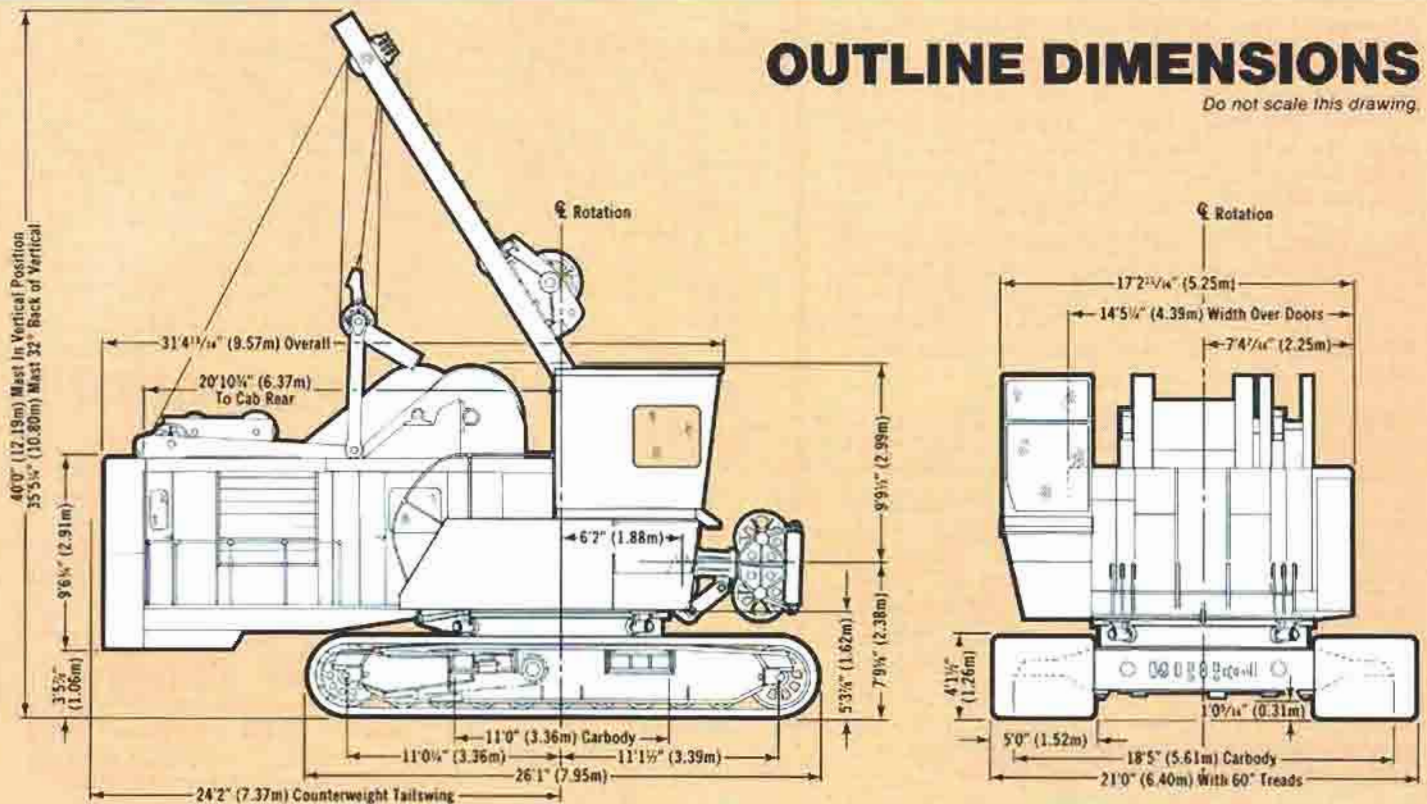




Manitowoc 4600 S-3

OUTLINE DIMENSIONS

Do not scale this drawing.



WEIGHTS

COMPLETE MACHINE (with 80' boom):

Liftcrane	478,035
Clamshell	482,145
Dragline	487,220

LOWERWORKS:

Carbody, with travel mechanism, king pin, and roller path	54,195
Crawler Assemblies (2), with 60" wide treads (each assembly 53,600)	107,200

UPPERWORKS:

Rotating Bed, complete with basic machinery, including drums, but not front end attachments or counterweights	154,365
Independent Boom Hoist	18,698
Mast and Backhitch	16,600
Lower Equalizer	1,965
Upper Equalizer	2,275
Telescopic Boom Stop	1,550
Dragline Fairlead	3,915

Pounds*

REMOVABLE COUNTERWEIGHTS:

Liftcrane	113,500
Clamshell	88,500
Dragline, 80' or 100' boom	56,500
Dragline, 120' or 140' boom	88,500

Pounds*

BOOM NO. 27:

Butt, with wire rope roller guide and mast support	8,510
Top, with lower point assembly	10,300
Add for upper point and sheave	1,090
Basic Pendants	920
Inserts	
10' (with pendants & wire rope roller guide)	2,540
20' (with pendants & wire rope roller guide)	4,020
40' (with pendants & wire rope roller guides)	6,870

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

BASIC	POWER PLANTS						
	Cylinder	Bore	Stroke	Cubic Inch Displacement	Net HP @ RPM (at flywheel)	Converter	Function
OPTIONAL	Cummins VTA-1710-C700	12	5.500"	6.000"	1,710	685* @ 2,000	3 Controlled
	Detroit Diesel 12V-71N	12	4.250"	5.000"	852	393 @ 2,000	1 Controlled
	Detroit Diesel 8V-71N	8	4.250"	5.000"	568	272 @ 1,800	2 Controlled
	Caterpillar D-379	8	6.250"	8.000"	1,964	635* @ 1,270	3 Controlled
	Caterpillar 3412 DIT	12	5.400"	6.000"	1,649	530* @ 2,000	3 Controlled

Fuel Tank Capacity: 910 Gallons.

*Rating Without Fan

Other Power Plants Available — Consult Factory.



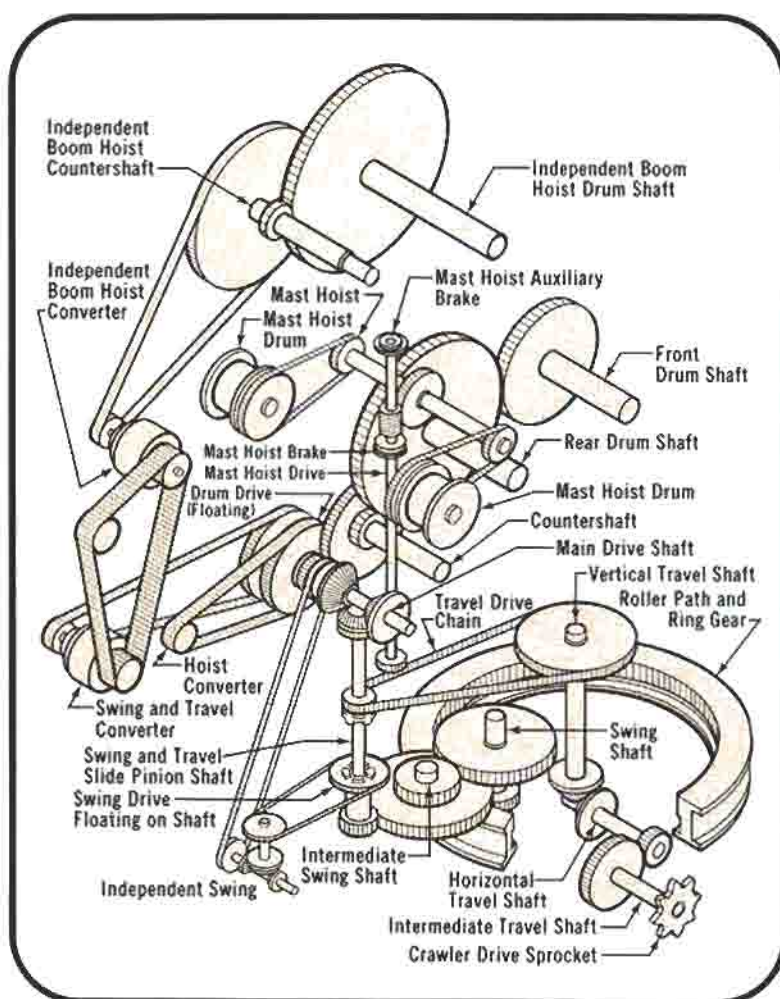
POWER TRAIN

POWER TRANSMISSION, VICON®: Patented VICON (Variable Independent CONTROL) system provides stepless variable power for major functions. Clutches engage when no torque is transmitted from power source, virtually eliminating slippage and wear. After clutch sets, torque converter output is increased for infinitely-variable speed and torque.

VICON POWER LOWERING: Power lowering for line pulls over 6,000 pounds is an integral part of VICON. It enables loads to be held or lowered using hoist converter's variable output. Drum clutch remains engaged, eliminating transfer of load from clutch to brake during normal operation.

