

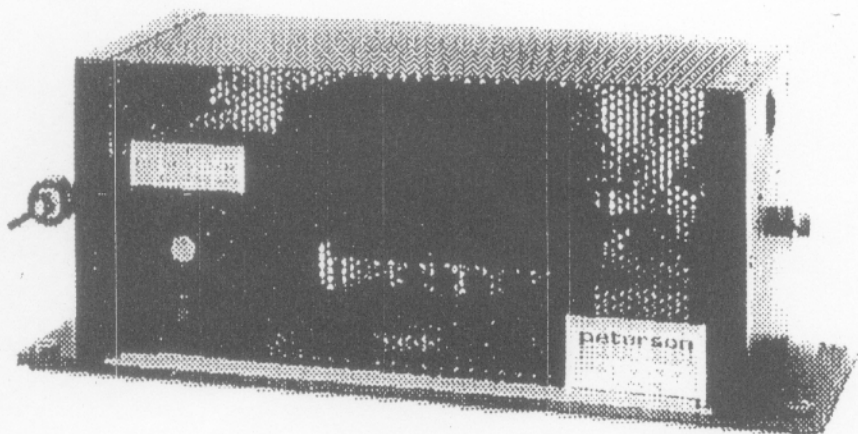
INSTALLATION INSTRUCTIONS

peterson

ELECTRO-MUSICAL PRODUCTS, INC.

WORTH, ILLINOIS 60482-2476

ELECTRONIC SWELL SHADE OPERATOR



ATTENTION:

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

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GENERAL DESCRIPTION

A brief explanation of the principles behind the Peterson Swell Shade Operator should help you to understand how to install it properly. The device consists of a D.C. gearmotor, motor drive speed control, position comparator, shoe position sensor and motor shaft position sensor. Signals from the shoe position sensor (Position Adjust Board) and motor shaft position sensor are compared on the position comparator. If the signals match, the motor will remain at rest because current flow to the motor is prevented and an electrical brake is applied to the motor. When the shoe changes position, the comparator senses this difference and the motor is driven in a direction that would eliminate the position difference. In theory, the motor would stop instantly when the shoe and motor positions match. An ideal system would allow infinitely small increments of motor shaft rotation (shade travel). Due to the effects of inertia on the motor armature and shades and the limitations of the braking system, the motor does not stop at the exact instant that the shoe and the motor shaft positions match. The shaft will keep going slightly beyond this point and then stop. If the system was designed to have sensitivity to very small increments of travel, the arm would go past the desired position, return to the desired position and beyond (due to inertial effects), and would repeat this cycle indefinitely. This effect is known as overshoot or "hunting".

The main causes of hunting are high inertial loads, high speed and high sensitivity to position differences by the position comparator circuit. We have de-sensitized the position comparator circuit so that the smallest increment of travel is $3/16"$. This $3/16"$ "deadband" eliminates hunting at normal speeds of operation, i.e., one second or more for end to end shade travel. At greater speeds the inertial effects increase, consequently if the speed is set too high the system will hunt.

You might notice that the position adjust potentiometers on the Position Adjust Board require a small amount of rotation before the arm will begin to move, because of the built in deadband. We have set the deadband to an optimum setting to provide a small enough increment of travel at an acceptable speed without hunting. If this deadband is widened, the arm could rotate faster while still avoiding any hunting, but the minimum travel would be larger, perhaps too large to permit satisfactory expression results.

SOURCES OF NOISE

There are several possible sources of noise in a swell shade system when installed. One source of noise is play in the trace arm pivots and top and bottom shade pivots. Play in these parts should be minimized. Also, play can be present in the linkage between the Swell Shade Operator output arm and the trace. Rod end swivel joints similar to the type supplied on the output arm are recommended. Consult the factory for additional rod ends if needed.

The effect of play in the trace can be reduced, if not completely eliminated, by pulling the trace to one side of its play with a spring or weight return. This increases the loading and current draw on the organ rectifier, and also makes the shades slightly less responsive. However, even with the spring or weight return, the performance is still quite satisfactory.

In some cases you may not be able to position the Swell Shade Operator with the trace as needed for rigid connection, consequently, a pulley and cable system must be used. In this case, a spring or weight return is required, and noise due to play will be minimized. When using a pulley, the pulley should be as large as possible to reduce losses. Aircraft cable works well for the cable connection to the trace.

WIRING INSTRUCTIONS

Organ Positive and Organ Negative must be connected to the main terminal block located inside the Swell Shade Operator. Once you have decided on the mounting location for the Swell Shade Operator, determine the wire length between the Swell Shade Operator and the main rectifier feed. If this distance is 50 feet or less, use 16 gauge wire. On any runs that require more than 50 feet, use 14 gauge wire. Use the clamp type terminals supplied for the rectifier connections.

