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**VOLUME 2**

**NAVAL SHIPS' TECHNICAL MANUAL**

**CHAPTER 600**

**NON STRUCTURAL  
CLOSURES**

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## **CHAPTER 600**

### **SECTION 10**

#### **INTRODUCTION**

##### **600-10.1**

This volume covers non structural closures with sections on Balanced Joiner Doors, Firezone Doors, Sound Insulated Doors, Non Tight Joiner Doors, and surface ship heating, ventilation, and air conditioning (HVAC) fittings for Damage Control and Ship Survivability All of these equipments provide some type of closure; the majority of these equipments are doors while the last equipment (such as vent dampers and valves) is specifically part of the heating, ventilating and air conditioning system of the ship.

Whereas the equipments covered in volume 1 are considered structural, the equipments in volume 2 are non-structural; that is why they are grouped in this fashion.

## SECTION 11 BALANCED JOINER DOORS.

### 600-11.1 PURPOSE/BACKGROUND.

600-11.1.1 Purpose. Balanced Joiner Doors are mainly used on U.S. Navy surface ships between two areas of potentially different air pressures. The balanced hinge enables easy opening in the case of severe pressure differential. When installed at machinery space main accesses and at the top of trunks, the doors push open into passageways. When installed at the bottom of escape trunks, the doors push open into the trunks. Balanced design is defined as a door with an offset pivot at the door panel centerline. A pivot point near the center of the door panel balances forces exerted against the panel, preventing the door from slamming open during an explosion, and allowing the door to be opened against differential pressure (positive/negative ventilation in either space).

600-11.1.2 Background. These doors are commonly called "Ellison" doors, but there are three manufacturers, each with different models of balanced doors. These are listed in table 600-11.1. The basic components that make up the different balanced doors are shown in figure 600-11.1 through figure 600-11.4. Doors manufactured by Bennett Industries, Inc., Steel Products Division (referred to hereafter as Steel Products) use a continuous hinge tube and have a hydraulic damping device (Balanced Door Operator (BDO)) located in the top of the door panel. Ellison Bronze NAVSEA 129 Design doors are built in conformance to NAVSEA drawing number 803/804-5184129, and although the majority of these models are steel, some older ones are made of aluminum (NAVSEA drawing number 804-5184128). The unique feature of this model is the split hinge tube and lower track guide assembly. The Puget Sound Naval Shipyard Model 159-17STD doors roughly conform to the aforementioned NAVSEA drawing, but contain many different internal components. The Ellison Bronze Models 137, 138, 139B and 139BN doors are made of aluminum and use a continuous hinge tube. These models have gearboxes mounted in the sill of the door. The difference between the 139B and 139BN rests in the tension adjusting gear. The 139B requires a special tool (spanner wrench) to adjust the tension, while the 139BN requires a 1/2" Allen wrench. The 139CN model is a steel version of the 139BN model. (Refer to table 600-11.2).

### 600-11.2 DESCRIPTION.

600-11.2.1 Balanced Door Operation Description. The balanced door operating mechanism may be comprised of a spring or torsion bar, a hydraulic damping mechanism, and hinge arms that allow the door to swing open in an elliptical arc to the position shown in figure 600-11.5. A spring or torsion bar or hydraulic damping mechanism provides the force to close the door and to keep it closed. Opening the door requires a force equivalent to 20 lbs. ( $\pm 3$  lbs.) applied to the pull handle or push plate.

**Table 600-11.1.** Balanced Door Manufacturer Information

MFR.	CAGE	MODEL	NSN	APL	SWING	MFR. DWG. NO.
Steel Products	14149					
		w/aluminum arms 12391		None	RH/LH	12391
		w/steel arms				
		* 11001	***		RH/LH	
		11003	2040-01-374-9940	319990101	RH	11003
		11002	2040-01-374-9939	319990102	LH	11002

**Table 600-11.1. Balanced Door Manufacturer Information - Continued**

MFR.	CAGE	MODEL	NSN	APL	SWING	MFR. DWG. NO.
Ellison Bronze	88171					
		137, 138	***	312090077	RH	805-1749017 RH
			***	312090078	LH	805-1749017 LH
		139B, 139BN	***	312090183	RH	804-5184128 RH
			***	312090184	LH	804-5184128 LH
		139CN	2040-01-486-3500	319990151	RH	139CN
			2040-01-486-3599	319990150	LH	139CN
		NAVSEA 129	***	312090185	RH	803/804-5184129 RH
			***	312090186	LH	803/804-5184129 LH
** Puget Sound Naval Ship- yard	82522					
		Model 159- 17STD	***	None	RH/LH	17STD Sketch 159

\*MFR. DWG. No. 11001 pertains to old doors manufactured by Steel Products, Inc.

\*\*\*New doors are no longer available. Limited repair parts are still available.

\*\*Parts for Puget Sound Naval Shipyard (PSNSY) doors are available from PSNSY TYPE DESK; consult PSNSY 17STD Sketch 159 Parts List or PSNSY Metal Joiner Door Catalog and Price List.

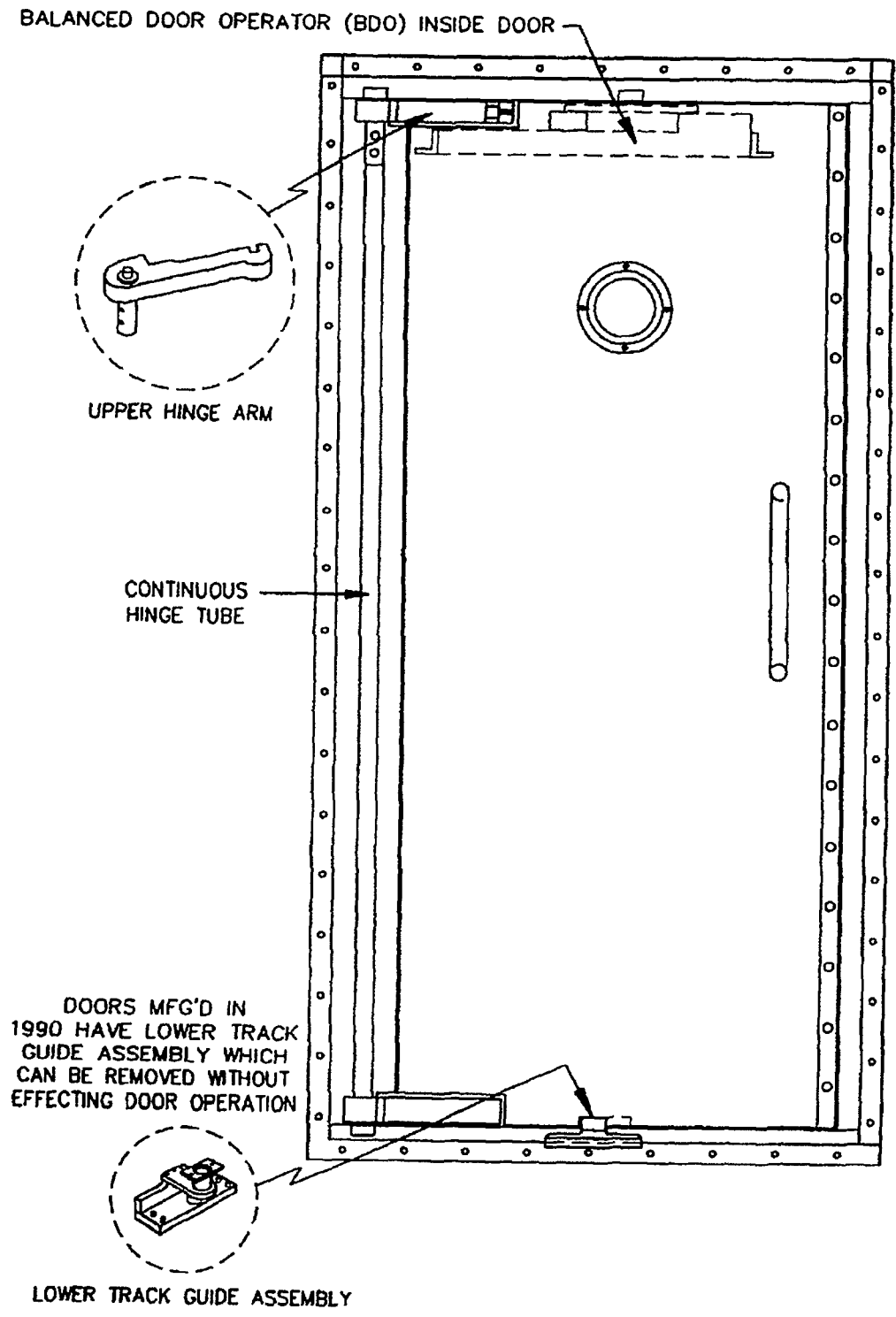


Figure 600-11.1. Steel Products Balanced Door Unique Characteristics

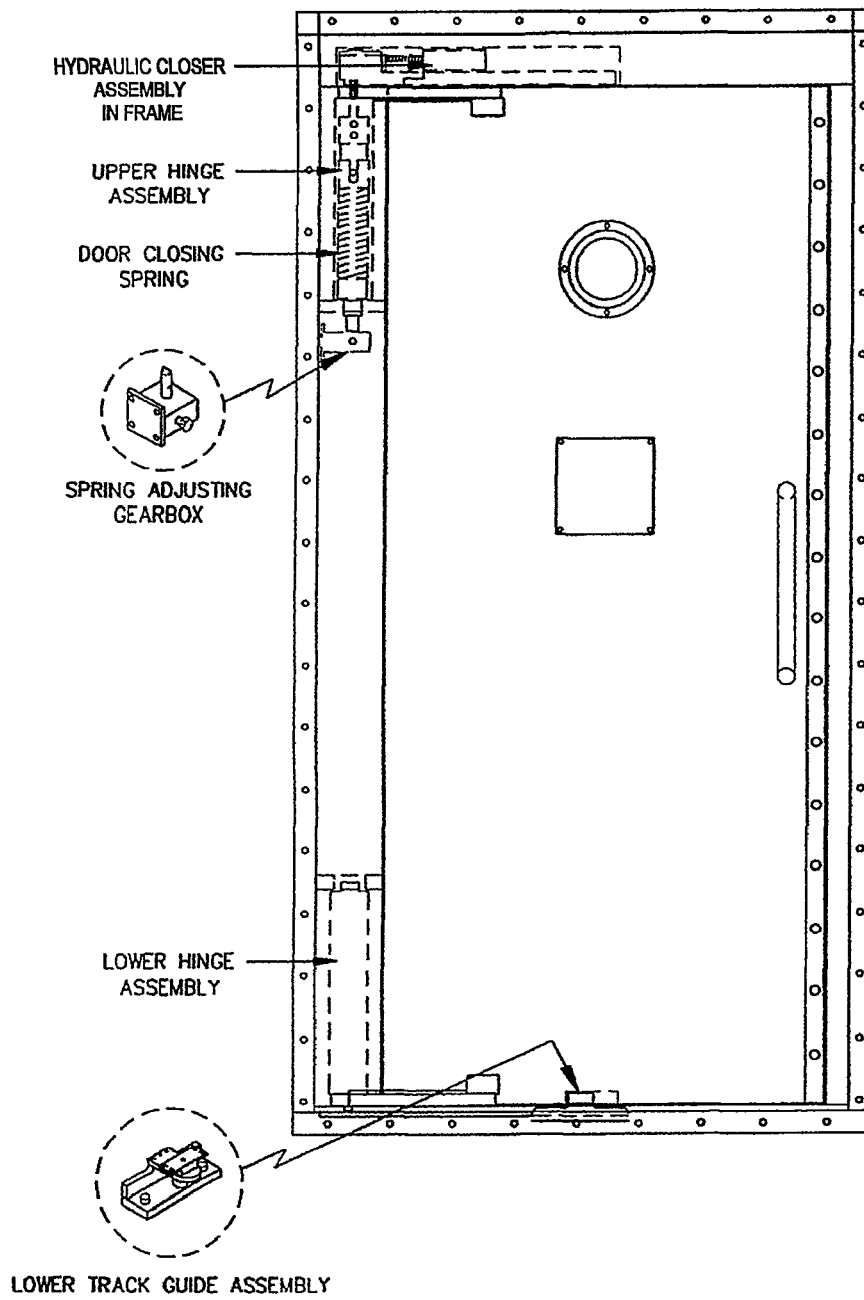


Figure 600-11.2. Ellison Bronze NAVSEA 129 Design Balanced Door Unique Characteristics

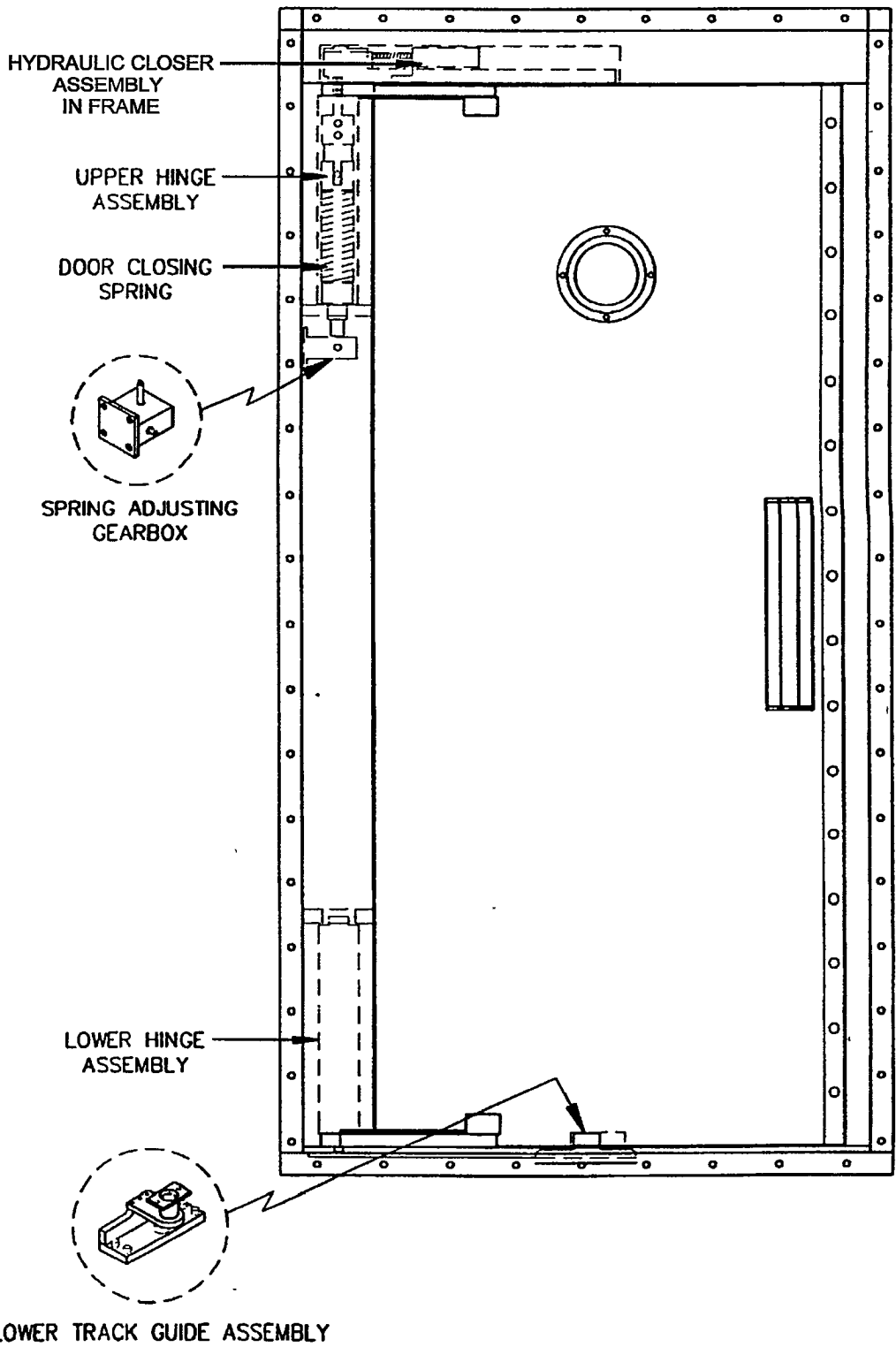


Figure 600-11.3. Puget Sound Naval Shipyard Model 159-17STD Balanced Door Unique Characteristics



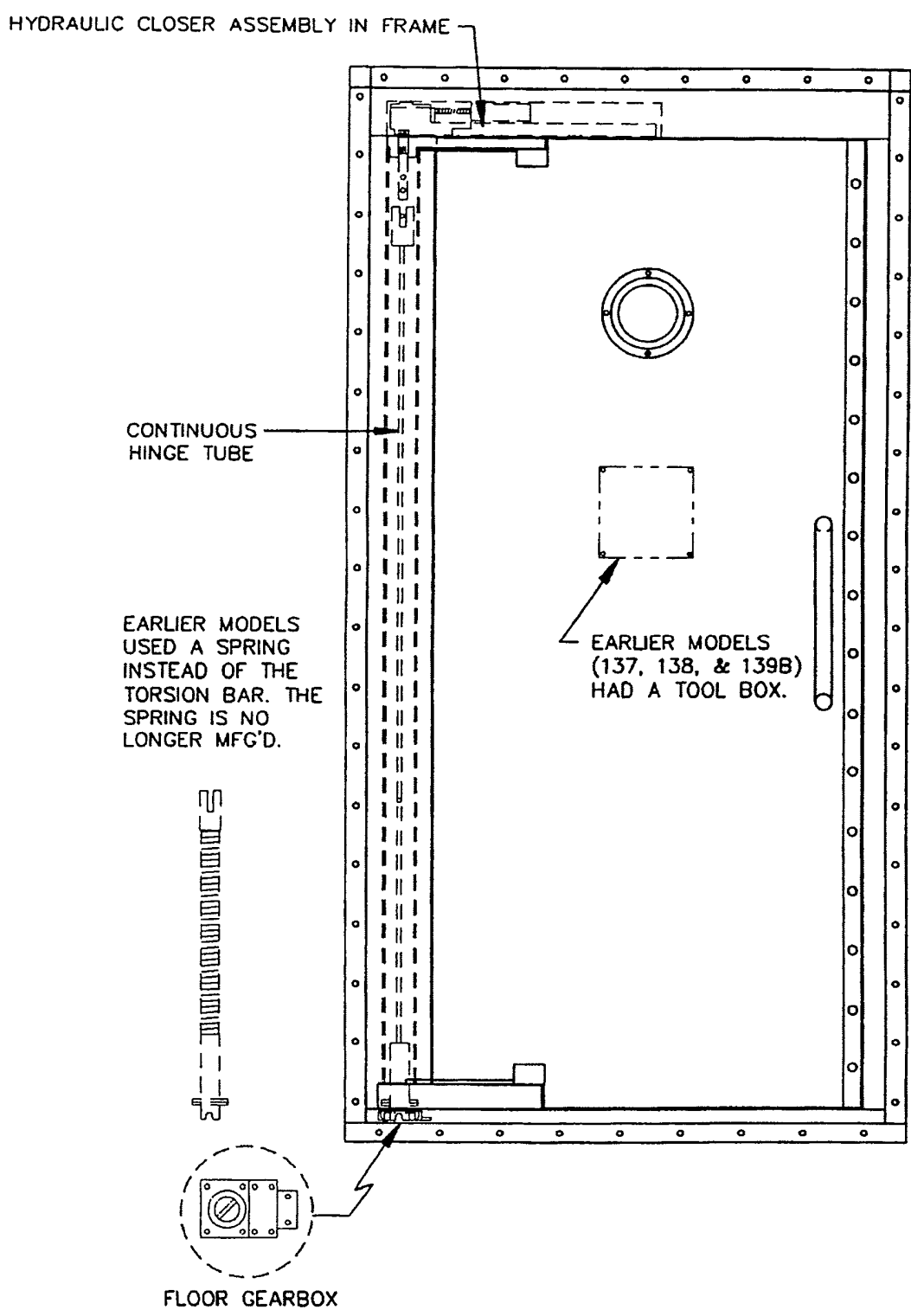


Figure 600-11.4. Ellison Bronze Models 137, 138, 139B, 139BN and 139CN Balanced Door Unique Characteristics

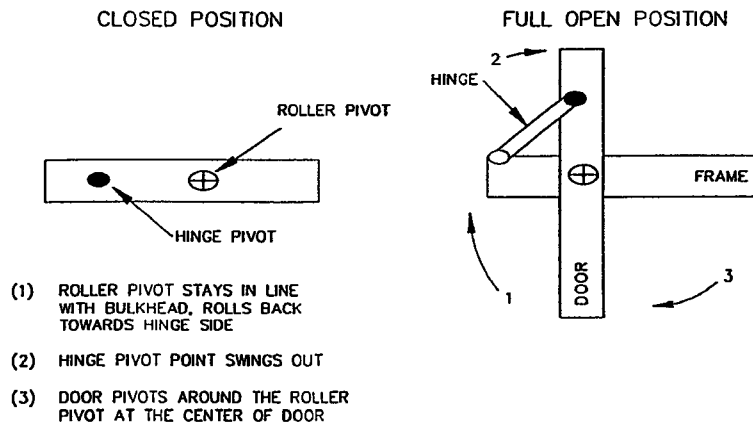


Figure 600-11.5. Door Operation

600-11.2.2 Balanced Door Hydraulics System. The hydraulic damping mechanism provides a two-stage closing speed arrangement to prevent the door from slamming. The door should travel through the initial closing arc at a reasonably fast rate and slow considerably during the final 8-10 inches of closing so the door does not slam shut. Closing speed should be fast enough to completely close the door. The approximate closing speed range is 6-8 seconds, however, closing speed shall not be less than 5 seconds and no greater than 10 seconds. The transition from fast to slow should be smooth with no perceivable door bounce at the point of speed change.

### 600-11.2.3 Balanced Door Functional Descriptions.

600-11.2.3.1 Steel Products Door. (Refer to figure 600-11.1 and figure 600-11.9 and table 600-11.2) The square notch cut in the upper hinge arm most easily identifies the Steel Products door. A square block keeper is held in place in this notch by a setscrew. This is the only model of balanced joiner doors with this feature. However, there are several variations of Steel Products doors. One earlier version was made of aluminum. Another early version, constructed of steel, had a lower track guide assembly attached to the bottom of the door panel (this guide shoe is unnecessary and may be removed and discarded). All later versions of Steel Products doors are made of steel. Steel Products doors are an approved Navy design and are available from the Supply System. The Steel Products doors consist of the following major subassemblies: Door Panel; Door Frame; Continuous Hinge Tube Assembly; and Balanced Door Operator (BDO).

600-11.2.3.1.1 Door Panel. The Steel Products door panel contains the Balanced Door Operator (BDO). This mechanism contains the spring and hydraulic closer. Early versions of the Steel Products door had gaskets around the perimeter. The newest version does not require a gasket between the door panel and frame because the door is built with closer tolerances.

600-11.2.3.1.2 Door Frame. The door frame contains the Continuous Hinge Tube Assembly. There is a sheet metal cover on the push side that permits access to the hinge tube assembly. The new Steel Products door features a spring-loaded pin in the sill that may be used to hold the door panel in the open position.

600-11.2.3.1.3 Continuous Hinge Tube Assembly. Steel Products uses a continuous hinge tube design. The upper arm is bolted on the top of the tube and the lower arm is welded to the bottom of the tube. The hinge tube assembly is supported by two hinge bearings (one top and one bottom) and one lower arm bearing. All bearings are ball bearings sealed on one side. Grease fittings are provided to lubricate the bearings.

600-11.2.3.1.4 Balanced Door Operator. The BDO is located in the top of the door panel. The BDO contains both the spring and hydraulic operating mechanism. Spring tension is set at the factory and there is no provision for adjustment. There are two recessed flat tipped adjustment screws on the top of the BDO to provide for adjust-

ment of the sweep and latch speeds. There is also one recessed flat tipped lock screw on the top of the BDO to provide for locking the BDO piston rod in the event the door panel is to be removed from the door frame.

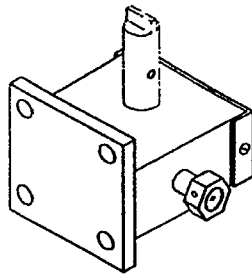
600-11.2.3.2 Ellison Bronze Door Built to NAVSEA Drawing Number 803/804-5184129. (Refer to figure 600-11.2 and figure 600-11.14 and table 600-11.2.) The NAVSEA 129 Design door (referred to as the "129" door) is built in accordance with NAVSEA dwg. No. 803/804-5184129. The model number is derived from the last three digits of the drawing number. These doors are easily identified by the 5/8-inch tension-adjusting nut located on the pull side of the door frame. This model requires a lower track guide assembly mounted on the bottom of the door panel because of the split hinge design. A few of these doors were constructed of aluminum (refer to NAVSEA dwg. No. 804-5184128); however, most of the doors are steel manufactured to NAVSEA dwg. No. 803/804-5184129. The Ellison Bronze NAVSEA 129 Design door consists of the following major subassemblies: Door Panel; Door Frame; Upper and Lower Hinge Tube Assemblies; Spring Adjusting Gearbox; Hydraulic Closer Assembly; and Lower Track Guide Assembly.

600-11.2.3.2.1 Door Panel. The door panel has a guide roller mounted in the top door channel. The upper pivot guide roller is mounted on the centerline of the door panel. The door panel also has a lower track guide assembly mounted in the lower door channel. Two bearing pivot cups mounted at the top and bottom of the door on the pull side house tapered roller bearings.

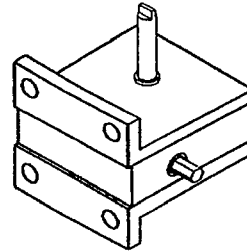
600-11.2.3.2.2 Door Frame. The door frame contains three of the other major subassemblies: the spring adjusting gearbox, the hydraulic closer assembly, and the upper and lower hinge tube assemblies. There are two removable cover plates which allow access to the hinge tubes and spring tension adjusting gearbox.

600-11.2.3.2.3 Upper and Lower Hinge Tube Assemblies. This model door utilizes a split hinge design consisting of a hinge arm welded to each hinge tube. A door pivot pin is threaded into the end of each hinge arm. The hinge pins pivot in the two tapered roller bearings mounted on the door panel. The upper hinge tube contains the tensioning spring that provides the force to close the door. A spline shaft is installed in the upper hinge tube that operates the cam in the roller guide channel (fixed section). A slotted shaft is installed in the bottom of the hinge tube that engages the output shaft of the spring adjusting gearbox. The tensioning spring is between the guide assembly and the slotted shaft. The upper hinge assembly is supported by a tapered roller bearing located above the gearbox assembly. The lower hinge tube contains no spring, but bears most of the weight of the door. A small tapered roller bearing on the bottom of the hinge tube supports the lower hinge tube assembly. A larger tapered roller bearing located on the top of the hinge tube keeps the lower hinge tube assembly in line.

600-11.2.3.2.4 Spring Adjusting Gearbox. (Refer to figure 600-11.6.) The spring adjusting gearbox incorporates a worm and spur gear design to set the tension on the spring in the upper hinge tube. The gearbox is constructed entirely of stainless steel and does not require lubrication. The gearbox is mounted inside the hinge side of the door frame. An adjustment shaft protrudes through the door frame on the pull side of the door. On the outside of the frame, a 5/8-inch nut is attached to the gearbox adjustment shaft. Spring tension on the door is adjusted by turning this nut with a 5/8-inch box end wrench.



MANUFACTURED BY ELLISON BRONZE CO.  
 FOR THE NAVSEA 129 DESIGN



MANUFACTURED BY PUGET SOUND  
 NAVAL SHIPYARD FOR THE  
 PSNSY MODEL 159-17STD

Figure 600-11.6. Spring Adjusting Gearbox

600-11.2.3.2.5 Hydraulic Closer Assembly. The hydraulic closer assembly, commonly referred to as the "door check", is located in the top of the door frame near the hinge side. It consists of a roller guide channel (removable section) that guides the top roller on the door panel, the door check (hydraulic cylinder) and a roller guide channel (fixed section) that contains a cam that operates against the upper hinge tube. The assembly controls the closing speed of the door by means of two needle valves that internally port hydraulic fluid in the hydraulic cylinder. One needle valve controls sweep speed, the other latch speed. Both can be adjusted with a 5/32" Allen wrench. (Refer to figure 600-11.7.)

600-11.2.3.2.6 Lower Track Guide Assembly. The lower track guide assembly consists of a lower pivot assembly mounted in the bottom channel of the door panel and a lower guide shoe assembly fastened to the pivot arm assembly. Two cam followers mounted on the lower guide shoe assembly ride in a track on the bottom of the door frame (the PSNSY Model 159-17STD has four cam followers). With the split hinge design, the lower guide shoe assembly permits the door panel to pivot about its vertical centerline and facilitates smooth opening and closing of the door.

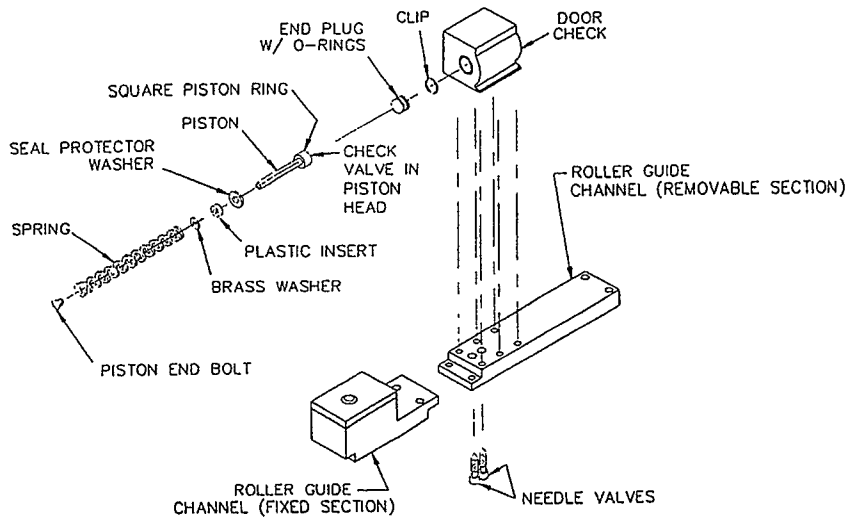


Figure 600-11.7. Ellison Bronze Hydraulic Closer Assembly used in the NAVSEA 129 Design Door and PSNSY Model 159-17STD Door and Ellison Bronze Models 137, 138, 139B, 139BN, and 139CN

600-11.2.3.3 Puget Sound Naval Shipyard Door Model 159-17STD. (Refer to figure 600-11.3 and figure 600-11.15 and table 600-11.2.) The PSNSY Model 159-17STD door was built generally in accordance with

NAVSEA dwg. No. 803/804-5184129; however, only one part, the hydraulic closer assembly, is interchangeable with the NAVSEA 129 Design doors. The hydraulic closer assembly is provided by Ellison Bronze. The functional description of the PSNSY Model 159-17STD door is essentially the same as that for the NAVSEA 129 Design door.

600-11.2.3.4 Ellison Bronze Models 137, 138, 139B, 139BN and 139CN. (Refer to figure [600-11.4](#) and figure [600-11.18](#) and table [600-11.2](#).) The Ellison Bronze Models 137, 138, 139B, 139BN and 139CN doors are easily identified by the tension adjusting floor gearbox assembly located in the sill of the door frame underneath the hinge tube assembly. The 137, 138, 139B and 139BN doors are aluminum doors. The Ellison Bronze 139CN doors are made of steel and are an approved Navy design and are available through the Supply System. These models consist of the following subassemblies: Door Panel; Door Frame; Hinge Tube Assembly; Door Tension Adjusting Floor Gearbox; and Hydraulic Closer Assembly.

600-11.2.3.4.1 Door Panel. The door panel has a guide roller fastened to the top channel of the door panel. The guide roller rides in the bottom of the roller guide channel (removable section) of the hydraulic closer assembly. On the 137, 138, 139B and 139BN doors, this guide roller is mounted slightly off the door centerline. On the 139CN doors, this guide roller is mounted on the door centerline. None of these doors feature the lower track guide assembly on the bottom of the panel. The 139CN door panels do not require gaskets.

600-11.2.3.4.2 Door Frame. The door frame contains three of the other major subassemblies: the hinge tube assembly, the door tension adjusting floor gearbox, and the hydraulic closer assembly. The hinge tube assembly is accessible by removing a sheet metal cover on the push side of the door frame.

600-11.2.3.4.3 Hinge Tube Assembly. The Ellison Bronze 139 series utilizes a continuous hinge tube design. Inside the hinge tube is a torsion bar with an adapter welded on the end that meshes with the floor gearbox adjusting assembly. This provides the torsional force to close the door. (In door Models 137 and 138, there is a spring and shaft arrangement inside the hinge tube instead of the torsion bar.) The torsion bar is supported by a flat roller bearing and collar that fit inside the lower hinge arm and act as a thrust bearing. Hinge arms are welded to the end of the tube and are drilled to accommodate the pins which hold the door panel in place. The top pin rides in a sealed ball bearing in the top of the door and the bottom pin in a needle bearing in the bottom of the door. A spline protrudes through the top of the hinge tube which engages the cam in the roller guide channel (fixed section) of the hydraulic closer assembly.

600-11.2.3.4.4 Door Tension Adjusting Floor Gearbox. The floor gearbox assembly is located in the sill of the door frame underneath the hinge tube assembly. It consists of a large gear that meshes with a smaller gear. The end of the torsion bar engages the hub of the large gear and tension can be applied to the bar. A spring-loaded locking pawl holds the gears in place as the tension is adjusted. The only difference between the 137, 138, 139B and the 139BN and 139CN models is in the small gear. On the 137, 138, and 139B models the cover plate must be removed so that tension can be increased by inserting a special spanner wrench in the small gear. On the 139BN and 139CN models, there is a hole in the cover plate to facilitate adjustment and a 1/2-inch hex hole in the small gear. Door tension adjustment is made with a 1/2-inch Allen wrench. The floor gearbox assembly does not require lubrication in any of the models.

600-11.2.3.4.5 Hydraulic Closer Assembly. The hydraulic closer assembly is the same unit used in the NAVSEA 129 Design door. Refer to paragraph [600-11.2.3.2.5](#) for functional description.

### **600-11.3 INSPECTION.**

600-11.3.1 Purpose and Scope. The following paragraphs provide maintenance personnel with inspection information and refer to procedural guidelines necessary in identifying and correcting problems that can occur with balanced joiner doors. Moreover, the critical first step is for maintenance personnel to properly identify the manufacturer and model, as well as applicable APL and MRC, of the balanced joiner door in need of inspection (refer to table [600-11.1](#) and table [600-11.2](#)).

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600-11.3.2 Preliminary Inspection Checks. When possible, door inspection and repair should be scheduled when machinery in the space is not operating (cold iron). If corrective maintenance is required during accomplishment of inspection procedures, ensure the following precautionary steps are followed.

600-11.3.2.1 Obtain watch supervisor's permission before inspecting and repairing balanced joiner doors to machinery spaces (Engineering Officer of the Watch (EOOW) underway and Duty Engineer in port). (See Equipment Guide List (EGL) for door locations.)

**Table 600-11.2.** Summary of Door Models and Features

<b>DOOR MFR.</b>	<b>MODEL</b>	<b>TYPE OF HINGE</b>	<b>TYPE/LOCATION OF SPRING</b>	<b>LOCATION OF HYDRAULICS</b>	<b>LOWER ROLLER GUIDE (Y/N)</b>	<b>TYPE TOOL FOR TENSIONING DOOR</b>	<b>LOCATION OF SPRING TENSION ADJUSTMENT</b>
Steel Products	12391	One piece w/aluminum arms	Coil spring/BDO*	BDO in door panel	No	N/A	N/A
	11001, 11002, 11003	One piece w/steel arms	Coil spring/BDO*	BDO indoor panel	No**	N/A	N/A
Ellison Bronze	137, 138	One piece	Torsion bar/hinge tube	Top of frame - removable	No	Spanner wrench	Bottom of frame under hinge arm
	139B	One piece	Torsion bar/hinge tube	Top of frame - removable	No	Spanner wrench	Socket in sill plate
	139BN	One Piece	Torsion bar/hinge tube	Top of frame - removable	No	1/2" Allen wrench	Socket in sill plate
	139CN	One Piece	Torsion bar/hinge tube	Top of frame - removable	No	1/2" Allen wrench	Socket in sill plate
	129***	Two piece	Coil spring/upper hinge tube	Top of frame - removable	Yes	5/8" combination wrench	1/4 way down door frame on hinge side (hex nut)
Puget Sound Naval Shipyard	159-17STD***	Two piece	Coil spring/upper hinge tube	Top of frame - removable	Yes	3/16" socket or hex driver	1/4 way down door frame on hinge side (hex nut)

\*BDO Balanced Door Operator.

\*\*Some of the older door models have a lower track guide assembly.

\*\*\*Doors conform to Navy Standard Design (NAVSEA dwg. No. 803/804-5184129)

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600-11.3.2.2 Notify personnel in machinery space that the door to that space (by number) will be under inspection and repair, and to utilize alternate door or doors for access.

600-11.3.2.3 Place signs on door and near door inside and out reading, "Personnel Working Behind Door; Use Alternate Access".

600-11.3.3 Inspection Tools Required. Refer to table 600-11.3 for a list of inspection tools required by door manufacturer/model.

**Table 600-11.3.** Inspection Tools Required

DOOR MFR.	MODEL	REPAIR TOOLS REQUIRED
Steel Products	12391, 11001, 11002, 11003	Flat tip screwdriver, #2 and #3 Phillips screwdriver, 3/16" Allen wrench
Ellison Bronze/Puget Sound Naval Shipyard	NAVSEA 129, 159-17STD	Flat tip screwdriver, #2 Phillips screwdriver, 5/32" and 3/16" Allen wrenches, spring scale, shim stock 4" x 10" x 1/32"
Ellison Bronze	137, 138, 139B, 139BN, 139CN	Flat tip screwdriver, #2 Phillips screwdriver, 5/32", 3/16" and 1/2" Allen wrenches, spring scale, shim stock 4" x 10" x 1/32"

600-11.3.4 Steel Products Door Inspection Procedures. The following inspection procedures, are applicable to all balanced joiner door models manufactured by Steel Products (refer to table 600-11.1 and table 600-11.2). Each inspection item includes possible door problems that should be identified by accomplishing the inspection and will refer to corrective actions that are located in the "REPAIR" section (See paragraph 600-11.4).

600-11.3.4.1 Inspect overall operating condition of door. Open door panel fully and release several times. Check for binding of panel against sill, frame sides and frame head. When closed, door panel should fit flush with door frame in both vertical and horizontal planes. Note any areas where door panel is binding and where door panel does not fit flush with door frame.

600-11.3.4.2 Inspect door assembly fasteners for tightness. Check the balanced door operator (BDO) mounting screws, BDO cam follower, hinge shaft cover screws, sill plate mounting screws and hold open assembly. Tighten any loose fasteners. If hold-open assembly is frozen in sill plate or missing parts, refer to paragraph 600-11.4.2.6.

600-11.3.4.3 Inspect door for evidence of accumulation of hydraulic oil in upper roller guide channel, recessed mounting area in top of door panel and on the door sill. If hydraulic oil is found, refer to paragraph 600-11.4.2.4.

**NOTE**

Prior to testing door closing speed, differential ventilation flow should be negligible. This can be accomplished by isolating airflow from balanced door. Close adjacent WTD/WTH leading to machinery space or secure ventilation flow to machinery space. After correct door closing speed is achieved, open WTD/WTH to machinery space and restore ventilation flow to machinery space.

600-11.3.4.4 Check door closing speed. The door should travel from fully open to fully closed position in 6 - 8 seconds, however 5 - 10 seconds is acceptable. Door should close rapidly at first then slower over the last 8 - 10 inches of travel. If the door closing speed is not within the 5 - 10 second range, or the door does not slow down over the last 8 - 10 inches of travel, refer to paragraph 600-11.4.2.2.



600-11.3.4.5 If inspection accomplished in paragraph [600-11.3.4.1](#) reveals any evidence of door panel binding or door panel was not flush with frame, refer to paragraph [600-11.4.2.7](#).

600-11.3.5 Ellison Bronze And Puget Sound Naval Shipyard Door Inspection Procedures. The following inspection procedures are applicable to all balanced joiner door models manufactured by Ellison Bronze and Puget Sound Naval Shipyard (PSNSY) (refer to table [600-11.1](#) and table [600-11.2](#)). Each inspection item includes possible door problems that should be identified by accomplishing the inspection and will refer to corrective actions that are located in the "REPAIR" section ([600-11.4](#)). Separate "REPAIR" section references will be provided to address the problems by door manufacturer/model.

600-11.3.5.1 Inspect overall operating condition of door. Open door panel fully and release several times. Check for binding of panel against sill, frame sides and frame head. When closed, door panel should fit flush with door frame in both vertical and horizontal planes. Note any areas where door panel is binding and where door panel does not fit flush with door frame.

600-11.3.5.2 Inspect door assembly fasteners for tightness. Check the shaft cover screws, sill plate mounting screws, upper channel guide mounting screws, hydraulic assembly mounting screws, upper/lower hinge arm pivot screws and lower track guide assembly mounting screws. Tighten any loose fasteners.

600-11.3.5.3 Inspect door panel for torn, cracked and hardness of gaskets (this step applies to Ellison Bronze NAVSEA 129 design and PSNSY model 159-17STD and Ellison Bronze models 137, 138, 139B and 139 BN doors). Ensure gaskets are free of paint and grease. Check gasket backing strip for proper fit and missing mounting screws. Check outer edges of gasket for straightness and proper clearance. The vertical gasket clearance should be a maximum of 1/16" clearance maintained between the gasket edge and the sides of the door frame. The horizontal gasket (upper and lower) clearance should be the minimum clearance necessary that will allow the door to open and close smoothly without binding. If the gaskets do not have the proper clearance, are causing binding or they are damaged, refer to paragraph [600-11.4.3.8](#) for Ellison Bronze NAVSEA 129 design and PSNSY model 159-17STD doors and paragraph [600-11.4.4.7](#) Ellison Bronze Models 137, 138, 139B, 139BN, and 139CN doors.

600-11.3.5.4 Inspect lower track guide assembly (this step applies to Ellison Bronze NAVSEA 129 design and PSNSY model 159-17STD doors). Check lower track guide for dirt, rust and accumulation of grease. Check lower track guide assembly bearings for smooth operation. If lower track guide assembly is binding or rubbing on the sill plate, refer to paragraph [600-11.4.3.6.25](#).

600-11.3.5.5 Inspect door for evidence of accumulation of hydraulic oil in upper roller guide channel, recessed mounting area in top of door panel and on the door sill. If hydraulic oil is found, refer to paragraph [600-11.4.3.4](#) for Ellison Bronze NAVSEA 129 design and PSNSY model 159-17STD doors and [600-11.4.4.4](#) Ellison Bronze Models 137, 138, 139B, 139BN, and 139CN doors.

#### NOTE

Prior to testing door opening force and closing speed, differential ventilation flow should be negligible. This can be accomplished by isolating airflow from balanced door. Close adjacent WTD/WTH leading to machinery space or secure ventilation flow to machinery space. After correct door opening force and closing speed is achieved, open WTD/WTH to machinery space and restore ventilation flow to machinery space.

600-11.3.5.6 Check door opening force. Attach a spring scale to door handle, while standing directly in front of door, and slowly pull door open. Check spring scale when door "breaks" away from door frame. Force required to open door should be between 17 to 23 pounds. If door opening force is less than 17 pounds or greater than 23 pounds, refer to paragraph

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[600-11.4.3.1](#) for Ellison Bronze NAVSEA 129 Design and PSNSY Model 159-17STD doors and paragraph [600-11.4.4.1](#) Ellison Bronze Models 137, 138, 139B, 139BN, and 139CN doors.

600-11.3.5.7 Check door closing speed. The door should travel from fully open to fully closed position in 6 - 8 seconds, however 5 - 10 seconds is acceptable. Door should close rapidly at first, then slower over the last 8 - 10 inches of travel. If the door closing speed is not within the 5 - 10 second range, or the door does not slow down over the last 8 - 10 inches of travel, refer to paragraph [600-11.4.3.2](#) for Ellison Bronze NAVSEA 129 Design and PSNSY Model 159-17STD doors, and paragraph [600-11.4.4.2](#) Ellison Bronze Models 137, 138, 139B, 139BN, and 139CN doors.

600-11.3.5.8 If inspection accomplished in paragraph [600-11.3.5.1](#) reveals any evidence of door panel binding or door panel was not flush with frame, refer to paragraph [600-11.4.3.7](#) for Ellison Bronze NAVSEA 129 Design and PSNSY Model 159-17STD doors and paragraph [600-11.4.4.6](#) Ellison Bronze Models 137, 138, 139B, 139BN, and 139CN doors.

600-11.3.6 Inspection Completion Requirements.

600-11.3.6.1 Remove signs previously installed.

600-11.3.6.2 Upon completion of inspection return doors to normal operation.

600-11.3.6.3 Notify completion of inspection to watch supervisor.

## **600-11.4 REPAIR**

600-11.4.1 Purpose and Scope. The following paragraphs provide maintenance personnel with repair procedures and parts information necessary in identifying and correcting problems that can occur with balanced joiner doors. Maintenance personnel should become thoroughly familiar with the contents of this manual prior to repairing the doors. Moreover, the critical first step is for maintenance personnel to properly identify the manufacturer and model as well as applicable APL and MRC, of the balanced joiner door in need of repair (refer to table [600-11.1](#) and table [600-11.2](#)).

600-11.4.1.1 Safety Requirements. Specific repair procedures, along with their individual warnings, cautions and notes shall be read in full prior to accomplishing any repairs.

600-11.4.1.2 Guide to Door Repairs. The repair procedures are based on the assumption that all operating and maintenance procedures have been followed correctly. When recent maintenance has been performed on a component involved in a malfunction, that component shall be checked before proceeding to the repair procedures. Individual repair procedures have been developed for each grouping of specific door manufacturer/door models. Repair procedures for the Steel Products door Models 12391, 11001, 11002 and 11003 begin with paragraph [600-11.4.2](#); repair procedures for the Ellison Bronze NAVSEA 129 Design door and PSNSY Model 159-17STD door begin with paragraph [600-11.4.3](#); and repair procedures for the Ellison Bronze door Models 137, 138, 139B, 139BN and 139CN begin with paragraph [600-11.4.4](#).

600-11.4.1.3 Guide to Parts Information. Immediately following each individual door repair procedure will be an Illustrated Parts Breakdown (IPB) and Group Assembly Parts List (GAPL). The information contained in the IPB and GAPL, combined with the applicable Allowance Parts Lists (APL's) for the door, will assist in identifying and procuring repair parts needed for maintenance/repair.

600-11.4.1.3.1 Illustrated Parts Breakdown (IPB). The IPB consist of illustrations that show the physical appearance and location of each door part and subassembly. Each part is numbered and corresponds with the index number of the associated Group Assembly Parts List (GAPL).

600-11.4.1.3.2 Group Assembly Parts List (GAPL). A GAPL is a table that includes all major components, assemblies and detail parts of each balanced joiner door. Each illustrated part shown disassembled is assigned an index number. Parts shown as assemblies are listed with reference to the figure number that shows the part disassembled. The following paragraphs describe the information contained in each column of the GAPL.

600-11.4.1.3.2.1 Figure and Index Number Column. The figure and index number column lists, in numerical order, the figure and index number of each part shown on the corresponding Illustrated Parts Breakdown (IPB).

600-11.4.1.3.2.2 Part Number Column. The part number column lists the part identification for all parts shown on the corresponding Illustrated Parts Breakdown (IPB). Numbers listed in this column are obtained from engineering design drawings/drawing parts lists, manufacturer assembly drawings, vendor parts list, shipcheck verification, photographs, Commercial manuals and other source material. Entries include some or all of the following:

NAVSEA Drawing Number

NAVSEA Drawings and Item/Piece Number

Manufacturer Drawing Number

Manufacturer Drawings and Item/Piece Number

Manufacturer Part or Identification (ID) Number

Commercial (COML)

No entry

In every case, the number listed identifies the part in some way. When ordering or requesting replacement parts, each number must be written as listed, including dashes, slashes, period and spaces, in order for the supply department to identify and procure the part. A drawing number entry consists of a number or number/alpha set. Drawing numbers are listed when no other part identification is available; however, sometimes the drawing number and part number are considered the same by the manufacturer of the part. The drawing permits further research of the equipment being maintained, if required. It can assist the supply office in identifying and procuring parts not normally stocked or identifiable as repair/replacement parts.

600-11.4.1.3.2.3 National Stock Number (NSN) Column. The NSN column lists the stock number assigned to a particular part within the Navy supply system. The entry COML indicates that the item is a common hardware item (such as a nut, screw/bolt, or washer). It may be carried as consumable stock in general stores aboard ship or is available through a variety of commercial sources, and is identified by the data in the description column. No entry indicates that the item is a general arrangement or grouping/installation of equipment assemblies, or that the assembly/part has no identified applicable part number. Should such a part have to be ordered, the order/re-quest shall include all the data in the description column.

600-11.4.1.3.2.4 Description Column. The description column contains a description of all parts on the corresponding Illustrated Parts Breakdown (IPB). Modifiers are included to identify the characteristics of a particular item. When a separate illustration is used to show the detail parts of an assembly/subassembly, the description column contains the appropriate figure cross-reference "FOR DETAILS SEE FIGURE 600-11.XX".

600-11.4.1.3.2.5 Quantity Column. This column contains a number that indicates the total quantity of the item.

600-11.4.1.3.2.6 Used On Code Column. This column contains letters to indicate equipment variations within one company or where two companies make interchangeable parts or where more than one company makes the same (interchangeable) part. Used on codes for this equipment are listed in table 600-11.4. Corresponding names and addresses are in numerical order by CAGE number in table 600-11.5.

600-11.4.1.3.2.7 Abbreviations and Acronyms. A table listing abbreviations and acronyms that appear in the GAPL and in the text of this manual is located at the end of the "Repair and Parts" section of this manual. Refer to table [600-11.12](#).

**Table 600-11.4.** Used On Codes

CODE	APPLICATION	DRAWING NUMBER
A	Steel Products (one piece w/aluminum arms)	12391
B	Steel Products (one piece w/steel arms)	11001, 11002 (LH)
		11001, 11003 (RH)
C	Ellison Bronze Co. Model 137	805-1749017
D	Ellison Bronze Co. Model 138	805-1749017
E	Ellison Bronze Co. Model 139B	139B
F	Ellison Bronze Co. Model 139BN	139BN
G	Ellison Bronze Co. Model 139CN	139CN
H	Ellison Bronze Co. Model Built to NAVSEA Design	803/804-5184129
I	Puget Sound Naval Shipyard Model 159-17STD	17STD Sketch 159

**Table 600-11.5.** Manufacturers' Codes, Names and Addresses

CODE	NAME AND ADDRESS	MODEL
14149	Bennett Industries, Inc. Steel Products Division 1635 Portland Avenue Tacoma, Washington 98421 Phone (206) 633-5252	12391 11001 11002 11003
82522	Puget Sound Naval Shipyard Bremerton, WA 98103-8603 Phone (206)476-5368 AUTOVON 439-5368	159-17STD
88171	Ellison Bronze Co., Inc. 125 West Main Street Falconer, NY 14733-1613 Phone (800) 665-6445	NAVSEA 129 137,138, 139B, 139BN, 139CN

600-11.4.1.3.2.8 Door Swing Designations. Ensure that the Navy designations are used when identifying parts that are swing specific; note that this is opposite from commercial practice. To determine the swing of the door, stand directly in front of the door handle. A left-handed door will have the hinge on the left side and the handle on the right side. A right-handed door will have the hinge on the right side of the frame with the handle on the left side of the door (refer to figure [600-11.8](#)).

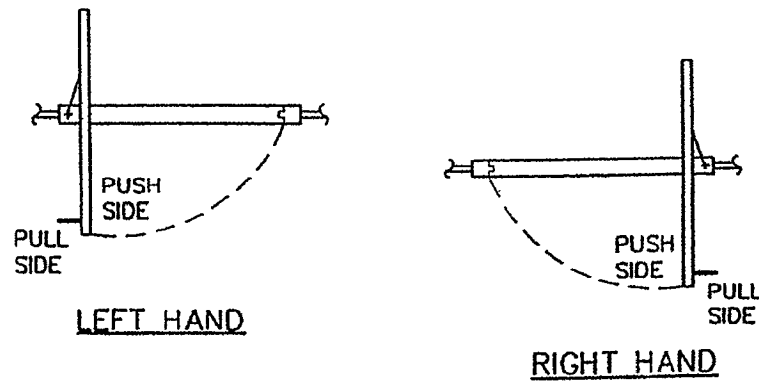


Figure 600-11.8. Door Swings

600-11.4.1.4 Preliminary Repair Checks. When possible, door repairs should be scheduled when machinery in the space is not operating (cold iron). Ensure the following precautionary steps are followed.

600-11.4.1.4.1 Obtain watch supervisor's permission before repairing balanced joiner doors to machinery spaces (Engineering Officer of the Watch (EOOW) underway and Duty Engineer in port). (See Equipment Guide List (EGL) for door locations.)

600-11.4.1.4.2 Notify personnel in machinery space that the door to that space (by number) will be under repair, and to utilize alternate door or doors for access.

600-11.4.1.4.3 Place signs on door and near door inside and out reading, "Personnel Working Behind Door; Use Alternate Access".

600-11.4.1.5 Repair Tools required. Refer to table 600-11.6 for a list of repair tools required by door manufacturer/model.

**Table 600-11.6.** Repair Tools Required

DOOR MFR.	MODEL	REPAIR TOOLS REQUIRED
Steel Products	12391, 11001, 11002, 11003	Flat tip screwdriver, #2 and #3 Phillips screwdriver, 3/16", 5/32, and 7/32" Allen wrenches, bearing puller, tape measure, 6" pliers
Ellison Bronze/Puget Sound Naval Shipyard	NAVSEA 129, 159-17STD	Flat tip screwdriver, #2 Phillips screwdriver, 5/32", 3/16", 5/16" and 1/4" Allen wrenches, 5/8" combination wrench, chisel, ball peen hammer, 1/4" drive ratchet, 3/16" socket - 1/4" drive, tape measure, spring scale, shim stock 4" x 10" x 1/32"
Ellison Bronze	137, 138, 139B, 139BN, 139CN	Flat tip screwdriver, #2 Phillips screwdriver, 5/32", 3/16", 1/4" and 1/2" Allen wrenches, ball peen hammer, tape measure, spring scale, shim stock 4" x 10" x 1/32"

600-11.4.2 Steel Products Door Assembly and Balanced Door Operator (BDO) Adjustment And Repair Procedures.

600-11.4.2.1 Steel Products Balanced Door Operator General Maintenance (Refer to figure 600-11.9). The operator is a mechanical/hydraulic unit which does not need lubrication or hydraulic oil changing. If the operator loses its checking action, adjust the BDO as described in paragraph 600-11.4.2.2. If the BDO cannot be adjusted or is leaking, the operator must be replaced, refer to paragraph 600-11.4.2.4.

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600-11.4.2.2 Balanced Door Operator (BDO) Adjustment. (Refer to figure [600-11.10](#).)

**CAUTION**

**Do not bottom out the adjusting screws. Do not mistake the piston rod lock screw (2) for an adjusting screw (3 and 4).**

**NOTE**

If sweep (3) and latch (4) adjustment screws are "bottomed out" and the closing speed is unaffected, the BDO needs to be replaced. (Refer to paragraph [600-11.4.2.4](#)).

**NOTE**

The sweep and latch adjustments affect only the closing speed of the door, not the force required to open the door. The door tension is preset within the BDO during the manufacturing process.

**NOTE**

Prior to adjusting door closing speed, differential ventilation flow should be negligible. This can be accomplished by isolating airflow from balanced door. Close adjacent WTD/WTH leading to machinery space or secure ventilation flow to machinery space. After correct door closing speed is achieved, open WTD/WTH to machinery space and restore ventilation flow to machinery space.

