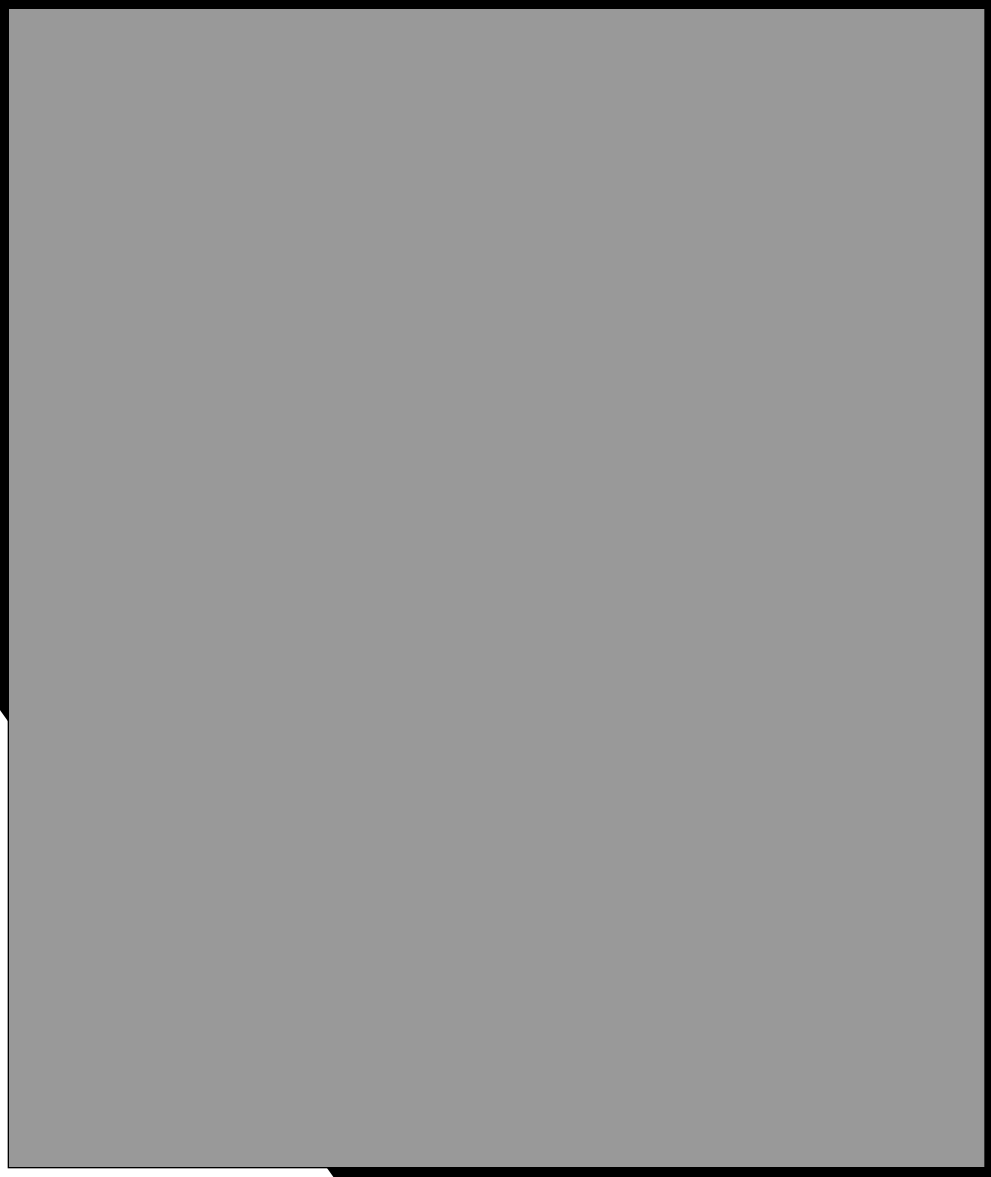
National N-135 Articulating Crane

From America's Truck-Mounted Hydraulic Crane Leader



- ***Crane Rating:*** ***137,700 ft• lb (19.04 t• m)***
- ***Maximum Capacity:*** ***9.5 tons (8.6 t)***
- ***Maximum Vertical Reach:**** ***52 ft 4 in (16 m)***
- ***Horizontal Reach:*** ***41 ft (12.5 m)***
- ***Reach Below Truck Frame:*** ***32 ft (9.8 m)***
- ***Total Hydraulic Extension:*** ***27 ft 10 in (8.5 m)***

