

REPAIR KIT

INSTRUCTION BOOK

PART NUMBER 8790-050

FOR REPAIR OF

MODELS 8790 AND 8791

TERMALINE® RF LOAD RESISTOR

LIMITED WARRANTY

Bird Electronic Corporation warrants all parts to be operational upon arrival to customer.

MODELS COVERED IN THIS INSTRUCTION BOOK

8790

8790-100

8791

8791-100

SAFETY PRECAUTIONS

The following are general safety precautions that are not necessarily related to any specific part or procedure and do not necessarily appear elsewhere in this publication.

Keep away from live circuits.

Operating personnel must at all times observe normal safety regulations. Do not attempt to replace parts or disconnect a RF transmission or any other high voltage line while power is applied. When working with high voltage always have someone present who is capable of rendering aid if necessary. Personnel working with or near high voltage should be familiar with modern methods of resuscitation.

The following will appear in the text of this publication and is shown here for emphasis.

```
*****
*                               C A U T I O N                               *
*                               *                                           *
* Handle the load with care, do not subject it to unnec- *
* essary jarring.                                           *
*****
```

```
*****
*                               W A R N I N G                               *
*                               *                                           *
* When using dry cleaning solvents or pressurized spray *
* cleaner, take necessary precautions and supply adequate *
* ventilation. Avoid breathing fumes.                       *
*****
```

TABLE OF CONTENTS

	<u>Page</u>
SAFETY PRECAUTIONS.....	i
SECTION I - REPAIR KIT	
Part Number 8790-050.....	1
SECTION II - MAINTENANCE AND TROUBLESHOOTING FOR MODELS 8790 AND 8791	
General.....	2
RF Load Resistor.....	2
SECTION III - REPLACEMENT PROCEDURE FOR RESISTIVE ELEMENT	
Load Removal.....	3
Resistor Removal.....	3
Load Reassembly.....	5
Load Midsection.....	6
Load Ground Section.....	6
SECTION IV - REPLACEMENT PARTS LIST	
Model 8790/8791.....	11
ILLUSTRATIONS	
Load, Ground Section.....	8
Load, Midsection.....	9
Load, Input Section.....	10

SECTION I - REPAIR KIT

1-1. Part Number 8790-050 consists of the following:

<u>ITEM</u>	<u>QUANTITY</u>	<u>DESCRIPTION</u>	<u>PART NUMBER</u>
1	1	Flow Tube, Front	8790-021
2	1	Flow Tube, Rear	8790-034
3	1	Insulator Junction	8790-020
4	1	Tube Junction	8790-019
5	1	Resistor Contact Assembly	8790-008
6	1	Resistor Cap Subassembly	8790-011
7	1	Water Inlet Tube	8790-032
8	1	Resistor Fitting	8790-016
9	1	Repair Kit Instruction Book	923-8790-050
10	1	O-Ring Kit 8790-045 consisting of:	
		3 O-Ring	5-1340
		1 O-Ring	5-1251
		1 O-Ring	5-1250
		4 O-Ring	5-1128
		1 O-Ring	5-1127

SECTION II - MAINTENANCE AND TROUBLESHOOTING FOR MODELS 8790 AND 8791

2-1. GENERAL

2-2. The TERMALINE® RF Load Resistor is rugged and simple, requiring only nominal and routine attention. The load resistor is designed to operate for long periods of time without failure if care is taken not to exceed its power handling capabilities.

