INSTALLATION INSTRUCTIONS

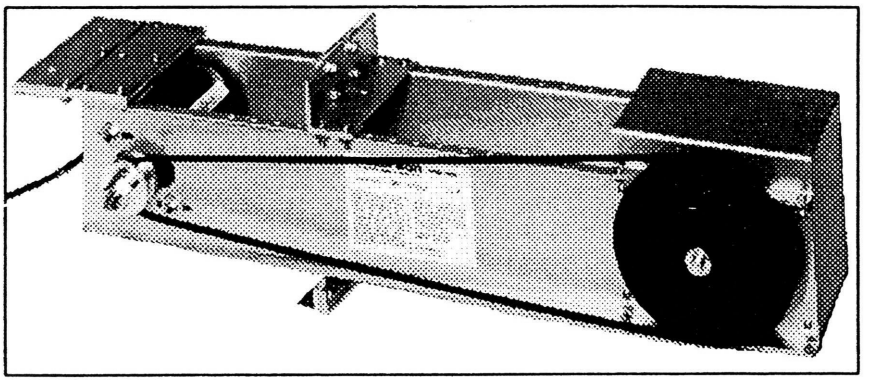
peterson

ELECTRO–MUSICAL PRODUCTS, INC.

ALSIP, ILLINOIS 60803-2476

DYNATREM™

PIPE ORGAN TREMULANT



ATTENTION:

Please leave instruction booklet on job site for future reference whenever possible.

GENERAL DESCRIPTION

The purpose of a pipe organ tremulant is to smoothly vary the air pressure to the pipes. The **PETERSON DYNATREM** (U.S. Patent 4,319,513) is completely different than conventional dump type tremolos in that it uses power supplied by an electric motor to drive a shaft to which a number of lead weights are attached. Since the weights are off center, forces are generated in a circular direction when the shaft rotates. The unique mounting hinge system restrains all horizontal forces and allows only forces in a vertical direction perpendicular to the length of the **DYNATREM** chassis to be coupled to the reservoir. This eliminates horizontal shear forces that would act on the reservoir top causing excessive wear on the folds. This action of moving the top up and down causes the volume of air stored in the reservoir to vary accordingly, thus varying the pressure at the tremolo rate. The **DYNATREM** chassis may be thought of as a lever with the fulcrum at one end. The amount of force exerted on the reservoir top depends on how much weight is rotating and also at which point the reservoir top is connected to the "lever". The key factor in getting maximum tremolo depth is to apply more force to the reservoir top. If the top is connected close to the main hinge (fulcrum) of the **DYNATREM**, more force will be produced against the reservoir top as shown in **Figures 1 and 2.** The trade–off for more force is reduced distance travelled of the reservoir top which is not critical because the distance required for a typical tremolo is very small (approximately 1/4 inch). **Figure 3** illustrates how the **DYNATREM** would appear when mounted on a Schwimmer type reservoir.

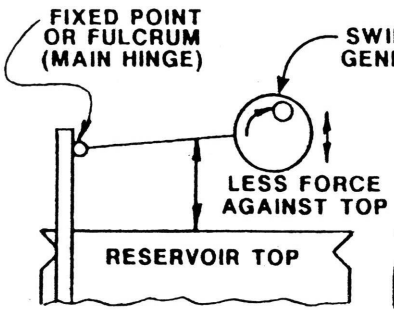


Figure 1

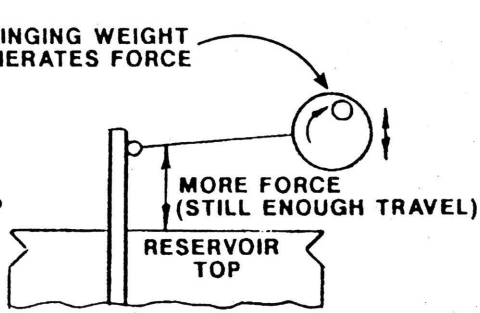


Figure 2

INSTALLATION ON STANDARD TYPE RESERVOIR

It is very important that the **DYNATREM** is coupled to the point at which downward pressure on the reservoir top causes all points of the top to move equally in the same direction. This is usually the exact center of the top of the reservoir. This causes the volume of the reservoir

to change most efficiently. Usually the regulating valve adjustment screw is in the exact center. The **DYNATREM** connecting hinge mounting bracket **(See Fig. 4)** is shaped to straddle this valve adjustment screw. Hold the connecting hinge against the reservoir top and mark the screw locations. Use the four #8 x 1" sheet metal screws supplied to securely fasten the two angle brackets to the reservoir top.

