

# 460 Hydro-Scopic

## SPECIAL FEATURES

Custom Built in America. For Today. For the Future.

## HYDRO-SCOPIC TELESCOPING BOOM EXCAVATOR

### ONE MACHINE DOES THE WORK OF MANY

You'll get more hard work from one Hydro-Scopic than from any other machine in your fleet because a wide variety of easily changed attachments allow an amazing range of construction and maintenance tasks. Beyond its use as a precision excavator, Hydro-Scopic can stand in for backhoes, trenchers, graders and loaders. It can even be used for lifting objects of three tons and more.

### SPEED AND COORDINATION GET DIGGING JOBS DONE FAST

Only when you've seen Hydro-Scopic operate can you fully appreciate how its rapid, versatile actions pay big dividends in total yards moved per hour.

Imagine the productivity of an excavator that provides five working functions: the boom hoists and telescopes, the excavator swings and the bucket tilts and curls. All these operations can occur simultaneously, even while the carrier is in motion, under full control from the excavator cab.

New operators will quickly master these rapid, coordinated movements while experienced hands exploit Hydro-Scopic's extreme flexibility to make quick work of production digging and loading.

### UNIQUE ABILITIES NO OTHER TYPE OF EXCAVATOR CAN MATCH

More than handling the production work that other excavators can, however, Hydro-Scopic handles precision grading and finishing. And, Hydro-Scopic typically completes an entire task with no need for final shoveling by hand.

Other machines can't match Hydro-Scopic's abilities to work in tight spaces and around obstructions. Culverts, posts and powerlines pose little problem for Hydro-Scopic. With its precise controls and sensitive feel, Hydro-Scopic even works with great accuracy under water to clear or enlarge running ditches or to dig in flooded excavation sites.

### THE ONE EXCAVATOR TO HAVE

Consider its many features and uses. You'll agree that Hydro-Scopic is the most versatile type of excavator and over a thousand satisfied users will confirm that Hydro-Scopic heads the list for reliable productivity.

### FOR MINIMUM TRANSIT TIME

For most construction and maintenance projects, the 6 x 4 Hydro-Scopics have the traction you'll need to get to the jobsite. Or, choose the sure-footed 6 x 6 version to venture even further off-road. No matter which truck-mounted unit you select, you'll get the convenience of unlimited highway mobility, plus the time and cost savings of eliminating an extra truck needed to transport most other types of excavators.

### FULL-FEATURED HYDRAULIC REMOTE DRIVE

At the jobsite, the upperstructure engine powers the carrier using a hydraulic motor attached to the carrier's transmission. From the upperstructure, the operator can control carrier speed, direction and braking.

### EXTRA HEAVY-DUTY BADGER CARRIERS

Truck-mounted Hydro-Scopics are built on a heavily reinforced, wide-flange 'I' beam frame designed specifically for these excavators. Cross members are integrally welded and distribute working loads equally. The swing-bearing mounting structure is welded integrally to the frame adding to its strength.

### TROUBLE-FREE FLUID POWER SYSTEM

The sealed reservoir has a built-in filter and a visual sight glass. An oil filter condition light is provided in the cab. All cylinders have precision-honed barrels and chrome-plated rods and use bolt-on heads for simplified maintenance. Relief and cushion valves are provided throughout the hydraulic system.

### PRECISION-MACHINED GEAR-DRIVE TURNTABLE

A hydraulic motor provides 360° of continuous rotation on a ball-bearing turntable. For long life and smooth operation, the mating surfaces are precision-machined to very fine tolerances using a computer-controlled boring mill.

### EXCLUSIVE WRIST-ACTION BUCKET

Our exclusive boom-tip hydraulic swivel holds its angle firmly for grading or contouring. It provides 180° of bucket tilt - 90° each way from horizontal - and is fully sealed against dirt and corrosion.

