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Makino a61 PRE-INSTALLATION CHECKLIST – Rev 2/2009

Installation of your new Makino a61 can be smooth and rapid if preparations are made prior to the delivery of your machine. Any questions regarding machine installation should be directed to our service department for clarification. We hope this checklist will aid in a rapid installation of your new machine. ***NOTE: The following must be completed prior to our service technician arriving at your facility to install the new machine.***

- Power Requirements for your machine: 240v/3ph/48kVa** 240v/225Amp (Main Circuit Breaker)
  NOTE: **86kVa (including options) See Makino Installation Manual or contact our Service Department for complete information or questions. Machine is a dual-voltage machine and comes with a transformer.
  Proper voltage per machine specifications should be ready at machine site. ***Do NOT power up the machine.***

- Customer should furnish and have available the proper supply and types of lubricants required for machine operation. ***See enclosed Makino Installation Manual for specifics – any questions should be directed to our Service Department at the above locations.***

ITEM	CAPACITY	FLUID TYPE
Coolant	106 Gallons *(may vary with type/size of tank ordered – check Manual for specifics)*	Water Soluble, Synthetic

You will need to have Coolant on hand at the time of installation. Contact our Service Department with any questions.

- Air lines should be routed to the machine location and operational for proper air pressure.

Must have clean, dry air supply with less than 40% relative humidity in line. In-line water trap recommended. 72-116 psi @ 23.9 cfm; we recommend ½" air line hose.

- Machine location should be planned to allow enough room for access panels to be opened and serviced with ease. A minimum of 36" clearance is required around the machine for operator and maintenance access.

- Weight requirements should be checked to insure that the surface below the machine will have sufficient strength for support and stability. The machine must be set on a solid, sound and stable, steel bar-reinforced concrete slab poured directly on the grade. In general, the 6" concrete floor on industrial buildings is suitable for machine placement.

- ***The Makino a61 can be moved with either a forklift or crane***.*** Upon arrival of your machine, uncrate and immediately check for visible damage. ***SEE ATTACHED FOR SHIPPING DIMENSIONS.***

******NOTE: LIFTING EQUIPMENT, ROPES, SHACKLES, LIFTING BARS, LIFTING BEAMS, ETC. ARE OPTIONAL EQUIPMENT AND ARE NOT PROVIDED WITH THE MACHINE. ITEMS MUST BE PURCHASED PRIOR TO MACHINE DELIVERY. CHECK WITH YOUR RIGGER TO SEE IF THEY HAVE ANY OF THESE ITEMS.******

- **Remove as much preservative from the machine as possible without having to power up (tables – slides, pulleys, etc.). We recommend mineral spirits to clean. Apply oil when finished to prevent rust.**

Approximate Machine Shipping Dimensions

(Note – they may vary slightly – we will provide you with a Bill of Lading copy with actual dimensions at time of shipment. Refer to your Makino Installation Manual for exact floor space/layout dimensions/requirements on the Chip Conveyor/Tank and any other optional peripherals purchased with your new machine.)

Makino a61, 40/60-Tool ATC Machine

SHIPPING WEIGHT	SHIPPING DIMENSIONS OF MACHINE
25,022# (machine)	189” L x 94” W x 127" H (40/60ATC machine CRATED)
2,535# (Chip Conveyor)	111” L x 59” W x 70” H (Chip Conveyor crated)
772# (Accessories)	79” L x 35” W x 86” H (Crated Box)
882# (Accessory)	59” L x 36” W x 83” H (skidded/crated)
700# (transformer)	3’ L x 3’ W x 4’ H (skidded – shipped separately from Makino in Ohio)
See Makino Installation Manual for floor space/layout dimensions, depending upon your configuration.	

Makino a61, 134-Tool ATC Machine

SHIPPING WEIGHT	SHIPPING DIMENSIONS OF MACHINE
23,589# (machine)	189” L x 94” W x 122" H (Machine CRATED)
4,960# (134ATC Unit)	71” L x 76” W x 120” H (134ATC Unit Crated)
2,535# (Chip Conveyor)	111” L x 59” W x 70” H (Chip Conveyor crated)
772# (Accessories)	37” L x 28” W x 85” H (Crated Box)
700# (transformer)	3’ L x 3’ W x 4’ H (skidded – shipped separately from Makino in Ohio)
See Makino Installation Manual for floor space/layout dimensions, depending upon your configuration.	

Makino a61, 219-Tool ATC Machine

SHIPPING WEIGHT	**SHIPPING DIMENSIONS OF MACHINE**
23,699# (machine)	189” L x 94” W x 122" H (Machine CRATED)
6,724# (219ATC Unit)	100” L x 72” W x 122” H (219ATC Unit Crated)
1,433# (Chip Conveyor)	102” L x 59” W x 49” H (Chip Conveyor crated)
772# (Accessories)	37” L x 28” W x 85” H (Crated Box)
265# (Accessory)	46” L x 46” W x 26” H (skidded/crated)
700# (transformer)	3’ L x 3’ W x 4’ H (skidded – shipped separately from Makino in Ohio)
See Makino Installation Manual for floor space/layout dimensions, depending upon your configuration.	

PLEASE FORWARD THIS TO THE APPROPRIATE PERSON. THANK YOU.

2 Preparations for Installation

2.1 Confirmation of Preparations for Installation and Set-Up Area

1 Confirmation of Preparations for Installation

Perform the following preparations to ensure all installation conditions are satisfied prior to machine installation.

Table 2.1 Check Points for Installation Preparation

Check	Items
	Preparation of Foundation
	Preparation of Set-Up Area
	Set-Up Conditions
	Preparation of Transport Route
	Preparation of Transportation Equipment
	Preparation of Electric Source
	Preparation of Air Source
	Preparation of Air Dryer

2 Preparation of Set-Up Area

Confirm spacing requirements prior to installation. The maintenance area refers to the maintenance space required after installation. When lifting the machine body using a crane, the total lifting height required is 3700mm. The maintenance area varies depending on different types of tool magazines and conveyor specifications (☞ Table 2.2 Machine Size Shipment Dimensions).

