Installation Instructions for 45HM IDH Max® 1300 Mortise Locks

The 45HM IDH Max® Mortise Lock provides the following features in an integrated lock, eliminating the need to install separate sensors in and around the door frame:

- electrified locking mechanism
- electronic token reader
- integrated trim
- door status detection
- latchbolt status detection
- ability to exit without triggering an alarm (RQE)
- compatibility with varied access control panels/ reader interfaces.

Note: *For a list of compatible access control panels/ reader interfaces, contact your local Stanley Representative.*

For hole sizes, see the W28 Template (T81625)

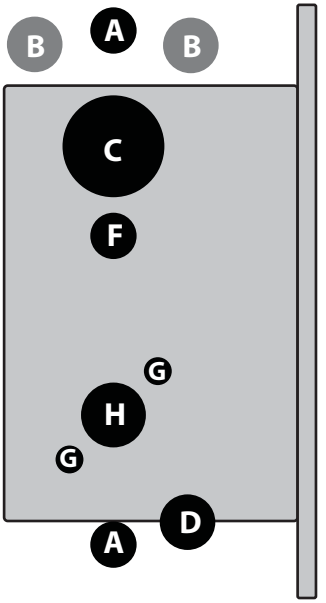
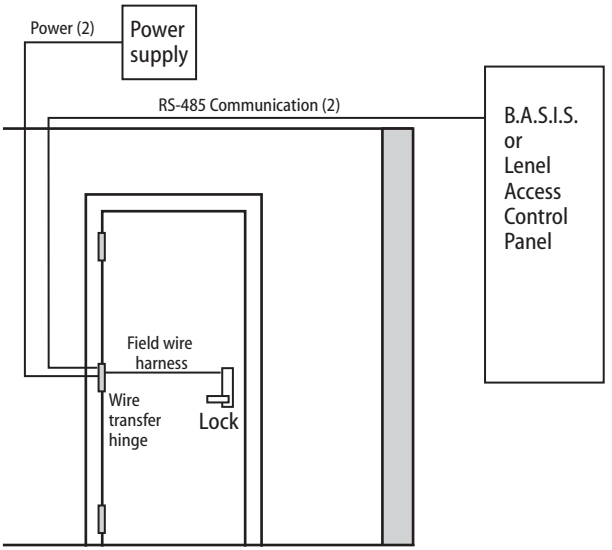


Figure 1 Identifying holes to drill



Holes by Function	Functions							
	DEU/DEL		LEU/LEL		NXEU/NXEL		TDEU/TDEL	
Holes to drill	I/S	O/S	I/S	O/S	I/S	O/S	I/S	O/S
A Forged trim (2 holes)†	Through door		Through door		Through door		Through door	
B Harness†	Through door		Through door				Through door	
C Standard cylinder		■						■
D Sensor & solenoid wire	■		■		■		■	
F Thumb turn			■				■	
G Trim mounting (2 holes)†	Through door		Through door		Through door		Through door	
H Lever†	Through door		Through door		Through door		Through door	

† Because these holes pass through the mortise pocket, it is recommended that each hole be drilled separately rather than straight through.

1 Identify holes to drill

1 Determine the lock function to be installed.
2 Determine the inside and outside, hand, and bevel of the door.
3 See the *Holes by Function* table and Figure 1 to determine the holes to be drilled for the lock function.

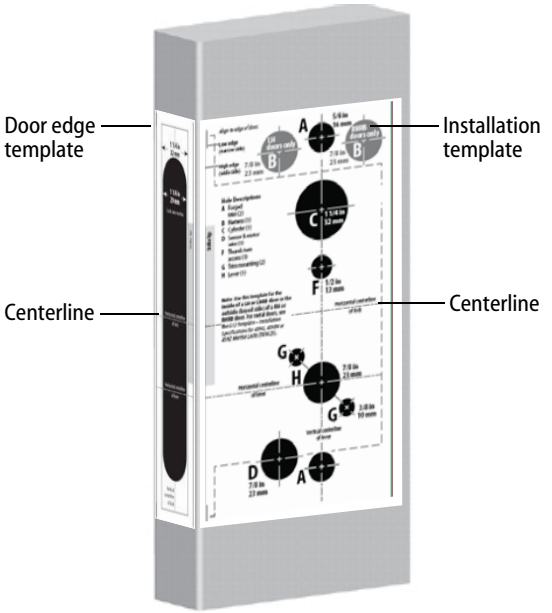


Figure 1 Aligning the templates

2 Align templates

Note: *If the door is a fabricated hollow metal door, determine whether it is properly reinforced to support the lock. If door reinforcement is not adequate, consult the door manufacturer for information on proper reinforcement. For dimensions for preparing metal doors, see the* W29 Template – *Installation Specifications for 45HM IDH Max Mortise Locks* (T81630).

1 Separate the four templates provided on the *W28 Template—Installation Template for 45HM IDH Max Mortise Locks* (T81625).
2 Position one of the door edge templates on the door, making sure that the lock case mortise shown on the template aligns with the mortise pocket prepared in the door.
3 Using the centerlines on the door edge template as a guide, position the appropriate door template on each side of the door. You need to take the bevel into account. Tape the templates to the door.

3 Drill wire channel through door

Caution 1: **Check with your local fire marshal before drilling a fire-rated door. Drilling through a fire-rated door may void the fire label.**

Caution 2: **Be careful to drill straight through the door, making sure the drill does not break through the face of the door.**

1 Remove the hinge nearest the mortise cavity.

2 Using a 3 to 4 foot drill bit, drill a 3/8″ diameter channel through the upper back of the mortise cavity to the center of the nearest hinge mortise. See Figure 3.

