

FIELD MANUAL · VOLUME 09

Door. Code. Standard.

Door classification, fail-mode logic, hardware, gates, power and code for luxury residential construction. Fail-safe is a code decision.

PREPARED FOR

Architects · Door Consultants · GCs · Electricians · Locksmiths · Gate Installers · Owner's Reps

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MANIFESTO

Fail-safe is a code decision. Not a field preference.

Door classification, occupancy use, and the AHJ determine the unlock mode under power loss — written and on file before any hardware is ordered. Every controlled opening succeeds or fails before the strike is energized. It succeeds when the door is classified on the schedule, when power supply, PoE, and backup battery are sized to the load and confirmed at the controller, when conduit, J-box, and reader/REX/DPS pulls are roughed-in before drywall closes, and when gate operators meet UL 325 7th Edition entrapment with two independent monitored means per direction. It fails when any of those decisions slides downstream to the access control installer at the door.

The door is the system — not just the slab in the frame. Frame material, strike pocket preparation, hinge electrification, power transfer device, reader mounting height, DPS, REX, lock hardware, and the controller circuit are one assembly, coordinated in the design stage and confirmed at the pre-door rough-in gate before drywall closes. PDK io and Brivo separate the physical credential plane from access policy — the credential lives on the wall, the logic lives in the cloud — but neither platform resolves a fail-mode that was not decided at door classification. NFPA 101 §7.2 governs free egress; NFPA 80 governs positive latching on fire-rated assemblies; UL 325 7th Edition governs gate entrapment. None of those are installer preferences. All are code decisions, made in writing, before the hardware order ships.

HOW TO USE THIS MANUAL

Sections are numbered §01 through §13. Each section opens with a kicker, explains the operating principle, references the governing standard, and closes with field rules and inspection callouts. The QC gate at the back of the manual matches the 10-item checklist walked at install, commissioning, and owner handoff. Residential scope only — all door types and access control considerations are framed around luxury residential construction.

CALLOUT LEGEND

FIELD RULE A non-negotiable rule applied on site, every job.

BEST PRACTICE Restrepo standard above code minimum. Default unless waived in writing.



DO NOT	Conditions we refuse to ship. Pull and rework, no exceptions.
INSPECTION	What the architect, door consultant, or owner's rep checks at QC.
NOTE	Context, citation, or platform clarification.
SPECIFICATION	A number, tolerance, or model that must be matched exactly.

CONTENTS

Table of Contents

Four parts, thirteen sections, one QC gate. Linked to bookmarks in this PDF.

01	Operating Principles	p. 7
02	Door Classification & Code Authority	p. 9
03	Without Written Direction — Do Not Default	p. 11
04	PDK io — Cloud Hub & Door Controllers	p. 15
05	Brivo — Estate Cloud Access	p. 17
06	LiftMaster Gate Operators & UL 325 Compliance	p. 19
07	Crestron Home, Control4 & Lutron Integration	p. 21
08	Electric Strikes, Maglocks & Electrified Hardware	p. 23
09	Door Frame, Hinge & Hardware Coordination	p. 27
10	Power Supply, PoE & Backup Battery	p. 29
11	Pre-Door Inspection — Rough-In Gate	p. 31
12	Commissioning & Owner Handoff	p. 35
13	Access-Stage QC, Spares & Closeout	p. 37

PART 1

Operating Principles

Sections 01–03 — the door is the system; classification; what we refuse without writing

§ 01

Operating Principles

THE DOOR IS THE SYSTEM

Access control is a design discipline, not an installer preference. The mode a door assumes on power loss — fail-safe unlocking, fail-secure locking — is determined by the door's classification under NFPA 101, its fire rating under NFPA 80, the occupancy category per IBC, and any overlay from the authority having jurisdiction. That determination is made in writing, entered on the door schedule, and held on file before any hardware is ordered. The field does not interpret code at the strike pocket. The field executes a written classification that the design team has already resolved. When that classification is missing, the field holds the run and escalates — it does not default to a mode that seems reasonable at the door.

Every controlled door has a written schedule entry covering: fire rating or non-fire-rated status, egress or non-egress classification, fail-safe or fail-secure mode, hardware model, power circuit, battery runtime, and controller location. PDK io and Brivo cloud-managed platforms separate the credential plane from access policy — the reader and strike are a construction discipline; the credential, schedule, and access level are owner decisions executed in the cloud platform. Neither platform resolves a fail-mode that was not decided at door classification. The integrator's scope of authority ends at the door schedule. The chain of documentation flows from the AHJ to the architect to the integrator to the field, and it is not reversed by a field substitution, a verbal change order, or a manufacturer's default setting.

FIELD RULE

FIELD RULE — Door schedule before hardware order

No hardware is ordered for any controlled opening until the door schedule entry is complete: fire rating, egress classification, fail mode, hardware model, power circuit, battery runtime, and controller location — all confirmed in writing by the architect or engineer of record. A door without a completed schedule entry is removed from the hardware order until the entry is resolved. The field does not substitute a hardware model or a fail mode without a signed change order.

INSPECTION STANDARD

INSPECTION — Pre-hardware-order schedule review

Before any access control hardware is ordered, the Restrepo PM reviews the door schedule with the door consultant, architect, and integrator. Confirm every controlled door has a written fail-mode entry, a listed hardware model, a power circuit assignment, and a controller location. Confirm that every fire-rated door in the schedule is marked fail-secure and that no fail-safe strike is specified on a fire-rated assembly. Document the review and file it in the project record.



NOTE**NOTE — Credential on the wall, logic in the cloud**

PDK io and Brivo treat the access controller as a field-installed hardware device and the credential, schedule, and access level as cloud-managed owner decisions. The installer provisions the hardware. The owner or their authorized administrator manages credentials, access levels, and event logs through the platform. Field technician test credentials are deleted from the platform at commissioning closeout — they are never left active in a production system handed to the owner.

§ 02

Door Classification & Code Authority

CLASSIFY BEFORE THE HARDWARE ORDER — NO EXCEPTIONS

Door classification is the foundation of every access control decision on the project. A door that is fire-rated under NFPA 80 requires positive latching — a fail-safe electric strike on a fire-rated assembly eliminates positive latching and voids the fire rating. A door that is a means of egress under NFPA 101 §7.2.1.5 requires free egress — a fail-secure lock on a primary egress path violates the Life Safety Code unless an AHJ-approved controlled-egress exception is on file. A delayed-egress door under NFPA 101 §7.2.1.6.1 has a standard delay of 15 seconds after application of force; the 30-second delay is permitted only where the AHJ has approved it in writing, and the building must be protected throughout by an approved supervised automatic fire detection or sprinkler system. None of these determinations are made in the field.

UL 294 governs access control units under the ALVY and FWAX certification categories. UL 1034 governs burglary-resistant locking mechanisms under CVXS, CVXY, and CVYT categories. The 2024 IBC clarification requires that electromechanical or electromagnetic locking devices be listed in accordance with either UL 294 or UL 1034 for access-controlled openings. BHMA A156.23 governs electromagnetic locks; A156.24 governs delayed-egress locking systems; A156.25 governs electrified locking systems including locking devices, input devices, controlling devices, and power supplies. Vehicular gate operators on residential driveways must comply with UL 325 7th Edition (effective August 1, 2018), which requires two independent monitored means of entrapment protection per direction of travel, and ASTM F2200 governs the gate structure itself. IBC 2009 and subsequent editions require gate and door operators to be labeled and listed to UL 325.

SPECIFICATION

SPECIFICATION — Fail-safe vs. fail-secure decision matrix

Primary egress door (NFPA 101 §7.2.1.5): fail-safe. Fire-rated non-egress door (NFPA 80): fail-secure — fail-safe strike voids fire rating. Interior controlled non-egress door: fail-secure acceptable; document in writing. Delayed-egress door (NFPA 101 §7.2.1.6.1): fail-safe on power loss; 15-sec standard; 30-sec by AHJ written approval only. Fire-rated stairwell reentry door: electric latch retraction lockset — not a strike. Vehicular gate: two independent UL 325 entrapment means per direction.



