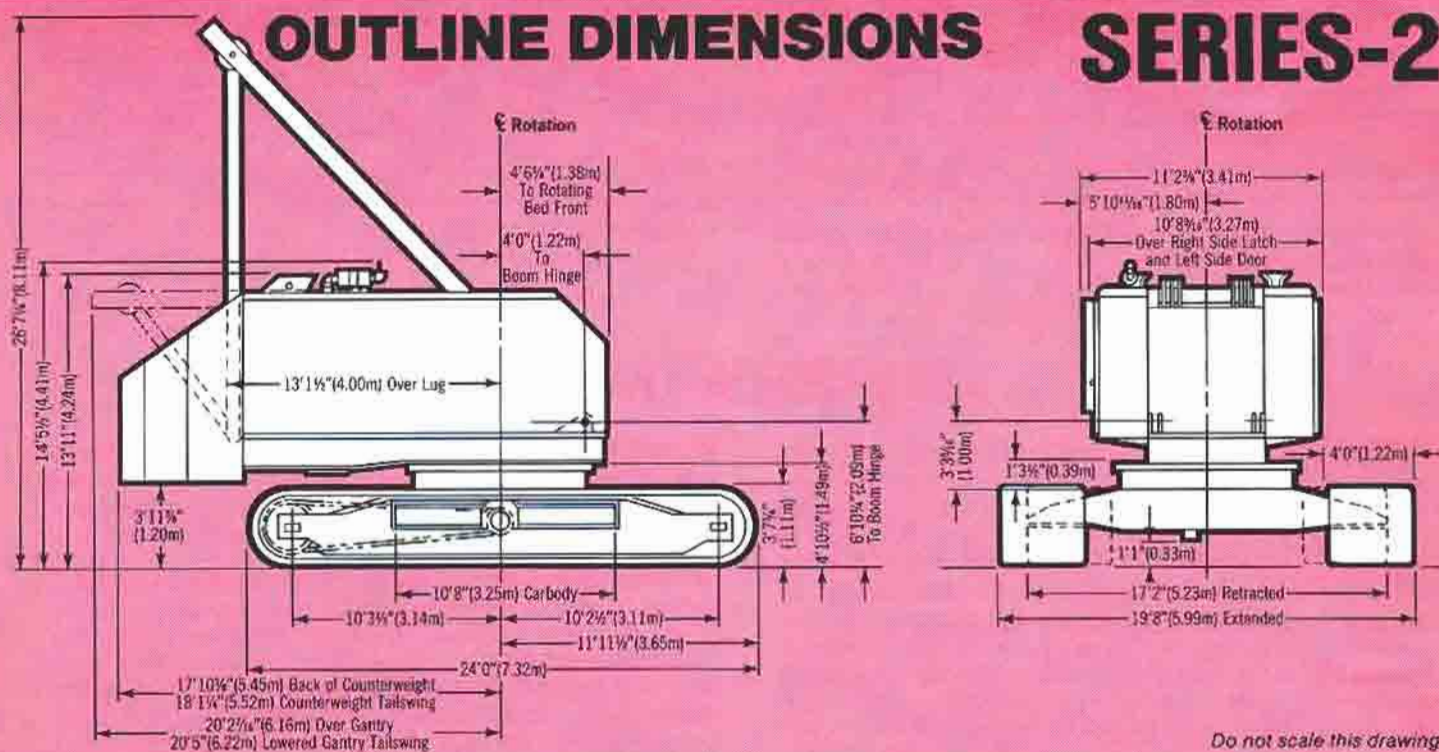


**Manitowoc****3900W****OUTLINE DIMENSIONS****SERIES-2**

Do not scale this drawing.

WEIGHTS

	Pounds*
LIFTCRANE (complete): lowerworks, upperworks, and 60' basic boom	258,840
CARBODY AND UPPERWORKS (combined): complete with basic machinery, drums, gantry, backhitch, equalizer, and boom hoist wire rope	100,540
LOWERWORKS:	
Carbody, with travel mechanism, king pin, and roller path	34,700
Crawler Assemblies (2), with 48" wide treads and outside drive chains (each assembly 31,150)	62,300
UPPERWORKS:	
Rotating Bed, complete with basic machinery, including drums, but not gantry and backhitch, front end attachments, or counterweight	61,520
Gantry and Backhitch	4,320
Equalizer	1,330
Telescopic Boom Stop	660
Removable Counterweight (3-piece):	
Inner	43,000
Middle	30,000
Outer	11,600
Total	84,600
Dragline Fairlead	
Revolving Type	1,910
Hinged Type	5,120
BOOM NO. 9A:	
Butt, 30' (less wire rope and pendants)	4,375

