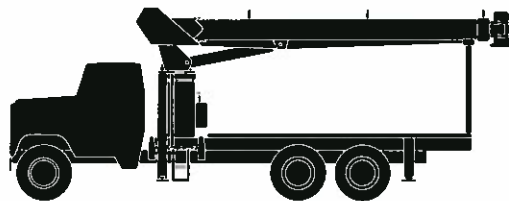


National Series 600B Buyer's Guide

Truck-Mounted Telescoping Cranes and Accessories
Maximum Vertical Reach: 118 Feet (36 Meters)
Maximum Capacity: 28,000 Pounds (12.7 Metric Tons)



America's Truck-Mounted Hydraulic Crane Leader



National Series 600B



Dear Crane User:

National Crane Corporation values your goodwill. We have developed our engineering, manufacturing, sales and service programs with you — our customer — in mind.

This Series 600B Buyer's Guide provides you with technical data and other considerations that will give you an informational base to make a sound and sensible buying decision. We encourage you to compare the technologies, capabilities and other benefits that National Crane offers against those of competitive manufacturers. We are confident that when you are equipped with all of the facts, National will be your brand of preference.

Our heavy-duty Series 600B offers a vertical reach of 118 feet, a rated capacity of 28,000 pounds, a wide choice of mounting configurations (many on single axle trucks), and a selection of jibs and other optional equipment.

National has been in business, manufacturing truck-mounted hydraulic telescoping and articulating cranes, for a full quarter-century. We have earned our reputation for quality through performance — through sound, sensible engineering and the manufacture of durable, user-oriented cranes that meet the most stringent on-the-job demands. The new Nationals combine time-proven strengths and exciting new technologies that afford greater vertical reach than ever before, and more lift, particularly in areas where capacity really counts.

Our cranes are subjected to the industry's most demanding testing program. Each crane undergoes quality inspections at all levels of the manufacturing and assembly process. We like to think that National's emphasis on quality is a key reason our cranes have, traditionally, retained the highest market value among comparable products year after year.

We offer strong warranty protection. Moreover, when you buy a National, you receive support from our outstanding network of dealers. Working with National, they are responsive to your parts and repair requirements. National's emphasis on customer service and responsiveness is unexcelled in the industry.

For these, and other reasons, National is touted as America's truck-mounted crane leader. We hope that you will take your cue from the some 17,000 demanding users who have purchased Nationals over the past 25 years. Read the information that follows carefully. I am confident that you will be impressed.

Sincerely,

Ted Urbanek
President
National Crane Corporation

A high-capacity, hydraulic telescoping crane from National



National Model 666B



The National Testing Program

National Crane established its original product durability standards by carefully evaluating the performance of competitive machines. Taking the best performances from these tests, National engineers set their own standards **more than 50% higher!** This is the same testing program each National must pass today.

Before a new model is released for production manufacturing it is subjected to state-of-the-art testing. A plastic-based "brittle lacquer" coating is applied to the boom. After loading the

boom, test engineers inspect the coating for cracks. The special lacquer has virtually no elastic qualities, so stretching or deformation of the metal shows up in "fractures" of the coating, perpendicular to the direction of stretching.

This procedure indicates where engineers are to place strain gauges, tiny chips printed with electronic circuitry which expand or contract with changes in the metal. Minute changes in electrical resistance are measured by a computerized strain gauge monitor and printed out for engineering studies. These strain gauges measure metal strain as small as one-millionth of an inch.

After strain gauge testing, the prototype of each new model undergoes life-cycle testing. The crane is operated at full-load through a full life-cycle under close scrutiny. Outriggers, frames, and other components are loaded and rotated through a complete range of motion for the prescribed number of cycles.

The 600B undergoes detailed inspections at all levels of the manufacturing and assembly process. National attention to testing and inspection insures that each crane delivered to the field is as close to perfect as state-of-the-art technology permits.

National Series 600B



National Crane, America's truck-mounted hydraulic crane leader, manufactures an extensive line of telescoping and articulating cranes. The **Series 600B**, a heavy-duty telescoping crane, is the product of National's field-proven know-how and pace-setting new technologies. Here are some of the reasons that you should "think National" when buying a medium-to-heavy-duty telescoping crane to serve your lifting needs:

Why buy a National Series 600B?

- The Series 600B provides you with solid lifting power and extra-long hydraulic reach. The rated capacity is **28,000 pounds**. The 66-foot all-hydraulic boom reaches vertically to **76-feet** (and to **118-feet** with the optional 42-foot jib).
- The Series 600B offers you field-proven quality, backed by National's more than **25 years** of manufacturing excellence. Buy with confidence. Take your cue from the 17,000 demanding users who have put National cranes to the test over the past 25 years.
- Nationals are durable. Nearly 90% of all National cranes ever manufactured are working on the job today.
- The value of a National crane traditionally remains high year after year. The Series 600B is a solid, enduring, cost-efficient investment.
- All National cranes, including the 600B, are subjected to the industry's most rigorous, demanding testing.
- The Series 600B undergoes detailed inspections at all levels of manufacturing and assembly processes.
- All structural welders at National must pass AWS welder certifications.
- Component manufacturers are subjected to critical review by National's senior management before they can qualify as a supplier of National crane parts.
- Inspections of incoming material and components ensure that purchased items will perform as expected.
- Material certifications are maintained and steel composition is regularly verified.
- All tooling and instruments are calibrated and verified to ensure parts consistency.
- The Series 600B is backed by strong warranty protection (covering defects in materials and workmanship for **six months** from the date of shipment).
- When you purchase a 600B, you get committed sales and service support from National's professional, well-trained nationwide dealer network.
- You receive responsive parts and repair service from your authorized National dealer and the factory. If your dealer cannot immediately supply a needed part, the factory maintains a back-up program providing 24-hour parts shipping in 90% of all breakdown rush orders. Your needs are National's first concern.
- National's box-section boom design utilizes thicker top and bottom plates to enhance boom strength and thinner side plates to increase the crane capacity through lower boom weight.
- Proportional boom design provides more efficient boom weight distribution. This maximizes boom operational efficiency and allows higher capacities (particularly in normal working radii). The design permits minimum overlap to get the most reach with minimum retracted length for maneuverability. The use of cable (rather than chain) means longer service life and less maintenance.
- Large bolt-in wear pads are easier to replace and provide longer, more durable service.
- Control rods supported by nylon bearings permit smooth, low-maintenance operation of the crane.
- Rotation resistant cable provides tangle-free, multi-part loadline applications. It restricts wire rope spinning, resulting in better load control.
- National's standard anti-two-block system helps prevent cable damage when winching up or extending the boom without paying out the winch cable.
- The 600B's angle indicator is easy to read and readily visible. It allows the operator to determine the boom angle during crane operation.
- The standard tandem vane pump isolates the winch from other crane functions, providing independent operation capability. The vane pump is more efficient and less costly to repair than gear pumps used by some manufacturers.
- National's unique "tab and slot" shear plate mounting is a strong and secure method of mounting a crane to a truck.
- The pressure gauge on the operator's console permits the operator to monitor the hydraulic system pressure to ensure maximum performance.
- The 600B's operator's platform is positioned to give the operator excellent visibility of the load as well as convenient access to the truck bed.
- The 600B's rotation stop design eliminates the sudden stop on non-continuous rotation machines by gradually slowing the rotation of the boom.
- The aluminized hydraulic reservoir prevents the gathering of rust in the system, keeping the hydraulic oil clean.
- The outrigger and stabilizer hydraulic power is sufficient to allow the leveling of a fully-loaded truck and still not lock up in the air.
- The 600B provides a precise machine leveling indicator. The level bubble bracket is machined to be parallel with the turntable bearing to indicate whether the unit is level during crane operation.
- Labeled control knobs make it easy for the operator to determine the function of each control.
- Turret and winch rotation indicators allow the operator to readily determine that the winch drum is rotating and the degree of rotation at which the boom has been positioned.
- The turntable bearing full-circle bolt pattern provides longer bearing life due to uniform loads on the bearing.
- National's planetary rotation gear box design includes a hydraulic release brake and a "slip-through" feature that helps protect the rotation system against damage from accidental side loading.

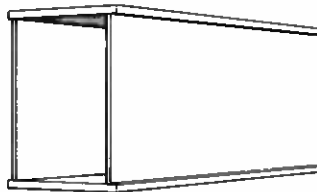
These advantages plus National's heavy-duty A-frame out-and-down outriggers with an 18-foot span for stability, dual controls in SAE orientation, and the high-performance planetary winch make the Series 600B the optimum crane for your medium-to-heavy-duty lifting requirements.

National Series 600B

Strong Four-Plate Booms

Through computer aided design, National has improved the weight efficiency of the Series 600B boom sections. We fabricate our telescoping boom sections from four high-strength steel members welded with perpendicular corners. This box-section construction lets us use thicker top and bottom plates for extra strength. The use of thinner side plates means increased capacity through lower boom weight. Only strong, low-alloy steel is used in National booms. It is welded with automatic, low-hydrogen techniques for extra strong seams. Corner seams are ultrasonically tested for proper penetration.

The National Series 600B is equipped on all sides with large nylon wear pads impregnated with lubricants, providing a smooth, long-life operation. The wear resistance of the material used in the Series 600B pads is unexcelled by competitive models.



