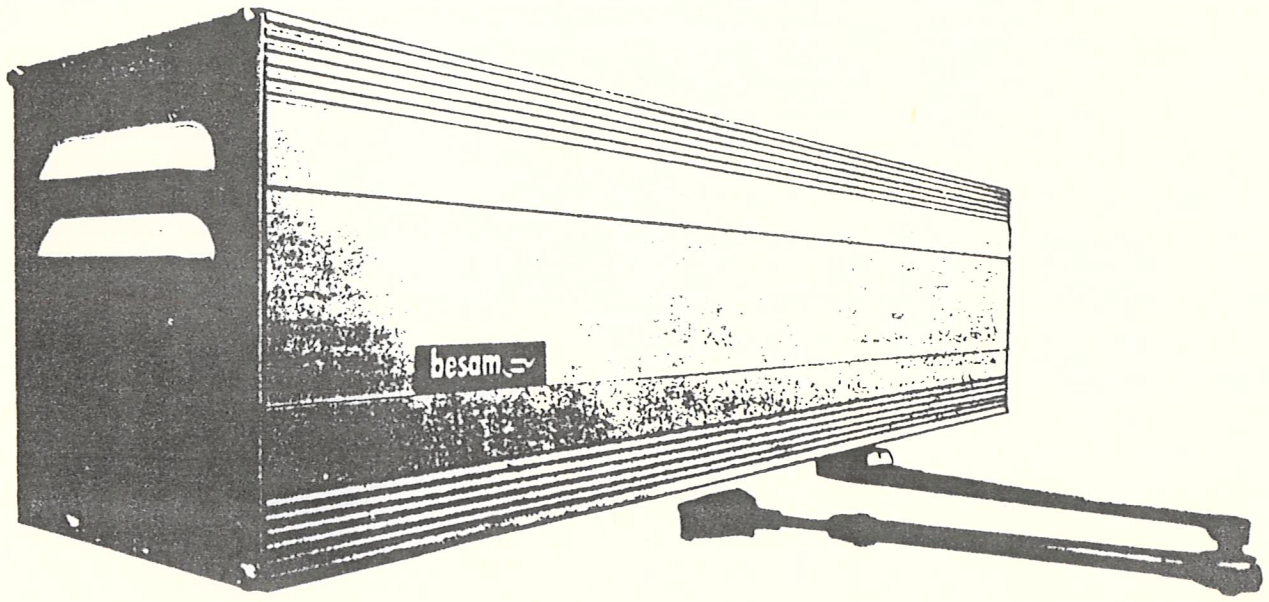
INSTALLATION MANUAL
US-012

besam

Automatic Swing door operator

Econo-Swing™



This Besam manual has been prepared to provide you with the necessary information and instructions to enable you to install, adjust and maintain the reliable Besam Door Operators.

TABLE OF CONTENTS

Reliable Design

The operators are designed with a view to versatile application, high dependability and minimal maintenance costs. The swing-door operator consists of an electric motor, oil pump and hydraulic servo unit -- all designed as one integral unit. Since the opening unit has only one moving part and uses no gears, the design ensures long life and low maintenance costs. The operators are protected against both overheating and overloading.

Operation, Safety

Opening motion is imparted hydraulically, while closing motion is imparted by means of a spring, providing assurance against jamming. This also means that in the event of a power failure, the door can always be opened manually and the spring mechanism will function as a manual door closer. Both opening and closing speeds are individually adjustable by means of valve screws on the hydraulic unit. Each opener undergoes thorough checks for eight hours on the test bench before delivery.

Sound Level

The operator functions at a very low sound level due to the damped electro-hydraulic servo operation complemented by a cover of dark bronze or clear anodized aluminum. The cover also enables the operator to blend into the interior design thus eliminating expensive fascia arrangements.

Compact Size

Continuing development of this swing-door operator has resulted in several advantages. The control unit is integral with the drive mechanism using plug-in connections. The cover is available in standard and extended lengths, as specified. The cover can be the same width as the door-frame or corridor, forming an integral part of the architectural design.

Control Unit

The control unit is fully electronic, manufactured with specially designed integrated circuits and has been reduced to minimum size. The basic designation for this unit is ESV-S-US, but it is also available with the following suffixes added: SLAVE and DC.

Accessories

The control unit provides simple adjustment of the delay in the open position, and is connected to the main power supply and the selected actuation device (e.g. contact mat, radar, photocell, elbow contact, push-button, etc.). All swing-door operators can be supplied with electric locking using an electric striking plate, or timed operation.

Installation Instructions

To assure proper installation and operation, it is extremely important that these are carefully followed.

Checks

1. Establish that the complete and correct equipment for the installation is on hand.
   A. The correct type and size of operator (see Figures 1.1 to 1.6)
   B. The selected type of actuation devices (contact, mats, radars, pushbuttons, etc.)

Checking the Type of Operator

Figure 1.1 Regular Installations

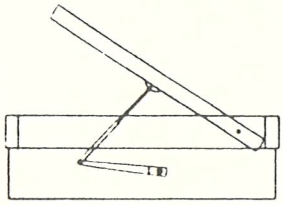
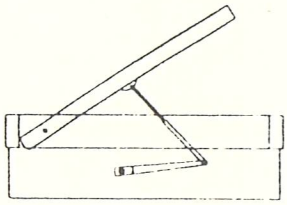
	Type of oil servo unit (see label on servo unit)	Type of arm system (see Figure 1.2)
 Right Hand Door	OVE	Regular Z-arm system
 Left Hand Door	OHE	Regular Z-arm system

Figure 1.2

Regular Z-arm System, Left and Right

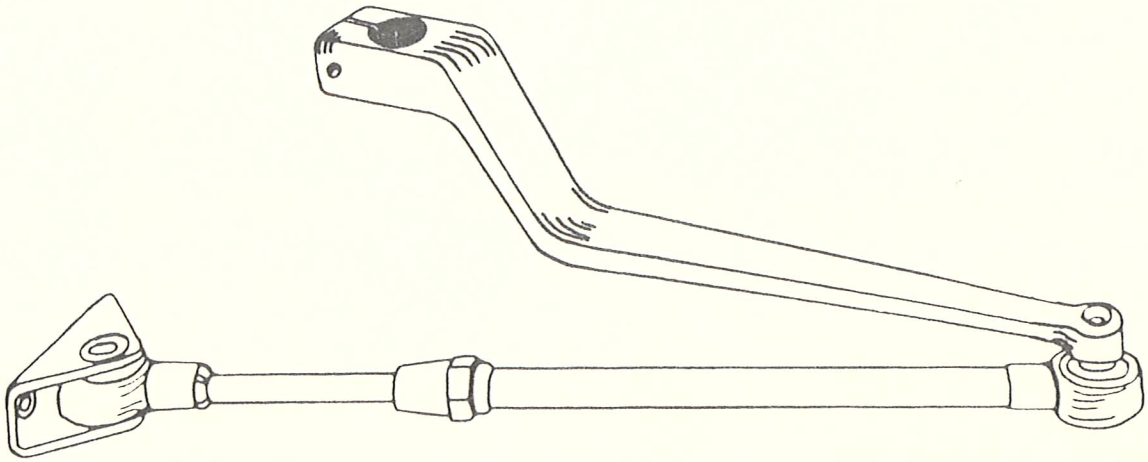


Figure 1.3 Parallel Installations

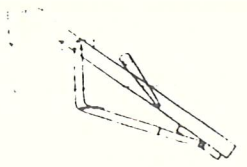
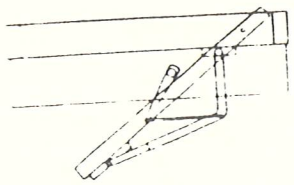
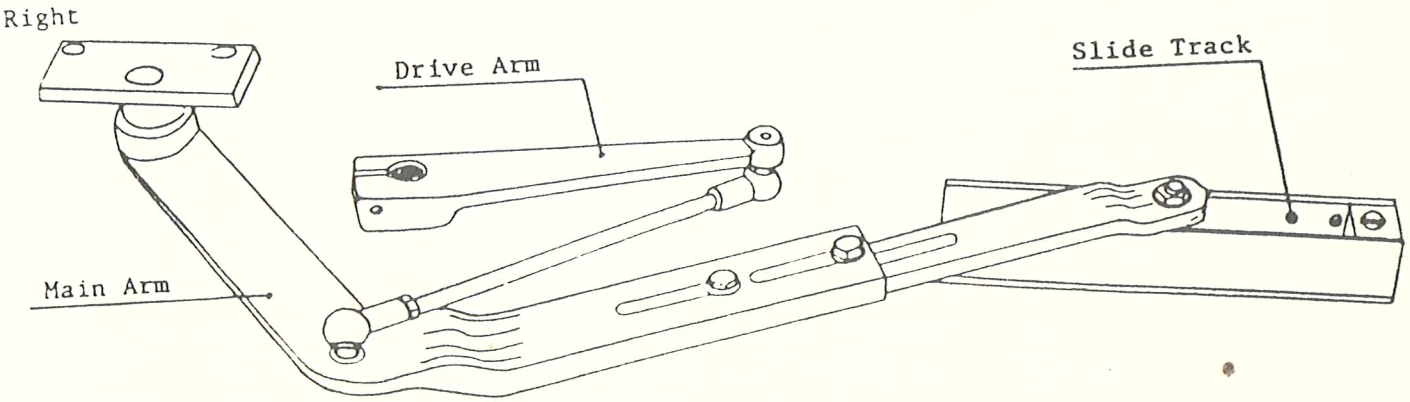
	Type of oil servo unit (see label on servo unit)	Type of arm system (see Figure 1.4)
 Right Hand Door	POVE	Parallel Slide-Track arm system, right
 Left Hand Door	POHE	Parallel Slide-Track arm system, left

