

## Tech Note #10: Building a Trouble-Free Power Window System

The purpose of this document is to establish an understanding of the critical aspects of a window system that make it a good candidate for a power window system installation. This information pertains to both our Sentry II and Sentry 2000 power window systems.

### The Role of the Window Manufacturer in a Power Window System Installation

One of the traits of successful companies is their reputation for outstanding product quality and after-the-sale service. Power window systems are a unique product in the sense that it requires extra attention to detail by all those in the distribution channel to result in a high quality, trouble free product to the homeowner. Because of the complexity of power window systems, not paying this extra attention to detail can quickly add up to many services calls, frustration and finger pointing at many levels in the distribution channels and ultimately a very dissatisfied homeowner.

The key word is Power Window **System**. A power window system is made up of much more than the drive motor and the electronic power and control system. In order to function properly, the design of the motor system is predicated on a properly functioning manual window system. If any element of the window does not function properly as a manual window system, it will not function properly as a power window system. To compound matters, when a problem with the window system does occur the root cause usually becomes masked as a motor system problem. This often results in many hours of frustration and wasted time by the motor system installer (usually the electrician) trouble shooting a problem not associated with the motor system at all.

When a motor system is not functioning properly it must be recognized as a symptom of a problem with the power window **system**, not just a problem with the motor system itself.

When the root cause is a bad *motor* system, AmesburyTruth's Technical Services 800 number (800-324-4487) is printed on the installation instructions and is available for the installer to use. These problems are handled by AmesburyTruth with minimal customer (window manufacturer) involvement.

However, when the root cause is associated with the window system, resolution can become quite frustrating for the installer/contractor. They usually call AmesburyTruth with the symptom of a non-functioning motor system. After speaking with a AmesburyTruth Technical Services representative, the motor system installer (usually an electrician) becomes unsure whose problem it really is so they turn it back over to the contractor. The contractor may have to relearn all the facts before knowing who to contact for resolution. Many times the actual problem can be complex and unfamiliar to the installer/contractor therefore high levels of frustration can result.

AmesburyTruth Technical service personnel do their best to trouble shoot and explain what we think the problem is. At this point the window manufacturer's field service and/or dealer personnel usually get involved.

Most window system problems occur when the window size and weight fall outside of the specifications of the manual hardware system.

When hardware specifications are exceeded the operation of the window system as a *manual* unit can be acceptable to the window manufacturer, however this will usually result in a troublesome installation when a *motor system* is applied.

Therefore, an important role of the window manufacturer is to insure the window size and type being requested as a power window system is a good candidate for a motorized window application before accepting the order. Said another way, it is vitally important that the window size and weight fall within the parameters of the manual window hardware as established by the hardware manufacturer.

The following is a list of the most common problems encountered with power window systems and an explanation of why it negatively affects the window system:

### **1. The importance of using the proper hinge size on an awning window**

A common problem is under-sized awning window hinges. It is very important for proper power window system operation that any awning window be properly hinged. What we mean by this is that proper operation of AmesburyTruth's power window systems is predicated on an awning window system using a properly sized counter-balance hinge to suit the sash height and weight. Two examples of counter balance awning hinges in AmesburyTruth's product line is our 13 series two bar hinges and 34 series four bar hinges.

When properly sized to the awning sash height and weight, the hinge counterbalances the sash weight throughout its full range of motion. If the hinge is too small for the sash height or weight (under hinged), the awning sash will have a tendency to want to close under its own weight. Under these circumstances sash chatter can result. (For more information on sash chatter, see Tech Note # 2)

When a power window system is installed on an under-hinged awning window the weight of the window is pushing the operator closed at the same time the motor system is trying to drive the



operator to pull the window closed. This condition causes an erratic closing torque requirement from the motor system. Since many of the motor system control parameters are based on electrical current sensing technology the erratic closing torque can cause the motor control system to become confused causing the window to stop closing during mid-cycle. When this begins to happen repeatedly, a service call to someone in the distribution channel will typically result.

### **1. Casement window size and/or weight exceeds hardware specifications**

As previously said, the operating parameters programmed into the motor control logic are based around normal operating specifications for manual hardware systems. This includes maximum window size and weight. If the window size and weight fall outside of the manual hardware specifications the operating characteristics can exceed the limitations programmed into the motor control logic which can cause erratic and sometimes unpredictable operation of the power window system.

Therefore, careful consideration needs to be given to proper window sizing to insure all casement window sizes and weights fall within the hardware manufacturers' specifications for the manual hardware system chosen.

### **2. Excessive tightness (Weather-strip compression/friction)**

As the size of windows continue to grow and the quality of weather-strip systems continue to improve some weather strip systems have been found to have excessive compression/friction which can have a detrimental effect on power window systems. The affect can be especially pronounced while closing the window to near the fully closed position on larger window sizes because of the increased lineal length of the window perimeter.

Therefore, care must be taken to insure not only that window size and weights fall within hardware specifications, as noted above, but also that the torque to fully open or close a casement or awning window does not exceed 30 inch/pounds on the largest casement and awning window sizes under normal operating conditions.

### **3. Finishing of the window**

Another problem encountered with power window systems is when latex paint is used to finish the window. Most weather stripping will have a tendency to seal against a surface that has been finished with a latex based paint. Therefore, when window finishing calls for paint, oil based paints should be used.

If a window has been finished with latex paint, applying wax (such as automotive finish wax) to the painted surface can help alleviate the problem.