### RUGGED, PRECISION BOOM

Hydro-Scopic's exclusive rectangular, fast-cycling boom holds accurate grade extended or retracted. Since the boom itself never pivots, maximum boom strength is maintained regardless of the bucket angle. Boom sections are continuously welded for strength and telescope on adjustable, heavy-duty rollers with aluminum-bronze bushings. Due to the square cross section with rollers at each corner, digging loads are always supported by at least two rollers no matter what the bucket angle.

### RETRACTING RAILROAD GUIDE WHEELS

With its optional railroad guide wheels, Hydro-Scopic is an excellent tool for maintaining a railroad right-of-way and it gains this added use with no loss of flexibility to perform other tasks. The guide-wheel mechanism is hydraulically operated and is welded securely to a special, heavy-duty truck frame.

### WORKS EASILY IN CONFINED AREAS

With the boom fully lowered, Hydro-Scopic works to within a few feet of the carrier. And, with its shorter tail swing, Hydro-Scopic works in areas where other excavators can't. When used for ditching, Hydro-Scopic will let traffic flow, even on narrow roads.



- Super heavy-duty carriers
  - 6 x 4 and 6 x 6 drivetrains available
  - Legal for unrestricted highway travel
  - Hydraulically assisted power steering
  - Isolation-mounted cab with sound deadening
  - Tinted, safety-glass windows
  - Sound-insulated engine compartment
  - 10-speed transmission
  - 14-leaf front suspension with snubbers and spring stops
  - Cast-steel equalizer beams
  - Rear-wheel brakes, spring set and pneumatically released
- All specifications are subject to change.



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## THE ONE EXCAVATOR TO HAVE.

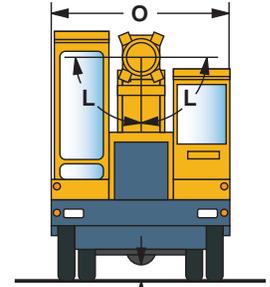
# 460 Hydro-Scopic

# WORKING RANGE

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## RATED LIFTING CAPACITY – OVER SIDE, ON TIRES – POUNDS (kg)

Load Point Height		Minimum Load Radius	15' (4.6m)	20' (6.1m)	Maximum Load Radius	
Above Ground Level	20.0' 6.1m			2890 (1311)	2840 (1288)	⊙ 20.2' 6.2m
	15.0' 4.6m	7470 (3388)	⊙ 11.6' 3.5m	5370 (2435)	3460 (1569)	2710 (1229) ⊙ 22.9' 7.0m
	10.0' 3.0m	*6310 (2862)	⊙ 14.1' 4.3m	*5710 (2590)	*3520 (1596)	*2470 (1120) ⊙ 24.2' 7.3m
	8.5' 2.6m	*6060 (2748)	⊙ 14.4' 4.4m	*5690 (2580)	*3510 (1592)	*2430 (1102) ⊙ 24.4' 7.4m
	5.0' 1.5m	*5920 (2685)	⊙ 14.5' 4.4m	*5600 (2540)	*3460 (1569)	*2400 (1088) ⊙ 24.5' 7.5m
Ground Level		6250 (2834)	⊙ 12.9' 3.9m	5340 (2422)	*3380 (1533)	*2510 (1138) ⊙ 23.6' 7.2m
Below Ground Level	-5.0' 1.5m			3850 (1746)	2910 (1320)	2640 (1197) ⊙ 21.5' 6.5m
	-10.0' 3.0m			2420 (1098)		2310 (1048) ⊙ 17.7' 5.4m



