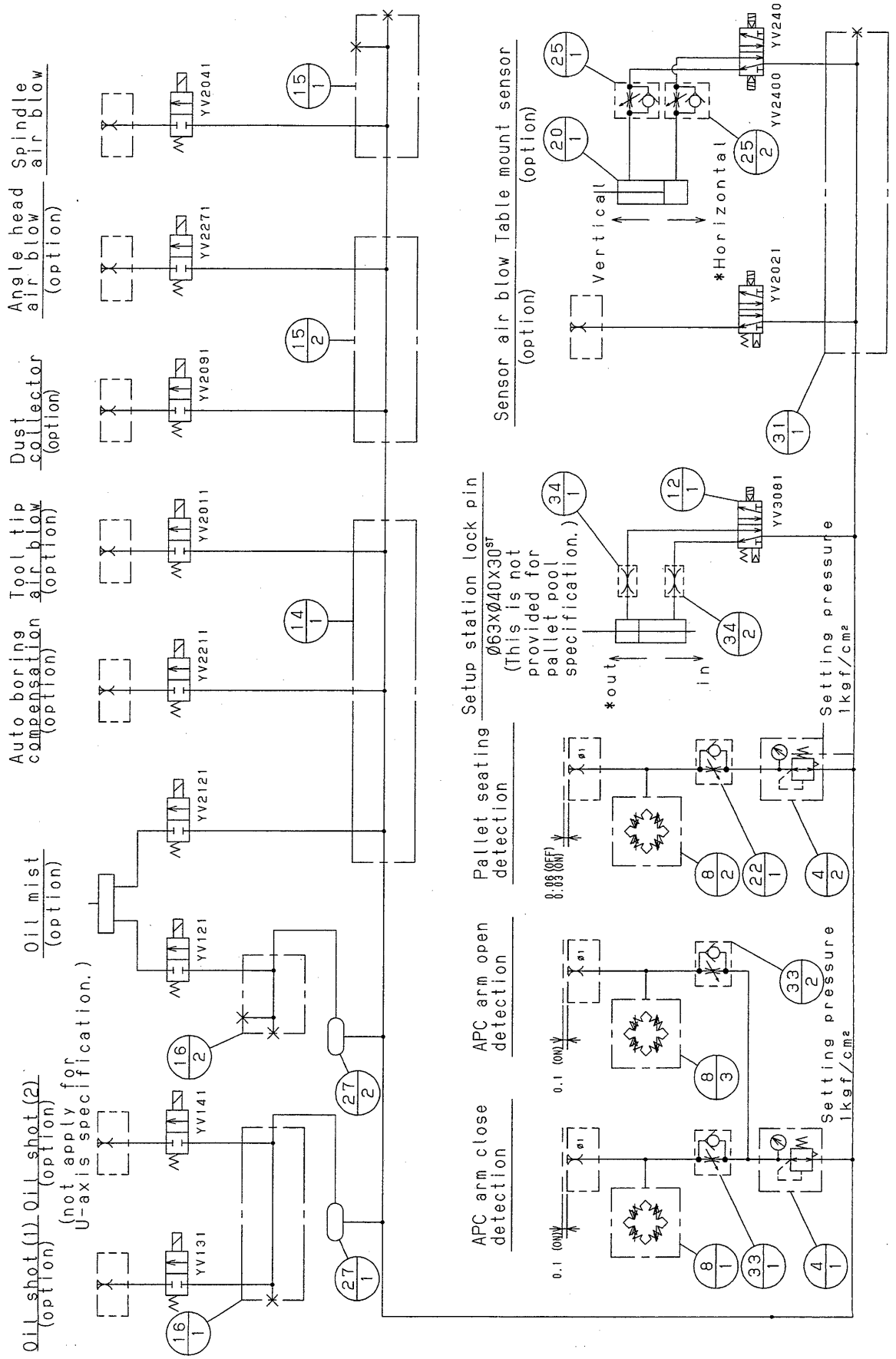
① * indicates home position.

② ◎ : for only 120,180,240-tool type.

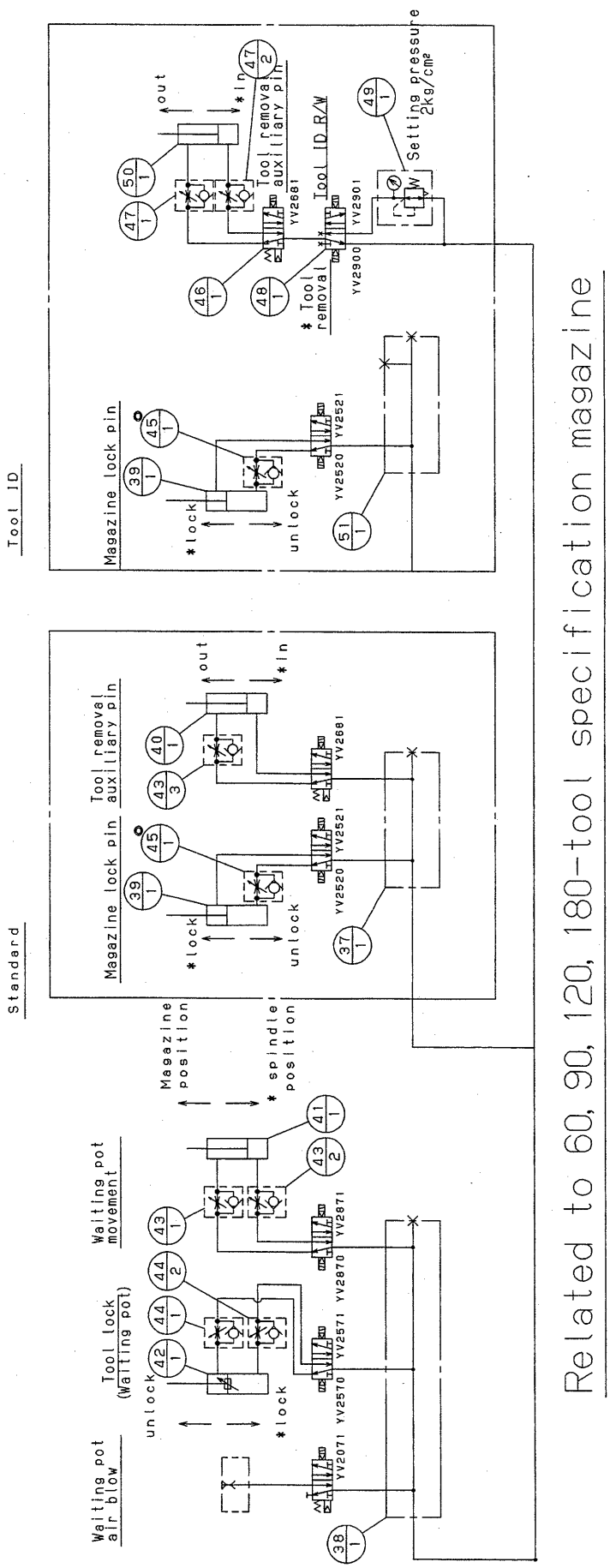
(Q46008 001 1/2)

<Detail of A>

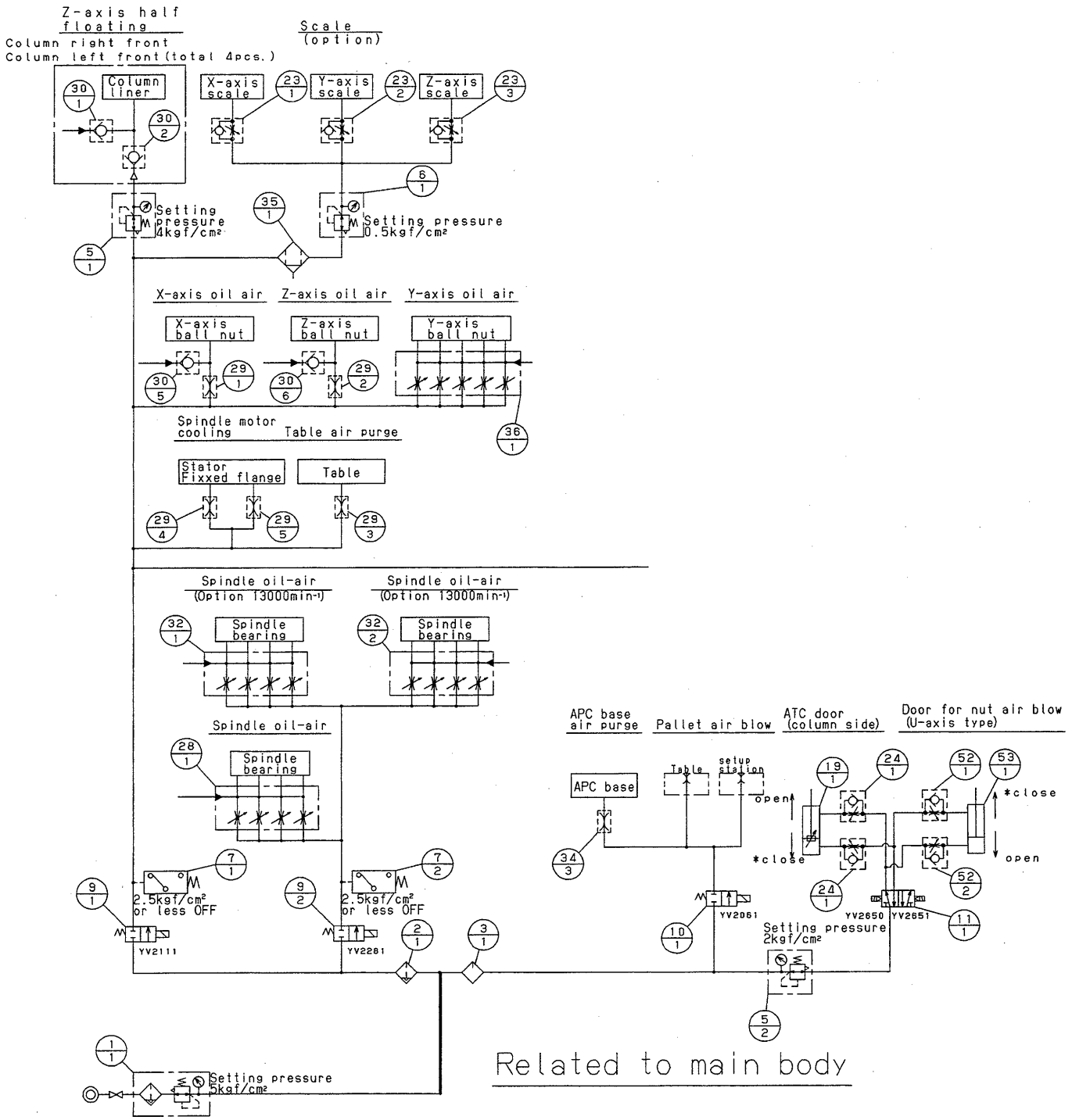
A


Oil shot (1) Oil shot (2)
(option)
(not apply for
U-axis specification.)
Oil mist
(option)
Auto boring
compensation
(option)
Tool tip
air blow
(option)
Dust
collector
(option)
Angle head
air blow
(option)
Spindle
air blow
YV131
YV141
YV121
YV2121
YV2211
YV2011
YV2091
YV2271
YV2041
Pallet seating
detection
APC arm open
detection
APC arm close
detection
Setup station lock pin
Ø63XØ40X30ST
(This is not
provided for
pallet pool
specification.)
*out
in
YV3081
Setting pressure
1kgf/cm²
Sensor air blow Table mount sensor
(option)
Vertical
*Horizontal
YV2021
YV2400
YV2401

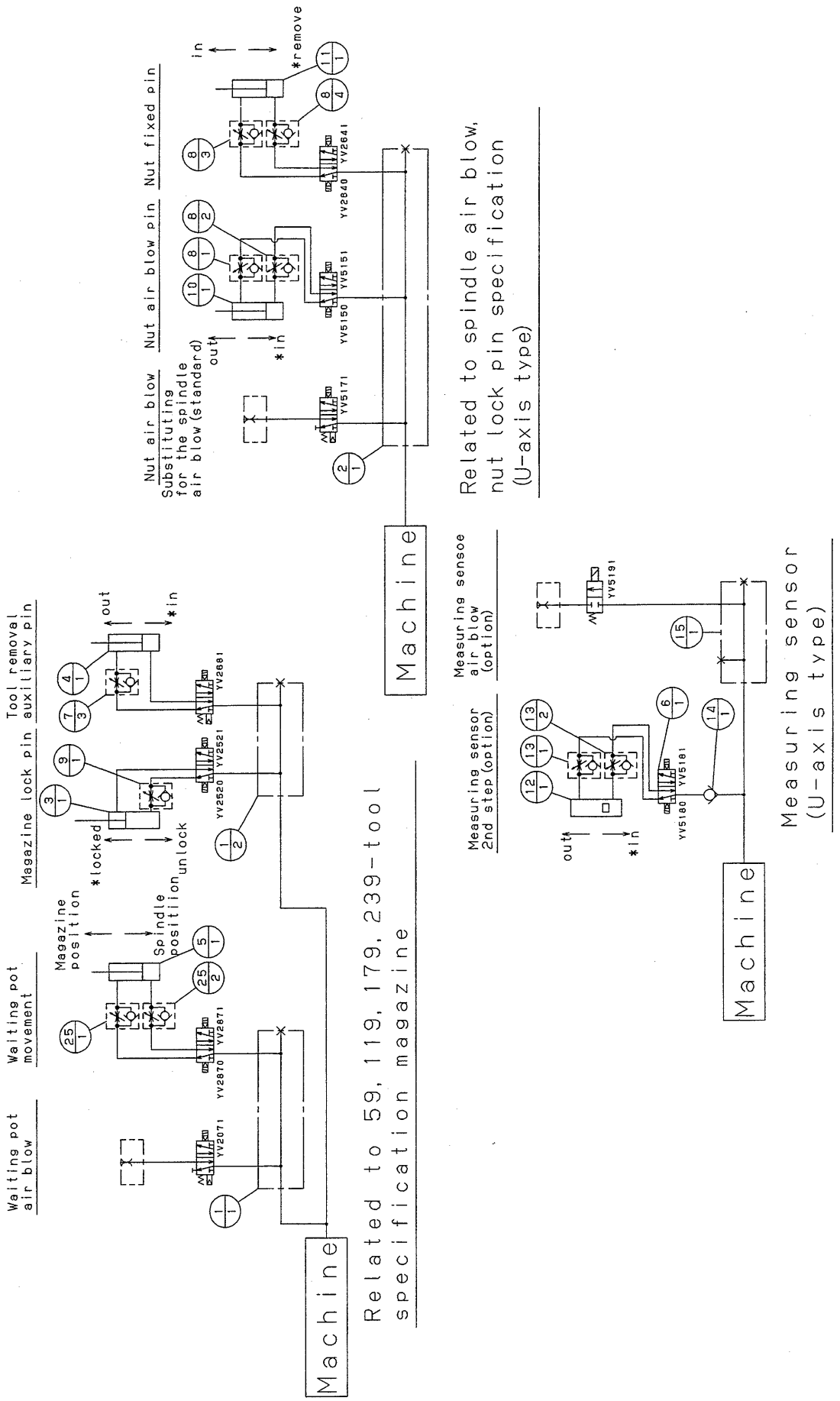
<Detail of B>


Related to 60, 90, 120, 180-tool specification magazine
Standard
Tool ID
Waiting pot air blow
Tool lock (Waiting pot)
Waiting pot movement
Magazine position
* spindle position
Magazine lock pin
Tool removal auxiliary pin
Tool ID R/W
Setting pressure 2kg/cm²
* Tool removal
unlock
* lock
* in
out
YV2071
YV2570
YV2571
YV2870
YV2871
YV2520
YV2521
YV2681
YV2900
YV2901

