

CASING ROTATOR

# SUPERTOP



ISO 9001  
Certified

JQA-1232



ISO 14001  
Certified

JQA-EM4858



**NIPPON SHARYO**



## DREAM OF CIVIL ENGINEERS REALIZED

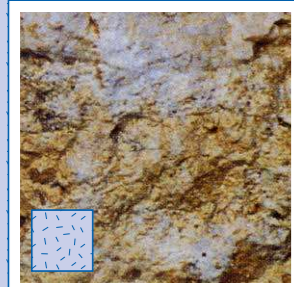
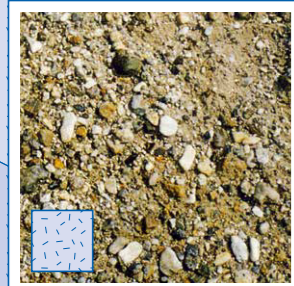
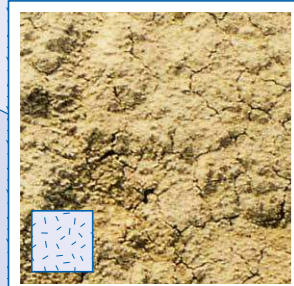
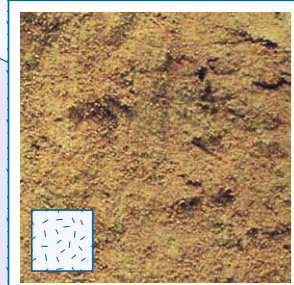
SUPERTOP foundation technique was developed to construct cast-in-place concrete pile, soil replacement pile, sequent pile and deep well with high efficiency and high vertical accuracy in the ground that was previously understood impossible to execute those works by the former oscillator, such as the stratum containing large boulders, reinforced concrete structures and steel piles.

### ULTRADEEP BORING

- Deep cast-in-place concrete piles and long steel piles pushing down into deep soil stabilized layers at Tokyo Bay.
- Deep wells for underground water dams in tropical islands.
- Industrial deep wells.
- Vertical boring in dam sites and ventilation holes of tunnels.

Deepest boring record  
Dia. : φ1500  
Depth : GL-73m

Two stage boring method record.  
2000 dia. : GL-59m  
1500 dia. : GL-59m~132.75m



### SEQUENT PILE

- Diaphragm walls for underground water dams.
- Soil replacement piles (sand/clay piles) for driving sheet piles and pushing down pipe piles.
- Soil retaining walls (Permanent foundation bases).
- Soil retaining and water-tight walls.

### BORING THROUGH UNDERGROUND OBSTACLES

- Cutting reinforced concrete structures and steel piles of old buildings in urban development projects.
- For renewal of electric towers and bridges, cutting old concrete foundations.

### BORING THROUGH BOULDERS

- Cast-in-place concrete piles and retaining walls at the ground with boulders in the mountainous area.
- Soil replacement piles in the stratum with large boulders and concrete tetrapods along sea shore.

### BORING THROUGH BED ROCK

- Insertion of pile end into bed rock.
- Vertical boring in bed rock.

Vertical accuracy 1/500

Boulders of 137~206MPa uniaxial compression strength and B-class bed rock.



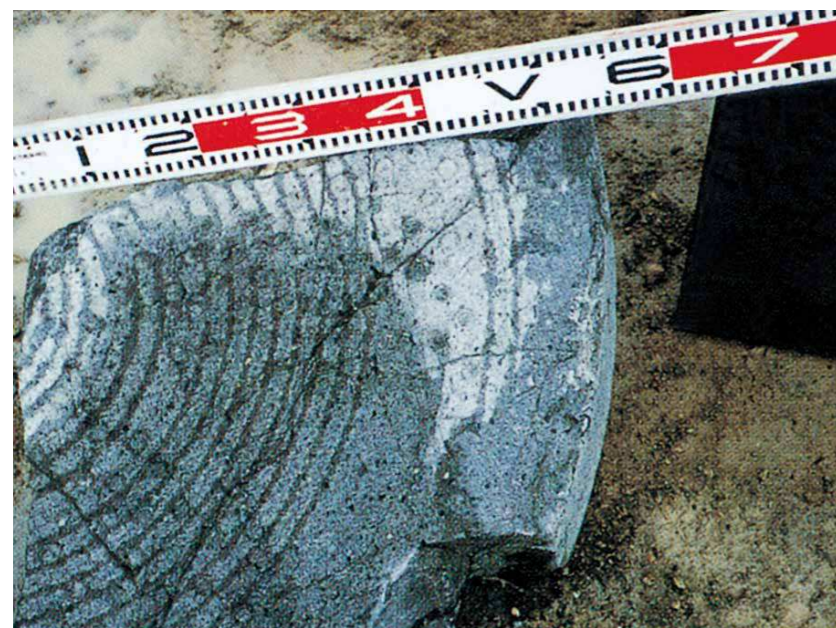
# CUTTING RECORD OF HARD BED ROCK AND BOULDERS

## ULTRA DEEP RECORD 132.75m

The SUPERTOP has a 132.75m ultra deep boring record under B / C grade rock by 2000mm dia. & 1500mm dia. 2 stage casing method. That means the SUPERTOP can keep an excellent vertical accuracy of the casing with high power. Refer to right Geological Column Data. Especially a B / C<sub>H</sub> grade rock was drilled by the DOWN THE HOLE HAMMER to through a casing.

■ Geological column data

DEPTH (m)	MARK	DESCRIPTION	CASING CLASS	CASING DIAMETER
0-15	△ △ △ △	Talus Cone Hard Wethered Sand Stone	D	
15-30		Hard Wethered Sand Stone	C <sub>L</sub>	
30-40		Wethered Sand Stone	C <sub>L</sub> C <sub>M</sub>	
40-50		Wethered Sand Stone	C <sub>L</sub>	
50-55		Wethered Sand Stone	C <sub>M</sub>	
55-66		Fresh Sand Stone With no Crack	B C <sub>H</sub>	φ2000
66-85		With Same Cracks	B C <sub>H</sub>	
85-100		Sand Stone	C <sub>H</sub>	φ1500
100-132.75			C <sub>M</sub>	



The points in hard rock boring are ;

- to maintain the high boring efficiency.
- to minimize the consumption of cutting bits.

Upon the most appropriate bed rock boring condition, the number and arrangement of cutting bits should be well studied to design the smooth cleaning of the chips.

### ■ Geological column data of bed rock cutting

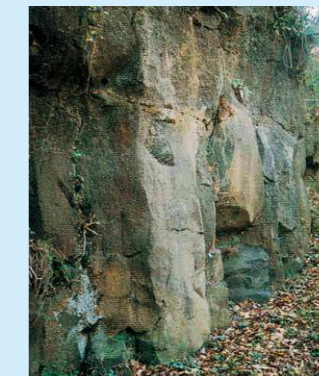
Depth (Ground level)	Description
0m	Old concrete foundation with φ32 iron reinforcement bars.
-2m	Porous basalt lava bed RQD 50%~70% GL -6m and deeper : hard bed rock with no joints (cracks) Uniaxial compression strength 129~142MPa
-8m	Boulder with gravels  (Mainly basalt lava)  GL -16m and deeper : Large boulder of φ1000 and larger
-18m	Lava with quartz.
-20m	

### Boring into rock bed (140MPa uni-axial compression strength)

8 pieces of cast-in-place concrete piles (20m long × φ 1500) were constructed through the bed rock as shown in the pictures below in this jobsite.