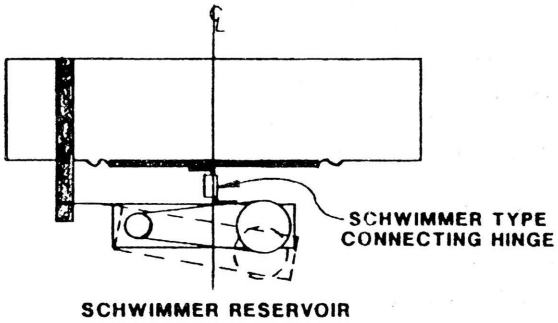


Figure 3

On the top rails of the **DYNATREM** chassis are a number of holes for connecting the upper end of the connecting hinge. There are a few things to consider when positioning the **DYNATREM** on your reservoir. One factor is the amount of force required to achieve enough tremolo depth. The larger the reservoir, the more force will be required from the tremolo. Therefore, the **DYNATREM** unit must be positioned in a way that the top can be coupled to it nearer the main hinge **(See Fig. 8)**. Usually, the nominal air pressure will not be affected by adding the relatively slight extra weight of the tremolo to a large system. In any case, the reservoir can be readjusted to desired pressure after installation of the **DYNATREM** by readjusting springs and/or weights. On small reservoirs, **(Refer to Fig. 6)**, the reservoir top should be connected to the tremolo near the weight end (the end with the large pulley). This will reduce the effect that the added weight of the tremolo makes on the wind pressure. **Figure 6, 7 and 8** illustrate typical mounting positions of the **DYNATREM** on various size reservoirs. You will see from the drawings that as the reservoir top is connected closer to the main hinge point of the **DYNATREM**, (Dimension "a"), the distance that the weight end travels (Dimension "b") is greater. **Figure 11** includes a chart for use in determining what Dimension "b" will be for a given Dimension "a" and a given travel of the reservoir top. This becomes a concern when the blower is shut off and the top travels through Distance "c". The rear main hinge point has to be low enough so that the weight end of the tremolo does not hit the reservoir top. The travel of the top will have to be limited. The top travel limit stops ("y") will be described later. Determine from the drawings where the tremolo should be mounted based on the size of the reservoir. A framework can then be devised to hold the **DYNATREM** in the proper position. It is important that the framework is rigid enough to prevent horizontal motion of the **DYNATREM**. Local electrical supply

houses usually carry highly adjustable strut systems that will work well. The following instructions describe how such a strut system can be used.

