Wellhead Mast

Installation and Operation Guide

Nanometrics Inc.
Kanata, Ontario
Canada

Wellhead Mast Installation and Operation Guide

The information in this document has been carefully reviewed and is believed to be reliable. Nanometrics, Inc. reserves the right to make changes at any time without notice to improve the reliability and function of the product.

Nanometrics, Inc.
250 Herzberg Road
Kanata, Ontario, Canada K2K 2A1
Tel (613)592-6776
Fax (613)592-5929
Email info@nanometrics.ca

Part number 13617R2
Release date 2005-01-13

Contents

Figures

Wellhead Mast Installation and Operation

Use the wellhead mast and winch assembly to lower a seismometer into a borehole or to remove a seismometer from a borehole.

1 Preinstallation

This section lists installation and safety guidelines, and provides an overview of the parts.

1.1 Installation guidelines

- Use the correct wrench size when tightening the bolts and nuts.
- Ensure correct torquing of the bolts and nuts; do not overtighten.

Warning Improper installation and use of the winch may cause injury, or damage to equipment. Observe these guidelines for installing and operating the winch:

1) The winch should be installed and operated only by persons suitably trained to do so, and who are conversant with any local regulations governing this type of device.
2) Overtightening bolts may cause them to fail. Do not overtighten the bolts.
3) Do not touch moving parts.
4) Ensure that any defects are repaired immediately by a competent, trained person.
5) Do not attempt any repair while the winch is in a loaded state.
6) Maintain, at all times, 3 dead wraps of rope on the winch drum and a maximum fleet angle of 1.5 degrees (Figure 3-1 on page 9).
7) When multiple layers of rope are used on this winch, the drum flanges must project a distance at least 1.5 times the diameter of the installed rope.