DO NOT**DO NOT — Fail-safe strike on any fire-rated assembly**

A fail-safe electric strike on a fire-rated door assembly eliminates positive latching, which is required by NFPA 80 for all fire-rated swinging doors. The fire rating is voided — not reduced, not compliant with a variance, voided. On any fire-rated door, specify a fail-secure electric strike or an electric latch retraction device (Adams Rite 8800 EL/MLR) where both latching and reentry are required. The field does not install a fail-safe strike on a fire-rated door without a signed deviation from the architect and AHJ on file.

FIELD RULE**FIELD RULE — Delayed-egress defaults to 15 seconds**

The field programs all delayed-egress devices to 15 seconds as the default per NFPA 101 §7.2.1.6.1. The 30-second delay is not programmed without written AHJ approval in the project file. Signage is installed on the door leaf adjacent to the release device reading: 'PUSH UNTIL ALARM SOUNDS. DOOR CAN BE OPENED IN 15 SECONDS.' The audible alarm at the door is confirmed functional at commissioning. Immediate release on sprinkler actuation, heat detector, or smoke detector activation, and on loss of power, is confirmed at commissioning before owner occupancy.

INSPECTION STANDARD**INSPECTION — UL listings confirmed before installation**

Before any access control hardware is installed, confirm: UL 294 listing on every access control unit (ALVY/FWAX category). UL 1034 listing on every burglary-resistant locking device (CVXS/CVXY/CVYT category). BHMA A156.31 Grade 1 on every electric strike. UL 10C fire-rated listing on every strike installed on a fire-rated assembly. UL 325 listing on every gate operator and its paired entrapment protection sensors. All listing marks are visible on installed hardware and documented in the AHJ package.

§ 03

Without Written Direction — Do Not Default

VARIANCES LIVE ON PAPER, NOT AT THE DOOR

Access control hardware decisions carry code, life-safety, and warranty consequences that cannot be corrected after the door is hung, the drywall is closed, and the credential system is commissioned. The seven items on the Without-Written-Direction list below name the specific conditions the Restrepo field does not resolve unilaterally at the door. Every one of them must be settled in the project record before work proceeds: confirmed in writing, signed by the design team or owner's representative, and logged against the door schedule. A verbal field change, a GC approval by phone, or a site memo without a signature does not constitute written direction. The BX/MC wiring method, a non-standard fail mode, or a platform substitution that is not on the written direction list is framed as a deviation requiring written approval — never as a prohibited condition resolved by installer judgment alone.

The field installer's obligation is to hold the run and escalate — not to resolve the variance at the door. The project manager's obligation is to have resolved every item on this list before the installer arrives at the opening. Any deviation from these items requires a signed change order before work proceeds. The list applies to every door and gate in scope on every project regardless of construction phase, schedule pressure, or owner instruction delivered verbally on site.

DO NOT

DO NOT — Seven conditions without written direction

Maglock as sole hardware on a fire-rated door — maglocks do not positively latch; fire rating voided unless architect and AHJ confirm in writing. Delayed-egress timing programmed to 30 seconds — NFPA 101 default is 15 seconds; 30 seconds requires AHJ written approval in the project file. Fail-secure mode on a primary egress door — voids NFPA 101 §7.2.1.5 free egress unless an approved controlled-egress exception is on file. Gate operator energized without two independent UL-listed model-compatible entrapment protection means per direction of travel — UL 325 7th Edition. Z-Wave or Wi-Fi-only battery lock as sole credential path on a perimeter entry — owner risk acknowledgment required in writing. Brivo ACS6000 powered from 24 VDC — boards require 12 VDC; 24 VDC causes irreversible board damage. Hardware installed on any door that has not passed the §11 Pre-Door Inspection.

FIELD RULE**FIELD RULE — Verbal is not written direction**

If the direction is not on paper — signed by the design team or owner's representative and logged against the door schedule — it does not exist. The installer holds the run and calls the Restrepo PM. The PM records the variance as a formal change order, obtains written direction, and releases the run only after the signed document is on file. No exceptions, no retroactive written direction after hardware is installed or commissioned.

PART 2

Platforms & Hardware

Sections 04–08 — PDK io, Brivo, LiftMaster gates, Crestron/C4/Lutron, strikes & maglocks

§ 04

PDK io — Cloud Hub & Door Controllers

CLOUD NODE ALWAYS REQUIRED — SINGLE IO AT EACH DOOR

ProdataKey (PDK io) is the cloud-managed access control platform of record for Restrepo luxury residential projects. The system architecture is: one Red Cloud Node (RCNEW) as the system hub, with distributed Single io (1DPOE) controllers at each door, or one Eight io (8DE/8DW) in a central equipment room for multi-door installations where wire runs can be held under 98.5 feet. The Cloud Node is always required — no PDK io controller operates without it. The Single io receives power via a 30-watt PoE+ injector compliant with IEEE 802.3at Class 4; do not energize a Single io from a standard PoE (802.3af) injector or a switch port, which provides only 15.4 watts and will not sustain the controller and door hardware load. The 30-watt wattage must be confirmed at the patch panel before the controller is energized.

The Red Cloud Node operates on 12 to 24 VDC input and provides an onboard 14 VDC 2A Class 2 power supply. The recommended backup battery is a 12 VDC 8 Ah sealed lead-acid; this provides the minimum 30-minute backup required for UL 294 Standby Power II compliance and supports the residential 4-hour runtime standard when paired with appropriately sized supplies. The Cloud Node communicates over Ethernet and WiMAC wireless mesh (2.4 GHz / IEEE 802.15.4) with AES-128 encryption and a 1-mile line-of-sight wireless range — useful for gate operator and outbuilding coverage on estate properties. The Eight io controller receives 12 VDC from an Altronix SMP10 power supply (sold separately), provides a 10-ampere concurrent output bus, requires a 12 VDC 5.0 Ah backup battery, and does not support PoE — PoE is available only on the Single io model. The UL 294 wire-run limit of 98.5 feet (30 meters) applies to every controller-to-device wire regardless of controller model; install distributed Single io units if any run exceeds that limit.

SPECIFICATION

SPECIFICATION — PDK io controller power and wire limits

PDK Single io: 30W PoE+ injector (IEEE 802.3at Class 4). PDK Red Cloud Node: 12–24 VDC input; 14 VDC 2A onboard; 8 Ah backup; AES-128 encryption; 1-mile WiMAC line-of-sight wireless. PDK Eight io: 12 VDC from Altronix SMP10; 10A bus; 5.0 Ah backup; no PoE. UL 294 wire-run limit: all controller-to-device wire less than 98.5 ft (30 m). UL-listed direct plug-in power supply within 6 ft of the panel, visible after install. Reader wiring: 22/5 or 22/6 stranded; REX wiring: 18/4; DPS wiring: 22/2.

FIELD RULE**FIELD RULE — PoE wattage confirmed before energizing**

Before a PDK Single io controller is energized, confirm the PoE injector at the patch panel is rated at 30 watts minimum. A standard PoE port or a 15.4-watt injector will not sustain the Single io under door hardware load. The wattage confirmation is logged in the commissioning record. Any patch panel substitution that reduces PoE budget below 30 watts per port triggers a change order before the controller is installed.

INSPECTION STANDARD**INSPECTION — Wire-run compliance at rough-in**

At pre-door rough-in inspection, measure every pull from the PDK controller location to the reader J-box, strike pocket, REX, and DPS. Any run at or above 98.5 feet triggers a redesign: relocate the controller or add a distributed Single io unit. Wire-run lengths are logged on the as-built door schedule. The Cloud Node location, Ethernet connection, and backup battery are confirmed accessible and within 6 feet of the UL-listed power supply before drywall closes.

