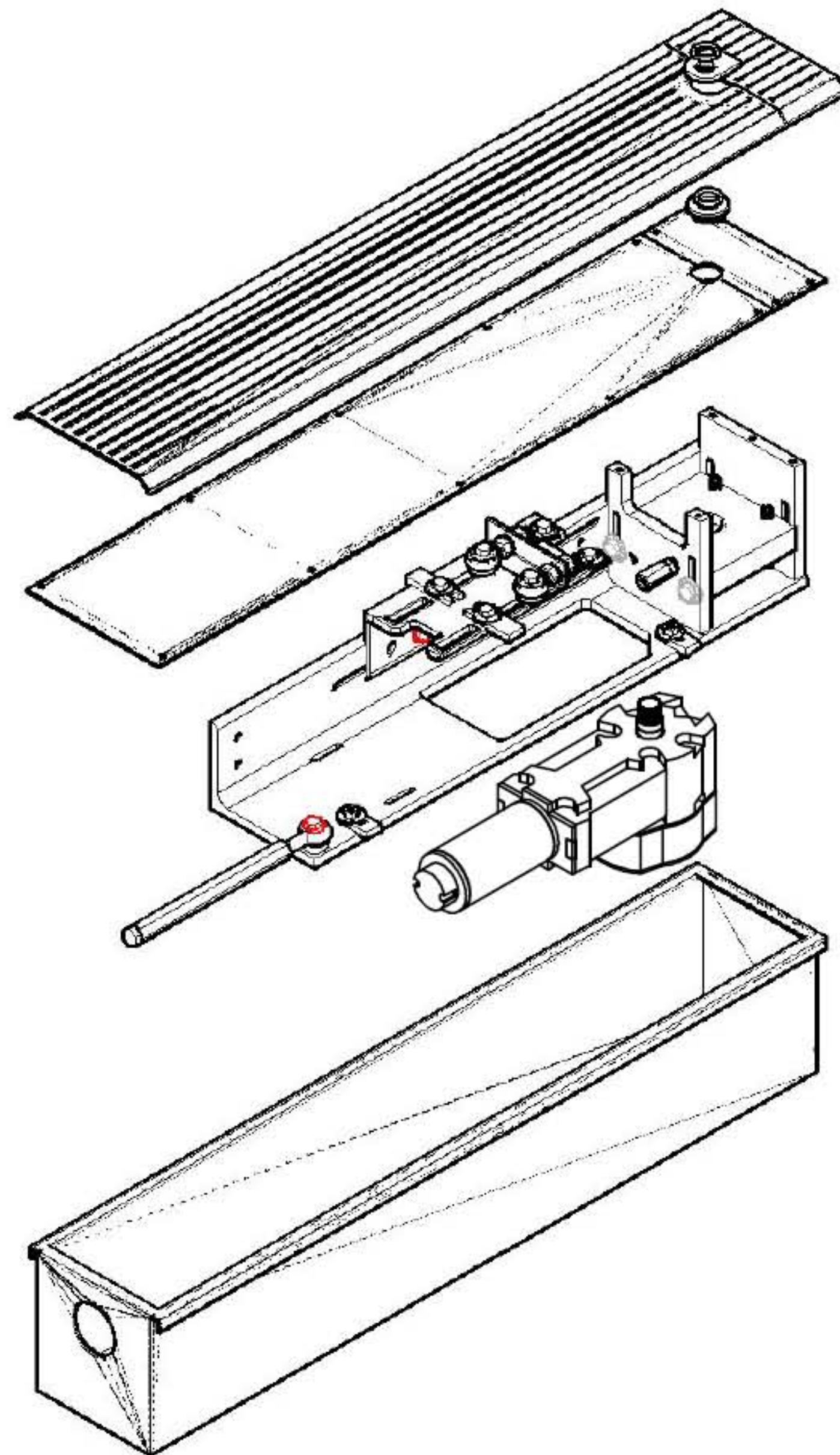


DORMA

ASSEMBLY & INSTALLATION MANUAL

OPCON CONVERTER SYSTEM FOR DORMA ED-400 IG



ALL RIGHTS RESERVED

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OPERATOR CONVERSION THEORY & IMPORTANT CONSIDERATIONS

(REVIEW BEFORE STARTING ASSEMBLY AND INSTALLTION)

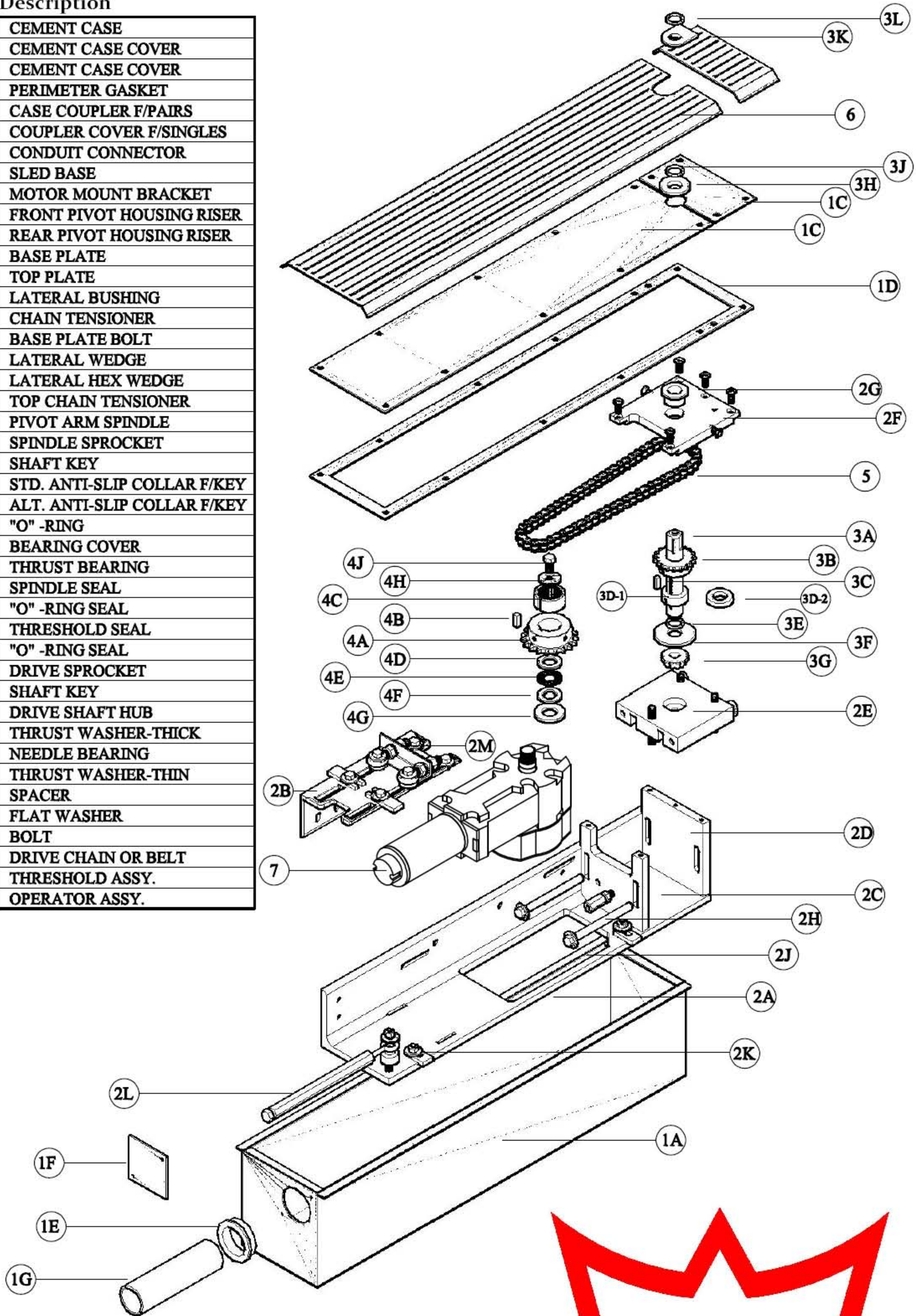
THEORY OF OPERATION

The Operator Conversion System is designed to convert standard overhead mounted, swing door operators from overhead mounted to underground/underfloor use. A custom pivot assembly and operator-mounting sled is provided to attach the standard operator, creating a new drive assembly. The entire drive assembly is then placed into a waterproof cement case, sealed, and cemented into place under the door. The drive system Spindle attaches to the bottom arm of the door. The Spindle profile of the unit integrates with many available bottom arms for center hung and offset hung swing doors.

CONSIDERATIONS

- 1) HANDING: It is important to note that handing the operator is opposite of standard since the operator is mounted upside down when converted. Specifically, a left hand operator swings a right hand door; and a right hand operator swings a left hand door. Microswitch placement, stop block placement, and programming functions will be affected depending upon the operator selected.
- 2) DRIVE SPINDLE: The Spindle of the converter is specific to the bottom arm selected for each door. Spindle profiles are available for most Dorma and Rixson bottom arm hardware for center hung, offset pivot hung, and offset butt hung (hinged) doors. The Dorma arm profile is often compatible with CR Laurence hardware. Bottom arms are NOT supplied with the converter. Be certain that the Spindle ordered matches the bottom arm selected.
- 3) CEMENT CASE SIZE: All cement cases are supplied at the standard size of 35-1/2" long X 7" wide. On pairs of doors, a conduit connects the cement cases and the width is variable. Pairs of doors narrower than 72" are available as a custom order.
- 4) FLOOR EXCAVATION & PREPARATION: The typical floor depth for the converter is 7" minimum; but this may be reduced somewhat by the height of the threshold or other flooring material if the converter can be raised under the floor covering. Center hung door excavation is the width between the jambs + 1/4" under the jambs; Offset hung door excavation is the width between the jambs + 2-1/4" under the pivot side jambs.
- 5) THRESHOLD & FLOORING: All units are shipped considering a 1/2" tall threshold or stone cover unless otherwise advised. Most thresholds must be 10" wide to cover the converter and excavation. Terrazzo/stone pans have a variable size between 8" and 10".
- 6) ELECTRICAL & LOW VOLTAGE: The electrical supply and low voltage signal lines must enter the cement case at the non-pivot side of the converter on single doors, and at or near the center on pairs of doors. Liquid Tight conduit fittings must be installed. Wireless activation requires sealed antennae placement through the cement case. Refer to Wiring section of Install Manual.

| Description | |
|-------------|-----------------------------|
| 1A | CEMENT CASE |
| 1B | CEMENT CASE COVER |
| 1C | CEMENT CASE COVER |
| 1D | PERIMETER GASKET |
| 1E | CASE COUPLER F/PAIRS |
| 1F | COUPLER COVER F/SINGLES |
| 1G | CONDUIT CONNECTOR |
| 2A | SLED BASE |
| 2B | MOTOR MOUNT BRACKET |
| 2C-T | FRONT PIVOT HOUSING RISER |
| 2D-T | REAR PIVOT HOUSING RISER |
| 2E | BASE PLATE |
| 2F | TOP PLATE |
| 2G | LATERAL BUSHING |
| 2H | CHAIN TENSIONER |
| 2J | BASE PLATE BOLT |
| 2K | LATERAL WEDGE |
| 2L | LATERAL HEX WEDGE |
| 2M | TOP CHAIN TENSIONER |
| 3A | PIVOT ARM SPINDLE |
| 3B | SPINDLE SPROCKET |
| 3C | SHAFT KEY |
| 3D-1 | STD. ANTI-SLIP COLLAR F/KEY |
| 3D-2 | ALT. ANTI-SLIP COLLAR F/KEY |
| 3E | "O" -RING |
| 3F | BEARING COVER |
| 3G | THRUST BEARING |
| 3H | SPINDLE SEAL |
| 3J | "O" -RING SEAL |
| 3K | THRESHOLD SEAL |
| 3L | "O" -RING SEAL |
| 4A | DRIVE SPROCKET |
| 4B | SHAFT KEY |
| 4C | DRIVE SHAFT HUB |
| 4D | THRUST WASHER-THICK |
| 4E | NEEDLE BEARING |
| 4F | THRUST WASHER-THIN |
| 4G | SPACER |
| 4H | FLAT WASHER |
| 4J | BOLT |
| 5 | DRIVE CHAIN OR BELT |
| 6 | THRESHOLD ASSY. |
| 7 | OPERATOR ASSY. |



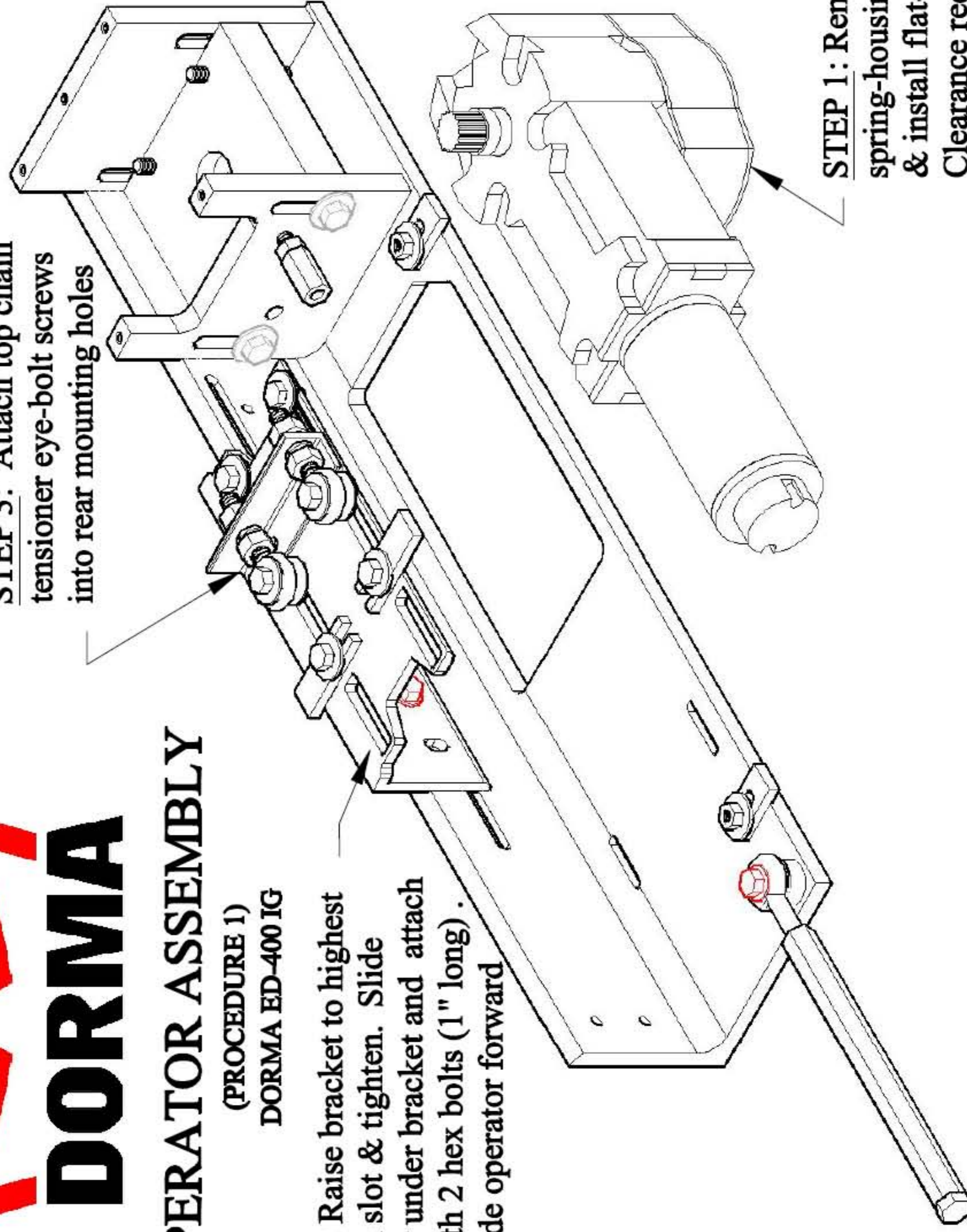


OPERATOR ASSEMBLY

(PROCEDURE 1)
DORMA ED-400 IG

STEP 2: Raise bracket to highest point on slot & tighten. Slide operator under bracket and attach front with 2 hex bolts (1" long). Then slide operator forward on sled

STEP 3: Attach top chain tensioner eye-bolt screws into rear mounting holes



STEP 1: Remove hex bolts at spring-housing. Countersink & install flat-head bolts. Clearance required for spindle seals.

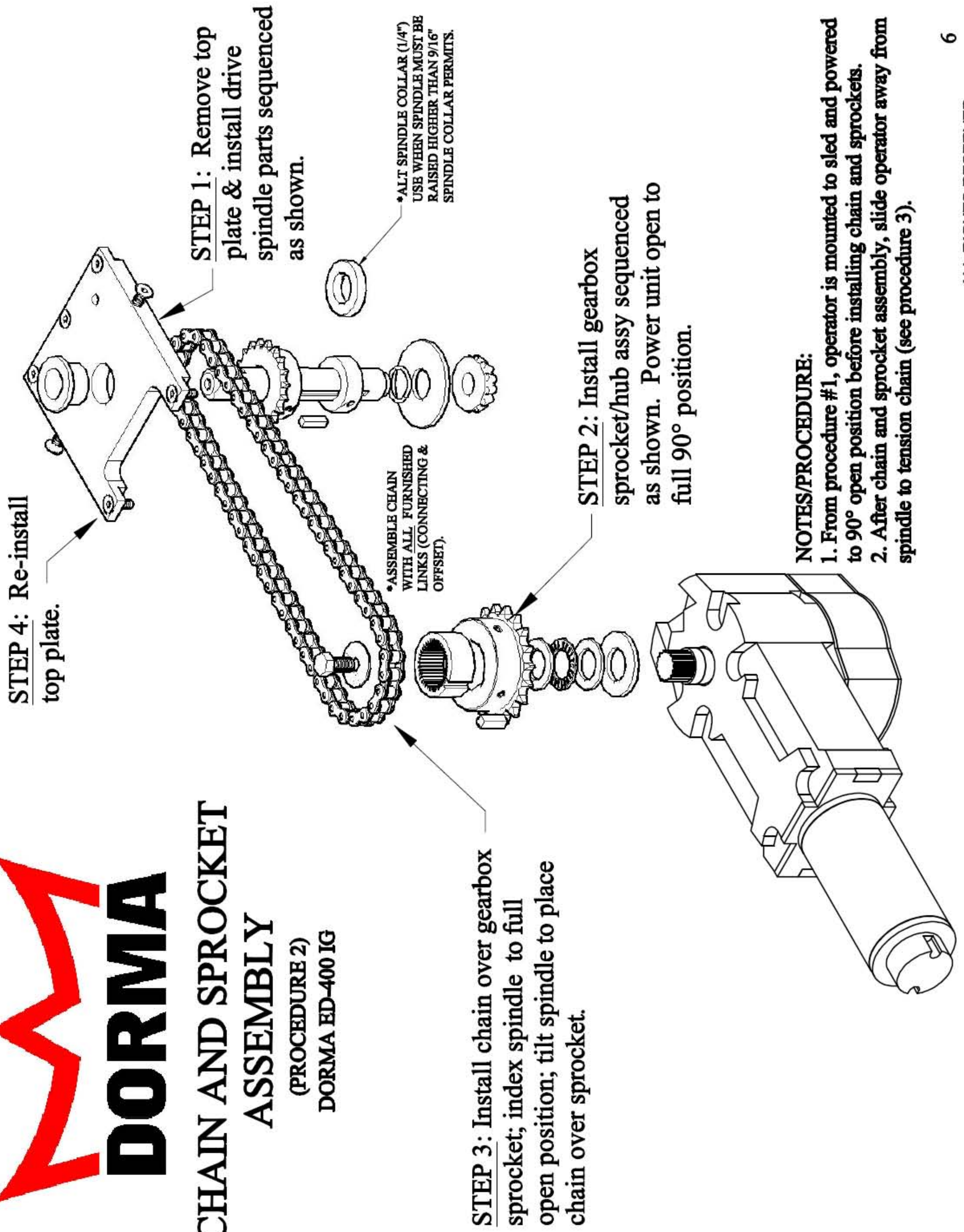
NOTES/PROCEDURE:

1. Reference isometric drawing for more details.
2. Right hand outswing shown; uses left hand outswing operator due to upside-down mounting. Program for left-hand outswing.
3. After mounting, power operator to 90° open position & set open stop block location.
4. See chain and sprocket assembly to continue.