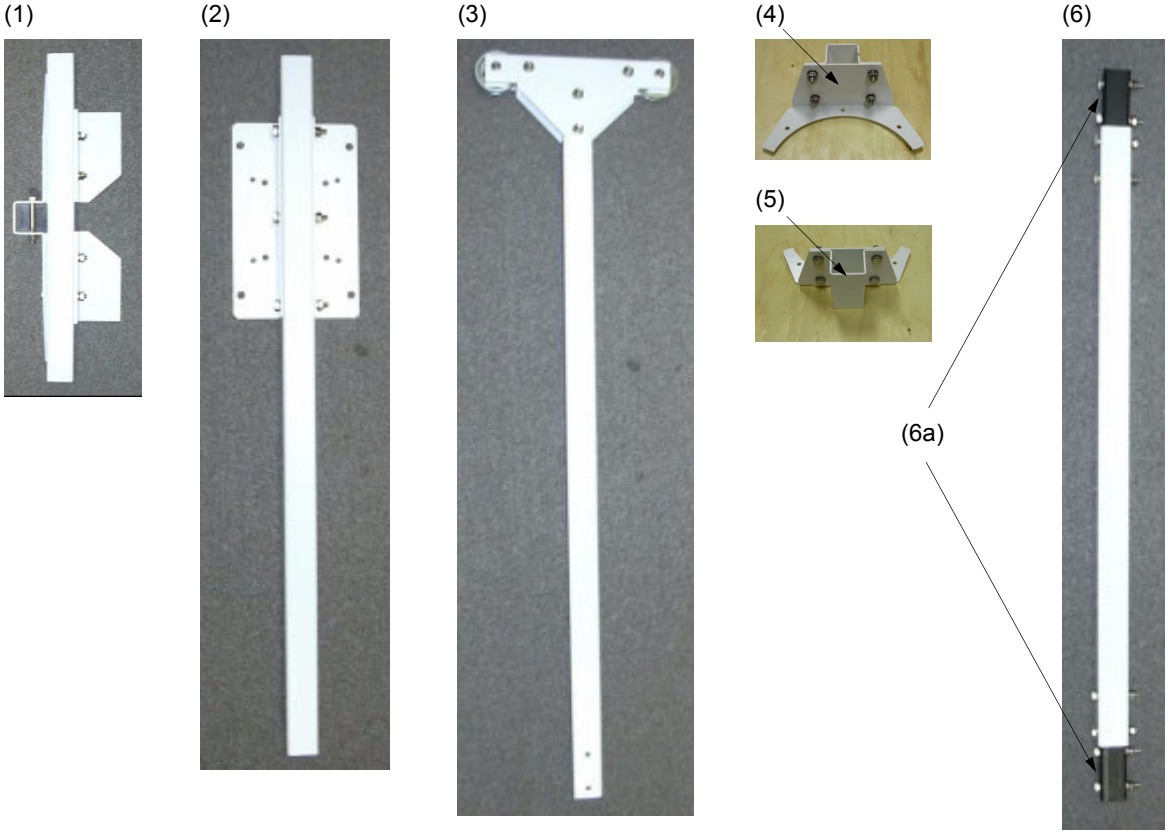
1.2 Overview of parts

Table 1-1 lists the Wellhead mast sub-assemblies and hardware. See also Figure 1-1 on page 3, and related Figures showing installation (as listed in the Notes column).

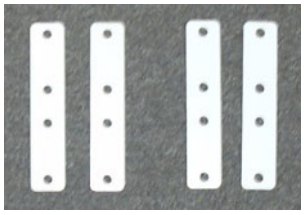
Table 1-1 Parts list

Item #	Description	Qty.	Notes
1	Stabilizer Assembly	1	Figure 2-2 on page 5
2	Lower Mast Assembly	1	Figure 2-2 on page 5
3	Upper Mast Assembly	1	Figure 2-5 on page 8
4	Wellhead Mast Flange Support (retainer)	1	Figure 2-1 on page 4
5	Wellhead Mast Flange Support Bracket	1	Figure 2-2 on page 5
6	Wellhead Mast Middle Vertical Tube	1	Figure 2-5 on page 8
6a	Wellhead Mast Vertical Tube Union	2	Figure 2-5 on page 8; typically shipped as part of item #6
7	Wellhead Mast Joint Support Plate	4	Figure 2-5 on page 8
8	Screw (bolt), hex head cap, M10 x 1.5 x 80, SS	1	
9	Nut, plain hex, M10 x1.5, SS	13	
10	Washer, flat, M10, SS	26	
11	Washer, lock split, M10, SS	13	
12	Screw (bolt), hex head cap, M10 x 1.5 x 30, SS	8	
13	Screw (bolt), hex head cap, M10 x 1.5 x 70, SS	4	
14	Nut, 3/8-16, SS	2	
15	Washer, flat, 3/8, SS	4	
16	Eyebolt, 3/8” – 16, SS, 3/4” ID	2	
17	Chain, 5/16, SS	46cm	Figure 2-3 on page 6
18	Quick link, 5/16, SS	2	
19	Winch	1	Figure 2-4 on page 7
20	Winch handle	1	

Figure 1-1 Wellhead mast parts*

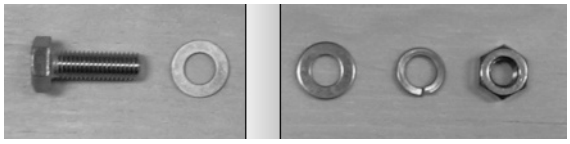


(7)



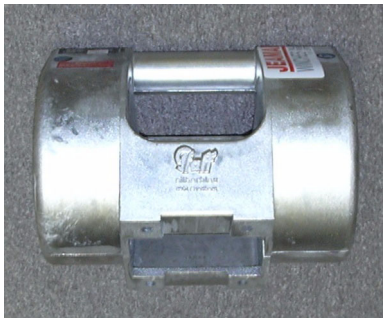
(8) to (15):

See Table 1-1 for descriptions of bolts, washers, lock washers, and nuts. In general, connect fastener hardware in the sequence shown in this example:



(17) (18) (16)

(19)



(20)

* See also Table 1-1, “Parts list,” on page 2.