Figure 1.4

Parallel Slide Track Arm System



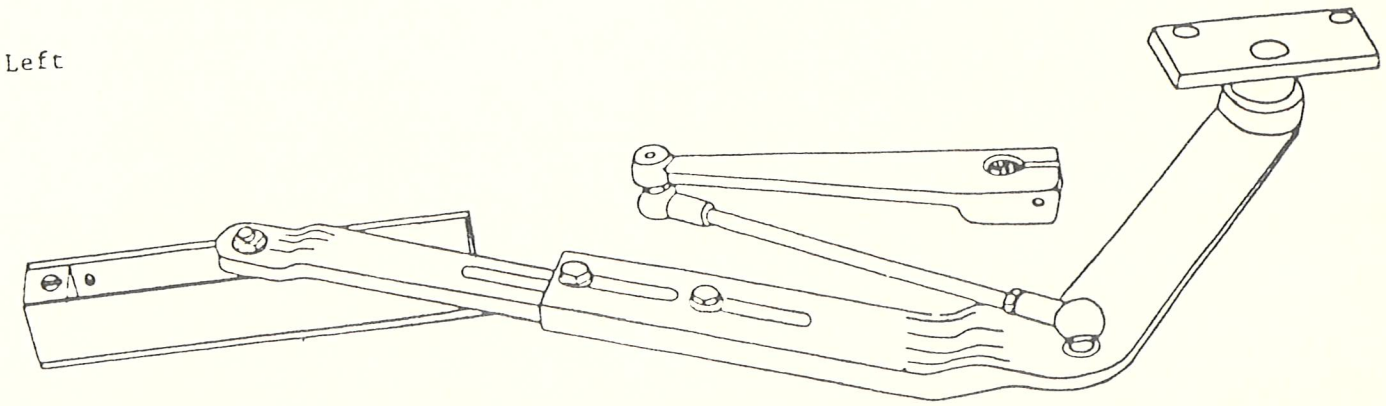
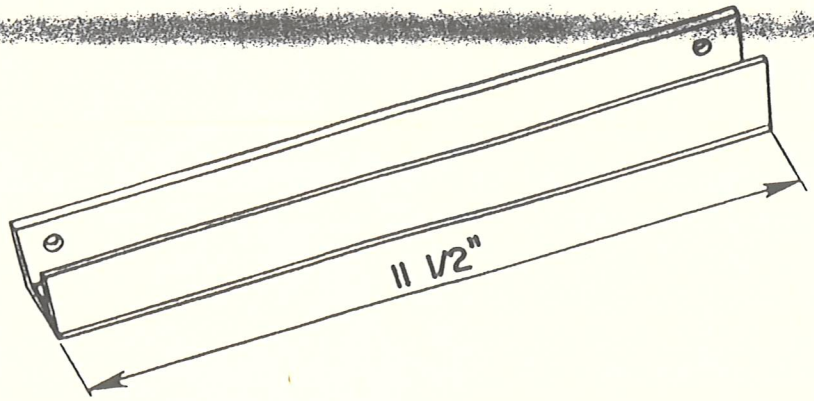
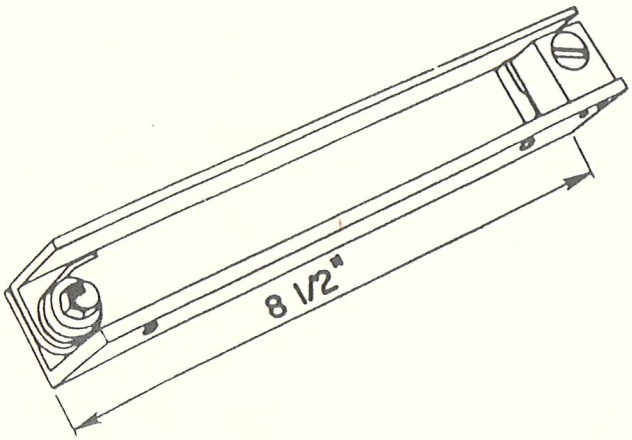


Figure 1.5 Slide Track

For Butt Hinged Door
Left and Right



For Center Pivot Door
Left



Right

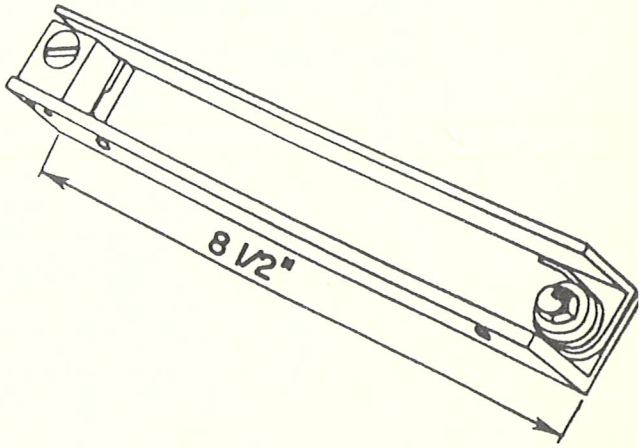
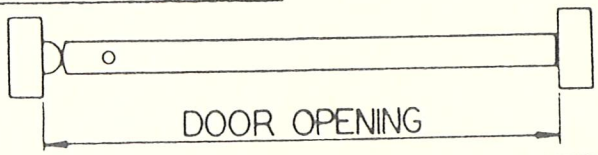


Figure 1.6 Checking the Size of Operator



Door Opening (without Fingerguard)	Door Opening (with Fingerguard)	Length of Operator
30"	31"	33"
36"	37"	39"
42"	43"	45"
Special	Special	Door Opening + 3"

NOTE:

For dual operators select and combine the appropriate types of single operators.

2. Make sure that the swing door which is to be automated is manually functioning smooth and easy, and in all aspects is in good condition.

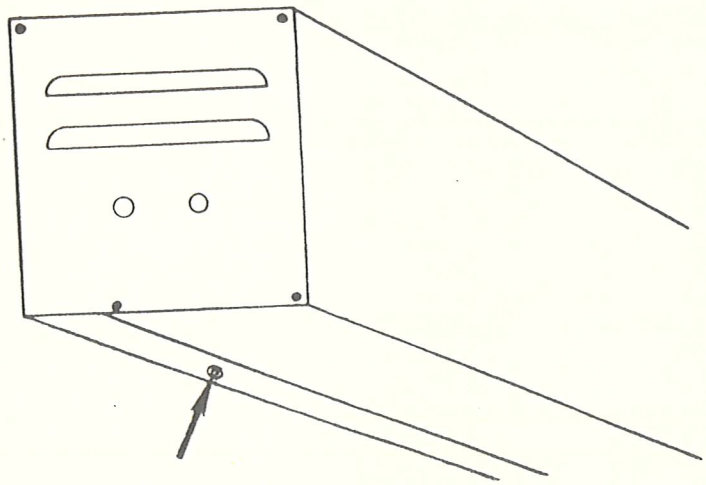
   Whenever possible be sure that a mechanical floor-mounted door stop is installed. If this is not possible - an operator-mounted door stop (collar stop) is available from Besam.

3. Make sure that a 120V, 60HZ main outlet or receptacle is available. A single operator requires a 15 AMP fuse and a dual operator 20 AMP.

Installation of the Back Plate to the Header

4. Remove the cover from the operator by removing the slot screws on the underside of the housing. End plates will remain with the cover when it is removed. Remove the drive arm from the spindle if not already done.

