

# TYPE ME MOTOR OPERATOR INSTRUCTIONS FOR INSTALLATION AND OPERATION



*Federal Pacific Automatic-Transfer Switchgear assembly arranged for common bus application includes Type ME Motor Operators behind narrow covers on incoming switches (Bays 2 and 4 from left) and FP Touch-Pad OCS-300 Microprocessor Control is low-voltage compartment on Bay 3 (from left). Bay 1 at left is a feeder bay containing power fuses.*



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## WARNING

The equipment covered by this publication must be selected for a specific application and it must be operated and maintained by qualified persons who are thoroughly trained and knowledgeable in the installation, operation, and maintenance of underground power distribution equipment along with the associated hazards that may be involved. This publication is written only for such qualified persons and is not intended to be a substitute for adequate training and experience in safety procedures for this type of equipment. Proper installation is the responsibility of the operating and construction personnel and the utility performing and authorizing the work. Completion of these instructions implies no further warranty by the manufacturer.

A qualified person is one who is trained and competent in:

- The skills and techniques necessary to distinguish exposed live parts from non-live parts of electrical equipment.
- The skills and techniques necessary to determine the proper approach distances corresponding to the voltages to which the qualified person will be exposed.
- The proper use of the special precautionary techniques, personal protective equipment, insulating and shielding materials, and insulated tools for working on or near energized parts of electrical equipment.

These instructions are intended only for such qualified persons. They are not intended to be a substitute for adequate training and experience in safety procedures for this type of equipment.

It is the responsibility of the customer/user to properly apply, install, operate and maintain this motor operator and the associated high voltage equipment. Qualified professional assistance is required. Responsibilities of qualified persons include but are not limited to the following:

**High Voltage Switch Application** - Ratings, limitations of NON-LOADBREAK and NON-FAULT CLOSING switches, lightning and surge protection, adherence to standards such as NEMA, ANSI, and/or National Electric Code.

**Customer's conductors and conductor terminations** - Ratings, support, bracing, electrical clearance and dielectric stress reduction.

**Mounting and weather sealing of conductors.**

**Personnel Safety** - Protection from electric shock, equipment grounding and interlocks, system operating and safety procedures.

**Maintenance** - Scheduled inspection, cleaning of insulation and greasing of contacts depending on weather and other environmental conditions.

**The enclosure should be kept locked at all times. Only experienced qualified persons should be able to gain access to the interior of the switch cabinet. Access should only be made after approved lockout and grounding procedures have been executed.**

## SAFETY INFORMATION

### Understanding Safety-Alert Messages

There are several types of safety-alert messages which may appear throughout this instruction bulletin as well as on labels attached to the padmounted switchgear. Familiarize yourself with these types of messages and the importance of the various signal words, as explained below.



### DANGER

“DANGER” identifies the most serious and immediate hazards which will likely result in serious personal injury or death if instructions, including recommended precautions, are not followed.



### WARNING

“WARNING” identifies hazards or unsafe practices which can result in serious personal injury or death if instructions, including recommended precautions, are not followed.



### CAUTION

“CAUTION” identifies hazards or unsafe practices which can result in minor personal injury or product or property damage if instructions, including recommended precautions, are not followed.



### NOTICE

“NOTICE” identifies important procedures or requirements that, if not followed, can result in product or property damage if instructions are not followed.

## FOLLOWING SAFETY INSTRUCTIONS



### NOTICE



Thoroughly and carefully read this instruction bulletin before installation of the padmounted switchgear, before switching or operating the switches or fuse mountings in this equipment, and before performing any maintenance on the equipment.

If you do not understand any portion of this instruction bulletin and need assistance, contact Federal Pacific at 276-466-8200.

### Replacement Instructions & Labels

If you need additional copies of this instruction bulletin, contact Federal Pacific at 276-466-8200.

It is important that any missing, damaged, or faded labels on the equipment be replaced immediately. Replacement labels are available by contacting Federal Pacific.

## SAFETY PRECAUTION



### DANGER

Federal Pacific Fuse Mountings in conjunction with appropriate fuses are designed to protect equipment and to disconnect faulted equipment from the system. The fuses cannot protect personnel from injury or electrocution if contact is made with energized circuits or hardware.