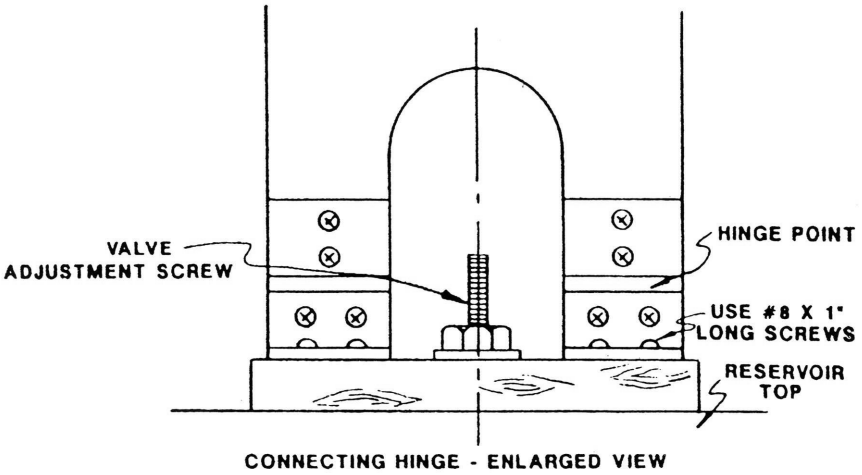


Figure 4

Observe the side of your reservoir. To secure the mounting frame you need a clear space approximately 4" wide from the top to bottom on both sides **(Refer to Figures 9 and 10)**. The frame uprights must be spaced away from the reservoir so they do not interfere with the movement of the reservoir top. A strip of 3/4" plywood or 1" x 4" lumber works well. Fasten the spacers and uprights to the reservoir side. Use three 1/4" x 2" long screws on each upright. The uprights must be in line with each other so the crossbar is straight. Use angle brackets to mount the crossbar to the uprights. The crossbar height is adjusted by moving the crossbar angle brackets along the uprights. The required height is determined by the amount of travel needed for the reservoir to regulate properly. With the organ turned on, measure the amount the top moves when full wind load is applied. Typically, the top only moves 1 to 2 inches at full organ load. Add 1/2" to the figure you come up with for safety sake. The travel of the top is limited by fastening wood stops to the sides of the reservoir and to the top **(Refer to Figures 5 and 6)**. Keep in mind that the length of the stops should be at least 50% the length of the top to provide adequate support **(Refer to Figure 9)** Once the travel limit stops, frame and connecting hinge are mounted, the **DYNATREM** chassis can be mounted to the frame. Usually two 1/4–20 x 1" machine screws, nuts and washers will be used for this. Move the connecting hinge angle bracket over the appropriate holes in the side rails and fasten together with the #8 screws and nuts provided. Adjust the crossbar height so that the weight end of the **DYNATREM** has 1/4" clearance to the reservoir top when the blower is off.

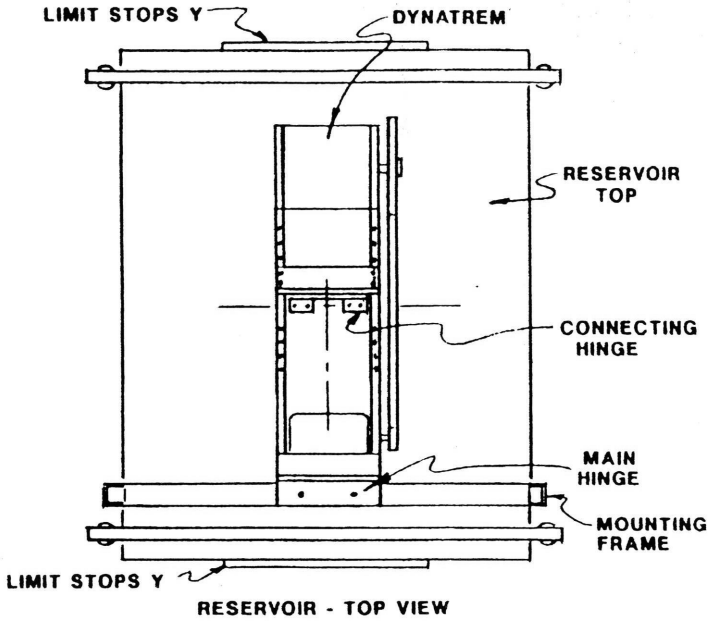


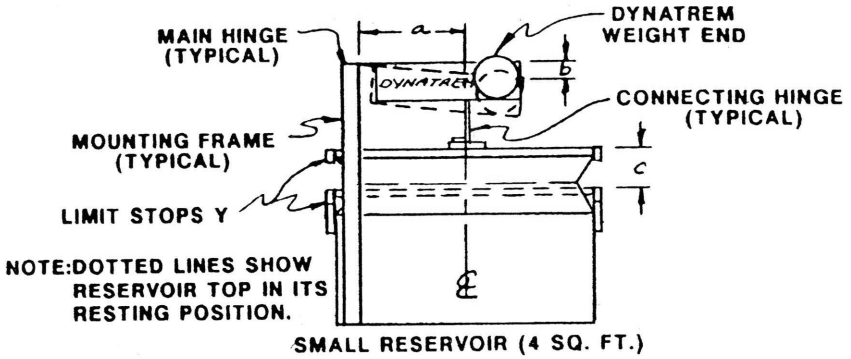
Figure 5

CONTROL BOX INSTALLATION

There is a relay mounted in a metal control box supplied with your **DYNATREM**. The purpose of this control box is to switch 117 VAC to the motor when the tremolo stop tab is activated.