CHAIN AND SPROCKET ASSEMBLY

(PROCEDURE 2)
DORMA ED-400 IG



NOTES/PROCEDURE:

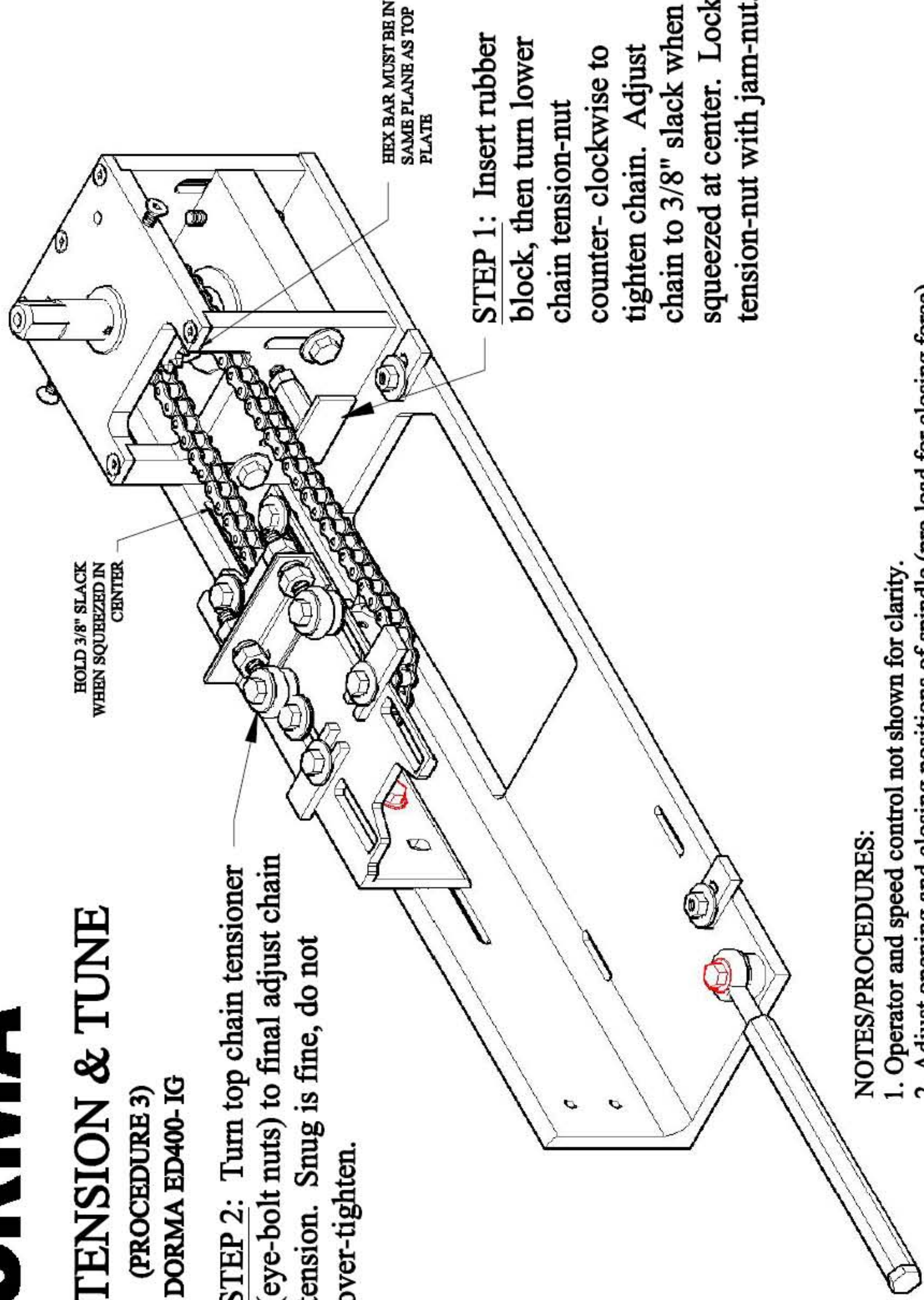
1. From procedure #1, operator is mounted to sled and powered to 90° open position before installing chain and sprockets.
2. After chain and sprocket assembly, slide operator away from spindle to tension chain (see procedure 3).



CHAIN TENSION & TUNE

(PROCEDURE 3)
DORMA ED400- IG

STEP 2: Turn top chain tensioner (eye-bolt nuts) to final adjust chain tension. Snug is fine, do not over-tighten.



STEP 1: Insert rubber block, then turn lower chain tension-nut counter- clockwise to tighten chain. Adjust chain to 3/8" slack when squeezed at center. Lock tension-nut with jam-nut.

NOTES/PROCEDURES:

1. Operator and speed control not shown for clarity.
2. Adjust opening and closing positions of spindle (pre-load for closing force).
3. Attach control box and tune to Dorma specifications.
4. Install completed and tuned assembly into cement case.

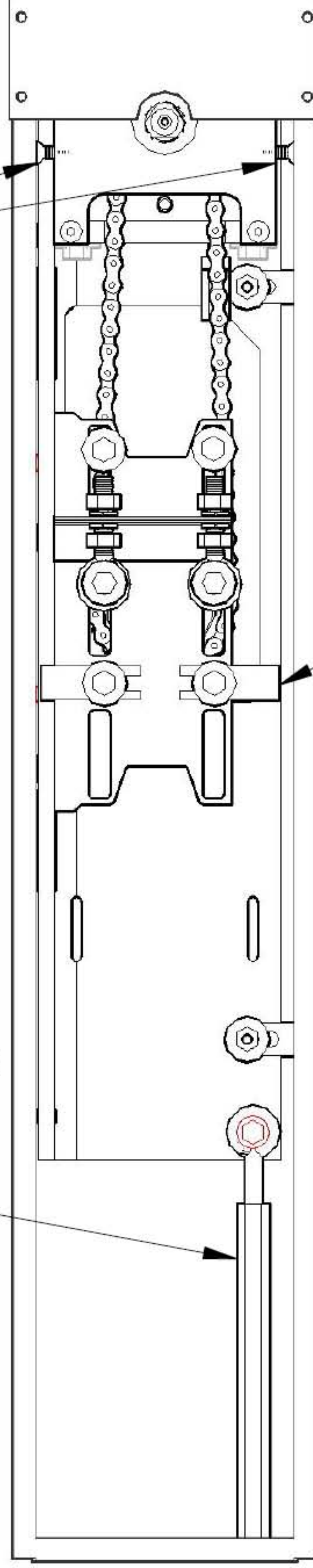


SPINDLE CENTERING & WEDGING

(PROCEDURE 4)
DORMA ED-400 IG

STEP 1: Center spindle using 2 bolts on top plate. Minimize pressure on cement case to avoid misalignment of cover screws.

STEP 2: Adjust hex bar for lateral movement. Insert shims behind spindle housing for alternate spindle locating.



STEP 3: Tighten sled wedges in 4 places. Wedge flat and tight against cement case.

NOTES/PROCEDURES:

1. Operator and speed control not shown for clarity.
2. Insert tuned converter/operator assembly into cement case.
3. Adjust spindle to center of cement case using adjusting bolts and hex bar.
4. Wedge sled assembly firmly within cement case.



SPINDLE HEIGHT ADJUSTMENT

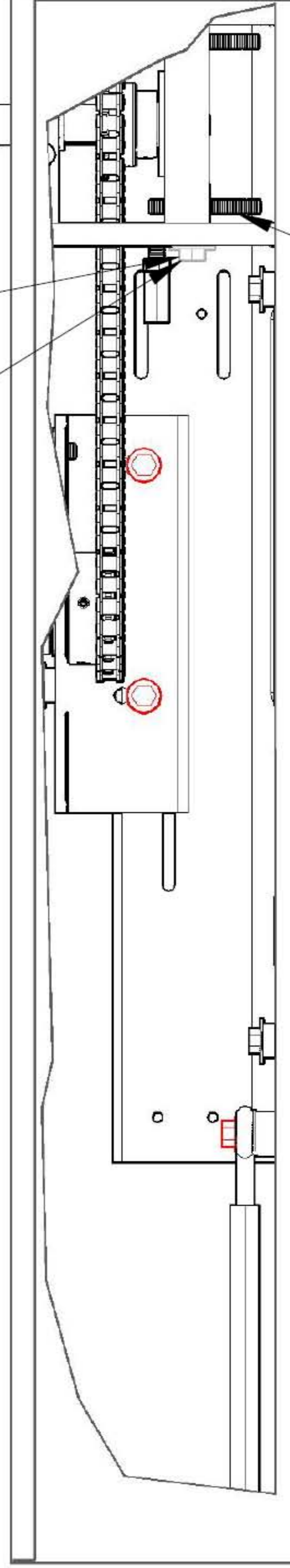
(PROCEDURE 5)

DORMA ED-400 IG

STEP 1: Loosen (2) 9/16" base plate bolts. Do not remove.

STEP 3: Re-tighten (2) 9/16" base plate bolts.

Spindle shoulder

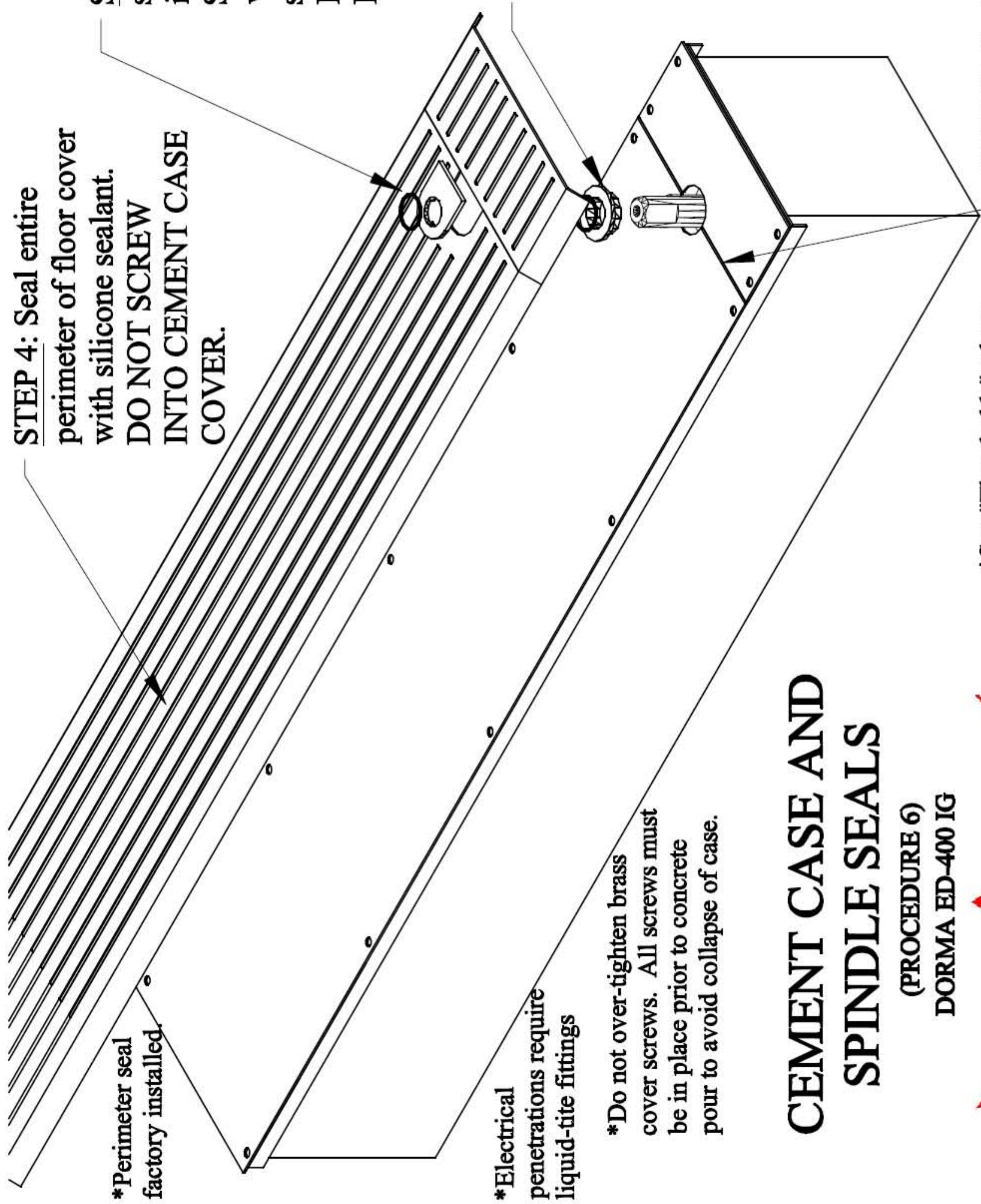


STEP 2: Adjust base-plate height using Allen wrench on 3 threaded posts. Turn clockwise to raise; turn counter-clockwise to lower. Turn each post equally.

NOTES/PROCEDURES:

1. Operator and speed control not shown for clarity.
2. Spindle height adjustment formula:

ASSUMES CEMENT CASE COVER IS 1/4" BELOW FINISHED FLOOR AT INSTALLATION.
DIMENSIONS TAKEN FROM TOP OF CEMENT CASE COVER TO SPINDLE SHOULDER.
1/4" BELOW FINISHED FLOOR + THRESHOLD HEIGHT + SPACE BENEATH DOOR +
DEPTH OF BOTTOM ARM IF ARM IS RECESSED INSIDE BOTTOM OF DOOR (MAX RECESS 1/8").



STEP 4: Seal entire perimeter of floor cover with silicone sealant. **DO NOT SCREW INTO CEMENT CASE COVER.**

STEP 3: Install delrin seal and "O" ring after installing floor cover. Set onto floor cover with a bed of gasket sealant. **INSTALL PRIOR TO HANGING DOOR.**

STEP 1: Install delrin bushing/seal and "O" ring after installing unit in cement case. Set bronze and/or nylon bushing/seal onto cement case cover with a **BED OF GASKET SEALANT.** **INSTALL AND SEAL PRIOR TO HANGING DOOR.**

STEP 2: Seal splice with furnished gasket sealant. Leave sealant inside cement case for future access.

*See "Thresholds" tab at website for other floor covering options(terrazzo, stone, transition, etc.).

*Perimeter seal factory installed.

*Electrical penetrations require liquid-tite fittings

*Do not over-tighten brass cover screws. All screws must be in place prior to concrete pour to avoid collapse of case.