**TECHNICAL SUPPORT**  
**276-466-8200**  
**276-645-8212 FAX**

Web site: [www.federalpacific.com](http://www.federalpacific.com)

Call to confer with technical support personnel who are familiar with the equipment that you are installing. We promise to do our best to help with an efficient, quality installation.

Call when:

- There is something that you do not fully understand.
- Questions arise before, during or after the installation.
- You want to make comments about the products, drawings, instruction books delivery condition, etc.
- Seeking information regarding renewal or repair parts.

To avoid delays when calling, please have the product type, the equipment serial number (SN#) and the appropriate assembly drawing number available for reference.

For a permanent record, duplicate all motor operator nameplate data here and retain in a convenient location.

SWITCHGEAR ASSEMBLY S.N.	
TYPE: OPERATOR	IN LBS. TORQUE
CHARGER	LBS. THRUST MIN.
HEATER	
SPEED	SECONDS
MOTOR OPERATOR S.N.	
ASSEMBLY DRAWING #:	

**GENERAL**

The Type ME Motor Operator kit (Model C100C198) is a special design made to operate the Federal Pacific Auto-jet® II cabinet mounted load interrupter switch. This operator kit may be supplied either for an OEM installation on a new un-installed switch, or as a field installed retrofit to an existing installed switch.

The motor operator uses a high torque motor turning a drive shaft and worm-drive gearbox to operate the interrupter switch. The motor and controls operate on 125 volt AC or DC power. The unit has a handcrank mechanism for non-powered operation and a decoupler to allow service and motor exercise without operating the switch. The system is designed to open or close the switch in approximately 2 seconds if no intentional time delay is programmed into the control scheme.

The motor operator can be controlled from either a remote control location or by local controls mounted on the front of the cabinet. Control location is selected by the LOCAL – REMOTE switch on the front panel. When in LOCAL, remote signaling is disabled and the unit can only be operated by the OPEN – CLOSE toggle switch on the front panel. When in REMOTE, the front panel switch is disabled allowing only REMOTE control. When operation is to be performed on site through an FP microprocessor control, the front panel must be set on “Remote” and the microprocessor must be set to “Manual” mode. In either case, when a run signal is received, the command is “sealed in” and the motor will run until the operating travel limit switch is reached. The limit switches activate a dynamic braking circuit that stops the motor instantly.

**⚠ CAUTION**

If the motor operator is decoupled from the switch and the door is open with the door interlock slid out to its latched position (e.e. the door interlock is defeated), then if a subsequent motor run signal is received, the motor will run continuously. To stop the motor from running, raise the slide cover that is over the manual charging access port.

The system incorporates several overlapping control interlocks. These interlocks are provided to prevent opening of the cabinet door with the switch closed, to prevent powered switch operation with the door open or with the hand crank in place, and to prevent motor operation from a remote location while decoupled.

The motor operator system is designed for easy installation in a properly prepared cabinet with the disconnect switch mechanism in place. Control components and wiring harness terminals are designed for service access with the cabinet door closed.

## INSPECTION

The Type ME Motor Operator when sold separately is shipped in a crate as five subassemblies. The shipment should be visually inspected for shipping damage. Any shipping damage found should be immediately reported to the delivering carrier. Any other problems should be reported to Federal Pacific. Nameplate data should be recorded on page 4. Refer to this data when contacting the factory.

## INSTALLATION

This motor operator may be installed in a cabinet containing an FP Auto-jet® II switch either as a retrofit installation in an installed switchgear assembly, or as a new OEM installation.

The cabinet must be prepared according to drawing C100C201 for new installation and C100C202 for a retrofit. The barriers and safety gate must be temporarily removed and the mounting and access holes in the front of the cabinet must be provided.

For clarity, the switch is shown outside the cabinet in Figures A1, A2 and A3. The installation/assembly procedures can be done with the switch installed in the cabinet.

