

Ground / Jumper Assembly Tester Catalog No. 6714

WARNINGS

- 1) Do not use this tester until all instructions have been read and understood.
- 2) If either of the circuit breakers have tripped, (the on/off switch is the second circuit breaker) verify the voltage control is in the zero position prior to resetting. If the breakers will not reset, or operate a second time, remove the tester from service until repairs can be made.
- 3) Do not try to test any equipment other than ground or jumper assemblies with this tester.
- 4) Do not attach or use any other electrode with this tester as it will change the resistance of the tester.
- 5) Do not exceed the charted voltage during a test as excessively high currents will result.
- 6) Do not lay cable on or near a conductive table or surface during tests.
- 7) Do not operate the tester above 105 percent.
(See Item 12 under OPERATION)

Failure to observe these warnings could result in inaccurate readings or damage to the tester.

OPERATION

- 1) Install the electrode through the tester and secure in place with the nuts supplied. **HAND TIGHTEN ONLY.**
- 2) Connect the tester to a grounded 110 volt source.
- 3) Measure the length of the cable. The length measured should be from the outer end of one ferrule to the outer end of the second ferrule. If testing a cable assembled to Mechanical Jumper Clamps or Load Pick-Up Tools, see Fig. 1 and Fig. 2 (page 4) to determine how to measure for length of the cable.
- 4) Attach the clamps and cable to be tested to the test electrode – one clamp on each side.

5) Position the cable to eliminate any coils, twists, or overlaps of the cable. Try to maintain 12 inches between the cable ends. See Fig. 3 on page 4.

6) MAKE SURE THE VOLTAGE CONTROL IS SET TO ZERO PRIOR TO SWITCHING THE TESTER ON.

7) Locate the page that corresponds to the size (diameter) of cable being tested.

8) Locate the length of the cable being tested by using the feet dimension at the side of the chart and the inch dimension at the top of the chart.

9) Determine the input voltage by the intersection of the (inch) column and the (feet) row. Example: A 6 ft 3 in. No. 2 cable would require an input voltage of 29.1. If testing the Load Pick Up Tool, Ball Socket Clamps, or A10015 URD Switch Clamps, see page 4 for adjustments to the input voltage.

10) Switch the tester on.

11) Turn the voltage control until the correct voltage is shown on the digital readout of the voltmeter.

12) Read the ammeter. It should indicate 100 percent. Readings higher than 105 percent may indicate the wrong voltage was chosen. Immediately reduce the voltage and check for the correct input voltage. Readings lower than 95 percent indicate higher resistance than normal and additional investigation is required.

TEST RESULTS

If the reading obtained is less than 95 percent, the jumper should be separated from the clamps and the connections between the clamps and cable cleaned. While a visual inspection of this connection is NOT reliable, a visual inspection of the rest of the assembly should be performed

This should include inspection for

- 1) “knotting” of the cable,
- 2) broken strands below the clamp,
- 3) missing or loose cable retaining hardware,
- 4) damaged, bent, corroded, or stiff eye screws, or
- 5) any other missing or damaged parts on the clamp or cable. All defects must be corrected and the assembly re-tested before returning the unit to service.

Slight variations may be detected between jumpers in good condition which have different clamps attached. This is due to the difference in resistance of the clamps, and will be most noticeable between clamps made from different metals. This difference should not be assumed to be an indication of a difference in the quality or capacity of the clamps.

The readings obtained may vary slightly if the length of the cable is not exactly the same as listed in the chart.

A digital voltmeter can be used to evaluate each individual connection in the jumper assembly and determine which connection may be making the jumper fail. With the jumper still connected to the 6714, increase the INPUT VOLTAGE until a 100 percent reading is obtained on the PERCENT meter. This will require an input voltage above the charted value. Do NOT exceed 100 percent. Use the two probes of an A.C. milli-voltmeter and measure the voltage drop across the various connections, i.e. from the cable to the ferrule, from the ferrule to the clamp, from the clamp body to the test bar, etc. Any two connected parts that the current must flow through represent a potential area for a bad connection. A good connection will measure approximately 5 milli-volts. Readings from 0 to 10 milli-volts are acceptable. Bad connections will be much higher, with readings of 100 milli-volts or more possible.

