

# Electromagnetic Particle Brakes

## Model: PRB-H

P-223-3  
819-0370

### Installation Instructions



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

**⚠ WARNING** Make sure all power is turned off to this equipment when installing, as injury (or even death) may result from contact with live wires or rotating shafts.

## Introduction

This service manual provides information required for installing, wiring, and maintaining Warner Electric Magnetic Particle brakes. Dimensions and specifications are also included. The model covered in this service manual includes PRB-H units with hollow bores. For selection information, please refer to your Warner Electric Tension Control Systems Catalog.

Warner Electric Magnetic Particle brakes provide smooth and controllable torque for a variety of torque and tension control applications. Extremely accurate tension control can be achieved with an appropriate Warner Electric tension control for electric brakes. They also provide excellent performance in applications where controlled stopping or deceleration is desired. Quick deceleration is achieved by applying full rated voltage. Lower voltage can be applied for a gradual engagement.

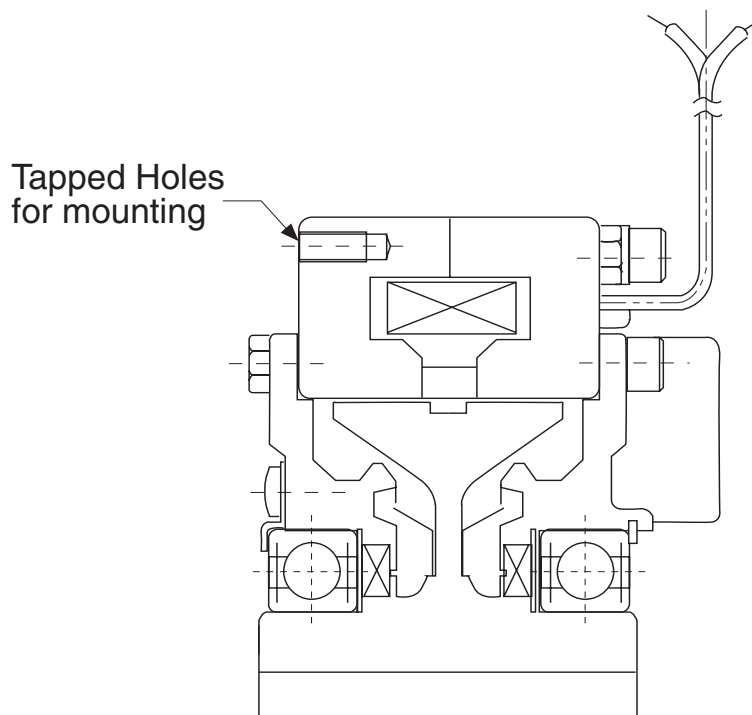


Figure 1 - PRB-H Basic Model

## Installation Instructions

### Introduction

The PRB-H brake mounts to a vertical surface and the customer's shaft is secured in the input hub of the unit. See Figure 2.

### Pre-Mounting

**Note:** Unit performance can be affected by prolonged exposure to humid environments. Please store in a dry location.

**Note:** The equipment covered by this service manual must be installed in accordance with these instructions. Failure to do so may damage the equipment and void the warranty.

1. Remove your magnetic particle brake from its shipping carton and inspect it thoroughly to ensure that it has arrived in good condition. When handling, please take care not to damage lead wires.
2. Check the input hub to make sure it turns freely. The magnetic powder inside the unit may settle due to shock and vibration caused during shipping. If hub rotation is difficult, turn the unit upside down and gently tap it to loosen the powder.
3. Make sure the location chosen for mounting will not expose the unit to water or oil as these contaminants may affect unit performance. If the unit is mounted next to a gear-box, special care should be taken to prevent oil from working its way into the unit.
4. If coupling(s) are used to connect to the drive system, the mounting surface must properly locate the housing to ensure that alignment is within tolerance of the coupling(s).

## Mounting

**Note:** For proper function, mount magnetic particle units horizontally.

Mounting dimensions for the PRB-H can be found on page 6 & 7.

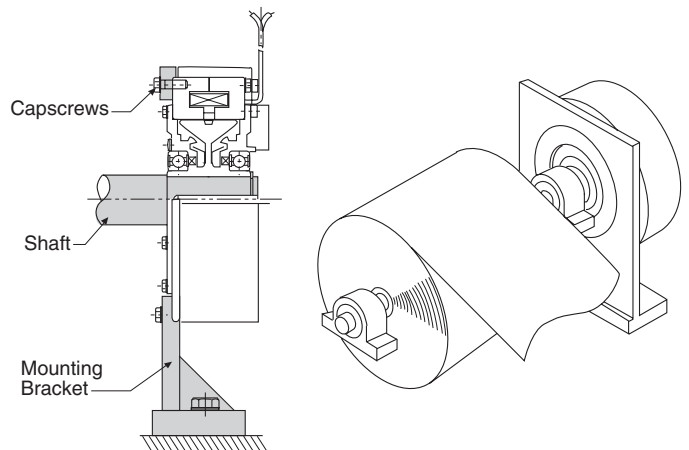
### Step 1: Bolt Unit Into Place

Mount the unit to a vertical surface with customer supplied fasteners. PRB-H brake should be mounted to a vertical surface. See Figure 2.

