



NIPPON GROVE

TMS 3500

HEAVY DUTY
HYDRAULIC CRANE

TRAPEZOIDAL BOOM SERIES

POWER
&
UTILITY



 SHOWA AIRCRAFT IND. CO., LTD.

THE GROVE **TRAPEZOIDAL*** BOOM

A Long Reach Boom of Superior Strength and Capacity

The most advanced heavy duty, extremely mobile, hydraulic crane . . . equipped with the popular GROVE TRAPEZOIDAL* telescoping boom designed for heavy rigging . . . and precise long boom work.

TRAPEZOIDAL* BOOM

The GROVE TRAPEZOIDAL* BOOM represents the best concepts in hydraulic boom design. The high strength-to-weight ratio enables the GROVE TRAPEZOIDAL* BOOM to deflect less and achieve greater capacity with fully extended boom at any working radii compared to conventional rectangular booms. Each extendable section of boom has an independent hydraulic cylinder. Extension and retraction are controlled by only one lever in the operator's cab.

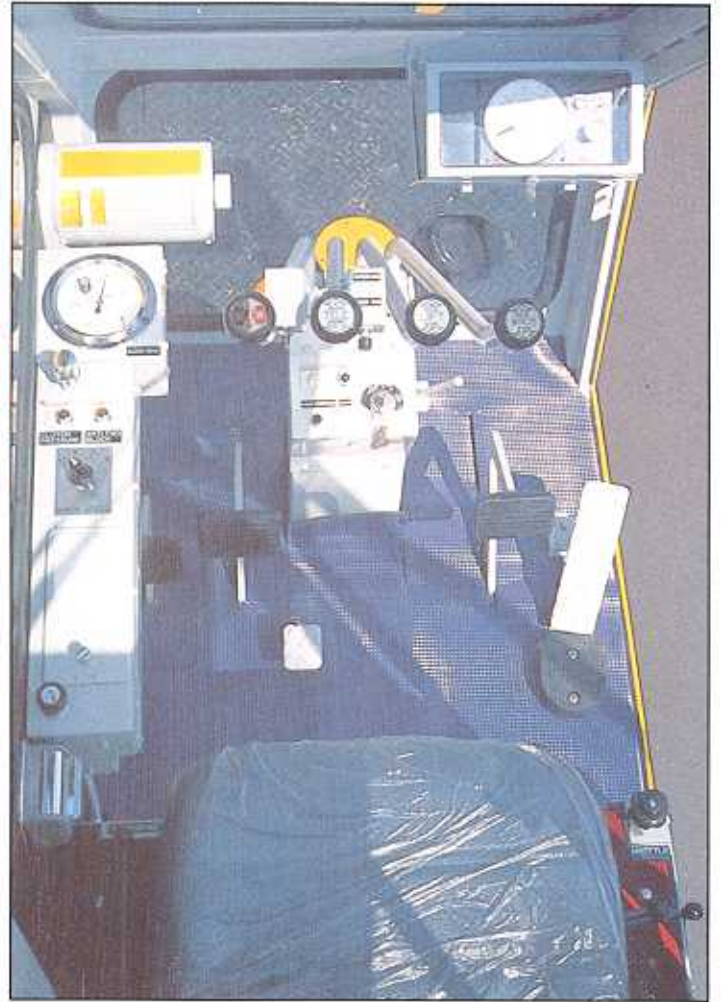
* THE GROVE TRAPEZOIDAL BOOM IS A PATENTED GROVE FEATURE.





DESIGNED FOR SAFETY AND EFFICIENCY

OPERATOR'S CAB features fully visibility and easy operation. The interior of the all steel cab is designed for operator efficiency, convenience and comfort. The tilt back control lever stand and tilting back rest give the operator better visibility for the entire duty cycle at both high and low boom angle positions. Other features include outrigger jack controls, full engine controls, rear window, tinted skylight and sliding side window for additional ventilation.