Testing Hastings 21362 Truck Ground Reels w/cable installed

1) Select a short jumper that will be used to go from the ground rod on the Ground Reel to the test bar on the Tester. Test this jumper per previous operation instructions. It is not necessary that this jumper be the same diameter cable as what is on the Ground Reel. Record the voltage used to test this jumper.

2) Pull all of the cable off of the reel and measure the cable from the outer end of the ferrule to where the cable enters the drum of the Ground Reel. Add 9" (length of cable inside of the reel) to this measurement and determine the input voltage from the corresponding chart* for cable size and length. Record this voltage.

3) Add 31.5 volts for the Ground Reel.

4) Add these three voltages together for the input voltage to use on the Tester.

5) When the total input voltage exceeds 130 volts, divide the total input voltage by 2. Use this value for your total input voltage (ex. $188.0 \text{ V} \div 2 = 94 \text{ V}$). Since the input voltage was divided by 2, the acceptable percentage range must also be divided by 2, changing the range from 95%-105% to 47.5%-52.5%.

Example Calculations:

Step 1:	Voltage
Length of Short Jumper 8' of 1/0 cable	28.2 V
Step 2:	
Length of Cable on Reel $39' 3" + 9" = 40'$ of 1/0 cable	128.3 V
Step 3:	
Add voltage for Ground Reel	31.5 V
Step 4:	
Add voltages together to get input voltage	188.0 V
Step 5:	
Input voltage exceeds 130 V, \div by 2 $188.0 \text{ V} \div 2 = 94.0 \text{ V}$	94.0 V

*You can use different sections of the charts for voltages for your jumper and the cable on the Ground Reel. If you use a section of the chart that uses a reduced reading for the percent meter (ex. #2 cable, 31' to 60', the ideal reading on the percent meter is reduced to 50%), you must use a multiplier for the voltage. Multiply the volts by 2 for the 50% chart, and by 2.5 for the 40% chart. Step 2 on the following example calculation uses the 50% chart for #2 cable.

Step 1:	Voltage
Length of Short jumper 8' of 1/0 cable	28.2 V
Step 2:	
Length of Cable on Reel $39' 3" + 9" = 40'$ of #2 cable $84.7 \text{ V} \times 2$	169.4 V
Step 3:	
Add voltage for Ground Reel	31.5 V
Step 4:	
Add voltages together to get input voltage	229.1 V
Step 5:	
Input voltage exceeds 130 V, \div by 2 $229.1 \div 2 = 114.6 \text{ V}$	114.6 V

6) Assemble one end of the jumper to the rod on the Ground Reel and the other end of the jumper to one side of the test bar on the Tester.

7) Attach the free end of the cable (from the Ground Reel) to the free end of the test bar on the Tester.

8) Position the cable to eliminate any coils, twists, or overlaps of the cable. Try to maintain 12 inches between the cable ends. See Fig. 3 on page 4.

9) **MAKE SURE THE VOLTAGE CONTROL IS SET TO ZERO PRIOR TO SWITCHING THE TESTER ON.**

10) Switch the tester on.

11) Turn the voltage control until the correct voltage is shown on the digital readout of the voltmeter.

12) Read the ammeter. It should indicate 100 percent. Readings higher than 105 percent may indicate the wrong voltage was chosen. Immediately reduce the voltage and check for the correct input voltage. Readings lower than 95 percent indicate higher resistance than normal and additional investigation is required.

Testing Hastings 21366 Truck Ground Reels w/cable installed

1) Select a short jumper that will be used to go from the ground rod on the Ground Reel to the test bar on the Tester. Test this jumper per previous operation instructions. It is not necessary that this jumper be the same diameter cable as what is on the Ground Reel. Record the voltage used to test this jumper.

2) Pull all of the cable off of the reel and measure the cable from the outer end of the ferrule to where the cable enters the drum of the Ground Reel. Add 9" (length of cable inside of the reel) to this measurement and determine the input voltage from the corresponding chart* for cable size and length. Record this voltage.

3) Add 38.6 volts for the Ground Reel.

4) Add these three voltages together for the input voltage to use on the Tester.

5) When the total input voltage exceeds 130 volts, divide the total input voltage by 2. Use this value for your total input voltage (ex. $188.0 \text{ V} \div 2 = 94 \text{ V}$). Since the input voltage was divided by 2, the acceptable percentage range must also be divided by 2, changing the range from 95%-105% to 47.5%-52.5%.