Single Axle Mounting

Our wide outriggers and stabilizers mean the National Series 600B can be mounted on selected single-axle trucks (Model 666B requires a tandem axle truck) yet still meet DOT and stability standards. The crane, not the truck, takes most of the stress. That adds up to lower investment and longer truck life.

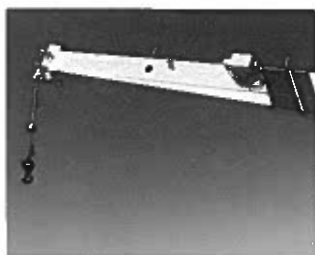
Proportional Boom Extension

Proportional (cable crowd) boom design (each boom section extends and retracts proportionally during the telescoping operation) provides more efficient boom weight distribution. This means smoother, more



Anti-Two-Block

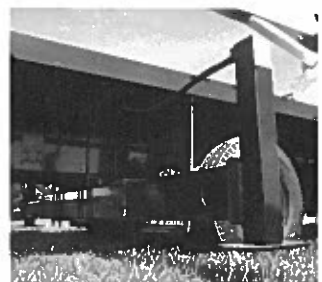
The 600B is equipped with a standard anti-two-block system. Two blocking occurs when the winch cable and attachments contact the underside of the boom sheave case, whether by winching up or extending the boom without paying out the winch cable. When this happens, the cable can be damaged by crimping or over-tensioning. The anti-two-block system helps prevent cable damage by sensing the position of the winch cable end attachments with respect to the sheave case and shutting down the functions that can cause two-blocking.



efficient boom operation and higher capacities for you. There are no fitting tubes or hoses inside the boom, and since the system utilizes only one extend cylinder, hydraulic maintenance is minimized. The boom telescope cylinder is equipped with a direct mount holding valve.

New Hydraulic Stabilizers

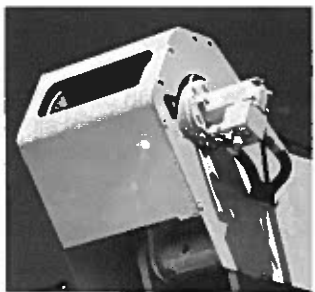
The 600B features optional hydraulic stabilizers with a 14-foot (4.3m) span for use on the rear of the truck. Horizontal extension is controlled by one cylinder; the vertical-down-motion is controlled by two cylinders acting independently. 600B stabilizers are designed to lift and level — or lower — a loaded truck without sticking or binding. Foot pad size is 8 by 14 inches. Travel clearance is 15 inches.



High Performance Planetary Winch

The 600B comes standard with a high-performance planetary gear drive winch. Anti-friction bearings are used throughout to maximize efficiency and seal life. A winch drum rotation indicator has been added. A "Burst-of-Speed" feature for faster, more efficient pay-out and pick-up of unloaded cable is optional. The "Burst-of-Speed" winch circuitry increases line speed up to 60% over normal.

This high-capacity winch has increased efficiency and, therefore, requires less horsepower and generates less heat. For fine control, both brake and counter-balance valves are standard. New winch covers improve visibility of drum and cable. The winch is filled with 9/16" diameter rotation resistant cable. See the winch data chart on page nine for further information.

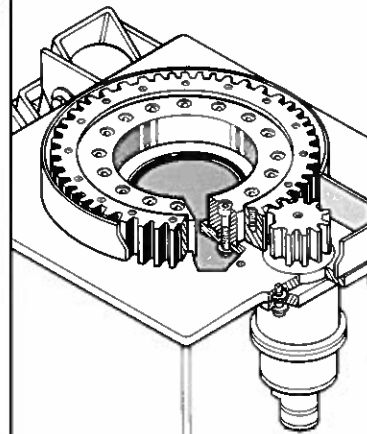


Compact Design

The National Series 600B is built tough, but compact, so it fits in just 46½ inches (1.163m) of bed space. That leaves ample payload space, making your Series 600B even more versatile. The operator platforms are made with open-mesh expanded metal to keep dirt and mud buildup to a minimum.

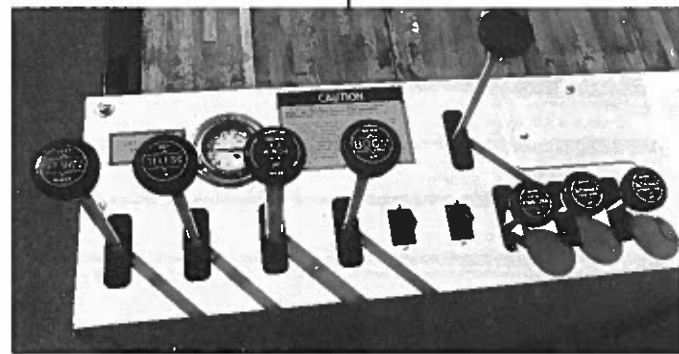
Positive Planetary Turret Rotation

The planetary rotation gearbox with a hydraulic release brake allows the gearbox to backdrive whenever excessive side load is applied to the boom, reducing shock loads on the upper and lower crane structure and gearbox. The turret drive is designed with extra heavy bearings below the drive pinion. The gearbox and rotation bearing mounting surfaces are precision machined after welding. This ensures consistent tooth alignment for smooth rotation and low wear, even under maximum loads. The entire turret glides smoothly on a low inertia ball bearing race. Rotation is 375° noncontinuous. The 600B is equipped with a turret rotation indicator to aid the operator in positioning loads.



Dual Controls

Dual controls are standard on the Series 600B. Extra fine metering and low spool forces give you smoother, more precise control. Crane controls are identical on each side with SAE recommended orientation of functions. That means you always work the same control with the same hand. Dual stations provide more efficient operations and greater load visibility. Each



station is equipped with kill and audible warning switches. A system pressure gauge is standard for easily checking pressures on all control functions. Foot throttles allow identical foot operation of engine speed from either side. Control rods are supported by nylon bearings, promoting smooth operation and reducing lubrication requirements.

Easy Service, Low Downtime

We designed the new Series 600B with boom access holes for serviceability. The Series 600B frame allows easy access to control valves and plumbing for minor adjustments and fitting tightening. The complete console is easily removable for major repair. Access holes in boom sections allow viewing of the extension system. The simplicity of boom design permits fast disassembly.

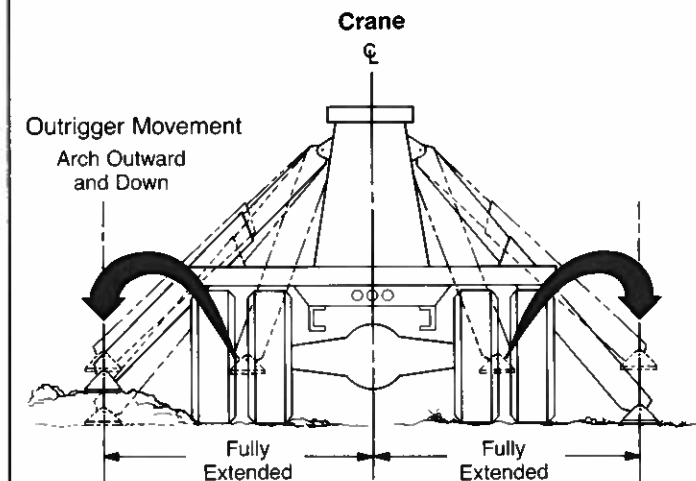
Wide Stance

The Series 600B is equipped with National's field proven A-frame out-and-down outriggers for a consistently wide stance and efficient leveling on uneven ground. The outriggers retract smoothly, without binding under load, first moving up, then in. Their efficient design and wide span — 18-foot (5.49m) — affords solid stability. With less truck weight, you can carry larger payloads more economically. A precision-mounted level indicator aids the operator in leveling the unit during the set-up procedure.



National's A-Frame "Out-and-Down" Stable Outriggers

- Outriggers **equally** spaced from crane center line.
- Consistent outrigger span.
- No skidding the foot into position.



National Series 600B Booms and Jibs

Heights to 118 feet (36m) available

The National Series 600B is available with a choice of booms and jibs. One of these combinations is right for your medium-duty lifting requirements.

Boom and Jib Combinations

Telescoping Booms

- Model 638B: 15'8" to 38' (4.8m to 11.6m) three section
- Model 647B: 18'8" to 47' (5.7m to 14.3m) three section
- Model 656B: 21'8" to 56' (6.6m to 17.1m) three section
- Model 666B: 25' to 66' (7.6m to 20.1m) three section

Jib Options (side stowing)

- Model 6FJ15: 15' (4.6m) straight (for Model 638B)
- Model 6FJ18: 18' (5.5m) straight (for Model 647B)
- Model 6FJ21: 21' (6.4m) straight (for Model 656B)
- Model 6FJ23M: 15' to 23' (4.6m to 7m) manual pullout (for Model 638B)
- Model 6FJ25: 25' (7.6m) straight (for Model 666B)

638B: 15-2/3 ft. - 38 ft. three section	
638B: 15-2/3 ft. - 38 ft. three section	6FJ16: 15 ft. straight
638B: 15-2/3 ft. - 38 ft. three section	6FJ23M: 15 ft. - 23 ft. manual pull out
647B: 18-2/3 ft. - 47 ft. three section	
647B: 18-2/3 ft. - 47 ft. three section	6FJ18: 18 ft. straight
647B: 18-2/3 ft. - 47 ft. three section	6FJ29M: 18 ft. - 29 ft. manual pull out
656B: 21-2/3 ft. - 56 ft. three section	
656B: 21-2/3 ft. - 56 ft. three section	6FJ21: 21 ft. straight
656B: 21-2/3 ft. - 56 ft. three section	6FJ35M: 21 ft. - 35 ft. manual pull-out
666B: 25 ft. - 66 ft. three section	
666B: 25 ft. - 66 ft. three section	6FJ25: 25 ft. straight
666B: 25 ft. - 66 ft. three section	6FJ42M: 25 ft. - 42 ft. manual pull-out.

