

SPEC. F5-BC830A-E-1

Date: December, 1999

SPECIFICATION

“NISSHA”

EARTH BOY Series

Hydraulic Earth Drilling Rig

Model : ED6500

(Hollow type kelly bar version)

Quantity: _____ unit

December, 1999

NIPPON SHARYO, LTD.

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

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1. GENERAL CONDITIONS

This specification shall cover the standard specification of NISSHA, Hydraulic earth drilling rig; model ED6500 (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 °C or higher and 40 °C or lower.

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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

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2. FEATURES

1) High performance in deep drilling of 71m

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

Boom length	Kelly bar- No. of stage	Kelly bar length (Retracted)	Drilling depth	
			High position	Low position
26m	5-stage	16.5m	65m	71m

2) Powerful drilling performance

	Low torque	High torque	Ultra-high torque
Maximum torque	5.3 ton-m	10.7 ton-m	13.4 ton-m
Bucket speed	33/20 rpm	18/10rpm	18/10 rpm

Three-range torque system allows the machine to perform an efficient drilling work into various stratum conditions.

3) 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.

4) Versatile operating radius

The operating radius can be easily adjusted from 5425mm to 7731mm (Boom angle : 82° to 76.8°) which allows to apply to wide operation range.

5) Robust suspension rope of 28mm in diameter plus large braking capacity

Adaptation of ϕ 28mm 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 200 PS

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

7) Long thrusting stroke of 1000mm

8) Low winch speed control

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

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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.

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3. SPECIFICATIONS OF EARTH DRILLING RIG