Note: *It may be easier to drill halfway from each side of the door.*

4 Optional: Prepare door for door status switch *(for deadbolt function locks with door sensing only)*

1 Locate the centerpoint for the door status switch 2.5″ above the top of the faceplate mortise on the edge of the door (as shown in Figure 4).

2 Drill a 1″ diameter hole 1 3/4″ deep for the door status switch.

3 Position the drill so the tip of the bit is approximately 1″ into the hole and the bit is close to the top edge of the hole. Then drill a 3/8″ channel at approximately a 35° angle from the door status switch hole into the mortise cavity (as shown in Figure 4).

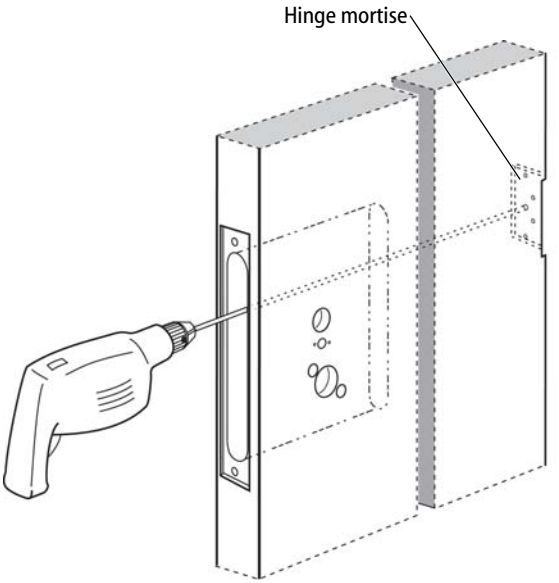


Figure 3 Drilling the wire channel through the door

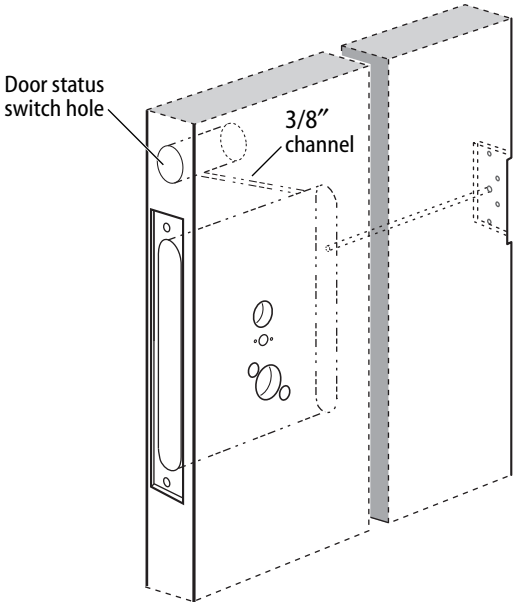


Figure 4 Preparing for the door status switch

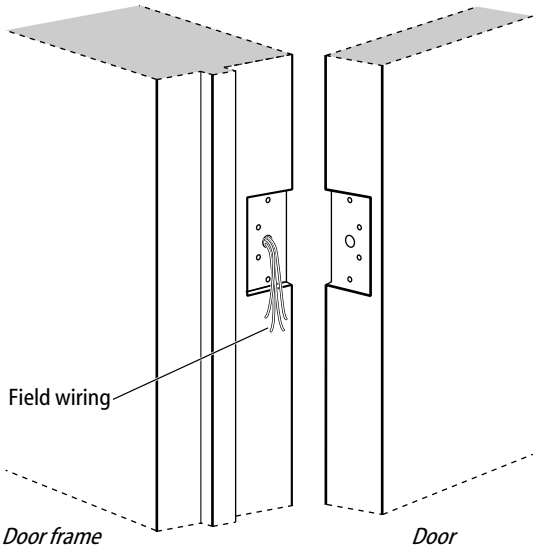


Figure 6 Running field wiring

5 Determine wire gauge for power wiring

1 Calculate the total length of the power wire run by summing:
   - The distance from the power supply to the first door.
   - If powering more than one door daisy-chained to the same power supply, add the total distance of the power runs between the doors.

2 Refer to the table below to determine the minimum wire gauge based on the number of doors sharing the power supply and the total length of the wire run.

1 door	2 doors	3 doors	4 doors	Min. wire gauge
250 ft.	125 ft.	75 ft.	60 ft.	18 AWG
400 ft.	200 ft.	130 ft.	100 ft.	16 AWG
600 ft.	300 ft.	185 ft.	150 ft.	14 AWG

6 Prepare door for wire transfer hinge and run field wiring

1 Drill a wire access hole through the frame side of the hinge mortise where you removed the hinge in Task 3, Step 1 on page 3.

2 Drill holes (or pockets) for splice connectors in the frame and door. Refer to the hinge manufacturer's specifications for the hole location.

3 De-burr the holes to prevent damage to the hinge leads.

4 Run the power field wiring from the location for the lock's power supply to the location for the wire transfer hinge.

Note 1: *To match the lock's wire color, use yellow for 12 volts DC power.*

Note 2: *To minimize lever temperature, install an 8WTCM (temperature control module) in series with the power and ground wiring within 20 feet of the lock. Use only one 8WTCM per lock. This module is supplied with electrically locked (EL) functions and is optional with electrically unlocked (EU) functions.*

– Continued

Configuring & installing the mortise case

5 Run the sensor wiring from the location of the access control panel to the location for the wire transfer hinge.

To match the sensor wire colors, refer to the table below.