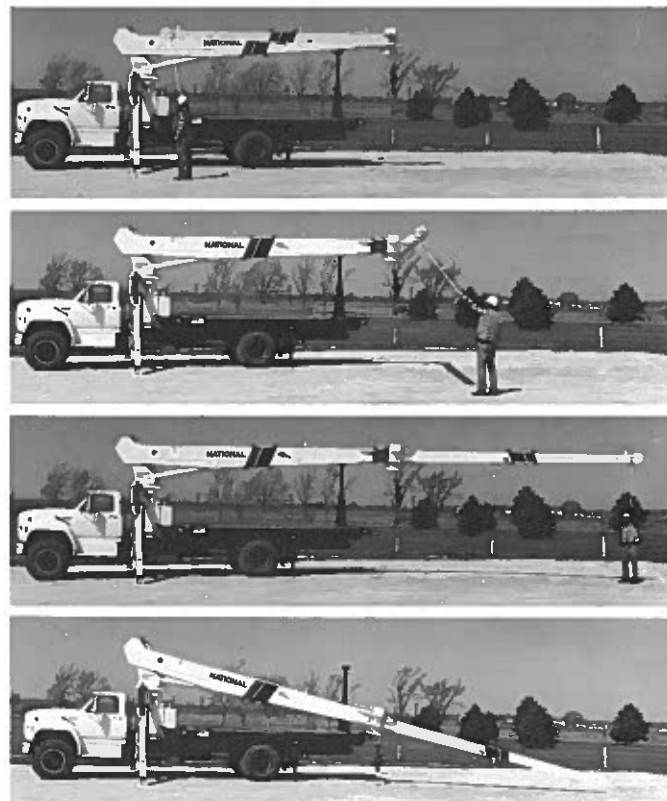
- Model 6FJ29M: 18' to 29' (5.5m to 8.8m) manual pullout (for Model 647B)
- Model 6FJ35M: 21' to 35' (6.4m to 10.7m) manual pull-out (for Model 656B)
- Model 6FJ42M: 25' to 42' (7.6m to 12.8m) manual pull-out (for Model 666B)

666B Capacity*

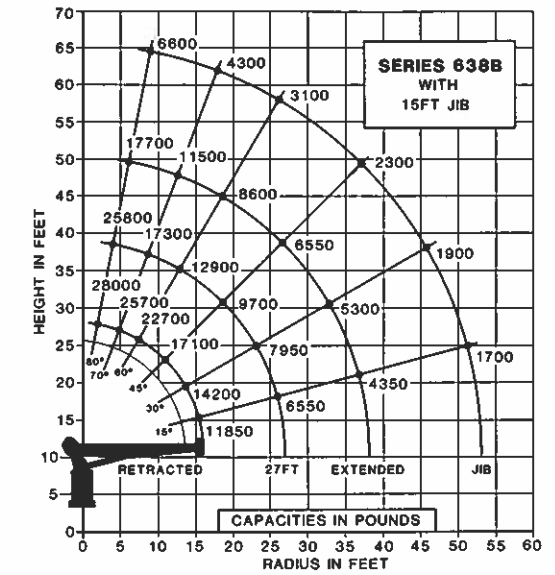
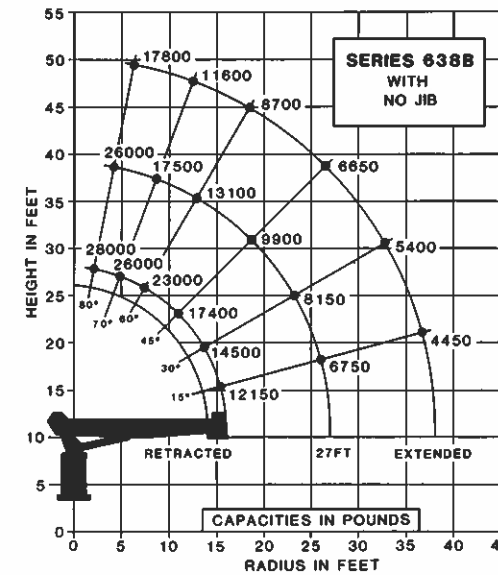
(Metric equivalents shown in parentheses)

Radius	All Booms Retracted	Extended 46 Feet	All Booms Extended Maximum
Maximum Capacity	28,000 lbs. (12,730kg.)		
9' (2.7m)	17,700 lbs. (8,050kg.)		
12' (3.7m)	13,800 lbs. (6,270kg.)	11,900 lbs. (5,398kg.)	
16' (4.9m)	10,700 lbs. (4,860kg.)	9,250 lbs. (4,196kg.)	8,050 lbs. (3,651kg.)
20' (6.1m)	8,550 lbs. (3,890kg.)	7,600 lbs. (3,447kg.)	6,600 lbs. (2,994kg.)
24' (7.3m)	6,300 lbs. (2,860kg.)	6,300 lbs. (2,858kg.)	5,500 lbs. (2,495kg.)
28' (8.5m)		5,500 lbs. (2,495kg.)	4,800 lbs. (2,177kg.)
32' (9.8m)		4,800 lbs. (2,177kg.)	4,200 lbs. (1,905kg.)
37' (11.0m)		4,150 lbs. (1,882kg.)	3,700 lbs. (1,678kg.)
40' (12.2m)		3,550 lbs. (1,610kg.)	3,350 lbs. (1,520kg.)
44' (13.4m)		2,800 lbs. (1,270kg.)	3,000 lbs. (1,361kg.)
48' (14.6m)			2,700 lbs. (1,225kg.)
52' (15.9m)			2,400 lbs. (1,089kg.)
56' (17.1m)			2,150 lbs. (975kg.)
60' (18.3m)			1,850 lbs. (839kg.)
64' (19.5m)			1,500 lbs. (680kg.)

*Capacities shown are for the 666B with the load suspended, radius shown includes increase due to boom deflection. Capacities vary for cranes equipped with jibs or attachments. Consult factory for specific load rating information.



The sequence of photos above shows how a National jib folds out into working position.



Do not operate cranes or accessories within 10 feet (3m) of live power lines.

1. Load ratings shown on these charts are maximum allowable loads with the outriggers properly extended on a firm, level surface and the crane leveled and mounted on a factory-recommended truck.
2. Always level the crane with the level indicator located on the crane frame.
3. The operator must reduce loads to allow for factors such as wind, ground conditions, operating speeds and the effect of freely suspended loads.
4. Overloading this crane may cause structural collapse or instability.
5. Weights of any accessories attached to the boom or loadline must be deducted from the load chart capacities.
6. Do not exceed jib capacities at any reduced boom lengths.

