



**GROVE**  
**CRANE**

A GROVE WORLDWIDE COMPANY

# AP410

**Material Handling Hydraulic Crane**



# Superstructure specifications

<b>Boom</b>	10.5 ft. to 24 ft. (3.2m - 7.3m) three section Trapezoidal full power boom. Telescoping is mechanically synchronized with single lever control. Telescopic sections slide on adjustable and replaceable low friction wear pads. Maximum Tip Height: 29 ft. (8.8m).
<b>*Optional Boom</b>	12.5 ft. to 30 ft. (3.8m - 9.1m) three section Trapezoidal full power boom. Telescoping is mechanically synchronized with single lever control. Telescopic sections slide on adjustable and replaceable low friction wear pads. Maximum Tip Height: 35 ft. (10.7m).
<b>Swingaway Extension</b>	10 ft. (3.05m) swingaway boom extension with offset links, stows alongside base boom section when not in use. Offsettable at 0° or 45°. Maximum Tip Height: 39 ft. (11.9m) with 24 ft. (7.3m) boom; 45 ft. (13.7m) with 30 ft. (9.1m) boom.
<b>*Optional Telescopic Swingaway</b>	10 ft. to 15.7 ft. (3.05m to 4.8m) telescopic swingaway extension with offset links, offsettable at 0° or 45°. Stows alongside base boom section when not in use. Maximum Tip Height: 44 ft. (13.4m) with 24 ft. (7.3m) boom; 50 ft. (15.2m) with 30 ft. (9.1m) boom.
<b>Boom Nose</b>	Two lower steel sheaves and one idler sheave mounted on bronze bushing with removable pin-type rope guards.
<b>*Optional Searcher Hook</b>	3,000 lbs. (1316 kg) capacity, boom nose mounted.
<b>Boom Elevation</b>	Single double acting hydraulic cylinders with integral holding valve provides elevation from 0° to 70°.
<b>Load Moment &amp; Anti-Two Block System</b>	Standard load moment and anti-two block system with audio-visual warning and control lever lockout. These systems provide electronic display of boom angle, length, radius, tip height, relative load moment, maximum permissible load, load indication and warning of impending two-block conditions.
<b>Cab</b>	Standard frame mounted control station includes all crane function and driving controls, engine monitoring instrumentation and deluxe fabric seat with seat belt. Standard full vision, all steel fabricated enclosed cab with tinted safety glass throughout. Dash panel incorporates gauges for all engine functions. Other features include skylight, sliding left & right side windows, electric windshield washer-wiper, circulating air fan and fire extinguisher. Also available: *sound suppression kit, *hot water heater and forced air defroster.
<b>Swing</b>	Ball bearing swing circle with 360° continuous rotation. Grove planetary glide-swing with automatic type multi-disc brake. Maximum speed: 1.5 RPM.
<b>Counterweight</b>	Integral with superstructure. 2,100 lbs. (952kg).

## HYDRAULIC SYSTEM

<b>Pumps</b>	2 main gear pumps, combined capacity 54.4 G.P.M. (205.7 LPM) driven by carrier engine through P.T.O.
<b>Valves</b>	Precision four way double acting control valves, 2 individual valve banks permit simultaneous control of two crane functions.
<b>Filter</b>	Return line type, full flow with bypass protection and service indicator. Three micron rated replaceable cartridge.
<b>Reservoir</b>	30 gallons (114 L) with spin-on breather filter, external sight gauges, clean out access, strap mounted to frame.
<b>Oil Cooler</b>	Remote mounted with thermostatically controlled electric motor driven fan.
<b>Pressure Check Panel</b>	System pressure check panel permits easy verification of circuit pressures.

## HOIST SPECIFICATIONS

Power up and down equal speed, planetary reduction with automatic spring applied multi-disc brake and hoist drum cable follower.

		<b>Main Hoist Grove HO12</b>
<b>Maximum single line speed</b>	Bottom layer	120 FPM (37m/min)
	Intermediate layer	132 FPM (40m/min)
	Top layer	145 FPM (44m/min)
<b>Maximum single line pull</b>	Bottom layer	9,580 lbs. (4345kg)
	Intermediate layer	8,692 lbs. (3943 kg)
	Top layer	7,954 lbs. (3608 kg)
<b>Maximum permissible single line pull</b>	7,400 lbs. (3356 kg)	
<b>5:1 strength factor</b>	with 9/16 in. (14mm) 18x19 class	
<b>Maximum rope stowage</b>	181 ft. (55.2m) 9/16 in (14mm)	
	Note: 130 ft. (39.6m) length of wire rope supplied with basic standard unit.	