2-3. The outside surface of the unit should be wiped free of dust and dirt occasionally. Disconnect the instrument from the transmission line and clean the RF input connector (both metallic and insulator surfaces) with an acceptable dry cleaning solvent.

```
*****  
*                               W A R N I N G                               *  
*                               *                                           *  
* When using dry cleaning solvents or pressurized spray *  
* cleaner, take necessary precautions and supply adequate *  
* ventilation. Avoid breathing fumes. *  
*****
```

```
*****  
*                               C A U T I O N                               *  
*                               *                                           *  
* Handle the load with care, do not subject it to unnec- *  
* essary jarring. *  
*****
```

2-4. RF LOAD RESISTOR

2-5. Accurate measurement of the dc resistance between the inner and outer conductors of the RF input connector will provide a good check of the condition of the load resistor. For this measurement, a resistance bridge or ohmmeter with an accuracy of one percent or better at 50 ohms should be used. Use low resistance leads, preferably a short piece of 50 ohm cable. The measured resistance should not deviate more than 2 ohms from a nominal 50 ohms. It is recommended that this resistance check be performed each time the load is to be used.

SECTION III - REPLACEMENT PROCEDURE FOR RESISTIVE ELEMENT

- 3-1. This series of water-cooled loads is designed to be easily repaired in the field. If in performing the dc resistance check described in Paragraph 2-5, a significant change in resistance is noted, or if for any reason the resistive element should fail, the element must be replaced. Inexpensive replacement resistors are available. They can be installed in the load using the procedures described in the special text and parts list to follow.

Note - Numbers in brackets [] are item numbers so indicated in Figures 3-1, 3-2, and 3-3.

3-2. LOAD REMOVAL

- a. Shut down the transmitter per manufacturers operating instructions. When the transmitter is completely inoperative, turn off the load cooling water.
- b. Disconnect the two water hoses from the hose nipples [2] at the water chamber of the load.
- c. Remove the load from the transmission line by first loosening and removing the 3/8-16 x 1-1/2 bolts fastening the outer conductor swivel flange [29] to the flange of the line and then pulling the load away from the transmission line to disengage the center conductor bullet.
- d. Tip the water chamber end of the load down - in a suitable place - to drain any remaining water from the load.

3-3. RESISTOR REMOVAL

- a. Place the load on end with the water chamber [1] up.
- b. Firmly grasp the water chamber [1] with one hand and the housing of the load, just below the water chamber, with the other hand. Twist the water chamber in a counterclockwise direction to loosen and unscrew the water chamber from the end of the ground section housing [9]. When the threads of the two parts are disengaged, remove the water chamber from the end of the ground section housing, see Figure 3-1.
- c. The water inlet tube [4], see Figure 3-1, should either remain seated inside the water chamber or inside the end of the load, half exposed.
 1. If the water inlet tube is in the water chamber, pull it out and visually inspect the water inlet tube [4], the inlet tube

Continued

seal [5] and the water inlet seal [3], inside the water chamber [1], for possible damage. If these parts are in good condition, set them aside and continue with Step 3-3d of this procedure, below.

2. If the water inlet tube [4] remains in the end of the load, allow it to remain there and proceed to Step 3-3d.

d. Remove the resistor cap assembly [7] from the ground section housing [9] by placing a screwdriver under the lip at the end of the resistor cap assembly and prying the resistor cap up about one-half inch. Then remove the resistor cap assembly the rest of the way by hand. Inspect the resistor cap assembly [7], the internal seal, resistor cap [8] and the rear seal, resistor cap [6] before setting the parts aside.

e. Using a 3/16-inch allen wrench, loosen and remove the six 1/4-20 x 1-3/4 socket head cap screws [20] from the second housing section [11], see Figure 3-2.

f. Grasp the second housing section [11], and by using a slight rocking motion, raise it from the front housing [19] approximately one-half inch. This will expose the teflon junction insulator [17]. The junction insulator should be kept in position inside the front housing [19] - hold it in place with a screwdriver while continuing to remove the second housing section [11].

g. The rear flow tube [12] should stay inside the second housing section and the ground housing. Inspect the inside surface of rear flow tube. If it is undamaged and the inside of the second housing section is dry, proceed to Step 3-3h. However, if the rear flow tube is damaged, unscrew the ground section housing [9] from the second housing section [11] and pull the rear flow tube [12] out of the ground section housing. Inspect the ground section seal [10] and replace if necessary. Replace the rear flow tube [12], small outside diameter end first, in the ground section housing, see Figure 3-2. Then screw the ground section housing [9] onto the end of the second housing section [11] and tighten securely.