FOUR SPEED HOIST — Driven by a single high torque radial piston motor. The hoist features grooved tandem drums, individual power clutches, and automatic spring loaded brakes. With turn of the selector switch, operator can select any line speed up to maximum of 160 m/min, even while hoisting or power lowering operation without shock. Free fall of the main and auxiliary hoists with foot pedal control is standard equipment.



FOUR SECTION HYDRAULIC OIL PUMPS — Two dual section gear type pumps driven from front of carrier engine have a air assisted pump disconnect operated from carrier cab for efficient road travel.



"SWINGAROUND" LATTICE JIB

The "SWINGAROUND" lattice jib for the TMS3500 stows conveniently beside the boom base section and swings quickly into working position.

 **SHOWA AIRCRAFT IND. CO., LTD.**

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Telephone: Tokyo 279-1453 Telex: 222-3766

*Licensed by
Grove Manufacturing Company
a division of Kidde, Inc.*

Distributor:

NIPPON GROVE

FULL HYDRAULIC

CARRIER-MOUNTED CRANE

MODEL TMS 3500 SERIES-II 41 M/TON CAP

SUPERSTRUCTURE SPECIFICATIONS

BOOM — 10.3m — 31.6m (33.8 ft. — 103.7 ft.) 4 section, full power sequence telescoping trapezoidal sections; Integral holding valves on each telescoping cylinder. Boom telescope sections are supported on anti-friction wear pads.

Side adjustable wear pads prevent metal to metal contact of inner boom sections.

JIB* — 9.3m — 15.0m (30.5 ft. — 49.2 ft.) telescopic swing around, stowed on left side of base boom. 5.7 m (18.7 ft.) rectangular roller mounted extension is manually extended and retracted from within 9.3m (30.5 ft.) lattice base section. Offset angle 5 degrees.

BOOM NOSE — Five sheaves, 342mm (13.5 in.) tread dia., mounted on roller bearings. Removable pin type rope guards allow easy reeving.

AUXILIARY BOOM NOSE* — Single 342mm tread dia. sheave mounted to the main boom nose for single line work.

BOOM ELEVATION — Dual double acting hydraulic cylinders with integral holding valves, elevation from -3° to 80° .

Combination controls provided for hand or foot operation.

MAX. LIFTING HEIGHT — Main boom — 31.8m
Extended jib — 46.2m

HOIST — Tandem-drums 4 speeds main and auxiliary hoists are driven by 2 speeds hydraulic radial piston motor through two stage spur gear reduction. Both hoist drums are controlled by individually engaged internal expanding clutches powered by an accumulator and individually actuated spring loaded automatic external band brakes. Both power lowering and free fall are available for main and auxiliary hoists.

Line speed can be changed up to 160m/min., (525FPM), even during heavy load hoisting and/or lowering operation without shock.

Drum dimensions:	dia.	342mm (13.5 in.)
(Main & aux.)	length	643mm (25.3 in.)
	flange dia.	590mm (23.2 in.)

Max. single line speed (at 4th layer):

51m/min (167FPM) —	1st speed
80m/min (262FPM) —	2nd speed
102m/min (334FPM) —	3rd speed
160m/min (525FPM) —	4th speed

Max. single line pull (at 1st layer):

5.93 ton (13,075 lbs.) at 1st & 2nd speeds
2.97 ton (6,539 lbs.) at 3rd & 4th speeds

WIRE ROPE* — 18mm dia. (Normal) Please consult distributor for option.

LOAD METER* — Electric load meter is consist of three roller type rope tension detector with load cell and load scale is changeable.

RATED LOAD INDICATOR* — Indicate rated lifting load correspond to each boom length and boom angle.

CAB — Full vision, all steel, fully enclosed, safety glass windows throughout, mounted on turn-table right side. Control lever stand is tilt back adjustable and combination hand and foot controls are provided for boom elevation and engine throttle.

Outrigger jack cylinder control switches. Adjustable operator's seat with tilting back-rest.

Engine start and stop switch, electric windshield wiper, swing horn, door lock, dome-light and dash-light. Kerosene heater, defroster fan and radio (Opt.).

SWING — Ball bearing swing circle, 360° continuous rotation.

