

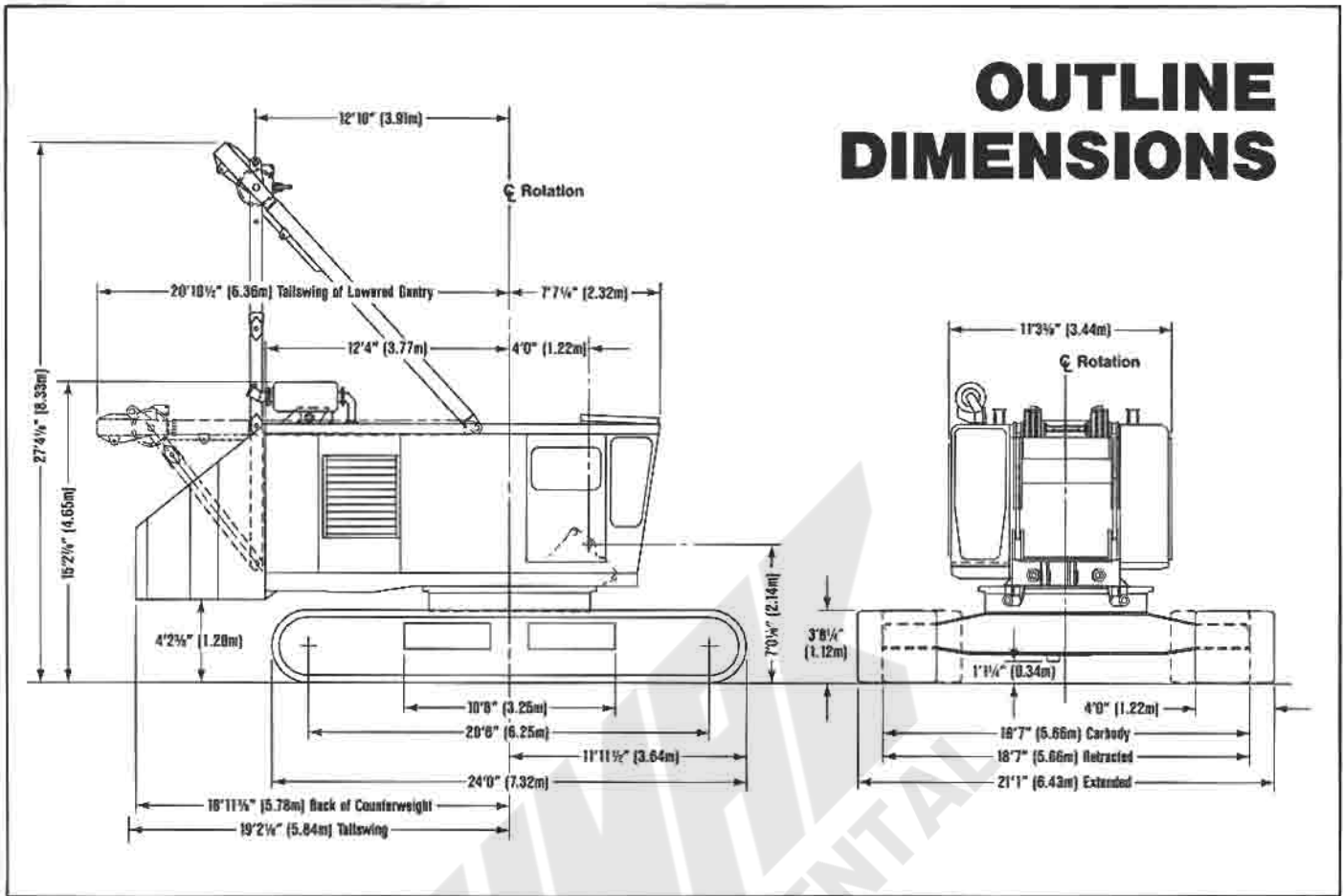


Manitowoc

3950W

LIFTCRANE • CLAMSHELL • DRAGLINE

OUTLINE DIMENSIONS



WEIGHTS*

	Pounds	Kilograms		Pounds	Kilograms
LIFTCRANE (complete): lowerworks, upperworks, & 70' (21.34m) basic boom	301,670	136,835	BOOM NO. 39:		
CARBODY AND UPPERWORKS (combined): complete with basic machinery, drums, gantry, backhitch, equalizer, & boom hoist wire rope	112,375	50,973	Butt, 30' (9.15m) less wire rope and pendants	4,400	1,996
			Open Throat Top, 40' (12.19m) equipped with 6-sheave lower point, 1-sheave upper point, and basic pendants	6,475	2,937
			Inserts:		
LOWERWORKS:			10' (3.05m) with pendants & wire rope roller guide	1,395	633
Carbody, with travel mechanism, king pin, & roller path	40,605	18,418	20' (6.10m) with pendants & wire rope roller guide	2,305	1,046
Crawler Assemblies (2), with 48" (1.22m) wide treads & outside drive chains. Each assembly 34,440 lbs. (15,622 kgs.)	68,880	31,243	40' (12.19m) with pendants & wire rope roller guides	3,920	1,778
			40' (12.19m) with pendants, wire rope roller guides, & jib backstay lugs	3,960	1,796
			Pendant Spreader Bar	610	277
			Wire Rope Guide	395	179
			JIB NO. 123:		
UPPERWORKS:			Butt, 15' (4.58m)	600	272
Rotating Bed, complete with basic machinery, including drums, but not gantry, backhitch, front end attachments, or counterweight	62,865	28,515	Insert, 10' (3.05m)	340	154
Gantry and Backhitch	5,900	2,676	Top, 15' (4.58m) with point assembly	695	315
Equalizer	2,010	912	Basic Pendant (2), each 115 lbs. (52 kgs.)	230	104
Telescopic Boom Stop	660	299	Pendant, 2 per insert, each 65 lbs. (30 kgs.)	130	59
Removable Counterweight (3-piece):			Backstay Pendant (2), each 90 lbs. (41 kgs.)	180	82
Inner	43,000	19,505	Strut, 12'6" (3.81m)	390	177
Middle	30,000	13,608	JIB NO. 124:		
Outer	29,400	13,336	Butt, 15' (4.58m)	325	147
Total	102,400	46,448	Insert, 10' (3.05m)	170	77
Dragline Fairlead:			Top, 15' (4.58m) with point assembly	520	236
Revolving Type	1,910	866	Basic Pendant	100	45
Hinged Type	5,250	2,381	Pendant, 2 per insert, each 25 lbs. (11 kgs.)	50	23
			Backstay Pendant (2), each 95 lbs. (43 kgs.)	190	86
			Strut, 18' (5.49m)	350	159

*Weights are approximate and may vary between cranes because of design changes and component variations.

POWER PLANTS

	Model	Cylinder	Bore	Stroke	Cubic Inch Displacement	Net HP @ RPM (at flywheel)
BASIC	Cummins NTA-855-C360	6	5.500" (140mm)	6.000" (152mm)	855 (14,011cc)	335 (250 kW) @ 2,000
OPTIONAL	Caterpillar 3406B DITA	6	5.400" (137mm)	6.500" (165mm)	893 (14,634cc)	364 (272 kW) @ 2,000
	Detroit Diesel 12V-71N	12	4.250" (108mm)	5.000" (127mm)	852 (13,962cc)	363 (271 kW) @ 2,000
Air Compressor: 37.5 CFM (1,062 Liters).		Fuel Tank Capacity: 211 Gallons (799 Liters).			Consult factory for other power plants.	

DRUMS AND LAGGINGS

Unequal-Width Drums (standard)									
Application	Drums			Lagging	Wire Rope Diameter	Spooling Capacity			
	Location	Diameter	Width			First Layer	Layers	Maximum Capacity	
LIFTCRANE	Hoist	Right Front	19" (483mm)	20 3/4" (518mm)	None	1" (25mm)	97' (29.57m)	8	1,050' (320.04m)
	Whip	Left Front	21" (533mm)	14 3/4" (365mm)	Plain	1" (25mm)	75' (22.86m)	7	673' (205.13m)
	Auxiliary	Rear	19" (483mm)	37 1/4" (946mm)	None	1" (25mm)	178' (54.25m)	8	1,922' (585.83m)
CLAMSHELL	Closing	Right	27" (686mm)	20 3/4" (518mm)	Grooved	1 1/2" (29mm)	123' (37.49m)	—	—
	Holding	Left	27" (686mm)	14 3/4" (365mm)	Grooved	1 1/2" (29mm)	87' (26.52m)	—	—
DRAGLINE	Drag	Right	24" (610mm)	20 3/4" (518mm)	Grooved	1 1/4" (32mm)	97' (29.57m)	—	—
	Hoist	Left	27" (686mm)	14 3/4" (365mm)	Grooved	1" (25mm)	96' (29.26m)	—	—
Full-Width Tandem Drums (optional)									
LIFTCRANE	Hoist	Front	19" (483mm)	37 1/4" (946mm)	None	1" (25mm)	178' (54.25m)	8	1,922' (585.83m)
	Whip	Rear	27 3/4" (702mm)	37 1/4" (946mm)	Plain	1" (25mm)	254' (77.42m)	4	1,126' (343.20m)
CLAMSHELL	Closing	Front	27" (686mm)	37 1/4" (946mm)	Grooved	1 1/2" (29mm)	221' (67.36m)	—	—
	Holding	Rear	27" (686mm)	37 1/4" (946mm)	Grooved	1 1/2" (29mm)	221' (67.36m)	—	—
DRAGLINE	Drag	Front	24" (610mm)	37 1/4" (946mm)	Grooved	1 1/4" (32mm)	172' (52.43m)	—	—
	Hoist	Rear	27" (686mm)	37 1/4" (946mm)	Grooved	1 1/2" (29mm)	221' (67.36m)	—	—

