

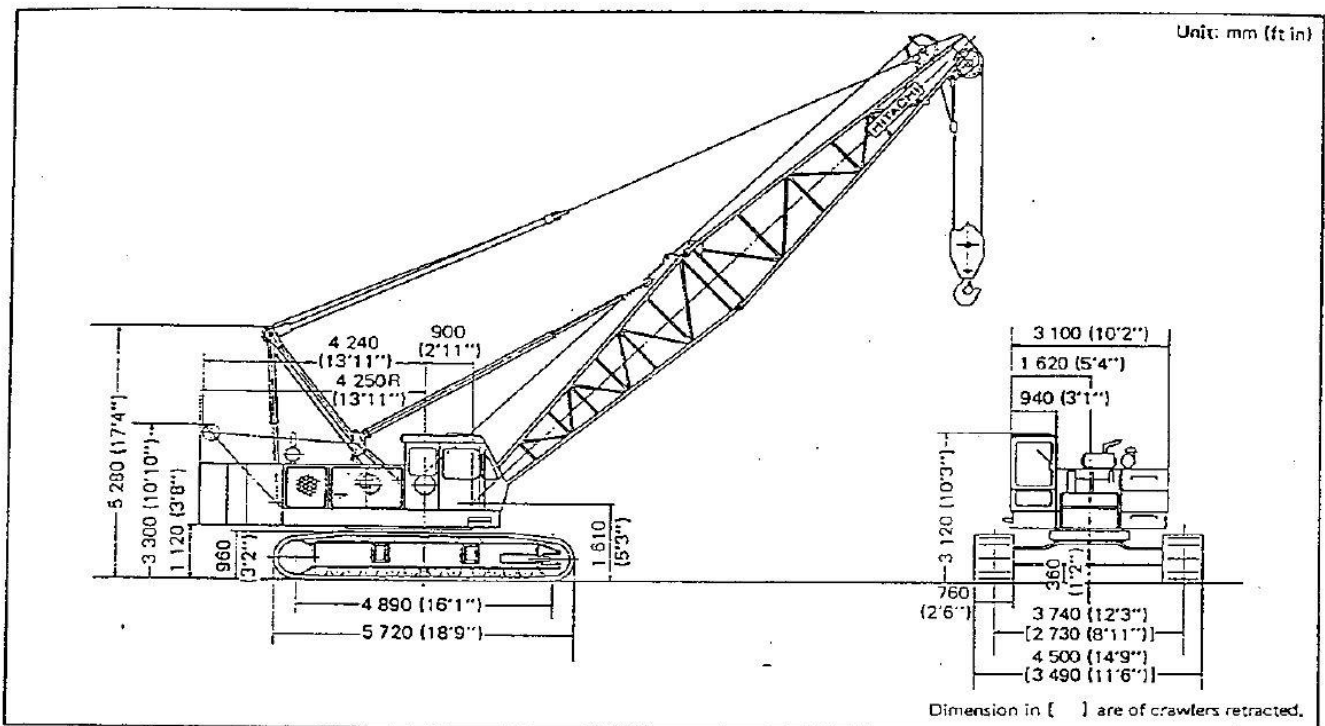


KH230-3

HYDRAULIC CRAWLER CRANE

Max Lifting Capacity: 60 000kg (132 200 lb) at 3.7m (12'2")

Dimensions



Specifications

Maximum rated load	60 000 kg (132 200 lb) at 3.7 m (12'2") working radius	
Boom	Basic boom length	13.0 m (42'8")
	Max. boom length	52.0 m (170'7")
	Jib length	9.0 m (29'6") to 18.0 m (59'1")
	Max. boom with jib length	64.0 m (210'0") [46.0 m (150'11") + 18.0 m (59'1")]
Swing speed	0 to 3.5 min ⁻¹ (0 to 3.5 rpm)	
Travel speed* -	0 to 1.1 km/h (0 to 0.68 mph)	
Gradeability	17° (30%)	
Ground pressure	0.75 bar (0.75 kgf/cm ² , 10.7 psi)	
Operating weight	Equipped with basic boom, 60 000 kg (132 200 lb) capacity hook and 22 800 kg (50 300 lb) counterweight	59 300 kg (130 700 lb)
Engine	Model	HINO EM100
	Rated horsepower	110 kW (150 PS) at 2 000 min ⁻¹ (2 000 rpm)