BEST PRACTICE**BEST PRACTICE — REX sensor settle time**

After mounting the PDK REX sensor at 7 to 15 feet on the interior frame or wall, wait 3 minutes before performing the walk-test. The PIR detector requires this settle period to stabilize its reference thermal baseline. Testing before the settle period produces false results. Set relay dwell time — typically 3 to 10 seconds — long enough for the door to fully open and the person to clear the threshold. Narrow the detection pattern to avoid false triggers from adjacent foot traffic in hallways or adjacent rooms.

§ 05

Brivo — Estate Cloud Access

12 VDC BOARD ONLY — 24 VDC KILLS THE BOARD

Brivo is the second cloud-managed access control platform on the Restrepo approved list. The Brivo ACS6000 control panel is the hardware layer; Brivo Onair is the cloud software layer where all credentials, access schedules, and event logs reside. The ACS6000 main board and all door boards require 12 VDC supply power — applying 24 VDC to any ACS6000 board causes immediate and irreversible damage to the board. This is the single most consequential power specification in the Brivo installation: a 24-volt supply on the same bus as an ACS6000 board is a destroyed board, not a tripped circuit breaker. Dual-voltage installations — where 12 VDC powers the board and 24 VDC powers locking devices — require two separate power supplies or a Life Safety Power FPO plus B100 combination; a shared 24 VDC bus is never used.

Distance limits on the ACS6000 are hard constraints set by the panel's low-voltage architecture. The chassis-to-transformer maximum distance is 100 feet — the power supply must be within 100 feet of the panel enclosure. The door board to strike maximum distance is 500 feet — door hardware beyond this limit requires a secondary power supply at the door. The maximum distance to the first expansion chassis is 1,500 feet. The ACS6000 panel requires TCP/IP with internet access to Brivo cloud servers; LAN configuration is performed by the IT trade per the Panel Networking Admin Interface Guide issued by Brivo on panel registration. Three cloud tier options are available: Brivo Onair (standard cloud), Brivo Access (simplified cloud), and Brivo Onsite (on-premise server for estates requiring air-gapped or low-latency operation). The owner administrator account is created and confirmed active before any field technician credentials are removed from the system at closeout.

SPECIFICATION

SPECIFICATION — Brivo ACS6000 power and distance limits

Board power: 12 VDC only — blue (+) and white (-) from power harness. 24 VDC on any ACS6000 board causes immediate irreversible damage. Chassis-to-transformer maximum: 100 ft. Door board to strike maximum: 500 ft. First expansion chassis maximum: 1,500 ft. Dual-voltage: two supplies or LSP FPO + B100 — never a shared 24 VDC bus. Network: TCP/IP with internet access to Brivo cloud servers required.

DO NOT**DO NOT — Apply 24 VDC to any ACS6000 board**

The Brivo ACS6000 main board and all door boards operate at 12 VDC. No 24 VDC source is placed on the same supply bus as any ACS6000 board without a confirmed dual-voltage architecture documented in the system design. The failure mode is immediate and irreversible — the board is destroyed, not recoverable. Verify supply voltage with a meter before connecting. Label every ACS6000 power supply with its voltage at installation.

FIELD RULE**FIELD RULE — Owner admin account before field credential removal**

Before any field technician credential is removed from the Brivo Onair platform at closeout, confirm the owner administrator account is active, the owner has logged in with their chosen credentials, and the access event log shows a confirmed owner login. Only then are all temporary installation credentials deleted. The deletion is confirmed in the commissioning record with a screen capture of the empty technician credential list.

INSPECTION STANDARD**INSPECTION — Distance limits measured at rough-in**

At rough-in inspection, measure the run from the power supply to the ACS6000 chassis. Any run at or above 100 feet requires a relocated power supply or a secondary supply at the panel. Measure the run from each door board to its strike. Any run at or above 500 feet requires a secondary power supply at the door. Distances are logged on the as-built door schedule. The LAN connection to Brivo cloud servers is confirmed active and the panel is registered in Brivo Onair before the commissioning record is signed.

§ 06

LiftMaster Gate Operators & UL 325 Compliance

TWO INDEPENDENT ENTRAPMENT MEANS PER DIRECTION — NO EXCEPTIONS

Residential vehicular gate operators on luxury estate driveways are governed by UL 325 7th Edition, effective August 1, 2018, and the gate structure itself is governed by ASTM F2200. UL 325 requires two independent means of entrapment protection per each direction of gate travel — opening and closing. The first means is the inherent sensor built into the gate operator, the auto-reverse or force-sensing system. The second means is an external monitored entrapment protection device — a photo eye, edge sensor, or equivalent — that must be UL-listed and model-compatible with the specific gate operator. The external sensor and the operator are a tested system, not mix-and-match components; LiftMaster monitored entrapment devices must be used with LiftMaster operators. A gate operator with a missing or failed external sensor is not permitted to operate in fully automatic mode — it monitors for sensor fault conditions and disables automatic operation until the sensors are installed and confirmed.

Three LiftMaster residential gate operator models cover the range of luxury estate gate applications. The RSW12UL is the standard residential swing gate operator: 16-foot maximum gate width, 1,000-pound maximum gate weight, 12 VDC motor, integrated myQ connectivity, battery backup rated for 147 cycles or 63 days standby, solar-ready, and listed to UL 325 and UL 991. The RSL12UL is the residential slide gate counterpart: 25-foot maximum gate width, 800-pound maximum gate weight, 12 VDC, integrated myQ, and battery backup. The CSW24UL is the high-traffic swing operator for staff or service estate entries: 18-foot maximum gate width, 1,600-pound maximum gate weight, 24 VDC motor, million-cycle rated. Pedestrian access must always use a separate gate or door — vehicle gate operators are not designed for pedestrian use and no exceptions exist. Access controls are mounted at least 6 feet from any moving gate part, positioned so a user cannot reach over, under, or through the gate.

SPECIFICATION

SPECIFICATION — LiftMaster residential gate operators

RSW12UL: residential swing; 16 ft max / 1,000 lb max; 12 VDC; myQ integrated; battery backup (147 cycles / 63 days standby); solar-ready; UL 325 + UL 991. RSL12UL: residential slide; 25 ft max / 800 lb max; 12 VDC; myQ; battery backup. CSW24UL: high-traffic swing; 18 ft max / 1,600 lb max; 24 VDC; million-cycle rated. UL 325 7th Edition effective August 1, 2018. ASTM F2200 gate construction required. Pedestrian separation: separate gate or door required — no exceptions.



FIELD RULE**FIELD RULE — Gate operator not energized without both entrapment means confirmed**

No residential gate operator is energized for commissioning or handed to the owner until both UL 325 entrapment protection means are confirmed installed, powered, and functional per direction of travel. The inherent reversing system and the external monitored photo eyes or edge sensors are both tested. The operator's fault monitoring is confirmed to disable automatic operation when a sensor fault is simulated. Entrapment zone is marked and photographed for the commissioning record.

BEST PRACTICE**BEST PRACTICE — myQ to Crestron Home via Intrinsic Dev driver**

For Crestron Home OS estates, the official myQ integration uses the Intrinsic Dev licensed driver released June 2024. This driver controls up to 12 myQ-connected gate and garage operators, requires an active internet connection, and presents natively in the Crestron Home interface. It is the only officially licensed Crestron Home myQ integration. For Control4 systems, no native official myQ driver exists — relay bypass or HomeBridge routing are workarounds, not official integrations. Document the platform limitation in the commissioning record.

INSPECTION STANDARD**INSPECTION — UL 325 entrapment verification at commissioning**

At commissioning, walk the gate entrapment zone with the gate installer and the Restrepo PM. Confirm: inherent reversing system activates on contact per UL 325 requirements. External photo eye or edge sensor triggers immediate stop and reversal. Simulated sensor fault disables automatic operation. Pedestrian separation gate or door confirmed separate and functional. Access control mounting distance from gate confirmed at 6 feet minimum. All confirmations logged in the commissioning record before owner handoff.