<Detail of C>


Z-axis half floating
Column right front
Column left front(total 4pcs.)
Scale (option)
Column liner
X-axis scale
Y-axis scale
Z-axis scale
Setting pressure 4kgf/cm²
Setting pressure 0.5kgf/cm²
X-axis oil air
Z-axis oil air
Y-axis oil air
X-axis ball nut
Z-axis ball nut
Y-axis ball nut
Spindle motor cooling
Table air purge
Stator Fixxed flange
Table
Spindle oil-air (Option 13000min-1)
Spindle oil-air (Option 13000min-1)
Spindle bearing
Spindle bearing
Spindle oil-air
Spindle bearing
2.5kgf/cm² or less OFF
2.5kgf/cm² or less OFF
YV2111
YV2281
APC base air purge
Pallet air blow
ATC door (column side)
Door for nut air blow (U-axis type)
APC base
Table
setup station
open
*close
*close
open
YV2061
YV2650
YV2651
Setting pressure 2kgf/cm²
Setting pressure 5kgf/cm²
Related to main body

NO	DRAWING NO	NAME	MODEL	Q	MAKER
1	U4021 4A	AIR PANEL	AIR PANEL	1	CKD
2	U4022 9A	FILTER	F3000-10-FYB	1	C, K, D
3	U4022 8A	LUBRICATOR	3000E-3C-JB	1	C, K, D
4	U4011 3A	REGULATOR	B2019-1C-LB	2	CKD
5	U4032 6A	REGULATOR	B2019-1C-B	2	CKD
6	U4018 9A	REGULATOR	2001-2C-LB	1	CKD
7	U4000 5A	PURESSURE SWITCH	APE-8T-FL193359	2	CKD
8	U4043 3A	PURESSURE SWITCH	PS7-102G-P (PNPタイプ)	3	COPAL
9	U4000 9A	SOLENOID VALVE	AB31-02-4-2EB	2	CKD
10	U4013 8A	SOLENOID VALVE	AD1X3351	1	CKD
11	U4021 2A	SOLENOID VALVE	4KA220-06L-FL17	1	CKD
12	U4021 3A	SOLENOID VALVE	4KA210-06L-FL17	1	CKD
14	U4003 7A	SOLENOID VALVE		1	CKD
15	U4006 5A	MANIFOLD		2	CKD
16	U4017 9A	MANIFOLD		2	CKD
19	U4118 5B	AIR CYLINDER		1	CKD
20	U4110 7A	AIR CYLINDER	CMK2-C-CC32-65	1	CKD
22	U4011 4A	SPEED CONTROLLER	SC3-6	1	CKD
23	U4019 2A	SPEED CONTROLLER	SC-M5-AI	3	CKD
24	U4021 8A	SPEED CONTROLLER		2	CKD
25	U4024 5A	SPEED CONTROLLER	SC3G-6-6I	2	CKD
27	U4009 6A	CHARGE TANK		2	SMC
28	P4015 7A	OIL-AIR DISTRIBUTOR	(SPECIAL ; 0. 01×2-0. 03×2)	1	SHOWA YUKI
29	P3043 4A	EXTENSION JOINT	1/8×1/8×0。5 DIA.	5	MATSUYA
30	P4014 4A	CHECK VALVE	PV-4	6	SHOWA YUKI
31	U4023 6A	SOLENOID VALVE	M4KA280-06-L-2	1	C, K, D
32	P4014 7A	OIL-AIR DISTRIBUTOR	DM4-3	2	SHOWA YUKI
33	U4035 8A	SPEED CONTROLLER	SC3-8-I	2	*
34	P3044 1A	EXTENSION JOINT	1/8×1/8×1. 0 DIA.	3	MATSUYA
35	U4903 1A	OIL MIST FILTER	M1000-6- -B	1	CKD
36	P4013 7A	OIL-AIR DISTRIBUTOR		1	SHOWA YUKI
37	U4023 6A	SOLENOID VALVE	M4KA280-06-L-2	1	C, K, D
38	U4024 4A	SOLENOID VALVE	M4KA280-06-L-3	1	CKD
39	U4105 2A	AIR CYLINDER	CMK2-LB-40-50-R03-R	1	CKD
40	U4111 5B	AIR CYLINDER	CSD2-L-50-15-S05-H	1	C. K. D
41	U4116 7A	AIR CYLINDER	SSD-50-40	1	C. K. D.
42	U4119 3A	AIR CYLINDER	SSD-K-LB-20-15	1	C. K. D.
43	U4008 9A	SPEED CONTROLLER	SC-3G-8-8	3	CKD
44	U4018 6A	SPEED CONTROLLER	SC3G-M5-6	2	CKD
45	U4005 4A	SPEED CONTROLLER	SC-3G-6-8	1	CKD
46	U4021 3A	SOLENOID VALVE	4KA210-06L-FL17	1	CKD
47	U4021 8A	SPEED CONTROLLER		2	CKD
48	U4021 2A	SOLENOID VALVE	4KA220-06L-FL17	1	CKD
49	U4012 5A	RAGULATOR	B2019-2C-BG	1	CKD
50	U4114 1A	AIR CYLINDER	CSD2-L-63-30-S0	1	CKD
51	U4027 8A	MANIFOLD VALVE	M4KA280-06-L-2	1	CKD
52	U4018 6A	SPEED CONTROLLER	SC3G-M5-6	2	CKD
53	U4123 8A	AIR CYLINDER	FCD-L-25-50-M05-D	1	CKD


Related to 59, 119, 179, 239-tool specification magazine
Machine
Waiting pot air blow
Waiting pot movement
Magazine position
Spindle position
Magazine lock pin
Tool removal auxiliary pin
*locked
unlock
out
*in
YV2071
YV2870
YV2871
YV2520
YV2521
YV2881
Related to spindle air blow, nut lock pin specification (U-axis type)
Machine
Nut air blow
Substituting for the spindle air blow(standard)
Nut air blow pin
Nut fixed pin
*remove
in
YV5171
YV5150
YV5151
YV2640
YV2641
Measuring sensor 2nd step (option)
Measuring sensoe air blow (option)
YV5191
YV5180
YV5181
Measuring sensor (U-axis type)
Machine

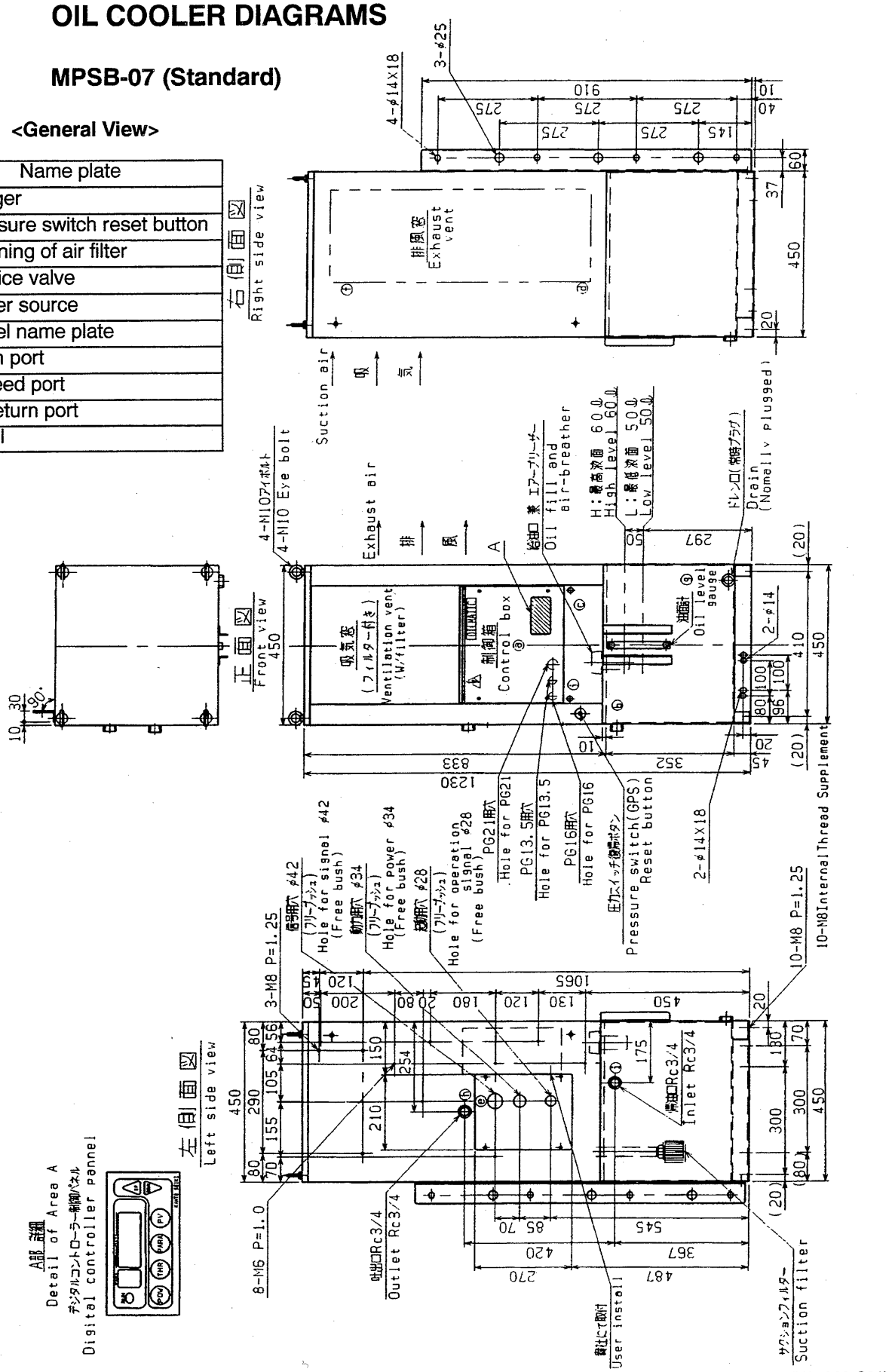
NO	DRAWING NO	NAME	MODEL	Q	MAKER
1	U40236A	Solenoid valve	M4KA280-06-L-2-DC24 S1=1, S2=2	2	CKD
2	U40244A	Solenoid valve	M4KA280-06-L-3	1	CKD
3	U41052A	Solenoid valve	CMK2-LB-40-50-R03-R	1	CKD
4	U41216A	Air cylinder	SSD-KL-63-185-TOH5-H	1	CKD
5	U41167A	Air cylinder	SSD-50-40	1	CKD
6	U40212A	Solenoid valve	4KA220-06-L-DC24	1	CKD
7	U40089A	Speed controller	SC3G-8-8	3	CKD
8	U40186A	Speed controller	SC3G-M5-6	4	CKD
9	U40054A	Speed controller	SC3G-6-8	1	CKD
10	U41218B	Speed controller	FCD-KL-25-60-M03-D-N	1	CKD
11	U41217B	Air cylinder	FCDK-25-40	1	CKD
12	U41227B	Air cylinder	SRL-00-25B-270-M03-D	1	CKD
13	U40245A	Speed controller	SC3G-6-6-I	2	CKD
14	P30085A	Check valve	Y61012 (1/4)	1	CKD
15	U40065A	Manifold	GAB312-4-2-2EAC100	1	CKD

20. OIL COOLER DIAGRAMS

20.1 MPSB-07 (Standard)

<General View>

Name plate	
a	Danger
b	Pressure switch reset button
c	Cleaning of air filter
d	Service valve
e	Power source
f	Model name plate
g	Drain port
h	Oil feed port
i	Oil return port
j	Oil fill



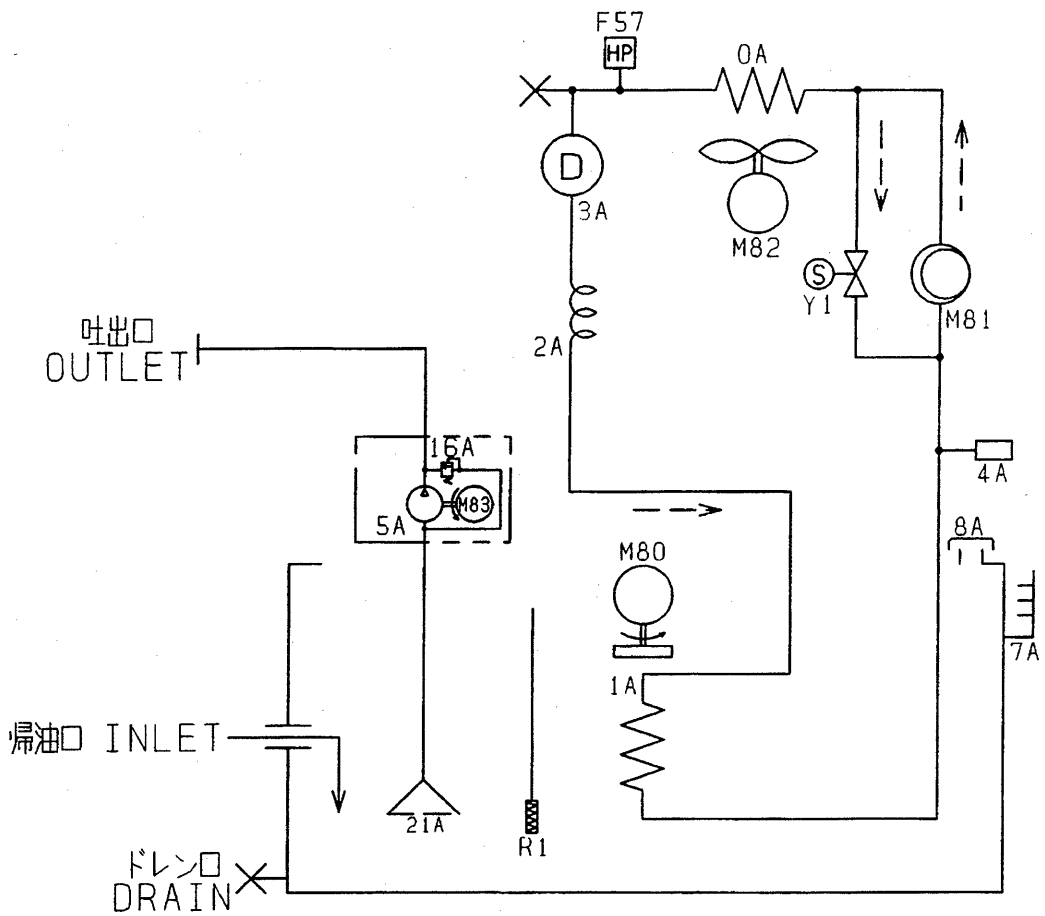
(U07028 C01)