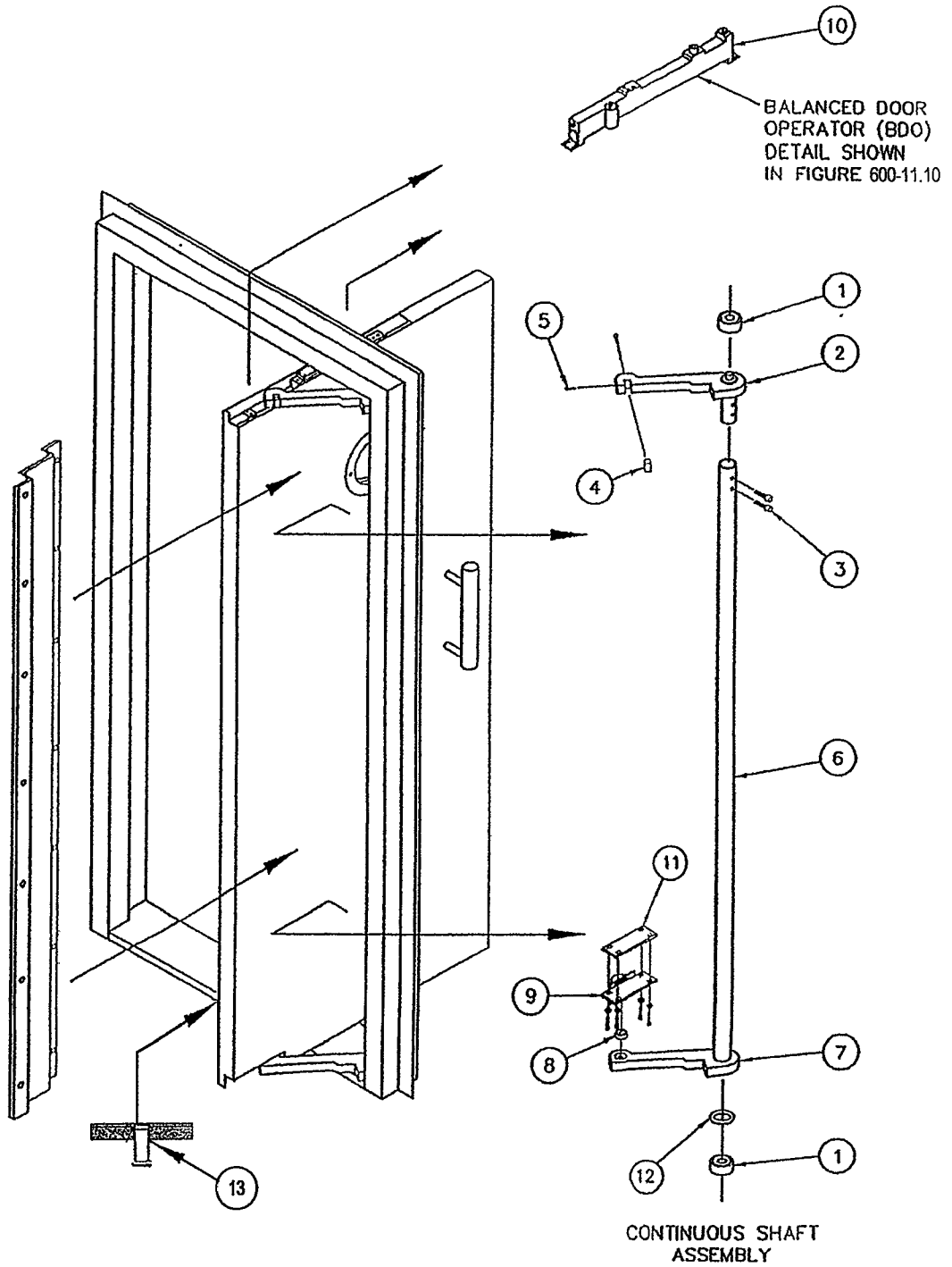


Figure 600-11.9. Steel Products Door

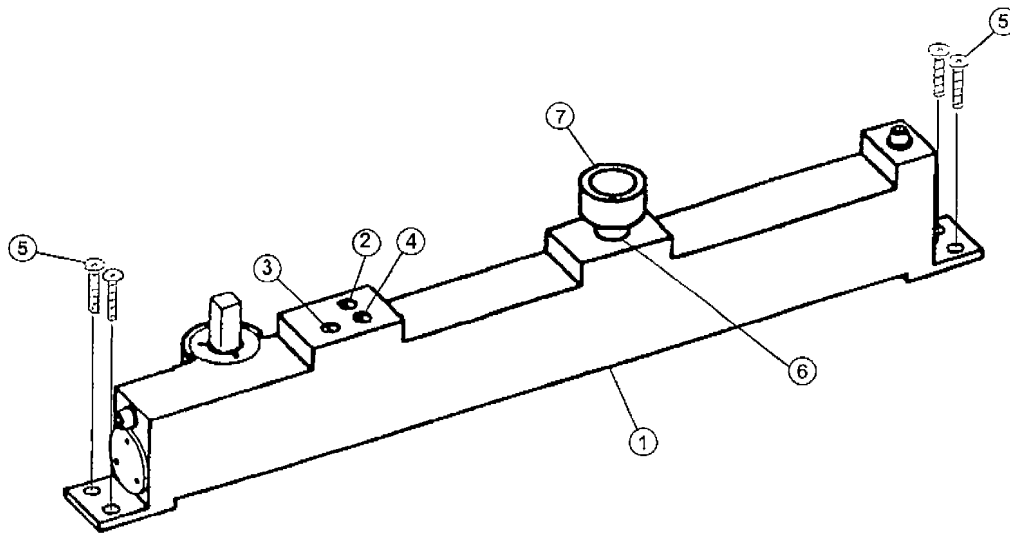


Figure 600-11.10. Typical Steel Products Balanced Door Operator (BDO); Right Hand BDO Shown.

600-11.4.2.2.1 At the top of the BDO there are two needle valve adjusting screws: (3) - sweep or closing speed and (4) - latch or final speed.

600-11.4.2.2.2 Adjust the latch adjusting screw (4) until door slows down during the last 8 - 10 inches of travel. Adjust the sweep adjusting screw (3) until closing speed is 6 - 8 seconds, however 5 - 10 seconds is acceptable.

600-11.4.2.3 Procedure to Remove and Install Door Panel. (Refer to figure [600-11.9](#) unless otherwise indicated.)

600-11.4.2.3.1 Door Panel Removal.

**CAUTION**

**Do not mistake the piston rod lock screw (2) for an adjusting screw (3 and 4).**

600-11.4.2.3.1.1 Open door more than 90 degrees (full open position), tighten piston rod lock screw (2) on BDO (figure [600-11.10](#)) securely, and remove screw (5) and upper arm block (4) from the upper arm (2).

600-11.4.2.3.1.2 Close door slowly, while inserting a rag or soft wooden block between the upper arm (2) and the face of the door. This will lever the upper arm off the vertical gear shaft of BDO without undue prying on the top arm.

**WARNING**

**A minimum of two people are required during door movement. Possible hazard to personnel exists due to weight of door panel.**



**NOTE**

The lower arm bearing (8) may remain in place in the lower arm, or it may remain on the pivot block (9) that is attached to the door panel. Ensure that the bearing is on the lower arm. Use tape to keep debris out of the bearing journal on the lower arm.

600-11.4.2.3.1.3 Carefully open door to full open position and tilt the door away from guide track in the top of the door frame (toward the push/pull side of the frame) until the cam follower (6) (figure 600-11.10) is free of the guide track. Lift the entire door assembly out of the lower arm (7).

600-11.4.2.3.2 Door Panel Installation.

**WARNING**

**A minimum of two people are required during door movement. Possible hazard to personnel exists due to weight of door panel.**

**CAUTION**

**Remove tape from bearing journal area of lower arm prior to installing door panel.**

600-11.4.2.3.2.1 To reinstall door, extend upper and lower arms (2 and 7) to full open position, set door assembly on lower arm (7), and position cam follower (6) (figure 600-11.10) into guide track in the door frame.

**CAUTION**

**Failure to unlock piston rod lock screw (2) (figure 600-11.10) after door panel is reinstalled on the frame will result in permanent damage to the BDO.**

**NOTE**

The vertical gear shaft of BDO must engage the upper arm (2) as the door closes into position.

600-11.4.2.3.2.2 Carefully close arms and door while fitting vertical gear shaft into the upper arm (2), and open door to the full open position. Install upper arm block (4) and screw (5), and unthread the piston rod lock screw (2) (figure 600-11.10) until top of lock screw is flush with the top of the BDO housing.

600-11.4.2.3.2.3 Adjust sweep and latch speed as necessary in accordance with paragraph 600-11.4.2.2.

600-11.4.2.4 Balanced Door Operator Removal and Replacement. (Refer to figure 600-11.9 unless otherwise indicated.)

600-11.4.2.4.1 Remove panel in accordance with paragraph 600-11.4.2.3.1.

600-11.4.2.4.2 Remove the screws (5) (figure 600-11.10) and remove BDO (10) from the top of the door.

600-11.4.2.4.3 Replace with a new BDO (10) and install screws (5) (figure 600-11.10) securely.

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600-11.4.2.4.4 Install door panel in accordance with paragraph 600-11.4.2.3.2.

600-11.4.2.5 Procedure to Replace Hinge Bearing and Lower Arm Bearing. (Refer to figure 600-11.9.)

600-11.4.2.5.1 Remove panel in accordance with paragraph 600-11.4.2.3.1.

#### NOTE

There are two hinge bearings (1) (one top and one bottom) and one lower arm bearing (8). All bearings are ball bearings sealed on one side. Grease fittings are provided to lubricate the bearings.

600-11.4.2.5.2 Remove sheet metal cover from hinge side of frame.

600-11.4.2.5.3 Remove two 3/8" socket head cap screws (3) that fasten upper arm (2) to hinge tube (6).

#### NOTE

The top and bottom hinge bearings (1) may remain in place in the bearing bores in the frame head and/or sill plate during removal of the hinge tube and arm assembly.

#### CAUTION

**Shims (12) may be located between the top (2) and bottom (7) arm assemblies and the top and bottom bearings (1). If shims are present, mark for location and retain for reinstallation.**

600-11.4.2.5.4 Drop upper arm (2) straight down from top hinge bearing (1), then lift entire hinge tube (6) and lower arm assembly (7) out of bottom hinge bearing (1). Remove any shims (12) located between the top (2) and bottom (7) arm assemblies and the top and bottom bearings (1). Mark for location and retain for reinstallation.

600-11.4.2.5.5 Remove lower arm bearing (8) from the lower arm (7) or pivot block (9) on bottom of door panel. Install new lower arm bearing (8) in the lower arm (7).

600-11.4.2.5.6 Remove the top and bottom hinge bearings (1) from the bearing bores in the frame head and sill plate or the upper arm (2) or lower arm (7). Although bearings are a clearance fit, it may be necessary to use a bearing puller or small pry bar to extract them from the bearing bores in the head and sill plates. Care should be exercised if a bearing puller or pry bar is used. Install new hinge bearings (1) in the bearing bores in the head frame and sill plate.

#### CAUTION

**Be sure to replace any shims (12) between the top and bottom arm assemblies and bearings that were removed during disassembly.**

600-11.4.2.5.7 To reinstall hinge tube and arm assembly, reinstall any shim(s) (12) that were removed in paragraph 600-11.4.2.5.4. set the entire assembly down into the bottom hinge bearing (1), lift upper arm (2) up into the top hinge bearing (1), and replace the two cap screws (3) through the upper arm assembly. Tighten cap screws (3) securely, but do not overtorque.

600-11.4.2.5.8 Reinstall sheet metal cover on hinge side of frame.

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600-11.4.2.5.9 Install door panel in accordance with paragraph [600-11.4.2.3.2](#).

600-11.4.2.6 Hold-Open Assembly Replacement. (Refer to figure [600-11.9](#).)

600-11.4.2.6.1 Open door more than 90 degrees (full open position). Remove top retaining ring, square ring and lower retaining ring.

600-11.4.2.6.2 Remove hold-open pin and spring through bottom of sill plate. Remove bushing through top of sill plate.

600-11.4.2.6.3 Install new bushing through top of sill plate and ensure the bushing shoulder is seated on the door sill.

600-11.4.2.6.4 Place spring on hold-open pin. Install hold-open pin through bottom of sill and bushing until hold-open pin protrudes approximately one inch above the sill plate. Install the bottom retaining ring, square ring and top retaining ring on the hold open pin. Release hold open pin.

600-11.4.2.6.5 Cycle the hold-open pin up and down several times to ensure pin moves freely.

600-11.4.2.6.6 Place door in the closed position.

600-11.4.2.7 Steel Products Door Panel Horizontal and Vertical Adjustments.

**NOTE**

A uniform clearance between the door panel and upper frame head and door panel and sill plate indicates that the door panel is properly adjusted.

**NOTE**

The horizontal door panel adjustment should be accomplished first because it will affect the vertical adjustments.

600-11.4.2.7.1 Door Panel Horizontal Adjustment. (Refer to figure [600-11.10](#).)

600-11.4.2.7.1.1 Place the door panel in the fully closed position. Check the clearance between the door panel and upper frame head. The clearance should be uniform across the entire upper surface of the door panel. If the clearance is uniform across the upper surface of the door panel, no horizontal adjustment is required. If the clearance is not uniform across the upper surface of the door panel proceed to paragraph [600-11.4.2.7.1.2](#).

600-11.4.2.7.1.2 Open door panel to the fully open position. Loosen four socket head cap screws (5) that fasten BDO (1) to the door panel. Move door panel to the left or right as required to provide a uniform clearance across the entire upper surface of the door panel and then tighten the four socket head cap screws (5). Fully open and close door panel several times. Check the clearance between the door panel and upper frame head. Repeat this step as required until a uniform clearance across the entire upper surface of the door panel is achieved.

600-11.4.2.7.2 Door Panel Vertical Adjustment. There are two vertical adjustments that can be accomplished on a Steel Products door. The hinge tube and arm assembly vertical adjustment will help to prevent upper and lower arms from rubbing on the upper frame head and the sill plate. The door panel pivot block vertical adjustment will help to center the door panel in the frame. (Refer to figure [600-11.9](#).)

**NOTE**

If the upper and lower arms are not rubbing the upper frame head or sill plate, the hinge tube and arm assembly vertical adjustment is satisfactory. A uniform clearance between the door panel and upper frame head and door panel and sill plate indicates that the door panel pivot block vertical adjustment is satisfactory.

**NOTE**

If clearance is not uniform between the door panel and upper frame head and door panel and sill plate and the upper and/or lower arms are rubbing, accomplish the hinge tube and arm assembly vertical adjustment first (refer to paragraph 600-11.4.2.7.2.1). If clearance is not uniform between the door panel and upper frame head and door panel and sill plate after the hinge tube and arm assembly vertical adjustment is accomplished, proceed to the door panel pivot block vertical adjustment (refer to paragraph 600-11.4.2.7.2.2)

600-11.4.2.7.2.1 Hinge Tube and Arm Assembly Vertical Adjustment. Fully open and close door panel several times. Check for rubbing between upper arm and upper frame head and between the lower arm and sill plate. If the upper or lower arms are rubbing proceed to paragraph 600-11.4.2.7.2.1.1. If no upper or lower arm rubbing is observed, the hinge tube and arm assembly vertical adjustment is satisfactory.

600-11.4.2.7.2.1.1 Remove panel in accordance with paragraph 600-11.4.2.3.1.

600-11.4.2.7.2.1.2 Remove hinge tube and arm assembly in accordance with paragraphs 600-11.4.2.5.2 through 600-11.4.2.5.4.

600-11.4.2.7.2.1.3 Install or remove shim(s) (12) located between the bottom (7) arm assembly and the bottom bearings (1) as required.

600-11.4.2.7.2.1.4 Install hinge tube and arm assembly in accordance with paragraph 600-11.4.2.5.7. Operate hinge tube and arm assembly through several open and close cycles while checking for rubbing between upper arm and upper frame head and between the lower arm and sill plate. If upper or lower arm rubbing is observed, repeat paragraphs 600-11.4.2.7.2.1.2 through 600-11.4.2.7.2.1.4. When no upper or lower arm rubbing is observed, proceed to paragraph 600-11.4.2.7.2.1.5.

600-11.4.2.7.2.1.5 Reinstall sheet metal cover on hinge side of frame.

600-11.4.2.7.2.1.6 Install door panel in accordance with paragraph 600-11.4.2.3.2.

600-11.4.2.7.2.2 Door Panel Pivot Block Vertical Adjustment. Measure and record the clearance between the door panel and the upper frame head. Measure and record the clearance between the door panel and the sill plate. If the upper and lower clearances are not uniform proceed to paragraph 600-11.4.2.7.2.2.1. If the upper and lower clearances are uniform, the door panel pivot block vertical adjustment is satisfactory.

600-11.4.2.7.2.2.1 Remove panel in accordance with paragraph 600-11.4.2.3.1.

600-11.4.2.7.2.2.2 Install or remove shim(s) (11) located between the pivot block (9) and door panel as required.

600-11.4.2.7.2.2.3 Install door panel in accordance with paragraph 600-11.4.2.3.2. Fully open and close door panel several times. Check the clearance between the door panel and the upper frame head and between the door panel and the sill plate. If the upper and lower clearances are not uniform repeat paragraphs 600-11.4.2.7.2.2.1 through 600-11.4.2.7.2.2.3. When a uniform clearance between the door panel and the upper frame head and between the door panel and the sill plate is achieved, proceed to paragraph 600-11.4.2.7.2.2.4.

600-11.4.2.7.2.2.4 Adjust sweep and latch speed as necessary in accordance with paragraph 600-11.4.2.2.

600-11.4.2.8 Accomplish Repair Completion Requirements in accordance with paragraph 600-11.4.5.

**Table 600-11.7.** Steel Products Door Group Assembly Parts List (GAPL)

FIGURE 600-11.9 AND INDEX NO.	PART NO.	NSN	DESCRIPTION	QTY	USED ON CODE
600-11.9-1	SKF-6203-RSJ	3110-00-100-2363	Hinge bearing top and bottom	2	A, B
600-11.9-2	11602		Upper arm (specify LH or RH)	1	A, B
600-11.9-3		COML	Screw, 3/8-16 SHCS, flathead, Grade 5, 1.75" long	2	A, B
600-11.9-4	11619		Block, upper arm	1	A, B
600-11.9-5		COML	Screw, 1/4-20 SHCS, Grade 5, 1.25" long		
600-11.9-6			Pivot shaft	1	A, B
600-11.9-7	11603		Lower arm (specify LH or RH)	1	A, B
600-11.9-8	SKF-6201-RSJ	3110-00-100-2359	Lower arm bearing	1	A, B
600-11.9-9	11606		Pivot block	1	A, B
600-11.9-10	11305	2040-01-391-8233	Balanced Door Operator (BDO) left hand <b>For Details see figure 600-11.10</b>	1	A, B
	11306	2040-01-391-8234	BDO right hand <b>For Details see figure 600-11.10</b>	1	A, B
600-11.9-11	11610		Shim, Pivot block	AR	A, B
600-11.9-12	11609		Shim, Lower arm	AR	A, B
	11310	5365-01-396-5305	Shim set, Pivot block and Lower arm*	1	A, B
600-11.9-13	11309	5340-01-496-0563	Kit, Door stop	1	A, B

\*Contains 3 Shims (P/N 11610, .06011, .03011 and .015, thick) and 3 Shims (P/N 11609, 2 - .060" thick and 1 - .030 thick).

**Table 600-11.8.** Steel Products Balanced Door Operator (BDO) Group Assembly Parts List (GAPL)

FIGURE 600-11.10 AND INDEX NO.	PART NO.	NSN	DESCRIPTION	QTY	USED ON CODE
600-11.10-1	11305	2040-01-391-8233	Balanced Door Operator (BDO) assembly LH	1	A, B
	11306	2040-01-391-8234	Balanced Door Operator (BDO) assembly RH	1	A, B
600-11.10-2		COML	Piston Rod Lock Screw, 10-24 x .75 long, Grade 8, SHCS	1	A, B
600-11.10-3			Sweep needle valve	1	A, B
600-11.10-4			Latch needle valve	1	A, B
600-11.10-5		COML	Screw, 1/4-20 x .75 long SHCS	4	A, B
600-11.10-6	11615	COML	Cam follower, R8C H-32LW or Equivalent	1	A, B
600-11.10-7	11614	COML	Cap, cam follower	1	A, B

600-11.4.3 Ellison Bronze NAVSEA 129 Design and PSNSY Model 159-17STD Door Assembly Repair Procedures.

600-11.4.3.1 NAVSEA Design Spring Adjusting Gearbox Tension. (Refer to figure 600-11.14 for Ellison Bronze NAVSEA 129 Design and figure 600-11.15 for PSNSY Model 159-17STD and figure 600-11.6.)

**CAUTION**

**Over tightening of the gearbox will result in spring and/or gearbox failure, rendering the door inoperative!**

**NOTE**

Force required to open both Ellison Bronze NAVSEA 129 Design and PSNSY Model 159-17STD is controlled by spring tensioning gears in the spring adjusting gearbox, located in door frame on hinge side. Spring tension can be adjusted by turning either adjustment nut or hex shaft located on pull side of door.

**NOTE**

Four (4) to five (5) complete revolutions should run spring from completely untensioned to 10 to 12 lbs. of applied tensioning force to door panel. Check amount of tension and proceed with caution until desired tension is achieved.

600-11.4.3.1.1 Adjust spring tension to close door by turning spring adjustment nut counterclockwise for Ellison Bronze NAVSEA 129 Design door (or hex shaft located beneath 3/4 CRES push plug counterclockwise for PSNSY Model 159-17STD).

600-11.4.3.1.2 Standing directly in front of door, attach spring scale to door handle and slowly pull door open. Check spring scale when door "breaks-away" from door frame. Force required to open door should be between 17 to 23 pounds.

600-11.4.3.1.3 If opening force exceeds 23 pounds, turn adjusting nut clockwise for Ellison Bronze NAVSEA 129 Design door (or hex shaft clockwise for PSNSY Model 159-17STD door). Check door opening force, adjust until force is between 17 to 23 pounds.

600-11.4.3.1.4 For PSNSY Model 159-17STD door, reinstall 3/4" CRES push plug.

600-11.4.3.1.5 After gearbox adjustments are made, the closing speeds may need readjusting (refer to paragraph [600-11.4.3.2](#)).

600-11.4.3.2 Hydraulic Closer Adjustment. (Refer to figure [600-11.11](#).)

600-11.4.3.2.1 Adjust the sweep and latch speeds by using a 5/32" Allen wrench. On the underside of the hydraulic assembly located in the top of the frame, sweep and latch speed needle-valve adjustment screws control the closing speed. Using the Allen wrench, turn the adjustment screws clockwise to slow down and counterclockwise to speed up the closing of the door. Needle valve adjustment screw #1/S controls the sweep speed and #2/F controls the latch speed. The door should travel from the completely open position at a reasonably fast rate and then slow considerably during the final 8 to 10 inches of the door panel closing without slamming shut. The closing speed should be no less than 5 seconds and no greater than 10 seconds. The optimum closing time is between 6 to 8 seconds. Adjust the needle valve adjustment screws to achieve the desired closing speed.

600-11.4.3.3 Procedure to Remove and Install Door Panel. (Refer to figure [600-11.14](#) for Ellison Bronze NAVSEA 129 Design and figure [600-11.15](#) for PSNSY Model 159-17STD and figure [600-11.6](#).)

600-11.4.3.3.1 Door Panel Removal.

**WARNING**

**Ensure that spring tension has been released before removing door panel.**

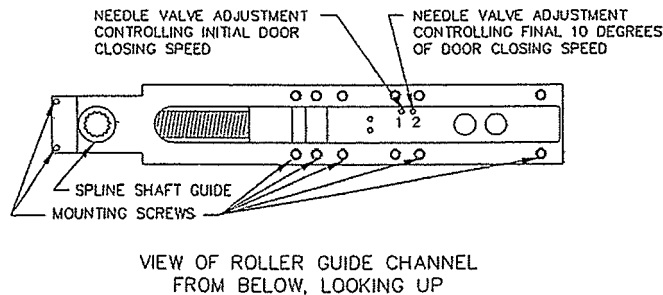


Figure 600-11.11. Hydraulic Closer Assembly NAVSEA 129 Design and PSNSY Model 159-17STD Doors and Ellison Bronze Models 137, 138, 139B, 139BN, and 139CN

600-11.4.3.3.1.1 Turn gearbox spring adjustment nut (77) clockwise until spring tension is fully released

**NOTE**

(PSNSY model has 3/16", hex head shaft).

**WARNING**

**Exercise extreme care when removing lower track guide assembly support from door. Do not insert fingers into lower track guide support cavity after removing lower track guide assembly.**

**CAUTION**

**To prevent lower track guide assembly from scraping against door frame, weight of door should be fully supported during movement.**

600-11.4.3.3.1.2 Remove lower track guide assembly, door will have to be placed close to the fully closed position in order to access the cap screws (79) on the guide assembly.

600-11.4.3.3.1.3 CAREFULLY work door to full open position.

**NOTE**

Pivot pin (21) is threaded on Ellison Bronze NAVSEA 129 Design and not threaded on PSNSY Model 159-17STD.

600-11.4.3.3.1.4 With one person supporting door, loosen set screw (22) at end of upper hinge arm. Back out pivot pin (21) from bearing.

**WARNING**

**A minimum of two people are required during door movement. Possible hazard to personnel exists due to weight of door panel.**

600-11.4.3.3.1.5 Keeping bottom of the door panel against hinge side of frame, lean top of door toward opposite side until upper roller guide comes out of channel. Lift door off bottom hinge. Place door panel away from work area and secure if necessary.

600-11.4.3.3.2 Door Panel Installation.

600-11.4.3.3.2.1 Install lower door pivot bearing on lower pivot pin (21).

**WARNING**

**A minimum of two people are required during door movement. Possible hazard to personnel exists due to weight of door panel.**

600-11.4.3.3.2.2 Carefully lift door panel, aligning lower door pivot (20) with lower pivot bearing (94B). Tilt the top of the door panel away from the hinge and align the top pivot roller (18) in the upper roller guide channel (removable section) (82). Carefully push the top of the door panel toward the upper hinge arm until the hole in the hinge arm aligns with the upper door pivot bearing (94B).

**NOTE**

Pivot pin (21) is threaded on Ellison Bronze NAVSEA 129 Design and not threaded on PSNSY Model 159-17STD.

600-11.4.3.3.2.3 Install upper pivot pin (21) flush with upper hinge arm.

**CAUTION**

**Over-tightening set screws (22) will damage the threads on pivot pins (21, Ellison Bronze NAVSEA 129 Design only).**

600-11.4.3.3.2.4 Tighten set screws (22).

600-11.4.3.3.2.5 With door in the closed position, install lower track guide assembly and fasten in place with cap screws (79).

600-11.4.3.3.2.6 Adjust spring adjusting gearbox tension in accordance with paragraph [600-11.4.3.1](#).

600-11.4.3.3.2.7 Adjust hydraulic closer in accordance with paragraph [600-11.4.3.2](#).

600-11.4.3.4 Ellison Bronze NAVSEA 129 Design and PSNSY Model 159-17STD Hydraulic Closer Assembly Replacement. (Refer to figure [600-11.14](#) for Ellison Bronze NAVSEA 129 Design and figure [600-11.15](#) for PSNSY Model 159-17STD and figure [600-11.11](#).)



**WARNING**

**Exercise care when removing the hydraulic closer assembly from the door frame. Ensure that spring tension has been released before removing the hydraulic closer assembly.**

600-11.4.3.4.1 Remove spring tension by turning gearbox (61) adjustment shaft clockwise until spring tension is fully released.

**NOTE**

In order to remove the hydraulic cylinder (84) you must first remove the roller guide channel (removable section) (82).

600-11.4.3.4.2 Secure door in open position. Turn out four cap screws (109) and drop roller guide channel (82) out of head jamb.

600-11.4.3.4.3 Remove hydraulic cylinder (84) from roller guide channel (82.)

600-11.4.3.4.4 Reinstall the hydraulic cylinder (84) to the roller guide channel (removable section) (82).

600-11.4.3.4.5 Position the hydraulic closer assembly into the head of the door frame. Place a screwdriver into the roller guide channel (82) hole and gently pry the hydraulic closer assembly into position. Fasten in place with cap screws (109).

600-11.4.3.4.6 Unsecure the door from the open position.

600-11.4.3.4.7 Tension spring adjusting gearbox in accordance with paragraph [600-11.4.3.1](#).

600-11.4.3.4.8 Adjust hydraulic closer in accordance with paragraph [600-11.4.3.2](#).

600-11.4.3.5 Ellison Bronze NAVSEA 129 Design and PSNSY Model 159-17STD Spring Adjusting Gearbox Removal. (Refer to figure [600-11.14](#) for Ellison Bronze NAVSEA 129 Design and figure [600-11.15](#) for PSNSY Model 159-17STD unless otherwise indicated.)

**WARNING**

**Ensure that spring tension has been released before removing door panel.**

600-11.4.3.5.1 Remove door panel in accordance with paragraph [600-11.4.3.3.1](#).

600-11.4.3.5.2 Remove sheet metal (45) cover concealing upper hinge.

600-11.4.3.5.3 Turn gearbox adjusting shaft to rotate split shaft coupling (66) until coupling faces out (refer to figure [600-11.12](#)).

600-11.4.3.5.4 Remove gearbox adjusting nut (77) by removing locking pin or set screw (65) (Ellison Bronze NAVSEA 129 Design only).

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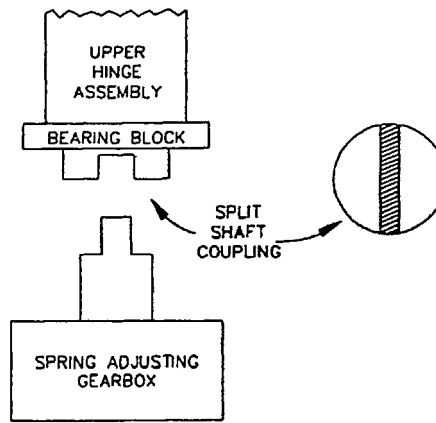
600-11.4.3.5.5 Remove 4 gearbox mounting bolts/self locking nuts (63 and 49) and remove gearbox (61).

600-11.4.3.5.6 Install replacement gearbox (61) with mounting bolts (63) and new self-locking nuts (49).

600-11.4.3.5.7 Install gearbox adjusting nut (77) and locking pin or set screw (65) (Ellison Bronze NAVSEA 129 Design only).

600-11.4.3.5.8 Install sheet metal (45) cover concealing upper hinge.

600-11.4.3.5.9 Install door panel in accordance with paragraph 600-11.4.3.3.2.



SPLIT SHAFT COUPLING BETWEEN SPRING ADJUSTING GEARBOX AND UPPER HINGE ASSEMBLY MUST BE TURNED TO FRONT AND ALL SPRING TENSION REMOVED TO ALLOW GEARBOX TO SLIDE OUT.

Figure 600-11.12. Upper Hinge Assembly/Spring Adjusting Gearbox

600-11.4.3.6 Ellison Bronze NAVSEA 129 Design and PSNSY Model 159-17STD Hinge and Bearing Overhaul. (Refer to figure 600-11.14 for Ellison Bronze NAVSEA 129 Design and figure 600-11.15 PSNSY Model 159-17STD unless otherwise indicated.)

**WARNING**

**Ensure that spring tension has been released before removing door panel.**

600-11.4.3.6.1 Remove door panel in accordance with paragraph 600-11.4.3.3.1.

600-11.4.3.6.2 Remove door bearings (94B) from hinge arm pins (21) or door pivots (20).

600-11.4.3.6.3 Remove machine screws (90) and lower hinge tube cover (46).

600-11.4.3.6.4 Remove ONLY bottom cap screw (60) from lower hinge tube pivot (76) (and if needed loosen upper cap screw) allowing pivot to drop inside hinge tube (56L). (Ellison Bronze NAVSEA 129 Design only.)

**NOTE**

On the PSNSY Model 159-17STD it will be necessary to remove the machine screws, cap screw, and lower hinge tube bearing support block (68) from the hinge channel in order to remove lower hinge assembly.

600-11.4.3.6.5 Turn hinge arm (74) to clear door frame, lean top of hinge tube out, lift hinge up and out of frame.

**NOTE**

The hinge tube bearing (26B), which supports the full weight of the door in the door sill, is often in need of replacement. The bearing is set in a bearing race that collects debris and water.

**NOTE**

The hinge tube bearing and the door bearings at the end of the hinge arms are mounted on threaded pins. These pins can be turned in or out to adjust clearance under hinge arm (refer to paragraph 600-11.4.3.7). Generally it is a good idea to leave these pins at factory settings. If you need to remove the pin (75) to remove a rusty or damaged bearing or to adjust clearance under hinge arm, loosen setscrews BEFORE trying to turn pins. Lightly tighten setscrews after making adjustments or installing pins. Over-tightening setscrews will damage threads on the hinge pin.

600-11.4.3.6.6 Inspect, repack with grease and/or replace lower hinge tube bearing (26B) and upper bearing on the bottom hinge tube (69B). Reinstall bearings.

600-11.4.3.6.7 Install lower hinge tube bearing (26B) onto lower hinge pin, lean top of hinge tube into place, turn hinge arm so slot in tube is accessible. Slide top cap screw (60) to top of slot and insert lower cap screw. Ensure the upper cap screw is at the top of the slot before installing the lower one. If difficulty is experienced installing the lower cap screw (60) into the lower shaft pivot (76), the lower cap screw is misaligned or cross threaded. Check that threads are free before proceeding further.

600-11.4.3.6.8 Rotate the lower hinge arm to ensure that it does not scrape on sill plate. If the lower hinge arm scrapes on sill plate, refer to paragraph 600-11.4.3.7.2.

600-11.4.3.6.9 Remove machine screws (90) and upper hinge tube cover (45).

600-11.4.3.6.10 Turn gearbox spring adjusting nut until the slot in upper hinge tube pivot shaft is facing out (see figure 600-11.12).

600-11.4.3.6.11 There are four screws (93) that support the bearing support block (67); loosen two screws on the handle side of the door and remove remaining two screws.

**NOTE**

PSNSY Model 159-17STD has no slot in the hinge tube, requiring both cap screws to be removed.

600-11.4.3.6.12 For the Ellison Bronze NAVSEA 129 Design, remove ONLY the lower cap screw (60) from the slot in the hinge tube. Loosen, DO NOT REMOVE, the upper cap screw, and slide it to the bottom of the slot. (It may be necessary to tap it down.)

**NOTE**

Teflon washer (105) on top of the hinge tube may fall out when hinge tube is leaned out.

600-11.4.3.6.13 Tap the front of bearing support block (67) down, leaning the hinge tube out. Lift hinge tube up and out.

**NOTE**

Removal of hinge internal components requires pressing the inner bearing race out of the bottom of hinge tube. The bearing is likely to be damaged during removal; ensure you have a replacement bearing available prior to removal.

600-11.4.3.6.14 Lay the hinge tube on a flat surface. Place a chisel on the side of bearing race (69R) and tap the bearing race, rotate the hinge tube and place a chisel on the side of the bearing race and tap the bearing race. Continue taping and rotating the hinge tube until the bearing race is separated from the hinge tube.

600-11.4.3.6.15 After the bearing race is separated from the hinge tube, the following parts will be removed from the hinge tube as an assembly; pivot shaft (66), upper shaft roller bearing (69B), bearing race (69R), spring lower guide (70), door return spring (71) and spring upper guide (72).

600-11.4.3.6.16 Inspect spring (71). Replace spring if cracked or broken by inserting spring in the upper and lower spring guides (70) and (72). Grease spring prior to reinstallation.

600-11.4.3.6.17 Inspect, repack with grease and/or replace upper hinge tube bottom bearing (69B).

600-11.4.3.6.18 Assemble the following parts and install into the upper hinge tube; pivot shaft (66), upper shaft roller bearing (69B), bearing race (69R), spring lower guide (70), door return spring (71) and spring upper guide (72). Ensure the upper spring guide (72) is aligned with spring pin (73).

600-11.4.3.6.19 Carefully tap bearing race (69R) in a circular pattern while rotating the upper hinge tube until the bearing race is fully seated into the upper hinge tube.

600-11.4.3.6.20 Place hinge tube back onto the bearing support block (67). Ensure slot in coupling (66) fits together properly with gearbox (61) output shaft. Place Teflon washer (105) on top of the hinge tube. Tap bearing support block (67) up to the level position while placing the top of the hinge tube into position. Install two bearing support block mounting screws (93) in block and tighten the remaining two mounting screws (93).

**NOTE**

It is essential that the spline shaft aligns itself with the spline socket.

**NOTE**

PSNSY Model 159-17STD has no slot, making cap screw hole alignment more difficult.

600-11.4.3.6.21 Turn hinge arm so that the spline shaft aligns with the spline socket. Slide the upper cap screw (60) to the top of the slot in the hinge tube and install lower cap screw. If difficulty is encountered aligning the spline shaft with the spline socket, push the upper cap screw (60) up with the end of a screwdriver. Turn the hinge back and forth slightly while pushing up. When the spline shaft slides up, immediately pull the hinge arm back toward the closed position. This creates tension on the spline shaft and will help keep the shaft from sliding back down while starting the lower cap screw (60). The cap screw hole is easier to access with the slot turned toward the front.

600-11.4.3.6.22 Install upper and lower hinge tube covers (45) and (46) and machine screws (90).

600-11.4.3.6.23 Inspect, repack with grease and/or replace lower door bearing (94B) and install on lower hinge arm pin (21).

600-11.4.3.6.24 Inspect, repack with grease and/or replace upper door bearing (94B) and install in upper door pivot (20).

600-11.4.3.6.25 Prior to installing the door panel, clean the lower track guide. Check the lower track guide assembly bearings for freedom of movement. For the Ellison Bronze NAVSEA 129 Design door only, if the bearings are defective, procure and install a new ball bearing pivot assembly (16-104) and a new shouldered shaft assembly (29-80). For the PSNSY Model 159-17STD door only, procure and install new lower track guide bearings (31).

600-11.4.3.6.26 Install door panel in accordance with paragraph [600-11.4.3.3.2](#).

600-11.4.3.6.27 Cycle door to ensure that door does not bind in frame. Refer to paragraph [600-11.4.3.7](#) if door binds.

600-11.4.3.7 Ellison Bronze NAVSEA 129 Design and PSNSY Model 159-17STD Door Horizontal and Vertical Adjustments. (Refer to figure [600-11.14](#) for Ellison Bronze NAVSEA 129 Design and figure [600-11.15](#) for PSNSY Model 159-17STD, and figure [600-11.13](#).)

**WARNING**

**Ensure that spring tension has been released before accomplishing horizontal door panel adjustments.**

**NOTE**

A uniform clearance between the door panel and the hinge and latch sides of the frame indicates that the door panel is properly adjusted horizontally.

**NOTE**

The horizontal door panel adjustments should be accomplished first because they will affect the vertical adjustments.

600-11.4.3.7.1 Horizontal Door Panel Adjustment.

600-11.4.3.7.1.1 Turn gearbox spring adjustment nut (77) clockwise until spring tension is fully released.

**NOTE**

(PSNSY model has 3/16", hex head shaft)

600-11.4.3.7.1.2 Open the door and loosen the socket head cap screws (24) that fasten the upper and lower door pivots (20) to the top and bottom of the door panel.

600-11.4.3.7.1.3 Insert a paint scrapper between the door panel and frame where the panel meets the frame and jog the door panel to achieve a uniform clearance that is parallel between the door panel and frame. Carefully open the door and re-tighten all of the socket head cap screws (24).

600-11.4.3.7.1.4 Cycle the door several times to ensure door panel and frame are parallel and door panel is centered in the frame.

**NOTE**

The following procedure applies only to the Ellison Bronze NAVSEA 129 Design. There are no front to back adjustments on the PSNSY Model 159-17STD. Occasionally the door panel needs to be adjusted front to back.

600-11.4.3.7.1.5 With the door closed, determine the distance the door panel needs to move to sit flush against the door frame stop.

600-11.4.3.7.1.6 Remove door panel in accordance with paragraph [600-11.4.3.3.1](#).

600-11.4.3.7.1.7 Loosen the socket head cap screws (24) that fasten the upper and lower door roller pivot assemblies (16U and 16L) to the top and bottom of the door panel.

600-11.4.3.7.1.8 Adjust the door roller pivot assemblies to the front or back as required and re-tighten all socket head cap screws (24).

600-11.4.3.7.1.9 Install door panel in accordance with paragraph [600-11.4.3.3.2](#).

**NOTE**

A uniform clearance between the door panel and the upper frame and door panel and sill plate indicates that the door panel is properly adjusted vertically.

600-11.4.3.7.2 Ellison Bronze NAVSEA 129 Design Door Vertical Door Panel Adjustment.

**NOTE**

If the lower arm is not rubbing the sill plate, the lower hinge tube assembly vertical adjustment is satisfactory. A uniform clearance between the door panel and upper frame head and door panel and sill plate indicates that the door panel pivot vertical adjustment is satisfactory.

**NOTE**

There are two vertical adjustments that can be accomplished on the Ellison Bronze NAVSEA 129 Design door. The lower hinge pin (75) on the bottom of the lower hinge tube assembly will help to prevent the lower arm from rubbing the sill plate. The lower pivot pin (21) in the lower hinge arm will help to center the door panel in the frame.

600-11.4.3.7.2.1 Lower Hinge Tube Vertical Adjustment. The lower hinge pin (75) threads into the lower hinge tube and is accessible through a hole under the sill. The pinhead is slotted and can be adjusted with the door panel in place. The weight of the door and the condition of the pin however, may make the adjustment difficult. If this is the case, it is recommended that the door panel be removed (refer to paragraph [600-11.4.3.3.1](#)) prior to making the adjustment.

600-11.4.3.7.2.1.1 Determine how much the door needs to be adjusted in the up direction.

600-11.4.3.7.2.1.2 Loosen set screw (22) in the lower hinge tube before adjusting lower hinge pin (75). To raise the door, thread the hinge pin (75) out of the lower hinge tube. One complete turn on lower hinge pin (75) will raise or lower the door approximately 1/32". Operate door through several open and close cycles while checking for rubbing between the lower arm and sill plate. If lower arm rubbing is observed, repeat paragraphs [600-11.4.3.7.2.1.1](#) through [600-11.4.3.7.2.1.2](#). When no upper or lower arm rubbing is observed, tighten set screw (22) and proceed to paragraph [600-11.4.3.7.2.2](#). (If door panel was removed prior to making the adjustments, install the door panel in accordance with paragraph [600-11.4.3.3.2](#).)

**CAUTION**

**Over-tightening the setscrew (22) will damage the threads on lower hinge pin (75) making it difficult to adjust or remove.**

600-11.4.3.7.2.2 Door Panel Pivot Vertical Adjustment. Measure and record the clearance between the door panel and the upper frame head. Measure and record the clearance between the door panel and the sill plate. If the upper and lower clearances are not uniform proceed to paragraph 600-11.4.3.7.2.2.1. If the upper and lower clearances are uniform, the door panel pivot block vertical adjustment is satisfactory.

600-11.4.3.7.2.2.1 Loosen set screw (22) in the lower hinge arm. Thread the lower pivot pin (21) into the hinge arm to raise the door panel and out to lower the door panel. Fully open and close door panel several times. Check the clearance between the door panel and the upper frame head and between the door panel and the sill plate. If the upper and lower clearances are not uniform continue adjusting the lower pivot pin (21). When a uniform clearance between the door panel and the upper frame head and between the door panel and the sill plate is achieved, tighten set screw (22).

**CAUTION**

**Over-tightening the setscrew (22) will damage the threads on lower pivot pin (21) making it difficult to adjust or remove.**

**NOTE**

The pivot pin (21) in the lower hinge arm is not adjustable on PSNSY Model 159-17STD.

600-11.4.3.7.3 PSNSY Model 159-17STD Door Vertical Door Panel Adjustment. Unlike the Ellison Bronze NAVSEA 129 Design door, the PSNSY Model 159-17STD door has only one vertical adjustment on the lower hinge tube. The door hinge tube can be adjusted vertically with the lower hinge pin (75), which is accessible through a hole in the bottom of the sill. This adjustment will help to prevent the lower arm from rubbing the sill plate and will also raise or lower the door panel. A 3/16" Allen wrench is required to make the adjustment. The procedure for making this adjustment is the same as the Ellison Bronze NAVSEA 129 Design door (refer to paragraphs 600-11.4.3.7.2.1. through 600-11.4.3.7.2.1.2.).

**CAUTION**

**Over-tightening the setscrew (22) will damage the threads on lower hinge pin (75) making it difficult to adjust or remove.**

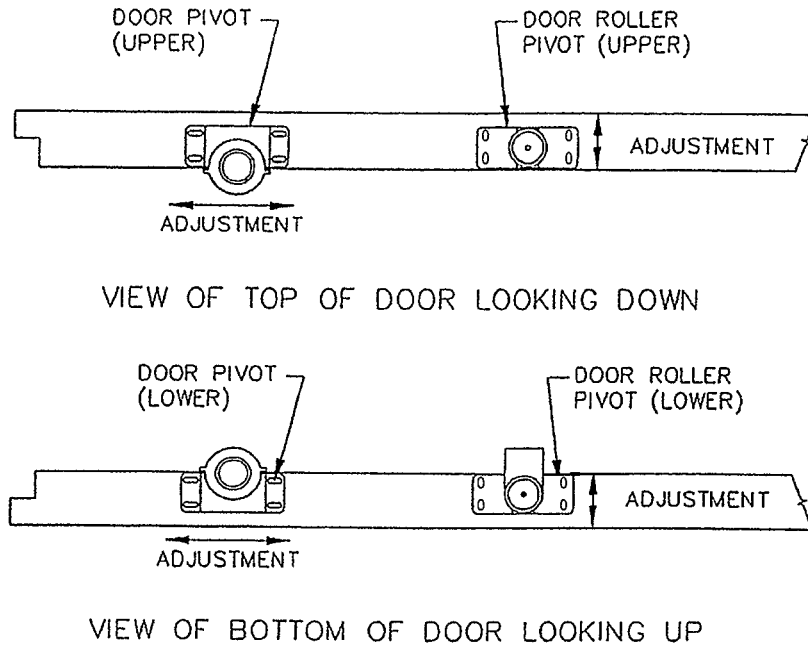


Figure 600-11.13. Ellison Bronze NAVSEA 129 Design and PSNSY Model 159-17STD Door Adjustments

600-11.4.3.8 Neoprene Door Edge Gasket. (Refer to figure 600-11.14 for Ellison Bronze NAVSEA 129 Design and figure 600-11.15 for PSNSY Model 159-17STD)

**CAUTION**

**Door edge gaskets (13) which drag on the door frame can cause the door to bind.**

600-11.4.3.8.1 The vertical gasket clearance should be a maximum of 1/16" clearance maintained between the gasket edge and the sides of the door frame. The horizontal gasket (upper and lower) clearance should be the minimum clearance necessary that will allow the door to open and close smoothly without binding. Replace any damaged gaskets (13) prior to accomplishing gasket adjustments.

600-11.4.3.8.2 To adjust gaskets, loosen the machine screws (14) holding the gasket (13) to the door. Obtain a piece of shim stock for a guide, approximate size 4" x 10" x 1/32". Place shim stock between door panel and frame. Gently position gasket up to the shim and tighten screws. Check door operation and ensure the gaskets are not binding on the frame. Continue to adjust the gaskets until the proper clearance is achieved and no binding or rubbing is present.

600-11.4.3.9 Accomplish Repair Completion Requirements in accordance with paragraph 600-11.4.5.



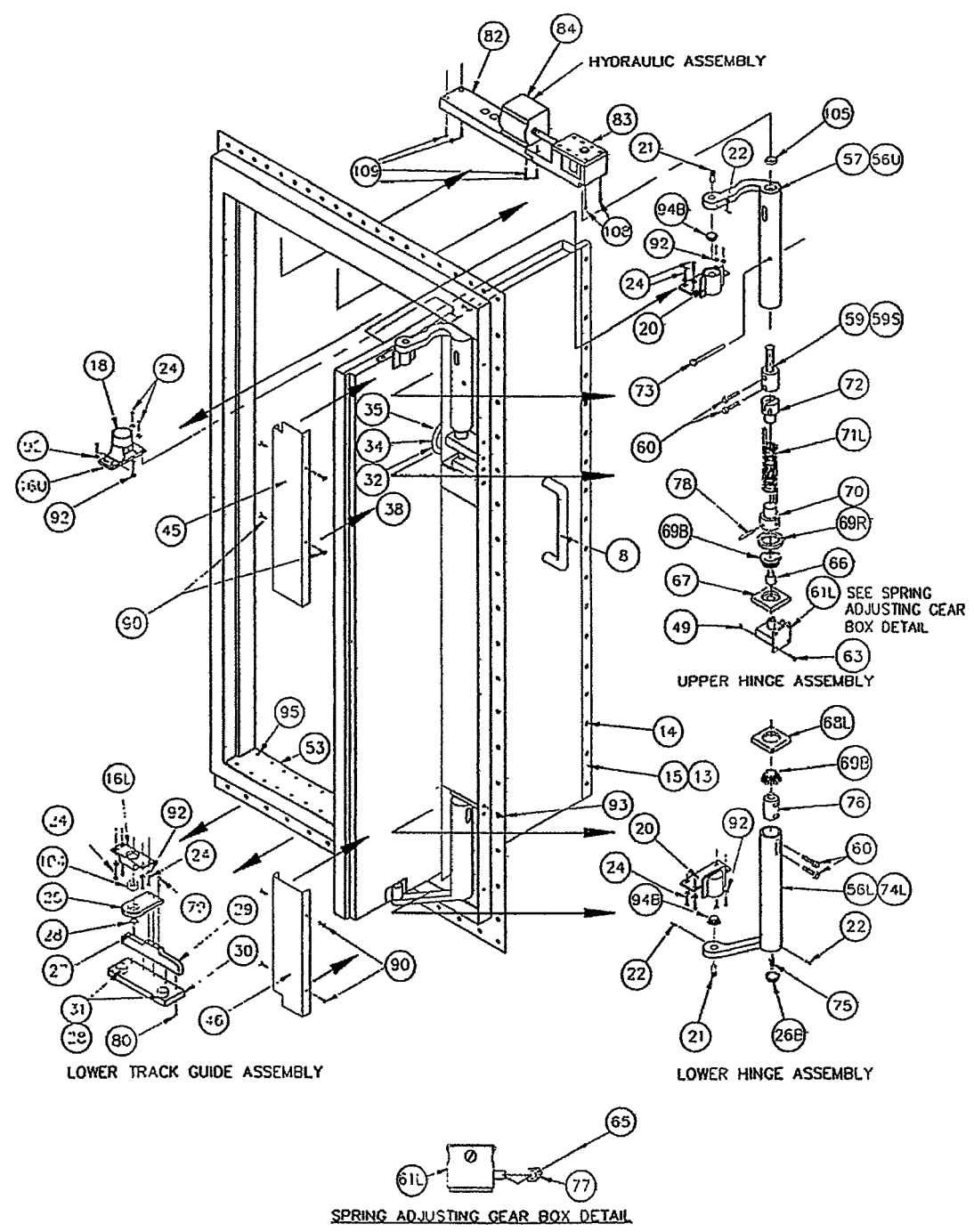


Figure 600-11.14. Ellison Bronze NAVSEA 129 Design Door

Table 600-11.9. Ellison Bronze NAVSEA 129 Design Door Group Assembly Parts List (GAPL)

FIGURE 600-11.14 AND INDEX NO.	PART NO.	NSN	DESCRIPTION	QTY	USED ON CODE*
600-11.14-8	PC8		Pull grip handle	1	H

**Table 600-11.9.** Ellison Bronze NAVSEA 129 Design Door Group Assembly

Parts List (GAPL) - Continued

FIGURE 600-11.14 AND INDEX NO.	PART NO.	NSN	DESCRIPTION	QTY	USED ON CODE*
600-11.14-13	PC13	5330-00-244-0192	Seal (neoprene w/elongated Holes)	1	H
600-11.14-14	PC14	5305-00-052-9051	Pan head screw, 8-32 x 1/2" (self tap SST) (Phillips head)	52	H
600-11.14-15	PC15	9515-01-381-1922	Sealing strip	4	H
600-11.14-16L	PC16L		Door roller pivot, lower	1	H
	PC16-104	3110-01-323-0107	Bearing, ball, pivot assembly - includes PC's 16L, 24, 25, 27, 28,79,92 and 104		
600-11.14-16U	PC16U		Door roller pivot, upper	1	H
600-11.14-18	PC18		Guide roller, upper	1	H
600-11.14-20	PC20		Door pivot (upper/lower)	2	H
	PC20-94	3110-01-322-8066	Bearing, ball, pivot assembly - includes PC's 20 and 94		
600-11.14-21	PC21	5315-01-324-5409	Door pivot pin (upper/lower)	2	H
600-11.14-22	PC22		Set screw	3	H, I
600-11.14-24	PC24		Socket head cap screw	16	H
600-11.14-25	PC25		Lower track bearing support	1	H
600-11.14-26B	PC26	3110-00-100-3678	Lower hinge bearing (Timken A2137 or equivalent)	1	H, I
600-11.14-26R	PC26	3110-00-100-0628	Lower hinge bearing race (Timken A2126 or equivalent)	1	H, I
600-11.14-27	PC27	5305-01-381-9872	Hex head shoulder screw 5/16"	1	H
600-11.14-28	PC28	5310-01-380-9195	Bellville washer 9/32"	1	H
600-11.14-29	PC29		Lower track mounting plate	1	H
	PC29-80	3040-01-323-5265	Shaft, shouldered assembly - includes PC's 29, 30, 31 and 80		
600-11.14-30	PC30		Lower track mounting bracket	1	H
600-11.14-31	PC31		Lower track guide bearing (Torrington CRS8-10 or equivalent)	2	H
600-11.14-32	PC32		Fixed light frame (pull side)	1	H
600-11.14-33	PC33		Fixed light frame (push side)	1	H
600-11.14-34	PC34	5330-01-273-6866	Gasket ring seal (neoprene)	1	H
600-11.14-35	PC35		Light	1	H
600-11.14-38	PC38		Flat head screw	4	H
600-11.14-45	PC45		Cover, shaft (upper)	1	H
600-11.14-46	PC46		Cover, shaft (lower)	1	H
600-11.14-49	PC49		Nut, elastic stop, #8-32UNC (w/nylon insert)	4	H
600-11.14-53	PC53		Cover, saddle	1	H
600-11.14-56L	PC56L		Lower shaft	1	H

**Table 600-11.9.** Ellison Bronze NAVSEA 129 Design Door Group Assembly

Parts List (GAPL) - Continued

FIGURE 600-11.14 AND INDEX NO.	PART NO.	NSN	DESCRIPTION	QTY	USED ON CODE*
600-11.14-56U	PC56U		Shaft, upper arm, upper	1	H
600-11.14-59	PC59		Upper shaft pivot	1	H
600-11.14-59S	PC59S		Upper shaft pivot spline	1	H
600-11.14-60	PC60	5305-01-381-1572	Cap screw, socket head, 5/16-18UNC-3A x 5/8" Long	4	H
600-11.14-61L	PC61	5360-01-307-3094	Spring adjusting gearbox, (specify Left hand)	1	H
600-11.14-61R	PC61	3010-01-318-9414	Spring adjusting gearbox, specify Right hand)	1	H
600-11.14-64	PC64		Shaft adapter bushing	1	H
600-11.14-65	PC65		Spring pin, heavy coiled tubular	1	H
600-11.14-66	PC66		Pivot, upper shaft	1	H
600-11.14-67	PC67		Upper shaft support plate, (specify LH)	1	H
600-11.14-67	PC67		Upper shaft support plate, (specify RH)	1	H
600-11.14-68L	PC68		Lower shaft support plate, (specify LH)	1	H
600-11.14-68R	PC68		Lower shaft support plate, (specify RH)	1	H
600-11.14-69B	PC69	3110-00-155-7453	Upper/lower hinge shaft roller bearing (SKF 07098 or equivalent)	2	H, I**
600-11.14-69R	PC69	3110-00-100-0637	Bearing race, hinge shaft roller (SKF 07204 or equivalent)	2	H, I**
600-11.14-70	PC70		Spring lower guide	1	H
600-11.14-71L	PC71	5360-01-380-9192	Spring, door return (specify LH)	1	H
600-11.14-71R	PC71	5360-01-380-9162	Spring, door return (specify RH)	1	H
600-11.14-72	PC72		Spring upper guide	1	H
600-11.14-73	PC73		Heavy coil tubular spring pin	1	H
600-11.14-74L	PC74		Lower pivot arm (specify LH)	1	H
600-11.14-74R	PC74		Lower pivot arm (specify RH)	1	H
600-11.14-75	PC75	3040-01-383-5297	Pin, pivot, lower arm	1	H
600-11.14-76	PC76		Pivot, lower shaft	1	H
600-11.14-77	PC77		Adapter, spring adjustment	1	H
600-11.14-78	PC78		Pin, 1/4" Diameter x 1-3/4" long	1	H
600-11.14-79	PC79		Cap screw, socket head	3	H
600-11.14-80	PC80		Cap screw, self-locking hex	5	H
600-11.14-82	PC82		Upper channel guide removable part	1	H, I
600-11.14-83	PC83	5340-01-319-5379	Upper guide channel fixed part (specify RH or LH)	1	H, I
600-11.14-84	PC84	5340-01-133-0631	Door check	1	H, I
600-11.14-90	PC90		Flat head machine screw	8	H
600-11.14-92	PC92		Bellville washer 5/16"	16	H
600-11.14-93	PC93		Flat head machine screw	8	H

**Table 600-11.9.** Ellison Bronze NAVSEA 129 Design Door Group Assembly  
 Parts List (GAPL) - Continued

FIGURE 600-11.14 AND INDEX NO.	PART NO.	NSN	DESCRIPTION	QTY	USED ON CODE*
600-11.14-94B	PC94	3110-00-100-3681	Upper/lower pivot pin bearing, tapered (Timken A4050 or equivalent)	2	H, I***
600-11.14-94R	PC94	3110-00-100-0630	Upper/lower pivot pin bearing race (Timken A4138 or equivalent)	2	H, I***
600-11.14-95	PC95		Flat head machine screw	13	H
600-11.14-104	PC104		Door roller pivot bearing, lower (SKF 627 2RSJEM or equivalent)	1	H
600-11.14-105	PC105		Upper Arm spacer washer, 1/16"	1	H
600-11.14-108	PC108		Round head screw	2	H
600-11.14-109	PC109		Socket head cap screws	4	H

\*See Table 600-11.4.