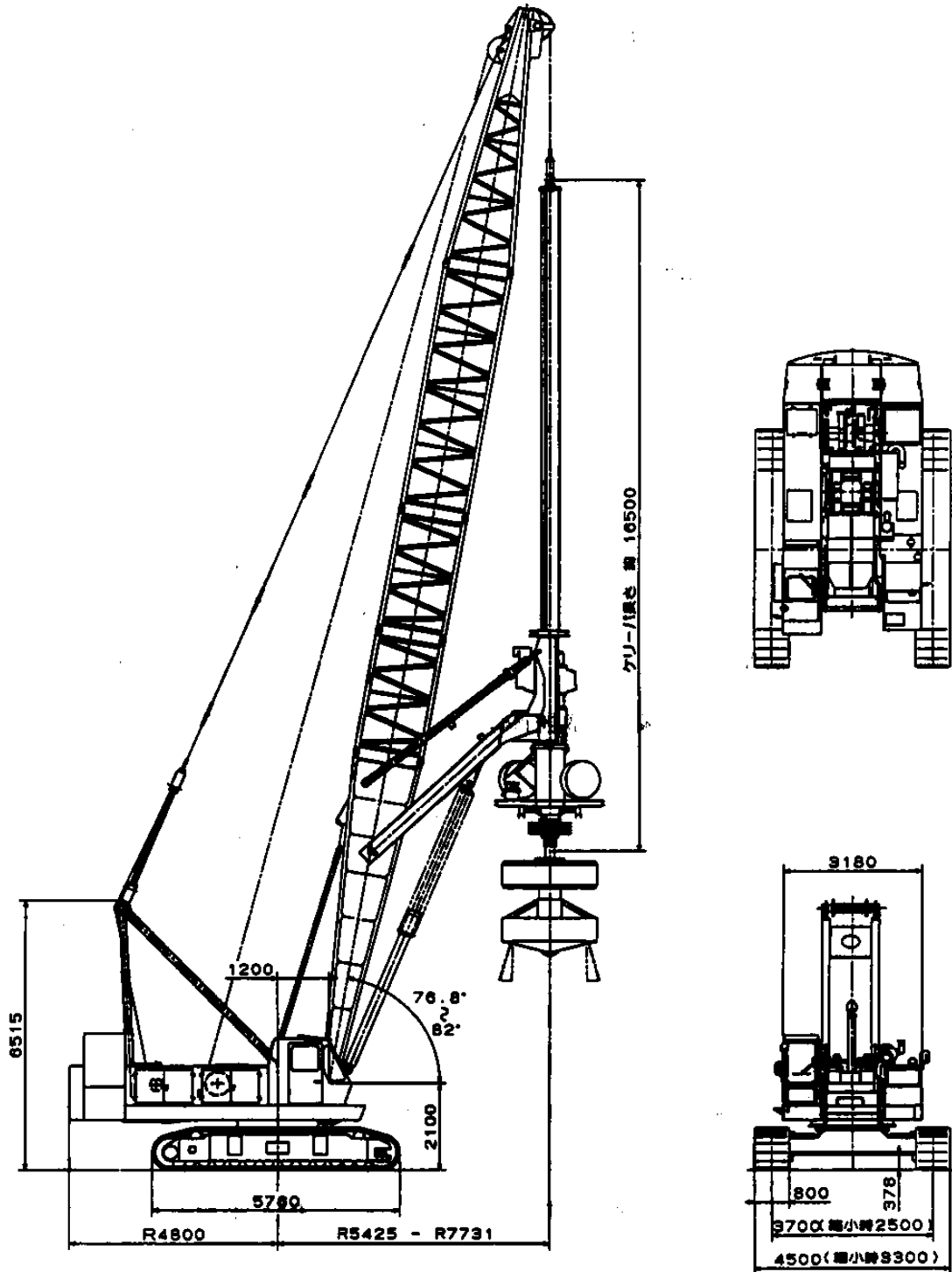
3.1 Model	NISSHA ED6500 (Earth boy)
3.2 Manufacturer	NIPPON SHARYO, LTD.
3.3 Type	
1) Type of bucket	Rotary bucket (Bottom open)
2) Drive system	Fully hydraulic drive
3) Travel system	Self-propelled with crawlers
4) Type of boom	Lattice boom: E-65
3.4 Dimensions	
1) Overall height (Working order)	Approximately 27,780~28,230mm
2) Overall width (Working order)	4,500mm
3) Overall length (Without bucket)	Approximately 11,525~13,831mm
4) Boom length	26,000mm
5) Swing radius (Without bucket)	
a) Front end distance from swing center	6,725~9,031mm
b) Rear end distance from swing center	4,800 mm
6) Working radius	5,425~7,731mm
7) Front clearance from bucket center	2,515~4,821mm
8) Dumping height of bucket	Approximately 1,940~5,170mm
9) Ground clearance of bucket when opened	Approximately 1,340~4,570mm
10) Crawler length	5,760mm
11) Crawler width	4,500mm(3,300mm-retracted)
12) Crawler center to center distance	3,700mm
13) Shoe width	800mm
14) Tumbler center to center distance	4,900mm
15) Ground clearance	378mm
16) Transportation dimensions of base machine	
a) Overall height	2,920mm
b) Overall width	3,180mm
c) Overall length	7,420mm
17) Weight	
a) Operating weight	Approximately 116,600 kg
b) Base machine	41,100kg
Counterweight	30,000kg
Boom	9,200kg
Front-end attachments	36,200kg
c) Maximum weight in transportation	26,700kg
18) Performance	
a) Travelling speed	*0.8km/hr
b) Swing speed	2.7rpm
c) Gradeability	40%
d) Average ground pressure	1.40kg/cm ²
e) Maximum drilling diameter (bore)	
Regular stratum	3,000mm
f) Maximum drilling depth	71m
g) Kelly bar thrusting stroke	1,000mm
h) Bucket torque(Forward/reverse)	
Ultra high torque range	13,400kg-m
High torque range	10,700kg-m
Low torque range	5,300kg-m

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i) Rotation speed		
Ultra high torque range (high/Low)		* 18/10 rpm
High torque range (High/Low)		* 18/10 rpm
Low torque range (High/Low)		* 33/20 rpm
j) Bucket suspension rope, line pull		17,000/29,300 kg
k) Bucket suspension rope speed		
Winding	High/Low	*58 / 29 m/min.
Rewinding	High/Low	58 / 29 m/min.
l) Boom hoisting rope		
	Winding	*41 m/min.
	Rewinding	*55 m/min.
m) Maximum lifting load x operating radius		4.9 ton x 14m
n) Diesel engine		
Manufacturer		HINO MOTOR CO.
Model		EP100-T diesel engine
Type		4-cycle, water cooled, Direct fuel injection, Turbo-charged
Output		200PS/2,000 rpm
Maximum torque		77kg.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, 5-stage telescopic