*Speeds may vary with load

HOOKS

Capacity	Weight	Number of hoist reaving and maximum rated loads										
		kg (lb)										
		10	9	8	7	6	5	4	3	2	1	
50 000 kg (132 200 lb)	800 kg (1 760 lb)	60 000 (132 200)	58 500 (129 000)	52 000 (114 600)	45 500 (100 300)	39 000 (86 000)	32 500 (71 600)	26 000 (57 300)	19 500 (43 000)	13 000 (28 700)		Standard
40 000 kg (88 200 lb)	410 kg (900 lb)					39 000 (86 000)	32 500 (71 600)	26 000 (57 300)	19 500 (43 000)	13 000 (28 700)		
20 000 kg (44 100 lb)	320 kg (710 lb)								19 500 (43 000)	13 000 (28 700)	6 500 (14 300)	Optional
6 500 kg (14 300 lb)	260 kg (570 lb)										6 500 (14 300)	

DRUMS

Dimensions

		Rope dia.	Width	Drum p.c.d.	Max. rope capacity
Winches	Main hoist drum	22 mm (0.866")	360 mm (14.17")	462 mm (18.19")	224 m (735')
	Aux. hoist drum	22 mm (0.866")	313 mm (12.32")	462 mm (18.19")	194 m (636')

(9th layer)

Line speed and line pull

		Max. line speed m/min (ft/min)				Effective line pull	@	Line speed	Max. starting line pull	Max. running line pull
		Hoisting		Lowering						
Winches	Main hoist drum	H	70 (230)	H	70 (230)	108 kN (11 000 kgf) (24 300 lbf)	@	34 m/min (112 ft/min)	140 kN (14 300 kgf) (31 600 lbf)	153 kN (15 600 kgf) (34 400 lbf)
		L	35 (115)	L	35 (115)					
	Aux. hoist drum	H	70 (230)	H	70 (230)	108 kN (11 000 kgf) (24 300 lbf)	@	34 m/min (112 ft/min)	140 kN (14 300 kgf) (31 600 lbf)	153 kN (15 600 kgf) (34 400 lbf)
		L	35 (115)	L	35 (115)					

H: High speed range L: Low speed range

Notes:

- Line speed and line pull are based on first layer of winding at rated engine rpm.
- Hoisting line speed varies with load.
- Line pull is based on a single line pull in high speed range.
- Effective line pull is equivalent to available line pull of mechanical drive winch.
- When hydraulic motor starts, since it is not rotating line pull is "Max. starting line pull". After motor rotating, the line pull becomes "Max. running line pull" shortly.

BOOM HOIST DRUM

Rope diameter	Hoisting line speed	Lowering line speed
16 mm (0.63")	60 m/min (197 ft/min)	60 m/min (197 ft/min)

Crane Ratings

BS Rating:

The rated loads are determined according to BS (British Standard; 1981) on the condition that the machine is stationed on firm, level ground.

PCSA Rating:

The rated loads listed are determined according to PCSA (Power Crane and Shovel Association in U.S.A.) and do not exceed 75% of tipping load on condition that the machine is stationed on firm, level ground.

JIS Rating:

The rated loads shown don't exceed 78% of tipping loads with the machine on firm level ground.