Wire connection	Color	No. of wires
Door status sensor	White	2
Latchbolt status sensor	Purple	2
RQE status sensor	Brown & Orange	2

7 Pull the field wiring down the wall and through the access hole in the frame.

7 Optional: Install door status switch *(for deadbolt function locks with door sensing only)*

1 Position the shield on the door status switch with the notch facing downwards (towards the mortise pocket).

Caution: **Make sure the wires are not routed across any sharp edges or over any surface that could damage its sleeving.**

2 Feed the wires for the door status switch into the door status switch hole and through the channel into the mortise cavity.

3 Insert the door status switch assembly into the door status switch hole.

8 Rotate latchbolt *(if necessary)*

Note: *If a function specific mortise case was ordered, some steps for configuring the case have already been performed at the factory.*

1 Determine whether you need to rotate the latchbolt to match the handing of the door.

Note: *The angled surface of the latchbolt must contact the strike when the door closes.*

2 If you need to rotate the latchbolt, insert a flat blade screwdriver into the latch access point approximately

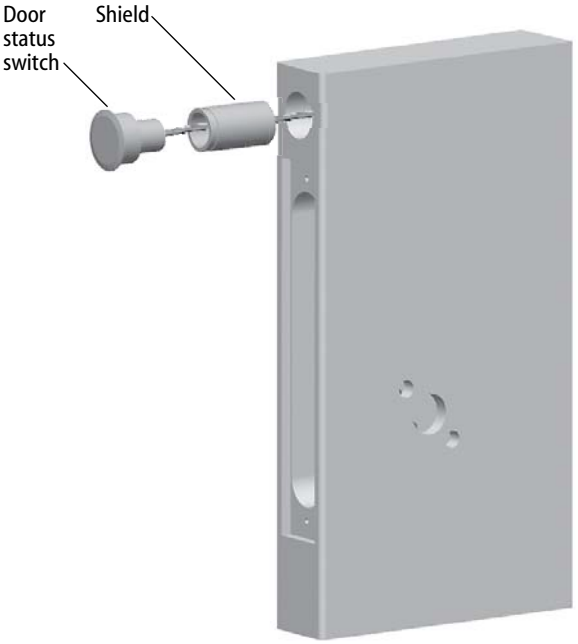


Figure 7 Installing the door status switch

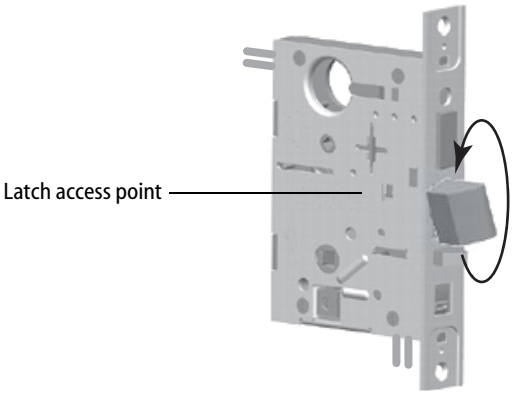


Figure 8 Rotating the latchbolt

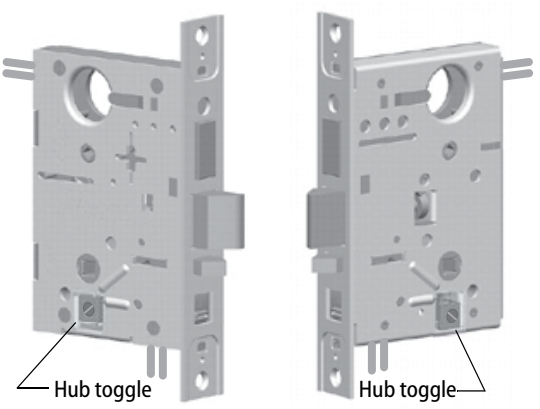


Figure 9 Positioning hub toggles

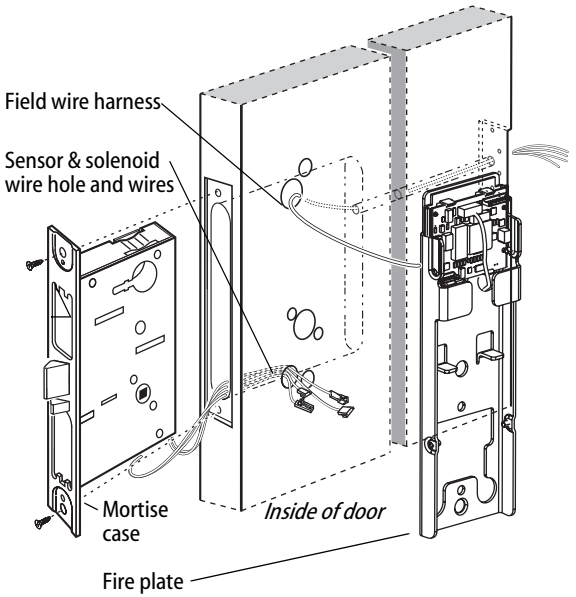


Figure 10 Installing the mortise case (inside of door)

1/2″ into the case and press to extend the latch out of the case. See Figure 8.

3 Rotate the latchbolt 180 degrees and allow it to retract into the case.

9 Position hub toggles *(if necessary)*

1 Check whether the hub toggles are in the proper position for the lock. See the table below and Figure 9.

Hub toggle positions

Function	Hub toggle positions
DEU/DEL, LEU/LEL, NXEU/ NXEL, TDEU/TDEL	Inside down (always unlocked) & outside up (lockable)

Note 1: *For LH & LHRB doors, the inside is the back side of the case and the outside is the cover side of the case.*
For RH & RHRB doors, the inside is the cover side of the case and the outside is the back side of the case. The cover is mounted to the case with four screws.