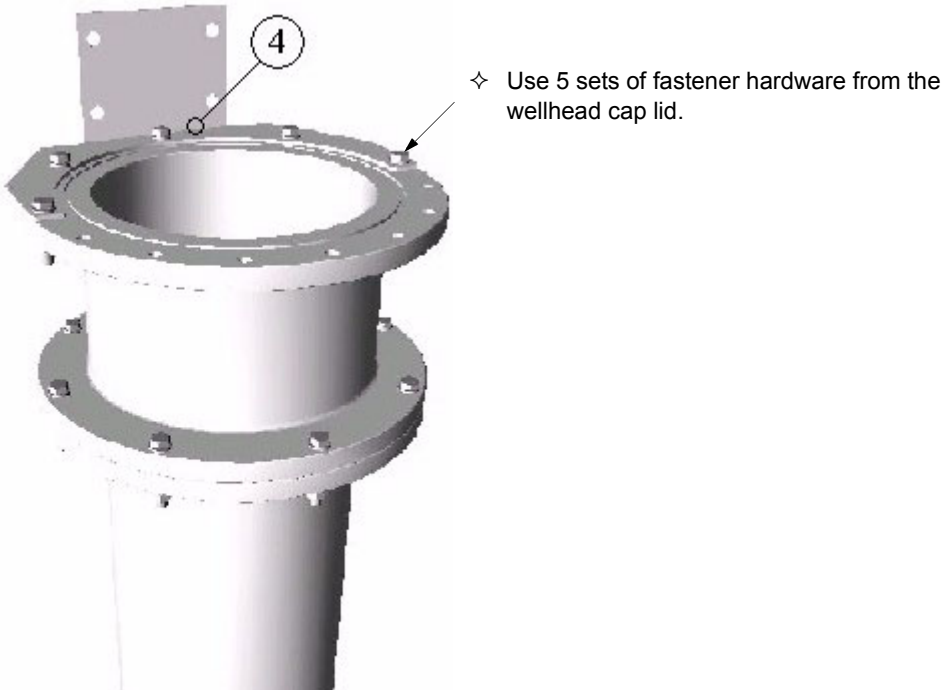
2 Wellhead Mast installation

Install the wellhead mast and winch temporarily, to insert or remove a borehole seismometer. During installation refer to the parts list (Table 1-1 on page 2) and corresponding Figures.

2.1 Retainer

1. Remove the wellhead cap lid.
2. Ensure that the cable support disk is installed in the wellhead to prevent hardware from falling down the borehole.
3. Install the retainer (wellhead mast flange support, item #4) using five sets of the fastener hardware from the wellhead cap lid (Figure 2-1).
4. Ensure that all wellhead cap hardware is tight.