There are four additional terminals on the main connector block. They are labeled, A, B, C, and D. These are wired to the Position Adjust Board located on the side of the gearmotor. Also, there is a 9 pin in-line connector located on this board. The terminal marked "Common" feeds the Swell Shoe Simulator Switch. When using the "shoe", it is not necessary to use this "Common". A positive feed to the expression shoe is required. Either the console Organ Positive or the "Common" on the Position Adjust Board can be used for this feed. CAUTION: Do not connect organ negative to the shoe terminals. Damage may result to the Swell Shade Operator. Consult the factory for special inverters if a special shoe contact configuration must be used.

The remaining terminals 1 through 8 are to be connected in order to the terminals on the shoe. **EXAMPLE:** Terminal #1 on the Position Adjust Board is to be wired to the first contact that is made when the shoe is advanced toward the open direction. Terminal #2 is to be wired to the second contact made when the shoe is further advanced toward the open direction. If there are more than 8 terminals on the shoe, skip some of the terminals on the shoe so the shade positions can be set over the entire range of the shoe.

MOUNTING THE UNIT

The base plate has six rubber grommets with holes in them. These grommets provide vibration dampening. When bolting the unit to its mounting surface, use #10 or larger screws with 5/8" outside diameter or larger flat washers.

SPEED ADJUSTMENTS

There are four speed adjustment controls located on the upper part of the side panel above the gearmotor output shaft. These are labeled **Close Fast**, **Close Slow**, **Open Fast** and **Open Slow**. Rotating any of these controls clockwise will increase the speed of the motor in the labeled mode. An LED (Light Emitting Diode) is located next to each control. The LED will light next to the control that is operative at any given time. When the arm has reached the desired shutter position, none of the LEDs will be lit and the motor will stop. When a small change in position is called for, the slow mode will dominate. The appropriate control should be adjusted for slow enough motion to prevent abrupt, jerky starting and stopping. The fast mode will be entered whenever a greater distance change is called for. Adjust the speed of this mode for a rate fast enough for adequate expression response.

If you see an LED indicator lit when the motor is not turning, it means that the motor is stalled. Turn the corresponding control clockwise to increase the power in that mode. If the motor does not start moving, the linkage is probably bound up, or you are exceeding the torque limits of the Swell Shade Operator. It is very important that the motor not be allowed to stall. A stall draws excessive current and will trip the circuit breaker. If you have a problem with the motor stalling, remove power from the Swell Shade Operator and correct the source of overload. In most cases, you will find that the positions are adjusted for too much travel and the shades are binding at the end of their travel limits. Refer to the Position Adjustments section.

POSITION ADJUSTMENTS

The positions of the shades in each of the eight stages are independently adjustable by their respective controls (potentiometers) located on the Position Adjust Board. Adjacent to each potentiometer is an LED which indicates when the stage is activated. There is also a closed position potentiometer. With the shoe in the fully closed position, an LED will be lit and the closed position may be adjusted as desired. As the shoe is advanced, additional LEDs will light. Advance the shoe one stage at a time and adjust each control accordingly.

4 Turning the potentiometer's pointer toward the LED will open the shades, and turning the pointer away will cause them to move toward their closed position. Remember that the increment of travel must be large enough for the comparator circuitry to tell the motor to start rotating. Otherwise, the arm may not reliably move from one position to another. Refer to the General Description section regarding "dead-bands". Do not adjust the positions so that the shutters could bind at the end of travel. This will stall the motor and trip the circuit breaker.

FUSE INFORMATION

Peterson Swell Shade Operators are supplied with an 8 Amp resettable circuit breaker. It is located on the side panel of the unit where the rectifier connections are made. If this breaker shows white, it is tripped. Simply push it back in to reset. If it blows repeatedly, the shades are probably binding. Locate the source of the trouble and reset the breaker.

WARRANTY INFORMATION

The Peterson Swell Shade Operator is fully warranted for a period of five (5) years from the date of purchase. During the period from five (5) to ten (10) years, there will be a maximum charge of \$125.00 for repair of a motor or gear train only. All other components are covered for a full ten (10) years. Any Swell Shade Operator that is returned to the factory prepaid during this period will be repaired according to the above terms, if in our opinion, it is defective in material or workmanship. Any unit 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 Swell Shade Operator, please contact the factory for technical assistance. A simple phone call may save much time and money. Our phone numbers are (708) 388-3311, or our toll-free number is (800) 341-3311.