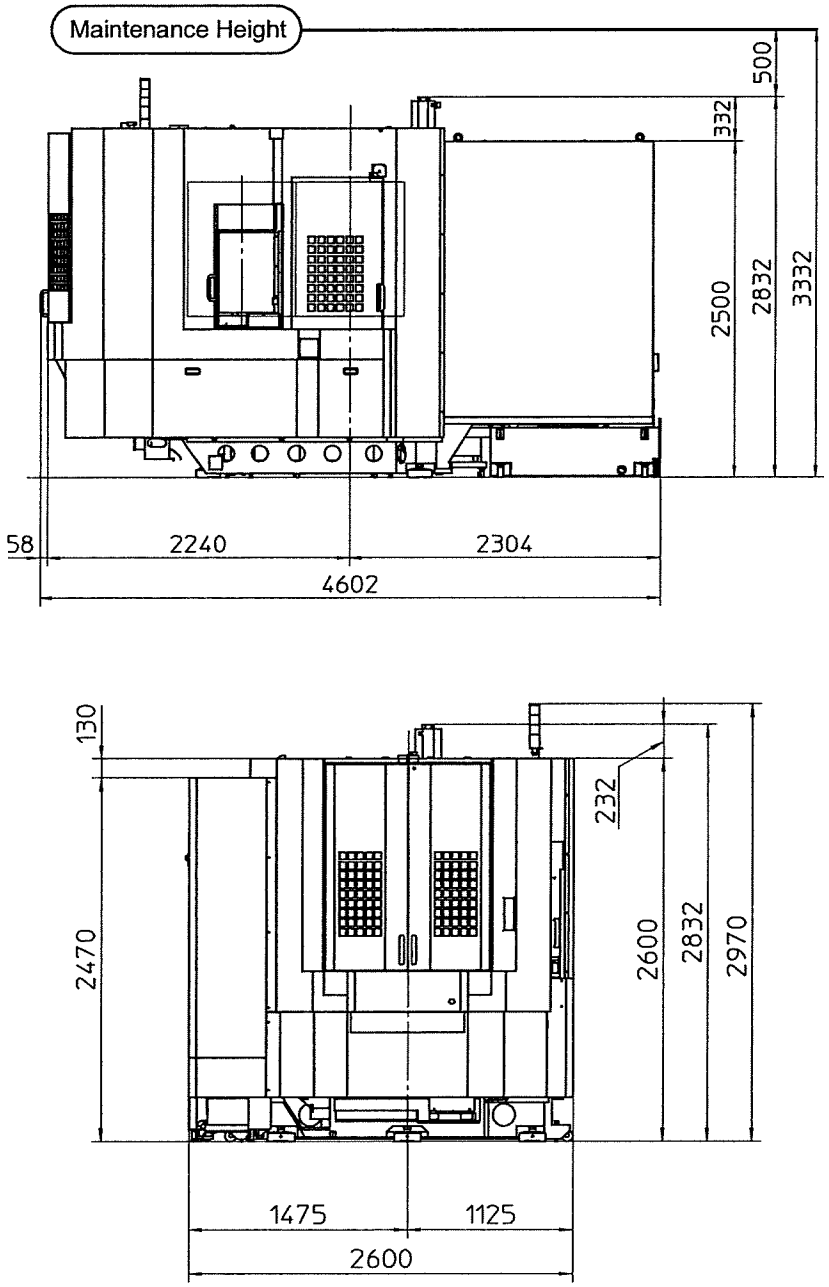


Figure 2.1 Front and Side View of Machine
(Tool Magazine A40/A60 and Left Discharge Lift-Up Conveyor Spec.)

