SPEC. F1614E-1
Date: December, 1999

SPECIFICATION

"NISSHA"

EARTH BOY Series

Hydraulic Earth Drilling Rig

Model : ED5500

(Hollow type kelly bar version)

Quantity: _____ unit

December, 1999

NIPPON SHARYO, LTD.

Nagoya, Japan
Tel: 81 - (52) -623-3329
Fax: 81 - (52) -623-4349

CONTENTS

1. GENERAL CONDITIONS

This specification shall cover the standard specification of NISSHA, Hydraulic earth drilling rig; model ED5500 (here-in-after called "The machine") manufactured by NIPPON SHARYO, LTD.

The general arrangement and principal dimensions of the machine are shown in the drawings attached.

1) DESIGN AND WORKMANSHIP

The machine shall be designed to perform the maximum efficiency with the least fuel consumption and the lowest maintenance costs.

The workmanship shall be of the first class in all respects.

The machine shall be built for simple mechanical arrangement and easy in inspection and maintenance.

2) MATERIALS

The materials used in the manufacture of the machine shall be of the highest quality, free from defects and imperfections.

Principal materials such as bolts, nuts, seals and steel plates used in the machine confirm to the Japanese Industrial Standards. (Almost equal to ISO)

3) TEST AND INSPECTION

Routine test and inspection in our factory shall be final.

4) PAINTING AND LETTERING

Under-coating by anti-rust paint and enamel finishing shall be performed in accordance with manufacturer's standard practice.

Main parts of the equipment shall be painted in NISSHA Green and other equipment in manufacturer's standard.

5) LANGUAGE AND UNIT OF MEASUREMENT

All documentation, such as specifications, manuals, etc. shall be written in English and all of equipment shall be designed in metric system.

6) SERVICE CONDITIONS

The equipment shall meet the following service conditions.

Ambient temperature: -10 ℃ or higher and 40 ℃ or lower.

7) WARRANTY

All the machines specified herein shall be warranted by us for a period of twelve (12) calendar months after the date of being to put into operation, or fourteen (14) months after the date of shipment at a Japanese port, or one thousand engine operation hours according to the service hour meter, whichever is soonest.

The warranty shall cover defects in design, materials and workmanship only, shall not applicable to damage sustained mishandling of the machine or normal wear and tear.

The warranty shall not be applicable to the parts and materials mentioned below.

1) **Linings as brake/clutch bands and disc.**
2) **Wear plates**
3) **Wire ropes**
4) **Rubber made parts**
5) **Seals as o-rings, seal rings, back-up rings, etc.**
6) **Gaskets and sheet packings**
7) **Filter elements**
8) **Batteries**
9) **Electric wiring**
10) **Glasses**
11) **Other quick moving parts**
12) **Lubricants**

⋯ concluded

2. FEATURES

1) High performance in deep drilling of 58m

The machine is specially designed for deep bored pile construction work.

Boom length	Kelly bar – No. of stage	Kelly bar length (Retracted)	Standard drilling depth		Drilling depth with 10m extension stem	
			High position	Low position	High position	Low position
23m	4-stage	Min. 16.6m	55m	**58m**	65m	**68m**

2) Hydraulic cylinder supported type kelly drive

A stable positioning of the kelly drive by a hydraulic cylinder eliminates swaying of the kelly bar and gives a high degree of vertical drilling accuracy compared to the conventional rope-suspension type machines.

3) Compact design

The rear end radius of the machine is so compact as 3570mm at the end of its counter weight which allows it to work in confined area.

4) Versatile operating radius

The operating radius can be easily adjusted from 3802mm to 5408mm (Boom angle : 83.5° to 79.5°) which allows to apply to wide operation range.

5) Robust suspension rope of 25mm in diameter plus large braking capacity

Adaptation of ϕ 25mm suspension rope for the kelly bar prolongs the life time of the suspension rope and minimizes rope maintenance work.

A large brake drum provided with cooling fins is suitable for a heavy duty drilling work.

6) High power diesel engine of 155 PS

A powerful diesel engine allows the machine to maneuver simultaneous operations and assures it to operate efficiently.

7) Powerful drilling torque of 6.0 ton-m and long thrusting stroke of 500mm

The maximum torque of 6.0 ton-m for forward and reverse directions conforms to the widespread stratums

8) Low winch speed control

Winch rope line speed can be controlled at the desired speed of 100% to 17% of its rating.

9) Easy maintenance

Adopting floating ring seals in drive tumblers, take-up tumblers and lower track rollers, and sealed bearings to every sheaves require minimum daily maintenance service. A grease-bath type swing pinion gear prolongs its service interval.

10) Low fuel consumption

The machine is powered by a direct fuel injection type diesel engine with a pair of variable displacement type plunger pumps of efficient performance, accordingly economical operation can be assured.

