GUAY

From America's Truck-Mounted Hydraulic Crane Leader

National Series 1800 Telescoping Crane

- *Maximum Capacity: 40 ton (36.29 t) at a 7-ft (2.13-m) radius*
- *Maximum Vertical Reach*: 175 ft (53.34 m)*
- *Maximum Hydraulic Extension: 142 ft (43.28 m)*

NATIONAL CRANE
A Grove Worldwide Company

** Maximum vertical reach is the ground level to boom tip at maximum extension and angle with outriggers fully extended*

The National Advantage

When you invest in a National telescoping 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, forward-looking 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 process, then given a detailed final inspection before its release from the factory.

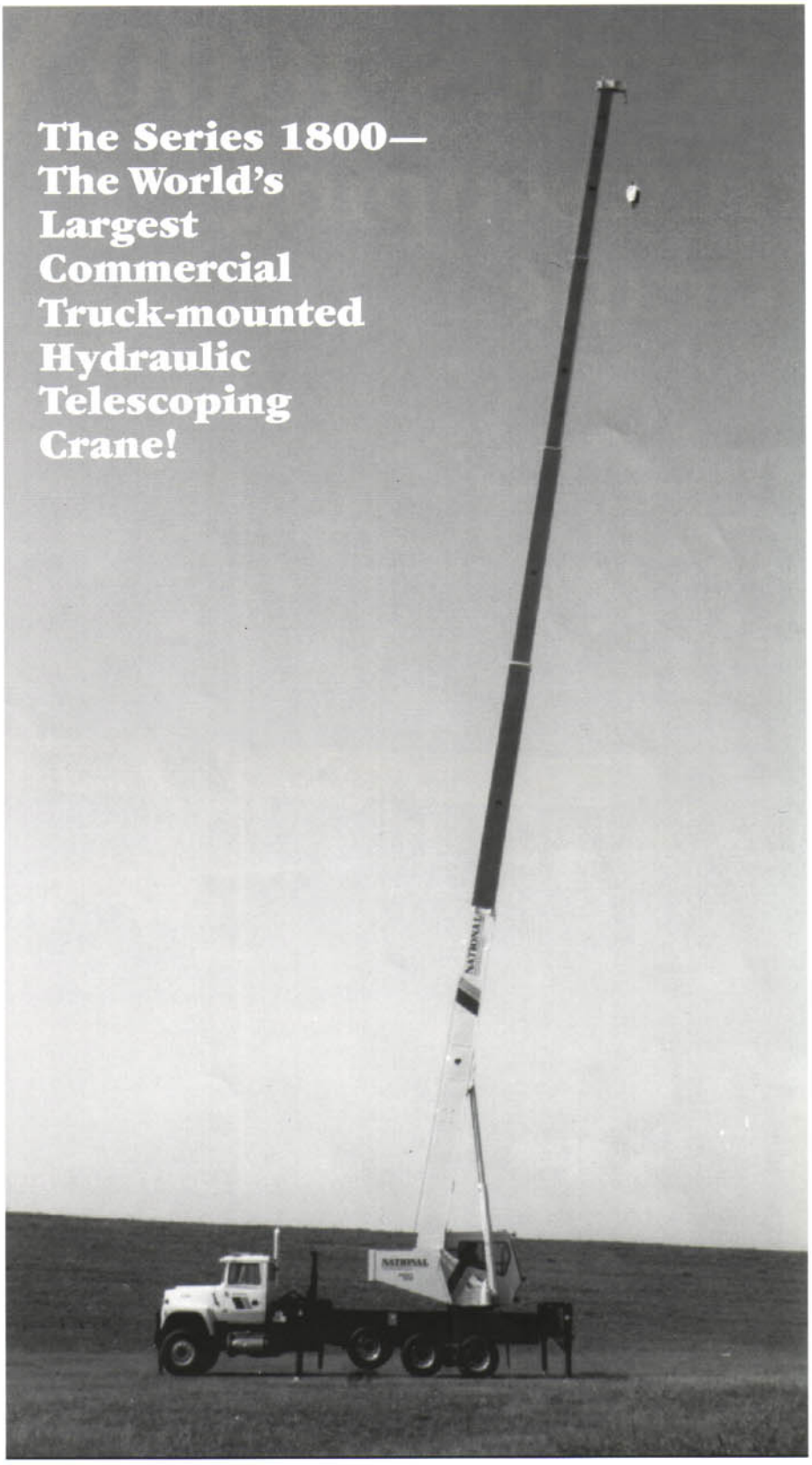
Performance

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 (nine out of ten are still on the job). 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 9001 Certified



National Series 1800 Telescoping Crane

- **40-ton (36.29-t) maximum capacity at a 7-ft (2.13-m) radius**
- **32-ton (30-t) capacity at a 10-ft (3.02-m) radius**
- **175-ft (53.34-m) maximum vertical reach***
- **142-ft (43.28-m) hydraulic extension**
- **Quick reeve load block and boom tip standard**
- **Operator's cab**
- **Load-sensing pressure-compensated hydraulic system**
- **24 ft 8 in (7.52-m) outrigger span**
- **Interactive load moment indicator (LMI) system**
- **Five-section proportional boom**
- **Mounts on standard commercial carrier with pusher or tag axle**

** Maximum vertical reach is ground-level to boom tip height at maximum extension and angle with outriggers fully extended. Note: maximum vertical reach will vary depending on truck frame, tires, load, etc.*

Boom construction

- Computer aided design maximizes boom weight efficiency and lifting capacity
- High-strength, low-alloy steel
- Four-plate "hat" design pairs thinner boom side and top plates with a thicker bottom compression plate for greater strength-to-weight ratio and maximized stability
- Automatic, low-hydrogen welds ensure fatigue-resistant seams; ultrasonic testing verifies proper weld penetration

Proportional boom extension

- Five-section fully hydraulic, synchronous boom extension system (Models 18127, 18142), pioneered by National Crane
- Model 18142 boom extends from 34 ft (10.36 m) to 142 ft (43.28 m)
- Model 18127 boom extends from 31 ft (9.45 m) to 127 ft (38.71 m)
- Four-section, fully hydraulic, synchronous boom extension system (Model 18103) extends from 31 ft (9.45 m) to 103 ft (31.39 m)
- Boom sections extend and retract proportionally
- Hydraulic-powered boom extension systems permit fast set-up
- Careful design placement of load-carrying cables and wear pads permits minimum boom overlap, resulting in more reach with minimum retracted boom length
- Less stowed boom overhang increases truck maneuverability
- Efficient boom weight distribution enhances capacity at normal working radii
- Dual and triple high-load cables (rather than chain) cycle the boom sections, increasing capacity and reducing maintenance; redundant cable sets add durability and reliability
- Boom sections are supported by one hydraulic extend cylinder, minimizing maintenance
- Boom elevation moves from -10 to +80 degrees for increased operating flexibility (especially when fitting the jib)

31-ft (9.45 m) jib for extra reach

- Optional side-stow, swing-around 31-ft (9.45 m) jib Model 18FJ31 increases the tip working height to 166 ft (50.60 m) when used with the five-section Model 18127 boom
- Optional side-stow, swing around 26-ft (7.92 m) jib, available exclusively for the five-section Model 18142 boom, increases the maximum vertical reach to 175 ft (53.34 m)
- Optional side-stow, swing around 55-ft (16.76 m) jib, available exclusively for the four-section Model 18103 boom, increases the maximum vertical reach to 166 ft (50.60 m)
- Four-plate tapered design gives high strength-to-weight ratio for increased capacity
- Jib tips and boom tip equipped for basket hangers, and jib jack is provided for easy pin-up

Easy Glide boom wear pads/ Polymer Paint*

- Exclusive *Easy Glide* wear pads, used in conjunction with National's specially formulated *Polymer Paint**, provide ultra-smooth extension and retraction with minimal lubrication

**Patent pending*

National cylinders

- National controls the manufacture of all cylinders, so standardized replacement parts, seals and bearings fit properly for precise, smooth and stable load placement