### Step 2: Make Mechanical Connections

Slide the input shaft into the brake's bore. The shaft should be supported from moving axially using external bearings, snap rings, or locking collars.

**\*Note:** Shaded items are customer supplied.



**Figure 2\***  
**PRB-H Installation Example**

## Electrical Connections

**⚠ WARNING** To avoid injury (or even death), always make certain all power is off before attempting to install or service the control or any electrical equipment.

Warner Electric Magnetic Particle brakes operate on DC voltage. Warner Electric offers a full line of AC powered controls to meet the needs of almost every application. The service and installation instructions included with each Warner Electric control show the proper electrical connections for the brake.

If a varistor is supplied with your unit, it is not required for use with a Warner Electric control. All Warner Electric controls have built in suppression.

After wiring your Magnetic Particle brake, check the control circuit. Without rotating the input hub, verify that voltage is applied when the control output is turned on. Also, if appropriate, set the current for the proper output. Your magnetic particle unit is now ready for operation. For information on start up and maintenance, see below.

## Start Up

The powder in the magnetic particle units sometimes settles during shipping and will need to be redistributed. A simple run in procedure should be performed to ensure proper performance.

## Run in Procedure

**Note:** Before running in the brake, make sure it does not bind. See step 2 of the premounting instructions.

Set the control output voltage to 5 - 6 volts. Turn off the control and run the input for one minute. Then run the input at a speed close to, but not exceeding, 1000 RPM. Cycle the unit at 5 or 6 volts for five seconds on and ten seconds off. Repeat this for 20 cycles.

When the powder is redistributed properly, torque will be consistent and proportional to current.

## Maintenance

### Heat

If the heat generated during operation is greater than the heat dissipation capability of the unit, it will overheat. The maximum allowable surface temperature for a PRB-H series unit is 194 degrees F.

### Slip Applications

The heat generated is proportional to the torque and slip RPM. Care must be taken when adjusting torque on the control to make sure that the unit heat dissipation capacity is not exceeded. Refer to the sizing procedure in the catalog to make sure the brake has adequate heat dissipation capability. Also, do not increase the slip speed or the torque without verifying that the unit can dissipate the heat.

### Cycling Applications

In cycling applications, the speed and inertia of the load and the stopping frequency determines the heat generated. Refer to the selection procedure in the catalog to verify that your brake can handle the thermal energy generated in your application. Also, do not increase the speed, cycle rate, or inertia without checking the unit's ability to dissipate the heat generated.

### Contamination

Do not expose the brake to water or oil. If water or oil gets in the powder cavity, performance may be affected. If the brake is mounted next to a gearbox, special care must be taken to prevent oil from entering the unit.

## Electrical Data

### Electrical Coil Data (PRB-H)

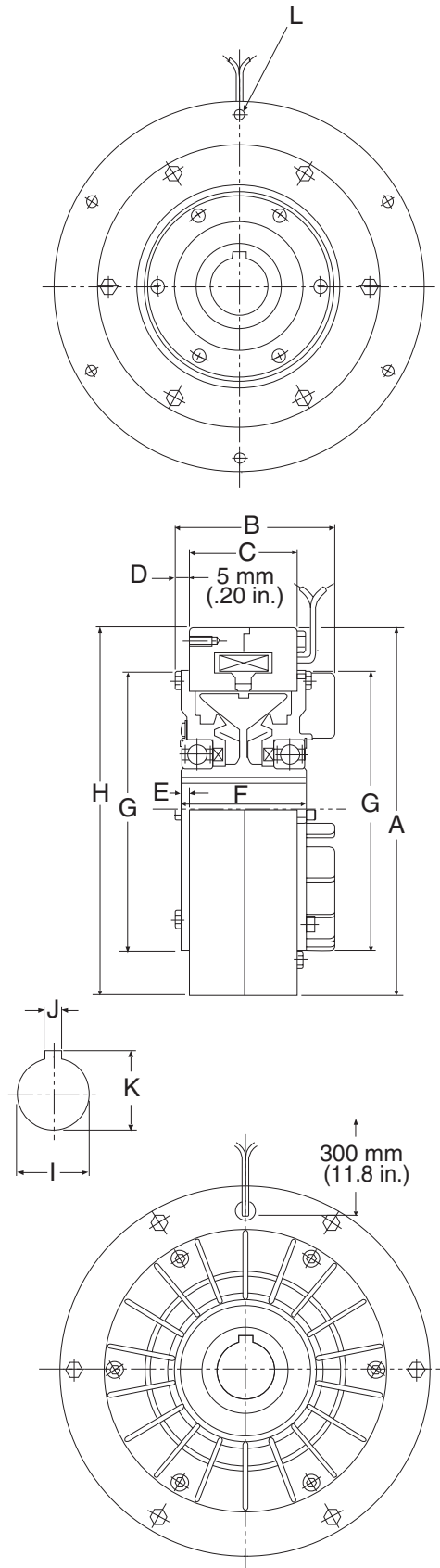
Unit Size	Voltage	Resistance [ohms @ 75° F (25°C)]	Amperes [@ 75° F (25°C)]	Watts [@ 75° F (25°C)]	Torque Build Up (msec)	Torque Decay (msec)
1.2	24	31.6	.760	18.2	138	38
2.5	24	25.6	.934	22.5	175	40
5	24	19.3	1.24	29.8	194	70
10	24	14.8	1.62	38.9	345	95
20	24	12.5	1.93	46.2	440	120

**Note:** Build up time equals time for torque to build to approximately 63.2% of steady state value after a step change in voltage. Decay time equals time for current to drop to approximately 36.8% of steady state value after a voltage change.