Note 2: *If the lock has an optional RQE status sensor, two RQE status switches are installed in the mortise case. However, only the switch for the inside of the lock needs to be connected. Before you install the mortise case in the door, determine whether you need to connect the 'Case Side' pair of RQE wires or the 'Cover Side' pair of RQE wires, based on the handing of the door.*

2 To change the position of a hub toggle, remove the toggle screw, move the toggle into the desired position, and re-tighten the screw.

10 Install mortise case

1 Remove the faceplate from the mortise case, if necessary.

2 Insert the mortise case into the mortise cavity, while feeding the sensor and solenoid wires into the mortise cavity and out the sensor & solenoid wire hole to the inside of the door.

Installing the trim

Note 1: *The armored front of the mortise case self-adjusts to the door bevel.*

Note 2: *The field wire harness should be routed above and behind the mortise case (depending on where the hole through the door meets the mortise cavity).*

3 Make sure there are 3″ to 4″ of slack in the field wire harness to allow access to the control electronics circuit board located in the fire plate.

3 Secure the mortise case with the case mounting screws.

11 Install trim mounting plates

1 Insert the outside trim mounting plate through the door and mortise case.

2 Position the inside trim mounting plate opposite the outside trim mounting plate and screw them securely in place.

Caution: **Do not overtighten the trim mounting plate screws. Overtightening may damage the locking mechanism.**

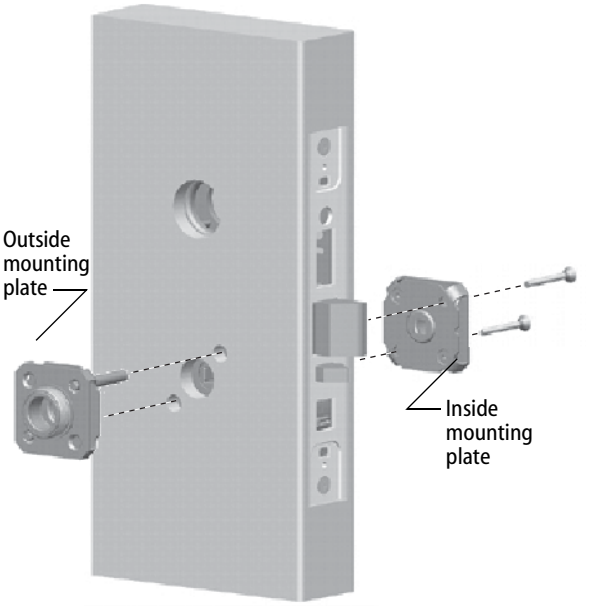


Figure 11 Installing the trim mounting plates

12 Install concealed cylinder & core (DEU/DEL and TDEU/TDEL functions only)

1 Use a cylinder wrench to thread the cylinder into the mortise case so that the groove around the cylinder is even with the door surface as shown in Figure 12.

