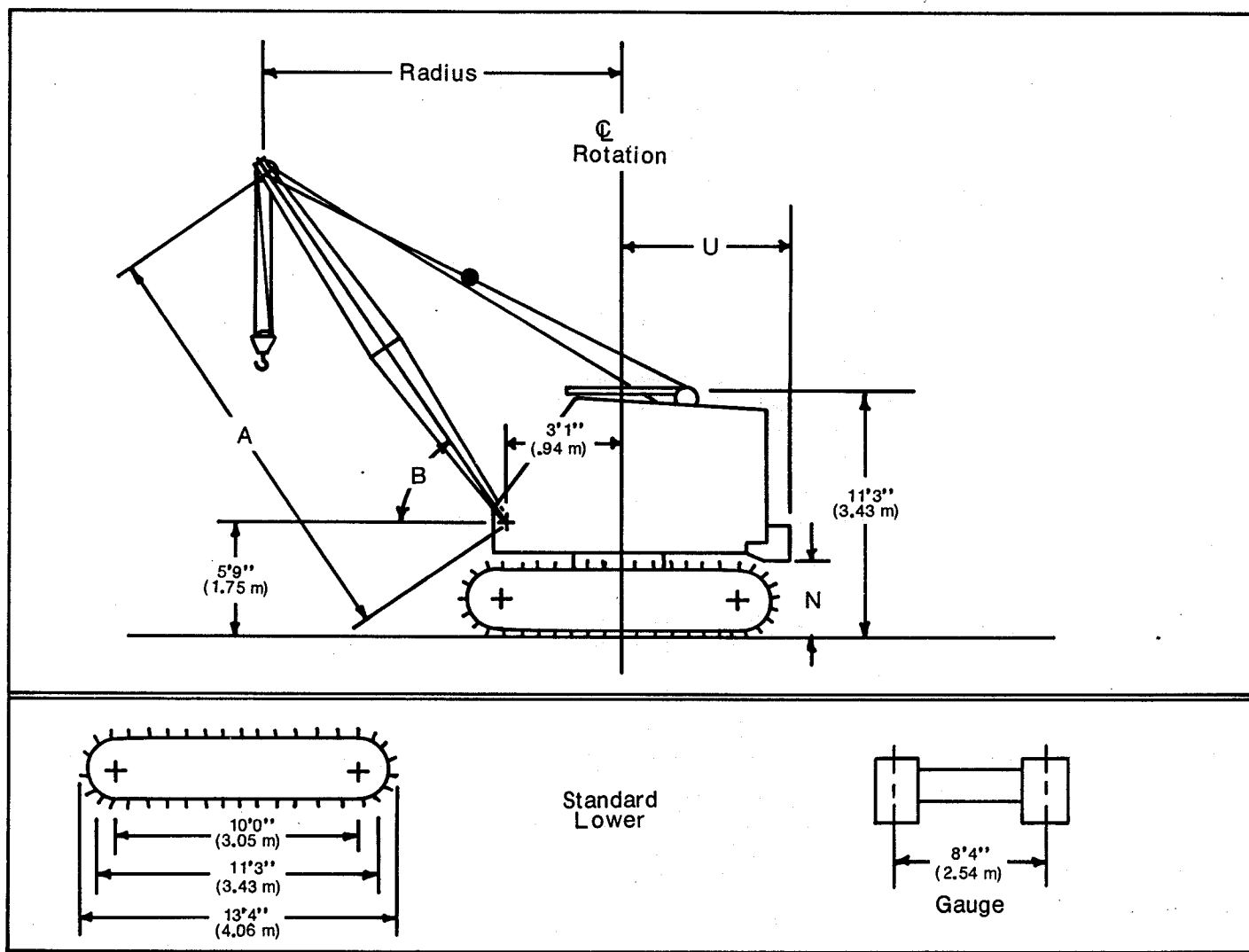




GENERAL INFORMATION ONLY

Link-Belt®**LS-78 Pipeliner****Crawler Excavator/Crane****General Dimensions**

CRANE GENERAL DIMENSIONS			
		Feet	Meters
Basic boom length	A	30'0"	9.14
Boom angle	B	—	—
Ground clearance, cwt. "A"	N	4'1"	1.24
Ground clearance, cwt. "AB"	N	3'11"	1.19
Ground clearance, cwt. "ABC"	N	3'8"	1.12
Tailswing of cwt. "A"	U	10'0"	3.05
Tailswing of cwt. "AB" and "ABC"	U	10'3"	3.12

