

# General Trouble Shooting

**P-233**  
**819-0451**

## Installation Instructions

**⚠ WARNING** Failure to follow these instructions may result in product damage, equipment damage, and serious or fatal injury to personnel.

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### General Troubleshooting For All Units

The Service Manuals listed below are available without charge. When ordering, specify form number of desired publication.

Form Number	Description
P-200	Service Manual: SF-120, 170; SFC-120, 170; PB-120, 170; SF-250, 400; SFC-250, 400.
P-201	Service Manual: PB-250, 400.
P-202	Service Manual: SF-500, 650; SFC-500, 650; SPBC-500, 650.
P-203	Service Manual: PC-500; PCC-500, PCBC-500.
P-204	Service Manual: PB-500, 650.

P-205	Service Manual: PCB-825, 1000, 1225; PCBC-825, 1000, 1225.
P-206	Service Manual: PC-825, 1000, 1225, 1525; PCC-825, 1000, 1225, 1525.
P-207	Service Manual: SFC-825, 1000, 1225, 1525; SFC-1525, Hi-Torque
P-208	Service Manual: PB-825, 1000, 1225, 1525; MB-825, 1000, 1225.
P-209	Service Manual: PB-825, 1000, 1225, 1525.
P-210	Service Manual: EC-375, 475, 650, 825, 1000, 1225.
P-211	Service Manual: EB-375, 475, 650, 825, 1000, 1225.
P-212	Service Manual: EP-170, 250, 400, 500, 825, 1000, 1525.
P-213	Service Manual: EM-50-10, 180-10, 210-10; EM-50-20, 180-20, 210-20; EM-50-30, 180-30, 210-30; EM-50-40, 180-40, 210-40.
P-214	Service Manual: PCBC-1225/1000, 1525/1225; PCB-1225/1000, 1525/1225.
P-215	Service Manual: SF-825, 1000, 1225, 1525; SF-1525 Hi-Torque
P-220	Service Manual: Controls
P-231	Service Manual: Electro-Disc
P-235	Tension Control System
P-237	Service Manual: Electrically Released FB-375, 475, 650.
P-238	Installation Manual: Motion Control
P-239	Installation Manual: Power-Supplies
P-248	Technical Manual: W-Line
P-250	Service Manual: ER-825 & 1225 Pin Drive
P-251	Service Manual: ER-825 & 1225 Spline Drive
P-252	Service Manual: MCS-129, 129-1
P-256	Service Manual: Modular Tension Brake

## Electrical Troubleshooting

### Coil Data

Unit Size	SF/PB 120			SF/PB 170			SF/PB 250		
Voltage – DC	6	24	90	6	24	90	6	24	90
Resistance @ 20°C – Ohms	6.32	104	1386	6.96	111.2	1506	5	76.4	1079
Current – Amperes	.949	.230	.065	.861	.215	.060	1.2	.314	.084
Watts	5.69	5.52	5.85	5.85	5.16	5.37	7.2	7.5	7.51
Coil Build-up – milliseconds	12	12	11	17	17	16	48	48	44
Coil Decay – milliseconds	8	8	7	8	7	6	15	15	13

Unit Size	SF/PB 400			SF-500			PB & PC 500			SF-650		
Voltage – DC	6	24	90	6	24	90	6	24	90	6	24	90
Resistance @ 20°C – Ohms	4.88	73	1087	1.076	14.9	206.1	1.36	23.8	251.1	1.16	17.7	225
Current – Amperes	1.23	.322	.083	5.58	1.61	.44	4.4	1.01	.36	5.19	1.36	.4
Watts	7.39	7.96	7.45	34	39	39	26	24	32	31	33	36
Coil Build-up – milliseconds	154	154	154	82	85	90	84	87	93	110	115	120
Coil Decay – milliseconds	62	60	55	40	40	40	38	35	30	50	50	50