Caution: **A malfunction can occur if the cylinder is threaded in too far.**

2 Secure the cylinder in the mortise case with the cylinder retainer screw.

3 Insert the control key into the core and rotate the key 15 degrees to the right.

4 With the control key in the core, insert the core into the cylinder.

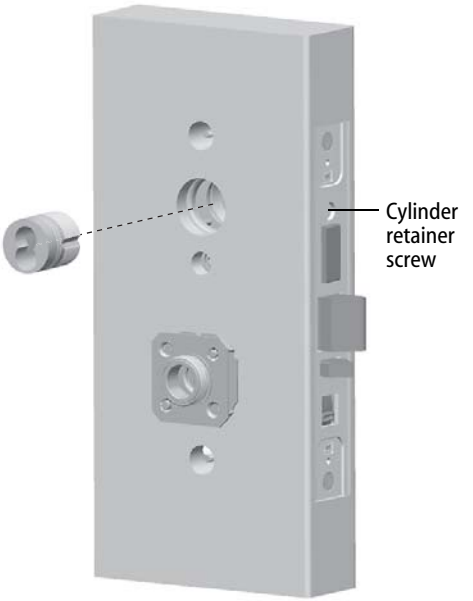


Figure 12 Installing the concealed cylinder

Installing the trim

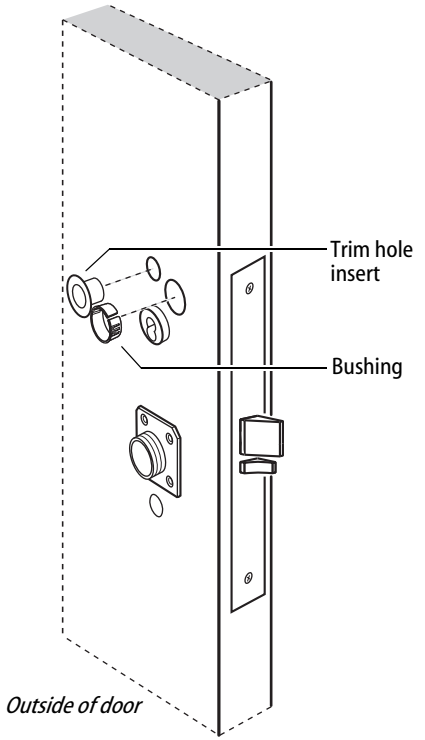


Figure 13 Installing the trim hole insert and bushing

5 Rotate the control key 15 degrees to the left and withdraw the key.

6 The control key can be used to remove cores and to access doors. Provide adequate security for the control key.

13 Install trim hole insert and bushing

1 Insert the trim hole insert into the upper trim hole on the outside of the door, as shown in Figure 13.

2 Insert the bushing into the field harness & reader wire hole on the outside of the door, as shown in Figure 13.

Installing the trim

14 Connect reader wire harness

1 From the outside of the door, feed the reader wire harness connector through the field harness & reader wire hole.

2 Temporarily rest the outside trim on the door by inserting the trim studs into the stud holes.

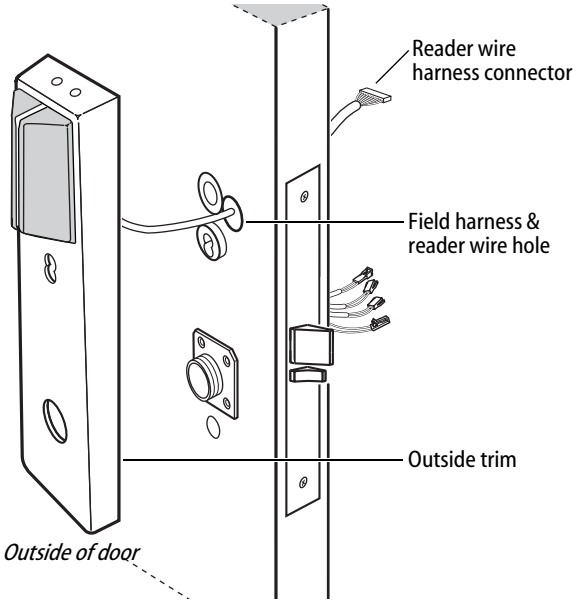


Figure 14a Feeding the reader wire harness connector from the outside trim through the door

15 Set the control electronics board DIP switches

Each IDH Max unit must be addressable (able to be identified automatically by the access control system) with a unique address that matches its Lenel or B.A.S.I.S.® reader address set up in the management software. See the *System Administration User Guide* for more information on reader addressing.

1 On the inside control electronics board use the first five switches to set the reader address in binary code. Switch one is the least significant digit. See the table on the next page.

2 Use the table below to set both switches 6 and 7 to the baud rate at which the locks will communicate with the intelligent controller.

Baud rate	Switch 6	Switch 7
2,400	All off	
9,600		ON
19,200	ON	
38,400	ON	ON

3 *For the last IDH Max Lock in the daisy-chain only*, set switch 8 to ON. Otherwise, set switch 8 to OFF.

Installing the trim

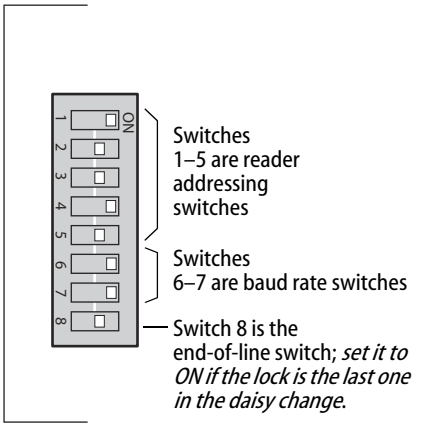


Figure 15 DIP switches on the Control Electronics circuit board set to reader address 5 and 38,400 bps baud rate and not end of line.

For example, to address an IDH Max Lock with address number 5, the binary equivalent number would be 00101 – OFF OFF ON OFF ON. See table below.

Reader address	(16) Switch 5	(8) Switch 4	(4) Switch 3	(2) Switch 2	(1) Switch 1
0			All off		
1					ON
2				ON	
3				ON	ON
4			ON		
5			ON		ON
6			ON	ON	
7			ON	ON	ON
8		ON			
9		ON			ON
10		ON		ON	
11		ON		ON	ON
12		ON	ON		
13		ON	ON		ON
14		ON	ON	ON	
15		ON	ON	ON	ON
16	ON				
17	ON				ON
18	ON			ON	
19	ON			ON	ON
20	ON		ON		
21	ON		ON		ON
22	ON		ON	ON	
23	ON		ON	ON	ON
24	ON	ON			
25	ON	ON			ON
26	ON	ON		ON	
27	ON	ON		ON	ON
28	ON	ON	ON		
29	ON	ON	ON		ON
30	ON	ON	ON	ON	
31	ON	ON	ON	ON	ON

Installing the trim

16 Install fire plate

1 From the inside of the door, feed the wiring through the fire plate harness hole.

2 Position the fire plate on the door so that the inside mounting plate fits through the square opening in the fire plate.

3 Insert the two counter sunk mounting screws into the holes at the top and bottom of the fire plate.

Note: *You may have to push the PCB board up out of the way of the mounting holes to access them.*

4 Tighten the mounting screws until the fire plate is securely mounted to the door.

Caution 1: **When routing the reader wire harness, make sure the reader wire harness is not routed across any sharp edges or over any surface that could damage its sleeving or wire insulation.**