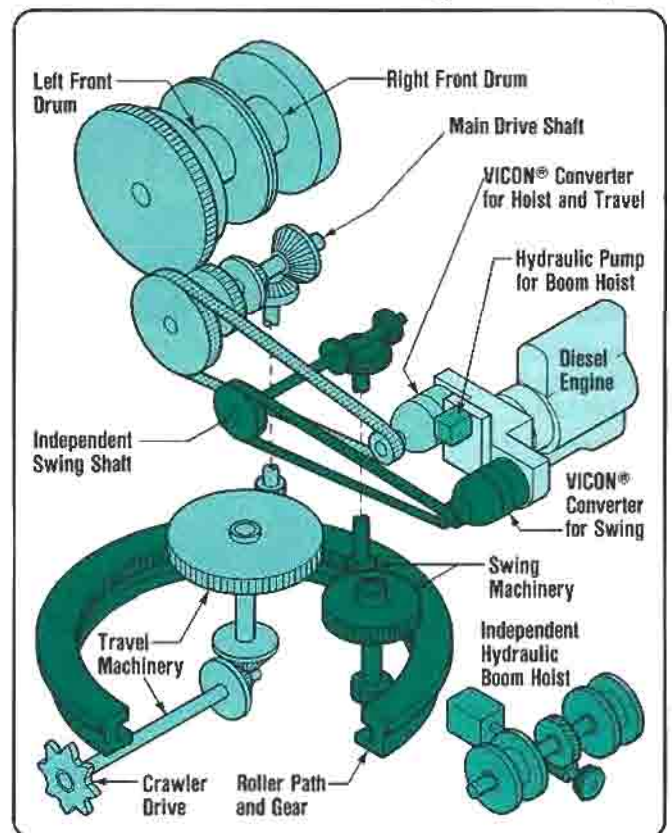
Consult factory for other drum options.

POWER TRAIN

POWER TRANSMISSION, VICON®: Manitowoc's patented VICON (Variable Independent CONTROL) system provides precision control and independent operation of major functions. Transmission case divides engine power to two controlled torque converters and a hydraulic pump. Front converter powers hoisting drums and travel machinery. Rear converter powers swing. Hydraulic pump powers independent boom hoist. VICON system engages clutches when no torque is transmitted from power source, eliminating clutch slippage and wear. After clutch is fully engaged, converter output is increased to provide infinitely-variable speed and torque for smooth, precise control.

VICON POWER LOWERING: VICON system provides controlled power load lowering for line pulls over 6,000 pounds (2,722 kgs.). It enables the load to be held or lowered by the VICON torque converter's stepless variable output. Drum clutch remains engaged, eliminating transfer of load from clutch to brake during normal operation.

FULL-RANGE VICON POWER LOWERING: Optional hydraulic motor drives output shaft of VICON hoist converter in reverse to provide power lowering for line pulls less than 6,000 pounds (2,722 kgs.). Permits a full range of lowering speeds with any load from empty hook through maximum capacity.



LOWERWORKS

ROLLER PATH AND RING GEAR: Machined, heat-treated, alloy-steel casting with 105 7/8" (2.69m) outside diameter, 6" (152mm) wide top face, and 3" (76mm) thick hook roller flange forms stable support for rotating upperworks. Secured to carbody with high-strength bolts, roller path remains in place for shipment, reducing setup time. Internal ring gear teeth are precision-cut by machine.

KING PIN: Machined steel fabrication bolted to carbody provides pivot for rotating bed and supports vertical travel shaft. Remains in place for shipment, reducing set-up time. Mates with pressure-lubricated bronze bearing in rotating bed.

FRONT IDLER ROLLER: Double-flanged steel roller keeps tread aligned. Roller is mounted on stationary shaft supported at both ends for maximum strength. Roller revolves on two bronze bearings lubricated by a center grease pocket.

CARBODY: Single-piece steel weldment provides high strength-to-weight ratio. Webbed design transmits loadings efficiently from area beneath roller path to four integral wings at sides.

The wings, visible on finished carbody (below), fit into pockets in the crawler assemblies, providing fast set-up and a low center of gravity. Machined surfaces on wing bottoms distribute loadings over large area of crawlers to minimize bearing pressure and increase stability. Steering mechanism, visible at center of carbody, is normally enclosed by steel covers.



CRAWLER ASSEMBLIES: Two self-contained assemblies mount quickly on carbody wings, enabling fast set-up. Each assembly consists of a fabricated frame supporting a drive tumbler, a crawler sprocket and chain, 12 intermediate rollers, a front idler roller, and a crawler tread. Abrasion-resistant slide rails along top of frame provide continuous support for tread, eliminating tread flexing and the need for upper idler rollers.

CRAWLER DRIVE: Outside drive chains permit crawlers to be removed and installed as complete assemblies for fast set-up. Drive sprocket in crawler frame is joined to horizontal travel shaft by jaw clutch. Telescoping shaft allows crawler to be extended, retracted, and removed without separating drive chain or tread.

CRAWLER TREADS: Consist of 52 pads per crawler. 48" (1.22m) wide pads distribute loadings over large area for maximum stability and low ground-bearing pressure. Adjacent pads connected by two wear-resistant steel pins. Closed design prevents pads from carrying dirt onto crawler frames.

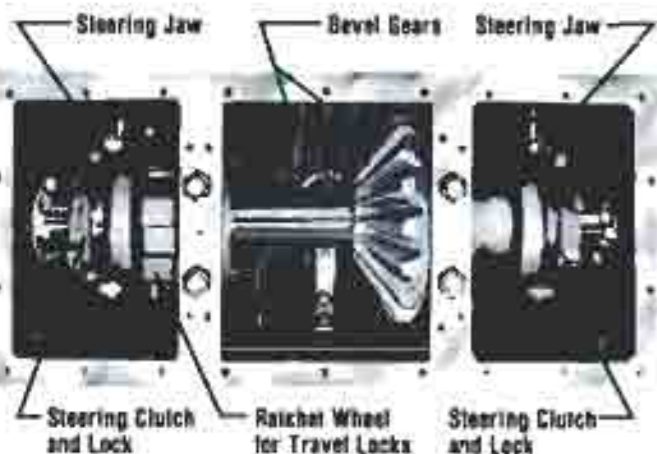
INTERMEDIATE ROLLERS: Twelve double-flanged 14" (356mm) diameter rollers recessed in bottom of crawler frame distribute loadings properly to tread and keep tread properly aligned. Rollers are mounted individually on stationary shafts supported at both ends by welded frames and held in place by keeper bars. Each roller revolves on two bronze bushings lubricated by a center grease pocket.

CRAWLER PADS: Constructed of alloy steel cast in closed box-section design with center driving lug. Heavy internal ribbing provides great strength, especially next to driving lug, where intermediate rollers bear. Tapered outer edges minimize digging-in during turns.

TREAD ADJUSTMENT: Crawler tread is adjusted easily by positioning the front idler roller's support shaft, then inserting shims.

CRAWLER SPROCKET AND TUMBLER: Durable steel casting with flame-hardened teeth and rim. Mounted on stationary shaft supported at both ends by crawler frame for maximum strength and proper alignment. Sprocket and tumbler revolve on two bronze bushings lubricated by center grease pocket for efficient operation. Self-cleaning tumbler has alternate sides open.

JAW CLUTCH COUPLING: Jaw clutches on ends of carbody's travel shaft mate quickly with drive shafts in crawler frames and are locked in position by coupling covers. Crawler drive shafts are splined and telescope so crawlers can be extended and retracted without uncoupling the jaw clutches. The splined shafts are protected from dirt and moisture by bellows.



TRAVEL AND STEERING MECHANISM: Mechanical system provides reliable control. Power is transmitted from upperworks through a vertical shaft in the king pin to the steering mechanism mounted on a three-piece horizontal shaft in carbody. Bevel gears that connect the vertical and horizontal shafts run in oil for long life. Two air-controlled jaw clutches provide steering. Both clutches are engaged for straight travel, and one clutch is placed in neutral for gradual turns or locked position for sharp turns. Interlock keeps at least one clutch engaged at all times. Ratchet wheel at left of bevel gears is engaged by two gravity-applied, air-released travel locks. Engaging a single lock prevents travel in one direction. Engaging both locks prevents all travel.



UPPERWORKS

REAR HOOK ROLLERS: Four antifriction-bearing-mounted rollers supported in pairs by heavy steel hangers that pivot to equalize roller loadings. Hangers' wide spacing provides stability and distributes loadings over a large area of the roller path. Rollers mounted on eccentric shafts for easy adjustment.