## Mechanical Data

Unit	Part Number	Torque (lb. ft.)	Drag Torque (lb. ft.)	Maximum Speed (rpm)	Input Inertial (ft. lb. <sup>2</sup> )	Weight (lbs.)
PRB-1.2H	5401-169-331	8.6	.26	1800	.104	11
PRB-2.5H	5401-169-341	18	.54	1800	.161	15
PRB-5H	5401-169-351	36	1.1	1800	.453	29
PRB-10H	5401-169-361	72	2.2	1800	1.51	57
PRB-20H	5401-169-371	144	4.3	1800	4.46	101

### PRB-H Dimensions



## PRB-H Dimensional Data

Note: All dimensions are nominal unless otherwise noted.

Model	A mm (in.)	B mm (in.)	C mm (in.)	D mm (in.)	E mm (in.)	F mm (in.)	G mm (in.)	Bore Dimensions				L							
								H		I		J		K		Thread Size	Depth mm (in.)	No. of Holes	Bolt Circle mm (in.)
								mm	(in.)	mm	(in.)	mm	(in.)	mm	(in.)				
PRB-1.2H	136 (5.35)	63 (2.48)	42 (1.65)	7 (0.28)	5.5 (0.22)	53 (2.09)	109 (4.29)	136.000	(5.3543)	15.018	(0.5913)	5.028	(0.1980)	17.250	(0.6791)	M5	10 (0.39)	6	125 (4.92)
								135.960	(5.3528)	15.000	(0.5906)	5.010	(0.1972)	17.000	(0.6693)				
PRB-2.5H	160 (6.30)	73 (2.87)	47 (1.85)	7.5 (0.30)	6.5 (0.26)	60 (2.36)	124 (4.88)	160.000	(6.2992)	20.021	(0.7882)	5.028	(0.1980)	22.250	(0.8760)	M5	10 (0.39)	6	148 (5.83)
								159.960	(6.2976)	20.000	(0.7874)	5.010	(0.1972)	22.000	(0.8661)				
PRB-5H	195 (7.68)	84.5 (3.33)	57 (2.24)	8 (0.31)	5 (0.20)	67 (2.64)	149 (5.87)	195.000	(7.6772)	30.021	(1.1819)	7.035	(0.2770)	33.250	(1.3091)	M6	12 (0.47)	6	181 (7.13)
								195.954	(7.7147)	30.000	(1.1811)	7.013	(0.2761)	33.000	(1.2992)				
PRB-10H	250 (9.84)	104 (4.09)	68 (2.68)	8.5 (0.33)	5 (0.20)	78 (3.07)	188 (7.40)	250.000	(9.8425)	30.021	(1.1819)	7.035	(0.2770)	33.250	(1.3091)	M6	12 (0.47)	8	233 (9.17)
								249.954	(9.8407)	30.000	(1.1811)	7.013	(0.2761)	33.000	(1.2992)				
PRB-20H	305 (12.01)	128.5 (5.06)	80 (3.15)	12 (0.47)	7.5 (0.30)	95 (3.74)	234 (9.21)	305.000	(12.0079)	40.025	(1.5758)	10.035	(0.3951)	43.750	(1.7224)	M8	12 (0.47)	8	282 (11.10)
								304.948	(12.0058)	40.000	(1.5748)	10.013	(0.3942)	43.500	(1.7126)				

## 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.

Some states do not allow limitation on how long an implied warranty lasts, so the above limitation may not apply to you.

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.

WITH RESPECT TO CONSUMER USE OF THE PRODUCT, ANY IMPLIED WARRANTIES WHICH THE CONSUMER MAY HAVE ARE LIMITED IN DURATION TO ONE YEAR FROM THE DATE OF ORIGINAL CONSUMER PURCHASE. WITH RESPECT TO COMMERCIAL AND INDUSTRIAL USES OF THE PRODUCT, THE FOREGOING WARRANTY IS IN LIEU OF AND EXCLUDES ALL OTHER WARRANTIES, WHETHER EXPRESSED OR IMPLIED BY OPERATION OF LAW OR OTHERWISE, INCLUDING, BUT NOT LIMITED TO, ANY IMPLIED WARRANTIES OF MERCHANTABILITY OR FITNESS.

Some states do not allow the exclusion or limitation of incidental or consequential damages, so the above limitation or exclusion may not apply to you. This warranty gives you specific legal rights and you may also have other rights which vary from state to state.

### **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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