	Pounds*
Top, 30' (equipped with 5-sheave lower point, single-sheave upper point, and basic pendants)	5,185
Inserts:	
10' (with pendants & wire rope roller guide)	1,500
20' (with pendants & wire rope roller guide)	2,480
40' (with pendants & wire rope roller guides)	3,580
40' (with pendants, wire rope roller guides, and jib backstay lugs)	3,600
Pendant Spreader Bar	385
Wire Rope Guide	295
JIB NO. 123:	
Butt, 15'	690
Insert, 10'	340
Top, 15' (with point assembly)	695
Basic Pendant, (2 required, each 115)	230
Pendant, (2 per insert, each 65)	130
Backstay Pendant, (2 required, each 155)	310
Strut, 12' 6"	365
JIB NO. 124:	
Butt, 15'	410
Insert, 10'	175
Top, 15' (with point assembly)	480
Basic Pendant	100
Pendant, (2 per insert, each 20)	40
Backstay Pendant, (2 required, each 140)	280
Strut, 18'	380

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



POWER PLANTS

	Model	Cylinder	Bore	Stroke	Cubic Inch Displacement	Net HP @ RPM (at flywheel)
BASIC	Cummins NT-855-C310	6	5.500"	6.0"	855	287 @ 2000
OPTIONAL	Caterpillar 3406 DIT	6	5.400"	6.5"	893	300 @ 2000
	*Caterpillar 3406 PCTA	6	5.400"	6.5"	893	364 @ 2000
	*Cummins NTA-855-C360	6	5.500"	6.0"	855	334 @ 2000
	*Detroit Diesel 12V-71N	12	4.250"	5.0"	852	363 @ 1800
Air Compressor: 37.5 CFM.		*Recommended For Duty Cycle Service.			Fuel Tank Capacity: 219 Gallons.	

LOWERWORKS

CARBODY: Single-piece, ribbed steel fabrication with integral side wings permits crawlers to be extended or retracted without reducing bearing area between crawler side frames and carbody wings. Side wings transmit loads directly to crawler side frames, eliminating axles and providing lower center of gravity.

ROLLER PATH AND RING GEAR: Machined from heat-treated alloy steel casting. Roller path has 105% outside diameter, 6" width, and 3" thick hook roller flange. Integral internal ring gear has machine-cut teeth. Roller path secured to carbody with single row of high-strength bolts.

KING PIN: Machined steel fabrication. Secured to carbody with high-strength bolts. Provides support for vertical travel shaft and pivot for rotating bed. Mates with bronze bearing in rotating bed. Takes horizontal loads only, no uplift.

TRAVEL AND STEERING MECHANISM: Power transmitted from upperworks through vertical travel shaft to three-piece horizontal travel shaft. Vertical travel shaft mounted in king pin, horizontal travel shaft in carbody; both supported by bronze bearings. Bevel gears transmit power from vertical shaft to horizontal shaft.

Steering provided by air-controlled steering clutch-and-lock mechanisms located to each side of bevel gears. Both clutches engaged for straight travel; one clutch placed in neutral for gradual turns or locked position for sharp turns. Interlock prevents both clutches from being in neutral at same time. Ratchet wheel for travel locks located to left of bevel gears. Travel locks are gravity-applied, air-released pawls that engage ratchet wheel. Engaging one pawl permits travel in one direction while preventing movement in opposite direction. Engaging both pawls prevents all travel.

CRAWLER SIDE FRAMES: Two reinforced steel fabrications with integral pockets for mounting frames onto carbody wings. Each crawler frame provides mounting for front idler roller, 12 intermediate rollers, crawler sprocket and chain, drive tumbler, and crawler tread. Abrasion-resistant slide rails along top provide smooth, continuous support for tread, eliminating need for upper idler rollers.

FRONT IDLER ROLLER: Double-flanged, fabricated steel roller mounted on 6 1/4" diameter stationary shaft supported at both ends by crawler frame. Roller revolves on two large bronze bearings lubricated by a center grease pocket.

INTERMEDIATE ROLLERS: Double-flanged, 14" diameter rollers, bronze bearing mounted on 4 3/4" diameter stationary shafts. Bearings lubricated by center grease pocket. Rollers located in pockets along underside of crawler frame. Shaft ends supported by welded frames and held in place by keeper bars.

CRAWLER DRIVE: Drive chains located outside crawler frames. Drive sprockets self-contained within crawler side frames telescope on hexagonal shaped horizontal travel shaft ends. Allows crawler extension, retraction, and removal without separating drive chain or tread.

CRAWLER SPROCKET AND TUMBLER: Transmit drive torque. Integral cast steel unit with flame-hardened sprocket teeth and tumbler rim. Mounted on stationary shaft supported at both ends by crawler frame. Sprocket-and-tumbler unit revolves on two large bronze bearings lubricated by center grease pocket. Self-cleaning tumbler has alternate sides open. Drive chain adjusted by positioning sprocket-and-tumbler support shaft with hydraulic jack, then inserting U-shaped shims to hold shaft in place.