CRANE & HOE GENERAL DIMENSIONS			
		Feet	Meters
Crawler ground bearing length	O _s	11'3"	3.43
Cab clearance height	P	10'10"	3.30
Over-all height, low gantry	P ₁	11'3"	3.43
Center to center of wheels	R	10'0"	3.05
Over-all crawler length	S	13'4"	4.06
Radius of boom hinge pin	X	3'1"	.94
Height of boom hinge pin	Y	5'9"	1.75
Minimum ground clearance	—	1'10"	.56
Width of cab	—	7'10"	2.39



GENERAL INFORMATION ONLY

Machine Working Weights -- Approximate

Based on std. machine including GM3-71N diesel engine w/friction clutch, 6 hook rollers, independent boomhoist w/lowering ratchet, independent swing/travel, 2-speed travel, instant travel, auxiliary fuel tank, low gantry, swing brake, cwt. "A", 26" (.66 m) wide single grouser shoes and the following —	Pounds	Kilograms
Hoe with $\frac{3}{4}$ cu. yd. (.57 cu. m) Esco bucket — 33" (.84 m) outside lip width — with Esco tooth type side cutters for 41" (1.02 m) cutting width.	55,510	25,202
Hoe with hydraulic digging bucket, GM4-71N diesel engine w/friction clutch, auxiliary rear drum brake, telescopic mast backstops, complete hydraulic system and bucket cylinder, $\frac{3}{4}$ cu. yd. (.57 cu. m) Esco bucket — 33" (.84 m) outside lip width — with Esco tooth type side cutters for 41" (1.02 m) cutting width.	56,190	25,510
Dragline with cwt. "AB", necessary hoist and inhaul wire ropes, fairleader, but with no bucket, and the following — 50' (15.24 m) angle boom — 26" (.66 m) 50' (15.24 m) angle boom — 34" (.86 m)	54,220 55,265	24,616 25,090
Clamshell with cwt. "AB", necessary holding (hoist) and closing wire ropes, but no bucket or tagline winder, and the following — 50' (15.24 m) angle boom — 26" (.66 m) 50' (15.24 m) angle boom — 34" (.86 m)	52,960 54,965	24,044 24,954
Maximum Lifting Crane — with boom lowering clutch, 8 hook rollers, necessary main load hoist wire rope on rear drum, cwt. "ABC", fixed boom backstops, and the following — 50' (15.24 m) angle boom — 26" (.66 m) 50' (15.24 m) angle boom — 34" (.86 m)	55,870 56,915	25,365 25,839

General Specifications —
Crawler Mounting —

Lower Frame — All-welded, stress relieved, precision machined; line bored for horizontal traction shaft.

Roller Path with Integral Ring (Swing Gear) — Double flanged, machined roller path; swing pinion meshes with internal, integral ring gear.

Horizontal Traction Shaft — Two-piece shaft joined with involute splined coupling within lower frame; shaft mounted on bronze bushings in lower frame. Shaft powered through bevel gear drive enclosed in oil. Travel/steer jaw clutches involute splined to shaft; all shaft components mounted within lower frame. Sprockets on outer ends of shaft chain drive the track chain sprockets at inside rear of each crawler side frame.

Power Hydraulic Steer/Travel — For steering or traveling; jaw clutches splined to traction shaft are power hydraulically engaged with jaws on brake drums, releasing the spring-applied steer/digging brakes. Brake drums splined to shaft. Jaw clutches and brakes interconnected — brakes are not released until jaw clutches are preloaded or fully engaged.

Two-Speed Travel — Standard; low or high speed travel power transmitted via vertical travel shaft to horizontal travel shaft in lower by mechanical shifting of gears in deck gear (upper frame) transmission case.

Instant Travel — Standard. Push button control mounted on travel control lever at operator's position in cab. As operator actuates travel control lever, he depresses the push button which actuates an electrical solenoid. Solenoid controlled valve directs Speed-o-Matic hydraulic oil to release both travel brakes simultaneously as travel jaw clutches are engaged. Permits instant straight-line travel either forward or reverse.

Crawler Side Frames — Fabricated side frames welded integral with lower frame cross axles.

Track Drive Assembly — Heat treated track drive and chain drive sprockets welded integral, mounted on axles on anti-friction bearings at rear end of each crawler side frame; sealed for lifetime lubrication.

Track Idler Roller (Wheel) — Heat treated rollers mounted on shaft on anti-friction bearings at front end of each crawler side frame; sealed for lifetime lubrication.

Track Adjustment — Hydraulically operated with hand grease gun. Contains pre-set safety valve to prevent overtightening of track belts. Pre-loaded compensating springs for each track are enclosed in oil.