<Specifications>

Model	: MPSB−07
Control number	: AMB04004
Appearance	: Steel plate with baking finish (Mori ivory powder coat)
Ambient temp. conditions	: Temp. of inhaling air for condenser: 5～40℃
Cooling capacity	: 3500W(3000Kcal/h) 60Hz 3200W(2750Kcal/h) 50Hz : (Liquid temp. 35℃ Ambient temp. 35℃ Service oil ISO VG2)
Refrigeration Compressor	Totally-enclosed compressor -Nominal capacity 750W. 2P -Refrigerant HCFC-22 (R-22)
Condenser	Forced air cooling system, cross-Fin type. Fan motor for forced air cooling: 60W.4P
Cooler	Open coil type with agitator Agitation motor : 50W.4P
Pump (For Circulation)	:Directly driven by trochoid gear pump motor(2MH400-210HBEMVB-A5) Theoretical discharge :15/18.0L/min(1500/1800rpm) Relief valve :direct-acting type 0.5MPa (5Kg/ cm^2) At full relief :Electric rating :400W.4P
Power source	:Power Circuit AC200V 50/60Hz AC220V 60Hz 3Ph Max. operating current: 9A Power source capacity: 3.1KVA
Temp. controller	: Digital setting, indication temperature controller (Follow-up base temperature differential type) Set range :Base temperature ±5～-5℃ (Oil temp. is limited within 10～40℃) ON/OFF Sensitivity :0.2℃(sensitivity of controller unit) ・・・ Upper and lower limit alarm indicating function oil temp. Set range (Set temp.-15～+15) ・・・ Start up timer function oil temp. Set range 0.5～72h ・・・ Enable to exchange from constant type to follow-up type.
Weight	: 1000N (100Kgf)
Accessory	: Base temperature sensor (Drawing No.437-7400-**)1 pce.
Electric Spcification	:Conform to IEC60204-1
Control box	:Conform to IP54

<Oil cooling medium circulation circuit>

←	液循環方向(FLUID)
<—	冷媒循環方向(REFRIGERATION)

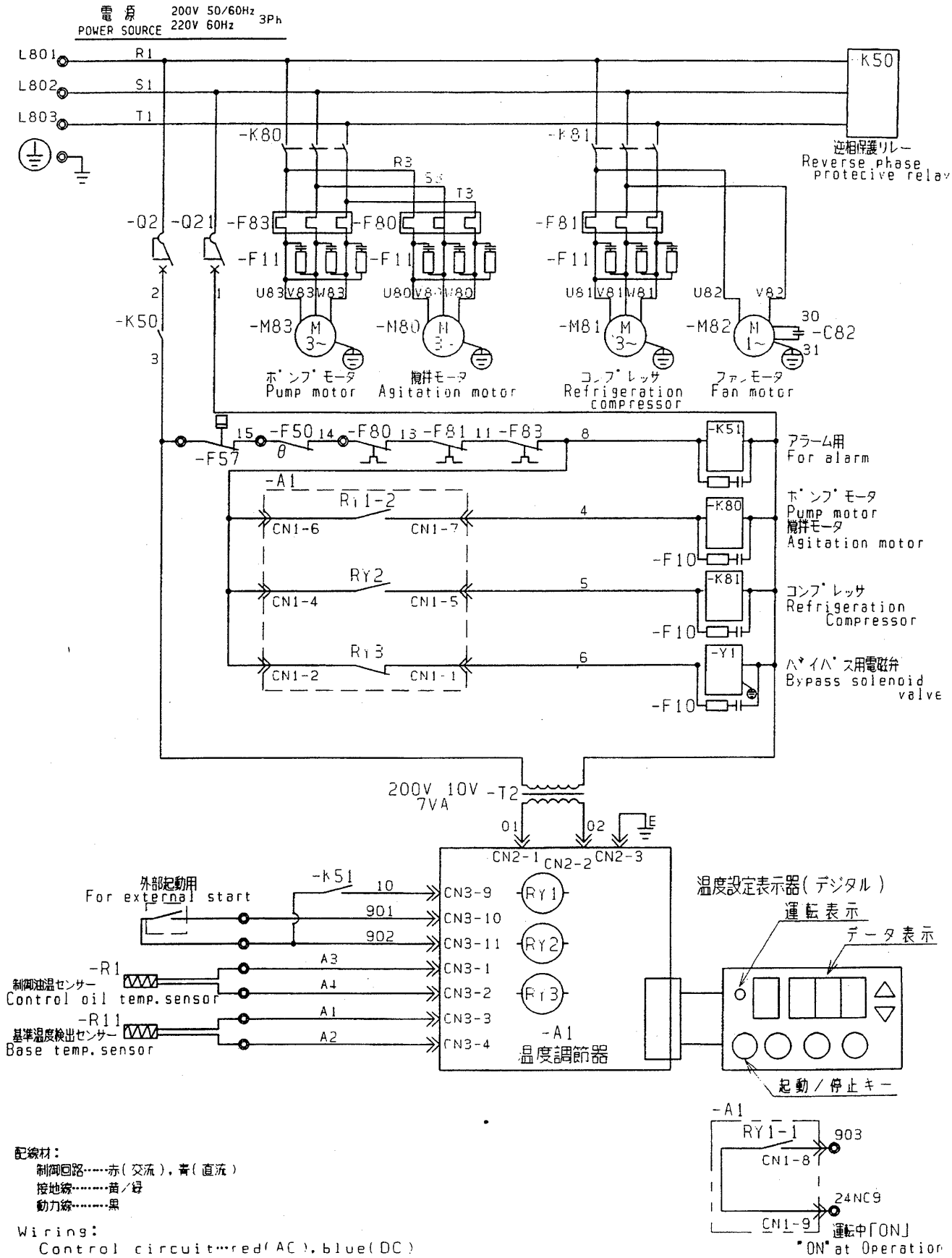


記号 Code	シンボル Symbol	名称 Part Name	記号 Code	シンボル Symbol	名称 Part Name	記号 Code	シンボル Symbol	名称 Part Name
0A		コンデンサ Condenser	7A		液面計 Oil lever gauge	M81		コンプレッサ Compressor
1A		冷却器 Cooler	8A		給油口 Oil inlet	M82		ファンモータ Fan motor
2A		キャピラリーチューブ Capillary	16A		リリーフバルブ Relief valve	M83	M83	ポンプモータ Pumpmotor
3A	D	ドライヤー Dryer	21A		サクションフィルタ Suction filter	R1		センサー Sensor
4A		サービスバルブ Service valve	F57	HP	圧力スイッチ Refrigeration circuit pressure switch	Y1	S	ソレノイドバルブ Solenoid valve
5A		トロコイドギヤポンプ Trocoid gearpump	M80	M80	撹拌モータ Agitating motor			

<Oil circuit parts list>

No.	Code	Parts Name	Specification	Q'ty	Type	Manufacturer
1	M81	Compressor (ASSY)	Nominal capacity 750W 2P 3ph	1	C-R79H3R (806 773 83)	SANYO
2	OA	Condenser	Slit fin type 3rows × 16fins Model 07	1	011-A1007-＊＊	Kanto seik
3	1A	Cooler (open type)	Model 07 Open and coil type	1	030-0707-＊＊	Kanto seiki
4	5A	Trochoid gear pump	15.0/18.01/min (1500/1800 min^{-1})	1	TOP-210HBE MVB-A5	NOP
5	M80	Agitation motor	50W 4P 3ph	1	10ET4-50A2	Shibaura Eng. works
6	M82	Fan motor	60W with fan	1	BP-60S2-30D1	Shibauwa Eng. works
7	M83	Pump motor	400W 4P	1	TOP-2MH400 Integral with pump	NOP
8	3A	Dryer	For 750W 197mm(for capillary)	1	KC-6776-01	Kawamura Seikan
9	4A	Service valve	Withstanding pressure 30 kgf/cm^2G	1	ZVH-W	Nichiden Kogyo
10	Y1	Solenoid valve	For refrigeration circuit	1	EVR6 200V	Danfoss
11	16A	Relief valve	set $5kgf/cm^2$	1	Integral with pump	NOP
12	21A	Suction filter	150 mesh PT3/4"	1	SFT-06-150W	Taisei kogyo
13	2A	Capillary tube	∅3 × ∅1.5 × 400mm	1	380-0107-＊＊	Kanto seiki
14	R1	Thermistor sensor	Thermistor ∅6 × 250 Rc1/8"	1	TCFSD025P5 02AT	Kanto seiki
15	F57	Pressure switch	For gas circuit Set pressure $26kgf/cm^2$	1	FTB-Z364	Saginomiya S.S.
16	7A	Fluid level gage	For water/oil Heat resistance 90	1	951-0900-＊＊	Kanto seiki
17	8A	Oil fill		1	SAB-40	Tokyo Roka

<Electrical circuit diagram>



配線材:
制御回路……赤(交流),青(直流)
接地線……黄/緑
動力線……黒

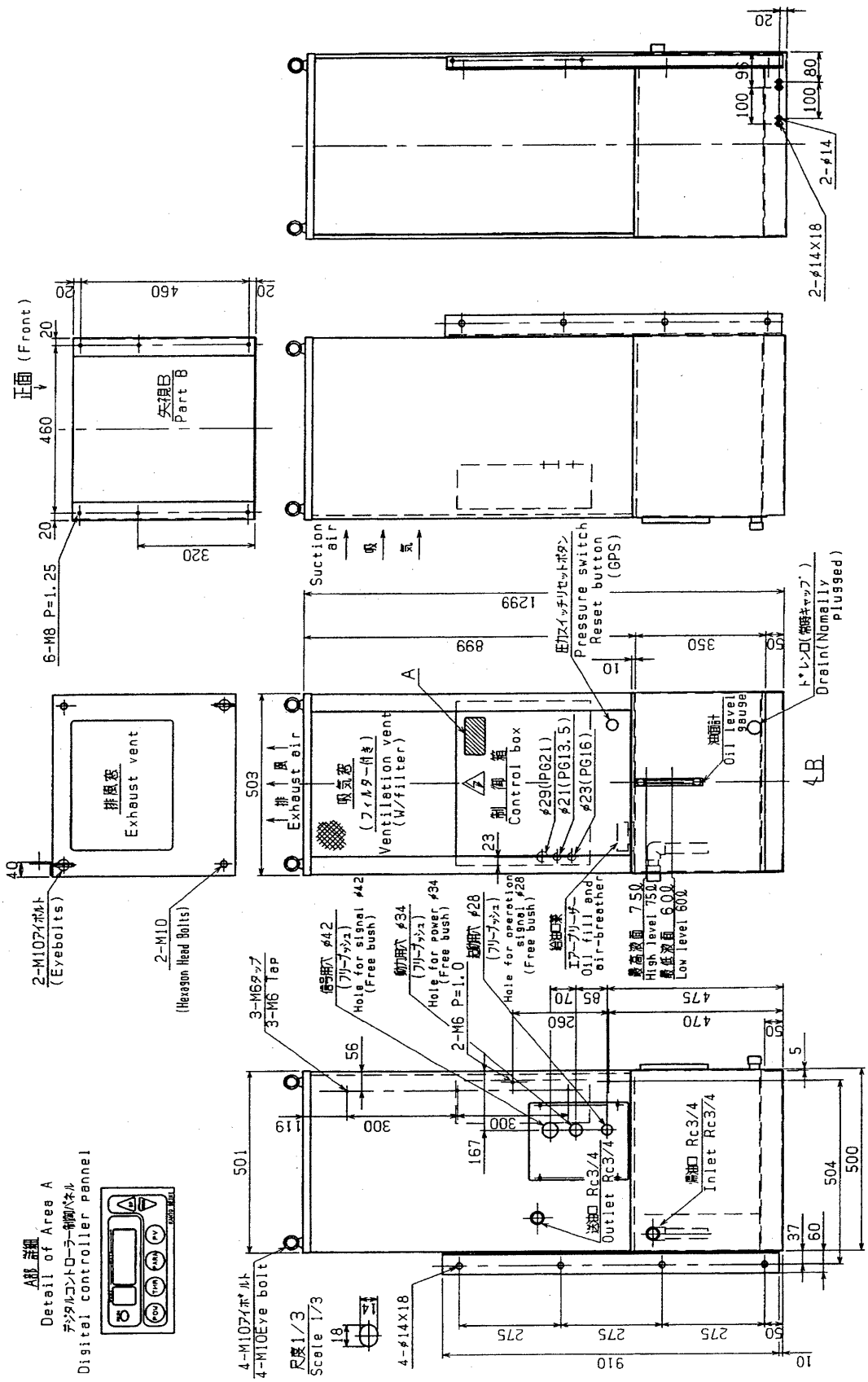
Wiring:
Control circuit…red(AC),blue(DC)
Ground lead ……yellow/green
Power line ……black