The stratum of the ground was basalt lava, 8 meters thick from the ground level and sandy gravels contained boulders from 8 meters to 20 meters deep.

#### Basalt lava and boulders



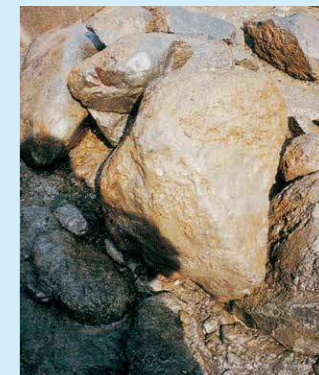
▲ GL-5m



▲ GL-10-15m



▲ Basalt lava



▲ Boulders

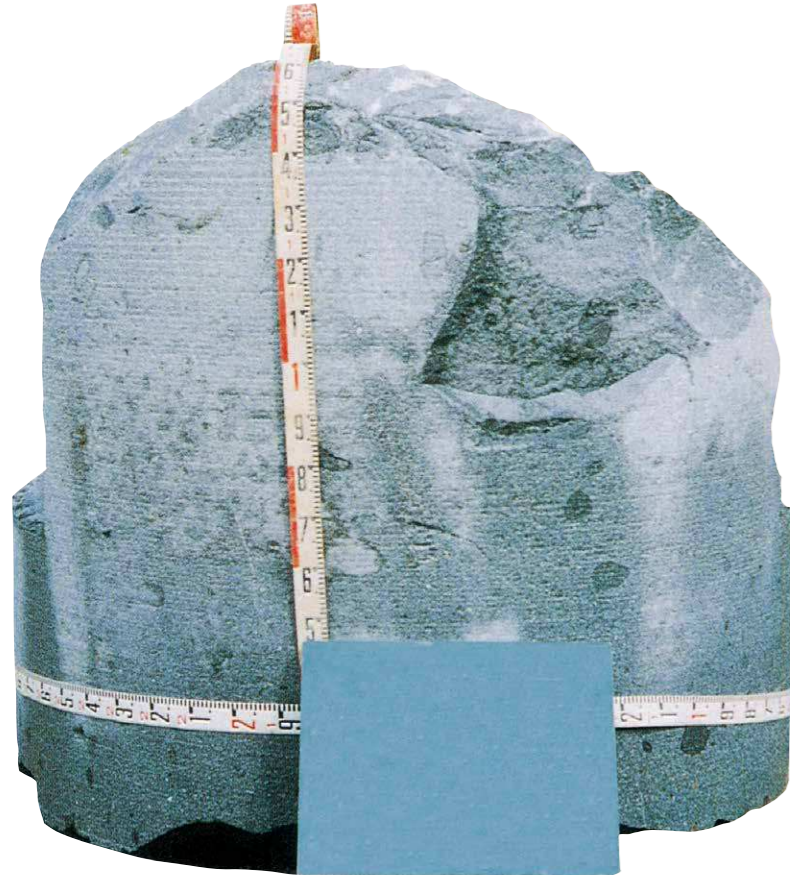




# AUTOMATIC LOAD & ROTATION TORQUE CONTROLLER (B-CON) SYSTEM.

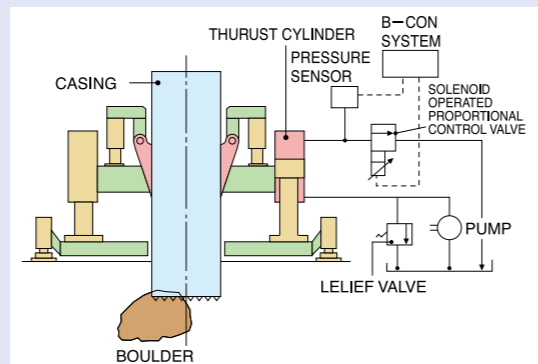
## Boulders cutting

For boulders cutting, sometimes even without applying the pushing down force to the casing, the self weight of the casing rotator and the casing itself gives an over loading on the cutting bits, and sometimes which caused to destroy the cutting bits. The automatic bit control mechanism helps to protect the over loading and the sequent damage to the cutting bits. NIPPON SHARYO has been accumulating the knowledge and the experiance deeply through diverse jobsites.

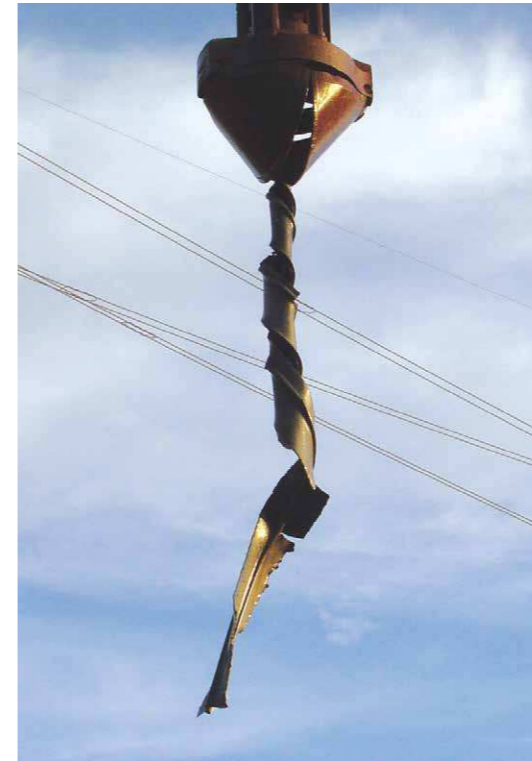


## B-CON SYSTEM

In case of deep drilling, the total weight of a casing, upper frame, and thrust cylinder will charge the bottom cutter bits. Sometimes, the cutter bits are broken due to such heavy load. More than that, such eccentric load would become a cause of the broken cutter bits. The B-CON is very adequate to control a hydraulic pressure by computer to adjust the suitable condition for the continuous use of cutter bits. (RT-200AⅢ, 200H, 260H, 300Ⅲ)



# CUTTING OF UNDERGROUND OBSTACLES



H-shaped steel pile ▲▶



▼ Steel pipe pile.



Urban development project and renewal of bridges and electric towers frequently face to bore the ground that remains old reinforced concrete foundation, concrete piles and steel piles.