Crawler Tracks — Tractor/chain type; track belts equipped with single bar grouser shoes; shoes bolted to 7" (.18 m) pitch continuous chain. Each track belt equipped with two master link pins and locks.

Standard Tracks — 13'4" (4.06 m) over-all length; equipped with forty-eight 26" (.66 m) wide single bar grouser shoes per side frame. Ground contact area (neglecting grouser bars) — 48.6 sq. ft. (4.51 sq. m). Optional — 24 flat, bolt-on street plates for each side frame (one for every other track shoe); recommended for intermittent service only.

Track Rollers — Heat treated, mounted on anti-friction bearings; sealed for lifetime lubrication. Seven dual type rollers and 1 single type roller per side frame. (Single type rollers mounted next to track drive sprocket in each side frame.)

Track Carrier Rollers — Heat treated, mounted on anti-friction bearings; sealed for lifetime lubrication. Two dual type rollers per side frame.

Travel Speed — Low speed, .875 m.p.h. (1.41 km/hr); high speed, 1.75 m.p.h. (2.82 km/hr).

**GENERAL INFORMATION ONLY****Upper —**

Upper Frame — All-welded, stress relieved, precision machined unit; machinery side housing bolted to upper frame.

Turntable Rollers — Adjustable, heat treated, conical, hook-type rollers mounted on anti-friction bearings. Standard — 6 rollers; 2 equalized pairs front, 2 single rear. Option — 8 rollers; 4 equalized pairs, 2 front and 2 rear.

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

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

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

Clutches — Speed-o-Matic power hydraulic, internal expanding, 2-shoe type (with exception of engine master clutch). Standard for swing, travel, front and rear main operating drums, and boom hoist. Optional for boom lowering, power load lowering on front and rear drums, and for hoist/inhaul control of optional third operating drum.

Clutch Drum Sizes — Swing, travel, front and rear main operating drums, boom hoist and optional boom lowering, and optional power load lowering on front and rear main drums — 18" (.46 m) diameter, 4½" (.11 m) face width. Optional third drum hoist/inhaul clutch — 17¼" (.44 m) diameter, 4" (.10 m) face width. Note — optional rear drum power load lowering clutch not available on machine equipped with optional auxiliary rear drum brake.

Clutch Spiders — Involute splined to shaft.

Drums — Front and rear main, and optional third, operating drums.

Shafts — Mounted in line bores on anti-friction bearings. Front and rear main drum shafts only extended to accommodate mounting power load lowering clutches.

Spur Gears — Machine-cut teeth; mounted on anti-friction bearings on shaft.

Clutch Drums — Bolted to spur gears; gear/drum assembly mounted on shaft on anti-friction bearings. On machine equipped with auxiliary rear drum brake, spur gear is eliminated on right-hand end (operator's side) of rear drum shaft and clutch drum is fixed to machinery side housing to serve as auxiliary brake drum.

Brakes — External contracting band; mechanically foot pedal operated. Each brake pedal equipped with latch to permit locking brakes in applied position.

Brake Drums — Involute splined to shafts. Front and rear drum brake drums — 23¾" (.60 m) dia., 3¾" (.10 m) face width. Optional third drum — 18" (.46 m) dia., 3" (.08 m) face width.

Drum Laggings — Two-piece, removable; bolted to brake drums and shafts.

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

Auxiliary Rear Drum Brake — Standard on hoe equipped with hydraulic digging bucket; optional with other attachments. Internal expanding Speed-o-Matic power hydraulic 2-shoe type; brake drum 18" (.46 m) dia., 4½" (.11 m) face width. Increases brake lining contact area by 172 sq. in. (.11 sq. m). Pressure on mechanical brake pedal applies standard rear drum brake band and auxiliary 2-shoe brake simultaneously. Mechanical linkage actuates control mechanism of a variable pressure valve to direct hydraulic pressure to the auxiliary brake cylinder. Brake shoe spider splined to shaft; brake drum bolted to anchor plate attached to machinery side housing. Note — auxiliary rear drum brake not available on machine equipped with power load lowering clutch on rear drum.

Third Drum — Optional; serves as additional operating drum. Particularly useful for pile driving and logging operations that require "snaking in" a load. Also useful in lift crane and stevedoring operations where controlled power tagline is desired. Third drum unit mounted in auxiliary support housing — forward of machine side housing — bolted to upper frame.

Drum Lagging — Two-piece, removable, bolted to brake drum and shaft; 9" (.23 m) root dia., grooved for ⅝" (15.88 mm) wire rope.