Hydraulic radial piston motor drive, planetary gear reduction free swing with cushion valve. Dry disc type swing brake operated by foot pedal and hand lever. Swing speed 2.0 R.P.M.

OUTRIGGER — Double box telescoping beams and vertical jack cylinders with integral holding valves. Beams extend to 5.8m (19 ft.) and retract to 2.5m (8.2 ft.) centerline-to-centerline.

HYDRAULIC SYSTEM:

RESERVOIR — 600 l (158 gallon) all steel welded construction with integral baffles, clean out access and exterior oil sight level.

PUMP — 2 section gear type driven from transmission P.T.O. and 2 section gear type driven from fly wheel P.T.O., pump disconnect operated from carrier cab, combined capacity 580l/min. (153 gallon)

CONTROL VALVES — Precision four-way, double acting with integral relief valves.

Four individual valve banks permit independent control of four crane functions simultaneously.

Maximum operating pressure 200kg/cm² (2,845PSI).

OIL COOLER — Electric motor drive, fin and tube.

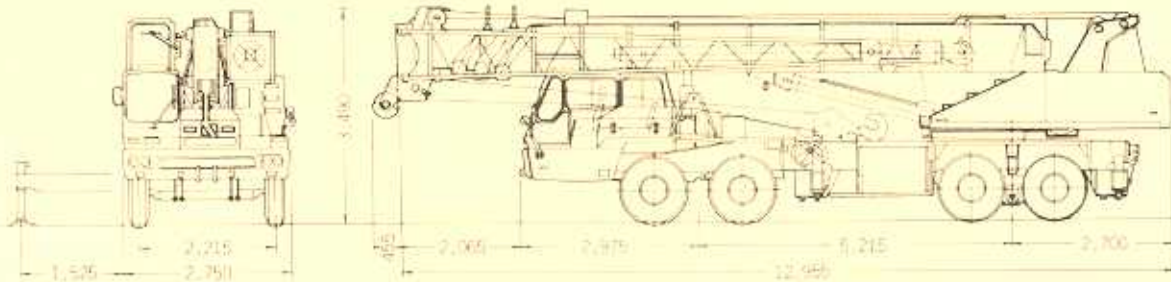
POWER DISTRIBUTION — (Main & Aux. Hoist), (Lift), (Telescope, Hoist Boost), (Swing, Outrigger).

* denotes optional equipment

DIMENSIONS

- Overall Length : Approx. 12,955mm
 Overall Width : Approx. 2,750mm
 Overall Height : Approx. 3,490mm

Unit: mm



CARRIER SPECIFICATIONS

Make and Model	: NISSAN DIESEL MOTOR CO Model KG51T (8 x 4)	Steering	: Ball nut type with hydraulic booster
Wheel Base	: 1,470mm+3,780mm+1,400mm	Service Brakes	: 2 system air for all 8 wheels (Std.) and spring brake for 4 rear wheels (Opt.)
Engine		Parking Brake	: Manual operated internal expanding type positioned behind transmission
Model	: NISSAN RD8	Suspension	
Max. Out-put	: 300 PS/2,500 r.p.m.	Front	: Independent leaf spring (Std.), Equalized load sharing leaf spring (Opt.)
Max. Torque	: 100 kg-m/1,400 r.p.m.	Rear	: Torque rod and equalizer beam type
Air Filter	: Dual-element dry-paper with precleaner	Cab	: Full vision, all steel, fully enclosed, safety glass windows throughout, two men tandem seat, mounted on front right side carrier (Std.)
Fuel Capacity	: 300 liters (79.3 gallon)	Max. Rd. Speed	: 74 km/h (46 m.p.h.)
Electric System	: 24 volt	Gradeability (tan θ)	: 0.46
Clutch	: Single disc, dry type with clutch booster	Turning radius	: 11.8m (38.7 ft.)
Clutch Control	: Air servo hydraulic control system with booster	G.V.W.	: Approx. 36 ton
Transmission			
Main & Aux.	: Synchromesh 9 speeds forward and 1 reverse		
Front Axle	: Dual non-drive with boosted steering		
Rear Axle	: Tandem drive with differentials and interaxle differential		
Tires			
Front (4)	: 12.00-20-18 PR - Rib pattern		
Rear (8)	: 12.00-20-18 PR - Lug pattern		

Note: Specification are subject to be changed without notice.