\*Denotes optional equipment

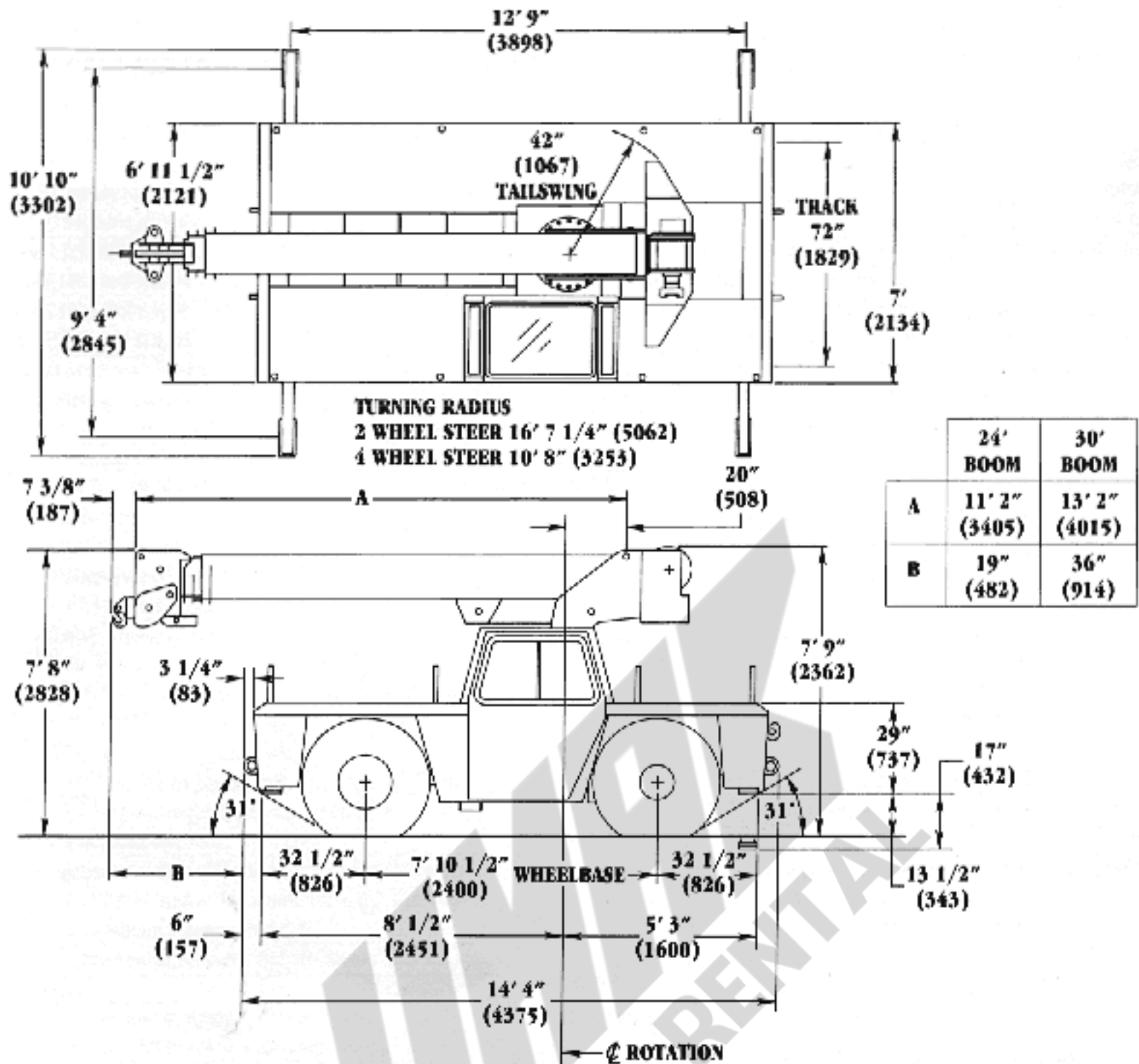
# Carrier specifications

<b>Frame</b>	High strength alloy steel construction with integral outrigger housings and front/rear lifting, towing and tie down lugs. Carry deck with surface area of 69.4 sq. ft. (6.44m <sup>2</sup> ).	<b>Maximum Speed</b>	17 MPH (27 kph) with automatic transmission. *29 MPH (46.7 kph) with manual transmission.
<b>Outrigger System</b>	Front and rear oblique type telescoping beams at all four corners with integral holding valves. Outrigger pads are an integral part of the beam and have a surface area of 72 sq. in. (464 cm <sup>2</sup> ). Maximum outrigger pad load 16,400 lbs. (7439 kg).	<b>Maximum Gradeability</b>	65.6% (Theoretical based on 16,371 lbs. [7425 kg] GVW).
<b>Outrigger Controls</b>	Located in cab on left side of seat and on right side of dash requires two hand operation. Crane level indicator located in cab.	<b>Gross Vehicle Weight &amp; Axle Loads</b>	BASIC STANDARD MACHINE (3 Section Boom) Front: 6,423 lbs. (2913 kgs) Rear: 9,948 lbs. (4512 kgs) G.V.W.: 16,371 lbs. (7425 kgs)
<b>Engine</b>	Cummins 4B3.9L four cylinder water cooled diesel - 3.9 liters, 76 bhp (57 kw) (Gross) @ 2,500 RPM. Maximum torque 184 ft. lbs. (23 kg/m) @ 1,200 RPM.	<b>Miscellaneous Standard Equipment</b>	Dual rear view mirrors, front hookblock tiedown sling, electronic back-up alarm, light package and stowage well.