<Electrical parts list>

No.	Code	Parts Name	Specification	Q'ty	Type	Manufacturer
1	A1	Temperature controller	Follow-up type, 3position(for precision type)	1	D3-F05VM	Kanto seiki
2	C82	Condenser	2.5 μF AC430V	1	Accessory of M82	Shibaura Eng. Work.
3	Q2	Circuit protector	Rated current 1A (for middle action speed)Attached cover	1	BAC101105	Matsushita Elec.
4	Q21	Circuit protector	Rated current 1A (for middle action speed)Attached cover	1	BAC101105	Matsushita Elec.
5	K51	Auxiliary relay	2C contact, coil voltage AC 200V 50/60Hz(with cover, spark killer)	1	MY2-CR AC200V	OMRON
6	F57	Pressure switch	OFF at pressure over rising, manual reset(Set value 2.55MPa)	1	FTB-Z364	Saginomiya Eng. Work.
7	M80	Agitation motor	50W 4P 200V 50/60Hz 3ph	1	10ET4-50A2	Shibaura Eng. Work.
8	M83	Pump motor	400W 4P 200V 50/60Hz 3ph	1	TOP-2MH400	NOP
9	M81	Compressor	Nominal capacity 750W 2P AC 200V 50/60Hz 3ph	1	C-R79H3R	SANYO
10	M82	Fan motor	60W 4P AC 200V 50/60Hz 1ph	1	BP-60S2-30D1	Shibaura Eng. Work.
11	K80	Electromagnetic contactor	Contact point 3A+1a, Coil voltage AC 200V 50/60Hz	1	LC1D0910L7	Telemechanic
12	F80	Thermal relay	Set value 0.5A 3 pole 3 element manual reset	1	LR2D1304	Telemechanic
13	K81	Electromagnetic contactor	Contact point 3A+1a, Coil voltage AC 200V 50/60Hz	1	LC1D0910L7	Telemechanic
14	F81	Thermal relay	Set value 4.6A 3 pole 3 element manual reset	1	LR2D1310	Telemechanic
15	F83	Thermal relay	Set value 2.2A 3 pole 3 element manual reset	1	LR2D1307	Telemechanic
16	K50	Reverse phase protective relay	3ph AC 200V 50/60Hz OFF at reverse phase	1	RDR-S-1	SANYO
17	F10	Spark killer	Rated voltage AC 250V 0.22 μ F+120Ω	3	RFNA 224M	Marukon Denshi
18	F11	Spark killer	Rated voltage AC 250V 0.1 μ F+120Ω	9	XEB1201	Okaya Elec.
19	F50	Thermal protector	OFF at dome temp. over rising automatically reset	1	CS-7SA	Wako Elec.
20	R1	Thermistor sensor	Installed with screw thread Rc 1/8" 5kΩ ∅6×250	1	TCFSD025P 502AT	Kanto seiki
21	R11	Thermistor sensor	Installed with screw thread Rc 1/8" 5kΩ	1	437-7400-＊＊	Kanto seiki
22	T2	Transformer	AC200/AC10V 7VA 1ph	1	EP-541	Tokyo Trans.
23	X1	Terminal block	Rated isolation voltage AC 600V, rated current 10A-15P	1	UK10-15J	Yoshida Elec.
24	X11	Terminal block	Rated isolation voltage AC 600V, rated current 15A-3P	1	UK15-3J	Yoshida Elec.
25	Y1	Solenoid valve	For refrigerant circuit AC 220V 50/60Hz	1	EVR6 AC220V	Danfoss

20.2 KTVM-11B-LM (High Output Specification)

<General View>



(U07041 D01)

<Specifications>

M o d e l : KTV-11B-LM

Control number : AMB03904

A p p e a r a n c e : Steel plate with baking finish (Mori ivory, Powder coat)

Ambient temp. conditions : Temp. of inhaling air for condenser 10~35℃

Cooling capacitiy : 4460W(3840Kcal/h) 60Hz 3720W(3200Kcal/h) 50Hz
(Ambient temp. 35℃ oil temp. 35℃ Service oil ISO VG32)

Refrigeration Compressor : Totally-enclosed compressor -Norminal capacitiy 1.1KW. 2P
-Refrigerant HCFC-22(R-22)

C o n d e n s e r : Forced air cooling system. cross-fin type.
Fan motor for forced air cooling : 200W. 4P

C o o l e r : Open coil type with agitator Agitation motor : 50W. 4P

Pump (For circulation) :
Directly driven by trochoid gear pump motor
Theoretical discharge : 24/28.8l/min(1500/1800rpm)
Relief valve : direct-acting type 0.5Mpa(5Kg/cm^2) at full relief
Electrical rating : 400W. 4P. 200V 50/60Hz 3Ph

Power source : Power Circuit AC200V 50/60Hz AC220V 60Hz 3Ph
Max. operating current : 11A
Power source capacity : 3.9KVA

Temp. controller : Digital setting, Indication temperature controller
(Follow-up Base temperature differential type)
Set range : Base temperature ±5℃
(Oil temp. is limited within 10~40℃)
ON/OFF Sensitivity : 0.2℃ (Sensitivity of controller unit)
·Upper and Lower limit alarm indication function oil temp.
Set range (set temp. ±15℃)
·Start up timer function oil temp. Set range 0.5h~72h
·Enable to exchange from constant type to follow-up type.

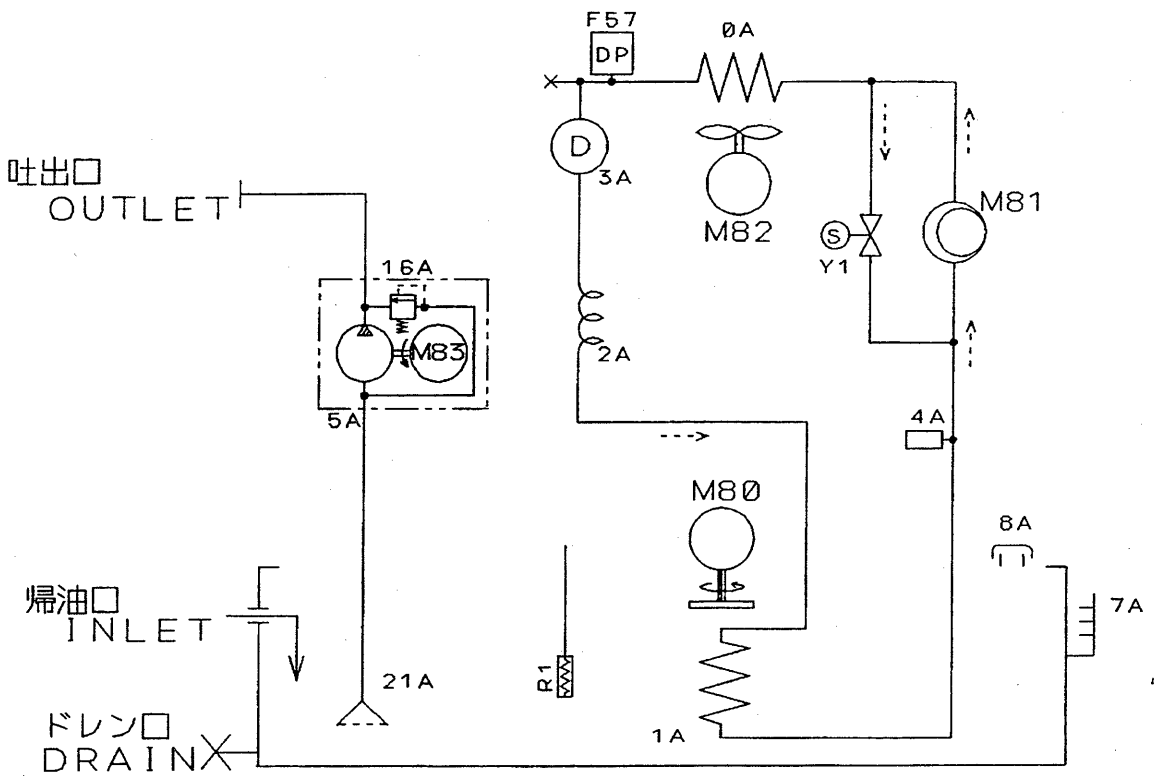
W e i g h t : 1400N (140Kgf)

A c c e s s o r y : Base temparature sensor (Drawing No. 437-7400-**) 1 pce.

<Oil cooling medium circulation circuit>

冷 媒 及び 液循環回路図
CIRCULATION CIRCUIT OF REFRIGERANT AND FLUID

←——	液循環方向(FLUID)
<----	冷媒循環方向(REFRIGERANT)

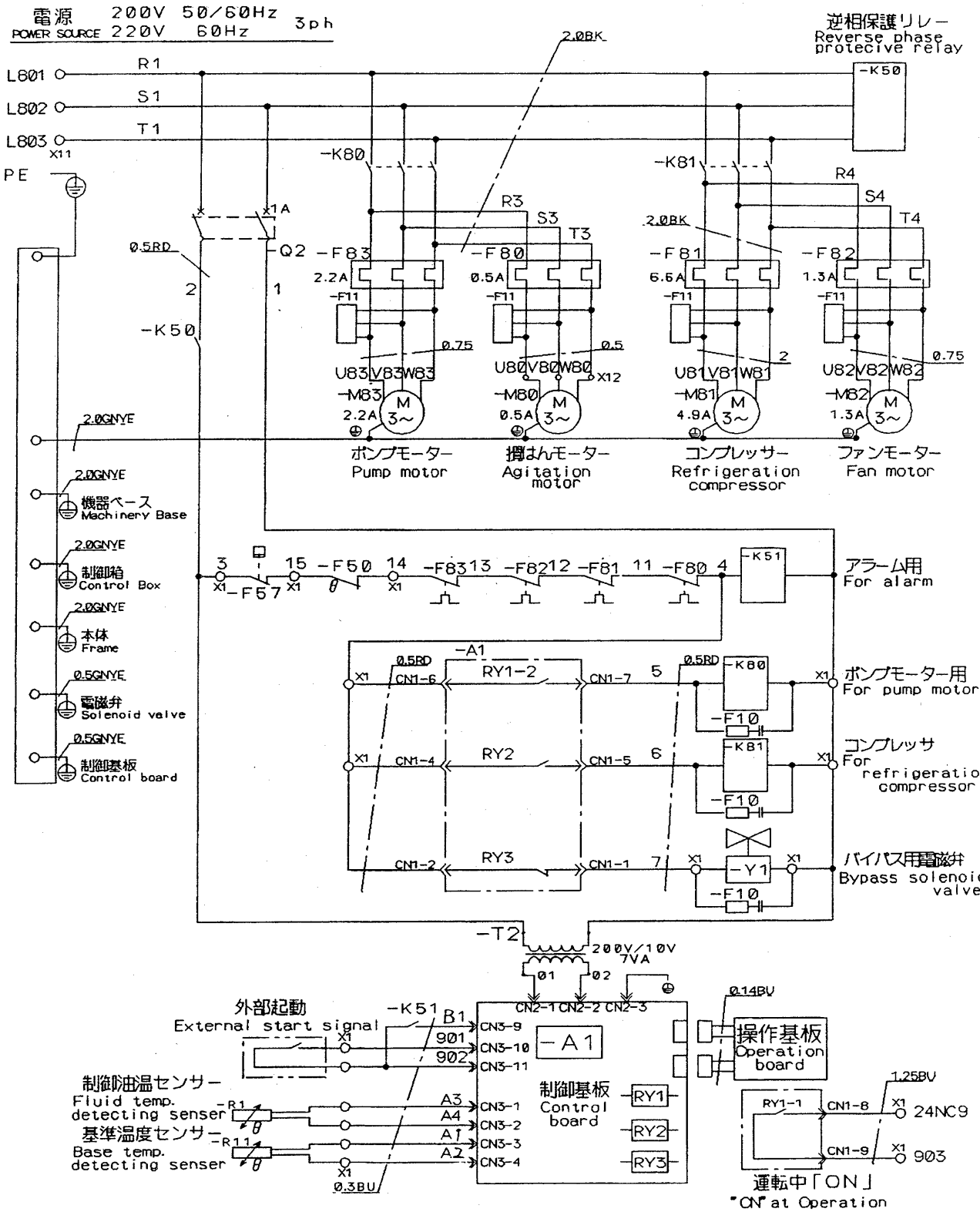


記号 Code	シンボル Symbol	名称 Part Name	記号 Code	シンボル Symbol	名称 Part Name	記号 Code	シンボル Symbol	名称 Part Name
0A		コンデンサ Condenser	M80	M	撹拌モーター Agitation motor	21A		サクションフィルタ Suction filter
1A		冷却器 Cooler	M81		コンプレッサー Compressor	M83	M	ポンプモーター Pumpmotor
2A		キャピラリーチューブ Capillary	M82		ファンモータ Fan motor	16A		リリーフバルブ Relief valve
3A	D	ドライヤー Dryer	Y1	S	ソレノイドバルブ Solenoid valve	F57	DP	圧力スイッチ Refrigeration circuit pressure switch
7A		液面計 Oil lever gauge	5A		トロコイドギア ポンプ Trocoid gear pump	4A		サービスバルブ Service valve
8A		給油口 Oil inlet						
R1		センサー Sensor						

<Oil circuit parts list>

No.	Code	Parts Name	Specification	Q'ty	Type	Manufacturer
1	M81	Compressor (ASSY)	Nominal capacity 1100W 2P 3ph	1	C-R113H3U (806 147 83)	SANYO
2	OA	Condenser	Cross fin type 6rows × 15fins Model 11.22	1	011-1011-＊＊	Kanto seik
3	1A	Cooler (open type)	Model 11 Open and tube type	1	031-1011-＊＊	Kanto seiki
4	5A	Trochoid gear pump	24.0/28.81/min (1500/1800 min^{-1})	1	TOP-216HAE MVB5	NOP
5	M80	Agitation motor	50W 4P 3ph	1	10ET4-50A2	Shibaura Eng. works
6	M82	Fan motor	200W with fan	1	FBKK8-4P IEC	Toshiba
7	M83	Pump motor	400W 4P	1	Integral with pump	NOP
8	3A	Dryer	For 750W, 1100W 197mm(for capillary)	1	KC-6476-01	Kawamura Seikan
9	4A	Service valve	Withstanding pressure 30 kgf/cm^2G	1	ZVH-W	Nichiden Kogyo
10	Y1	Solenoid valve	For refrigeration circuit	1	EVR6 200V	Danfoss
11	16A	Relief valve	set $5kgf/cm^2$	1	Integral with pump	NOP
12	21A	Suction filter	150 mesh Rc3/4"	1	SFT-06-150W	Taisei kogyo
13	2A	Capillary tube	∅3 × ∅2 × 1000mm	1	380-1015-＊＊	Kanto seiki
14	R1	Thermistor sensor	Thermistor ∅6 × 250 Rc1/8"	1	TCFSD025P5 02AT	Kanto seiki
15	F57	Pressure switch	For gas circuit Set pressure $26kgf/cm^2$	1	FTB-Z364	Saginomiya S.S.
16	7A	Fluid level gage		1	NL-072	Kanto seiki
17	8A	Oil fill		1	SAB-40	Tokyo Roka

<Electrical circuit diagram>



注) • 指示なき配線はすべてRed…1.25mm²
All wiring color is red without indicated
• BK=black, BU=blue, GNYE=green-yellow, RD=red, OG=orange
• 断面積単位はmm²とする
Unit of sectional area is "mm²"
• CN□-□はコネクターNo、を示す。
Connector Number is show as "CN□-□".