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FULL HYDRAULIC

CARRIER-MOUNTED CRANE

MODEL TMS 3500 SERIES-II 41 M/TON CAP

RATED LIFTING CAPACITIES IN KILOGRAMS

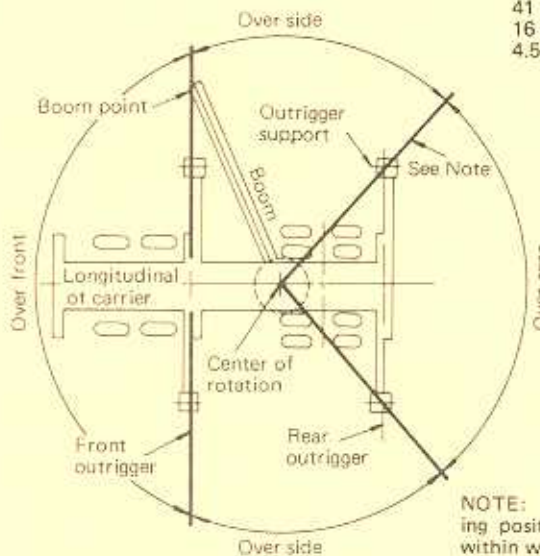
Radius in Meters	Main Boom Capacities On Outrigger Fully Extended												On Rubber	
	Over Rear				Over Side				Over Front & 360°				Just Over Rear	
	Boom Length (m)				Boom Length (m)				Boom Length (m)				Boom Length (m)	
	10.3	17.4	24.5	31.6	10.3	17.4	24.5	31.6	10.3	17.4	24.5	31.6	10.3	17.4
3.0	41,000 (67.5)	23,500 (77.5)			41,000 (67.5)	23,500 (77.5)			24,000 (67.5)	16,000 (77.5)			10,000	10,000
3.5	35,500 (64.5)	23,500 (75.5)			35,500 (64.5)	23,500 (75.5)			24,000 (64.5)	16,000 (75.5)			8,700	8,700
4.0	31,200 (61.5)	23,500 (74.0)	15,000 (79.0)		31,200 (61.5)	23,500 (74.0)	15,000 (79.0)		24,000 (61.5)	16,000 (74.0)	11,000 (79.0)		7,500	7,500
4.5	27,800 (58.0)	23,000 (72.0)	15,000 (78.0)		27,800 (58.0)	23,000 (72.0)	15,000 (78.0)		21,500 (58.0)	16,000 (72.0)	11,000 (78.0)		6,400	6,400
5.0	24,600 (55.0)	21,500 (70.5)	15,000 (77.0)		24,600 (55.0)	21,500 (70.5)	15,000 (77.0)		18,800 (55.0)	16,000 (70.5)	11,000 (77.0)		5,500	5,500
6.0	20,800 (47.5)	18,000 (67.0)	15,000 (74.5)	10,000 (79.0)	20,800 (47.5)	18,000 (67.0)	15,000 (74.5)	10,000 (79.0)	13,300 (47.5)	11,800 (67.0)	11,000 (74.5)	7,000 (79.0)	4,000	4,000
7.0	16,200 (39.5)	15,000 (63.0)	13,700 (72.0)	10,000 (77.0)	16,200 (39.5)	15,000 (63.0)	13,700 (72.0)	10,000 (77.0)	9,800 (39.5)	9,300 (63.0)	9,000 (72.0)	7,000 (77.0)	3,000	3,000
8.0	12,800 (30.0)	12,200 (59.0)	12,000 (69.5)	10,000 (75.0)	12,800 (30.0)	12,200 (59.0)	12,000 (69.5)	10,000 (75.0)	7,500 (30.0)	7,400 (59.0)	7,400 (69.5)	7,000 (75.0)	2,100	2,100
9.0	10,100 (15.0)	10,100 (55.5)	10,000 (67.0)	9,000 (73.5)	10,100 (15.0)	10,100 (55.5)	10,000 (67.0)	9,000 (73.5)	5,500 (15.0)	5,900 (55.5)	6,000 (67.0)	6,000 (73.5)	1,500	1,500
10.0		8,100 (51.5)	8,450 (64.5)	8,100 (71.5)		8,100 (51.5)	8,450 (64.5)	8,100 (71.5)		4,500 (51.5)	4,800 (64.5)	5,000 (71.5)	1,000	1,000
12.0		5,650 (42.5)	6,000 (59.0)	6,550 (67.5)		5,650 (42.5)	6,000 (59.0)	6,550 (67.5)		2,700 (42.5)	3,000 (59.0)	3,300 (67.5)		
14.0		3,950 (31.5)	4,600 (53.5)	5,000 (63.5)		3,950 (31.5)	4,300 (53.5)	4,950 (63.5)		1,500 (31.5)	1,900 (53.5)	2,200 (63.5)		
16.0		2,550 (14.0)	3,400 (47.0)	4,000 (59.0)		2,550 (14.0)	3,100 (47.0)	3,800 (59.0)		600 (14.0)	1,100 (47.0)	1,400 (59.0)		
18.0			2,400 (40.5)	3,200 (55.0)			2,200 (40.5)	2,850 (55.0)			500 (40.5)	900 (55.0)		
20.0			1,700 (33.0)	2,500 (50.0)			1,450 (33.0)	2,200 (50.0)				500 (50.0)		
22.0			1,100 (22.0)	1,800 (45.5)			850 (22.0)	1,550 (45.5)						
24.0				1,300 (40.0)				1,150 (40.0)						
26.0				900 (33.5)				750 (33.5)						
28.0				650 (25.5)				450 (25.5)						