- Heavy-duty lift cylinder design incorporates a thicker barrel wall and a large diameter, hollow shaft for extra strength and stability
- Threaded one-piece, phosphate-dipped piston and an atmospheric O-ring seal on the packing gland help prevent thread corrosion
- Low-temperature rod seals, polyurethane U-cup piston seals, composite piston and rod bearings and buna-N O-rings with back-up rings form a long-lasting and virtually trouble-free cylinder seal and bearing system
- Close-tolerance, line-bored pin bearing holes with field-proven composite bearings ensure long-lasting, trouble-free pin joint life
- A manifold-mounted counterbalance valve coupled with a fine-metering pressure-compensated control valve ensures smooth operation at all boom speeds; helps prevent cylinder collapse in the event of hose leakage

Stronger sheaves

- Cast iron sheaves resist flange chipping and cable core damage
- All boom-tip sheaves rotate on efficient needle bearings and hardened pins for increased performance and smoothness

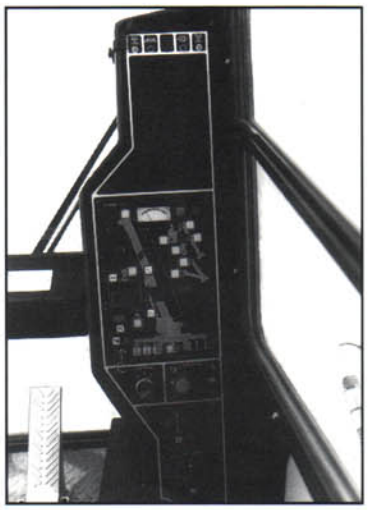
Faster multi-part reeving

- Quick reeve boom tip has three lower sheaves. When coupled with our new one-to-four sheave quick-reeve blocks, they allow simple reeving from one to eight parts of line by pulling four pins (no disassembly of the wedge socket is required)
- Multiple load blocks offer increased winch capacities (See "Winch Data" on page 9)

High performance winch/loadline

- A planetary gear drive winch with roller bearings increases efficiency, requires less horsepower, and generates less heat
- A variable volume, bent-axis piston motor coupled with a pressure-compensated control valve and load sensing pump provides the smoothest loadline control in the industry, whether inching or at full speed, up or down
- Winch is mounted directly to the boom base with cable centering guides to ensure level, non-fouling loadline wrap on winch drums (boom mounted winches eliminate one cause of two–blocking)
- Standard two-speed winch circuitry increases winch payout/pickup of cable by 100 percent
- New 5/8-in (15.88 mm) diameter loadline is the strongest, most rotation-resistant wire rope manufactured with compacted strands. It is 25% stronger and more flexible than the premium rotation-resistant wire rope used previously. This new rope is extremely stable under load, virtually eliminating load spin when single-parted, and block spin-up when multi-parted. This allows more precise load control and reduced rope wear

Deluxe operator's cab


Load Moment Indicator

Load moment indicator

- PAT DS 350 LMI with console display of boom length/angle, load on hook, maximum load, hook radius, and a dial readout showing approximate percentage of maximum load on hook
- Caution light illuminates as load capacity is approached; red warning light and horn activate when capacity is reached
- To prevent overload, LMI then allows only functions that relieve load (boom up, winch down, telescope in)—the system will automatically readjust to allow use of all functions
- Minimum and maximum boom angle presets can be input for repetitive work or to warn
- Momentary override switch and horn mute touch pad are standard with LMI
- Integrally mounted battery in central processing unit (CPU) maintains LMI data for two hours when cab power is turned off, simplifying re-start

Anti-two-block system

- An ATB sensor shuts down functions that can cause two-blocking, preventing wire-rope damage (crimping, etc.) from attachment contact with the underside of the boom or sheave case
- LMI audibly warns and visually displays a two-block condition

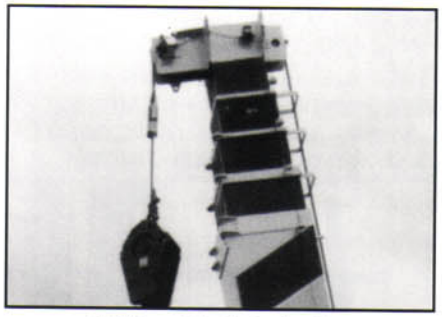
Upper revolving frame

- The turret is a simple, reinforced structure with line-bored pin holes and faced base plate
- A four-port hydraulic rotation swivel is mounted above the turret base plate for easy access
- A twenty-four-channel electrical swivel is mounted above hydraulic swivel with plug termination above and below the hy-

draulic swivel for easy removal for service
- Control valves are mounted inside the turret to reduce weight and improve appearance
- Two banks of manifold mounted solenoid valves control free-swing, boom extend, hoist-up, boom-down and auxiliary hoist-up for anti-two-block and LMI shutdown
- The line-bored, heavy-duty rotation gearbox is mounted rigidly to the turret and incorporates a newly designed, free-swing dynamic brake activated by a cab-mounted, low-pressure pedal valve to provide smooth, positive stops with minimal brake pressure
- Swinging counterweight pinned to the turret provides efficient weight distribution and reduces load moment into the swing bearing to allow for greater load ratings
- Swing motor and valving allows for smooth, precise swing with quiet, efficient swing after the control valve is centered. A knob located on the motor allows the operator to dial in slower or faster swing speeds as desired

Operator cab

- Rigid galvanized steel structure, well insulated, with ample safety glass for operator visibility and comfort
- Multi-position seat with folding back and armrests housing either two single-axis hydraulic controllers or one dual-axis joystick in each arm rest
- Arm rests contain winch high/low speed switches, horn switch, and auxiliary winch on/off switch
- Sliding side door travels freely on ball-bearing rollers
- Sliding side, back and top windows allow for ventilation; see-through sunscreen on top of cab
- Propane heater with ducted heat to windows or cab floor
- Two separate variable-speed ventilation fans mounted at top left front and right rear corner of cab can be positioned to move air to



Anti-two-block protection is standard

any cab location
- Self-parking front and top windshield wipers with washers
- Control console located at lower right front of cab contains high-speed winch indicator lights, hot-hydraulic-oil indicator light, truck engine distress light, LMI display console, heater controls and manual locking truck engine throttle
- Crane cab ignition switch is live only when truck cab ignition switch is off
- Truck engine start function is interlocked with transmission neutral safety switch to prevent inadvertent movement
- Floor-mounted electronic engine throttle control and swing brake (foot-controlled telescope pedal is optional)

Pressure compensated, load sensing hydraulic system

- State-of-the-art hydraulics for ultimate control and minimal horsepower requirements
- Vickers PVH 131 pressure compensated, load sensing, axial piston, variable volume pump direct mounts to PTO and delivers up to 70 gal/min (265 L/min) at up to 4200 psi (29 MPa)
- Control valve spools are hard chrome-plated for corrosion resistance
- Extra-capacity 100-gal (379-L) oil reservoir, 10-micron in-tank filter, fill and temperature gage, change filter indicator, diffuser, magnetic plug and cleanout covers
- The aluminized reservoir inhibits rust and is located above pump for positive suction line pressure
- Automatic radiator system with electric fan cools oil under continuous operation
- Hydraulic swivel with only four passages (pressure, return, drain, and load sense) for low maintenance and long life
- O-ring boss, O-ring face seal, four-bolt flange connections on all high-pressure ports
- Two pairs of low pressure-activated single axis hydraulic controllers offer simultaneous control of all functions without adverse interaction, featuring load sensing individual section pressure compensated main control valves (dual-axis joysticks are optional)
- Extensive use of tubing and manifold solenoid valves simplifies plumbing and aids troubleshooting

Hydraulic outriggers/stabilizers

- Two extra-wide cross-frame hydraulic outriggers, each spanning 24 ft 8 in (7.52 m), and a standard single front stabilizer provide 360-degree operating radius and stability, even on unlevel ground (there is no de-rate for over-the-side, over-the-front, or over-the-rear operation)
- Reduced outrigger span—17 ft 6 in (5.34 m) on center—load chart is available for working in tight areas; reduced-span manual locks are standard
- Two-stage outrigger beams move synchronously from full retraction to full extension
- Outriggers can be controlled from either side of the truck or from within the crane cab
- Level bubbles are located at all outrigger control stations and on subbase behind bearing
- 24-in (.61-m) diameter aluminum pads can be carried conveniently stowed on the legs at less than 8 ft (2.44 m) width
- Outrigger leg design provides best departure angle clearance in the industry