Operational Limitations — Dragline; to prevent interference with inhaul rope, necessary to remove third drum and lagging. Lifting Crane; (front drum) when using booms up to 50' (15.24 m) long at maximum radii, amount of third drum rope left on drum must be limited to avoid interference with front drum rope coming off underwinding front drum. For longer boom lengths — requiring more wire rope on front drum — third drum rope should be removed. Hoe and Shovel; third drum unit must be removed.

Independent Boomhoist — Spur gear driven. Boom hoist control — through internal expanding, 2-shoe, Speed-o-Matic power hydraulic clutch; standard with all attachments. Boom lowering

control — through automatic mechanical ratchet and pawl mechanism; standard with all attachments. Also standard on all machines are an automatic boomhoist brake plus an operator controlled boomhoist wire rope drum locking pawl. Optional — internal expanding, 2-shoe, Speed-o-Matic power hydraulic clutch, in lieu of ratchet and pawl mechanism, for precision boom lowering control. Note — boom lowering clutch is standard on machines equipped with GM 4-71 diesel engine with torque converter.

Shaft — Mounted in line bore on anti-friction bearings.

Spur Gears — Machine-cut teeth; mounted on shaft on anti-friction bearings.

Wire Rope Drum — Involute splined to shaft; 9" (.23 m) dia., smooth. Brake drum — 22" (.56 m) dia., 3¾" (.08 m) face width — and locking pawl ratchet wheel are cast integral with wire rope drum.

Brake — External contracting band; spring applied, power hydraulically released — brake drum 22" (.56 m) dia., 3" (.08 m) face width.

Boomhoist Limiting Device — When properly adjusted, device prohibits booming up beyond pre-determined minimum operating radius. As boom approaches minimum radius, it contacts head of an adjusting bolt to trip a hydraulic valve which causes hydraulic pressure to by-pass boomhoist clutch and permits simultaneous engagement (setting) of spring applied boomhoist brake.

Two-Speed Front & Rear Drums — Optional for either or both drums. Gear driven — for hoist only. Intermediate gears installed in side housings between reduction shaft pinion and drum spur gears converts 2-shoe power hydraulic load lowering clutches to high-speed hoist clutches; load hoist wire rope speeds increased 100% over standard rope speeds. Note — not available on machines equipped with power load lowering clutch on front and/or rear main operating drums or auxiliary rear drum brake.

Planetary Drive Units for Front & Rear Drums — Optional for either or both drums; available for hoist on front and/or rear drums or lowering on rear drum only. Planetary drive unit mounts between spur gear and 2-shoe clutch drum on extended shaft; provides 70% increase or 40% decrease of standard load hoist wire rope speeds. Note — not available on machines equipped with two-speed drum or auxiliary rear drum brake, and not available for third operating drum.





Upper Machinery Power Train

Independent Swing & 2-Speed Travel —

Horizontal Swing Shaft — Mounted in line bores on anti-friction bearings.

Spur Gears — Heat treated, machine-cut teeth; mounted on anti-friction bearings.

Bevel Gear — Heat treated, involute splined to shaft; fully enclosed, running in oil.

Vertical Center Drive Shaft for Swing — Mounted in line bores in anti-friction bearings.

Bevel Gear — Involute splined to shaft. Heat treated, machine-cut teeth; enclosed, running in oil.

Vertical Swing Shaft — Mounted in line bores in anti-friction bearings.

Spur Gear — Involute splined to shaft. Heat treated, machine-cut teeth; enclosed, running in oil.

Swing Pinion — Involute splined to shaft; heat treated, machine-cut teeth. Pinion located below upper frame; meshes with internal teeth of swing (ring) gear integral with hook roller path.

Horizontal Travel Shaft — Mounted in line bores on anti-friction bearings.

Spur Gears — Heat treated, machine-cut teeth; mounted on anti-friction bearings.

Bevel Gear — Heat treated, involute splined to shaft; fully enclosed, running in oil.

Vertical Center Drive Shaft for Travel — Mounted in line bores in anti-friction bearings.

Jaw Clutch — Heat treated, involute splined to shaft; enclosed, running in oil. Clutch is engaged with spur gear beneath it to transmit power for high-speed travel to upper spur gear on vertical travel shaft.

Spur Gear (Upper) — Heat treated, machine-cut teeth, mounted on bronze bushings; enclosed, running in oil. Gear has integral jaw clutch on top side for engagement by jaw clutch above.