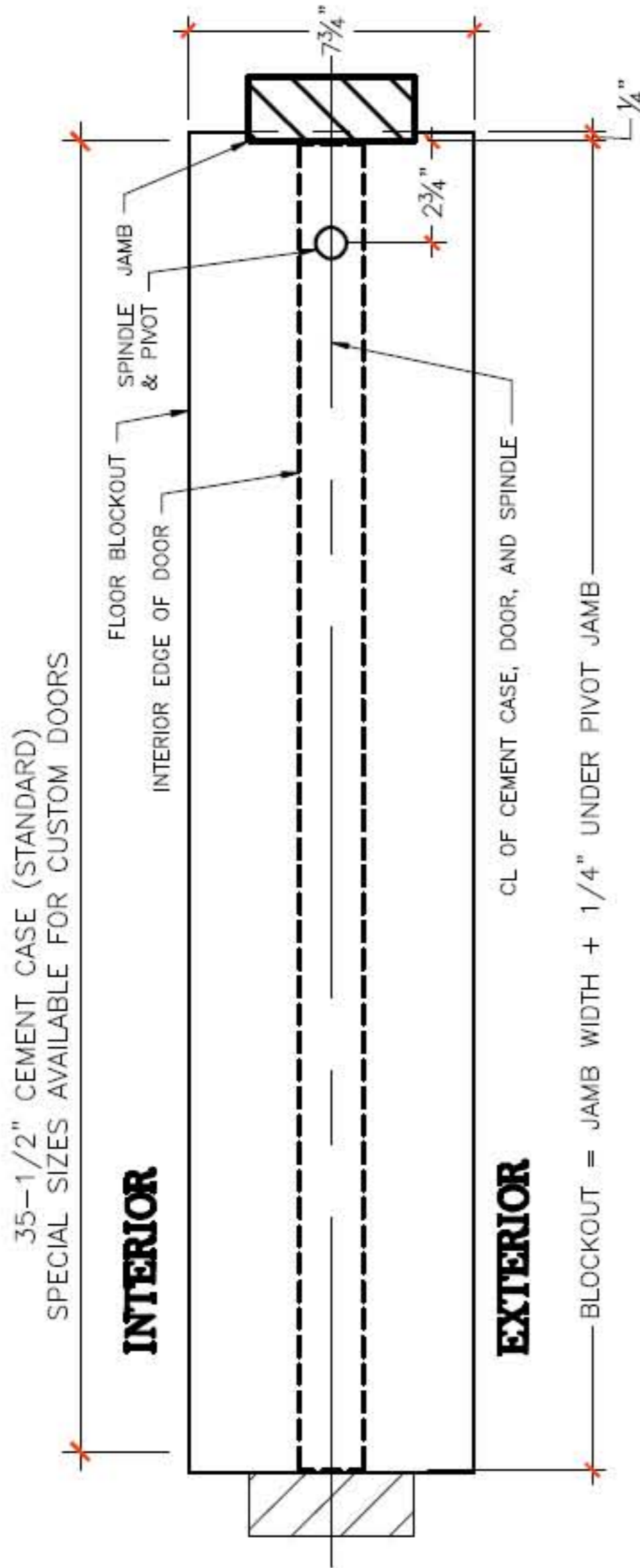
CEMENT CASE AND SPINDLE SEALS

(PROCEDURE 6)
DORMA ED-400 IG

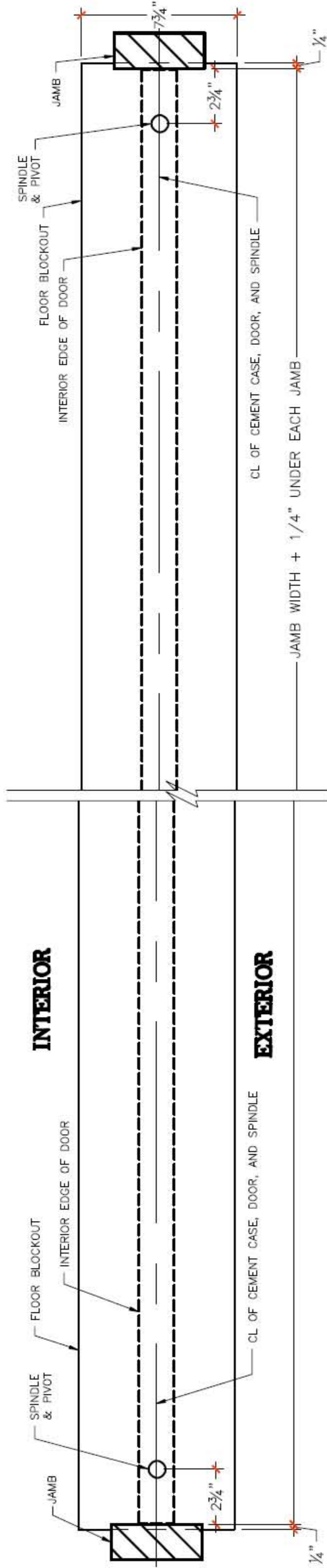




**FIELD LAYOUT TEMPLATE
FLOOR BLOCKOUT
CENTER HUNG DOORS**



**SINGLE DOOR : LEFT HAND OUTSWING (RHR) SHOWN
RIGHT HAND OUTSWING (LHR) OPPOSITE**



OUTSWING DOOR PAIR

NOTES

1. CENTER HUNG DOORS ONLY. DIMENSIONS DIFFERENT ON OFFSET PIVOT AND BUTT HUNG DOORS
2. SEE MANUFACTURERS TEMPLATE FOR LATEST DOOR LEAF AND BOTTOM ARM PREP
3. DEPTH OF EXCAVATION IS 7.125 MINIMUM TO 7.75 MAXIMUM BELOW FINISHED FLOOR
4. SPINDLE CENTER MUST BE PLUMB WITH TOP PIVOT

FL-C101

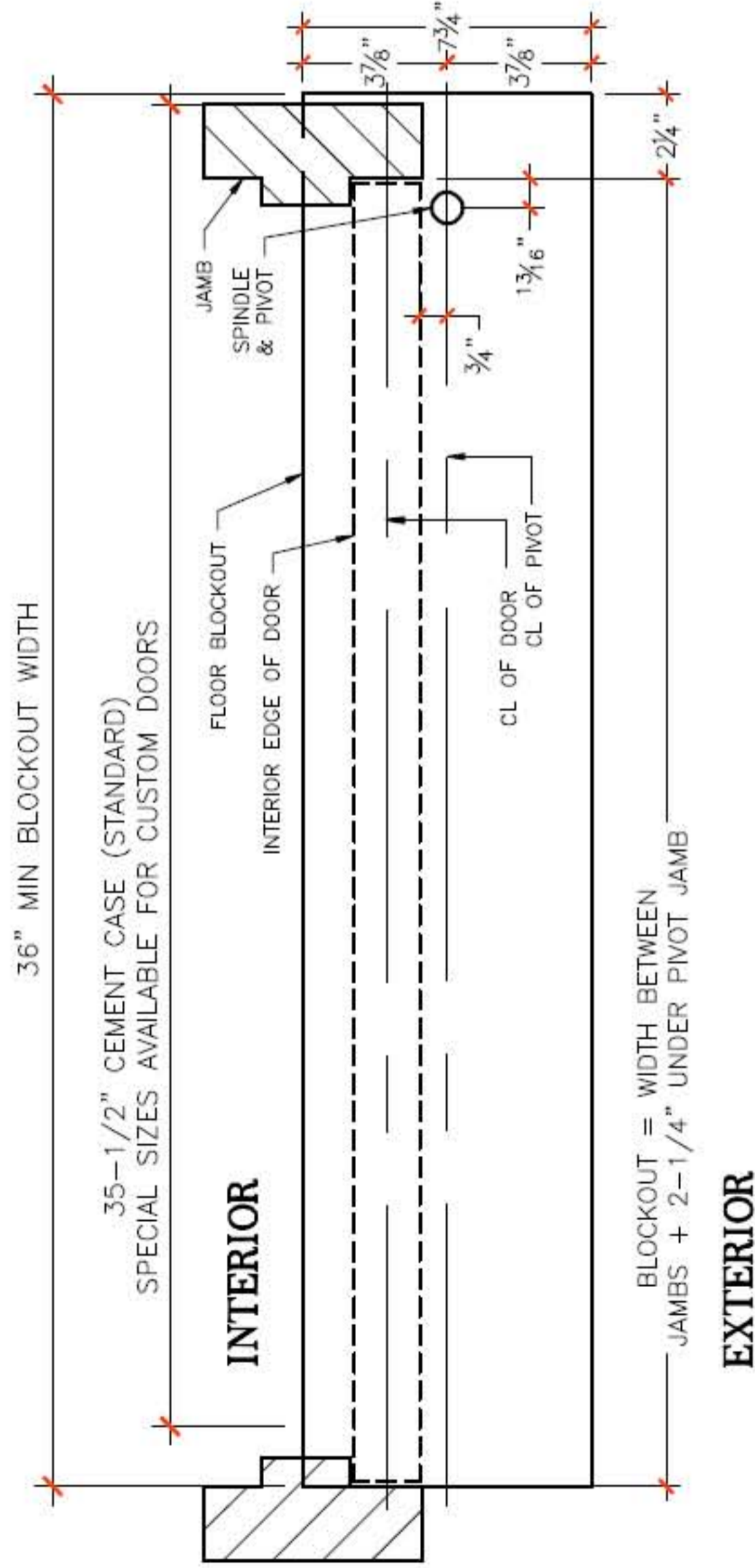


FIELD LAYOUT TEMPLATE

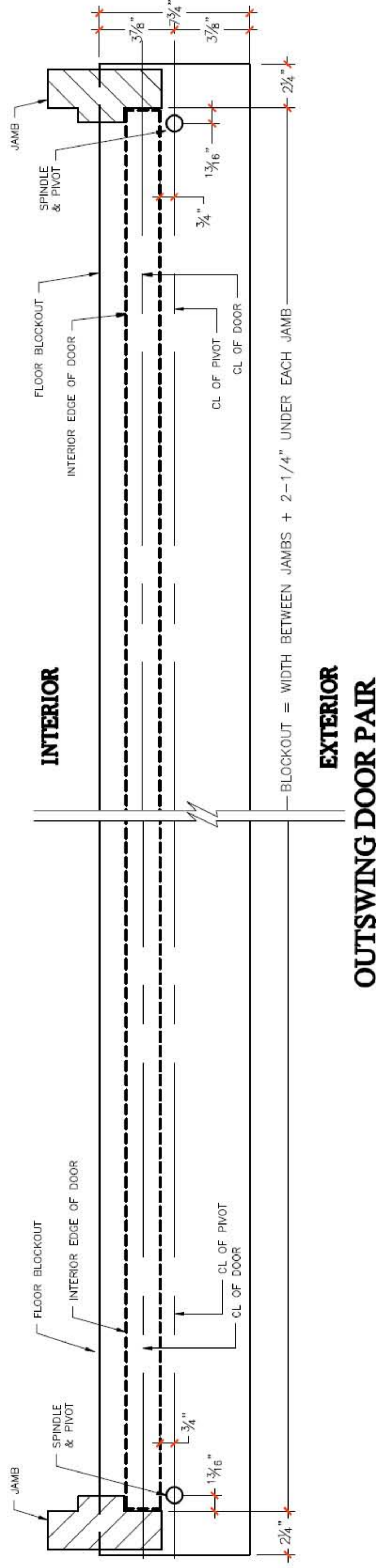
FLOOR BLOCKOUT WITH STANDARD
BOTTOM ARMS ONLY

(RIXSON #27 OR DORMA BTS-80, ETC.)

13/16" OFFSET PIVOT HUNG DOORS ONLY



SINGLE DOOR : LEFT HAND OUTSWING (RHR) SHOWN RIGHT HAND OUTSWING (LHR) OPPOSITE



NOTES

1. 13/16" OFFSET PIVOT DOORS USING STANDARD BOTTOM ARMS ONLY. DIMENSIONS DIFFERENT ON BUTT HUNG (HINGED), OFFSET SLIDE-ARM, AND CENTER-HUNG DOORS
2. SPINDLE MUST BE PLUMB WITH PIVOT CENTER. SEE MANUFACTURER'S CURRENT TEMPLATE FOR BOTTOM ARM PLACEMENT ON DOOR
3. DEPTH OF EXCAVATION IS 7.125 MINIMUM TO 7.75 MAXIMUM BELOW FINISHED FLOOR

FL-P101-S27

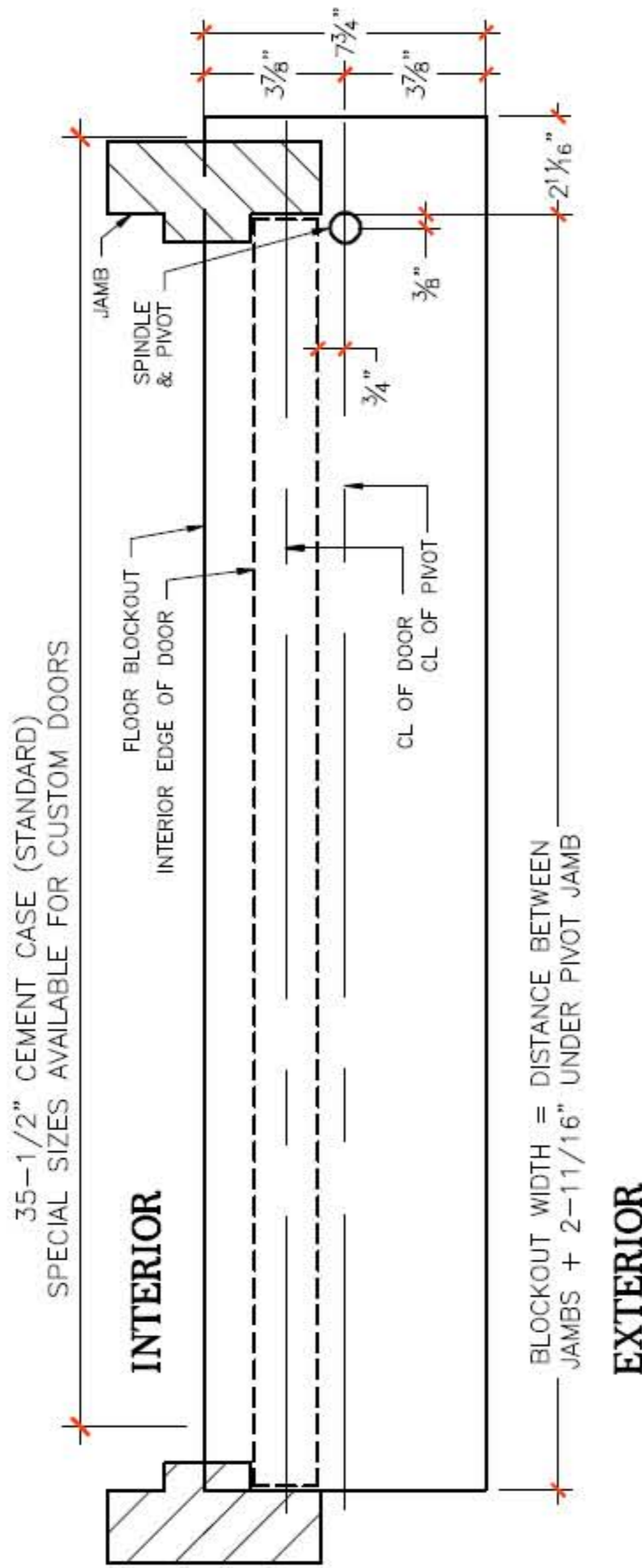


FIELD LAYOUT TEMPLATE

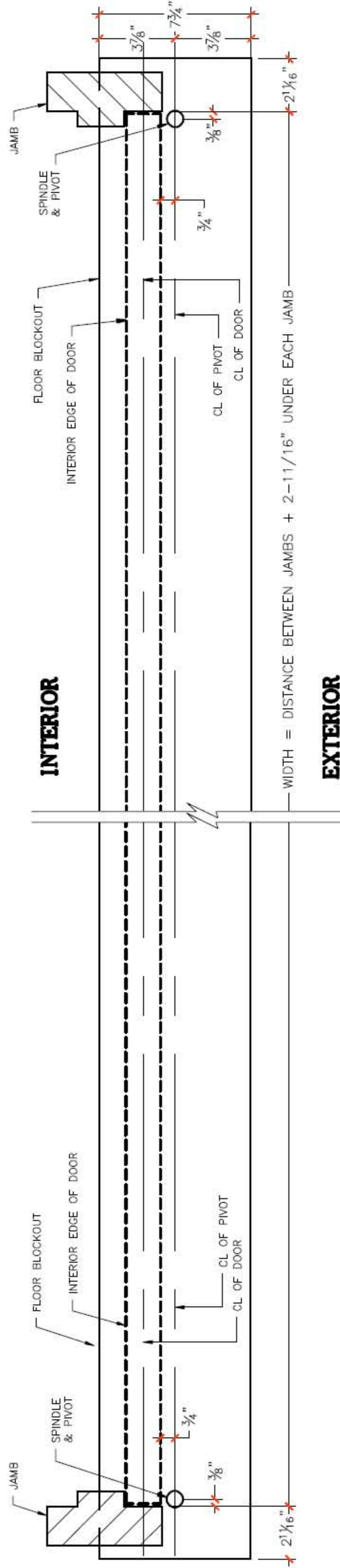
FLOOR BLOCKOUT WITH STANDARD
BOTTOM ARMS ONLY

(RIXSON #27 OR DORMA BTS-80, ETC.)

BUTT HINGED - OFFSET HUNG DOORS ONLY



SINGLE DOOR : LEFT HAND OUTSWING (RHR) SHOWN RIGHT HAND OUTSWING (LHR) OPPOSITE



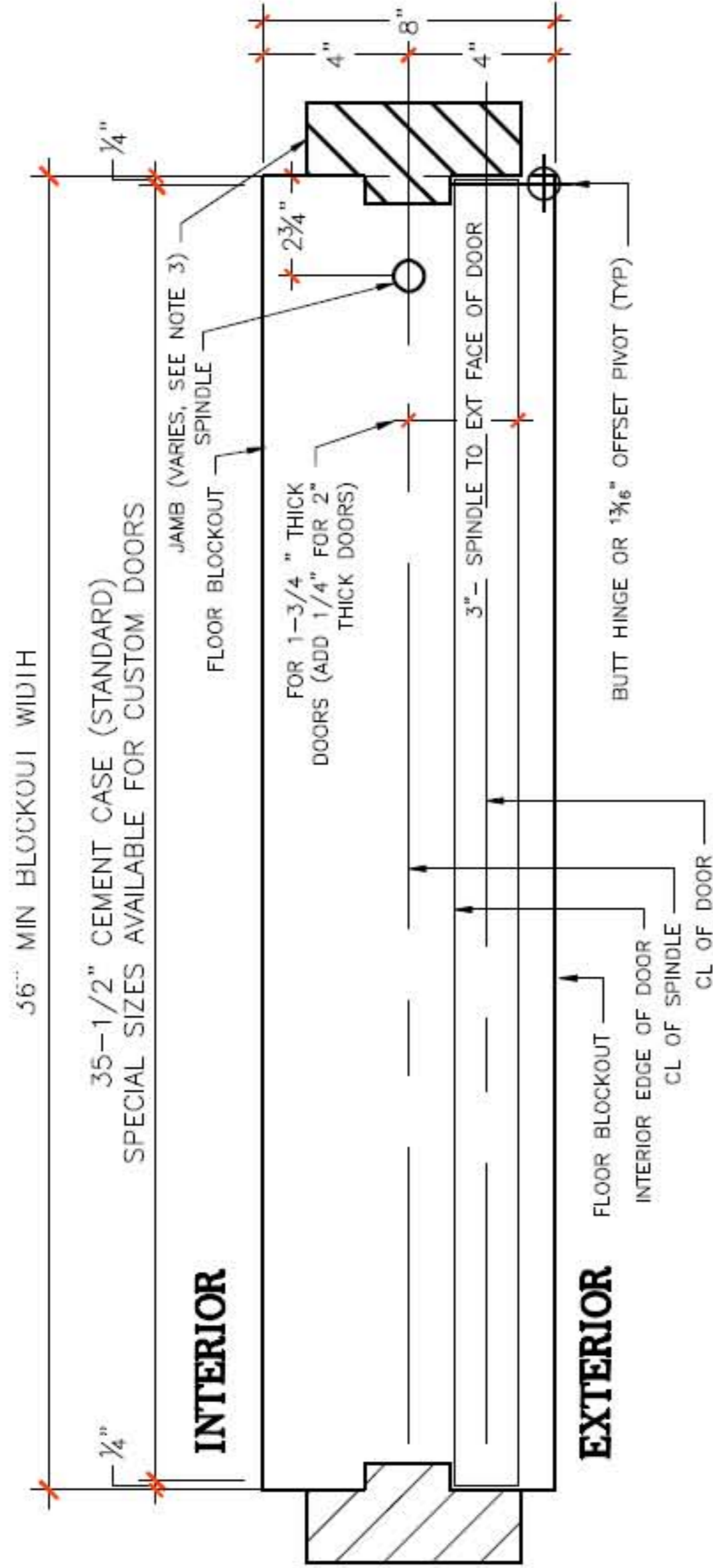
NOTES

1. OFFSET BUTT- HUNG DOORS USING STANDARD BOTTOM ARMS ONLY. DIMENSIONS DIFFERENT ON OFFSET PIVOT, OFFSET SLIDE-ARM, AND CENTER-HUNG DOORS
2. SPINDLE MUST BE PLUMB WITH HINGE CENTER. BOTTOM ARM PLACEMENT ON DOOR WILL DIFFER FROM MANUFACTURER'S TEMPLATE.
3. DEPTH OF EXCAVATION IS 7.125 MINIMUM TO 7.75 MAXIMUM BELOW FINISHED FLOOR