ROTATING BED: Single-piece steel fabrication with high strength-to-weight ratio forms rigid deck for mounting all other upperworks components. Precision boring assures proper alignment of machinery. Bed rotates on four house rollers: two front and two rear, all mounted on antifriction bearings.

FRONT HOOK ROLLERS: Two antifriction-bearing-mounted rollers supported individually by fabricated frames integral with rotating bed. Frames spaced wide to provide stability. Rollers mounted on eccentric shafts for easy adjustment.

MAIN DRIVE SHAFT: Precision-machined alloy-steel shaft, antifriction-bearing-mounted for efficient operation. Shaft, chain-driven by front VICON™ converter, transmits power for travel and hoisting functions. (See "Power Train", page 3.) Pinion splined to shaft's left end drives drum shaft. Large single-disc clutches at middle are air applied, spring released. One clutch is engaged for forward travel, the other engaged for backward travel. Clutch hubs are splined to shaft. Clutch spiders with bevel pinions revolve on antifriction bearings. Clutches are air applied and spring released for smooth operation. Bevel pinions on clutches engage bevel gear on top of slide pinion shaft. Pinions and gear are fully enclosed and operate in oil for long life.

INDEPENDENT SWING SHAFT: Permits swing function to be operated independently for maximum productivity. Heat-treated, alloy-steel shaft, antifriction-bearing-mounted on rotating bed. Chain-driven by rear VICON converter. Powers two double-disc clutches that smoothly control swing direction. Clutch hubs splined to shaft. Clutch spiders with integral bevel pinions, antifriction-bearing-mounted. Clutches applied by air-actuated cam levers, and released by springs. Cam lever faces separated by roller bearings that minimize friction. Linings remove easily for replacement. Bevel pinions drive through gear train to ring gear on roller path. Spring-applied, air-released swing brake provided.

UPPERWORKS MACHINERY: Components fit compactly onto rotating bed. Right to left: boom hoist, power plant with VICON controlled torque converters and boom-hoist hydraulic pump, chain drives, independent swing shaft, main drive shaft, drum shaft, and A-frame center legs.

INDEPENDENT BOOM HOIST: Hydrostatic boom hoist powered by variable-displacement hydraulic motor provides full-range speed control. Dual drums mounted on heat-treated alloy-steel shaft. Driven through planetary gear reduction by bronze worm and gear. All rotating shafts antifriction bearing mounted. Gears fully enclosed and run in oil. Boom hoist main brake is external-contracting band-type, spring applied, air released. Auxiliary brake is external-contracting band-type, manually-applied from operator's station. Ratchet and pawl enclosed inside gear housing. Ratchet mounted to worm gear, pawl gravity-engaged, air-released. Drum rotation indicator standard. Boom hoist mounted in rear of rotating bed.

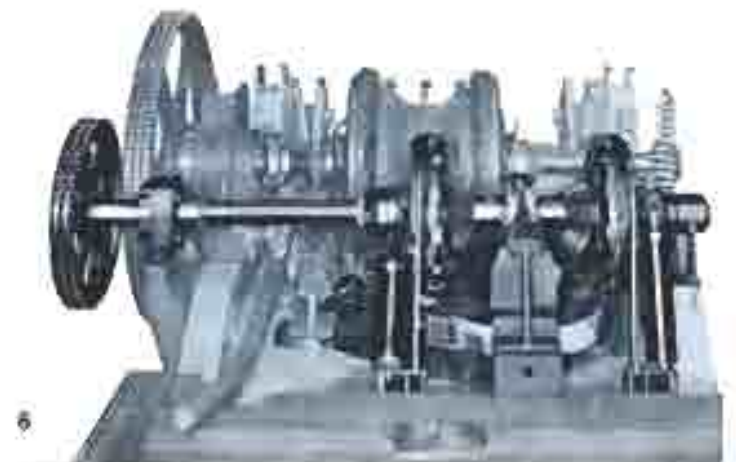
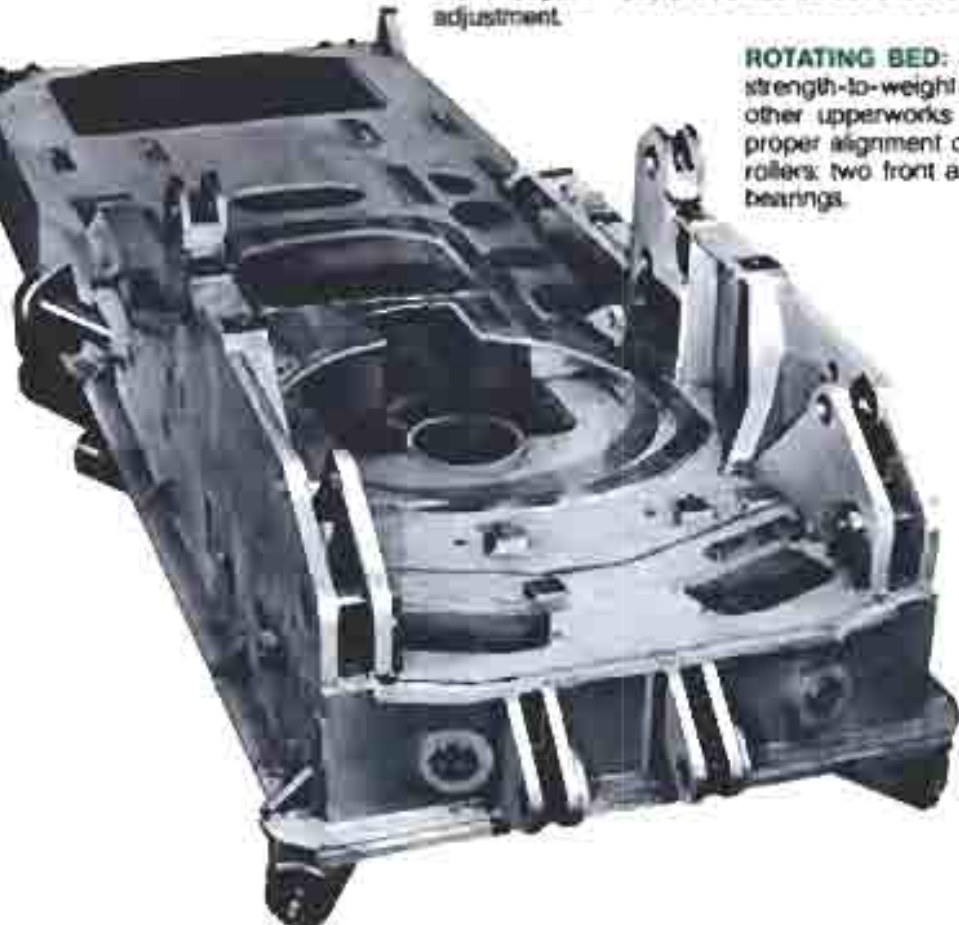
DRUM SHAFT ASSEMBLY: Heat-treated alloy-steel shaft, antifriction-bearing mounted for efficient operation. Antifriction-bearing-mounted drums are cast steel with a cast-iron brake-and-clutch flange bolted to outboard side. Clutch spiders splined to drum shaft. Air-controlled, internal-expanding, band-type clutches. External-contracting, band-type brakes have toggle design that maximizes efficiency. Mechanically-applied brakes are standard on liftcranes. Air-applied brakes are standard on excavators. Spring-set parking brakes are provided on machines that have air-controlled brakes.

CENTRALIZED LUBRICATION: Conveniently grouped and labeled grease fittings placed in an easily accessible location simplify lubrication and reduce maintenance time.

GANTRY AND BACKHITCH: Gantry is fabricated plate with parallel box-section legs. Supported on large pins by A-frame center leg. Three-piece telescoping backhitch is pin-connected to rear of rotating bed and top of gantry. All gantry sheaves are antifriction-bearing mounted.

GANTRY LIFTING DEVICE: Electrically-powered hydraulic unit begins raising of gantry and controls lowering of gantry into cab roof.

SWING LOCK: Air-controlled, spring-loaded gear segment engages swing gear for positive locking.



FRONT END EQUIPMENT

NO. 39 BOOM: 30' (9.14m) butt; 10' (3.05m), 20' (6.10m), and 40' (12.19m) inserts; 40' (12.19m) open-throat top. Rectangular box-section design. All-welded construction with inverted-angle chords and tubular lacings. Chords are 100,000 PSI (689,500 kPa) yield steel; lacings are 90,000 PSI (620,550 kPa) yield steel. All boom sections 80" (2.03m) wide x 80" (2.03m) deep at pin-connected joints. Each insert matched with two pair of 1 1/4" (32mm) diameter, single-length pendants. Lower boom point equipped with six 24" (610mm) diameter sheaves. Upper boom point has single 27" (686mm) diameter sheave with rope guard for liftcrane or cheek plate for dragline. For clamshell, upper point has two 27" (686mm) diameter sheaves with cheek plates. All sheaves antifriction-bearing mounted. Basic boom length, 70' (21.34m); maximum length, 260' (79.25m).

BOOM RIGGING: Twelve-part rigging is formed by a single line reeved from boom hoist drums through sheaves on gantry and equalizer. Equalizer is connected to boom point by four 1 1/4" (32mm) diameter pendants. As inserts are added to lengthen boom, additional sets of pendants are added to lengthen rigging.