h. Remove the exposed rear resistor [13] and remove the water inlet tube [4] from the resistor if it was not removed in Step 3-3c. Visually inspect the resistor for obvious damage then measure its resistance. The resistance should be 25 ohms plus or minus one ohm. If the resistance measures outside these limits, the resistor should be replaced.

i. Pull the junction insulator [17] out of the end of the front housing [19] and inspect the junction insulator seals [18]. Then remove the resistor contact assembly [16] and inspect the spring contacts at each end. The spring contacts should be neither burned nor flattened.

j. Loosen and remove the six 1/4-20 x 1 socket head cap screws [20] that hold the front housing [19] to the outer conductor assembly [28], see Figure 3-3. Then lift the front housing off of the outer conductor assembly.

k. Hold the input insulator [24] down and pull the front flow tube [21] out of the insulator. Now remove the front resistor [13] from the resistor fitting [22] and check the resistor as described in Step 3-3h, above. The resistor junction tube [14] will be in the end of either this resistor or the resistor that was removed in Step 3-3h. At this stage, the resistor junction tube should be removed from the end of the resistor and the resistor junction seals [15] should be inspected.

l. Lift the input insulator [24] out of the outer conductor assembly [28] - the remaining parts may be inspected without further disassembly. If any of the remaining parts are damaged, they can be released by removing the 3/8-16 x 3/4 hex head machine screw and split lockwasher [27], see Figure 3-3.

3-4. LOAD REASSEMBLY

3-5. Load Input Section

a. Position the resistor fitting seal [23] in the groove in the resistor fitting [22] then insert the shaft of the resistor fitting into the hole in the center of the input insulator [24] and slide the resistor fitting into the insulator until it bottoms at the edge of the groove in the end of the insulator.

b. Place the input insulator [24] on the end of the center conductor assembly [26] (not common to all models). Then fasten the parts together by inserting and securely tightening the 3/8-16 x 3/4 hex head machine screw and split lockwasher [27], see Figure 3-3.

c. Position the outer conductor assembly [28] on end with the tapped holes facing up and insert the assembled parts from Step 3-5b above, center conductor assembly first, into the recess in the end of the outer conductor assembly.

d. Place terminal of one of the resistors [13], either of the resistors can be used into the inside of the resistor fitting and slide the resistor to the bottom in the fitting. The resistor should fit snugly in the fitting. If the fit is loose, carefully close the fingers of the resistor fitting until a snug, even fit is achieved.

e. Lower the front flow tube [21], larger outside diameter end first, over the resistor and press it into the groove in the input insulator [24]. Then lower the front housing [19] over the front flow tube and set the flange of the front housing on the end of the outer conductor assembly [28]. Fasten the front housing to the outer conductor assembly with six 1/4-20 x 1 socket head cap screws [20] and tighten securely.

3-6. LOAD MIDSECTION

a. Place the resistor junction seals [15] into the grooves in the resistor junction tube [14] and then slide either end of the resistor junction tube into the exposed end of the resistor [13] and press the junction tube to shoulder on the end of the resistor, see Figure 3-2. At this time position the spacer [30] and junction ring in place as shown.

b. Press the resistor contact assembly [16] into the end of the front flow tube [21] until it bottoms. Replace the junction insulator seals [18] and then press the junction insulator [17] into the recess in the end of the junction ring [25]. Insure that the junction insulator bottoms by twisting it while pressing down on it with the palm of the hand.

c. Insert the end of the remaining resistor [13] into the exposed end of the resistor contact assembly [16], and press it to the bottom. Then lower the ground section housing [9], the second housing section [11] and the rear flow tube [12] over the resistor, and rest the flange of the second housing section on the end of the junction ring [25] and front housing [19].

d. Fasten the housing sections together by inserting six 1/4-20 x 1-3/4 socket head cap screws and securely tighten them using a 3/16 inch allen wrench.