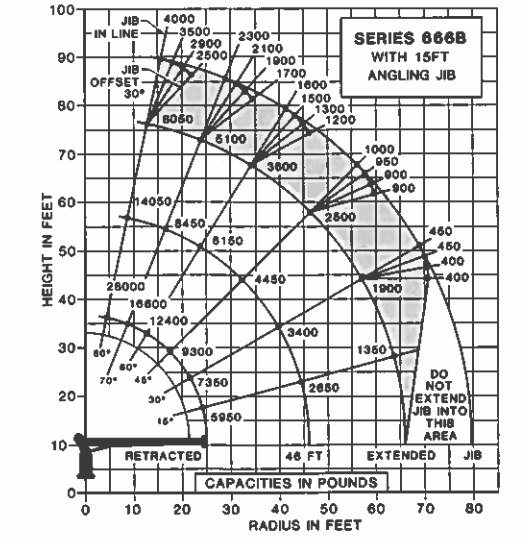
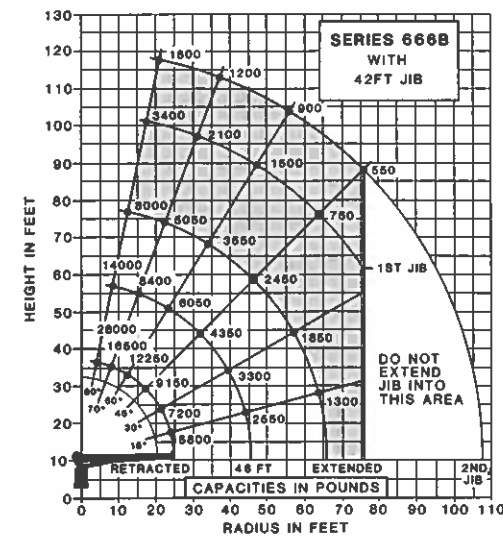
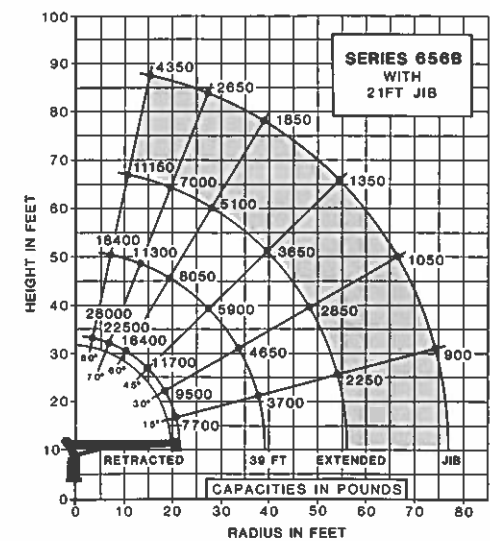
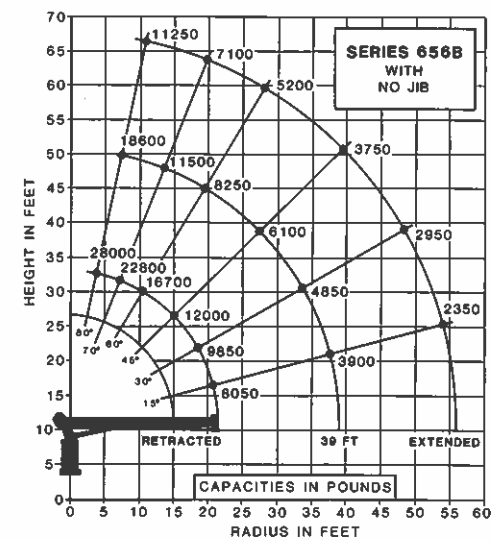
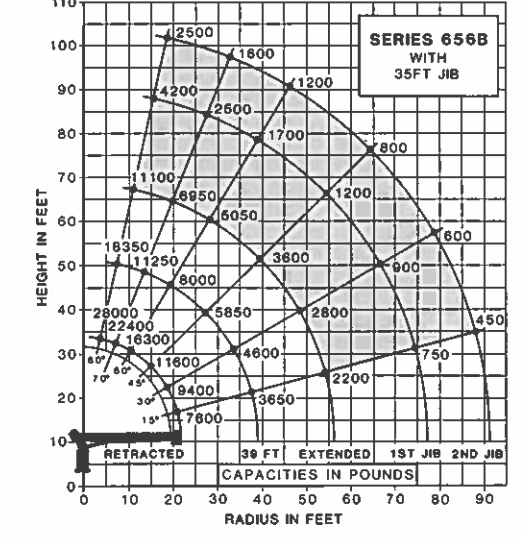
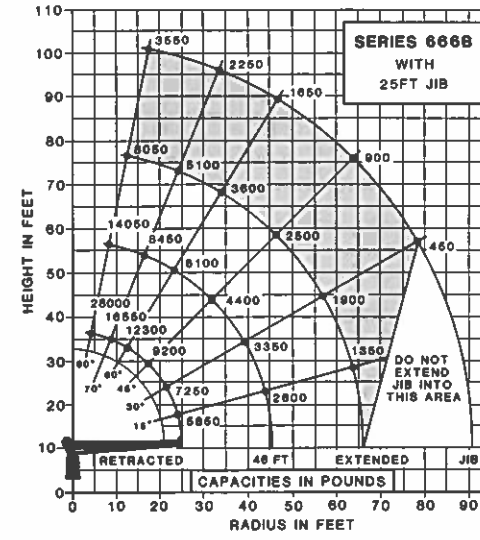
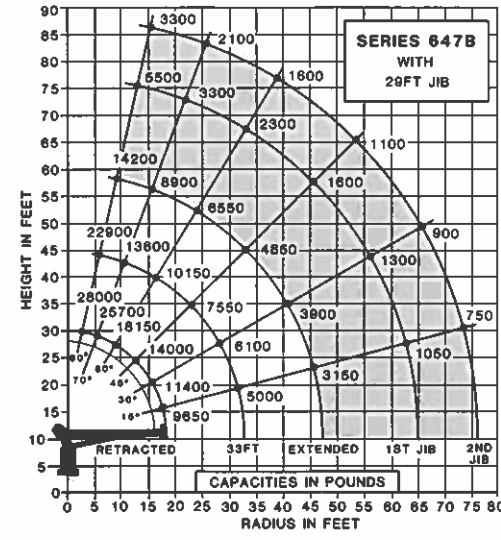
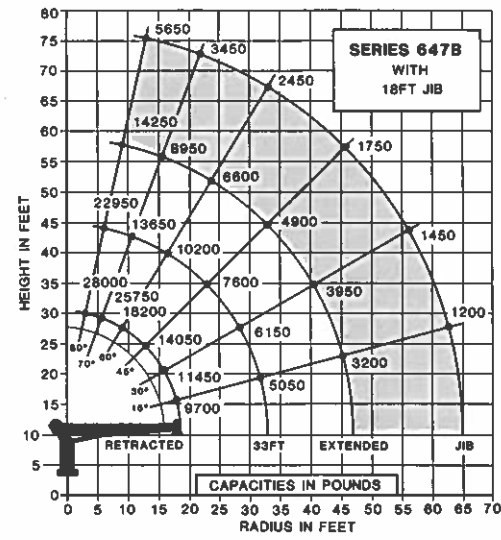
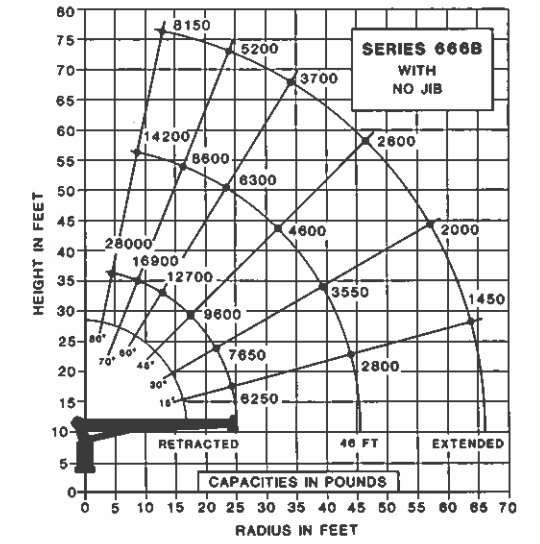
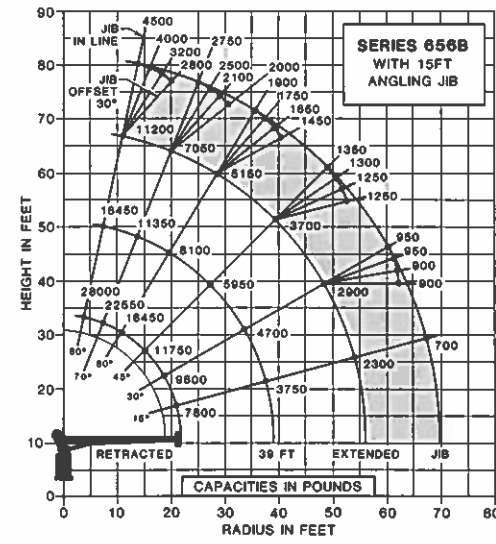
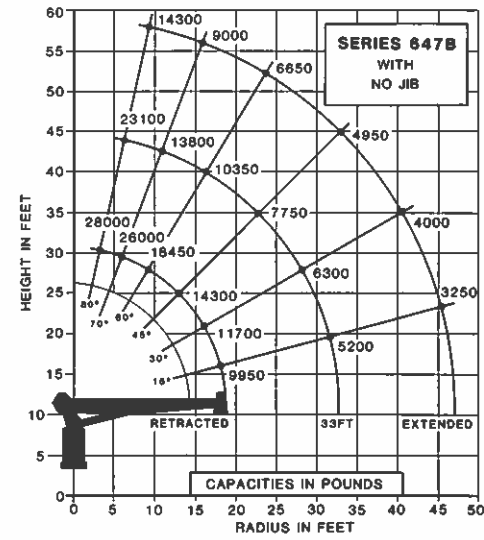
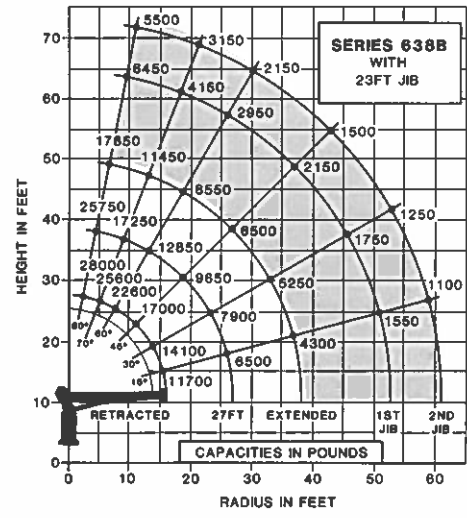
National Series 600B Winch Data			1 Part Line	2 Part Line	3 Part Line	4 Part Line
CAUTION:						
Do not deadhead lineblock against boom tip when extending boom.						
Keep at least three wraps of loadline on drum at all times.						
Use only the specified cable on this machine.						
Winch	Cable Supplied	Average Breaking Strength	Lift and Speed	Lift and Speed	Lift and Speed	Lift and Speed
Standard Planetary Winch	Standard 9/16" diameter rotation resistant	35,000 lbs.	7,000 lbs. 150 fpm	14,000 lbs. 75 fpm	21,000 lbs. 50 fpm	28,000 lbs. 37 fpm
	Optional 9/16" diameter 6 x 25 IWRC	29,750 lbs.	7,500 lbs.* 150 fpm	15,000 lbs.* 75 fpm	22,500 lbs.* 50 fpm	28,000 lbs.* 37 fpm
With Optional Burst-of-Speed Feature	Same as corresponding cable data shown above.		3,000 lbs. 240 fpm	6,000 lbs. 120 fpm	9,000 lbs. 80 fpm	12,000 lbs. 60 fpm

All winch pulls and speeds are shown on the third layer (the fourth layer on 666B). Winch pulls would increase on the first and second layers. Winch line speeds would decrease on the first and second layers. Winch line pulls may be limited by the winch capacity or the cable safety factor. These are shown below:

Winch	Bare Drum Pull	Allowable Cable Pull
With standard rotation resistant rope	10,200 pounds	7,000 pounds
With optional 6 x 25 IWRC rope	10,200 pounds	8,400 pounds

**This feature is available with either the standard or optional cable. Ratings are based on intermittent use. High cycle applications may require optional oil cooler.