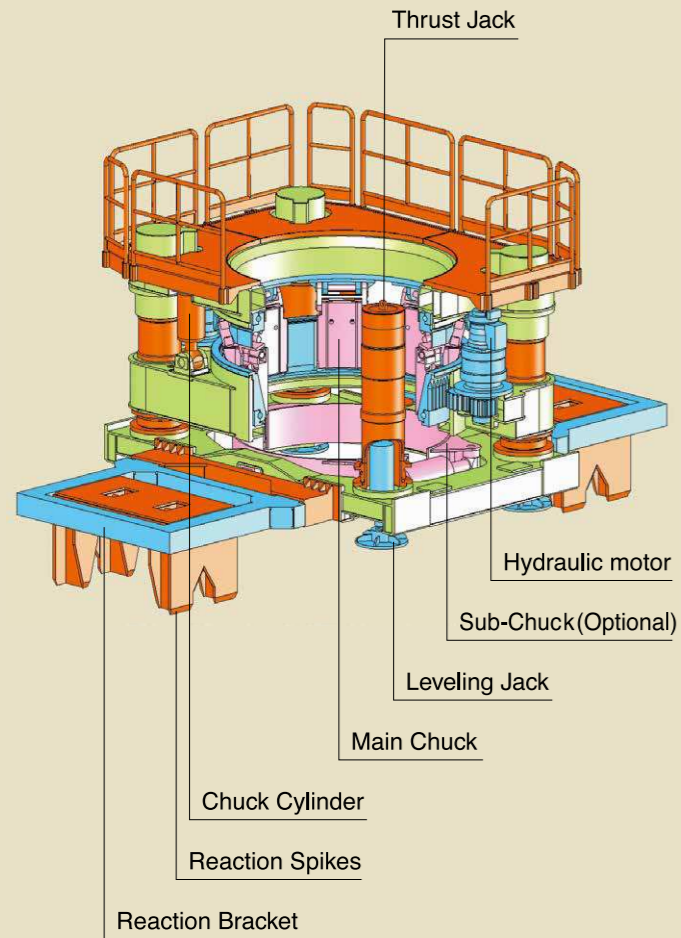
SUPERTOP foundation technique gives assurance to cut and dig out these underground obstacles with certainty.



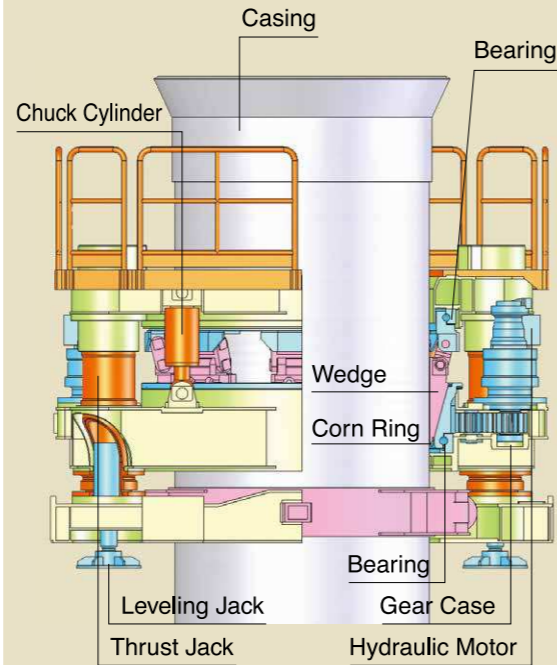
▲ Reinforced concrete foundation.



### STRUCTURE OF CASING ROTATOR



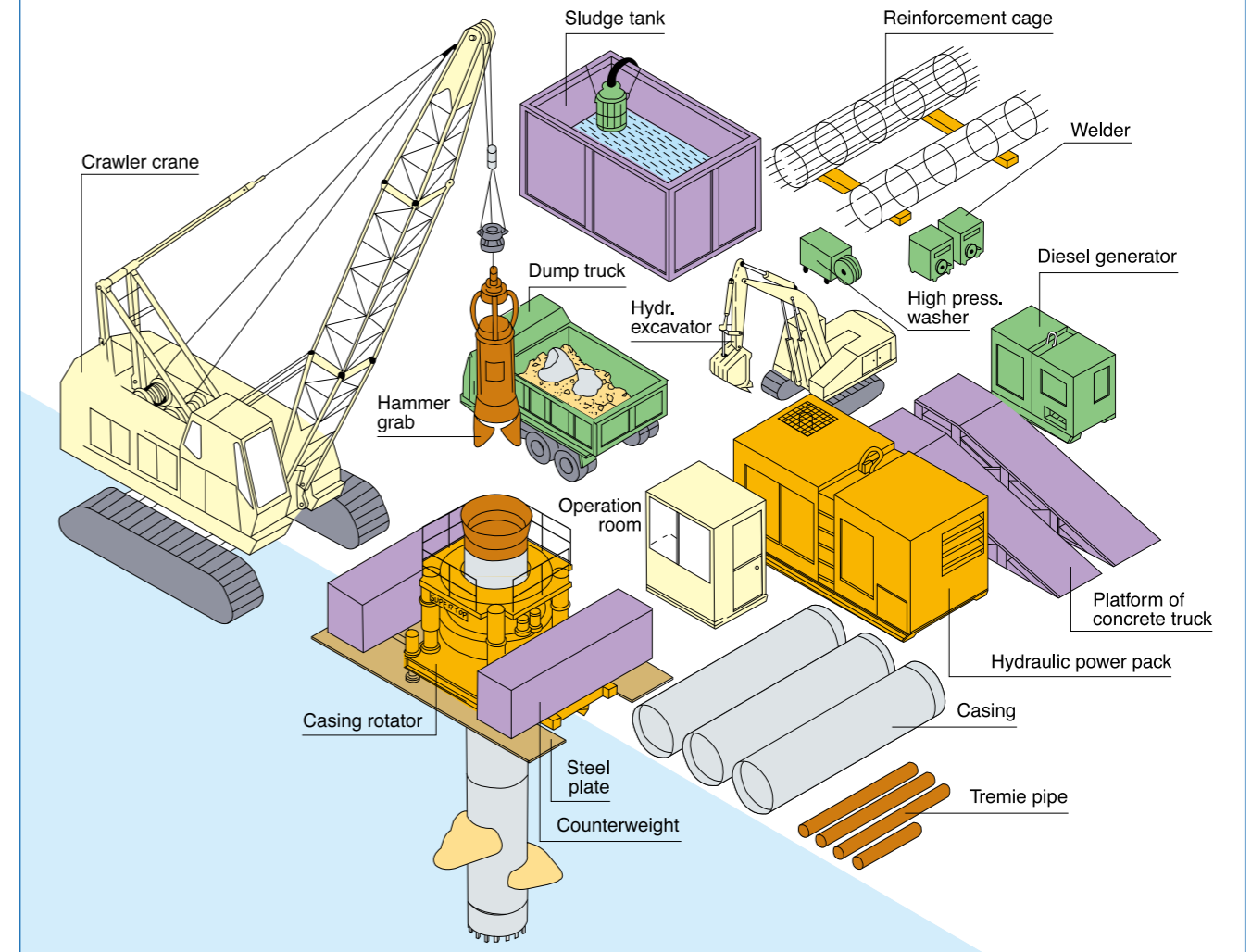
### STRUCTURE OF WEDGE TYPE CHUCK SYSTEM