3. SPECIFICATIONS OF EARTH DRILLING RIG

3.1	**Model**	**NISSHA ED5500 (Earth boy)**
3.2	**Manufacturer**	**NIPPON SHARYO, LTD.**
3.3	**Type**	
1)	**Type of bucket**	**Rotary bucket (Bottom open)**
2)	**Drive system**	**Fully hydraulic drive**
3)	**Travel system**	**Self-propelled with crawlers**
4)	**Type of boom**	**Lattice boom: E-50**
3.4	**Dimensions**	
1)	**Overall height (Working order)**	**Approximately 24,700~24,980mm**
2)	**Overall width (Working order)**	**4,110mm**
3)	**Overall length (Without bucket)**	**Approximately 7,837~9,43mm**
4)	**Boom length**	**23,000mm**
5)	**Swing radius (Without bucket)**	
	a) Front end distance from swing center	**3,802~5,408mm**
	b) Rear end distance from swing center	**3,570mm**
6)	**Working radius**	**3,802~5,408mm**
7)	**Front clearance from bucket center**	**1,152~2,758mm**
8)	**Dumping height of bucket**	**Approximately 3,400~4,900mm**
9)	**Ground clearance of bucket when opened**	**Approximately 1,700~3,200mm**
10)	**Crawler length**	**5,320mm**
11)	**Crawler width**	**4,110mm(3,300mm-retracted)**
12)	**Crawler center to center distance**	**3,350mm**
13)	**Shoe width**	**760mm**
14)	**Tumbler center to center distance**	**4,460mm**
15)	**Ground clearance**	**374mm**
16)	**Transportation dimensions of base machine**	
	a) Overall height	**3,300mm**
	b) Overall width	**3,300mm**
	c) Overall length	**6,210mm**
17)	**Weight**	
	a) Operating weight with ϕ1800 bucket	**Approximately 57,800 kg**
	b) Base machine	**26,800kg**
	Counterweight	**14,500kg**
	Boom	**5,100kg**
	Front-end attachments	**11,400kg**
	c) Maximum weight in transportation	**26,800kg(Base machine)**
18)	**Performance**	
	a) Travelling speed	***1.3km/hr**
	b) Swing speed	**3.3 rpm**
	c) Gradeability	**40%**
	d) Average ground pressure	**0.80kg/cm^2**
	e) Maximum drilling diameter (bore)	
	Regular stratum	**1,800mm**
	Comparatively soft	**2,000mm**
	f) Maximum drilling depth	
	With 10m extension stem	**68m**
	Without extension stem	**58m**
	g) Kelly bar thrusting stroke	**500mm**
	h) Bucket speed	***30/15 rpm**
	i) Bucket torque(Forward/reverse)	**6,000 / 6,000 kg-m**

j) Bucket suspension rope speed	
Winding High/Low	***58 / 29 m/min.**
Rewinding High/Low	**58 / 29 m/min.**
k) Boom hoisting rope Winding	***49 m/min.**
rewinding	**49 m/min.**
l) Maximum lifting load x operating radius	**7.5 ton x 9.1 m**
m) Diesel engine	
Manufacturer	**HINO MOTOR CO.**
Model	**EM100 diesel engine**
Type	**4-cycle, water cooled, vertical Direct fuel injection**
Output	**155PS/2,000 rpm**
Maximum torque	**57kg.m/1,600 rpm**
Fuel consumption rate	**170g/PS-H**
Batteries	**24V-120AH**
Fuel tank	**250 liters**
n) Hydraulic pump	**Variable displacement plunger pump: Full power control**