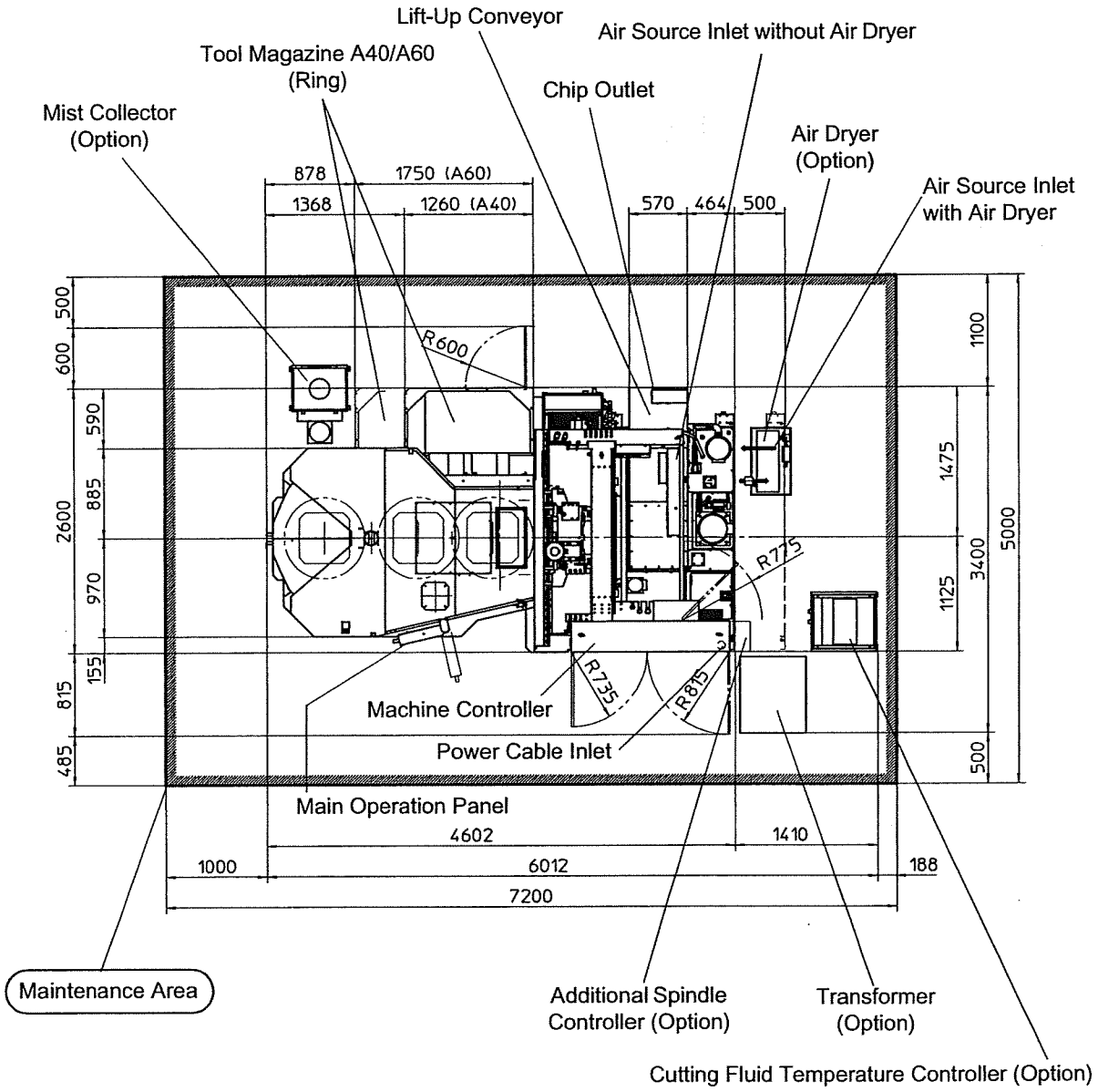


Figure 2.2 Top View of Machine (Tool Magazine A40/A60 and Left Discharge Lift-Up Conveyor Spec.)

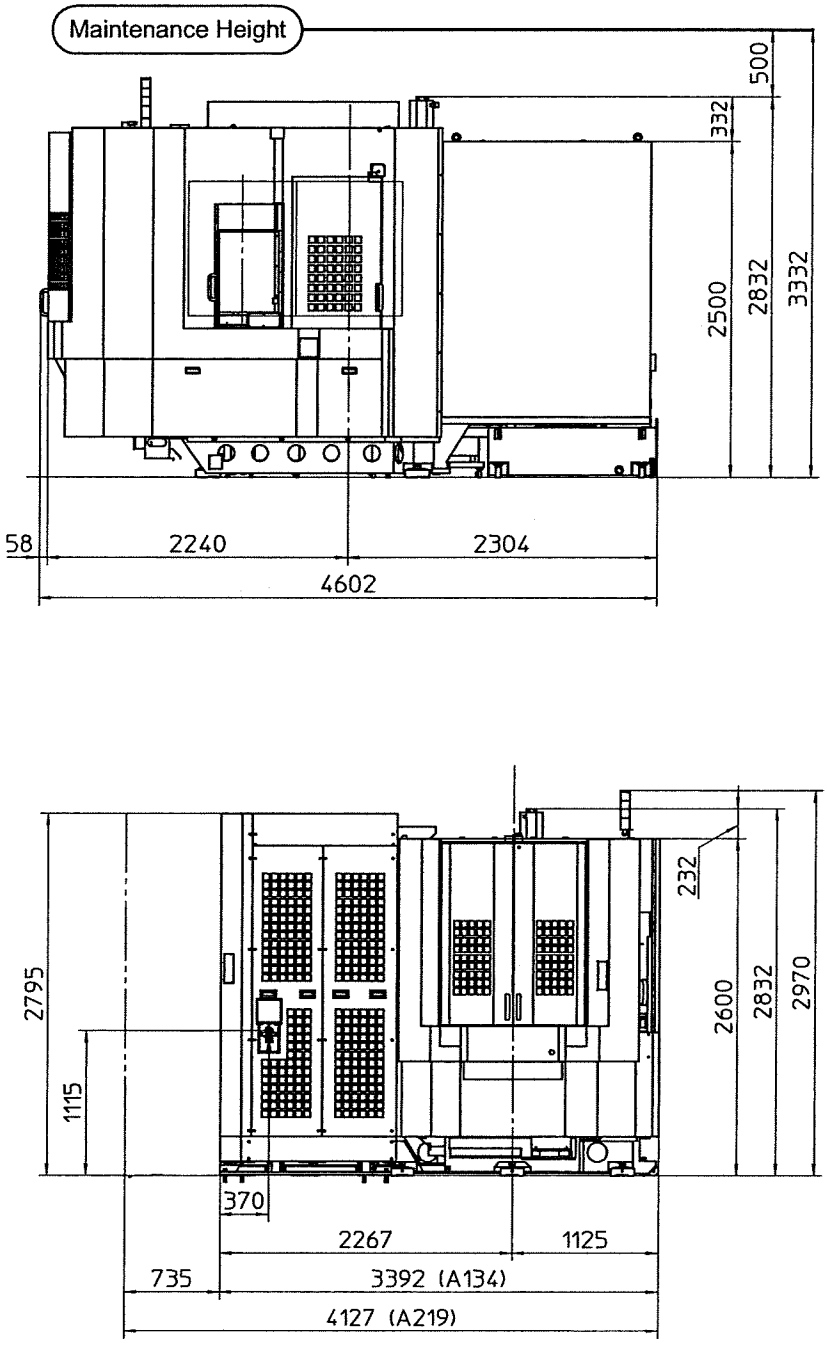


Figure 2.3 Front and Side View of Machine
(Tool Magazine A134/A219 and Left Discharge Type Lift-Up Conveyor Spec.)