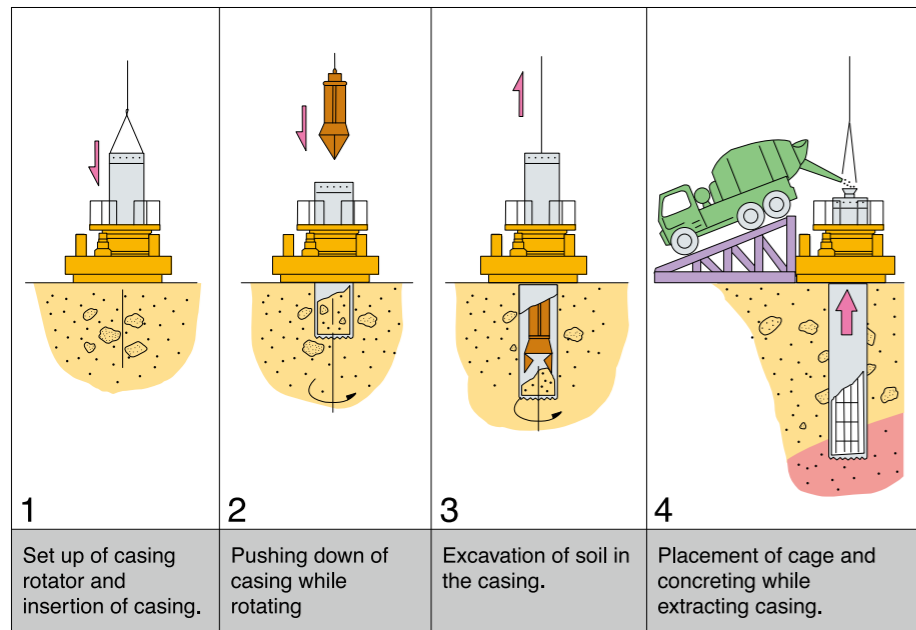
#### ABOVE SECTION DRAWING SHOWS ADVANTAGE OF WEDGE-SHAPED CHUCK SYSTEM

The wedge chuck can clamp the casing any position without disconnect & connect hydraulic line arbitrarily. Vertical accuracy & Clamping force under extracting motion also get an advantage.

### SUPERTOP FOUNDATION TECHNIQUE, SYSTEM LAYOUT

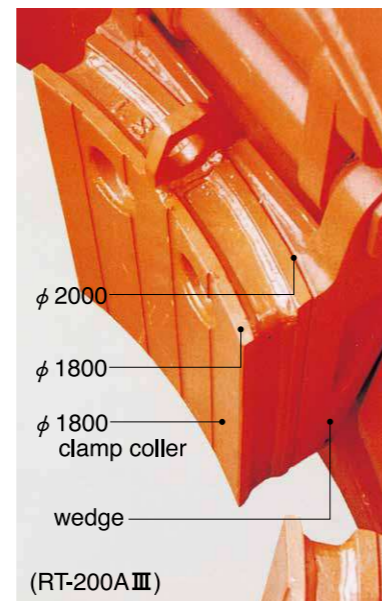


### PROCESS FLOW OF CAST-IN-PLACE CONCRETE PILE

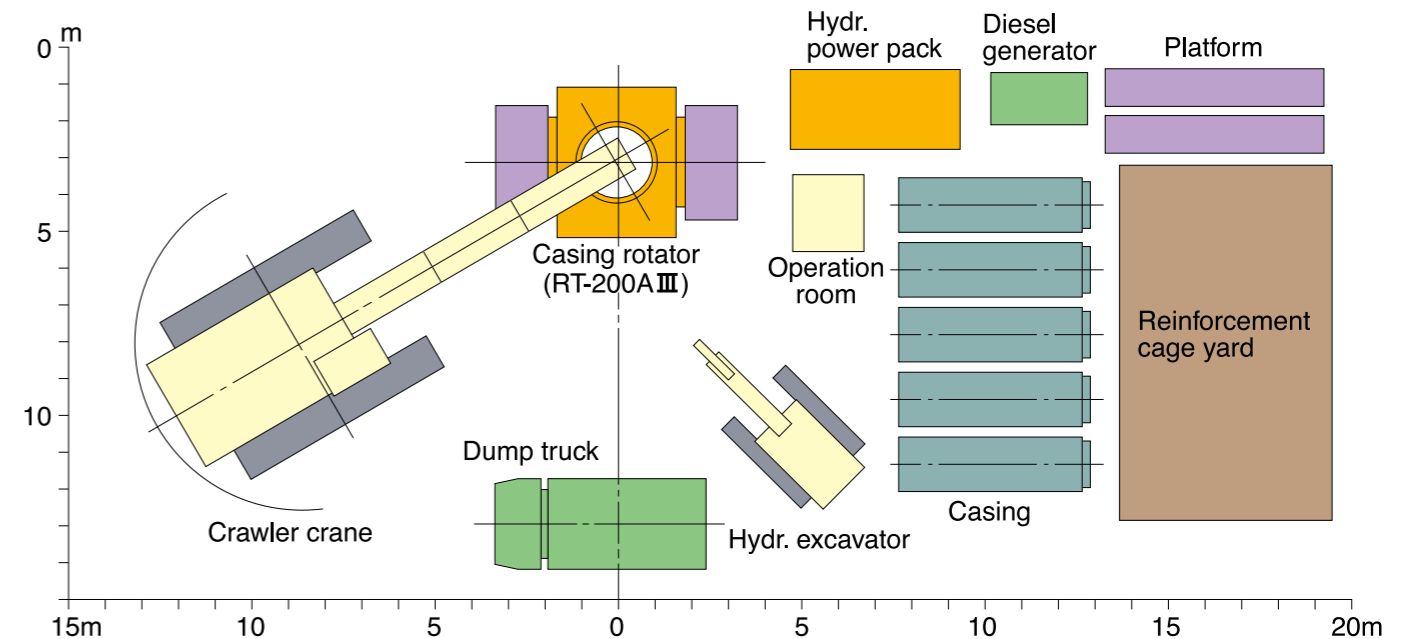


### CHUCK REDUCER

The chuck reducer assists under small casing operation. (Optional)