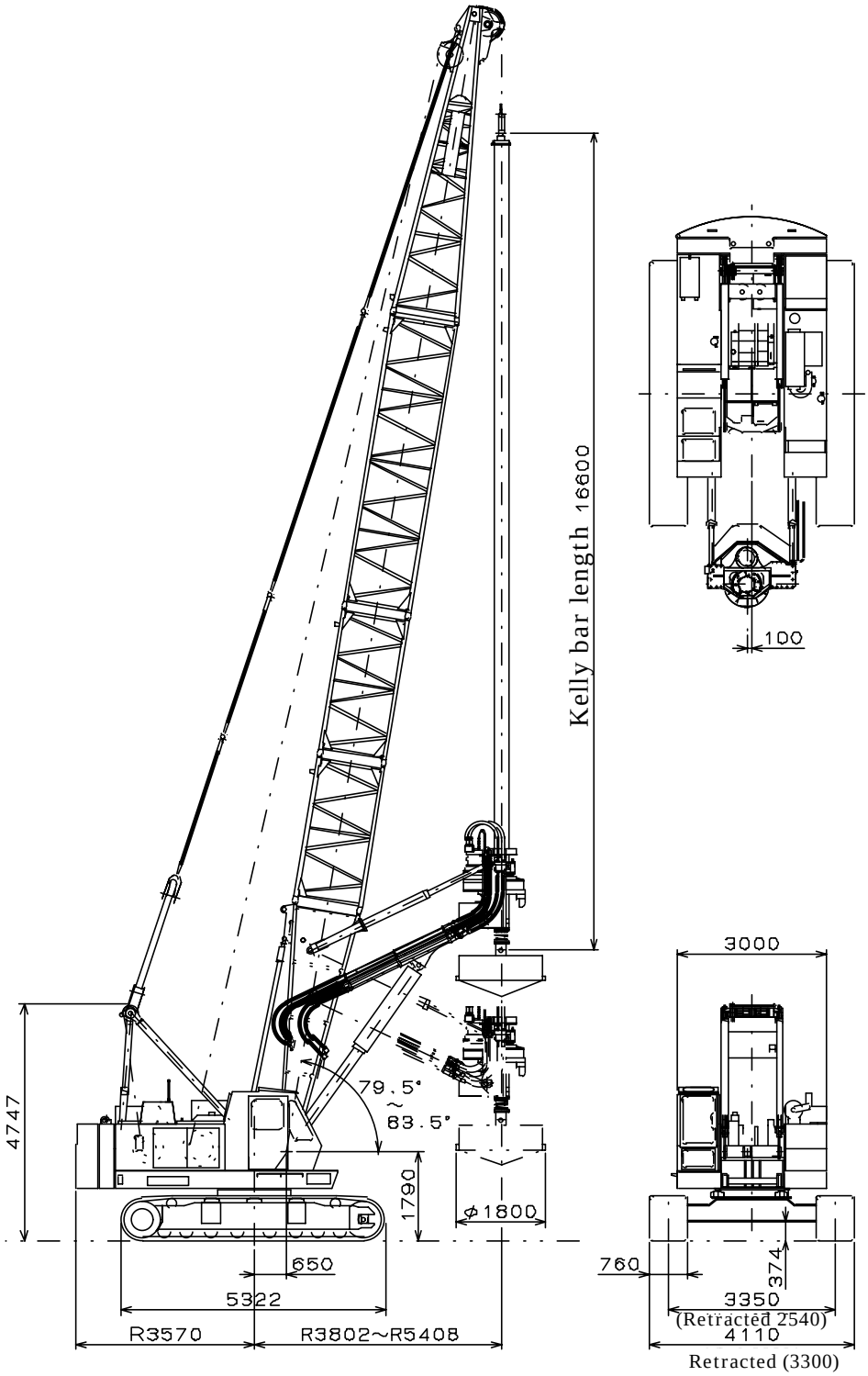
(*marked : varies depending on load applied.)

19) Structure and functions

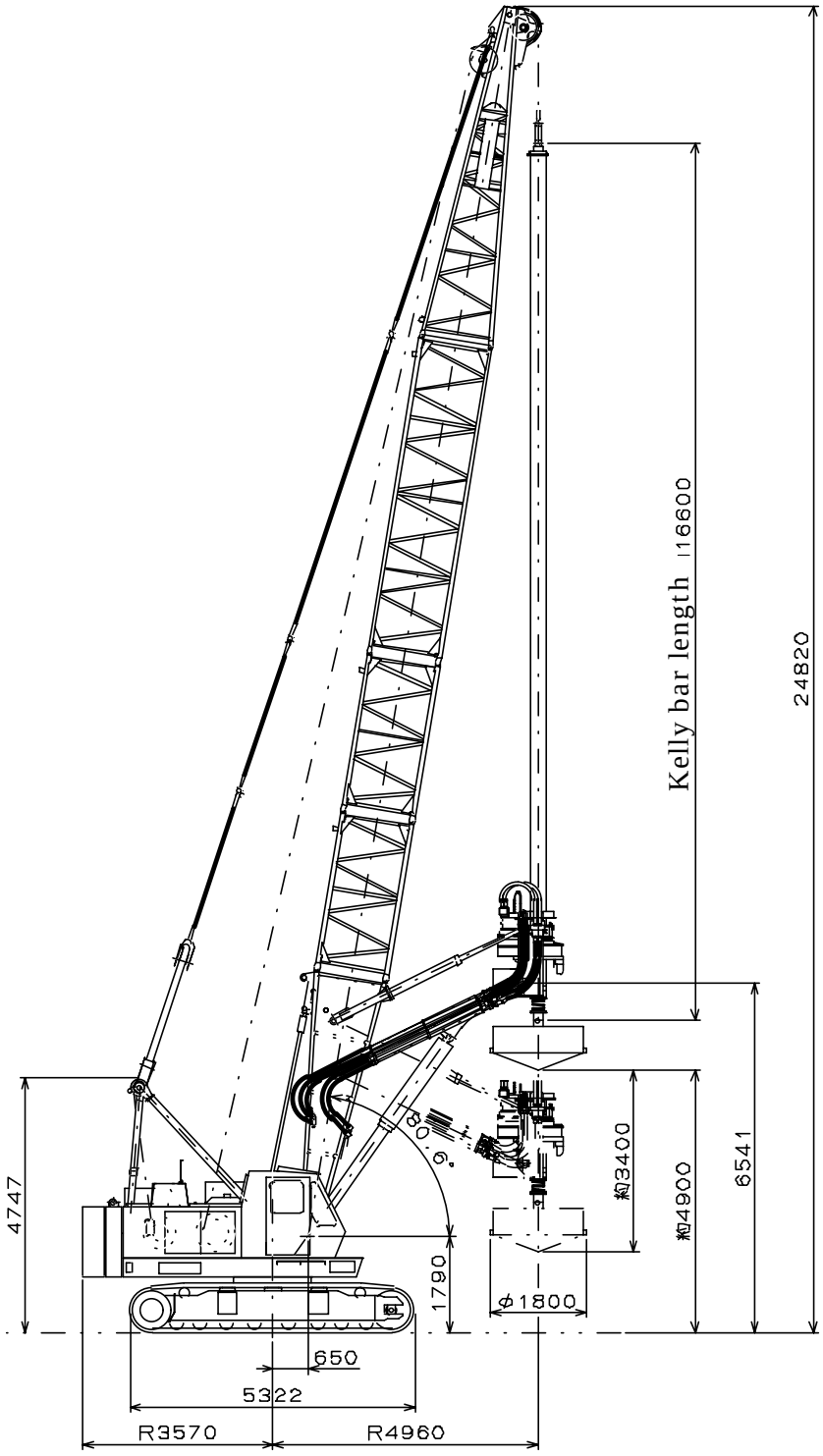
a) Travelling device (Track frame)	
Drive system	**Hydraulic drive**
Steering system	**L.H. and R.L. independent drive (Pivot turn / Spin turn)**
b) Swing system (Superstructure)	
Swell bearing	**Heavy duty ball race bearing with internal gear teeth**
Drive system	**Hydraulic drive**
Swing lock system	**Rod tip insertion**
c) Boom	
Type	**Lattice**
Boom hoisting	**Rope suspension**
d) Kelly drive	
Type	**Direct drive**
Drive system	**Hydraulic drive**
Kelly bar	**Hollow type, 4-stage telescopic**