\*\*Only upper hinge shaft roller bearing is interchangeable.

\*\*\*Only lower pivot pin bearing is interchangeable.

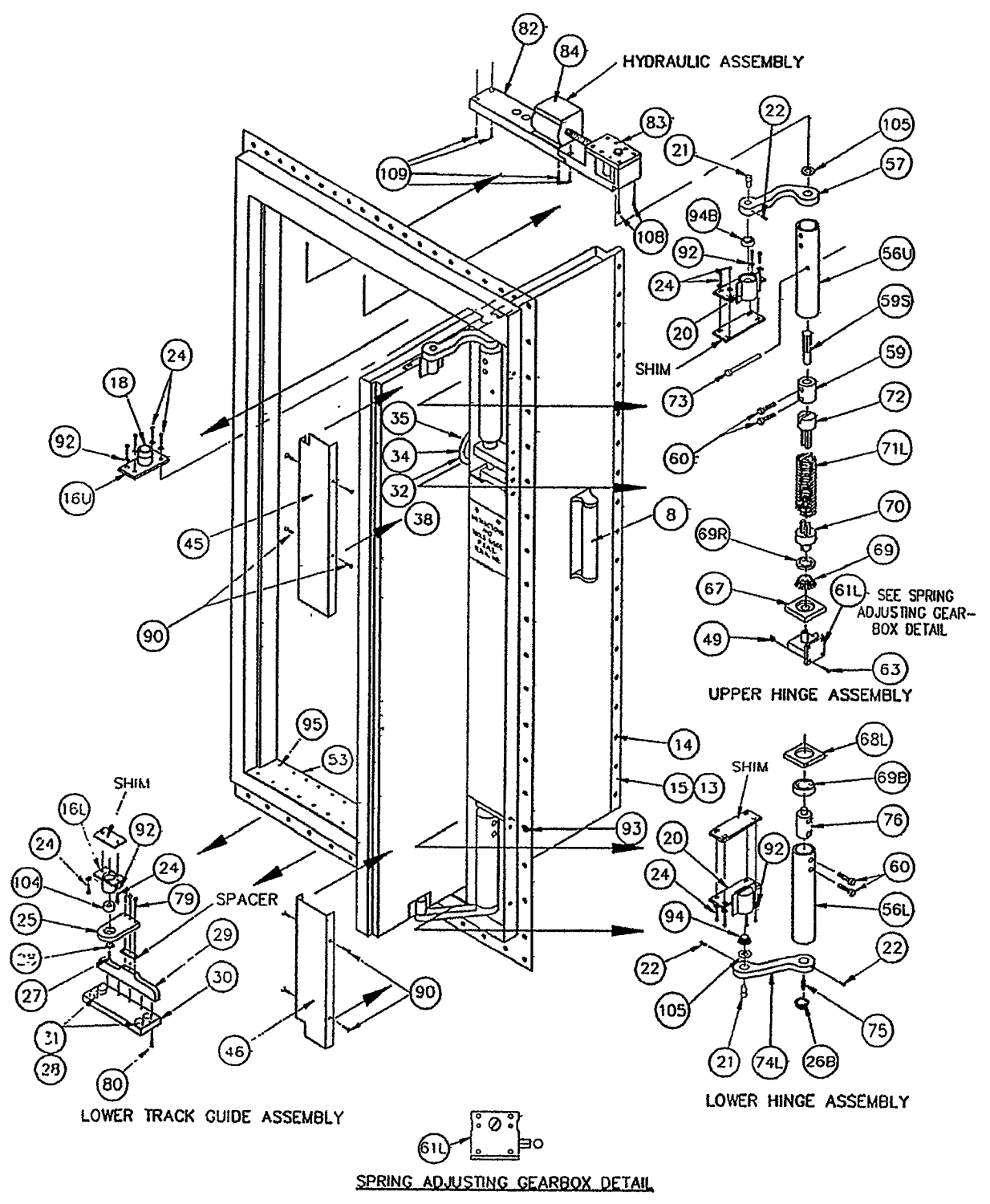


Figure 600-11.15. Puget sound Naval Shipyard Model 159-17STD Door

**Table 600-11.10.** Puget Sound Naval Shipyard Model 159-17STD Door Group  
 Assembly Parts List (GAPL)

FIGURE 600-11.15 AND INDEX NO.	PSNSY 17STD PART NO.	NSN	DESCRIPTION	QTY	USED ON CODE*
600-11.15-8	PC8		Pull grip handle	1	I
600-11.15-13	PC13		Seal (neoprene w/elongated Holes)	1	I
600-11.15-14	PC14	5305-00-054-6668	Round head screw, 8-32 UNC-2A x .375 (CRES)	68	I
600-11.15-15	PC15		Sealing strip	4	I
600-11.15-16L	PC16L		Door roller pivot, lower	1	I
600-11.15-16U	PC16U		Door roller pivot, upper	1	I
600-11.15-18	PC18	3110-00-159-1603	Door upper guide roller (Torrington or equivalent)	1	I
600-11.15-20	PC20		Door pivot (upper/lower)	2	I
600-11.15-21	PC21		Door pivot pin (upper/lower)	2	I
600-11.15-22	PC22		Set screw, upper/lower arm	3	H, I
600-11.15-24	PC24		Socket head cap screw	16	I
600-11.15-25	PC25		Lower track bearing support	1	I
600-11.15-26B	PC26	3110-00-100-3678	Lower hinge bearing (Timken A2137 or equivalent)	1	H, I
600-11.15-26R	PC26	3110-00-100-0628	Lower hinge bearing race (Timken A2126 or equivalent)	1	H, I
600-11.15-27	PC27	5305-01-381-9872	Hex head shoulder screw 5/16" x 2.00	1	I
600-11.15-28	PC28	5310-01-380-9195	Bellville washer 9/32"	1	I
600-11.15-29	PC		Lower track mounting plate	1	I
600-11.15-30	PC30		Lower track mounting bracket	1	I
600-11.15-31	PC31	3110-00-005-8270	Lower track guide bearing (CF5-8SB)	4	I
600-11.15-32	PC32		Fixed light frame (pull side)	1	I
600-11.15-34	PC34	5330-01-273-6866	Gasket ring seal	1	I
600-11.15-35	PC35	9340-00-275-2719	4" Diameter glass	1	I
600-11.15-38	PC38		Flat head screw	4	I
600-11.15-45	PC45		Cover, shaft (upper)	1	I
600-11.15-46	PC46		Cover, shaft (lower)	1	I
600-11.15-49	PC49		Nut, elastic stop, #8-32UNC (w/nylon insert)	4	I
600-11.15-53	PC53		Cover, saddle	1	I
600-11.15-56L	PC56L		Lower shaft	1	I
600-11.15-56U	PC56U		Upper shaft	1	I
600-11.15-57L	PC57L		Upper arm	1	I
600-11.15-59	PC59		Upper shaft pivot	1	I
600-11.15-59S	PC59S		Upper shaft pivot spline	1	I
600-11.15-60	PC60	5305-01-381-1572	Socket head cap screw	4	I
600-11.15-61L	PC61L		Spring adjusting gearbox, (specify Left hand)	1	I
600-11.15-61R	PC61R		Spring adjusting gearbox, specify Right hand)	1	I
600-11.15-63	PC63		Flat head machine screw	4	I

**Table 600-11.10.** Puget Sound Naval Shipyard Model 159-17STD Door  
 Group Assembly Parts List (GAPL) - Continued

FIGURE 600-11.15 AND INDEX NO.	PSNSY 17STD PART NO.	NSN	DESCRIPTION	QTY	USED ON CODE*
600-11.15-64	PC64		Shaft adapter bushing	1	I
600-11.15-67L	PC67L		Upper shaft support plate, (specify LH)	1	I
600-11.15-67R	PC67R		Upper shaft support plate, (specify RH)	1	I
600-11.15-68L	PC68L		Lower shaft support plate, (specify LH)	1	I
600-11.15-68R	PC68R		Lower shaft support plate, (specify RH)	1	I
600-11.15-69	PC69	3110-00-155-7453	Upper hinge shaft roller bearing (SKF 07098 or equivalent)	1	H, I
600-11.15-69B	PC69B	3110-00-849-6805	Lower hinge shaft ball bearing	1	I
600-11.15-70	PC70		Spring lower guide	1	I
600-11.15-71L	PC71L		Spring, door return (specify LH)	1	I
600-11.15-71R	PC71R		Spring, door return (specify RH)	1	I
600-11.15-72	PC72		Spring upper guide	1	I
600-11.15-73	PC73		Heavy coil tubular spring pin	1	I
600-11.15-74L	PC74L		Lower pivot arm (specify LH)	1	I
600-11.15-74R	PC74R		Lower pivot arm (specify RH)	1	I
600-11.15-75	PC75		Pin, pivot, lower arm	1	I
600-11.15-76	PC76		Pivot, lower shaft	1	I
600-11.15-79	PC79		Cap screw, socket head	3	I
600-11.15-82	PC82		Upper channel guide removable part	1	H, I
600-11.15-83	PC83		Upper guide channel fixed part	1	H, I
600-11.15-84	PC84	5340-01-133-0631	Door check	1	H, I
600-11.15-90	PC90		Flat head machine screw	8	I
600-11.15-92	PC92		Bellville washer 5/16"	16	I
600-11.15-93	PC93		Flat head machine screw	8	I
600-11.15-94	PC94	3110-00-100-3681	Lower pivot pin bearing, tapered (Timken A4050 or equivalent)	1	H, I
600-11.15-94	PC94	3110-00-100-0630	Lower pivot pin bearing race (Timken A4138 or equivalent)	1	H, I
600-11.15-94B	PC94B	3110-00-278-7393	Upper pivot pin bearing, roller	1	I
600-11.15-95	PC95		Flat head machine screw	13	I
600-11.15-104	PC104		Door roller pivot bearing, lower	1	I
600-11.15-105	PC105		Upper pivot shim washer, .097" (brass)	2	I
600-11.15-108	PC108		Round head screw	2	I
600-11.15-109	PC109		Socket head cap screws	4	I

\*See Table 600-11.4.

600-11.4.4 Ellison Bronze Models 137, 138, 139B, 139BN and 139CN Door Assembly Repair Procedures.

600-11.4.4.1 Ellison Bronze Models 137, 138, 139B, 139BN and 139CN Door Gearbox Adjustment. (Refer to figure 600-11.16 and figure 600-11.18)

**WARNING**

**Exercise caution when removing the floor gearbox cover plate on Models 137, 138 and 139B. The pawl may spring out of the gearbox.**

600-11.4.4.1.1 Standing directly in front of door, attach spring scale to door handle and slowly pull door open. Check spring scale when door "breaks-away" from door frame. Force required to open door should be between 17 to 23 pounds.

600-11.4.4.1.2 If opening force is less than 17 pounds, remove floor gearbox cover plate (Does not apply to Models 139BN and 139CN.). Insert prongs of closer spring spanner wrench in adjusting gear center hole and one tooth space (Models 137, 138 and 139B). For 139BN or 139CN, insert 1/2" Allen wrench through hole in cover plate. Turn toward door panel. Repeat adjustment until 17 to 23 pounds of opening force is achieved.

600-11.4.4.1.3 If opening force exceeds 23 pounds, increase tension 1/2 turn (to release pressure against pawl); hold pawl back away from gear teeth with flat screwdriver; allow gear to turn back. Repeat adjustment until 17 to 23 pounds of opening force is achieved.

600-11.4.4.1.4 Replace floor gearbox access cover.

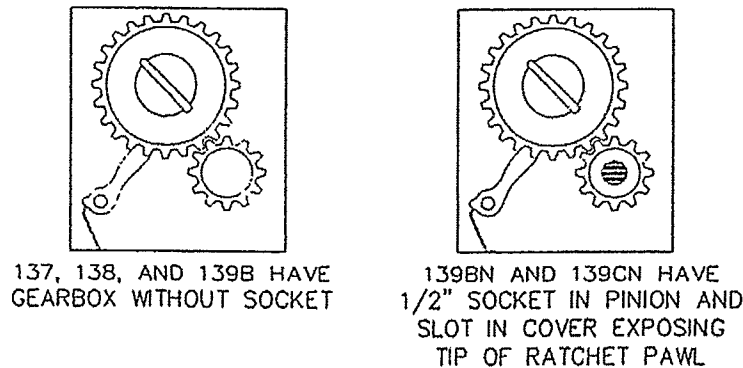


Figure 600-11.16. Floor Gearbox

600-11.4.4.2 Hydraulic Closer Adjustment. (Refer to figure [600-11.11.](#))

600-11.4.4.2.1 The hydraulic closer assembly adjustments for Ellison Bronze Models 137, 138, 139B, 139BN, and 139CN doors are identical to the procedures for the Ellison Bronze NAVSEA 129 Design and the PSNSY 159-17 STD doors. Refer to paragraph [600-11.4.3.2.](#)

600-11.4.4.3 Procedure to Remove and Install Door Panel on Ellison Bronze Models 137, 138, 139B, 139BN and 139CN. (Refer to figure [600-11.18](#))

600-11.4.4.3.1 Door Panel Removal.



**WARNING**

**Ensure that spring tension has been released before removing door panel.**

**WARNING**

**Exercise caution when removing the floor gearbox cover plate on Models 137, 138 and 139B. The pawl may spring out of the gearbox.**

600-11.4.4.3.1.1 Remove floor gearbox cover-plate (Does not apply to Models 139BN and 139CN.). Release spring tension. Insert prongs of closer spring spanner wrench in adjusting gear center hole and one tooth space (Models 137, 138 and 139B). For 139BN or 139CN, insert 1/2" Allen wrench through hole in cover plate. This may be accomplished by increasing tension 1/2 turn (to release pressure against pawl); hold pawl back away from gear teeth with flat screwdriver; allow gear to turn back until tension is released.

600-11.4.4.3.1.2 With door in open position, turn a 1/4-20 screw into hole on top of door top pivot pin (4), remove top pivot pin set screw (5) and pull door top pivot pin (4) up and out of hinge arm, thereby releasing top of door from top hinge arm.

**WARNING**

**A minimum of two people are required during door movement. Possible hazard to personnel exists due to weight of door panel.**

600-11.4.4.3.1.3 With door panel in the open position, tip the top of the door panel toward the push side until door roller (1) releases from roller guide channel. Carefully lift the door panel out of the frame to release door bottom pivot (11) from bottom hinge arm.

600-11.4.4.3.2 Door Panel Installation.

600-11.4.4.3.2.1 Carefully lift the door panel, aligning the lower door pivot (11) pin with the lower door pivot needle bearing (12). Tilt the top of the door panel away from the hinge and align the top pivot roller in the upper guide channel (removable section). Carefully push the top of the door panel toward the upper hinge arm until the hole in the hinge arm aligns with the upper door bearing (6).

600-11.4.4.3.2.2 Install door pivot pin (4) and tap down flush with upper hinge arm. Move door panel back and forth to help the pin seat in the upper door bearing (6). Tighten setscrew (5).

600-11.4.4.3.2.3 Carefully work door to closed position. Inspect door for smooth swing and proper alignment in frame.

600-11.4.4.3.2.4 Adjust door gearbox tension in accordance with paragraph [600-11.4.4.1](#).

600-11.4.4.3.2.5 Adjust hydraulic closer in accordance with paragraph [600-11.4.4.2](#).

600-11.4.4.4 Ellison Bronze Models 137, 138, 139B, 139BN and 139CN Hydraulic Closer Assembly Replacement. (Refer to figure [600-11.11](#) and figure [600-11.18](#).)

**WARNING**

**Exercise care when removing the hydraulic closer assembly from the door frame. Ensure that spring tension has been released before removing the hydraulic closer assembly.**

600-11.4.4.4.1 Remove floor gearbox cover plate (Does not apply to Models 139BN and 139CN.). Release spring tension. Insert prongs of closer spring spanner wrench in adjusting gear center hole and one tooth space (Models 137, 138 and 139B). For 139BN or 139CN, insert 1/2 Allen wrench through hole in cover plate. This may be accomplished by increasing tension 1/2 turn (to release pressure against pawl); hold pawl back away from gear teeth with flat screwdriver; allow gear to turn back until tension is released.

600-11.4.4.4.2 Secure door in open position. Turn out four cap screws and remove hydraulic closer assembly (17) out of the door frame.

600-11.4.4.4.3 Reinstall the hydraulic closer assembly (17) to the roller guide channel (removable section).

600-11.4.4.4.4 Position the hydraulic closer assembly into the head of the door frame. Place a screwdriver into the roller guide channel hole and gently pry the hydraulic closer assembly into position. Fasten in place with cap screws.

600-11.4.4.4.5 Unsecure the door from the open position.

600-11.4.4.4.6 Adjust gearbox tension in accordance with paragraph [600-11.4.4.1](#).

600-11.4.4.4.7 Adjust hydraulic closer in accordance with paragraph [600-11.4.4.2](#).

600-11.4.4.5 Ellison Bronze Models 137, 138, 139B, 139BN and 139CN Hinge and Bearing Overhaul Gearbox Replacement. (Refer to figure [600-11.18](#) unless otherwise indicated.)

**WARNING**

**Ensure that spring tension has been released before removing door panel.**

**WARNING**

**Exercise caution when removing the floor gearbox cover plate on Models 137, 138 and 139B. The pawl may spring out of the gearbox.**

**NOTE**

Inability to tension floor gearbox shaft is indicative of a broken spring shaft/torsion bar (10) or broken floor gearbox (16).

600-11.4.4.5.1 Remove door panel in accordance with paragraph [600-11.4.4.3.1](#).

600-11.4.4.5.2 Remove sheet metal cover which forms inside section of door side frame on hinge side.

600-11.4.4.5.3 Remove lower screw (8) and upper screw will slide down to bottom of the slot. This drops the spline shaft pin (2) out of spline guide in the hydraulic closer assembly. Tip hinge shaft assembly (3) away from frame and lift up and out of jamb.

600-11.4.4.5.4 Lay the hinge shaft assembly (3) on a flat surface. Remove the closer spring assembly/torsion bar (10), door bottom pivot thrust bearing (13), Oarlock washer (14) and access cover (15) from the bottom of the hinge shaft assembly (On the Ellison Bronze Model 139CN model door, you will have to remove a cap-screw that secures the closer spring assembly/torsion bar (10) to the underside of the hinge shaft assembly lower arm).

600-11.4.4.5.5 Remove the access cover (15), Garlock washer (14) and bottom pivot thrust bearing (13) from the closer spring assembly/torsion bar (10). Inspect parts for excessive wear or damage and replace parts as necessary.

600-11.4.4.5.6 Lubricate the closer spring assembly/torsion bar (10) and the bottom pivot thrust bearing (13). Install the bottom pivot thrust bearing (13), Garlock washer (14) and access cover (15) on the bottom of the closer spring assembly/torsion bar (10).

600-11.4.4.5.7 Install the closer spring assembly/torsion bar (10), door bottom pivot thrust bearing (13), Garlock washer (14) and access cover (15) in the bottom of the hinge shaft assembly (On the Ellison Bronze Model 139CN model door, you will have to install a cap-screw that secures the closer spring assembly/torsion bar (10) to the underside of the hinge shaft assembly lower arm). Ensure that the top spring shaft or torsion bar adapter engages the roll pin installed in the hinge shaft.

600-11.4.4.5.8 Remove floor gearbox cover from Models 139BN and 139CN (the floor gearbox cover was previously removed from Models 137, 138 and 139B during paragraph [600-11.4.4.5.1](#)). Inspect floor gearbox (16). Check gears for worn or broken teeth. Check pawl for wear and ensure spring is properly engaged in the side of the gearbox. If the gears, pawl or spring are damaged, proceed to paragraph [600-11.4.4.5.9](#) for floor gearbox replacement.

**WARNING**

**A minimum of two people are required during door frame movement. Possible hazard to personnel exists due to weight of door frame.**

**NOTE**

Door frame must be removed from bulkhead in order to replace floor gearbox (16).

600-11.4.4.5.9 Remove door frame in accordance with paragraph [600-11.5.7](#).

**NOTE**

Floor gearboxes (16) for Models 137, 138 and 139B are no longer manufactured but can be replaced with the floor gearboxes installed in the 139BN and 139CN models that are completely compatible.

600-11.4.4.5.10 Remove floor gearbox (16) by removing five mounting screws.

600-11.4.4.5.11 Install new floor gearbox (16) with five new mounting screws.

**WARNING**

**A minimum of two people are required during door frame movement. Possible hazard to personnel exists due to weight of door frame.**

600-11.4.4.5.12 Install door frame in accordance paragraph [600-11.5.8](#).

600-11.4.4.5.13 Inspect the lower door pivot bearing (12) for excessive wear or damage. Lubricate and install or replace the lower door pivot bearing in the hinge shaft assembly (3) lower arm.

600-11.4.4.5.14 Reinstall the hinge shaft aligning the lower shaft adapter with the floor gearbox. Tip the hinge shaft up into the channel in the frame. Slide the spline shaft up to engage the spline guide in the roller guide channel (fixed section) of the hydraulic closer assembly. Move the upper hinge arm back and forth slightly, while sliding the spline shaft up until it engages. When the spline shaft slides up, immediately pull the hinge arm back toward the closed position. This creates tension on the spline shaft and will help keep the shaft from sliding back down while starting the lower cap screw (8). The capscrew hole is easier to access with the slot turned toward the front. Tighten the upper and lower cap screws (8) in the spline shaft.

600-11.4.4.5.15 Reinstall sheet metal cover.

600-11.4.4.5.16 Inspect the upper door pivot bearing (6) for excessive wear or damage. Lubricate and install or replace the upper door pivot bearing in the upper door pivot (7).

600-11.4.4.5.17 Install door panel in accordance with paragraph [600-11.4.4.3.2](#).

600-11.4.4.6 Ellison Bronze Models 137, 138, 139B, 139BN and 139CN Door Horizontal and Vertical Adjustments. (Refer to figures [600-11.17](#) and figure [600-11.18](#).)

**WARNING**

**Ensure that spring tension has been released before accomplishing horizontal door panel adjustments.**

**NOTE**

A uniform clearance between the door panel and the hinge and latch sides of the frame indicates that the door panel is properly adjusted horizontally.

**NOTE**

The horizontal door panel adjustments should be accomplished first because they will affect the vertical adjustments.

600-11.4.4.6.1 Horizontal Door Panel Adjustment.

600-11.4.4.6.1.1 Remove floor gearbox cover-plate (Does not apply to Models 139BN and 139CN.). Release spring tension. Insert prongs of closer spring spanner wrench in adjusting gear center hole and one tooth space (Models 137, 138 and 139B). For 139BN or 139CN, insert 1/2 Allen wrench through hole in cover plate. This may be accomplished by increasing tension 1/2 turn (to release pressure against pawl); hold pawl back away from gear teeth with flat screwdriver; allow gear to turn back until tension is released.

600-11.4.4.6.1.2 Open the door and loosen the socket head cap screws that fasten the top (7) and bottom (11) door pivots to the top and bottom of the door panel.

600-11.4.4.6.1.3 Insert a paint scrapper between the door panel and frame where the panel meets the frame and jog the door panel to achieve a uniform clearance that is parallel between the door panel and frame. Carefully open the door and re-tighten all of the socket head cap screws.

600-11.4.4.6.1.4 Cycle the door several times to ensure door panel and frame are parallel and door panel is centered in the frame. When proper horizontal door panel adjustment is achieved, proceed to vertical door panel adjustment paragraph [600-11.4.4.6.2](#).

600-11.4.4.6.2 Vertical Door Panel Adjustment.

**WARNING**

**Ensure that spring tension has been released before removing door panel.**

**WARNING**

**Exercise caution when removing the floor gearbox cover plate on Models 137, 138 and 139B. The pawl may spring out of the gearbox.**

**NOTE**

A uniform clearance between the door panel and the upper frame and the door panel and sill plate indicates that the door panel is properly adjusted vertically.

**NOTE**

In order to adjust the door panel vertically, it is necessary to remove the door panel.

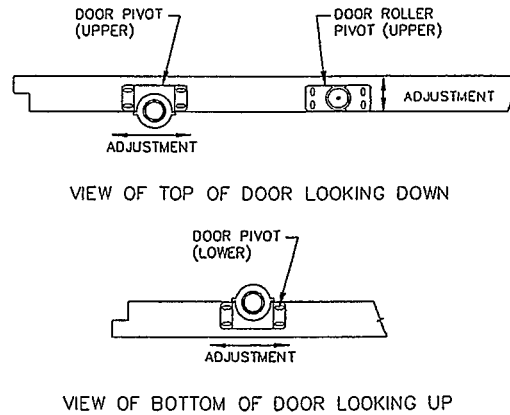
600-11.4.4.6.2.1 Measure and record the clearance between the door panel and the upper frame head. Measure and record the clearance between the door panel and the sill plate. If the upper and lower clearances are not uniform proceed to paragraph [600-11.4.4.6.2.2](#). If the upper and lower clearances are uniform, the door panel pivot block vertical adjustment is satisfactory.

**NOTE**

Prior to removing door panel, ensure that spring tension has been released in accordance with paragraph [600-11.4.4.6.1.1](#).

600-11.4.4.6.2.2 Remove door panel in accordance with paragraph [600-11.4.4.3.1](#).

600-11.4.4.6.2.3 With the door panel removed, remove lower door pivot by removing socket head cap screws. Add or remove shims between the lower door pivot and the bottom of the door panel depending upon whether the door panel needs to be raised or lowered respectively. The amount of shims should equal the amount of adjustment required.



required.

Figure 600-11.17. Ellison Bronze Models 137, 138, 139B, 139BN, and 139CN Door Adjustments

600-11.4.4.6.2.4 Install door panel in accordance with paragraph [600-11.4.4.3.2](#).

600-11.4.4.7 Ellison Bronze Models 137, 138, 139B, 139BN Neoprene Door Edge Gasket.

**CAUTION**

**Door edge gaskets which drag on the door frame can cause the door to bind.**

**NOTE**

The Ellison Bronze Model 139CN door does NOT require door edge gaskets. The door jamb is beveled to seat the closed door panel and meet clearance requirements.

600-11.4.4.7.1 The vertical gasket clearance should be a maximum of 1/16" clearance maintained between the gasket edge and the sides of the door frame. The horizontal gasket (upper and lower) clearance should be the minimum clearance necessary that will allow the door to open and close smoothly without binding. Replace any damaged gaskets prior to accomplishing gasket adjustments.

600-11.4.4.7.2 To adjust gaskets, loosen the machine screws holding the gasket to the door. Obtain a piece of shim stock for a guide, approximate size 4" x 10" x 1/32. Place shim stock between door panel and frame. Gently position gasket up to the shim and tighten screws. Check door operation and ensure the gaskets are not binding on the frame. Continue to adjust the gaskets until the proper clearance is achieved and no binding or rubbing is present.

600-11.4.4.8 Accomplish Repair Completion Requirements in accordance with paragraph [600-11.4.5](#).

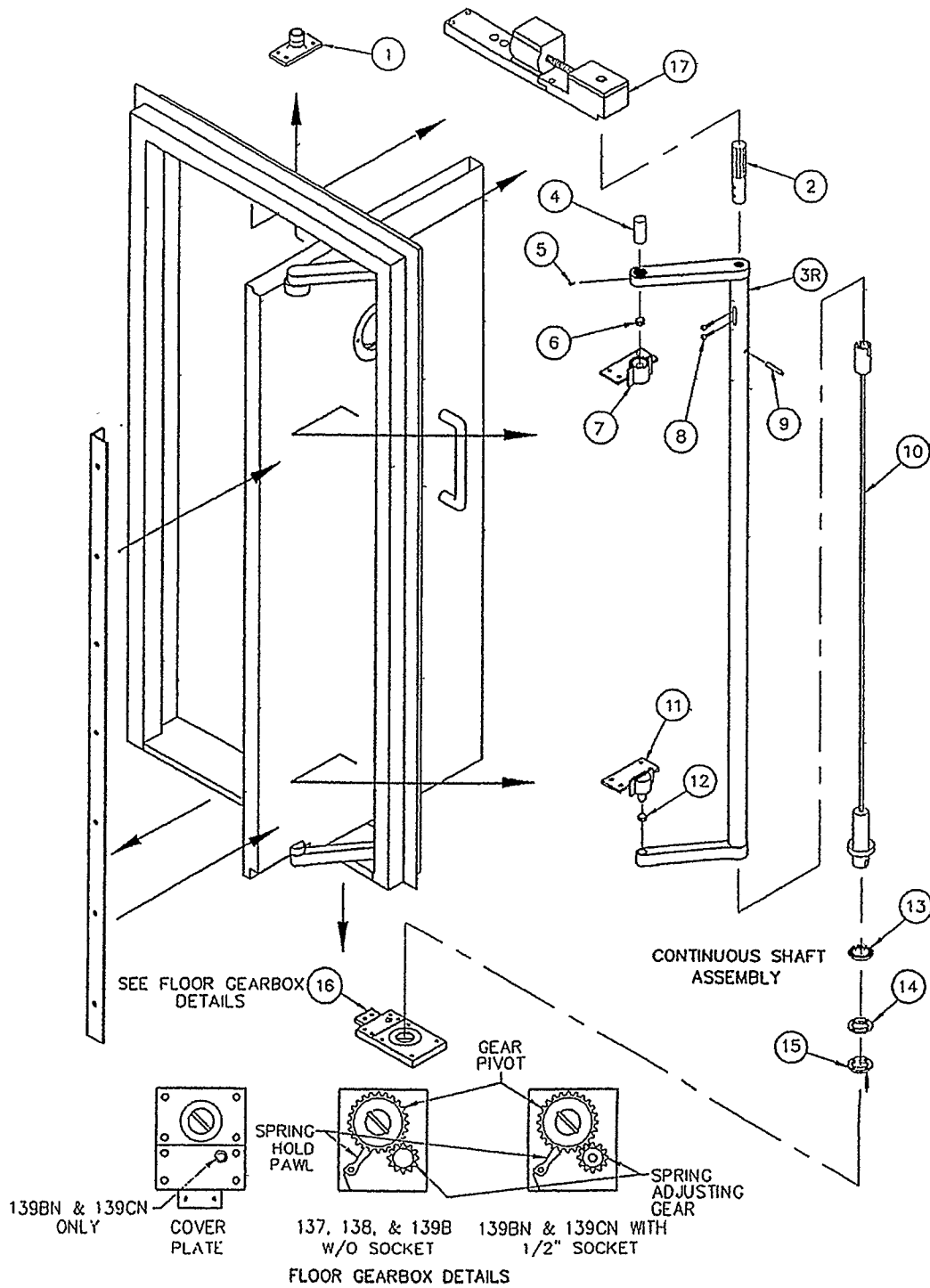


Figure 600-11.18. Ellison Bronze Models 137, 138, 139B, 139BN, and 139CN Door

Table 600-11.11. Ellison Bronze Models 137, 138, 139B, 139BN, and 139CN Door Group Assembly Parts List (GAPL)

FIGURE 600-11.18 AND INDEX NO.	PART NO.	NSN	DESCRIPTION	QTY	CODE*
600-11.18-1	139-10	5340-01-133-0633	Door guide roller	1	C, D, E, F, G, H

**Table 600-11.11.** Ellison Bronze Models 137, 138, 139B, 139BN, and 139CN

Door Group Assembly Parts List (GAPL) - Continued

FIGURE 600-11.18 AND INDEX NO.	PART NO.	NSN	DESCRIPTION	QTY	CODE*
600-11.18-2	137-35-42	5315-01-134-0117	Top pivot pin, hinge	1	C, D, E, F, G
600-11.18-3	139-36		Hinge shaft assembly, RH or LH	1	C, D, E, F, G
600-11.18-4	137-35-81	5315-01-142-6257	Top pivot pin, door	1	C, D, E, F, G
600-11.18-5	N8		Top pivot pin set screw	1	C, D, E, F, G
600-11.18-6	137-5A	3110-01-143-6745	Needle bearing, top pivot	1	C, D, E, F
	139CN-N15	3120-01-425-4321			G
600-11.18-7	139-54-254	3130-01-132-0982	Door top pivot	1	E, F, G, H
	139-16	3130-01-132-0983			C, D
600-11.18-8		COML	Socket head cap screw, 1/4-28 UNF self locking, stl, cad plt'd	2	C, D, E, F, G
600-11.18-9		COML	Key pin, stl, 0.1875 dia x 1-1/16" long	1	C, D, E, F, G
600-11.18-10**	139BN-23-152SH	5360-01-129-9461	Torsion bar, closer, RH or LH	1	C**, D**, B, F, G
600-11.18-11	139-63	5342-01-133-0634	Door bottom pivot	1	E, F, G, H
		5342-01-130-3215			C, D
600-11.18-12	J-1412	3110-01-143-6745	Needle bearing, bottom pivot	1	C, D, E, F
	1412PL	3120-01-425-4321			G
600-11.18-13	139-23-61		Thrust bearing	1	C, D, E, F, G
600-11.18-14		COML	Washer, Garlock Co., No. 661 or equivalent	1	C, D, E, F, G
600-11.18-15			Cover disc, bronze ASTM B130	1	C, D, E, F, G
600-11.18-16***	139BN-13 - (RH/LH)	5999-01-258-3648	Floor gearbox assembly (specify RH or LH)	1	C, D, E, F, G
		5999-01-281-9743			
600-11.18-17	139-3	5340-01-133-0631	Hydraulic closer assembly	1	C, D, E, F, G, H, I

\*See Table 600-11.4.

\*\*Models 137 and 138 were originally manufactured with spring shaft assemblies which are no longer manufactured. The spring shaft can be replaced with a torsion bar (6-11.18-10) with a minor modification to the hinge shaft assembly (6-11.18-3). Punch or drill out existing key pin (6-11.18-9). Drill a new 3/16" hole in the hinge shaft 5-3/4" down from the bottom of the upper hinge arm. Insert a new key pin (6-11.18-9). Replace the hinge shaft with a torsion bar (refer to paragraph 600-11.4.4.5).

\*\*\*Gearboxes for Models 137, 138, and 139B are no longer manufactured but can be replaced with the gearbox installed in the 139BN and 139CN models which are completely compatible.

**NOTE**

Parts for Models 137, 138, 139B and 139BN are in limited supply from the supply system. Repair parts for Model 139CN are available from the supply system and/or manufacturer.



**NOTE**

Prior to testing door opening force and closing speed, differential ventilation flow should be negligible. This can be accomplished by isolating airflow from balanced door. Close adjacent WTD/WTH leading to machinery space or secure ventilation flow to machinery space. After correct door opening force and closing speed is achieved, open WTD/WTH to machinery space and restore ventilation flow to machinery space.

600-11.4.5 Repair Completion Requirements.

600-11.4.5.1 Remove signs previously installed.

600-11.4.5.2 Obtain watch supervisor's permission to test balanced joiner door(s).

600-11.4.5.3 Open and close door(s) several times to prove satisfactory operation.

600-11.4.5.4 Upon completion of repairs and testing return door(s) to normal operation.

600-11.4.5.5 Notify completion of repair to watch supervisor.

600-11.4.6 Abbreviations and Acronyms. The abbreviations and acronyms listed in table 600-11.13 appear in the GAPL and in the text of this manual. Abbreviations used in the text of this manual may be in lower-case letters, initial capitals with lowercase letters, or all capitals. Abbreviations used in the GAPL are in all capitals. Acronyms used, both in the text and in the GAPL, are in all capitals. The abbreviations and acronyms listed in table 600-11.12 are capitalized for consistency and presented in alphabetical order.

**Table 600-11.12.** Abbreviations and Acronyms

ABBREVIATIONS/ACRONYMS	DEFINITION
AR	As Required
ASSY	Assembly
BDO	Balanced Door Operator
BRG	Bearing
BRS	Brass
CAD	Cadmium
COML	Commercial
CPLG	Coupling
CRES	Corrosion Resistant Steel
CU	Copper
DIA	Diameter
DWG	Drawing
FIG	Figure
FL	Flat
GAPL	Group Assembly Parts List
IPB	Illustrated Parts Breakdown
LG	Length
LH	Left Hand
MIP	Maintenance Index Page
MRC	Maintenance Requirement Card

**Table 600-11.12.** Abbreviations and Acronyms - Continued

ABBREVIATIONS/ACRONYMS	DEFINITION
NAVSEA	Naval Sea Systems Command
NHA	Next Higher Assembly
NO	Number
NSN	National Stock Number
OD	Outside Diameter
PLD	Plated
PMS	Planned Maintenance System
QTY	Quantity
REF	Reference
RDH	Round Head
RH	Right Hand
RLR	Roller
SCDP	Steel Cadmium Plate
SCHED	Schedule
SFT	Shaft
SHCS	Socket Head Cap Screw
SKT	Socket
SST	Stainless Steel
STL	Steel

**600-11.5 REPLACEMENT**

600-11.5.1 Purpose and Scope. This chapter provides maintenance personnel with the procedures necessary to remove and install the various models of balanced joiner doors covered by this technical manual (Steel Products Models 11001, 11002, and 11003; Ellison Bronze NAVSEA 129 Design and PSNSY Model 159-17STD; and Ellison Bronze Models 137, 138, 139B, 139BN and 139CN).

600-11.5.2 Safety Requirements. Specific removal and installation procedures, along with their individual warnings, cautions and notes shall be read in full prior to accomplishing any repairs.

600-11.5.3 Door Swing Designations. The swing of each balanced joiner door located on U.S. Navy ships has been designated for optimum entry/exit from a specific location on the ship. When purchasing a replacement door, the new door **MUST** have the same swing as the existing door being replaced. Ensure that the Navy designations are used when identifying replacement doors; note that this is opposite from commercial practice. To determine the swing of the door, stand directly in front of the door handle. A left-handed door will have the hinge on the left side and the handle on the right side. A right-handed door will have the hinge on the right side of the frame with the handle on the left side of the door (refer to figure 600-11.8).

600-11.5.4 New Door Requirements. The critical first step is for maintenance personnel to properly identify the manufacturer and model, as well as applicable APL and MRC, of the balanced joiner door in need of replacement (refer to table 600-11.1 and table 600-11.2). Whenever possible, procure a new door that is the same manufacturer, model and swing as the door being replaced. The Steel Products doors Models 11002 (Left hand door, APL 319990102) and 11003 (Right hand door, APL 319990101); and Ellison Bronze doors Model 139CN (Left hand door, APL 319990150 and Right hand door, APL 319990151) are the only new doors available at this time.

600-11.5.5 Preliminary Repair Checks. When possible, door repairs should be scheduled when machinery in the space is not operating (cold iron). Ensure the following precautionary steps are followed.

600-11.5.5.1 Obtain watch supervisor's permission before repairing balanced joiner doors to machinery spaces (Engineering Officer of the Watch (EOOW) underway and Duty Engineer in port). (See Equipment Guide List (EGL) for door locations.)

600-11.5.5.2 Notify personnel in machinery space that the door to that space (by number) will be under repair, and to utilize alternate door or doors for access.

600-11.5.5.3 Place signs on door and near door inside and out reading, "Personnel Working Behind Door; Use Alternate Access".

600-11.5.6 Repair Tools Required. Refer to table 600-11.13 for a list of door removal/installation tools required by door manufacturer/model.

**Table 600-11.13. Door Removal/Installation Tools Required**

DOOR MFR.	MODEL	REPAIR TOOLS REQUIRED
Steel Products	12391, 11001, 11002, 11003	Flat tip screwdriver, #2 and #3 Phillips screwdriver, 3/16" Allen wrench, utility knife, 7/16" combination wrench, 6" pliers, 3/8" drive ratchet, 7/16" deep well socket - 3/8" drive, paint scraper, drill motor, 1/4" drill bits, tool capable of cutting 1/4" thick steel bulkhead, shim material 1/16", 1/8" and 1/4" thick x 1" wide x various lengths, tape measure, 14' of string, 4' ladder, 4" portable grinder, two - 8" deep throat "C" clamps, Angle iron - 2" x 1-1/2" x 3/16" x various lengths
Ellison Bronze/Puget Sound Naval Shipyard	NAVSEA 129, 159-17STD	Flat tip screwdriver, #2 Phillips screwdriver, 1/8" and 3/16" Allen wrenches, utility knife, 7/16" and 5/8" combination wrenches, 1/4" and 3/8" drive ratchets, 3/16" deep well socket - 1/4" drive, 7/16" deep well socket - 3/8" drive, paint scraper, drill motor, 1/4" drill bits, tool capable of cutting 1/4" thick steel bulkhead, shim material 1/16", 1/8" and 1/4" thick x 1" wide x various lengths, tape measure, 14' of string, 4' ladder, 4" portable grinder, two - 8" deep throat "C" clamps, Angle iron - 2" x 1-1/2" x 3/16" x various lengths
Ellison Bronze	137, 138, 139B, 139BN, 139CN	Flat tip screwdriver, #2 Phillips screwdriver, 1/8" and 1/2" Allen wrenches, utility knife, 7/16" combination wrench, 3/8" drive ratchets, 7/16" deep well socket - 3/8" drive, paint scraper, drill motor, 1/4" drill bits, tool capable of cutting 1/4" thick steel bulkhead, shim material 1/16", 1/8" and 1/4" thick x 1" wide x various lengths, tape measure, 14' of string, 4' ladder, 4" portable grinder, two - 8" deep throat "C" clamps, Angle iron - 2" x 1-1/2" x 3/16" x various lengths

600-11.5.7 Door Removal Procedures.

**WARNING**

**A minimum of two people are required during door and frame movement. Possible hazard to personnel exists due to weight of door and frame.**

**NOTE**

The door panel should be removed from the door frame prior to removing door frame in order to reduce the weight of the components being handled.

600-11.5.7.1 Remove door panel from door frame. Refer to paragraph 600-11.4.2.3 for Steel Products door; paragraph 600-11.4.3.3 for Ellison Bronze NAVSEA 129 Model and PSNSY 159-17STD doors; and paragraph 600-11.4.4.3 for Ellison Bronze Models 137, 138, 139B, 139BN and 139CN doors.

600-11.5.7.2 Locate the door frame mounting fasteners at the top, bottom and sides of the door frame. If the mounting fasteners are covered by lagging, carefully trim the lagging back until the mounting fasteners are exposed.

600-11.5.7.3 Inspect door frame for shims. If shims are present, mark bulkhead for shim locations.

600-11.5.7.4 Loosen all door frame fasteners BUT DO NOT REMOVE.

**CAUTION**

**Shims must be removed and marked with the bulkhead location when the door frame fasteners are removed. Retain shims for installation with new door in order to prevent door from dragging or binding due to warped bulkhead.**

**NOTE**

Caulking may be applied between the door frame and bulkhead. If caulking is present, remove caulking prior to removing the door frame fasteners and shims.

600-11.5.7.5 Remove mounting fasteners and shims from top and bottom of door frame.

600-11.5.7.6 Remove mounting fasteners and shims from handle side of door frame.

600-11.5.7.7 While one person supports door frame, remove mounting fasteners and shims from hinge side of door frame.

600-11.5.7.8 While two people support door frame, tilt door frame away from bulkhead. Lift and remove the door frame out of the bulkhead.

600-11.5.8 Door Installation

**CAUTION**

**A major cause of door failure can be attributed to bolting frames directly against warped bulkheads without shims, which can result in twisted frames and door panel not sealing completely.**

600-11.5.8.1 Preparation of Site.

600-11.5.8.1.1 Balanced joiner doors are to be installed into a minimum bulkhead opening of 34-7/8" x 70-1/8" and a maximum of 35" x 70-1/4" (refer to figure 600-11.19). If the bulkhead opening is less than 34-7/8" x 70-1/8" the bulkhead must be cut to achieve the minimum opening size. Do not exceed the maximum opening size of 35" x 70-1/4". The opening in the bulkhead must be square, plumb and relatively flat. The balanced joiner door will normally have a 9" sill height parallel to the deck.

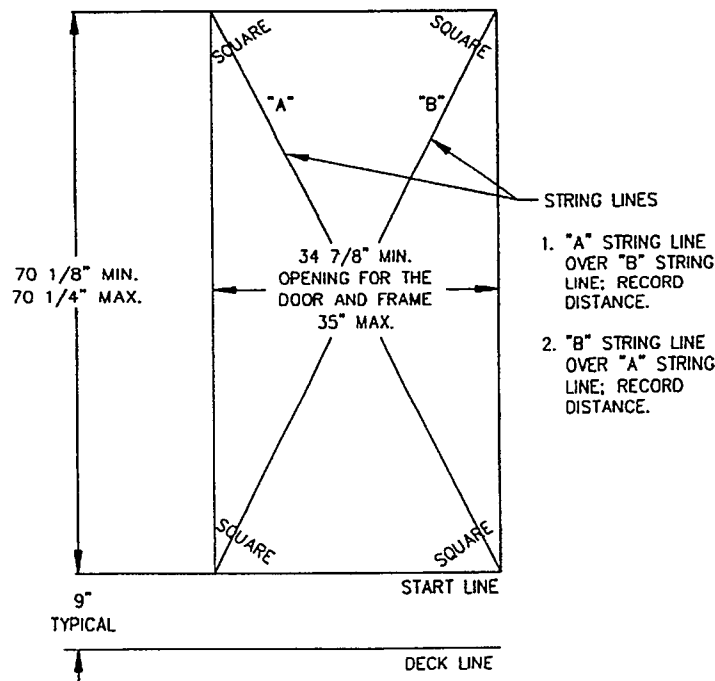


Figure 600-11.19. Door Opening

600-11.5.8.1.2 The bulkhead surface must be free of foreign matter. Remove all gasket material and caulking from bulkhead.

600-11.5.8.1.3 Bulkhead warpage can be checked by string lines. Position the string lines at opposite top and bottom corners, pull the lines tight, and check the space between the intersection of the string lines. Repeat this process by placing the string line that was in the closest position to the farthest position. If the string lines touch after process is complete the bulkhead is relatively flat. If there is a space between the string lines then the door frame needs to be shimmed approximately the distance between the lines.

**CAUTION**

**DO NOT DROP, TWIST OR BANG THE DOOR. Dropping, twisting or banging the door only a minor amount will knock the door frame out of square and cause permanent damage to the door operation.**

600-11.5.8.2 Unpacking and Moving Door.

**WARNING**

**A minimum of two people are required during door movement. Possible hazard to personnel exists due to weight of door panel and frame.**

600-11.5.8.2.1 With lid removed from shipping crate, visually inspect the door for obvious damage. Check the pull of the door to ensure that you have the correct door (i.e., left hand or right hand). Great care must be taken when removing the door from the crate. Always move the door with the pull handle facing upwards to prevent the door from opening during movement.

600-11.5.8.2.2 If door frame and panel must be handled sideways for movement through narrow passageways, ensure that the door panel will not open during transit. If the door panel is removed, secure the hinge arms against the frame (closed position) so they do not protrude from the frame and become damaged.

600-11.5.8.2.3 Balanced joiner doors are complex, close tolerance precision doors. Great care must be taken when rigging the door as a complete unit or when handling components separately. Care must also be exercised when installing these doors. Mishandling or rough treatment will cause misalignment.

**CAUTION**

**Prying door up into position will damage bottom of door frame.**

**CAUTION**

**Do not force the door flange to align with previous holes in bulkhead. This will cause warping of the door frame.**

**CAUTION**

**Failure to shim before final bolting to a warped bulkhead will cause the frame to assume the contour of the bulkhead. The door may drag, bind or it will not operate correctly or at all. This will result in excessive wear and premature failure.**

**NOTE**

Balanced joiner doors should be installed with the "push" side of the door facing the machinery space and the "pull" handle side of the door facing away from the machinery space.

600-11.5.8.3 Mounting. The most common installation problem associated with balanced joiner doors is that they are mounted into warped or uneven bulkheads. This causes the door frame to assume the shape of the deformed bulkhead. In the worst cases, this has caused new doors to be immediately inoperable. In less severe cases, the door hinge and/or pivot points fail prematurely. The following procedures shall be accomplished to ensure proper installation:

**WARNING**

**A minimum of two people are required during door movement. Possible hazard to personnel exists due to weight of door panel and frame.**

#### NOTE

For procedures to remove the door panels, refer to paragraph 600-11.4.2.3 for Steel Products door; paragraph 600-11.4.3.3 for Ellison Bronze NAVSEA 129 model and PSNSY 159-17STD doors; and paragraph 600-11.4.4.3 for Ellison Bronze Models 137, 138, 139B, 139BN and 139CN doors.

600-11.5.8.3.1 Position the door frame into the bulkhead opening. This can be accomplished with the door panel in the frame or with the door panel removed. The combined weight of the door frame and panel is approximately 260 pounds.

600-11.5.8.3.2 With the frame in position and parallel to the deck, check all around and identify any locations where the frame is separated from the bulkhead by more than 1/8".

600-11.5.8.3.3 If shims were present during the removal of the old door (refer to paragraph 600-11.5.7), verify bulkhead markings for shim locations and the thickness of shims required. Align holes in old shims to the mounting holes in the door frame. Clamp the door frame and shim(s) to the bulkhead. Ensure a flat mounting plane is achieved. If no shims were present during the removal of the old door, proceed to paragraph 600-11.5.8.3.4.

600-11.5.8.3.4 For separations between the door frame and bulkhead of 1/8" to 3/8", manufacture shims of varying thickness using 1" wide flat bar. Clamp the door frame and shim(s) to the bulkhead. Ensure a flat mounting plane is achieved.

600-11.5.8.3.5 For separations between 1/2" and 1-1/2", an angle iron alignment frame can be installed to avoid excessive shimming. Angle iron (2" x 1-1/2" x 3/16") can be used as the frame material. The installation of the angle iron frame must be controlled to avoid twisting or warping during welding. The 2" leg of the angle iron frame is inserted plumb into the bulkhead. The door frame mounts to the 1-1/2" surface that faces the door frame.

600-11.5.8.3.6 Separations between the door frame and the bulkhead greater than 1-1/2" require the bulkhead to be either straightened or replaced in accordance with standard structural practices.

#### NOTE

All doors are to be mounted to the bulkhead using 1/4-20 UNC hex head steel grade 8 bolts, 1/4" steel flat and lock washers and 1/4" steel nuts. The length of the bolts should be determined by the thickness of the bulkhead and the thickness of the shims. There must be 3 to 5 threads of the bolts extending beyond the nuts.

600-11.5.8.3.7 Once a flat mounting plane is achieved, drill 1/4" holes in the bulkhead to mount the door frame. Use the holes provided on the door frame flange as a drilling template. Begin by drilling and attaching the door hinge side first, then the latch side and finally the top and bottom. All mounting bolts are to be hand tight.

600-11.5.8.3.8 Install door panel into door frame. Refer to paragraph 600-11.4.2.3.2 for Steel Products door; paragraph 600-11.4.3.3.2 for Ellison Bronze NAVSEA 129 model and PSNSY 159-17STD doors; and paragraph 600-11.4.4.3.2 for Ellison Bronze Models 137, 138, 139B, 139BN and 139CN doors.

600-11.5.8.3.9 Cycle the door from fully closed position to fully open position several while checking for binding and rubbing. Check to ensure door panel sits flush with door frame in the closed position. If binding or rubbing is present or if door panel does not sit flush with door frame in the closed position, check the frame to the bulkhead mounting surface and identify if shims need to be added or removed. Install or remove shims as required until no binding or rubbing is present when door is cycled from fully closed position to fully open position and door panel sits flush with the door frame in the closed position.

600-11.5.8.3.10 Fully tighten all the mounting hardware. Cycle the door from fully closed position to fully open position several times while checking for binding and rubbing. Check to ensure door panel sits flush with door frame in the closed position. If binding or rubbing is present, or if door panel does not sit flush with door frame in the closed position, refer to paragraph 600-11.5.8.3.9.

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600-11.5.8.3.11 Seal the voids that may exist between the door frame and bulkhead with RTV or POLYSULFIDE sealant conforming to MIL-S-81733, Type 4.

**CAUTION**

**Using the adjustments to overcome a misaligned, twisted or out of square door may result in the complete failure of the internal components of the door.**

600-11.5.8.4 Adjustments.

**NOTE**

Prior to testing door opening force and closing speed, differential ventilation flow should be negligible. This can be accomplished by isolating airflow from balanced door. Close adjacent WTD/WTH leading to machinery space or secure ventilation flow to machinery space. After correct door opening force and closing speed is achieved, open WTD/WTH to machinery space and restore ventilation flow to machinery space.

**NOTE**

Door opening force and closing speeds should be accomplished in accordance with paragraphs [600-11.5.8.4.1](#) through [600-11.5.8.4.2](#) and the applicable MRC.

600-11.5.8.4.1 Door Opening Force. Door opening force is controlled by the spring adjusting gearbox on the Ellison Bronze NAVSEA 129 design and PSNSY model 159-17STD doors and by the floor gearbox on the Ellison Bronze Models 137, 138, 139B, 139BN, and 139CN doors. The door opening force is factory set and non-adjustable on the Steel Products Models 12391, 11001, 11002 and 11003 doors. Attach a spring scale to door handle, while standing directly in front of door, and slowly pull door open. Check spring scale when door "breaks-away" away from door frame. Force required to open door should be between 17 to 23 pounds. If door opening force is less than 17 pounds or greater than 23 pounds, refer to paragraph [600-11.4.3.1](#) for Ellison Bronze NAVSEA 129 design and PSNSY model 159-17STD doors and paragraph [600-11.4.4.1](#) Ellison Bronze Models 137, 138, 139B, 139BN, and 139CN doors.

600-11.5.8.4.2 Door Closing Speed. Door closing speed is controlled by the Balanced Door Operator (BDO) on the Steel Products Models 12391, 11001, 11002 and 11003 doors and the hydraulic closer assembly on the Ellison Bronze NAVSEA 129 design and PSNSY model 159-17STD doors, and Ellison Bronze Models 137, 138, 139B, 139BN, and 139CN doors. The door should travel from fully open to fully closed position in 6-8 seconds, however 5 - 10 seconds is acceptable. Door should close rapidly at first then slower over the last 8- 10 inches of travel. If the door closing speed is not within the 5 - 10 second range or the door does not slow down over the last 8 - 10 inches of travel, refer to paragraph [600-11.4.2.2](#) for Steel Products Models 12391, 11001, 11002 and 11003 doors; refer to paragraph [600-11.4.3.2](#) for Ellison Bronze NAVSEA 129 design and PSNSY model 159-17STD doors; and paragraph [600-11.4.4.2](#) Ellison Bronze Models 137, 138, 139B, 139BN, and 139CN doors.

600-11.5.8.5 Repair Completion Requirements.

600-11.5.8.5.1 Remove signs previously installed.

600-11.5.8.5.2 Upon completion of repairs and testing return door(s) to normal operation.

600-11.5.8.5.3 Notify completion of repair to watch supervisor.



## SECTION 12

### FIREZONE DOORS AND FUMETIGHT DOORS.

#### 600-12.1 PURPOSE/BACKGROUND.

##### 600-12.1.1 Purpose.

600-12.1.1.1 Firezone doors are located on USN surface ships in a firezone boundary and are designed to retard the passage of flame and smoke and meet the requirements of fumetightness. They may also be installed in conjunction with structural quick acting watertight doors when required for bulkheads designated as "Watertight Firezone".

600-12.1.1.2 Fumetight doors are located on USN surface ships in fumetight spaces and are designed with a tightness such that there are no visible or discernable openings in the structure. These doors prevent the passage of fumes and smoke but **DO NOT** retard the passage of flame.