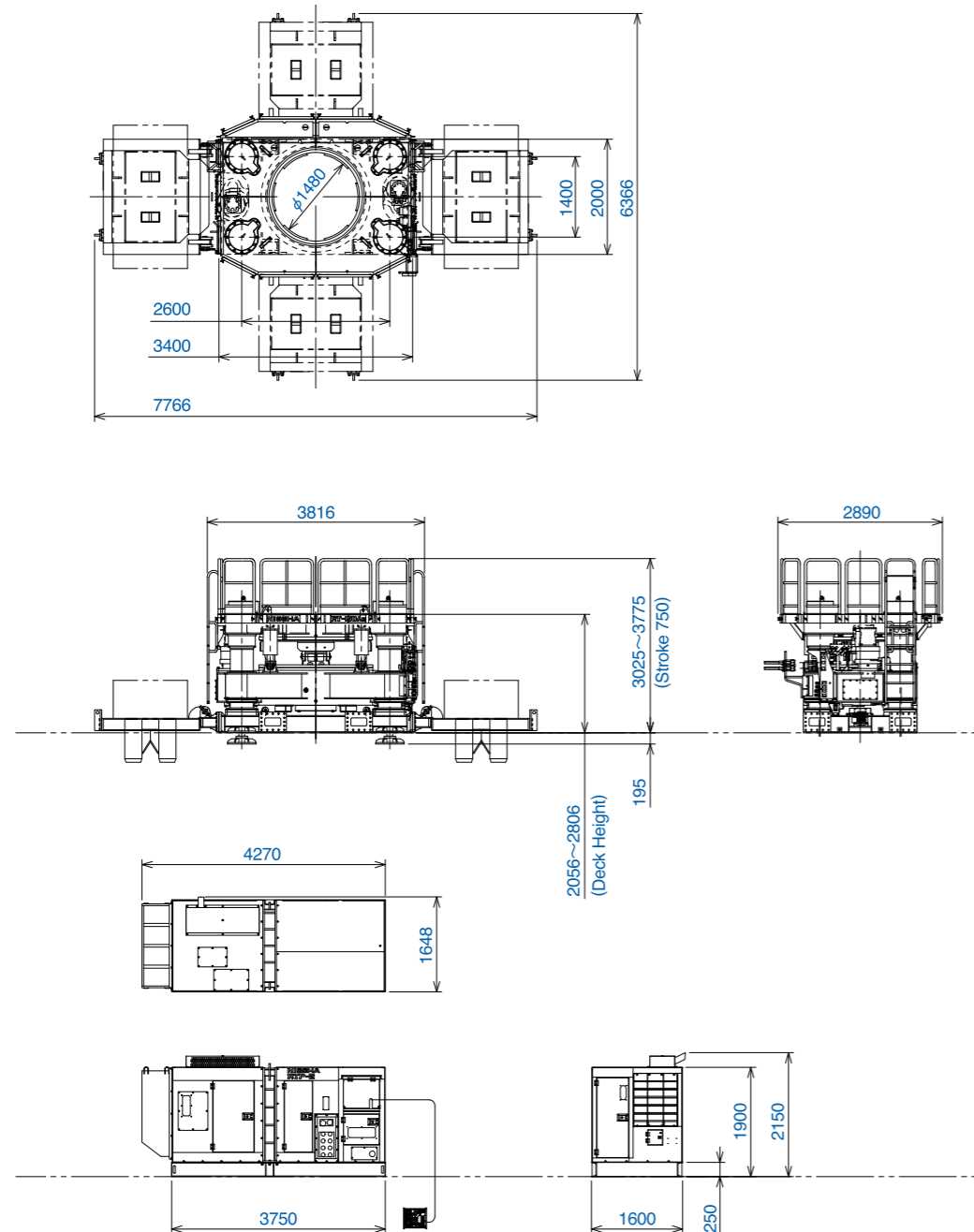
### TYPICAL JOBSITE LAYOUT



# Specification

## RT-150AII

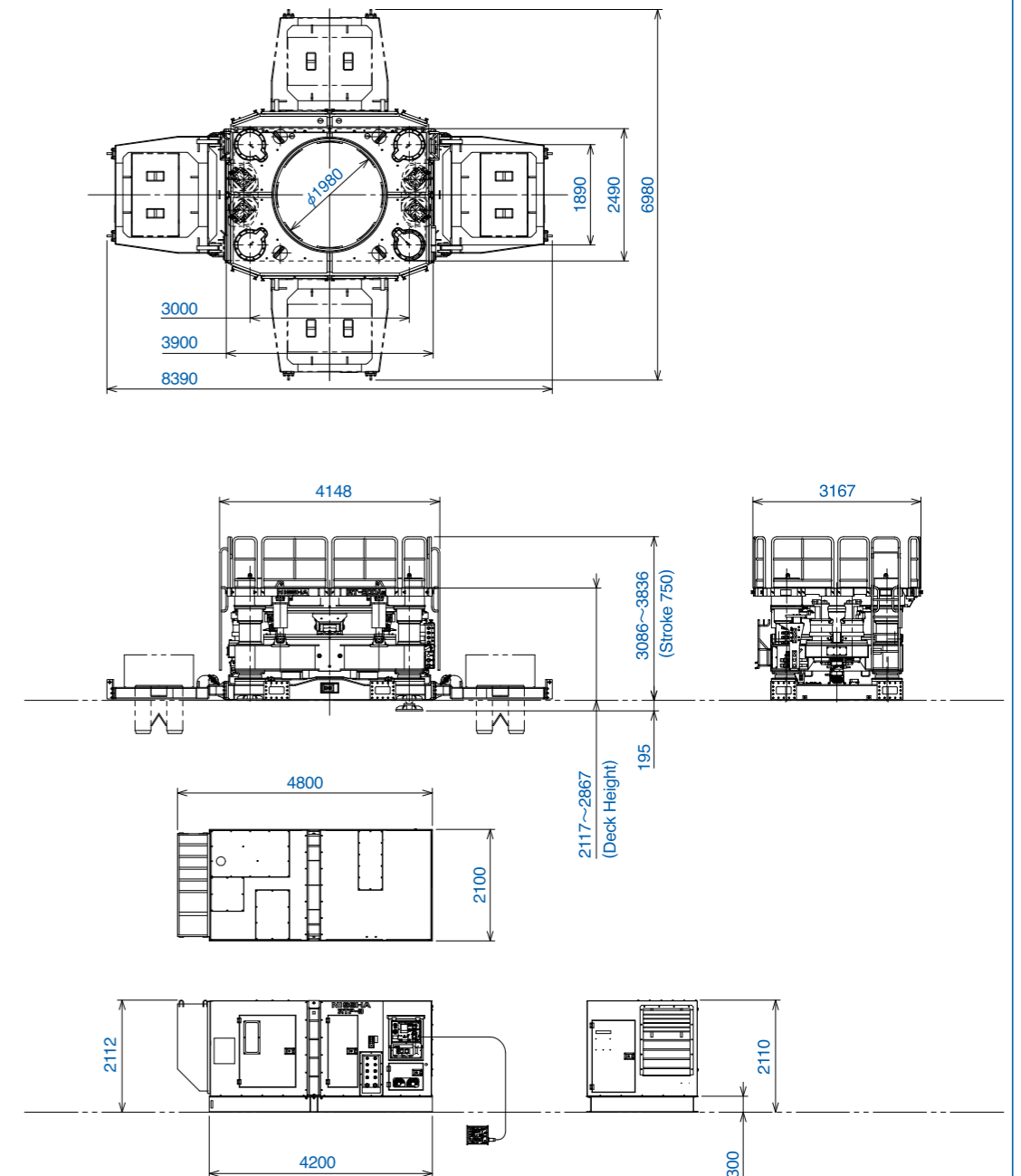
CASING ROTATOR RT-150AII	
Borehole dia.	800mm-1500mm
Extracting force	2050kN (209tf)
Pushing down force (Hydraulic+Deadweight)	360kN (37tf)+200kN (20tf)
Thrust jack stroke	750mm
Torque	1400/480kN-m (143/49tf-m)
Rotation speed	1.3/3.7min <sup>-1</sup>
Weight	26.1ton
HYDRAULIC POWER PACK RTP-2	
Engine	HINO J08E-TM
Output	159kW (216PS)/2000min <sup>-1</sup>
Weight	5.5ton
Dimension (L×W×H)	4270mm×1600mm×2150mm