***Maximum vertical reach is from ground level with the crane mounted on a 42-inch (1067 mm) high truck frame**

National Crane:
A Grove Worldwide Company

The National Advantage

When you invest in a National articulating crane, you are assured of these competitive advantages:

Quality

National cranes are designed for durability, performance, and ease of service. National's cutting-edge technologies set the industry standard for the manufacture of lifting and materials handling equipment. An experienced workforce turns innovative designs into quality-crafted cranes. Factory prototypes are subjected to the toughest testing requirements in the industry. Each National crane is checked throughout the manufacturing and assembly processes, then given a detailed final inspection before it is released from the factory.

Performance

Each user-friendly National gives you what you expect in a crane. Long reach. High capacity. Fast set-up. Easy operation. Smooth movement. Versatile accessories. Premium components. Add it all up—you'll find that a National is not only a pleasure to operate, but a reliable investment in bottom line performance.

Value

National has manufactured cranes since 1963. With a National you get field-proven reliability plus the best factory/dealer support in the industry. National's warranty provides protection against defects in materials and workmanship for a full year from the date the customer takes delivery. Dealers maintain extensive parts stocking programs. Should a dealer be unable to supply a part you need, National's back-up program is committed to providing equipment replacement parts on a breakdown rush basis, holding your downtime to a minimum. These advantages enhance a National crane's resale value—consistently the highest in the industry!

National Crane is ISO certified

137,700-ft•lb (19.04-t•m) crane rating

9.5-ton (8.6-t) rated lifting capacity

52-ft 4-in (16-m) maximum vertical reach*

41-ft (12.5-m) horizontal reach

32-ft (9.8-m) reach below truck frame

27-ft 10-in (8.5-m) total hydraulic extension

**Maximum vertical reach is from ground level with the crane mounted on a 42-inch (1067 mm) high truck frame*

Strong booms and jibs
- Inner boom offset at its base to allow the lengthy outer boom to stow alongside the mast, resulting in longer reaches and larger capacities while maintaining a light weight, compact unit when stowed
- Outer boom, powered by a sequentially controlled, two-stage cylinder extends and retracts smoothly on long-wearing *Easy Glide* wear pads
- Ultra-strong boom sections manufactured from low-alloy, high-strength steel
- Lightweight manual pull-out jibs constructed of high-strength steel extend the working range of the crane quickly and easily
- Boom nose or jib nose equipped with swivel hook with a safety latch is rated for maximum crane capacity; it is designed to accept all boom-tip options by a simple pin-on procedure

Durable cylinders
- Cylinder shafts are hard chrome-plated; high pressure tubing reduces hose wear
- All cylinders are double acting for smooth, positive control

Clean design
- Wherever possible, heavy-duty wire-braided hoses are routed inside the mast and boom for protection from bumps, twists, cuts and abraisons and to enhance the crane's appearance

Counterbalance valves
- Pilot operated counterbalance valves on lift, fold, and extend cylinders lock all cylinders in place (until they are powered to move) in the event of hose failure—they serve as overload relief valves to slowly lower the load in the event of an overload condition; they do not allow inadvertant cylinder movement

Efficient rotation
- Low-maintenance shear ball bearing rotation system with smooth, precise planetary control
- When unpowered, the swing is locked in place by a spring-applied, hydraulically released brake
- Powered by a high-torque, low speed motor through a double-reduction planetary gearbox

High-performance hydraulics
- Couplings and fittings are of highest quality; hydraulic hoses, tubes and fittings have a 4:1 minimum safety factor on burst
- Inline hose swivels that rotate with the mast protect hoses from kinking and abrasion and help keep the end connections tight
- Each valve section is pressure compensated for smooth, precise multiple-function control, simultaneously without interaction
- Hose connections in hydraulic system use SAE JIC 37° fittings
- A high capacity, high pressure vane pump produces full system pressure—even at truck engine idle speed—and maintains high efficiency throughout its life
- A two-bolt mounting flange can be integrally mounted to most PTO's to simplify mounting
- Detachable oil tank (for easy maintenance) comes with an oil level sight gage, breather, magnetic plug and 10-micron external return line filter integrally mounted to the crane frame; special design reduces mounting time and space requirements

