

Ground / Jumper Assembly Tester Catalog No. 7714

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 start 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) Attach each electrode to the tester and secure.
- 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. For substation clamps and other large clamps, see figure 4.
- 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 20 inches between the cable ends. See Fig. 3 on page 4.

6) MAKE SURE THE VOLTAGE CONTROL IS SET TO START 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 249. 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 Input Voltage meter.
- 12) Read the Percent Amperage. 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 7714, 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. millivoltmeter 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 millivolts. Readings from 0 to 10 millivolts are acceptable. Bad connections will be much higher, with readings of 100 millivolts 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 300 millivolts 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 1200 millivolts, divide the total input voltage by 2. Use this value for your total input voltage (ex. $1459 \text{ mV} \div 2 = 730 \text{ mV}$). 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> Length of Short Jumper 8' of 1/0 cable	<u>Voltage</u> 248 mV
<u>Step 2:</u> Length of Cable on Reel $29'6" + 9" = 30'3" 1/0 cable$	911 mV
<u>Step 3:</u> Add voltage for Ground Reel	300 mV
<u>Step 4:</u> Add voltages together to get input voltage	1459 mV
<u>Step 5:</u> Input voltage exceeds 1200 mV, \div by 2 $1459 \text{ mV} \div 2 = 730 \text{ mV}$	730 mV

*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 input voltage 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> Length of Short Jumper 8' of 1/0 cable	<u>Voltage</u> 248 mV
<u>Step 2:</u> Length of Cable on Reel $39'3" + 9" = 40'$ of #2 cable 774 V X 2	1548 mV
<u>Step 3:</u> Add voltage for Ground Reel	300 mV
<u>Step 4:</u> Add voltages together to get input voltage	2096 mV
<u>Step 5:</u> Input voltage exceeds 1200 mV, \div by 2 $2096 \text{ mV} \div 2 = 1048 \text{ mV}$	1048 mV

- 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.

- 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 START PRIOR TO SWITCHING THE TESTER ON.**

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 368 millivolts 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 1200 millivolts, divide the total input voltage by 2. Use this value for your total input voltage (ex. $1527\text{mV} \div 2 = 764\text{ mV}$). 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> Length of Short Jumper 8' of 1/0 cable	<u>Voltage</u> 248 mV
<u>Step 2:</u> Length of Cable on Reel $29'6" + 9" = 30'3"$ of 1/0 cable	<u>Voltage</u> 911 mV
<u>Step 3:</u> Add voltage for Ground Reel	<u>Voltage</u> 368 mV
<u>Step 4:</u> Add voltages together to get input voltage	<u>Voltage</u> 1527 mV
<u>Step 5:</u> Input voltage exceeds 130 V, \div by 2 $1527\text{mV} \div 2 = 764\text{ mV}$	<u>Voltage</u> 764 mV

*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 input voltage 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> Length of Short jumper 8' of 1/0 cable	<u>Voltage</u> 248 mV
<u>Step 2:</u> Length of Cable on Reel $39'3" + 9" = 40'$ of #2 cable $774\text{ mV} \times 2$	<u>Voltage</u> 1548 mV
<u>Step 3:</u> Add voltage for Ground Reel	<u>Voltage</u> 368 mV
<u>Step 4:</u> Add voltages together to get input voltage	<u>Voltage</u> 2164 mV
<u>Step 5:</u> Input voltage exceeds 130 V, \div by 2 $2164\text{ mV} \div 2 = 1082\text{ mV}$	<u>Voltage</u> 1082 mV

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 START 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 listed fittings below with the 7714 tester.

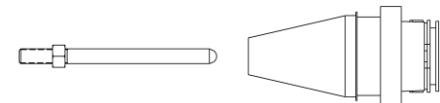
Adjustments to the chart are necessary for the fittings shown below.

When testing grounded elbows add 20 millivolts to the input voltage. Measure the cable length to the center of the elbow



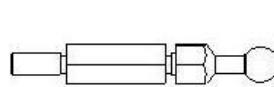
A30367

When testing grounded bushings add 35 millivolts to the input voltage. Measure the cable length to the center of the bushing.

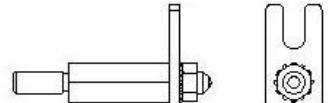


A30368

When testing ball socket clamps using the A30387 Short 20 mm Dia. ball stud electrode, the input voltage must be increased 10 millivolts if using a ball at only one end, and 20 millivolts if using a ball at both ends. When testing URD clamp with the A30666 electrode, increase the input voltage by 35 millivolts.

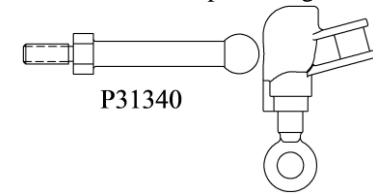


A30387



A30666

When testing ball socket clamps using the P31340 Long 1" Dia. ball electrode, 10 millivolts must be added to the input voltage.



P31340

Fig. 1 When testing the 6600, 35 millivolts must be added to the input voltage, when testing the 6605, 50 millivolts must be added to the input voltage.

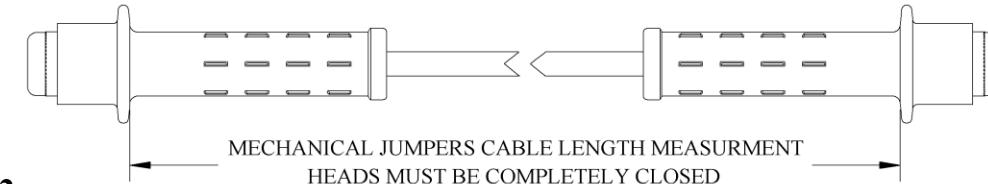
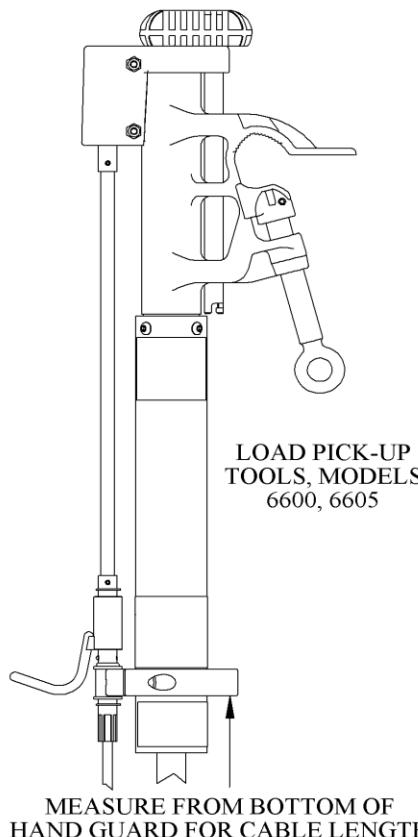