## RT-200AIII

CASING ROTATOR RT-200AIII	
Borehole dia.	1000mm-2000mm
Extracting force (Normal/Emergency)	2600kN (265tf)/2990kN(305tf)
Pushing down force (Hydraulic+Deadweight)	470kN (48tf)+220kN (22tf)
Thrust jack stroke	750mm
Torque (Normal/Emergency)	2170/1270/740kN-m (221/130/75tf-m)*2530kN(258tf-m)
Rotation speed	1.1/1.8/3.1min <sup>-1</sup>
Weight	30.0 (31.3) ton
HYDRAULIC POWER PACK RTP-3	
Engine	HINO P11C-UP
Output	257kW (350PS)/1850min <sup>-1</sup>
Weight	7.3ton
Dimension (L×W×H)	4800mm×2100mm×2112mm

● < > shows the weight with sub chuck system(Optional extra)



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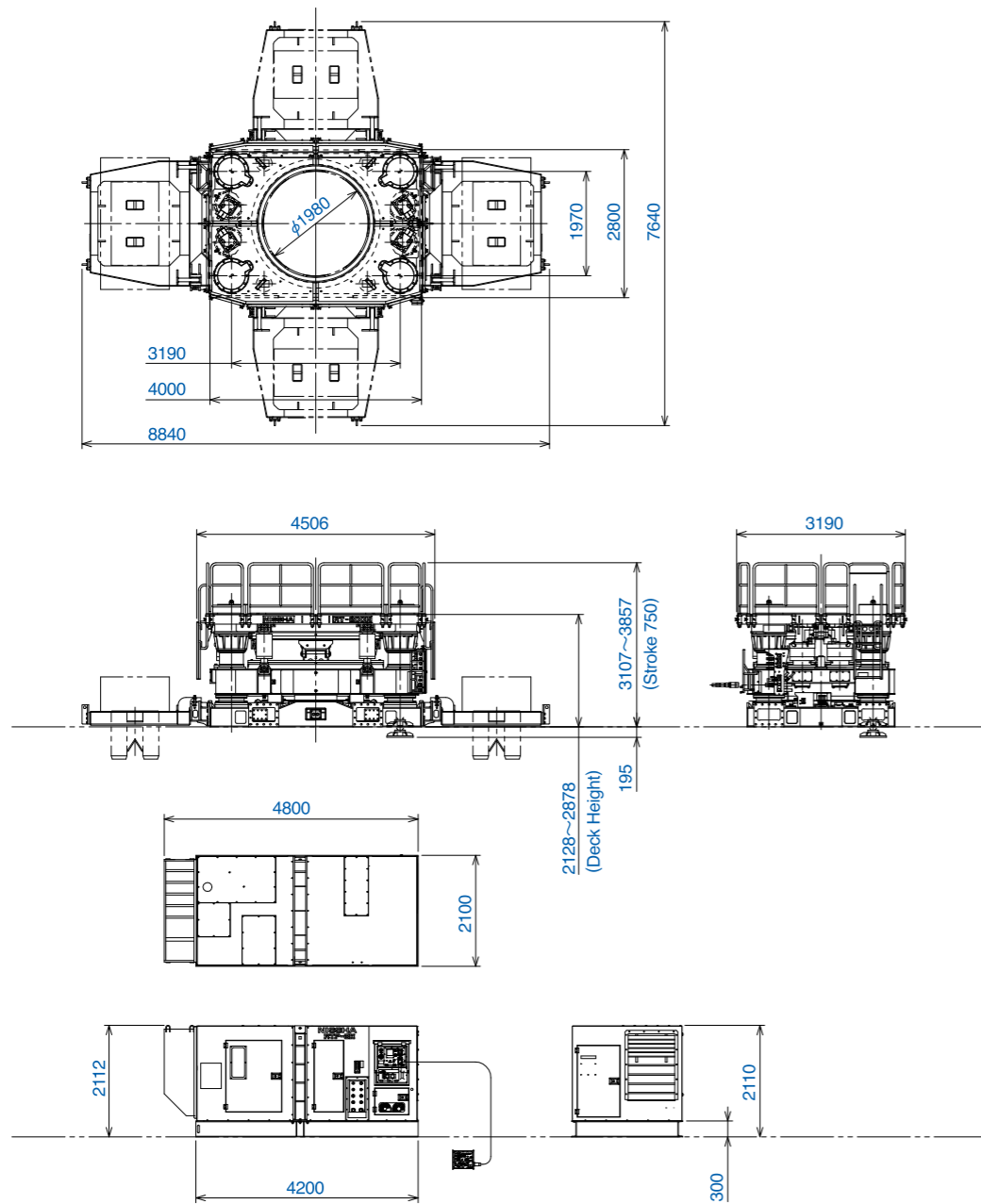
# RT-200H

CASING ROTATOR RT-200H	
Borehole dia.	1000mm-2000mm
Extracting force (Normal/Emergency)	3450kN (352tf)/3940kN(402tf)
Pushing down force (Hydraulic+Deadweight)	590kN(60tf)+250kN(26tf)
Thrust jack stroke	750mm
Torque (Normal/Emergency)	2950/1740/1010kN-m (301/177/103tf-m)*3130kN(319tf-m)
Rotation speed	0.9/1.5/2.5min <sup>-1</sup>
Weight	34.1 (35.8) ton

HYDRAULIC POWER PACK RTP-3H	
Engine	HINO P11C-UP
Output	257kW(350PS)/1850min <sup>-1</sup>
Weight	7.3ton
Dimension(L×W×H)	4800mm×2100mm×2112mm

● < > shows the weight with sub chuck system(Optional extra)