### Switch should be OPEN.

#### A. Install the worm gear drive assembly.

1. Remove the sprocket from the switch shaft and any other related original switch-mechanism parts from the switch body. (Fig. A1-1)
2. One-at-a-time, remove the nuts from the mechanism retainer bolts at the back of the assembly and replace the nuts with the threaded extensions provided. Re-use the present flat head screws. Fig. A1-2
3. Remove ONE of the front retainer bolts. (Fig. A2-3)
4. Set the worm drive assembly in place and start one of the back bolts (3/8-16 x 3/4" lg. W/ flat washer and external tooth lockwasher) into its tapped hole in the spacer. Run it in only a couple of turns. (Fig. A2-4)
5. Start the worm gear onto the shaft. The hub goes on the inside facing the switch. Position it so the set screw points out and up at approximately 45 degrees for wrench clearance. (Fig. A3-5)
6. Turn the worm shaft to engage the worm and gear. Push the worm drive assembly inwards toward the switch, align the bolt holes and install one of the 3/8-16 x 3-1/2" SST bolts with a spacer and external tooth lockwasher in the hole where the original bolt was removed. Use the original flanged locknut. Remove the second bolt and install the second 3-1/2" bolt with spacer, original nut and lockwasher. (Fig. A3-6)
7. Install the second back bolt with flat and lock washers. Tighten all four bolts. (Fig. A3-7)

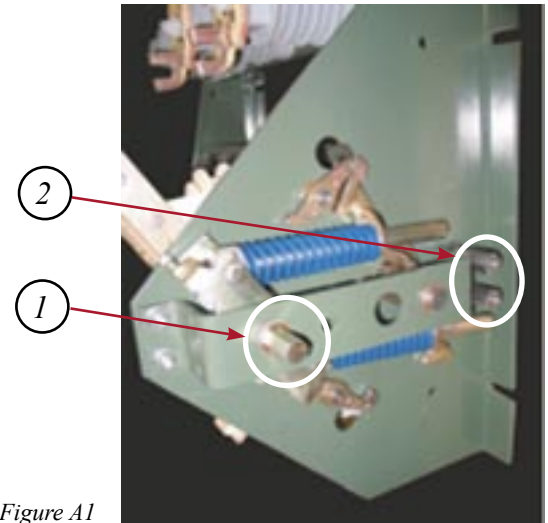


Figure A1

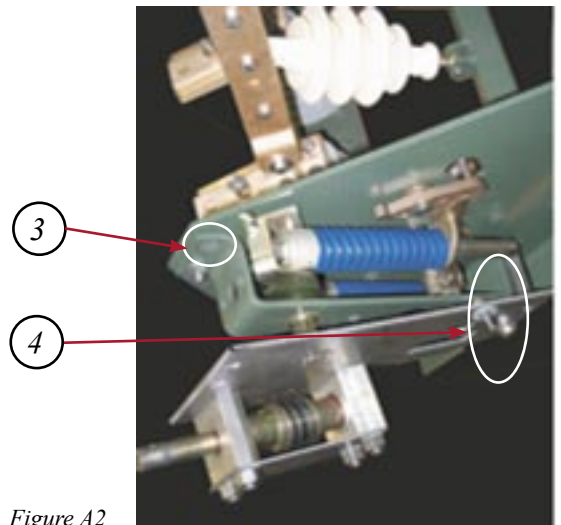


Figure A2

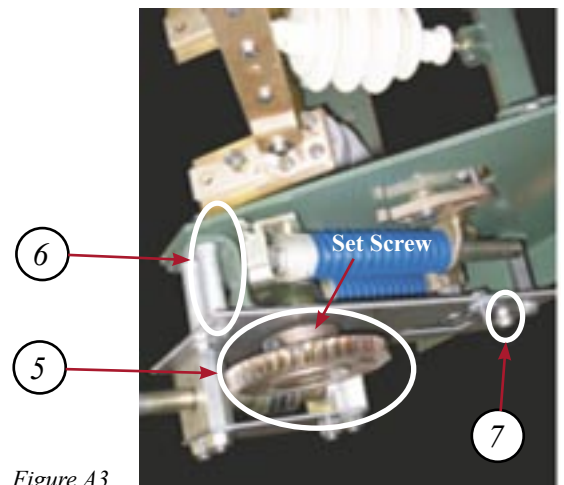


Figure A3

## B. Install the Drive Motor Package

1. Slip the drive shaft coupling onto the motor drive shaft and slide it up the shaft a couple of inches. Lift the motor box into position. Insert the decoupler slide through the opening in the front of the cabinet and start the two 3/8-16 x 1"lg SST bolts into the upper tapped holes in the front of the motor box. (Fig.B2-1)

2. Using the two remaining 3/8"x 1" bolts; install the decoupler padlock bracket to the two lower tapped holes. Tighten all four bolts. (Fig. B2-2)

3. Align the drive shafts from the motor and switch. Slip the coupling over the joint and align the holes in the coupling with the hole in either the motor or switch drive shaft. Insert a 1/4" socket head bolt (provided) and tighten the nut. (Fig. B3-3).