Unit Size	PB-650			SF-825			SF-825 Brg			PB & PC 825			SF-1000			PB & PC 1000		
Voltage – DC	6	24	90	6	24	90	6	24	90	6	24	90	6	24	90	6	24	90
Resistance @ 20°C – Ohms	1.24	18.3	257.2	1.23	20.9	267.0	1.098	14.6	221	1.27	20.4	223.3	1.07	14.4	214.4	1.23	19.7	248.7
Current – Amperes	4.84	1.31	.35	4.9	1.15	.34	5.464	1.65	.407	4.74	1.18	.4	5.61	1.67	.42	4.87	1.22	.36
Watts	29	31	32	29	28	30	33	40	37	28	28	36	34	40	38	29	29	33
Coil Build-up – milliseconds	100	105	110	222	200	245	180	200	225	170	170	170	256	275	283	205	220	235
Coil Decay – milliseconds	50	50	50	105	120	100	115	120	130	70	75	80	123	105	90	70	75	80

Unit Size	SF-1225			PB & PC 1225			SF-1525			PB & PC 1525			SF-1525 H.T.	
Voltage – DC	6	24	90	6	24	90	6	24	90	6	24	90	6	90
Resistance @ 20°C – Ohms	1.21	19.5	268.3	1.33	22.3	261.7	1.11	15.5	239.1	1.45	19.8	258.4	55	113.4
Current – Amperes	4.97	1.23	.34	4.5	1.08	.34	5.41	1.55	.38	4.13	1.21	.35	10.83	.794
Watts	30	30	30	27	26	31	32	37	34	25	29	31	65	72
Coil Build-up – milliseconds	475	490	510	300	320	350	505	535	575	470	490	512	480	560
Coil Decay – milliseconds	240	230	220	190	190	190	230	237	215	200	170	140	210	160

### Voltage Check

The initial electrical check should be the input voltage to the magnet, as follows:

For 90 volt units connect a DC voltmeter with a range of 0-100, or more, directly across the magnet terminals. With the power on the potentiometer turned up, a normal reading is 90 volts, although 85 to 105 is satisfactory. The reading should drop smoothly as the potentiometer is turned counterclockwise.

For 6 volt magnets use a DC range on the voltmeter of approximately 0-15 volts. A normal reading is from 5.5 to 6.5 volts, depending on the power supply.

### Current Check

A low range ammeter, when connected in series with one magnet lead, will normally indicate approximately .35 amperes for the 90 volt IHP

units and 4.0 amperes for the 6 volt series. These readings are with power on and the potentiometer control in the maximum position.

### Resistance Check

Ohmmeter checks should be made with the power off and the circuit open (to be certain, disconnect one magnet lead). Average resistance for the IHP 90 volt series is 250 ohms; for the 6 volt series, 1.5 ohms. A very high or infinite resistance reading would indicate an open coil.

### Summary

If the above checks indicate that the proper voltage and current is being supplied to the magnet, mechanical parts should be checked to assure that they are in good operating condition and properly installed.



**Note:** The following steps apply to the basic standard controls.

### General

1. Make a visual check from the control input to the clutch or brake units, looking for frayed wires, broken wires, or loose connections. Examine the lead wires or terminals at the clutch or brake. Look for dirt, grease, or metal chips that would interfere with a good electrical circuit. Make a special check at the brushholder when a PC clutch is involved.

Problems may result from a loose brushholder, worn-out brushes, or a loose terminal connection caused by steady machine vibration or simply a broken wire.

### Fuse

2. Check the fuse. The fuse is a glass cartridge type and can be checked visually. Make certain that the fuse is of the proper value.

### Output

3. With a DC voltmeter, check the output of the control at the clutch and brake (potentiometer or rheostats should be at maximum). With the coil connected, a normal reading is 85-105 volts DC. If the output is normal and the unit still does not function, check the clutch and brake coils against the nominal readings in the coil data chart on page 4.

When checking resistance, make sure the power is off. Disconnect one lead to be certain. A shorted coil will indicate a zero resistance, while an open coil will read infinity.

A current check is usually not necessary although one can be made by placing an ammeter in series with the clutch or brake coil. Correct readings are listed in the coil data chart on page 4.