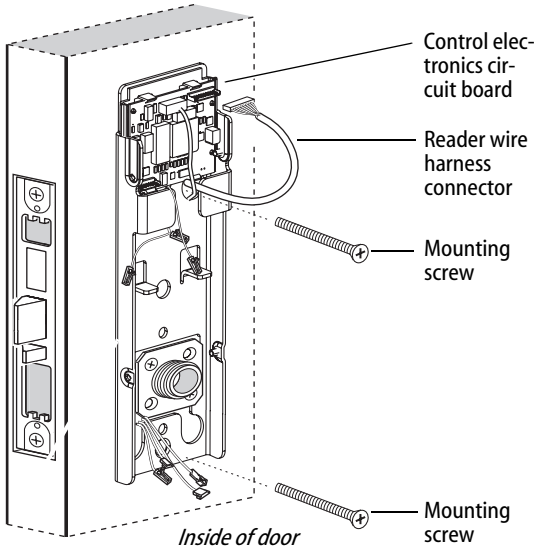


Figure 16 Installing the fire plate and connecting the reader wire harness

Completing the installation at the door

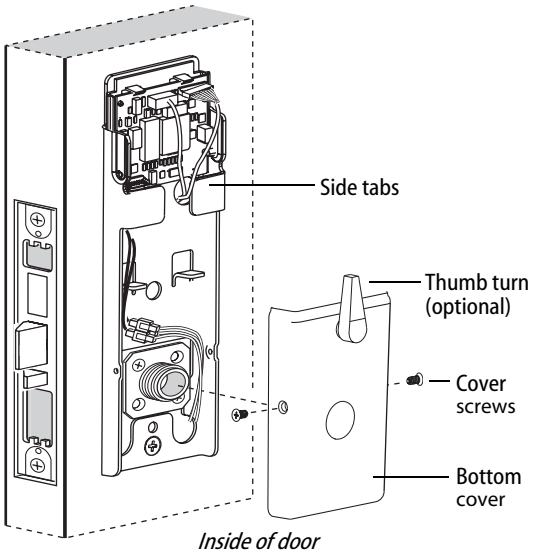


Figure 17 Installing the bottom cover

17 Secure through-bolt trim and complete connections

Caution: **When routing the solenoid and sensor wire harness, the sensor wires, and the solenoid wires, make sure the wires are not routed across any sharp edges or over any surface that could damage their sleeving or wire insulation.**

1 Make the solenoid connection and three sensor connections, and place the wires into the inside trim.

Wire connection	Color	No. of wires	No. of pins
Solenoid	Yellow	2	3
RQE	Brn/Org	2	3
Shorting connection	Purple	2	2
Door status sensor	White	2	2

Caution: **When making the sensor connections and solenoid connection, make sure:**

- **there are no loose wire connections where the wires are inserted into the connectors**
- **the connectors are firmly mated.**

18 Install bottom cover (inside escutcheon)

1 Position the battery wires above the side tabs and against the side of the fire plate, as shown in Figure 17.

2 **Optional for Thumb Turn option only:** Make sure that the Thumb Turn is in the upright position, as shown in Figure 17.

3 Use two cover screws to secure the cover to the side of the fire plate.

Note: *Phillips Type 2 and T20 Torx options are available for the cover mounting screws.*

Caution: **Dress all wires away from possible pinch points before the bottom cover is put in place.**

Completing the installation at the door

19 Install top cover (inside escutcheon)

1 Position the top cover above the fire plate and slide it down over the guide notches on the fire plate.

Caution: **Make sure that the top cover does not pinch any wires as you slide it over the fire plate.**

2 Use two cover screws to secure the cover to the side of the fire plate, as shown in Figure 18.

Note: *Phillips Type 2 and T20 Torx options are available for the cover mounting screws.*