Example Calculations:

<u>Step 1:</u>	<u>Voltage</u>
Length of Short Jumper 8' of 1/0 cable	28.2 V
<u>Step 2:</u> Length of Cable on Reel 39' 3" + 9" = 40' of 1/0 cable	128.3 V
<u>Step 3:</u> Add voltage for Ground Reel	38.6 V
<u>Step 4:</u> Add voltages together to get input voltage	195.1 V
<u>Step 5:</u> Input voltage exceeds 130 V, \div by 2 $195.1 \text{ V} \div 2 = 97.6 \text{ V}$	97.6 V

*You can use different sections of the charts for voltages for your jumper and the cable on the Ground Reel. If you use a section of the chart that uses a reduced reading for the percent meter (ex. #2 cable, 31' to 60', the ideal reading on the percent meter is reduced to 50%), you must use a multiplier for the voltage. Multiply the volts by 2 for the 50% chart, and by 2.5 for the 40% chart. Step 2 on the following example calculation uses the 50% chart for #2 cable.

<u>Step 1:</u>	<u>Voltage</u>
Length of Short jumper 8' of 1/0 cable	28.2 V
<u>Step 2:</u> Length of Cable on Reel 39' 3" + 9" = 40' of #2 cable 84.7 V X 2	169.4 V
<u>Step 3:</u> Add voltage for Ground Reel	38.6 V
<u>Step 4:</u> Add voltages together to get input voltage	236.2 V
<u>Step 5:</u> Input voltage exceeds 130 V, \div by 2 $236.2 \text{ V} \div 2 = 118.1 \text{ V}$	118.1 V

6) Assemble one end of the jumper to the rod on the Ground Reel and the other end of the jumper to one side of the test bar on the Tester.

7) Attach the free end of the cable (from the Ground Reel) to the free end of the test bar on the Tester.

8) Position the cable to eliminate any coils, twists, or overlaps of the cable. Try to maintain 12 inches between the cable ends. See Fig. 3 on page 4.

9) **MAKE SURE THE VOLTAGE CONTROL IS SET TO ZERO PRIOR TO SWITCHING THE TESTER ON.**

10) Switch the tester on.

11) Turn the voltage control until the correct voltage is shown on the digital readout of the voltmeter.

12) Read the ammeter. It should indicate 100 percent. Readings higher than 105 percent may indicate the wrong voltage was chosen. Immediately reduce the voltage and check for the correct input voltage. Readings lower than 95 percent indicate higher resistance than normal and additional investigation is required.

The attached charts are for use with the standard test bar (P30605), and with the underground elbow test bar (6714-3)

Adjustments to the chart are necessary for the test bars shown below.

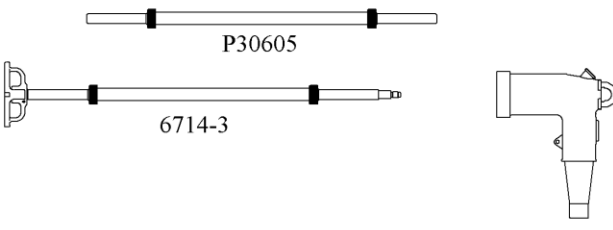
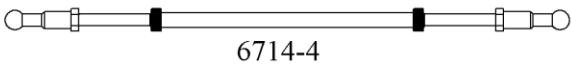
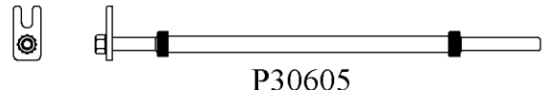
	<p>When testing ball socket clamps with the 6714-4 test bar, the input voltage must be increased 1.0 volt if using a ball at only one end, and 2.0 volts if using a ball at both ends. (NOTE: The ball attachments on the end of the test bar are not supplied.)</p> 	<p>When testing the A10015 URD switch clamp with test bar 6714-5, 3.0 volts must be added to the input voltage.</p> 
----------------------------------------------------------------------------------	-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------	----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------

Fig. 1 When testing the 6600, **3.5 volts must be added** to the input voltage, when testing the 6605, **5.0 volts must be added** to the input voltage.