Fig. 2

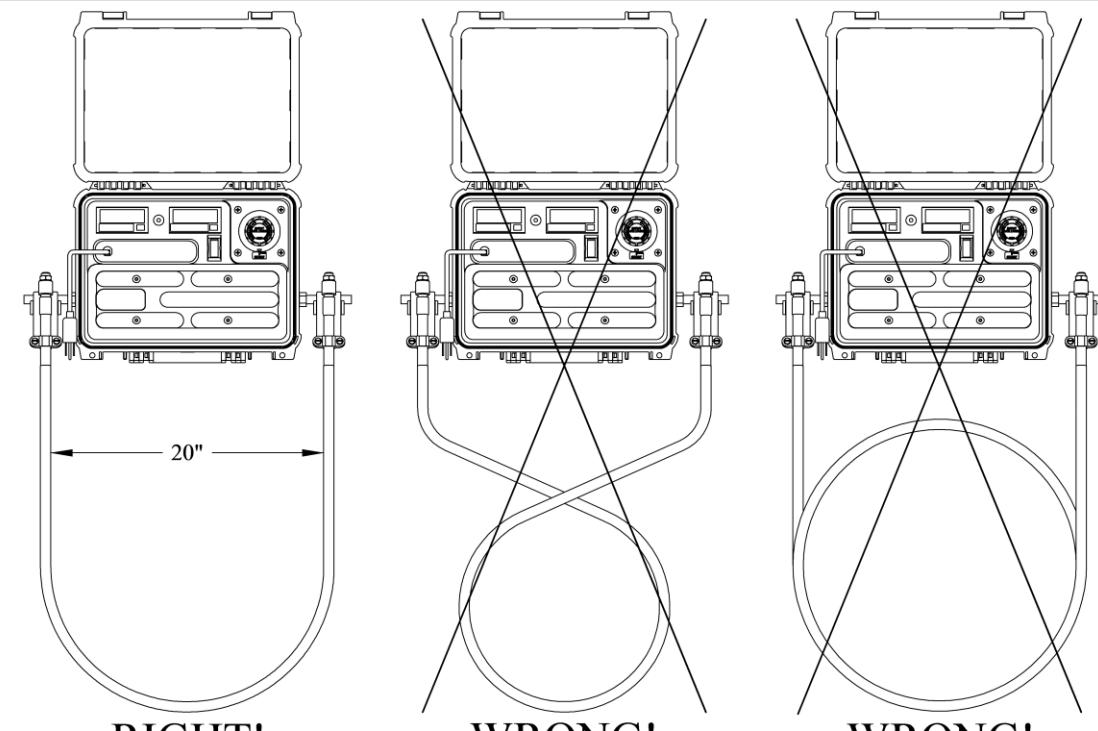


Fig. 3

SUBSTATION/LARGE CLAMP INPUT ADJUSTMENT

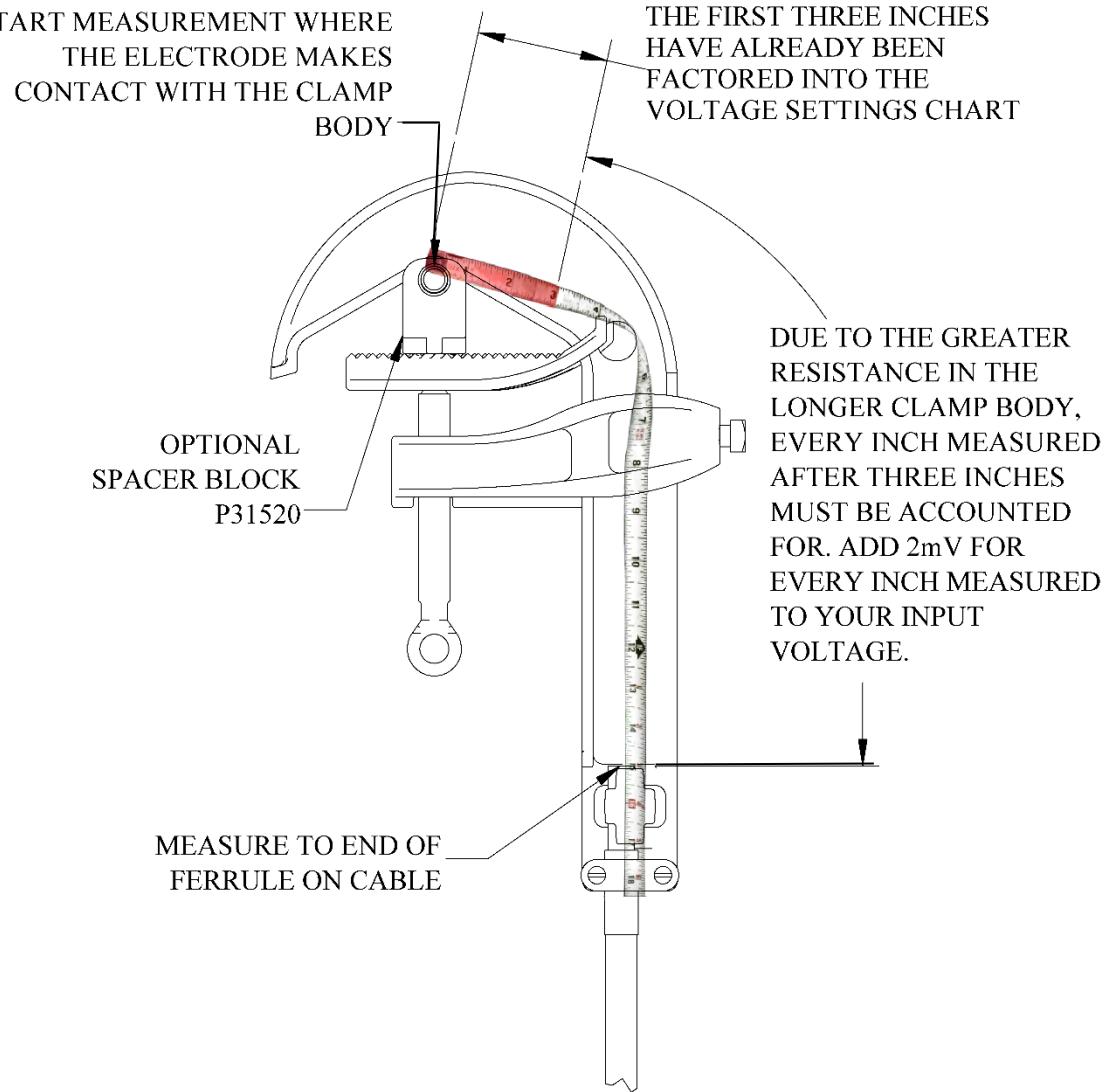
ADJUSTING THE INPUT VOLTAGE:

1. MEASURE THE TOTAL LENGTH FROM THE POINT OF CONTACT BETWEEN THE ELECTRODE AND THE CLAMP BODY TO THE TOP OF THE CABLE FERRULE.
2. SUBTRACT 3" FROM TOTAL LENGTH TO GET THE NEW LENGTH. (THE VOLTAGE CHART HAS A BUILT IN ALLOWANCE FOR 3").
3. MULTIPLY THE NEW LENGTH BY 2mV AND ADD THE NUMBER OF MILLIVOLTS TO THE INPUT VOLTAGE ON THE CHART.

EXAMPLE: 12282 CLAMP

1. MEASURED LENGTH: 15"
2. NEW LENGTH: 12"
3. NUMBER OF MILLIVOLTS TO ADD TO THE CHART: 24mV

COMMON HASTINGS CLAMPS			
CAT. NO.	TOTAL LENGTH	COMPENSATION LENGTH	mV TO ADD TO CHART
12282	15"	12"	24
9071	6"	3"	6
21056	13"	10"	25



- * ONLY APPLICABLE TO FURTHEST CABLE CONNECTION
- * ADDED 5mV TO FINAL NUMBER TO COMPENSATE FOR EXTRA CONNECTION BETWEEN THE CLAMP AND BUS BAR

FIGURE 4

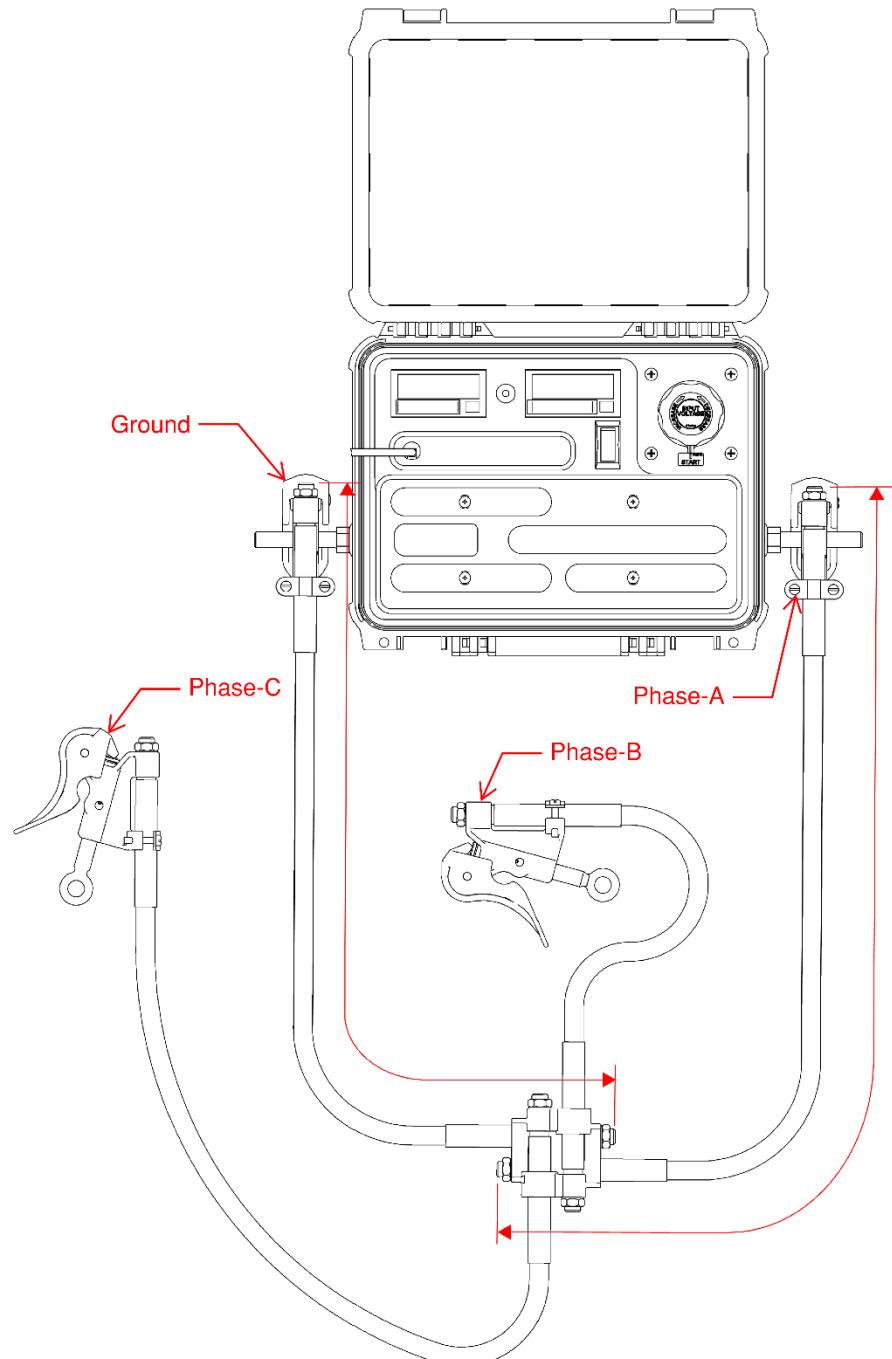
Three Phase Grounding Sets

SEE WARNINGS ON PAGE ONE

OPERATION

- 1) Attach each electrode to the tester and secure.
- 2) Connect the tester to a grounded 110 volt source.
- 3) Measure the length of each cable being tested. The length measured should be from the outer end of one ferrule to the outer end of the second ferrule for each cable that is connected to the tester. Add the two lengths of cable together to get one total length.
- 4) Attach the clamps and cable to be tested to the test electrode – one clamp on each side. Test from ground to phase. Test through the possible combinations: Ground to A, Ground to B, Ground to C.
- 5) Position the cable to eliminate any coils, twists, or overlaps of the cables being tested. Try to maintain 20 inches between the cable ends. The grounds sets not being tested can be set aside and will not interfere with the testing. Make sure clamps not being tested do not contact any energized source or the clamps and connections being tested.
- 6) MAKE SURE THE VOLTAGE CONTROL IS SET TO START 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: An 8 ft. 3 in. 2/0 cable combined with a 10 ft. 2 in. 2/0 cable (18 ft. 5 in. total) would require an input voltage of 507.
- 10) Switch the tester on.
- 11) Turn the voltage control until the correct voltage is shown on the Input Voltage meter.
- 12) Read the Percent Amperage. 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.
- 13) Test the rest of the clamps as described above.