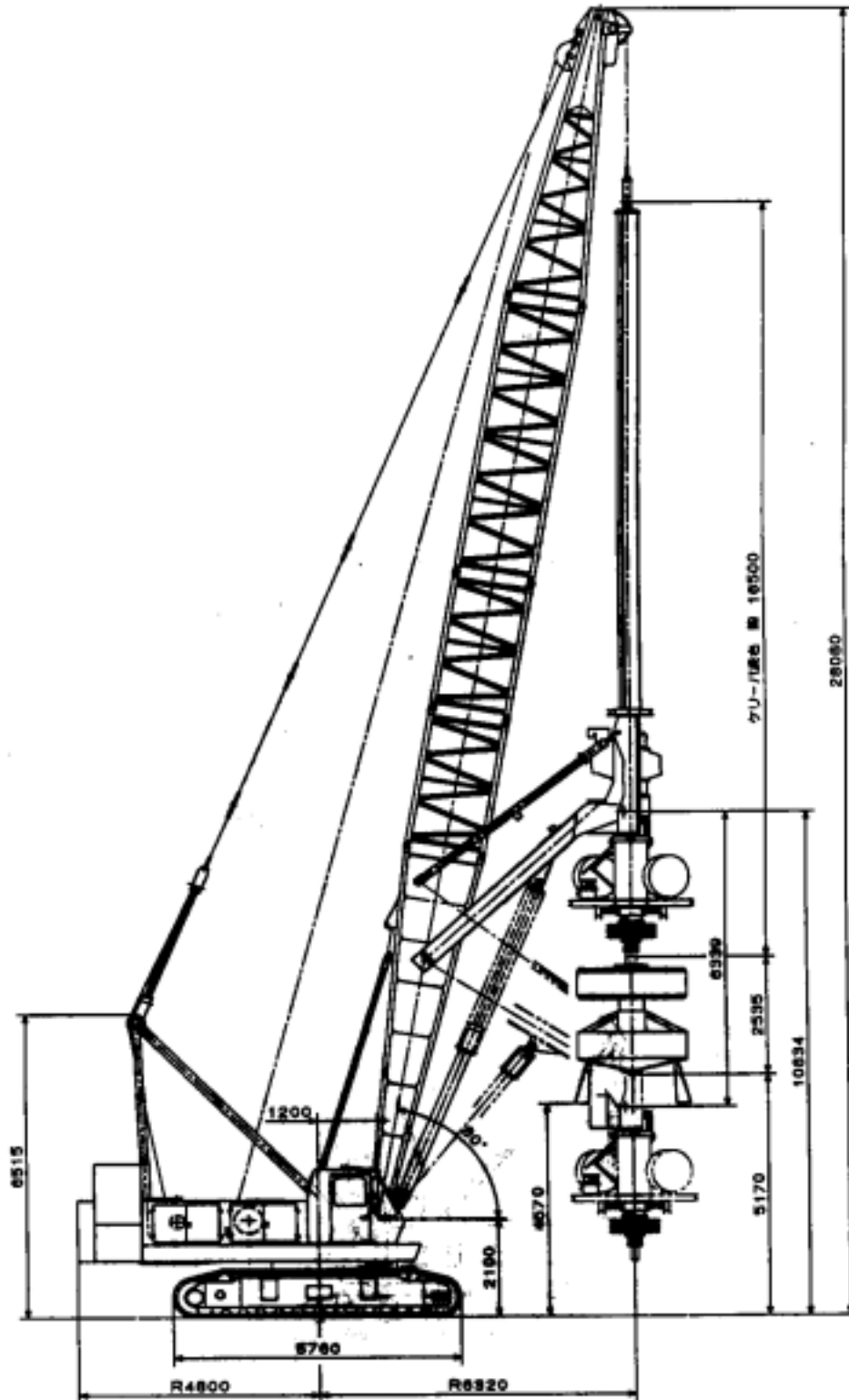
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4. General view of ED6500 earth drilling rig



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**5. General view of ED6500 earth drilling rig
(Standard operating radius)**