3-7. LOAD GROUND SECTION

a. Replace the internal seal, resistor cap [8] in the groove inside the resistor cap assembly [7]. Then slide the end of the resistor cap assembly, with the internal O-ring seal, into the ground section housing [9]. Apply firm downward pressure on the end of the resistor cap assembly and it will snap into position.

b. Replace the rear seal, resistor cap [6] in the groove in the exposed end of the resistor cap assembly [7], see Figure 3-1. Replace the inlet tube seal [5] in the groove in the end of the water inlet tube [4] then press the seal end of the water inlet tube into the end of the resistor to shoulder.

c. Reposition the water inlet seal [3] in the groove on the inside of the water chamber [1], then lower the water chamber over the end of the water inlet tube [4] and onto the threaded end of the ground section housing [9] screw the water chamber onto the ground section housing and tighten it thoroughly.

d. Check the resistance between the inner and the outer conductors at the input of the load. If the load is properly assembled, the resistance will be approximately 50 ohms. Reconnect the cooling water hoses to the hose nipples [2] at the water chamber [1] and turn on the water. Check carefully for leaks. If the load resistance is about 50 ohms and if no leaks appear, the load resistor is ready for use.

FIGURE 3-1. LOAD, GROUND SECTION.

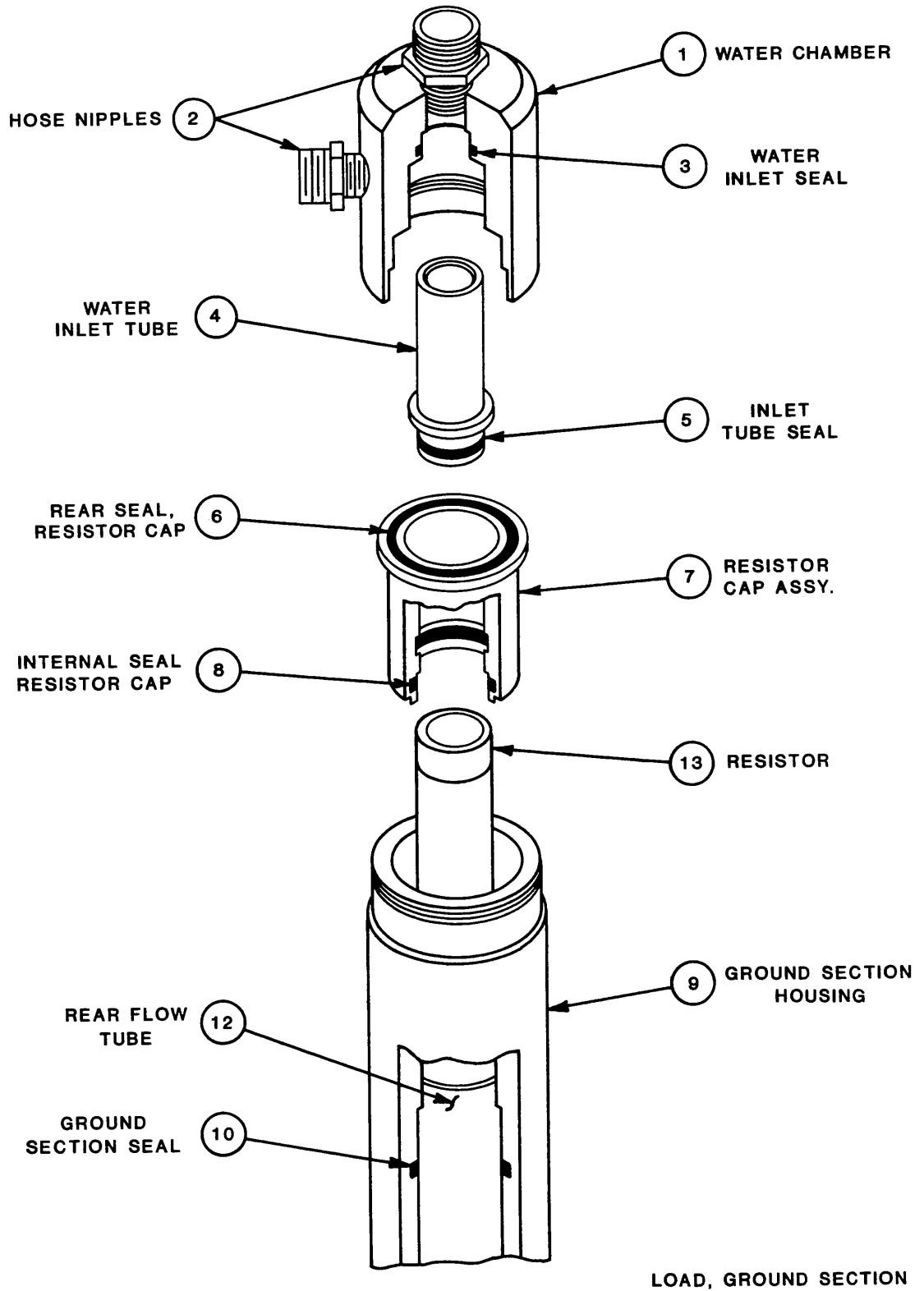


FIGURE 3-2. LOAD, MIDSECTION.