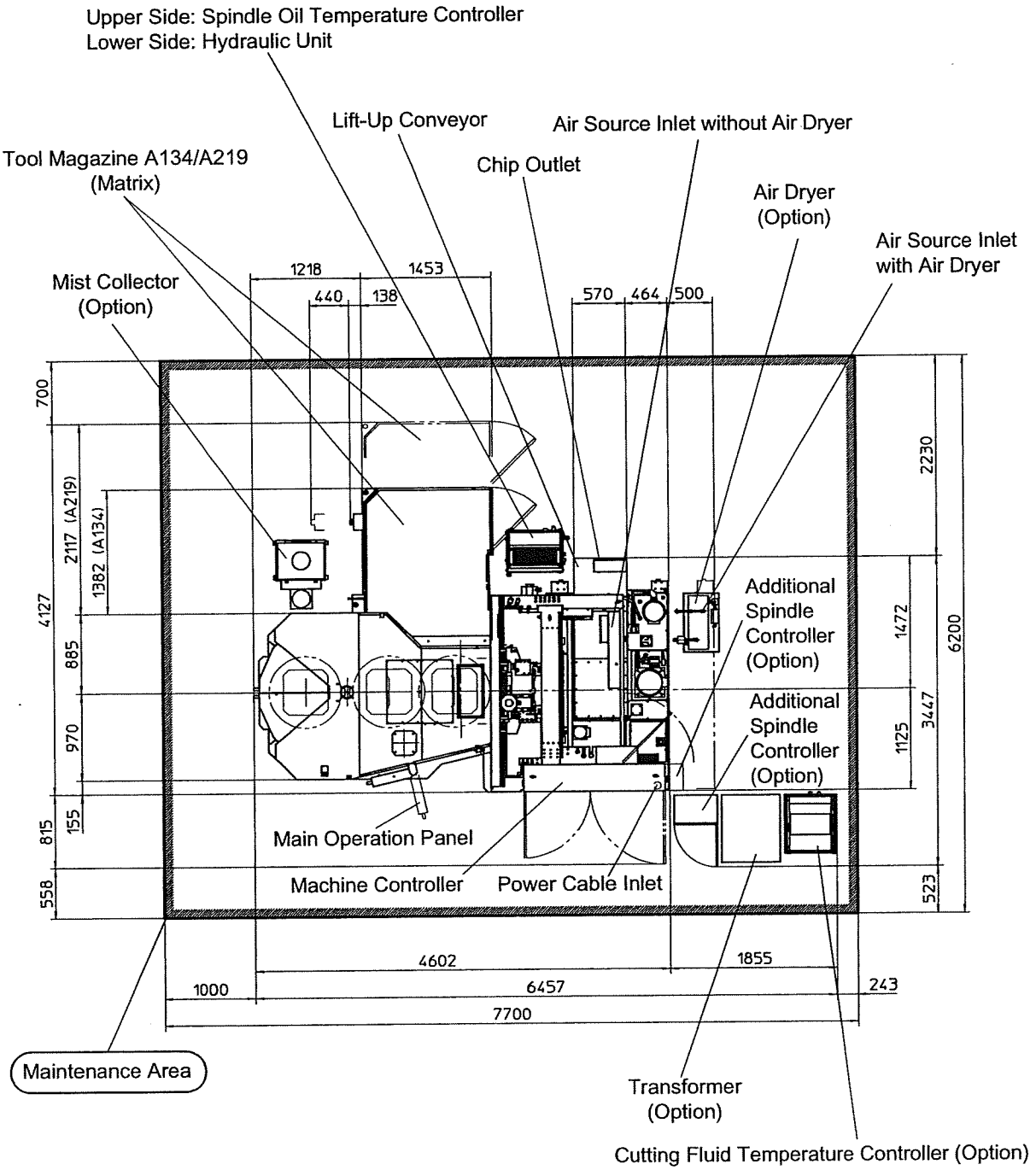


Figure 2.4 Top View of Machine (Tool Magazine A134/A219 and Left Discharge Type Lift-Up Conveyor Spec.)

2.2 Preparation of Transport Route

Prepare the machine transport route, referring to the machine size shipment dimensions.

Table 2.2 Machine Size Shipment Dimensions

Item	Height	Height With Lifting Equipment	Width	Depth
Main Machine	2970mm	3700mm	2600mm	4548mm
Tool Magazine A134	2795mm	3795mm	1440mm	1453mm
Tool Magazine A219	2795mm	3795mm	2175mm	1453mm

NOTE:

When lifting the main machine using a crane, the necessary total height required to provide adequate lifting space is 500mm plus the height with the lifting equipment.