##### 600-12.1.2 Background.

600-12.1.2.1 Firezone Doors. These doors shall be fabricated in accordance with NAVSEA drawing 805-1648659 REV "D", as modified by sketch 6132 SK-8201. The door panel and frame are all steel construction. The door panel is hollow and the void is filled with insulation. A gasket is mounted in an adjustable gasket retainer that is mounted to the door frame. These doors are used for routine access through firezone boundaries. Refer to table [600-12.1](#) and figure [600-12.1](#).

600-12.1.2.2 Fumetight Doors. There are two types of fumetight doors. These doors are used for routine access to fumetight spaces. Refer to table [600-12.1](#) and figure [600-12.1](#).

600-12.1.2.2.1 The first type of fumetight door is fabricated in accordance with NAVSEA drawing 805-1648659 REV "D". The door panel and frame are all steel construction. The door panel is hollow and the void is filled with insulation. This type of door **DOES NOT** have a gasket.

600-12.1.2.2.2 **The second type of fumetight door is fabricated in accordance with NAVSEA drawing 805-4629248 Rev A, type P only. The door panel is a honeycomb core construction consisting of two face sheets of 5052-H32 aluminum laminated to a 3/8" cell 5052 aluminum honeycomb core. The door frame is extruded aluminum. A closed cell foam Neoprene self-adhesive (non-adjustable) gasket is attached to the door frame.**

**Table 600-12.1.** Firezone Door And Fumetight Door Information

DOOR TYPE	APL	SWING	NAVSEA DWG. NO.
Firezone	312090268	RH	805-1648659 REV "D", as modified by sketch 6132 SK-8201
	312090269	LH	805-1648659 REV "D", as modified by sketch 6132 SK-8201
Fumetight, steel	312090268	RH	805-1648659 REV "D"
	312090269	LH	805-1648659 REV "D"
Fumetight, aluminum	31A030014	RH/LH	805-4629248 Rev A, <b>Type P only</b>

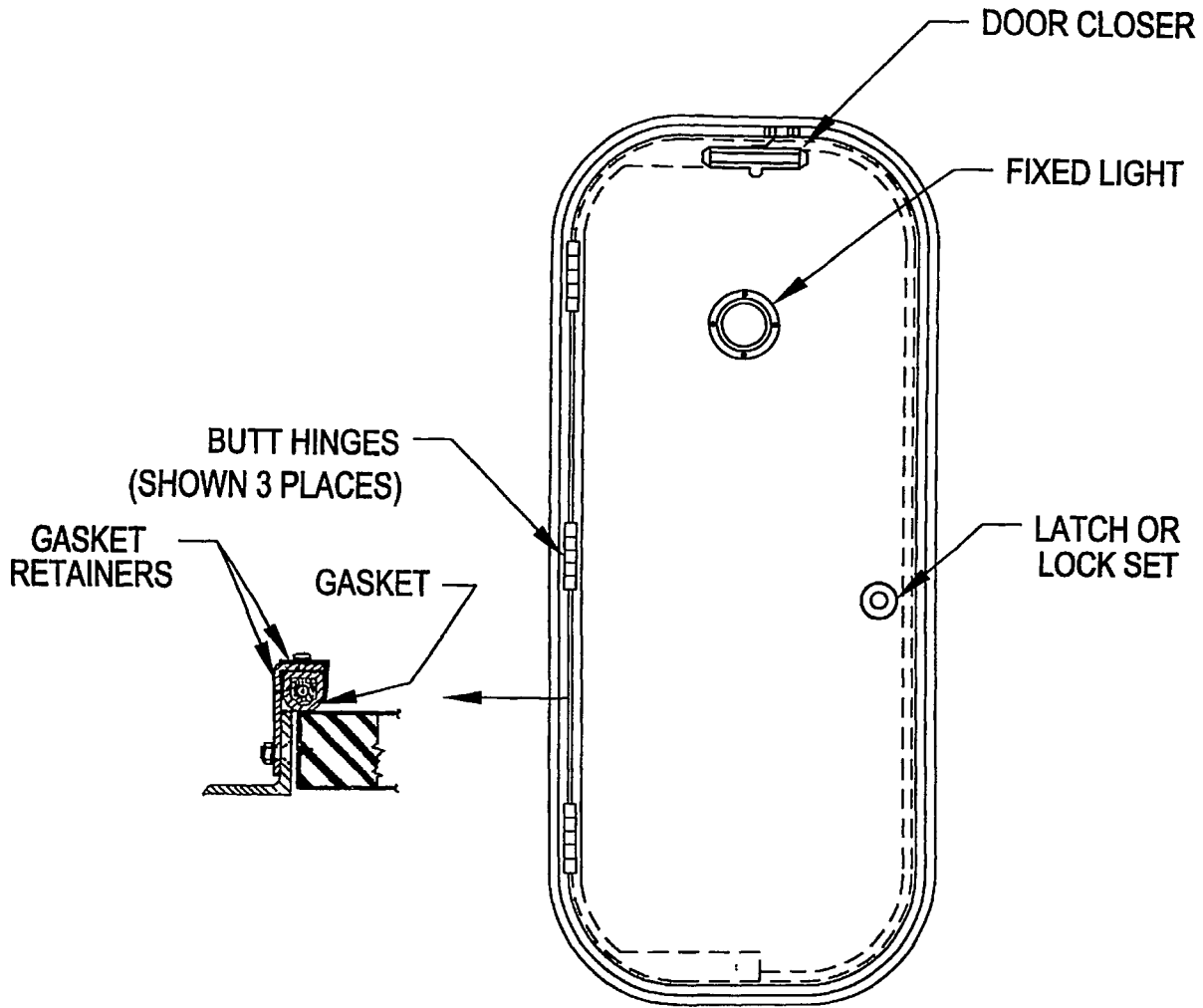


Figure 600-12.1. Typical Firezone Door

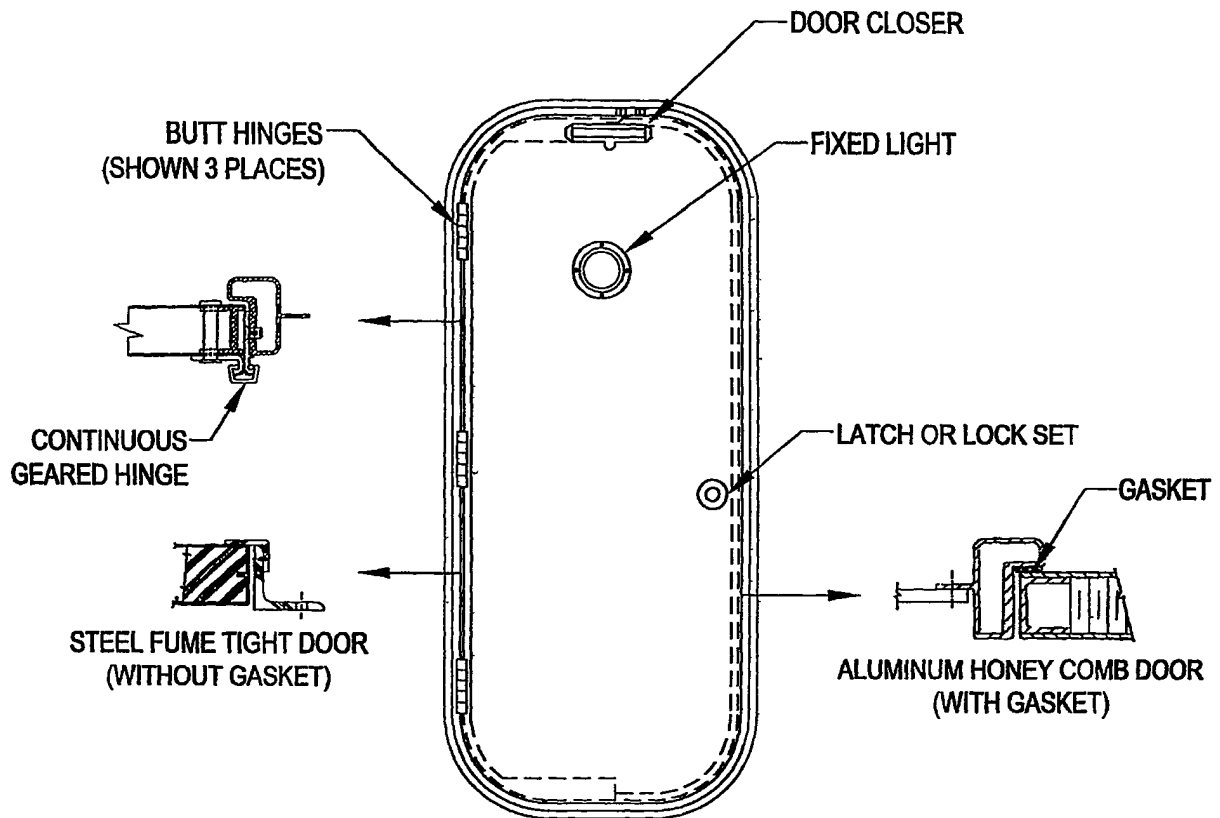


Figure 600-12.2. Typical Fumetight Door

**600-12.2 DESCRIPTION.**

600-12.2.1 Firezone Door Operation Description. The firezone door is a steel flush panel radius corner door that is manually operated. The door is opened by manually rotating the latch or lock assembly to release the door from the door frame and pulling on the latch or lock assembly or pushing on the door panel. Some doors are maintained in the open position by an electro magnet that is controlled by a fire door release control system. Some doors have an automatic closing device that closes the door when the latch or lock assembly is released or the magnet is de-energized.

600-12.2.2 Fumetight Door Operation Description. The fumetight doors are steel or aluminum honeycomb flush panel radius corner doors that are manually operated. These doors are opened by manually rotating the latch or lock assembly to release the door from the door frame and pulling on the latch or lock assembly or pushing on the door panel. Some doors are maintained in the open position by a manual hold-open hook assembly. Some doors have an automatic closing device that closes the door when the manual hold-open hook assembly is released and the latch or lock assembly is released.

600-12.2.3 Firezone and Fumetight Door Functional Descriptions.

600-12.2.3.1 Firezone Doors. These doors shall be fabricated in accordance with NAVSEA drawing 805-1648659 REV "D", as modified by sketch 6132 SK-8201. The door panel and frame are all steel construction

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with 8-1/2" radius corners. The door panel is flush with the frame on the pull side of the door and mates to a gasket on the push side of the door. A gasket is mounted in an adjustable two piece gasket retainer that is mounted to the door frame. These doors contain the following items: latch or lock set, hinges and gasket. These doors may also contain the following items: closer, fixed light and an electro magnet armature plate. Refer to figure [600-12.1](#).

600-12.2.3.1.1 Latch and Lock Sets. Firezone door latch sets and lock sets shall be in accordance with ANSI 156.2, Grade 1, Series 4000, Type F75 for latch sets, and ANSI 156.4, Grade 1, Type F90 for lock sets. Lock or latch chassis and the internal structure and operational components shall be AISI type 302 or 304 CRES. The latch bolt face plate and strike plate shall a full radius on the top and bottom. The strike shall be the Marine type that is suitable for doors 1-3/8" thick. The latch bolt face plate and strike plate shall be AISI 302 or 304 CRES with a US 32 finish. The knobs and roses shall be round in shape and shall be AISI 302 or 304 CRES with a US 32 finish. Roses shall have a diameter of not less than 3-1/4 inches. Other lockset types, in accordance with ANSI 156.2, Grade 1, may be used to suit a specific application requiring a special lockset. For additional lock requirements for joiner doors, refer to **NSTM Chapter 604**.

600-12.2.3.1.2 Hinges. Butt hinges, in accordance with Commercial Item Description (CID) A-A-50432, have been specified on drawing NAVSEA 805-1648659 REV "D". The hinge is a Type II, Class 3, Style B, 3-1/2" x 3" nickel plated (US 32 finish) steel hinge, with nylon bushings in the hinge knuckles. Refer to figure [600-12.3](#). Some doors have been manufactured with a full mortise swing clear hinge, 3-1/2" x .123 thick, steel, part number F248, in accordance with sketch 6132 SK-8201. The hinge leaves are secured to the door panel and door frame using eight (four per leaf) #10-24 flat head machine screws.

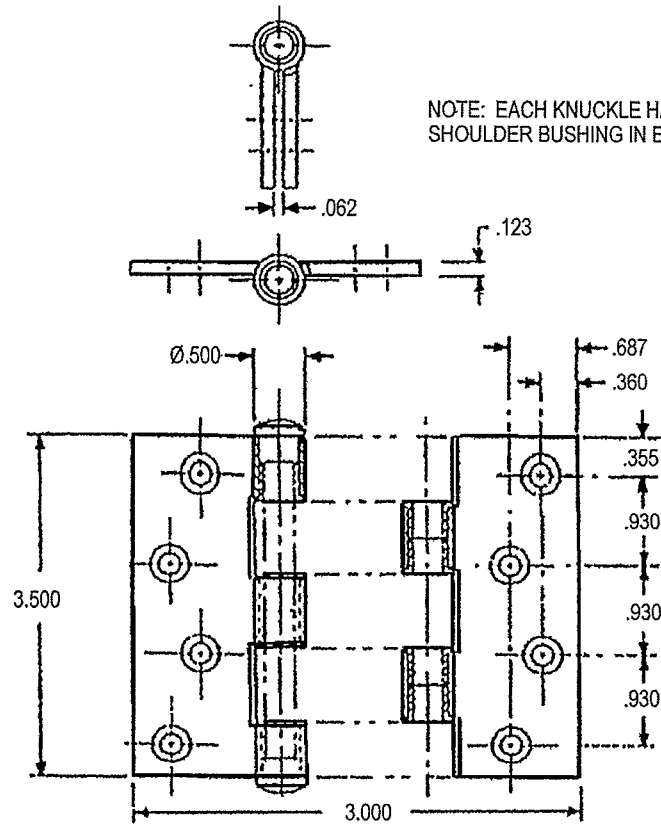
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**WARNING**

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**Some older firezone doors in the Fleet may possibly have gaskets that contain asbestos. Gaskets that contain asbestos will have a braided covering that is NOT coated with the black silicone rubber and will have a black rubber core.**

600-12.2.3.1.3 Gasket. The firezone door gasket is a 3/4" "D" shaped gasket manufactured in accordance with MIL-G-17927 Revision C, Type 1, Class 2. The gasket has an orange rubber inner core with a hole in it and a braided fiberglass metallic yarn with black silicone rubber outer coating. Some older firezone doors may have gaskets that contain asbestos. The gaskets that contain asbestos are no longer available in the stock system. Refer to paragraph [600-12.4.2.8](#) in order to identify and dispose of asbestos gaskets. Replacement gasket can be purchased using NSN 9Z 5330-01-160-6848.



NOTE: EACH KNUCKLE HAS A SHOULDER BUSHING IN EACH END.

Figure 600-12.3. Butt Hinge Knuckles With Bushings

600-12.2.3.1.4 Closer. Hydraulic closers installed on firezone doors shall be in accordance with ANSI 156.4, Grade 1, Size V, aluminum Finish, with optional features PT4C (50 percent adjustable spring power), and PT4D (adjustable backcheck). The hydraulic closer is mounted to the door panel and the associated frame arm shoe is mounted to the door frame. Refer to figure 600-12.4.

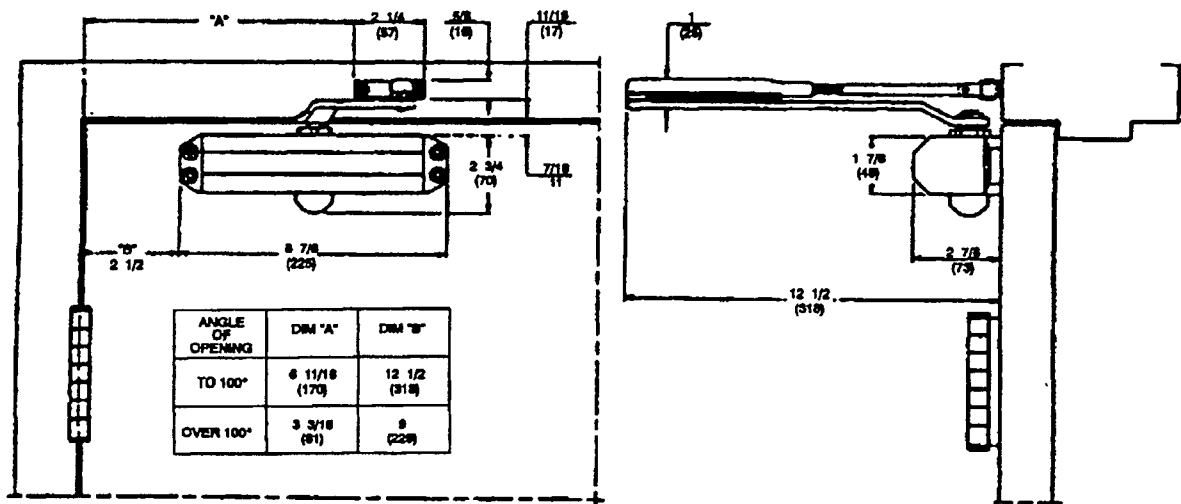


Figure 600-12.4. Door Closers

600-12.2.3.1.5 Fixed Light. A 1/4" thick x 4-1/4" diameter fixed glass light is usually installed in firezone doors located in passageways. Older firezone doors may have two fixed glass lights, one mounted on each side of the door panel. New firezone doors have one fixed glass light mounted in the center of the door panel. The fixed glass light is mounted with a gasket and held in place with a light frame that may be bolted or riveted to the door panel.

600-12.2.3.1.6 Electro Magnet Armature Plate. A steel electro magnet armature plate is mounted on firezone doors that are maintained in the open position by an electro magnet that is controlled by a fire door release control system. The plate can be mounted directly to the door panel or mounted on a sub-plate with adjustable tension springs. The fire door release control system and associated components vary between ship classes and ships within a ship class. The fire door release control system will not be covered in this technical manual, see the applicable ship specific drawings.

600-12.2.3.2 Fumetight Doors. There are two types of fumetight doors. The first type of fumetight door is fabricated in accordance with NAVSEA drawing 805-1648659 REV "D". The door panel and frame are all steel construction with 8-1/2" radius corners. The door panel is flush with the frame on the pull side and the push side of the door. This type of door **DOES NOT** have a gasket. The second type of fumetight door is fabricated in accordance with NAVSEA drawing 805-4629248 Rev A, **type P only** . The door frame is extruded aluminum and the door panel is an aluminum honeycomb core construction with 8-1/2" radius corners. This type of door has a closed cell foam Neoprene self-adhesive (non-adjustable) gasket is attached to the door frame. These doors contain the following items: latch or lock set, hinges and gasket (applies to the NAVSEA drawing 805-4629248 Rev A, **type P only door** ). These doors may also contain the following items: closer and fixed light. Refer to figure [600-12.2](#).

600-12.2.3.2.1 Latch and Lock Sets. Fumetight door latch sets and lock sets shall be in accordance with ANSI 156.2, Grade 1, Series 4000, Type F75 for latch sets (ANSI 156.2) and Grade 1, Series 4000, Type F90 for lock sets (ANSI 156.4). Lock or latch chassis and the internal structure and operational components shall be AISI type 302 or 304 CRES. The latch bolt face plate and strike plate shall a full radius on the top and bottom. The strike shall be the Marine type that is suitable for doors 1-3/8" thick. The latch bolt face plate and strike plate shall be AISI 302 or 304 CRES with a US 32 finish. The knobs and roses shall be round in shape and shall be AISI 302 or 304 CRES with a US 32 finish. Roses shall have a diameter of not less than 3-1/4 inches. Other lockset types, in accordance with ANSI 156.2, Grade 1, may be used to suit a specific application requiring a special lockset. For additional lock requirements for joiner doors, refer to **NSTM Chapter 604** .

600-12.2.3.2.2 Hinges. There are two types of hinges that can be installed on fumetight doors, butt hinges and aluminum continuous geared hinge. Butt hinges, in accordance with Commercial Item Description (CID) A-A-50432, have been specified on drawing NAVSEA 805-1648659 REV "D". The hinge is a Type II, Class 3, Style B, 3-1/2" x 3" nickel plated (US 32 finish) steel hinge, with nylon bushings in the hinge knuckles. The hinge leaves are secured to the door panel and door frame using eight (four per leaf) #10-24 flat head machine screws. Butt hinges, in accordance with Commercial Item Description (CID) A-A-50432, have been specified on drawing NAVSEA drawing 805-4629248 Rev A. The hinge is a Type II, Class 1, Style B, 3-1/2" x 3" brass hinge, with nylon bushings in the hinge knuckles. The hinge leaves are secured to the door panel and door frame using eight (four per leaf) #10-24 flat head machine screws and nut-serts, which are swaged into the frame and panel edge. Refer to figure [600-12.3](#). However, due to the high failure rate of these hinges, they are being discontinued for use on aluminum joiner doors. A more durable heavy duty aluminum continuous hinge (Refer to figure [600-12.5](#)), NSN 9Z-5340-01-418-5048, has been selected as a suitable replacement, both for backfit on existing doors, as well as new doors. Installation instructions for the continuous geared hinge are provided with the new hinge. The continuous hinge will be included in the next revision of the joiner door drawings.

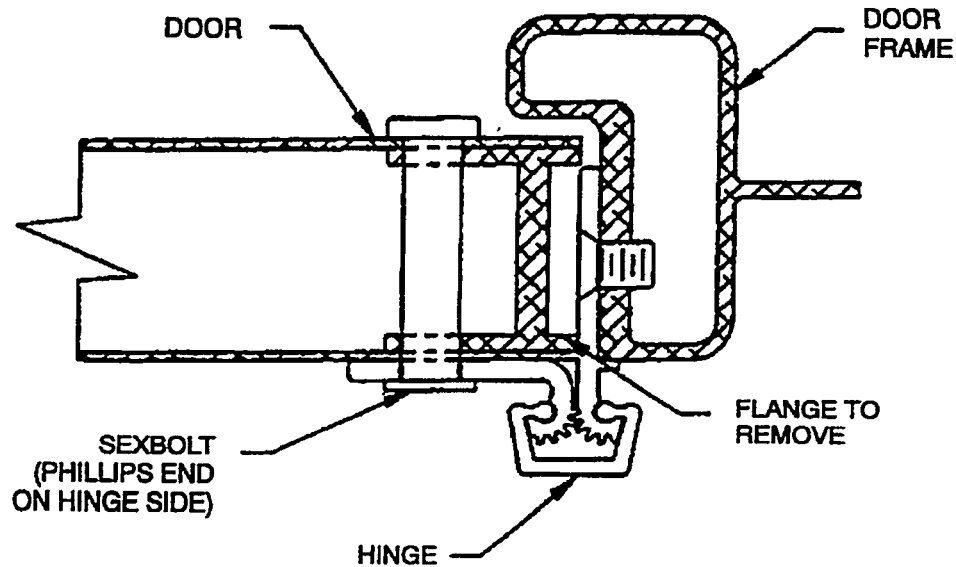


Figure 600-12.5. Continuous Geared Hinge

600-12.2.3.2.3 Gasket. Gaskets are required for aluminum fumetight doors built in accordance with NAVSEA drawing 805-4629248 Rev A, **type P only door**. The gasket material is closed cell foam neoprene, 12.7 mm (1/2") wide x 4.8 mm (3/16") thick, with adhesive on one side. The gasket is applied to the door frame that contacts the face of the door panel on three sides (top, bottom, and latch side). The hinge side gasket strip is applied to door frame such that it contacts the panel edge in the closed position. Gaskets **ARE NOT** installed on fumetight doors built in accordance with NAVSEA 805-1648659 REV "D".

600-12.2.3.2.4 Closer. Hydraulic closers installed on fumetight doors shall be in accordance with ANSI 156.4, Grade 1, Size III for aluminum doors and Size V for steel doors, aluminum Finish, with optional features PT4C (50 percent adjustable spring power), and PT4D (adjustable backcheck). The hydraulic closer is mounted to the door panel and the associated frame arm shoe is mounted to the door frame. Refer to figure [600-12.4](#).

600-12.2.3.2.5 Fixed Light. A 1/4" thick x 4-1/4" diameter fixed glass light is usually installed in fumetight doors located in passageways. Steel fumetight doors may have two fixed glass lights, one mounted on each side of the door panel. New fumetight doors and aluminum fumetight doors have one fixed glass light mounted in the center of the door panel. The fixed glass light is mounted with a gasket and held in place with a light frame that may be bolted or riveted to the door panel.

### 600-12.3 INSPECTION.

600-12.3.1 Purpose and Scope. The following paragraphs provide maintenance personnel with inspection information and refer to procedural guidelines necessary in identifying and correcting problems that can occur with firezone and fumetight doors. Moreover, the critical first step is for maintenance personnel to properly identify the door type, as well as applicable APL and MRC, of the firezone or fumetight door in need of inspection. Refer to table [600-12.1](#).

600-12.3.2 Preliminary Inspection Checks. When possible, door inspection and repair should be scheduled when personnel traffic in the space is at a minimum. If corrective maintenance is required during accomplishment of inspection procedures, ensure the following precautionary steps are followed.

600-12.3.2.1 Obtain watch supervisor's permission before inspecting and repairing firezone and fumetight doors (Engineering Officer of the Watch (EOOW) underway and Duty Engineer in port). (See Equipment Guide List (EGL) for door locations.)

600-12.3.2.2 Notify personnel in the space that the door to that space (by number) will be under inspection and repair, and to utilize alternate door or doors for access.

**WARNING**

**Ensure all tag-out procedures are in accordance with current shipboard instructions.**

600-12.3.2.3 Secure passage and tag door and electro magnet (where applicable) "Out of Service".

600-12.3.2.4 Place signs on door and near door inside and out reading, "Personnel Working Behind Door; Use Alternate Access".

600-12.3.3 Inspection Tools Required. Refer to table 600-12.2 for a list of inspection tools required by door type.

600-12.3.4 Firezone and Fumetight Door Inspection Procedures. The following inspection procedures are applicable to all firezone and fumetight doors. Each inspection item includes possible door problems that should be identified by accomplishing the inspection and will refer to corrective actions that are located in the "REPAIR" section (600-12.4). Procedures that only apply to the firezone door or the fumetight door will be noted in the individual procedure paragraph.

**Table 600-12.2. Inspection Tools Required**

DOOR TYPE	INSPECTION TOOLS REQUIRED
Firezone	Flat tip screwdriver; #2 and #3 Phillips screwdriver; 3/8" drive ratchet; socket set, 3/8" drive, 5/16" - 3/4"; Allen wrench set, .028 - 3/4"; Latch/Lock set spanner wrench
Fumetight, steel	Flat tip screwdriver; #2 and #3 Phillips screwdriver; 3/8" drive ratchet; socket set, 3/8" drive, 5/16" - 3/4"; Allen wrench set, .028 - 3/4"; Latch/Lock set spanner wrench
Fumetight, aluminum	Flat tip screwdriver; #2 and #3 Phillips screwdriver; 3/8" drive ratchet; socket set, 3/8" drive, 5/16" - 3/4"; Allen wrench set, .028 - 3/4"; Latch/Lock set spanner wrench

600-12.3.4.1 Inspect Overall Operating Condition of Door. Open door panel fully and release several times. Check for binding of panel against door frame. When closed, door panel should fit flush with door frame. Note any areas where door panel is binding and where door panel does not fit flush with door frame. If there is any evidence of door panel binding or door panel was not flush with frame, refer to paragraph 600-12.5.8.3.7.

600-12.3.4.2 Inspect Door Assembly Fasteners for Tightness. Check the door closer mounting screws; hinge mounting screws and hinge pins; latch/lock set roses, striker plate and latch plate mounting screws; and door



frame mounting fasteners. On **firezone** doors, check the adjustable gasket retainer mounting screws. Tighten any loose fasteners. If hinges are defective, refer to paragraph [600-12.4.2.5](#) for firezone doors or paragraph [600-12.4.3.4](#) for fumetight doors.

600-12.3.4.3 Inspect Door Closer for Evidence of Leaking Hydraulic Oil. If hydraulic oil is found, replace closer in accordance paragraph [600-12.4.2.2](#).

#### NOTE

Before accomplishing any adjustment procedures on the closer, make sure the ventilation system where the door closure is located is in its normal operating condition.

600-12.3.4.4 Check Door Closing Speed. The door should travel from fully open to fully closed position in 4-8 seconds. If door checks suddenly when opening or not at all, the backcheck will require adjustment. If door closes from a fully opened position to a 3" position too fast or too slow, the sweep valve will require adjusting. If door latches too slow or too fast from the 3" open position, the latch valve will require adjusting. Refer to paragraph [600-12.4.2.1](#) for closer backcheck, sweep and latch adjustments.

600-12.3.4.5 Inspect Door Latch or Lock Set. Ensure latch/lock set is tight in door panel, roses are tightened against the door panel and the latch bolt properly engages with the strike plate in the door frame. If the latch/lock set is loose in the door panel or the latch bolt does not engage with the strike plate in the door frame, refer to paragraphs [600-12.4.2.3](#) through [600-12.4.2.4.2.3](#) for firezone doors or paragraph [600-12.4.3.3](#) for fumetight doors.

#### WARNING

**Some older firezone doors in the Fleet may possibly have gaskets that contain asbestos. Gaskets that contain asbestos will have a braided covering that is NOT coated with the black silicone rubber and will have a black rubber core.**

600-12.3.4.6 Gaskets.

600-12.3.4.6.1 Firezone Door Gaskets and Gasket Retainer. Inspect gasket for dirt, paint, deterioration and separation where ends of gasket meet. Inspect gasket retainer for damaged or missing retainer sections and mounting fasteners. Conduct a light test to ensure that there are no visible or discernible openings between the door panel and the gasket. If gasket is damaged and requires replacement, refer to paragraph [600-12.4.2.8](#). If gasket retainer sections are damaged or door does not pass the light test (gasket out of adjustment), refer to paragraphs [600-12.4.2.6](#) through [600-12.4.2.7](#).

600-12.3.4.6.2 Aluminum Fumetight Door Gasket. These gaskets are closed cell foam Neoprene self-adhesive (non-adjustable) gaskets that are attached to the door frame. Inspect gasket for dirt, paint, deterioration, loose adhesive and separation where ends of gasket meet. If gasket is damaged and requires replacement, refer to paragraph [600-12.4.3.5](#).

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600-12.3.4.7 Inspect the Electro Magnet and Associated Armature Plate on Firezone Doors. **Check the electro magnet face and associated armature plate for paint. Remove paint from the electro magnet face and associated armature plate.**

**WARNING**

**Ensure all tag-out procedures are in accordance with current shipboard instructions.**

600-12.3.4.8 Test the Fire Door Release Control System. Remove "Out of Service" tag from door and electro magnet in accordance with current shipboard instructions (where applicable).

600-12.3.4.8.1 At door, rotate control station element switch to the release position. Verify that electro magnet de-energizes and door closes.

600-12.3.4.8.2 At damage control central, rotate control station element switch to the release position. Verify that electro magnet de-energizes and door closes. Verify door close indicator illuminates.

600-12.3.4.8.3 If any problems are noted with the fire door release control system, notify the watch supervisor.

600-12.3.4.9 Light Glass Replacement. Inspect fixed glass light (where applicable). Check glass for cracks, chips and paint. Check light glass mounting frames for loose or missing mounting fasteners and ensure glass is tight in the mounting frame. If light glass or mounting frames are damaged refer to paragraph [600-12.4.2.9](#).

600-12.3.5 Inspection Completion Requirements.

**WARNING**

**Ensure all tag-out procedures are in accordance with current shipboard instructions.**

600-12.3.5.1 Remove "Out of Service" tag from door in accordance with current shipboard instructions (for door that do not have the fire door release control system).

600-12.3.5.2 Remove signs previously installed.

600-12.3.5.3 Upon completion of inspection return doors to normal operation.

600-12.3.5.4 Notify completion of inspection to watch supervisor.

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## 600-12.4 REPAIR.

600-12.4.1 Purpose and Scope. The following paragraphs provide maintenance personnel with repair procedures and parts information necessary in identifying and correcting problems that can occur with firezone and fumetight doors. Maintenance personnel should become thoroughly familiar with the contents of this manual prior to repairing the doors. Moreover, the critical first step is for maintenance personnel to properly identify the type of door as well as applicable APL and MRC, of the firezone or fumetight door in need of repair. Refer to table [600-12.1](#).

600-12.4.1.1 Safety Requirements. Specific repair procedures, along with their individual warnings, cautions and notes shall be read in full prior to accomplishing any repairs.

600-12.4.1.2 Guide to Door Repairs. The repair procedures are based on the assumption that all operating and maintenance procedures have been followed correctly. When recent maintenance has been performed on a component involved in a malfunction, that component shall be checked before proceeding to the repair procedures. Individual repair procedures have been developed for each type of door. Repair procedures for the firezone doors begin with paragraph [600-12.4.2](#) and repair procedures for the fumetight doors begin with paragraph [600-12.4.3](#).

600-12.4.1.3 Guide to Parts Information. Immediately following each individual door repair procedure will be an Illustrated Parts Breakdown (IPB) and Group Assembly Parts List (GAPL). The information contained in the IPB and GAPL, combined with the applicable Allowance Parts Lists (APL's) for the door, will assist in identifying and procuring repair parts needed for maintenance/repair.

600-12.4.1.3.1 Illustrated Parts Breakdown (IPB). The IPB consist of illustrations that show the physical appearance and location of each door part. Each part is numbered and corresponds with the index number of the associated Group Assembly Parts List (GAPL).

600-12.4.1.3.2 Group Assembly Parts List (GAPL). A GAPL is a table that includes all major components, assemblies and detail parts of each door. Each illustrated part shown disassembled is assigned an index number. The following paragraphs describe the information contained in each column of the GAPL.

600-12.4.1.3.2.1 Figure and Index Number Column. The figure and index number column lists, in numerical order, the figure and index number of each part shown on the corresponding Illustrated Parts Breakdown (IPB).

600-12.4.1.3.2.2 Part Number Column. The part number column lists the part identification for all parts shown on the corresponding Illustrated Parts Breakdown (IPB). Numbers listed in this column are obtained from engineering design drawings/drawing parts lists, manufacturer assembly drawings, vendor parts list, shipcheck verification, photographs, Commercial manuals and other source material. Entries include some or all of the following:

NAVSEA Drawing Number

NAVSEA Drawings and Item/Piece Number

Manufacturer Drawing Number

Manufacturer Drawings and Item/Piece Number

Manufacturer Part or Identification (ID) Number

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Commercial (COML)

No entry

In every case, the number listed identifies the part in some way. When ordering or requesting replacement parts, each number must be written as listed, including dashes, slashes, period and spaces, in order for the supply department to identify and procure the part. A drawing number entry consists of a number or number/alpha set. Drawing numbers are listed when no other part identification is available; however, sometimes the drawing number and part number are considered the same by the manufacturer of the part. The drawing permits further research of the equipment being maintained, if required. It can assist the supply office in identifying and procuring parts not normally stocked or identifiable as repair/replacement parts.

600-12.4.1.3.2.3 National Stock Number (NSN) Column. The NSN column lists the stock number assigned to a particular part within the Navy supply system. The entry COML indicates that the item is a common hardware item (such as a nut, screw/bolt, or washer). It may be carried as consumable stock in general stores aboard ship or is available through a variety of commercial sources, and is identified by the data in the description column. No entry indicates that the item is a general arrangement or grouping/installation of equipment assemblies, or that the assembly/part has no identified applicable part number. Should such a part have to be ordered, the order/request shall include all the data in the description column.

600-12.4.1.3.2.4 Description Column. The description column contains a description of all parts on the corresponding Illustrated Parts Breakdown (IPB). Modifiers are included to identify the characteristics of a particular item.

600-12.4.1.3.2.5 Quantity Column. This column contains a number that indicates the total quantity of the item.

600-12.4.1.4 Door Vendors. Table 600-12.3 provides a list of vendors who can supply new firezone and fume-tight doors.

**Table 600-12.3. Door Vendors**

VENDOR NAME AND ADDRESS
Pier Side Supply 1080 Aragona Blvd., Suite C Virginia Beach, VA 23455 Phone:(757) 671-3211
Advanced Structures Corporation 235 West Industry Court Deer Park, NY 11729 Phone: (631) 667-5000
Railway Specialties Corporation PO Box 29 Bristol, PA 19007 Phone:(215) 788-9242
Anchor Industries Inc. 100 Bombay Dr. Columbia, SC 29209 Phone: (803) 695-2734

600-12.4.1.5 Door Swing Designations. Ensure that the Navy designations are used when identifying the swing of a door; note that this is opposite from commercial practice. To determine the swing of the door, stand directly in front of the door handle. A left-handed door will have the hinge on the left side and the latch/lock set on the right side. A right-handed door will have the hinge on the right side of the frame with the latch/lock set on the left side of the door.

600-12.4.1.6 Preliminary Repair Checks. When possible, door repairs should be scheduled when personnel traffic in the space is at a minimum. Ensure the following precautionary steps are followed.

600-12.4.1.6.1 Obtain watch supervisor's permission before repairing firezone and fumetight doors (Engineering Officer of the Watch (EGOW) underway and Duty Engineer in port). (See Equipment Guide List (EGL) for door locations.)

600-12.4.1.6.2 Notify personnel in the space that the door to that space (by number) will be under repair and to utilize alternate door or doors for access.

**WARNING**

**Ensure all tag-out procedures are in accordance with current shipboard instructions.**

600-12.4.1.6.3 Secure passage and tag door and electro magnet (where applicable) "Out of Service".

600-12.4.1.6.4 Place signs on door and near door inside and out reading, "Personnel Working Behind Door; Use Alternate Access".

600-12.4.1.7 Repair Tools Required. Refer to table 600-12.4 for a list of repair tools required by door type.

**Table 600-12.4. Repair Tools Required**

DOOR TYPE	REPAIR TOOLS REQUIRED
Firezone	Flat tip screwdriver; #2 and #3 Phillips screwdriver; 3/8" drive ratchet; socket set, 3/8" drive, 5/16" - 3/4"; Allen wrench set, .028 - 3/4"; Latch/Lock set spanner wrench, safety goggles
Fumetight, steel	Flat tip screwdriver; #2 and #3 Phillips screwdriver; 3/8" drive ratchet; socket set, 3/8" drive, 5/16" - 3/4"; Allen wrench set, .028 -3/4"; Drill, 3/8" variable speed; drill bits, 3/8" and 11/64"; shim material 1/16" and 1/8" thick x various widths x various lengths; ball peen hammer; flat file; portable grinder; utility knife; masking tape; Latch/Lock set spanner wrench, safety goggles
Fumetight, aluminum	Flat tip screwdriver; #2 and #3 Phillips screwdriver; 3/8" drive ratchet; socket set, 3/8" drive, 5/16" - 3/4"; Allen wrench set, .028 - 3/4"; Drill, 3/8" variable speed; drill bits, 3/8" and 11/64"; shim material 1/16" and 1/8" thick x various widths x various lengths; ball peen hammer; flat file; portable grinder; utility knife; Putty knife, 1" wide; masking tape; Latch/Lock set spanner wrench, safety goggles

600-12.4.2 Firezone Door Assembly Repair Procedures. Refer to figure 600-12.7 and table 600-12.5.

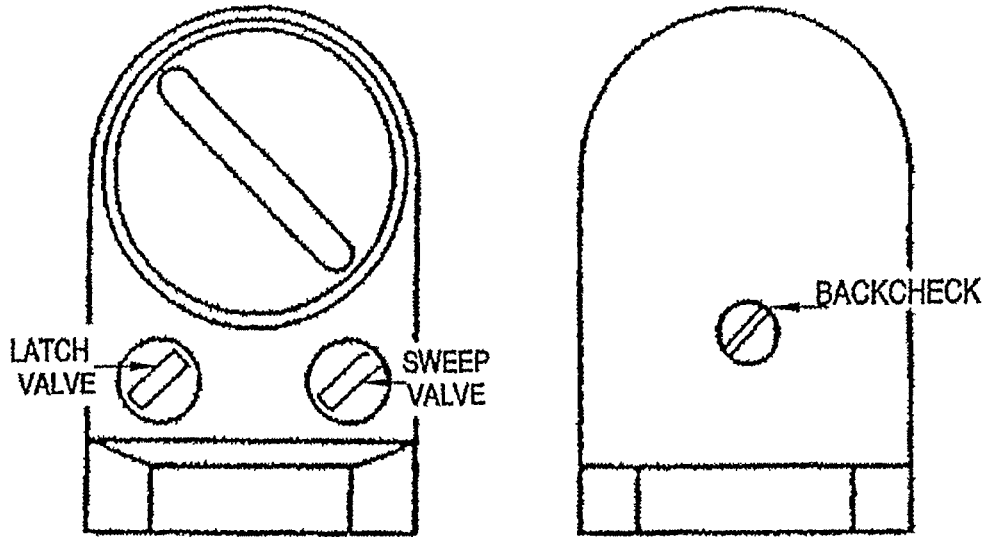


Figure 600-12.6. Closer Adjustments

600-12.4.2.1 Closers. Fire zone doors use closers to help control the opening, closing, and latching speed of the door. Closers are to be made in accordance with ANSI 156.4, Grade 1, Size 5, with adjustable spring power and adjustable backcheck features as identified in Table 600-12.5. Multiple vendors can supply the closer when ordering NSN 5340-01-481-837. It is important to realize that although the closers supplied from different vendors will have these features, the closers will differ in the location and adjustment of valves associated with the closer as well as adjustment of the closer spring size.

**NOTE**

The spring must be adjusted to the correct spring size before making any other adjustments on the closer.

**CAUTION**

**Door closers can be destroyed by over tightening the spring adjusting nut. Follow the spring adjustment procedures that came in the closer packaging box provided by the closer vendor. If information on the closers cannot be obtained this way, contact the following addresses for information: Dorma's web site is: <http://www.dorma-usa.com/architectural/products/surfaceclosers> CAL-Royal's web site is: <http://www.cal-royal.com/products>**

Most closers will be delivered as a size 3 closer with the capability of being adjusted to a size 5. Almost universally, the spring size can be increased by turning the spring adjusting nut in a clockwise direction. One closer vendor, Dorma, provides a product that requires sixteen (16) full clockwise turns of the spring adjusting nut on a Dorma 8600 series closer to go from a size 3 spring to a size 5 spring. Another vendor, Cal-Royal, only requires six (6) full clockwise turns on the spring adjustment to go from a size 3 rating to a size 5 rating on its 900 series closer. **Typically, the location of the spring adjusting nut is not identified on the closer itself, but is identified on literature accompanying the closer.** Be sure that you know of the correct spring adjustment procedure to use before proceeding ahead with any adjustments/repairs to the closer spring.

**CAUTION**

**Prior to adjusting the closer backcheck, sweep and latch, adjust the closer spring power to a Size 5 setting in accordance with the manufacturers instructions provided with the closer.**

### NOTE

Before accomplishing any adjustment procedures on the closer, make sure the ventilation system where the door closure is located is in its normal operating condition.

### NOTE

Prior to making any closer adjustments or closer replacements, ensure that fire zone door inspection procedures identified in para 600-12.3.4.1 through 600-12.3.4.6, and any associated necessary repairs, have been accomplished.

600-12.4.2.1.1 Closer Adjustment. Over time, door closers often require periodic adjustment of its opening and closing speeds. Periodicity of adjustment shall be in accordance with applicable MRC, or as frequently as conditions necessitate. There are three adjustable valves (Refer to figure 600-12.6) that can be adjusted on closers: backcheck (used for the opening cycle) and sweep and latch (used for the closing cycle).

600-12.4.2.1.2 Opening Cycle Backcheck adjustment. The backcheck feature acts as a dampening device to prevent uncontrolled opening of the door, thereby reducing the possibility of slamming the door against the door bumper, bulkhead, or equipment. The backcheck valve should be adjusted to take effect at approximately 10-15 degrees before the door reaches its fully opened position (see Figure 600-12.6A.) The location of the backcheck valve may vary according to the manufacturer, and is usually identified with the letters "BC" stamped on the housing. (see figure 600-12.6) Turn backcheck valve clockwise for more backcheck (this increases the dampening effect of the closer); turn backcheck valve counterclockwise for less backcheck (this decreases the dampening effect of the closer).

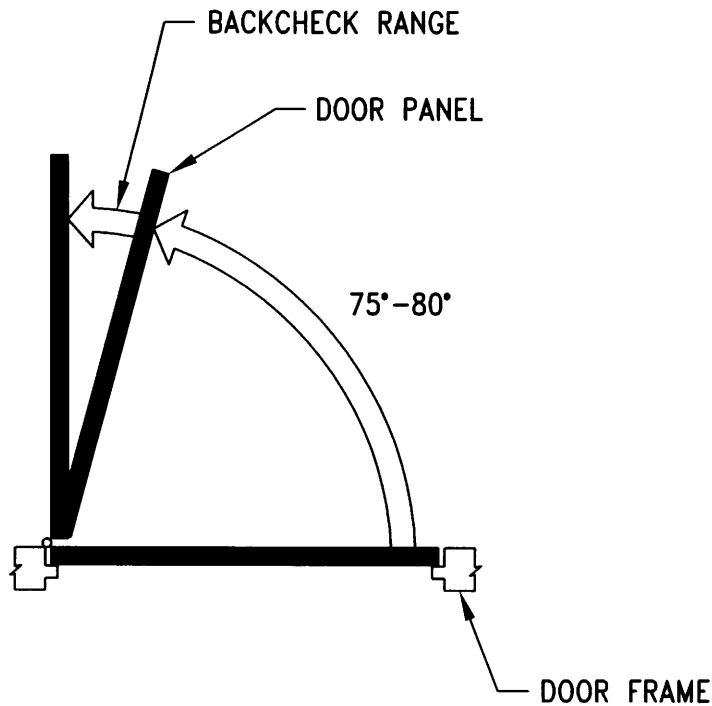


Figure 600-12.6A. Opening Cycle

If the backcheck is not affected by adjustment of the backcheck valve, the closer should be replaced. Refer to paragraph [600-12.4.2.2](#).

600-12.4.2.1.3 Closing Cycle Closer speed adjustment. The door closing speed is controlled by two valves - sweep and latch. When the door closer adjustments are made correctly, the door should go from the fully opened position to a fully closed and latched position in approximately 4-8 seconds.

600-12.4.2.1.3.1 Sweep Adjustment The sweep valve controls the initial 70-75 degrees of the door's closing. The door should get to this position in approximately 3-6 seconds from the fully open position (see Figure [600-12.6B](#)). The location of the sweep valve may vary according to the manufacturer, and is usually identified with the word "Sweep" or "S" stamped on the housing (see figure [600-12.6](#)). Adjust the sweep valve in a counterclockwise direction to increase the door's initial closing speed; turn the sweep valve in a clockwise direction to decrease the door's initial closing speed.

600-12.4.2.1.3.2 Latch adjustment The latch valve controls the final 15-20 degrees of the door's closing and latching. The door should close and latch in approximately 1-2 seconds once it gets into the final closing/latching position. (see Figure [600-12.6B](#).) The location of the latch valve may vary according to the manufacturer, and is usually identified with the word "Latch" or "L" stamped on the housing (see Figure [600-12-6](#)). Adjust the



latch valve in a counterclockwise direction to increase the latching speed of the door; adjust the latch valve in a clockwise direction to decrease the latching speed of the door.

If the closing speed is not affected by adjustment of the latch and sweep valves, the closer should be replaced. Refer to paragraph [600-12.4.2.2](#)

600-12.4.2.1.3.3 Latching After closer adjustments have been made correctly and door opens and closes in specified time intervals, open door and allow door to close. Verify that door is fully latched at the end of the open/close cycle.

If the closing speed is not affected by adjustment of the latch and sweep valves, the closer should be replaced. Refer to paragraph [600-12.4.2.2](#)

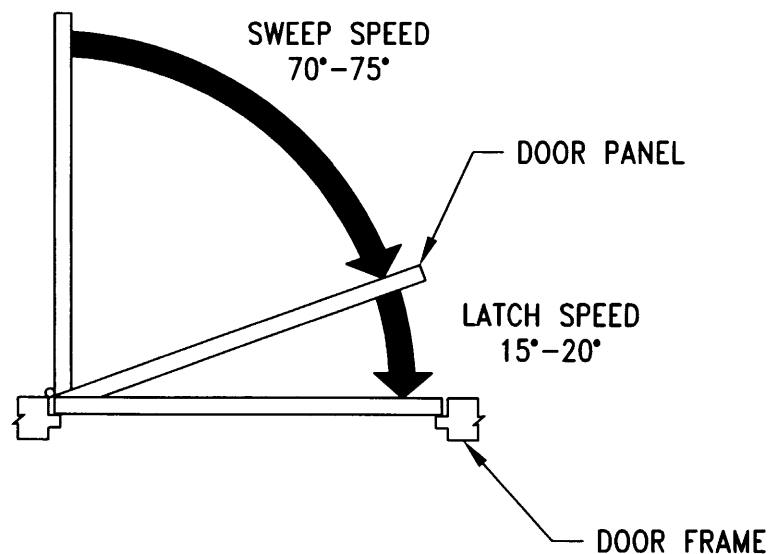


Figure 600-12.6B. Closing Cycle

600-12.4.2.2 Closer Replacement. Place the door in closed and latched position.

600-12.4.2.2.1 Closer Removal. Separate main arm from connecting arm by using a flat tip screwdriver to pry apart arms at the elbow while making sure arms are parallel. Remove the screw that attaches the main arm to the closer and remove main arm from closer. Remove the mounting screws from the connecting arm shoe on the door frame and remove the connecting arm and shoe. Remove the mounting screws that attach the closer to the door panel and remove the closer (1).

### NOTE

There are several different manufacturers and models of door closers available for installation on firezone doors. Installation of door closers shall be in accordance with the manufacturers instructions provided with the closer. Proper installation of the closer is essential to the smooth operation of the door.

600-12.4.2.2.2 Closer Installation General Guidance. The following paragraphs provide general guidance to aid in the installation of door closers. Since there are several different manufacturers and models of door closers available for installation on firezone doors, installation of door closers shall be in accordance with the manufacturers instructions provided with the closer.

600-12.4.2.2.2.1 Mark door closer mounting location on door panel and connecting arm shoe location on door frame in accordance with the manufacturers instructions provided with the closer.

600-12.4.2.2.2.2 Drill mounting holes (as required) and attach closer (1) to door panel in accordance with the manufacturers instructions using the mounting hardware provided with the closer. Drill mounting holes (as required) and attach connecting arm shoe to door panel in accordance with the manufacturers instructions using the mounting hardware provided with the new closer.

600-12.4.2.2.2.3 Attach the main arm to the closer in accordance with the manufacturers instructions provided with the closer.

600-12.4.2.2.2.4 **Using the manufacturers instructions provided with the closer, position the connecting arm at 90 degrees to the door frame. Move the main arm until it is aligned at the elbow with the connecting arm. Adjust the connecting arm length (as required) until it is aligned with the main arm elbow connection point while maintaining the connecting arm at 90 degrees to the door frame. Snap the connecting arm to the main arm at the elbow.**

### NOTE

Prior to adjusting the closer backcheck and speed, adjust the closer spring power for a Size 5 setting in accordance with the manufacturer's instructions provided with the closer.

600-12.4.2.2.2.5 **Adjust the closer backcheck and speed in accordance with paragraphs 600-12.4.2.1 through 600-12.4.2.1.2 and manufacturers instructions provided with the closer.**

### NOTE

**The latch or lock set must be properly secured in the door panel prior to adjusting the latch strike plate.**

600-12.4.2.3 Latch And Lock Strike Plate Adjustment. **The latch strike plate adjustment is critical for the proper sealing of the door panel and gasket. When the latch strike plate is properly adjusted, the door panel will be flush with the door frame.**

600-12.4.2.3.1 **Loosen latch strike base plate adjustable mounting screws. Place door in closed position and ensure door panel is flush with door frame. Move the latch strike base plate and strike plate in or out until the strike plate is secure against the latch or lock bolt. Mark position of the latch strike base plate. Open door panel and tighten latch strike base plate adjustable mounting screws. Close door panel and ensure**

door panel is flush with door frame and the latch or lock bolt is engaged with the latch strike plate. If door panel is not flush with the door frame due to premature contact with the door gasket, adjust door gasket in accordance with paragraph 600-12.4.2.6.

#### NOTE

In accordance with NAVSEA drawing 805-1648659 REV "D" (as modified by sketch 6132 SK-8201), firezone door latch and lock sets must have a Marine type strike that is suitable for doors 1-3/8" thick. The latch bolt face plate and strike plate shall have a full radius on the top and bottom and the roses shall have a diameter of not less than 3-1/4 inches. The complete latch or lock set shall be ANSI type 302 or 304 CRES.

#### NOTE

There are several different manufacturers and models of door latch and lock sets available for installation on firezone doors. Installation of door latch and lock sets shall be in accordance with the manufacturers instructions provided with the latch or lock set. Proper installation of the latch or lock set is essential to the smooth operation of the door.

600-12.4.2.4 Latch And Lock Set Replacement. Place the door in the open position.

600-12.4.2.4.1 Latch (2) and Lock (3) Set Removal. Insert small end of spanner wrench into hole in door knob bearing sleeve and press knob catch to release knob from latch or lock assembly. Unscrew the rose from side of latch or lock set where knob was removed. Remove the latch or lock set main housing from the door panel by pulling on the knob while working the knob back and forth to release the main housing from the latch tail piece. Remove the latch bolt mounting screws and remove the latch bolt from the door panel. Remove strike plate mounting screws and remove strike plate.

600-12.4.2.4.2 Latch (2) and Lock (3) Set Installation. The following paragraphs provide general guidance to aid in the installation of door latch and lock sets. Since there are several different manufacturers and models of door latch and lock sets available for installation on firezone doors, installation of door latch and lock sets shall be in accordance with the manufacturers instructions provided with the latch or lock set.

600-12.4.2.4.2.1 Install the latch bolt into the door panel and secure in place with mounting screws provided with the latch or lock set.

#### NOTE

The firezone doors are pre-drilled with two rose alignment holes on each side of the door panel. When the new latch or lock assembly is installed, the rose alignment tabs must be engaged in the door panel rose alignment holes before the roses are tighten to the door panel.

600-12.4.2.4.2.2 Insert small end of spanner wrench into hole in door knob bearing sleeve and press knob catch to release knob from new latch or lock assembly. Remove the rose from side of latch or lock set where knob was removed. Insert the latch or lock set main housing through the door panel by pushing on the knob while working the knob back and forth to engage the main housing with the latch tail piece. Ensure the door knob actuates the latch bolt and there is no binding. Install the rose on the side of the latch or lock set where the knob is removed and tighten until rose contacts the door panel. Insert the rose alignment tabs into the two pre-drilled rose alignment holes on each side of the door panel. Tighten the roses with the spanner wrench provided with the new latch or lock set. Install new strike plate with new mounting screws.

600-12.4.2.4.2.3 Adjust the latch (2) or lock (3) set in accordance with paragraphs 600-12.4.2.3 through 600-12.4.2.3.1 and manufacturers instructions provided with the closer.

**WARNING**

**If door panel must be removed in order to replace the door hinges, a minimum of two people are required during door panel movement. Possible hazard to personnel exists due to weight of door panel.**

**NOTE**

The door panel will not have to be removed if the hinges are replaced one at a time.

600-12.4.2.5 Butt Hinge Replacement. Place door in the open position. Replace the hinges one at a time starting with the top hinge. Remove the hinge mounting screws (5) from door panel and door frame and remove hinge (4). Install new hinge (4) with new mounting screws (5).

**WARNING**

**Closer arm will be under tension when the door is in the closed and latched position. Exercise extreme care when separating main arm from connecting arm.**

600-12.4.2.5.1 If door panel must be removed in order to replace the hinges, separate closer main arm from connecting arm in accordance with paragraph 600-12.4.2.2.1. One person must support the door panel while a second person removes the hinge mounting screws (5) from the door panel starting with the bottom hinge and moving up; remove door panel. After the door panel is removed, remove the hinge mounting screws (5) from the door frame and remove the hinges (4). Install new hinges (4) with new mounting screws (5) on the door panel. Place the door panel into the door frame. One person must support the door panel while a second person installs the hinge mounting screws (5) in the door frame starting with the top hinge and moving down.

600-12.4.2.5.2 After door hinges have been replaced, connect the closer main arm to the connecting arm in accordance with paragraph 600-12.4.2.2.2.4. Adjust closer in accordance with paragraph 600-12.4.2.2.2.5. Open door panel fully and release several times. Check all hinge mounting screws (5) for tightness.

**NOTE**

A minimum of 85 percent of the gasket should be in contact with the door panel. Areas where there is no contact shall have a gap of no more than 1.2 mm (.047 inch).