Figure 4

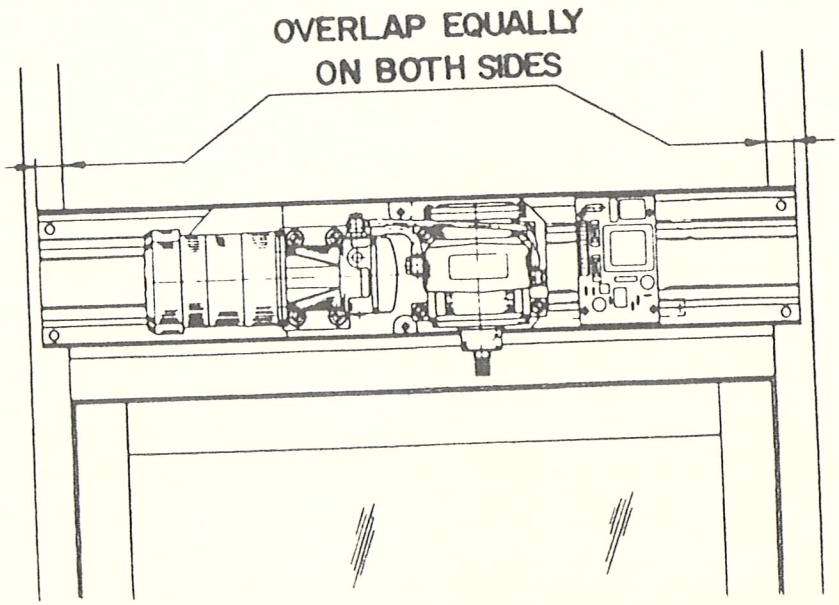


5. Center the backplate between the jambs at the correct height in relation to the header. Mark the position of the pre-drilled holes on each side of the backplate onto the jambs.

   NOTE:

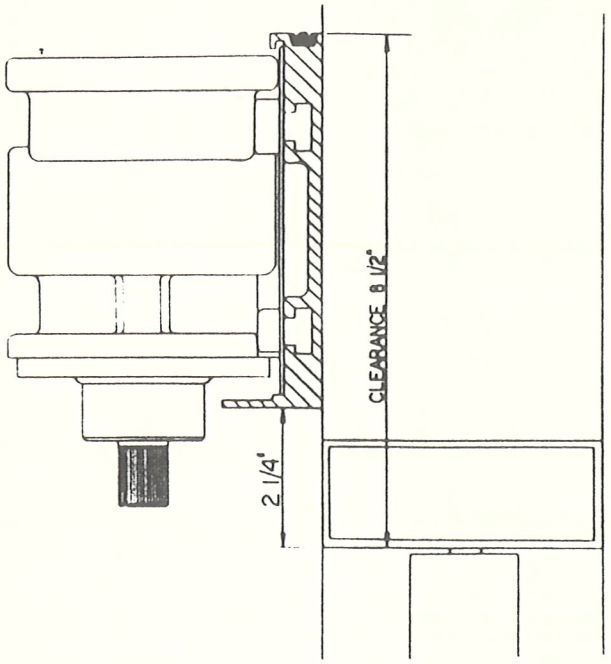
   If ceiling clearance is less than 8 1/2", the standard Z-arm system must be replaced by a straight arm system which requires only 6 1/4" of clearance. Parallel arm installations require an 8 1/2" ceiling clearance.

Figure 5.1



Drill the holes to accept 1/4" thread reinforcement rivets, e.g., Rivnuts or similar.

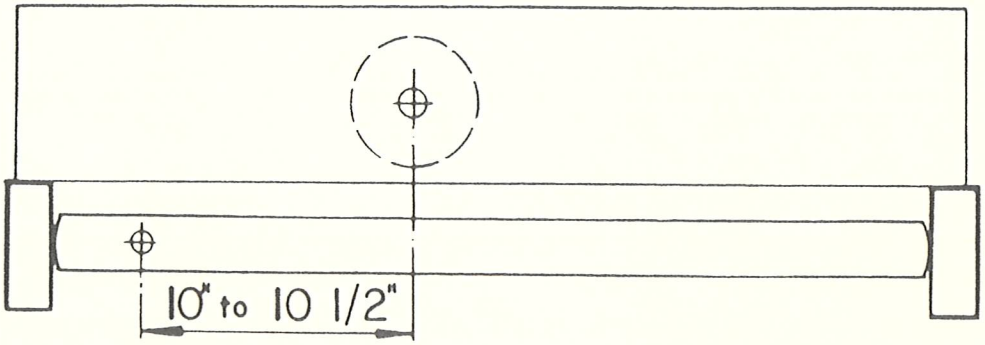
Figure 5.2



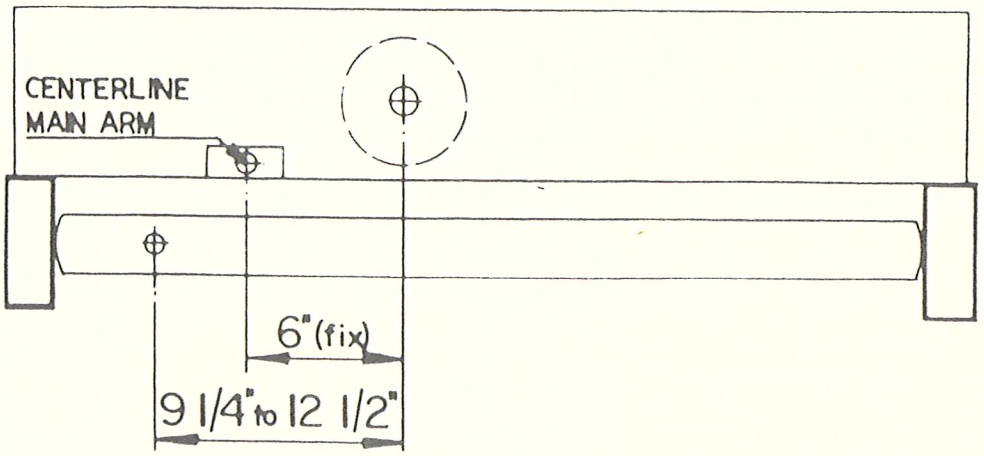
If the backplate has to be shortened or can not be mounted in its normal position due to lack of space or similar, be careful to maintain the spindle of the oil servo unit in its correct position in relation to the pivot point of the door. The critical measurements shown in Figure 5.3 must always be kept, otherwise the operator will not perform in the correct way.

Figure 5.3 Critical Installation Measurements

Regular Installation



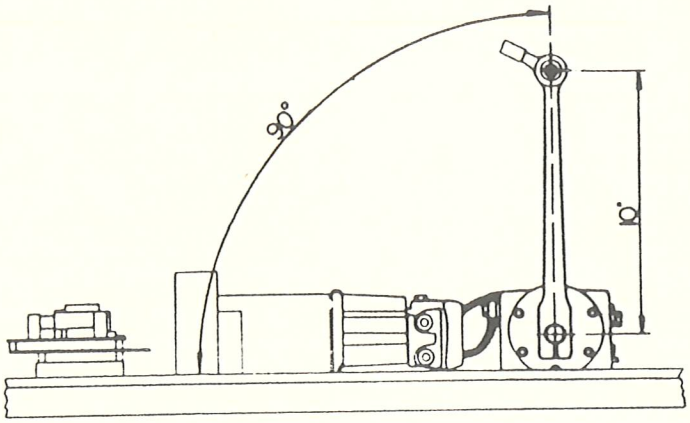
Parallel Installation



6. Attach the drive arm to the spindle according to the figures. (Illustrations show operator from underside.)

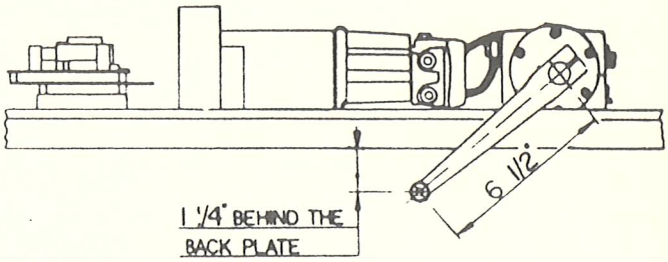
Regular Installations

Figure 6.1



Parallel Installations

Figure 6.2



If an operator-mounted door stop will be used, mount it on the spindle housing.

NOTE:

Attach arm to spindle, being sure to align the splines and grooves in the arm hub exactly with the splines and grooves on the spindle.

Tighten the allen screw in the arm sufficiently.

7. Install the backplate to the jambs. Be sure to tighten all screws sufficiently.

NOTE:

Parallel arm installations require a small deviation in mounting procedure. Since the already attached drive arm will interfere with the header during mounting, the entire unit must be tilted forward and away from the header to clear the arm into position. After the operator is mounted - the drive arm will rest against the header under slight pressure.

If the header is smaller than 2 1/4" a gap will be visible between the backplate and the header. In that case, we recommend using a filler piece of aluminum angle, channel, or tube (see Figure):

If the backplate is longer than 45", e.g., by dual operators, it must be fastened to the filler piece. Be sure to tighten all screws completely.