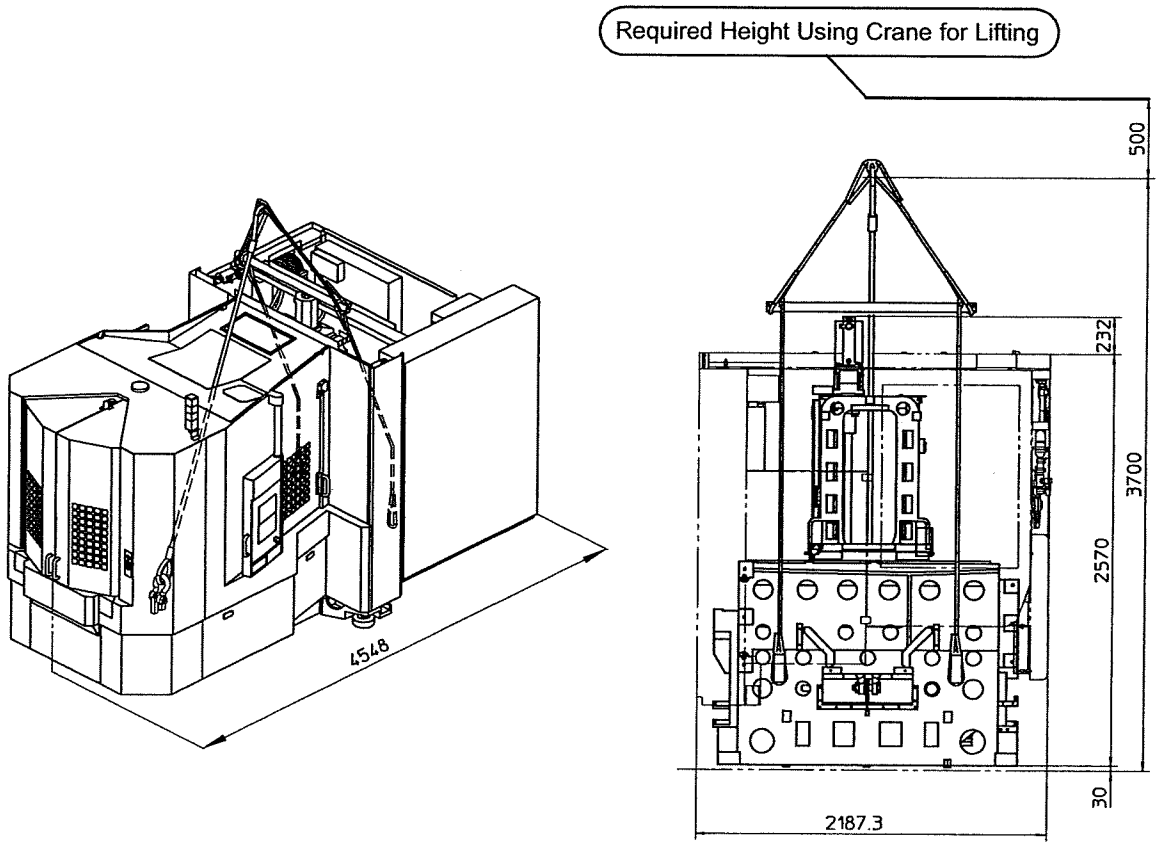
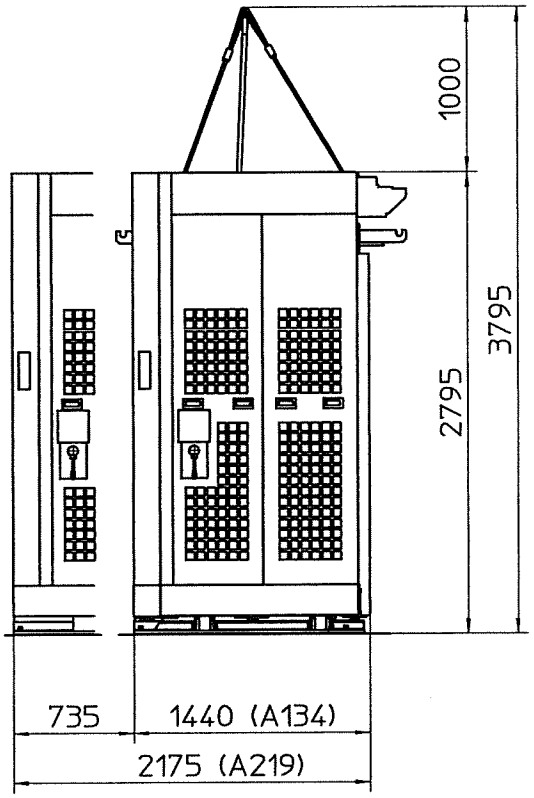


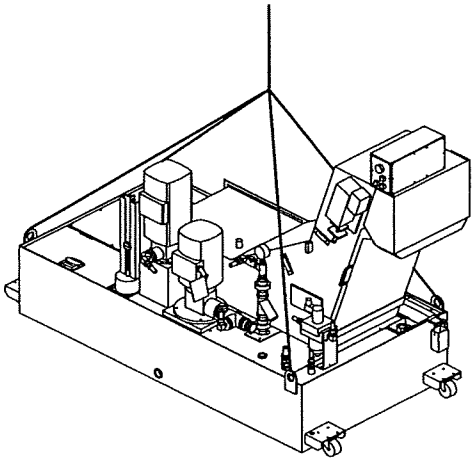
Figure 2.5 Main Machine When Being Transported

Tool Magazines A134 and A219 (Matrix)



Spindle Oil Temperature Controller/ Hydraulic Unit (For Matrix Magazine)

Coolant Tank (Left Discharge Type Lift-Up Conveyor)



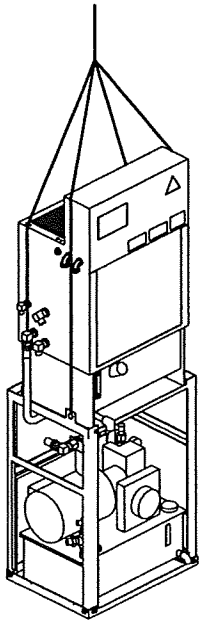


Figure 2.6 Lifting Options and Accessory Units

2.3 Preparation of Transportation Equipment

1 Preparation of Transportation Equipment

Prepare equipment such as the crane, fork lift truck, skates, capable of supporting the size and withstanding the weight of the machine prior to machine transportation. If the transportation equipment cannot be prepared, contact Makino service representative for further assistance.

Table 2.3 Machine Weight When Shipped

Model: Item	Weight
Main Machine (Tool Magazine A40)	9500kg
Main Machine (Tool Magazine A60)	9700kg
Tool Magazine A134	2100kg
Tool Magazine A219	2700kg
Spindle Oil Temperature Controller	95kg
Hydraulic Unit	60kg
Coolant Tank Left Discharge (Through Spindle 1.5MPa/Without Option: Standard Spec.)	510kg
Coolant Tank Left Discharge (Through Spindle 3.0MPa/Without Option)	560kg
Coolant Tank Left Discharge (Through Spindle 7.0MPa/Without Option)	577kg
Coolant Tank Rear Discharge (Through Spindle 1.5MPa/Without Option: Standard Spec.)	610kg
Coolant Tank Rear Discharge (Through Spindle 3.0MPa/Without Option)	660kg
Coolant Tank Rear Discharge (Through Spindle 7.0MPa/Without Option)	677kg
* Add 13kg to coolant tank weight listed above when installing a workpiece cleaning gun or cutting fluid temperature controller.	