SEE TEST RESULTS AS INDICATED ON PAGE ONE



VOLTAGE INPUT SETTINGS

#2 CABLE

FOR USE WITH HASTINGS FIBER GLASS PRODUCTS
7714 TESTER
November 16, 2009

FEET	INCHES											
	1	2	3	4	5	6	7	8	9	10	11	
3	124	127	130	133	136	140	143	146	149	152	156	159
4	162	165	169	172	175	178	181	185	188	191	194	197
5	201	204	207	210	213	217	220	223	226	229	233	236
6	239	242	246	249	252	255	258	262	265	268	271	274
7	278	281	284	287	290	294	297	300	303	307	310	313
8	316	319	323	326	329	332	335	339	342	345	348	351
9	355	358	361	364	368	371	374	377	380	384	387	390
10	393	396	400	403	406	409	412	416	419	422	425	429
11	432	435	438	441	445	448	451	454	457	461	464	467
12	470	473	477	480	483	486	490	493	496	502	506	
13	509	512	515	518	522	525	528	531	534	538	541	544
14	547	550	554	557	560	563	567	570	573	576	579	583
15	586	589	592	595	599	602	605	608	611	615	618	621
16	624	628	631	634	637	640	644	647	650	653	656	660
17	663	666	669	672	676	679	682	685	689	692	695	698
18	701	705	708	711	714	717	721	724	727	730	733	737
19	740	743	746	750	753	756	759	762	766	769	772	775
20	778	782	785	788	791	794	798	801	804	807	811	814
21	817	820	823	827	830	833	836	839	843	846	849	852
22	855	859	862	865	868	872	875	878	881	884	888	891
23	894	897	900	904	907	910	913	916	920	923	926	929
24	932	936	939	942	945	949	952	955	958	961	965	968
25	971	974	977	981	984	987	990	993	997	1000	1003	1006
26	1010	1013	1016	1019	1022	1026	1029	1032	1035	1038	1042	1045
27	1048	1051	1054	1058	1061	1064	1067	1071	1074	1077	1080	1083
28	1087	1090	1093	1096	1099	1103	1106	1109	1112	1115	1119	1122
29	1125	1128	1132	1135	1138	1141	1144	1148	1151	1154	1157	1160
30	1164	1167	1170	1173	1176	1180	1183	1186	1189	1193	1196	1199

FROM 31 TO 60 FEET, THE IDEAL READING ON THE PERCENT METER IS
REDUCED TO 50 PERCENT, DUE TO THE INCREASED RESISTANCE OF THE
JUMPERS AND THE LIMITED OUTPUT VOLTAGE OF THE TESTER.

50 PERCENT

FEET	INCHES											
	1	2	3	4	5	6	7	8	9	10	11	
31	601	603	604	606	607	609	611	612	614	616	617	619
32	620	622	624	625	627	628	630	632	633	635	636	638
33	640	641	643	644	646	648	649	651	652	654	656	657
34	659	660	662	664	665	667	668	670	672	673	675	677
35	678	680	681	683	685	686	688	689	691	693	694	696
36	697	699	701	702	704	705	707	709	710	712	713	715
37	717	718	720	721	723	725	726	728	729	731	733	734
38	736	737	739	741	742	744	746	747	749	750	752	754
39	755	757	758	760	762	763	765	766	768	770	771	773
40	774	776	778	779	781	782	784	786	787	789	790	792
41	794	795	797	798	800	802	803	805	807	808	810	811
42	813	815	816	818	819	821	823	824	826	827	829	831
43	832	834	835	837	839	840	842	843	845	847	848	850
44	851	853	855	856	858	859	861	863	864	866	868	869
45	871	872	874	876	877	879	880	882	884	885	887	888
46	890	892	893	895	896	898	900	901	903	904	906	908
47	909	911	912	914	916	917	919	920	922	924	925	927
48	928	930	932	933	935	937	938	940	941	943	945	946
49	948	949	951	953	954	956	957	959	961	962	964	965
50	967	969	970	972	973	975	977	978	980	981	983	985
51	986	988	989	991	993	994	996	998	999	1001	1002	1004
52	1006	1007	1009	1010	1012	1014	1015	1017	1018	1020	1022	1023

FEET	INCHES											
	1	2	3	4	5	6	7	8	9	10	11	
53	1025	1026	1028	1030	1031	1033	1034	1036	1038	1039	1041	1042
54	1044	1046	1047	1049	1050	1052	1054	1055	1057	1059	1060	1062
55	1063	1065	1067	1068	1070	1071	1073	1075	1076	1078	1079	1081
56	1083	1084	1086	1087	1089	1091	1092	1094	1095	1097	1099	1100
57	1102	1103	1105	1107	1108	1110	1111	1113	1115	1116	1118	1119
58	1121	1123	1124	1126	1128	1129	1131	1132	1134	1136	1137	1139
59	1140	1142	1144	1145	1147	1148	1150	1152	1153	1155	1156	1158
60	1160	1161	1163	1164	1166	1168	1169	1171	1172	1174	1176	1177

FROM 61 TO 75 FEET, THE IDEAL READING ON THE PERCENT METER IS
REDUCED TO 40 PERCENT, DUE TO THE INCREASED RESISTANCE OF THE
JUMPERS AND THE LIMITED OUTPUT VOLTAGE OF THE TESTER.