Tubular Chord Crane Boom in 360° Working Area

Boom length	Working radius		Boom angle	Rated load				
	m	ft in		BS rating		PCSA rating		JIS rating
m (ft in)	m	ft in	degree	kg	lb	kg	lb	kg
13.0 (42'8")	3.7	12' 2"	78.93	60 000	132 200	60 000	132 200	60 000
	4.0	13' 1"	77.57	55 450	122 200	55 450	122 200	55 450
	4.5	14' 9"	75.29	49 150	108 300	49 150	108 300	49 150
	5.0	16' 5"	72.99	44 100	97 200	44 100	97 200	44 100
	5.5	18' 1"	70.65	40 000	88 100	38 500	84 800	40 000
	6.0	19' 8"	68.27	34 850	76 800	33 500	73 800	34 850
	6.5	21' 4"	65.86	30 850	68 000	29 650	65 300	30 850
	7.0	23' 0"	63.39	27 650	60 900	26 550	58 500	27 650
	8.0	26' 3"	58.27	22 800	50 200	21 950	48 300	22 800
	9.0	29' 6"	52.84	19 350	42 600	18 650	41 100	19 350
	10.0	32' 10"	46.95	16 800	37 000	16 150	35 600	16 800
	12.0	39' 4"	32.76	13 200	29 100	12 700	27 900	13 200
	12.3	40' 4"	30.12	12 750	28 100	12 300	27 100	12 750
16.0 (52'6")	4.0	13' 1"	79.94	55 300	121 900	55 300	121 900	55 300
	4.5	14' 9"	78.11	49 000	108 000	49 000	108 000	49 000
	5.0	16' 5"	76.26	43 950	96 800	43 950	96 800	43 950
	5.5	18' 1"	74.40	39 800	87 700	38 400	84 600	39 800
	6.0	19' 8"	72.53	34 750	76 600	33 400	73 600	34 750
	6.5	21' 4"	70.63	30 750	67 700	29 550	65 100	30 750
	7.0	23' 0"	68.70	27 500	60 800	26 450	58 300	27 500
	8.0	26' 3"	64.77	22 700	50 000	21 800	48 000	22 700
	9.0	29' 6"	60.70	19 250	42 400	18 500	40 700	19 250
	10.0	32' 10"	56.45	16 650	36 700	16 000	35 200	16 650
	12.0	39' 4"	47.19	13 050	28 700	12 550	27 600	13 050
	14.0	45' 11"	36.17	10 650	23 400	10 250	22 500	10 650
	14.9	48' 11"	30.08	9 800	21 600	9 450	20 800	9 800
19.0 (62'4")	4.5	14' 9"	80.01	48 800	107 500	48 800	107 500	48 800
	5.0	16' 5"	78.47	43 800	96 500	43 800	96 500	43 800
	5.5	18' 1"	76.93	39 650	87 400	38 300	84 400	39 650
	6.0	19' 8"	75.37	34 650	76 300	33 300	73 400	34 650
	6.5	21' 4"	73.80	30 600	67 400	29 450	64 900	30 600
	7.0	23' 0"	72.21	27 400	60 400	26 350	58 000	27 400
	8.0	26' 3"	68.99	22 550	49 700	21 700	47 800	22 550
	9.0	29' 6"	65.70	19 100	42 100	18 350	40 400	19 100
	10.0	32' 10"	62.32	16 500	36 300	15 850	34 900	16 500
	12.0	39' 4"	55.19	12 900	28 400	12 400	27 300	12 900
	14.0	45' 11"	47.35	10 500	23 100	10 050	22 100	10 500
	16.0	52' 6"	38.31	8 750	19 200	8 450	18 600	8 750
	17.5	57' 5"	30.06	7 800	17 100	7 500	16 500	7 800
22.0 (72'2")	5.1	16' 9"	79.80	42 800	94 300	42 800	94 300	42 800
	5.5	18' 1"	78.74	39 550	87 100	38 250	84 300	39 550
	6.0	19' 8"	77.40	34 600	76 200	33 250	73 300	34 600
	6.5	21' 4"	76.06	30 550	67 300	29 400	64 800	30 550
	7.0	23' 0"	74.71	27 350	60 200	26 300	57 900	27 350
	8.0	26' 3"	71.98	22 500	49 600	21 650	47 700	22 500
	9.0	29' 6"	69.21	19 050	41 900	18 300	40 300	19 050
	10.0	32' 10"	66.38	16 450	36 200	15 800	34 800	16 450
	12.0	39' 4"	60.51	12 800	28 200	12 300	27 100	12 800
	14.0	45' 11"	54.27	10 400	22 900	10 000	22 000	10 400
	16.0	52' 6"	47.47	8 700	19 100	8 350	18 400	8 700
	18.0	59' 1"	39.80	7 400	16 300	7 100	15 600	7 400
	20.0	65' 7"	30.57	6 400	14 100	6 150	13 500	6 400
25.0 (82'0")	5.6	18' 4"	79.87	38 650	85 200	37 150	81 900	38 650
	6.0	19' 8"	78.94	34 500	76 000	33 200	73 100	34 500
	6.5	21' 4"	77.77	30 500	67 200	29 300	64 500	30 500
	7.0	23' 0"	76.59	27 250	60 000	26 200	57 700	27 250
	8.0	26' 3"	74.21	22 400	49 300	21 550	47 500	22 400
	9.0	29' 6"	71.81	18 950	41 700	18 200	40 100	18 950
	10.0	32' 10"	69.37	16 350	36 000	15 700	34 600	16 350
	12.0	39' 4"	64.35	12 700	27 900	12 200	26 800	12 700
	14.0	45' 11"	59.11	10 250	22 500	9 850	21 700	10 250
	16.0	52' 6"	53.56	8 550	18 800	8 200	18 000	8 550
	18.0	59' 1"	47.56	7 250	15 900	6 950	15 300	7 250
	20.0	65' 7"	40.90	6 250	13 700	6 000	13 200	6 250
	22.0	72' 2"	33.15	5 450	12 000	5 250	11 500	5 450
22.7	74' 6"	30.03	5 200	11 400	5 050	11 100	5 250	
28.0 (91'10")	6.1	20' 0"	79.93	33 550	73 900	32 250	71 000	33 550
	6.5	21' 4"	79.10	30 400	67 000	29 200	64 300	30 400
	7.0	23' 0"	78.05	27 150	59 800	26 100	57 500	27 150
	8.0	26' 3"	75.95	22 300	49 100	21 450	47 200	22 300
	9.0	29' 6"	73.82	18 850	41 500	18 100	39 900	18 850
	10.0	32' 10"	71.67	16 250	35 800	15 600	34 300	16 250
	12.0	39' 4"	67.28	12 600	27 700	12 100	26 600	12 600
	14.0	45' 11"	62.74	10 150	22 300	9 750	21 400	10 150
	16.0	52' 6"	58.00	8 450	18 600	8 100	17 800	8 450
	18.0	59' 1"	53.00	7 150	15 700	6 850	15 100	7 150
	20.0	65' 7"	47.63	6 150	13 500	5 900	13 000	6 150
	22.0	72' 2"	41.74	5 350	11 700	5 150	11 300	5 350
	24.0	78' 9"	35.05	4 650	10 200	4 550	10 000	4 700
25.3	83' 0"	30.02	4 300	9 470	4 200	9 250	4 350	