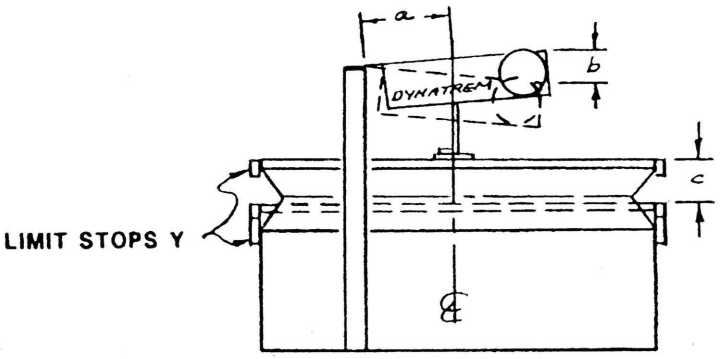
The box should be mounted to the frame crossbar near the motor. Remove the control box cover. Drill two holes in the crossbar to line up with the holes in the bottom of the control box and fasten the box in place with #8 screws. The screw heads must be inside the box and the nuts and lockwashers on the bottom of the frame crossbar.

The box has been provided with a ground type line cord (if you wish to directly connect the box you may use rigid conduit or BX armored cable. Be sure the box is grounded and that you use wire nuts to insulate connections). If you are using the box as supplied, replace the cover. The electric motor from the **DYNATREM** plugs into the socket on the control box. There is also a 2 lug terminal strip to which the stop tab wires are connected. Wire your stop tab to these terminals observing polarity as marked. NOTE: The A.C. line has been fused using a 1 Amp, Slow–blow type 3AG fuse. Replace only with a fuse of the exact rating. Turn on the organ and test the system. Turn the stop on and off several times to make sure the motor starts every time. If the motor will not start every time, the belt may be too tight. The belt, when adjusted properly, may appear to be loose. This is normal.



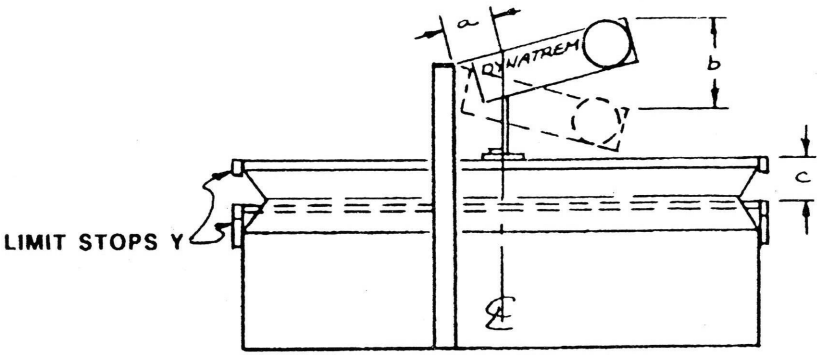
SMALL RESERVOIR (4 SQ. FT.)

Figure 6



MEDIUM RESERVOIR (9SQ. FT.)

Figure 7



LARGE RESERVOIR (16 SQ. FT.)