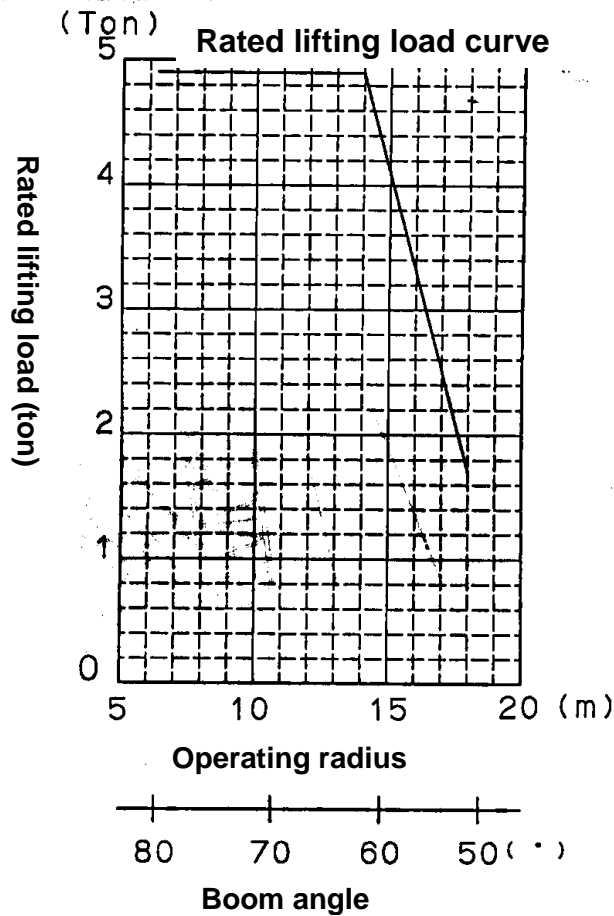


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7. Crane work (Auxiliary hook)

Rated lifting load table in crane work of ED6500

Operating radius	(m)	6.3	7.0	8.0	9.0	10.0	12.0	14.0	16.0	18.0
Boom angle	(°)	80.0	78.5	76.2	73.9	71.6	66.8	61.9	56.8	51.3
Rated lifting load	(t)	4.9	4.9	4.9	4.9	4.9	4.9	4.9	3.3	1.7



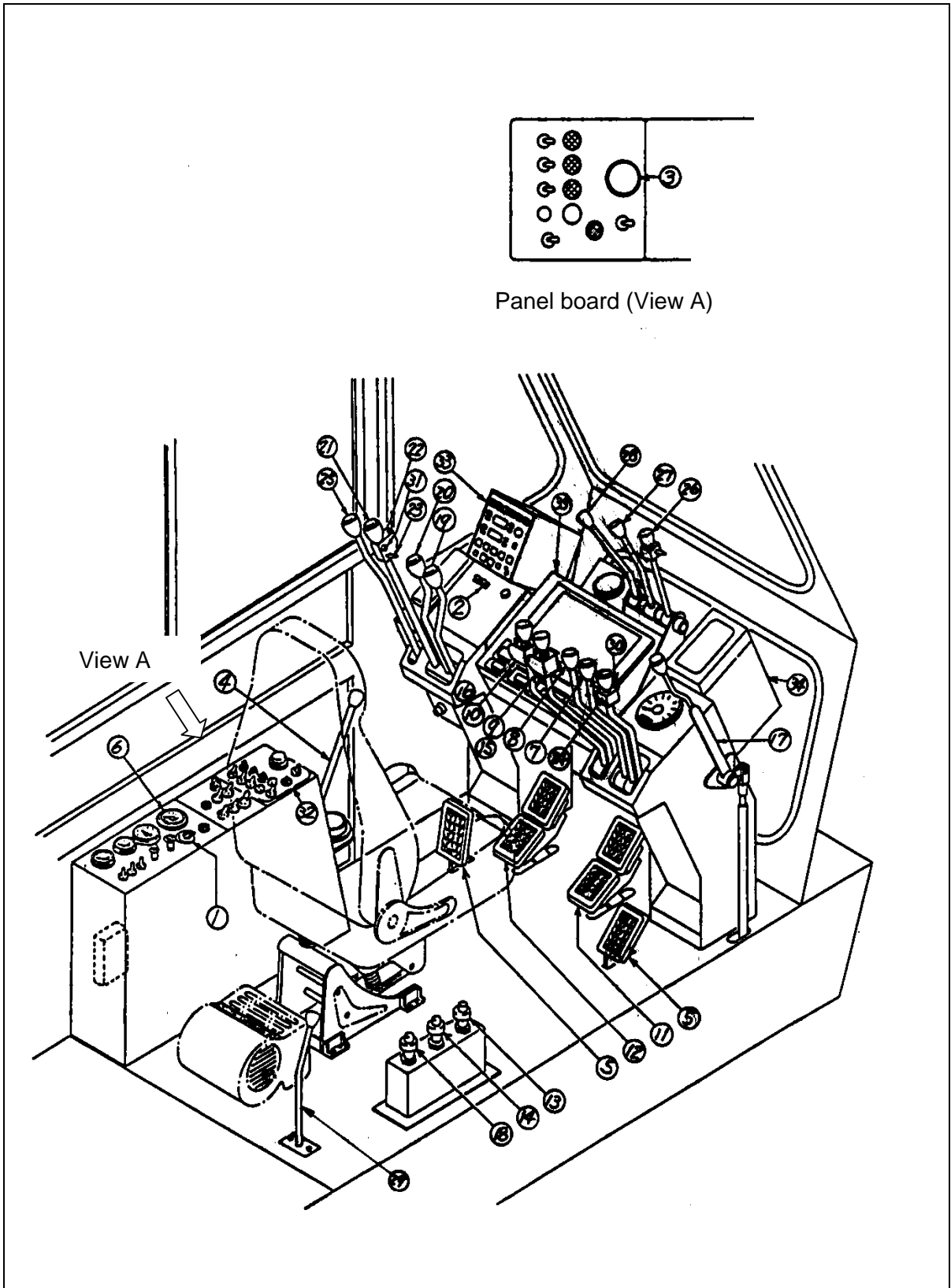
- Note 1 Auxiliary hook is used to lift up various materials as a stand pipe , reinforcement cage and tremie pipes, etc.
- Note 2 The rated lifting loads in the table are given when the machine is on firm and level surface without bucket and its kelly bar to be positioned to protrude approximately 5m 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.

