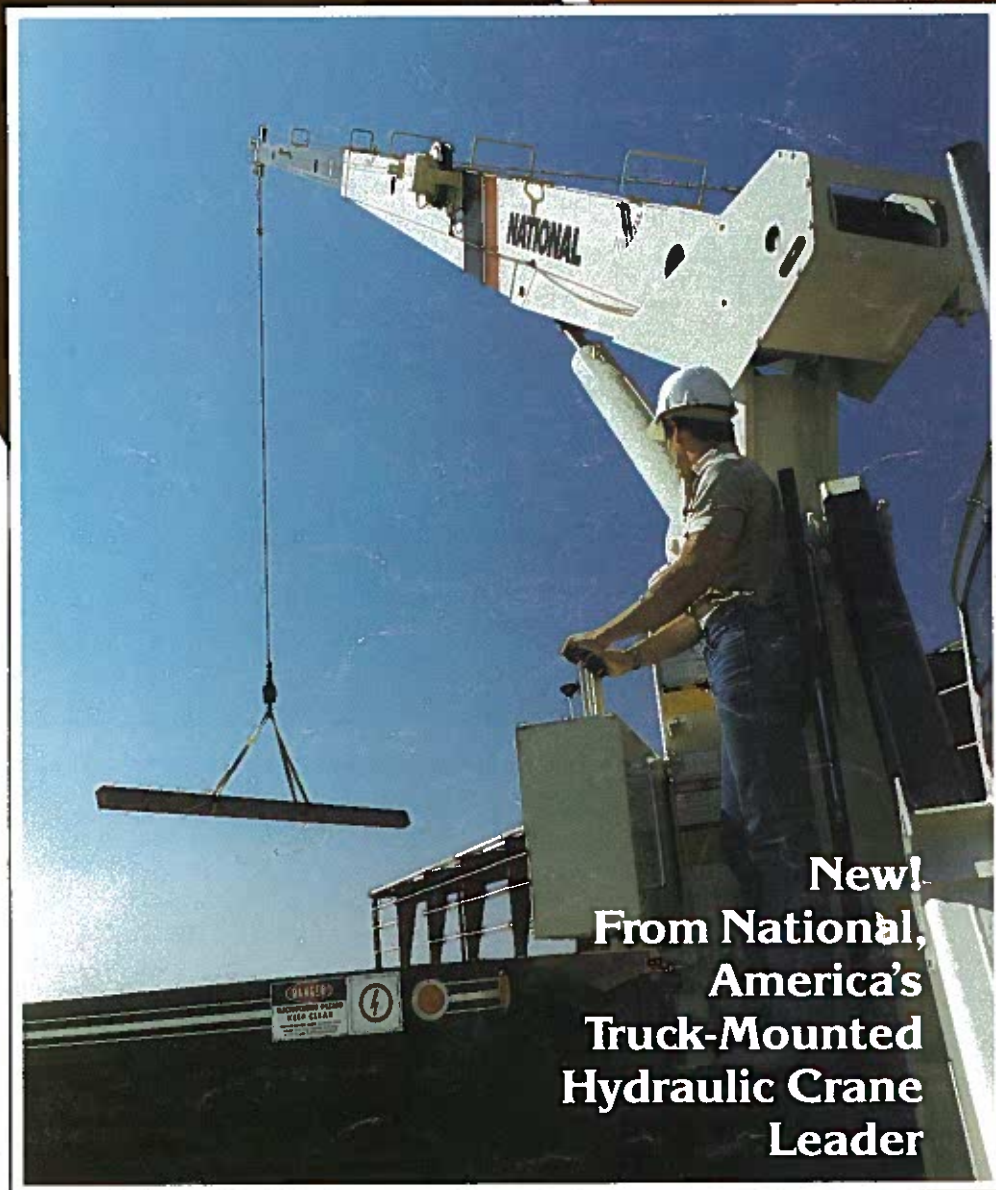


NATIONAL SERIES 600B

Truck-Mounted Telescoping Cranes and Accessories

Maximum Height: 118 Feet (36 Meters)

Maximum Capacity: 28,000 Pounds (12.7 Metric Tons)



New!
From National,
America's
Truck-Mounted
Hydraulic Crane
Leader

NATIONAL SERIES 600B

A NEW, high-capacity, hydraulic telescoping crane from National

National is America's leading manufacturer of commercial truck-mounted telescoping and articulating cranes. Our products serve a wide range of applications and our manufacturing standards are unexcelled. Nationals are durable, dependable, and designed for ease of operation.

