

SERVICE MANUAL

This Manual has been prepared for and is considered part of -

500E2 Telescoping Crane

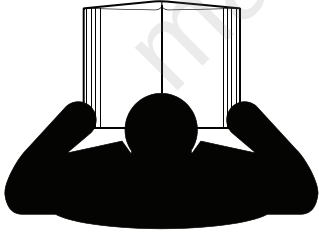
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NOTICE

The crane serial number is the only method your distributor or the factory has of providing you with correct parts and service information.

The crane serial number is identified on the builder's decal attached to the crane frame. ***Always furnish crane serial number*** when ordering parts or communicating service problems with your distributor or the factory.



WARNING

To prevent death or serious injury:

- Avoid unsafe operation and maintenance.
- This crane must be operated and maintained by trained and experienced personnel. National Crane is not responsible for qualifying these personnel.
- Do not operate or work on this crane without first reading and understanding Operator's Manual and Rating Plate supplied with crane.
- If Operator's Manual or Capacity Charts are missing from crane, contact your distributor for new ones.

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CONTROL VALVE RELIEF ADJUSTMENT

The control valves supplied on this crane are equipped with adjustable relief valves. After some time of use, it may be necessary to make some adjustment in pressure because of spring weakening, etc. The relief valves are adjustable only through a specific pressure range.

Both the inlet and mid-inlet of the main control valve and inlet of the winch valve have screw adjustable main relief valves. Turning the relief in increases pressure relief setting; turning the relief out decreases pressure relief setting.

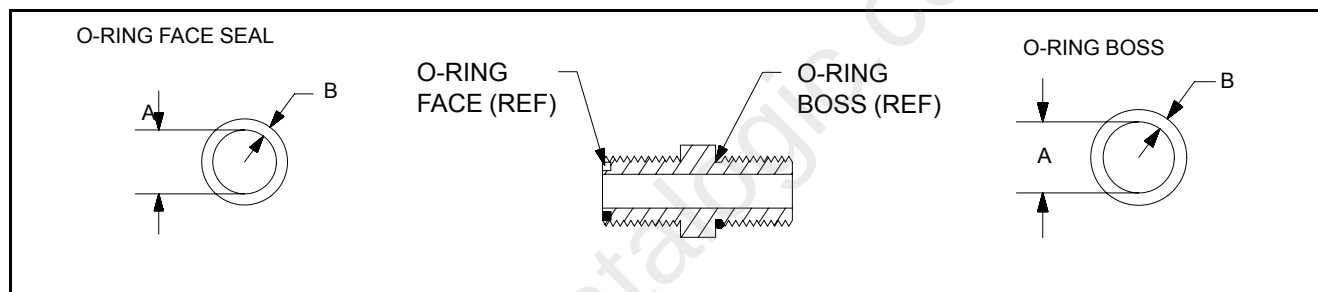
The turn circuit pressure can be checked by plugging a port on the turn motor with a pressure gage. The pressure on the main control valve stack should be checked by booming the lift cylinder down against the end of the cylinder stroke. The winch circuit pressure can be checked by plugging a port on the winch motor with a pressure gage.

Some valve sections include work port reliefs. The work port reliefs are shim adjustable. Adjustment is made by adding or taking out shims. Adding a 0.010 shim will increase pressure 100 psi (0.68 MPa). See "Specifications" section for correct pressure settings.

Never set pressure above recommendations.

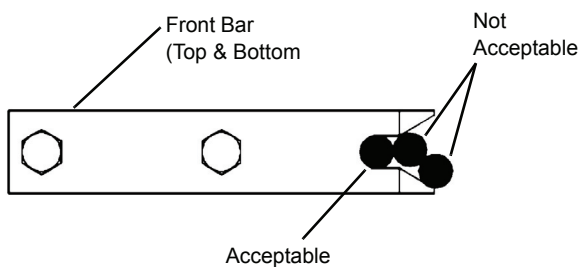
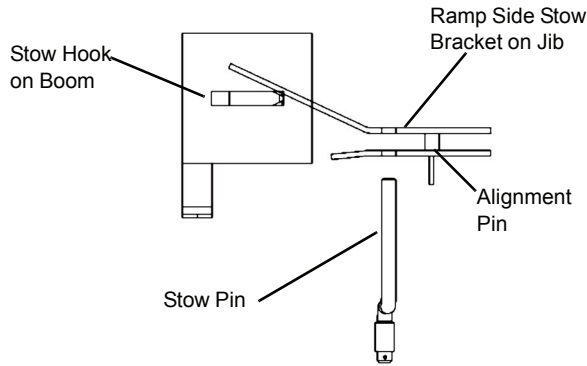
WARNING

If the machine does not perform properly at these pressures, the problem is not the relief valve and no attempt should be made to readjust the setting. If the relief valves are set to higher pressures than those listed above, the warranty on the machine is void. Also the machine could operate in a manner such as to endanger personnel safety.