40 PERCENT

FEET	INCHES											
	1	2	3	4	5	6	7	8	9	10	11	
61	943	944	946	947	948	950	951	952	953	955	956	957
62	959	960	961	962	964	965	966	967	969	970	971	973
63	974	975	976	978	979	980	982	983	984	985	987	988
64	989	991	992	993	994	996	997	998	999	1000	1001	1003
65	1005	1006	1007	1009	1010	1011	1012	1014	1015	1016	1017	1018
66	1020	1021	1023	1024	1025	1027	1028	1029	1030	1032	1033	1034
67	1036	1037	1038	1039	1041	1042	1043	1045	1046	1047	1048	1049
68	1051	1052	1054	1055	1056	1057	1058	1059	1060	1061	1062	1063
69	1066	1068	1069	1070	1072	1073	1074	1075	1076	1077	1078	1079
70	1082	1083	1084	1086	1087	1088	1089	1091	1092	1093	1094	1095
71	1097	1098	1100	1101	1102	1104	1105	1106	1107	1109	1110	1111
72	1113	1114	1115	1116	1118	1119	1120	1122	1123	1124	1125	1127
73	1128	1129	1131	1132	1133	1134	1136	1137	1138	1140	1141	1142
74	1143	1145	1146	1147	1149	1150	1151	1152	1154	1155	1156	1158
75	1159	1160	1161	1163	1164	1165	1167	1168	1169	1170	1172	1173

FROM 76 TO 100 FEET, THE IDEAL READING ON THE PERCENT METER IS
REDUCED TO 30 PERCENT, DUE TO THE INCREASED RESISTANCE OF THE
JUMPERS AND THE LIMITED OUTPUT VOLTAGE OF THE TESTER.

30 PERCENT

FEET	INCHES										
	1	2	3	4	5	6	7	8	9	10	11
76	881	882	883	884	885						

VOLTAGE INPUT SETTINGS

1/0 CABLE

FOR USE WITH HASTINGS FIBER GLASS PRODUCTS

7714 TESTER

November 16, 2009

FEET	INCHES											FEET											INCHES															
	1	2	3	4	5	6	7	8	9	10	11	49	735	736	737	739	740	741	742	744	745	746	747	749	1	2	3	4	5	6	7	8	9	10	11			
3	99	102	104	107	109	112	114	117	119	122	124	127	54	809	811	812	813	814	816	817	818	819	821	822	823	50	750	751	752	754	755	756	757	759	760	761	762	764
4	129	132	134	137	139	142	144	147	149	152	154	156	55	824	826	827	828	829	831	832	833	834	836	837	838	51	765	766	767	769	770	771	772	773	775	776	777	778
5	159	161	164	166	169	171	174	176	179	181	184	186	56	839	841	842	843	844	845	847	848	849	850	852	853	52	780	781	782	783	785	786	787	788	789	790	791	793
6	189	191	194	196	199	201	204	206	209	211	214	216	57	854	855	857	858	859	860	862	863	864	865	867	868	58	869	870	872	873	874	875	877	878	879	880	881	883
7	219	221	224	226	228	231	233	236	238	241	243	246	59	884	885	886	888	889	890	891	893	894	895	896	898	60	899	900	901	903	904	905	906	908	909	910	911	913
8	248	251	253	256	258	261	263	266	268	271	273	276	61	914	915	916	917	919	920	921	922	924	925	926	927	62	929	930	931	932	934	935	936	937	939	940	941	942
9	278	281	283	286	288	291	293	296	298	301	303	305	63	944	945	946	947	949	950	951	952	953	955	956	957	64	958	960	961	962	963	965	966	967	968	970	971	972
10	308	310	313	315	318	320	323	325	328	330	333	335	65	973	975	976	977	978	980	981	982	983	985	986	987	66	988	989	991	992	993	994	996	997	998	999	1001	1002
11	338	340	343	345	348	350	353	355	358	360	363	365	67	1003	1004	1006	1007	1008	1009	1011	1012	1013	1014	1016	1017	68	1018	1019	1021	1022	1023	1024	1025	1027	1028	1029	1030	1032
12	368	370	373	375	377	380	382	385	387	390	392	395	69	1033	1034	1035	1037	1038	1039	1040	1042	1043	1044	1045	1047	70	1048	1049	1050	1052	1053	1054	1055	1057	1058	1059	1060	1061
13	397	400	402	405	407	410	412	415	417	420	422	425	71	1063	1064	1065	1066	1068	1069	1070	1071	1073	1074	1075	1076	72	1078	1079	1080	1081	1083	1084	1085	1086	1088	1089	1090	1091
14	427	430	432	435	437	440	442	445	447	449	452	454	73	1093	1094	1095	1096	1097	1099	1100	1101	1102	1104	1105	1106	74	1107	1109	1110	1111	1112	1114	1115	1116	1117	1119	1120	1121
15	457	459	462	464	467	469	472	474	477	479	482	484	75	1122	1124	1125	1126	1127	1129	1130	1131	1132	1133	1135	1136	76	910	911	912	913	914	915	916	917	918	919	920	921
16	487	489	492	494	497	499	502	504	507	509	512	514	77	922	923	924	925	926	927	928	929	930	931	932	933	78	934	935	936	937	938	939	940	941	942	943	944	945
17	517	519	521	524	526	529	531	534	536	539	541	544	79	946	947	948	949	950	951	952	953	955	956	957	968	80	957	958	959	960	961	962	963	964	965	966	967	968
18	546	549	551	554	556	559	561	564	566	569	571	574	81	969	970	971	972	973	974	975	976	977	978	979	980	82	981	982	983	984	985	986	987	988	989	990	991	992
19	576	579	581	584	586	589	591	593	596	598	601	603	83	993	994	995	996	997	998	999	1000	1001	1002	1003	1004	84	1005	1006	1007	1008	1009	1010	1011	1012	1013	1014	1015	1016
20	606	608	611	613	616	618	621	623	626	628	631	633	85	1017	1018	1019	1020	1021	1022	1023	1024	1025	1026	1027	1028	86	1029	1030	1031	1032	1033	1034	1035	1036	1037	1038	1039	1040
21	636	638	641	643	646	648	651	653	656	658	661	663	87	1041	1042	1043	1044	1045	1046	1047	1048	1049	1050	1051	1052	88	1053	1054	1055	1056	1057	1058	1059	1060	1061	1062	1063	1064
22	665	668	670	673	675	678	680	683	685	688	690	693	89	1065	1066	1067	1068	1069	1070	1071	1072	1073	1074	1075	1076	90	1077	1078	1079	1080	1081	1082	1083	1084	1085	1086	1087	1088
23	695	698	700	703	705	708	710	713	715	718	720	723	91	1089	1090	1091	1092	1093	1094	1095	1096	1097	1099	1100	1101	92	1097	1098	1099	1100	1101	1102	1103	1104	1105	1106	1107	1108
24	725	728	730	733	735	737	740	742	745	747	750	752	93	1112	1113	1114	1115	1116	1117	1118	1119	1120	1121	1122	1123	93	1122	1124	1125	1126	1127	1128	1129	1130	1131	1132	1133	1134
25	755	757	760	762	765	767	770	772	775	777	780	782	94	1141	1142	1143	1144	1145	1146	1147	1148	1149	1150	1151	1152	95	1153	1154	1155	1156	1157	1158	1159	1160	1161	1162	1163	1164
26	785	787	790	792	795	797	800	802	805	807	810	812	96	1148	1149	1150	1151	1152	1153	1154	1155	1156	1157	1158	1159	97	1160	1161	1162	1163	1164	1165	1166	1167	1168	1169	1170	1171
27	814	817	819	822	824	827	829	832	834	837	839	842	98	1169	1172	1173	1174	1175	1176	1177	1178	1179	1180	1181	1182	99	1172	1173	1174	1175	1176	1177	1178	1179	1180	1181	1182	1183
28	844	847	849	852	854	857	859	862	864	867	869	872	100	1184	1185	1186	1187	1188	1189	1190	1191	1192	1193	1194	1195	101	1196	1197	1198	1199	1200	1201	1202	1203	1204	1205	1206	
29	874	877	879	882	884	886	889	891	894	896	899	901	102	1204	1205	1206	1207	1208	1209	1210	1211	1212	1213	1214	1215	103	1212	1214	1215	1216	1217	1218	1219	1220	1221	1222	1223	1224
30	904	906	909	911	914	916	919	921	924	926	929	931	105	1222	1223	1224	1225	1226	1227	1228	1229	1230	1231	1232	1233	106	1222	1224	1225	1226	1227	1228	1229	1230	1231	1232	1233	1234
31	934	936	939	941	944	946	949	951	954	956	958	961	107	1232	1233	1234	1235	1236	1237	1238	1239	1240	1241	1242	1243	108	1232	1234	1235	1236	1237	1238	1239	1240	1241	1242	1243	1244
32	963	966	968	971	973	976	978	981	983	986	988	991	109	1244	1245	1246	1247	1248	1249	1250	1251	1252	1253	1254	1255	110	1244	1245	1246	1247	1248	1249	1250	1251	1252	1253	1254	1255
33	993	996	998	1001	1003	1006	1008	1011	1013	1016	1018	1021	111	1252	1253	1254	1255	1256	1257	1258	1259	1260	1261	1262	1263	112	1252	1253	1254	12								