With our new National 600B, you are assured of a well-engineered, quality machine ready to take on your demanding lifting requirements.

At National, we put quality first. Our commitment to product quality and reliability means that you can buy with confidence, knowing that your National is designed to provide you with years of service.

Our Series 600B telescoping crane gives you everything you want and need in a tough, compact, 14-ton-capacity crane. Consider these features:

- 14-ton (12.7 MT) rated capacity
- Reaches up to 118 feet (36m) high
- Available with 66-foot boom
- Proportional boom design allowing higher lifting capacities in normal lifting areas
- Wide 18-foot (5.49m) outrigger span for greater stability
- Larger 13" x 16" outrigger pads
- Optional rear hydraulic stabilizers with a 14-foot span for stability
- Large bolt-in wear pads in boom last longer and are easier to replace
- Holding valves on all cylinders
- Dual controls in SAE recommended orientation; each with foot throttle
- Control rods supported by nylon bearings, promoting smooth operation and serviceability

- Improved high-performance planetary winch with rotation resistant cable
- Standard anti-two-block feature to prevent cable damage when winching up or extending the boom without paying out the winch cable
- New easy-to-read boom angle indicator
- Planetary rotation gear box with a hydraulic release brake and a slip-through feature that helps protect the rotation system against damage from accidental side loading
- Turret and winch rotation indicators to aid operator
- Outrigger location (behind operator) allows occasional 360° working area without front stabilizers when mounted on recommended truck
- Seven different mounting configurations available
- Mounts on standard, single rear axle trucks (Model 666B requires a tandem axle truck)
- Simple mounting; Subbase available to eliminate truck reinforcing and, in some cases, counterweight
- Boom pivot and hoist cylinder bearings provide longer life and lower maintenance
- Standard tandem pump system isolates winch from other crane functions to provide independent operation capability
- Horn and stop switches located at control stations
- Complete accessory line adds to versatility
- Boom access holes allow easy access to telescoping cylinder holding valve and extension system for serviceability
- Oil filter and control valves located externally for improved serviceability
- Precision machine level at both operating stations



National's anti-two-block system is standard on all National telescoping cranes (as of June 1, 1986). Photos in this brochure taken prior to that date may not show the crane equipped with the current standard anti-two-block protection system.

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. For example, 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

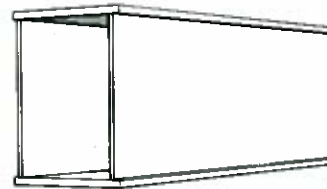
range of motion for the prescribed number of cycles. More than 400 individual quality control inspections are made on each National crane during manufacture and assembly. National attention to testing insures that each crane delivered to the field is as close to perfect as state-of-the-art technology permits.

National Series 600B

Strong Four-Plate Booms

Through computer aided design, National has improved 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.



New Hydraulic Stabilizers

The 600B features new 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

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

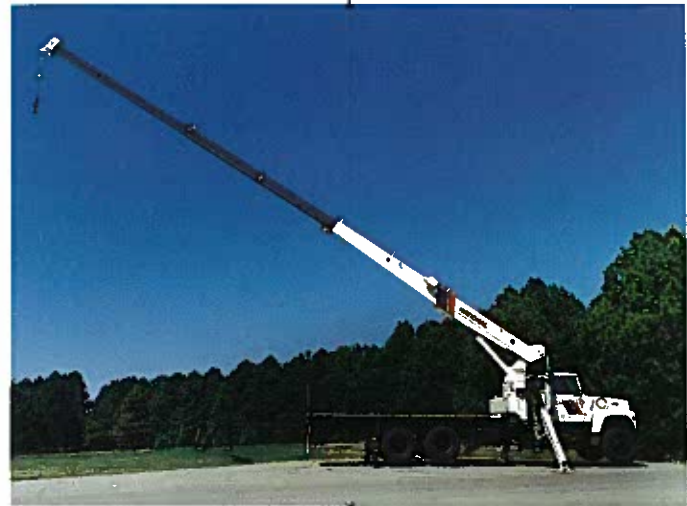
over-tensioning. The anti-two-block system prevents cable damage by sensing the position of the winch cable end attachments with respect to the sheave case and shutting down the functions that can cause two-blocking.