<b>*Optional Engine</b>	Continental TM2.7L four cylinder water cooled gas - 2.7 liters, 66 bhp (49 kw) (Gross) @ 2,800 RPM. Maximum torque 144 ft. lbs. (19 kg/m) @ 1,800 RPM.	<b>*Optional Equipment</b>	* Worklights * 360° Flashing light * Cab spotlight * Tachometer * Cold start aid (less canister) * Engine block heater * Maintenance platform, 500 lbs. (227 kg) evenly distributed * Hookblocks * Tow winch * Tool kit * Pintle hook front/rear * Carry deck posts * LP gas conversion kit (less bottle) * Engine low oil pressure/high water temperature A/V warning system * Spark arrestor muffler * 360° positive swing lock
<b>Fuel Tank Capacity</b>	30 gallons (114 L)		
<b>Electrical System</b>	One 12 volt maintenance free battery, 815 CCA @ 0° F. 12 volt starting.		
<b>Drive</b>	4 x 2		
<b>Steering</b>	Full hydraulic power, controlled by steering wheel. Three modes: Front only, all wheel coordinated and crab, available by switching to desired function.		
<b>Transmission</b>	Automatic with 3 speeds forward and 1 reverse with torque converter.		
<b>*Optional Transmission</b>	4 forward and 4 reverse speeds with torque converter drive and forward/reverse shuttle control.		
<b>Axles</b>	Front: Drive steer-type with no-spin differential and planetary reduction hubs (rigid mounted to the chassis). Rear: Steer-type rigid mounted to the frame.		
<b>Tires</b>	Standard 10.00 x 15-16PR tube type, deep mine lug.		
<b>Brakes</b>	Enclosed hydraulic wet disc type acting on front drive differential. Mechanically actuated parking brake acting on front differential. *Optional are hydraulic dry disc type brakes acting on rear wheels.		
<b>Lights</b>	Full lighting package including turn indicators, head, tail, brake and hazard warning lights.		

\*Denotes optional equipment.