- Integral mount dual lock valves automatically lock beams and legs to prevent unpowered movement or collapse due to hose breaks
- Rod-fed extend cylinder and proportioning cables eliminate extend hoses in beam
- The single front stabilizer (standard) incorporates integrally mounted dual lock valves and a pressure relief valve to maintain proper downward pressure; the stabilizer leg is slightly angled to reduce stress at mounting surface

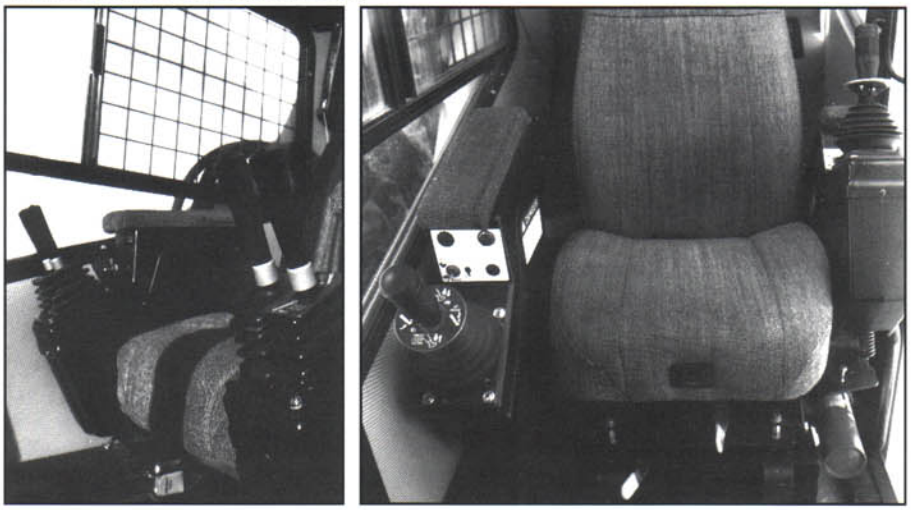
Commercial truck requirements

- The crane mounts on standard commercial trucks (see page 10)

Subbase with integral outrigger boxes

- Rigid box construction provides a solid base and better "feel" and control
- Two shear plates and four flex plates allow for simple, secure attachment to truck
- Numerous access holes in the subbase provide easy routing and inspection of hoses/wires
- Slewing ring mount surface is machined to precise flatness after welding for optimum bearing life
- Level bubble mount plate is machined parallel with slewing ring mount surface

A choice of in-the-cab-controls



National gives you a choice of two in-the-cab controls for the Series 1800 telescoping crane. Unless you specify otherwise, the crane will be equipped with the single axis, dual lever control shown above left. You may, optionally, specify the dual axis, single lever joystick ("wobble stick" style), shown above right.

Accessories
Accessories add to the versatility of a National crane. Some of the popular options that are part of the National lifting system are shown here. Contact National Crane or your National dealer for detailed information.
Weights for accessories attached to the crane boom or loadline must be deducted from the effective lifting capacity. Some accessories cannot be used in combination with other accessories and/or jibs. Consult your National dealer for accessory availability and requirements.
Personnel basket operation limits vary based on crane configuration and basket type. Refer to the owners manual for details and operation restrictions.

One-Person Basket
Strong, lightweight steel basket. Optional dual basket bracket for two basket operation on the main boom or jib. Easy on-off. Body harness and lanyard are included. ***Model B1-L*** (with lock)

Heavy-Duty Personnel Basket
High capacity steel basket with safety loops to secure two passengers. Dimensions: 72- x 42- x 42-in (1.83- x 1.07- x 1.07 m). Fast attachment system allows easy pinning of the basket to the boom or jib. Gravity leveling basket has a secure disc-brake locking system. Two body harnesses and lanyards included. ***Model BSA-1***

Heavy-Duty Rotating Personnel Basket
Steel basket 72"x42", on 4-ft yoke extension, gravity hung, adjustable friction brake lock. Yoke angles with two pin positions. Basket rotates 90° each side from normal position when yoke is in lower position. Includes quick-attach three-point boom attachment. (Does not side stow with jib. Does not stow with angling jib.) ***Model BSA-R1***

Angling Jib
31' boom extension (side fold for stowing). Angles to 30° offset. For use with 18103 boom only.

Winch Option
Auxiliary winch, 10,000 lb (4535.92 kg) line pull with 375 ft (114.30 m) of extremely stable and flexible 5/8-in diameter rotation-resistant wire rope and 180 lb (81.65 kg) downhaul weight. ***(18AW)***

Control Option
Dual axis, single lever joystick ("wobble stick" style) control in lieu of standard single axis, dual lever control. ***(JSC)***

Air Conditioning
Air conditioning for the operator's cab. ***(AC)***

Safety Beacon
Amber safety beacon for cab roof. ***(ABR)***

Spotlight
Manually adjusted from crane cab. ***(MS)***

Worklight Wiring on Boom
Provision for switch and wiring for a customer-supplied worklight on boom. ***(WLB)***

Fixed-Position Worklight
Fixed-position worklight on the cab with in-cab control. ***(WLF)***

Remote Worklight
Remote operated worklight with an in-the-cab control. ***(WLR)***

Winch Motion Indicator
Winch drum rotation indicator(s) are available. ***(WDRI)***

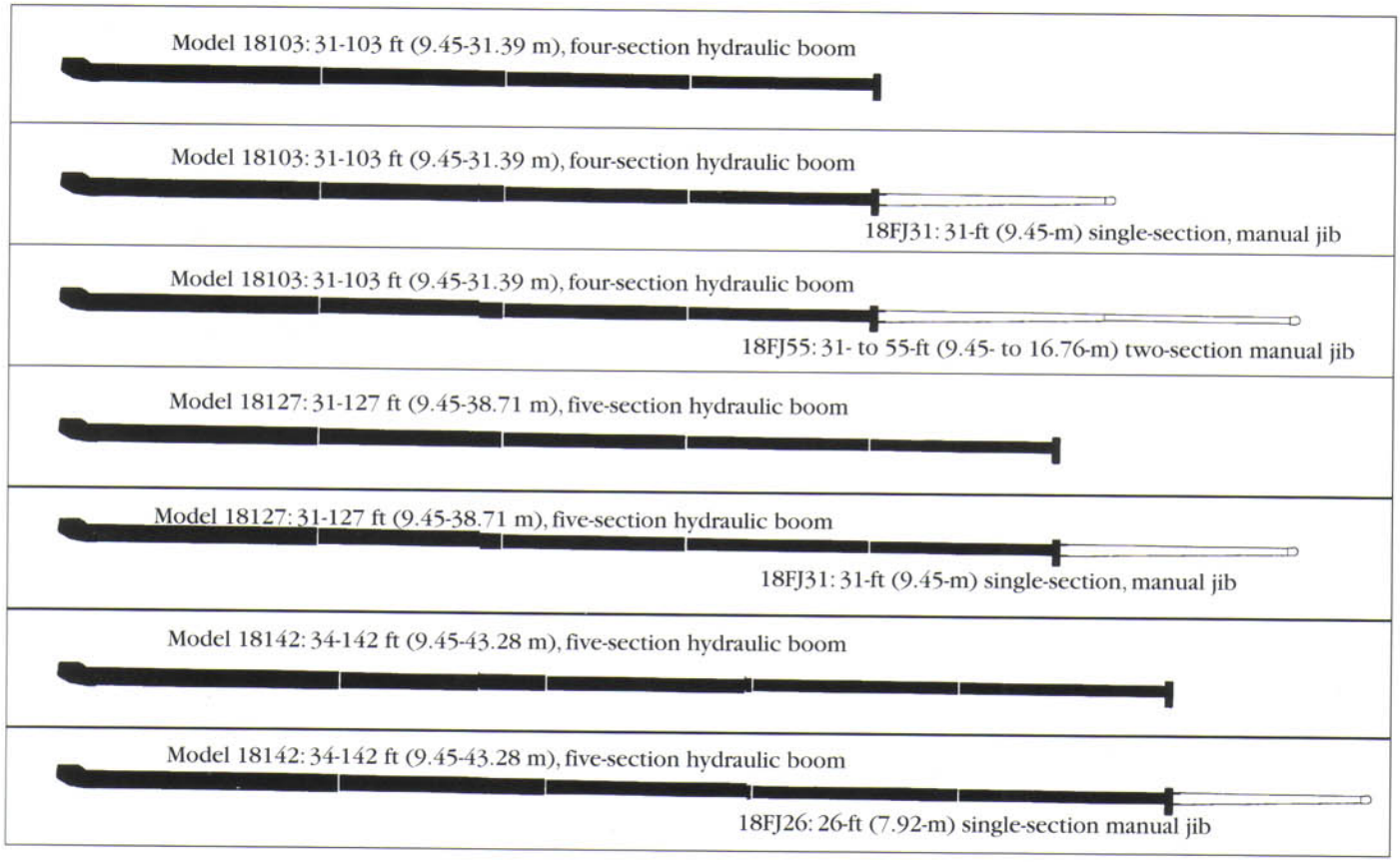
"Light Bar" Indicator
A "light bar" indicator displays the percent of load moment on the hook. Available for in-the-cab or exterior use.