### Voltage Control

4. Check the potentiometer or rheostat settings. Frequently an operator will change the original settings thinking that this will improve the performance of the machine. The potentiometer or rheostat should be set at a voltage level no lower than necessary to achieve satisfactory operation. Since conditions vary from one application to another the setting must be determined through trial and error.

To determine if a potentiometer or rheostat is working properly, measure the resistance with the power off. A smooth variation in resistance should be noted from a minimum of 0 to approximately 1000 ohms.

If the voltage settings are correct and the control still does not function, check the input to the control.

### Input

5. Place an AC voltmeter across the AC input connections to the control (connections are shown on each drawing). The AC supply voltage should be within  $\pm 5\%$  of the nominal rating. **Example:** for a 115 volt AC input the acceptable range is from approximately 110 to 120 volts.

When using a control with a transformer, the AC voltage must be checked both at the input (transformer primary) and the output (transformer secondary). The output should be approximately 115 volts AC regardless of whether the input is 230, 460, or 575 volts AC.

If the readings are normal, the switching should be checked next.

### Switching

6. With normal input and no output, a problem may lie in the switching. The switch connections are shown on each drawing. A voltage or resistance check at these points will show whether or not the circuit is being closed as the switch is actuated.

If the switching is done with an external relay, the relay should be checked to make sure it is actuating and making contact.

If the switching is done electronically inside the control, it is recommended that the complete control be replaced.

## Mechanical Troubleshooting

### Proper Assembly

Check the unit for proper assembly. See the specific service manual that covers your unit.

Is the armature free to slide in and out axially?

Check the autogap installation.

### Autogap Installation Instructions For Automatic Adjustment of Armature Clearance

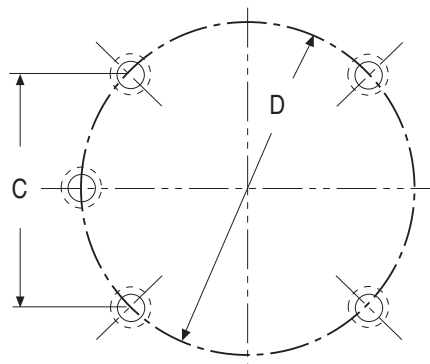
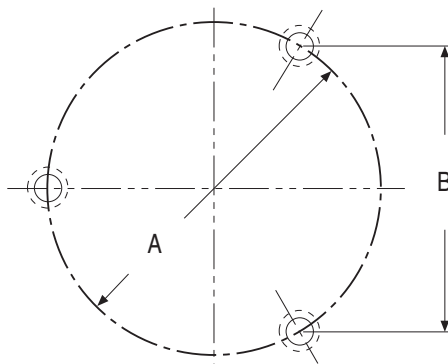
### Drive Pins

Are the drive pins screwed in tightly?

If the armature hangs up on the drive pins, the pins may have worked loose or the hub was incorrectly machined.

All drive pins should have Loctite or an equivalent thread sealant applied to the threads prior to installation.

### Machine Instructions For Gear, Sprocket or Pulley



Unit Size	A	B	C	D
825	3.563 ± .001	3.085 ± .001		
1000	5.252 ± .002	4.548 ± .002		
1225			4.155 ± .002	5.877 ± .002
1525			6.010 ± .002	8.500 ± .002

### Taper Bushings

Are the taper bushings tight on the shaft? Proper bushing installation is important. Proceed as follows: All parts must be clean before assembly. Place the bushing into the hub and insert the key. The key is a side to side fit and should not contact the top of the keyway. Lubricate the locking set screws, insert them into the bushing and slide the assembly on to the shaft. Position the hub so that a 1/16" running clearance will be provided between the magnet and armature faces. Tighten the bushing on the shaft by drawing up on each screw alternately. During the tightening process the bushing should be wrapped sharply from time to time, to make certain that it seats-in properly.

### Brushholder

Is the brushholder properly installed? The mounting bracket must be solid. The brushes are springloaded and should be in good contact with the collector ring. The brushes may be simply worn out and should be replaced.

