Grove Manitowoc National Crane Potain

National Crane Series NBT45

Product Guide

ASME B30.5
Imperial 85%

Features

- 40,8 t (45 USt) rating
- 49,1 m (161 ft) five-section boom
- Self-lubricating Easy Glide wear pads
- 2041 kg (4500 lb) tailswing counterweight

Features

National Crane Series NBT45

- 40,8 t (45 USt) maximum capacity
- 51,2 m (168 ft) maximum tip height (main boom)
- 62,8 m (206 ft) maximum tip height (boom with jib)

Outriggers

Outrigger span of 7,52 m (24.7 ft) when fully extended; 5,33 m (17.5 ft) at mid-span.

Equipped with both ground level and in-cab outrigger controls, the NBT45 outriggers allow quick and easy crane set-up and can be positioned at 0%, 50% and 100%.

Deluxe operator's cab

Rigid galvanized steel structure, well insulated, with tinted safety glass for operator visibility and comfort. Multi-position seat with arm rest mounted single axis controls, ventilation fans, diesel heater, dual cab mounted worklights and wipers. Optional air conditioning is available.

Five-section boom

At 49,07m (161 ft), the NBT45 five-section boom is the longest in its size range. The long boom allows the operator to perform more lifts without the use of a jib, reducing setup time and improving efficiency. Also available are optional boom lengths of 31,39 m (103 ft), 38,71 m (127 ft) and 43,29 m (142 ft).

Overload protection

All National Crane boom trucks are equipped with overload protection. A Load Moment Indicator (LMI) is standard on all NBT45 machines. The LCD display is visible in full or low light and displays all crane load lifting values simultaneously. Includes Work Area Definition System (WADS).

Features

National Crane is proud to introduce the Series NBT45

- The stronger standard torsion box improves rigidity, reduces truck frame flex and reduces the need for counterweight
- Easy Glide boom wear pads reduce the conditions that cause boom chatter and vibration. The net result is smoother crane operation
- Speedy-reeve boom tip and sheave blocks simplify rigging changes by decreasing the time needed to change line reeving
- Painting crane components before assembly reduces the possibility of rust, improves serviceability and enhances the appearance of the machine
- State of the art control valve provides smoother operation. The new design eliminates parts, reducing repair costs and improving the machines serviceability
- Bearings on the boom and retract cables can be greased through access holes in the boom side plates
- Boom sections are supported by one hydraulic extend cylinder, minimizing maintenance
- Two-speed grooved drum hoist with cable packer, electronic drum rotation indicator (DRI)

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Boom and jib combinations data

Available in four basic models:

NBT45 - 103: Equipped with a 9,45 m - 31,39 m (31 ft - 103 ft) four-section boom. This model can be equipped with a 9,45 m (31 ft) jib, offering a vertical reach of 43,29 m (142 ft) or a 9,45 m - 16,76 m (31 ft- 55 ft) side-stowing foldaway jib, providing a vertical reach of 50,60 m (166 ft).

9,45 m - 31,39 m (31 ft - 103 ft) four-section hydraulic boom **18FJ31OS** 9,45 m (31 ft) single-section offsettable manual jib

9,45 m - 31,39 m (31 ft - 103 ft) four-section hydraulic boom **18FJ55M** 9,45 m - 16,76 m (31 ft - 55 ft) two-section manual jib

NBT45-127: Equipped with a 9,45 m - 38,71 m (31 ft - 127 ft) five-section boom. This model can be equipped with a 9,45 m - 16,76 m (31 ft - 55 ft) fold-away jib offering a vertical reach of 57,91 m (190 ft).

9,45 m - 38,71 m (31 ft - 127 ft) five-section hydraulic boom **18FJ55M** 9,45 m - 16,76 m (31 ft - 55 ft) two-section manual jib

NBT45 - 142: Equipped with a 10,36 m - 43,29 m (34 ft - 142 ft) five-section boom. This model can be equipped with a 7,92 m (26 ft) foldaway jib, offering a vertical reach of 53,64 m (176 ft) or a 9,45 m - 16,76 m (31 ft - 55 ft) side-stowing foldaway jib, providing a vertical reach of 62,48 m (205 ft).