Chrome-plated pins
- Large-diameter chrome-plated pins with encapsulated composite bearings provide long life with reduced maintenance

User-friendly operation
- Identical waist-level crane function controls are located on both sides of crane—same controls, same hand positioning
- Operator can work controls from either side of the crane, keeping boom and load in full view at all times
- Low-effort, ultra-smooth, fine-metering, five-spool control valves provide pinpoint accuracy
- Control knobs are illustrated with function symbols
- Additional valve banks for operating hydraulic accessories can easily be added

Solid stability
- Wide 19-foot 8-inch (6 m) hydraulic-powered outriggers provide solid stability—even in soft or uneven ground conditions
- 24.5-inch (63 cm) hydraulic-powered outrigger legs
- Standard outrigger pads are 8- by 14-inches (20 by 36 cm)
- Enclosed outrigger cylinders with pilot operated check valves that automatically lock all cylinders in place
- Vertical cylinders lock automatically when stowed so they will not leak down in transit
- Legs are removable for shipment and storage

Simplified mounting
- Easy three-point clamp-on mounting minimizes crane and truck frame stress
- Mounts on standard, single-axle trucks

A wide choice of accessories (see page 8)

National N-135 Crane Specifications

Technical Data

Working pressure	3,100 psi	214 bar
Pump Capacity (vane-type pump)	17 gal/min	64 L/min
Reservoir oil capacity	22 gal	83 L
Outrigger span	19 ft 8 in	6 m
Outrigger vertical travel	24.5 in	62.8 cm
Stowed height (above truck frame)	7 feet 9.5 in	2.4 m
Model 28 weight (with oil)*	6,050lbs	2750 kg
Filter	10 micron replaceable (spin-on type)	
Rotation (non-continuous)	410 degree	410 degree
Mounting space required	40 in	101.6 cm
with optional winch	40 in	101.6 cm
with optional reel	41.5 in	105.4 cm
Boom rotation speed	410° in 35 sec	
Boom hydraulic extension speed	16 sec for Model 28**	
Boom hydraulic retraction speed	16 sec for Model 28**	

Note: Contact the factory for continuous duty cycle applications
**Crane options will increase crane weight*
***Approximate*

**The N-135 is rate*
***The maximum v*
mounted on a 4
xxxxxxxxxxxxx

The Basic N-135 (Model 135/28)

- Two hydraulic-powered out-and-down outriggers extending to 19-ft 8-in (6 m) span
- Frame, inner boom, outer boom with two hydraulic extensions to 27 ft 10 in (8.5 m)
- 410-degree rotation
- Five spool control valves
- Boom cylinder counterbalance valves on lift, fold, and extend; automatic check valves on outriggers
- Identical dual controls
- Manual truck throttle
- Clamp-on mounting
- Hydraulic reservoir
- Hydraulic pump and easy mounting group
- Crane hook with safety latch

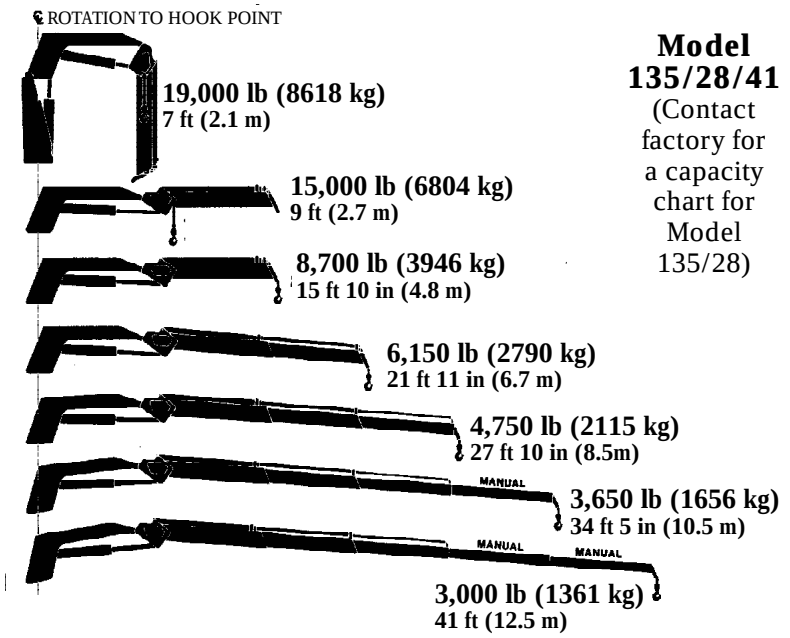
Model N-135/28/41 (Manual Extension Option)

Like basic unit (Model 28), but adds two manual boom extensions to provide maximum reach of 41 ft (12.5 m).