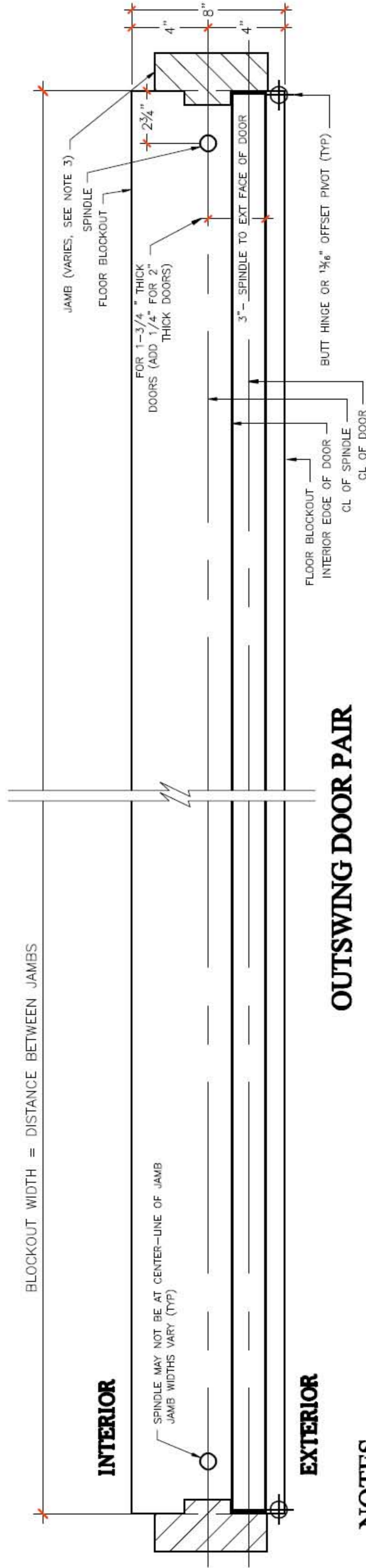
OUTSWING DOOR PAIR



**FIELD LAYOUT TEMPLATE
FLOOR BLOCKOUT FOR BOTTOM SLIDE-ARMS
USING DORMA BTS-81 W/745IN SLIDE TRACK OR
RIXSON #327 BOTTOM ARM W/SLIDE TRACK
BUTT HUNG (HINGED) AND 13/16" OFFSET PIVOT DOORS**



**SINGLE DOOR : LEFT HAND OUTSWING (RHR) SHOWN
RIGHT HAND OUTSWING (LHR) OPPOSITE**



OUTSWINGING DOOR PAIR

NOTES

1. BUTT HUNG (HINGED) & 13/16" OFFSET PIVOT DOORS USING DORMA BOTTOM ARM AND SLIDE TRACK ONLY.
2. DIMENSIONS ARE FOR DOOR THICKNESS SHOWN. ALTER DIMENSIONS PROPORTIONATELY FOR OTHER THICKNESS
3. JAMB WIDTHS VARY. PLACEMENT DIMENSIONS ARE FROM EXTERIOR FACE OF DOOR TO CENTER OF SPINDLE.
4. DEPTH OF EXCAVATION IS 7.125 MINIMUM TO 7.75 MAXIMUM BELOW FINISHED FLOOR

REF. WEB DWGS
FL-P101-D81
FL-B101-D81
FL-P101-R327
FL-B101-R327

INSTALLATION PROCEDURE

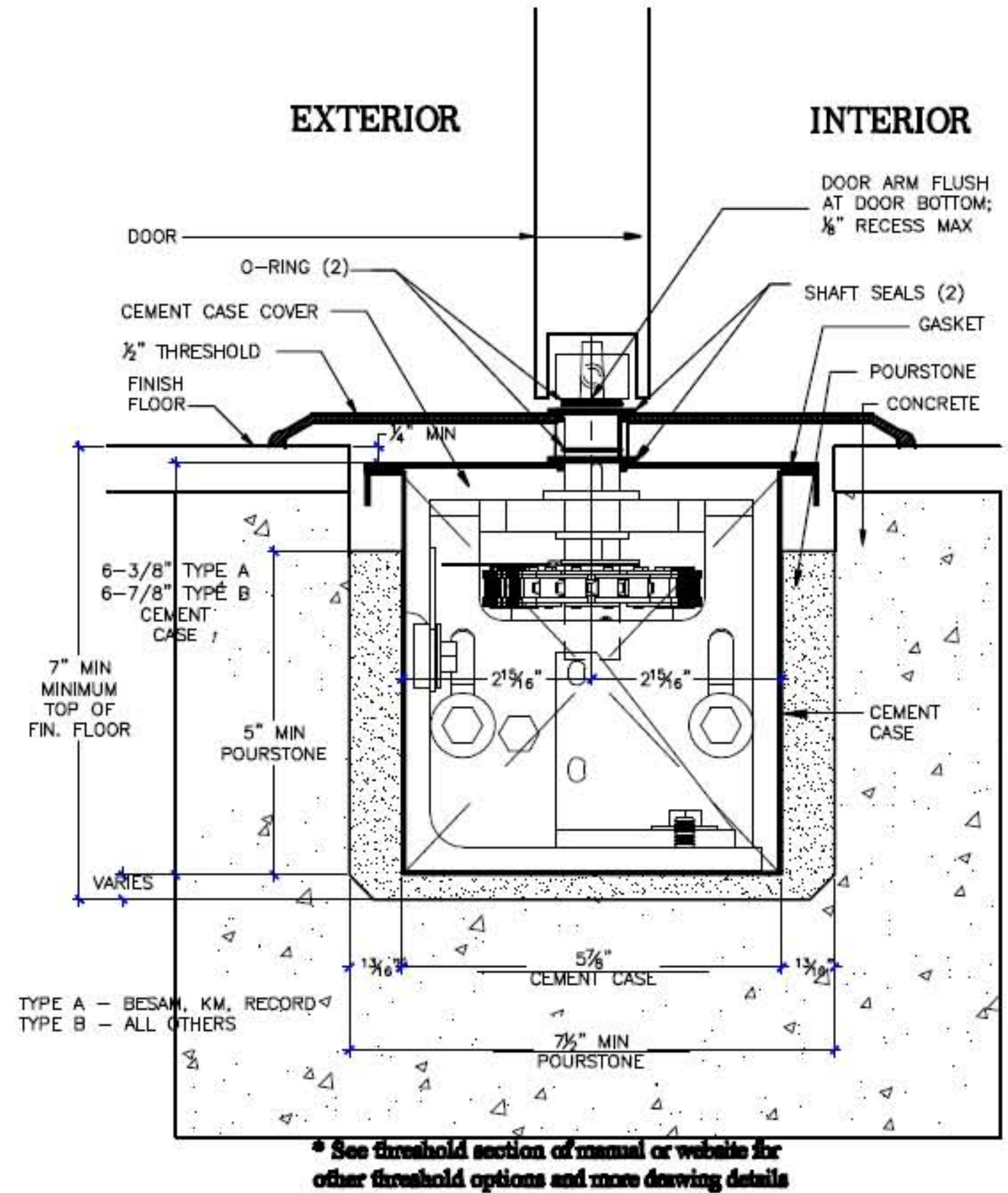
ALL MANUFACTURERS - ALL STANDARD OPERATORS

CENTER HUNG DOORS

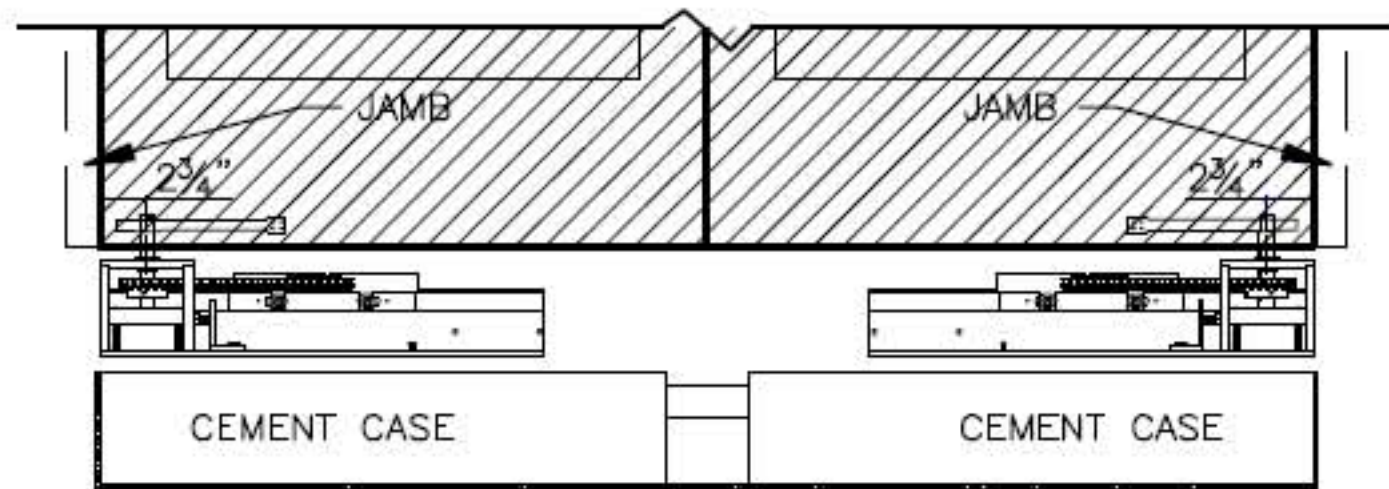
2 3/4" Pivot Setback (Rixson #28, Dorma BTS-80, etc.)



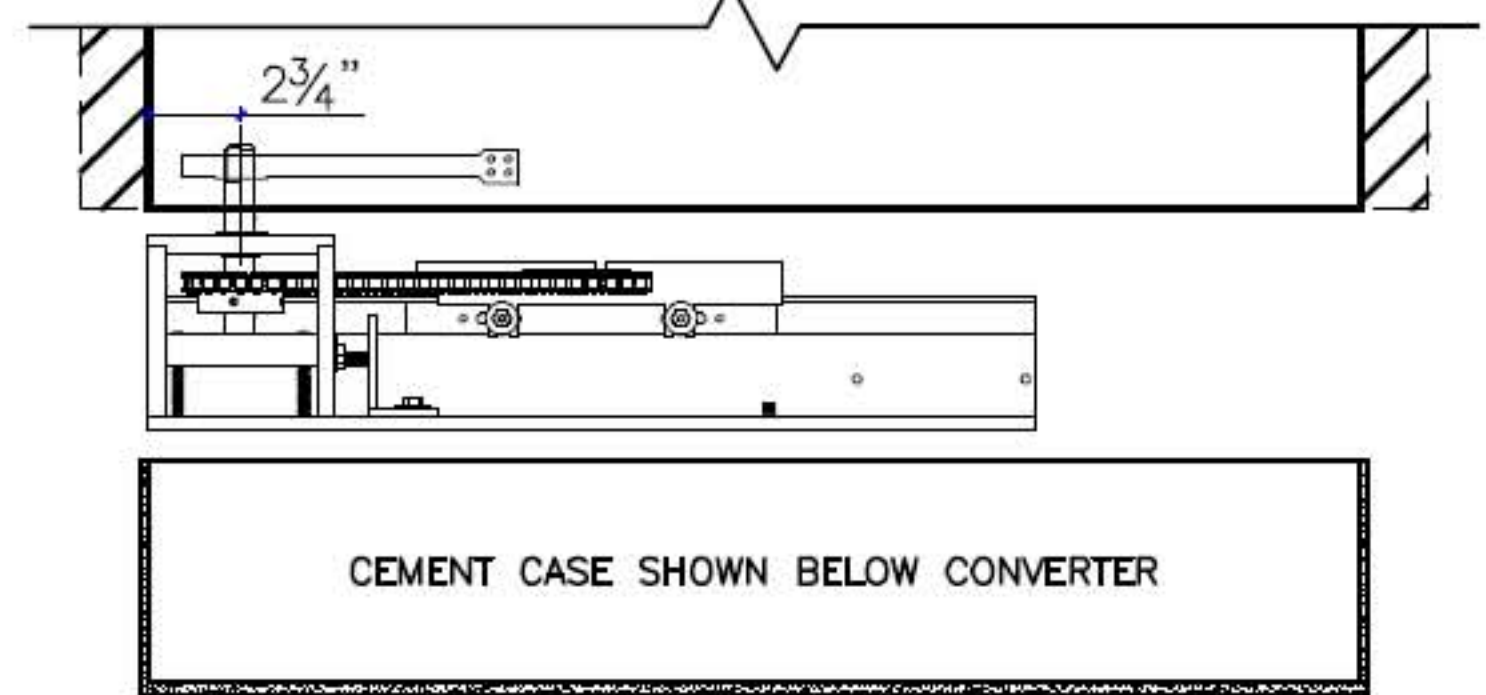
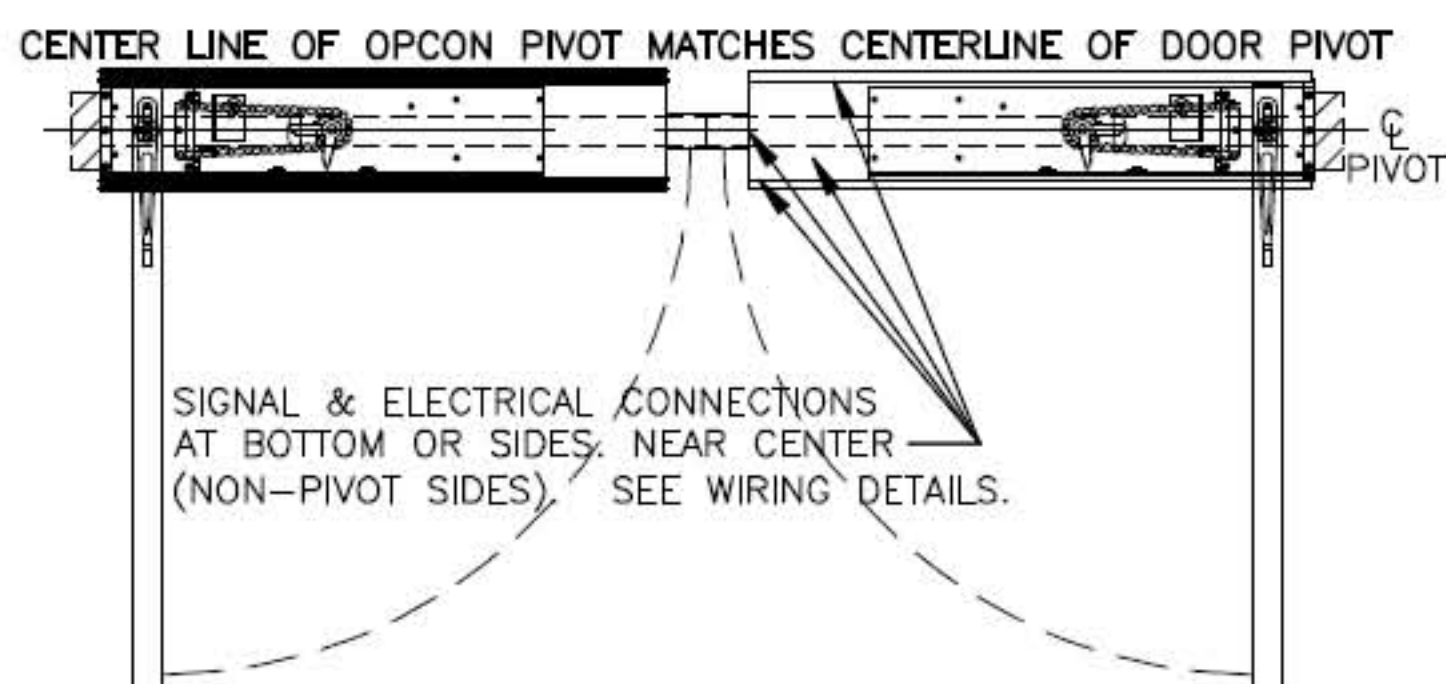
1. Cut concrete or floor to dimensions detailed on blockout/template drawing. Blockout must be entire door width between jambs + 1/4" under each pivot jamb.
2. Layout & drill cement case for electrical & signal lines
3. Install electric & low voltage conduit with liquid-tite fittings.
4. Install top door pivot & locate center of converter spindle using a plumb-bob/laser.
5. Cement case must be parallel with door header. CEMENT CASE COVER IS SET 1/4" BELOW FINISHED FLOOR (min.).
6. For PAIRS of doors the cases will be set separately with a connecting conduit at center.
7. Cement case must be level & plumb in all directions.
8. Set cement case into excavation & secure in position.
9. Pourstone ONLY around bottom 1" of cement case. INSTALL SPINDLE/SHAFT SEALS NOW. Hang door and final adjust position.
10. BE SURE THAT CEMENT CASE COVER IS INSTALLED PRIOR TO POURSTONE. POURSTONE WILL COLLAPSE THE CEMENT CASE IF COVER IS NOT ATTACHED.
11. Final pourstone cement case with converter assembly & door leaf in place.