VOLTAGE INPUT SETTINGS

2/0 CABLE

FOR USE WITH HASTINGS FIBER GLASS PRODUCTS
7714 TESTER
November 16, 2009

FEET	INCHES										
	1	2	3	4	5	6	7	8	9	10	11
3	92	94	96	99	101	103	105	108	110	112	114
4	119	121	123	126	128	130	132	135	137	139	141
5	146	148	150	152	155	157	159	161	164	166	168
6	173	175	177	179	182	184	186	188	191	193	195
7	200	202	204	206	209	211	213	218	220	222	224
8	227	229	231	233	236	238	240	242	245	247	251
9	254	256	258	260	263	265	267	269	272	274	278
10	281	283	285	287	290	292	294	296	298	301	303
11	307	310	312	314	316	319	321	323	325	328	330
12	334	337	339	341	343	346	348	350	352	355	357
13	361	364	366	368	370	373	375	377	379	382	384
14	388	391	393	395	397	400	402	404	406	409	411
15	415	418	420	422	424	427	429	431	433	435	438
16	442	444	447	449	451	453	456	458	460	462	465
17	469	471	474	476	478	480	483	485	487	489	492
18	496	498	501	503	505	507	510	512	514	516	519
19	523	525	528	530	532	534	537	539	541	543	546
20	550	552	555	557	559	561	564	566	568	570	573
21	577	579	581	584	586	588	590	593	595	597	599
22	604	606	608	611	613	615	617	620	622	624	626
23	631	633	635	638	640	642	644	647	649	651	653
24	658	660	662	665	667	669	671	674	676	678	680
25	685	687	689	692	694	696	698	701	703	705	707
26	712	714	716	718	721	723	725	727	730	732	734
27	739	741	743	745	748	750	752	754	757	759	761
28	766	768	770	772	775	777	779	781	784	786	788
29	793	795	797	799	802	804	806	808	811	813	815
30	820	822	824	826	829	831	833	835	838	840	842
31	847	849	851	853	856	858	860	862	864	867	869
32	873	876	878	880	882	885	887	889	891	894	896
33	900	903	905	907	909	912	914	916	918	921	923
34	927	930	932	934	936	939	941	943	945	948	950
35	954	957	959	961	963	966	968	970	972	975	977
36	981	984	986	988	990	993	995	997	999	1001	1004
37	1008	1010	1013	1015	1017	1019	1022	1024	1026	1031	1033
38	1035	1037	1040	1042	1044	1046	1049	1051	1053	1055	1060
39	1062	1064	1067	1069	1071	1073	1076	1078	1080	1082	1087
40	1089	1091	1094	1096	1098	1100	1103	1105	1107	1109	1112

FROM 41 TO 86 FEET, THE IDEAL READING ON THE PERCENT METER IS
REDUCED TO 50 PERCENT, DUE TO THE INCREASED RESISTANCE OF THE
JUMPERS AND THE LIMITED OUTPUT VOLTAGE OF THE TESTER.

50 PERCENT

FEET	INCHES										
	1	2	3	4	5	6	7	8	9	10	11
41	558	559	560	561	563	564	565	566	567	568	569
42	571	573	574	575	576	577	578	579	580	582	583
43	585	586	587	588	589	591	592	593	594	595	596
44	598	600	601	602	603	604	605	606	607	609	611
45	612	613	614	615	616	618	619	620	621	622	624
46	625	627	628	629	630	631	632	633	634	636	638
47	639	640	641	642	643	644	646	647	648	649	651
48	652	653	655	656	657	658	659	660	661	662	665