600-12.4.2.6 Gasket Adjustment. Place the door in the closed and latched position. Prior to adjusting the door gasket, conduct a light test and note areas where the door panel is not in contact with the gasket.

600-12.4.2.6.1 Loosen all adjustable gasket retainer screws (5) and nuts (7). Move adjustable gasket retainer towards door panel until gasket contacts the door panel on all sides. Mark location of adjustable gasket retainer.

600-12.4.2.6.2 Open door. Place adjustable gasket retainer at marks noted in paragraph 600-12.4.2.6.1. Tighten four retainer screws (5) and nuts (7) on the top, bottom and sides of the door. Place the door in the closed and latched position. Conduct a light test and note areas where the door panel is not in contact with the gasket. If 85 percent of the gasket is in contact with the door panel and the areas where there is no contact have a gap of no more than 1.2 mm (.047 inch), the gasket is properly adjusted, proceed to paragraph 600-12.4.2.6.3. If less than 85 percent of the gasket is in contact with the door panel and the areas where there is no contact have a gap of more than 1.2 mm (.047 inch), repeat paragraphs 600-12.4.2.6.1 through 600-12.4.2.6.2.

600-12.4.2.6.3 If gaskets are properly adjusted, open door and tighten all gasket retainer screws (5) and nuts (7).

600-12.4.2.7 Fixed Gasket Retainer Replacement. Place door in the open position. Remove the fixed gasket retainer screws (9) and lock washers (10) and remove the damaged section of fixed gasket retainer (11). Fit new fixed gasket retainer (11) to the adjustable gasket retainer and mark locations for mounting holes (as required) to match the adjustable gasket retainer mounting holes. Remove fixed gasket retainer (11) and drill new mounting holes (as required). Attach the fixed gasket retainer (11) to the adjustable gasket retainer with screws (9) and lock washers (10). Place door in the closed and latched position. Adjust gasket in accordance with paragraph 600-12.4.2.6.

### **WARNING**

**Some older firezone joiner doors in the Fleet may possibly have gaskets that may contain asbestos outer covering. Prior to working on gasket, attempt to identify gasket material as follows:**

Inspect gasket for black silicone rubber outer coating. This feature may be a reasonably accurate indication that the outer covering material is fiberglass and not asbestos. Another method that may be used is to remove the gasket retainer in the area of the gasket joint, separate the joint and note the color of the core. Gaskets with asbestos covering will have a black rubber core; gaskets with fiberglass covering will have an orange core.

### **NOTE**

Personnel should immediately notify the ship's safety officer if firezone door gaskets are found to contain asbestos, or if the gasket material cannot be identified. Signs should be posted at each door location where found warning of the presence of asbestos. If there is any doubt as to the material composition of the gasket, it should be treated as asbestos.

Removal and disposal of asbestos gasket material should be accomplished in accordance with NSTM Chapter 635.

600-12.4.2.8 Gasket Replacement. Place door in the open position. Identify gasket material in accordance with WARNING above. If existing gasket material is identified as containing asbestos or if the gasket material cannot be identified, removal and disposal of asbestos gasket material should be accomplished in accordance with NSTM Chapter 635 (see NOTE above).

600-12.4.2.8.1 Using a flat tip screw driver, separate gasket (8) where ends of gasket meet and remove gasket from adjustable gasket retainer. Clean all surface areas of the adjustable and fixed gasket retainers that contact the gasket.

### NOTE

New firezone door gasket is a 3/4" "D" shaped gasket manufactured in accordance with MIL-G-17927 Revision C, Type 1, Class 2. The gasket has an orange rubber inner core with a hole in it and a braided fiberglass metallic yarn with black silicone rubber outer coating. Replacement gasket can be purchased using NSN 9Z 5330-01-160-6848.

600-12.4.2.8.2 The new gasket (8) should be installed starting at the top center of the adjustable and fixed gasket retainers. The new gasket is "D" shaped and care must be taken to ensure the flat side of the gasket is installed facing into the gasket retainers and the round side of the gasket should be facing the door panel.

600-12.4.2.8.3 **Starting at the top center of the adjustable and fixed gasket retainers, use a blunt flat tip screwdriver and carefully insert the gasket (8) into the retainers with the flat side of the gasket facing into the gasket retainers. As the gasket is inserted into the gasket retainers, care must be taken to ensure the gasket is forced back toward the starting point to prevent stretching the gasket. Cut the installed gasket with a two-inch overlap at the point where the ends of the gasket meet at the top center of the adjustable and fixed gasket retainers. Apply backpressure to the overlapping section of gasket while inserting the gasket into the adjustable and fixed gasket retainers.**

600-12.4.2.8.4 Adjust gasket (8) in accordance with paragraph [600-12.4.2.6](#).

600-12.4.2.9 Light Glass Replacement. Place the door in the open position.

600-12.4.2.9.1 Remove the light retaining ring fasteners (12) (the fasteners may be rivets or screws) and one light retaining ring (13). Remove the light glass (15) with gasket (14).

600-12.4.2.9.2 Install new gasket (14) on light glass (15). Place light glass (15) and gasket (14) in center of light opening in door panel. Install light retaining ring (13) using new mounting fasteners (12).

600-12.4.2.10 Accomplish Repair Completion Requirements in accordance with paragraph [600-12.4.4](#).

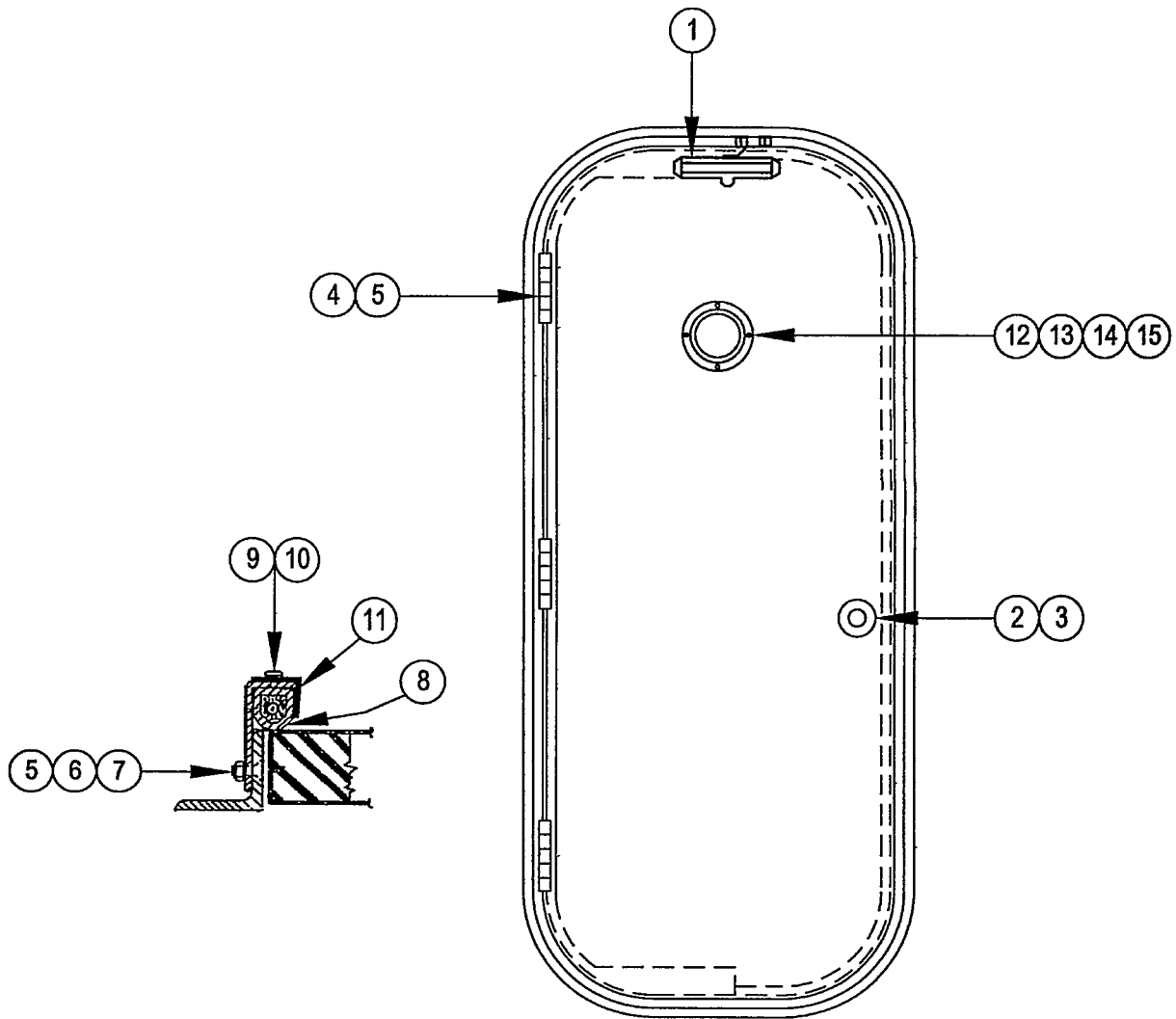


Figure 600-12.7. Firezone Door

Table 600-12.5. Firezone Door Group Assembly Parts List (GAPL)

FIGURE 600-12.7 AND INDEX NO.	PART NO.	NSN	DESCRIPTION	QTY
600-12.7-1	8616 AR X AL	5340-01-481-8637	Closer, ANSI 156.4, Grade 1, Size V, aluminum Finish, with optional features PT4C (50 percent adjustable spring power), and PT4D (adjustable backcheck).	1

**Table 600-12.5.** Firezone Door Group Assembly Parts List (GAPL) -

Continued

<b>FIGURE 600-12.7 AND INDEX NO.</b>	<b>PART NO.</b>	<b>NSN</b>	<b>DESCRIPTION</b>	<b>QTY</b>
600-12.7-2	805-1648659 PC. NO. 10	5340-01-390-3723	Latch set, ANSI 156.2, Grade 1, Series 4000, Type F75 for latch sets (ANSI 156.2), latch chassis and the internal structure and operational components shall be ANSI type 302 or 304 CRES. The latch bolt face plate and strike plate shall have a full radius on the top and bottom. The strike shall be the Marine type that is suitable for doors 1-3/8" thick. The latch bolt face plate and strike plate shall be ANSI 302 or 304 CRES with a US 32 finish. The knobs and roses shall be round in shape and shall be ANSI 302 or 304 CRES with a US 32 finish. Roses shall have a diameter of not less than 3-1/4 inches.	1
600-12.7-3	805-1648659 PC. NO. 8	5340-01-392-6676	Lock set, ANSI 156.2, Grade 1, Series 4000, Type F90 for lock sets (ANSI 156.4), lock chassis and the internal structure and operational components shall be ANSI type 302 or 304 CRES. The lock bolt face plate and strike plate shall have a full radius on the top and bottom. The strike shall be the Marine type that is suitable for doors 1-3/8" thick. The lock bolt face plate and strike plate shall be ANSI 302 or 304 CRES with a US 32 finish. The knobs and roses shall be round in shape and shall be ANSI 302 or 304 CRES with a US 32 finish. Roses shall have a diameter of not less than 3-1/4 inches.	1
600-12.7-4	805-1648659 PC. NO. 7	5340-01-396-8447	Hinge, Butt, in accordance with Commercial Item Description (CID) A-A-50432, the hinge is a Type II, Class 3, Style B, 3-1/2" x 3" nickel plated (US 32 finish) steel hinge, with nylon bushings in the hinge knuckles.	3
600-12.7-5	805-1648659 PC. NO. 13	5305-01-396-8446	Screw, machine, 10-24 FHMS, 1/2" long	AR
600-12.7-6	805-1648659 PC. NO. 15	5310-00-045-3296	Lockwasher, No. 10	AR
600-12.7-7	805-1648659 PC. NO. 14	5310-00-934-9758	Nut, machine, hex, 10-24 UNC	AR
600-12.7-8	805-1648659 PC. NO. 12	5330-01-160-6848	Gasket, 3/4" "D" shaped gasket manufactured in accordance with MIL-G-17927 Revision C, Type 1, Class 2.	1
600-12.7-9	805-1648659 PC. NO. 16	5305-01-396-8449	Screw, machine, 6-32 UNF PHMS, 1/4" long	AR
600-12.7-10	805-1648659 PC. NO. 18	5310-00-045-4007	Lockwasher, No. 6	AR
600-12.7-11	805-1648659 PC. NO. 17	5330-01-392-8134	Fixed gasket retainer, rectangular metal, 0.0598 inch thick, Steel	AR



**Table 600-12.5.** Firezone Door Group Assembly Parts List (GAPL) -

Continued

FIGURE 600-12.7 AND INDEX NO.	PART NO.	NSN	DESCRIPTION	QTY
600-12.7-12	805-4629248 Rev A PC. NO. 56	COML	Rivet, round head, 3/16 x grip to suit	AR
600-12.7-13	805-4629248 Rev A PC. NO. 29	COML	Light retaining ring, Steel	2
600-12.7-14	805-4629248 Rev A PC. NO. 10		Gasket, molded rubber, MIL-R-15624	1
600-12.7-15	805-4629248 Rev A PC. NO. 11	2040-01-407-9658	Light, glass, 1/4" thick, 4-1/4" OD, heat treated Type "A", MIL-G-2697	1

600-12.4.3 Fumetight Door Assembly Repair Procedures. Refer to figure 600-12.8 and table 600-12.6.

600-12.4.3.1 Closer Adjustment. Closer adjustments for fumetight doors are identical to closer adjustments for firezone doors. Refer to paragraphs 600-12.4.2.1 through 600-12.4.2.1.2 and figure 600-12.6.

**WARNING**

**Closer arm will be under tension when the door is in the closed and latched position. Exercise extreme care when separating main arm from connecting arm.**

600-12.4.3.2 Closer Replacement. Closer removal and installation for fumetight doors is identical to closer removal and installation for firezone doors. Refer to paragraphs 600-12.4.2.2.1 through 600-12.4.2.2.5.

**NOTE**

In accordance with NAVSEA drawing 805-1648659 REV "D" (as modified by sketch 6132 SK-8201) and NAVSEA drawing 805-4629248 Rev A, fumetight door latch and lock sets must have a Marine type strike that is suitable for doors 1-3/8" thick. The latch bolt face plate and strike plate shall have a full radius on the top and bottom and the roses shall have a diameter of not less than 3-1/4 inches. The complete latch or lock set shall be ANSI type 302 or 304 CRES.

**NOTE**

There are several different manufacturers and models of door latch and lock sets available for installation on fumetight doors. Installation of door latch and lock

sets shall be in accordance with the manufacturers instructions provided with the latch or lock set. Latch and lock strike plates are not adjustable. Proper installation of the latch or lock set is essential to the smooth operation of the door.

600-12.4.3.3 Latch And Lock Set Replacement. Latch and lock set removal and installation for fumetight doors are identical to latch and lock set removal and installation for firezone doors. Refer to paragraphs [600-12.4.2.4](#) through [600-12.4.2.4.2.2](#).

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**WARNING**

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**If door panel must be removed in order to replace the door hinges, a minimum of two people are required during door panel movement. Possible hazard to personnel exists due to weight of door panel.**

**NOTE**

The door panel will not have to be removed if the butt hinges are replaced one at a time.

600-12.4.3.4 Hinge Replacement. There are two types of hinges that can be installed on fumetight doors, butt hinges (5) and aluminum continuous geared hinge (6). Butt hinges, in accordance with Commercial Item Description (CID) A-A-50432, have been specified on drawing NAVSEA 805-1648659 REV "D" (Steel fumetight door). The hinge is a Type II, Class 3, Style B, 3-1/2" x 3" nickel plated (US 32 finish) steel hinge, with nylon bushings in the hinge knuckles. The hinge leaves are secured to the door panel and door frame using eight (four per leaf) #10-24 flat head machine screws. Butt hinges, in accordance with Commercial Item Description (CID) A-A-50432, have been specified on drawing NAVSEA drawing 805-4629248 Rev A (Aluminum honey comb core door). The hinge is a Type II, Class 1, Style B, 3-1/2" x 3" brass hinge, with nylon bushings in the hinge knuckles. The hinge leaves are secured to the door panel and door frame using eight (four per leaf) #10-24 flat head machine screws and nut-serts, which are swaged into the frame and panel edge. Refer to figure [600-12.3](#). However, due to the high failure rate of these hinges, they are being discontinued for use on aluminum joiner doors. A more durable heavy duty aluminum continuous geared hinge (Refer to figure [600-12.5](#)), NSN 9Z-5340-01-418-5048, has been selected as a suitable replacement, both for backfit on existing doors, as well as new doors. Installation instructions and mounting hardware for the continuous geared hinge are provided with the new hinge. The continuous hinge will be included in the next revision of the joiner door drawings.

600-12.4.3.4.1 Butt Hinge Removal and Installation. Butt hinge (5) removal and installation for fumetight doors is identical to butt hinge removal and installation for firezone doors. Refer to paragraphs [600-12.4.2.5](#) through [600-12.4.2.5.2](#).

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**WARNING**

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**A minimum of two people are required during door panel movement. Possible hazard to personnel exists due to weight of door panel.**

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**WARNING**

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**Closer arm will be under tension when the door is in the closed and latched position. Exercise extreme care when separating main arm from connecting arm.**

**NOTE**

The aluminum continuous geared hinge shall be installed in accordance paragraph 600-12.4.3.4.2 and the manufacturers instructions using the mounting hardware provided with the new hinge. Proper installation of the aluminum continuous geared hinge is essential to the smooth operation of the door.

**NOTE**

If the aluminum continuous geared hinge mounting holes on the door frame are snipped out or elongated on an existing door, do not replace the hinge, replace the door.

600-12.4.3.4.2 Aluminum Continuous Geared Hinge Installation.

600-12.4.3.4.2.1 Separate closer main arm from connecting arm in accordance with paragraph 600-12.4.2.2.1. Place door in the open position. Door panel must be removed in order to install the aluminum continuous geared hinge (6). One person must support the door panel while a second person removes the existing hinge mounting screws from the door panel starting with the bottom hinge and moving up; remove door panel. After the door panel is removed, remove the hinge mounting screws from the door frame and remove the hinges.

600-12.4.3.4.2.2 Determine the length of the new hinge (6) to be installed. Measure the distance between the tangent points of the radius corners on the hinge side of the door frame, minus 1/2". Locate the hinge to avoid existing hinge CRES threaded inserts in the door frame. The length of the hinge may also be templated from the door panel by positioning the hinge against the edge of the panel. This also helps to locate the hinge to avoid existing hinge CRES threaded inserts in the edge of the door panel. **Hinges should be cut at the bottom.** Avoid cutting through the hinge bearing. If the cut line falls on a bearing, cut equal amounts from the top and bottom. After cutting, file smooth any rough/sharp edges and remove all metal filings so as not to contaminate the bearings.

600-12.4.3.4.2.3 Position the hinge frame leaf on the door frame with the hinge frame alignment flange held tight against the face of the door frame. On fumetight doors equipped with gaskets, it may be necessary to trim away approximately 1/8" from the edge of the gasket prior to positioning the hinge on the door frame. Position the hinge on the straight portion of the door frame between the tangent points of the radius corners. Ensure the pre-drilled holes in the hinge frame leaf are **NOT** positioned over the existing CRES threaded inserts in the door frame.

600-12.4.3.4.2.4 With hinge held firmly in position, center punch three holes, top bottom, and center, using the self-centering punch provided with the hinge. Drill 11/64" pilot holes in the door frame and install three #12 thread forming screws (provided with the hinge) to secure the hinge to the door frame. For easier installation of

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the mounting screws, lubricate the screw threads with soap, wax or a few drops of oil prior to installation. Once the hinge frame leaf is secure in place, install the remaining hinge frame leaf screws in the same manner.

600-12.4.3.4.2.5 Swing the hinge door panel leaf away from the door opening. Position the door panel in the door frame. Insert shims between the face of the door panel (on the push side of the door) and the door frame as necessary to ensure the door panel is flush with the door frame on the hinge side of the door. Ensure the shims on the hinge side of the door do not interfere with the installation of the sexbolts. Insert shims between the bottom and top of the door as necessary to ensure the latch/lock assembly is properly aligned with the strike plate on the door frame. Insert 1/8" shims between the door panel and frame on the latch side of the door. Position the hinge door panel leaf against the door panel. Check the locations of the sexbolt holes and ensure there is no interference with the existing hinge CRES threaded inserts in the edge of the door panel. If there is an interference, remove door panel from frame and remove the inserts by punching the inserts through the edge of the door panel. Reinstall door panel in the door frame and shim as described above.

#### NOTE

When drilling the new sexbolt holes through the door panel, care should be taken to avoid any interference with the existing CRES threaded inserts in the edge of the door panel. If this occurs, remove the inserts by punching the inserts through the edge of the door panel.

600-12.4.3.4.2.6 Position the hinge door panel leaf against the door panel. Mark the locations of the sexbolt holes using the 3/8" x 1" transfer punch provided with the hinge. Drill 3/8" diameter holes all the way through the door panel. Attach the hinge door panel leaf to the door panel with 1/4"-20UNC Phillips head sexbolts provided with the hinge. For security purposes, it is recommended that the Phillips head end of the sexbolts be installed on the hinge side of the door panel.

600-12.4.3.4.2.7 After door hinges have been replaced, connect the closer main arm to the connecting arm in accordance with paragraph 600-12.4.2.2.4. Adjust closer in accordance with paragraph 600-12.4.2.2.5. Open door panel fully and release several times. Check all hinge mounting screws for tightness.

600-12.4.3.5 Gasket Replacement. Gaskets are required for aluminum fumetight doors built in accordance with NAVSEA drawing 805-4629248 Rev A, **type P only door**. The gasket material is closed cell foam neoprene, 12.7 mm (1/2") wide x 4.8 mm (3/16") thick, with adhesive on one side. The gasket is applied to the door frame that contacts the face of the door panel on three sides (top, bottom, and latch side). The hinge side gasket strip is applied to door frame such that it contacts the panel edge in the closed position. Gaskets **ARE NOT** installed on fumetight doors built in accordance with NAVSEA 805-1648659 REV "D".

600-12.4.3.5.1 Gasket removal. Place door in the open position. Using a putty knife, remove existing gasket (8) from door frame. Clean all surface areas where gasket mounts to the door frame.

600-12.4.3.5.2 Gasket installation. **Remove the protective cover from the adhesive side of the new gasket (8). Attach the adhesive side of the gasket to the door frame that contacts the face of the door panel on three sides (top, bottom, and latch side). Attach the adhesive side of the gasket to the hinge side of the door frame such that it contacts the panel edge in the closed position.**

600-12.4.3.6 Light Glass Replacement. Place the door in the open position.

600-12.4.3.6.1 Remove the light retaining ring fasteners (9) (the fasteners may be rivets or screws) and one light retaining ring (10). Remove the light glass (12) with gasket (11).

600-12.4.3.6.2 Install new gasket (11) on light glass (12). Place light glass (12) and gasket (11) in center of light opening in door panel. Install light retaining ring (10) using new mounting fasteners (9).

600-12.4.3.7 Accomplish Repair Completion Requirements in accordance with paragraph [600-12.4.4](#).

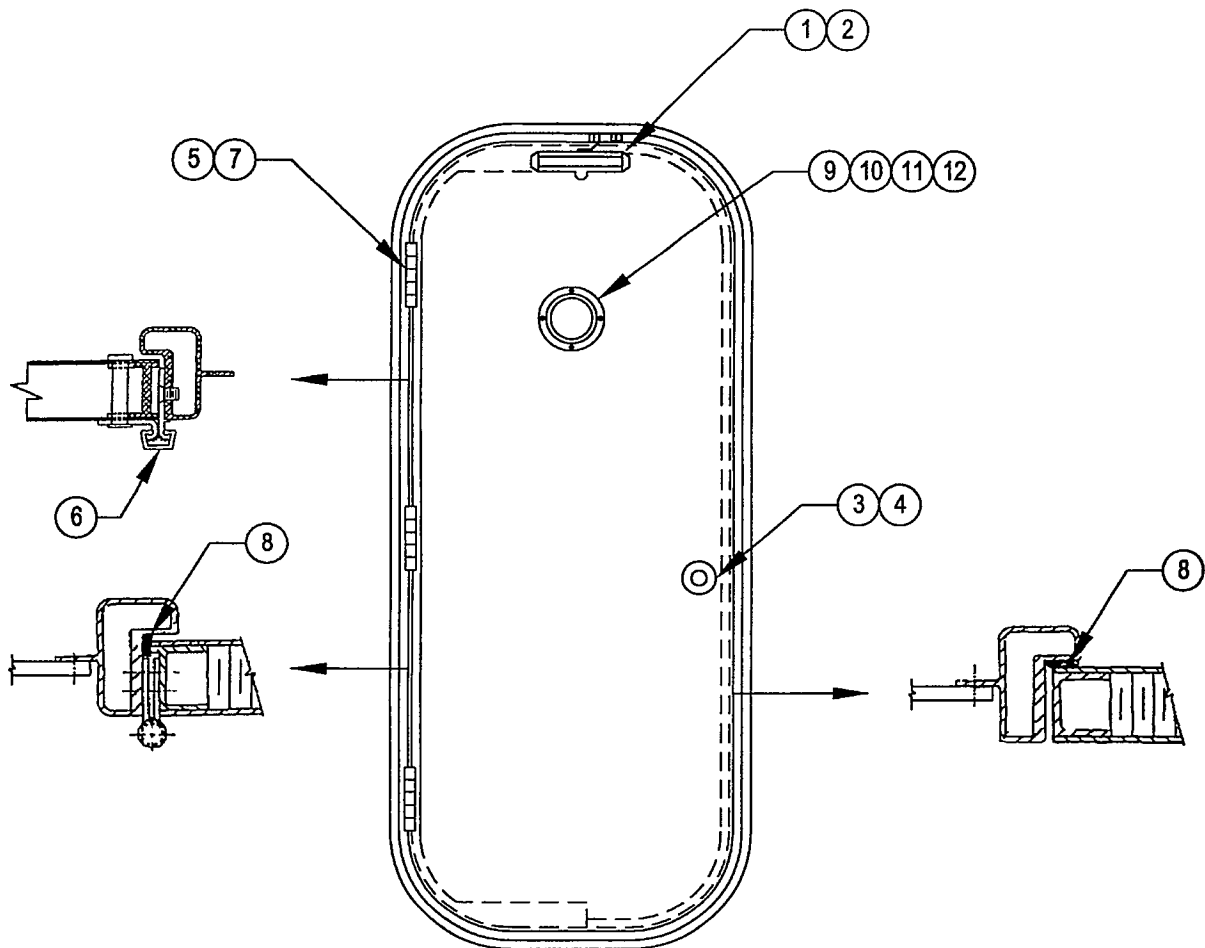


Figure 600-12.8 Fumetight Door

Table 600-12.6. Fumetight Door Group Assembly Parts List (GAPL)

FIGURE 600-12.6 AND INDEX NO.	PART NO.	NSN	DESCRIPTION	QTY
600-12.8-1	8616 AR X AL	5340-01-481-8637	Closer, for Steel fumetight doors built in accordance with NAVSEA drawing 805-1648659 REV "D", as modified by sketch 6132 SK-8201, ANSI 156.4, Grade 1, Size V, aluminum Finish, with optional features PT4C (50 percent adjustable spring power), and PT4D (adjustable backcheck).	1

**Table 600-12.6.** Fumetight Door Group Assembly Parts List (GAPL) -

Continued

FIGURE 600-12.6 AND INDEX NO.	PART NO.	NSN	DESCRIPTION	QTY
600-12.8-2	A156-4 TYPE C02012 SIZE 3	5340-00-000-0058	Closer, for Aluminum honeycomb core fumetight doors built in accordance with NAVSEA drawing 805-4629248 Rev A, <b>type P only</b> , ANSI 156.4, Grade 1, Size III, aluminum Finish, with optional features PT4C (50 percent adjustable spring power), and PT4D (adjustable backcheck).	1
600-12.8-3	805-1648659 PC. NO. 10	5340-01-390-3723	Latch set, ANSI 156.2, Grade 1, Series 4000, Type F75 for latch sets (ANSI 156.2), latch chassis and the internal structure and operational components shall be ANSI type 302 or 304 CRES. The latch bolt face plate and strike plate shall have a full radius on the top and bottom. The strike shall be the Marine type that is suitable for doors 1-3/8" thick. The latch bolt face plate and strike plate shall be ANSI 302 or 304 CRES with a US 32 finish. The knobs and roses shall be round in shape and shall be ANSI 302 or 304 CRES with a US 32 finish. Roses shall have a diameter of not less than 3-1/4 inches.	1
	OR			
	805-4629248 Rev A PC. NO. 4			
600-12.8-4	805-1648659 PC. NO. 10	5340-01-392-6676	Lock set, ANSI 156.2, Grade 1, Series 4000, Type F90 for lock sets (ANSI 156.4), lock chassis and the internal structure and operational components shall be ANSI type 302 or 304 CRES. The lock bolt face plate and strike plate shall have a full radius on the top and bottom. The strike shall be the Marine type that is suitable for doors 1-3/8" thick. The lock bolt face plate and strike plate shall be ANSI 302 or 304 CRES with a US 32 finish. The knobs and roses shall be round in shape and shall be ANSI 302 or 304 CRES with a US 32 finish. Roses shall have a diameter of not less than 3-1/4 inches.	1
	OR			
	805-4629248 Rev A PC. NO. 4			

**Table 600-12.6.** Fumetight Door Group Assembly Parts List (GAPL) -

Continued

<b>FIGURE 600-12.6 AND INDEX NO.</b>	<b>PART NO.</b>	<b>NSN</b>	<b>DESCRIPTION</b>	<b>QTY</b>
600-12.8-5	805-1648659 PC. NO. 7	5340-01-396-8447	Hinge, Butt, in accordance with Commercial Item Description (CID) A-A-50432, the hinge is a Type II, Class 3, Style B, 3-1/2' x 3" nickel plated (US 32 finish) steel hinge, with nylon bushings in the hinge knuckles.	3
600-12.8-6	USN 109/042H D079CL	5340-01-418-5048	Hinge, heavy duty, aluminum, continuous	
600-12.8-7	805-1648659 PC. NO. 13	5305-01-396-8446	Screw, machine, 10-24 FHMS, 1/2" long	AR
600-12.8-8	805-4629248 Rev A PC. NO. 36	COML	Gasket, closed cell foam, Neoprene, adhesive on one side, 3/16" thick x 1/2" wide.	AR
600-12.8-9	805-4629248 Rev A PC. NO. 56	COML	Rivet, round head, 3/16 x grip to suit	AR
600-12.8-10	805-4629248 Rev A PC. NO. 29	COML	Light retaining ring, Aluminum 5052-1132, .063 thick	2
600-12.8-11	805-1648659 PC. NO. 17	5330-01-392-8134	Fixed gasket retainer, rectangular metal, 0.0598 inch thick, Steel	AR
600-12.8-12	805-4629248 Rev A PC. NO. 11	2040-01-407-9658	Light, glass, 1/4" thick, 4-1/4" OD, heat treated Type "A", MIL-G-2697	1

600-12.4.4 Repair Completion Requirements.

600-12.4.4.1 Remove signs previously installed.

600-12.4.4.2 Obtain watch supervisor's permission to test firezone or fumetight door(s).

**WARNING**

**Ensure all tag-out procedures are in accordance with current shipboard instructions.**

600-12.4.4.3 Remove "Out of Service" tag in accordance with current shipboard instructions.

600-12.4.4.4 Open and close door(s) several times to prove satisfactory operation of door. Test the fire door release control system (where applicable) in accordance with paragraphs 600-12.3.4.8 through 600-12.3.4.8.3.

600-12.4.4.5 Upon completion of repairs and testing return door(s) to normal operation.

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600-12.4.4.6 Notify completion of repair to watch supervisor.

## **600-12.5 REPLACEMENT.**

600-12.5.1 Purpose and Scope. This chapter provides maintenance personnel with the procedures necessary to remove and install the firezone and fumetight doors covered by this technical manual.

600-12.5.2 Safety Requirements. Specific removal and installation procedures, along with their individual warnings, cautions and notes shall be read in full prior to accomplishing any repairs.

600-12.5.3 Door Swing Designations. Ensure that the Navy designations are used when identifying the swing of a door; note that this is opposite from commercial practice. To determine the swing of the door, stand directly in front of the door handle. A left-handed door will have the hinge on the left side and the latch/lock set on the right side. A right-handed door will have the hinge on the right side of the frame with the latch/lock set on the left side of the door.

600-12.5.4 New Door Requirements. The critical first step is for maintenance personnel to properly identify the type of door as well as applicable APL and MRC, of the firezone or fumetight door in need of repair. Refer to table [600-12.1](#) and table [600-12.3](#).

600-12.5.5 Preliminary Repair Checks. When possible, door repairs should be scheduled when personnel traffic in the space is at a minimum. Ensure the following precautionary steps are followed.

600-12.5.5.1 Obtain watch supervisor's permission before repairing firezone and fumetight doors (Engineering Officer of the Watch (EOOW) underway and Duty Engineer in port). (See Equipment Guide List (EGL) for door locations.)

600-12.5.5.2 Notify personnel in the space that the door to that space (by number) will be under repair and to utilize alternate door or doors for access.

### **WARNING**

**Ensure all tag-out procedures are in accordance with current shipboard instructions.**

600-12.5.5.3 Secure passage and tag door and electro magnet (where applicable) "Out of Service".

600-12.5.5.4 Place signs on door and near door inside and out reading, "Personnel Working Behind Door; Use Alternate Access".

600-12.5.6 Repair Tools Required. Refer to table [600-12.7](#) for a list of door removal/installation tools required by door type.

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600-12.5.7 Door Removal Procedures.

**WARNING**

**A minimum of two people are required during door and frame movement.  
 Possible hazard to personnel exists due to weight of door and frame.**

**Table 600-12.7. Door Removal/Installation Tools Required**

DOOR TYPE	REPAIR TOOLS REQUIRED
Firezone	Flat tip screwdriver; #2 and #3 Phillips screwdriver; Allen wrench set, .028 - 3/4"; utility knife; combination wrenches, 3/8" - 1/2"; 3/8" drive ratchet; 3/8" drive socket set, 5/16" - 3/4"; paint scraper; drill motor; 1/4" drill bits; tool capable of cutting 1/4" thick steel bulkhead; shim material 1/16", 1/8" and 1/4" thick x 1" wide x various lengths; tape measure; 14' of string; 4' ladder; 4" portable grinder; two - 8" deep throat "C" clamps; Latch/Lock set spanner wrench; Rivet gun; safety goggles
Fumetight, steel	Flat tip screwdriver; #2 and #3 Phillips screwdriver; Allen wrench set, .028 - 3/4"; utility knife; combination wrenches, 3/8" - 1/2"; 3/8" drive ratchet; 3/8" drive socket set, 5/16" - 3/4"; paint scraper; drill motor; 1/4" drill bits; tool capable of cutting 1/4" thick steel bulkhead; shim material 1/16", 1/8" and 1/4" thick x 1" wide x various lengths; tape measure; 14' of string; 4' ladder; 4" portable grinder; two - 8" deep throat "C" clamps; Latch/Lock set spanner wrench; Rivet gun; safety goggles
Fumetight, aluminum	Flat tip screwdriver; #2 and #3 Phillips screwdriver; Allen wrench set, .028 - 3/4"; utility knife; combination wrenches, 3/8" - 1/2"; 3/8" drive ratchet; 3/8" drive socket set, 5/16" - 3/4"; paint scraper; drill motor; 1/4" drill bits; tool
	capable of cutting 1/4" thick steel bulkhead; shim material 1/16", 1/8" and 1/4" thick x 3/4" wide x various lengths; tape measure; 14' of string; 4' ladder; 4" portable grinder; two - 8" deep throat "C" clamps; Latch/Lock set spanner wrench; Rivet gun; safety goggles

**WARNING**

**Closer arm will be under tension when the door is in the closed and latched position. Exercise extreme care when separating main arm from connecting arm.**

**NOTE**

The door panel should be removed from the door frame prior to removing door frame in order to reduce the weight of the components being handled.

600-12.5.7.1 Remove door panel from door frame. Separate closer main arm from connecting arm in accordance with paragraph 600-12.4.2.2.1. Place door in the open position. One person must support the door panel while a second person removes the existing hinge mounting screws from the door panel starting with the bottom hinge and moving up; remove door panel.

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600-12.5.7.2 Locate the door frame mounting fasteners at the top, bottom and sides of the door frame. If the mounting fasteners are covered by lagging, carefully trim the lagging back until the mounting fasteners are exposed.

600-12.5.7.3 Inspect door frame for shims.

600-12.5.7.4 Loosen all door frame fasteners BUT DO NOT REMOVE.

### **CAUTION**

**Shims must be removed when the door frame fasteners are removed. Retain shims for installation with new door in order to prevent door from dragging or binding due to warped bulkhead.**

### **NOTE**

Caulking may be applied between the door frame and bulkhead. If caulking is present, remove caulking prior to removing the door frame fasteners and shims.

600-12.5.7.5 Remove mounting fasteners and shims from top and bottom of door frame.

600-12.5.7.6 Remove mounting fasteners and shims from handle side of door frame.

600-12.5.7.7 While one person supports door frame, remove mounting fasteners and shims from hinge side of door frame.

### **NOTE**

On firezone doors only, the opening in the bulkhead may not be large enough to remove the door frame due to interference from the gasket retainer ring mounting fasteners.

600-12.5.7.8 While two people support door frame, tilt door frame away from bulkhead. Lift and remove the door frame out of the bulkhead. On firezone doors only, if bulkhead opening is not large enough to remove the door frame and gasket retainers as one assembly, remove adjustable gasket retainer by removing all mounting screws (5), nuts (7) and lock washers (6), refer to 600-12.7.

600-12.5.8 Door Installation.

### **CAUTION**

**A major cause of door failure can be attributed to riveting or bolting frames directly against warped bulkheads without shims, which can result in twisted frames and door panel not seating properly.**

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#### 600-12.5.8.1 Preparation of Site.

600-12.5.8.1.1 The opening in the bulkhead must be plumb and relatively flat.

600-12.5.8.1.2 The bulkhead surface must be free of foreign matter. Remove all gasket material and caulking from bulkhead.

600-12.5.8.1.3 Bulkhead warpage can be checked by string lines. Position the string lines at opposite top and bottom corners, pull the lines tight, and check the space between the intersection of the string lines. Repeat this process by placing the string line that was in the closest position to the farthest position. If the string lines touch after process is complete the bulkhead is relatively flat. If there is a space between the string lines then the door frame needs to be shimmed approximately the distance between the lines.

#### 600-12.5.8.2 Unpacking and Moving Door.

### **WARNING**

**A minimum of two people are required during door movement. Possible hazard to personnel exists due to weight of door panel and frame.**

600-12.5.8.2.1 With lid removed from shipping crate, visually inspect the door for obvious damage. Check the pull of the door to ensure that you have the correct door (i.e., left hand or right hand). Great care must be taken when removing the door from the crate. Always move the door with the pull side of the door facing upwards to prevent the door from opening during movement.

600-12.5.8.2.2 If door frame and panel must be handled sideways for movement through narrow passageways, ensure that the door panel will not open during transit.

### **CAUTION**

**Do not force the door flange to align with previous holes in bulkhead. This will cause warping of the door frame.**

### **CAUTION**

**Failure to shim before final riveting or bolting to a warped bulkhead will cause the frame to assume the contour of the bulkhead. The door may drag, bind or it will not operate correctly or at all. This will result in excessive wear and premature failure.**

600-12.5.8.3 Mounting. The most common installation problem associated with firezone and fumetight doors is that they are mounted into warped or uneven bulkheads. This causes the door frame to assume the shape of the

deformed bulkhead. In the worst cases, this has caused new doors to be immediately inoperable. In less severe cases, the door hinges fail prematurely. The following procedures shall be accomplished to ensure proper installation:

**WARNING**

**A minimum of two people are required during door movement. Possible hazard to personnel exists due to weight of door panel and frame.**

600-12.5.8.3.1 Position the door and frame into the bulkhead opening. The combined weight of the door frame and panel is approximately 140 pounds for firezone doors and steel fumetight doors and approximately 50 pounds for the aluminum honey comb core fumetight doors.

600-12.5.8.3.2 With the frame in position and parallel to the deck, check mating surfaces and identify any locations where the frame is separated from the bulkhead by more than 1/8".

600-12.5.8.3.3 If shims were present during the removal of the old door (refer to paragraph [600-12.5.7](#)), verify shim locations and the thickness of shims required. Align holes in old shims to the mounting holes in the door frame. Clamp the door frame and shim(s) to the bulkhead. Ensure a flat mounting plane is achieved. If no shims were present during the removal of the old door, proceed to paragraph [600-12.5.8.3.4](#).

600-12.5.8.3.4 For separations between the door frame and bulkhead of 1/8 to 3/8", manufacture shims of varying thickness using 1" wide flat bar for firezone doors and steel fumetight doors and 3/4" wide flat bar for aluminum honey comb core fumetight doors. Clamp the door frame and shim(s) to the bulkhead. Ensure a flat mounting plane is achieved.

600-12.5.8.3.5 Separations between the door frame and the bulkhead greater than 1-1/2" require the bulkhead to be either straightened or replaced in accordance with standard structural practices.

**NOTE**

The firezone doors and steel fumetight doors are to be mounted to the bulkhead using 1/4" steel rivets or 1/4 - 20 UNC hex head steel grade 8 bolts with 1/4" steel flat and lock washers and 1/4" steel nuts. The aluminum honey comb core fumetight doors are to be mounted using 3/16" aluminum rivets or 10-32 UNC panhead screws with #10 flat washers and nyloc nuts. The length of the rivets, bolts or screws should be determined by the thickness of the bulkhead and the thickness of the shims. There must be 3 to 5 threads of the bolts or screws extending beyond the nuts.

600-12.5.8.3.6 Once a flat mounting plane is achieved, drill 9/32" holes in the bulkhead for firezone or steel fumetight doors or .193 diameter (#10 drill) holes in the bulkhead for the aluminum honey comb core doors, to mount the door frame. Use the holes provided on the door frame flange as a drilling template if frame is pre-drilled. Drill and attach the door frame on the hinge side by installing the fasteners in every other mounting hole.

Drill and attach the door frame on the latch side by installing the fasteners in every other mounting hole. Drill and attach the door frame on the top and bottom sides by installing the fasteners in every other mounting hole.

600-12.5.8.3.7 Cycle the door from fully closed position to fully open position several times while checking for binding and rubbing. Check to ensure door panel sits flush with door frame in the closed position. If binding or rubbing is present or if door panel does not sit flush with door frame in the closed position, check the frame to the bulkhead mounting surface and identify if shims need to be added or removed. Install or remove shims as required until no binding or rubbing is present when door is cycled from fully closed position to fully open position and door panel sits flush with the door frame in the closed position.

600-12.5.8.3.8 Drill all remaining holes and attach the door frame to the bulkhead. Fully tighten all the mounting hardware. Cycle the door from fully closed position to fully open position several times while checking for binding and rubbing. Check to ensure door panel sits flush with door frame in the closed position. If binding or rubbing is present, or if door panel does not sit flush with door frame in the closed position, refer to paragraph [600-12.5.8.3.7](#).

600-12.5.8.3.9 Install latch or lock set in accordance with paragraphs [600-12.4.2.4.2](#) through [600-12.4.2.4.2.3](#).

600-12.5.8.3.10 Adjust gasket (firezone doors only) in accordance with paragraphs [600-12.4.2.6](#) through [600-12.4.2.6.3](#).

600-12.5.8.3.11 Install closer (as required) in accordance with paragraphs [600-12.4.2.2.2](#) through [600-12.4.2.2.2.5](#).

600-12.5.8.3.12 If the door being replaced is a firezone door with a steel electro magnet armature plate mounted on the firezone door, measure and record the location of the steel electro magnet armature plate. Remove the steel electro magnet armature plate (and sub-plate with adjustable tension springs if installed) from the door being replaced. Mark the location for mounting the steel electro magnet armature plate on the new door. Install the steel electro magnet armature plate with new mounting fasteners on the new door using the same mounting arrangement from the door being replaced.

600-12.5.8.3.13 Seal the voids that may exist between the door frame and bulkhead and the latch strike area with RTV 106 or equivalent.

600-12.5.9 Repair Completion Requirements.

600-12.5.9.1 Remove signs previously installed.

600-12.5.9.2 Obtain watch supervisor's permission to test firezone or fumetight door(s).

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**WARNING**

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**Ensure all tag-out procedures are in accordance with current shipboard instructions.**

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600-12.5.9.3 Remove "Out of Service" tag in accordance with current shipboard instructions.

600-12.5.9.4 Open and close door(s) several times to prove satisfactory operation of door. Test the fire door release control system (where applicable) in accordance with paragraphs [600-12.3.4.8](#) through [600-12.3.4.8.3](#).

600-12.5.9.5 Upon completion of repairs and testing return door(s) to normal operation.

600-12.5.9.6 Notify completion of repair to watch supervisor.

## SECTION 13

### SOUND INSULATED ACOUSTIC DOORS

#### 600-13.1

Sound Insulated Acoustic Doors (referred to as VUESONIC or Diesel Enclosure doors) provide personnel access to the Ship Service Diesel Generator (SSDG) enclosures located in the Auxiliary Machinery rooms on FFG-7 class USN ships. The doors are designed to contain the sound of the diesel generators within the sound insulated acoustic enclosure while providing personnel access to the enclosure. They are used in applications where structural strength and ballistic qualities are not required.

The door panel and frame are all steel construction. The door panel and frame are hollow and the voids are filled with fiberglass insulation. Two 10" x 10" wire reinforced glass windows are mounted in the door panel to provide viewing into the diesel enclosure. The sides and top of the door frame are fitted with an adjustable gasket and an automatic door drop sill is mounted in the bottom of the door panel to provide a seal for the bottom of the door when the door is closed. The door frame gaskets and door panel drop sill gasket assist in containing the sound of the diesel generators when the door is placed in the closed position.

Most of the existing doors on the FFG-7 class ships are VUESONIC doors manufactured by JAMESTOWN METAL MARINE SALES, INC; all are all 26' x 66". The existing right hand doors are covered by APL 31A000466 and MFR ID # D300-0001-001, the left hand doors are covered by APL 31A000467 and MFR ID # D300-0002-001 (I am not aware of any drawing numbers for these doors)

The new doors are all 26" 66". The new doors are manufactured in accordance with JAMESTOWN METAL MARINE SALES, INC. drawing no. BN-100202 (drawing title is" SOUND INSULATED ACOUSTIN DOOR (FFG-42)". The right hand door part number is D300-004-001 and the left hand door part number is D300-003-001. There are no APLs to cover the new doors.

#### 600-13.1

The information in this section is under development.

**SECTION 14**  
**NON-TIGHT METAL JOINER DOORS.**

**600-14.1 PURPOSE/BACKGROUND.**

600-14.1.1 Purpose.

600-14.1.1.1 Non-tight metal joiner doors (referred to as Metal Joiner Doors) provide access to various secure and non-secure office spaces, passageways, berthing, sanitary spaces, medical spaces, post office spaces, store-rooms, air-conditioned boundaries, and mess areas. They are used in applications where structural strength and ballistic qualities are not required. Joiner doors with square corners are normally installed in non-structural metal joiner bulkheads. However, where joiner doors are installed in structural bulkheads, radius corner doors shall be used. Joiner doors shall open into rooms and not into passageways, except where local conditions make the swing in the other direction necessary.

600-14.1.2 Background.

600-14.1.2.1 There are two types of construction of metal joiner doors. Refer to table 600-14.1 and figure 600-14.1, figure 600-14.2 and figure 600-14.3.

600-14.1.2.1.1 The first type of construction of metal doors is a flush panel door fabricated in accordance with NAVSEA drawing 805-4629248 REV "A". The door panel is a honeycomb core construction consisting of two face sheets of 5052-H32 aluminum laminated to a 3/8" cell 5052 aluminum honeycomb core. The door frame is extruded aluminum 6063-T6. This type of metal joiner door may be fitted with an environmental gasket. Refer to figure 600-14.1 and figure 600-14.3.

600-14.1.2.1.2 The second type of construction of metal joiner doors is an extruded door fabricated in accordance with NAVSEA drawing 804-5959320 REV "A". The door panel consists of solid aluminum 5052-H32 panels surrounded by extruded aluminum 6063-T6 stiles and rails. The door frame is extruded aluminum 6063-T6. Refer to figure 600-14.2 and figure 600-14.3.

**Table 600-14.1. Metal Joiner Door Information**

<b>DOOR DESCRIPTION</b>	<b>APL</b>	<b>SWING</b>	<b>NAVSEA DWG. NO.</b>
Metal Joiner Door, Flush Panel, Honeycomb Core	31A030014	RH/LH	805-4629248 REV "A"
Metal Joiner Door, Extruded	31A030015	RH/LH	804-5959320 REV "A"



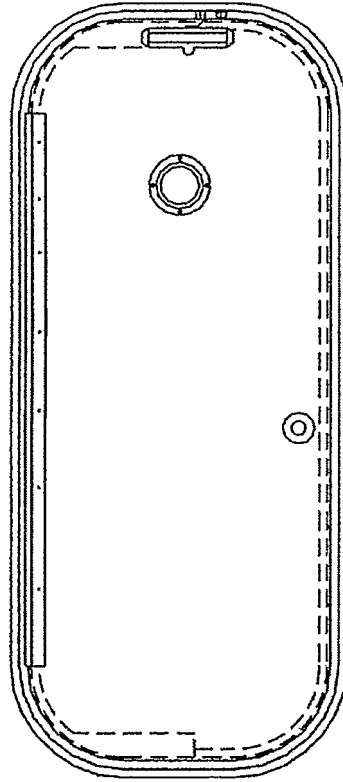


Figure 600-14.1. Metal Joiner Door, Flush Panel (Typical)

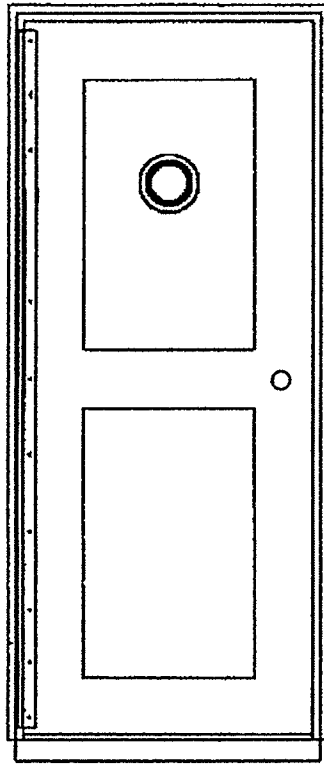


Figure 600-14.2. Metal Joiner Door, Extruded (Typical)

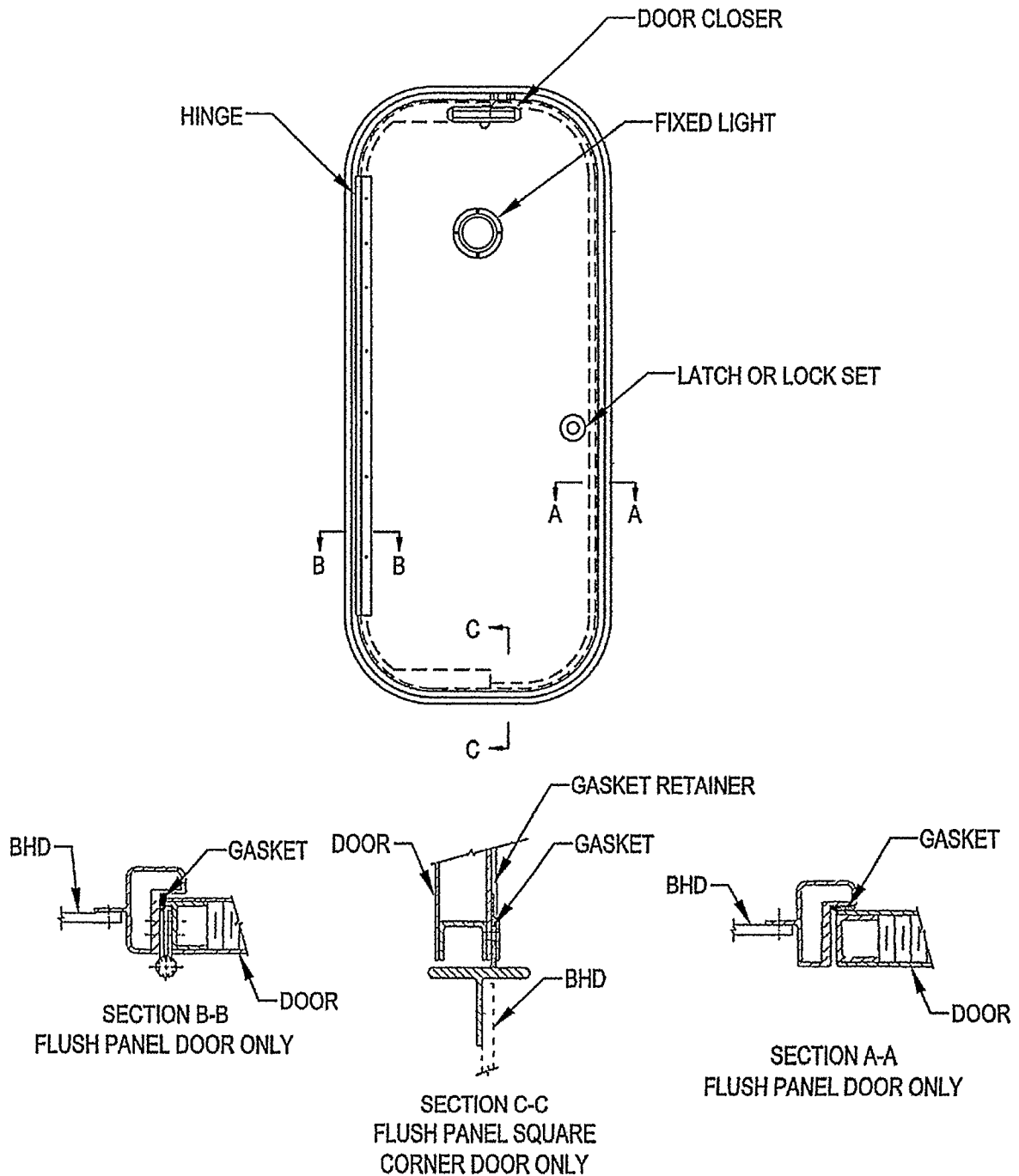


Figure 600-14.3. Metal Joiner Door (Typical)

**600-14.2 DESCRIPTION.**

600-14.2.1 Metal Joiner Door Operation Description. The metal joiner doors are manually operated. The doors are opened by manually rotating the latch or lock assembly to release the door from the door frame and pulling on the latch or lock assembly or pushing on the door panel. Some doors have a split door panel and the upper and lower door panels can be opened individually or as one unit. Some doors have a cipher lock that must be released before the door can be opened.

## 600-14.2.2 Metal Joiner Door Functional Descriptions.

600-14.2.2.1 Flush Panel and Extruded Metal Joiner Doors. Flush panel metal joiner doors shall be fabricated in accordance with NAVSEA drawing 805-4629248 REV "A". Extruded metal joiner doors shall be fabricated in accordance with NAVSEA drawing 804-5959320 REV "A". Doors fabricated in accordance with the NAVSEA drawings listed above can be Types A, B, C, D, E, F, G, H, J, K, L, M, N, P, Q, R and S. Each door "Type" is designed for use in a specific space and has unique features to service the space, i.e. double door, split door panels, sliding shutters, grilles, and shelves. Each door "Type" has a standard clear opening that can be modified to suit the space requirements as long as the function and strength of the door is not impaired. These doors contain the following items: latch or lock set and hinges. These doors may also contain the following items: closer, fixed light and gasket (flush panel doors only). For the specific characteristics of each door Type, refer to the NAVSEA drawings listed above, table [600-14.2](#) and table [600-14.3](#) and figure [600-14.3](#).

600-14.2.2.1.1 Latch and Lock Sets. Metal joiner door latch sets and lock sets shall be in accordance with ANSI 156.2, Grade 1, Series 4000, Type F75 for latch sets and Grade 1, Series 4000, Type F90 for lock sets. Latch or lock chassis and the internal structure and operational components shall be AISI type 302 or 304 CRES. The latch or lock bolt face plate and strike plate shall have a full radius on the top and bottom. The strike shall be the Marine type that is suitable for doors 1-3/8" thick. The latch or lock bolt face plate and strike plate shall be AISI 302 or 304 CRES with a US 32 finish. The knobs and roses shall be round in shape and shall be AISI 302 or 304 CRES with a US 32 finish. Roses shall have a diameter of not less than 3-1/4 inches. Other lockset types, in accordance with ANSI 156.2, Grade 1, may be used to suit a specific application requiring a special lockset. For additional lock requirements for joiner doors, refer to NSTM Chapter 604.