Due to company policy of continuous development and improvement, the right is reserved to change the specifications without notice.

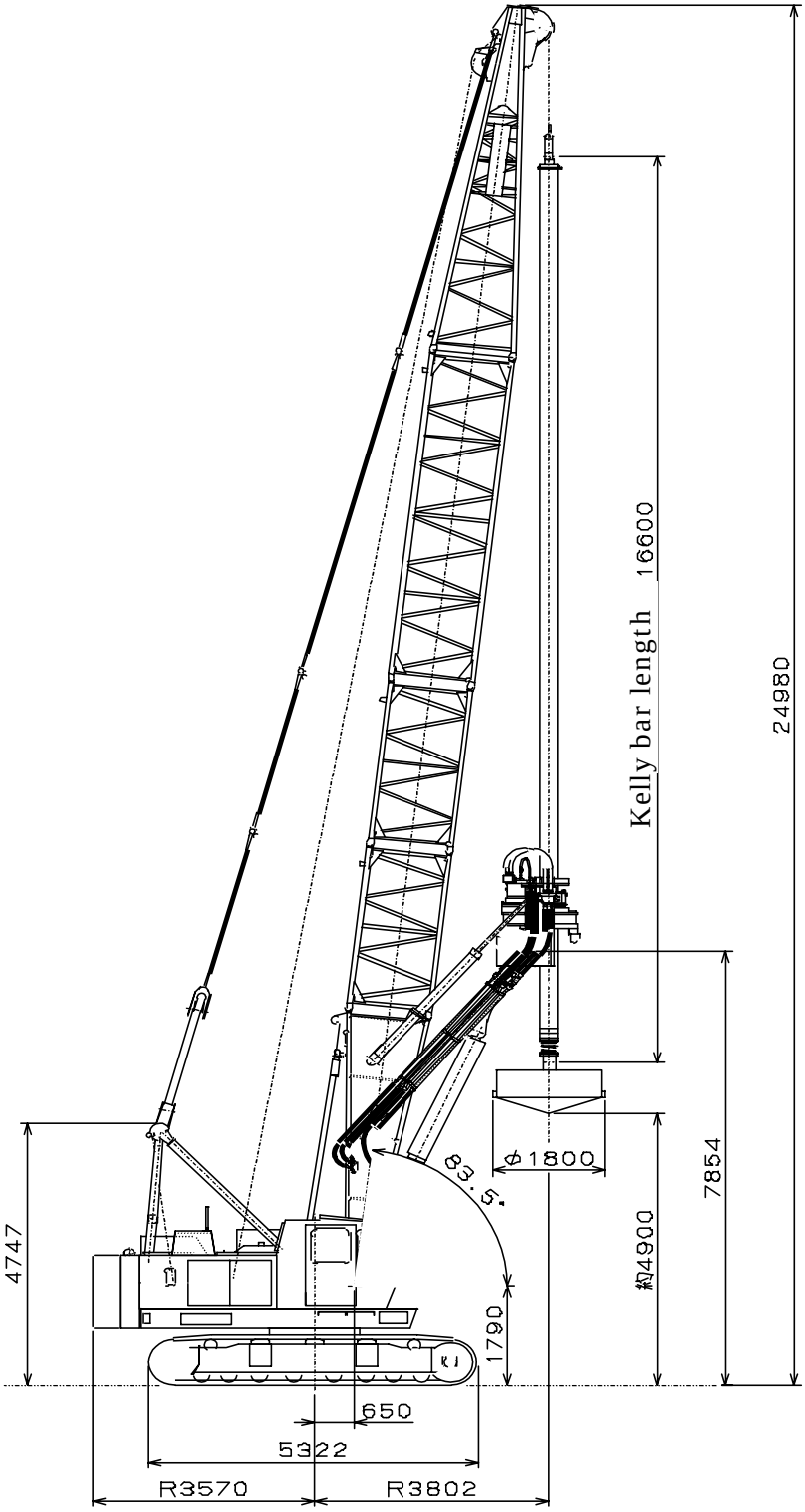
4. General view of ED5500 earth drilling rig with ϕ1800 bucket