Notes:
Ranges are indicative of unloaded conditions.
Deflection may restrict range under loaded conditions.

Caution

- **Do not operate crane, truck, boom/jib, accessories or loads within 10 ft (3 m) of live power lines or any other source or conductors of electricity**
- **Jib and boom capacities shown are maximum allowable loads, including the weight of any attached accessories**
- **When operating a National crane never exceed maximum rated boom/jib capacity at any reduced radii—overloading the crane may cause instability or structural collapse**
- **Booms must be folded slightly to lift rated loads**
- **No protection system is infallible. There is no substitute for training, sound judgment, and caution. Follow all guidelines and cautionary notes appearing in the operator's manual**



Model 135/28/41 (Contact factory for a capacity chart for Model 135/28)

Crane Model	Crane Rating	Maximum Capacity	Maximum Vertical Reach	Maximum Horizontal Reach	Maximum Hydraulic Extension	Maximum Reach Below Frame
135/28	137,700 ft•lb (19 t•m)*	9.5 tons (8.6 t)	39 ft 2 in (11.9 m)**	27 ft 10 in (8.5 m)	27 ft 10 in (8.5 m)	18 ft (5.5 m)
135/28/41	137,700 ft•lb (19 t•m)*	9.5 tons (8.6 t)	52 ft 4 in (16 m)**	41 ft (12.5 m)	27 ft 10 in (8.5 m)	32 ft (9.8 m)

** The N-135 is rated with the boom extended to 15 ft 10 in (4.8 m)*
*** The maximum vertical reach is from ground level and with the crane mounted on a 42-in (1067 mm) high truck frame*

The N-135 is a "hook point" machine. Capacities shown on the capacity charts are maximum loads at specific hook points rather than at specific load radii or combination of boom angles and boom lengths.

A load can be lifted on the N-135 if the load is within the capacity of the hook point and its arc about the inner boom position. If the load is within the capacity of the hook point being used to lift the load, it can be positioned anywhere the hook arc permits by at least one crane function. All crane functions may not be able to move the load to all positions within the arc unless the position of the boom is at its best mechanical advantage. ***Always refer to the capacity chart (located near the operator's station) to determine what hook point will be used to lift the load. Never exceed the capacity of the hook point.***

ed with the boom extended to 15 ft 10 in (4.8m)
ertical reach is from ground level and with the crane
2-in (1067 mm) high truck frame
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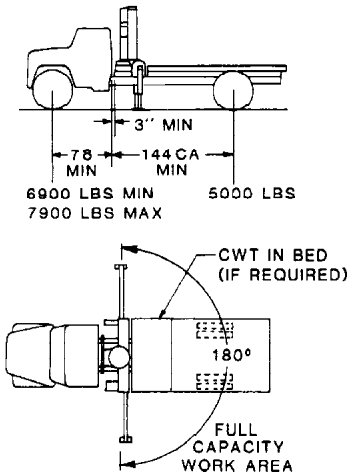
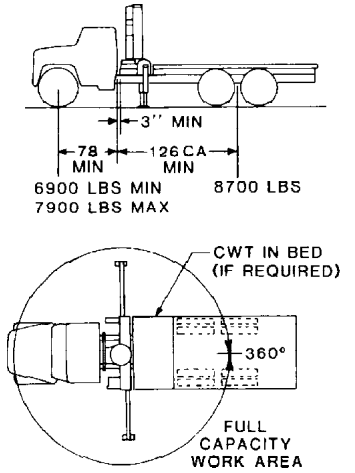
National N-135 Mounting Specifications



180-degree Working Area

Permits lifting capacity loads in all areas around rear of vehicle in a 180° arc from outrigger to outrigger. No load should be lifted over the front of the vehicle unless stabilizing provisions are made (such as adding front stabilizers and/or extra weight in the truck bed).