K2

460 Hydro-Scopic shown with 30" (76cm) excavating bucket

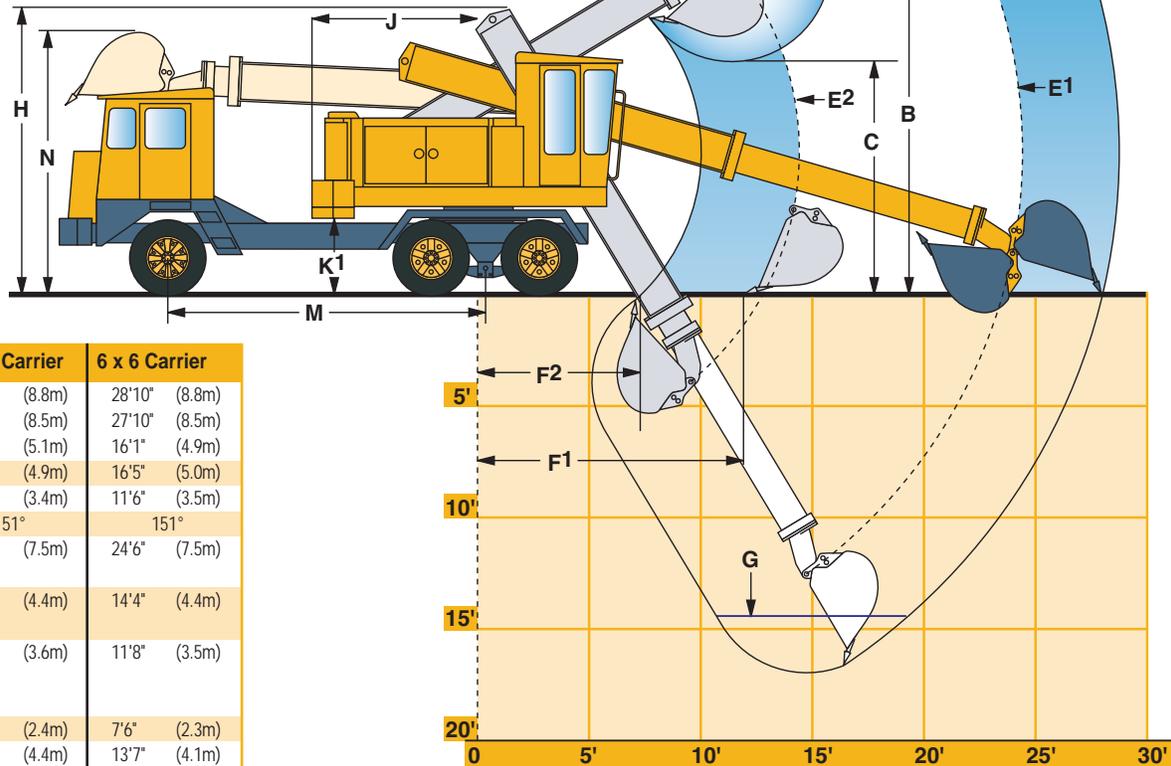
## RATED LIFTING CAPACITY – OVER REAR, ON TIRES – POUNDS (kg)

Load Point Height		Minimum Load Radius	15' (4.6m)	20' (6.1m)	Maximum Load Radius	
Above Ground Level	20.0' 6.1m			2890 (1311)	2840 (1288)	⊙ 20.2' 6.2m
	15.0' 4.6m	7470 (3388)	⊙ 11.6' 3.5m	5370 (2435)	3460 (1569)	2710 (1229) ⊙ 22.9' 7.0m
	10.0' 3.0m	6850 (3107)	⊙ 14.1' 4.3m	6240 (2830)	3890 (1764)	2680 (1215) ⊙ 24.2' 7.3m
	8.5' 2.6m	6780 (3075)	⊙ 14.4' 4.4m	6370 (2889)	3950 (1791)	2680 (1215) ⊙ 24.4' 7.4m
	5.0' 1.5m	6650 (3016)	⊙ 14.5' 4.4m	6310 (2862)	3960 (1796)	2680 (1215) ⊙ 24.5' 7.5m
Ground Level		6250 (2834)	⊙ 12.9' 3.9m	5340 (2422)	3600 (1633)	2690 (1220) ⊙ 23.6' 7.2m
Below Ground Level	-5.0' 1.5m			3850 (1746)	2910 (1320)	2640 (1197) ⊙ 21.5' 6.5m
	-10.0' 3.0m			2420 (1098)		2310 (1048) ⊙ 17.7' 5.4m

⊙ Boom is level at this point

\*Load is limited by tipping conditions. All other loads are limited by hydraulic capacity.