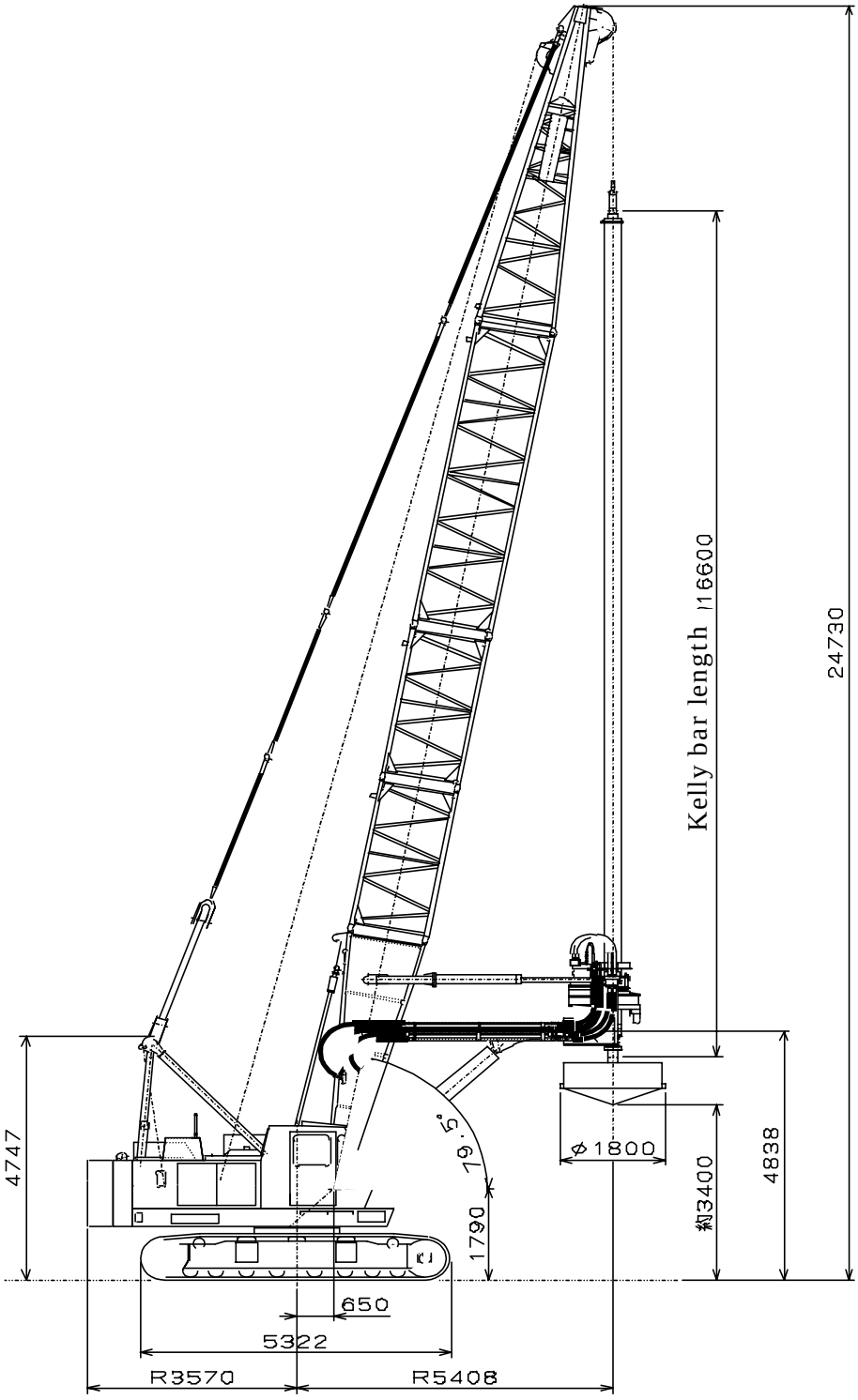
5. General view of ED5500 earth drilling rig with ϕ1800 bucket (Standard operating radius)