Fenders
Bright aluminum fenders in lieu of standard fenders only. ***(AFPA) (AFTA)***

Tool Boxes
Tool boxes available with any fenders offered on S1800.

Series 1800 Crane Boom/Jib Combinations

The new Series 1800 is available in the basic model: **Model 18127,** equipped with a 31- to127-ft (9.45-m to 38.71-m) five-section hydraulic boom.This model can be equipped with the 31-ft (9.45-m) **18FJ31**, a single-section, side-stowing jib. Attached to the basic boom, the jib extends the maximum vertical reach to 166 ft (50.60 m). **Model 18142** has a 34- to 142-ft (43.28-m) five-section hydraulic boom that accepts the 26-ft (7.92 m) jib, for a vertical reach of 175 ft (53.34 m). **Model 18103** has a 31- to 103-ft (9.45-m to 31.39-m) four-section hydraulic boom that accepts both the 31-ft (9.45 m) jib (noted above) offering a vertical reach of 142 ft (43.29 m), and a 31- to 55-ft (16.76-m) side-stowing folding jib providing a vertical reach of 166 ft (50.60 m). Contact factory for information on the angling jib.



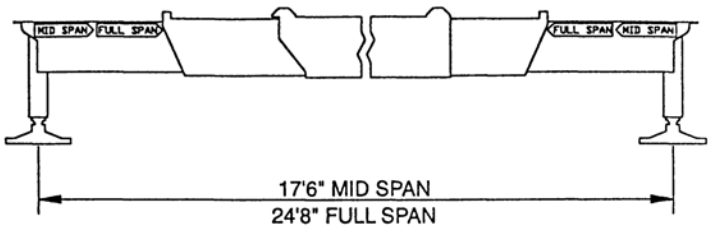
A National jib folds out into working position quickly and easily.

INFORMATIONAL DATA

OUTRIGGERS

1 Outrigger spread from center to center of the outrigger floats at mid span is 17'6" and at full span is 24'8"

2 No outrigger pad load exceeds 63,000 pounds maximum at full span or 74,000 pounds maximum at mid span



WEIGHT REDUCTIONS FOR LOAD HANDLING DEVICES (See load chart for jib deductions)

1 Hook blocks are rated at maximum capacity for the block Do not exceed rated cable pull with any block

	Aux Boom Head	100 lb
5 Ton	Downhaul Weight	180 lb
15 Ton	1 Sheave Block	375 lb
25 Ton	2 Sheave Block	640 lb
35 Ton	3 Sheave Block	870 lb
40 Ton	4 Sheave Block	970 lb

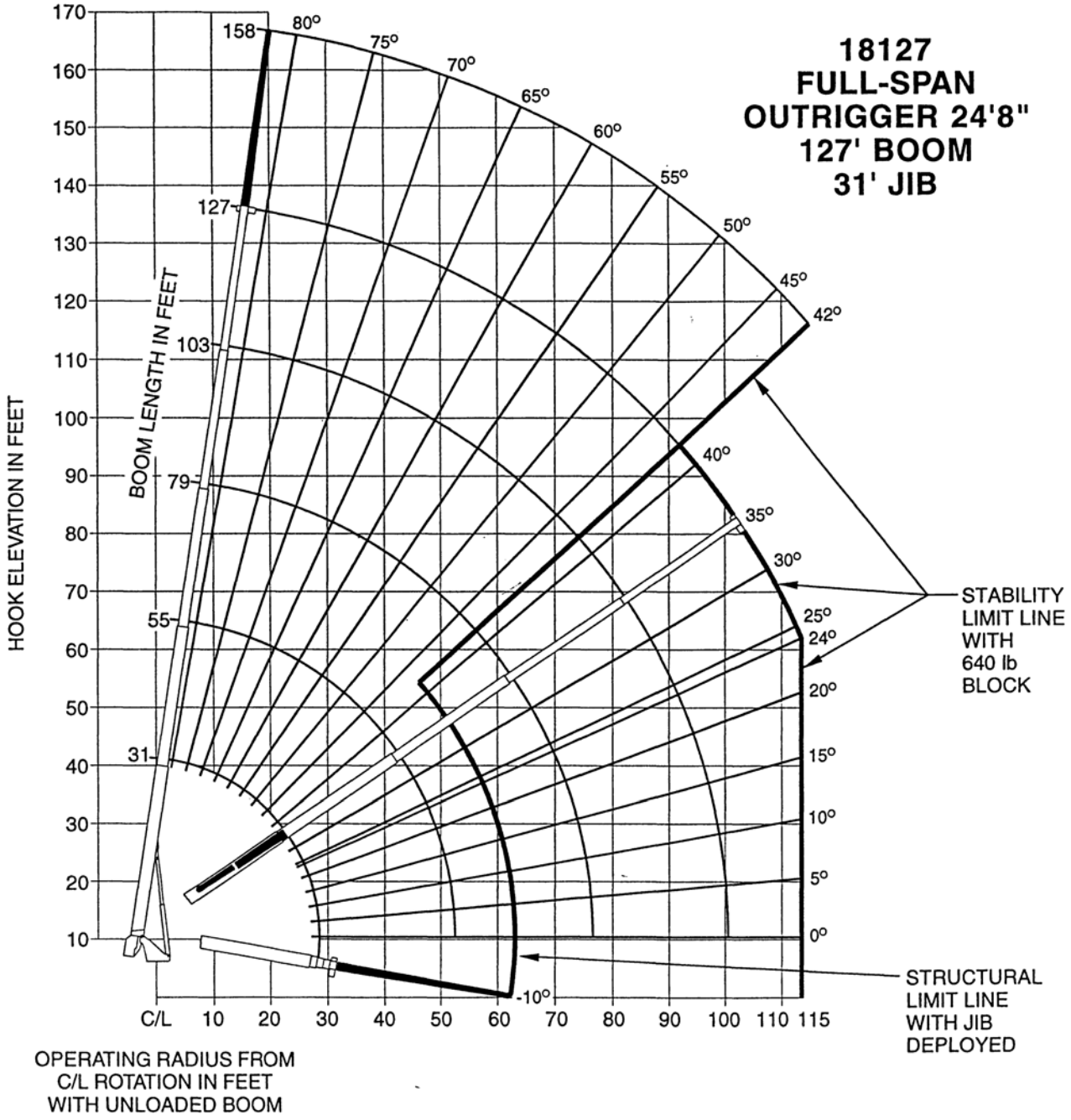
NOTICE

- Do not deadhead line block against boom tip when extending boom
- Keep at least 3 wraps of loadline on drum at all times
- Use only 5/8" diameter rotation resistant cable with 56,400 pounds breaking strength on this machine