Spur Gear (Lower) — Heat treated, machine-cut teeth, involute splined to shaft; enclosed, running in oil. Gear transmits power for low-speed travel to lower spur gear on vertical travel shaft.

Vertical Travel Shaft — Mounted in line bores in anti-friction bearings.

Spur Gear (Upper) — For high-speed travel. Heat treated, machine-cut teeth, involute splined to shaft; enclosed, running

in oil. Gear has integral clutch on underneath side. Gear furnishes power directly to shaft for high-speed travel, or is shifted downward to engage clutch jaws with those on top side of lower spur gear on shaft to effect transmittal of power for low-speed travel to vertical travel shaft from lower spur gear on vertical center drive shaft for travel.

Spur Gear (Lower) — For low-speed travel. Heat treated machine-cut teeth, mounted on bronze bushings; enclosed, running in oil. Gear has integral clutch jaws on top side for engagement with clutch jaws on underneath side of upper spur gear to effect transmittal of power for low-speed travel.

Bevel Gear — Involute splined to shaft, heat treated; enclosed, running in oil. Gear meshes with bevel gear on horizontal traction shaft in lower frame to transmit power for travel.

Swing Lock — Mechanically controlled double pawl engages with internal teeth of ring (swing) gear.

Swing Brake — Two-directional, external contracting band; spring applied, power hydraulically released.

Brake Drum — Involute splined to lower end of vertical center drive shaft for swing; brake mounted beneath upper revolving frame.

Gantry — Mounted on upper revolving frame to rear of machinery side housings (low gantry); supports boom suspension system.

Ball — Pinned to gantry frame. Contains 2 sheaves for standard 4-part boomhoist wire rope for hoe attachment or 4 sheaves for standard 8-part boomhoist wire rope for crane.

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

Elevated Operator's Cab — Optional; 4' (1.22 m) higher than standard cab elevation. Upper cab portion hinged and hydraulic control lines equipped with quick-disconnect fittings to facilitate folding (or removal) cab portion forward to reduce over-all clearance height.

Optional Cab Accessories — Electric windshield wiper, cab heater, defroster fan. (Cab heater and defroster fan not recommended for machine equipped with elevated cab).

Catwalks — Optional; along operator's side and/or right-hand side of cab, including overhead grab rails on sides of cab. Catwalks hinged to permit folding vertically along cab sides to reduce over-all width of machine for transporting.

Counterweight — Removable, held in place by "T"-bolts. Upper frame platform extension under engine — 2,000# (908 kg) — not included in counterweight figures.

Cwt. "A" — 4,550# (2,064 kg); standard for hoe and shovel applications.

Cwt. "AB" — 7,850# (3,561 kg); standard for crane, clamshell, dragline, magnet, or piledriver applications.

Cwt. "ABC" — 9,350# (4,241 kg); optional for crane application only.

Control System — Speed-o-Matic power hydraulics; an open system. Operating pressure is transmitted through oil to all operating two-shoe clutch cylinders, swing brake and boomhoist drum brake cylinders. The system includes a pump to provide a constant flow of oil, an accumulator to maintain operating pressure and variable pressure operator-controlled valves to regulate this pressure to each clutch cylinder.

Pump — Vickers; rated at 4.7 g.p.m. (17.79 liters/min.) at 1,200 r.p.m.

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

Relief Valve — FMC; set to operate at 1,250 p.s.i. (88 kg/cm²).

Unloader Valve — FMC; set to unload pump at a maximum 1,050 p.s.i. (74 kg/cm²) and to load pump when pressure drops below 900 p.s.i. (63 kg/cm²).

Accumulator — FMC; piston-type, precharged with nitrogen gas to 650 p.s.i. (46 kg/cm²).

Sump Tank — FMC; 7-gal. /26.50 liters) capacity with oil filter and strainer assembly.

Control Valves — FMC; variable pressure type.

GENERAL INFORMATION ONLY



Engines — Diesel. Full-pressure lubrication, oil filter, air cleaner, fuel

filter, hand throttle, optional foot throttle, and/or hand throttle (lever

type) on swing control lever.