# Dimensions

# AP410



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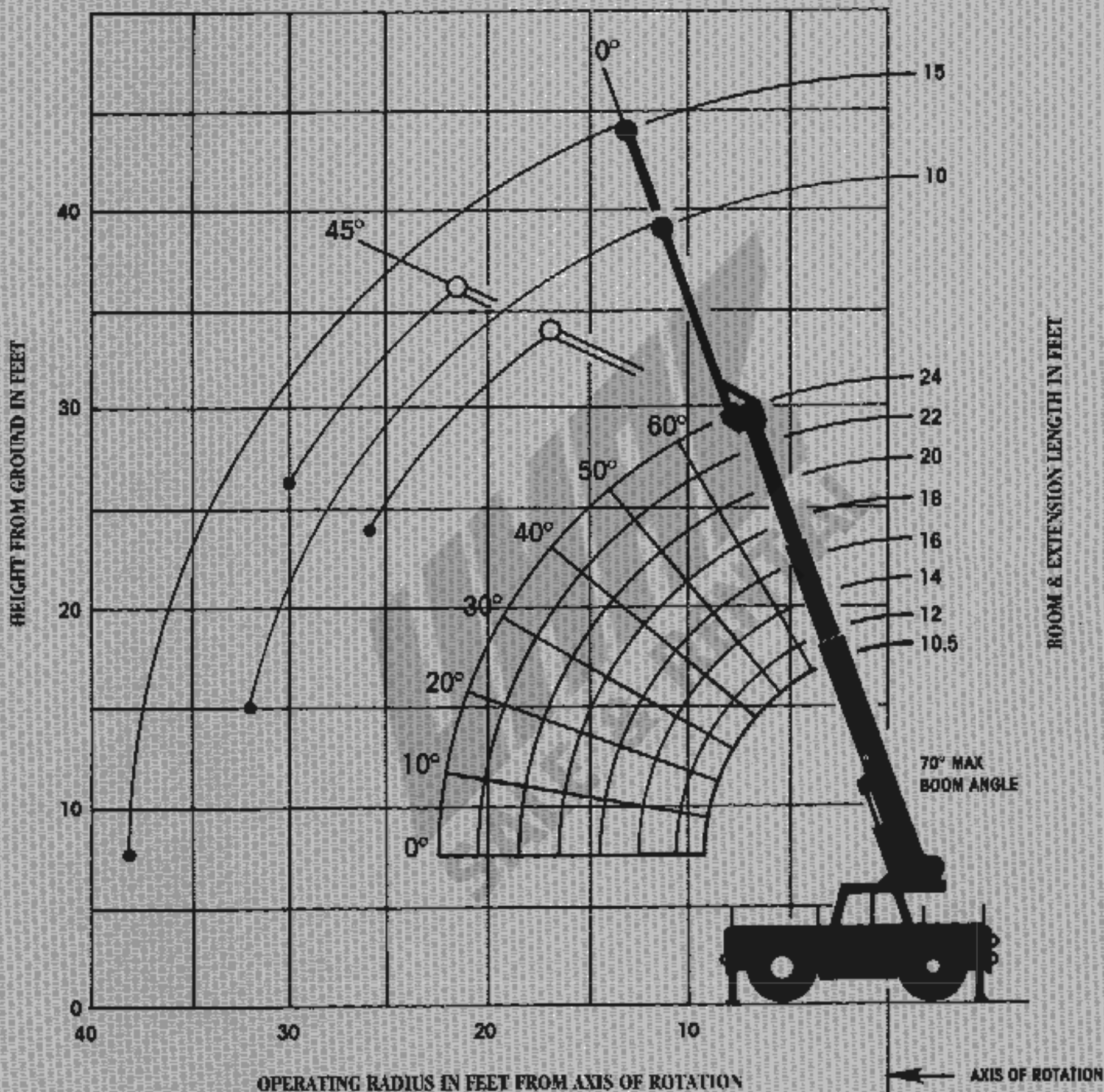
A GROVE WORLDWIDE COMPANY

# AP410

Material Handling Hydraulic Crane/85% Domestic

10.5 ft. - 24 ft. full power boom

WORKING RANGE DIAGRAM  
(BOOM DEFLECTION NOT SHOWN)



# 10.5 FT. - 24 FT. FULL POWER MAIN BOOM

## ON RUBBER

Radius in Feet	#05		#06
	Stationary Capacity Defined Arc (3) Over Front	Stationary Capacity 360 Degree Arc	Pick & Carry Cap. Up to 2.5 MPH Boom Centered (6) Over Front
4	17,000	14,700	15,000
5	17,000	10,600	13,800
6	15,000	9,260	12,450
7	14,000	7,380	11,100
8	12,700	5,920	10,000
10	7,920	4,170	7,920
12	5,680	3,160	5,680
14	4,450	2,500	4,450
16	3,520	2,040	3,520
18	2,920	1,700	2,920
20	2,480	1,430	2,480
22	2,130	1,220	2,130

46-829-007981B

# LMI operating code. Refer to LMI manual for operating instructions.

## ON OUTRIGGERS FULLY EXTENDED

Radius in Feet	#01			
	10.5 FT. (Fully Retracted)		10.5 - 24 FT. BOOM	
	Over Front	360°	Over Front	360°
5	20,000	20,000	17,000	17,000
6	18,000	18,000	15,000	15,000
8	13,750	13,750	13,000	13,000
10			11,000	11,000
12			9,500	9,500
14			8,100	7,180
16			6,900	5,740
18			5,900	4,750
20			5,150	4,040
22			4,590	3,500

# LMI operating code. Refer to LMI manual for operating instructions.

46-829-012326A

## 10 FT. FIXED AND 10 FT. - 15 FT. TELE BOOM EXTENSION ON OUTRIGGERS

Radius in Feet	360 Degrees				Over Front			
	*10 ft. Tele. Ext.		15 ft. Tele. Ext.		*10 ft. Tele. Ext.		15 ft. Tele. Ext.	
	#21	#24	#31	#34	#21	#24	#31	#34
	0°	45°	0°	45°	0°	45°	0°	45°
8	7,000				7,000			
10	6,500		4,150		6,500		4,150	
12	6,000		3,800		6,000		3,800	
14	5,500	4,500	3,400		5,500	4,500	3,400	
16	5,000	4,200	3,150		5,000	4,200	3,150	
18	4,500	3,900	2,950	2,600	4,500	3,900	2,950	2,600
20	4,110	3,600	2,800	2,550	4,200	3,600	2,800	2,550
22	3,480	3,350	2,650	2,500	3,700	3,350	2,650	2,500
24	2,990	2,990	2,550	2,450	3,500	3,150	2,550	2,450
26	2,590	2,590	2,500	2,400	3,250	3,000	2,500	2,400
28	2,260		2,450	2,250	3,000		2,450	2,250
30	1,980		2,170	2,100	2,760		2,350	2,100
32	1,750		1,930		2,480		2,200	
34			1,720				2,000	
36			1,540				1,900	
38			1,380				1,800	

46-829-009831A

46-829-009911A

# LMI operating code. Refer to LMI manual for operating instructions.

\* 10 ft. capacities applicable to both the 10 ft. fixed and 10 ft. tele. boom extension.

## 10 FT. FIXED AND 10 FT. - 15 FT. TELE. BOOM EXTENSION ON RUBBER

Radius in Feet	360 Degrees				**Defined Arc (3) Over Front			
	*10 ft. Tele. Ext.		15 ft. Tele. Ext.		*10 ft. Tele. Ext.		15 ft. Tele. Ext.	
	#25	#28	#35	#38	#25	#28	#35	#38
	0°	45°	0°	45°	0°	45°	0°	45°
8	6,110				7,000			
10	4,260		4,150		6,500		4,150	
12	3,190		3,430		6,000		3,800	
14	2,490	2,490	2,700		4,570	4,500	3,400	
16	2,010	2,010	2,180		3,630	3,630	3,150	
18	1,640	1,640	1,790	1,790	2,970	2,970	2,950	2,600
20	1,360	1,360	1,500	1,500	2,480	2,480	2,550	2,550
22	1,140	1,140	1,260	1,260	2,100	2,100	2,180	2,180
24	960	960	1,070	1,070	1,800	1,800	1,890	1,890
26	810	810	910	910	1,560	1,560	1,650	1,650
28	690		780	780	1,360		1,450	1,450
30	580		660	660	1,180		1,280	1,280
32	480		560	560	1,040		1,140	1,140
34			480				1,020	
36			400				910	
38			330				810	

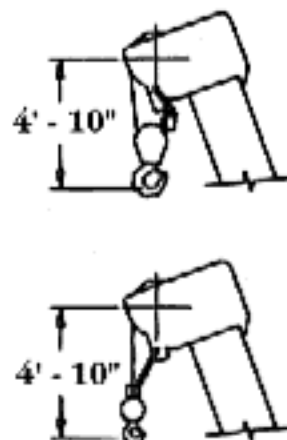
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46-829-009917B

# LMI operating code. Refer to LMI manual for operating instructions.

\* 10 ft. capacities applicable to both the 10 ft. fixed and 10 ft. tele. boom extension.

\*\*Refer to rubber capacity notes.



DIMENSIONS ARE FOR LARGEST GROVE FURNISHED HOOK BLOCK AND HEADACHE BALL WITH ANTI-TWO BLOCK ACTIVATED.



# NOTES FOR LIFTING CAPACITIES

**WARNING: THIS CHART IS ONLY A GUIDE.** The notes below are for illustration only and should not be relied upon to operate the crane. The individual crane's load chart, operating instructions and other instruction plates must be read and understood prior to operating the crane.

- All rated loads have been tested to and meet minimum requirements of SAE J1063 OCT80 - Cantilevered Boom Crane Structures - Method of Test, and do not exceed 85% of the tipping load on outriggers (75% of tipping load on rubber) as determined by SAE J765 OCT80 Crane Stability Test Code.
- Capacities given do not include the weight of hookblocks, slings, auxiliary lifting equipment and load handling devices. Their weights MUST be added to the load to be lifted. When more than minimum required reeving is used, the additional rope weight shall be considered part of the load.
- Defined Arc  $\pm 6^\circ$  on either side of longitudinal centerline of machine.
- Capacities appearing above the hold line are based on structural strength and tipping should not be relied upon as a capacity limitation.
- All capacities are for crane on firm, level surface. It may be necessary to have structural supports under the outrigger floats or tires to spread the load to a larger bearing surface.
- For pick and carry operation, the boom, using the shortest practical boom length, must be centered over front of machine. When handling loads in the structural range with capacities close to maximum ratings, travel should be reduced to creep speed\*. 2.5 MPH capacities are permissible on main boom only, NOT on boom extension.  
\*Creep not over 200 ft. of movement in any 30 min. period and not exceeding 1 mph.
- When either boom length or radius or both are between values listed, the smallest load shown at either the next larger radius or boom length shall be used.
- For outrigger operation, ALL outriggers shall be fully extended with tires raised free of ground before raising the boom or lifting loads.
- Tires shall be inflated to the recommended pressure before lifting on rubber.
- When lifting loads with the tele-boom extension, the minimum allowable boom angle is:  $3^\circ$  with  $0^\circ$  offset and  $48^\circ$  with  $45^\circ$  offset.

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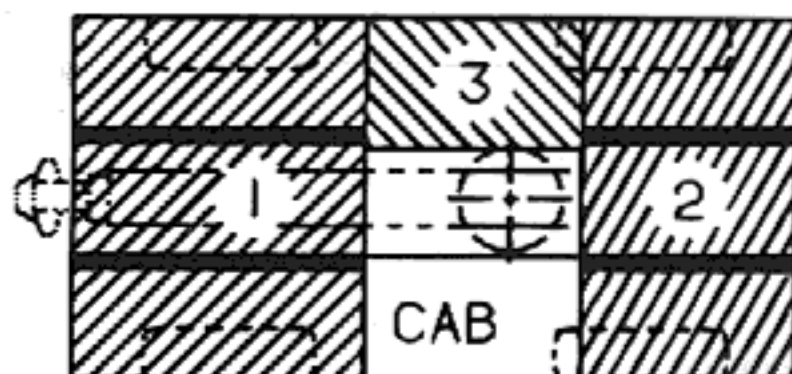


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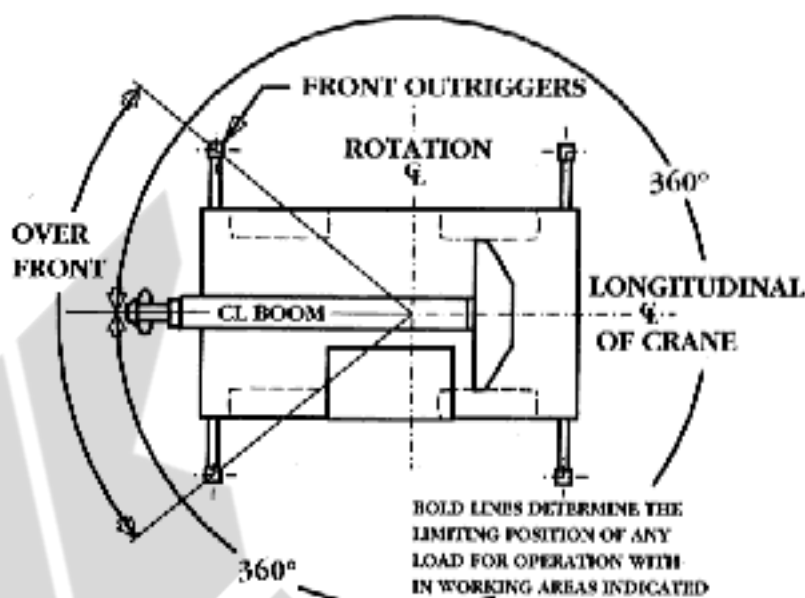
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## LOAD DISTRIBUTION CHART FOR CARRY DECK



### MAXIMUM ALLOWABLE LOAD

AREA 1	35.0 SQ. FT.	8,750 LBS.
AREA 2	25.9 SQ. FT.	6,475 LBS.
AREA 3	8.5 SQ. FT.	2,125 LBS.
<b>TOTAL</b>	<b>69.4 SQ. FT.</b>	<b>17,350 LBS.</b>



### LIFTING ON OUTRIGGERS

### WEIGHT REDUCTIONS FOR LOAD HANDLING DEVICES

10 FT. FIXED I.G. EXTENSION	
* Stowed	.....65 lbs.
* Erected	.....775 lbs.

10 - 15 FT. TELE. BOOM EXT.  
w/10.5 - 24 FT. BOOM

* Stowed	.....80 lbs.
* Erected (Ret.)	.....1,125 lbs.
* Erected (Ext.)	.....1,380 lbs.

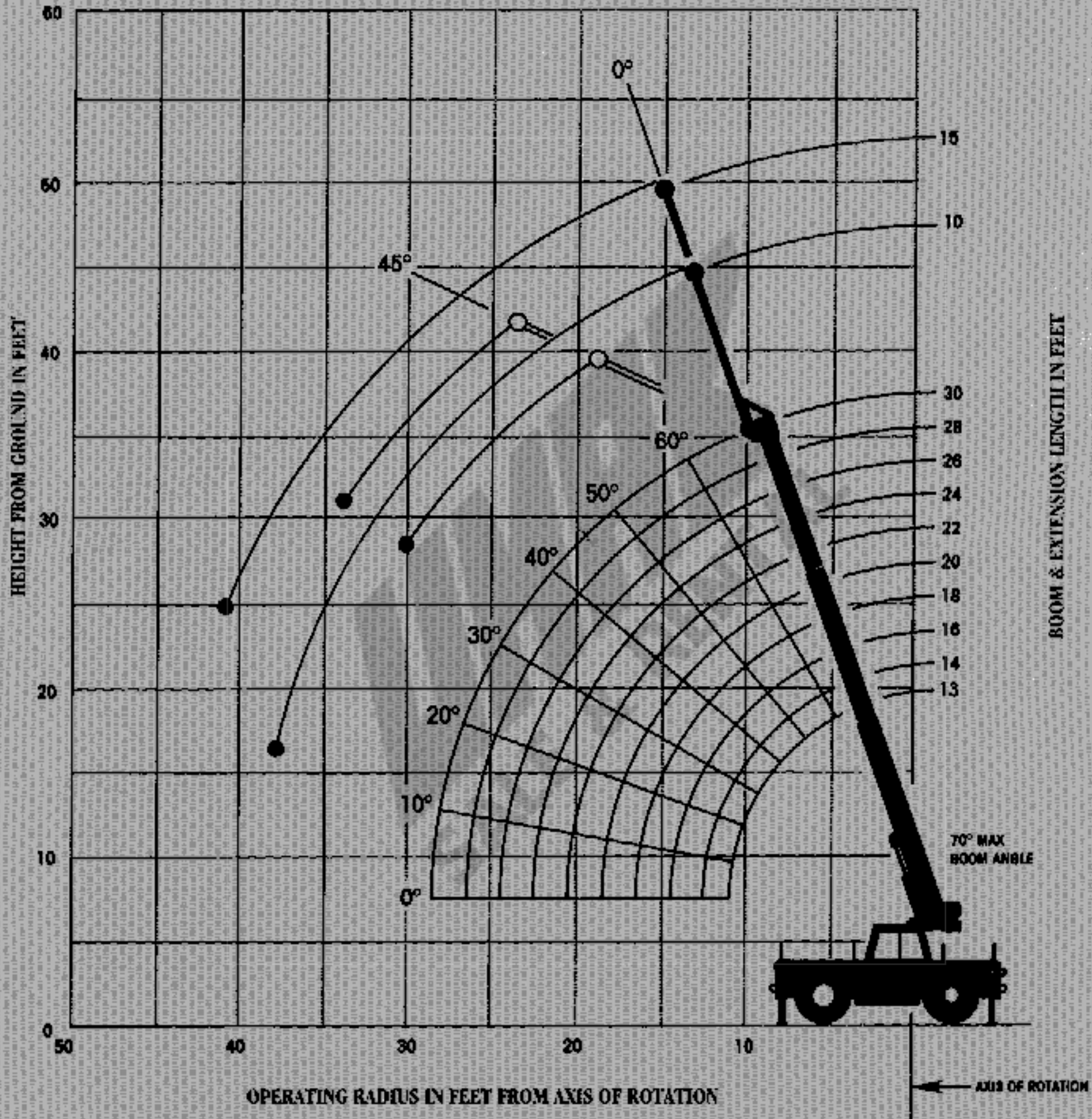
\*Reduction of main boom capacities.

HOOKBLOCKS & HEADACHE BALL	
10 Ton, 1 Sheave	.....304 lbs.
10 Ton, 2 Sheave	.....314 lbs.
5 Ton Headache Ball	.....172 lbs.
Searcher Hook	.....55 lbs.

### NO LOAD STABILITY ON OUTRIGGERS AND RUBBER

	No Load Stability Data	Main Boom 30 ft.
Front (No Load)	Min. boom angle (deg.) for indicated length	0
	Max. boom length (ft.) at 0 deg. boom angle	30
360 Deg. (No Load)	Min. boom angle (deg.) for indicated length	0
	Max. boom length (ft.) at 0 deg. boom angle	30

WORKING RANGE DIAGRAM  
(BOOM DEFLECTION NOT SHOWN)





## 13 FT. - 30 FT. FULL POWER MAIN BOOM

### ON RUBBER

Radius in Feet	#05		#06
	Stationary Capacity Defined Arc (3) Over Front	Stationary Capacity 360 Degree Arc	Pick & Carry Cap. Up to 2.5 MPH Boom Centered (6) Over Front
5	17,000	10,300	15,000
6	15,000	7,310	13,200
8	13,000	4,820	10,550
10	11,000	3,140	8,720
12	8,080	2,390	7,390
14	6,050	1,860	6,050
16	4,790	1,410	4,790
18	3,920	1,150	3,920
20	3,290	930	3,290
22	2,810	790	2,810
24	2,430	650	2,430
26	2,130	510	2,130
28	1,880	400	1,880

# LMI operating code. Refer to LMI manual for operating instructions.

A6-829-012538

### ON OUTRIGGERS FULLY EXTENDED

Radius in Feet	#01			
	13 FT. (Fully Retracted)		13 - 30 FT. BOOM	
	Over Front	360°	Over Front	360°
5	20,000	20,000	17,000	17,000
6	18,000	18,000	15,000	15,000
8	13,750	13,750	13,000	13,000
10			11,000	11,000
12			9,500	9,500
14			8,100	7,990
16			6,900	6,820
18			5,900	5,190
20			5,150	4,370
22			4,590	3,740
24			4,225	3,250
26			3,870	2,850
28			3,520	2,530

# LMI operating code. Refer to LMI manual for operating instructions.

A6-829-012512

## 10 FT. FIXED AND 10 FT. - 15 FT. TELE BOOM EXTENSION ON OUTRIGGERS

Radius in Feet	360 Degrees				Over Front			
	*10 ft. Tele. Ext.		15 ft. Tele. Ext.		*10 ft. Tele. Ext.		15 ft. Tele. Ext.	
	#21 0°	#24 45°	#31 0°	#34 45°	#21 0°	#24 45°	#31 0°	#34 45°
8	7,000				7,000			
10	6,500		4,150		6,500		4,150	
12	6,000		3,800		6,000		3,800	
14	5,500	4,500	3,400		5,500	4,500	3,400	
16	5,000	4,200	3,150		5,000	4,200	3,150	
18	4,500	3,900	2,950	2,600	4,500	3,900	2,950	2,600
20	4,200	3,600	2,800	2,550	4,200	3,600	2,800	2,550
22	3,700	3,350	2,650	2,500	3,700	3,350	2,650	2,500
24	3,310	3,150	2,550	2,450	3,350	3,150	2,550	2,450
26	2,850	2,850	2,500	2,400	3,250	3,000	2,500	2,400
28	2,480	2,480	2,450	2,250	3,080	2,850	2,450	2,250
30	2,170	2,170	2,350	2,100	2,800	2,700	2,350	2,100
32	1,900		2,110	2,050	2,600		2,200	2,050
34	1,670		1,880	1,880	2,450		2,000	1,950
36	1,470		1,690		2,200		1,900	
38	1,300		1,510		2,200		1,800	
40			1,360				1,700	
42			1,220				1,600	

NOTE: No load stability on rubber 360° with 10 ft. or 10-15 ft. tele. extension installed:

- a. Minimum boom angle for 30 ft. main boom = 45° with 10' fixed or 10' tele., and 49° with 15' tele. ext.
- b. Maximum main boom length at 0° main boom angle = 19 ft. with 10' fixed or 10' tele., and 15 ft. with 15' tele. ext.

# LMI operating code. Refer to LMI manual for operating instructions.

\* 10 ft. capacities applicable to both the 10 ft. fixed and 10 ft. tele. boom extension.

A6-829-012515

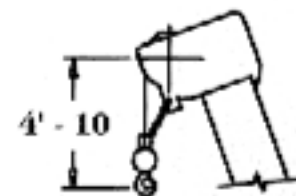
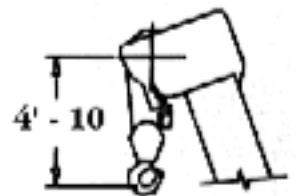
## 10 FT. FIXED AND 10 FT. - 15 FT. TELE. BOOM EXTENSION ON RUBBER

Radius in Feet	360 Degrees				** Defined Arc (3) Over Front			
	*10 ft. Tele. Ext.		15 ft. Tele. Ext.		*10 ft. Tele. Ext.		15 ft. Tele. Ext.	
	#25 0°	#28 45°	#35 0°	#38 45°	#25 0°	#28 45°	#35 0°	#38 45°
8	5,740				7,000			
10	3,780		4,150		6,500		4,150	
12	2,730		2,930		6,000		3,800	
14	2,080	2,080	2,210		5,500	4,500	3,400	
16	1,630	1,630	1,730		5,000	4,200	3,150	
18	1,310	1,310	1,390	1,390	4,100	3,900	2,950	2,600
20	1,070	1,070	1,130	1,130	3,400	3,400	2,800	2,550
22	880	880	930	930	2,860	2,860	2,650	2,500
24	720	720	770	770	2,450	2,450	2,550	2,450
26	590	590	640	640	2,110	2,110	2,360	2,360
28	490	490	530	530	1,830	1,830	2,060	2,060
30					1,600	1,600	1,820	1,820
32					1,400		1,610	1,610
34					1,230		1,430	1,430
36					1,080		1,270	
38					950		1,130	
40							1,010	
42							900	

# LMI operating code. Refer to LMI manual for operating instructions.

\* 10 ft. capacities applicable to both the 10 ft. fixed and 10 ft. tele. boom extension.

\*\* Refer to rubber capacity notes.



DIMENSIONS ARE FOR LARGEST GROVE FURNISHED HOOK BLOCK AND HEADACHE BALL WITH ANTI-TWO BLOCK ACTIVATED.

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