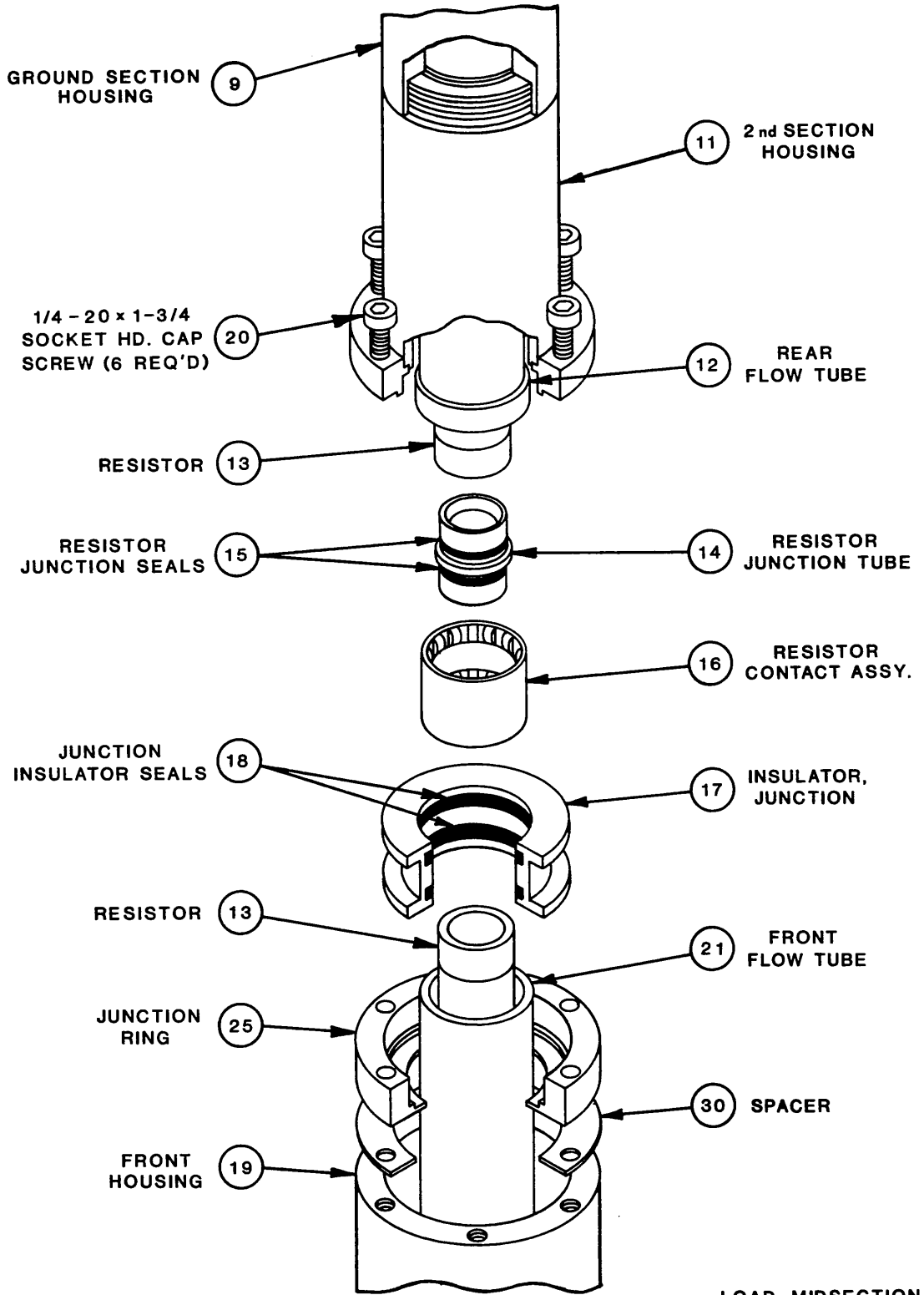