EQUALIZER: Fabricated steel frame supports four vertical sheaves and two horizontal sheaves, all antifriction-bearing mounted.

AUTOMATIC BOOM STOP: Standard on liftcrane, clamshell, and combination machines. When boom reaches 82° angle, it contacts push rod, automatically stopping boom hoist operation.

TELESCOPIC BOOM STOP: Standard on liftcrane. Air-cushioned telescoping tubes pinned to boom and A-frame start cushioning at 77° boom angle; provide positive physical stop at 85° from horizontal.

WIRE ROPE GUIDE: Mounted on upper side of boom top. Two fleeting sheaves, bronze-bearing mounted in steel frame.

WIRE ROPE ROLLER GUIDES: Mounted on top of boom inserts. Rollers are induction-hardened tubing, antifriction-bearing mounted.

4 1/2° OFFSET BOOM TOP: Optional. Increases clearance between boom and load. Standard boom top converted by adapter links at upper joints. Consult factory for capacity charts and information.

NO. 123 JIB: Optional. 20-ton (18.14-metric ton) maximum capacity. 30' (9.15m) basic length extendible to 40' (12.20m), 50' (15.25m), or 60' (18.30m) with 10' (3.05m) inserts and matching pendants. Jib offset angle adjustable to 0, 10, or 20 degrees. All-welded construction with tubular chords and lacings. Chords 100,000 PSI (689,500 kPa) yield steel. Rectangular box section 30" (762mm) wide x 30" (762mm) deep at pin-connected joints. Jib point has 24" (610mm) OD, antifriction-bearing-mounted sheave, cheek plate, and anchor for two-part line. Maximum boom-and-jib combination, 230' (70.15m).

NO. 124 JIB: Optional. 10-ton (9.07-metric-ton) maximum capacity. 30' (9.15m) basic length extendible to 40' (12.20m), 50' (15.25m), or 60' (18.30m), with 10' (3.05m) inserts and matching pendants. Jib offset angle adjustable to 0, 10, 20, or 30 degrees. All-welded construction with tubular chords and lacings. Chords 100,000 PSI (689,500 kPa) yield steel. Rectangular box section 29 1/2" (749mm) wide x 22" (559mm) deep at pin-connected joints. Jib point has 19 1/2" (495mm) OD, antifriction-bearing-mounted sheave with wire rope guide. Anchor joint for two-part line optional. Maximum boom-and-jib combination, 250' (76.25m).

CONSULT JIB LIFTING CAPACITY CHARTS FOR SPECIFIC CAPACITY WHEN USED ON VARIOUS BOOM LENGTHS.

REVOLVING FAIRLEAD: Furnished on dragline-equipped machines. Full revolving, antifriction-bearing-mounted in support at front of rotating bed. All joints tapered-pin connected for maximum stability. Trunnion shaft bronze-bearing mounted. Two large side guide rollers are case hardened and bronze-bearing mounted for long life. Two end guide rollers provided. For boom lengths through 80' (24.40m).

HINGED FAIRLEAD: Optional. Recommended for booms longer than 80' (24.40m). Extends guide sheaves for greater drag rope fleet angle. Stationary frame securely mounted to boom hinge lugs and front of rotating bed with tapered pins for maximum rigidity. Swivel frame antifriction-bearing mounted. Drag rope fully guided through swivel frame by sheaves and rollers. Sheaves mounted on tapered shaft for maximum stability; shafts antifriction-bearing mounted.

TAGLINE: Boom-mounted, three-barrel tagline with 30" (762mm) wheel standard on clamshell-equipped machines.

GENERAL

MACHINERY HOUSE: Fully encloses upperworks machinery. Sliding service doors on left side and in roof; hinged service door at left front. Power plant radiator shutter and ladder to roof provided. Catwalks and railings on both sides of cab, optional.

UNIVERSAL OPERATOR'S MODULE: Fully enclosed, insulated module mounted on right front corner of rotating bed provides comfortable environment. Large, rubber-mounted safety-glass windows offer wide-angle view. Sliding door on right side; sliding window on left side; roof window for overhead vision. Controls conveniently located and arranged for efficient operation. Signal horn standard; heater, windshield wiper, and circulating fan, optional. Elevated operator's module with duplicate controls, optional. Module is mounted forward of standard cab and provides eye-level 26'6" (8.08m) above ground.

CONTROLS: Modulating air controls engage boom hoist, main-drive-shaft clutches, and drum clutches. VICON control levers for hoisting, travel, and swing functions operate both clutch and converter. First movement engages clutch; further movement increases converter output, permitting variable speed. Drum brakes are pedal-operated and are mechanically applied on liftcranes, air-applied on duty-cycle machines. Travel locks, steering, and swing lock are air controlled.

SWING SPEED: Variable, 4.90 RPM maximum.

TRAVEL SPEED: Variable, 1.45 MPH (2.33 KPH) maximum.

GRADEABILITY: 30%.

Because of a program of continuing improvements, Manitowoc Engineering Co. reserves the right to change specifications at any time, without notice.

MANITOWOC ENGINEERING CO.

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Manitowoc, Wisconsin 54221

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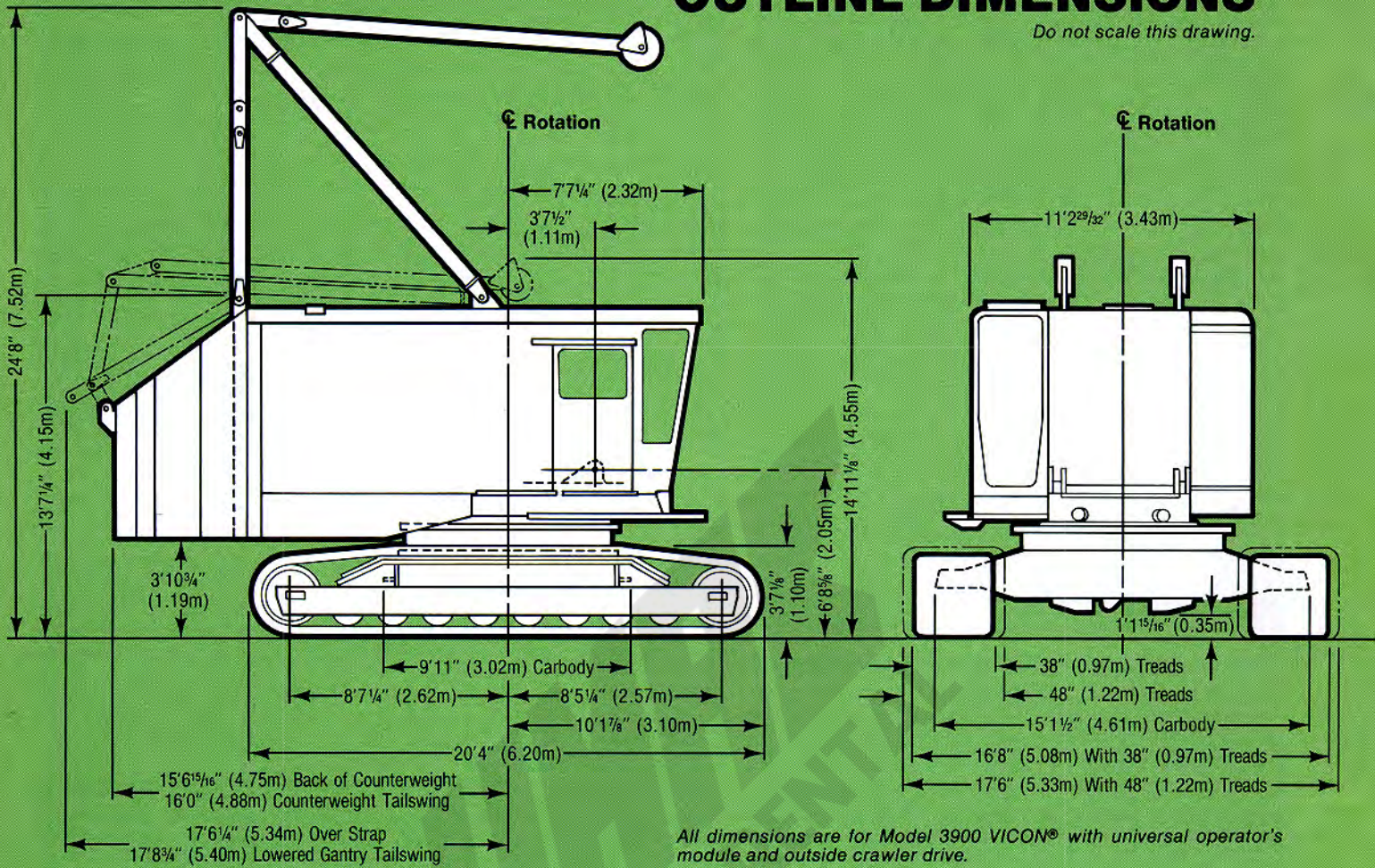


Manitowoc

3900 **VICON**[®]
LIFT • CLAM • DRAG • GRAPPLE • MAGNET

OUTLINE DIMENSIONS

Do not scale this drawing.