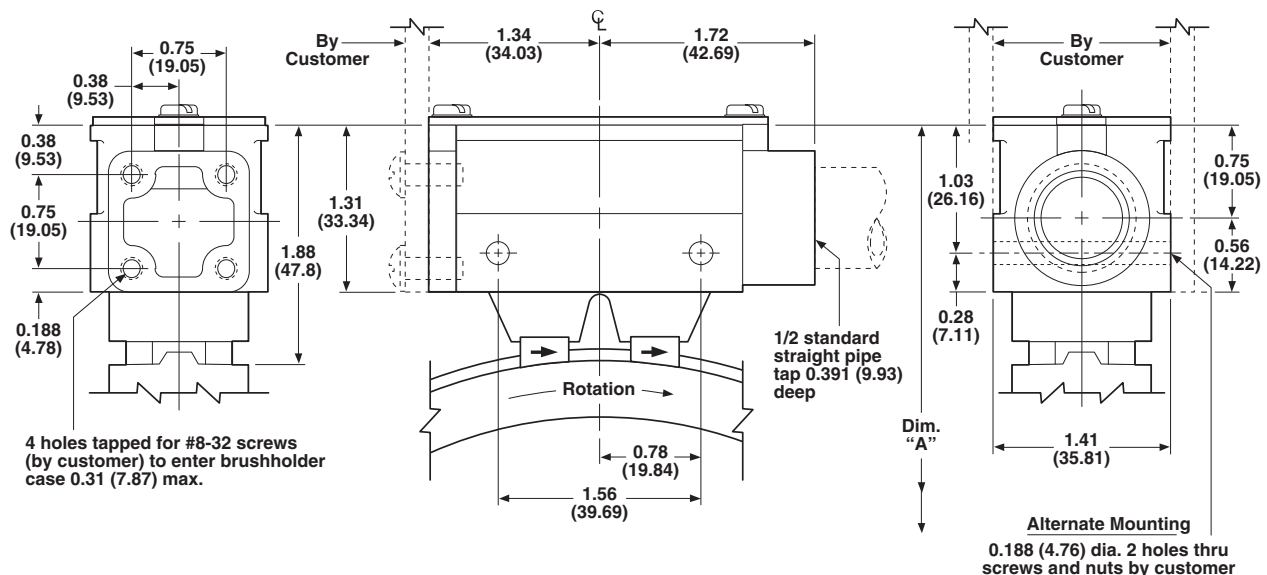
### Alignment

Are the friction surfaces correctly aligned? If the unit is a clutch coupling, the two shafts should be concentric within .006 T.I.R. The unit does not compensate for angular misalignment between shafts. For a brake the magnet face must be square with the armature shaft within .006 T.I.R. The magnet mounting pilot diameter must be concentric with the armature shaft within .010 T.I.R.

### Armature Flatness

Is the armature face flat? If it has been dropped or damaged, it may be out of flat and the torque will drop off considerably. New armature segments are held flat and in plane within .002 T.I.R.

### Brushholder Assembly And Mounting Dimensions



Dimension "A" for collector ring: Size 500 units is 4" to centerline of shaft. Size 825 and above is 5-3/4" to centerline of shaft. Brushholder may be mounted at one end opposite conduit or from either side. It is recommended that brushes be assembled so that arrow on brushes points in the direction of rotation of collector ring, however brushholder may be used with reversing clutch.

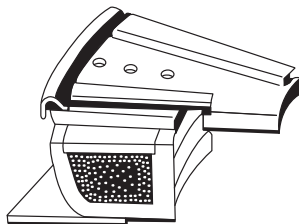
## Environmental Problems

If units are used on machinery where fine, abrasive dust, chips or grit are dispelled into the atmosphere, shielding the clutch may be necessary if maximum life is to be obtained. Where units are used near gear boxes or transmissions requiring frequent lubrication, means should be provided to protect friction surfaces from oil and grease to prevent serious loss of torque.