§ 07

Crestron Home, Control4 & Lutron Integration

PLATFORM-NATIVE LOCK DRIVERS — NEVER A LUTRON DIMMER

Crestron Home OS 4.5 and later supports native lock integration through the infiNET EX wireless mesh protocol. The locks supported natively — all purchased through Crestron with the infiNET EX radio module — are: Yale Pro 2 (YRD614, YRD624, YRD634, YRD654), Yale Assure (YRD216, YRD226, YRD240, YRD246, YRD256), Yale nexTouch lever (NTB620), Baldwin Boulder and Soho series with infiNET EX module, and Kwikset SmartCode 914/916 with infiNET EX module.

Crestron Home OS 4.5 also introduced the third-party door lock driver type, which allows any wireless lock with a CSP-authored driver to integrate fully into the Crestron Home access control section with user management, PIN codes, access permissions, and user profiles per door.

Control4 lock integration uses platform-native Zigbee and Z-Wave Plus protocols. The Yale Assure and Yale nexTouch locks use the AYR202 Zigbee module from SnapAV/Control4; the AYR202 is not a routing node and requires proximity to existing Zigbee repeating devices such as switches or dimmers. The Schlage Connect Smart Deadbolt uses Z-Wave Plus and requires a Control4 Z-Wave module in the controller. The Baldwin Home Connect uses Zigbee with a certified Control4 driver. AYR202 Zigbee modules have experienced availability constraints — confirm procurement lead time before specifying. Lutron HomeWorks integration uses the HWI-CCI-8 contact closure input interface: 8 dry-contact inputs, two-pair twisted shielded keypad link wiring, 4,000-foot maximum distance from the wired HomeWorks processor, powered from the processor keypad link at 15 VDC. The reverse path — Lutron keypad triggering a door unlock — uses the HWI-CCO-8 contact closure output interface. Neither the CCI nor CCO is ever connected to a Lutron dimmer circuit.

SPECIFICATION

SPECIFICATION — Lutron HWI-CCI-8 and HWI-CCO-8

HWI-CCI-8: 8 dry-contact closure inputs; normally-open or normally-closed programmable. Keypad link: two-pair twisted shielded — one pair 18 AWG (power, terminals 1 and 2), one pair 18 to 22 AWG (data, terminals 3 and 4). Maximum 4,000 ft (1,220 m) from HomeWorks wired processor. Counts as 1 of 32 addresses on keypad link. Powered from HomeWorks processor at 15 VDC. HWI-CCO-8: 8 individually-controlled outputs; normally-open and normally-closed; momentary or maintained — never connected to a Lutron dimmer.

BEST PRACTICE**BEST PRACTICE — Welcome Home scene via CCI integration**

On Lutron HomeWorks estates, configure the Welcome Home scene: an access event at the front door reader triggers the access controller's dry-contact output (HWI-CCO-8 compatible), which closes a contact on the HWI-CCI-8. The HomeWorks system reads this as a keypad button press and executes the Welcome Home scene — lighting, shading, HVAC setpoint, and audio — simultaneously with credential presentation at the door. Test the end-to-end sequence at commissioning and log the result: keypad button press to door unlock event, with timestamps.

NOTE**NOTE — Control4 myQ limitation**

As of 2024 there is no native official Control4 driver for myQ that matches the Crestron official integration. Control4 integrators use relay bypass or HomeBridge routing as workarounds. This is a platform limitation, not a defect in the installation. Document the workaround method in the commissioning record and disclose it to the owner before system acceptance.

INSPECTION STANDARD**INSPECTION — Lutron CCI end-to-end test**

On every Lutron HomeWorks keypad programmed to trigger a door unlock event, verify the complete sequence at commissioning: keypad button press triggers the HWI-CCO-8 contact closure output, the access controller receives the input, an unlock event is logged in the access control platform, and the door releases. Confirm on every integrated keypad. Log each test with timestamp and door reference in the commissioning record. Any failure in the chain is a defect — hold the system for rework before owner handoff.

§ 08

Electric Strikes, Maglocks & Electrified Hardware

DIODE AT EVERY TERMINAL — NO EXCEPTIONS

Electric strikes, electromagnetic locks, and electrified hardware are the electromechanical interface between the access control platform and the door assembly. Hardware selection follows door classification: a fire-rated door requires a fail-secure strike listed to UL 10C; an egress door paired with a maglock requires the maglock to fail-safe (de-energize to release) and the AHJ to confirm that electromagnetic locking is acceptable without positive latching; a formal entry door in a luxury estate context is best served by the Schlage L Series electrified mortise, which provides full mortise hardware with fail-safe or fail-secure field selection. The HES 1006 Series electric strike is the Restrepo standard for cylindrical and mortise applications: 12/24 VDC dual voltage, 480/240 milliamps, 2,500-pound static holding force, UL 10C fire-rated, UL 1034, UL 294, and ANSI/BHMA A156.31 Grade 1.

The HES 9600 Series is the surface-mounted strike for applications where recessed preparation is not available: 2,000-pound static holding force, 250/450 milliamps at 12/24 VDC, windstorm-rated, UL 1034, UL 294. The Securitron M38 is the interior maglock standard at 600 pounds holding force, 12 VDC at 500 milliamps or 24 VDC at 275 milliamps. The Securitron M62 and M62-OS are the weatherproof exterior maglock standard at 1,200 pounds holding force, 12 VDC at 250 milliamps or 24 VDC at 150 milliamps. The Adams Rite 8800 EL/MLR electric latch retraction exit device is the solution for fire-rated stairwell reentry doors where both latching and reentry are required: 24 VDC, 1.5-ampere inrush, 850 milliamps retraction, 370 milliamps maintained, listed to UL 294 and UL 305. The Adams Rite 7100 Series electric strike is specified for narrow-stile aluminum entry doors, paired with the Adams Rite 4500 or 4900 deadlatch. A suppression diode (1N4004 minimum) is installed at every strike and maglock terminal at the hardware — without exception — to suppress inductive kickback that can damage access controller output circuits.

Model	Voltage / Current	Holding Force	Listings
HES 1006 Strike	12/24 VDC; 480/240 mA	2,500 lb static	UL 10C, UL 1034, UL 294, A156.31 Gr.1
HES 9600 Surface	12/24 VDC; 250/450 mA	2,000 lb static	Windstorm, UL 1034, UL 294
Securitron M38	12 VDC 500 mA / 24 VDC 275 mA	600 lb	Interior; fail-safe
Securitron M62/M62-OS	12 VDC 250 mA / 24 VDC 150 mA	1,200 lb	Weatherproof; fail-safe
Adams Rite 8800 EL	24 VDC; 1.5A inrush; 370 mA hold	—	UL 294, UL 305
Adams Rite 7100	Per config	Per config	Narrow-stile aluminum; A156.31

Schlage L Series	12/24 VDC; 1.0A / 0.4A peak	Mortise body	UL 10C 3-hr; EL/EU selectable
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SPECIFICATION

SPECIFICATION — Schlage L Series electrified mortise

Voltage: 12 or 24 VDC auto-detecting (10.8 V min / 26.4 V max); DC only. Peak current: 1.0A at 12 VDC / 0.4A at 24 VDC. Fail mode: EL = fail-safe; EU = fail-secure — field-selectable via switch on lock case. Fire rating: UL 10C 3-hour; CAN/ULC-S104. Wiring: Allegion Connect Molex connector; compatible with Allegion electrified continuous hinges and EPT for concealed wiring. Preferred voltage: 24 VDC at 0.4A peak to allow multiple doors on one power supply circuit.

DO NOT

DO NOT — Install a strike or maglock without a diode

Every electric strike and every electromagnetic lock terminal receives a suppression diode — 1N4004 minimum rating — installed at the hardware terminal, not at the controller. Inductive kickback from a strike or maglock relay without a diode damages access controller output circuits over time, producing intermittent operation before complete failure. The diode is not optional, not an upgrade, and not installed only on 'sensitive' controllers. Every terminal, every job.