POWER PLANTS

	Model	Cylinder	Bore	Stroke	Cubic Inch Displacement	Net HP @ RPM (at flywheel)
BASIC	Cummins NT-855-C310	6	5.500" (140mm)	6.000" (152mm)	855 (14,011cc)	287 @ 2,000
OPTIONAL	Cummins NTA-855-C360*	6	5.500" (140mm)	6.000" (152mm)	855 (14,011cc)	334 @ 2,000
	Caterpillar 3406B DIT	6	5.400" (137mm)	6.500" (165mm)	893 (14,634cc)	300 @ 2,000
	Caterpillar 3406B DITA*	6	5.400" (137mm)	6.500" (165mm)	893 (14,634cc)	345 @ 2,000
	Detroit Diesel 12V-71N*	12	4.250" (108mm)	5.000" (127mm)	852 (13,962cc)	363 @ 2,000

Air Compressor: 37.5 CFM (1,062 Liters).

*Recommended for Duty Cycle.

Fuel Tank Capacity: 225 Gallons (852 Liters).

For other power plants, consult factory.

DRUMS AND LAGGINGS

Application	Drum	Diameter	Drum Width	Type of Lugging	Wire Rope Size	Spooling Capacity			
						First Layer	Layers	Maximum Capacity	
LIFTCRANE	Hoist	Right	17½" (445mm)	17¾" (441mm)	None	1" (25mm)	77' (23.49m)	7	710' (216.55m)
	Whip	Left	27" (686mm)	17¾" (441mm)	Grooved	1" (25mm)	116' (35.38m)	2	240' (73.20m)
	Third Drum	Rear Aux.	17" (432mm)	32 ⁹ / ₁₆ " (827mm)	None	1" (25mm)	140' (42.70m)	3	467' (142.44m)
				34 ¹⁵ / ₁₆ " (887mm)*		1" (25mm)	150' (45.75m)*	3	501' (152.81m)*
CLAMSHELL	Closing	Right	27" (686mm)	17¾" (441mm)	Grooved	1½" (29mm)	105' (32.03m)	3	340' (103.70m)
	Holding	Left	27" (686mm)	17¾" (441mm)	Grooved	1½" (29mm)	105' (32.03m)	3	340' (103.70m)
DRAGLINE	Drag	Right	24" (610mm)	17¾" (441mm)	Grooved	1¼" (32mm)	83' (25.32m)	1	83' (25.32m)
	Hoist	Left	27" (686mm)	17¾" (441mm)	Grooved	1" (25mm)	116' (35.38m)	1	116' (35.38m)

*Without ratchet ring.

For other options, consult factory.

WEIGHTS

	Pounds*	Kilograms*		Pounds*	Kilograms*
LIFTCRANE (complete): lowerworks, upperworks, and 60' (18.30m) basic boom	229,485	104,186	Regular Top, 30' (9.15m) equipped with 2-sheave point and basic bridle set	4,202	1,908
CARBODY AND UPPERWORKS (combined): complete with basic machinery, drums, gantry, backhitch, equalizer, and boom hoist wire rope	94,550	42,926	Inserts:		
LOWERWORKS:			10' (3.05m) with pendants and wire rope roller guide	1,160	527
Carbody, with travel mechanism, king pin, and roller path	29,000	13,166	20' (6.10m) with pendants and wire rope roller guide	1,930	876
Crawler Assemblies (2), with 38" (0.97m) wide treads and outside drive chains, each assembly 20,830 lbs. (9,457 kgs.)	41,660	18,914	30' (9.15m) with pendants and wire rope roller guides	2,610	1,185
For 48" (1.22m) treads, add 4,170 lbs. (1,893 kgs.) to each crawler assembly	50,000	22,700	30' (9.15m) with pendants, wire rope roller guides, and jib backstay lugs	2,660	1,208
UPPERWORKS:			Pendant Spreader Bar	280	127
Rotating Bed, complete with basic machinery, including drums, but not gantry and backhitch, front end attachments, or counterweight	59,640	27,077	Wire Rope Guide	270	123
Gantry and Backhitch	4,200	1,907	JIB NO. 123:		
Equalizer	1,050	477	Butt, 15' (4.58m)	690	313
Telescopic Boom Stop	650	295	Insert, 10' (3.05m)	340	154
Removable Counterweight (3-piece):			Top, 15' (4.58m) with point assembly	695	316
Inner	32,000	14,528	Basic Pendant, 2 required, each 115 lbs. (52.21 kgs.)	230	104
Middle	26,500	12,031	Pendant, 2 per insert, each 65 lbs. (29.51 kgs.)	130	59
Outer	15,500	7,037	Backstay Pendant, 2 required, each 155 lbs. (70.37 kgs.)	310	141
Total	74,000	33,596	Strut, 12'6" (3.81m)	365	166
Dragline Fairlead:			JIB NO. 124:		
Revolving Type	1,910	867	Butt, 15' (4.58m)	410	186
Hinged Type	3,340	1,516	Insert, 10' (3.05m)	175	80
BOOM NO. 8:			Top, 15' (4.58m) with point assembly	480	218
Butt, 30' (9.15m) less wire rope and pendants	3,250	1,476	Basic Pendant	100	45
Open Throat Top, 30' (9.15m) equipped with 4-sheave lower point, 2-sheave upper point, and basic pendants	4,925	2,236	Pendant, 2 per insert, each 20 lbs. (9.08 kgs.)	40	18
			Backstay Pendant, 2 required, each 140 lbs. (63.56 kgs.)	280	127
			Strut, 18' (5.49m)	380	173

*Weights are approximate and may vary between machines as a result of design changes and component variations.

GENERAL

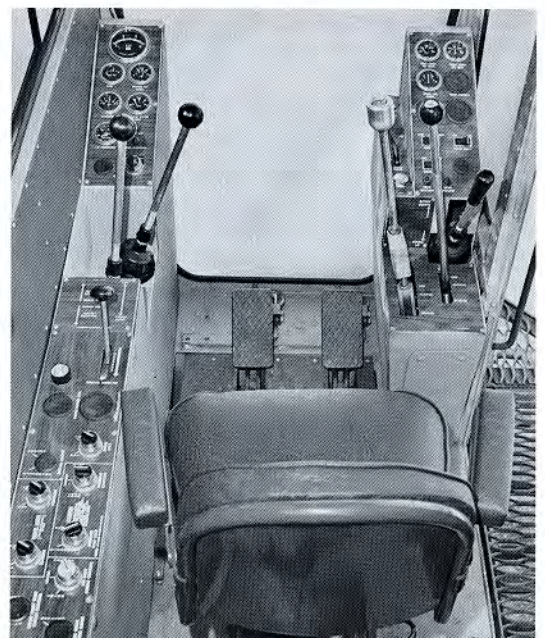
SWING SPEED: Independent Swing, variable, 4.50 RPM maximum. Standard Swing, variable, 4.95 RPM maximum.

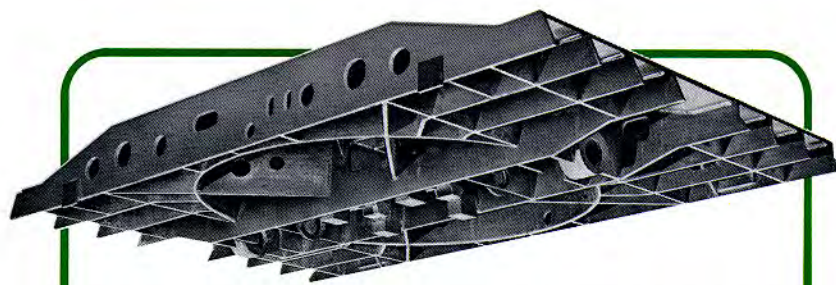
TRAVEL SPEED: Variable, 1.45 MPH (2.33 KPH) maximum.
GRADEABILITY: 30%.

MACHINERY HOUSE: Steel house fully encloses upperworks machinery. Service doors left side rear, left front, and in roof, plus roof ladder provide easy access. Catwalks and railings optional.

UNIVERSAL OPERATOR'S MODULE: Fully-enclosed and insulated module isolates operator from machinery noise. Large, rubber-mounted safety glass windows provide wide-angle view. Sliding door right side; sliding window left side; overhead window for high-boom vision. Signal horn standard; windshield wiper, fan, heater, and air conditioner optional. Optional elevated modules provide operator eye level 14' (4.27m) or 18' (5.49m) above ground.

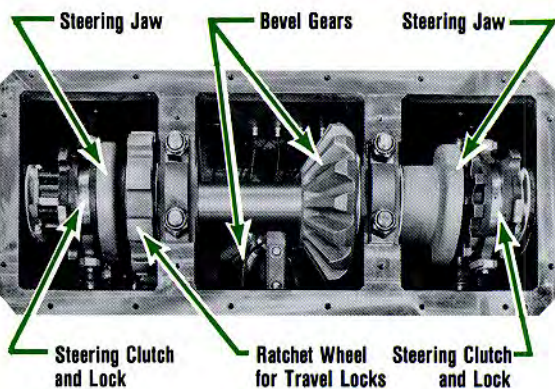
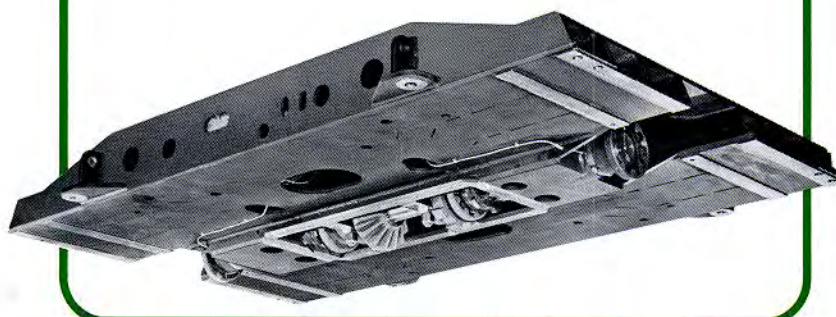
CONTROLS: Modulating air controls engage clutches for main drive shaft, boom hoist, and drums. With VICON, control levers for drums, travel, and swing operate both clutch and converter. First movement engages clutch; further movement increases converter output, permitting variable speed. Drum brakes are pedal-operated, mechanically applied on liftcrane and air-applied on duty cycle machines. Travel locks, steering, and swing lock are air controlled. Slide pinion is manually controlled.