NOT TO SCALE

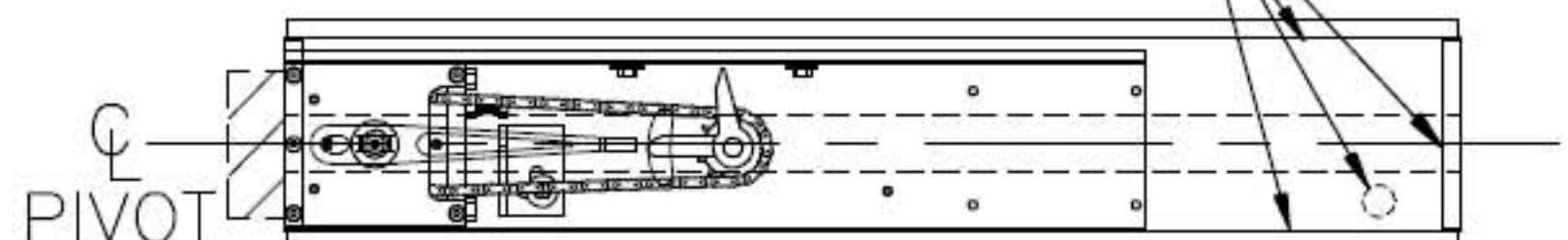


(CONNECTING CONDUIT
CEMENT CASES SHOWN BELOW CONVERTER)
CENTER HUNG DOORS - PAIR



CENTER HUNG DOOR - SINGLE

SIGNAL & ELECTRICAL CONNECTIONS
AT BOTTOM, SIDES, OR END AT
NON-PIVOT SIDE. SEE WIRING DETAILS.



INSTALLATION PROCEDURE

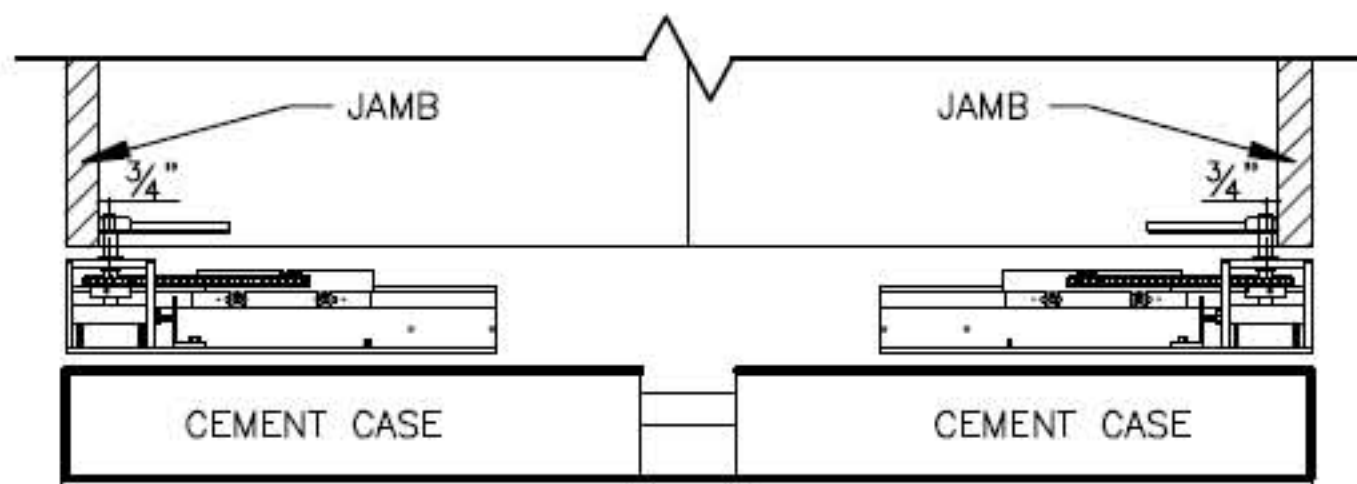
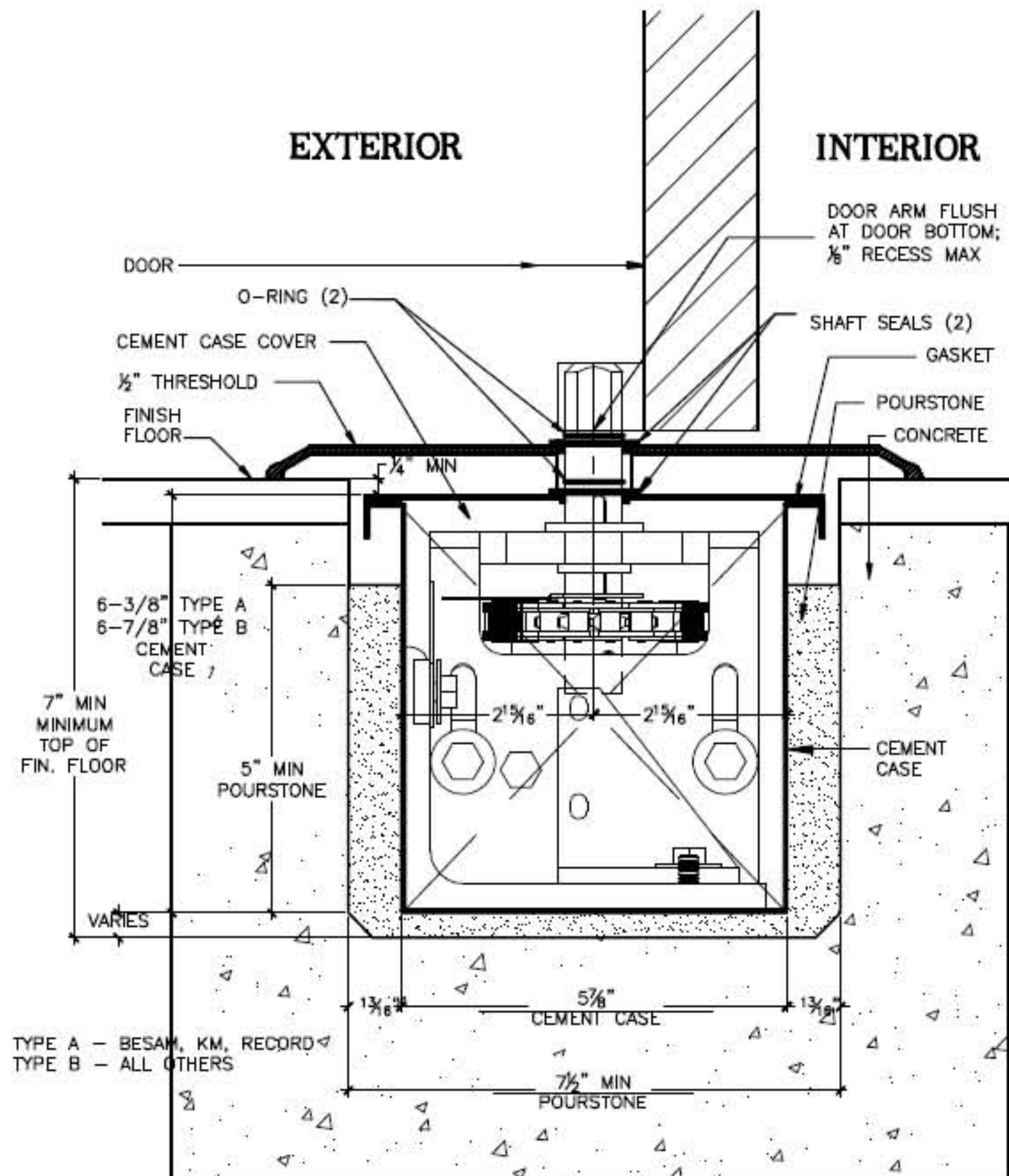
ALL MANUFACTURERS - ALL STANDARD OPERATORS

OFFSET (PIVOT) HUNG DOORS

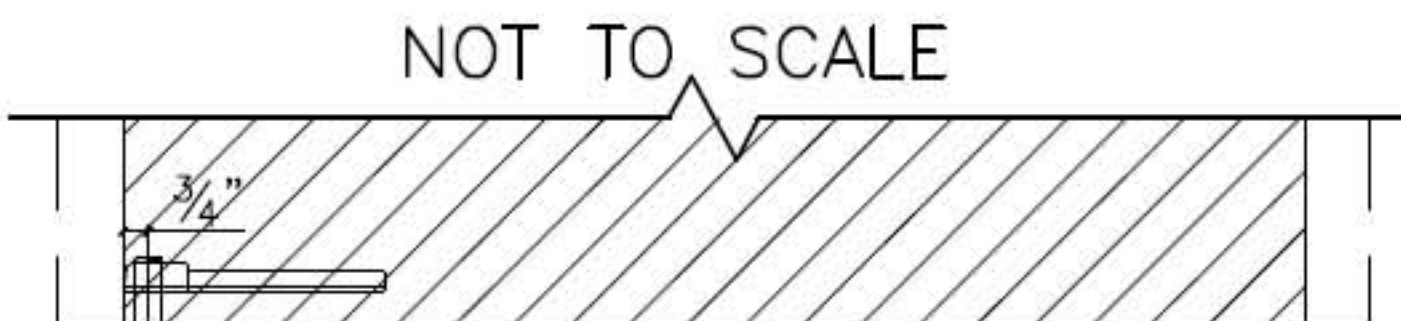
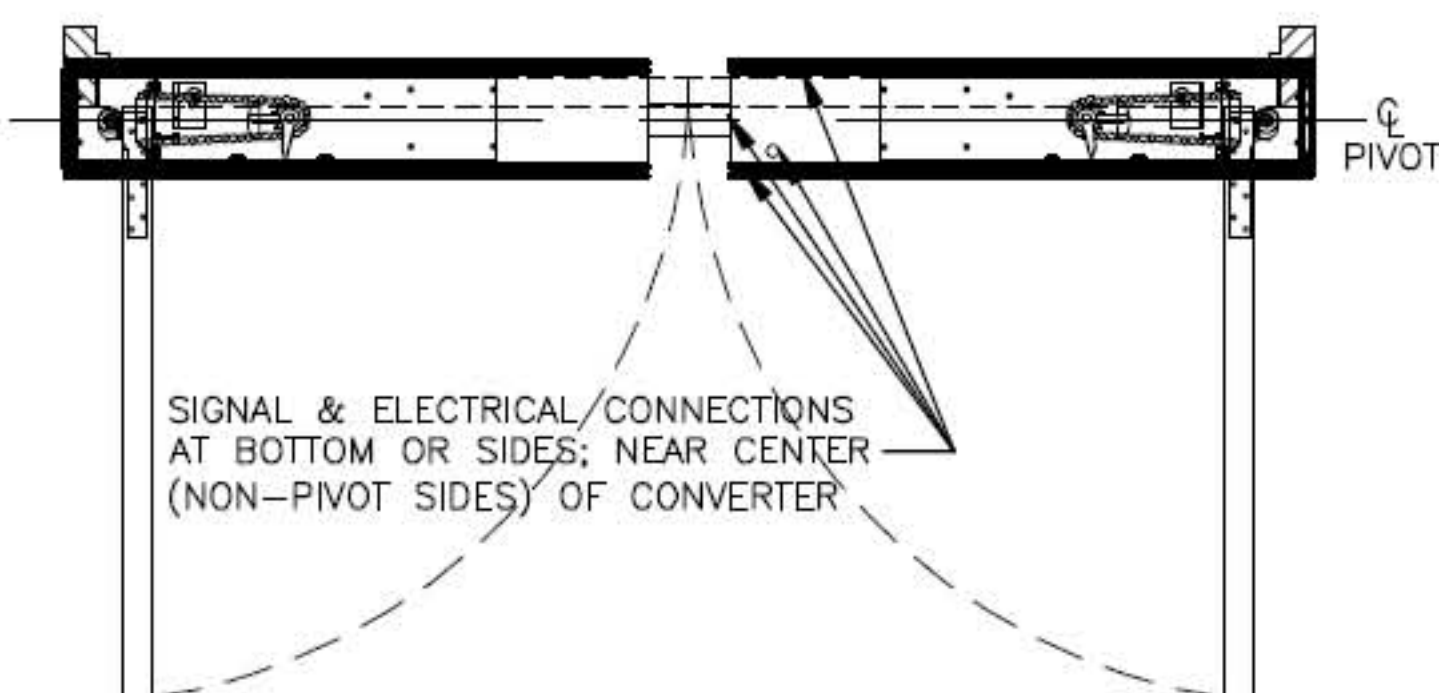
13/16" Pivot Setback (Rixson #27, Dorma BTS-80, etc.)



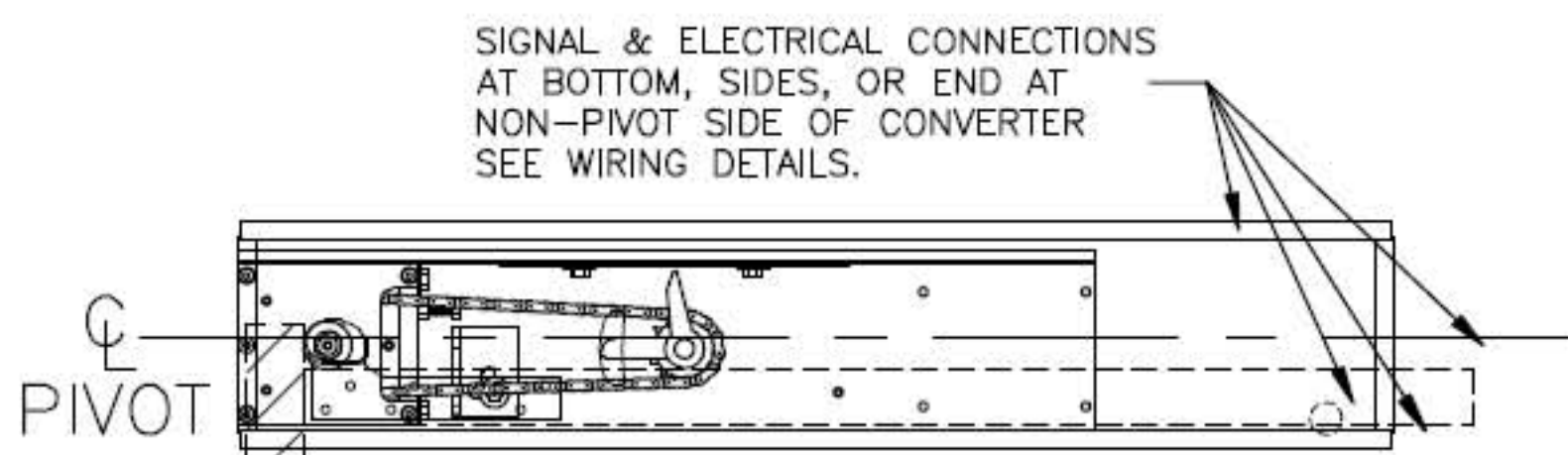
1. Cut concrete or floor to dimensions detailed on breakout/template drawing. Breakout must be entire door width between jambs + 2 1/4" under each pivot jamb.
2. Layout & drill cement case for electrical & signal lines
3. Install electric & low voltage conduit with liquid-tite fittings.
4. Install top door pivot & locate center of converter spindle using a plumb-bob/laser.
5. Cement case must be parallel with door header. **CEMENT CASE COVER IS SET 1/4" BELOW FINISHED FLOOR (min.).**
6. For PAIRS of doors the cases will be set separately with a connecting conduit at center.
7. Cement case must be level & plumb in all directions.
8. Set cement case into excavation & secure in position.
9. Pourstone ONLY around bottom 1" of cement case. **INSTALL SPINDLE/SHAFT SEALS NOW. Hang door and final adjust position.**
10. **BE SURE THAT CEMENT CASE COVER IS INSTALLED PRIOR TO POURSTONE. POURSTONE WILL COLLAPSE THE CEMENT CASE IF COVER IS NOT ATTACHED.**
11. Final pourstone cement case with converter assembly & door leaf in place.



CONNECTING CONDUIT
(CEMENT CASES SHOWN BELOW CONVERTER)
OFFSET HUNG DOORS - PAIR
CENTER LINE OF OPCON PIVOT MATCHES CENTERLINE OF DOOR PIVOT