National Series 600B Load Rating Charts

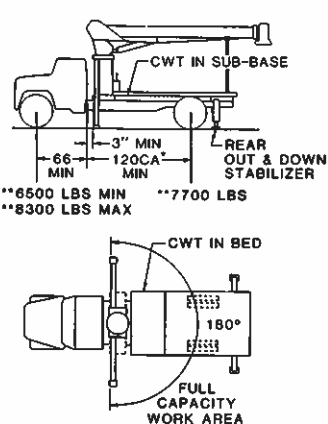
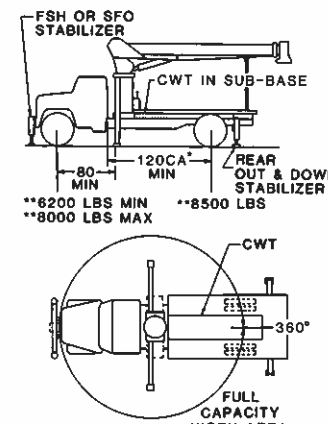


National Series 600B Truck Specifications

(Continued on page 14)

Mounting Configurations	Configuration 1 with Torsion Box	Configuration 2 with Torsion Box	Configuration 3 with Torsion Box	Configuration 4 without Torsion Box	Configuration 5 with Torsion Box
The versatility of the Series 600B can be enhanced by the mounting configurations described at the right. The configurations are based on an 85% stability factor. The complete unit must be installed in accordance with factory requirements and a test performed to determine actual stability and counterweight requirements since individual truck chassis vary.	Allows installation on a tandem rear axle chassis with considerably less frame strength by using the standard subbase. In most cases, the chassis will not require reinforcing and the amount of the counterweight required is reduced, increasing the truck's payload. Requires standard subbase, rear ASH stabilizers, and usually counterweight in the bed or subbase centered near the crane frame. Full capacity work area is rear 180° of vehicle from outrigger to outrigger.	Allows 360° full stability at full capacity without the use of front stabilizers. Requires additional weight at rear of truck to reduce the loading on the truck's front axle when lifting over the front. Counterweighting should be centered down the bed between the crane and stabilizers. Since the front tires are used as a stabilizing base, this type of mount is recommended for the operator who occasionally needs to lift loads over the front of the vehicle. If loads are to be continually lifted around the front of the vehicle, front stabilizers are recommended to give the unit a firm base. Requires rear stabilizers, standard torsion box, and bed with counterweight in the underside. Requires 80 inches (minimum) between crane outriggers and front axle to minimize front axle loads when lifting over the front of the vehicle.	Requires additional counterweight in the underside of the bed and front stabilizers for full capacity 360° lifting around the truck. The truck must have a 13 inch ³ section modulus and 750,000 in-lb RBM through the front suspension to the bumper or be capable of being reinforced to do this. Normally a tapered frame cannot be reinforced up to the required strength. The front stabilizers give the machine a solid base, helping the operator control crane loads. Requires front and rear stabilizers, standard subbase with counterweight centered in the bed between the crane and the rear stabilizers. Counterweighting in this manner reduces the loading induced on the front stabilizer when lifting over the front of the truck. Requires 80 inches (minimum) between crane outriggers and front axle to minimize truck frame loads when lifting over the front of the vehicle.	This is the least expensive method of mounting and does not require using a subbase. However, it will require a tandem truck and, in almost all cases, counterweight will be needed in the bed. Requires rear stabilizers and a bed with concrete counterweight centered near the crane. Some minimum trucks require a heavy bumper. Full capacity work area is 180° of vehicle from outrigger to outrigger.	The advantages of a rear-mounted crane are: (1) the location of the crane allows the operator to effectively use the close-in working area to lift the heavier capacity loads; (2) 360° solid stability at full rated load; and (3) the front axle weight rating of the truck is lower than the standard behind-the-cab mounts. A heavy-duty rear-mount torsion-resisting subbase and hydraulic out-and-down outriggers are a necessity in this type of mount to keep the total weight of the unit to a minimum with full stability. Requires 6 HO outriggers behind cab, rear-mount torsion box, and usually concrete counterweight centered down the bed between the crane and HO outriggers. 190-inch minimum distance required between centers of front and rear outriggers. 80-inch maximum distance between cab and front axle required to minimize front axle loads when lifting over the front of the vehicle. Cab-over trucks may be used for rear-mounted cranes.
Stable	180°	360°	360°	180°	360°
Gross Axle Weight Rating (GAWR), Front	12,000 lbs.	12,000 lbs.	12,000 lbs.	12,000 lbs.	10,860 lbs.
Gross Axle Weight Rating (GAWR), Rear	34,000 lbs.	34,000 lbs.	34,000 lbs.	34,000 lbs.	34,000 lbs.
Wheelbase (WB)	184" on Model 638B; 202" on Model 647B; 210" on Model 656B; 222" on Model 666B				222 inches
Cab to axle/trunnion (CA/CT)	120" on Model 638B; 138" on Model 647B; 144" on Model 656B; 156" on Model 666B				144 inches
Frame Section Modulus (SM) under crane 50,000 PSI	18.0 inch ³	18.0 inch ³	18.0 inch ³	40.0 inch ³	15.0 inch ³
----- or 110,000 PSI	13.3 inch ³	13.3 inch ³	13.3 inch ³	30.0 inch ³	13.3 inch ³
Frame Section Modulus (SM) over rear stabilizers 50,000 PSI	15.0 inch ³	15.0 inch ³	15.0 inch ³	30.0 inch ³	15.0 inch ³
----- or 110,000 PSI	13.0 inch ³	13.0 inch ³	13.0 inch ³	21.0 inch ³	13.3 inch ³
Stability Weight, Front	6,500 lbs. minimum 8,300 lbs. maximum	6,500 lbs. minimum 8,300 lbs. maximum	6,500 lbs. minimum 8,000 lbs. maximum	7,600 lbs. minimum 8,300 lbs. maximum	8,000 lbs. minimum 9,000 lbs. maximum
Stability Weight, Rear	10,500 lbs. w/ASH; 7,700 lbs. w/RSOD	14,000 lbs.	10,500 lbs. w/ASH; 8,500 lbs. w/RSOD	15,000 lbs.	8,000 lbs.
Estimated Average Final Weight	30,000 lbs.	34,000 lbs.	34,000 lbs.	36,500 lbs.	34,500 lbs.
<p>NOTES:</p> <p>(1) GAWR means Gross Axle Weight Rating and is dependent on all components of the vehicle, such as axles, tires, springs, frame, etc., meeting manufacturer's recommendations. Always specify GAWR when purchasing trucks.</p> <p>(2) Minimum axle requirements may increase with use of longer wheelbase, service bodies, diesel engines or front stabilizers.</p> <p>(3) Tandem axle trucks must be used for hauling larger payloads.</p> <p>(4) Diesel engines require variable speed governor and electric engine shut-off.</p> <p>(5) 666B requires 34,000 GAWRR and 46,000 GVWR.</p>	<p>*Longer CT required for 647B, 656B, 666B</p>	<p>*Longer CT required for 647B, 656B, 666B</p>	<p>*Longer CT required for 647B, 656B, 666B</p>	<p>*Longer CT required for 647B, 656B, 666B</p>	
**Estimated axle scale weights prior to installation of crane and stabilizers and subbase if required for 85% stability.					