6. General view of ED5500 earth drilling rig with ϕ1800 bucket (Minimum operating radius)



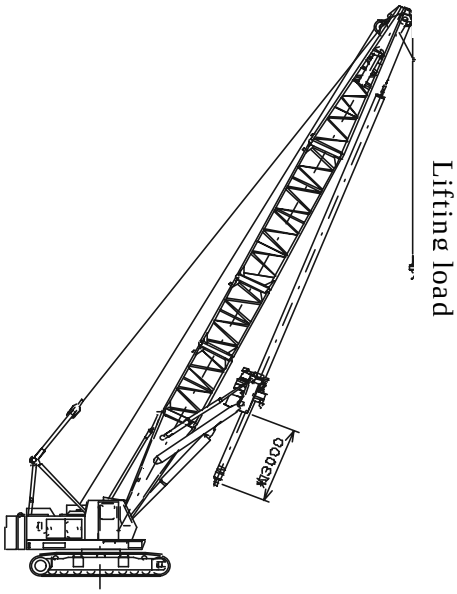
7. General view of ED5500 earth drilling rig with ϕ1800 bucket (Maximum operating radius)



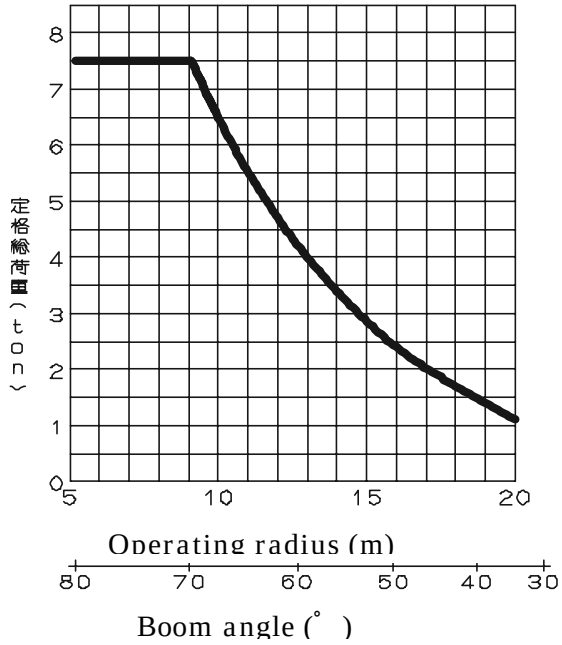
8. Crane work (Auxiliary hook)

Rated lifting load table in crane work of ED5500

Radius (m)	5.2	6.0	8.0	10.0	12.0	14.0	16.0	18.0	20.0
Boom angle (°)	80.0	77.9	72.8	67.4	61.9	56.0	49.7	42.7	34.6
Rated lifting load (t)	7.5	7.5	7.5	6.5	4.7	3.4	2.4	1.7	1.1



Rated lifting load curve of auxiliary hook



Note 1 Auxiliary hook is used to lift up various materials as a stand pipe , reinforcement cage and tremie pipes, etc.

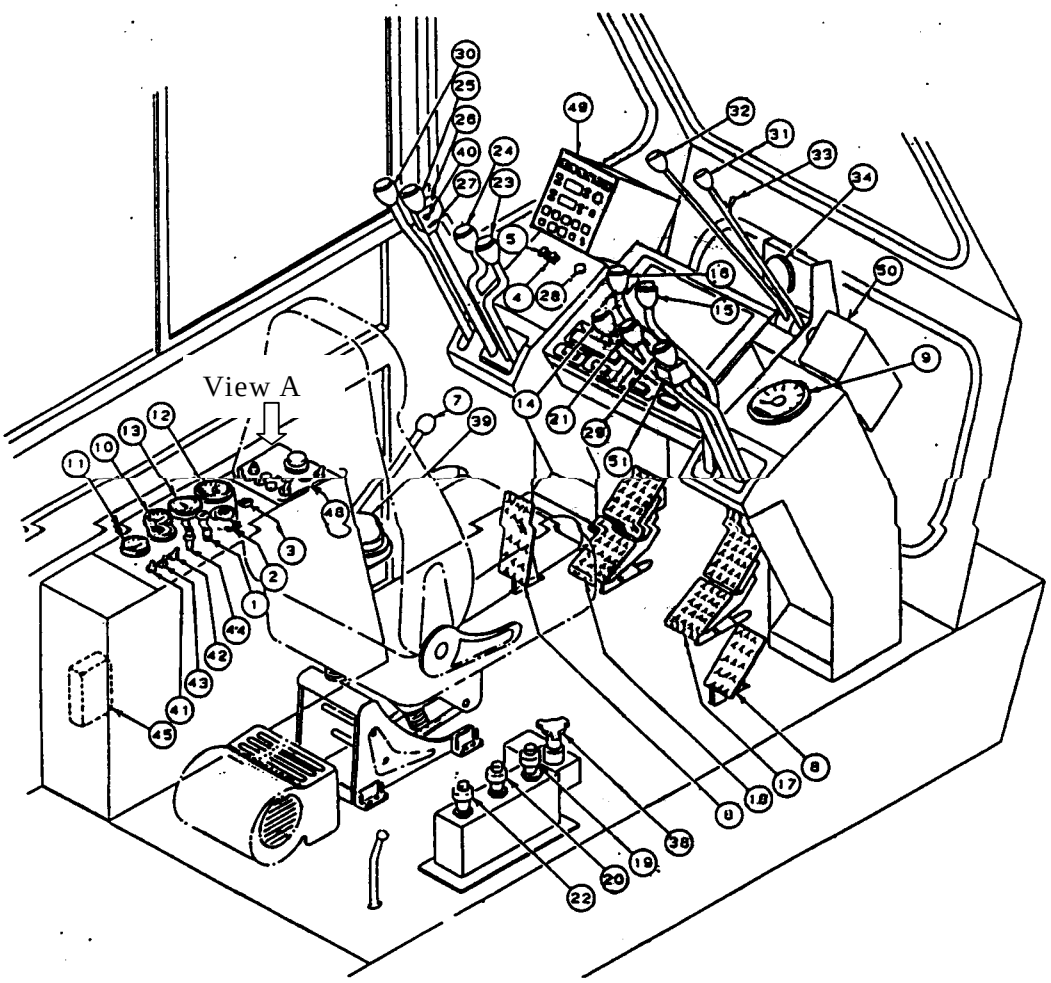
Note 2 The rated lifting loads in the table are given when the machine is on firm and level surface without bucket and its kelly bar to be positioned to protrude approximately 3m from its kelly drive. (78 % of the tipping load)