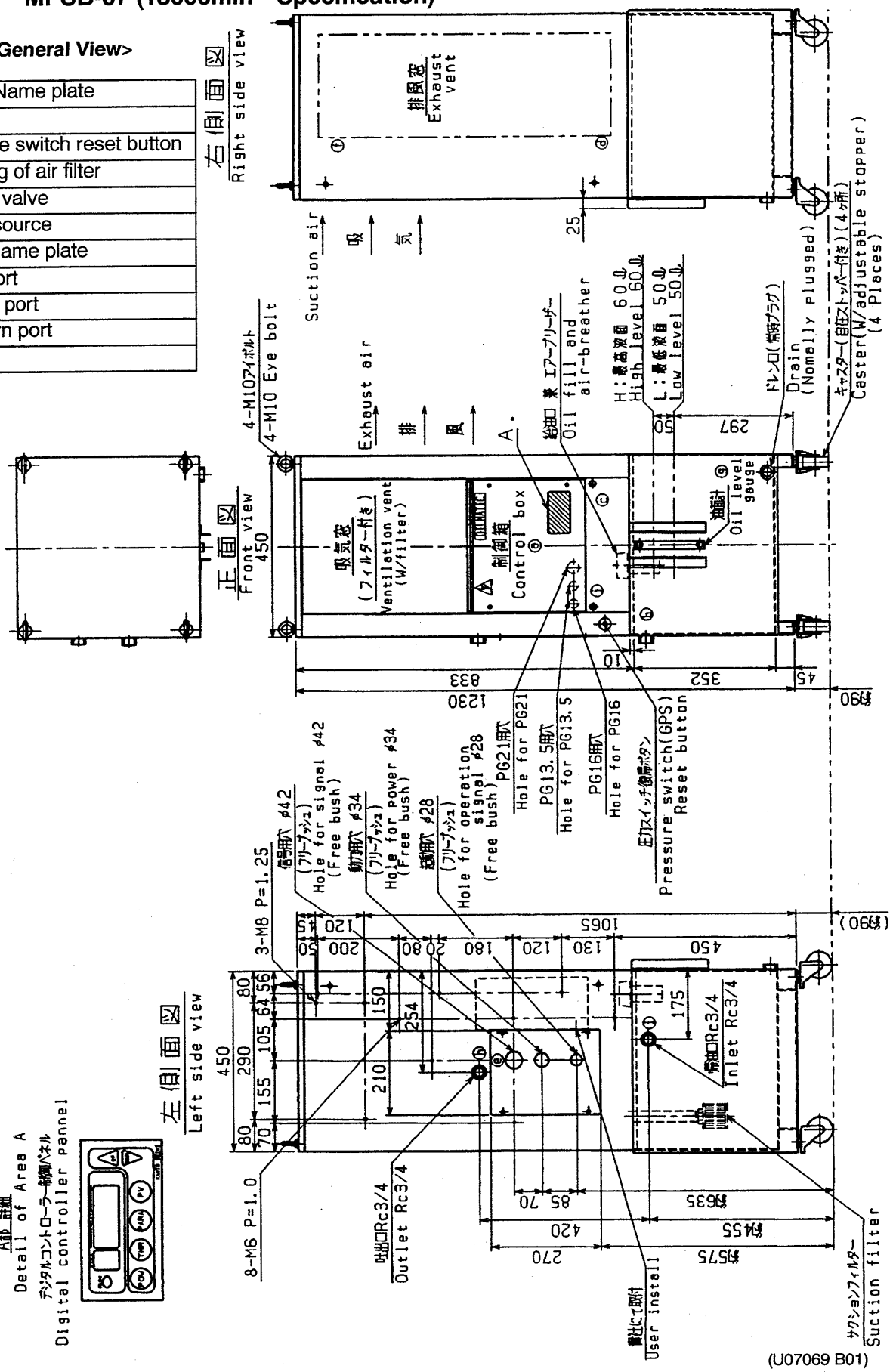
<Electrical parts list>

No.	Code	Parts Name	Specification	Q'ty	Type	Manufacturer
1	A1	Temperature controller	Follow-up type, 3position(for precision type)	1	D3-F05VM	Kanto seiki
2	F10	Spark killer	Rated voltage AC 250V 0.22 μ F+120Ω	3	RFNA 0.22μ F+120Ω	Marukon Denshi
3	F11	Spark killer	Rated voltage AC 250V (0.5 μ F+50Ω)×3	4	3CRE-50500	Okaya Elec.
4	F50	Thermal protector	OFF at dome temp. over rising, automatically reset	1	CS-7SA	Wako Elec.
5	F57	Pressure switch	OFF at pressure over rising, manual reset(Set value 2.55MPa)	1	FTB-Z364	Saginomiya Eng. Work.
6	K50	Reverse phase protective relay	OFF at reverse phase, 3ph AC 200V 50/60Hz	1	RDR-S-1	SANYO
7	K51	Auxiliary relay	2C contact, coil voltage AC 200V 50/60Hz	1	MY2-CR AC200V	OMRON
8	K80	Electromagnetic contactor	Contact point 3A+1a, Coil voltage AC 200V 50/60Hz	1	LC1D0910L7	Telemechanic
9	F83	Thermal relay	Set value 2.2A, 3 pole 3 element, manual reset	1	LR2D1307	Telemechanic
10	K81	Electromagnetic contactor	Contact point 3A+1a, Coil voltage AC 200V 50/60Hz	1	LC1D0910L7	Telemechanic
11	F81	Thermal relay	Set value 6.6A, 3 pole 3 element, manual reset	1	LR2D1312	Telemechanic
12	F80	Thermal relay	Set value 0.5A, 3 pole 3 element, manual reset	1	LR2D1304	Telemechanic
13	F82	Thermal relay	Set value 1.3A, 3pole 3 element, manual reset	1	LR2D1306	Telemechanic
14	M80	Agitation motor	50W 4P 200V 50/60Hz 3ph	1	10ET4-50A2	Shibaura Eng. Work.
15	M81	Compressor	Nominal capacity 1.1KW 2P AC 200V 50/60Hz 3ph	1	C-7R113H3U	SANYO
16	M82	Fan motor	200W 4P AC 200V 50/60Hz AC 220V 60Hz 3ph	1	FBKK8-4P IEC	Toshiba
17	M83	Pump motor	400W 4P 200V 50/60Hz 3ph	1	FCKLK8	Toshiba
18	Q2	Circuit protector	AC 250V 2P 1A (for middle action speed)Attached cover	1	BAC201105	Matsushita Elec. Works
19	R1	Thermistor sensor	Installed with screw thread Rc 1/8" 5kΩ ∅6×250	1	TCFSD025P 502AT	Kanto seiki
20	R11	Thermistor sensor	Installed with screw thread Rc 1/8" 5kΩ	1	437-7400-＊＊	Kanto seiki
21	T2	Transformer	AC200/AC10V 7VA 1ph	1	EP-541(200V/ 10V)	Tokyo Trans
22	X1	Terminal block	Rated isolation voltage AC 250V, rated current 10A-18P	1	SKK10-18J	Yoshida Elec.
23	X11	Terminal block	Rated isolation voltage AC 600V, rated current 15A-3P	1	UK15-3J	Yoshida Elec.
24	X12	Box type terminal block	AC250V-15A 4P IP65	1	BOXTC-4	Toyo Giken
25	Y1	Solenoid valve	For refrigerant circuit AC 220V 50/60Hz	1	EVR6 AC220V	Danfoss

20.3 MPSB-07 (13000min^{-1} Specification)

<General View>

Name plate	
a	Danger
b	Pressure switch reset button
c	Cleaning of air filter
d	Service valve
e	Power source
f	Model name plate
g	Drain port
h	Oil feed port
i	Oil return port
j	Oil fill



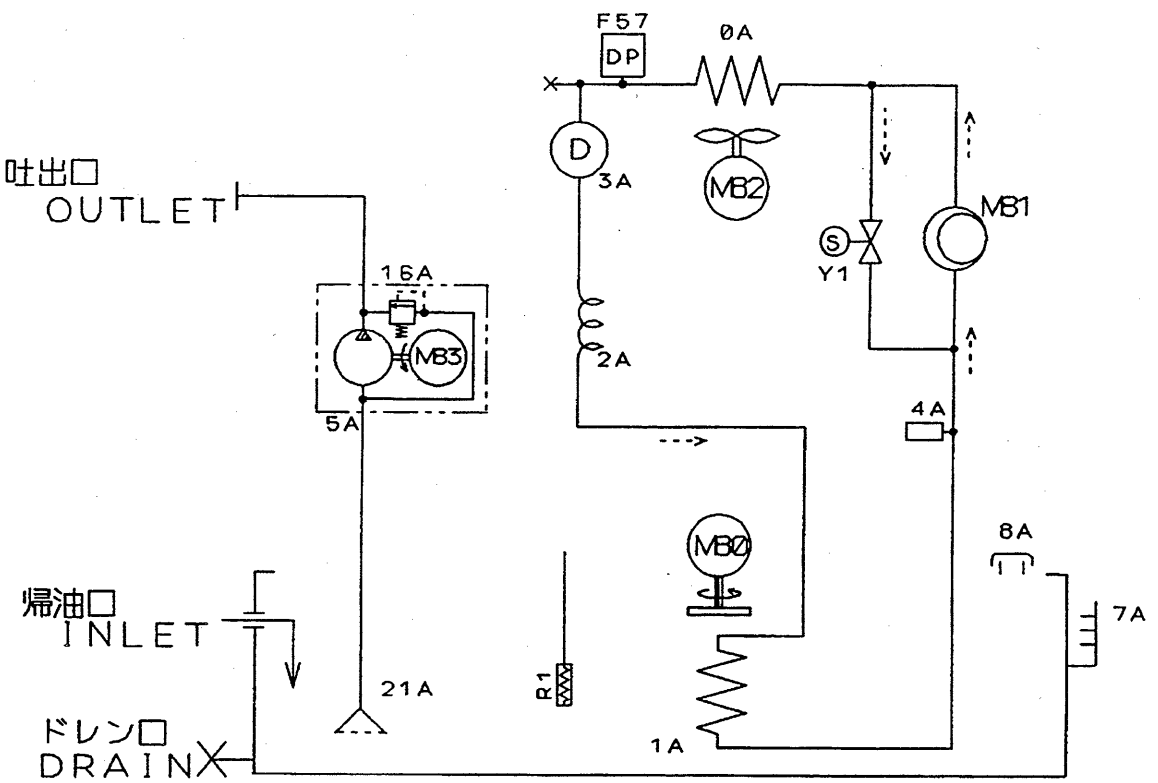
<Specifications>

Model	: MPSB−07
Control number	: AMB06602
Appearance	: Steel plate with baking finish (Mori Ivory, Powder coat)
Ambient temp. conditions	: Temp. of inhaling air for condenser: 5～40℃
Cooling capacity	: 2850W(2450Kcal/h) 60Hz 2600W(2250Kcal/h) 50Hz : (Liquid temp. 25℃ Ambient temp. 25℃ Service oil ISO VG2)
Refrigeration Compressor	Totally-enclosed compressor -Nominal capacity 750W. 2P -Refrigerant HCFC-22 (R-22)
Condenser	Forced air cooling system, cross-Fin type. Fan motor for forced air cooling: 60W.4P
Cooler	Open coil type with agitator Agitation motor : 50W.4P
Pump	:Directly driven by trochoid gear pump motor TOP-2MH400-212HBEMVB-A5 Theoretical discharge :15/18.0L/min(1500/1800rpm) Relief valve :direct-acting type 0.5MPa (5Kg/ cm^2) at full relief :Electric rating :400W.4P 200V 50/60Hz
Power source	:Power Circuit AC200V 50/60Hz AC220V 60Hz 3Ph Max. operating current: 9A Power source capacity : 3.1KVA
Temp. controller	: Digital setting, indication temperature controller (Follow-up base temperature differential type) Set range :Base temperature ± 5～ - 5℃ (Oil temp. is limited within 10～40℃) ON/OFF Sensitivity :0.2℃(sensitivity of controller unit)
Weight	: 1000N (100Kgf)
Accessory	: Base temperature sensor (Drawing No.437-7400-**)1 pce.
Electric Spcification	:Conform to IEC60204-1
Control box	:Conform to IP54

<Oil cooling medium circulation circuit>

冷 媒 及び 液循環回路図
CIRCULATION CIRCUIT OF REFRIGERANT AND FLUID

⟵	液循環方向(FLUID)
<----	冷媒循環方向(REFRIGERANT)