CARBODY: Single-piece steel weldment provides high strength-to-weight ratio. Fabricated construction provides maximum strength where it's needed most. Webbed design transmits loads efficiently from area beneath roller path to four integral wings at sides.

The wings, clearly visible on finished carbody (below), fit into pockets in crawler assemblies, providing fast setup and a low center of gravity. Machined surfaces on wing bottoms distribute loadings over large area of crawlers to minimize bearing pressure and increase stability. Steering mechanism, visible at center of carbody bottom, is normally enclosed by steel covers.



TRAVEL AND STEERING MECHANISM: Simple mechanical system provides reliable steering control. Travel power transmitted from upperworks to mechanism through vertical shaft in king pin. Mechanism is mounted on center section of three-piece horizontal travel shaft in carbody. Bevel gears that transmit power from vertical shaft to horizontal shaft run in oil for long life. Air-controlled jaw clutches at each side of bevel gears provide steering. Each clutch can be placed into engaged, neutral, or locked position. Operator steers by choosing combinations of clutch positions. Both clutches engaged for straight travel; one clutch placed in neutral for gradual turns or locked position for sharp turns. Clutch interlock keeps at least one clutch engaged at all times.

Ratchet wheel at left of bevel gears is engaged by two gravity-applied, air-released travel locks. Engaging a single lock prevents travel in one direction while permitting movement in opposite direction. Engaging both locks prevents all travel.

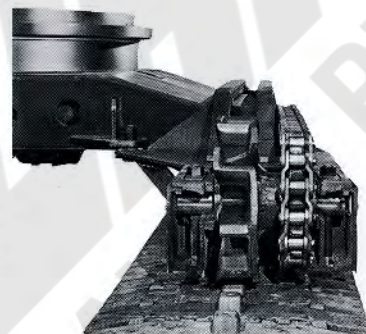
LOWERWORKS

KING PIN: Machined steel fabrication bolted to carbody. Supports vertical travel shaft and provides pivot for rotating bed. King pin remains in place during shipment, reducing setup time. Mates with pressure-lubricated bronze bushing in rotating bed. Takes horizontal loadings only, no uplift.



CRAWLER TREADS: Provide large surface area to distribute loads for maximum stability with low ground-bearing pressures. Consist of 44 pads per crawler assembly. Adjacent pads connected by two wear-resistant steel pins. Closed pad design prevents dirt from being carried onto crawler frames. 38" (0.97m) and 48" (1.22m) pad widths available.

CRAWLER SPROCKET AND TUMBLER: Steel casting with flame-hardened teeth and rim constructed for durability. Mounted on stationary shaft supported at both ends by crawler frame for maximum strength and proper alignment. Sprocket and tumbler revolve on two bronze bushings lubricated by center grease pocket for efficient operation. Self-cleaning tumbler has alternate sides open.



CRAWLER PADS: Constructed of alloy steel cast in a closed box-section design for high strength-to-weight ratio. Heavy internal ribbing provides maximum strength, especially where rollers bear. Tapered outer edges maximize maneuverability.



INTERMEDIATE ROLLERS: Eight 18" (457mm) diameter rollers recessed in crawler frame bottom distribute loadings properly to tread. Double-flanged roller design keeps tread properly aligned. Rollers mounted individually on stationary shafts supported at both ends by welded frames and held in place by keeper bars. Each roller revolves on two bronze bushings lubricated by a center grease pocket.



ROLLER PATH AND RING GEAR: Large-diameter roller path forms stable support for rotating upperworks. Machined, heat-treated, alloy steel casting has 105 1/2" (2.69m) outside diameter, 4 7/8" (124mm) wide top face, and 3" (76mm) thick hook roller flange. Roller path secured to carbody with single row of high strength bolts, remains in place for shipment, reducing setup time. Internal ring gear teeth are precision-cut by machine.

FRONT IDLER ROLLER: Double-flanged, 29 1/2" (749mm) diameter, fabricated steel roller mounted at front of crawler assembly keeps tread properly aligned. Roller mounted on stationary shaft supported at both ends for maximum strength. Roller revolves on two bronze bushings lubricated by center grease pocket.

CRAWLER ASSEMBLIES: Two self-contained assemblies mount quickly on carbody wings, enabling fast setup. Each assembly consists of a fabricated frame supporting a drive tumbler, a crawler sprocket and chain, eight intermediate rollers, a front idler roller, and crawler tread. Abrasion-resistant slide rails along crawler frame top provide smooth, continuous support for tread, eliminating tread flexing and need for upper idler rollers.

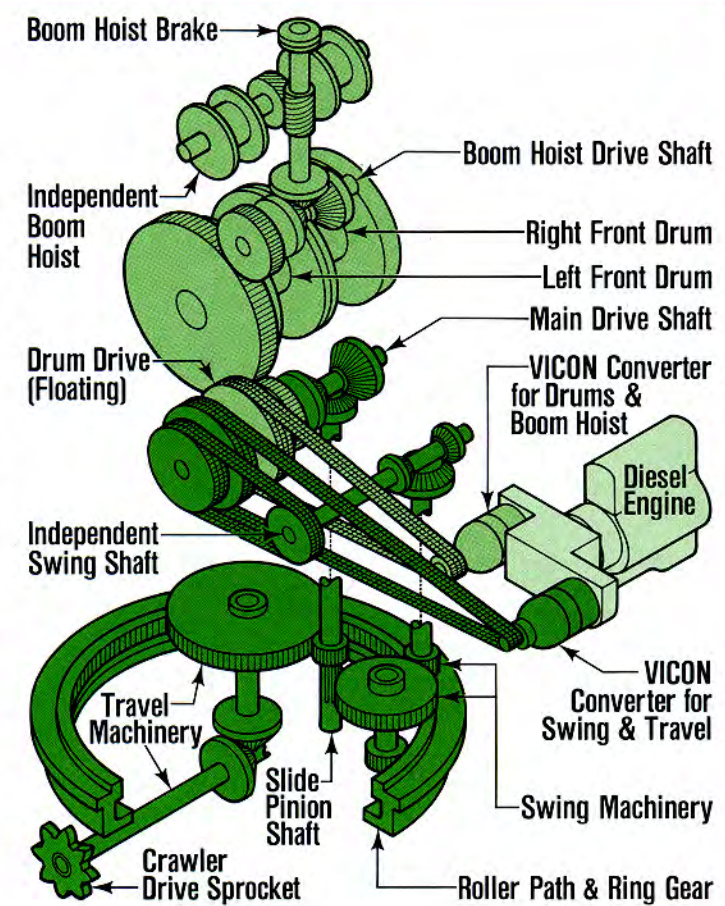
CRAWLER DRIVE: Optional outside drive chains (shown) permit crawler assemblies to be removed or installed as units for fast setup and takedown. Self-contained drive sprocket is mounted within crawler assembly and joined to horizontal travel shaft by jaw clutch coupling. Inside drive chains are standard.

POWER TRAIN

POWER TRANSMISSION, VICON®: Manitowoc's patented VICON (Variable Independent CONTROL) system provides precision control and independent operation of major functions. Engine power is divided by transmission case to two controlled torque converters. Front converter powers hoisting drums and boom hoist. Rear converter powers swing and travel machinery. With VICON, clutches engage when no torque is transmitted from power source, eliminating clutch slippage and wear. After clutch is fully engaged, converter output is increased to provide infinitely-variable speed and torque for smooth, precise control.

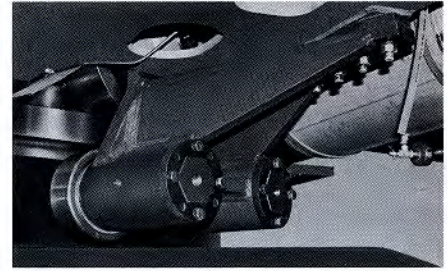
VICON POWER LOWERING: VICON provides controlled power load lowering for line pulls exceeding 6,000 pounds (2,724 kgs). Load can be held or lowered using hoist converter's stepless variable output.

FULL-RANGE VICON POWER LOWERING: Optional hydraulic motor drives output shaft of VICON hoist converter in reverse to provide power lowering for line pulls less than 6,000 pounds (2,724 kgs). Permits full range of lowering speeds with any load from empty hook through maximum capacity.