10,36 m - 43,29 m (34 ft - 142 ft) five-section hydraulic boom **18FJ26** 7,92 m (26 ft) single-section manual jib

10,36 m - 43,29 m (34 ft - 142 ft) five-section hydraulic boom **18FJ55M** 9,45 m - 16,76 m (31 ft - 55 ft) two-section manual jib

NBT45 - 161: Equipped with a 11,6 m - 49,1 m (37.9 ft - 161 ft) five-section boom. This model can be equipped with a 11,6 m (38 ft) side-stowing foldaway jib, providing a vertical reach of 62,8 m (206 ft).

11,6 m - 49,1 m (37.9 ft - 161 ft) five-section hydraulic boom **18FJ38** 11,6 m (38 ft) single-section manual jib

Note: Maximum tip is measured with outriggers/stabilizers fully extended.

Specifications

NBT45 winch data

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

Standard planetary winch	Cable supplied	Average breaking strength	1 part line Max. pull	2 part line Max. pull	3 part line Max. pull	4 part line Max. pull	5 part line Max. pull	6 part line Max. pull	7 part line Max. pull	8 part line Max. pull
Low speed	5/8" diameter rotation resistant IWRC	25 583 kg (56,400 lb)	5103 kg (11,250 lb) 62 m/min (205 fpm)	10 206 kg (22,500 lb) 31 m/min (103 fpm)	15 309 kg (33,750 lb) 21 m/min (68 fpm)	20 412 kg (45,000 lb) 16 m/min (51 fpm)	25 515 kg (56,250 lb) 13 m/min (41 fpm)	30 618 kg (67,500 lb) 10 m/min (34 fpm)	35 721 kg (78,750 lb) 9 m/min (29 fpm)	40 824 kg (90,000 lb) 8 m/min (26 fpm)
High speed	5/8" diameter rotation resistant IWRC	25 583 kg (56,400 lb)	2268 kg (5000 lb) 125 m/min (410 fpm)	4536 kg (10,000 lb) 62 m/min (205 fpm)	6804 kg (15,000 lb) 42 m/min (137 fpm)	9072 kg (20,000 lb) 31 m/min (103 fpm)	11 340 kg (25,000 lb) 25 m/min (82 fpm)	13 608 kg (30,000 lb) 21 m/min (68 fpm)	15 876 kg (35,000 lb) 18 m/min (59 fpm)	18 144 kg (40,000 lb) 16 m/min (51 fpm)

Winch	Fourth layer pull	Allowable cable pull
Standard planetary and auxiliary planetary	2268 kg (5000 lb) high speed 5103 kg (11,250 lb) low speed	5117 kg (11,280 lb) 5117 kg (11,280 lb)

Block type	Rating	Weight
Aux boom head		45 kg (100 lb)
Downhaul weight	4,53 USt (7 USt)	78 kg (172 lb)
1-sheave block	13,60 t (20 USt)	149 kg (329 lb)
2-sheave block	22,67 t (30 USt)	290 kg (640 lb)
3-sheave block	31,74 t (40 USt)	272 kg (600 lb)
4-sheave block	32,65 t (50 USt)	361 kg (796 lb)

USED TO OPERATE THE CRANE.
The individual crane's load chart, operating instructions and other instructional plates must be read and understood prior to operating the crane.

Mounting configurations

The configurations are based on the Series NBT45 with 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.

Configuration 1: 31,39 m (103 ft) or 38,71 m (127 ft) Boom with Tag Axle
Working area: 360˚
Gross Axle Weight Rating Front: 9072 kg (20,000 lb)
Gross Axle Weight Rating Rear: 18 144 kg (40,000 lb)
Tag Axle Weight Rating: 5987 kg (13,200 lb)
Wheelbase: 625 cm (246 in)
Cab to Axle/trunnion (CA/CT): 427 cm (168 in)
Frame Section Modulus (SM), front axle to end of AF: 785 MPa (110,000 PSI): 426 cm³ (30.0 in³)
Stability Weight, Front: 4286 kg (9450 lb) minimum*
Stability Weight, Rear: 4899 kg (10,800 lb) minimum*
This configuration shows the 360° working area that is achieved with the front stabilizer (standard on the Series NBT45). The front stabilizer is essential when extending the boom and lifting loads over the front of the truck. NOTE: Chassis will require extended front frame rails for SFO mounting.
*Estimated axle scale weights prior to installation of crane, stabilizers and subbase for 85% stability.