600-14.2.2.1.2 Hinges. Due to the high failure rate of butt hinges, butt hinges are being discontinued for use on metal joiner doors. A more durable heavy duty aluminum continuous hinge (Refer to figure [600-14.4](#)), NSN 9Z-5340-01-418-5048, has been selected as a suitable replacement, both for backfit on existing doors, as well as new doors. Installation instructions for the continuous geared hinge are provided in the "REPAIR" section ([600-14.4](#)) and are provided with the new hinge. The continuous hinge will be included in the next revision of the metal joiner door drawings.

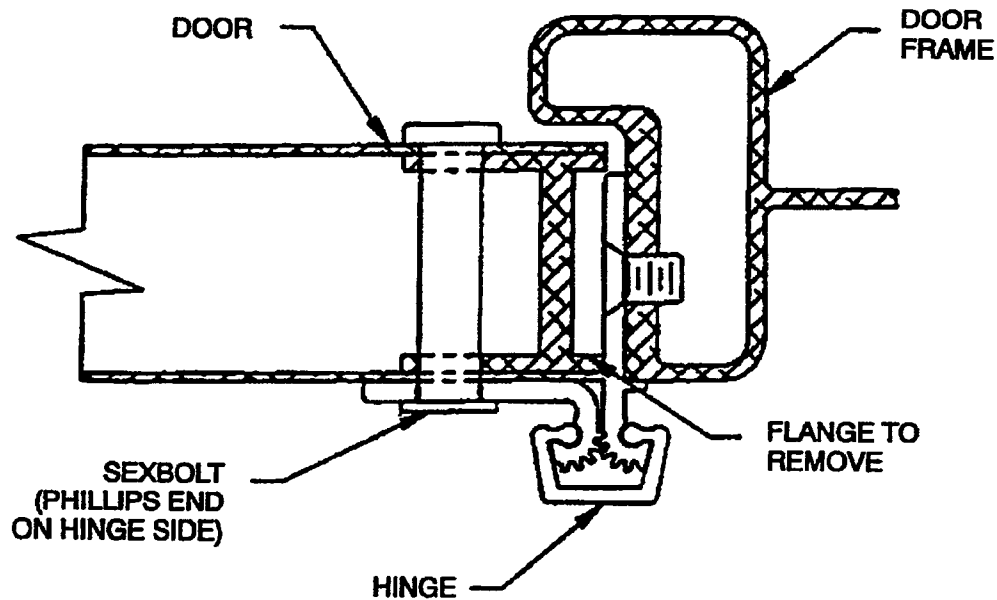


Figure 600-14.4 Continuous Geared Hinge

600-14.2.2.1.3 Closer. Hydraulic closers installed on metal joiner doors shall be in accordance with ANSI 156.4 (C02011), Grade 1, Size III, aluminum finish, with optional features PT4C (50 percent adjustable spring power), and PT4D (adjustable backcheck). The hydraulic closer is mounted to the door panel and the associated frame arm shoe is mounted to the door frame. Refer to figure 600-14.5.

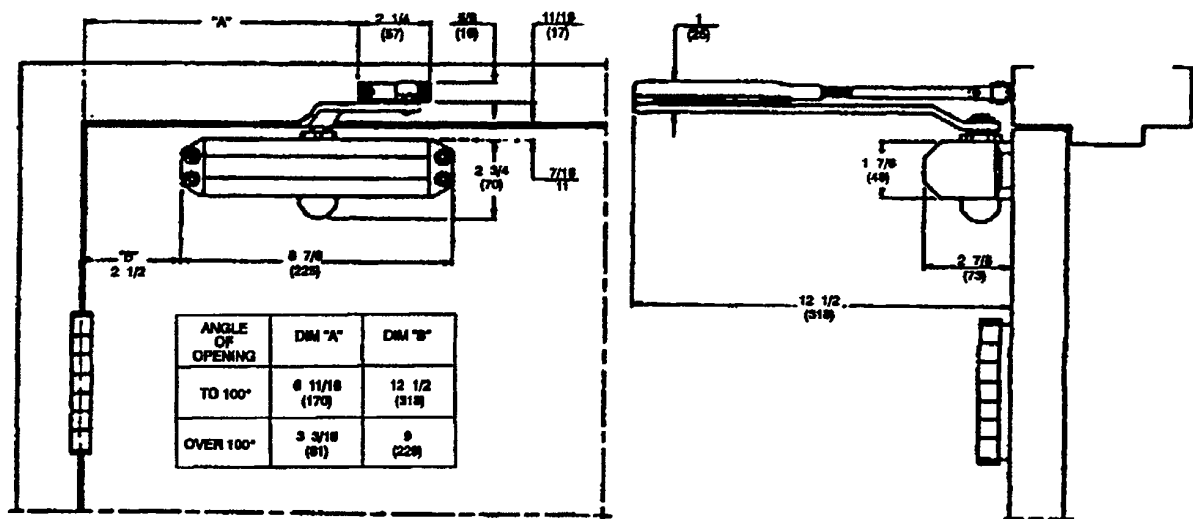


Figure 600-14.5. Door Closer

600-14.2.2.1.4 Gasket. Gaskets may be installed on flush panel metal joiner doors fabricated in accordance with NAVSEA drawing 805-4629248 REV "A". The gaskets usually serve as an environmental barrier between air conditioned and non-air conditioned spaces. The door frame gasket material is closed cell foam neoprene, 12.7 mm (1/2") wide x 4.8 mm (3/16") thick, with adhesive on one side. The gasket is applied to the door frame that

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contacts the face of the door panel (top, bottom, and latch side on radius corner doors; and top and latch side on square corner doors). The hinge side gasket strip is applied to door frame such that it contacts the panel edge in the closed position. The bottom gasket on square corner doors is neoprene, 1-1/8" wide x 1/8" thick. The gasket is attached to the bottom pull side of the door with a gasket retainer that is fastened to the bottom of the door panel. Refer to figure 600-14.3 sections "A-A", "B-B" and "C-C".

600-14.2.2.1.5 Fixed Light. A 1/4" thick x 4-1/4" diameter fixed glass light may be installed on the flush panel or extruded metal joiner doors. Fixed lights installed on the flush panel metal joiner doors fabricated in accordance with NAVSEA drawing 805-4629248 REV "A" have one fixed glass light mounted in the center of the door panel. The fixed glass light is mounted with a gasket and held in place with two light frames that may be bolted or riveted to both sides of the door panel. Fixed lights installed on the extruded metal joiner doors fabricated in accordance with NAVSEA drawing 804-5959320 REV "A" have one fixed glass light mounted on one side of the door panel. The fixed glass light is mounted on the pull side of the door with a gasket and is held in place with one fixed light frame that is bolted through the door panel.

### **600-14.3 INSPECTION.**

600-14.3.1 Purpose and Scope. The following paragraphs provide maintenance personnel with inspection information and refer to procedural guidelines necessary in identifying and correcting problems that can occur with metal joiner doors. Moreover, the critical first step is for maintenance personnel to properly identify the door type as well as the applicable APL of the metal joiner door in need of inspection. Refer to table 600-14.1, table 600-14.2 and table 600-14.3.

600-14.3.2 Preliminary Inspection Checks. When possible, door inspection and repair should be scheduled when personnel traffic in the space is at a minimum. If corrective maintenance is required during accomplishment of inspection procedures, ensure the following precautionary steps are followed.

600-14.3.2.1 Notify personnel in the space that the door to that space (by number) will be under inspection and repair, and to utilize alternate door or doors for access.

600-14.3.2.2 Secure passage to the door.

600-14.3.2.3 Place signs on door and near door inside and out reading, "Personnel Working Behind Door; Use Alternate Access".

600-14.3.3 Inspection Tools Required. Refer to table 600-14.4 for a list of inspection tools required for metal joiner doors.

**Table 600-14.2** Summary of Flush Panel Metal Joiner Door Characteristics

<b>Flush Panel Metal Joiner Door, Honeycomb Core, NAVSEA Dwg 805-4629248 REV "A"</b>							
<b>DOOR TYPE</b>	<b>ELEV</b>	<b>DESCRIPTION</b>	<b>SILL</b>	<b>WHERE USED</b>	<b>CLEAR OPENING</b>	<b>WEIGHT LBS</b>	<b>SUPERSEDE DOOR TYPE &amp; DWG NO.</b>
A	3-D	Standard SQ Corner Door	6	Wet Space	26" x 69"	55.0	Type 2, 805-4629248
B	4-D	Standard SQ Corner Door	1-5/8	Dry Space	26" x 74-1/2"	58.1	N/A
C	4-D	Standard SQ Corner Door	0	Dry Space	26" x 75"	57.8	Type 1, 805-4629248
D	6-D	SQ Corner DR w/Sliding Shutter, Grille and Shelf	0	Post Office	26" x 75"	83.2	N/A
E	6-D	SQ Corner DR w/Sliding Shutter, Grille and Shelf	1-5/8	Post Office	26" x 74-1/2"	84.4	N/A
F	3-A	SQ Corner DR in Halves w/Sliding Shutter	6	Wet Space	26" x 69"	70.2	N/A
G	3-A	SQ Corner Door in Halves	6	Wet Space	26" x 69"	69.3	N/A
H	5-A	SQ Corner DR in Halves w/Sliding Shutter and Shelf	0	Dry Space	26" x 75"	73.1	N/A
I	5-A	SQ Corner DR in Halves w/Shelf	0	Dry Space	26" x 75"	71.3	Type 3, 805-4629248
K	5-A	SQ Corner DR in Halves w/Sliding Shutter and Shelf	1-5/8	Dry Space	26" x 74-1/2"	76.2	N/A
L	5-A	SQ Corner DR in Halves w/Shelf	1-5/8	Dry Space	26" x 74-1/2"	72.1	N/A
M	7-A	SQ Corner Door	0	Medical Spaces	36" x 75"	84.6	N/A
N	11-D	SQ Corner Double Door	0	Medical Spaces	52" x 75"	119.3	N/A
P	13-D	Radius Corner Door	9	NT Structure	26" x 66"	54.3	Type 4, 805-4629248
Q	14-D	Full Radius Corner Door	9	NT Structure	26" x 66"	53.7	N/A
R	15-D	Full Radius Top, Flat Bottom Door	0	NT Structure	26" x 75"	56.8	N/A
S	15-D	Full Radius Top, Flat Bottom Door	1-5/8	NT Structure	26" x 74-1/2"	57.1	N/A

**Table 600-14.3. Summary of Extruded Metal Joiner Door Characteristics**

<b>Extruded Metal Joiner Door, NAVSEA Dwg 804-5959320 REV "A"</b>							
<b>DOOR TYPE</b>	<b>ELEV</b>	<b>DESCRIPTION</b>	<b>SILL</b>	<b>WHERE USED</b>	<b>CLEAR OPENING</b>	<b>WEIGHT LBS</b>	<b>SUPERSEDE DOOR TYPE &amp; DWG NO.</b>
A	3-D	Standard SQ Corner Door	9	Non-Secure Spaces	26" x 66"	60	Type A, 804-1642752
B	3-D	Standard SQ Corner Door	9	Secure Spaces	26" x 66"	55	Type A, 804-1048897
C	4-D	Standard SQ Corner Door	0	Non-Secure Spaces	26" x 75"	61	Type H, 804-1642434
D	4-D	Standard SQ Corner Door	0	Secure Spaces	26" x 75"	64	Type H, 804-1048899
E	4-D	Standard SQ Corner Door	Low 1/8 - 1-5/8	Non-Secure Spaces	26" x 74-1/2"	63	Type H, 804-1642434
F	4-D	Standard SQ Corner Door	Low 1/8 - 1-5/8	Secure Spaces	26" x 74-1/2"	66	Type H, 804-1048899
G	6-D	SQ Corner DR w/Shutter, Grille and Shelf	9	Non-Secure Spaces	26" x 66"	82	Type L, 804-1643220
H	6-D	SQ Corner DR w/Shutter, Grille and Shelf	9	Secure Spaces	26" x 66"	76	Type L, 804-1048901
J	3-A	SQ Corner DR in Halves w/Sliding Window and Shelf	9	Non-Secure Spaces	26" x 66"	77	Type P, 804-1048903
K	5-A	SQ Corner DR in Halves w/Shelf	9	Non-Secure Spaces	26" x 66"	72	Type T, 804-1642990
L	5-A	SQ Corner DR in Halves w/Shelf	9	Secure Spaces	26" x 66"	68	Type T, 804-1048904
M	7-A	SQ Corner Door	0	Medical Spaces	36" x 75-11/16"	81	Type HS, 805-2217402
N	11-D	SQ Corner Double Door	0	Medical Spaces	52" x 75-11/16"	114	Type Z, 805-2224381
							805-2224382
P	13-D	Radius Corner Door	9	NT Structure	26" X 66"	55	Type D, 804-1648655
Q	14-D	Full Radius Corner Door	9	NT Structure	26" X 66"	57	Type G, 804-1643218
R	15-D	Full Radius Top, Flat Bottom Door	0	NT Structure	26" X 75"	64	Type Y, 804-1643218
S	15-D	Full Radius Top, Flat Bottom Door	Low 1/8" - 1 5/8"	NY Structure	26"X 74-1/2"	66	Type Y, 804-1643218

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**Table 600-14.4. Inspection Tools Required**

<b>INSPECTION TOOLS REQUIRED</b>	
Flat tip screwdriver	#2 and #3 Phillips screwdriver
3/8" drive ratchet	Socket set, 3/8" drive, 5/16" - 3/4"
Allen wrench set, .028 - 3/4"	Latch/Lock set spanner wrench

600-14.3.4 Metal Joiner Door Inspection Procedures. The following inspection procedures are applicable to all metal joiner doors. Each inspection item includes possible door problems that should be identified by accomplishing the inspection and will refer to corrective actions that are located in the "REPAIR" section (600-14.4).

**NOTE**

Inspection procedures will be provided for unique door feature assemblies (i. e. sliding shutters, grilles and shelves) and associated operating and securing hardware (i.e. special size hinges, latch bolts, hold-open hooks, friction catches, hasp & staples, locking bars, special latches, etc.). However, these items will not be addressed in the "REPAIR" section because most of the items are available through commercial sources and are not supported by the Supply System. Refer to table 600-14.1, table 600-14.2, table 600-14.3 and the applicable NAVSEA drawing to identify the door type and items needed.

600-14.3.4.1 Inspect overall operating condition of door. Open and close door panel(s) fully several times, including double door panels and upper and lower door panels on split panel doors. Check for binding of panel against door frame. When closed, door panel should fit flush with door frame. On split panel doors upper and lower door panels should fit flush to each other and the door frame. Note any areas where door panel is binding and where door panel does not fit flush with door frame. If there is any evidence of door panel binding or door panel was not flush with frame, refer to paragraph 600-14.5.8.3.7.

600-14.3.4.2 Inspect unique door feature assemblies (i.e. sliding shutters, grilles and shelves) for damage (where applicable).

**NOTE**

If discrepancies are noted on the unique door feature assemblies (i.e. sliding shutters, grilles and shelves) and the corrective repairs are beyond ships force capabilities, submit a request for an industrial activity to correct the discrepancy. Ensure the request for industrial assistance includes the specific door type and list the individual piece numbers listed on the parts list of the applicable NAVSEA drawing. Refer to table 600-14.1, table 600-14.2, table 600-14.3 and the applicable NAVSEA drawing to identify the door type and items needed.

600-14.3.4.2.1 Raise and lower the sliding shutter several times. Check for binding of shutter panel against shutter frame and ensure shutter frame is properly secured to door panel. When closed, shutter panel should fit flush with window frame and should lock in place. Note any areas where shutter panel is binding, where shutter panel does not fit flush with window frame and where shutter will not lock in place.

600-14.3.4.2.2 Open and close door hinged grille several times. Check the hinged grille for bent or broken grille bars and loose or broken hinges. When closed, hinged grille should fit flush inside the door panel and should latch in place. Note any areas where hinged grille is binding, hinged grille bars are bent or broken, hinges are loose or broken, if hinged grille does not latch in the closed position and where hinged grille does not fit flush inside the door panel.

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600-14.3.4.2.3 Check the fixed shelf support to see if it is bent, cracked or detached from the shelf. Ensure the fixed shelf is level in the door. Note any areas where the fixed shelf is not level or the support is bent, cracked or detached from the shelf.

600-14.3.4.2.4 Raise and lower the folding shelf several times. Check shelf for loose or broken hinges and mounting fasteners. Check shelf supporting hinged bracket or folding arms for bent, loose or missing parts. When shelf is in the raised position, the shelf should be level and the shelf supporting hinged bracket or folding arms should be in the locked position. Note any areas where shelf hinges are loose, broken or missing fasteners; shelf supporting hinged bracket or folding arms are bent, loose or missing parts; and where the supporting hinged bracket or folding arms do not lock when the shelf is in the raised position.

600-14.3.4.3 Inspect door assembly fasteners for tightness. Check the door closer mounting screws (where applicable); hinge mounting screws and hinge pins; latch/lock set roses, striker plate and latch plate mounting screws; and door frame mounting fasteners. Tighten any loose fasteners. If hinges are defective, refer to paragraph [600-14.4.2.5](#).

600-14.3.4.4 Inspect door closer for evidence of leaking hydraulic oil (where applicable). If hydraulic oil is found, replace closer in accordance paragraph [600-14.4.2.3](#).

#### NOTE

Prior to testing door closing speed, differential ventilation flow should be negligible. This can be accomplished by isolating airflow from door. Secure ventilation flow to the space. After correct door closing speed is achieved, restore ventilation flow to the space.

600-14.3.4.5 Check door closing speed (where applicable). The door should travel from fully open to fully closed position in 4-8 seconds. If door checks suddenly when opening or not at all, the backcheck will require adjustment. If door closes from a fully opened position to a 3" position too fast or too slow, the sweep valve will require adjusting. If door latches too slow or too fast from the 3" open position, the latch valve will require adjusting. Refer to paragraph [600-14.4.2.2](#) for closer backcheck, sweep and latch adjustments.

600-14.3.4.6 Inspect door latch or lock set. Ensure latch/lock set is tight in door panel, roses are tightened against the door panel and the latch bolt properly engages with the strike plate in the door frame. If the latch/lock set is loose in the door panel or the latch bolt does not engage with the strike plate in the door frame, refer to paragraph [600-14.4.2.4](#).

600-14.3.4.7 Inspect flush panel metal joiner door gaskets (where applicable). Inspect gaskets for dirt, paint, deterioration, loose adhesive, and separation where ends of gasket meet. On square corner doors with bottom door gaskets, check gasket retainer mounting hardware for loose or missing fasteners and check for bent, broken or missing gasket retainers. If gasket or gasket retainer is damaged and requires replacement, refer to paragraph [600-14.4.2.6](#).

600-14.3.4.8 Inspect fixed glass light (where applicable). Check glass for cracks, chips and paint. Check light glass mounting frames for loose or missing mounting fasteners and ensure glass is tight in the mounting frame. If light glass or mounting frames are damaged, refer to paragraph [600-14.4.2.7](#).

600-14.3.5 Inspection Completion Requirements.

600-14.3.5.1 Remove signs previously installed.

600-14.3.5.2 Upon completion of inspection return doors to normal operation.

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600-14.3.5.3 Notify personnel in the space that the inspection on the door to that space (by number) has been completed.

#### **600-14.4 REPAIR.**

600-14.4.1 Purpose and Scope. The following paragraphs provide maintenance personnel with repair procedures and parts information necessary in identifying and correcting problems that can occur with metal joiner doors. Maintenance personnel should become thoroughly familiar with the contents of this manual prior to repairing the doors. Moreover, the critical first step is for maintenance personnel to properly identify the type of door as well as the applicable APL of the metal joiner door in need of repair. Refer to table 600-14.1, table 600-14.2 and table 600-14.3 and the applicable NAVSEA drawing.

600-14.4.1.1 Safety Requirements. Specific repair procedures, along with their individual warnings, cautions and notes shall be read in full prior to accomplishing any repairs.

600-14.4.1.2 Guide to Door Repairs. The repair procedures are based on the assumption that all operating and maintenance procedures have been followed correctly. When recent maintenance has been performed on a component involved in a malfunction, that component shall be checked before proceeding to the repair procedures. Individual repair procedures have been developed for the common items that may be found on the metal joiner doors.

600-14.4.1.3 Guide to Parts Information. Immediately following the door repair procedure will be an Illustrated Parts Breakdown (IPB) and Group Assembly Parts List (GAPL). The information contained in the IPB and GAPL, combined with the applicable Allowance Parts Lists (APL's) for the door, will assist in identifying and procuring repair parts needed for maintenance/repair.

600-14.4.1.3.1 Illustrated Parts Breakdown (IPB). The IPB consist of an illustration that shows the physical appearance and location of each door part. Each part is numbered and corresponds with the index number of the associated Group Assembly Parts List (GAPL).

600-14.4.1.3.2 Group Assembly Parts List (GAPL). A GAPL is a table that includes all major components, assemblies and detail parts of the door. Each illustrated part shown disassembled is assigned an index number. The following paragraphs describe the information contained in each column of the GAPL.

600-14.4.1.3.2.1 Figure and Index Number Column. The figure and index number column lists, in numerical order, the figure and index number of each part shown on the corresponding Illustrated Parts Breakdown (IPB).

600-14.4.1.3.2.2 Part Number Column. The part number column lists the part identification for all parts shown on the corresponding Illustrated Parts Breakdown (IPB). Numbers listed in this column are obtained from engineering design drawings/drawing parts lists, manufacturer assembly drawings, vendor parts list, shipcheck verification, photographs, Commercial manuals and other source material. Entries include some or all of the following:

- NAVSEA Drawing Number
- NAVSEA Drawings and Item/Piece Number
- Manufacturer Drawing Number
- Manufacturer Drawings and Item/Piece Number
- Manufacturer Part or Identification (ID) Number
- Commercial (COML)
- No entry

In every case, the number listed identifies the part in some way. When ordering or requesting replacement parts, each number must be written as listed, including dashes, slashes, period and spaces, in order for the supply department to identify and procure the part. A drawing number entry consists of a number or number/alpha set. Drawing numbers are listed when no other part identification is available; however, sometimes the drawing number and part number are considered the same by the manufacturer of the part. The drawing permits further research of the equipment being maintained, if required. It can assist the supply office in identifying and procuring parts not normally stocked or identifiable as repair/replacement parts.

600-14.4.1.3.2.3 National Stock Number (NSN) Column. The NSN column lists the stock number assigned to a particular part within the Navy supply system. The entry COML indicates that the item is a common hardware item (such as a nut, screw/bolt, or washer). It may be carried as consumable stock in general stores aboard ship or is available through a variety of commercial sources, and is identified by the data in the description column. No entry indicates that the item is a general arrangement or grouping/installation of equipment assemblies, or that the assembly/part has no identified applicable part number. Should such a part have to be ordered, the order/request shall include all the data in the description column.

600-14.4.1.3.2.4 Description Column. The description column contains a description of all parts on the corresponding Illustrated Parts Breakdown (IPB). Modifiers are included to identify the characteristics of a particular item.

600-14.4.1.3.2.5 Quantity Column. This column contains a number that indicates the total quantity of the item.

600-14.4.1.3.2.6. Used On Code Column. This column contains letters to indicate metal joiner door parts that are unique to one type of door construction or parts that are the same (interchangeable) for both type of door construction. Used on codes for the metal joiner doors are listed in table 600-14.5.

**Table 600-14.5.** Used On Codes

CODE	TYPE OF DOOR CONSTRUCTION	DRAWING NUMBER
A	Metal Joiner Door, Flush Panel, Honeycomb Core	805-4629248, REV "A"
B	Metal Joiner Door, Extruded	804-5959320, REV "A"

600-14.4.1.4 Door Vendors. Table 600-14.6 provides a list of vendors who can supply new metal joiner doors.

**Table 600-14.6.** Door Vendors

VENDOR NAME AND ADDRESS
Pier Side Supply 1080 Aragona Blvd., Suite C Virginia Beach, VA 23455 Phone:(757) 671-3211
Advanced Structures Corporation 235 West Industry Court Deer Park, NY 11729 Phone: (631) 667-5000
Railway Specialties Corporation P.O. Box 29 Bristol, PA 19007 Phone:(215) 788-9242

**Table 600-14.6. Door Vendors - Continued**

<b>VENDOR NAME AND ADDRESS</b>
Anchor Industries, Inc. 100 Bombay Dr. Columbia, SC 29209 Phone:(803) 695-2734

600-14.4.1.5 Door Swing Designations. Ensure that the Navy designations are used when identifying the swing of a door; note that this is opposite from commercial practice. To determine the swing of the door, stand directly in front of the door knob on the pull side of the door. A left-handed door will have the hinge on the left side and the latch/lock set on the right side. A right-handed door will have the hinge on the right side of the frame with the latch/lock set on the left side of the door.

600-14.4.1.6 Preliminary Repair Checks. When possible, door repairs should be scheduled when personnel traffic in the space is at a minimum. Ensure the following precautionary steps are followed.

600-14.4.1.6.1 Notify personnel in the space that the door to that space (by number) will be under inspection and repair, and to utilize alternate door or doors for access.

600-14.4.1.6.2 Secure passage to the door.

600-14.4.1.6.3 Place signs on door and near door inside and out reading, "Personnel Working Behind Door; Use Alternate Access".

600-14.4.1.7 Repair Tools Required. Refer to table [600-14.7](#) for a list of repair tools required for metal joiner doors.

**Table 600-14.7. Repair Tools Required**

<b>REPAIR TOOLS REQUIRED</b>	
Flat tip screwdriver	#2 and #3 Phillips screwdriver
3/8" drive ratchet	Socket set, 3/8" drive, 5/16" - 3/4"
Allen wrench set, .028 - 3/4"	Ball peen hammer
Flat file	Portable grinder
Utility knife	Putty knife, 1" wide
Masking tape	Latch/Lock set spanner wrench
Safety goggles	
Drill, 3/8" variable speed; drill bits, 3/8" and 11/64"	
Shim material 1/16" and 1/8" thick x various widths x various lengths	

600-14.4.2 Metal Joiner Door Assembly Repair Procedures. Refer to figure [600-14.7](#) and table [600-14.8](#).

600-14.4.2.1 Closers Metal joiner doors use closers to help control the opening, closing, and latching speed of the door. Closers are to be made in accordance with ANSI 156.4, Grade 1, Size 3, with adjustable spring power and adjustable back-check features as identified in Table [600-14.8](#). Multiple vendors can supply the closer when ordering NSN 5340-00-000-0058. It is important to realize that although the closers supplied from different vendors will have these features, the closers will differ in the location and adjustment of valves associated with the closer as well as adjustment of the closer spring size.

### NOTE

The spring must be adjusted to the correct spring size before making any other adjustments on the closer.

### CAUTION

**Door closers can be destroyed by over tightening the spring adjusting nut. Follow the spring adjustment procedures that came in the closer packaging box provided by the closer vendor. If information on the closers cannot be obtained this way, contact the following addresses for information: Dorma's web site is: <http://www.dorma-usa.com/architectural/products/surfaceclosers> CAL-Royal's web site is: <http://www.cal-royal.com/products>**

Most closers will be delivered as a size 3 closer with the capability of being adjusted to other sizes. Almost universally, the spring size can be increased by turning the spring adjusting nut in a clockwise direction. One closer vendor, Dorma, provides a product that requires sixteen (16) full clockwise turns of the spring adjusting nut on a Dorma 8600 series closer to go from a size 3 spring to a size 5 spring. Another vendor, Cal-Royal, only requires six (6) full clockwise turns on the spring adjustment to go from a size 3 rating to a size 5 rating on its 900 series closer. **Typically, the location of the spring adjusting nut is not identified on the closer itself, but is identified on literature accompanying the closer.** Be sure that you know of the correct spring adjustment procedure to use before proceeding ahead with any adjustments/repairs to the closer spring.

### CAUTION

**Prior to adjusting the closer backcheck, sweep and latch, adjust (if required) the closer spring power to a Size 3 setting in accordance with the manufacturers instructions provided with the closer.**

### NOTE

Prior to making any closer adjustments or closer replacements, ensure that metal joiner door inspection procedures identified in para 600-14.3.4.1 through 600-14.3.4.6, and any associated necessary repairs, have been accomplished.

600-14.4.2.2 Closer Adjustment Over time, door closers often require periodic adjustment of its opening and closing speeds. Periodicity of adjustment shall be in accordance with applicable MRC, or as frequently as conditions necessitate. There are three adjustable valves (Refer to figure 600-14.6) that can be adjusted on closers: backcheck (used for the opening cycle) and sweep and latch (used for the closing cycle).

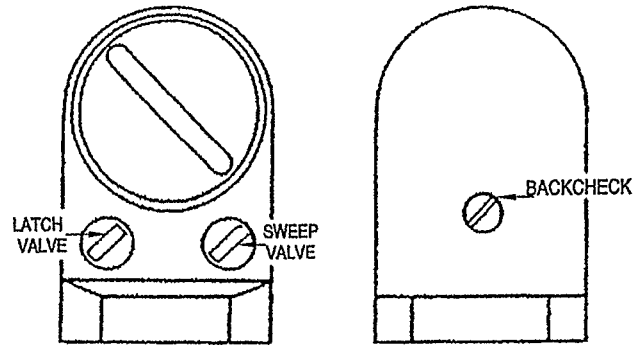


Figure 600-14.6. Closer Adjustments

600-14.4.2.2.1 Opening Cycle Backcheck adjustment. The backcheck feature acts as a dampening device to prevent uncontrolled opening of the door, thereby reducing the possibility of slamming the door against the door bumper, bulkhead, or equipment. The backcheck valve should be adjusted to take effect at approximately 10-15 degrees before the door reaches its fully opened positioned (see Figure 600-14.6A.) The location of the backcheck valve may vary according to the manufacturer, and is usually identified with the letters “BC” stamped on the housing. (see figure 600-14.6) Turn backcheck valve clockwise for more backcheck (this increases the dampening effect of the closer); turn backcheck valve counterclockwise for less backcheck (this decreases the dampening effect of the closer).

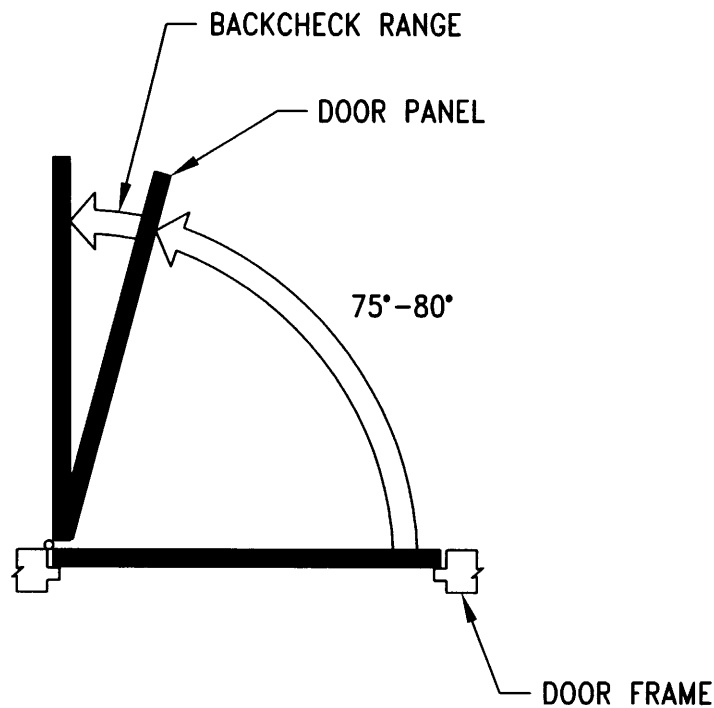


Figure 600-14.6A. Opening Cycle

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If the backcheck is not affected by adjustment of the backcheck valve, the closer should be replaced. Refer to paragraph [600-14.4.2.3](#).

600-14.4.2.2.2 Closing Cycle Closer speed adjustment. The door closing speed is controlled by two valves - sweep and latch. When the door closer adjustments are made correctly, the door should go from the fully opened position to a fully closed and latched position in approximately 4-8 seconds.

600-14.4.2.2.2.1 Sweep Adjustment The sweep valve controls the initial 70-75 degrees of the door's closing. The door should get to this position in approximately 3-6 seconds from the fully open position (see Figure [600-14.6B](#)). The location of the sweep valve may vary according to the manufacturer, and is usually identified with the word "Sweep" or "S" stamped on the housing (see figure [600-14.6](#)). Adjust the sweep valve in a counterclockwise direction to increase the door's initial closing speed; turn the sweep valve in a clockwise direction to decrease the door's initial closing speed.

600-14.4.2.2.2.2 Latch adjustment The latch valve controls the final 15-20 degrees of the door's closing and latching. The door should close and latch in approximately 1-2 seconds once it gets into the final closing/latching position. (see Figure [600-14.6B](#).) The location of the latch valve may vary according to the manufacturer, and is usually identified with the word "Latch" or "L" stamped on the housing (see figure [600-14.6](#)). Adjust the latch valve in a counterclockwise direction to increase the latching speed of the door; adjust the latch valve in a clockwise direction to decrease the latching speed of the door.

If the closing speed is not affected by adjustment of the latch and sweep valves, the closer should be replaced. Refer to paragraph [600-14.4.2.3](#)

600-14.4.2.2.3 Latching After closer adjustments have been made correctly and door opens and closes in specified time intervals, open door and allow door to close. Verify that door is fully latched at the end of the open/close cycle.

If the closing speed is not affected by adjustment of the latch and sweep valves, the closer should be replaced. Refer to paragraph [600-14.4.2.3](#)



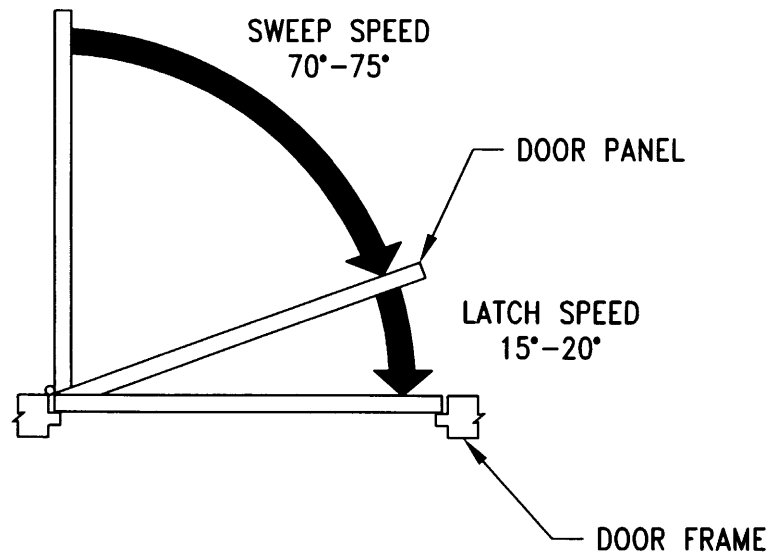


Figure 600-14.6B. Closing Cycle

### 600-14.4.2.3 Closer Installation

600-14.4.2.3.1 Closer installation general guidance. The following paragraphs provide general guidance to aid in the installation of door closers. Since there are several different manufacturers and models of door closers available for installation on firezone doors, installation of door closers shall be in accordance with the manufacturers instructions provided with the closer.

600-14.4.2.3.1.1 Mark door closer mounting location on door panel and connecting arm shoe location on door frame in accordance with the manufacturers instructions provided with the closer.

600-14.4.2.3.1.2 Drill mounting holes (as required) and attach closer (1) to door panel in accordance with the manufacturers instructions using the mounting hardware provided with the closer. Drill mounting holes (as required) and attach connecting arm shoe to door frame in accordance with the manufacturers instructions using the mounting hardware provided with the new closer.

600-14.4.2.3.1.3 Attach the main arm to the closer in accordance with the manufacturers instructions provided with the closer.

600-14.4.2.3.1.4 **Using the manufacturers instructions provided with the closer, position the connecting arm at 90 degrees to the door frame. Move the main arm until it is aligned at the elbow with the connecting arm. Adjust the connecting arm length (as required) until it is aligned with the main arm elbow connection point while maintaining the connecting arm at 90 degrees to the door frame. Snap the connecting arm to the main arm at the elbow.**

**NOTE**

Prior to adjusting the closer backcheck and speed, adjust the closer spring power for a Size 5 setting in accordance with the manufacturer's instructions provided with the closer.

600-14.4.2.3.1..5 **Adjust the closer backcheck and speed in accordance with paragraphs 600-14.4.2.2.1 through 600-14.4.2.2.2 and manufacturers instructions provided with the closer.**

**NOTE**

**In accordance with NAVSEA drawings 805-4629248, REV "A" and 804-5959320, REV "A"; metal joiner door latch and lock sets must have a Marine type strike that is suitable for doors 1-3/8" thick. The latch bolt face plate and strike plate shall have a full radius on the top and bottom and the roses shall have a diameter of not less than 3-1/4 inches. The complete latch or lock set shall be ANSI type 302 or 304 CRES.**

**NOTE**

There are several different manufacturers and models of door latch and lock sets available for installation on metal joiner doors. Installation of door latch and lock sets shall be in accordance with the manufacturers instructions provided with the latch or lock set. Proper installation of the latch or lock set is essential to the smooth operation of the door.

600-14.4.2.4 Latch And Lock Set Replacement. Place the door in the open position.

600-14.4.2.4.1 Latch (2) and lock (3) set removal. Insert small end of spanner wrench into hole in door knob bearing sleeve and press knob catch to release knob from latch or lock assembly. Unscrew the rose from side of latch or lock set where knob was removed. Remove the latch or lock set main housing from the door panel by pulling on the knob while working the knob back and forth to release the main housing from the latch tail piece. Remove the latch bolt mounting screws and remove the latch bolt from the door panel. Remove strike plate mounting screws and remove strike plate.

600-14.4.2.4.2 Latch (2) and lock (3) set installation. The following paragraphs provide general guidance to aid in the installation of door latch and lock sets. Since there are several different manufacturers and models of door latch and lock sets available for installation on metal joiner doors, installation of door latch and lock sets shall be in accordance with the manufacturers instructions provided with the latch or lock set.

600-14.4.2.4.2.1 Install the latch bolt into the door panel and secure in place with mounting screws provided with the latch or lock set.

**NOTE**

The metal joiner doors are pre-drilled with two rose alignment holes on each side of the door panel. When the new latch or lock assembly is installed, the rose alignment tabs must be engaged in the door panel rose alignment holes before the roses are tighten to the door panel.

600-14.4.2.4.2.2 Insert small end of spanner wrench into hole in door knob bearing sleeve and press knob catch to release knob from new latch or lock assembly. Remove the rose from side of latch or lock set where knob was removed. Insert the latch or lock set main housing through the door panel by pushing on the knob while working the knob back and forth to engage the main housing with the latch tail piece. Ensure the door knob actuates the latch bolt and there is no binding. Install the rose on the side of the latch or lock set where the knob is removed and tighten until rose contacts the door panel. Insert the rose alignment tabs into the two pre-drilled rose alignment holes on each side of the door panel. Tighten the roses with the spanner wrench provided with the new latch or lock set. Install new strike plate with new mounting screws.

600-14.4.2.5 Hinge Replacement. There are two types of hinges that may be installed on existing metal joiner doors, butt hinges and aluminum continuous geared hinge. However, due to the high failure rate of the existing butt hinges, they are being discontinued for use on aluminum joiner doors. A more durable heavy duty aluminum continuous geared hinge (4) (Refer to figure 600-14.4 and figure 600-14.7), NSN 9Z-5340-01-418-5048, has been selected as a suitable replacement, both for backfit on existing doors, as well as new doors. Refer to paragraphs 600-14.4.2.5.1 through 600-14.4.2.5.7 and the installation instructions provided with the new hinge. The mounting hardware for the continuous geared hinge is provided with the new hinge. The continuous hinge will be included in the next revision of the joiner door drawings.

**WARNING**

**Door panel must be removed in order to replace the door hinges, a minimum of two people are required during door panel movement. Possible hazard to personnel exists due to weight of door panel.**

**WARNING**

**Closer arm will be under tension when the door is in the closed and latched position. Exercise extreme care when separating main arm from connecting arm.**

**NOTE**

The aluminum continuous geared hinge shall be installed in accordance paragraphs 600-14.4.2.5.1 through 600-14.4.2.4.7 and the manufacturers instructions using the mounting hardware provided with the new hinge. Proper installation of the aluminum continuous geared hinge is essential to the smooth operation of the door.

**NOTE**

If the aluminum continuous geared hinge mounting holes on the door frame are stripped out or elongated on an existing door, do not replace the hinge, replace the door.

600-14.4.2.5.1 Hinge removal and aluminum continuous geared hinge installation. Separate closer main arm from connecting arm in accordance with paragraph 600-14.4.2.2.1. Place door in the open position. Door panel must be removed in order to install the aluminum continuous geared hinge (4). One person must support the door panel while a second person removes the existing hinge mounting screws from the door panel starting with the bottom hinge and moving up; remove door panel. After the door panel is removed, remove the hinge mounting screws from the door frame and remove the hinges.

600-14.4.2.5.2 Determine the length of the new hinge (4) to be installed. For square corner doors, measure and cut the new hinge approximately 1/4 inch less than the length of the door. For radius corner doors, measure the distance between the tangent points of the radius corners on the hinge side of the door frame minus 1/2". Locate the hinge to avoid existing hinge CRES threaded inserts in the door frame. The length of the hinge may also be templated from the door panel by positioning the hinge against the edge of the panel. This also helps to locate the hinge to avoid existing hinge CRES threaded inserts in the edge of the door panel. **Hinges should be cut at the bottom.** Avoid cutting through the hinge bearing. If the cut line falls on a bearing, cut equal amounts from the top and bottom. After cutting, file smooth any rough/sharp edges and remove all metal filings so as not to contaminate the bearings.

600-14.4.2.5.3 Position the hinge frame leaf on the door frame with the hinge frame alignment flange held tight against the face of the door frame. On flush panel metal joiner doors equipped with gaskets, it may be necessary to trim away approximately 1/8" from the edge of the gasket prior to positioning the hinge on the door frame. On square corner doors, center the hinge vertically on the door frame. On radius corner doors, position the hinge on the straight portion of the door frame between the tangent points of the radius corners. Ensure the pre-drilled holes in the hinge frame leaf are **NOT** positioned over the existing CRES threaded inserts in the door frame.

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600-14.4.2.5.4 With hinge (4) held firmly in position, center punch three holes, top bottom, and center, using the self-centering punch provided with the hinge. Drill 11/64" pilot holes in the door frame and install three #12 thread forming screws (provided with the hinge) to secure the hinge to the door frame. For easier installation of the mounting screws, lubricate the screw threads with soap, wax or a few drops of oil prior to installation. Once the hinge frame leaf is secure in place, install the remaining hinge frame leaf screws in the same manner.

600-14.4.2.5.5 Swing the hinge door panel leaf away from the door opening. Position the door panel in the door frame. Insert shims between the face of the door panel (on the push side of the door) and the door frame as necessary to ensure the door panel is flush with the door frame on the hinge side of the door. Ensure the shims on the hinge side of the door do not interfere with the installation of the sexbolts. Insert shims between the bottom and top of the door as necessary to ensure the latch/lock assembly is properly aligned with the strike plate on the door frame. Insert 1/8" shims between the door panel and frame on the latch side of the door. Position the hinge door panel leaf against the door panel. Check the locations of the sexbolt holes and ensure there is no interference with the existing hinge CRES threaded inserts in the edge of the door panel. If there is an interference, remove door panel from frame and remove the inserts by punching the inserts through the edge of the door panel. Re-install door panel in the door frame and shim as described above.

#### NOTE

When drilling the new sexbolt holes through the door panel, care should be taken to avoid any interference with the existing CRES threaded inserts in the edge of the door panel. If this occurs, remove the inserts by punching the inserts through the edge of the door panel.

600-14.4.2.5.6 Position the hinge door panel leaf against the door panel. Mark the locations of the sexbolt holes using the 3/8" x 1" transfer punch provided with the hinge. Drill 3/8" diameter holes all the way through the door panel. Attach the hinge door panel leaf to the door panel with 1/4"-20UNC Phillips head sexbolts provided with the hinge. For security purposes, it is recommended that the Phillips head end of the sexbolts be installed on the hinge side of the door panel.

600-14.4.2.5.7 After door hinge has been replaced, connect the closer main arm to the connecting arm in accordance with paragraph 600-14.4.23.1.4. Adjust closer in accordance with paragraphs 600-14.4.2.2.1 through 600-14.4.2.2.2. Open door panel fully and release several times. Check all hinge mounting screws for tightness.

600-14.4.2.6 Gasket Replacement (where applicable). Gaskets may be installed on flush panel metal joiner doors fabricated in accordance with NAVSEA drawing 805-4629248 REV "A". The gaskets usually serve as an environmental barrier between air conditioned and non-air conditioned spaces. The door frame gasket material is closed cell foam neoprene, 12.7 mm (1/2") wide x 4.8 mm (3/16") thick, with adhesive on one side. The gasket is applied to the door frame that contacts the face of the door panel (top, bottom, and latch side on radius corner doors; and top and latch side on square corner doors). The hinge side gasket strip is applied to door frame such that it contacts the panel edge in the closed position. The bottom gasket on square corner doors is neoprene, 1-1/8" wide x 1/8" thick. The gasket is attached to the bottom pull side of the door with a gasket retainer that is fastened to the bottom of the door panel. Refer to figure 600-14.7 sections "A-A", "B-B" and "C-C".

600-14.4.2.6.1 Door frame gasket removal and installation. Place door in the open position. Using a putty knife, remove existing gasket (5) from door frame. Clean all surface areas where gasket mounts to the door frame. Remove the protective cover from the adhesive side of the new door frame gasket (5). Attach the adhesive side of the gasket to the door frame that contacts the face of the door panel (top, bottom, and latch side on radius corner doors; and top and latch side on square corner doors). Attach the adhesive side of the gasket to the hinge side of the door frame such that it contacts the panel edge in the closed position.

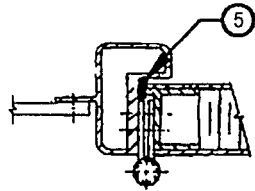
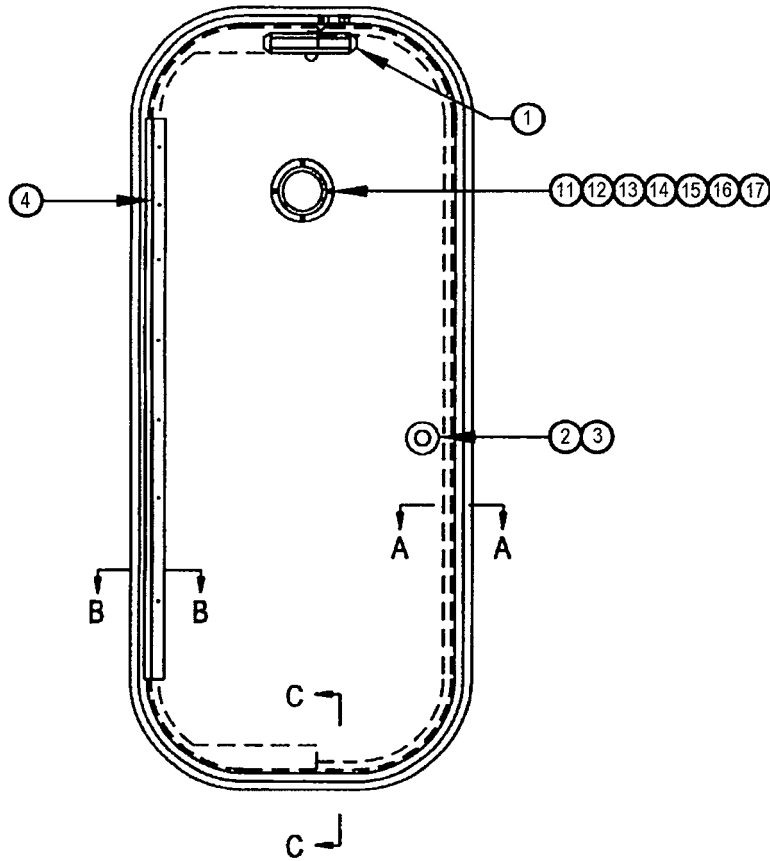
600-14.4.2.6.2 Square corner door bottom gasket removal and installation. **Place door in the open position. Remove the rivets (8), screws (9) and nuts (10) from the gasket retainer strip (7). Remove the gasket (6) and gasket retainer strip (7) from the bottom of the door panel. Clean all surface areas where gasket mounts to the door panel. Ensure the mounting holes in the new gasket (6) are aligned with the bottom screw mounting holes in the gasket retainer strip (7). Cut the gasket length to match the width of the door panel. Attach the gasket (6) and gasket retainer strip (7) to the bottom of the door panel using new rivets (8), screws (9) and nuts (10).**

600-14.4.2.7 Light Glass Replacement. Place the door in the open position.

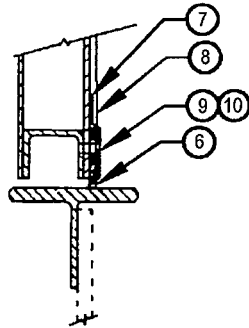
600-14.4.2.7.1 Remove the light retaining ring fasteners (11) on flush panel doors (the fasteners may be rivets or screws) or screws (12) and nuts (13) on extruded doors. Remove one light retaining ring (14) on flush panel doors or (15) on extruded doors. Remove the light glass (17) with gasket (16).

600-14.4.2.7.2 Install new gasket (16) on light glass (17). On flush panel doors, place light glass (17) and gasket (16) in center of light opening in door panel and install light retaining ring (14) on door panel using new mounting fasteners (11). On extruded doors, place light glass (17) and gasket (16) in center of light retaining ring (15) and install light retaining ring (15) on door panel using new screws (12) and nuts (13).

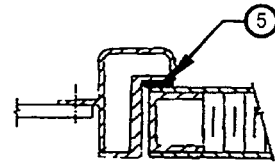
600-14.4.2.8 Accomplish Repair Completion Requirements in accordance with paragraph [600-14.4.3](#).



**SECTION B-B  
 FLUSH PANEL DOOR ONLY**



**SECTION C-C  
 FLUSH PANEL SQUARE  
 CORNER DOOR ONLY**



**SECTION A-A  
 FLUSH PANEL DOOR ONLY**

Figure 600-14.7 Metal Joiner Door

Table 600-14.8 Metal Joiner Door Group Assembly Parts List (GAPL)

FIGURE 600-14.7 AND INDEX NO.	PART NO.	NSN	DESCRIPTION	USED ON CODE *	QTY
600-14.7-1	A156-4 TYPE C02012 SIZE 3	5340-00-000- 0058	Closer, ANSI 156.4 (C02012), Grade 1, Size III, aluminum Finish, with optional features PT4C (50 percent adjustable spring power), and PT4D (adjustable backcheck).	A, B	1

**Table 600-14.8** Metal Joiner Door Group Assembly Parts List (GAPL) -

Continued

FIGURE 600-14.7 AND INDEX NO.	PART NO.	NSN	DESCRIPTION	USED ON CODE *	QTY
	805-4629248 REV "A"		Latch set, ANSI 156.2, Grade 1, Series 4000, Type F75 for latch sets. Latch chassis and the internal structure and operational components shall be ANSI type 302 or 304 CRES. The latch bolt face plate and strike plate shall have a full radius on the top and bottom. The strike shall be the Marine type that is suitable for doors 1-3/8" thick. The latch bolt face plate and strike plate shall be ANSI 302 or 304 CRES with a US 32 finish. The knobs and roses shall be round in shape and shall be ANSI 302 or 304 CRES with a US 32 finish. Roses shall have a diameter of not less than 3-1/4 inches.		
600-14.7-2	or	5340-01-390-3723		A, B	1
	804-5959320 REV "A"				
	805-4629248 REV "A" Pc. No. 14		Lock set, ANSI 156.2, Grade 1, Series 4000, Type F90 for lock sets. Lock chassis and the internal structure and operational components shall be ANSI type 302 or 304 CRES. The lock bolt face plate and strike plate shall have a full radius on the top and bottom. The strike shall be the Marine type that is suitable for doors 1-3/8" thick. The lock bolt face plate and strike plate shall be ANSI 302 or 304 CRES with a US 32 finish. The knobs and roses shall be round in shape and shall be ANSI 302 or 304 CRES with a US 32 finish. Roses shall have a diameter of not less than 3-1/4 inches.		
600-14.7-3	Or	5340-01-392-6676		A, B	1
	804-5959320 REV "A" Pc. No. 14				
600-14.7-4	USN109/04 2HD079CL	5340-01-418-5048	Hinge, heavy duty, aluminum, continuous	A, B	1
600-14.7-5	805-4629248 REV "A"	COML	Gasket, closed cell foam, Neoprene, adhesive on one side, 3/16" thick x 1/2" wide.	A	AR
600-14.7-6	805-4629248 REV "A"	COML	Gasket, Neoprene, 1/8" thick x 1-1/8" wide, length as required	A	AR
600-14.7-7	805-4629248 REV "A"	COML	Gasket retainer strip, 1/16" thick x 1-3/4" wide, length as required, Aluminum 5052-H32 (For square corner doors only)	A	AR

**Table 600-14.8** Metal Joiner Door Group Assembly Parts List (GAPL) -

Continued

FIGURE 600-14.7 AND INDEX NO.	PART NO.	NSN	DESCRIPTION	USED ON CODE *	QTY
600-14.7-8	805-4629248 REV "A"	COML	Rivet, round head, Aluminum, 3/16 x grip to suit (For square corner doors only)	A	AR
600-14.7-9	805-4629248 REV "A"	COML	Screw, machine, 10-24 UNC FHMS, length as required, Steel, CAD plated (For square corner doors only)	A	AR
600-14.7-10	805-4629248 REV "A"	COML	Nut, hex, self-locking, 10-24 UNC, Steel, CAD plated (For square corner doors only)	A	AR
600-14.7-11	805-4629248 REV "A" Pc. No. 13	COML	Rivet, round head, Aluminum, 3/16 c grip to suit	A	AR
600-14.7-12	804-5959320 REV "A" Pc. No. 13	COML	Screw, machine, round head, 10-24 UNC x 1/2" long, CRES	B	AR
600-14.7-13	804-5959320 REV "A"	COML	Nut, hex, self-locking, 10-24 UNC, CRES	B	AR
600-14.7-14	805-4629248 REV "A" Pc. No. 12	COML	Light frame, Aluminum 5052-H32, .064 thick	A	2
600-14.7-15	804-5959320 REV "A" Pc. No. 12	2040-01-407- 6318	Light frame, fixed, Aluminum 5052-1132, .064 thick	B	1
	805-4629248 REV "A" Pc. No. 11		Gasket, molded rubber, MIL-R-15624, 1/32" thick	A	
600-14.7-16	Or				1
	804-5959320 REV "A" Pc. No. 11	5330-01-399- 8413	Gasket, rubber, MIL-R-15624, 1/32" thick	B	
	805-4629248 REV "A" Pc. No. 10				
600-14.7-17	Or	2040-01-407- 9658	Light, glass, 1/4" thick, 4-1/4" OD, heat treated Type "A", MIL-G-2697	A, B	1
	804-5959320 REV "A" Pc. No. 10				

\*See Table 600-14.5

600-14.4.3 Repair Completion Requirements.

600-14.4.3.1 Remove signs previously installed.

600-14.4.3.2 Open and close door(s) several times to prove satisfactory operation of door.



600-14.4.3.3 Upon completion of repairs and testing return door(s) to normal operation.

600-14.4.3.4 Notify personnel in the space that the repair on the door to that space (by number) has been completed.

**600-14.5 REPLACEMENT.**

600-14.5.1 Purpose and Scope. This chapter provides maintenance personnel with the procedures necessary to remove and install the metal joiner doors covered by this technical manual.

600-14.5.2 Safety Requirements. Specific removal and installation procedures, along with their individual warnings, cautions and notes shall be read in full prior to accomplishing any repairs.

600-14.5.3 Door Swing Designations. Ensure that the Navy designations are used when identifying the swing of a door; note that this is opposite from commercial practice. To determine the swing of the door, stand directly in front of the door knob on the pull side of the door. A left-handed door will have the hinge on the left side and the latch/lock set on the right side. A right-handed door will have the hinge on the right side of the frame with the latch/lock set on the left side of the door.

600-14.5.4 New Door Requirements. The critical first step is for maintenance personnel to properly identify the type of door as well as the applicable APL of the metal joiner door in need of repair. Refer to table 600-14.1, table 600-14.2 and table 600-14.3 and the applicable NAVSEA drawing.