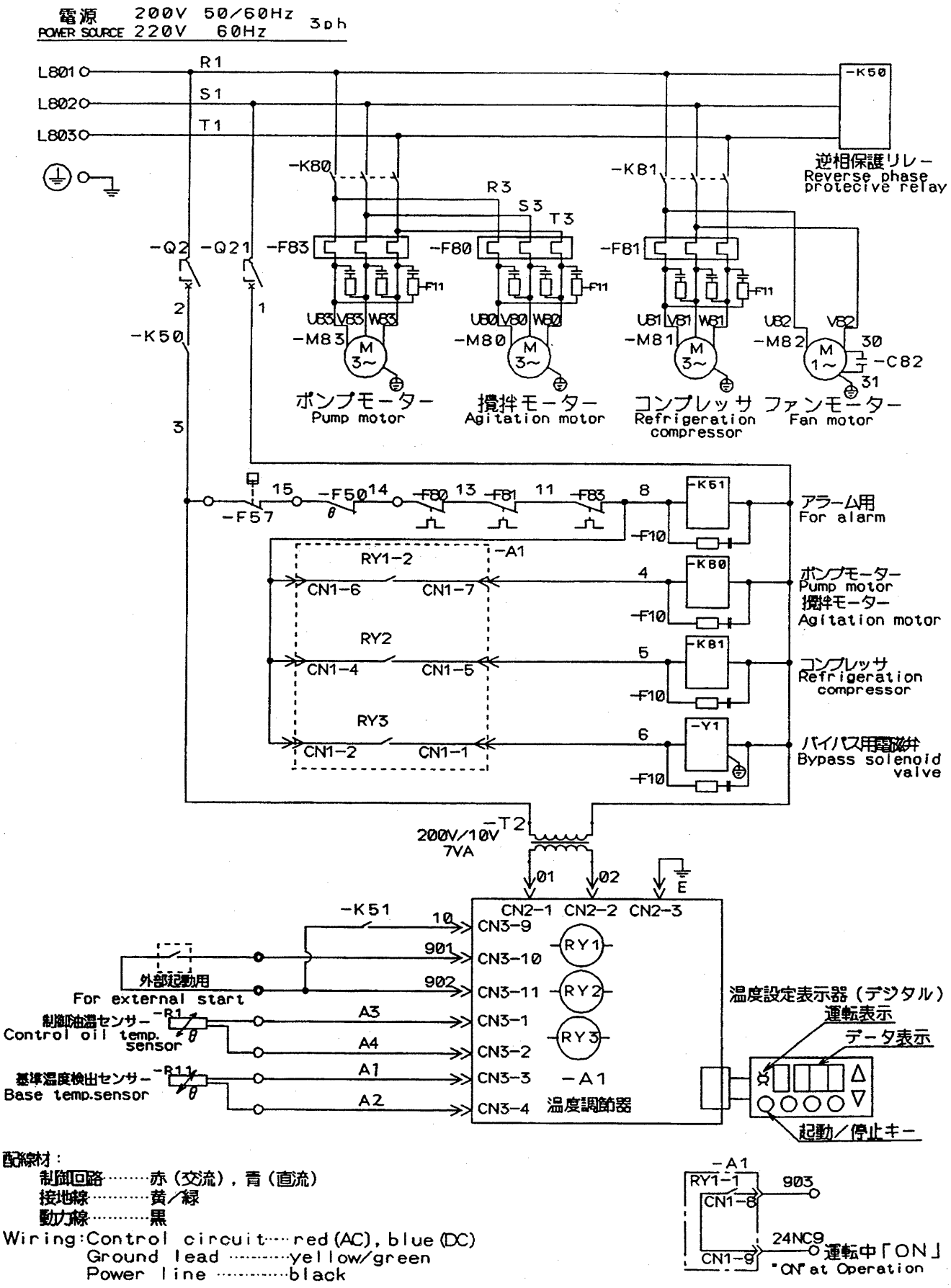


記号 Code	シンボル Symbol	名称 Part Name	記号 Code	シンボル Symbol	名称 Part Name	記号 Code	シンボル Symbol	名称 Part Name
0A		コンデンサ Condenser	F57	DP	圧力スイッチ Refrigeration circuit pressure switch	21A		サクションフィルタ Suction filter
1A		冷却器 Cooler				M1	M	ポンプモーター Pumpmotor
2A		キャピラリーチューブ Capillary	M80	M	撹拌モーター Agitation motor	5A		トロコイドギア ポンプ Trocoid gear pump
3A	D	ドライヤー Dryer	M81		コンプレッサー Compressor			
4A		サービスバルブ Service valve	M82		ファンモータ Fan motor	16A		リリーフバルブ Relief valve
7A		液面計 Oil lever gauge	R1		センサー Sensor			
8A		給油口 Oil inlet	Y1	S	ソレノイドバルブ Solenoid valve			

<Oil circuit parts list>

No.	Code	Parts Name	Specification	Q'ty	Type	Manufacturer
1	M81	Compressor (ASSY)	Nominal capacity 750W 2P 3ph	1	C-R79H3R (806 773 83)	SANYO
2	OA	Condenser	Slit fin type 3rows × 16fins Model 07	1	011-A1007-＊＊	Kanto seik
3	1A	Cooler (open type)	Model 07 Open and coil type	1	030-0707-＊＊	Kanto seiki
4	5A	Trochoid gear pump	15.0/18.01/min (1500/1800 min^{-1})	1	TOP-210HAE MVB-A5	NOP
5	M80	Agitation motor	50W 4P 3ph	1	10ET4-50A2	Shibaura Eng. works
6	M82	Fan motor	60W with fan	1	BP-60S2-30D1	Shibauwa Eng. works
7	M83	Pump motor	400W 4P	1	FCKLK8-4P 0.4K	Toshiba
8	3A	Dryer	For 750W, 1100W 197mm(for capillary)	1	KC-6476-01	Kawamura Seikan
9	4A	Service valve	Withstanding pressure 30 kgf/cm^2G	1	ZVH-W	Nichiden Kogyo
10	Y1	Solenoid valve	For refrigeration circuit	1	EVR6 AC 220V	Danfoss
11	16A	Relief valve	set $5kgf/cm^2$	1	Integral with pump	NOP
12	21A	Suction filter	150 mesh Rc3/4"	1	SFT-06-150W	Taisei kogyo
13	2A	Capillary tube	∅3 × ∅1.5 × 400mm	1	380-0107-＊＊	Kanto seiki
14	R1	Thermistor sensor	Thermistor ∅6 × 250 Rc1/8"	1	TCFSD025P5 02AT	Kanto seiki
15	F57	Pressure switch	For gas circuit Set pressure $26kgf/cm^2$	1	FTB-Z364	Saginomiya S.S.
16	7A	Fluid level gage	For water/oil Heat resistance 90	1	951-0900-＊＊	Kanto seiki
17	8A	Oil fill		1	SAB-40	Tokyo Roka

<Electrical circuit diagram>



配線材：
制御回路……赤（交流），青（直流）
接地線……黄／緑
動力線……黒

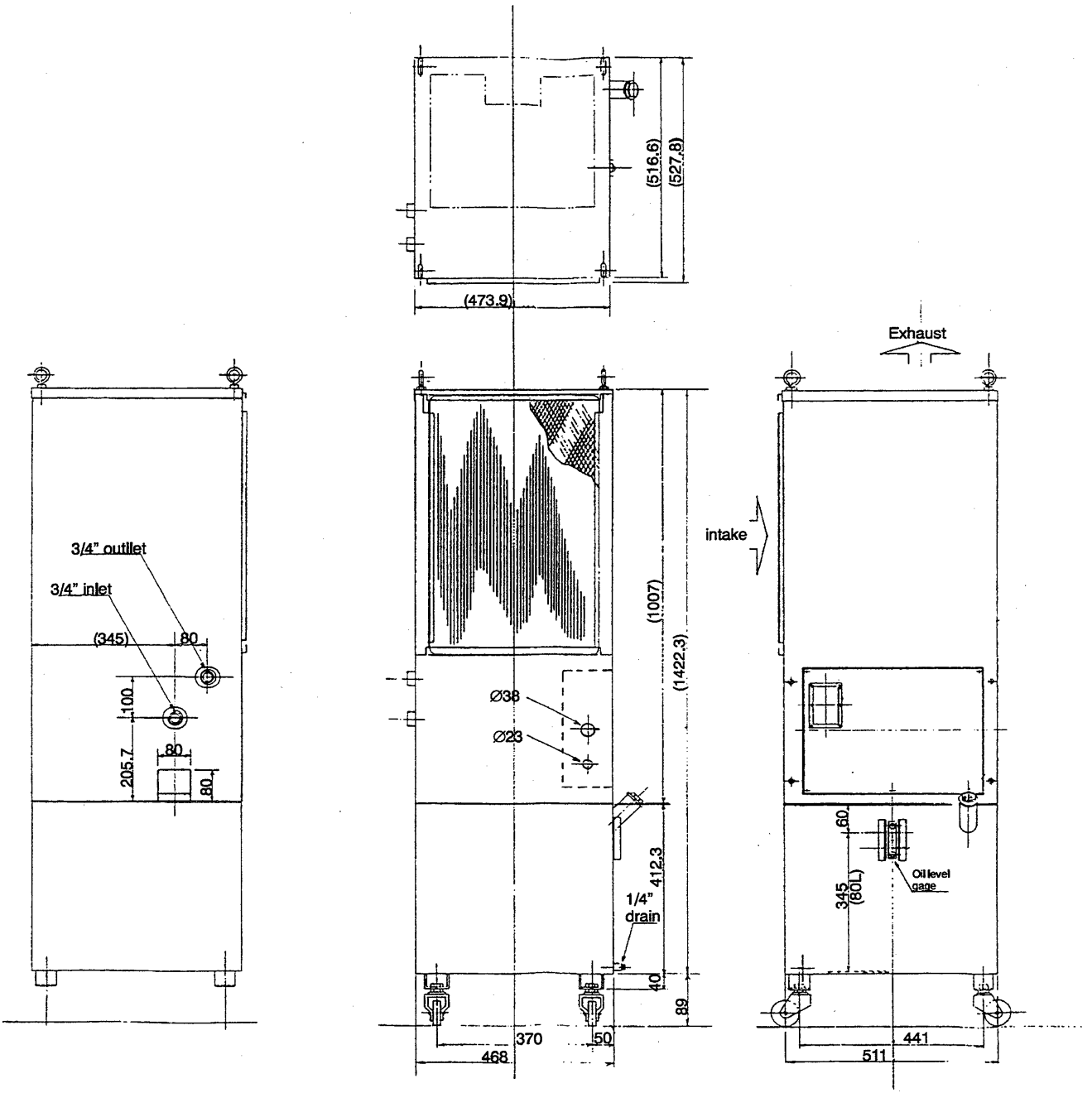
Wiring: Control circuit……red (AC), blue (DC)
Ground lead……yellow/green
Power line……black

<Electrical parts list>

No.	Code	Parts Name	Specification	Q'ty	Type	Manufacturer
1	A1	Temperature controller	Follow-up type, 3position(for precision type)	1	D3-F05VM	Kanto seiki
2	C82	Condenser	2.5 μF AC430V	1	Accessory of M82	Shibaura Eng. Work.
3		Terminal cover	For Q2, Q21	2	BAC9001	Matsushita Elec.
4	F10	Spark killer	Rated voltage AC 250V 0.22 μ F+120Ω	4	RFNA 0.22 μ F+120Ω	Marukon Denshi
5	F11	Spark killer	Rated voltage AC 250V 0.1 μ F+120Ω	9	XEB 1201	Okaya Elec.
6	F50	Thermal protector	OFF at dome temp. over rising, automatically reset	1	CS-7SA	Wako Elec.
7	F57	Pressure switch	OFF at pressure over rising, manual reset(Set value 2.55MPa)	1	FTB-Z364	Saginomiya S.S.
8	K50	Reverse phase protective relay	OFF at reverse phase, 3ph AC 200V 50/60Hz	1	RDR-S-1	SANYO
9	K51	Auxiliary relay	2C contact, coil voltage AC 200V 50/60Hz	1	MY2 AC200V	OMRON
10		Socket	For K51	1	PYF08A-E	OMRON
11	K80	Electromagnetic contactor	Contact point 3A+1a, Coil voltage AC 200V 50/60Hz	1	LC1D0910L7	Telemechanic
12	F80	Thermal relay	Set value 0.5A, 3 pole 3 element, manual reset	1	LR2D1304	Telemechanic
13	F83	Thermal relay	Set value 2.2A, 3 pole 3 element, manual reset	1	LR2D1307	Telemechanic
14		Attachment plate	For LR1D, LR2D	1	LA7D1064	Telemechanic
15	K81	Electromagnetic contactor	Contact point 3A+1a, Coil voltage AC 200V 50/60Hz	1	LC1D0910L7	Telemechanic
16	F81	Thermal relay	Set value 4.6A, 3 pole 3 element, manual reset	1	LR2D1310	Telemechanic
17	M80	Agitation motor	50W 4P AC 200V 50/60Hz 3ph	1	10ET4-50A2	Shibaura Eng. Work.
18	M81	Compressor	Nominal capacity 750W 2P AC 200V 50/60Hz 3ph	1	C-R79H3R	SANYO
19	M82	Fan motor	60W 4P AC 200V 50/60Hz 1ph	1	BP-60S2-30D1	Shibaura Eng. Work.
20	M83	Pump motor	400W 4P 200V 50/60Hz 3ph	1	FCKLK8	Toshiba
21	Q2	Circuit protector	AC 250V 1P 1A (for middle action speed)Attached cover	1	BAC101105	Matsushita Elec. Works
22	Q21	Circuit protector	AC 250V 1P 1A (for middle action speed)Attached cover	1	BAC101105	Matsushita Elec. Works
23	R1	Thermistor sensor	Installed with screw thread Rc 1/8" 5kΩ ∅6×250	1	TCFSD025P 502AT	Kanto seiki
24	R11	Thermistor sensor	Installed with screw thread Rc 1/8" 5kΩ	1	437-7400-＊＊	Kanto seiki
25	T2	Transformer	AC200/AC10V 7VA 1ph	1	EP-541(200V/ 10V)	Tokyo Trans.
26	X1	Terminal block	Rated isolation voltage AC 600V, rated current 10A-15P	1	UK10-15J	Yoshida Elec.
27	X11	Terminal block	Rated isolation voltage AC 600V, rated current 15A-3P	1	UK15-3J	Yoshida Elec.
28	Y1	Solenoid valve	For refrigerant circuit AC 220V 50/60Hz	1	EVR6 AC220V	Danfoss