Configuration 2: 31,39 m (103 ft) or 38,71 m (127 ft) Boom with Pusher Axle
Working area: 360˚
Gross Axle Weight Rating Front: 9072 kg (20,000 lb)
Gross Axle Weight Rating Rear: 18 144 kg (40,000 lb)
Pusher Axle Weight Rating: 5987 kg (13,200 lb)
Wheelbase: 655 cm (258 in)
Cab to Axle/trunnion (CA/CT): 457 cm (180 in)
Frame Section Modulus (SM), front axle to end of AF: 785 MPa (110,000 PSI): 426 cm³ (30.0 in³)
Stability Weight, Front: 4525 kg (9975 lb) minimum*
Stability Weight, Rear: 4661 kg (10,275 lb) minimum*
This configuration shows the 360° working area that is achieved with the front stabilizer (standard on the Series NBT45). The front stabilizer is essential when extending the boom and lifting loads over the front of the truck. NOTE: Chassis will require extended front frame rails for SFO mounting.
*Estimated axle scale weights prior to installation of crane, stabilizers and subbase for 85% stability.

Configuration 3: 43,29 m (142 ft) Boom with Tag Axle
Working area: 360˚
Gross Axle Weight Rating Front: 9072 kg (20,000 lb)
Gross Axle Weight Rating Rear: 18 144 kg (40,000 lb)
Tag Axle Weight Rating: 5987 kg (13,200 lb)
Wheelbase: 655 cm (258 in)
Cab to Axle/trunnion (CA/CT): 427 cm (168 in)
Frame Section Modulus (SM), front axle to end of AF: 785 MPa (110,000 PSI): 426 cm³ (30.0 in³)
Stability Weight, Front: 4207 kg (9275 lb) minimum*
Stability Weight, Rear: 4797 kg (10,575 lb) minimum*
This configuration shows the 360° working area that is achieved with the front stabilizer (standard on the Series NBT45). The front stabilizer is essential when extending the boom and lifting loads over the front of the truck. NOTE: Chassis will require extended front frame rails for SFO mounting.
*Estimated axle scale weights prior to installation of crane, stabilizers and subbase for 85% stability.

Mounting configurations

Configuration 4: Extended T-box 31,39 m (103 ft), 38,71 m (127 ft) or 43,29 m (142 ft) Boom with Tag Axle
Working area: 360˚
Gross Axle Weight Rating Front: 9072 kg (20,000 lb)
Gross Axle Weight Rating Rear: 18 144 kg (40,000 lb)
Tag Axle Weight Rating: 5987 kg (13,200 lb)
Wheelbase: 686 cm (270 in)
Cab to Axle/trunnion (CA/CT): 516 cm (203 in)
Frame Section Modulus (SM), front axle to end of AF: 785 MPa (110,000 PSI): 426 cm³ (30.0 in³)
Stability Weight, Front: 4309 kg (9500 lb) maximum*
Stability Weight, Rear: 5103 kg (11,250 lb) minimum*
*Estimated axle scale weights prior to installation of crane, stabilizers and subbase for 85% stability.

Configuration 5: 49,1 m (161 ft) Boom with Tag Axle
Working area: 360˚
Gross Axle Weight Rating Front: 9072 kg (20,000 lb)
Gross Axle Weight Rating Rear: 18 144 kg (40,000 lb)
Tag Axle Weight Rating: 5987 kg (13,200 lb)
Wheelbase: 655 cm (258 in)
Cab to Axle/trunnion (CA/CT): 427 cm (168 in)
Frame Section Modulus (SM), front axle to end of AF: 785 MPa (110,000 PSI): 426 cm³ (30.0 in³)
Stability Weight, Front: 4207 kg (9275 lb) minimum*
Stability Weight, Rear: 4797 kg (10,575 lb) minimum*
This configuration shows the 360° working area that is achieved with the front stabilizer (standard on the Series NBT45). The front stabilizer is essential when extending the boom and lifting loads over the front of the truck. NOTE: Chassis will require extended front frame rails for SFO mounting.
*Estimated axle scale weights prior to installation of crane, stabilizers and subbase for 85% stability.