FULL RANGE VICON POWER LOWERING: Optional. A hydraulic motor drives hoist converter's output shaft in reverse to provide power lowering for line pull less than 6,000 pounds. Permits full range of lowering speeds with any load from empty hook through maximum capacity.

POWER PLANT: STANDARD — One diesel engine powering three VICON torque converters. Front converter drives drums. Top converter drives boom hoist. Rear converter drives main drive shaft for swing, travel, and mast hoist. **OPTIONAL** — Two diesel engines. Front engine powers VICON converter for drums. Rear engine powers two VICON converters: one for boom hoist and one for swing, travel, and mast hoist. With either system, variable speed and torque are achieved with VICON converters, without slipping clutches and brakes.



LOWERWORKS

CARBODY: Single-piece, ribbed steel fabrication with high strength-to-weight ratio. Carbody transmits loads evenly from area beneath roller path to four machined wings that fit into pockets in crawler frames to provide rugged mounting and a low center of gravity.

ROLLER PATH AND RING GEAR: Machined alloy steel casting with 132" outside diameter and 3½" thick hook roller flange. Internal ring gear teeth machine-cut. Roller path secured to carbody with double row of high-strength bolts.

KING PIN: Cast steel. Bolted to carbody. Provides pivot for rotating upperworks. Takes horizontal loads only. Mates with pressure lubricated bronze bearing in rotating bed.

TRAVEL SHAFTS: Power transmitted through vertical travel shaft to horizontal travel shaft by bevel gears. Reduction gears on horizontal shaft increase torque to crawlers. Reduction gears and steering mechanism enclosed in carbody.

TRAVEL AND STEERING: Two air-controlled jaw clutches are engaged for straight travel, and one clutch is placed in neutral for gradual turns or locked position for sharp turns. Clutch interlock assures at least one clutch is engaged at all times.

TRAVEL LOCKS: Air-operated travel locks have dual ratchet arrangement, permitting travel in one direction while preventing movement in opposite direction. Can be set to prevent all travel.

CRAWLER SIDE FRAMES: Two reinforced steel fabrications with pockets for mounting frame onto carbody wings. Each frame provides mounting for front idler roller, 10 intermediate rollers, crawler drive tumbler, and crawler tread. Abrasion-

resistant slide rails on frame top provide smooth, continuous support for tread, eliminating need for upper idler rollers.

CRAWLER SPROCKET AND TUMBLER: Cast steel unit with flame-hardened edges transmits drive torque to crawlers. 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 shaft, then inserting shims to hold shaft in place.

CRAWLER DRIVE: Drive chain located outside each crawler frame. Drive sprocket within crawler frame joined to horizontal travel shaft by jaw clutch. Design allows crawler removal without separating drive chain or tread.

CRAWLER FRONT IDLER: Double-flanged, cast steel roller, mounted on stationary shaft supported at both ends by crawler frame. Roller revolves on two bronze bearings lubricated by center grease pocket.

INTERMEDIATE ROLLERS: Ten double-flanged, 20" diameter rollers, bronze-bearing-mounted on stationary shafts. Rollers recessed in pockets along crawler frame bottom.

CRAWLER TREADS: 60" wide, 52 pads per crawler frame. Adjacent pads connected by two high-carbon steel pins. Pads constructed of cast alloy steel in closed box-section design with center driving lug. Internal ribbing provides high strength, especially next to lug, where rollers bear. Bottom edges taper upward to minimize digging in during turns. Closed design prevents pads from carrying dirt up onto crawler frames. Crawler tread easily adjusted by positioning front idler roller shaft, then inserting shims to hold shaft in place.



DRUMS AND LAGGINGS

Application			Drum	Diameter	Drum Width	Type of Drum or Lagging	Wire Rope Size	Spooling Capacity	
								First Layer	Maximum
LIFTCRANE	Basic	Whip Hoist	Front	34½"	30"	Plain Drum	1¼"	203'	1,436'
			Rear	34½"	30"	Plain Drum	1¼"	203'	1,436'
	Optional	Third Drum	Front Rot. Bed	14¾"	22½"	Grooved Drum	¾"	95'	202'
CLAMSHELL	Basic	Holding Closing	Front	34½"	30"	Grooved Drum	1½"	157'	—
			Rear	34½"	30"	Grooved Drum	1½"	157'	—
		VICON® Power Tagline	Roof Mounted	12¾"	20¼"	Plain Drum	¾"	103'	—
	Optional	Holding Closing	Front	41"	30"	Grooved Lagging	1½"	189'	—
			Rear	41"	30"	Grooved Lagging	1½"	189'	—
DRAGLINE	Basic	Hoist Drag	Front	41"	30"	Grooved Lagging	1¾"	210'	—
			Rear	41"	30"	Grooved Lagging	1¾"	189'	—

Other Drum Options Available — Consult Factory.