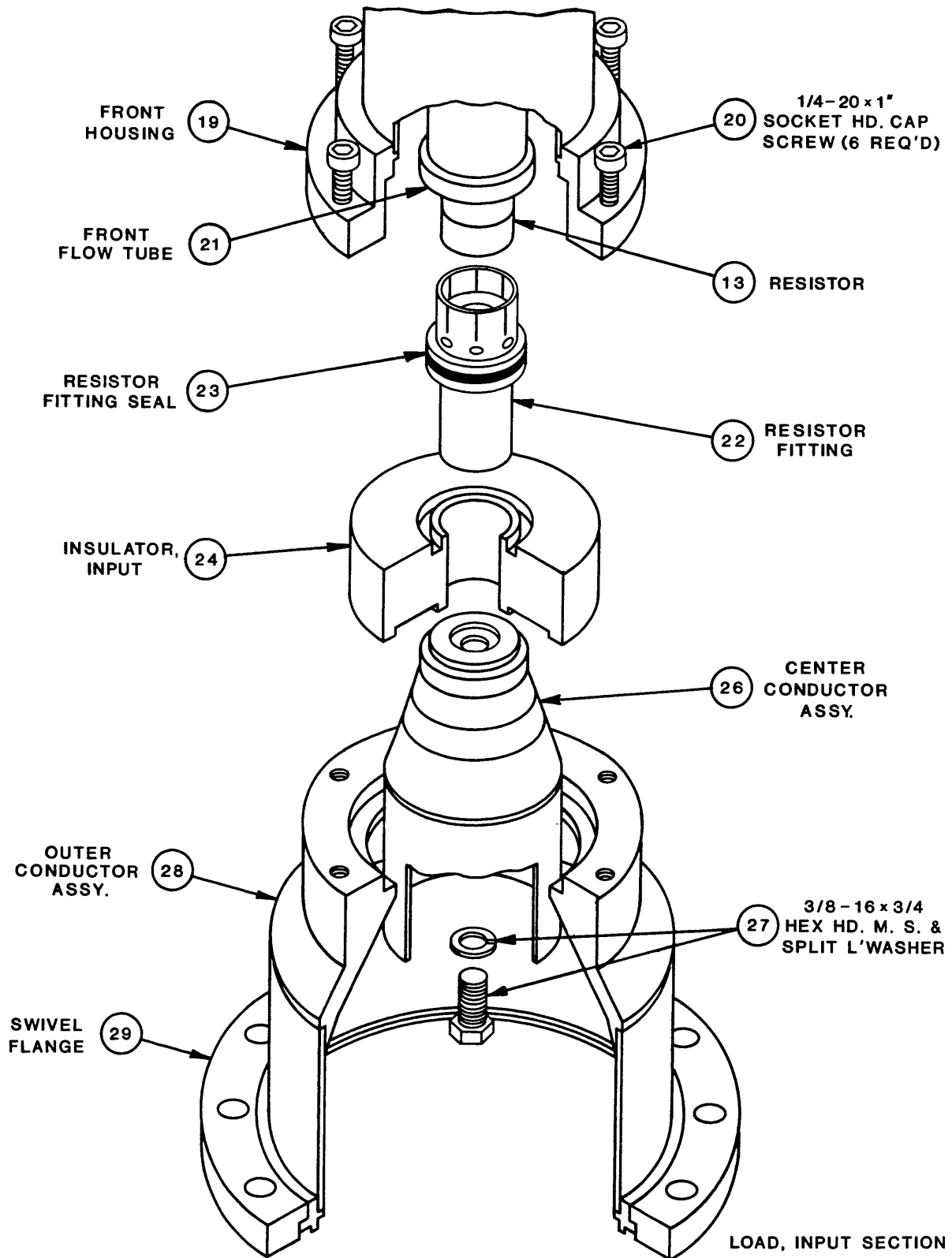