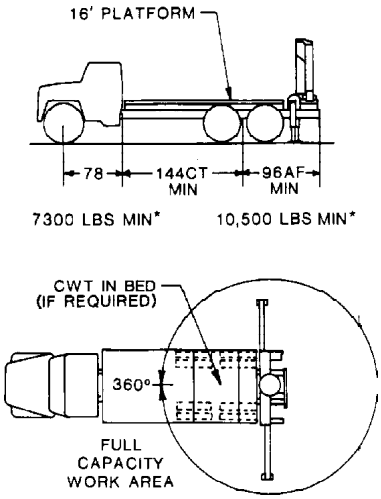
- Minimum wheelbase: 222 in (564 cm)
- Rear of cab to rear tandem: 144 in (369 cm)
- Recommended front axle rating: 12,000 lbs (5443 kg) GAWRF*
- Recommended rear axle rating: 18,000 lbs (8165 kg) GAWRR
- Recommended vehicle rating: 30,000 lbs (13 609 kg) GVWR
- Working area: Rear 180 degrees**
- Truck weight: 11,900 lbs (5398 kg) minimum (4)*
- Chassis weight front axle: 6,900 lbs (3130 kg) minimum*, 7,900 lbs Maximum (3583.4 kg)**
- Chassis weight rear axle: 5,000 lbs (2268 kg) minimum (4)*
- Frame: 50,000 psi (3450 bar) yield steel, 26.0-in^3 (426.1-cm^3) section modulus;110,000 psi (7590 bar) yield steel,15.9-in^3 (260.6-cm^3) section modulus
- Frame height: 42 in (108 cm) or less preferred
- Power take-off: 70 to 80 percent of engine speed; minimum 30 hp (22.4 kW) at 1,400 rpm



360-degree Working Area

Permits lifting capacity loads in all areas around the vehicle in a 360° arc. Caution should be employed when rotating from the rear to the front as the vehicle springs will compress and cause a change in the level of the vehicle. Always rotate loads slowly and smoothly to maximize control.

- Minimum wheelbase: 204 in (523 cm)
- Rear of cab to rear tandem: 126 in (323 cm)
- Recommended front axle rating: 12,000 lbs (5443 kg) GAWRF*
- Recommended rear axle rating: 34,000 lbs (15 422 kg) GAWRR
- Recommended vehicle rating: 46,000 lbs (20 865 kg) GVWR
- Working area: Rear 360 degrees**
- Truck weight: 15,600 lbs (7076 kg) minimum (4)
- Chassis weight front axle: 6,900 lbs (3130 kg) minimum*, 7,900 lbs (3583 kg) maximum**
- Chassis weight rear axle: 8,700 lbs (3946 kg) minimum (4)*
- Frame: 50,000 psi (3450 bar) yield steel, 26.0-in^3 (426.1-cm^3) section modulus;110,000 psi (7590 bar) yield steel; 15.9-in^3 (260.6-cm^3) section modulus
- Frame height: 42 in (108 cm) or less preferred
- Power take-off: 70 to 80 percent of engine speed; minimum 30 hp (22.4 kW) at 1,400 rpm



Rear Mount

The advantages of a rear-mounted N-135 are: location of the crane allows the operator to effectively use the close-in working area to lift heavier capacity loads, and it permits lifting capacity loads in a 360° arc. Caution should be employed when rotating from the rear to the front as the vehicle springs will compress and cause a change in the level of the vehicle. Always rotate loads slowly and smoothly to maximize control.

- Minimum wheelbase: 222 in (564 cm)
- Rear of cab to rear tandem: 144 in (369 cm)
- Recommended front axle rating: 12,000 lbs (5443 kg) GAWRF*
- Recommended rear axle rating: 34,000 lbs (15 422 kg) GAWRR
- Recommended vehicle rating: 46,000 lbs (20 865 kg) GVWR
- Working area: 360 degrees around the vehicle
- Truck weight: 17,800 lbs (8074 kg) minimum (4)
- Chassis weight front axle: 7,300 lbs (3311 kg) minimum (4)*
- Chassis weight rear axle: 10,500 lbs (4763 kg) minimum (4)*
- Frame: 50,000 psi (3450 bar) yield steel, 26.0-in^3 (426.1-cm) section modulus; 110,000 psi (7590 bar) yield steel, 15.9-in^3 (260.6-cm^3) section modulus
- Frame height: 42 in (108 cm) or less preferred
- Power take-off: 70 to 80 percent of engine speed; minimum 30 hp (22.4 kW) at 1,400 rpm

