Engineering Spec

IC-20-J

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Date: Aug 2011

Replaces: Form BD106G
Dated: June 2006

The IC-20-1J is a self-propelled industrial crane designed for in-plant lifting and material handling applications. It is powered by either a dual fuel (gasoline/LPG) or diesel engine. The IC-20 has special features of low height, narrow width, short length, cargo deck, rear wheel steer and front wheel drive. The basic unit consists of a chassis and hydraulic boom assembly. The chassis includes a frame, three hydraulic outriggers, oil tank, control station and full power steering. The boom assembly includes a hydraulic powered 90° swing turret, 3-section telescopic boom, hydraulic boom elevating cylinder, and hydraulic powered hoist.

General:

Length:	
Chassis	9 feet 1 inch (2.77 m)
Overall	9 feet 1 inch (2.77 m)
Width:	4 feet (1.22 m)
Height:	
Deck	28 inches (711 mm)
Overall	5 feet 6 inches (1.68 m)
Wheelbase:	4 feet 6 inches (1.37 m)
Ground Clearance:	
Chassis	8 inches (200 mm)
Rear Axle (Minimum)	5 7/8 inches (149 mm)
Angle of Approach:	28 degrees
Angle of Departure:	16 degrees
Turning Radius: (Minimum)	10 feet (3.05 m)
Aisle Width for 90-degree Turn: (Minimum)	7 feet 3 inches (2.2 m)
Travel Speed: (Maximum)	5.5 mph (8.8 km/h)
Weight:	6,380 pounds (2900 kg)
Weight Distribution:	
Left-Hand Front Wheel	1,150 pounds (525 kg)
Right-Hand Front Wheel	1,150 pounds (525 kg)
Left-Hand Rear Wheel	1,260 pounds (570 kg)
Right-Hand Rear Wheel	2,820 pounds (1280 kg)
Tire Footprint:	46 square inches (297 cm^2) each
Outrigger Footprint:	39 square inches (252 cm^2) each
Drawbar Pull:	3,000 pounds (1360 kg)
Gradeability:	53% (28 degrees)

(Calculated values based on GM 2.4L Gasoline engine. Wheels may spin before these values are reached.)

Grade Limit:	
Forward and backward	15%
Sideways with no load	10%

Boom Movement:	
Rotation	90 degrees
Elevation	75 degrees
Telescope	9 feet (2.74 m)
Tailswing	2 feet 5 5/8 inches (753 mm)
Boom Speed:	
Rotation	10 seconds
Elevation	9 seconds
Telescope	25 seconds
Sheave Height:	
Without Jib	21 feet (6.4 m)
With Jib	27 feet 9 inches (8.46 m)
Horizontal Reach:	
Without Jib	15 feet (4.57 m)C/L Rotation 8 feet 8 inches (2.64m) Front of frame
With Jib	22 feet (6.71 m)C/L Rotation 15 feet 8 inches (4.78 m) Front of frame

ENGINE:

Standard:

GM 2.4L, Woodward EFI Dual Fuel, EPA Tier II Certified:

Industrial gasoline engine complete with multi-port electronic fuel injection, dual fuel, and engine management system. Water-cooled, 4-cylinder, 147 CID (2.4 L), 3.44-inch (87.4 mm) bore, 3.94-inch (100 mm) stroke, 65 HP (48 kW) at governed speed of 2500 rpm. Maximum torque, 137 foot pounds (185 Nm) at 2300 rpm. 70-amp alternator, 13.5-gallon (51 L) gas tank, and 33 lb (15 kg) LPG tank. Includes high temperature, low oil pressure shutdown, engine management system, and a catalytic converter muffler.

Optional Engines and Accessories:

Kubota 2.4L, EPA Interim Tier 4 Certified:

Kubota V2403-M-E3B diesel engine. Water-cooled, 4-cylinder, naturally aspirated, 148 CID (2.4 L), 3.43-inch (87 mm) bore, 4.03-inch (102 mm) stroke. 48.9 HP (36.5 kW) at governed speed of 2700 rpm. Maximum torque 118 ft-lbs (160 Nm) of torque at 1800 rpm. 12V, 40-amp alternator. Net weight: 80 pounds (36 kg)

Spark Arrestor Muffler:

Spark arrestor muffler used in addition to standard muffler. Net Weight: 10 pounds (5 kg)

Engine Shutdown Kit:

Consists of Murphy switches that shut engine down if water temperature is excessive or oil pressure is too low. For diesel engine only.

Hydrostatic Transmission Pump:

Standard:

Sauer-Danfoss piston type, 2.8 CID (45 mL) per revolution, direct driven from engine crankshaft. Maximum flow 30 gpm (114 L/min), maximum pressure 3,000 psi (207 bar).

Axle:

Standard:

Front Axle:

Channel shaped structure houses torque hubs, brakes and hydraulic drive motors. Front axle oscillates a total of 1.5 inches (38 mm) to minimize wheel spin on uneven surfaces.

Rear Axle:

Fixed rigidly to frame. Box beam crossmember and thrust bearing supported wheel hubs.

Steering:

Standard:

Full hydraulic unit controls 2.5 inch (63.5 mm) steering cylinder attached to rear axle. Limited steering if engine dies.

Brakes:

Standard:

Primary braking from hydrostatic transmission. Foot-actuated hydraulic disc brake for additional braking. Spring-applied, hydraulic-released park brake, actuated from a toggle switch on control panel. All braking is on front wheels.

Tires:

Standard:

7.50 x 10 pneumatic tires, 16 ply. Pressurized to 145 psi (1000 kPa) for crane rated loads.

Optional Tires:

Solid Rubber Tires:

For applications where hazardous ground conditions exist. These tires do not change the overall height or ground clearance. Net Weight: 240 pounds (109 kg)

Solid Rubber Tires Non-Marking:

Same as solid rubber tires except non-marking. Net Weight: 240 pounds (109 kg)

Foam Filling of Tires:

Standard tires, foam filled to prevent flats. Net Weight: 312 pounds (142 kg)

Spare Tire & Wheel:

7.50 x 10 pneumatic tires, 16-ply. Front or rear axle must be specified. Net Weight: 80 pounds (37 kg)

Chassis:

Standard:

Cargo Deck:

19 square foot (1.77 m^2) area. A maximum of 5000 pounds (2270 kg) may be carried on the deck when centered over front axle. Six stake pockets are provided in deck and six, 1.3 inch (34 mm) diameter pipe stakes.

Optional Deck Mats:

Deck Mats:

Rubber mats, 1/4 inch (6 mm) thick, covering the three deck sections. Protects delicate loads from scratching and reduces sliding of heavy loads during travel. Net Weight: 40 pounds (18 kg)

Outriggers:

Three hydraulic outriggers with box beam construction. Hydraulic cylinders are equipped with direct-connected holding valves. Pad dimensions are 6 inches (152 mm) x 6.5 inches (165 mm). Pulsating alarm sounds when outriggers are being lowered.

Front Pulling Eye:

Heavy eye in front bumper provides for attachment of hook block so main winch line can be used for pulling loads at or near floor level.

Lifting Sling Brackets:

Two lift rings in front deck and lug on turntable for attaching lifting sling.

Optional Chassis Accessories:

Auxiliary Winch:

Optional worm gear winch mounted behind front bumper, with a selector valve and single lever control at the operator's console. Hydraulic powered to provide bare-drum line pull of 3000 pounds (1360 kg) at 20 ft/min (6m/min). Winch drum is 3.5 inches (89 mm) diameter by 6.25 inches (159 mm) long. The winch includes 80 feet (24.3 m) of 5/16 inch (7.94 mm) wire rope, hook and four-way roller guide. Net Weight: 130 pounds (59 kg)

Pintle Hook:

T-60-A Holland 5-ton pintle hook mounted on rear frame member. Net Weight: 7 pounds (3 kg)

Lifting Sling :

Three-leg hitch consisting of heavy-duty pear link and 3 wire ropes with swaged-on clevis ends for attaching to lift points on crane chassis and turntable. Net Weight 10 pounds (5 kg)

Rear View Mirrors:

One right-hand and one left-hand mirror, 6 inch (152 mm) diameter, mounted on deck stakes. Pivot out of way when contacted by obstacle at side of deck. Net Weight: 12 pounds (6 kg)

Operator's Compartment:

Standard:

Operator control station provides one-position access to all chassis and crane functions.

Operator's Compartment Accessories:

Operator Guard:

Tubular steel weldment with heavy expanded steel mesh top section, bolts over operator's compartment. Overall height with guard installed is 90 inches (2.3 m). Net Weight: 60 pounds (27 kg)

Floor mat:

Ribbed vinyl mat with foam backing for operator comfort.

Electrical System:

Standard:

Back-Up Alarm:

Provides pulsating 97 dB sound from solid-state alarm when ignition is on and transmission is in reverse.

Electrical Group:

12 Volt DC

Battery:

Group 24 with 550 CCA rating.

Lighting Group:

Consists of two headlights and taillight and 12 volt horn activated by button on instrument panel.

Instrument Group:

Located at operator's station and includes lighted fuel gauge, volt meter, oil pressure, water temperature and hydraulic oil temperature gauges. Hourmeter records hours only during actual engine operation.

Optional Electrical Accessories:

Strobe Light:

One yellow strobe light mounted on operator guard for high visibility. Flashes 60-120 times per minute. Draws 1/2 amp. Includes operator-controlled switch. When the operator guard is not ordered the strobe light is mounted outside the operator's compartment on the left side.

Boom Work Light:

Two work lights, one on left side of boom to light boom tip, and one on left side of turret to light ground under boom tip. Includes switch at operator's station. Net Weight: 10 pounds (5 kg)

Hydraulic System:

Standard:

Tandem pump mounted to rear of hydrostatic piston pump, which is driven by the engine crankshaft. Delivers 6 gpm (23 L/min) at 2500 psi (172 bar) for boom circuits and 16 gpm (98.5 L/min) at 2500 psi (172 bar) for hoist and outrigger circuits. System protected by relief valves and two 10-micron filters. Hydraulic reservoir has 9.5 gallons (36 L) capacity.

Boom Assembly:

Standard:

Three section, high strength steel construction, equipped with bearing pads for efficient support and extension. Double-acting hydraulic cylinders extend boom sections. The primary extension cylinder and the double-acting boom elevation cylinder are equipped with direct connected holding valves. Boom angle indicator provided on left side of boom.

Boom Swing:

Standard:

Two double-acting hydraulic cylinders are connected to turntable torque tube to provide 90 degrees of swing. Heavy-duty rotation bearing supports boom.

Optional Boom Swing Lock:

Boom Swing Lock:

Welds to back of frame and engages lug under turntable to hold boom in "over front" position and prevent boom from being swung in normal 90 degree arc. Net Weight: 12 pounds (6 kg)

Boom Hoist:

Standard:

Turret-mounted, worm gear hoist is hydraulically powered to provide bare-drum line pull of 3,100 pounds (1400 kg). The IC-20 has a line speed of 63 ft/min (19 m/min). Hoist drum is 5 5/8 inch (143 mm) diameter by 4 7/8 inches (124 mm) long and provides even pull and long cable life. Hoist includes 80 feet (24 m) of 5/16 inch (8 mm) wire rope, downhaul weight and swivel hook.

Boom Attachments:

Standard:

Anti-Two-Block Device:

Has electric solenoid dump valve which prevents damage to hoist rope and machine components from accidentally pulling load hook against boom tip. This valve will dump the **HOIST RAISE**, **TELESCOPE EXTEND** and **BOOM LOWER** circuits. No other circuits are affected. These circuits are returned to normal operations by operating the "hoist lower" or "telescope retract" control. This system uses a trip arm to activate switch.

Sheave Block:

Single sheave block for two-part line requirements. Six inch O.D. sheave for 5/16 inch (8 mm) diameter wire rope. Swivel hook with safety latch. Fifty pounds of weight provides positive overhaul. Includes bar on top to actuate anti-two-block system.

Optional Boom Attachments:

7 Foot (2 m) Pin-On Jib:

Consists of jib with pair of tension bars, tip sheave, cable keeper, pins, jib attaching pins. Tension bars provide two positions, in-line and 30 degree offset. Net Weight: 97 pounds (44 kg)

Rated Capacity Limiter:

Operator's aid that warns operator of impending overlaoad with audible and visual signals. Has read-outs for load, boom angle, boom length and load radius. In the event of an overload, the following boom functions will have hydraulic flow dumped: **HOIST RAISE**, **TELESCOPE EXTEND**, and **BOOM LOWER**. These circuits are returned to normal by lowering load to a safe resting place with hoist or by retracting or raising boom to a shorter load radius. There is also an override button on the RCL control panel and an override switch on the upper dash panel. Net Weight: 30 pounds (14 kg)

Specifications subject to change without notice.

Should you require an option or special equipment not listed please consult your dealer salesperson or BMC®.

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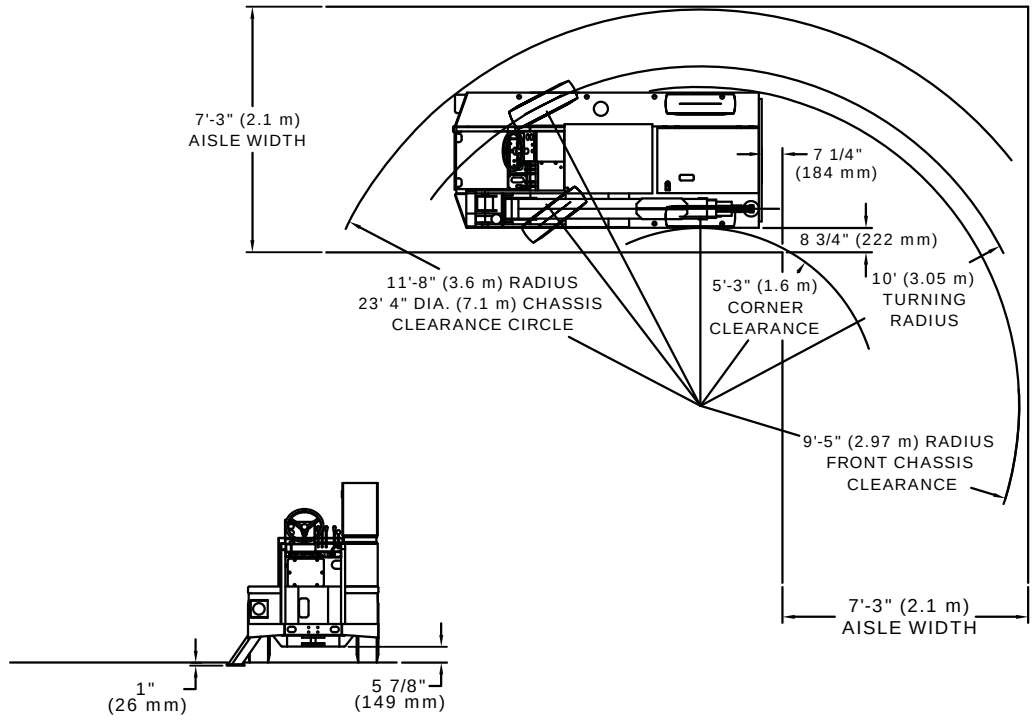
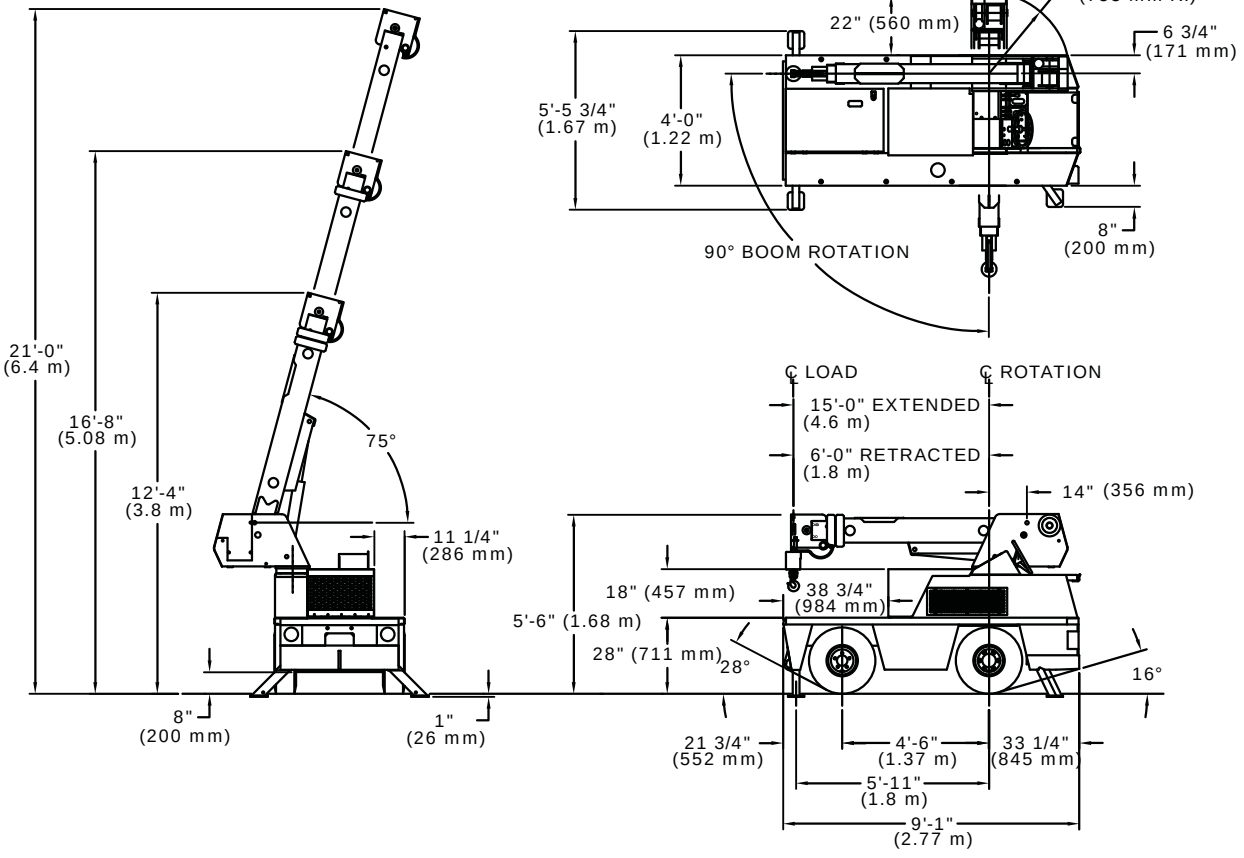
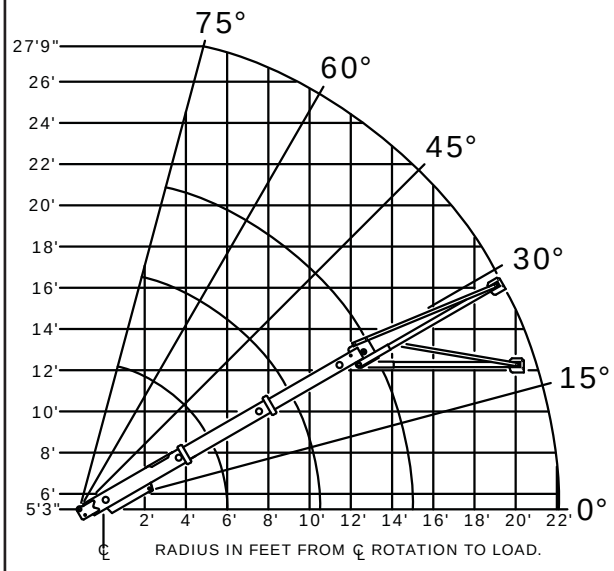
Dimensions and values shown are for reference purposes only.
Specifications subject to change.





IC-20-1J
Load Chart

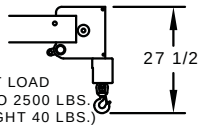


CAPACITIES IN LBS FOR OPERATION ON FIRM LEVEL SURFACE					
LOAD RADIUS FEET	3-SECTION BOOM				7-FT. JIB
	FRONT ON RUBBER	FRONT ON OUTRIGGERS	LEFT SIDE ON RUBBER	LEFT SIDE 0N OUTRIGGERS	ON RUBBER OR OUTRIGGERS
4	2500	5000	3800	5000	1300
5	2000	4000	3100	4000	1100
6	1500	3300	2500	3300	750
8	1400	2500	1500	2500	650
10	1300	2000	1000	2000	550
12	1200	1600	750	1400	500
15	1100	1200	500	1000	500
17					425
19					325
22					225

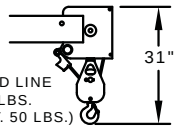
EXCEEDING CAPACITY RATINGS OR APPLYING SIDE LOADS TO THE BOOM OR JIB IS MISUSE, IS HAZARDOUS, AND VOIDS WARRANTY.

CAPACITIES ON OUTRIGGERS ARE 85% OF TIPPING LOADS. CAPACITIES ON RUBBER ARE 75% OF TIPPING LOADS. CAPACITIES BELOW BOLD LINES ARE LIMITED BY TIPPING. OTHER CAPACITIES ARE LIMITED BY STRUCTURAL OR HYDRAULIC CAPACITY.

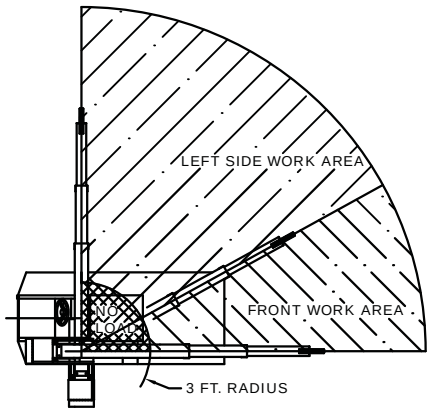
BOOM ANGLE MUST NOT BE LESS THAN 30° EXCEPT WHILE RIGGING IF THE JIB IS IN THE 30° OFFSET POSITION.



USE SINGLE PART LOAD LINE FOR LOAD TO 2500 LBS. (DOWNHAUL WEIGHT 40 LBS.)



USE TWO PART LOAD LINE FOR LOAD TO 5000 LBS. (SHEAVE BLOCK WT. 50 LBS.)



WORK AREA DIAGRAM

NOTE: DO NOT OPERATE INSIDE 3 FOOT LOAD RADIUS.

JIB MAY BE OPERATED IN ALL WORKING AREAS.

PICK AND CARRY WITH THE SHORTEST PRACTICAL BOOM, CENTERED OVER THE FRONT AXLE. OPERATE WITH THE BOOM AS LOW AS POSSIBLE, WITH THE LOAD CLOSE TO THE GROUND. PICK AND CARRY CAPACITIES ARE FOR SMOOTH, LEVEL, PAVED SURFACES.

LOAD RADIUS IS THE HORIZONTAL DISTANCE FROM THE CENTER OF ROTATION OF THE UNLOADED CRANE TO THE VERTICAL LOAD LINE WITH THE LOAD APPLIED.

LOAD HOOK, DOWNHAUL WEIGHT, HOOK BLOCKS, AND OTHER LOAD HANDLING DEVICES SHALL BE CONSIDERED PART OF THE LOAD EXCEPT FOR HOIST ROPE.

DECK LOAD CAPACITY 5000 LBS. (CENTERED OVER AXLE). CARRY SPEED 3 MPH MAX.

THE BOOMS ON THIS UNIT ARE ALL STEEL AND HAVE NO LINE VOLTAGE RATING.

ALL CAPACITIES APPLY TO FIRM LEVEL SURFACES.

ENSURE ANTI-TWO BLOCK SWITCH IS FUNCTIONAL AFTER INSTALLING OR REMOVING JIB.

MAXIMUM HYDRAULIC PRESSURE 2500 PSI

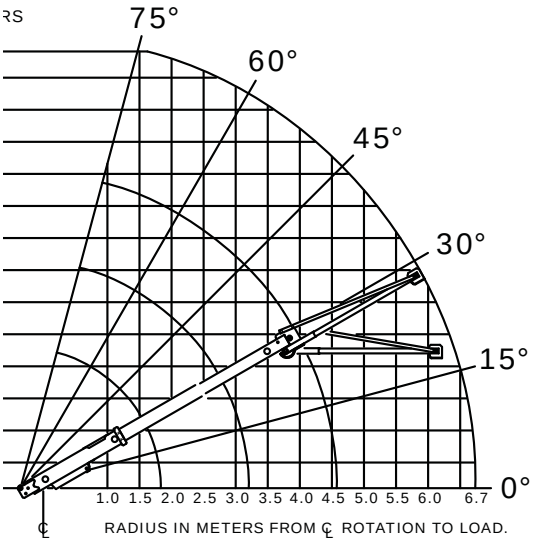
OPERATION:

1. READ AND UNDERSTAND THE OPERATION AND MAINTENANCE MANUAL BEFORE OPERATING THIS CRANE.
2. CHECK LEVEL OF ENGINE OIL AND HYDRAULIC OIL DAILY.
3. CHECK UNIT FOR VISIBLE DEFECTS AND LOOSE PARTS DAILY.
4. START ENGINE.
5. SET VEHICLE PARK BRAKE SECURELY.
6. EXTEND OUTRIGGERS TO SOLID FOOTING.
7. OPERATE ALL HYDRAULIC CONTROLS SLOWLY AND SMOOTHLY. AVOID SUDDEN STARTS AND STOPS.
8. DRIVE SLOWLY WHEN MAKING SHARP TURNS ON SLOPES.

THE LOAD HOIST LINE ON THIS UNIT MUST BE 5/16" DIA. 6X36- IPS-IWRC WIRE ROPE WITH A MINIMUM BREAKING STRENGTH OF 9160 LBS.

TIRE PRESSURE 145 PSI FOR 7.50-10 16PR; TORQUE FRONT WHEEL NUTS TO 60 FT. LBS., REAR WHEEL NUTS TO 200 FT. LBS. (THESE CONDITIONS MUST BE MAINTAINED TO HANDLE RATED LOADS ON THIS CRANE.)

IC-20-1J
Metric Chart

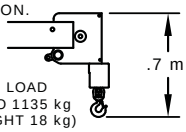


CAPACITIES IN KILOGRAMS FOR OPERATION ON FIRM LEVEL SURFACE					
LOAD RADIUS METERS	3-SECTION BOOM				2.1 m JIB
	FRONT ON RUBBER	FRONT ON OUTRIGGERS	LEFT SIDE ON RUBBER	LEFT SIDE ON OUTRIGGERS	ON RUBBER OR OUTRIGGERS
1.2	1130	2270	1720	2270	590
1.5	920	1840	1430	1840	510
2.0	670	1370	990	1370	310
2.5	630	1110	650	1110	290
3.0	590	920	460	920	250
3.5	550	770	370	700	230
4.0	520	660	290	530	220
4.5	500	550	230	460	220
5.0					200
5.5					170
6.0					130
6.7					100

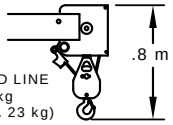
EXCEEDING CAPACITY RATINGS OR APPLYING SIDE LOADS TO THE BOOM OR JIB IS MISUSE IS HAZARDOUS, AND VOIDS WARRANTY.

CAPACITIES ON OUTRIGGERS ARE 85% OF TIPPING LOADS. CAPACITIES ON RUBBER ARE 75% OF TIPPING LOADS. CAPACITIES BELOW BOLD LINES ARE LIMITED BY TIPPING. OTHER CAPACITIES ARE LIMITED BY STRUCTURAL OR HYDRAULIC CAPACITY.

BOOM ANGLE MUST NOT BE LESS THAN 30° EXCEPT WHILE RIGGING IF THE JIB IS IN THE 30° OFFSET POSITION.



USE SINGLE PART LOAD LINE FOR LOAD TO 1135 kg (DOWNHAUL WEIGHT 18 kg)



USE TWO PART LOAD LINE FOR LOAD TO 2270 kg (SHEAVE BLOCK WT. 23 kg)

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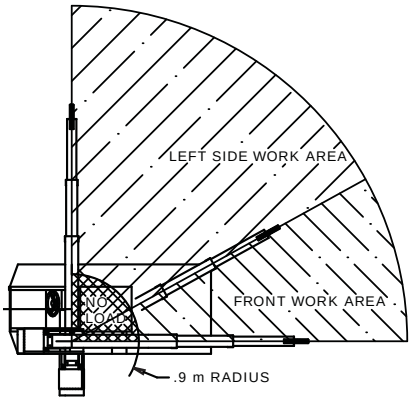

WORK AREA DIAGRAM

NOTE: DO NOT OPERATE INSIDE .9 METER LOAD RADIUS.

JIB MAY BE OPERATED IN ALL WORKING AREAS.

PICK AND CARRY WITH THE SHORTEST PRACTICAL BOOM, CENTERED OVER THE FRONT AXLE. OPERATE WITH THE BOOM AS LOW AS POSSIBLE, WITH THE LOAD CLOSE TO THE GROUND. PICK AND CARRY CAPACITIES ARE FOR SMOOTH, LEVEL, PAVED SURFACES.

LOAD RADIUS IS THE HORIZONTAL DISTANCE FROM THE CENTER OF ROTATION OF THE UNLOADED CRANE TO THE VERTICAL LOAD LINE WITH THE LOAD APPLIED.

LOAD HOOK, DOWNHAUL WEIGHT, HOOK BLOCKS, AND OTHER LOAD HANDLING DEVICES SHALL BE CONSIDERED PART OF THE LOAD EXCEPT FOR HOIST ROPE.

DECK LOAD CAPACITY 2270 kg (CENTERED OVER AXLE). CARRY SPEED 5 km/hr MAX.

THE BOOMS ON THIS UNIT ARE ALL STEEL AND HAVE NO LINE VOLTAGE RATING.

ALL CAPACITIES APPLY TO FIRM LEVEL SURFACES.

ENSURE ANTI-TWO BLOCK SWITCH IS FUNCTIONAL AFTER INSTALLING OR REMOVING JIB.

MAXIMUM HYDRAULIC PRESSURE 172 bar

OPERATION:

1. READ AND UNDERSTAND THE OPERATION AND MAINTENANCE MANUAL BEFORE OPERATING THIS CRANE.
2. CHECK LEVEL OF ENGINE OIL AND HYDRAULIC OIL DAILY.
3. CHECK UNIT FOR VISIBLE DEFECTS AND LOOSE PARTS DAILY.
4. START ENGINE.
5. SET VEHICLE PARK BRAKE SECURELY.
6. EXTEND OUTRIGGERS TO SOLID FOOTING.
7. OPERATE ALL HYDRAULIC CONTROLS SLOWLY AND SMOOTHLY. AVOID SUDDEN STARTS AND STOPS.
8. DRIVE SLOWLY WHEN MAKING SHARP TURNS ON SLOPES.

THE LOAD HOIST LINE ON THIS UNIT MUST BE 7.9 mm DIA. 6X36-IPS-IWRC WIRE ROPE WITH A MINIMUM BREAKING STRENGTH OF 4155 kg.

TIRE PRESSURE 1000 kPa FOR 7.50-10 16PR; TORQUE FRONT WHEEL NUTS TO 80 Nm, REAR WHEEL NUTS TO 270 Nm (THESE CONDITIONS MUST BE MAINTAINED TO HANDLE RATED LOADS ON THIS CRANE.)