4. Pull the door interlock slide out until it latches. (Fig B1-4A). Pull the decoupler slide out until the coupling engages and the padlock tab drops into the outer (coupled) slot. Fig. B2-4). If the decoupler slide does not come out easily, lift the shutter and insert the handcrank. Slowly turn the crank until the decoupler pulls out sufficiently and the padlock tab drops into the outer (coupled) slot. With the decoupler-coupled turn the handcrank **counterclockwise - towards OPEN** - until the interlock slide has moved to the left and is about 1/8" to 3/16" from the end of the threads on the 3/4" shaft.. (Fig. B1-4B). Proceed with caution. Watch the slide move.

5. Use the handcrank to align the holes in the coupling with the hole in the shaft. Insert the remaining 1/4" socket head bolt and tighten the nut. (Fig. B3-5).

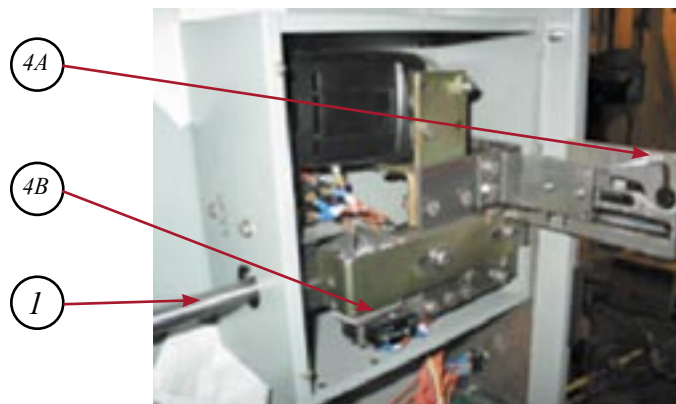


Figure B1. View from inside enclosure looking out toward the cabinet door.

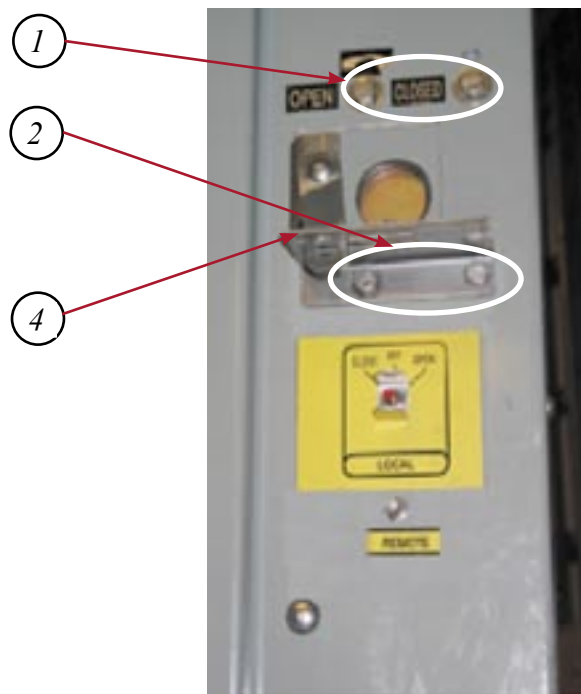


Figure B2. View of motor operator control features.