All specifications are subject to change.



Description	6 x 4 Carrier	6 x 6 Carrier
A Maximum reach	28'10" (8.8m)	28'10" (8.8m)
Surface reach	28'0" (8.5m)	27'10" (8.5m)
Digging depth	16'7" (5.1m)	16'1" (4.9m)
B Loading height, boom extended	16'2" (4.9m)	16'5" (5.0m)
C Loading height, boom retracted	11'0" (3.4m)	11'6" (3.5m)
D Bucket pivot angle	151°	151°
E <sup>1</sup> Attachment pivot point, full range, boom extended	24'6" (7.5m)	24'6" (7.5m)
E <sup>2</sup> Attachment pivot point, full range, boom retracted	14'6" (4.4m)	14'4" (4.4m)
F <sup>1</sup> Minimum surface reach, cleanup, bucket level at ground line, boom retracted	11'11" (3.6m)	11'8" (3.5m)
F <sup>2</sup> Minimum surface reach, digging	8'0" (2.4m)	7'6" (2.3m)
G 8' (2.4m) of level bottom	14'5" (4.4m)	13'7" (4.1m)
H Maximum working height	12'7" (3.8m)	13'1" (4.0m)
J Tail swing	7'5" (2.3m)	7'5" (2.3m)
K <sup>1</sup> Upperstructure ground clearance	3'5" (1.0m)	3'11" (1.2m)
K <sup>2</sup> Carrier ground clearance	8.7" (22cm)	8.7" (22cm)
L Bucket tilt (90° each way)	180° total	180° total
M Wheel base	171" (4.3m)	171" (4.3m)
Boom telescoping action	10'0" (3.0m)	10'0" (3.0m)
Swing	continuous	continuous
Digging range	270°	270°
Dumping range	360°	360°
Boom raise and lower (for 6x4 & 6x6)	Above horizontal 31°, Below horizontal 59°, Total arc 90°	

Rated bucket tangential force:

Ditching bucket (60°)	6 x 4 and 6 x 6	14,950 lb. (66.5kN)
Ditching bucket (66°)	6 x 4 and 6 x 6	15,850 lb. (70.5kN)

Telescope crowd force:

6 x 4 and 6 x 6	13,250 lb. (58.9kN)
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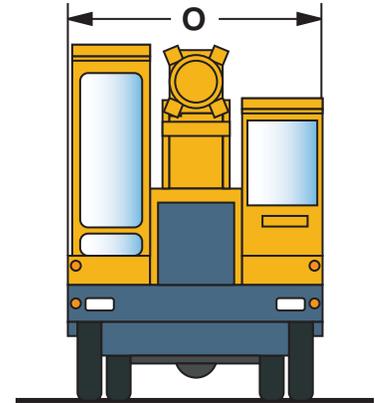
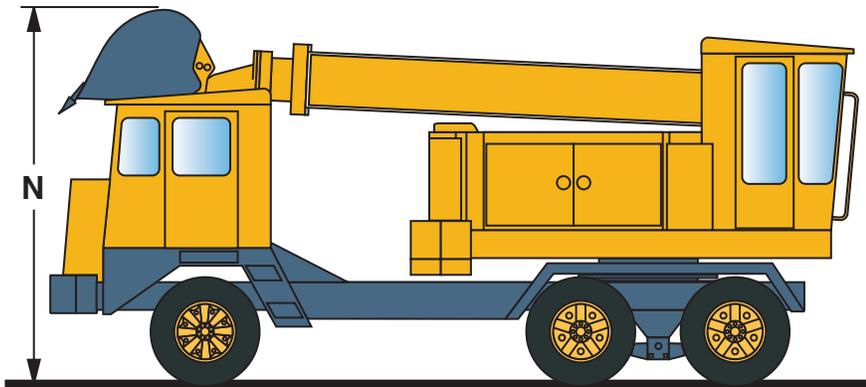
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# 460 Hydro-Scopic TRANSPORTATION DIMENSIONS