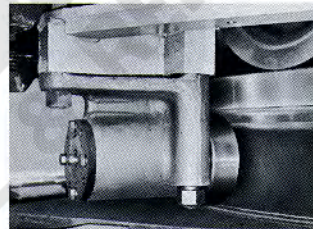
UPPERWORKS

REAR HOOK ROLLERS: Four rollers supported in pairs by steel frames secure rotating bed to roller path. Widely-spaced hangers distribute loadings over large area of roller path. Rollers are mounted individually on eccentric shafts for easy adjustment. Each roller revolves on a durable bronze bushing for easy maintenance.



ROTATING BED: Single-piece steel fabrication with integral machinery side frames forms rigid deck for mounting all upperworks components. Fabricated construction provides high strength-to-weight ratio. Precision boring assures proper alignment of machinery components. Bed rotates on four bushing-mounted house rollers: two front and two rear.

MAIN DRIVE SHAFT: Precision-machined alloy-steel shaft, antifriction-bearing mounted for efficient operation. Shaft chain-driven by rear VICON® converter transmits power to travel and standard swing functions through two single-disc reversing clutches. (See "Power Train", page 5.)



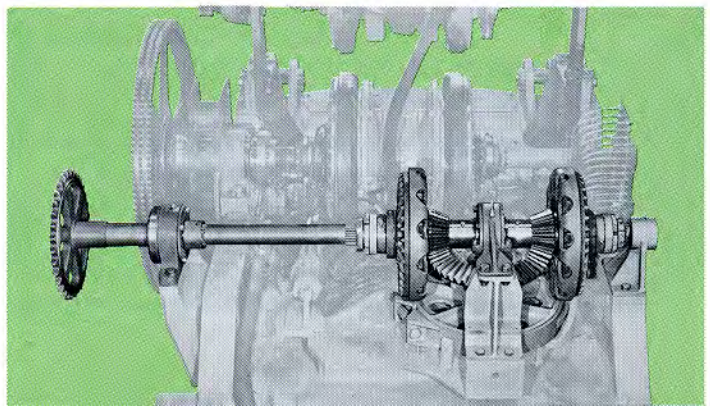
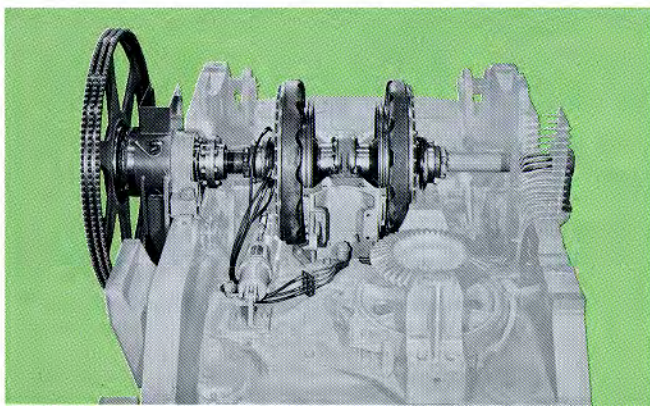
FRONT HOOK ROLLERS: Two rollers supported individually by steel frames bolted to rotating bed. Wide spacing of frames holds rotating bed securely on roller path. Rollers mounted on eccentric shafts for easy adjustment. Each roller revolves on a durable bronze bushing for easy maintenance.

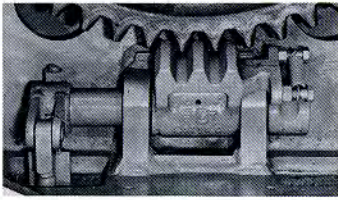
Operator selects travel or standard swing by positioning manually-controlled slide pinion to engage either travel or swing machinery. Left clutch is then applied to travel forward or swing left. Right clutch is applied to travel backward or swing right. Clutch hubs are splined to shaft. Clutch spiders with bevel pinions revolve on antifriction bearings. Clutches are air applied and spring released for smooth operation. Bevel pinions on clutches engage bevel gear on top of slide pinion shaft. Pinions and gear are fully enclosed and operate in oil for long life.

Main drive shaft also supports sprocket and pinion that drive drum shaft. Mounted on antifriction bearings, sprocket and pinion revolve independently of main drive shaft and are driven by front VICON converter.

INDEPENDENT SWING SHAFT: Optional. Heat-treated alloy steel shaft, antifriction-bearing mounted on rotating bed behind main drive shaft permits independent operation of swing and travel functions. Chain-driven from main drive shaft. Independent swing is controlled smoothly by two single-disc clutches mounted on shaft: one clutch engaged for swing left; the other for swing right. Clutch hubs splined to shaft. Clutch spiders antifriction-bearing mounted.

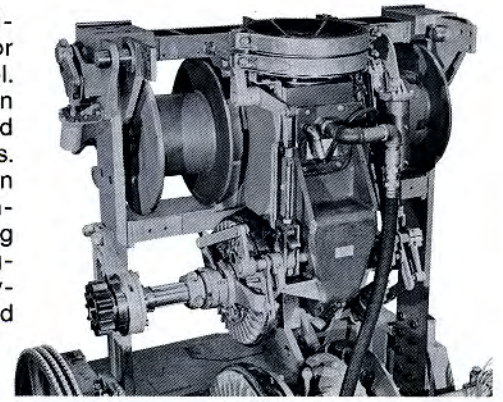
Clutches applied by manually-actuated cam levers and released by springs. Linings remove easily for quick replacement. Bevel pinions on clutches drive through gear train to ring gear on roller path. Pinions enclosed and lubricated by circulating oil for long life. Spring-applied, air-released swing brake provided.



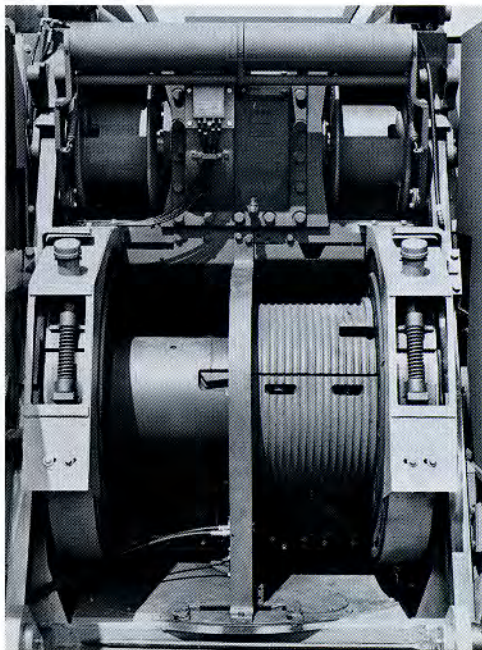
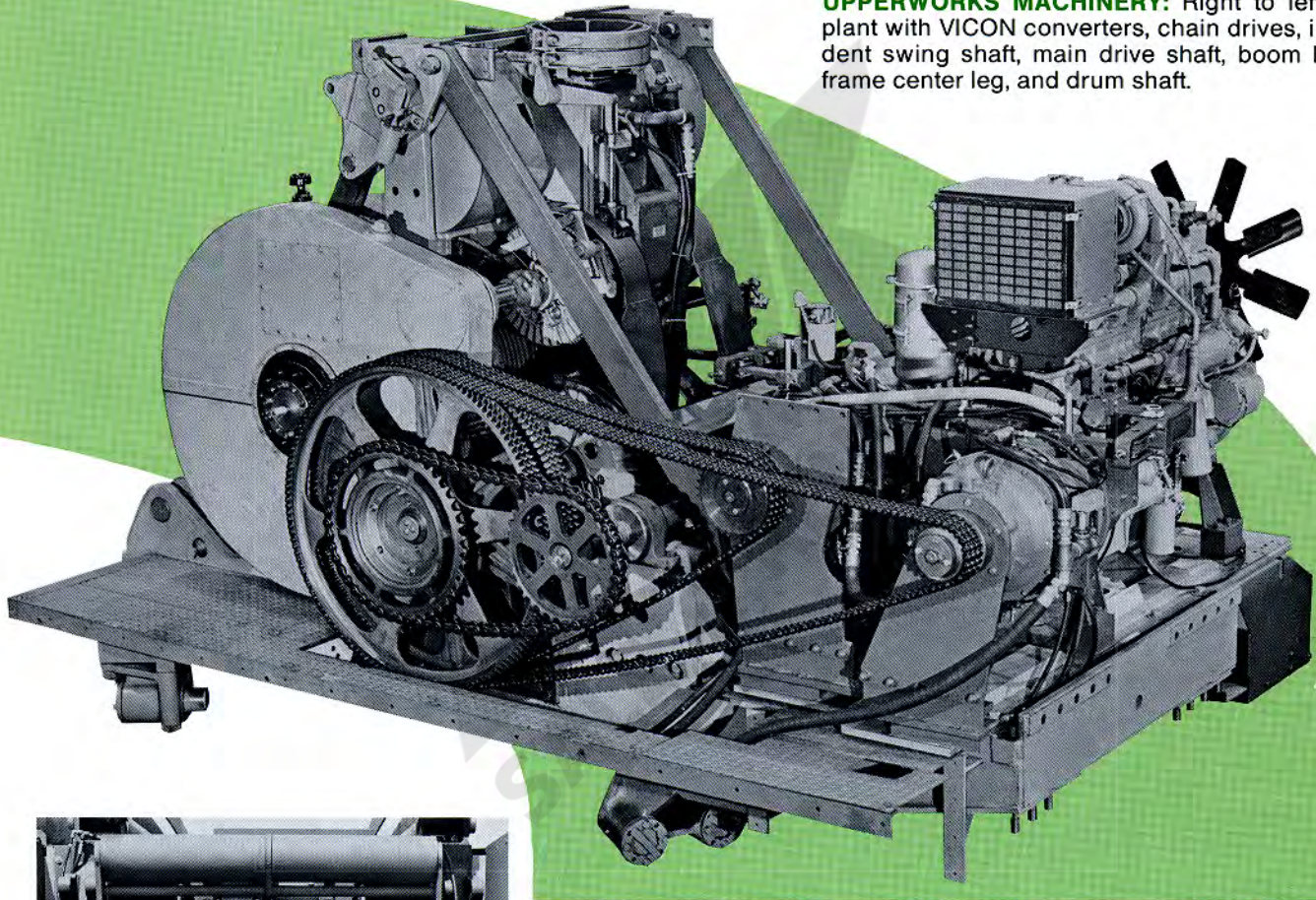


SWING LOCK: Air-operated, spring-loaded, gear-type lock engages swing gear for positive locking.