2 Set-Up Conditions

Confirm the following set-up location and environmental conditions prior to machine set-up.

Table 2.4 Set-Up Conditions

Set-Up Location and Environmental Conditions	
Ambient Temperature	10 to 40°C (Optimum Temp: 20°C ± 1°C)
Relative Humidity	35% to 70% (No Condensation)
Temperature Fluctuation	Less than 1°C/30 minutes (Range which does not influence machining.)
Well-illuminated	
Free from direct sunlight	
Dust-free	
Available space for storing raw materials, finished workpiece and tools	
Available space for maintenance work	
Adequate space around machine to open doors completely	
Required electrical power sources	
A level foundation strong enough to support the weight of the machine	
Appropriate distance from factory air ducting/inlets (Air Flow)	

2.4 Air and Power Sources

Table 2.5 Air and Power Sources

<table>
<tr><th>Item</th><th>Description</th></tr>
<tr><td>Electrical Source</td><td>AC200/220V ± 10%
50/60Hz ± 2%</td></tr>
<tr><td rowspan="2">Maximum Power Consumption</td><td>48kVA (standard)</td></tr>
<tr><td>Approx. 86kVA (including options)</td></tr>
<tr><td>Total Power Requirement</td><td>The actual power requirements are shown below:
48 x 0.6 = 28.8kVA (standard)
86 x 0.6 = 51.6kVA (including options)</td></tr>
<tr><td>Circuit Breaker</td><td>225A</td></tr>
<tr><td>Power Cable</td><td>60mm^2 or more (600V insulated cables specified by JIS C3307)
or
38mm^2 or more
(600V-flame-retardant poly-flex insulated cables made by HITACHI Cable, SP39-10021J)</td></tr>
<tr><td>Ground</td><td>Ground resistance 100 Ω</td></tr>
<tr><td>Ground Cable</td><td>30mm^2 or more cross section (600V insulated cables specified by JIS C3307)</td></tr>
<tr><td>Air Source</td><td>• 0.5Mpa to 0.8MPa
• 410L/min: ANR (Standard Condition)
• Dew point temperature: -20°C or less
NOTE:
Clean air (free from solvent and iron rust) is required.

Equivalent to the grade ISO2.5.2 specified by ISO8573-1 (equivalent to JIS B 8392-1)
• Max. particles number/1m^3: Below 10 (diameter: 0.001 $<$ x $\leqq$ 0.005mm)
• Max. particles number/1m^3: Below 1000 (diameter: 0.0005 $<$ x $\leqq$ 0.001mm)
• Max. particles number/1m^3: Below 100000 (diameter: 0.0001 $<$ x $\leqq$ 0.0005mm)
• Dew point at max. pressure: Below 7°C (Absolute Pressure: 0.8MPa)
• Max. oil concentration: 0.1mg/m^3 or less

NOTE:
The machine requires the above air quality. The air filter is installed as a standard feature. However, when maintenance of the filters is neglected, filter pollution and damage to the filter may occur in a short period of time. Periodic maintenance must be performed to maintain an optimum air supply.

Required Air Flow (L/min: ANR)
<table>
<tr><th></th><th>Standard</th><th>Using Through Spindle Air Frequently</th><th>With Air Blow</th></tr>
<tr><td>Standard Spec. (without scale)</td><td>360</td><td>750</td><td></td></tr>
<tr><td>With Scale</td><td>410</td><td>800</td><td></td></tr>
</table></td></tr>
<tr><td>Air Dryer</td><td>Should be ordered except when prepared by customer</td></tr>
<tr><td>Air Filter</td><td>5μm + 0.3μm + water remover</td></tr>
</table>

NOTE:

The air quality varies according to the factory circumstances. The air quality specified by ISO 8573-1 (equivalent to JIS B 8329-1) is only a recommended value. Use a "Particle Counter" to confirm that the air quality values satisfy the required values.