UPPERWORKS

ROTATING BED: Single-piece steel fabrication with high strength-to-weight ratio provides rigid deck for mounting all upperworks components. Precision boring assures proper machinery alignment. Bed rotates on four front and two rear house rollers. Antifriction-bearing-mounted front house rollers standard, bushing-mounted optional. Rear house rollers bushing mounted.

HOOK ROLLERS: 6 bushing-mounted on eccentric shafts for adjustment: 2 front, 4 rear.

MAIN DRIVE SHAFT: Antifriction-bearing-mounted alloy steel shaft chain-driven by rear converter. Powers large clutches for swing, travel, and mast hoist. Clutches are air-controlled, internal-expanding, shoe-type, each with four individual shoes and molded linings. Steel clutch spiders splined to shaft. Cast alloy iron clutch drums and steel bevel pinions antifriction-bearing mounted. Bevel pinions and gear are oil lubricated. Floating sprocket-and-pinion combination on shaft is chain-driven by front converter and transmits power to drum gears. All chains and gears enclosed and oil lubricated.

SWING AND TRAVEL SLIDE PINION SHAFT: Alloy steel shaft, antifriction-bearing mounted. Bevel gear splined to top is powered by bevel pinions on main drive shaft clutches. Slide pinion positioned manually to select travel or standard swing. Drum brake on shaft provides braking for swing and travel.

INDEPENDENT SWING: Standard on liftcrane. Heat-treated alloy steel shaft with antifriction-bearing-mounted clutches. Chain-driven by main shaft. Air-controlled, disc-type clutches provide precise load positioning.

DRUM DRIVE: Front converter chain-drives sprocket-and-pinion combination floating on main drive shaft. Pinion transmits power through countershaft to rear drum shaft. Rear drum shaft gear-drives front drum shaft. All chains and gears fully enclosed and oil lubricated.

FRONT AND REAR DRUM ASSEMBLIES: Heat-treated alloy steel drum shafts, antifriction-bearing mounted. Drum gears have steel hubs and detachable rims. Hubs with integral clutch spiders are keyed to drum shafts. Drums antifriction-bearing mounted on shafts. Drums are grooved steel with a cast iron brake-and-clutch flange bolted to each side. Drum clutches air-controlled, internal-expanding, band-type with heavy-duty molded linings. Dual brakes external-contracting, band-type, air-applied during operation. One brake per drum is spring-set for parking, and automatically applied if air pressure is lost. Ratchet and pawl for each drum optional.

Front drum used for holding line on clamshell or hoist line on dragline. Rear drum used for closing line on clamshell or drag line on dragline.

DRAGLINE INTERLOCK: Standard on dragline-equipped machines. Eliminates brake riding. Interlock chain connects sprocket floating on drag drum shaft with sprocket bolted to hoist drum. Floating sprocket selectively engaged to drag drum by operator-controlled clutch. With clutch applied, interlock synchronizes speed and direction of drum rotation so drag rope pays out at same rate hoist rope spools in. Drag rope remains taut, bucket stays level, drag brake riding is eliminated. In addition, bucket tension on drag rope is transmitted through interlock to hoist drum, reducing required hoist power and fuel consumption. Interlock also enables simultaneous lowering and inhauling of bucket. Clutch may be disengaged at any time to cast.

THIRD DRUM: Optional. Mounted on front of rotating bed. Driven by front drum gear. Air-operated, internal-expanding, band-type clutch. External-contracting, spring-applied, air-released, band-type brake. Single-lever control. Can be used only with 66-tooth front drum gear.

MAST HOIST: Used only to position mast at selected angle, not for operating with load. Independent of travel and standard swing. Air-operated slide pinion transmits power from main drive shaft through worm gear and wheel to shaft that chain-drives drums. Dual drums provide equal tension on both sides of mast rigging. Spring-applied, air-released brake; disc-type auxiliary brake; and automatic mast hoist kick-out provided.

INDEPENDENT BOOM HOIST: Capable of operating under full capacity loads. Roof mounted. Removable for shipment. Independent of swing, travel, and mast hoist. Driven by separate VICON® converter. Steel drum antifriction-bearing mounted on alloy steel drum shaft. Cast-iron brake-and-clutch flanges. Air-operated, internal-expanding, band-type clutch. Double, external-contracting, spring-set, air-released, band-type brakes for holding. Ratchet and pawl standard. Planetary drive and clutch for lowering is standard; hydraulic lowering, optional. With optional lowering system, a hydraulic motor rotates output shaft of VICON boom hoist converter in reverse to provide power boom lowering.