National Series 600B Truck Specifications (Continued from page 13)

Mounting Configurations (continued from preceding page)	Configuration 6 with Torsion Box	Configuration 7 with Torsion Box
	Allows crane (except 666B) to be installed on a single rear axle chassis with considerably less frame strength by using the standard subbase and rear out-and-down stabilizers. In most cases the chassis will not require reinforcing and the amount of counterweight is reduced. Payloads will be small with this configuration. Requires standard subbase, rear out-and-down stabilizers, and usually concrete counterweight in the bed or subbase centered near the crane frame. Full capacity work area is rear 180° of vehicle from outrigger to outrigger. Diesel engine is required. Heavy front bumper or counterweight in front bumper may be required. Options weighing over 500 pounds cannot be carried if unit is equipped with jib. All components must be located properly (closest to front axle) so as not to exceed rear axle rating.	This configuration is not available with 666B. Requires additional counterweight in the underside of the bed, rear out-and-down stabilizers, and front stabilizer for lifting at full capacity around the truck. Requires a 13-inch ³ section modulus and 750,000 in-lb RBM through the front suspension to the bumper or be capable of being reinforced to this. Normally a tapered frame cannot be reinforced up to the required strength. The front stabilizers give the machine a solid base, helping the operator control crane loads 360° around the truck. Payloads will be small with this configuration. Requires front and rear stabilizers, standard torsion box, and concrete counterweight centered down the bed between the crane and rear stabilizer. Counterweighting in this manner reduces the loading induced on the front stabilizer when lifting over the front. Diesel engines are required. Options weighing over 500 pounds (including jibs) cannot be carried. All components must be located properly so as not to exceed rear axle ratings. Requires 80 inches (minimum) between crane outriggers and front axle to minimize truck frame loads when lifting over the front of the vehicle.
Stable	180°	360°
Gross Axle Weight Rating (GAWR), Front	12,000 lbs.	12,000 lbs.
Gross Axle Weight Rating (GAWR), Rear	19,000 lbs.	19,000 lbs.
Wheelbase (WB)	184" on Model 638B; 202" on Model 647B; 210" on Model 656B	
Cab to Axle/Trunnion (CA/CT)	120" on Model 638B; 138" on Model 647B; 144" on Model 656B	
Frame Section Modulus (SM) under crane 50,000 PSI	18.0 inch ³	18.0 inch ³
----- or 110,000 PSI	13.3 inch ³	13.3 inch ³
Frame Section Modulus (SM) over rear stabilizers 50,000 PSI	15.0 inch ³	15.0 inch ³
----- or 110,000 PSI	13.0 inch ³	13.0 inch ³
Stability Weight, Front	6,500 lbs. minimum 8,300 lbs. maximum	6,200 lbs. minimum 8,000 lbs. maximum
Stability Weight, Rear	7,700 lbs. RSOD	8,500 lbs. RSOD
Estimated Average Final Weight	28,000 lbs.	28,500 lbs.
NOTES: (1) GAWR means Gross Axle Weight Rating and is dependent on all components of the vehicle, such as axles, tires, springs, frame, etc., meeting manufacturer's recommendations. Always specify GAWR when purchasing trucks. (2) Minimum axle requirements may increase with use of longer wheelbase, service bodies, diesel engines or front stabilizers. (3) Tandem axle trucks must be used for hauling larger payloads. (4) Diesel engines require variable speed governor and electric engine shut-off. (5) 666B requires 34,000 GAWRR and 46,000 GVWR.	 <p>FSH OR SFO STABILIZER CWT IN SUB-BASE REAR OUT & DOWN STABILIZER 66" MIN 3" MIN 120CA" MIN 6500 LBS MIN 7700 LBS 8300 LBS MAX</p> <p>CWT IN BED 180° FULL CAPACITY WORK AREA *Longer CA required for 647B, 656B</p>	 <p>FSH OR SFO STABILIZER CWT IN SUB-BASE REAR OUT & DOWN STABILIZER 80" MIN 120CA" MIN 6200 LBS MIN 8000 LBS MAX 8500 LBS</p> <p>CWT 360° FULL CAPACITY WORK AREA *Longer CA required for 647B, 656B</p>
	**Estimated axle scale weights prior to installation of crane and stabilizers and subbase if required for 85% stability.	

National Series 600B Boom Rests

Cranes are tough when in use, but they can be severely damaged during transit from job to job. The only way your crane can be protected from this type of wear and damage is via a strong, solid, boom rest.

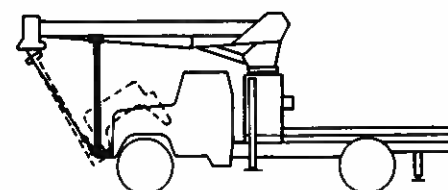
Boom Rests

- Add years to the life of your crane
- Reduce stress on the crane frame
- Protect rotation gear from transit damage
- Remove stress from truck frame
- Spread crane load more evenly
- Reduce maintenance and down time

Boom rests are required to provide a positive way to immobilize your crane for transit.

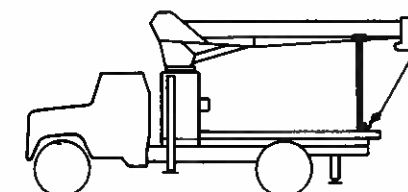
National Crane supplies four heavy-duty boom rests for strong, sure protection of your 600B. There is a quality National boom rest to fit your mounting configuration. All National cranes must be fitted with a boom rest. All factory mounted cranes will be supplied with a boom rest.

NOTE: Only shorter booms can be stowed forward.

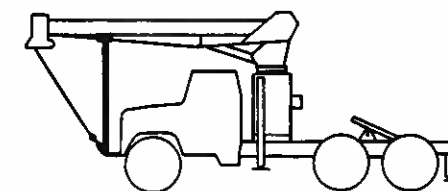


Front mount for trucks with lifting hoods.

Larger Front Axle Rating Required.

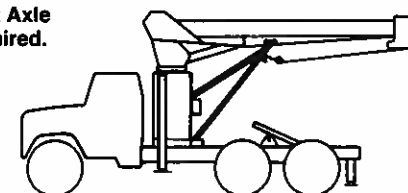


Horizontal rear bed mount for greater load space



Tractor/trailer front mount

Larger Front Axle Rating Required.



Tractor/trailer rear mount

National Series 600B Accessories (Continued on page 16)

Every Series 600B is part of the National Lifting System, a select choice of accessories that add versatility to your crane. With National accessories you can tailor your crane to handle your specific job requirements. In many instances, a truck-mounted crane equipped with accessories can eliminate your need for other specialized equipment.

Because your 600B affords such versatility, you save time, money, and manpower. You can do more, faster, with less equipment. National accessories are, thus, cost-efficient options.

Note:

Weights of all accessories attached to the boom or loadline of the crane must be deducted from the effective lifting capacity. Consult your National dealer for specific accessory availability. Some accessories cannot be used in combination with other accessories and/or certain boom/jib combinations.

"Burst-of-Speed" Planetary Winch Feature

Enjoy the advantage of faster, more efficient pay-out and pick-up of unloaded cable with National's optional "Burst-of-Speed" high performance planetary gear drive winch. This control feature increases line speed up to 60% over normal. **It is designed for intermittent use and may require optional oil cooler for high cycle applications.** See the winch data chart on page 9 for further information.

Model BOS

Do not operate cranes or accessories within 10 feet (3m) of live power lines.

Remote Control

National offers one-hand remote control for your Series 600B. Ideal for use where precise control and total load visibility are required.

Fine metering and instant response mean operators can position loads or work platforms easily.

National's remote controls are built with solid state circuitry and few working parts. They are designed for reliability.

Available in two models: R4 with tilt, turn, telescope and winch functions, and R3 with tilt, turn, and telescope only. R3 is used to control cranes from basket.

A priority control valve, operated by a trigger on the remote control unit, regulates oil flow and gives you fingertip speed control over all crane functions. Due to limited hydraulic flow with remote control, all crane speeds are reduced.

National's remote control is the lightweight, easy-to-use way to add extra versatility to your crane. Consult your dealer or the factory for availability.

Model R3

Tilt, turn and telescope

Model R4

Tilt, turn, telescope and winch



(continued on page 16)

National Series 600B

Accessories (Continued from page 15)

One Person Basket

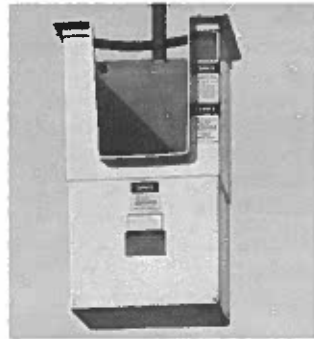
Strong, lightweight fiberglass basket with 300-pound capacity puts personnel where you want them for maintenance and installation jobs. Optional dual basket bracket for two-basket operation on main boom.

(Note: Jib will accommodate only one basket.) Easy on-off. Safety belts included. With basket(s) attached to the crane, the crane must not be operated at a position where the crane load chart shows less than the following capacities:

- One fiberglass basket — 550 pounds
- Two fiberglass baskets — 1,100 pounds

Model B1

Model B1-L
With lock



Personnel Platform

This extra strength 3 x 6-foot steel platform will carry up to 1,000 pounds and operate at working heights up to 80 feet. It is hydraulically self-leveling and protected by safety valves. Safety belts included. Fold down sides standard.

Optional manual rotator available for precise placement of the platform. Easy-to-operate crank rotates the platform through a dependable chain drive. Continuous rotation. Locks in position.

The personnel platform must not be operated in load rated areas where the load chart shows capacities less than 2,000 pounds on Model SLP and 2,200 pounds on Model SLPR. Requires remote controls.

Model SLP Model SLPR



Pallet Fork

Turns your Series 600B into a versatile, payload-packing fork lift. Great for delivering palletized material right where you want it. 4,400 lbs. (1,996kg) capacity with adjustable throat and teeth. Handles most loads with ease.

Capacity: 4,400 lbs. at 20" center
Throat Opening: 41" to 65" (adjustable)
Tooth Length: 38"
Tooth Width: 33.5" to 57" (outside to min. max. outside)
Weight: 350 lbs.