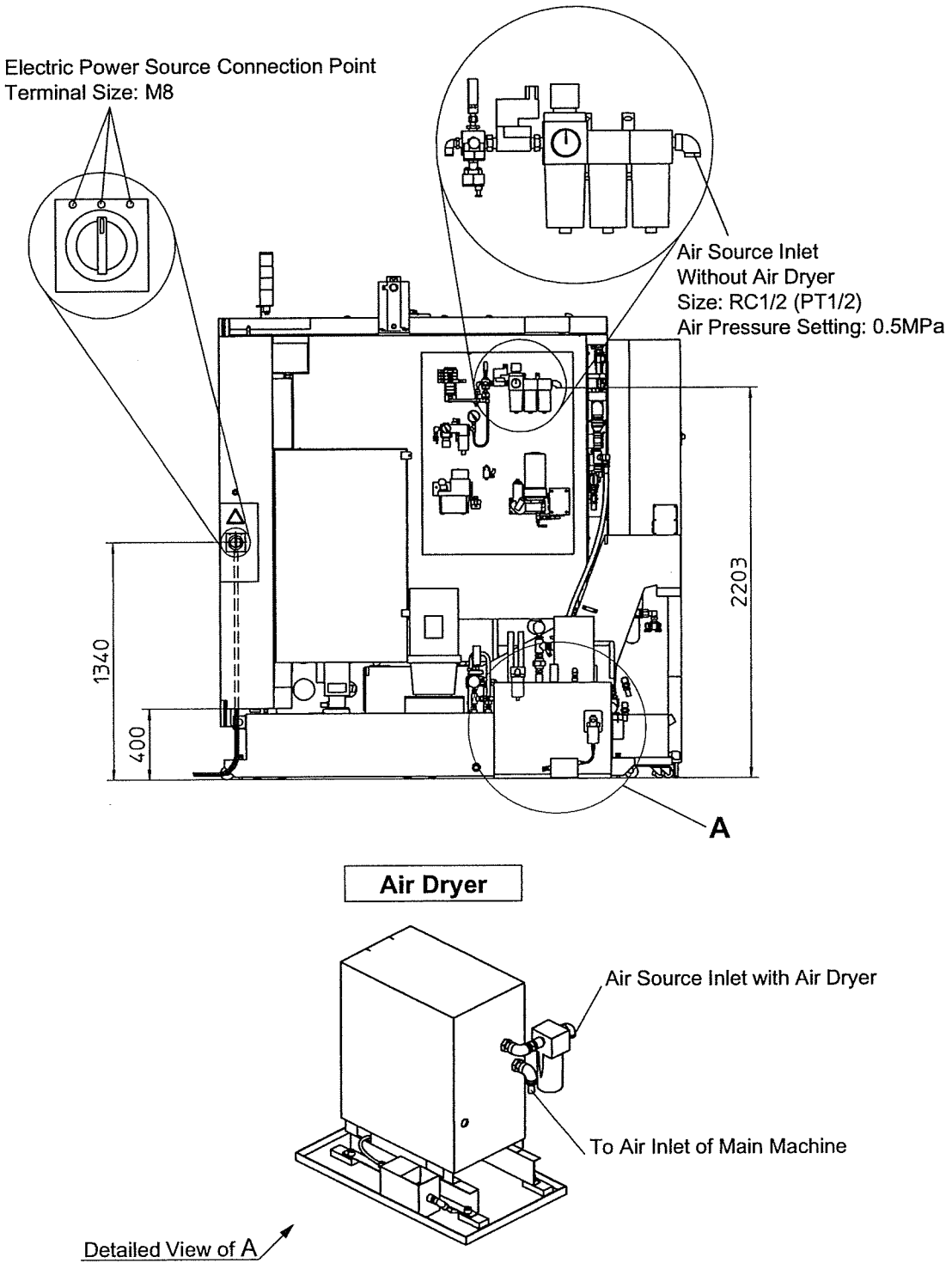


Figure 2.7 Power, Air Intake and Air Piping (with Air Dryer)

2.5 Recommended Foundation

Table 2.6 Foundation Range for Each Specification

Foundation Range	Specifications
A	Main Machine Foundation
B	Insulated Foundation from Surrounding Vibration (Use of small crushed stone is desirable.)
C	Tool Magazine A134 (Matrix) Foundation
D	Tool Magazine A219 (Matrix) Foundation

Table 2.7 Recommended Foundation

No.	Item	Description
1	Ground Resistance	6 ton/m^2
2	Foundation Thickness	300mm
3	Ground Leveling	3.2mm/m
4	Main Machine Support Point "a"	3 points
5	Main Machine Fixing Jig	3 points
6	Jet Anchor for Main machine	6 points (M16: Jet Anchor)
7	Jet Anchor for Tool Magazine A134/A219	4 points (M16: Jet Anchor)
8	Main Machine Iron Bar	ϕ 10mm (Both Vertical and Horizontal)
9	Recommended Concrete	FC180 standard or above
10	Recommended Rubble	Medium or Large Size Crushed Stone
11	Leveling Concrete Thickness	50mm
12	Concrete Weight in "A"	7 ton

NOTES:

1 Nos. 8 ~ 12 in Table 2.7 are only recommended values.

2 It is necessary to use machine fixing tools in order to secure the main machine to the floor when installing the options (Matrix Magazine, Pallet Magazine or MMC) (☞ Section "4.1.1 Machine Fixing Tool Installation").

3 Dimensions indicated in this foundation drawing are minimum requirements given for good solid installation foundation. The foundation drawings on following pages show only recommended values.

4 As this machine operates at high-speeds, vibration generated by machine operations may affect the surrounding area upon the foundation and ground conditions. Consult a professional civil engineer to determine the final foundation dimension requirements as they vary according to the actual ground conditions and possible influence on the surrounding area.