INDEPENDENT BOOM HOIST: Permits simultaneous booming, hoisting, and swinging for faster operation with superior load control. Reliable, mechanical boom hoist mounted on top of A-frame powers boom both up and down for accurate control of load radius. Dual-drum design provides equal tension on both sides of boom rigging for superior handling. Air-controlled, single-disc reversing clutches provide smooth operation. Spring-applied, air-released main brake, manually-controlled auxiliary brake, and gravity-applied ratchet-and-pawl provided.

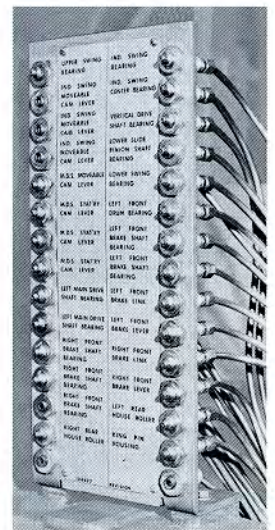


UPPERWORKS MACHINERY: Right to left: power plant with VICON converters, chain drives, independent swing shaft, main drive shaft, boom hoist, A-frame center leg, and drum shaft.



DRUM SHAFT ASSEMBLY: Heat-treated alloy-steel shaft, antifriction-bearing mounted for efficient operation. Enclosed drum gears run in oil for extended life with minimized maintenance. Antifriction-bearing-mounted drums are cast steel with a cast-iron brake-and-clutch flange bolted to outboard side. Clutch spiders splined to drum shaft. Clutches are air-controlled, internal-expanding, band type. Brakes are external-contracting band type with toggle design that maximizes braking efficiency. Mechanically-applied brakes are standard on liftcranes. Air-applied brakes are optional on liftcranes and standard on clamshells and draglines to increase operator efficiency in duty cycle applications. Spring set parking brakes are provided on liftcranes and duty cycle machines that employ air-controlled brakes.

CENTRALIZED LUBRICATION: Conveniently grouped and labeled grease fittings placed in an easily-accessible location simplify lubrication and reduce maintenance time.



FRONT END EQUIPMENT

NO. 8 BOOM: Rugged boom serves both liftcrane and duty cycle applications. 30' (9.15m) butt; 10' (3.05m), 20' (6.10m), and 30' (9.15m) inserts; 30' (9.15m) top. All sections constructed of inverted-angle chords and tubular lacings welded in rectangular box-section design 74" (1.88m) wide x 72" (1.83m) deep. Chords 100,000 PSI (7,000 kg/cm²) yield steel; lacings 90,000 PSI (6,300 kg/cm²) yield steel. Adjacent boom sections connect with four single-bolt pad joints for fast boom assembly. Basic boom length: 60' (18.30m). Maximum boom lengths: 100' (30.50m) for dragline; 120' (36.60m) for clamshell; 210' (64.05m) for liftcrane.

"Open Throat Top", standard on liftcranes and combination lift-clam-drag machines. Features four 24" (610mm) diameter sheaves in lower point and two 27" (686mm) diameter sheaves in upper point, all mounted on straight roller bearings. Rope guard provided on liftcranes; cheek plate provided on combination machines.

"Regular Top", standard on duty cycle machines. Equipped with cheek plate and one 36" (914mm) diameter sheave for dragline or magnet, or two 36" (914mm) diameter sheaves for clamshell or grapple. All sheaves mounted on tapered roller bearings.

GANTRY AND BACKHITCH: Fabricated gantry has parallel tube legs. Supported on large pins by A-frame center leg. Folding, link-type backhitch is pin-connected to gantry and rear of machinery house. All sheaves antifriction-bearing mounted.

EQUALIZER: Fabricated steel frame supports six antifriction-bearing-mounted sheaves.

BOOM RIGGING: Ten-part standard rigging formed by a single line reeved from boom hoist drums through sheaves on gantry and equalizer. Rigging between gantry and equalizer remains intact during shipment, minimizing setup time. On liftcranes and combination machines, equalizer is connected to boom point by two 1½" (38mm) diameter pendants. As inserts are added to lengthen boom, additional pendant sets are added to lengthen rigging. On machines equipped specifically for duty cycle service, equalizer is connected to boom point by two 2-part bridles of wire rope.

AUTOMATIC BOOM STOP: Standard on liftcrane, clamshell, and combination machines. When boom reaches 82° angle from horizontal, it contacts a push rod mechanism that automatically stops boom hoist operation.

PANTOGRAPHIC BOOM STOP: Standard on clamshell. Folding arms pin to A-frame and boom butt provide physical stop when boom reaches maximum allowable angle.

TELESCOPIC BOOM STOP: Standard on liftcrane. Air-cushioned telescoping tubes pinned to boom and A-frame start cushioning at 74° boom angle; provide positive physical stop at 85° from horizontal.

WIRE ROPE GUIDE: Mounted on upper side of boom top. Two fleeting sheaves, bronze-bearing mounted in steel frame.

WIRE ROPE ROLLER GUIDES: Mounted on top of boom inserts. Rollers are induction-hardened tubing, antifriction-bearing mounted.

NO. 123 JIB: Optional. 20-ton (18.14-metric ton) maximum capacity. 30' (9.15m) basic length extendible to 40' (12.20m), 50' (15.25m), or 60' (18.30m) with 10' (3.05m) inserts and matching pendants. Jib offset angle adjustable to 0, 10, or 20 degrees. All-welded construction with tubular chords and lacings. Chords 100,000 PSI (7,000 kg/cm²) yield steel. Rectangular box section 30" (762mm) wide x 30" (762mm) deep at pin-connected joints. Jib point has 24" (610mm) OD, antifriction-bearing-mounted sheave, cheek plate, and anchor for two-part line. Maximum boom-and-jib combination, 230' (70.15m).

NO. 124 JIB: Optional. 10-ton (9.07-metric ton) maximum capacity. 30' (9.15m) basic length extendible to 40' (12.20m), 50' (15.25m), or 60' (18.30m), with 10' (3.05m) inserts and matching pendants. Jib offset angle adjustable to 0, 10, 20, or 30 degrees. All-welded construction with tubular chords and lacings. Chords 100,000 PSI (7,000 kg/cm²) yield steel. Rectangular box section 29½" (749mm) wide x 22" (559mm) deep at pin-connected joints. Jib point has 19½" (495mm) OD, antifriction-bearing-mounted sheave with wire rope guide. Anchor joint for two-part line optional. Maximum boom-and-jib combination, 250' (76.25m).

CONSULT JIB LIFTING CAPACITY CHARTS FOR SPECIFIC CAPACITY WHEN USED ON VARIOUS BOOM LENGTHS.

REVOLVING FAIRLEAD: Furnished on dragline-equipped machines. Full revolving, antifriction-bearing mounted in support at front of rotating bed. All joints tapered-pin connected for maximum stability. Trunnion shaft bronze-bearing mounted. Two large side guide rollers are case hardened and bronze-bearing mounted for long life. Two end guide rollers provided. For boom lengths through 80' (24.40m).

HINGED FAIRLEAD: Optional. Recommended for booms longer than 80' (24.40m). Extends guide sheaves for greater drag rope fleet angle. Stationary frame securely mounted to boom hinge lugs and front of rotating bed with tapered pins for maximum rigidity. Swivel frame antifriction-bearing mounted. Drag rope fully guided through swivel frame by sheaves and rollers. Sheaves mounted on tapered shaft for maximum stability; shafts antifriction-bearing mounted.

TAGLINE: Boom-mounted, two-barrel tagline with 20" (508mm) wheel standard on clamshell-equipped machines. Boom-mounted, three-barrel tagline with 30" (762mm) wheel optional.

MANITOWOC ENGINEERING CO.

Division of The Manitowoc Company, Inc.
Manitowoc, Wisconsin 54220

Because of a program of continuing improvements, Manitowoc Engineering Co. reserves the right to change specifications at any time, without notice.