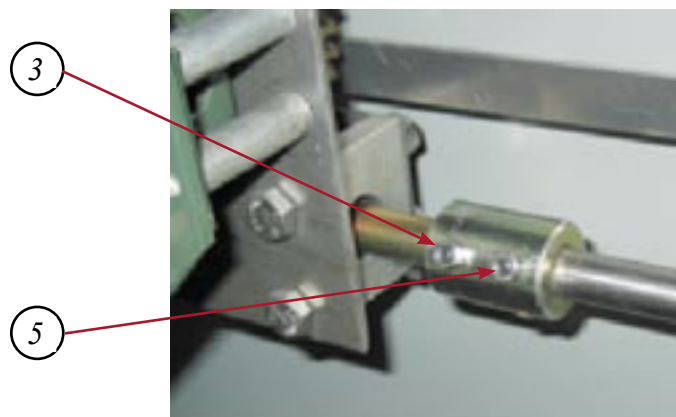


Figure B3. View inside cabinet at switch frame.

6. Insert the end of the limit switch operator bar into the slot in the end of the motor box. (Fig. B4-6). Engage the switch position lever assembly (other end of operator bar) with the switch arming lever, swing it around and place it over the 3/8" stud on the side of the worm drive plate. Tighten the elastic stop nut until it bottoms and back it off about 1/8 turn to allow free motion. (Fig. B5-7)

7. Handcrank the switch closed and back open. Verify that all components move through their full range without binding or interference. **Stay clear of the switch moving parts. When the mechanism operates the switch, it will go full travel almost instantly. Severe injury will occur if you are struck by a moving switch blade.**



Figure B4

**C. Install the Electrical Component/Control Box & Wiring**

Bolt the electrical box behind the opening in the front of the cabinet. The box has four tapped holes in the corners. Stuff the wiring harnesses from the motor box into the opening in the top of the electrical box, align the bolt holes and insert the bolts. Install conduit and install the power supply and control wiring according to the wiring diagrams and schematics furnished with the motor operator.

**D. Install Door Interlock Bracket**

Remove and discard the bolts holding the lock bars to the door handle mechanism. Retain the brass washers. Install the Door Interlock Bracket on the handle mechanism using the original brass washers and the 3/8 - 16 x 1.25 lg. SST shoulder screws and brass spacers provided. Assemble in the order shown in Fig. D-1.

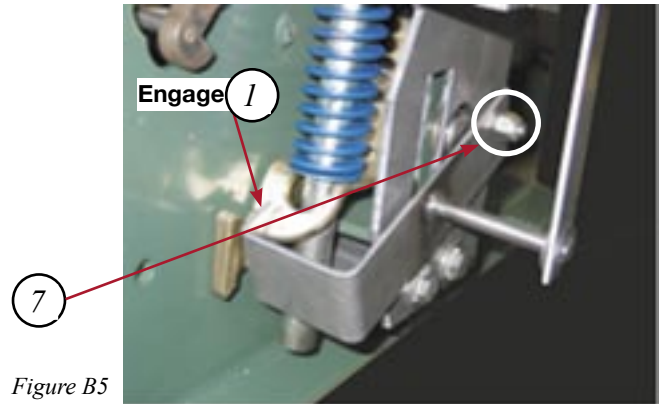


Figure B5

1	Door Interlock Bracket W/Locking Pin
2	3/8 - 16 x 1.25 lg. SST Shoulder Screws
3	Brass Spacers
4	Original Brass Washers

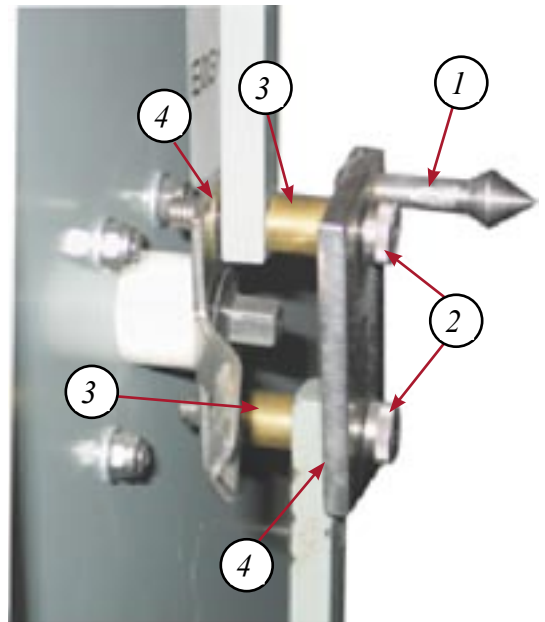


Figure D1

## OPERATION

### Motorized Operation

The motor can be controlled from two different positions. A LOCAL/REMOTE toggle switch on the front panel determines which position is active. "LOCAL" control disables any remote signals and allows use of the momentary toggle switch "OPEN – OFF – CLOSE" also located on the front panel to control motorized opening and closing of the switch. "REMOTE" disables the local toggle switch control and requires a pair of dry contacts to make the circuit between the common and open circuit or the common and close circuit to operate the motor.