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Transport Data	6 x 4 Carrier		6 x 6 Carrier	
N Overall height (boom in rack)				
with 30" bucket	11'9"	(3.6m)	12'3"	(3.7m)
without bucket	11'0"	(3.4m)	11'6"	(3.5m)
Overall length (without bucket)	25'6"	(7.8m)	25'6"	(7.8m)
O Overall width	8'0"	(2.4m)	8'0"	(2.4m)

### TRAVEL SPEEDS:

6 x 4 or 6 x 6 Carrier with C8.3-210 Engine, 2400 rpm, 4.88:1 Axle Ratio, 10.00-20 Traction Tires

	Forward										Reverse		
	1	2	3	4	5	6	7	8	9	10	low	int.	dir.
mph	3.0	4.7	7.1	9.6	13.0	17.5	24.2	32.6	44.5	59.6	2.9	4.5	15.3
kph	4.8	7.6	11.4	15.4	20.9	28.2	38.9	52.5	71.6	95.9	4.7	7.2	24.6

All specifications are subject to change.



## FIRST CLASS CONSTRUCTION.

The Hydro-Scopics are quality built. T-1 steel is used in areas of stress, continuous welds, proven components and **especially** precision assembly.

Instead of shimming our gear-drive turntable, we machine the surfaces to very fine tolerances. We precision align-bore all of the boom pivot and hoist cylinder pins. Numbers and charts don't show these differences, but you'll see them with more years of trouble-free operation.



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## SPECIFICATIONS

### 460 Carrier Engine

Cummins ISB-280, turbo-charged, charge-air cooled, 6-cylinder, 4-cycle, liquid-cooled, isolation-mounted diesel engine. 280 peak hp (209kw) @ 2,300 rpm, 660 lbs.-ft. peak torque (895Nm) @ 1,600 rpm, 409 cid (6.7L), 4.21" bore x 4.88 stroke (107mm x 124mm), 17.3:1 compression ratio. Electronically controlled exhaust gas particulate filter. Two-stage dry-type air cleaner. Spin-on coolant, fuel/water separator and combination full flow/bypass lube filters. 12 volt DC, 100 amp alternator with integral solid-state regulator. Electronically controlled fuel pump. **Battery:** One SAE 12 volt DC, 1,150 CCA @ 0 deg. F (-22° C) **Radiator:** Fin and flat tube type radiator with silicone coolant and heater hoses. Brazed aluminum charge-air cooler. **Fuel Tank:** 50-gal. (189L) fuel tank with in-line filter.

### Optional Carrier Engine

Cummins ISC-300 turbo-charged, charge-air cooled, 6-cylinder, 4-cycle, liquid cooled, isolation-mounted diesel engine. 300 peak hp (224kw) @ 2,000 rpm; peak torque 860 lbs.-ft. (1,166Nm) @ 1,300 rpm; 504.5 cid (8.3L).

### Carrier Air System

13.2 cfm (374CL) compressor. Bendix AD-9 desiccant type air dryer with heated automatic ejector valve, spin-on cartridge.

### Transmission

Eaton Fuller RT8908LL manual, 10 speeds forward, 3 reverse with Spicer 14" (356mm) diameter two-disc hydraulic clutch. Air operated countershaft brake and multi-mesh gearing. **Transfer Case:** Fabco TC170 with cab-controlled front axle disconnect

### Axles

**6 x 4 Front:** Rockwell FF-942: 13,200lb. (5,987kg) rated capacity. **6 x 6 Front:** Fabco SDA-1600: 16,000lb (7,257kg) rated capacity with 4.88:1.00 ratio **Rear:** Eaton 405 tandem: 40,000lb. (18,144kg) rated capacity. Cab-controlled inter-axle and differential lock with 4.88:1.00 ratio. **Optional Rear Axle:** Eaton 461 tandem: 46,000lb. (20,865kg) rated capacity.