600-14.5.5 Preliminary Repair Checks. When possible, door repairs should be scheduled when personnel traffic in the space is at a minimum. Ensure the following precautionary steps are followed.

600-14.5.5.1 Notify personnel in the space that the door to that space (by number) will be under inspection and repair, and to utilize alternate door or doors for access.

600-14.5.5.2 Secure passage to the door.

600-14.5.5.3 Place signs on door and near door inside and out reading, "Personnel Working Behind Door; Use Alternate Access".

600-14.5.6 Repair Tools Required. Refer to table 600-14.9 for a list of door removal/ installation tools required for metal joiner doors.

**Table 600-14.9. Door Removal/Installation Tools Required**

<b>REMOVAL/INSTALLATION TOOLS REQUIRED</b>	
Flat tip screwdriver;	#2 and #3 Phillips screwdriver
Allen wrench set, .028 - 3/4"	Utility knife
Combination wrenches, 3/8" - 1/2"	3/8" drive ratchet
Socket set, 3/8" drive, 5/16" - 3/4"	Paint scraper
Drill, 3/8" variable speed; #10 drill bits	Ball peen hammer
Flat file	Tape measure
14' of string	4' ladder
4" portable grinder	Two - 8" deep throat "C" clamps

**Table 600-14.9.** Door Removal/Installation Tools Required - Continued

<b>REMOVAL/INSTALLATION TOOLS REQUIRED</b>	
Latch/Lock set spanner wrench	Rivet gun
Safety goggles	
Tool capable of cutting 1/4" thick bulkhead	
Shim material 1/16", 1/8" and 1/4" thick x 3/4" wide x various lengths	

600-14.5.7 Door Removal Procedures.

**WARNING**

**A minimum of two people are required during door and frame movement. Possible hazard to personnel exists due to weight of door and frame.**

**WARNING**

**Closer arm will be under tension when the door is in the closed and latched position. Exercise extreme care when separating main arm from connecting arm.**

**NOTE**

The door panel should be removed from the door frame prior to removing door frame in order to reduce the weight of the components being handled.

600-14.5.7.1 Remove door panel from door frame. Separate closer main arm from connecting arm in accordance with paragraph 600-14.4.2.2.1. Place door in the open position. One person must support the door panel while a second person removes the existing hinge mounting screws from the door panel starting with the bottom hinge and moving up; remove door panel.

600-14.5.7.2 Locate the door frame mounting fasteners at the top, bottom and sides of the door frame. If the mounting fasteners are covered by lagging, carefully trim the lagging back until the mounting fasteners are exposed.

600-14.5.7.3 Inspect door frame for shims.

600-14.5.7.4 Loosen all door frame fasteners BUT DO NOT REMOVE.

**CAUTION**

**Shims must be removed when the door frame fasteners are removed. Identify and record location of each shim for reinstallation in the same location. Retain shims for installation with new door in order to prevent door from dragging or binding due to warped bulkhead.**

**NOTE**

Caulking may be applied between the door frame and bulkhead. If caulking is present, remove caulking prior to removing the door frame fasteners and shims.

600-14.5.7.5 Remove mounting fasteners and shims from top and bottom of door frame.

600-14.5.7.6 Remove mounting fasteners and shims from handle side of door frame.

600-14.5.7.7 While one person supports door frame, remove mounting fasteners and shims from hinge side of door frame.

600-14.5.7.8 While two people support door frame, tilt door frame away from bulkhead. Lift and remove the door frame out of the bulkhead.

600-14.5.8 Door Installation.

**CAUTION**

**A major cause of door failure can be attributed to riveting or bolting frames directly against warped bulkheads without shims, which can result in twisted frames and door panel not seating properly.**

600-14.5.8.1 Preparation of Site.

600-14.5.8.1.1 The opening in the bulkhead must be plumb and relatively flat.

600-14.5.8.1.2 The bulkhead surface must be free of foreign matter. Remove all gasket material and caulking from bulkhead.

600-14.5.8.1.3 Bulkhead warpage can be checked by string lines. Position the string lines at opposite top and bottom corners, pull the lines tight, and check the space between the intersection of the string lines. Repeat this process by placing the string line that was in the closest position to the farthest position. If the string lines touch after process is complete the bulkhead is relatively flat. If there is a space between the string lines then the door frame needs to be shimmed approximately the distance between the lines.

600-14.5.8.2 Unpacking and Moving Door.

**WARNING**

**A minimum of two people are required during door movement. Possible hazard to personnel exists due to weight of door panel and frame.**

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600-14.5.8.2.1 With lid removed from shipping crate, visually inspect the door for obvious damage. Check the pull of the door to ensure that you have the correct door (i.e., left hand or right hand). Great care must be taken when removing the door from the crate. Always move the door with the pull side of the door facing upward to prevent the door from opening during movement.

600-14.5.8.2.2 If door frame and panel must be handled sideways for movement through narrow passageways, ensure that the door panel will not open during transit.

**CAUTION**

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**Do not force the door flange to align with previous holes in bulkhead. This will cause warping of the door frame.**

**CAUTION**

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**Failure to shim before final riveting or bolting to a warped bulkhead will cause the frame to assume the contour of the bulkhead. The door may drag, bind or it will not operate correctly or at all. This will result in excessive wear and premature failure.**

600-14.5.8.3 Mounting. The most common installation problem associated with metal joiner doors is that they are mounted into warped or uneven bulkheads. This causes the door frame to assume the shape of the deformed bulkhead. In the worst cases, this has caused new doors to be immediately inoperable. In less severe cases, the door hinges fail prematurely. The following procedures shall be accomplished to ensure proper installation:

**WARNING**

---

**A minimum of two people are required during door movement. Possible hazard to personnel exists due to weight of door panel and frame.**

600-14.5.8.3.1 Position the door and frame into the bulkhead opening. The combined weight of the door frame and panel is approximately 55 to 120 pounds depending on the type of door.

600-14.5.8.3.2 With the frame in position and parallel to the deck, check mating surfaces and identify any locations where the frame is separated from the bulkhead by more than 1/8".

600-14.5.8.3.3 If shims were present during the removal of the old door (refer to paragraph 600-14.5.7), verify shim locations and the thickness of shims required. Align holes in old shims to the mounting holes in the door frame. Clamp the door frame and shim(s) to the bulkhead. Ensure a flat mounting plane is achieved. If no shims were present during the removal of the old door, proceed to paragraph 600-14.5.8.3.4.

600-14.5.8.3.4 For separations between the door frame and bulkhead of 1/8" to 3/8", manufacture shims of varying thickness using 3/4" wide flat bar. Clamp the door frame and shim(s) to the bulkhead. Ensure a flat mounting plane is achieved.

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600-14.5.8.3.5 Separations between the door frame and the bulkhead greater than 1-1/2" require the bulkhead to be either straightened or replaced in accordance with standard structural practices.

**NOTE**

The metal joiner doors are to be mounted using 3/16" aluminum rivets or 10-32 UNC panhead screws with #10 flat washers and nyloc nuts. The length of the rivets, bolts or screws should be determined by the thickness of the bulkhead and the thickness of the shims. There must be 3 to 5 threads of the bolts or screws extending beyond the nuts.

600-14.5.8.3.6 Once a flat mounting plane is achieved, drill .193 diameter (#10 drill bit) holes in the bulkhead to mount the door frame. Use the holes provided on the door frame flange as a drilling template if frame is pre-drilled. Drill and attach the door frame on the hinge side by installing the fasteners in every other mounting hole. Drill and attach the door frame on the latch side by installing the fasteners in every other mounting hole. Drill and attach the door frame on the top and bottom (where applicable) sides by installing the fasteners in every other mounting hole.

600-14.5.8.3.7 Cycle the door from the fully closed position to the fully open position several times while checking for binding and rubbing. Check to ensure door panel sits flush with door frame in the closed position. If binding or rubbing is present or if door panel does not sit flush with door frame in the closed position, check the frame to the bulkhead mounting surface and identify if shims need to be added or removed. Install or remove shims as required until no binding or rubbing is present when door is cycled from fully closed position to fully open position and door panel sits flush with the door frame in the closed position.

600-14.5.8.3.8 Drill all remaining holes and attach the door frame to the bulkhead. Fully tighten all the mounting hardware. Cycle the door from the fully closed position to the fully open position several times while checking for binding and rubbing. Check to ensure door panel sits flush with door frame in the closed position. If binding or rubbing is present, or if door panel does not sit flush with door frame in the closed position, refer to paragraph [600-14.5.8.3.7](#).

600-14.5.8.3.9 Install latch or lock set in accordance with paragraphs [600-14.4.2.4.2](#) through [600-14.4.2.4.2.2](#).

600-14.5.8.3.10 Install closer (where applicable) in accordance with paragraphs [600-14.4.2.2.2](#) through [600-14.4.2.2.2.5](#).

600-14.5.8.3.11 Seal the voids that may exist between the door frame and bulkhead and the latch strike area with RTV 106 or equivalent.

600-14.5.9 Repair Completion Requirements.

600-14.5.9.1 Remove signs previously installed.

600-14.5.9.2 Open and close door(s) several times to prove satisfactory operation of door.

600-14.5.9.3 Upon completion of repairs and testing return door(s) to normal operation.

600.14.5.9.4 Notify personnel in the space that the repair on the door to that space (by number) has been completed.

## SECTION 15.

### SURFACE SHIP HEATING VENTILATION AND AIR CONDITIONING SYSTEMS (HVAC) FITTINGS USED FOR DAMAGE CONTROL AND SHIP SURVIVABILITY

#### 600-15.1. INTRODUCTION

This section contains a description of the operation, care, and maintenance instruction references for Damage Control (DC) fittings and components used in the design of Heating, Ventilating and Air Conditioning (HVAC) systems. Heating, ventilating and air conditioning systems provide safe, breathable air within the ship. Instructions for the operation, maintenance, and care of HVAC systems are contained in **NSTM Chapter 510, HVAC Systems**, **NSTM Chapter 512 Fans** and **NSTM Chapter 470, Section 6, Ventilation System Capability in a Toxic Environment**.

600-15.1.1. HVAC SYSTEMS DC INTERFACE. Heating, Ventilation, and Air Conditioning distributive systems and equipment arrangements aboard ship are closely involved with damage control, watertight integrity and fire fighting systems. Damage control classification of the ventilating systems, air conditioning systems, accesses, fans, and closures, are covered in **NSTM Chapter 079 Volume I, Damage Control - Stability and Buoyancy**. HVAC system operation during firefighting is covered in **NSTM Chapter 555, Shipboard Firefighting**. The general types of DC fittings/components are described in the paragraphs below.

600-15.1.2. HVAC CLOSURES (VALVES/COVERS) AND DAMPERS. DC fittings such as, closures; dampers and covers are installed at the weather intakes/discharges openings or in the distributive system ductwork of ventilation and air conditioning systems to enhance the ships' DC and ship survivability features. HVAC systems and fittings are classified in accordance with standard damage control classifications for ship operation. These are required for flooding protection, power conservation, vital functions and CBR threat protection. Table **600-15-1** provides the required DC classifications labeling required for fans and watertight closures installed in HVAC systems.

Watertight closures (butterfly valves) and watertight (WT) covers (hinged plates) when secured will preclude the shipping of water and spread of fire/smoke across fire zones (FZ) boundaries and WT subdivision bulkheads/decks as well as WT boundaries of compartments (magazines) in the event of a breach in the ductwork penetrating the boundary as a result of ship battle damage or compartment damage by a peace time internal fire or explosion. They may be located in the ductwork at the boundary penetration or where the ductwork terminates in a compartment that is designated as watertight according to vital space designation requirements for the ship. Closures can be valves of the "butterfly type" that can be closed manually by a handle or wheel on the closure; remotely by mechanical linkage operators; or automatically by electric actuators. Covers (hinged plate) are usually closed manually at the cover based on system and boundary DC classification for GQ.

Dampers are louvered blades or single plate HVAC fittings installed in ventilation and air conditioning systems to secure, divert or reduce airflow in ventilation or air conditioning systems ductwork. They are usually not "watertight" but either airtight or fire tight or both. A fire damper can be used in a duct penetration of a FZ bulkhead where water tightness is not a requirement, such as spaces in the superstructure of a ship above the bulkhead deck. Dampers can be closed manually, remotely or automatically depending on their function and on whether HVAC system fans are de-energized to rapidly minimize airflow.

**Table 600-15-1. FAN AND CLOSURE DC CLASSIFICATIONS**

CLASS SYM-BOL	CLASS DEFINITION
W	Fan operating or closure open under all conditions of ship operation.
Ⓜ	Fan secured or closure closed only during NBC warfare.
X	Fan normally secured and closure normally closed. Fan is operated and closure opened only when the damage control officer authorizes blowout of the space served by the fan and closure.
ⓧ	Fan normally secured and closure normally closed. Fan maybe operated and closure opened during General Quarters without approval of damage control officer.
Y	Fan normally secured and closure normally closed. Fan is operated and closure opened only when the space served is in use.
Z	Fan normally operating and closure normally open but secured and closed respectively during General Quarters.
Ⓩ	Fan normally operating and closure normally open but secured and closed respectively during General Quarters. Fan may be operated and closure opened during prolonged periods of General Quarters to permit preparation of food, operation of sanitary facilities, etc.

600-15.1.3. GENERAL SAFETY PRECAUTIONS. Safety precautions must always be taken when operating or working on heating, ventilating, and air conditioning systems and equipment. Before performing maintenance or repairs, personnel shall make certain that all equipment that might affect the work area is properly secured and tagged OUT OF SERVICE. No personnel shall enter any space subject to toxic gases or fumes until that space has been certified as "gas-free" in accordance with **NSTM Chapter 074 Volume 3, Gas Free Engineering**. Follow precautions on the Planned Maintenance System (PMS) cards. Do not stand under the duct, or under any equipment, when it is suspended from handling equipment (chain falls and other rigging equipment). All handling equipment used must first be known to be adequate for the intended use.

Ventilating systems are designed to meet strict requirements regarding water tightness, air tightness, cleanliness, maintainability, and repairability. Ventilation ducts that penetrate certain defined watertight boundaries below the Flooding Water Levels (FWL) have watertight closures.

**CAUTION**

**Unauthorized alterations may compromise the watertight integrity of the ship or degrade the performance of the HVAC system.**

Because many ventilation ducts that run below the FWL's are designed to be watertight, no alterations to ventilation systems should be made without specific approval from the Naval Sea Systems Command (NAVSEA).

600-15.1.4. DEFINITIONS. The following definitions of HVAC fittings and DC terms briefly describe the components and DC terminology used in providing HVAC DC fitting aboard surface ships.

600-15.1.4.1. Closures. Closures, are often referred to as "valves" if they contain a butterfly type closing device, are water tight and fire tight (FT) positive shutoff fittings installed in supply and exhaust ventilation system and air conditioning system distributive ductwork at duct penetrations of WT/FZ bulkheads, WT subdivision bulkheads, WT decks (DC deck), and WT compartment boundaries, such as those provided for magazines and

flammable material storage and issue spaces above or below the DC deck. The purpose of these closures (valves) is to prevent shipping of water and/or spread of fire into the adjacent subdivision/compartments because of a breach in the ventilation or air conditioning ductwork penetrating that boundary. Other functions of WT closures (valves) will be discussed herein, as appropriate.

600-15.1.4.1.2. Covers. Covers are WT positive airflow shutoff devices (rectangular or round) installed in ventilation or air conditioning system at the end of a duct branch (e.g. where an air duct enters a space at a compartment bulkhead penetration) or in ventilation system intake or discharge openings at the weather to prevent "green seas" from entering a ventilation system at the weather openings. Covers usually have a hinged plate with a strong-back closing device to the air passage.

600-15.1.4.1.3. Dampers. Dampers may be installed in ventilation and air conditioning system ductwork or at weather intake/discharge openings of certain supply and exhaust systems to control airflow. They are not classified as WT fittings. Dampers are multi-bladed (louver type) or solid plates and can minimize or change direction of airflow within a system, proportion airflow between two duct branches in the same system, divert airflow to/from compartments/areas to other compartments/areas in a subdivision. Dampers can be manually controlled (open/shut) via a handle attached to a damper closing mechanism or automatically actuated via an electrically or pneumatically powered operator when system fans are secured for DC purposes. Dampers are not completely airtight but sufficiently tight to accomplish desired DC results.

600-15.1.4.4. Flooding Water Level (FWL) 1. The highest water level that can be expected at any particular intact main transverse watertight bulkhead, when that bulkhead serves as a flood-confining boundary, after any flooding that the ship is expected to survive.

600-15.1.4.5. Flooding Water Level (FWL) 2. The highest water level that can be expected above the bulkhead deck at a particular intact watertight subdivision, after any flooding elsewhere in the ship, and that the ship is expected to be capable of surviving.

600-15.1.4.6. Remote Operating Gear. Remote operating gear is provided only for magazine WT closures below decks and WT closures used at penetrations of fire zone boundaries on the DC deck but below FWL 1. Most other closures are locally controlled, and every effort is made to provide accessible locations for the closure operator. When this is not possible, as in some stowage spaces, extension stems are provided to permit operation from the working area of the space or immediately adjacent to the space.

## **600-15.2. CLOSURES (VALVES AND COVERS)**

600-15.2.1. OVERVIEW. HVAC system WT closures (valves and covers) that are used for damage control and containment should have the same degree of tightness as the deck or bulkhead affected, so that air tightness or water tightness will not be impaired. Closures must be maintained in working order. Some weather openings may have closures for protection from water ingestion into ventilation supply systems serving spaces not requiring continuous ventilation or where a closure is necessary for compartment testing. These closures require the same attention and upkeep as described for interior closures. Ventilation WT closures are designed to be quick closing and are usually of one of the following types:

600-15.2.2. "R" (ROUND) and "K" (FLAT OVAL) CLOSURES. These closures (valves) have butterfly-type closing devices that are round or flat oval. "R" and "K" ventilation closures are watertight, fire-resistant closures used at fire-zone and WT bulkheads. They are installed between bolted duct flanges without the use of additional



flange gaskets. Seats and seals that expand when heated provide water tightness and fire resistance. The normal working temperature for Navy Standard "R" and "K" ventilation closures can be as high as 1500°F in emergency conditions. Both "R" and "K" closures are rated for 15 psi working pressure and 30 psi maximum pressure. "R" and "K" ventilation closures meet the requirements on NAVSEA drawings Nos. 804-1749102 and 804-1749103. "R" ventilation closures are available in 16 sizes and "K" ventilation closures are available in 11 sizes, as specified on the drawings.

Special handles, worm gear operators, and electric actuators are available for both types of closures. The handle is designed for one-hand operation and can be mounted in any quadrant in relation to the valve body. The worm gear operator features a Navy standard hand wheel and is encased in a watertight and fire-resistant housing. The Navy standard hand wheel meets the requirements of NAVSHIPS drawing No. 803-1385620. Navy Standard "R" and "K" ventilation closures with handle and worm gear operators are shown in **Figure 600-15-2-1**. Physical data for Navy Standard "R" ventilation closures are shown in **Figure 600-15-2-2**. Physical data for Navy Standard "K" ventilation closures are shown in **Figure 600-15-2-3**. When only one Navy Standard "R" or "K" ventilation closure is installed at a WT fire-zone boundary, a remote, manual operator must be used to control the closure from the other side of the boundary. The operator uses a quick disconnect coupling at the closure and a Navy standard handwheel at the other end of the operator along with various combinations of geared joints or gearboxes, universal joints, solid reach rods, flexible shafts, and spline couplings.

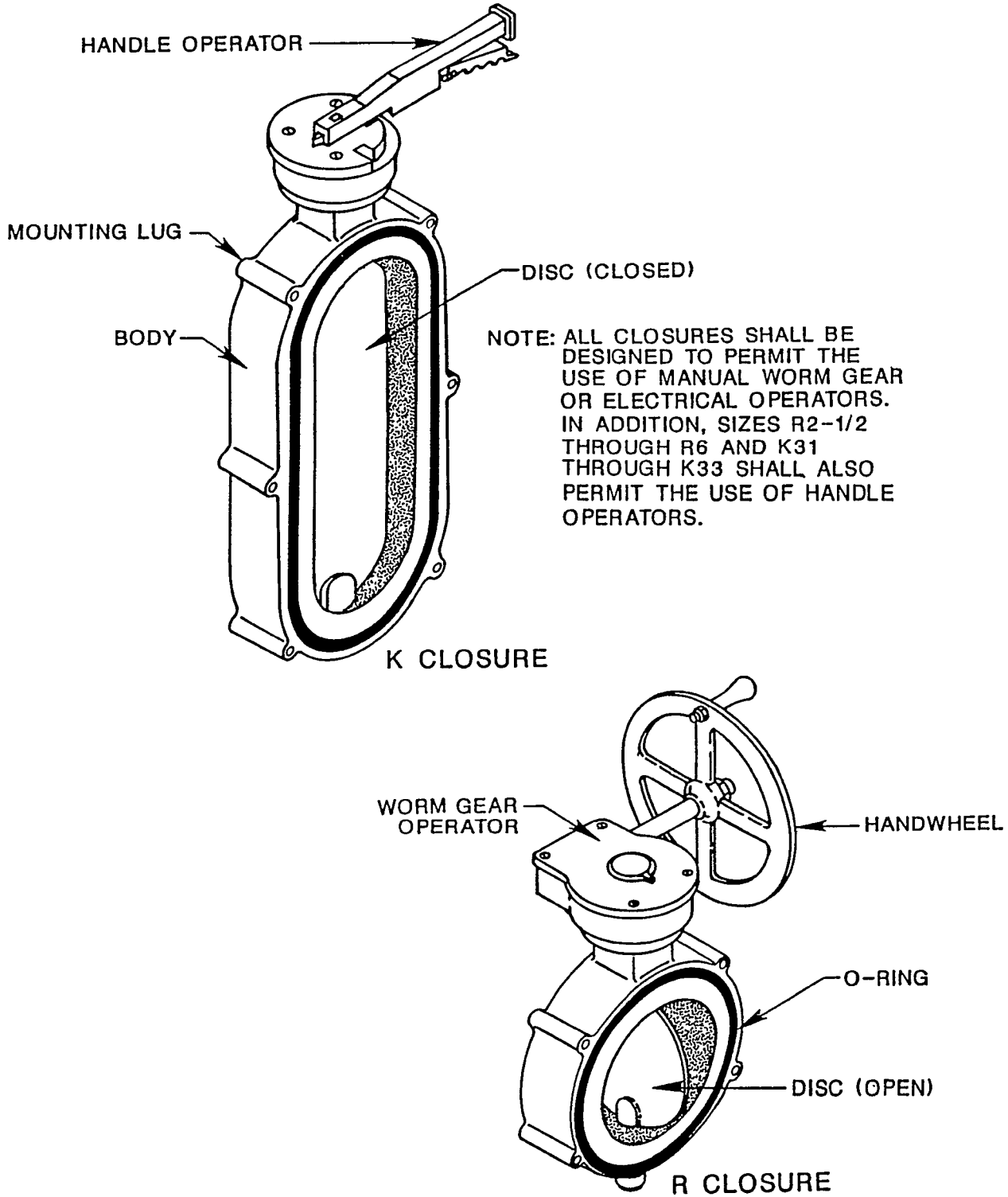


Figure 600-15-2-1. R and K Ventilation Closures

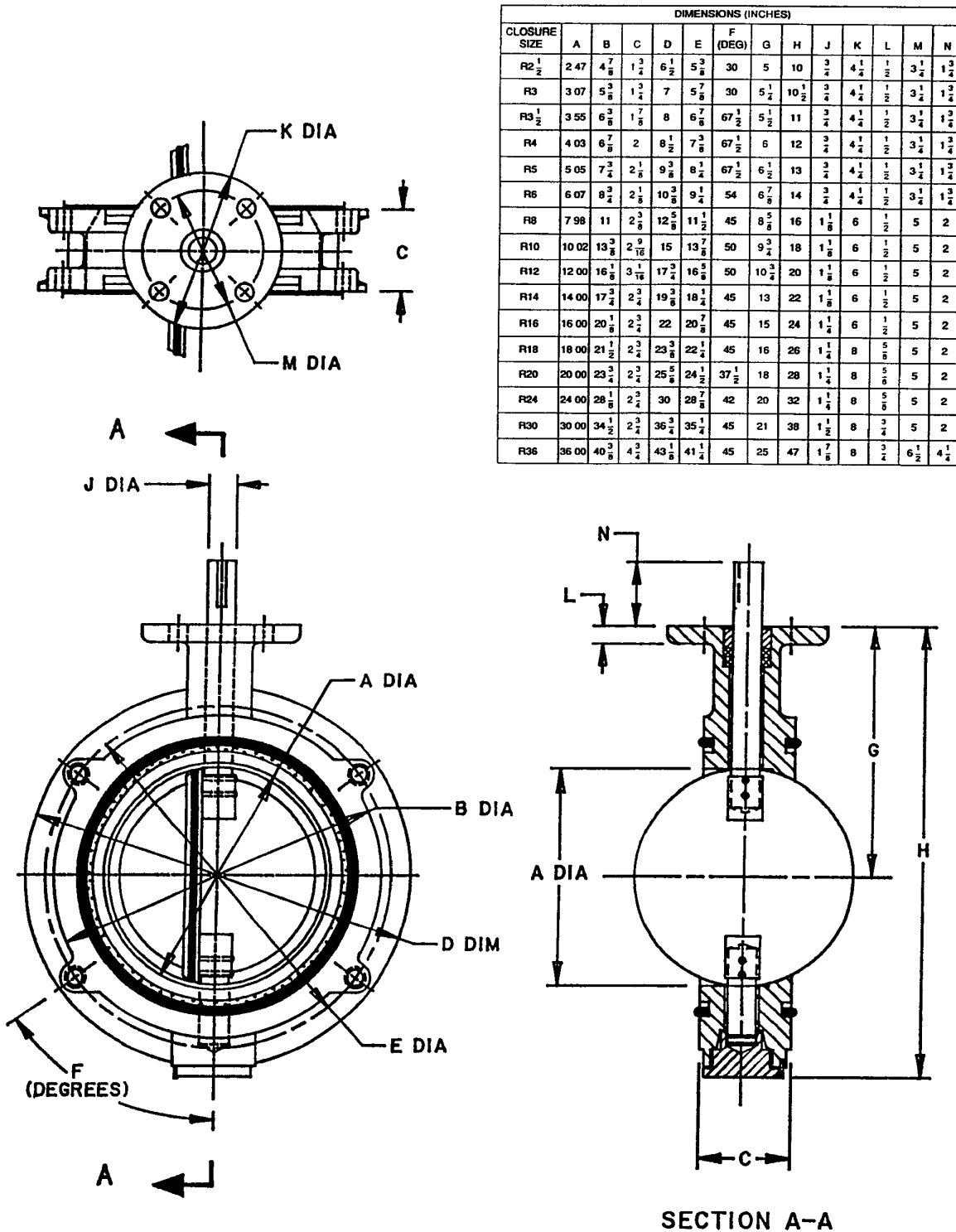
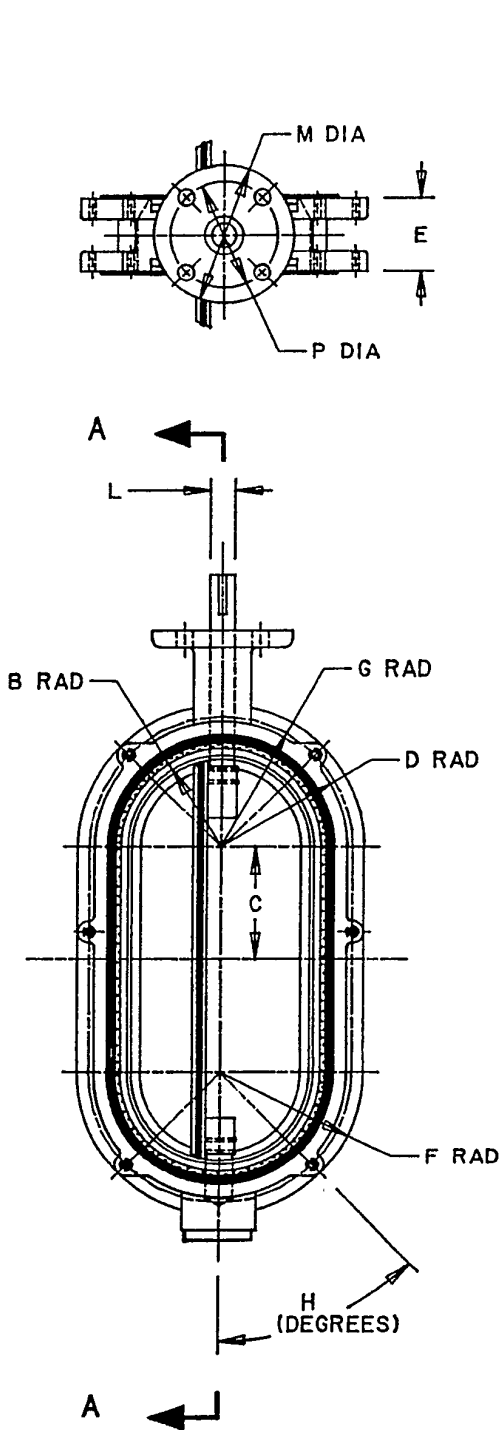


Figure 600-15-2-2. "R" Ventilation Closure - Physical Data



DIMENSIONS (INCHES)																
CLOSURE SIZE	A	B	C	D	E	F	G	H (DEG)	J	K	L	M	N	P	R	
K31	7	1 1/2	2	2 11/16	2 3/8	3 1/2	2 15/16	30	7 1/4	15	3 3/4	4	3 3/8	3 1/4	3 3/4	
K32	8	2	2	3 7/16	2 3/8	4 1/4	3 11/16	67 1/2	7 3/4	16	3 3/4	4	3 3/8	3 1/4	3 3/4	
K33	9	2 1/2	2	3 7/8	2 3/8	4 11/16	4 1/8	67 1/2	8 1/4	17	3 3/4	4	3 3/8	3 1/4	3 3/4	
K34	11	3	2 1/2	4 3/8	2 3/8	5 3/16	4 5/8	54	9 1/4	19	3 3/4	4	3 3/8	3 1/4	3 3/4	
K35	13	3 1/2	3	4 15/16	2 3/8	5 3/4	5 3/16	54	10 7/8	21	1 1/8	6	1 1/2	5	2	
K36	16	4	4	5 1/2	2 3/8	6 5/16	5 3/4	45	12 3/8	24	1 1/8	6	1 1/2	5	2	
K37	20	4 1/2	5 1/2	6 1/8	2 3/8	6 15/16	6 3/8	45	14 3/8	28	1 1/8	6	1 1/2	5	2	
K38	24	5	7	6 11/16	2 3/8	7 5/8	7 1/16	45	16 3/8	32	1 1/8	6	1 1/2	5	2	
K39	24	7 1/2	4 1/2	9 7/16	2 3/8	10 3/8	9 13/16	30	16 3/8	32	1 1/8	6	1 1/2	5	2	
K40	30	8	7	10 1/16	2 3/4	11	10 7/16	45	19 3/8	38	1 1/8	6	1 1/2	5	2	
K41	30	10	5	11 7/8	2 3/4	12 13/16	12 1/4	37 1/2	19 3/8	38	1 1/8	6	1 1/2	5	2	

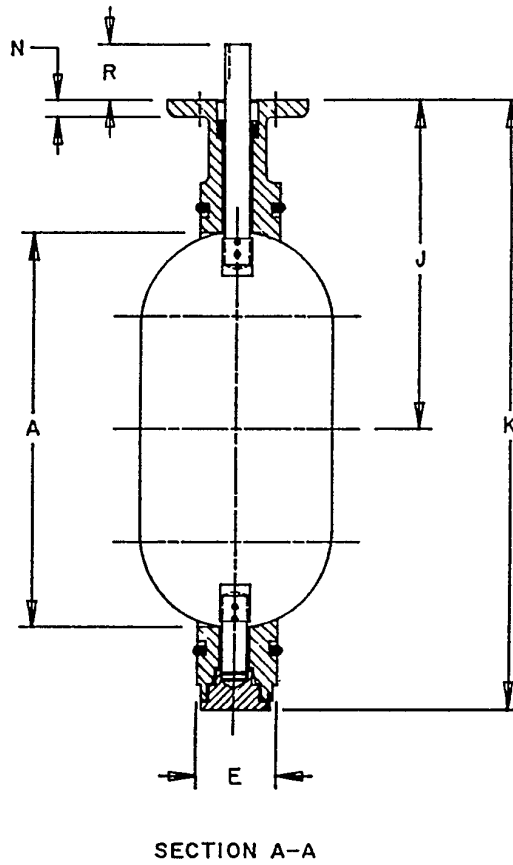


Figure 600-15-2-3. "K" Ventilation Closure - Physical Data

600-15.2.2.1. Remote Mechanical Operating Gear for "R" AND "K" Closures. Geared joints, gearboxes, and universal joints permit the remote operator to change direction as it is routed through the ship. Spline couplings permit expansion and contraction to occur laterally along a solid reach rod without binding the operator's geared joints and gearboxes. Flexible shafting with a maximum length of 8 feet may be used. Remote operating equipment meets the requirements of BUSHIPS drawings Nos. 4824-841650, 4824-841651, 4824-841652, 4824-841653, 4824-841654, and 4824-841655. Various remote operator components are shown in **Figure 600-15-2-4**. All of the gear must be maintained in good operating condition. Clothing and other items must not be stowed in such manner as to foul the operating gear and impede or prevent its operation. Stuffing boxes must be set up tightly enough to maintain the tightness of the bulkhead penetrated, without interfering with the ready operation of the gear. Operating gear of closures and ventilators should be cycled as required.

600-15.2.2.2. Electric Actuators for "R" and "K" Closures. Type R and K valves are sometimes installed with electric actuators. These actuators may be actuated with an automatic device, such as a pressure switch, or a manual switch. Manual operation of some valves with electric actuators is possible only when the power to the actuator is shut off. For this case, the actuators are controlled by a two-position snap switch (OPEN, CLOSE). If manual operation of these valves is attempted no damage will occur. However, as soon as the manual hand-wheel is released, the valve will return to its previous position. Other actuators are wired so that they can be operated manually. These actuators are wired with a two-position momentary contact switch (OPEN, CLOSE) or a three-position snap switch (OPEN, STOP, CLOSE). The two-position momentary contact switch allows manual operation of the valve at all times because the actuator is energized only while opening or closing the valve electrically. This type of switch must be held in position for the entire time that the valve is being repositioned. The three-position snap switch operates the same way as the two-position snap switch, except for the STOP position. This position de-energizes the circuit and permits manual operation of the valve. In some Halon systems, the electric actuator is wired so that the valve can be manually operated under all conditions except when Halon is discharged. In this case, a relay switch signals the actuator to close the valve, which disconnects the open contacts of the actuator. Subsequently, manual opening is required. Except when the Halon system is being discharged, manual operation is possible.

600-15.2.3. "F" CLOSURES (COVERS). An "F" closure is an end-of-line cover used as a watertight duct closure, with a strong back that secures the cover. The strong-back must be engaged under two hooks attached to the cover frame and secured by a handle whose axle forms the strong-back pivot. "F" covers are available in round and rectangular shapes with various hinge and strong-back configurations. The use of "F" covers at weather openings is limited by the proper use of airlifts. "F" covers may be used in special applications to protect intermittent ventilation systems from water ingestion. An "F" cover is shown in **Figure 600-15-2-5**.

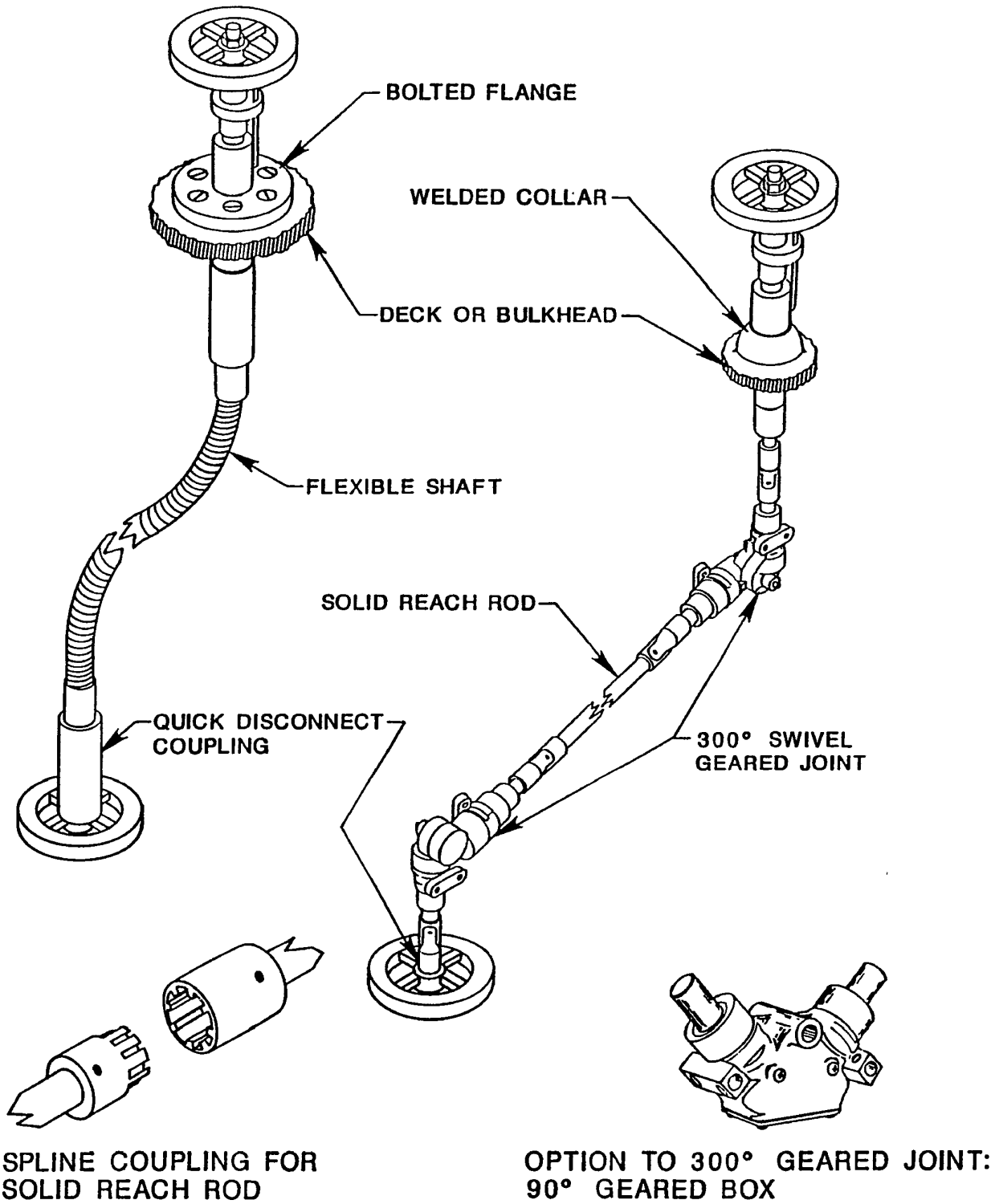


Figure 600-15-2-4. Ventilation Closure Remote Operators

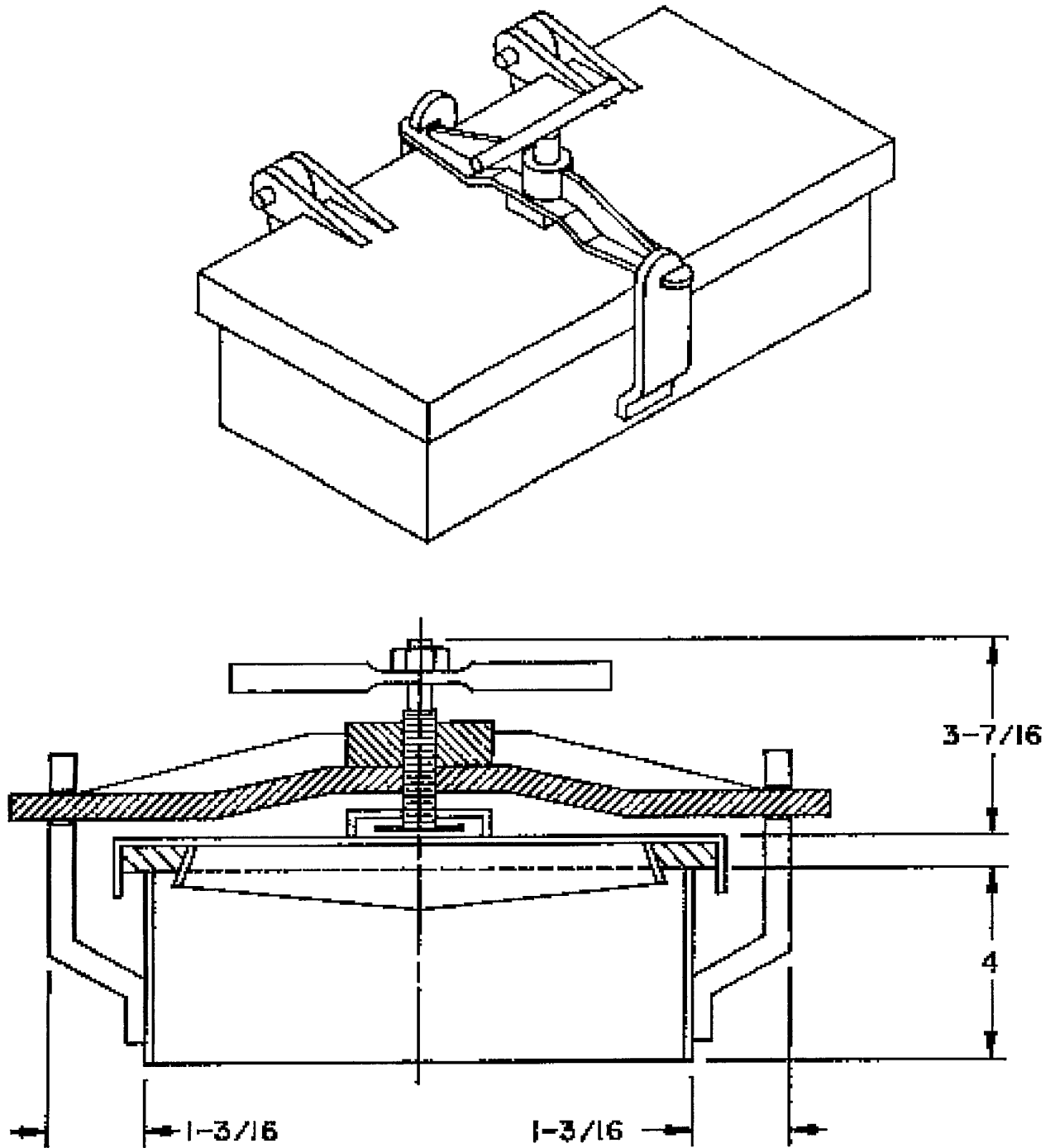


Figure 600-15-2-5. "F" Cover

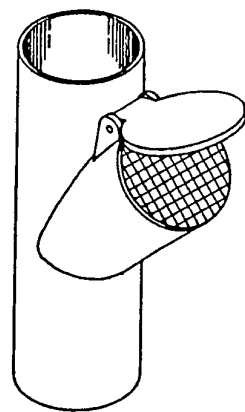
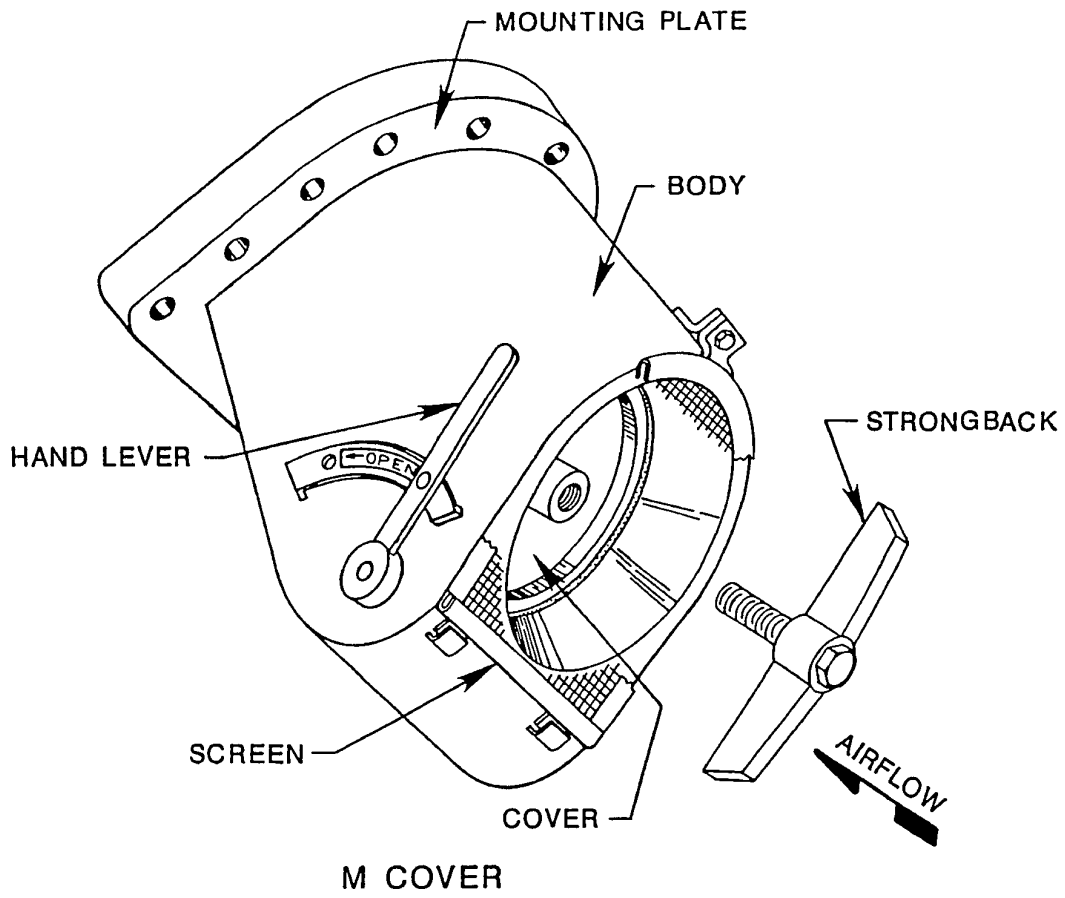
600-15.2.4. "M" CLOSURES (COVERS). M covers are watertight, air-escape check valves used in watertight duct serving a magazine that is also used as an air escape during magazine flooding operations. They consist of a gasketed flapper valve mounted in a housing that is secured to the open end of the magazine exhaust duct. "M"

covers allow air to escape from the magazine during flooding operations but do not permit anything to enter the magazine through the exhaust duct. An "M" cover is shown in **Figure 600-15-2-6** . "M" covers may be installed vertically or horizontally. Physical data for "M" covers are shown in **Figure 600-15-2-7** . Naval shipboard applications typically use 4- and 5-inch diameter "M" covers. Since magazine exhaust ductwork is sized for blowout, when exhaust ducts larger than 5 inches are required, a Navy Standard "R" or "K" ventilation closure is used with an "M" cover mounted in a branch off the exhaust main before the closure. This special installation is shown in **Figure 600-15-2-8** . A strong back is provided to secure the "M" cover during magazine pressure testing. The strong back must be removed after pressure testing or the "M" cover will not operate. The strong back is stored on a clip mounted on the bulkhead next to the "M" cover.

600-15.2.4.1. Overflow Check Valves. Overflow check valves are swing type check valves used in water and air escapes during magazine flooding. These valves permit air or water to escape from the air escape ductwork when the magazine is flooded. These valves do not allow anything to enter the ductwork. The valves are required in air escape ductwork that extends above the V-lines. The valves are installed in a section of air escape ductwork located above the V-lines. Instances have been reported where the check valves have been reversed when installed, thus providing valve operation in the wrong direction. The installation of these check valves should be inspected and the valves removed and properly reinstalled if necessary. When the check valve is of the ordinary swing type, a pipe plug is inserted in the end during compartment testing (see **NSTM Chapter 079 Volume 2, Damage Control - Practical Damage** ). Care should be taken to ensure that such plugs are removed immediately after the test.

600-15.2.5. ANTI-BLAST VALVES. Anti-blast valves are installed at the supply and exhaust system weather openings of Limited Protection (LP) and Total Protection (TP) Collective Protection System (CPS) applications. Anti-blast valves are designed to close on blast overpressure impact and re-open after the blast overpressure has passed. This design protects ventilation equipment from damage; reduces the possibility of shipboard chemical, biological, and radiation contamination; and permits the CPS ventilation fans to continue operating.

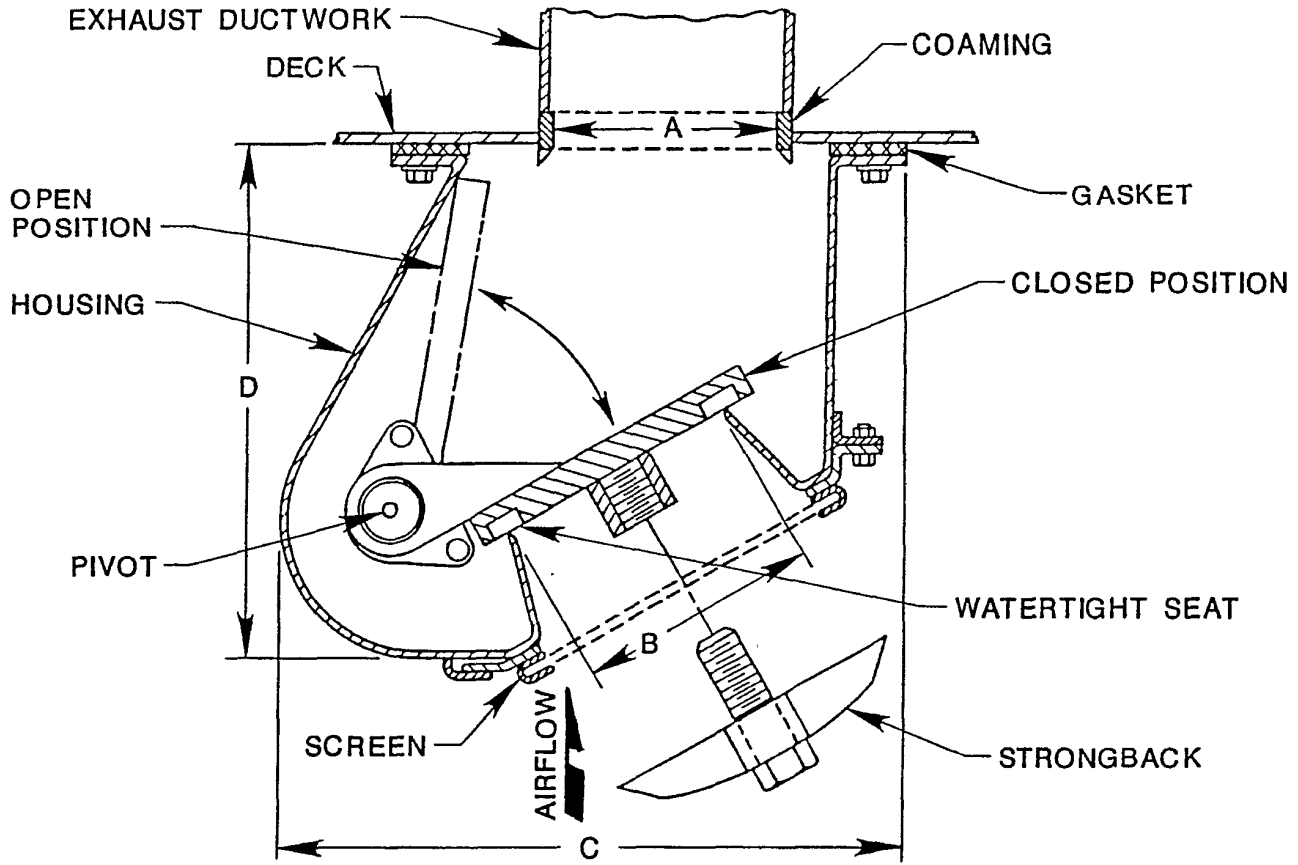




OVERFLOW CHECK VALVE

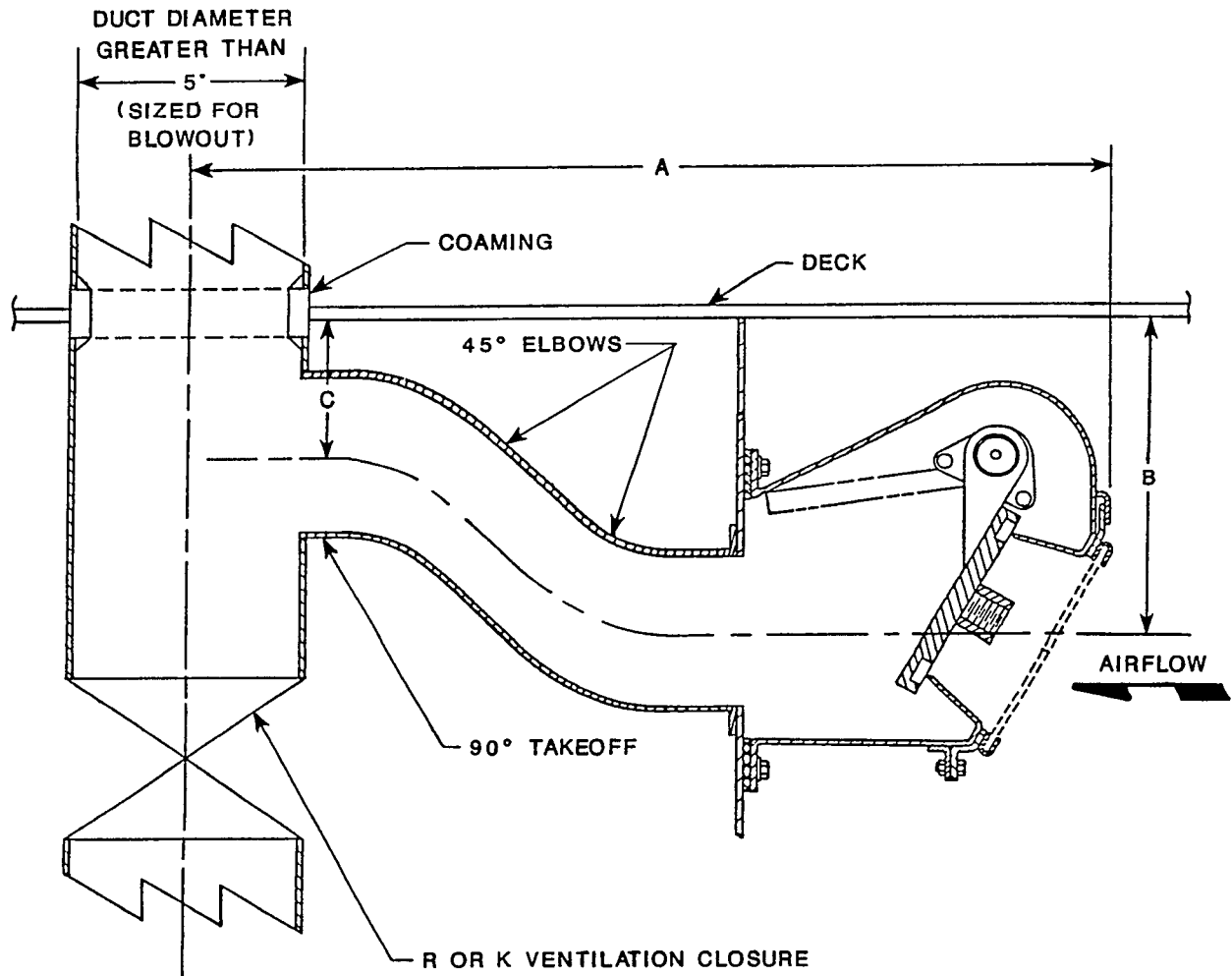
Figure 600-15-2-6. "M" Cover and Overflow Check Valve

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DIMENSIONS (INCHES)			
A	B	C	D
4	4	10 $\frac{1}{2}$	9 $\frac{1}{16}$
5	5	11 $\frac{3}{16}$	10 $\frac{3}{32}$

Figure 600-15-2-7. "M" Cover - Physical Data



PHYSICAL DATA			
A (inches)	B (inches)	C (inches)	M COVER SIZE (inches)
30	10	4	4
33	11	4 $\frac{1}{2}$	5

Figure 600-15-2-8. Special "M" Cover Installation

**600-15.3. DAMPERS AND RELATED FITTINGS**

600-15.3.1. OVERVIEW. Dampers, when installed in HVAC systems for DC, will prevent ingestion of toxic gases from missile exhaust components into the ship, prevent smoke migration through the ship compartment,

and prevent spread of a fire across a non-WT fire boundary at duct penetrations into exhaust ductwork in Galley cooking equipment. Dampers also play a part in the effective routing of air to compartments or fire zones.