In either case, local or remote, once started, the motor is sealed in and cannot be stopped until it reaches and operates the limit switch at end of travel. Limit switch activation causes the dynamic brake circuit to instantly stop the motor.

If the decoupler is moved to the "DECOUPLED" position and the motor is started by LOCAL signal, the motor will continue to run because the limit switch will never be activated. To stop the motor, power must be removed or the cover over the Handcrank Port (see Figure E) must be lifted to break the seal-in circuit. The motor will not start from "Remote" when in the decoupled position.

### Handcranking

Handcranking is accomplished by lifting the cover over the Handcranking Port (see Figure E) to expose the handcrank shaft. Lifting the handcrank cover operates two microswitches, one to interrupt power to the controls that could start the motor and the other to break continuity in the motor circuit itself to prevent dynamic braking of the motor during handcranking. The crank can then be inserted, placed on the handcrank shaft and turned about 9 revolution to accomplish either a "CLOSE" or "OPEN" operation.

### Decoupler

In the decoupled position, neither the motor nor the handcrank can change the position of the switch. Coupling is accomplished by pulling the decoupler lever to its outward position. Pushing the control to its inward position decouples the operator. The decoupler lever bar can be padlocked in either the coupled or decoupled position. Running the motor or handcranking while in "DECOUPLED" mode will misalign the engagement of the front and rear shafts at the decoupler. When the decoupler is to be recoupled, engagement will not take place until the handcrank is inserted and turned to realign the front shaft with the rear shaft.

### Door Interlock

An interlock system prevents the cabinet door from being opened unless the interrupter switch is "OPEN" **and** the drive system (handcrank or motor) is decoupled.

#### To open the cabinet door:

Following company guidelines, manually or electrically open the switch. Decouple the operator. Swing the padlocking tab aside and push inwards on the decoupler slide until the padlock tab drops into the inner (decoupled) slot. The interlock mechanism inside the cabinet is now released and the door can be unlatched and opened.

**NOTE: Motor operator MUST be decoupled before attempting to open the door.**

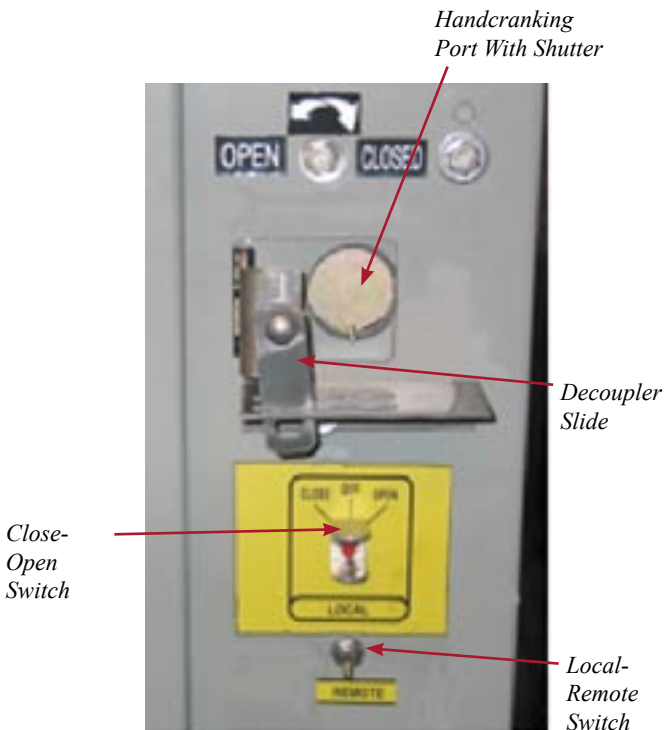


Figure E. Front Panel Nomenclature.