FIELD RULE

FIELD RULE — Maglock armature gap maximum 1/8 inch

Electromagnetic lock armature face-to-magnet gap must not exceed 1/8 inch at any point when the door is closed and the maglock is energized. Gap beyond 1/8 inch reduces holding force below the rated specification. Confirm door alignment, weatherstrip compression, and armature plate mounting before commissioning. Adjust door hardware until the gap is within tolerance. Document gap measurement on the commissioning record.

INSPECTION STANDARD

INSPECTION — Hardware listings at installation

Before any strike or maglock is installed, confirm the model matches the door schedule and that the hardware carries the required listings: UL 10C for fire-rated doors, UL 1034 for burglary-resistant applications, UL 294 for access control unit compliance, and ANSI/BHMA A156.31 Grade 1. Listing marks are visible on the installed hardware body. Photograph hardware labels before installation and file with the project record.



PART 3

Frame, Power & Rough-In

Sections 09–11 — door frame & hinge, power/PoE/battery, pre-door inspection

§ 09

Door Frame, Hinge & Hardware Coordination

FRAME DRIVES STRIKE SELECTION — CONFIRM AT FABRICATION

Frame material determines strike selection, and strike selection must be confirmed at door frame fabrication — not after the frame is hung. A hollow metal frame receives a standard ANSI 4-7/8-inch strike preparation for the HES 1006 or equivalent cylindrical/mortise strike. A narrow-stile aluminum frame requires the Adams Rite 7100 Series electric strike paired with the Adams Rite 4500 or 4900 deadlatch; the standard ANSI preparation does not fit a narrow-stile aluminum frame. A wood frame requires a reinforcement plate sized to the strike model; the plate dimensions are confirmed before the frame is built. Mortise preparation is confirmed and locked at the door schedule release — it is never field-cut after the frame is hung. Strike pocket dimensions, electrical knockout location, and conduit stub-up position are all resolved at the drawing stage and communicated to the frame fabricator before any steel is cut.

Power transfer from the frame to the door — required when a reader, DPS, or REX device is mounted on the door leaf rather than the frame — uses an electrified continuous hinge (Hager, Markar, or Allegion Connect series) or an electrified power transfer device (EPT). Coiled door cords are not the Restrepo default on luxury residential projects — they are visible, subject to wear, and architecturally incompatible with the finish level of luxury door hardware. Fire-rated assemblies require every component — door, frame, hinges, closer, latchware, and glazing — to be individually listed and labeled for fire door use per NFPA 80. Hold-open devices on fire-rated doors are permitted only if listed for fire door use and connected to the building fire alarm system, releasing automatically on alarm, smoke detector activation, or loss of power. Maglock armature seating requires door alignment and weatherstrip compression confirmed before mounting — the armature face-to-magnet gap must not exceed 1/8 inch when the door is closed and the maglock is energized.

FIELD RULE

FIELD RULE — Mortise prep confirmed before frame fabrication

The strike pocket preparation — including electrical knockout location and conduit stub-up position — is confirmed on the door schedule before frame fabrication begins. Any discrepancy between the door schedule and the frame shop drawing triggers a hold: the frame fabricator does not proceed until the schedule and drawing are reconciled and signed off by the architect. Field-cut strike pockets on hung frames are not permitted without a written change order from the architect confirming the field modification is acceptable.

BEST PRACTICE**BEST PRACTICE — Electrified continuous hinge for power transfer**

On luxury residential doors where a device is mounted on the door leaf, specify an electrified continuous hinge (Hager 780 Series, Markar EM Series, or Allegion Connect) or an Allegion EPT electrified power transfer device. These conceal the wiring path within the hinge barrel or door edge, producing a clean finish compatible with luxury door hardware. Confirm the conductor count needed — reader plus DPS plus REX plus lock — and specify the correct continuous hinge model for that conductor count before the door order ships.

INSPECTION STANDARD**INSPECTION — Fire-rated assembly component listings**

On every fire-rated door assembly, confirm before installation that every component carries an individual fire-door listing label: door, frame, hinges, closer, latchware, and glazing infill. A single unlisted component invalidates the assembly's fire rating. Hold the installation and escalate to the architect and AHJ for any component whose listing label is absent or illegible. Photograph all listing labels before the assembly is closed in.

NOTE**NOTE — Coiled door cords on residential projects**

Coiled door cords (power transfer cables looped at the hinge side of the door) provide a low-cost path for low-voltage conductors to the door leaf but are architecturally incompatible with luxury residential finish levels and are subject to mechanical wear at the flex point over the door's service life. The Restrepo default is an electrified continuous hinge or EPT device. Coiled cords require written direction from the architect or owner's rep acknowledging the aesthetic deviation and the service life limitation.

§ 10

Power Supply, PoE & Backup Battery

SIZE TO LOAD, CONFIRM AT CONTROLLER, TEST BEFORE HANDOFF

Power supply selection for access control hardware is a load calculation, not an estimation. The sizing method is: sum the peak current draw of all devices on the circuit — lock or strike, reader, REX, DPS — add a 20 percent safety factor, and select the next standard amperage tier: 2A, 4A, or 6A. Provide a dedicated fused circuit per opening for the cleanest fault isolation. The PDK Single io controller receives power via a 30-watt PoE+ injector at IEEE 802.3at Class 4 — no other PoE class is acceptable. The Brivo ACS6000 board receives 12 VDC only; 24 VDC on the board circuit is a destroyed board. Backup battery runtime is calculated on a 4-hour minimum basis consistent with NFPA 101 emergency lighting references and UL 294 Standby Power requirements. The Ah formula: total load in amps multiplied by backup hours required multiplied by 1.25 derating factor equals the minimum Ah rating. At 1.5 amperes total load over 4 hours with the 1.25 derating, the minimum Ah is 7.5 — specify an 8 Ah sealed lead-acid battery.

Wire gauge for strike and maglock runs is selected on a 5-percent maximum voltage drop basis. At 12 VDC and 0.5 amperes, 18 AWG is acceptable to approximately 100 feet; 16 AWG extends that to approximately 160 feet; 14 AWG extends to approximately 250 feet. At 24 VDC and 0.25 amperes, the distances roughly double. Reader wiring is 22/5 or 22/6 stranded for a 5-wire or 6-wire Wiegand connection plus LED indication. DPS wiring is 22/2. REX wiring is 18/4. The PDK UL 294 wire-run limit of 98.5 feet applies to every controller-to-device wire — use distributed Single io controllers if any run exceeds that limit. NEC Article 725 requires Class 2 and Class 3 circuits — readers, DPS, REX, access control signal circuits — to be physically separated from Class 1 line-voltage circuits unless the low-voltage circuits are reclassified and installed with Class 1 wiring methods per NEC 725.130. Shared raceways with line voltage are not permitted without reclassification documentation.

SPECIFICATION

SPECIFICATION — Wire gauge and conduit schedule

18 AWG: strike/maglock to approx. 100 ft at 12 VDC / 0.5A. 16 AWG: to approx. 160 ft. 14 AWG: to approx. 250 ft. Reader: 22/5 or 22/6 stranded (5-wire Wiegand plus LED). DPS: 22/2. REX: 18/4. Conduit: 3/4 in. EMT at exterior reader; 1/2 in. EMT at strike pocket; 3/4 to 1 in. EMT at controller homerun; 3/4 to 1 in. RMC at gate operator. NEC 725: Class 2/3 separated from Class 1 unless reclassified per 725.130.



FIELD RULE**FIELD RULE — Backup battery load test before owner handoff**

Before owner handoff, every backup battery is load-tested on battery-only power for a minimum of 30 minutes with all door hardware active. The test confirms the controller remains operational, all strikes and readers function, and the system does not alarm or fault during the test period. Battery runtime and test result are logged in the commissioning record. Any battery that fails to sustain the load for 30 minutes is replaced before the system is handed to the owner.