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 efficient boom operation and higher capacities for you. Since the system utilizes only one extend cylinder, hydraulic maintenance is minimized. Boom telescope cylinder is fully protected with a direct mount holding valve.



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 seven for further information.

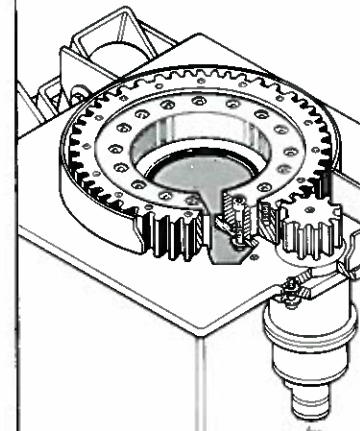


Single Axle Mounting

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, it still meets DOT and stability standards. The Series 600B crane, not the truck, is designed to take most of the stress. That adds up to lower investment and longer truck life.

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. The 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.

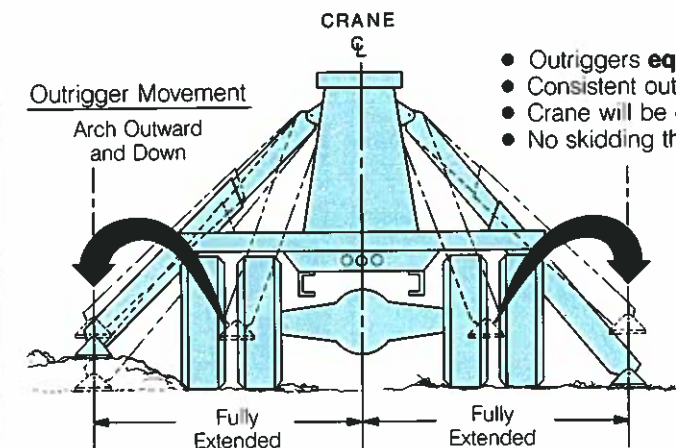


Wide Stance

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 wider span — 18-foot (5.49m) — gives you 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.
- Crane will be equally stable on both sides.
- No skidding the foot into position.



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 removeable for major repair. Access holes in boom sections allow viewing of extension system. The simplicity of boom design permits fast disassembly.



Compact Design

The National Series 600B is built tough, but compact, so it fits in just 46½ inches (1,163mm) 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.

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 14-ton capacity lifting requirements. Select the telescoping boom you want, then add one of National's jib options as a cost-efficient way to increase the reach and versatility of your Series 600B.

The charts at right show the capacities of National's all new Series 600B telescoping cranes. Your National dealer can provide detailed information on the boom/jib combinations that are available on the Series 600B.