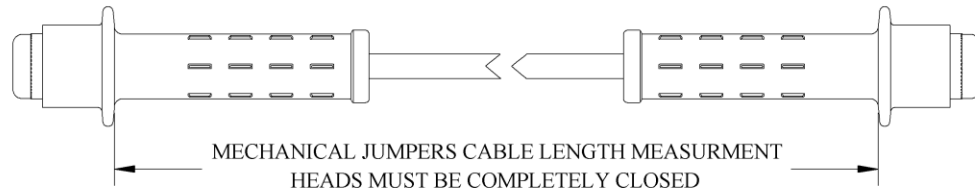
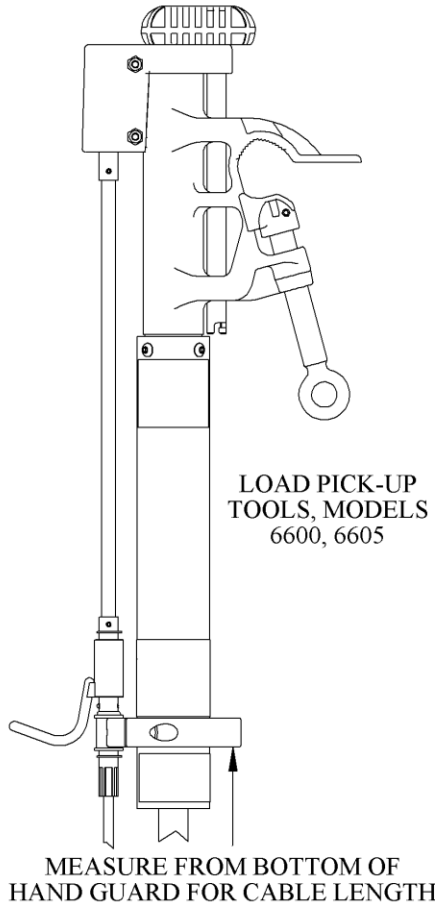


Fig. 2

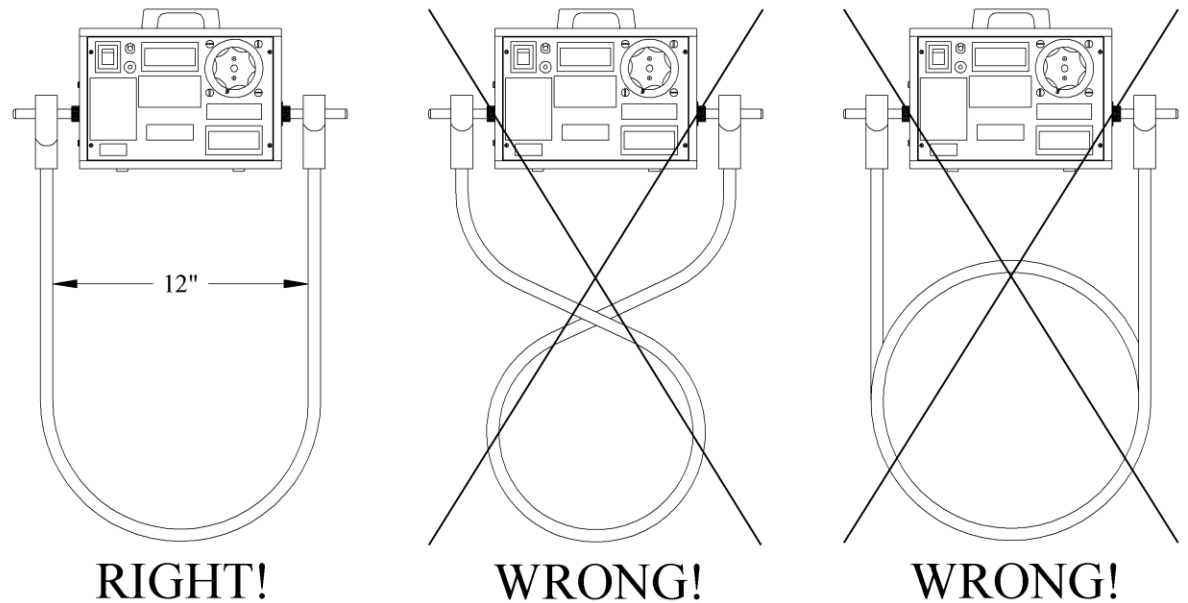
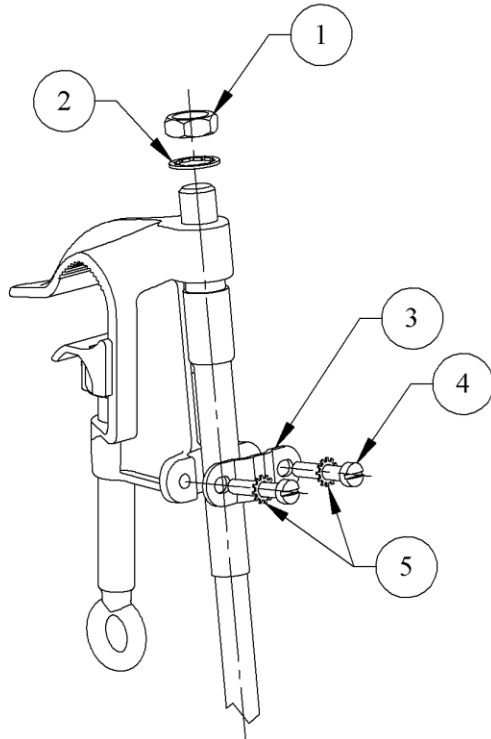
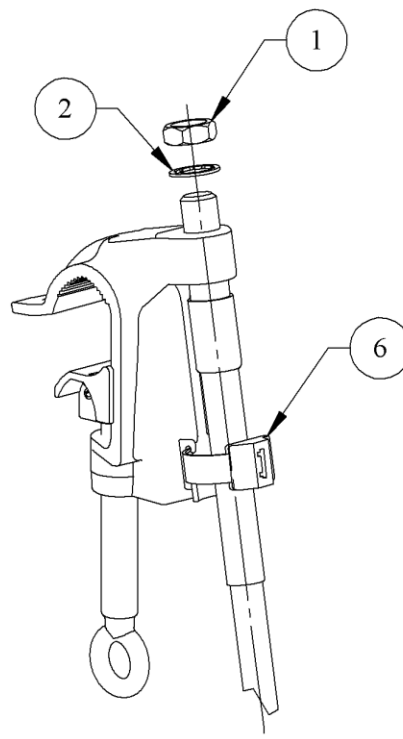