20.4 NU-YS150BMW (For Column Cooling)

<General View>

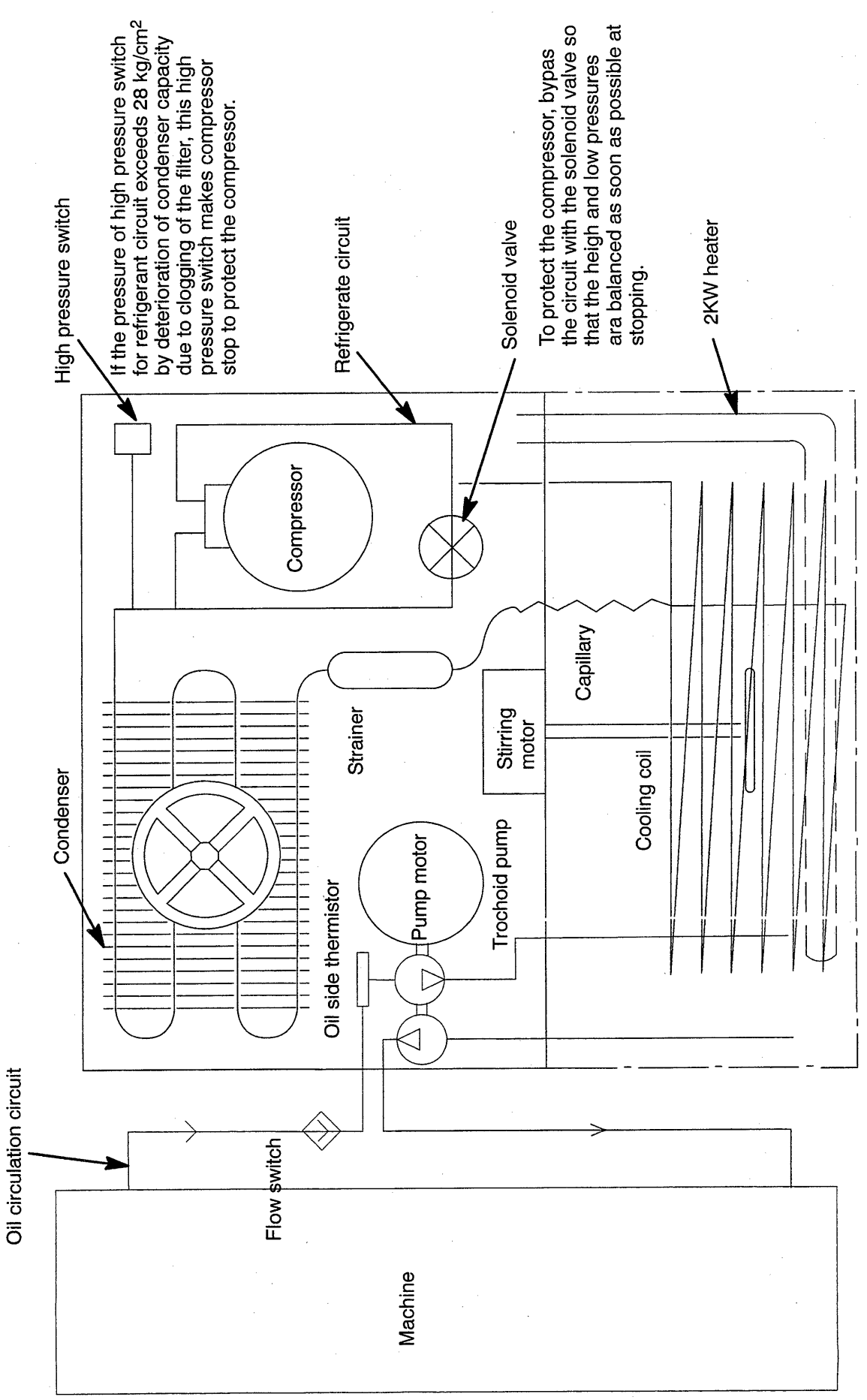


(U07189 B01)

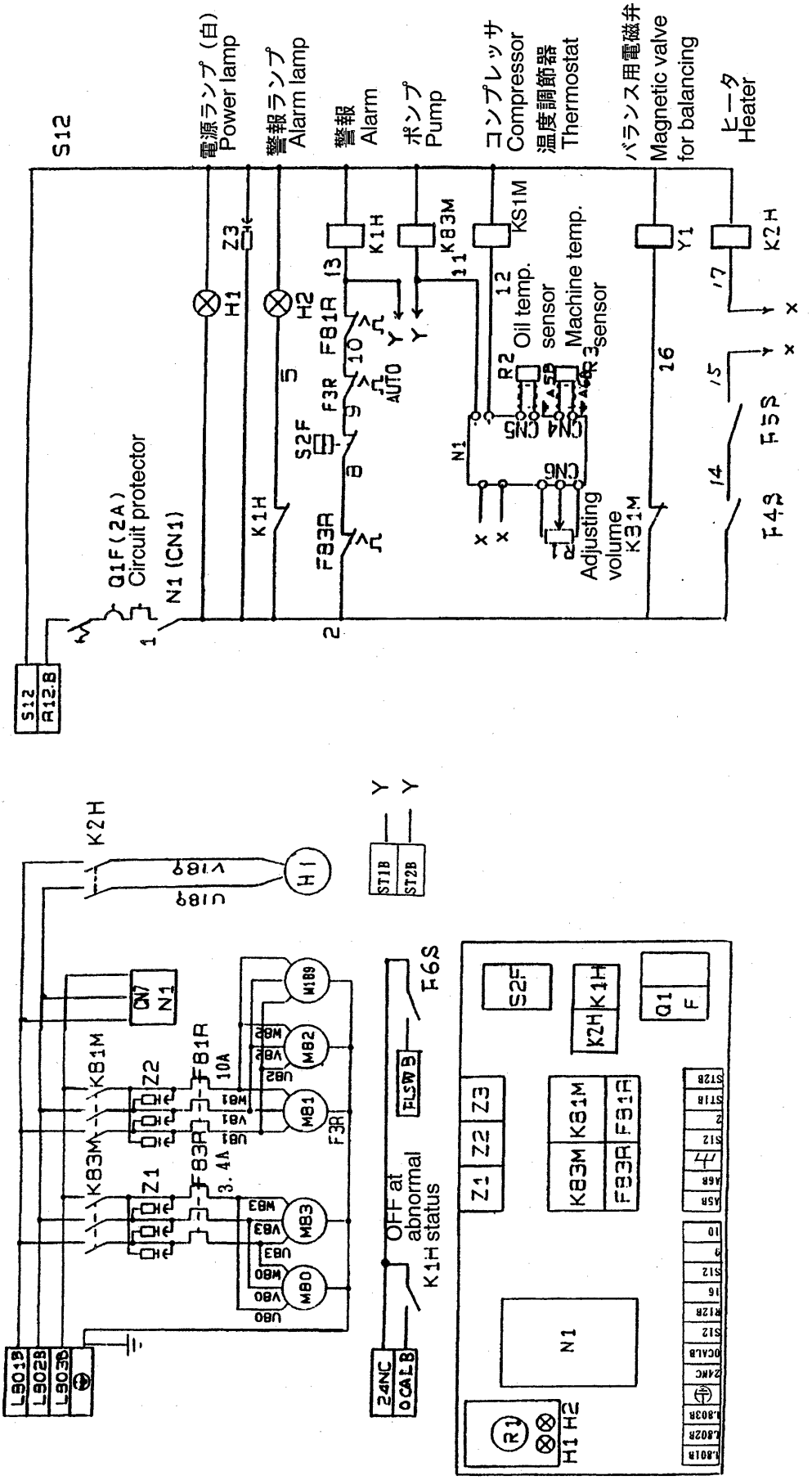
<Specifications>

Type	NU-YS150BMW
Cooling capacity	5000 Kcal/H Room Tem. 35℃ Oil temp. 38℃ 200V 60Hz
Comp.	Rotary type 1500W 3∅ 200V 50/60 Hz 2P
Condenser	Fan cooling type Fin and tube type
Cooler	Circulating type
Heater	pipe heater 2KW 1∅ 200V
Fan & Motor	∅300 6 Vanes 50W 3∅ 200V 50/60 Hz 4P 2pcs.
Motor of pump	Totally enclosed external fan type 750W 3∅ 200V 50/60 Hz 4P
Liquid pump	Kuse Trochoid pump KSP-MS14-18 Displacement (25.2 / 21 - 32.4 / 27 L/min) Safety valve setpoint (5kg/cm^2)
Liquid temp. controller	Machine temp. tracing type (Standard : ±15℃) Sensitivity 0.2℃ Thermistor type
Refrigerant and control	Fleon R22 $CHC\ell F_2$ 1400g Capillary tube
External dimension	W512×L470×H1511
Mass	130 kg
Power source	3∅ 200V 50/60 Hz
Rated power	4.2 KVA
Fuse	Power circuit 3∅ 200V 30A Breker is to be fitted by the customer. Control circuit 1∅ 100V 2A (Fitted with circuit protector.)
Room temperature	5℃-40℃
Liquid temp.	5℃-40℃
Sound level	Max. 70 dB(A)
Liquid type	Clean lubricant, Working oil (Never use oil which corrode copper and Aluminium) Recommendable Dynamic Viscosity Index 2cSt~32cSt
Size of connector	INLET Rc3/4 OUTLET Rc3/4
Protective device	Pressure switch (High pressure) Spark quencher Over load protector of compressor and pump motor.
Terminal box	For alarm (24NC, OCAL contact a)

<Oil cooling medium circulation circuit>



<Electrical Circuit diagram>

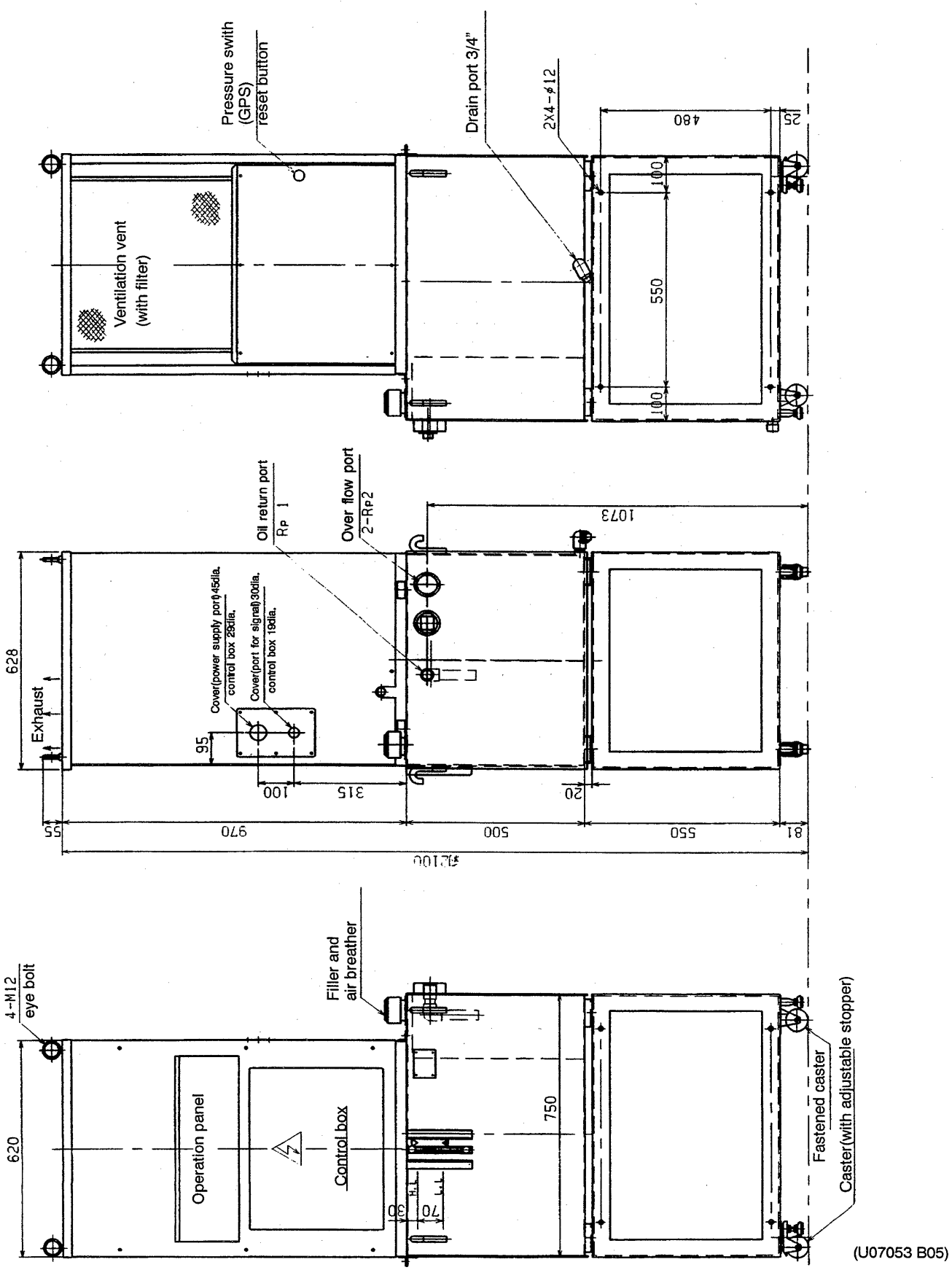


<Electrical parts list>

MARK	Part Name	Type	Q'ty	Remarks
M81	Comp.	2JS324M3AA01 1500W 3∅ 2P 200/200. 220V 50/60Hz	1	MATSUSHITA ELEC.
F3R	Comp. internal thermostat		1	
M83	Pump motor	EM-FA 36 750W 3∅ 4P 200/200. 220V 50/60Hz	1	MITSUBISHI ELEC.
M82 M189 M80	Fan motor Agitate motor	G09B4M50HS 50W 3∅ 4P 200/200. 220V 50/60Hz	2 1	MATSUSHITA ELEC.
S2F	High pressure switch	FTB-N205 (Manual return 28kg/cm^2)	1	SAGINOMIYA
K81M	Magnetic switch for comp.	SC-04 AC100V	1	FUJI ELEC.
K83M	Magnetic switch for pump	SC-03 AC100V	1	
F81R	Overcurrent relay for comp.	TR-0N/3 10Aset	1	
F83R	Overcurrent relay for pump	TR-0N/3 4.0Aset	1	
K1H	Magnetic relay for alarm	LY2F-VD 100V	1	OMRON
K2H	Magnetic relay for heater	LY2F-VD 100V	1	OMRON
H1	Heater	8∅ pipe heater 2KW	1	KAWAI ELEC.
N1	Thermostat	T6DIK-610 AC200V 46-W24280	1	TAIKOU SANGYOU
R2	Thermistor(air)	06-W26380	1	
R3	Thermistor(oil)	06-W24261 ℓ=250mm	1	
R1	Variable resistor	W-251 B2KΩ 06-W24740	1	
Q1F	Circuit protector	CP31E 2A AC250V 50/60Hz	1	FUJI ELEC.
Z1 Z2	Spark quencher	CRE-50500 CR-30680	1 1	OKAYA ELEC.
H1	Operating lamp (white)	MB205WFU	1	METRO ELEC.
H2	Alarm lamp (orange)	MB205	1	
X1	Terminal block	AYBN013-1 AYBN011-1	1 1	FUJI ELEC.
Y1	Magnetic valve for balancing	NEV-603DXF AC100V	1	SAGINOMIYA
F4S	Float switch	RSF-2	1	TAIKOU SANGYOU
F5S	Thermostat	ANT N22	1	SAGINOMIYA
F6S	Flow switch	FW-314T	1	TAIKOU SANGYOU