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

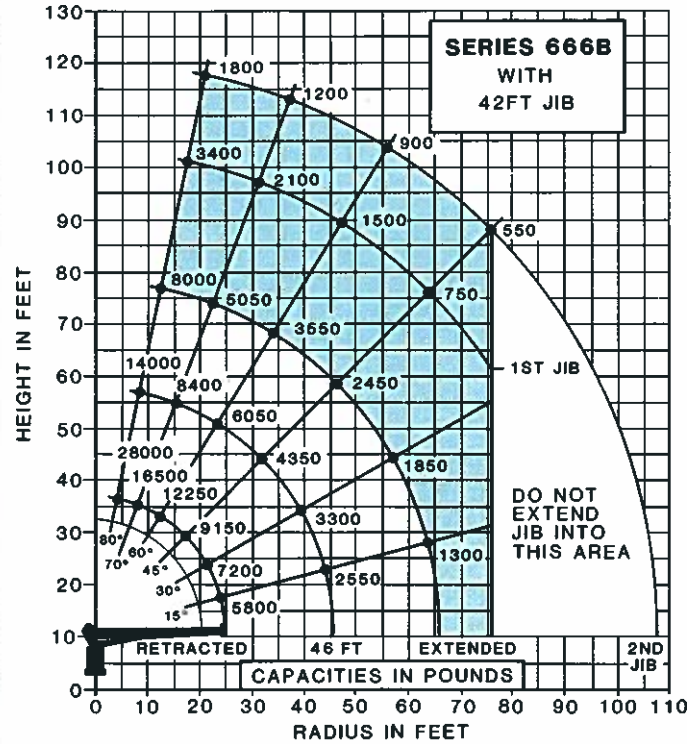
Jib Options (side stowing)

- 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 pull-out (for Model 638B)
- Model 6FJ25: 25' (7.6m) straight (for Model 666B)
- Model 6FJ29M: 18' to 29' (5.5m to 8.8m) manual pull-out (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)

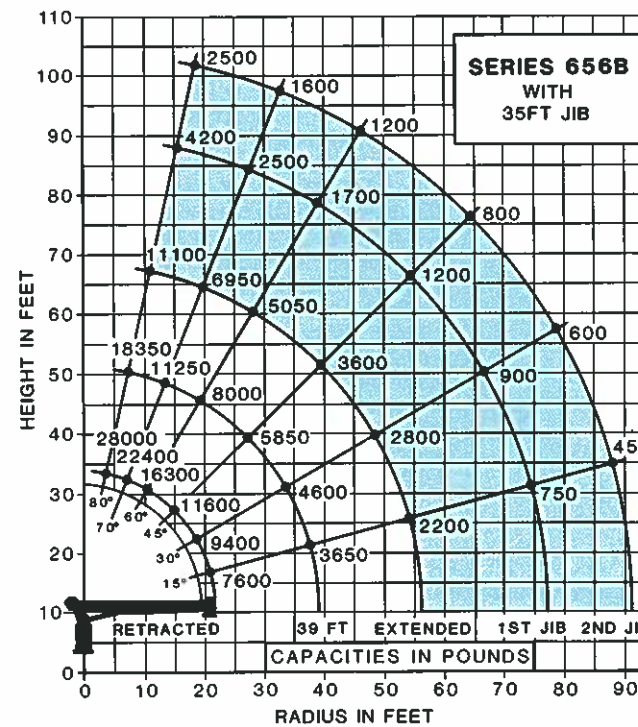
Do not operate cranes or accessories within 10 feet (3m) of live power lines.

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.



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



666B Capacity*

(Metric equivalents shown in parentheses)

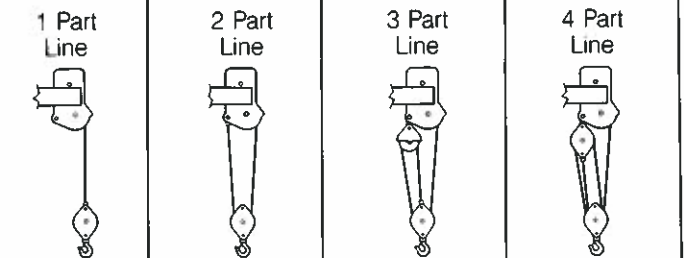
Radius	All Booms Retracted	Extended 46 Feet	All Booms Extended Maximum
Maximum Capacity	28,000 lbs. (12,730kg)		
9' (2.7m)	17,700 lbs. (8,050kg)		
12' (3.7m)	13,800 lbs. (6,270kg)	11,900 lbs. (5,398kg)	
16' (4.9m)	10,700 lbs. (4,860kg)	9,250 lbs. (4,196kg)	8,050 lbs. (3,651kg)
20' (6.1m)	8,550 lbs. (3,890kg)	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)
36' (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.