7 cont'd

Figure 7.1

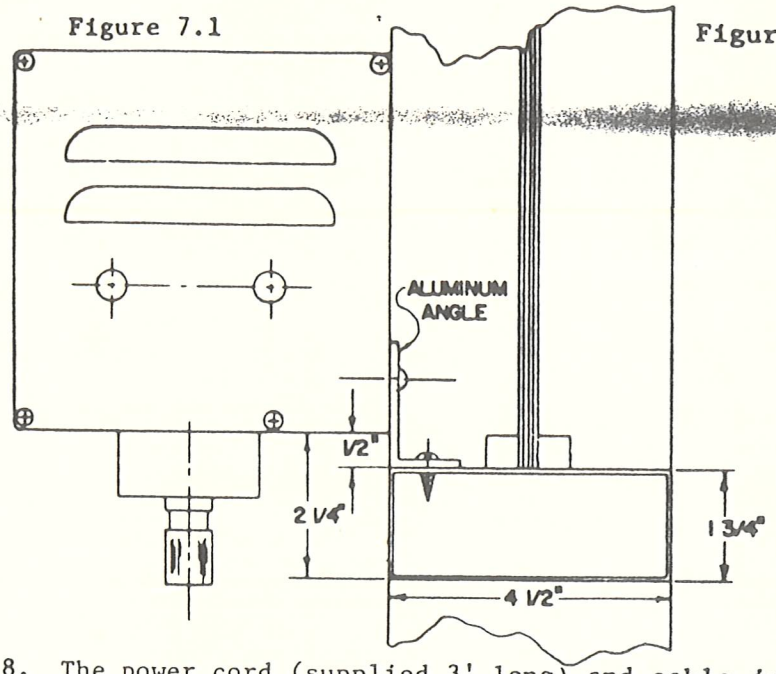
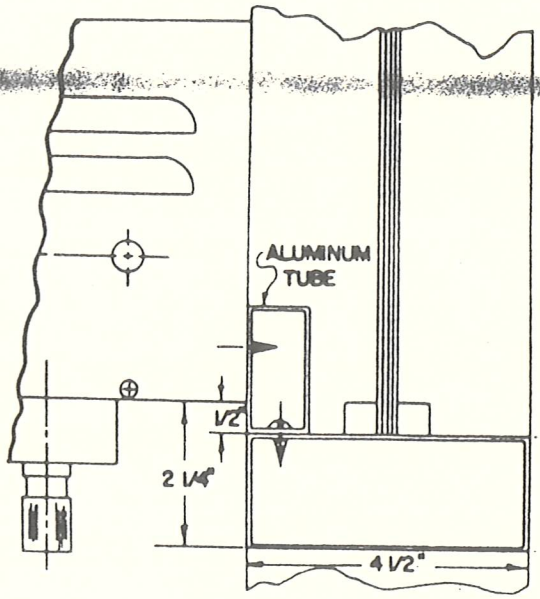


Figure 7.2



8. The power cord (supplied 3' long) and cable inlets are normally located on the left end plate of the operator. If the operator will be permanently connected to the main, drill holes in the backplate (away from operating mechanisms) to receive the wiring of POWER actuation devices and accessories, coming from the ceiling or up through the jambs.

Attachment of the Arm System to the Door Leaf

When installing the arm system - extreme care must be taken to ensure correct measurements since the relationship of arm, the pivot point or the center line hinges and the spindle creates a mathematical/geometrical ratio. Depending on whether it is a regular or parallel installation, one of two different ways of mounting the arm system are to be followed.

Be sure that the cutout in the cover allows the spindle to be located in the correct distance from the pivot point or the butt hinge.

Regular Installation

9. Detach the telescopic bar from the rest of the arm system by loosening the screw nut. Mark the position of the door bracket on the door leaf. See the figure for correct measurements:

Figure 9.1

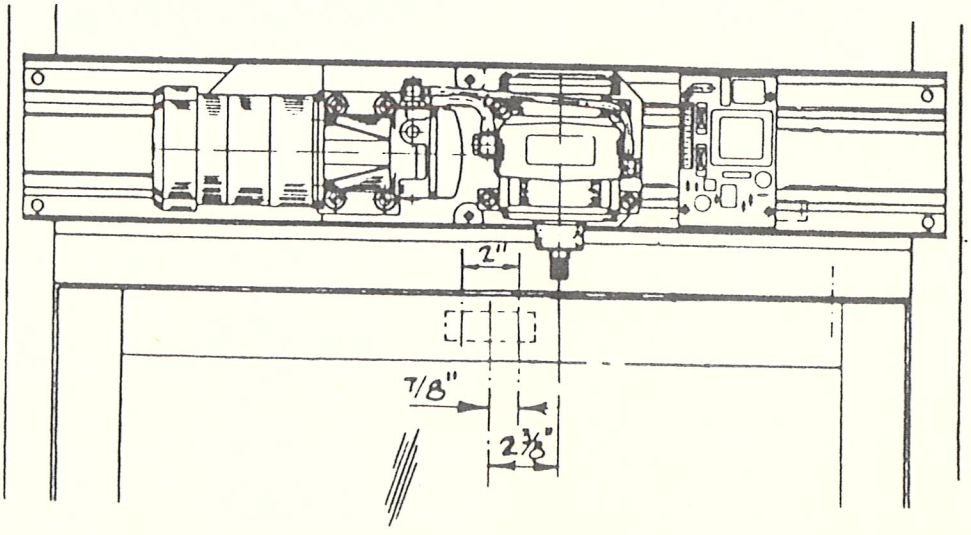
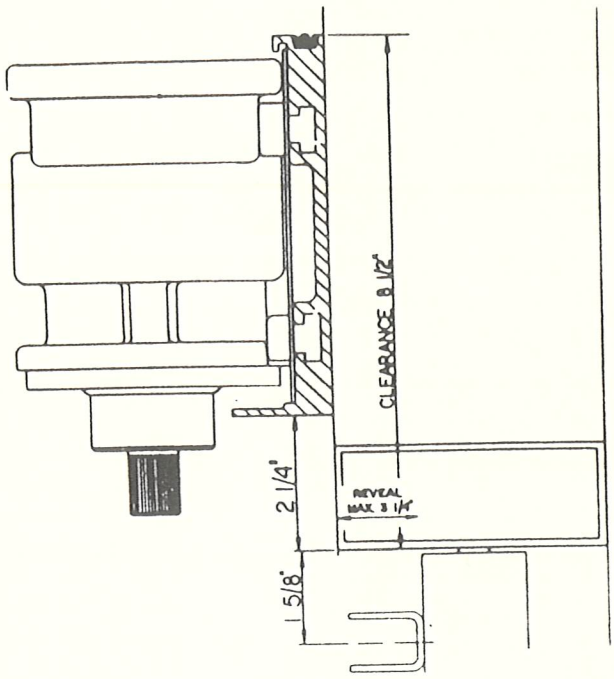


Figure 9.2



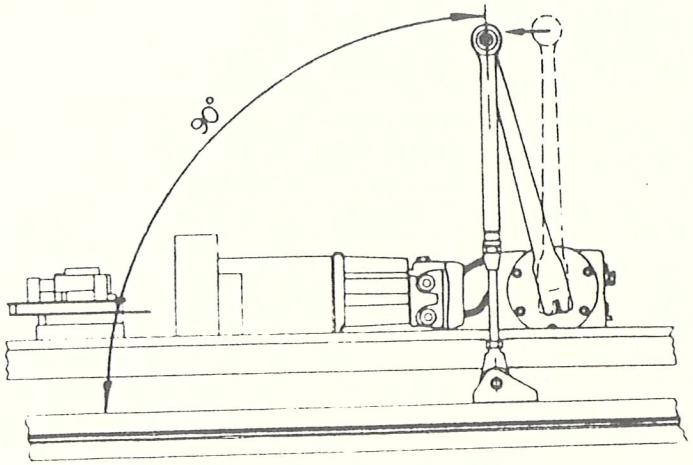
The critical dimension is the distance between the center line spindle and center line door bracket link and should always be 2 3/8".

Drill holes to accept 1/4" thread reinforcement rivets type rivnuts or similar.

Attach the door bracket to the door leaf and tighten the screws sufficiently.

10. Reconnect the telescopic bar to the arm system but DO NOT tighten the screw nut yet. Keep door in closed position and then pre-tension the torsion spring in the operator by moving the drive arm from its original perpendicular position so that the telescopic bar and the door leaf turn a 90° angle. Tighten the screw nut on the telescopic bar in this position using two wrenches.

Figure 10



NOTE: Be sure that the two rubber shock absorbing gromets located at drive arm joints are not twisted and are positioned in the same plane.