NOT TO SCALE
3/4"
CEMENT CASE SHOWN BELOW CONVERTER
OFFSET HUNG DOOR - SINGLE



INSTALLATION PROCEDURE

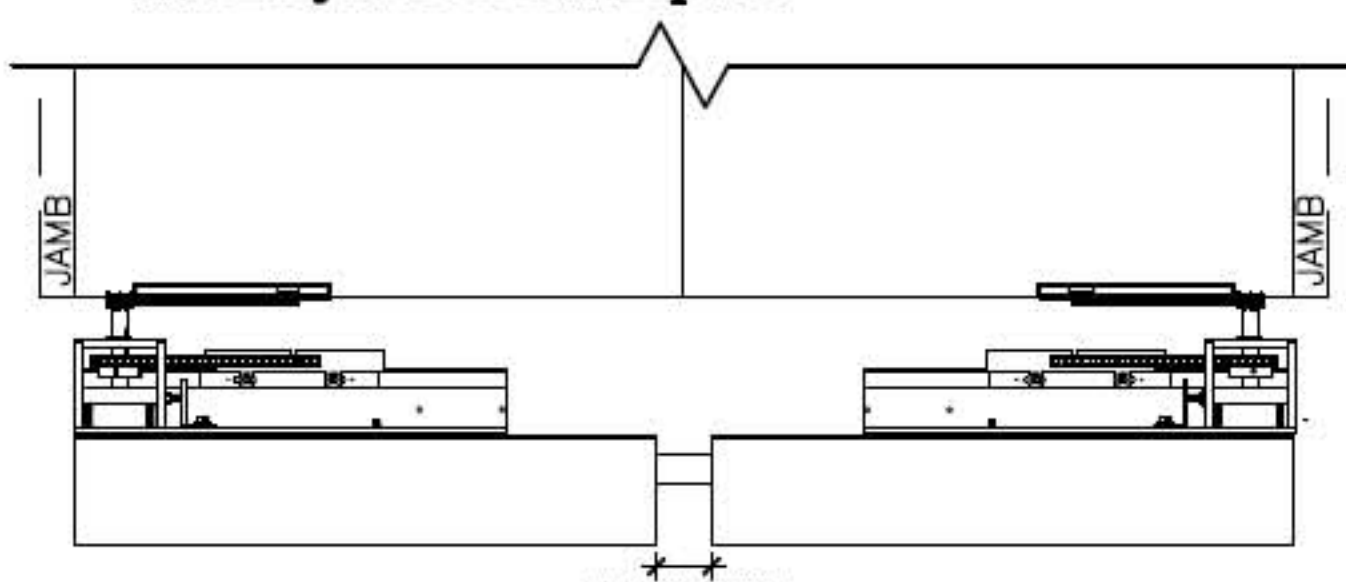
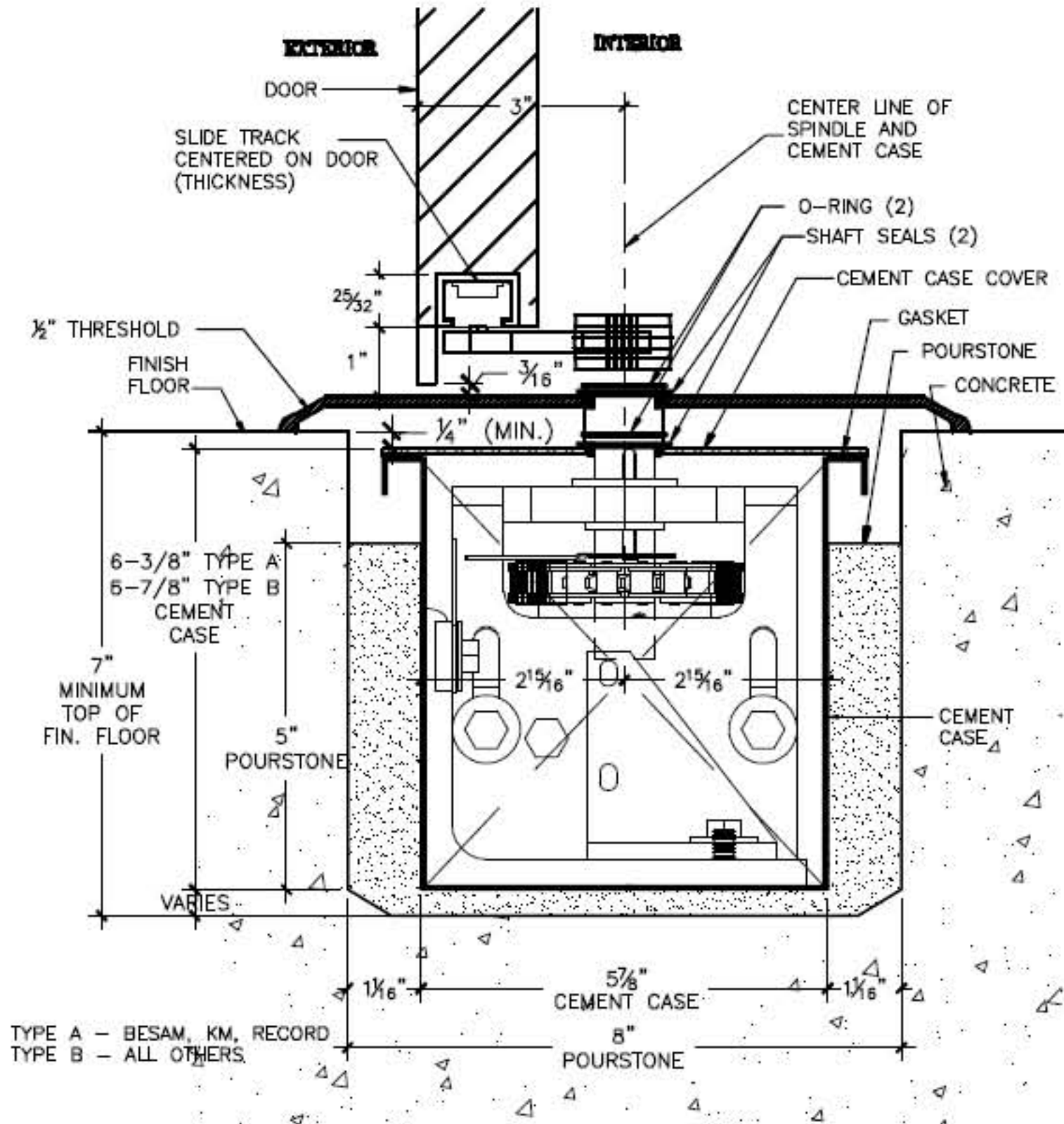
ALL MANUFACTURERS - ALL STANDARD OPERATORS

BUTT-HUNG (HINGED) DOORS

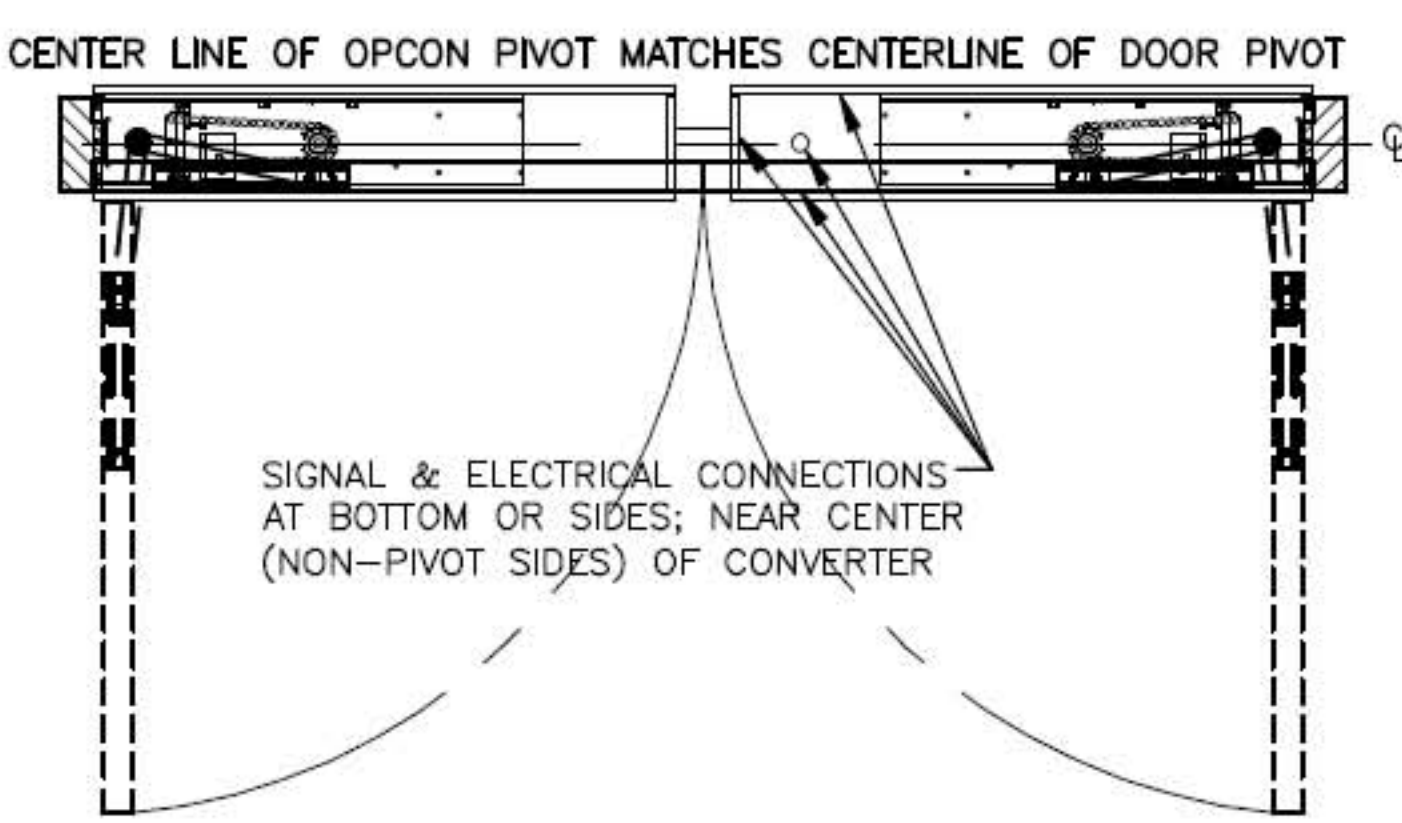
Hinged Setback (Dorma #7451N Slide-arm or Rixson #327)



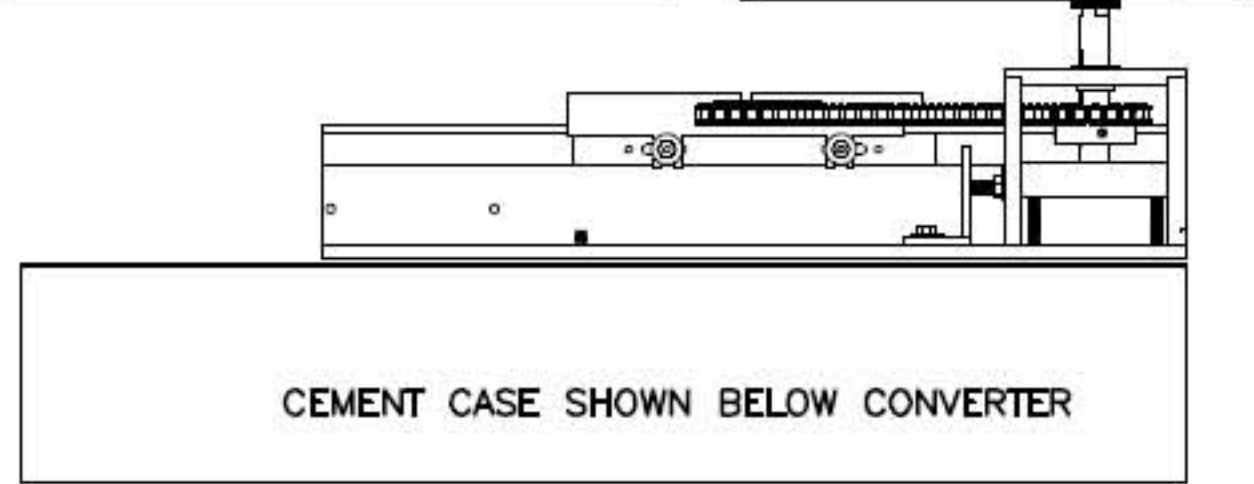
1. Cut concrete or floor to dimensions detailed on blockout/template drawing. Blockout must be entire door width between jambs.
2. Layout & drill cement case for electrical & signal lines
3. Install electric & low voltage conduit with liquid-tite fittings.
4. Establish location of exterior door face & locate center of converter spindle. DRAWING ASSUMES 1-3/4" THICK DOOR, ADJUST DIMENSIONS FOR THICKER OR THINNER DOORS.
5. Cement case must be parallel with door header. CEMENT CASE COVER IS SET 1/4" BELOW FINISHED FLOOR (min.).
6. For PAIRS of doors the cases will be set separately with a connecting conduit at center.
7. Cement case must be level & plumb in all directions.
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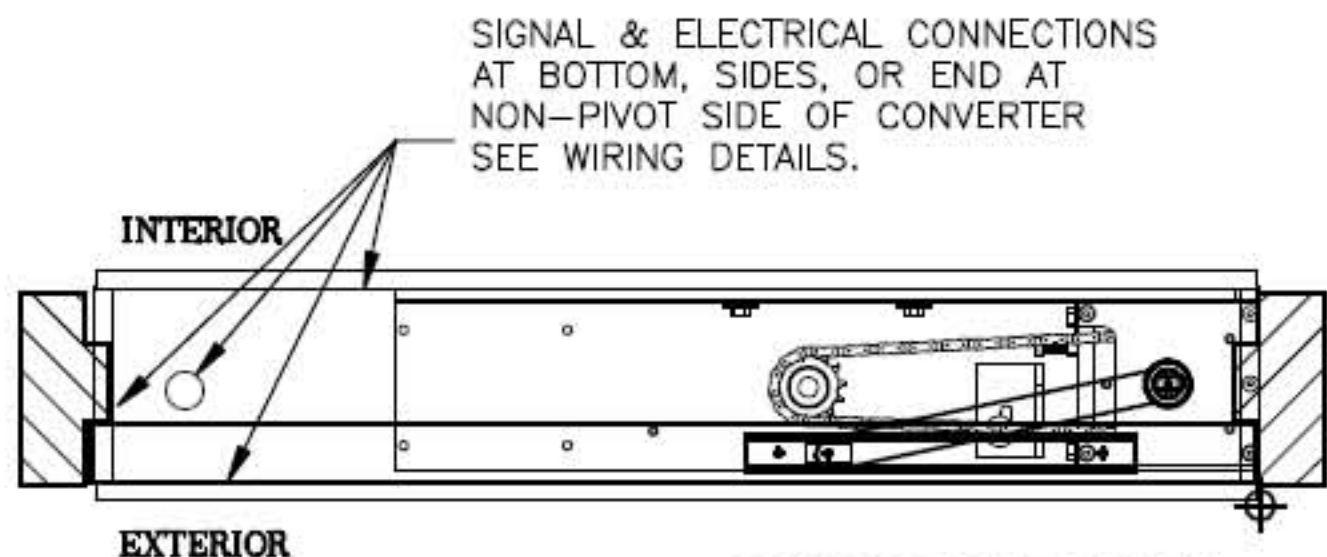
OFFSET HUNG DOORS - PAIR