Model MKF (Manual leveling, adjustable throat)



Loose Material Clam Bucket

Increase the flexibility of your National crane with a National clam bucket. This versatile accessory loads or moves up to 2/3 cubic yard of loose materials with each bite. Just position the load where you want it and open the bucket. Hooks easily to loadline, comes with 50 feet of hydraulic hose on automatic reel, and quick-connected fittings. Extension hoses are required for use with jibs.

Model LMC



Capacity Alert System

National offers two capacity alert options. The audible-visual capacity alert system is designed to alert the operator when he reaches a maximum capacity condition on the crane structure. This system activates the truck horn when the capacity load is exceeded on the main boom.

The hydraulic capacity alert system is an hydraulically operated, maximum capacity sensing device designed to stop all normal crane functions that cause overload when maximum capacity is exceeded on the main boom. Neither system is applicable to jib and stability capacities.

Model AAS (Audible capacity alert system)

Model HAS (Hydraulic capacity alert system)

Hydraulic Oil Cooler

Automatic hydraulic device designed to cool the oil under continuous operation.

Model HOC

Caution

Do not operate crane booms, jib extensions, any accessories, or loads within 10 feet (3m) of live power lines or other electrified sources. Do not exceed jib capacities at any reduced boom lengths.



Two Person Basket

Extra capacity steel basket, swing-mounted to self-level. An adjustable, over-center, lever-operated friction brake for stability and locking. Safety belts included. The basket must not be used in load-rated areas where the crane load chart shows capacities less than 1,150 pounds. The maximum capacity of the basket is 500 pounds.

Model BS-1 5-ft. yoke

Stabilizers

We offer a complete range of front and rear stabilizers with hydraulic vertical and horizontal motion. All cylinders are fully enclosed for protection against dirt and on-the-job damage.

Stabilizers

	Rear Mounted (Model ASH)	Rear Mounted (Model RSOD)	Front Mounted (Model SFO Fixed*)
Vertical Travel	20"	25 1/2"	25"
Ground Penetration (38" Frame Height)	8"	10"	13"
Operation	All-Hydraulic	All-Hydraulic	All-Hydraulic
Span	10'	14'	Single
Controls	All stabilizers noted above can be operated from either crane control station		



*The SFO, a single front mounted hydraulic stabilizer, is not designed to lift the vehicle, but will provide stability for the vehicle after it has been leveled. The SFO has a 25" vertical stroke.

Cross-frame Outriggers

Extended Span	15' 6"
Retracted Span	7' 11"
Vertical Travel	
Over-Frame	25"
Under-Frame	18"
Ground Penetration (38" Frame Height)	10"
Mounting Space	
Crane/Outrigger	60"
Outrigger Only	24"
Mounting	Behind cab at rear of chassis or both

Model 6HO

Three Pump System

This optional pump system provides three separate (or individual) hydraulic circuits for independent operation of winch, swing, and crane functions. The option increases productivity on high-cycle jobs and facilitates the ease of operation.

Hydraulic Tilting Pole Grab

The hydraulic tilting pole grab attaches to the end of the third boom section to steady poles and make setting them faster and easier.

The pole grab will guide poles from 7 to 20 inches in diameter and tilts from 45° to 70° for precise placement. Tilt and guide functions are controlled by separate controls operating separate hydraulic cylinders. The unit pins easily and quickly in place. Comes complete with all controls, hoses, and hose feeder assembly.

Model PG



National Warranty, Parts and Service

The National Warranty

The National warranty covers your crane against defects in materials and workmanship for **six months** from the date of shipment, subject to the conditions of the warranty. When you purchase a National crane, you have — along with strong warranty protection and National's longstanding commitment to quality — access to our nationwide dealer warranty service network. Questions concerning the National warranty should be directed to: National Warranty Service; 11200 North 148th Street; Waverly, NE 68462.

The National Parts System

Authorized National Crane dealers stock an inventory of parts to support the National cranes in their areas. If your dealer cannot immediately supply a needed part, the factory maintains a back-up

program providing 24-hour parts shipping in 90% of all breakdown rush orders. National's responsiveness to dealer parts orders means that your crane will be back on the job without needless delay. National maintains a trained Service and Parts staff to answer dealer service questions and expedite parts shipping.

The National Service Center

National maintains a fully equipped Service Center at its Waverly, Nebraska plant. Here, we do all factory crane mounting and handle special crane modifications or repairs. Most National dealers can accommodate all but the most unusual modifications or serious repairs. The Service Center gives each crane requiring warranty repair, modification, or other service, priority attention to ensure that it's back on the job as soon as possible.

National Series 600B Specifications

General Construction

Low-alloy, high-strength steel, including T-1, Ex-Ten, Stressproof, Hi-Yield and other steels combined with special, low-hydrogen welding techniques wherever advantageous. Standard color: painted *National Ivory*.

Frame:

Box construction bolt-on truck frame mounting brackets and bolt-on subbase attachment. Rotation bearing, gearbox, and level indicator mounting surfaces are precision machined after welding to ensure accurate alignment and flat surfaces for prolonged life.

Turret:

Fabricated, rigid structure, well-braced for stability. The bearing surface is machined and the pin holes are bored after welding to ensure accurate alignment and flat surfaces for prolonged life.

Rotation:

375° noncontinuous. Rotational force 224,000 in./lbs. (670,000 in./lbs. breaking strength). Turret rotation is by hydraulic orbit motor and planetary gearbox driving a pinion. The turret rotates on a ball-bearing race. Spring-applied-hydraulic release brake provides positive, no-drift lateral positioning.

Outriggers:

"A" frame box-type, 18-foot span (center of pad at ground level) moves out-and-down, will not bind when raising or lowering truck. Can be positioned to 8 inches below ground level when mounted on truck with a frame height of 38 inches. Outrigger cylinders are equipped with butt-mounted, safety check valves.

Lift:

Double-acting hydraulic cylinder raises and lowers the boom; butt-mounted, safety holding valve prevents the boom from falling in the event of hose failure. Tough, field-

tested bearings in lift cylinder and boom pivot combined with micro-honed pins provide long life with reduced maintenance.

Boom:

Boxed construction. Telescopes hydraulically proportionally on nylon plates impregnated with molybdenum disulfide on all sides of boom, permitting maximum loads to be extended at greater radii. Holding valve prevents retraction except under power.

Controls:

Dual side, stand-up with operator platform and foot accelerator identical on both sides. Simultaneous operation of load-line and other operations standard. Horn and stop switch on both sides. Controls easily removable for maintenance.

Winch:

Hydraulic gear motor with planetary gear reduction brake, and counterbalance valve for "power down" load lowering. 10,200-pound bare drum, single line pull available with 280 ft. on 666B; (220 feet on all other booms) of 9/16" diameter, 35,000-pound* breaking strength on the standard rotation resistant loadline. Optional 9/16" diameter, 29,750-pound* breaking strength 6/25 IWRC loadline is available. Optional "Burst-of-Speed" control increases pay-out and pickup of unloaded cable 60% over normal operating speed with maximum rated single line pull of 3,000 pounds.

*Because of ANSI safety factor requirements, the standard rotation resistant wire rope is rated at a 7,000-pound, 5:1, single line pull and the optional 6x25 IWRC wire rope is rated at an 8,400-pound, 3.5:1, single line pull.

Pump:

One Vickers, high-pressure, high-speed, balanced-vane, replaceable cartridge-type tandem pump independently providing 34 gpm to winch, and 23 gpm to crane for smooth, fast, simultaneous operation.

Cylinders:

Shaft packing: Polyurethane U-cup type. Shafts: Hi-Yield, stress-relieved, chrome-plated. Piston sets: Polyurethane U-cup and rider construction. Cylinder barrels: Micro-honed tubing, butt-mounted, safety check valves.

Valves:

Four-way, spring-centered, spool type with independent relief valves set at 2,825 psi (3,050 psi on winch system) to protect circuits against overload.

Hose:

All high-pressure hose is wire-braid reinforced, having a minimum safety factor of 4 to 1.

Operating Speeds

Winch third layer speed: 150 fpm. Rotation 375°, 40-45 seconds. Boom up, -10° to 80°, 16 seconds. Boom down, 80° to -10°, 12 seconds. Boom extend: 56 fpm. Boom retract: 52 fpm. When using remote control, crane function speeds will be reduced by 50% to assure smooth operation. (Speeds above assume no load with 23 gpm oil flow on boom and 34 gpm on winch.)

Oil Tank Capacities:

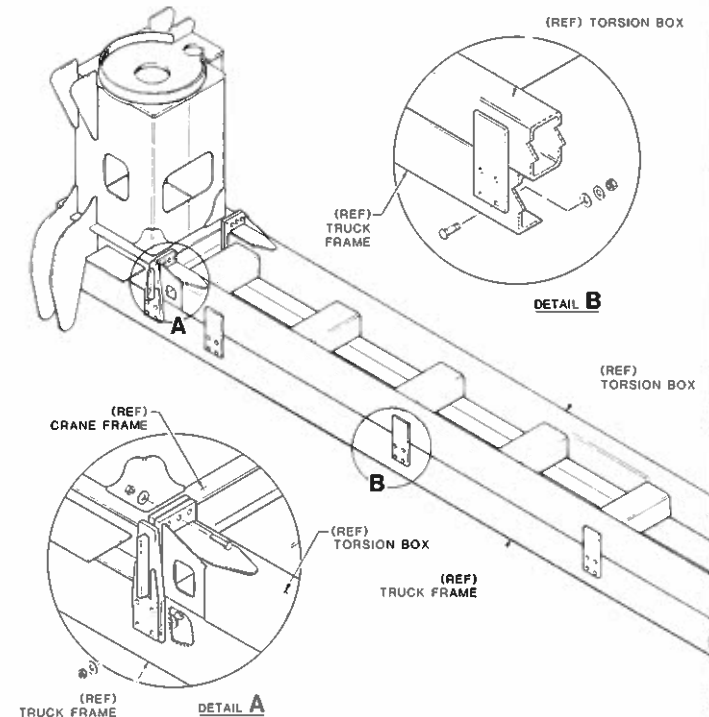
60-gallon supply tank. Normally mounted on subframe. Sight gauge, breather, suction strainer, clean-out, and magnetic plug.