FIGURE 3-3. LOAD, INPUT SECTION.



SECTION IV - REPLACEMENT PARTS LIST

4-1. MODEL 8790/8791

ITEM	QTY	DWG REF NBR	DESCRIPTION	PART NUMBER
1	1		Water Chamber Assembly consisting of:	8790-005
		1	1 Water Chamber	8790-031
		2	2 Hose Nipples	5-065-2
		3	1 O-Ring, Water Inlet Seal	5-1250
2	1	4	Water Inlet Tube	8790-032
3	1	5	O-Ring, Water Inlet Tube Seal	5-1340
4	1	6	O-Ring, Resistor Cap Rear Seal	5-1128
5	1		Resistor Cap Assembly consisting of:	8790-004
		7	1 Resistor Cap Subassembly	8790-011
		8	1 O-Ring, Resistor Cap Internal Seal	5-1251
6	1	9	Ground Section Housing	8790-033
7	1	10	O-Ring, Ground Section Seal	5-1128
8	1	11	Second Section Housing	8790-003
9	1	12	Rear Flow Tube	8790-034
10	2	13	Front & Rear Resistor	8790-035
11	1	14	Resistor Junction Tube	8790-019
12	2	15	O-Ring, Resistor Junction Seal	5-1340
13	1	16	Resistor Contact Assembly	8790-008
14	1	17	Insulator Junction	8790-020
15	2	18	O-Ring, Junction Insulator Seal	5-1128

Continued

ITEM	QTY	DWG		DESCRIPTION	PART NUMBER
		REF	NBR		
16	1	19		Front Section Housing Assembly	8790-007
17	6	20		1/4-20 x 1-3/4 Socket Head Cap Screw (see Figure 3-2)	Standard
	6	20		1/4-20 x 1 Socket Head Cap Screw (see Figure 3-3)	Standard
18	1	21		Front Flow Tube	8790-021
19	1			Center Conductor Input Assembly consisting of:	8790-009
		22	1	Resistor Fitting	8790-016
		23	1	O-Ring, Resistor Fitting Seal	5-1127
		24	1	Insulator, Input	8790-015
		26	1	Center Conductor Assembly	8790-010
		27	1	3/8-16 x 3/4 Hex Head Machine Screw, Split Lockwasher	Standard
20	1	28		Outer Conductor Assembly	8790-006
21	1	29		Swivel Flange	4902-014
22	1	30		Spacer	8790-042
23	1	25		Junction Ring	8790-022