600-15.3.2. TOXIC GAS DAMPERS (TGD). Toxic gas dampers are installed in ventilation supply systems that have the potential to ingest toxic gases from the firing of a ship's weapon systems (guns and missiles). These ventilation supply systems are interlocked with the launch controller or salvo warning contactor, so that the dampers are closed before the firing of a weapon system that produces such gases. The same circuitry also shuts down the supply system fan. After firing is complete, a short interval (2 to 5 minutes) is allowed for gases to dissipate. A timing mechanism then opens the toxic gas damper and restarts the fan.

The Navy standard toxic damper can be used on new construction surface ships and was installed as a back-fit on some fleet ships as a result of new topside weapon system additions to existing ships. Nonstandard toxic gas dampers and actuators were used on CG 47, DDG 51 and LPD 17 classes. These are as effective as the typical Navy damper design but less expensive. An information booklet, titled "Toxic Gas Ventilation Dampers", provides information on operation, control systems, troubleshooting, and technical manuals by ship class. The booklet also provides logistic support data for both Navy standard and nonstandard TGD. It is available from NSWCCD SSES Philadelphia, Code 9213.

600-15.3.2.1. Navy standard toxic gas dampers are designed to prevent toxic gases, resulting from the firings of various weapons systems, from entering the ventilation system. In addition to being toxic to humans, these gases pose a hazard to electrical equipment. A toxic gas damper is provided at the inlets to circle W and select Z damage control classified ventilation supply systems that are located within so many feet from of a weapons launcher. Navy standard toxic gas dampers comply with NAVSEA drawing No. 803-6257699. A Navy standard toxic gas damper is shown in **Figure 600-15-3-1**. Physical data for Navy standard toxic gas dampers are shown in **Figure 600-15-3-2**. The Navy standard toxic gas damper consists of a control box mounted on a damper frame and either a single or a double tier of damper blades. Inside the control box are solenoid valves, a pneumatic actuator, and an operating mechanism. The solenoids control the flow of the ship's low-pressure (LP) compressed air to and from the pneumatic actuator in response to an electric signal received from a relay panel connected to the respective weapons system launch controller or the Salvo Warning Contactor (DD-963 Class). The pneumatic actuator uses the LP air to move the operating mechanism and open or close the damper blades. The damper blades are aerodynamically designed to minimize turbulence and pressure loss. A manual operating tool (mounted on the control box cover) can be used to open and close the damper in the event of an LP air or electrical failure.

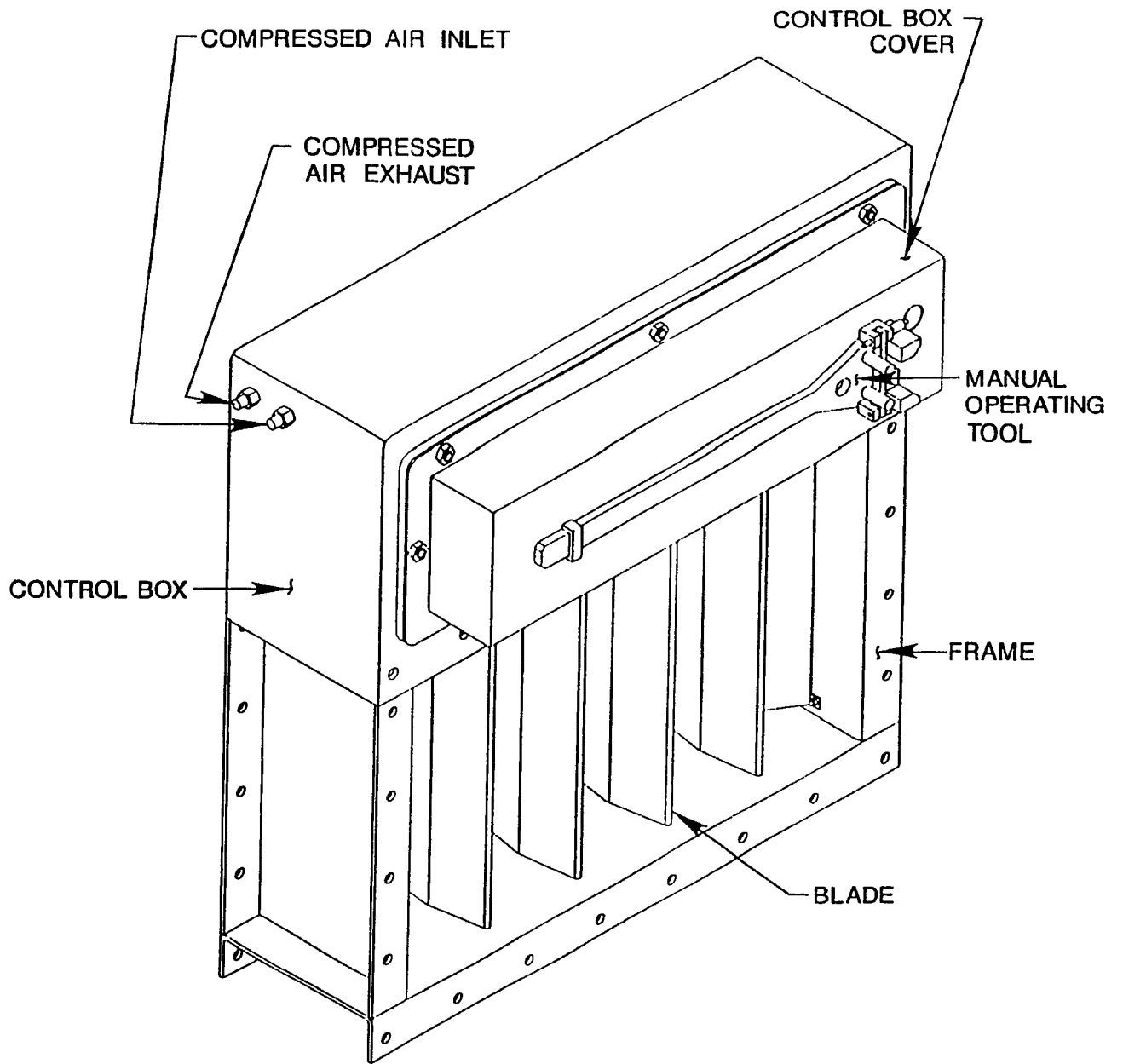
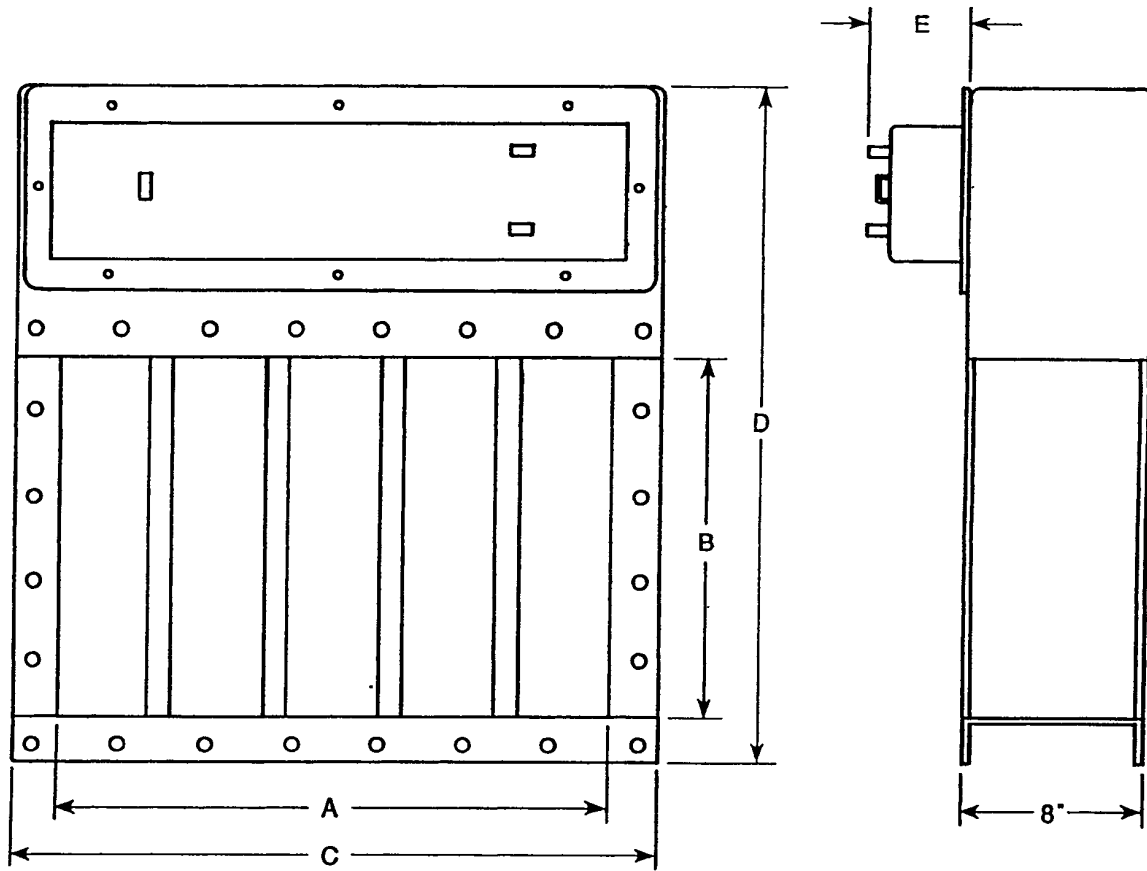


Figure 600-15-3-1. Navy Standard Toxic Gas Damper

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DIMENSIONS (INCHES)				
A	B	C	D	E
18	12	22	26	4 <sup>3</sup> / <sub>8</sub>
24	16	28	30	4 <sup>3</sup> / <sub>8</sub>
36	18	40	32	1 <sup>1</sup> / <sub>64</sub>
42	20	46	34	1 <sup>1</sup> / <sub>64</sub>
56	14	60	28	1 <sup>1</sup> / <sub>64</sub>
20	36	24	50	4 <sup>3</sup> / <sub>8</sub>
27	27	31	41	1 <sup>1</sup> / <sub>64</sub>
33	35	37	49	1 <sup>1</sup> / <sub>64</sub>
41	43	45	57	1 <sup>1</sup> / <sub>64</sub>
84	60	88	74	1 <sup>1</sup> / <sub>64</sub>

Figure 600-15-3-2 Navy Standard Toxic Gas Damper - Physical Data

600-15.3.2.2. Non Standard Toxic Gas Dampers installed on CG 47 and DDG 51 class ships are similar and manufactured by American Warming and Ventilating Company. They are a modified marine type louvered damper constructed in accordance with requirements specified in Section 512 of the shipbuilding specifications for these classes of ships. A damper control box is mounted 90 degree to the face of the damper blade frame (housing) (see **Figure 600-15-3-3** ). A toxic gas ventilation control panel, connected to the respective weapons system launch or gun firing control system computer, sends an electric signal to a solenoid valve, which then directs compressed air from the ship's low-pressure (LP) system to a pneumatic actuator. The pneumatic actuator then closes the damper blades. A spring return is provided to re-open damper blades when the solenoid valve relieves air pressure. The frame, blades and axles are type 316L CRES. Linkages are type 316 CRIES bars and arms with type 316 CRIES pins and oil-impregnated bronze bearings.

600-15.3.3. DE-SMOKING DAMPERS The de-smoking damper for the galley is a normally closed damper installed in-line similar to a galley auxiliary exhaust terminal or as an independent terminal off the galley main exhaust duct. It consists of a control box mounted on a damper frame and a single-blade damper. The de-smoking damper is designed for use (activation) after a galley fire is secured because residual smoke from the fire still remains. While the airflow through the de-smoking damper is not 100 percent replacement for the exhaust airflow capacity of the ventilation grease interceptor hoods, it is sized to exhaust not less than 50 percent of the total grease interceptor hood volume. A de-smoking damper is shown in **Figure 600-5-3-4** . For an electrically actuated de-smoking damper, a signal from a remote switch deactivates a solenoid located in the control box, and a spring opens the damper blade. The remote switch is located outside the galley and activated by ships' force. The de-smoking damper must be manually reset by pushing the manual operating lever until the spring is reloaded.

A de-smoking damper installation can be by manual operation, in which case the spring and solenoid device are not required. This de-smoking damper is opened by mechanical remote operating gear (solid reach rod or flexible shaft) attached to the damper blade. The remote gear control extends to a location outside the galley that is adjacent to the remote stop-start switches used for the galley exhaust fan. When the galley fire is secured, the de-smoking damper is opened (using the operating gear) and galley exhaust fan is energized.

NAVSEA Drawing 804-1749099 Rev B "Centrifugal Grease Interceptor and Associated Equipment for Commissary Equipment" provides information on the design interfaces for the Galley's ventilation, de-smoking, fire fighting and wash down system.

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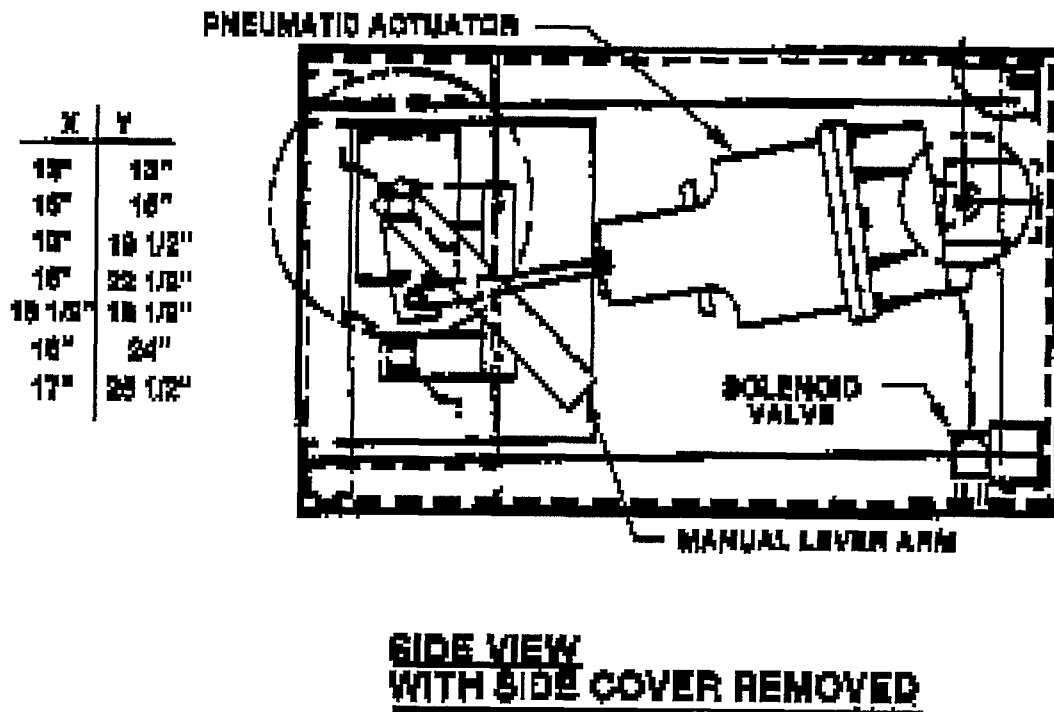
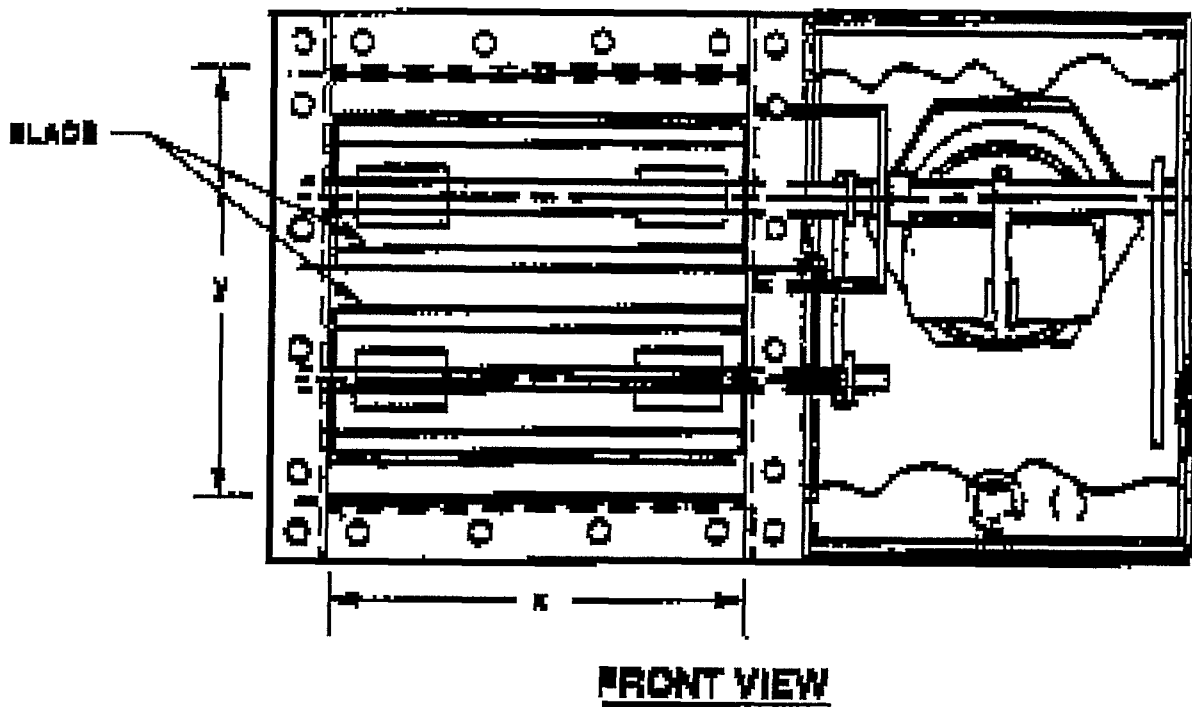


Figure 600-15-3-3. Non Standard Toxic Gas Damper



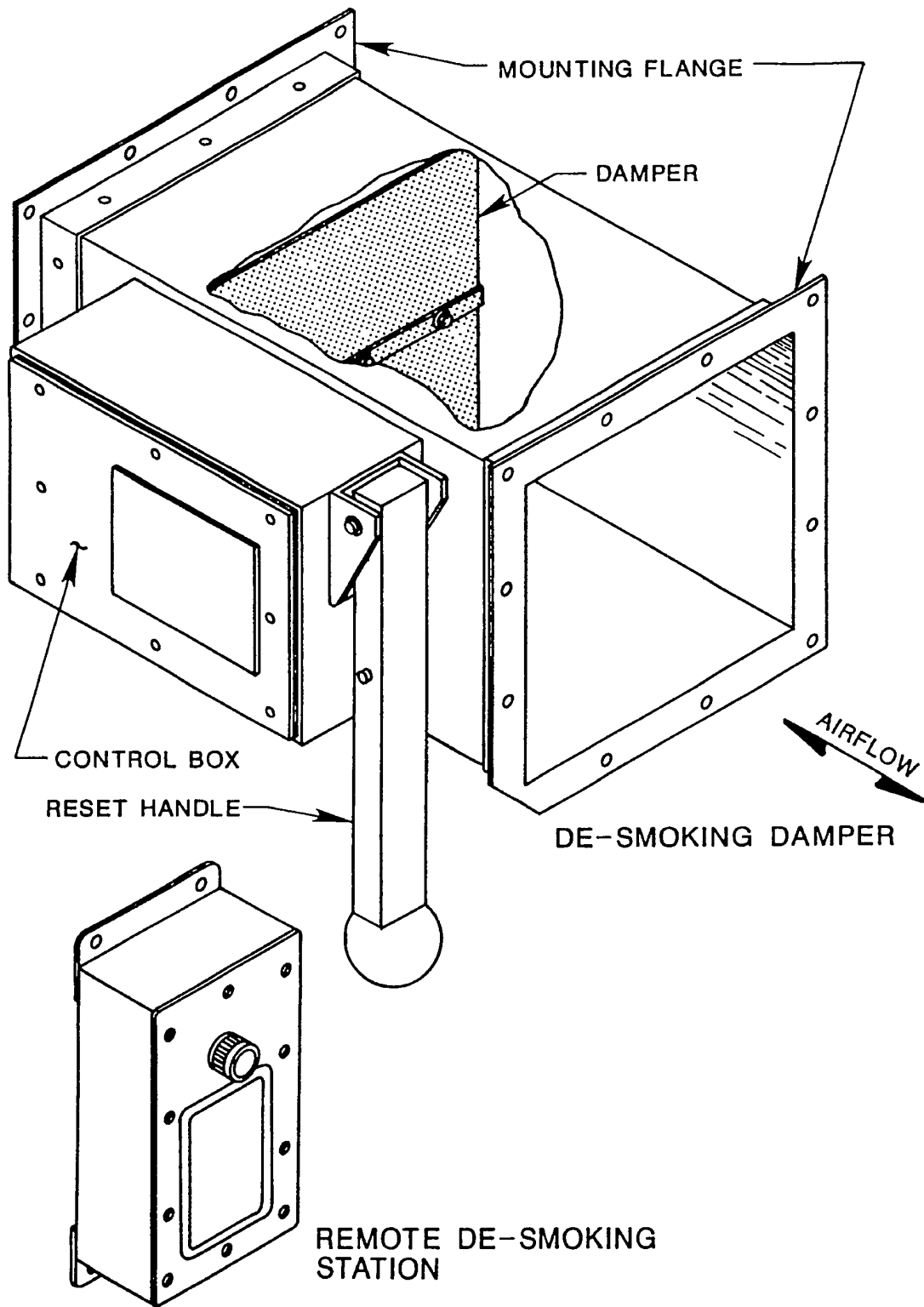


Figure 600-15-3-4. Galley De-Smoking Damper

600-15.3.4. **DIVERTING DAMPERS** Diverting dampers are installed in CPS TP Zone galley exhaust systems. They consist of a manual operating handle and positioning plate mounted on the outside and a single-blade damper mounted on the inside of a "pair-of-pants" takeoff. The operating handle is in-line with the damper to show the current damper position. These dampers are manually operated to direct all exhaust airflow from either the ventilation grease interceptor hood or the exhaust terminal connected to the takeoff branches. This airflow diversion permits the ventilation grease interceptor hoods to be cleaned (exhaust diverted from hood) without securing the exhaust system and interfering with CPS operation. Diverting dampers are clearly labeled to show both damper positions and have a label plate describing their use. A diverting damper is shown in **Figure 600-15-3-5**.

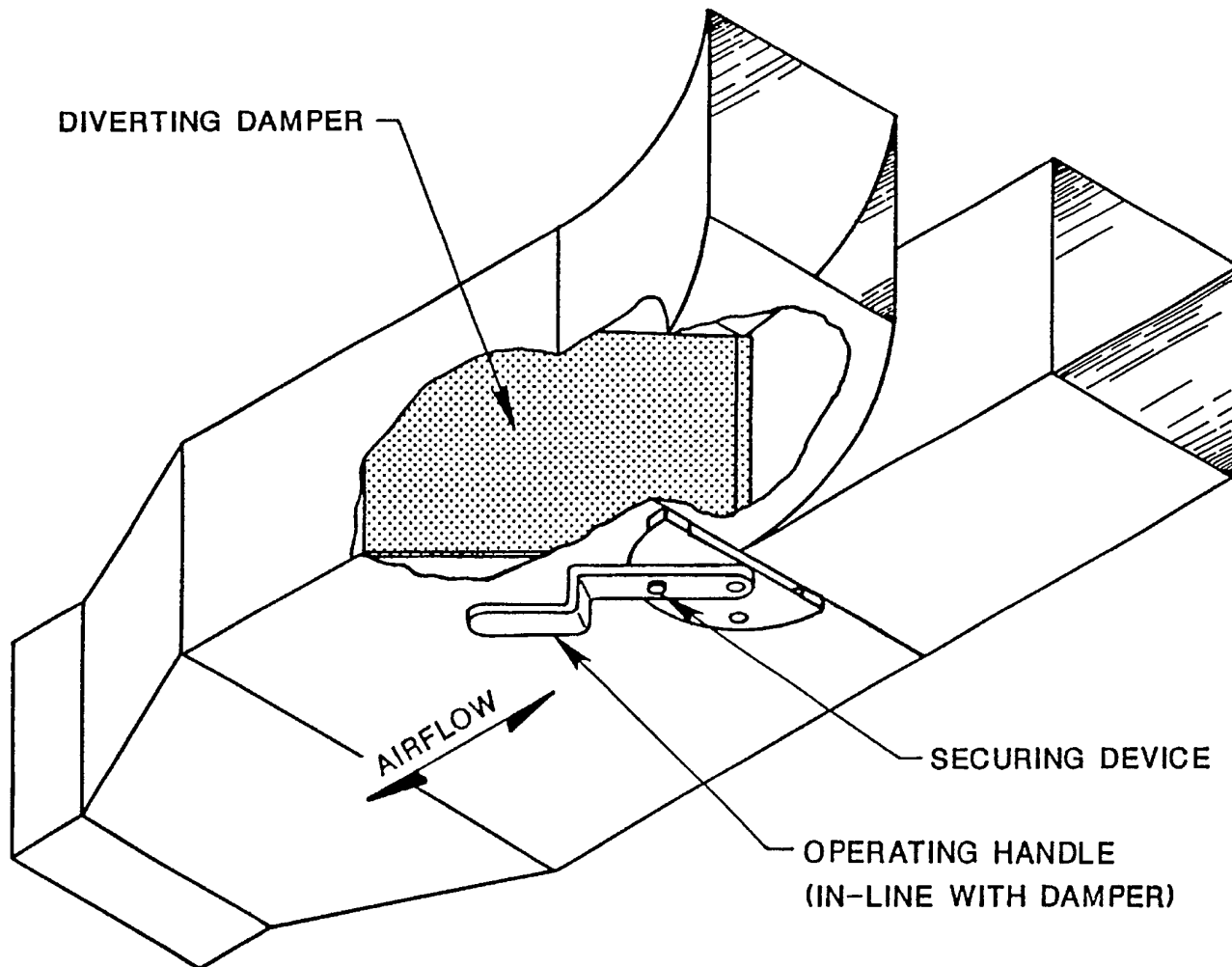


Figure 600-15-3-5. Diverting Damper

600-15.3.5. **FIRE DAMPERS.** Fire dampers are used at fire-zone boundaries to help control the spread of fire through HVAC system ductwork. A fire damper must be operated from both sides of a fire-zone boundary. Therefore, a fire damper is installed with a remote operator on the other side of the boundary or fire dampers are installed on both sides of the boundary. There are two types of fire dampers: Navy Standard watertight/fire tight "R" and "K" valves discussed in **paragraph 600-15.2.1.1** and non-watertight (NWT) steel fire dampers, and they are applied as follows to the various types of fire-zone boundaries:

Non-watertight Fire-Zone Boundaries (NWT/FZ): "R" or "K" ventilation closures are preferred; NWT steel fire dampers may be used when space or cost problems exist.

Watertight/Fire-Zone (WT/FZ) Boundaries: "R" or "K" ventilation closures (valves) must be used.

Non-watertight Halon Fire Extinguishing System Boundaries: "R" or "K" ventilation closures with electric actuators are acceptable but NWT steel dampers such as, toxic gas type damper (with pneumatic or electrical) actuators can be used and are more cost effective than the "R" or "K" ventilation closures when water tightness of the boundary at the duct penetration is not an issue.

Watertight Halon Fire Extinguishing System Boundaries: "R" or "K" ventilation closures with electric actuators must be used when a HVAC duct penetrates a WT compartment boundary such as, a magazine or flammable liquid storage/issue space. The watertight requirement of the penetrated boundary takes precedence.

NWT steel fire dampers consist of a positioning handle and securing device mounted on the outside and a single-blade damper mounted on the inside of a section of duct. The positioning handle is in-line with the damper to show the current damper position. NWT steel fire dampers are designed to shut off the airflow manually in the duct in which they are mounted. They may be manufactured of steel or corrosion-resistant steel in sizes and shapes to suit the installation. NWT steel fire dampers comply with Navy requirements for high-impact shock and vibration. They are constructed and installed in accordance with NAVSEA drawing No. 803-6397244. The damper may also be designed to use the electric actuator used on "R" and "K" ventilation closures. A round, steel fire damper is shown in **Figure 600-15-3-6**

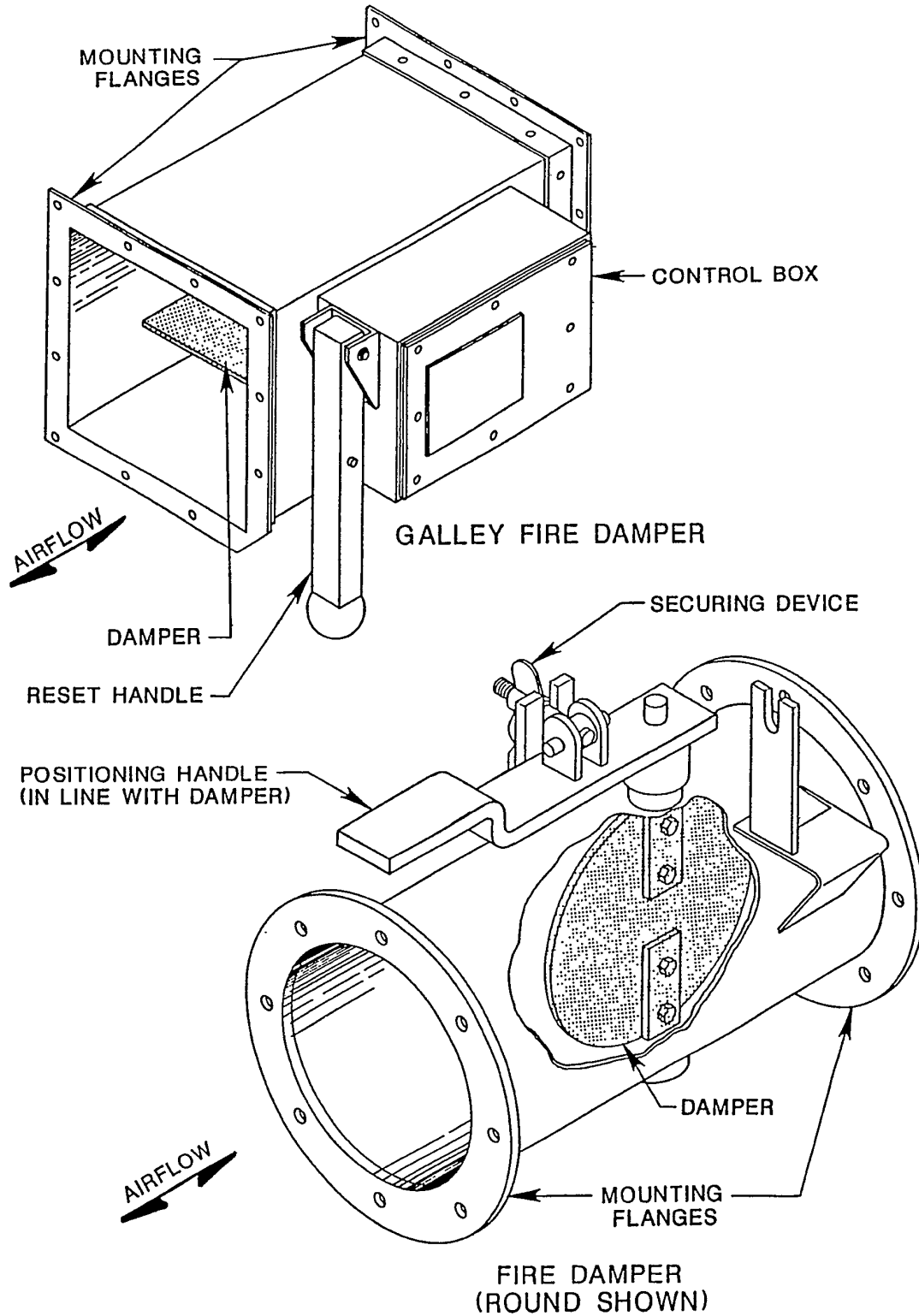


Figure 600-15-3-6. Galley Auxiliary Fire Damper and Round Fire Damper

600-15.3.5.1. Galley Auxiliary Fire Dampers. Galley auxiliary fire dampers are normally open dampers installed in all exhaust branch ducts in the galley that are connected to terminals or conventional canopy hoods when the total exhaust airflow from all grease interceptor hoods is less than the design ventilation exhaust air requirements for the galley. They are constructed and installed in accordance with NAVSEA drawing No. 804-1749099 (See Figure 600-15-3-6 ). They consist of a control box mounted on a damper frame and a single-blade damper. The galley fire damper is 16 inches long; height and width vary.

#### NOTE

These are different from the thermally actuated, automatic fire damper provided in the ventilation grease interceptor hoods by the hood vendor.

The galley fire damper is a fail closed spring operated damper and is normally held open by a solenoid in the damper control box. The damper closes when the solenoid is de-energized from Galley Fire Fighting Control Panel. This releases the spring that closes the damper. The electric signal to close the damper can be initiated at the control panel or in response to a fire signal received at the control panel from the ventilation grease interceptor hood. Pushing the operating lever mounted on the control box manually operates galley fire dampers. After closing, the galley fire damper must be manually reset (opened) by pushing the manual operating lever to reset the damper.

600-15.3.6. GREASE INTERCEPTOR HOOD FIRE DAMPERS. Ventilation grease interceptor hoods are equipped with an integral fire protection system consisting of a high temperature thermostat, an automatic fire damper, and a fire suppression system. When the temperature of the exhaust air-stream reaches 121.1°C (250°F) in the ductwork, the fail-safe thermostat will automatically activate the system. The hinged fire damper provided by the hood manufacture, at the air inlet of the grease interceptor hood closes to prevent flame and hot gases from entering the grease interceptor hood. The exhaust fan shuts off and a water spray (on newer ships) is released. The system can also be activated remotely. If the damper control switch is closed manually, the exhaust fan will not shut off. The damper control switches should always be in the open position under normal operation and hood wash-down conditions.

600-15.3.7. SMOKE SHUTOFF DAMPERS. Smoke shutoff dampers are installed in ventilation system ductwork to control the spread of smoke to or from served spaces. Smoke shutoff dampers are fire dampers or ventilation closures or dampers that may have been installed for some other DC purpose, but can be used to control the spread of smoke from space to space. Smoke shutoff dampers are provided in vital manned spaces in some classes of ships. The dampers prevent smoke contamination of served spaces caused by a fire or smoke outside the space. The dampers are part of the supply and exhaust ductwork of systems ventilating or providing replenishment air to vital manned spaces. Smoke shutoff dampers are also used on air-conditioning systems serving more than one vital manned space, if the spaces have watertight, airtight, or fume tight bulkheads. The dampers are operated from inside the space served. The dampers shall be shut when smoke begins to enter the compartment from the ductwork.

600-15.3.8. VOLUME CONTROL DAMPERS. Manually operated volume control dampers are installed in ventilation supply branches to control the airflow to a space and thereby control the temperature within that space. Volume control dampers are not installed in branch ducts serving spaces where a thermostat is installed. Volume control dampers can have either opposed-blade or parallel-blade operation and be either two-position (open-closed) or proportional (modulating). Opposed-blade dampers are superior to parallel-blade dampers for modulating control, because opposed-blade dampers exhibit nearly linear damper/airflow characteristics (a 50 percent change in damper position results in a 50 percent change in airflow through the damper). Also, opposed-blade

dampers require less total system pressure than a parallel-blade damper to achieve the same airflow reduction. Volume control dampers design and sizes are commercially available.

600-15.3.9. SMOKE EJECTION SYSTEM (SES) DAMPERS. A collective name for dampers such as Smoke Control Dampers (SCD), Smoke Purge Dampers (SPD), Smoke Isolation Dampers (SID) and Orifice Damper (OD) used in the Smoke Ejection System (SES) installed on LPD 17. The SES reconfigures select supply and exhaust ventilation systems serving compartments and their adjacent passageways as well as ingress/egress accesses into areas of the Damage Control Deck or other selected SES areas to provide improved smoke containment and smoke removal. The ventilation systems in a normal operational mode are reconfigured for the SES areas to supply and exhaust different air quantities (SES air flow rates) during a fire, for purging and de-smoking operations. SES dampers shall be made of Class 304 and Class 316 CRES and suitable for insertion between segments of watertight ducting. See NAVSEA drawing No. 512-6337323 for requirements related to SES dampers.

SES damper actuators are electric motor drive, quarter turn type, with adjustable positive stops, Keystone Valve USA Inc., type EPI 3, or equal. The manual override feature shall be permanently attached to the housing, drive the gearing directly, and require no tools for operation. The hand wheel on the manual override feature shall be capable of being extended, if required to suit damper location. All SES damper manual operating gear must be readily accessible for use without the need for portable ladders or the removal of any other components, panels, access plates, obstructing systems or items. See functional description of SES dampers below.

600-15.3.9.1. Smoke Control Dampers (SCD) are normally open, electrically power-driven dampers, with a manual override and used in conjunction with other SES components to permit diversion of ventilation system air flow to SES protected areas during and after a fire casualty. The SCD is closed during the SES mode.

600-15.3.9.2. Smoke Purge Dampers (SPD) are normally closed, electrically power-driven damper, with manual override, used to enable ventilation system capability diverted by SCD to be applied to SES areas to provide purging and de-smoking. When closed, the SPD allows no airflow through its associated terminal. The SPD is opened during the SES mode.

600-15.3.9.3. Smoke Isolation Dampers (SID) are normally open, manually operated dampers, used to prevent migration of smoke to SES protected areas via natural convection in ducting serving both SES protected areas and non-SES protected areas, where SCD do not accomplish that function. The SID is closed during the SES mode only if necessary to prevent smoke migration to SES protected areas.

600-15.3.9.4. Orifice Dampers (OD) are normally closed, electrically -driven dampers, with manual override, used to increase ventilation terminal capability from normal mode air flow rates to SES mode air flow rates. The OD has the same basic function as the SPD, except that when closed, normal mode airflow is permitted through an annular opening around the blade. The OD is opened during the SES mode.

600-15.3.10. COLLECTIVE PROTECTION SYSTEM (CPS) THREE-POSITION DAMPERS. Another Naval shipboard application of a volume control damper is the Collective Protection System (CPS) three-position damper. A CPS three-position damper is a manually adjustable, multi-blade, volume control damper. The CPS three-position damper is installed downstream of the CPS Total Protection (TP) Zone exhaust fan. It can be secured in three positions: fully open, fully closed, and adjustable intermediate position. The intermediate position is set to balance the TP Zone airflow in such a manner that an internal zone pressure of 2.0 in. WG (relative to atmospheric pressure) is maintained within the TP zone. CPS three-position dampers are non-standard items built to meet the particular requirements of the TP exhaust systems in which they are installed. A CPS

three-position damper with an opposed blade configuration is shown in **Figure 600-15-3-7** . The CPS three-position damper must be manually set to reflect the operating mode in effect in each TP zone. The damper should be set as follows:

Fully closed - system secured

Fully open - system operating but unpressurized

Intermediate - system operating, fully pressurized

Because the CPS three-position damper is manually operated, it must be installed where it can be operated from within the TP zone.

600-15.3.11. BLAST SHIELDS. Blast shields are installed over ventilation system weather intake or discharge openings that are subjected to blast overpressures. Blast shields prevent blast overpressure caused by the firing or detonation of weapon systems from damaging the ventilation system. Air enters both sides of the blast shield and must make two 90-degree turns to enter the weather opening. This design causes the blast overpressure to cancel itself out before entering the weather opening. A blast shield is shown in **Figure 600-15-3-8** .

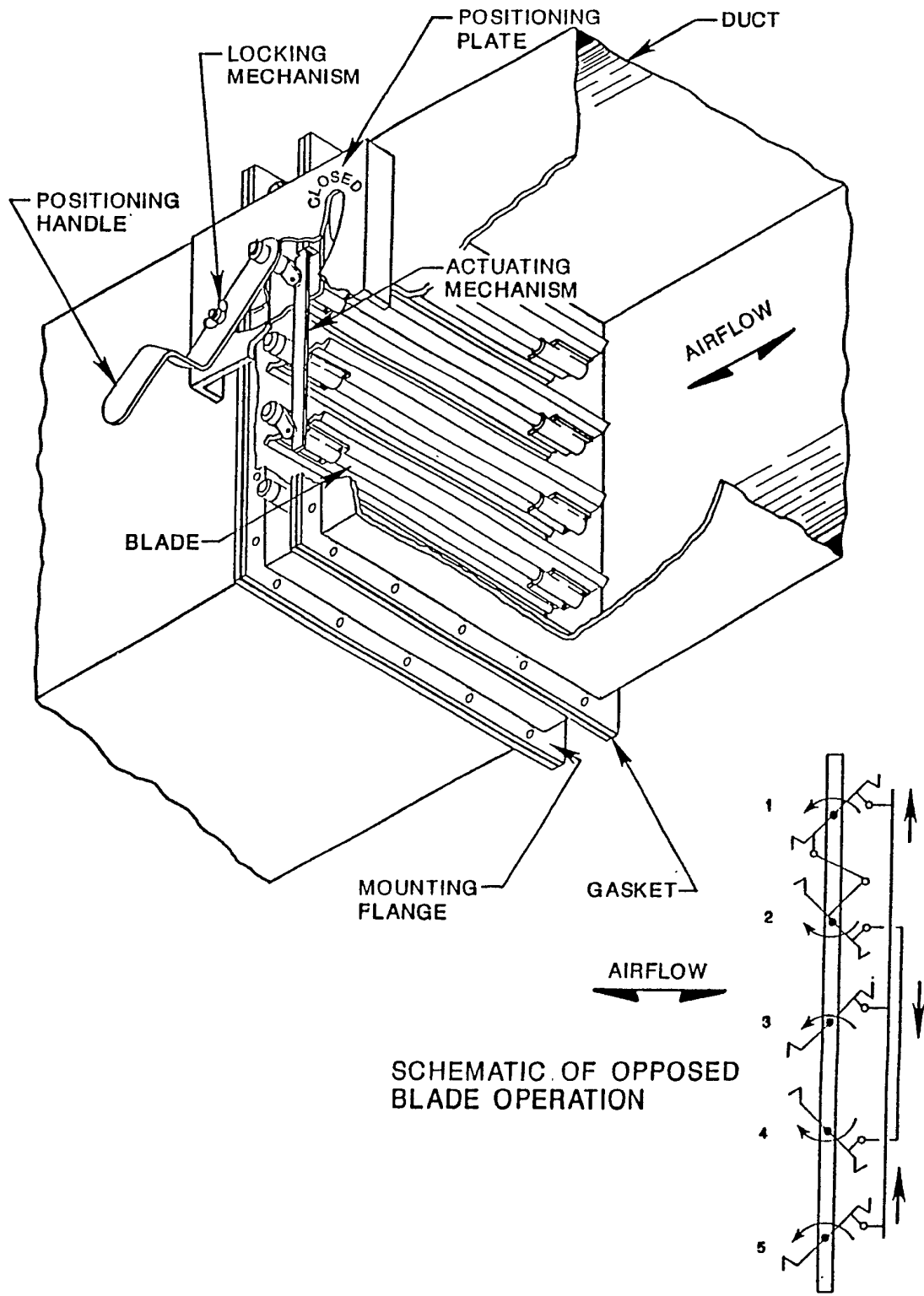


Figure 600.15-3-7. CPS Three-Position Damper



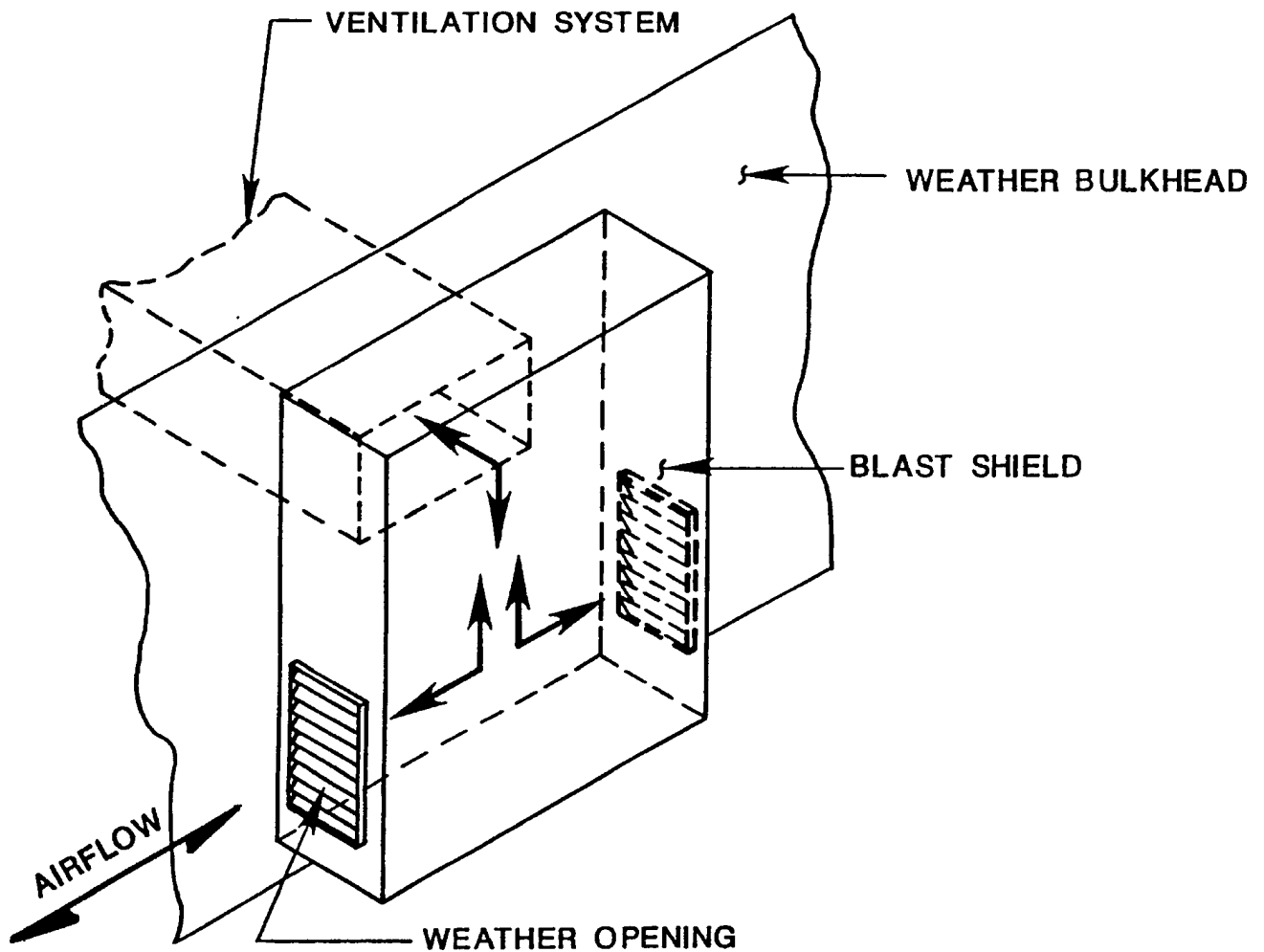
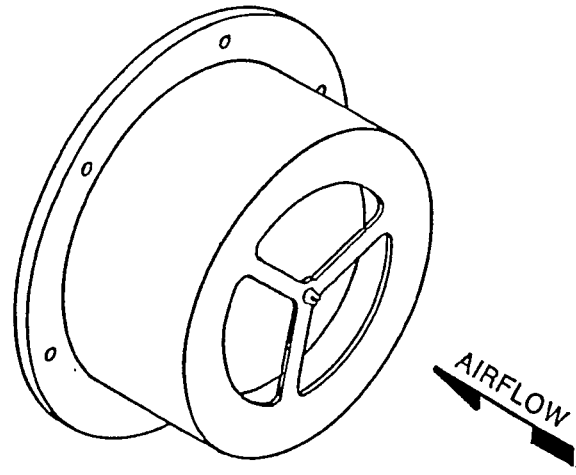


Figure 600-15-3-8. Blast Shield

600-15.3.12. CPS PRESSURE CONTROL VALVES. A Pressure Control Valve (PCV) is a self-contained/self-actuated control device that regulates the pressure within a CPS zone. The CPS zone pressure mechanically actuates the PCV. As zone pressure increases, it acts on the face of the PCV diaphragm to open the valve. Spring force pushing on the back of the diaphragm closes the valve when zone pressure decreases. The PCV is gasket mounted to a bulkhead within the CPS zone, where it can exhaust directly to the weather (atmospheric pressure) or some space open to the weather. In some installations it may be necessary to duct the CPS zone exhaust to weather. In such cases, the exhaust duct must be sized to minimize any pressure loss that might alter the performance of the PCV. After a CPS zone has been balanced, a certain amount of zone air will "leak" to the weather (or to unpressurized zones) due to the pressurization of the CPS zone. The amount of this leakage typically varies due to normal zone usage. Consequently, the zone pressure also varies. The PCV controls the volume of air exhausted through it to compensate for variations in zone air leakage. The PCV can maintain the CPS zone's internal pressure between 2.0 and 2.5 inches WG. A CPS pressure control valve is shown in **Figure 600-15.3.9**



ISOMETRIC VIEW

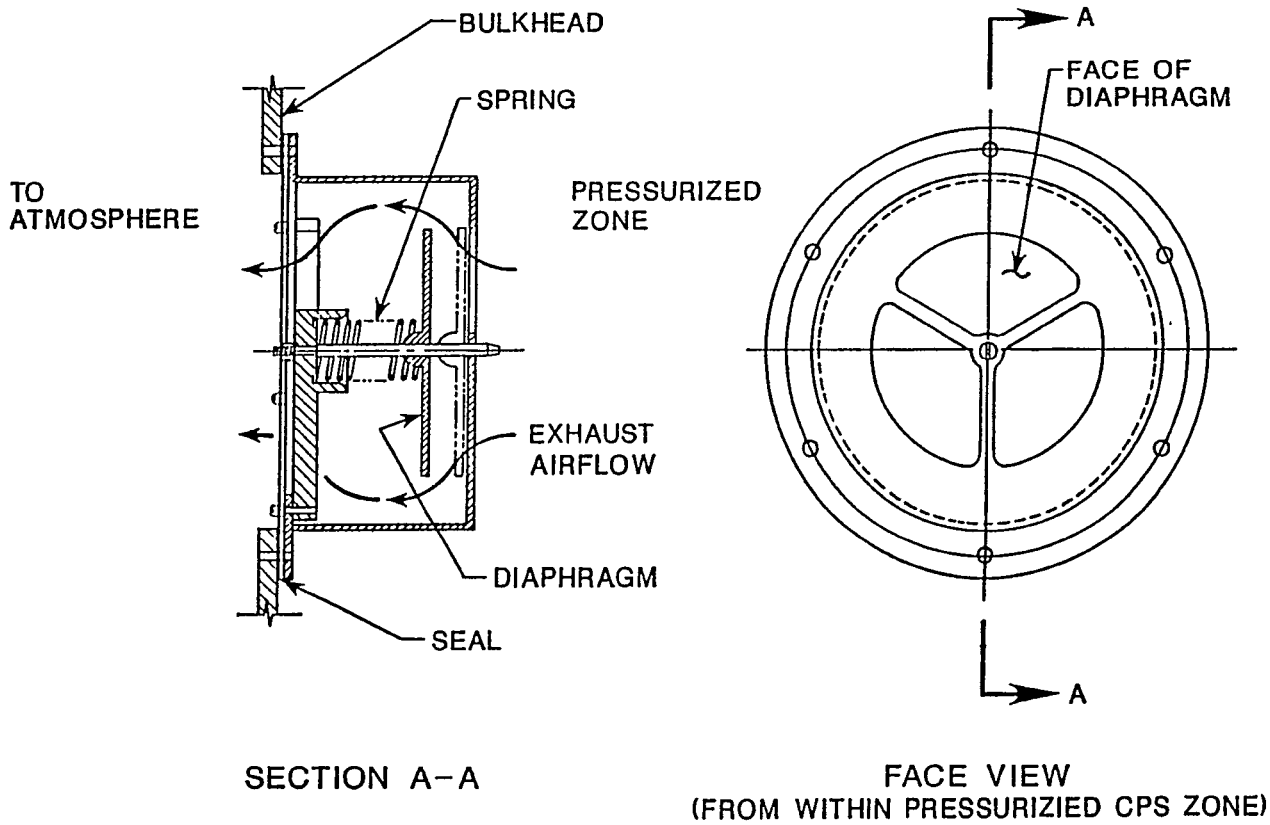


Figure 600-15-3-9. CPS Pressure Control Valve

**600-15.4. INSPECTION AND MAINTENANCE**

Guidance on the proper care and safety procedures for closures and dampers installed in HVAC systems are discussed throughout this section. Included are discussions of Planned Maintenance Schedule (PMS) requirements. Generally, no special tools are required for accomplishing scheduled maintenance work items.

600-15.4.1. CLOSURES AND COVERS. Maintenance Index Pages (MIP) 6641/005-72, DCPO Climate Control Items, and Level 4 Equipment Test provide a listing of appropriate Maintenance Requirements Cards (MRC) associated with the scheduled maintenance of HVAC system components, including HVAC fittings such as closures, dampers and covers. MRC are listed for actuators and remote manual operating gear. Some MRC listed in 6641 will apply to specific ship classes while others apply, in general, to all surface ships (See the "scheduling aids" section of MIP). Periodicity codes listed indicate the frequency (e. g.: monthly, quarterly, semi-annually). Toxic Gas Ventilation Dampers discussed below are often used as anti-recirculation dampers when fans are installed in parallel to preclude air circulation around a failed fan. See NSTM Chapter 510 for supplemental information on HVAC system DC closures, covers and dampers, and MIP 5121/017 for inspection and maintenance required on Pressure Control Valves.

600-15.4.2. DAMPERS. MIP 5121/010-72, "Toxic Gas Ventilation Dampers, Level 4 Equipment Test" provides a listing of MRC associated with Toxic Gas Damper systems - both the Navy standard and non-Navy standard configurations. The CG 47, DDG 51 and some of the CV/CVN class ships use dampers that are non-standard. The DD 963 class and DDG 993 class ships use the newer 25-psig air for the damper actuators on intake openings as a result of the VLS back fit. This MIP also addresses scheduled maintenance for older ships equipped with the original Navy Standard TDG system that use 125-psig air for the damper actuators. Also included are some dampers on DD 963/DDG 993 class ships originally installed as fire dampers and now serving dually as fire dampers and toxic gas dampers. Also see "Toxic Gas Ventilation Damper Information Booklet", referenced in Section [600-15-3-2](#), for supplemental information on this equipment.



**APPENDIX 600-A.**

**STANDARD ACRONYMS/ABBREVIATIONS**

CPS	Collective Protection System
DC/FF	Damage Control/Fire Fighting
FD	Fire Damper (Round or Rectangular)
FZ Bkhd	Fire Zone Bulkhead
HVAC	Heating Ventilation and Air Conditioning
K-Closure	Flat Oval (butterfly valve) Closure
PCV	Pressure Control Valve
OD	Orifice Damper
R-Closure	Round (butterfly valve) Closure
TGD	Toxic Gas Damper
SES	Smoke Ejection System
SCD	Smoke Control Damper
SPD	Smoke Purge Damper
SID	Smoke Isolation Damper
WT Bkhd	Water Tight Bulkhead



**APPENDIX 600-B.**

**TECHNICAL MANUAL DEFICIENCY/EVALUATION REPORT(TMDER)**

**NOTE**

Ships, training activities, supply points, depots, Naval Shipyards, and Supervisors of Shipbuilding are requested to arrange for the maximum practical use and evaluation of NAVSEA technical manuals. All errors, omissions, discrepancies, and suggestions for improvement to NAVSEA technical manuals shall be reported to the Commander, NAVSURFWARCENDIV, 4363 Missile Way, Port Hueneme, CA 93043-4307 in NAVSEA/SPAWAR Technical Manual Deficiency/Evaluation Report (TMDER), NAVSEA Form 4160/1. To facilitate such reporting, print, complete, and mail NAVSEA Form 4160/1 below or submit TMDERS at web site <http://nsdsa.phdnswc.navy.mil/tmder/tmder.htm>. All feedback comments shall be thoroughly investigated and originators will be advised of action resulting therefrom.

**TMDER / MAILER**