Specifications	GM3-71N	GM4-71N	GM4-71N ^②	Cat. 3304 NA
Number of cylinders	3	4	4	4
Bore and stroke — inches	4 ¹ / ₄ x5 (108x127 mm)	4 ¹ / ₄ x5 (108x127 mm)	4 ¹ / ₄ x5 (108x127 mm)	4.75x6 (120.7x152 mm)
Piston displacement — cu. inch	212.7 (3,486.2 cm ³)	283.7 (4,649.8 cm ³)	283.7 (4,649.8 cm ³)	425 (6,965.8 cm ³)
High idle speed — r.p.m.	1,990	1,408	1,408	1,990
Engine r.p.m. @ full load speed	1,815	1,268	1,268	1,870
Net engine h.p. @ full load speed	84	80	80	80
Peak torque — ft. lbs.	271 (37.48 kgm)	332 (45.92 kgm)	332 (45.92 kgm)	284 (39.28 kgm)
Peak torque — r.p.m.	1,200	1,000	1,000	1,150
Electrical system	12-volt	12-volt	12-volt	12-volt
Batteries	2/6-volt	2/6-volt	2/6-volt	2/12-volt
Clutch or Power Take-Off	Friction Twin Disc ^① #SP111-HP-1	Friction Twin Disc #SP111-HP-1	Disconnect Clutch Between Engine and Converter	Friction Twin Disc #SP111-HP-1
Transmission —				
No. chain wheel teeth	161	161	161	161
No. engine pinion teeth	17	17	24	17

①Or optional Cotta TSU 2-speed transmission.

②Allison #TCDOA377 single stage torque converter

Fuel Tanks — One 43-gal. (162.7 liters) capacity fuel tank with flame arrestor fill unit, self-closing cap with locking eye for padlock, and fuel level gauge

— mounted to rear of machine under engine. Auxiliary 43-gal. (162.76 liters) capacity fuel tank, equipped with same accessories, mounted within cab in

right front corner forward of chain wheel case.

Crane Booms and Auxiliary Equipment --

Crane Booms

Standard 26" (.66 m) Angle Boom —

Two-piece; basic 30' (9.14 m) length with 17' (5.18 m) long base section and 13' (3.96 m) long top (open throat) section. Boom 26" (.66 m) deep and 28" (.71 m) wide at connections; low alloy, high-strength steel main chord angles 2¹/₂" (63.5 mm) x 2¹/₂" (63.5 mm) x 5/16" (7.94 mm) in base and top section and boom extensions. Basic boom pendants standard.

Boompint Machinery — Heat treated, 18" (.46 m) root diameter head sheaves mounted on anti-friction bearings. Standard — 2 sheaves; optional — 3 or 4 sheaves, or 1 wide flared sheave for dragline.

Boom Extensions — Available in 5' (1.52 m), 10' (3.05 m), 15' (4.57 m), and 20' (6.10 m) lengths with appropriate length pendants.

Boomhoist Bridle — Serves as connection between pendant ropes and boomhoist wire rope reeving. Fabricated bridle frame houses sheaves for boomhoist rope reeving.

— **Low Gantry**; Heat treated, 8" (.20 m) root dia. sheaves, mounted on bronze bushings. Standard — 4 sheaves for 8-part boomhoist wire rope reeving.

Optional 34" (.86 m) Angle Boom — Two-piece; basic 35' (10.67 m) length with 20' (6.07 m) base section and 15' (4.57 m) top (open throat) section. Boom 34" (.86 m) deep and 34" (.86 m) wide at connections. Low alloy, high-strength steel main chord angles —

base section and boom extension chords 3" (76.2 mm) x 3" (76.2 mm) x 3/8" (9.5 mm); top section chords 3" (76.2 mm) x 3" (76.2 mm) x 5/16" (7.94 mm). Basic boom pendants standard.

Boompint Machinery — Heat treated, 18" (.46 m) root dia. head sheaves, mounted on anti-friction bearings. Standard — 3 sheaves; optional — 2 or 4 sheaves, or 1 wide flared sheave for dragline.

Boom Extensions — Available in 5' (1.52 m), 10' (3.05 m), 15' (4.57 m), and 20' (6.07 m) lengths with appropriate length pendants.

Boomhoist Bridle — Serves as connection between pendant ropes and boomhoist wire rope reeving. Fabricated bridle frame houses sheaves for boomhoist rope reeving.

— **Low Gantry**; Heat treated, 9¹/₂" (.24 m) root dia. sheaves, mounted on bronze bushings.

Items Common To Both 26" (.66 m) and 34" (.86 m) Angle Booms —

Boomfeet — 1⁵/₈" (41.3 mm) thick on 35" (.89 m) centers.

GENERAL INFORMATION ONLY



Boompoint Head Sheave Guards — Standard; formed, rigid, round steel. Optional — roller-type guards. Note — roller guards do not permit use of center head sheave(s), and are not available on boom equipped with jib.

Boom Connections — Pin connections; permit quick addition or removal of boom extensions. Optional — bolted connections.