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8. Instruments and controls (ED6500)

8.1 Instruments and controls in operator's room

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8.2 Name of instruments and controls in operator's room

Diesel engine controls

1. Starting switch
2. Engine lube. Oil pressure pilot lamp
3. Engine stop button
4. Acceleration lever
5. Acceleration pedal

Hydraulic control

6. Pilot circuit oil pressure gauge

Winch control

7. Main winch lever
8. Auxiliary winch lever
9. Main drum clutch lever
10. Auxiliary drum clutch lever
11. Main drum brake pedal
12. Auxiliary drum clutch lever
13. Main drum lock knob
14. Auxiliary drum lock lever
15. Main drum negative brake switch
16. Auxiliary drum negative brake switch

Boom control

17. Boom lever
18. Boom drum lock knob

Travelling control

19. R.H. travel lever
20. L.H. travel lever

Swing control

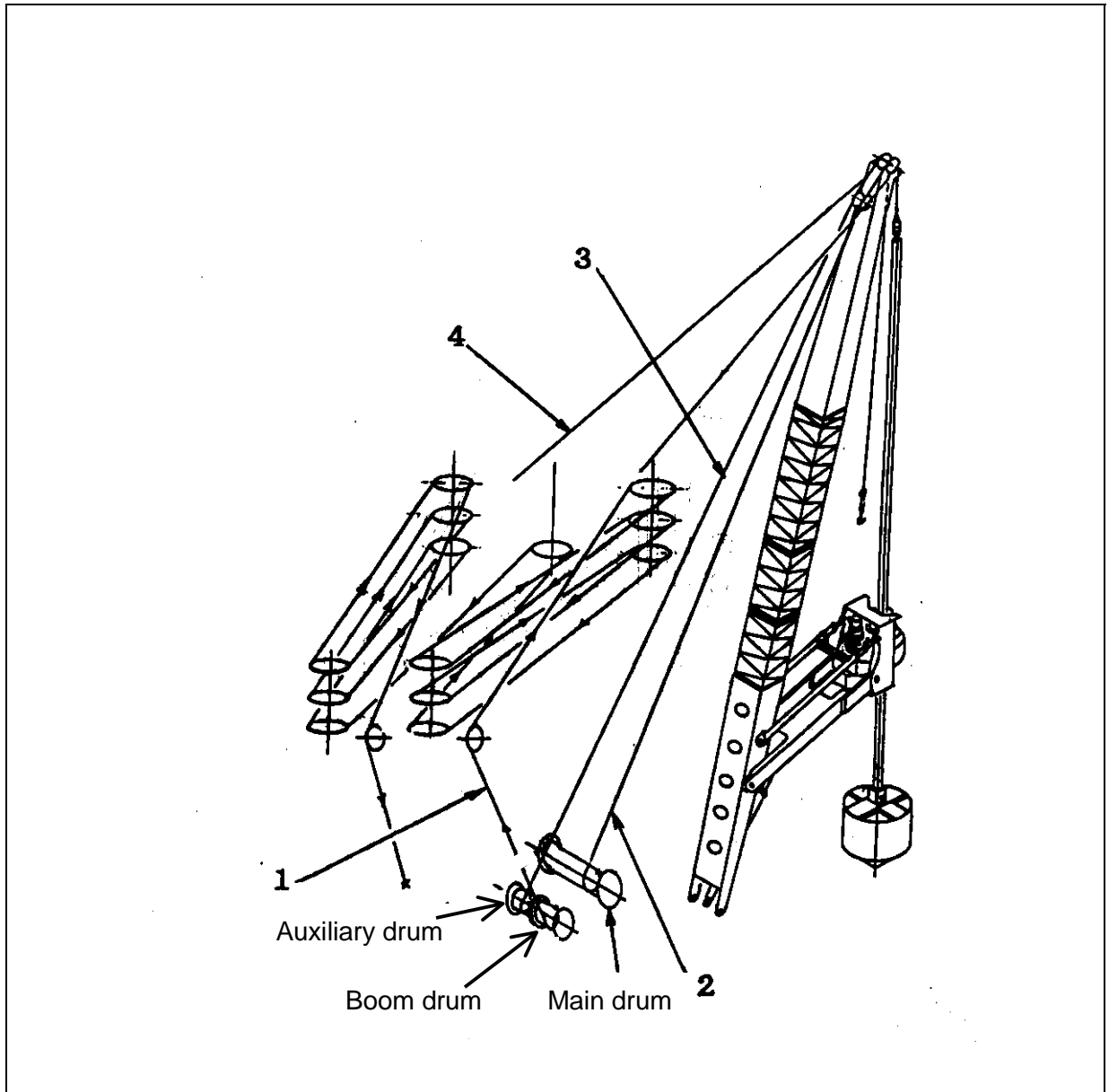
21. Swing lever
22. Swing brake switch
23. Swing lock switch