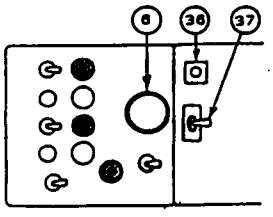
Note 3 Actual allowable lifting load shall be reduced the weight of all sling devices as hook from the load in the table.

Note 4 The weight of 7.5 ton auxiliary hook is 60 kg.

9. Instruments and controls (ED5500)

9.1 Instruments and controls in operator's room





○パネル面

9.2 Name of instruments and controls in operator's room

Diesel engine controls

1. Battery switch
2. Starting switch
3. Heater signal (Per-heating)
4. Engine lube. Oil pressure pilot lamp
5. Charging lamp
6. Engine stop button
7. Acceleration lever
8. Acceleration pedal
9. Speedometer
10. Water temperature gauge
11. Fuel level gauge

Hydraulic controls

12. Pilot circuit oil pressure gauge
13. Hydraulic oil temperature gauge

Winch control

14. Winch lever
15. Main drum clutch lever
16. Auxiliary drum clutch control lever
17. Main drum brake pedal/pedal lock
18. Auxiliary drum brake pedal/pedal lock
19. Main drum lock knob
20. Auxiliary drum lock knob

Boom control

21. Boom lever
22. Boom drum lock knob

Travelling control

23. R.H. travel lever
24. L.H. travel lever

Swing control

25. Swing lever
26. Swing brake switch
27. Swing lock switch
28. Swing lock lamp

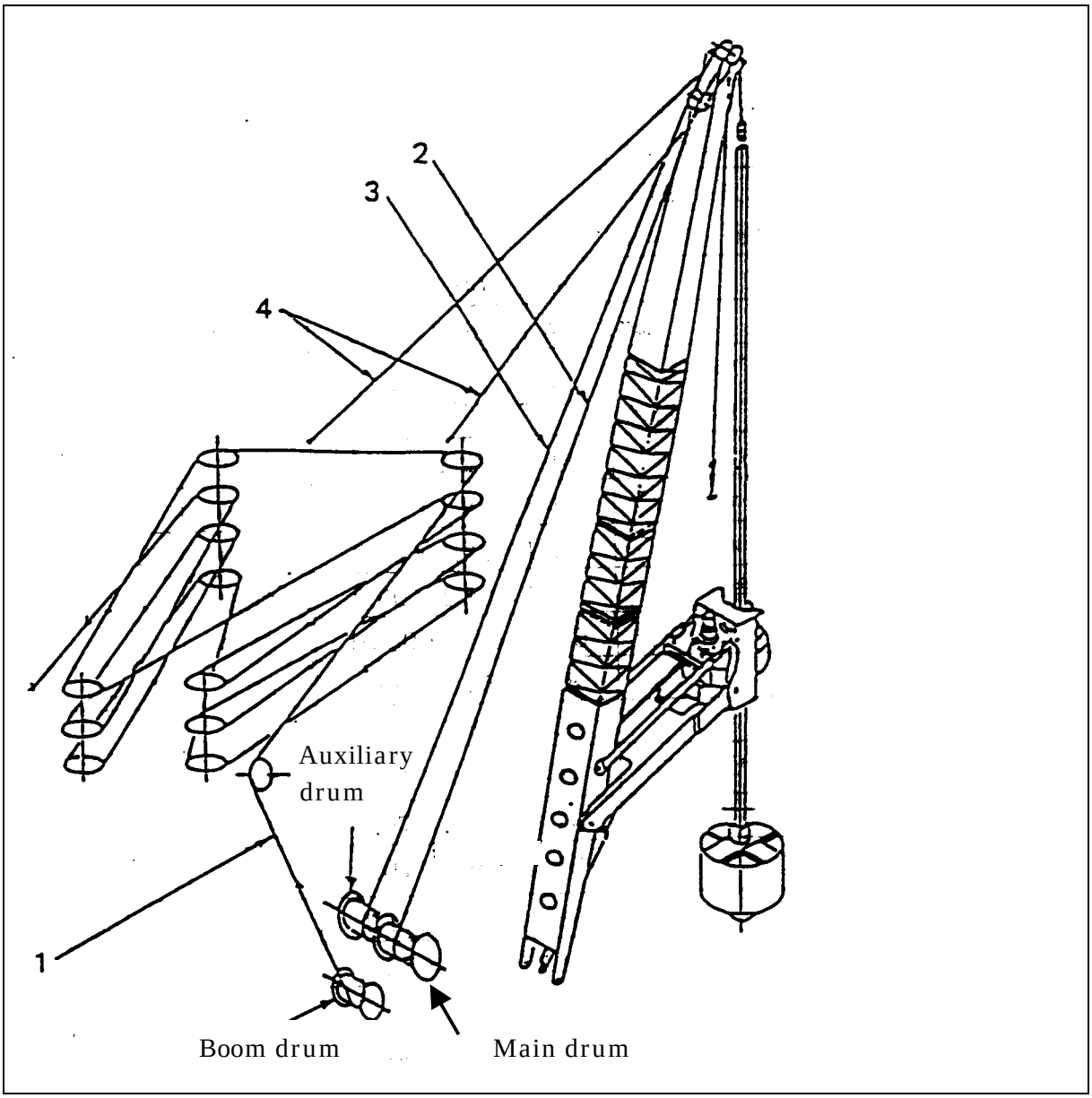
Front-end attachment control

29. Bucket rotation lever
30. Thruster level
31. Front frame erecting lever
32. Kelly frame adjuster lever
33. Kelly frame-free change-over switch
34. Bucket rotation oil pressure gauge
35. Level meter of kelly frame

Others

36. Window washer switch
37. Slow speed change-over switch
38. Slow speed control knob
39. Sight level meter
40. Horn switch
41. Front light switch
42. Front wiper switch
43. Roof wiper switch
44. Heater switch
45. Fuse box
46. Over hoist preventive switch
47. Depth meter (Option)
48. Moment limiter (Option)

10. Rope reeving chart



	Name of rope	Specification of rope	Rope dia.	Rope length
1	Boom hoist	XP7x7+6xWS, ordinary Z-twist C	14mm	130m
2	Kelly rope	Mono rope SP 4xF(ax40) ordinary Z-twist	25mm	100m
3	Aux. drum	IWRC 6xFi(29) Ordinary Z-twist C	22.4mm	70m
4	Pendant rope	IWRC 6xFi(29) Ordinary Z-twist C	32mm	3, 6m

11. Weight and dimensions for transportation

Description		Weight(t)	Dimensions **L** m **x W** m **x H** m	Remarks
Base machine	Base machine	31.99	11.16 x 3.30 x 3.30	With Lower boom, c-weight
		26.80	6.21 x 3.30 x 3.30	Without Lower boom C-weight
	Counterweight (Inner)	5.70	0.51 x 3.00 x 1.46	
	Counterweight (Outer)	8.80	0.63 x 2.99 x 1.46	
Front-end attachments	Lower boom	5.18	7.05 x 2.10 x 2.30	Back-stopper Front frame Cylinder
	Upper boom	1.10	6.40 x 1.22 x 1.44	Pendant ropes
	3m insert boom	0.49	3.10 x 1.22 x 1.48	Pendant ropes
	6m insert boom	0.74	6.10 x 1.22 x 1.48	Pendant ropes
	Kelly drive	2.93	2.00 x 1.90 x 1.40	Kelly frame
	Kelly bar	3.77	16.6 x 0.40 x 0.40	
	7.5t hook	0.05	1.00 x 0.25 x 0.18	

12 . STANDARD SCOPE OF SUPPLY

1) Basic machine : model ed5500 ..... 1 unit
equipped with

- **5.7 + 8.8 ton counter weight**
- **Three drums of main, auxiliary and leader**
- **Electric fan in operator's cab**
- **Radio**
- **Electric fuel pump**
- **Ash tray and sight level gauge with a bubble**

2) Earth drill front-end attachments ..... 1 set

- **23m lattice boom**
- **Kelly drive + 4-stage telescopic kelly bar (Hollow type)**
- **Kelly drive frame + erecting cylinder**

(OPTIONAL EXTRA DEVICE)

- **Drilling bucket (ϕ 1000) .....…….. 1 set**
- **Drilling bucket (ϕ 1500) .....…….. 1 set**
- **Depth meter …… 1 unit**