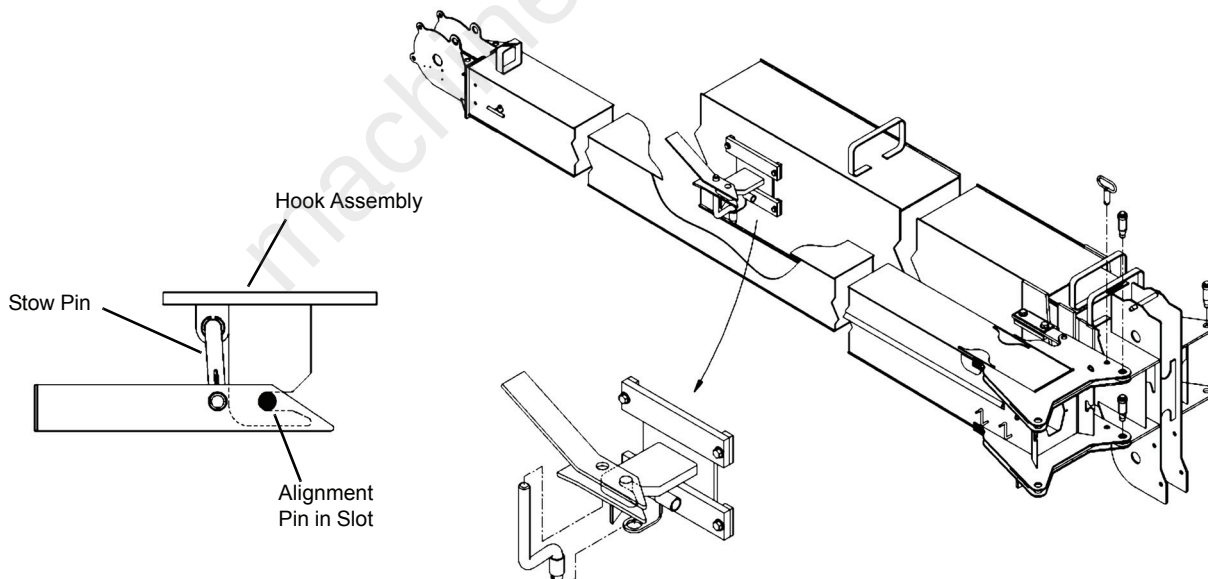
O-RING FACE SEAL			FITTING SIZE		O-RING BOSS		
THREAD SIZE	B inches (mm)	A inches (mm)	TUBE O. D.	MFGR 'S SIZE CODE	A inches (mm)	B inches (mm)	THREAD SIZE
9/16-18	0.07 (1.78)	0.301 (7.64)	0.250	4	0.351 (8.92)	0.072 (1.83)	7/16-20
11/16-16	0.07 (1.78)	0.364 (9.24)	0.375	6	0.458 (11.63)	0.078 (1.98)	9/16-18
13/16-16	0.07 (1.78)	0.489 (12.42)	0.500	8	0.644 (16.36)	0.087 (2.21)	3/4-16
1-14	0.07 (1.78)	0.614 (15.60)	0.625	10	0.755 (19.18)	0.097 (2.46)	7/8-14
1 3/16-12	0.07 (1.78)	0.739 (18.77)	0.750	12	0.924 (23.47)	0.116 (2.95)	1 1/16-12
1 7/16-12	0.07 (1.78)	0.926 (23.52)	1.000	16	1.171 (29.74)	0.116 (2.95)	1 5/16-12
1 11/16-12	0.07 (1.78)	1.176 (29.87)	1.250	20	1.475 (37.46)	0.118 (3.00)	1 5/8-12
2-12	0.07 (1.78)	1.489 (37.82)	1.500	24	1.720 (43.69)	0.118 (3.00)	1 7/8-12

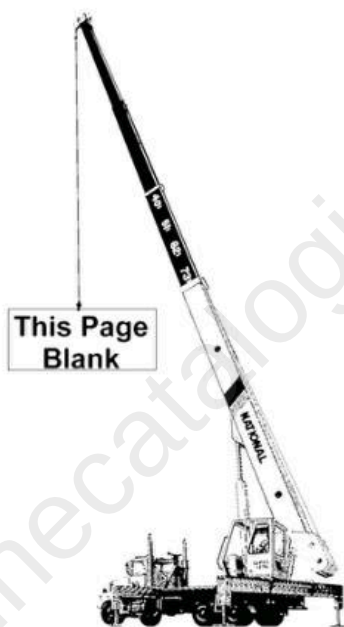
NOTE: Contact your National Crane Distributor or Manitowoc Crane Care for O-Ring boss seal kits.