21. COOLANT COOLING UNIT

<General View>

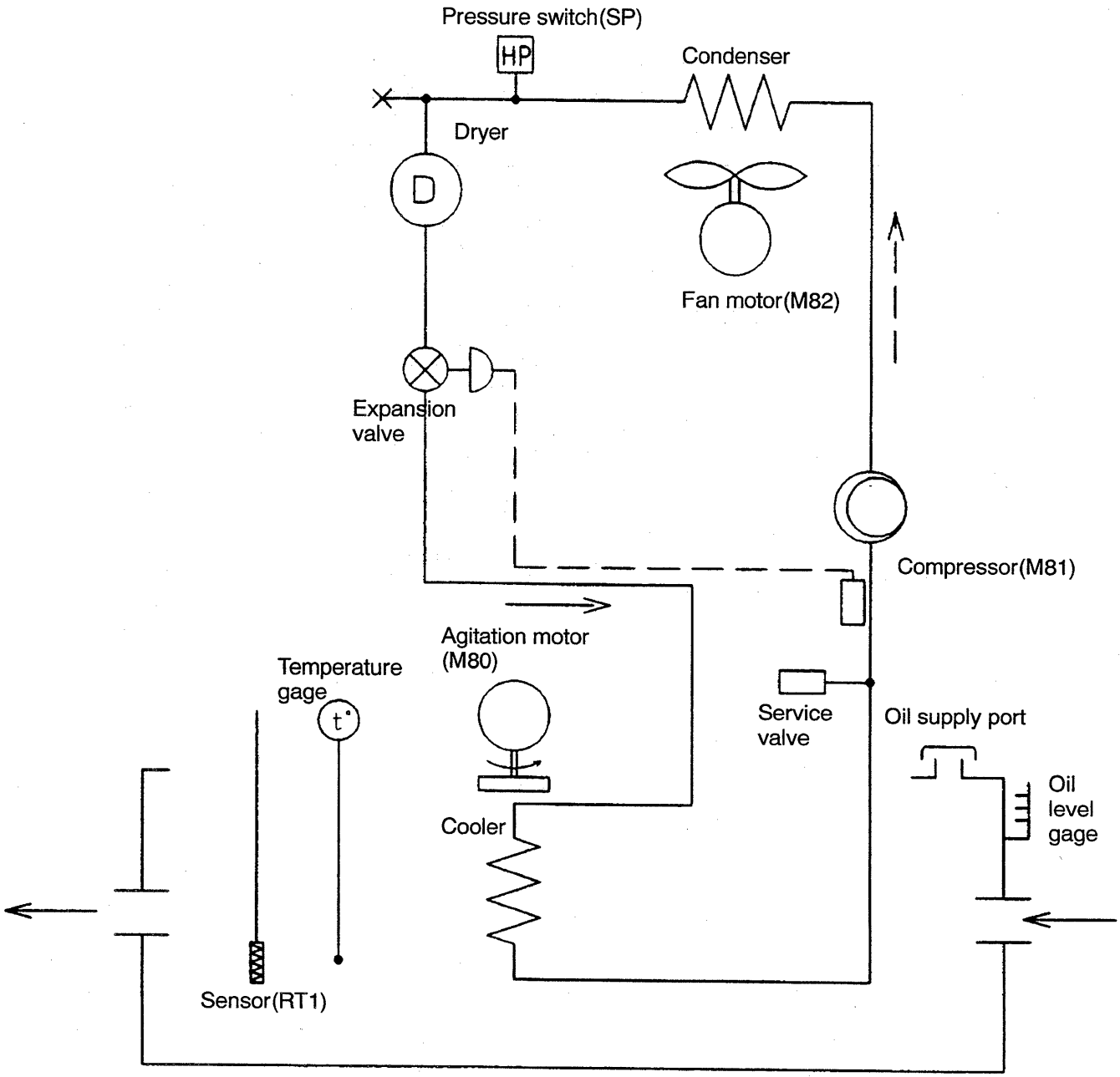


(U07053 B05)

<Specifications>

Type / Item	KTV-15B-LC7 (MLCA15)
Cooling capacity	5600 W (4820 kcal/h) 60Hz 5200 W (4470 kcal/h) 50Hz Ambient temperature 35°C Oil temperature 35°C Service oil ISO VG2
Refrigerating compressor	Totally enclosed compressor · Nominal capacity: 1.5KW. 2P · Refrigerant: HCFC-22 (R-22)
Condenser	Forced air cooling system, Cross-fin type fan motor for forced air cooling: 200W. 4P
Cooler	Open coil type with agitator Agitation motor: 100W. 8P
Power source	AC200V 50/60Hz, AC 220V 60Hz 3ph motor circuit 200V 50/60Hz 220v 60Hz 3ph control circuit 200V 50/60Hz 220v 60Hz 1ph Max. operating current: 13A
Temperature controller	Digital setting, Indication temperature controller (Follow-up Base temperature differential type) Set range : Base temperature +5- -5°C (Oil temp. is limited within 10-40°C) ON/OFF Sensitivity : 0.2°C (Sensitivity of controller unit)
Mass	160 kg

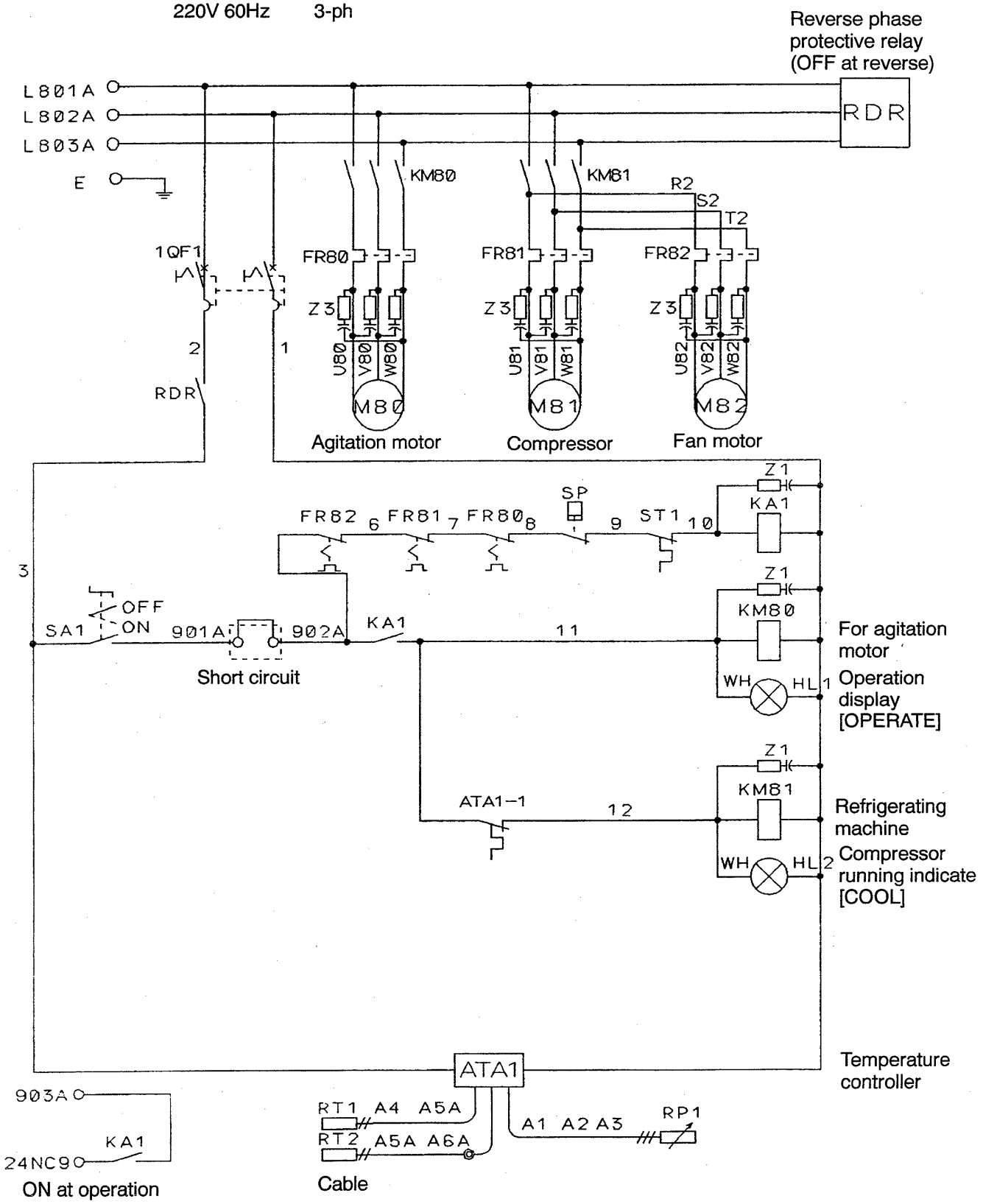
<Oil cooling medium circulation circuit>



←	Fluid
← - - -	Refrigerant

<Electrical circuit diagram>

Power sauce 200V 50/60 Hz 3-ph
220V 60Hz 3-ph



<Electrical parts list>

No.	Code	Parts Name	Specification	Q'ty	Type	Manufacturer
1	M81	Compressor	Nominal capacity 1.5KW 2P AC 200V 50/60Hz 3ph	1	C-2R153H3S	Sanyo
2	ST1	Thermal protector		1	Accessory of M2	
3	M80	Agitation motor	100W 8P AC 200V 50/60 Hz AC 220V 60Hz 3ph	1	FCKLK8	Toshiba
4	M82	Fan motor	200W 4PAC 200V 50/60 Hz AC 220V 3ph	1	FBKK8-4P	Toshiba
5	HL1	Lamp	∅25 AC200-AC220V White	1	APS126N-W	Izumi Denki
6	HL2	Lamp	∅25 AC200-AC220V White	1	APS126N-W	Izumi Denki
7	SA1	Selector switch	∅25 contact point 1a	1	ASS210N	Izumi Denki
8	KA1	Relay	contact point 2ab AC 200V 50/60Hz	1	MY2-CR AC200V	OMRON
9	RDR	Reverse phase protective relay	OFF at reverse phase, 3ph AC 200V 50/60Hz	1	RDR-S-1	Sanyo
10	ATA1	Temperature controller	Base temperature Follow-up type	1	KT2-F05-200 AC200V	Kanto seiki
11	RT1	sensor	Thermistor ∅6 × 250 PT1/8" 5kΩ	1	TCFSD025P 502AT	Kanto seiki
12	RT2	sensor		1		Kanto seiki
13	1QF1	Circuit protector	Type AC 1A 2P	1	NRC-210L-1A.A A	Izumi Denki
14	SP	Pressure switch	For gus circulation set 26kgf/cm^2	1	FTB-Z364	Saginomiya S.S.
15	RP1	Volume	(temperature controller) RA25Y	1	B1Ω-1KΩ	Cosmos
16	Z1	Spark killer	250V AC 0.2 μ F+150Ω	2	CRE-20151	Okaya Denki
17	Z3	Spark killer	250V AC 0.47μ F+47Ω	3	RFM2E145KPD	Marcon
18	KM80	Electromagnetic contactor	Contact point1a, AC 200V	1	LC1D0910L7	Telemechanic
19	KM81	Electromagnetic contactor	Contact point 1a, AC 200V	1	LC1D1810L7	Telemechanic
20	FR80	Thermal relay	3-component 1.0-1.6A set 1.2A	1	LR2D1306	Telemechanic
21	FR81	Thermal relay	3-component 7.0-10A set 10A	1	LR2D1314	Telemechanic
22	FR82	Thermal relay	3-component 1.0-1.6A set 1.4A	1	LR2D1306 LA7D1064	Telemechanic

Comment Form

Date: _____

To improve this manual, we invite you to make comments on any insufficient description or errors in this manual. We want to know how you think we can make this manual better. Please restrict your comments to those concerning this manual only.

♦ Name of manual	DRAWINGS for MH-630, MH-630/U
♦ Number of revisions	MD-CEMH630-A0E (1999.06)

♦ Name		♦ Company	
♦ Department		♦ Telephone	
♦ Address			

♦ Chapter	♦ Page	♦ Line	♦ Comments / Requests

♦ For Mori Seiki's use - Do not write below this line.

♦ Description	♦ Reception No.	♦ Received by

APPENDIX CONVERSION TABLE OF UNITS

This manual uses SI unit system and metric system.
If inch system is required, please convert the values to inch system by referring to the following table.

Quantity	Metric	SI	Yard/Pound	Remarks
Length	1 mm	1 mm	0.0394 in.	
	1 m	1 m	3.281 ft	
Velocity	1 mm/min	1 mm/min (0.017 mm/s)	0.0394 in./min	
	1 m/min	1 m/min (0.017 m/s)	3.281 ft/min	
Area	1 m^2	1 m^2	10.764 ft^2	
	1 mm^2	1 mm^2	0.0016 $in.^2$	
Volume	1 L (liter)	1 L (liter) (1 × 10^{-3} m^3)	0.264 gal.	gal.: US gallon
Volumetric flow rate	1 L/min	1 L/min (1.66666 × 10^{-5} m^3/s)	0.264 gpm	gal.: US gallon
Mass	1 kg	1 kg	2.2 lb.	
Force	1 kgf	9.80665 N	2.2 lbf	
Torque	1 kgf·m	9.80665 N·m	7.233 ft·lbf	
Pressure	1 kgf/cm^2	9.80665 × 10^{-2} MPa	14.22 psi (14.22 $lbf/in.^2$)	1 MPa = 1000 kPa 1 kPa = 1000 Pa
	1 ton/m^2	9.80665 × 10^3 Pa	204.4 $lb./ft^2$	ton: metric ton
Output	1 kW	1 kW	1.34 HP	
Temperature	1°C	1°C (274.16 K)	33.8°F °F = (1.8 × °C) + 32	Temperature difference: 1°C = 1 K
Kinematic viscosity	1 cSt	1 × 10^{-6} m^2/s	1.076 × 10^{-5} ft^2/s	1 St = 100 cSt
Rotational speed	1 min^{-1} (rpm)	1 min^{-1} (1/60 s^{-1})	1 rpm	
Angle	1°	1° (π/180 rad)	1° (deg)	Degrees, minutes, and seconds may also be used.
Work	1 kcal	4.186 × 10^3 J	1 kcal	
	1 kgf·m	9.80665 J	7.233 ft·lbf	Different from torque
Power	1 kcal/h	1.16 W	1 kcal/h	
Acceleration	1 G	9.80665 m/s^2	1 G	

CAUTION

In the texts and drawings in this manual, there are dimensions and other values specific to inch specification machines. In the case of these specific dimensions and values, converting the corresponding values for the metric specification machines into inch system dimensions or values using the conversion table will not give the correct dimensions or values.

<Example>

The dimensions and values specific to the inch system machines include cutting feedrate per spindle revolution, manual jog feed rate, tool dimensions, zero point (NC lathe only), and T-slot and pallet dimensions (machining center only).

For these values, refer to the values specified in the machine specification table. If the required value is not found in the table, contact Mori Seiki.

NOTE

Units and numerical values in ( ) in the SI column indicate the formal expression of the SI unit system.

However, they are not used usually and the units described above the expression in ( ) are used instead of the formal SI unit expression. These units are also approved as SI unit system expression.

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