Boom Stops — Dual, tubular with spring-loaded bumper ends; fixed horizontal on cab roof.

Load Hoist Rope Deflector Rollers — Required when third drum wire rope passes over crane boompoint. Recommended for long booms and for short booms when load is being handled on front drum wire rope. Heat treated, tubular steel rollers; mounted on anti-friction bearings. One roller standard on top side of base section of either boom. Recommended optional rollers — 1 for 40' (12.19 m) boom, 2 for 45' (13.72 m) or 50' (15.24 m) booms.

Boom Angle Indicator — Mounted on boom near base.

Auxiliary Equipment for Angle Booms —

Fairlead — Full-revolving type; barrel, sheaves, and guide rollers mounted on anti-friction bearings.

Tagline Winders — Rud-o-Matic Model 648; spring-wound, drum-type mounted on crane boom — cable pull off drum 60' (18.29 m) to 75' (22.86 m) from neutral. Also available; Morin Tagmaster Model BR.

Backfill Board — 7' (2.13 m) wide; for use in backfilling material into trench.

Hoe Attachment —

Boom — All-welded, box section, gooseneck design; 19'0" (5.79 m) long from center of boomfoot to center of boompeak shaft.

Boom Foot Idler Roller — Supports inhaul wire rope at boomfoot when digging at maximum depths.

Inhaul Rope Sheave — Bronze bushed, 15 $\frac{1}{8}$ " (.40 m) root dia. sheave is mounted on right side of boom near gooseneck. Sheave supports inhaul rope as it passes from front drum to bucket bail; inhaul rope passes through bucket bail and dead ends on opposite side of boom from inhaul rope sheave.

Inhaul Rope Deflector Rollers — Two rollers, mounted on either side of boom tip; deflect inhaul rope when arm is extended for maximum digging or dumping radii.

Boom Mast — 8'8" (2.64 m) long; pin connected to foot of boom.

Mast Sheaves — Mast equipped with one 15 $\frac{1}{8}$ " (.40 m) root dia. head sheave and one 11 $\frac{1}{8}$ " (.30 m) root dia. link sheave for standard 3-part hoist rope reeving — hoist rope dead ends at socket on top end of arm. Standard equipment includes dead end link sheave to permit converting to 2-part hoist rope reeving — hoist rope is then dead ended at mast. Mast also equipped with two 6 $\frac{1}{2}$ " (.17 m) root dia. sheaves for 4-part mast hoist. All sheaves heat treated, mounted on bronze bushings.

Mast Stops — Dual, telescoping type.

Arm — All-welded, box section; 7'10 $\frac{1}{2}$ " (2.40) long from hinge on boom tip to connection at bucket.

Hoist Sheave — 13 $\frac{3}{8}$ " (.34 m) root dia., bronze bushed; mounted in fabricated connecting link which is mounted at top end of arm on bronze bushings.

Bucket Pitch Brace — All-welded, box-type construction; secured to arm and bucket with steel pins. Permits adjusting pitch of bucket to suit varying types of soils and digging conditions.

Bucket Bail — Horizontal sheave type, fabricated steel; connected to bucket with fabricated link and steel pins. Bail equipped with 15 $\frac{7}{8}$ " (.40 m) root dia. heat treated sheave mounted on bronze bushings.

Hoe Buckets —

Amsco $\frac{3}{4}$ cu. yd. (.57 cu. m) with 8" (.20 m) tooth-type sidecutters for 41" (1.04 m) cutting width.

Optional Hoe Attachment With Hydraulic Digging Bucket — Includes auxiliary rear drum brake, complete hydraulic system, and bucket actuating cylinder. Note — available only on machine equipped with GM4-71N diesel engine with friction clutch.

Hydraulic Pump — Gear-type pump coupled to engine disconnect clutch output shaft by flexible coupling. Pump capacity, 51.2 g.p.m. (193.79 liters/min.) @ 1,800 r.p.m.

Bucket — Esco $\frac{3}{4}$ cu. yd. (.57 cu. m); 33" (.84 m) outside lip width bucket with Esco tooth-type sidecutters for 41" (1.04 m) cutting width.

Bucket Cylinder — One hydraulic cylinder; 5 $\frac{1}{2}$ " (.14 m) dia. bore, 3" (.762 mm) dia. rod, 41 $\frac{1}{2}$ " (1.05 m) stroke. Cycle time — extend, 5.9 seconds; retract, 4.17 seconds. Double-acting cylinder protected from shock loadings at full extend or retract by internal hydraulic cushioning at each end. Cylinder also equipped with polyurethane shock absorber at rod end, and each end (rod and cylinder) is mounted in self-aligning steel bushings.