Fig. 3

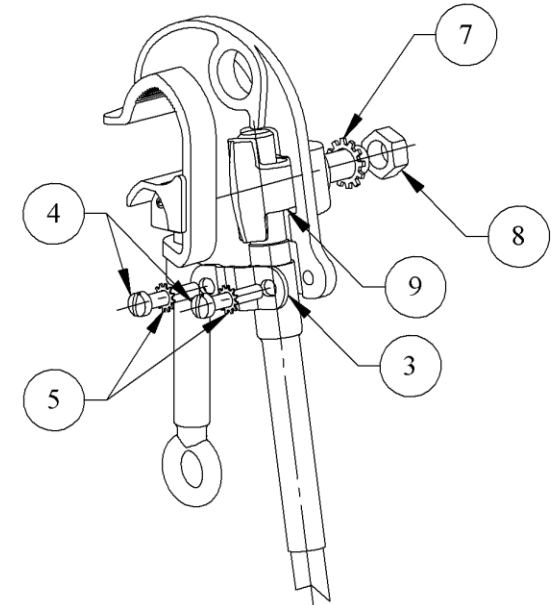
Replacement Parts for Hastings Grounding Clamps



HASTINGS 5/8-11 THREADED
TERMINAL GROUND CLAMPS
W/METAL CABLE STRAP



HASTINGS 5/8-11 THREADED
TERMINAL GROUND CLAMPS
W/PLASTIC CABLE STRAP



HASTINGS BOLTED FERRULE
GROUND CLAMPS

1	9	5-20116	EYE BOLT
1	8	1-04261	NUT
1	7	1-07457	LOCK WASHER
1	6	P16703	PLASTIC TIE CLAMP
2	5	1-07447	LOCK WASHER
2	4	1-05185	SCREW
1	3	P31008	METAL CABLE STRAP
1	2	1-07832	LOCK WASHER
1	1	1-04270	BRONZE HEX NUT
QTY.	ITEM NO.	PART NO.	DESCRIPTION

Refer to page O-8 for ferrules and cables.

Refer to page O-8-1 for ferrules with heat shrink.

Contact your Hastings representative or the factory if you need help in identifying parts needed for repair or replacement.

HASTINGS
FIBER GLASS PRODUCTS, INC
P.O. BOX 218, 770 COOK ROAD
HASTINGS, MI 49058
tel (269) 945-9541 fax (269) 945-4623

P15094R8