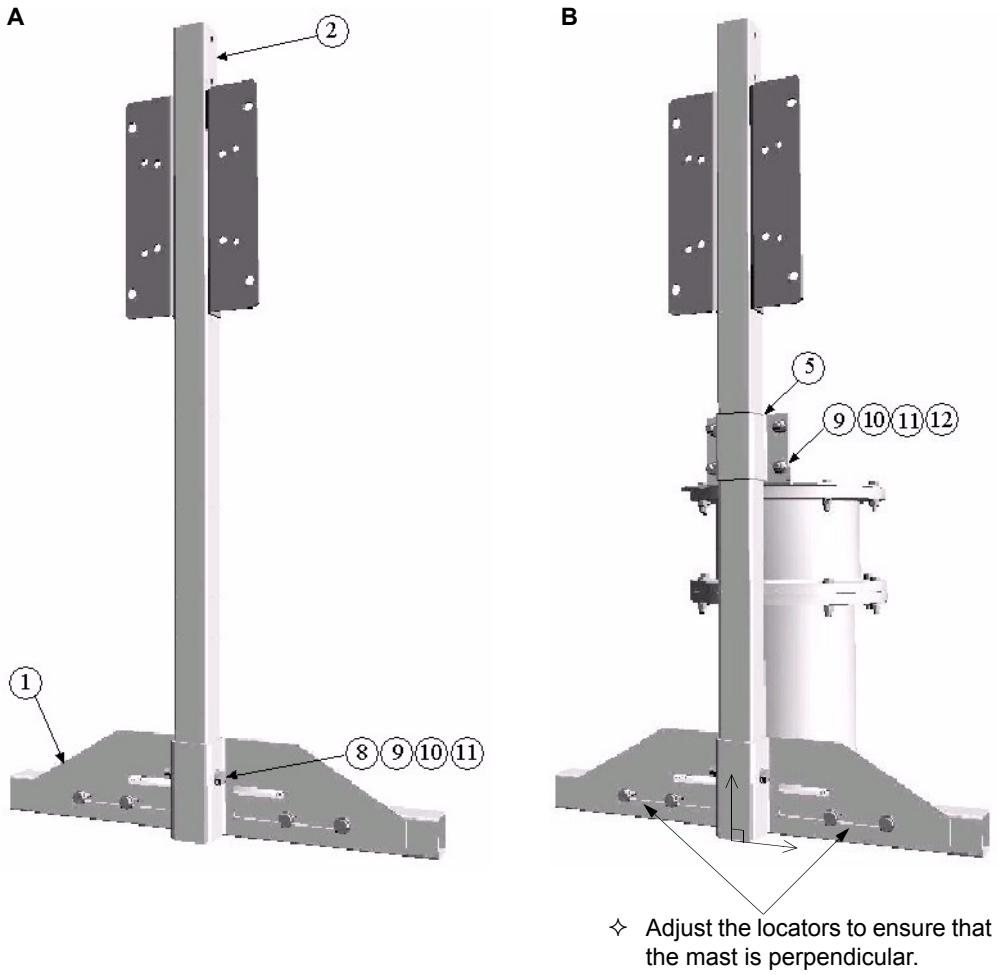
Figure 2-1 Retainer installation



2.2 Lower mast

1. Insert the lower mast assembly (item #2) into the stabilizer assembly (item #1). Fasten the assemblies with one M10 x 80 bolt (item #8), two washers (item #10), one lock washer (item #11), and one nut (item #9). See Figure 2-2 (A).
2. Place the lower mast assembly/stabilizer assembly against the flange of the retainer. Install the wellhead mast flange support bracket (item #5) using four M10 x 30 bolts (item #12), eight washers (item #10), four lock washers (item #11) and four nuts (item #9). See Figure 2-2 (B).

Figure 2-2 Lower mast installation



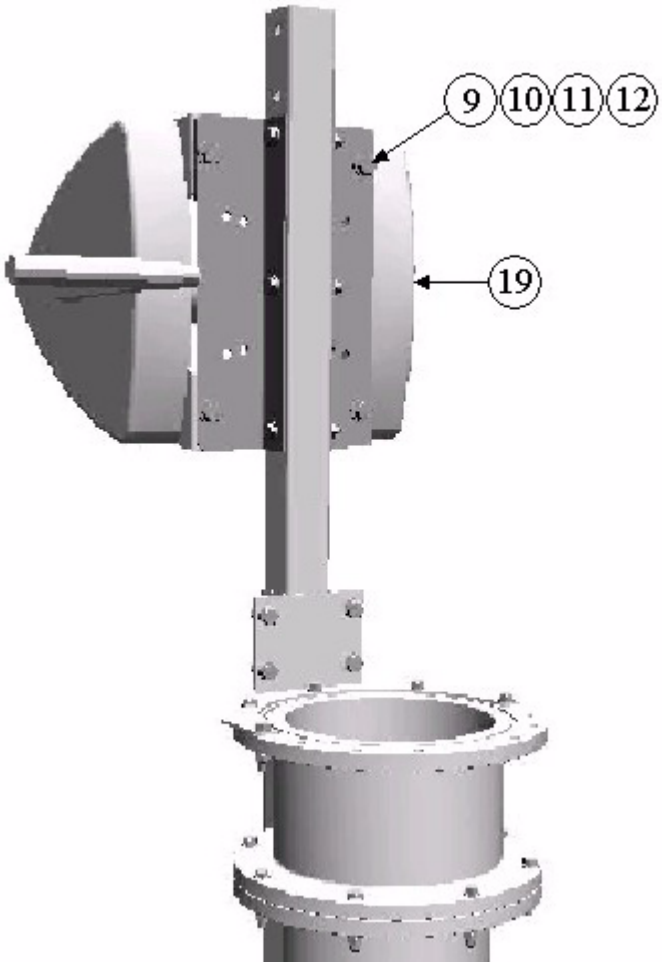
3. Use a spirit level to check whether the mast is perpendicular. Adjust the locators on the stabilizer if required to ensure that the mast is perpendicular, and then tighten the bolts. See Figure 2-2 (B).
4. Install the chain (see Figure 2-3):
   a) Adjust the chain length (item #17) and attach two eyebolts (item #16) using two quick links (item #18).
   b) Put the threaded ends of the eyebolts through the slots in the stabilizer, and then install four washers (item #15) and two nuts (item #14).
   c) Tighten the eyebolts to clamp the stabilizer to the borehole casing.
5. Check that all bolts are tight and then try moving the mast. If it is installed properly it will be rigid.