Filter:

10-micron, replaceable-cartridge, return-line filter. 100% filtration.

Capacity Alert Systems:

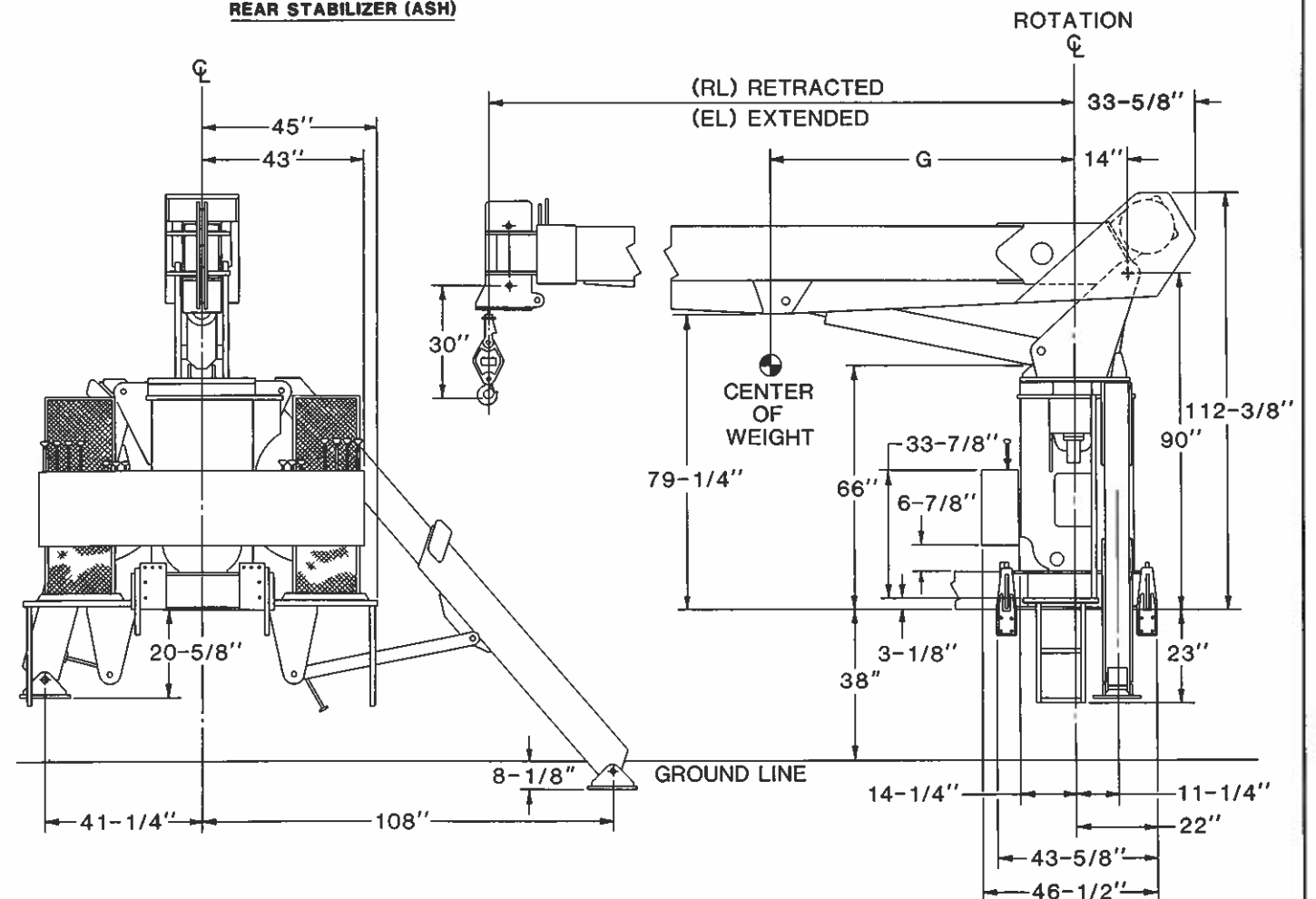
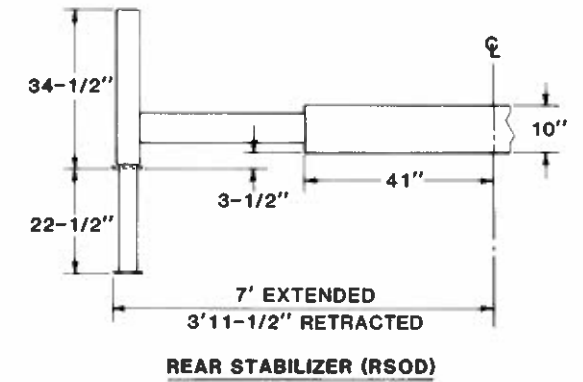
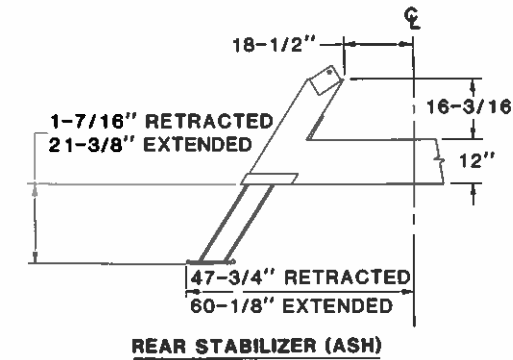
Devices available to reduce possibility of operator error. See your dealer.



G. CENTER OF GRAVITY

Series	RL	EL	G	*Dry Weight	*W/Oil Weight
666B	25'	66'	56"	11,000 lbs.	11,500 lbs.
656B	21'8"	56'	45"	10,400 lbs.	10,900 lbs.
647B	18'8"	47'	36"	9,900 lbs.	10,400 lbs.
638B	15'8"	38'	30"	9,400 lbs.	9,900 lbs.

*Above weights do not include subbase or rear stabilizers. The standard subbase weight is 1,150 pounds. The rear stabilizer (ASH 18") weight is 800 pounds. The rear stabilizer (RSOD) weight is 1,100 pounds. The subbase dimension is: 34" wide by 216" long by 9" high.



National Series 600B Proposal

	Description	Price
Date: _____	1. Series _____	\$ _____
Prepared for: _____ _____	2. Boom _____	_____
Submitted by: _____ _____	3. Jib _____	_____
(Firm Name)	4. Rear Stabilizers <input type="checkbox"/> ASH <input type="checkbox"/> RSOD	_____
(Address)	5. Front Stabilizers <input type="checkbox"/> Std. <input type="checkbox"/> Tilt <input type="checkbox"/> SFO	_____
(City & State)	6. Line Block <input type="checkbox"/> 2 Part <input type="checkbox"/> 3 Part <input type="checkbox"/> 4 Part	_____
(Zip)	Accessories	_____
(Phone)	7. "Burst-of-Speed" Planetary Winch Feature	_____
Signed: _____	8. _____	_____
National reserves the right to change designs, prices, and specifications at any time without notice.	9. _____	_____
Your National Dealer	Mounting	_____
	10. Installation: Behind Cab	_____
	(Deduct if no torsion box required)	(_____)
	11. Installation: Rear Mounting (add to installation charge above)	_____
	<input type="checkbox"/> Air Throttle	_____
	<input type="checkbox"/> Rear Mounting Hydraulic Group	_____
	<input type="checkbox"/> Heavy-duty Torsion Box	_____
	<input type="checkbox"/> Reverse Frame Conversion Kit	_____
	<input type="checkbox"/> HO Outriggers	_____
	12. Frame Reinforcement: <input type="checkbox"/> Weld <input type="checkbox"/> Bolt-Extra	_____
	13. Platform Body _____ ft. <input type="checkbox"/> Wood <input type="checkbox"/> Steel	_____
	14. Weight in bed _____ lbs. (if required)	_____
	15. Boom rest: <input type="checkbox"/> Parallel <input type="checkbox"/> Other	_____
	16. Mount Stabilizers (Rear) _____	_____
	17. Mount Stabilizers (Front) _____	_____
	18. Chassis _____	_____
	19. Rear Bumper Underride Protection <input type="checkbox"/> Ordered <input type="checkbox"/> Not Ordered	_____
	20. Freight _____	_____
	This quotation will remain firm for _____ days.	_____
	Accepted by: _____	\$ _____
	(Name)	TOTAL PRICE
	_____	_____
	(Firm Name)	(Date)



NATIONAL CRANE

General Offices: 11200 North 148th Street • Waverly, NE 68462
Phone: 402-786-2240 • Telex: 438061 • Fax: 402-786-3636