Other configurations are available, please consult the factory for more information.

Mimimum truck requirements

Many factors must be considered in the selection of proper truck for a NBT45 series crane. Items which must be considered are:
1. Axle Rating. Axle ratings are determined by the axles, tires, rims, springs, brakes, steering and frame strength of the truck. If any one of these components is below the required rating, the gross axle rating is reduced to its weakest component value.
2. Wheelbase (WB), Cab-to-Trunnion (CT) and Bare Chassis Weight. The wheelbase, CT and chassis weights shown are required so the basic NBT45 can be legally driven in most states and meet stability requirements. The dimensions given assume the sub-base is installed properly behind the truck cab. If exhaust stacks, transmission protrusions, etc., do not allow a close installation to the cab, the WB and CT dimensions must be increased. Refer to the Mounting Configuration pages for additional information.
3. Truck Frame. Try to select a truck frame that will minimize or eliminate frame reinforcement or extension of the after frame (AF). Many frames are available that have the necessary after frame (AF) section modulus (SM) and resistance to bending moment (RBM) so that reinforcing is not required. The front hydraulic jack is used for a 360˚ working range around the truck. The frame under the cab through the front suspension must have the minimum S.M. and RBM because reinforcing through the front suspension is often difficult because of engine, radiator mounts and steering mechanics. See "Truck Requirements" and "Frame Strength" pages for the necessary section modulus and resistance to bending moment values. Integral extended front frame rails are required for front center stabilizer installation.
4. Additional Equipment. In addition to the axle ratings, wheelbase, cab-to-axle requirements and frame, it is recommended that the truck is equipped with electronic engine control, increased cooling and a transmission with a PTO opening available with an extra heavy duty PTO. A conventional cab truck should be used for standard crane mounts.
5. Neutral Start Switch. The chassis must be equipped with a switch that prevents operation of the engine starter when the transmission is in gear.

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 for smooth crane operation; electronic fuel injection requires EET engine remote throttle
• All mounting data is based on a National Crane Series NBT45 with 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 per SAE J765; contact the factory for details

Dimensions

Weight/CG Data		
Series	**Dimension G**	**Weight with oil**
NBT45103	132,1 mm (52 in)	17 998 kg (39,679 lb)
NBT45127	142,2 mm (56 in)	18 592 kg (40,989 lb)
NBT45142	162,6 mm (64 in)	19 180 kg (42,284 lb)
NBT45161	195,6 mm (77 in)	19 978 kg (44,045 lb)

No jib, no auxiliary hoist, with 2/3 hookblock.

Working range

31,39 m (103 ft) main boom, full span outrigger, with 9,45 m - 16,76 m (31 ft - 55 ft) jib

Boom deflection not shown

Dimensions are for largest furnished hookblock and headache ball with anti-two block activated.

*Drawing is to show the physical reach of the machine. Always refer to load chart to see what portions of this range are structurally and stability limited.

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Load chart

31,39 m (103 ft) main boom, full span outrigger, without jib

Radius in feet	#01						
	Main boom length in feet						
	31	43-A	55-B	67-C	79-D	91-E	103
7	90,000 (73.6)						
8	82,000 (71.6)	51,000 (76.9)					
10	69,950 (67.6)	51,000 (74.1)	50,000 (78)				
12	58,000 (63.4)	50,000 (71.2)	47,000 (75.8)	37,000 (78.7)			
15	45,700 (56.9)	46,050 (66.9)	40,000 (72.5)	36,000 (76.1)	33,000 (78.7)		
20	33,150 (44.5)	33,550 (59.1)	33,700 (66.8)	33,800 (71.7)	29,000 (75.1)	18,500 (77.3)	18,500 (79.5)
25	25,400 (28)	25,800 (50.7)	26,050 (60.8)	26,150 (66.9)	26,250 (71.2)	18,000 (74.2)	17,500 (76.8)
30		20,650 (40.9)	20,850 (54.4)	21,000 (62)	21,050 (67.2)	17,500 (71)	16,500 (74)
35		16,200 (28.6)	16,450 (47.5)	16,650 (56.9)	16,750 (63.1)	16,200 (67.6)	15,000 (71.1)
40			13,200 (39.6)	13,350 (51.4)	13,450 (58.8)	13,600 (64.1)	13,500 (68.2)
45			10,900 (30)	11,050 (45.5)	11,150 (54.2)	11,150 (60.4)	11,250 (65.1)
50			9000 (17.5)	9200 (39.5)	9300 (49.9)	9400 (56.9)	9500 (62.1)
55				7700 (31.8)	7800 (44.7)	7900 (52.8)	8000 (58.7)
60				6500 (21.7)	6600 (39)	6700 (48.5)	6750 (55.1)
65					5600 (32.4)	5700 (43.9)	5750 (51.4)
70					4750 (24.3)	4850 (38.8)	4900 (47.5)
75					4000 (11.2)	4100 (33.1)	4200 (43.3)
80						3500 (26.3)	3550 (38.8)
85						2950 (16.8)	3000 (33.7)
90							2550 (27.8)
95							2100 (20.2)
100							1700 (4.7)
Minimum boom angle (°) for indicated length (no load)							0
Maximum boom length (ft) at 0° boom angle (no load)							103