Figure 2-3 Chain installation (lower mast to borehole casing)

2.3 Winch

- Install the winch (item #19) on the winch bracket. Use the four M10 x 30 bolts (item #12), 8 washers (item #10), four lock washers (item #11), and four nuts (item #9). See Figure 2-4.

Figure 2-4 Winch installation

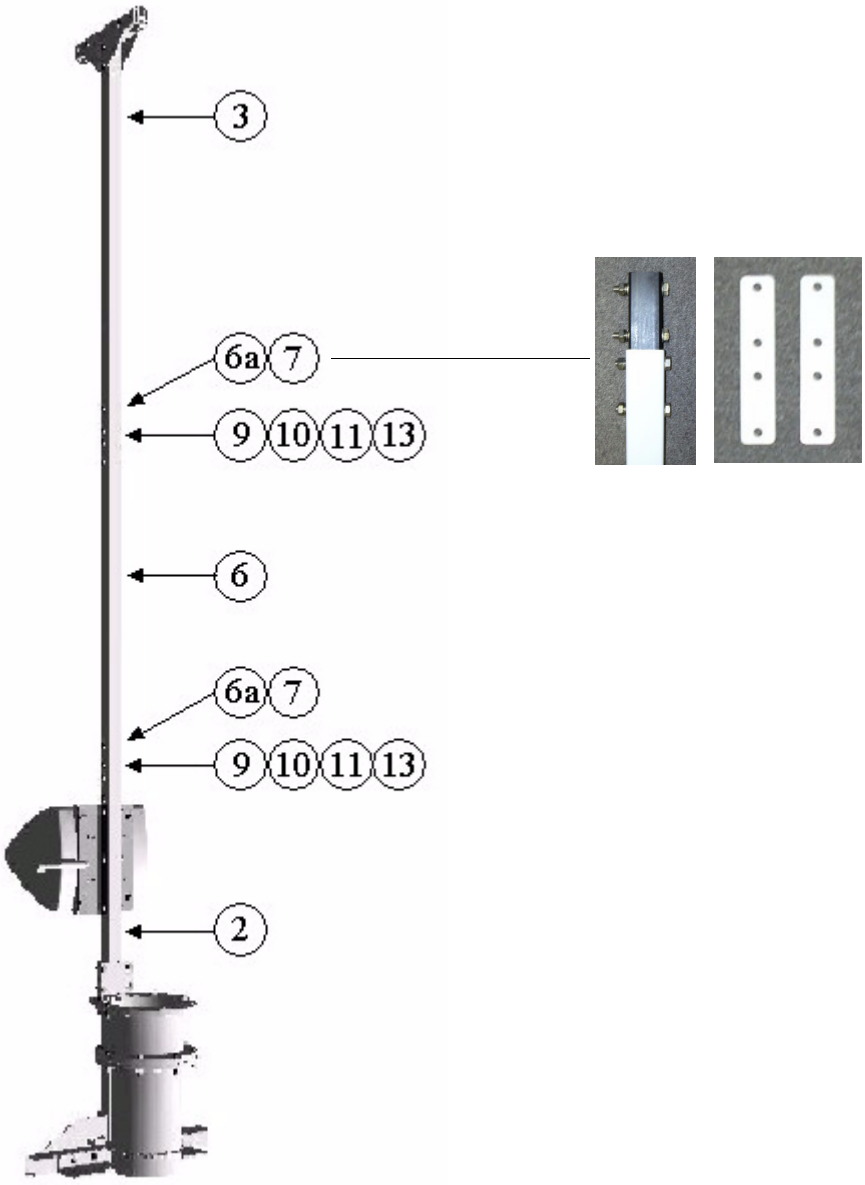


2.4 Full mast

The full mast includes the upper mast and lower mast assemblies. The mast may include the optional middle section if required. See Figure 2-5 for an example full mast assembly that includes the upper mast (item #3), lower mast (item #2), and the optional middle vertical tube (item #6) assemblies.

1. Insert the vertical tube union (item #6a) into the lower mast, and then loosely attach two wellhead joint support plates (item #7) to the lower mast. Use two M10 x 70 bolts (item #13), four washers (item #10), two lockwashers (item #11), and two nuts (item #9).
2. Place the upper mast assembly (item #3) on the vertical union tube and then secure the Wellhead mast joint support plates (item #7). Use two M10 x 70 bolts (item #13), four washers (item #10), two lockwashers (item #11), and two nuts (item #9).
3. Ensure that all joint support hardware is tight.

Figure 2-5 Full mast installation example*



* This example includes the optional middle vertical tube (6).

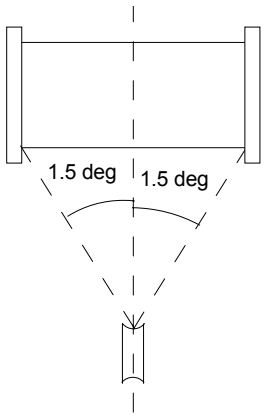
3 Operation

Warning Improper use of the winch may cause injury, or damage to equipment. Observe these 6 guidelines for operating the winch:

1) The winch should be installed and operated only by persons suitably trained to do so, and who are conversant with any local regulations governing this type of device.