Notes:

(These notes pertain to mounting specification data on preceding page):

(1) Truck used for mounting must meet minimum requirements for capacity loads

(2) Gross Axle Weight Rating (GAWR) is dependent on all components of the vehicle such as axles, tires, wheels, springs, brakes, steering and frame strength meeting manufacturer's recommendations; ***Always specify GAWR when purchasing trucks***

(3) Diesel engines require variable speed governor

(4) Diesel engines, longer wheelbase or service bodies may increase minimum axle requirements—contact factory for information

(4) Chassis weight includes the bed

*(5) *If front or rear chassis weight is less than minimum, counterweight may be required to lift rated capacity loads to keep unit stable*

*(6) **Maximum rating can be exceeded if GAWRF is greater than 10,860 lb (4926 kg); crane options will reduce the maximum allowable weight*

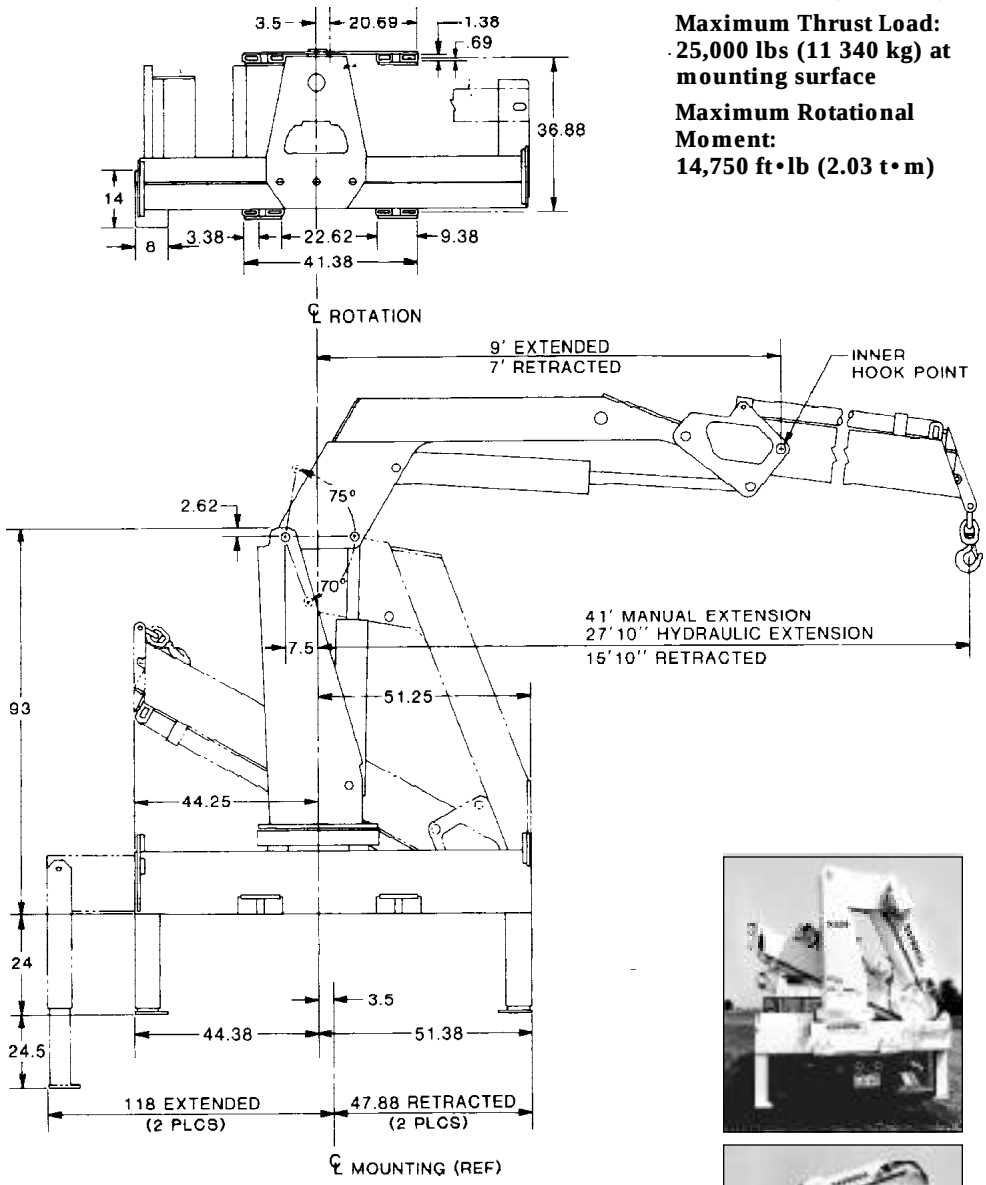
*(7) ***Full capacity work area is permitted around the front of vehicle with addition of a front stabilizer*