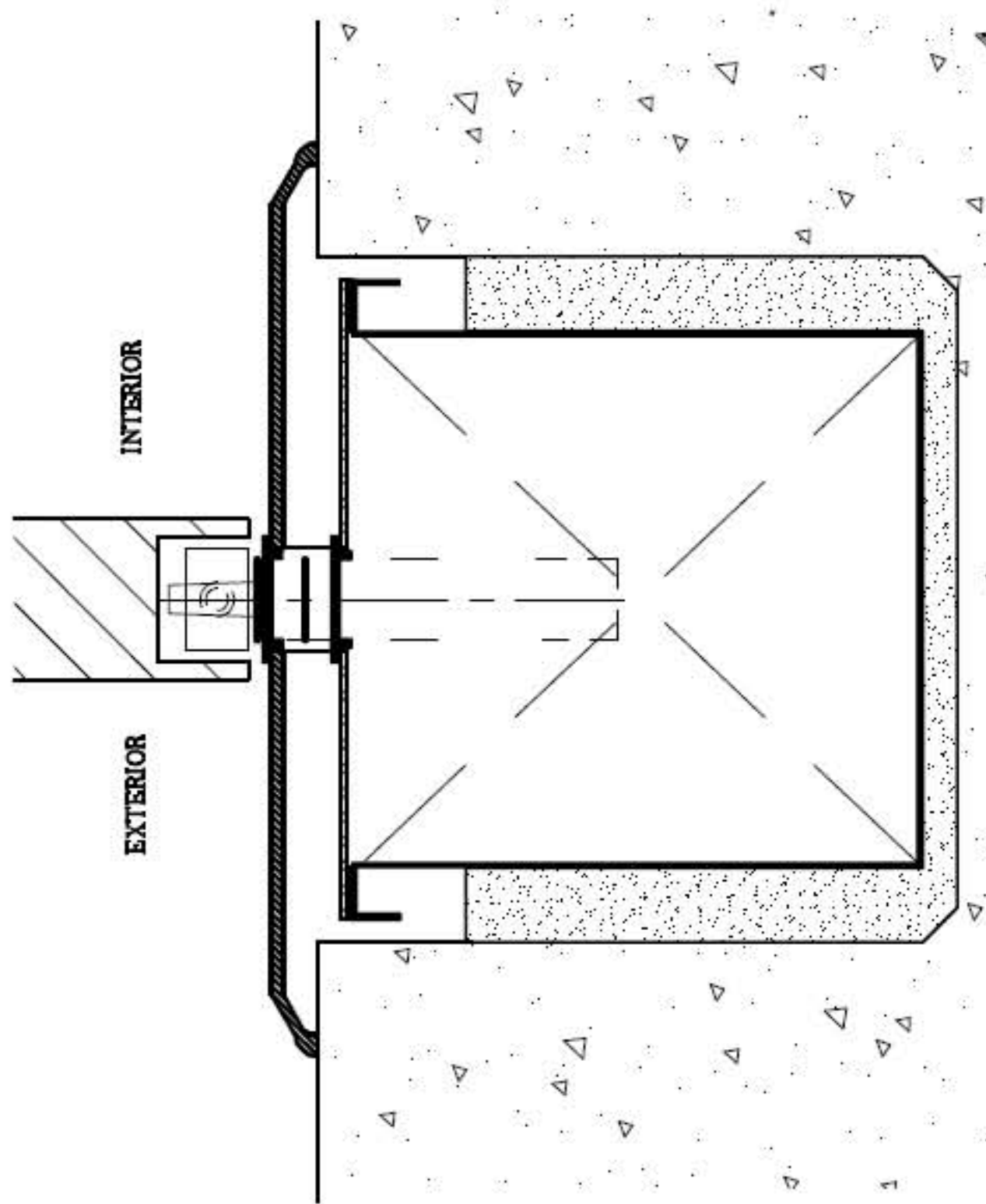


NOT TO SCALE

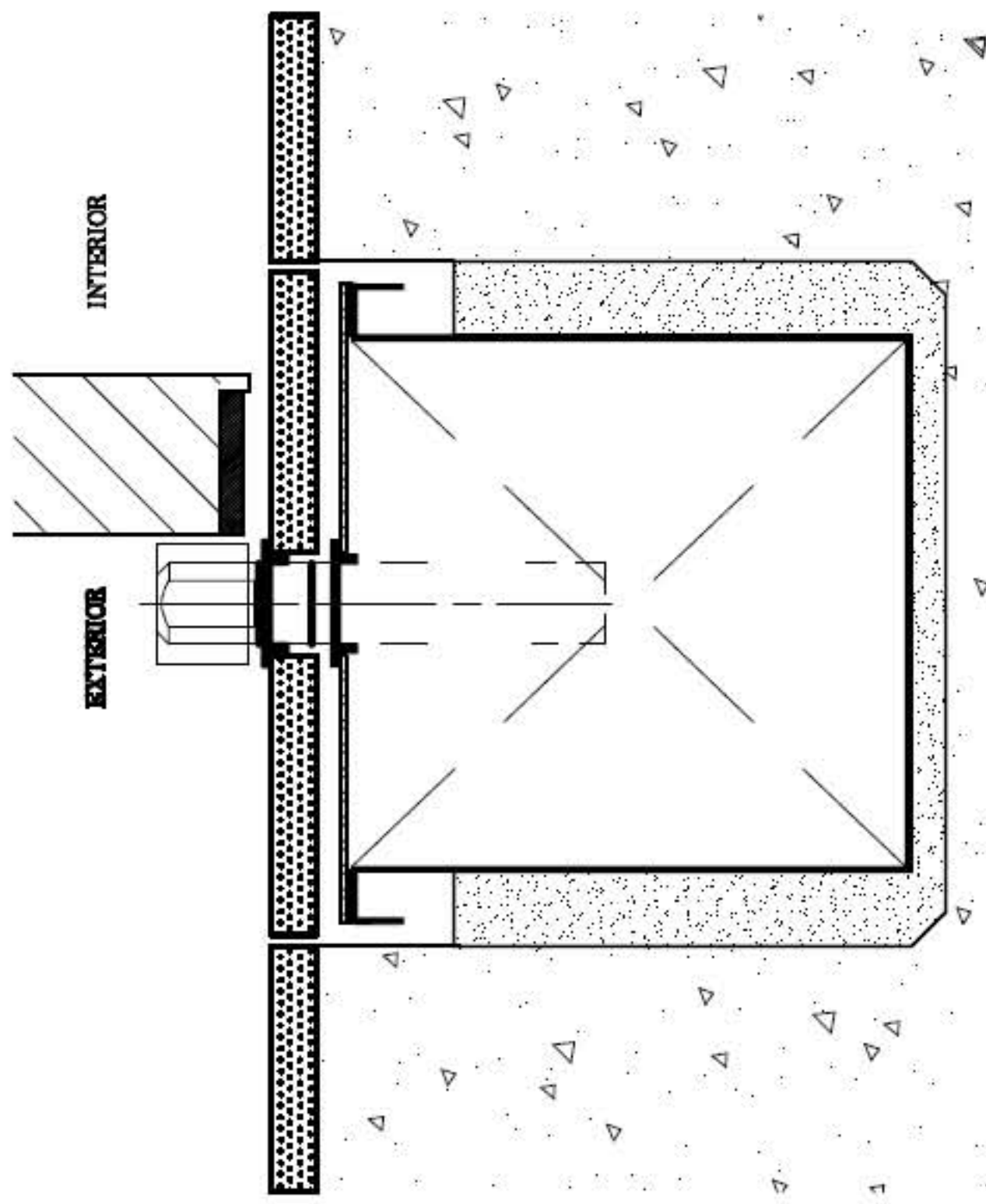


OFFSET HUNG DOOR - SINGLE

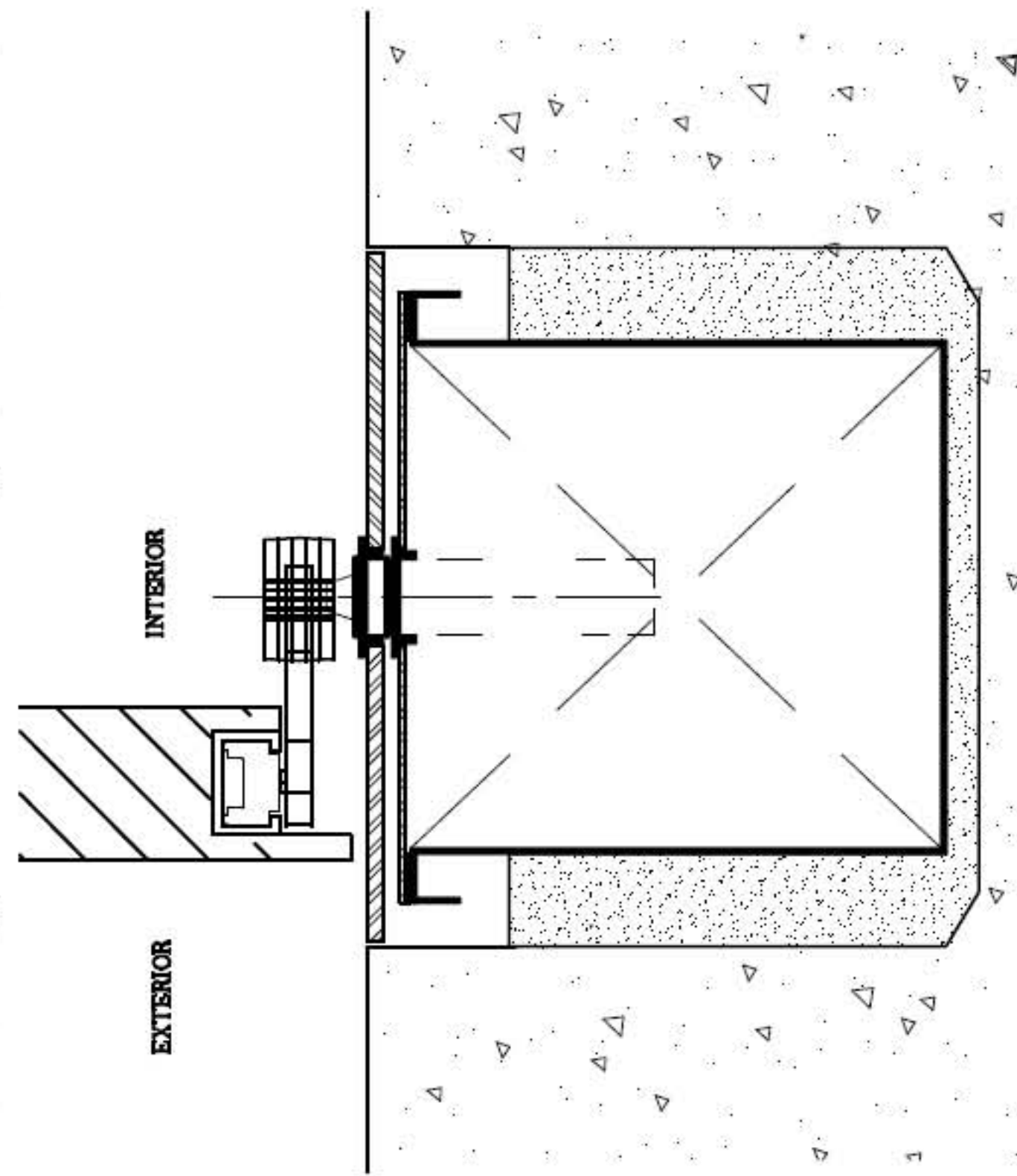




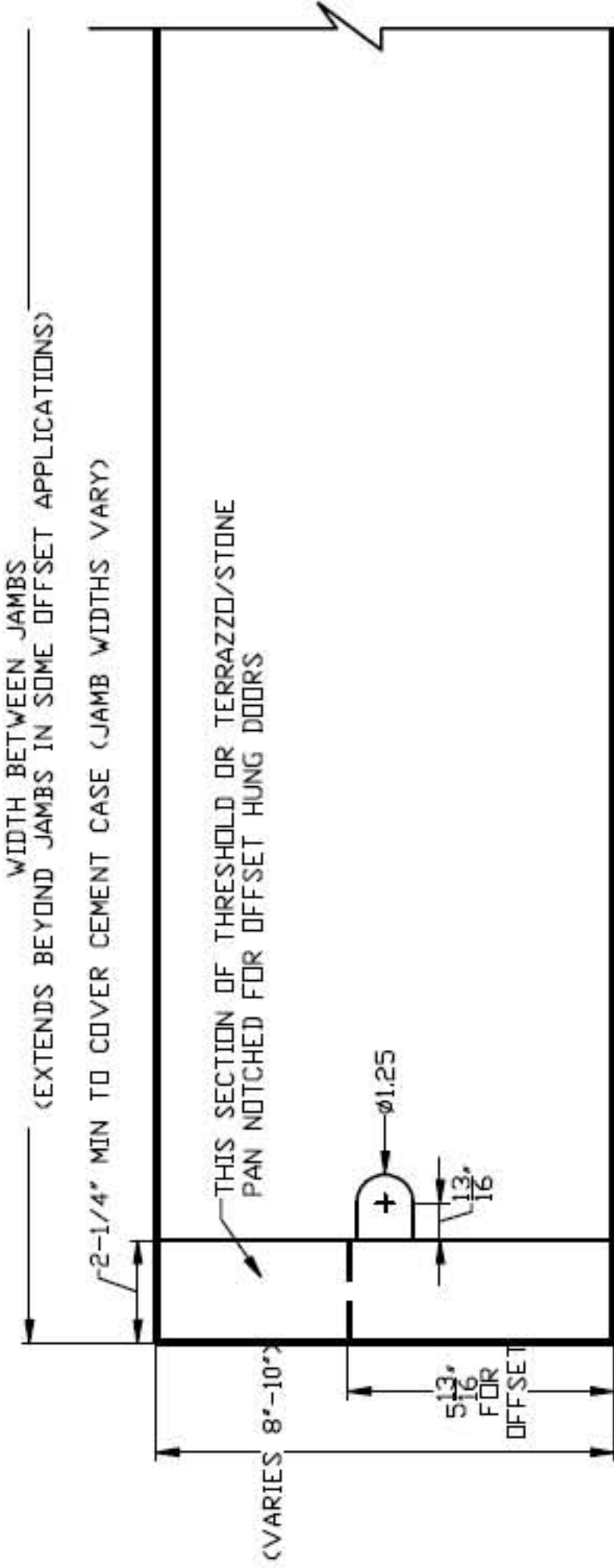
END VIEW W/STANDARD THRESHOLD CENTER HUNG



END VIEW W/TERRAZZO OR STONE PAN - OFFSET PIVOT HUNG



END VIEW W/FLUSH (TRANSITION) THRESHOLD - BUTT HUNG (HINGED) WITH BOTTOM SLIDE-ARM



PLAN VIEW - TYPICAL FLOOR COVER PREP
•SEE WEBSITE FOR DETAILED DRAWINGS & OPTIONS
FLOOR COVERING OPTIONS



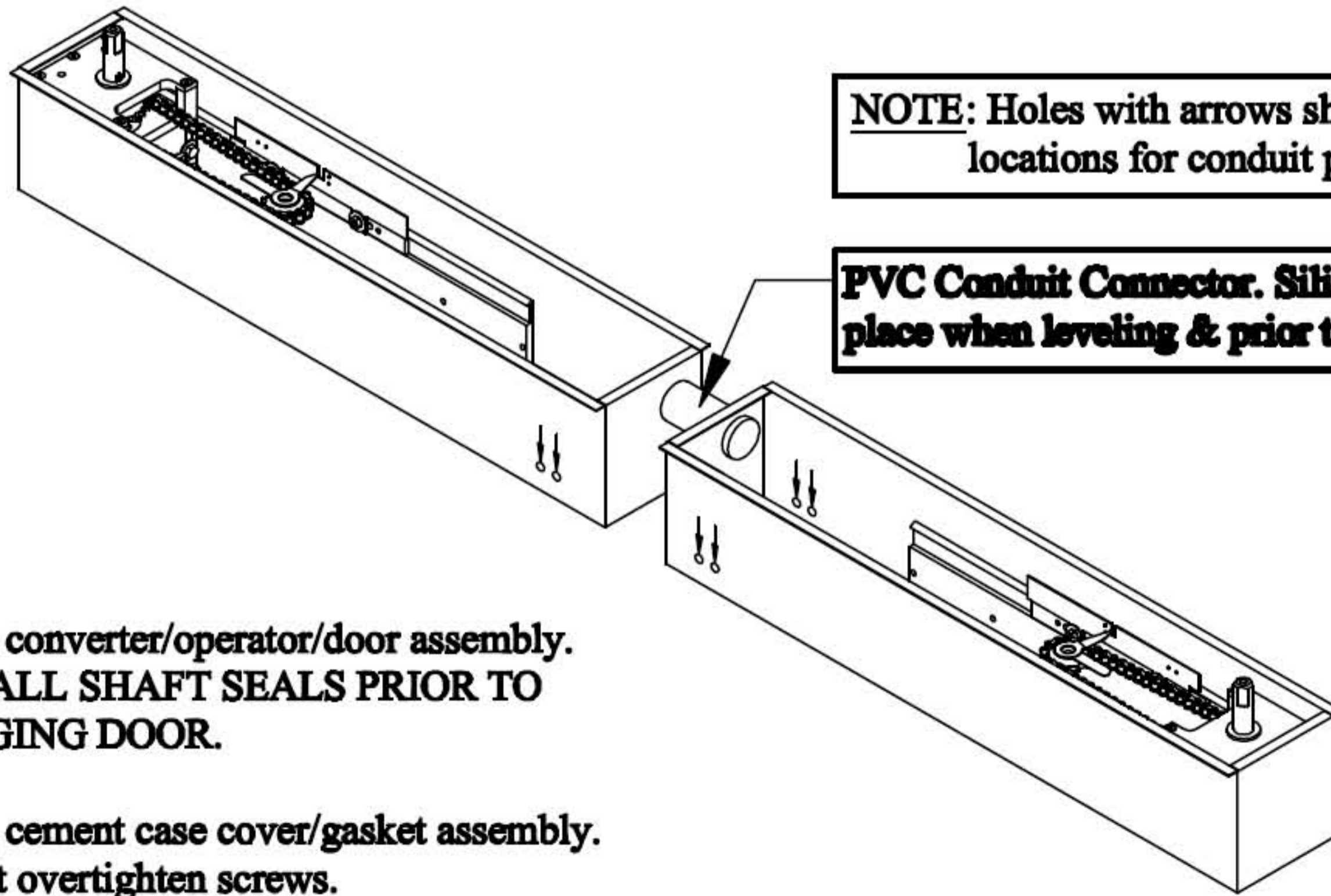
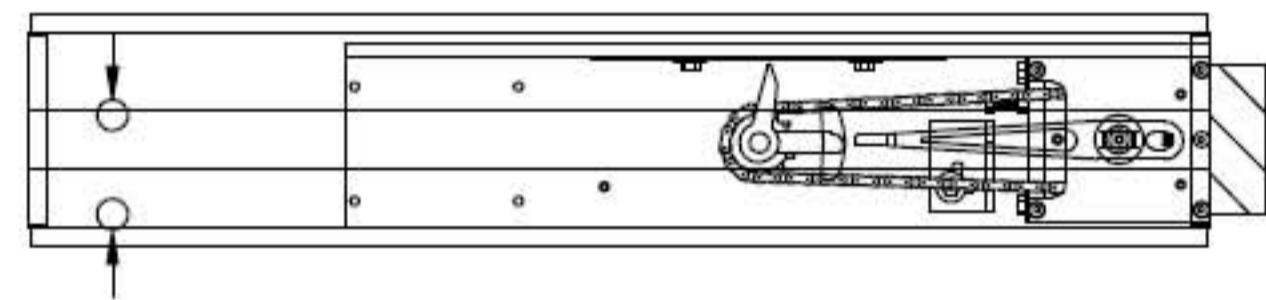
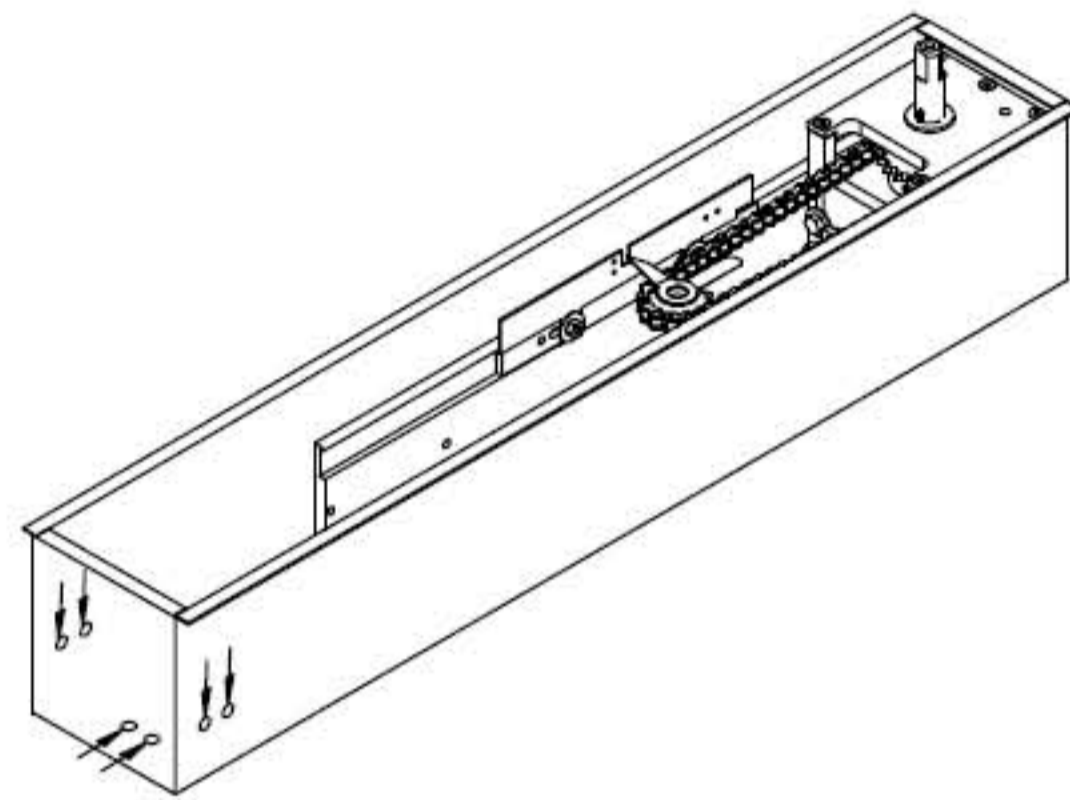
CONDUIT CONNECTIONS

ELECTRIC & LOW VOLTAGE LINES

TYPICAL FOR ALL INSTALLATIONS
(Standard System for Dual Cement Case)



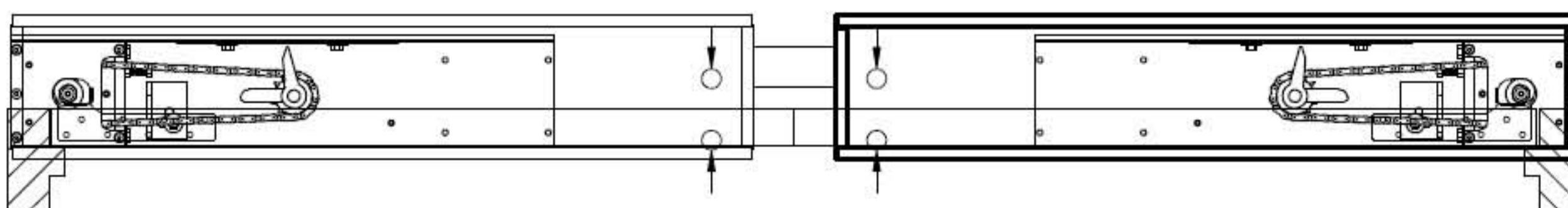
1. Verify power requirements with operator manufacturer & layout cement case for conduit.
2. Verify low voltage signal lines for accessories & layout cement case for conduit.
3. Conduit to Cement Case Connection must be "liqui-tite" (or equal) water tite fittings. Field drilled as required. Conduit & fittings required for both 120VAC and low voltage signal runs.
4. Conduit connections to convertor must be at the strike side of single doors and near center of dual doors as shown. Holes may be located at sides, bottom, or end (on single doors) of cement case. Use silicone sealant to seal penetrations if necessary.



NOTE: Holes with arrows show the best locations for conduit penetrations

PVC Conduit Connector. Silicone in place when leveling & prior to pourstone.

5. Install converter/operator/door assembly. **INSTALL SHAFT SEALS PRIOR TO HANGING DOOR.**
6. Install cement case cover/gasket assembly. Do not overtighten screws.