2) Do not touch moving parts.

3) Ensure that any defects are repaired immediately by a competent, trained person.
4) Do not attempt any repair while the winch is in a loaded state.
5) Maintain, at all times, 3 dead wraps of rope on the winch drum, and maintain a maximum fleet angle of 1.5 degrees (Figure 3-1).
6) When multiple layers of rope are used on this winch, the drum flanges must project a distance at least 1.5 times the diameter of the total layers of the installed rope.

Figure 3-1 Maximum fleet angle



3.1 Installing the rope

Warning Improper installation of the rope may cause the load to fall. Install the rope as described in this procedure to ensure correct operation of the winch braking system.

Install the rope so that when the crank is turned clockwise the seismometer is lifted, and when the crank is turned counter-clockwise the seismometer is lowered.

1. Ensure that the size of rope (cable) used conforms to the load and to the winch name-plate detail.
2. Rotate the drum to bring the rope clamp to an accessible position.
3. Loosen the fixing screw in the rope clamp.
4. Insert the rope into the rope clamp.
5. Tighten the fixing screw.

3.2 Connecting the seismometer

- Once the rope has been properly installed on the winch rope drum, run the rope through the rollers (the sheaves at the top of the mast) and connect the seismometer.

3.3 Using the winch

- Insert the winch handle into either end of the winch:
  - To lift the seismometer, rotate the winch handle in the clockwise direction.
  - To lower the seismometer, rotate the winch handle in the counter-clockwise direction.