			1 Part Line	2 Part Line	3 Part Line	4 Part Line	5 Part Line	6 Part Line	7 Part Line	8 Part Line
										
MAXIMUM BOOM LENGTH AT MAXIMUM ELEVATION WITH RIGGING SHOWN WITH LOAD BLOCK AT GROUND LEVEL			158' BOOM & JIB	114'	83'	64'	52'	43'	36'	31'
Winch	**Cable Supplied**	**Average Breaking Strength**	**Lift and Speed**	**Lift and Speed**	**Lift and Speed**	**Lift and Speed**	**Lift and Speed**	**Lift and Speed**	**Lift and Speed**	**Lift and Speed**
Standard Planetary Winch Low Speed	5/8" diameter rotation resistant IWRC	56,400 lb	10,000 lb 205 fpm	20,000 lb 103 fpm	30,000 lb 68 fpm	40,000 lb 51 fpm	50,000 lb 41 fpm	60,000 lb 34 fpm	70,000 lb 29 fpm	80,000 lb 26 fpm
Standard Planetary Winch High Speed	5/8" diameter rotation resistant IWRC	56,400 lb	5,000 lb 410 fpm	10,000 lb 205 fpm	15,000 lb 137 fpm	20,000 lb 103 fpm	25,000 lb 82 fpm	30,000 lb 68 fpm	35,000 lb 59 fpm	40,000 lb 51 fpm

All winch pulls and speeds are shown on the fifth layer Winch line pulls would increase on the first, second, third and fourth layers Winch line speed would decrease on the first, second, third and fourth layers Winch line pulls may be limited by the winch capacity or the ANSI 5 to 1 cable safety factor These are shown below

Winch	Full Drum Pull	Allowable Cable Pull
Standard planetary & Auxiliary planetary	5,000 pounds (high speed) 10,000 pounds (low speed)	11,280 pounds



SET-UP

1 Fully extend and set outriggers to full-span location, level crane and set front stabilizer

OPERATION

1 The 31 ft boom length capacities are based on boom fully retracted If not fully retracted, do not exceed 55 ft boom length capacities

2 Do not extend unloaded boom or jib beyond stability limit line on range chart as loss of stability may occur

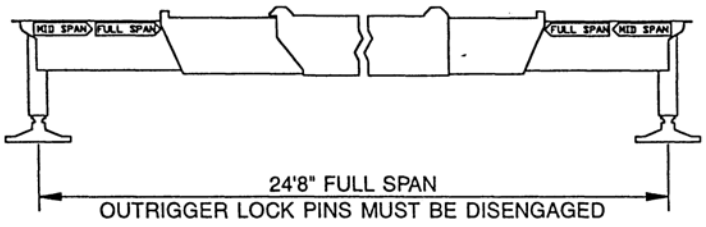
3 Load blocks and slings are considered to be a part of the load

4 Operate with jib by radius when main boom is fully extended and by boom angle when main boom is partially extended Do not exceed jib capacities at any partially extended boom length

5 All jib loads must be lifted with single part reeving

FULL-SPAN OUTRIGGER

18127
127' BOOM
31' JIB



NOTE:

1 All capacities are in pounds, angles in degrees, radius in feet
2 Loaded boom angles are given as reference only
3 Shaded areas are structurally limited capacities

31 TO 127 FOOT BOOM RATED LOADS WITHOUT JIB

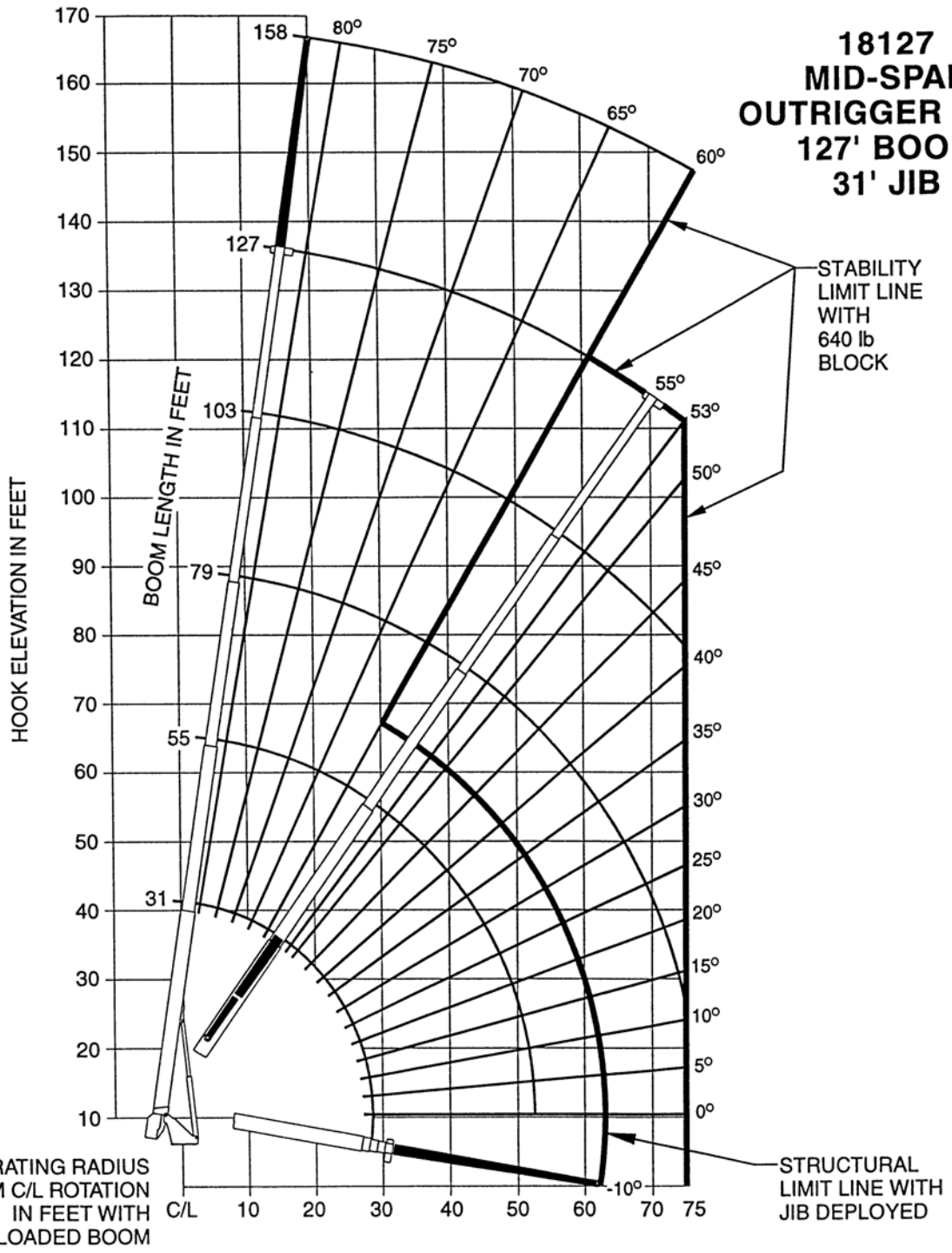
LOAD RADIUS (FEET)	LOADED BOOM ANGLE	31 FT BOOM (lb)	LOADED BOOM ANGLE	55 FT BOOM (lb)	LOADED BOOM ANGLE	79 FT BOOM (lb)	LOADED BOOM ANGLE	103 FT BOOM (lb)	LOADED BOOM ANGLE	127 FT BOOM (lb)
7	74 5	80,000								
8	72 4	74,000								
10	68 2	64,000								
12	63 8	56,000	76 9	40,000						
15	56 9	43,000	73 8	38,000	79 8	29,000				
20	44 2	30,000	68 1	31,000	76 2	25,000	80	16,000		
25	27 4	22,500	62	23,400	72 5	21,500	77 2	14,500	80	10,000
30			55 5	18,300	68 5	18,700	74 4	13,000	78	9,500
35			48 6	14,800	64 3	15,100	71 5	11,500	75 9	9,000
40			40 7	12,100	59 9	12,500	68 6	10,500	73 6	8,100
45			31 3	10,100	55 3	10,400	65 9	9,500	71 2	7,200
50			19 4	8,500	50 9	8,800	62 7	8,500	68 8	6,500
55					45 8	7,500	59 3	7,500	66 3	5,800
60					40 1	6,400	55 7	6,500	63 7	5,300
65					33 6	5,400	52	5,600	61 1	4,800
70					25 6	4,600	48 1	4,700	58 4	4,300
75					13 5	3,850	43 9	3,950	55 6	3,900
80							39 3	3,350	52 6	3,400
85							34 3	2,800	49 4	2,850
90							28 4	2,300	46	2,350
95							21	1,850	42 5	1,900
100							8 2	1,500	38 8	1,550
105									34 6	1,200
110									30	900
115									24 6	650
	0	19,000	0	7,700	0	3,600	0	1,450		