**To close the cabinet door:**

The switch must be open and the mechanism must be decoupled. (Decoupler slide pulled out). The inside door interlock bar must be fully to the right. The door handle on the outside of the enclosure door must be horizontal. Check the door latch as the door closes. The locking pin must enter the keyhole shaped locking hole on the interlock bar for the door to close. Close door first before coupling.

**Interlock Defeat Procedures**

Both the cabinet door and decoupler interlocks are defeatable once the door is opened. The defeat position allows switch maintenance to be carried out. The door cannot be re-closed unless the switch is "OPEN" and the drive is decoupled.

To defeat the door interlock; open the door and pull out on the interlock slide until it latches. (Fig. B1-4a). This is the same position that the interlock bar would be in if the door were closed. All switch functions will now operate as if the door were closed. When coupled, the switch can be operated electrically or manually.

A coupled decoupler interlock will allow REMOTE operation.

A decoupled decoupler interlock will not release the dynamic brake and the motor will seal in and run continuously. To STOP the motor, raise the Handcranking Port Shutter.

**Emergency Door Opening**

An emergency interlock defeat feature is included that allows the door to be opened in case of a failure of any component that prevents opening the switch and decoupling the drive. This defeat mechanism requires drilling a 1/4" dia. hole through the front door near the handle. Drilling a hole makes it obvious that someone tried to defeat the interlock. When the hole is in the door, a socket head cap screw is accessible with an Allen wrench and can be removed. Removing this screw allows the door handle to be rotated and the door opened.

**⚠ DANGER**

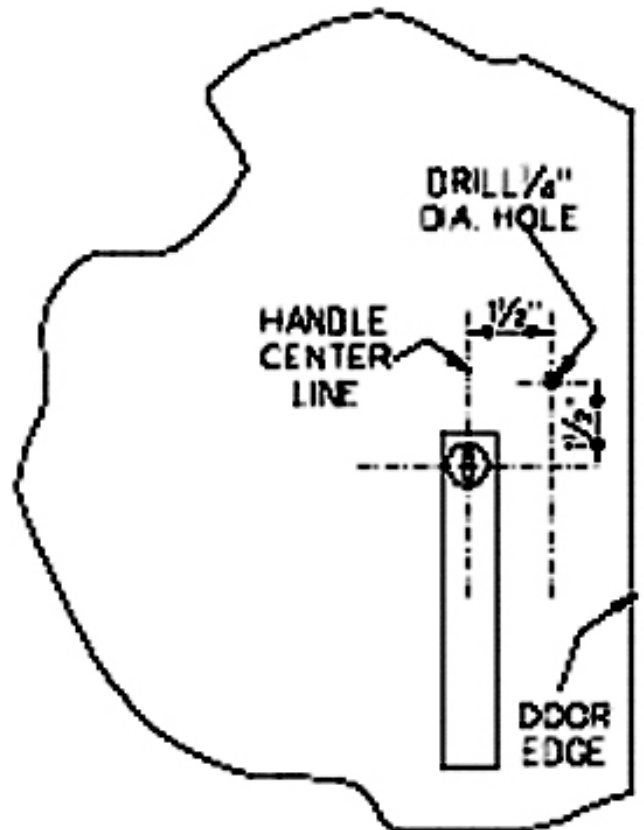
Do not use the defeating feature of the interlock mechanism unless you have followed all precautions regarding de-energizing and grounding to allow work around this high voltage equipment.

**Defeating the interlock completely eliminates the security and safety features it provides.**

Follow company safety rules and guidelines for operating, opening, and servicing these cabinet mounted switches.

**MAINTENANCE**

The motor operator requires very little maintenance. During regular switch maintenance check the drive chain. It should be tight and may need to be lightly oiled. A small amount of grease should be applied to the worm. Infrequently operated switches should have the motor "exercised" occasionally. To exercise the motor, decouple the operator. Use the LOCAL control switch to run the motor. A decoupled motor cannot activate the limit switches so it will continue to run until stopped. To stop the motor, disconnect power to the operator or open the handcrank shutter. Be sure to recouple the operator before leaving the site.



*Hole location for emergency interlock defeat*