Boom length	Working radius		Boom angle	Rated load				
				BS rating		PCSA rating		JIS rating
				m	ft in	kg	lb	kg
49.0 (160'9")	9.8	32' 2"	79.90	12 950	28 500	15 500	34 100	16 100
	10.0	32'10"	79.66	12 850	28 300	15 050	33 100	15 650
	12.0	39' 4"	77.27	12 000	26 400	11 550	25 400	12 000
	14.0	45'11"	74.86	9 550	21 000	9 200	20 200	9 550
	16.0	52' 6"	72.41	7 750	17 000	7 500	16 500	7 800
	18.0	59' 1"	69.94	6 400	14 100	6 250	13 700	6 500
	20.0	65' 7"	67.42	5 350	11 700	5 250	11 500	5 450
	22.0	72' 2"	64.86	4 550	10 000	4 500	9 920	4 650
	24.0	78' 9"	62.24	3 850	8 480	3 850	8 480	4 000
	26.0	85' 4"	59.55	3 300	7 270	3 300	7 270	3 400
	28.0	91'10"	56.79	2 800	6 170	2 850	6 280	2 900
	30.0	98' 5"	53.93	2 400	5 290	2 450	5 400	2 450
	32.0	105' 0"	50.97	2 050	4 510	2 050	4 510	2 050
	34.0	111' 7"	47.87	1 700	3 740	1 700	3 740	1 700

Boom length	Working radius		Boom angle	Rated load				
				BS rating		PCSA rating		JIS rating
				m	ft in	kg	lb	kg
52.0 (170'7")	10.3	33'10"	79.93	11 050	24 300	14 350	31 600	14 900
	12.0	39' 4"	78.02	10 100	22 200	11 400	25 100	11 850
	14.0	45'11"	75.75	9 400	20 700	9 050	19 900	9 400
	16.0	52' 6"	73.46	7 600	16 700	7 350	16 200	7 650
	18.0	59' 1"	71.14	6 250	13 700	6 100	13 400	6 350
	20.0	65' 7"	68.79	5 200	11 400	5 150	11 300	5 350
	22.0	72' 2"	66.40	4 400	9 700	4 350	9 590	4 500
	24.0	78' 9"	63.97	3 700	8 150	3 700	8 150	3 850
	26.0	85' 4"	61.48	3 150	6 940	3 150	6 940	3 200
	28.0	91'10"	58.93	2 650	5 840	2 700	5 950	2 700
	30.0	98' 5"	56.31	2 250	4 960	2 250	4 960	2 250
	32.0	105' 0"	53.61	1 850	4 070	1 850	4 070	1 850
	34.0	111' 7"	50.81	1 550	3 410	1 550	3 410	1 550