Front end attachments

24. Bucket rotation lever
25. Thruster lever
26. Front frame erecting lever
27. Kelly frame adjusting lever
28. Gantry cylinder level
29. Spanner lever
30. Bucket opening switch
31. Horn switch
32. Over-hoist preventive switch
33. Moment limiter(Optional)
34. Sight level meter
35. Monitor/recorder(Optional)

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9. Rope reeving chart



	Name of rope	Specification of rope	Rope dia.	Rope length
1	Boom hoist	XP IWRC 6 x WS(31) ordinary Z-twist C	16mm	185m
2	Kelly rope	Mono rope SP 3xF(ax40) ordinary Z-twist	28mm	120m
3	Aux. drum	IWRC 6xFi(29) Ordinary Z-twist C	20mm	70m
4	Pendant rope	IWRC 6xFi(29) Ordinary Z-twist C	37.5mm	1.5, 3, 6m

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10. Weight and dimensions for transportation

Description		Weight(t)	Dimensions L m x W m x H m	Remarks
Base machine	Base machine	41.08	8.27 x 3.30 x 3.28	With side frame, Without c-weight
		26.70	7.42 x 3.18 x 2.92	Without side frame c-weight
	Counterweight (1)	10.00	3.18 x 0.94 x 0.96	Lower
	Counterweight (2)	5.20	0.94 x 0.94 x 1.45	L.H.
	Counterweight (3)	4.80	0.87 x 0.94 x 1.45	R.H.
	Counterweight (4)	5.00	2.99 x 0.53 x 1.46	Rear
	Counterweight (5)	5.00	1.53 x 0.84 x 1.45	Middle
Front-end attachments	Lower boom	12.63	12.00 x 2.43 x 2.54	Back-stopper Front frame Cylinder
	Upper boom	1.89	6.47 x 1.51 x 1.64	Pendant ropes
	3m insert boom	0.68	3.14 x 1.51 x 1.71	Pendant ropes
	6m insert boom	1.15	6.14 x 1.51 x 1.71	Pendant ropes
	Kelly drive	6.00	2.76 x 2.24 x 1.75	Kelly frame
	Kelly bar	6.11	16.52 x 0.49 x 0.49	Swivel joint
	4.9t hook	0.06	1.00 x 0.25 x 0.18	
	Rotary table	1.90	2.40 x 1.50 x 1.76	
Rotary coupling	1.53	1.03 x 0.90 x 1.46		

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11 . STANDARD SCOPE OF SUPPLY

- 1) **Basic machine : model ED6500 1 unit**
equipped with
 - 10.00 + 5.20 + 4.80 + 5.00 + 5.00 ton counter weights
 - 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**
 - 26m lattice boom
 - Kelly drive + 5-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**