NATIONAL SERIES 600B WINCH DATA

CAUTION:

Do not deadhead lineblock against boom tip when extending boom.
Keep at least three wraps of load line 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 rotol on resistant	35,000 lbs.	Data applies to all 600B booms.			
	Optional 9/16" diameter 6 x 25 IWRC	29,750 lbs.	7,000 lbs. 150 fpm	14,000 lbs. 75 fpm	21,000 lbs. 50 fpm	28,000 lbs. 37 fpm
With Optional Burst-of-Speed Feature**	Same as corresponding cable data shown above.		*Applicable to the 666B boom. †Applicable to all other Series 600B booms. Speeds shown are the same for all Series 600B booms.			
			7,500 lbs.* 150 fpm	15,000 lbs.* 75 fpm	22,500 lbs.* 50 fpm	28,000 lbs.* 37 fpm
			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 Truck Specifications

(Continued on page 10)

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; 232" 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.
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 48,000 GVWR.	<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>	<p>360° FULL CAPACITY WORK AREA</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 9)

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 48,000 GVWR	<p>*Longer CA required for 647B, 656B</p>	<p>*Longer CA required for 647B, 656B</p>
	<p>**Estimated axle scale weights prior to installation of crane and stabilizers and subbase if required for 85% stability.</p>	

National Series 600B Boom Rests

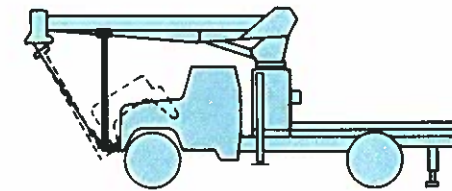
Cranes are tough when they're in use, but they can be severely damaged during travel from job to job. The only way a crane can be protected from this type of wear and damage is a strong, solid, boom rest.

Boom Rests

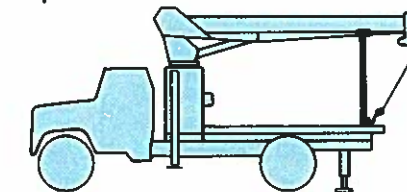
- Add years to the life of your crane
- Reduce stress on the crane frame
- Protect rotation gear from transit damage
- Remove stress from truck frame
- Spread crane load more evenly
- Reduce maintenance and down time

In addition, boom rests are required to provide a positive way to immobilize your crane for transit.

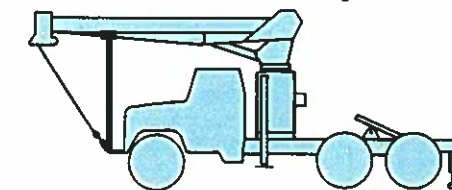
National Crane supplies four heavy-duty boom rests for strong, sure protection of your crane. There is a quality National boom rest to fit your mounting configuration. All National Cranes must be fitted with a boom rest. NOTE: Only shorter booms can be stowed forward.



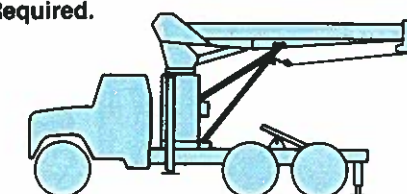
Front mount for trucks with lifting hoods
Larger Front Axle Rating Required.



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 12)

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 should be 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

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

(continued on page 12)

Every Series 600B is part of the National Lifting System.

The National Lifting System can equip your 600B to do more than just lift or handle materials. It lets you equip your truck-mounted crane to perform the functions of a whole fleet of specialized vehicles, and at a fraction of the cost.

Because your 600B can do so many jobs from start to finish, you save time, money, and manpower on almost every job you do. You'll find you can do more, faster, with less equipment. And that's money in your pocket.

Get the most from your National 600B. Make it more than just a crane with cost-efficient, hard-working accessories from the National Lifting System.

Note:

Weights of all accessories attached to the boom or loadline of the crane must be deducted from the effective lifting capacity.

Consult your 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 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 7 for further information.