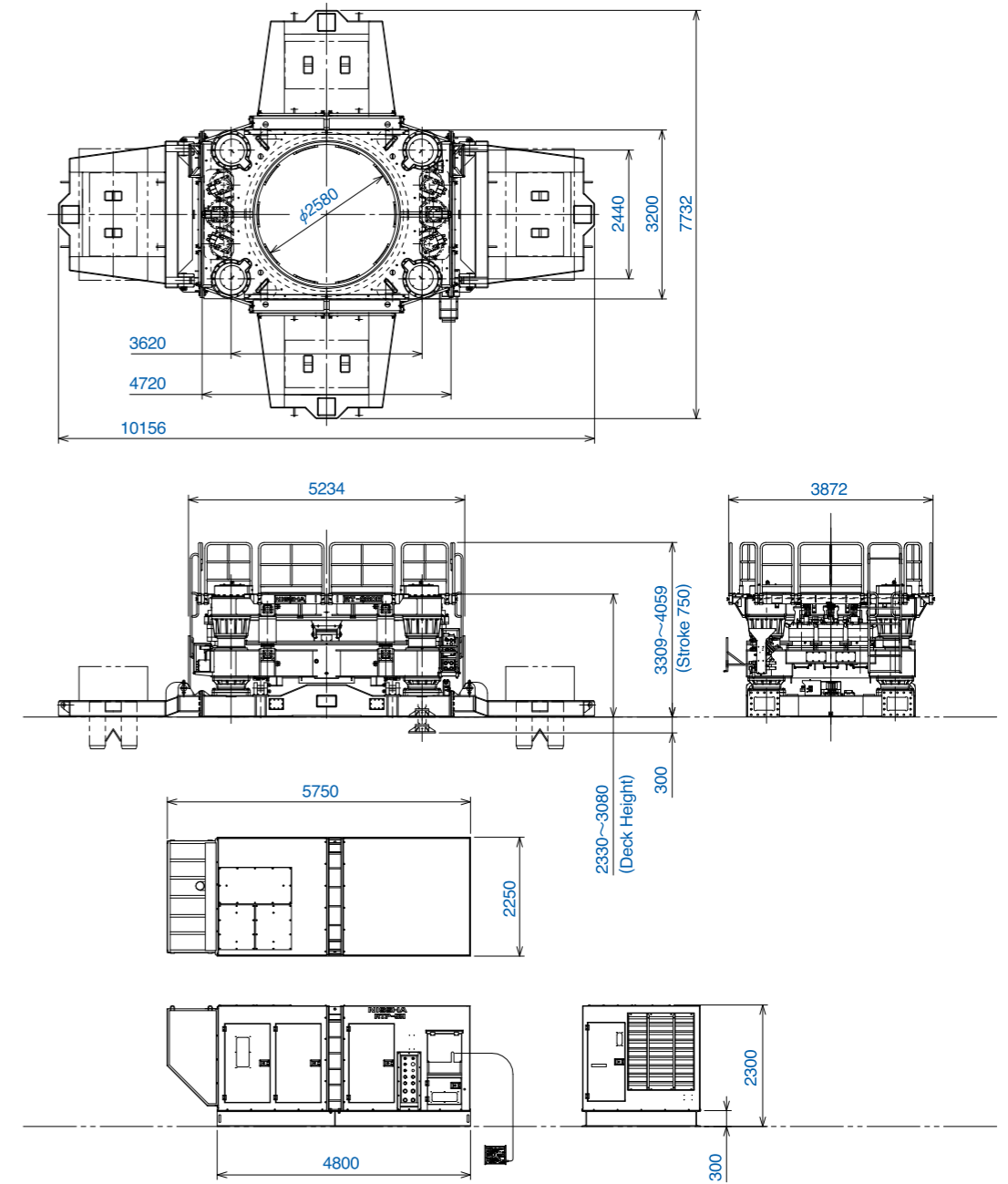
# RT-260H

CASING ROTATOR RT-260H	
Borehole dia.	1500mm-2600mm
Extracting force (Normal/Emergency)	3800kN (388tf)/4340kN(443tf)
Pushing down force (Hydraulic+Deadweight)	830kN(85tf)+350kN(36tf)
Thrust jack stroke	750mm
Torque (Normal/Emergency)	5100/3000/1740kN-m (520/306/177tf-m)*5950kN(607tf-m)
Rotation speed	0.6/1.1/1.9min <sup>-1</sup>
Weight	46.5 (48.4) ton

HYDRAULIC POWER PACK RTP-5H	
Engine	KOMATSU SAA6D140E-5
Output	370kW(503PS)/1800min <sup>-1</sup>
Weight	10.0ton
Dimension(L×W×H)	5750mm×2250mm×2300mm

● < > shows the weight with sub chuck system(Optional extra)



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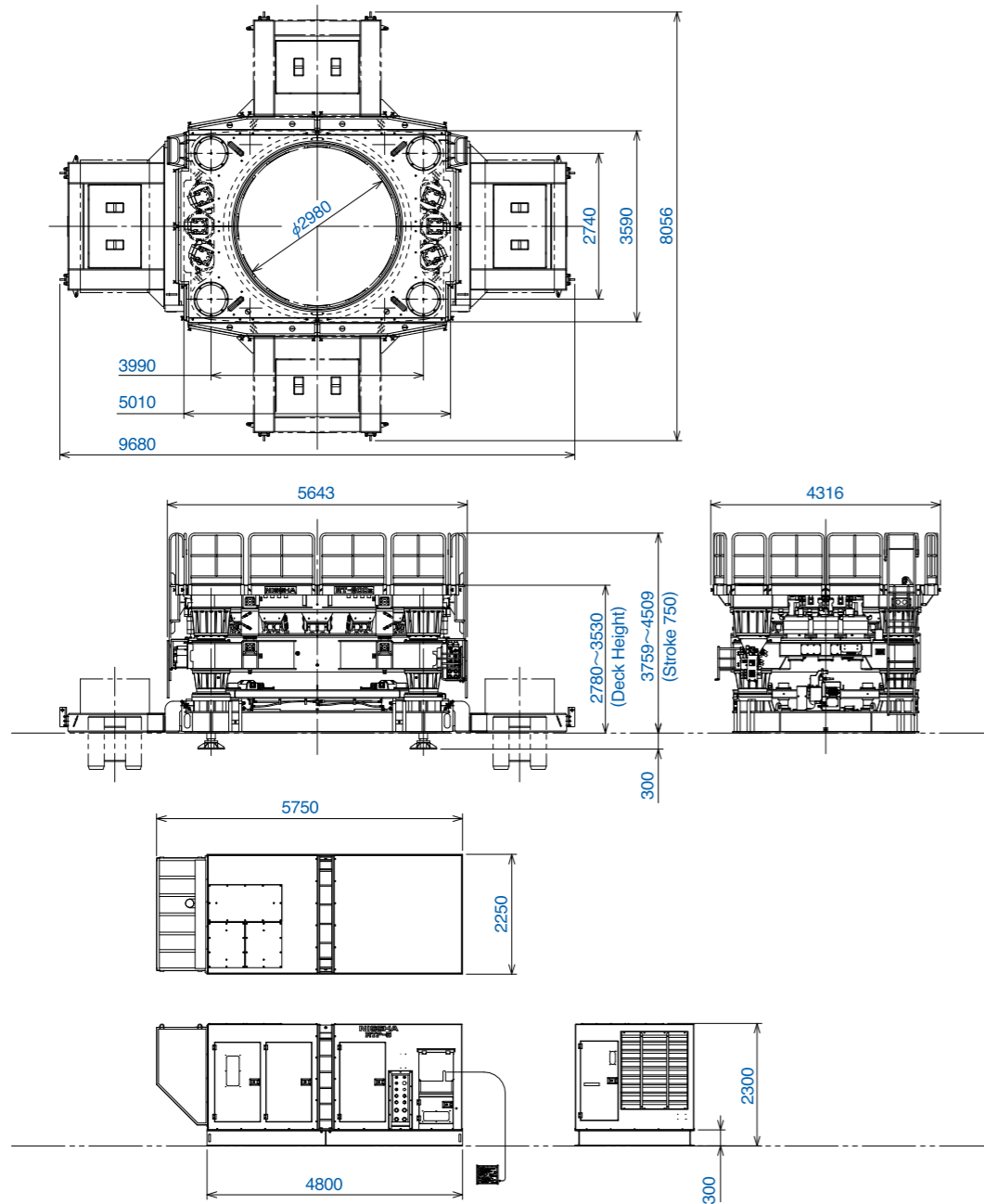
## RT-300III