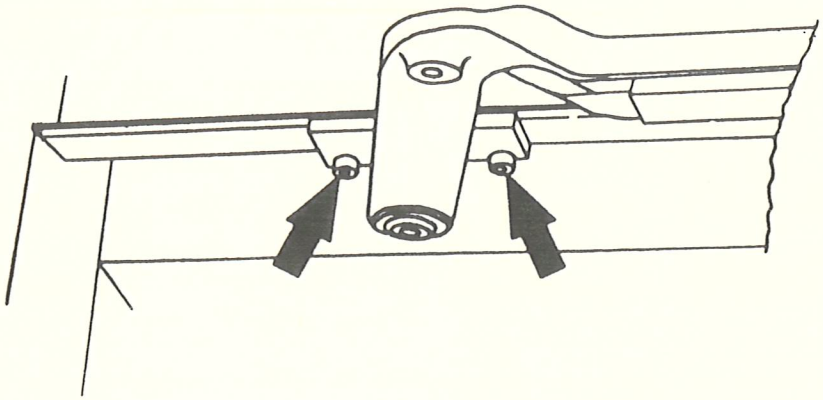
The spring in the operator is now correctly pre-loaded to keep the door in closed position.

Attachment of the Arm System to the Door Leaf

Parallel Installation

11. Mount the main arm to the underside of the backplate in the pre-drilled holes as shown in figure below:

Figure 11



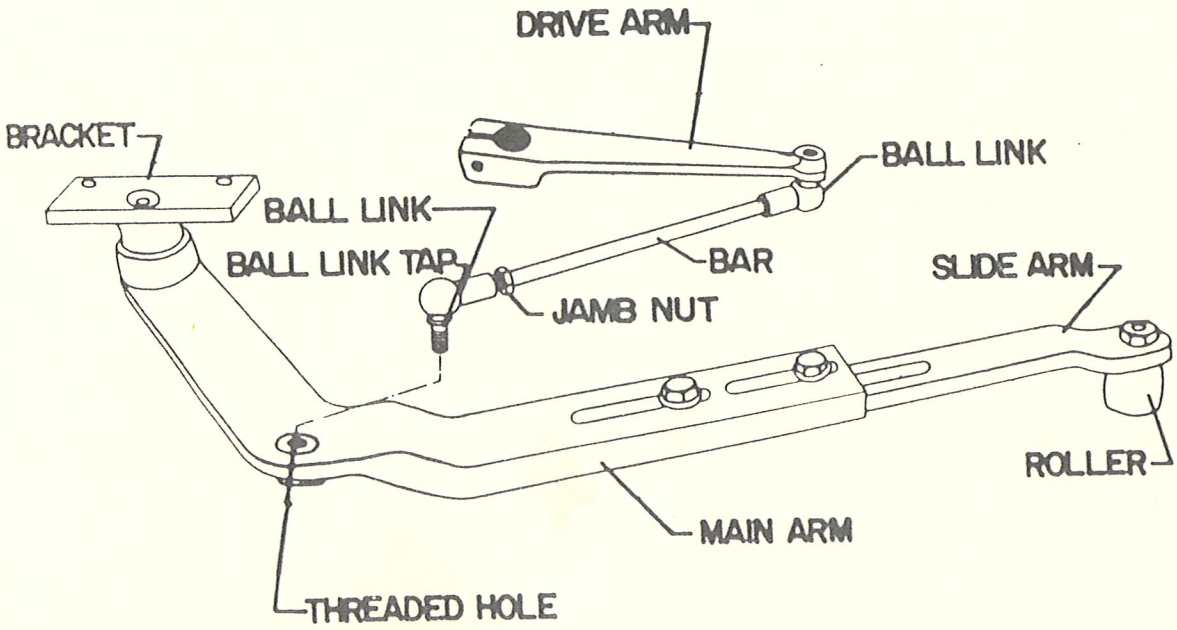
12. Loosen the adjustable slide arm and reduce it to its shortest length.

13. Loosen the jamb nut on the bar allowing the ball link to be loose on the threaded bar.

Position the ball link tap to the threaded hole in the main arm and turn it down fully and tighten it securely.

Adjust the two ball links so they are parallel to each other and allow free movement without jamming. Tighten the jamb nut.

Figure 13



14. Slide the slide arm but until it hits the face of the door leaf (the door should be in the closed position), and tighten the two screws. Mark the position of the roller on the door leaf frame in the closed position. Watch the roller very carefully and open the door slowly while marking the maximum total movement of the roller on the door frame. That gives you the total movement of the roller.

Position the slide track to the door leaf so that the marked area of the roller movement will be in the middle of the door fitting, allowing the roller to move freely in the door fitting.

Figure 14.1

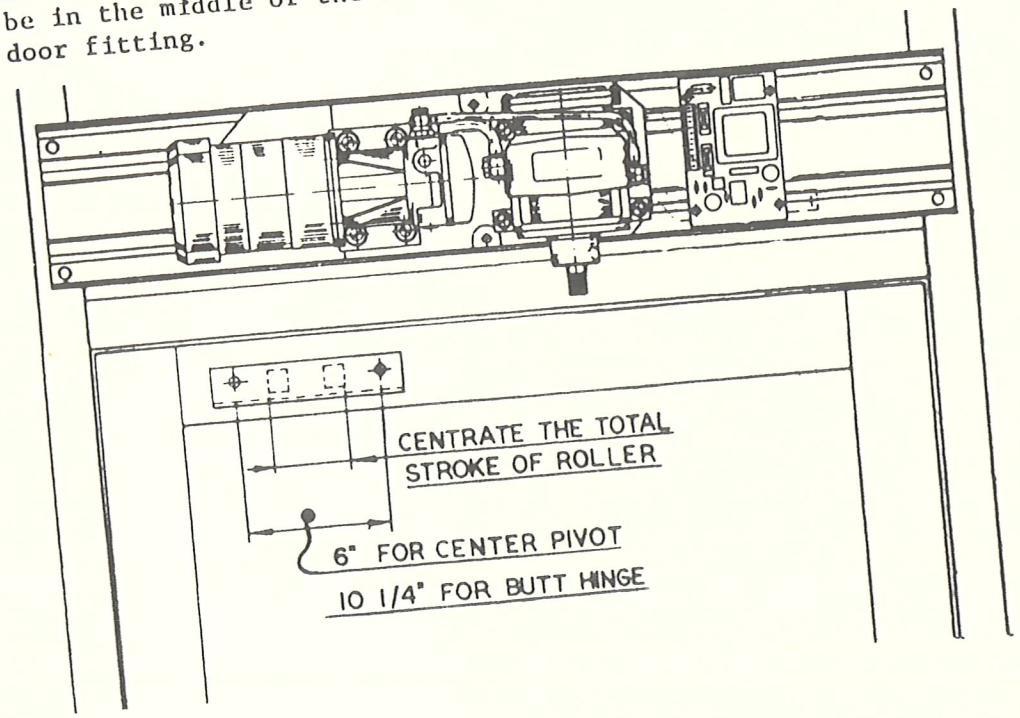
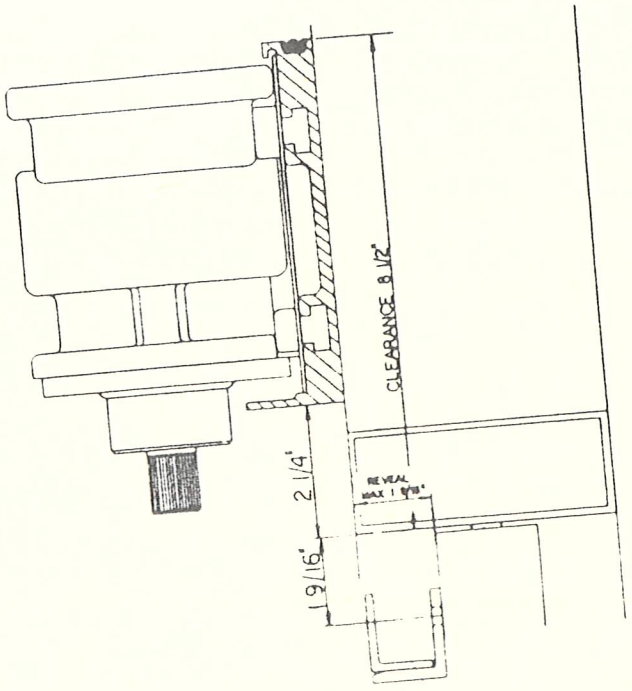


Figure 14.2



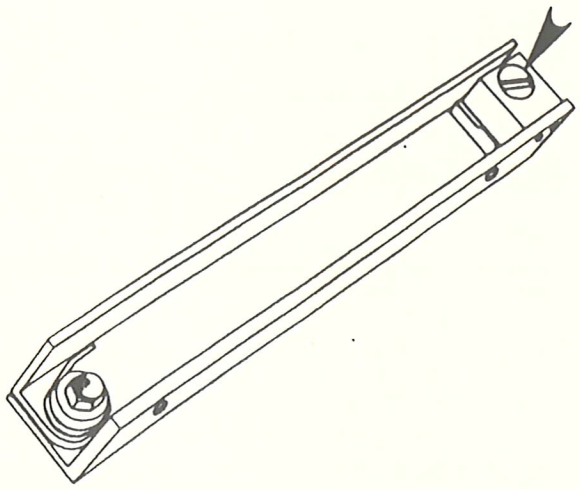
Mount the slide track to the door frame using two 1/4" thread reinforcements type rivnuts or similar. See figure for correct measurements. Be sure to have the correct type and hand of slide track.

