

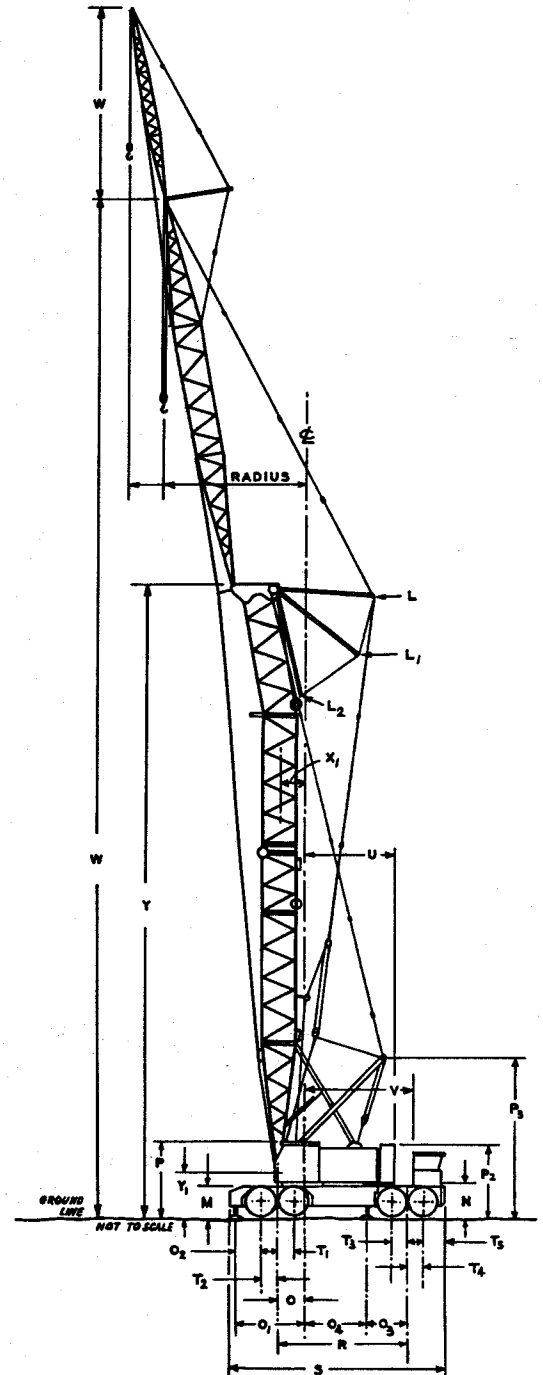
# Link-Belt® HC-238

## Carrier Mounted Tower Crane

GENERAL INFORMATION ONLY

### Dimensions and Working Ranges

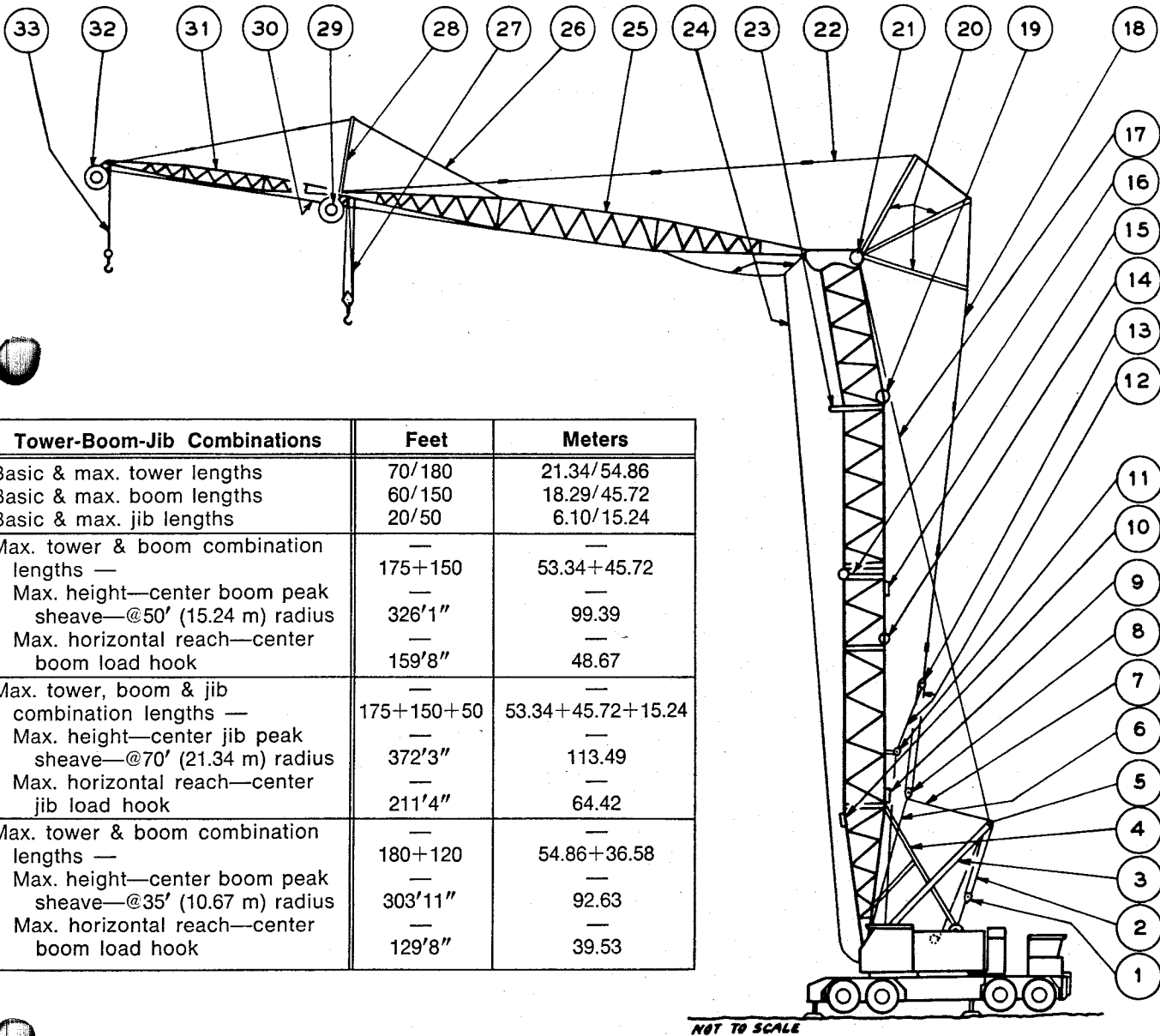
		Feet	Meters
Boom live mast strut lengths —			
Front strut	L	15'0"	4.57
Center strut	L <sub>1</sub>	16'0"	4.88
Rear strut	L <sub>2</sub>	17'0"	5.18
Over-all height, top of turntable bearing mounting plate	M	4'9"	1.45
Ground clearance under counterweight	N	4'9 <sup>5</sup> / <sub>8</sub> "	1.48
Centerline rotation to rear axle bogie pivot	O	3'8"	1.11
Centerline rotation to center rear outrigger	O <sub>1</sub>	10'0"	3.05
Center rear rear axle to center rear outrigger	O <sub>2</sub>	3'11"	1.19
Center front axle bogie to center front outrigger	O <sub>3</sub>	8'0"	2.44
Centerline rotation to center front outrigger	O <sub>4</sub>	10'0"	3.05
Over-all height, upper ctwt. "AB"	P <sub>2</sub>	12'3 <sup>7</sup> / <sub>8</sub> "	3.76
Height, over tower live mast	P <sub>3</sub>	31'6"	9.60
Minimum ground clearance	Q	0'9"	.21
Wheelbase (260")	R	21'8"	6.60
Over-all length over rear outrigger box —			
With front bumper ctwt. "A"	S	35'7"	10.85
With tower crane front bumper ctwt. "AB"	S	37'2"	11.33
Without front bumper ctwts.	S	35'0"	10.67
Center rear axles to pivot of rear bogie	T <sub>1</sub> & T <sub>2</sub>	2'5"	.74
Center front axles to pivot of front bogie	T <sub>3</sub> & T <sub>4</sub>	2'5"	.74
Center front front axle to front bumper	T <sub>5</sub>	2'10 <sup>1</sup> / <sub>4</sub> "	.87
Center front front axle to front bumper ctwt. "A"	T <sub>5</sub>	3'11 <sup>1</sup> / <sub>2</sub> "	1.20
Center front front axle to tower crane front bumper ctwt. "AB"	T <sub>5</sub>	5'0"	1.52
Center rear front axle to center front rear axle	U	16'10"	5.13
Tailswing of upper ctwt. "A"	U	14'4"	4.37
Tailswing of upper ctwt. "AB" (std. on tower crane)	U	15'6"	4.72
Centerline of rotation to back of carrier cab (muffler)	V	15'7"	4.75
Radius of boom hinge pin	X <sub>1</sub>	9'8"	2.95
Radius of tower hinge pin	X <sub>1</sub>	3'6"	1.07
Height of boom angle pin (180'—54.86 m tower)	Y	186'7"	56.87
Height of tower hinge pin	Y <sub>1</sub>	6'7"	2.01
Over-all width, outriggers retracted (floats removed)		11'10"	3.61
Width, outriggers extended (C/L to C/L of jacks)		22'0"	6.71
Over-all width, outriggers extended (over floats)		24'6"	7.47
Over-all length — attachment removed but with tower mast lowered over rear of carrier		55'6"	16.92
Over-all length — attachment removed but with tower mast lowered over front of carrier		47'0"	14.33
Over-all travel height — bail sheaves		12'2"	3.71
Boom or ijb point heights (refer capacity charts)	W		
Radius — from centerline rotation to center main load hook or jib load hook			



Reprinted

## NOMENCLATURE

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|--|---|
| <ul style="list-style-type: none"> <li>1. Tower hoist bail</li> <li>2. Tower hoist wire rope (off boomhoist drum)</li> <li>3. Tower live mast</li> <li>4. Tower stops</li> <li>5. Tower hoist bridle and spreader bar</li> <li>6. Boomhoist bail (to frame) positioning pendant</li> <li>7. Boomhoist bail (to tower live mast) positioning pendant</li> <li>8. Boomhoist bail</li> <li>9. Boomhoist bail stand-off</li> <li>10. Boom stop wear block</li> <li>11. Boom hoist rope deflector sheave</li> <li>12. Boom hoist wire rope (off third drum)</li> <li>13. Boom hoist bridle and spreader bar</li> <li>14. Load hoist rope deflector sheave</li> <li>15. Boom hoist bridle stand-off</li> <li>16. (Not applicable)</li> <li>17. Tower hoist pendants</li> </ul> | <ul style="list-style-type: none"> <li>18. Boom hoist backstay pendants</li> <li>19. Load hoist rope deflector sheave</li> <li>20. Boom live mast struts</li> <li>21. Load hoist rope deflector sheave</li> <li>22. Boom hoist frontstay pendants</li> <li>23. Boom stand-off</li> <li>24. Boom stops</li> <li>25. Boom</li> <li>26. Jib backstay pendants</li> <li>27. Main load hoist wire rope</li> <li>28. Jib strut</li> <li>29. Boom folding wheel</li> <li>30. Jib stops</li> <li>31. Jib</li> <li>32. Jib folding wheel</li> <li>33. Jib load hoist wire rope (whipline)</li> </ul> |
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Tower-Boom-Jib Combinations	Feet	Meters
Basic & max. tower lengths	70/180	21.34/54.86
Basic & max. boom lengths	60/150	18.29/45.72
Basic & max. jib lengths	20/50	6.10/15.24
Max. tower & boom combination lengths —	175+150	53.34+45.72
Max. height—center boom peak sheave—@50' (15.24 m) radius	326'1"	99.39
Max. horizontal reach—center boom load hook	159'8"	48.67
Max. tower, boom & jib combination lengths —	175+150+50	53.34+45.72+15.24
Max. height—center jib peak sheave—@70' (21.34 m) radius	372'3"	113.49
Max. horizontal reach—center jib load hook	211'4"	64.42
Max. tower & boom combination lengths —	180+120	54.86+36.58
Max. height—center boom peak sheave—@35' (10.67 m) radius	303'11"	92.63
Max. horizontal reach—center boom load hook	129'8"	39.53

NOT TO SCALE

# General Specifications

## Carrier —

**Type** — FMC truck-type, 8x4, 260" (6.60 m) wheelbase, 11'10" (3.61 m) wide.

**Frame** — Main members alloy steel; machined mounting surface for outer race of turntable bearing.

**Front Axles** — Tandem, bogie beam mounted; Eaton tubular, Model FTCA-34L, 114" (2.90 m) track.

**Rear Axles** — Tandem, bogie beam mounted; Clark planetary, Model BD71000 double reduction, 109<sup>7</sup>/<sub>8</sub>" (2.79 m) track.

**Wheels and Rims** — Front; cast spoke type. Rear; integral with planetary hub.

**Tires** — Single tires front; dual tires rear.

*Standard* — 14:00 x 24-L, (20-ply) rating, transport type tread.

*Optional* — 14:00 x 24N, (24-ply) rating, General Nygen HCT tread.

**Outriggers** — Full width, double box, front and rear; pin connected to carrier frame. Hydraulically operated beam and jack cylinders individually controlled from either side of carrier. Hydraulic power supplied by carrier engine PTO driven hydraulic pump. Locking type check valve at each jack cylinder.

**Floats** — Lightweight, low profile, alloy steel.

**Brakes** — Eight-wheel air brakes.

**Service** — Dual diaphragm, internal expanding type. Dual diaphragm Bendix-Westinghouse DD-3 air chambers on rear wheels — 20" x 7" (.51 m x .18 m), total effective lining area 1,148 sq. in. (.74 sq. m). Single diaphragm air chambers on front wheels — 17<sup>1</sup>/<sub>4</sub>" x 4" (.44 m x .10 m), total effective lining area 496 sq. in. (.32 sq. m).

**Digging** — Eight-wheel service brakes applied with air control valve on carrier dash.

**Parking** — Four-wheel rear brakes applied with air control valve on carrier dash.

**Emergency** — Brakes on 4 rear wheels apply when air pressure drops below 40 p.s.i. (2.81 kg/cm<sup>2</sup>) in the system. Emergency brake may be manually applied at any time by hand control of dash mounted air valve.

**Steering** — Power hydraulic. Ross Model HPS70, 20" (.51 m) diameter wheel.

**Turning Radius** — Over outside of front bumper — 61'8" (18.80 m); over outside of front bumper ctwt. "A" — 62'2" (18.95 m); over outside of front bumper ctwt. "AB" — 62'5" (19.03 m).

**Engines** — Diesel; 12-volt alternator, starter, full pressure lubrication, radiator, air cleaner, oil filter, and 15 c.f.m. (.42 cu. m) air compressor.

*Standard* — GM8V-71N diesel engine, 8 cylinder, 2 cycle, 4<sup>1</sup>/<sub>4</sub>" (.11 m) bore, 5" (.13 m) stroke, 568 cu. in. (9,310 cm<sup>3</sup>) displacement, 280 brake horsepower at 2,300 r.p.m. governed load speed. Peak torque, 760 ft. lbs. (105.11 kgm) at 1,200 r.p.m. Manual control cable shut down.

*Optional* — Cummins NTF-295 diesel engine, 6 cylinder, 4 cycle, 5<sup>1</sup>/<sub>2</sub>" (.14 m) bore, 6" (.15 m) stroke, 855 cu. in. (14,013 cm<sup>3</sup>) displacement, 295 maximum brake horsepower at 2,300 r.p.m. governed load speed. Peak torque, 740 ft. lbs. (102.34 kgm) at 1,500 r.p.m. Electrical shut down.

**Fuel Tank** — 90-gallons (341 liters) capacity tank with self-closing cap equipped with locking eye for padlock.

**Clutch** — Lipe Rollway; 14" (.36 m), 2-plate.

**Transmissions** —

*Main* — Eaton RTO 915; 15 speeds forward, 3 reverse.

*Auxiliary* — Eaton AT-1202; 2-speed, midship mounted — for creeping only.

**Universals** — Mechanics type needle bearing.

**Cab** — One-man, offset, fully enclosed. Air suspension mounted bucket seat with seat belt. Sound absorbing foam insulation with vinyl covering, soundproof headliner, and carpeted floor mat. Cab isolated from engine compartment; rubber mounted for sound level reduction. Instrument panel and dash includes speedometer, odometer, ammeter, and gauges for fuel, engine temperature, air and oil pressures, low air pressure warning buzzer, key start/locking switch, throttle control and tachometer.

**Electrical System** — 12-volt; including dual sealed beam headlights, directional signals with 4-way flashing system, stop and tail lights, clearance lights, horn, lighting of instrument panel, dome light, headlight dimmer switch, two 12-volt, 205 ampere hour batteries, and electric windshield wiper.

**Standard Auxiliary Equipment** — Fire extinguisher, heater and defroster, windshield wiper, bus-type rear view mirrors, boom guide, lug wrench, 2-way reading bubble levels at four positions on carrier, tire gauge and tire inflation hose, hand grab rails, step, removable rear fenders, storage-type running boards, back-up alarm, and skid-resistant finish on carrier deck. High pressure lube fittings at all bearing points.

**Bumper Counterweight** — Mounts on front bumper ctwt. hooks; easily removable. Standard bumper ctwt. required for tower crane operation — 27,300# (12,394 kg) "AB" ctwt.

**Weight** — Approximate carrier weight, less turntable bearing, but with 11,200# (5,085 kg) "A" bumper ctwt. (for conventional truck crane operation only) — 73,160# (33,215 kg).

GENERAL INFORMATION ONLY

**Carrier Speeds** — All HC-238 carrier speeds based on engines at governed full load r.p.m. — 2,300.

Gear		Transmissions				
		Main-Eaton RTO-915	Auxiliary — Eaton AT-1202		M.p.h.	Km/hr.
			1.00:1.00	2.036:1.00		
High	10th	.81	40.5	65.18	19.9	32.03
	9th	1.00	32.8	52.79	16.1	25.91
	8th	1.26	26.1	42.00	12.8	20.60
	7th	1.59	20.6	32.77	10.1	16.25
	6th	2.04	16.1	25.91	7.9	12.71
	Rev.	2.21	14.9	23.98	7.3	11.75
Low	5th	2.59	12.7	20.44	6.3	10.14
	4th	3.20	10.3	16.58	5.1	8.21
	3rd	4.04	8.1	13.04	4.0	6.44
	2nd	5.10	6.4	10.30	3.2	5.15
	1st	6.51	5.0	8.05	2.5	4.02
	Rev.	7.06	4.7	7.56	2.3	3.70
Deep Reduction	5th	3.87	8.5	13.68	4.2	6.76
	4th	4.78	6.9	11.10	3.4	5.47
	3rd	6.03	5.4	8.69	2.7	4.35
	2nd	7.62	4.3	6.92	2.1	3.38
	1st	9.73	3.4	5.47	1.7	2.74
	Rev.	10.55	3.1	4.99	1.5	2.41

GENERAL INFORMATION ONLY

Creep speeds in deep reduction low (1st) and all reverse speeds — based on peak engine torque at 1,200 r.p.m. Deep reduction creep speeds are .87 m.p.h. (1.40 km/hr.) in 1st and .80 m.p.h. (1.29 km/hr.) in reverse.

## Axle Loadings -- Approximate

Basic HC-238 tower crane upper with 26,900# upper cwtw. "A" and GM6-71N diesel engine; mounted on FMC 260" wheelbase carrier, 11'10" wide, equipped with 14.00 x 24-L (20-ply) rating transport type tires, hydraulic outrigger assemblies with 4 floats in storage racks, GM8V71-N diesel engine, no attachment and no bumper cwtw.	Basic Machine Weight			Upper Facing Front				Upper Facing Rear			
	Component	Pounds	Kilograms	Front		Rear		Front		Rear	
				Pounds	Kilograms	Pounds	Kilograms	Pounds	Kilograms	Pounds	Kilograms
Upper Carrier	68,350	31,031	-12,550	-5,698	+80,900	+36,729	+35,710	+16,212	+32,640	+14,819	
Total	130,310	59,161	+9,330	+4,236	+120,980	+54,925	+57,590	+26,146	+72,720	+33,015	
Adjust axle loadings accordingly for the following components:	Component Weights			Front		Rear		Front		Rear	
	Pounds	Kilograms	Pounds	Kilograms	Pounds	Kilograms	Pounds	Kilograms	Pounds	Kilograms	
<b>Upper Machinery—</b>											
Boom hoist rope—545' (166.12 m), 3/4" (19.1 mm) Type "T" (8-part)	+ 560	+ 254	+ 120	+ 54	+ 440	+ 200	+ 70	+ 32	+ 490	+ 222	
Tower hoist rope—675' (205.74 m), 7/8" (22.23 mm) Type "T" (16-part)	+ 970	+ 440	- 280	- 127	+ 1,250	+ 568	+ 610	+ 277	+ 360	+ 163	
Front drum rope (main load line)—1,005' (306.32 m), 3/4" (19.1 mm) Type "N"	+ 1,040	+ 472	+ 120	+ 54	+ 920	+ 418	+ 230	+ 104	+ 810	+ 368	
Rear drum rope (jib load line)—720' (219.46 m), 3/4" (19.1 mm) Type "K" (1-part)	+ 700	+ 318	- 10	- 4.5	+ 710	+ 322	+ 250	+ 114	+ 450	+ 204	
Rear drum rope (jib load line)—1,080' (329.18 m), 3/4" (19.1 mm) Type "N" (2-part)	+ 1,120	+ 508	- 20	- 9	+ 1,140	+ 518	+ 400	+ 182	+ 720	+ 327	
Front drum planetary	+ 790	+ 359	+ 90	+ 41	+ 700	+ 322	+ 180	+ 82	+ 610	+ 277	
Rear drum planetary	+ 790	+ 359	- 20	- 9	+ 810	+ 368	+ 280	+ 127	+ 510	+ 232	
Counterweight "A"	-26,900	-12,213	+11,740	+ 5,330	-38,640	-17,543	-20,850	- 9,466	- 6,050	- 2,747	
Counterweight "B"	+20,400	+ 9,253	- 8,960	- 2,418	+29,360	+13,318	+15,870	+ 4,294	+ 4,530	+ 2,055	
Optional Cummins N743 diesel engine w/3-stage torque converter	+ 830	+ 377	- 240	- 109	+ 1,070	+ 486	+ 530	+ 241	+ 300	+ 136	
<b>Attachment —</b>											
20' Tower base section with tower live mast Tower stops with supports and accessories	+ 8,980	+ 4,077	+ 8,890	+ 4,036	+ 90	+ 41	- 5,850	- 2,656	+ 14,830	+ 6,734	
	- 1,080	+ 490	+ 280	+ 127	+ 800	+ 363	+ 90	+ 41	+ 990	+ 449	
<b>Carrier —</b>											
Front outrigger box, beams and jacks	- 7,300	- 3,314	- 5,000	- 2,270	- 2,200	- 999	- 5,080	- 2,306	- 2,220	- 1,008	
Rear outrigger box, beams and jacks	- 7,300	- 3,314	+ 2,350	+ 1,067	- 9,650	- 4,381	+ 2,350	+ 1,067	- 9,650	- 4,381	
Four floats	- 480	- 218	- 140	- 64	- 340	- 154	- 140	- 64	- 340	- 154	
B counterweight "A" (For tower crane)	+11,200	+ 5,085	+14,200	+ 6,447	- 3,000	- 1,362	+14,200	+ 6,447	- 3,000	- 1,362	
B counterweight "B" (For tower crane)	+16,100	+ 7,309	+21,100	+ 9,579	- 5,000	- 2,270	+21,100	+ 9,579	- 5,000	- 2,270	
Optional Cummins NTF-295 diesel engine	+ 300	+ 136	+ 314	+ 143	- 14	- 6	+ 314	+ 143	- 14	- 6	

## Upper --

**Upper Frame** — All-welded, stress relieved, precision machined unit; machinery side housings welded integral with upper revolving frame.

**Turntable Bearing with Integral Swing Gear** — Roller bearing type. Outer race with integral, external swing (ring) gear bolted to carrier; inner race bolted to upper revolving frame on machined surface. Swing (ring) gear teeth machine-cut.

**Transmission** — Quadruple roller chain enclosed in oil tight chain case with integral sump; pump driven oil stream lubrication. Engine pinion and chain wheel teeth machine-cut.

**Reduction Shaft** — Two-piece shaft, joined by involute splined coupling; mounted on anti-friction bearings in line bored machinery side housings.

**Drive Pinions** — Two pinions; heat treated, machine-cut teeth, involute splined to shaft. Pinions mounted one each on outer ends of shaft outside of machinery side housings.

**Clutches** — Speed-o-Matic power hydraulic, internal expanding 2-shoe type. Standard for swing, boom hoist, hoisting and power load lowering on front and rear main operating drums. Clutch drums 23" (.58 m) diameter, 6" (.15 m) face width.

**Drums** — Front and rear main operating drums; rope drums splined on shafts, clutch drums bolted to spur gears — units mounted on shafts on anti-friction bearings, brake drums splined on shafts, shafts mounted in line bores on anti-friction bearings, machine-cut spur gear teeth.

**Brakes** — Two-piece, external contracting band, mechanically foot pedal operated on both front and rear drums — brake drums 34" (.86 m) diameter, 5" (.13 m) face width.

**Drum Rotation Indicators** — Standard for both front and rear drums. Dial indicators mounted on front of control stand; actuated by flexible shaft drives attached to drum shafts.

**Planetary Drive Units** — Optional for either or both front and rear drums. Planetary unit mounts between spur gear and 2-shoe clutch drum; available for either 70% increase or 40% decrease of standard load hoist or lowering wire rope speeds. Each planetary unit controlled by external contracting band brake through pushbutton located on front and/or rear clutch control lever.

**Swing Mechanism** — Combination spur gear/bevel gear drive. Horizontal and vertical swing shafts mounted in line bores on anti-friction bearings; machine-cut spur gear, bevel gear, and swing pinion.

**Horizontal Swing Shaft** — Spur gears mounted on shaft on anti-friction bearings; bevel gear involute splined on shaft, enclosed and running in oil.

— **Swing Brake**; two-directional, external contracting band, 20" (.51 m) diameter, 3 1/4" (82.6 mm) face width, spring applied and hydraulically released.

— **Swing Brake Drum**; involute splined to shaft, 20" (.51 m) diameter, 3 1/2" (88.9 m) face width.

**Vertical Swing Shaft** — Bevel gear involute splined to shaft; enclosed and running in oil.

— **Swing Pinion**; involute splined to shaft. Pinion meshes with external teeth of swing (ring) gear which is integral with outer race of turntable bearing.

**Swing Speed** — 2.8 r.p.m.

**Tower Hoist** — Independent, spur gear driven; precision tower raising and lowering through low-speed planetary drive units. Tower hoist rope drum locking pawl manually controlled from operator's position. (Standard HC-238 crane boomhoist mechanism modified for use as tower hoist unit on tower crane). Wire rope drum involute splined to shaft; machine cut spur gear teeth.

**Tower Hoist Brake** — External contracting band, spring applied and power hydraulically released; 28" (.71 m) diameter, 5" (.13 m) face width. Brake drum 28" (.71 m) diameter, 5 1/2" (.14 m) face width; involute splined to shaft.

**Boom Hoist** — Independent, spur gear driven; precision boom raising and lowering through 2-shoe power hydraulic clutches. Boom hoist rope drum locking pawl manually controlled from operator's position. Wire rope drum involute splined to shaft; machine cut spur gear teeth. (Standard HC-238 crane third drum mechanism modified for use as boomhoist unit on tower crane).

**Boom Hoist Brake** — External contracting band, spring applied and power hydraulically released; 28" (.71 m) diameter, 5" (.13 m) face width. Brake drum 28" (.71 m) diameter, 5 1/2" (.14 m) face width; involute splined to shaft.

**Cab** — Operator door hinged, rear double doors roll on ball bearing rollers, other machinery access doors hinged. Full-vision operator's compartment with safety glass panels. Standard equipment includes dry chemical fire extinguisher, electric horn warning device, roof-top access ladder, skid-resistant finish on roof, machinery guards, and hand grab rails.

**Optional Cab Accessories** — Cab heater and defroster fan.

**Counterweight** — 47,300# (21,474 kg) cwt. "AB" standard. Cwt. "A" — 26,900# (12,213 kg); cwt. "B" — 20,400# (9,262 kg). ("B" cwt. pinned in position on top of "A" cwt. for ease in mounting or removal). Cwt. held in working position at rear of crane upper cab by two hydraulic frustums; is power hydraulically lowered to position on carrier deck from which it can be lifted to haul unit (or raised to working position from carrier deck) in seconds.

**Control System** — Speed-o-Matic power hydraulics; an open system. Operating pressure transmitted through oil to all operating 2-shoe clutch cylinders, swing brake, boom hoist and tower hoist drum brake cylinders. System includes pump to provide constant flow of oil, an accumulator to maintain operating pressure and variable pressure operator-controlled valves to regulate pressure to clutch cylinders.

**Pump** — Vickers; rated at 5 g.p.m. (18.93 liters/min.) at 1,200 r.p.m.

**Oil Filter** — FMC; replaceable Skinner ribbon-type element.

**Relief Valve** — FMC; set to operate at 1,250 p.s.i. (88 kg/cm<sup>2</sup>).

**Unloader Valve** — FMC; set to unload pump at a maximum 1,050 p.s.i. (74 kg/cm<sup>2</sup>) and to load pump when pressure drops below 900 p.s.i. (63 kg/cm<sup>2</sup>).

**Accumulator** — FMC; piston-type, precharged with nitrogen gas to 650 p.s.i. (46 kg/cm<sup>2</sup>).

**Sump Tank** — FMC; 7-gallons (26.50 liters) capacity with filter and strainer assembly.

**Control Valves** — FMC; variable pressure type.

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**Engines** — Diesel; full pressure lubrication, oil filter, air cleaner, hour meter, hand and foot throttles,

75-gallons (283.88 liters) capacity fuel tank with self-closing cap equipped with locking eye for padlock, and fuel gauge.

Specifications	GM 6-71N <sup>①</sup>	GM 6-71N <sup>②</sup>	Cummins N855P220 <sup>②</sup>
Number of cylinders	6	6	6
Bore and stroke — inches	4 <sup>1</sup> / <sub>4</sub> x 5 (108x127 mm)	4 <sup>1</sup> / <sub>4</sub> x 5 (108x127 mm)	5 <sup>1</sup> / <sub>2</sub> x 6 (140x152 mm)
Piston displacement — cu. inch	425.6 (6,975.6 cm <sup>3</sup> )	425.6 (6,975.6 cm <sup>3</sup> )	855 (14,013 cm <sup>3</sup> )
High idle speed—r.p.m.	2,040	1,940	1,980
Engine r.p.m. @ full load speed	1,900	1,800	1,800
Net engine h.p. @ full load speed	171	165	165
Peak torque — ft. lbs.	1,400 (193.62 kgm)	2,360 (326.39 kgm)	2,200 (307.03 kgm)
Peak torque — r.p.m.	Output shaft stall	Output shaft stall	Output shaft stall
Electrical system	12-volt	12-volt	12-volt
Batteries	1/12-volt	1/12-volt	2/12-volt
Clutch or Power Take-Off	Disconnect between engine and converter	Disconnect between engine and converter	Disconnect between engine and converter
Transmission —			
No. chain wheel teeth	171	171	171
No. engine pinion teeth	21	22	22

①Allison single stage torque converter, Model TCDO 475.

②Twin Disc three stage torque converter, Model CO-10066TC1.

GENERAL INFORMATION ONLY

**Drum Wire Rope Capacities, Line Speed and Pull — (Available line pull, not based on wire rope strength).**

Front and Rear Drums																		
Attachment		Wire Rope Dia.		Rope Drum Root Dia.		Type	Line Speed and Pull								Drum Rope Capacity			
							1st Layer Rope				Full Drum Rope				1st Layer		Full Drum	
							Speed		Pull		Speed		Pull		Feet	Meters	Feet	Meters
Inch	Milli-meters	F.p.m.	M/Min.	Pounds	Kilograms	F.p.m.	M/Min.	Pounds	Kilograms	Feet	Meters	Feet	Meters					
Crane	3/4	19.1	17 <sup>1</sup> / <sub>4</sub>	.44	Smooth	168	51.21	26,400	11,986	280	85.34	15,900	7,212	117	35.66	1,359	414.22	
						286	87.17	14,667	6,653	476	145.08	8,833	4,007					

NOTE: First line is standard machine.  
Second line is machine equipped with optional planetary-driven high speed drums.

Boom Hoist and Tower Hoist Drums																		
Attachment		Wire Rope Dia.		Rope Drum Root Dia.		Type	Line Speed and Pull								Drum Rope Capacity			
							1st Layer Rope				Full Drum Rope				1st Layer		Full Drum	
							Speed		Pull		Speed		Pull		Feet	Meters	Feet	Meters
Inch	Milli-meters	F.p.m.	M/Min.	Pounds	Kilograms	F.p.m.	M/Min.	Pounds	Kilograms	Feet	Meters	Feet	Meters					
7/8	22.23	12 <sup>1</sup> / <sub>4</sub>	.31	Smooth	136	41.45	30,800	13,983	208	63.40	20,100	9,125	74	22.56	459	139.90		

**Tower Attachment, Boom, Jib & Auxiliary Equipment**

**Tower** — Welded box construction; 60" (1.52 m) centerline to centerline of main chords.

**Base Section** — 20' (6.10 m) long. Equipped with wire rope deflector roller mounted between rear main chords on anti-friction bearings. Roller required to support boom hoist rope leading from drum to sheave attached to first 20' (6.10 m) tower extension. Tower feet 2<sup>1</sup>/<sub>2</sub>" (63.5 mm) wide on 60" (1.52 m) centers.

**Extensions** — 20' (6.10 m), 25' (7.62 m) and 30' (9.14 m) long extensions. Welded box construction; square tubular main chords, round tubular lattice.

**Connections** — Off-set pin connections.

**Top Section** — Canted (off-set), 20' (6.10 m) long; headshaft extends through tower top section to permit connecting tower pendants. Load hoist rope deflector sheaves guide wire rope over top section to

boompoint — 2 sheaves, 15<sup>1</sup>/<sub>4</sub>" (.39 m) root dia., grooved for 3/4" (19.1 mm) dia. wire rope, mounted on anti-friction bearings. Wire rope deflector roller, mounted on front of top section between boomfoot lugs, required to support main load hoist rope when boom is folded parallel to tower. Deflector sheaves mounted at rear of top section guide wire rope from main load hoist drum to peak of top section — 2 sheaves, 12" (.30 m) root dia., grooved for 3/4" (19.1 mm) wire rope, mounted on anti-friction bearings.

**Tower Stops** — Dual, lever type, with spring cushioned bumpers. Raised and lowered by telescoping strut pins. Bumper end of backstops manually extendible; may be pinned in one of 2 positions depending on attachment being used — vertical tower as tower crane, or conventional boom for crane service.

**Tower Live Mast** — Required for all tower lengths. Mast 30' (9.14 m) long from centerline headshaft to centerline mast foot pin; non-retractable. Mast feet 2½" (63.5 mm) wide on 49¼" (1.25 m) centers. Mounted on front of upper revolving frame; supports tower hoist bridle and spreader bar.

— **Live Mast Stops**; equipped with spring cushioned bumpers. Mounted on main tubes of tower stops, manually pinned to tower stops in one of 2 positions. During tower erection, live mast stops must be pinned in storage position on top side of tower stops.

**Tower Hoist Bail** — Attached to lugs on upper rear of machinery side housings. Equipped with 8 sheaves — 6 for supporting 16-part tower hoist wire rope reeving, 2 for guiding wire rope on and off tower hoist drum. Deflector roller at bottom of bail frame prevents tower hoist wire rope chafing against bail frame when bail rests on revolving frame support.

**Tower Hoist Bridle and Spreader Bar** — Located at peak of tower live mast. Eight sheaves — 15" (.38 m) root dia., grooved for 7/8" (22.2 mm) dia. wire rope, mounted on anti-friction bearings — support 16-part tower hoist wire rope reeving. One deflector sheave deflects tower hoist rope off drum and prevents chafing against tower bail frame.

**Basic Tower** — 70' (21.34 m) high; made up of 20' (6.10 m) base section, one 30' (9.14 m) extension, one 20' (6.10 m) top section. Includes tower bail, tower live mast, tower hoist bridle and spreader bar, tower and live mast stops.

**Maximum Tower** — 175' (53.34 m), for use with maximum 150' (45.72 m) boom. Tower made up of one 20' (6.10 m) base section, three 30' (9.14 m) extensions, one 25' (7.62 m) extension, one 20' (6.10 m) extension, one 20' (6.10 m) top section. Variations of tower heights with sections assembled in this order will be 70' (21.34 m), 90' (27.43 m), 115' (45.72 m), 145' (41.15 m), and 175' (52.34 m). The first 50' (15.24 m) of all towers must be assembled as follows — one 20' (6.10 m) base section and one 30' (9.14 m) extension.

**Maximum Tower** — 180' (54.86 m), for use with maximum 120' (36.58 m) boom. Tower made up of one 20' (6.10 m) base section, four 30' (9.14 m) extensions, one 20' (6.10 m) extension, one 20' (6.10 m) top section. Variations of tower heights with sections assembled

in this order will be 70' (21.34 m), 90' (27.43 m), 100' (30.48 m), 120' (36.58 m), 130' (39.62 m), 150' (45.72 m), 160' (48.77 m), and 180' (54.86 m). The first 50' (15.24 m) of all towers must be assembled as follows — one 20' (6.10 m) base section and one 30' (9.14 m) extension.

**Tower Hoist Limiting Device** — Provided to prohibit hoisting tower beyond minimum recommended vertical position. Located on exterior right side of operator's cab near roof. Hydraulic solenoid valve, actuated by electric switch when contacted by tower base section in vertical position, automatically shuts off hydraulic pressure to tower hoist function. As pressure is shut off, tower hoist brake is automatically spring applied.

**Boom** — Tubular, welded box lattice type; 54" (1.37 m) wide, 44" (1.27 m) deep centerline to centerline main chords. Basic length 60' (18.29 m) including 20' (6.10 m) long base section, 20' (6.10 m) extension, and 20' (6.10 m) top section.

**Boomfeet** — 2¾" (60.3 mm) wide on 60" (1.52 m) centers; equipped with steel bushings with Teflon liner inserts requiring no lubrication.

**Top Section** — Open throat design; equipped with two 18" (.46 m) root dia. sheaves, grooved for ¾" (19.1 mm) dia. wire rope, mounted on anti-friction bearings. Top section has special jib foot lugs which allow jib to fold at 90° (relative to boom) during erection.

**Extensions** — Available in 20' (6.10 m) and 30' (9.14 m) lengths with appropriate length pendants.

**Connections** — In-line pin connections.

**Boomhoist Bail** — Equipped with 12" (.30 m) root dia. sheaves, grooved for ¾" (19.1 mm) dia. wire rope, mounted on anti-friction bearings. Bail sheaves support 8-part, or optional 12-part, boomhoist reeving spooling from boomhoist wire rope drum.

**Hoist Rope Deflector Rollers** — Tubular steel rollers on top side of boom, mounted on anti-friction bearings. One roller standard on boom top section, one on each boom extension; prevents load hoist rope from chafing top side of boom.

**Boom Stops** — Wire rope type; attached to top end of boom base section secured at top of tower and at lugs at front end of upper revolving frame. Turnbuckle adjustments at lower ends.

**Boomhoist Bridle and Spreader Bar** — Equipped with 12" (.30 m) root dia. sheaves grooved for ¾" (19.1 mm) or 5/8" (15.9 mm) dia. wire rope, mounted on anti-friction bearings. Bridle sheaves support 8-part, or optional 12-part, boomhoist reeving. Boom suspension pendants attach to lugs on spreader bar.

**Boom Live Mast** — Three individual struts make up boom live mast — connected to tower head shaft by adaptor mounted on bushings. Struts may be folded when transporting peak section of tower. Rear strut 17' (5.18 m) long; center strut 16' (4.88 m) long, front strut 15' (4.57 m) long. Boom frontstay suspension pendants attach to top end of front mast strut; boom backstay suspension pendants attach to top end of rear mast strut linkage and to boomhoist spreader bar. Boom live mast struts, as a unit, provide leverage assist in positioning boom as well as support for boom in operating position.

**Boomhoist Limiting Device** — Electrically controlled hydraulic solenoid valves operating in conjunction with Speed-o-Matic hydraulic control system. Located on tower top section at boom foot area to prohibit hoisting boom above maximum recommended vertical position (minimum radius), and at support for rear boom strut to prevent strut contacting support when under load. As boom or rear strut position limits are reached, electrical circuit is broken and hydraulic pressure is automatically shut off to boomhoist clutch cylinder, releasing the clutch. As clutch is released, boomhoist brake is automatically spring applied.

**Boom Peak Wheel** — Pin connected to peak of boom; supports boom peak on ground during tower and boom erection. Grooved, implement type tire with tube; 6:50 x 16-C (6-ply) rating.

**Boom Stand-Off** — Mounted on front pin connecting lugs at base of tower top section. Prevents boom from becoming parallel to tower during erection to provide desired control of attachment as tower approaches vertical position. Boom must also be supported on stand-off prior to lowering tower.

**Boom Angle Indicator** — Electronic type standard. Readout unit conveniently located in crane operator's cab. Electric cable for 180' tower is stored on reel mounted on tower base section.

**Boom Length Restrictions** — Tower heights 70' (21.34 m) through 175' (53.34 m) — minimum boom length is 60' (18.29 m), maximum is 150' (45.72 m). On 180' (54.86 m) tower height — **only** 90' (27.43 m) minimum through 120' (36.58 m) maximum boom lengths are permitted.

**Jib** — Welded box lattice type; round tubular main chords and lattice, 30" (.76 m) wide, 24" (.610 m) deep centerline to centerline main chords. Basic 2-piece jib — top and base sections each 10' (3.05 m) long. Special base section allows jib to fold at 90° angle to boom — required during erection. Special jib top section equipped with lugs for mounting jib peak wheel.

**Extensions** — 10' (3.05 m) long extensions available.

**Connections** — In-line pin connections.

**Peak Sheave** — Single sheave, 15 1/4" (391 mm) root dia., grooved for 3/4" (19.1 mm) dia. wire rope, mounted on anti-friction bearings.

**Jib Stops** — Wire rope type, attached to each end of jib peak wheel shaft and at sides of lower end of boom top section. Turnbuckle adjustments at ends which attach to peak wheel shaft.

**Jib Strut** — Tubular, alloy steel fabrication, 10' (3.05 m) high. Two jib strut load hoist line (whipline) deflector sheaves mounted on anti-friction bearings. Lower sheave 6 1/2" (.17 m) root dia., upper sheave 5 1/8" (.13 m) root dia. Jib strut feet on 30" (.76 m) centers. Two 6 1/8" (.16 m) root dia. jib stayline equalizer sheaves mounted on bronze bushings.

**Jib Peak Wheel** — Pin connected to jib peak; supports jib peak on ground during tower/boom/jib erection. Grooved, implement type tire with tube — 4:80/4.00 (8-ply) rating.

**Jib Length Restrictions** — Jib lengths 20' (6.10 m), 30' (9.14 m), 40' (12.19 m), and 50' (15.24 m) can be used on all tower and boom combinations **except** the following:

— 175' (53.34 m) tower plus 60' (18.29 m), 70' (21.34 m) and 80' (24.38 m) boom lengths — **no jib permitted.**

— 180' (54.86m) tower plus 90' (27.43 m), 100' (30.48 m), 110' (33.53 m) and 120' (36.58 m) boom lengths — **no jib permitted.**

## Wire Rope --

Application — Type and Size Used

Application	Type and Size Used
Tower hoist (Tower live mast)	16-part, 7/8" (22.2 mm) dia. Type "T"—675' (206 m)
Tower suspension pendants	1 3/8" (34.9 mm) dia. Type "N"
Boomhoist (8-part)	3/4" (19.1 mm) dia. Type "T"—545' (166 m)
Boomhoist (12-part)	5/8" (15.9 mm) dia. Type "T"—800' (244 m)
Boom frontstay pendants	1 1/4" (31.8 mm) dia. Type "N"
Boom backstay pendants	1 1/4" (31.8 mm) dia. Type "N"
Main load hoist	3/4" (19.1 mm) dia. Type "N"
Jib load hoist (1-part)	3/4" (19.1 mm) dia. Type "K"
Jib load hoist (2-part)	3/4" (19.1 mm) dia. Type "N"
Jib frontstay pendants	3/4" (19.1 mm) dia. Type "N"
Jib backstay pendants	3/4" (19.1 mm) dia. Type "N"

### Wire Rope Types —

**Type "K"** — 19 x 7 non-rotating, improved plow steel, preformed, wire center core.

**Type "N"** — 6 x 25 (6 x 19 class), filler wire, extra improved plow steel, preformed, independent wire rope center, right lay, regular lay.

**Type "T"** — (for 3/4" dia. wire rope) 6 x 25 flattened strand, extra improved plow steel, preformed, independent wire rope center, right lay, lang lay.

**Type "T"** — (for 7/8" dia. wire rope) 6 x 30 flattened strand, extra improved plow steel, preformed, independent wire rope center, right lay, lang lay.

### Jib Staylines —

**Backstay Wire Rope** — Attached from top of jib strut to lower end of boom top section.

**Frontstay Wire Rope** — Attached from top of jib strut to top of jib peak section.

GENERAL INFORMATION ONLY



**Wire Rope Lengths**

**Main Load Hoist Wire Rope — For machine equipped with tower and boom.**

Tower Height	Boom Length		1-Part Line		2-Part Line		3-Part Line		4-Part Line	
	Feet	Meters	Feet	Meters	Feet	Meters	Feet	Meters	Feet	Meters
180' (54.86 m)	100	30.48	580	176.78	870	265.18	1,160	353.56	1,450*	441.96
	110	33.53	600	182.88	900	274.32	1,200	365.76	1,500*	457.20
	120	36.58	620	188.98	930	283.46	1,240	377.95	1,550*	472.44
175' (53.34 m)	60	18.29	490	149.35	735	224.03	980	298.70	1,225	373.38
	70	21.34	510	155.45	765	233.17	1,020	310.90	1,275	388.62
	80	24.38	530	161.54	795	242.32	1,060	323.09	1,325*	403.86
	90	27.43	550	167.64	825	251.46	1,100	335.28	1,375*	419.10
	100	30.48	570	173.74	855	260.61	1,140	347.47	1,425*	434.34
	110	33.53	590	179.83	885	269.75	1,180	359.66	1,475*	449.58
	120	36.58	610	185.93	915	278.89	1,220	371.86	1,525*	464.82
	130	39.62	630	192.02	942	288.04	1,260	384.05	1,575*	480.06
	140	42.67	650	198.12	975	297.18	1,300	396.24	1,625*	495.30
150	45.72	670	204.22	1,005	306.32	1,340	408.43	1,675*	510.54	

\*Drum wire rope capacity — 1,359' (414.22 m)

**Note:** For tower heights less than 175' (53.34 m), reduce figures in chart above as follows for respective boom lengths and given parts of line.

Tower Height	Reduce Wire Rope Length								
	1-Part Line		2-Part Line		3-Part Line		4-Part Line		
	Feet	Meters	Feet	Meters	Feet	Meters	Feet	Meters	
170	51.82	10	3.05	15	4.57	20	6.10	25	7.62
165	50.29	20	6.10	30	9.14	40	12.19	50	15.24
160	48.77	30	9.14	45	13.72	60	18.29	75	22.85
155	47.24	40	12.19	60	18.29	80	24.38	100	30.48
150	45.72	50	15.24	75	22.85	100	30.48	125	38.10
145	44.20	60	18.29	90	27.43	120	36.58	150	45.72
140	42.67	70	21.34	105	32.00	140	42.67	175	53.34
135	41.15	80	24.38	120	36.58	160	48.77	200	60.96
130	39.62	90	27.43	135	41.15	180	54.86	225	68.58
125	38.10	100	30.48	150	45.72	200	60.96	250	76.20
120	36.58	110	33.53	165	50.29	220	67.06	275	83.82
115	35.05	120	36.58	180	54.86	240	73.15	300	91.44
110	33.53	130	39.62	195	59.44	260	79.25	325	99.06
105	32.00	140	42.67	210	64.01	280	85.34	350	106.68
100	30.48	150	45.72	225	68.58	300	91.44	375	114.30
95	28.96	160	48.77	240	73.15	320	97.54	400	121.92
90	27.43	170	51.82	255	77.72	340	103.63	425	129.54
70	21.34	210	64.01	315	96.01	420	128.02	525	160.02

**Jib Load Hoist (Whipline) Wire Rope — For machine equipped with tower, boom and jib.**

Tower Length	Boom Length		1-Part Line								2-Part Line									
			Jib Length																	
			20' (6.10 m)		30' (9.14 m)		40' (12.19 m)		50' (15.24 m)		20' (6.10 m)		30' (9.14 m)		40' (12.19 m)		50' (15.24 m)			
Feet	Meters	Feet	Meters	Feet	Meters	Feet	Meters	Feet	Meters	Feet	Meters	Feet	Meters	Feet	Meters	Feet	Meters			
70' (21.34 m) through 170' (51.28 m)	60	18.29	520	158.50	540	164.59	560	170.69	580	176.78	600	182.88	780	237.74	810	246.89	840	256.03	870	265.18
	70	21.34	540	164.59	560	170.69	580	176.78	600	182.88	810	246.89	840	256.03	870	265.18	900	274.32	930	283.46
	80	24.38	560	170.69	580	176.78	600	182.88	620	188.98	840	256.03	870	265.18	900	274.32	930	283.46	960	292.61
	90	27.43	580	176.78	600	182.88	620	188.98	640	195.07	870	265.18	900	274.32	930	283.46	960	292.61	990	301.75
	100	30.48	600	182.88	620	188.98	640	195.07	660	201.17	900	274.32	930	283.46	960	292.61	990	301.75	1,020	310.90
	110	33.53	620	188.98	640	195.07	660	201.17	680	207.26	930	283.46	960	292.61	990	301.75	1,020	310.90	1,050	320.04
	120	36.58	640	195.07	660	201.17	680	207.26	700	213.36	960	292.61	990	301.75	1,020	310.90	1,050	320.04	1,080	329.18
130	39.62	660	201.17	680	207.26	700	213.36	720	219.46	990	301.75	1,020	310.90	1,050	320.04	1,080	329.18	1,110	338.33	
140	42.67	680	207.26	700	213.36	720	219.46	740	225.55	1,020	310.90	1,050	320.04	1,080	329.18	1,110	338.33	1,140	347.47	
150	45.72	700	213.36	720	219.46	740	225.55	760	231.65	1,050	320.04	1,080	329.18	1,110	338.33	1,140	347.47			
175' (53.34 m)	90	27.43	590	179.83	610	185.93	630	192.02	650	198.12	885	269.75	915	278.89	945	288.04	975	297.18	1,005	306.32
	100	30.48	610	185.93	630	192.02	650	198.12	670	204.22	915	278.89	945	288.04	975	297.18	1,005	306.32	1,035	315.47
	110	33.53	630	192.02	650	198.12	670	204.22	690	210.31	945	288.04	975	297.18	1,005	306.32	1,035	315.47	1,065	324.61
	120	36.58	650	198.12	670	204.22	690	210.31	710	216.41	975	297.18	1,005	306.32	1,035	315.47	1,065	324.61	1,095	333.76
	130	39.62	670	204.22	690	210.31	710	216.41	730	222.50	1,005	306.32	1,035	315.47	1,065	324.61	1,095	333.76	1,125	342.90
	140	42.67	690	210.31	710	216.41	730	222.50	750	228.60	1,035	315.47	1,065	324.61	1,095	333.76	1,125	342.90		
150	45.72	710	216.41	730	222.50	750	228.60	770	234.70	1,065	324.61	1,095	333.76	1,125	342.90	1,155	352.04			
180' (54.86 m)	110	33.53	640	195.07	← Not Applicable →						960	292.61	← Not Applicable →							