CASING ROTATOR RT-300III	
Borehole dia.	2000mm-3000mm
Extracting force (Normal/Emergency)	4020kN (410tf)/4470kN (456tf)
Pushing down force (Hydraulic+Deadweight)	820kN (84tf)+390kN (40tf)
Thrust jack stroke	750mm
Torque (Normal*/Emergency)	5280/3100/1780kN-m (539/316/182tf-m)*6040kN-m(616tf-m)
Rotation speed	0.6/1.0/1.7min <sup>-1</sup>
Weight	53.0 (57.5) ton

HYDRAULIC POWER PACK RTP-5	
Engine	KOMATSU SAA6D140E-5
Output	370kW(503PS)/1800min <sup>-1</sup>
Weight	10.0ton
Dimension(L×W×H)	5750mm×2250mm×2300mm

● < > shows the weight with sub chuck system(Optional)



## LOW HEAD type

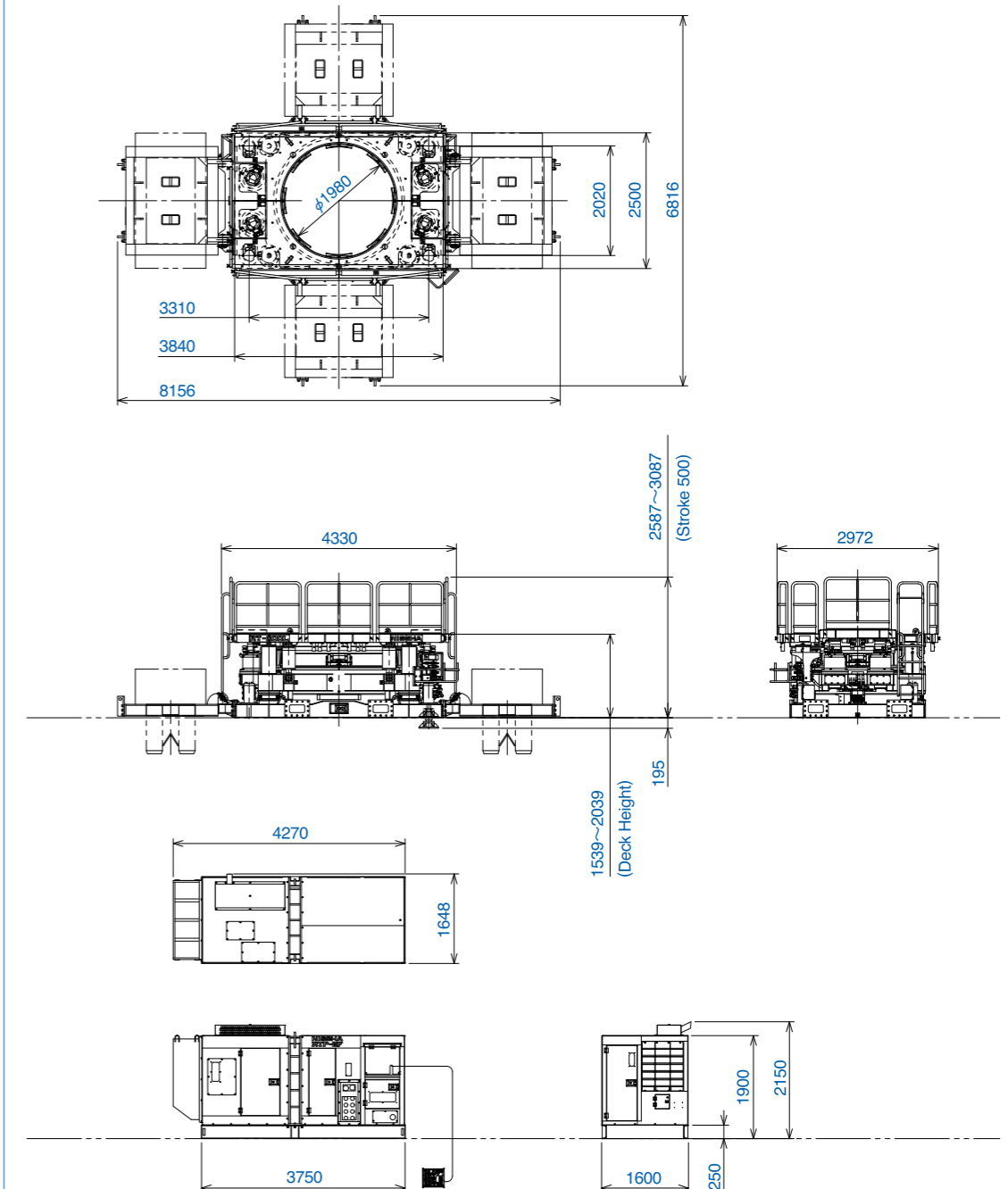
## RT-200L

CASING ROTATOR RT-200L	
Borehole dia.	1000mm-2000mm
Extracting force	1970kN (201tf)
Pushing down force (Hydraulic+Deadweight)	390kN (40tf)+150kN (15tf)
Thrust jack stroke	500mm
Torque	1540/530kN-m (157/54tf-m)
Rotation speed	1.2/3.4min <sup>-1</sup>
Weight	18.5 (19.2) ton

HYDRAULIC POWER PACK RTP-2F	
Engine	HINO J08E-TM
Output	159kW(216PS)/2000min <sup>-1</sup>
Weight	5.5ton
Dimension(L×W×H)	4270mm×1600mm×2150mm

● < > shows the weight with sub chuck system(Optional)



SUPERTOP



Distributor

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Manufacturer

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CAT.No.143B

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