FEET	INCHES										
	1	2	3	4	5	6	7	8	9	10	11
49	666	667	668	669	670	671	672	673	674	675	678
50	679	680	682	683	684	685	686	687	688	689	691
51	693	694	695	696	697	698	700	701	702	703	705
52	706	707	709	710	711	712	713	714	715	716	719
53	720	721	722	723	724	725	726	727	728	729	730
54	733	734	735	737	738	739	740	741	742	743	746
55	747	748	749	750	751	752	753	755	756	757	759
56	760	761	762	764	765	766	767	768	769	770	773
57	774	775	776	777	778	779	780	781	782	783	786
58	787	788	789	790	792	793	794	795	796	797	799
59	801	802	803	804	805	806	807	808	809	810	813
60	814	815	816	817	819	820	821	822	823	824	826
61	828	829	830	831	832	833	834	835	837	838	840
62	841	842	843	844	846	847	848	849	850	851	853
63	854	856	857	858	859	860	861	862	863	865	866
64	868	869	870	871	872	874	875	876	877	878	879
65	881	883	884	885	886	887	888	889	890	891	894
66	895	896	897	898	899	901	902	903	904	905	907
67	908	910	911	912	913	914	915	916	917	919	921
68	922	923	924	925	926	927	929	930	931	932	934
69	935	936	938	939	940	941	942	943	944	945	948
70	949	950	951	952	953	954	956	957	958	959	961
71	962	963	965	966	967	968	969	970	971	972	974
72	976	977	978	979	980	981	983	984	986	987	988
73	989	990	991	993	994	995	996	997	998	999	1000
74	1003	1004	1005	1006	1007	1008	1009	1010	1011	1012	1015
75	1016	1017	1018	1020	1021	1022	1023	1024	1025	1026	1027
76	1030	1031	1032	1033	1034	1035	1036	1038	1039	1040	1041
77	1043	1044	1045	1047	1048	1049	1050	1051	1052	1053	1056
78	1057	1058	1059	1060	1061	1062	1063	1064	1066	1067	1069
79	1070	1071	1072	1073	1075	1076	1077	1078	1079	1080	1082
80	1084	1085	1086	1087	1088	1089	1090	1091	1093	1094	1096
81	1097	1098	1099	1100	1102	1103	1104	1105	1106	1107	1109
82	1111	1112	1113	1114	1115	1116	1117	1118	1120	1121	1123
83	1124	1125	1126	1127	1129	1130	1131	1132	1133	1134	1136
84	1137	1139	1140	1141	1142	1143	1144	1145	1146	1148	1150
85	1151	1152	1153	1154	1155	1157	1158	1159	1160	1161	1162

FEET	INCHES										
	1	2	3	4	5	6	7	8	9	10	11
86	932	933	934	935	936	937	938	939	940	941	941
87	942	943	944	945	946	947	948	949	950	951	952
88	953	954	955	956	957	958	959	960	961	962	963
89	964	965	966	967	968	969	970	971	972	973	974
90	975	976	977	978	979	980	981	982	983	984	985
91	985	986	987	988	989	99					

VOLTAGE INPUT SETTINGS

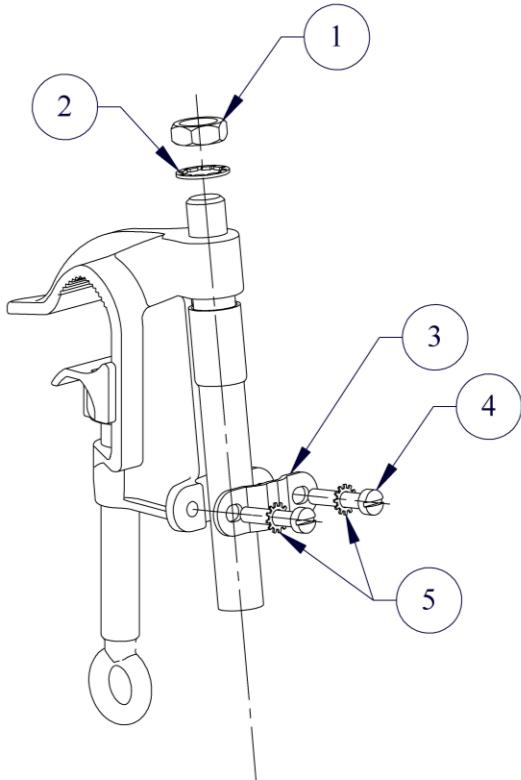
4/0 CABLE

FOR USE WITH HASTINGS FIBER GLASS PRODUCTS
7714 TESTER
November 16, 2009

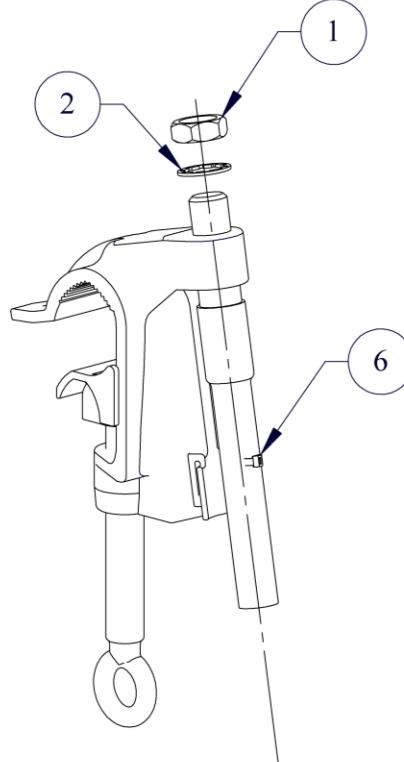
FROM 51 TO 100 FEET, THE IDEAL READING ON THE PERCENT METER IS
REDUCED TO 50 PERCENT, DUE TO THE INCREASED RESISTANCE OF THE
JUMPERS AND THE LIMITED OUTPUT VOLTAGE OF THE TESTER.