Bucket Cylinder Control Valve — Hydraulic spool valve actuated by flexible control attached to hand-operated lever at operator's control stand in cab.

Sump Tank — All-welded unit; baffled for strength, maximum deaeration, and heat rejection. Mounted on right-hand rear side of extended cab. Capacity, 50 gallons (189.25 liters); equipped with filters in suction and return lines to assure clean oil supply.

GENERAL INFORMATION ONLY



Wire Rope --

Application — Type and Size Used

Boomhoist — 26" (.66 m) Angle Boom — 5/8" (15.88 mm) dia. Type "N" with low gantry.

Boom Pendants — 26" (.66 m) Angle Boom — 1" (25.40 mm) dia. Type "N".

Boomhoist — 34" (.86 m) Angle Boom — 5/8" (15.88 mm) dia. Type "N" with low gantry.

Boom Pendants — 34" (.86 m) Angle Boom — 1 1/8" (28.88 mm) dia. Type "N".

Main Load Hoist — 5/8" (15.88 mm) dia. Type "N".

Jib Load Hoist —
— (1-part line); 5/8" (15.88 mm) dia. Type "P".

— (2-part line); 5/8" (15.88 mm) dia. Type "F".

Clamshell Holding (Hoist) — 5/8" (15.88 mm) dia. Type "F".

Clamshell Closing — 5/8" (15.88 mm) dia. Type "F".

Dragline Inhaul — 3/4" (19.05 mm) dia. Type "D".

Dragline Hoist — 3/4" (19.05 mm) dia. Type "F".

Hoe Hoist — 3/4" (19.05 mm) dia. Type "N".

Hoe Inhaul — 3/4" (19.05 mm) dia. Type "D".

Hoe Mast Hoist —
— 5/8" (15.88 mm) dia. Type "F" with low gantry.

Wire Rope Types

Type "D" — 6 x 25 (6 x 19 class), filler wire, improved plow steel, preformed, independent wire rope center, right lay, lang lay.

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

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 "P" — 19 x 7 non rotating, extra improved plow steel, preformed, wire rope center.

Main Load Hoist Wire Rope Lengths

Parts of Line	Boom Length							
	30' (9.14 m)		35' (10.67 m)		40' (12.19 m)		50' (15.24 m)	
	Feet	Meters	Feet	Meters	Feet	Meters	Feet	Meters
1	75	22.86	85	25.91	95	28.96	115	35.05
2	110	33.53	125	38.10	140	42.67	170	51.82
3	145	44.20	165	50.29	185	56.39	225	68.58
4	180	54.86	205	62.48	230	70.10	280	85.34

Dragline Wire Rope Lengths

Function	Parts of Line	Boom Length									
		30' (9.14 m)		35' (10.67 m)		40' (12.19 m)		45' (13.72 m)		50' (15.24 m)	
		Feet	Meters	Feet	Meters	Feet	Meters	Feet	Meters	Feet	Meters
Hoist	1	85	25.91	95	28.96	105	32.00	115	35.05	125	38.10
Inhaul	1	120	36.58	130	39.62	140	42.67	150	45.72	160	48.77

Clamshell Wire Rope Lengths

Function	Parts of Line	Boom Length									
		30' (9.14 m)		35' (10.67 m)		40' (12.19 m)		45' (13.72 m)		50' (15.24 m)	
		Feet	Meters	Feet	Meters	Feet	Meters	Feet	Meters	Feet	Meters
Holding	1	75	22.86	85	25.91	95	28.96	105	32.00	115	35.05
Closing	1	40	12.19	46	14.02	52	15.85	58	17.68	64	19.51
Tagline	Furnished with tagline										

Hoe Wire Rope Lengths

Hoist — 102' (31.09 m) for 3-part line; 92' (28.04 m) for 2-part line.

Inhaul — 64' (19.51 m) for 2-part line.

Hoe Mast Hoist — 95' (28.96 m) for low gantry.

Boomhoist Wire Rope Lengths

Type Gantry	Parts of Line	26" (.66 m) Angle Boom								34" (.86 m) Angle Boom							
		Wire Rope								Wire Rope							
		Diameter				Length				Diameter				Length			
		Inch	Milli-meters	Feet	Meters	Inch	Milli-meters	Feet	Meters	Inch	Milli-meters	Feet	Meters	Inch	Milli-meters	Feet	Meters
Low	8	5/8	15.88	215	65.53	5/8	15.88	235	71.63								

GENERAL INFORMATION ONLY