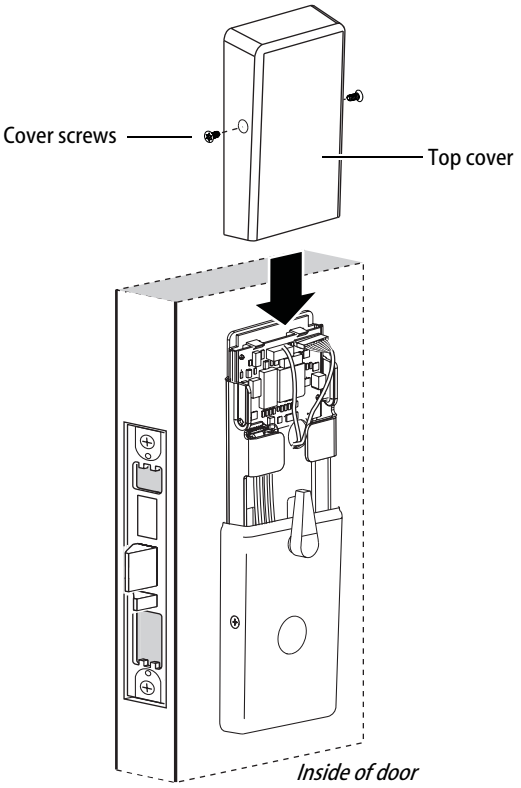


Figure 18 Installing the top cover

Completing the installation at the door

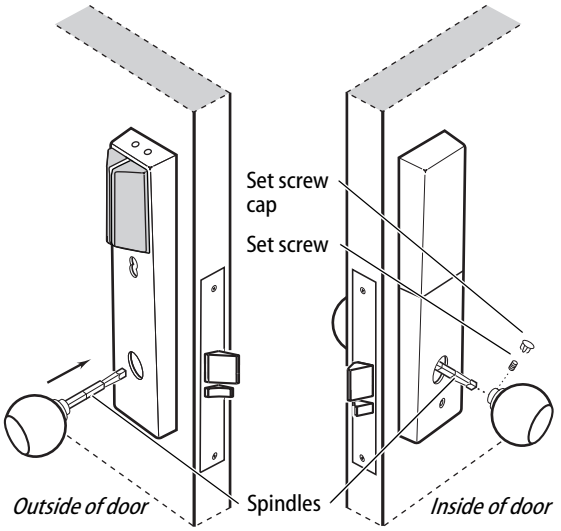


Figure 19a Installing the knobs

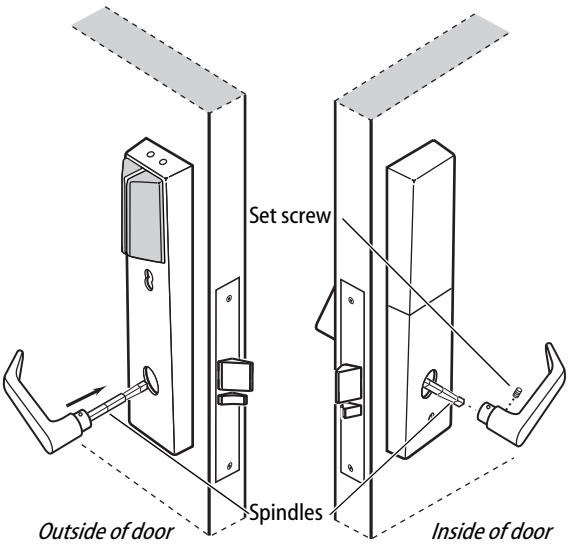


Figure 19b Installing the levers

20 Install inside and outside knobs/levers

For both knobs and levers

Unscrew the inside spindle one full turn to allow the spindles to turn freely.

For knobs

1 From the outside of the door, insert the outside knob and spindles assembly into the lockset.
2 Slide the inside knob onto the inside spindle and secure it with the set screw.
3 Push the set screw cap into the set screw hole.
4 Tighten the trim mounting screws.
5 Turn the knobs to check that they operate smoothly.

For levers

1 With the handle pointing toward the door hinges, insert the outside lever and spindles assembly into the lock from the outside of the door.
2 Slide the inside lever onto the inside spindle and secure it with the set screw.
3 Tighten the trim mounting screws.
4 Turn the levers to check that they operate smoothly.

Completing the installation at the door

21 Install core (DEU/DEL and TDEU/TDEL only)

1 Insert the control key into the core and rotate the key 15 degrees to the right.

2 With the control key in the core, insert the core into the cylinder.

3 Rotate the control key 15 degrees to the left and withdraw the key.

Caution: **The control key can be used to remove cores and to access doors. Provide adequate security for the control key.**

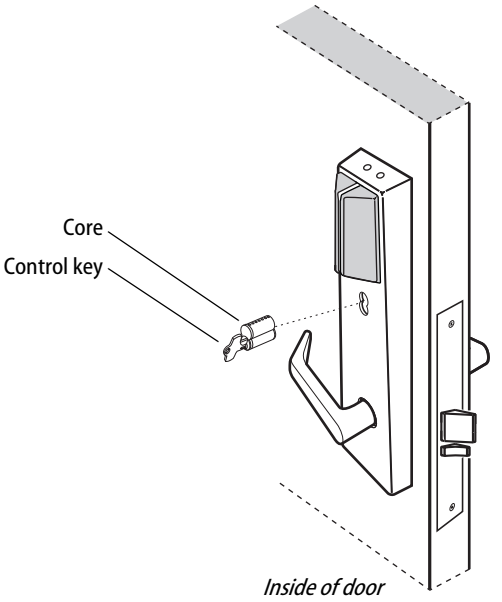


Figure 20 Installing the core

Completing the installation at the door

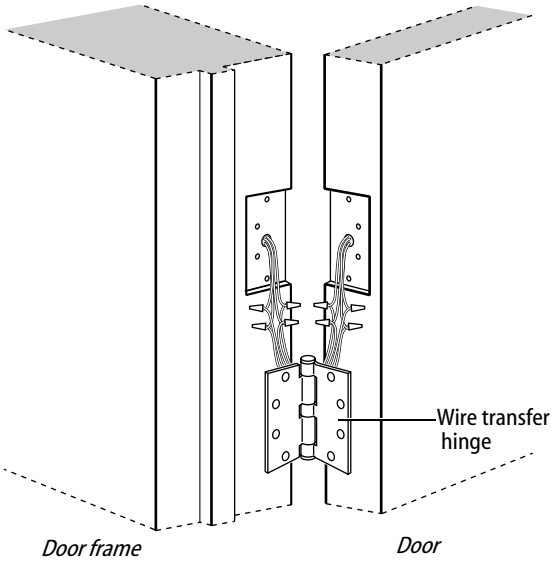


Figure 21 Installing the wire transfer hinge

22 Install wire transfer hinge

Note: *BEST recommends one of the following concealed electric hinges from Stanley Security Solutions. For more information, contact your BEST representative.*

Hinge	Description†
CECB 179-66	Standard weight; steel
CECB 168-66	Heavy weight; steel
CECB 191-66	Standard weight; brass

† All hinges measure 4.5″ × 4.5″ and have a 26D finish. All hinges have two 24 AWG wires rated for 2 A at 12 or 24 volts (AC or DC) and four 28 AWG wires rated for 1 A at 12 or 24 volts (AC or DC).

1 Trim the power and sensor wires that you pulled through the hinge edge of the door. Leave sufficient length to connect to the wire transfer hinge and to allow for future splices.

2 Splice the field wires to the leads on the frame side of the hinge, following the hinge manufacturer's instructions.

3 Splice the power and sensor wires from the lock to the leads on the door side of the hinge, matching each lead to its corresponding wire.

Note: *If the lock has an optional RQE status sensor, splice only the pair of RQE wires for the switch on the inside of the door, which you identified in Task 9 on page 6. Put the unused pair of RQE wires in the door.*

4 Insert the wires and splice connectors into the holes or pockets in the door and frame, being careful not to pinch the wires. Install the wire transfer hinge.

Completing the installation at the door

23 Install strike box and strike plate

1 Insert the strike box into the mortise in the door jamb. Place the strike plate over the strike box and secure the strike with the screws provided.