INSPECTION STANDARD**INSPECTION — Power supply sizing review**

At rough-in inspection, review the power supply sizing calculation for every controlled door. Confirm the peak load calculation accounts for all devices on the circuit: lock or strike at peak inrush, reader, REX, DPS. Confirm the 20 percent safety factor is applied. Confirm the selected supply amperage is at the next standard tier above the derated load. Confirm a dedicated fused circuit is provided per opening. Confirm the backup battery Ah rating is at or above the 4-hour formula result. Document the calculations in the project file.

BEST PRACTICE**BEST PRACTICE — Dedicated fused circuit per opening**

Provide one dedicated fused circuit per controlled opening — not a shared bus across multiple doors. A fault on a shared bus affects every door on that circuit simultaneously. A dedicated fused circuit isolates the fault to one opening, leaving the remainder of the system operational during diagnosis and repair. Label every fuse and breaker with the door reference from the door schedule at installation.

§ 11

Pre-Door Inspection — Rough-In Gate

SIGNED BEFORE DRYWALL — THE GATE IS A GATE

The pre-door rough-in inspection is the gate that separates framing, conduit, and rough electrical work from the drywall close. It is signed by the integrator and the general contractor before any drywall is installed at a controlled opening, and the signed gate is recorded in the project file. A controlled opening that does not pass this gate does not receive drywall until every item is resolved. The gate confirms that the door schedule entry is complete and signed — fire rating, egress classification, hardware mode, hardware model, frame preparation, power supply circuit, and controller location. The reader J-box is confirmed centered at the correct height, oversized for wire management, and fitted with a weatherproof gasket on any exterior or semi-exposed location. The conduit schedule is confirmed in place: 3/4-inch EMT at the exterior reader, 1/2-inch EMT at the strike pocket, 3/4 to 1-inch EMT at the controller homerun, and 3/4 to 1-inch rigid metal conduit at the gate operator.

Every conductor — reader, DPS, REX, and lock — is pulled, labeled, and slack-coiled in the J-box before drywall is closed. Wire that is not pulled before drywall closure is field-fished after the fact at significant cost and disruption to finished surfaces; on luxury residential projects this is not acceptable. The controller location is in an equipment closet with a plywood backboard, a 120 VAC outlet within 6 feet, adequate ventilation, and conditioned space — not in a mechanical room or an unconditioned crawlspace. The strike pocket preparation is verified before the frame is hung; wood frame reinforcement plates are installed. Reader mounting height is confirmed at the J-box center: 48 inches AFF is the industry standard for commercial applications; confirm any owner-requested residential height deviation in writing before rough-in. The inspection is signed, dated, and photographed. Any deficiency discovered at inspection must be corrected before the gate is signed.

INSPECTION STANDARD

INSPECTION — Pre-door rough-in gate checklist

Every controlled opening passes eight checks before drywall: Door schedule entry complete and signed. Reader J-box at confirmed height, oversized, weatherproof gasket on exterior. Conduit schedule confirmed — 3/4 in. EMT at reader, 1/2 in. at strike, 3/4–1 in. at controller, 3/4–1 in. RMC at gate operator. Strike pocket preparation verified before frame is hung; reinforcement plate installed. All conductors pulled, labeled, and slack-coiled — reader, DPS, REX, lock. Controller location confirmed: plywood backboard, 120 VAC within 6 ft, conditioned. Backup battery and power supply confirmed in place and connected. Gate signed by integrator and GC before drywall.

FIELD RULE**FIELD RULE — No drywall without a signed gate**

Drywall is not installed at any controlled opening until the pre-door rough-in gate is signed by the integrator and the GC and recorded in the project file. A GC who proceeds to drywall without the signed gate accepts responsibility for all destructive access costs required to correct deficiencies discovered after closure. The Restrepo PM confirms the gate is signed before releasing the drywall trade to work at any controlled opening.

DO NOT**DO NOT — Field-fish conductors after drywall closure**

Conductors that were not pulled and coiled before drywall closes are not field-fished through finished walls and ceilings on luxury residential projects without a signed change order from the owner's representative that explicitly acknowledges the risk of finished surface damage and accepts responsibility for any patch and paint costs. The correct resolution is to have the conductor present and coiled before drywall — the gate exists to enforce exactly that.

BEST PRACTICE**BEST PRACTICE — Controller location confirmed conditioned**

The access controller equipment location — whether a dedicated IT/AV equipment room, a mechanical room closet, or a built-in cabinet — is confirmed conditioned before rough-in. Backup batteries in unconditioned spaces fail prematurely in freeze-thaw cycles and at sustained elevated temperatures. Any controller location that is not confirmed conditioned at rough-in is flagged and resolved before the gate is signed.

PART 4

Commissioning & Closeout

Sections 12–13 — commissioning, owner handoff, QC, spares, AHJ package

§ 12

Commissioning & Owner Handoff

TEST EVERY CREDENTIAL, EVERY DOOR, BEFORE HANDOFF

Commissioning is the sequence that validates every decision made upstream in this manual — at the door classification stage, at the hardware order, at the rough-in gate, and at platform configuration. It is not a software walkthrough; it is a physical test of every door, every reader, every REX sensor, every backup battery, and every credential in the system. The credential commissioning protocol for PDK io and Brivo Onair requires: every user credential is issued in the platform, tested at every door in that user's access level, and revoked — then re-issued for delivery to the owner. No credential is handed to the owner without a confirmed test event log in the platform. Temporary installation credentials used during commissioning are tracked by name and removed from the platform at closeout before the system is considered commissioned.

The REX sensor walk-test protocol requires 3 minutes of settle time after mounting before the first test. The door releases on approach from the secured side without false triggers from adjacent foot traffic. Relay dwell time is confirmed sufficient for the door to fully open and the person to clear the threshold. Every fire-rated door's fail-mode is confirmed by a power-cycle test: remove power to the strike or maglock, confirm the door assumes the scheduled fail mode — fail-safe unlocking or fail-secure locking — and confirm no hardware conflicts. The Lutron CCI end-to-end test is performed on every integrated keypad: keypad button press triggers the HWI-CCO-8 output, the access controller logs an unlock event, and the door releases. Gate operator commissioning confirms limits are set, both entrapment protection means are functional, sensor fault disables automatic operation, and the pedestrian separation access point is operational. The delayed-egress timing is timed with a stopwatch: 15 seconds from application of force. Immediate release on simulated sprinkler actuation, heat detector, and power loss is confirmed. The owner administrator account is confirmed active with the owner's chosen credentials before any field credential is removed from the system.

FIELD RULE

FIELD RULE — All field credentials removed at closeout

Before the system is handed to the owner, every temporary installation credential — every card, fob, PIN code, and user profile created during commissioning and testing — is deleted from the access control platform. The deletion is confirmed with a screen capture of the empty installation credential list. The owner's administrator account is the only active account at handoff. No exceptions for convenience credentials or 'just in case' access left for the installer.



INSPECTION STANDARD**INSPECTION — Commissioning record sign-off**

The commissioning record documents: backup battery load test (30-minute minimum, result logged). REX walk-test per door (3-minute settle, dwell time, no false triggers). Fail-mode power-cycle test per door (mode confirmed against schedule). Credential test cycle per user (issued, tested, revoked, re-issued). Gate entrapment confirmation (both means, sensor fault test). Lutron CCI end-to-end test per integrated keypad. Delayed-egress timing and signage confirmed. Owner admin account active, field credentials removed. All items signed by integrator and Restrepo PM before owner walkthrough.