Rotation: 410 degree (non-continuous)

Maximum Load Moment: 161,000 ft•lb (22.3 t•m)

Maximum Thrust Load: 25,000 lbs (11 340 kg) at mounting surface

Maximum Rotational Moment: 14,750 ft•lb (2.03 t•m)



National N-135 Accessories

Every National is part of a complete and versatile system that lets you do more faster. You can tailor your crane to perform jobs that would otherwise call for a whole fleet of specialized equipment.

Information on specific accessories is available. Contact National Crane or your National dealer to learn more about these cost-efficient accessories.

Note:
Weights of all accessories attached to the boom or loadline of the crane must be deducted from the effective lifting capacity. Additional accessories not listed may be available. Not all accessories are available for all crane models, and some accessories cannot be used in combination with other accessories. Consult your dealer or the factory for accessory capabilities, availability, and pricing.

Remote Controls One-hand control, ideal for precise control and total load visibility. Diesel engines require electric shut-off.	• ***Model MR4*** • ***Model MR5*** (requires one accessory valve section) • ***Model MR6*** (requires two accessory valve sections)
Radio Remote Controls Eliminate handling and maintenance concerns that accompany cabled remotes. Operate to a range of approximately 400 ft (122 m), varying with conditions.	• ***Model MR4R*** • ***Model MR5R*** (requires one accessory valve section) • ***Model MR6R*** (requires two accessory valve sections)
Winch Heavy-duty, easy single-pin attachment of boom-tip sheave head. Includes winch control and anti-two-block system.	• ***Model N5***
Front Stabilizer Center-mount single front with a 25-in (64 cm) vertical stroke. Tilts forward for chassis with tilt hood. Control valve.	• ***Model SFOH*** (hydraulic) • ***Model SFOM*** (Manual)
Pallet Fork 4,400-lb (1996-kg) capacity, with adjustable throat and teeth.	• ***Model MKF*** (manual leveling adjustable throat) • ***Model HKF*** (hydraulic leveling adjustable throat requiring AH1) • ***Model HKFR*** (hydraulic leveling adjustable throat with hydraulic rotator requiring AH2)
Grapple Available in butt or bypass type. Both come with a hydraulic rotator and quick connect fittings.	• ***Model BTG*** (requires AH2) • ***Model BPG*** (requires AH2)
Clam Bucket Can be used to load or move materials in 1/3 yd^3 (.25 m^3) bites.	• **Model GPC** (requires AH2)
One-Person Basket Fiberglass with 300-lb (136kg) capacity. Gravity hung.	• ***Model B1-L*** (with swing lock, body harness and lanyard)
Hydraulic Auger Provides digging depths up to 4 ft 6 in (1.4 m); flightings up to 18 in (46cm).	• ***Model AG*** (requires AH1)
Hydraulic Capacity Alert System Helps prevent crane operation beyond crane capacity. Blocks functions that increase overload. Allows operator to reduce load radius to acceptable limits.	• ***Model HCA*** (not applicable with manual jib)
Accessory Control Valves Allow operation of hydraulic accessories, mount easily on the control panel.	• ***Model AH1*** (single function for rotator or auger) • ***Model AH2*** (two functions for grapple or clam)
Hydraulic Reel Provides accessory lines at end of second hydraulic section. Controls for both sides of machine.	• ***Model RAH2*** (two functions for grapple or clam)

NATIONAL CRANE
A Grove Worldwide Company

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