V SERIES

SERVICE MANUAL

BEST

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ACCESS SYSTEMS

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GETTING STARTED

INTRODUCTION

The *V Series Service Manual* contains essential information to help you maintain your 8KV, 9KV, 30HV stand-alone locks, and the XV Controller.

CERTIFICATIONS AND STANDARDS

HV and KV Locks
- The strike fits the standard door frame cutout as specified in ANSI A115.1.
- The faceplate dimensions fit the standard door preparation as specified in ANSI A115.1.
- The locks comply with the following:
  - ▲ FCC CFR 47 Part 15, Subpart C for Intentional Radiators
  - ▲ CES–003 Canadian EMI Requirements
  - ▲ IEC 61000–4–2 (1995) ESD Immunity
  - ▲ IEC 61000–4–3 (1995) RD Immunity
  - ▲ IEC 61000–4–4 (1995) EFT Immunity
  - ▲ International Safe Transit Association–Procedure 1A
  - ▲ Humidity Test RTCA/DO–160C–Extended Humidity.

V Series Controller

The controller complies with the following:

■ FCC CFR 47 Part 15, Subpart C for Intentional Radiators

■ CES–003 Canadian EMI Requirements

■ IEC 61000–4–2 (1995) ESD Immunity

■ IEC 61000–4–3 (1995) RD Immunity

■ IEC 61000–4–4 (1995) EFT Immunity

■ International Safe Transit Association–Procedure 1A

■ Humidity Test RTCA/DO–160C–Extended Humidity.

DOCUMENTATION PACKAGE

The following documentation is available to help you with the installation, start-up, and maintenance of the V Series System. To order a document, contact your BEST representative.

The installation instructions for the locks and controller also can be ordered separately:

Document Title	Doc. No.
8KV/9KV Installation Instructions	T61918
30HV Installation Instructions	T61919
XV Controller Installation Instructions	T61920

The templates required for lock installations also can be ordered separately:

Document Title	Doc. No.
Installation Template for 83KV/93KV Locksets	T61921
Installation Template for 34HV–35HV Locksets	T61922
Installation Specifications for 34HV–35HV Locks/Hole Pattern Chart for 34HV–35HV Locks	T61923
V Series Controller Drilling Template	T61924

The wiring and power related instructions can be ordered separately:

Document Title	Doc. No.
V Series Controller Wiring Diagram	T61928
External Power Installation Instructions	T61925
Door Wiring Instructions for Electrically–Operated Locksets	T61926

Depending on the programming method you choose for the V Series System, you may need one or more of the following manuals:

Document Title	Doc. No.
V Series Handheld Terminal User Manual	T61931
V Series Intelligent Programmer Software User Manual	T61930
IPS Getting Started Instructions	T61929

Depending on the type of reader you choose for the V Series System, you may need one or more of the following manuals:

Document Title	Doc. No.
Installation Instructions for the BEST Encoder	T61933
V Series Keypad Security Device Programming Guide	T61927
V Series Keypad Security Device Quick Programming Guide	T61938

TECHNICAL SUPPORT

Support services

When you have a problem with the V Series Lockset, your first resource for help is the *V Series Service Manual*. If you cannot find a satisfactory answer, contact your local BEST representative.

Telephone technical support

A factory-trained Certified Product Specialist (CPS) is available in your area whenever you need help. Before you call, however, please make sure you are at the location where the problem exists, and that you are prepared to give the following information:

■ the exact wording of any error or warning messages

■ what happened and what you were doing when you encountered the problem

■ what you have done so far to correct the problem

■ the lock serial number located on the inside trim in the battery compartment.

Best Access Systems Representatives provide telephone technical support for all V Series products. You may locate the representative nearest you by calling (317) 849-2250 Monday through Friday, between 7:00 a.m. and 4:00 p.m. eastern standard time; or visit the web page, www.BestAccess.com.

Training seminars   BEST holds training sessions for its customers. If you are interested, you may contact your local BEST representative for the details.

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SECURITY DEVICE MAINTENANCE

The following pages contain exploded diagrams for all V Series Security Devices. These diagrams detail all field serviceable mechanical and electronic parts. Use the diagrams and parts lists on the following pages to find the part numbers you need.

8KV/9KV MAGNETIC STRIPE TRIM EXPLODED DIAGRAM

Figure 2.1 8KV/9KV magnetic stripe trim exploded diagram

8KV/9KV magnetic stripe trim parts list

Refer to Figure 2.1 and the table below to find the part you need.

Item	Part No.	Qty.	Description
1[a]		2	Knob or lever
2	C61403	1	9KV outside escutcheon
not shown	C61405	1	8KV outside escutcheon
3	A61503	2	Wire clamp (1 inside, 1 outside)
4	A61502	1	Communications port retainer clip
5	B61646	1	Card reader
6	A61643	1	Outside wire harness for card reader
7	A61429	2	Card reader screws
8[b]	D60464	1	9KV chassis assembly
not shown	D60419	1	8KV chassis assembly
9	B61649	1	Outside wire harness clip
10	C54680	1	Latch
11	A61433	2	Plastic bushings
12	A25359	2	Latch screws
13	B62099	1	Programmed PROM (VP_S15)
14	C55556	1	Inside rose liner
15	A61501	4	Circuit board screws
16	A55557	2	Through–bolt mounting screws
17	B61664	1	Circuit board (without PROM)
18	A61642	1	Inside wire harness
19	B61412	1	Upper escutcheon screw for 1 3/4″ thick doors
not shown	B61413	1	Upper escutcheon screw or 2″ thick doors
not shown	B61414	1	Upper escutcheon screw for 2 1/4″ thick doors
20	C61404	1	9KV inside escutcheon
not shown	C61406	1	8KV inside escutcheon
21	C61410	1	Battery cover
22	A61422	1	Lower escutcheon screw for 1 3/4″ thick doors
not shown	A61423	1	Lower escutcheon screw or 2″ thick doors
not shown	A61424	1	Lower escutcheon screw for 2 1/4″ thick doors
23	B61917	1	Alkaline battery pack
24	A61411	1	Battery cover screw (torx with post head) *or*
	A61428	1	Battery cover screw (McGard head)

a. Refer to the *H Series Service Manual* for knob and lever part numbers.
b. For 8KV/9KV chassis parts, see *Figure 2.4.*

8KV/9KV KEYPAD TRIM EXPLODED DIAGRAM
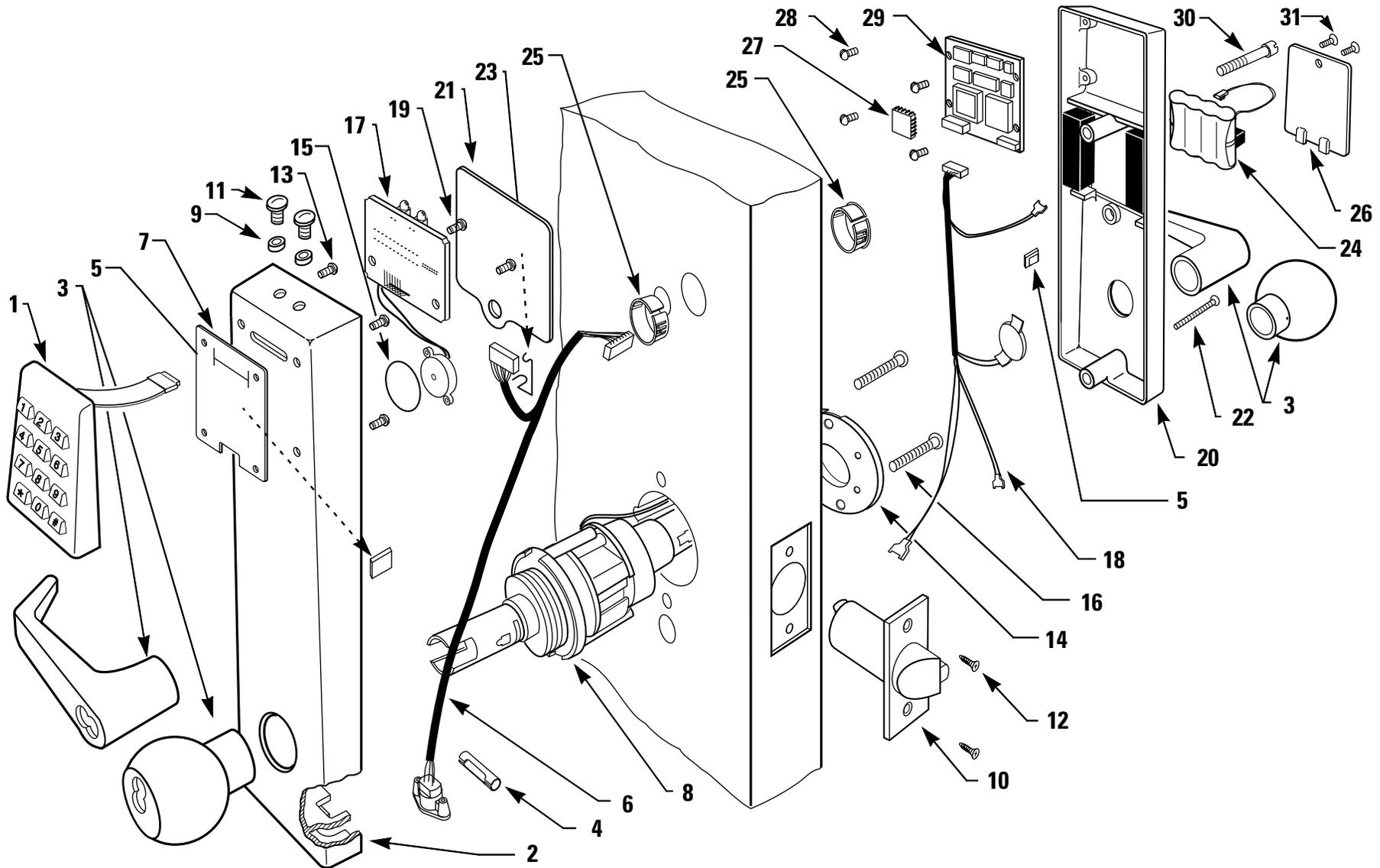
Figure 2.2   8KV, 9KV keypad trim exploded diagram

8KV/9KV keypad trim parts list

Refer to Figure 2.2 and the table below to find the part you need.

Item	Part No.	Qty.	Description
1	B60325	1	Keypad assembly with cable and connector
2	C60449	1	9KV outside escutcheon
not shown	C60448	1	8KV outside escutcheon
3[a]		2	Knob or lever
4	A61502	1	Communications port retainer clip
5	A61503	2	Wire clamp (1 inside, 1 outside)
6	B60305	1	Outside wire harness for keypad
7	B60321	1	Keypad gasket
8[b]	D60464	1	9KV chassis assembly
not shown	D60419	1	8KV chassis assembly
9	A60318	2	Retaining rings
10	C54680	1	Latch
11	A60317	2	Sealing lens covers
12	A25359	2	Latch screws
13	A60348	4	Keypad mounting screws
14	C55556	1	Inside rose liner
15	A60324	1	Adhesive tape for sounder
16	A55557	2	Through–bolt mounting screws
17	C60303	1	Keypad reader electronics assembly
18	A61642	1	Inside wire harness
19	A61429	2	Keypad electronics screws
20	C61404	1	9KV inside escutcheon
not shown	C61406	1	8KV inside escutcheon
21	A60316	1	Escutcheon gasket
22	A61422	1	Lower escutcheon screw for 1 3/4″ thick doors
not shown	A61423	1	Lower escutcheon screw or 2″ thick doors
not shown	A61424	1	Lower escutcheon screw for 2 1/4″ thick doors
23	B61649	1	Outside wire harness clip
24	B61917	1	Alkaline battery pack
25	A61433	2	Plastic bushings
26	C61410	1	Battery cover
27	B62076	1	Programmed PROM for keypad (VP15KP)
28	A61501	4	Circuit board screws
29	B61664	1	Circuit board (without PROM)
30	B61412	1	Upper escutcheon screw for 1 3/4″ thick doors
not shown	B61413	1	Upper escutcheon screw or 2″ thick doors
not shown	B61414	1	Upper escutcheon screw for 2 1/4″ thick doors
31	A61411	1	Battery cover screw (torx with post head) *or*
not shown	A61428	1	Battery cover screw (McGard head)

a. Refer to the *H Series Service Manual* for knob and lever part numbers.
b. For 8KV/9KV chassis parts, see *Figure 2.4.*

8KV/9KV PROXIMITY TRIM EXPLODED DIAGRAM
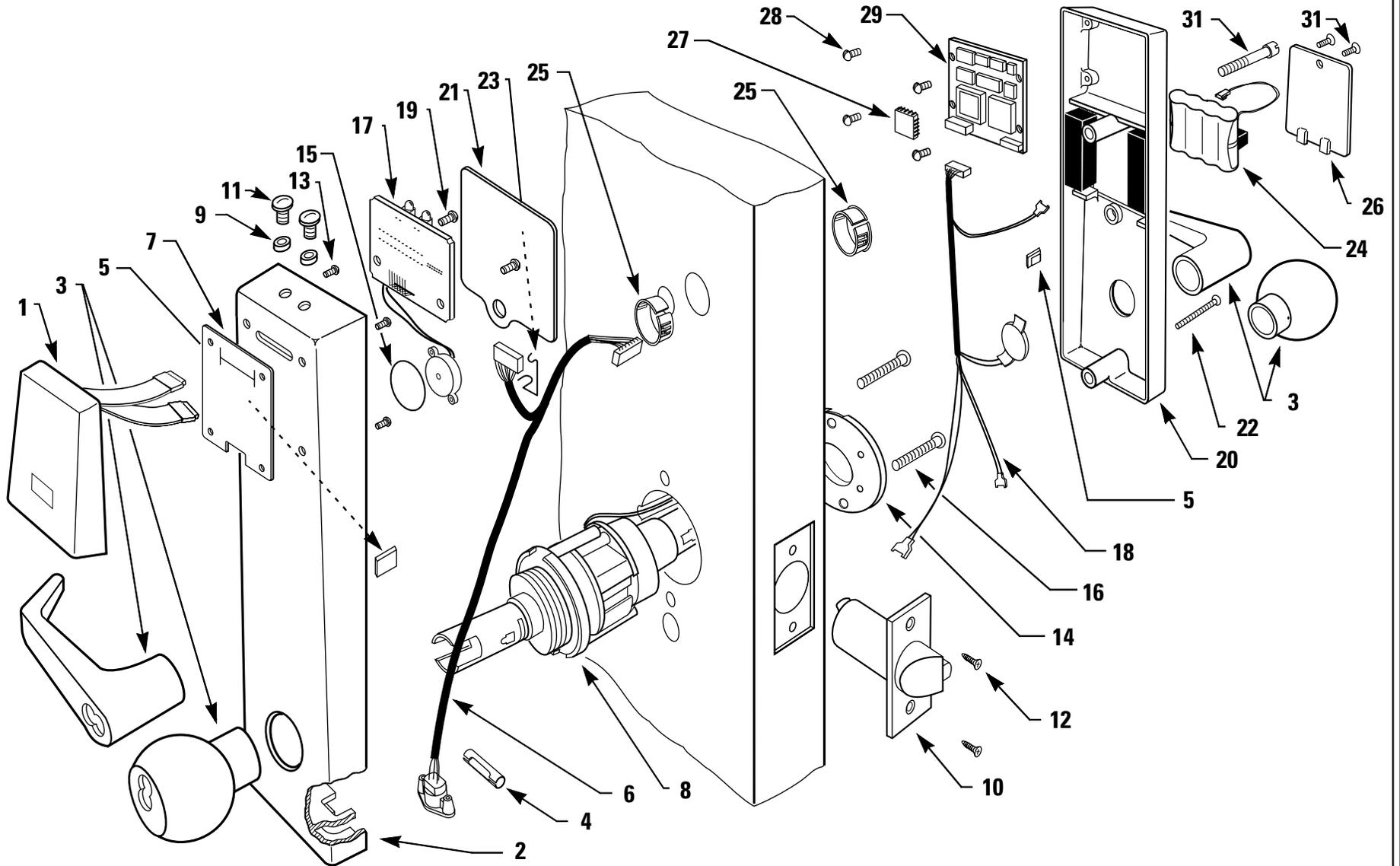
Figure 2.3   8KV/9KV proximity trim exploded diagram

8KV/9KV proximity trim parts list

Refer to Figure 2.3 and the table below to find the part you need.

Item	Part No.	Qty.	Description
1	C60337	1	Motorola proximity bezel with reader assembly
not shown	C60342	1	HID proximity bezel with antennae & IR assembly
2	C60449	1	9KV outside escutcheon
not shown	C60448	1	8KV outside escutcheon
3[a]		2	Knob or lever
4	A61502	1	Communications port retainer clip
5	A61503	2	Wire clamp (1 inside, 1 outside)
6	B60305	1	Outside wire harness
7	B60321	1	Proximity reader gasket
8[b]	D60464	1	9KV chassis assembly
not shown	D60419	1	8KV chassis assembly
9	A60318	2	Retaining rings
10	C54680	1	Latch
11	A60317	2	Sealing lens covers
12	A25359	2	Latch screws
13	A60348	4	Proximity reader mounting screws
14	C55556	1	Inside rose liner
15	A60324	1	Adhesive tape for sounder
16	A55557	2	Through–bolt mounting screws
17	B60338	1	Motorola proximity wake-up electronics assembly
not shown	B60339	1	HID proximity reader with wake–up electronics assembly
18	A61642	1	Inside wire harness
19	A61429	2	Proximity reader electronics screws
20	C61404	1	9KV inside escutcheon
not shown	C61406	1	8KV inside escutcheon
21	A60316	1	Escutcheon gasket
22	A61422	1	Lower escutcheon screw for 1 3/4″ thick doors
not shown	A61423	1	Lower escutcheon screw or 2″ thick doors
not shown	A61424	1	Lower escutcheon screw for 2 1/4″ thick doors
23	B61649	1	Outside wire harness clip
24	B61917	1	Alkaline battery pack
25	A61433	2	Plastic bushings
26	C61410	1	Battery cover
27	B62099	1	Programmed PROM (VP_S15)
28	A61501	4	Circuit board screws
29	B61664	1	Circuit board (without PROM)
30	B61412	1	Upper escutcheon screw for 1 3/4″ thick doors
not shown	B61413	1	Upper escutcheon screw or 2″ thick doors
not shown	B61414	1	Upper escutcheon screw for 2 1/4″ thick doors
31	A61411	1	Battery cover screw (torx with post head) *or*
not shown	A61428	1	Battery cover screw (McGard head)

a. Refer to the *H Series Service Manual* for knob and lever part numbers.
b. For 8KV/9KV chassis parts, see *Figure 2.4.*

8KV/9KV EXPLODED CHASSIS DIAGRAM
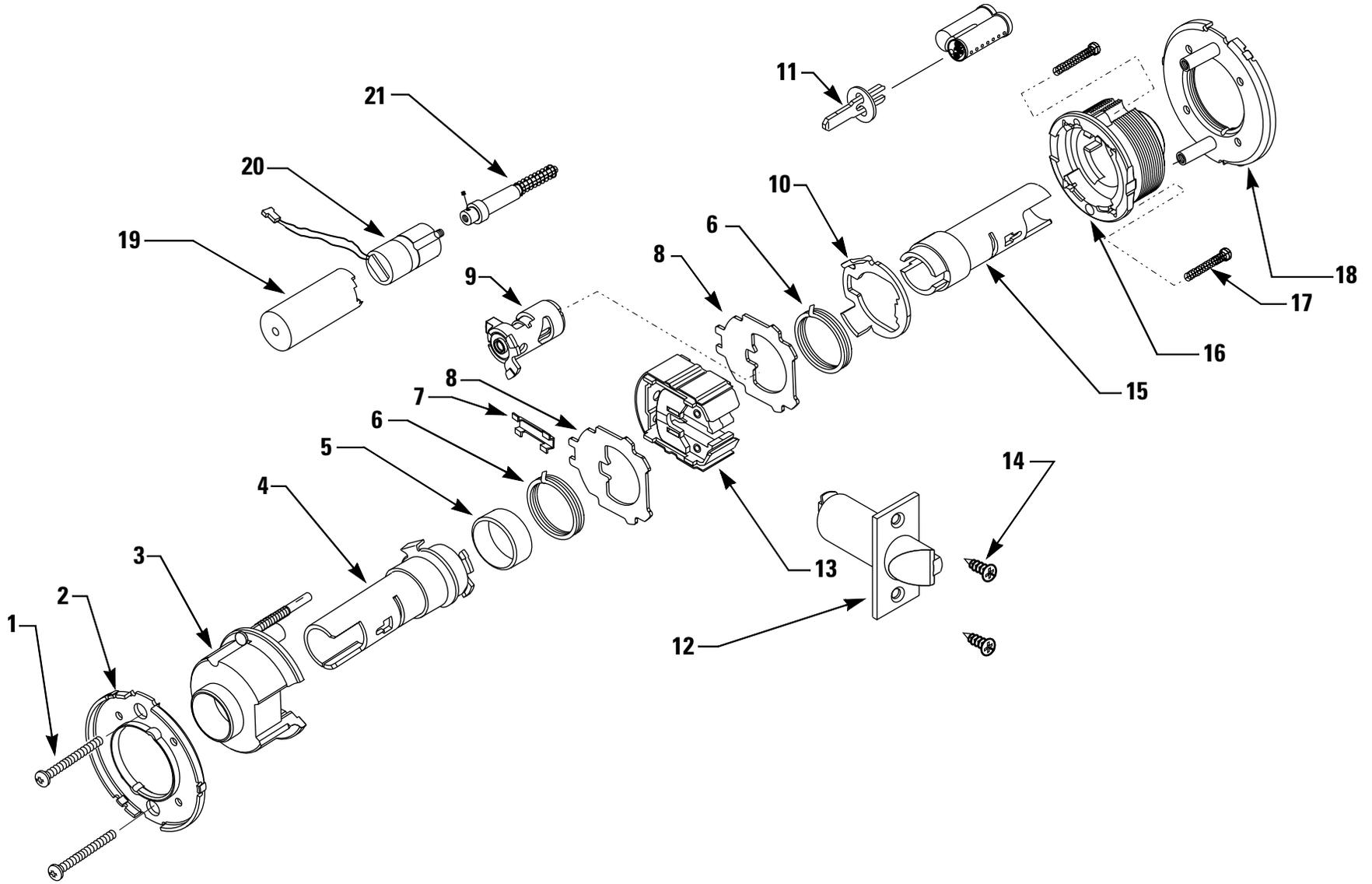
Figure 2.4 8KV/9KV chassis exploded diagram

8KV/9KV chassis parts list

Refer to Figure 2.4 and the table below to find the part you need.

Item	Part No.	Qty.	Description
1	A55557	2	Through–bolt mounting screws
2	C55556	1	Inside rose liner
3	A55685	1	Inside hub assembly
4	B60418	1	Non-keyed sleeve assembly for 8KV
not shown	B55610	1	Non-keyed sleeve assembly for 9KV
5	A55517	1	Spring guide
6	B55518	2	Lever return springs for 9KV
not shown	B60420	1	Lever return spring for 8KV (outside only)
7	B60470	1	Wire protection cap
8	B55504	2	Thrust plates
9	A60461	1	Key release cam assembly
10	C55515	1	Spring drive plate
11	A54200	1	Throw member
12	C54680	1	Latch
13	B60416	1	Chassis frame and retractor assembly for 8KV
not shown	B60463	1	Chassis frame and retractor assembly for 9KV
14	A25359	1	Latch screw
15	A55687	1	Keyed sleeve assembly
16	D55571	1	Outside hub
17	A55505	2	Chassis screws
18	A55603	1	Outside liner and stud assembly
19	C60473	1	Motor mount
20	A61012	1	Motor
21	B60520	1	Spindle and plunger sub assembly

34/35HV MAGNETIC STRIPE TRIM EXPLODED DIAGRAM
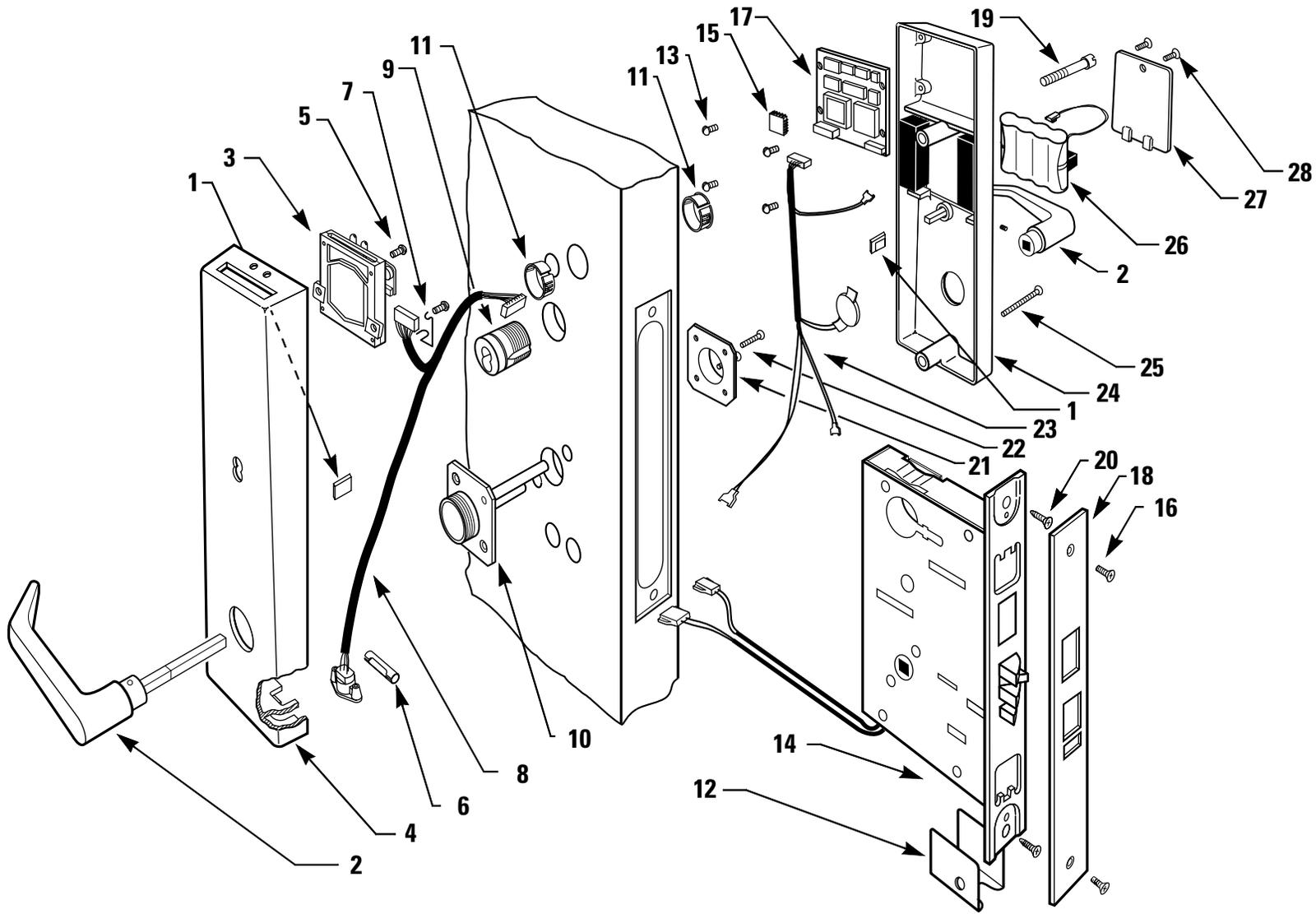
Figure 2.5   34/35HV magnetic stripe trim exploded diagram

34/35HV magnetic stripe trim parts list

Refer to Figure 2.5 and the table below to find the part you need.

Item	Part No.	Qty.	Description
1	A61503	2	Wire clamp (1 inside, 1 outside)
2[a]		2	Knob or lever
3	B61646	1	Card reader
4	C61400	1	35HV outside escutcheon with key *or*
not shown	C61402	1	35HV outside escutcheon without key *or*
not shown	C61420	1	34HV outside escutcheon with key *or*
not shown	C61405	1	34HV outside escutcheon without key
5	A61429	2	Card reader screws
6	A61502	1	Communications port retainer clip
7	B61649	1	Outside wire harness clip
8	A61643	1	Outside wire harness for card reader
9	B61307	1	Concealed cylinder for 1 3/4″–2″ thick doors
not shown	B61308	1	Concealed cylinder for 2 1/4″–2 1/2″ thick doors
not shown	B61309	1	Concealed cylinder for 2 3/4″–3″ thick doors
10	B35247	1	Outside mounting plate
11	A61433	2	Plastic bushings
12	A60346	1	Mortise case spacer
13	A61501	4	Circuit board screws
14[b]	C60498	1	35HV case assembly with deadbolt
not shown	C60496	1	34HV case assembly with deadbolt
not shown	C60497	1	35HV case assembly without deadbolt
not shown	C60495	1	34HV case assembly without deadbolt
15	B62099	1	Programmed PROM (VP_S15)
16	A18722	2	Standard faceplate screws
not shown	A34454	2	Standard faceplate screws
17	B61664	1	Circuit board (without PROM)
18	D34095	1	Faceplate for deadbolt function
not shown	B34515	1	Faceplate for non-deadbolt function
19	B61412	1	Upper escutcheon screw for 1 3/4″ thick doors
not shown	B61413	1	Upper escutcheon screw or 2″ thick doors
not shown	B61414	1	Upper escutcheon screw for 2 1/4″ thick doors
not shown	B61415	1	Upper escutcheon screw for 2 3/4″ thick doors
not shown	B61416	1	Upper escutcheon screw for 3″ thick doors
20	A34450	2	Case mounting screws
21	B35030	1	Inside mounting plate
22	A18991	2	#8-32 x 1 1/4 SS screw
23	A61642	1	Inside wire harness with deadbolt sensing
24	C61401	1	35HV inside escutcheon with turn knob
not shown	C61421	1	34HV inside escutcheon with turn knob
not shown	C61409	1	35HV inside escutcheon without turn knob
not shown	C61406	1	34HV inside escutcheon without turn knob

Item	Part No.	Qty.	Description
25	A61422	1	Lower escutcheon screw for 1 3/4″ thick doors
not shown	A61423	1	Lower escutcheon screw or 2″ thick doors
not shown	A61424	1	Lower escutcheon screw for 2 1/4″ thick doors
not shown	A61425	1	Lower escutcheon screw for 2 1/2″ thick doors
not shown	A61426	1	Lower escutcheon screw for 2 3/4″ thick doors
not shown	A61427	1	Lower escutcheon screw for 3″ thick doors
26	B61917	1	Alkaline battery pack
27	C61410	1	Battery cover
28	A61411	1	Battery cover screw (torx with post head) *or*
not shown	A61428	1	Battery cover screw (McGard head)

a. Refer to the *H Series Service Manual* for knob and lever part numbers.

b. For 30HV case parts, see Figure 2.8 and Figure 2.9.

34/35HV KEYPAD TRIM EXPLODED DIAGRAM
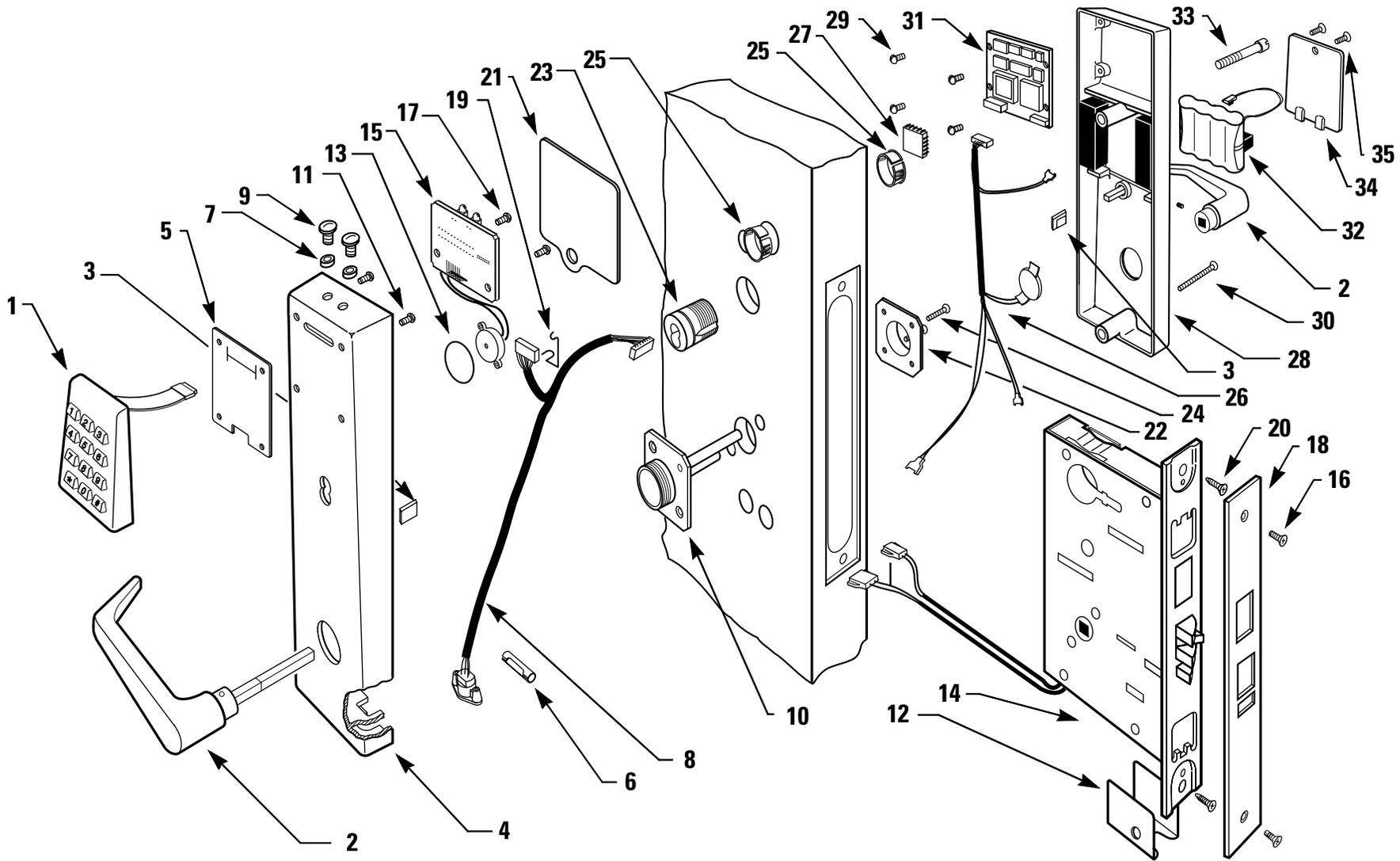
Figure 2.6   34/35HV keypad trim exploded diagram

34/35HV keypad trim parts list

Refer to Figure 2.6 and the table below to find the part you need.

Item	Part No.	Qty.	Description
1	C60325	1	Keypad assembly with cable and connector
2[a]		2	Knob or lever
3	A61503	2	Wire clamp (1 inside, 1 outside)
4	C60445	1	35HV outside escutcheon with key *or*
not shown	C60446	1	35HV outside escutcheon without key *or*
not shown	C60447	1	34HV outside escutcheon with key *or*
not shown	C60448	1	34HV outside escutcheon without key
5	B60321	1	Keypad gasket
6	A61502	1	Communications port retainer clip
7	A60318	2	Retaining rings
8	B60305	1	Outside wire harness for keypad
9	A60317	2	Sealing lens covers
10	B35247	1	Outside mounting plate
11	A60348	4	Keypad mounting screws
12	A60346	1	Mortise case spacer
13	A60324	1	Adhesive tape for sounder
14[b]	C60498	1	35HV case assembly with deadbolt
not shown	C60496	1	34HV case assembly with deadbolt
not shown	C60497	1	35HV case assembly without deadbolt
not shown	C60495	1	34HV case assembly without deadbolt
15	C60303	1	Keypad reader electronics assembly
16	A18722	2	Standard faceplate screws
not shown	A34454	2	Standard faceplate screws
17	A61429	2	Keypad electronics screws
18	D34095	1	Faceplate for deadbolt function
not shown	B34515	1	Faceplate for non-deadbolt function
19	B61649	1	Outside wire harness clip
20	A34450	2	Case mounting screws
21	A60316	1	Escutcheon gasket
22	B35030	1	Inside mounting plate
23	B61307	1	Concealed cylinder for 1 3/4″–2″ thick doors
not shown	B61308	1	Concealed cylinder for 2 1/4″–2 1/2″ thick doors
not shown	B61309	1	Concealed cylinder for 2 3/4″–3″ thick doors
24	A18991	2	#8-32 x 1 1/4 SS screw
25	A61433	2	Plastic bushings
26	A61642	1	Inside wire harness
27	B62076	1	Programmed PROM for keypad (VP15KP)
28	C61401	1	35HV inside escutcheon with turn knob
not shown	C61421	1	34HV inside escutcheon with turn knob
not shown	C61409	1	35HV inside escutcheon without turn knob
not shown	C61406	1	34HV inside escutcheon without turn knob

Item	Part No.	Qty.	Description
29	A61501	4	Circuit board screws
30	A61422	1	Lower escutcheon screw for 1 3/4″ thick doors
not shown	A61423	1	Lower escutcheon screw or 2″ thick doors
not shown	A61424	1	Lower escutcheon screw for 2 1/4″ thick doors
not shown	A61425	1	Lower escutcheon screw for 2 1/2″ thick doors
not shown	A61426	1	Lower escutcheon screw for 2 3/4″ thick doors
not shown	A61427	1	Lower escutcheon screw for 3″ thick doors
31	B61664	1	Circuit board (without PROM)
32	B61917	1	Alkaline battery pack
33	B61412	1	Upper escutcheon screw for 1 3/4″ thick doors
not shown	B61413	1	Upper escutcheon screw or 2″ thick doors
not shown	B61414	1	Upper escutcheon screw for 2 1/4″ thick doors
not shown	B61415	1	Upper escutcheon screw for 2 3/4″ thick doors
not shown	B61416	1	Upper escutcheon screw for 3″ thick doors
34	C61410	1	Battery cover
35	A61411	1	Battery cover screw (torx with post head) *or*
not shown	A61428	1	Battery cover screw (McGard head)

a. Refer to the *H Series Service Manual* for knob and lever part numbers.

b. For 30HV case parts, see Figure 2.8 and Figure 2.9.

34/35HV PROXIMITY TRIM EXPLODED DIAGRAM
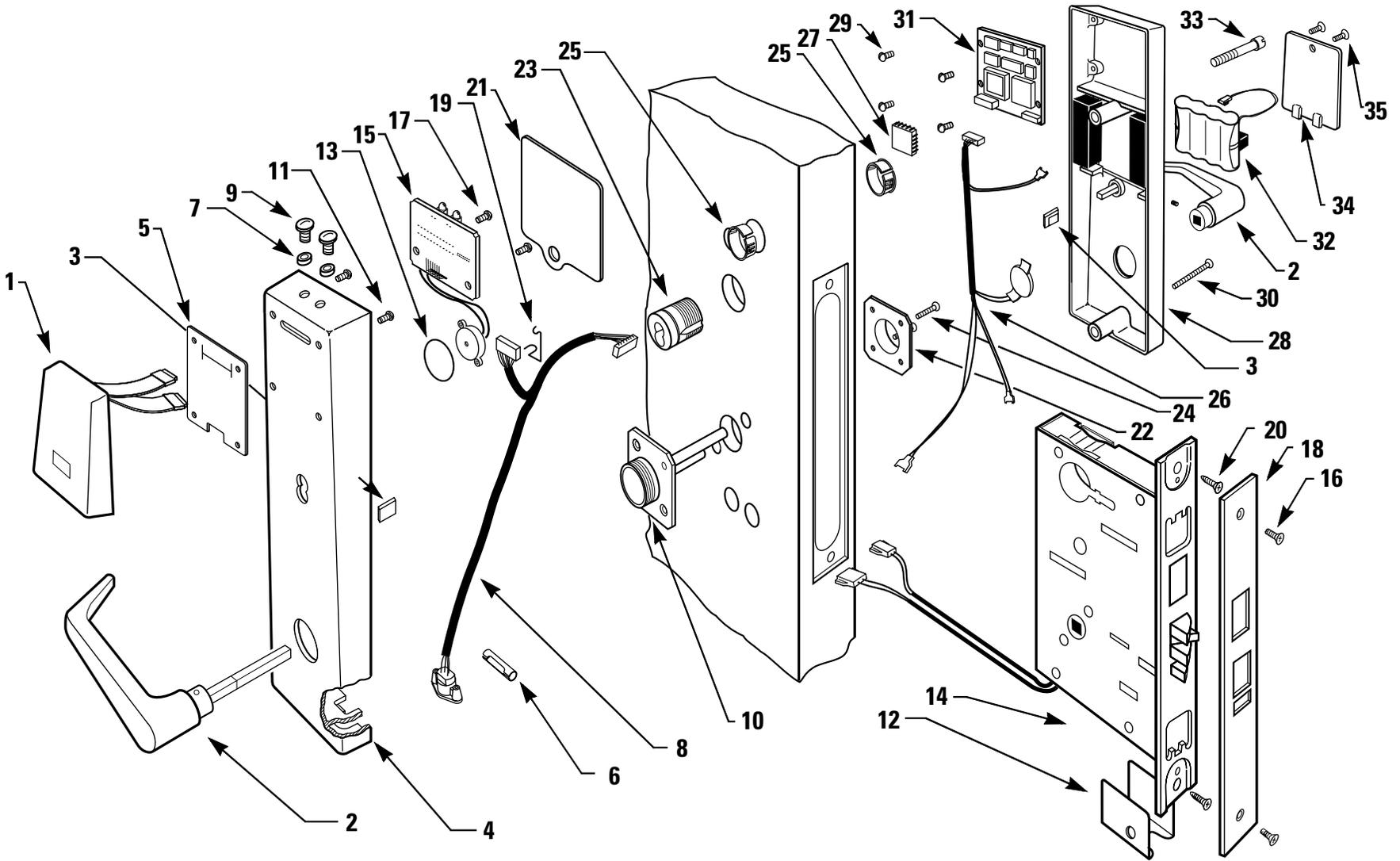
Figure 2.7 34/35HV proximity trim exploded diagram

34/35HV proximity trim parts list

Refer to Figure 2.7 and the table below to find the part you need.

Item	Part No.	Qty.	Description
1	C60337	1	Motorola proximity bezel with reader assembly
	C60342	1	HID proximity bezel with antennae & IR assembly
2[a]		2	Knob or lever
3	A61503	2	Wire clamp (1 inside, 1 outside)
4	C60445	1	35HV outside escutcheon with key *or*
not shown	C60446	1	35HV outside escutcheon without key *or*
not shown	C60447	1	34HV outside escutcheon with key *or*
not shown	C60448	1	34HV outside escutcheon without key
5	B60321	1	Proximity reader gasket
6	A61502	1	Communications port retainer clip
7	A60318	2	Retaining rings
8	B60305	1	Outside wire harness for proximity reader
9	A60317	2	Sealing lens covers
10	B35247	1	Outside mounting plate
11	A60348	4	Proximity reader mounting screws
12	A60346	1	Mortise case spacer
13	A60324	1	Adhesive tape for sounder
14[b]	C60498	1	35HV case assembly with deadbolt
not shown	C60496	1	34HV case assembly with deadbolt
not shown	C60497	1	35HV case assembly without deadbolt
not shown	C60495	1	34HV case assembly without deadbolt
15	B60338	1	Motorola proximity wake up electronics assembly
not shown	B60339	1	HID proximity reader with wake up electronics assembly
16	A18722	2	Standard faceplate screws
not shown	A34454	2	Standard faceplate screws
17	A61429	2	Proximity reader electronics screws
18	D34095	1	Faceplate for deadbolt function
not shown	B34515	1	Faceplate for non-deadbolt function
19	B61649	1	Outside wire harness clip
20	A34450	2	Case mounting screws
21	A60316	1	Escutcheon gasket
22	B35030	1	Inside mounting plate
23	B61307	1	Concealed cylinder for 1 3/4″–2″ thick doors
not shown	B61308	1	Concealed cylinder for 2 1/4″–2 1/2″ thick doors
not shown	B61309	1	Concealed cylinder for 2 3/4″–3″ thick doors
24	A61411	1	Battery cover screw (torx with post head) *or*
not shown	A61428	1	Battery cover screw (McGard head)
25	A61433	2	Plastic bushings
26	A61642	1	Inside wire harness
27	B62099	1	Programmed PROM (VP_S15)

Item	Part No.	Qty.	Description
28	C61401	1	35HV inside escutcheon with turn knob
not shown	C61421	1	34HV inside escutcheon with turn knob
not shown	C61409	1	35HV inside escutcheon without turn knob
not shown	C61406	1	34HV inside escutcheon without turn knob
29	A61501	4	Circuit board screws (Motorola)
30	A61422	1	Lower escutcheon screw for 1 3/4″ thick doors
not shown	A61423	1	Lower escutcheon screw or 2″ thick doors
not shown	A61424	1	Lower escutcheon screw for 2 1/4″ thick doors
not shown	A61425	1	Lower escutcheon screw for 2 1/2″ thick doors
not shown	A61426	1	Lower escutcheon screw for 2 3/4″ thick doors
not shown	A61427	1	Lower escutcheon screw for 3″ thick doors
31	B61664	1	Circuit board (Motorola)
32	B61917	1	Alkaline battery pack
33	B61412	1	Upper escutcheon screw for 1 3/4″ thick doors
not shown	B61413	1	Upper escutcheon screw or 2″ thick doors
not shown	B61414	1	Upper escutcheon screw for 2 1/4″ thick doors
not shown	B61415	1	Upper escutcheon screw for 2 3/4″ thick doors
not shown	B61416	1	Upper escutcheon screw for 3″ thick doors
34	C61410	1	Battery cover
35	A61411	1	Battery cover screw (torx with post head) *or*
not shown	A61428	1	Battery cover screw (McGard head)

a. Refer to the *H Series Service Manual* for knob and lever part numbers.

b. For 30HV case parts, see Figure 2.8 and Figure 2.9.

34/35HV CASE WITH DEADBOLT EXPLODED DIAGRAM

Figure 2.8   34/35HV case with deadbolt exploded diagram

34/35HV case with deadbolt parts list

Refer to Figure 2.8 and the table below to find the part you need.

Item	Part No.	Qty.	Description
1	A34087	5	Case cover mounting screws
2	B60481	1	Case cover
3	A34236	2	Wire strain relief
4	A34066	1	Upper auxiliary spring
5	B34020	2	Auxiliary return levers
6	A34065	1	Lower auxiliary spring
8	B60493	1	Motor module
8	A34018	1	Deadlocking spring
9	A61210	1	Auxiliary bolt spring
10	A34315	1	Retaining ring
11	A35002	1	Deadlocking lever
12	A34450	1	Case mounting screw
13	B60467	1	Locking bar
14	B34092	1	Auxiliary bolt
15	D34095	1	Faceplate for deadbolt function
not shown	B34515	1	Faceplate for non-deadbolt function
16	A18722	2	Standard faceplate screws
not shown	A34454	2	Security faceplate screws
17	A34081	1	Hub lever spring
18	B35490	1	Long hub lever
19	B34003	1	Outside hub
20	B34043	1	Inside hub
21	B35019	1	Latchbolt (lever)
not shown	B35018	1	Latchbolt (knob)
22	A34048	1	Stop pin
23	B35035	1	Deadbolt
24	A35004	1	Latch lever
25	A35000	1	Turn knob hub
26	A61250	2	M2 0.4×10 m screws
27	A61607	1	Deadbolt sensing switch & wire assembly
28	A35257	1	Clamp plate
29	B61302	1	Case sub-assembly
30	A34045	2	#8–32 × 1/4″ screws
31	C34053	1	Armored front

34/35HV CASE WITHOUT DEADBOLT EXPLODED DIAGRAM
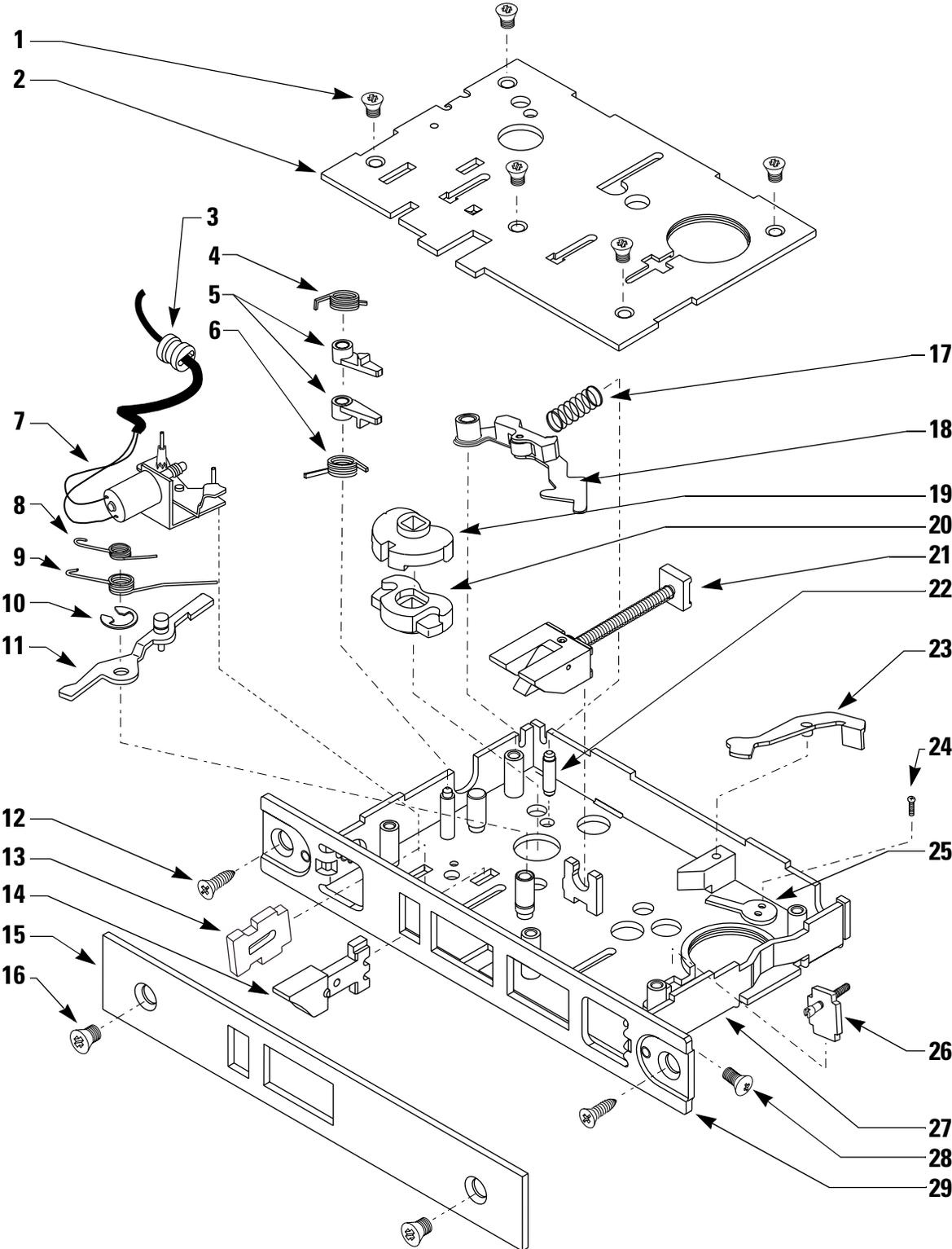
Figure 2.9   34/35HV case without deadbolt exploded diagram

34/35HV case without deadbolt parts list

Refer to Figure 2.9 and the table below to find the part you need.

Item	Part No.	Qty.	Description
1	A34087	5	Case cover mounting screws
2	B60481	1	Case cover
3	A34236	1	Wire strain relief
4	A34066	1	Upper auxiliary spring
5	B34020	2	Auxiliary return levers
6	A34065	1	Lower auxiliary spring
7	B60493	1	Motor module
8	A34018	1	Deadlocking spring
9	A61210	1	Auxiliary bolt spring
10	A34315	1	Retaining ring
11	A35002	1	Deadlocking lever
12	A34450	1	Case mounting screw
13	B60467	1	Locking bar
14	B34092	1	Auxiliary bolt
15	B34515	1	Faceplate for non-deadbolt function
not shown	D34095	1	Faceplate for deadbolt function
16	A18722	2	Standard faceplate screws
not shown	A34454	2	Security faceplate screws
17	A34081	1	Hub lever spring
18	B35490	1	Long hub lever
19	B34003	1	Outside hub
20	B34043	1	Inside hub
21	B35019	1	Latchbolt (lever)
not shown	B35018	1	Latchbolt (knob)
22	A34048	1	Stop pin
23	A35004	1	Latch lever
24	A61250	1	M2 0.4×10 m screw
25	A41172	1	Special mortise cam C210
26	A35257	1	Clamp plate
27	B61302	1	Case sub-assembly
28	A34045	2	#8–32 × 1/4″ screws
29	C34053	1	Armored front

XV CONTROLLER EXPLODED DIAGRAM
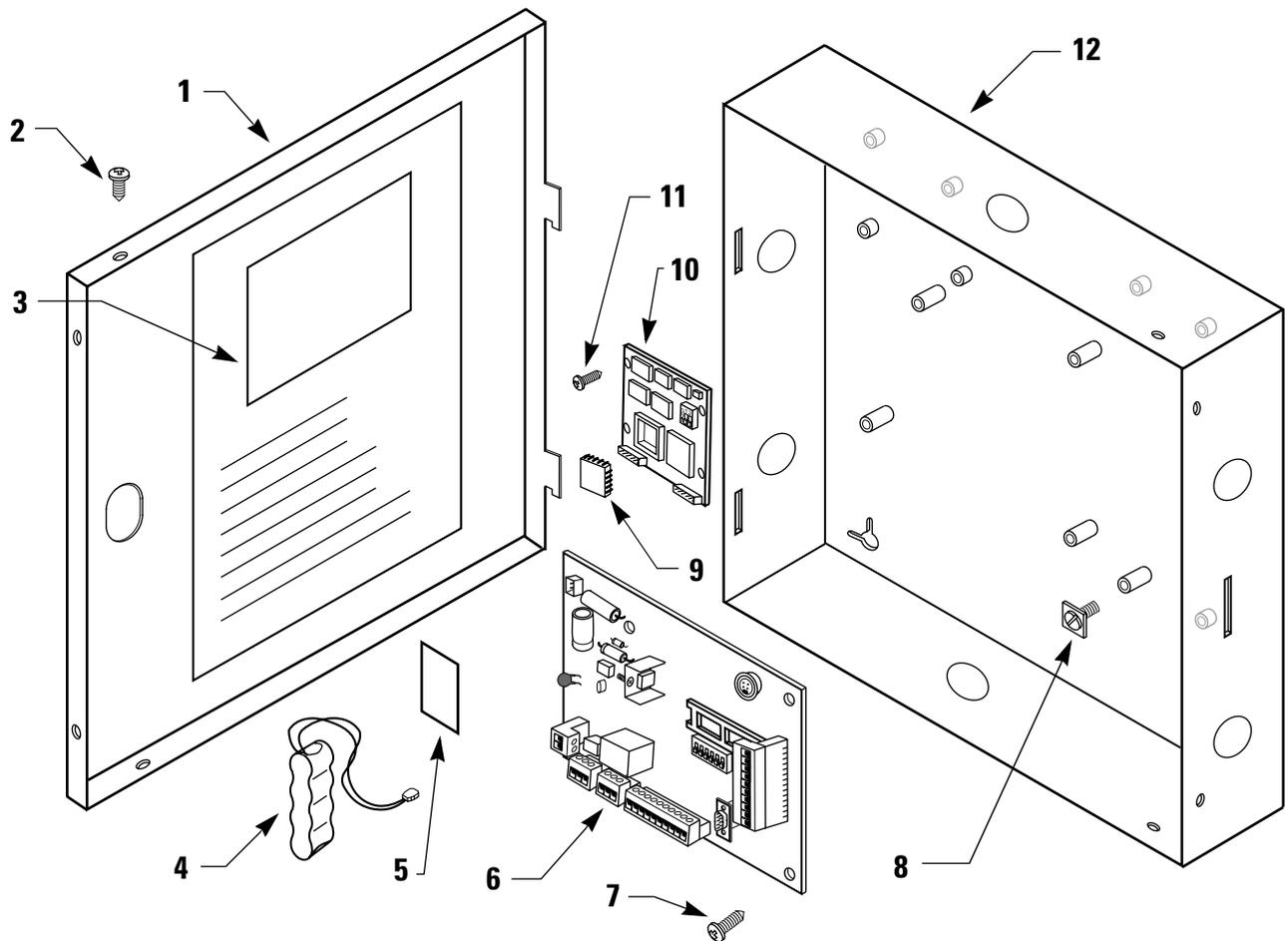
Figure 2.10   XV controller exploded diagram

XV Controller parts list

Refer to Figure 2.10 and the table below to find the part you need.

Item	Part No.	Qty.	Description
1	B80220	1	XV Enclosure cover
2	1765873	2	#6 x 3/8″ sheet metal screws
3	T61928	1	XV Wiring diagram instruction sticker
4	1762170	1	External power supply battery pack
5	A34510	1	Adhesive strip for battery pack
6	B80224	1	XV Control electronics
7	1765915	4	#6-32 X 5/8″ phil–pan head screws
8	1777517	1	Grounding screw with washer
9	B62098	1	Programmed PROM (VP_ _XV) *or*
	B62075	1	Programmed PROM for XV keypad (VPXVKP)[a]
10	B61664	1	Micro-controller circuit board
11	1772640	4	#4-40 X 3/8″ phil–pan head screws
12	C80221	1	XV Enclosure box

not shown	1767179	1	Keypad reader (Lexan illuminated)
not shown	1767210	1	Keypad reader (stainless steel finish)
not shown	1767252	1	Magnetic stripe card reader (off-white finish)
not shown	1767294	1	Magnetic stripe card reader (black finish)
not shown	1789014	1	Motorola proximity reader I (beige finish)
not shown	1788974	1	Motorola proximity reader I (black finish)
not shown	1789056	1	Motorola proximity reader II (beige finish)
not shown	1789098	1	Motorola proximity reader II (black finish)
not shown	1788005	1	HID miniprox proximity reader (grey finish)
not shown	1788047	1	HID miniprox proximity reader (beige finish)
not shown	1788089	1	HID thinline proximity reader (beige finish)
not shown	1788120	1	HID thinline proximity reader (black finish)

a. Use this part for XV units with keypad readers.

EXTERNAL COMMUNICATIONS EXPLODED DIAGRAM
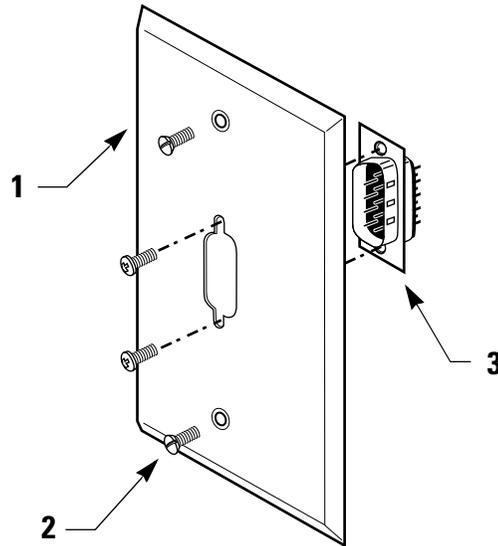
Figure 2.11   External communications exploded diagram

External communications parts list

Refer to Figure 2.11 and the table below to find the part you need.

Item	Part No.	Qty.	Description
1	1767451	1	Wall plate
2	A10055	2	#6-32 X 3/8″ screws
3	1767493	1	Nine (9) pin male connector
not shown	1768015	1	Nine (9) pin female connector

PROGRAMMING PARTS DIAGRAM
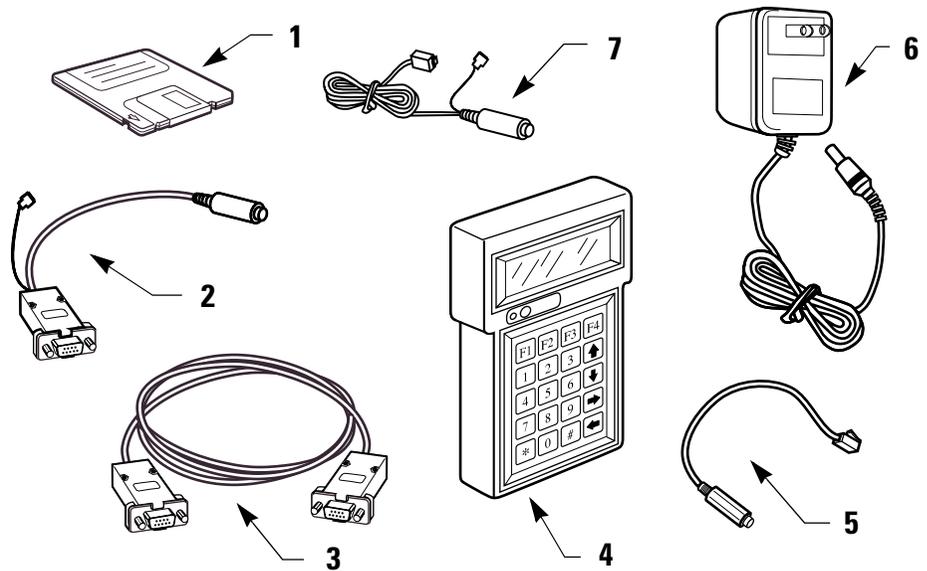
Figure 2.12 Programming parts

Programming parts list

Refer to Figure 2.12 and the table below to find the part you need.

Item	Part No.	Description
1	1760849	Intelligent Programmer Software
2	1760922	IPS interface cable
3	1760964	IPS crossover cable
4	1746981	Handheld terminal
5	1754552	Handheld charge cable adapter
6	1754594	Handheld terminal charger
7	1751829	Handheld terminal to lock cable

CARD ENCODER PARTS DIAGRAM
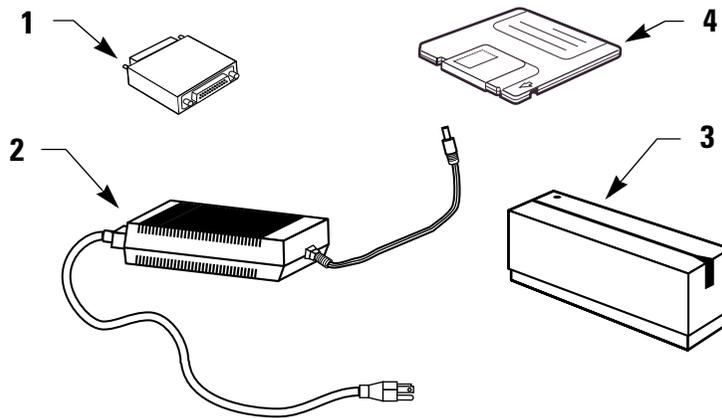
Figure 2.13 Card Encoder parts

Card Encoder parts list

Refer to Figure 2.13 and the table below to find the part you need.

Item	Part No.	Description
1	1754877	Card Encoder security device
2	1747021	Card Encoder power supply
3	1754751	Card Encoder
4	1754919	Card Encoder Software

LOCK EXTERNAL POWER SUPPLY PARTS DIAGRAM
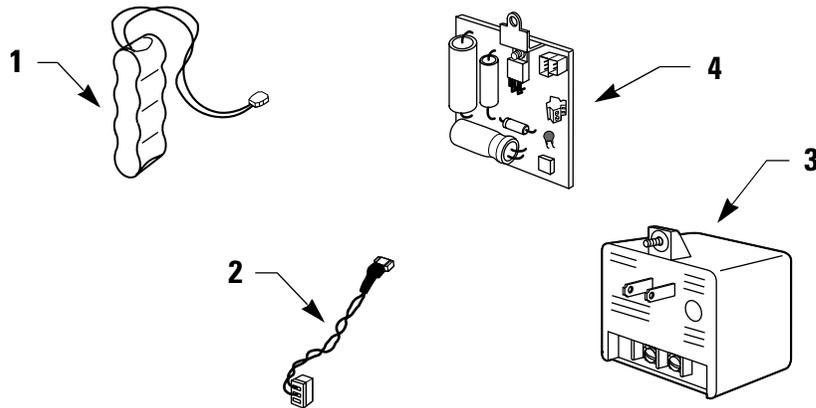
Figure 2.14 Lock external power supply parts

Lock external power supply parts list

Refer to Figure 2.14 and the table below to find the part you need.

Item	Part No.	Description
1	1762170	External power supply battery pack
2	1762139	External power supply adapter cable
3	1711519	External power supply
4	1762212	External power supply electronics

SPECIAL TOOLS DIAGRAM
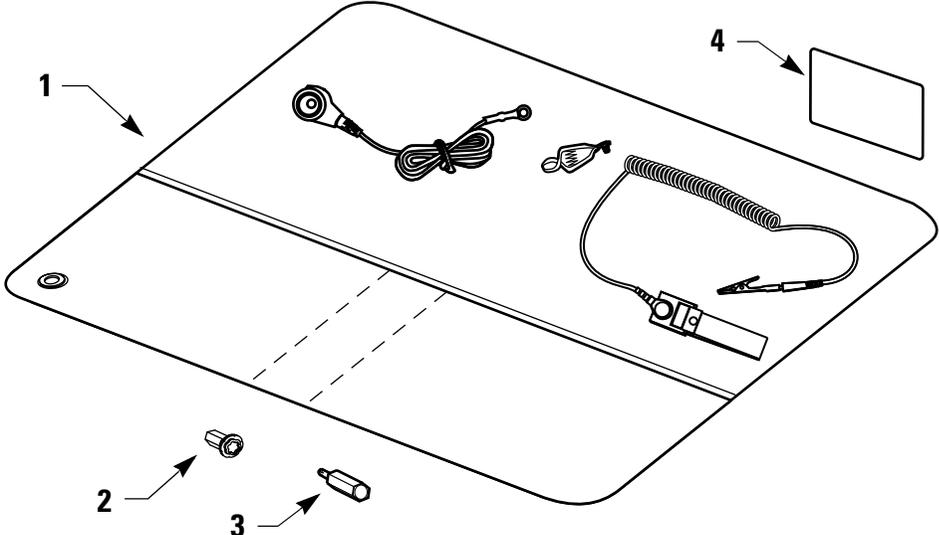
Figure 2.15 Special tools

Special tools parts list

Refer to Figure 2.15 and the table below to find the part you need.

Item	Part No.	Description
1	1723791	ESD kit
2	1702829	McGard driver bit
3	1503525	Standard driver bit
4	1724093	Magnetic stripe reader cleaning card (shipped 50 to a box)

FUNCTION DESCRIPTIONS

HV Locks The following lists describe how the latchbolt, deadbolt, outside lever/knob, and inside lever/knob operates for each HV function.

FV–Deadbolt with key override
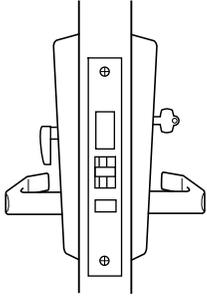
Latchbolt operated by:
- outside key
- outside lever/knob—unless locked by internal motor drive mechanism
- inside lever/knob

Latchbolt deadlocked by auxiliary latch

Deadbolt operated by:
- outside key
- inside turn–lever
- outside lever/knob when lever/knob is unlocked by internal motor drive mechanism (retracts only)
- inside lever/knob (retracts only)

Outside lever/knob locked and unlocked by:
- internal motor drive mechanism operated by time-activated electronic signal or by valid card/PIN (if deadbolt is thrown, deadbolt override privilege is required)

Inside lever/knob is always unlocked

LV–Deadbolt without key override
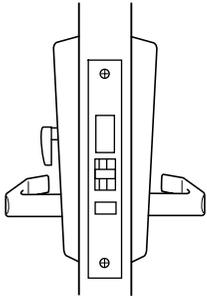
Latchbolt operated by:
- outside lever/knob—unless locked by internal motor drive mechanism
- inside lever/knob (deadlocked by auxiliary latch)

Latchbolt deadlocked by auxiliary latch

Deadbolt operated by:
- inside turn–lever
- outside lever/knob when lever/knob is unlocked by internal motor drive mechanism (retracts only)
- inside lever/knob (retracts only)

Outside lever/knob locked and unlocked by:
- internal motor drive mechanism operated by time-activated electronic signal or by valid card/PIN (if deadbolt is thrown, deadbolt override privilege is required)

Inside lever/knob is always unlocked

EV–Latch with key override
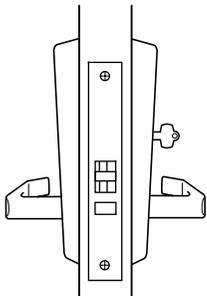
Latchbolt operated by:
- outside key
- outside lever/knob—unless locked by internal motor drive mechanism
- inside lever/knob

Outside lever/knob locked by:
- internal motor drive mechanism operated by time-activated electronic signal or by valid card/PIN

Outside lever/knob unlocked by:
- internal motor drive mechanism operated by time-activated electronic signal or by valid card/PIN

Inside lever/knob is always unlocked

NV–Latch without key override
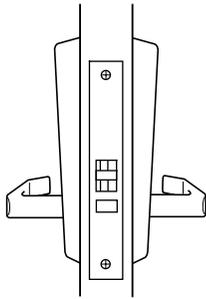
Latchbolt operated by:
- outside lever/knob—unless locked by internal motor drive mechanism
- inside lever/knob

Outside lever/knob locked by:
- internal motor drive mechanism operated by time–activated electronic signal or by valid card/PIN

Outside lever/knob unlocked by:
- internal motor drive mechanism operated by time–activated electronic signal or by valid card/PIN

Inside lever/knob is always unlocked

KV Lock   The following list describes how the latchbolt, outside lever/knob, and inside lever/knob operates for the KV function.

DV–Cylindrical latch with key override
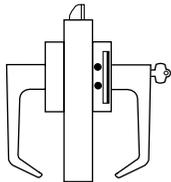
Latchbolt operated by:
- outside key
- outside lever/knob—unless locked by internal motor drive mechanism
- inside lever/knob

Outside lever/knob locked by:
- internal motor drive mechanism operated by time–activated electronic signal or by valid card/PIN

Outside lever/knob unlocked by:
- internal motor drive mechanism operated by time–activated electronic signal or by valid card/PIN

Inside lever/knob is always unlocked

FUNCTION CONVERSION

If you want to convert the function of an existing HV Lock, use the following table to determine the parts that you need. This table includes only the parts that are different.

For example, to convert the function of a 34H Lock with a magnetic stripe card reader from FV to EV, you would remove the following parts:

- 34HV inside escutcheon with turn knob (C61421)
- Faceplate for deadbolt function (D34095)
- Deadbolt (B35035)
- Turn knob hub (A35000)
- Deadbolt sensing switch & wire assembly (A61607)
- One M2 0.4 x 10 m screw (A61250)
- One wire strain relief (A34236).

You would add the following parts:

- 34HV inside escutcheon without turn knob (C61406)
- Faceplate for non–deadbolt function (B34515)
- Special mortise cam (A41172).

Part Type	Part No.	Description	Function			
			FV	LV	EV	NV
Trim Parts						
Outside escutcheon	C61420	34HV outside escutcheon with key (magnetic stripe)	✓		✓	
	C60447	34HV outside escutcheon with key (keypad/proximity)	✓		✓	
	C61405	34HV outside escutcheon without key (magnetic stripe)		✓		✓
	C60448	34HV outside escutcheon without key (keypad/proximity)		✓		✓
	C61400	35HV outside escutcheon with key (magnetic stripe)	✓		✓	
	C60445	35HV outside escutcheon with key (keypad/proximity)	✓		✓	
	C61402	35HV outside escutcheon without key (magnetic stripe)		✓		✓
	C60446	35HV outside escutcheon without key (keypad/proximity)		✓		✓
Inside escutcheon	C61421	34HV inside escutcheon with turn knob	✓	✓		
	C61406	34HV inside escutcheon without turn knob			✓	✓
	C61401	35HV inside escutcheon with turn knob	✓	✓		
	C61409	35HV inside escutcheon without turn knob			✓	✓
Case parts						
Faceplate	D34095	Faceplate for deadbolt function	✓	✓		
	B34515	Faceplate for non-deadbolt function			✓	✓
Deadbolt	B35035	Deadbolt	✓	✓		
Turn knob hub	A35000	Turn knob hub (deadbolt)	✓	✓		
Deadbolt sensing switch & wire assembly	A61607	Deadbolt sensing switch & wire assembly (deadbolt)	✓	✓		
Special mortise cam	A41172	Special mortise cam (non deadbolt)			✓	✓
Screw	A61250	M2 0.4 x 10 m screw (2 needed for FV and LV, 1 needed for EV and NV)	✓	✓	✓	✓
Wire strain relief	A34236	Wire strain relief (2 needed for FV and LV, 1 needed for EV and NV)	✓	✓	✓	✓

34HV/35HV KNOB/LEVER CONVERSION

If you want to convert an existing 34HV Lock (with knob) to a 35HV Lock (with lever), or vice-versa, use the following table to determine the parts that you need. This table includes only the parts that are different.

For example, to convert a 34HV Lock with turn knob, key, and magnetic strip card reader to a 35HV Lock with lever (with turn knob, key, and magnetic stripe card reader, you would remove the following parts:

- Old knob
- 34HV outside escutcheon with key (C61420)
- 34HV inside escutcheon with turn knob (C61421)
- Latchbolt for knob (B35018).

You would add the following parts:
- New lever
- 35HV outside escutcheon with key (C61400)
- 35HV inside escutcheon with turn knob (C61401)
- Latchbolt for lever (B35019)
- Lower auxiliary spring (A34065)
- Upper auxiliary spring (A34066)
- Auxiliary return lever (B34020) (2 needed).

Part Type	Part No.	Description	Knob	Lever
Trim Parts[a]				
Outside escutcheon	C61420	34HV outside escutcheon with key (magnetic stripe)	✓	
	C60447	34HV outside escutcheon with key (keypad/proximity)	✓	
	C61405	34HV outside escutcheon without key (magnetic stripe)	✓	
	C60448	34HV outside escutcheon without key (keypad/proximity)	✓	
	C61400	35HV outside escutcheon with key (magnetic stripe)		✓
	C60445	35HV outside escutcheon with key (keypad/proximity)		✓
	C61402	35HV outside escutcheon without key (magnetic stripe)		✓
	C60446	35HV outside escutcheon without key (keypad/proximity)		✓
Inside escutcheon	C61421	34HV inside escutcheon with turn knob	✓	
	C61406	34HV inside escutcheon without turn knob	✓	
	C61401	35HV inside escutcheon with turn knob		✓
	C61409	35HV inside escutcheon without turn knob		✓
Case parts				
Latchbolt	B35018	Latchbolt (knob)	✓	
	B35019	Latchbolt (lever)		✓
Lower auxiliary spring	A34065	Lower auxiliary spring		✓
Upper auxiliary spring	A34066	Upper auxiliary spring		✓
Auxiliary return lever	B34020	Auxiliary return lever (2 needed)		✓

a. Refer to the *H Series Service Manual* for additional trim parts.

READER CONVERSION

HV reader conversion

If you want to convert the reader of an existing HV Lock, use the following table to determine the parts that you need. This table includes only the parts that are different.

For example, to convert a 34HV Lock with key and magnetic stripe card reader to a 34HV Lock with key and keypad reader, you would remove the following parts:

- 34HV outside escutcheon with key (C61420)
- Card reader (B61646)
- Outside wire harness (A61643)
- Programmed PROM (B62099).

You would add the following parts:

- 34HV outside escutcheon with key (C60447)
- Keypad assembly with cable and connector (C60325)
- Outside wire harness (B60305)
- Programmed PROM for keypad (B62076)
- Reader gasket (B60321)
- Retaining ring (A60318)
- Sealing lens cover (A60317)
- Reader mounting screws (A60348)
- Adhesive tape for sounder (A60324)
- Keypad reader electronics assembly (C60303)
- Escutcheon gasket (A60316).

Part type	Part No.	Description	Mag.[a]	Kpd.[b]	Proximity HID[c]	Mot.[d]
Outside escutcheon	C61420	34HV outside escutcheon with key	✓			
	C60447	34HV outside escutcheon with key		✓	✓	✓
	C61405	34HV outside escutcheon without key	✓			
	C60448	34HV outside escutcheon without key		✓	✓	✓
	C61400	35HV outside escutcheon with key	✓			
	C60445	35HV outside escutcheon with key		✓	✓	✓
	C61402	35HV outside escutcheon without key	✓			
	C60446	35HV outside escutcheon without key		✓	✓	✓
Reader	B61646	Card reader	✓			
	C60325	Keypad assembly with cable and connector		✓		
	C60342	HID proximity bezel with antennae & IR assembly			✓	
	C60337	Motorola proximity bezel with reader assembly				✓
Outside wire harness	A61643	Outside wire harness	✓			
	B60305	Outside wire harness		✓	✓	✓

Part type	Part No.	Description	Mag.[a]	Kpd.[b]	Proximity HID[c]	Mot.[d]
Programmed PROM	B62099	Programmed PROM (VP_S15)	✓		✓	✓
	B62076	Programmed PROM for keypad (VP15KP)		✓		
Reader gasket	B60321	Reader gasket		✓	✓	✓
Retaining ring	A60318	Retaining ring		✓	✓	✓
Sealing lens cover	A60317	Sealing lens cover		✓	✓	✓
Reader mounting screws	A60348	Reader mounting screws		✓	✓	✓
Adhesive tape	A60324	Adhesive tape for sounder		✓	✓	✓
Electronics assembly	C60303	Keypad reader electronics assembly		✓		
	B60339	HID proximity reader with wake up electronics assembly			✓	
	B60338	Motorola proximity wake up electronics assembly				✓
Escutcheon gasket	A60316	Escutcheon gasket		✓	✓	✓

a. Magnetic stripe reader
b. Keypad reader
c. HID proximity reader
d. Motorola proximity reader

KV reader conversion

If you want to convert the reader of an existing KV Lock, use the following table to determine the parts that you need. This table includes only the parts that are different.

For example, to convert an 8KV Lock with a magnetic stripe card reader to a 8KV Lock with a Motorola proximity reader, you would remove the following parts:

- 8KV outside escutcheon (C61405)
- Card reader (B61646)
- Outside wire harness (A61643).

You would add the following parts:

- 8KV outside escutcheon (C60448)
- Motorola proximity bezel with reader assembly (C60337)
- Outside wire harness (B60305)
- Reader gasket (B60321)
- Retaining ring (A60318)
- Sealing lens cover (A60317)
- Reader mounting screws (A60348)
- Adhesive tape for sounder (A60324)
- Motorola proximity wake up electronics assembly (B60338)
- Escutcheon gasket (A60316).

Part Type	Part No.	Description	Mag.[a]	Kpd.[b]	Proximity HID[c]	Mot.[d]
Outside escutcheon	C61405	8KV outside escutcheon	✓			
	C60448	8KV outside escutcheon		✓	✓	✓
	C61403	9KV outside escutcheon	✓			
	C60449	9KV outside escutcheon		✓	✓	✓
Reader	B61646	Card reader	✓			
	C60325	Keypad assembly with cable and connector		✓		
	C60342	HID proximity bezel with antennae & IR assembly			✓	
	C60337	Motorola proximity bezel with reader assembly				✓
Outside wire harness	A61643	Outside wire harness	✓			
	B60305	Outside wire harness		✓	✓	✓
Programmed PROM	B62099	Programmed PROM (VP_S15)	✓		✓	✓
	B62076	Programmed PROM for keypad (VP15KP)		✓		
Reader gasket	B60321	Reader gasket		✓	✓	✓
Retaining ring	A60318	Retaining ring		✓	✓	✓
Sealing lens cover	A60317	Sealing lens cover		✓	✓	✓
Reader mounting screws	A60348	Reader mounting screws		✓	✓	✓
Adhesive tape for sounder	A60324	Adhesive tape for sounder		✓	✓	✓

Part Type	Part No.	Description	Mag.[a]	Kpd.[b]	Proximity HID[c]	Mot.[d]
Electronics assembly	C60303	Keypad reader electronics assembly		✓		
	B60339	HID proximity reader with wake up electronics assembly			✓	
	B60338	Motorola proximity wake up electronics assembly				✓
Escutcheon gasket	A60316	Escutcheon gasket		✓	✓	✓

a. Magnetic stripe reader
b. Keypad reader
c. HID proximity reader
d. Motorola proximity reader

REPLACING PARTS

![Caution triangle icon]

Caution

Before you handle the circuit board or any component on the circuit board, make sure that you are properly grounded using an electrostatic discharge (ESD) protection kit. When ordering an ESD protection kit, refer to the part number on page 2-27. Touching the circuit board without proper grounding can damage sensitive electronic components—even if you don't notice any static discharge.

Replacing batteries

The battery pack consists of four AA alkaline batteries. The expected battery life is two years for 8KV and 9KV, and three years for 30HV locks (used at a rate of twenty times per day and 365 days per year). The battery life for keypad locks and proximity locks is slightly shorter.

When to replace batteries

You know that it's time to replace the battery pack when you start to encounter a different response than normal when using a token to access the lock. Refer to the table below to determine whether the battery pack should be replaced.

When access is…	and you see…	and you hear…	The battery voltage level is…
Granted	green flashes		normal
Granted with a 2-second delay	green flashes	beeps	low with limited accesses remaining
Denied[a]	red & green flashes		very low
Denied			dead

a. Access to operating tokens is denied, but access to programming functions is still allowed using a communication token. To unlock the door when the battery is at this level, access programming with the communication token and set the door mode to "door unlock".

Special tools

The battery compartment cover is secured by either a torx head or a McGard head screw. Use the appropriate bit to remove and replace the battery compartment cover. When ordering a torx bit driver or a McGard bit driver, refer to the part numbers on page 2–27.

Replacing the battery pack

Replacing the battery pack is a completely safe operation. When you remove the battery pack, the backup battery temporarily takes over the maintenance of the lock's clock and memory. Then, after the new battery pack is connected, the battery pack resumes maintenance of the clock and memory.

The only purpose of the backup battery is to support the clock and memory if power is not available from the battery pack. After the batteries in the battery pack fail, the backup battery can maintain the clock and memory for several years.

To replace the battery pack:

Refer to Figure 2.16 and follow the steps below.

1. Open the battery compartment by removing the security screw and the battery compartment cover.
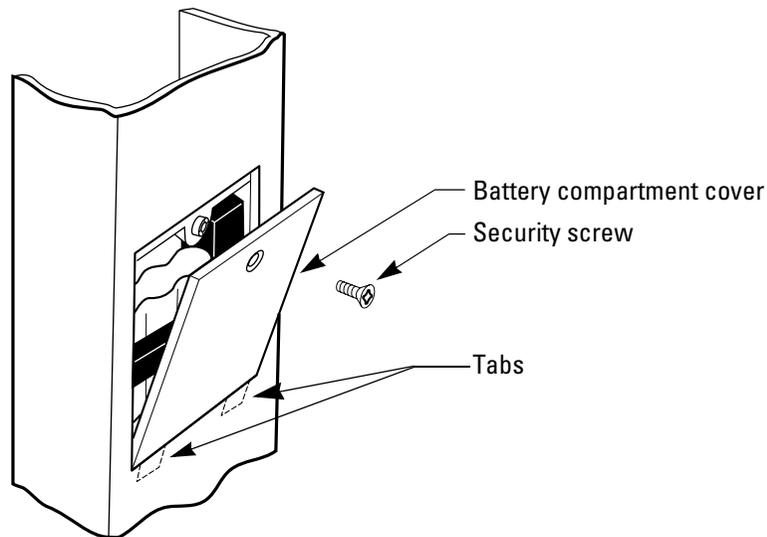
Figure 2.16   Removing and replacing the battery compartment cover

2. Remove the battery pack from the compartment.
3. Disconnect the old battery pack, as shown in Figure 2.17, and connect the new battery pack.
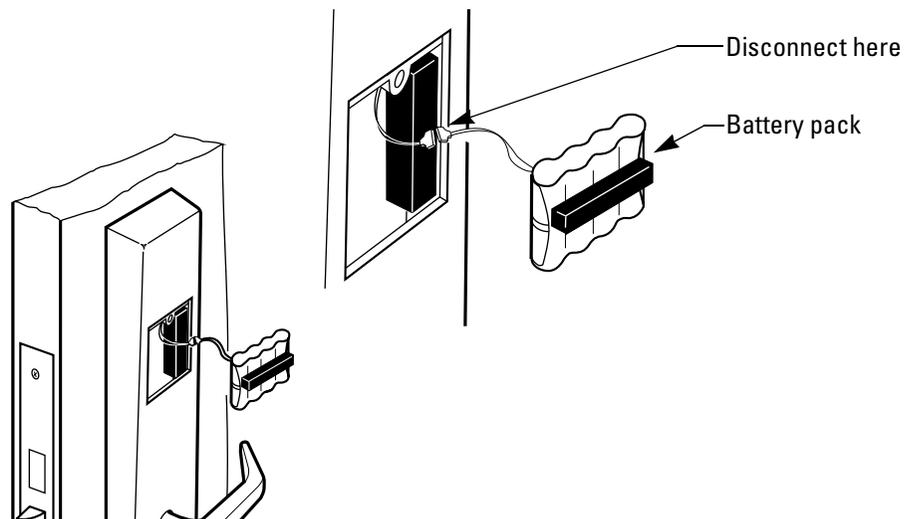
Figure 2.17   Disconnecting the old battery pack

4. Position the new battery pack in the battery compartment.

5. Insert the tabs on the lower edge of the battery compartment door into the battery compartment. Swing the door closed. Install the security screw.

Removing and reinstalling the inside and outside trim

To remove the inside and outside trim:

Refer to Figure 2.18 and follow the steps below.

1. Open the battery compartment by removing the security screw and the battery compartment cover.

2. Remove the battery pack from the battery compartment.

3. Disconnect the battery pack.

4. Remove the inside knob or lever.

5. From the inside of the door, remove the upper and lower escutcheon screws and pull the inside trim out enough to expose the circuit board. Carefully disconnect the outside wire harness from the circuit board. Disconnect the motor connector and the deadbolt sensing connector (30HV with deadbolt only).

Wire hole in the door
Inside trim
Circuit board
Outside wire harness

Deadbolt sensing connector
Motor connector
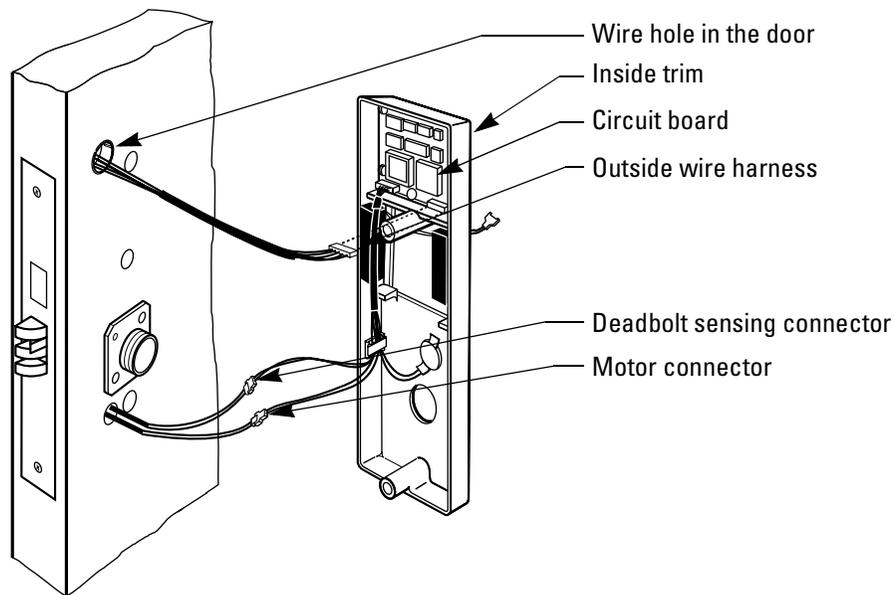
Figure 2.18   Removing the inside trim

6. Set aside the inside trim.

7. Feed the outside wire harness to the outside of the door through the wire hole in the door.

8. Remove the outside knob or lever.

   Note: For 8V and 9V, remove the core and depress the knob keeper with a screwdriver blade.

9. Remove the outside trim.

To reinstall the inside and outside trim:

1. Holding the outside trim near its position on the door, feed the outside wire harness back through the wire hole to the inside of the door.

2. Reconnect the outside wire harness to the circuit board in the inside trim. Reconnect the motor wire connector and deadbolt sensing connector (for 30HV with deadbolt only).

   Note: It is possible to plug the battery pack into the motor connector and the motor wire into the battery connector. To avoid this, connect only the connectors with matching wire colors.

3. Position the inside trim against the door and pull the outside wire harness back through to the outside of the door until the wire harness is taught.

4. Making sure that the trim does not pinch the wires, secure the inside and outside trim to the door from the inside. Use the combination mounting screw in the top mounting hole and the standard screw in the bottom mounting hole. Do not tighten the screws completely.

5. Reinstall the inside and outside knobs or levers.

6. Reconnect the battery pack.

7. Position the battery pack in the battery compartment.

8. Insert the tabs on the lower edge of the battery compartment door into the battery compartment. Swing the door closed. Install the security screw.

9. Tighten the trim mounting screws firmly.

Replacing the wire harnesses

To replace the inside wire harness:

1. Open the battery compartment by removing the security screw and the battery compartment cover.

2. Remove the battery pack from the battery compartment.

3. Disconnect the battery pack.

4. Remove the inside knob or lever.

5. From the inside of the door, remove the upper and lower escutcheon screws and pull the inside trim out enough to expose the circuit board. Carefully disconnect the outside wire harness from the circuit board. Disconnect the motor connector and the deadbolt sensing connectors (30HV with deadbolt only).

6. Unfasten the coin–cell battery from the inside trim.

7. Release the wires from the wire clamp on the inside trim.

⚠️ **Caution**

Disconnecting the inside wire harness will cause all security device information to be lost and revert the security device to its factory default settings. You must reprogram the security device after disconnecting the inside cable harness.

8. Disconnect the inside wire harness from the circuit board in the inside trim.

9. Wait at least 30 seconds, then connect the new inside wire harness to the circuit board in the inside trim.

    Note: The pair of connectors is keyed to connect only one way.

10. Slide the motor and deadbolt sensing wires into the wire clamp on the inside trim.

11. Fasten the coin–cell battery to the inside trim.

12. Connect the motor connector and deadbolt sensing connector (30HV only).

    Note: It is possible to plug the battery pack into the motor connector and the motor wire into the battery connector. To avoid this, connect only the connectors with matching wire colors.

13. Position the inside trim against the door and pull the outside wire harness back through to the outside of the door until the wire harness is taught.

14. Making sure that the trim does not pinch the wires, secure the inside and outside trim to the door from the inside. Use the combination mounting screw in the top mounting hole and the standard screw in the bottom mounting hole. Tighten the screws firmly.

15. Position the battery pack in the battery compartment.

16. Reconnect the battery pack.

17. Insert the tabs on the lower edge of the battery compartment door into the battery compartment. Swing the door closed. Install the security screw.

18. Use the temporary communication token to enter the programming mode.

19. Reprogram the security device. See the *V Series Handheld Terminal User Manual* or the *V Series Intelligent Programmer Software User Manual* for more information.

To replace the outside wire harness:

Note: Disconnecting the outside wire harness will not cause any security device information to be lost.

1. Remove the inside and outside trim. For instructions, see *To remove the inside and outside trim:* on page 2-38.

2. *If you are replacing a keypad reader or proximity card reader*, remove the gasket that covers the circuit board for the card reader.

3. Loosen the screw holding the harness clip and remove the clip. Save the clip.

4. Disconnect the wire harness from the circuit board on the card reader or keypad reader.

5. Remove the communication port retainer clip. Save the clip.

6. Release the wires from the wire clamp on the outside trim to free the wire harness.

7. Connect the new wire harness to circuit board on the card reader or keypad reader.

8. Slide the harness clip under the loosened screw. Tighten the screw.

9. Slide the communication port wires under the wire clamp.

10. Position the communication port, as shown in Figure 2.19. Secure the port with the retainer clip.

Note the position of the pins and keyed hole
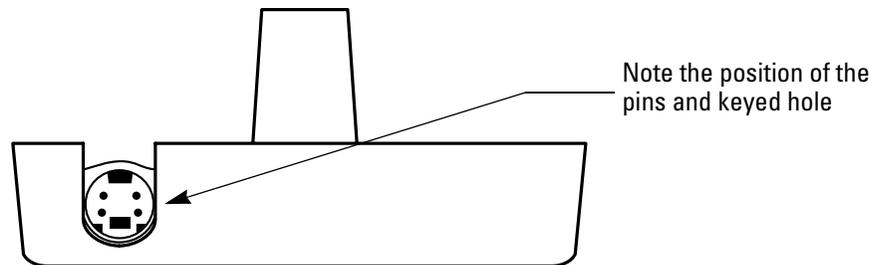
Figure 2.19   Orienting the communication port

11. *If you are replacing a keypad reader or proximity card reader*, reinstall the gasket over the circuit board on the card reader with the adhesive side towards the circuit board.

12. Reinstall the inside and outside trim. For instructions, see *To reinstall the inside and outside trim:* on page 2-39.

Replacing the inside circuit board

To replace the inside circuit board:

1. Remove the inside and outside trim. For instructions, see *To remove the inside and outside trim:* on page 2-38.

⚠ **Caution**

Before you handle the circuit board or any component on the circuit board, make sure that you are properly grounded using an electrostatic discharge (ESD) protection kit. When ordering an ESD protection kit, refer to the part number on page 2–27. Touching the circuit board without proper grounding can damage sensitive electronic components—even if you don't notice any static discharge.

2. Disconnect the inside wire harness from the circuit board.
3. Unscrew the four circuit board mounting screws. Save the screws.
4. Remove the circuit board and place it in an anti-static bag.

    Note: You may need to remove the PROM from the existing circuit board and install it into the new circuit board. For more information, see *Replacing the PROM* on page 2-44.

5. Position the new circuit board in the inside trim and secure it using the four circuit board mounting screws.
6. Reconnect the inside wire harness to the circuit board.
7. Reinstall the inside and outside trim. For instructions, see *To reinstall the inside and outside trim:* on page 2-39.

Replacing the card reader or keypad reader

To replace a magnetic stripe card reader, replace the:

■ reader only.

To replace a keypad reader, replace the:

■ keypad assembly
■ reader electronics.

To replace a proximity card reader, replace the:

■ proximity bezel
■ wake-up electronics assembly.

To replace the magnetic card reader

1. Remove the inside and outside trim. For instructions, see *To remove the inside and outside trim:* on page 2-38.
2. Unscrew the two circuit board mounting screws. Save the harness clip and screws.
3. Disconnect the outside wire harness from the circuit board on the card reader.
4. Remove the card reader.
5. Position the new card reader in the outside trim and secure it with the two mounting screws. Do not tighten the left screw.

6. Connect the outside wire harness to the circuit board on the card reader.

7. Position the clip under the left mounting screw. Tighten the screw.

8. Reinstall the inside and outside trim. For instructions, see *To reinstall the inside and outside trim:* on page 2-39.

To replace the keypad reader or proximity bezel:

1. Remove the inside and outside trim. For instructions, see *To remove the inside and outside trim:* on page 2-38.

2. Remove the gasket that covers the keypad reader electronics assembly or the proximity wake–up electronics assembly.

3. Unscrew the two electronics assembly mounting screws. Save the harness clip and screws.

4. Disconnect the outside wire harness from the electronics assembly.

⚠️
Caution

Before you handle the circuit board or any component on the circuit board, make sure that you are properly grounded using an electrostatic discharge (ESD) protection kit. When ordering an ESD protection kit, refer to the part number on page 2–27. Touching the circuit board without proper grounding can damage sensitive electronic components—even if you don't notice any static discharge.

5. Carefully lift the electronics assembly out of the outside trim.

6. Disconnect the ribbon cable(s) from the back of the electronics assembly.

7. Remove the four keypad or bezel mounting screws. Remove the keypad reader or proximity bezel.

8. Orient the new keypad reader or proximity bezel. Feed the ribbon cable connector(s) through the slot in the outside trim.

9. Holding the keypad reader or proximity bezel in position against the trim, install the four mounting screws.

10. Connect the ribbon cable(s) to the electronics assembly. Make sure that all of the pins are inserted in the connector(s).

11. Position the electronics assembly in the outside trim. Secure it with the four mounting screws. Do not tighten the left screw.

12. Connect the outside wire harness to the electronics assembly.

13. Position the clip under the left mounting screw. Tighten the screw.

14. Reinstall the gasket over the electronics assembly with the adhesive side towards the electronics assembly.

15. Reinstall the inside and outside trim. For instructions, see *To reinstall the inside and outside trim:* on page 2-39.

Replacing the PROM

The Programmable Read-Only Memory (PROM) stores the program that controls the operation of the V Series Security Device. From time to time, BEST might upgrade the PROM either to add new features and functions or to fix problems. Follow the instructions below to upgrade the security device by replacing the PROM.

Circuit boards may be shipped without the PROM. If you are replacing the circuit board, you will need to remove the PROM from the existing circuit board and install it in the new circuit board, or you will need to install a new PROM. Follow the instructions below.

Note: To remove the PROM without damaging the PROM socket, use a tool specifically made for this purpose. You can purchase a PROM removal tool at most electronics supply stores, or contact your local BEST representative.

To remove the PROM:

Refer to Figure 2.20 and Figure 2.21 and follow the steps below.

1. *For the V Series Electronic Lock*, remove the inside and outside trim. For instructions, see *To remove the inside and outside trim:* on page 2-38. *For the V Series Controller*, remove the enclosure cover.

⚠ **Caution**

Before you handle the circuit board or any component on the circuit board, make sure that you are properly grounded using an electrostatic discharge (ESD) protection kit. When ordering an ESD protection kit, refer to the part number on page 2–27. Touching the circuit board without proper grounding can damage sensitive electronic components—even if you don't notice any static discharge.

2. *For the V Series Electronic Lock*, disconnect the inside wire harness and the outside wire harness from the circuit board in the inside trim.

⚠ **Caution**

When performing step 3, do not force the PROM out of its socket. Prying too far or too forcefully may damage the PROM socket.

3. Insert the hook of the PROM removal tool in one of the notched corners of the PROM socket, as shown in Figure 2.20. Use the PROM removal tool to pry the corner of the PROM part way out of the socket.
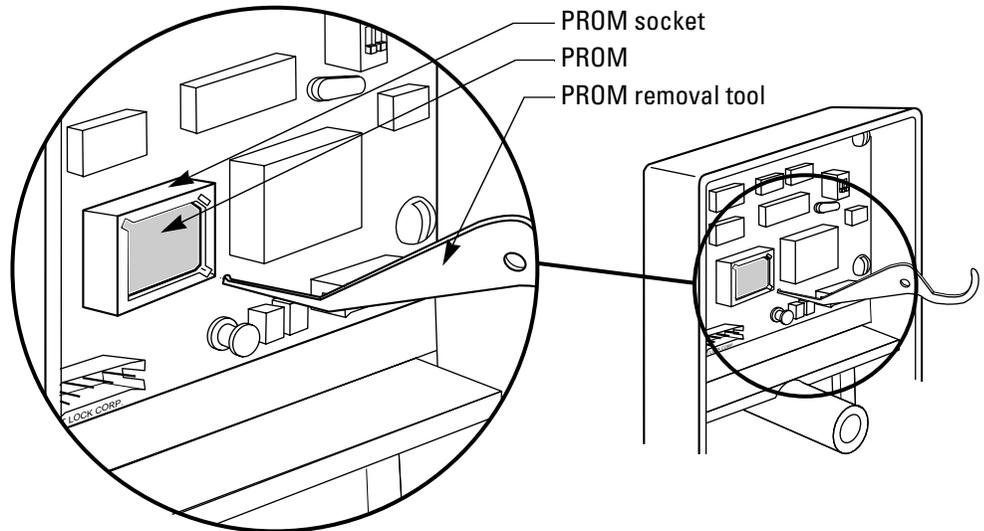
Figure 2.20   Prying one corner of the PROM part way out of the socket
[V Series electronic lock shown]

4. Insert the PROM tool in the opposite notched corner. Pry the PROM the rest of the way out of the socket, as shown in Figure 2.21.
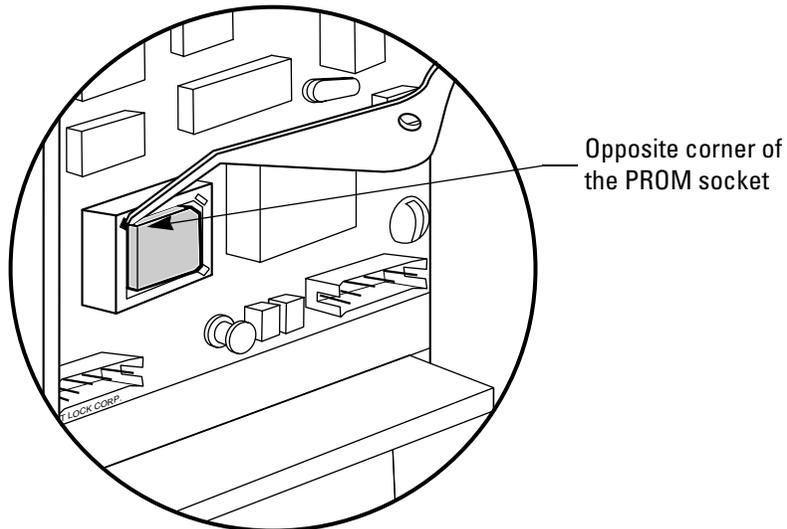
Figure 2.21   Prying the opposite corner of the PROM

To install the PROM:

Refer to Figure 2.22 and follow the steps below.

1. Before inserting the new PROM, make sure that the PROM is oriented so that the flat corner of the PROM matches the flat corner of the socket.

⚠ **Caution**

Make sure that the PROM is oriented correctly before inserting it into the PROM socket. The PROM will fit into the socket the wrong way! Installing the PROM incorrectly will damage the circuit board.

⚠ **Caution**

Before you handle the circuit board or any component on the circuit board, make sure that you are properly grounded using an electrostatic discharge (ESD) protection kit. When ordering an ESD protection kit, refer to the part number on page 2–27. Touching the circuit board without proper grounding can damage sensitive electronic components—even if you don't notice any static discharge.

2. Using your fingers, carefully place the PROM in the correct position over the socket. Press firmly on the face of the PROM until it seats completely in the socket. See Figure 2.22.

PROM socket

Flat corner on the PROM

Face of the PROM

Press firmly.
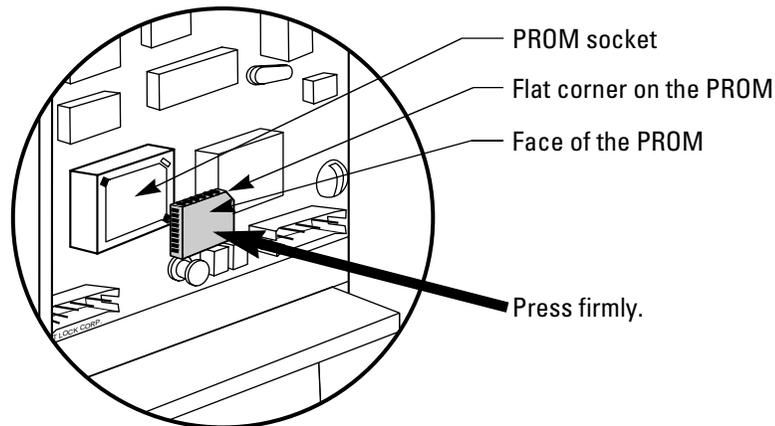
Figure 2.22 Inserting the new PROM

3. Reconnect the inside wire harness and outside wire harness to the circuit board in the inside trim.

4. Reinstall the inside and outside trim. For instructions, see *To reinstall the inside and outside trim:* on page 2-39.

3 TROUBLESHOOTING

EMERGENCY OPERATIONS

⚠️ **Caution**

Before you handle the circuit board or any component on the circuit board, make sure that you are properly grounded using an electrostatic discharge (ESD) protection kit. When ordering an ESD protection kit, refer to the part number on page 2-27. Touching the circuit board without proper grounding can damage sensitive electronic components—even if you don't notice any static discharge.

How do you enable communications if you have lost the token or forgotten the password?

If the communication token is lost or unavailable, you can enable communications by using the two switches on the circuit board inside the security device. This procedure is equivalent to using a valid communication token, except a password is not required. This procedure will not affect the user database, history, or the security device configuration. You can reset the security device via programming.

To enable communications without the communication token:

Refer to Figure 3.1 and follow the steps below.

1. Connect the handheld terminal to the security device. For instructions, see the *V Series Handheld Terminal User's Manual*.

2. Turn on the handheld terminal.

3. Remove the inside and outside trim from the door. For more instructions, see *To remove the inside and outside trim:* on page 2-38.

4. Reconnect the outside wire harness to the circuit board in the inside trim.

5. Locate the DIP switches on the circuit board in the inside trim and move switch 2 to the ON position.
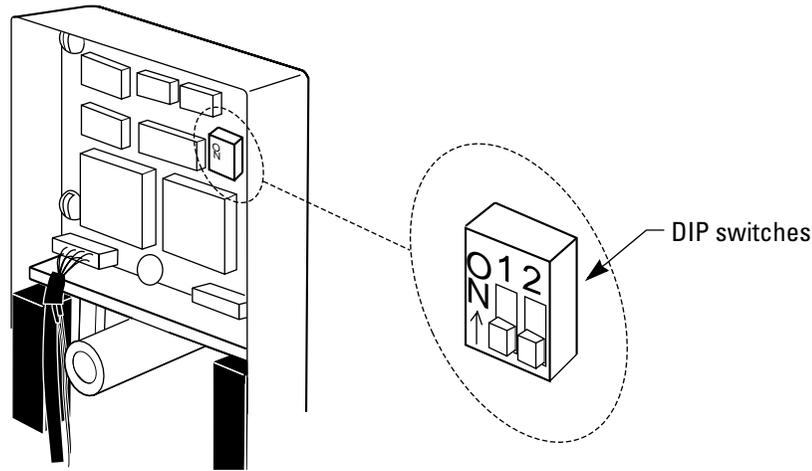
Figure 3.1   Enabling communications using the DIP switches

6. Move switch 1 to the ON position. Both switches should now be in the ON position.
7. Move both switches back to the OFF position. It does not matter which switch you move first.

⚠️ **Caution**

This function only enables communication and should be used only when you either forget your password or lose your communication token. The security device will not work until you return both switches to the OFF position.

8. When you've finished communications and exited communication mode, disconnect the outside wire harness from the circuit board and reassemble the inside and outside trim on the door. For more instructions, see *To reinstall the inside and outside trim:* on page 2-39.

How do you open a lock after a complete battery failure?

If you were not able to replace the batteries before they expired and cannot unlock the door, don't worry! If the lock does not have a key override feature, you still can unlock the door and access the lock's battery compartment.

Note: The low battery alarm may have to be cancelled. To do this, use the terminal mode in the IPS software, or connect the handheld terminal, and follow the prompts.

To open a lock after complete battery failure:

Refer to Figure 3.2 and follow the steps below.

1. To provide temporary power to the lock, connect the palmtop cable, with an external battery pack connected, to the base of the lock. Although the palmtop PC itself does not need to be connected to the cable, it will not cause a problem if it is connected.

Palmtop cable
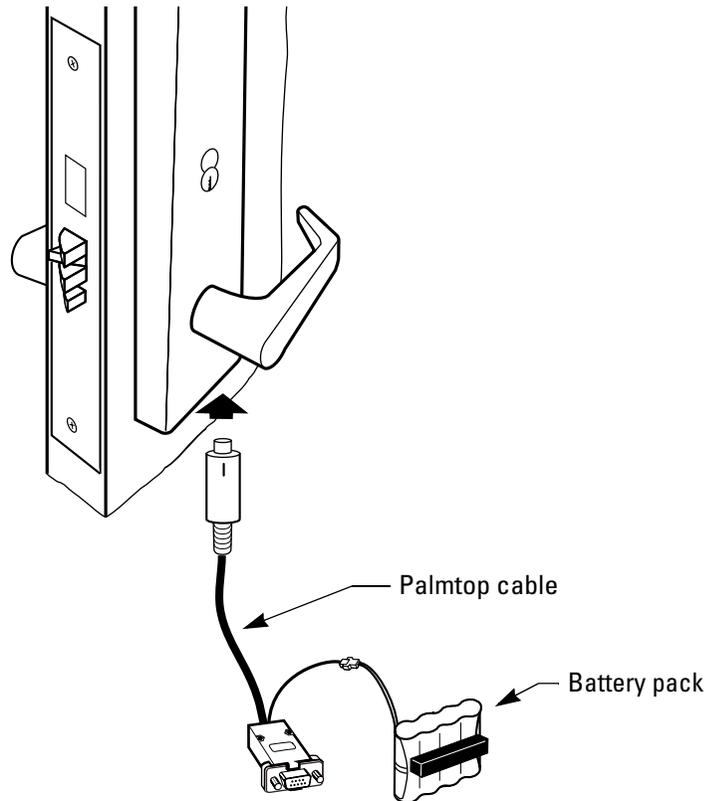
Battery pack

Figure 3.2 Connecting the palmtop cable to the base of the lock

2. To open the door, use a valid operating token for the lock.
3. Replace the lock's battery pack. For more instructions, see *Replacing batteries* on page 2-36.
4. Disconnect the palmtop cable from the lock.

TROUBLESHOOTING THE V SERIES ELECTRONIC LOCK

This table summarizes the possible causes for certain lock problems based on visible and audible signals (LEDs, sounder, and whether access is granted or denied). The causes of failure are listed in the order of likelihood. (The most likely cause is first, and so forth.)

Another helpful tool to use when troubleshooting the V Series Electronic Lock and the V Series Controller is the lock's history of events. Appendix B lists the types of events recorded in the history and their meaning. For information about retrieving, viewing, and printing history records, see the *IPS User Manual* or the *Handheld Terminal User Manual.*

LEDs	Sounder	Access	Possible causes include…	You should…
Green		Granted	Condition is normal for a valid token.	
	1 long tone	Denied	Token reader cannot read the token correctly.	Use the token at a moderate speed.
	1 short tone	Denied	a. Card was used, but not removed soon enough.	a. Try using the card again.
			b. Variable card format error occurred.	b. Check the variable card format.
Red	2 short tones	Denied	a. Token number is invalid.	a. Check the access privileges.
			b. Time zone is invalid.	b. Check the access privileges.
			c. Card is damaged.	c. Re-encode the operating card. It may be possible to re-encode a damaged card. If not, issue a new operating card.
			d. Lock has not been programmed.	d. Program the lock.
			e. Facility code is invalid.	e. Program the correct facility code in the lock.
			f. Token has expired.	f. Re-program the lock with a valid expiration date.
			g. Lock may be in a lock down mode.	g. Check to see if a door lock mode is active by using the handheld terminal to review the door mode. If desired, set the door mode to TZ Control.
Red & green	2 short tones	Denied	Token does not have the deadbolt override privilege.	Either program the token to have the deadbolt override privilege, or instruct the user that his or her token cannot access the lock when the deadbolt is thrown.

LEDs	Sounder	Access	Possible causes include…	You should…
		Denied	a. Card reader needs cleaning.	a. Clean the card reader head using a cleaning card for magnetic stripe card readers.
			b. Outside wire harness is damaged or disconnected.	b. Check the outside wire harness. If it's damaged, replace the wire harness.
			c. Card reader or keypad reader has failed.	c. Replace the card reader or keypad reader.
			d. Foreign object is inserted in the card reader.	d. Remove the object or replace the card reader.
			e. Battery pack is faulty.	e. Check the battery pack. Replace it, if necessary.
			f. Circuit board is malfunctioning.	f. Replace the circuit board.
			g. Circuit board failed for an unknown reason. **Note:** If the above condition exists, the key override may be used to access the door. If the lock has no key override, call your local BEST representative.	g. Replace the circuit board.
			h. Inside wire harness is disconnected from the motor or is damaged.	h. Check the inside wire harness.
			i. Self-aligning trim is overtightened.	i. Loosen the self-aligning trim.
Green	4 short tones	Granted after delay	Battery is low.	Change the battery pack. For more information, see *Replacing batteries* on page 2-36.
Red & green		Denied	Battery is very low.	Change the battery pack.
Green stays on		Denied	a. Communication token was used.	a. Wait 1 minute for the lock communications to automatically expire, or use any token again to turn off communications.
			b. Circuit board switches are in the ON position.	b. Remove the trim and set the switches to the OFF position. For more information, see *To remove the inside and outside trim:* on page 2-38.
Red		Denied	a. Sounder is damaged.	a. Replace the card reader or keypad reader.
			b. Circuit board is malfunctioning.	b. Replace the circuit board.
		Granted	a. LEDs are damaged.	a. Replace the card reader or keypad reader.
			b. Circuit board is malfunctioning.	b. Replace circuit board.

LEDs	Sounder	Access	Possible causes include…	You should…
Green		Denied	a. Chassis type of cylindrical lock is set to "mortise".	a. Change the programming setting for chassis type to cylindrical.
			b. If the lock is a 9K, the spindle may be faulty.	b. If you can hear the chassis cycling, replace the chassis. Contact your local BEST representative for assistance.
Lock is always unlocked.			a. Lock may be in a door unlock mode or passage mode. Setting the door mode to "Door unlock" means that anyone can access the door in this condition.	a. Use the handheld terminal to check the door mode. If desired, change the door mode.
			b. Lock may be in a door unlock time zone.	b. Use the handheld terminal to check the door mode and the time zone settings. If desired, change the door mode.
Cannot plug the handheld terminal connector into the lock's communications port.			a. Foreign object is jammed into the communications port.	a. Remove the object from the communications port.
			b. Communications port is damaged.	b. Replace the outside wire harness.
Cannot insert a card.			Foreign object is jammed in the card reader.	Push the object down through the card reader if possible. Unless the object is preventing the card from being inserted fully, there is no reason to remove the trim. If the object will not push through the card reader, remove the trim and remove the foreign object. **Note:** Use a valid card to verify that the card reader head is not damaged.
When communicating between a PC or palmtop and a V Series Security Device, or between a PC and a palmtop, you see a message that communications has failed.			a. Communications cable(s) is (are) not connected properly.	a. Check cable connections.
			b. If the device is an electronic lock, the lock's outside wiring harness is damaged or disconnected.	b. Check the outside wire harness. If it's damaged, replace the wire harness.
			c. Communications cable is faulty or damaged.	c. Try communicating with another device or PC. If communications works, the cable(s) is (are) not the problem. If communications does not work, replace the cable(s).

TROUBLESHOOTING THE V SERIES CONTROLLER

For readers with red and green LEDs *and no sounder*

This table summarizes the possible causes for certain controller problems based on visible signals (LEDs and whether access is granted or denied). Causes of failure are listed in order of likelihood. (The most likely cause is first, and so forth.)

Before troubleshooting problems with the V Series Controller, it's a good practice to confirm that the DIP switches on the controller board are set properly. For instructions, see *Figure 1–Controller board wiring diagram* in the *V Series Controller Installation Instructions*, which are included in Appendix C.

LEDs	Access	Possible causes include…	You should…
Green	Granted	Condition is normal for a valid token.	
	Denied	a. Token reader cannot read the token correctly.	a. Use the token at a moderate speed.
		b. Card reader needs cleaning.	b. Clean the card reader head using a cleaning card for magnetic stripe card readers.
		c. Connection to the card reader or keypad reader is bad.	c. Check all connections.
		d. Foreign object is inserted into the card reader.	d. Remove the object or replace the card reader.
		e. LEDs are damaged.	e. Replace the card reader or keypad reader.
Red	Denied	a. Token number is invalid.	a. Check the access privileges.
		b. Time zone is invalid.	b. Check the access privileges.
		c. Card is damaged.	c. Re-encode the operating card. It may be possible to re-encode a damaged card. If not, issue a new operating card.
		d. Controller has not been programed.	d. Program the controller.
		e. Facility code is invalid.	e. Program the correct facility code in the controller.
		f. Token has expired.	f. Re-program the token with a valid expiration date.
		g. Controller may be in a lock down mode.	g. Check to see if a door lock mode is active by using the handheld device to review the door mode. If desired, set the door mode to TZ Control.

LEDs	Access	Possible causes include…	You should…
Green stays on	Denied	a. Communication token was used.	a. Wait 1 minute for the lock communications to automatically expire, or use any token again to turn off communications.
		b. Micro-controller circuit board switches are in the ON position.	b. Set the switches to the OFF position.
		c. Micro-controller circuit board is malfunctioning.	c. Replace the micro-controller circuit board.
		d. XV Controller electronics circuit board is malfunctioning.	d. Replace the micro-controller circuit board.
Door is always unlocked.		a. Controller may be in a door unlock mode or passage mode. Setting the door mode to "Door unlock" means that anyone can access the door in this condition.	a. Use the handheld terminal to check the door mode. If desired, change the door mode.
		b. Controller may be in a door unlock time zone.	b. Use the handheld terminal to check the door mode and time zone settings.
		c. Locking device may not be connected properly.	c. Check the connections.
Cannot plug the handheld connector into the controller's communications port.		a. Foreign object is jammed in the communications port.	a. Clear the object from the communications port.
		b. Communications port is damaged.	b. Replace the communications port.

For readers with a dual red/green LED and sounder

This table summarizes the possible causes for certain controller problems based on visible and audible signals (LEDs, sounder, and whether access is granted or denied). The causes of failure are listed in the order of likelihood. (The most likely cause is first, and so forth.)

LEDs	Sounder	Access	Possible causes include…	You should…
Green		Granted	Condition is normal for a valid token.	
	1 long tone	Denied	Token reader cannot read the token correctly.	Use the token at a moderate speed.
Green/ red flashing	2 short tones	Denied	a. Token number is invalid.	a. Check the access privileges.
			b. Time zone is invalid.	b. Check the access privileges.
			c. Card is damaged.	c. Re-encode the operating card. It may be possible to re-encode a damaged card. If not, issue a new operating card.
			d. Controller has not been programmed.	d. Program the controller.
			e. Facility code is invalid.	e. Program the correct facility code in the controller.
			f. Token has expired.	f. Re-encode the token with a valid expiration date.
Green/ red flashing	2 short tones	Denied	Controller may be in a lock down mode.	Use the handheld terminal to check the door mode. If desired, set the door mode to TZ Control.
		Denied	a. Card reader needs cleaning.	a. Clean the card reader head using a cleaning card for magnetic stripe card readers.
			b. Card or keypad reader has failed.	b. Replace the card or keypad reader.
			c. Card is damaged.	c. Try other cards in the reader. If another card accesses the controller, the problem involves the card. Replace the card reader if other cards do not access the controller.
Green remains on		Denied	a. Communication token was used.	a. Wait 1 minute for the lock communications to automatically expire, or use any token again to turn off communications.
			b. Micro-controller circuit board switches are in the ON position.	b. Set the switches to the OFF position.
Green/ red flashing		Denied	Sounder is damaged.	Replace the card reader or keypad reader.
		Denied	LEDs are damaged.	Replace the card reader or keypad reader.

LEDs	Sounder	Access	Possible causes include...	You should...
Door is always unlocked.			a. Controller may be in a door unlock mode or passage mode. Setting the door mode to "Door unlock" means that anyone can access the door in this condition.	a. Use the handheld terminal to check the door mode. If desired, change the door mode.
			b. Controller may be in a door unlock time zone.	b. Use the handheld terminal to check the door mode and time zone settings.
			c. Locking device may not be connected properly.	c. Check the connections.
Cannot plug the handheld terminal connector into the controller's communications port.			a. Foreign object is jammed in the communications port.	a. Clear the object from the communications port.
			b. Communications port is damaged.	b. Replace the communications port.

Alarm troubleshooting

This table summarizes the possible causes of valid and false alarms based on the type of alarm (siren, strobe, or security system) indicated (or not indicated). The causes are listed in the order of likelihood. (The most likely cause is first, and so forth.)

You notice…	Possible causes include…	You should…
A local alarm (the card or keypad reader's own alarm sounds and/or displays).	a. Door is propped open, triggering the Door Open Too Long (DOTL) alarm.	a. Secure the door. You may want to change the DOTL alarm settings with the IPS program or handheld terminal to allow more time to close the door.
	b. Door contact wiring is disconnected, loose, or cut.	b. Secure all of the door wiring.
	c. Door is not latched completely.	c. Secure the door. You may want to install a door closer if the door does not have one, or adjust the door closer.
	d. Door latch is taped retracted so that it does not latch in the door strike.	d. Remove the tape and secure the door.
	e. Door contact is bad.	e. Replace the door contact.
Alarm output device is triggered. This device could be a siren, a strobe, a security system, or any combination of security alarm functions.	a. Entry has been forced.	a. Secure the door.
	b. Door is propped open, triggering the Door Open Too Long (DOTL) alarm.	b. Secure the door. You may want to change the DOTL alarm settings with the IPS program or handheld terminal to allow more time to close the door.
	c. Controller has been tampered with.	c. Secure the door.
	d. Door contact type has been specified incorrectly.	d. Change the door contact information with the IPS program or handheld terminal.
	e. Door has been accessed using a key.	e. Cancel the alarm. Remind the key holders to disarm the alarm system prior to using their key.
	f. Door contact wiring is disconnected, loose, or cut.	f. Secure all door wiring.
	g. Request-to-exit (RQE) wiring is disconnected, loose, or cut.	g. Secure all RQE wiring.
	h. Door latch is taped retracted so that it does not latch in the door strike.	h. Remove the tape and secure the door.
No alarm (when expected).	a. Alarm output duration is not set properly.	a. Set the alarm output duration with the IPS program or handheld terminal.
	b. Alarm wiring is disconnected, loose, or cut.	b. Secure all of the alarm wiring.
	c. Alarm device is bad.	c. Replace the alarm device.

A GLOSSARY

Battery pack	Set of alkaline batteries that powers the electronic lockset.
Card reader	Device that reads the information encoded on magnetic stripe cards or proximity cards.
Chassis type	Type of mechanical locking mechanism—cylindrical or mortise—used in an electronic lock.
Communication token	Token generally used for all security devices in a facility to access locks at any time for programming.
Communications port	Security device's communication interface used to transmit to, and receive data from, a handheld device.
Controller	A locally-powered, stand-alone access control panel. Controllers are wired to control access devices such as narrow-rail latches, electric strikes, and magnetic locks.
Deadbolt override privilege	Privilege that can be granted to a token so that the token can access a lock even when the lock's deadbolt is thrown.
Door	Location of an installed security device.
Door lock door mode	Door mode that locks down a security device, denying all cards access.
Door lock time zone	Time zone when a security device automatically locks down, denying all tokens access, and then later resumes normal operation.
Door mode	One of five types of security device operation that determines what access is currently provided.
Door unlock door mode	Door mode that sets a security device to unlock and remain unlocked.

Door unlock time zone	Time zone when a security device automatically unlocks (or unlocks when accessed by a valid token) and then later relocks.
Electronic lock	Battery-powered, self-contained, electronically-controlled lock.
Emergency power	Temporary, external power source, applied (through the communications port) to open a lock, usually in the event of a battery failure.
ESD	Electrostatic discharge.
Facility code only door mode	Door mode that sets a security device to allow access to any token with a valid facility code.
Handheld terminal	Device that lets you program a security device with parameters and view access control information, such as the token data, security device configuration, and security device event history.
Intelligent Programmer Software (IPS)	Software that lets you define programming settings and the user database for groups of security devices, as well as individual devices. The IPS also lets you retrieve the history records from security devices, as well as view and print security device information.
Key override	Optional feature that enables an authorized user (in an emergency) to bypass all electronic locking features, and open the lock with a mechanical key.
LED	Light emitting diode, which indicates the status of the electronic lockset to the user.
Magnetic stripe card	Credit-card shaped device to which data is encoded in the form of a magnetically encoded strip of tape.
Passage mode privilege	Privilege that can be granted to a token for a security device. When the token is used two times within the unlock duration and during the time zone assigned to the token, the security device remains unlocked. When the security device is unlocked, and the token is used twice, the security device relocks.
Password	One to six digits used with a communication token to access a security device for programming. Or, one to six digits used to access the Intelligent Programmer Software.
Personal identification number (PIN)	Sequence of digits, which generally includes a facility code and an access code. A user enters a PIN to access a door controlled by a V Series Keypad Security Device.
PROM	Programmable read-only memory, which is the integrated circuit that stores the security device program.
Request-to-exit (RQE) device	Device, such as a button, that can be connected to a V Series Controller. When someone activates the request-to-exit device, the controller does not trigger an alarm. If the controller is programmed for the RQE unlock feature, the controller also unlocks the door.
Security device	V Series Electronic Lock or a V Series Controller.
Security device serial number	Factory-assigned, unchangeable, and unique identifier for each security device.
Sounder	Device in the lock that produces sound. The sounder annunciates when access is denied.

Temporary communication token	Token for temporary use that lets you communicate with a V Series Security Device programmed with factory default settings.
Temporary operator token	Token that gives people temporary access to locks before the devices in a V Series System are permanently programmed.
Token	Access card or V Series personal identification number (PIN) used to access a door.
User database	All user tokens—up to 1000—defined for a lockset configuration.
Wire harness	Group of wires bundled together with connectors at either end.

B

SECURITY DEVICE HISTORY EVENT TYPES

The table on the following pages describes in alphabetical order each history event that can be recorded at a V Series Security Device. For information about retrieving, viewing, printing, and deleting device history records, see the *IPS User Manual.*

Security device history event types

Event	Description
ACCESS GRANTED	The device granted access to the indicated token.
ADD CARD	Using the handheld terminal, the indicated token was added to the device's user database.
ADD CARD RANGE	Using the handheld terminal, the indicated range of tokens was added to the device's user database.
CARD EXPIRED	The device denied access to the indicated token because the token's programmed expiration date was earlier than the current date.
CONTROLLER ERR	The microcontroller board was unable to communicate with the controller board.
CONTROLLER OK	The controller's micro-controller board was able to communicate with the controller board after having failed to do so.
CYCLE ISSUE	The device updated the issue code recorded for the indicated token in the device's user database.
DEADBOLT LOCKED	The V Series Electronic Lock denied access to the indicated token because the lock's deadbolt was locked and the token did not have the deadbolt override privilege.
DEL CARD RANGE	Using the handheld terminal, the indicated range of tokens was deleted from the device's user database.
DELETE CARD	Using the handheld terminal, the indicated token was deleted from the device's user database.
DEVICE PC CONFIG	Using the IPS, the device's programming settings were retrieved from the device to the PC.
DEVICE PC HIST	Using the IPS, the device's history records were retrieved from the device to the PC.
DEVICE PC USERDB	Using the IPS, the device's user database was retrieved from the device to the PC.
DOOR FORCED	The door, which is controlled by a V Series Controller, was opened without use of a valid access method.
DOOR LOCKED	The device denied access to the indicated token because the device was in the door lock mode.
DOOR SECURED	The door automatically locked.
DOOR TAMPER	The device protected by the controller's tamper feature, such as the controller enclosure, was opened.
DOOR UNLOCKED	The door automatically unlocked.
DOTL ALARM	The door controlled by the controller generated a door open too long alarm.
FIRST UNLOCK	The first card unlock feature was used to unlock the door.
INVALID CARD #	The device denied access to the indicated token because the token was not recorded in the device's user database.

Event	Description
INVALID F-CODE	The device denied access to the indicated token because the token's facility code was not valid.
INVALID ISSUE	The device denied access to the indicated token because the token's issue number was not valid.
INVALID T-ZONE	The device denied access to the indicated token because the token's time zone was not in effect.
MOD DOOR STATUS	Using the handheld terminal, the controller's programmed door status settings were changed.
MODIFY CARD	Using the handheld terminal, the information in the device's user database for the indicated token was modified.
MODIFY CHASSIS	Using the handheld terminal, the electronic lock's programmed chassis type was changed.
MODIFY DATE/TIME	Using the handheld terminal, the device's date and/or time were changed.
MODIFY DOOR MODE	Using the handheld terminal, the device's door mode was changed.
MODIFY F-CODE	Using the handheld terminal, the device's valid facility codes were changed.
MODIFY HOLIDAY	Using the handheld terminal, the holidays defined for the device were changed.
MODIFY READER	Using the handheld terminal, the device's timed access features were changed.
MODIFY SYSTEM	Using the handheld terminal, the electronic lock's system settings were changed.
MODIFY TIME ZONE	Using the handheld terminal, the device's time zones were changed.
MODIFY VAR FORM	Using the handheld terminal, the device's card format was changed.
PASSAGE CLOSE	The passage mode feature was used to lock the door.
PASSAGE OPEN	The passage mode feature was used to unlock the door.
PC DEVICE CONFIG	Using the IPS, programming settings were transferred from the PC to the device.
PC DEVICE USERDB	Using the IPS, a user database was transferred from the PC to the device.

Event	Description
POWER LOSS: 0X0_	The device lost power and may have performed an internal reset. Use the following table to understand the code.

Code	Meaning	Internal reset
0x00	Reset code was cleared.	N/A
0x01	Memory was corrupted.	Yes
0x02	Real time clock was corrupted.	Yes
0x04	Power was lost.	No
0x08	Database version is incorrect, ROM change.	Yes

Event	Description
REMOTE UNLOCK	The door, which is controlled by a controller, was unlocked using the remote unlock feature.
RESET DATABASE	Using the handheld terminal, the device's user database was erased.
RESET HISTORY	Using the handheld terminal, the device's history was erased.
RESET SYSTEM	Using the handheld terminal, the device's programming was restored to factory default settings, and the device's history and user database were erased.
SHUTDOWN	The controller lost power and shut down.
STARTUP	The controller restarted after it lost power and shut down.
TAMPER CLEARED	The device protected by the controller's tamper feature was secured after having been opened.

C

INSTALLATION INSTRUCTIONS

The following pages contain the *KV Installation Instructions*, *HV Installation Instructions,* and the *V Series Controller Installation Instructions*.

Overview
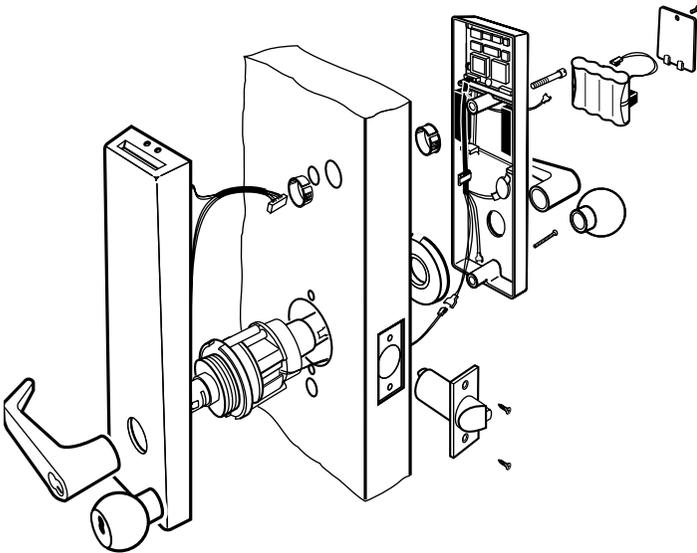
Figure 1

1　Position template

Note: *On steel frame applications, align the horizontal centerline of the latch with the horizontal centerline of the strike preparation.*
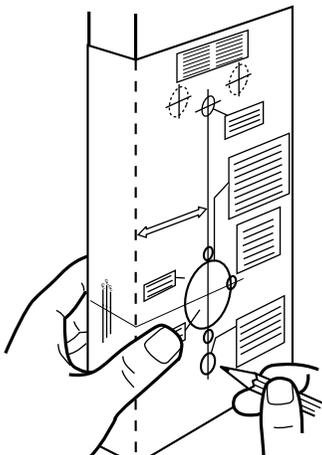
Figure 2

1 **For uncut doors**

Fold the template along the perforation and carefully place it in position on the high side of the door edge bevel. The suggested height from floor to the centerline of the lock is 38".

For doors with standard cylindrical preparation

Looking through the hole from the opposite side of the door, align the template so that you see the template outline of the 2 1/8" diameter hole.

2 Tape the template onto the door.

3 Center punch the drill points.

2　Drill holes and install latch

Note 1: *If the door is a fabricated hollow metal door, determine whether it is properly reinforced to support the lock. If the door reinforcement is not adequate, consult the door manufacturer for information on proper reinforcement.*

Note 2: *To locate the centerpoint of a hole on the opposite side of the door, drill a pilot hole completely through the door.*

Note 3: *For through-holes, it is best to drill halfway from each side of the door to prevent the door from splintering.*

1 Drill a 3/8" diameter hole through the door for the motor wires.

2 Bore the 2 1/8" diameter hole (if not already bored).
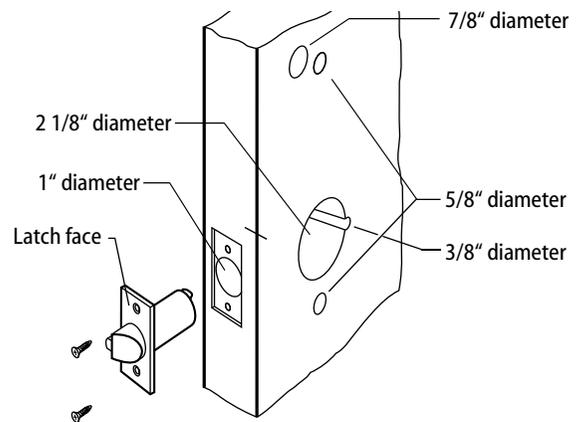
Figure 3

3 Drill the 1" diameter hole into the edge of the door to meet the center of the 2 1/8" diameter hole (if not already drilled).

4 Drill two 5/8" diameter holes for the trim and one 7/8" diameter hole for the wire harness.

5 Mortise the edge of the door to accommodate the latch face.

6 Install the latch and check that the door swings freely.

7 Drill one 7/8" diameter hole for the wires.

Note: *The latch tube prongs should be centered and should project into the 2 1/8" diameter hole, as shown in Task 6.*

3　Install boring jig and drill two 5/16" diameter holes

1 Press the boring jig (KD303) onto the door, engaging it with the latch tube prongs. Make sure the front edge of the jig is parallel with the door edge.
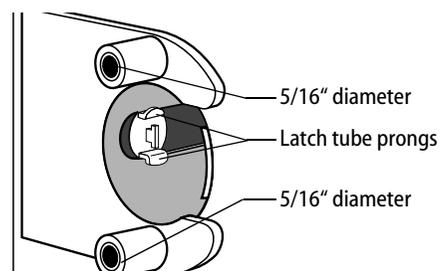
Figure 4

2 Drill two 5/16" diameter holes halfway into the door.

3 Turn the boring jig over and repeat steps 1 and 2 from the opposite side of the door.

Note: *Replace the boring jig after 10 door preparations.*

4 Remove outside knob/lever

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

2 Remove the core and throw member from the knob/lever.
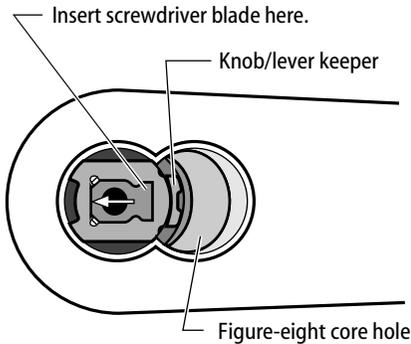
Figure 5

3 Insert a flat blade screwdriver into the figure-eight hole and into the knob/lever keeper.

4 Press the screwdriver blade in the direction of the arrow in Figure 5.

Note: *You will not be able to remove the knob/lever if the screwdriver blade is inserted too far past the keeper.*

5 Slide the knob/lever off the sleeve.

5 Adjust to door thickness

1 Determine the door's thickness.

2 Pull the rose locking pin and rotate the outside rose liner until the proper groove on the through bolt stud lines up with the hub face.
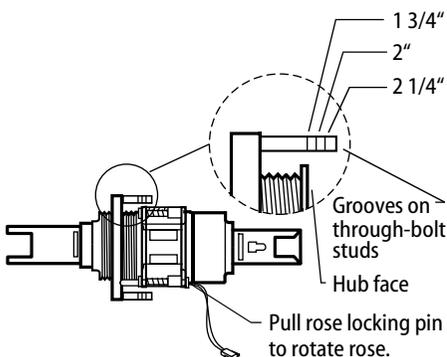
Figure 6

Note 1: *Make sure that the locking pin fully locks into the rose liner.*

Note 2: *Locksets will fit doors 1 3/4" to 2 1/4" thick. (A spacer is available for 1 3/8" doors.) See the enlarged view for the correct rose adjustment for these thicknesses.*

6 Engage retractor in latch

■ While feeding the motor wires through the 3/8" hole to the inside of the door, insert the lock chassis into the hole.

Enlarged view
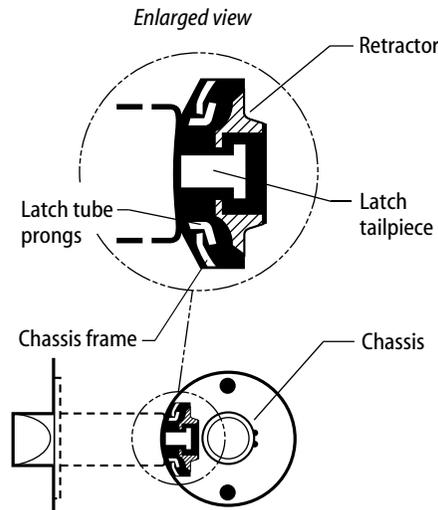
Figure 7

Caution: Be sure that the latch tube prongs engage the chassis frame and that the latch tailpiece engages the retractor.

7 Install through-bolts and rose liner

1 Making sure that the motor wires come through the notch in the 2 1/8" hole, align the holes in the liner with the holes prepared in the door.
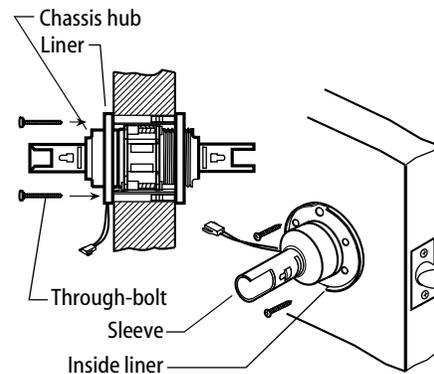
Figure 8

Caution: **Make sure that there is clearance for the motor wire between the rose liner and the door.**

2 Install the through-bolts through the liner and door in the top and bottom holes.

3 Tighten the liner onto the door with the through-bolts.

8 Make wire connections

1 Insert the bushings into the wire hole, as shown in Figure 9 and Figure 10.

2 Feed the outside wire harness connector through the top wire hole (Figure 9).
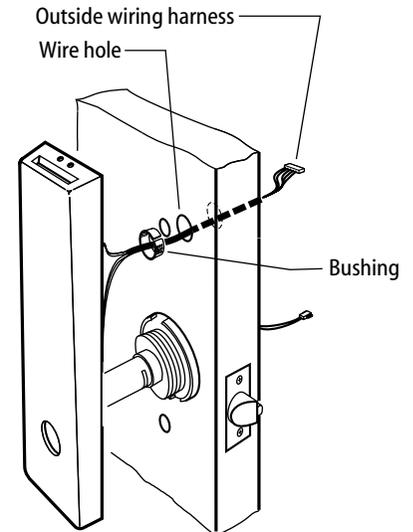
Figure 9

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

4 From the inside of the door, connect the motor connector to the mating connector from the circuit board (Figure 10).

Note: *It is possible to plug the battery pack into the motor connector and the motor wire into the battery connector. To avoid this, connect only the connectors with matching wire colors.*
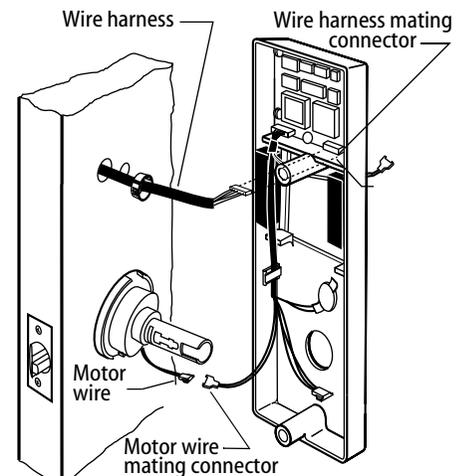
Figure 10

5. Making sure that the connector is properly aligned, connect the outside wire harness connector to the lower-right circuit board connector in the inside trim. Press firmly on the connector until it is fully seated.

9 Secure the throughbolt trim

1. Pull the excess outside wire harness back through to the outside trim.
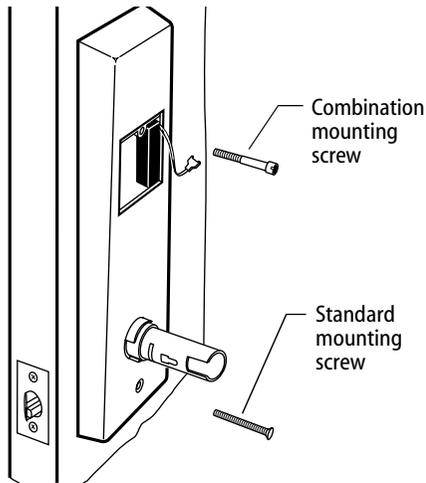
Combination mounting screw

Standard mounting screw

Figure 11

2. Position the inside and outside trim onto the door.
3. **Making sure that the trim does not pinch the wires**, secure the trim to the door — but do not tighten — with the combination mounting screw at the top mounting hole and with the standard screw at the bottom mounting hole.

10 Connect battery pack

1. Connect the battery pack to the connector hanging inside the battery compartment.

Battery pack

Figure 12

2. Insert the battery pack into the battery compartment so that the foam will face the battery door.

11 Install battery compartment door

1. Insert the tabs of the battery compartment door into its mating slots and swing the door closed.

Security screw

Tabs
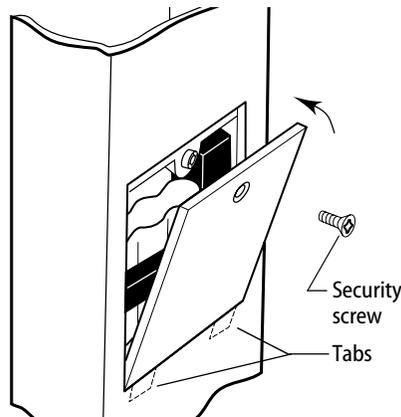
Figure 13

2. Secure the battery compartment door with the security screw. Tighten firmly.

12 Install inside and outside knobs/levers
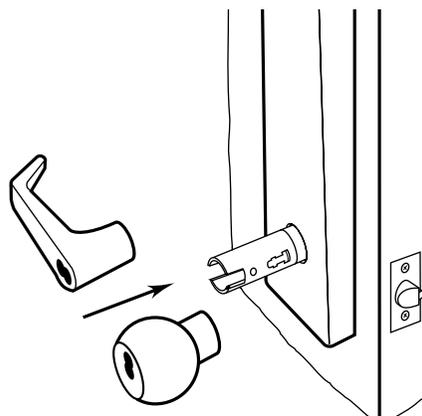
Figure 14

1. **For the inside and outside levers**
   With the lever pointing toward the hinges, push firmly on the lever until it is seated.
   For the inside and outside knobs
   Push firmly on the knob until it is seated.
2. Tighten the trim mounting screws (see Figure 11).
3. Turn the knobs/levers to check that they operate smoothly.

13 Install strike plate

Caution: **The deadlocking plunger of the latchbolt must make contact with the strike plate, as shown in Figure 15. The plunger deadlocks the latchbolt and prevents someone from forcing the latch open when the door is closed.**

Deadlocking plunger
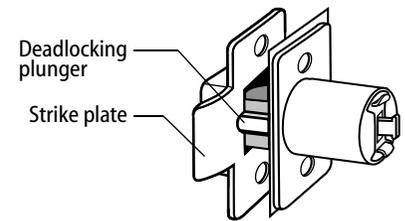
Strike plate

Figure 15

1. In alignment with the center of the latchbolt, mortise the door jamb to accommodate the strike box and strike plate.
2. Insert the strike box and secure the strike with the two screws provided.

One-half door thickness

Door stop

Door frame
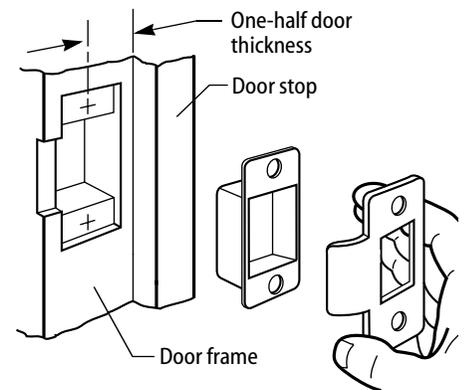
Figure 16

14 Install core and throw member

1. Install the blocking plate onto the throw member.

Caution: **You must use the blocking plate to prevent unauthorized access.**

Blocking plate
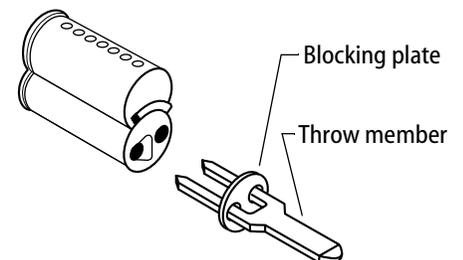
Throw member

Figure 17

2 Insert the control key into the core and rotate the key 15 degrees to the right.
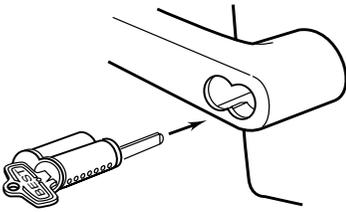
Figure 18

3 Insert the core and throw member into the knob or lever with the control key.

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

Note: *Be sure to insert the correct throw member into the core: six-pin cores require the number "6" throw member; seven-pin cores require the number "7" throw member.*

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

15 Test lock

To test the lock for proper operation, use the temporary operator card or personal identification number (PIN) that came with the lock. This card or PIN is for temporary use only and once permanent cards or PINs have been programmed for the lock, you should delete the temporary cards or PINs.

These temporary operator cards and PINs will only work on factory default V Series locks.

For details on programming the lock for access control, refer to the *V Series Intelligent Programming Software User Manual* or the *V Series Handheld Terminal User Manual*.

For magnetic stripe card electronic locks

1 With the temporary operating instructions facing toward you, insert and remove the temporary operator card, as shown in Figure 19.

The green light flashes and the locking mechanism unlocks.
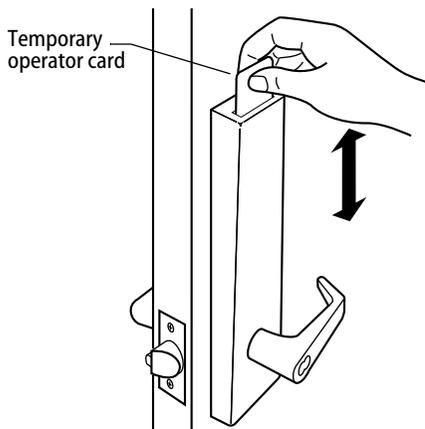
Figure 19

2 Turn the lever or knob and open the door.

3 Insert and turn the key to unlatch the door.

For keypad electronic locks

1 Enter the temporary operator PIN **99998** on the keypad.

2 Press ✳.

The green light flashes and the locking mechanism unlocks.

3 Turn the lever or knob and open the door.

4 Insert and turn the key to unlatch the door.

For proximity card electronic locks

1 Place the temporary operator card in front of the proximity reader, as shown in Figure 20.

The green light flashes and the locking mechanism unlocks

Figure 20

2 Turn the lever or knob and open the door.

3 Insert and turn the key to unlatch the door.

If the mechanism doesn't unlock, refer to the following table.

LEDs	Sounder	Access	You should…
	1 long tone	Denied	Use the token at a moderate speed.
Green stays on		Denied	Use the temporary operator token, not the temporary communication token.
Green flashes		Denied	Connect the motor wires.
		Denied	Connect the battery and connect the outside wire harness.

Overview
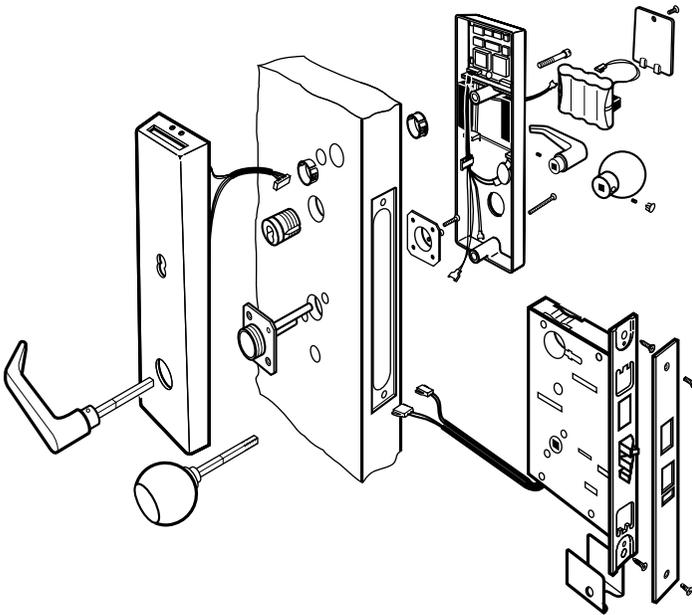
Figure 1

1   Mark centerlines

Note 1: *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.*

Note 2: *The suggested height from floor to centerline of the knob/lever is 38".*

1   Mark the horizontal centerline of the lock on both sides of the door and on the door's edge.

Recommended door/jam gap ~ 1/8"

2 3/4" backset

Vertical centerline of cylinder and knob/lever

1 1/2"

Horizontal centerline of lock

Horizontal centerline of knob/lever

Recommended height 38" from floor

Centerline of strike

3/8"

Vertical centerline of door edge and lock front
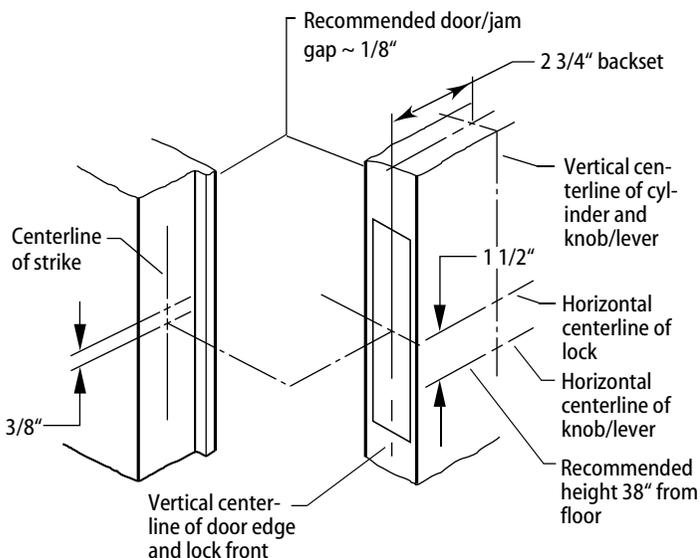
Figure 2

2   Mark the vertical centerline of the lock on the door edge.

3   Mark the vertical centerline of the lock on both sides of the door as measured from the vertical centerline on the door's edge.

4   Mark the horizontal centerline of the strike on the door jamb 3/8" above the horizontal centerline of the lock.

2   Position template

1   Cut the template along the dotted line and align the horizontal and vertical arrows to the marked centerlines on the door.
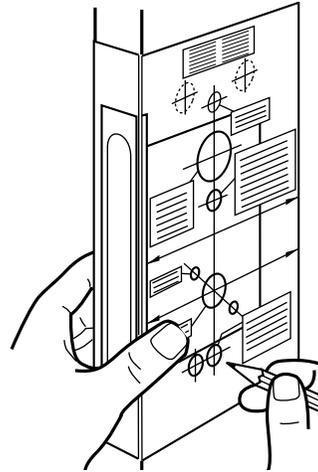
Figure 3

2   Tape the template onto the door.

3   Center punch the drill points.

3   Mortise for lock case and front

■   Mortise the edge of the door to accommodate the lock case and face plate.

Mortise case
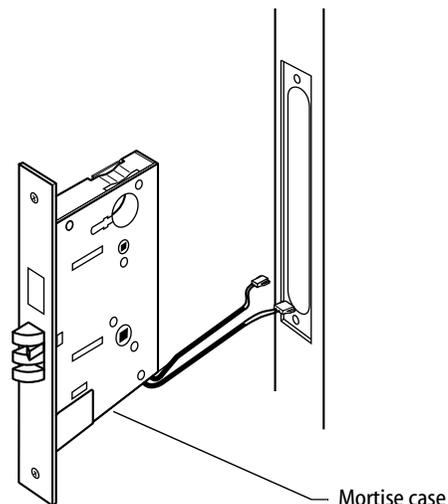
Figure 4

4 Drill holes

Caution: **Check the lock for the correct function, hand, and bevel before drilling.**

■ Drill only those holes required for the function.
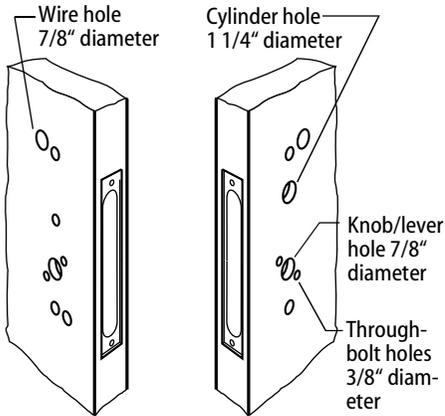
Figure 5—RH and RHRB hole pattern
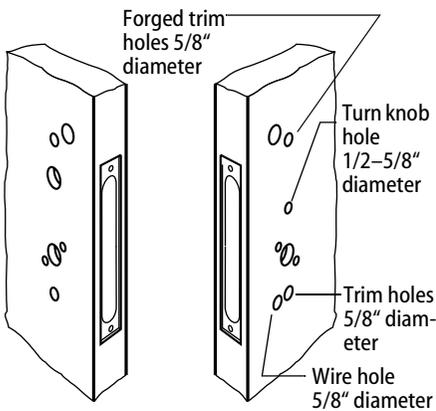
Figure 6—LH and LHRB hole pattern

5 Install lock

1 Remove the faceplate from the mortise case.
2 Install the mortise case while feeding the motor wires and deadbolt sensing wire (deadbolt function only) into the mortise cavity and out through the inside hole, as shown in Figure 7.
3 Secure the mortise case with the case mounting screws.
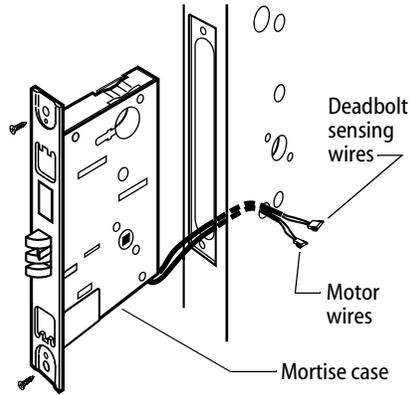
Figure 7

6 Install mounting plates

1 Insert the outside mounting plate through the door and lock case.
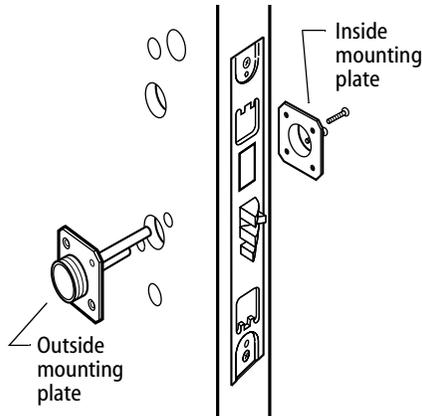
Figure 8

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

Caution: **Do not overtighten the mounting plate screws. Overtightening may compress the mortise cavity and bind the locking mechanism.**

7 Install cylinder

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

1 Thread the concealed cylinder into the lockset so that the groove around the cylinder head is even with the door surface. Adjust the cylinder depth plus or minus one (1) turn so that the core, when installed in the cylinder, will be flush with the outer surface of the trim.
2 Secure the cylinder into the case with the case set screw.
3 Secure the faceplate.
4 Check the cylinder and lock for proper operation.
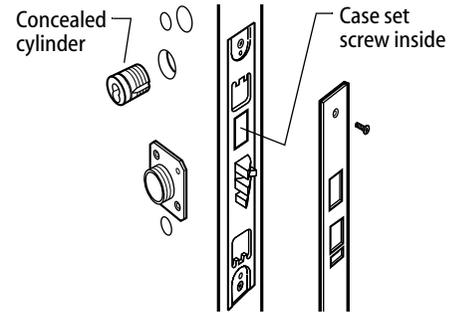
Figure 9

8 Make wire connections

1 Insert the bushings into the wire hole, as shown in Figure 10 and Figure 11.
2 Feed the outside wire harness connector through the top wire hole, as shown in Figure 10.
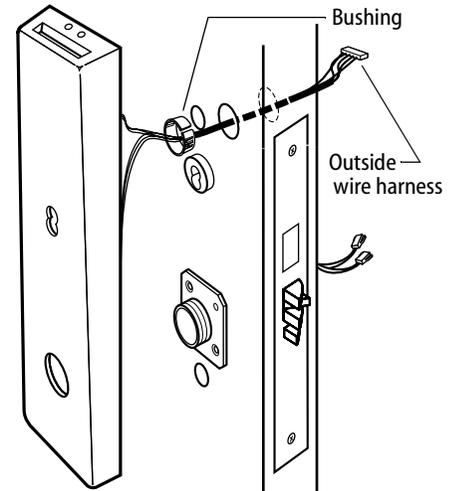
Figure 10

3 Temporarily rest the trim on the door by inserting the trim studs into the stud holes.
4 From the inside of the door, connect the motor connector and the optional deadbolt sensing connector to their mating connectors from the circuit board, as shown in Figure 11.
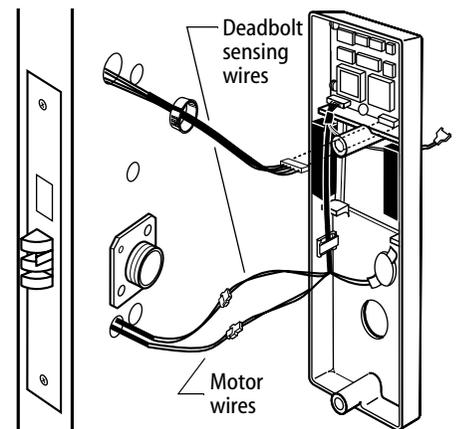
Figure 11

5 Making sure that the connector is properly aligned, connect the outside wire harness connector to the lower right circuit board connector in the inside trim. Press firmly on the connector until it is fully seated.

9 Secure the throughbolt trim

1 Pull excess outside wire harness back through to the outside.

Combination mounting screw

Standard mounting screw
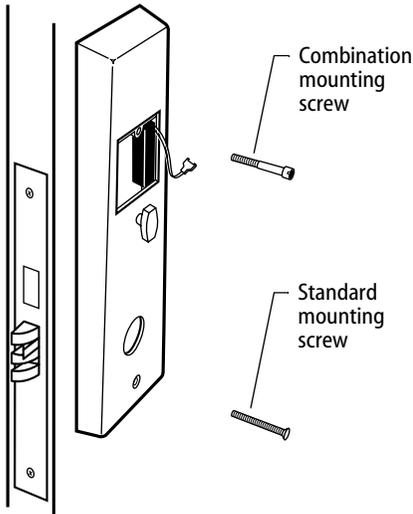
Figure 12

2 Position the inside and outside trim onto the door.

3 **Making sure that the trim does not pinch the wires**, secure the trim to the door — but do not tighten — with the combination mounting screw at the top mounting hole and with the standard screw at the bottom mounting hole.

10 Connect battery pack

1 Connect the battery pack to the connector hanging inside the battery compartment.
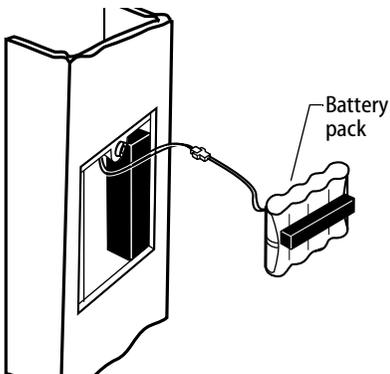
Battery pack

Figure 13

2 Insert the battery pack into the battery compartment so that the foam will face the battery door.

Caution: **If installing a lock with the turn knob function, make sure that the battery wires are not rubbing against the turn knob retaining ring.**

11 Install battery compartment door

1 Insert the tabs of the battery compartment door into its mating slots and swing the door closed.

Security screw

Tabs
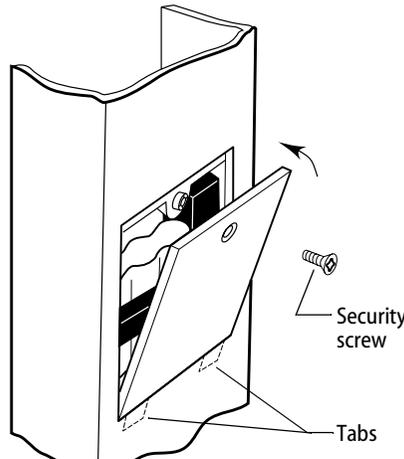
Figure 14

2 Secure the battery compartment door with the security screw. Tighten firmly.

12 Install inside and outside levers/knobs

For both levers and knobs

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

For levers

1 With the handle pointing toward the door hinges, put the outside lever and spindles into the lockset from the outside of the door.
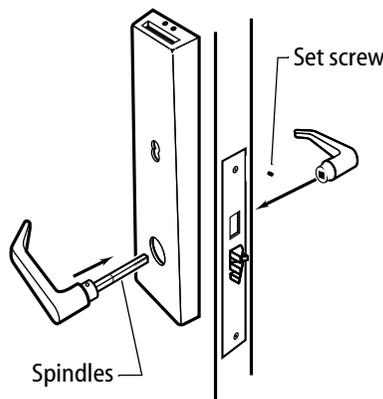
Set screw

Spindles

Figure 15

2 Slide the inside lever onto the inside spindle and secure it with the set screw.

3 Tighten the trim mounting screws (see Figure 12).

4 Turn the levers to check that they operate smoothly.

For knobs

1 From the outside of the door, put the outside knob and spindles into the lockset.

Set screw
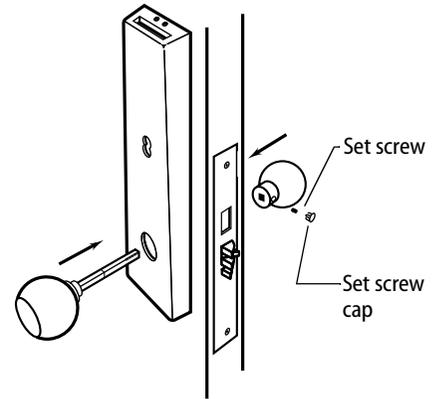
Set screw cap

Figure 16

2 Slide the inside knob onto the inside spindle and secure with the set screw.

3 Push the set screw cap into the set screw hole.

4 Tighten the trim mounting screws (see Figure 12).

5 Turn the knobs to check that they operate smoothly.

13 Install strike plate

1 Mortise the door jamb to accommodate the strike box and strike plate. (See Installation Specifications or dimensions, template V03 and H11.)
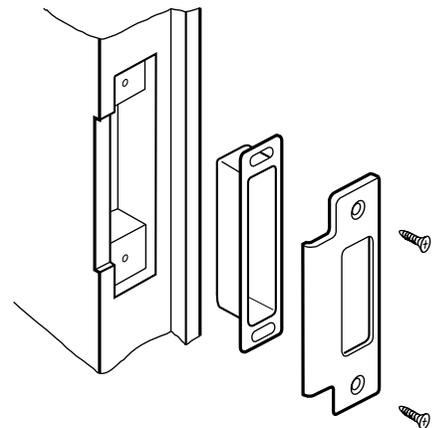
Figure 17

2 Insert the strike box into the mortise in the door frame and secure the strike with screws provided.

Caution: **The auxiliary bolt must make contact with the strike plate, as shown in Figure 18. The auxiliary bolt dead-locks the latchbolt and prevents some-one from forcing the latch open when the door is closed. If the incorrect strike is installed, a lock-in can occur.**

Strike plate

Auxiliary bolt
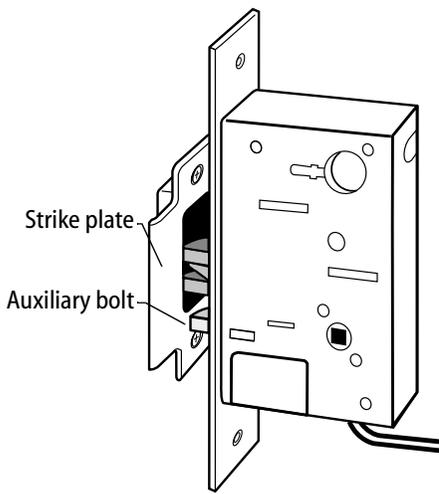
Figure 18

14 Install core

1 Insert the control key into the core and rotate the key 15 degrees to the right.
2 Insert the core into the cylinder with the control key.
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 access doors. Provide adequate security for the control key.**

15 Test lock

To test the lock for proper operation, use the temporary operator card or personal identifi-cation number (PIN) that came with the lock. This card or PIN is for temporary use only and once permanent cards or PINs have been pro-grammed for the lock, you should delete the temporary cards or PINs.

These temporary operator cards and PINs will only work on factory default V Series locks.

For details on programming the lock for access control, refer to the *V Series Intelligent Programming Software User Manual* or the *V Series Handheld Terminal User Manual*.

For magnetic stripe card electronic locks

1 With the BEST logo facing toward you, insert and remove the temporary operator card, as shown in Figure 19.

   The green light flashes and the locking mechanism unlocks.

Temporary operator card
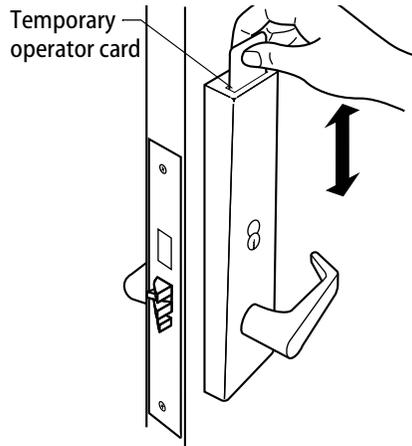
Figure 19

2 Turn the lever/knob and open the door.
3 Insert and turn the key to unlatch the door.

For keypad electronic locks

1 Enter the temporary operator PIN **99998**.
2 Press ✱.

   The green light flashes and the locking mechanism unlocks.

3 Turn the lever/knob and open the door.
4 Insert and turn the key to unlatch the door.

For proximity card electronic locks

1 Place the temporary operator card in front of the proximity reader, as shown in Figure 20.

   The green light flashes and the locking mechanism unlocks

Temporary operator card

Proximity reader

Figure 20

2 Turn the lever/knob and open the door.
3 Insert and turn the key to unlatch the door.

If the mechanism doesn't unlock, refer to the following table.

LEDs	Sounder	Access	You should…
	1 long tone	Denied	Use the token at a moderate speed.
Green stays on		Denied	Use the tempo-rary operator token, not the temporary com-munication token.
Green flashes		Denied	Connect the motor wires.
		Denied	Connect the battery and con-nect the out-side wire harness.

V Series Controller Installation Instructions

Use these installation instructions to install a V Series Controller. The controller allows the V Series electronics to be separate from a door's locking mechanism and to be located up to 500 feet away from the locking mechanism. The controller provides V Series electronic features for use with electrically-controlled locking devices.

The controller is well-suited to provide access control for:

■ exit devices
■ glass doors
■ non-standard doors
■ turnstiles
■ doors controlled by electric strikes or magnetic locks
■ electrically-operated mortise or cylindrical locks.

The controller is suitable for use with interior or exterior doors. The controller has an adaptable power supply input that accepts 12 to 24 volts AC or DC. A backup battery supports the controller's programming in the event of a power failure. All controller functions are shut down while under backup power.

The main role of the controller is to control the operation of the locking device connected to the controller. A reader can be connected to the controller to provide a means for users to access the door controlled by the controller.

Figure 2 shows the relationship between the controller and the other possible components in the access control system for the door.

The controller can accept a request-to-exit signal from a lock or a separate request-to-exit device, such as a button, can be connected to the controller. When someone turns a door knob with a request-to-exit feature, or presses a request-to-exit button, the controller does not trigger an alarm when the door is opened. If the controller is programmed for the RQE unlock feature, the controller also unlocks the door.

A remote unlock device, such as a button, can be connected to a controller. This device can be located away from the door. When someone, such as a receptionist, presses the remote unlock button, the controller unlocks the door if programmed for the remote unlock feature.

The controller can monitor the door's status. If the door is opened without use of a valid access method, the controller can trigger a door forced alarm. The controller can monitor whether the door has been open too long. The controller also can supervise a tamper switch, which can be used to protect the controller enclosure or another device. The controller's alarm output can trigger an external alerting device, such as a siren or strobe light, or a security system.

Installation overview

Caution: **To prevent damage, always wear a properly grounded electrostatic discharge (ESD) wrist strap when installing the controller.**

1 Prepare to mount the enclosure

a   Unpackage the controller.
b   Check that you have the following components, in addition to these instructions:
   ▲ enclosure with circuit boards and battery pack installed
   ▲ magnetic stripe reader (optional)
   ▲ keypad reader with *V Series Keypad Security Device Programming Guide* (optional)
   ▲ proximity reader (optional)

   ▲ remote RS-232 connector (optional)
   ▲ temporary access cards (for magnetic stripe and proximity readers only)
   ▲ *V Series Controller Enclosure Drilling Template* (V05).
c   Read these instructions carefully before you begin installation.

   Note: *Wire gauge and length requirements for each device to be connected to the controller are included in Figure 1.*

d   Reference the V05 template to select a location for the controller enclosure. Get four mounting screws suitable for the selected mounting surface.
e   If you are running cables to the enclosure through the wall or ceiling, drill any necessary cable entry holes for the cables.
f   Run all necessary cables to the selected mounting location.

2 Mount the enclosure

a   Referencing the V05 template, install the four mounting screws for the enclosure. Do not tighten the screws completely.
b   If you ran cables through the wall or ceiling to the enclosure, hold the enclosure near the selected mounting location and feed the cables through the appropriate cable entry holes into the enclosure.

   Note: *In addition to the cable entry hole in the back of the enclosure above the controller board, there are cable entry holes in the sides, top, and bottom of the enclosure.*

c   With the enclosure door removed, hang the enclosure on the four mounting screws and slide it into position so that the screws are in the narrow part of the keyhole-shaped mounting holes. Then, tighten the mounting screws.

3 Connect devices to the controller board

You can connect the devices listed below to the controller board. Refer to Table 1 and to Figure 1.

■ **Locking device**. Use the locking device output. Set the locking device jumper (J1).
■ **Magnetic stripe or proximity card reader or keypad reader** (optional). Use the reader output, reader communications input, and reader power output. Set DIP switches 1, 2, 3, 4, and 5. Also, set the power jumper (J3).

   Note: *Standard readers are the Mercury Security, MR–5 (magnetic stripe card reader), the Essex KTP–71212XX (keypad reader), the Motorola ASR603, and the HID MB–5398 (proximity readers). To determine whether another reader is compatible with the controller, refer to the specifications provided in Table 1 for the reader output, reader communications input, and reader power output.*

■ **Door status switch and/or door latch monitor** (optional). Use the door status/latch monitor input.
■ **Request-to-exit device** (optional). Use the request-to-exit input.
■ **Remote unlock device** (optional). Use the remote unlock input.
■ **Tamper switch** (optional). Use the tamper switch input.
■ **Security system or alerting device** (optional). Use the alarm output.
■ **Remote RS-232 connector** (optional). Use the controller board's RS-232 connector.
■ **Shielding & grounding**. Connect all cable shielding to the grounding screw located to the right of the circuit board. Then connect the grounding screw connection to earth ground.

Table 1—Controller inputs and outputs

Input/output	Description	Related DIP switches, jumpers, and programming tasks
Backup battery input	Input for the 4.8 volt nicad battery pack. In the event of a power failure, the battery pack temporarily powers the microprocessor until it can properly shut down.	Before you install the controller, we recommend you charge the backup battery pack in the controller for at least 48 hours.
	Note: *When changing batteries, dispose of old batteries in accordance with all federal, state, and local regulations.* *Caution:* **After a power interruption, the backup battery pack may require 48 hours to recharge. If another power interruption occurs within 48 hours, the controller might lose its programming.**	
Power input two (2) terminals (Polarity does not matter.)	Input for a 12 to 24 volts AC or DC at 0.75 amp power supply. *Caution:* **To prevent damage and injury, connect the power supply after all other connections have been made.**	None
Alarm output NC terminal NO terminal COM terminal	Relay output that can be used to signal a security system or activate an alarm input for an alerting device such as a siren, bell, or strobe light. This output can switch up to 1 amp at 24 volts AC or DC. This output is triggered by door open too long (DOTL), tamper, or door forced conditions.	Program the alarm output duration. For instructions, see the *V Series Intelligent Programmer Software User Manual*.
Locking device output NC terminal NO terminal COM terminal	Relay output used to unlock or lock an external locking device. This output can switch up to 5 amps at 24 volts AC or DC. To determine which terminals to use, consider how the locking device should operate when power fails at the controller. Refer to the appropriate table below based on whether the controller and locking device share one power supply or have two separate power supplies.	Set the locking device jumper (J1). To determine which jumper setting to use, consider how the locking device should operate when power fails at the controller. Refer to the appropriate table below based on whether the controller and locking device share one power supply or have two separate power supplies.

Table A—Controller and locking device share one power supply

	During power failure at the central controller	
	Locking device is fail-safe	**Locking device is fail-secure**
Terminals to use **Jumper setting to use**	NC & COM de-energized	NO & COM de-energized

Table B—Controller and locking device have two separate power supplies

	During power failure at the central controller			
	Fail-safe locking device should be		**Fail-secure locking device should be**	
	locked	**unlocked**	**locked**	**unlocked**
Terminals to use **Jumper setting to use**	NC & COM de-energized	NO & COM energized	NO & COM de-energized	NC & COM energized

Note: *A fail-safe locking device locks when power is applied, and unlocks when power is removed. A fail-secure device unlocks when power is applied, and locks when power is removed.*

Reader output RLED terminal GLED terminal SOUND terminal	Output that supplies 10 mA at 5 volts, and provides signals corresponding to the V Series Electronic Lock's green LED, red LED, and sounder. This output can be connected to the reader and used to provide visual and/or audio user feedback similar to the feedback provided by the electronic lock. For a description, see the *V Series Service Manual*. The table below shows the recommended color wiring connections for the standard readers—the Mercury Security, MR–5 (magnetic stripe card reader), the Essex KTP–71212XX (keypad reader), and the Motorola ASR603, and the HID MB–5398 (proximity readers).	Set controller DIP switch 1. **Note:** *For readers with a single two-color LED, set DIP switch 1 ON. For readers with two separate LEDs, set DIP switch 1 OFF.* The table below shows the recommended controller DIP switch settings for the standard readers—the Mercury Security, MR–5, the Essex KTP–71212XX, the Motorola ASR603, and the HID MB–5398.

Term	Mercury	Essex	Motorola	HID
RLED	None	Blue	None	Brown
GLED	Brown	Brown	Brown	Orange
SOUND	Orange	None (sounder gives keypad feedback only)	Blue	Yellow

Reader	S1
Mercury Security	ON
Essex	OFF
Motorola	ON
HID	ON

For the Mercury Security, MR–5 (magnetic stripe card reader), set DIP switch 2 *on the reader itself* to OFF.

Table 1—Controller inputs and outputs

Input/output	Description	Related DIP switches, jumpers, and programming tasks
Reader communications input DATA terminal STRB terminal CARDPR terminal	Input for an ABA signal consisting of a data signal and a strobe signal (and sometimes a card present signal). **Note:** *The strobe signal sometimes is called "clock."* The table below shows the wiring connections for the standard readers—the Mercury Security, MR–5, the Essex KTP–71212XX, the Motorola ASR603, and the HID MB–5398. **Term** **Mercury** **Essex** **Motorola** **HID** DATA Green Green Green Green STRB White Red White White CARDPR None None None None PWR Red Orange Red Red GND Black Yellow Black Black	Set controller DIP switches 2, 3, 4, and 5. See Table C for the switch settings for various reader types.
Reader power output PWR terminal GND terminal	Output that provides 5 volts DC at up to 100 mA, or 12 or 24 volts DC at up to 200 mA, to the reader. The table above shows the wiring connections for the standard readers. **Note:** *The standard readers — the Mercury Security, MR–5, the Essex KTP–71212XX, the Motorola ASR603, and the HID MB–5398 — operate at the optimal voltage — 12 volts.*	Set the power jumper (J3). ***Caution:*** **To prevent damage to the reader, set the power jumper (J3) before supplying power to the controller.** For the standard readers, set the jumper to the 12 V position.
RS-232 connector	Connector for use when programming the controller using a PC. To program the controller, connect a remote RS-232 connector to this connector. Then, connect the PC to the remote connector using either the laptop cable or the palmtop cable. Alternately, connect a PC directly to this connector using either the laptop cable or the palmtop cable. See Figure 3.	When programming using the RS-232 connector, DIP switch 6 must be set to the OFF position.
Door status/latch monitor input DOOR terminal GND terminal	Input that signals the status (open or closed) of the door. To monitor door status, you can use a door contact and/or a latch switch. Use the door contact to monitor whether the door is closed. Use the latch switch to monitor whether the lock's latch is out (secure) or in (not secure). Thus one or both of these sensors can be used to determine whether the door has been secured. When used in combination, the door contact and latch switch must be either both normally closed contacts or both normally open contacts. If both contacts are normally closed, wire the devices in series. If both contacts are normally open, wire the devices in parallel.	Program the controller to generate door forced alarms and/or door open too long alarms. For instructions, see the *V Series Intelligent Programmer Software User Manual*.
Request-to-exit input RQE terminal GND terminal	Input for a switch contact that signals the controller to unlock the door and/or to not trigger an alarm while the door is unlocked or exited. If the lock has a built-in request-to-exit output, connect that output here. Or you can connect a separate request-to-exit device, such as a button.	Program the controller for request-to-exit operation. For instructions, see the *V Series Intelligent Programmer Software User Manual*.
Remote unlock input REMOTE terminal GND terminal	Input for a switch contact that signals the controller to unlock the door. A remote unlock device, such as a button, can be connected to this input. This device can be located away from the door. When someone, such as a receptionist, presses the button, the input signals the controller to unlock the door.	Program the controller for remote unlock operation. For instructions, see the *V Series Intelligent Programmer Software User Manual*.
Tamper switch input TMPR terminal GND terminal	Input for a switch contact that signals the controller when a tamper switch has been triggered. You can use a tamper switch to protect the controller enclosure or another device.	None
Handheld connector	Connector for programming the controller using a handheld terminal. Connect the handheld cable to this connector. **Note:** *This connector also can be used when programming using a PC. Connect the PC-to-lockset adapter cable to this connector.*	When programming using the handheld connector, DIP switch 6 must be set to the ON position. After programming, set switch 6 back to the OFF position.

4 Connect the power supply to the controller board

Caution: **To prevent damage and injury, connect the power supply after all other connections have been made.**

Connect the 12 to 24 volts AC or DC at 0.75 amp power supply to the controller board's power input. Refer to Table 1 and to Figure 1.

5 Finish the Installation

a When you've finished making connections to the controller board, dress all cables so they do not interfere with installation of the enclosure door.
b Install the enclosure door.

Programming the controller

You can use either a V Series Handheld Terminal or an IBM-compatible PC running the V Series Intelligent Programmer Software (IPS) to program the controller.

To program the controller using a handheld terminal:

a Connect the handheld cable to the controller's handheld connector, shown in Figure 1.
b Place controller DIP switch 6 in the ON position.
c Follow the instructions in the *V Series Handheld Terminal User Manual*.
d When you've finished programming the controller, place DIP switch 6 back in the OFF position.

To program the controller using a PC running the IPS:

a Connect the palmtop cable or laptop cable to the controller's remote RS-232 connector or to the RS-232 connector on the controller board, shown in Figure 1.
b Follow the instructions in the *V Series Intelligent Programmer Software User Manual*.

Specifications

Enclosure size: 12″ x 12″ x 3″

Normal operating temperature: −40°F to +158°F (−40°C to +70°C)

Storage temperature: −58°F to +176°F (−50°C to +80°C)

Relative humidity: 10% to 90% non-condensing for indoor installations

Figure 1—Controller board wiring diagram

T61920/Rev A 1768984 ER-7991-1

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Caution: **To prevent damage, always wear a properly grounded electrostatic discharge (ESD) wrist strap when installing the controller.**

Caution: **To avoid injury, do not touch the heat sink. It may be hot.**

To communicate with a handheld, connect to handheld cable.

Handheld connector

Backup battery input

BATTERY BACKUP

Locking device jumper *See Table A and B*

DE-ENERGIZED ENERGIZED
K1 CONDITION

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XV Control Electronics
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DIP switches *See Table C.*

Power input

J2

12-24V AC/DC

Connect to 12 to 24 V AC/DC power supply. See Note A.

Caution: **To prevent damage and injury, connect the power supply after all other connections have been made.**

HANDHELD P1

J7: GND VPP SPD SPC +5V MFG. PROG

J5 STATUS SIGNALS: GND, SPARE, GND, TMPR, GND, REMOTE, GND, RQE, GND, DOOR

Spare input

Tamper switch input

Remote unlock input

Request-to-exit unlock input

Door status/ latch monitor input

See Note B.

ALARM — P6: NC NO COM
LOCK SERVICE — P5: NC NO COM
READER SIGNALS — P4: RLED GLED SOUND SPARE OUT DATA STRB CARDPR PWR GND SPARE IN

J4

J3: +5V +12V +24V

P7 RS-232

Alarm output
See Note A.

Locking device output
See Note A Table A and Table B.

Reader output

Reader communications input

Reader power output

See Note B.

Reader power jumper

RS-232 connector

Connect to remote RS-232 connector. Or, to communicate with a PC, connect to palmtop cable or laptop cable.

Grounding screw

Connect all cable shields to the grounding screw. Then connect the grounding screw to earth ground.

Table A—Controller and locking device share one power supply

| | During power failure at the central controller | |
	Locking device is fail-safe	Locking device is fail-secure
Terminals to use	NC & COM	NO & COM
Jumper setting to use	de-energized	de-energized

Table B—Controller and locking device have two separate power supplies

| | During power failure at the central controller | | | |
| | Fail-safe locking device should be | | Fail-secure locking device should be | |
	locked	unlocked	locked	unlocked
Terminals to use	NC & COM	NO & COM	NO & COM	NC & COM
Jumper setting to use	de-energized	energized	de-energized	energized

Table C—Standard reader DIP switch settings

Reader	S1	S2	S3	S4	S5	S6
Mercury Security, MR-5	Note C	ON	ON	ON	OFF	Note D
Essex, KTP-71212XX	Note C	ON	ON	ON	OFF	Note D
Motorola ABA	Note C	OFF	OFF	OFF	OFF	Note D
Motorola Weigand	Note C	ON	OFF	OFF	OFF	Note D
HID ABA reader with HID ABA card	Note C	OFF	ON	OFF	OFF	Note D
HID ABA reader with HID 26 bit Weigand card	Note C	ON	ON	OFF	OFF	Note D
HID ABA reader with HID 37 bit Weigand card	Note C	OFF	OFF	ON	OFF	Note D
Handheld Terminal communications	Do not move switches 1–5					ON

Note A: To determine the appropriate wire gauge and length, refer to Minimum Gauge Wire Chart for Lock Circuits.

Note B: We recommend you use 22 AWG shielded cable no more than 500' long.

Note C: Use switch 1 to set the LED and sounder output for various readers. *See* Reader Output on page 2.

Note D: Use switch 6 for handheld terminal communications only. Leave the switch in the off position normally.
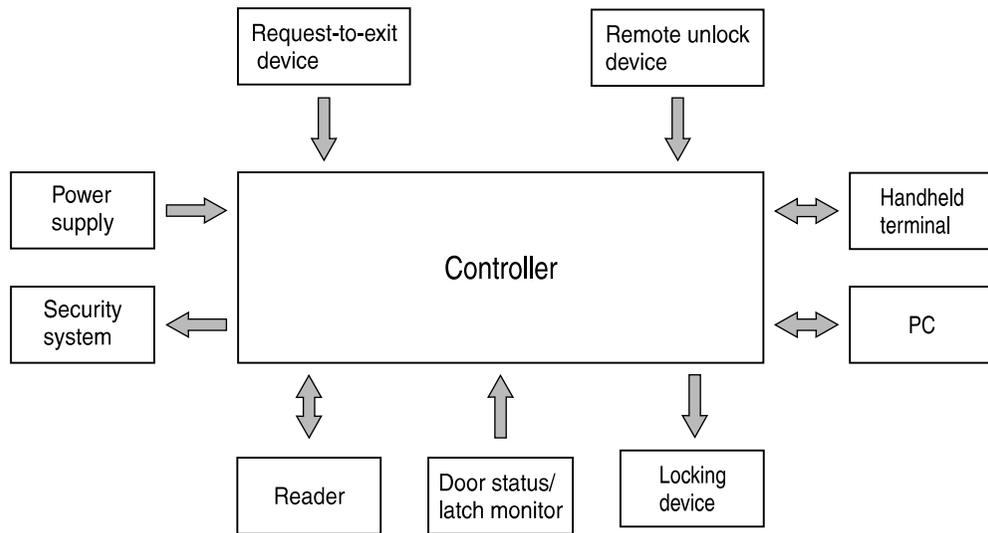
Figure 2—Block diagram

Figure 3—RS–232 wiring diagram

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