**CAUTION**

Make sure ramp slides up to the stow hook and does not hit the end of the ramp.

9. When the boom is fully retracted, the jib must be bottomed out securely in the ear assemblies. If the alignment pins are not aligned properly, the hook assembly and front bars will have to be positioned as shown so the jib cannot slide forward or backward as the boom is elevated.
 10. Try to remove the jib pins. If the pins are too tight, the stow hook assembly or front bars will have to be adjusted.
 11. Torque all capscrews to their specified torque value (see "Fasteners and Torque Values Table in Section 2. Install stow pin in lock assembly and remove the jib pins.
 12. Extend and retract boom to insure proper alignment of jib pins.
 13. Install jib pins and remove the stow pins.
 14. Extend and retract the boom and jib to ensure proper alignment of jib stow brackets.
 15. Install jib stow pins and remove jib pins.
- Always save shims to allow future adjustment of jib stow if required



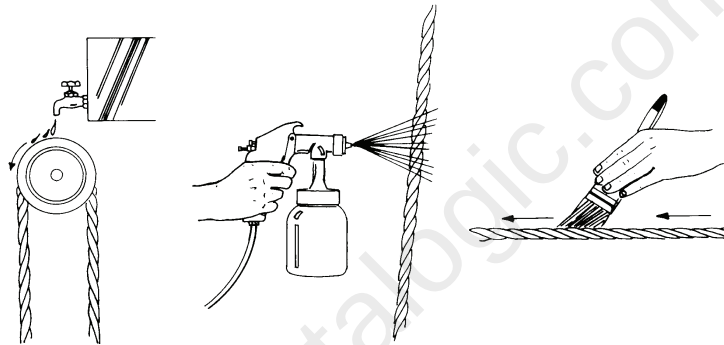


The following are important characteristics of a good wire rope lubricant:

1. It should be free from acids and alkalis.
2. It should have sufficient adhesive strength to remain on the ropes.
3. It should be of a viscosity capable of penetrating the interstices between wires and strands.
4. It should not be soluble in the medium surrounding it under the actual operating conditions (i.e. Water).
5. It should have a high film strength.
6. It should resist oxidation.

Before applying lubrication, accumulations of dirt or other abrasive material should be removed from the rope. Cleaning can be accomplished by using a stiff wire brush and solvent, compressed air, or live steam. Immediately after the wire rope is cleaned, it should be lubricated. Many techniques may be used; bath, dripping, pouring, swabbing, painting, pressure spray.

Whenever possible, the lubricant should be applied at the top of a bend in the rope, because at that point the strands are spread by bending and are more easily penetrated. There should be no load on the rope while it is being lubricated. It should be noted, the service life of wire rope will be directly proportional to the effectiveness of the method used and amount of lubricant reaching the working parts of the rope.



Example:

Refer to the sample truck frame cross sections in Table E. Truck frame yield strength is 110,000 psi (758 MPa) with the following dimensions at the front axle location: 3/8 in. (9.65 mm) thick, 1.50 in. (38.1 mm) top flange, 3 in. (76.2 mm) bottom flange, 10.25 in. (260 mm) deep. To find the frame section modulus:

1. Use a channel with 1.50 (38.1 mm) flanges since 1.50 in. (38.1 mm) is the smaller flange width.
2. From Table E, 3/8 in. (9.65 mm) thickness:
 - W (width) = 1.50 in. (38.1 mm)
 - D (depth) = 10.0 in. (254 mm)
 - Section Modulus = 10.2 in.³ (167 cm³)
3. From Table E, 3/8 in. (9.65 mm) thickness
 - W = 1.50 in. (38.1 mm),
 - D = 11.0 in. (279 mm)
 - Section Modulus = 11.9 in.³ (195 cm³)
4. Interpolate between the two values:
 - 10 in. (254 mm) deep channel = 10.2 in.³ (167 cm³)
 - 11 in. (279 mm) deep channel = 11.9 in.³ (195 cm³)
 - 10.5 in. (267 mm) deep channel

$$= \frac{10.2 \text{ in.}^3 + 11.9 \text{ in.}^3}{2} = 11.0 \text{ in.}^3$$

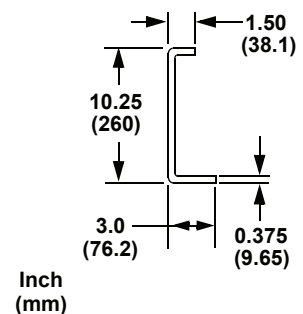
$$= \frac{167 \text{ cm}^3 + 195 \text{ cm}^3}{2} = 181 \text{ cm}^3$$