FEET	INCHES											50 PERCENT											
	1	2	3	4	5	6	7	8	9	10	11	1	2	3	4	5	6	7	8	9	10	11	
3	81	83	85	87	89	91	93	95	97	99	101	103	51	596	597	598	599	600	601	602	603	604	605
4	105	106	108	110	112	114	116	118	120	122	124	126	52	608	609	610	611	612	613	614	615	616	617
5	128	130	132	133	135	137	139	141	143	145	147	149	53	619	620	621	622	623	624	625	626	627	628
6	151	153	155	157	159	160	162	164	166	168	170	172	54	631	632	633	634	635	636	637	638	639	640
7	174	176	178	180	182	184	186	187	189	191	193	195	55	642	643	644	645	646	647	648	649	650	651
8	197	199	201	203	205	207	209	211	213	214	216	218	56	654	655	656	657	658	659	660	661	662	663
9	220	222	224	226	228	230	232	234	236	238	240	241	57	665	666	667	668	669	670	671	672	673	674
10	243	245	247	249	251	253	255	257	259	261	263	265	58	677	678	679	680	681	682	683	684	685	686
11	267	268	270	272	274	276	278	280	282	284	286	288	59	689	690	691	692	693	694	695	696	697	698
12	290	292	294	295	297	299	301	303	305	307	309	311	60	700	701	702	703	704	705	706	707	708	709
13	313	315	317	319	321	322	324	326	328	330	332	334	61	712	713	714	715	716	717	718	719	720	721
14	336	338	340	342	344	346	348	349	351	353	355	357	62	723	724	725	726	727	728	729	730	731	732
15	359	361	363	365	367	369	371	373	375	376	378	380	63	735	736	737	738	739	740	741	742	743	744
16	382	384	386	388	390	392	394	396	398	400	402	403	64	746	747	748	749	750	751	752	753	754	755
17	405	407	409	411	413	415	417	419	421	423	425	427	65	758	759	760	761	762	763	764	765	766	767
18	429	430	432	434	436	438	440	442	444	446	448	450	66	770	771	772	773	774	775	776	777	778	779
19	452	454	456	457	459	461	463	465	467	469	471	473	67	781	782	783	784	785	786	787	788	789	790
20	475	477	479	481	483	484	486	488	490	492	494	496	68	793	794	795	796	797	798	799	800	800	801
21	498	500	502	504	506	508	510	511	513	515	517	519	69	804	805	806	807	808	809	810	811	812	813
22	521	523	525	527	529	531	533	535	537	538	540	542	70	816	817	818	819	820	821	822	823	824	825
23	544	546	548	550	552	554	556	558	560	562	564	565	71	827	828	829	830	831	832	833	834	835	836
24	567	569	571	573	575	577	579	581	583	585	587	589	72	839	840	841	842	843	844	845	846	847	848
25	591	592	594	596	598	600	602	604	606	608	610	612	73	851	852	853	854	854	855	856	857	858	859
26	614	616	617	619	621	623	625	627	629	631	633	635	74	862	863	864	865	866	867	868	869	870	871
27	637	639	641	643	644	646	648	650	652	654	656	658	75	874	875	876	877	878	879	880	880	881	882
28	660	662	664	666	668	670	671	673	675	677	679	681	76	885	886	887	888	889	890	891	892	893	894
29	683	685	687	689	691	693	695	697	698	700	702	704	77	897	898	899	900	901	902	903	904	905	906
30	706	708	710	712	714	716	718	720	722	724	725	727	78	908	909	910	911	912	913	914	915	916	917
31	729	731	733	735	737	739	741	743	745	747	749	751	79	920	921	922	923	924	925	926	927	928	929
32	752	754	756	758	760	762	764	766	768	770	772	774	80	932	933	934	934	935	936	937	938	939	940
33	776	778	779	781	783	785	787	789	791	793	795	797	81	943	944	945	946	947	948	949	950	951	952
34	799	801	803	805	806	808	810	812	814	816	818	820	82	955	956	957	958	959	960	961	961	962	963
35	822	824	826	828	830	832	833	835	837	839	841	843	83	966	967	968	969	970	971	972	973	974	975
36	845	847	849	851	853	855	857	859	860	862	864	866	84	978	979	980	981	982	983	984	985	986	987
37	868	870	872	874	876	878	880	882	884	886	887	889	85	989	990	991	992	993	994	995	996	997	998
38	891	893	895	897	899	901	903	905	907	909	911	913	86	1001	1002	1003	1004	1005	1006	1007	1008	1009	1010
39	914	916	918	920	922	924	926	928	930	932	934	936	87	1013	1014	1015	1015	1016	1017	1018	1019	1020	1021
40	938	940	941	943	945	947	949	951	953	955	957	959	88	1024	1025	1026	1027	1028	1029	1030	1031	1032	1033
41	961	963	965	967	968	970	972	974	976	978	980	982	89	1036	1037	1038	1039	1040	1041	1042	1042	1043	1044
42	984	986	988	990	992	994	995	997	999	1001	1003	1005	90	1047	1048	1049	1050	1051	1052	1053	1054	1055	1056
43	1007	1009	1011	1013	1015	1017	1019	1021	1022	1024	1026	1028	91	1059	1060	1061	1062	1063	1064	1065	1066	1067	1068
44	1030	1032	1034	1036	1038	1040	1042	1044	1046	1048	1049	1051	92	1070	1071	1072	1073	1074	1075	1076	1077	1078	1080
45	1053	1055	1057	1059	1061	1063	1065	1067	1069	1071	1073	1075	93	1082	1083	1084	1085	1086	1087	1088	1089	1090	1091
46	1076	1078	1080	1082	1084	1086	1088	1090	1092	1094	1096	1098	94	1094	1095	1096	1096	1097	1098	1099	1100	1101	1102
47	1100	1102	1103	1105	1107	1109	1111	1113	1115	1117	1119	1121	95	1105	1106	1107	1108	1109	1110	1111	1112	1113	1114
48	1123	1125	1127	1129	1130	1132	1134	1136	1138	1140	1142	1144	96	1117	1118	1119	1120	1121	1122	1123	1124	1125	1126
49	1146	1148	1150	1152	1154	1156	1157	1159	1161	1163	1165	1167	97	1128	1129	1130	1131	1132	1133	1134	1135	1136	1137
50	1169	1171	1173	1175	1177	1179	1181	1182	1184	1186	1188	1190	98	1140	1141	1142	1143	1144	1145	1146	1147	1148	1149
													99	1151	1152	1153	1154	1155	1156	1157	1158	1159	1160
													100	1163	1164	1165	1166	1167	1168	1169	1170	1171	1172
														1166	1167	1168	1169	1170	1171	1172	1173	1174	

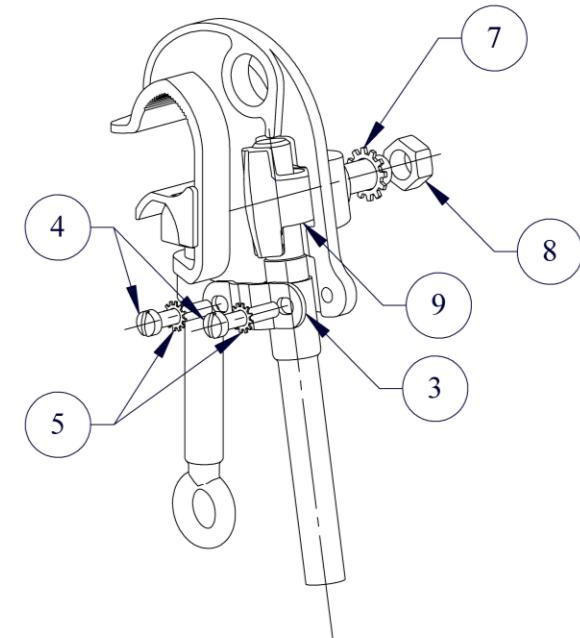
Replacement Parts for Hastings Grounding Clamps



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

QTY.	ITEM NO.	PART NO.	DESCRIPTION
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

Refer to catalog pages 409 and 410 for ferrules and cables.

Refer to catalog page 410 for ferrules with heat shrink.

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

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