### Steering

Integral hydraulic power steering

### Drive Line

Spicer 1710 series needle bearing universal joints.

### Suspension

**Front:** Two 14-leaf spring 41.5" x 3" (105cm x 7.6cm) with mechanical stops. **Rear:** Hendrickson cast steel equalizer teams with 54" (137cm) axle center, 8" (20cm) oscillation.

### Brakes

Independent front and rear service brake system incorporates spring set emergency and air applied service and parking brakes with automatic slack adjusters on both rear axles. **6 x 4 Front:** Rockwell Cam/Master 16.5" x 5" (41.9cm x 12.7cm). **6 x 6 Front:** Eaton standard Service Cam 16.5" x 5" (41.9cm x 12.7cm) **Rear:** Eaton Extended Service Cam 16.5" x 7" (41.9cm x 17.8cm).

### Wheels

**6 x 4 Front:** Disc  
**6 x 6 Front:** Disc  
**6 x 6 Rear:** Disc

### Tires

**6 x 4 and 6 x 6:** 11R-22.5 (G) 14 PR front and dual rear highway tread  
**Option:** 385/65R-22.5 (J) 18 PR front highway tread.  
**Option:** 11R-22.5 (G) 14 PR dual rear traction tread.

### Frame

Reinforced wide-flange "I" beams 10" x 39 lbs./ft. (25cm x 58kg/m), fully welded cross members. Bolt-on front bumper.

### Carrier Cab

All-weather steel cab, isolation-mounted, acoustic-lined, with Bostrom T-bar seat, seat belt, tinted safety glass windows with adjustable side windows, ventilator in cowl, 2-speed electric windshield wiper with washer, fire extinguisher, sun visor, heat and defroster fans, and interior light.

### Carrier Controls

Individual foot pedals hydraulically actuate the clutch and mechanically actuate the dual air brake valve and engine throttle. Once manual transmission shift lever with air-operated range selector.

### Carrier Standard Equipment

Sealed halogen high/low beam headlights with high-beam indicator. Turn signals, clearance lights, taillights, back-up lights, stop lights, and 4-way hazard lights. 3-light identification cluster front and rear. Cab interior light. West-coast and convex mirrors. Tow hooks front and rear. Dual electric horns. Dial electric travel alarms signal remote control movement and reverse movement. Key-operated ignition/start. Lighted gauges for engine oil pressure and coolant temperature, voltage, fuel level, speedometer, odometer, tachometer, hour meter and dual air pressure. Audio-visual alarm system monitors: low coolant level, high coolant temperature, and low engine oil pressure. Low air pressure warning light. Push-pull air valve for emergency/parking brakes with flashing indicator light. Disc wheels.

### Carrier Options

Spark arrester. Vandalism covers. Hydraulic stabilizers, control in upper cab. Maintenance-free battery, air ride seat, and air conditioning.

### Upperstructure Engine

Cummins QSB4.5-Tier 3 turbo-charged, 4-cylinder, 4-cycle, liquid-cooled, isolation-mounted diesel engine. 140 peak hp (104kw) @ 2,300 rpm, 130 hp (97kw) @ 2,500 rpm, 459 lbs.-ft peak torque (622Nm) @ 1,500 rpm 275 cid (4.5L), 4.21" bore x 4.88 stroke (107mm x 124mm), 17.2:1 compression ratio. Two-stage dry-type air cleaner. Spin-on lube filter, fuel filter/water separator. Electronically controlled fuel pump. 12 volt DC, 105 amp alternator with integral solid-state regulator. Exhaust gas particulate filter is not required. **Battery:** Two SAE 12 volt DC 600 CCA @ 0° F (-22° C). **Radiator:** Fin and flat tube type radiator with box type shroud. Brazed aluminum charge-air cooler. **Fuel Tank:** 50-gal. (189L) fuel tank with in-line filter.