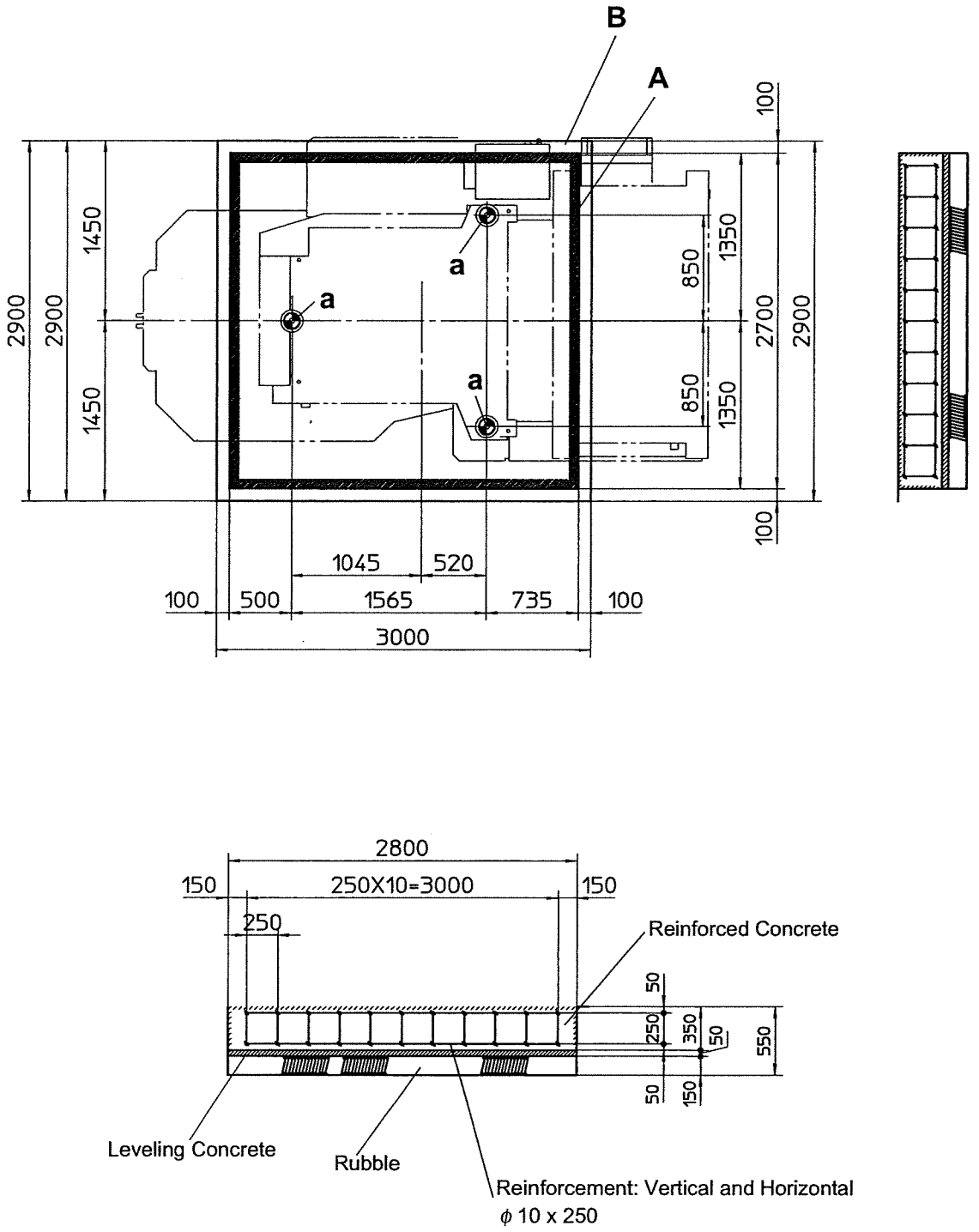


Figure 2.8 Foundation Drawing (Tool Magazine A40/A60 and Left Discharge Lift-Up Conveyor Spec.)

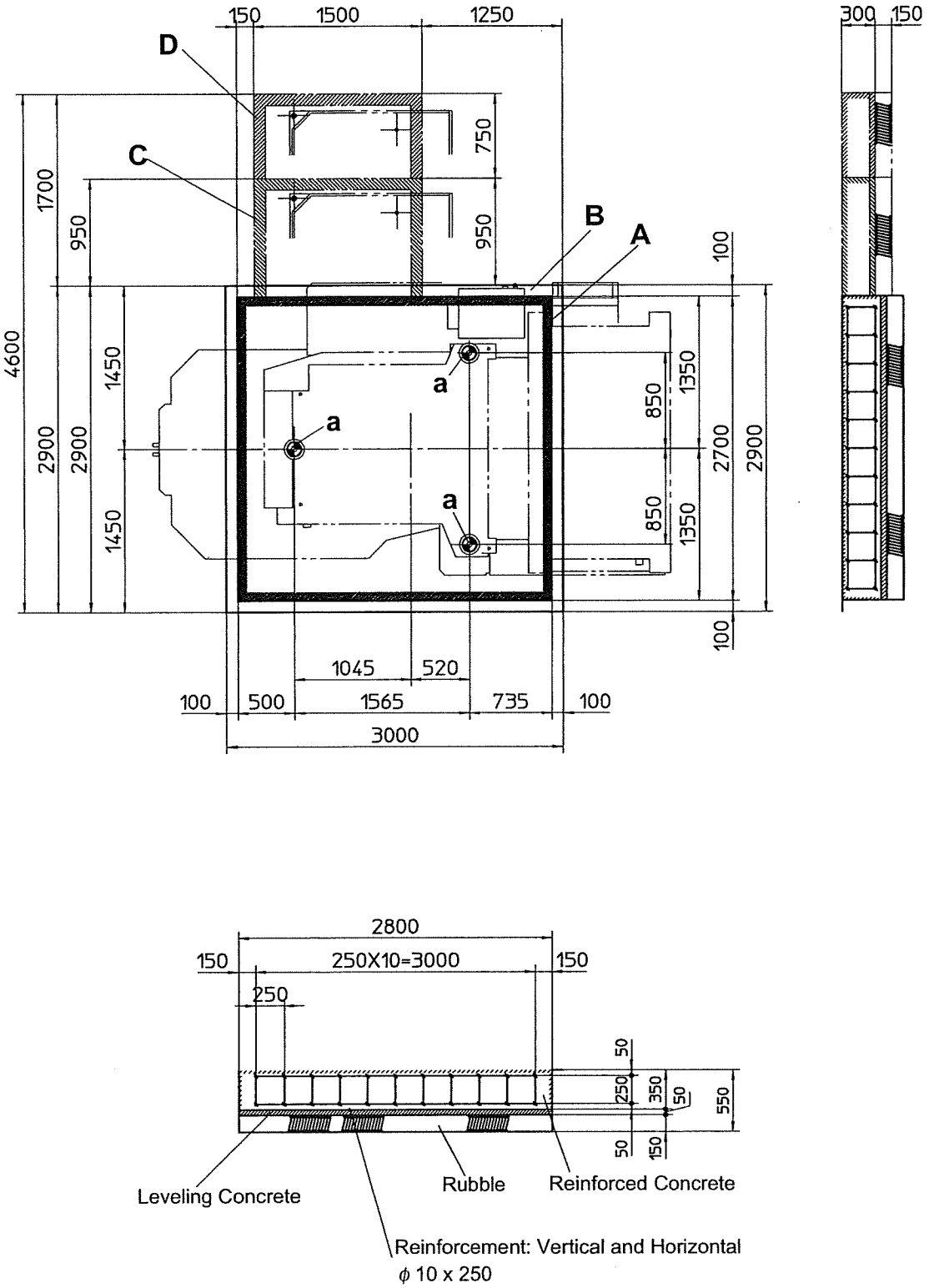


Figure 2.9 Foundation Drawing (Tool Magazine A134/A219 and Left Discharge Lift-Up Conveyor Spec.)