NOTE: Loads displayed in pounds. ( ) Boom angles are in degrees.
#LMI operating code. Refer to LMI manual for operating instructions.

Lifting capacities at zero degree boom angle							
Boom angle	Main boom length in feet						
	31	43-A	55-B	67-C	79-D	91-E	103
0°	21,850 (28.5)	13,150 (40.5)	8450 (52.5)	5650 (64.5)	3850 (76.5)	2650 (88.5)	1600 (100.5)

NOTE: ( ) Reference radii in feet. 80026252

Rated Load Reductions from main boom capacity when lifting over main boom nose with :							
tele. erected (retracted)	2300	2150	2000	1950	1900	1850	1800
31' off. erected at 0° offset	1800	1700	1550	1500	1450	1450	1400

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Load chart

31,39 m (103 ft) main boom, full span outrigger, with 9,45 m - 16,76 m (31 ft - 55 ft) jib

Radius in feet	#02						
	Main boom length in feet						
	31	43-A	55-B	67-C	79-D	91-E	103
7	89,200 (73.6)						
8	81,200 (71.6)	50,350 (76.9)					
10	69,150 (67.6)	50,350 (74.1)	49,550 (78)				
12	57,200 (63.4)	49,350 (71.2)	46,550 (75.8)	36,600 (78.7)			
15	44,900 (56.9)	45,400 (66.9)	39,550 (72.5)	35,600 (76.1)	32,650 (78.7)		
20	32,350 (44.5)	32,900 (59.1)	33,250 (66.8)	33,400 (71.7)	28,650 (75.1)	18,200 (77.3)	18,250 (79.5)
25	24,600 (28)	25,150 (50.7)	25,600 (60.8)	25,750 (66.9)	25,900 (71.2)	17,700 (74.2)	17,250 (76.8)
30		20,000 (40.9)	20,400 (54.4)	20,600 (62)	20,700 (67.2)	17,200 (71)	16,250 (74)
35		15,550 (28.6)	16,000 (47.5)	16,250 (56.9)	16,400 (63.1)	15,900 (67.6)	14,750 (71.1)
40			12,750 (39.6)	12,950 (51.4)	13,100 (58.8)	13,300 (64.1)	13,250 (68.2)
45			10,450 (30)	10,650 (45.5)	10,800 (54.2)	10,850 (60.4)	11,000 (65.1)
50			8550 (17.5)	8800 (39.5)	8950 (49.9)	9100 (56.9)	9250 (62.1)
55				7300 (31.8)	7450 (44.7)	7600 (52.8)	7750 (58.7)
60				6100 (21.7)	6250 (39)	6400 (48.5)	6500 (55.1)
65					5250 (32.4)	5400 (43.9)	5500 (51.4)
70					4400 (24.3)	4550 (38.8)	4650 (47.5)
75					3650 (11.2)	3800 (33.1)	3950 (43.3)
80						3200 (26.3)	3300 (38.8)
85						2650 (16.8)	2750 (33.7)
90							2300 (27.8)
95							1850 (20.2)
100							1450 (4.7)
Minimum boom angle (°) for indicated length (no load)							0
Maximum boom length (ft) at 0° boom angle (no load)							103

NOTE: Loads displayed in pounds. ( ) Boom angles are in degrees.
#LMI operating code. Refer to LMI manual for operating instructions.