NOTE: Boom Angle (degrees) in reference, required for given lift appears below the load.

Jib Capacities On Outrigger Fully Extended				
Boom Angle in Degrees	Over Rear		Over Side	
	Jib Length (m)	Jib Length (m)	Jib Length (m)	Jib Length (m)
	9.3	15	9.3	15
80.0	4,500 (8.0)	2,700 (10.0)	4,500 (8.0)	2,700 (10.0)
78.0	4,200 (9.5)	2,700 (11.5)	4,200 (9.5)	2,700 (11.5)
75.0	3,650 (11.5)	2,300 (14.0)	3,650 (11.5)	2,300 (14.0)
70.0	2,650 (15.0)	1,800 (18.0)	2,650 (15.0)	1,800 (18.0)
65.0	2,000 (18.0)	1,450 (21.5)	2,000 (18.0)	1,450 (21.5)
60.0	1,600 (21.5)	1,200 (25.5)	1,600 (21.5)	1,200 (25.5)
55.0	1,200 (24.0)	750 (28.5)	1,050 (24.0)	750 (28.5)
50.0	750 (27.0)	400 (31.0)	600 (27.0)	400 (31.0)

NOTE: Working Radius (meters) in reference, required for given lift appears below the load.

LIFTING AREA DIAGRAM

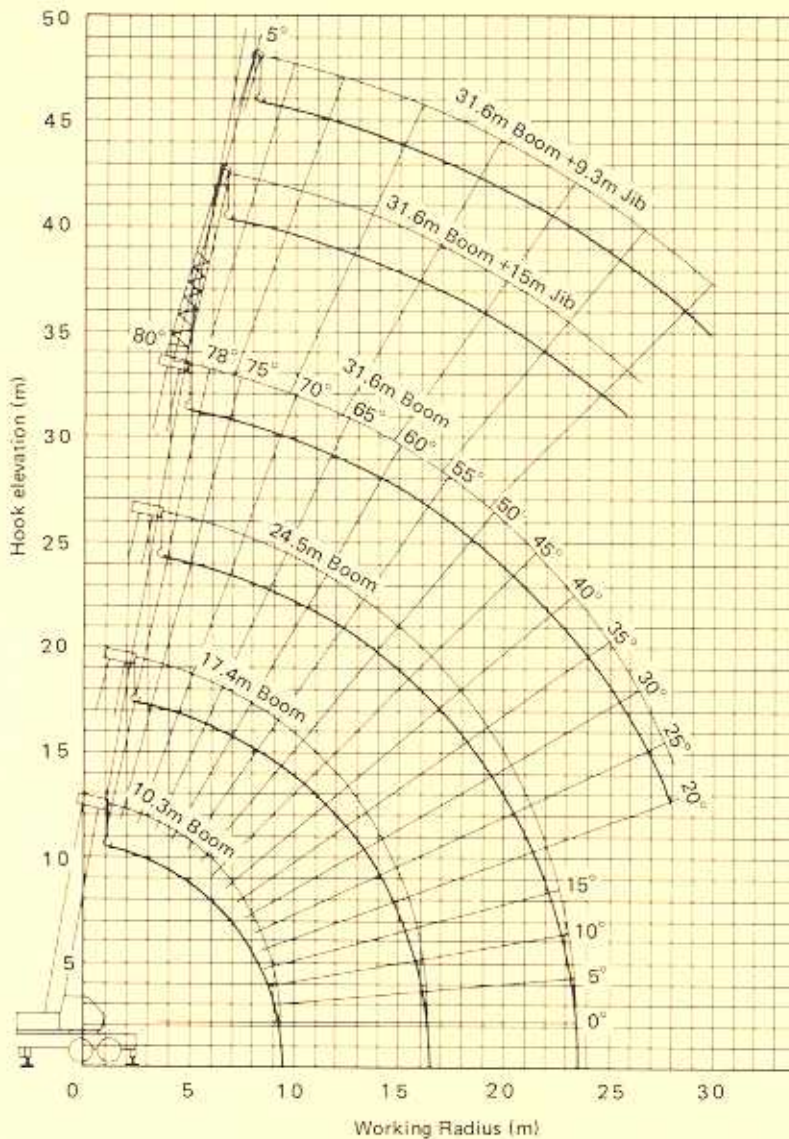


HOOK WEIGHT

41 tonne 5 sheave hook block 450 kg
16 tonne 2 sheave hook block 200 kg
4.5 tonne headache ball 100 kg

NOTE: Bold lines determine the limiting position of any load for operation within working areas indicated.

TMS 3500 RANGE DIAGRAM



NOTE:

1. Rated lifting capacities are based on freely suspended loads. They are the maximum covered by the manufacturer's warranty with the machine levelled and standing on a firm supporting surface. Ratings with outriggers are based on outriggers being extended to their maximum positions and tires raised free of crane weight before extending the boom or lifting loads.
2. Capacities shown within bold line area (**□**) are based on structural strength and tipping should not be relied upon as a capacity limitation. Capacities appearing below bold line are based on machine stability. Operation is not intended or approved for any conditions outside of those shown hereon.
3. Rated loads include the weight of hook block, and auxiliary lifting devices.
4. Maximum rating on rooster sheave is 4500kg.
5. Deduct 150kg from main boom ratings when headache ball is suspended under rooster sheave.
6. Deduct 1500kg from main boom ratings when 9.3m jib erected. Deduct 1700kg from main boom ratings when 15m jib erected.
7. Do not lower the boom below 50 degrees when jib erected.

ADDITIONAL NOTES FOR "OVER FRONT AND 360°" LIFTING

8. All capacities are based on stability.
9. Any jib operations are not permitted.
10. Do not lower the boom below 45 degrees when boom fully extended.

ADDITIONAL NOTES FOR "ON RUBBER" LIFTING

11. Capacities are applicable only with machine on firm level surface.
12. "ON RUBBER" lifting depends on proper tire inflation (690kPa, 100psi), capacity and condition.
13. "ON RUBBER" operation is only permitted directly over rear using main boom lengths 10.3m to 17.4m.
14. For "PICK AND CARRY" operation, boom must be centered over rear of machine, swing lock pin engaged and load should be restrained from swinging. "ON RUBBER" loads may be transported at maximum vehicle speed of 4km/hr on a firm and level surface only.

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