Figure 8

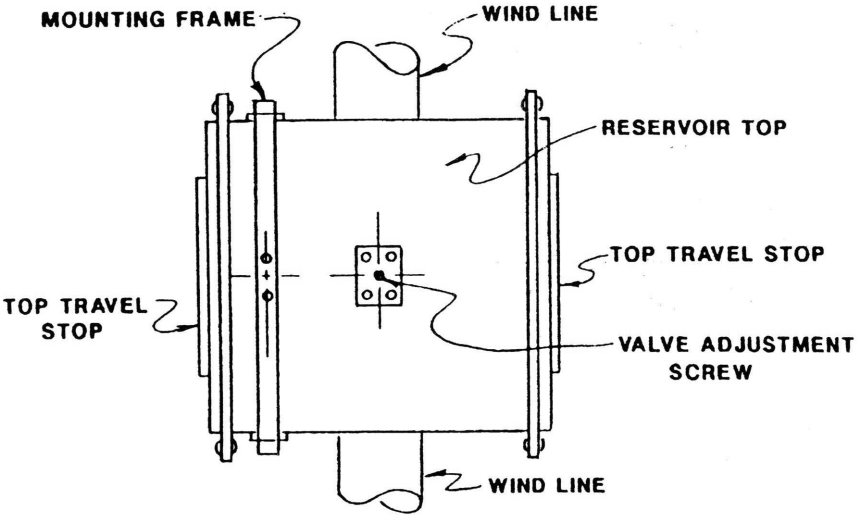


Figure 9

ADJUSTMENTS

DYNATREM SPEED ADJUSTMENT

The speed of the **DYNATREM** is adjustable over a range of about 4.0 Hz to 8.0 Hz, 5.5 Hz being a suitable speed for most church needs. The speed can be changed by the adjustable pulley. To change the speed of the **DYNATREM**, follow the instructions given below:

1. Disconnect the power unit.

2. Loosen the four 11/32" Hex Nuts that secure the motor into the chassis slots.

3. Slide the motor forward to loosen the belt or for belt removal.

4. Insert the pin provided into the hole on the adjustment half of the pulley (the part of the pulley farthest from the motor). While holding this half securely with the pin, loosen the jam nut with a 3/4" wrench. Rotating this half clockwise on the threaded hub effectively increases the diameter of the pulley, therefore increasing the tremolo speed. One half turn will produce a noticeable change. Likewise, turning it counterclockwise reduces the speed. Retighten the jam nut and remove the pin.

5. Replace the belt and move the motor back towards the main hinge to take up the slack. **It is very important that you do not over-tighten the belt.** Doing so will prevent the motor from starting. The amount of belt deflection at the center of the chassis is approximately 1" with two pounds force applied to the belt. When the belt looks a little loose, it is probably right.

6. Tighten the four nuts that secure the motor. Connect power to the system and test to see that the motor starts and stops quickly.

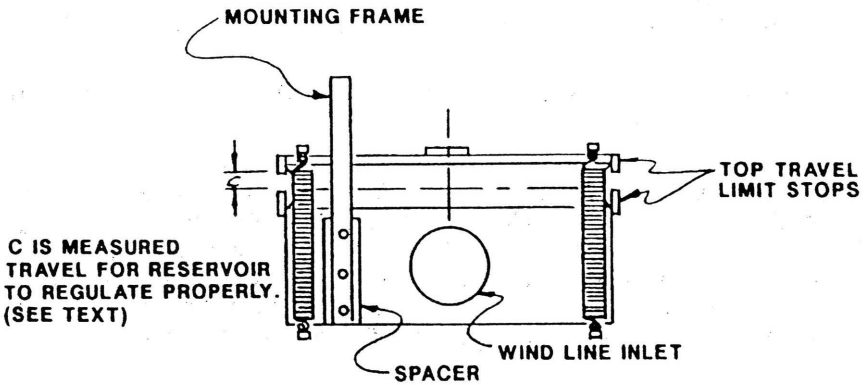


Figure 10

DYNATREM DEPTH ADJUSTMENT

There are many factors that affect the depth of the tremolo including the size of the reservoir, the wind pressure, etc. The position of the tremolo on the reservoir should be matched to the size reservoir you have as shown in **Figures 6, 7, 8 and 11**. Furthermore, weights can be removed or added to change the depth. To adjust, remove the cover. There is a 7/16" Hex Nut on a carriage bolt that fastens the lead weights to the rotating arm. Remove the nut and add or remove weights as desired.

WARRANTY INFORMATION

The **DYNATREM** tremolo unit is guaranteed for a period of ten (10) years from the date of purchase. Any **DYNATREM** that is returned to the factory prepaid within this period will be repaired free of charge, if in our opinion,

it is defective in material or workmanship. Any **DYNATREM** that requires repairs due to accidental damage, abuse, or operation on power sources other than those specified, will be repaired and charged for at current rates.

IN CASE OF DIFFICULTY

PETERSON recognizes the importance of giving good customer service. Providing comprehensive support to the customer after the sale, has given us a fine reputation in the industry. If you experience any difficulty with the **DYNATREM**, please contact the factory for technical assistance. A simple phone call may save much time and money. Our phone number is (708) 388–3311 or you may use our toll–free number, (800) 341–3311.