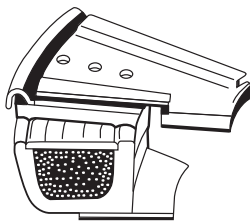
Oil and grease accidentally reaching the friction surfaces may be removed by wiping with a rag dampened with a degreasing solvent. In performing this operation, do not drench the friction material. If the friction materials have been saturated with oil or grease, no amount of cleaning will be completely effective. Once such a unit has been placed back in service, heat will cause the oil to boil to the surface, resulting in further torque loss.

## Wear Pattern

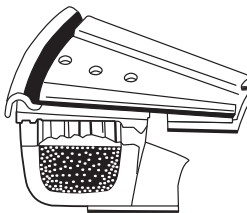
Wear grooves appear on the armature and magnet surfaces. This is a normal wear condition and does not impair functioning of the unit.



New



Burnished



Worn

## Remachining Faces

Remachining the face of a worn armature is not recommended. If a replacement armature is to be used with a used magnet, it is necessary to remachine the worn magnet face. In refacing a magnet: (1) machine only enough material to clean up the complete face of the magnet; (2) hold the face within .005" of parallel with the mounting plate; and (3) undercut the molded facing material .002" - .004" below the metal poles. Normally the magnet and armature, as a mating pair, will wear at the same rate. It is the usual recommendation that both components be replaced at the same time.

## Burnishing

Intimate metal to metal contact is essential between the armature and the metal rings (called poles) of the magnet. Warner Electric clutches and brakes leave the factor with the friction material slightly undercut to assure a good initial contact. Normally, the desired wear-in process occurs naturally as the surfaces slip upon engagement. The time for wear-in, which is necessary to obtain the ultimate torque of the unit, will vary depending on speed, load or cycle duty. If maximum torque is required immediately after installation, the unit should be burnished by forcing the friction surfaces to slip at reduced voltage. It is recommended that the burnishing be done right on the installation, if at all possible. Burnishing at high speed will result in a smoother wear-in pattern and reduce the time for burnishing. The voltage should be set at approximately 30 or 40% of the rated value. The unit should be cycled on and off to allow sufficient time between slip cycles to prevent overheating.

## Heat Dissipation

Excessive heat and high operating temperatures are causes of rapid wear. Units, therefore, should be ventilated as efficiently as possible, especially if the application requires fast, repetitive cycle operation.



## Warranty

Warner Electric LLC warrants that it will repair or replace (whichever it deems advisable) any product manufactured and sold by it which proves to be defective in material or workmanship within a period of one (1) year from the date of original purchase for consumer, commercial or industrial use.

This warranty extends only to the original purchaser and is not transferable or assignable without Warner Electric LLC's prior consent.

Warranty service can be obtained in the U.S.A. by returning any defective product, transportation charges prepaid, to the appropriate Warner Electric LLC factory. Additional warranty information may be obtained by writing the Customer Satisfaction Department, Warner Electric LLC, 449 Gardner Street, South Beloit, Illinois 61080, or by calling 815-389-3771.

A purchase receipt or other proof of original purchase will be required before warranty service is rendered. If found defective under the terms of this warranty, repair or replacement will be made, without charge, together with a refund for transportation costs. If found not to be defective, you will be notified and, with your consent, the item will be repaired or replaced and returned to you at your expense.

This warranty covers normal use and does not cover damage or defect which results from alteration, accident, neglect, or improper installation, operation, or maintenance.

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Warner Electric LLC's obligation under this warranty is limited to the repair or replacement of the defective product and in no event shall Warner Electric LLC be liable for consequential, indirect, or incidental damages of any kind incurred by reason of the manufacture, sale or use of any defective product. Warner Electric LLC neither assumes nor authorizes any other person to give any other warranty or to assume any other obligation or liability on its behalf.

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### Changes in Dimensions and Specifications

All dimensions and specifications shown in Warner Electric catalogs are subject to change without notice. Weights do not include weight of boxing for shipment. Certified prints will be furnished without charge on request to Warner Electric.



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