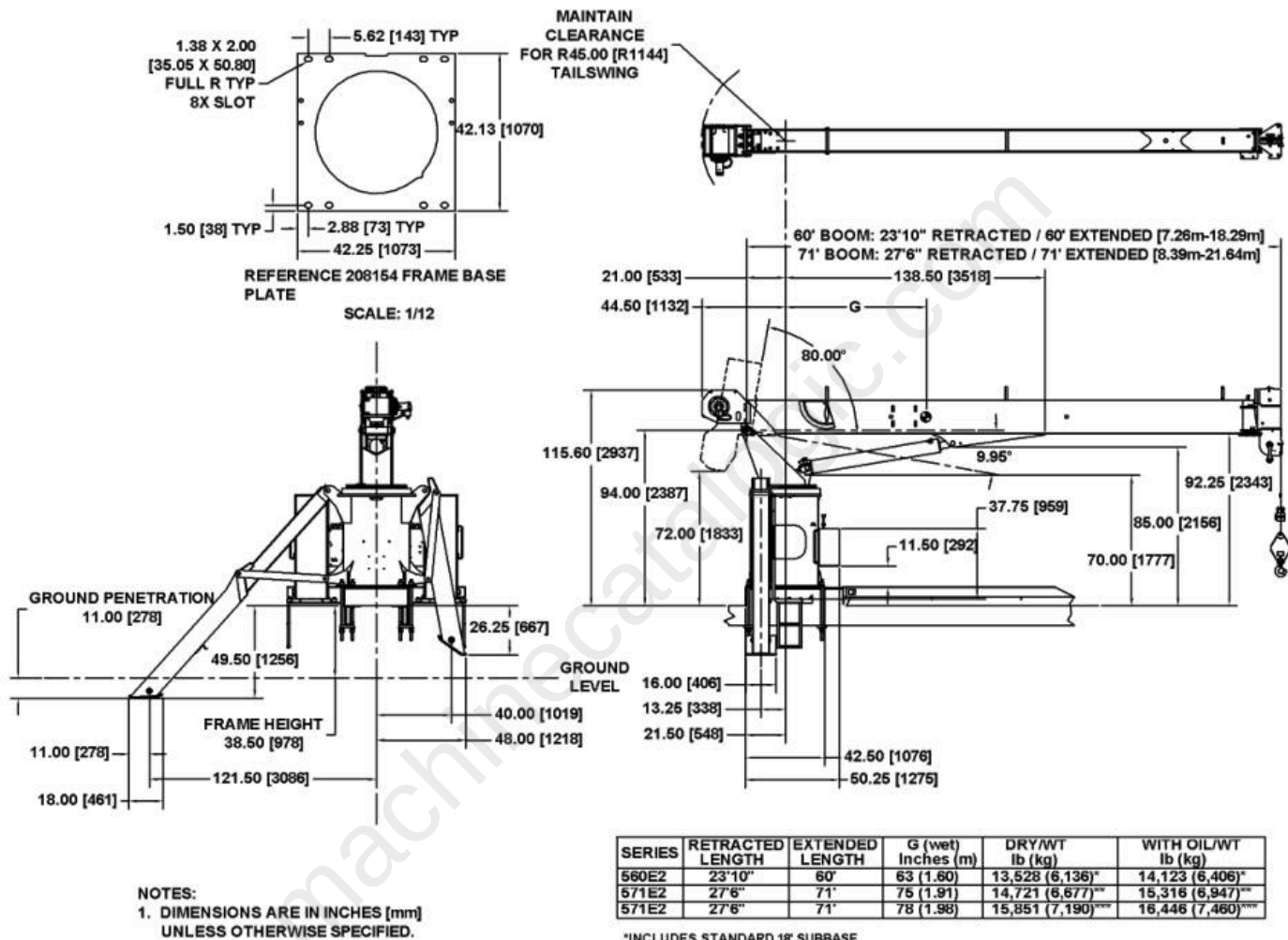
5. Now interpolate between a 10.0 in. (254 mm) deep channel and a 10.5 in. (267 mm) deep channel to get the section modulus of a 10.25 in. (260 mm) deep channel.
 - 10.0 in. (254 mm) deep channel = 10.2 in.³ (167 cm³)
 - 10.5 in. (267 mm) deep channel = 11.0 in.³ (181 cm³)
 - 10.25 in. (260 mm) deep channel

$$= \frac{10.2 \text{ in.}^3 + 11.0 \text{ in.}^3}{2} = 10.6 \text{ in.}^3$$

$$= \frac{167 \text{ cm}^3 + 181 \text{ cm}^3}{2} = 174 \text{ cm}^3$$

Frame Section Modulus at the front axle location is 10.6 in.³ (174 cm³). This is greater than the 7.5 in.³ (123 in.³) required so the truck frame is strong enough at this location.





Full Version Available

National Crane 500E2 Boom Truck Service Manual

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