BEST PRACTICE**BEST PRACTICE — As-built door schedule at handoff**

The closeout package delivered to the owner includes the as-built door schedule with hardware model, fail mode, power supply, battery runtime, controller location, and wire-run length per door. The access level map shows which credentials access which doors. The credential register lists every credential issued and the owner's authorized users. The platform administrator login instructions are in writing. Spare credentials — owner's count plus 10 percent for cards and fobs — are counted, labeled with the project name, and delivered to the owner with a signed receipt.

NOTE**NOTE — Brivo Onsite for air-gapped installations**

On luxury estate projects where the owner or their security advisor specifies an air-gapped or low-latency access control operation, Brivo Onsite provides an on-premise server variant of the Brivo platform. Credential management, event logs, and access schedules are hosted locally rather than in the cloud. Onsite installations require a dedicated server with a static IP and an IT administrator for maintenance. Confirm the Onsite tier with the owner and architect before platform procurement — Onsite licensing and server hardware are not included in a standard Brivo ACS6000 installation budget.

§ 13

Access–Stage QC, Spares & Closeout

5% SPARE HARDWARE, LABELED — WARRANTY REGISTERED AT CLOSEOUT

Access-stage QC closes the loop on every decision made upstream in this manual. The 10-item QC gate is walked three times: at hardware install, at commissioning, and at owner walkthrough. It is the same checklist each time. Door classification confirmed in writing for every controlled opening. Fail-safe and fail-secure logic confirmed against NFPA 101 and NFPA 80. PoE injector or 12 VDC power supply confirmed for the controller model. Backup battery installed, charged, and load test logged. Every credential issued, tested, revoked, and re-issued on commissioning. REX walk-tested with 3-minute settle on every controlled door. UL 325 entrapment protection on every gate operator — both means UL-listed and model-compatible. Delayed-egress timing and signage verified before owner occupancy. Lutron CCI integration tested end-to-end on every integrated keypad. Owner administrator account active, every field credential removed.

Spare hardware at closeout is a minimum quantity, not a target. The Restrepo minimum is: one reader per platform type installed (PDK Touch io, Brivo reader model), one of each strike and maglock model installed, one backup battery per controller, and spare credentials at the owner's count plus 10 percent for cards and fobs. Hardware spares are at least 5 percent of the installed count per model, consistent with the cross-volume Restrepo standard. Spare hardware is labeled with the project name, install date, and hardware model, and filed in the closeout package. Warranty registration is submitted to every manufacturer whose hardware is installed on the project — PDK, Brivo, HES, Securitron, Adams Rite, Schlage, and LiftMaster — and the registration confirmation is filed in the closeout package. The AHJ package is assembled at closeout: door schedule, NFPA 80 component listings, UL 294 and UL 1034 documentation, UL 325 entrapment protection confirmation, and any delayed-egress AHJ written approvals. The owner walkthrough demonstrates the spare hardware archive, the platform administrator account, and the warranty documentation before the project is released.

FIELD RULE

FIELD RULE — Owner receives a signed spare inventory

At owner handoff, the spare hardware inventory is counted in front of the owner or their authorized representative, and both parties sign the inventory receipt. The signed receipt is filed in the project record. Spare credentials — cards and fobs — are sealed in a labeled envelope with the quantity, project name, and credential type noted on the outside. The owner is shown where the spare hardware is stored and how to reorder from each manufacturer.

INSPECTION STANDARD**INSPECTION — Closeout package completeness**

Closeout package confirms: as-built door schedule with hardware model, fail mode, power supply, battery runtime, controller location, and wire-run length per door. Access level map and credential register. Platform administrator login instructions. Spare hardware: one reader per platform type, one of each strike and maglock model, one battery per controller, credentials at owner count plus 10 percent. Warranty registration confirmations from every manufacturer. AHJ package: door schedule, NFPA 80 listings, UL 294/1034/325 documentation, delayed-egress approvals. Signed spare inventory receipt from owner.

BEST PRACTICE**BEST PRACTICE — Warranty registered within 30 days of commissioning**

Submit warranty registration to every hardware manufacturer within 30 days of commissioning closeout. PDK io, Brivo, HES, Securitron, Adams Rite, Schlage, and LiftMaster all require registration to activate warranty coverage. A warranty registration that is missing at the first service call becomes a project liability. File the registration confirmation with the project record and include a copy in the owner's closeout package.

NOTE**NOTE — AHJ package assembled at closeout**

The AHJ package is the documentation set that the authority having jurisdiction may request at any inspection after the project is complete. It includes the door schedule with fail mode and classification per door, NFPA 80 component listing labels or documentation for every fire-rated assembly, UL 294 and UL 1034 listing documentation for every access control unit and locking device, UL 325 entrapment protection confirmation for every gate operator, and written AHJ approval for any delayed-egress timing beyond 15 seconds. Assemble the AHJ package before owner handoff and retain a copy in the project file.

QC GATE

Verify Before Final Signoff

Same gate walked at hardware install, commissioning, and owner walkthrough.

- ☐ **VERIFY** Door classification confirmed in writing for every controlled opening
- ☐ **VERIFY** Fail-safe / fail-secure logic matches NFPA 101 and NFPA 80
- ☐ **VERIFY** PoE injector or 12 VDC supply confirmed for the controller model installed
- ☐ **VERIFY** Backup battery installed, charged, and 30-minute load test logged
- ☐ **VERIFY** Every credential issued, tested at each door, revoked, and re-issued on commissioning
- ☐ **VERIFY** REX walk-tested with 3-minute settle on every controlled door
- ☐ **VERIFY** UL 325 entrapment protection on every gate operator — both means listed and model-compatible
- ☐ **VERIFY** Delayed-egress timing and signage verified before owner occupancy
- ☐ **VERIFY** Lutron CCI integration tested end-to-end on every integrated keypad
- ☐ **VERIFY** Owner administrator account active; every field credential removed from the platform

SPECIFICATION SHEET

Hardware Reference — Key Models

Hard specifications for every model in scope. Verify against current manufacturer datasheet at time of order.

Model	Voltage / Power	Key Spec	Listings
PDK Single io (1DPOE)	30W PoE+ (IEEE 802.3at Cl.4)	1.5A battery-backed bus; UL 294 wire limit 98.5 ft	UL 294
PDK Red Cloud Node (RCNEW)	12–24 VDC; 14 VDC 2A onboard	8 Ah backup; AES-128; 1-mile WiMAC	UL 294
PDK Eight io (8DE/8DW)	12 VDC from Altronix SMP10	10A bus; 5.0 Ah backup; no PoE; 98.5 ft wire limit	UL 294
Brivo ACS6000	12 VDC ONLY (24V kills board)	Chassis-to-xfmr 100 ft; door board-to-strike 500 ft; exp. chassis 1,500 ft	UL 294
LiftMaster RSW12UL	12 VDC motor	16 ft / 1,000 lb swing; 147 cycles / 63 days battery; myQ; solar-ready	UL 325, UL 991
LiftMaster RSL12UL	12 VDC motor	25 ft / 800 lb slide; myQ integrated; battery backup; solar-ready	UL 325
LiftMaster CSW24UL	24 VDC motor	18 ft / 1,600 lb swing; million-cycle rated; myQ	UL 325
HES 1006 Strike	12/24 VDC; 480/240 mA	2,500 lb static / 350 ft-lb dynamic; fail-secure std.	UL 10C, UL 1034, UL 294, A156.31 Gr.1
HES 9600 Surface Strike	12/24 VDC; 250/450 mA	2,000 lb static / 120 ft-lb dynamic; windstorm-rated	UL 1034, UL 294, A156.31 Gr.1
Securitron M38	12 VDC 500 mA / 24 VDC 275 mA	600 lb holding; interior; fail-safe by design	UL Listed
Securitron M62/M62-OS	12 VDC 250 mA / 24 VDC 150 mA	1,200 lb holding; weatherproof; instant-release circuit	UL Listed
Adams Rite 8800 EL/MLR	24 VDC; 1.5A inrush	850 mA retraction; 370 mA maintained; electric latch retraction exit device	UL 294, UL 305
Adams Rite 7100 Strike	Per config	Narrow-stile aluminum; pairs with AR 4500/4900 deadlatch	A156.31 Gr.1
Schlage L Series EL/EU	12/24 VDC auto; 1.0A/0.4A peak	EL fail-safe / EU fail-secure; Allegion Connect hinge or EPT	UL 10C 3-hr; UL 294

Lutron HWI-CCI-8	15 VDC from keypad link	8 dry-contact inputs; 4,000 ft max from processor	Lutron certified
Lutron HWI-CCO-8	15 VDC from keypad link	8 contact outputs; momentary or maintained; not a dimmer	Lutron certified

CITATIONS & FURTHER READING

Standards & Manufacturer References

NFPA 101 — Life Safety Code (Sections 7.2, 7.2.1.5, 7.2.1.6.1)

Means of egress, free egress, and delayed-egress electrical locking system requirements (15-sec standard; 30-sec by AHJ written approval; fail-safe on power loss; sprinkler/alarm triggers).