2 Check the position of the auxiliary bolt against the strike plate.

Caution: **The auxiliary bolt must make contact with the strike plate. The auxiliary bolt deadlocks the latchbolt and prevents someone from forcing the latch open when the door is closed. If the incorrect strike is installed, a lock-in can occur.**

Note: *The recommended gap between the door and jamb is 1/8".*

24 Optional: Install lock power supply

If you are providing a separate power supply for the lock, instead of providing power via the panel interface module, connect the two power field wires (run from the wire transfer hinge) to the power supply. Make sure power (12 volts DC) and ground are connected properly.

Follow the instructions provided by the power supply manufacturer. Do not plug in the power supply yet.

25 Set and connect power supply

1 Make sure that the output voltage of the power supply for the panel interface module and lock is set to 15 volts DC or lower.

2 Make the final power supply connections.

3 Adjust the power supply output voltage to 13.8 volts DC

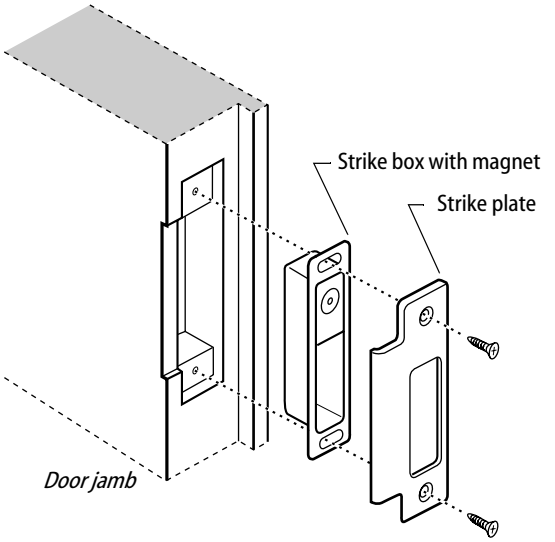


Figure 22a Installing the strike box and strike plate

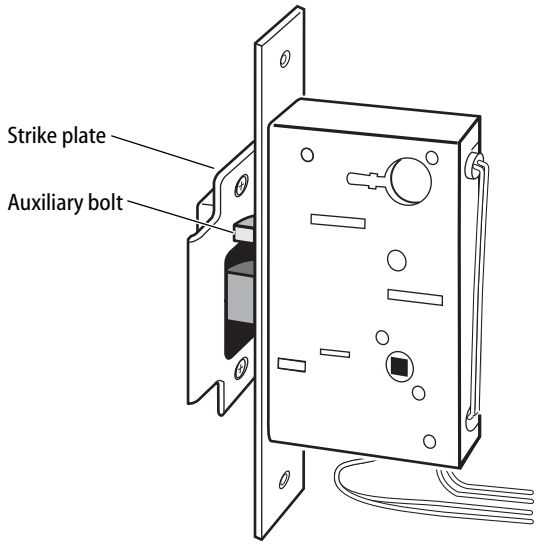


Figure 22b Positioning the strike

Testing the installation

26 Test installation

Perform the following steps to test the installation. Also, perform any standard testing recommended by the manufacturer of the access control panel. If you encounter problems, see *Troubleshooting the installation,* on page 19.

1 Check the control electronics' green status LED and the panel interface module's green status LED.

Both LEDs should be blinking, indicating that the communication connection between the panel interface circuit board and the lock's control electronics circuit board is OK.

2 After performing any necessary programming for the lock and putting the door in a locked mode, use a valid token to access the lock.

Confirm that the red reader LED, green reader LED, and sounder respond as expected.

The lock should allow access, verifying that the solenoid is working.

To check that the reader is working, view the lock's event history and verify that the information recorded for the token is correct.

3 Use an invalid token to attempt to access the lock.

Confirm that the red reader LED, green reader LED, and sounder respond as expected.

The lock should deny access.

4 With the door armed, attempt to exit through the door.

The request-to-exit (RQE) feature should let you exit without triggering an alarm by the access control panel.

5 Remove power from the lock and check whether the door remains locked or is unlocked.

Verify that the lock fails safe or secure, according to its function.

6 With the door armed, hold the door open. Hold a magnet against the edge of the door, over the door status sensor, until the access control panel sees the door as closed. Then remove the magnet.

Verify that the appropriate alarm response is triggered by the access control panel, indicating that the door status sensor is working.

7 With the door armed, hold the door open. Hold a magnet against the edge of the door, over the door status sensor, until the access control panel sees the door as closed. With the magnet in place, push in the latchbolt.

Verify that the appropriate alarm response is triggered by the access control panel, indicating that the latchbolt status sensor is working.

Troubleshooting the installation

Troubleshooting

To troubleshoot installation problems, refer to the table below. For more information, refer to the *IDH Max Lock Service Manual* (T60775) and to the documentation provided by the manufacturer of the access control panel/ reader interface.

You notice . . .	Possible causes include . . .	You should . . .
Control electronics' red status LED and access control panel's red status LED are on only 20% of the time.	Communication between the lock's control electronics circuit board and the access control panel has been interrupted.	Make sure DIP switches 6 and 7 on the lock's control electronics circuit board are set to the proper baud rate. See page 9. Check the connections for all communication field wiring. Make sure that the last daisy-chained IDH Max DIP switch is set to ON and all others are OFF. See page 9. Check the communication connections between the field wire harness and the wire transfer hinge.
Control electronics' red status LED is off.	Power is not being supplied to the lock.	Make sure that the lock's power supply is connected to electrical service. Check the connections for all power field wiring to the lock. Check the power connections between the field wire harness and the wire transfer hinge.

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