RETURNING A SWELL SHADE OPERATOR

Should it become necessary to return a Swell Shade Operator, please observe the following:

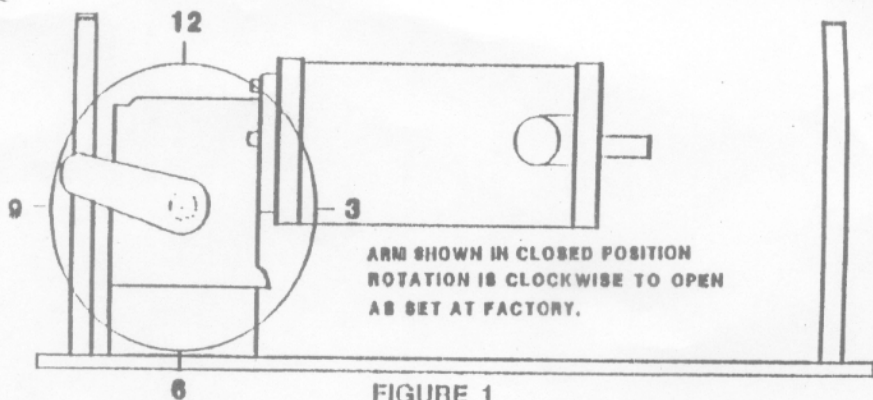
5 If the desired location of the Swell Shade Operator is in a position that would make it difficult to adjust the positions of the shades, the Position Adjust Board can be easily removed from the Swell Shade Operator and relocated to a more convenient location. The board is held in place with four screws. It will be necessary to extend the wires connected to the A,B,C,D and Organ Negative terminals of the board to wherever you locate it. Turn off the power first, and be careful when removing this board that you do not upset any components and that you do not drop any of the screws into the circuitry. The wire size used is not critical (24 or 26 gauge wire is sufficient).

ARM ORIENTATION SETTINGS (Refer to Fig.1)

Peterson Swell Shade Operators are shipped set for clockwise rotation of the arm to open as viewed in Fig. 1. If in your particular application you require the arm to open in a counter-clockwise rotation, the arm rotation can be reversed by changing the polarity of the motor and the position sensing potentiometer. This can be accomplished by moving certain wires on the terminal strip mounted on the side of the gear-motor itself. These terminals are marked Motor 1,2 and Pot 3,4 and 5. Once you have determined that you need to reverse the motor rotation, proceed as follows:

1. Be sure the motor is in its closed position before removing the power.
2. Disconnect the organ rectifier wires to the Swell Shade Operator.
3. Reverse the motor feed wires 1 and 2 (the wires nearest the base plate).
4. Reverse the pot feed wires 3 and 4 (the blue wire to #5 is the pot wiper and must be left where it is).
5. Reconnect the organ rectifier wires to the unit. The arm will rotate to its new position on the clockwise side of the rotation. This is the new closed position. As you go through the stages, the arm will rotate in a counterclockwise direction to open when viewed as in Fig. 1.

The arm can be positioned on the motor shaft in one of four ways. It can rotate clockwise from 9 to 3 o'clock, 12 to 6 o'clock, 3 to 9 o'clock or 6 to 12 o'clock. When repositioning or replacing a crank arm, make sure a set screw bears down squarely on the flat of the motor shaft to prevent the arm from coming loose.



LINKAGE CONNECTION

As discussed previously, if your shade parts have play in them, a spring or a weight return system is recommended. Again, use pulleys that are large in diameter (3" or 4"). Plastic or wood pulleys are usually the quietest. The spring should be preloaded and be as long as practical, so that the difference in tension between the open and closed positions is minimal. Do not use excessive spring tension. Use only the tension needed to positively return the shades to the closed position.

When using a weight system, the loading is constant throughout the range of travel. Use only enough weight to return the shades effectively. Always have the spring or weight pulling the shades to the closed position and the Swell Shade Operator pull against the return to open.

We have supplied the crank arm with a rod end swivel joint and a length of fine thread (1/4-28) threaded rod. It is recommended that you make a direct connection from this threaded rod to the trace system of your shades, extending it if necessary with a length of threaded oak rod. The other end of the threaded oak rod (or metal rod) can be attached to the trace with a pivot pin of your own fabrication, or you can use an additional rod end assembly identical to the one supplied on the crank arm, available from the factory as Part Number 400777.

If you are using a cable/pulley system, you may have trouble matching the fine thread of the crank arm rod. Hardware store turnbuckles usually have a coarse thread. We have a fine thread turnbuckle assembly available that will attach to the end of the crank arm rod. The Part Number for this is 400778. If you require these additional parts please mail your request to Peterson Electro-Musical Products, Inc., 11601 South Mayfield Avenue, Worth, IL 60482-2476 or call toll free 1(800)341-3311.