Rated Load for Main Boom

Notes:

- The rated loads shown are based on the machine on firm level ground without traveling.
- The rated loads shown include the weight of all lifting attachments such as hook, bucket, etc. The load to be actually lifted will be the rated load minus the weight of all lifting attachments.
- The rated load for auxiliary jib hook is equal to that of main hook at the same working radius, but do not exceed maximum rated load 6 500 kg (14 300 lb).
- When the jib boom is attached to the main boom, the load to be actually lifted will be the rated load minus weight of jib boom.

Jib length	9.0 m (29'6")	13.5 m (44'4")	18.0 m (59'1")
Jib weight	1 350 kg (2 970 lb)	1 650 kg (3 630 lb)	1 950 kg (4 290 lb)

- When the auxiliary jib is attached to the main boom, the load to be actually lifted is the rated load minus auxiliary jib weight.
Auxiliary jib weight 360 kg (790 lb)
- The jib can be attached to boom of 31.0 m (101'9") to 46.0 m (150'11") long.
- The auxiliary jib can be attached to the main boom of 13.0 m (42'8") to 49.0 m (160'9") long.
- Counterweight is 22 800 kg (50 300 lb).

Rated Load for Jib

Maximum jib rating

Jib length		9.0 m (29'6")	13.5 m (44'4")	18.0 m (59'1")
Jib offset angle				
Max. rated load	10°	6 500 kg (14 300 lb)	6 500 kg (14 300 lb)	6 500 kg (14 300 lb)
	30°	6 500 kg (14 300 lb)	6 000 kg (13 200 lb)	4 200 kg (9 260 lb)

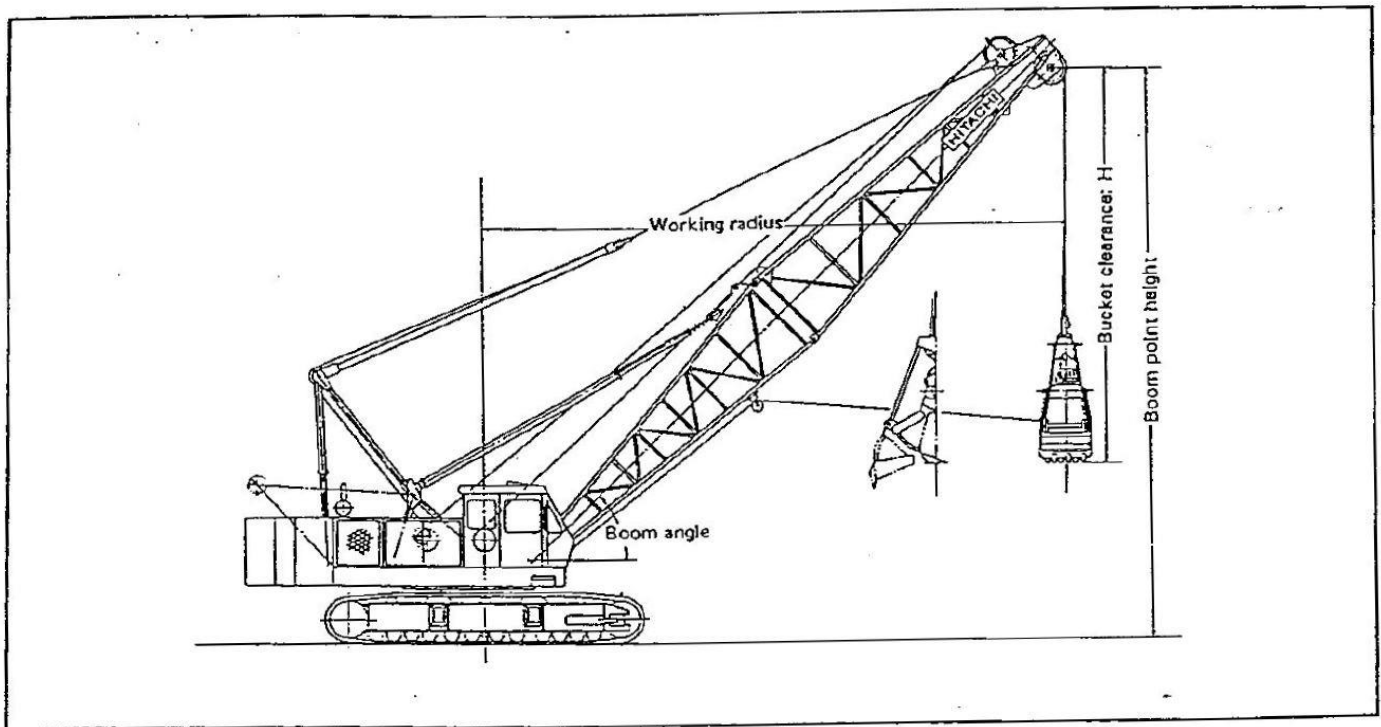
Notes:

- The rated load for jib is equal to that of the main boom at the same working radius, but should not exceed maximum jib ratings shown.
The jib offset angle to the main boom is under loaded condition.
- The maximum working radius of the jib do not exceed that of the main boom used.

CLAMSHELL

with Tubular CRANE Boom

Dimensions



Specifications

Max. rated load	5 500 kg (12 100 lb)
Bucket capacity	0.8 m ³ (1.0 cu yd) to 1.2 m ³ (1.57 cu yd)
Boom length	13.0 m (42'8") to 19.0 m (62'4")
Ground pressure	0.77 bar (0.77 kgf/cm ² , 10.9 psi)
Operating weight	60 600 kg (133 600 lb) When equipped with 13.0 m (42'8") boom and 1.0 m ³ (1.31 cu yd) bucket

The other specifications such as engine horsepower, drum data, swing speed, travel speed, etc. are same as crane basic machine. See page 1 – 2.

BUCKETS

Capacity	Self weight	Bucket clearance: H
0.8 m ³ (1.05 cu yd)	2 000 kg (4 410 lb)	5.4 m (17'9")
1.0 m ³ (1.31 cu yd)	2 450 kg (5 400 lb)	5.7 m (18'8")
*1.2 m ³ (1.57 cu yd)	2 400 kg (5 290 lb)	5.7 m (18'8")

*1.2 m³ (1.57 cu yd) bucket is light-duty service.



Boom

Tubular Chord CRANE Boom 1 400 mm (55") wide by, 1 400 mm (55") deep at connection, lattice construction, high tensile strength steel tubular chord.

- Basic boom 2-piece, total length 13.0 m (42'8"); upper section 6.5 m (21'4") and lower section 6.5 m (21'4").
- Boom point Offset boom point, 5 sheaves mounted on anti-friction bearings on boom peak, Sheave P.C.D. 520 mm (20.5") Std. winches
- Boom insert 3.0 m (9'10"), 6.0 m (19'8") and 9.0 m (29'6") long available with appurtenant pendants.
- Connection type Pin-connected
- Boom backstop Dual-rail, telescopic tubular construction with spring bumper.
- Boom hoist bridle Serves as connection between pendants and boom hoist wire rope reeving, equipped with 6 sheaves (340 mm (13.4") p.c.d.) for 12-part boom hoist wire rope reeving.

Crane Jib 510 mm (20") wide by 540 mm (21") deep at connection, lattice construction, high tensile strength steel tubular chord.

- Basic jib 2-piece, total length 9.0 m (29'6"), upper section 4.5 m (14'9"), and lower section 4.5 m (14'9").
 - Jib point 1 sheave (520 mm (20.5") p.c.d.) mounted on anti-friction bearings on jib peak.
 - Jib insert 4.5 m (14'9") long available.
 - Connection type Pin-connected
 - Auxiliary jib Optional
- Attachable to main boom top for hoisting lightweight load quickly with a single rope used.

Note: Boom insert, crane jib, or auxiliary jib can be attached to the basic boom when needed. However both, crane jib and auxiliary jib cannot be attached simultaneously to the boom and used.



Operator's Cab

All-weather, well-ventilated, all-round visibility, roomy operator's cab. The completely independent cab is insulated against noise and vibration. Sliding, fold-in front window swings up and stores in roof. Fully adjustable reclining seat.