Should it become necessary to return a **DYNATREM**, please observe the following instructions:

Use a shipping carton that will allow at least 2" of packing material around the entire instrument. Crumpled newspaper works very well for packing. Mark the carton "Fragile–Delicate Instrument". We suggest shipping via United Parcel Service if possible, or Parcel Post Special Handling, Insured. Be sure to enclose a letter which describes the difficulty you have experienced. Also enclose your return address. Ship the unit Prepaid to:

PETERSON ELECTRO–MUSICAL PRODUCTS, INC.
11601 South Mayfield Avenue
Alsip, Illinois 60803-2476

TO CALCULATE MAX. TRAVEL AT POSITION b :
1. CHOOSE MOUNTING POSITION OF CONNECTING HINGE (A–N).
2. MULTIPLY TRAVEL OF CONNECTING HINGE (INCHES) BY THE "TRAVEL RATIO" NUMBER SELECTED BELOW.

MOUNTING POSITION OF CONNECTING HINGE	A,B	B,C	C,D	D,E	E,F	F,G	G,H	H,I	I,J	J,K	K,L	L,M	M,N
TRAVEL AT POSITION b FOR 1" CONN. HINGE TRAVEL	3 3/4"	3 11/32"	3"	2 3/4"	2 17/32"	2 5/16"	2 3/16"	2 1/32"	1 29/32"	1 25/32"	1 11/16"	1 19/32"	1 17/32"

EXAMPLE: CONNECTING HINGE POSITION IS E,F. THE TRAVEL RATIO FOR THIS POSITION (FROM THE CHART) IS 2 17/32" : 1.
IF THE CONN. HINGE AND RESERVOIR TOP MOVE 2", THEN THE TRAVEL AT b IS 2 17/32" X 2 = 5 1/16".

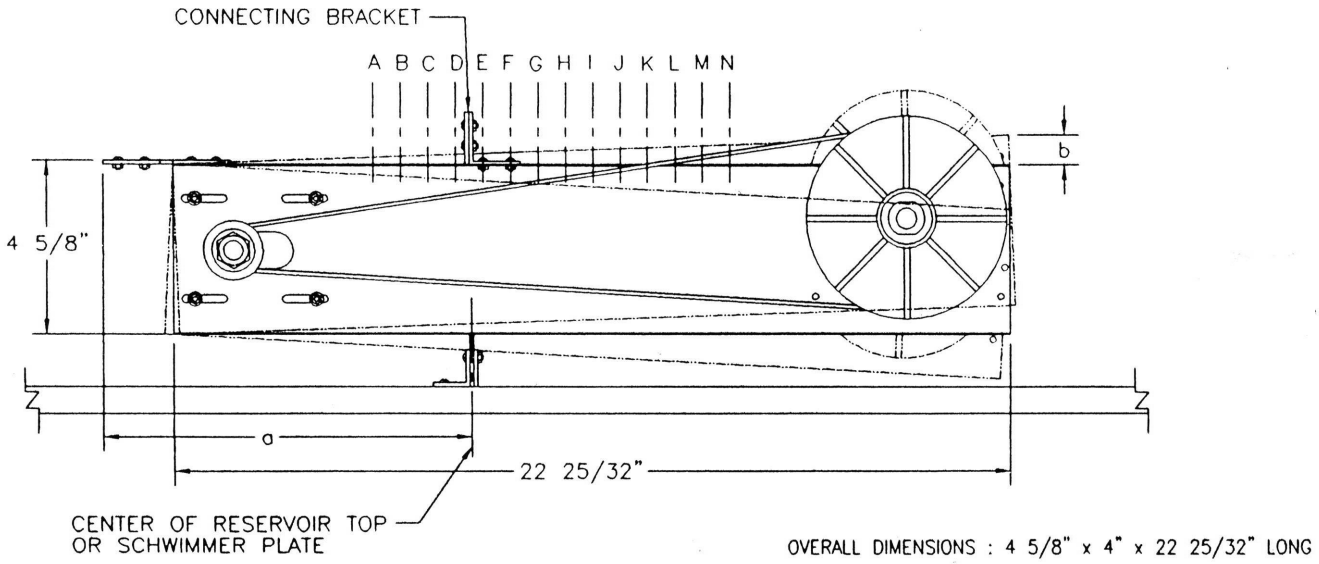


FIGURE 11
DIMENSIONS AND TRAVEL CALCULATIONS

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