Lifting capacities at zero degree boom angle							
Boom angle	Main boom length in feet						
	31	43-A	55-B	67-C	79-D	91-E	103
0°	21,050 (28.5)	12,500 (40.5)	8000 (52.5)	5250 (64.5)	3500 (76.5)	2350 (88.5)	1350 (100.5)

NOTE: ( ) Reference radii in feet. 80026255

Rated Load Reductions from main boom capacity when lifting over main boom nose with :							
tele. erected (retracted)	2300	2150	2000	1950	1900	1850	1800
31' off. erected at 0° offset	1800	1700	1550	1500	1450	1450	1400

Radius in feet	0° OFFSET
	#06
25	8800 (80)
38	8000 (75)
49	6500 (70)
60	5100 (65)
70	4100 (60)
79	3300 (55)
88	2600 (50)
96	1900 (45)
103	1350 (40)
110	950 (35)
115	650 (30)
Min. boom angle for indicated length (no load)	25.1°
Max. boom length at 0° boom angle (no load)	103 ft

Radius in feet	30° OFFSET
	#09
39	6400 (80)
50	5700 (75)
60	5000 (70)
70	4200 (65)
79	3600 (60)
87	3000 (55)
95	2500 (50)
102	2000 (45)
108	1550 (40)
113	1200 (35)
118	1000 (30)
122	750 (25)
124	650 (21)
Min. boom angle for indicated length (no load)	20°
Max. boom length at 0° boom angle (no load)	103 ft

80026258A

NOTE: Loads displayed in pounds.
( ) Boom angles are in degrees.
#LMI operating code. Refer to LMI manual for operating instructions.

Boom extension capacity notes:

1. All capacities above the bold line are based on structural strength of boom extension.
2. 31 ft offsettable extension length may be used for single line lifting service
3. Radii listed are for a fully extended boom with the boom extension erected. For main boom lengths less than fully extended, the rated loads are determined by boom angle. For boom angles not shown, use the rating of the next lower angle. **Warning:** Operation of this machine with heavier loads than the capacities listed is strictly prohibited. Machine tipping with boom extension occurs rapidly and without advance warning.
4. Boom angle is the angle above or below horizontal of the longitudinal axis of the boom base section after lifting rated load.
5. Capacities listed are with outriggers properly extended and vertical jacks set.
6. When lifting over the main boom nose with 31 ft offsettable extension erected, the outriggers must be fully extended or 50% (17.5 ft) spread.

THIS CHART IS ONLY A GUIDE AND SHOULD NOT BE USED TO OPERATE THE CRANE.
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Accessories

Radio Remote Controls – (Ground level or boom tip) Eliminate the handling and maintenance concerns that accompany cabled remotes. Operate to a range of about 76 m (250 ft), varying with conditions.	• **NB4R (R4 functions)**
Heavy-duty Personnel Basket – 544 kg (1200 lb) capacity steel basket with safety loops for two passengers. Gravity leveling 183 cm x 107cm (72 in x 42 in) platform. Fast attachment and secure locking systems.	• **BSA-1** • **BSA-R1 (provides rotation)** • **BSAY-1** • **BSAY-2**
Air Conditioning for Crane Cab – Provides excellent crane cab cooling to overcome the radiant heat from the sun reflection.	• **A/C**
Auxiliary Winch 15,000 lb Line Pull – Second winch redundant to the main, planetary winch with boom tip "rooster sheave" to allow reeving of both winch lines.	• **NBT45AW**
Spanish-Language Danger Decals, Control Knobs, and Operators' Manuals	• **SDD** • **SOM**

Notes

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Makati City
Singapore

Factories

Brazil
Passo Fundo
China
TaiAn
Zhangjiagang
France
Charlieu
Moulins
Germany
Wilhelmshaven
India
Pune
Italy
Niella Tanaro
Portugal
Baltar
Fânzeres
USA
Manitowoc
Port Washington
Shady Grove

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Form No. NBT45 PG
Part No.09-008 / 2M /0713