### Upperstructure Air System

8.5 cfm (241 CL) compressor. Bendix AD-9 desiccant type air dryer with heated automatic ejector valve, spin-on cartridge.

### Hydraulic System, Fixed Flow

One 2-section tandem pump, flange mounted to the engine and driven directly by means of a Lovejoy Centaflex coupling. Maximum 80 gpm (364L/min.) @ 2,500 rpm, and 100° F (38 C) oil temperature. Integral flow divider and relief valve provide flow for remote steer, etc. **Four double-acting cylinders with bolt-on heads:** Two boom hoist: 5" ID (127mm), 3.25" (83mm) rod, 30.25" (768mm) stroke, self-aligning bearings. One boom telescope: 4.5" ID (114mm), 3" (76mm) rod, 120" (3,048mm) stroke, self-aligning bearing in rod end. One tool: 5" ID (127mm), 2.5" (63mm) rod, 18" (457mm) stroke, self-aligning bearing in housing end. One 22 hp (16.4kw) hydraulic swing motor with manually or automatic disc type swing brake. One 56hp (41.8kw) hydraulic remote travel motor. Once cylinder-type rotary actuator, 6" ID (152mm), 180° rotation with cushion lock valve

### Hydraulic Remote Control

Carrier powered by upperstructure engine through hydraulic motor and P.T.O. attached to transmission. Toggle air valve to select remote control located in carrier cab. Propel, steering levers located in upperstructure cab.

### Swing

Speed: 7.9 rpm, 0 deg to 90° 2.5 seconds.

### Upperstructure Cab

All-weather, isolation-mounted, acoustic-lined steel cab with tinted safety glass windows and skylight. Heater, defroster fan, fire extinguisher, 3-way adjustable cushioned seat. Front window self-stores in cab. Sliding rear window.

### Upperstructure control

Two armrest mounted joysticks control all excavator functions. **Dead-man type self-centering:** when controls are released, machine movements stop automatically. **Remote Control:** One floor mounted rocker pedal controls forward/reverse carrier travel, one joystick mounted rocker switch controls the steering. Both are dead-man type self-centering: when pedal is centered, carrier brakes are set automatically. One operator controlled swing-parking brake switch. Push-pull air valve for emergency brakes.

### Upperstructure Options

**Vandalism protection package:** metal window covers, locks for upperstructure access doors, storage rack (or Lexan windows less storage rack). Tachometer/hour meter. Engine coolant filter. Pump cavitation warning light. Strobe or rotating-beacon and indicator. Light package: two boom-mounted and two frame-mounted halogen work lights, two tail lights on upper shroud. Electric 2-speed windshield wiper with washer. Electric heating element hydraulic reservoir. Kwik-change bucket adapter. Seat belts. Air conditioning.

### Buckets and Attachments

Buckets fabricated of steel plate with T-1 steel cutting edges and wear strips, hardened steel bushings in ears, replaceable tooth points with flex pins on excavating buckets **Ditching Buckets:** 60" (152cm), 66" (168cm). **Excavating Buckets:** 24" (61cm), 30" (76cm), 36" (91cm). **Specialty Buckets:** 24" (61cm) V-type bucket, rounded bottom; 60" (152cm) material handling bucket; 30" (76cm) pavement removal bucket. **Boom Extensions:** 2.5' (.8m), 4' (1.2m), 90' Material (unloading). **Attachments:** 8' (2.4m) grading blade, single-tooth ripper, guard rail cleanout, brush mower, grapple, magnet, hammer and auger attachments also available.

### Operating Weights

Approximate working weight of carrier and upperstructure, including 60" (152cm) ditching bucket and full fuel tanks. **6 x 4:** 39,200 lbs. (17,781kg). **6 x 6:** 41,400 lbs. (18,779kg).

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