NOTE: If the reveal exceeds 1 9/16" -- an oversize slide arm has to be used.

15. Place the roller at the end of the main arm in the slide track. Have the door leaf in the closed position and the drive arm resting against the header. Then center the roller within the depth of the slide track by extending the slide arm to a mid-way position and tighten the two screws to secure the slide arm.

16. If the slide track is the Emergency Breakout type, adjust the required pressure on the ball catch by adjusting the screw on the top of the ball catch.

Figure 16



17. Finally -- check that the arm system does not bind anywhere -- but is free to function smoothly. Also, check the Emergency Breakout function if applicable.

18. The mechanical part of the installation is now finished.

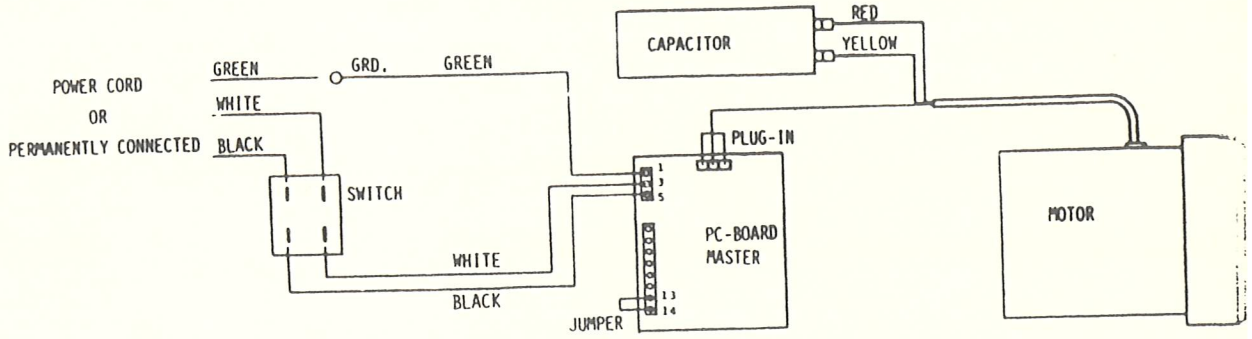
Check that the door stop is functioning and stops the door in 90°.

Also, check the pre-tension and the hydraulic system of the operator by opening the door manually to fully opened position (90°). Then let the door close, but follow the door with your hand - prepared to stop it - if a maladjustment in the operator is present. The normal function of the operator is that the door closes smoothly and slowly with the hydraulic system which is factory-preset.

Electrical Wiring

19. The operator is provided with a 3 foot long grounded power cord and all internal wiring is pre-wired as diagram inside operator shows.

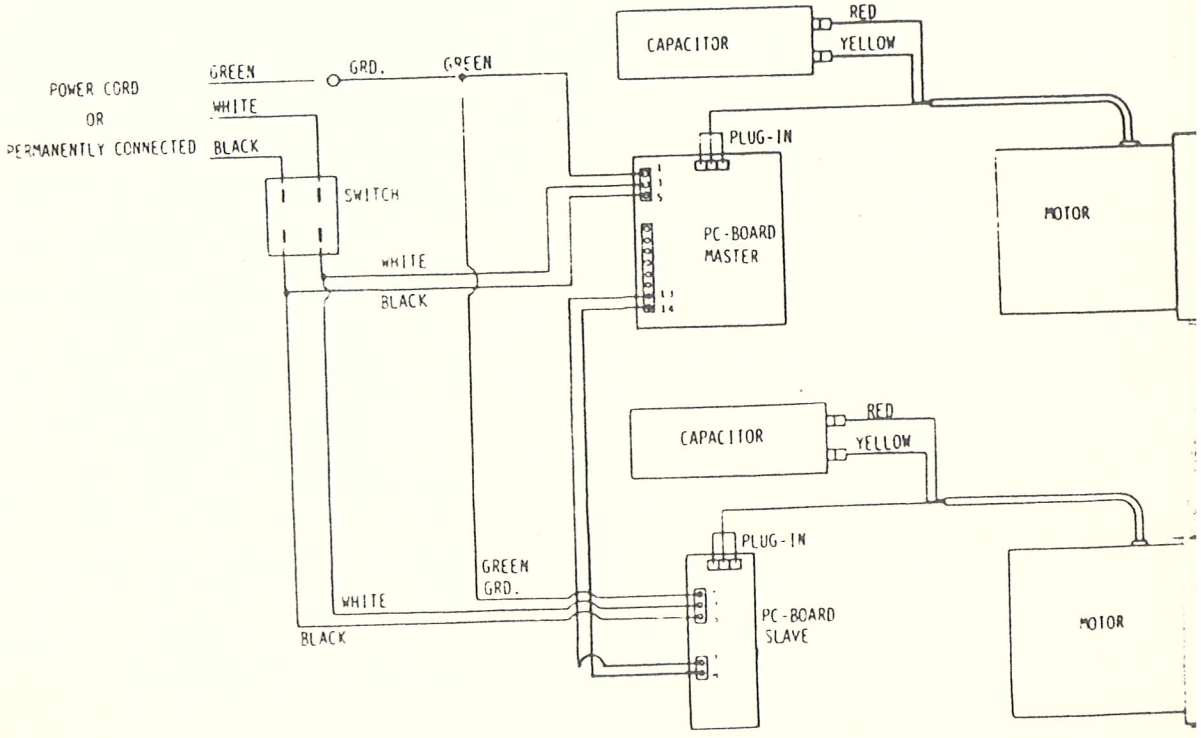
Figure 19



If the operator is to be permanently connected - follow the diagram. Be su to have the hot leg (phase) connected to connection No. 5 on the master PC Board, ESV-S-US. Otherwise, the internal fuse will not protect the PC Boar

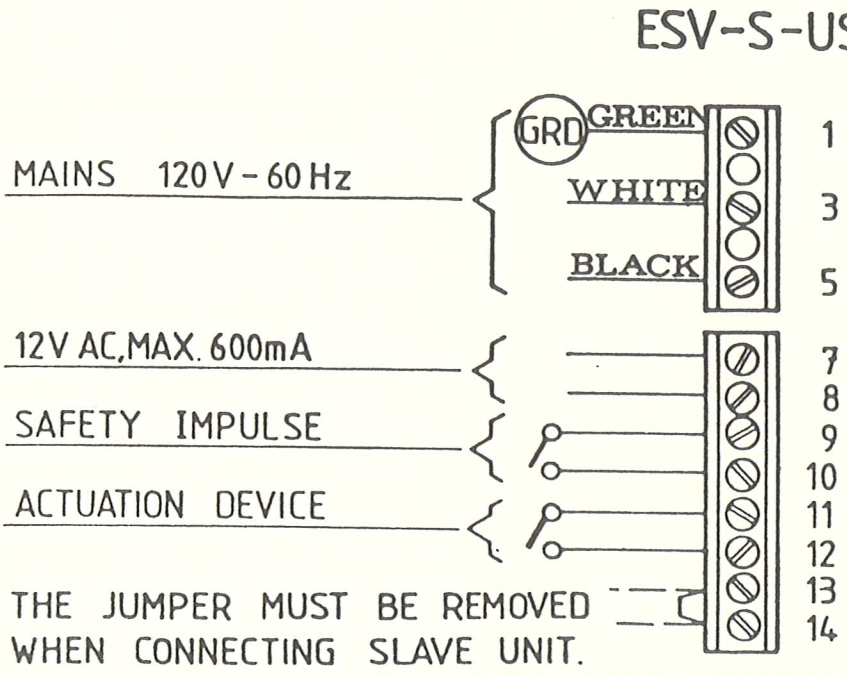
20. For a dual operator with simultaneous control - one master PC Board type ESV-S-US and one SLAVE PC Board type ESV-SLAVE-US are required. See diagra for wiring of simultaneous control dual operators.

Figure 20



21. External wiring is done after the operator is installed and should follow the diagram shown:

Figure 21



This wiring is required for each single operator which is to be separately controlled.

If dual operators with simultaneous control are installed, the same diagram is to be followed.

22. Venting the Oil Servo Unit

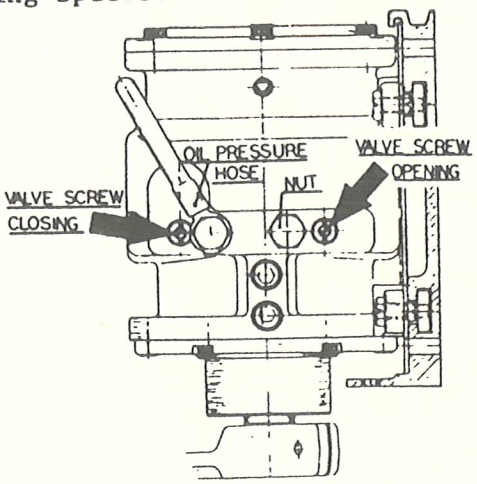
Loosen the vent screw on the top of the oil servo unit 3-4 full turns, to ensure that the hydraulic system is properly vented.