31' JIB RATED LOADS

RADIUS FULLY EXTENDED	LOADED BOOM ANGLE	RATED LOADS ALL BOOM LENGTHS
30	80	4,000
46	75	3,800
60	70	3,300
73	65	2,800
85	60	2,300
96	55	1,800
106	50	1,350
115	45	900
120	42	650

RATED LOAD REDUCTIONS WITH JIB

BOOM LENGTH	31' JIB STOWED 	31' JIB ERECTED 
31'	Reduce load 500 lb	Reduce load 1,600 lb
55'	Reduce load 300 lb	Reduce load 1,400 lb
79'	Reduce load 200 lb	Reduce load 1,300 lb
103'	Reduce load 150 lb	Reduce load 1,250 lb
127'	Reduce load 100 lb	Reduce load 1,200 lb



SET-UP

1 Engage mid-span outriggers lock pins, extend and set outriggers to mid-span location, level crane and set front stabilizer

OPERATION

1 The 31 ft boom length capacities are based on boom fully retracted If not fully retracted, do not exceed 55 ft boom length capacities

2 Do not extend unloaded boom or jib beyond stability limit line on range chart as loss of stability may occur

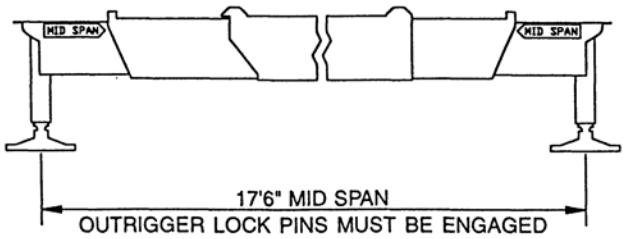
3 Load blocks and slings are considered to be a part of the load

4 Operate with jib by radius when main boom is fully extended and by boom angle when main boom is partially extended Do not exceed jib capacities at any partially extended boom length

5 All jib loads must be lifted with single part reeving

MID-SPAN OUTRIGGER

18127
127' BOOM
31' JIB



31 TO 127 FOOT BOOM RATED LOADS WITHOUT JIB

LOAD RADIUS (FEET)	LOADED BOOM ANGLE	31 FT BOOM (lb)	LOADED BOOM ANGLE	55 FT BOOM (lb)	LOADED BOOM ANGLE	79 FT BOOM (lb)	LOADED BOOM ANGLE	103 FT BOOM (lb)	LOADED BOOM ANGLE	127 FT BOOM (lb)
7	74 5	80,000								
8	72 4	74,000								
10	68 2	64,000								
12	63 9	56,000	76 9	40,000						
15	57	43,000	73 8	38,000	79 8	29,000				
20	44 2	27,700	67 8	27,000	76 2	25,000	80	16,000		
25	27 4	17,500	61 6	17,200	71 9	17,600	77 2	14,500	80	10,000
30			55	12,000	67 7	12,300	74 3	12,400	78	9,500
35			48 7	8,700	63 7	9,100	71 3	9,200	75 9	9,000
40			41	6,500	59 4	6,900	68	7,000	73 2	7,100
45			31 8	4,900	54 8	5,200	64 7	5,300	70 5	5,400
50			18 7	3,700	50	4,000	61 3	4,100	67 8	4,150
55					44 8	3,050	57 9	3,150	65 1	3,200
60					39 1	2,250	54 4	2,350	62 4	2,400
65					32 7	1,600	50 7	1,700	59 7	1,750
70					24 6	1,050	46 8	1,150	56 9	1,200
75					12 5	650	42 6	700	53 9	750
	0	12,400	0	3,150						

31' JIB RATED LOADS

RADIUS FULLY EXTENDED	LOADED BOOM ANGLE	RATED LOADS ALL BOOM LENGTHS
30	80	4,000
46	75	3,800
58	70	2,500
69	65	1,450
80	60	650

RATED LOAD REDUCTIONS WITH JIB

BOOM LENGTH	31' JIB STOWED	31' JIB ERECTED
31'	Reduce load 500 lb	Reduce load 1,600 lb
55'	Reduce load 300 lb	Reduce load 1,400 lb
79'	Reduce load 200 lb	Reduce load 1,300 lb
103'	Reduce load 150 lb	Reduce load 1,250 lb
127'	Reduce load 100 lb	Reduce load 1,200 lb

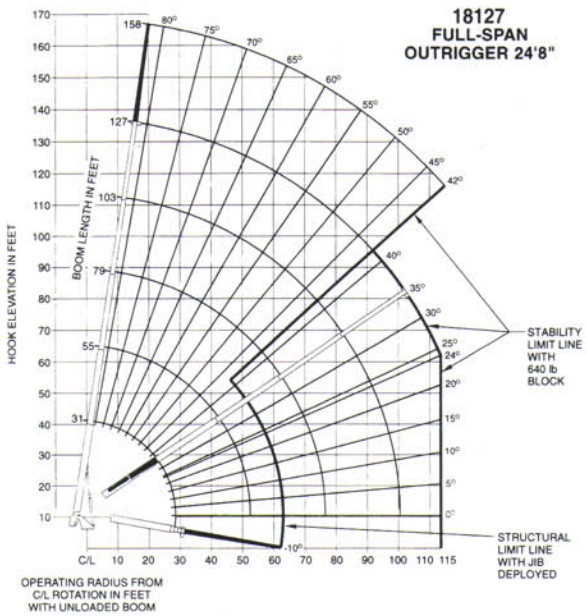
NOTE:

1 All capacities are in pounds, angles in degrees, radius in feet
2 Loaded boom angles are given as reference only
3 Shaded areas are structurally limited capacities

Series 1800 Sample Load Rating Chart

Notes:

- Jib and boom capacities shown are maximum allowable loads for each section under optimal conditions
- Rated loads do not exceed 85% of the tipping load

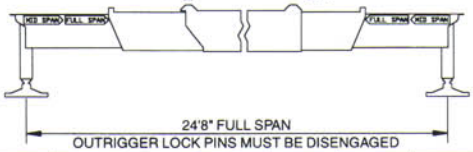


Capacity charts for Model 18103 and 18142 are available on request

CAUTION

- **This chart shows maximum allowable loads with the crane properly leveled (using the frame-mounted level indicator), mounted on a specified truck, with the outriggers properly extended on a firm, level surface**
- **Always refer to the capacity chart, and do not exceed maximum rated boom/jib capacity at any boom length—overloading the crane may cause instability or structural collapse**
- **Reduce loads to allow for wind, ground conditions, operating speeds and the effect of freely suspended loads**
- **Do not operate the crane (truck, boom/jib, accessories or loads) within 10 ft (3 m) of live power lines or any other source or conductor of electricity**
- **Weights of any accessories, including jibs, attached to the boom or loadline will automatically be deducted from the load capacity charts by the LMI**
- **Do not exceed jib capacities at any reduced boom length**
- **No protection system is infallible, and there is no substitute for training, sound judgment and caution; follow all guidelines outlined in the operator's manual**

Full-Span Outrigger



Load Radius (Feet)	Loaded Boom Angle	31 Ft Boom (Lbs)	Loaded Boom Angle	55 Ft Boom (Lbs)	Loaded Boom Angle	79 Ft Boom (Lbs)	Loaded Boom Angle	103 Ft Boom (Lbs)	Loaded Boom Angle	127 Ft Boom (Lbs)
7	74.5	80,000								
8	72.4	74,000								
10	68.2	64,000								
12	63.8	56,000	76.9	40,000						
15	56.9	43,000	73.8	38,000	79.8	29,000				
20	44.2	30,000	68.1	31,000	76.2	25,000	80.0	16,000		
25	27.4	22,500	62.0	23,400	72.5	21,500	77.2	14,500	80.0	10,000
30			55.5	18,300	68.5	18,700	74.4	13,000	78.0	9,500
35			48.6	14,800	64.3	15,100	71.5	11,500	75.9	9,000
40			40.7	12,100	59.9	12,500	68.6	10,500	73.6	8,100
45			31.3	10,100	55.3	10,400	65.9	9,500	71.2	7,200
50			19.4	8,500	50.9	8,800	62.7	8,500	68.8	6,500
55					45.8	7,500	59.3	7,500	66.3	5,800
60					40.1	6,400	55.7	6,500	63.7	5,300
65					33.6	5,400	52.0	5,600	61.1	4,800
70					25.6	4,600	48.1	4,700	58.4	4,300
75					13.5	3,850	43.9	3,950	55.6	3,900
80							39.3	3,350	52.6	3,400
85							34.3	2,800	49.4	2,850
90							28.4	2,300	46.0	2,350
95							21.0	1,850	42.5	1,900
100							8.2	1,500	38.8	1,550
105									34.6	1,200
110									30.0	900
115									24.6	650
	0	19,000	0	7,700	0	3,600	0	1,450		

31' Jib Rated Loads

Radius Fully Extended	Loaded Boom Angle	Rated Loads All Boom Lengths
30	80	4,000
46	75	3,800
60	70	3,300
73	65	2,800
85	60	2,300
96	55	1,800
106	50	1,350
115	45	900
120	42	650

Rated Load Reductions with Jib

Boom Length	31' Jib Stowed	31' Jib Erected
31'	Reduce load 500 lb	Reduce load 1,600 lb
55'	Reduce load 300 lb	Reduce load 1,400 lb
79'	Reduce load 200 lb	Reduce load 1,300 lb
103'	Reduce load 150 lb	Reduce load 1,250 lb
127'	Reduce load 100 lb	Reduce load 1,200 lb

Note: 1. All capacities are in pounds, angles in degrees, radius in feet.
2. Loaded boom angles are given as reference only.
3. Shaded areas are structurally limited capacities.

National Series 1800 Winch Data

All winch pulls and speeds are shown on the fifth layer. Winch line pulls would increase on the first, second, third and fourth layers. Winch line speeds would decrease on the first, second, third and fourth layers. Winch line pulls may be limited by winch capacity or the cable safety factor shown below.

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 5/8-in (15.9-mm) diameter rotation resistant cable with 56,400-lb (25 636-kg) breaking strength**

Cable Supplied		1-Part Line	2-Part Line	3-Part Line	4-Part Line	5-Part Line	6-Part Line	7-Part Line	8-Part Line
Standard 5/8-in diameter rotation-resistant - Average breaking strength: 56,400 lb (25 636 kg)									
Maximum boom length at maximum elevation with rigging shown to reach the ground		168 ft (48.16 m) with 31-ft (9.45-m) jib	114 ft (34.75 m)	83 ft (25.30 m)	64 ft (19.51 m)	52 ft (15.85 m)	43 ft (13.11 m)	36 ft (10.97 m)	31 ft (9.45 m)
Winch		**Line Pull and Speed Data**							
Standard Planetary Winch—Low Speed	Line Pull	10,000 lb (4536 kg)	20,000 lb (9072 kg)	30,000 lb (13 608 kg)	40,000 lb (18 144 kg)	50,000 lb (22 680 kg)	60,000 lb (27 216 kg)	70,000 lb (31 751 kg)	80,000 lb (36 287 kg)
	Speed	205 ft/min (63 m/min)	103 ft/min (31 m/min)	68 ft/min (21 m/min)	51 ft/min (16 m/min)	41 ft/min (13 m/min)	34 ft/min (10 m/min)	29 ft/min (9 m/min)	26 ft/min (8 m/min)
High Speed	Line *Pull*	5,000 lb *(2268 kg)*	10,000 lb *(4536 kg)*	15,000 lb *(6804 kg)*	20,000 lb *(9072 kg)*	25,000 lb *(11 340 kg)*	30,000 lb *(13 608 kg)*	35,000 lb *(15 876 kg)*	40,000 lb *(18 144 kg)*
	Speed	410 ft/min (125 m/min)	205 ft/min (62 m/min)	137 ft/min (42 m/min)	103 ft/min (31 m/min)	82 ft/min (25 m/min)	68 ft/min (21 m/min)	59 ft/min (18 m/min)	51 ft/min (16 m/min)

Winch	**Bare Drum Pull**	**Allowable Cable Pull**
With rotation resistant cable	14,100 lb (6409 kg)	11,280 lb (5117 kg)

(Auxiliary winch specifications are identical)

National Series 1800 Mounting Specifications

1800 with 127' boom – With pusher axle chassis

Working area ..... 360°
Gross Axle Weight Rating Front ..... 20,000 lb (9072 kg)
Gross Axle Weight Rating Rear (tandem) ..... 40,000 lb (18144 kg)
Gross Vehicle Weight Rating ..... 60,000 lb (27216 kg)
Gross Pusher Axle Rating ..... 10,000 lb (4536 kg) (min)
Wheelbase ..... 258 in (6.55 m) (min for 58,000 GVWR on bridge law)
Pusher Axle Location (from front axle) ..... 180 in (4.57 m) (typ)
Frame Section Modulus (front axle to end of AF) ..... 30 in³
Afterframe ..... 92 in (2.34 m)

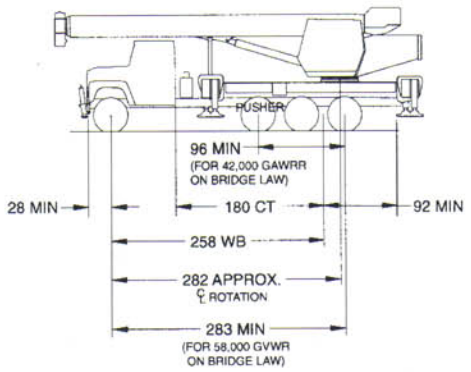
Minimum truck and pusher weight required for stability:

	Gross	*Front Axle*	*Rear Axle*
Truck	18,750* lb (8505 kg)	9,525* lb (4320 kg)	9,225* lb (4184 kg)
Pusher	1,500 lb (680 kg)	450 lb (204 kg).	1,050 lb (476 kg)

Maximum truck and pusher weight ..... 21,300 lb (9662 kg) (no jib, no aux)
19,125 lb (8675 kg) (31' jib, aux winch)

Estimated Final Weight:
1800 (wet) with 127' boom, 400# 3-part block, steel decks, 2,300-lb swinging counterweight, 100 gal fuel, two men in cab ..... 56,945 lb (25830 kg) (1055-lb/478-kg payload)
Add ..... 920 lb (417 kg) for 31' jib
1,105 lb (501 kg) for auxiliary winch with rooster sheave and 180# downhaul weight

*Less weight required if equipped with auxiliary winch or additional swinging counterweight



1800 with 127' boom – With tag axle chassis

Working area ..... 360°
Gross Axle Weight Rating Front ..... 20,000 lb (9072 kg)
Gross Axle Weight Rating Rear (tandem) ..... 40,000 lb (18144 kg)
Gross Vehicle Weight Rating ..... 60,000 lb (27216 kg)
Gross Pusher Axle Rating ..... 10,000 lb (4536 kg) (min)
Wheelbase ..... 246 in (6.25 m) (min for 60,000 GVWR on bridge law)
Tag Axle Location (from front axle) ..... 318 in (8.08 m) (typ)
Frame Section Modulus (front axle to end of AF) ..... 30 in³
Afterframe ..... 101 in (2.57 m)

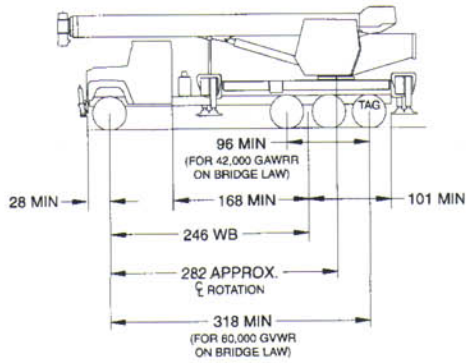
Minimum truck and tag weight required for stability

	Gross	*Front Axle*	*Rear Axle*
Truck	18,750* lb (8505 kg)	9,900* lb (4491 kg)	8,850* lb (4014 kg)
Tag	1,500 lb (680 kg).	450 lb (204 kg).	1,950 lb (885 kg)

Maximum truck and tag weight ..... 23,305 lb (10571 kg) (no jib, no aux)
22,385 lb (10154 kg) (31' jib, no aux)
22,385 lb (10154kg) (31' jib, aux winch)

Estimated Final Weight:
1800 (wet) with 127' boom, 400# 3-part block, steel decks, 2,300-lb swinging counterweight, 100 gal fuel, two men in cab ..... 56,945 lb (25830 kg) (3055-lb/1385-kg payload)
Add ..... 920 lb (417 kg) for 31' jib
1,105 lb (501 kg) for auxiliary winch with rooster sheave and 180# downhaul weight

*Less weight required if equipped with auxiliary winch or additional swinging counterweight



1800 with 142' boom – With tag axle chassis

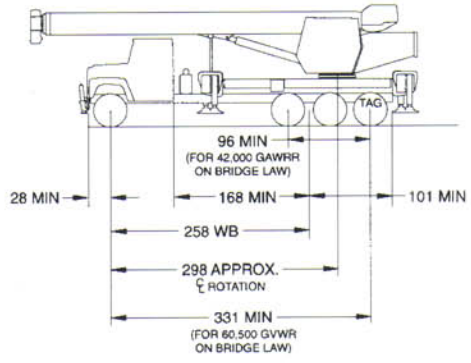
Working area ..... 360°
Gross Axle Weight Rating Front ..... 20,000 lb (9072 kg)
Gross Axle Weight Rating Rear (tandem) ..... 40,000 lb (18144 kg)
Gross Vehicle Weight Rating ..... 60,000 lb (27216 kg)
Wheelbase ..... 258 in (6.55 m)
Afterframe ..... 101 in (2.57 m) (min)

Minimum truck weight required for stability with 1,600 lb additional swinging counterweight

	Gross	*Front Axle*	*Rear Axle*
Truck	18,350* lb (8505 kg)	9,700* lb (4491 kg)	8,650* lb (4014 kg)

Estimated Final Weight:
1800 (wet) with 142' boom, 400# 3-part block, steel decks, 2,300-lb swinging counterweight, 100 gal fuel, two men in cab ..... 58,000 lb (26308 kg) (2500-lb/1134-kg payload)
Add ..... 785 lb (356 kg) for 26' jib
1,105 lb (501 kg) for auxiliary winch with rooster sheave and 180# downhaul weight

*Less weight required if equipped with auxiliary winch or additional swinging counterweight



Note: A configuration is available featuring the National Series 1800 with 127' boom on a three-axle chassis. This configuration is road legal without permit in **some states** on state and local roads. It does not meet federal bridge law. Contact the factory for information regarding this configuration.

The diagrams at the right show the 360° working area that can be achieved with the front stabilizer (standard on the Series 1800). The front stabilizer is mandatory when extending the boom and lifting loads over the front of the truck. A minimum of 10-in³ (104 cm³) section modulus at 110,000 psi (759 MPa) is required from the rear of the front spring hanger forward to the front stabilizer.

Notes:

- Gross Vehicle Weight Rating (GVWR) is dependent on all components of the vehicle (axles, tires, springs, frame, etc.) meeting manufacturers' recommendations; always specify GVWR when purchasing trucks
- Diesel engines require a variable speed governor and energize-to-run fuel solenoid for smooth crane operation; electronic fuel injection is required
- All mounting data is based on a National Series 1800 with an 85 percent stability factor
- The complete unit must be installed in accordance with factory requirements, and a test performed to determine actual stability and counterweight requirements per SAE J765; contact the factory for details
- Transmission neutral safety interlock switch is required

Dimensional Specifications

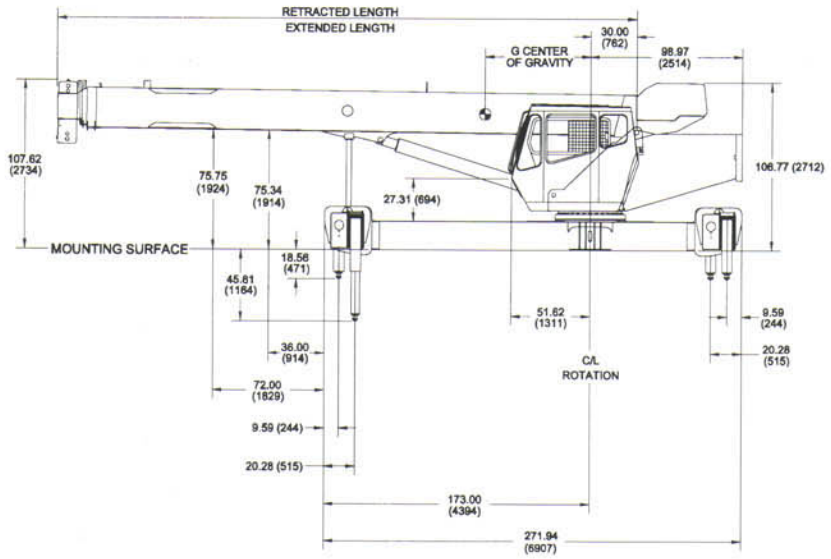
1800 Model	Retracted Length	Extended Length	G	Weight with Oil*
18127	31 ft (9.45 m)	127 ft (38.71 m)	69 in (1.75 m)	35,275 lb (16 000 kg)
18103	31 ft (9.45 m)	103 ft (31.39 m)	69 in (1.75 m)	33,850 lb (15 354 kg)
18142	34 ft (10.36 m)	142 ft (43.28 m)	87 in (2.21 m)	36,970 lb (16 769 kg)

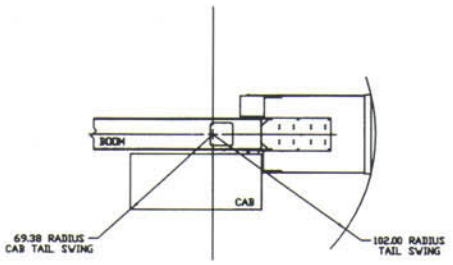
**Weight includes all items including complete HO outriggers, 2,300-lb counterweight, 400-lb block, decks and SFO. Booms fully retracted.*

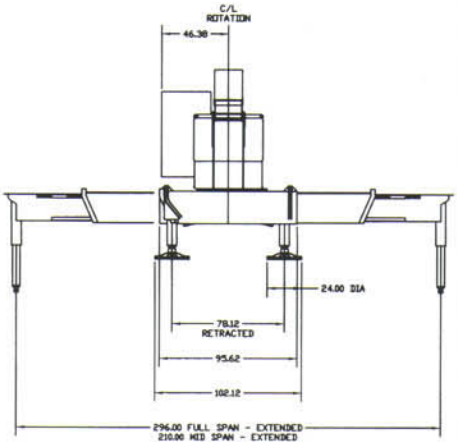
Model 18127
31' 3.25" Retracted
127' 3.25" Extended

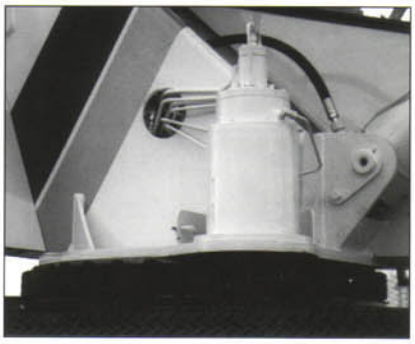
Model 18103
31' 3.25" Retracted
103' 3.25" Extended

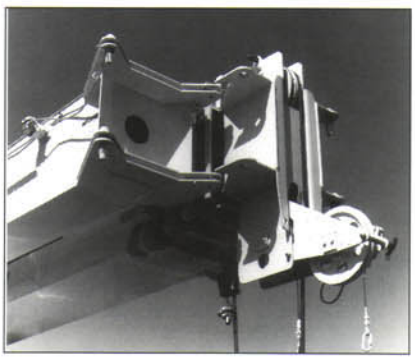
Model 18142
34' 3.25" Retracted
142' 3.25" Extended











National Series 1800 Telescoping Cranes

NATIONAL CRANE
A Grove Worldwide Company

General Offices: 11200 North 148th Street • Waverly, NE 68462 USA
Phone: (402) 786-6300 • FAX: (402) 786-6363
Web: http://www.nationalcrane.com

Printed in U.S.A. • Form No. S1800/199/5M/JN