GEARS: All main gears are alloy steel with machine-cut, induction-hardened teeth. Enclosed and run in an oil bath. Main drum gears have steel hubs and detachable rims. Rear drum gear has 99 teeth; front drum gear has 66 teeth on liftcrane and dragline machines, 99 teeth on clamshell.



FRONT END EQUIPMENT

NO. 27 BOOM: 40'6" butt; 10', 20', and 40' inserts; 39'6" top. Rectangular box-section design. All-welded construction with inverted-angle chords and tubular lacings. Chords 100,000 PSI-yield steel; lacings 90,000 PSI-yield steel. All boom sections 114" wide x 90" deep at pin-connected joints. Lower boom point equipped with six 32" diameter sheaves for liftcrane. Detachable upper boom point for liftcrane equipped with single, 36" diameter sheave. Integral upper boom point for duty cycle applications has cheek plates and one 47" diameter sheave for dragline or two 47" diameter sheaves for clamshell. All sheaves roller-bearing mounted. Basic boom length 80'; maximum length 260'.

BOOM RIGGING: 16-part line reeved between lower equalizer on mast and upper equalizer connected to boom top by four single-piece, 1-3/8" diameter bridge strand pendants. Controls boom angle by a single line reeved continuously from independent boom hoist drum.

MAST: 30' heavy duty mast of reinforced box-type construction. Pivots on boom hinge pin.

MAST RIGGING: 12-part line reeved between backhitch and mast sheaves. Controls mast angle by two single lines reeved from mast hoist drums.

LOWER EQUALIZER: Steel fabrication pinned to mast. Supports 8 antifriction-bearing-mounted sheaves.

UPPER EQUALIZER: Steel fabrication supports antifriction-bearing-mounted sheaves.

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

TELESCOPIC BOOM STOP: Spring-cushioned telescoping tubes. Provides positive physical stop at 85° boom angle.

WIRE ROPE GUIDE: One fleeting sheave for dragline, two for clamshell, bushing-mounted on top side of boom top.

WIRE ROPE ROLLER GUIDES: Induction hardened, antifriction-bearing mounted on top side of boom.

FAIRLEAD: Full-revolving, antifriction-bearing mounted in support at front of rotating bed. Equipped with two 32" diameter, bushed sheaves and two large guide rollers.

TAGLINE: Boom-mounted, three-barrel tagline with 30" wheel. Optional VICON tagline also available.

VICON TAGLINE: Standard on clamshell; optional on other machines. Mounted on machinery house roof. Equipped with VICON® torque converter that chain-drives tagline drum shaft. Drum is keyed to shaft and measures 20 1/4" long with 14" diameter barrel and 24" diameter flanges. Single external-contracting band-type brake is spring-applied and air-released. Single-lever control. Triple-disc clutch can be disengaged to permit free payout of tagline.

4 1/2° OFFSET BOOM TOP: Optional. Permits greater clearance between boom and load. Standard boom top converted by adapter links at upper joints. May be used on all boom lengths up to 260'.

NO. 122A JIB: Optional. 40-ton maximum capacity. 40' basic length extendible to 50' with 10' insert and matching pendants. Jib offset angle adjustable to 3, 10, or 20 degrees. All-welded construction with tubular chords and lacings. Chords 100,000 PSI-yield steel. Rectangular box section 49" wide x 38 1/2" deep at pin-connected joints. Jib point has antifriction-bearing-mounted 32" OD sheave, cheek plates, and anchor for two-part line.

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

GENERAL

FIXED OPERATOR'S MODULE: Fully-enclosed and insulated steel module with large safety glass windows. Mounted in elevated position at right front corner of rotating bed. Isolates operator from machinery noise. Provides exceptional visibility. Signal horn, windshield wiper, circulating fan, and dome light standard; heater and air conditioner optional.

CONTROLS: Modulating air controls for main functions. First lever movement engages clutch; further movement increases VICON converter's output for variable speed and torque. Drum brakes air-operated with pedal control. Drum parking

brakes spring set, air-released, and automatically applied if air pressure is lost. Slide pinion operated manually; swing lock air-operated.

STANDARD SWING SPEED: Variable, 2.4 RPM maximum.

INDEPENDENT SWING SPEED: Variable, 1.5 RPM maximum.

TRAVEL SPEED: Variable, 1.3 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.

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