<https://www.nfpa.org/codes-and-standards/nfpa-101-standard-development/101>

NFPA 80 — Fire Doors & Other Opening Protectives

Positive latching required on all fire-rated swinging doors; fail-safe strike voids fire rating; hold-open release on alarm; all components individually listed and labeled.

<https://www.nfpa.org/codes-and-standards/nfpa-80-standard-development/80>

ANSI/BHMA A156.23 — Electromagnetic Locks

Standard for maglocks including fire-door compliance requirements and operational tests.

<https://buildershardware.com/ANSI-BHMA-Standards/Hardware-Highlights/A15623-2017-Electromagnetic-Locks>

ANSI/BHMA A156.24 — Delayed Egress Locking Systems

A156.24-2022: functional, cycle, fail-safe and overload test criteria for delayed-egress hardware.

<https://buildershardware.com/ANSI-BHMA-Standards/Hardware-Highlights/A15624-2022-Delayed-Egress-Locking-Systems>

ANSI/BHMA A156.25 — Electrified Locking Systems (2023)

Covers locking devices, input devices, controlling devices, and power supplies — cyclical, security, operational and environmental tests.

<http://buildershardware.com/ANSI-BHMA-Standards/Hardware-Highlights/A15625-2023-Electrified-Locking-Systems>

UL Solutions — UL 294 vs. UL 1034 Proper Application

ALVY/FWAX (UL 294) vs. CVXS/CVXY/CVYT (UL 1034); 2024 IBC clarification; which hardware requires which listing for access-controlled openings.

<https://www.ul.com/news/proper-application-ul-standards-controlled-or-delayed-egress-locking-devices-ul-294-1034>

UL 325 — Gate, Door & Window Operators (7th Edition, August 1, 2018)

Two independent means of entrapment protection per direction of travel; monitored external sensors; ASTM F2200 gate construction standard.

<https://www.liftmaster.com/builder-knowledge-center/UL-guidelines>

NEC Article 725 — Class 2 and Class 3 Remote-Control Circuits

Class 2/3 circuit separation from Class 1; reclassification option per NEC 725.130; reader, DPS, REX, and access control signal circuit requirements.

https://winnieindustries.com/resources/knowledge_center/frequently-asked-questions/power_class/

PDK io — Single io Door Controller Installation Manual

Full wiring diagrams, PoE requirements (30W IEEE 802.3at), wire-run limit 98.5 ft, fail-safe/fail-secure wiring, UL 294 compliance notices, REX and DPS wiring.

<https://support.pdk.io/hc/en-us/articles/360040984314-Single-io-Door-Controller>

PDK io — Red Cloud Node (RCNEW) User Manual

System hub; 14 VDC 2A onboard supply; 8 Ah battery; WiMAC mesh; AES-128; 1-mile wireless. UL 294 levels: Destructive Attack II, Line Security II, Endurance IV, Standby Power II.

<https://support.pdk.io/hc/en-us/articles/5696612588951-Red-Cloud-Node-Ethernet-Wireless-User-Manual>

PDK io — Eight io Door Controller

Up to 8 doors; Altronix SMP10 required; 10A bus; 5.0 Ah backup; no PoE; 98.5 ft wire limit.

<https://support.pdk.io/hc/en-us/articles/360041089374-Eight-io-Door-Controller>

Brivo ACS6000 Control Panel Installation Manual

12 VDC board power; chassis-to-transformer max 100 ft; door board max 500 ft to strike; expansion chassis 1,500 ft; UL 294 compliance levels; fail-secure warning.

<https://www.brivo.com/resource-library/brivo-acs6000-control-panel-installation-manual/>

LiftMaster — UL 325 Compliance Guide

UL 325 7th Edition requirements; monitored photo eyes and edge sensors; two independent entrapment protection means; IBC adoption references.

<https://www.liftmaster.com/builder-knowledge-center/UL-guidelines>

Intrinsic Dev — Official myQ Module for Crestron Home

Licensed driver (June 2024); up to 12 myQ-connected devices; active internet required.

<https://www.intrinsicdev.com/downloads/official-myq-module-for-crestron/>

Crestron Home OS — Security and Door Locks Compatibility

Full model list of Yale Pro 2, Yale Assure, Yale nexTouch, Baldwin Boulder/Soho, Kwikset SmartCode locks with infiNET EX; third-party driver type (OS 4.5+).

<https://docs.crestron.com/en-us/8525/Content/CP4R/Appendix/Works-With-Crestron-Home/Security-and-Locks.htm>

HES 1006 Series Electric Strike — Spec Sheet

Full specs: 2,500 lb static / 350 ft-lb dynamic; 12/24 VDC; 480/240 mA; UL 10C; UL 294; UL 1034; ANSI/BHMA A156.31 Grade 1.

<https://www.hesinnovations.com/en/products/electric-strikes/1006-series>

HES 9600 Series Surface Mounted Electric Strike — Spec Sheet

Surface-mount; 2,000 lb static; 12/24 VDC; 250/450 mA; windstorm-rated; UL 1034; UL 294.

<https://www.hesinnovations.com/en/products/electric-strikes/9600-series>

Securitron M62 / M62-OS Magnalock

1,200 lb holding force; 250/150 mA at 12/24 VDC; weatherproof; patented instant-release circuit.

<https://www.securitron.com/en/products/electromagnetic-locks/m62>



Adams Rite — 8800 Series EL/MLR Exit Device Options

Electric latch retraction; fail-secure default; 850 mA retraction / 370 mA maintained at 24 VDC; UL 294; UL 305.

<https://www.adamsrite.com/en/products/exit-devices/options-exitdevices>

Schlage L Series Electrified Mortise — Product Catalog

12/24 VDC auto-detecting; 1.0A/0.4A peak; EL fail-safe / EU fail-secure; UL 10C 3-hour; Allegion Connect electrified hinge and EPT compatibility.

<https://commercial.schlage.com/en/products/electrified-locks/l-series-electrified-mortise-locks.html>

Lutron — Contact Closure Interfaces (366-963h)

HWI-CCI-8 and HWI-CCO-8 full specifications; wiring tables; keypad link cabling; 4,000 ft max distance; integration for driveway sensors, security systems, and gate control.

https://assets.lutron.com/a/documents/366-963h_components_contact-closure-interfaces.pdf

SDC Security — Wire Gauge Size and Distance Chart

Industry-standard voltage drop reference; 12 VDC and 24 VDC; AWG by distance and load; 5 percent maximum voltage drop basis.

<https://sdcsecurity.com/docs/SDC-Wire-Gauge-Size-Distance-chart.pdf>

iDigHardware — Electric Strikes on Fire Doors (NFPA 80 Analysis)

Fail-secure required on fire-rated doors; fail-safe strike voids positive latching; stairwell reentry analysis; electric latch retraction as the compliant solution.

<https://idighardware.com/2025/09/decoded-electric-strikes-on-fire-doors/>

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