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

CRAWLER TREADS: 48" wide, 52 pads per crawler frame. Adjacent pads connected by two high-carbon steel pins. Pads' closed design prevents them from carrying dirt up onto crawler frames.

TREAD ADJUSTMENT: Crawler tread easily adjusted by positioning front idler roller support shaft with hydraulic jack, then inserting U-shaped shims to hold shaft in place.



UPPERWORKS

ROTATING BED: Single-piece, welded-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 house rollers: two front and two rear, all antifriction bearing mounted.

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.

REAR HOOK ROLLERS: Four antifriction bearing mounted rollers supported in pairs by heavy steel hangers that pivot to equalize roller loads. Hangers spaced wide apart to provide stability. Rollers mounted on eccentric shafts for easy adjustment.

A-FRAME: Fabricated steel rear column, roof support, and vertical center legs. Bar-type front legs. All joints pin-connected. Structure supports gantry, counterweights, and optional rear auxiliary drum shaft.

POWER TRANSMISSION, VICON®: The patented VICON (Variable Independent CONTROL) system provides stepless variable power transmission for major machine functions. Engine power is divided at transmission case to two controlled torque converters and a hydraulic pump. Front converter powers hoisting drums. Rear converter powers main drive shaft for swing and travel. Hydraulic pump powers independent boom hoist. With VICON, clutches engage when little or no torque is transmitted from power source, virtually eliminating clutch slippage and wear. After clutch sets, controlled torque converter output is increased to provide infinitely-variable speed and torque.

MAIN DRIVE SHAFT: Antifriction bearing mounted, alloy-steel shaft chain-driven by rear VICON converter. Powers two single-disc clutches that control travel and standard swing. Clutch hubs splined to shaft; integral clutch spiders and bevel pinions antifriction bearing mounted. Clutches applied by air-actuated cam levers and released by springs. Cam faces separated by roller bearings that minimize friction. Fully-enclosed, oil-spray-lubricated bevel pinions drive slide pinion shaft that permits selection of travel or standard swing functions. Operator selects each function by manually positioning slide pinion to engage travel or swing gear train.

INDEPENDENT SWING SHAFT: Standard. Heat-treated, alloy-steel shaft, antifriction bearing mounted on rotating bed behind main drive shaft. Chain-driven by sprocket on main drive shaft. Powers two double-disc reversing clutches that control direction of independent swing. Clutch hubs splined to shaft. Clutch spiders with integral bevel pinions, antifriction bearing mounted. Clutch pressure plates applied by manually-actuated, axial-pressure cam levers, and released by springs. Cam lever faces separated by antifriction roller bearings that take axial thrust to minimize friction. Disc assemblies remove easily for lining replacement. Bevel

pinions drive through gear train to ring gear on carbody. Swing brake provided on vertical independent swing shaft. With independent swing, travel is also independent.

SWING LOCK: Spring-loaded, gear segment type lock engages swing gear for positive locking. With independent swing, lock is air-controlled. With standard swing, lock is operated by slide pinion control: lock engages when pinion is in neutral or travel position, and disengages when pinion is in swing position.

SPLIT DRUM SHAFT ASSEMBLY: Heat-treated alloy-steel shaft, antifriction bearing mounted. Drums antifriction bearing mounted on shaft. Each drum is cast steel with a bolt-on cast iron combination clutch-and-brake flange on outboard side. Drum clutch spiders splined to shaft. Clutches, air-controlled, internal-expanding, band-type. Brakes, external-contracting, band-type; manually controlled on liftcrane, air assisted on duty cycle machines.

Optional auxiliary drums are available to provide three operating lines for specialized applications. Rear auxiliary drum provides 20,000-pound line pull; front auxiliary drum provides 5,000-pound line pull. Full-width rear drum mounted on A-frame above and behind main drums has single, air-applied, internal-expanding, band-type clutch, and double, external-contracting, band-type brakes that are spring-set, air-released, and air-operated. Front drum mounted ahead of main drums on rotating bed has an air-applied, single-disc clutch and an external-contracting, band-type brake that is spring-applied and automatically released upon clutch application.

VICON® POWER LOWERING: Controlled power load lowering with any hoist drum for line pull in excess of 6,000 pounds is an integral part of the VICON control system. It enables raising, holding, or lowering the load using stepless variable torque output from hoist converter. Drum clutch remains engaged, eliminating transfer of load from clutch to brake during normal operation.

FULL-RANGE VICON POWER LOWERING: Optional. An engine-driven hydraulic pump powers a hydraulic motor which rotates output shaft of VICON hoist converter in reverse direction. Provides power lowering for drum line pull less than 6,000 pounds. The hydraulic equipment permits a full range of lowering speeds from empty hook through maximum capacity.