UNDERCARRIAGE

Traction mechanism Each track is driven by a bent axis motor through reduction gear. This mechanism allows counter-rotation of tracks for maximum maneuverability in close quarters. When lever is at neutral position, both hydraulic brake and spring-set/hydraulic-released multiplate disc brake are automatically actuated to effect reliable stopping. Upper and lower rollers, sprockets and idlers are lifetime-lubricated. A hydraulic track adjuster is provided for easy tension adjustment of each track.

Track Frame All-welded, stress relieved, box section construction.

Side Frame Side frames of all-welded construction can be retracted for transportation.

Side Frame Extending/Retracting Device Side frame extending/retracting is done with the cylinder provided inside the track frame. Hydraulic power source for this extending/retracting cylinder is common with that for the left track. All that's required is to operate the switching valve installed inside the track frame and shift the left travel lever. Then, side frame extending/retracting can easily be done in a short time eliminating troublesome piping, etc.

Track Link Disengaging Prevention Device Track link disengaging prevention device goes up and down together with the track link to prevent it from coming off.

Track Shoes Heat treated alloy steel castings with induction hardened roller path and driving lugs. Shoes are connected by induction-hardened steel pins.

No. of upper rollers (on each side)	3
No. of lower rollers (on each side)	12
No. of track shoes (on each side)	61
Shoe width	760 mm (30")

H HYDRAULIC SYSTEM

2 variable displacement piston pumps + 1 gear pump hydraulic system allows both independent and combined operations of all functions. Variable-displacement piston pumps not only adequately control operating speeds, but also utilize engine horsepower to maximum.

	Pump-1	Pump-2
Type of pump	Variable displacement pump	
Pressure setting	300 bar (300 kgf/cm ² , 4 270 psi)	300 bar (300 kgf/cm ² , 4 270 psi)
Oil flow	200 l/min (44.0 Imp gpm, 52.7 U.S. gpm)	200 l/min (44.0 Imp gpm, 52.7 U.S. gpm)
	Pump-3	Pump-4
Type of pump	Gear pump	
Pressure setting	210 bar (210 kgf/cm ² , 2 990 psi)	45 bar (45 kgf/cm ² , 640 psi)
Oil flow	134 l/min (29.5 Imp gpm, 35.0 U.S. gpm)	32 l/min (7.0 Imp gpm, 8.4 U.S. gpm)

Main and Auxiliary Hoist Motor (Common Motor)

Swash plate type axial piston motor with counterbalance valve.

Boom Hoist Motor Bent axis motor with counterbalance valve.

Swing Motor Axial piston motor with brake valve and spring-set/hydraulic-released multiplate disc brake.

Travel Motor Bent axis motor with brake valve and spring-set/hydraulic-released multiplate disc brake.

Relief and Brake Valves Each hydraulic circuit incorporates large-capacity relief valves to protect circuit from overload or shock load. Counterbalance valves (compensates safe, positive pad lowering and prevents accidental load drop when hydraulic power is suddenly reduced) are provided for hoist motor. Brake valves (consisting of relief valve and counterbalance valve) are provided for travel circuit.

Pressure Setting

MAIN CIRCUIT

- Main relief valves
 - Hoist (main and aux.) 300 bar
(300 kgf/cm², 4 270 psi)
 - Swing 210 bar
(210 kgf/cm², 2 990 psi)

- Overload relief valves
 - Hoist (main and aux.) circuit 305 bar
(305 kgf/cm², 4 340 psi)
 - Boom hoist circuit 265 bar (265 kgf/cm², 3 770 psi)
 - Travel circuit 280 bar (280 kgf/cm², 3 980 psi)

PILOT CIRCUIT

- Main relief valve 45 bar (45 kgf/cm², 640 psi)

Line Filters High filtration 10 μ full-flow filter element is provided to keep hydraulic oil clean and ensure long-term, trouble-free operation. Pilot filter and suction filter are provided for each circuit.



CONTROLS

Boom, Main and Auxiliary Hoist and Travel Remote controlled hydraulic servo. Working speed can be precisely controlled by changing lever stroke.

Swing Mechanical linkage type.

Fuel Control Two foot throttle (accelerator) pedals and hand throttle (accelerator) controls equipped as standard.