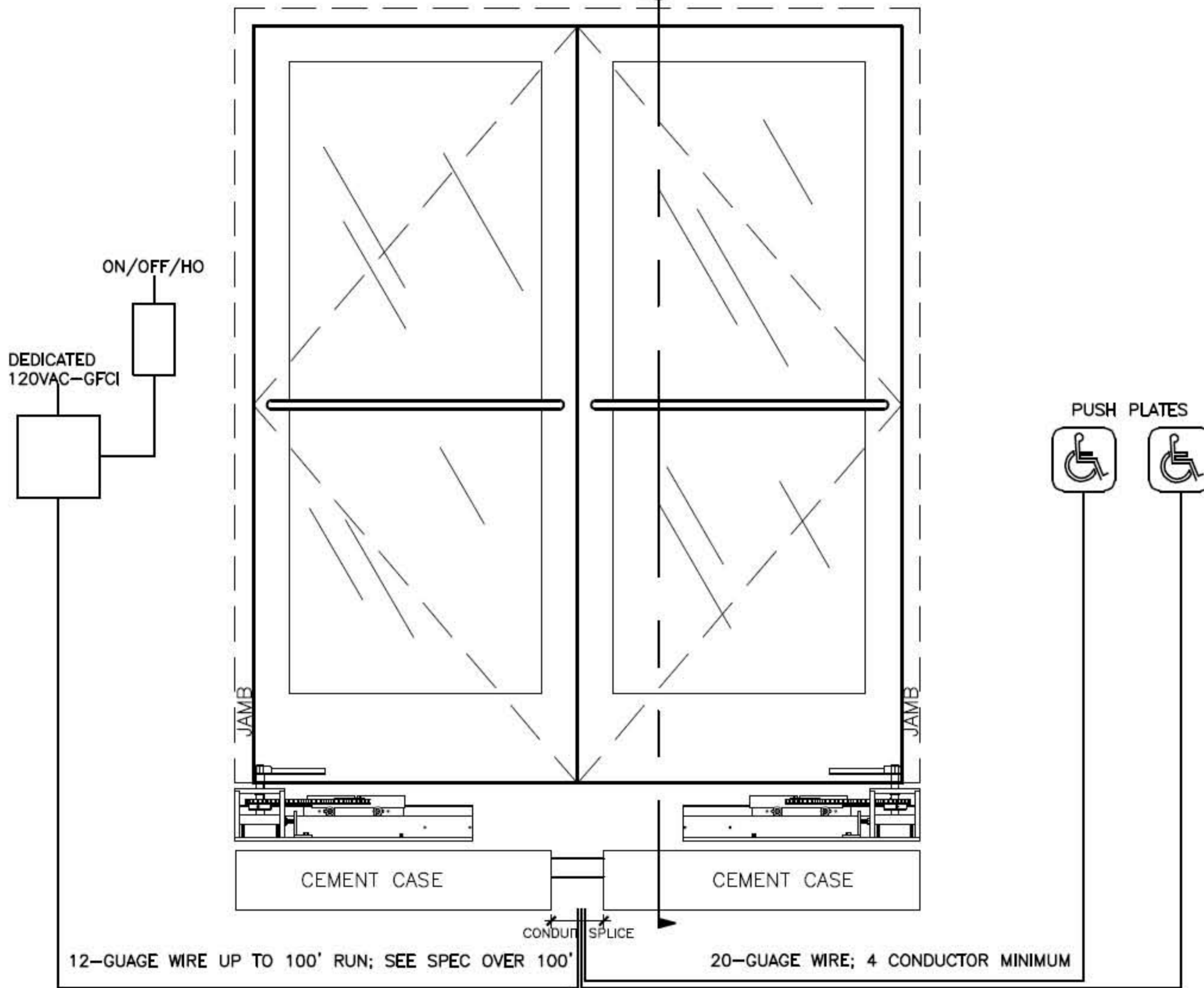


WIRING REQUIREMENTS STANDARD INSTALL

ALL WIRING TO NON-PIVOT SIDE OF DOOR LEAF. WIRES TO CENTER ON PAIRS; WIRES TO STRIKE SIDE ON SINGLES. SEE ELECTRICAL PENETRATION DRAWING IN MANUAL FOR CONDUIT FITTING LOCATION ON CEMENT CASE. SEE OPERATOR MANUFACTURER'S MANUAL FOR SPECIFIC WIRING REQUIREMENTS

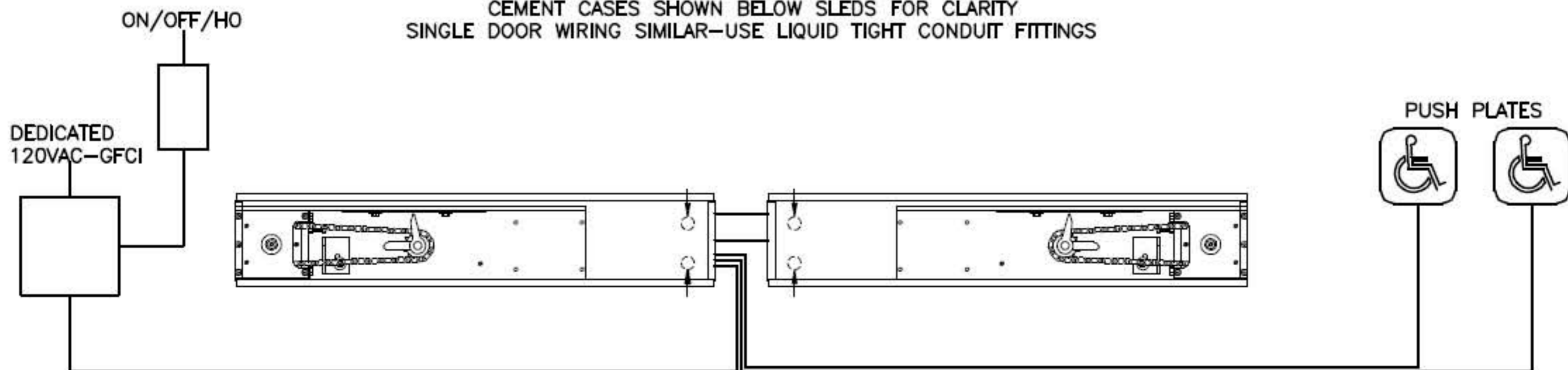


② REF SHOP DWG FOR SECTION



FRONT ELEVATION ③ SCALE = 1:20

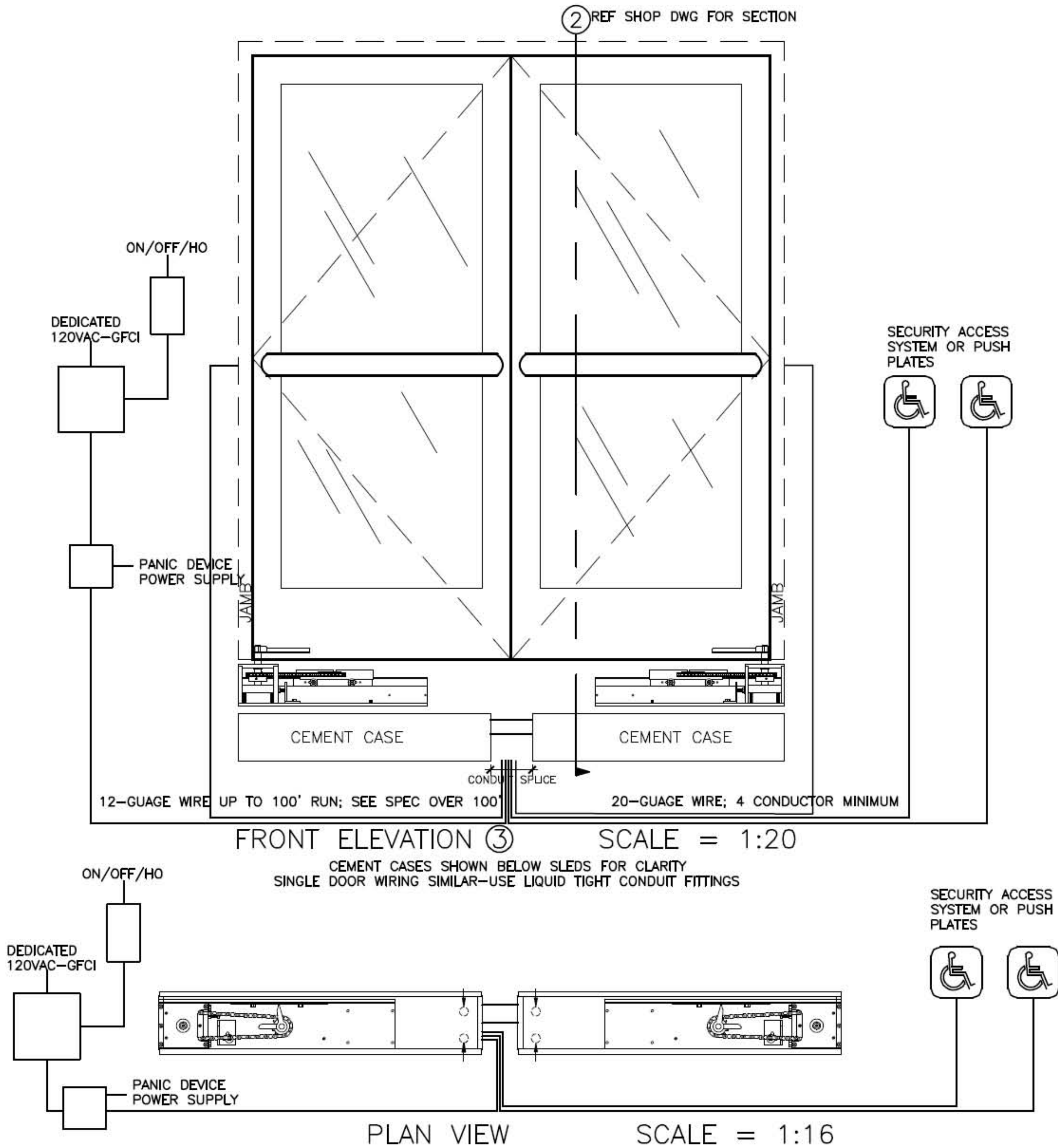
CEMENT CASES SHOWN BELOW SLEDS FOR CLARITY
SINGLE DOOR WIRING SIMILAR-USE LIQUID TIGHT CONDUIT FITTINGS



PLAN VIEW SCALE = 1:16

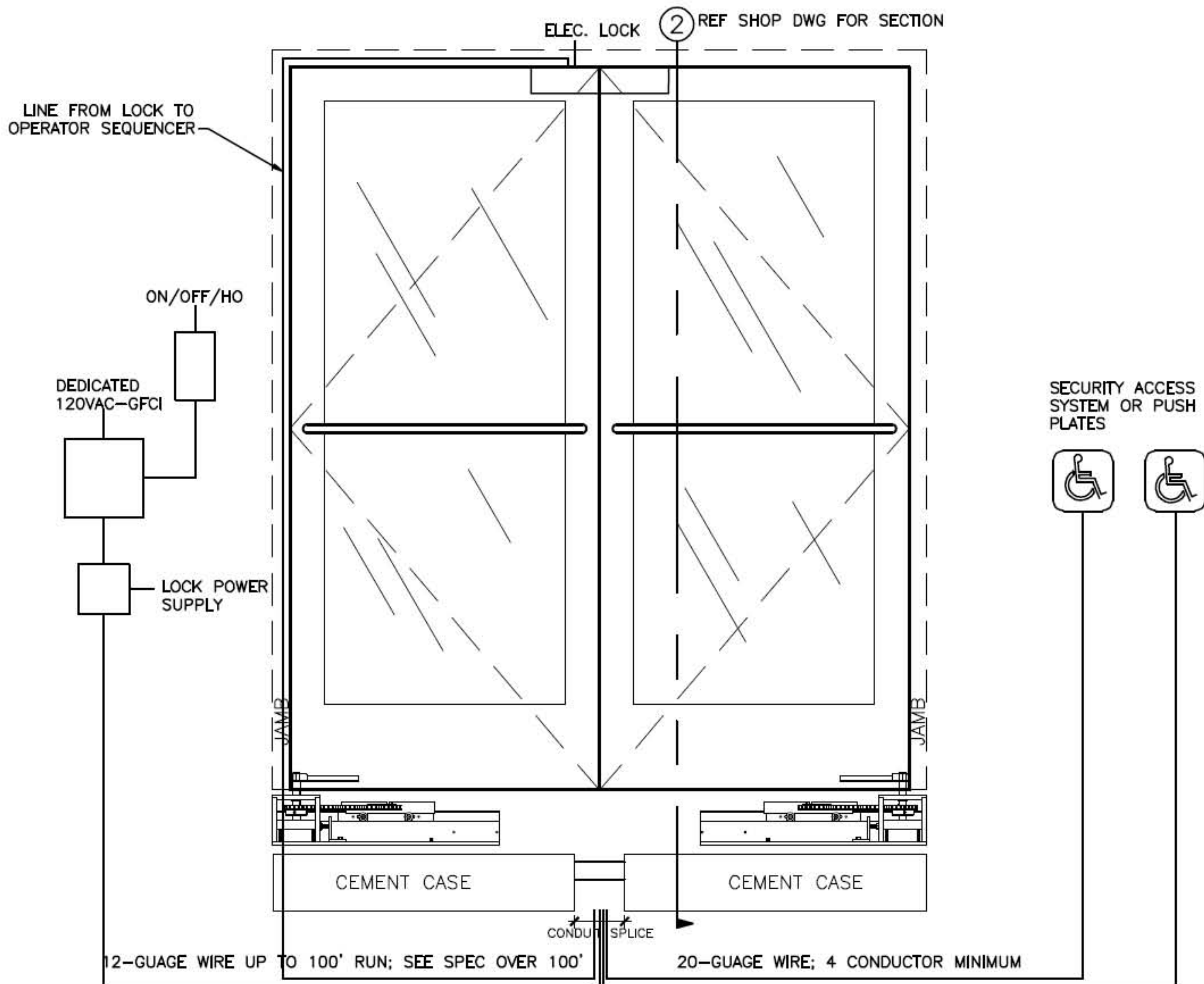
WIRING REQUIREMENTS ELECTRIC PANIC DEVICE INSTALLATION

ALL WIRING TO NON-PIVOT SIDE OF DOOR LEAF. WIRES TO CENTER ON PAIRS; WIRES TO STRIKE SIDE ON SINGLES. SEE ELECTRICAL PENETRATION DRAWING IN MANUAL FOR CONDUIT FITTING LOCATION ON CEMENT CASE. SEE OPERATOR/DEVICE MANUFACTURER'S MANUAL FOR SPECIFIC WIRING



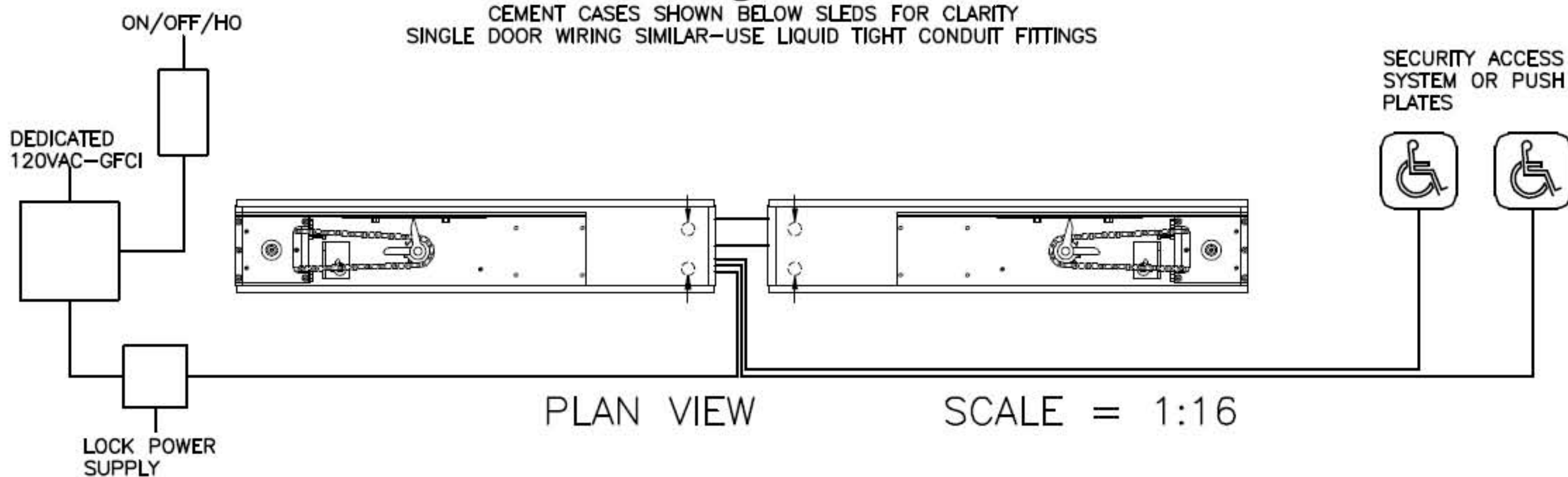
WIRING REQUIREMENTS OVERHEAD LOCK INSTALL

ALL WIRING TO NON-PIVOT SIDE OF DOOR LEAF. WIRES TO CENTER ON PAIRS;
WIRES TO STRIKE SIDE ON SINGLES. SEE ELECTRICAL PENETRATION DRAWING IN
MANUAL FOR CONDUIT FITTING LOCATION ON CEMENT CASE. SEE LOCK &
OPERATOR MANUFACTURER'S MANUALS FOR SPECIFIC WIRING REQUIREMENTS



FRONT ELEVATION ③ SCALE = 1:20

CEMENT CASES SHOWN BELOW SLEDS FOR CLARITY
SINGLE DOOR WIRING SIMILAR-USE LIQUID TIGHT CONDUIT FITTINGS



WIRING REQUIREMENTS BOTTOM LOCK INSTALL



ALL WIRING TO NON-PIVOT SIDE OF DOOR LEAF. WIRES TO CENTER ON PAIRS;
WIRES TO STRIKE SIDE ON SINGLES. SEE ELECTRICAL PENETRATION DRAWING IN
MANUAL FOR CONDUIT FITTING LOCATION ON CEMENT CASE. SEE LOCK &
OPERATOR MANUFACTURER'S MANUALS FOR SPECIFIC WIRING REQUIREMENTS

NOTE: REQUIRES IN-FIELD FABRICATION/MODIFICATION TO THRESHOLD & CEMENT
CASE. ADEQUATE AND APPROPRIATE SEALANT IS REQUIRED AT LOCK PENETRATIONS.
WATERPROOF SEAL IS THE RESPONSIBILITY OF THE INSTALLER