National Series 600B

Accessories (Continued from page 11)

One Person Basket

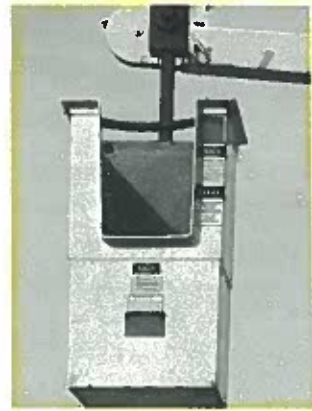
Strong, lightweight fiberglass basket with 300-pound capacity puts personnel where you want them for tough maintenance and installation jobs. Optional dual basket bracket for two-basket operation on main boom. (Note: Jib will accommodate only one basket.) Easy on-off. Safety belts included. With basket(s) 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



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



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. (1,814kg) capacity with adjustable throat and teeth. Handles most loads with ease.

Capacity: 4,400 lbs. at 20' center

Throat Opening: (adjustable) 41' to 65'

Tooth Length: 38"

Tooth Width: 33.5" to 57" (outside to outside) min. max.

Weight: 350 lbs.

Model MKF

(Manual leveling, adjustable throat)



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. Do not exceed jib capacities at any reduced boom lengths.

Loose Material Clam Bucket

Increase the flexibility of your National crane with a National clam bucket. Use this versatile accessory to load or move up to 1/2 cubic yard of loose materials with each bite. Hooks easily to loadline, comes with 50 feet of hydraulic hose on automatic reel and quick-connect fittings. Extension hoses are required for use with jibs. Just position the load where you want it and open the bucket.

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 a hydraulically operated, maximum capacity sensing device that is designed to stop all of the normal crane functions that cause overload when maximum capacity is exceeded on the main boom. Neither of these systems is applicable to jib and stability capacities.

Model AAS

(Audible capacity alert system)

Model HAS

(Hydraulic capacity alert system)

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 FSH-25 Fixed, SFO Fixed*, and Model FSHF-25 Folding)

Vertical Travel	20'	15'	25'
Ground Penetration (38" Frame Height)	8"	10"	13"
Operation	All-Hydraulic	All-Hydraulic	All-Hydraulic
Span	10'	14'	8'
Controls	All stabilizers noted above can be operated from either crane control station		

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

*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 an 18" vertical stroke.

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

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

The pole grab will grip poles from 7 to 20 inches in diameter and tilts from 45° to 70° for precise placement. Tilt and grab 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

National's warranty covers your crane against defects in materials or workmanship for **six full months** from the date of shipment, subject to the conditions of the warranty.

When you select a National crane, you're getting more than just a crane. You're getting a nationwide dealer warranty service network, strong warranty protection and our special concern for every product we make.

Read our warranty. Then, don't settle for less. For complete information, write National Warranty Service, Waverly, NE 68462.

The National Parts System

Authorized National Crane dealers maintain a parts supply to support the National cranes in each dealer's area. If a dealer cannot immediately supply a needed part, the factory maintains a back-up parts supply that provides 24-

hour parts shipping in 85% of all breakdown rush orders. National's responsiveness to dealer requests means that your crane will be back on the job fast. National maintains a highly trained Service and Parts staff to answer dealer service questions and expedite parts shipping.

The National Service Center

National maintains a well-equipped service center where we do all our factory crane mounting. The central location of our Service Center makes it easy to return cranes for special modifications or extreme repairs. Most National dealers can perform all but the most unusual modifications or most serious repairs.

Should you need to return your crane to us for modification, warranty repair or other service, we will give it priority care and see it's returned 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 pick-up of 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:

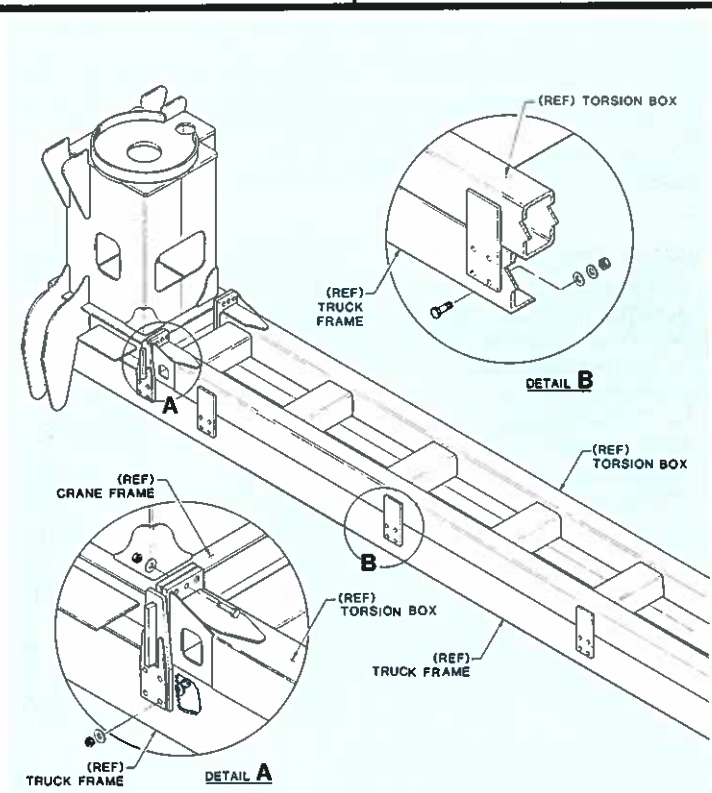
60-gallon supply tank. Normally mounted on subframe. Sight gauge, breather, suction strainer, clean-out, and magnetic plug.

Filter:

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

Capacity Alert Systems:

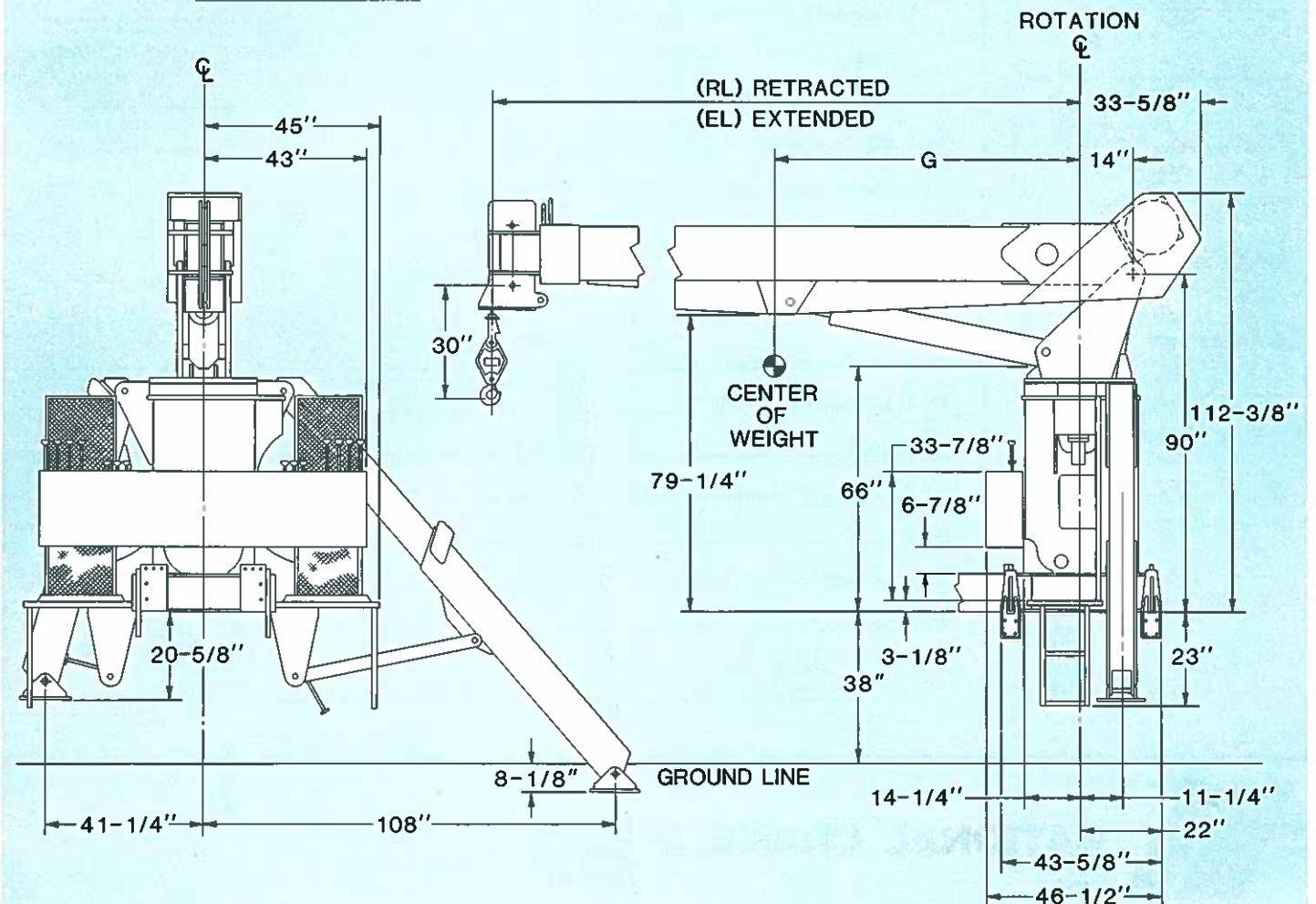
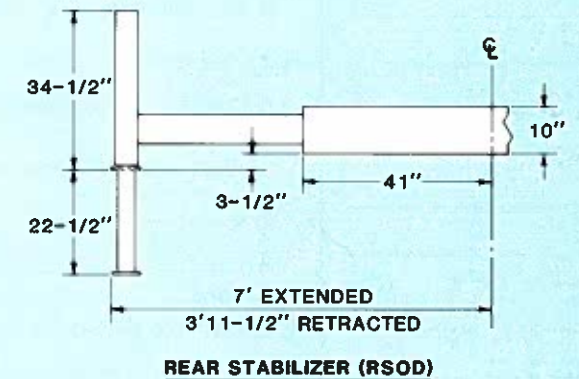
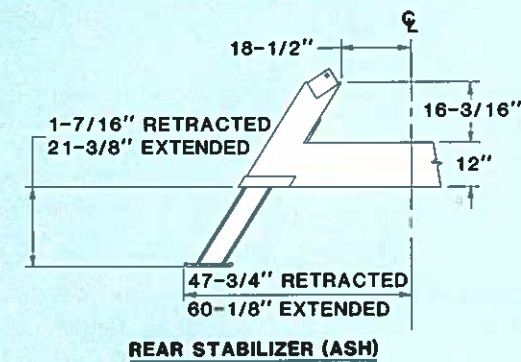
Devices available to reduce possibility of operator error. See your dealer.



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 _____	_____
_____	3. Jib _____	_____
_____	4. Rear Stabilizers <input type="checkbox"/> ASH <input type="checkbox"/> RSOD	_____
Submitted by: _____	5. Front Stabilizers <input type="checkbox"/> Std. <input type="checkbox"/> Tilt <input type="checkbox"/> SFO	_____
_____	6. Line Block <input type="checkbox"/> 2 Part <input type="checkbox"/> 3 Part <input type="checkbox"/> 4 Part	_____
(Firm Name) _____	Accessories	
_____	7. "Burst-of-Speed" Planetary Winch Feature	_____
_____	8. _____	_____
(Address) _____	9. _____	_____
_____	Mounting	
(City & State) _____	10. Installation: Behind Cab	_____
(Zip) _____	(Deduct if no torsion box required) (_____)	_____
(Phone) _____	11. Installation: Rear Mounting (add to installation charge above)	_____
Signed: _____	<input type="checkbox"/> Air Throttle	_____
_____	<input type="checkbox"/> Rear Mounting Hydraulic Group	_____
National reserves the right to change designs, prices, and specifications at any time without notice	<input type="checkbox"/> Heavy-duty Torsion Box	_____
Your National Dealer	<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
Subsidiary of Kidde, Inc.
KIDDE

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