INDEPENDENT BOOM HOIST: 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 powered by variable-displacement hydraulic motor, providing full-range speed control. 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.



FRONT END EQUIPMENT

NO. 9A BOOM: 30' butt, 10', 20', and 40' inserts, 30' open throat top. Rectangular box-section design. All-welded construction with inverted-angle chords and tubular lacings. Chords are 100,000 PSI-yield steel; lacings are 90,000 PSI-yield steel. All boom sections 74" wide x 72" deep at pin-connected joints. Each insert matched with two pair of 1 1/4" diameter, single-length pendants. Lower boom point equipped with five 24" diameter sheaves. Upper boom point has single 27" diameter sheave with rope guard for liftcrane or cheek plate for dragline. For clamshell, upper point has two 27" diameter sheaves with cheek plates. All sheaves antifriction bearing mounted. Basic boom length 60'; maximum length 250'.

GANTRY AND BACKHITCH: Gantry is fabricated plate with parallel box-section legs. Supported on large pins by A-frame center leg. Backhitch is three-piece, telescoping, link-type construction, pin-connected to rear of rotating bed and gantry. Vertical sheaves antifriction bearing mounted; horizontal sheave bronze bearing mounted. Floating, vertical boom hoist wire rope sheaves bronze bearing mounted.

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

BOOM RIGGING: Ten-part line reeved between gantry and equalizer (twelve-part line optional). Controls boom angle by single line reeved continuously from boom hoist drums, which power boom up and down. Equalizer connected to boom point by two pair of 1 1/4" diameter pendants. For longer booms, pendants are matched to insert lengths.

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

AUTOMATIC BOOM STOP: Boom contacts push rod, automatically stopping boom hoist when boom angle reaches 82° from horizontal.

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

WIRE ROPE GUIDE: Mounted on top side of boom top. Two fleeting sheaves, bronze bearing mounted.

WIRE ROPE ROLLER GUIDES: Mounted on top side of boom inserts. Roller is induction hardened tubing, antifriction bearing mounted.

4 1/2° OFFSET BOOM TOP: Optional. Permits greater clearance between load and boom. Standard boom top converted by adapter links at upper joints. May be used on all boom lengths up to 250'.

HAMMERHEAD BOOM TOP: Optional. Replaces standard boom top to permit lifting maximum capacity loads in areas with restricted overhead clearance. Standard boom converted by adding 3' hammerhead top. May be used on all boom lengths from 33' to 223'.

NO. 123 JIB: Optional. 20-ton maximum capacity. 30' basic length extendible to 40', 50', or 60' with 10' 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-yield steel. Rectangular box section 30" wide x 30" deep at pin-connected joints. Jib point has 24" OD, antifriction bearing mounted sheave, cheek plates, and anchor for two-part line.

NO. 124 JIB: Optional. 10-ton maximum capacity. 30' basic length extendible to 40', 50', or 60' with 10' 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-yield steel. Rectangular box section 29 1/2" wide x 22" deep at pin-connected joints. Jib point has 19 1/2" OD, antifriction bearing mounted sheave with wire rope guide. Anchor joint for two-part line, optional.

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

REVOLVING FAIRLEAD: Furnished only on dragline-equipped machines. Full revolving, antifriction bearing mounted in support at front of rotating bed. All joints taper-pin-connected for maximum rigidity. Two sheaves mounted on tapered shaft and sleeve for maximum stability. Trunnion shaft bronze bearing mounted. Two large side guide rollers, case hardened and bronze bearing mounted. Two end guide rollers. For boom lengths through 80'.

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

TAGLINE: Furnished only on clamshell-equipped machines. Boom mounted, three-barrel tagline with 30" wheel.

GENERAL

MACHINERY CAB: 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.

OPERATOR'S STATION: Fully enclosed. Located in right front corner of cab. Insulated door behind seat isolates operator from machinery noise. Large, rubber-mounted safety glass windows provide wide-angle view. Sliding door on right side; sliding window on left side; overhead window for high-boom vision. Controls conveniently located and arranged for efficient operation. Air signal horn standard; heater, windshield wiper, and circulating fan, optional. Elevated operator's module with duplicate controls, optional. Module is mounted forward of main cab and provides eye level 26' 6" above ground.

CONTROLS: Modulating air controls engage boom hoist, main drive shaft clutches, and drum clutches. Drum and main drive shaft control levers are combination clutch and converter control: first movement engages clutch; further movement increases converter output torque, permitting variable speed. Drum brakes are pedal-operated and manually-controlled on liftcrane, air-assisted on clam-drag machines. Travel locks and steering, air-controlled. Slide pinion and swing lock, manually-controlled.

SWING SPEED: Variable, 4.90 RPM maximum.

TRAVEL SPEED: Variable, 1.45 MPH 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.

Division of The Manitowoc Company, Inc.

Manitowoc, Wisconsin 54220

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