Adjustments

23. Switch the power on. The operator should now open and close one full cycle. This is the first indication that the operator is correctly wired.

24. On the side of the oil servo unit two valve screws will be found. These contr the opening and closing speeds.

Figure 24



Opening Speed

The opening speed is factory-preset at a normal speed. If necessary, this s can be adjusted. By turning the opening valve screw (the valve closest to t nut) full turns clockwise, the speed will decrease. Turning the valve scre full turns counter-clockwise, the opening speed will increase.

A "creep-speed" occurs in the last stage of the opening cycle braking the do and allowing it to proceed slowly to a fully open position. The creep-spee also adjustable by turning the valve screw a partial revolution in one dire or the other. First, find the valve position at which the door brakes abru and then using this position as a reference point, carefully adjust until a gentle braking performance is obtained.

Closing Speed

The same procedure as above, except the closing valve screw is used (the val screw closest to the oil pressure hose). Allow the closing speed to be as s as acceptable to obtain the maximum safety.

Time Delay

The potentiometer on the master PC Board provides a time delay on the hold o time for 0 to 30 seconds. The last given impulse will start the time dela a safety device is connected, the time delay begins when the safety functi no longer active. Adjust to required time delay.

The operator is now completely installed and adjusted. Let it operate a f times, assuring everything is correct and no re-adjustments are necessary.

25. Mount the cover to the operator, ensuring that the rubber extrusion on the of the backplate and the foam filler ring is around the motor fan guard in proper position.

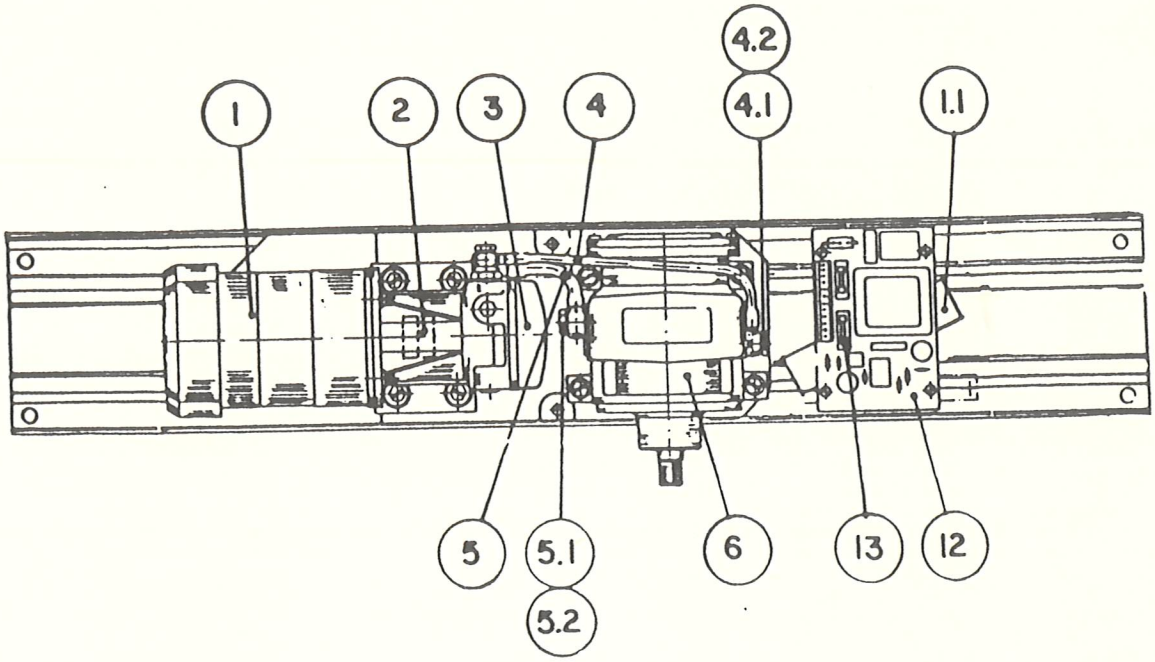
Fasten the slotted screws on the underside of the cover to complete the cov assembly.

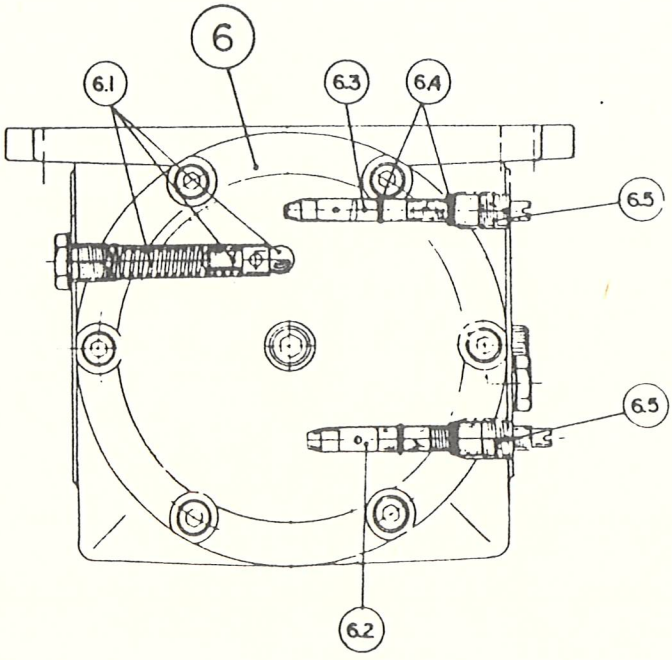
SPARE PART LIST

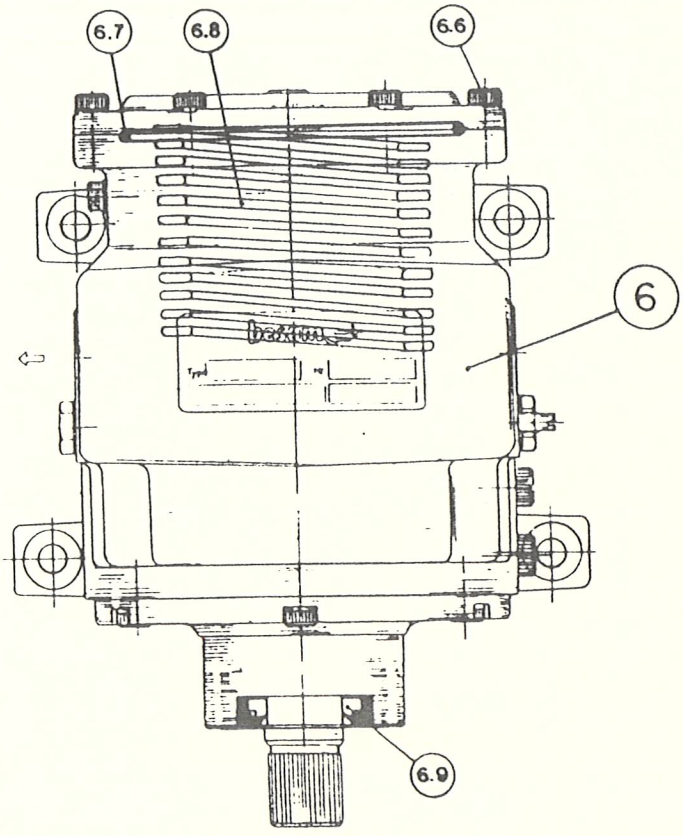
The items are referring to picture 1 to 5:

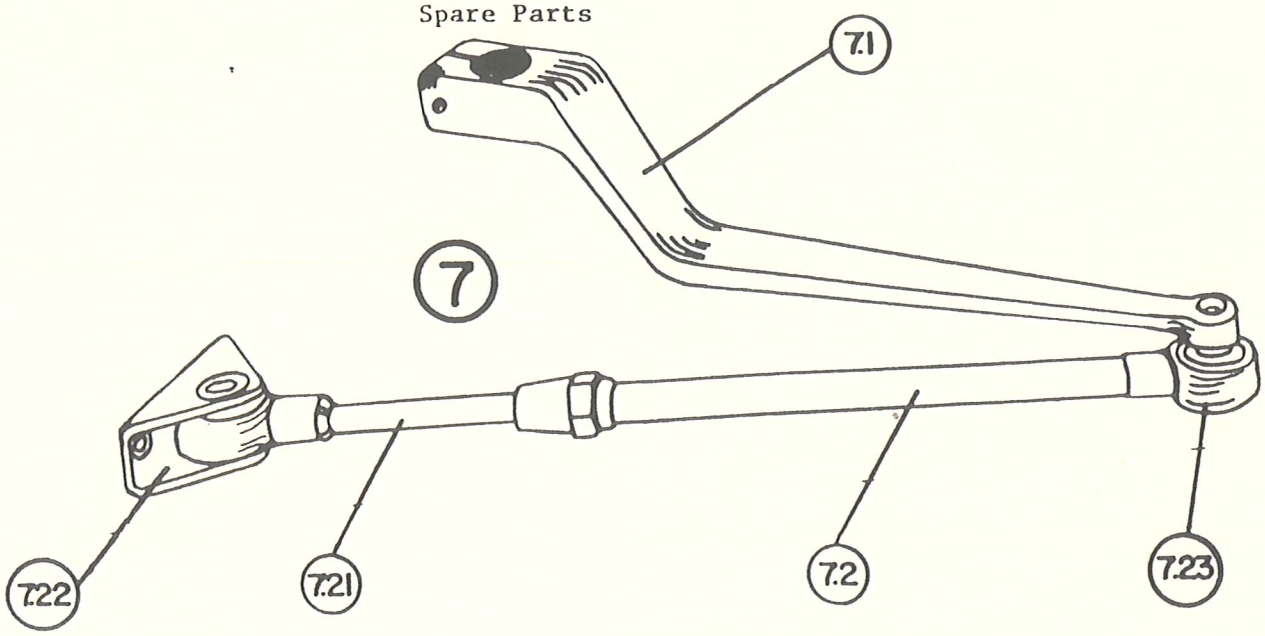
ITEM	DESCRIPTION	TYPE OF OIL SERVO UNIT	PART NO	REMARKS
1	Electric Motor	All Types	172192	Includes 30 UF Capacitor
1.1	Capacitor 25 UF	All Types	713257	For motors with black plastic fan cover
	30 UF	All Types	713329	For motors with yellow steel fan cover
2	Coupling complete	All Types	170910	
3	Oil Pump complete	All Types	171792	
4	Oil Hose, pressure side	OVE	171242	
		OHE	171243	
		POHE	171273	
		POVE	171274	
4.1	Union Screw set, pressure side	All Types	171658	Set of 4
4.2	Copper washer set, pressure side	All Types	171808	Set of 8
5	Oil Hose, return side	OVE, POHE	171244	
		OHE, POVE	171245	
5.1	Union screw set, return side	All Types	171891	Set of 4
5.2	Aluminum washer set, return side	All Types	171892	Set of 8
6	Hydraulic oil servo unit	OHE	171235	
		OVE	171236	
		POHE	171269	
		POVE	171268	
6.1	Valve spring set	All Types	171885	
6.2	Valve screw, opening	All Types	170369	Complete
6.3	Valve screw, closing	All Types	171368	Complete
6.4	O-ring set for valve screw	All Types	171661	Set of 6
6.5	Valve screw bushing	All Types	171666	Set of 5
6.6	Screw set for top plate	All Types	171886	Set of 6
6.7	O-ring for top plate	All Types	171887	Set of 5
6.8	Torsion spring, normal	OHE, POHE	170707	
		OVE, POVE	170706	
	heavy duty	OHE, POHE	170705	
		OVE, POVE	170704	
6.9	Radial oil seal	All Types	171888	Set of 5
7	Arm System, regular installation			
	Arm System, Z-type, clear	OVE, OHE	172023	Complete
	bronze	OVE, OHE	172057	Complete
	straight type, clear	OVE, OHE	171263	Complete
	bronze	OVE, OHE	172054	Complete
7.1	Arm, Z-type	OVE, OHE	172022	State color
	straight type	OVE, OHE	170927	State color
7.2	Telescopic bar system	OVE, OHE	171898	State color
7.21	Telescopic bar	OVE, OHE	170772	In overlength 2 ft.
7.22	Door Attachment	OVE, OHE	170936	State color
7.23	Washer set	OVE, OHE	171894	Set of 4

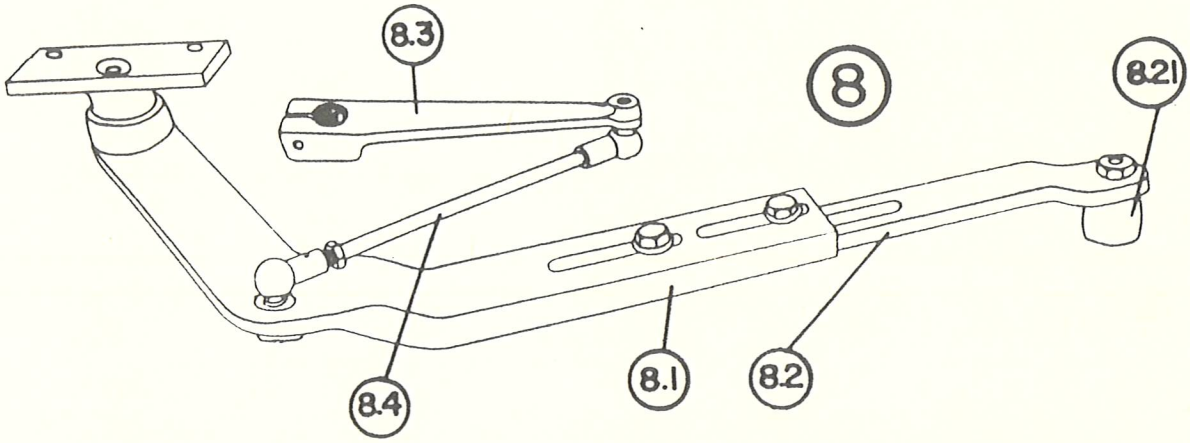
ITEM	DESCRIPTION	TYPE OF OIL SERVO UNIT	PART NO	REMARKS
8	Arm System, parallel installation			
	Arm System ST-V, right hand, clear	POVE	171851	Complete
	bronze	POVE	172069	Complete
	Arm System ST-H, left hand, clear	POHE	171852	Complete
	bronze	POHE	172070	Complete
8.1	Main arm for ST-V	POVE	171855	State color
	for ST-H	POHE	171856	State color
8.2	Slide arm for ST-V and ST-H	POVE, POHE	171858	State color
	Slide arm in overlength for reveal more than 1 9/16"	POVE, POHE	171859	State color
8.21	Roller for slide arm	POVE, POHE	171867	
8.3	Drive arm for ST-V and ST-H	POVE, POHE	171857	State color
8.4	Bar for ST-V and ST-H	POVE, POHE	171863	State color
9	Slide Track (butt hinge), clear	POVE, POHE	171868	
	bronze	POVE, POHE	172071	
10	Slide Track (center pivot with panic breakaway),			
	right hand, clear	POVE	171869	
	right hand, bronze	POVE	172072	
	left hand, clear	POHE	171870	
	left hand, bronze	POHE	172073	
10.1	Ball catch complete	POVE, POHE	171877	
10.2	Spring	POVE, POHE	171882	
11	Hydraulic Oil	All Types	732039	
12	PC-Board ESV-S-US	All Types	620101	
	ESV-SLAVE-US	All Types	620103	
13	Fuse set 7 Amp	All Types	651611	Set of 5
	3/4 Amp	All Types	651608	Set of 5

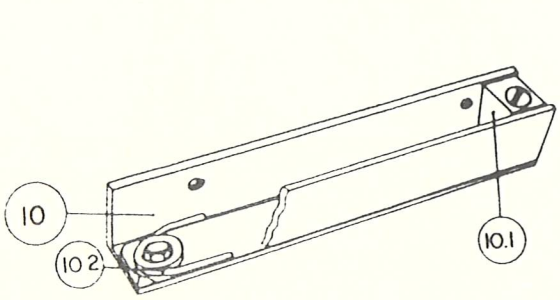

1
2
3
4
4.2
4.1
1.1
5
5.1
5.2
6
13
12

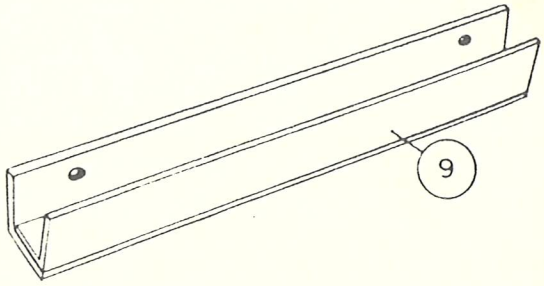

6
6.1
6.3
6.4
6.5
6.5
6.2


6.7
6.8
6.6
6
6.9









besam

BESAM INC.

171 TWIN RIVERS DRIVE ■ EAST WINDSOR, NEW JERSEY 08520 ■ (609) 443-5800 ■ TWX 510 685 2684

YOUR NEAREST SALES REPRESENTATIVE: